Weather and Camping in Ontario Parks

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Climate and weather have a major influence over seasonality in nature-based tourism by determining the availability and quality of certain outdoor recreational activities (Butler, 2001). Climate and weather act as central motivators involved in the travel decisions of tourists (Mintel International Group, 1991; Kozak, 2002). Climate as an attraction is also an integral component considered in destination choice among tourists (Lohmann & Kaim, 1999; Hamilton & Lau, 2005; Gössling et al. 2006). Due to the relationship between climate, weather and outdoor recreation, climate change is expected to have a direct impact on park visitation and camper decision-making (Jones & Scott, 2006a; 2006b). This study contributes to the understanding of weather sensitivity for different tourism segments across varying climate zones world-wide which can contribute to more informed park tourism planning and climate change adaptation in Ontario. Using a survey-based approach, this study identified and compared the stated weather preferences and weather related decision-making of campers from two different provincial parks in Ontario. The two parks selected as case studies, based on differing park characteristics and perceived climatic requirements, were Pinery and Grundy Lake.

Statistically significant differences (at the 95% confidence level) were observed in stated weather preferences and weather related decision-making, based on differences in respondent characteristics. Most notably, activity participation, length of planned stay and age of the respondent had the most significant and widespread effect on weather preferences and camper decision-making. Temperature preferences between the two parks were strikingly similar. However, differences in weather related decision-making were statistically significant showing campers at Pinery to be more sensitive to weather than those at Grundy Lake. Overall, this study suggests that parks which are more beach-oriented, closer to tourism generating areas and are characterised by visitors with shorter than average lengths of stay, are likely to be the most sensitive to weather variability. As such, it will be most important for parks that rely on similar tourism generating markets and share similar park characteristics as Pinery, to place a greater planning emphasis on climate change adaptation, as these parks are likely to be most affected by the impact of climate change on park visitation in Ontario.

Climatic warming was not perceived by campers as a major threat to park visitation in Ontario. Instead, heavy rain, strong winds and unacceptably cool temperatures were the most influential weather variables in relation to camper decision-making. In response to the perceived threat of heavy rain and strong winds to camping in Ontario, and in association with projected increases pertaining to the frequency and intensity of these weather events under climate change, a number of recommendations have been made, which could be implemented by Ontario Parks in an effort to reduce camper vulnerability to extreme weather and improve overall trip satisfaction.

Keywords: Weather Preferences; Camping; Parks; Nature-based Tourism; Tourist Decision-making; Climate Change

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Dedication

This thesis is dedicated to my wife Jennifer. Thank you for all your love, support and encouragement along the way. Thank you for blessing me with a family and our new baby girl Sarah. I hope that my pursuit of higher education helps us to build and nurture a loving and supportive family in the Lord.

Table of Contents

List of Figures

List of Tables

Chapter 1 – Introduction

1.1 Study Context

Camping as an outdoor recreational activity is classed as a form of nature-based tourism. By definition, nature-based tourism is undertaken in natural settings where both the recreational activity and visitor experience depend on and are enhanced by the natural environment (Eagles et al. 2002). Nature-based tourism is a major component of Canada's tourism industry and provincial parks represent a significant resource for this type of tourism (Eagles, 2003). According to the Ontario Ministry of Natural Resources (OMNR, 2010), 9.4 million visitor days were recorded within Ontario's Provincial Parks in 2009. In contrast, there were 4.8 million camper nights recorded which would suggest that approximately 51% of Ontario Park visitors are campers (OMNR, 2010).

The position that climate was one of the more stable properties of tourism destinations was once held among tourism scholars within the academic community (Abegg et al. 1997; see Moreno & Amelung, 2009). Based on this misconception, it was therefore thought that climate did not need to be considered when trying to understand long-term trends in tourism supply and demand. This position has been more recently abandoned given the increasing evidence that the global climate is changing (Moreno & Amelung, 2009). The relationship between climate and tourist motivations has been assessed in a number of different studies, within which climate has been found to be one of the most important factors to be considered in tourist decision-making (Lohmann & Kaim, 1999; Morgan et al. 2000; Maddison, 2001; Kozak, 2002; Lise & Tol, 2002; Gomez-Martin, 2005; Hamilton, 2005; Hamilton & Lau, 2005; Gössling et al. 2006; Scott et al. 2008a).

The influence of climate over the availability of physical resources and the requirements for certain outdoor activities has contributed to the climatic sensitivity of park visitation in Ontario (Jones & Scott, 2006a). According to Butler's (2001) definition of "natural seasonality", climate has also been found to directly influence the length and quality of recreation seasons. The interaction between climate and seasonality for recreation is such that it determines when certain outdoor activities can take place and also influences the level of satisfaction associated with the recreation experience (Butler, 2001). Due to the relationship between park visitation and climate, a changing climate can therefore be expected to induce changes in the length and quality of park operating seasons, which could have considerable implications for park management and visitation (Jones & Scott, 2006a). It is understood that the relationship between climate and tourism varies in nature depending on the type of activity being assessed, especially seeing that different tourism segments have been found to be associated with different climatic requirements (Mieczkowski, 1985; de Freitas et al., 2008; Scott et al. 2008a; Rutty & Scott, 2010). As a result, it is important that ideal and unacceptable temperatures for park visitation be defined in order that our understanding of how campers respond to certain weather conditions and the implications for the impact of climate change on park tourism improves.

The study of preferred climates and the development of climate indexes for tourism have been identified by de Freitas et al. (2008) as being important research endeavours and as having numerous applications to the tourism industry. Due to the relationship between tourism and climate, the assessment of climate suitability is important for use in tourist decision-making and tourism planning (de Freitas et al. 2008). Understanding the relationship between climate and tourism also allows for the implementation of models in an effort to predict tourist flows and international tourism demand (de Freitas et al. 2008). Indentifying preferred climates for tourism and developing applicable climate indexes also enables the more thorough study of the implications of global climate change on the climate conditions of destinations as well as the related competitive advantages between destinations (Scott et al. 2004; de Freitas et al. 2008).

The development of a universal climate index with application to various tourism segments worldwide has been identified as being conceptually unsound (Scott et al. 2008a; de Freitas et al. 2008). It has been argued that climate indexes need to the tailored specifically to the tourism activities which they are trying to assess (Scott el al. 2008; de Freitas et al. 2008). More recently, the focus has shifted towards the need to validate each tourism climate index against the actual stated preferences of tourists in the different tourism contexts for which the index was designed (Scott el al. 2008; de Freitas et al. 2008). It therefore becomes increasingly important to determine the importance campers assign to different climatic variables, to define unacceptable and ideal weather conditions for camping, as well as to further understand how campers will respond to certain weather conditions. These lines of inquiry are critical to the development of climate index for park tourism (CIPT).

According to the Intergovernmental Panel on Climate Change (IPCC), it has been concluded (at the 90% confidence level) that the net effect of increased greenhouse gas (GHG) concentrations, resulting from anthropogenic activities, has resulted in a rise in global average temperatures (IPCC, 2007a). Eleven of the warmest years found in the instrumental record of global surface temperature were recorded to have occurred during the period of 1995 to 2006 (IPCC, 2007a). By the end of the 21st century, a warming of between 1.7 to 4.4˚C is expected for global annual mean surface air temperatures, based on an A1B SRES emissions scenario (Meehl et al. 2007). It is the objective of the United Nations Framework Convention on Climate Change (UNFCCC) to avoid dangerous warming. Temperature increases beyond 2˚C have been classified as "dangerous warming" by the scientific community and it has been suggested (within the 90% confidence level) that such warming will cause an increase in the net economic costs or a decline in the net economic benefits of economies associated with climate-sensitive resources (IPCC, 2007b).

Among the many stakeholders in the tourism industry, it has been recognised that tourists have the greatest capacity to adapt to the impacts of climate change (Scott et al. 2008b). This comparative advantage is derived from their ability to avoid undesirable climatic conditions by simply altering the time of their trip or by avoiding a specific destination entirely (Scott et al. 2008b). The link between tourism and climate change has recently received considerable attention within the academic community (see Scott et al. 2005b; Scott & Becken, 2010). The claim has arisen that climate change may push temperatures beyond the threshold for human comfort and as a result, certain regions may become undesirable for tourism, especially during the peak summer seasons (Agnew & Viner, 2001; Maddison, 2001; Hamilton et al. 2005; Amelung & Viner, 2006; Perry 2006). It has been suggested that as a result of the changing climate, summer visitation may decline in regions where temperatures become uncomfortable, with tourist demand moving towards the existing shoulder seasons, and travel patterns shifting pole ward to cooler, more northern destinations (Alcamo et al. 2007; Wilbanks et al. 2007). This study intends to determine whether or not these same concerns can be applied to the park tourism context, with a specific focus on the Ontario parks. Therefore, this study will answer the following research question: will temperatures during the summer months projected under climate change rise to levels which may be perceived as being “too hot” for camping in Ontario parks?

Lemieux and Scott (2005) presented the impacts of climate change on the six different park regions of Ontario, looking specifically at increases in temperature and precipitation. The two park regions relevant to this study are the central and southwest park regions. For both the central and southwest park regions, Lemieux and Scott (2005) reported increases in annual temperatures ranging from +1°C to +10°C as well as changes to annual precipitation ranging from -3% to +30% throughout the 21st century. Using the figures reported by Lemieux and Scott (2005) as parameters and applying them to the results of this study, it will become possible to answer the question of whether or not temperatures during the summer months projected under climate change will rise to levels which may be perceived as being “too hot” for camping in Ontario parks.

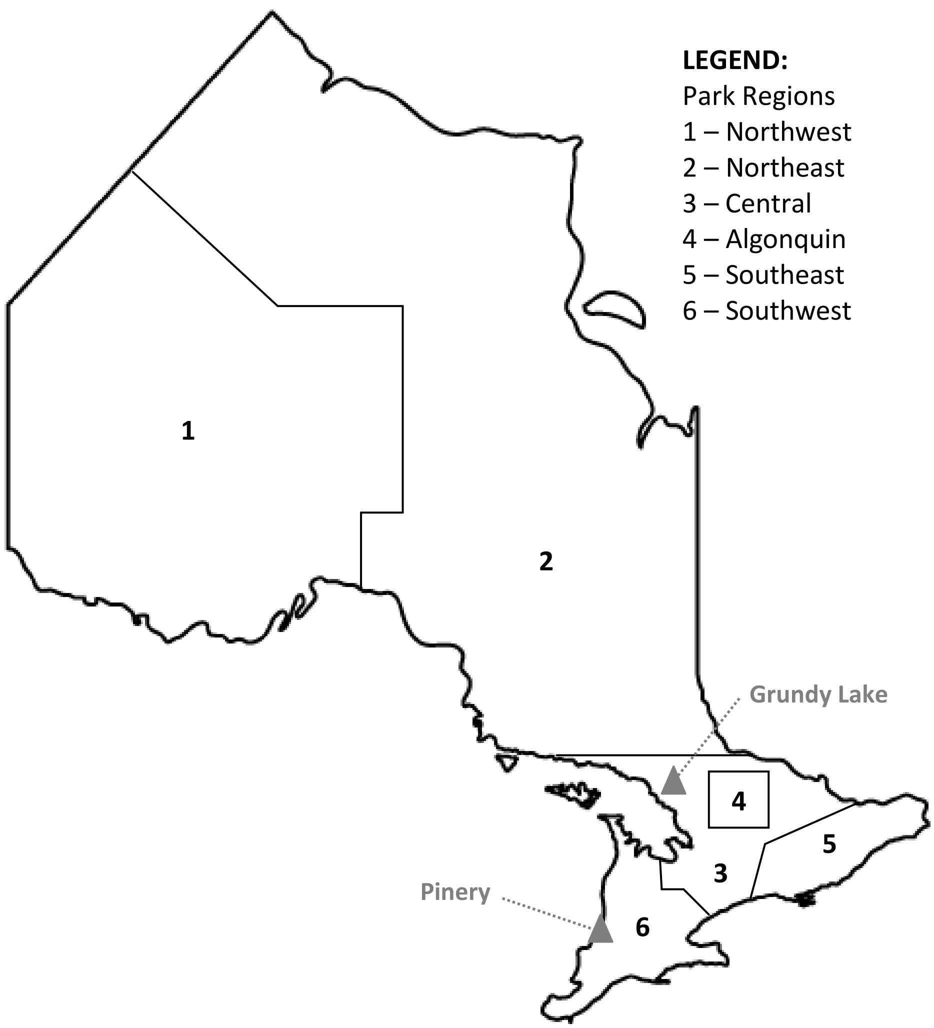
In an assessment of the impacts of climate change on park visitation in Ontario, Jones and Scott (2006a) projected substantial increases in annual park visitation for the central and southwest park regions of Ontario throughout the 21st century. The parks selected by Jones and Scott (2006a) to represent the central (Killbear) and southwest (Pinery) regions, were both projected to demonstrate considerable increases in park visitation during the peak season between July and August, under both emission scenarios for the 2050s and on to the 2080s. The current study intends to test and validate these claims using a preferred climate preferences approach to determine how increased warming in the summer months will affect park visitation. By identifying what campers perceive to be ideal and unacceptable temperatures for camping in the summer months, it will become possible to cross reference these stated preferences with the projected temperature increases projected used by Jones and Scott (2006a). This analysis will determine if at any time temperatures are projected to rise to levels above the stated temperature thresholds for camping, which could result in a decline in park visitation and call into question the previously projected increases to park visitation during the summer months for these two park regions.

Progress has been made in the field of climate and tourism research, specifically in regard to the climate criteria tourists use to make their travel decisions as well as the ideal climate conditions preferred by tourists (Gomez-Martin, 2004; Scott et al. 2008a; de Freitas et al. 2008; Moreno et al. 2009). However, research dedicated to identifying what tourists perceive to be "unacceptably hot" for particular destinations or tourism segments remains extremely limited (Rutty & Scott, 2010). Future research into the study of preferred climates and climatic thresholds for tourism have been identified as an important area of future research in order to enable more accurate projections and informed planning in relation to the impacts of climate change on tourism supply and demand (Perry, 2006; Gössling et al. 2006; Scott et al. 2008a; Scott et al. 2008b; Moreno & Amelung, 2009). Future studies aimed at understanding how visitors will respond to certain weather conditions has also been identified as an area of research in critical need of further assessment (Moreno & Amelung, 2009). This study is the first of its kind within the existing literature to use an *in-situ*, survey-based approach to determine stated weather preferences for the camping segment of park tourism. It also goes further than any other study in an attempt to understand the intended responses of visitors to unfavourable weather conditions, looking not only at which weather elements have the greatest influence over camper decision-making, but also looking at key behavioural thresholds for weather variables such as temperature, rain and wind.

A number of the more recent attempts to identify climate preferences for different tourism segments world-wide have employed an *ex-situ*, survey-based approach, with a narrower sample of primarily university students (de Freitas et al. 2008; Scott et al. 2008a; Rutty & Scott, 2010). Although the advantages associated with collecting data *ex-situ* rather than *in-situ* have been recognised (limitation of bias caused by prevailing weather conditions), the authors acknowledge that university students alone were not entirely representative of the specific tourism market for which they were trying to identify preferred climates. In an effort to overcome this sampling limitation, Moreno (2010) conducted an *ex-situ* stated climate preferences study which surveyed tourists travelling to the Mediterranean at airports in Belgium and Holland. In order to most accurately represent the camper market segment of park tourism in the central and southwest regions of Ontario, it was deemed appropriate to conduct the survey research directly within the two parks selected as case studies. This method will also allow the researcher to present reliable figures in regard to the preferred climates for this type of park visitation as well as the subsequent weather based decision-making of campers in these two parks.

In an effort to capture the different types of park tourism in the regions of southern and central Ontario, two provincial parks were selected as case studies for this study, based of varying park characteristics and perceived climatic requirements. Figure 1.1 displays the six park regions in Ontario, as defined by the Ontario Ministry of Natural Resources (OMNR) and Ontario Parks; it also identifies the location of each study park within their respective park regions. Pinery Provincial Park was selected to be representative of the south-western park region, and was classified as a Great Lakes-Coastal park. Grundy Lake Provincial Park was chosen to be representative of the central park region (now referred to as the near north by Ontario Parks, 2010), and was classified as an Inland-Canadian Shield park.

Figure 1.1 – Map of Ontario: Park regions and study parks



It is hypothesised that due to the different nature of these two parks, weather preferences and weather related decision-making would vary from one park to another. As a costal park, Pinery is a more beach-oriented park where swimming and other beach activities are predominate. On the other hand, Grundy Lake is set further in-land and is more associated with activities such as fishing, canoeing and kayaking. It is expected that the different climatic requirements associated with the main activities of these two parks, as well as the different natural environments themselves, will in turn be associated with different stated weather preferences as well as different weather-related behavioural thresholds associated with visitation to each park. By identifying these differences and endeavouring to explain their presence based on the corresponding differences found between the different user types visiting each park, this study will be able offer suggestions towards the weather sensitivity of different types of parks in Ontario.

1.2 Study Goal and Objectives

The goal of this study is to identify and compare stated weather preferences and weather-related behavioural thresholds for summer camping in Ontario parks. Using a survey-based approach, this study sets out to indentify the importance that campers assign to different weather aspects in relation to overall trip satisfaction, to define unacceptable and ideal temperature ranges and to assess camper decision-making for a series of different weather conditions (temperature, rain and wind).

In order to realise the goal of this study, 5 objectives guided this research:

1. To explore the relative importance of different weather aspects on camper satisfaction and determine if these preferences vary across different user types and between parks.
2. To identify temperature preferences for camping and assess whether these preferences vary across different user types and between parks.
3. To explore camper decision-making for different weather conditions (temperature, rain and wind) and determine if weather related decision-making varies across different user types and between parks.

4. To apply the stated temperature preferences from this study to previous climate change projections for each study park, in order to assess the potential risks and opportunities associated with climate change for park visitation in Ontario.
5. To assess the feasibility of a climate index for park tourism (CIPT) and offer insights which could lead towards its development.

Chapter 2 – Literature Review

2.1 – Introduction

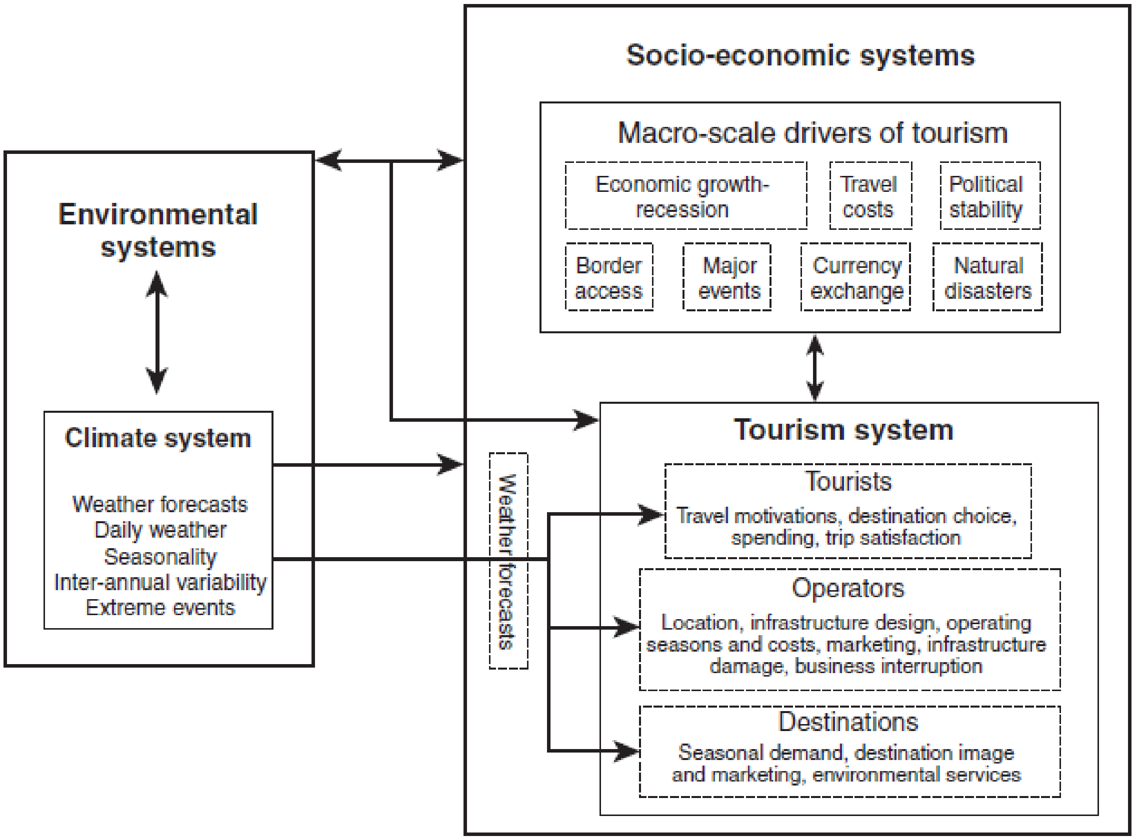
The major areas of research which this thesis draws upon are: climate preferences for tourism; the development of climate indices for tourism; tourist decision-making, especially as it related to weather and climate; as well as climate change and tourism demand. The literature review will begin by presenting a brief overview of the field of study referred to by de Freitas et al. (2008) as "tourism climatology", which itself contains the majority of the research this literature review will focus on. This chapter will then examine the relationship between climate and tourist decision-making. Based on the summary by Scott et al. (2008a), the chapter will go on to discuss three distinct research approaches for identifying preferred climates for tourism. Next, the chapter will discuss the multi-faceted nature of the tourism climate resource and review the subsequent development of tourism climate indices. Following this, the chapter will proceed to examine studies which have used tourism climate indices to assess the impact of climate change on tourism. It was also deemed necessary to review the available literature that has examined the relationship between weather and climate with park visitation in Ontario. Based on the relationship that has been established between weather, climate and park visitation, consideration has also been given to the implications that climate change may have for park visitation in Ontario. In conclusion, this chapter reviews and discusses knowledge gaps within the existing literature surrounding the study of climate preferences for tourism, tourist decision-making and the impact of climate change on tourism demand.

2.2 – Tourism Climatology

Tourism climatology refers to the study of climate and tourism in their broadest sense. Climate involves an understanding of weather in that climate is defined by the IPCC (2007a) as the average weather for a specific location, measured over a period of time (usually 30 years), being most commonly described using weather variables such as temperature, precipitation and wind. The term weather refers to the condition of the atmosphere at any given time and place (de Freitas, 2003). Tourism is concerned with recreation as a tourism activity. According to the United Nations World Tourism Organization (WTO, 1995), is defined as an activity that involves people "traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes" (p. 14). Recreation, on the other hand, is defined by Yukic (1970) as “an act or experience, selected by the individual during his leisure time, to meet a personal want or desire, primarily for his own satisfaction” (p. 5). After considering the close relationship evident when looking at the pairing of these four terms, it was conferred by de Freitas (2003) that tourism climatology can therefore be broadly defined as “the study of the interrelationships of tourism and recreation with climate and weather” (p. 46). Furthermore, weather and climate have been identified as two of the critical elements which make the natural resource-base for a tourism or recreation destination (de Freitas, 2003). According to Hibbs (1966; see de Freitas, 2003), climate and weather are recreational resources exploited by tourism which, at various times and locations, can be classified along a spectrum ranging from unfavourable to favourable.

Figure 2.1 displays a conceptual framework for understanding the climate-tourism interface as part of larger environmental and socio-economic systems (Scott et al. 2012). The climate system is part of the larger environmental system, whereas, the tourism system is part of the larger socio-economic system. However, as the figure displays there are point of interaction where a relationship exists between the climate system and the tourism system. The focus of this study is particularly interested in two main aspects of the climate system and their interactions with two sections of the tourism system. In regard to weather preferences for camping in Ontario parks, this study can be identified with daily weather within the climate system and tourists within the tourism system. In reference to weather related decision-making, this study identifies with extreme weather within the climate system and tourists as well as operators with the tourism system. Extreme weather relates to tourists in regard to camper vulnerability within this study and to operators with respect to risk management within Ontario parks.

Figure 2.1 – The Climate-Tourism Interface



Source: Scott et al. (2012, p. 56)

It has been recognised that tourists experience and therefore respond to, the integrated effects of the atmospheric environment (Mieczkowski, 1985; de Freitas, 2003). There has also been a very strong recognition that our understanding of tourist perceptions of climate still remains very limited (de Freitas, 2003; Scott et al. 2004; Bigano et al. 2006; Gomez-Martin, 2006; Gössling et al. 2006; Scott et al. 2008a). Most of the early studies of tourism climate preferences, involving tourism climate indices (Mieczkowski, 1985; Harlfinger, 1991) or climate suitability assessments (Crowe et al. 1973; Gates, 1975; Yapp & McDonald, 1978; Besancenot et al. 1978) were based on the opinions of identified experts within academia and were reliant on subjective criteria of the researchers themselves, not having been verified against actual tourist perceptions (de Freitas, 2003). It was recommended by de Freitas (2003) that future research in the field of tourism climatology should involve more field studies and the examination of observational data in order to determine more accurately the actual responses, perceptions, needs, reactions and expectations of both tourists and recreationists (de Freitas, 2003).

Specific applications of research in the field of tourism climatology were identified by de Freitas (2003). The study of tourism and climate can also develop a greater understanding of how weather and climate affect the on-site behaviour of tourists so that businesses can be more prepared to meet tourist demand and adapt to external pressures associated with certain recreational activities (de Freitas, 2003). Research in the field of tourism climatology also has application for impact assessments looking at opportunities and threats for tourists and tourism destinations associated with climate change (de Freitas, 2003). It has been recognised that the relationship between weather and recreation is not universal for all forms of tourism as certain activities have different climatic requirements, making it essential to examine each tourism segment individually (Mieczkowski, 1985; de Freitas et al. 2008; Scott et al. 2008a). It has also been found that the application of tourism climate indices that were not specifically designed for the tourism segment for which they are being employed, have resulted in inaccurate results when attempting to project the impacts of climate change on tourism climate suitability and the associated fluctuations in tourism demand (Moreno & Amelung, 2009).

Within the field of tourism and climate research, many studies have attempted to identify the most favourable or optimal climate conditions of tourism in general, or more specifically for one particular tourism segment, such as beach tourism (Crowe et al. 1973; Besancenot et al. 1978; Mieczkowski, 1985; de Freitas, 1990; Harlfinger, 1991; Becker, 1998; Morgan et al. 2000; Maddison, 2001; Lise & Tol, 2002; Hamilton et al. 2005; Bigano et al. 2006; Scott et al. 2008a; Rutty & Scott, 2010). Other studies have made an effort to assess the suitability of climate for tourism in an attempt to provide a decision-making tool for both tourists and tourism operators (Mieczkowski 1985, Besancenot 1991, Harlfinger 1991, Becker 2000, Morgan et al. 2000; de Freitas et al. 2008). A number of studies have attempted to predict tourist demand and international tourism flows by inputting climate data into statistical models (Maddison, 2001; Lise & Tol, 2002; Hamilton et al. 2005; Bigano et al. 2006; Amelung et al. 2007; Hamilton & Tol, 2007). Even more recently, a growing number of studies have examined the impact that global climate change could have on the quality of climate conditions at certain destinations and the implications that these changes will have on the competitive relationships among destinations (Scott et al. 2004; Amelung & Viner, 2006; Yu et al. 2009b, 2009b; Moreno & Amelung, 2009; Hein et al. 2009; Perch-Nielsen et al. 2010).

2.3 – Climate, Tourist Satisfaction and Tourism Demand

Understanding that recreation is a voluntary activity undertaken for personal satisfaction and pleasure, de Freitas (2003) argued that participation in such an endeavour will only occur if the participant perceives the weather to be suitable. Due to this relationship, de Freitas (2003) goes on to suggest that as discomfort and dissatisfaction increase related participation will decrease. The interrelationship between climate satisfaction and tourist demand is such that climate and weather directly affect tourist satisfaction which in turn affects participation; where participation is a measure of demand for a climatic resource (de Freitas, 2003). Weather and climate have also been identified as being salient factors in tourism spending and holiday satisfaction (Scott et al. 2008a). Once again, tourism spending can be used as an indicator of tourism demand for a specific region or destination based on the climatic resources available there.

A number of studies have shown that weather has had an influence on travel patterns and tourism expenditures in several nations. According to Wilton and Wirjanto (1998), a 1˚C warmer than average summer season in Canada was found to increase domestic tourism by 4%. Jorgensen and Solvoll (1996) found that summer time demand for chartered tours by Norwegians, primarily to sunshine destinations, was affected by weather conditions in the previous summer. These findings were supported by the work of Agnew and Palutikof (2006) who also found that outbound and inbound visitor movements in the UK were responsive to weather conditions during both the current and previous year. When trying to assess tourist satisfaction with winter holidays, Williams et al. (1997) found that prevailing weather conditions had a significant effect on the reported overall trip satisfaction. Therefore, weather was seen as a troublesome factor when trying to accurately evaluate tourist satisfaction with trips to specific destinations. Looking specifically at temperature extremes and thermal comfort, Lin and Matzarakis (2011) suggested that when conditions at a destination are within a close range of the thermal comfort zone it is likely that tourist numbers will increase. However, during the occurrence of extremely high or low temperature conditions, tourists may experience thermal stress which can be associated with discomfort and negative heath effects causing tourist numbers to decrease (Lin & Matzarakis, 2011).

2.4 – Climate and Tourist Decision-making

Climate and weather have a direct influence over tourist decision-making. According to Scott et al. (2008a), climate and weather can act as central motivators in tourist decisions regarding destination choice and time of travel. A number of studies have concluded that weather and climate play an important role in destination selection seeing that tourists have been found to be sensitive to both climate and climate change (Maddison, 2001; Hamilton and Lau, 2005; Bigano et al., 2006a). Lohmann and Kaim (1999) found that climate was the third most important destination attribute considered in tourist decision-making, behind only landscape and price, respectively. According to Zaninovic et al. (2006), the presence of pleasant climatic conditions at a destination can have a strong influence over tourist decision-making. From a survey of tourists in Mallorca and Turkey, Kozak (2002) found that 'enjoying good weather' was the most important motivational factor for travel decisions to these two study areas. In addition to other primary factors, Giles and Perry (1998) found that climate influences tourists' decisions on when and where they travel. These finding were confirmed by Hamilton and Lau (2005), who found climate to be the most frequently considered destination attribute in tourist decision-making.

Weather and climate can also be a deterrent to tourism visitation. For example, a number of studies project that tourists from countries such as Britain, Germany, and Holland will begin to decrease the number of times they visit historically warm countries such as those in the Mediterranean, due to rising temperatures expected under climate change (Berrittella et al. 2006; Bigano et al. 2005; Hamilton, 2005; Lise & Tol, 2002). Several studies come together to support the inclination that climate and changes in climate are likely to affect tourist destination choice, activity selection and seasonality, as well as tourism demand in general (Lise & Tol, 2002; Scott et al. 2004, 2007; Higham & Hall, 2005; Jones & Scott, 2006a, 2006b).

Figure 2.2 depicts the influence of weather and climate on tourist decision-making beginning with the trip planning process and transitioning into the actual trip then moving right through to the post trip experience (Scott et al. 2012). The weather at the tourist's place of origin, as well as the climate information pertaining to the destination, are both influential factors in regard to pre-trip tourist decision-making. During the trip the tourist is most affected by the actual weather on-site. The use of destination weather forecasts transcends both pre-trip decision-making as well as tourist decision-making while on the actual trip. After the trip, again it is mainly the weather that the tourist experienced while on the trip that will have the greatest affect on future travel decisions. In regard to the current study, specifically in relation to weather preferences for camping in Ontario parks and the development of a climate index for park tourism, the results of this study will work towards increasing access to information for campers during the pre-trip decision-making process. Furthermore, with respect to weather related decision-making, this study endeavour to identify the effect of on-site weather conditions over camper decision-making during their current trip and potentially over future decisions pertaining to park visitation.

<u>Figure 2.2 – The Influence of Weather-Climate on Tourist Decisions</u>

Trip phase	Pre-trip		Trip	Post-trip
Tourist decisions	Travel motivation Destination choice Timing of travel Activity planning Insurance needs	'Last minute' Destination choice Activity planning Travel routing	Activity choice Spending patterns Health and safety	Trip satisfaction Destination Recommendation Return visit potential
Weather and climate influence	← Weather at origin → Destination climate	Destination	Destination weather Forecasts --→	→
	Months Week	Day	Day Week	Months

Source: Scott et al. (2012, p. 57)

Tourists react or respond to two different sets of climate and weather circumstances. These two circumstances are (1) conditions anticipated by the tourist (associated with weather forecasts, travel brochures and other forms of media) and (2), conditions experienced on-site (such as heavy rain while camping or strong winds at the beach). This reaction or response to weather or climate by the tourist demonstrates its influence over tourist decision-making. According to de Freitas (2003), human response to weather and climate can be assessed using demand indicators such as visitation numbers and tourist expenditure. De Freitas (2003) discussed two different categories in regard to methods for collecting data on human response to climate, from which demand for the climate resource can be determined. The first is concerned with assessing conditional behaviour using tools such as surveys, questionnaires or images to determine how people react to, or what they think about, certain weather conditions within a specific tourism context. The second approach involves direct observation of the actual on-site experience. In regard to behavioural responses to on-site atmospheric conditions, de Freitas (2003) identified five ways in which tourists can adapt: tourists can avoid unfavourable weather; change activities to suit weather; use structural or mechanical aids; adjust thermal insulation of the body; or adopt passive acceptance of weather conditions.

2.5 – Preferred Climates for Tourism: Research Approaches

2.5.1 – Expert-based Climate Preferences

In an exhaustive review of the literature on preferred climates for tourism, Scott et al. (2008a) defined three different types of preferred climate studies. The first of these three to be reviewed was the expert-based tourism climate preferences approach. Within this domain, three different research tools were identified: minimum requirements (defined by tourism professionals), weather typing, and tourism climate indices. Of the three methods within the expert-based approach, the development of tourism climate indices has been the most influential approach within this field of study. At first, tourism climate indices were very rudimentary, but overtime have evolved and are now being applied in combination with both revealed and stated climate preference approaches to assess climate suitability for tourism as well as project the impact of climate change on tourism destinations. This combination of available research tools and approaches makes up what is now the most current and 'state of the art' research in the field of tourism climatology.

The original development of tourism climate indices was theoretically grounded in the biometeorological literature on weather and human comfort (Scott et al. 2008a). One of the most comprehensive and widely accepted climate indexes to date is the work of Mieczkowski (1985), which looked at preferred climates for general tourism activities such as sightseeing and shopping. However, the subjectivity of the rating schemes for each component of this index as well as the weightings of each variable within the index, have been identified as the central limitations to this tool (Morgan et al. 2000; de Freitas et al. 2008; Scott et al. 2008a). This limitation arose because the rating schemes and variable weights for the indices were based on the opinions of the author and had not been tested against actual tourist preferences or validated within the tourism marketplace (de Freitas, 2003; Scott et al. 2004; Gomez- Martin, 2006; Scott et al. 2008a).

2.5.2 – Revealed Climate Preferences

The second type of preferred tourism climate research identified by Scott et al. (2008a) was referred to as the revealed tourism climate preferences approach. These studies determined statistical relationships between measures of tourism demand and actual climate data in an effort to infer tourism climate preferences for a given destination, over a specific period of time (Scott et al. 2008a). The main strength associated with this approach is its objectivity, seeing that the influence of climate on tourists is determined using measures of aggregate tourist behaviour such as visitation numbers and is not based on subjective expert-based opinion (Scott et al. 2008a).

A number of international studies have used temperature as a predictor of tourist flows and international tourism arrivals (Maddison, 2001; Lise & Tol, 2002; Hamilton et al. 2005; Bigano et al. 2006). Based on the results of the applied models, these studies were able to define optimal temperatures for tourism. Seeing that at these temporal and spatial scales statistical relationships could not be found with any other climate variable (sky conditions, rain or wind), these authors contend that temperature is perceived by tourists as being the most important climate variable. Major limitations of these revealed climate preference approaches for tourism are identified by Scott et al. (2008a). These limitations include the crude temporal and spatial resolution of available data (i.e. monthly opposed to daily visitation data; climate data from the nearly weather station which may not be representative of the actual tourism site). The absence of other non-climate factors (i.e. nature of attraction, institutional seasonality) which would have a significant effect on tourist decision-making, from within the models designed to determine the affect of climate on tourism demand, was identified as being another limiting factor in these studies (Gössling & Hall, 2006; Scott et al. 2008a). More recent revealed preference studies which focused on a local to national scale and were able to access some daily data rather than just monthly data alone were able to overcome some of these limitations. Jones and Scott (2006a, 2006b) established statistically significant relationships between weather and park visitation in Ontario and Canada, respectively. Scott and Jones (2007) also assessed the influence of weather on participation at a number of golf resorts across Canada.

2.5.3 – Stated Climate Preferences

The third method for identifying climate preferences for tourism identified by Scott et al. (2008a) was the stated climate preferences approach. This approach has been used far less within the academic literature. Stated climate preferences for tourism have been assessed using both *in situ* and *ex situ* research constructs.

Using a combination of both survey results as well as direct observations, de Freitas (1990) conducted an *in situ* study with the aim of identifying climatic preferences and the affect of weather on visitor satisfaction for beach tourism in Australia. In an effort to identify and describe the experience of on-site atmospheric conditions, de Freitas (1990) employed two different forms of user response inquiry in order to further understand tourist weather perceptions. The first aspect involved sensory perception of the immediate atmospheric conditions expressed verbally by the tourist. The other aspect looked at behavioural responses that either modified or enhanced the effects of the atmosphere on the tourism experience. The work of de Freitas (1990) involved multiple weather variables and one of the key findings was the over-riding effect that weather aspects such as rain and strong winds had on beach tourist satisfaction and subsequent decision-making.

Mansfield et al. (2004) also employed an *in situ* approach to assessing stated weather preferences for tourism in Israel. However, this study was subject to greater limitations as observations were based on only four days of weather and tourist reaction/responses. This brought about criticisms of the *in situ* approach for identifying stated weather preferences as academics recognised the limitations of a data set based on only four days out of a season (Scott et al. 2008a). Comments were also generated concerning the time requirements and resource extensive nature of such *in situ* studies as researchers would be required to be on site multiple times and during a wide range of atmospheric conditions in order for the sample to be representative (Scott et al. 2008a). Another criticism of *in situ* stated climate preference studies involves the on-site weather bias that could be associated with days that are subject to marginal weather conditions (Scott et al. 2008a). For example, on days with marginal weather conditions the number of respondents available for observation/participation may be significantly diminished. In addition, those that do remain may display behaviour or offer responses different from the majority of visitors, thereby making the sample and results non-representative of the actual tourism market. Nonetheless, one of the main findings of Mansfield et al. (2004) was the disparate responses between domestic and international tourists, where the results suggested that domestic tourist were much more sensitive and less tolerable to marginal weather conditions than international tourist were found to be. It can be suggested that such a disparity in climate preferences and related decision-making between domestic and international tourists may stem from the amount of time and resources devoted to the trip, thereby invoking a greater sense of commitment to the travel experience.

Using an *in situ* approach, Morgan et al. (2000) also conducted a survey-based study of beach tourists, this time in Wales, Malta and Turkey, in an effort to explore climate preferences and the importance of different weather aspects for beach tourism specifically. The aim of this study was to determine the actual stated preferences of tourists in an effort to revise and then validate Mieczkowski's (1985) Tourism Climate Index (TCI) so that it would become more suitable for beach tourism in particular. The main modifications that Morgan et al. (2000) recommended were based on the greater levels of importance that beach tourists placed on weather aspects such as the presence of sunshine and the absence of rain. Gomez-Martin (2006) also used an *in situ* approach in order to assess the climatic preferences of beach tourists, relative to beach tourism in Spain. An optimal day for tourism in this region was defined as being 22-28°C, with less than 1 hour of rain and with sunshine less than or equal to 75% of the day (Gomez-Martin, 2006).

An even more limited number of studies have utilised an *ex situ* approach to assessing stated climate preferences for tourism. Scott et al. (2008a), who pioneered this approach, conducted a survey-based study of university students in Canada, New Zealand and Sweden to assess stated climate preferences for beach, urban and mountain tourism. The authors found that preferred climates vary significantly across the three different tourism contexts, while also, but to a lesser degree, across the different cultural samples. Another *ex situ* study conducted by de Freitas et al. (2008) used a similar survey-based approach, sampling students from the University of Waterloo, in an effort to identify stated climate preferences as well as the level of importance assigned to different weather aspects all in relation to beach tourism. The goal of this study was to provide the empirical data necessary to develop a new generation climate index for tourism (CIT), one designed specifically for assessing climatic preferences for beach tourism. Rutty and Scott (2010) also used an *ex situ* approach to identify the stated climate preferences for urban and beach tourists in the Mediterranean. The study was based on the responses of university students (N=866) from a number of different academic institutions located in Austria, Germany, Netherlands, Sweden and Switzerland, in an effort to answer the research question: will the Mediterranean become too hot for tourists?

The major limitation of these studies which engenders a potential research bias stems from the demographic constraints of the related sample selections. The authors recognised the potential on-site weather bias associated with *in situ* approaches, as well as the time and resource intensive nature of such studies, and therefore opted to employ an *ex situ* approach instead. However, by surveying university students alone, the results are only representative of one age demographic (with respondents being primarily between 18 and 25 years of age). These studies are also associated with another demographic sampling limitation as it can be suggested that university students are from similar social classes. It can therefore be concluded that a sample of university students alone is not representative of the larger tourism market in general. However, a limited public sample of tourists (N=197) collected by Wirth (2009) in the same community as a student sample collected by Rutty and Scott (2010) revealed no significant differences ($P > 0.05$) in regard to the temperature thresholds for either beach or urban tourism in the Mediterranean. A comparison of the results of these two stated preference studies was able to offer some consultation and it was inferred by Rutty and Scott (2010) that the climate preferences of the young adult market are not dissimilar from that of the broader tourism market.

2.6 – Facets of Tourism Climate

Until only recently, most of the academic literature in the field of tourism climatology considered air temperature to be the climate variable of greatest importance to tourism (Mieczkowski, 1985; Becker, 2000; Maddison, 2001; Lise & Tol, 2002; Hamilton et al. 2005;

Bigano et al. 2006). However, de Freitas (1990, 2003) argued that there are three distinct aspects of climate that are relevant to tourism. These three aspects include a thermal, a physical and an aesthetic component (de Freitas, 1990). The thermal component determines the comfort of tourists and therefore is physiological in nature (de Freitas, 1990). The physical component refers to actual weather events such as rain, snow or wind which can have an over-riding effect on visitor satisfaction and thereby strongly influence on-site tourist decision-making. The aesthetic component refers to atmospheric conditions such as cloud coverage and the presence of sunshine; these factors are primarily psychological in nature yet have still been found to have a significant effect on visitor satisfaction.

Human response to climate, with the exception of the thermal component, according to de Freitas (2003) is to a large degree a matter of individual perception. Commenting on the common position found within the literature that the thermal component is of the greatest importance to tourism; de Freitas (2003) claims that during non-extreme thermal conditions other weather conditions such as rain or strong winds assume a position of greater importance and have over-riding effects on tourist satisfaction and subsequent decision-making. This finding goes toward supporting the contention of de Freitas (1990; 2003) that tourists respond to the combined condition of the atmosphere at a particular point in time. Therefore, the use of only one facet of tourism climate (i.e. temperature or thermal comfort) cannot be sufficient to assess the suitability of tourism climate nor to predict tourist flows based on changes in climate for tourism.

The work of de Freitas (1990, 2003) concerning the identification of the three dimensions of tourism climate has been generally accepted within the literature over recent years and incorporated into modern tourism climate indices (de Freitas et al. 2008; Yu et al. 2009a), preferred climate studies for tourism (Gomez-Martin, 2005; Gössling et al. 2006; Scott et al. 2008a) and studies intent on exploring the impacts of climate change on tourism (Moreno & Amelung, 2009; Yu et al. 2009b; Perch-Neilson et al. 2010; Lin & Matzarakis, 2011). The dimensions described by de Freitas (1990) are in line with those outlined by Smith (1993) and Matzarakis (2001), who suggested that the weather factors which most strongly affect the comfort and safety of tourists are air temperature, humidity, radiation intensity, wind speed, cloud cover, sunshine duration and precipitation. Although the results of their destination choice study did suggest that temperature was the most influential attribute in destination choice and tourist decision-making, Hamilton and Lau (2005) did not fail to recognise that other tourism-related climate attributes were also of importance and had been given fair consideration in the tourist decision-making process. It was concluded by Moreno & Amelung (2009) that any climate suitability assessments for tourism should take into account all three of the dimensions of tourism climate defined by de Freitas (1990, 2003); including thermal, physical and aesthetic components.

2.7 – Tourism Climate Indices

Due to the multifaceted nature of weather and the complex ways that weather variables interact with each other to define climate for tourism, de Freitas et al. (2008) suggest that an index approach is appropriate for the measurement and evaluation of the tourism climate resource. One of the most comprehensive and widely adopted tourism climate indices is the work of Mieczkowski (1985), who developed the TCI. Mieczkowski's (1985) TCI considers seven features of climate, merging them together to form a single climate index for general tourism activities, such as sightseeing and shopping. The main criticisms of Mieczkowski's (1985) TCI as represented within the literature (de Freitas, 2003; Scott et al. 2004; Scott et al. 2008a; de Freitas et al. 2008; Moreno & Amelung, 2009; Yu et al. 2009a), focus on its origin as an 'expert-based' index and draw attention to the way in which the meaning attached to the index was derived from the existing biometeorological literature, while also being based on Mieczkowski's subjective opinion. In addition, the rating schemes and weighting of climate variables for the TCI had not been validated against tourist perceptions or visitation data from within the tourism marketplace. This important limitation has been attributed to the majority of tourism climate indices, apart from only a few studies that have endeavoured to overcome this shortcoming (Morgan et al. 2000; de Freitas et al. 2008). Another limitation of Mieczkowski's (1985) TCI is that it is too coarse of an indicator, being identified as insensitive to a wide range of weather requirements associated with different tourism activities and therefore is not universally applicable to different tourism segments worldwide (Scott et al. 2008a; Moreno & Amelung, 2009). The TCI also received criticism for the lack of consideration given to the over-riding effects of weather aspects such as rain and strong winds, as well as for its inability to correct for intercultural and geographical differences in tourism climate preferences (de Freitas et al. 2008).

One of the first studies that made an effort to overcome some of the limitations of Mieczkowski's (1985) TCI was the work of Morgan et al. (2000). Morgan et al. (2000) used an *in situ*, survey-based approach to assess the stated climate preferences of beach tourists in Wales, Malta and Turkey in an effort to revise the TCI for beach tourism in particular. Although recognising that the work of Morgan et al. (2000) had became conceptually superior to that of Mieczkowski (1985) seeing that the rating schemes and weights had been validated against actual tourist preferences, Scott et al. (2004) still criticised the adapted TCI for the cultural homogeny of the sample. It was suggested by Scott et al. (2004) that the activities, dress and climate preferences of beach users in the UK are most likely to be considerably different from that of tourists in the Mediterranean, Australia or the Caribbean.

There is another considerable body of tourism climate index work which de Freitas et al. (2008) and Scott et al. (2008a) argue is even more limited in its ability to accurately assess the climatic suitability of regions for tourism, seeing that they consider only the thermal component of tourism climate (Harlfinger, 1991; Becker, 1998, 2000; Matzarakis, 2001; Blazejczyk, 2001; Cegnar & Matzarakis, 2004; Morabito et al. 2004; Zaninović & Matzarakis, 2004; Lin & Matzarakis, 2011; Endler & Matzarakis, 2011). Thermal indices, including the Physiologically Equivalent Temperature (PET), were first developed for assessing human comfort in general (Matzarakis et al. 1999). It was not until later that scholars such as Cegnar and Matzarakis (2004), as well as Morabito et al. (2004), applied these thermal indices to tourism contexts. Lin and Matzarakis (2011) acknowledge the work of de Freitas (2003) and accept that tourism climate can be represented by both physical and aesthetic components in addition to the commonly expressed and assessed thermal component. However, it is the contention of Lin and Matzarakis (2011) that physical and aesthetic factors are subjective making tourist perceptions of such weather aspects difficult to quantify, which is their reasoning for analysing the thermal component alone. Moreno and Amelung (2009) highlight the advantage of thermal indices acknowledging that they are rooted in a long tradition of physiological research. However, Moreno and Amelung (2009) also recognised that thermal indices disregard important non-thermal aspects of climate and weather and as such are incapable of effectively assessing the suitability of climate and weather conditions for tourism activities. As a result, the use of composite measures has become the preferred method within the field of tourism climatology (Moreno & Amelung, 2009). The results of Scott et al.'s (2008a) stated tourism climate preferences study generated results which placed the presence of sunshine and the absence of rain as being of greater importance to tourist satisfaction than comfortable temperatures, for urban, beach and mountain tourism in destinations that are characterised by temperate climates. Subsequently, it was the contention of Scott et al. (2008a) that "climate indices that only examine the thermal aspect, regardless of their sophistication, are not sufficient to assess the suitability of climate for tourism" (p. 68).

In an effort to define the ideal characteristics of an appropriate climate index for tourism, de Freitas (2003) listed characteristics that an ideal index should include. Included in these ideal characteristics were: reliance on standard climate data only; minimised reliance on average climate data, maximised reliance on actual (real) observation; use and input of all attributes of the atmospheric environment; use of an integrated body/atmospheric energy balance assessment for the thermal component of climate; inclusion of all three attributes of tourism climate (thermal, aesthetic and physical); as well as recognition of climate as a limiting factor, which focuses on tourism climate thresholds (de Freitas, 2003). Using these recommendations as a foundation, de Freitas et al. (2008) developed a new generation climate index for tourism (CIT). One of the most defining characteristics of the CIT was its ability to recognise the over-riding characteristic of the physical attribute of tourism climate. It has been argued by de Freitas et al. (2008) that "under certain conditions and at certain thresholds, the physical facet has an overriding influence on the thermal and aesthetic facets (p. 402). The examples that were given to support this conclusion included the over-riding effect that more than 30 minutes of rain had on beach tourists even if thermal conditions were ideal. In addition, a similar relationship was described, for example, when wind speed was greater than 6 ms^{-1}, regardless of how appealing the aesthetic or thermal attributes of the beach tourism climate was. Recognising the importance of this advancement in the development of climate indices for tourism, de Freitas et al. (2008) went on to criticise previous climate indices as they had failed to recognise the over-riding effect of the physical component and therefore tended to overrate days when rain or wind dominated.

In a discussion on the validation of tourism climate indices, de Freitas et al. (2008) highlight a number of challenges. The first issue presented revolves around the use of conventional demand indicators such as visitation numbers or occupancy rates. It was argued by de Freitas et al. (2008) that the use of these conventional indicators may be unsuitable for index validation as they are not necessarily a measure of tourist satisfaction with the prevailing climate or weather conditions. Looking at peak demand, de Freitas et al. (2008) refer to Butler's (2001) definition of institutional seasonality which dictates that school holidays and long weekends have a significant impact on tourism seasonality by influencing the timing of high and low demand periods – which can operate totally independent of climate and weather. Furthermore, other studies have also concluded that peak demand has been observed to occur at times outside the period when optimal climate and weather conditions prevail (Yapp & McDonald, 1978; de Freitas, 1990). As a result, de Freitas et al. (2008) concluded that self-reported tourist satisfaction with climate (stated tourism climate preferences) is potentially a more reliable method for validating a tourism climate index what can be accomplished by way of the revealed climate preferences approach.

Another important limitation that researchers have recently begun endeavouring to overcome (de Freitas et al. 2008; Yu et al. 2009a; Perch-Neilsen et al. 2010) is the insufficient temporal scale of climate variables used in the application of climate indices for tourism. The CIT, developed by de Freitas et al. (2008) relies on actual observations of atmospheric conditions rather than averages or statistically processed climate data because tourists respond to the combined effect of actual atmospheric conditions at any given time (Besancenot, 1990; de Freitas, 1990). Perch-Neilson et al. (2010) attempted to overcome the temporal limitation of Mieczkowski's (1985) TCI, which was originally reliant on monthly climate data, by utilising daily climate data in an effort to more accurately assess the suitability of climate for tourism. This important step forward addressed the limitation stemming from the inapplicable nature of climate data such as number of rain days per month, total amount of monthly precipitation or monthly temperature highs. This information is only of limited use seeing that weather information would be more useful to tourists if they could understand on which days rain occurred and whether or not it rained lightly each day of the month or if the occurrence of rain came in heavy intervals but on only a few days of the month (Perch-Neilson et al. 2010). Similar arguments can be presented in regard to temperature extremes. If the average temperature high for a month was an optimal temperature such as 24°C, does that mean each day was approximately 24°C or is the standard deviation of average temperatures much greater? Such as a range of average daily temperature highs with a significant number of days being too cold (14°C) and another significant number being too hot (34°C), yet the monthly average still represented by an optimal temperature of 24°C.

Yu et al. (2009a) sought to advance the ability of an index approach to assessing the suitability of climate for tourism to an even greater degree by developing a modified climate index for tourism (MCIT), which also endeavoured to address the limitation seen in the crude temporal scale of previous TCIs and the CIT. Yu et al. (2009a) utilised hourly weather data for the MCIT. This advancement addressed yet another important limitation identified even in the use of daily climate data. The argument of Yu et al. (2009a) pertaining to the insufficiency of daily climate data was similar to that of Perch-Neilson et al. (2010) in that just as a monthly climatic average may not accurately represent the climate for each day within that month, even so, the climatic average for a given day may not accurately represent the hourly weather of that day as would be deemed important to tourists. This argument follows the notion that an average of 15mm of rain on a given day does not tell the user the complete nature of precipitation on that day. Did it rain lightly the whole day, or was there a heavy down pour for an hour or so and the rest of the day was rain free? Similar concerns were expressed by Yu et al. (2009a) in regard to daily temperature averages. For example, if the average daily temperature high was 28°C, a tourist would respond quite differently to a day that held temperatures consistently around 28°C for the majority of the day compared to a day with fluctuating temperatures reaching highs of 38°C yet still averaging 28°C over a 24 hour time period. The utilization of hourly weather data opposed to average daily climate data also overcomes another important limitation involving temporal scale as it allows for a deeper consideration of the timing of certain weather events. For example, rain during the early hours of the day (4am to 6am) will have far less of an impact on visitation to a public beach than rain during the afternoon (1pm to 3pm). Unfortunately, a discrepancy such as this would not be accurately represented through the use of daily average climate data.

It is the opinion of this author that the work of Yu et al. (2009a, 2009b) in the development of the MCIT has produced the most advanced climate index for tourism as has been presented in the literature to date. Yu et al. (2009a) built on the foundation of de Freitas et al. (2008) as set forth in their development of the CIT. Three main alterations were performed by Yu et al. (2009a) in order to modify the CIT and create the MCIT. These modifications were seen in the inclusion of different climate variables as well as the removal of pre-existing climate variables, simplification of levels of climate suitability for tourism and finally, as was previously discussed, the utilization of hourly weather data instead of average climate data for input into the index. In regard to the inclusion and removal of certain climate elements, Yu et al. (2009a) choose to include two new tourism-related climate elements which were visibility and significant weather (e.g. lightning and hail). These new elements were recognised as having the ability to impair tourist's experiences and therefore had great potential to affect tourist decision-making (Yu et al. 2009a). Other climate elements such as the presence of sunshine and cloud coverage were removed from the index, although they have been seen to affect tourist satisfaction, they were not deemed to overly influential for tourist decision-making. Yu et al. (2009a) also choose to simplify the levels used to describe the suitability of climate for tourism from the previous seven levels originally set forth in the TCI and retained in the CIT, down to three levels which ranged from unsuitable to marginal and up to ideal.

2.8 – Tourism Climate Indices and Climate Change

Climate change can be expected to have a continued effect on tourism because climate as a tourism resource for a destination is made up of the weather that tourist's experience during visitation (de Freitas, 1990) and weather has been found to influence both tourist satisfaction as well as tourist decision-making (Yu et al. 2009b). Since many types of tourism depend directly on weather and climate as principle resources, it can be expected that the current and any future changes in global climate will have a strong affect on the tourism industry across its many sectors (Perch-Neilson, 2010). Despite the clear relationship between climate and tourism, and although research in this field has gained momentum in recent years (Scott et al. 2005a), it is still the consensus within the scientific community that the influence of climate change on tourism remains poorly understood (Moreno & Amelung, 2009; Yu et al. 2009a; Perch-Neilson, 2010). It has been suggested by de Freitas et al. (2005) that the lack of empirical research quantifying the impact of climate change on tourism demand is most likely due to the multifaceted nature of climate and the integral way in which aspects of climate come to together to construct the combination of weather conditions that affect tourism.

Until only recently, in an effort to model the sensitivity of tourism demand to climate change, the majority of studies (Bigano et al. (2005); Hamilton et al. 2005) used average temperature alone as a representative of the climate resource for tourism. Within this line of inquiry, for example, Lise and Tol (2002), as well as Maddison (2001), both looked at the statistical relationship temperature, precipitation and tourist flows and were able to discover a non-linear relationship between temperature and tourism demand, as well as identify ideal temperatures for tourism. However, neither Lise and Toll (2002) or Maddison (2001) were able to find statistically significant relationships between tourism demand and any other climate variables apart from temperature. Other authors have cautioned this approach and stressed the importance of including additional weather parameters in order to more accurately represent the climate resource for tourism (Gössling & Hall, 2006). Apart from the single faceted nature of these studies, de Freitas (2003) also criticised this approach arguing that climate expressed as an average has no psychological meaning and thus cannot effectively predict tourism demand or tourist flows. Recognising that weather and climate are multifaceted, de Freitas et al. (2005) suggested that climate elements should be aggregated in a suitable manner as to form a measure of tourism-related weather conditions. Given the above considerations, overtime, the implementation of an index based approach became more widely accepted and now resembles the most appropriate method for assessing the impact of climate change on tourism destinations and activities in different regions worldwide.

More recently, a number of studies have employed Mieczkowski's (1985) TCI in an effort to model the effects of climate change on different segments of the tourism industry worldwide (Scott et al. 2004; Amelung & Viner, 2006; Amelung et al. 2007; Moreno & Amelung, 2009; Perch-Nielsen et al. 2010). This realm of inquiry has been identified as an important area of research by Scott et al. (2004), who recognised that one of the most direct impacts of climate change on tourism will be the redistribution of climatic assets across different tourism regions. According to Scott et al. (2004), such climate induced changes will have implications for tourism seasonality, tourism demand and travel patterns. It was also the contention of Scott et al. (2004) that changes in the length and quality of warm weather recreation seasons across different tourism regions will have significant impact on competitive relationships between destinations and will thereby affect the profitability of tourism enterprises.

As discussed, certain studies have set out to develop new generation climate indices for tourism (de Freitas et al. 2008); or adapted Mieczkowski's (1985) TCI to either suit a specific form of tourism (Morgan et al. 2000), or overcome some of the index's original shortcomings (Yu et al. 2009a; Perch-Neilson et al. 2010). There are three main characteristics of the TCI, identified by Scott et al. (2004), which make the tool highly suitable for studies intent on assessing the impact of climate change on tourism. The first characteristic mentioned by Scott et al. (2004) referred to the TCI as the most comprehensive index developed to date specifically for tourism. Mieczkowski's original (1985) TCI was comprised of 7 monthly climate variables: maximum daily temperature, mean daily temperature, minimum daily relative humidity, mean daily relative humidity, total precipitation, total hours of sunshine, and average wind speed. The second is seen in the way that the TCI was originally designed to assess the climatic elements most relevant to the quality of the tourism experience of general tourism activities such as sightseeing and shopping. This is an important characteristic for the selection of an index to be used in climate change impact assessments that attempt to cover large areas represented by a wide range of different tourism destinations, seeing that these activities are participated in across many different types of tourism destinations. The third characteristic which makes the TCI a favourable selection for climate change impact assessments is that it was designed to use climate data which is easily accessible from tourism destinations worldwide.

The thermal component of climate for tourism, primarily represented by temperature, has received disproportionate attention within the existing literature examining the impact of climate change on tourism activities and destination. Endler and Matzarakis (2011) provide a reasonable explanation for such a trend arguing that the thermal environment is extremely relevant to human health and recreation. In addition, Endler and Matzarakis (2011) state that human adaptation to heat stress is quite marginal, unlike cold stress which can be addressed by wearing adequate clothing and taking certain protective actions. Therefore, rising temperatures and increasing thermal discomfort implies a serious threat to both human health and the suitability of climate for tourism (Endler and Matzarakis, 2011). As a result of the recognised importance that the thermal component holds for the suitability of climate for tourism purposes across a number of different tourism destinations worldwide, many researchers have been lead to ask the question: will temperatures become too hot for tourists in certain regions?

A number of studies have produced results which suggest that at some point future climate change and associated rising temperatures will make certain regions unsuitable for tourism activities (Maddison, 2001; Hamilton et al. 2005; Amelung & Viner, 2006). According to Moreno & Amelung (2009), tourist flows for beach tourism can be expected to shift pole wards under climate change, with more northern destinations gaining competitive advantages over southern locations due to rising temperatures and the associated thermal comfort of tourists. This suggested trend in tourist flows is also supported by Yu et al (2009b), who based on the results of a modified climate index for tourism (MCIT), found that climate conditions in northern regions such as Alaska will become increasingly favourable, whereas, southern regions such as Florida will see decreases in the favourable nature of the prevailing climate conditions for tourism currently there. Looking at the redistribution of climatic resources for tourism in Europe, Perch-Neilson et al. (2010) also found that southern tourism regions would lose some if not all of their competitive advantages based on climatic suitability under future climate change, making way for a shift in tourist flows to more northern regions offering comparable tourism activities and products. Nonetheless, even researchers examining relatively cool northern destinations such as Ontario have begun to ask the same question: will summer temperatures become too hot for tourism in this region? Scott et al. (2004) projected that by the 2050s, climate conditions for general tourism activities such as sightseeing and shopping in areas of south western Ontario may begin to decline during the summer seasons. Similar trends relating to a decline in the overall attractiveness of climate for general tourism activities was projected for the central region of Ontario come the 2080s (Scott et al. 2004).

A number of authors have expressed uncertainties with the projections of tourist flows, based on climatic preferences for tourism and the future changes to climate conditions (Scott et al. 2004; Gössling & Hall, 2006; Perch-Neilson et al. 2010; Endler & Matzarakis, 2011). According to Scott et al. (2004), three main factors limit the ability of researchers to definitively predict the impact of climate change on tourist flows and tourism demand. The first of these stems from the uncertainty associated with the impact that climate change will have on environmental resources for tourism such as sea level, water supply and biodiversity. Another limiting factor relates to the unprecedented way in which tourists will respond to changes in climate, the environment, as well as potential socio-economic restructuring. The final limiting factor mentioned by Scott et al. (2004) addressed the possibility that tourist climate preferences could change significantly come the time frames considered under climate change as a form of human adaptation in order to be more resilient to the environment in which they will then live. In reference to the work of Besancenot (1990), which concluded that tourist preferences vary over time, Perch-Neilson et al. (2010) expressed similar cautions suggesting that tourists may become acclimatised as a result of gradual warming and begin to actually prefer warmer climates. Referring to the work of Lin and Matzarakis (2008), which demonstrated how climate preferences vary across cultures, Perch-Neilson et al. (2010) also discussed limitations that surround uncertainties concerning the nature of tourist generating regions in the future. With the rise of world powers such as China, India and Brazil, major tourist generating countries in the future may be different than they are today and in turn may be accompanied by a significantly different set of climate preferences for tourism.

2.9 – Weather, Climate and Park Visitation in Ontario

The outdoor recreational activity of camping, which is offered by a number of provincial parks in Ontario, has been classified as a form of nature-based tourism (Jones & Scott, 2006a). According to Jones and Scott (2006a), visitation to Ontario's provincial parks is strongly influenced by climate. These two authors explain how climate influences the physical resources that parks are dependent upon to attract tourists; resources such as water levels, snow cover and wildlife species. These physical resources provide the foundation for the recreational activities offered at different parks during specific seasons; activities such as boating, cross-country skiing and bird watching (Jones & Scott, 2006a). Being referred to as "natural seasonality" by Butler (2001), climate also directly influences the length and quality of recreation seasons. The influence of climate over recreational season lengths pertains to its ability to control when certain activities such as beach use and swimming can takes place, while also affecting the level of satisfaction associated with the experience. For instance, cool rainy weather or an open fire ban can have a significantly negative effect on visitor satisfaction during a summer camping trip (Jones & Scott, 2006a).

Based on the relationship of climate and weather with park recreation and tourism, it has been suggested by Jones and Scott (2006a) that the impact of global climate change within the regions of Ontario will have a direct affect on the length and quality of recreation seasons and therefore will have considerable implications for visitation and management of Ontario parks. The authors identify both negative and positive implications of climate change for park tourism in Ontario. Assuming that all other contributing factors remain equal, it is expected that annual warming will lengthen summer recreation seasons and will therefore generate greater revenues for the parks (Jones & Scott, 2006a). However, warmer weather and longer operating seasons will increase park visitation which could accelerate ecological strains on the environment and resources causing concern for park management (Jones & Scott, 2006a).

It has been recognised that there are other factors which strongly influence park visitation in Ontario, apart from climate, such as social trends in recreation, transportation costs, park user fees, and changing demographics (Jones and Scott, 2006a). In a study designed to assess the impact of climate change on park visitation to Ontario's provincial parks, Jones and Scott (2006a) discussed the correlation between visitation and temperature both in the summer months (July and August) as well as during the spring and fall. Based on their analysis it was concluded that visitation during the summer months varied only slightly based on temperature, whereas, during any other month visitation varied significantly with changes in temperature. These correlations reflect the influence of institutional seasonality, primarily the scheduling of summer vacation for students and corresponding family vacations (Jones & Scott, 2006a).

It was also noted by Jones and Scott (2006a) that the type of recreational activities that visitors participate in based on the available natural and recreational amenities vary across the many different parks in Ontario. Different parks support different types of activities and certain activities have different climatic requirements and accompanying season lengths, which can also vary based on geographic locations within Ontario (Jones & Scott, 2006a). As a result of these considerations, Jones & Scott (2006a) hypothesised that climate and climate change would have a disparate impact on visitation to provincial parks across different regions in Ontario.

Looking specifically at the projected impact of global climate change on park regions in Ontario, Lemieux and Scott (2005) reported an increase in temperature of 0.6- 3.3°C for the 2020s, 1.9-7.0°C for the 2050s and 2.7-10.1°C for the 2080s. It is expected that over the course of the century the greatest warming will occur in the Northeast and Algonquin park regions of Ontario. Using a regression analysis to model the relationship between climate and visitation, Jones and Scott (2006a) projected increases in park visitation numbers based on projected climate change for each respective park region. Looking at all the park regions combined, the system wide projected increases in visitation over the course of the next century was as follows: 10.6 to 26.7% for the 2020s, 14.7 to 56.4% for the 2050s and 18.6 to 81.7% for the 2080s (Jones & Scott, 2006a).

2.10 – Knowledge Gaps

In an effort to assess the impact of climate change on visitation to Ontario's provincial parks at the system-wide level, Jones and Scott (2006a) recognised a limitation in their study seeing that it was not possible to clearly identify the direct impact of climate change on specific recreational activities within the respective parks. This limitation arose due to the lack of available information that would effectively correlate specific activities such as beach use, hiking or nature viewing with visitation to a specific park. This becomes an important gap which can be addressed performing a study on a smaller scale and using a survey-based approach, which will allow the researcher to connect participation in certain activities to preferred temperatures and overall weather sensitivity. This new information could then be incorporated in climate impact assessment for the parks from which this information was derived.

It has been recognised that the use of a universal tourism climate index may be conceptually unsound, especially for highly weather sensitive tourism activities such as skiing or beach use (Scott et al. 2008a). Not only will the application of such indices present inaccurate measurements of the tourism climate resources at subsequent destinations, it may also cause for inflated assessment of the projected impact of climate change for these specific destination and tourism segments (Scott et al. 2008a). Based on these suggestions, it becomes increasingly important that a climate index should either be designed specifically for park tourism or that a previously constructed index should be modified and adapted for use in the park tourism context. Such advancement in the field of tourism climatology would allow for more accurate measurement of the tourism climate resources available at different parks and would be advantageous in the planning process of both tourists and managers alike.

It was prescribed by de Freitas (2003) that further research was needed in order to identify the optimal or preferred climate conditions for different outdoor recreational activities that had not yet received adequate attention from the scientific community. Park tourism and the recreational activity of camping is one such segment of the tourism and recreation industry that demands such attention. It was also mentioned by de Freitas (2003) that further research into examining the overall weather sensitivity of certain tourism segments was also required in order to more accurately assess the opportunities and threats associated with projected climate change for recreational activities within various tourism destination. The collection and identification of both preferred climates as well as the overall weather sensitivity information for different tourism segments and recreational activities is necessary in order to foster the effective development of appropriate tourism climate indices related to each specific line of inquiry.

One of the major limitations identified from within some of the more recent studies designed to identify preferred climates for different tourism segments worldwide (de Freitas et al. 2008; Scott et al. 2008a) was that of homogeneity in demographic variables such as age and education. The results from both these studies were based on a sample of university students, and although they were able to bring new and interesting insights into the field of tourism climatology, they were not representative of the whole tourism market for the activities in which they were trying to assess. The authors recognised that future research into preferred climates for tourism which would draw upon a more diverse sample of leisure tourists was necessary in order to more accurately identify and represent the climate preferences of a given tourism segment or recreational activity. Nonetheless, even within this demographically limited sample, Scott et al. (2008a) discovered a number of significant differences between the climate preferences of tourists as they would relate to different tourism segments (either urban, mountain or beach tourism respectively), as well as between tourists from different geographic location. As such, it has been suggested by Scott et al. (2008a) that a similar study that employed a sample which more effectively represented the full spectrum of age and class for a given tourism segment would likely generate even more disparate results and heterogeneity in climate preferences.

To a great degree, the examination of the beach tourism segment has dominated research in the field of tourism climatology. Moreno and Amelung (2009), as well as Scott et al. (2008a) make the petition that future research in this field would examine other tourism segments, besides that of beach tourism. More specifically, Moreno and Amelung (2009) argue that tourism segments which demand higher levels of physical activity and which may not have access to the cooling affects of water require the attention of future research. Identification of the specific climate preferences and requirements for these other forms of tourism would allow for further impact assessments to be preformed, thereby identifying the opportunities and threats that these segments of the tourism industry may face as a result of climate change.

In regard to tourist behaviour and its relationship with climate and weather, de Freitas (2003) advocates for future research that will directly examine the way in which tourism respond to certain weather conditions as well as looking at which climate variables hold the greatest level of influence over tourist decision-making. Again, these types of studies would need to be directed at a number of different tourism segments and within a number of climate regions in order to assess the way in which tourism behaviour and decision-making varies as a result of differing activity bases and prevailing climatic conditions. By determining how tourists respond to weather and climate today, we become much more equipped to assess how tourists will respond to future changes in the climate and to determine the overall impact of climate change on tourist flows. Moreno and Amelung (2009) suggest that future research aimed at identifying how tourists will be likely to respond to projected climate change is urgently needed. It is recommend that studies employ either a qualitative approach or make use of a traditional survey-based approach in order to gather more information concerning the potential impact of climate change on tourist behaviour (Moreno & Amelung, 2009).

Chapter 3 – Methods

3.1 – Introduction

This chapter describes the methods which were used to identify the stated weather preferences and weather related decision-making of a sample of campers from two provincial parks in Ontario. The chapter begins by laying out a rationale for the case studies which were chosen as well as by introducing some of the defining characteristics of each park. The research approach that was chosen in order to achieve the study's objectives is also discussed. The chapter then goes on to describe the development of the survey instrument as well as the implementation process. Finally, the chapter concludes by presenting the strategy for data analysis and discussing the limitations of this research approach.

3.2 – Study Area

The studies conducted by Jones and Scott (2006a; 2006b) were two of the most comprehensive studies yet to be done in the field of tourism and climate change, with specific application to the park tourism context. The focuses of these studies were on Ontario's provincial park system (Jones & Scott, 2006a) and on Canada's national park system (Jones & Scott, 2006b). In regard to the study that looked specifically at provincial parks in Ontario, the authors used a revealed preferences approach to determine the relationship between climate and visitation for a provincial park from each of Ontario six park regions, as defined by the Ontario Ministry of Natural Resources (OMNR, 2004). As such, it was the desire of the researcher in this study to conduct an additional project, one looking at some of the same regions and parks examined by Jones and Scott's (2006a) revealed preferences approach, this time using a stated preferences approach to identify weather preferences for visitation to Ontario parks, thereby making a comparison of these two approaches possible.

There are six different park regions in Ontario as defined by the Ontario Ministry of Natural Resources (OMNR, 2008). Jones and Scott (2006a) were able to examine a park from each of these regions in order to conduct a system wide analysis of the projected impact of climate change on visitation to Ontario parks. Given the resource and time extensive nature of a stated climate preferences approach, in comparison to that of a revealed climate preferences approach, the scope of this study was limited to only two parks. Only parks from within the three most southern park regions (southeast, southwest and central) were considered for selection as case studies for this project. Since this research approach required the researcher to travel to each park twice, for a period of three days each time, all during the summer of 2010, any more than two parks was thought to be unmanageable. The same thoughts were shared in regard to considering more northern parks. Additionally, one of the main lines of inquiry that the researcher sought to explore through this study was whether summer temperatures projected under climate change would rise to levels unacceptable for camping in Ontario parks. The researcher did not perceive rising temperatures as a threat to park visitation in the northern regions of Ontario.

The two parks that were selected for this study, Pinery Provincial Park in the south-western region and Grundy Lake Provincial Park in the central (or near north) region were chosen for the following reasons. First, the researcher intended that the two parks which were to be chosen, even before considering any other qualifying criteria would be representative of two different camping experiences and natural park environments. Looking at the variety of parks within the three most southern regions of Ontario, those having substantial populations of campers, two logical park classifications became evident. The one type was that of a Great Lakes costal park and the other was an in-land Canadian Shield park. After deciding upon these two different park groupings, the researcher then proceeded to identify the parks from within these two classifications which had the greatest number of campsites. Pinery had the greatest number of campsites of all provincial parks in Ontario and was a fitting representative of a Great Lakes coastal park in Ontario. Grundy Lake had the greatest number of campsites among the parks defined as in-land Canadian Shield parks, and again was seen as a fitting representative of this classification.

Grundy Lake Provincial Park has been classified by the Ontario Ministry of Natural Resources as a Natural Environment park; it covers 3,614 ha and is within the Central park region (Ontario Parks, 2010a). The park contains nine different campgrounds with a total of 485 campsites; 138 of these campsites have electrical service. All the registered sites are in close proximity to one of the eight fresh water lakes within the park boundaries. Seven of the eight lakes are fishable and are populated with fish species such as Bass, Northern Pike, Panfish, Walleye, Crappie and Brown Bullhead (Ontario Parks, 2010a). One of the lakes has been designated as a nature reserve, on which fishing is not allowed. Motorised boating is not allowed on any of the lakes in the park. All of the 485 camp sites offer modern amenities such as flushing toilets, wash rooms, showers, and access to laundry facilities. Back country camping is also available within the park, but was not the focus of this study. Grundy Lake Provincial Park is populated by a mixed forest of both coniferous and deciduous trees. The park is close to the northern limits of the Great Lakes-St. Lawrence lowlands forest region so tree species such as Red and White Pine, Maple and Yellow Birch are very evident within its forests (Ontario Parks, 2010a). However, trees common to the northern boreal forest region, such as White Birch, Poplar and Jack Pine can also be found within Grundy Lake's mixed forest; accurately representing its location just south of the border between southern and northern Ontario (Ontario Parks, 2010a). The park is located on the Canadian Shield; as such the landscape is very rocky, even within its forested areas. Many of the lakes are bordered by either sloping smooth rock face or rising cliffs.

Pinery Provincial Park has also been classified by the Ontario Ministry of Natural Resources as a Natural Environment park; it covers 2,532 ha and is within the South-western park region (Ontario Parks, 2010b). This park contains only three different campgrounds but has a total of 1000 campsites. There are 404 campsites at Pinery that offer electrical service. The park rests on the coast of Lake Huron which is populated with Perch, Salmon, Rainbow Trout, Bass, Panfish and Pike; all of which support the activity of fishing at the park (Ontario Parks, 2010b). One of the significant differences between Pinery and Grundy Lake is that motorised boating is allowed on Lake Huron, whereas canoeing and kayaking are the dominate boating activities at Grundy Lake. The 1000 campsites at Pinery all offer modern amenities such as flushing toilets, wash rooms, showers, and access to laundry facilities. Pinery's sand dunes are the dominant natural feature. They are more than 30 metres high near the park entrance. They descend towards the shore of Lake Huron which has created a series of parallel dunes. Plant species such as Sea Rocket and Marram Grass grow along the dunes and the beach helping to hold the sand in place (Ontario Parks, 2010b). Pinery is also home to the largest Oak savannah woodlands remaining in North America. The Oak savannah ecosystem, which once dominated the Great American Plains, is now considered rarer than the rain forest (Ontario Parks, 2010b). The park is home to 700 plant species, 300 bird species, 30 species of mammals and 60 species of butterflies (Ontario Parks, 2010b). Pinery is a very sandy park; it is a known as a beach environment yet drifts back into a densely populated southern forest.

In 2009, among the 53 provincial parks in the Central region, there were 2,964,875 visitor days recorded; of which 1,305,455 were considered camper nights (OMNR, 2010). At Grundy Lake Provincial Park, in 2009, there were 112,892 visitor days recorded, of which 107,568 were considered camper nights (95.3%). Therefore, in 2009, visitation to Grundy Lake represented 3.8% of total park visitation to the Central region and 8.2% of camping in the Central region. There are 4,933 developed campsites in the Central park region of Ontario (OMNR, 2010). Therefore, the 485 campsites at Grundy Lake represent 9.8% of the total campsites in the Central region. The average length of stay for campers at Grundy Lake is 4.6 nights and the park averages a 69% total occupancy rate during the months of July and August (OMNR, 2010).

In 2009, among the 40 provincial parks in the South-western region, there were 2,345,275 visitor days recorded, of which 1,410,000 were considered camper nights (OMNR, 2010). At Pinery Provincial Park, in 2009, there were 625,002 visitor days recorded, of which 502,460 were considered camper nights (80.4%). Therefore, in 2009, visitation to Pinery represented 26.6% of total park visitation to the South-western region and 35.6% of camping in the South-western region. There are only 3,956 developed campsites in the South-western park region of Ontario (OMNR, 2010). As a result, the 1000 campsites at Pinery make up a very substantial 25.3% of the total campsites in the South-western region. The average length of stay for campers at Pinery is 4.2 nights and the park averages a 94% total occupancy rate during the months of July and August (OMNR, 2010).

Table 3.1 presents the climate normal (1971-2000) taken from the weather stations in Sarnia and Sudbury. The weather station in Sarnia was been chosen to represent Pinery Provincial Park, whereas, the weather station in Sudbury represents Grundy Lake Provincial Park. The table below demonstrates daily and monthly averages for climate variables such as temperature, rainfall, wind speed and humidex ratings. The climate information is for the months of July and August and where possible, has also been averaged to represent these two summer months combined.

Table 3.1 – Climate Normals (1971-2000) for Sarnia and Sudbury

Climate Variable	July		August		Summer Average	
	Sarnia	Sudbury	Sarnia	Sudbury	Sarnia	Sudbury
Average Daily Temp. (°C)	20.9	19	20	17.7	**20.5**	**18.4**
Avg. Daily Max. Temp. (°C)	26.3	24.8	25.3	23.1	**25.8**	**24**
Avg. Daily Min. Temp. (°C)	15.5	13.3	14.8	12.3	**15.15**	**12.8**
Extreme Max. Temp. (°C)	**39.1**	**38.3**	**37.3**	**36.7**		
Date:	25/1988	31/1975	06/1988	01/1975		
Avg. Rainfall (mm)	74.1	76.6	77.1	96.7	**75.6**	**86.7**
Extreme Daily Rainfall (mm)	**72.4**	**91.8**	**59.4**	**77.7**		
Date:	01/1997	24/1977	24/1985	21/1972		
Avg. Wind Speed (km/h)	12	13.5	11.5	13.2	**11.8**	**13.4**
Extreme Wind Speed (km/h)	**53**	**77**	**67**	**64**		
Date:	04/1974	21/1968	22/1987	13/1956		
Extreme Humidex	**49.9**	**42.9**	**47.3**	**49.2**		
Date:	14/1995	31/1975	02/1988	19/1955		

Data source: Environment Canada (2011a, 2011b)

Based on the Köppen-Geiger climate classification (Peel et al. 2007), these two parks share vary similar climates. Grundy Lake is located in a temperate continental climate zone (dfb), whereas, Pinery is on the border of both a temperate continental climate zone (dfb) and a warm continental climate zone (dfa). Nonetheless, when reviewing the information conveyed in Table 3.1, it is evident that on average, the climate at Grundy Lake is cooler, wetter, and windier than it is at Pinery. This accurately reflects the disparity in temperature that should be expected based on the more northern location associated with Grundy Lake compared to Pinery. The differences in climate between these two parks coincide well with the different types of activities which are common, and the different types of camping experiences that are expected, at these two parks. For example, Pinery is most notably a beach-oriented park and as such requires warmer, dryer and less windy climate conditions to maintain camper satisfaction. However, Grundy Lake is associated with a more back woods feel; canoeing, kayaking and fishing prevail as much more common activities there. As a result, the cooler, wetter, windier conditions may not impact camper satisfaction as much as they would at a predominantly beach-oriented park such as Pinery.

3.3 – Research Approach

A quantitative approach, with the use of a structured, closed-ended survey instrument was decided to be the most effective and efficient way to explore the weather preferences and weather related decision-making of campers in Ontario's provincial parks. It has been recognised that the reach of survey research far exceeds that of many other conventional forms of inquiry (Babbie, 2001). This was an important advantage as the climate preferences of tourists has been seen to vary across different user types (de Freitas et al. 2008; Scott et al. 2008a; Rutty & Scott, 2010). With this in mind, it became necessary to draw upon a large sample of campers in order to accurately reflect the weather preferences and subsequent decision-making of the camping market at large. Another benefit of using a survey-based approach was that the researcher was able to derive the necessary information from a respondent in only a short period of time (15-20 minutes). In addition, the respondents were able to complete the surveys independently which allowed the researcher more time to continue their efforts to recruit more participants and collect additional surveys. This also helped to reduce the introduction of potential biases as the researcher was not present or able to interact with the participant while they completed the survey package (Babbie 2001; Creswell 2003). It has also been acknowledged that surveys have the potential to produce manageable data which can easily be entered into a variety of computer software packages allowing for efficient and effective data analysis (Babbie, 2001).

It was decided that the most effective and time sensitive manner in which to distribute and collect the survey instrument was to actually visit each park. The researcher visited each park twice, for a period of three days each time, during which time the researcher travelled on foot from campsite to campsite requesting the participation of campers for the study. The researcher was dressed in University of Waterloo apparel and clearly identified their self as a Graduate Student while still standing on the road beside each site. If the researcher was permitted to enter the site they then went on to introduce the study and seek participation from the camper. If the camper agreed to participate the researcher left the survey with them and anyone else on the site who had agreed to participate. The researcher then informed the camper(s) their intention to return in approximately one hour in order to collect the completed survey. Campers were able to pin the survey to their campsite post, which made collection easy and hassle free. In addition, the researcher had a supply of self-addressed, mail back envelopes, in case the participant could not complete the survey in the time allotted (i.e. they were packing down to leave), or if they simply chose to complete the survey at another time (i.e. when they got home from vacation). Other options for distributing and collecting the surveys were considered (mail-out/mail-back surveys; on-line surveys). However, the pre-described form was chosen as it was expected to have the greatest response rate. A time effective and highly successful survey implementation process was essential given the time and resource constraints associated with this study.

Surveys have been identified within the existing tourism literature as an appropriate and useful way to explore a research topic from the tourist's perspective. A number of studies have employed survey instruments in an effort to examine tourist motivations (Lohmann and Kaim, 1999; Kozak, 2002; Hamilton, 2005; Perry, 2006). Surveys have also been used to explore the way in which tourists make travel decisions with specific regard to destination choice (Hamilton, 2005; Hamilton & Lau, 2005). Even more relevant to this study, a significant number of studies have used a survey-based approach to identify climate preferences for tourism in a variety of different contexts (Morgan et al. 2000; Gomez-Martin, 2004; Mansfeld et al. 2004; de Freitas et al. 2008; Scott et al. 2008a; Rutty & Scott, 2010; Moreno et al. 2009). Given the widespread application of surveys as a means of inquiry in the areas of both tourist decision-making and climate preferences for tourism, the use of surveys for this study can be both justified and condoned.

3.4 – Survey Design

The design of this survey was partially based on the work Scott et al. (2008a). Their study utilised a survey-based approach to identify climate preferences for three different tourism contexts (beach, urban and mountain), from within three different study areas (Canada, New Zealand and Switzerland). This survey also took into account the modifications made to Scott et al.'s (2008a) survey, set forth by Rutty and Scott (2010), as a second generation survey designed to assess climate preferences for beach and urban tourists in the Mediterranean. The decision to adapt the survey instrument for this study from existing surveys used in previous studies in this field was made in order to allow comparability between the studies. This survey also used questions included in the Ontario Parks User Survey (OMNR, 2008), in order to accurately and consistently classify the different types of campers within the two parks. Given the differing nature of tourism contexts being examined by Scott et al. (2008a) as well as Rutty and Scott (2010), in comparison to the park tourism context being explored in this study, fundamental changes were made to the survey instrument in an effort to apply the existing tool to park tourism, and even more specifically, to a camping context. Beyond the existing measures employed to determine climate preferences, this survey also constructed a means to assess the weather related decision-making of campers within the two parks. The additional questions that were included were designed to explore weather based decision-making as well as to identify temporal weather thresholds among campers. Questions designed to explore weather based decision-making looked specifically at whether or not campers indicated their intentions to leave the park early in response to a number of different hypothetical weather scenarios. Whereas, questions directed at identifying temporal weather thresholds sought to determine the length of time that campers were willing to endure a particular weather condition, before they indicated their intentions to leave the park early.

The survey instrument (Appendix A) began with a cover letter explaining the nature of the study and what would be expected of a potential participant. The survey consists of five sections in total: (1) Ontario Parks Camping Experience; (2) Weather Preferences for Camping in Ontario; (3) Influence of Weather on Camper Decision-Making; (4) Ontario Parks Management Recommendations; and (5) Camper Characteristics. Each section of the survey instrument will be explained in further detail beneath the corresponding headings, which are to follow.

3.4.1 – Ontario Parks Camping Experience

The first section of the survey focused on identifying the different types of campers that participated in the study from each park. The questions in this section were taken primarily from the Ontario Parks User Survey (OMNR, 2008). The use of questions from this existing Ontario parks survey allowed for comparability between both sources in order to verify whether or not the samples from the two parks in this study were representative of the larger camper market segment for park tourism in Ontario.

This section began by assessing how often respondents camped during a typical year, as well as how many times they had been to the study park during their life time. These questions helped to determine the degree of camping experience respondents had, as well as their loyalty to the study park. The next set of questions were aimed at determining the types of activities respondents intended to participate in during their trip to the park and which activities they intended to spend the most time engaging in. This allowed the respondents to be grouped into different activity classes, such as active versus passive or water-based versus land-based activities, in order to determine the differences in weather preferences and weather related decision-making between these different activity-based groupings. This section also inquired as to the nature of the respondent's current trip; determining whether it was part of a larger tour or if it was the main destination for their trip away from home. Respondents were also asked what type of accommodation (i.e. tent, tent trailer or travel trailer) they planned to use while at the park and what forms of climate control (i.e. air conditioning, heating, or fan only) they would have access to during their stay. This component of the survey instrument helped to explain the differences in reported weather sensitivities based on the various forms of accommodation and accompanying climate control systems.

Finally, respondents were asked to rank their present satisfaction with their current trip as well as to rank the following aspects of their camping experience in order of importance with regard to their overall trip satisfaction: performance of park staff and services; quality of park facilities; condition of natural environment; and presence of ideal weather conditions. These closing questions helped to determine the present level of satisfaction that respondents had with their current trip and if this may have had an effect on their reported weather preferences and weather related decision-making. Additionally, these questions also allowed the researcher to determine the level of importance that campers placed on the presence of ideal weather conditions in comparison to other elements of the camping experience, elements which had already been established as integral to overall trip satisfaction and used in previous surveys conducted by Ontario Parks (OMNR, 2008). This information was also useful in assessing the effect that the level of importance respondents placed on the presence of ideal weather conditions had on their stated weather preferences and weather related decision-making.

3.4.2 – Weather Preferences for Camping in Ontario

This section began by assessing the level of importance campers assigned to a number of different weather aspects. Included in these weather aspects were: the absence of strong winds; the absence of rain; the presence of sunshine; as well as comfortable day, night and water temperatures. Respondents were asked to rank each weather aspect according to its level of importance in relation to overall trip satisfaction. Primarily, this allowed the researcher to determine which weather aspects were of greatest importance to campers in Ontario parks. Secondarily, it also provided a measure to determine the effect that varying levels of importance for different weather aspects had on other research variables such as preferred temperatures and weather related decision-making.

The main portion of this section consisted of a series of questions designed to determine preferred temperatures for camping in Ontario parks. Respondents were asked to communicate what they perceived to be unacceptably hot, ideal or unacceptably cool temperatures for camping in Ontario parks. The questions were structured in such a way as to create a distinction between preferred temperatures for the spring/fall seasons and the summer season (July and August). This was done since it was perceived that preferred temperatures would vary depending on the season of visitation (i.e. 18°C may be perceived as ideal for the spring/fall season but unacceptably cool during the summer months). A distinction was also made between day-time and night-time temperature preferences. Again, it was expected that temperature preferences would vary based on the time of day (i.e. 30°C may be ideal during the day but could be perceived as unacceptably hot during the night). Respondents were asked to circle the range of temperatures that best described what they perceived to be either unacceptably hot, ideal or unacceptably cool. This was done by circling degrees on a temperature scale that recorded degrees in Celsius and Fahrenheit. The decision to include both measures of temperature was made in order to allow those that were more familiar with either of the systems of measurement to still complete this section accurately and easily. This form of assessment for preferred temperatures and weather preferences in general was identified by Rutty and Scott (2010) as a more accurate and encompassing method since it allows respondents to define any number of degrees as either ideal or unacceptable. This was viewed as more innovative than previous approaches that limited the respondent to predetermined temperature ranges or to only one specific degree.

3.4.3 – Influence of Weather on Camper Decision-Making

The purpose of this section was to identify the intended responses of campers to a series of different weather conditions which were of increasing intensity and spread over increasing periods of time. Respondents were asked how they would respond to unacceptably cool and unacceptably hot temperatures, light and heavy rain conditions, as well as light and strong wind conditions. For each weather condition, respondents were given a series of possible responses which included: adjust activities to accommodate weather; leave the park early; not return to the park again; or don't know. For each of the six weather conditions presented, respondents were asked to identify how they would respond at each interval as the duration of that specific weather condition increased. Each hypothetical weather scenario presented the defined weather condition over 1-12 hours; 13-24 hours; 25-48 hours and then finally a period of time greater than 48 hours. This structure allowed the researcher to identify the temporal weather thresholds for each specific condition. The research question answered in specific was: how much time of a particular weather condition were campers willing to endure before indicating their intentions to leave the park early? This section also enabled the researcher to identify which weather conditions had the greatest influence over camper decision-makings as well as which weather conditions campers were willing to endure for the least amount of time before indicating their intentions to leave the park early..

Additionally, following each weather condition grouping (temperature, rain and wind), if a respondent had answered "adjust activities to accommodate weather" for any of the given time intervals, they were then asked to describe what adjustments were made. This was an open-ended portion of the survey which not only helped to identify how campers responded to different weather conditions, but also gave respondents an opportunity to communicate other sentiments about the study or research approach. This open-ended portion of the survey was found to be very interesting and beneficial as it provided additional information that was useful in the interpretation of results as well as providing direction towards future revisions of the survey instrument, if it were to be modified and used again in some form.

3.4.4 – Ontario Parks Management Recommendations

The purpose of this section was to provide relevant consumer feedback to Ontario Parks and the Ontario Ministry of Natural Resources regarding what can be done from a management perspective to: (a) improve visitor satisfaction during less than ideal weather conditions; and (b) to decrease camper vulnerability during extreme weather conditions. Again, this portion of the survey utilised an open-ended question approach, where respondents were provided with a comment box and given opportunity to communicate any suggestions they might have in response to these two lines of inquiry.

3.4.5 – Camper Characteristics

The purpose of this section was to further classify the respondents based on demographic characteristics such as age, gender and place of residence. The survey questions in this section were primarily taken from Ontario Parks User Survey (OMNR, 2008) to allow for a comparison of the study sample to the full demographics of the park tourism market in Ontario. Within this section, respondents were also asked to describe the composition of their camping group; such as, how old were each of the group members, what was their gender and how many members in total was the group comprised of? From the information collected based on the responses to "where is your permanent place of residence?" it was also possible to get a sense of how far the respondent travelled to reach the park. This was made possible by dividing all the responses of those who lived permanently in Ontario into two different groups, one that represented recreationists (those that lived within 80km of the park) and another the represented tourists (those that lived further than 80km from the park).

3.4.6 – Pre-testing and Revisions

The survey instrument went through a rigorous review and revisions process before the final product was established. The review and revision process started in the Department of Geography and Environmental Management at the University of Waterloo, under the close supervision of Dr. Daniel Scott. From there, the survey was brought to the Department of Recreation and Leisure Studies, still at the University of Waterloo, where it was presented to Dr. Paul Eagles, whose criticisms and recommendations were given careful consideration. Finally, the revised survey instrument was sent to Dr. Will Wistowsky from the Protected Area

Science Division at the Ontario Ministry of Natural Resources. Dr. Wistowsky's comments and proposed revisions were also taken into account and upon implementation the survey instrument received ministry approval for distribution in the two provincial parks that had been selected as case studies for this project.

Before beginning the field research and survey implementation process, a pilot test was conducted with friends and family members (N=21). The prerequisite for participation in the pilot test was that respondents had previously been on a camping trip to an Ontario provincial park. The test respondents were asked to complete the survey as if they were currently at the provincial park they visited last. This stage in the revisions process was also very helpful as it brought to light some new issues in regard to respondents not being able to understand certain questions and question formats. Based on the feedback provided by the pilot test participants, further revisions were made to the survey instrument which made it easier to complete. The test sample involved a wide range of participants including elderly people (older than 65 years), middle aged people as well as young people (younger than 25 years). The pilot test also drew upon the responses of participants in different income brackets and from different educational backgrounds. Finally, the survey instrument received clearance from the University of Waterloo Research Ethics Board in July of 2010.

3.5 – Survey Implementation

Survey implementation involved four field trips to the two provincial parks during the months of August and early September. The researcher reserved a site in a central location at each of the parks for a period of two nights each time. Table 3.2 shows the dates of each trip to the two different parks as well as the number of surveys which were successfully collected as a result of each trip. During the process of survey implementation, the researcher experienced a remarkable acceptance rate among the camper population which was canvassed. Of the 844 campers approached, to whom the study was introduced and their participation was requested, 801 agreed to participate. This translates into a 95% acceptance rate for study participation among the camper population at these two parks. The return rate was also, unexpectedly high. Of the 801 campers who agreed to participate in the study, 721 respondents returned a usable survey, which represents a 90% return rate for the survey instrument; which is very high for this type of research method.

Table 3.2 – Trip Dates, Collection Modes and Total Surveys Collected

Provincial Park	Dates	Surveys Collected In-person	Mail-back Surveys Returned	Total Surveys Collected
Pinery	Aug. 12-14	204	3	206
Grundy Lake	Aug. 19-21	160	3	163
Pinery	Aug. 23-25	194	2	196
Grundy Lake	Sept. 1-3	145	3	148
Not Specified	Aug. 12 to Sept. 3	N/A	7	7
TOTAL	**Aug. 12 to Sept. 3**	**703**	**18**	**721 (N=721)**

3.6 – Data Analysis

The initial step in the data analysis process was to code each question included in the survey in order to easily and consistently input the data from all the surveys that were returned (N=721). The coding was done in such a way as to allow the survey data to be easily and effectively enter into Statistical Package for the Social Sciences (SPSS), a software program that utilizes descriptive and inferential statistical tools to analyze quantitative data. Once the codebook was constructed, the researcher then proceeded to enter all the survey data into SPSS. After all the survey data was entered into the datasheet on SPSS the researcher began to run preliminary tests to understand the nature of the sample and the responses to each question individually. These tests included looking at both frequencies and descriptive statistics.

The data from the two parks was originally looked at as a combined data set regarding the weather preferences and weather related decision-making of summer campers in Ontario parks. Given the volume of data that was derived from the survey instrument, for the purpose of this study, the researcher chose to examine the responses that pertained to the summer months only. This decision was made, primarily due to time and resource limitations. However, the researcher also selected the summer data over that of the spring and fall seasons to satisfy the inquiry concerning whether or not rising temperatures may result in uncomfortable weather conditions for summer camping in Ontario parks. In later stages of the data analysis process, the researcher used tools such as Chi-square tests, Mann-Whitney U Tests and T-Tests to determine the differences between the two parks in relation to the different weather preferences and decision-making variables. The five main subject areas with their accompanying dependent variables considered in the data analysis process were: the importance of ideal weather conditions; preferred day-time temperatures; preferred night-time temperatures; intended responses to weather and temporal weather thresholds.

Another important stage in the data analysis process was determining the differences between user types in relation to the various weather preferences and decision-making variables. Given the varying nature of the different forms of measurement used to establish the numerous user types within the sample, the researcher had to employ a number of different statistical tools in order to accomplish this task. These operations included T-Tests, One-way ANOVAS, simple regression models, discriminant analyses, Kruskal-Wallis Tests, Mann-Whitney U Tests, and Chi-square tests.

3.7 – Research Limitations

In an effort to overcome the limitation acknowledged by Scott et al. (2008a) and Rutty and Scott (2010) regarding the homogeneity of certain demographic variables within their samples (primarily age and level of education); this study utilised an *in-situ* survey-based approach in an effort to identify weather preferences and weather related decision-making for summer camping in Ontario parks. A limitation recognised by Scott et al. (2008a) regarding *in-situ* studies of preferred climates for tourism relates to potential biases caused by the prevailing weather conditions while implementing the survey. With regards to the research at hand, potential biases caused by the prevailing weather conditions at each park during the time of survey implementation must be recognised as a limitation to this study. It was evident that weather conditions at Pinery, during both times the researcher visited the park for the purpose of this study, were much more favourable for camping, park visitation and outdoor recreation in general, than those which were observed while at Grundy Lake. Table 3.3 records the historical weather data for each of the days during which surveys were completed by campers at the two different parks.

The weather conditions while surveying respondents at Grundy Lake on both trips were notably cooler and substantially wetter than the weather conditions during either of the trips to Pinery. Seeing that the unfavourable weather conditions (cool and rainy) were isolated to one park only (Grundy Lake), it became impossible to isolate the effect of such weather on camper responses. As such, it is difficult to say whether or not the observed differences in weather preferences and weather related decision-making between these two parks is a result of the disparate weather conditions that prevailed during the collection periods or if it is actually because of the differing natures of these two parks, the activities associated with them, and the type of campers that visit them. It is the position of the researcher that the bulk of differences are a result of the latter and cannot be attributed entirely to bias associated with on-site weather conditions.

Table 3.3 – Historical Weather Data for the Study Parks during Survey Implementation

Date	Max Temp. (°C)	Min Temp. (°C)	Mean Temp. (°C)	Total Rain (mm)	Max Wind Speed (km/h)
PINERY PROVINCIAL PARK (Sarnia, Ontario)					
Aug. 12	26.8	19.5	23.2	0	<31
Aug. 13	28.9	18.7	23.8	0	35
Aug. 14	29.3	21.4	25.4	0	35
Aug. 22	23.3	18.1	20.7	Trace	37
Aug. 23	23.3	16.8	20.1	0	<31
Aug. 24	24.0	16.8	20.3	2.8	46
GRUNDY LAKE PROVINCIAL PARK (Sudbury, Ontario)					
Aug. 19	19.6	11.5	15.6	28.2	Missing
Aug. 20	23.8	8.3	15.6	5.8	<31
Aug. 21	21.6	12.2	16.9	23.6	44
Sept. 1	29.1	18.8	24.0	3.2	52
Sept. 2	24.2	16.7	20.5	Trace	32
Sept. 3	23.0	12.9	18.0	18.4	48

Data source: Environment Canada (2011a, 2011b)

However, the presence of such disparate weather conditions between the two parks during the data collection process has presented a potential bias and is a formidable limitation to this study. One of the potential biases that may have arisen, especially within the data collected from Grundy Lake, is that seeing temperatures were low and rainfall was high, many campers may have already left the park early or decided not to visit the park at all. As a result, the data collected during this time may not capture this portion of the camper market and may actually over represent those who are willing to endure longer periods of unfavourable weather conditions and have a greater propensity to adjust their activities to accommodate the weather, rather than leaving the park early in response.

This limitation could be overcome by increasing the number of trips to each park in an effort to be present at the park and actively collecting data during a full range of different weather conditions. This would significantly increase the time and resources necessary to complete the study and as a result, it was not feasible for the current project. Another approach which could have been taken would be to disregard the data collected at Grundy Lake during the periods when unfavourable weather conditions prevailed and instead return to the park at a future time in an effort to collect new data that may not be subject to such an environmental bias. There were two main reasons why such an approach was not possible for this study. First, the original field trips to the parks couldn't be scheduled until late in the summer forcing any additional trips to fall well into September. A sample of campers taken during the middle of September would not be representative of the camper market present at the parks during the peak visitation period (July and August). Second, the time and resources required to recollect the data every time weather conditions presented a potential bias, were simply not available to the researcher during the process of this study.

Another limitation to the present study was the limited number of parks which were considered as case studies, which came as a result of time constraints and resource limitations. The parks were selected to be representative of only two different types of camping experiences in Ontario, despite how different these two parks were, the limited number selected were not able to represent the full range of camping experiences available within Ontario's provincial park system. For example, camping experiences which were not captured within this study include back country camping, such as is available within the Algonquin park region, as well as the more northern camping experience found in the North-western and North-eastern park regions. It is expected that parks in these regions would have different activity bases and associated climatic requirements and therefore would be accompanied by significantly different weather preferences and subsequent weather related decision-making. As a result, it would be ideal that a study of similar design examine a park from each of the six different park regions in Ontario, as defined by the Ontario Ministry of Natural Resources

(OMNR, 2008), in order to more effectively capture the full range of climate preferences for camping in Ontario parks.

Another area in which the design of this study could have been improved relates to the number of different climate zones for which the climatic preferences for camping were examined and identified. The two parks that were chosen as case studies are located in very similar climate zones. Grundy Lake is found in a temperate continental climate zone while Pinery is within a warm continental climate zone but is very close to the border of the temperature continental climate zone which dominates the southern and central regions of Ontario (Peel et al. 2007). In this regard, a study that examines a number of parks from within a variety of different climate zones would more accurately represent the climate preferences and accompanying weather related decision-making for camping in general. Such a study could more effectively convey the differences in preferences and decision-making which come as a result of the changing climatic conditions associated with each park. In regard to the current study, such an approach was not possible as the amount of resources and time that the researcher had available would not permit extensive travel to a number of different climate zones.

In regard to the survey instrument used to collect the data for this study, the use of mainly close-ended questions limited the type of information that campers could include in response to the various weather preference and decision-making questions they were asked. Close-ended question are an effective means to examine and identify a specific objective but also effectively narrow the range of responses. This limitation may cause certain avenues to become overlooked as the predetermined responses are based on the researcher's foreknowledge and perspective. In addition, the way in which the survey instrument was implemented, in that the researcher was not present during the completion of the survey, limited the ability of the researcher to explain specific questions or portions of the survey which the respondents may have had difficulty understanding or answering. The fact that the researcher was not present during the completion of the survey may have also decreased the number of surveys and survey questions that were deemed useable for the purpose of this study.

Chapter 4 – Results and Discussion

4.1 – Introduction

This chapter presents the results and discusses the findings of this study. Although the appropriate statistical tests were performed in an effort to determine the relationships between all the variables included within the survey instrument, only those which recorded statistically significant relationships (at the 95% confidence level) will be reported within this chapter. This chapter begins with a description of the sample which communicates the characteristics of the respondents that were present within each of the parks selected as case studies. The main portion of this chapter addresses the first three objectives of this study. In relation to the first three objectives, there are five main focal points which will be covered: the importance of weather in relation to overall trip satisfaction; day-time temperature preferences and thresholds; night-time temperature preferences and thresholds; intended responses to hypothetical weather scenarios; and temporal thresholds for different weather conditions (temperature, rain and wind). In accordance with these stated objectives, three main aspects are examined within each section: general responses to each line of inquiry within the total sample; differences between the various user types and then differences between the two parks. Discussion is focused on explaining the observed differences between user types and the between the two parks as well as linking the results of this study to relevant literature in the field of tourism and climatology. This chapter concludes by addressing the final two objectives of this study which were to assess the impact of climate change on park visitation in Ontario and to explore the feasibility of a Climate Index for Park Tourism (CIPT).

4.2 – Description of Sample

The total number of surveys included in this sample is 721. There were more surveys collected from Pinery Provincial Park (N=403), than from Grundy Lake Provincial Park (N=312). There were also 6 surveys that were returned by mail which did not specify which park they were sampled from. The sample was comprised of a representative population of both males (48.6%) and females (51.4%). The number of males and females found in each park did not differ significantly (x^2=0.167, P=0.682). Based on the result of a Mann-Whitney U Test, the age groups reported among campers within each park were also without significant differences (P=0.968).

The origin of campers, based on their permanent place of residence differed significantly within multiple groupings between the two parks (Table 4.1). In particular, significant differences were found between parks in regard to the number of campers who lived within 80km of the park and those who lived further than 80km from the park. This classifying distance of 80km was selected to differentiate between recreationists (<80km) and tourists (>80km), based on the Canadian Tourism Council's (2004) definition of a domestic tourist. There was a significantly greater percentage of campers at Pinery who lived within 80km of the park than there were at Grundy Lake (x^2=38.341, P<0.001). Whereas, there was a significantly greater percentage of respondents who lived further than 80km from the park found at Grundy Lake compared to Pinery (x^2=58.595, P<0.001). In addition, there was a significantly greater percentage of American respondents at Pinery compared to Grundy Lake (x^2=22.810, P<0.001). Because of Pinery's southern location in Grand Bend, it attracts more Americans and is also closer to visitor generating regions such as London, Kitchener, Cambridge, Waterloo, Brantford and Hamilton. Grundy Lake is located further north in Britt, placing a greater distance between the park and visitor generating regions such as the Greater Toronto Area (GTA).

Table 4.1 – Permanent Place of Residence within Sample and between Parks

	Percentage of Campers				
Permanent Place of Residence	**Pinery**	**Grundy Lake**	**Total Sample**	x^2	**P**
Ontario (Less than 80km from Park)	20.1	4.0	**13.0**	**38.341**	**<0.001**
Ontario (More than 80km from Park)	69.8	93.3	**80.1**	**58.595**	**<0.001**
Canada (Outside Ontario)	0.3	1.0	**0.6**	1.585	0.208
USA	9.6	1.0	**5.8**	**22.810**	**<0.001**
International (Outside USA)	0.3	0.7	**0.4**	0.637	0.425

In regard to the camping experience of respondents within the sample, the majority of campers indicated they went on either 1 to 2 (46.0%) or 3 to 5 (32.3%) overnight camping trips each year. However, as shown in Table 4.2, a significant difference (P<0.001) was found between the two parks, showing that campers from Grundy Lake, on average, camped more frequently each year than campers from Pinery.

Table 4.2 – Overnight Camping Trips each Year within Sample and between Parks

	Percentage of Campers					
Provincial Park:	Don't Camp Each year	1 to 2 Trips	3 to 5 Trips	6 to 10 Trips	More than 10 Trips	Mean Rank (P<0.001)*
Pinery	4.8	53.9	26.8	8.6	5.8	**321.71**
Grundy Lake	3.2	36.0	39.3	11.7	9.7	**390.85**
Total Sample:	**4.1**	**46.0**	**32.3**	**9.9**	**7.8**	

* Mean Rank and significance of difference (P) generated through the use of the Mann-Whitney U Test, where higher mean ranks reflect a greater frequency of camping each year.

The number of overnight trips to the study park that campers had been on during their lifetimes also differed significantly between the two parks (P<0.001). A greater percentage of campers from Grundy Lake reported that their current trip was their first visit to the park, compared to those from Pinery. In addition, the percentage of campers that reported higher frequencies of visitation to the study park (the upper three categories of response) were considerably greater within the sample from Pinery than that of Grundy Lake (Table 4.3). The mean rank for each park is an indicator of how many times respondents from within the park sample had been to the park during their life time. In this regard, it can be seen that campers from Pinery, on average, had been to the park more times during their lifetimes than those from Grundy Lake.

Table 4.3 – Overnight Trips to Study Park during Lifetime within Sample and between Parks

	Percentage of Campers					
Provincial Park:	First Trip to park	2 to 5 Trips	6 to 10 Trips	11 to 25 Trips	More than 25 Trips	Mean Rank (P<0.001)*
Pinery	18.5	23.6	17.0	21.8	19.0	**395.31**
Grundy Lake	33.9	32.2	13.0	9.8	11.1	**299.17**
Total Sample:	**25.1**	**27.5**	**15.2**	**16.4**	**15.7**	

* Mean Rank and significance of difference (P) generated through the use of the Mann-Whitney U Test, where higher mean ranks reflect a greater number of trips to study park during lifetime.

The number and type of activities that campers planned to spend at least one half participating in are displayed in Table 4.4. Resting/relaxing, campfire activities and swimming/wading were the top three activities most frequently reported among campers. The activities displayed in rank order, showing those activities that were most frequently reported among campers first then ending with activities less frequently reported, such as motorboating. Each activity was conceptually classified in order to group the activities for analysis purposes.

From the list of activities shown in Table 4.4, three composite measures of activity participation were formed. The three classes of activities derived from the list were physically active activities, relatively passive activities, and water-based activities. It is worth noting that both the physically active and relatively passive classifications are mutually exclusive from one another and no activity is found in both classifications. To such a degree that activities which could be perceived as either active or passive were not included in the classification (motorboating and using playground facilities). On the other hand, the five water-based activities that comprise the third classification are all included within the physically active classification. All three of these composite measures were formed by taking the sum of all activities within each classification and thereby reflect the number of activities within each classification for which a respondent planned to spend at least one half hour participating in.

Table 4.4 – Intended Activity Participation within Sample

Activity intent on spending at least one half hour participating in during current trip to park:	Classification:	n	Pct.
Resting / Relaxing	Passive	699	96.9
Campfire Activities	Passive	686	95.1
Swimming / Wading	Active/Water-based	649	90.0
Reading	Passive	585	81.1
Casual Play (e.g. Frisbee)	Active	584	81.0
Trail Hiking (non-guided)	Active	567	78.6
Viewing / Photographing Nature	Passive	518	71.8
Visiting Viewpoints / Lookouts	Passive	483	67.0
Visiting Friends / Family	Passive	474	65.7
Viewing Photographing Wildlife	Passive	445	61.7
Biking / Cycling	Active	427	59.2
Picnicking	Passive	390	54.1
Canoeing	Active/Water-based	390	54.1
Visiting Historical / Nature Displays	Passive	325	45.1
Fishing	Active/Water-based	291	40.4
Walking With Dog	Active	229	31.8
Attending Staff Presentations	Passive	205	28.4
Kayaking	Active/Water-based	149	20.7
Using Playground Facilities	Exempt	145	20.1
Hiking / Walking (guided)	Active	131	18.2
Motorboating	Exempt/Water-based	16	2.2

Campers at Grundy Lake recorded higher mean scores within all three composite measures (Table 4.5). However, differences between the two parks for the number of physically active activities campers planned to participate in were not found to be statistically significant (t=-1.921, P=0.055). The most interesting of these three measures, when considering the differences between the two parks, is the water-based activity classification (t=-3.869, <0.001). However, further analysis showed that the water-based activities which particularly set these two parks apart were intended participation in: canoeing, kayaking and fishing. This was logical because motorboating is an activity available only at Pinery, specifically on Lake Huron, while motorised boats are prohibited on the waters at Grundy Lake. In addition, swimming/wading was recognised as a more universal activity enjoyed across a wide range of parks in Ontario. For this purpose, a fourth measure was developed which looked only at these three particular water-based activities (t=-5.933, P<0.001). The results show that participation in canoeing, fishing and kayaking is more common among respondents at Grundy Lake than at Pinery.

Table 4.5 – Type of Activity Participation within Sample and between Parks

Number of activities intent on spending at least one half hour participating in:	Mean Value			t	P
	Pinery	Grundy Lake	Sample Total		
Physically Active Activities (0-9)	4.64	4.89	4.74	-1.921	0.055
Relatively Passive Activities (0-10)	6.53	6.88	6.67	**-2.290**	**0.022**
Water-Based Activities (0-5)	1.94	2.26	2.07	**-3.869**	**<0.001**
Canoeing, Kayaking and Fishing (0-3)	0.98	1.41	1.16	**-5.933**	**<0.001**

Table 4.6 lists the activities that respondents planned to spend the most, second most or third most time participating in during their current trip to the park. Swimming/wading, resting/relaxing and campfire activities were still the three activities that the greatest percentage of campers planned to participate in, and in this case, spend the most time engaged in as well. This table reflects responses to three different survey questions: what activity do you intend to spend the most time, the second most time and the third most time participating in? The percentages were calculated by treating these three questions as one. For example, 25.4% of respondents in the total sample indicated visiting friends/family as the activity they intended to spend either the most, second most or third most time participating in. The

activities are displayed in rank order, with the most frequently participated in activity appearing first and that of the least appearing last.

In order to conduct further analysis based on the time respondents intended to spend participating in certain activities and activity types, three most time activity groupings were constructed. These composite measures looked at campers who planned to spend the most time, second most time or third most time in the following three activity groupings: swimming/wading compared to all other activities; resting/relaxing compared to all other activities; and canoeing, kayaking or fishing compared to all other activities.

Table 4.6 – Frequency of Intended Activity Participation within Sample

Activity intent on spending either most, second most or third most time participating in during current trip to park:	n	Pct.
Swimming / Wading	409	58.3
Resting / Relaxing	396	56.4
Campfire Activities	268	38.2
Visiting Friends / Family	178	25.4
Trail Hiking (non-guided)	161	22.9
Biking / Cycling	145	20.7
Reading	119	17.0
Casual Play (e.g. Frisbee)	78	11.1
Canoeing	76	10.8
Fishing	65	9.3
Walking with Dog	54	7.7
Viewing / Photographing Nature	29	4.1
Kayaking	19	2.7
Picnicking	18	2.6
Hiking / Walking (guided)	16	2.3
Viewing / Photographing Wildlife	10	1.4
Visiting Viewpoints / Lookouts	7	1.0
Motorboating	7	1.0
Visiting Historical / Nature Displays	4	0.6
Using Playground Facilities	2	0.3
Attending Staff Presentations	1	0.1

Differences between the two parks concerning activity popularity and frequency of participation as seen by comparing these most time activity groupings are displayed in Table 4.7. Swimming/wading was a significantly more popular activity (x^2=28.817, P<0.001) at Pinery than it was at Grundy Lake. In addition, campers at Pinery were significantly more interested in resting/relaxing than respondents from Grundy Lake (x^2=6.678, P<0.001). The most significant difference between these two parks in this regard was participation in water-based activities such as canoeing, kayaking and fishing (x^2=71.403, P<0.001).

Table 4.7 – Activity Participation based on Most Time within Sample and between Parks

Most Time Activity: [a] Group	**Percentage of Campers** **Pinery**	 **Grundy Lake**	 **Total Sample**	x^2	**P**
Swimming/Wading:					
Other Activities	34.7	54.8	**43.5**	**28.817**	**<0.001**
Swimming/Wading	65.3	45.2	**56.5**		
Resting/Relaxing:					
Other Activities	40.9	50.6	**45.2**	**6.678**	**0.010**
Resting/Relaxing	59.1	49.4	**54.8**		
Canoeing, Kayaking or Fishing:					
Other Activities	90.6	66.0	**79.9**	**65.871**	**<0.001**
Water-based Activity	9.4	34.0	**20.1**		

[a] Based on activity intent on spending either most, second most or third most time participating in.

Two sets of groups were examined when considering trip circumstances that lead up to the current trip being studied. These involved whether or not the camping group reserved the site they were currently camping on and whether or not the park being studied was in fact the main destination of their trip away from home. These two sets of groups were difficult to use later in the analysis as they only represented a very small percentage of the overall sample (Table 4.8).

Table 4.8 – Trip Circumstances within Sample and between Parks (Chi Square)

Trip Circumstance: Group	**Percentage of Campers** **Pinery**	 **Grundy Lake**	 **Total Sample**	x^2	**P**
Site Reservation:					
Did Not Reserve Site	5.8	13.1	8.9	**11.462**	**0.001**
Reserved Site	94.2	86.9	91.1		
Main Destination:					
Not the Main Destination	3.8	10.3	6.7	**11.163**	**0.001**
Main Destination	96.2	89.7	93.3		

When considering the differences between parks for these two trip circumstances, significant differences were associated with both site reservation (x^2=11.462, P=0.001) and main destination (x^2=11.163, P=0.001) groupings. A greater percentage of respondents at Grundy

Lake did not reserve their campsite in advance and also indicated that the park was not the main destination of their trip away from home.

Two other classifying measures were examined in relation to circumstances surrounding the current trip to the park. These were the number of nights campers intended to stay at the park and the number of days prior to arrival that their site reservation was made (Table 4.9). Within the total sample, on average, campers planned to stay at the park for five nights (mean=5.27 nights) and reserved their site more than three months in advance (mean=97.83 days). Significant differences between the two parks were found in both the number of nights planned to stay at the park (t=-2.733, P=0.007) and the number of days in advance that site reservations were made (t=6.349, P<0.001). On average, the length of planned stay was approximately one night longer among respondents at Grundy Lake than it was at Pinery. However, respondents at Pinery reserved their campsite, on average, over a month earlier than campers at Grundy Lake.

Table 4.9 – Trip Circumstances within Sample and between Parks (T Tests)

Trip Circumstance:	**Mean Value**			**t**	**P**
	Pinery	**Grundy Lake**	**Total Sample**		
Number of NIGHTS planned to stay in park during current visit (1-60)	4.91	5.78	5.27	**-2.733**	**0.007**
Number of DAYS before trip site reservation was made (1-150)	109.83	73.24	97.83	**6.349**	**<0.001**

Table 4.10 displays the types of camping vehicles/shelters that were present on campsites within the total sample. Tents were the most commonly reported camping shelter with 59.2% of the sample indicating that they had a tent present on their campsite. The presence of a dining shelter on the campsite was treated differently than all other camping shelters/vehicles as it did not serve as a form of accommodation (since dining shelters are not typically slept in). Tent trailers (26.1%) and travel trailers (20.1%) were the next two most commonly utilised camping vehicles/shelters within the sample.

From the types of camping vehicles/shelters listed in Table 4.10, two particular groupings were constructed in regard to the nature of accommodations while at the park. The first of these two groupings classified the types of camping vehicles/shelters into three different groups: traditional camping shelters, luxury camping vehicles and fixed structures. However, due to the small percentage of campers within the fixed structure group and the fact that only Pinery offered this form of accommodation, this group was not included in any subsequent analyses. In addition, when forming these three groups, dining shelters and vans were not included nor classified within any of these three groups. Dining shelters were not classified as it was unlikely that campers were using a dining shelter as a form of accommodation. Vans were excluded from this process as well as it was unclear whether or not these vans were a form of accommodation or simply there as a mode of transportation. The second group concerning the nature of accommodation involved looking at those who had a tent present of their site compared to those who did not have a tent present.

Table 4.10 – Type of Camping Vehicle/Shelters in use within Sample

Type of Camping Vehicle / Shelter on Site:	Classification	n	Pct.
Tent	Traditional	427	59.2
Dining Shelter	Not classified	211	29.3
Tent Trailer	Traditional	188	26.1
Travel Trailer	Luxury	145	20.1
Van	Not classified	70	9.8
Motorhome	Luxury	31	4.3
Fifth Wheel	Luxury	23	3.2
Yurt	Fixed structure	17	2.4
Truck Camper	Traditional	6	0.8
Cabin	Fixed structure	2	0.3

There were no significant differences between the two parks found within either of these accommodation groupings (Table 4.11). Nonetheless, it is interesting to note that only a small percentage of campers within the total sample (19.0%) reported having a luxury camping vehicle (travel trailer, motorhome or fifth wheel) on their site.

Table 4.11 – Nature of Accommodation within Sample and between Parks

Nature of Accommodation: Group	Percentage of Campers: Pinery	Grundy Lake	Total Sample	x^2	P
Type of Camping Shelter/Vehicle:					
Traditional Shelter	81.6	80.3	81.0	0.193	0.661
Luxury Vehicle	18.4	19.7	19.0		
Tent Camping:					
No Tent on Site	42.4	37.1	40.1	2.010	0.156
Tent Present on Site	57.6	62.9	59.9		

Access to climate control systems, which was in direct relation to the nature of accommodation, was perceived to be of significant importance when considering weather preferences and weather related decision-making for summer camping in Ontario. Within the total sample, 43.6% of campers reported having access to heating while only 26.4% indicated having access to cooling (air conditioning). No significant differences were observed between the two parks in relation to access to either of these climate control systems (Table 4.12).

Table 4.12 – Access to Climate Control Systems within Sample and between Parks

Climate Control Systems: Group	Percentage of Campers: Pinery	Grundy Lake	Total Sample	x^2	P
Heating:					
No Access to Heating	58.0	54.2	56.4	0.997	0.318
Access to Heating	42.0	45.8	43.6		
Cooling:					
No Access to Cooling	72.8	74.7	73.6	0.339	0.560
Access to Cooling	27.2	25.3	26.4		

When considering the composition of groups and their relationship with weather preferences and weather related decision-making, two particular groupings were examined. The first grouping considered the presence of children (14 years and younger) within the camp group. The second grouping looked at the presence of seniors (65 years or older) within the camp group. Within the total sample, 55.5% of respondents indicated that they had one or more children in their group. A much smaller percentage of campers indicated the presence of one or more seniors within their group (only 9.7% within the total sample). There were no significant differences found between parks concerning the presence of children or seniors within camp groups (Table 4.13).

Table 4.13 – Group Composition within Sample and between Parks

Group Composition: Characteristic	Percentage of Campers: Pinery	Grundy Lake	Total Sample	x^2	P
Children (14 years and younger):					
No Children in Group	46.4	42.0	44.5	1.388	0.239
1 or more Children in Group	53.6	58.0	55.5		
Seniors (65 years and older):					
No Seniors in Group	89.8	91.0	90.3	0.290	0.590
1 or more Seniors in Group	10.2	9.0	9.7		

The final consideration when looking at respondent characteristics and the differences between parks was overall satisfaction with the current trip to the park. Within the total sample, the mean value for overall trip satisfaction was 4.45, based on a 5 point scale where higher scores reflected a higher level of satisfaction with the current trip experience. Mean values for trip satisfaction compared between Pinery (4.45) and Grundy Lake (4.44) were virtually identical and therefore tests did not support a significant difference between the two parks (t=0.252, P=0.801).

4.2 The Importance of Weather

When considering the importance of weather in relation to overall trip satisfaction respondents were asked to identify the level of importance they placed on a series of trip elements identified by Ontario Parks as being integral to the camping experience (Park User Survey Program, 2008). Table 4.14 displays the importance of each trip elements in rank order. The mean values derived from each scale of importance were used to establish which trip elements were most important in relation to overall trip satisfaction. The quality of park facilities was the most important trip element, followed by the condition of the natural environment and then the performance of park staff and services. In comparison to the other three trip elements, the presence of ideal weather conditions was seen to be the least important.

Table 4.14 – Importance of Trip Elements in relation to Overall Satisfaction

Trip Element:	Percentage of Campers within Importance of Trip Element					Mean Value (1-5)
	Not Important	Of Little Importance	Moderately Important	Important	Very Important	
Quality of Park Facilities	0.3	0.6	5.2	29.1	64.9	4.58
Condition of Natural Environment	0.4	1.4	7.7	31.9	58.5	4.47
Performance of Park Staff and Services	1.7	5.5	21.7	39.3	31.8	3.94
Presence of Ideal Weather Conditions	4.1	8.7	30.4	31.3	25.5	3.65

In order to assess the influence that the importance campers assigned to the presence of ideal weather conditions compared to other trip elements, all in relation to overall trip satisfaction, a composite measure was formed. This new measure was formed by subtracting the combined mean score of the three non-weather related trip elements from the mean score for the importance of ideal weather conditions. The resulting measure is based on a 9 point scale with a potential range of -4 to 4, where higher values reflect a greater level of importance assigned to weather when compared to the other three trip elements. Since the importance of weather was, on average, of less importance than the other three trip elements, the value representing the comparative importance of ideal weather conditions typically appeared as a negative. For example, the mean value for the comparative importance of weather within the total sample is -0.67.

The second dimension for assessing the importance of weather asked respondents to identify the level of importance they assigned to a number of different weather aspects in relation to overall trip satisfaction. Table 4.15 displays the importance assigned to each of the six different weather aspects. The mean values for each weather aspect indicate its rank of importance. The presence of sunshine was identified as the most important weather aspect, followed by comfortable day-time temperatures, the absence of rain, comfortable night-time temperatures, comfortable water temperatures, and then the absence of strong winds, which was identified by respondents as the least important weather aspect.

Table 4.15 – Importance of Weather Aspects in relation to Overall Satisfaction

Weather Aspect:	Percentage of Campers within Importance of Weather Aspect					Mean Value (1-5)
	Not Important	A little Important	Moderately Important	Important	Very Important	
Sunshine	2.1	6.5	22.0	33.7	35.7	3.94
Comfortable Day-time Temp	2.7	7.0	23.2	39.7	27.4	3.82
Absence of Rain	4.9	12.7	28.4	28.0	26.0	3.57
Comfortable Night-time Temp	6.9	11.1	28.9	31.5	21.6	3.49
Comfortable Water Temp	6.2	15.1	32.4	29.8	16.5	3.36
Absence of Strong Winds	10.9	19.9	33.3	24.7	11.3	3.06

Table 4.16 displays the findings of a number of studies which set out to identify the importance tourists assigned to different weather aspects for beach, urban, mountain and park tourism activities. The presence of sunshine was identified as the most important weather variable for park tourism. Interestingly, this was also the case for beach tourism (Scott et al. 2008a; Rutty & Scott, 2010). Air temperature was the second most important weather variable for camping, which again mirrored that of beach tourism (Scott et al. 2008a; Moreno, 2009), but was also similar to mountain tourism (Rutty & Scott, 2010). Surprisingly, the absence of rain was found to be only the third most important weather variable for park tourism, a finding that was only echoed by one other study concerned with beach tourism (Scott et al. 2008a). The absence of strong winds was recorded at being the least most important weather variable for all tourism contexts considered. These results suggest that campers rank the importance of weather variables in an order that is most similar to the way in which beach tourists rank the importance of weather.

Table 4.16 – The Importance of Weather Aspects for different Tourism Segments

Source	Rank of Importance for Weather Aspect			
	Air Temperature	Presence of Sunshine	Absence of Rain	Absence of Strong Winds
Beach Tourism:				
Moreno (2009)	2	3	1	4
Rutty & Scott (2010)	3	1	2	4
Scott et al. (2008a)	2	1	3	4
Urban Tourism:				
Rutty & Scott (2010)	1	3	2	4
Scott et al. (2008a)	1	3	2	4
Mountain Tourism:				
Scott et al. (2008a)	2	3	1	4
Park Tourism:				
Hewer (Current Study)	2	1	3	4

A number of studies that examined preferred climates for tourism identified temperature as the most important climate variable (Mieczkowski, 1985; Becker, 2000; Maddison, 2001; Lise & Tol, 2002; Hamilton et al. 2005; Bigano et al. 2006). Only in the case of more recent studies looking specifically at beach tourism (Scott et al. 2008a; Moreno, 2009; Rutty & Scott, 2010) has the notion of temperature as the most important climate variable for tourism begun to be questioned. The results of this study add further validity to the suggestion that temperature may not be the most important climate variable in the study of preferred climates and weather sensitivity for tourism. Giving further support to the claims of de Freitas et al. (2008) and Scott et al. (2008a), who stated that both physical (wind and rain) as well as aesthetic (hours of sunshine and sky condition) components of weather variability need to be considered in order to accurately assess climate preferences for tourism.

The results of this study have implications for studies which have endeavoured to incorporate Mieczkowski's (1985) TCI in an effort to explore the impacts of climate change on different segments of the tourism industry (Scott et al. 2004, Amelung & Viner, 2006; Perry, 2006; Amelung et al. 2007; Nicholls & Amelung, 2008). Arguments have been presented that Mieczkowski's (1985) index may be unsuitable for certain tourism segments given the fact that the weight allotted for air temperature makes up 50% of the overall index weighing (de Freitas, 2008; Scott et al. 2008a). The rankings of importance campers assigned to the different weather aspects mirrored that which Scott et al. (2008a) found in relation to beach tourists.

Therefore, it can be suggested that studies which employed Mieczkowski's (1985) index in an effort to assess the impacts of climate change of tourism activities that included park visitation, may also serve to be unreliable and may have over-estimated the impact of climate change of this form of tourism (Scott et al. 2004).

4.2.1 Differences in the Importance of Weather between User Types

When considering the effect that the average number of annual overnight camping trips had on the level of importance respondents assigned to the six different weather aspects, significant differences were found for the importance of no rain as well as for the importance of comfortable night-time temperatures (Table 4.17). Respondents who camped less frequently each year placed a significantly greater level of importance on the absence of rain, compared to those who camped more frequently (x^2=18.575, P<0.001). A similar pattern was observed concerning the importance of comfortable night-time temperatures, where once again, as the frequency of camping per year increased, the level of importance placed on comfortable night-time temperatures decreased (x^2=8.589, P=0.014). These results would suggest that respondents who have a greater level of camping experience are less sensitive to rain events and unfavourable night-time temperatures. Using the number of camping trips that respondents went on each year as a measure of camping experience, these differences could relate to the degree of preparation, as well as the availability of adequate equipment and supplies, which may be lacking with less experienced campers.

Table 4.17 – Differences in the Importance of Weather Aspects based on Number of Overnight Camping Trips each Year

	Importance of Weather Aspect			
Weather Aspect: Number of Overnight Camping Trips each Year	**n**	**Mean Rank**	x^2	**Kruskal-Wallis Test (P)**
Absence of Rain:				
O to 2 trips	354	385.24[a]	**18.575**	**<0.001**
3 to 5 trips	227	325.07		
6 or more trips	125	315.23[b]		
Comfortable Night-time Temperatures:				
O to 2 trips	354	373.39[a]	**8.589**	**0.014**
3 to 5 trips	226	337.02		
6 or more trips	124	321.07[b]		

[a] Denotes a significant difference between the category displaying the highest level of importance assigned to a specific weather aspect, while [b] signifies the category displaying the lowest level of the same.

The number of overnight trips to the study park had a similar effect on the importance of comfortable day-time temperatures (x^2=13.474, P=0.001). Respondents who reported that their current trip was their first visit to the park placed a greater level of importance on comfortable day-time temperatures (mean rank=402.73), compared to those who had been to the park between 2 to 10 times before (mean rank=337.54). However, campers who reported having visited the park more than 10 times before (mean rank=343.37), although still placing less importance on comfortable day-time temperatures than those on their first visit to the park, held this weather aspect in slightly higher regard than campers who had been to the park between 2 to 10 times during their life. It is expected that this difference in the level of importance assigned to comfortable day-time temperatures between categories of park loyalty may relate to age. Older campers, when compared to middle-aged campers, were found to place greater importance on comfortable temperatures (Table 4.22). Based on the results of a Kruskal-Wallis Test (P<0.001), older campers (mean rank=408.49) had visited the park more times during their lives than younger campers (mean rank=291.69).

The types of activities that campers intended to spend at least one half hour participating in influenced the level of importance they assigned to different weather aspects (Table 4.18). The number of physically active activities (R^2=0.036, P<0.001), as well as the number of water-based activities (R^2=0.020, P=0.007) that campers planned to participate in were both shown to have a significant effect on the level of importance assigned to comfortable water temperatures. In both cases, the more physically active (i.e. casual play, hiking, biking) or water-based activities (i.e. swimming, canoeing, kayaking) that campers intended to participate in, the greater importance they placed on comfortable water temperatures. This makes sense because the overall satisfaction of campers that planned to participate in a greater number of either physically active or water-based activities would be more dependent on the presence of suitable weather conditions.

The number of relatively passive activities that campers planned to participate in had an inverse effect on the importance assigned to the absence of rain (R^2=0.026, P=0.001) as well as the importance of comfortable night-time temperatures (R^2=0.029, P=0.002). The more relatively passive activities that campers planned to participate in, the less importance they placed on the absence of rain and comfortable night-time temperatures. This seems reasonable as campers who planned to engage in a greater number of relatively passive activities such resting/relaxing and reading would be less sensitive to adverse weather conditions, especially rain.

Table 4.18 – Differences in the Importance of Weather Aspects based on Participation in Selected Activity Types

Importance of Weather Aspect: Number of Activities Intent on Participating in	Mean Value: Not Imp.	Little Imp.	Mod. Imp.	Imp.	Very Imp.	Total R^2	P
Comfortable Water Temperatures: Physically Active Activities (0-9)	4.18[a]	5.07	5.47[b]	5.46	5.14	**0.036**	**<0.001**
Comfortable Water Temperatures: Water-Based Activities (0-5)	1.57[a]	2.00	2.13	2.20[b]	2.17	**0.020**	**0.007**
Absence of Rain: Relatively Passive Activities (0-10)	6.97	6.98	7.01[b]	6.71	6.21[a]	**0.026**	**0.001**
Comfortable Night-time Temperatures: Relatively Passive Activities (0-10)	6.94	7.09[b]	7.02	6.38[a]	6.49	**0.029**	**0.002**

[a,b] Signifies the categories of importance between which the greatest degree of difference in the average number of activities intent on participating in were found. Where ([a]) signifies the lowest number of activities and ([b]) denotes the highest number of activities from within each category of importance.

Additionally, the number of relatively passive activities that campers planned to spend at least one half hour participating in had a significant effect on the importance assigned to the presence of ideal weather conditions in comparison to other trip elements (F=47.647, P<0.001). Based on the results of a simple linear regression model, it was found that a one unit increase in the number of relatively passive activities that campers intended to participate in, contributed to a 0.15 point deduction in the comparative importance of ideal weather conditions (B=-0.145). Furthermore, the model suggests that changes in the number of relatively passive activities that campers intended to participate in were able to explain 6.1% of the total variation in the comparative importance of ideal weather conditions (R^2=0.061). In other words, the more relatively passive activities that campers planned on participating in, the less importance they placed on the presence of ideal weather conditions. Again, this makes sense as the relatively passive activities classified in Table 4.4 can be perceived as being less dependent on the presence of ideal weather conditions.

Respondents that reported swimming/wading was one of the activities they intended to spend either the most, second most or third most time participating in, on average, placed a significantly greater level of importance on a number of different weather aspects (Table 4.19). The inclusion of swimming/wading as one of the three most time activities had a significant effect on the importance assigned to the absence of rain (P=0.007), the presence of sunshine (P<0.001), comfortable day-time temperatures (P=0.008), and comfortable water temperatures (P<0.001). In all four cases, respondents who listed swimming/wading placed greater importance of each weather aspect compared to those who listed other activities instead. This makes rationale sense as swimming/wading, or beach use in general, is highly dependent on these four weather variables: the absence of rain, the presence of sunshine, as well as comfortable day-time and water temperatures.

Table 4.19 – The Effect of Intending to Spend the Most Time Swimming/Wading on the Importance of Weather Aspects

	Percentage of Campers						
Importance of Weather Aspect: Most time activity	**Not Imp.**	**Little Imp.**	**Mod. Imp.**	**Imp.**	**Very Imp.**	**Mean Rank***	**P***
Absence of Rain:							
Other Activities	6.1	15.2	28.4	29.4	21.0	**335.75**	**0.007**
Swimming/Wading	4.2	11.1	28.0	26.5	30.2	**376.71**	
Presence of Sunshine:							
Other Activities	2.9	8.5	26.1	34.3	28.1	**319.92**	**<0.001**
Swimming/Wading	1.5	5.0	18.8	33.4	41.3	**382.45**	
Comfortable Day-time Temp:							
Other Activities	2.9	7.7	26.8	39.7	22.9	**337.08**	**0.008**
Swimming/Wading	2.5	6.4	20.6	39.7	30.9	**376.54**	
Comfortable Water Temp:							
Other Activities	9.4	20.5	30.5	28.6	11.0	**316.67**	**<0.001**
Swimming/Wading	3.7	11.1	33.7	31.0	20.6	**389.28**	

* Mean Rank and significance of difference (P) generated through the use of the Mann-Whitney U Test, where higher mean ranks reflect a higher level of importance assigned to a particular weather aspect.

Apart from swimming/wading, other water-based activities such as canoeing, kayaking and fishing were also seen to have a significant effect on the importance assigned to various weather aspects (Table 4.20). Intentions to spend either the most, second most or third most time participating in one of these a water-based activities had a significant effect on the importance assigned to the absence of rain (P<0.001), the presence of sunshine (P=0.012), comfortable day-time temperatures (P=0.001), and comfortable night-time temperatures (P=0.045). Listing one of these three water-based activities as one of the most time activities had an inverse effect on the importance assigned to different weather aspects than what was observed when considering the effect of listing swimming/wading. Campers who listed one of these water-based activities consistently placed less importance on each respective weather aspect. These results would suggest that this group of campers, defined by activity classification (canoeing/kayaking/fishing), is less sensitive to weather at large. In addition, this class of campers appears to be on the other end of the spectrum in regard to weather sensitivity and could be considered a polar opposite when compared to those who intended to spend most of their time swimming/wading.

Table 4.20 – The Effect of Intending to Spend the Most Time Canoeing, Kayaking or Fishing on the Importance of Weather Aspects

	Percentage of Campers						
Importance of Weather Aspect: Most time activity	**Not Imp.**	**Little Imp.**	**Mod. Imp.**	**Imp.**	**Very Imp.**	**Mean Rank***	**P***
Absence of Rain:							
Other Activities	4.5	11.2	27.2	28.4	28.6	**373.31**	**<0.001**
Canoeing, Kayaking or Fishing	6.9	19.4	31.9	25.0	16.7	**302.06**	
Presence of Sunshine:							
Other Activities	1.9	5.5	21.5	33.6	37.5	**364.71**	**0.012**
Canoeing, Kayaking or Fishing	2.8	10.6	23.9	34.5	28.2	**318.66**	
Comfortable Day-time Temp:							
Other Activities	2.1	5.9	22.6	39.9	29.4	**371.24**	**0.001**
Canoeing, Kayaking or Fishing	4.9	11.1	25.7	38.9	19.4	**312.69**	
Comfortable Night-time Temp:							
Other Activities	6.8	10.2	28.4	32.0	22.6	**365.52**	**0.045**
Canoeing, Kayaking or Fishing	6.9	16.0	30.6	29.9	16.7	**328.18**	

* Mean Rank and significance of difference (P) generated through the use of the Mann-Whitney U Test, where higher mean ranks reflect a higher level of importance assigned to a particular weather aspect.

Campers who intended to spend either the most, second most or third most time canoeing, kayaking or fishing placed significantly less importance on the presence of ideal weather conditions in comparison to other trip elements (t=4.136, P<0.001). Campers that listed canoeing, kayaking or fishing as one of their three most time activities recorded an average score for the comparative importance of ideal weather conditions of -1.03. Whereas, campers who listed other activities (swimming/wading included) had a higher mean score (-0.58), signifying a greater level of importance being assigned to the presence of ideal weather conditions. This supports the notion that this unique class of campers places less importance of the presence of ideal weather conditions and is thereby less sensitive to weather in general.

As displayed in Table 4.21, the distance between the park and the respondent's home, being determined by their indicated place of permanent residence, resulted in significant differences between the level of importance campers assigned to both comfortable day- and night-time temperatures (P=0.039 and P=0.002, respectively). Campers who lived within 80km of the park placed a greater level of importance on both comfortable day- and night-time temperatures when compared to those who lived further than 80km away from the park.

Table 4.21 – Differences in Importance of Comfortable Temperatures based on Distance between Park and Home

Importance of Weather Aspect: Distance from Home	Percentage of Campers: Not Imp.	Little Imp.	Mod. Imp.	Imp.	Very Imp.	Mean Rank*	P*
Comfortable Day-time Temp:							
Less than 80km	0.0	3.4	20.2	43.8	32.6	**383.08**	**0.039**
More than 80km	2.8	7.8	23.4	39.1	26.9	**338.77**	
Comfortable Night-time Temp:							
Less than 80km	1.1	4.5	29.5	35.2	29.5	**402.54**	**0.002**
More than 80km	7.9	12.0	28.6	31.1	20.4	**334.81**	

* Mean Rank and significance of difference (P) generated through the use of the Mann-Whitney U Test, where higher mean ranks reflect a higher level of importance assigned to a particular weather aspect.

These finding can be explained by considering the average length of planned stay within each group and linking these results to trip commitment and the importance of weather. Based on the results of a Mann-Whitney U Test (P<0.001), campers who had travelled more than 80km (mean rank=332.91) planned to stay at the park longer than campers who had travelled less than 80km to reach the park (mean rank=268.82). This would suggest that campers who travelled less than 80km may be staying for just a weekend rather than a full week and weather in such a case, would be of more importance. Whereas, campers who travelled greater distances and stayed for longer periods found weather to be less important.

The age of respondents was a very influential characteristic when considering its effect on the importance assigned to different weather aspects. Significant differences based on the respondent's age were recorded for four out of the six weather aspects; all but the importance of no strong winds and comfortable water temperatures (Table 4.22). In all four cases, younger campers placed greater levels of importance on weather than older campers did. In regard to the importance of no rain and the presence of sunshine, significant differences were identified between campers aged 18 to 34 and those 55 years and older. However, when considering the effect of age on the importance of comfortable day- and night-time temperatures, the significant differences were found between campers aged 18 to 34 years and those aged 35 to 54 years.

Table 4.22 – Differences in the Importance of Weather Aspects based on Age

	Mean Rank within Age Group				
Importance of Weather Aspect:	**18 to 34**	**35 to 54**	**55 or older**	**x^2***	**P***
Absence of Rain	378.81[a]	340.34	298.24[b]	**13.024**	**0.001**
Presence of Sunshine	379.51[a]	329.22	318.78[b]	**11.351**	**0.003**
Comfortable Day-time Temperatures	382.79[a]	328.13[b]	332.02	**11.461**	**0.003**
Comfortable Night-time Temperatures	384.37[a]	321.76[b]	347.84	**13.862**	**0.001**

* Chi-square test statistic (x^2) and significance of differences (P) based on the Kruskal-Wallis Test.
[a,b] Signifies the age groups between which the greatest degree of difference mean ranks for the level of importance is found. Where ([a]) signifies the highest mean rank of importance and ([b]) denotes the lowest mean rank of importance.

The age of respondents was also found to have a significant effect on the importance assigned to the presence of ideal weather conditions in relation to other trip elements ($F=13.363$, $P<0.001$). The results of a one-way ANOVA showed that as the age of respondents went up, the level of importance assigned to the presence of ideal weather conditions decreased. For example, campers aged 18 to 34 years old placed a considerably higher level of importance on the presence of ideal weather conditions (mean=-0.37), compared to those aged 35 to 54 years (mean=-0.74) and to an even greater degree, those aged 55 years and older (mean=-1.03). Using a Scheffe post hoc test, it was concluded at the 95% confidence level, that significant differences were present between the youngest age group and the older two age groups, while differences between campers aged 35 to 54 years and those aged 55 years and older were not found to be significantly different.

The effect of age on the importance of weather can be explained by considering the interaction between age and a number of different variables such as the average number of camping trips each year, length of planned stay, as well as nature of accommodation. Based on the results of a Kruskal-Wallis Test ($X^2=26.250$, $P<0.001$), on average, older respondents camped more times each year (mean rank=289.97), compared to younger campers (mean rank=395.10). There were significant differences found between age groups in regard to length of planned stay ($F=9.039$, $P<0.001$); where younger campers (mean=4.34) planned to stay at the park for fewer nights than older campers (mean=6.07). In addition, the results of a Mann-Whitney U Test (P<0.001) showed that respondents with a tent present on their campsite (mean rank=294.81), on average, were younger than those without a tent present on their site (mean rank=413.98). Since younger respondents camped less times each year, planned to stay at the park for fewer nights and were more likely to have a tent present on their campsite, they also therefore placed a greater level of importance on weather.

In regard to the importance assigned to the absence of rain, two additional classifying measures were shown to have a significant effect on the importance campers assigned to this particular weather aspect (Table 4.23). Based on a discriminant analysis, the relationship between overall trip satisfaction and the importance of no rain (R^2=0.024, P=0.002) was such that higher levels of overall trip satisfaction were associated with lower levels of importance being placed on the absence of rain. In other words, campers who were more satisfied with their current trip placed less importance on the absence of rain. It rained quite frequently while sampling respondent's at Grundy Lake (N=318) which could possibly explain why those who placed less importance on the absence of rain were more satisfied with their current trip. However, the weather was consistency fair during sampling at Pinery (N=403).

Table 4.23 – Differences in the Importance of No Rain based on Trip Satisfaction and Number of Nights Planned to Stay at Park

Classifying Measure:	Mean Value within Importance of No Rain					Total R^2	P
	Not Imp.	Little Imp.	Mod. Imp.	Imp.	Very Imp.		
Overall trip Satisfaction (1-5)	4.72	4.63	4.53	4.38	4.29	**0.024**	**0.002**
Nights planned to stay at park	5.11	5.56	5.97	5.05	4.66	**0.016**	**0.020**

As shown in Table 4.23, the number of nights campers planned to stay at the park during their current trip also had a significant effect on the importance assigned to the absence of rain (R^2=0.016, P=0.020). Campers who planned to stay at the park for longer periods of time placed less importance on the absence of rain. This is likely related to the level of trip commitment associated with longer trips, as campers that planned to stay at the park for a week or more may be less concerned with the absence of rain, compared to those who were only visiting the park for a few nights over the weekend. Campers that planned to stay for a week or more may actually expect it to rain once or twice over the course of their trip and would likely be prepared for such weather. Weekend campers would place a greater level of importance on the absence of rain in relation to overall trip satisfaction, having much higher hopes of a few days of consistently fair weather, with one or two days of rain having the potential to ruin their whole trip.

Other factors that also helped to explain variation in the importance assigned to the absence of rain, based on length of planned stay were the number of camping trips that respondents reported going on each year and the age of the respondents. Using the average number of yearly camping trips as a measure of camping experience, the results of a one-way ANOVA ($F=5.204$, $P=0.006$) showed that respondents who camped more times each year, also planned to stay at the park for longer periods. Additionally, the results of One-way ANOVA ($F=9.039$, $P<0.001$) also showed that on average, older campers (mean=6.07) planned to stay at the park for more nights than younger campers (mean=4.34). These findings are important because higher levels of camping experience and increases in age among respondents were both associated with lower levels of importance being assigned to the absence of rain..

A weather aspect that very seldom demonstrated significant differences in the level of importance assigned to it based on respondent characteristics was the absence of strong winds. However, the results of a pair of Mann-Whitney U Tests showed that the type of accommodation present on the site, whether it was a traditional camping shelter or a luxury camping vehicle ($P<0.001$), as well as the respondent's gender ($P=0.037$), were both found to have significant effects on the level of importance assigned to the absence of strong winds (Table 4.24). Campers staying in a traditional shelter placed less importance on the absence of strong winds compared to those who were using a luxury camping vehicle. This is interesting as one would expect that campers in larger more secure camping shelters such as travel trailers, fifth wheels and motorhomes would be less vulnerable to strong winds than those staying in tents. However, one camper commented that strong winds become a danger for campers using large trailers, especially when trying to travel to or from the park, as it presents a driving hazard. With respect to gender, females placed a greater level of importance on the absence of strong winds than males did. The potential danger associated with strong winds may have been influential in creating this difference. Further inquiry would be necessary to substantiate these claims, but it is possible that females may perceive strong winds as presenting more of a danger to themselves and their families (especially those with young children), and as a result, may have placed a greater level of importance on the absence of strong winds.

Table 4.24 – Differences in the Importance of No Strong Winds based on Accommodation Type and Gender

Classifying Measure: Group	% of Campers within Importance of No Strong Winds: Not Imp.	Little Imp.	Mod. Imp.	Imp.	Very Imp.	Mean Rank*	P*
Type of Accommodation:							
Traditional Shelter	11.3	21.8	33.5	24.0	9.5	**332.59**	**<0.001**
Luxury Vehicle	8.3	11.4	33.3	25.0	22.0	**402.79**	
Gender:							
Female	10.5	18.0	30.8	27.9	12.8	**347.53**	**0.037**
Male	11.5	21.8	34.9	21.8	10.0	**317.42**	

* Mean Rank and significance of difference (P) generated through the use of the Mann-Whitney U Test, where higher mean ranks reflect a higher level of importance assigned to a particular weather aspect.

A number of additional respondent characteristics had significant effects on the importance of ideal weather conditions compared to other trip elements. These factors included: access to heating (t=2.193, P=0.029), the presence of a tent on the campsite (t=-2.452, P=0.014), and having reserved the campsite in advance prior to arrival at the park (t=-3.242, P=0.001). Campers who reported having access to heating (mean=-0.79) placed less importance on the presence of ideal weather conditions than those without access to heating (mean=-0.59). Respondents that indicated the presence of a tent on their campsite (mean-0.59) placed a greater level of importance on the presence of ideal weather conditions than those without a tent on their site (mean=-0.80). Finally, campers that did not reserve their site in advance prior to their arrival at the park (mean=-1.13) placed less importance on the presence of ideal weather conditions, when compared to those who had reserved their site in advance (mean=-0.64).

The results of a Chi-Square test of significant differences (X^2=163.816, P<0.001) showed that access to heating was directly associated with the nature of accommodation; only 30.9% of campers in a traditional shelter had access to heating, compared to 92.4% of campers in a luxury camping vehicles. Similarly, in regard to the relationship between the presence of a tent and access to heating (X^2=243.635, P<0.001), only 19.3% of campers with a tent present on their campsite had access to heating, while 79.0% of campers without a tent had access to heating. In relation to the importance assigned to the presence of ideal weather conditions, it is reasonable to suggest that campers with access to heating are less vulnerable to cold and damp conditions. Whereas, respondents staying in traditional camping shelters and tent campers in particular, are less likely to have access to heating and are therefore more sensitive to cold and more vulnerable to rain, given the more permeable nature of a tent.

4.2.2 Differences in the Importance of Weather between Parks

When considering the comparative importance of weather, significant differences were observed between parks ($t=2.939$, $P=0.003$), where the presence of ideal weather conditions were of greater importance at Pinery (-0.56) than they were at Grundy Lake (-0.82). Significant differences between the two parks were also observed when considering the importance of specific weather aspects in relation to overall trip satisfaction (Table 4.25). Significant differences where found between the two parks for the absence of rain ($P<0.001$), comfortable day-time temperatures ($P=0.027$) and comfortable night-time temperatures ($P<0.001$). Campers at Pinery placed a significantly greater level of importance on all three of these weather aspects, when compared to campers at Grundy Lake. The other three weather aspects considered in this study (the importance of sunshine, the importance of comfortable water temperatures and the importance of no strong winds) did not show any significant differences between the two parks.

Table 4.25 – Differences in Importance of Weather Aspects between Parks

	Percentage of Campers						
Importance of Weather Aspect: Group	**Not Imp.**	**Little Imp.**	**Mod. Imp.**	**Imp.**	**Very Imp.**	**Mean Rank***	**P***
Absence of Rain:							
Pinery	4.0	10.3	25.1	30.3	30.3	**382.97**	**<0.001**
Grundy Lake	6.1	15.7	32.7	25.0	20.5	**321.51**	
Comfortable Day-time Temp:							
Pinery	2.2	5.5	22.2	40.4	29.7	**370.81**	**0.027**
Grundy Lake	3.2	9.0	24.4	38.9	24.4	**338.05**	
Comfortable Night-time Temp:							
Pinery	4.5	8.8	27.6	33.8	25.3	**383.42**	**<0.001**
Grundy Lake	10.0	14.2	30.6	28.4	16.8	**318.43**	

* Mean Rank and significance of difference (P) generated through the use of the Mann-Whitney U Test, where higher mean ranks reflect a higher level of importance assigned to a particular weather aspect.

By analyzing the observed differences between user types for the importance of ideal weather conditions and cross-examining the differences in the sample characteristics from each park, it became possible to suggest why campers from Pinery placed greater importance on the presence of ideal weather conditions, compared to campers from Grundy Lake. In this regard, campers who intended to participate in a greater number of relatively passive activities during their trip, as well as those who intended to spend most of their time in a water-based activity such as canoeing, kayaking or fishing, both placed lower levels of importance on the presence of ideal weather conditions. Inversely, campers who reported reserving their site prior to arriving at the park placed higher levels of importance on the presence of ideal weather conditions. Campers from Grundy Lake, on average, intended to participate in a greater number of relatively passive activities (Table 4.5) and were also more likely to spend most of their time canoeing, kayaking or fishing (Table 4.7), when compared to those at Pinery. Additionally, a greater percentage of campers from Grundy Lake did not reserve their campsite in advance (Table 4.8), when compared to that from Pinery. It can therefore be suggested that the reason why campers from Grundy Lake placed less importance on the presence of ideal weather conditions, compared to those from Pinery, is because they intended to participate in a greater number of relatively passive activities; intended to spend more time participating in water-based activities such as canoeing, kayaking or fishing; and finally, were less likely to have reserved their campsite prior to arriving at the park.

When considering the different user types for which significant differences were found between the two parks, a number of factors were found to affect the level of importance assigned to the absence of rain. The more overnight camping trips respondents went on each year, the less importance they placed on the absence of rain. The more relatively passive activities that campers intended to participate in, the less importance they assigned to the absence of rain. Campers who intended to spend most of their time canoeing, kayaking or fishing also placed less importance on the absence of rain. In addition, as the number of nights that campers planned to stay at the park increased, the level of importance they placed on the absence of rain decreased. Campers from Grundy Lake, on average, camped more times each year (Table 4.2); intended to participate in more relatively passive activities (Table 4.5); intended to spend more time canoeing, kayaking or fishing (Table 4.7); and planned to stay at the park for more nights (Table 4.9), in comparison to those from Pinery. In addition, more campers indicated their intentions to spend most of their time swimming/wading at Pinery than at Grundy Lake (Table 4.7). Campers who listed swimming/wading as one of their three most time activities placed more importance on the absence of rain, which also helps to explain why campers from Pinery placed more importance on the absence of rain.

The finding that campers from Pinery placed significantly higher levels of importance on comfortable day-time temperatures can be explained, in part, by the fact that campers at Pinery intended to spend more time swimming/wading than those from Grundy Lake (Table 4.7). As the analysis conveyed, campers who intended to spend most of their time swimming placed greater levels of importance on comfortable day-time temperatures. It is also useful to note those campers who listed a water-based activity other than swimming (canoeing, kayaking or fishing) as one of their most time activities, as well as those who had travelled more than 80km to visit the park, both placed significantly less importance on comfortable day-time temperatures. This is important seeing that the sample of campers from Grundy Lake intended to spend more time canoeing, kayaking and fishing (Table 4.7) and also travelled a greater distance to reach the park (Table 4.1), compared to those from Pinery. It can therefore be suggested that parks populated by campers who live within 80km of the park and have come to the park with the intent to spend most of their time swimming, are more likely to place high levels of importance on comfortable day-time temperatures and would thereby be more sensitive to temperature extremes. Inversely, parks populated with campers who have travelled a considerable distance to reach the park and intend to spend more time participating in other water-based activities such as canoeing, kayaking and fishing, can be expected to place a lower level of importance on comfortable day-time temperatures and would thereby be less sensitive to temperature extremes.

Campers who camped a greater number of times each year, intended to participate in a higher number of relatively passive activities, planned to spend most of their time canoeing, kayaking or fishing, and those that lived a greater distance from the park, were all found to place significantly less importance on comfortable night-time temperatures. The sample of campers from Grundy Lake was more highly populated with these types of users when compared to the sample of campers from Pinery. These findings help explain why campers from Grundy Lake placed less importance on comfortable night-time temperatures than campers from Pinery did. As a result, campers from Grundy Lake and parks with similar camper characteristics can be expected to be less sensitive to the presence of unacceptable night-time temperatures, when compared to campers from Pinery and other similar parks.

4.3 Preferred Day-time Temperatures

This study examined three facets of temperature preferences for camping: unacceptably cool temperature thresholds, ideal temperatures and unacceptably hot temperature thresholds (Table 4.26). The average unacceptably hot day-time temperature threshold for summer camping in Ontario parks was 34.8°C, while the average unacceptably cool day-time temperature threshold was 15.6˚C. The average ideal day-time temperature was 27.4°C. In addition to calculating the average ideal temperature for camping, the average range of ideal temperatures was also indentified, which for the day-time, during the summer months, was 24-31˚C. This ideal range was determined by taking the mean value from the lowest and highest temperatures from within the range of ideal temperatures specified by respondents. When considering ideal temperatures, an additional calculation was made by taking the highest temperature within the ideal range and subtracting from it the lowest temperature in the range, then adding one to the total. By doing this, the number of degrees within the ideal range was determined, which on average consisted of 7.7 degrees.

Table 4.26 – Preferred Day-time Temperatures for Summer Camping in Ontario Parks

Preferred Temperature:	n	Min.	Max.	Range	Mean	SD
Unacceptably hot temperatures (˚C)	635	24	49	-	34.76	4.11
Unacceptably cool temperatures (˚C)	644	2	31	-	15.64	4.46
Ideal temperatures (˚C)	698	15	45	24-31	27.38	3.08
Number of degrees within ideal range	698	1	30	-	7.65	3.90

Figure 4.1 graphs the preferred day-time temperatures for summer camping in Ontario from within the total sample. This figure illustrates the three facets of preferred temperatures: unacceptably cool, ideal and unacceptably hot temperatures; all being graphed over a temperature scale ranging from 2˚C to 50˚C. The point at which more than 50% of respondents felt that the temperature was either too cold, ideal or too hot is identified allowing for each segment of the graph to be shaded in, and thereby representing the respective preferences. New information that became evident from this display was that the majority of

campers felt that temperatures between 16˚C and 24˚C as well between 31˚C and 35˚C were acceptable ranges, being outside the ideal range but not yet too cold or too hot. The reason that at even the lowest and highest ends of the temperature scale the percentage of campers who felt these temperatures were either too cold or too hot still did not reach 100% is representative of the percentage of campers who indicated that no temperatures were either unacceptably cool (8.9%) or unacceptably hot (8.6%), for summer camping in Ontario parks.

Figure 4.1 – Preferred Day-time Temperatures for Summer Camping in Ontario Parks

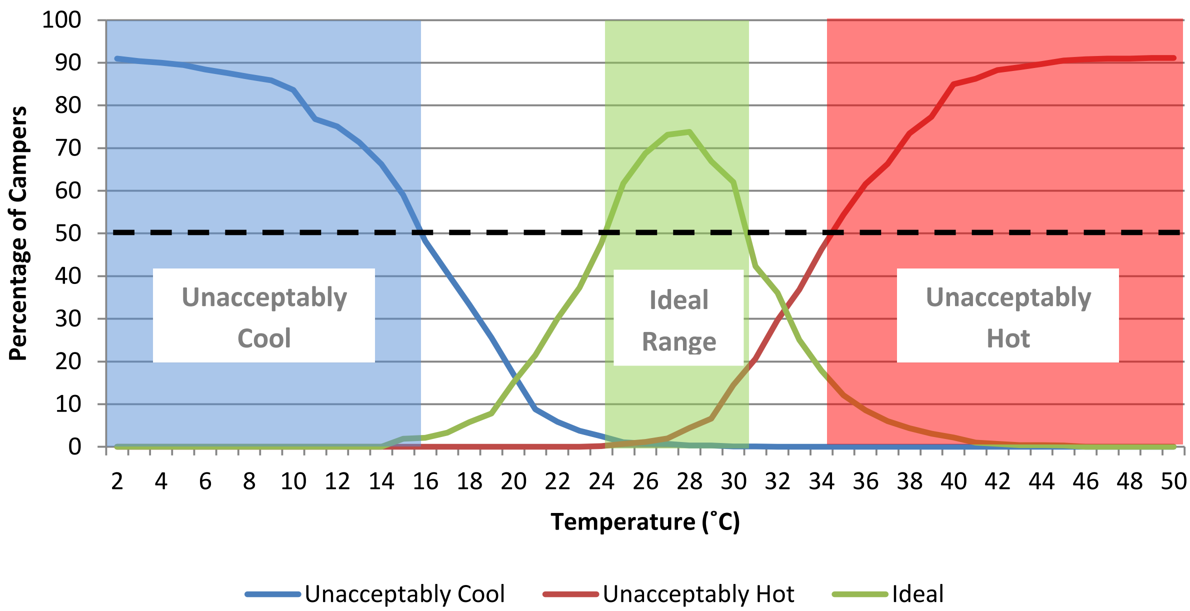


Table 4.27 displays a list of studies that have endeavoured to identify the ideal temperatures for different tourism contexts from across the globe. Some studies represented the ideal temperature for tourism as a single mean temperature value, while others reported a range of ideal temperatures. It had been argued that tourists are more likely to perceive a range of temperatures as being ideal rather than identifying only one specific degree of temperature (de Freitas et al. 2008). As such, this study produced a range of ideal temperatures for camping in Ontario parks, but was also able to determine the mean temperature value within this range for the purpose of direct comparability with other studies that identified only one degree as being the ideal temperature for a specific tourism context. The range of ideal day-time temperatures for camping in Ontario parks (24-31˚C), was very similar to the range of ideal temperatures for beach tourism (27-30°C, 27-32°C), as identified by both Morgan et al. (2000) and Rutty and Scott (2010), respectively. The mean ideal day-time temperature for park tourism (27.4˚C)

again, is similar to that which was identified by Scott et al. (2008a) and Moreno (2009) for beach tourism (26.8˚C and 28.3°C, respectively). Based on a review of the existing academic literature, it can therefore be suggested that ideal day-time temperatures for camping, which did not vary significantly between the two parks, are most similar to that for beach tourism.

Table 4.27 – Comparison of Ideal Temperatures across different Tourism Contexts Worldwide

Tourism Context:		**Ideal Temperature(s) in degrees Celsius**	
Source	Study Region:	Mean	Range
General:			
Besancenot et al. (1978)	France		25-33
Mieczkowski (1985)	Global		20-27
Maddison (2001)	United Kingdom (UK)	30.7	
Beach:			
Morgan et al. (2000)	UK and Mediterranean		27-30
Gomez-Martin (2004)	Spain		22-28
Scott et al. (2008a)	Canada, New Zealand and Sweden	26.8	
Moreno (2009)	Mediterranean	28.3	
Rutty & Scott (2010)	Mediterranean		27-32
Urban:			
Scott et al. (2008)	Canada, New Zealand and Sweden	22.5	
Rutty & Scott (2010)	Mediterranean		20-26
Mountain:			
Scott et al. (2008a)	Canada, New Zealand and Sweden	20.5	
Park (day-time):			
Hewer (current study)	South-western and Central Ontario	27.4	24-31

The identification of unacceptable temperature thresholds has received far less attention within the academic literature on climate and tourism, when compared to the efforts put forth to identify ideal temperatures for tourism activities across the globe. Table 4.28 displays both unacceptably cool and unacceptably hot temperature thresholds for a number of different tourism contexts in both the Mediterranean and Ontario. A comparison of the results from this study and that of Rutty and Scott (2010) show that unacceptably hot day-time temperature thresholds for camping in Ontario (>35˚C) are most similar to those for beach tourism in the Mediterranean (>37˚C). Beach tourists in the Mediterranean were willing to accept temperatures two degrees warmer, which is reasonable since the climate in the Mediterranean in much warmer than it is in Ontario. When considering the unacceptably cool temperature threshold for camping in Ontario parks (<16°C), the results were most similar to that of urban tourism in the Mediterranean (<17°C). Campers in Ontario were willing to accept temperatures 1 degree cooler, which is reasonable given the drastically cooler climate in Ontario, compared to that of the Mediterranean.

Table 4.28 – Comparison of Unacceptable Temperature Thresholds across different Tourism Contexts

Tourism Context:	Unacceptable Temperatures (˚C)	
Study Area (source)	Cold	Hot
Beach:		
Mediterranean (Rutty & Scott, 2010)	<22	>37
Urban:		
Mediterranean (Rutty & Scott, 2010)	<17	>30
Park (day-time):		
South-western and Central Ontario (Hewer, current study)	<16	>35

Therefore, unacceptably hot temperature thresholds for park tourism in Ontario are most similar to that of beach tourism in the Mediterranean. While on the other hand, unacceptably cool temperature thresholds for park tourism in Ontario are most similar to that of urban tourism in the Mediterranean. This is interesting to note as it suggests that campers are willing to endure temperatures as hot as beach tourists and as cool as urban tourists making them a more robust tourist market and in comparison to these other tourism segments, less sensitive to temperature extremes.

4.3.1 Differences in Preferred Day-time Temperatures between User Types

When considering the differences in preferred day-time temperature preferences between user types, the number of overnight camping trips that respondents went on each year had a significant effect on unacceptably cool day-time temperature thresholds ($F=5.052$, $P=0.007$). Using the Scheffe post hoc test, a significant difference was found between those who camped between 0 and 2 times each year (mean=16.11˚C) and those who camped 6 or more times each year (mean=14.6˚C). Therefore, it can be suggested that individuals who camp more times each year will have lower unacceptably cool temperature thresholds. Based on the results of a Mann-Whitney U Test, a likely explanation for this difference was found regarding access to heating ($P<0.001$). On average, respondents with access to heating (mean rank=406.97), camped more times each year than those without access to heating (mean rank=270.88).

The number of overnight camping trips to the study park during the respondent's lifetime had a significant effect on unacceptably hot temperature thresholds (F=4.332, P=0.014). The results of the Scheffe post hoc test identified significant differences between campers who had been to the park between 2 and 10 times (mean=35.4˚C) and those who had been to the park 11 or more times (mean=34.4˚C). These results suggest that campers who have been returning continually to the same park throughout their lifetime, perceive lower temperatures to be unacceptably hot than those who have been to the park fewer times. It is expected that this difference relates to the age of respondents in the upper category of park loyalty. The results of a Kruskal-Wallis Test (P<0.001) showed that older campers (mean rank=291.69) reported coming to the park more times in their lifetime than younger campers (mean rank=408.49) and also recorded lower unacceptably hot temperature thresholds (Table 4.32).

The intention to spend either the most, second most of third most time swimming/wading had a significant effect on all three facets of day-time temperature preferences (Table 4.29). Statistically significant differences between campers who listed swimming/wading as one of their most time activities and those that did not, were found in relation to unacceptably cool day-time temperature thresholds (t=-4.849, P<0.001), ideal day-time temperature reference (t=-4.762, P<0.001), and unacceptably hot day-time temperature thresholds (t=-1.992, P=0.047).

Table 4.29 – Differences in Preferred Day-time Temperatures based on Intent to Spend Most Time Swimming/Wading

Preferred Temperature: Most Time Activity	**n**	**Mean (˚C)**	**SD**	**t**	**P**
Unacceptably Cool Temperatures:					
Other Activities	285	14.69	4.58	**-4.849**	**<0.001**
Swimming/Wading	359	16.37	4.20		
Ideal Temperatures:					
Other Activities	302	26.76	2.99	**-4.762**	**<0.001**
Swimming/Wading	396	27.86	3.06		
Unacceptably Hot Temperatures:					
Other Activities	277	34.40	4.19	**-1.992**	**0.047**
Swimming/Wading	358	35.05	3.99		

Campers who listed swimming/wading as one of their three most time activities found warmer temperatures to be unacceptably cool, identified warmer temperatures as being ideal and had higher unacceptably hot temperature thresholds. This is reasonable as campers who planned to spend the majority of their time swimming could be expected to be more sensitive to cold, less sensitive to heat, and on average, to prefer warmer temperatures than other campers who planned to spend the majority of their time in activities other than swimming.

Figure 4.2 emphasises the differences between respondents who listed swimming/wading as one of the three most time activities and those who indicated other activities instead. By looking at the point at which the majority of campers (50%) within each group felt that the temperature was unacceptably cool, it can be observed that among those who listed swimming/wading the majority felt that 17˚C was too cold. The difference between these two groups is seen in that only approximately 35% of campers who did not list swimming/wading felt the same about this particular temperature. On the other hand, 50% of the campers that listed other activities instead of swimming felt that the temperature of 15˚C was too cold for camping; whereas, about 61% of those who listed swimming/wading had identified this temperature as being unacceptably cool.

Figure 4.2 – The Effect of Intending to spend the Most Time Swimming/Wading on Unacceptably Cool Day-time Temperatures (T=-4.849, P<0.001)

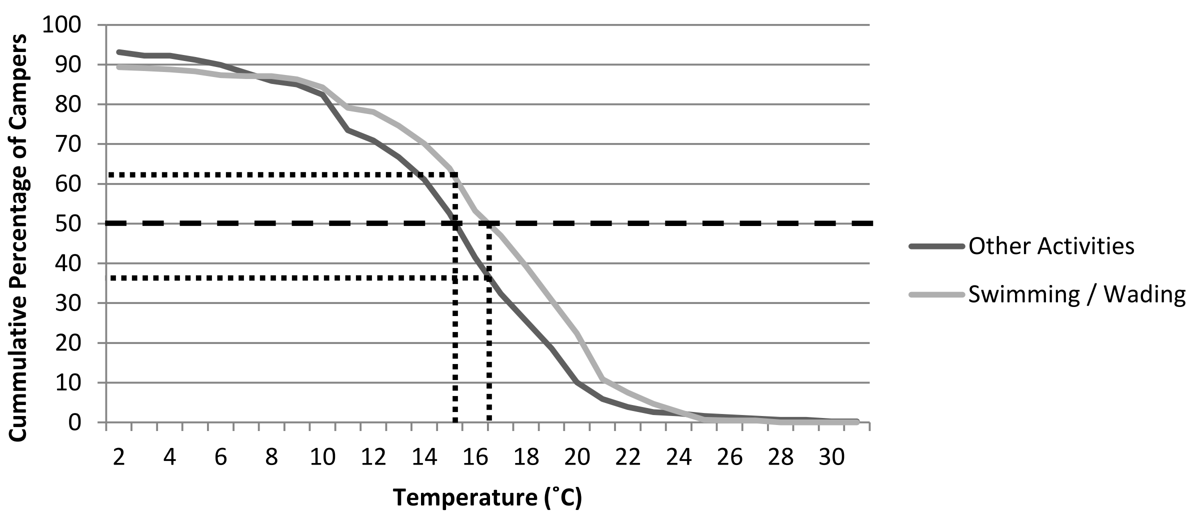
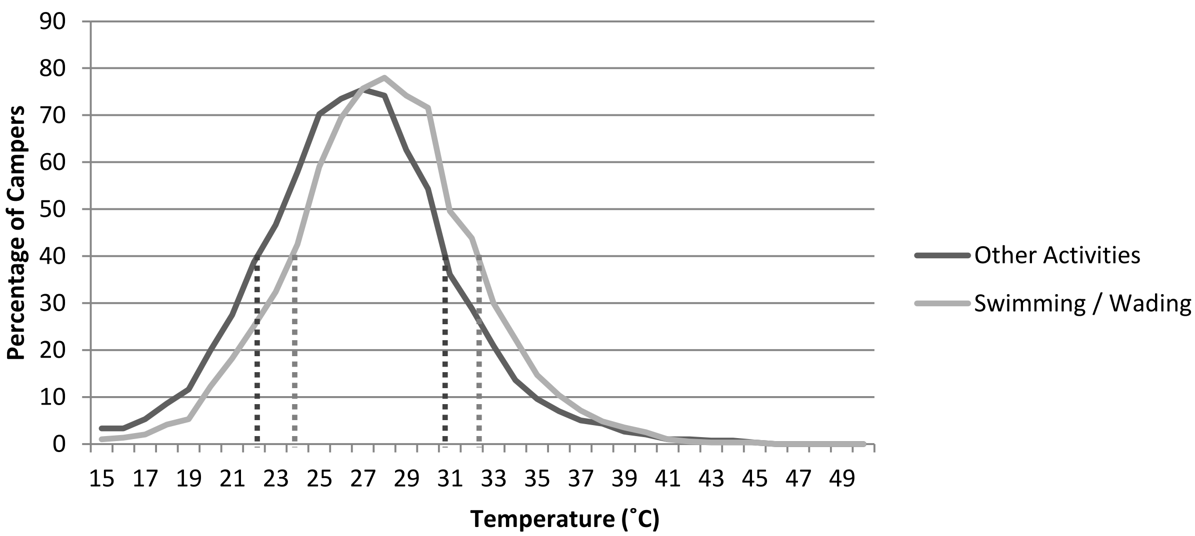


Figure 4.3 depicts the differences in preferred ideal day-time temperatures between campers who listed swimming/wading as one of the three most time activities and those who

did not. The greatest visual difference between these two groups can be observed at the point where 40% of the campers in each group perceived temperatures to be ideal. For example, 40% of the campers who listed swimming/wading felt that the ideal range of temperatures was between 24˚C and 32˚C. On the other hand, 40% of those who listed other activities instead of swimming/wading perceived the ideal range of temperatures to be between 22˚C and 31˚C. It is therefore apparent that campers who intended to spend a great deal of their time swimming/wading desired a warmer range of ideal temperatures than those without such intentions.

Figure 4.3 – The Effect of Intending to spend the Most Time Swimming/Wading on Ideal Day-time Temperatures (T=-4.762, P<0.001)



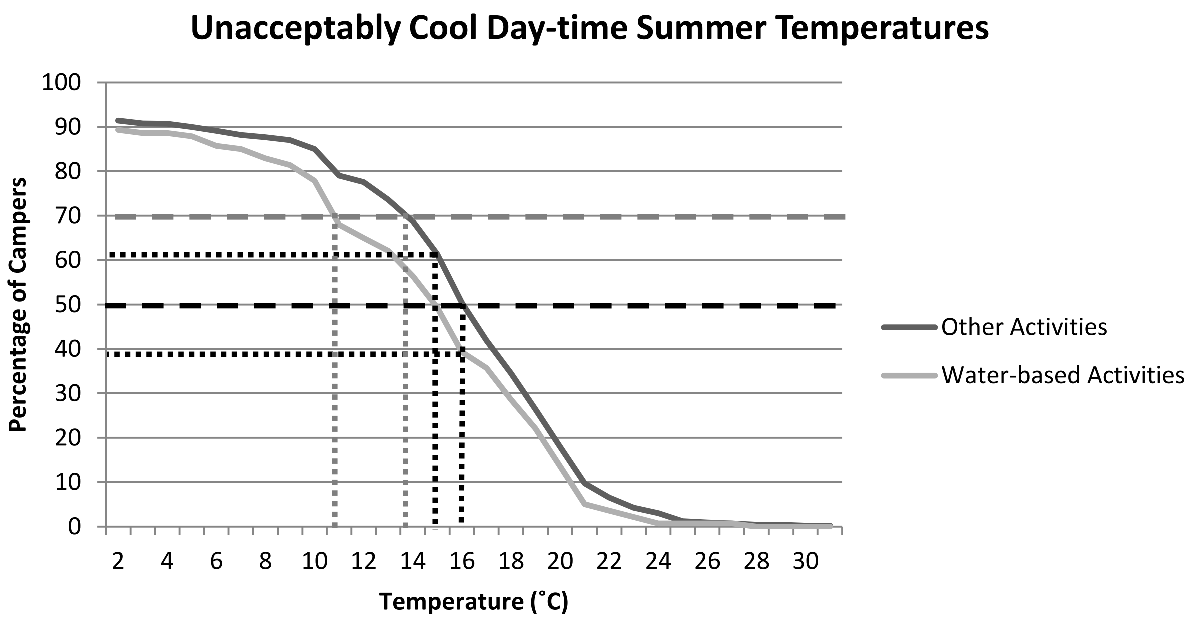
Continuing with the consideration of the activity in which campers intended to spend either the most, second most or third most time participating in, respondents who planned to spend most of their time canoeing, kayaking, or fishing had significantly different temperature preferences compared to respondents who did not list any such activities (Table 4.30). Significant differences for this particular respondent characteristic were found in relation to unacceptably cool temperatures (t=2.709, P=0.007), as well as for the number of degrees within the range of ideal temperatures (t=-2.263, P=0.025). These results show that campers who intended to spend a great deal of time canoeing, kayaking or Fishing were willing to accept colder temperatures, and also reported a broader range of temperatures that they consider to be ideal. This unique classification of respondents, those who intended to spend most of their time canoeing, kayaking or fishing, in general, appeared to be a very robust group of campers. These campers placed less importance on weather and as such, were willing to endure colder temperatures and perceived a broader range of temperatures as being ideal for summer camping in Ontario parks.

Table 4.30 – Differences in Preferred Day-time Temperatures based on Intent to Spend Most Time Canoeing, Kayaking or Fishing

Preferred Temperature: Most Time Activity	**n**	**Mean**	**SD**	**t**	**P**
Unacceptably Cool Temperatures (˚C):					
Other Activities	519	15.87	4.38	**2.709**	**0.007**
Canoeing, Kayaking or Fishing	125	14.67	4.65		
Range of Ideal Temperatures:					
Other Activities	527	7.89	3.28	**-2.263**	**0.025**
Canoeing, Kayaking or Fishing	128	8.88	4.69		

Figure 4.4 demonstrates the effect of planning to spend either the most, second most of third most time canoeing, kayaking or fishing on unacceptably cool day-time temperature thresholds. A comparison between the two groups in this most time activity classification showed that the majority of campers who did not list one of these water-based activities felt that 16˚C was too cold, while only approximately 39% of campers who listed one of these water-based activities felt the same way about that temperature. On the other hand, where 50% of campers who listed one of these water-based activities felt that 15˚C was unacceptably cool, approximately 62% of campers who listed other activities instead felt that this same temperature was too cold. It is also worth noting that the greatest difference between these two groups can be observed at the point where approximately 68% of campers felt the temperature was too cold. In this regard, it can be seen that at 14˚C, approximately 68% of campers who did not list one of these water-based activities felt this temperature was unacceptably cool; whereas, it was not until 11˚C that the same percentage of campers who listed one of these water-based activities found the temperature to be too cold.

Figure 4.4 – The Effect of Intending to spend the Most Time Canoeing, Kayaking or Fishing on Unacceptably Cool Day-time Temperatures (T=2.709, P=0.007)



The class of activity that respondents intended to spend the most time participating in had a significant effect on whether or not they acknowledged that at some critical point, day-time temperatures became too hot for summer camping (x^2=5.097, P=0.024). The two classes of activities used to identify this difference were "physically active" and "relatively passive", as defined in Table 4.4. In this case, campers that intended to spend most of their time in a physically active activity were more likely to deny the presence of an unacceptably hot temperature threshold (11.4%), in comparison to campers who intended to spend most of their time in a relatively passive activity (6.5%). This is interesting as it would be expected that campers who were engaging in more physically active activities would be more vulnerable to extreme heat then those who intended to spend most of their time in a relatively passive activity. However, these two different activity groupings have consistently demonstrated throughout this study that they represent two different classes of campers, where those who are more physically active were less sensitive to weather, while those who engaged in more passive activities displayed a greater sensitivity to weather.

The distance between the respondent's permanent place of residence and the study park had a significant effect on unacceptably hot day-time temperature thresholds. Out of the small sample of respondents who reported living within 80km of the park (N=84), the average unacceptably hot temperature threshold was 33.7˚C. Campers who reported living more than 80km from the park (N=525) recorded an average unacceptably hot temperature threshold of 34.9˚C. This 1.2˚C difference between these two groups was found to be statistically significant (t=-2.646, P=0.008). Viewing the distance between the park and the respondent's permanent place of residence as a measure of commitment to the current trip, it makes sense that those campers who had travelled further to reach the park and again must travel a greater distance to return home, would be willing to accept warmer temperatures while visiting the park.

When looking at the two groups derived from classifying the type of accommodation on site, campers who indicated the presence of a traditional camping shelter (N=494) had a significantly higher unacceptably hot temperature threshold (t=2.471, P=0.014) than those who indicated the presence of a luxury camping vehicle (N=118). Campers with a traditional shelter on site reported an average unacceptably hot temperature threshold of 35.0˚C, while those with a luxury vehicle felt that any temperature above 34.0˚C was too hot. Initially, the opposite relationship was expected, where it was envisioned that campers without the modern amenities of a luxury camping vehicle (specifically air conditioning in this case) would be more sensitive to extreme heat. The finding that respondents staying in luxury camping vehicles perceived cooler temperatures to be unacceptably hot is most likely related to the age of the respondents that indicated the presence of such accommodations. Based on the results of a Mann-Whitney U Test (P<0.001), campers with luxury camping vehicles (mean rank=420.95), on average, were older than those with traditional camping shelters (mean rank=312.69). This is important to note as older campers also reported lower unacceptably hot temperature thresholds (Table 4.32).

The presence of having a tent on site as a camping shelter had a significant effect on both unacceptably hot day-time temperatures (-3.589, P<0.001), as well as the number of degrees within the range of ideal day-time temperatures (t=-2.675, P=0.008). As seen in Table 4.31, tent campers, on average, were willing to accept warmer temperatures than campers without tents. In regard to the number of degrees within the range of ideal temperatures, tent campers reported a larger range of ideal temperatures than those without a tent present on site. This is an interesting finding as it was originally expected that campers staying in tents would be more sensitive to unacceptably hot temperatures given the lack of air conditioning and the thermal sensation associated with sleeping in a tent during a very hot and humid night. However, the finding that tent campers reported broader ranges of ideal temperature did help, in part, to explain this relationship between the presence of a tent on site and unacceptably hot temperature thresholds. The results suggest that tent campers may be more robust as they perceive a wider range of temperatures as being ideal and therefore have higher unacceptably hot temperature thresholds. In addition, the respondent's age, once again, may have influenced this relationship in that tent campers were predominantly found within the youngest age category (18-34 years), where higher unacceptably hot temperature thresholds can be expected.

Table 4.31 – Differences in Preferred Day-time Temperatures based on Tent Camping

Preferred Temperature: Tent Camping	**n**	**Mean**	**SD**	**t**	**P**
Unacceptably Hot Temperatures (˚C):					
No tent present	258	34.08	3.76	**-3.589**	**<0.001**
Tent present on site	373	35.26	4.23		
Range of Ideal Temperatures:					
No tent present	264	7.62	3.26	**-2.675**	**0.008**
Tent present on site	387	8.40	3.83		

Figure 4.5 illustrates the differences in unacceptably hot day-time temperature thresholds between campers who had a tent on site and those who did not. By emphasising the point at which the majority of campers felt that the temperature was too hot, the differences become more easily observed and quantified. For example, although the majority of campers (50%) without a tent found 34˚C to be too hot, only approximately 38% of tent campers found that same temperature to be unacceptably hot. Inversely, 50% of tent campers felt 35˚C was too hot, while approximately 62% of campers without a tent felt the same way about that temperature.

Figure 4.5 – The Effect of having a Tent on Unacceptably Hot Day-time Temperatures (T=-3.589, P<0.001)

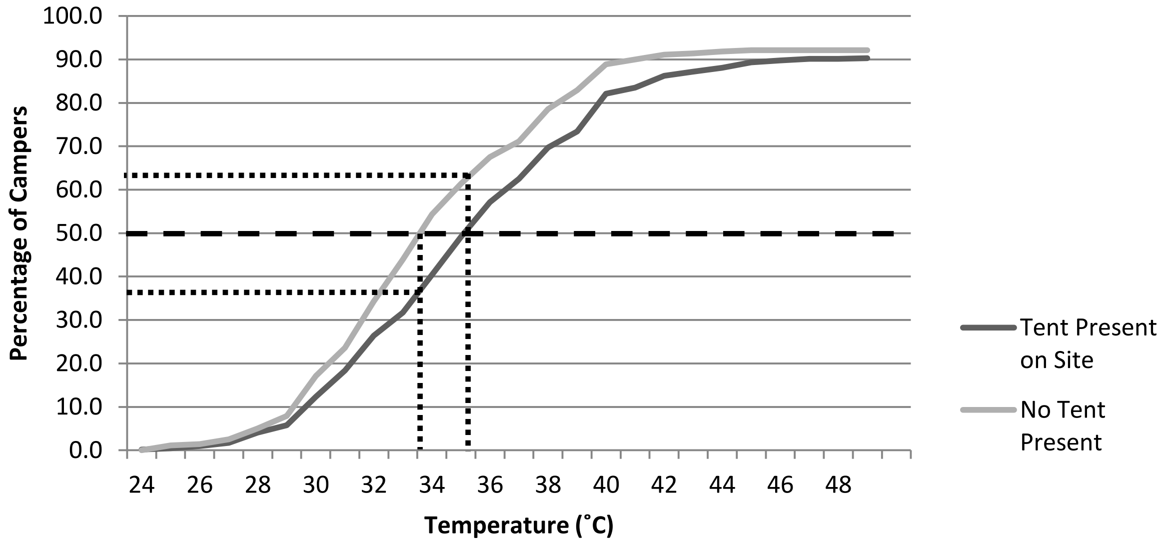
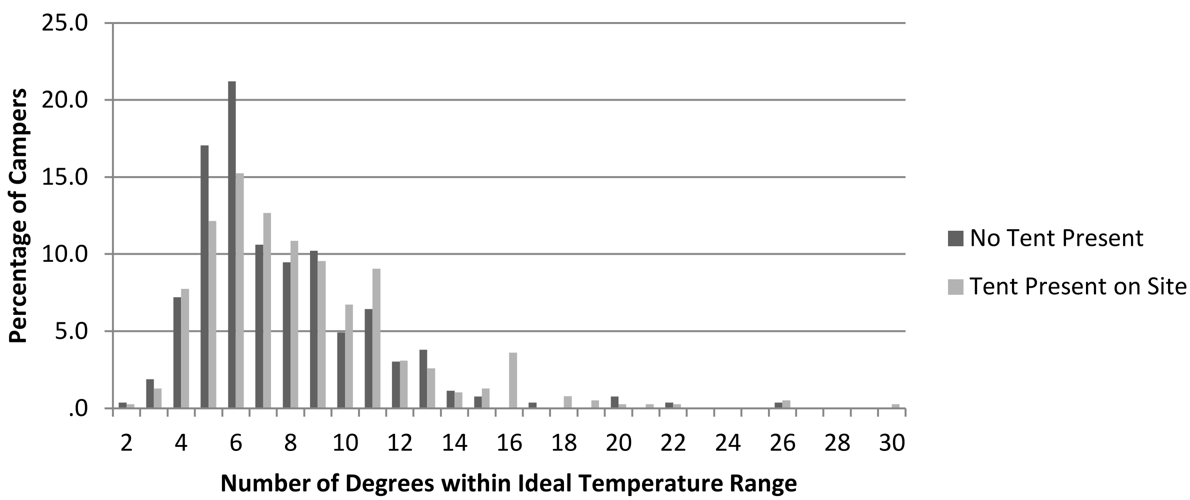


Figure 4.6 shows the differences in the frequency distribution for the number of degrees within the range of ideal day-time temperatures between campers with a tent and those without one. It can be observed that campers without a tent present on site more frequently had a range of ideal temperatures between five and six degrees, compared to campers with a tent on site. On the other hand, there were notably more tent campers with larger ideal temperature ranges such as 11 and 16 degrees.

Figure 4.6 – The Effect of having a Tent on the Range of Ideal Day-time Temperatures (T=-2.675, P=0.008)



In regard to the effect that the presence of climate control systems had on day-time temperature preferences, the only statistically significant result found was the effect that having access to air conditioning had on unacceptably hot temperature thresholds ($t=2.086$, $P=0.037$). It was surprising to see that campers without access to air conditioning were willing to accept warmer temperatures (35.0˚C) than campers with access to air conditioning (34.3˚C). This relationship can be explained by looking at the age and type of accommodation associated with campers who had access to air conditioning. Based on the results of a Mann-Whitney U Test, campers with access to air conditioning (mean rank=387.05) were on average, older than those without access (mean rank=314.98). Within the entire sample, only 167 respondents reported having access to air conditioning, which pertained mainly to campers within luxury camping vehicles (88.6%). This is important to note as older campers and those with luxury camping vehicles, both recorded lower unacceptably hot temperature thresholds.

The age of the respondent was a significant factor in relation to day-time temperature preferences (Table 4.32). For the purpose of this analysis, age groups were collapsed from the original six down (Appendix 1, Section 5) to a broader three, in order to increase the number of respondents within each group and strengthen the statistical reliability of the subsequent tests. It was found that as the age of campers increased, unacceptably hot temperature thresholds decreased significantly ($F=18.271$, $P<0.001$). Age was also seen to have a significant effect on ideal day-time temperatures ($F=9.743$, $P<0.001$). Campers between the ages of 18 to 34 and 35 to 54 years, on average, recorded warmer ideal day-time temperatures than those aged 55 years and older. It is reasonable that older campers would prefer cooler temperatures and would have lower unacceptably hot temperature thresholds, as studies suggest that the elderly population will be most vulnerable to heat waves associated with climate change (Brody et al. 2008; Sabates-Wheeler et al. 2008). These findings also have important implications for studies that have attempted to identify temperature preferences for tourism based on a sample of university students alone (Scott et al. 2008; Rutty & Scott, 2010). Since older campers prefer cooler temperatures and have lower unacceptably hot temperature thresholds, being more sensitive and vulnerable to extreme heat, the ideal temperatures and thresholds presented in these studies are only representative of the younger market segment and may not be not applicable to the wider tourism market in general.

Table 4.32 – Differences in Preferred Day-time Temperatures based on Age

Preferred Temperature: Age Group	n	Mean (˚C)	SD	F	P
Unacceptably Hot Temperatures:					
18-34 years	167	35.86[a]	4.01	**18.271**	**<0.001**
35-54 years	339	34.76[b]	4.03		
55 years or older	103	32.86[c]	3.64		
Ideal Temperatures:					
18-34 years	190	27.62 [a]	3.34	**9.743**	**<0.001**
35-54 years	372	27.54 [a]	2.81		
55 years or older	111	26.24 [b]	3.19		

[a,b,c] Signifies that the differences in mean values are significant at the 95% confidence level, where each letter signifies a significant difference between that mean score and one corresponding to another letter.

Group composition among respondents also had a significant effect on certain day-time temperature preferences (Table 4.33). The presence of one of more children under the age of 14 within the camp group had a significant effect on both ideal temperatures (t=-2.857, P=0.004) and unacceptably hot temperature thresholds (t=-2.883, P=0.004). Campers in groups with at least one child under the age of 14, on average, perceived warmer temperatures as being ideal and also recorded higher unacceptably hot temperature thresholds.

Table 4.33 – Differences in Preferred Day-time Temperatures based on Group Composition

Preferred Temperature: Group Composition	n	Mean (˚C)	SD	t	P
Ideal Temperatures					
No children in group	308	27.01	3.21	**-2.857**	**0.004**
1 or more children in group	390	27.68	2.94		
Unacceptably Hot Temperatures:					
No children in group	286	34.25	3.95	**-2.883**	**0.004**
1 or more children in group	349	35.18	4.19		
Unacceptably Hot Temperatures:					
No seniors in group	573	34.90	4.12	**2.656**	**0.008**
1 or more seniors in group	62	33.45	3.74		

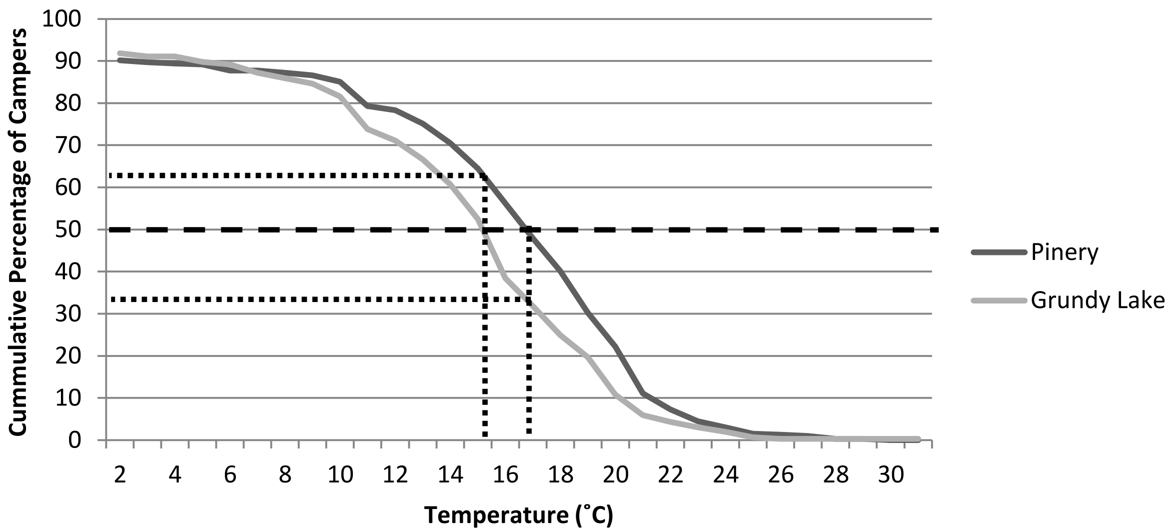
These differences in ideal temperatures and thresholds based on the presence of children may be related to participation in swimming/wading. Based on the results of a Chi-Square test of significant differences (X^2=30.537, P<0.001), a greater percentage of campers with children in their group intended to spend most of their time swimming/wading (65.8%) than could be statistically expected when considering responses across the entire sample (56.7%). Swimmers preferred warmer temperatures and had higher unacceptably hot temperature thresholds (Table 4.29), which helps to explain why campers with children in their group would also prefer cooler temperatures and have lower unacceptably hot temperature thresholds. In regard to the presence of at least one senior (65 years or older) within the camp group, a significant effect was found in relation to unacceptably hot temperature thresholds (t=2.656, P=0.008). The results suggest that respondents with a least one senior present in their group found lower temperatures to be unacceptably hot, compared to those who did not have any seniors present in their group. This difference could be expected as it most likely relates to the sensitivity and vulnerability of elderly populations to extreme heat (Brody et al. 2008; Sabates-Wheeler et al. 2008).

4.3.2 Differences in Preferred Day-time Temperatures between Parks

The first difference between the two parks in regard to day-time temperature preferences is in relation to the presence on an unacceptably hot temperature threshold. A significant difference was found between the two parks showing that 11.9% of campers at Grundy Lake felt that no temperatures were unacceptably hot, while only 6.0% of the campers at Pinery made this same indication (x^2=7.854, P=0.005). Interestingly, campers who intended to participate in a greater number of relatively passive activities were more likely to deny the existence of an unacceptably hot day-time temperature threshold. Campers from Grundy Lake, on average, planned to participate in a greater number of relatively passive activities, compared to those from Pinery. These findings help to explain why a greater percentage of campers from Grundy Lake claimed that no day-time temperatures (including humidity) were too hot for summer camping. As a result, it can be suggested that campers at Grundy Lake will be less sensitive to temperature change, particularly to increased warming during the summer months, when compared to those from Pinery.

The second difference observed between parks in regard to temperature preferences was related to unacceptably cool day-time temperature thresholds. The average temperature that campers from Pinery felt was unacceptably cool was 16.4˚C, while campers from Grundy Lake indicated a lower average unacceptably cool temperature threshold of 14.7˚C. This 1.7˚C difference in unacceptably cool temperature thresholds between the two parks was found to be statistically significant (t=4.725, P<0.001). Figure 4.7 illustrates the difference in unacceptably cool temperature thresholds between the two study parks. The difference was such that the majority of campers at Pinery felt that 17°C was too cold; whereas, at Grundy Lake only approximately 33% felt the same way. On the other hand, the majority of campers at Grundy Lake felt that 15.5˚C was unacceptably cool, while approximately 62% of campers at Pinery felt that 15˚C was too cold.

<u>Figure 4.7 – Differences in Unacceptably Cool Day-time Temperatures between Parks (T=4.725, P<0.001)</u>



Campers who intended to spend most of their time swimming/wading were associated with warmer unacceptably cool day -time temperature thresholds than those who listed other activities instead. Inversely, campers who listed a water-based activity other than swimming (canoeing, kayaking or fishing) as one of their three most time activities, had significantly lower unacceptably cool day-time temperature thresholds. Campers from Pinery planned to spend more time swimming/wading, while campers from Grundy Lake intended to spend more time canoeing, kayaking or fishing. These differences in respondent characteristics between the two parks (regarding intended activity participation), can help explain the observed differences in unacceptably cool day-time temperature thresholds. Furthermore, the results suggest that parks populated with a greater number of swimmers will be more positively influenced by increased warming (particularly the lengthening of operating seasons) than should be expected among parks more associated with other water-based activities such as canoeing, kayaking and fishing.

There were no other significant differences observed between the two parks in relation to preferred day-time temperatures. Even though the percentage of campers who indicated the presence of an unacceptably hot day-time temperature threshold did vary between the two parks, the average temperature that campers felt was too hot between the two parks, was without significant difference (t=0.206, P=0.803). There were no differences between the two parks found in relation to ideal day-time temperatures (t=1.551, P=0.121), or in the number of degrees recorded within the range of ideal temperatures (t=-1.288, P=0.198). Finally, despite the average temperature that campers felt was too cold varying between parks, the percentage of campers who indicated the presence of an unacceptably cool temperature threshold was without significant difference (X^2=0.598, P=0.262).

4.4 Preferred Night-time Temperatures

Three parameters were once again considered in order to determine night-time temperature preferences for summer camping in Ontario parks: unacceptably cool temperature thresholds, ideal temperatures and unacceptably hot temperatures thresholds (Table 4.32). In regard to ideal night-time temperatures, both the ideal temperature and the range of ideal temperatures were determined. In addition, the number of degrees within the range of ideal temperatures was also identified to give a richer perspective on the selectiveness of campers with respect to temperature preferences. The average ideal night-time temperature for summer camping was 19.7˚C, with the ideal range of night-time temperatures being between 17 and 23˚C. The average number of degrees within the range of ideal night-time temperatures was 7.2. The average unacceptably cool night-time temperature threshold was 8.7˚C, while the average unacceptably hot temperature threshold was 28.7˚C.

Table 4.34 – Preferred Night-time Temperatures for Summer Camping in Ontario Parks

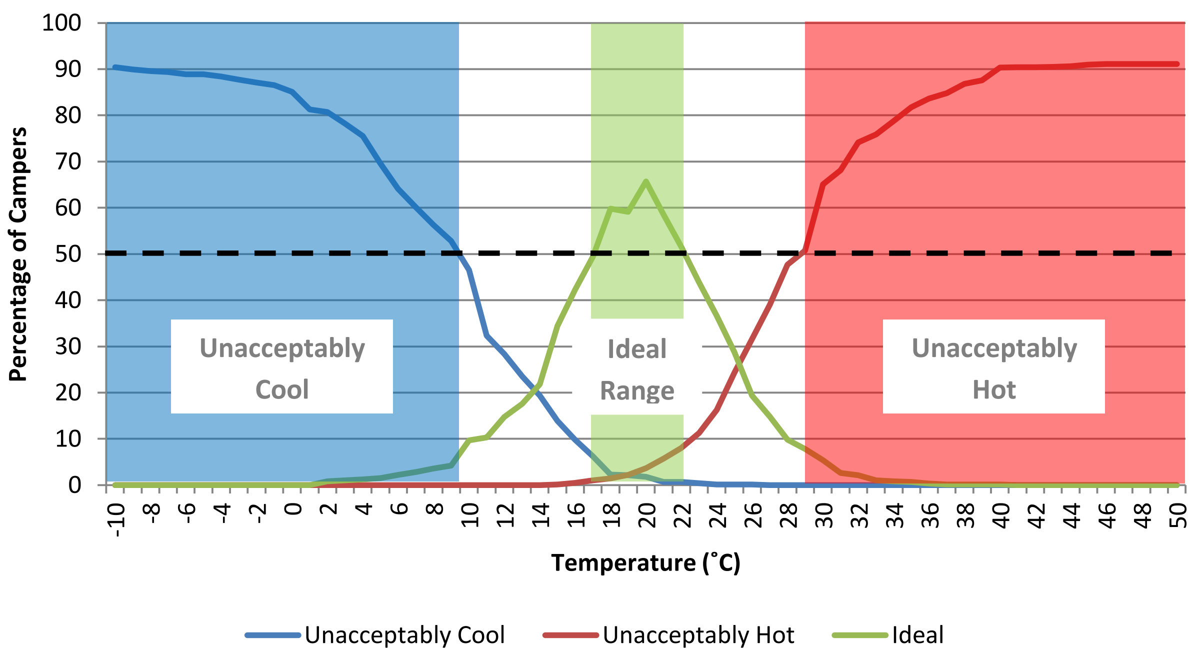
Preferred Temperature:	n	Min.	Max.	Mean	Range	SD
Unacceptably cool temperatures (˚C)	637	-10	26	8.71	-	5.77
Ideal temperatures (˚C)	690	2	40	19.69	17-23	3.64
Unacceptably hot temperatures (˚C)	623	15	46	28.73	-	5.06
Number of degrees within the ideal range	690	1	31	7.19	-	3.96

Ideal night-time temperatures for summer camping are comparable to what Heurtier (1968) identified as being optimal temperatures for a lightly dressed, seated person (20-27°C).

Mieczkowski (1985) used this range as part of his TCI to define optimal temperatures for general tourism activities during the day. Since this temperature range was identified as being optimal for a seated person, it is arguable that it may be more applicable to the night-time when people are generally seated, relaxing, or are lying down sleeping; rather than during the day-time when people are typically engaged in some form of activity that requires varying levels of movement.

Figure 4.8 graphs the preferred night-time temperatures for summer camping in these two Ontario parks. The figure illustrates all three temperature parameters, including unacceptably cool, ideal and unacceptably hot temperatures; all being graphed over a temperature scale ranging from -10˚C to 50˚C.

Figure 4.8 – Preferred Night-time Temperatures for Summer Camping in Ontario Parks



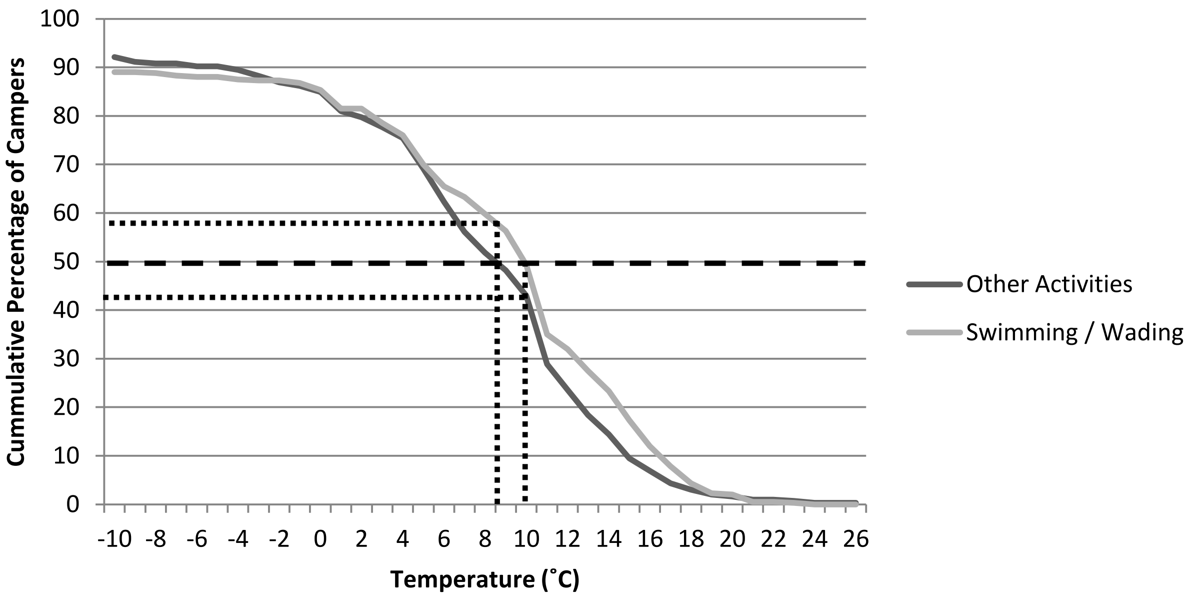
The point at which more than 50% of respondents felt that the temperature was either too cold, ideal or too hot is emphasised, allowing for each segment of the graph to be shaded in, representing the respective temperature preferences. Additionally, it has become evident that the majority of respondents felt that temperatures between 10˚C and 17˚C, as well as between 22˚C and 29˚C were acceptable, being outside the ideal range, but not yet too cold or too hot. The reason that at even the lowest and highest ends of the temperature scale the percentage of campers who felt that temperature was either too cold or too hot still did not reach 100% is representative of the percentage of campers who indicated that no night-time temperatures were either unacceptably cool (9.4%) or unacceptably hot (8.5%) for summer camping in Ontario parks.

4.4.1 Differences in Preferred Night-time Temperatures between User Types

The first factor to generate significant results when examining differences between user types for preferred night-time temperatures was the number of overnight trips to the study park during the respondent's lifetime. The number of overnight trips had a significant effect on unacceptably hot night-time temperature thresholds (F=5.114, P=0.006). Campers who indicated that the current trip was their first trip to the park recorded a significantly lower unacceptably hot temperature threshold (mean=27.6˚C) than respondents who had been to the park between 2 and 10 times before (mean=30.0˚C). However, this comparison of means between categories was the only one to be found statistically significant, at the 95% confidence level. A consistent pattern of increase in unacceptably hot temperatures was not maintained as the number of trips to the park increased to 11 or more trips (mean=28.8˚C). The finding that respondents who were on their first trip to the park had lower unacceptably hot temperature thresholds than those who had been to the park 2 to 10 times before is likely related to a lack of camping experience and inadequate equipment. The finding that this relationship was not maintained in regard to those who had been to the park 11 or more times before, in that these campers demonstrated lower unacceptably hot temperature thresholds is most likely related to the rising age of respondents in this category of park loyalty and the heightened sensitivity of elderly people to unacceptably hot temperatures.

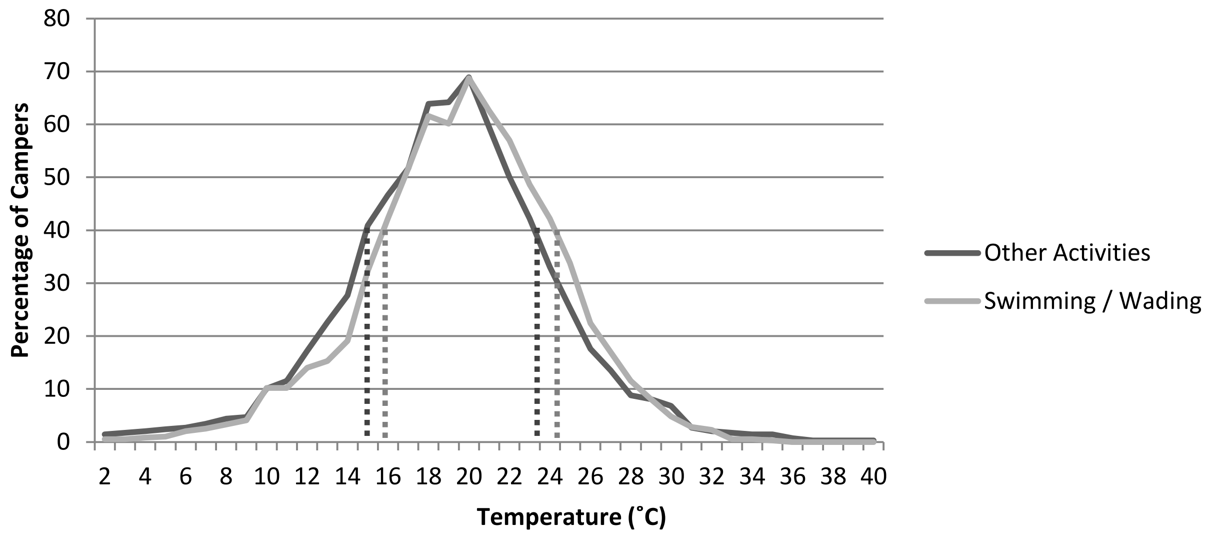
The intention of campers to spend either the most, second most or third most time swimming/wading had a significant effect on unacceptably cool night-time temperature thresholds (t=-3.148, P=0.002). Campers who listed swimming/wading as one of the three most time activities recorded a 1.4˚C warmer unacceptably cool temperature threshold (mean=9.4˚C) than those who listed other activities instead (mean=7.9˚C). This is reasonable as campers that wanted to spend most of their time swimming/wading would be more sensitive to unacceptably cool temperature during the night as they could potentially affect water temperatures and swimming conditions in the day(s) to come. Figure 4.9 further illustrates these differences in unacceptably cool temperature thresholds between campers who listed swimming/wading and those who did not. The majority of campers who planned to spend most of their time swimming/wading felt that temperatures below 10˚C were unacceptably cool; whereas, only 44% of respondents who listed other activities instead felt the same about this temperature. On the other hand, where 50% of the campers who did not list swimming/wading felt that 8˚C was unacceptably cool, 59% of those who listed swimming/wading as one of their three most time activities felt that this temperature was too cold.

Figure 4.9 – The Effect of Intending to spend the Most Time Swimming/Wading on Unacceptably Cool Night-time Temperatures (T=-3.148, P=0.002)



Listing swimming/wading as one of the three most time activities also had a significant effect on ideal night-time temperatures (t=-2.956, P=0.003). Campers who listed swimming/wading reported a warmer average ideal night-time temperature (mean=20.0°C) than those who listed other activities instead (mean=19.2˚C). Again, this makes sense, as campers that intended to spend most of their time swimming/wading would desire warmer temperatures than campers who planned to spend most of their time in some other activity which may not be as dependent on warm temperatures. Figure 4.10 shows the difference in ideal night-time temperatures between these two groups. By focusing on the point within the graph at which 40% of the campers felt that the temperature was ideal; the differences in the range of ideal temperatures become more evident. For example, 40% of campers who listed swimming/wading as one of the three most time activities felt that 16-24˚C were ideal night-time temperatures. On the other hand, campers who listed other activities instead recorded a cooler ideal temperature range of 15-23˚C.

Figure 4.10 – The Effect of Intending to spend the Most Time Swimming/Wading on Ideal Night-time Temperatures (T=-2.956, P=0.003)



A significant difference in unacceptably cool temperature thresholds was also found between campers who listed canoeing, kayaking or fishing as one of the three most time activities (t=2.695, P=0.007). However, the inverse effect was observed, where respondents who listed one of these water-based activities recorded lower unacceptably cool temperature thresholds (mean=7.5˚C), compared to those who listed other activities instead (mean=9.0˚C). This is interesting to note as it demonstrates that not all water-based activities have the same temperature preferences. But rather suggest that swimming/wading is associated with warmer than average temperature preferences, while these other three water-based activities are associated with cooler than average temperature preferences.

The class of activity that respondents planned to spend the most time participating in had a significant effect on whether or not they acknowledged that at some critical point night-time temperatures became unacceptably hot for summer camping (x^2=3.943, P=0.047). In this case, a greater percentage of campers who listed a physically active activity denied the presence of an unacceptably hot temperature threshold (11.1%), compared to those who listed a relatively passive activity (6.8%). Similar to what was discussed in relation to day-time temperatures, campers who planned to spend most of their time in a physically active activity, on average, were younger than those who listed a relatively passive most time activity and as a result, are less sensitive to unacceptably hot temperatures.

The number of physically active activities that campers intended to participate in had a significant effect on both unacceptably cool (F=10.497, P=0.001) as well as unacceptably hot (F=10.508, P=0.001) temperature thresholds. Table 4.35 shows the results from two simple linear regression models employed to illustrate the effect this aspect of activity participation had on these two temperature thresholds. The results indicate that campers who participated in a greater number of physically active activities, on average, perceived cooler temperatures as being unacceptably cool and warmer temperatures as being unacceptably hot; thereby making these campers less sensitive to temperature extremes.

Table 4.35 – Differences in Preferred Night-time Temperatures based on Participation in Physically Active Activities

	Number of Physically Active Activities			
Preferred Temperature:	**Total R^2**	**F Change**	**B**	**P**
Unacceptably Cool Temperatures	0.015	10.497	**-0.411**	**0.001**
Unacceptably Hot Temperatures	0.015	10.508	**0.364**	**0.001**

The number of water-based activities that campers planned to spend at least one half hour participating in had a significant effect on certain night-time temperature preferences (Table 4.36). The number of water-based activities that campers intended to participate in had a significant effect on unacceptably cool night-time temperatures (F=12.311, P<0.001), where campers that intended to participate in a greater number of water-based activities were also willing to endure colder temperatures. Participation in water-based activities also had a significant effect on unacceptably hot temperature thresholds (F=11.157, P=0.001), where increasing participation was directly correlated with rising unacceptably hot temperature thresholds. Finally, participation in water-based activities also had a significant effect on the number of degrees within the range of ideal night-time temperatures (F=12.703, P<0.001). In this regard, increasingly levels of participation in water-based activities were associated with a widening range of ideal night-time temperatures. These results suggest that campers who planned to participate in a greater number of water-based activities were more robust and less sensitive to weather in general. These campers are willing to endure both cooler and warmer temperatures than average campers and also identified a greater range of temperatures as being ideal

Table 4.36 – Differences in Preferred Night-time Temperatures based on Participation in Water-based Activities (swimming excluded)

	Number of Water-based Activities			
Preferred Temperature:	**Total R^2**	**F Change**	**B**	**P**
Unacceptably Cool Temperatures	0.017	12.311	**-0.727**	**<0.001**
Unacceptably Hot Temperatures	0.016	11.157	**0.616**	**0.001**
Range of Ideal Temperatures	0.018	12.703	**0.483**	**<0.001**

The presence of having a tent on site as a camping shelter had a significant effect on unacceptably hot night-time temperature thresholds (t=-2.341, P=0.020). Contrary to what was expected during the proposal stage of this project, campers who indicated the presence of a tent on site (mean=29.1˚C) actually reported higher unacceptably hot temperature thresholds than those without a tent on site (mean=28.2˚C). This is likely related to differences in age between campers with a tent and those without a tent (P<0.001). Tent campers (mean rank=294.49), on average, were younger than campers without tents (mean rank=414.46). This helps to explain the differences associated with tent campers and unacceptably hot temperature thresholds since older campers are more vulnerable to extreme heat and also recorded lower unacceptably hot temperature thresholds.

Figure 4.11 further illustrates the differences in unacceptably hot temperature thresholds between campers with a tent on site and those without a tent. By focusing on the point at which the majority of campers felt that the temperature was too hot, the graph is able to effectively demonstrate the differences between these two groups. For example, where the 50% of campers who indicated the presence of a tent on site felt that temperatures above 29˚C were unacceptably hot, 57% of campers without a tent identified this temperature as being too hot. On the other hand, where the majority of campers without a tent felt that temperatures above 28˚C were too hot, only 43% of campers with a tent felt the same about this temperature threshold.

Figure 4.11 – The Effect of having a Tent on Unacceptably Hot Night-time Temperatures (T=-2.341, P=0.020)

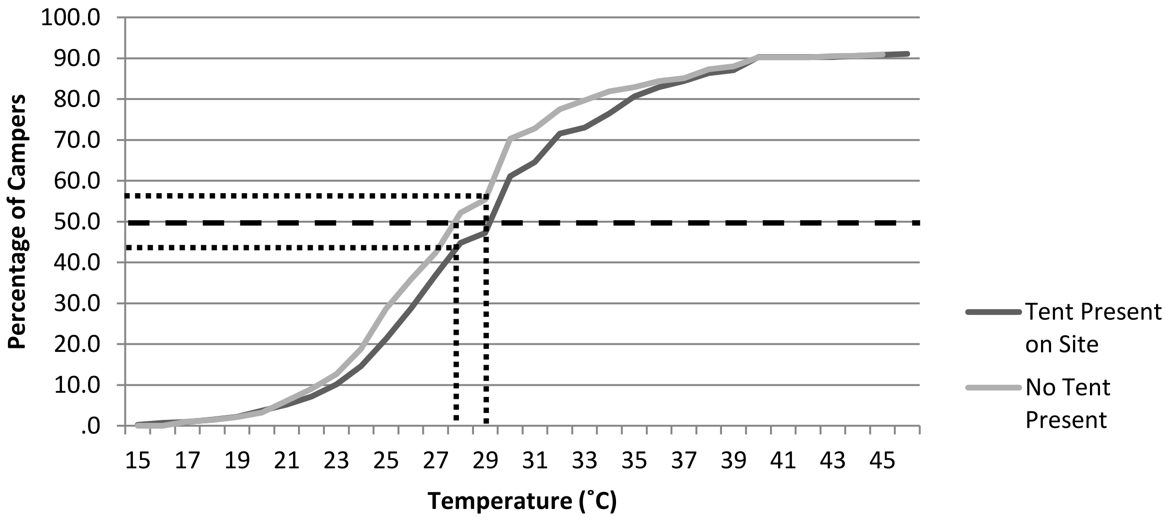


Table 4.37 displays the significant effect that the respondent's gender had on both ideal (t=2.375, P=0.018), and unacceptably hot (t=2.250, P=0.025), night-time temperature preferences and thresholds. A comparison of means across both males and females for ideal temperature values would suggest that men prefer cooler night-time temperatures than women. Generally speaking, women seem to be more sensitive to cold than men and therefore it is reasonable that women would prefer warmer temperatures. A similar interaction with gender was seen in relation to unacceptably hot night-time temperature thresholds. The results of a T-Test suggest that, on average, females have higher unacceptably hot night-time temperature thresholds than men. These finding are in line with the work of Hardy and du Bois (1940), who found that men started sweating at cooler temperatures (29°C) than women (32-33°C).

Table 4.37 – Differences in Preferred Night-time Temperatures based on Gender

Preferred Temperature: Gender	**n**	**Mean (˚C)**	**SD**	**t**	**P**
Ideal Temperatures:					
Female	333	20.02	3.64	**2.375**	**0.018**
Male	313	19.33	3.66		
Unacceptably Hot Temperatures:					
Female	299	29.22	4.97	**2.250**	**0.025**
Male	286	28.74	5.22		

The respondent's age had a significant effect on both ideal (F=3.349, P=0.036), and unacceptably hot (F=6.878, P=0.001), night-time temperature preferences and thresholds. Table 4.38 houses the results of two One-way ANOVAs, showing differences in the mean values for each temperature preference across the different age categories. Campers aged 55 years and older preferred cooler night-time temperatures than those ages 35-54 years of age. Campers aged 55 years and older also demonstrated lower unacceptably hot night-time temperature thresholds when compared to the two younger age groups (18-34 years and 35-54 years). As discussed in relation to day-time temperature preferences, this is likely associated with the increased sensitivity and vulnerability of elderly people to extreme heat.

Table 4.38 – Differences in Preferred Night-time Temperatures based on Age

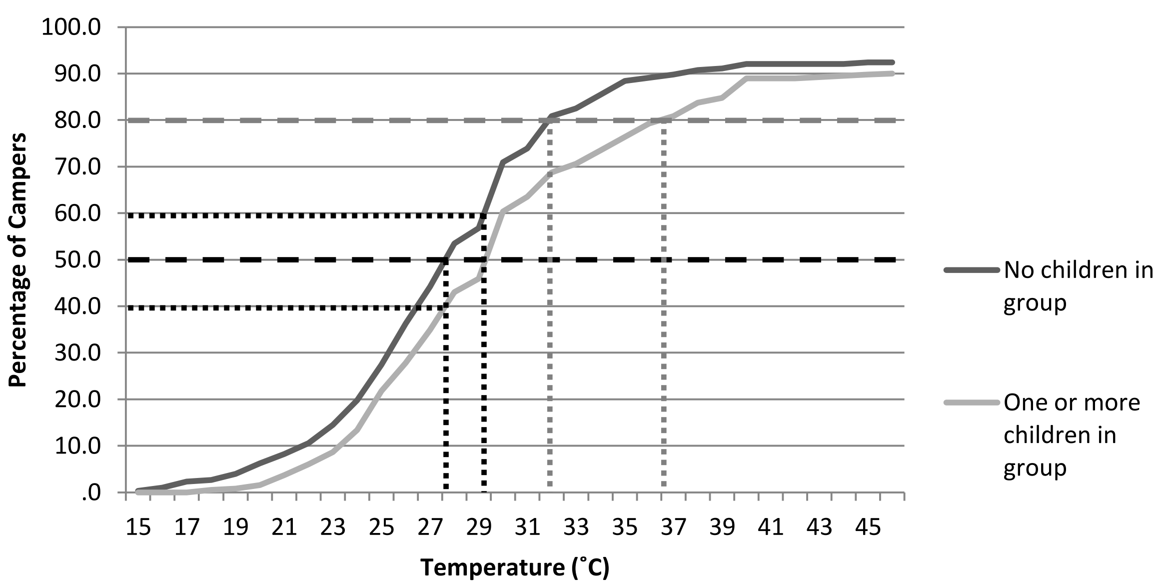
Preferred Temperature: Age	n	Mean (˚C)	SD	F	P
Ideal Temperatures:					
18-34 years	186	19.58	3.97	**3.349**	**0.036**
35-54 years	367	19.94[a]	3.24		
55 years or older	112	18.94[b]	3.64		
Unacceptably Hot Temperatures:					
18-34 years	164	28.81[a]	5.18	**6.878**	**0.001**
35-54 years	335	29.22[a]	5.15		
55 years or older	102	27.10[b]	4.43		

[a,b] Signifies that the differences in mean values are significant at the 95% confidence level, where each letter signifies a significant difference between that mean score and one corresponding to another letter.

When considering the effect of group composition, the number of children in the group had a significant effect on both ideal (t=-2.045, P=0.042) and unacceptably hot (t=-4.278, P=0.001) night-time temperature preferences and thresholds. Campers in groups with at least one child (14 years or younger) preferred warmer temperatures (mean=19.9˚C) than campers in groups without any children (mean=19.4˚C). Additionally, campers with children present in their group (mean=29.5˚C), were willing to accept temperatures warmer temperatures than those without children present in their group (mean=27.8˚C). Similar to what was suggested in regard to the effect of group composition on day-time temperature preferences, this difference is likely related to intended activity participation, specifically that of swimming/wading (X^2=30.537, P<0.001). A greater percentage of campers with children intended to spend most of their time swimming (65.8%), compared to the average percentage from within the total sample (55.6%). It therefore makes sense that campers with children would prefer warmer temperature (to meet the climatic requirements of swimming) and would have higher unacceptably hot temperature thresholds (due to the cooling effect of being close to water).

Figure 4.12 further illustrates the effect that having children present in the camp group had on unacceptably hot night-time temperature thresholds. The graph shows that where 50% of campers with children present in their group felt that temperatures above 29˚C were too hot, 60% of those without children in their group identified this same temperature as being unacceptably hot. Inversely, where the majority of campers without children felt that temperatures above 28˚C were too hot, only 40% of those with children felt the same about this temperature threshold. Another area of interest with respect to the differences between these two groups is the point at which 80% of campers found the temperature to be too hot. Looking at this point, 80% of campers without children in their group felt that temperatures above 32˚C were too hot. On the other hand, it was not until temperatures reached 37˚C that 80% of the campers with children present in their group indicated that the temperature was too hot.

Figure 4.12 – The Effect of having Children in the Group on Unacceptably Hot Night-time Temperatures (T=-4.278, P<0.001)



Continuing with the consideration of group composition, the presence of seniors (those aged 65 years or older), also had a significant effect on both ideal (t=2.085, P=0.037) and unacceptably hot (t=2.288, P=0.022) night-time temperature preferences and thresholds. Respondents with at least one senior within their camp group recorded cooler ideal night-time temperatures (mean=18.8˚C), compared to those who did not have any seniors present in their group (mean=19.8˚C). Similarly, respondents with at least one senior in their group recorded lower unacceptably hot temperature thresholds (mean=27.3°C), compared to those without any seniors present in their group (mean=28.9˚C). These results corresponds with the cooler temperature preferences and lower unacceptably hot temperature thresholds recorded among older campers but may also point toward the sensitivity of other campers who themselves may not be as vulnerable to such temperatures but are still mindful of the sensitivities of those they are travelling with.

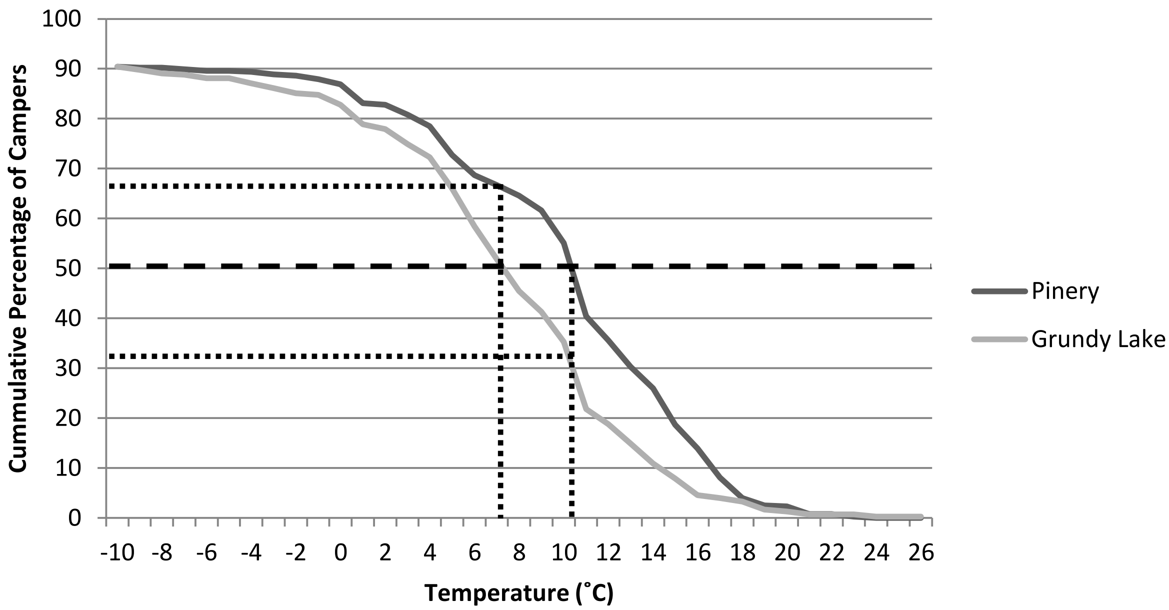
4.4.2 Differences in Preferred Night-time Temperatures between Parks

The first difference observed between the two parks in relation to preferred night-time temperatures was in reference to the presence of an unacceptably hot temperature threshold. At Pinery, only 5.7% of respondents indicated that no night-time temperatures (including humidity) felt too hot. On the other hand, 11.9% of campers at Grundy Lake denied the presence of an unacceptably hot temperature threshold. This difference between the two parks was statistically significant (x^2=8.657, P=0.003). Examining the clientele from within the samples of these two parks helps to explain why a greater percentage of campers from Grundy Lake claimed that no night-time temperatures (including humidity) were too hot for summer camping. Campers who intended to participate in a greater number of relatively passive activities were more likely to deny the existence of an unacceptably hot night-time temperature threshold. Campers from Grundy Lake, on average, planned to participate in a greater number of relatively passive activities, compared to campers from Pinery (Table 4.5). These findings help to explain why a greater percentage of campers from Grundy Lake claimed that no night-time temperatures (including humidity) were too hot for summer camping.

The second difference in preferred night-time temperatures between these two parks was found in relation to unacceptably cool temperature thresholds (t=5.505, P<0.001). The average unacceptably cool temperature threshold recorded among respondents at Pinery was 9.8˚C. Whereas, campers at Grundy Lake, recorded a 2.5˚C cooler average unacceptably cool temperature threshold (mean=7.3˚C). Figure 4.13 further illustrates this difference between these two parks. By focusing on the point of the graph where the majority of campers felt that the temperature was too cold, the difference between these two parks becomes more evident.

For example, where the majority of campers at Pinery felt that temperatures below 10˚C were unacceptably cool, only 30% of campers at Grundy Lake felt the same way about this temperature threshold. Inversely, while 50% of the campers at Grundy Lake felt that temperatures below 7˚C were too cold, approximately 66% of campers from Pinery identified this temperature as being too cold.

Figure 4.13 – Differences in Unacceptably Cool Night-time Temperatures between Parks (T=5.505, P<0.001)



Again, by looking the different clientele that visit these two parks, it becomes more apparent why these differences in unacceptably cool night-time temperature thresholds may have been present within the results. Campers who planned to spend most of their time swimming/wading were associated with warmer unacceptably cool night-time temperature thresholds than those who listed other activities instead. Inversely, campers who listed a water-based activity other than swimming (canoeing, kayaking or fishing) as one of their three most time activities, recorded significantly lower unacceptably cool night-time temperature thresholds. Campers from Pinery intended to spend more time swimming/wading, while campers from Grundy Lake intended to spend more time canoeing, kayaking or fishing.

Apart from the differences in the presence of an unacceptably hot night-time temperature threshold and in unacceptably cool night-time temperature thresholds, there were no other significant differences in relation to preferred night-time temperatures, observed between these two parks.

4.5 Intended Responses to Weather Conditions

Respondents were presented with a series of hypothetical weather conditions where they were asked how they would respond to different weather conditions if they persisted over increasing durations of time (Appendix 1, section 3). The six weather conditions that were presented were: unacceptably cool and hot temperatures (as defined by the respondent); light rain (less than 1mm/hour); heavy rain (more than 16mm/hour); light winds (10-40km/hour); and strong winds (41-90 km/hour). The increasing durations of time presented in the scenarios that corresponded to each weather condition were as follows: 1 to 12 hours, 13 to 24 hours, 25 to 48 hours, and more than 48 hours. For each time interval within the weather scenario, respondents were given the option to select any number of the following four behavioural responses: adjust activities to accommodate weather, leave park early, not return to the park again or, don't know. After an initial analysis of this section, two dominant groups emerged among those who had completed these questions. The first group was respondents who had no intentions at any time to leave the park early. The second was those who after a certain period of time indicated their intentions to leave the park early due to unfavourable weather conditions. Table 4.39 shows the number and valid percentage of campers who indicated their intentions to leave the park early due to these particular weather conditions.

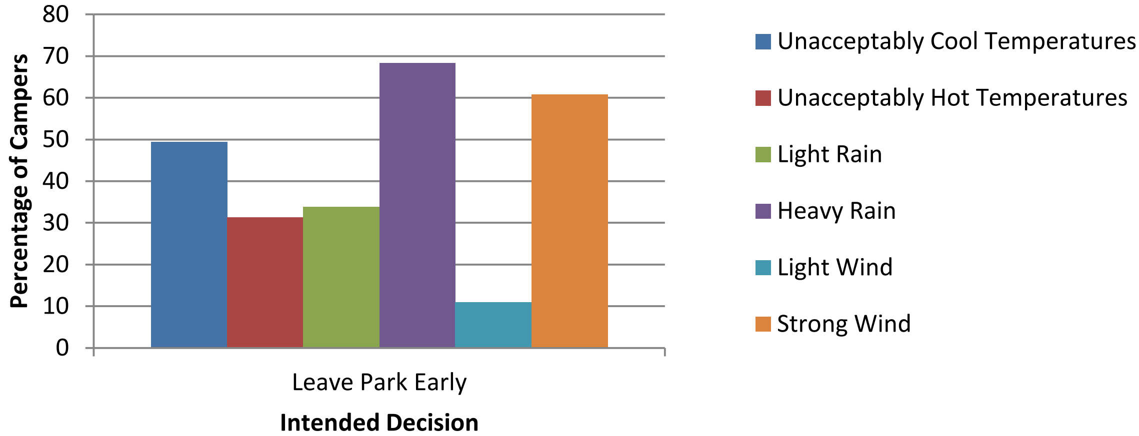
Table 4.39 – Intentions to Leave Park Early due to Weather Conditions

	Indicated Intentions to Leave Park Early due to Weather	
Weather Condition:	**n**	**Pct.**
Unacceptably Cool Temperatures	307	49.4
Unacceptably Hot Temperatures	189	31.3
Light Rain (less than 1mm/hour)	213	33.8
Heavy Rain (more than 16mm/hour)	436	68.3
Light Wind (10-40 km/hour)	62	10.9
Strong Wind (41-90 km/hour)	351	60.8

Figure 4.14 further illustrates the different influences each weather condition had on camper's intentions to leave the park early. In this visual depiction, it becomes increasingly evident that heavy rain, strong wind and unacceptably cool temperatures were the most

influential conditions in regard to camper decision-making. Light rain and unacceptably hot temperatures had less of an effect on camper's decisions to leave the park early due to weather, with light rain being slightly more influential. Light wind was the least influential weather condition considered.

Figure 4.14 – Compared Influence of Weather Conditions on Intentions to Leave Park Early



The finding that heavy rain and strong winds were the most influential factors in regard to camper's decisions to leave the park early is in line with what de Freitas et al. (2008) and Scott et al. (2008a) argued regarding the "overriding effect" of both wind and rain in relation to the suitability of weather for beach tourism. As reported earlier, the presence of sunshine and comfortable temperatures were the most important weather variables in relation to overall trip satisfaction. However, when considering which weather variables had the greatest influence over decisions to leave the park early, heavy rain and strong winds were the most influential factors.

4.5.1 Differences in Intended Responses to Weather Conditions between User Types

The first respondent characteristic considered when exploring the differences in intended responses to weather conditions was the number of overnight camping trips a respondent indicated they went on each year (Table 4.40). The results of a series of Chi-square tests show that a significant difference was found between the number of overnight camping trips each year and intended responses to unacceptably hot temperatures (x^2=8.849, P=0.012), light rain (x^2=12.246, P=0.002), and heavy rain (x^2=11.631, P=0.003). In all three cases, respondents who camped more times each year were less likely to leave the park early due to these specific weather variables.

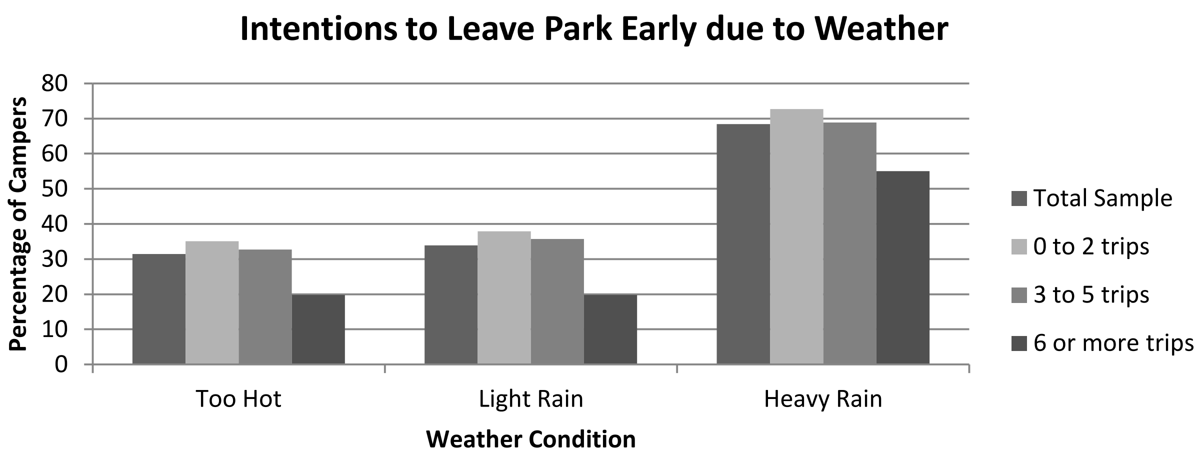
Table 4.40 – Differences in Intended Responses to Weather Conditions based on Number of Overnight Camping Trips each Year

Weather Condition (Total Sample): Camping trips each year	Percentage of Campers in Intended Response to Weather: Adjust Activities	Leave Park Early	x^2	P
Unacceptably Hot Temperatures:	**(68.6)**	**(31.4)**		
0 to 2 trips	64.9	35.1	**8.849**	**0.012**
3 to 5 trips	67.3	32.7		
6 or more trips	80.2	19.8		
Light Rain (less than 1mm/hour):	**(66.1)**	**(33.9)**		
0 to 2 trips	62.1	37.9	**12.246**	**0.002**
3 to 5 trips	64.3	35.7		
6 or more trips	80.2	19.8		
Heavy Rain (more than 16mm/hour):	**(31.6)**	**(68.4)**		
0 to 2 trips	27.3	72.7	**11.631**	**0.003**
3 to 5 trips	31.1	68.9		
6 or more trips	45.0	55.0		

Considering this variable as a measure of camping experience among respondents, it is likely that those who camped more times each year had a greater level of experience, and would therefore be better equipped to deal with adverse weather, making them less sensitive and vulnerable to weather while camping. More specifically, the results of a Mann-Whitney U Test ($P<0.001$) showed that respondents with a luxury camping vehicle, on average, went on more camping trips each year (mean rank=457.43) than those with traditional camping shelters (mean rank=317.50). Luxury camping vehicles are more resilient to rain than tents or canvas trailers and most often have access to air conditioning (88.6%), making extreme heat less of a concern. These finding help to explain why respondent that camped more times each year were less likely to leave the park early in response to these temperature and rain conditions.

Figure 4.15 graphs the differences for intentions to leave the park early due to weather, based on the number of overnight camping trips that respondents indicated they went on each year. By graphing the percentage of campers from within the total sample with intentions to leave the park early in response to each different weather condition, the differences between the intended responses of campers within each of the three categories of yearly camping trips becomes more emphasised. The percentage of campers within the total sample represents the statistically expected value, testing the null hypothesis that there are no differences between the three different categories of camping experience. Respondents who indicated they camped six or more times each year were consistently less likely to leave the park early in response to each of the three weather conditions considered.

Figure 4.15 – Differences in Intentions to Leave Park Early due to Weather Conditions based on Number of Overnight Camping Trips each Year



The number of overnight camping trips to the study park that respondents indicated they had been on during their lifetime had a significant effect on intended responses to unacceptably cool temperatures (x^2=9.014, P=0.011) as well as light wind conditions (x^2=9.923, P=0.007). In both cases, respondents who had been to the study park more times in their lifetime were less likely to leave the park early in response to either of these weather conditions. Table 4.41 shows the percentage of campers within the total sample as well as those from within each category of park loyalty in order to demonstrate where the differences in intended responses occurred. This variable can also be perceived as a measure of camping experience as those who had only been to the park only once may have less experience camping than those who had been numerous times before. It is therefore reasonable that campers on their first trip to the park would be more likely to leave the park early due to unacceptably cool temperatures or even light winds since they may be less prepared to deal with cold and rainy weather conditions.

Table 4.41 – Differences in Intended Responses to Weather Conditions based on Number of Overnight Trips to Study Park in Lifetime

Weather Condition (Total Sample): Trips to park in lifetime	Percentage of Campers in Intended Response to Weather: Adjust Activities	Leave Park Early	x^2	P
Unacceptably Cool Temperatures:	**(50.6)**	**(49.4)**		
First trip to park	40.8	59.2	**9.014**	**0.011**
2 to 10 trips	51.1	48.9		
11 or more trips	57.1	42.9		
Light Wind (10-40 km/hour):	**(66.3)**	**(33.7)**		
First trip to park	59.7	40.3	**9.923**	**0.007**
2 to 10 trips	66.7	33.3		
11 or more trips	70.6	29.4		

Oddly, campers who planned to spend most of their time swimming/wading were less likely to leave the park early due to unacceptably cool temperatures (45.7%), when compared to those who listed other activities instead (54.2%). The difference in intended responses to unacceptably cool temperatures between these two most time activity groups was statistically significant (x^2=4.445, P=0.035). This result was surprising as it was expected that campers who planned to spend most of their time swimming/wading would prefer warmer temperatures and thereby would be more sensitive to unacceptably cool temperatures.

Listing one of the three water-based activities other than swimming (canoeing, kayaking or fishing) as one of the activities that campers planned to spend either the most, second most or third most time participating in, had a significant effect on intended responses to five of the six different weather conditions considered in this study (Table 4.42). The results showed that campers who listed one of these water-based activities as one of their three most time activities were consistently less likely to leave the park early in response to all five weather conditions, in comparison to those who listed other activities instead. The greatest difference between these two groups was seen in intended responses to heavy rain conditions (x^2=16.042, P<0.001).

These results suggest that respondents who planned to spend most of their time canoeing, kayaking or fishing were in general, less sensitive to weather and therefore less likely to leave the park as a result of weather. The differences in intended responses to weather observed among this unique camper classification can be explained by considering the nature of campers that make up this group. Campers who planned to spend most of their time canoeing, kayaking or fishing, on average, camped more times each year, had been to the study park more times during their lifetime, travelled a greater distance to reach the park and planned to stay at the park for more nights. These specific characteristics are all associated with decreasing levels of weather sensitivity and therefore help to explain why this group responded the way that it did.

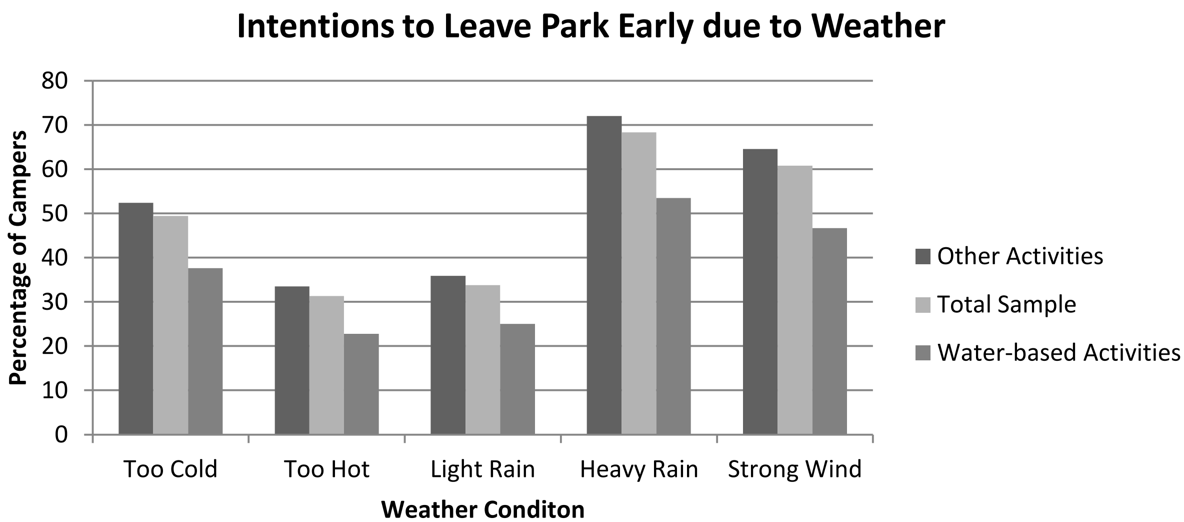
Table 4.42 – Differences in Intended Responses to Weather Conditions based on Intent to Spend Most Time Canoeing, Kayaking or Fishing

	Percentage of Campers in Intended Response to Weather			
Weather Condition (Total Sample): Most time activity	**Adjust Activities**	**Leave Park Early**	x^2	**P**
Unacceptably Cool Temperatures:	**(50.6)**	**(49.4)**		
Other Activities	47.6	52.4	**8.771**	**0.003**
Canoeing, Kayaking or Fishing	62.4	37.6		
Unacceptably Hot Temperatures:	**(68.7)**	**(31.3)**		
Other Activities	66.5	33.5	**5.224**	**0.022**
Canoeing, Kayaking or Fishing	77.2	22.8		
Light Rain (less than 1mm/hour):	**(66.2)**	**(33.8)**		
Other Activities	64.1	35.9	**5.141**	**0.023**
Canoeing, Kayaking or Fishing	75.0	25.0		
Heavy Rain (more than 16mm/hour):	**(31.7)**	**(68.3)**		
Other Activities	28.0	72.0	**16.042**	**<0.001**
Canoeing, Kayaking or Fishing	46.5	53.5		
Strong Wind (41-90 km/hour):	**(39.2)**	**(60.8)**		
Other Activities	35.4	64.6	**12.579**	**<0.001**
Canoeing, Kayaking or Fishing	53.3	46.7		

Figure 4.16 illustrates the differences in intended responses to weather conditions based on the intention to spend the most, second most or third most time canoeing, kayaking or fishing. Again, by comparing the observed percentage of campers with intentions to leave the park early from within each most time activity groupings to that from within the total sample, the difference between these two groups becomes increasingly evident. It is interesting to note that campers who listed other activities did not differ much from the expected value based on the percentage from within the total sample for each particular weather condition. However, campers who listed one of these three water-based activities differed considerably. These results would suggest that this group truly is a unique class of campers with significantly

different tendencies in relation to weather based decision-making and overall weather sensitivity.

Figure 4.16 – Differences in Intentions to Leave Park Early due to Weather Conditions based on Intent to Spend Most Time Canoeing, Kayaking or Fishing



The results of a series of discriminant analyses shown in Table 4.43 demonstrate how the number of physically active activities that a respondent planned on participating in had a significant effect on intended responses to all six weather conditions. In all six cases, campers who participated in more physically active activities were less likely to leave the park early due to weather. The greatest difference in this regard was found in relation to intended responses to unacceptably cool temperatures (R^2=0.019, P=0.001). Considering the weather sensitive nature of physically active activities, it is odd that greater levels of participation in such activities would be associated with lower likelihood to leave the park early due to weather, especially in regard to light and heavy rain conditions. However, looking at this variable as a measure of activity diversification rather than a class of activity participation alone, it is possible to view these results in a relatively different light. A perspective which suggests that campers who planned to participate in a greater number of activities in general, were less sensitive to weather variability and less likely to leave the park in response any of the weather conditions considered (temperature, rain or wind).

Table 4.43 – Differences in Intended Responses to Weather Conditions based on Participation in Physically Active Activities

Weather Condition:	Average Number of Physically Active Activities in Response to Weather: Adjust Activities	Leave Park Early	Total R^2	P
Unacceptably Cool Temperatures	5.48	5.00	**0.019**	**0.001**
Unacceptably Hot Temperatures	5.40	5.01	**0.011**	**0.009**
Light Rain (less than 1mm/hour)	5.38	5.09	**0.006**	**0.047**
Heavy Rain (more than 16mm/hour)	5.46	5.15	**0.007**	**0.037**
Light Wind (10-40 km/hour)	5.37	4.81	**0.011**	**0.014**
Strong Wind (41-90 km/hour)	5.54	5.09	**0.017**	**0.002**

The distance between the respondent's permanent place of residence and the study park that they were currently visiting had a significant effect on intended responses to both unacceptably cool (x^2=4.078, P=0.043) and unacceptably hot (x^2=19.127, P<0.001) temperature conditions. As shown in Table 4.44, respondents who reported living within 80km of the park were more likely to leave the park early in response to both unacceptably cool and unacceptably hot temperatures. This is reasonable as respondents who had travelled a greater distance would be more committed to the current trip and would therefore be less likely to leave the park in response to weather. The most significant difference was observed in relation to intended responses to unacceptably hot temperatures, a weather variable that did not have a great influence over camper decision-making. This is interesting as it would suggest that campers who lived within the local area were more likely to leave the park in response to extreme heat than campers who had travelled more than 80km, which is most likely related to the ease with which these respondents could simply pack up and return home. Additionally, the results of a T-Test (t=-4.247, P<0.001) showed that respondents who had travelled more than 80km to reach the park, on average, planned to stay at the park for more nights (mean=5.59), compared to respondents that travelled less than 80km (mean=4.30). Respondents who planned to stay for more nights were also less likely to leave the park early in response to these two weather variables, which helps to explain why these differences in intended responses to temperature extremes based on distance travelled were present within the results.

Table 4.44 – Differences in Intended Responses to Weather Conditions based on Distance between the Park and Home

Weather Condition (Total Sample): Distance from home	Percentage of Campers in Intended Response to Weather: Adjust Activities	Leave Park Early	x^2	P
Unacceptably Cool Temperatures:	**(51.0)**	**(49.0)**		
Less than 80km	40.3	59.7	**4.078**	**0.043**
More than 80km	52.6	47.4		
Unacceptably Hot Temperatures:	**(69.0)**	**(31.0)**		
Less than 80km	47.4	52.6	**19.127**	**<0.001**
More than 80km	72.2	27.8		

Length of planned stay was a very important factor in relation to differences for intended responses to weather conditions between user types (Table 4.45). Length of planned stay had a significant effect on intended responses to both unacceptably cool (x^2=23.859, P<0.001) and unacceptably hot temperatures (x^2=9.355, P=0.009), as well as light (x^2=14.330, P=0.001) and heavy (x^2=9.031, P=0.010) rain conditions. In all four weather scenarios, as the length of the respondent's planned stay at the park increased, their tendency to leave the park early in response to these weather conditions decreased. Length of stay had the strongest effect on intended responses to unacceptably cool temperatures.

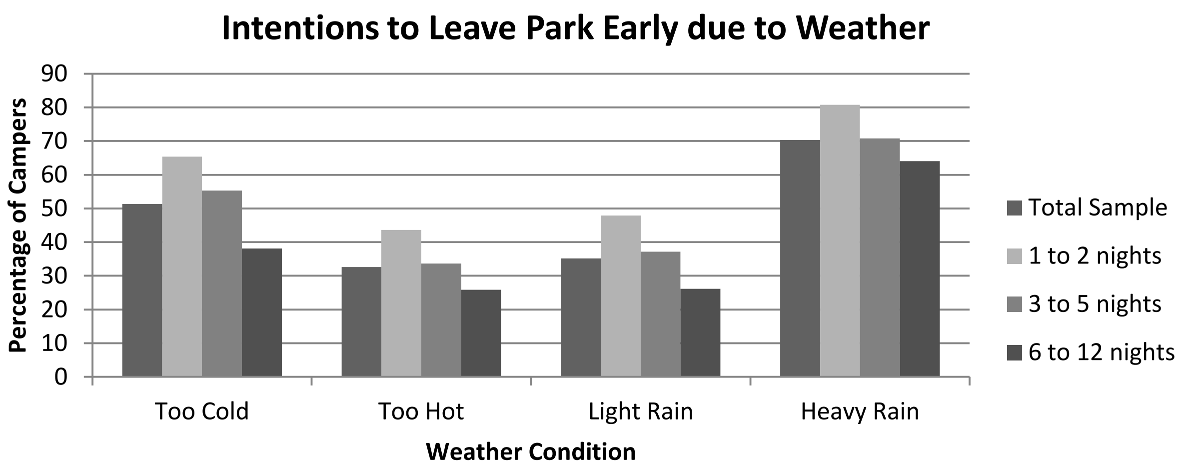
These findings are reasonable in that campers who planned to stay at the park for longer periods of time, especially those who planned to stay for a week or more, would be more committed to their current trip to the park and would therefore be less likely to leave the park in response to weather. It is also likely that campers who planned to stay at the park for a week or more would expect some occurrence of poor weather while at the park, but could still hope for better weather to come and postpone plans that required such weather conditions. Whereas, campers that were only staying for 1 to 2 nights (such as weekend trips) would be more sensitive to poor weather conditions seeing their visit was shorter and a day or two of poor weather would greatly affect their overall camping experience. In addition, campers who planned to stay at the park for more nights, on average, camped more times each year, travelled greater distances to reach the park, and were less likely to be staying in a tent. All of these factors combined help to explain why campers that planned to stay at the park for longer periods of time were less likely to leave the park early in response to weather.

Table 4.45 – Differences in Intended Responses to Weather Conditions based on Length of Planned Stay at Park

Weather Condition (Total Sample): Length of planned stay	Percentage of Campers in Intended Response to Weather: Adjust Activities	Leave Park Early	x^2	P
Unacceptably Cool Temperatures:	**(48.7)**	**(51.3)**		
1 to 2 nights	34.6	65.4	**23.859**	**<0.001**
3 to 5 nights	44.7	55.3		
6 to 12 nights	61.9	38.1		
Unacceptably Hot Temperatures:	**(67.4)**	**(32.6)**		
1 to 2 nights	56.4	43.6	**9.355**	**0.009**
3 to 5 nights	66.4	33.6		
6 to 12 nights	74.1	25.9		
Light Rain (less than 1mm/hour):	**(64.8)**	**(35.2)**		
1 to 2 nights	52.1	47.9	**14.330**	**0.001**
3 to 5 nights	62.8	37.2		
6 to 12 nights	73.9	26.1		
Heavy Rain (more than 16mm/hour):	**(29.7)**	**(70.3)**		
1 to 2 nights	19.2	80.8	**9.301**	**0.010**
3 to 5 nights	29.2	70.8		
6 to 12 nights	36.0	64.0		

Figure 4.17 depicts the differences for intentions to leave the park early due to temperature and rain conditions, based on length of planned stay at the park. The first bar within the graph for each weather condition represents the expected value for intentions to leave the park early due to that particular weather condition. Through this illustration it becomes increasingly clear which categories of length of stay recorded either greater or lesser propensities to leave the park early. In most cases, considerable divergence from the expected values for intended responses to these temperature and rain conditions were only observed between those campers who planned to stay for 1-2 nights and those who planned to stay for 6-12 nights. However, it is interesting to note that in the case of intended responses to unacceptably cool temperatures, both those campers who planned to stay for 1-2 nights, as well as those who planned to stay for 3-5 nights, were more likely to leave the park early than would be statistically expected. As a result, this created an even greater disparity between the expected value and the observed value for those campers who planned to stay for 6-12 nights, showing that they were considerably less likely to leave the park early due to extreme cold.

Figure 4.17 – Differences in Intentions to Leave Park Early due to Weather Conditions based on Length of Planned Stay at Park



In further consideration of the effect that length of planned stay had on intended responses to these temperature and rain conditions, a series of discriminant analyses were employed, using the actual number of nights planned to stay in the park rather than length of stay categories (Table 4.46). The same relationship between length of stay and intended responses to each different weather condition remained, where campers who planned to stay at the park for a greater number of nights were less likely to leave the park early in response to any of these four weather variables. New information that became available through this series of analyses was the degree to which the number of nights that respondents planned to stay at the park affected camper's intentions to leave the park early. Most notably, one model suggested that the number of nights that respondents planned to stay at the park was able to explain 5.5% of the total variation in intended responses to unacceptably cool temperatures (R^2=0.055).

Table 4.46 – Differences in Intended Responses to Weather Conditions based on Number of Nights Planned to Stay at Park

	Average Number of Nights Planned to Stay at Park in Response to Weather			
Weather Condition:	**Adjust Activities**	**Leave Park Early**	**Total R^2**	**P**
Unacceptably Cool Temperatures	6.25	4.33	**0.055**	**<0.001**
Unacceptably Hot Temperatures	5.80	4.41	**0.024**	**<0.001**
Light Rain (less than 1mm/hour)	5.87	4.24	**0.037**	**<0.001**
Heavy Rain (more than 16mm/hour)	6.28	4.85	**0.027**	**<0.001**

It is worth noting that length of planned stay did not result in any significant differences for intended responses to either light or strong wind conditions. This could be because respondents who indicated their intentions to leave the park early in response to strong winds (41-90km/h) did so out of a concern for safety and not just comfort, due to the danger associated with such weather conditions. It is therefore likely that campers would uphold such a decision to leave the park in response to strong winds, regardless of the length of their planned trip.

The type of camping shelter/vehicle respondents reported having on their site, whether it was a traditional camping shelter or a luxury camping vehicle, had a significant effect on intended responses to unacceptably hot temperatures (x^2=4.681, P=0.031) as well as on heavy rain conditions (x^2=3.987, P=0.046). In both cases, respondents who indicated the presence of a luxury camping vehicle on site were less likely to leave the park early due to either excessive heat or heavy rain (Table 4.47). It is likely that the presence of such a form of accommodation would allow campers to more comfortably adapt to intense heat by way of improved shade and access to air conditioning. Additionally, residing in an impermeable luxury vehicle such as a travel trailer, motorhome or fifth wheel would also provide improved resilience to excessive flooding and torrential rains, compared to that which could be expected from a canvas trailer or ground-dwelling tent.

Table 4.47 – Differences in Intended Responses to Weather Conditions based on Nature of Accommodation

Weather Condition (Total Sample): Nature of Accommodation	Percentage of Campers in Intended Response to Weather: Adjust Activities	Leave Park Early	x^2	P
Unacceptably Hot Temperatures:	**(69.5)**	**(30.5)**		
Traditional camping shelter	67.4	32.6	**4.681**	**0.031**
Luxury camping vehicle	77.9	22.1		
Heavy Rain (more than 16mm/hour):	**(32.3)**	**(67.7)**		
Traditional camping shelter	30.4	69.6	**3.987**	**0.046**
Luxury camping vehicle	39.8	60.2		

Tent campers, in particular, were more sensitive to heavy rain conditions than those without a tent present on their camp site. Of those who indicated the presence of a tent on site, 73.1% showed intentions to leave the park early due to heavy rain conditions, while only

61.2% of campers without tents did the same. The difference in intended responses to heavy rain between these two groups was found to be statistically significant (x^2=10.004, P=0.002). This makes logical sense as tents are more vulnerable to wet conditions than other forms of accommodation and heavy rain events would pose a serious threat of flooding; causing supplies, clothes and sleeping materials to get wet and become unusable.

In relation to access to different climate control systems, the only significant relationship found was the effect that access to heating had on camper's intended responses to unacceptably cool temperatures (x^2=4.434, P=0.035). In this regard, it was observed that of those campers who had access to heating, only 44.3% showed intentions to leave the park early due to extreme cold, while 53.0% of those without access to heating indicated their intentions to leave the park early. This is reasonable as campers with access to heating would be less vulnerable to extreme cold and could endure unacceptably cool temperatures for longer periods of time. It is interesting to note that although differences in intentions to leave the park early in response to unacceptably hot temperatures were observed between those who had access to air conditioning (25.7%) and those who did not (32.9%), these difference were not found to be statistically significant at the 95% confidence level (x^2=2.789, P=0.095). This is likely because respondents with access to air conditioning were older than those without (due to the nature of accommodation associated with access to air conditioning) and older campers were found to be more sensitive and vulnerable to unacceptably hot temperatures.

The level of importance that campers assigned to the presence of ideal weather conditions, in relation to overall trip satisfaction, compared to that of other trips elements, had a significant effect on intended responses to a number of different weather variables (Table 4.48). The results suggest that respondents who placed a greater level of importance on the presence of ideal weather conditions were more likely to leave the park early in response to both unacceptably cool and unacceptably hot temperatures as well as to light and heavy rain conditions. The comparative importance of weather was found to have the most significant effect on intended responses to heavy rain conditions (R^2=0.059, P<0.001), being able to explain 5.9% of the total variation in responses. This makes sense as campers who felt that the presence of ideal weather conditions was of greater importance in relation to overall trip satisfaction would logically be more inclined to leave the park early if weather conditions became unfavourable.

Table 4.48 – Differences in Intended Responses to Weather Conditions based on the Comparative Importance of the Presence of Ideal Weather Conditions

	Average Importance of Ideal Weather (-4 to 4) in Intended Response to Weather			
Weather Condition:	**Adjust Activities**	**Leave Park Early**	**Total R^2**	**P**
Unacceptably Cool Temperatures	-0.92	-0.50	**0.032**	**<0.001**
Unacceptably Hot Temperatures	-0.79	-0.49	**0.014**	**0.004**
Light Rain (less than 1mm/hour)	-0.86	-0.36	**0.042**	**<0.001**
Heavy Rain (more than 16mm/hour)	-1.07	-0.49	**0.059**	**<0.001**

Group composition was also found to have a significant effect on intended responses to certain weather conditions. There was a significant difference observed for the intended responses to light wind conditions between campers who indicated the presence of at least one child (14 years or younger) in their camp group and those with no children in their group (x^2=7.186, P=0.007). In this regard, 14.9% of campers with no children indicated their intentions to leave the park early due to light wind conditions, while only 7.8% of campers with children did the same. This would suggest that campers without children in their group are seemingly more agitated by light winds than those with children. Additionally, the presence of seniors (65 year or older) within the respondent's camp group had a significant effect on intended responses to unacceptably cool temperatures (x^2=4.202, P=0.040). In this regard, 48.1% of campers without seniors in their group indicated their intentions to leave the park early due to unacceptably cool temperatures, while 62.5% of campers with at least one senior in their group were inclined to leave the park early in response to extreme cold. These results would suggest that campers with at least one senior present in their group are more sensitive to extreme cold than those without any seniors.

4.5.2 Differences in Intended Responses to Weather Conditions between Parks

The two parks displayed significant differences for intended responses to five out of the six different weather conditions presented to respondents (Table 4.49). Only in the case of intended responses to light winds were no significant differences found between the two parks (x^2=1.972, P=0.160). A significantly higher percentage of campers from Pinery indicated their intentions to leave the park early for all five weather conditions considered, compared to that which was observed among campers from Grundy Lake. The most pronounced difference found between these two parks was observed in the intended responses of campers to heavy rain conditions (x^2=32.256, P<0.001).

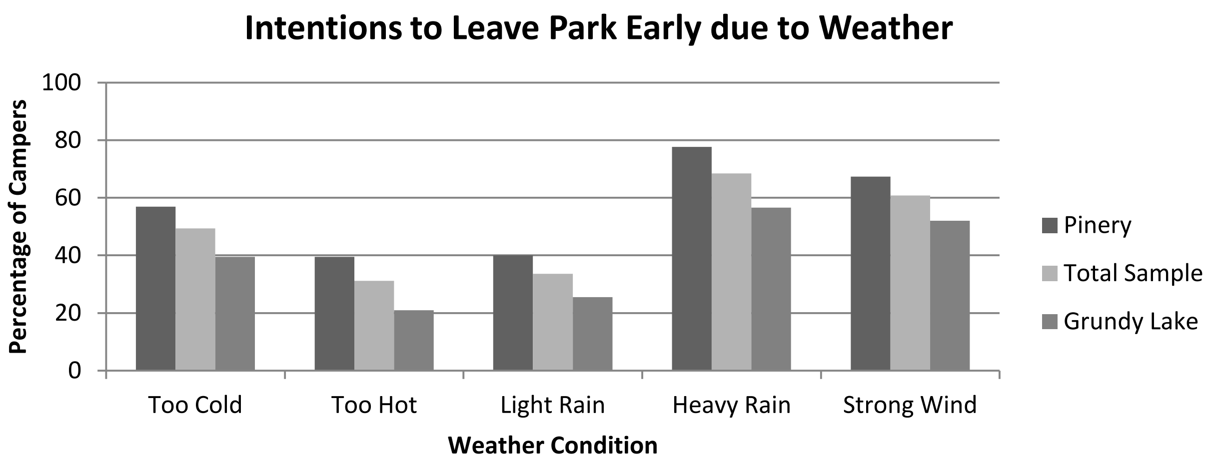
Table 4.49 – Differences in Intended Responses to Weather Conditions between Parks

Weather Condition (Total Sample): Provincial Park	**Percentage of Campers in Intended Response to Weather** **Adjust Activities**	 **Leave Park Early**	x^2	**P**
Unacceptably Cool Temperatures:	**(50.6)***	**(49.4)**		
Pinery	43.1	56.9	**18.272**	**<0.001**
Grundy Lake	60.5	39.5		
Unacceptably Hot Temperatures:	**(68.8)**	**(31.2)**		
Pinery	60.5	39.5	**23.547**	**<0.001**
Grundy Lake	79.0	21.0		
Light Rain (less than 1mm/hour):	**(66.4)**	**(33.6)**		
Pinery	60.0	40.0	**14.604**	**<0.001**
Grundy Lake	74.5	25.5		
Heavy Rain (more than 16mm/hour):	**(31.5)**	**(68.5)**		
Pinery	22.3	77.7	**32.256**	**<0.001**
Grundy Lake	43.4	56.6		
Strong Wind (41-90 km/hour):	**(39.2)**	**(60.8)**		
Pinery	32.6	67.4	**13.889**	**<0.001**
Grundy Lake	48.0	52.0		

* Percentages within brackets, placed in bold, are representative of the percentage of responses within the total sample for each intended response. This is figurative of the expected value from the individual parks within each intended response for the various weather conditions.

Figure 4.18 further demonstrates the differences for intended responses to weather conditions between the two parks. The percentage of campers with intentions to leave the park early from within the total sample for each weather condition is the expected value for responses from within each park and acts as the baseline for the test of significant differences. The graph illustrates the finding that campers from Pinery consistently responded with greater intentions to leave the park early across each weather condition considered, when compared to campers from Grundy Lake.

Figure 4.18 – Differences in Intentions to Leave Park Early due to Weather Conditions between Parks



By considering the relationship between respondent characteristics and intended responses to both unacceptably cool and unacceptably hot temperatures, it becomes possible to further understand the difference between these two parks in this regard. The greater the level of importance that campers assigned to the presence of ideal weather conditions, the more likely they were to leave the park early in response to both temperature extremes. On the other hand, campers who planned to spend most of their time canoeing, kayaking or fishing; had travelled more than 80km to reach the park; and planned to stay at the park for extended periods of time, were all found to be less likely to leave the park early due to unacceptable temperatures. The more times that campers reported having visited the study park over their lifetime was found to reduce the likelihood that they would leave the park early due to unacceptably cool temperatures. Whereas, the more overnight camping trips that respondents indicated they went on each year, the less likely they were to leave the park early due to unacceptably hot temperatures. Seeing that, on average, campers from Pinery were more likely to have travelled less than 80km to reach the park, planned to stay at the park for fewer nights and also held the presence of ideal weather conditions in higher regard, they were also more inclined to leave the park early when confronted with unacceptable temperatures. Inversely, since respondents from Grundy Lake camped more frequently, had travelled a greater distance, planned to stay at the park for longer periods, planned to spend most of their time canoeing, fishing or kayaking and placed less importance on the presence of ideal weather conditions, they were less likely to leave the park early during unacceptable temperature conditions.

The same four factors in relation to user types that were seen in relation to intended responses to unacceptably temperatures also prevailed in the case of rain conditions. The more times that campers indicated they went on overnight camping trips each year, the less likely they were to leave the park due to either light or heavy rain conditions. Campers who listed canoeing, kayaking or fishing as one of their three most time activities were less likely to leave the park early due to rain, when compared to those who listed other activities instead. Similarly, the longer campers planned to stay within the park, the less likely they were to leave the park early in response to either light or heavy rain conditions. Finally, increasing levels of importance assigned to the presence of ideal weather conditions contributed to a greater tendency to leave the park early due to rain. The sample of campers from Grundy Lake was more closely aligned with the user types that were less likely to leave the park early due to rain. On the other hand, the sample of campers from Pinery consisted of user types that were more sensitive to rain conditions, and were thereby more likely to leave the park early when faced with varying durations and intensities of rain.

Only one factor in relation to user types was found to affect intended responses to strong wind conditions while also being associated with a difference between the sample characteristics of the two parks. In this regard, campers who intended to spend most of their time canoeing, kayaking or fishing were less likely to leave the park early due to strong winds, compared to those who listed other activities instead. This finding seems remotely odd in that the activities which comprise this water-based category were conceptually more vulnerable and sensitive to strong wind conditions in that they operate on open waters where high winds can make non-motorised water travel very difficult and at times dangerous. However, this still speaks to the nature of this class of camper in that they appear to be more willing to accept adverse weather conditions and place less importance on weather in relation to overall trip satisfaction. Respondents from Grundy Lake were less likely to leave the park early due to strong winds as were those campers who listed canoeing, kayaking or fishing as one of their three most time activities. This respondent characteristic was most frequently observed at Grundy Lake, which helps to explain why this difference in weather based decision-making between these two parks was present.

4.6 Temporal Weather Thresholds

Respondents who indicated their intentions to leave the park early in response to weather (N=521) also identified the duration of time they were willing to endure for each specific weather condition before leaving the park. Table 4.50 displays the temporal weather thresholds for each weather condition. The duration of time in which the greatest percentage of campers indicated their intentions to leave the park was used to define the temporal threshold for each specific weather condition.

Table 4.50 – Time before Leaving Park Due to Undesirable Weather Conditions

Weather Condition:	Percentage of Campers in Time Before Leaving Park			
	1 to 12 hours	13 to 24 hours	25 to 48 hours	More than 48 hours
Unacceptably Cool Temperatures	5.2	12.4	37.1	**45.3**
Unacceptably Hot Temperatures	2.6	11.1	37.0	**49.2**
Light Rain (less than 1mm/hour)	1.4	17.4	36.6	**44.6**
Heavy Rain (more than 16mm/hour)	10.6	21.6	**44.3**	23.6
Light Wind (10-40 km/hour)	8.1	17.7	35.5	**38.7**
Strong Wind (41-90 km/hour)	12.3	31.1	**38.2**	18.5

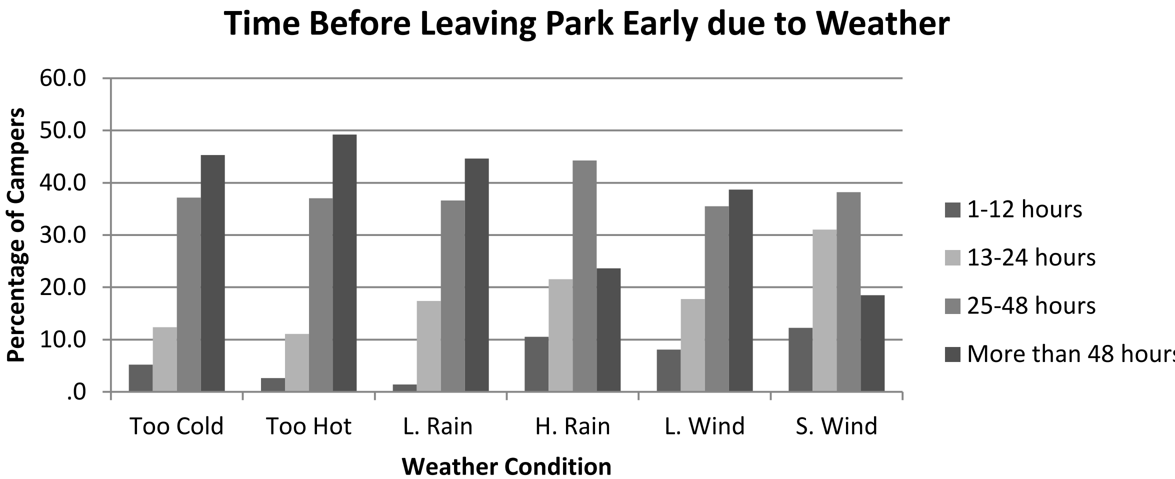
In four of the six weather conditions considered (unacceptably cool and hot temperatures, light rain and light winds), the greatest percentage of campers were willing to withstand more than 48 hours of each respective weather condition, before indicating their intentions to leave the park early. It was only in the case of heavy rain and strong winds that the greatest percentage of campers indicated their intentions to leave the park after 25 to 48 hours. Once again, these results support the contentions that wind and rain have an "over-riding effect" on the suitability of weather for tourism and on weather based decision-making among tourists (de Freitas, 1990; 2003; de Freitas et al. 2008). The suggestion that wind and rain would have an over-riding effect on the suitability of weather for tourism has been applied primarily to a beach tourism context. Interestingly, the results of this study would suggest that the climate preferences of campers are similar to that of beach users in this regard.

It is also interesting to note that in the case of strong winds, a greater percentage of campers indicated their intentions to leave the park early after only 13 to 24 hours than that which was observed for any other weather condition. This finding further demonstrates the overarching influence of strong winds on camper decision-making, seeing that campers were willing to endure strong winds conditions for less time than any other weather condition. This is likely related to the danger associated with strong wind conditions and the vulnerability of campers to such weather conditions while within natural park settings.

Finally, it is also worth noting that in the case of light winds, a strikingly similar percentage of campers indicated their intentions to leave the park after 25 to 48 hours (35.5%) as compared to the percentage of campers who were willing to endure more than 48 hours (38.7%). These results suggest that among the very few campers who indicated their intentions to leave the park early due to light winds (N=62), their temporal weather threshold was crossed sooner than was the case for either temperature extremes or for light rain conditions. However, it is important to recognise that the temporal weather threshold for light wind conditions may not be completely representative of the population given its small response pool.

Figure 4.19 illustrates the temporal weather thresholds among campers for each of the six weather conditions considered in this study. The graph shows that the greatest percentage of campers willing to endure more than 48 hours of a particular weather conditions occurred in response to unacceptably hot temperatures (49.2%). On the other hand, the lowest percentage of campers willing to withstand more than 48 hours of a certain weather conditions was seen in the case of strong wind conditions (18.5%). Additionally, the greatest percentage of campers who had indicated their intentions to leave the park early after only 1-12 hours, as well as after 13-24 hours for any one specific weather condition were also observed in relation to strong winds. It can therefore be suggested that temporal weather thresholds were the highest in the case of unacceptably hot temperatures and the lowest in regard to strong wind conditions. This finding has important implications for the rating of weather variables in relation to the development of a climate index for park tourism, showing that the absence of strong winds is of great importance to campers as they were most sensitive to this weather condition.

Figure 4.19 – Comparison of Temporal Weather Thresholds for different Weather Conditions



The time that campers were willing to endure before indicating their intentions to leave the park early in response to a number of different weather scenarios, can be taken as a measure of influence that these weather aspects had on camper decision-making. Table 4.51 ranks the influence that of five of the six different weather conditions considered in this study had on camper decision-making. The ranking of importance is based on the average time that campers were willing to endure under each weather condition before indicating their intentions to leave the park early. There were four possible temporal thresholds that campers could indicate: 1-12 hours, 13-24 hours, 25-48 hour and more than 48 hours. The four temporal thresholds were ranked in order from one to four, with (1) being the shortest duration (1-12 hours) and (4) being the longest (more than 48 hours). As such, when considering the mean scores for each weather aspect, a lower mean score would represent a lower temporal threshold for that particular weather condition, while a higher mean score would represent a higher temporal threshold. Therefore, the weather aspects with the lowest mean scores were ranked as the most influential weather aspects since campers were willing to endure the shortest length of time under these conditions before indicating their intentions to leave the park early.

Table 4.51 – The Influence of Weather in relation to Camper Decision-making (time before leaving park early)

Weather Conditions	Total Sample (n=721)		Pinery (n=403)		Grundy Lake (n=312)	
	Mean Time Before Leaving (1-4)	Rank of Influence	Mean Time Before Leaving (1-4)	Rank of Influence	Mean Time Before Leaving (1-4)	Rank of Influence
Too Hot	3.33	5	3.30	5	3.39	5
Too Cold	3.23	3	3.19	3	3.31	4
Light Rain	3.24	4	3.26	4	3.26	3
Heavy Rain	2.81	2	2.72	2	2.99	2
Light Winds	n=62	-	n=39	-	n=22	-
Strong Winds	2.63	1	2.59	1	2.70	1

It is important to note that only those campers who indicated their intentions to leave the park early in response to a specific weather condition, were thereby able to identify a temporal threshold (time before leaving the park) for that same weather aspect. As a result, the validity of the mean ranking of one weather aspects (light wind conditions) had been called into question, given its unreliably small sample size (n=62). Therefore, the temporal weather threshold for light wind conditions has not been included in the discussion surrounding the importance of the other five weather aspects. Because of the small percentage of campers who indicated their intentions to leave the park early due to light wind conditions, this variable was ranked as the least influential weather condition. However, when looking at the mean values in relation to time before leaving the park early, due to this small sample of respondents, light wind conditions were ranked as the third most influential weather variable. If nothing else, these results suggest that the few respondents who indicated their intentions to leave the park early due to light wind conditions, on average, did so sooner than respondents did in response to a number of other weather variables.

4.6.1 Differences in Temporal Weather Thresholds between User Types

The number of overnight camping trips to the study park that respondents indicated they had been on during their lifetime had a significant effect on temporal weather thresholds for heavy rain conditions (x^2=7.267, P=0.025). Using a Kruskal-Wallis Test of significant differences, mean ranks were generated and it was found that campers who were on their first trip to the park (mean rank=192.39), were inclined to leave the park earlier than those who had been to the park between 2-10 times before (mean rank=216.46) and to an even greater degree, those who had been to the park 11 or more times before (mean rank=234.47). Therefore, campers who had been to the park more times during their lifetime were willing to endure longer durations of heavy rain before leaving the park, especially when compared to campers on their first visit to the park. It is likely that these differences relate to the level of camping experience associated with respondents in each of these categories. Campers on their first trip to the park may be inexperienced and may lack essential skills and equipment to handle heavy rain conditions. Whereas, those who have been to the park many times before would know what to expect and would have a history of successful trips that have motivated them to come back each time.

The average number of physically active activities that campers planned to spend at least one half hour participating in during their current trip to the park had a significant effect on the temporal weather thresholds for five out of the six weather conditions considered (Table 4.52). The results of a series on discriminant analyses showed that in all five cases the more physically active activities that campers planned to participate in, the higher their temporal weather thresholds were. Participation in physically active activities had the most significant effect on temporal weather thresholds for heavy rain conditions (R^2=0.044, $P<0.001$). This finding was one of the most difficult relationships to make sense of; however, looking at this variable as a measure of activity diversification rather than a classification of activities, it becomes possible to suggest why this relationship may exist. What can then be suggested is that campers who planned to participate in a greater number of activities were less sensitive to adverse weather conditions and less likely to leave the park as a result. A possible explanation for is that because these respondents planned to participate in a number of different activities, if weather impeded one activity they may have been able to enjoy another activity instead. On the other hand, campers who came to the park planning to participate in only a few different activities (i.e. swimming/wading, beach volleyball, picnicking), would be more sensitive to weather since if it conflicted with these activities they would not have any other activities in their plans that they could choose as a satisfactory alternative.

Table 4.52 – Differences in Time before Leaving Park due to Weather Conditions based on Participation in Physically Active Activities

Weather Condition:	Average Number of Physically Active Activities (0-9) in Time Before Leaving Park: 1 to 24 hours	25 to 48 hours	More than 48 hours	Total R^2	P
Unacceptably Cool Temperatures	4.78	4.76	5.29	**0.023**	**0.033**
Unacceptably Hot Temperatures	4.31	4.88	5.29	**0.041**	**0.021**
Light Rain (less than 1mm/hour)	4.68	4.94	5.40	**0.028**	**0.050**
Heavy Rain (more than 16mm/hour)	4.75	5.16	5.71	**0.044**	**<0.001**
Strong Wind (41-90 km/hour)	4.74	5.30	5.45	**0.032**	**0.003**

The distance between the respondent's permanent place of residence and the park they were currently visiting had a significant effect on the temporal weather threshold for heavy rain (P=0.010). The results of a Mann-Whitney U Test showed that campers who lived further than 80km from the park were willing to endure longer periods of heavy rain (mean rank=213.66), when compared to campers who lived within 80km of the park (mean rank=173.19). In this regard, it was observed that the greatest percentage of campers who lived within 80km from the park indicated their intentions to leave the park after only 1 to 12 hours of heavy rain (44.8%). On the other hand, campers who lived further than 80km from the park most frequently indicated their intentions to leave the park after 13 to 24 hours of heavy rain (44.8%). Therefore, campers who lived closer to the park had a significantly lower temporal weather threshold for heavy rain conditions, compared to those who lived further away from the park. Two different factors in relation to respondent characteristics helped explain why this difference may be present, apart from the logical conclusion that campers who had less distance between the park and their home would be more willing to travel that distance and cancel their trip as a result of heavy rain conditions. Being confirmed by a T-Test and a Pearson Chi-Square Test, these additional factors were length of planned stay (t=-4.247, P<0.001) and participation in canoeing, kayaking or fishing (X^2=7.842, P-0.003). Campers who had travelled more than 80km to reach the park, on average, planned to stay at the park longer (mean=5.59 nights), compared to those who had travelled less than 80km (mean=4.30 nights). Additionally, a greater percentage of respondents that lived further than 80km from the park planned to spend most of their time canoeing, kayaking or fishing (21.7%), compared to those who lived less than 80km from the park (11.0%). These findings are significant because respondents who planned to stay at the park for more nights, and those who intended to spend most of their time canoeing, kayaking or fishing, were both less likely to leave the park early in response to heavy rain.

The length of planned stay at the park had a highly significant and wide spread effect on temporal weather thresholds, in comparison to the effect of the other respondent characteristics considered in this study. Length of planned stay had a significant effect on all of the weather conditions examined, except light wind conditions (Table 4.53). The patterns of observed change remained consistent across all five weather conditions, in that as the length of planned stay increased, so did the temporal threshold for each particular weather condition. Therefore, campers who planned to stay at the park for a greater number of nights were willing to endure each weather condition for a greater period of time, before indicating their intentions to leave the park early as a result.

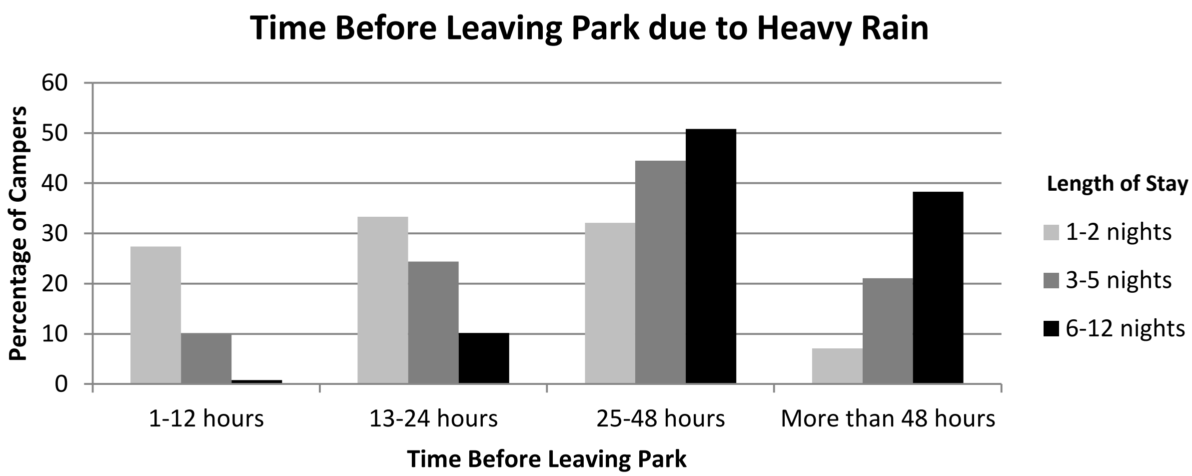
Table 4.53 – Differences in Time before Leaving Park due to Weather Conditions based on Planned Length of Stay at Park

Weather Condition: Length of planned stay at park	Time before Leaving Park due to Weather: n	Mean Rank	X^2	Kruskal-Wallis Test (P)
Unacceptably Cool Temperatures:				
1 to 2 nights	68	118.74	**21.720**	**<0.001**
3 to 5 nights	157	149.65		
6 to 12 nights	75	181.07		
Unacceptably Hot Temperatures:				
1 to 2 nights	41	65.45	**22.322**	**<0.001**
3 to 5 nights	93	93.82		
6 to 12 nights	51	113.65		
Light Rain (less than 1mm/hour):				
1 to 2 nights	45	65.13	**34.854**	**<0.001**
3 to 5 nights	112	108.80		
6 to 12 nights	52	131.32		
Heavy Rain (more than 16mm/hour):				
1 to 2 nights	84	137.30	**67.421**	**<0.001**
3 to 5 nights	209	205.30		
6 to 12 nights	128	268.68		
Strong Wind (41-90 km/hour):				
1 to 2 nights	64	131.86	**16.188**	**<0.001**
3 to 5 nights	169	171.15		
6 to 12 nights	106	191.19		

As discussed in the previous section (4.5.1), referring to the effect of the length of planned stay on decisions to leave the park early due to weather, these findings make logical sense for a number of different reasons. To begin, longer visits engender a greater sense of commitment to the current trip. In addition, there would be a greater expectation of some form of adverse weather during a longer visit and most likely a greater degree of preparation for such an occurrence. Campers who planned to stay at the park for more nights, on average, also camped more times each year, travelled greater distances to reach the park, and were less likely to be staying in a tent. All of these factors combined help to explain why campers that planned to stay at the park for longer periods of time were less likely to leave the park early in response to weather.

The most significant relationship displayed in Table 4.53 was the effect that length of planned stay had on the temporal weather threshold for heavy rain conditions (x^2=67.421, $P<0.001$). Figure 4.20 graphs the percentage of campers who indicated their intentions to leave the park early due to heavy rain across each temporal threshold, setting apart the three different camper groupings related to length of planned stay. From this graph, it become increasingly clear that campers who planned to stay at the park for only 1 to 2 nights indicated their intentions to leave the park sooner than those who planned to stay for either 3 to 5 nights or 6 to 12 nights. In the case of campers who planned to stay for only 1 to 2 nights, the greatest percentage of campers (33.3%) indicated their intentions to leave the park after 13 to 24 hours of heavy rain, with 32.1% intent on leaving after 25 to 48 hours and a very notable 27.4% intent of leaving the park after only 1 to 12 hours of heavy rain. Both those campers who planned to stay for 3 to 5 nights (44.5%) and those who planned to stay for 6 to 12 nights (50.8%), most frequently indicated their intentions to leave the park after 25 to 48 hours of heavy rain. It is worth noting, however, that out of the campers who planned to stay for 3 to 5 nights, the next greatest percentage of campers were intent on leaving after 13 to 24 hours (24.4%). Whereas, the next greatest percentage of campers who planned to stay for 6 to 12 nights were willing to endure more than 48 hours of heavy rain (38.3%); reinforcing that as length of stay increased, so did temporal weather thresholds for heavy rain.

Figure 4.20 – Differences in Time before Leaving Park due to Heavy Rain based on Length of Planned Stay at Park (x^2=67.421, P<0.001)



To further explore the relationship between length of planned stay and temporal weather thresholds, a series of discriminant analyses were conducted using the actual number of nights that campers planned to stay at the park in order to determine the effect this variable had on time before leaving (Table 4.54). For the five temporal weather thresholds showing significant relationships with the number of nights that campers planned to stay at the park (all but light wind conditions), campers who planned to stay at the park for a greater number of nights were willing to endure longer periods of each weather condition, before indicating their intentions to leave the park early.

Table 4.54 – Differences in Time before Leaving Park due to Weather Conditions based on Number of Nights Planned to Stay at Park

Weather Condition:	Average Number of Nights Planned to Stay at Park within Time Before Leaving Park: 1 to 24 hours	25 to 48 hours	More than 48 hours	Total R^2	P
Unacceptably Cool Temperatures	3.19	4.30	4.80	**0.057**	**<0.001**
Unacceptably Hot Temperatures	2.77	4.30	4.95	**0.086**	**<0.001**
Light Rain (less than 1mm/hour)	3.23	4.06	4.82	**0.067**	**0.001**
Heavy Rain (more than 16mm/hour)	3.54	4.97	6.40	**0.076**	**<0.001**
Strong Wind (41-90 km/hour)	4.25	4.99	5.34	**0.024**	**0.016**

New information that these additional tests revealed was to what degree changes in the number of nights that campers planned to stay at the park were able to explain variations in the time before leaving the park for each of these weather conditions considered. Based on this analysis, the number of nights that campers planned to stay at the park had the most significant effect on the temporal weather threshold for unacceptably hot temperatures (R^2=0.086, P<0.001), being able to explain 8.6% of the total variation in responses.

In regard to climate controls systems, based on a series of Mann-Whitney U Tests, the only significant relationship found in regard to temporal weather thresholds was the difference in time before leaving the park due to unacceptably cool temperatures, observed between campers with and without access to heating (P=0.019). In this regard, campers who had access to heating were more likely to withstand longer periods of extreme cold before leaving the park (mean rank=161.26), compared to those without access to heating (mean rank=139.26). A greater percentage of campers with access to heating were willing to endure over 48 hours of unacceptably cool temperatures (51.3%), when compared to campers without access to heating (41.0%). Inversely, a greater percentage of campers without access to heating indicated their intentions to leave the park early after only 1 to 24 hours of extreme cold (21.9%), compared to those with access to heating (10.3%). This is understandable as access to heating would logically increase a camper's resilience to extreme cold, thereby reducing their sensitivity and vulnerably to unacceptably cool temperatures.

It is interesting to note that a significant relationship existed between overall satisfaction with the current trip and temporal weather thresholds for both heavy rain (R^2=0.021, P=0.011) and light wind (R^2=0.037, P=0.016) conditions. In both cases, the more satisfied that campers were with their current trip, the more willing they were to endure longer periods of these two weather conditions, before indicating their intentions to leave the park early (Table 4.55). This makes rationale sense in that if campers are already feeling a certain degree of dissatisfaction with their current trip, even the slightest occurrence of undesired weather may motivate them to leave the park early. In this case, even the occurrence of light winds was enough to incite certain respondents to leave the park early, not necessarily because the light winds were a serious issue or threat to them, but rather, because they were already discontent and were not enjoying their trip to begin with.

Table 4.55 – Differences in Time before Leaving Park due to Weather Conditions based on Overall Satisfaction with Current Trip

Weather Condition:	Average Overall Satisfaction with Current Trip (0-5) in Time Before Leaving Park: 1 to 24 hours	25 to 48 hours	More than 48 hours	Total R^2	P
Heavy Rain (more than 16mm/hour)	4.27	4.42	4.60	**0.021**	**0.011**
Light Wind (10-40 km/hour)	3.29	4.18	4.30	**0.037**	**0.016**

The importance that campers assigned to the presence of ideal weather conditions compared to other trip elements, all in relation to overall trip satisfaction, had a significant effect on temporal weather thresholds (Table 4.56). In the case of each temporal weather threshold (except for that of light rain, which did not display a significant relationship with the importance of ideal weather conditions), as the level of importance assigned to the presence of ideal weather conditions increased, the duration of time campers were willing to endure before leaving the park early decreased. The effect of the comparative importance assigned to the presence of ideal weather conditions on temporal weather thresholds was most significant in relation to the time before leaving the park due to heavy rain conditions (R^2=0.059, P<0.001). In this regard, change in the importance of ideal weather conditions was able to account for 5.9% of the total variation in time before leaving the park due to heavy rain. This results are reasonable as respondents who felt the presence of ideal weather was of great importance in relation to their overall trip satisfaction would be expected to be more greatly impacted by the occurrence of adverse weather conditions and therefore would be more likely to leave the park and to do so sooner, compared to those who held the presence of ideal weather conditions in lower regard.

Table 4.56 – Differences in Time before Leaving Park due to Weather Conditions based on Comparative Importance of Ideal Weather Conditions

Weather Condition:	Comparative Importance of Ideal Weather (-4 to 4) in Time Before Leaving Park: 1 to 24 hours	25 to 48 hours	More than 48 hours	Total R^2	P
Unacceptably Cool Temperatures	-0.15	-0.52	-0.62	**0.024**	**0.026**
Light Rain (less than 1mm/hour)	-0.01	-0.48	-0.41	**0.030**	**0.043**
Heavy Rain (more than 16mm/hour)	-0.17	-0.54	-0.84	**0.059**	**<0.001**
Strong Wind (41-90 km/hour)	-0.41	-0.70	-0.84	**0.028**	**0.008**

Interestingly, respondent's age had a significant effect on the temporal weather threshold for light rain conditions (x^2=13.123, P=0.001). In this case, the results of a Kruskal-Wallis Test of significant differences showed that campers aged 18 to 34 years (mean rank=79.37) indicated their intentions to leave the park due to light rain conditions sooner than any other age group. Campers aged 35 to 54 were willing to endure the longest periods of light rain conditions (mean rank=112.29). Meanwhile, campers aged 55 years and older (mean rank=103.65), were willing to endure longer periods of light rain than those aged 18 to 34 years, but less than those ages 35 to 54. Based on an examination of respondent characteristics, there are two reasonable explanations for why younger campers are more sensitive to light rain conditions than middle-aged or older campers. First, younger campers were more likely to be staying in a tent than older campers. Second, they also planned to stay at the park for fewer nights, compared to older campers. Tent campers and those who planned to stay at the park for fewer nights were both more sensitive to light rain conditions and indicated their intentions to leave the park sooner than their respective counterparts.

Based on the results of a Mann-Whitney U Test, gender was shown to have a significant effect on the temporal weather threshold for unacceptably cool temperatures (P=0.019). Males (mean rank=175.36) were willing to endure longer periods of unacceptably cool temperatures before leaving the park than females (mean rank=152.66). In this case, it was observed that a considerably higher percentage of females (49.2%) indicated their intentions to leave the park after only 1 to 24 hours of unacceptably cool temperatures, compared to males (36.5%). On the other hand, a greater percentage of males intended to leave the park after 25 to 48 hours of extreme cold (41.9%), and were willing to stay longer than 48 hours before leaving in response to unacceptably cool temperatures (21.6%), compared to females (35.6% and 15.3%, respectively). This finding supports the preconceived notion that women are more sensitive to cold than men.

Finally, the number of degrees that respondents identified as being the range of ideal night-time temperatures had a significant effect on the temporal weather thresholds for both unacceptably cool (R^2=0.025, P=0.022) and unacceptably hot (R^2=0.032, P=0.048) temperatures. Table 4.57 displays the results of two discriminant analyses which looked at the effect that the number of degrees within the ideal range of night-time temperatures had on the duration of time before leaving the park due to both cold and hot temperature extremes. In both cases, as the number of degrees within the range of ideal night-time temperatures increased, time before leaving the park due to these temperature conditions increased as well.

Table 4.57 – Differences in Time before Leaving Park due to Weather Conditions based on Preferred Temperatures

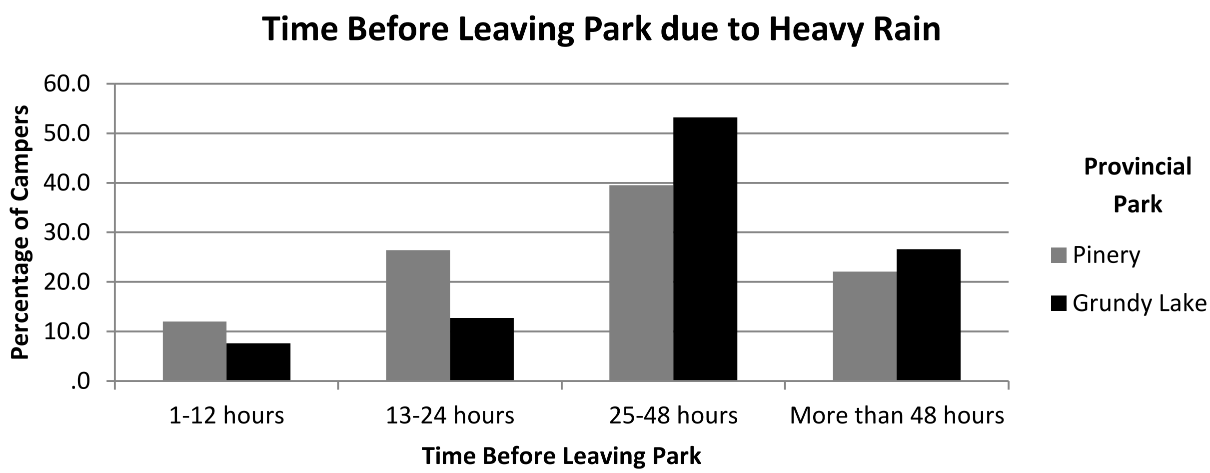
Weather Condition:	Number of Degrees in the Range of Ideal Night-time Temperatures in Time Before Leaving Park			Total R^2	P
	1 to 24 hours	25 to 48 hours	More than 48 hours		
Unacceptably Cool Temperatures:	4.81	6.14	6.61	**0.025**	**0.022**
Unacceptably Hot Temperatures:	4.40	6.46	6.76	**0.032**	**0.048**

These findings would suggest that campers who identified a broader range of temperatures as being ideal were more robust and less sensitive to temperature variation. Not only did these campers define cooler and warmer temperatures as being ideal, once unacceptable temperatures did occur, they were also willing to endure longer periods of such temperatures before leaving the park in response. One notable respondent characteristic that was associated with campers who specified a broader range of ideal temperatures and also demonstrated higher temporal weather thresholds during unacceptable temperatures were campers who planned to spend most of their time canoeing, kayaking or fishing. This group was also found to a more robust class of camper and less sensitive to weather in general.

4.6.2 Differences in Temporal Weather Thresholds between Parks

When considering the differences between parks for temporal weather thresholds, only one weather condition generated statistically significant differences related to time before leaving the park early. Based on a Mann-Whitney U Test (P=0.003), campers at Grundy Lake were willing to endure heavy rain conditions for a significantly longer duration of time (mean rank=240.14), when compared to campers at Pinery (mean rank=204.54). Figure 4.21 further illustrates the differences between these two parks in relation to the time endured before leaving the park early due to heavy rain conditions. The graph shows that a greater percentage of campers from Pinery indicated their intentions to leave the park early after 1 to 12 hours (12.0%) as well as after 13 to 24 hours (26.4%), compared to what was observed among campers at Grundy Lake (7.6% and 12.7%, respectively). Inversely, a greater percentage of campers from Grundy Lake were willing to endure between 25 to 48 hours (53.2%) as well as more than 48 hours (26.6%) of heavy rain conditions, compared to what was reported among campers at Pinery (39.5% and 22.1%, respectively). It can therefore be said that campers at Grundy Lake had a significantly higher temporal weather threshold for heavy rain conditions and are therefore less sensitive to extreme rain events, in comparison to campers at Pinery. It is, however, important to recognise that the on-site weather conditions while sampling at Grundy Lake were predominantly wet and rainy, in comparison to the hot and dry conditions experienced at Pinery. These onsite weather conditions may present a possible bias within the results and more specifically, when comparing these two parks, especially in relation to weather based decision-making surrounding light and heavy rain conditions.

Figure 4.21 – Differences between Parks for Time before Leaving Park due to Heavy Rain (P=0.003)



None the less, differences in the type of campers present at these to parks, in relation to temporal weather thresholds for heavy rain conditions were able to explain some of the variation seen between parks. The more times that campers had visited the park in their lifetime, the longer periods of heavy rain conditions they were willing to endure. Additionally, campers who had travelled greater distances and planned to stay at the park for more nights were also willing to endure longer periods of heavy rain conditions. Finally, campers who placed greater importance on the presence of ideal weather conditions also indicated their intentions to leave the park early in response to heavy rain conditions sooner than campers who placed less importance of the presence of ideal weather conditions. A consideration of the differing sample characteristics between the two parks revealed that campers from Grundy

Lake, on average, camped more time each year (Table 4.2), lived further from the park (Table 4.1) and planned to stay for longer periods of time (Table 4.9), compared to those from Pinery. On the other hand, campers from Pinery (mean=-0.82), placed a significantly greater level of importance on the presence of ideal weather conditions (t=2.939, P=0.003), in comparison to that which was reported among campers from Grundy Lake (mean=-0.56).

4.7 – The Impact of Climate Change on Park Visitation in Ontario

In order to discuss the implications of the results of this study in relation to the projected impact of climate change on park visitation in Ontario, it is appropriate to first examine the climatic averages for the regions where the two study parks are located. Table 4.58 displays the average temperatures between 1971 and 2000 for the summer months of July and August, based on weather data from reliable meteorological stations located closest to the two study parks. The weather station in Sarnia represents the climate for Pinery Provincial Park; whereas, the weather station in Sudbury has been used to represent the climate for Grundy Lake Provincial Park. The average daily minimum temperature will be used to base discussion around night-time temperature preferences while the average daily maximum temperature will be considered in relation to day-time temperature preferences. This seemed fitting as it can be expected that the coolest daily temperatures typically occur during the night; whereas, the warmest daily temperatures typically occur during the day, especially during the summer months in Ontario.

The average daily maximum temperature within the climate normal of 1971-2000 for the summer months at Grundy Lake (24.0˚C) and Pinery (25.8˚C) both fall within what campers perceived to be ideal day-time temperatures for summer camping in Ontario parks (24-31˚C). However, when looking at the average daily minimum temperatures for Grundy Lake (12.8˚C) as well as that for Pinery (15.˚C), it becomes evident that the average daily minimum temperatures during the summer months at these two parks fall below what campers perceived to be ideal temperatures during the night-time (17-23˚C). Given the relatively cool climate within these regions of Ontario, a rise in average temperatures may be perceived by tourists as an improvement on existing climate conditions. This reaffirms the results of studies such as Jones and Scott (2006a, 2006b), which suggest that the impacts of climate change will bring about increased visitation to parks in Ontario and other regions of Canada, even during the already warm and peaking summer months of July and August.

Table 4.58 – Average Temperatures between 1971-2000 during the Summer Months for Sarnia and Sudbury

Weather Station:	Average Temperatures 1971-2000		
Temperature Parameter	July	August	Summer Average
Sarnia (Pinery):			
Daily Minimum (˚C)	15.5	14.8	15.2
Daily Maximum (˚C)	26.3	25.3	25.8
Sudbury (Grundy Lake):			
Daily Minimum (˚C)	13.3	12.3	12.8
Daily Maximum (˚C)	24.8	23.1	24.0

Source: Environment Canada (2010)

Table 4.59 displays the projected increases in average temperatures for both Pinery and Grundy Lake, based on a climate change impact assessment conducted by Lemieux and Scott (2005), which looked at the same park regions in Ontario that this study is concerned with. The table also recounts the stated temperature preferences for summer camping in Ontario parks which came as results from this study, to enable a comparison of project and preferred climate conditions.

Table 4.59 – Projected Temperature Increases under Climate Change compared to Stated Temperatures Preferences for the Two Study Parks

CLIMATE STATION (PARK): Temperature Parameter (Preference Represented)	Climate Normal (˚C)	Projected Temperature Range under Climate Change* (˚C)			Temperature Preferences for Camping** (°C)	
	1971-2000	2020s	2050s	2080s	Ideal	Too Hot
SARNIA (PINERY):						
Daily Max (day)	25.8	26.3-29.0	27.6-32.6	28.3-35.7	24.3-30.8	34.8
Daily Min (night)	15.2	15.7-18.4	17.0-22.0	17.7-25.1	16.9-23.0	28.8
SUDBURY (GRUNDY LAKE):						
Daily Max (day)	24.0	24.7-27.4	25.9-31.1	26.6-34.1	23.8-30.6	34.8
Daily Min (night)	12.8	13.5-16.2	14.7-19.9	15.4-22.9	16.2-22.6	28.7

*Based on NCARPCM B21 (low) and CCSRNIES A11 (high) emission scenarios (Lemieux & Scott, 2005)
** Based on the results of the current study

During the 2020s, when climate change is projected to cause annual temperatures to increase between 0.6-3.3˚C for the central and south-western regions of Ontario, even under the highest emissions scenario, average maximum temperatures would still remain within the ideal day-time temperature range for both parks. Additionally, average minimum temperatures during this period would begin to enter into the ideal range with respect to night-time temperatures, if the upper limits of projected warming are realised. However, as early as the 2050s, the daily average temperature high may move outside the ideal day-time temperature range for summer camping within both parks, if the higher thresholds of warming are realised. None the less, projected temperature change for the 2050s would still leave temperatures below the unacceptably hot temperature thresholds for summer camping in Ontario parks. By the 2080s, when temperature increases are projected to be between 2.5 and 10˚C for these two regions, under the highest emissions scenario, both parks will have moved out of the ideal day-time temperature range for camping. At such a time, Pinery will have just crossed the unacceptably hot day-time temperature threshold and Grundy Lake will be on the cusp of entering into what campers have identified as being unacceptably hot day-time temperatures for summer camping in Ontario parks. However, come the end of the century, average temperatures 1°C above what was defined by campers as being too hot at the beginning of the century may not pose a threat to park visitation as it is likely the campers will become acclimatised to such gradual warming over the course of the century. It is worth noting that even under the highest emissions scenarios, throughout the course of this century; average minimum temperatures will remain well below the unacceptably hot night-time temperature thresholds for summer camping in Ontario parks. Temperature increases in this regard are expected to align average minimum temperatures over the course of the century with what campers have identified as being ideal night-time temperatures.

The ideal and unacceptably hot temperature ranges for summer camping between these two parks are virtually the same. Projected temperature change for these two park regions is also very similar. However, due to the slightly warmer climate associated with the more southern park, Pinery can be expected to experience the negative effects of increased warming on park visitation and visitor satisfaction before Grundy Lake will. Within the climate average of 1971-2000, Pinery had a daily average maximum temperature 1.8˚C warmer than that of Grundy Lake. Therefore, if temperature change and preferred climates remain constant between these two regions, it is understandable that increased warming will cause temperatures to be pushed out of the ideal range sooner at Pinery than will be the case at Grundy Lake.

Therefore, due to the historical precedence of an already warmer climate in the southwest region of Ontario compared to that which has been experienced in the central area (or near north region), it can be expected that campers at Pinery and other parks in the southwest region, will be more vulnerable to the threat of increased warming brought about by climate change, in comparison to campers at Grundy Lake and other parks in the central region of Ontario.

These results therefore suggest that increased warming projected under climate change may push day-time temperatures during the summer months, beyond what campers have defined as being too hot for camping in Ontario parks. However, in regard to night-time temperature thresholds and projected climate change, these results suggest that night-time temperatures will not become too hot for summer camping; but rather, night-time temperature conditions will improve as a result of climate change. This assessment of the suitability of temperature for camping in Ontario Parks, as it related to park visitation, is based solely on the relationship between thermal comfort and camper satisfaction, neglecting to comment on the ecological and aesthetic implications of a changed climate system for these two park regions.

The findings that strong winds and heavy rain had the greatest influence over camper decision-making, as well as the finding that campers were willing to endure the least amount of time under either of these two weather conditions before indicating their intentions to leave the park early, has important implications for assessing the impact of climate change on park visitation. Warming temperatures and an increase in the frequency and intensity of storms are both projected impacts of global climate change (IPCC, 2007b). It can therefore be suggested that previous studies which have endeavored to assess the impact of climate change on park visitation may have placed a potentially disproportionate emphasis on temperature change (Jones & Scott, 2006a, 2006b; Hyslop, 2007). The results of this study suggest that a much greater emphasis should be placed on the impact that an increasing frequency and intensity of storms under climate change may have on park visitation in the future.

4.8 – The Feasibility of a Climate Index for Park Tourism

The ranking of importance that campers assigned to the presence of sunshine, comfortable air temperatures, the absence of rain and the absence of strong winds, all in relation to camper satisfaction, were the same for both parks examined in this study. Although certain climate preferences and subsequent weather based decision-making varied between the parks, these results would suggest that the development of a general climate index for park tourism may be feasible.

It is interesting to note that although significant differences were found between the two parks in regard to the frequency of participation in both swimming/wading as well as in other water-based activities such as canoeing, kayaking and fishing; the two parks did not record significant differences in relation to the level of importance assigned to the presence of sunshine. Campers that intended to spend most of their time swimming/wading placed significantly higher levels of importance on the presence of sunshine, compared to campers who listed other activities instead. The opposite relationship was found in regard to the level of importance that campers who listed canoeing, kayaking or fishing as one of their three most time activities placed on the presence of sunshine. This has implications for the development of a climate index for park tourism, seeing that although the nature of activity participation varied significantly between these two parks, the presence of sunshine was still identified as the most important weather aspect in relation to camper satisfaction within both parks. This finding lends support to the conceptual feasibility of a general climate index tailored specifically to park tourism in regions with similar climates as these areas of south-western and central Ontario.

The ranking of importance of weather aspects for camping in Ontario parks identified within this study mirrors that which was reported by Scott et al. (2008a) for beach tourism. These findings have implications for the development a park tourism climate index, as the results suggest that the ranking of weather aspects by campers in Ontario parks is similar to that of beach tourists. As a result, it may be feasible to utilise previous climate indices that have been developed for beach tourism and simply make the appropriate modifications in order to calibrate the index for use in the park tourism context.

Ideal day-time and night-time temperature ranges for summer camping did not vary between the two parks. It can therefore be suggested that what campers perceive to be the ideal range of temperatures for summer camping remains relatively constant across parks within southern and central Ontario; despite differences in visitor generating markets, natural features and associated activities. These results support the suggestion that the development of a general climate index for park tourism would be feasible, at least on a localised scale. However, further research would be needed to determine whether or not temperature preferences vary in parks with drastically different climate conditions.

In an effort to identify ideal temperature ranges for summer camping in Ontario parks, it was important to explore both ideal day- and night-time temperature ranges seeing that the temperatures campers perceive to be ideal in the day while they are trying to swim or hike would be conceptually different than what they would perceive to be ideal while they are sitting by the fire or trying to sleep. These preconceived notions were supported by the results of this study as the ideal range of temperatures varied substantially from the day-time (24-31˚C) to that of the night-time (17-23˚C). The two ranges were so dramatically different that no overlap between the two was present; to such a degree that temperatures which were perceived as being ideal during the day-time (30-31˚C), were perceived to be unacceptably hot during the night (>29˚C). This is important to note when considering the development of a climate index for park tourism, as unlike other tourism contexts, tourists are exposed to temperature variation during both the day and the night. Additionally, more substantial weight would need to be allotted to the importance of comfortable night-time temperatures, when attempting to evaluate the suitability of climate for park tourism purposes.

The finding that unacceptably cool temperature thresholds varied between the two parks, where campers at Grundy Lake were willing to endure cooler temperatures than those from Pinery, has implications for the development of a climate index for park tourism. These results suggest that no one temperature can be defined as being the unacceptably cool temperature threshold for summer camping in Ontario parks, and to an even greater degree, for the whole of North America. What is apparent, is that parks in more southern climates and those that are more associated with beach oriented activities, will require warmer temperatures and therefore will perceive warmer temperatures as being unacceptably cool, in comparison to parks in more northern climates that are more associated with other activities such as canoeing, kayaking and fishing.

It is uncertain whether or not the unacceptably hot temperature thresholds established in this study could be generalised and applied to parks located in different climate zones throughout North America, but seeing there were no significant differences between the two parks in this regard, this possibility should not be ruled out. Future research that includes a park from each of the different climate zones in North America would be required to determine whether one universal temperature could be identified as the unacceptably hot threshold for summer camping in a park tourism context. However, these preliminary results would suggest that an unacceptably hot temperature threshold for summer camping could be established and applied to a climate index for park tourism, at least in the areas of southern and central Ontario. The development of such an index would not only be useful for determining which parks are currently suitable for visitation during the summer months, but would also have important implications for assessing the impact of climate change on park visitation in Ontario, over the course of the next century.

Campers from Pinery demonstrated that they were significantly more sensitive to weather, with more campers indicating their intentions to leave the park early for each weather condition considered, than was observed among respondents from Grundy Lake. However, the ranking of influence which was established based on the intended responses to each weather condition remained the same for both parks: heavy rain, strong winds and unacceptably cool temperatures had the greatest influence over camper decisions to leave the park early for both parks. These results therefore suggest that a general climate index for park tourism may be feasible for construction and implementation in parks with similar climates (temperate) as these two. Further research would be required to assess the feasibility of such an index for the whole of North America, as it is possible that results from parks in polar, tropical and semi-arid climates may differ significantly. If parks in different climates displayed disparate levels of influence for similar weather conditions and reacted differently to the occurrence of such weather, they would subsequently require a modified index in order to properly assess the suitability of climate for park tourism in those regions.

A difference in the ranking of influence that these weather variables had on camper decision-making, based on temporal weather thresholds, was observed between the two parks. Within the rankings of influence for each weather aspect, the influence of light rain and unacceptably cool temperatures were reversed between the two parks. Unacceptably cool temperatures were the third most influential weather aspect for campers at Pinery, while it was the fourth most influential among those from Grundy Lake. Inversely, light rain conditions were more influential to campers at Grundy Lake than they were to those at Pinery. This lends support for the notion that parks in different climate zones (particularly those distanced pole wards) will be influenced to either a greater or lesser degree by certain weather aspects, as suggested for both general tourism (Scott et al. 2004) and beach tourism contexts (Moreno, 2009). In this case, campers from Grundy Lake ranked unacceptably cool temperatures as being of less influence than campers from Pinery did. The climate at Grundy Lake had a lower average daily temperature for the summer months from 1971-2000 (18.4˚C), than was recorded for Pinery (20.5˚C). Therefore, parks in regions with warmer seasonal climates, as is the case at Pinery, may find unacceptably cool temperatures to be more influential, seeing that these temperatures are less expected in those regions.

4.9 – Summary of Findings

In regard to the importance that respondents assigned to different weather aspects, in relation to overall trip satisfaction, the presence of sunshine was identified by campers as the most important weather aspect. Comfortable day-time temperatures were the next most important weather variable, followed by the absence of rain and then the absence of strong winds. Interestingly, these results mirror identically that which was determined by Scott et al. (2008a) regarding the importance of these four weather variables for beach tourism.

Certain types of respondents placed more or less importance on different weather variables. Of these, swimmers placed more importance on the absence of rain, the presence of sunshine as well as comfortable day and water temperatures. Inversely, campers who planned to spend most of their time canoeing, kayaking or fishing, as well as older campers, placed less importance on the absence of rain, the presence of sunshine, and comfortable day- and night-time temperatures.

The two study parks also placed varying levels of importance on a number of different weather variables. Campers from Pinery placed more importance on the presence of ideal weather conditions, the absence of rain as well as comfortable day- and night-time temperatures, in comparison to campers from Grundy Lake. This makes sense since campers at Pinery were more likely to spend most of time swimming, while campers from Grundy Lake were more involved in canoeing, kayaking and fishing.

The ideal day-time temperature range for summer camping in Ontario parks was between 24-31°C or 27.4°C, on average. This temperature range is very similar to that which was identified as being ideal for beach tourism (27-30°C and 27-32°C, respectively) by both Morgan et al. (2000) as well as Rutty and Scott (2010). Additionally, the mean ideal day-time temperature for summer camping in Ontario parks was within one degree of that which was identified in relation to beach tourism (26.8°C and 28.3°C, respectively) by Scott et al. (2008a) and Moreno (2009). Day-time temperatures above 34.8°C were perceived as being too hot for summer camping, which is very similar to that which was reported in relation to beach tourism (>37°C) by Rutty and Scott (2010). Day-time temperatures below 17°C were perceived as being too cold for summer camping. This unacceptably cool temperature threshold was most similar to that which was recorded by Rutty and Scott (2010) in relation to urban tourism.

A number of respondent characteristics resulted in significant differences regarding day-time temperature preferences for summer camping in Ontario parks. Swimmers preferred warmer temperatures, reported warmer temperatures as being too cold and had higher unacceptably hot temperature thresholds. On the other hand, older campers preferred cooler temperatures and had lower unacceptably hot temperature thresholds. Campers who planned to spend most of their time canoeing, kayaking or fishing were willing to accept cooler temperatures and perceived a greater range of temperatures as being ideal. Additionally, tent campers had higher unacceptably hot temperature thresholds and also recorded a broader range of ideal temperatures.

A comparison of the preferred day-time temperatures between the two parks showed that Grundy Lake was willing to accept cooler temperatures than Pinery, recording an unacceptably cool temperature threshold 1.7°C lower. Ideal day-time temperatures and unacceptably hot day-time temperature thresholds were without significant differences between these two parks. Again, the different activity classes that make up these two parks does help to explain this difference, with Pinery being predominantly swimmers and Grundy Lake having significantly more campers that planned to spend most of their time canoeing, kayaking or fishing. However, the cooler climate associated with the more northern location of Grundy

Lake also helped to explain this difference, seeing that the average daily temperature at Grundy lake between 1971-2000 was 1.8°C cooler than it was at Pinery.

The ideal night-time temperature range for summer camping in Ontario parks was identified as being between 17-23°C or 19.7°C, on average. This temperature is equivalent to room temperature (20°C) and in terms of comfort, is also similar to what Heurtier (1968) identified as being optimal for a lightly dressed seated person (20-27°C). Additionally, respondents perceived night-time temperatures below 8.7°C as being too cold and temperatures above 28.7°C as being too hot for summer camping in Ontario parks.

Differences in night-time temperature preferences were observed based on various respondent characteristics. Swimmers preferred warmer night-time temperatures and perceived higher temperatures as being unacceptably cool. Campers that planned to participate in a greater number of water-based activities also preferred warmer temperatures, but interestingly, were willing to accept cooler temperatures and recorded higher unacceptably hot temperature thresholds. On the other hand, as the age of respondents went up, preferred temperatures were found to decline, where older campers preferred cooler temperatures and reported lower unacceptably hot temperature thresholds.

Once again, campers from Grundy Lake were willing to accept cooler temperatures than campers from Pinery. The average unacceptably cool night-time temperature threshold for campers from Grundy Lake (7.3°C) was 2.5°C lower than it was for campers from Pinery (9.8°C). This makes sense as there were more swimmers at Pinery and there were a greater diversity of participation in water-based activities (especially canoeing, kayaking and fishing) at Grundy Lake. As mentioned earlier, the historical climate from Grundy Lake is also cooler than it is for Pinery.

Based on the percentage of campers who indicated their intentions to leave the park early in response to a number of different weather scenarios, a ranking of influence that these specific weather variables had over camper decision-making was established. Heavy rain and strong winds had the greatest influence over camper’s decisions to leave the park early due to weather. This lends support to the claim of de Freitas (1990, 2003), who in the context of beach tourism, argued that wind and rain have an over-riding effect on tourist decision-making.

Unacceptably cool temperatures were the third most influential weather variable for camping in Ontario parks, which makes sense since unacceptably cool temperatures are the principal factor deciding operating season lengths in these regions. Of the six different weather variables considered, unacceptably hot temperatures had the second lowest level of influence over camper decision-making, which is to suggest that campers do not perceive rising temperatures as a threat to overall satisfaction in the park tourism context.

A number of different respondent characteristics demonstrated differences in the intended responses of campers to these hypothetical weather scenarios. Respondents who went on a greater number of camping trips each year were less likely to leave the park early in response to extreme heat as well as light or heavy rain conditions. Interestingly, the more physically active activities that campers planned to participate in during their trip, the less likely they were to leave the park early in response to all six weather conditions presented. Length of planned stay at the park also had a significant effect on weather based decision-making, where campers who planned to stay at the park for longer periods were less likely to leave early in response to both hot and cold temperature extremes as well as light and heavy rain conditions. Campers who planned to spend most of their time canoeing, kayaking or fishing were also less likely to leave the park early in response to five out of the six weather conditions considered (all but light winds). Inversely, campers that placed a greater level of importance of the presence of ideal weather conditions were more likely to leave the park early in response to both hot and cold temperature extremes as well as light and heavy rain conditions.

Differences in the intended responses to weather were observed between the two parks. Campers from Pinery were more likely to leave the park early in response to five of six weather conditions considered (all but light winds), when compared to campers from Grundy Lake. This can be explained by considering the differences in clientele between these two parks. Respondents from Pinery, on average, planned to stay at the park for fewer nights, placed a greater level of importance on the presence of ideal weather conditions and were less likely to spend most of their time canoeing, kayaking or fishing.

In consideration of the time the campers were willing to endure for each of the six different weather conditions, before indicating their intentions to leave the park early, another ranking of influence was developed. In this case, strong winds then heavy rain were the most influential weather variables in relation to camper decision-making. Of all the weather conditions considered, campers were willing to endure the shortest period of time under the occurrence of strong wind conditions. On the other hand, campers were willing to endure the longest duration of time under unacceptably hot temperatures, which would again suggest that rising temperatures under climate change are not perceived by campers as a threat to park vitiation in Ontario.

In regard in temporal weather thresholds (time before leaving the park due to weather), differences were observed between a number of different user types. Most notably, these include the effect that participation in physically active activities, length of planned stay and the importance of ideal weather conditions had on the time campers were willing to endure under specific weather conditions. Campers who planned to participate in a greater number of physically active activities, as well as those who planned to stay at the park for more nights, were both willing to endure longer periods of time under each of the six weather conditions considered. The importance that campers placed on ideal weather conditions had the inverse effect, where as the importance of weather increased, time before leaving was found to decrease in relation to extreme cold, light and heavy rain, as well as strong winds.

Significant differences in temporal weather thresholds between the two parks were only found in relation to the time before leaving the park in response to heavy rain conditions. Campers at Pinery were willing to endure less time under heavy rain conditions, when compared to campers from Grundy Lake. This makes sense since the sample of respondents from Pinery, on average, placed greater importance on the presence of ideal weather conditions and planned to stay at the park for fewer nights.

The current climate for both these two park regions is such that average daily maximum temperatures fall within the range of ideal day-time temperatures, as identified by respondents for camping in Ontario parks. Average daily minimum temperatures are currently below what campers identified as being ideal night-time temperatures. Within the 2020s, average daily maximum temperatures for both these regions, projected under climate change, are expected to stay with the ideal range of day-time temperatures for summer camping and average daily minimum temperatures are expected to push temperatures into the ideal night-time temperature range. By the 2050s, warming caused by climate change is expected to result in day-time temperature being warmer than ideal, but night-time temperature should still be within the ideal range. It is not until the 2080s, and only under the highest emissions scenarios, that day-time temperatures are expected to cross the unacceptably hot temperature threshold for summer camping in Ontario parks. However, even by the end of the century, night-time temperatures under climate change are expected to remain close to the ideal temperature range specified by campers. Through the course of the 21st century, based solely on tourist comfort and not taking into consideration the ecological and aesthetic implications of a changed climate or other socio-economic factors that may arise, the results of this study would suggest that temperature increase under climate change will likely lead to increases for park visitation in Ontario, even during the summer months.

Although temperature increases under climate change may not be a threat to park visitation, the increasing frequency and intensity of severe weather events could have a significant impact on park visitation over the course of the century. Campers identified strong winds and heavy rain as being the most influential weather variables in relation to camper decision-making, which would therefore merit that a greater emphasis be placed on these weather variables when considering the impact of climate change on park visitation in Ontario. Additionally, based on the differences observed between the two parks with respect to the importance of ideal weather conditions and intended responses to certain weather extremes, it can be expected that the impacts of climate change will have disparate effects on different parks based on the characteristics of visitors to each park, such as activity participation, length of stay, distance travelled and age.

Based on the way in which campers at these two study parks responded in relation to stated weather preferences and weather based decision-making, the development of a climate index specific to park tourism should be feasible and practical, at least on the regional scale. The ranking of importance in relation to overall satisfaction for different weather variables was the same between the two parks. Ideal temperature preferences and unacceptably hot temperature thresholds were also without significant differences. The ranking of influence in relation to camper decision-making for different weather variables were also very similar between the two parks. Despite the apparent differences in activity participation, length of stay, distance travelled and natural environments, these two parks still demonstrated striking similarities in relation to weather preferences, which would therefore suggest that the development of a climate index for park tourism would be feasible. However, due to the differences observed in relation to unacceptably cool temperatures, which is in part a result of the climatic differences between these two parks, it is likely that certain weather preferences would vary significantly when comparing parks from different climate zones (arctic, tropical or arid). Additionally, the ranking of influence that certain weather variables had over camper decision-making were also found to vary slightly between these two parks. Therefore, further research is still required to assess whether or not it would be feasible to apply a climate index for park tourism to a national or continental scale.

5 – Conclusions

This chapter begins by presenting the key findings of this study and discussing their contributions to the current literature in the field of tourism climatology. It then suggests ideas for future research that either build on the results of this study or address critical gaps in understanding within the field. Finally, this chapter concludes by offering management recommendations based on the results of this study which consist of planning for expected increases in park visitation due to climate change as well as reducing the vulnerability of campers to severe weather and improving camper satisfaction during undesirable weather conditions.

5.1 – Key Findings

The ranking of importance for weather variables in relation to camper satisfaction were identical between the two study parks. Ideal temperatures as well as unacceptably hot temperature thresholds were also without significant differences between the two parks. Additionally, the ranking of influence that the different weather variables had over camper decision-making were also very similar between these two parks. These key findings come together to support the feasibility of a climate index for park tourism which would be appropriate for implementation across parks within similar climate zones as were examined in this study.

Despite the similarities reported between these two parks, there were also key differences that should not go overlooked. Campers at Pinery placed significantly greater levels of importance on a number of different weather variables (including the absence of rain, comfortable temperatures and the presence of sunshine). These results support the claims within the literature that climate change will have a disparate effect on different parks, even within the same region or climate zone (Jones & Scott, 2006a, 2006b). It is therefore likely that visitation to Pinery Provincial Park will be more strongly affected by climate variation under projected climate change than Grundy Lake Provincial Park.

Activity participation demonstrated highly significant relationships with weather preferences and weather related decision-making. Particularly, two different classes of activities appeared to position themselves as polar opposites in this regard. Campers who planned to spend most of their time swimming/wading placed greater levels of importance on weather, preferred warmer temperatures, recorded higher unacceptably hot temperature thresholds and were more sensitive to unacceptably cool temperatures. On the other hand, campers who planned to spend most of their time canoeing, kayaking or fishing placed less importance on weather, recorded a broader range of ideal temperatures and were less sensitive to hot and cold temperature extremes. As a result, these campers were also less likely to leave the park early in response to weather. These results lend further support to the claim that climate change will have disparate impacts on park visitation across the province as well as on a national or continental scale. Parks that are primarily associated with swimming/wading (beach-oriented parks) are likely to be more strongly affected by climate variation in comparison to parks that a more associated with activities such as canoeing, kayaking and fishing (back-country camping parks).

The age of respondents also had a significant effect on weather preferences and weather related decision-making. Older campers placed less importance on a number of weather variables (the presence of ideal conditions, the absence of rain and comfortable temperatures). Older campers also perceived cooler temperatures as being ideal and were more sensitive to unacceptably hot temperatures. In addition, older campers were less likely to leave the park early in response to heavy rain conditions. The findings that older campers are more sensitive to extreme heat and prefer cooler temperatures in general, are in line with the existing biometeorological literature which suggests that older people are more vulnerable to the rise of heat waves associated with climate change (Brody et al. 2008; Sabates-Wheeler et al. 2008). All of these significant differences in relation to the age of respondents have important implications for previous tourism climate preference studies which were based on only one age demographic, typically university students (Scott et al. 2008a; Rutty & Scott, 2010). These results suggest that climate preferences vary across different age groups and therefore studies based on only one age demographic may not be an accurate representation of the climate preferences for the larger market of a given tourism segment.

Length of planned stay demonstrated a highly significant relationship with weather related decision-making among campers in Ontario parks. Campers who planned to stay at the park for longer periods of time were less likely to leave the park early in response to weather and were also willing to endure longer periods of severe weather conditions before indicating their intentions to leave the park. These results again lend support to the claim that climate change will have a disparate effect on park visitation and camper decision-making across different parks. Parks characterised by shorter lengths of stay (i.e. weekend, beach-oriented trips) are likely to be more strongly affected by climate variation than parks associated with longer lengths of stay (back-country camping trips for a week or longer).

The results of this study in comparison to projected climate change for the two study parks demonstrate that future warming is very unlikely to pose a threat to park visitation or camper satisfaction in these regions of Ontario. Although it has been acknowledged that many other socio-economic and cultural factors may have both negative and positive impacts on park visitation throughout the course of the 21st century, this study confirms the findings of Jones and Scott (2006a) which suggest that future climate change, particularly rising temperatures, will have a positive effect on park visitation in Ontario.

The finding that heavy rain and strong winds had the greatest influence over camper decision-making was confirmatory in relation to what de Freitas (2003) argued pertaining to the over-riding effect or rain and wind on beach tourist decision-making. This finding also has important implications for park mangers and park planning in relation to climate change impacts and adaptation. The frequency and intensity of severe weather is expected to increase under future climate change (IPCC, 2007b). As a result, park managers need to plan for this as it posed a serious threat in relation to risk management associated with the vulnerability of park visitors and staff.

5.2 – Future Research

It has been noted within the literature (Scott et al. 2008a), that only a limited number of studies have set out to identify climate preferences for tourism. This research gap is further extrapolated on by de Freitas et al. (2008), who state that there is an even greater shortage of research available on the weather sensitivity of tourism in general, and that research attempting to identify climate thresholds for tourism is virtually void of existence. In response to these recommendations for future research, Rutty and Scott (2010) performed a study based on the responses of university students (N=866), in an effort to identify unacceptably hot temperature thresholds for urban and beach tourists in the Mediterranean. With the work of Rutty and Scott (2010) being the first known study that attempted to identify climate thresholds for tourism, further inquiries into this area of research is in high demand, especially in relation to tourism contexts that have not yet been examined.

The current study looked at weather preferences and weather related decision-making for camping in Ontario parks, identifying preferred temperatures as well as temperature thresholds for camping (both cold and hot extremes). This study also utilised hypothetical weather scenarios to determine the influence of different weather variables over camper decision-making and to identify temporal thresholds for these weather conditions (temperature, rain and wind). A similar study would be warranted in different tourism contexts that have yet to be examined and therefore demand the attention of future research in this field. Tourism contexts such as zoo visitation, amusement park/theme park visitation, eco-tourism and wine tourism lack existing information regarding weather preferences, climate thresholds, weather sensitivity or the way in which tourists respond to certain weather conditions. The vast majority of research in this field has focused on beach tourism (sun, sea and sand destinations), while only a few studies have examined other tourism contexts, such as the work by Scott et al. (2008a) that looked at climate preferences for beach, urban and mountain tourism; Rutty and Scott (2010) who examined climate preferences and thresholds for urban and beach tourism; and Vivian (2011) who looked at climate preferences and weather based decision-making for ski tourism. General tourism activities such as sightseeing and shopping could also be revisited using some of the refined tools now available in order to determine stated climate preferences and to further understand the way in which tourists respond to certain weather conditions.

For the purpose of the current study, only two parks were examined in order to explore weather preferences and weather related decision-making for summer camping in Ontario. In a future study, it would be beneficial to broaden the geographic scope in order to take into consideration a greater number of parks with more variety in the activities they host as well as the type of natural environments and climate conditions that each park is associated with. This could be done while still examining Ontario provincial parks, such as conducting a system wide analysis similar to what was exercised by Jones and Scott (2006a) in their revealed preferences approach. Such a study could select a park from each of Ontario's six park regions. This would regenerate a selection of case studies that would vary significantly based on the climatic conditions surrounding each park (especially from north to south), as well as the type of activities that are most common within each park. On a larger scale, a study could be conducted looking at the Canada's national parks system, where case studies could be taken from each of the seven different climate zones found in Canada, based on the Köppen-Geiger climate classification system (Peel et al. 2007). For an even more encompassing approach, yet also more time and resource extensive, a study could be conducted that looked at parks in the different climate zones located across North America. This approach would come closest to answering the call from Scott et al. (2008a), recommending that future research into climate preferences and weather sensitivity look specifically at tourism activities from within in a full range of different climate zones (tropical, temperate, monsoon and semi-arid).

It is evident from the results of this study that different parks host different activities and attract different portions of the camper market segment. Based on these differences, certain parks are associated with unique climate preferences for camping, which position campers to respond differently to various weather conditions. It can therefore be suggested, as was discussed by Jones and Scott (2006a, 2006b), that climate change will have disparate impacts on visitation to different parks across Ontario and nation-wide. Within Ontario, across Canada, and throughout North America the impact of climate change on visitation will vary from park to park based on differing activity bases, camper markets, climatic conditions, and natural environments. In the case of the current study, the two study parks were only separated by a distance of approximately 350 km from north to south, yet the way in which campers responded to different weather conditions, the degree of importance they assigned to weather in general, as well as certain climate thresholds, all varied significantly between these two parks. If differences existed in this rather small and limited sample, it can be expected that differences would be even more pronounced between a sample of parks from across the country or to an even greater degree, throughout the entire continent, taking into consideration the many different climate zones, park environments and activity bases associated with parks located across the continent.

Based on the revealed climate preferences approach applied by Hyslop (2007), climate change and the gradual warming of atmospheric temperatures will have a significant impact of park visitation across North America. Using unacceptably hot temperature thresholds that have been validated against actual camper perceptions, it would be beneficial to examine the findings of Hyslop (2007) in an effort to reassess the impact of climate change on America's national park system. Based on the discussion of Scott et al. (2004), under climate change, it can be expected that parks within the current bi-modal annual tourism climate type (those generally located between 30° and 40° latitude) may shift more towards a winter peak tourism climate. Whereas, parks located in the more northern regions of North America, being currently classified by a summer peak annual tourism climate may begin to emulate more of a bi-modal annual tourism climate. The results of the study by Scott et al. (2004) which looked at general tourism activities (i.e. sightseeing and shopping) are based on the Mieczkowski's (1985) TCI. It would therefore be interesting to reassess the impact of climate change on the distribution of climatic resources in North America, this time looking at park tourism and camping in particular. Such research could utilise the unacceptably hot temperature thresholds established in this study in combination with additional information regarding weather sensitivity and weather related decision-making, in order to establish a new climate index specifically for park tourism. Once a climate index for park tourism was designed and validated against actual park tourist preferences, it could then be applied to climate change projections in an effort to forecast shifts in the suitability of climates for park tourism across North America.

This study is the first known study to identify a full range of temperature preferences for camping in Ontario parks, ranging from ideal to unacceptable. It is also the first known study to identify temporal thresholds for additional weather conditions such as rain and wind. In so doing, the results of this study was able to rank which weather aspects (temperature, rain or wind) had the greatest affect over camper decision-making, as well as which weather aspects campers were willing to endure for either the least or greatest amount of time. This adds to understanding in regards to climate preferences, weather sensitivity and climate thresholds for camping in the context of tourism and recreation. Future research with a more specific focus on weather sensitivity for different tourism contexts is still needed (de Freitas et al. 2008). It would be beneficial to more closely examine the physical aspects of climate such as rain and wind in an effort to further understand the relationship between these weather conditions and park visitation. A future study could look directly at the way in which campers respond to extreme weather events such as dangerous storms, flooding, drought as well as the potential for forest fires caused by extremely dry climates. It is understood that the frequency and intensity of extreme weather is expected to increase during the course of the 21st century (IPCC, 2007b). Therefore, research that attempts to further understand the relationship between tourism and these types of weather events will enable more informed assessments regarding the impact of climate change on different tourism activities and destinations.

Some of the most comprehensive climate indices for tourism that have been developed in recent times have recognised the over-riding affect that the physical aspects of climate (such as rain and wind) have on tourist perceptions of what ideal climate conditions are for different tourism activities and subsequent weather based decision-making. The Climate Index for Tourism (CIT), set forth by de Freitas et al (2008), was the first study to incorporate this element into a climate index for tourism. The Modified Climate Index for Tourism (MCIT), established by Yu et al. (2009a), also recognised the over-riding effect of physicals elements such as rain and wind. Similar to the tourism contexts for which the aforementioned indices were designed (beach tourism and general tourism activities, respectively), the results of this study show that the physical aspects of climate such as rain and wind have an overriding affect on both camper satisfaction as well as camper decision-making. Campers were most likely to leave the park early as a result of heavy rain and strong winds. In addition, heavy rain and strong winds were the two weather conditions that campers were willing to endure for the least amount of time before indicating their intentions to leave the park early. Therefore, if a Climate Index for Camping (CIC) was to be developed, additional information regarding the way in which campers respond to certain weather extremes and events would be necessary as to not over or under estimate the appeal of a camping destination based on the thermal component of the tourism climate resource alone. Inquiries such as how campers respond to dangerous storms, severe flooding, as well as fire bans associated with lasting droughts and the risk of forest fires would be incremental to the development of a climate index specifically for camping in the park tourism context. A greater understanding of the timing that corresponds to tourist decision-making regarding extreme weather conditions would also be an important area of future research with implications for the further development of climate indices for tourism.

The current study elected to examine the weather preferences and weather related decision-making of campers only from within two provincial parks in Ontario. This decision was made as campers were seen to be the most accessible segment of the park tourism market. Each camper would have a registered campsite on which they could be easily approached in an effort to recruit participants for the study. Campers were also expected to be easy to find again when trying to collect the completed surveys. Including day-users in this study posed difficulties for the collection of surveys and would have placed a high reliance on mail-back envelopes as a means of receiving the completed surveys. This would have potentially reduced the ratio between surveys distributed and surveys returned. This was a margin of difficulty that the time and resource restrictions associated with this study would not permit. Nonetheless, it would be very useful to conduct a similar study that focused specifically on the weather preferences and weather related decision-making of day-users. Such a study would provide instrumental information required for the development of a Climate Index for Park Tourism (CIPT), as the results of this study would not be sufficient for developing such an index as they are based on camper responses alone and may not be completely representative of the park tourism market.

This study employed a quantitative research and data analysis approach in an effort to determine weather preferences and weather related decision-making for camping in Ontario parks. Particularly in regard to weather related decision-making, weather sensitivity and vulnerability to severe weather, a qualitative research approach may prove to be an increasingly useful and revealing method for future studies in this field. In-depth interviews across a wide range of campers, in order to maintain an accurate representation of camper market segment, may prove highly effective in an effort to further understand why weather has such a disparate affect on the decision-making of different types of campers.

This survey instrument employed within this study, although it was a third generation survey, still has room for improvement in a number of different areas:

- The list of activities that campers planned to engage in while on their trip only included activities offered within the park and specifically defined within the Ontario Parks Camper Survey (OMNR, 2010). This list could be modified or an additional question added that asks what activities campers planned to participate in which may not occur within the park boundaries, such as shopping, dining or golfing.

- It may also prove useful and more accurate to request that respondents specify the percentage of time that they planned to spend engaged within each of the activities listed.
- When asking the respondents about accommodation in the form of camping shelters and vehicles it would be more effective to specify that the question was interested in the respondent's primary form of accommodation, rather than all forms of accommodation present on their site in use by their group.
- Clarification on the use of vans as a form of accommodation is also necessary in order to more effectively decipher between vans used for transportation and vans used for accommodation.
- The questions used to explore weather related decision-making may have confused a number of respondents and therefore should be simplified in an effort to only focus on what was determined to be the key responses (whether or not campers intended to leave the park after each increasing duration of time under a given weather condition).
- Finally, the finding that some respondents expressed their willingness to endure more than 48 hours of heavy rain (16mm/hour) suggests that this quantity of rain may not have been effectively understood. More than 384 mm of rain per day for 2 or more days is an extremely high an unprecedented amount of rain. The daily record rainfall for Ontario is 166mm, which was recorded in Ottawa in 2005 (Environment Canada, 2011c).

5.3 – Recommendations

The results of this study suggest that rising temperatures, even during the summer months, are not currently a threat to park visitation, nor are they expected to become a threat during the 21st century. However, unacceptably cool temperatures were identified as being an influential factor affecting camper decision-making. Although other socio-economic factors may have a disparate impact on park visitation over the course of the 21st century, park managers in

Ontario and areas with similar climates can expect the impact of climate change and subsequent temperature increases to have a positive effect on park visitation, as suggested by Jones and Scott (2006a, 2006b) and Hyslop (2007).

Heavy rain and strong winds were identified as the most influential weather variables affecting camper decision-making. These two elements of the physical component of tourism climate were also the two weather variables that campers were willing to endure for the least amount of time. With these results in mind, and in light on the projected increases in storm frequency and intensity under climate change, it is reasonable to suggest that park managers place a greater emphasis on the formulation of emergency response plans for severe weather events in connection with risk management for both park visitors and staff. As such, in an effort to reduce camper vulnerability to weather and improve camper satisfaction during undesirable weather conditions, a number of recommendations for park managers were derived from the results of this study.

According to the IPCC (2007b), vulnerability is “the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity” (p.21). In relation to campers within the park tourism context and in line with the results of this study, climate vulnerability is most closely linked to severe weather such as heavy rain and strong winds. In an effort to reduce camper vulnerability to heavy rain conditions, parks should strongly consider the development of communal shelters that would allow campers and day-users alike to gain shelter from the rain. This would prove as an effective means for campers that are unprepared to still cook and sleep during severe rain events and may reduce the number of campers that leave the park early as a result of heavy rain conditions. An adequate supply of equipment that could be used by campers to protect them from the rain, such as tarps, rope, rain coats, rubber boots, umbrellas, and heaters, made available for sale or rent within the camp store, would also be an effective way to reduce camper vulnerability to heavy rain conditions. Additionally, access to laundry facilities is also an important element to be considered in an effort to reduce camper vulnerability in this regard, as the presence of such facilities may very well be the determining factor in whether or not campers decide to leave the park after heavy rain conditions.

Recommendations for reducing the vulnerability of campers to strong wind conditions include the maintenance and removal or dead trees and branches. Such routine maintenance would reduce the risk of injury or damage to property caused by falling trees or branches during high winds. Park wide warning systems such as alarms, billboard posting or personal notifications would also be an effective method for reducing camper vulnerability to strong winds. In combination with this, educational programs geared to inform campers of the dangers of strong winds within the park setting as well as what they can do in order to prepare themselves for such occurrences, would also be useful to campers.

Appendix A – Survey Instrument

Weather Preferences and Weather Related Decision-Making for Summer Camping in Ontario Parks

Dear participant,

This letter is an invitation to participate in a study being conducted by researchers from the Department of Geography and Environmental Management at the University of Waterloo. Tourism and outdoor recreation in Canada are greatly influenced by weather conditions. Weather conditions determine park operating season lengths, the availability of certain recreational activities and the overall quality of the visitor experience. **The purpose of this survey is to improve the understanding of weather sensitivity on camping and related activities within parks in Ontario.** The results of this study will also be used to provide recommendations to Ontario Parks about what they can do to improve camper satisfaction during poor weather conditions and to decrease camper vulnerability to extreme weather conditions while camping at this park.

Your participation in this study is entirely voluntary and would involve completing a short survey. You must be at least 18 years of age in order to participate in this study. The survey should only take approximately 15 minutes of your time. In the survey you will be asked questions about your preferred weather for camping at this park and how you would respond to various types of weather conditions that occur at this park. You may decline to answer any of the questions. All the information you provide will remain completely confidential because your name and contact information will not, in any way, be linked to your survey responses.

The Ministry of Natural Resources and Ontario Parks have approved this study. It has also received ethics clearance from the Office of Research Ethics at the University of Waterloo. If you have any questions or would like additional information about the study to assist you in reaching a decision about participation, you may contact my supervisor, Dr. Daniel Scott at (519) 888-4567 ext. 35497, dj2scott@uwaterloo.ca or Dr. Susan Sykes of the Office of Research Ethics at (519) 888-4567 ext. 36005, ssykes@uwaterloo.ca.

If you have chosen to return this survey by mail please place the completed survey in the self-addressed envelope with pre-paid postage provided and bring it to the nearest Canada Post mail box.

Please return the completed survey as soon as you can. Your opinions are greatly appreciated and necessary to the success of this project! Thank you in advance for your assistance with this survey.

Sincerely,

Micah J. Hewer

University of Waterloo

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University of Waterloo

Date: ________________________Location: ________________________________

Code #: ____________

Section One: Ontario Parks Camping Experience

1. **On average, how often do you go on overnight camping trips each year?** *(Please mark* ***only one*** *response)*

   ☐ Don't Camp Each Year ☐ 1-2 ☐ 3-5 ☐ 6-10 ☐ More than 10 ☐ Don't Know

2. **How many overnight camping trips have you made to this park in your life time?** *(Please mark* ***only one*** *response)*

   ☐ First Visit ☐ 2-5 ☐ 6-10 ☐ 11-25 ☐ More than 25 ☐ Don't Know

3. **Please indicate the activities that you intend to spend at least *one half hour* doing during this park visit.** *(A response to* ***each*** *of the 21 activities is required)*

	Activity	**No**	**Yes**	**Don't Know**
1.	Swimming / wading	☐	☐	☐
2.	Picnicking	☐	☐	☐
3.	Motorboating	☐	☐	☐
4.	Trail Hiking (non-guided)	☐	☐	☐
5.	Canoeing	☐	☐	☐
6.	Kayaking	☐	☐	☐
7.	Biking / Cycling	☐	☐	☐
8.	Fishing	☐	☐	☐
9.	Guided Hikes / Walks	☐	☐	☐
10.	Casual Play (e.g. Frisbee)	☐	☐	☐
11.	Visiting Historical / Nature Displays	☐	☐	☐
12.	Using Playground Facilities	☐	☐	☐
13.	Viewing / Photographing Nature	☐	☐	☐
14.	Visiting Viewpoint / Lookouts	☐	☐	☐
15.	Attending Staff Presentations	☐	☐	☐
16.	Resting / Relaxing	☐	☐	☐
17.	Campfire Activities	☐	☐	☐
18.	Visiting Friends / Family	☐	☐	☐
19.	Walking with Dog	☐	☐	☐
20.	Reading	☐	☐	☐
21.	Viewing / Photographing Wildlife	☐	☐	☐
	Other (*please specify below*)			
22.		☐	☐	☐

4. **From the previous list, what activities do you intend to spend the most time doing during this park visit?** *(Please specify by number, example: 18 = Visiting Friends/Family)*

Most Time: _________________ 2nd Most: __________________

3rd Most: ___________________

5. **Was this park the main destination of your trip away from home?** ☐ Yes ☐ No ☐ Don't Know

6. **How many nights do you plan to stay at this park for your current visit? ____________________**

7. **Did your group pre-register for the site you are currently camping on?** *(If **NO** or **DONT KNOW**, please proceed to question **9**)* ☐ Yes ☐ No ☐ Don't Know

8. **How long in advance, prior to the date of your arrival to the park, did your group make its reservation?** (*number of **days** before trip*): _______________________ ***OR***, ☐ Don't Know

9. **Which of the following camping vehicle(s)/shelter(s) is your group using during this visit to the park?** *(Please mark **all** that apply)*

☐ Tent ☐ Truck Camper ☐ Tent Trailer ☐ Travel Trailer

☐ Van ☐ Motorhome ☐ Cabin ☐ Dining Shelter

☐ Yurt ☐ Fifth Wheel ☐ Other (*please specify*):_________________________

10. **What climate control function(s) does your camping vehicle/shelter have?** *(Please mark **all** that apply, if **NONE** please proceed to question **12**)*

☐ None ☐ Heating ☐ Cooling (A/C) ☐ Basic Air Circulation (fan only) ☐ Don't Know

11. **Which of your camping vehicle/shelter climate control function(s) do you think you will use on this trip?** *(Please mark **all** that apply)*

☐ None ☐ Heating ☐ Cooling (A/C) ☐ Basic Air Circulation (fan only) ☐ Don't Know

12. **In regard to your current visit to this park, how satisfied are you so far with the overall trip experience?** *(Please **circle** your answer along the 5-point scale)*

Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Not Applicable
1	2	3	4	5	☐

13. How important are each of the following aspects of your experience in relation to overall trip satisfaction for camping at this park? *(Please* ***circle*** *your answer along the 5-point scale for each statement)*

	Not Important	A Little Important	Moderately Important	Important	Very Important	N/A
Performance of Park Staff and Services	1	2	3	4	5	□
Quality of Park Facilities	1	2	3	4	5	□
Condition of Natural Environment	1	2	3	4	5	□
Presence of Ideal Weather Conditions	1	2	3	4	5	□

Section Two: Weather Preferences for Camping in Ontario

14. **How important are the following aspects of weather in relation to your overall trip satisfaction for summer camping at this park?** *(Please **circle** your answer along the 5-point scale for each statement)*

	Not Important	A Little Important	Moderately Important	Important	Very Important	***OR,*** Not Applicable
Absence of Strong Winds	1	2	3	4	5	☐
Absence of Rain	1	2	3	4	5	☐
Sunshine	1	2	3	4	5	☐
Comfortable Day-time Temperature	1	2	3	4	5	☐
Comfortable Night-time Temperature	1	2	3	4	5	☐
Comfortable Water Temperature	1	2	3	4	5	☐

FOR EACH OF THE FOLLOWING THREE SETS OF QUESTIONS, PLEASE CIRCLE THE TEMPERATURE OR RANGE OF TEMPERATURES THAT BEST REPRESENT YOUR OPINION ON CONDITIONS FOR CAMPING AT THIS PARK. ***PLEASE USE THE TEMPERATURE MEASUREMENT (EITHER CELSIUS OR FAHRENHEIT) WHICH YOU ARE MOST FAMILIAR WITH.***

EXAMPLES:

If you think the ***ideal*** temperatures for camping at this park are between 38 and 42°C, then you would circle these temperatures as illustrated below.

15°C 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50°C

62°F 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120°F

If you think the temperatures which are ***unacceptably hot*** for camping at this park are any temperatures above 102°F, then you would circle these temperatures as illustrated below.

15°C 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50°C

62°F 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120°F

15. What do UNACCEPTABLY HOT temperature(s) feel like to you (including humidity), for camping at this park?

Unacceptably hot **temperatures during the SUMMER months of July and August:**	
DAY-TIME	15°C 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50°C 62°F 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120 122°F ☐ **OR**, ***no*** day-time temperature(s) including the humidity feel ***unacceptably hot.***
NIGHT-TIME	15°C 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50°C 62°F 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120 122°F ☐ **OR**, ***no*** night-time temperature(s) including the humidity feel ***unacceptably hot.***

16. What do IDEAL temperature(s) feel like to you (including humidity), for camping at this park?

Ideal **temperatures during the SUMMER months of July and August:**	
DAY-TIME	15°C 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50°C 62°F 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120 122°F ☐ **OR**, I ***don't know*** what ***ideal*** day-time temperature(s) feel like.
NIGHT-TIME	2°C 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40°C 32°F 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100°F ☐ **OR**, I ***don't know*** what ***ideal*** night-time temperature(s) feel like.

__Ideal__ **temperatures during the SPRING (April to June) or FALL (September to November):**	
DAY-TIME	15°C 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50°C 62°F 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120 122°F ☐ **OR**, I ***don't know*** what ***ideal*** day-time temperature(s) feel like.
NIGHT-TIME	2°C 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40°C 32°F 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100°F ☐ **OR**, I ***don't know*** what ***ideal*** night-time temperature(s) feel like.

17. **What do UNACCEPTABLY COOL temperature(s) feel like to you for camping at this park?**

__Unacceptably cool__ **temperatures during the SUMMER months of July and August:**	
DAY-TIME	2°C 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40°C 32°F 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100°F ☐ **OR**, ***no*** day-time temperature(s) feel ***unacceptably cool.***
NIGHT-TIME	-10°C -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30°C 14°F 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84°F ☐ **OR**, ***no*** night-time temperature(s) feel ***unacceptably cool.***

Unacceptably cool **temperatures during the SPRING (April to June) or FALL (September to November):**	
DAY-TIME	-10°C -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30°C 14°F 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84°F ☐ **OR**, ***no*** day-time temperature(s) feel ***unacceptably cool.***
NIGHT-TIME	-10°C -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30°C 14°F 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84°F ☐ **OR**, ***no*** night-time temperature(s) feel ***unacceptably cool.***

Section Three: Influence of Weather on Camper Decision-Making

18. If the following temperature conditions *occurred* during your visit to this park, how would you respond? *(Please mark **all** that apply for each temperature extreme and duration of time)*

TEMPERATURE CONDITION		CAMPER RESPONSE			
Extreme	**Duration (hours)**	**Adjust Activities to Accommodate Weather**	**Leave Park Early**	**Not Return to the Park Again**	***OR,* Don't Know**
UNACCEPTABLY COOL *(As you have defined it)*	1-12	□	□	□	□
	13-24	□	□	□	□
	25-48	□	□	□	□
	>48	□	□	□	□
UNACCEPTABLY HOT *(As you have defined it)*	1-12	□	□	□	□
	13-24	□	□	□	□
	25-48	□	□	□	□
	>48	□	□	□	□

19. If you responded to ANY of the previous temperature conditions by adjusting your activities, please describe what you intended to do in the comment box provided below:

Comment(s):

20. If the following rain events *occurred* during your visit to this park, how would you respond? *(Please mark **all** that apply for each rain intensity and duration of time)*

RAIN EVENT		CAMPER RESPONSE			
Intensity	**Duration (hours)**	**Adjust Activities to Accommodate Weather**	**Leave Park Early**	**Not Return to the Park Again**	***OR,* Don't Know**
LIGHT RAIN *(less than 1mm/hour)*	1-12	□	□	□	□
	13-24	□	□	□	□
	25-48	□	□	□	□
	>48	□	□	□	□
HEAVY RAIN *(more than 16mm/hour)*	1-12	□	□	□	□
	13-24	□	□	□	□
	25-48	□	□	□	□
	>48	□	□	□	□

21. **If you responded to the ANY of the above rain events by adjusting your activities, please describe what you intended to do in the comment box provided below:**

Comment(s):

22. **If the following wind conditions *occurred* during your visit to this park, how would you respond?** *(Please mark **all** that apply for each wind intensity and duration of time)*

WIND CONDITION		CAMPER RESPONSE			
Intensity	**Duration (hours)**	**Adjust Activities to Accommodate Weather**	**Leave Park Early**	**Not Return to the Park Again**	***OR,* Don't Know**
LIGHT WIND *(10-40 km/hour)*	1-12	☐	☐	☐	☐
	13-24	☐	☐	☐	☐
	25-48	☐	☐	☐	☐
	>48	☐	☐	☐	☐
STRONG WIND (41-90 km/hour)	1-12	☐	☐	☐	☐
	13-24	☐	☐	☐	☐
	25-48	☐	☐	☐	☐
	>48	☐	☐	☐	☐

23. **If you responded to the ANY of the above wind conditions by adjusting your activities, please describe what you intended to do in the comment box provided below:**

Comment(s):

Section Four: Ontario Parks Management Recommendations

24. Do you feel that there is anything Ontario Parks can do to increase *camper satisfaction* during poor weather conditions while camping at this park? *(**IF SO**, please write your recommendations in the comment box provided below)*

Comment(s):

25. Do you feel that there is anything Ontario Parks can do to decrease *camper vulnerability* to extreme weather conditions while camping at this park? *(**IF SO**, please write your recommendations in the comment box provided below)*

Comment(s):

Section Five: Camper Characteristics

26. **How old are you?** *(Please mark the age range that applies)*

☐ 18-24 years old ☐ 25-34 years old ☐ 35-44 years old

☐ 45-54 years old ☐ 55-64 years old ☐ 65+ years old

27. **What is your gender?** ☐ Female ☐ Male

28. **Including yourself, please indicate the number of people that were in your group that were in each of the following age and gender categories (individuals staying on your campsite):**

Age	Number of Males	Number of Females
0-14		
15-24		
25-44		
45-64		
65+		

29. **Where is your permanent place of residence?** *(for trip distance calculation purposes, please mark* ***only one*** *response)*

☐ Ontario (less than 80km from park) ☐ Ontario (more than 80km from park)

☐ Canada (outside Ontario) ☐ USA

☐ International (outside USA)

THANK YOU VERY MUCH FOR YOUR WILLINGNESS TO COMPLETE THIS SURVEY, YOUR TIME IS GREATLY APPRECIATED.

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