

Weather, Climate and Tourism: A New Zealand Perspective

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Weather, Climate and Tourism

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Executive Summary

Background

This report is part of a larger project “Preparing the tourism sector for climate change”, which seeks to identify which parts of the tourism sector are most vulnerable to climate variability and change, and what adaptation measures could be put in place to reduce vulnerability. Climate and weather are important factors in tourists’ decision making and also influence the successful operation of tourism businesses. While tourists might expect certain climatic conditions, they will experience the actual weather, which might deviate quite substantially from the average conditions. Hence, in the first place tourists and tourism businesses are likely to be affected by weather conditions, although in the long term these will follow systematic changes as projected under different climate change scenarios. Some of the changes in New Zealand include warmer temperatures, less frost and snow, more precipitation in the West and drier conditions in the East, as well as an increase in heavy precipitation in many regions.

Method

The focus of this report is the impact of the weather on tourists (and to a lesser extent on tourism businesses) in New Zealand. Three individual research projects are reported:

1. An archive analysis of summer weather events and how they impacted on tourism for the last 15 years (Chapter 3);
2. An analysis of tourists’ highlights, disappointments and recommendations in relation to the weather, as reported in the 2008/09 International Visitor Survey (Chapter 4);
3. A tourist survey on weather and climate, targeted at international tourists in New Zealand during the 2009/10 summer season (Chapter 5).

The report is designed so that the three individual projects can be read independently of each other. Each project is presented as a discrete chapter with a method, results, discussion and conclusion section.

Together the three projects inform the integrated discussion presented in Chapter 6, and summarised in the results section below. This integrated discussion also presents a preliminary analysis of the research findings in respect of the vulnerability of tourism sector to climate variability and change. A number of suggestions are also made for future research.

Results

The three projects provided complementary and confirmative information on the interface between weather, climate and tourism in New Zealand. Four major themes emerged from the three projects. These are:

- i) Importance of climate and weather for tourists in New Zealand;
- ii) Information about climate and weather;
- iii) Variable impacts and adaptability depending on types of tourists; and,
- iv) Climate Change.

Tourism in New Zealand was found to be quite sensitive to a wide range of weather conditions, most notably wet and windy weather. This is due to the nature of New Zealand’s naturally variable climate and the tourism industry’s focus on outdoor activities. Media provide significant coverage of tourism

related weather events, especially those with a flavour of ‘disaster’ and disruption. At the same time, tourism’s resilience is noted – a fact that is confirmed in the demand analysis presented in this report (see adaptability below). The more settled weather in late summer appears to have a positive effect on tourist participation and satisfaction. Also, disruptions due to weather are more likely during the winter months.

This research found that information on weather and climate is relevant at three stages of a tourist’s trip: pre-trip, during travel and post-trip (i.e. information sharing when returning home). Almost all (94%) of tourists obtained some weather or climate information before arriving in New Zealand; most often this related to temperature, rainfall and sunshine hours. While travelling in New Zealand three quarters of tourists looked for weather information either regularly or occasionally. The sources of information were diverse, but included television, newspapers and the Internet. With hindsight, tourists would have liked to be provided with information on the changeability and variability of New Zealand’s weather, temperature ranges and night time temperatures.

Tourists – especially international ones – are relatively adaptive in response to adverse or favourable weather. Changes identified in this research include modifications to timing, routing and activities. The IVS analysis suggests that holiday visitors and those on fixed itineraries (e.g. tour groups) were more vulnerable to adverse weather conditions. Furthermore, the tourist survey found that those travelling in campervans and rental cars were more flexible in their every-day decisions in response to the weather than other tourist types. Some differences in behaviour were also found for country of origin, but these were relatively minor and could be explained by a range of factors (e.g. tendencies towards specific travel styles, climate in countries of origin etc.). The archive analysis indicated that domestic tourists are much more responsive to weather and weather information; in particular, short term weather forecasts significantly influence their travel decisions. Hence, destinations that rely on domestic tourists may be more vulnerable to unfavourable weather conditions.

While tourism and tourists are dealing to a considerable extent with present-day climate variability, information on future climatic changes, and how these might impact on tourism, is seldom reported in the media. Tourists also have a limited understanding of these complex issues. In the survey, when asked about climate change, tourists were able to identify a number of generic issues (e.g. sea level rise) but did not show particular understanding of how this might impact on New Zealand tourism.

Implications for the tourism sector

Although weather is not the key driver for tourism in New Zealand, it is an important facilitator. Adverse weather conditions have the potential to disrupt tourism activities and impact on businesses’ financial bottom line. Cancellations, in particular, can lead to tourist disappointment and affect overall satisfaction. The data do not suggest this to be a dominant factor, but future changes of the climate towards more erratic and disruptive conditions may exacerbate this constraint on New Zealand tourism.

Tourists are willing users of weather information and successful adaptation to adverse (or favourable conditions) could benefit greatly from tailored information provided to tourists before their trip and as they travel. At present, although weather and climate information is readily available via a number of medium, there is no one specific source that brings together relevant information for tourism. There is an opportunity to address this gap and improve the flow of information between providers and tourism end-users.

Tourist destinations and businesses could consider the extent to which they depend on weather and the risks associated with adverse weather conditions. A vulnerability analysis could then take into account projected changes in climate and assess how these might exacerbate (or improve) business impacts. Destinations could follow a similar approach. This type of vulnerability assessment could also consider the different degrees of adaptability of various types of tourists.

The New Zealand government may wish to build on its communication efforts on climate change in other sectors (e.g. agriculture) to address potential knowledge gaps within the tourism sector. Key vulnerabilities and adaptation measures could be communicated to increase resilience of the sector.

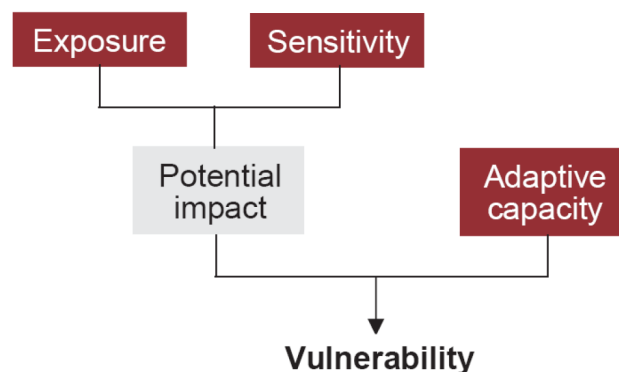
Chapter 1

Introduction

It is widely acknowledged that over the 21st century the global community will need to adapt to the effects of climate change (IPCC, 2007). Current climate models predict that New Zealand will experience higher average and extreme temperatures, less frost and snow, rising average and extreme sea level, and (in the annual average) increased westerly winds resulting in more precipitation in the West and drier conditions in the East, as well as an increase in heavy precipitation events in most regions. Such changes will impact on key regional tourism drivers such as destination attractiveness, product content, business profitability, infrastructure planning and investment. Changes will manifest locally and will uniquely affect individual tourist destinations, communities and businesses. An ability to respond is therefore vital.

This report is part of a larger project on “Preparing the tourism sector for climate change”, which seeks to identify which parts of the tourism industry are most vulnerable to climate variability and change, and what adaptation measures could be put in place to reduce vulnerability. Our research is based on the vulnerability framework illustrated in Figure 1. Exposure and sensitivity are important determinants of the potential impact of a climatic condition, and adaptive capacity acts as a moderator to reduce or increase vulnerability of a particular group, place or activity to those potential impacts.

Figure 1
Diagram of exposure, sensitivity and adaptive capacity as joint determinants of vulnerability



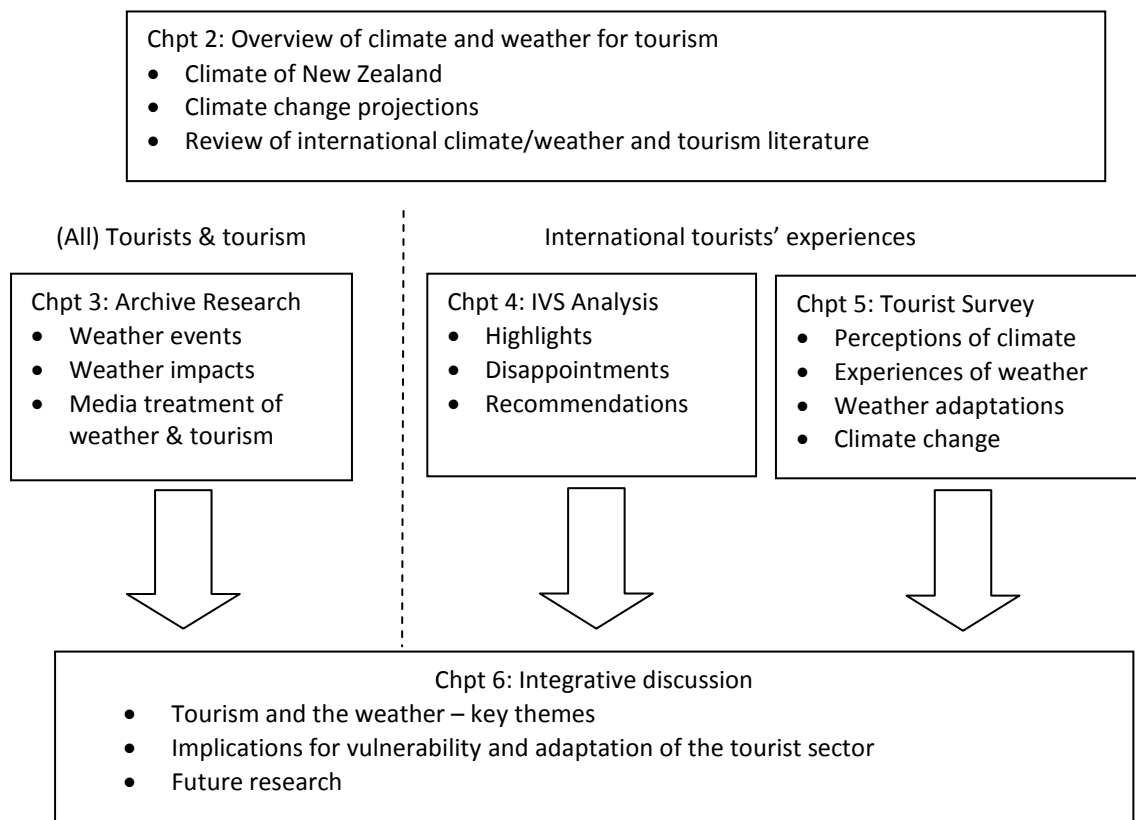
Source: Figure from Allen Consulting (2005), consistent with the definition of vulnerability employed by IPCC (2007).

Climate and weather are important factors in tourists’ decision making and also influence the successful operation of tourism businesses. More specifically, climate is defined as the prevailing condition observed as a long term average in a location. In contrast, weather is the manifestation of climate at a specific point in time and place. So, while tourists might expect certain climatic conditions when they travel to a place, they will experience the actual weather, which might deviate quite substantially from the average conditions. Hence, in the first place tourists and tourism businesses are likely to be affected by weather conditions, although in the long term these will follow systematic changes as projected under different climate change scenarios.

While the overall research aim is to understand the vulnerability of tourism industry to climate change this report presents a demand side analysis. As such, it focuses on tourists’ vulnerability to

present day weather and climate variability, although this is to be seen in the wider context of natural climate cycles (e.g. El Niño / La Niña periods) and longer term climate change. A majority of popular tourist activities are outdoors and therefore exposed and potentially sensitive to weather effects such as rain or wind. Some activities and places are more exposed and sensitive to weather conditions than others. Also, domestic tourists are likely to be more knowledgeable about local weather conditions than international tourists, and they are potentially more flexible in their trip planning. It is the aim of this report to understand these many interactions of weather, climate and tourism in New Zealand. Figure 2 presents a thematic overview of the report structure and of the three individual research projects.

Figure 2
Overview of report structure



This report begins with an overview of New Zealand's climate and projections of climate change and a brief review of international literature relating to climate/weather and tourism interactions (Chapter 2). This is followed by an analysis of tourism-related weather events, as observed through an archive analysis of media reports published during the last 15 summer seasons (Chapter 3). The analysis of tourists' perceptions of New Zealand weather, as reported in the 2008 International Visitor Survey (IVS), provides an insight into the impact of the weather on international tourists' satisfaction (Chapter 4). The importance of weather in tourists' planning, travel behaviour and travel experiences is then analysed in more detail based on a tourist survey, undertaken in the summer season of 2009/10 (Chapter 5). Each of the three empirical research projects is designed to be read independently; an integrated discussion of the research findings and implications of these findings in respect of the vulnerability of tourism industry are presented in Chapter 6.

Chapter 2

Overview of Climate and Weather for Tourism

2.1 Climate of New Zealand

The New Zealand National Institute of Water and Atmospheric Science (NIWA) summarises New Zealand's climate as complex, as – due to its geographic length – it varies from warm subtropical in the far north to cool temperate climates in the far south (NIWA, 2010). Further, the mountainous areas can be described as alpine climates. Westerly winds are prevailing, and in combination with the mountain chains, they provide for very wet conditions on the West Coast of the South Island and dry climate in the east.

Rainfall ranges typically between 600 and 1600 mm per year, with a drier period during the summer, although much of southern New Zealand receives more rainfall in summer than in winter. Mean annual temperatures range from 10°C in the south to 16°C in the north with the coldest month being July and the warmest month being January or February. Temperatures drop about 0.7°C for every 100m of altitude. New Zealand is a relatively sunny place with sunshine hours often exceeding 2000 hours annually.

Most snow in New Zealand falls in the mountain areas during June and September. Frosts can form on cold nights with clear skies and little wind, even in coastal areas (NIWA, 2010). NIWA divides New Zealand into nine climate zones (see Figure 3 below). For more information refer to NIWA's website (www.niwa.co.nz).

Figure 3
Climatic zones of New Zealand (NIWA, 2010)



2.2 Climate change projections

Regional climate modelling currently undertaken by NIWA will help us to understand the *exposure* of tourism to climatic changes. Already, we understand that temperatures in New Zealand are expected to increase. The amount of increase depends strongly on the emissions scenarios, but a “mid-range” (A1B) emissions scenario suggests an increase of about 1°C by 2040, and 2°C by 2090. Likewise for this mid-range scenario there are projected changes in mean rainfall and wind patterns. These changes show a marked seasonality with the latest results suggesting increased westerlies in winter and spring, along with more rainfall in the west of the North and the South Islands and drier conditions in the east and north. Conversely, in summer and autumn, the models suggest decreased frequency of westerly conditions, with drier conditions in the west of the North Island and possible rainfall increases in Gisborne and Hawke’s Bay (Ministry for the Environment, 2008).

Other changes expected include a decreased frost risk, increased incidence of high temperatures, increased frequency of extreme daily rainfalls, a possible increase in strong winds, and a decreases in average snow cover. Such climatic changes will have bio-physical consequences that in turn affect tourism operations, such as changes in flood and drought risk, seasonal water supply, demand for, and quality of, available water, biodiversity and biosecurity, changes in glaciers and river run-off. A rise in average sea level, which is likely to be at least 0.5m by 2100, although substantially higher increases cannot be ruled out, will affect coastal erosion and inundation. Table 1 summarises the main features of these New Zealand climate projections (NIWA, 2010) (see also Figures 4A and B further below).

Table 1
Main features of New Zealand climate change projections for 2040 and 2090
(Ministry for the Environment, 2008, NIWA, 2010)

Climate variable	Direction of change	Magnitude of change	Spatial and seasonal variation
Mean temperature	Increase (****)	All-scenario average 0.9°C by 2040 2.1°C by 2090 (**)	Least warming in spring season (*)
Daily T, extremes (frosts, hot days)	Fewer cold temperatures and frosts (****), more high temperature episodes (****)	Whole frequency distribution moves right	
Mean rainfall	Varies. Increases in annual mean expected for Tasman, West Coast, Otago, Southland and Chatham; decreases in annual mean in Northland, Auckland, Gisborne and Hawke’s Bay (**)	Substantial variation around the country and with season	Tendency to increase in south and west in winter and spring (**); decrease in the western North Island, and increase in Gisborne and Hawke’s Bay, in summer and autumn (*)
Extreme rainfall	Heavier and/or more frequent extreme rainfalls (**), especially where mean rainfall increase predicted (***)	No change through to halving of heavy rainfall return period by 2040; no change through to fourfold reduction in return period by 2090 (**)	Increases in heavy rainfall most likely in areas where mean rainfall is projected to increase (***)
Snow	Shortened duration of seasonal snow lying (***), Rise in snowline (**), Decrease in snowfall events (*)		
Glaciers	Continuing long-term reduction in ice volume and glacier length (***)		Reductions delayed for glaciers exposed to increasing westerlies
Wind (average)	Increase in the annual mean westerly component of windflow across New Zealand (**)	About a 10% increase in annual mean westerly component of flow by 2040 and beyond (*)	By 2090, increased avg. westerly in winter (>50%) and spring (20%), and decreased westerly in summer and autumn (20%) (*)
Strong winds	Increase in severe wind risk possible (**)	Up to a 10% increase in the strong winds (>10m/s, top 1 %ile) by 2090 (*)	
Storms	More storminess possible, but little information available for NZ (*)		
Sea level	Increase (****)	At least 18-59 cm rise (New Zealand average) between 1990 and 2100 (****)	See Coastal Guidance Manual

Waves	Increased frequency of heavy swells in regions exposed to prevailing westerlies (**)	See Coastal Guidance Manual	
Storm surge	Assume storm tide elevation will rise at the same rate as mean sea-level rise (**)	See Coastal Guidance Manual	
Ocean currents	Various changes plausible, but little research or modelling yet done		
Ocean temperature	Increase (****)	Similar to increases in mean air temperature	Patterns close to the coast will be affected by winds and upwelling and ocean current changes (**)

The degree of confidence placed by NIWA scientists on the projections is indicated by the number of stars in brackets:

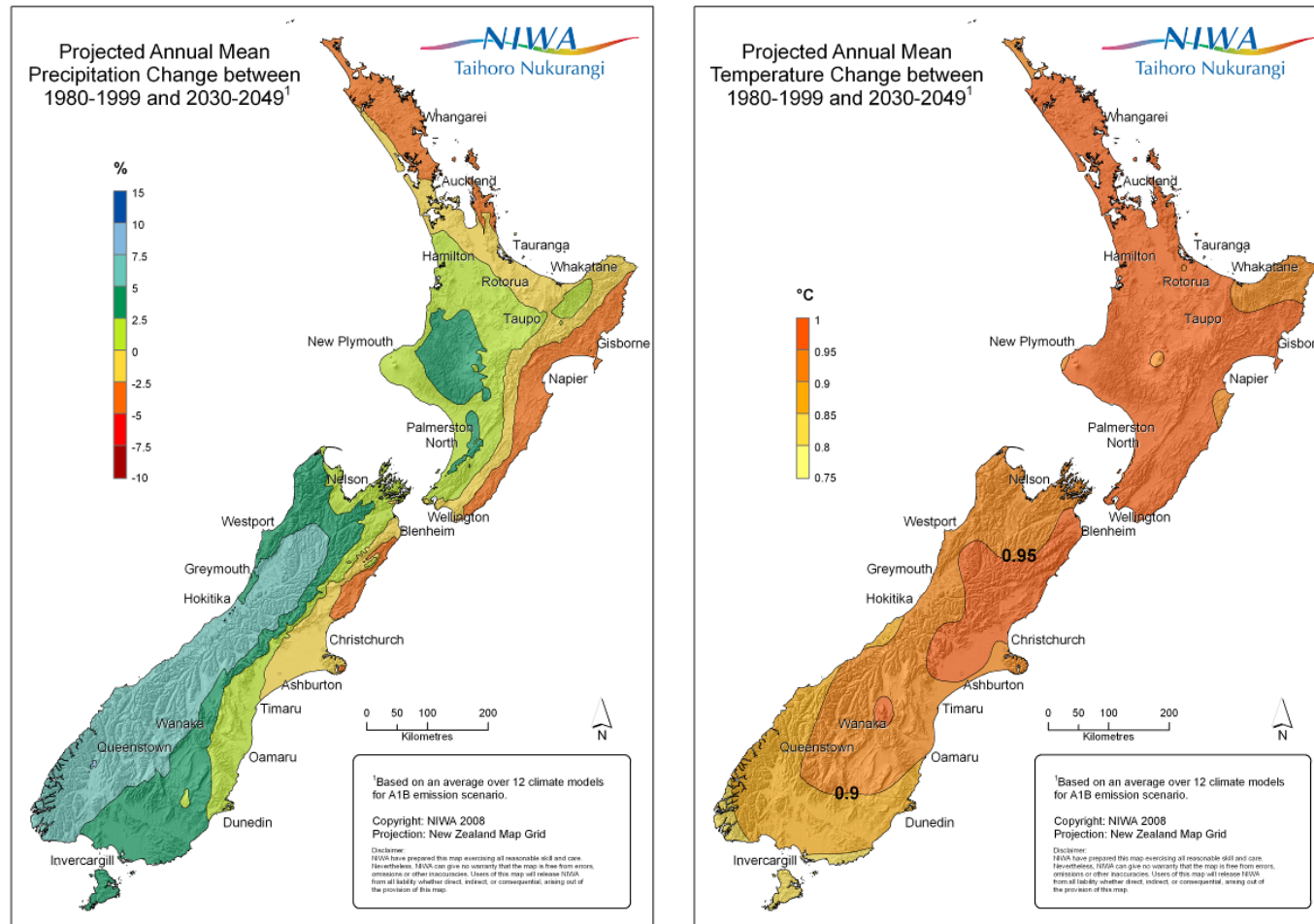
**** = Very confident, at least 9 out of 10 chance of being correct. Very confident means that it is considered very unlikely that these estimates will be substantially revised as scientific knowledge progresses.

*** = Confident.

** = Moderate confidence, which means it is more likely than not to be correct in terms of indicated direction and approximate magnitude of the change.

* = Low confidence, but the best estimate possible at present from the most recent information. Such estimates could be revised considerably in the future.

Figure 4
Projected climate changes



(A) Projected annual mean precipitation change between 1980-1999 and 2030-2049.

(B) Projected annual mean temperature change between 1980-1999 and 2030-2049. Based on an average over 12 climate models for an A1B emissions scenario.

It is important to understand that changes in mean climate also imply a change in the frequency and intensity of climate and weather extremes, and that those changes can be much larger and more significant than the changes in means. This is illustrated in Figure 5, which shows that a moderate change in mean temperature (which may be well within the range of natural variability) could nonetheless result in a significant increase in the number of extremely hot days and lead to new temperature records being reached. Similar considerations apply to rainfall, drought, extreme high tides and wind. Where tourism operations are sensitive to thresholds in weather conditions (e.g. operations can only proceed if winds or temperature are within certain limits), such changes in extremes could have a much more significant impact than the change in mean conditions suggests.

Figure 5
Schematic illustration of the relationship between changes in mean temperature and temperature extremes

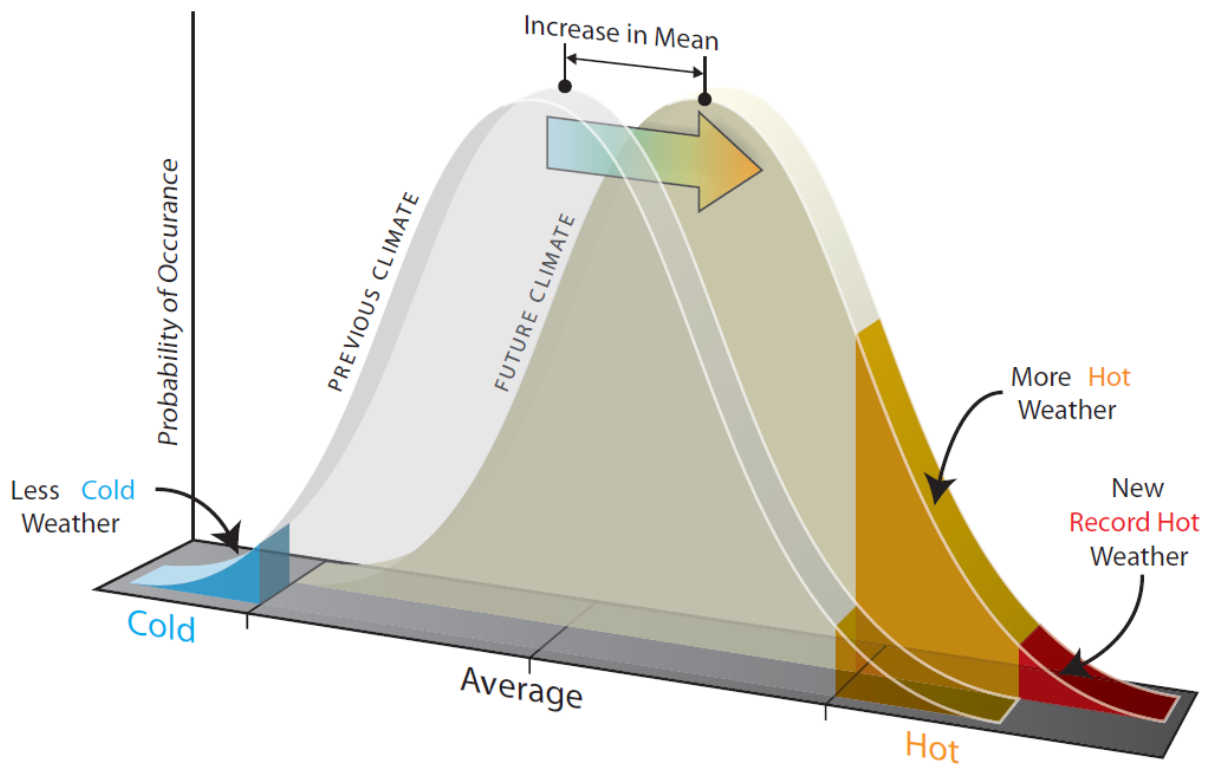


Figure 5 assumes a normal distribution of temperatures (i.e. most days have 'average' temperatures, and fewer days have either unusually cold or unusually warm temperatures). The same schematic applies to other climate variables such as rainfall, drought, sea level, fire risk, and wind. Figure used with permission from Reisinger (2009).

2.3 International literature review

Three different facets of tourism climate have been identified: aesthetic, physical, and thermal (de Freitas, 2001, Table 2). The aesthetic aspect describes a psychological perspective, for example the tourist's enjoyment of the light or formation of clouds. The physical dimension relates to non-temperature conditions such as wind and rain. The thermal component includes temperature and humidity and determines how comfortable the tourist feels. Weather conditions are not always ideal and there are different behaviours a tourist can display that indicate how comfortable they are and to what extent they are able or willing to adapt. Examples of 'adaptation' include avoiding unfavourable weather, changing activity to suit weather conditions, using mechanical aids (e.g. umbrellas or wind breaks), and adjusting thermal insulation of body through clothing (de Freitas, 2003, p. 50). The latter response is also classified as 'coping' rather than adaptation.

Table 2
Facets of climate and impact on tourists

Facet of climate	Impact on tourists
Aesthetic	
Sunshine/cloudiness	Enjoyment, attractiveness of site
Visibility	Enjoyment, attractiveness of site
Day length	Hours of daylight available
Physical	
Wind	Blown belongings, sand, dust etc.
Rain	Wetting, reduced visibility
Snow	Participation in activities
Ice	Personal injury, damage to property
Air quality	Health, physical well-being, allergies
Ultraviolet radiation	Health, suntan, sunburn
Thermal	
Integrated effects of air temperature, wind, solar radiation, humidity, long-wave radiation, metabolic rate	Environmental stress, heat stress Physiological strain, Hypothermia Potential for therapeutic recuperation

Source: Becken & Hay, 2007, after de Freitas, 2001, 2003

There has been a long interest in the relationship between weather, climate and recreational activities, in particular outdoor activities such as skiing, swimming, golfing and the visitation of parks. As early as the 1970s, the Atmospheric Environment Service in Canada produced tourism and outdoor recreation handbooks that specified start and end dates for different kinds of activities and the climatic conditions that impact human comfort (Smith, 1990). Studies have shown some activities to be more constrained by climatic conditions than others. For example, wind speeds over 15 km/h are detrimental to fishing or water skiing, whereas motor boating could be undertaken up to wind speeds of 50 km/h (More, 1988).

Winter sport is another prime example of a weather dependent tourist activity: snow reliability is one of the top requirements for activity participation. Broadly, ski areas can operate when the snow depth is more than 30cm, when the temperature does not exceed 10°C for more than two consecutive days accompanied by rain, or when it does not rain for two days and over 20mm (Scott et al., 2006). Several studies show that minimum and maximum temperature, snow depth, wind speeds and wind chill relate to the demand for downhill skiing (Buerki et al., 2003; Tervo, 2008; Falk, 2009; Shih et al., 2009). Changes in demand for specific products have important economic flow-on effects, for example for accommodation businesses and other supporting services (Elsasser & Buerki, 2002).

Many beach destinations also depend on favourable climatic conditions, such as, for example, ample hours of sunshine, no precipitation and no wind (Scott et al., 2008; Moscardo et al., 2001). Warm temperatures, clear waters and low health risks were found to be the most important environmental features influencing the destination choice for tourists in the Caribbean (Uyarra et al., 2005). Research at the Great Barrier Reef in Australia indicates that poor weather has a more pronounced effect on satisfaction than good weather: seasickness, cold or wet conditions, reduced visibility and difficult snorkelling conditions all led to reduced satisfaction levels (Coghlan & Prideaux, 2009). Poor weather as an important source of dissatisfaction was also identified in a survey of visitors to Scotland (Smith, 1993).

Tourists' safety can be linked to unfavourable weather conditions. Recently, a number of heat waves have been observed in Europe with substantial impacts on tourism. Most directly, tourists experienced thermo-physiological discomfort which could be observed in increased hospital admissions and fatalities (e.g. for Florence, Italy, see Morabito et al., 2004). The 2003 heatwave was responsible for at least 15,000 deaths in France and major shifts in traditional tourist flows for this year away from the traditional resorts in the Mediterranean and towards Northern or Western beach locations (UNWTO, UNEP & WMO, 2009). Hot weather conditions increase the risk of forest fires. In Greece, after the devastating fires of summer 2000, more than half of all tourist bookings for 2001 were cancelled. Similarly, drought in the State of Colorado (USA) in 2002 created dangerous wildfire conditions and visitor numbers declined by 40% in some areas (Scott & Lemieux, 2009).

Extreme wind events can have a severe impact on tourism. Hurricane Ivan, for example, was a "category 4" hurricane when it reached Grenada in September 2004. An official damage assessment reported 28 persons killed, 90% of hotel rooms damaged or destroyed, heavy damage to eco-tourism and cultural heritage sites, and damage to major infrastructure such as power lines and telecommunication (Organisation of Eastern Caribbean States, 2005, in Becken & Hay, 2007). Hurricane frequency and named storm days have increased in the Caribbean, although intensity has not increased substantially (Jackson, 2002).

Poor snow conditions have been linked to negative impacts on personal safety of tourists. During the poor snow conditions of the 1990/91 ski season in the Swiss and Austrian Alps, accident insurance claims by British skiers were almost double average levels, with approximately half listing accidents caused by exposed rocks and congestion on the slopes (Smith, 1993). Cold winters are also linked to higher road accident rates, whereas warmer than usual winters reduce the likelihood of accidents (Koetse & Rietveld, 2009).

Weather conditions can be linked to transportation delays, cancellations and accidents. Mild wind conditions and good visibility are critically important for aviation. In San Francisco, for example, poor visibility in summer and rain storms in winter result in more than double the cancellations and delays, compared with normal conditions (Eads, 2000, in Koetse & Rietveld, 2009). Moreover weather was found to be a cause in 70% of aviation delays and 23% of accidents (Koetse & Rietveld, 2009).

While the literature clearly shows that weather impacts on tourists and tourism, very little is known about the New Zealand situation (Becken, 2010). Given that many of the activities undertaken by tourists in New Zealand are located outdoors it is likely that weather plays a significant role, both in terms of participation and safety. This analysis will address this gap and identify what kinds of weather events are important and why. In contrast to the studies summarised above, this analysis does not focus on a particular location or activity, but seeks to gain a holistic understanding of New Zealand as a destination.

Chapter 3

Weather Impacts on Tourists and Tourism

3.1 Introduction

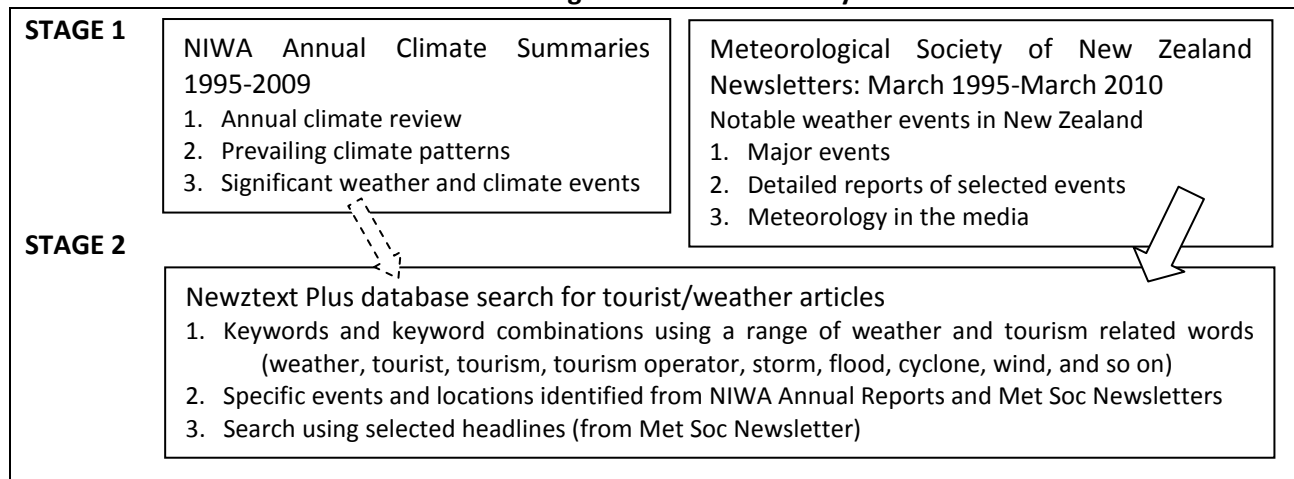
In this chapter we examine types of weather events that impact on tourists, tourism activities and the tourism industry through an archive analysis¹ of media reports focused on tourism and the weather. In particular, the analysis aimed to establish which events affect tourism negatively and which weather events are beneficial. Moreover, we sought to establish which weather events pose serious risks for tourism, for example in relation to tourist safety. The analysis was also informed by a longer term view of climate change impacts in New Zealand, namely tropical cyclones, increased westerly winds, increased wet in the west/dry in the east conditions, and other extreme events. The analysis is structured as follows:

- Method (Section 3.2);
- Results (Section 3.3);
- Discussion (Section 3.4);
- Conclusion (Section 3.5).

3.2 Method

The archive search focused on weather events that occurred over a fifteen year period (1995 – 2010) for which records were readily available. The two stage material search process is summarised in Figure 6 and described in detail below.

Figure 6
Overview of stages in the archive analysis



Stage 1 involved a search of the NIWA annual climate summaries and notable weather events reported by the Meteorological Society of New Zealand. To reflect New Zealand's busiest tourist season the primary focus was on events that occurred during the summer tourist season of

¹ While the focus in this report is primarily on the identification of weather impacts on the travel experiences of international summer tourists to New Zealand, the archive material provided useful contextual information, informed the analysis of the IVS data (reported in Chapter 4) and contributed to both the development and analysis of the tourist survey reported in Chapter 5. The archive research also provided a platform for the development of several on-going research projects undertaken as part of the wider tourism and climate change research programme.

November to March (inclusive). Significant weather events are more frequent, and usually more disruptive, in the winter season and these were not included in Stage 1 of the archive search. In Stage 2, however, the search was extended to include articles which focused on the winter ski season in the Southern Lakes Region.

The NIWA annual climate summaries present an overview of the previous year's weather, describe prevailing climate patterns, and list significant weather and climatic events. Depending on the year in question, the overview and significant events may include data describing: averages and extremes of temperatures, including high temperatures, heat waves and warm months, snowfall, low temperatures and severe frosts; drought and record low monthly rainfall and low soil moisture levels; floods and high rainfall; tornadoes, gales, high winds and rough seas; tropical cyclones; severe or damaging hail storms and electrical storms; sunshine extremes; and fog episodes.

The Meteorological Society Newsletter is published every three months and is available to the public through the library system. Since late 1987 the Newsletter has featured notes on important or interesting weather events that occurred in New Zealand in the previous three months. More detailed descriptions are also given on any events of particular significance. 'Significance' in this instance is measured in respect of impacts on people, rather than the physical magnitude of the weather event itself. A "Meteorology in the media" section provided a number of newspaper reports on key weather events which impacted on tourists.

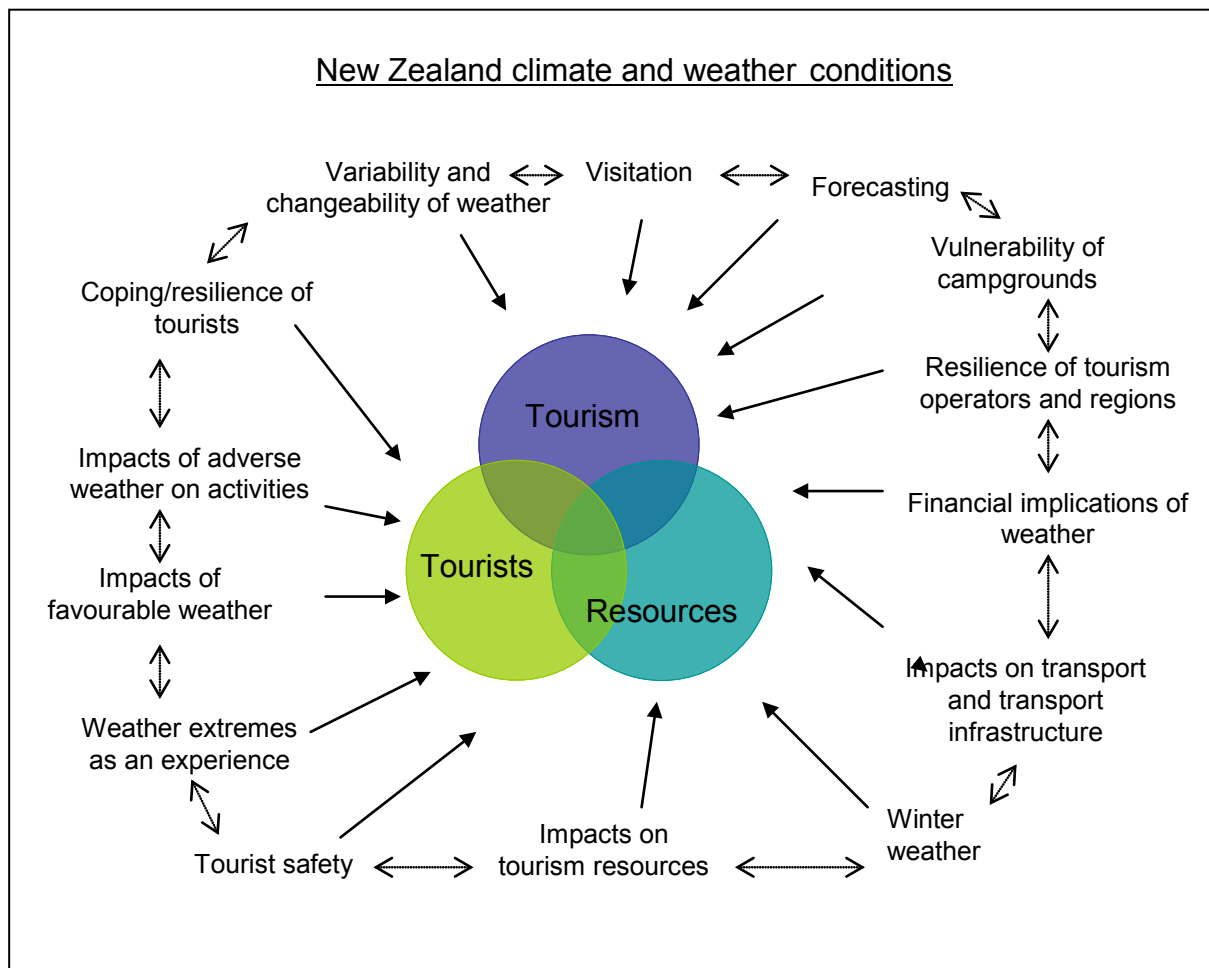
Stage 2 involved a search of the Newztext Plus database for additional articles on tourism and the weather. This database provides full text newspaper reports from most of New Zealand's major newspapers (the main exception being the *Otago Daily Times*); the database also records *Radio New Zealand Newswire* reports. For most publications, records are held for the last 15 years and the database can be searched electronically using keywords. The database was searched using specific dates, places and events and more generic searches using combinations of weather and tourism terms (see Figure 6). More than 200 articles were found which specifically reported interactions of tourism/tourists and the weather.

These articles, along with those found in the Met Society Newsletters were content analysed and coded to identify key weather and tourism themes. The analysis identified two broad topic areas: weather impacts (on tourists, tourism businesses and infrastructure) and weather data. The key themes in the weather 'data' material (which included more than 50 articles) were the accuracy and appropriateness of climate and weather data collected by the MetService, and the ways in which this data is presented to the public. This material is examined in a separate publication (see Wilson & Becken, forthcoming).

3.3 Results

Together, the notable weather events reported by NIWA and the Met Society and the media articles found in the archive search revealed a significant number of weather events that impact on tourists and tourism in New Zealand. The following sections describe these weather impacts (both positive and negative) through an examination of their treatment in the media. The analysis of each type of weather impact is supported by a selection of media headlines. A brief section on New Zealand climate and weather is presented first, followed by more detailed examination of the impacts of weather on tourists, tourism businesses and tourism resources. A final section examines weather impacts in winter with a focus on the South Island. Figure 7 presents a schematic diagram of the impacts identified and discussed.

Figure 7
Overview of archive results



3.3.1 The New Zealand climate and weather

A feature of the New Zealand climate is the regional variability of the weather. This variability has to be seen in the context of natural climatic cycles and longer term weather patterns, such as seasonal and inter-annual variability, decadal variability and climate change. Large scale climatic patterns such as El Niño or La Niña impact significantly on the New Zealand weather and, in turn, have an impact on tourist numbers, tourist businesses and tourism resources (Table 3).

Table 3
New Zealand climate and weather

"La Niña blamed for drop in Northland tourists"	<i>Radio New Zealand Newswire</i> , Apr 25, 1999
"El Niño weather harms tourist business"	<i>Radio New Zealand Newswire</i> , Dec 13, 2006
"El Niño pours cold water on beaches"	<i>New Zealand Herald</i> , Jan 10, 2007
"La Niña promises warm summer"	<i>The Dominion Post</i> , Oct 1, 2007

In 1999, the La Niña weather pattern was blamed for a drop in visitor numbers in some parts of the country: for the three months to the end of February the number of tourists visiting the Coromandel decreased by 14%, while in Northland numbers were down 6% compared to the previous year. The same article noted the impact of the La Niña weather pattern on places popular for outdoor pursuits like boating. The El Niño pattern, present in the summer of 2006/07, brought more south westerly

winds and unsettled weather and was reported to have reduced the number of possible flying days in the Milford Sound area and reduced surface sea temperatures around New Zealand, particularly in the Auckland region. Other parts of New Zealand, however, reported little impact from this weather pattern.

Variability and changeability of New Zealand weather

The variability of weather conditions between locations and its changeability within a short time is also of note. The first headline in Table 4 described Labour weekend conditions in which winter and summer overlapped, with some holidaying New Zealanders taking advantage of an extended ski season at Mount Hutt and others visiting the beach. The same headline was used again in 2002 to describe a sunny and warm Christmas Day in Christchurch and a snowfall warning for the Milford Road. The same cold front reached Christchurch the following day prompting the “four seasons in two days” headline. During the school holidays in October 2007, Auckland was plagued with unsettled weather, which ‘fluctuated wildly’ from glorious sunshine, to downpours, swirling winds and hailstones, and which disrupted flights, ferry services and road travel (Table 4).

Table 4
Variability and changeability of New Zealand weather

“Sand, sea, sun... and snow”	<i>The Press</i> , Oct 23, 2000
“Sand, sea, sun – and snow”	<i>The Press</i> , Dec 26, 2002
“Four seasons in two days”	<i>The Press</i> , Dec 27, 2002
“Want the sun? Just wait a minute”	<i>New Zealand Herald</i> , Oct 4, 2007
“Bay battered then frosted as weather cooks up a bizarre mix”	<i>Hawke’s Bay Today</i> , Oct 4, 2007

Weather conditions and forecasting

Commonly, when extended periods of bad weather occur, media attention focuses on detailed descriptions of the current conditions (with both intra- and inter-regional comparisons) with some attention also given to longer term weather forecasts. Adverse weather may bring a complex set of impacts such as happened in the Taranaki region in late December 2000. A weather system of prolonged north-westerlies had brought ‘foul sticky weather’ to Taranaki and resulted in the cancellation of a Shell Cup cricket match and the annual Festival of Lights. Also, 39 Air New Zealand flights had been cancelled since Christmas Eve and heavy fog made driving hazardous. Forecast heavy rain and thunderstorms were expected to bring more disruption to the region (Table 5).

Tourists may also be ‘unlucky’ with the weather, as was the case with many international tourists during the 2000/01 summer: “Break in the clouds” featured an interview with international tourists who had arrived in a wet Auckland, moved onto a damp Bay of Islands and then to an even wetter Marlborough Sounds. “Soggy facts” described domestic tourists leaving Golden Bay the following summer because of the weather – the region had experienced half a month’s rainfall in just 24 hours (Table 5).

Table 5
Weather conditions and forecasting

“Taranaki weather tipped to get worse”	<i>The Daily News</i> , Dec 28, 2000
“Break in the clouds”	<i>The Marlborough Express</i> , Dec 10, 2001
“Soggy facts”	<i>The Nelson Mail</i> , Jan 15, 2002
“Fowl weather for summer”	<i>The Dominion Post</i> , Dec 30, 2003
“Deep, dark December – with snow and floods”	<i>The Press</i> , Jan 4, 2007

Many media articles also addressed the accuracy and presentation of weather data in New Zealand, particularly in relation to inaccurate weather data and forecasting and impacts on destination image

and visitation. As noted in Section 3.2 (Method), these are examined in detail in a separate publication (Wilson & Becken, forthcoming).

3.3.2 Weather impacts on tourists and tourism businesses

The weather impacts directly on tourists in a number of ways including: the locations they visit and how long they stay; the amount of money they spend and what they spend it on; the type of accommodation they choose; their participation in activities; the quality of their experiences; their satisfaction, enjoyment and safety; and the ease with which they are able to travel. Tourism businesses also rely on the number of visitors attracted to a region or destination, and the weather conditions those visitors encounter impacts on the popularity and operational viability of particular activity and accommodation options. The weather can also impact on the natural resources on which much New Zealand tourism is based.

Visitation

A tourist's decision to visit a particular location, and the length of time they stay, is often influenced by the weather (Table 6). A key difference between international and domestic tourists is the propensity of the former to undertake touring holidays, rather than visiting only one location whilst in New Zealand. Severe weather events are often very short-lived in New Zealand, and for international tourists it is often more a case of good luck, than good management, as to whether they are affected by extreme weather. Also, for international tourists, time constraints may impact significantly on their ability to change their plans because of weather they encounter. For domestic tourists, forecast weather and longer term weather patterns may have more impact on their travel plans and holiday experiences.

Table 6
Visitation

"Sun brings tourists back to peninsula"	<i>Waikato Times</i> , Jan 2, 1999
"Rain and flooding cause havoc for holidaymakers"	<i>Waikato Times</i> , Jan 10, 2003
"Tourists flee bad weather"	<i>Press Release: Flight Centre</i> , Dec 23, 2004
"Rain hits holidaymakers"	<i>The Press</i> , Jan 3, 2006
"Tourists come and go with the weather"	<i>Timaru Herald</i> , Jan 18, 2007
"Havoc for holidaymakers"	<i>Timaru Herald</i> , Dec 28, 2007
"Tourists flood in as weather stays fine"	<i>The Northern Advocate</i> , Jan 6, 2010

In 1999, for example, tourists were reported to be flocking back to the Coromandel Peninsula after two bad summers. In December 2004, Flight Centre was inundated with both international tourists and New Zealand holidaymakers wanting to leave the country as a result of a 'dismal start to summer'. In 2003, thousands of holidaymakers were left stranded by heavy rain in Coromandel Peninsula, with some holidaymakers leaving early for home. Heavy rain in the South Island forced riverside campers to move and stranded trampers in the Arthur's Pass area in January 2006, while the following year flooding reports affected the number of campers at Peel Forest in South Canterbury. In the latter case domestic tourists were reported to be much more affected by bad weather forecasts, than were international tourists. In January 2010, fine weather attracted many campers and boaties to the Northland region, and although high numbers of boaties in the region did not benefit accommodation suppliers, they did contribute considerably to the local economy through food and other purchases from local retailers (Table 6).

Vulnerability of camp grounds

Camping is the accommodation sector most vulnerable to adverse weather conditions and events, although they also benefit the most from fine weather. The headlines shown in Table 7 report on a

number of severe weather events which affected camping grounds all over New Zealand: Taranaki, Marlborough, Kapiti Coast, Southern Lakes and Central Otago. In some cases, poor weather forecasts and negative media reports were also having an impact on the number of campers. Often, however, although tent numbers were down, campervan and caravan sites and cabins were all still popular. Tourists were also reported to be staying in backpackers, rather than camping, because of rain.

Table 7
Vulnerability of camp grounds

"Weather makes life miserable for campers and camp owners"	<i>The Daily News</i> , Dec 29, 2000
"Campers brace for more bad weather"	<i>The Marlborough Express</i> , Dec 23, 2004
"Taranaki camping grounds hit by unseasonable December"	<i>The Daily News</i> , Dec 24, 2004
"Wet and wild summer not all gloomy for camping grounds"	<i>The Dominion Post</i> , Jan 12, 2005
"Holiday park evacuated ahead of flood"	<i>The Marlborough Express</i> , Mar 30, 2005
"Campers call it quits as weather takes its toll"	<i>Southland Times</i> , Jan 5, 2006
"Twister rips through Oakura beach camp"	<i>Taranaki Daily News</i> , Feb 9, 2006
"Campers scamper in Central"	<i>Southland Times</i> , Dec 31, 2009

Financial implications of the weather for tourism

Many articles note the financial implications for individual tourism businesses or wider regions as a result of the weather. Three headlines illustrate this (Table 8): in 1989, the Bay of Islands holiday season was affected by cyclones; in 1999 the drought in Otago, which was negatively affecting many other sectors of the economy, was a positive for tourism businesses; and, in 2009, bad weather in Queenstown affected tourist activity operators and those offering camping accommodation, but was more positive for moteliere (Table 8).

Table 8
Financial implications of the weather for tourism

"Storms blow away the tourist dollar"	<i>New Zealand Herald</i> , Jan 20, 1989
"Drought for some but a gold mine for others"	<i>Otago Daily Times</i> , Feb 13, 1999
"Weather dulls colour of visitor coin"	<i>Southland Times</i> , Jan 5, 2009

Weather-related damage to accommodation and to other tourism infrastructure also brings significant costs for both tourism providers and the New Zealand public more generally. As a result of the weather, for example, insurance costs may rise, food costs can rise (reducing profit margins) and there are costs to taxpayers for infrastructure repairs and rescues.

Coping/resilience of tourists

Many articles note tourists' resilience in the face of bad weather; again with campers often singled out for special mention (Table 9). In most cases campers were reported to have been sitting out bad weather and to have found indoor activities to occupy their time, although some international tourists had moved more quickly through regions as a result of the weather. Cities offered more activities in rain than did areas popular for outdoor activities. Most media reports suggest that while many tourists might be initially disappointed to encounter bad weather they were generally happy with their tourism experiences, whatever the weather. For international visitors from Europe, a bad New Zealand summer was still better than the winter they had left behind at home.

Table 9
Coping/resilience of tourists

"Campers opting to brave the storm"	<i>The Daily News</i> , Dec 31, 1996
"Weather doesn't deter campers"	<i>Southland Times</i> , Dec 30, 1997
"Campers don't let weather ruin their holiday"	<i>The Nelson Mail</i> , Jan 3, 2000
"Tourists take weather in their stride"	<i>The Nelson Mail</i> , Jan 15, 2002
"Bad weather doesn't deter tourists"	<i>Press Release: Maori Arts and Crafts Institute</i> , Jan 19, 2005
"Wintry chill no problem to Brits visiting region"	<i>Timaru Herald</i> , Dec 22, 2006
"Campers still having fun despite the weather"	<i>Timaru Herald</i> , Jan 4, 2007
"Poor weather fails to spoil festive season"	<i>The Press</i> , Jan 11, 2007
"Thunder, wind and hailstones don't deter campers"	<i>Marlborough Express</i> , Dec 27, 2007
"Tourists undeterred by weather"	<i>Southland Times</i> , Dec 31, 2009

Resilience of tourism operators and regions

The resilience of tourism operators and destinations as a whole was also a feature in media reports (Table 10). In January 2007, for example, a drop in fuel prices and in air prices attracted more Australian visitors to New Zealand despite 'grim weather'. Although many destinations rely heavily on outdoor attractions those destinations that offered alternative indoor attractions were still able to entertain and hold onto the tourists they had in bad weather. Many individual operators also put a positive spin on less than favourable weather with suggestions that 'rainy conditions made sea kayaking trips special' and that 'geysers performed better in wet weather', and so on. When poor weather was widespread, some destinations took comfort in having better weather than other regions, as was the case in Wellington and Marlborough in January 2007 (Table 10).

Table 10
Resilience of tourism operators and regions

"Tourism booms despite grim weather"	<i>The Dominion Post</i> , Jan 11, 2007
"Wind blows good for charter boats"	<i>The Press</i> , Jan 11, 2007
"Dull days not bad for tourism"	<i>Marlborough Express</i> , Jan 12, 2007
"Fiordland unfazed by drenching"	<i>Southland Times</i> , Jan 11, 2010
"Visitor numbers high despite poor weather"	<i>The Press</i> , Jan 16, 2010

Impacts of adverse weather on activities

The focus in New Zealand on outdoor activities means that tourists are quite sensitive to the weather and both commercially operated activities and those undertaken independently can be affected by the weather. Low cloud, high winds and rain can cancel scenic flights and boat cruises, while both low and high water levels can affect water based operations. Other commercial activities vulnerable to high winds include sky diving, scenic boat trips, nature cruises, and bungy jumping. Weather cancellations can also disrupt tourist flows, as tourists may change their itineraries. Tourist disappointment can also be high (Table 11).

Table 11
Impacts of adverse weather on activities

"Heavy rain disrupts Timaru weekend events"	Timaru Herald, Nov 14, 2005
"Wind fouls up cricket and holidays"	Dominion, Dec 29, 2000
"Bad weather disappoints tourists"	Kaikoura Star, Jan 17, 2007
"Long summer takes toll on tourism Numbers: More visitors, but fewer visiting attractions"	The Daily Post, Mar 27, 2008
"Weather thwarts tourism operators"	The Press, Jan 25, 2010

Bad weather also impacted significantly on special events such as concerts, festivals and outdoor shows and many sporting events. In January 2010, poor summer weather disrupted the operating capacity of hot-air ballooning, jet boat and rafting companies in Canterbury although regionally, the impact of the weather was not significant with visitor numbers up as a result of increases in cruise passengers (Table 11).

Impacts of favourable weather

While hot and sunny weather is preferred for most tourist activities, extended periods of extreme heat can have infrastructure and safety impacts. The impacts noted in the articles shown in Table 12 include melting tarseal on roads (causing driving problems), buckled train tracks (resulting in delays), increased risks of forest fires and fire bans (with some roads and recreation areas closed), and water shortages and restrictions. Temperature increases also have an impact on insect populations, such as wasps and mosquitoes. Warm temperatures in the early months of the 1999/2000 summer resulted in high wasp numbers in Nelson Lakes National Park. As well as threatening the food supplies of many native bird species, wasps eat vast amounts of native insects and can kill newly hatched chicks, and present a major worry to visitors, tourist operators and trampers (Table 12).

Table 12
Impacts of favourable weather

"Summer sizzle on the way"	<i>New Zealand Herald</i> , Nov 5, 2006
"Wasp poison warning issued"	<i>The Nelson Mail</i> , Jan 15, 2000
"Weekend of fun, sun for region"	<i>The Daily News</i> , Oct 24, 2000
"Sun spot rates highly with tourists"	<i>The Nelson Mail</i> , Jan 6, 2009
"When the road melts and the mercury hits 40C... it's off to the beach"	<i>New Zealand Herald</i> , Jan 9, 2009
"Good weather, fewer tourists hit museum takings"	<i>The Daily Post</i> , Feb 4, 2010

Extended periods of fine weather, along with forecasted fine weather, have an impact on the numbers tramping in national parks. While many tourists tramp independently they often use commercial transport services to access wilderness areas and these companies can be much busier in a 'good' summer season. As might be expected, for operators of indoor activities, bad weather is usually a positive and good weather a negative (Table 12).

Weather extremes as an experience

Extreme weather conditions can also impact positively on tourist activities and on tourists' experiences. In October 1998, for example, it was reported that tourists trapped overnight in Milford Sound after heavy rain closed the road had regarded it as 'a great adventure'. In 2009, trampers on the Routeburn Track who had to be airlifted over a closed section of the track (because of snow avalanches and ice falls) were reported to be 'buzzing at the experience' (Table 13).

Table 13
Weather extremes as an experience

"Tourists enjoy weather-enforced stay"	<i>The Press</i> , Oct 27, 1998
"Wild weather puts adrenalin in bridge climb"	<i>New Zealand Herald</i> , Jan 22, 2002
"Oh my goodness, bloody hell, the river is coming up into the restaurant"	<i>The Dominion Post</i> , Mar 30, 2007
"Chills and thrills on Akaroa visit"	<i>Stuff</i> , Dec 27, 2008
"Chopper ride bonus for trampers"	<i>Southland Times</i> , Nov 13, 2009
"Mass evacuation after wild weather"	<i>Southland Times</i> , Mar 24, 2010

Tourists' safety and the weather

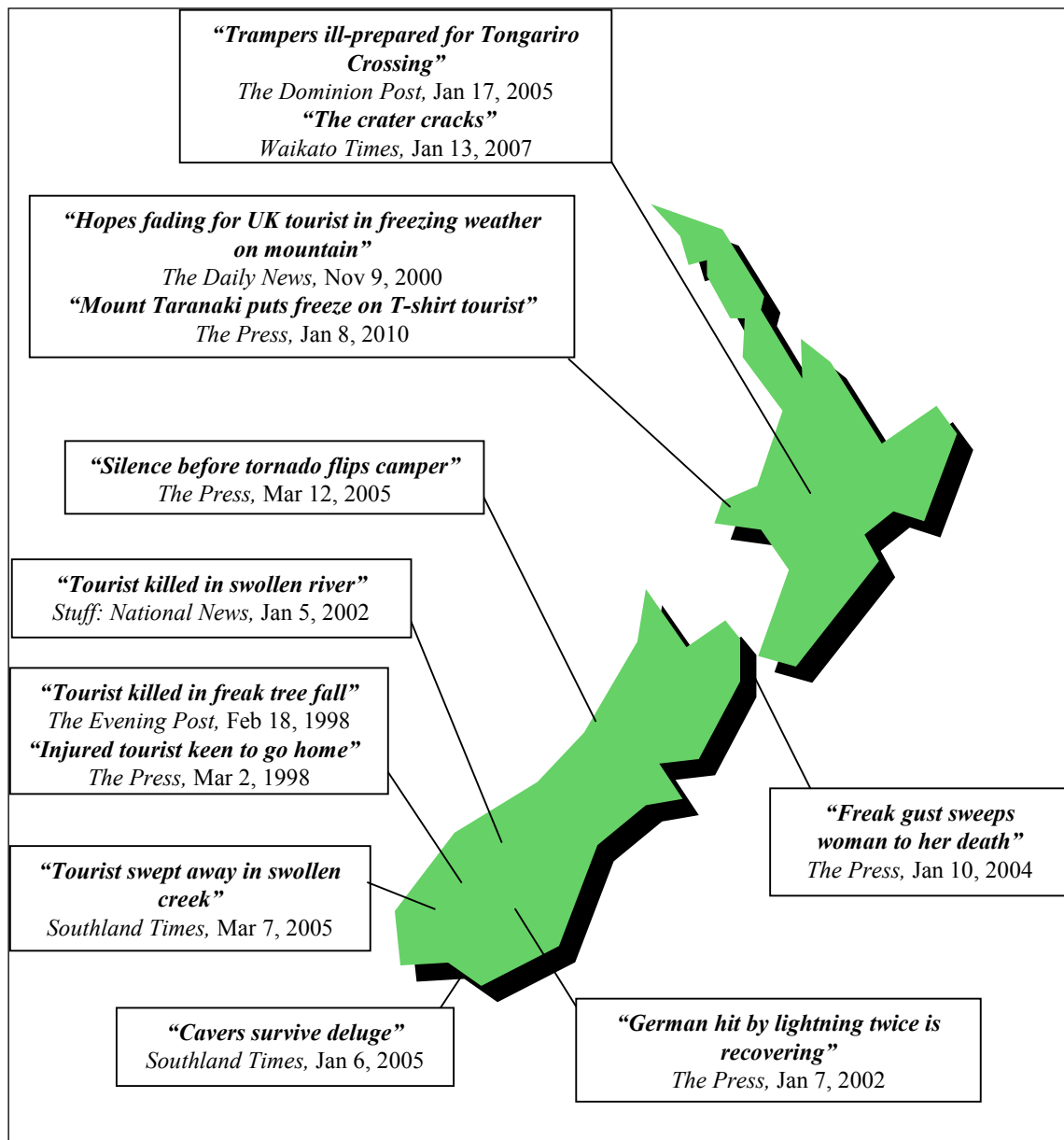
In the case of commercial activities, safety concerns arise in the media whenever there are accidents involving international tourists. It is recognised, however, that there is often a delicate balance between upholding safety standards and offering activities which, by their definition, depend on risk. The inquest into the 1995 hot air balloon accident that killed three tourists found that if the pilot had been able to access a database link to 'real-time' weather information the flight would have almost certainly been cancelled. After a tour bus crash on Ninety Mile Beach in 1997, a new off-road protocol was suggested: the protocol noted that drivers should be conscious of the need to avoid remote areas, such as Farewell Spit, in dangerous weather and to turn back if conditions deteriorate (Table 14). In 2001, however, a *New Zealand Herald* article reported results from a Massey University study which found that some smaller operators put the pressure to make profits ahead of safety concerns – carrying on in marginal weather (Gamble, 2001). To ensure tourist safety and enjoyment, activity providers sometimes need to provide more equipment or a higher ratio of guides/operating staff, which can considerably reduce their profit margins and increase ticket prices for tourists.

Table 14
Tourists' safety and the weather

"Weather link 'must be used'"	<i>The Press</i> , Nov 19, 1998
"Off-road protocol drafted"	<i>The Press</i> , Dec 9, 1997
"Searching questions"	<i>The Dominion Post</i> , May 1, 2004
"Trampers ill-prepared for Tongariro Crossing"	<i>The Dominion Post</i> , Jan 17, 2005
"Rescue squad set for silly season"	<i>Taranaki Daily News</i> , Dec 6, 2005
"New safety rules to help visitors enjoy the outdoors"	<i>The Dominion Post</i> , Jan 6, 2010

In the case of tourists doing outdoor activities independently (e.g. trampers) the number and cost of rescues are topical issues. Also, because of the location of these activities in remote areas, rescues can be difficult and expensive. Media attention is often focused on how prepared international tourists are for New Zealand weather conditions (see Table 14 & Figure 8). While these tourist accidents occur all over New Zealand, some locations (e.g., Fiordland, Mt Taranaki and Tongariro) feature more often than others. In some cases freak weather events impact on tourists: the media articles shown in Figure 8 include reports on trampers being swept away by swollen rivers and cavers trapped by heavy rain, trampers struck by fallen trees and by lightning, strong winds that flipped a campervan and killed a woman in a tent, and the threat to tourists of a possible lahar on the slopes of Mt Ruapehu.

Figure 8
Tourists' safety and the weather



Impacts on the tourism resource

The weather also impacts on the natural resources on which many tourism operations are dependent. In 2002, a wet summer gave new life to an old geyser and created a new one in one of Taupo's geothermal areas and, in 2005, a chilly spring and summer caused the Franz Josef Glacier to grow at a rapid rate. Also, while a hot weekend in 2002 brought people flocking to the beaches in the Hauraki Gulf, long slicks of red, jelly-like algal bloom reduced visibility and operational safety for both private and commercial tourism boat operators. In 2008, the famous signpost at Cape Reinga had to be replaced after high winds ripped off the 10 signs pointing to cities around the world. It was reported that tourists were disappointed to have missed a popular photographic opportunity. In 2008, erosion caused by flooding was responsible for the loss of some camping sites and assets at the Onaero camping ground in Taranaki. New management plans were being considered to address the vulnerability of this specific camping ground (Table 15).

Table 15
Impacts on the tourism resource

"Summer rains bring new geyser to life"	<i>New Zealand Herald</i> , Jan 25, 2002
"Summer blooms at last, but so do the beaches"	<i>New Zealand Herald</i> , Dec 2, 2002
"Largest ever icebergs seen in Mueller Lake"	<i>Timaru Herald</i> , Jan 15, 2005
"Franz Josef Glacier growing"	<i>Radio New Zealand Newswire</i> , Jan 22, 2005
"Winds play havoc with Cape pointers"	<i>New Zealand Herald</i> , Nov 27, 2008
"Erosion influences camp ground plans"	<i>Taranaki Daily News</i> , Dec 20, 2008

Weather impacts on transport and transport infrastructure

The weather can also have a significant impact on transport infrastructure and on tourists' travel plans. All types of transport and associated infrastructure may be affected by severe weather events. Floods and high winds can cause surface flooding, road closures, landslips, rail lines washed out, trees down, driver danger (e.g. campervans) and wash out bridges trapping tourists. High winds and rough seas disrupt Cook Strait ferry crossings and cruise ship itineraries. Extreme heat can buckle rail lines disrupting rail services while drought and hot spells can close recreation areas popular as scenic drives (such as the Molesworth Road). Airports are affected by low cloud and fog, high winds and heavy rain, disrupting flights (Table 16). The costs of clearing roads blocked as a result of landslides, repairing damaged bridges and restoring power supplies can be high.

Table 16
Weather impacts on transport and transport infrastructure

"Hundreds hit by fast-ferry delays"	<i>Dominion</i> , Jan 4, 1995
"Ships forced to stay in capital"	<i>Dominion</i> , Oct 13, 2000
"Tourist sleep in terminal"	<i>The Evening Post</i> , Feb 7, 2002
"2000 holidaymakers stranded"	<i>Dominion</i> , Apr 2, 2002
"Railway delays to last all summer"	<i>New Zealand Herald</i> , Jan 7, 2003
"Blocked roads add to misery"	<i>Waikato Times</i> , Jan 11, 2003
"Ferries delayed by 6m swells"	<i>New Zealand Herald</i> , Nov 14, 2004
"Grounded by a lack of wind"	<i>The Dominion Post</i> , Mar 26, 2005
"Weather bomb strands tourists and locals near Cape Reinga"	<i>Radio New Zealand Newswire</i> , Feb 7, 2007

Tourists' travel plans can be severely disrupted when they are either stranded in a particular destination, or are unable to gain access due to road closures or washed out bridges. Wellington is particularly vulnerable in respect of both water and air transport. In 1995, for example, hundreds of passengers were delayed when the fast ferry was unable to sail because of the weather; in 2002 tourists were forced to sleep in the terminal building when ferries were cancelled and in 2005 more than 40,000 passengers had their travel disrupted for several days by fog at Wellington airport. The persistent fog was blamed on rare wind conditions that brought warm, moist air from the Pacific over central New Zealand (Table 16).

3.3.3 Winter weather

Usually winter weather is more disruptive to travel with storms causing road closures, and increases in accidents along with the cancellation of ferry crossings. Ferry crossings that do operate can be more uncomfortable for passengers (see Table 17).

Table 17
Weather impacts in winter

"Foul weather brings spate of accidents, cancels ferries"	<i>The Dominion</i> , Jul 23, 2001
"Seasick passengers find Cook Strait far too swell"	<i>The Press</i> , Jul 23, 2004
"Wintry blast causing havoc in lower South Island"	<i>Radio New Zealand Newswire</i> , June 23, 2007
"Snow causing major disruption in Central Otago"	<i>Radio New Zealand Newswire</i> , June 20, 2007
"Food shortages hit Queenstown"	<i>Radio New Zealand Newswire</i> , June 24, 2007
"Lengthy power cut halts Wanaka"	<i>Southland Times</i> , August 13, 2007
"Heavy snow disrupts travel, causes road crashes"	<i>Otago Daily Times</i> , July 7, 2008
"Snow is back, and so is Coronet Peak"	<i>Southland Times</i> , Sep 30, 2008
"People warned to keep off mountains, despite snow"	<i>Otago Daily Times</i> , May 21, 2009
"Skifields buzzing about snowfalls"	<i>Otago Daily Times</i> , May 21, 2009
"Milford staff survive on veges and bingo"	<i>Southland Times</i> , Aug 8, 2009

In winter, the South Island and Central North Island are also vulnerable to road closures from snow and the Milford Road and Homer Tunnel subject to closure as a result of avalanche risk. The ski season can be disrupted by winter storms, with Queenstown and Wanaka airports vulnerable to snowstorms, fog and ice. With alpine passes also closed to traffic, getting food supplies to tourism destinations like Queenstown can also be difficult. Although heavy snow is a positive for ski fields, access roads are often vulnerable to avalanche risk (Table 17).

3.4 Discussion

This review of media reports on significant weather events shows the ways in which a variety of weather conditions and events impact on tourism in New Zealand. Heavy rain, for example may result in the flooding of roads, railways, buildings, campgrounds, slips leading to road closures, bridges washed away and damage to walking tracks. There may also be river, lake and coastline flooding, flash floods and commercial tourism activities may be cancelled. Strong wind can result in road closures, danger from falling trees and debris, slips, high seas close coastal roads, disruption to water and air transport, power outages, cancellation of commercial activities, and danger for high vehicles such as campervans. Fog causes transport disruptions and the cancellation of many commercial tourism activities.

Generally dry weather and warmer temperatures are more positive for tourism, although recreation areas and roads may be closed and road and rail infrastructure damaged during drought conditions and hot spells. Extended periods of hot weather also increase fire risks and necessitate fire bans; cause algae bloom; impact on air quality, from dust and smoke; cause water shortages and low lake and river levels; and increase the populations of pests. Unseasonal weather, such as out of season snow falls, may close roads, trap outdoor recreationists and make rescue attempts difficult. Often several of these weather events can occur in unison and severe weather events may be very localised, i.e. there are often media reports that describe weather extremes occurring in destinations that are geographically very close to each other. Weather conditions in New Zealand can also change very rapidly.

The number of articles found reflects the New Zealanders' obsession with the weather. A recent article in the *Listener*, for example, noted that we [New Zealanders] still have "the English fixation with the weather, as a conversation staple, a source of grievance and even competitive bravado" (Clifton, 2010, p.21). Clifton also suggests that "You're probably not a proper New Zealander unless

you regard the weather as a competitive sport and gloat to relatives in other cities about your home's superior climate" (p.17).

Impacts on tourists reported in weather-related media articles vary depending on whether international or domestic tourism is under consideration. When the focus in the media is on domestic tourism, longer-term weather patterns and regional competitiveness are commonly discussed, based on the assumption that domestic tourists are more influenced by weather forecasting than are international tourists. For international tourists, the media focuses on the competitive edge of particular regions, destinations and activities, and on the overall benefits of tourism for the New Zealand economy.

The emphasis in media reports on the resilience of both tourists and tourism reflects the importance of the tourism industry to the New Zealand economy. Reports that focus on the negative impacts of weather usually make some attempt to include at least some positives as well (reporting, for example, that while some businesses are unable to operate, others are very busy). Also, many weather-related articles are illustrated with information on how well-known local tourism businesses are being impacted, despite these not usually being patronised extensively by locals. When particular New Zealand-wide weather conditions are reported, the focus tends to shift to explanations of the global weather patterns, such as El Niño or La Niña, that are responsible for the weather.

A final weather impact that featured implicitly in many of the media articles analysed was the hidden cost of the weather. Tourism businesses may suffer financially as a result of severe weather events or conditions. They may also have additional operational and infrastructure costs including insurance, heating and or air-conditioning, all of which are costs hidden to tourists. Similarly, rises in the price of foodstuffs impacts on the financial viability of restaurants, while activity providers have to provide more equipment for tourist safety and enjoyment; both instances increasing the prices for tourists. For the taxpayer, the costs of repairs as a result of weather damage to transport and other utility infrastructure can be significant. The high cost to the taxpayer of rescues involving international tourists is also an issue.

3.5 Conclusion

The media articles examined in this analysis identified a wide range and variety of weather events that impact on tourism and tourists in New Zealand. Also, because there is no such thing as 'perfect' weather' the response of tourists and tourism is highly variable depending on the specific type of activities and, in some cases, specific destinations (or types of destinations) under consideration. The type of tourists attracted to, or interested in specific activities and destinations also varies considerably. Importantly, the archive analysis suggests that the weather (and weather forecasts) may affect domestic holidaymakers in different ways than it does international tourists.

The next two chapters present empirical research undertaken in order to better understand the impact of the weather on international tourists' experiences in New Zealand. Chapter 4 ("Influence of weather on tourists' satisfaction") looks at the impact of the weather on international tourists over a full calendar year through an analysis of weather responses recorded in the International Visitor Survey (IVS). Then, in Chapter 5, we report the results of a survey which explored the perceptions of weather and the weather experiences of international tourists visiting New Zealand during the peak summer season.

Chapter 4

Influence of Weather on Tourists' Satisfaction

4.1 Introduction

The weather is likely to influence tourists' experience of New Zealand. A recent report on cruise ship tourism, for example, revealed that the weather and limited time were the two most frequently mentioned disappointments (Tourism New Zealand, 2007). To shed more light on how tourists perceived the weather during their travel/holidays in New Zealand and how this might affect satisfaction, three aspects of tourists' experience (tourists' highlights, disappointments and recommendations) were identified as important.

Data for quantitative analyses of these questions was available through the International Visitor Survey (IVS) managed by the Ministry of Tourism. Using a questionnaire survey approach, the IVS collects detailed information on their whole trip from tourists at the departure gate before they leave New Zealand. It was expected that the weather might feature in responses given to questions relating to tourists' satisfaction, and that, taken together with weather-highlights, weather-disappointments and weather-recommendations, these measures would indicate some overall level of tourists' satisfaction with the weather. The IVS analysis is structured as follows:

- Method (Section 4.2);
- Results (Section 4.3);
- Discussion (Section 4.4);
- Conclusion (Section 4.5).

4.2 Method

To cover tourist experiences during all four seasons of the year, data from 2008 (Quarter 4 from October to December) and 2009 (Quarters 1, 2 and 3) were used. Quarters 1 and 4 relate to the summer season (October to March), while Quarters 2 and 3 reflect the colder winter months. The total sample size for all four quarters analyses was 5,292 tourists, with each quarter contributing 25% of the sample. Three questions from the IVS were analysed in detail. The first related to tourists' highlights (IVS Q.31 *What were the **main** highlights of your visit?*); the second to disappointments (IVS Q.32 *What, if any, were the **greatest** disappointments?*); and the third to recommendations (IVS Q.33b *What would you say to others about New Zealand as a holiday destination?*). The analysis involved manual coding of responses into a variety of 'weather' categories.

Tourists' responses on the highlight of their visit were first coded into those that did not report a highlight (N= 127 tourists, coded as 'none'), those who reported a highlight that was not related to weather (N= 5,039, coded as 'other') and those reporting a weather-related highlight (N= 126). If tourists provided more than one highlight and one of them was weather-related the whole answer was coded according to the weather aspect. The 126 weather highlights were then further coded into six sub-categories (see Table 18).

Similarly, the responses related to tourists' disappointments were coded into no disappointment (N= 3,139, 'none'), other disappointments² (N= 1,593, 'other') and weather-related disappointments (N= 560). In cases where a tourist reported multiple reasons for disappointment and if one of them

² Typical examples of these related to problems with the accommodation, service quality, immigration, food, the nature of New Zealand's roads or personal issues.

related to weather the whole response was coded according to the weather-related statement. All disappointments relating to weather were further coded into 12 sub-categories (see Table 19). In some cases, coding was not straightforward as the response could have been attributed to more than one sub-category: for example, one tourist stated “weather – wet and cold – missed out on seeing the nature at Milford Sound and Arthur’s Pass”. This response would match the codes “wet and cold” and “poor visibility” or possibly even “weather cancellation activity”. In fact the response did not reveal if the weather conditions led to a cancellation or just a poor experience. In this case the response was coded as “wet and cold”. Similarly, there were a range of responses which indicated that weather may have been a factor leading to disappointment, but was not stated explicitly, for example “could not do swimming with dolphins” or “flight was cancelled”. In these cases, responses were coded as “other” (i.e. not weather-related).

Again, for tourists’ recommendations about New Zealand, the responses were coded into categories of those who had no recommendations (N= 14), those made recommendations about aspects of New Zealand that were unrelated to the weather (N= 5,056), and tourists who commented specifically on the weather (N= 222). Seven sub-categories of weather- or climate-related responses were identified.

Tourists’ satisfaction scores (IVS Q.34a *On a rating from 1 (not at all satisfied) to 10 (extremely satisfied), how satisfied are you with your New Zealand experience?*) were also analysed against responses to these three questions.

4.3 Results

4.3.1 Highlight of New Zealand trip

While most tourists reported at least one highlight, only 2.4% of responses related to the weather. As can be seen in Table 18, the most common response was a generic reference to ‘the weather’. More specific responses mentioning particular aspects of the weather, such as the ‘sun’ or its ‘changeable nature’ were very limited.

Most of the responses related to tourists experiencing good weather during the summer months of January, February and March (Quarter 1); or when analysed on a monthly basis most often in February. The experience of sunshine constituted a highlight over the whole year rather than just in the summer season.

Table 18
Weather-related codes in the IVS for reported highlights

Weather code	Frequency (1 year)	Examples
Weather	94	“good weather”, “the weather was fantastic”
Sun	10	“nice sunshine”, “going to Milford Sound – sunny day”
Climate	7	“climate is beautiful”
Changeable	6	“the weather changed a lot”, “strange weather, cold and hot, up and down”
Cool	6	“like the cool weather”, “saw snow”
Sky	3	“beautiful sky”, “blue sky”

To provide a better context for the comparative role of weather as a highlight, the experience of Milford Sound as a highlight was coded specifically from within 'other' highlights. Milford Sound, one of New Zealand's main tourist icons, was explicitly reported by 4.9% of all tourists as a highlight, i.e. the single attraction of Milford Sound was recorded as a highlight twice as often as was the weather. Because of the limited mention of weather as a highlight no further analysis was undertaken, although it was observed that Australians were slightly less likely to mention the weather as a highlight (only 1.6%) compared with UK visitors (2.8%). Japanese visitors were the most likely to report the weather or climate as a highlight (5.7%).

4.3.2 Disappointment with New Zealand trip

Overview

Weather-related disappointment accounted for 10.9% of all responses on disappointment. Most tourists who were disappointed about the weather did not specify which aspect of weather they were disappointed with (N= 228). When a particular weather aspect was specified, the single largest reasons for disappointment were cold temperatures (N= 90) and wet conditions (N= 84). A number of tourists were affected by cancelled activities due to adverse weather conditions (N= 68) (Table 19).

Table 19
Weather-related codes in the IVS for reported disappointments

Weather code	Frequency (1 year)	Examples
Weather	228	most tourists just said "The weather", or "weather of course"
Cold	90	"too cold", "campervan-cold"
Wet	84	"too rainy", "rain on the day of 70 th birthday", "raining all the time"
Cancellation of activity	68	"weather - disrupted planned weekends away", "whale watching being cancelled due to weather"
Cold and wet	25	"too cold, too much rain"
Transport	22	"Rain-Franz Josef-Road was closed", "flight delayed due to weather"
Windy	11	"Milford Sound had a storm", "winter storm"
Poor visibility	16	"could not see Mt Cook - due to bad weather"
Changeable	6	"the weather – very changeable"
Sun strong /hot	4	"sun strong", "too hot"
Lack of snow	4	"not enough snow"
Coldwater	2	"the sea temperature"

Seasons

Weather-related disappointment was higher in the winter season (Table 20). Twenty-eight percent of weather-related responses for disappointment occurred in Quarter 3 (July, August, September), compared with the lowest occurrence of 20.3% in Quarter 1 (i.e. January, February, March). Some tourists, however, qualified their statement that it was cold by adding that this was to be expected given it was the winter season. The relationship between weather-related disappointment and survey quarter was statistically significant ($\chi^2 = 18.77$, $df=6$, $p=0.005$)

On a monthly basis, May, June and July were characterised by the highest occurrence of weather-related responses. For example, of all tourists surveyed in May, 16% reported disappointment due to the weather; the second highest proportion was found in July (15.4%), and the lowest in April,

February and January (5.6%, 7.0% and 7.5%, respectively). These differences were statistically significant ($\chi^2=71.57$, $df=22$, $p<0.001$).

Table 20
Weather-related disappointments compared with other or no disappointments by quarter of interview

	Quarter of interview				Total
	1 (Jan-Mar)	2 (Apr-June)	3 (Jul-Sep)	4 (Oct-Dec)	
None	24.9%	25.3%	25.6%	24.2%	100.0%
Other	27.1%	24.0%	22.4%	26.6%	100.0%
Weather-related	20.3%	26.8%	28.3%	24.5%	100.0%

More detailed analysis of weather sub-categories revealed that the category of “cold and wet” was mostly related to Quarter 3, with more than half of the comments. “Cold and wet” was not mentioned in quarter 1. Also, activities cancelled due to poor weather were mostly related to the winter months (32.4% of all responses within this code). Only 20.6% of tourists who reported cancelled activities were surveyed in Quarter 4 and 23.5% were in Quarter 1. Issues with transportation, such as road closures, also largely related to winter (59.1%), although a larger number were also reported for autumn (Quarter 2 at 31.8%). Transport issues in summer seem to be less frequent. Wet weather was reported as a source of disappointment for all seasons, however, in spring (Quarter 4) wet conditions were considerably less of a problem than in other seasons.

Tourists who reported no specific reasons for disappointment were represented to a similar level across all seasons (see Table 20) at about 25% of the sample within each quarter, suggesting that the differences between seasons may be the result of a trade off between ‘weather’ and ‘other’ disappointments.

Satisfaction ranking

Overall satisfaction was ranked by each tourist on a Likert scale from 1 to 10, where 10 represents the highest satisfaction. On average, tourists in the sample achieved a satisfaction ranking of 8.8. Those who were unable to report any specific disappointment were significantly more satisfied (9.02) than those who reported a non-weather reason (8.42) or a weather-related factor (8.67) (ANOVA, $F=120.98$, $df=2$, 5232, $p<0.001$). It appeared that weather-related incidents affect overall satisfaction less than other events.

Further analysis explored whether satisfaction differences exist amongst those tourists that reported weather-related disappointments, depending on what the specific weather event was that affected their disappointment. To this end, the coded responses were re-classified into four categories (for larger sample sizes), namely ‘weather’, ‘cold/wet’, ‘transport’ and ‘cancelled activity’. The ANOVA test of satisfaction ranking by weather category was not significant ($F=1.5$, $df=3$, 556, $p<0.213$), although tourists who reported ‘weather’ in a generic sense were least satisfied (ranking of 8.59). It therefore appears that none of the categories has a more or less dominant influence on overall satisfaction.

Origin and demographics

A nationality based analysis shows that tourists from the UK were the most likely to be disappointed by the weather (14% of all UK tourists in the sample). Chinese tourists were least likely to be disappointed due to the weather (5.3%). When looking at the specific weather conditions it was found that tourists from Australia were particularly likely to be disappointed due to “cold and wet” as

well as “windy” conditions. They also seemed to experience more problems with transport due to bad weather than other tourists. Similarly, visitors from the USA were more likely to find New Zealand “cold and wet” compared with other tourists.

Purpose of visit is statistically related to the extent to which tourists perceived the weather as a major reason of disappointment ($\chi^2=39.65$, $df=12$, $p<0.001$). Holiday visitors were most likely to be disappointed with the weather: 13.8% reported weather as a disappointment compared with only 9.0% for VFR tourists and even less for all other categories of purpose of visit (Table 21). Interestingly, satisfaction rankings (on a scale from 1 to 10) still indicated that holiday visitors were comparatively satisfied (an average ranking of 8.9), although VFR tourists were slightly more satisfied (9.0) with their trip to New Zealand. Education visitors were the least satisfied overall (8.4), and again, the weather did not appear to be a major reason for this.

Table 21
Importance of weather-related disappointments relative to no
or other disappointments by purpose of visit

	Holiday/ Vacation	Visiting friends or relatives (VFR)	Business	Education	Other	Total
None	52.4%	68.8%	66.4%	53.0%	62.5%	59.3%
Other	33.8%	22.2%	26.9%	40.6%	29.3%	29.8%
Weather	13.8%	9.0%	6.7%	6.4%	8.2%	10.9%

Altogether, 356 weather-related disappointments were recorded by holiday tourists and 16.9% of these related to cancelled activities. For all other purposes of visit, cancelled activities as a result of the weather were much less likely (e.g. only 2.3% of VFR tourists). Transport issues affected both holiday and business visitors more than all other types of visitor, whereas the perception of the weather being “cold and wet” was most often reported by education visitors (61.1% of education visitors reported weather disappointments, compared with only 31.2% of holiday tourists). This is probably related to the fact that many education visitors stay during the winter season (or for the whole year), whereas holiday tourists chose to visit in the more favourable seasons (e.g. Quarters 4 and 1). The differences between purposes of visit and weather event are statistically significant ($\chi^2=39.65$, $df=12$, $p<0.001$).

Style of travel is an important variable that may affect tourists’ experience and likelihood of disappointment. The reasons for disappointment that tourists from different travel styles reported differed significantly ($\chi^2=57.63$, $df=6$, $p<0.001$). Free independent travellers (FIT) were most likely to report ‘nothing’ (64.3%) compared with 57.4% of package tourists, 55.1% of semi-independent travellers (SIT) and only 47.9% of tour group visitors. The weather was an important reason for disappointments in these other categories. Twelve percent of tour group visitors reported a weather-related disappointment, along with 11.8% of SITs and 11.5% of package tourists. Only 9.8 % of FITs found aspects of the weather disappointing.

Further analysis of weather-related disappointments revealed that tour group visitors and package tourists were more likely to be affected by cancelled activities (22.6% and 17.8% of all those who provide some weather-related disappointments) than other visitors, in particular FITs (only 8.1%). A similar pattern was found for weather-related transport problems. While less affected by cancellations and transport problems, FITs were more like to be disappointed about the weather generally and about cold and wet conditions (Table 22). These differences were not statistically significant however. It is plausible that tourists with a highly structured itinerary have much less

flexibility to respond to weather situations, for example by changing route, delaying departures or modifying activity patterns, than independent travellers.

Table 22
Weather-related disappointments (disaggregated) by style of travel

Aggregated weather-related responses	Style of travel				Total
	Package	FIT	SIT	Tour	
Weather (generic)	44.4%	52.4%	48.6%	38.7%	49.4%
Cold/wet	31.1%	36.7%	34.7%	29.0%	35.0%
Transport issues	6.7%	2.8%	3.6%	9.7%	3.8%
Cancelled activity	17.8%	8.1%	13.1%	22.6%	11.8%

Finally, repeat visitation was seen as a factor that could influence tourists' disappointment with weather conditions encountered in New Zealand. Repeat visitors, for example, would be more likely to be aware of what kinds of weather to expect in New Zealand. The analysis shows that there were statistically significant differences between first-time and repeat visitors with respect to their propensity to be disappointed about the weather ($\chi^2 = 63.63$, $df=2$, $p<0.001$). Out of all 2,799 first-time visitors in the sample, 12.3% reported the weather as a cause of disappointment. The equivalent proportion amongst repeat visitors was only 9.3%. A substantial 65.0% of repeat visitors did not report any disappointments, compared with 54.2% of first-timers. This indicates that repeat visitors were generally happier with their trip in New Zealand than first timers. Indeed satisfaction rankings confirmed this trend (8.77 for first time visitors versus 8.84 for repeat visitors), although the difference was not statistically significant.

Cancelled activities

The cancellation of activities due to poor weather conditions is an important issue as it both affects tourists' satisfaction and experiences and tourism businesses bottom line. Note that also non-commercial activities were recorded in this category, for example a tourist who could not undertake a hiking trip due to the weather.

In total, only 1.3% ($N= 67$) of tourists reported that their weather-related disappointment was because the weather prevented them from undertaking a particular activity. Closer analysis, however, revealed a number of specific places and particular activities that were more weather affected. The most commonly reported places were: Milford Sound (and Doubtful Sound) - 15 times³; Kaikoura - 11 times; Glaciers (Franz Josef and Fox) - 10 times; Tongariro National Park - 5 times; and Mt Cook - 3 times.

The activities mostly affected were water based activities (18), air based ones (14 times), and skiing/snowboarding (8 times). The cancellation of whale watching alone accounted for 10 out of the 18 water based activities reported by tourists. Skydiving and scenic flights were frequently mentioned air based activities affected by the weather.

4.3.3 Recommendations

Most tourists (all but 14) were able to make some recommendations concerning New Zealand as a holiday destination, but only a small proportion of these related to weather or climate (4.2%). These, however, were overwhelmingly positive with 141 tourists recommending "good weather" and 32

3 Note, however, that Milford Sound was reported as a highlight by almost 5% of tourists.

recommending “good climate”; others noted that New Zealand’s climate is ‘pleasant’ or ‘wonderful’. While it was unclear whether tourists actually understood the difference between weather and climate, responses were coded into two distinct categories to maintain the level of detail. A few tourists made generic comments about the weather or climate (N= 28, e.g. “it all depends on the weather”), the fact that it is cold in New Zealand (“cold weather”, N= 18), or that it is better not to visit in winter (N= 4). References to ‘cold weather’ were not necessarily negative; the highlight analysis above had revealed that some tourists actually interpret a cool climate as a positive asset, especially when it differs from their home country. Only four tourists recommended that New Zealand should not be visited in winter, but preferably during warmer months.

Tourists from Singapore, the UK and Canada were most likely to recommend New Zealand with reference to its good weather or climate (7.7%, 5.3% and 5.2% of respondents within weather-related recommendations). Only one tourist from Germany made a recommendation that related to the weather saying “it’s nice country if you like hot weather and winding roads and hills”.

A number of comments made related to the changeable and unpredictable nature of New Zealand’s weather, for example:

- “Weather is the problem/ NZ is mostly outdoor activities and scenery so if the weather is bad – spoiled your holiday”
- “Very clean and organized/ the weather is unpredictable/ not good”
- “Nice place but can’t predict the weather”
- “Bring waterproof clothing as the weather is all extremes from one day to the next”
- “Beautiful place. Watch the weather when you come”
- “Check out weather before you book to do things”

4.4 Discussion

The key insights from the analysis of tourists’ responses to three IVS questions indicate that, overall, weather plays a limited role compared with other highlights, disappointments or recommendations. This underpins the idea that tourists to New Zealand are unlikely to travel specifically for climatic reasons (as might be the case for other tourist destinations) but are motivated by New Zealand’s natural environment, specific activities (e.g. tramping or skiing) or by personal reasons such as visiting friends or family. All of these were much more commonly reported than weather experiences or perceptions. Nevertheless, a number of tourists recorded climate- or weather-related comments in the IVS.

Overall, tourists were content with the New Zealand weather and climate or even recommended it positively. The weather rarely constituted a highlight, however, whereas the climatic conditions featured to a greater extent in tourists’ recommendations to friends at home. Weather was most often represented as a disappointment: over ten percent of tourists reported a weather-related disappointment. These did not seem to overly affect satisfaction (especially not for holiday visitors), but were more often linked to one specific event, for example the cancellation of an activity – most often airborne or water based activities. Although Milford Sound appeared frequently in this context, it was also noted that 5% of tourists reported Milford Sound as a highlight (which by far outweighs the number of those who were hindered from visiting it due to the weather).

The impact of the weather also varies according to season of visit. Tourists who visited in winter were most likely to find New Zealand cold and wet and a small number would recommend that

others not visit during this time. Incidents such as road closures were also more common during the winter months.

Visitors from the UK and Australia appear to be slightly more sensitive to detrimental weather conditions. Asian visitors were generally less disappointed about the weather, but more disappointed about other issues. These differences may relate to the type of activities each type of tourist undertakes whilst in New Zealand (e.g. Asian tourists are less likely to participate in outdoor activities such as tramping). Some tourists, e.g. from Singapore, particularly enjoyed the New Zealand climate, whereas others did not seem to find it noteworthy enough to comment about (e.g. the Germans). Repeat visitors were less disappointed with the weather than were first time visitors. Also, free independent tourists (FITs) were less likely to report disappointment with the weather compared with tourists on packaged trips. More specifically, package tourists were particularly affected by cancelled activities and transport issues, probably related to their more rigid itineraries and less flexibility to alter scheduled activities as a result of the weather.

4.5 Conclusion

Overall, the analysis of the IVS data revealed a weak but discernible correlation between overall satisfaction and specific weather-related experiences. Generally, the weather is more likely to be a source of explicit disappointment rather than a particularly positive experience.

We found that the extent to which the weather featured as a source of dissatisfaction depends on tourists':

- reason for a visit (with holiday visitors most likely to be disappointed)
- style of travel (with FIT tourists the least disappointed)
- country of origin (with some nationalities more sensitive to the weather, although there is a possible cross-correlation between country of origin, activities and style of travel)
- types of activities planned or undertaken (once again, with some cross-correlation between these and other attributes of the tourists origin and travel style)
- season of visit (with winter tourists more disappointed)

This analysis of IVS data was a preliminary look into the impact of the weather on international tourists visiting New Zealand and was based on data not specifically focused on the interaction of tourism and the weather. Rather, the data analysed were collected in response to a number of questions in the IVS which were expected to generate weather-related responses: overall satisfaction with New Zealand as a destination; trip highlights; trip disappointments; and, recommendations. The tourist survey reported in the next chapter presents a more focused and more detailed examination of the impact of the weather on international tourists' travel in New Zealand.

Chapter 5

International Tourists' Expectations and Experiences of New Zealand Weather

5.1 Introduction

The aim of the research was to better understand the impact of the weather on international tourists visiting New Zealand, particularly in respect of their trip planning and behaviour. The research was informed by the IVS analysis reported in the previous chapter. Three hypotheses were tested:

H1: There would be some differences in tourists' responses to the weather encountered, according to whether they were visiting early or later in the summer;

H2: Tourists' responses to the weather they encounter within New Zealand would vary depending on the mode of transport they use to travel;

H3: Expectations and perceptions of the weather would vary according to tourists' country of residence.

To test the above hypotheses a tourist survey was carried out in Christchurch in the summer season of 2009/2010. The survey results are structured as follows:

- Method (Section 5.2);
- Results (Section 5.3);
- Discussion (Section 5.4);
- Conclusion (Section 5.5).

5.2 Method

A survey approach was taken in order to collect data from a large number of international tourists, all of whom were at the end of their New Zealand holidays. The questionnaire (see Appendix) was written in English and designed for self-completion by respondents (i.e. with no assistance from surveyors). While the majority of questions asked respondents to mark pre-selected answers, in some cases an 'other' option was also provided (to cover unanticipated answers); a number of questions asked respondents to provide examples to elucidate their responses. The questionnaire also included several open-ended questions. The questionnaire was divided into four sections:

- Section 1: Details about tourists and their New Zealand trip
- Section 2: Perceptions of weather before coming to New Zealand
- Section 3: Experiences of weather whilst in New Zealand
- Section 4: Understanding of, and attitudes towards, Climate Change issues

To finish the survey, space was left for respondents to record any other comments they wanted to make in respect of the New Zealand climate and weather. A final question asked whether respondents would pass on any New Zealand weather information to people in their home countries. Two survey periods were selected within the busy summer tourist season to represent times when there are usually variations in the weather conditions:

- Period 1: Mid-December 2009 – early-January 2010; a time when more unsettled weather is usually experienced
- Period 2: February 2010; a time when the weather is, traditionally, more settled

5.2.1 Sampling

The survey was carried out in central Christchurch and at the KEA Campers Christchurch depot. Sampling at the two survey sites was as follows:

Central Christchurch: several survey sites popular with tourists⁴ were selected and any persons who appeared to be international tourists were approached and asked to participate in the survey. To be eligible, tourists had to be from overseas, aged over 18 years, at the end of their New Zealand holiday, and understand English to a sufficient standard. Only one person in each travel group/party was asked to complete the survey.

KEA Campers Depot: the survey was distributed to international tourists returning campervans to the Christchurch depot during the two survey periods. KEA staff were asked to explain that tourists' participation was voluntary and the research was independent (i.e. it was in no way connected to KEA Campers). Again, only one person in each travel group/party was asked to complete the survey.

5.2.2 Response rates

Altogether, 436 surveys were completed; 207 in the first survey period, and 229 in the second. More than half of the surveys (N= 251) were completed in central Christchurch and 185 surveys were completed at the KEA depot. Because of the differences in the sampling frameworks comparative response rates are difficult to calculate. Of the eligible tourists approached in central Christchurch during the first survey period, there were 26 refusals (most because the tourist did not have time to complete the survey). During the second survey period, 23 tourists refused to participate, again largely due to time constraints.

The completion rate at the KEA depot was influenced by how busy the staff were and by how much time the tourists returning their campervans had to spare. During the first survey period when 93 surveys were completed, there were 260 campervan returns; during the second survey period, when 92 surveys were completed, there were 219 campervan returns. Some of these returns, may however, have been New Zealanders, and were therefore not eligible to complete the surveys. A number of survey forms were returned at the KEA depot with an insufficient number of questions answered for inclusion in the final data set. A summary of the response rates, by survey period and survey location, is shown in Table 23. Together, these give an overall response rate of 56%.

Table 23
Response rates (in percentages) by survey period and location

	Central Christchurch (%)	KEA Depot (%)	Overall (%)
Survey Period 1	81	36	52
Survey Period 2	86	42	60
Overall (%)	84	39	56

⁴ The survey sites were outside the i-SITE, on the Worcester Street Bridge, at the Arts Centre and the entrance to the Botanical Gardens.

5.2.3 Analysis

The survey data were entered into a spread sheet and analysed using SPSS (Version 17.0). The majority of data were analysed using frequencies and descriptive statistics, and nonparametric tests (e.g. Chi Square). Where statistically significant, test results are reported. Open-ended questions were either recoded in SPSS for statistical analysis or were manually coded and analysed. The 436 surveys included in the analysis were not all complete, and in those instances the subsample size is provided.

5.3 Results

The results presented below follow the order in which they were asked in the survey. First, respondents' demographic and trip information is presented, followed by pre-trip weather knowledge, and then weather experiences during-trip. The responses given in respect of the differences between the weather experienced and the perceptions of weather pre-trip were analysed together. The final results section addresses respondents' understanding of climate change in respect of tourism experiences in New Zealand.

5.3.1 Demographic and trip information

In which country do you live? (Question 1.1.)

The 435 respondents who answered this question represented 36 countries (Table 24). The two largest groups were from the UK (19.3%) and from Germany (18.8%). The high number of Germans in the research sample was a result of the sampling method used (surveying through KEA Campers⁵); campervan travel is very popular with Germans and one of the key markets for KEA is Germany. Australia is greatly under-represented in this sample.

Table 24
Respondents by country of residence (N= 435)

Country of residence	Number	Percentage in sample %	Percentage of international arrivals in January 2010 %*
UK	84	19.3	14.7
Germany	82	18.8	3.9
Other Europe	59	13.5	3.4
Australia	50	11.5	37.3
USA/Canada	49	11.2	10.9
Netherlands	42	9.6	1.8
Switzerland	29	6.7	1.1
Asia	25	5.7	14.7
Other	15	3.4	13.1
Total	435	99.7	100

'Other Europe': Denmark (17), France (16), Belgium (6), Austria (6), Sweden (5), Italy (3), Spain (2), Norway (1), Romania (1), Finland (1) and Malta (1).

'Asia': Singapore (10), Japan (5), Hong Kong (3), Malaysia (2), Thailand (1), Indonesia (1), Vietnam (1), South Korea (1) and the Philippines (1).

'Other': South Africa (3), Reunion (1), Israel (4), the UAE (1), Saudi Arabia (1), Brazil (2), Chile (1), Argentina (1) and New Caledonia (1).

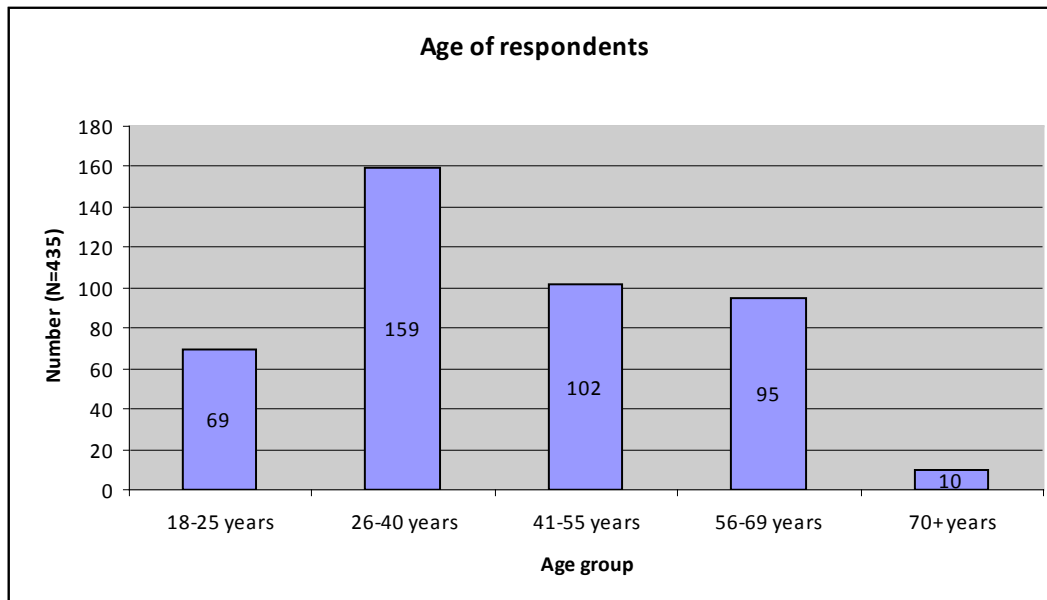
*In the month of January 2010, International Arrivals, Statistics New Zealand (2010) www.tourismresearch.govt.nz

5 Sampling through KEA Campers also meant that Asians tourists were underrepresented (they are less likely to travel independently); Asian tourists are also less willing to participate in a survey because of language barriers.

What is your age? (Question 1.2.)

The age distribution of respondents is shown in Figure 9. The largest number of respondents was in the 26-40 years age group and those aged over 70 years were the least well represented⁶.

Figure 9
Age of respondents (N= 435)

*How many times have you been to New Zealand before (excluding this trip)? (Question 1.3.)*

Altogether, 274 respondents (63.0%) were on their first visit to New Zealand, 110 (25.3%) had made one previous visit and 51 (11.7%) had been two, or more times, previously. One person did not answer this question.

There were some differences in the number of previous visits by nationality, with 56% of the Australian and Asian respondents, 46% of respondents from “Other” countries, almost 38% of respondents from Germany, and 33.4% each of respondents from the UK and the Netherlands having visited at least once before. Respondents from Switzerland (27.6%) and the USA/Canada (26.5%) were the least likely to have visited before.

By age, first time visitors were younger and the likelihood of having visited previously increased with age. For example, almost three quarters of respondents aged 18-25 years were first time visitors, compared to 70% of those aged 26-40 years, 60% of those aged 41-55 years, 54% of those aged 56-69 years and 30% of those aged 70+ years. Half of the respondents aged 70+ had been two or more times before.

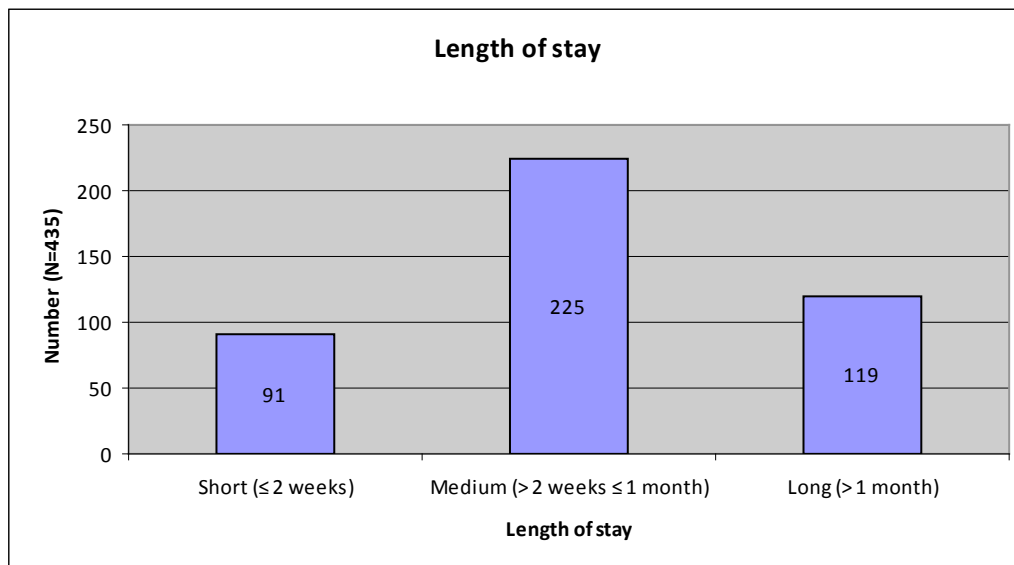
How long was your stay in New Zealand on this trip? (Question 1.4.)

The number of days stayed was recoded into ‘short’ (two weeks or less), ‘medium’ (more than two weeks, less than or equal to one month) and ‘long’ (more than one month) stays and the number of respondents in each category is shown in Figure 10. Altogether, just over 50% of respondents stayed

⁶ There were some differences in age groups of the tourists surveyed by country of residence, with tourists from European countries (with the exception of the Netherlands) overrepresented in the 26-40 years age group, and tourists from the UK overrepresented in the older age categories (56-69 years and 70+ years). There were no Asian tourists in the two oldest categories. Tourists from Germany, the USA/Canada and the UK were also overrepresented in the 18-25 years category.

in New Zealand between two weeks and one month, with almost 30% staying longer than one month.

Figure 10
Length of stay (N= 435)



Short stay visitors were more likely to be from Asia (60% of Asian visitors were short stays) and Australia (52% of Australians), and least likely to be from Switzerland and Germany (less than 4% from each were short stay visitors). Altogether, 85% of all short stay visitors were in the three middle age groups.

The largest proportions of medium stay visitors were from Germany (68% of Germans), the Netherlands (62%) and Other Europe (66%) and the smallest from the USA/Canada (29%) and Switzerland (31%). Forty percent of medium stay visitors were in the 26-49 years age group. Slightly over two thirds of medium stay visitors (67.1%) were on their first visit to New Zealand. Over half of the new visitors were medium stay visitors.

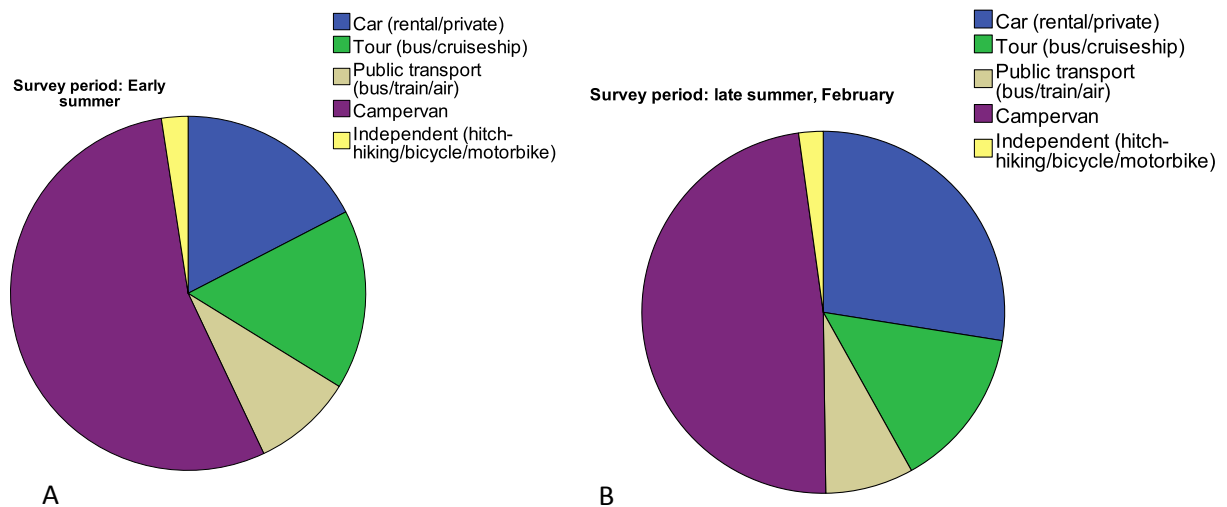
Long stay visitors were more likely to be from Switzerland (66% of visitors from Switzerland were long stay) and “Other” countries (53%). Just over 50% of 18-25 year olds were long stay visitors and, altogether, 60% of all long stay visitors were aged either 18-25 years or 26-40 years. Just under a third of long stay visitors (62.2%) were on their first visit to New Zealand.

What was your main transport mode in New Zealand on this trip? (Question 1.5.)

As Figure 11(A/B) shows, the most popular transport mode was campervan which was a reflection of the sampling frame used in the research. Altogether, of the 223 respondents who were travelling by campervan, 184 were surveyed at the KEA depot⁷ and 39 were surveyed in central Christchurch. Within the sample, campervan travel was relatively more popular in early summer compared with late summer, when car travel became more prevalent.

⁷ One KEA respondent was recorded as travelling by car as they were travelling in New Zealand for a long time and intended to purchase a car to use for most of that time.

Figure 11
Main mode of transport (N= 436) by season (A and B)



After campervans, cars were the most popular transport mode (81 rental and 16 private), followed by tours (54 respondents were on bus tours and 13 on cruise ships) and public transport. The final “Independent” category includes those travelling by hitch-hiking, motorbike and bicycle and represents visitors who are likely to be the most vulnerable to the weather, as a result of their transport mode.

Campervan travel was most popular with visitors from Germany (24% of campervan users), the UK (19%) and Other Europe (18%) and least popular with visitors from USA/Canada (5%), Asia (5%) and ‘Other’ countries (2% of campervan users). Car travel was most popular with visitors from the UK (36% of car users) and Australia (18%); tours were most popular with visitors from the UK and USA/Canada (22% each) and public transport was most popular with visitors from the UK (27% of all public transport travellers)⁸.

Altogether, 69% of those travelling by campervan were aged either 26-40 years or 41-59 years. Car travel was more popular with those aged slightly younger (42% of car users were aged 26-40 years), while both tours and public transport were popular with the two youngest age groups, as well as with the slightly older 56-69 years age group. Half of those travelling independently were aged 26-40 years.

There were some differences between mode of transport and length of stay with campervan and car tourists being likely to stay a medium length of time, those on tours staying a short time and those using either public or independent transport staying a long time.

5.3.2 Pre-trip expectations of New Zealand weather

Before you got here what did you think the weather would be like? (Question 2.1.)

Altogether, 421 respondents answered this question and a wide range of weather variables and combinations of these were recorded to describe the weather they expected to encounter in New Zealand. Some answers were contradictory (e.g. “warm and cool”, “sun and rain”) and a number of

⁸ Within country of residence groups, more than 60% of the Germans, Dutch and Other European tourists surveyed travelled by campervan, compared to only 25% of the visitors from the USA/Canada. Australia and Asia had the highest number of car users (36% each) and the USA/Canada had the highest proportion travelling on a tour (31%). Asian respondents reported the highest public transport use (used by 16% of Asians).

the responses recorded appeared to reflect the weather respondents had actually experienced, rather than their pre-trip expectations. Instead of coding into categories, the comments were searched electronically for key words and each set of comments analysed manually. The key words and the number of times each was mentioned, along with some sample comments are shown in Table 25 (the coding method used – i.e. counting the key words, rather than coding into categories – resulted in some comments appearing several times in Table 25).

Table 25
Expectations of New Zealand weather

Key word	Times mentioned	Comments
Warm	120	“warm and wet”; “warm and sunny”; “nice and warm”; “expected it would be warmer”
Rain/wet/showers	96	“hot/rainy”; “cool temperatures, possible rain”; “sunny and dry, some rain”; “mild and many rainy days”; “like Danish summer – sun and rain”
Sun/sunny	87	“partly sunny”; “fine, warm and sunny”; “cool, wet, low humidity, plenty of sunshine”; “sunny in the east, wet in the west”;
Summer	75	“summer time warm”; “almost same as in Finland (summer is nice and warm)”; “nice because of the summer”; “cold, even though it is summer”
Hot	39	“rainy in some parts, changing quickly, not too hot”; “not really hot”; “hotter than Switzerland”; “hot and sunny”
Cool	34	“cool (enjoyable)”; “cool/temperate”; “cool with some rain”; “North Island warm, South Island cooler”; “cooler than Australia”
Wind/windy	18	“cold and windy”; “warm, windy, sunny”; “a mixture of cold, warm, windy and wet weather”
Nice/pleasant	17	“nice, because of the summer”; “we thought it would be nice, not too hot”; “warm and pleasant”; “pleasant, 20-25°C, cooler in the South”
Changeable	17	“not so warm, weather change a lot of times”; “similar to the UK, i.e. changeable”; “changes often from sunny to raining”
Mild	16	“mild, mid 20s, sun and rain”; “mild, subtropical in the north”; “quite warm summers, mild winters”; “sea climate, mild, not hot”
Dry/drier	11	“very hot and dry during the summer months”; “dry summer and cold winter”; “similar to Australia – hot, dry”; “a bit drier”
Cloudy	11	“cloudy and fresh”; “sunshine, maybe small clouds”

Note: Other ‘weather’ words used included: ‘mixed’ (11 times), ‘temperate’ (8 times), ‘humid/humidity’ (6 times), and ‘fine’, ‘subtropical’, ‘cold nights’ and ‘unpredictable’ (3 times each).

Differentiation between the weather in the two main islands of New Zealand was made 16 times (e.g. “similar to UK in South Island, warmer in North Island”). Altogether, 95 respondents likened the New Zealand summer to either their own country’s summer (or to that of other countries they were familiar with).

Was the weather that you experienced different to what you expected? (Question 3.1.)

Altogether, 256 respondents (59%) reported that the weather was different to what they expected while 179 (41%) reported that it was the same. One person did not answer the question. The expected difference in weather experienced by survey period was minimal, with only a slightly higher percentage of those surveyed during the first survey period in early summer reporting different weather.

Visitors from Germany, the USA/Canada and the UK were slightly more likely to find the weather different to expected, while those from Asia, the Netherlands and Other countries were slightly less likely to do so. Encountering different weather to that expected varied only marginally according to previous visitation, with those who had been before showing a lesser tendency to be surprised by the

weather. Finding weather different to that expected was related to length of stay with 70% of those staying longer than one month (Q1.4. 'long stay') reporting different to expected weather, compared to 55% of those staying less than one month ($\chi^2 = 7.84$, $df = 2$, $p = 0.02$). Those using public transport and independent transport modes were slightly more likely to find the weather different to expected than did those travelling on tours.

The 256 respondents who found the weather different to expected were also asked to provide details of the differences they found. These responses were compared with the open ended responses recorded for expected weather and then coded into three categories: 'better than expected' (74 respondents); 'worse than expected' (N=114); and, 'unexpected/different to expected' (N=50) (Table 26).

Table 26
Weather expectations and experiences

	Expectation of New Zealand weather	Experience of New Zealand weather
Better than expected weather (N= 74) with examples of comments		
	"Warm and sunny"	"It was warmer"
	"Cool temperatures, possibly rain"	"Warmer and sunnier"
	"Like Germany"	"More sunshine"
	"Like English summer"	"Much better"
Worse than expected weather (N= 114) with examples of comments		
	"Warm and wet"	"Colder and windier than expected"
	"Warm and sunny"	"Much colder – we wore long johns a few nights and we're from Canada"
	"Sunny, warm, a little rain"	"More rain, colder, more wind"
	"Just like Europe"	"It was a lot colder than expected"
Unexpected/different to expected (N= 50) with examples of comments		
	"Cold"	"I didn't expect such a change from north to south"
	"More or less same as in the Netherlands"	"Changes in one day could be rapid"
	"Warm, sunny"	"Cooler in the south"

There were some statistically significant differences in these responses by survey period ($\chi^2 = 33.41$, $df = 4$, $p < 0.001$). Altogether, 67% of the 114 respondents who found the weather worse than expected were surveyed in the first survey period; in comparison, only 26% of the 74 respondents who found it better than expected were surveyed in the first survey period. Also, a much lower percentage of the 50 respondents who reported unexpected/different to expected weather were surveyed in the early summer period (38% in the first survey period, compared to 62% in the second survey period).

5.3.3 Weather information and planning pre-trip

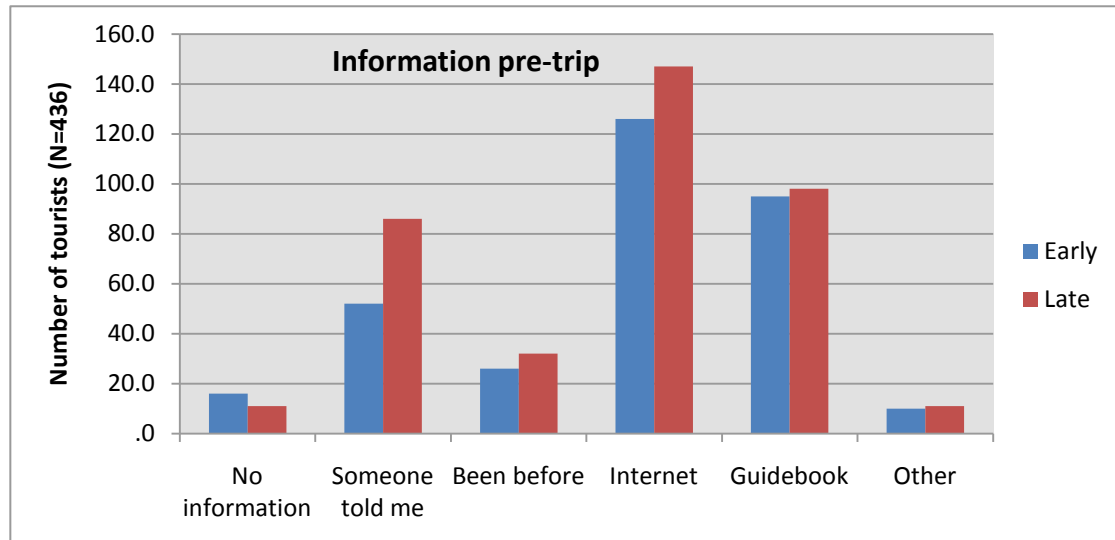
Where did you get your information on NZ's climate and weather from? (Question 2.2.)

The most popular source of information in both survey periods was the internet (273 respondents, 63%), followed by guidebooks (N= 193, 44%) and 'other people' (N= 138, 32%). Fifty-eight respondents (13%) used knowledge from a previous trip ('been before'). Only 27 respondents (6%) did not seek any climate and weather information. Twenty-one respondents (5%) got information from "Other" sources (Figure 12)⁹. Tourists in the late summer period were more likely to use pre-trip climate information, although the differences as shown in Figure 11 were only statistically

⁹ Multiple answers were possible with this question and altogether 137 respondents got information from both the internet and guidebooks. Of the 138 respondents who were "told by someone else", 83 also consulted the internet and 64 looked at climate and weather information in a guidebook.

significant for “someone told me”, possibly because later in the summer the chance of encountering someone who has returned from New Zealand increases ($\chi^2 = 7.77$, $df = 1$, $p = 0.004$).

Figure 12
Information sources pre-trip by survey period (N= 436, multiple answers possible)



There were some statistically significant differences in pre-trip weather information behaviour in relation to transport mode and country of origin. Tourists travelling in campervans and cars were the least likely to have visited without any pre-trip information (3% and 4%, respectively) compared with independent travellers at the other extreme (20%) ($\chi^2 = 17.86$, $df = 4$, $p = 0.001$). Also, those travelling independently and by public transport were significantly less likely to have used the Internet compared with other transport users ($\chi^2 = 15.34$, $df = 4$, $p = 0.004$).

With respect to nationality, German and ‘Other European’ tourists were far more likely to have used guidebooks for weather information than tourists from other origins ($\chi^2 = 42.95$, $df = 8$, $p < 0.001$). There were also differences in information drawn from previous visits, in accordance with origin-driven patterns of repeat visitation ($\chi^2 = 15.67$, $df = 8$, $p = 0.047$).

What climate and weather information did you collect? (Question 2.3.)

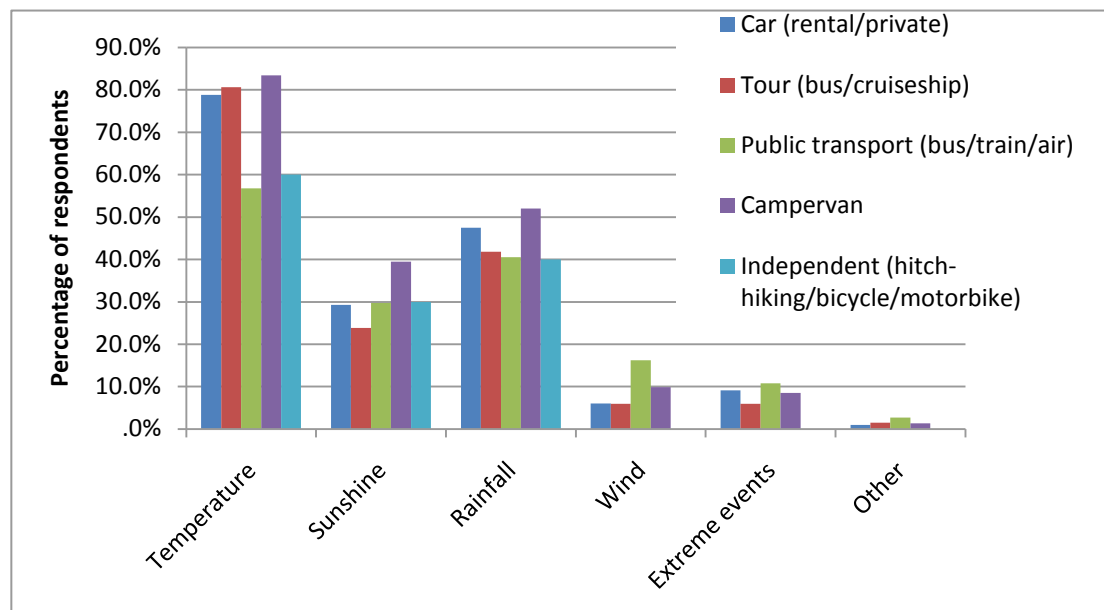
As Figure 13 shows, the most common weather information collected was the temperature (345 respondents, 79%) followed by rainfall (N= 210, 48 %) and sunshine hours (N= 147, 34%). A roughly equal number of respondents collected information on extreme events (N= 36, 8%) and wind (N= 38, 9%), while another 27 respondents (“none of these”) did get weather information in advance, but did not specify what type of information or data they looked at¹⁰. Many of those who collected temperature information also collected information on rainfall (199 respondents) and sunshine hours (125 respondents).

Overall, there was no significant difference between survey periods in the type of weather information collected, although there was slightly more interest in temperature in the first survey period, and slightly more interest in all other types of weather information in the second survey period.

¹⁰ Of the six respondents who reported getting ‘other’ information, two got information on snowfall, one on water temperature, one on specific areas (for example, national parks) and the other two did not indicate what type of information they got.

There were substantial differences in the type of information sought by transport mode and nationality. Campervan tourists were the most likely to collect information on temperature, sunshine and rainfall, whereas those using public transport and travelling independently were less likely to get temperature and rainfall information. Respondents travelling by tour were the least likely to collect information on sunshine hours, extreme events and wind but had the second highest level of interest in temperature information. The test results are reported as part of Figure 13.

Figure 13
Type of weather information by transport mode (N= 409, multiple answers possible)

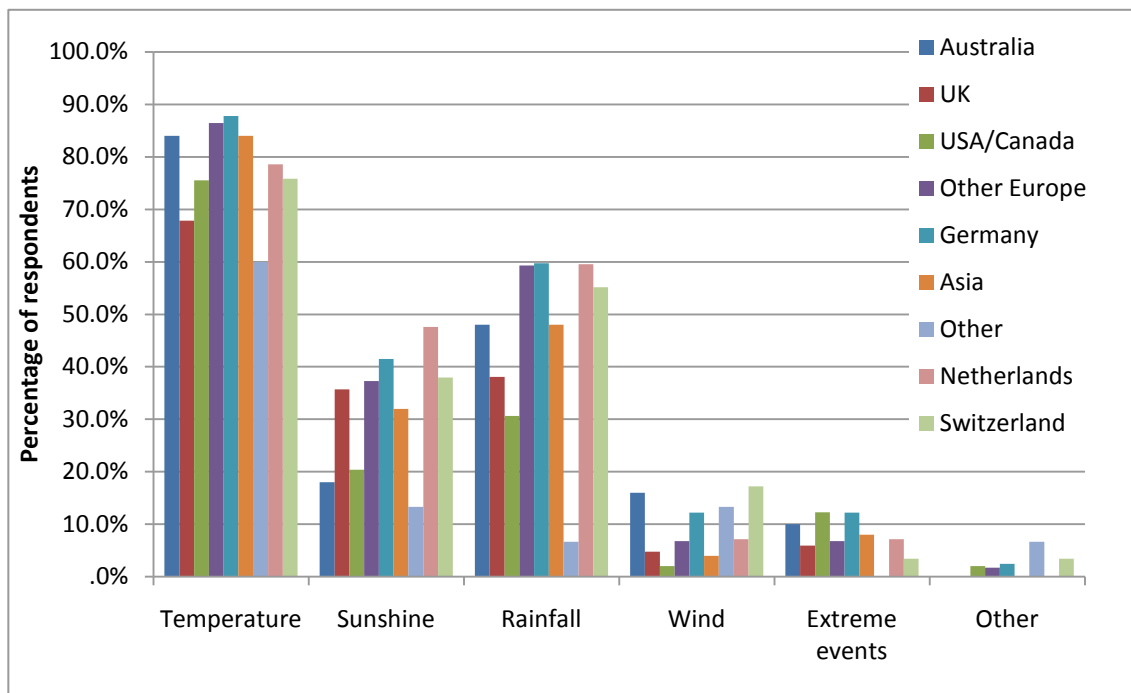


The significance levels for the Chi-Square tests are: temperature $p=0.01$; sunshine hours $p=0.03$; rainfall $p=0.015$; wind $p=0.003$; extreme events $p=0.013$; other information $p=0.017$). Note: some cells of the statistical test have small sample sizes.

Variations in the type of information collected were also found according to country of residence; although these differences were less pronounced compared with transport modes (see Figure 14):

- Germans, Other Europe, Australians and Asians were the most likely, and those from other countries and the UK the least likely, to collect temperature information.
- Dutch and German visitors were the most likely, and those from Australia and Other countries the least likely, to collect information on sunshine hours.
- Germans, Dutch and Swiss respondents were the most likely, and those from the USA/Canada and Other countries the least likely, to collect rainfall information.
- Those from Australia, the USA/Canada and Germany were the most likely to collect information on extreme events.
- Those from Switzerland, Australia, Other countries and Germany were the most likely to collect information on wind; respondents from USA/Canada the least likely to collect information on wind.

Figure 14
Type of weather information by country of origin (N= 409, multiple answers possible)

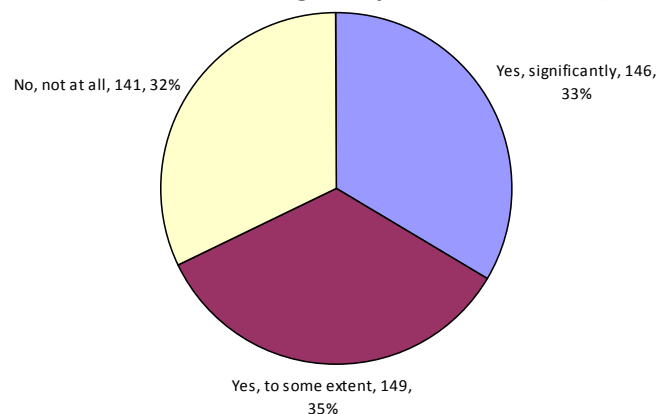


The significance levels for the Chi-Square tests are as follows: temperature $p=0.008$; sunshine hours $p=0.021$; rainfall $p=0.001$; wind $p=0.038$; extreme events $p=0.236$; other information $p=0.143$). Note: some cells of the statistical test have small sample sizes.

Did climate and weather influence your decision to travel to New Zealand in this month, rather than at another time? (Question 2.4.)

A large majority of tourists (68%) indicated that the weather had some influence on the timing of their trip to New Zealand (Figure 15). Campervan tourists and those travelling independently were relatively more likely to report that climate and weather influenced their timing (e.g. 39% and 40%, respectively, indicated significant influence), but the differences were not significant at the 5% level. Europeans (excluding those from the UK) were more likely to be influenced by weather in regard to the timing of their trip than were Australian, North American and Asian tourists, but again, the differences were not statistically significant.

Figure 15
Weather influence on timing of trip to New Zealand (N= 436)

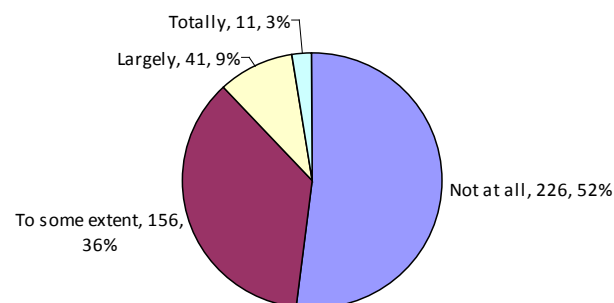


Although no details of the ways in which the weather influenced the timing of their trip to New Zealand were asked for, some examples relating to the timing of travel 'to' New Zealand were given in response to the planning 'within' New Zealand question (*Question 2.5.*). Seventeen respondents noted that they had made the decision to travel to New Zealand in the summer, both because summer travel was perceived to be more enjoyable, and because the New Zealand summer coincided with winter in their home countries.

Did you plan any of your route, destinations to be visited, or specific activities within New Zealand based on expectations about the climate and weather conditions? (Question 2.5.)

When it came to planning the details of their trip (rather than just timing), fewer people considered the weather or climate as an essential input. As Figure 16 shows, just over half of respondents did not take account of the weather when planning the details of their New Zealand trip and the planning of slightly more than one third were only influenced by expected weather 'to some extent'.

Figure 16
Planning according to expected weather (N= 434)



The remainder (just over 12%) indicated that their trip planning was strongly (either largely, or totally) influenced by the expected weather. There was little variation in weather influence on trip planning according to survey period, transport mode or country of residence.

Those who indicated that they had been influenced by the weather were asked to provide examples. In respect of advance planning, the most common examples given were:

- Travelling around the North Island first, followed by the South Island, so as to encounter warmer weather in the south (19 respondents)
- Packing suitable clothing for the expected weather conditions (12 respondents)

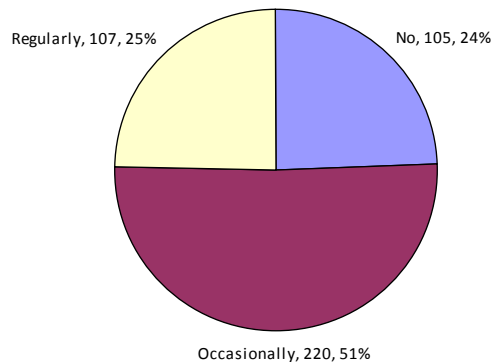
The remainder of the weather-influenced planning examples given related to decisions made whilst travelling in New Zealand, and are discussed below with *Questions 3.4. and 3.5.*

5.3.4 Weather information within New Zealand

Whilst travelling in New Zealand did you seek information in advance about the likely weather? (Question 3.2.)

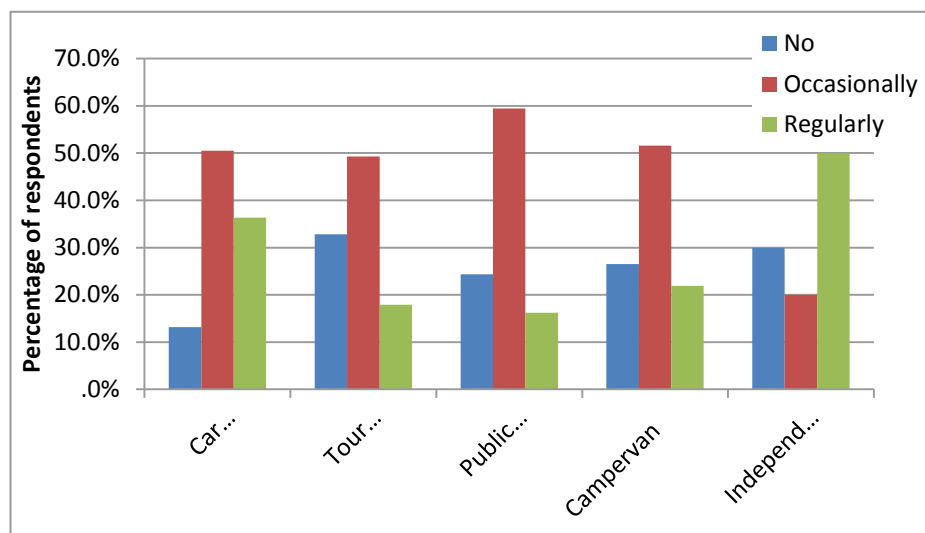
Only a quarter of tourists did not collect any weather information whilst travelling. Three quarters of respondents (N= 327) got some weather information whilst they were travelling in New Zealand, although over half did so only occasionally (Figure 17).

Figure 17
Weather information whilst travelling in NZ (N= 432)



There were some differences in the likelihood of getting weather information whilst travelling according to the type of transport used¹¹ (Figure 18). Within transport modes, car users were the most likely to get weather information (36.4% of car users did so regularly and 50.5% occasionally), followed by those using public transport (16.2% regularly, 59.5% occasionally) and campervans (21.9% regularly, 51.6% occasionally). Independent transport users reported the lowest percentage of 'occasional' weather information collection (20%), and the highest percentage of 'regular' weather information collection (50%). Those using tours were the least likely to collect weather information whilst travelling, although 49.3% still collected information occasionally and 17.9% did so regularly.

Figure 18
Weather information whilst travelling in NZ by transport mode (N= 434)*



*($\chi^2 = 21.15$, $df = 8$, $p = 0.07$)

Those who did seek weather information were asked what the main source of this was. Altogether, 44 different responses were recorded (either single information sources or combinations of sources). A summary of these, showing the total number of times each information source was mentioned and

¹¹ Respondents surveyed in the first survey period were slightly more likely to get weather information whilst travelling, but the difference was not significant. Within country of resident groups, Australians, Asians and those from other countries were the most likely to get weather information regularly. Asians, along with respondents from Switzerland and the USA/Canada were the most likely to get weather information occasionally. Differences are not statistically significant.

the most popular combined information sources (recorded by more than three respondents) is shown in Table 27.

Table 27
Main sources of weather information whilst travelling

Information source	Popular Combinations	Number	Number
Internet			121*
	Internet/newspaper	13	
	Internet/i-site	6	
	Internet/accommodation	5	
	Internet/DOC	5	
	Internet/TV	5	
	Internet/locals	3	
Newspaper			54*
	Newspaper/TV	11	
	Newspaper/i-site	5	
	Newspaper/accommodation	4	
TV			48
i-site			41*
	i-site/DOC	3	
Accommodation provider			36*
	Accommodation/DOC	3	
DOC			19
Locals			16*
	Locals/other tourists	6	
Radio			12
Other tourists			6
Tour guides			3
Activity/transport providers			3
Own weather device			1

* Total number of times source mentioned by respondents

5.3.5 Weather and satisfaction

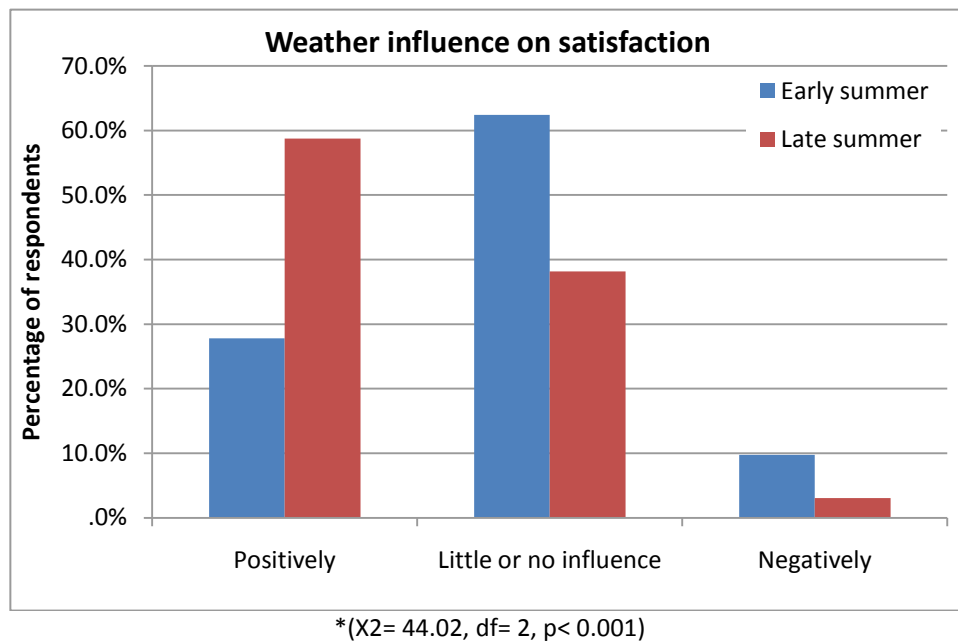
Overall, how did the weather you experienced influence your satisfaction with your trip in New Zealand? (Question 3.3.)

Just under half of respondents (49.7%) reported that the weather they encountered had little or no influence on their satisfaction with their trip, while 44.1% reported that the weather was a positive influence. Only 6.2% reported that the weather had a negative influence on their trip but it is notable that, of these, almost all (92.6%) found the New Zealand weather different to what they had expected.

Survey period, i.e. early or late summer, had a significant influence on how weather affected satisfaction (Figure 19):

- Respondents surveyed in the second survey period were more likely to report that the weather had a positive influence on their satisfaction (58.8% compared with 27.8% in the first survey period).
- 9.8% of those surveyed in the first survey period reported that the weather had a negative influence on their satisfaction, compared to only 3.1% in the second survey period.
- The weather had little or no influence on satisfaction for 62.4% of respondents in the first survey period, compared to 38.2% in the second survey period.

Figure 19
Weather influence on trip satisfaction by survey period (N= 433)*



There were no significant differences in satisfaction according to type of transport used, although those using public transport were less likely to report a positive weather influence and more likely to report either no influence or a negative influence than all other transport types. Those using independent transport (motorbike, bicycle etc) were also slightly less likely to report a positive weather influence, and slightly more likely to report that the weather had little or no influence on satisfaction. Those travelling on tours were slightly less likely, than either car or campervan tourists, to report that the weather had either a positive or negative influence on their satisfaction (i.e. they were more ambivalent about the influence of the weather). A layered Chi-square crosstabulation between transport mode and season, and satisfaction level indicates that campervan and tour group tourists were much more likely to be positively influenced by the weather in the later summer survey period. Also, the proportion of campervan tourists who were negatively influenced by the weather in early summer was relatively high (13%). While these results were statistically significant the test has to be treated with caution due to small cell sizes. The IVS analysis also reported a higher percentage of weather-related disappointment in Quarter 4 (Oct-Dec), compared to Quarter 1 (Jan-Mar) and the months of January and February recorded the second and third lowest proportions of weather-related disappointment¹².

There were no significant differences in how weather influenced satisfaction according to country of residence, although respondents from 'Other Europe', the Netherlands, Switzerland and the UK were slightly more likely to report a positive weather experience; those from the UK were also slightly more likely to report a negative weather experience (the IVS analysis also found that tourists from the UK were the most likely to be disappointed by the weather). The weather had little or no influence on around half of respondents from each of the country of residence groups

¹² The tourists surveyed in the early summer period would have been travelling in New Zealand during Quarter 4 (i.e. during December), whereas the late summer survey period (which included tourists travelling in January and February) corresponds with Quarter 1 from the IVS analysis.

5.3.6 Changes as a result of weather

This section provides the results for the following three questions:

- *Did you make any changes to the length of time you spent in places as a result of the weather? (Question 3.4.)*
- *Did the weather you experienced make you change your route? (Question 3.5.)*
- *Did the weather you experienced make you change your intended activities? (Question 3.5.)*

Overview

These questions were asked in order to understand the influence of the weather on actual trips and activities whilst in New Zealand (whereas *Question 2.5.* asked a similar question, but with regard to planning pre-trip). The responses to all three questions (summarised in Table 28) suggest that activities are most likely to change, followed by length of stay in a particular destination as a result of the weather. The travel route is least likely to change as a result of the weather. For all three, however, most changes were made only occasionally, suggesting that the weather did not have a significant impact on tourists' trips and activities.

Table 28
Changes to trip timing, route and activities as a result of the weather

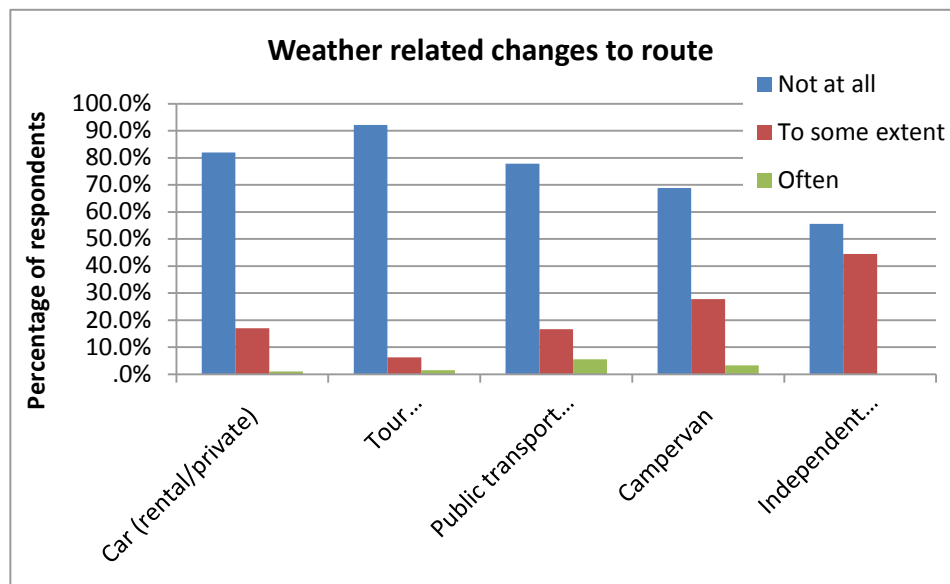
	No change		Occasionally/To some extent		Frequently/ Often	
	Number	%	Number	%	Number	%
Length of time (N= 433)	284	66	125	29	24	5
Route (N= 415)	315	76	89	21	11	3
Activity (N= 324)	156	48	154	48	14	4

The tourists surveyed in the first survey period were more likely to change the length of time they spent in places, their route taken and their activities as a result of the weather (significant at the 10% level for length of time and route and highly significant for activity, $\chi^2 = 13.55$, $df = 1$, $p = .000$). Altogether, 62.3% of respondents reported making changes to activities (either occasionally or frequently) as a result of the weather in the first survey period, compared to only 41.8% who reported making changes to their activities as a result of the weather in the second survey period.

Within transport modes, the group most likely to make changes to trip timing were the independent travellers (50.0% made some changes), followed by campervan tourists (39.1%), car users (34.4%), those using public transport (29.7%) and those on tours (19.4%) (significant at the 10% level). Timing changes made by respondents on tours are likely associated with hop-on hop-off tour services that allow some flexibility (in particular, in respect of the length of time tourists might stay in a particular destination, but also sometimes in respect of the route taken).

Independent travellers and campervan tourists were the most flexible transport groups with respect to route changes (44.4% and 31.1%, respectively, made changes to their routes as a result of the weather). Public transport users (22.3%), car users (18.1%) and tour groups (7.9%) were least likely to make changes (Figure 20).

Figure 20
Weather related changes made to the route by main mode of transport (N= 415)*



*($\chi^2 = 21.86$, $df = 8$, $p = 0.005$)

Activity changes in response to the weather were not significantly related to transport mode, but they were more likely to be made by campervan tourists (57.9% of this group made some changes), followed by those using public transport (53.4%), car users (47.5%) and those on tours (42.8%). Only 25% of independent travellers made changes to activities, most likely because, for this group of tourists, interest lies in the travel journey (e.g. tourists who are cycling around New Zealand) rather than in participating in tourist activities when reaching particular destinations within New Zealand.

Flexibility with respect to time spent, route and activity did not differ significantly between country of residence groups, although there were some observable differences. Australians were the most likely to make changes to timing and activities, while those from Other countries and from the UK were the most likely to make route changes. In the case of activities, respondents from Other countries and the USA/Canada were the most likely to make changes and those from the Netherlands and the UK the least likely to do so.

For each of these questions, respondents were asked to provide examples if they had made any changes. For a significant number of New Zealand attractions, place and activity are synonymous (for example, the “glaciers”, or specific walks in National Parks) and this was reflected in the responses given to these questions; the questions under which examples were recorded varied accordingly. For similar reasons, the three questions were not filled in by all respondents equally, with the activity question, in particular, often missed by respondents. Also, in some cases it was not clear from the way examples were recorded what the impact of the weather had actually been (for example, if a respondent simply wrote “Milford Sound” or “skydive”). Overall, however, the data recorded across the three questions provides insight into the influence of the weather on travel timing, route planning, and activity participation and provides empirical evidence in support of the weather disruptions identified through the archive research (see Section 3.3.2).

Travel timing

As Table 28 showed, one third of respondents (N= 149) reported that the weather had influenced how long they stayed in a particular destination. The most common changes in timing were to leave a place early because of bad weather, or to stay longer because of good weather. In some cases,

respondents waited for the weather to improve in a particular destination, or they cancelled plans to visit based on weather forecasts. Many of the examples given related to specific destinations; Table 29 shows the destinations that were most often reported.

Table 29
Changes to travel timing (and destinations visited) as a result of the weather*

Changes to travel timing (and destinations visited) because of weather	West Coast	Milford Sound	Glaciers	Golden Bay/Abel Tasman NP	Tongariro National Park	Mount Cook	Queenstown
Bad weather – moved on more quickly	10	-	4	3	5	2	-
Good weather – stayed longer	2	1	-	7	-	-	4
Waited for weather to improve	1	7	3	-	2	2	-
Cancelled plans to visit	1	3	1	1	4	1	1
Other (non-specific)	12	15	14	10	6	7	2
Total	26	26	22	21	17	12	7

* The figures presented here only include destinations that were mentioned with regard to travel timing and routes taken or which, in the case of 'Other', were named, but no other detail as to what impact the weather actually had was given. The figures do not include any destination examples that specifically mentioned an activity (for example, "Milford Sound" is included, but not "boat trip Milford Sound").

The West Coast and Milford Sound were mentioned most often with regard to travel timing changes and a notable difference was that 10 respondents moved on more quickly from the West Coast because of bad weather, while seven respondents waited for better weather to visit Milford Sound. Tongariro National Park was also affected by the weather, with five respondents leaving early and four cancelling planned visits. These destinations all featured in the IVS analysis with regard to weather disappointments (see Section 4.3.2). Golden Bay/Abel Tasman and Queenstown had the highest number of longer stays because of good weather (Table 29).

The weather encountered by the survey respondents varied considerably and a number of destinations were mentioned as both a place that respondents moved on from more quickly because of bad weather, and stayed longer in because of good weather. These included: Wanaka, Taupo, Whakatane and Northland. The destinations that only featured as 'bad weather' destinations, and from which respondents moved on more quickly than planned included: Tekapo, Stewart Island, Gisborne, Arthurs Pass, Rotorua, Westport, the Catlins, Kaikoura, Otago Peninsula, Wellington and Napier. In some cases respondents moved on more quickly because of better weather forecasts for their next destination.

The destinations that featured as places respondents stayed longer in because of good weather included: Pahia, Glenorchy, Akaroa and the Marlborough Sounds. Four respondents stayed longer on the West Coast as a result of heavy rain and flooding in the Haast region (and the overnight closure of SH 6). The type of transport used sometimes had an impact on the timing of travel and transport choice (e.g. "rain kept me in one place as I am travelling on foot" and "taking the bus rather than cycling due to wind"). Several respondents reported that they drove instead of flying when the weather forecast was good.

Route changes

Altogether, one hundred respondents reported making route changes as a result of the weather (Table 28), although as most appeared to have their route decided on in advance, these changes were usually only minor. There were some who cancelled their plans to visit particular destinations, usually because of forecast bad weather. In addition to the destinations shown in Table 29, this occurred in respect of Stewart Island, the Catlins, Wanaka, Queenstown, Arthurs Pass, Kaikoura and Ninety-mile Beach.

Others drove past intended stops because of bad weather, or continued driving in the hope of finding better weather, both of which resulted in covering more ground than intended in one day. The weather could also influence which roads were taken (“we didn’t take the desert road”; “drove in central area instead of the coast”). Some respondents also changed the order in which they visited particular destinations, or the direction in which they travelled (“there was much rain west, so went east”; “came down the West Coast first to follow the sun”; “driving around the South Island anti-clockwise”).

Activity changes

As noted above, the synonymous nature of place and activity in New Zealand meant that this question was only answered by 324 respondents (74%). Of those who did answer this question, however, more than half made some changes to their activities, as a result of the weather (Table 28). Activities were also given as examples with regard to planning (*Question 2.5.*) and timing and route changes, and these are included here for those instances where an activity was specifically mentioned. Table 30 presents a summary of those activities most affected by the weather. The first column shows the number of times a particular activity was mentioned, but was not associated with a specific destination; the next columns show those activities mentioned with regard to particular destinations. The activities are grouped according to whether they are land-, water- or air-based.

Table 30
Activities on which weather had some effect*

Activity (total number of times given as an example)	No destination specified	Glaciers	Tongariro Crossing	Abel Tasman	Milford Sound	Other destinations specified
Tramping/hiking/walks (78)	40	8	16	5	-	Arthurs Pass (2) Fiordland (3) Q. Charlotte Track (2) Mt Taranaki (2)
Climbing (2)	2	-	-	-	-	-
Horse trip (1)	1	-	-	-	-	-
Total land-based (81)	43	8	16	5	-	9
Beach/swimming/surfing (20)	17	-	-	2	-	Raglan (1)
Whale Watch Kaikoura (12)	-	-	-	-	-	Kaikoura (12)
Kayaking (11)	3	-	-	5	2	Queenstown (1)
Scenic boat trips (6)	1	-	-	-	5	-
Dolphin swimming (7)	6	-	-	-	-	Akaroa (1)
Sailing (4)	4	-	-	-	-	-

Jet boating (3)	3	-	-	-	-	-
Fishing (3)	3	-	-	-	-	-
Rafting (2)	1	-	-	-	-	Queenstown (1)
Canyoning/water boarding (2)	2	-	-	-	-	-
Total water-based (70)	40	-	-	7	7	16
Scenic flights (16)	7	5	-	-	2	Mt Cook (2)
Sky diving (10)	9	-	-	-	-	Taupo (1)
Paragliding/hang gliding (4)	4	-	-	-	-	-
Heli-hiking (4)	-	4	-	-	-	-
Gondola (2)	-	-	-	-	-	Queenstown (2)
Total air-based (36)	20	9	-	-	2	5

* Many of the examples discussed above (as timing and route changes) may have also included activities, especially in the case of those destinations where the activity and destination are synonymous.

In many cases, no details were given as to how the weather affected particular activities, but the number of times each was mentioned does suggest which activities (and destinations) are the most weather sensitive, in respect of planning and participation. The specific locations mentioned most often, with regard to activities affected by the weather, were the Glaciers, Tongariro, Milford Sound, Abel Tasman, Kaikoura and Queenstown. Again, these match the destinations recorded in the IVS analysis under weather disappointments.

While respondents reported postponing or cancelling both independent and commercially run outdoor activities because of the weather, it is notable that the activities most affected by the weather were those commonly undertaken independently such as, for example, walking/tramping, beach visits and swimming. A number of respondents reported doing more indoor activities when the weather was bad ("museum instead of hiking"; "looking for more inside activities"; "hiking and surfing in better weather, visiting museums when it rained"). The following examples of weather impacts on activities were reported:

- Bad weather (particularly rain) either prevented walks/tramps or shortened these (for example, two respondents reported driving through Arthurs Pass without stopping to do walks because of bad weather)
- Tongariro Crossing (mentioned by 16 respondents) was either cancelled or shortened because of bad weather, some other walks were also cut short
- Rain closed access to the glaciers and heli-hike trips were cancelled because of bad weather
- Many air-based activities were affected by wind (including scenic flights, sky diving and paragliding)
- In two instances, a gondola was closed because of high winds
- Scenic flights were also cancelled because of poor visibility at the Glaciers, Milford Sound and Mt Cook
- Bad weather and cold water affected beach visits and participation in swimming and surfing (for surfing both good weather and good surfing conditions were necessary)
- Cold water and bad weather also affected dolphin swimming
- Bad weather in Kaikoura affected Whale Watch for 12 respondents
- Sailing was cancelled because of rough seas

- Jet boat, canyoning and river kayaking all cancelled because of high water
- Sea kayaking at Milford Sound was cancelled because of heavy rain

A number of activity-related comments described behavioural responses to the weather conditions:

- One respondent chose a lower altitude tramp
- In good weather, respondents were more likely to look for beaches and to spend more time on beaches
- Some respondents were only prepared to do some activities (some walks/tramps, sky diving, scenic boat trips) in good weather (one respondent wrote that, “I may not have gone rafting in the rain if it wasn’t a group schedule”)
- Some respondents waited for good weather to do particular tramps/walks (for example, “we timed some bush walks for the weather, we also walked a lot in the rain”; “scheduled summit trip Mt Taranaki after weather change”)

5.3.7 Post-trip weather reflections

Looking back, what information about New Zealand’s weather would have been useful to have had in advance? (Question 3.6.)

The majority of tourists (N= 289) said there was no other advance information that could have been useful, but 144 respondents recorded a comment about potentially useful information. These were coded according to the themes shown in Table 31.

Table 31
Useful information about the weather (with hindsight)

Theme	Sub-theme	Number of comments
Information about climate/weather		53
	Changeable/unpredictable/variability	15
	Temperature	11
	Rain	8
	Wind	8
	Combination of climate/weather information (rain/wind/temp/changeable)	6
	Cold nights	5
Forecasting & weather information		48
	Type of information available	21
	Quality/accuracy of forecasts	17
	General availability of information	5
	Knowing weather information	5
Weather irrelevant		20
Clothing		10
UV/sun strength		4
Any/all information		4
Timing of travel		3
Activity specific		3
Odd comment		3
Total		148*

* Four people recorded comments that fitted two themes or sub-themes

Altogether, 53 respondents would have liked to have had more information about the climate and weather conditions found in New Zealand. Sub-themes included the changeability and

unpredictability of the weather (both from one day to the next, and between regions) and more detailed temperature information (how cool it could get, the temperature range, and how quickly the temperature could change, cold nights). Other suggestions were for more information on the frequency of rain days and the intensity and strength of the wind (and that it was not only Wellington that is windy).

In the comments recorded by those who wanted forecasting and weather information, the majority were concerned with the type of information available (“most radio reports state rain or fine with no temperature”; “television shows more of the current weather than the forecast”; “how many rainy days a month”) and the quality/accuracy of weather forecasts (“14-day forecast”; “4-day forecast”; “regional weather forecasts a few days in advance”). The other ten respondents wished they had better weather information whilst travelling, or had known where to find it.

Twenty respondents noted that weather was of little importance (“I wasn’t coming for the weather”; “take it as it comes”) or that they had as much weather information as they needed. The remainder of hindsight information suggested included: knowing what clothing to bring; the need for sunscreen; having as much weather information as possible; knowledge of the best weather for the timing of travel; and, activity specific information (particularly for hiking).

Given your experiences with weather in New Zealand, would you recommend or advise against certain activities when you talk about your experiences to friends and fellow travellers? (Question 3.7.)

More than two thirds of respondents (N= 302, 69.3%) would not recommend or pass on any advice to others about activities and the weather but almost a third would do so (N= 118, 27.1%). Sixteen respondents did not answer this question. Those who reported that they would pass on advice were asked what that advice would be and the 110 comments recorded were coded into the seven themes shown in Table 32.

Table 32
Advice that tourists would give to others with respect to weather and activities

Advice (Main themes)	Number of comments
Weather can disrupt activities/impact on destination attractiveness	25
Clothing	21
Activity recommendation	19
Need to check weather/expect variability	18
Allow time for weather to change/take advantage of good weather	12
Timing of trip	11
Sunscreen necessary	4
Total comments recorded	110

The most common activity advice was about how the weather could disrupt activities (“in Kaikoura we missed whale watching due to windy weather”; “sky diving, hang gliding etc could be cancelled due to the weather”) and weather impacts on destination attractiveness (“difficult to have good weather at Milford Sound and West Coast”; “don’t visit Milford Sound if its rainy”). A number of comments referred to the water temperature in New Zealand (“difficult to swim in spring or early summer”; “no water activities”).

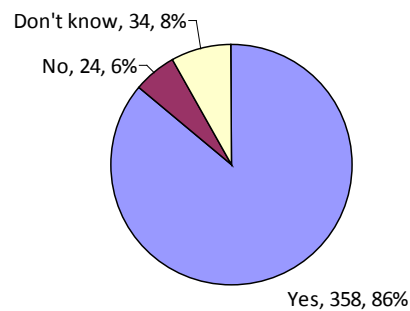
Clothing recommendations included having enough warm clothing, especially for outdoor activities, (“pack warm clothes”; “you need warm clothes for the nights”; “if they go on a boat take a windproof jacket”), and being prepared for both rain and sun (“be prepared, warm clothes, rain jacket,

sunscreen”; “rain gear and sun block”). A further 18 respondents suggested that tourists should “check the weather”; “pray for good weather”; and, “be aware that the weather could change very quickly”. Twelve respondents recommended allowing time for the weather to improve or taking advantage of good weather (“to have enough time to wait for better weather, especially before tramping”; “wait for fine weather before going up to scenic spots”; “weather in Nelson area is great - make use of it”) and 11 respondents suggested advice concerning trip-timing (“January/February for sea stuff”; “travel in Feb/Mar not in Dec/Jan”).

When you get home, will you be telling people you know (friends/family/colleagues) about the New Zealand climate and weather? (Final Question)

As Figure 21 shows, the majority of respondents (86%) said that they would pass on information about the New Zealand climate and weather when they returned home. This compares to just under one third (31.7%) who, when asked where they had got information on New Zealand climate and weather conditions from before their trip (*Question 2.2.*), had been told by other people. Tourists in the first survey period were more likely to pass on climate information compared with tourists from the second period (32.5% compared with 24.2%), although the difference was only significant at the 10% level. The difference is nevertheless important as respondents from the first survey period were also the ones whose satisfaction appeared to be more negatively affected by the weather.

Figure 21
Will you tell people about the New Zealand weather? (N= 416)



The kind of information tourists would pass on was coded according to the three themes and 12 sub-themes shown in Table 33.

Table 33
Weather information passed on by respondents

Theme	Sub-theme	Number of times mentioned*
General weather information	General/overall weather comment	80
	Variation and diversity of weather	68
	Changeability and unpredictability	50
	Clothing/being prepared	40
Specific weather characteristics	Rain	65
	Temperature	62
	Sunshine	38
	Wind	23
Subjective weather judgements	Nice/lovely/beautiful weather	52
	Better than expected	12
	Lucky with the weather	12
	Worse than expected	8

*Some examples were coded under more than one theme

General weather information

Altogether, 80 respondents noted that they would pass on a general comment about the weather they had encountered whilst in New Zealand. This category included comments about the weather being good “overall” throughout their trip and although the weather might not have been perfect, it was “comfortable for travel”. Also, a number of respondents noted that the New Zealand summer they had just experienced was worse than the norm (“colder than usual, but that didn’t affect our plans overall”). Others commented that the weather was not important (“so much to see and do despite the weather”; “don’t let the weather stop you going to New Zealand”).

Others compared the New Zealand summer weather to that of their own country (“it’s almost the same climate like in Switzerland”; “similar to what we get in the UK”) or commented that they were enjoying missing the current weather in their own country (“I can’t really complain, it’s winter in Canada now and it’s really cold”; “that it is fantastic to spend the European winter in New Zealand”). The New Zealand weather was also compared to that encountered in Australia and was enjoyed by Australian tourists (“it was cold, but coming from Queensland this wasn’t a problem”; “I missed out on the heat waves in Australia, loved it”).

The second largest category of comments described some of the unusual characteristics of New Zealand weather. These included:

- Weather extremes and variation (“very extreme sometimes – rain-sunshine, hard wind-quiet”; “how diverse it is between the coast, plains, hills”);
- Regional variations (“it’s rather a small country with very varied regions/plants/climate”; “don’t be disappointed if it rains, especially in Milford Sound and the West Coast”; “delightful changes in the weather causing unusual tree formations”; “how dry it was east of the Alps”);
- Temporal variations (“not a bad place in December”; “maybe better another time of the year”; “December/January is actually spring/summer – not fully summer yet”; “nice weather in January/February”);
- The ways in which these weather characteristics helped to create and shape the natural environments in New Zealand (“not to worry about the wind, rain or cold as this helps make the South Island lush, green and beautiful”; “the weather creates the environment which we visit for”).

Altogether, there were 50 comments made about the changeability of New Zealand weather and experiencing “four seasons in one day”. For some respondents this added novelty to their holiday experiences: “a day in New Zealand can be four seasons – fickle”; “come here and you will have all of the weather in one day – nice”; “careful with weather forecasts, fast changes”; “tell them to prepare for all weather as it changes hourly”; “sun, rain, wind, storm... wonderful!” Some would give advice on how to deal with such changeability: “it’s good to be spontaneous, because the weather can change very fast” while one respondent noted that “short holidays are not useful, as one sometimes has to wait for better weather”.

Associated with this changeability was the unpredictability of New Zealand weather and, again, this was often compared to what tourists were used to at home: “it’s just like home – you can’t predict” and “we had some excellent weather, but like Tasmania it changes quickly”. ‘Being prepared’ was usually linked to having adequate clothing and, in some cases, enough protection against the strong New Zealand sun. Many of the comments mirrored those already reported in Table 32.

Specific weather characteristics

As well as these general categories of comments many respondents reported that they would tell people at home about specific characteristics of the New Zealand weather:

- Rain (mentioned by 65 respondents) comments were usually about how much rain they had encountered, although only eight respondents mentioned the high rainfall in south and west of New Zealand (while three mentioned high rainfall in the North Island). For some, heavy rain on the West Coast appeared to be a novelty as they were planning to tell people about “our experiences with heavy rain on the West Coast”. Some respondents noted that they had had little rain during their trip and that, even when it did rain, it usually did not last long.
- Temperature (62 respondents) comments were commonly about the variations in temperature (during the course of a day, and between regions) and about cold nights and cold winds. Positive temperature comments usually referred to it being a comfortable temperature for travel.
- Sunshine (38 respondents) was usually noted for the ‘amount’ of sunshine and the ‘strength’ of the sun, despite temperatures often being lower than expected (“they have a cooler summer than us, but the sun is very, very strong”; “that the north east of South Island is very sunny and that everyone gets burnt”).
- Wind (23 respondents) was most often mentioned with regard to adequate clothing (“cold wind, bring suitable clothing”) and its strength (“how strong the wind can be”).

Subjective weather judgements

The final theme included subjective weather judgements and altogether 52 respondents reported that they would tell people that the weather in New Zealand had been ‘nice/lovely/beautiful’ during their trip. Eight respondents reported that they would tell people it was ‘worse than they expected’ and 12 that it had been ‘better than expected’. Two respondents in this last group also used the term ‘lucky’ with regard to the weather, (“better than expected – we might have been lucky”). ‘Luck’ was also mentioned by ten other respondents and was usually associated with sunshine (“we were very lucky to have sun every day”; “we were lucky with 80% sun during our vacation”).

5.3.8 Tourism businesses’ response to weather conditions

Did you feel that tourism businesses in New Zealand dealt adequately with the actual and expected weather conditions? (Question 3.8.)

Most respondents (65.4%) thought that tourism businesses dealt adequately with weather conditions, 20 respondents (4.6%) did not think they did and 116 (26.6%) did not know. Fifteen respondents did not answer this question.

Those who thought tourism businesses did not deal adequately with actual and expected weather conditions were asked to explain why not, and six respondents recorded a comment. Three of these comments referred to inaccurate weather forecasts and three respondents thought that tourism operators did not provide either enough weather information or accurate weather information.

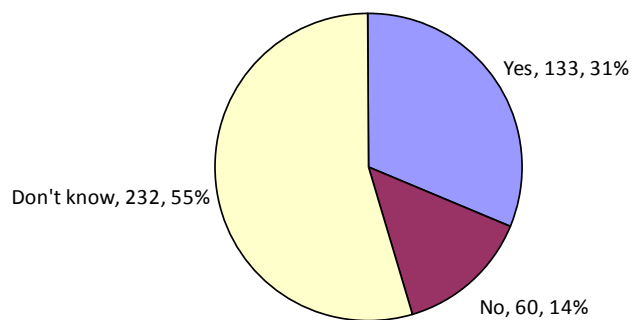
The following other comments were made about tourism businesses: “very safety conscious”; “it’s an outdoor activity – you take the risk”; “cancelling in case of weather”; and, “companies were well prepared for the cold”. One tourist noted that “most come to New Zealand for the nature” (rather than the weather) and another one noted that “pictures [of New Zealand] show nice weather”.

5.3.9 Climate Change

Do you think New Zealand weather patterns are likely to change in the future? (Question 4.1.)

Almost a third of respondents (31%, N= 133) who answered this question thought that New Zealand weather patterns were likely to change in the future, 14% (N= 60) thought they would not change, while more than a half of respondents (55%, N= 232) did not know if it would change (Figure 22). Eleven respondents did not answer this question.

Figure 22
Change in New Zealand weather patterns (N= 425)



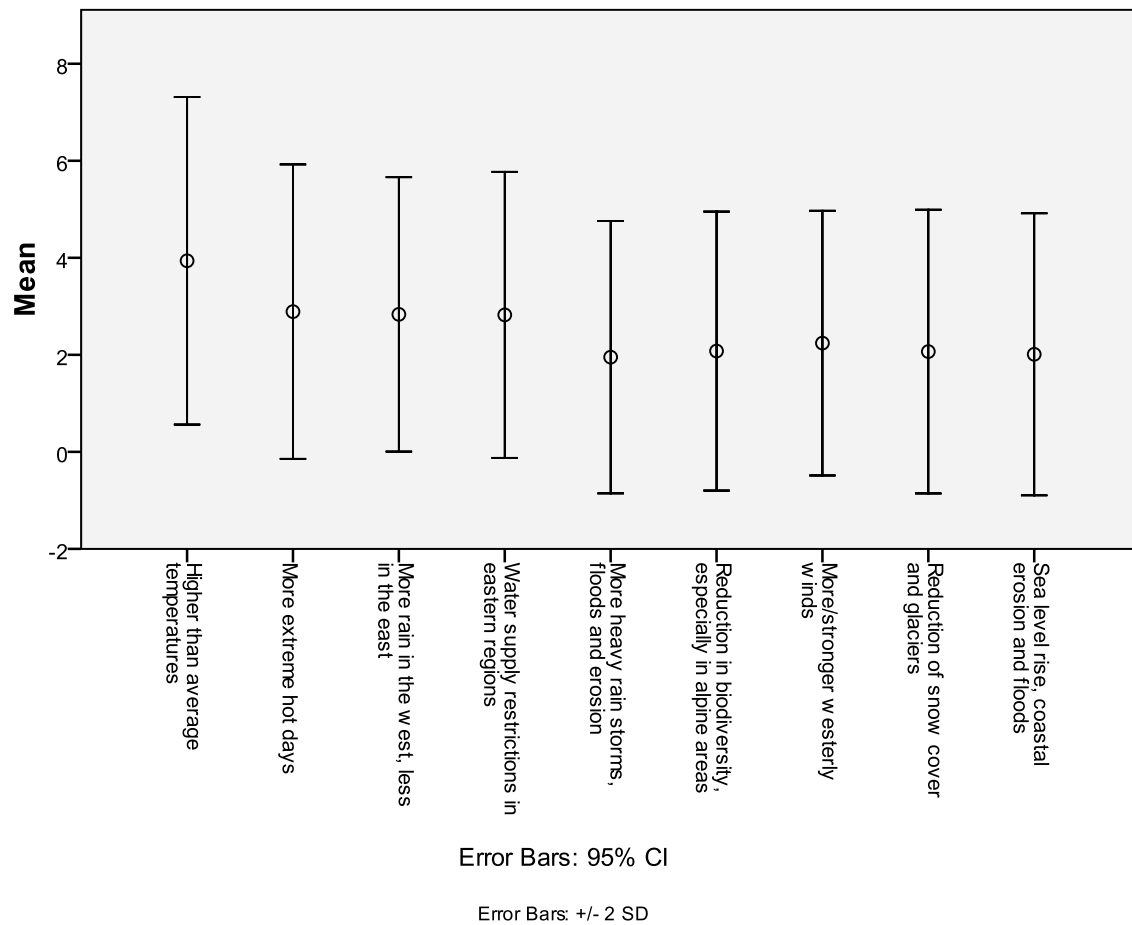
Respondents from Switzerland and Asia were most likely to answer ‘yes’ (44% from each country of residence group), and those from the Netherlands were the least likely to answer ‘yes’ (only 13%). Those from ‘Other’ countries were the most likely to answer ‘no’ (27%), and respondents from Australia the least likely to answer ‘no’ (10%). Seventy-five percent of respondents from the Netherlands ‘did not know,’ compared to only 36% from Asia.

By age, younger respondents were more likely to answer ‘yes’ (44% of those aged 18-25 years compared to 22% of those aged over 56 years) and least likely to answer ‘no’ (only 6% of 18-25 year olds compared to 40% of those aged over 70).

Respondents were provided with a list of nine possible weather and climate-related changes in New Zealand and asked to rate (on a scale of 1-7) how desirable each was for tourists in New Zealand. (Question 4.2.)

A score of ‘7’ indicated that the change was desirable; a score of ‘1’ was not at all desirable. Figure 23 shows the list of changes with the mean scores and standard deviations for each possible change. The number of respondents who recorded a score for each change varied.

Figure 23
Mean scores for possible weather and climate-related changes in New Zealand



Note: Not all tourists responded to each item, the lowest response was N= 387 for biodiversity and the highest was N= 398 for hot days)

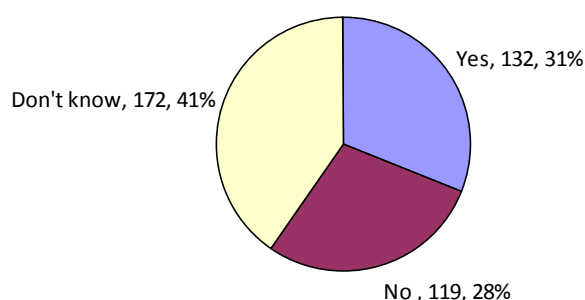
As might be expected, higher temperatures and more hot days were the most desirable of the possible changes, although neither scored positively (i.e. had a mean score of 4 or higher). The least desirable were weather and climate-related changes that were clearly related to adverse current weather events that tourists might have experienced.

There is a strong possibility that many tourists do not understand the implications of many of these changes i.e. they do not realise what impact many climate changes will have on the weather and, consequently, on the New Zealand tourist experience.

Do you believe climate change is, or will be, a significant issue for tourism in New Zealand? (Question 4.3.)

Altogether, roughly one third of respondents thought that climate change would be an issue; another third thought that it would not be an issue, while the remainder did not know (Figure 24). Thirteen respondents did not answer this question.

Figure 24
Climate change an issue for tourism in New Zealand (N= 423)



There was a statistically significant relationship between belief in likelihood of the weather patterns changing and thinking that climate change would be an issue for tourism ($\chi^2 = 69.55$, $df = 4$, $p < 0.001$). There was general agreement between the answers given to these questions for approximately half of respondents, i.e. 50.8% of those who thought the climate will change also thought it would be an issue for tourism, 60% of those who thought it wouldn't change also thought it wouldn't be an issue, while 53.3% of those who didn't know if it would change, also didn't know if it would be an issue. Of those who thought New Zealand weather patterns would change, 22.7% thought climate change would not be an issue for tourism, whereas only 15% thought there would be no change in weather patterns, but did think that climate change would be an issue for tourism. In the 'don't know' weather pattern change group roughly similar percentages thought climate change would be an issue (24.5%) and not an issue (22.3%) for New Zealand. Overall these responses suggest that the implications of climate change for tourism in New Zealand are not well understood by tourists.

Those who answered yes to this question were asked what they thought the most important issue would be. Altogether, 114 respondents provided examples (this included 15¹³ respondents who answered either "no" or "don't know" to the question) and the majority of these were coded into six main themes (Table 34).

Altogether, 28 respondents gave an example that was directly relevant to tourism in New Zealand, although opinions varied as to what the impacts of climate change might be. One respondent, for example, noted that it "depends on how the weather changes – but the scenery will be the same", another that "New Zealand was unique because of its weather" while several others noted that the reasons people visit might change with changes in the weather, particularly "because New Zealand has a lot of tourist places that could be affected by climate". A number of respondents noted that tourists come to New Zealand for nature experiences (rather than the weather); others thought that managing unpredictability and safety in respect of nature-based activities might become an issue. Six respondents thought there could be fewer tourists as a result of climate change and two suggested that the "main season might start later" and that there might be a "change of pattern". A further 14 respondents suggested that climate change will impact on natural environments of New Zealand. These included a reduction in biodiversity and wildlife, deterioration or modifications to natural landscapes and changes in national parks.

13 The 15 respondents who gave examples, despite answering "no" or "don't know" to this question thought that climate change was not an issue in the "short term" or the "near future" (either globally or for New Zealand) and that, for New Zealand, the issues were the "same as everywhere else". One respondent wrote that "I don't believe in climate change" and another that they "don't know [for New Zealand], but that it will be a problem for the whole world".

Table 34
Climate change issues for tourism in New Zealand

Theme	Number*
Impact on tourism in New Zealand	28
Extreme weather/change in weather characteristics	27
Reduction of snow cover/glaciers	19
Global warming/hotter temperatures	15
Sea level rise/coastal erosion	14
Environmental changes (wildlife, biodiversity, landscape)	14

*Some examples were coded under more than one theme. Of the examples given that were not coded under the six main themes, four respondents noted the strength of the sun and the dangers associated with the ozone layer in New Zealand.

Overall, the examples given were a mixture of global climate change issues (which are popularly known) and more specific issues relating to the New Zealand weather and climate. Four of the themes addressed global climate change such as global warming (mentioned by 15 respondents); sea level rise (14 respondents); reduction of snow cover/glaciers (19 respondents); and extreme weather events (27 respondents). While many of the examples given were generic (for example, “global warming”, “sea level rise”, “more extreme weather”, “less snowfall”) some respondents did specifically mention the possible changes in New Zealand weather and climate that were suggested in *Question 4.2.*, and others gave New Zealand specific examples (e.g. 13 of the 19 snow reduction examples specifically referred to “glacier melting”).

Were you aware of any actions taken in New Zealand to reduce and/or cope with climate change? (Question 4.4.)

Of the 418 respondents who answered this question, slightly more than one fifth (N= 91, 22%) were aware of actions taken in New Zealand to reduce and/or cope with climate change and four fifths were not (N= 327, 78%). Those who were aware of climate change actions were asked to provide an example, and the examples given, along with the number who mentioned each, are summarised in Table 35.

Table 35
Climate change actions noticed by respondents

Climate change action	Number*
Recycling	28
Environmentally aware/conservation activities/green	16
Water restrictions/save water	12
Saving power/non-nuclear	11
Planting trees	6
Information on signs/at accommodation (not specified what)	6
Copenhagen climate conference	3
Reduced driving/fuel use	3
Reduce plastic bag use	2
Eco tourism	2
Fire ban/fire risks	2
Greenpeace campaigners on street	1
Earth Hour	1
Carbon credits	1
Kyoto Protocol	1
350ppm campaign	1
Reducing CO2 emissions from sheep	1

*Some respondents gave more than one example

5.4 Discussion

This survey explored tourists' perceptions and experiences of New Zealand weather during the summer season. Although weather does not appear to be a particularly strong factor in the choice of New Zealand as a holiday destination, the decision by these tourists to travel in summer does indicate that the weather plays some part in the timing of New Zealand holidays, particularly for tourists from the northern hemisphere. Climate and weather information are of importance to tourists at three stages of their travel: pre-trip, when climate information informs destination and activity planning, as well as the selection of appropriate clothing; during trip, when weather information helps determine day-to-day activities and influences participation and enjoyment of these; and, post-trip, when climate and weather information features in personal holiday stories and in travel advice about New Zealand passed on to others.

The majority of tourists had some idea of what the New Zealand climate was like before coming to New Zealand with only 6% of respondents reporting that they did not collect any climate and weather information in advance. For those who did collect weather information, the most common variables were temperature, followed by rainfall and sunshine hours. Despite this, however, almost 60% of the tourists surveyed found the weather different to expected. A significant relationship between length of stay and finding the weather different to expected was found (with long stay tourists more likely to find the weather different to expected). Tourists from Germany, the USA/Canada and the UK were slightly more likely to find the weather different to expected. The likelihood of finding the weather different also decreased as the number of previous visits increased.

While travelling in New Zealand a quarter of tourists looked for weather information on a regular basis and half looked for weather information on an occasional basis. The most popular sources of weather information were the internet, newspapers, television, i-SITEs and accommodation providers.

Half of the tourists surveyed reported that the weather affected their satisfaction (the majority of these reporting a positive impact). Altogether, just over half of respondents reported changing activities, one third changed the length of time they stayed in destinations and a quarter altered their travel route because of the weather. A number of key tourist destinations featured in terms of these weather-related disruptions.

When asked what weather information, with hindsight, might have been useful to have, the responses highlighted a number of deficiencies in the climate and weather information currently available to tourists. Temperature averages, for example, do not convey the temperature range, the speed at which temperature can change, or how cold the nights can get. Likewise, the number of rain days tourists could expect was thought to be more useful than rainfall averages. For many respondents, the quality and accuracy of weather forecasts were also an issue. Of particular note, however, were the changeability, unpredictability and variability of New Zealand weather; all of which were unexpected. Tourists are likely to pass on information about the weather, especially its variability.

In addition to exploring the general role of weather three hypotheses were tested:

- H1. There would be some differences in the weather encountered and in tourists' responses to this, according to whether they were visiting early or later in the summer season;
- H2. Tourists' responses to the weather they encounter within New Zealand would vary depending on the mode of transport they use to travel;
- H3. Expectations and perceptions of the weather would vary according to tourists' country of residence.

Weather expectations and experiences by survey period

As hypothesised, there were some differences in respondents' experiences of the weather by survey period with those visiting in the early summer more negatively affected by the weather. Statistically significant relationships were found between survey period and:

- Experiencing worse weather than expected (more respondents in the first survey period);
- Likelihood of reporting a positive weather experience (lower in the first survey period);
- Likelihood of reporting a negative weather experience (higher in first survey period);
- Likelihood of reporting a neutral weather experience (higher in first survey period);
- Changing the length of time spent in places, routes taken and activities (all more likely for tourists surveyed early summer).

A number of other (non-significant) findings also suggest some variations in weather behaviours and experiences by survey period. Early summer visitors, for example, were slightly more likely to get weather information whilst travelling and were more likely to pass on information to others about the weather; and conversely, more late summer tourists were 'told by others' about New Zealand weather pre-trip. Also, late summer tourists were more likely to report that the weather influenced the timing of their trip to New Zealand. There was slightly more interest in pre-trip temperature information in the first survey period, and more interest in all other types of weather information in the second period. Those travelling in early summer were also slightly more likely to get weather information whilst travelling. The impacts of the weather in both survey periods may have been magnified by the bad summer overall (a number of tourists were aware of this).

Weather expectations and experiences by transport mode

The sampling methods used (e.g. sampling at KEA Campers) were designed to include a significant number of tourists with a high degree of independence (i.e. not restricted by fixed timetables, routes and activities). The transport mode used by tourists reflects their degree of independence and flexibility to change and adapt their travel plans according to the weather they encountered. Overall, campervan and car tourists, along with those travelling 'independently' (by motorbike, hitchhiking and bicycle) have the highest degree of flexibility. The flexibility of tourists travelling by public transport may be constrained by the availability of transport services and tickets. While tourists travelling on tours are normally restricted both spatially and temporally, those on the hop-on hop-off services do have some freedom in both the routes they take and the length of time they spend in particular locations.

It was hypothesised that tourists' responses to the weather they encounter within New Zealand would vary depending on their preferred mode of transport. Statistically significant relationships were found between mode of transport and:

- Pre-trip weather information (with campervan and car tourists less likely to visit without any pre-trip weather information and independent tourist much more likely to do so);
- Source of pre-trip weather information (with those using either public transport or travelling independently less likely to have used the Internet);
- Type of weather information sought (with, once again, those using either public transport or travelling independently seeking different information to that sought by other types of transport users);
- Changing the length of time spent in places and the routes taken as a result of the weather (with independent and campervan tourist most likely to make changes and those on tours least likely to).

A number of other (non-significant) findings also suggest further variations. Those using public transport and 'independent' transport modes were slightly more likely to find the weather different to what they expected and those on tours slightly less likely to do so. Tourists travelling by campervan and independently were slightly more likely to report that the weather influenced the timing of their trips to New Zealand. Those using public transport were slightly more likely to report weather as a negative influence on their satisfaction while those travelling on tours and those travelling 'independently' were more ambivalent about the weather than those using other transport modes. There were also some differences in the likelihood of making activity changes, in response to the weather, with campervan tourists and those using public transport the most likely to do so and those travelling 'independently' least likely to do so.

Weather expectations and experiences by nationality

The sample of tourists surveyed came from 36 countries. There were some differences in the travel characteristics according to nationality. Overall, there was a high percentage of repeat visitors with more than a third of the Australian, Asian, Other countries, German, UK and Dutch tourists having been at least once before. Asian and Australia tourists were more likely to be short stay visitors, Germans, Dutch and other Europe most likely to be medium stay visitors and tourists from Switzerland and Other countries were more likely to be long stay visitors. There were also some variations in the type of transport used according to country of residence.

It was hypothesised that expectations and perceptions of the weather would vary according to tourists' country of residence. In respect of weather variables, statistically significant relationships were found between country of residence and:

- Pre-trip information (with German tourists, and those from other European markets more likely to get this information from guidebooks);
- Type of weather information data collected (with Germans most likely to collect information on all weather variables and tourists from the UK the least likely to collect temperature information, Australians the least likely to collect sunshine hours and those from the USA/Canada the least likely to collect information on wind).

A number of other (non-significant) findings suggest other variations according to tourists' country of residence. Germans and tourists from the USA/Canada and the UK were more likely to find the weather different to expected and Asians, those from the Netherlands and from Other countries less likely to do so. Also, Europeans were more likely to be influenced by the weather in respect of the overall timing of their trip to New Zealand than were Australian, North American and Asian tourists. The regular collection of weather information whilst travelling in New Zealand, however, was more common for Australian, Asian and those from Other countries while tourists from the Netherlands, Australia, and the UK were the least likely to get weather information whilst travelling in New Zealand. Tourists from Other Europe, the Netherlands, Switzerland and the UK were slightly more likely to report positive weather experiences, although the latter were also more likely to report a negative one. Australians were the most likely to make weather-related changes to timing and activities, while those from Other countries and the UK were the most likely to make route changes and the least likely to make activity changes.

Climate change

While the main focus in the survey was on exploring the impacts of the weather on tourists in New Zealand, a final section of the survey examined tourists' understanding of, and attitudes towards, projected climate changes in relation to the New Zealand tourist experience. Overall, respondents appeared to have limited understanding of the implications of climate change in New Zealand. When given examples of potential climate change-related weather changes, and asked to rate their importance, most did not consider that weather changes would impact on the tourist experience. When asked specifically what they thought the implications of climate change would be for tourism

in New Zealand many of the examples given described broader global climate changes (global warming, sea level rise, and so on) and two thirds of respondents either did not think that these would be an issue for tourism in New Zealand, or stated that they did not know if they would be an issue. Only a fifth of the tourists surveyed reported noticing any climate change actions whilst travelling in New Zealand. Most of the actions reported were broader and more generic environmentally friendly behaviours such as recycling, conservation activities, water and power conservation, rather than climate specific measures.

5.5 Conclusion

The survey presents empirical data describing the impact of the weather on international tourists visiting New Zealand during the main summer tourist season. The results show that while experiences of New Zealand weather are mostly perceived as positive, the weather does present some specific negative experiences. Negative weather experiences and disappointments are generally related to the cancellation of activities or forced changes to destinations visited. Some of the most iconic attractions/destinations in New Zealand (e.g. Mt Cook, Milford Sound, the Glaciers, Whale Watch) are the most weather affected and generate the most disappointment.

The survey data suggests that there is considerable scope to improve the weather information available to tourists, particularly prior to their arrival in New Zealand and that a more nuanced approach to portraying and marketing destinations in terms of their weather conditions could actually increase tourists' reported levels of satisfaction (or rather, reduce the number who are not satisfied).

The specific hypotheses tested indicate some variations in experiences of weather whilst in New Zealand according whether tourists visit occurs in early or late summer, the type of transport used and the tourists' country of residence.

The survey also found that climate change per se does not feature on most tourists' radar screens. It must be noted, however, that tourists do not experience climate change, but only a snapshot of weather and climate conditions (which could be changing over time).

The next chapter integrates the key findings from each of the three individual research projects and examines these findings in respect of the wider project of which this research is part.

Chapter 6

Integrative Discussion

This research forms part of a larger climate change and tourism project. The focus here has been on the demand side of the tourism and weather interactions, with a particular focus on the impacts of the weather on the experiences of international visitors to New Zealand. The three research projects provide considerable insight into: the ways in which the weather impacts on tourists and tourism businesses (the archive research); influences their satisfaction (the IVS analysis); and, tourists' expectations and experiences of New Zealand weather (the survey). The main findings are discussed below according to four key themes.

The findings reported here have important implications for understanding the vulnerability of tourism in New Zealand to climate variability and change, and offers insights into measures that could increase the resilience of the tourism industry. As a reflection of this, the concluding section of the report integrates the research findings with the overall objectives of this climate change and tourism project, in part to give concrete recommendations, but also in part to set up a research agenda for the ongoing project.

6.1 Tourists and the weather – key themes

Together, the three research projects contribute to a greater understanding of the interface between weather, climate and tourism in New Zealand. Four major themes emerged and are discussed in more detail below. These are: i) The importance of weather for tourists and tourism; ii) Information about the climate/weather; iii) Variable impacts and adaptability depending on types of tourists; and, iv) Climate Change.

6.1.1 Importance of climate and weather for tourists in New Zealand

Together, these research results indicate that although the weather is not a key driver of international tourism to New Zealand the weather can, and does, have some significant impacts on tourists' ability to undertake selected activities as well as affecting their satisfaction. However, the fact that the weather only featured to a limited extent in satisfaction-related questions in the IVS analysis indicates that overall tourists are coping well with any adverse weather conditions they may encounter and that their holiday experience is not greatly affected as a result of the weather.

The literature review highlighted a number of ways in which climate/weather and tourism interact (e.g. Scott & Lemieux, 2009). Of particular note is the impact of the weather on participation in outdoor recreation activities, with a strong research focus on the identification of the most favourable climatic conditions for different activities. The literature review, the archive analysis and the two empirical studies reported here all showed that some activities and destinations are more weather constrained than others. Weather impacts on participation in particular activities may be further determined by any number of specific weather variables which facilitate or constrain those activities. Studies have shown that unfavourable weather conditions have implications for tourists' safety (e.g. Bentley & Page, 2008) – and this was confirmed through the archive analysis for the New Zealand situation. The analyses presented in this report suggest that the weather impacts on all aspects of tourists' experiences, including accommodation services and infrastructure. All types of land, sea and air transport can be disrupted and affected by weather events.

The dominant climatic factors impacting on tourism relate to wet and windy weather. All three projects presented in this report highlight how heavy or persistent rain and strong wind affect tourism operations, tourists' enjoyment and participation, and safety. Specific destinations, such as

Fiordland and the West Coast, were particularly mentioned in this context. Heavy rain also leads to flooding and landslips, which can constrain access to tourist attractions or interrupt tourist itineraries. Wider transportation issues due to wind or poor visibility were reported as well. The frequency of such unfavourable events is higher in winter and tourists in the IVS reported greater disappointments for visits in the winter months. While most tourism in New Zealand takes place in summer (when the likelihood of disruptive weather is lower) the newspaper reports analysed in Chapter 3 suggest that there is always potential for 'less than perfect' summer weather and that the weather can, and does, disrupt both domestic holidaymakers and international tourists in numerous destinations and regions. The survey reported in Chapter 5 showed that, for international tourists, a number of iconic destinations and activities are particularly vulnerable to weather disruption.

The more settled weather in late summer (e.g. February) appears to have a positive effect on tourist participation and satisfaction. The three different analyses all highlight the importance of sunny and warm weather for tourism, confirming findings from the international literature (Gómez Martín, 2005). Destinations receive greater visitation and tourist activities can go ahead as planned. Also, favourable weather conditions are likely to be reported as tourist highlights. The reaction of tourists to the weather they encounter is based partly on their expectations and many tourists are pleasantly surprised about the New Zealand climate. However, some features of New Zealand weather, such as for example, its changeability, may be perceived by some tourists as a highlight of their trip, while for others it impacts negatively on their experience.

A large number of the media articles analysed focused on the negative impacts of the weather. Negative media coverage has long been a concern of tourism marketers (Castelltort & Mäder, 2009). This may simply be a result of the tendency in all media to report 'bad' news rather than 'good' news, as disaster related news have greater public appeal (Pasquare & Pozzetti, 2007). Using emotional language (Choi & Lin, 2008), many articles would amongst others report on tourist accidents, vulnerabilities and financial impacts. At a destination or regional scale, attention shifts to the ability of a particular tourist destination to attract and to hold visitors, despite inclement weather conditions. In this respect it is important to offer alternative indoor attractions, although outdoor attractions remain the mainstay of both international and domestic tourism in New Zealand.

In addition to unfavourable weather getting more media space there was also more emphasis on unfavourable weather in both the IVS 'weather' comments, and in the survey findings. This may be a function of recall (i.e. negative weather events may be more recalled than positive ones). The resilience of tourists in the face of adverse weather is also of note. The survey findings confirmed reports of tourist resilience in the face of adverse weather which often appear in the media. The survey data, however, showed that tourists make numerous adjustments to their routes, schedules and activities in order to accommodate the weather they encounter during their travel in New Zealand. They also adapt through wearing appropriate clothing. These findings suggest that tourists are more proactive in weather adaptation than the media reports suggest. Media reports, for example, tend to simply put a positive spin on the effects of adverse weather (e.g., by reporting that tourists are happy, or that particular destinations are still able to attract, hold and entertain tourists "despite the weather").

6.1.2 Information about climate and weather

The survey collected some interesting data about the use of weather information by international summer tourists in New Zealand. Three stages of travel were considered: pre-trip climate/weather information, during trip information and post-trip information sharing. Tourists reported to be frequent users of climate/weather information, although there is some indication that the information currently available does not meet fully what tourists would consider as useful.

Most tourists to New Zealand obtain some weather or climate information before arrival. Only 6% of respondents reported that they did not collect any such information. For those who did collect weather information, the most common variables were temperature, followed by rainfall and sunshine hours. These results are in line with a study on German tourists that found that 73% of interviewed had acquired information on the climate of their holiday destinations, usually on more than one aspect, but most often temperature (Hamilton & Lau, 2005). Despite acquiring some information, almost 60% of the tourists surveyed in New Zealand found the weather different to expected. A significant relationship between length of stay and finding the weather different to expected was found (with long stay tourists finding the weather different more often). As might be expected, however, the likelihood of finding the weather different to expected decreased with higher levels of repeat visitation.

While travelling in New Zealand a quarter of tourists looked for weather information on a regular basis and half looked for weather information on an occasional basis. For many respondents, the quality and accuracy of weather forecasts were an issue. The archive analysis also highlighted problems with the accuracy of weather information and weather forecasts broadcast by the television and newspaper media, albeit from the perspective of the challenges presented for Regional Tourism Organisations (RTOs) and other organisations responsible for marketing particular regions (for detailed analysis of this see, Wilson & Becken, forthcoming). Unfavourable weather is often anything that departs from a perceived norm, regardless of whether it is actually any different from the real norm. This raises questions as to what extent educating tourists about the type of weather they can expect to encounter can contribute to a positive tourism experience, and to what extent there is a conflict with standard marketing approaches that always portray destinations in sunshine with blue skies.

When asked what weather information, with hindsight, might have been useful to have, the responses highlighted a number of deficiencies in the weather information currently available (see also de Freitas, 2005). Temperatures, for example, are usually provided as averages, which do not convey the range, the speed at which temperature can change, and the differences between day and night temperatures. Likewise, the number of rain days tourists could expect was thought to be more useful than rainfall averages. Of particular note, however, were the changeability, unpredictability and variability of the New Zealand weather; all of which were unexpected.

The survey findings suggest that the quality of climate and weather data available information could be improved, with particular emphasis on providing tourists with greater understanding of the New Zealand climate overall. One way this could be done appears to be through the presentation of comparative data i.e. information for tourists which specifically outlines the differences between the type of climate and weather patterns they are familiar with and those they can expect to encounter in New Zealand.

Tourists are likely to pass on information about the weather. Word-of-mouth is a powerful source of information for future tourists and there may be opportunities to influence what people say by carefully managing their experience in New Zealand. Most tourists would make recommendations with respect to clothing and specific activities. These were also found in the 'recommendation' analysis of the IVS data. It was of note, however, that even though a high number of the tourists surveyed reported being given weather information by others pre-trip, more than half of these tourists also sought weather information from other sources. The most popular source of weather information both pre-trip and whilst travelling in New Zealand was the internet and further research is needed to identify the most common sources of weather information tourists look for on the internet (i.e. weather specific websites, travel guides, traveller blogs, social media sites). Also, of interest are the tools used, and the context and frequency with which tourists access weather

information (e.g. during general information searching, via web applications downloaded on mobile devices, and so on).

The archive analysis featured numerous articles addressing weather information issues. Of particular note, is the perception (by tourism operators and in the tourism industry) that accurate weather forecasting is of vital importance for regions and destinations wishing to attract domestic tourists and, conversely, that poor forecasting (and negative media reports) may have a significant impact on visitor numbers. This is an area that needs further research.

6.1.3 Variable impacts and adaptability depending on types of tourists

The weather was found to play an important role in tourists' holidays, even though it is not the main reason why international tourists travel to New Zealand. Weather impacts on timing, activities and to a lesser extent on travel routes. Some iconic tourist destinations within New Zealand are particularly weather-affected. Both the IVS analysis and the survey showed that tourists travelling later summer in the summer were more satisfied with the weather they encountered. The IVS analysis also showed that holiday visitors were more likely to report weather-disappointments than were other visitor groups (e.g. VFR, education, business visitors) and that within this holiday subset of visitors those with more flexible itineraries (e.g. FIT & SIT travellers) were less likely to experience weather cancellations and transport problems than were those on pre-booked packages or tours.

The survey explored the impact of the weather on holiday visitors in greater detail and confirmed this finding. There were also differences in behaviour relating to weather for different kinds of transport modes. This is not surprising given the very different nature of tourist types based on their main choice of transport (Becken et al., 2003). Those travelling in campervans and rental cars are by nature more flexible in their every-day decisions than those with tight itineraries and prebooked accommodation (e.g. tour group visitors). Accordingly, campervan and car tourists were more likely to inform themselves about the climate before the trip and they also showed greater flexibility with respect to timing and routing of their trip. Some minor differences in terms of weather behaviour were found according to country of origin, possibly reflecting different cultural backgrounds, a tendency towards certain travel styles and climatic conditions in tourists' home countries (Maddison, 2001).

Although there were some differences found in weather impacts and experiences by types of tourists, overall these differences were limited and suggest that impacts of the weather are similar for all types of international tourists in New Zealand. In contrast, seasonality appears to have a significant influence on how much the weather impacts on tourists in New Zealand and influences tourists' satisfaction and the likelihood of passing on positive word-of-mouth recommendations. As might be expected these impacts were stronger (and more negative) during the winter season (which was only included in the IVS analysis). The survey results, however, also show some significant differences between early and later summer tourist experiences with regard to weather experiences and impacts which may have implications in respect of the viability of extending the peak international tourist season beyond what is currently popular.

There are differences in weather impacts between international and domestic tourists. While not specifically tested in this research, the archive analysis indicates that domestic tourists might be better informed and prepared for the New Zealand weather conditions compared with international tourists. Also, for domestic tourists, poor weather forecasts both leading up to and during the main holiday seasons, along with weather conditions experienced in previous seasons, appear to have significant impacts on their likelihood of visiting particular destinations and regions. This is especially the case with regard to camping holidays: a report on camping by the Department of Conservation found that the weather was the most negative aspect of camping, followed by crowded

campgrounds and insects/bugs (DOC, 2006). Domestic tourists are more likely to holiday in a single destination which may limit their flexibility to change plans that are disrupted by the weather. Further research is needed to assess the impact of the weather on domestic tourists in New Zealand.

In contrast, international tourists are more likely to participate in touring holidays and, as a result are exposed to a greater variety of weather conditions. Although international tourists are less likely to shorten their holidays as a result of the weather they may still have their travel plans severely disrupted and be unable to participate in preferred activities. Many of the iconic tourist destinations of New Zealand (e.g. Milford Sound, the Glaciers) popular with international tourists are located in remote areas and are accessed via alpine passes, and as a result are particularly vulnerable to weather impacts. All the locations which were identified as being the most weather vulnerable in the IVS analysis were similarly identified in the survey data. From a safety perspective, international tourists participating in commercial activities are more protected from adverse impacts of the weather although they may still be negatively affected when their chosen activities are cancelled. As both the survey and the archive analysis showed, tourist safety may be potentially made worse by the fact that many international tourists arrive with inadequate climate and weather information (see above).

6.1.4 Climate Change

While the emphasis in the archive research was to examine the impact of current weather conditions on tourists and tourism in New Zealand, the longer term aspect of a changing climate was also of interest. Projections by NIWA indicate more westerly winds and potentially more erratic weather patterns. Given that these are already key factors impacting on tourism at present day conditions, climate change is likely to exacerbate this and be of importance to some operations and destinations. The increased exposure to climatic factors coupled with high sensitivity in some places is likely to lead to high vulnerabilities for some tourist businesses. Warmer temperatures and longer seasons are likely to benefit tourism, as temperature is a key factor in tourist decision making and enjoyment.

The impacts of climate change in New Zealand, in general and on tourism in particular, are not talked about much. It is of note, for example, that no mention was made in any articles identified in the archive analysis about the potential for extreme weather events to get worse over time as a result of climate change. Also, the tourist survey was not able to establish great understanding amongst tourists about climate change. Few of the tourists surveyed were able to make logical links current weather conditions and potential future changes – even when these changes had been specifically listed in an earlier survey question. It can be concluded that, while tourists indicated that they had reasonable understanding of more general environmental issues and initiatives, their overall knowledge on the impacts of climate change appears limited.

We note though that tourists do not have to be aware of climate change but could still be affected by it, or rather by an increase in extreme events. A separate piece of research therefore would need to analyse whether the most significant sources of tourist dissatisfactions – where they are related to extreme events (or cancellations because weather conditions did not meet certain criteria) – are likely to change systematically over the next two decades, and how large this change is likely to be relative to natural interannual and decadal climate variability. Significant changes (see initial discussion on the change of climate extremes related to changes in mean climate) could be used to inform priorities for tourism businesses and destinations to reduce their vulnerability to such extremes.

6.2 Implications for vulnerability and adaptation of the tourist sector

The analysis carried out in this report is based on the concept that vulnerability to climate change (but also climate variability) is a function of exposure, sensitivity and adaptive capacity (see Figure 1). Our analysis suggests that even though many tourist activities are highly exposed to climate and weather extremes, and variability in conditions, the vulnerability to such extremes is not as high, either due to limited sensitivity or relatively high adaptive capacity. Sensitivity can be limited either because tourists are prepared to accept that inclement weather is part and parcel of experiencing New Zealand, or because a few extreme weather events play only a minor role in their overall experience of New Zealand. Adaptive capacity of tourists is high either because they are flexible in their activities, or choice of route and timing, or a combination of those factors.

We note that our analysis here focused on experiences of international tourists, but that limited vulnerability of tourists to climate variability and change does not in itself imply that the tourist sector as a business activity in New Zealand also has low vulnerability. The analysis reported here shows that while New Zealand's climate on average has a positive general influence on satisfaction, it can be the cause for significant negative experiences.

Adverse weather conditions and experiences do not necessarily colour tourists' overall satisfaction, but they are remembered and reported to friends and family. More importantly, tourists' responses to unfavourable weather (apart from 'toughing it out') can also result in changes to tourists' itineraries and activities. This can create a vulnerability for particular regions, destinations and activities even though the tourists themselves may not feel that their experiences have been greatly reduced. Again, of particular note here, is the frequency with which some of New Zealand's most iconic tourist destinations were mentioned in regard to travel disruption, activity cancellations and tourist dissatisfaction.

Our findings suggest that in the near term, reducing negative experiences that tourists have as a result of weather extremes, while at the same time ensuring that tourist destinations do not suffer from changed itineraries or activities, holds the greatest potential for improving the resilience of the NZ tourism sector to climate variability and near-term change. The change in marketing approaches noted in section 6.1.2 could also allow an entry point to reflect any gradual changes in climate conditions that may be associated with climate change, as far as they are of sufficient significance in respect of the tourist experience.

Based on analysis to date, key steps that could reduce negative experiences include:

- Better provision of short- to medium-term weather forecasts that provide weather information relevant to tourists' activities and their decision-making approaches. This could be facilitated by regional tourism organisations or voluntary regional tourism ventures, and could be particularly effective if information about weather is coupled with suggestions for appropriate activities (or at least clear guidance on what to expect if weather-exposed activities are undertaken – some tourists see 'wild weather' as a positive draw card, so information on where and how to get the most out of wild weather without being exposed to undue hazards could be helpful).
- A strategic approach to regional diversification of tourism activities could increase the time that tourists remain in regions that are more routinely exposed to inclement weather, by providing alternative activities to sit out a day or two. Examples include Milford Sound and the West Coast, where both the research projects reported here and independent analysis suggests that tourists systematically spend less time during wet weather, whereas other regions seem to have a greater ability to hold tourists even during wet conditions.

- Up-front information on the sort of weather to expect, as people are planning their trips, could assist with shaping their expectations. Our study shows that dissatisfying experiences are often linked to a dissonance between expectations and reality, rather than the occurrence of particular weather events per se. More realistic climate and weather information, tailored to issues of most relevance to tourists (such as temperature variability instead of only mean temperature) could alter expectations and thus reduce the gap between expected and experienced weather. This may need to be balanced against the desire to portray holiday destinations through tranquil seas and blue skies.

We also found that the likelihood with which tourists experience or report a negative weather-related event is driven not only by the specific activities they undertake and the exposure of those activities (or locations visited) to extreme weather, but that this also depends on tourism demographics, mode of transport and tourists' countries of origin. Changes in these socio-economic drivers will therefore influence the extent to which changing weather conditions could affect tourists' satisfaction or dissatisfaction with their visit.

Adaptation to climate variability and long-term change will need to consider the ability to predict, monitor and influence these factors directly or indirectly, as well as managing the more direct impacts on specific routes, destinations and activities. These findings highlight that a full understanding of the vulnerability of tourism in New Zealand to climate change requires an integrated approach that combines socio-economic trends with an understanding of the detailed changes in climate and their implications for specific activities. This report adds important elements to this larger and more complex question.

6.3 Future research

The research reported here primarily focused on the weather experiences of international tourists in New Zealand, although the archive research also identified a number of other important impacts of the weather with regard to tourism in New Zealand. At times, for example, the weather may impact significantly on tourism businesses, on destinations and on domestic tourists. Understanding domestic tourists' vulnerability to current weather conditions and projected climate change requires a better understanding of the patterns of domestic tourist activity and the factors that both drive and constrain domestic tourism. Often, for example, domestic tourists visit different destinations than do international tourists; they participate in different activities and, as this research has shown, also appear to have a better understanding of the New Zealand weather conditions. They may also, however, be more influenced by negative media reports and poor weather forecasting.

A number of specific lines of inquiry for future research have been identified in the preceding discussion sections. Chief amongst these is the need to better understand how all tourists (both domestic and international) access and use weather information. More specifically, there is a need to understand tourists' information seeking behaviours AND the relationships between these and information sources with research that:

- seeks to establish what type of information is most suitable for tourists and whether this information is currently available;
- determines how often tourists seek weather information whilst travelling (including the timeframes within which weather-related decisions are made);
- explores the impact of media reports and weather forecasting on domestic tourists' travel behaviour;

- examines in greater detail the use of the internet for weather information, including the identification of which weather websites, or types of internet media (e.g. social media, travel blogs, travel guides, and so on) are most commonly consulted by tourists; and,
- examines the ways in which tourists access internet-based weather information, particularly in light of the increasing use of personal electronic media whilst travelling.

More targeted research is needed to understand the extent to which the weather and climate impacts on the broader tourism system in New Zealand (i.e. tourism businesses and destinations) both in the context of current weather conditions and events and in light of projected climate changes. It seems that tourism business vulnerability may also be considered within the exposure, sensitivity and adaptive capacity framework shown in Figure 1, while destination vulnerability and responses to projected climate changes might be best considered within a broader resilience framework.

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Appendix 1

Survey

NZ Weather and Climate Tourism Survey

Completed on: _____

You are invited to participate in a project being undertaken by researchers at Lincoln University who want to find out more about how the weather and climate in New Zealand affects tourists.

We would appreciate it if you could complete the following questionnaire, which has four sections:

- **Section 1** asks a few details about you and your trip in New Zealand
- **Section 2** has some questions about what you knew about New Zealand's weather and climate before you got here
- **Section 3** has questions about the weather you encountered whilst in New Zealand
- **Section 4** asks some questions about changes in the weather and climate in the future

The questionnaire should take you less than 10 minutes to complete and **your participation is voluntary**.

The questionnaire is anonymous and you may withdraw your participation, including withdrawal of any information you have provided up until the completion of this questionnaire. If you complete the questionnaire, however, it will be understood that you have consented to participate in the project and consent to publication of the results of the project with the understanding that anonymity will be preserved.

If you require any further information about this project, or have any concerns about your participation, an information sheet is available with full contact details for the researchers involved.

You will notice that some questions are about *climate*, some are about *weather* and some include both terms. Loosely defined, we consider the climate to be what you might expect to encounter in a particular country or tourist destination, whereas the weather is what you get.

**Section 1. Details about you and your trip in New Zealand**

1.1. In which country do you live? _____

1.2. What is your age?

☐ 18-25 yrs ☐ 26-40 yrs ☐ 41-55 yrs ☐ 56-69 yrs ☐ 70+ yrs

1.3. How many times have you been to NZ before (excluding this trip)? _____ times

1.4. How long was your stay in New Zealand on this trip? _____ days

1.5. What was your main transport mode in New Zealand on this trip? (please tick only one)

☐ Rental car ☐ Public buses ☐ Campervan
☐ Tour bus/van ☐ Domestic air ☐ Other (please specify) _____

Section 2. Before your trip to New Zealand

2.1. Before you got here, what did you think the NZ climate and weather would be like?

2.2. Where did you get your information on NZ's climate and normal weather conditions from? *(please tick all that apply)*

- ☐ I didn't get any information (*go to q 2.4*) ☐ Internet
☐ Someone told me ☐ Guidebooks
☐ I have been before ☐ Other source (*please specify*) _____

2.3. What climate and weather information did you collect at home? *(please tick all that apply)*

- ☐ Temperature ☐ Potential for extreme weather events (eg, storms)
☐ Sunshine hours ☐ Wind
☐ Rainfall ☐ Other (*please specify*) _____

2.4. Did climate and weather influence your decision to travel to NZ in this month, rather than at another time?

- ☐ Yes, significantly ☐ Yes, to some extent ☐ No, not at all

2.5. Did you plan any of your route, destinations to be visited, or specific activities within NZ based on expectations about the climate and weather conditions?

- ☐ Not at all (*please go to Section 3*)
☐ To some extent
☐ Largely
☐ Totally

Can you give one or two examples of your planning that were influenced by what you knew about the climate or weather?

Example 1: _____

Section 3. Now that you are at the end of your trip in New Zealand

3.1. Was the weather that you experienced different to what you expected?

- ☐ Yes ☐ No

If yes, in what way? _____

3.2. Whilst travelling in NZ did you seek information in advance about the likely weather?

- ☐ No ☐ Occasionally ☐ Regularly

If you did seek weather information, what were the main sources of this?

3.3. Overall, how did the weather you experienced influence your satisfaction with your trip in NZ?

- ☐ Positively ☐ It had little or no influence ☐ Negatively

3.4. Did you make any changes to the length of time you spent in places as a result of the weather?

- ☐ No, never ☐ Yes, occasionally ☐ Yes, frequently

If yes, could you give an example?

3.5. Did the weather you experienced make you change your route or intended activities?**ROUTE**

- ☐ Not at all (*go to question 3.6*)
☐ To some extent
☐ Often

Could you please give an example:

ACTIVITIES

- ☐ Not at all (*go to question 3.6*)
☐ To some extent
☐ Often

Could you please give an example:

3.6. Looking back, what information about NZ's weather would have been useful to have had in advance?

3.7. Given your experiences with weather in NZ, would you recommend or advise against certain activities when you talk about your experiences to friends and fellow travellers?

- ☐ Yes ☐ No

If yes, what advice about activities would you give?

3.8. Did you feel that tourism businesses in NZ dealt adequately with actual and expected weather conditions?

- ☐ Yes ☐ No ☐ Don't know

If no, please explain:

Section 4. Climate change**4.1. Do you think NZ weather patterns are likely to change in the future?**

- ☐ Yes ☐ No ☐ Don't know

4.2. The following is a list of possible weather and climate-related changes in New Zealand. Please rate how desirable you think each change would be for tourists in NZ by circling a number between 1 and 7 on each line (1 = 'Not at all desirable', 7 = 'Very desirable')

<i>How desirable do you think it would be for tourists in New Zealand if there were....</i>	Not at all desirable					Very desirable	
	1	2	3	4	5	6	7
Higher than average temperatures	1	2	3	4	5	6	7
More extreme hot days	1	2	3	4	5	6	7
More rain in the west, less in the east	1	2	3	4	5	6	7
Water supply restrictions in eastern regions	1	2	3	4	5	6	7
More heavy rain storms, floods and erosion	1	2	3	4	5	6	7
Reduction in biodiversity, especially in alpine areas	1	2	3	4	5	6	7
More/stronger westerly winds	1	2	3	4	5	6	7
Reduction of snow cover and glaciers	1	2	3	4	5	6	7
Sea level rise, coastal erosion and floods	1	2	3	4	5	6	7

4.3. Do you believe climate change is, or will be, a significant issue for tourism in NZ?

☐ Yes ☐ No ☐ Don't know

If yes, what do you think the most important issue will be?

4.4. Were you aware of any actions taken in NZ to reduce and/or cope with climate change?

☐ Yes ☐ No

If yes, can you please give an example?

If you have any other comments you would like to make about your trip in New Zealand with regard to the weather and climate please feel free to do so:

(If you are answering one of the earlier questions in more detail here, please write the question number).

One final question:

When you get home, will you be telling people you know (friends/family/colleagues) about the New Zealand climate and weather?

☐ Yes ☐ No ☐ Don't know

If yes, what are you likely to tell them?



Thank you for your time and your help with our research