

**Linking Climate Change, Tourist Destination
Adaptation and Tourist Attitudes:
A Case Study of the Victorian Surf Coast Region**

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Declaration

I, Ryan Jopp, declare that the PhD thesis entitled *Linking Climate Change, Tourist Destination Adaptation and Tourist Attitudes: A Case Study of the Victorian Surf Coast Region* is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

Signature

Date

Acknowledgements

My PhD journey has been both challenging and rewarding. I have grown significantly over this period, both professionally and personally. However, this project would not have been possible without the support of my family, friends and colleagues.

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Abstract

The global tourism industry is particularly vulnerable to climate change due to its strong link to climate and natural ecosystems. Impacts such as warmer temperatures, increasingly frequent and intense storms, and sea level rise present a range of implications for tourism destinations from altered seasonality and increased risk of fire, to loss of beaches and erosion of coastal areas. Both destination infrastructure and ecosystems will be impacted and the ability to adapt to these impacts will ultimately influence destination's long-term sustainability. A review of tourism sector adaptation frameworks found that none of the existing models focused on regional tourism destinations. This was deemed important as adaptation is best applied at the local level. The role of the tourist was also largely neglected, which was of some surprise given that tourism is a consumer driven industry, and it is the tourist who has the greatest adaptive capacity in terms of choosing when and where they go on holiday and the activities they engage in whilst they are there. Finally, the existing models tended to take a risk science approach and therefore did not fully consider the opportunities made possible by climate change.

This thesis proposes a regional tourism adaptation framework (RTAF) model. The aim of the model is to provide a holistic representation of the steps involved in assessing a destination's vulnerability and resilience, and developing an appropriate adaptation action plan. The RTAF model was applied to Victoria's Surf Coast region as a single case study and a number of climate change impacts and adaptation options were identified. The study incorporated three research phases: a model development stage, a Delphi study and a tourist survey.

The Delphi study involved two rounds of communication with experts on climate change, destination management and the Surf Coast region. Panel members were asked to identify the major climate change risks and opportunities for the Surf Coast region, as well as appropriate adaptation options. The adaptation options identified included the further development of early warning systems for extreme events, the construction of sea walls and the need for greater awareness and education throughout the tourism system. Potential opportunities identified included the ability to capitalise on the emergence of the so called "green" consumer and the potential to decrease seasonality and extend the peak summer season as regional temperatures increase.

The Delphi study proved a valuable means of identifying and prioritising potential adaptation options. These options were then tested with consumers by administering tourist surveys throughout the Surf Coast region. The aim being to determine different market segments' perceptions of the adaptation options identified in the Delphi study. Participants were asked to rate various adaptation options across a range of criteria. Also, in order to allow further statistical analysis information on participants 'environmental worldview' was collected using the New Ecological Paradigm (NEP). Overall, the sample responded positively towards the adaptation option to develop early warning systems for extreme events. These events could be fires, floods, or severe storms, or indeed any other form of man-made or natural disaster. Data analysis also showed that prior visitation, age, education, nationality and NEP score all played a role in determining respondent's opinions of the different adaptation options presented.

The case study analysis demonstrated that the RTAF model can play a role in identifying effective climate change adaptation strategies for regional tourism destinations. It gives all stakeholders greater insight into how a range of different climate change impacts are likely to impact on tourism at a regional destination level. In doing so it enables the identification of both potentially positive and negative climate change impacts and allows destination managers and policy-makers to make appropriate decisions regarding adaptation to both minimise potentially negative impacts and capitalise on potential opportunities.

Publications Associated with this Thesis

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List of Acronyms

ANOVA	One-way Analysis of Variance
CNS	Connectedness to Nature Scale
COAG	Council of Australian Governments
DSE	Department of Sustainability and Environment
EPS	Extensive Problem Solving
GHG	Greenhouse Gas
GOR	Great Ocean Road
GOT	Geelong-Otway Tourism
HDM	Habitual Decision-making
IPCC	Intergovernmental Panel on Climate Change
LPS	Limited Problem Solving
LTA	Local Tourism Association
NEP	New Ecological Paradigm
PMSEIC	Prime Minister's Science, Engineering and Innovation Council (Australia)
PV	Parks Victoria
RTA	Regional Tourism Association
RTAF	Regional Tourism Adaptation Framework
TDR	Tourist Destination Regions
TGR	Tourist Generating Regions
TRR	Transit Route Regions
TTF	Tourism and Transport Forum (Australia)
UNWTO	United Nations World Tourism Organisation
VIC	Visitor Information Centre
WHO	World Health Organisation
WTA	Wildlife Tours Australia
WWF	World Wildlife Fund

Chapter 1. Introduction

1.1 Introduction

Climate change is predicted to have a range of impacts on the tourism sector. Whilst some debate remains regarding the scope, scale and nature of these impacts, it is generally accepted that there will be a variety of positive and negative impacts on tourism destinations. To ensure the long-term sustainability of tourist destinations, it is important to understand the possible adaptation strategies that can be implemented to cope with and/or benefit from the potential consequences of climate change.

The purpose of this thesis is to develop a regional tourism adaptation framework and apply it to Victoria's Surf Coast region as a single case study. The study aims to develop a state-of-the-art framework to assist regional destination managers adapt to a changing climate. In particular, this thesis seeks to contribute to the understanding of climate change adaptation at the regional tourism destination level. It examines various framework models for adaptation and proposes a regional tourism adaptation framework (RTAF) model based upon this analysis. In particular, the study explores the role of the tourist, and examines the potential impact of adaptation on destination choice. The inclusion of a consumer behaviour element, or demand-side analysis, together with the internal supply-side perspective, enables a more inclusive review of the implications of adaptation.

1.2 Background to the Research

Climate plays an important role in attracting visitors to many touristic regions around the world. Indeed, Ritchie and Crouch (2003, p. 111) state that a "comfortable and constant climate immediately provides a baseline of attractiveness for the great majority of visitors". Therefore, any change in climate may affect the destinations appeal (C. Michael Hall & Higham, 2005). Climate change will alter the conditions in which tourism destinations manage visitor flows and tourist assets (Becken, 2010). Various elements of climate have an affect on tourism including temperature, number of sun hours, precipitation, wind, humidity and fog (Martin, 2005). This thesis uses the totality of these interrelated elements to represent climate and examines how potential changes

in the climate may impact upon tourism. The following sections will elaborate on the relationship between climate and tourism, with particular focus on the role of climate change and adaptation.

1.2.1 Climate Change

Scientific evidence indicates that climate change is occurring and that this is highly likely a result of an increase in greenhouse gases in the atmosphere as a result of human activities (Garnaut, 2008; IPCC, 2007b; N. Stern, 2007). The travel and tourism sector is particularly vulnerable to changes in climate and resulting physical (e.g. increased sea-levels), ecological (e.g. bleaching of coral reefs), economic (e.g. increased cost of long-haul travel) and social impacts (e.g. changes in consumer attitude) (DeLacy, 2007; Garnaut, 2008; IPCC, 2007b). This thesis will use the following definition of climate change provided by the IPCC (2007b, p. 30):

Climate Change refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity

The Intergovernmental Panel on Climate Change (IPCC) (2007b) identifies two broad approaches to deal with climate change: mitigation and adaptation. Mitigation involves reducing greenhouse gas (GHG) emissions in order to minimise the changes to the climate, whilst adaptation reduces the vulnerability to climate change impacts by increasing the ability to cope with any potentially adverse effects. Traditionally, mitigation was seen as the most favourable way to respond to the climate crisis, and it was thought that a coordinated global response to mitigate GHG emissions would avoid any major negative consequences (Wilbanks et al., 2003). Mitigation was seen as key to the fight against climate change and discussion of adaptation was often kept in the background because it was seen as a somewhat defeatist view, as it would only reduce the urgency of appropriate mitigation (IPCC, 2007b; McKibbin & Wilcoxon, 2003). However, adaptation is now recognised by the IPCC and the majority of policy advisors around the world, as a vital component of an integrated approach to tackling climate change (IPCC, 2007b).

Climate change seems likely to impact all countries and all economic sectors to some degree, including tourism. Indeed, climate and tourism are inextricably linked, as it is the climate (hours of sun, amount of snow, etc.) which sets the boundaries of tourism potential in terms of the range of activities that can be offered to meet tourist demand (Martin, 2005). As destinations do not have the ability to relocate, their ability to adapt to potential changes in climate becomes crucial. If a tourism destination aims to remain economically, environmentally and socially sustainable, it will need to adapt to climate change in order to minimise the potential risks and capitalise on potential opportunities.

Unlike destinations, tourists have a relatively high degree of adaptive capacity, as they are able to change their choice of destination, the timing of their holiday, and the activities in which they engage. Climate change will alter tourism demand for a destination by improving or deteriorating climatic conditions at both the destination and other competing destinations, whilst also changing the socio-economic conditions of source markets (Hamilton & Tol, 2004). Whilst some research has been conducted on the effects of climate change on tourist behaviour (DeLacy, 2007; McEvoy, Cavan, Handley, McMorrow, & Lindley, 2008; Scott et al., 2008; Scott & Jones, 2006), to the author's knowledge no research has been conducted that studied the particular impacts of climate change adaptation on tourist behaviour.

1.2.2 Tourism

As tourism is a central component of this research, it is important to provide a clear definition of this term, yet a review of the literature finds no definitive definition. Whilst it is apparent that tourism involves the activity of someone travelling, the multi-faceted nature of tourism allows for a range of interpretations dependent on the intentions of the researcher. While there is no shortage of definitions for tourism, there is some agreement that they can be categorised as either 'conceptual' or 'technical' definitions (Colin Michael Hall, 2007; Richardson & Fluker, 2008). Technical definitions are used to enable the identification and measurement of tourists and involve various measures such as length of stay, activities undertaken and purpose of visit (i.e. leisure or business). The United Nations World Tourism Organisation (UNWTO) provides the following technical definition of tourism: "Tourism comprises the activities of persons, travelling to and staying in places outside their usual environment

for not more than one consecutive year for leisure, business and other purposes” (UNWTO, 1995b, p. 12). Such technical definitions have evolved for the use of statisticians, planners and governments in order to meet particular research and forecasting needs.

Conceptual definitions are used by academics in order to try and explain the phenomenon of tourism. One widely used conceptual definition of tourism is provided by Leiper (2004, p. 44):

The ideas and opinions people hold which shape their decisions about going on trips, about where to go (and where not to go) and what to do or not to do, about how to relate to other tourists, locals and service personnel. And it is all the behavioural manifestations of those ideas.

Despite the range of definitions of tourism available, they tend to share some basic elements as described by Hall (2007, p. 9):

- tourism is temporary, short-term travel of non-residents along transit routes to and from a destination;
- it can have a wide variety of impacts on the destination, the transit route and the source point of tourists;
- it can influence the character of the tourist; and
- it is primarily for leisure or recreation, although business is also important.

Whilst an understanding of both the technical and conceptual definitions of tourism is appropriate for this research, the conceptual definition proposed by Leiper (2004) is most relevant, as it takes a more inclusive approach to tourism, incorporating elements from both a demand and supply perspective. This is important as the conceptual framework to be proposed in this thesis adopts a more inclusive approach to tourism, examining the whole tourism system, including a consumer behaviour component. The details of the proposed adaptation framework are provided in Chapter 5.

1.2.3 The Tourist

Like tourism, the term ‘tourist’ also has various definitions. Indeed, the terms ‘tourist’ and ‘visitor’ are often interchangeable. The UNWTO (1995a, p. 7) defines ‘tourists’ as people who:

“travel to and stay in places outside their usual environment for more than twenty-four (24) hours and not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited”.

Another generic definition is provided by (Colin Michael Hall, 2007, p. 35) who describes tourists as:

Persons who travel away from their normal residential region for a temporary period of at least one night, to the extent that their behaviour involves a search for leisure experiences from interactions with features or characteristics of places they choose to visit.

This thesis adopts this definition because it is not destination specific, it doesn't take a supply perspective in terms of destinations or tourism operators providing a service to visitors, and it does not focus on the impact of visitors on various environments (economic, social or environmental). Instead, it focuses on the distinctive characteristics that go along with being a tourist (Colin Michael Hall, 2007). This is important as this thesis will examine the role of consumer attitudes in destination choice, whilst also exploring the potential effect of altering destination characteristics through adaptation. Whilst both of these definitions are appropriate to this research, a combination of the two is perhaps most suitable. Therefore, for this research a tourist can be defined as a person who travels away from their regular place of residence for a temporary period of more than one night, but less than a year, for business and/or leisure purposes and interacts with the touristic elements of the places visited.

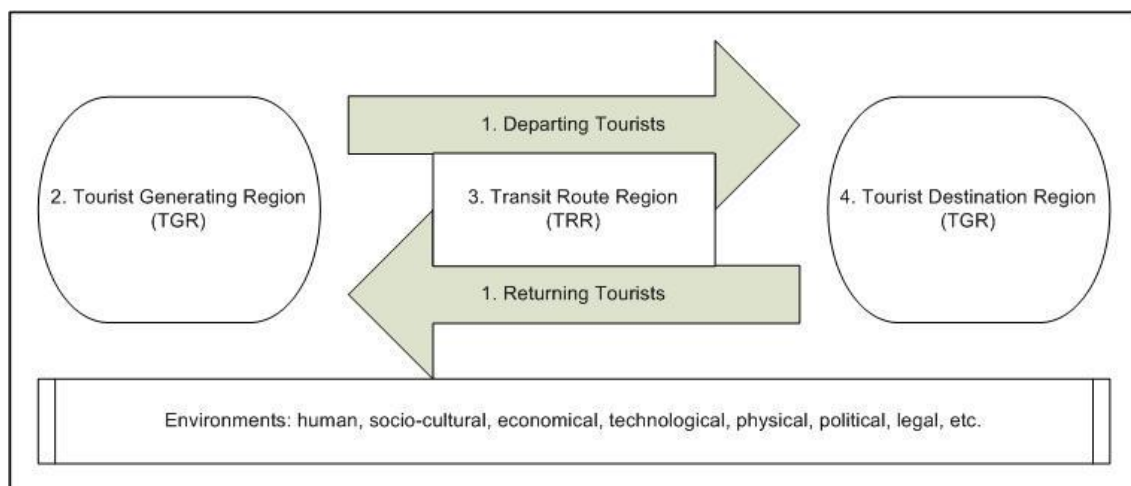
1.2.4 The Tourism System

Tourism comprises many different components including hospitality, transportation, accommodation and customer service, to name but a few. Consequently, it is perhaps more practical to view tourism not as an industry, but as an open system. Being an open system means various environments interact with each other. In tourism terms, this means that social, cultural, political, economic, legal, technical and physical environments are all relevant and can all affect the tourism experience. Likewise

tourists themselves can impact on each of these environments. According to Leiper (2004, p. 52) “this point has not always been adequately recognised; most discussions of tourism and its environments only recognise the impact on environments, and then only in reference to places visited”. It is important to recognise that despite tourism being served by many industries, often across vast geographic boundaries, these components are all closely connected and that impacts on one part of the tourism system can have significant impacts upon other components. For example, if an airline reduces or removes flights to a particular destination, this may impact on tourist arrivals and consequently the viability of other tourism stakeholders’ such as tour operators and accommodation providers.

In order to visualise the whole tourism system, Leiper (2004) developed a basic whole tourism system model, as shown in Figure 1.1. This model provides a geographical perspective, as opposed to a marketing one, and provides a simple yet useful guide to understanding how tourism works (French, Craig-Smith, & Collier, 2000).

Figure 1.1 The whole tourism system



Source: (Adapted from Leiper 2004).

An understanding of the whole tourism system is fundamental to this thesis as it is a key component of the proposed adaptation framework. This understanding is important as adaptation will impact on individuals, groups and human and natural systems to varying degrees. Chapter 5 provides further background information on the process of defining the tourism system, and Chapter 6 applies this to the Surf Coast, the region under investigation in this thesis.

1.2.5 Tourism Destinations

Due to the multi-disciplinary nature of tourism, there can often be confusion regarding widely used terms such as destination, region, stakeholders and policy-makers, to name but a few. This section is designed to clarify the term destination and give further understanding to some of the tourism-related terms used throughout this thesis.

The terms “tourism destination” and “tourism region” can have complimentary or differing definitions dependent on the source. Richardson and Fluker (2008, p. 48) simply define a destination as a “significant place visited on a trip”, whilst Kelly and Nankervis (2001, p. 13) describe the destination as “the area in which visitors conduct their leisure and business activities”. Whilst no consistent definition of a destination appears to exist, it is apparent that a destination must have some geographic boundary, whether it applies to a city, a country or a region. Indeed, a destination may also be classified in terms of its legal boundaries, for example the area under the jurisdiction of a local or state government. For example, the Surf Coast region is a clearly defined local government area with specific geographical boundaries, in the state of Victoria, Australia. Bornhorst, Ritchie and Sheehan (2010, p. 572) define a tourism destination as “a geographical region, political jurisdiction, or major attraction, which seeks to provide visitors with a range of satisfying to memorable visitation experiences”. This definition encompasses many of the elements of the aforementioned definitions and it is this definition that will be used for this thesis.

This brings us to the next term “region”. Like ‘destination’ the term region may also have several connotations. It may refer to a group of countries, usually within the same geographic context, such as South-East Asia. Or, it may refer to an area within a country, usually a tourism destination area (Richardson & Fluker, 2008). For this thesis, the latter definition of a region is used; in particular, the Surf Coast region of Victoria, Australia, is discussed.

Another term widely used in the tourism literature is ‘stakeholder’. This term is often used without adequate explanation, and the complex and varied application of this term may be a cause of confusion. In tourism terms, stakeholder refers to those who have an interest in, or who are affected by tourism (Richardson & Fluker, 2008). Tourism is a

sector with a large number of interested parties as well as a large diversity in the type of stakeholders (Bhat & Gaur, 2012). These stakeholders include travel and tourism companies, governments, host communities and tourists themselves. In addition, they may include not-for-profit organisations and community groups, with a particular interest in the development of tourism within their community.

Finally, the management of tourism destinations requires appropriate planning and policy development. Planning for tourism occurs in numerous forms (development, infrastructure, marketing) and involves various government organisations across various levels (national, state, regional, local and sectoral) (Colin Michael Hall, 2007). Consequently a broad-based definition of tourism ‘policy-makers’ becomes complex. Tourism policy is designed to guide the decision-making process, and may impact both supply and demand sides of tourism. For example, tourism policy may have an impact on tourism through the development of supply (attraction, facilities, infrastructure) and demand (through domestic and international marketing) (Colin Michael Hall, 2007). Therefore, the use of the term policy-maker, in this research, refers to as a person whose decisions strongly influence the future of tourism and whose aim is to pursue the plan of a particular government and/or government agency.

1.3 Review of Research Aims and Objectives

The overall aim of this study is to develop a framework to assist regional tourism destinations adapt to climate change. This will involve a detailed examination of potential climate change impacts and adaptation options for tourism at Victoria’s Surf Coast region, as well as an analysis of the potential impact of the proposed adaptation options on consumers’ destination choice.

The aims of this study can be expressed more specifically as the following explicit research objectives:

1. Develop an adaptation framework model for regional tourism destinations.
2. Test the model using Victoria’s Surf Coast region as a single case study.

A number of research questions were also developed to further define the key research objectives.

Research Objective 1 – Develop a regional tourism adaptation framework.

Research Questions:

- a) What is climate change adaptation and how does it apply to tourism?
- b) What adaptation models exist?
- c) Which, if any, are the most suitable for application to a regional tourism system?
- d) What are the limitations of the current adaptation models?

Research Objective 2 – Apply the model using the Surf Coast region as a single case study.

Research Questions:

- a) What are the various elements of the Surf Coast tourism system?
- b) What are the potential climate change impacts for tourism on Victoria's Surf Coast region?
- c) What are the most appropriate adaptation options for tourism at Victoria's Surf Coast region?
- d) What type of tourist is visiting the Surf Coast region?
- e) What are these visitors' attitudes towards the proposed adaptation options?

Table 1.1 Research objectives, questions and data collection methods

RQ*	What information is needed?	How will this information be gathered?	Other information	Relevant chapter/section
Research Objective 1 – Develop a regional tourism adaptation framework				Chapter 5
Q1a	<ul style="list-style-type: none"> – What is adaptation? – What are the different types of adaptation discussed in the literature? – How does adaptation apply to tourism? 	<ul style="list-style-type: none"> – Exploratory literature review. – Synthesis of secondary data. 		Chapter 2
Q1b	<ul style="list-style-type: none"> – What adaptation frameworks exist? 	<ul style="list-style-type: none"> – Exploratory literature review. – Analysis of secondary data. 		Chapter 2
Q1c	<ul style="list-style-type: none"> – Are existing frameworks tourism specific? – Are they applicable to regional tourism destinations? 	<ul style="list-style-type: none"> – Exploratory literature review. – Analysis of secondary data. – Analysis of tourism sector requirements. – Observation of previous application to regional areas. 		Chapter 2
Q1d	<ul style="list-style-type: none"> – Information on existing adaptation frameworks. – Strengths & weaknesses. 	<ul style="list-style-type: none"> – Exploratory literature review. – Analysis of secondary data. – Analysis of tourism sector requirements. – Evaluation of existing adaptation framework models. 		Chapter 2
Research Objective 2 – Apply the model using the Surf Coast region as a single case study				
Q2a	<ul style="list-style-type: none"> – What are the different elements of the whole 	<ul style="list-style-type: none"> – Exploratory literature review. – Analysis of secondary data. 	<ul style="list-style-type: none"> – The research will involve developing a model of the Surf 	Chapter 6

	<ul style="list-style-type: none"> – tourism system? – Who are the key stakeholders? – How are they likely to be impacted by climate change? – Who is visiting the Surf Coast? 	<ul style="list-style-type: none"> – Informal discussion with relevant stakeholders. – Participation in community and industry forums on climate change and adaptation. 	Coast whole tourism system.	
Q2b	<ul style="list-style-type: none"> – What are the potential risks for Surf Coast tourism as a result of climate change? – What are the potential opportunities for Surf Coast tourism as a result of climate change? 	<ul style="list-style-type: none"> – Exploratory literature review. – Analysis of secondary data. – Delphi study. 	<ul style="list-style-type: none"> – The Delphi study will involve 2 stages: a semi-structured in-depth interview, followed by an on-line survey. – NVIVO used to record and analyse interviews. 	Chapters 7 & 8
Q2c	<ul style="list-style-type: none"> – What are the most appropriate adaptation options for Victoria's Surf Coast? 	<ul style="list-style-type: none"> – Delphi study. 		Chapters 7 & 8
Q2d	<ul style="list-style-type: none"> – What type of tourist is visiting the Surf Coast? – What is their knowledge of the Surf Coast region? – What is their knowledge of climate change issues? – What is their environmental worldview? 	<ul style="list-style-type: none"> – Exploratory literature review. – Analysis of secondary data. – Tourist survey. 	<ul style="list-style-type: none"> – Tourists will be segmented using the New Ecological Paradigm (NEP). – Tourist profiles will be created by combining visitors NEP score with traditional demographic information. 	Chapters 3, 6 and 8
Q2e	<ul style="list-style-type: none"> – What are different segments attitudes towards the various adaptation options? – Will different segments have different opinions of the proposed adaptation options? 	<ul style="list-style-type: none"> – Tourist survey. 	<ul style="list-style-type: none"> – SPSS will be used for statistical analysis of survey results. 	Chapter 8

An overview of the research design is presented in Table 1.1 above. Here each of the research objectives and its relevant research questions are described in terms of the information that is required and how this information will be gathered. Other details such as the relevant chapter and the specific research tools being used are also included.

1.4 Justification of the Topic

International and domestic climate policy were first developed during the mid-1980s, primarily through activities of the International Council of Scientific Unions (ICSU), the United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO) (Boycoff & Roberts, 2007). Since that time there has been steady growth in interest from scientists, the media, the general public and policy-makers. Historically, the majority of attention has been given to mitigation of climate change through the reduction of greenhouse gas emissions; however, it is now recognised that adaptation will be necessary due to climate change resulting from current and historic

risers in GHG and the inertia in the climate system (Simpson, Gössling, Scott, Hall, & Gladin, 2008).

The destination studied in this thesis is the Surf Coast region, in Victoria, Australia. This region was selected due to its vulnerability to a number of different climate change impacts and because of its relatively high reliance on tourism (G21, 2010; Hossain & Barry, 2003). The Surf Coast region is a major drawcard for international visitors to Australia due to its spectacular coastline, scenic rainforests and magnificent beaches (Hossain & Barry, 2003). Tourism contributes over \$250 million to the economy annually and provides more than 1,000 jobs (Surf Coast Tourism, 2008). The Surf Coast region is expected to become warmer and drier, and the risks associated with bushfire are expected to increase (Australian Government, 2009; DSE, 2008). Coastal issues, such as sea-level rise and increasingly frequent and intense storms are also predicted (DSE, 2008).

The realisation of climate change at the regional level will be highly relevant for tourism destinations and tourists alike, requiring adaptation by all major tourism stakeholders (Scott et al., 2008). Nonetheless, there is very limited research that investigates the role of adaptation at the regional destination level. Consequently, one of the main objectives of this thesis is to develop an adaptation framework model for regional tourism destinations.

Although various models exist that examine the role of adaptation, they are either non-tourism specific, or do not incorporate all the necessary elements of the tourism system. Consequently, this is where the proposed Regional Tourism Adaptation Framework (RTAF) model provides a significant contribution to knowledge. The addition of a consumer behaviour element to this study provides a more inclusive approach to adaptation by considering the impact of potential adaptation strategies on tourist behaviour. This is considered important as spatial, temporal and activity substitution are generally recognised as providing tourists with tremendous adaptive capacity (Scott & Jones, 2006).

The study is also significant from a practical point of view, as the application of the proposed model provides a tool for regional tourism managers and tourism policy-

makers to utilise when making decisions regarding an increasingly uncertain future. This is particularly important because effective communication between the climate change science community and tourism operators at the regional and local scale has been identified as lacking (Scott et al., 2008).

In summary, the key issues that present a clear justification for this research are:

1. Adaptation is becoming increasingly recognised as important when dealing with climate change.
2. There is a lack of research into adaptation of the tourism sector at the regional level.
3. There is a clear lack of research into the effect of adaptation on tourist behaviour.
4. There is an apparent lack of communication between climate scientists and regional tourism practitioners.

1.5 Overview of Methodology

This research is grounded on the principles of critical realism. Critical realism does not make claims regarding a totally comprehensive understanding of a problem and regards all knowledge as fallible (Jeppesen, 2005). As such, this research introduces a mixture of quantitative and qualitative methods as a form of triangulation, in order to minimise the fallibility of the measures used. Due to this recognition, proponents of critical realism also state that all theory is revisable (Trochim, 2010). Furthermore, it is put forward that combining different methods can lead to a more holistic view of the problem or issue (Devine & Heath, 1999).

This research adopts a mixed-methods approach to data collection and analysis and incorporates both quantitative and qualitative research. This combination facilitates more in-depth research and allows for greater insight into the data. The research process involves a theoretical model building phase, followed by two phases of primary data collection: a Delphi study and a tourist survey. This research builds upon the initial literature review, which involved gathering and analysing secondary data from journal articles, case studies, government and industry reports and books in order to gain solid

background knowledge of the issues surrounding climate change adaptation in the tourism sector.

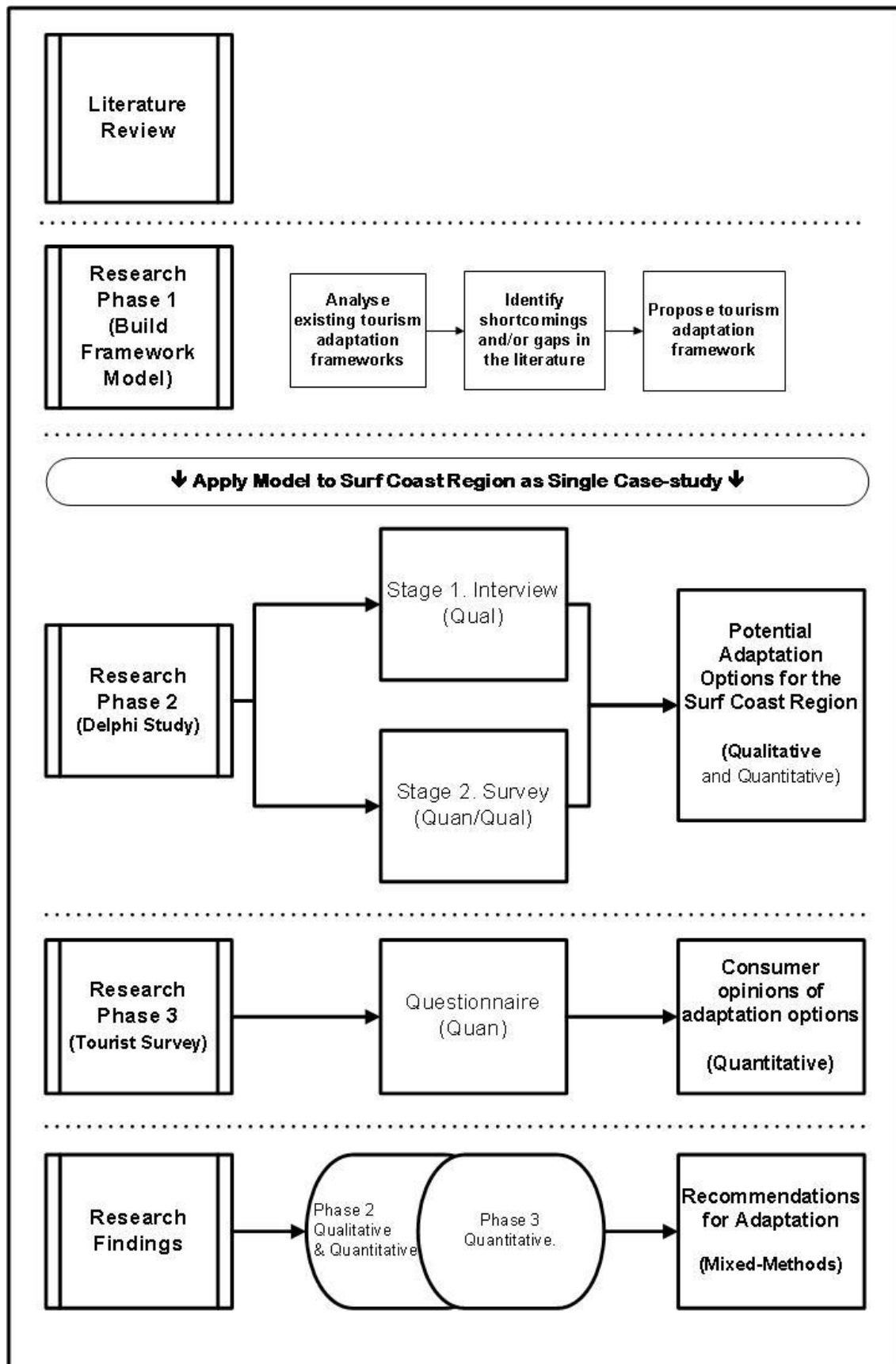
The first phase of research involved the development and design of the RTAF model (Research Objective 1). This required an extensive review of the adaptation models available in the literature and the identification of potential shortcoming or areas for improvement. The proposed model aims to build upon the existing adaptation models and create the most suitable composition for regional tourism destinations. The process of development for the RTAF model is detailed in Chapter 5 of this thesis.

In order to apply the RTAF model, this research utilises a case study approach, as theorised by Yin (1993). Using this approach, both qualitative and quantitative data is collected and analysed incorporating both primary and secondary data collection. This represents the second and third phases of research and incorporates a Delphi study and a tourist survey, respectively (Research Objective 2).

Phase two saw the implementation of a Delphi study whereby a panel of experts were involved in a two stage investigative process. The first component involved in-depth interviews and the second component an on-line survey. Analysis of both the quantitative and qualitative data was then used to determine adaptation options for tourism at Victoria's Surf Coast region. Discussion and analysis of the Delphi study is presented in Chapter 7.

Research phase three involved the administration of a self-complete questionnaire to tourists visiting the Surf Coast region. The questionnaire sought tourist views on both adaptations in general and their views regarding the proposed adaptation options identified in the Delphi study. This quantitative research phase builds on information gathered during research phase two by exploring tourist views on the adaptation options recommended by the expert panel. Discussion and analysis of the tourist surveys is presented in Chapter 8. This section provided an outline of the mixed-methods approach to data collection used in this study. Figure 1.2 provides a visual representation of this process.

Figure 1.2 Mixed-methods research design



1.6 Structure of the Dissertation

This thesis is divided into ten distinct chapters. Chapter 1 introduces the study and outlines the purpose of the research, as well as providing background information on the topics under investigation, justification for the research and an overview of the methodology to be used. The research aims and objectives are explained and Table 1.1 is provided to clarify specific research questions and methods of data collection.

Chapter 2 provides a review of the literature related to climate change adaptation in the tourism sector. This involved a review of the link between climate change and tourism, the types of climate change adaptation in tourism, as well as an analysis of currently existing tourism adaptation frameworks.

Chapter 3 investigates the relationship between consumer behaviour and tourism. This involved an analysis of consumer behaviour and the consumer decision-making process. In order to conduct such an investigation the major models of consumer behaviour, consumer behaviour in tourism, and destination choice are all analysed and the particular role of attitudes assessed. Literature relating to the application of the New Environmental Paradigm (NEP) in tourism is also discussed in this chapter.

Chapter 4 focuses on the approach and methodology used to achieve the research objectives of this study. The first part of this chapter focuses on the social science methodologies and the particular approach taken for this research, whilst the latter part of the chapter discusses the research design and data collection methods. Justification for the use of a mixed-methods approach is provided, and the application of the framework model as a single case study is explained. The data collection process involves two phases: a Delphi Study and a Tourist Survey. Finally, ethical considerations and limits to the research are also discussed.

Chapter 5 details the process of developing a regional tourism adaptation framework (RTAF) model and outlines the various stages involved.

Chapter 6 focuses on the first phase of the model, which involved ‘Assessing the Vulnerability and Resilience of the Surf Coast’. This process involves investigating the Surf Coast tourism system, establishing the climate change risks and opportunities, and determining the adaptive capacity of the Surf Coast region. This section is based largely on secondary data gathered during the literature review.

Chapter 7 provides information on the Delphi study used in order to determine climate change risks and opportunities, and adaptation options for the Surf Coast. This process involved two stages, semi-structured, in-depth interviews, followed by an on-line survey. The chapter reports on the development and application of the study as well as discussion and analysis of the results. Information regarding the reliability and validity of the results is also provided.

Chapter 8 focuses on the consumer element of the adaptation process and analyses how tourists may respond to various adaptation options. An analysis of tourist surveys conducted throughout the Surf Coast region is provided and both demographic and psychographic segmentation techniques are used to group respondents based on various characteristics. The results of 268 surveys conducted throughout the Surf Coast region are analysed and the implications for Surf Coast tourism are discussed. This chapter also includes analysis of data pertaining to the tourist’s environmental worldview which is used to help segment visitors to the Surf Coast region

Chapter 9 reports on the results of both the Delphi study and the tourist survey, then provides practical recommendations regarding adaptation for the Surf Coast region. Each of the adaptation options are classified as high priority, medium priority, low priority (future consideration) or not recommended.

Chapter 10 presents a discussion of the limitations and advantages of using the model and information on potential improvements to the model are discussed. This chapter concludes the thesis by presenting a summary of the key findings and recapping the contribution to knowledge made by this study. Finally, further applications for the model are discussed and opportunities for future research identified.

Chapter 2. Climate Change and Tourism Destination Adaptation

2.1 Climate Change: A Global Challenge

Climate change is recognised as a major global issue that presents serious risks that require a unified global response to ensure the sustainability of life as we know it. The impacts of increased greenhouse gas (GHG) emissions, in particular carbon dioxide emissions since pre-industrial times, has led to significant warming over the past fifty years and will cause continued warming over the next fifty years (IPCC 2007b). The impacts of this warming will be felt across all geographic regions, environmental systems and economic sectors. Therefore an urgent and unified response is required.

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC 2007) provides an integrated review of climate change, its causes and impacts, options for mitigation and adaptation, as well as examining the long-term scenarios. This comprehensive report concludes with a very high degree of confidence that the net effect of human activities since 1750 has been one of climatic warming (IPPC, 2007). The report also predicts other important climatic shifts including rising sea levels, decreases in snow and ice cover, variations in rainfall, increased occurrences of drought and heat waves, and increases in the number of severe storms.

Climate change will have both direct and indirect effects and these will vary from region to region (S. Gossling & C. M. Hall, 2006). Direct effects include changes in temperature, precipitation and storm frequency. Indirect effects of climate change include heatwaves, changes in biodiversity and outbreak of disease (Lindner et al., 2010; Simpson et al., 2008). The cumulative effect of direct and indirect impacts of climate change is anticipated to affect many areas of economic and social policy including employment and labour demand, housing, transport, and social infrastructure (Scott et al., 2008).

Other foremost climate change reports such as the Garnaut Review (2008) and the Stern Report (2007) further support the claims made by the IPCC, stating that the scientific evidence is now overwhelming and that climate change presents very serious global risks. These reports focus on the economic impacts of climate change and strongly conclude that the benefits of strong, early action on climate change clearly outweigh the economic costs of inaction.

With the production of such reports and the increased media focus upon the issues of climate change, the public both here in Australia, and globally, are becoming increasingly knowledgeable and aware of climate change issues. This in turn is impacting on their attitudes and behaviour, which in turn represents both challenges and opportunities for producers and marketers of tourism products.

Climate change will impact on all sectors of the economy and all destinations to varying degrees. The IPCC (2007a) identify tourism, agriculture, water resources, human health, and industry, settlement and society as sectors likely to be impacted by climate change. The energy industry will continue to be a sector of particular focus, as governments and industry look to develop renewable energies in order to reduce carbon emissions. However, other sectors such as the service sector, and in particular tourism, will also be impacted. They will need to adapt to rapidly changing government regulations and also respond to consumer demands for more sustainable business practices. Whilst there will be a range of both 'winners' and 'losers' due to climate change, the sectors that prepare earliest for these changes, and the price and regulatory changes that accompany them, will be best placed to assert themselves in this changing environment (Heymann, 2007). The vulnerability of various sectors to climate change and their potential to adapt is discussed in Section 2.4.

2.2 The Relationship between Climate Change and Sustainable Tourism

Climate change has become an integral component of sustainable tourism development, a concept that is now widely discussed in the literature (Becken & Hay, 2007; Fennell & Ebert, 2004; Scott & Simpson, 2008; Turton, Hadwen, & Wilson, 2009; Williams &

Ponsford, 2009). Sustainable tourism development is defined by the World Tourism Organisation (UNWTO, 2001) as:

Sustainable tourism development meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future. It is envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems.

The tourism sector faces many challenges in responding to climate change if they are to achieve long-term sustainable development (Turton et al., 2009). Indeed, a greater degree of coordination between tourism stakeholders is required to become more sustainable. Without stronger commitments and actions by all three stakeholder groups, meaningful ‘sustainable tourism’ is uncertain (Williams & Ponsford, 2009). Whilst an in-depth discussion of the relationship between climate change and sustainable tourism development is outside the scope of this thesis, it is acknowledged that dealing with the challenges of climate change falls under the umbrella of sustainable tourism development.

Climate change adds to the challenge of sustainable tourism development due to tourism's intrinsic link with the natural environment. The global tourism industry is particularly vulnerable to climate change impacts on weather and ecosystems (Becken & Hay, 2007; S Gossling & C. M. Hall, 2006; IPCC, 2007a; Scott et al., 2008). Impacts such as warmer temperatures, increasingly frequent and intense storms, sea level rise and degradation of ecosystems, present a range of implications for tourism destinations including altered seasonality, increased risk of fire, erosion of coastal areas and loss of beaches, decreased snow cover, bleaching of coral reefs and transformed habitat for wildlife. Both destination infrastructure and ecosystems will be impacted and their ability to cope with these impacts will ultimately influence their long-term sustainability. This is emphasised by Scott et al.'s (2008) comprehensive report “Climate Change and Tourism: Responding to global challenges” which investigated the implications of climate change for tourism, mitigation and adaptation alternatives, and the implications for tourism demand (amongst other things). The report states that

“climate change is already affecting decision-making in the tourism sector and will be a pivotal issue affecting the long-term future of tourism development and management” (Scott et al., 2008, p. 3).

The decisions made by destination managers in regards to issues of climate change will be important in determining how to meet the changing needs of tourists. Understanding what is important to the tourist, and why it is important, is useful in the design of specific tourism products. This is of clear importance to destination managers seeking to encourage both new and repeat visitation. However, this is not to say that the demands of tourists will always be in line with sustainability objectives. Indeed, the research to be conducted in this particular study may assist in identifying the gap between what tourists want and what is actually a sustainable option.

Many regions rely heavily on the economic benefits of tourism for both employment and foreign exchange earnings. This is particularly true for many of the world’s poorest countries where there are limited alternatives for income generation. Paradoxically, it is often these destinations that have ecosystems particularly sensitive to the impacts of climate change. For example, the IPCC (2007a) states the characteristics of small island states, make them particularly vulnerable to the effects of climate change, such as sea-level rise and extreme events. This is further supported by reports by the UNWTO that identify Pacific and Indian Ocean Island States as “Hot Spots” in terms of climate change vulnerability (Scott et al., 2008). With largely underdeveloped economies, limited resources and widespread poverty, many island states are subsequently ill-equipped to meet the challenges of climate change (Maclellan et al., 2009).

Compounding this issue is the fact that many of these destinations are long-haul destinations, which poses additional logistical and transportation issues. These issues combined with an increasing consumer backlash against the carbon emissions created by long-haul flights put such destinations in an increasingly difficult position. Indeed research by Becken (2007) and Dwyer and Forsyth (2008) shows that the impacts of long-haul flights, in terms of carbon emissions, can influence the consumer’s choice of destination, or their decision to fly at all.

The influence of climate change on consumer behaviour can be seen as an extension of so-called 'Green Tourism' whereby tourists became more environmentally aware, and consequently the tourism industry began supplying 'environmentally friendly' products marketed towards this new segment (Andereck 2007; Straughn & Roberts 1999; Swarbrooke & Horner 1999). Furthermore, recent research predicting that climate change will influence tourist behaviour and choice of destinations (Amelung, Nicholls, & Viner, 2005; Berrittella, Bigano, Roson, & Tol, 2006; Hamilton, Maddison, & Tol, 2005; Hamilton & Tol, 2004) presents destination managers with new marketing challenges and opportunities.

2.2.1 Impacts of Climate Change on Different Geographic Regions

Climate defines the length and quality of tourism seasons (e.g. winter or summer activities) in different regions (UNWTO, 2009). Some tourism destinations are highly climate-dependent, where climate is the principal resource upon which the tourism industry is based (e.g. beach destinations and ski resorts), whilst other destinations, with diversified tourism products, are less climate dependent (e.g. popular city destinations such as Paris or New York). Despite this fact, all destinations will be impacted to some degree by changes in climate, and regardless of their vulnerability, they will need to adapt in order to minimise the potential risks and capitalise on the potential opportunities (Simpson et al., 2008; UNWTO, 2007, 2009). Furthermore, the number of regions affected by climate change events, including many major tourism destinations, will expand as climate change induced effects become more apparent (Simpson et al., 2008).

Some countries and regions are more vulnerable than others to the impacts of climate change and indeed there may be some benefits for certain regions. The level of knowledge in relation to potential climate change impacts also varies greatly between regions. Table 2.1 displays the estimated impact of climate change on tourism in various regions, as well as the relative level of tourism specific climate change knowledge.

Table 2.1 Relative level of tourism specific climate change knowledge and estimated impact of climate change on tourism by region

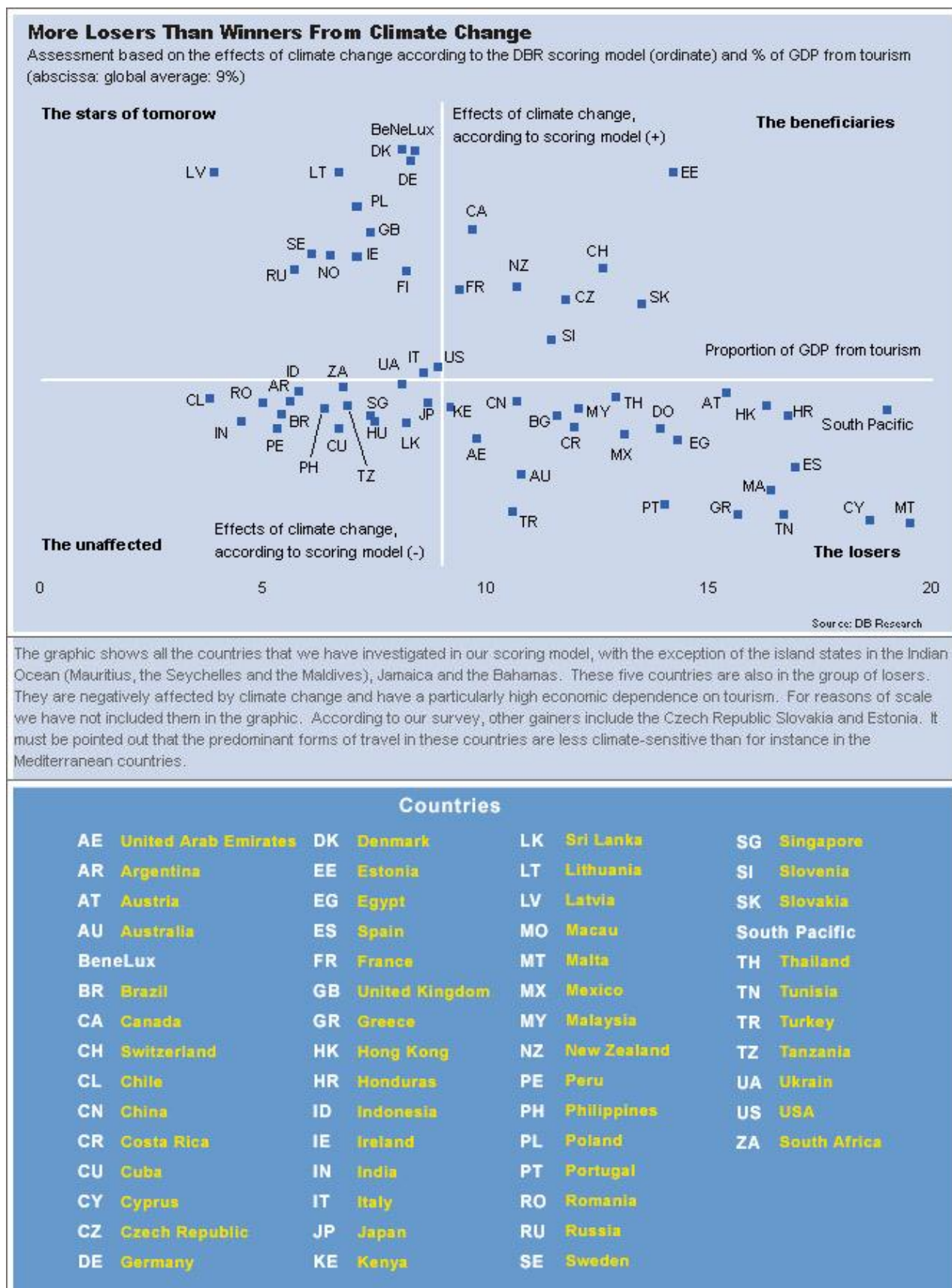
Region	Estimated impact of climate change on tourism	Relative level of tourism specific climate change knowledge
Africa	Moderately-strongly negative	Extremely poor
Asia	Weakly-moderately negative	Extremely poor
Australia & New Zealand	Moderately-strongly negative	Poor-moderate (high in Great Barrier Reef)
Europe	Weakly-moderately negative	Moderate (high in alpine areas)
Latin America	Weakly-moderately negative	Poor
North America	Weakly negative	Moderate (high in coastal and ski areas)
Polar regions	Weakly negative – weakly positive	Poor
Small islands	Strongly negative	Moderate (highest with respect to impacts on reef systems)

Source : (Simpson et al., 2008).

Table 2.1 shows that Australia is likely to experience moderate to strong negative impacts due to climate change impacts, yet only a relatively poor to moderate amount of specific climate change knowledge exists. Figure 2.1 also illustrates an assessment based on the predicted effects of climate change and the countries percentage of GDP earned through tourism. The diagram places countries into one of four quadrants: the stars of tomorrow, the beneficiaries, the unaffected, and the losers. This diagram places Australia clearly in the ‘losers’ quadrant. It also demonstrates that in general there is likely to be more ‘losers’ than ‘winners’.

This report aims to help reduce this knowledge gap in relation to climate change and regional tourism destinations by exploring the potential impacts of climate change and investigating appropriate adaptation options. The following section will explore the direct and indirect impacts of climate change on Australian tourism.

Figure 2.1 Climate change and tourism, more losers than winners



Source: (Ehmer & Heymann, 2008).

2.2.2 Climate Change and Australian Tourism

Climate change presents particular issues for Australian tourism, primarily because many of its major attractions are located in fragile ecosystems susceptible to climate change impacts. This is supported by the report *Climate Change and Australian Tourism* (Buultjens, White & Willacy 2007), which states that many of Australia's main attractions such as the Great Barrier Reef, the Blue Mountains, and water-based recreation activities, are all susceptible to climate change impacts. Clearly different destinations will be affected in different ways, and will consequently need to develop appropriate strategies to deal with individual current and future risks.

As mentioned, climate change is also associated with many flow-on impacts such as increased risk of bushfire, impacts of storm surges and flooding on coastal ecosystems, and habitat loss. For example the World Wildlife Fund (WWF 2008) states that in Australia, at least 90 species have been identified as being at risk of extinction, including iconic Australian animals such as koalas, wombats and some species of kangaroo. Furthermore, many of these issues are exacerbated by Australia's ongoing struggle with drought and flood, which has been linked to climate change (WWF, 2003).

Many of these impacts may have an influence over the consumer decision-making process, impacting not only on the choice of destination, but also their time of travel and the activities they engage in whilst there. Australia is a long-haul destination from many of its traditional source markets, such as Europe, North Asia and the USA. This presents further challenges, as a growing number of carbon-conscious travellers wish to reduce their carbon footprint by choosing destinations closer to home, or by not flying at all (Dickinson, Robbins, & Lumsdon, 2010).

2.2.3 Climate Change Sceptics

The United Nations IPCC presents the largest peer-review process in the history of science (Andreadis & Smith, 2007), with over 2,000 scientists from around the world contributing to their reports (Grundmann, 2007). They concluded that:

...warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level. (IPCC, 2007a, p. 2)

Yet issues of uncertainty and the complexities of predicting atmospheric processes, particularly over the long-term, have fuelled the arguments of climate change sceptics. However, it is the author's opinion that uncertainty should not be used as a reason not to act, as certainty can only truly occur after the fact. Of course, there are issues of uncertainty and this is acknowledged by the IPCC, other climate scientists and the author.

Although it is recognised that there are climate change sceptics, their number is relatively small in comparison to the many climate change scientists, backed by peer-reviewed research, that espouse its occurrence. Indeed, Andreadis and Smith (2007, p. 51) state that "these sceptics currently number fewer than a dozen, and with only one exception (Richard Lindzen, Professor of Meteorology at MIT), have no track record of peer-reviewed science in the field".

Despite their relatively small numbers, climate change sceptics have gained enormous visibility in the mass media (Grundmann, 2007). Indeed, it has become apparent that the media, in search of "balanced coverage" of climate change science, has given an unequal voice to a small group of climate change sceptics (Boykoff & Boykoff, 2004). Furthermore, it is posited that the vast majority of these sceptics either do not have a climate science background, or are not publishing their work in peer-reviewed literature (Andreadis & Smith, 2007; Boykoff & Boykoff, 2004; Grundmann, 2007). Consequently, not only has the mass media failed to recognise the importance of the peer review process, a practice central to the maintenance of academic standards and rigour (Andreadis & Smith, 2007), but they have amplified the voice of what remains a minority group.

Even if the predictions about climate change prove to be incorrect, which is appearing less and less likely, the risk of inaction clearly outweighs the cost of action (N. Stern, 2007). Consequently, a precautionary principle should be adopted whereby current knowledge is used to guide attempts to avoid potential risks. In decision-making, the precautionary principle is considered when possibly dangerous, irreversible or catastrophic effects are identified, but scientific uncertainty remains, and actions to prevent these potential adverse effects need to be justified (N. Stern, 2007). As

individuals, we insure our car or our home, hoping that we will never have to make a claim. Therefore, whilst it is acknowledged that uncertainty does remain over the rate of climate change and to what extent its cause is anthropogenic, for the purposes of this study, climate change is recognised as a legitimate phenomenon and a legitimate economic, environmental and social challenge.

2.3 Mitigation and Adaptation

The fourth report released by the International Panel on Climate Change (IPCC, 2007a) predicts severe consequences for planet Earth unless effective action is implemented over the next 50 years, starting immediately. The two broad options available to manage climate change are mitigation and adaptation. Mitigation is the attempt to reduce greenhouse gas (GHG) emissions, with the aim of slowing or preventing climate change, whereas adaptation is the act of reducing vulnerability to the impacts of climate change (Sanderson & Islam, 2007).

Historically, adaptation has received less attention than mitigation. This was because prevention was seen as better than a cure, and that efforts put towards adaptation would merely weaken the resolve of policy-makers to commit to mitigation efforts (Sanderson & Islam, 2007). However, adaptation is now seen as necessary and complementary to mitigation efforts (IPCC, 2007a; Preston, Suppiah, Macadam, & Bathols, 2006; Simpson et al., 2008). Mitigation will always be required to avoid irreversible changes to the climate system, but adaptation will still be necessary due to the irreversible climate change resulting from current and historic GHG emissions already in the climate system (Simpson et al., 2008).

Mitigation approaches involve technological, economic and social changes and substitutions, and are key to avoiding the negative effects of climate change (De Lacy 2007). However, even if the world makes a significant reduction in GHG emissions, the impact of emissions already released into the atmosphere over previous decades will see the world face climate change of some degree. The magnitude of change and the impact this will have on the environment and society is still subject to uncertainty. However, scientists are increasingly concerned that change is happening more rapidly than previously thought. For example, Matthew England, the co-director of the Climate

Change Research Centre at the University of New South Wales, says:

“it is likely for new studies to find that the raw measures of climate change – global average air temperature, global sea-level rise and atmospheric carbon dioxide concentrations – are all happening at or above the worst-case IPCC scenario. (Moton & Arup, 2009, p. 9)

With this in mind, it is imperative that adaptation is used to complement mitigation efforts.

Adaptation is a process whereby governments, organisations and the public aim to moderate, cope with and/or benefit from the consequences of climate change, to manage risk and reduce vulnerability (Becken, 2007; COAG, 2007; DeLacy, 2007; Scott & Jones, 2006; Simpson et al., 2008). Whilst society, government, industry and the individual are increasingly aware of mitigation options available to reduce GHG emissions, such as increasing the use of renewable energies, the value of adaptation is often overlooked. Indeed, major reports, such as the Stern Report, state that adaptation is crucial for dealing with the unavoidable consequences of climate change; however, it has been under-emphasised by many countries (N. Stern, 2007).

An adaptation strategy aims to increase the resilience of human and natural systems to possible changes in climate conditions (AGO & DEH, 2005). Adaptation is the principal way to deal with the unavoidable consequences of climate change in the short term. It is a mechanism to manage economic, social and environmental risks, and to adjust economic activity to reduce vulnerability and to improve business certainty (COAG, 2007). It offers the potential of reducing future economic, social and environmental costs, as well as protecting life (AGO & DEH, 2005). In view of these points, this thesis will focus on adaptation.

2.4 Sectoral Adaptation

All sectors of society and the economy will need to adapt to the future changes brought on by climate change. Each sector's relative ability to adapt to the challenges presented and exploit the opportunities available varies greatly. There are also many links and interdependencies between different sectors, which demonstrate the need for a comprehensive approach to adaptation. For example, increases in temperature or a reduction in rainfall may affect biodiversity levels, and this in turn may impact upon agriculture production or tourism appeal for a particular destination.

The *Climate Change Risk and Vulnerability* report (AGO & DEH, 2005) identifies six sectors as most vulnerable in Australia including. These include: ecosystems and biodiversity, forests, agriculture (including crops and livestock), coasts (including fisheries and marine life), settlements (including infrastructure and planning) and water (including water supply and quality, and drought). These sectors are identified in the report as reflecting “considerations of climate vulnerability, the significance of the systems at risk and the likely need for government intervention to encourage a timely and efficient adaptation response” (AGO & DEH, 2005, p. X). The stressors of climate change are likely to affect both bio-physical and socio-economic components of the sectors identified.

Although tourism is not specifically identified in this list, the importance of each of these sectors in producing an attractive tourism destination is clear. For example, the majority of Australian tourist destinations are in coastal zones, making the maintenance of coastal regions essential to destination appeal. Coastal tourism in Australia is a major sector of the tourism industry, with significant on-going growth (Hardiman & Burgin, 2010, p. 2096). In addition, the quality of infrastructure, transportation and other components classified under ‘Settlements’ are vital for providing tourist access to a destination and appropriate amenities whilst there, including emergency services and electricity.

The National Climate Change Adaptation Framework presents eight areas of potential action for reducing sectoral and regional vulnerability. These include water resources, coastal regions, biodiversity, agriculture, fisheries and forestry, human health, settlements, infrastructure and planning, and natural disaster management. In addition to these sectors, the Council of Australian Governments (COAG, 2007) report also specifically addresses tourism. It is identified that climate change will impact on infrastructure and the natural environment and this has the potential to affect the relative attractiveness of different destinations (COAG, 2007).

The more recent COAG report (COAG, 2007), although very similar to the Australian Government report (AGO & DEH, 2005) report, has some significant differences. Of

particular importance to this research, is the inclusion of tourism. This provides an indication of the importance of understanding the potential impacts of climate change throughout the tourism sector. However, tourism only receives minimal coverage in the COAG report (2 paragraphs) and only warrants one point in the Summary of Potential Areas of Action (COAG, 2007, p. 27). Consequently, further research is required that examines the potential impacts of climate change on the tourism sector and investigates the potential for adaptation.

More information on tourism and adaptation is provided by the IPCC reports (2007a, 2007b), where not only is tourism recognised as a sector for planned adaptation, but further detail on adaptation options, the underlying framework, and key constraints and opportunities are provided (see Table 2.2). The other sectors examined by the IPCC include Water, Agriculture, Infrastructure/Settlement, Human Health, Transport and Energy, with the only major difference to the COAG and Australian Government reports being that Transport and Water are categorised separately, whereas they are incorporated into the Settlements sections of the Australian reports. Again, the interrelationships between the different sectors cannot be ignored, and the various sectors should not be considered in isolation. However, breaking down a region into such sectors allows for a more comprehensive review of key vulnerabilities, and therefore enables more effective decision-making in relation to adaptation.

Adaptations come in a wide variety of forms. Commonly used distinctions are purposefulness and timing (IPCC, 2001). Adaptation strategies that are largely reactive to climatic impacts are often referred to as autonomous or spontaneous, whilst planned adaptation strategies are described as purposeful and intentional (IPCC, 2001, 2007a). These planned adaptation strategies can be either reactive or anticipatory. The report also discusses autonomous or spontaneous adaptations as those considered to be in response to climatic stimuli and without the directed intervention of a public agency. Conversely, planned adaptation is led by policy. In addition, both forms of adaptation can be short or long-term, localized or widespread and they can serve various functions and take numerous forms (IPCC, 2001). The complex nature of adaptation means that the net gain of adaptation must be considered prior to implementation and the use of multiple adaptation strategies should be integrated as part of a broad adaptation strategy (Simpson et al., 2008). This is important for all sectors of the economy (including

tourism) to recognise, as each sector does not exist in isolation and adaptation in one area may impact positively or negatively on another. Indeed, many adaptation strategies are in line with sound environmental practice and may present multiple benefits. For example the wise use of water is not only environmentally beneficial, but is also cost effective (Becken & Hay 2007).

All sectors of the economy and society will need to respond to climate change impacts, and a range of factors will affect their ability to do so. The ability to adjust to climate change, in order to moderate potential damages, cope with unavoidable consequences and take advantage of potential opportunities is termed “Adaptive Capacity”. According to COAG (2007), the key components of adaptive capacity include the ability (and willingness) to:

- access and interpret information about climate change and its likely impacts;
- generate suitable methods for identifying and assessing potential adaptation strategies;
- access appropriately skilled people and adequate financial and other resources;
- utilise governance systems with sufficient flexibility and foresight to embrace adaptation planning; and
- adapt.

The capacity to adapt varies considerably among regions, countries, and socioeconomic groups and will vary over time. Table 2.2 summarises the determinants of adaptive capacity and explains how each may affect a destination’s ability to cope with change. The most vulnerable regions are those that are highly exposed to hazardous climate change impacts and have limited adaptive capacity.

Table 2.2 Determinants of adaptive capacity

Determinant	Explanation (influence on the ability to cope with change)
Economic resources	<ul style="list-style-type: none">– Greater economic wealth and resources increases a regions adaptive capacity– Increasing the ability to bear the costs of adaptation– A lack of financial resources limits adaptation options– Less wealthy regions are generally considered more vulnerable
Technology	<ul style="list-style-type: none">– Regions who have access to and utilise technology will have enhanced adaptive capacity– Adaptive capacity is likely to vary, depending on availability and access to technology at various levels– Lack of technology limits the range of possible adaptation options– Many adaptive strategies incorporate technology (e.g. protective structures, flood control measures, early warning systems)
Information & skills	<ul style="list-style-type: none">– Successful adaptation requires recognition of the need to adapt, and the ability to analyse, evaluate and implement appropriate strategies– Lack of trained and skilled personnel can limit a region's ability to implement appropriate adaptation options– Greater sharing of, and access to, information can increase the likelihood of appropriate adaptation
Infrastructure	<ul style="list-style-type: none">– Greater variety of infrastructure can enhance adaptive capacity, as it provides more options– The type, location and relative flexibility of infrastructure can also affect adaptive capacity
Institutions	<ul style="list-style-type: none">– Well–developed social institutions generally increase adaptive capacity– Inadequate institutional support are often cited as hindrance to adaptation (IPCC 2001)– Policies and regulations can constrain or enhance adaptive capacity– Generally accepted that established institutions in the developed world facilitate management of climate change risks
Equity	<ul style="list-style-type: none">– Equitable distribution of resources increases overall adaptive capacity– Fair and equal access to relevant resources is important

Source: Adapted from IPCC (2001).

Table 2.2 is derived from Chapter 18 of the IPCC Working Group II, Third Assessment Report (IPCC, 2001). These criteria are reiterated by research done by the World Health Organisation (WHO, 2009) who listed economic wealth, technology and innovation, information and skills, infrastructure, institutions, and public and political will as the main determinants of adaptive capacity. These six determinants are also relevant to tourism. The particular issues of tourism adaptation and adaptive capacity are discussed in Section 2.7.

2.5 Vulnerability and Resilience

Vulnerability is explained as a function of *exposure* to climate factors, *sensitivity* to change and *capacity* to adapt to that change (Adger & Vincent, 2005; AGO & DEH, 2005; IPCC, 2001). Systems that are highly exposed to climate change impacts,

sensitive to their impacts and less able to adapt, are consequently more vulnerable. Therefore, appropriate adaptation strategies need to be developed in order to increase the system's resilience, consequently decreasing its vulnerability. A formulaic illustration of this is provided below, whereby the vulnerability (V) of the destination, equals the exposure (E) to climate change impacts, combined with the sensitivity (S) to these impacts, minus the destination's capacity to adapt to these impacts (AC):

$$V = (E + S) - AC$$

Where V = vulnerability, E = exposure, S = sensitivity, and AC = adaptive capacity.

Again, once the variables in this equation are determined, appropriate adaptation strategies can then be designed to increase resilience and consequently decrease vulnerability.

Before planned adaptation strategies can be formulated it is essential that a destination determines its vulnerability and resilience to climate change impacts. Planned anticipatory adaptation has the potential to reduce vulnerability and realise opportunities associated with climate change, regardless of autonomous adaptation (IPCC, 2001). Therefore, before any planned adaptation occurs it is essential that the vulnerability and resilience of the region is assessed. Once this is determined, adaptive actions can be implemented that improve adaptive capacity, and subsequently reduce vulnerability.

The vulnerability of both bio-physical and socio-economic environments should be considered, as the degree of resilience and vulnerability of these sectors is likely to vary greatly across regions (Scott et al., 2008). The assessment of bio-physical vulnerability will examine the coping ability of ecosystems, for example the strain put on water resources, impacts on native flora and fauna, or the ability of coastal zones to cope with sea-level rise and increasingly severe storm surges. The assessment of the socio-economic environment will involve reviewing the vulnerability and resilience of elements such as human settlements, their communities, infrastructure and financial resources.

Climate change pressures will impact on both environments to varying degrees across different sectors and regions, and the impact of these pressures will be dependent on the destination's ability to increase its adaptive capacity and decrease its vulnerability. Tourism is particularly vulnerable to climate change and variability due to its inextricable link with climate and weather. The following section of this study will examine further the relationship between climate change and tourism, and investigate the role that adaptation can play in reducing a tourism destination's vulnerability to climate change.

2.6 Vulnerability and Resilience in Tourism

Many of the climate change impacts identified by the IPCC (2001, 2007a) such as temperature extremes, more intense precipitation events and increased frequency and intensity of storms, have been identified as being relevant to the tourism sector. The effect of such impacts will be dependent upon vulnerability and resilience factors, and appropriate management is required to maximise resilience and resistance to such threats, whilst increasing a destination's readiness to capitalise on opportunities that may arise.

Vulnerability is often discussed in relation to bio-physical impacts, such as sea-level rise, bushfires or coastal erosion; however, it is important that socio-economic impacts are also considered (Birkmann, 2007; Folke, 2006). For example, what is the likely effect of the aforementioned impacts on destination appeal, tourist numbers and seasonality? The break-down of impacts into bio-physical and socio-economic factors can help gain a clearer knowledge of destination specific impacts, which in turn can assist in developing targeted adaptation strategies. However, it is important to understand how both categories of impacts operate together. Before determining the process for adaptation it is important to consider the issue of vulnerability in its entirety. For example, exposure to increased temperatures may have a greater impact on bio-physical elements, such as increased proliferation of non-native plants; however, this may not necessarily lead to negative socio-economic impacts. Therefore, a review of vulnerability should include two stages: 1) What are the potential bio-physical impacts of climate change? and 2) What are the likely socio-economic implications? The bio-

physical and socio-economic dimensions of vulnerability for tourism are summarised below.

Bio-physical Dimension

- Environmental fragility (air, water, land)
- Dependency on environment for tourism activities and appeal

Socio-economic Dimension

- Vulnerability of different social groups
- Role of social networks (coping ability)
- Vulnerability of different tourist groups (elderly, business, etc.)
- Vulnerability of different tourism sub-sectors (accommodation, transportation, etc.)

Regardless of future efforts to reduce greenhouse gas emissions, climate change impacts are unavoidable; therefore, it is important to begin to plan for these now (Barnett et al. 2011). Adaptation aims to reduce vulnerability by avoiding or reducing the negative consequences of climate change and capitalising on any opportunities. Early action will bring significant advantages, including minimising the social and economic costs of climate change and realisation of the gains that may come from new opportunities (Barnett et al. 2011). A delayed response by a destination to adapt to climate change issues may lead to higher costs in the future, or even irreversible damage to the environmental and social components that form the essence of destination appeal. Adaptation should be planned, and it should be based upon an evaluation of the future costs and benefits of action versus inaction (Simpson et al. 08).

2.6.1 The Relationship between Human and Natural Environments

Research by Fussel (2007), Adger (2006b) and Turner et al. (2003) examined the importance of understanding the link between bio-physical vulnerability and socio-economic vulnerability. In examining the various views on vulnerability, Adger (2006b) described a fundamental relationship between both social resilience and the resilience of the ecosystems on which human well-being ultimately depends. Similarly, Fussel (2007) and Turner et al. (2003) describe the coupled human-environment whereby the relationship between ecological vulnerability is linked with the vulnerability of human

systems. Therefore, before adaptation policy can be implemented several questions need to be asked:

1. What are the potential bio-physical impacts of climate change, and how are these likely to impact on the tourism system?
2. What are the potential socio-economic impacts of climate change, and how are these likely to impact on the tourism system?
3. Given both the bio-physical impacts and socio-economic impacts, what is the tourism system's overall vulnerability to climate change?
4. Which adaptation options can reduce vulnerability to climate change and variability across the whole tourism system?

Socio-economic and bio-physical vulnerabilities are linked and should therefore be treated accordingly. However, due to the complexity of these systems in regard to tourism destination vulnerability (exposure, sensitivity and adaptive capacity) research may benefit by examining specific components of the tourism system in isolation, before trying to understand the processes and flows within and across the span of the tourism system.

Developing adaptive strategies that considers the value of environmental assets, within the context of societal development, presents a major challenge for destination governance and planning (Folke, 2006). This thesis will examine the role of adaptation in decreasing vulnerability to climate change impacts that affect both the socio-economic and bio-physical attributes of regional tourism destinations. The main purpose for examining a destination's adaptation options is to enhance the ability of policy-makers and planners to make decisions that decrease climate change vulnerability.

2.7 Adaptation in Tourism

The tourism sector has often been overlooked by governments and policy-makers when examining adaptation options, with sectors such as agriculture and water garnering more attention (Simpson et al. 2008). This is further supported by Scott et al. (2008, p. 19) who state that “climate adaptation research in the tourism-recreation sector is 5-7 years behind that of sectors that have been actively engaged in adaptation research”. Table 2.3 provides an example of the issues involved in adaptation for the tourism sector as described by the IPCC (2007a). This outlines the potential for adaptation, the necessary policy framework and the key constraints and opportunities influencing implementation across the tourism sector.

As discussed in Section 2.2, tourism is a climate dependent industry, and many tourists travel to particular destinations to enjoy pleasant or suitable weather during their holiday periods. Most tourists prefer spending time outdoors to travel and enjoy the landscape, and a suitable climate can be a major factor influencing holiday choice (Hamilton et al., 2005; Lise & Tol, 2002; Ritchie & Crouch, 2003). Tourism is closely linked with the natural environment, and it is often environmental resources, such as beaches, snow, flora and fauna, etc. that are critical attractions for tourism destinations (DeLacy, 2007). In some cases, weather may even determine, or limit, a tourist's participation in certain activities (Moreno & Becken, 2009). This presents major challenges to destinations that may become less attractive or competitive due to the impacts of climate change, and this may have major social and/or economic ramifications for regions reliant on tourism as a source of income and employment (COAG 2007). For example, DeLacy (2007, p. 4) states that a 2-3 degree centigrade rise in global temperature could see 97% of the coral on the Great Barrier Reef bleached and 80% of Kakadu's wetlands gone. If such a situation was to prevail, this would have serious ramifications for tourist demand, and for Australia's regional and national economies. Therefore, the impacts that climate change will bring to the Australian tourism industry must be thoroughly analysed in order to best prepare destinations for an uncertain future.

Table 2.3 Adaptation for Tourism

Sector	Adaptation option	Underlying policy framework	Key constraints and opportunities for implementation
Tourism	Diversification of tourism attractions and revenues; shifting ski slopes to higher altitudes and glaciers; artificial snow-making	Integrated planning (e.g. carrying capacity; linkages with other sectors); financial incentives, e.g. subsidies and tax credits	Appeal/marketing of new attractions; financial and logistical challenges; potential adverse impact on other sectors (e.g. artificial snow-making may increase energy use); revenues from 'new' attractions; involvement of wider group of stakeholders

Source: (IPCC, 2007a).

A report by Amelung, Nicholls and Viner (2005) looked at tourist comfort levels by investigating likely changes in the suitability of tourism at various destinations due to climate change. The results, which were based on the IPCC emissions scenarios, suggest a definite poleward shift in maximum tourism comfort, with the most ideal conditions for tourism activity in the northern hemisphere shifting to the countries of northern Europe and Canada (Amelung et al., 2005). In contrast, Amelung et al. (2005, p. 292) suggest that “the regions of Spain, France, Italy, Greece, Turkey, and others that currently attract the traditional ‘sun and sand’ summer vacationer are likely to become too hot for comfort in the current ‘summer peak’ season”. Such changes would not only make some destinations less appealing to tourists and others more appealing, but also impact upon seasonal demand.

Although the negatives of climate change appear to outweigh the positives, it is also important for destination managers to identify any opportunities brought about by climate change. Whether this is decreasing seasonality or an increasing number of beach days, understanding the implications of climate change for tourism, both good and bad, is necessary to gain a complete picture of possible impacts and plan accordingly. Figure 2.1 demonstrates that countries from the north, which are responsible for a large share of anthropogenic climate change, as potential winners, whilst countries from the south, who contribute relatively little to climate change, are the major losers (Ehmer & Heymann, 2008). However, there are regional particularities within countries, such as their resilience to climate change impacts and their ability to adapt, that influence their individual situation.

Adaptation provides the tourism sector with measures to deal with the environmental changes caused by climate change. Tourism adaptation offers processes that the industry can explore in order to reduce the negative effects of climate change, to achieve sustainable tourism development in the longer-term (Turton et al., 2009).

2.8 Types of Adaptation in Tourism

Climate change will affect various components of the entire tourism system including tourist infrastructure facilities and natural ecosystems at the TDR and tourist attitudes within various TGRs. Adaptation can assist in “climate proofing” a destination. Scott et al. (2006, p. 4) describe three broad types of adaptation, as shown below. Each type will be defined and then discussed in relation to tourism destinations.

- 1) **Technical Adaptation** – specialised equipment, use of new technologies and innovations, for example desalination plants or snow-making machines.
- 2) **Business Management** – Operational techniques such as marketing and pricing changes, or product/market diversification.
- 3) **Behavioural Adaptation** – adjusting the type of clothing worn, changing the activities engaged in, adjusting the timing of the visit, changing the destination altogether.

Technical Adaptation involves utilising technology and being innovative in order to determine methods of coping with climate change and vulnerability. This form of adaptation often requires substantial investment, for example snow-making machinery, desalination plants, weather forecasting and early warning systems. Due to the cost and complexities of many technical adaptation options, this type of adaptation often requires government backing.

Business Management techniques can be used by tourism operators, regional governments and tourism industry associations to reduce their vulnerability to climate change. Climate change may mean changes in seasonality for many regions, whereby the relative attractiveness of the destination at different times of the year changes. This may require destination managers to change their marketing approach to try and

increase or decrease travel during certain times, and/or redirect tourists to different locations or encourage them to engage in different activities. Indeed, changing climatic conditions may present new opportunities for product diversification. For example, an increasing number of warm days and less rainfall at a destination may enable it to further promote a range of outdoor activities. Another example is ski resorts, many of which have diversified their tourism product by including non-winter activities, such as mountain biking, white water rafting, golf, etc. subsequently making them 'four season resorts' (Scott et al., 2006).

Behavioural Adaptation is normally associated with the tourist, as they have the ability to decide on the tourism activities they engage in, including when and where they do them. Spatial, temporal and activity substitution subsequently provide tourists with tremendous adaptive capacity. Several articles and reports have been written on the affects of climate change on consumer behaviour (Amelung et al., 2005; Hamilton et al., 2005; McEvoy et al., 2008) and changes in weather conditions are likely to have an increasing impact on destination appeal, leading to changing visitation patterns and/or decline in visitor numbers (Amelung et al., 2005). The relative adaptive capacity of different tourism stakeholders is discussed in the following section.

Although behavioural adaptation is generally performed by the tourist, there are some strategies that destination managers can use to affect behaviour. This can be achieved by using two of the previously discussed types of adaptation (technical and business management) to manipulate the behaviour of tourists. Two simple examples of this are the promotion of sun-smart behaviour at summer destinations whereby tourists are encouraged to wear sunscreen and other protective clothing to avoid sun damage, or the development of sheltered walkways, that encourage tourists to move along pre-defined, protected areas. Destination managers can also adapt the behaviour of employees by setting regulations or guidelines regarding work practices. For example, policies can be put in place to limit outdoor activities during particularly sunny parts of the day, or dress codes can be created to protect employees from hostile weather conditions. Therefore, it is possible for destination managers to influence the behaviour of both tourists and employees, if not always control it.

As destinations cannot relocate, adaptation at this level requires the “greatest ingenuity, innovation, and government support” (DeLacy, 2007, p. 24). Given that despite researchers best efforts, uncertainty remains regarding future emissions scenarios, future mitigation, and global and regional vulnerability; flexibility remains key to successful adaptation (AGO & DEH, 2005). Adaptation should be designed to fit in with sustainable development goals, and where possible dual or multiple benefits should be sought. For example, encouraging the use of rainwater tanks may not only offset decreasing rainfall brought about by climate change, but it may also free up water supply for agriculture or other purposes, as well as reducing running costs. Often, within the regional tourism sector, adaptation implemented by one stakeholder will affect others. As stated by Scott et al. (2006, p. 16), “climate adaptations by each of the major actor groups in the tourism-recreation sector are not taken in isolation as a single discrete action”. Consequently, in order to place adaptation within a sustainable development context, a cooperative approach to adaptation is required. This will commonly involve various stakeholders and often include multiple adaptation strategies.

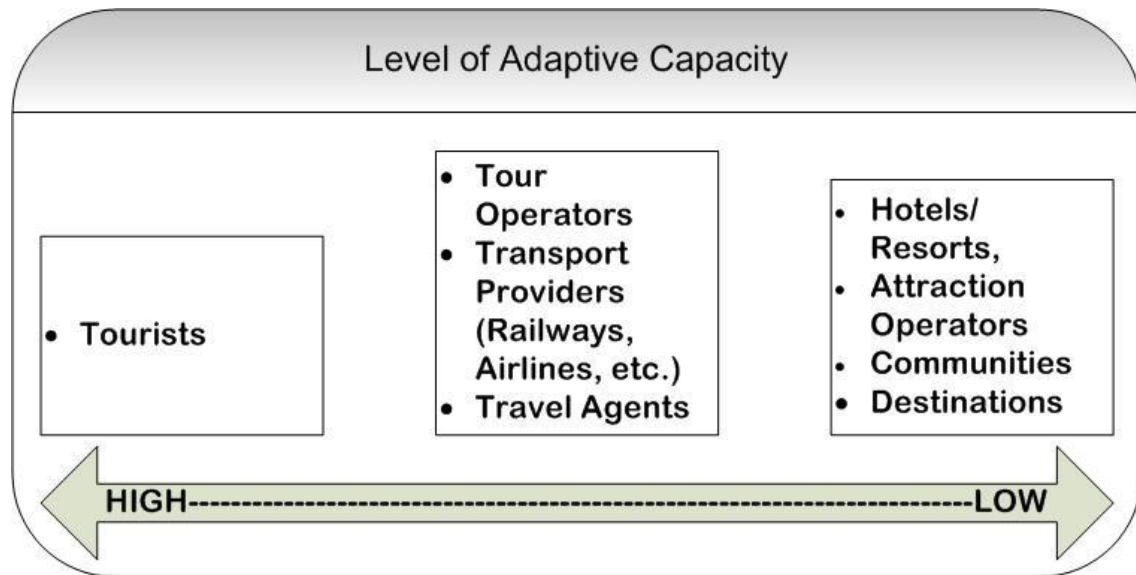
2.8.1 Adaptive Capacity in Tourism

Adaptive capacity is defined by (Fussler & Klein, 2006, p. 19) as “The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences”. The degree of adaptive capacity depends on the ability of actors in a system to influence resilience (Walker, Holling, Carpenter, & Kinzig, 2004). In tourism, which involves a fundamental relationship between the natural and bio-physical environments, this refers to the capacity of humans to manage resilience (Adger, 2006a; Walker et al., 2004). The process of building adaptive capacity includes adjustment to behaviour, and resource and technology use (Simpson et al., 2008).

The adaptive capacity of a region can influence its ability to reduce overall vulnerability to climate change impacts. However, this will be dependent on the climate’s relative importance at the destination, and the potential for alternative forms of tourism. For example, a ski resort’s ability to adapt to warmer temperatures and reducing snowfalls will be dependent on its level of innovation and the financial resources available. Tourism as a whole has shown great propensity for adaptation; this has been evident by

its ability to cope with a variety of recent pressures such as terrorism, severe acute respiratory syndrome (SARS) and tsunamis (Scott et al., 2008; UNWTO, 2007). However, the adaptive capacity of different tourism sub-sectors, such as accommodation or transportation, may vary greatly, as is shown in Figure 2.2.

Figure 2.2 The relative adaptive capacity of tourism stakeholders



Source: Adapted from Scott and Jones (2006).

Destinations are somewhat limited in their ability to adapt, as unlike tour operators or tourists themselves, they do not have the ability to relocate. Whilst individual adaptation will be dependent on personal knowledge, and rational self-interest (Simpson et al., 2008), a destinational adaptation approach is more complex, due to the number the stakeholders involved and their links to various components of the tourism system. A destination's ability to be proactive and make well-informed, long-term decisions is needed in the development and implementation of appropriate adaptation strategies. However, this may prove difficult for regional destinations due to the high number of small and medium enterprises (SMEs) in the tourism sector, who do not have the ability or willingness, to implement major adaptations (Turton et al., 2009). In contrast, larger stakeholders, such as government departments and larger tour operators are more likely to have the human and financial resources to enact such changes.

Adaptation strategies are intended to prepare and protect tourism destinations from the inevitable impacts of climate change and building capacity will assist in the planning process by incorporating long-range climate change forecasts into ongoing discussions

(Sovacool, D'Agostino, Meenawat, & Rawlani, 2012). Adapting to climate change will require a comprehensive response to regional vulnerability incorporating all the determinants of adaptive capacity including economic resources, technology, information and skills, infrastructure, institutions and equity (see Table 2.2, Determinants of adaptive capacity).

2.9 Analysis of Tourism Adaptation Frameworks Available

Various reports (AGO & DEH, 2005; Australian Government, 2007; COAG, 2007) have been commissioned to assist enterprises or communities adapt to climate change, however, only Simpson et al. (2008), Becken and Hay (2007) and Scott et al. (2006) have specifically considered adaptation in tourism. Research into how Australia's regional tourism destinations can adapt has not been reported. Although reports, such as that written by the Prime Minister's Science, Engineering and Innovation Council (PMSEIC) Independent Working Group (2007) do discuss regional impacts and adaptation, they are not tourism specific. Moreover, this PMSEIC report states that further research is required on regional level climate change impacts and vulnerability in key sectors, identification of the adaptation options and their likely effectiveness and analysis of potential direct and indirect effects of planned adaptation measures (PMSEIC, 2007, p. 45). It is acknowledged that the aforementioned frameworks for adaptation are relevant to this research; however, given the focus on tourism within this dissertation, the remainder of this section will focus on adaptation frameworks in this sector.

Recent frameworks for tourism adaptation to climate change impacts have been put forward by Simpson et al. (2008), Becken and Hay (2007) and Scott et al. (2006). Of these, the approach by Simpson et al. (2008, p. 35) is the most comprehensive, as it considers the sequence of events in adaptation as "an iterative cycle of problem definition, adaptation implementation and evaluation of outcomes" whilst providing lines for feedback between the various stages. This model is also the most comprehensible of all the models available; however it does not present information on the different types of adaptation available.

The process of adaptation as outlined by Simpson et al. (2008) involves seven steps. The first step involves engaging the relevant stakeholders. This is identified as “a vital aspect in determining the eventual success of the adaptation process...” (Simpson et al., 2008, p. 36). Although emphasising the importance of a participatory, multi-stakeholder approach, Simpson’s model does not consider the role of the tourist at any stage. Despite stating that “stakeholders should be sought, both those directly involved in the tourism sector or whose livelihoods are affected by tourism”, tourists themselves are not included amongst the plethora of suggested stakeholders (Simpson et al., 2008, p. 36). As tourists have been identified as having the greatest adaptive capacity of all the tourism stakeholders, it is suggested that it is important to understand how any implemented adaptation may impact on their perceptions of a destination, behaviour at the destination, or decision to visit a destination. However, neither Simpson’s model, nor any existing adaptation models incorporate the views of the tourist.

The second stage involves screening for vulnerability. This section discusses the process of identifying current and potential climate change risks, however, no discussion of opportunities is provided. Scott (2008) identifies that a risk in one area of the tourism system may be offset by an opportunity in another. Therefore, it is also important to consider any potential opportunities that may arise due to climate change (as identified in Section 2.7).

Stage three provided a description of how to assess adaptive capacity. This section focuses on the eight determinants of adaptive capacity as outlined by the IPCC (2001). It is unclear if the adaptation process is designed for application at the local or national level and this is important as adaptive capacity is scale-dependent and different indicators are required to capture various elements of adaptive capacity, dependent on the scale of adaptation (Adger & Vincent, 2005).

Stage four discusses the process of identifying adaptation options and creating a portfolio of preparatory and participatory activities (Simpson et al., 2008). This process incorporates a range of stakeholder views and may involve activities including field interviews, workshops, the development of an adaptation team, or Delphi techniques (Simpson et al., 2008).

Stage five of Simpson's (2008) model involves an evaluation of the adaptation options identified in the previous stage. Evaluation matrices are provided which illustrate a range of criteria upon which adaptation options should be evaluated (e.g. cost, effectiveness, ease of implementation). Further evaluation criteria proposed include 'Acceptability to local stakeholders' and 'Acceptability to financing agencies/ministries/donors' Simpson et al. (2008, p. 45). However, despite proposing an adaptation process specifically for the tourism sector, 'Acceptability to tourists' is not mentioned in the list of evaluation criteria.

Stage six discusses the implementation process and identifies the roles of various stakeholders, the resources required, and the specific timeline for adaptation (Simpson et al., 2008). The specific components of the implementation plan are drawn from a USAID report (USAID, 2007).

The seventh stage identifies the significance of monitoring and evaluating adaptations. Importantly, it is recognised that complete evaluation of adaptation may prove difficult "as the long-term risks posed by climate change that required the adaptation may not be realised for many years (even decades)."

The model presented by Becken and Hay (2007) differs from Simpson's (2008) and Scott's (2006), as it takes a risk science approach to adaptation. A risk science approach involves estimating the risk of various impacts, by determining the likelihood of exposure to various stressors and the magnitude of consequences to such exposure, in order to determine risk profiles (ACT Insurance, 2004; Australian Government, 2006). A risk science (or risk management) approach has been widely used when examining adaptation strategies (AGO & DEH, 2005; Australian Government, 2006; COAG, 2007), and any adaptation framework would benefit from incorporating such an approach. For example, a risk science element could be inserted into Step 2 of Simpson's (2008) framework, "Define the problem". By doing this, destination managers would receive a more comprehensive model for review, as well as enabling them to categorise and rank the risk of various stressors, and prioritise the types of adaptation to be implemented.

The report by Scott et al. (2006) provides a valuable investigation of the types of adaptation available in the tourism sector. However, rather than providing a detailed framework for adapting to climate change impacts, they provide a conceptual framework for considering adaptation to changes in climate. That is, rather than providing a representation of the stages involved in adaptation, they present a number of elements of tourism adaptation and attempt to clarify their relative variability, need for coping strategies and adaptive capacity. Furthermore, as outlined in Section 2.8, they also provide information on three basic forms of adaptation: behavioural, technical, and business management. This framework may assist individuals in understanding the relative importance of various types of adaptation in tourism. However, it does not provide policy-makers or destination managers with a tool to better understand the process of adaptation or the many stages involved.

As discussed throughout this chapter, there are also possible opportunities brought about by climate change, however the aforementioned models all focus on the risks. In order to provide a more holistic view of adaptation, both identifying and assessing these positive opportunities should also be incorporated into any model.

2.10 Chapter Summary

This chapter provided a review of the literature pertaining to climate change adaptation. The chapter introduced the relationship between climate change and tourism, and gave insight into the potential impacts for different geographic regions and sectors of the economy. The concepts of vulnerability and resilience were introduced, and both the bio-physical and socio-economic dimensions of adaptation were discussed. An apparent lack of research into tourism adaptation was identified and the issues involved with adaptation for the tourism sector were outlined.

The chapter then defined and discussed three types of adaptation possible for the tourism sector, before outlining the role of adaptive capacity. This discussion of adaptive capacity noted the relatively high adaptive capacity of tourists in comparison to tourism destinations. Tourism destinations are unable to relocate and subsequently must be proactive in planning and implementing adaptation strategies, whereas tourists are more flexible in terms of the timing and location of their holidays.

Finally, this chapter provided a review of the existing climate change adaptation frameworks/models for the tourism sector. This analysis found that there were very few adaptation models or frameworks available that specifically considered tourism and none that focused on regional tourism destinations. Furthermore, this review ascertained several shortcomings, including the omission of a consumer perspective and the widespread disregard of possible opportunities.

The following chapter will further investigate the role of the consumer by providing a review of the relevant literature. In particular, literature pertaining to the consumer decision-making process and the role of attitudes in this process will be explored.

Chapter 3. The Tourist Perspective

3.1 Introduction

As identified in Chapter 2 none of the existing tourism adaptation frameworks include reference to the tourist. Given the relatively high adaptive capacity of tourists (see Figure 2.2), it is necessary to investigate how tourists (consumers) will react to the proposed adaptation options. As the incorporation of a consumer perspective regarding adaptation is a significant gap in the literature, this chapter will consider the various aspects of consumer behaviour and tourism, and specifically, focus on the role of consumer attitudes in determining destination choice.

Understanding how consumers make decisions and what individual characteristics influence them during this process is essential to this research. It was identified in the previous chapter that tourists are becoming more environmentally aware and that concerns about climate change will influence behaviour and destination choice. (Amelung, Nicholls, & Viner, 2005; Berritella et al., 2005; Hamilton, Maddison, & Tol, 2005; Hamilton & Tol, 2004). Understanding tourist's attitudes to potential adaptation options will assist in the decision-making process. Whilst other characteristics, such as personality and motivation, play an important part in the consumer decision-making process, a review of the consumer behaviour models, and models of destination choice, show that attitudes play a fundamental role in the decision-making process (Engel et al., 2006; Pizam & Mansfeld, 1999; Um & Crompton, 1990).

Initially, the chapter will provide a broad overview of consumer behaviour, then more specifically, consumer behaviour in tourism. Various models of consumer decision-making will be analysed, followed by an explanation of the role of attitudes and a review of the New Ecological Paradigm (NEP) which is used to determine environmental attitudes.

3.2 Consumer Behaviour

Although there are numerous definitions of consumer behaviour (Pachauri, 2002; Schiffman et al., 2001; Swarbrooke & Horner, 1999), they all include studying the activities and processes involved when people are selecting, purchasing and disposing of goods or services. This is reiterated by Solomon, Russell-Bennett and Previte (2010, p. 5) who state that “there are three phases of consumer behaviour; pre-consumption, consumption and post consumption”. It is argued that consumer behaviour as a distinct field of study first emerged during the 1960s (Pachauri, 2002), and although some social scientists limit their definitions of behaviour to physical action that results from those decisions, others recognise the importance of investigating both the mental decisions and the physical actions that result from those decisions (Schiffman et al., 2001). Consumers’ decision-making behaviour is influenced by a number of internal and external aspects, which will be discussed later in this chapter. It is important to recognise the complexity of consumer behaviour due to the psychological process which the consumer goes through during the decision-making process. Consequently, the following sections will examine why academics study consumer behaviour, what the major aspects of consumer behaviour are, and analyse in detail how consumers make decisions. This will help in understanding how tourists may respond to climate change adaptation strategies at a destination.

3.3 The Study of Consumer Behaviour

Modern consumers exhibit diversified preferences and less predictable purchase behaviour (Schiffman et al., 2001). However, despite this prevailing diversity, there also are many similarities between both individuals and groups. Consequently, the objective of the study of consumer behaviour is to provide greater understanding of consumers in order to better understand their wants and needs, and in turn ensure the success of organisations, both profit and non-profit.

A key element of consumer behaviour that is used to meet the needs of specific groups of consumers is segmentation. Market segmentation is defined by Blackwell, Miniard and Engel (2006, p. 41) as “the process of identifying groups of people who behave in similar ways to each other, but somewhat differently to other groups”. By dividing the market into smaller, more homogenous groups, this enables the design and development

of products, services and marketing and promotional campaigns tailored to meet their specific wants and needs.

According to Swarbrooke and Horner (1999), there are typically five different types of segmentation variables consumer markets can be divided by: demographic, geographic, socio-economic, psychographic and behavioural segmentation. Each of these segmentation types will now be discussed briefly. Demographic segmentation is perhaps the most well-known and widely used form of market segmentation. It involves grouping individuals based on variables such as age, gender, religion, nationality and education level. Geographic segmentation involves dividing the market according to location. According to Schiffman et al. (2001, p. 59), the theory behind this strategy is “that people who live in the same area share some similar wants and needs, and these wants and needs differ from those of people living in other areas”. For example different purchasing patterns may appear between rural and urban communities, or between different cities within one country. Socio-economic segmentation attempts to divide the market using measures of social class such as education, income and occupation (Engel et al., 2006; Schiffman et al., 2001). Although there is still debate amongst researchers as to what constitutes the underlying dimensions of social class, the concept remains a valid means of segmentation which can assist marketers in developing appropriate marketing mix strategies based on social class (Schiffman et al., 2001). Behavioural segmentation groups consumers according to their relationship with a particular product (Swarbrooke & Horner, 1999). Using this theory consumers are divided into groups based on variables including their knowledge, attitudes, usage or responses to a product. Psychographic segmentation is based on the theory that individual lifestyle, attitudes, opinions and personality factors determine the behaviour of consumers. According to Swarbrooke and Horner (1999, p. 97), this method of segmentation is “the most modern and is also the most fashionable with marketers at the moment”. However, more recent research still claims that despite its benefits, psychographic segmentation remains little used, understood or appreciated (Baharun et al., 2010).

It is clear that understanding consumer behaviour is a vital aspect of marketing. Market segmentation can assist destination managers to understand the ways that a destination can effectively segment tourism markets, and therefore identify and attract tourists from

key target markets (Tkaczynski, Rundle-Thiele, & Beaumont, 2010). Researchers need to understand the many elements of consumer behaviour to best position their products or services. Indeed, a successful marketing approach will often utilise a combination of different segmentation techniques in order to get a clearer description of the consumer (Hauser, Orr, & Daugherty, 2011). This enables organisations or destinations to engage more effectively in target marketing. Target marketing helps sellers more efficiently use their marketing resources by developing a product tailored towards a specific target market (segment). Marketers also use these promotional techniques to vary the image of their products so they appear to meet the specific needs of certain target markets (Schiffman et al., 2001). This process is known as marketing positioning.

Marketing positioning is defined by Swarbrooke and Horner (1999, p. 436) as “the position in the market which the product is perceived to have, in the minds of consumers, in relation to such variables as quality, value-for-money and level of service”. Marketers try to differentiate their product by focussing on attributes they claim will fulfil customer’s needs better than their competitor’s. Indeed Schiffman et al. (2001, p. 163) claim that the positioning of a product or service in the mind of the consumer is “probably more important to its ultimate success than its actual characteristics”.

3.4 What are the Major Aspects of Individual Consumer Behaviour?

There are a range of psychological concepts that account for the behaviour of individual consumers. These individual determinants of consumer behaviour can provide further understanding of the many facets involved in consumer behaviour. These variables are personal in nature and influence the way in which consumers proceed through the decision-making process. Five major individual determinants of consumer behaviour are personality, motivation, perception, learning and attitudes (Engel et al., 2006; Moutinho, 1987; Pachauri, 2002; Schiffman et al., 2001).

Although each of these elements are important in understanding what determines individual consumer behaviour, the first four aspects will only be briefly discussed before a more detailed review of attitudes is presented. This is because, although the importance of each characteristic is recognised, the understanding of attitudes and their

particular influence on consumer behaviour is central to this thesis, as will soon be revealed.

Personality focuses on the personal characteristics of an individual; those specific qualities, attributes, traits, factors and mannerisms that distinguish one individual from other individuals (Schiffman et al., 2001). Personality is a concept that emphasises the effect of an individual's past history on his or her current behaviour, and theorists view personality as a collection of traits that impacts on behaviour (Moutinho, 1987). Examples of various personality traits include: anxious, self-conscious and adventurous.

According to Moutinho (1987, p. 16), motivation refers to “a state of need, a condition that exerts a “push” on the individual toward certain types of action that are seen as likely to bring satisfaction”. Motivation is the driving force that impels individuals to act, in order to reduce the tension that is created, as a result of an unfulfilled need (Schiffman et al., 2001). Motivations may stem from physiological or psychological needs, and several motivation theories exist that examine the role of motivations on individual behaviour (Herzberg, Mausner, & Snyderman, 1959; Maslow, 1943). There are numerous examples of individual motivations including hunger, thirst, need for shelter, power, achievement and affiliation.

Two of the most commonly cited and discussed motivational theorists are Maslow (1943, 1954) and Herzberg (1959). Maslow, a behavioural scientist, developed a theory about the rank and satisfaction of various human needs and how people pursue these needs. Herzberg, also a behavioural scientist, proposed a theory about job factors that motivate employees, and developed the motivation-hygiene theory. Tourism scholars have long recognised the importance of studying motivations for travel to tourism destinations to better understand and predict travel the travel decisions and behaviour of tourists (Sirakaya, Uysal, & Yoshioka, 2003).

Perception is defined by Schiffman (2001, p. 148) as “the process by which an individual receives, selects and interprets stimuli to form a meaningful and coherent picture of the world”. An individual will organise his or her perceptions and knowledge, in order to produce meaningful relationships among separate elements (Moutinho, 1987). It is important to note that consumers make their decisions based upon their

perceptions, regardless of how accurate or inaccurate these may be (Pizam & Mansfeld, 1999). Consequently, it is essential that information is available regarding any planned adaptation options to allow consumers to make an informed decision on whether this will affect their decision to visit a destination or not.

3.5 Attitudes

Attitudes are described by Schiffman et al. (2001, p. 218) as “an expression of inner feelings that reflect whether a person is favourably or unfavourably predisposed to some object” such as a particular product, brand or service. There is general agreement that an attitude is created through learning and experience (Moutinho, 1987; Pachauri, 2002; Schiffman et al., 2001) and that due to this attitudes can change. Attitudes are generally considered to consist of three components: *affect*, *cognition* and *behaviour* (also known as the conative component) (Moutinho, 1987; Pachauri, 2002).

The affective component refers to how a consumer feels about a particular product and implies an emotional judgment (Moutinho, 1987; Pachauri, 2002). The cognitive component refers to the beliefs a consumer has about a product. According to Moutinho (1987, p. 19), this consists of “the beliefs and opinions, based on some evidence, that an individual holds about something”. The behaviour or conative component is the action tendency or behavioural intention in regards to a particular product (Moutinho, 1987; Pachauri, 2002).

It is important to understand that attitudes vary along several dimensions. According to Blackwell, Miniard and Engel (2006), two fundamental properties of attitudes are their *valence* and *extremity*. Attitude *valence* refers to whether an attitude is positive, neutral or negative. And attitude *extremity* refers to the weight or intensity of this attitude. From these two dimensions it is clear that an attitude may fall anywhere on the continuum between extreme dislike towards an attitude object, to extreme liking of an attitude object.

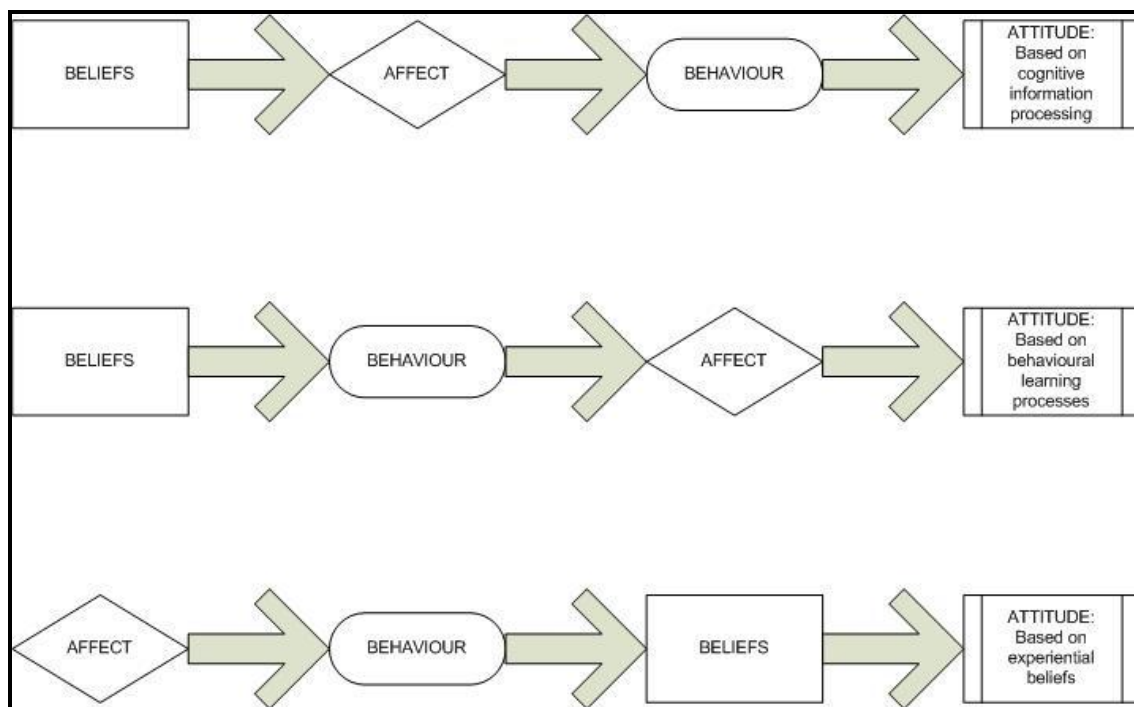
Whilst all three components of an attitude are important, their relative importance will depend on the consumer’s level of motivation and involvement in the buying process

(Pachauri, 2002). The sequence in which a consumer considers each of the three components is dependent on what the attitude is based upon:

According to the theory of cognitive information processing, attitudes are formed in the order of beliefs, affect, and behaviour. Attitudes based on behavioural learning follow the beliefs, behaviour, and affect sequence. Attitudes formed based on the experiential hierarchy follow the affect, behaviour, and beliefs route. (Pachauri, 2002, p. 332)

Figure 3.1 helps to further illustrate the three hierarchies of effects that may come into play during the formation of attitudes.

Figure 3.1 The three hierarchies of attitude formation



Source: Adapted from Pachauri (2002)

Previous discussions of attitude formation are in-line with traditional or rational views, and stress the fact that attitude formation occurs prior to behaviour. However, that may not always be the case. Cognitive dissonance theory as described by Schiffman et al. (2001) suggest that the conflicting thoughts, or dissonant information, that follows a purchase may compel a consumer to change their attitude towards their purchase and towards the product. Post-purchase dissonance is more likely to occur with high-involvement products such as cars, flat-screen televisions or holidays. For example, an individual may feel uncertainty or regret about their decision to have their latest holiday

in Thailand, after returning home to hear of a friend's similar, yet less expensive trip to Vietnam.

Attitudes can be formed in a number of ways, and it is fair to assume, at least with high-involvement purchases such as those in travel and tourism, that a positive attitude towards a product is likely to correlate positively with purchase behaviour. Where there is a high economic and/or emotional price to pay, it is likely that there needs to be a positive attitude developed towards the product before it is even considered for purchase. Furthermore, from discussion in previous sections, it is understood that attitudes are learned and therefore can change due to new knowledge and experience. The specific role of attitudes in tourist behaviour and destination choice is discussed later in this chapter which highlights the importance of this concept to this study.

3.6 How Consumers Make Decisions

Simply put, a decision is a choice between two or more alternatives. However, the amount of effort that goes into each decision can vary greatly. Understanding the decision-making process involved is important for marketers and managers, and consequently researchers often characterise decisions along a continuum with habitual or routine decision-making at one end and extended problem solving at the other (Engel et al., 2006; Solomon et al., 2010). Decisions that fall somewhere between these two variables are characterised by what is termed limited problem solving (Engel et al., 2006; Schiffman et al., 2001; Solomon et al., 2010). Each type of decision-making is briefly described below.

Habitual Decision-making (HDM) – Also known as Routinised Response Behaviour (Schiffman et al., 2001). Decisions made at this level are usually based on some experience with the product and may be made *automatically* with little or no conscious effort (Solomon et al., 2010). Such a decision is the polar opposite to EPS.

Limited Problem Solving (LPS) – Is more straight forward than EPS and usually involves less time searching for information and evaluating alternatives. The consumer may have some concept of what they are after and why, but need

further information to refine their decision. Indeed, Schiffman (2001, p. 520) describe their search for information as “more like ‘fine-tuning’ (where) they must gather additional information concerning each of the brands to be considered”. Consequently, when undertaking a limited problem solving process consumers are often not motivated to search extensively for information or to rigorously evaluate each alternative, instead using simple decision rules (heuristics) to choose among alternatives (Pachauri, 2002).

Extensive Problem Solving (EPS) – Involves a decision whereby the outcome is thought to carry a fair degree of risk. Consequently the consumer looks for a large amount of information concerning the product or service and a large amount of thought and evaluation of alternatives occur prior to making a purchase. Travel and tourism are often characterised by EPS (Hong, Lee, Lee, & Jang, 2009), and this extended process increases the information sought about the destination.

3.7 Heuristics

During the consumer decision-making process, consumers often develop short-cut decision-making rules called ‘heuristics’ in order to simplify this process. According to Schiffman et al. (2001, p. 528), “these rules reduce the burden of making complex decisions by providing guidelines or routines that make the process less taxing”. The applications of heuristics or ‘rules of thumb’ are influenced by both individual factors (e.g., personality differences) and situational factors (e.g., urgency of the decision); thus it is unlikely that the same decision by the same consumer will apply in a different situation or with another consumer in the same situation (Solomon et al., 2010).

These decision-making rules (heuristics) occur prior to making a purchase decision, and assist the consumer in making a speedy decision. Examples of heuristics applied by consumers include the positive relationship between price and quality, judgements regarding country of origin, the perceived relationship between certain brands and quality, and the availability of goods or services (Pachauri, 2002; Tversky & Kahneman, 1974).

While both extended and limited problem solving modes involve some degree of information search and evaluation of alternatives, at the other end of the choice continuum, habitual decision-making is undertaken with little or no conscious effort. Indeed, as stated earlier many habitual decisions require very little thought or effort, and are in fact largely characterised by what Pachauri (2002, p. 327) terms “automaticity”. Therefore it is safe to presume that heuristics play a greater role in HDM as opposed to LPS or EPS, where the perceived risk of the purchase is usually greater. The level of perceived risk, whether it is financial risk, physical risk, psycho-social risk, or time generated risk, influences the level of involvement with the purchase. Consumers tend to engage in more external search when purchasing higher priced, more visible, and more complex products, such as most travel and tourism products, as these products intrinsically create greater perceived risk. The higher the levels of perceived risk, the higher the level of involvement, and the more detailed the information search and deliberation process are likely to be (Engel et al., 2006). Although some tourism-related consumer behavior may involve habitual decision-making in certain circumstances, it is more likely to involve EPS or at least LPS.

3.8 Modelling Consumer Behaviour

The purpose of consumer behaviour models is to attempt to give a simplified version of the relationship between the various factors that influence consumer behaviour (Swarbrooke & Horner, 1999). According to Gilbert (1991, p. 93), models have proved useful as “a means of organising disparate knowledge of social action into a somewhat arbitrary yet plausible process of intervening psychological, social economic and behavioural variables”. There are numerous models of consumer behaviour available in the literature (Engel, Blackwell, & Kollat, 1979; Howard & Sheth, 1969), and their approach and utility can vary widely and is dependent largely on the level of information processing that goes into the decision. However, the primary reasons for developing consumer behaviour models are to assist in constructing a theory and to facilitate learning of what is presently known (Vignali, Gómez, Vignali, & Vranesovic, 2001).

Historically, the three major theories of consumer behaviour were put forward by Nicosia in 1966; Engell, Kollat and Blackwell in 1968, and Howard and Sheth in 1969. These models try to trace the psychological state of consumers from the point at which they become aware of the possibility of satisfying a particular need by purchasing a product or service, to their final evaluation of the consequences of their choice. In order to better understand the processes involved with consumer decision-making, several models have been developed. Swarbrooke and Horner (1999, p. 41) state that the purpose of consumer behaviour models is “to attempt to give a simplified version of the relationship of the various factors that influence consumer behaviour”. A simple model of consumer decision-making usually involves 5 stages: 1) problem recognition 2) information search 3) evaluation of alternatives 4) purchase decision, and 5) post-purchase evaluation (Schiffman et al., 2001).

The Nicosia model (1966) focuses on the buying decision for a new product. However, it focuses not on the decision itself, but the processes that precede and follow the act. It examines the flow of events, describing each sequential stage as a ‘field’. Field One represents the organisation’s attempts to communicate with the consumer and the predisposition of the consumer to act in a certain manner. Field Two involves the consumer in a search evaluation process; this stage is influenced by individual attitudes. Field Three reflects the actual purchase and the post-purchase feedback process (Abdallat & El-Emam, nd.; Swarbrooke & Horner, 1999).

The Engel, Kollat Blackwell model (1978) originated in 1968, was further developed in 1973 and revised in 1978 (Vignali et al., 2001). This model treats the individual as being a system with outputs that responds to inputs. The model focuses on the five basic decision-process stages: 1) problem recognition; 2) information search; 3) evaluation of alternatives (during which beliefs may lead to the formation of attitudes, which in turn may result in a purchase intention); 4) purchase; and 5) post purchase behaviour. But it is not necessary for every consumer to go through all these stages; it depends on whether it is an extended or a routine problem-solving behavior (Abdallat & El-Emam, nd.; Vignali et al., 2001) as discussed in Section 3.6. Attitudes are again shown as a central construct within the decision-making process, and they are displayed in the continuum of beliefs, attitudes, purchase intention and purchase behaviour.

According to Swarbrooke and Horner (1999, p. 41), “the most frequently quoted of all consumer behaviour models is the Howard-Sheth model of buyer-behaviour which was developed in 1969”. This model describes what happens in-between receiving a stimuli (input) and the action called the behaviour (output). This model provides a comprehensive review of consumer behaviour and is deemed essential as it highlights the importance of inputs to the consumer buying process and suggests ways in which the consumer orders these prior to making a purchase decision (Abdallat & El-Emam, nd.; Swarbrooke & Horner, 1999).

Attitudes are presented twice in this model. Firstly as a key component of the ‘Learning’ construct, which identifies various factors affecting the intention to purchase, and secondly as part of the ‘Outputs’ construct which describes consumer actions throughout the decision-making process, from the initial attention (or problem recognition) stage to the ultimate purchase. As with both the aforementioned models, attitudes are central to the Howard-Sheth model. The widespread use of attitudes in each of the so-called ‘Grand Models’ of consumer behaviour is evidence of its importance in the consumer decision-making process; this is particularly noticeable during the evaluation of the alternatives stage.

A review of the grand models of consumer behaviour provides valuable insight into the decision-making process when it comes to considering models in tourism; however, these models are not without their criticisms. The models assume that the individual consumer behaves in a predictable and rational manner (Pachauri, 2002; Swarbrooke & Horner, 1999; Moutinho, 1987). It is argued that not all decision making is rational and that the models take it for granted that the consumer seeks and uses information, as part of the decision making process (Pachauri, 2002, p. 326). However, it is uncertain if the same degree of rationality would apply to the routine purchase of milk, as would apply to the extended problem solving associated with the purchase of an international holiday. The models are also criticised for not considering the role of collective decision-making. This is an important consideration as family, and other reference groups, can influence the processes involved with decision making (Moutinho, 1987).

Despite their limitations, these models remain significant as they provide a valuable framework for future understanding of the consumer decision-making process. Section 3.9 will look at the development of consumer behaviour models designed specifically for tourism. Once again the value of the grand models will be made apparent, as many of the key elements of these models are visible throughout the tourism specific models.

3.9 Consumer Behaviour in Tourism

Tourism is a service, and marketing a service is different to marketing goods. Although the grand models of consumer behaviour provide a benchmark for the study of consumer behaviour, they do not consider the many differences between goods and services. Middleton (2001, p. 41) defines goods and services as follows:

Goods are products purchased through an exchange transaction conferring ownership of a physical item that may be used or consumed at the owner's choice of time and place. Services are products purchased through an exchange transaction that does not confer ownership, but permits access to, and use of a service, usually at a specified time and in a specified place.

Tourism-related services include services provided by hotels and restaurants, travel agencies and tour operators and tourist guides, amongst many others. The primary factors that generally distinguish a tourism product from most other products are, inseparability, heterogeneity, perishability and intangibility (Sirakaya & Woodside, 2004).

Inseparability means that the act of production and consumption of the tourism product occurs simultaneously (Middleton, 2001). So, the provision of the service requires that both the producer and consumer of the services partake in the process together. Therefore, the role of the staff, as the service providers, is viewed as inseparable from the service itself. Consequently, inseparability can be problematic as the attitude and behaviour of staff during the service encounter may impact on customer satisfaction.

Services are also heterogeneous, in that they can differ substantially across providers due to the human inconsistencies involved in service provision (Sirakaya & Woodside, 2004). Heterogeneity, taken literally, means that every service encounter is unique. This is due to the fact that human variability ensures that services are intrinsically variable. Middleton (2001, p. 43) argues that:

It would make no sense to apply this to frequently used convenience service products such as those marketed by banks, transport operators, post-offices and other large-large-scale service operators, all of which are committed to the specification and quality control of service performance.

However, due to the complexity and variability of most tourism services, heterogeneity can be seen as a valid implication for managers and service providers in this sector.

Perishability follows on from the fact that consumption of services must occur simultaneously with production; in the absence of a consumer the production potential is lost forever. For example, if a seat on a particular flight is not sold prior to the departure time, the opportunity to gain revenue for that particular service is gone forever.

Tourism products are also considered to be largely intangible in that they cannot be seen, touched or evaluated at the point of sale, prior to consumption (Middleton, 2001). The fact that tourism products cannot be sampled in advance makes the tourist's image of the product a fundamental component influencing the decision-making process (Pizam & Mansfeld, 1999).

Due to this intangibility and the difficulty in standardisation of the service encounter, tourism is often discussed as a high involvement service (Sirakaya & Woodside, 2004; Swarbrooke & Horner, 1999). As tourism service products are often expensive and there is no option for pre-purchase trial, a tourist is expected to be highly involved in the information search stage (Swarbrooke & Horner, 1999). This is reiterated by Sirakaya and Woodside (2004) who explain that tourists are more highly involved in the information search for tourism service purchases due to the perceived high level of emotional and financial risk associated with such a purchase.

From this brief discussion about tourism as a service, it is clear that tourism goods are quite different to regular consumer goods. Consequently, it is important to look at models of consumer behaviour that deal directly with tourism and the unique characteristics presented in this field of study. The following section will examine, in detail, the work that has been done in this area.

3.10 Models of Consumer Behaviour in Tourism

Any decision regarding climate change adaptation is likely to influence destination image and potentially destination choice. This is important as understanding the consumer perspective on adaptation is an integral part of this research and the proposed adaptation model. The utility and importance of the theories and models of destination choice provided by Moscardo (1996), Um and Crompton (1990), and Woodside and Lysonski (1989) are well recognised in the literature (Goodall, 1991; Moscardo, Morrison, Pearce, Lang, & O'Leary, 1996) with Sirakaya and Woodside (2005) claiming that research on tourist destination choice is generally informed by the 'grand models' of consumer behaviour.

There are several models which have been developed in an attempt to explain how consumers make decisions in regards to tourism and destination choice, and the following section will investigate some of the more prominent models in detail.

3.10.1 The "Grand Models" of Consumer Behaviour in Tourism

One of the earliest models that attempted to provide an understanding of tourist purchase behaviour was created by Wahab, Crampon and Rothfeld (1976). They saw the tourist purchase decision as a linear process from an 'initial stimulus' through the various stages of information search and evaluation of alternatives, to the final purchase 'decision', and ultimately the 'outcome' of the process which is either satisfaction or dissatisfaction. They believed that all decision-making goes through the same basic process, whether it is instantaneous or takes a period of years (Pizam & Mansfeld, 1999).

Another of the earlier authors to convert the general models of consumer behaviour to tourism was Schmoll (1977). Scholl designed a model describing the travel decision process based on the grand models of Howard and Sheth (1969) and Nicosia (1966) (Pizam & Mansfeld, 1999). The model is composed of four fields:

1. External stimuli such as trade publications.
2. Travel needs and desires determined by personality, socio-economic factors, attitudes and values.

3. External variables such as confidence in the travel agent, destination image, previous experience, and cost and time constraints.
4. Destination or service-related characteristics that have a bearing on the decision process and its outcome.

Schmoll (1977) saw these four fields as jointly influencing the travel decision process, and although it has its flaws, this model along with Wahab et al.'s (1976) remain amongst the most widely cited in regard to consumer behaviour and tourism (Pizam & Mansfeld, 1999; Sirakaya & Woodside, 2004).

Mathieson and Wall (1982) presented a linear five-stage model of travel buying behaviour. These five stages are similar to both the simple model of consumer decision-making discussed previously, and in-line with the grand models of consumer behaviour. The model is easily comprehensible; however this is perhaps due in part to its simplicity in comparison with other such models. The five stages of Mathieson and Wall's (1982) model of travel-buying behaviour are as follows:

1. Felt need or travel desire.
2. Information collection and evaluation image.
3. Travel decision (choice between alternatives).
4. Travel preparations and experiences.
5. Travel satisfaction outcome and evaluation.

A somewhat more recent model of vacation tourist behaviour was presented by Moutinho in 1987. The model consists of a flow chart that divides the model into three parts: 1) pre-decision and decision process; 2) post-purchase evaluation; and 3) future decision-making (Moutinho, 1987). This model is more complex than the models discussed previously, and each part is comprised of fields and sub-fields that attempt to give a more comprehensive view of the many elements that influence tourist's purchase decision.

Each of the models discussed have been adapted from general consumer behaviour for tourism, and each of them provide insight into the complexities of the consumer buying process. The author recognises that other models of consumer behaviour in tourism such as Van Raaij and Francken (1984) and Mayo and Jarvis (1981) do contribute further to

the discussion of the consumer buying process, however for the purposes of this thesis it was decided that the models discussed provide sufficient background information on the subject.

The models discussed in this section incorporated the entire consumer behaviour process including, motivation/stimulus, information search and evaluation of alternatives, the purchase decision and holiday itself, post-purchase behaviour, as well as future travel intentions. However, a considerable body of literature exists which focuses on the evaluation of alternatives and how consumers decide which destination they will visit. In order to gain further understanding of the influences on destination choice, the following section introduces some of the major models of destination choice. This is of great significance to this study, as research will be conducted to determine the influence of various adaptation options on consumers' decision to visit the Surf Coast region.

3.11 Models of Destination Choice

Whereas the previous section looked at the entire consumer decision-making process in tourism, the following section will focus on one part of the buying process: the evaluation of alternatives in tourism. This aspect of the buying process has been the focus of significant research. Of particular interest are the models developed by Moscardo (1996), Um and Crompton (1990), and Woodside and Lyonski (1989).

3.11.1 Woodside and Lyonski 1989

The “General Model of Traveller Destination Choice” was developed by Woodside and Lyonski in 1989 and it proposed that “tourism marketing and research policy should be based on consumer perceptions and preferences” (Woodside & Lyonski, 1989, p. 8). The model incorporates eight variables and nine relationships. This includes marketing and traveller variables, destination awareness, affective associations, traveller destination preferences, intentions to visit, situational variables, and choice (see Figure 3.2).

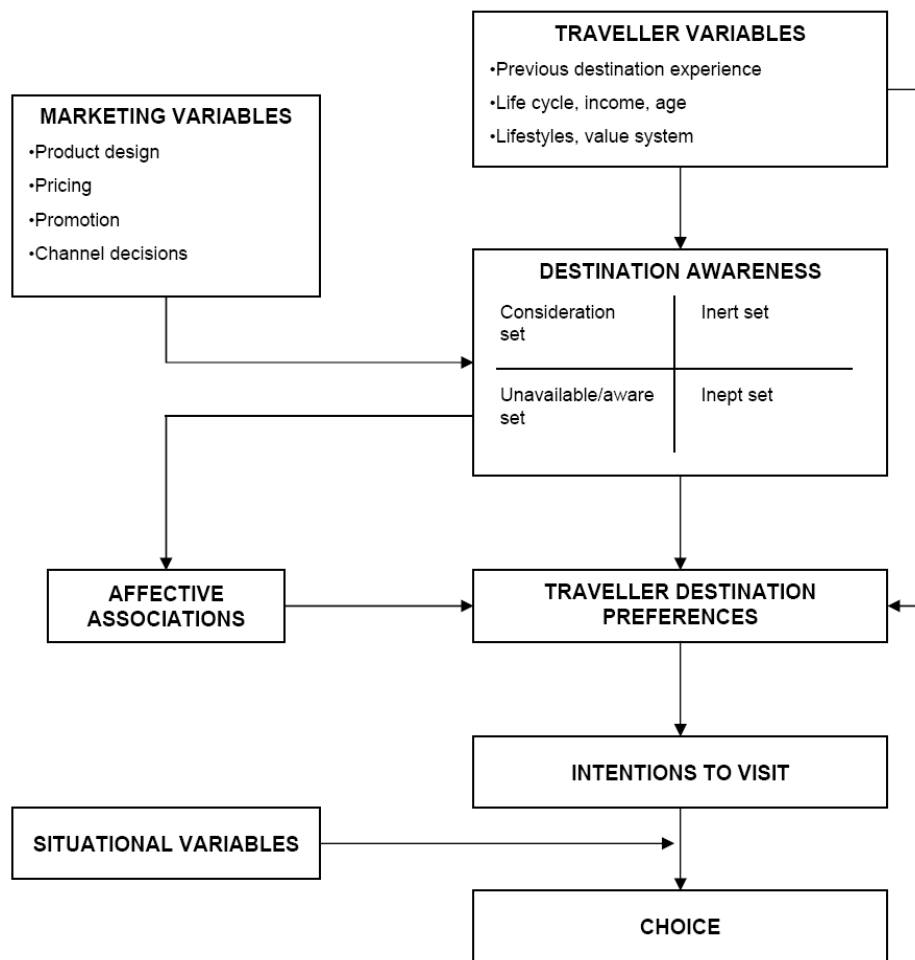
Although a relatively simple model, it demonstrates the importance of the categorisation process of various destinations, from which preferences, intentions and ultimately destination choice result. More specifically, before deciding on a preferred destination,

the model suggests that consumers place all destinations into one of four awareness sets: consideration set, inert set, unavailable/aware set and inept set.

The awareness set is simply the total number of destinations a potential tourist knows to be available as a potential destination choice. The inert set includes destinations the individual is aware of, but would not actively consider as a holiday destination. The unavailable/aware set consists of destinations the individual is aware of, however believes are unavailable or difficult to go to due to distance, access problems, etc. Finally, the inept set includes destinations rejected by the individual as it is perceived to comprise more negative than positive affective associations (Woodside & Lysonski, 1989).

Of these, the most interesting in terms of marketing is the consideration set (also known as the evoked set), as positive associations relate more with this set than those in other sets (Sirakaya & Woodside, 2004). The fact that a destination is in the consideration set for an individual consequently implies that this destination is more likely to be considered and possibly selected as the destination choice (Mair, 2005). Therefore, it is important for destinations to maintain their presence in the minds of consumers if they wish to even be considered as a potential holiday destination. It may be the case that changes in destination characteristics, such as the implementation of climate change adaptation options, may be of significance when tourists make their final choice in terms of destination.

Figure 3.2 Woodside and Lysonski's General Model of Destination Choice



Source: (Woodside & Lysonski, 1989).

3.11.2 Um and Crompton 1990

Um and Crompton (1990) proposed a “Model of the Pleasure Travel Destination Choice Process” which consists of five sets of processes and three different concepts – *external inputs*, *internal inputs* and *cognitive constructs*. *External inputs* are described as “the sum of social interactions and marketing communications to which the potential pleasure traveller is exposed” (Um & Crompton, 1990, p. 434). *Internal inputs* comprise the socio-psychological set and include personal characteristics such as motives, values and attitudes (Sirakaya & Woodside, 2004; Um & Crompton, 1990). *Cognitive constructs* represent “an integration of the internal and external inputs, into the awareness set of destinations and the evoked set of destinations” (Um & Crompton, 1990, p. 436).

The five processes identified in the model are as follows (Um & Crompton, 1990):

1. Belief formation (passive information catching).
2. Initiation of choice.
3. Evolution of evoked set.
4. Belief formation (active information searching)
5. Destination selection.

The model also identifies a three-stage process of destination selection that includes: (1) composition of awareness set; (2) evoked set; and (3) final destination selection, where the latter is a condensed form of the former (Sirakaya & Woodside, 2004; Um & Crompton, 1990). During the first stage, the traveller's mind is involved in passive information collection, whereas during the latter stages the individual is involved in active information searching from external sources such as media, family and friends, and is also influenced by internal psychological aspects such as motives, values and attitudes (Sirakaya & Woodside, 2004; Um & Crompton, 1990).

Um and Crompton (1990) argue that travel destination choice depends largely on the attitude towards each alternate destination. As potential travellers often have limited knowledge of destination attributes (if they have not visited there previously), the image and attitude dimensions of a destination become critical (Sirakaya & Woodside, 2004; Um & Crompton, 1990). This is likely to be the case irrespective of whether these offer a true representation of what the destination has to offer. This emphasis on the role of attitudes is what really differentiates Um and Crompton's (1990) model from that of Woodside and Lysonski (1989).

3.11.3 Moscardo et al. 1996

Following on from Um and Crompton was the model put forward by Moscardo, Morrison, Pearce, Lang, and O'Leary (1996). This model suggests "that the critical link between motives and destinations may be found in the understanding of activities" (Moscardo et al., 1996, p. 111). They suggest that activities are critical attributes of destinations which are evaluated by travellers according to their ability to satisfy specific needs. Unlike the other models discussed, Moscardo et al's (1996) model is not descriptive of the entire destination choice process, preferring rather to focus on how activities can be related to motives, and consequently to destination choice. Activities

are central to this model, as they are seen as the link between motives and destination choice. Moreover, motives are seen as providing potential travellers with expectations for certain activities at a destination, and activities are seen as key attributes of destinations (Moscardo et al., 1996). Consequently, the model presented is not explicitly concerned with the entire process of destination selection; rather it brings the focus on destination attributes, namely activities.

This review of the major models of destination choice provides foundational knowledge of the consumer decision-making process as it relates to destination choice. The models share similarities in that they each identify the influence of psychological (internal) and non-psychological (external) factors on destination choice. Table 3.1 summarises the key propositions, major contributions and limitation of each of these models.

Table 3.1 Summary of the key propositions, major contributions and limitations of the discussed models of destination choice

Author/Year	Key propositions	Major contributions	Limitations
Woodside & Lysonski (1989)	<p>Destination choice is a result of a categorisation process.</p> <p>Awareness of a tourism product will transfer the same from long-term memory to working memory causing that product to be chosen over other possible products.</p> <p>Cognitive and emotional factors mediate the relationship between choice sets and the actual choice.</p> <p>Choice is affected by the interaction of intention to visit and situational variables.</p>	<p>Parsimony, simple but theoretically sound perspective on tourists' decision processes.</p> <p>Integration of various disciplinary knowledge into one comprehensive model of tourist decision-making.</p> <p>Addition of variables that were overlooked by previous models (e.g., affective associations, traveller destination preferences, situational variables and their place of impact)</p> <p>Size of the consideration set is small (three to five destinations).</p>	<p>Limited description and testing of some of the constructs and the relationships in the model (i.e. affective associations).</p> <p>Exploratory nature of the study with a relatively small and non-representative sample.</p> <p>Use of cross-sectional survey data.</p> <p>Lack of empirical support in actual choice processes.</p>
Um & Crompton (1990)	<p>Attitudes play an important role in destination decision processes.</p> <p>Interaction between constraints and image are integral for destination choice decisions.</p>	<p>Conceptualization, operationalisation and empirical testing of attitudes in real destination choice processes.</p> <p>Efficiency in the operationalisation of the dependent variable (eliminated the need for measuring behavioural intentions).</p> <p>Potential traveller's awareness</p>	<p>Untested relationships in the model.</p> <p>Lack of attention to emotions and joint decision processes.</p> <p>Mostly cognition and individual traveller-based.</p> <p>Marginalization of socialization process.</p> <p>Measurement problems (lack of comparison of comparison at the abstract level, generation of destination attributes by two seemingly different</p>

		<p>sets and evoked sets were identified longitudinally, confirming.</p> <p>Earlier claims that destination choice sets narrow down over time (funnelling effect).</p> <p>Provision of a simplistic but theoretically sound decision process model.</p>	<p>populations, experts and tourists which may produce non-comparable lists...we don't know what abstraction level is used by actual decision makers).</p> <p>The model is not reflexive and thus not dynamic.</p> <p>It neglects the outcomes role in influencing the personality of the consumer for the next decision (missing reflexive loop).</p> <p>Lack of tracing the actual decision-process (measuring decisions after such decisions have been already made).</p> <p>Unsubstantiated assumption about the linearity of relationships between perceived inhibitors and facilitators.</p> <p>Operationalisation of attitudes as the difference between perceived facilitators and perceived inhibitors.</p> <p>Heavy reliance on Grand Models.</p>
Moscardo, Morrison, Pearce, Lang & O'Leary (1996)	<p>Critical link between motives and destination choice may be found in the understanding of activities.</p> <p>Activities are seen as key attributes at destinations.</p>	<p>Identifies importance of matching activities offered and preferred activities in determining destination choice.</p> <p>Identifies activities as central to forming destination image and influencing destination choice.</p> <p>Inclusion of section describing the destination itself (not included in the other two models).</p>	<p>Open to issues of perception, whereby the tourist may perceive that the destination offers the best array of activities, but due to tourism's intangible nature, this may or may not be the case.</p> <p>The model does not specifically identify and situational constraints.</p>

Source: Adapted from Mair (2005), Sirakaya and Woodside (2004), and Woodside and Lyonski (1989).

3.12 Role of Attitudes in Destination Choice

From the review of the major models of destination choice, it becomes apparent that individual psychological factors such as values, motivations and experiences can have a major impact on destination choice. However, there is one attribute that perhaps deserves further investigation, attitudes. Attitudes, as discussed in Section 3.5, are described as a predisposition, created by learning and experience, to respond in a consistent way towards an object, such as a product (Moutinho, 1987). As attitudes influence purchase and consumption intentions it is important to further investigate their role in destination choice.

Attitudes have been apparent throughout all of the consumer behaviour models discussed, from the so-called grand models of consumer behaviour and consumer behaviour in tourism, to the models of destination choice. Attitudes have consistently been one of the most popular variables used in consumer behaviour to predict behavioural responses (Pizam & Mansfeld, 1999; Um & Crompton, 1990). One of the earlier examples of this can be found in the EKB model where attitudes are shown as leading to intentions and ultimately to purchase (Engel et al., 2006).

However, it is during the process of choosing a destination where attitudes truly come to the fore. The work by both Sirakaya and Woodside (2004) and Um and Crompton (1990) suggest that the attitude a potential tourist has towards a particular destination is an important indicator of whether that potential traveller will select a destination or not. Likewise, Sirakaya and Woodside (2004) suggest that destination choice is affected by psychological variables such as attitudes, and a number of non-psychological factors such as marketing, time and pull factors. This argument is furthered by Pizam and Mansfield (1999) who discuss the evolution of a late consideration or evoked set, and the ultimate selection of a destination, as a combination of the attitude towards alternative destinations and the constraints upon the individual at the time of decision-making.

Um and Crompton go even further by suggesting that destination choice depends on the attitude towards each alternative destination, and that this attitude might have the final say in terms of a destination being selected or rejected (Um & Crompton, 1990). Indeed, Um and Crompton's model assesses the role of attitudes in the decision-making process as either inhibitors or facilitators. Inhibitors are considered to be incompatible with the traveller's motives, while facilitators are those beliefs about a destination's attributes which help to satisfy a potential traveller's specific motives (Um & Crompton, 1990). Furthermore, travellers who have not visited a destination previously, generally have limited knowledge of its attributes, therefore attitude, along with image, are likely to play a major role in destination choice (Um & Crompton, 1990).

Although the work by Moscardo et al. (1996) does not specifically deal with the role of attitudes, it does have a construct which discusses traveller/socio-psychological variables, and it would be reasonable to assume that this includes attitudes. These socio-

psychological variables, along with motives (displayed as a separate factor) lead to both images of destinations and destination choice.

From the review of the literature it has become apparent that consumers follow a funnel-like approach to destination choice and that attitudes play a crucial role in narrowing down the alternatives before ultimately selecting a destination(s). The following section will investigate the particular role of environmental attitudes, a field that has garnered increased attention over recent years and is of particular relevance to this particular study.

3.13 Environmental Attitudes, Climate Change and Tourism

Although there is much debate over the link between the attitude and behaviour of the “green consumer”, it is accepted that some tourists have stronger views on environmental issues such as climate change, and there is anecdotal evidence that suggests this is transferring to the purchase of tourism products (Bergin-Seers & Mair, 2009). Furthermore, as the importance of climate change and other environmental issues increases, these factors will play a greater role in purchase decisions (Bergin-Seers & Mair, 2008). The recent increase of articles and conferences on topics such as tourism and climate change, and the sustainability of tourism, is indicative of more recent concerns with the social and environmental dimensions of tourist behaviour (Smallman & Moore, 2010).

According to Bergin-Seers and Mair (2009, p. 109), “concern about environmental sustainability and climate change has increased dramatically in the past decade and is affecting the way consumers behave”. Media coverage of environmental issues, and in particular coverage of climate change and its links to human activity, has certainly grown over the past two decades. However, climate science and the mass media first came together as far back as the 1930s (Boycoff & Roberts, 2007).

The research presented by Boycoff and Roberts (2007) provided a detailed analysis of the role of media and public awareness of climate change. Although media coverage of human contributions appeared in the 1950s, it was not until the 1990s and 2000s that coverage of climate change peaked (Boycoff & Roberts, 2007). The report goes on to

state several reasons for an increase in climate change coverage from 1988 onwards, including the formation of the IPCC and the testimony of NASA scientist James Hansen to the U.S. Congress in which he stated that he was “99 percent certain” that warmer temperatures were caused by the burning of fossil fuels. Since this time, surges of media coverage have coincided with reports from the IPCC and other influential reports such as the “Stern Review” out of the United Kingdom (Boycoff & Roberts, 2007).

Research exploring the relationship between environmental attitudes and consumer behaviour has been espoused by various authors including Bergin-Seers and Mair (2009), Roberts and Bacon (1997), and Gagnon-Thompson and Barton (1994) amongst others. Gagnon-Thompson and Barton (1994, p. 149) investigated the relationship between two underlying aspects of environmental attitudes, “ecocentrism—valuing nature for its own sake, and anthropocentrism—valuing nature because of material or physical benefits it can provide for humans”. Their research explored the implications of the ecocentric-anthropocentric distinction in regards to environmental attitudes and behaviour, and builds on earlier research by Dunlap and Van Liere (1978) which developed the new environmental paradigm. In 1997, Roberts and Bacon claimed that “concern for the environment is likely to be a dominant social theme in the 1990s” (1997, p. 79). Consequently, their study looked at the link between environmental attitudes and what they termed the ecologically conscious consumer behaviour (ECCB).

3.13.1 The New Ecological Paradigm (NEP)

An article by Dunlap and Van Liere (1978) was the first to investigate what they termed the new environmental paradigm. Their article explored an apparent shift from the “dominant social paradigm” (DSP) to a new environmental paradigm (NEP). They argued that this new environmental paradigm, which grew from the environmental movement of the 1970s, had spawned an alternative set of beliefs and values (Dunlap & Van-Liere, 1978; Dunlap, Van-Liere, Mertig, & Jones, 2000; Roberts & Bacon, 1997). As a result of this, it was suggested that individuals with a higher level of environmental concern would be more likely to engage in ecologically conscious consumer behaviour (Roberts & Bacon, 1997).

The DSP emphasised “beliefs in progress, material abundance and the goodness of growth; faith in the efficacy of science and technology; and a view of nature as

something to be subdued” (Dunlap, 2008, p. 5). On the other hand, the NEP presented a new worldview which posited three key facets including: (1) the existence of ecological limits to growth; (2) the importance of maintaining balance in nature; and (3) the rejection of the anthropocentric notion that nature exists primarily for human use (Dunlap, 2008). Dunlap and Van Liere (1978) argued that there was a paradigmatic shift in the orientation of American people towards the environment and that increased public awareness of environmental issues had lead to disillusionment with the conventional way that they viewed and used nature (Roberts & Bacon, 1997).

Dunlap and Van Liere (1978) initially designed a NEP scale based on 12 statements that were presented on a 7-point Likert scale. They began to investigate people’s general position regarding society and the natural environment, with high scores on the NEP scale indicating pro-environmental attitudes in the respondent (Roberts & Bacon, 1997). The items included in the initial 12 item NEP scale are available in Appendix A. Dunlap and Van Liere later developed a 6–item NEP scale for use in a national survey for the Continental group in 1982 which has been used by several researchers since this time (Dunlap et al., 2000). In response to criticisms of the construct of the earlier versions of the of the scale, Dunlap et al. (1992) proposed the revised NEP scale that attempts to balance between pro and anti-NEP statements, as well as to broaden the content of the scale (Kim, Borges, & Chon, 2006). The latest revision of the NEP scale is a 15 item version titled the new ecological paradigm scale (Dunlap, 2008; Dunlap et al., 2000) and it is this scale that will be used in this research for the reasons outlined below.

The revised NEP scale was designed specifically to deal with the weaknesses of the original NEP scale, and five major changes were made (Dunlap, 2008):

1. Further focus was put on the ecological domain by incorporating two new facets of an ecological worldview.
2. Because of increased awareness of global problems such as climate change, items dealing with the likelihood of eco-crises were also added.
3. Three items were designed for each of the five facets, and the 15 items were worded so as to produce 8 pro-NEP and 7 anti-NEP items. It was also ensured that none of the facets were measured by items worded only in one direction.
4. Outmoded terminology such as ‘mankind’ was replaced by more egalitarian terms such as ‘humankind’.

5. An effort was made to ground the work in social-psychological theory, such as that done by Rokeach (1968) by arguing that the NEP items were measuring primitive beliefs about the relationship between human beings and the environment.

The result according to Dunlap (2008, p. 10) was “a much improved NEP scale that has gained rapid use not only in the United States but internationally as well...”. The revised scale (shown below) has been applied in various ways by numerous researchers and has been used as a measure of environmental concern, environmental values and environmental attitudes (Carmody, 2007; Dunlap, 2008). Much of this research has focused on the environmental concerns of the general public, investigating trends in public opinion and correlations with socio-economic data (P. C. Stern, Dietz, & Guagano, 1995). The items included in the revised 15 item NEP are:

1. We are approaching the limit of the number of people the earth can support.
2. Humans have the right to modify the natural environment to suit their needs.
3. When humans interfere with nature it often produces disastrous consequences.
4. Human ingenuity will insure that we do not make the earth unlivable.
5. Humans are severely abusing the environment.
6. The earth has plenty of natural resources if we just learn how to develop them.
7. Plants and animals have as much right as humans to exist.
8. The balance of nature is strong enough to cope with the impacts of modern industries.
9. Despite our special abilities humans are still subject to the laws of nature.
10. The so-called “ecological crisis” facing humankind has been greatly exaggerated.
11. The earth is like a spaceship with very limited room and resources.
12. Humans were meant to rule over the rest of nature
13. The balance of nature is very delicate and easily upset.
14. Humans will eventually learn enough about how nature works to be able to control it.
15. If things continue on their present course, we will soon experience a major ecological catastrophe. (Dunlap et al., 2000)

3.13.2 Use of the NEP in Tourism

Studies of environmental attitudes within the tourism field, that utilise the NEP in any of its forms, are uncommon in the associated literature. Most of the available studies appear to be based in the United States (4) and focus on visitors to National Parks (Carmody, 2007). The remainder of the studies were conducted in Australia (3), New Zealand (1) and China (1). Furthermore, it appears that there is little or no research that focuses specifically on the use of the NEP in conjunction with the various theories of destination choice. A review of previous research using the NEP shows its utility in determining the environmental attitudes of various tourism stakeholders, in particular visitors. Indeed, visitors were used as the chosen sample in seven out of the nine studies. Table 3.2 provides a revised summary of previous studies in tourism using the NEP, first presented by Carmody in 2008.

Table 3.2 Summary of previous tourism studies using the NEP

Author	Year	Location	Sample/Subjects	Environmental Attitude Scale
Uysal, Jurowski, Noe & McDonald	1994	Virgin Islands National Park, USA	1082 – Visitors	New Environmental Paradigm (12–item)
Lazar, Diagne, Gan & Henning	1995	Louisiana, USA	2001 – Visitors	New Environmental Paradigm (modified 6 item)
Floyd, Jang & Noe	1997	Capr Lookout National Seashores (CL) and Moores Creek (MC) National Battlefield, USA	CL = 392 – Visitors MC = 236 – Visitors	New Ecological Paradigm (15–item)
Jones, Jurowski, & Uysal	2000	Virginia, USA	1069 – Host community residents	New Ecological Paradigm (15–item)
Weaver & Lawton	2001	Lamington National Park, Queensland, Australia	1180 – Ec lodge guests	New Environmental Paradigm (limited & modified)
Higham	2001	New Zealand	967 – Ecotourists	New Environmental Paradigm (12–item)
Carmody	2007	Far North Queensland, Australia	90 – Accommodation providers	New Ecological Paradigm (15–item)
Luo & Deng	2008	China	381 – Park visitors (Nature-based tourists)	New Ecological Paradigm (15–item)
Dolnicar & Leisch	2008	Australia	1000 – General population	New Environmental Paradigm (limited & modified)

Most of the earlier research utilising the NEP occurred in the US, however many of the more recent studies took place outside the US in places including Australia and China. Luo and Deng's (2008, p. 399) study looked at visitors' environmental attitudes and travel motivations, and concluded that environmental attitudes and nature-based tourism motivations were "closely and positively related". These results, and the successful use

of the NEP in China, contradict the criticism by some researchers (Chatterjee, 2008) that the NEP may not be applicable outside of developed Western nations. Indeed, Dunlap (2008) points to a number of studies employing the NEP in Asian nations, further suggesting that it can be used productively outside of developed Western nations.

The other key criticisms of the NEP include a perceived weak link between environmental attitudes and behaviour (Carmody, 2007; Dunlap, 2008). In response to this claim, Dunlap (2008, p. 12) states that “one reason for the common finding of weak attitude-behaviour relations stems from use of broad attitudinal measures to predict specific behaviours”, and added that “there was never any reason to expect that the NEP Scale would be a predictor of behaviours.” (2008, p. 12). Additionally, Carmody (2007, p. 100) states that “External factors including normative behaviours, socio-demographic variables, personality characteristics and situational conditions are often neglected in attitude-behaviour correlations”. Ultimately, this is why Dunlap (2008) recommends using the NEP scale along with other variables.

Overall, despite the uncertainty regarding the strength of the attitude-behaviour relationship, it is generally accepted that individuals with a higher level of environmental concern are more likely to engage in environmentally conscious behaviour (Roberts & Bacon, 1997). This is backed by several reports that have found significant relationships between the NEP Scale and behavioural intentions, and both self-reported and observed behaviours (Dunlap et al., 2000).

The final criticism of the NEP scale is that the various versions are not uni-dimensional and often result in more than two identifiable environmental perspectives. For example, research done by Albrecht et al. (1982) suggested that the NEP consists of three distinct dimensions, namely balance of nature, limits to growth and human dominance of nature, whilst more recent research by Roberts and Bacon (1997) found as many as four dimensions. However, Dunlap (2008, p. 13) argues that “sets of 12 or 15 items will nearly always yield more than one factor” and that “researchers should use the revised NEP Scale and then decide on the basis of their data analyses whether to treat it as a single or multi-dimensional scale”. As the purpose of this paper is not to examine the

dimensionality of the NEP scale, but to measure the environmental attitudes of tourists, it is deemed to be a suitable measure of environmental orientation.

An increasing concern for the environment has indeed led to a shift away from the dominant social paradigm (DSP) and towards the new environmental paradigm. The NEP scale first developed by Dunlap and Van Liere in 1978 has been widely used since that time to explore this new environmental worldview. Researchers have tested the numerous forms of the scale and determined it to be a valid tool for the measurement of environmental attitudes (Luck, 2003). Whilst limitations of the NEP scale are recognised, in particular the inability to link broad ecological attitudes with specific behaviours, it is posited that this and any other potential shortcoming, can be overcome by incorporating the NEP scale into a more comprehensive research approach using other personal and situational variables.

Whilst the NEP is acknowledged as the most widely adopted measure of environmental attitudes, there are alternatives, in particular the connectedness to nature scale (CNS) developed by Mayer and Frantz (2004). Mayer and Frantz (2004) developed the CNS as a measure of an individual's emotional connection to nature. Such a measure may be an important predictor of environmental attitude and indeed behaviour (Perrina & Benassi, 2009). However, the CNS was designed as a measure of an individual's emotional connection to nature, whereas the NEP measures a "cognitive belief about environmental sustainability and not an emotional reaction to it" (Mayer & Frantz, 2004, p. 504). Furthermore, future research suggested by Mayer and Frantz themselves tends to focus on emotive factors such as "whether there is a causal path between connectedness to nature and life satisfaction", rather than looking at any potential correlation between a high score on the CNS and the likelihood of ecologically sustainable behaviour (2004, p. 512).

3.14 Chapter Summary

Chapter 3 has presented the second part of the literature review pertinent to the overall focus of this thesis. As the incorporation of a consumer perspective on adaptation has been identified as a significant gap in the literature, this chapter has analysed various

aspects of consumer behaviour and tourism, as well as exploring the specific role of attitudes in determining destination choice.

This chapter introduced the NEP as a measure for concern for environmental issues such as climate change. The use and development of the NEP was discussed and after a review of the literature, the revised 15-item NEP was selected as the best model to investigate the ecological worldview of tourists visiting Victoria's Surf Coast region.

Chapters 2 and 3 provide a detailed review of the literature exploring both climate change adaptation and consumer behaviour in tourism. The following chapter will shift the focus of the thesis to describing the approach and methodology chosen to investigate the aims of this thesis outlined in Chapter 1.

Chapter 4. Approach and Methodology

4.1 Introduction

This chapter discusses the approach and the methodology adopted to address the research aims given in Chapter 1. This chapter first discusses the philosophical approaches that underpin this study. This includes discussion of the epistemological standpoint of the researcher and the paradigm in which the work is grounded. Then, the three research phases first outlined in Chapter 1 are elaborated upon.

To achieve the aims and objectives of this project, the issues of climate change and regional tourism adaptation are investigated using a ‘single case study’ approach. Yin (1993, p. 2) states that “the distinctive need for case studies arises out of the desire to understand social phenomena”, specifically defining this approach as pertaining to “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (1993, p. 13). Further detail on the ‘case study’ approach is provided in Section 4.5.

Such an approach is appropriate for this research, as climate change and adaptation can be regarded as ‘contemporary phenomenon’ and by placing this within the ‘real-life context’ of Victoria’s Surf Coast region, greater understanding of these phenomena can be gained. A key aim of this study is to develop a framework to assist regional tourism destinations to adapt to climate change. This model is then applied, as a single case study, to explore the possibility of various adaptation options, and their potential impact on tourist behaviour and demand. The research objectives and the associated research questions are outlined in Chapter 1, Table 1.1.

This study incorporated three research phases. The first involved the development of the Regional Tourism Adaptation Framework (RTAF). The second and third research phases utilised a mixed-methods research design, incorporating two stages of primary data collection. Research phase 2 involved a Delphi study, whereby a mix of both quantitative and qualitative data is collected and analysed to determine potential climate

change risks and opportunities, as well as appropriate adaptation options. Research phase 3 involved surveys of tourists throughout Victoria's Surf Coast region to determine their opinions in regard to the suggested adaptation options. Each phase of the research will be discussed separately, before concluding with a summary of the key elements of the chapter.

4.2 The Research Paradigm

There are several philosophical paradigms that underpin an individual's approach to research. A paradigm is described variously as "a basic orientation to theory and research" (Neuman, 2006, p. 70), and "a basic set of beliefs that guides action, whether of the everyday variety or action taken in connection with a disciplined enquiry" Guba (1990, p. 17). In general, the research paradigm is the overall view held by the researcher of how the world works (Jennings, 2010).

There are several different research dimensions which are impacted by the paradigm in which researchers ground their work. Jennings (2010) advocates considering three issues to clarify the paradigm chosen: the ontological basis, the epistemological basis and the methodological basis of the research. Guba (1990) outlines the following questions in relation to these three topics:

1. **Ontology:** What is the nature of reality?
2. **Epistemology:** What is the relationship between the researcher and the researched?
3. **Methodology:** How should the researcher go about generating knowledge?

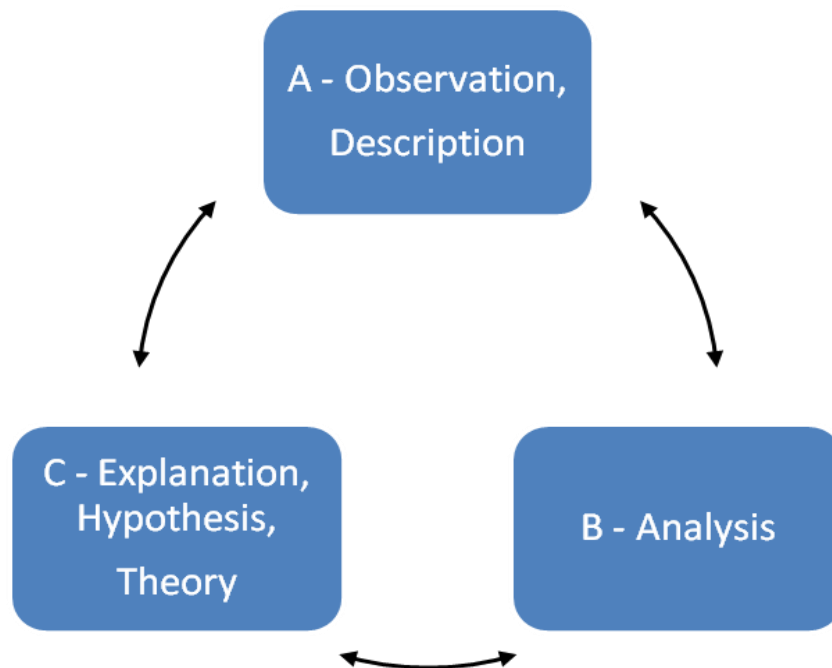
Researchers that work with different paradigms often have different views of the questions presented above, and this can affect the manner in which a study is carried out. Veal (1997) describes two dominant social research paradigms, the positivist and interpretative paradigms. Research grounded in the positivist paradigm strives to generate outcomes that apply to the wider population than the sample used (Cresswell & Clark, 2007). As such, this approach uses quantitative data and mathematical calculations to make generalisations based upon the analysis of probability. Veal (1997, p. 31) refers to positivism as:

A framework of research, similar to that adopted by the natural scientist, in which the researcher sees people as phenomena to be studied from the outside, with behaviour to be explained on the basis of facts and observations gathered by the researcher, using theories and models developed by the researcher.

Positivism is traditionally the most widely adopted paradigm in the social sciences, however, there is an apparent shift towards the interpretative paradigm (Veal, 1997). In contrast to the positivist approach, the interpretative approach is more likely to involve qualitative methods such as case studies or observation. Indeed, the interpretative approach relies on the people being studied to provide their own explanation of their situation or behaviour (Veal, 1997). The interpretative approach is based around an inductive process of gathering rich data in order to develop theory (Cresswell & Clark, 2007), as opposed to the positivist approach, whereby a large number of cases are sought in order to produce findings that are generalisable. In this approach interpretative researchers look to gain an in-depth understanding of the phenomenon under investigation using relatively few cases (Neuman, 2006).

The interpretative paradigm is based around an inductive process of data collection. This commences with specific observation or descriptions, which are analysed to form possible explanation or hypotheses that can be further explored. In contrast, the positivist approach begins with a hypothesis, and then gathers the required data to test this hypothesis, before proceeding to the analysis stage whereby the hypothesis is tested against the data. Whilst these approaches seem contradictory, Trochim (2010) points out that most social research involves both inductive and deductive reasoning at some stage. Figure 4.1 shows an example of the cyclical nature of research where the process may be inductive and begin at point A (observation), move through point B (analysis) and finish at point C (explanation and theory), or may be deductive and start at point C (hypothesis), then move through point B (analysis) and finish with point A (explanation of what has been found). Indeed, Veal (1997, p. 29) states that “a research project may involve a single circuit or a number of circuits, in both directions”.

Figure 4.1 The cyclical nature of research



Source: Adapted from (Veal, 1997).

There are advantages and disadvantages to both research approaches. Indeed, in tourism, much of the research conducted involves a combination of both approaches. For example, a mixed-methods approach may be used, whereby a qualitative interview is followed up by a quantitative survey. This mixed-methods approach involves the collection of both quantitative and qualitative data, and may overcome some of the shortcomings of using either approach in isolation. The specific advantages and disadvantages of quantitative, qualitative and mixed-methods approaches are detailed later in this chapter.

4.3 Epistemological Standpoint for this Research

This research will involve elements of both inductive and deductive research methods involving the collection of both qualitative and quantitative data. However, as this research involves developing and testing a model, then providing an explanation of what was found, the research is more deductive than inductive. Therefore, the researcher will use a combination of inductive and deductive reasoning, whilst remaining grounded by the principles of post-positivist, critical realism. Proponents of critical realism argue that measurement is fallible and consequently multiple measures

and observations are essential. As such, this research will utilise triangulation, through the combination of both qualitative and quantitative methods.

Critical realism recognises that reality exists despite human subjectivity, and therefore it is possible to conceptualise it and propose relevant theories to describe it (Jeppesen, 2005). However, critical realism, in recognising the role of human nature and subjectivity, also recognises that all knowledge is fallible and therefore a totally comprehensive understanding of a topic is unlikely. As such critical realism “offers an alternative to the spurious scientificity of positivism and to idealist and relativist reactions to positivism” (Sayer, 2004, p. 6).

As discussed in Section 4.2 there are several research dimensions that are impacted by the choice of research paradigm. To further clarify the paradigm used in this research, the ontological, epistemological and methodological basis that form the foundation of this research is summarised below:

1. **Ontology:** the researcher believes that there is a reality that can be studied, and this reality is independent of our thinking.
2. **Epistemology:** the research is based on the interpretative view that in social sciences the relationship between the researcher and the research is intersubjective, rather than objective.
3. **Methodology:** the research will utilise a case-study approach which will include a mix of qualitative interviews and the quantitative statistical analysis of tourist surveys.

A detailed explanation of the specific methods used in the data collection process is outlined in the following sections.

4.4 Methodology Overview

Before looking at each stage of the research in detail, a number of points need to be made that underpin the conceptual reasoning for this methodology. In particular, this relates to the qualitative/quantitative debate, the utility of a mixed-methods approach, the benefits of triangulation and finally, the use of a single case study.

4.4.1 Qualitative Research

Qualitative research is a type of scientific research that involves gathering a great deal of information based on a small sample size (Mack, Woodsong, MacQueen, Guest, & Namey, 2005). The objective of qualitative research is to gain an understanding of the underlying reasons, motivations, opinions and beliefs of individuals (Swarbrooke & Horner, 1999). Research of this kind does not involve gathering large amounts of numerical data, and is designed to provide complex textual descriptions of how individuals feel about a given issue (Mack et al., 2005; Veal, 1997).

Qualitative methods are generally thought of as being more flexible than quantitative methods as they allow more spontaneity and freedom in the interaction between the participant and the researcher (Mack et al., 2005; Veal, 1997). The use of open-ended questions creates a fluid dynamic whereby both parties are able to explore issues as they arise. Consequently, qualitative methods may enable the researcher to evoke responses that were unanticipated, and/or more detailed and meaningful (Mack et al., 2005).

According to Mack et al. (2005) the three most common forms of qualitative methods include:

1. Participant observation.
2. In-depth interviews.
3. Focus groups.

Most qualitative research tends to be inductive; in other words it generates theoretical propositions. According to Veal (1997), this usually involves a process of research involving three stages: 1) observation and/or description of the situation; 2) analysis of data; and 3) explanation/findings/hypothesis development (see Figure 4.1).

There are some criticisms of qualitative research, such as the demands on time to organise, and carry out and review the interviews and the potential for interviewer bias. However, the benefits, such as greater flexibility and spontaneity, can offset potential negatives if the appropriate measures are taken. One problem that often arises is how a researcher goes about categorising the events or activities described in qualitative research (Silverman, 2004). This is known as the problem of reliability. Reliability is

defined by (Henn, Weinstein, & Foard, 2006, p. 336) as “the effectiveness of data collection instruments for taking accurate and consistent measurements”. For example, when interviews are recorded and transcribed, the reliability of the interpretation of transcripts may be questionable, and does not take into consideration pauses, tone, or body language (Henn et al., 2006). Researchers should understand and acknowledge the concerns of bias, as slanting the results may jeopardise the aims of the study.

The defining characteristic of all qualitative research methods is that they are relatively unstructured (Henn et al., 2006). Qualitative research should be used because an problem or issue needs to be explored (Creswell, 2007). Whilst issues of reliability are recognised, recent research argues that qualitative studies are more likely to propose ‘trustworthiness’ as an appropriate measure to evaluate the quality of research (Bashir, Afzal, & Azeem, 2008; Golafshani, 2003; Lincoln & Guba, 1985; Patton, 2002). The issues of bias and trustworthiness in qualitative research are discussed in detail in Chapter 7 (Section 7.3).

4.4.2 Quantitative Research

A quantitative approach to research involves statistical analysis of data in order to better understand phenomena and make inferences about it. It relies on numerical evidence to draw conclusions or test hypotheses (Veal, 1997). As opposed to qualitative research, a quantitative approach usually requires a relatively large sample to ensure the reliability of results. Reliability relates to the extent to which research findings would be the same if the research were to be repeated, using the same research instrument, at a later date (Cresswell & Clark, 2007; Veal, 1997). Quantitative research is based on statistical analysis, therefore, there must be something that is able to be measured and expressed numerically.

Another important consideration in quantitative research is Validity. Veal (1997, p. 35) defines Validity as “the extent to which the information collected by the researcher truly reflects the phenomenon being studied”. Clark-Carter (2004) discusses four checks for validity, which evaluate whether the research achieves what Henn, Weinstein, & Foard, (2006, p. 208) describe as a close “approximation of the truth”. These checks include face validity, content validity, construct validity, and criterion-based validity (Henn, Weinstein, & Foard, 2006).

Quantitative research has the advantage of being able to achieve high levels of validity and reliability of gathered data due to controlled observations such as questionnaires and laboratory experiments (Ryan, 1995). It can also eliminate much of the uncertainty that can be apparent in qualitative research and enable greater statistical analysis through the use of electronic analytical systems such as SPSS – Statistics. Reliability and validity, both important considerations in quantitative research, are discussed in relation to the particular methods used in this research, in Section 8.6.

Some critics claim that quantitative research ignores the differences between the natural and social worlds by failing to understand the ‘meanings’ that are brought to social life (Silverman, 2004). This differs to qualitative researchers who stress the socially constructed nature of reality, and the close relationship between the researcher and what is being researched (Denzin & Lincoln, 2003). The approach taken in this study is to combine the use of both qualitative and quantitative research techniques. The combination of these two techniques can be complementary and has been advocated by several researchers as potentially strengthening the final outcome (Ryan, 1995; Veal, 1997; Zikmund, 2003). This ‘mixed-methods’ approach is detailed in the following section.

4.4.3 Mixed-methods Approach

A mixed-methods approach to research involves the combination of both quantitative and qualitative approaches. As a methodology, it focuses on collecting, analysing, and mixing both quantitative and qualitative data under the premise that their use in combination provides a better understanding of research problems than either approach alone (Cresswell & Clark, 2007).

Mixed-methods research designs are attractive to researchers for several reasons. Firstly, the combination of qualitative and quantitative data provides scope for triangulation of the data, whereby a researcher can explore issues in greater depth and also further explore their results. Secondly, it allows exploratory research through a qualitative approach and confirmatory research through quantitative methods.

Webb et al. (1966) are credited with first coining the term triangulation. Since then authors including Rossman and Wilson (1985), and Greene, Caracelli and Graham (1989) have identified several reasons or rationales for combining qualitative and quantitative research, each of which is relevant to the current study.

Triangulation is defined as measuring the same concept using two or more research methods (Kadushin, Hecht, Sasson, & Saxe, 2008). Combining two or more methods increases the validation of results and allows for the development of 'richer' data through confirmation and corroboration of results (Greene et al., 1989; Rossman & Wilson, 1985). It also enables identification of paradoxes between any two sets of data by approaching the data from a different perspective (Greene et al., 1989; Rossman & Wilson, 1985). As a single method rarely answers the research question completely, triangulation allows for more diverse forms of 'testing' (Kadushin et al., 2008). Expanding on the breadth and range of inquiry methods can improve the validity of the results (Greene et al., 1989; Rossman & Wilson, 1985). The ability to use complementary research methods, enables findings to be elaborated upon, enhanced or clarified (Greene et al., 1989; Rossman & Wilson, 1985). As all research methods are fallible, combining different methods through triangulation, overcomes the weaknesses of any single method. The key advantage for adopting a mixed-methods approach is that it is likely to assist in gaining a more complete view of the matter under investigation (Henn et al., 2006).

The use of a mixed-methods approach in the present study on climate change adaptation for regional tourism destinations was chosen as the research called for a quantitative approach to some aspects and a qualitative approach to others. The second phase of the research (Delphi study) required a combination of both quantitative and qualitative techniques in order to expand upon and confirm the initial findings of the study, develop 'rich' data, and identify any apparent inconsistencies between the two stages of data collection. The third phase of the research (tourist survey) applied a purely quantitative approach, and further developed, confirmed and expanded upon the results of the Delphi study.

A qualitative approach was initially needed to explore the opinions of various experts on climate change impacts, adaptation options and Surf Coast tourism. This was

necessary as there was a substantial lack of literature available on regional tourism's adaptation to climate change, and therefore exploratory research was required before appropriate quantitative research questions could be developed. Once the qualitative results were synthesised the results could be used to develop a quantitative measure using an on-line survey. This was justified in order to collect enough data to enable an objective analysis of the various stakeholders' opinions on adaptation options and to confirm or corroborate the results and/or identify and contradictions.

The specific approach and methods used in both stages of primary data collection are detailed in Chapter 7 and 8 (Delphi Study and Tourist Survey).

4.4.4 Scales

A scale is defined as “a series of items that are arranged progressively according to value or magnitude, into which an item can be placed according to its quantification (Zikmund, 2003, p. 296). Scales are used in both the second stage of the Delphi study and elements of the tourist survey. This research aimed to determine various stakeholders' opinions regarding adaptation, therefore Likert type scales were used to examine attitudes towards various adaptation options.

Likert type scales were developed by Renis Likert in 1932 (Ryan, 1995). Likert type scales are commonly used as they provide the opportunity for numerous forms of statistical analysis (Ryan, 1995; Zikmund, 2003). Simply asking respondents whether they support a particular adaptation or not, would not give respondents the opportunity to indicate the strength of their feelings, either positive or negative, towards a particular option. Attitudes and opinions are comparatively complex variables to use in questionnaire design as they often require respondents to indicate their level of agreement or disagreement with a statement, or the importance they attach to a particular proposition (Veal, 1997). Consequently, the use of Likert type scales throughout this research was deemed appropriate for gaining an understanding of respondent's attitudes towards a wide range of climate change issues.

Means provide an appropriate form of analysis when using a Likert scale to measure attitudes (Veal, 1997). The scores provide a numerical indication of the level of support

respondents attach to a certain item, for example strongly agree to strongly disagree. One difficulty with this approach is that any number of different responses can result in the same total score (David & Sutton, 2004). In addition to calculating the mean, a number of other calculations can be used to provide further interpretations of the information. For example, the data analysis package SPSS, can be used to investigate relationships between the mean response to one question and other suitable variables. Central tendency and social desirability bias are also potential limitations (Ryan, 1995). Central tendency bias may be problematic if participants choose to avoid extreme response categories. Social desirability bias may also occur where participants wish to portray themselves in a more socially acceptable light rather than giving an honest answer. Whilst it is difficult to avoid these particular limitations, providing clear, direct and simple questions should help avoid ambiguity (David & Sutton, 2004). There is no perfect way to design a survey scale, and the potential for bias is acknowledged, however this does not subtract significantly from the value of the scale.

A five-point Likert type scale was deemed appropriate for this research as it also allows for adequate variation in responses, which in turn allowed for appropriate statistical analysis. Other researchers have utilised three, seven or even nine-point scales that retain a midpoint to enable respondents to express their uncertainty (Ryan, 1995). However, the three point scale was deemed too small to adequately reflect respondent's opinions, whilst the larger item scales were deemed to be unnecessarily large for the research being conducted and required too much space in terms of questionnaire design. Some researchers have dropped the middle option which identifies uncertainty. However, given the often complex nature of this research, it seemed appropriate that respondents be given the opportunity to 'sit on the fence' if they did not have a clear opinion regarding certain questions.

4.5 Model Development

The development and design of the RTAF model represented the first phase of research in this study. This research phase involved review of the adaptation models available in the literature, particularly those designed for the tourism sector, and the identification of shortcoming or areas for improvement. Due to the complex nature of the research, a

model was considered essential for both understanding and communicating the process of adaptation.

Models can come in many forms; however, each has the goal of improving the understanding of a particular situation by graphically representing a number of factors. They can provide a quick and easy means of understanding often complex issues. The following definition proposed by Haggett and Chorley (1967, p. 22) supports this theory, stating that: “A model is...simplified structuring of reality which presents supposedly significant features or relationships in a generalized form”. Furthermore, the provision of relationships between the different factors can display not only the direct sequence of events (causal factors), but it can also demonstrate where feedback or return lines of communication are necessary (Haggett & Chorley, 1967).

Models are now extensively used by organisations worldwide to visually represent a set of causal relationships between various factors. A model should graphically portray the situation you wish to communicate in a clear and easy to understand manner. Models have been used in all sectors of business and society. Getz (1986) explains that models play a vital role in enabling us to describe and understand complexities of the real world, to acquire, order and interpret information, and to explain, understand and ultimately predict phenomena and the relationships between them. Over the past 30 years a number of models have emerged that may assist in destination planning and design (Dredge, 1999). These models have dealt with a range of issues fundamental to tourism planning and destination management, and include aspects such as spatial structure, evolutionary processes, travel patterns and external linkages.

Pearce (1995) argues that many of these models appear to have been developed independently and with only minimal reference to previous work. Further criticisms are also made by Dredge (1999), who claims that many of the models are empirically derived and therefore lack wide-ranging applicability across different types of destinations. Despite these criticisms, there are a number of important ideas and developments that have emerged from early models for destination planning and design, and models such as Butler's (1980) Tourism Area Life Cycle (TALC) model and Plog's (1973) allocentric-psychocentric model continue to be widely cited today.

On the basis of this review of the development and utility of models this, research aims to take a systematic approach to the development of a regional adaptation framework model, which enables the vital elements of climate change adaptation to be integrated with the broader elements of destination planning and design. The proposed model examined the existing adaptation models to determine the most suitable application to regional tourism destinations, set within the broader planning framework. Furthermore, the empirical application of this model as a single case-study will undoubtedly raise questions regarding its application, generalisability and utility. Ultimately, this will be beneficial and allow for the further development and improvement of the model.

4.6 Research Design: Single Case Study

To apply a framework for climate change adaptation, at the regional level, the research utilised a case study approach, as discussed by Yin (1993). Using this approach, both qualitative and quantitative data was collected and analysed incorporating both primary and secondary data collection. The purpose of a case-study is to examine the intricacies and complexities of the situation in order to reveal its most important features (Henn et al., 2006). The findings of case-studies are often distinctive to the area under investigation and this can mean there is little application for the findings in other settings or situations (Henn et al., 2006). This view that one cannot make generalisations based on a single case-study is often considered to be a considerable weakness of the case-study as a scientific method (Flyvbjerg, 2006). Therefore, the researcher must carefully decide upon a worthy subject or situation and provide rationale for the information gathered and the limitations of the study (Creswell, 2007).

This research entails a descriptive case-study incorporating multiple sources of information (Yin, 1993) Secondary data was sourced from regional and local tourism offices, local councils, local environmental and conservation officers, Tourism Victoria, and others relevant agencies and departments, before any primary research was conducted. Tourism Victoria is the Victorian State Government statutory authority responsible for marketing the state as a tourist destination for interstate and international travellers (Tourism Victoria, 2010b). This is important as case studies are designed to bring out the details from the viewpoint of the participants using multiple sources of data (Tellis, 1997). Yin (1993) explains that one application for a case study model is to

explain complex causal links in real-life interventions. In this thesis, the impact of various adaptation scenarios will be linked to the consumer response. This case study involved a detailed investigation of Victoria's Surf Coast region, in relation to climate change, destination adaptation and tourist attitudes. Although the conclusions of the study may not be generalisable to all destinations, through the establishment of appropriate parameters and objectives it is expected that the outcomes will be relevant and acceptable.

The destination and research methods chosen are designed to capture information that is comparable and generalisable. To maximise this occurrence, the Surf Coast region was chosen due to its vulnerability to a number of different climate change impacts. For example, the coastal impacts of climate change, such as erosion and inundation, are generalisable to most of Australia's numerous coastal tourism destinations. Although local impacts will be destination specific, the common goal of developing an appropriate adaptation framework will involve the same issues of sustainability, stakeholder consultation, tourist satisfaction and policy development.

In addition to this, the Surf Coast region was chosen because of its relatively high reliance on tourism. Tourism throughout the region contributes over \$250 million into the economy over a 12-month period and has creates more than 1,000 jobs (Surf Coast Tourism, 2008).

As mentioned, the proposed methodology incorporates three distinct research phases. The first research phase involved collecting secondary information on climate change adaptation and then developing a framework model to adapt to climate change. Research Phase Two used a Delphi approach to develop appropriate adaptation options suitable for the Surf Coast region. Research phase three utilised a self-complete survey to analyse the consumer response to the adaptation options developed in Phase Two.

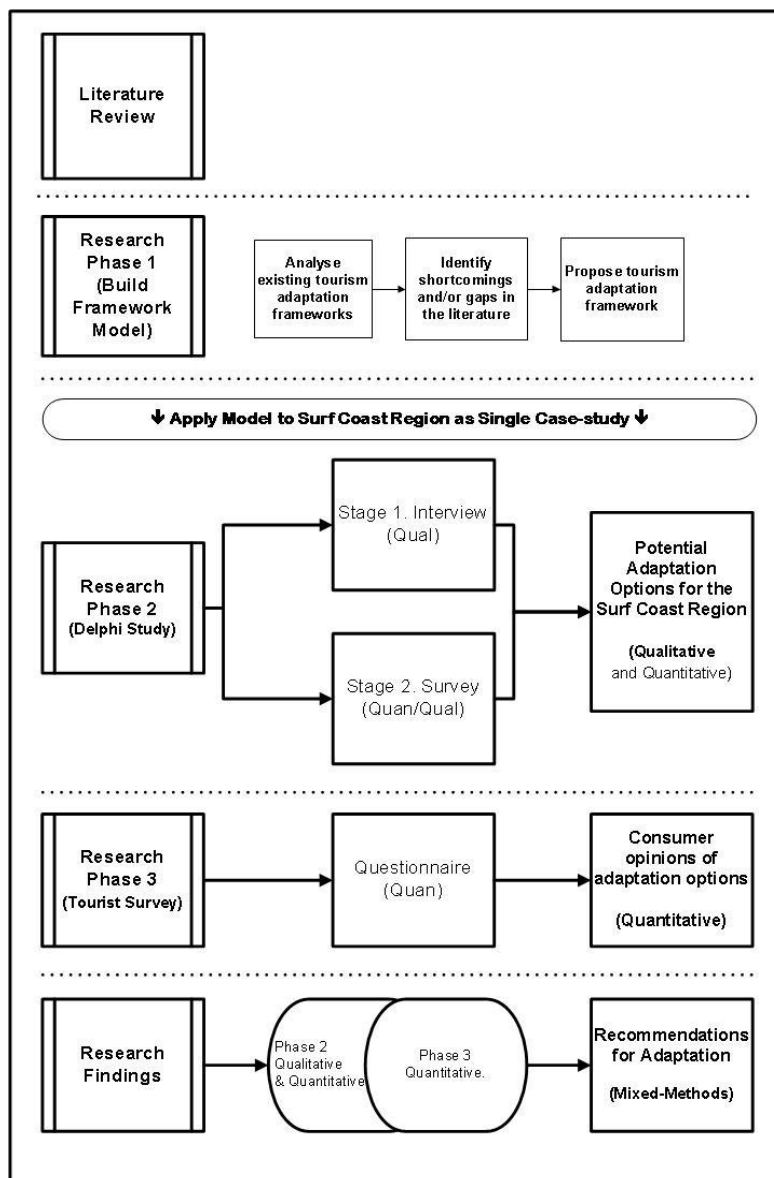
4.7 Process of Data Collection

Figure 4.2 presents the mixed-methods approach to data collection developed for this study. Cresswell and Clark (2007) discuss four major types of research design involving mixed-methods:

1. Triangulation design
2. Embedded design
3. Explanatory design
4. Exploratory design

This study exhibits attributes of both exploratory design and triangulation design.

Figure 4.2 Mixed-methods data collection method



The Delphi study demonstrated characteristics of exploratory design. Exploratory design is a two-stage process that starts with qualitative data, then builds on this by adding a quantitative stage, to strengthen the results (Cresswell & Clark, 2007).

In general, it is easier for researchers to quantify their qualitative data by transforming qualitative codes and identifiable themes into quantitative counts or ratings, rather than using qualitative data to build upon quantitative results (Cresswell & Clark, 2007). For the Delphi study, the results of the initial interviews were analysed, then the themes that were derived from this analysis were presented in quantitative form in the next stage of the study, the on-line surveys. This was done as many of the variables in this study were unknown and therefore there was an initial need to explore the phenomenon under investigation. The transformation of qualitative results into quantitative data also enabled statistical analysis, which was subsequently used to identify the relationships between various categories.

In a broader context, this research also displayed elements of the multi-level model of triangulation design. Whilst the second research phase involved a mixed-methods approach to determining potential climate change risks, opportunities and adaptation options, the third research phase concentrated on the consumer response to potential adaptation options. The overall aim of the third research phase was twofold: firstly, to test various important constructs of the model; and secondly to help determine the most appropriate adaptation strategies for the Surf Coast region.

Figure 4.2 provides a representation of the mixed-methods approach to data collection used in this research. Preliminary research, using secondary data and informal discussions with various stakeholders was initially used to ground the research. Then the RTAF model was designed and developed based on this information. The Delphi study then presents a two-stage exploratory process involving both semi-structures interviews and on-line surveys.

A detailed explanation and justification of the procedures adopted for both the Delphi study and the tourist survey are outlined in the following sections of this chapter.

4.8 The Delphi Method

The Delphi concept was first developed by the Rand Corporation for the US Air force in the 1950s (Hasson, Keeney, & McKenna, 2000; Veal, 1997). The procedure involves gathering and analysing information from a panel of experts to obtain a consensus. Initially, the technique was used as a forecasting tool, but more recently has been used to explore a range of complex issues using expert opinions. Participants are asked their view on future trends or potential scenarios, in a particular field of interest such as tourism (Veal, 1997). The technique involves an iterative process whereby participants are asked to refine their opinions throughout a number of different stages (commonly known as rounds). As part of the process, the responses from earlier rounds are summarised and fed back to participants in consequent rounds. This process of controlled feedback is repeated until a consensus is reached (Hasson et al., 2000).

The initial stage of the Delphi may involve the collection of qualitative data, which is then analysed and fed back to participants in a quantitative form through a second questionnaire (Hasson et al., 2000). The number of rounds required for a Delphi study is dependent on the amount of time available, the type of questions being asked and the level of consensus required. Whilst the classic Delphi technique traditionally had four rounds, more recent evidence has shown preference for either two or three rounds (Hasson et al., 2000). Overall, the decision on the number of rounds is dependent on the aims of the research, the number of participants, and their availability and commitment.

The major advantage of the Delphi technique is that it keeps participants unknown to each other, and therefore individuals respond independently without influence from others involved. This reduces the effect of domineering personalities who may act as opinion leaders and influence the responses of others involved (Hsu & Sandford, 2007). The other advantage is that participants may be located in widespread geographic locations, as questions may be administered by phone, email, fax or post.

There are also limitations or weaknesses in the Delphi technique. These weaknesses as stated by (Hsu & Sandford, 2007) are summarized below:

- The potential for low response rates due to the multiple feedback process.

- Consumption of large blocks of time due to the iterative and sequential method of data collection.
- The potential of molding opinions by influencing participants through the selection of information initially supplied and subsequently fed-back to individuals.
- Potential of identifying general statements versus specific topic-related information. As the expertise and knowledge of participants is likely to vary the Delphi technique is designed to provide a general perspective on an issue rather than a specific explanation.

Table 4.1 Summary of the use of the Delphi technique in tourism (2000-2010)

Author	Year	Title	Purpose
Garrod & Fyall	2000	Managing heritage tourism.	To investigate the major imperatives and constraints relating to the management of heritage attractions.
Lloyd, La Lopa & Braunlich	2000	Predicting changes in Hong Kong's hotel industry given the change in sovereignty from Britain to China in 1997.	To predict changes in Hong Kong's hotel industry as a result of a change in sovereignty.
Miller	2001	The development of indicators for sustainable tourism: results of a Delphi survey of tourism researchers.	To explore issues of sustainable tourism and identify what experts believe constitute a sustainable form of tourism.
Tideswell, Mules & Faulkner	2001	An integrative approach to tourism forecasting: a glance in the rear-view mirror.	To forecast future tourism potential.
Weber & Ladkin	2003	The convention industry in Australia and the United Kingdom: key issues and competitive forces.	To explore the key issues likely to affect the conventions sector in both Australia and the United Kingdom.
Kaynak & Marandu	2006	Tourism market potential analysis in Botswana: a Delphi study.	To forecast future tourism potential in Botswana.
Lee & King	2009	A determination of destination competitiveness for Taiwan's hot spring tourism sector using the Delphi technique.	To investigate the future development of hot springs tourism in Taiwan.
Valls & Sarda	2009	Tourism expert perceptions for evaluating climate change impacts on the Euro-Mediterranean tourism industry.	To analyse perceptions among European tourism experts specialising in tourism planning regarding the impact that climate change may have on tourism management.

Despite its limitations, the Delphi technique has been commonly adopted in medical, nursing and health services research (Hasson et al., 2000), as well as some areas of business and technological forecasting (Veal, 1997). It has also been used to a limited

extent in the travel and tourism industry. The Delphi technique has been used to predict/forecast future scenarios, to investigate/explore complex issues, and to analyse perceptions. Table 4.1 provides a summary of the use of the Delphi technique in tourism research over the past 10 years. The author, year and title of the research are provided, as well as an outline of the research purpose.

4.8.1 An Overview of the Delphi Study in this Research

The Delphi technique was chosen for this study as it is recognised as an effective tool for reaching consensus regarding complex issues (Harold A. Linstone & Murray Turoff, 2009; Hasson, Keeney, & McKenna, 2000; Hsu & Sandford, 2007). The Delphi technique has been widely used in tourism studies over the past decade (Cunliffe, 2002; Jennings, 2001; Miller, 2001; Scott & Simpson, 2008) and such studies have proven useful in forecasting tourism development and future risks. Research by Cunliffe (2002, p. 21) concluded that the Delphi technique is “an appropriate choice of methodology for long range tourism development forecasting to reveal the risks the industry will face in the next twenty-five and fifty years”. The Delphi approach was chosen to answer the following research questions, first outlined in Section 1.3

- b) What are the potential climate change impacts for tourism on Victoria’s Surf Coast region?
- c) What are the most appropriate adaptation options for tourism at Victoria’s Surf Coast region?

Group members were presented with an overview of the potential effects of climate change on the Surf Coast region, as well as information on the current tourism system and the region’s adaptive capacity. This information was provided via an information portal (website) designed specifically for the project (this is discussed in detail in the Section 7.3). Each stakeholder was then asked to contribute ideas and opinions regarding the best options for adaptation. This approach entailed two rounds in order to enable sufficient knowledge sharing between the various experts and encourage the generation of useful ideas (Jennings, 2001; Veal, 1997).

Although, traditionally the Delphi process involved three or four rounds (Harold A. Linstone & Murray Turoff, 2009; Hasson et al., 2000) there were several reasons for deciding on just two for this particular study. First, the amount of time requested of participants was thought to be more reasonable, and therefore more likely to be considered acceptable. Secondly, the process would begin with a range of questions, rather than one broad question, therefore it was expected to take less time to reach convergence (Hasson et al., 2000). Finally, by reducing the number of rounds the concerns of sample fatigue and member disengagement would also be reduced.

As a part of the process, the responses from the first round were summarised and fed back to participants in the subsequent round. This process of controlled feedback was designed to enable a greater degree of consensus to be reached (Hasson et al., 2000). Specific information on the development and content of the Delphi study, the trustworthiness of this approach, and analysis and discussion of the results can be found in Chapter 7.

4.9 Surveys

A survey is a method of data collection that involves communication with a representative sample of individuals (Zikmund, 2003). Surveys are not only useful for providing descriptive information, but can also be used to identify the characteristics of a group or to measure attitudes (Jennings, 2001; Zikmund, 2003). Surveys are relatively quick to administer, easy to analyse and can provide inexpensive, efficient and accurate means of assessing information about a population (Jennings, 2001; Zikmund, 2003). However, there are possible drawbacks with the method, and survey data may lack the depth of more qualitative data collection methods (Jennings, 2001).

The following section will discuss the advantage and disadvantages of various survey approaches before outlining the approach taken in this particular study.

4.9.1 Quantitative Survey Techniques

Arguably the most used research technique in leisure and tourism is the questionnaire survey (Veal, 1997). There are two broad types of questionnaires available to researchers: self-completion questionnaires and interviewer-completed questionnaires.

Table 4.2 outlines the advantages and disadvantages of each technique (Jennings, 2010; Ryan, 1995; Veal, 1997).

Table 4.2 Advantages and disadvantages of interviewer–completed and respondent–completed questionnaires

	Advantages	Disadvantage
Respondent completion	<ul style="list-style-type: none"> – Cheaper – Quicker – Relative anonymity – More than one respondent can complete the survey at a time 	<ul style="list-style-type: none"> – Increased possibility of incomplete or frivolous responses – More care required during questionnaire design
Interviewer completion	<ul style="list-style-type: none"> – Higher response rates – Greater accuracy – Design can be less ‘user friendly’ – Less effort required by respondents 	<ul style="list-style-type: none"> – Higher cost – Less anonymity – Possibility of interviewer bias

Source: Adapted from (Jennings, 2010; Veal, 1997).

Self–completion questionnaires require minimal administration, as the respondent does the work of reading and answering the given questions. Furthermore, questionnaires may be distributed to individual respondents or left in a prominent position for completion (Jennings, 2010). Whilst the latter has the advantage that the researcher does not have to be present, it is likely the response rate will be lower, as there is no personal contact between the researcher and the respondents (Jennings, 2010).

Interviewer–completed questionnaires engage the respondent by asking questions orally and writing down their replies. The respondent has less direct involvement and does not have to write anything down, as this is done by the interviewer (Jennings, 2010). Whilst interview–completed questionnaires may take more time and effort on behalf of the researcher, they can also be more accurate and achieve a higher response rate (Jennings, 2010; Veal, 1997).

Once the decision has been made whether interviewer or respondent–completed questionnaires are to be used, the particular type of questionnaire must be considered. Veal (1997, p. 149) discusses the following six questionnaire survey types that are commonly used in the leisure and tourism field:

- Household survey: people are selected on the basis of where they live and interviewed in their home.

- Street survey: people are selected by stopping them in the street, in shopping malls, etc.
- Telephone survey: interviews are conducted by telephone (interviewer completion).
- Mail survey: questionnaires are sent out and returned by mail.
- Site or user survey: users of a leisure or tourism facility or site are surveyed on-site.
- Captive group survey: members of groups such as classes of school children, members of a club or employees of an organisation are surveyed.

In addition to the aforementioned survey types, surveys involving on-line or web-based questionnaires should also be considered. On-line surveys can be embedded in emails that are sent to respondents, who simply click on 'reply' to fill out the survey before returning it to the sender, or they can be accessed through a website at the convenience of the respondent.

Deciding on the type of survey, depends on several factors including the length of the questionnaire, the level of detail involved, the desired sample, cost, and geographic location (Neuman, 2006; Veal, 1997). For example, respondent-complete surveys may be cheaper and quicker to administer, however, the response rate may be low and/or the participants may not fully understand the complexities of the study. The method that is ultimately selected will depend on the size and make-up of the sample desired, the nature of the research question/s and the resources available to the researcher (Henn et al., 2006).

Table 4.3 Characteristics of different questionnaires

Questionnaire type	Respondent or interviewer completion	Cost	Sample	Possible length of questionnaire	Response rate
Household	Either	Expensive	Whole population	Long	High
Street	Interviewer	Medium	Most of population	Short	Medium
Telephone	Interviewer	Medium	People with a telephone	Short	High
Mail	Respondent	Cheap	General or special	Varies	Low
On-site	Either	Medium	Users only	Medium	High
Captive	Respondent	Cheap	Group only	Medium	High
On-line	Respondent	Cheap	People with internet	Medium	Moderate

Source: Adapted from (Neuman, 2006; Veal, 1997).

4.10 Overview of the Surf Coast Tourist Survey

Interviewer completion questionnaires were ruled out for this research mainly due to the financial and time commitments that would be required to approach individual respondents either in the field or by telephone. Colleagues at Victoria University had previously taken undergraduate students on tours of the Great Ocean Road using Wildlife Tours Australia (WTA), and a relationship had been developed with the managing director. Given the relationship with WTA and the opportunity to administer surveys to a captive audience on their coaches, the use of self-complete questionnaires became the most practical option. WTA specialises in providing one, two or three day coach tours throughout Victoria and to Adelaide in South Australia (WTA, 2011).

The surveys conducted involved a two-tiered approach whereby approximately half of the respondents were surveyed on WTA coaches and the other half were administered at visitor information centres (VICs). The surveys administered on WTA coaches were cost effective, as the management at WTA offered to administer the questionnaires to the passengers free of charge. Whilst there were no exact figures regarding response rates, the drivers estimated the response rate was around 75%. Furthermore, any unused questionnaires were collected at the end of the tour and used on subsequent occasions. Although the management and drivers at WTA agreed to administer the surveys free of charge, a small incentive in the way of ‘Gold Class’ movie tickets was presented to the

manager and to the drivers for their assistance in the research. Respondents on the coaches were also rewarded with chocolate ‘Caramello Koalas’ if they agreed to complete the survey.

The other half of the respondents was surveyed at the official VICs in the Surf Coast region. This type of on-site survey helped ensure that only tourists were surveyed, as it was unlikely that local residents would need to visit the information centres. Although either interviewer–completion or respondent–completion questionnaires could have been utilised here, for consistency’s sake, the latter was once again used. This approach also had the benefit of enabling several different respondents to complete the survey at the same time, which allowed for a greater number of surveys to be completed.

4.10.1 Pilot Tests and Amendments

A pilot test is done prior to conducting the main data collection stages, and is relevant to any form of research. Pilot testing may aid in the elimination of ambiguity and assist in the improvement of wording and sequencing of questions (Veal, 1997). Veal (1997) proposes several reasons for conducting a pilot study, these include testing the wording and sequencing of the questions, estimating responses and interview time, and testing analysis procedures. Pilot test were conducted for each stage of data collection. The details regarding this process for the Delphi study are in Section 7.4.1 and 7.5.1. Whilst details of the process used for the tourist surveys can be found in Section 8.3.

4.11 Chapter Summary

This chapter began with a review of the aims of this research, before introducing the epistemological standpoint of the researcher and the research paradigm in which this study is grounded. The use of both inductive and deductive research was outlined and a comparison of the advantages and disadvantages of qualitative, quantitative and mixed-methods approaches discussed.

The importance of model development was discussed and conclusions were made on the appropriateness of its development for this research. In particular, it was deemed important to learn from previous adaptation models available in order to develop a approach that would be useful to regional tourism destinations in terms of policy development, planning and design.

Discussion and justification for the use of a single case study was provided and the process of data collection explained. This involved explanation of the Delhi technique, its use in tourism and an overview of its application in this research and information on the use of surveys and the decision to choose respondent-completion questionnaires. Whilst these issues were only discussed in general terms in this chapter, specific information on the two stages of primary data collection is provided in the relevant chapters. Background information on the value of pilot studies and the importance of reliability and validity in quantitative research and trustworthiness in qualitative research, were also outlined.

Having looked at the research options available, the approach and methods used in this research have been decided upon. Now that the theoretical issues of the research have been discussed, the following chapters will go on to outline the proposed model for regional tourism's adaptation to climate change, before providing discussion and analysis of the two stages of primary data collection.

Chapter 5. Developing a Regional Tourism Adaptation Framework for Climate Change

5.1 Developing a Framework Model

Due to the complex nature of adaptation, a framework model is helpful to illustrate the process involved and the relationships between various stages. Adaptation for various regions will involve different stakeholders, different risks and opportunities, different consumers, and different options for adaptation. However, providing a framework model offers simplified guidelines for destination managers and policy-makers to follow, and despite the heterogeneity of different regions, the same basic steps are required.

Whilst a range of framework models have been developed that examine adaptation (Fussel & Klein, 2006; Scott et al., 2006; Simpson et al., 2008) in the tourism sector, only the work of Simpson (2008) provides a clear graphical representation of the stages involved in adaptation. However, as mentioned in the literature review, this model does not include detail on the risk science involved, incorporate a consumer behaviour element, nor mention the types of adaptation available. The model does provide a basic overview of the process of adaptation, however, by incorporating these other important elements more information can be provided without over-complicating the model. Models should have no more than 25 boxes to avoid becoming overly complex or unmanageable (SERC, 2009). The proposed model for this study builds on the work of Simpson; however, the overall number of constructs would not reach such numbers. The changes would however, increase the amount information available in the model, providing a more holistic representation of the adaptation process.

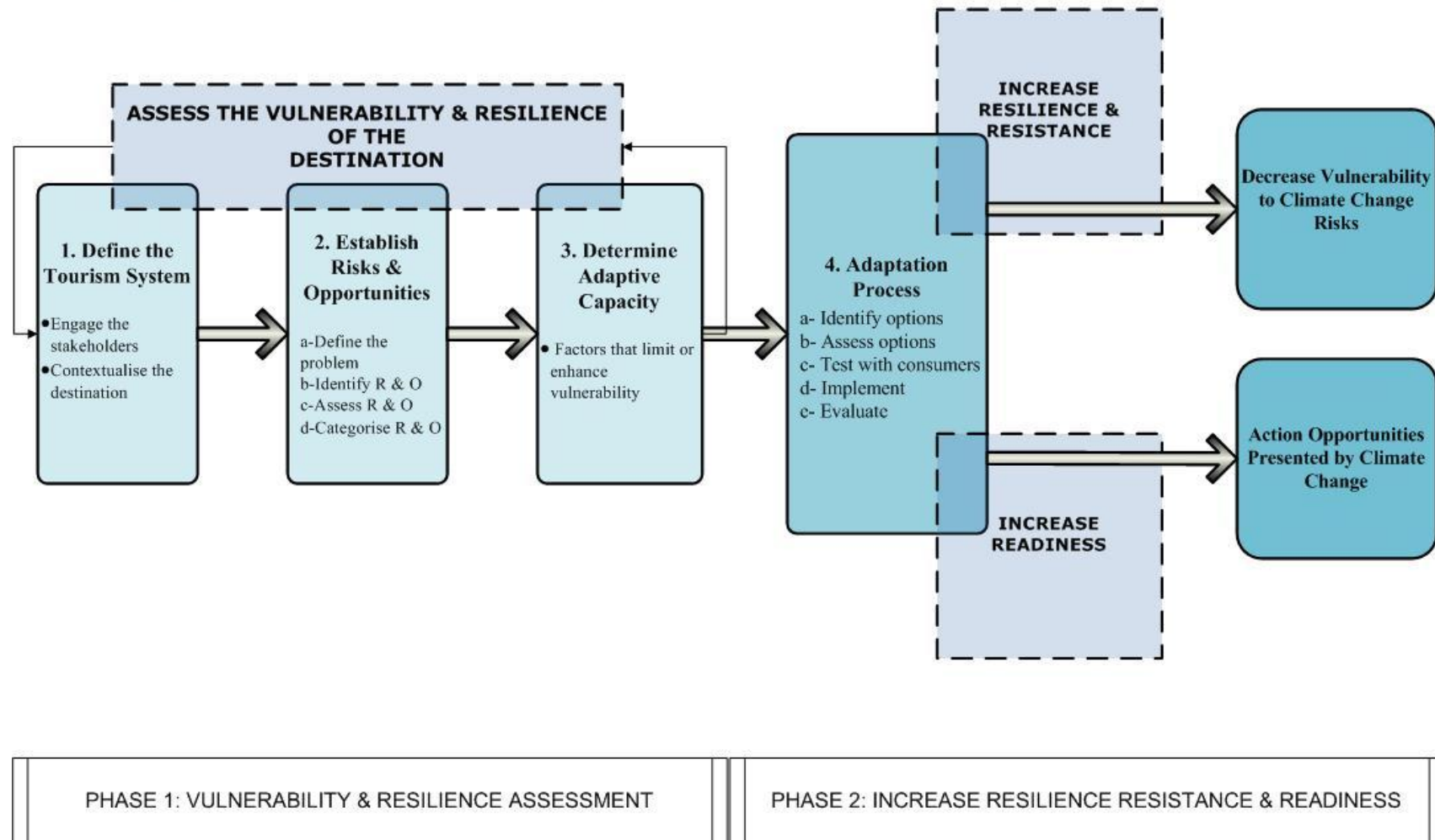
5.2 The Proposed Regional Tourism Adaptation Framework (RTAF) Model

The proposed regional tourism adaptation framework (RTAF) model represents an amalgamation of elements drawn from previous adaptation frameworks. The elements of these previous adaptation frameworks are outlined in Section 2.9 of this thesis. The aim of this section is to provide a representation of the steps involved in assessing a

destination's vulnerability and resilience, and developing an appropriate adaptation action plan. The RTAF model incorporates two major phases. The first assesses the vulnerability and resilience of the destination, and involves defining the tourism system, establishing the climate change risks and opportunities likely to impact on tourism, and determining the adaptive capacity of tourism in the region. The second phase details the process of adaptation intended to increase resilience, resistance and readiness of the region. This involves identifying and assessing adaptation options, testing these with consumers, and implementing and evaluating adaptation options. The RTAF model is presented in Figure 5.1.

Figure 5.1 The Regional Tourism Adaptation Framework (RTAF) Model

Regional Tourism Adaptation Framework (RTAF) Model

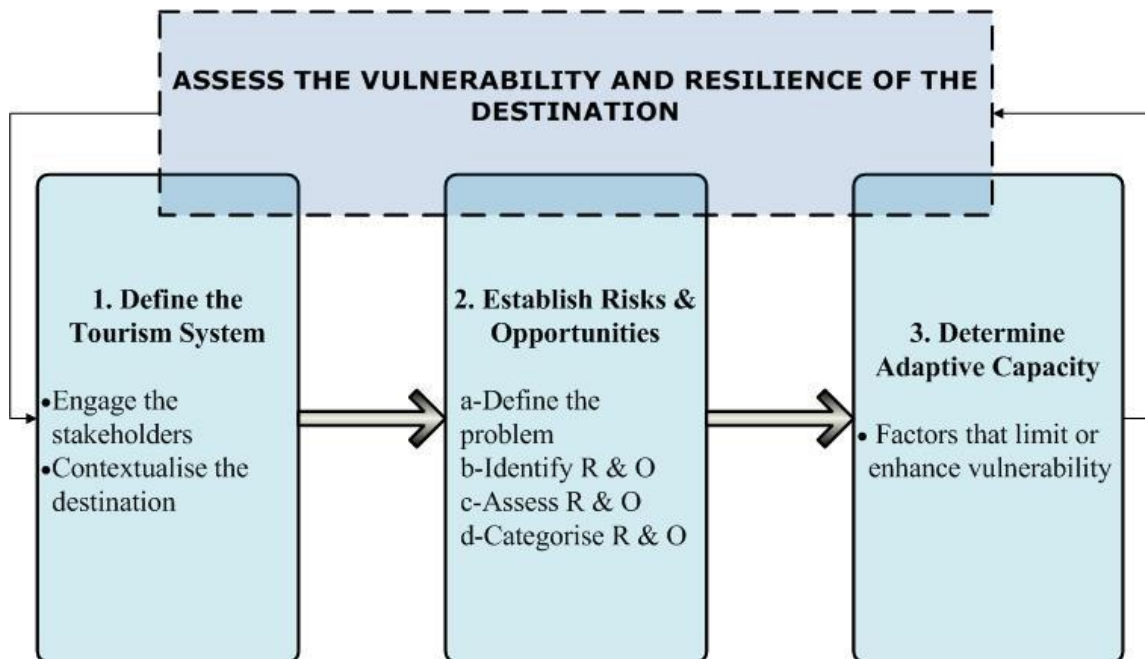


5.2.1 Phase 1: Assess the Vulnerability and Resilience of the Destination

The first phase of the adaptation framework involves an assessment of the destinations vulnerability and resilience. Vulnerability, as discussed in Chapter 2, is a term referring to the total exposure to risk, in this case those risks associated with climate change (Birkmann, 2007). Vulnerability can be reduced by increasing resilience to such risks. Resilience, in turn, is increased by implementing various adaptation options. The three stages in assessing the vulnerability and resilience of a destination, as detailed in the framework model shown in Figure 5.2, are:

1. Define the Tourism System
2. Establish the Risks and Opportunities
3. Determine the Adaptive Capacity

Figure 5.2 Phase One of the RTAF model



Stage 1 – Define the Tourism System

This involves establishing the context of the destination under review and determining who the key stakeholders are. Determining the context of the destination involves establishing the geographic boundaries of the region under investigation and evaluating

the range of environmental and socio-cultural assets that motivate both domestic and international visitation.

Tourism is a highly diverse sector involving stakeholders from a range of different sub-sectors including transportation, accommodation, hospitality and environmental management. Therefore it is important to have a clear understanding of the whole tourism system. This involves an examination of the tourism process and identification of the key stakeholders (a description of various tourism definitions and stakeholders is provided in Chapter 1). As this stage involves examination of the whole tourism system, not only is the destination itself analysed, but also other important stakeholders including:

- Suppliers – tourism operators, land managers, government departments, travel agents and transportation companies.
- Tourism Staff – destination employees, volunteers, tourism association members and visitor information centre employees.
- Tourists – information on international and domestic visitors, leisure and business tourists, demographic information.
- Local Community – residents (permanent and non-permanent), local business associations and lobby groups.

It is imperative to get the right people involved in the study early and get them engaged in a participatory process. The appropriate communication channels should be created to best enable the efficient communication of knowledge and information, and a broad cross section of participants should be involved.

Stage 2 – Establish the Risks and Opportunities

Once the tourism context of the destination is determined and the key stakeholders are identified, the potential effect of climate change on tourism at the destination must be investigated. This involves exploring how climate change is likely to affect the region in general, and then establishing what the risks and opportunities for tourism are. These steps involve defining the problem, and identifying, assessing, and categorising the risks and opportunities. These will now be discussed in detail.

Stage 2a – Define the Problem

This stage involves providing an overview of what climate change will mean for the destination and what changes are likely to occur. As the level of awareness of climate change amongst the stakeholders is likely to vary, it is important that knowledge is shared and all stakeholders are provided with, and have access to, relevant information on climate change.

Stage 2b – Identify the Risks and Opportunities

To gain a more complete view of climate change risks and opportunities a review of regional projections is required. Several reports exist that examine the potential effects of climate change on various regions throughout Australia (Australian Government, 2009; DeLacy, Jopp, Calgaro, & Law, 2010; Hennessy, 2007; PMSEIC, 2007; Turton et al., 2009; Voice, Harvey, & Walsh, 2006). The next step is to determine how the problems of climate change will affect the tourism sector specifically. This involves identifying the possible risk events that may impact on tourism. These risk factors may have consequences for tourism across a range of fronts, from more obvious impacts on the natural resource base, for example through increased coastal erosion due to the combination of sea level rise and more frequent storm surges, to less obvious impacts on tourist satisfaction due to a loss of biodiversity, or a shift in consumer demand. Both bio-physical and socio-economic impacts on tourism should be considered, and both short and long-term scenarios taken into account. For example, the indirect impacts of higher average temperatures may have more direct impacts such as increased bushfire risk (Turton et al., 2009). This may negatively affect tourism infrastructure and amenities, as well as natural tourism assets such as national parks. Such events are also likely to impact on the mental and physical wellbeing of both locals and visitors who experience such an event.

Although the negative impacts of climate change appear to outnumber the positives, it is important that any opportunities are also investigated. This should not be seen as politically incorrect, or as somehow supportive of climate change; rather a rational reaction to the realities of climate change. The opportunities brought about by changes in the climate may in fact reduce the negative impacts of tourism on both the bio-physical and socio-economic environments. For example, some destinations may experience decreased seasonality, as peak summer periods are extended due to warmer

weather, which may in turn reduce the negatives associated with overcrowding during peak summer times, such as pollution, strained resources, and community anger or frustration. Other adaptation opportunities may include changing the timing of special events, introducing new activities to certain areas, looking to attract new market segments, or even repositioning the destination.

Stages 2c and 2d – Assess/Categorise the Risks and Opportunities

Once a list of potential climate change risks and opportunities are established, the next stage is to assess and categorise each of these impacts to determine the potential negative or positive influence on Surf Coast tourism.

Assess and Categorise the Risks

In this step, the likelihood of each risk occurring and the consequences of their occurrence should be assessed. The likelihood for each risk occurring is dependent on the individual destination being reviewed. However, the list of possible climate change trends presented by the IPCC (2007b) could be used as a guide to predict impacts. The table shown in Appendix F lists the changes or trends projected due to climate change, the likelihood of their occurrence, and examples of major projected impacts for various sectors. Although the table does not include information on the tourism sector specifically, examples given for other sectors such as water resources and agriculture, forestry, and ecosystems, would likely be relevant. Other organisations, such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO, 2012) also provide further understanding of the region-by-region impact of climate change across Australia.

A risk matrix could be used to help rate each risk, with the likelihood of occurrence on one axis and the severity of consequences on the other. By using the matrix to plot the likelihood of an impact occurring, and the consequence of its occurrence, the relative risk of each impact can be evaluated. Dependent on which sector of the matrix each impact falls on, a different management response will be suggested. This provides a clear graphical representation of the severity of each of the risks and where it lies in comparison to other risks. This will assist decision-making by displaying which risks need attention and which can be accepted.

A consequence matrix and a likelihood matrix are provided in Appendix B and C. They provide information on the descriptions used in Table 5.1 to evaluate the level of risk from various climate change impacts.

Appendix B provides details of the consequence of various impacts from Insignificant (1) to Catastrophic (5). The impacts on both the bio-physical and socio-economic environments are considered, with impacts rated from Very Low to Very High (ACT Insurance, 2004). This helps demonstrate the impact's effect on tourism capabilities, destination image, etc.

Appendix C describes the likelihood of different impacts occurring, and uses the descriptors Almost Certain, Likely, Possible, Unlikely, and Rare to detail the chance of a particular climate change impact occurring. As climate change and variability can be very hard to predict, and/or take a long time to eventuate, the descriptors should only be used as a guide.

Table 5.1 uses the descriptors from the two appendices to predict the level of risk a particular impact presents to the destination. By combining the likelihood of an impact occurring with the consequences of its occurrence, the level of risk can be determined. The level of risk is then judged to be Low, Medium, High or Extreme. The risks are then able to be categorised, and dependent on the level of risk determined, a range of different actions can be implemented. The various impacts are assessed and categorised given the current situation.

The following tables represent the risk assessment process adapted from the AS/NZS 4360 Risk Management standard (ACT Insurance, 2004):

Table 5.1 Level of risk

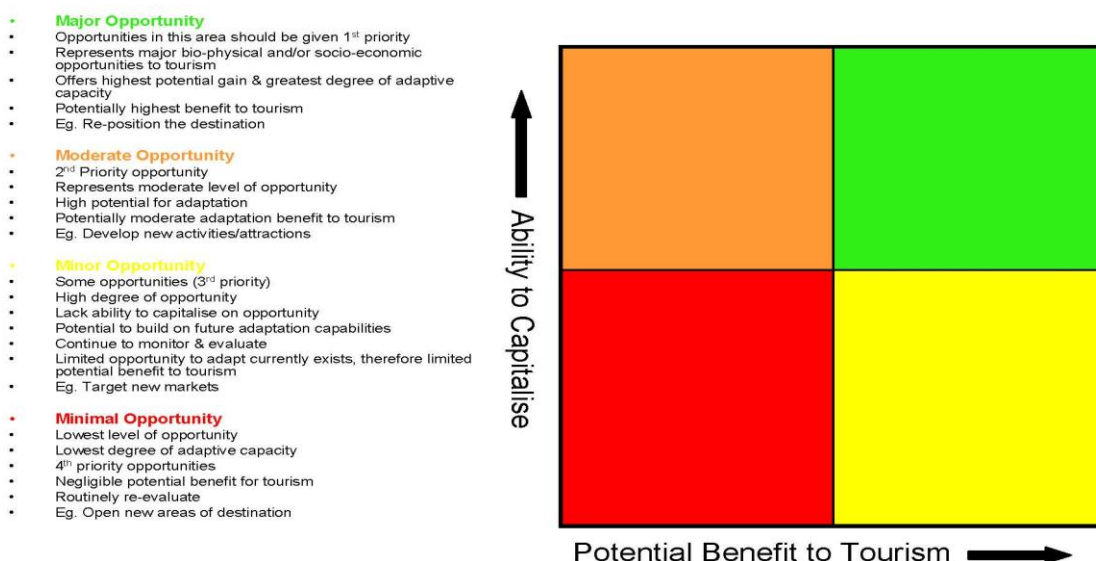
Consequence						
Likelihood		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
	A Almost Certain	High	High	Extreme	Extreme	Extreme
	B Likely	Medium	High	High	Extreme	Extreme
	C Possible	Low	Medium	High	Extreme	Extreme
	D Unlikely	Low	Low	Medium	High	Extreme
	E Rare	Low	Low	Low	High	High

Assess and Categorise the Opportunities

Once a list of potential opportunities is developed, they should be analysed to determine the degree of potential benefit each opportunity offers. To determine which opportunities provide the greatest potential benefit for tourism development, both the potential benefit to tourism and the capacity to capitalise on the opportunity should be analysed. To do this, a matrix can again be used classify potential opportunities. Each opportunity can be rated in terms of its potential benefit to tourism, and the capacity to implement the particular option. There are various ways to do this, and each destination must identify the most appropriate option method for them given various time and financial constraints. An example of an adaptation opportunity matrix is provided in Figure 5.3.

Figure 5.3 Climate change opportunity matrix

Climate Change Opportunity Assessment for Tourism



Stage 3 – Determine the Adaptive Capacity

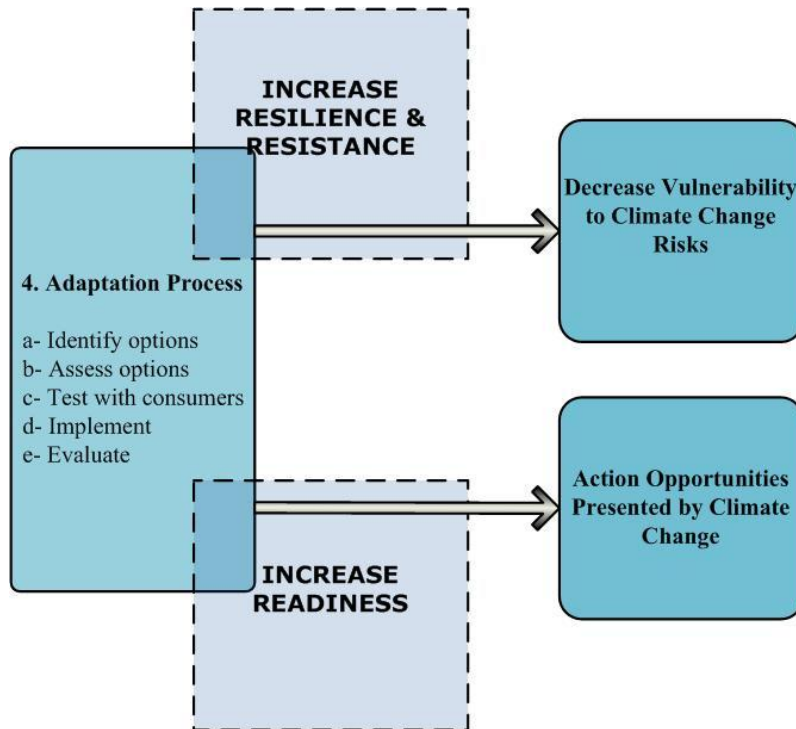
Adaptive capacity, as discussed in Chapter 2, is the ability of institutions, systems and individuals to adjust to potential climate change impacts, to take advantage of opportunities, and to cope with the consequences. Adaptive capacity can vary greatly from region to region, and is dependent on social, educational, institutional, economic and other factors (Simpson et al 2008). These determinants are not mutually exclusive and the adaptive capacity of a region will be determined by a combination of these factors. They represent the conditions that either limit or enhance a region's vulnerability to climate change, and determining the underlying factors affecting adaptive capacity can assist in evaluating the best options for adaptation. Consequently, it is important that the adaptive capacity of a region is determined prior to assessing and categorising potential adaptation options.

5.2.2 Phase 2: Increase Resilience, Resistance and Readiness

The second phase of the adaptation framework involves increasing resilience, resistance and readiness (Figure 5.4). Resilience is the ability to absorb changes in climatic conditions, resistance reduces the number of impacts that are likely to affect tourism,

and readiness is the ability of the destination to capitalise on opportunities that arise (Birkmann, 2007; Lorenz, Heard, Hoekstra-Fokkink, Orchard, & Valeri, 2008; Sivell, Reeves, Baldachin, & Brightman, 2008).

Figure 5.4 Phase Two of the Regional Tourism Adaptation Framework (RTAF) Model



To increase resilience, resistance and readiness, appropriate adaptation options must be identified, assessed, implemented and evaluated. As well as this, adaptation options will be tested with consumers to determine their opinion of various adaptation options. This step is vital, because the consumer has the greatest adaptive capacity of any tourism stakeholder, and ultimately they make the decision whether to visit a destination or not (see Figure 2.2 for the relative adaptive capacity of various tourism stakeholders).

By increasing resilience and resistance to climate change impacts, the region's vulnerability will be reduced. And by increasing its readiness, the region will be best positioned to capitalise on potential opportunities. The following section outlines the five steps involved in the adaptation process required to increase a region's resilience, resistance and readiness.

Stage 4 – Adaptation Process

Once the previous steps are completed and the vulnerability and resilience of the destination has been investigated and assessed it is time to develop an adaptation plan. Adaptation involves the following five steps:

- a) Identify adaptation options.
- b) Assess adaptation options.
- c) Test adaptation options with consumers.
- d) Implement adaptation options.
- e) Evaluate adaptation options.

Stage 4a – Identify Adaptation Options

This stage involves identifying potential adaptation options based on the risks and opportunities identified and analysed in the first phase of the RTAF model. Where possible, this would involve working with relevant stakeholders such as climate change experts, environmental scientists, risk scientists and local experts, to assemble a portfolio of adaptation options. This stage involves reviewing adaptation currently commissioned, discussing the risks and opportunities previously identified, and considering the region's adaptive capacity. An initial list of adaptation options for each climate change impact (increased bushfire risk, sea-level rise, coastal erosion, etc.) should be developed to ensure all possible options are considered. The list will be destination specific and should focus on the risks and opportunities identified in Stage Two of the model. Communication with the key stakeholders identified in Stage One is vital in identifying relevant options, and in ensuring that time is not wasted on inappropriate ideas or options that are already addressed through other means. A participative, community-based approach to adaptation throughout both the development and implementation stages is likely to receive greater stakeholder support than an independent ad-hoc approach (Moreno & Becken, 2009; Simpson et al., 2008).

Local governments and other authorities may have developed adaptation plans that are relevant to tourism. For example, the Australian Government (2007) developed a report titled "Climate change adaptation actions for local government" which outlines the roles

and functions of local government in response to climate change. The report recognises the importance of stakeholder consultation during the adaptation process and highlights that local government's climate change obligations may be shared with other agencies and authorities in other levels of government (Australian Government, 2007). Several other government authorities, at the state and local level, may also have produced relevant reports and guidelines for adaptation (DSE, 2004a; Mallon, Turner, & Wormworth, 2010; Queensland Government, 2005).

Identifying adaptation options is a major step in the entire process, and involves developing a portfolio of adaptation options suitable to the particular destination given its vulnerability to various stressors and its relevant adaptive capacity. It may be necessary to look back at the impacts caused by climate change to ensure that the adaptation options selected are appropriate, and that similar adaptation options have not already been commissioned. Participation of relevant experts in climate change science and key stakeholders in the region is recommended, and the use of interviews, focus groups, or a Delphi approach can be useful in identifying adaptation options (Simpson et al., 2008).

Stage 4b – Assess Adaptation Options

Once a range of adaptation options have been identified, a process of refinement should occur. This involves taking the portfolio of adaptation options back to the stakeholders and getting them to reduce the number of strategies chosen where appropriate. This could involve stakeholders being asked to rate the adaptation options across a number of criteria, for example:

- Effectiveness – Determine how well the particular adaptation option will work as a solution to the problem; or how well it will enable an opportunity to be capitalised upon (Scott & Simpson, 2008; Simpson et al., 2008; USAID, 2007).
- Local Acceptance – Determine how positively local communities are likely to react to the adaptation (Scott & Simpson, 2008; Simpson et al., 2008; USAID, 2007).
- Ease of Implementation – Determine how likely the adaptation is going to fit with other policies and development goals for the region (Scott & Simpson, 2008; Simpson et al., 2008; USAID, 2007).
- Distribution of Benefits – Determine which groups are likely to benefit most, or

least, from the adaptation (Simpson et al., 2008).

- **Affordability** – Determine if the cost of the adaptation is able to be met in the short, medium, and long-term (Scott & Simpson, 2008; Simpson et al., 2008; USAID, 2007).

It is recommended that a specific set of criteria be developed by stakeholders and a weighting scheme used to indicate the level of importance of each of the criteria (Simpson et al., 2008). The decision regarding the weighting scheme should involve all stakeholders and where necessary further expert advice should be sought, or more specific research conducted. Once each of the factors is given a weighting and then evaluated, an overall evaluation score can be derived for each potential adaptation. The outcome will be a ranked list of adaptation options.

Stage 4c – Test Adaptation Options with Consumers

Since tourists make the final decision as to whether to travel to a destination or not, they are key stakeholders in any adaptation process (Simpson et al., 2008). It is therefore imperative that their attitudes towards the different adaptation scenarios proposed are understood. It is also important to consider how any adaptation strategies may affect destination appeal or tourist satisfaction. Of all the stakeholders in the tourism system, tourists have the greatest adaptive capacity to climate change impacts by substituting the place, timing and type of holiday. Therefore, the impacts of any adaptation strategy on tourist attitudes towards a destination must be considered.

To do this, the adaptation strategies identified and evaluated in the previous stages should now be communicated with tourists and their opinions sought. This could be done by surveying tourists at destination ‘hot spots’ or by conducting focus groups. The aim of this research is to better understand the effect various adaptations would have on their likelihood of visiting the region. A pre-determined rating or ranking scale should be agreed upon prior to conducting the research, and once tourists have provided relative scores, a shortlist of the top few adaptation strategies can be compiled.

Stage 4d – Implement Adaptation Options

Now that a range of adaptation options have been developed and refined, the selected options can be implemented. Implementation of the chosen adaptation options requires

a clear outline of stakeholder responsibility, resource requirements and timelines (Simpson et al., 2008; USAID, 2007). This could include the following components: better definition of the specific tasks, schedule, and roles of implementing partners; decision-makers and stakeholders; and resource requirements (USAID, 2007). Implementation should be in line with other regional development and sustainability plans, whilst also considering local development initiatives and national development plans (Scott & Simpson, 2008; Simpson et al., 2008). Effectively incorporating adaptation plans into regular development planning is challenging, but essential (Lim, Spanger-Siegfried, Burton, Malone, & Huq, 2005). It requires political and community support, cross-sectoral cooperation and backing from government. The support of stakeholders will be essential to the success of the process and transparency and open lines of communication are essential.

Stage 4e – Monitor and Evaluate Adaptation Options

The final stage in the adaptation process is monitoring and evaluating the adaptation options selected. As climate change often presents long-term impacts, such as sea-level rise, or deals with infrequent events such as severe storms, the evaluation of adaptation is intrinsically problematic. Evaluation of adaptation must therefore occur over the long term and the situation continually monitored to determine if the intended outcomes have eventuated. The fact that an adaptation has not yet delivered the expected benefits does not necessarily mean the adaptation was inappropriate. Other methods of evaluation stated by USAID (2007) and Simpson et al. (2008) include ease of implementation, costs, adverse impacts and benefits delivered (both as a direct and indirect effect of the adaptation) (Pachauri, 2002).

5.2.3 Outcomes

The overall aim of the adaptation process is twofold. Firstly, the process aims to increase the *resilience* and *resistance* of the region in order to decrease its vulnerability to climate change risks. *Resistance* reduces the number of impacts that are likely to significantly affect tourism, whilst *resilience* reduces the extent of the damage caused by climate change impacts on a destination. By increasing resilience and resistance through appropriate adaptation action, you subsequently decrease your vulnerability to climate change risks (see Figure 5.1). The following analogy put forward by Sivell et al. (2008, p. 4) is useful in conceptualising the differences between resistance and

resilience:

If you think of adaptation efforts as being something like a boxer, resistance is blocking the punches. When punches inevitably get through, resilience is about not having a “glass jaw” and being able to avoid the worst effects of any given event.

Secondly, the adaptation process should also increase the region's *readiness* to action any potential opportunities presented by climate change. As established, climate change may also present opportunities for adaptation that capitalises on changing climatic conditions; this type of adaptation increases *readiness*. The subsequent improvement of the regions *resistance*, *resilience*, and *readiness* will reduce overall vulnerability to changes in climate and maximise the potential to capitalise on any potential opportunities that may emerge.

5.3 Chapter Summary

Even if mitigation efforts are successful in reducing greenhouse gas emissions, the earth's climate will continue to change. This is why adaptation is vital in society's overall strategy to tackle climate change. This thesis provides an investigation of the role of adaptation in improving resilience, resistance and readiness to climate change impacts in order to decrease vulnerability of regional tourism destinations. Chapter 2 provided a detailed analysis of the adaptation models available in the literature and concluded that they are either non-tourism specific, or do not incorporate all the elements of the proposed model. Therefore, the proposed model provides a significant contribution to knowledge.

None of the existing models focus on regional tourism adaptation, and this is important as adaptation is best applied at the local or regional level, as it is usually selected systems or locations that benefit from its implementation. Furthermore, the models reviewed either provide basic information on the actual process of adaptation, or no information at all. The role of the tourist is also neglected in the models analysed, which is of some surprise given that tourism is a consumer-driven industry, and it is the tourist who has the greatest adaptive capacity.

Chapter 3 therefore provided an in-depth examination of the elements of consumer behaviour that impact on destination choice. As a consequence, the inclusion of a

consumer behaviour element in the RTAF model enables a more inclusive review of the implications of adaptation, by incorporating an external or consumer perspective, with an internal or destinational perspective. Finally, other models, particularly those taking a risk science approach, do not fully consider the opportunities made possible by climate change. Indeed, there may in fact be both winners and losers in the one region. Reducing the risks of climate change may be the priority, however, the role of the destination manager should also be to identify, and take advantage of, any possibilities. Early identification of potential benefits from climate change, whether it be more sunny days or milder winters, can assist in offsetting the potential negatives of climate change.

The development of adaptation strategies is a complex task, and the development of a framework specific to tourism is important in clarifying the many issues involved. For regional tourism destinations to successfully adapt to climate change, they need to develop an environment that encourages knowledge sharing, and enable those involved to make well-informed sustainable decisions based on solid information. The development of the model provides not only a theoretical contribution to knowledge, but also provides a practical tool for regional managers and tourism policy-makers to utilise when making decisions regarding an increasingly uncertain future.

The adaptation framework proposed represents the ‘state of the art’ in terms of regional tourism adaptation; however, this does not mean that the process of adaptation is perfect for every destination. The adaptation process itself should be continually monitored throughout its design and implementation, and the role of stakeholders and the decision-making process should be tailored to meet the needs of each particular destination. Nevertheless, the proposed framework for regional tourism adaptation provides a solid basis for managers and policy-makers to improve their decision-making capabilities in the face of inevitable climate change.

This chapter has outlined the steps of the proposed model for regional tourism destinations to adapt to climate change. The following three chapters will now discuss and apply parts of this model in relation to Victoria’s Surf Coast region. As mentioned in the methodology chapter, the RTAF model will be applied as a single case study in order to gain greater knowledge of its utility in a practical sense. Chapter 6 will provide an exploration of the vulnerability and resilience of the Surf Coast region; as

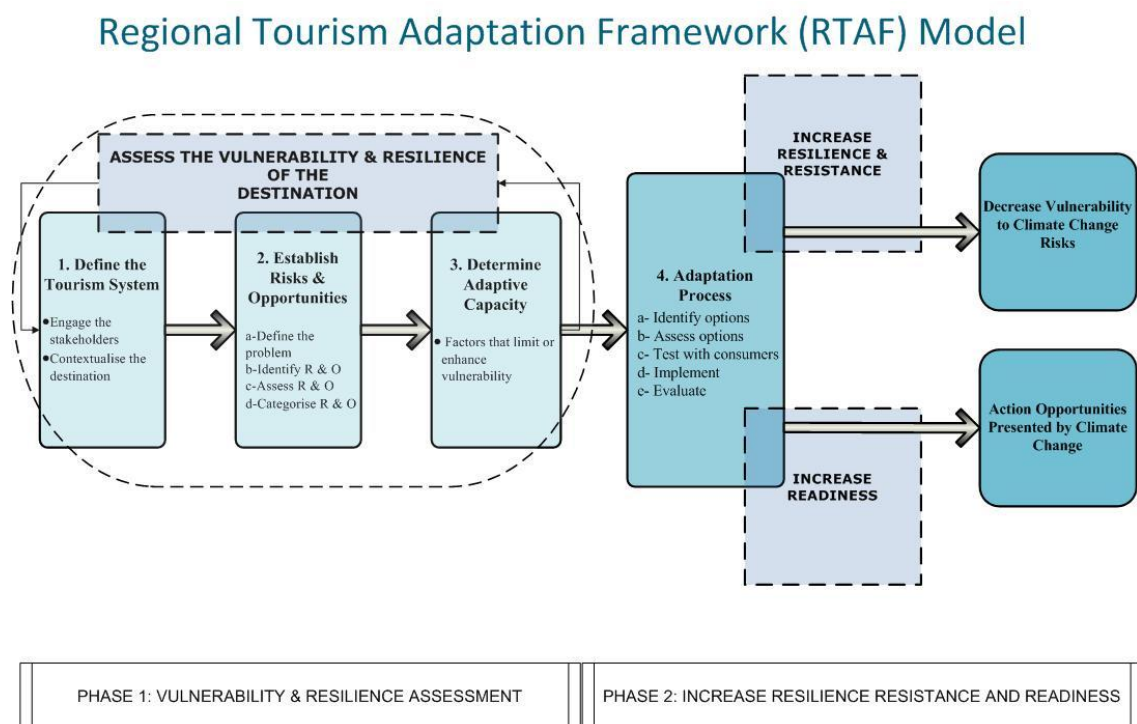
represented in Phase One of the RTAF model (Section 5.2). Whilst, Chapters 7 and 8 will discuss the process of adaptation presented in Phase Two. This phase involves a Delphi study which incorporates two stages of data collection aimed at determining the climate change risks and opportunities for Surf Coast tourism and the appropriate adaptation options available.

Chapter 6. Assess the Vulnerability and Resilience of the Destination: Phase 1 of the RTAF Model

6.1 Introduction

Chapter 2 provided a detailed literature review of the issues surrounding climate change and tourism destination adaptation, including an analysis of the tourism adaptation frameworks available. Chapter 3 went on to investigate the important role of consumer behaviour in tourism, with particular focus on the function of attitudes. Chapter 4 provided a detailed description of, and justification for, the methodology chosen for this research. Chapter 5 provided a description of the process involved in developing a regional tourism adaptation framework for climate change. This chapter will discuss the first phase of the RTAF model: assessing the vulnerability and resilience of the destination. Chapters 7, 8 and 9 are related to the second phase of the RTAF model and will present the findings of the application of the RTAF model to the Surf Coast region as a single case study. The three stages in phase one of the RTAF model are highlighted in Figure 6.1.

Figure 6.1 Phase 1 of the RTAF model



The aim of this chapter is to present an examination of the vulnerability and resilience of Victoria's Surf Coast region. This will involve defining the tourism system, establishing the climate change risks and opportunities, and determining the region's adaptive capacity. Victoria's Surf Coast region has been selected as the single case study destination, as discussed in Chapter 4, as it is a major coastal tourist destination and because it is vulnerable to a range of climate change impacts. Coastal destinations are especially vulnerable to climate change related impacts such as storm surge inundation and erosion (Voice et al., 2006).

6.2 Stage 1 of the RTAF Model: Define the Tourism System

As described in Chapter 5, defining the tourism system involves establishing the context of the destination under review, and determining who the key stakeholders are. To establish the various stakeholders throughout the Surf Coast tourism system, a review of the appropriate literature was conducted and information was gathered through informal meetings with representatives from tourism organisations such as Tourism Victoria and Geelong-Otway Tourism. This assisted in gaining a clear understanding of the major stakeholders, and their roles, within the whole tourism system. The following sections will further contextualise the region under investigation and provide an analysis of each component of the whole tourism system as it applies to the Surf Coast region.

6.2.1 Context of the Destination: Victoria's Surf Coast Region

Victoria is Australia's smallest mainland state in area but the most densely populated and urbanised. It is the second most populous Australian state after New South Wales, with an estimated population of around 5.2 million as of June 2007 (Australian Government, 2009). Victoria contains many diverse tourism destinations, from temperate rainforest areas of Gippsland, coastal areas such as the Great Ocean Road, and snow-covered alpine areas.

The Surf Coast region offers a "spectacular coastline, scenic rainforests and magnificent beaches, and is one of the major tourist draw cards of Australia" (Surf Coast Shire, 2008). The Surf Coast Shire was proclaimed on 9 March 1994, and it covers an area of 1,560 km² (Surf Coast Shire, 2008). The Shire is located in southwest Victoria, 20 minutes from Geelong and 90 minutes from Melbourne making it easily accessible for

day trippers. The region includes 55 kilometres of coastline and the start of the Great Ocean Road define its southern boundary:

The main population centres include Torquay, well known for its surf related industries and Bells Beach, Winchelsea, the gateway to the fertile Western District, and leafy Anglesea and the beautiful resort town of Lorne. (Surf Coast Shire, 2008)

The natural physiography of the region is a core attractor for many tourists, with a drive along the Great Ocean Road being on most visitor's must do list when visiting Victoria (Hossain & Barry, 2003). The natural environment and landscape of the region forms the essence of its appeal, and it is vital to the long-term competitiveness of the Surf Coast as a destination that appropriate resource stewardship exists to protect such valuable tourism assets (Surf Coast Tourism, 2008). This is largely the responsibility of public agencies such as Parks Victoria and the Department of Sustainability and Environment (DSE).

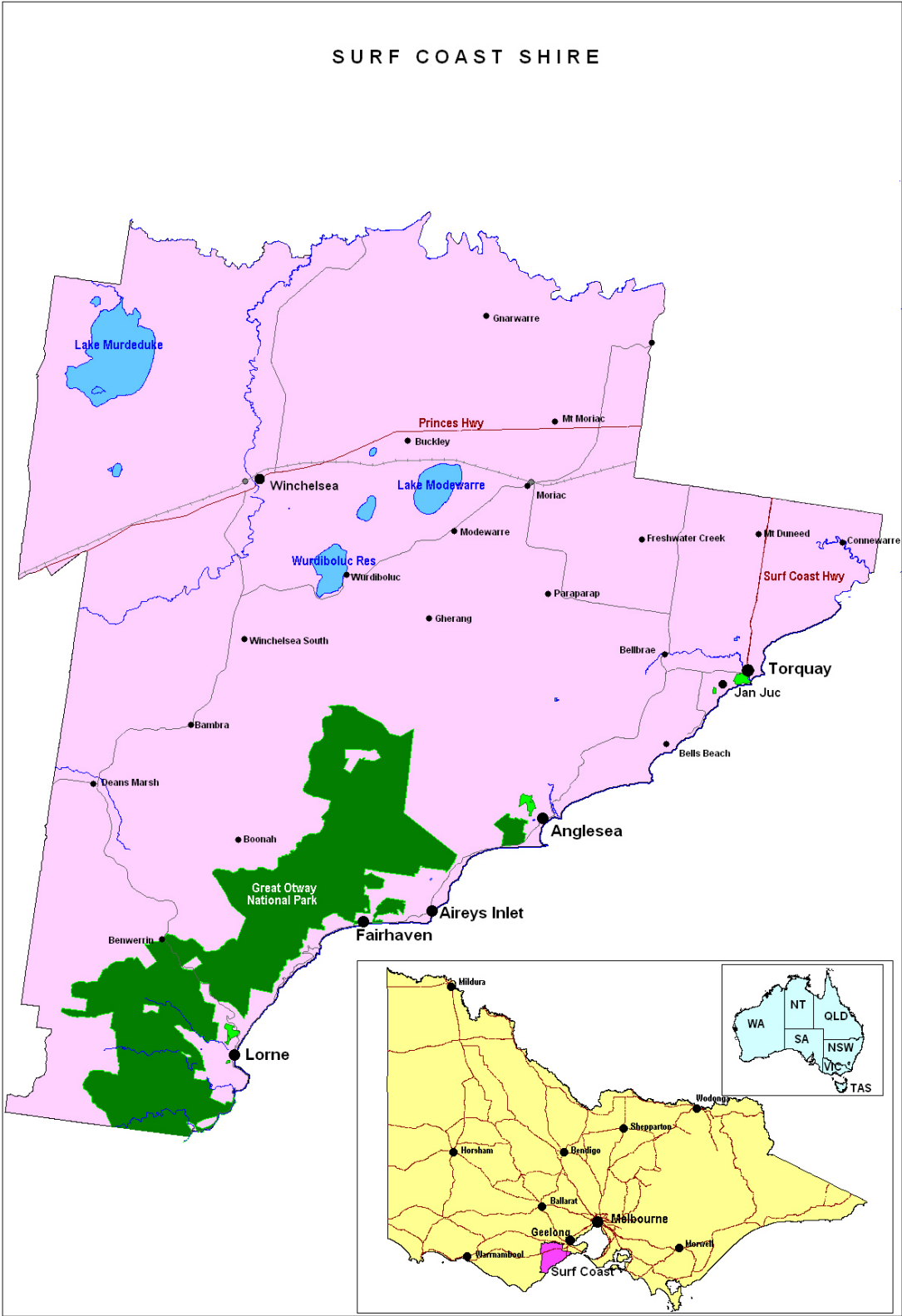
The permanent population is 21,771 (Census, 2006), however, the total population more than trebles at peak holiday times when large numbers of holidaymakers and visitors stay in the region. The Great Ocean Road, which starts in Torquay and ends at Allansford, attracts over 2.5 million travellers annually (Surf Coast Shire, 2008). The destination itself is popular with both domestic tourists, from both Melbourne and interstate, and with international tourists. This is discussed further in Section 6.2.2 on the Surf Coast tourism system.

Tourism and related industries, such as hospitality and accommodation, are major contributors to the economy of the region (Surf Coast Tourism, 2008), along with agriculture and the Alcoa Power Plant in Anglesea (Alcoa, 2009). Much of the rural area is used for farming, including viticulture. Tourism and surfing are particularly important industries throughout the Great Ocean Road, incorporating the Surf Coast townships of Torquay, Jan Juc, Anglesea, Aireys Inlet, Fairhaven, and Lorne (G21, 2010).

This chapter will consider the impact of climate change throughout the Surf Coast region, and will further analyse the current state of affairs in terms of the region's vulnerability to climate change variability, and its adaptive capacity to respond to

identified areas of concern and capitalise on any opportunities that may arise. Figure 6.2 presents a detailed map of the Surf Coast region.

Figure 6.2 Surf Coast Shire



Source: (Geelong Otway Tourism, 2007).

6.2.2 The Surf Coast Tourism System

This section is related to Research Objective 2 - *Apply the model using the Surf Coast region as a single case study*. Background information is provided on the Surf Coast tourism system and its various components. This provides the context for the case-study application by providing insight into the role of the tourism sector throughout the region. An understanding of which components of tourism may be affected by climate change is developed, before establishing specific risks and opportunities for the region.

The Surf Coast Shire receives more than 1.3 million visitors each year (Tourism Alliance Victoria, 2008); in 2006, this equated to \$258 million in tourist expenditure (Geelong Otway Tourism, 2007). This expenditure is estimated to directly support 800 full-time and part-time jobs, and indirectly support up to 1040 jobs (Geelong Otway Tourism, 2007).

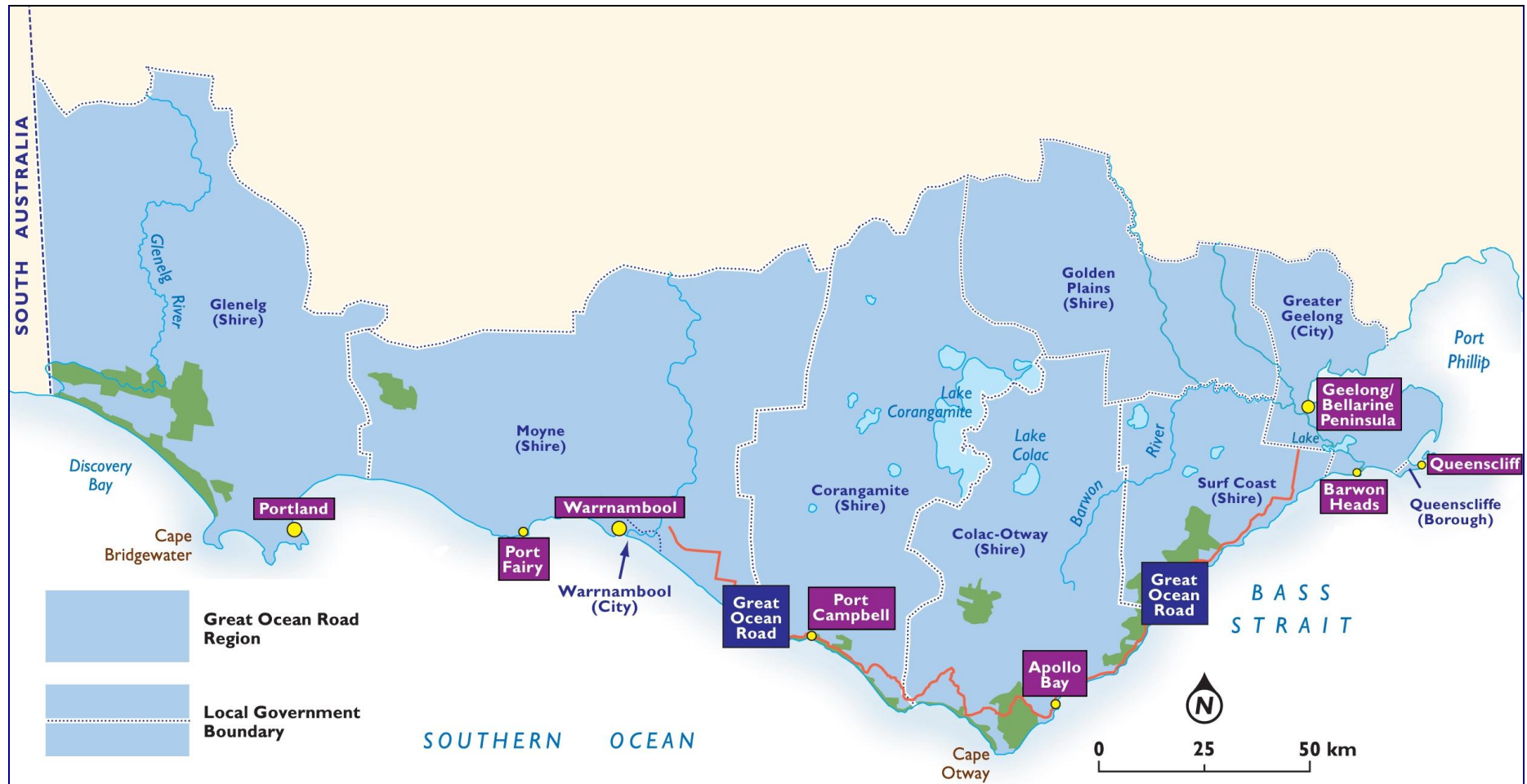
The Surf Coast Shire includes a major section of the Great Ocean Road (GOR), from Torquay in the east to Lorne in the west. A map of the GOR destination is presented in Figure 6.3 which also displays the location of the Surf Coast shire. The GOR region is the fastest growing tourism region in Victoria, outside Metropolitan Melbourne (Victoria, 2009). The GOR region receives over 8 million visitors per year including 5.3 million day trippers (EC3 Global, 2008). For the year ending December 2008 the GOR received 2.4 million domestic overnight visitors, and 150,500 international overnight visitors (Tourism Victoria, 2009b). This represents a 15 percent share of total visitors to Victoria and 11 percent of total visitor nights (EC3 Global, 2008). However, the GOR as a destination is a product constructed from a composite of interconnected elements brought together by a variety of stakeholders, all of which will be impacted – directly and indirectly – by climate-induced changes, fluctuations in resource availability and multi-scaled responses to these changes. The next sections outline the main components of the wider Surf Coast tourism system.

Every tourism system comprises the following five basic elements (Leiper, 2004):

1. *Tourists* – the essential human element.
2. *Tourist-generating Regions (TGRs)* – geographical place where a tourist's trip begins and usually ends.

3. *Tourist Destination Regions (TDRs)* – geographical places where a tourist's main visiting activity occurs.
4. *Transit Route Region* – transit routes and infrastructure tourists use to travel between tourist-generating regions and tourist destination regions.
5. *Tourism Industries* – collection of organisations and businesses that facilitate the creation, management and delivery of the purchased tourism product.

Figure 6.3 The Great Ocean Road region



Source: Tourism Victoria.

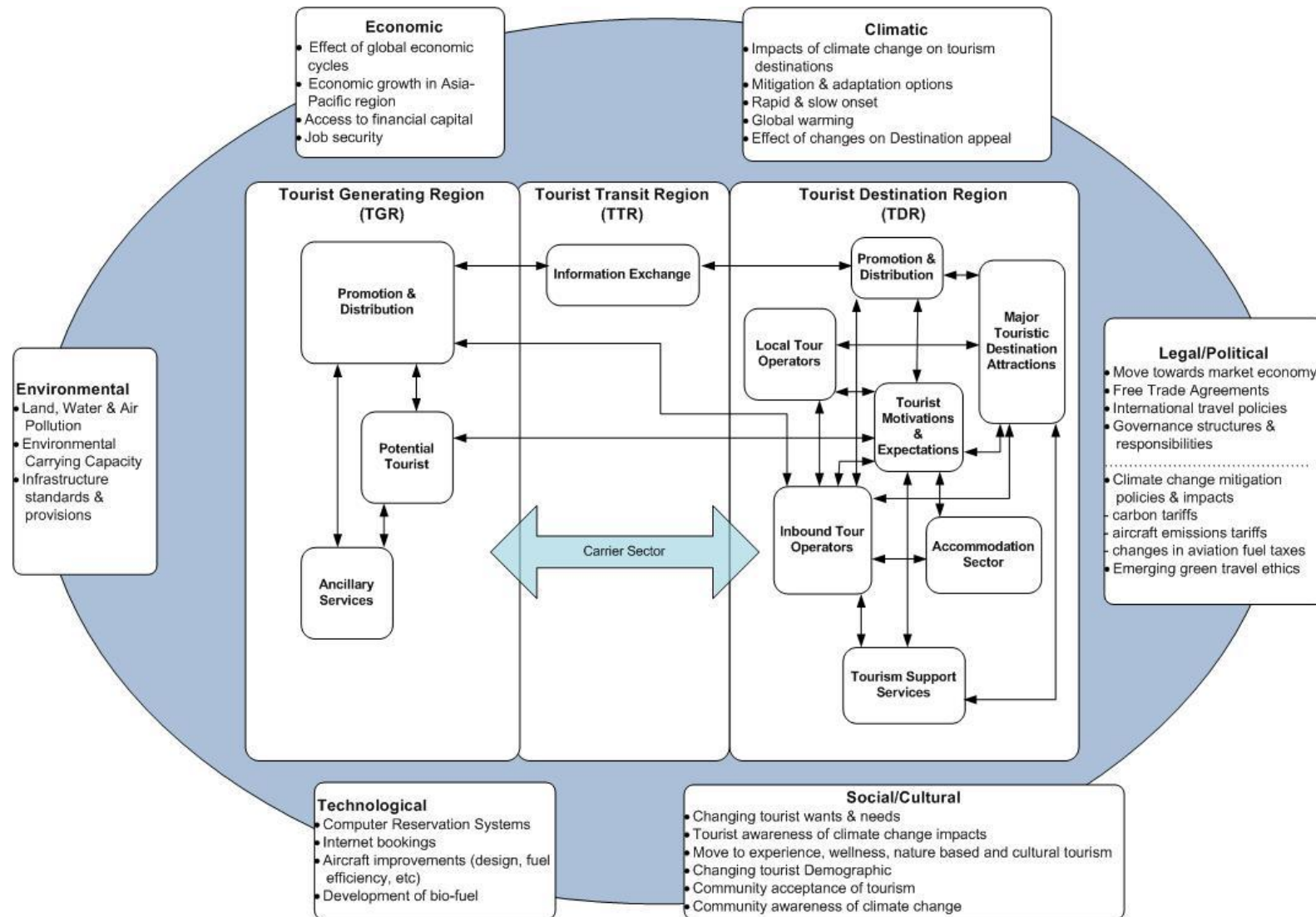
The elements of the Surf Coast region's tourism system and their linkages are mapped out in Figure 6.4. This figure also provides information on a number of external environments within which tourism occurs. Changes in these environments may cause changes in the way tourism is provided and consumed (Richardson & Fluker, 2008). The model attempts to clarify the complex relationship between the various elements in the whole tourism system, whilst demonstrating that tourism does not exist in a vacuum and is affected by various environments, including climate.

Each element of the tourism system is embedded within a wider socio-political, economic and environmental context that shapes every aspect of the system from the tourist's desires and expectations through to legal parameters of travel (for example visa requirements, airline emissions standards and flight curfews), tourism planning policy and process structures, and economic revenue flows that run through the economic goods and services value chain.

Whilst tourism activity does centre on the tourist destination region, the impact and consequences of severe "shocks" such as cyclones or bushfires, and more slow-onset "stressors" like global warming and sea-level rise, on one part of the system often reverberates throughout the entire system. Accordingly, it is imperative to identify the main components that make up the Surf Coast tourism system and to understand the interlinkages and relationships that exist between these elements, as well as the contextual environments within which the system operates.

Whilst Figure 6.4 provides an overview of the contextualised tourism system for Victoria's Surf Coast region, Figure 6.5 provides further detail on the specific components of this system and identifies the complex interlinkages between them. The following sections will go on to detail each of the five aforementioned elements of the Surf Coast tourism system.

Figure 6.4 The Surf Coast Tourism system and its contextual environment



The Whole Tourism System – Surf Coast Tourism

The diagram illustrates the Whole Tourism System for Surf Coast Tourism, organized into three main regions: Tourist Generating Region (TGR), Tourist Transit Region (TTR), and Tourist Destination Region (TDR). External factors (environmental, climatic, economic, social/cultural, legal/political, technological) influence the entire system.

Tourist Generating Region (TGR)

- Promotion & Distribution**
 - International (Tourism Australia)
 - Domestic (Tourism Australia/Tourism Victoria/Geelong Otway Tourism)
 - Internet (Tourism Australia/Tourism Victoria/The Official Great Ocean Road website)
- Potential Tourist**
 - 81% Intrastate
 - 13% Interstate
 - 6% International (Europe 34%, United Kingdom 24%, North America 14%, New Zealand 12%)
 - Socially Aware
 - Motivations
 - Expectations
- Ancillary Services**
 - Travellers
 - Cheques
 - Travel insurance

Tourist Transit Region (TTR)

- Information Exchange**
 - TDR information
 - TGR information
 - Market research information
 - Bookings & reservations systems
- Carrier Sector**
 - Plane* - Melbourne International Airport/Avalon Airport
 - Bus/Coach* - From Melbourne/Geelong to all major towns throughout the GOR region.
 - Train* - V-Line trains from Melbourne to Geelong (with transfers to Coaches) Overland train from Melbourne to Warrnambool
 - Car* - Most popular means of travelling to/from and throughout the GOR region

Tourist Destination Region (TDR)

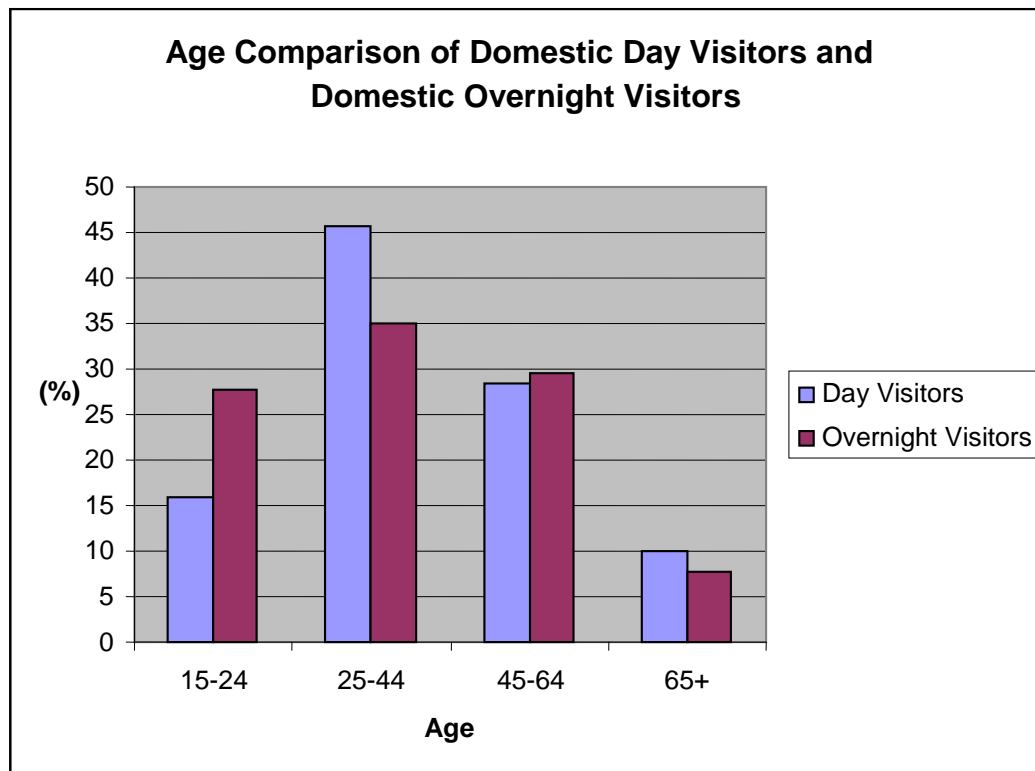
- Promotion & Distribution**
 - Tourism Australia
 - Tourism Victoria
 - Regional tourism associations
 - Local tourism associations
 - Great Southern Touring Route
 - Great Ocean Road Marketing
 - Retail travel agents
- Local Tour Operators**
 - Tiger Moth World Adventure Park
 - Seaside Coach Tours
 - Both-feet
- Inbound Tour Operators**
 - Australia One
 - Viator
 - Wildlife Tours Australia
 - Go West Tour
 - Coast to Country Touring
 - Centre One Tours Australia
- Tourist Motivations & Expectations**
 - Business
 - Leisure
 - VFR
 - Expectations met or exceeded? (expectations – perceptions = satisfaction level)
- Accommodation Sector**
- Tourism Support Services**
 - Car hire
 - Restaurants & cafes
 - Retail outlets (souvenir shops, arts, food, clothing)
 - Internet facilities
 - ATMs
- Major Touristic Attractions**
 - Lorne
 - Torquay
 - Apollo Bay
 - Touring the GOR
 - Bells Beach
 - The Otways National Park
 - Beaches & surfing
 - Bushwalking
 - The Great Ocean Walk
 - Aboriginal culture
 - Wineries

6.2.3 The Tourist

The Surf Coast region attracts intrastate, interstate and international visitors. The following sections will provide detailed information on the demographic make-up of these tourists, as well as their purpose of visit and the activities they prefer to engage in based on historical data. In addition, a review of visitors' psychographic information will provide insight into the motivations behind, and reasons for, visitors' previous buying behaviour. Where possible, information will be used that is specific to the Surf Coast region, however, to enable greater understanding of the whole tourism system, information pertaining to the broader Great Ocean Road region will also be considered. The aim of this section is to provide insight into the type/s of tourist currently visiting the Surf Coast region.

In terms of visitor age, the vast majority of domestic visitors to the Surf Coast, both day visitors (45.6%) and overnight visitors (34.9%), were 25-44 years old. Figure 6.6 provides a comparison of domestic visitors by age.

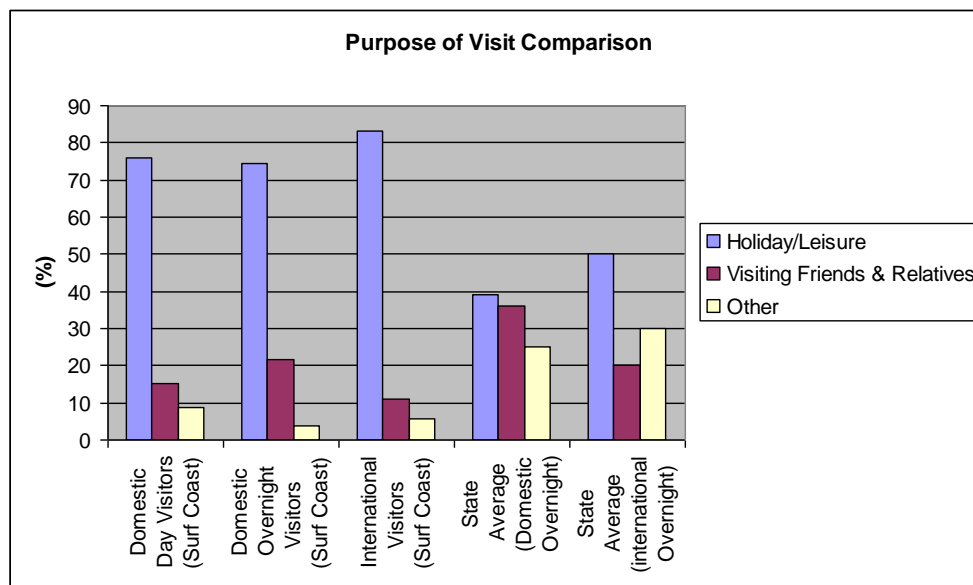
Figure 6.6 Main age groups for domestic visitors to the Surf Coast



Source: Adapted from (Geelong Otway Tourism, 2007).

The main purpose of visit for both domestic and international visitors was holiday and leisure; noticeably these figures are significantly higher than the state average. A comparison of the purpose of visit for domestic and international visitors to the Surf Coast and visitors to Victoria in general is provided in Figure 6.7.

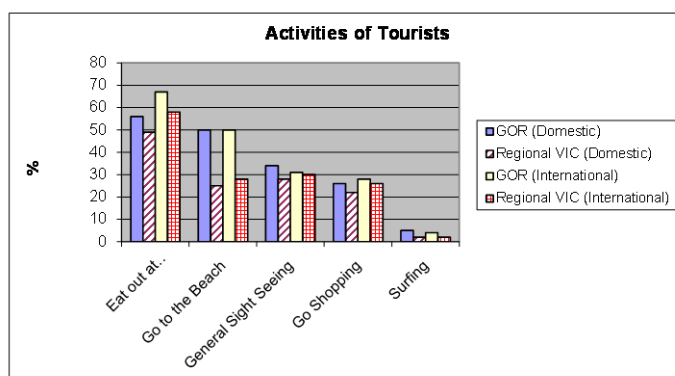
Figure 6.7 Purpose of visit for visitors to the Surf Coast and visitors to Victoria



Source: Adapted from: (Geelong Otway Tourism, 2007).

Recent reports by Tourism Victoria (Tourism Victoria, 2009a, 2009b, 2009c) compared visitors to regional Victoria with visitors to the Great Ocean Road region. Both domestic and international visitors to the Great Ocean Road region were found far more likely to ‘go to the beach’ and ‘go surfing’, confirming the importance of the coastal aspects of the destination. Figure 6.8 illustrates the activities engaged in by both domestic and international visitors to the Great Ocean Road region, compared with visitors to regional Victoria.

Figure 6.8 Activities engaged in by visitors to Regional Victoria and the Great Ocean Road region



Source: Adapted from: (Geelong Otway Tourism, 2007).

A Surf Coast Shire study completed by Hossain and Barry (2003) asked international visitors what activities they engaged in during their visit to Australia in general, compared with the Surf Coast specifically. This study found that international visitors to the Surf Coast were much more likely to visit national/state parks, visit friends and relatives, experience Aboriginal art/craft and cultural displays, and undertake bushwalking/rainforest walks. This may indicate a broader appeal than the coastal activities that were identified for the Great Ocean Road in general.

6.2.3.1 Psychographic Segmentation

Tourism Victoria segments the domestic market in several ways, which include demographics, but also psychographics using the Roy Morgan Values Segments (Tourism Victoria, 2009e). These segments provide an insight into motivations behind and reasons for the choices people make; including their buying decisions. Although this information does not relate directly to the Surf Coast region, it provides invaluable information in regards to the underlying motivations of tourists visiting the broader Great Ocean Road area.

Table 6.1 outlines the breakdown of domestic overnight visitors to the Great Ocean Road according to the Roy Morgan Values Segments, in relation to regional Victoria, Victoria and Australia. Domestic overnight visitors to the Great Ocean Road region were more likely to come from the Visible Achievement (25%), Socially Aware (24%) and Traditional Family Life (18%) segments (Tourism Victoria, 2009b).

Table 6.1 Breakdown of market by Roy Morgan Values Segments

Values segments	Great Ocean Road	Regional Victoria	Victoria	Australia
Basic Needs	1%	1%	1%	2%
Fairer Deal	2%	2%	3%	3%
Traditional Family Life	18%	20%	18%	19%
Conventional Family Life	9%	10%	8%	8%
'Look At Me'	7%	10%	9%	9%
Something Better	3%	4%	5%	7%
Real Conservatism	4%	5%	4%	5%
Young Optimism	8%	7%	9%	7%
Visible Achievement	25%	23%	25%	24%
Socially Aware	24%	19%	18%	17%

Source: (EC3 Global, 2008; Tourism Victoria, 2009e, 2009f).

The Visible Achievement segment is characterised by frequent travel and higher than average spending on their holidays. Quality and value for money are important for this segment, and the preferred type of accommodation are luxury hotels, serviced apartments and B&Bs. They enjoy holidays that offer the opportunity to play golf and tennis; and for those with a family, the holiday provides a chance to spend time together and to engage in activities with the kids (Tourism Victoria, 2009e). The Visible Achievement pattern of thinking is associated with people who have “made it”, and are visible success stories. They look for quality, value for money and good deals, rather than just expensive things. This segment retains traditional values – and the family plays a vital role. A great emphasis is placed on providing the family with a high quality environment (Tourism Victoria, 2009e).

The Traditional Family Life segment prefers planned itineraries like package tours or trips and services booked by a tour operator. They enjoy comfortable and good value accommodation like hotels and motels. However, this segment is also partial to holiday touring with caravans and campervans. Sightseeing, cultural activities, as well as visiting friends and family, are all important aspects of the holiday experience for them. This pattern of thinking is usually found among middle-aging Australian – home

owners (Tourism Victoria, 2009e). It is important for this segment to provide better opportunities for the family, and they seek security and reliability. This segment does not like change and cherishes traditional family roles and values (Tourism Victoria, 2009e).

Finally, the Socially Aware segment is also a big spender on holidays and has the highest frequency of travel amongst all segments, with particular regard to overseas travel. They prefer travel destinations that offer new and different experiences, and opportunities to explore. This segment enjoys boutique accommodation, as well as cultural and nature-based activities. They book directly with the provider as they enjoy the planning aspect and the value flexibility (Tourism Victoria, 2009e). This segment is socially active with a strong sense of social responsibility. Innovation and progressiveness are important, and they are always searching for something new and different. With a strong desire to learn they are continuously seeking new opportunities for training, education and knowledge. This segment seeks information before making choices but they are usually the first to try a new product or service (Tourism Victoria, 2009e).

The GOR region receives a higher percentage of socially aware tourists (24%) than regional Victoria in general (19%), or indeed the state as a whole (18%). This is important because not only do these tourists enjoy visiting cultural and natural attractions, but they are also likely to have a stronger sense of social responsibility when it comes to environmental issues such as climate change.

6.2.3.2 The 'Green' Tourist

Another important aspect in identifying the main markets for the Great Ocean Road, and the Surf Coast in particular, is the consumer behaviour of tourists in regards to green products. Green tourists are defined as tourists who behave in an environmentally friendly manner when on vacation (Dolnicar & Matus, 2008). Unpublished research by Tourism Australia suggests that while consumers are becoming increasingly 'carbon conscious' this is not necessarily reflected in their travel behaviour (EC3 Global, 2008).

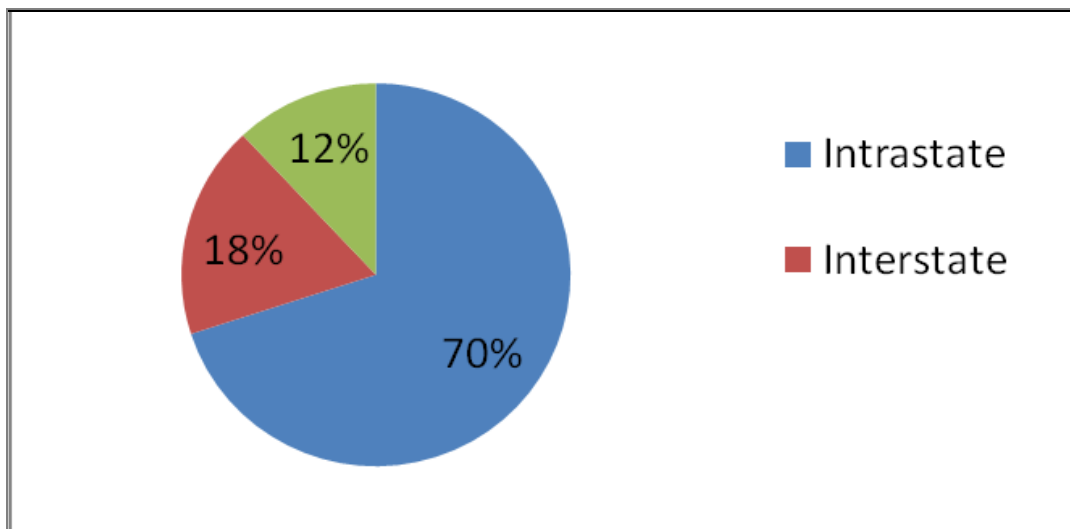
However, being 'green' may provide tourism businesses with a competitive advantage, once all other factors influencing the purchasing decision are equal (price, experience,

emotional payoff) (EC3 Global, 2008). ‘Green’ initiatives (i.e. energy, water and waste efficiency) play an important role in how tourists with a ‘green’ ethic, in particular higher yield tourists, rate their experience and recommend it to others (ibid). Indeed, the behaviour of the ‘green tourist’ is determined by a number of factors including information obtained from the media and pressure groups, the amount of disposable income and employment (Bergin-Seers & Mair, 2009).

6.2.4 Tourist Generating Region (TGR)

To gain a better understanding of the current tourism situation, Figure 6.9 provides a breakdown of the main source markets for the GOR and shows that the domestic market dominates visitor levels with 70 percent coming from Victoria and a further 18 percent from interstate (Tourism Victoria, 2009b). Twelve percent of GOR visitors are from overseas (Tourism Victoria, 2009b). Melbourne remained the GOR region’s largest source market, representing 48 percent of domestic visitors (Great Ocean Road Australia, 2006). The largest source markets outside Victoria were New South Wales (40%), South Australia (29%), and Queensland (19%) (EC3 Global, 2008). Tourism Victoria forecasts further growth from the domestic market; 26 percent of Victorians and 11 percent of Australians living outside of Victoria indicated that they would like to visit the region in the next two years (Tourism Victoria, 2009b).

Figure 6.9 Main market sources for the Great Ocean Road



Source: (Tourism Victoria, 2009b)

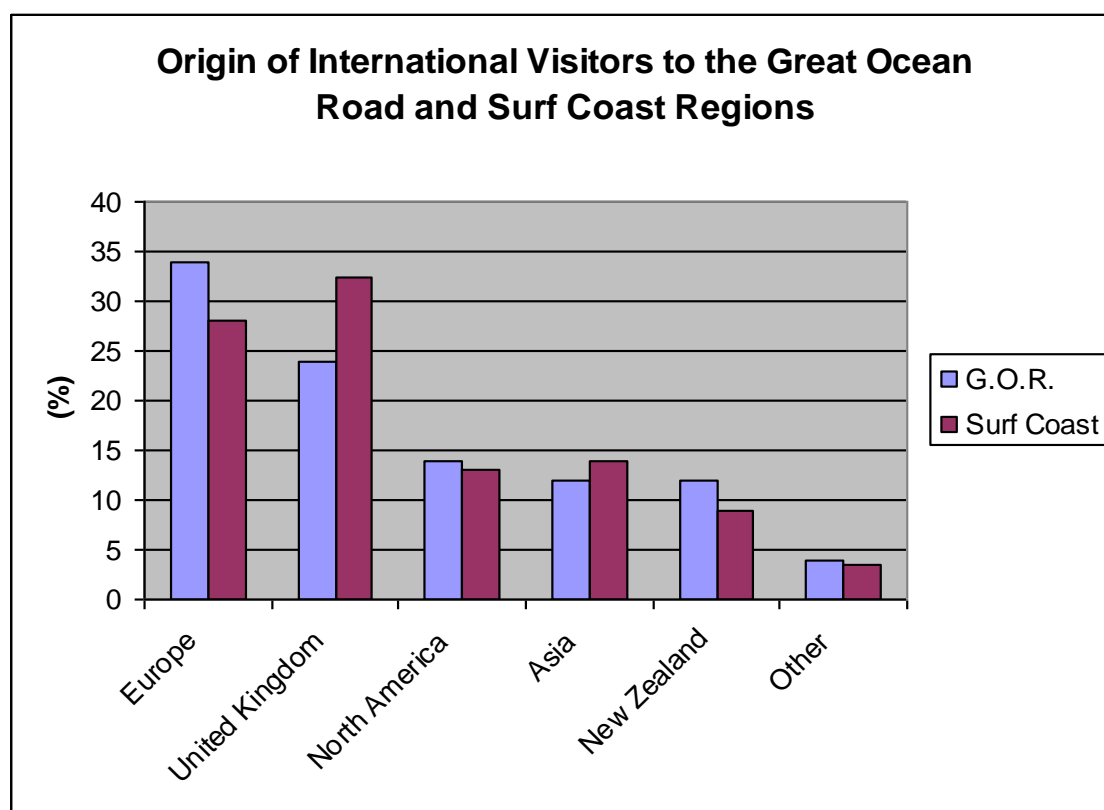
The Great Ocean Road's international market is much smaller than the domestic market but its importance to the region's earning potential cannot be overlooked. Attracting more international tourists is also important to Victoria's and Australia's economy and balance of trade. The largest international tourist generating region (TGR) for the Great Ocean Road is mainland Europe, which accounted for 34 percent of all international visitors in 2008 (Tourism Victoria, 2009). Other significant international TGRs include the United Kingdom (24%), North America (14%), New Zealand (12%) and Other Asia excluding Japan and China (9%) (EC3 Global, 2008; Tourism Victoria, 2009b). This differs to the rest of the state where the primary source of international visitors is New Zealand (EC3 Global, 2008).

In 2006 the Surf Coast attracted 1,352,000 domestic tourists (including 802,000 day visitors and 550,000 domestic overnight visitors) and 28,400 international visitors. This represented 2.5% of Victoria's day visitors, 3.2% of Victoria's domestic overnight visitors, and 2% of international overnight visitors (Geelong Otway Tourism, 2007).

The main international tourist generating regions (TGRs) for the Surf Coast in 2006 were the United Kingdom (32.5%) followed closely by Europe (28%) (Geelong Otway Tourism, 2007). Other key markets included North America (13%), Asia (14%) and New Zealand (9%) (Geelong Otway Tourism, 2007).

Figure 6.10 compares international TGRs for the Surf Coast and the entire Great Ocean Road region. Although the figures are similar overall, it is interesting to note that the top two TGRs are reversed for these two markets, with the Surf Coast receiving substantially more tourists from the United Kingdom than the entire Great Ocean Road region.

Figure 6.10 Main international TGRs for the Great Ocean Road region



Source: Adapted from: (Geelong Otway Tourism, 2007; Tourism Victoria, 2009b).

6.2.5 Tourist Destination Region (TDR)

The following section presents an overview of the main components of the Surf Coast region, which provide the essence of appeal for the destination and motivate both domestic and international visitation.

The region includes spectacular coastline, scenic rainforests and magnificent beaches, and is one of the major tourist draw cards of Australia. It covers an area of 1,560 km², from Torquay in the East to Lorne in the West, and features numerous seaside and inland towns. (Surf Coast Shire, 2008)

The iconic coastline is a popular touring route, and is complemented by rural and forested areas. The region offers a range of touristic activities from surfing to bushwalking, as well as a full range of accommodation options. Table 6.2 provides a detailed description of each of the major towns throughout the Surf Coast Region, including a summary of the areas key attractions and activities.

Table 6.2 Major towns within the Surf Coast region, key attractions and activities

Major regional towns	Population	Area (km ²)	Key attractions & activities
Torquay: Torquay is the largest town in the Surf Coast Shire and marks the official start of the Great Ocean Road. It is a world renowned surf destination, the birthplace of major surf companies such as Rip Curl and Quiksilver, and home to the Surf World museum. Torquay is around 20km from the city of Geelong.	8,003	11.8	<ul style="list-style-type: none"> - Bells Beach – This is a world renowned surfing destination and home to the longest continuously running surf competition the Rip Curl Pro. The event is held every Easter long weekend and is combines surfing with a music festival. - Surf World Museum - Surf City Plaza – A surf shopping district offering everything related to surf culture and fashion. - Golf - Fishing - Beaches
Anglesea: Anglesea is renowned for its abundant wildlife, particularly the kangaroos, which can often be found on the golf course. The area provides for an array of coastal activities, such as swimming and surfing, but is also surrounded by State park and bushland making it popular for walking, horse riding and mountain biking. Anglesea is on the Great Ocean Road and Bass Strait, around 35km from Geelong.	2,203	7.2	<ul style="list-style-type: none"> - Anglesea Golf Course - Paddle boats - Beach horse riding - Surfing - Galleries - Beaches
Aireys Inlet*: Offers secluded beaches, walks in the wilderness, a great pub with a fabulous view, and an array of restaurants. Aireys Inlet is one of the coast's oldest settlements, and is home to the Split Point Lighthouse.	1,033	9.3	<ul style="list-style-type: none"> - Split Point Lighthouse - Beaches - Bush & cliff top walks - Surfing
Fairhaven*: Fairhaven adjoins Aireys Inlet to the west of the Painkalac Creek, on the Great Ocean Road. Since major bushfires in 1983, Fairhaven has grown rapidly. Overlooking Fairhaven beach, this beach town has views of the Aireys Inlet river valley and the Split Point Lighthouse to the east and the mauve blue hills of Mt St George and Cape Patton to the west.	1,033	9.3	<ul style="list-style-type: none"> - Great Otway National Park - Beaches - Distillery Creek picnic ground - Walking tracks
Lorne: Set between the waters of Loutit Bay and forests of the Otway Ranges, Lorne is one of the coasts most popular tourist destinations. There is a sheltered 2km beach surrounded by lawn and picnic areas, an array of shops and cafes, and a range of accommodation options. Inland is the Otway forest, flush with tree ferns, brooks and waterfalls. Lorne is around 70km south west of Geelong on the Great Ocean Road and situated on a protected bay overlooking Bass Strait.	1,216	5.4	<ul style="list-style-type: none"> - Beaches - Shops & cafes - Sculpture park - Waterfalls - Bush gallery - Teddy's Lookout
Winchelsea: Winchelsea is a rural town by the banks of the Barwon River. There are many historic buildings and a heritage trail that encompasses the town's older buildings and other points of interest.	1,101	3.9	<ul style="list-style-type: none"> - Heritage trail - Barwon Park Historic Homestead - Barwon River - Fishing
Note: The population and area statistics are combined for the towns of Aireys Inlet and Fairhaven.			

Source: Adapted from (Geelong Otway Tourism, 2009; Great Ocean Road Australia, 2009; Great Ocean Road Marketing, 2006; Surf Coast Shire, 2008).

The Great Ocean Road (GOR) is a touring route that blends natural landscapes with coastal town stopovers and cultural events. However, the GOR is more than a major attraction; it doubles as a major component of the region's transportation infrastructure linking regions, towns and supply routes. The GOR also forms part of the Great Southern Touring Route which is a circular route incorporating the Grampians, Warrnambool and Ballarat.

There are also numerous natural and cultural attractions outside of the major towns. These include the Great Otway National Park, the Great Ocean Walk, and the annual Falls Music and Arts Festival. Each of these is discussed in further detail below.

The Great Otway National Park incorporates the former Otway National Park and Angahook-Lorne, Carlisle and Melba Gully State Parks, as well as areas of state forest and other crown land. The national park now covers 103,000 hectares in total (www.parkweb.vic.gov.au 2009).

Some of Australia's best rainforest scenery can be found in the Great Otway National Park behind Lorne and Apollo Bay (Tourism Victoria, 2010a). Bushwalkers, campers, cyclists and nature-enthusiasts are attracted to its diverse landscapes including coastal heathlands, secluded beaches (Johanna Beach) and beautiful bays (Blanket Bay), tall wet mountain ash forests, ancient rainforests with giant tree ferns, high waterfalls such as Triplet Falls, and deep moss-covered gullies:

This park represents all that is special about the Otways: the tall wet forests, ancient rainforests, the drier forests of the inland slopes and the very diverse heathlands and woodlands, fringed by a spectacularly rugged coastline and studded with some of Victoria's most striking waterfalls and other attractions. (www.parkweb.vic.gov.au 2009)

Figure 6.11 Beauchamp Falls, Otway National Park



Source: (Tourism Victoria, 2010a)

Another natural attraction is the Great Ocean Walk which stretches 104 kilometres along the coast between the resort town of Apollo Bay and Glenample Homestead near Port Campbell, and the Great Otway National Park. Visitors can walk through both cool forest and deserted beaches, and various access points provide for day walks or overnight trips (Tourism Victoria, 2010a).

A major attraction for the region is the annual Falls Festival. This is a major musical and cultural event held between the 29th of December and the 1st of January every year since 1993. It is situated in farmland just north of Lorne, and is surrounded by the Otway ranges. Although music is the major focus of the event, it also incorporated local arts and culture.

6.2.6 Transit Route Region (TRR)

Visitors travel to and from the Surf Coast region by bus, train or car. Proximity to Melbourne, and its airports, along with good roads and reasonably frequent trains and buses, make the Surf Coast region an easy place to travel to and from. Travel time from

Melbourne to the shire's first major town, Torquay, is about one and a half hours by most modes of transport.

The Great Ocean Road is not only the major attraction for the Great Ocean Road region, but it is a major part of the transportation infrastructure for the region. The Great Ocean Road (GOR) is in a unique position of not only being a major attraction in itself, but it also provides access to the many locations, and attractions throughout the region. Further, the road itself provides the means for one of the most popular activities of all: touring the Great Ocean Road.

Work officially started on the Great Ocean Road on 19th September 1919 and the 75 kilometre stretch between Anglesea and Apollo Bay was completed by 1932 (Great Ocean Road Australia, 2009). Today the GOR officially starts at Torquay and finishes at Allansford near Warrnambool (Great Ocean Road Australia, 2009). The journey without stopping takes around 3.5 hours and covers some 243 kilometres (Great Ocean Road Australia, 2009).

As previously mentioned, the Great Ocean Road also forms part of the Great Southern Touring Route which is a circular route incorporating the Grampians, Warrnambool and Ballarat. Roads are vital for tourism throughout the GOR region. For tourists, a drive, whether it be in a coach, car or on a motorcycle, is likely to be a major reason for choosing a holiday in the region. For those in the tourism industry, the road represents not only access for potential tourists, but also access for suppliers of essential goods. Below is a brief description of the transportation infrastructure available for accessing the Surf Coast Shire.

Figure 6.12 Great Ocean Road, Lorne



Source: (Tourism Victoria, 2011).

Plane – There are no commercial flights into airports along the Great Ocean Road. The closest international airport is the Melbourne International Airport at Tullamarine. Avalon Airport near Geelong is the closest major airport to the Surf Coast Shire, and receives interstate visitors. Sharps Airlines also fly into Portland in Western Victoria, from Melbourne and Adelaide, and other regional airports in Victoria and South Australia. This enables access to the western end of the Great Ocean Road, giving tourists the opportunity to travel east towards the Surf Coast Shire.

Train – V-Line has a train route running from Melbourne to Geelong; however there are no connecting train services to major destinations throughout the Surf Coast Shire (i.e. Torquay or Lorne). There is also an overland train from Melbourne to Warrnambool that runs three times a day Monday to Saturday, and twice on Sundays. This again enables visitors to access the Surf Coast via the western section of the Great Ocean Road.

Bus/Coach – V-Line operates train and coach trips from Melbourne stopping at all the major coastal towns along the Great Ocean Road, including Torquay, Anglesea and Lorne. A train is commonly used to travel to Geelong, where passengers are then transferred to a coach for the remainder of the trip.

Boat/Ship – There are no commercial boat or ship carriers departing or arriving at major destinations along the GOR. However, tourists can use the passenger ferry that operates between Sorrento and Queenscliff, to access or depart the Mornington Peninsula. The ferry operates every hour and Queenscliff is located only a short drive (about 1 hour) from Torquay and the start of the Great Ocean Road.

Road networks – Roads provide the lifeblood for tourism in the GOR both directly and indirectly, with the Great Ocean Road forming a major part of the region's transportation infrastructure since its completion in 1932. Total road work funding for the GOR region is in excess of \$31.8 million for the period 2004 – 2007 (Victorian Government, 2007). This includes: \$19.3 million dollars in funding from VicRoads for road works and safety improvements across the Great Ocean region, \$10 million allocated to the Great Ocean Road between Torquay and Apollo Bay, and a further \$3 million dollars for improvements between Apollo Bay and Allansford (Victorian

Government, 2007). The Geelong Bypass project will also have an ongoing effect on road access to the GOR region. The Geelong Bypass stretches from the Princes Freeway at Corio to the Princes Highway at Waurin Ponds (Victorian Government, 2005). A proposed road link between Geelong Bypass and the Surf Coast Highway (Victorian Government, 2005) would also create a thoroughfare for visitors from Melbourne to the Great Ocean Road and improve tourism access to the region.

6.2.7 Tourism Industries and Organisations

Tourism is a complex and multi-faceted industry, and sustainable tourism development requires involvement of those with an interest in its success. Understanding the roles and activities of various stakeholders can assist with the implementation of an effective planning process. The following section will outline the key roles and duties of the stakeholders responsible for the management and marketing of the Surf Coast region. Effective and meaningful engagement with these stakeholders will help gather information regarding the vulnerability and resilience of the region and also aims to confer a degree of ownership in regards to future tourism development.

The Surf Coast Shire is one of several shires throughout the Great Ocean Road region, which also includes the Colac-Otway Shire, Corangamite Shire and Moyne Shire. Local Government Acts empower local shires to deal with development generally, and tourism development in particular (Hall et al., 1997). Local governments can control development of accommodation, attractions, amenities and other tourism infrastructure in their locality, largely through local zoning and development schemes. Clearly, local government can play a pivotal role in tourism development through infrastructure planning, service provision and marketing of local attractions.

The Surf Coast also has a local tourism association (LTA) whose main roles are to develop and maintain local tourism facilities, and develop local marketing campaigns. Such campaigns are developed in conjunction with regional tourism associations (RTAs) and the local shire government. Surf Coast Tourism sits under Geelong-Otway Tourism as the RTA.

The Surf Coast also has several smaller tourism and trader associations that support and represent local destinations, for example, the Lorne Business and Tourism Association.

These local tourism associations often lobby local and regional tourism associations for funding, and often represent their town on LTA boards.

The structure and governance of tourism in the region is complex, and the following sections can only provide an overview of the roles and responsibilities of each organisation in the development of tourism. In order to have an integrated and effective tourism system, it is imperative that duties of each stakeholder are clear, and that organisations work together to develop a sustainable tourism product. Many of the organisations mentioned perform a range of management and marketing duties, and the interrelationships between various players can be complex. Table 6.3 provides a summary of the organisations involved, both directly and indirectly, in the marketing and management of the Surf Coast region, and outlines their key roles and responsibilities.

Table 6.3 Key roles and responsibilities of organisations involved in the marketing and management of the Surf Coast region

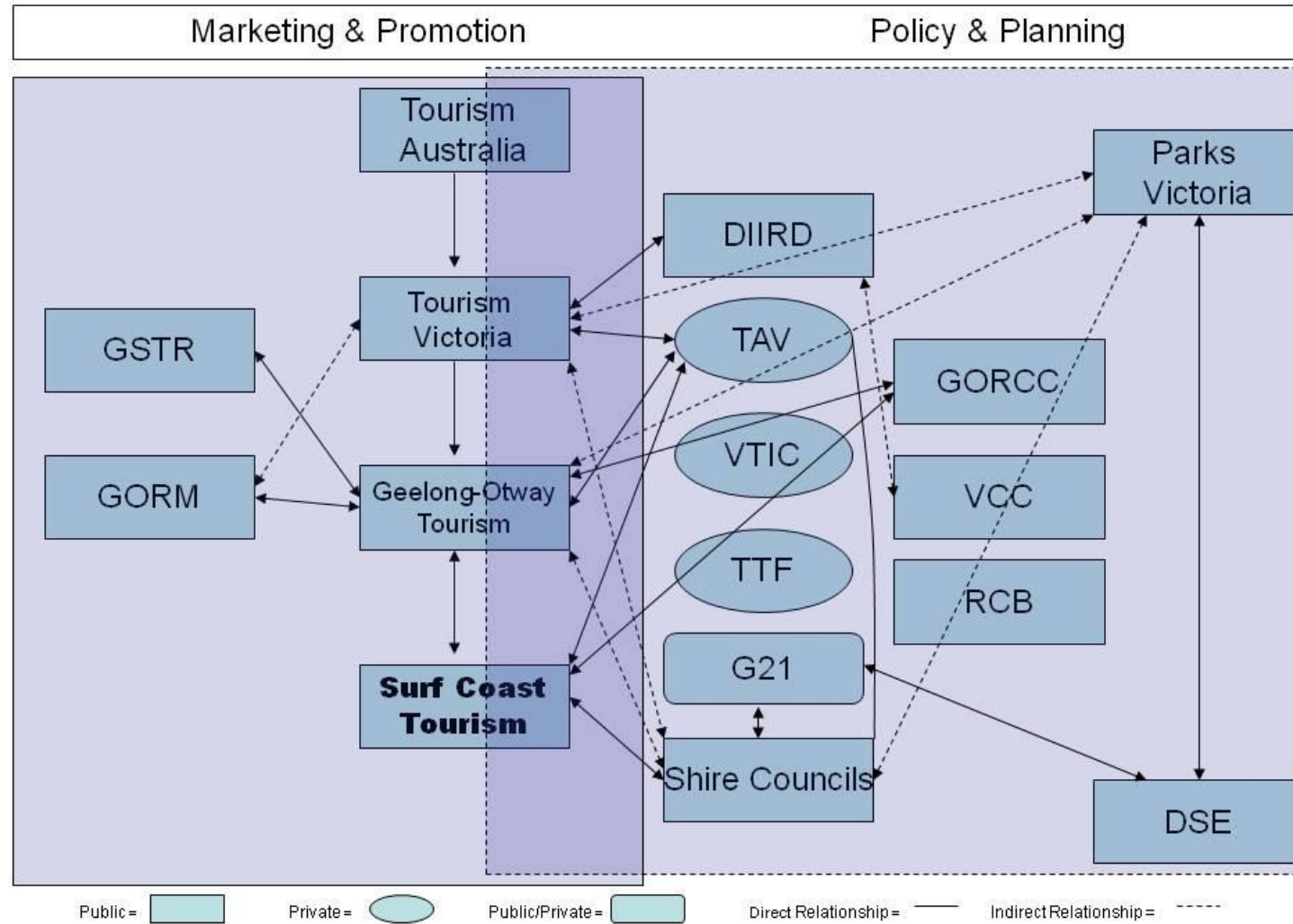
Organisation	Key roles & responsibilities
Tourism Australia (TA)	Marketing and promotion of Australia to the world.
Tourism & Transport Forum (TTF)	Peak national advocacy body representing the tourism, transport, aviation and investment sectors.
Department of Innovation, Industry and Regional Development (DIIRD)	Victorian Government's lead agency for economic and regional development. Guides tourism policy and planning for the state.
Tourism Victoria (TV)	Promotion of State-wide tourism both domestically and internationally.
Department of Sustainability & Environment (DSE)	Sustainably manage water resources and catchments, climate change, bushfires, parks and other public land, forests, biodiversity and ecosystem conservation.
Parks Victoria (PV)	Tourism policy, planning and implementation, monitoring and research, and development and support of tourism initiatives and products.
Tourism Alliance Victoria (TAV)	Represent the interests of the state's tourism industry, including tourism operators and RTAs. Work closely with Tourism Victoria.
Victorian Coastal Council (VCC)	Undertake state-wide strategic coastal planning. Facilitate the operation of the Regional Coastal Boards. Coordinate the implementation of the Victorian Coastal Strategy and Coastal Action Plans.
Victorian Tourism Industry Council (VTIC)	Represent the State's tourism industry to the State Government. Provide industry leadership, and raise the profile of tourism in both the public and private sector.
Great Ocean Road Marketing (GORM)	Promote the GOR region, increase tourist visitation, length of stay, and expenditure.
Great Ocean Road Coastal Committee (GORCC)	Management of coastal areas along GOR.
Great Southern Touring Route (GSTR)	Promote the Great Southern Touring Route to select target markets. Increase visitation to the region.
G21	Build regions capacity for tourism development.
Surf Coast Shire Council	Manage information centres, and other tourist amenities. Involved in tourism marketing and planning, and infrastructure maintenance and development.
Geelong-Otway Tourism (RTA)	Represent regional issues of the tourism industry. Work with Tourism Victoria and relevant LTAs.
Surf Coast Tourism (LTA)	Develop and maintain local tourism facilities. Develop local marketing campaigns with RTAs.

Figure 6.13 provides a representation of each stakeholder within the tourism structure of the Surf Coast region, and clarifies whether their focus is primarily on policy development and planning or on marketing and promotion of the region. Also presented are the direct and indirect connections between various stakeholders. Direct relationships represent a collaborative approach to either marketing or policy and planning, where the degree of communication and cooperation is relatively high. Indirect relationships represent a situation whereby stakeholders work together on certain elements of marketing, or policy and planning, however communication and cooperation is not as commonplace. This figure is meant only to be a guide to understanding the complex interrelations between various stakeholders, and the degree

of involvement and communication between various players may change over time, or fluctuate dependent upon particular circumstances.

Figure 6.13 Marketing and management of the Surf Coast region, tourism structure

Tourism Structure – Surf Coast Region



There are also numerous independent stakeholders working within the Surf Coast region that provide various tourism services. The following sections briefly discuss the role of tour operators, accommodation providers and support services available throughout the region.

Facilitators: Inbound and local tour operators

Numerous inbound and local tour operators operate in the Surf Coast region including: Australia One, Viator, Wildlife Tours Australia, Go West Tours, Coast to Country Touring, Tiger Moth World Adventure Park, Centre One Tours Australia, Seaside Coach Tours, amongst others.

Accommodation sector

The Surf Coast region provides a range of accommodation options for tourists including houses/cottages, apartments, bed and breakfast/farm stays, retreats, motels, hotels, backpacker lodges, and resorts. According to Totaltravel.com (2009) there are 284 accommodation providers in the region with the most popular forms being houses/cottages (112), apartments (47), and bed and breakfast/farm stays (43).

Auxiliary/Support tourism services

There are a number of service providers that support tourism within the Surf Coast region. These range from the supply of food and beverage services, to ATM and banking services. Most services are readily available throughout the region, particularly in tourist towns, however only basic services may be available in the more remote rural areas.

6.3 Stage 2 of the RTAF Model: Establish Risks and Opportunities for Victoria and the Surf Coast

Climate change presents various challenges to tourism across the state, with impacts likely to affect tourism infrastructure, the environment, and communities. Whether a net gain or loss results from such changes will partly depend on the ability of the tourism industry to predict and manage these impacts. Destinations and tourism businesses need to adapt to changes in the pattern of demand and in the type of tourism they offer.

As discussed in the Chapter 4, the Surf Coast region has been selected for this case study as it is considered a major tourist destination within the state of Victoria, receiving more than 1.3 million visitors each year (Tourism Alliance Victoria, 2008), and because it is vulnerable to a range of climate change impacts. The Surf Coast, like many Australian tourism destinations, has a coastal orientation. Australian tourism surveys (Henrick & Johnson, 2000) indicate that, of the ten most popular attractions to international visitors to Australia, eight are within a coastal zone, including the Great Ocean Road (part of the Surf Coast). Coastal destinations are especially vulnerable to climate change related impacts such as storm surge inundation and erosion (Voice et al., 2006). Tourism within the Surf Coast region is also very vulnerable to bushfires, which are forecast to become more frequent and intense as a result of climate change (Cioccio & Michael, 2007; DeLacy & Jago, 2007). Many of the Surf Coast's major coastal townships are bound by highly bushfire susceptible forests on their northern border.

The Surf Coast region has a relatively high dependence on tourism, and is vulnerable to a range of different climate change impacts. The review of vulnerability to climate change impacts is divided into two sections: (1) the bio-physical dimension, which looks at environmental fragility, and changes to the natural environment; and (2) the socio-economic environment, which looks at the vulnerability of different social groups and economic sectors such as transportation and accommodation.

Table 6.5 provides a summary of the key climate change impacts, both bio-physical and socio-economic, that are likely to influence the vulnerability of Surf Coast tourism. These predicted outcomes have been compiled using reports from the Australian Government (2009), the World Wildlife Fund (WWF, 2008) and the Department of Sustainability and Environment (DSE, 2008).

Many of the impacts discussed are inextricably linked and the degree of change in one area may be related to changes in another area or areas. For example, the predicted decrease in rainfall combined with the predicted increase in temperature, present an increasing risk of bushfire for the Surf Coast region. Furthermore, many of the aforementioned bio-physical impacts are also likely to have socio-economic impacts for both residents and tourists. For example, damage to key infrastructure such as the GOR

itself, would likely impact on not only visitor access, but also the quality of life of Surf Coast residents.

To establish a better understanding of the level of risk associated with each of the climate change impacts the risk matrix previously identified in Section 5.2.1 is applied to each factor. Table 6.4 identifies the likelihood and consequence of each climate change impact and calculates the potential level of risk to tourism for the Surf Coast region. Each of the climate change impacts is rated low, medium, high or extreme, dependent on the combined likelihood and consequence of the impact. The level of risk given to each impact is assessed and categorised to assist destination managers in determining future management plans to deal with each of these impacts accordingly.

Table 6.4 Level of climate change risk for Surf Coast tourism

CC impact	Likelihood	Consequence	Level of risk
Storm surge	A	3	Extreme
Bushfire	B	4	Extreme
Rainfall	B	2	High
Temperature	B	2	High
Sea-level rise	B	2	High
Water	B	2	High
Bio-diversity	B	2	High
Forests	B	2	High
Settlements	B	3	High
Policy response	B	2	High
Consumer behaviour	C	2	Medium
Destination appeal	C	2	Medium
Business tourism	C	2	Medium

Table 6.5 Potential climate change impacts for Surf Coast tourism

Climate change impact	Predicted outcome for Surf Coast tourism
Bio-physical impacts	
Rainfall	Dependent on the rate of emissions, average annual rainfall is expected to reduce by 4% to 12% (DSE, 2008). Furthermore, according to the DSE (2008), fewer rainy days are expected, with more droughts, however the intensity of heavy daily rainfall is likely to rise, impacting on soil erosion.
Temperature	Victoria is expected to become warmer with more hot days and less cold nights (Australian Government, 2009). This will likely lead to more extreme heat days and fewer frosts. By 2030 average annual temperatures for the Surf Coast region will be approximately 0.8 degrees warmer (DSE, 2008).
Sea-level rise	Global sea levels are predicted to rise 0.18 to 0.59 metres by 2095 (DSE, 2008). The Victorian coastline is likely to see an increase in erosion of beaches and sand dunes, and inundation of fresh water systems (DSE, 2008).
Storm surge	The frequency and intensity of storms and storm surges are predicted to increase (DSE, 2008). Increasing sea levels, combined with more frequent severe storms, are likely to impact on both environmental assets and coastal infrastructure. By 2070, a 1-in-100 year storm surge is likely to happen every 1 to 4 years (Australian Government, 2009).
Bushfire	Climate change predictions by the CSIRO suggest that the Surf Coast region will become hotter and drier, creating perfect conditions for more frequent and intense fire storms (DSE, 2008). The recent "Black Saturday" fires that affected much of Victoria in February 2009, have also brought to the fore the increased risk of bushfires throughout tourism destinations in Victoria, with the likelihood of 'extreme' fire danger days predicted to increase by 12-38% by 2020 (Australian Government, 2009).
Water	Lower rainfalls and higher temperatures may also reduce water quality and accessibility. Victoria is expected to become warmer with more hot days and less cold nights, resulting in increased evaporation rates. This will mean less water for rivers and dams, agriculture, and human needs (DSE, 2008).
Bio-diversity	Climate change will effect bio-diversity on many levels, from individuals to ecosystems (DSE, 2008). The most susceptible will be those with restricted or specialised habitat requirements, poor dispersal abilities and small populations (DSE, 2008). For example the World Wildlife Fund (2008) states that in Australia, at least 90 species have been identified as being at risk, including iconic Australian animals such as koalas, wombats and some species of kangaroos.
Forests	Climate change is already stressing forests through higher mean annual temperatures, altered precipitation patterns and more frequent and extreme weather events, such as bushfires and storms.
Socio-economic impacts	
Settlements	The aforementioned impacts will have numerous direct and indirect impacts on human settlements throughout the Surf Coast region. Impacts may include damage to infrastructure such as roads, lifeline infrastructure such as water and power, and beachside dwellings. The Australian Government (2009) suggests that the area of land subject to inundation due to sea-level rise and storm surge is likely to increase by 4-15% by 2030.
Destination appeal	Favourable climatic conditions at tourist destinations are key to their appeal, particularly at beach destinations, which are still the dominating form of tourism. Changing climatic conditions can affect the appeal of a destination in either a positive or negative manner, as improved or deteriorated conditions affect seasonal demand. For example, increasing average temperatures could lengthen summer seasons at beach locations across the Surf Coast, reducing seasonality issues. However, the increased threat of extreme weather events, such as bushfires, could negatively impact demand.
Consumer behaviour	Increased public awareness and understanding of tourism's link with climate change may bring about significant changes in tourist motivations and behaviour, in particular in relation to emissions from long-haul flights.
Policy response	Changes to national and international policy in regards to a carbon tax and carbon trading are likely to impact on the cost of air travel. A carbon tax on aviation fuel would particularly affect long-haul flights to Australia due to the high level of emissions.
Business tourism	Business tourism, in particular the incentives market, may also be impacted by increased concern over emissions. Concerns over climate change, and/or concerns regarding corporate image, may influence some businesses in their choices regarding travel. Destination choice for incentive travel may be based to some degree on emissions, and in more extreme cases, organisations may move away from incentive travel altogether. The Surf Coast region is one of the most popular incentive travel destinations in Victoria. There are also major conference centres in Lorne and Torquay, as well as smaller venues throughout the region.

6.3.1 Climate Change Opportunities for the Surf Coast Region

As identified in the literature review, there will be wide-ranging impacts due to climate change. Consequently, all tourism stakeholders will need to adapt in order to not only minimise potential risks, but also to capitalise upon new opportunities. Whilst, the majority of adaptation is likely to focus on minimising the negative impacts of climate change, for a regional tourism destination to remain competitive, recognition of potential opportunities is also necessary. Opportunities may come from direct changes to the climate, for example increased temperature, or indirectly through changes in consumer behaviour.

Research has already identified that changing temperatures will lead to some destinations becoming more appealing, whilst others become less appealing (Becken & Hay, 2007). Travel patterns are likely to change and tourism seasons will be altered (UNWTO, 2007). There is likely to be a poleward shift in tourism, whereby traditionally popular destinations in Europe, such as Greece, Spain and Italy, may become too hot and destinations with more temperate climates in central and northern Europe may become more appealing (Becken & Hay, 2007).

Annual average temperatures for the Surf Coast are predicted to increase an average of 0.8 degrees by 2030 (DSE, 2008). Therefore there may be opportunities to reduce seasonality and lengthen the peak summer period. Warmer weather may increase the appeal of the region and also increase the opportunity to engage in various beach activities such as swimming and sun-bathing, which usually occur during the warmer months.

It also appears that changes in consumer sentiment may lead to a growing market of carbon-conscious travellers. Consequently, the opportunity to offer tourism products that provide low, or even no-carbon, alternatives may provide opportunities for the Surf Coast region. Indeed, there is substantial research that predicts that climate change will influence tourist behaviour and their choice of destination (Amelung et al., 2005; Berrittella et al., 2006; Hamilton et al., 2005; Hamilton & Tol, 2004; McEvoy et al., 2008).

Adaptation should not only be seen as a tool for minimising the risks of climate change, but also as a means of capitalising on opportunities that may arise. As a consequence, the following chapters of this thesis will focus on adaptation options that not only reduce the risks associated with climate change, but also those that capitalise on opportunities that may become apparent.

6.4 Stage 3 of the RTAF Model: Determine Adaptive Capacity

This section examines the determination of a destination's adaptive capacity. Destinations such as the Surf Coast are limited in their ability to adapt, as unlike tour operators or tourists themselves, they do not have the ability to relocate (Scott et al., 2006; Scott & Jones, 2006). Whilst individual adaptation will be dependent on personal knowledge and values, a destinational adaptation approach is more complex, simply due to the number of stakeholders involved. A destination's ability to be proactive, and make well-informed, long-term decisions is needed in the development and implementation of appropriate adaptation strategies.

Various generic and context-specific variables of adaptive capacity have been discussed in the literature (Adger, Brooks, Bentham, Agnew, & Eriksen, 2004; IPCC, 2001; Matthews et al., 2010; Tol & Yohe, 2002). A review of the key determinants of adaptive capacity for the Surf Coast was conducted through informal discussions with tourism stakeholders and an analysis of secondary data (G21, 2010; Geelong Otway Tourism, 2007; Hossain & Barry, 2003; Surf Coast Shire, 2009, 2010; Surf Coast Tourism, 2008; Tourism Alliance Victoria, 2008; Victorian Government, 2005). The analysis determined broad-based support for improving adaptive capacity and a high degree of economic development which would further enable capacity building. However, increased understanding of the sector's vulnerability to climate change, across all tourism stakeholders, would further build understanding and support for adaptation. Timescales and spatial considerations are also important, as a response to climate change impacts may require consideration of short, medium and long-term variables, whereby successful adaptation involves local, regional and national participation (Matthews et al., 2010).

The adaptive capacity of a region such as the Surf Coast incorporates diverse elements, including the capacity to limit exposure to risks associated with climate change, absorb and recover from losses stemming from climate impacts, and capitalise upon opportunities that arise through the process of adaptation (Simpson et al., 2008). The key elements of adaptive capacity for the Surf Coast tourism system are summarised as:

- a high level of economic development;
- a relatively high level of dependence on tourism for income and employment;
- a highly climate dependent tourism resources (i.e. beaches);
- a high degree of seasonality;
- a high level of access to technology and resources;
- committed and knowledgeable local and regional tourism departments;
- comprehensive tourism research and marketing programs in place;
- physical adaptation of Great Ocean Road is somewhat restricted by natural landscape (Ocean on one side, Cliffs on the other);
- strong relationships with other local and regional tourism regions, enabling the sharing of information and knowledge; and
- a moderate degree of flexibility in terms of available tourism products.

The Surf Coast region has a relatively high adaptive capacity. The region demonstrates a high level of socio-economic development, with high-quality access to educational and employment opportunities. Infrastructure and amenities such as public roads and health care are widely accessible, and internet access is available to the majority of Surf Coast residents. A relatively high income and access to finance also allows the community and its residents a degree of flexibility.

The region is largely dependent on tourism and is impacted significantly by seasonality. Whilst tourism is estimated to represent 50% of all jobs within the Shire (Surf Coast Shire, 2009), the seasonal nature of tourism often leads to business uncertainties, especially in case of natural events and weather fluctuations that could potentially jeopardise the peak summer season. The region's ability to prepare for such instances

and be innovative and flexible in its response, will be paramount to the ongoing success of tourism in the region.

The local council has demonstrated a commitment to regional development and works closely with other stakeholders in the region. The local council plan for 2009-2013 is representative of this co-operative approach. The plan was developed using a community consultation process whereby 18 consultation sessions were held throughout the municipality to enable residents' input into the regions development. This process reflected the many and varied wants and needs of the region's community members. Notably, a key element of the final report was the importance of sustainable and protected natural environments, which specifically covered action on climate change (Surf Coast Shire, 2009, p. 30).

The tourism industry is predominantly nature based and as such is vulnerable to changes to the natural environment. Various components of the tourism industry such as tourism infrastructure that includes the Great Ocean Road, and natural assets such as and forests and beaches, are seen exposed to natural events. These areas perhaps represent the lowest level of adaptive capacity for the region, as such natural assets cannot be relocated and there is little room for adjustment to the GOR itself, due to the natural barriers of the ocean on one side and cliff face or forested areas on the other.

6.5 Conclusions

Chapter 6 provided a detailed analysis of the Surf Coast tourism system, established the potential risks and opportunities for tourism due to climate change, and discussed the adaptive capacity of the region. This information has provided a general view of the regions vulnerability and resilience, and now provides the platform for the next phase of the research.

The Surf Coast region was described as a popular tourist destination for both domestic and international visitors. The region's tourism is largely based around its key natural assets – the beach and the forests. However, the provision of a more diversified tourism portfolio may be required to safeguard against the hazards of climate change, such as

fire and coastal erosion, and also to minimise the negative consequences of seasonality. Through examination of the region's whole tourism system, an understanding of the key touristic components was obtained and the roles and responsibilities of the key stakeholders explained.

To establish the risks and opportunities for tourism in the region, the predicted climate change impacts were assessed. Both the bio-physical and socio-economic impacts were considered and the potential for climate change to increase the risk of bushfire due to warmer temperatures and less rainfall, along with coastal management concerns due to sea-level rise and more frequent and intense storms, were identified as the region's major issues.

The important elements in adaptive capacity were then outlined. The Surf Coast is in a relatively good position to manage or limit the exposure to climate change risks and capitalise on any opportunities that may arise. The region has a high degree of socio-economic development, and the key tourism stakeholders display a commitment to tackling the challenges of climate change.

Due to time, financial and other resource constraints of this research project, not all parts of the proposed model can be tested in detail. For example, whilst it is recognised that further investigation of the Surf Coast region's adaptive capacity would have added value to this study, this was unfortunately not possible at this stage. However, this and other potential areas for further research are detailed in Section 10.6 Scope for Further Research.

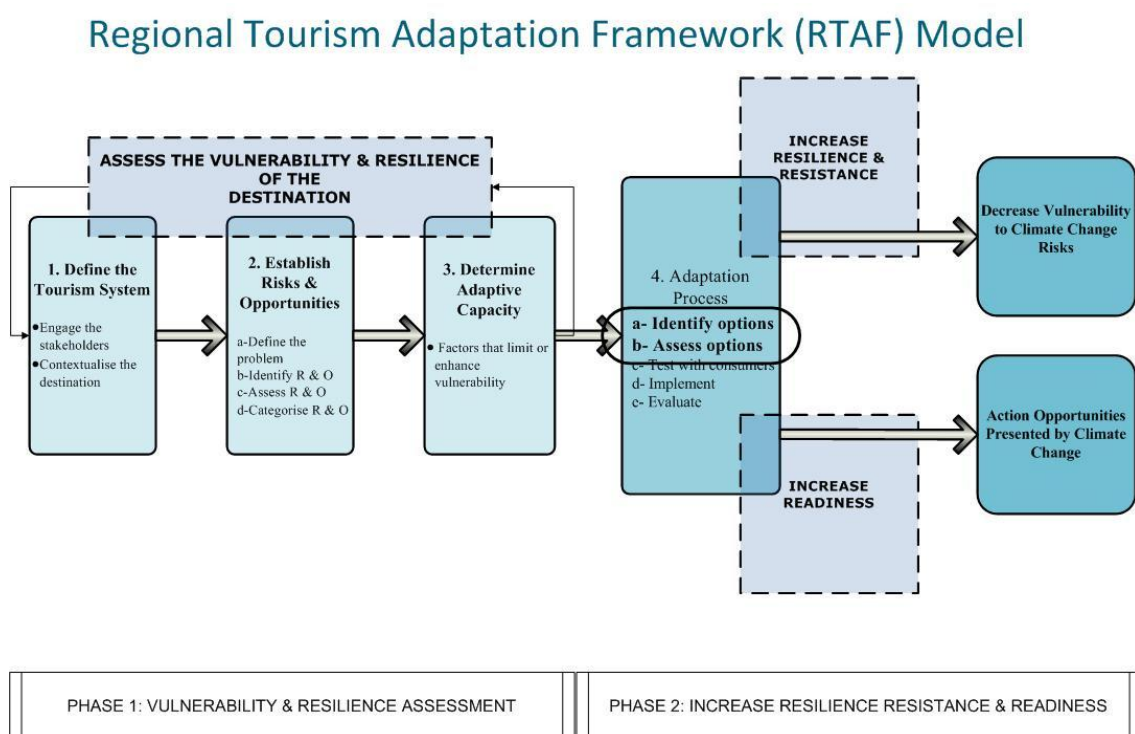
The next chapter will focus on the first two stages of the adaptation process, identifying and assessing the adaptation options for Surf Coast tourism. As discussed in the Methodology section, a Delphi study was chosen as the most appropriate data collection method. A discussion of the development and content of the Delphi study is provided followed by a detailed analysis of the results.

Chapter 7. Increasing Resilience, Resistance and Readiness of the Surf Coast Region: Phase 2 of the RTAF Model

7.1 Introduction

This chapter details the use of a Delphi study to determine climate change impacts and potential adaptation options for the Surf Coast region. This chapter is directly related to research questions 2b and 2c outlined in the methodology section. As detailed in Chapter 5, the second phase of the RTAF model explains the process of identifying, evaluating and implementing adaptation options in order to increase the resilience, resistance and readiness of the Surf Coast. This chapter focuses on Stages 4a and 4b of the RTAF model, as displayed in Figure 7.1, and describes the use of a Delphi study to identify and assess adaptation options for the Surf Coast region. Chapter 8 will then describe Stage 4c of the adaptation process where the results of the Delphi study were tested with tourists to gain a consumer perspective on adaptation. Chapter 9 will review the results of both the Delphi study and the tourist surveys, and recommend appropriate adaptation option for the Surf Coast region. Finally, Chapter 10 will summarise the key findings from this research and review the development and application of the RTAF model.

Figure 7.1 The Regional Tourism Adaptation Framework (RTAF) Model



7.2 Identify and Assess Adaptation Options for the Surf Coast

Region: Stages 4a and 4b of the RTAF Model

The aim of this part of the study is to conduct exploratory research to identify and assess adaptation options for the Surf Coast region. Participation of relevant experts in climate change science was sought and key stakeholders in the region were recruited. A Delphi technique was used to validate the potential climate change risks and opportunities previously identified and identify appropriate adaptation options. The first round of the Delphi study involved semi-structured interviews, whilst the results from this round informed the more quantitative approach taken in round two, which involved an on-line survey. The following sections discuss the Delphi process and the results collected.

7.3 Application of the Delphi Technique

The Delphi technique used in the Surf Coast case study involved a mixed-methods approach whereby both qualitative and quantitative data were collected. The first round utilised a qualitative interview approach, whilst the second utilised an on-line survey. Using this method, qualitative information gathered through the initial interviews is fed back to participants, through an on-line survey, to gain greater consensus. Because the

number of respondents in this stage of the study is small, this research is not intended to produce statistically significant results. Therefore, it is not intended to represent the opinion of any larger population. The value of a Delphi study such as this lies in the ideas it produces.

It is recognised that there are limitations to this study, due to the small sample size. As such, the results should be treated with some caution. However, this study has offered a opportunity to collect and analyse rich qualitative data. An increased sample size may also have led to saturation of data, where the added value of further participants was minimal. Increased numbers may lead to issues of data handling and potential analysis difficulties, particularly when employing a qualitative first round approach, such as used in this study (Hasson, Keeney, & McKenna, 2000). The Delphi technique often requires large blocks of time be committed by participants. If the sample size is too large, the obligation of time by the respondents may lead to a low (or slow) response rate (Hsu & Sandford, 2007). Finally, it is not uncommon for Delphi studies to use this type of sample size, for example Holey, Feeley, Dixon, & Whittaker (2007) used 12 participants, in a three round study of nursing, occupational therapy and physiotherapy students, and Abramowicz (2004) claims that a Delphi study requires only 5 to 20 experts.

In accordance with the Delphi technique (Jennings 2001; Veal 1997), the experts were asked to focus on what they understood to be the major concerns regarding climate change impacts and also to narrow down their ideas for appropriate adaptation. More information on a mixed-methods approach and the advantages and disadvantages of both qualitative and quantitative research approaches can be found in Chapter 4 – Approach and Methodology.

Altogether eight expert participants were selected, including four international experts on climate change, and four regional representatives with knowledge of both climate change and Surf Coast tourism. Participants on the expert panel were associated with the following organisations:

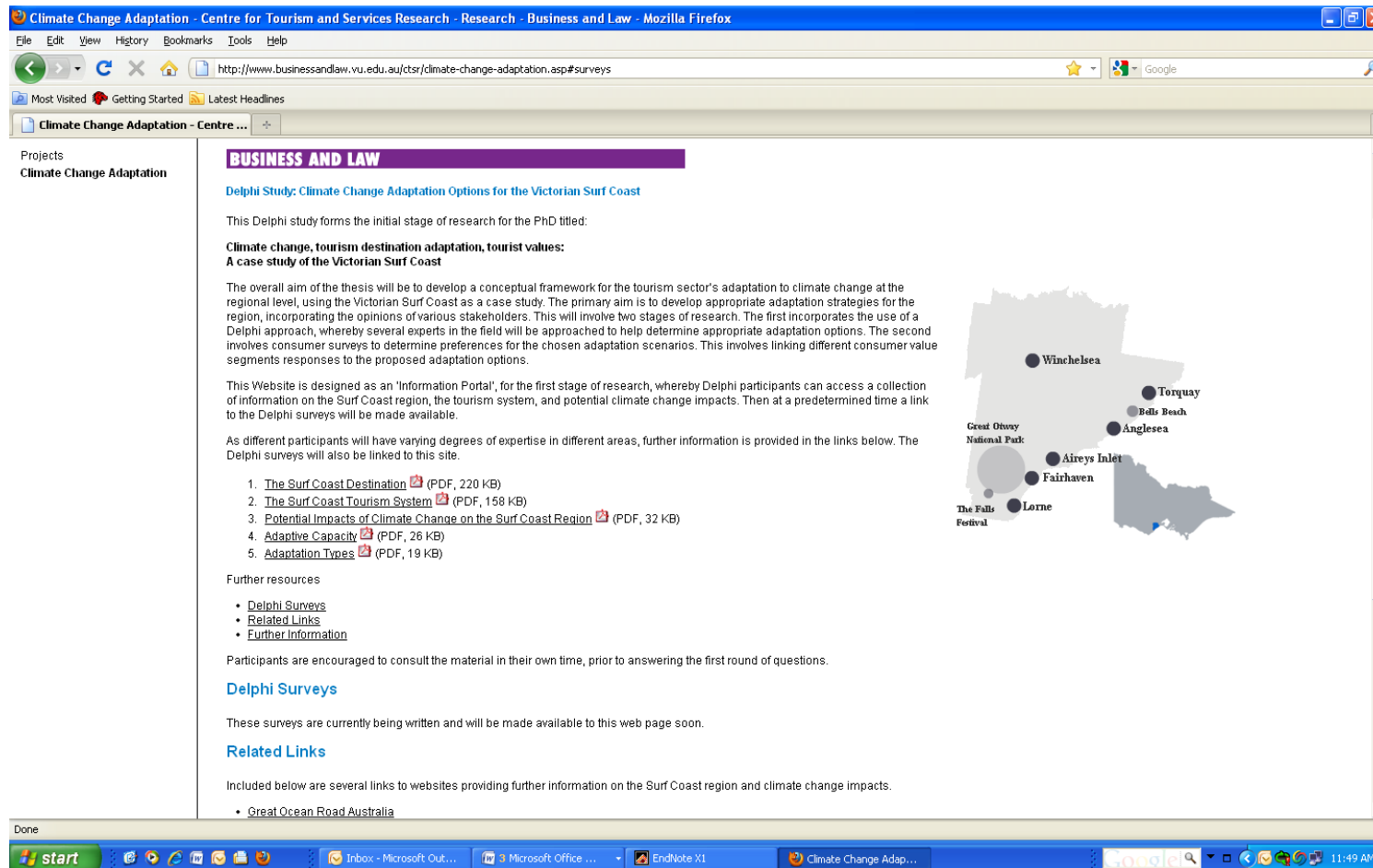
- United Nations World Tourism Organisation (UNWTO)

- Intergovernmental Panel on Climate Change (IPCC)
- Tourism and Transport Forum Australia (TTF)
- Oxford University
- University of Waterloo, Canada
- Tourism Victoria
- Geelong-Otway Tourism
- Great Ocean Road Coast Committee
- Quiksilver

Participants were presented with an overview of the potential impacts of climate change on the region, as well as information on the current tourism system. This information was all provided via an information portal (website) designed specifically for the project. Participants were first asked to provide some confirmation of the risks and opportunities identified in Phase One of the research. They were then asked to contribute ideas and opinions regarding the best options for adaptation. This approach entailed two rounds in order to enable knowledge sharing between the various experts and encourage the generation of useful ideas (Jennings, 2001; Veal, 1997).

Participants were emailed a link to the website, which was designated as an ‘Information Portal’, prior to the commencement of the Delphi study. Delphi participants were able to use this website to access a collection of background information on the Surf Coast region, the tourism system and potential climate change impacts. A screenshot of the website is provided in Figure 7.2. The following sections will outline the processes involved with both rounds of the Delphi study, and provide discussion and analysis of the results.

Figure 7.2 Screenshot from Surf Coast climate change adaptation website



As this Delphi study adopted a mixed-methods approach that incorporated a largely qualitative approach, the reliability and validity of the Delphi will be discussed in terms of ‘trustworthiness’. Studies such as this attempt to understand the experiences of the research participants involved in the study, therefore it has been suggested that the term ‘trustworthiness’ is a more appropriate term for reliability and validity in qualitative research (Lincoln & Guba, 1985). Whilst both qualitative and quantitative researchers must endeavour to demonstrate the legitimacy of their work, the research is evaluated using different methods. Qualitative studies are more likely to propose trustworthiness measures such as dependability, credibility, transferability and confirmability in order to evaluate the quality of research being conducted (Bashir et al., 2008; Golafshani, 2003; Lincoln & Guba, 1985; Patton, 2002). Table 7.1 summarises the different approaches to reliability and validity used in qualitative and quantitative research.

Table 7.1 Comparison of criteria used to judge quantitative and qualitative research

Criterion	Qualitative approach	Quantitative approach
Truth value	Credibility	Internal validity
Applicability	Transferability	External validity
Consistency	Dependability	Reliability
Neutrality	Confirmability	Objectivity

Source: (Trochim, 2010).

Although reliability and validity are treated separately in quantitative studies, these terms are not viewed separately in qualitative research (Golafshani, 2003). Table 7.2 describes the procedures used to verify the trustworthiness of the research and the relevant strategies that can be built into the research design.

Table 7.2 Strategies to verify the ‘trustworthiness’ of the research

Procedures to verify trustworthiness	Strategies to build into research design
Dependability	<ul style="list-style-type: none">– Dependability audit– Data collected over a range of time periods– Triangulation– Extensive audio recordings– Code-recode procedure– Replication of interviews in next phase/s of research
Credibility	<ul style="list-style-type: none">– Prolonged and varied data collection periods– Triangulation– Member checking– Establishing authority of researcher– Referential adequacy– Structural coherence
Transferability	<ul style="list-style-type: none">– Dense description provided– Comparison with existing data– Nominated sample
Confirmability	<ul style="list-style-type: none">– Confirmability audit– Triangulation– Member checks with on data– Discussion of data with stakeholders– Presentation of data at relevant forums

Source: Adapted from (Bashir et al., 2008; Golafshani, 2003; Long & Johnson, 2000; Stenbacka, 2001).

Lincoln and Guba (1985) argue that the notion of ‘reliability’ in quantitative research closely corresponds to the term ‘dependability’ in qualitative research. Indeed, Long and Johnson (2000, p. 31) claim that there seems to be a “growing popular movement within qualitative circles to insist that ‘dependability’ is a more appropriate term than reliability for qualitative research”. Dependability involves demonstrating that the process of research has been logical, traceable and documented, and that the researcher has provided the necessary information to demonstrate dependability to the reader.

Credibility, on the other hand, involves examining the plausibility of the research claims (Long & Johnson, 2000). Although the degree of evidence is somewhat dependent on the claims being made, there should be sufficient knowledge to underpin these assertions. Whilst both qualitative and quantitative researchers require their research to be credible, the credibility of qualitative research depends largely on the ability and effort of the researcher (Bashir et al., 2008).

Whilst quantitative research concentrates on the replicability of research, qualitative research concentrates on the ‘transferability’ of results (Golafshani, 2003). This can be achieved through comparison with other research that shows a connection between your

results and previous research. Similarly, confirmability refers to the degree to which the results could be confirmed or corroborated by others (Trochim, 2010). This involves presenting your research in a way which allows other researchers to understand the methods used for data collection and analysis. To ensure the trustworthiness of this research, credibility, dependability, transferability and confirmability were all addressed as follows.

The interviews were recorded and full transcription notes entered into NVIVO, which is a computer software package designed for qualitative researchers working with very rich text-based and/or multimedia information, where deep levels of analysis are required. The interviews used a semi-structured format and the credibility of the interpretations was sometimes consolidated through follow-up questions or the repetition of the interviewee's response. To further increase the credibility and confirmability of the interpretations, verification of any ambiguous statements occurred whenever necessary. In addition, relevant exemplars from each of the interviews were provided to further strengthen the credibility of the conclusions being drawn.

According to Martinsuo (2001, p. 546), "Emphasizing the confidentiality of the discussions and anonymity of respondents is another means to improve the reliability of the responses". Therefore the interviews were all conducted in a professional, yet friendly manner, and the participants were informed, in both verbal and written form, of the confidentiality of their responses. The dependability of the interviews was maximised by recording the audio for each interview and having full transcripts available upon request.

In an attempt to achieve a consistent quality of responses all interviews were conducted by the researcher. Significant efforts were also made to ensure that the interviewer was sufficiently prepared and knowledgeable. Sufficient knowledge of the topics to be discussed had to be ensured to enable sufficient guidance throughout the interviews and to avoid digression from the relevant themes. To assist in the management of the interviews, a structured guide for the procedure of the interviews was developed to ensure each of the three topics was addressed (Appendix E).

Triangulation, as discussed in Chapter 4, can also maximise the dependability, confirmability and credibility of a study. In this case, between-methods triangulation was used, whereby both quantitative and qualitative approaches were applied. This is deemed to be more rigorous than within-methods triangulation, which refers to either multiple quantitative, or multiple qualitative approaches (R. B. Johnson, Onwuegbizie, & Turner, 2007; Patton, 2002). Bashir et al. (2008, p. 42) claim that “Engaging multiple methods, such as observation, interviews and recordings will lead to more valid, reliable and diverse construction of realities”. Using a quantitative approach in the second round of the Delphi study helped to clarify the interpretations made during the interview stage and removed any doubts regarding the initial impressions of the data.

Member checking is put forward as a method for establishing the accuracy and credibility of qualitative research (Bradshaw, 2001). This involves informal checks with participants for accuracy during and after data collection (Bashir et al., 2008). It is argued that member checking is critical in qualitative research studies, because these types of studies often involve personal interpretation of the information being provided (Byrne, 2001). Obtaining feedback about important points during these interviews clarified the understanding of their responses and helped to establish credibility (Baxter & Eyles, 1997; Bradshaw, 2001; Byrne, 2001; Creswell, 2007). Questions such as, ‘Am I understanding you correctly?’ and, ‘Am I right in saying that you think...?’ were used to check that participant’s words were interpreted correctly. Member checking allowed participants to comment on the researchers interpretations of the interviews (Baxter & Eyles, 1997). Member checks were also completed after the initial findings were determined by sharing these results with the participants involved. This allows participants to critically analyse the findings and comment on whether this appeared to be a true reflection of their views or not.

These initial findings were also presented at appropriate forums including the 2010 Council for Australasian University Tourism and Hospitality Education (CAUTHE) conference (Jopp, DeLacy, & Mair, 2010b) and published in relevant academic journals (Jopp, DeLacy, & Mair, 2010a).

There is a clear imperative for rigour to be pursued in qualitative research so that findings may carry certainty and strength (Long & Johnson, 2000). Qualitative research such as this, seeks to understand, in as much detail as possible, the phenomena under investigation. In most qualitative research cases, it is difficult to demonstrate complete trustworthiness. However, this section has outlined the collection of strategies used to maximise its occurrence in this study. Having established the trustworthiness of the Delphi study, the following section will discuss its development and content.

7.4 Development and Content: Qualitative Interviews

The first round of the Delphi study involved semi-structured, in-depth, qualitative interviews. These interviews were conducted in person where possible, otherwise telephone or Skype meetings were organised (three members of the panel lived outside Australia). The interviews lasted between forty minutes and one hour, which allowed participants to talk freely about their concerns and ideas for adaptation. The aim of the first round of the study was for the participants to express what they thought were the main issues for Surf Coast Tourism as a result of climate change (Research Objective 2b), and what the potential adaptation options were (Research Objective 2c).

Semi-structured, in-depth interviews were used rather than a simple question and answer approach, and those interviewed were encouraged to explain their answer in detail. The use of a semi-structures interview format allowed participants to explore different issues as they arose, which helped evoke unanticipated responses not apparent to the researcher (Jennings, 2010). Follow-up questions were also used to extrapolate further information on certain topics. A semi-structured interview approach allowed respondents to share their perspective and insight on certain issues. A good rapport was developed with each of the interviewees and this was conducive to the discussion.

According to Thorkildsen (2005, p. 365) “the primary disadvantage of semi-structured interviews is the degree of training and prior knowledge necessary for designing and administering these tasks”. However, as significant analysis of the relevant literature had been conducted prior to the interviews this was not a concern in this instance.

Follow-up or probing questions were also used throughout the interviews. Zikmund (2003) identifies the following two situations where the interviewer may need to ask probing questions:

- when the respondent needs to be motivated to clarify or further explain their answer; and
- when the respondent begins to ramble or go off track from the topic at hand.

It is important that the interviewer keeps the respondents answers in line with the desired topic in order to avoid the provision of unnecessary or irrelevant information. To ensure that the interviews stayed on track and that clarity was achieved, an interview guide was used during each of the interviews. This interview guide helped ensure that the same questions were asked of each of the respondents, and also provided prompts for probing questions were they to become necessary.

As discussed in the Approach and Methodology section (Chapter 4), qualitative methods are generally thought of as being more flexible than quantitative methods as they allow more spontaneity and freedom in the interaction between the participant and the researcher (Mack et al., 2005; Veal, 1997). The Delphi study was designed to explore the effect of climate change on the region and to determine applicable adaptation options to manage these changes. However, as acknowledged in the literature review (Fussel & Klein, 2006; Scott et al., 2006; Scott & Simpson, 2008), climate change may also present opportunities for tourism in certain circumstances, therefore a question on adaptation opportunities was also included. Open-ended questions were used that covered three basic topic areas:

1. The potential climate change impacts likely to impact upon tourism in the Surf Coast region.
2. The adaptation options to help cope with, or manage, the potentially negative consequences for tourism due to the impacts of climate change.
3. The adaptation options available to capitalise upon any opportunities that may arise due to the impacts of climate change.

Analysis and discussion of the results of these questions is provided in the following sections.

7.4.1 Pilot Test and Amendments: Qualitative Interviews

For the Delphi interviews, three separate pilot tests were conducted with three different colleagues at Victoria University in Melbourne, Australia. After each pilot test, there was a de-briefing session, where thoughts on improving or altering the interview were discussed. As a result of this, several amendments were made to the interview:

1. Inclusion of an introductory section outlining the three major topics to be discussed. This was decided upon to ensure that the focus of the interview was clear to participants from the onset of the interview.
2. Amendment to the language used during the interview was decided upon in order to encourage more engagement with participants. This involved adopting a more conversational approach to the questioning.
3. A final question was added at the end of the interview asking participants to share any final thoughts they may have directly or indirectly related to issues discussed.
4. The particulars of each question were repeated, usually using the term “in other words...” to ensure there was no confusion as to the meaning of each question.

7.4.2 Selection of the Expert Panel

The selection of appropriate subjects for the expert panel is considered key to the success of the entire Delphi process as it relates directly to the quality of the results generated (Hsu & Sanford, 2007). Furthermore, in choosing the panel, it was necessary to have a balanced representation of experts with different backgrounds, who were able to provide a range of opinions (Miller, 2001).

The approach used in this research combined both purposive sampling and expert sampling. Purposive sampling, also referred to as judgemental sampling, involves the researcher making a decision about what or who will be involved in the study (Jennings, 2010). Expert sampling involves the identification of ‘experts’ that the researcher deems appropriate to his/her research because they hold certain levels of knowledge essential to understanding the topic under investigation (Jennings, 2010; Thorkildsen, 2005).

Such an approach is often used in focus groups, or Delphi studies such as that applied in this study (Jennings, 2010).

An initial list of twenty potential panel members was developed based on individual knowledge and expertise. In particular, participants were selected who had a good working knowledge of climate change adaptation and mitigation. Potential participants were then contacted by phone to determine their interest and availability to be involved in the project. Panelists were expected to have a solid working knowledge across at least two of the three following areas:

1. Climate change adaptation.
2. Tourism.
3. Surf Coast region.

The purpose of this combination was to ensure a balance of expertise and knowledge across the various fields being investigated. A total of eight experts consented to the study. They represented various domestic and international organisations including, universities, the United Nations World Tourism Organisation (UNWTO), the Intergovernmental Panel on Climate Change (IPCC), Tourism and Transport Forum (Australia), Tourism Victoria, and Geelong-Otway Tourism (the regional tourism board). Tourism is a highly diverse sector; therefore, representation was sought from the public and private sector and from local, regional, state and national tourism authorities.

National and international experts in climate change adaptation and tourism were sought to provide information and experience from other regions and assist in identifying any gaps in local stakeholder knowledge (Simpson et al., 2008). Each participant was sent an email containing information for participants (Appendix G), as well as an interview consent form (Appendix H).

7.4.3 Analysis and Discussion: Round 1 (Interviews)

The following section will examine the results of the first round of the Delphi study. This part of the study presented participants with three broad topic areas, as outlined in Section 7.4. Each of these topic areas is analysed separately and tables are provided to demonstrate the key issues identified by the expert panel. Relevant exemplars are provided to further corroborate the findings. Each of the interviews was recorded and

the audio files professionally transcribed. These transcripts were then manually coded using thematic coding.

This coding process involved recognising important moments in the interview process and encoding it for further analysis and interpretation. This form of encoding organises the data to identify and develop relevant themes (Fereday & Muir-Cochrane, 2006). The coding process involved three-stages. The first stage involved open coding, where transcripts were analysed line-by-line to determine themes and categories of interest to the study (Esterberg, 2002). Each of the interview transcripts was examined twice, before moving to the second stage of focussed or selective coding (Esterberg, 2002; Flick, 2006). This stage involved focussing on the key themes that became apparent and where appropriate, clustering similar themes into a single category. Once these key themes were identified and established, the third and final stage of ‘focused coding’ followed. This involved a more detailed examination of three key themes associated with this particular study. These included discussion of climate change impacts for Surf Coast tourism, identification of suitable adaptation options, and realisation of potential adaptation opportunities.

The first topic involved discussion of what panel members believed to be the major climate change impacts that were likely to impact on tourism throughout the Surf Coast region. This information was sought as confirmation of the climate change risks and opportunities previously identified in Phase 1 of the RTAF model (Section 6.3). These results were analysed to identify the different climate change impacts that were discussed and the frequency of this occurrence. Table 7.3 displays a total of 17 identifiable climate change impacts that were discussed. Of these, ten could be classified as bio-physical impacts and seven as socio-economic impacts, as per Scott’s (2006) classifications.

Table 7.3 The number of times various climate change impacts were discussed by the Delphi group during the initial interviews

Question 1: What are the likely climate change impacts for Surf Coast tourism?	Total
Bio-physical impacts	
Bushfire	13
Coastal erosion	10
Impact on surf	9
Increased temperature	8
Sea-level rise	8
Storm surge	7
Species loss/bio-diversity	7
Decreased rainfall/drought	5
Damage to GOR itself (storm/inundation)	5
Inundation/flooding	4
Socio-economic impacts	
Destination appeal	13
Decrease tourism revenue	5
Decreased long-haul flights	3
Increased costs (fuel, electricity, etc.)	2
Changes in climate policy	1
Changes in consumer behaviour	1
Decreased visitation	1

With regard to the panel's opinions on the potential bio-physical impacts of climate change on tourism in the region, the most common responses surrounded the issue of bushfires, with only one member of the panel not directly mentioning the increased risk of bushfire due to climate change. The following exemplars provide further depth to this analysis. The collection of comments provided present only a sample of all the comments made in relation to bushfire risk.

Comments: Potential impacts of increased bushfire risk for tourism in the Surf Coast region.

- *"We're in a bushfire environment and bushfire risks will increase."* (Respondent #2)
- *"Bushfire are obviously a concern to the tourism industry in terms of impacting on its infrastructure and also driving people away from the region at certain times of the year."* (Respondent #6)
- *"So given that we're going to end up having, as predicted, greater extreme weather events, increased hotter days, less rainfall, obviously this leads to a conducive environment for greater bushfires, extreme, catastrophic bushfires."* (Respondent #7)
- *"Not only do we have the physical threat of bushfires but putting it in people's mind because of media coverage and government warning."* (Respondent #7)

- *“Well, probably first and foremost is fire, the greater instance of fire activity. (Respondent #8)*

The second most widely identified bio-physical impact was coastal erosion. The potential impact on coastal destinations was discussed in terms of the likely impact on both environmental assets (i.e. beaches) and coastal infrastructure such as roads. The implications of coastal erosion were directly discussed by six of the eight panel members. Relevant exemplars are outlined below.

Comments: Potential impacts of climate change induced coastal erosion for tourism in the Surf Coast region.

- *“If there’s a road, parking lot, resort, cliff, whatever behind it, then that beach has nowhere to go.” (Respondent #1)*
- *“As far as the impact on that area, the first thing I suppose would really be the coastal erosion that’s taking place.” (Respondent #6)*
- *“I would hope and expect that there would be some level of data on coastal erosion, in particular because of the nature of the Great Ocean Road.” (Respondent #6)*
- *“It obviously poses a threat to infrastructure...but the bottom line is beaches.” (Respondent #2)*

Other potential climate change impacts such as increasing sea levels, combined with more frequent and severe storms, are also likely to impact on coastal areas that are core resources for tourism in the region, and this was widely acknowledged by the expert panel. Indeed, the issues of coastal erosion, sea-level rise and storm surge were rarely spoken about in isolation, and the connection between them was often identified. Furthermore, the potential impact on coastal assets due to the associated effects of climate change was identified as a major concern for tourism in the region. This was affirmed by the following comments that refer to climate change impacts on coastal areas.

Comments: Potential impacts of coastal erosion, sea-level rise and storm surge on coastal assets throughout the Surf Coast region.

- *“So some of the aspects that are relied on for tourism, whether that’s a beach or the infrastructure that allows people to enjoy the coast, will be impacted on and that may make those assets unusable, less usable, or it may restrict the ability to use a bit of coast.” (Respondent #2)*

- *“That’s one of the key assets of the region; the coast and the beaches” (Respondent #1)*
- *“The coastal erosion side of things, compounded by sea-level rise, impacts on the aesthetics of the area.” (Respondent #6)*
- *“Coastal erosion and sea level rise impacts need to be taken into account of how they might affect the coastline and the beauty, general for the beauty of the area and why people go there.” (Respondent #6)*

Many of the other bio-physical impacts that were identified during the coding process were also related to those previously discussed. However, it became apparent through the interviews that the most prevalent themes were related to bushfire and the aforementioned impacts of storm surge, coastal erosion and sea-level rise. Many of these bio-physical impacts are inherently linked to the results regarding the potential socio-economic impacts of climate change on tourism throughout the Surf Coast region. These potential socio-economic impacts are discussed in the following sections.

The most commonly cited socio-economic impact likely to affect tourism in the region was the potentially negative effect of climate change impacts on destination appeal. This was specifically mentioned by seven members of the expert panel on a total of thirteen separate occasions. The following exemplars demonstrate some of their concerns regarding climate changes impact on the appeal of the region.

Comments: Potential impacts of climate change on destination appeal.

- *“We’re in a bushfire environment and bushfire risks will increase, and that will threaten both residential and community assets. That will have flow on effects in terms of reducing the willingness of travellers to come to this region.” (Respondent #2)*
- *“The basic impacts are what’s going to happen to the water and whether that will change the tourism appeal positively or negatively.” (Respondent #5)*
- *“The coastal erosion side of things, compounded by sea level rise, impacts on the aesthetics of the area, in particular with somewhere like the Great Ocean Road.” (Respondent #6)*
- *“Coastal erosion and sea level rise impacts need to be taken into account of how they might affect the coastline and the beauty, general for the beauty of the area and why people go there.” (Respondent #6)*

Again, many of the other socio-economic impacts that were identified, such as the potential for visitor numbers to decrease and tourism revenues to fall, were associated

with discussion of the more general impact of deteriorating destination appeal. For example, one of the participants discussed *“the follow-on or indirect effects of climate change impacts”* stating that impacts such as large scale bushfires would *“have a significant impact on the market for a period of time, which then would have resulting impact on visitation and the economy”* (Respondent #7).

The second section of the interviews focused on discussion of potential adaptation options to help the Surf Coast region to cope with, or manage, the potentially negative consequences for tourism due to the impacts of climate change. Table 7.4 displays the most commonly identified adaptation options. These results are broken into technical and business management adaptations as described by Scott (2006). There was no specific mention of any form of behavioural adaptation.

Table 7.4 The number of times various climate change adaptation options were discussed by the Delphi group

Question 2: What adaptation options would you propose for Surf Coast tourism given the negative impacts associated with climate change?	Total
Technical	
Fire breaks/controlled burning	5
Sea walls, groynes, etc.	5
Retreating	3
Reclaiming/replenishing beaches	3
Water tanks/on-site reservoirs/catchments	3
Early warning systems (fire/storm)	2
GOR one-way	2
Divert or close the GOR	2
Artificial reef	2
Further develop sustainable tourism	1
Water pipeline	1
Insurance	1
Business management	
Communicate likely impacts with tourism stakeholders (including tourists)	6
Future planning (action plans/smart design)	6
Increase domestic tourism*	3
Determine vulnerability (evaluate potential CC impacts)	3
Tourism product development*	3
Monitor tourist behaviour/travel patterns	2
Fire ban	1
Closing affected beaches	1
Increase marketing efforts	1

Note*Also discussed as potential opportunities.

The technical adaptations most commonly cited by the expert panel were ‘fire breaks/controlled burning’ and ‘sea wall, groynes, etc.’. The following comments are representative of the panel’s opinions regarding these two adaptation types.

Comments: Potential adaptation option involving firebreaks and controlled burning.

- *“At the macro level there’s back burning and all that other stuff that you can do. At the more micro level you could be looking at individual businesses and operators and residents alone preparing themselves better with whatever you need.” (Respondent #3)*
- *“You make sure you don’t build in areas where if there’s suddenly a fire, you know, you’re building in a place which is becoming more a fire hazard. Just like after the tsunami people said, well you know we’re stupid to build on the coast, we’ve got to go back 200 metres/500 metres whatever they decided on the local circumstances and the topography and I think the same thing is going to be applicable when it comes to looking at things like fires.” (Respondent #5)*
- *“In light of the fact of potential forest fires, then of course fire breaks and various other strategies should be put in place as soon as possible to cater for the potential for increased bushfires. So emergency response, that sort of stuff, needs to be dealt with very seriously.” (Respondent #6)*

Another technical adaptation that was also related to fire management and risk reduction was the use of early warning systems. Whilst the specifics of such a system were not discussed, and its use may not be exclusively for bushfires, it was recognised by some members of the panel as an effective means of dealing with increasing risk of more frequent and severe bushfires. This was typified by the following comment *“So the bushfire risk is a key one, like this year we’re going to have significant warnings where everyone’s going to be more risk-averse this year, so we’re going to have more warnings, more often, and much earlier”* (Respondent #4).

Comments: Potential adaptation option involving sea walls, groynes, etc.

- *“The Americans spend millions and millions of dollars nourishing beaches or sand, every year, to maintain those big beaches and that’s probably what will be the case in some of the major urban centres in Australia, to protect those recreation beaches, they’ll put out the groynes, they’ll feed them with sand because they’re such high use beach areas.” (Respondent #1)*

- *“How do you protect the key destinations from these events, putting up barriers and all those seawalls, we’ve seen in themselves impacted through the industry in terms of the amenity of the place you’re visiting.” (Respondent #7)*

Whilst many of the comments regarding sea walls discussed their potential utility or necessity, at least one panel member saw a prospective downside for tourism given the development of sea walls stating *“If you’re driving along Great Ocean Road with a whacking big wall beside you to support the road and you can’t see the coast, hasta la vista, tourists”* (Respondent #2).

Other technical adaptations that relate to coastal protection and management were also identified, including the potential need to reclaim or replenish beaches, whereby sand is moved in from other areas to ensure the amenity of a particular beach is not lost. Or the option to develop artificial reefs that may serve to protect beaches from erosion, as well as improve the amenity for surfing and diving. However, it was recognised by at least one of the group members that such an adaptation may have negative environmental ramifications. For example, one respondent stated *“you can make artificial reefs, but that obviously has environmental implications as well as developing it because you’ve got to put concrete blocks in”* (Respondent #2). It is also likely that such developments would receive significant opposition from community and environmental groups.

The Delphi group also identified numerous business-management type adaptations that could assist the region in dealing with the potentially negative consequences of climate change. As discussed in Section 2.8, this involves operational techniques that can be adopted by tour operators, destination managers, and/or regional government and tourism authorities. The two most widely cited business management adaptation strategies were: improving communication of likely climate change impacts with various tourism stakeholders, including tourists; and future planning, which includes elements of so-called ‘smart design’ and the development of appropriate action plans to better prepare for frequent and severe weather events. The following sections will report on some of the comments Delphi members made in regards to these adaptation options.

Comments: Business management adaptation options – Communicate likely climate change impacts with tourism stakeholders (including tourists).

- *“A lot of that comes down to visitor safety campaigns and things like that which we do conduct and are going to be greater into the future in terms of people’s awareness of these issues and how particularly the safety aspects of climate change impacts what we do with visitors and what they do in terms of bushfire events or tidal surge or whatever it is that may impact on them.” (Respondent #7)*
- *“There must be some mechanisms for communicating, well (a) showing some leadership, in our case in accommodation properties, and (b) and we haven’t yet sort of dipped our toes in this, but part of the experience can be a bit of subtle education (of visitors).” (Respondent #2)*

The issue of communication with various tourism stakeholders ties in with many of the technical adaptation options discussed. For example, the use of early warning systems is one way to inform both local tourism operators and visitors to the area of any extreme weather events that may impact upon tourism in the region. The following section provides examples of comments made by the expert panel in regards to the utility of future planning.

Comments: Business management adaptation options – Future planning (action plans/smart design).

- *“In terms of future planning for destinations, in terms of provision of infrastructure to support the tourism use, we’ve got to get smarter and make sure that we’re planning ahead for that.” (Respondent #2)*
- *“Yeah, trees, erosion, getting access to the coast, good design for infrastructure, good design for places, and we know that a lot of the infrastructure we manage is there for tourism, to support the tourism use.” (Respondent #2)*
- *“In terms of erosion and sea level rise, one of the big issues for any tourism destination is monitoring and evaluation of those impacts and gathering of data to actually base any strategy or action plan and implementation of that action plan.” (Respondent #6)*
- *“I mean, obviously business management will come into your adaptation cycle as you’re looking at the various technical issues and the behavioural issues and the link to the physical impacts.” (Respondent #6)*

The third and final section of the interviews focused on the possibility for adaptation opportunities for tourism in the Surf Coast region as a result of climate change. The expert panel identified a number of adaptation opportunities from re-positioning the destination to capitalising on the impact at competing destinations. Table 7.5 presents

the most frequently discussed adaptation opportunities for tourism in the Surf Coast region.

Table 7.5 The number of times various adaptation opportunities were discussed by the Delphi group

Question 3: What adaptation opportunities do you see for Surf Coast Tourism as a result of Climate Change?	Total
Re-position destination	6
Capitalise on “green” tourist	6
Impact at competing destinations	5
New target markets	4
Promote off season/decrease seasonality	4
Extend peak summer period	3
Increase beach tourism	2
Promote as a safe destination	2
Unforeseeable opportunities	2
See it before its gone	1

The potential to re-position the Surf Coast region was one potential opportunity discussed by several of the Delphi participants. Some of the comments regarding this adaptation option are detailed below.

Comments: Adaptation opportunities for Surf Coast tourism – Re-positioning the destination.

- *“If you’re looking at re-branding the destination for example, or taking a destination off in a different direction, whatever it might be, you might say; okay surf tourism, we can’t depend on it as much as we want so we’re going to develop a stream in education tourism or nature-based tourism or whatever it might be.” (Respondent #3)*
- *“The Surf Coast would have every reason to sort of do an in depth analysis that says okay, what is it that’s driving our supply and demand at the moment, what is our USP, how is that going to be affected regionally as a consequence of this change (to climate) and how can we position ourselves effectively to stay competitive in this respect?” (Respondent #5)*

The discussions regarding the re-positioning of the destination also merged with discussion of other opportunities such as the development of new target markets. Whilst a variety of new positioning strategies were mentioned by the group, the majority of discussion focussed on the potential to capitalise on the emergence of the so-called ‘green tourist’. Green tourists are defined as tourists who behave in an environmentally friendly manner when on vacation (Dolnicar & Matus, 2008). Further discussion of the

potential development of the green consumer is provided in Chapter 6. The following section lists some of the comments Delphi members made in relation to this adaptation opportunity.

Comments: Adaptation opportunities for Surf Coast tourism – Capitalising on the ‘Green Tourist’ and the opportunity to develop new target markets.

- *“Nature-based tourism is a key one, because if it’s done properly it is about integrating tourism experience with the natural and cultural environment and therefore the more we do of that in Victoria in general and Surf Coast is no different, the better.” (Respondent #2)*
- *“If we can establish the region as a safe, well-managed, risk-free environment, then the international market that you were talking about before, the people who are naturally cautious or unsophisticated in the Australian context, are more likely to view a destination they’ve been told that it is safe.” (Respondent #8)*
- *“It’s also a tourism truth that though people are more environmentally aware they’re perhaps less environmentally active when they’re on holiday. So their awareness is being taught at a younger age, so it will become, I guess, socially unacceptable to be irresponsible with the environment.” (Respondent #8)*

Many of the respondents also saw the potential for decreased seasonality and the potential to increase the duration of peak summer periods as temperatures during shoulder periods became more favourable for popular beach activities such as swimming, sun-bathing and surfing. Interestingly, several of the group members also suggested that the impact of climate change on competing destinations should also be examined as a potential opportunity to increase market share.

Comments: Adaptation opportunities for Surf Coast tourism – Capitalising on climate change impacts likely to affect competing destinations.

- *“If they (visitors) were going to other locations and their main attractions in those other locations are being hit harder than you, you get some of that market share. So that would be part of an adaptation strategy, I think, to understand who your competitors are, how are they being affected.” (Respondent #1)*
- *“Yeah, it might mean there’s more extreme days which are more risky with heat stroke or heat-induced fire issues, but anything that extends the season, temperature’s a key constraint on seasonality down here. There will be other regions to the north,*

Queensland for example where that will become a negative impact. Victoria, maybe that'll be part of the positive things.” (Respondent #2)

- *“You can market it as the Gold Coast of Victoria, you know what I mean, which then raises an issue that the coastal resource in Victoria may benefit from the issue that Queensland now has in terms of it's going to be much hotter up there. The comfort for people lying on a beach on the Gold Coast may be an issue into the future, so the Surf Coast tourism, the best place in Surf Coast Shire can present an alternative, more moderate climate for people to undertake their beach-side activities.” (Respondent #7)*

Whilst the expert panel did foresee a range of potential adaptation opportunities as a result of the predicted changes in climate, at least two of the group members indicated that there is likely to be a number of unforeseen opportunities that will materialise over time. This was expressed in the following two statements: *“We may discover all these other things that we didn't know were there that become a new asset that can be capitalised on”* (Respondent #2), and *“Again, the opportunities will present themselves when we know more”* (Respondent #8).

Round One of the Delphi study took an exploratory approach designed to determine key themes and also to acquaint the panellists with the research areas. Round Two of the study was designed to gain greater consensus from the group by asking them to rate various items identified in the previous round. This was done through the use of an on-line survey, the results of which are discussed in the following section.

7.5 Development and Content: On-line Survey

The second round of the Delphi Study involved an on-line survey. The primary rationale for this approach stemmed from discussions with Delphi members during the first round of questioning. During this time it became clear that many of those involved had extremely busy and unpredictable schedules, and committing to a particular time for a subsequent interview would be difficult. Consequently, it was decided that the second round of data collection would occur electronically, which would allow participants to complete the survey at a time and place convenient to them.

The second round of questions was based on the results of the first round interviews; however a rating system was also included to enable further analysis. A five-point Likert type scale was used to determine respondent's opinions of various factors. Very

low rating factors were also removed, and some similar factors were combined to keep the lists manageable. For example early warning systems for fires were combined with early warning systems for storms, to create a single classification encompassing any form of early warning system.

Participants were asked to rate the potential effect of each of the climate change impacts discussed in the first round and then state whether they favoured or opposed the various adaptation options. For example, Figure 7.3 provides a screenshot of Question 1 and displays the available options for respondents ranging from no impact at all, to severe impact. A further n/a option was also provided for respondents who didn't believe the question was applicable to that particular variable. Although other methods of analysis such as ranking do exist, increasingly rating scales have become the preferred approach (Lee & Soutar 2007). The rating scale was found to be quick and easy to comprehend, as participants only had to rate each variable rather than rank them in comparison to all other variables. Further discussion of the use of scales, and the advantages and disadvantages of using the Likert system is discussed in the approach and methodology (Section 4.4.4).

Delphi Study (Stage 2) Surf Coast Tourism & Climate Change Adaptation [Exit this survey](#)

2. Default Section

*** 1. Q1) What sort of effect are the following climate change impacts likely to have on Surf Coast Tourism?**

	No impact at all	Minimal Impact	Moderate Impact	Major Impact	Severe Impact	N/A
Decreased Rainfall/Drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased Temperature	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sea-Level Rise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Storm Surge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coastal Erosion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bushfire	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Species Loss/Bio-diversity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inundation/Flooding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Damage to GOR itself (Storm/Inundation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Impact on Surf (Size, Shape, Frequency)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decreased long-haul flights	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in climate policy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Impact on Destination Appeal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes in Tourist Behaviour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[Prev](#) [Next](#)

The initial interviews were transcribed and coded in order to quantify the different climate change impacts and adaptation options mentioned. Once the first round results had been collected and collated, the second round survey was distributed to participants. Participants were asked to rate the potential effect of each of the climate change impacts discussed in the first round and then state whether they favoured or opposed the various adaptation options. A five-point Likert scale was used. The survey involved the following three questions/requests:

1. What sort of effect are the following climate change impacts likely to have on Surf Coast tourism?
2. Please tell us your opinion of the following adaptation options for Surf Coast tourism considering the potential risks associated with climate change.
3. Please tell us your opinion of the following adaptation options for Surf Coast tourism considering the potential opportunities associated with climate change.

The rating of each potential climate change impact is presented in Figure 7.4 where the likely impact on Surf Coast tourism is presented on a continuum between 1 representing 'No impact at all' and 5 representing a 'Severe Impact'. The top ten ranked impacts, in terms of their potential effect are provided, with the remaining impacts amalgamated and presented in the bottom row titled 'Other'.

The second question aimed to determine how strongly panel members favoured or opposed the adaptation options aimed at minimising the risks associated with climate change. Unlike the first question, all eleven adaptation options initially discussed in round one are rated and included in this discussion. The scale used for this question ranged from 1 (Strongly Agree) to 5 (Strongly Oppose).

The third and final question asked refers to adaptation options that could be implemented to capitalise on any potential opportunities that may arise as a result of climate change. This represented an important component of the research as many adaptation frameworks took a risk minimisation approach to adaptation, neglecting to recognise the potential opportunities that may arise. The scale used for this question was the same utilised for Question 2.

7.5.1 Pilot Test and Amendments: On-line Survey

A draft version of the questionnaire was reviewed by several colleagues at Victoria University in order to avoid any ambiguity and to enhance the reliability and validity of the research. As a result of this procedure several minor changes were made to the questionnaire. Most of these amendments involved improvement to the language used in the questions; however an additional paragraph, displayed below, was also added to the introductory section of the questionnaire:

As there is no timeframe for the options given or specific consideration of the adaptive capacity involved, you are required simply to give a general opinion towards each of the options provided. If you are unsure about a particular variable please tick N/A. Please note, that you must provide an answer to all of the questions provided.

This paragraph was designed to further clarify what was required of the respondents and to explain that a N/A option was provided for questions they did not understand, or did not have an opinion on. The following section provides detailed analysis and discussion of the on-line survey, including graphical representations of the results.

7.5.2 Analysis and Discussion: On-line Survey

The first round of the Delphi study yielded a variety of responses in regards to potential adaptation options ranging from broad over-arching business management and policy responses to technical impacts and/or destination specific responses. Whilst the second round largely confirmed the priorities regarding adaptation, several issues that were discussed broadly during the interviews were largely disregarded during the on-line survey.

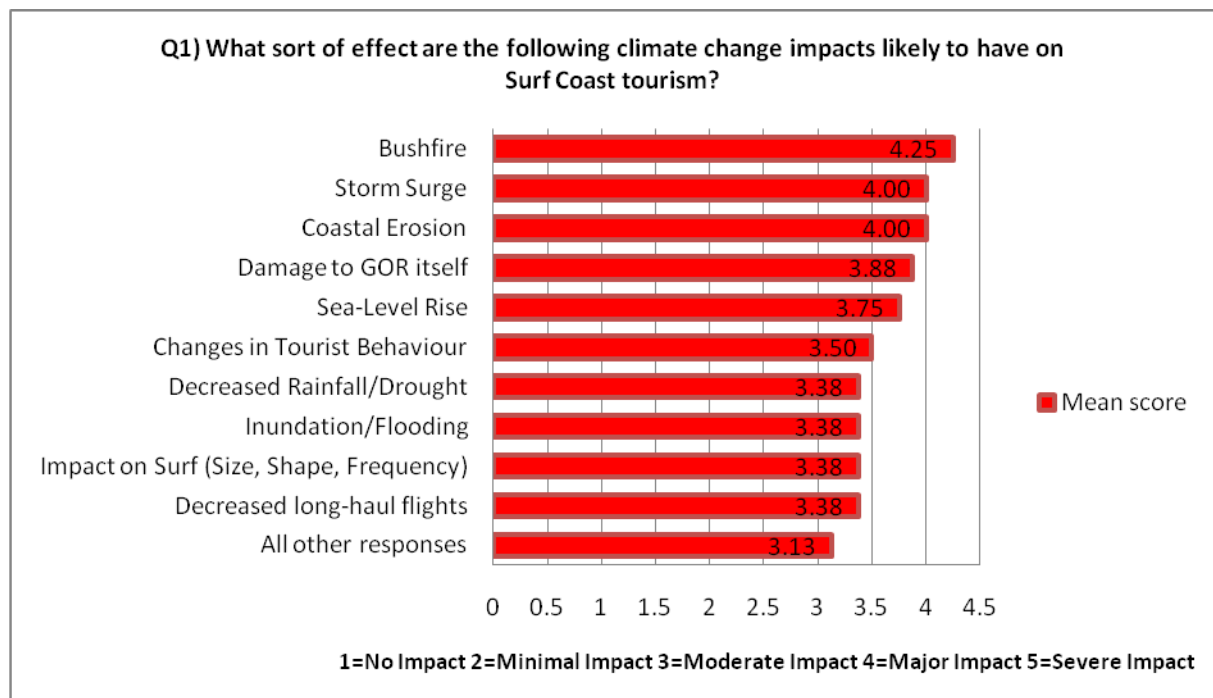
All of the impacts identified as likely to have an effect on Surf Coast tourism scored above 3, indicating that there was a consensus amongst the panel that each of the climate change impacts proposed in the survey would have at least a moderate effect on tourism in the region. However, two of the potential impacts that were mentioned during the first round, increased temperature and species loss, were not rated highly enough by the panel to be considered amongst the ten most influential impacts on tourism in the region. This section uses means and bar charts to illustrate the findings of

the expert panel. Veal (1997, p. 236) states that “means are an appropriate form of analysis when using attitude or ‘Likert’ type scales”.

Perhaps unsurprisingly, bushfire was identified as potentially having the greatest impact on Surf Coast Tourism (mean=4.25). This was also the most discussed impact during the initial interviews in Round One of the Delphi study (see Table 7.3). The technical adaptations to counteract the increased risk of bushfire also rated highly, with the use of fire breaks and controlled burning, as well as the use of early warning systems both scoring a mean score of 4.63. As described in Section 2.8, technical adaptations usually involve utilising technology and being innovative in order to determine methods of coping with climate change and vulnerability.

Storm surge and coastal erosion were also identified as potentially having a major impact on Surf Coast tourism; both scoring a mean of 4.0. This indicated that participants thought both impacts were likely to have a major impact on tourism at the Surf Coast. Adaptation in this area was seen as a priority due to the major role coastal attractions and activities play in forming the appeal of the Surf Coast region.

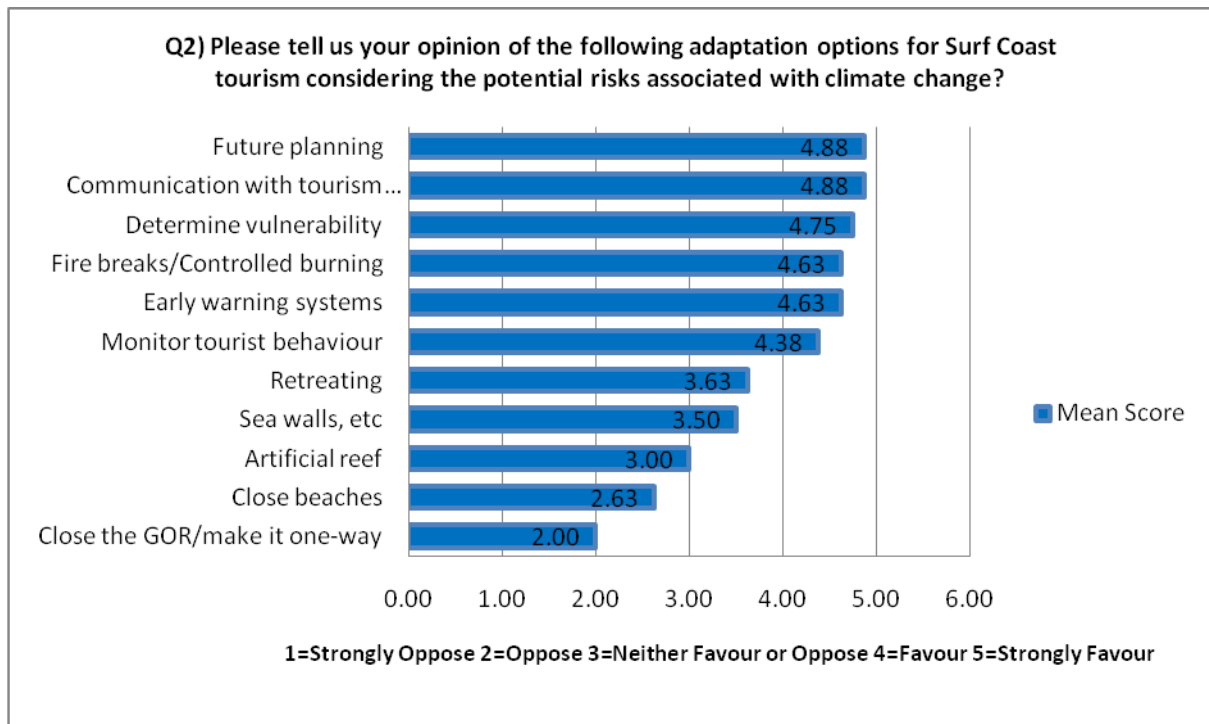
Figure 7.4 Rating of climate change impacts likely effect on Surf Coast tourism



As can be seen from Figure 7.5, communication of likely impacts with various stakeholders, including tourists, along with the implementation of future planning that incorporates action planning and smart design were the most strongly favoured adaptation options, both receiving a mean score of 4.88. Interestingly, both these options fall under what Scott et al. (2006) identify as Business Management forms of adaptation. These are techniques that can be used by tourism operators, regional governments and tourism industry associations to reduce vulnerability to climate change.

The importance of education and awareness campaigns for all tourism stakeholders, including tourists, was something that was identified by several respondents as key to the process of adaptation. Indeed, communicating the possible impacts of climate change and the potential benefits of adaptation were seen as key issues for the sustainability of the Surf Coast tourism industry. Therefore, emphasis on stakeholder education and awareness campaigns is seen as essential in ensuring the highest level of preparedness for climate change and for effective adaptation. Education should be proactive and occur prior to climate change occurring, as well as during and after specific climate change events or adaptations. Increased education, communication and information sharing would increase the capacity of the Surf Coast Shire and its tourism industry to adapt to climate change and consequently increase its resilience.

Figure 7.5 Popularity of various adaptation options



The most strongly opposed adaptation options were clear, and both involved a reduction in amenity for potential tourists. Closing the Great Ocean Road (GOR) or making it one-way was the most strongly opposed adaptation option (mean=2.0). However, careful consideration should be given to the interpretation of this question, as no timeframe for the closure was provided and it was not stated whether this would involve a total or partial closure of the road. The permanent closure of the entire GOR would dramatically impair tourism throughout the region, whilst the impact of short-term and/or localised closures would be far less dramatic. Similarly, given the relative importance of beaches for providing the appropriate setting for many of the Surf Coast's major touristic activities such as swimming and surfing, it is not surprising that the option to close beaches was also widely opposed (mean=2.63).

In terms of capitalising on potential opportunities brought about by climate change, the most strongly favoured adaptation option (mean=4.63) focused on increased promotion of the tourism off season to decrease seasonality issues. It is a characteristic of most tourism destinations that demand fluctuates greatly between seasons of the year (Middleton, 2001), consequently it is perhaps not surprising that any potential ability to decrease seasonality is seen as an opportunity. This adaptation option initially arose

through discussion of a warming climate and the possible extension of the peak summer period. Such an opportunity would certainly be influenced by other factors, such as the timing of public and school holidays. However, if the weather at either side of the traditional summer peak period was to improve, and conditions for popular activities such as swimming and going to the beach remained favourable, then potentially the region could reduce seasonality issues by encouraging tourists to visit during these shoulder periods.

Another highly rated adaption opportunity (mean=4.50) identified by the expert panel was the opportunity to re-position the region to capitalise on the growth of the so-called “Green Tourist”. Debate over the existence of the green consumer has been widespread (Bergin-Seers & Mair, 2009; Straughn & Roberts, 1999; Swarbrooke & Horner, 1999). However, there is no doubt that in recent years environmental issues such as climate change have come to the forefront of public debate (Bergin-Seers & Mair, 2009). As a consequence of this, there is little doubt that the public both here in Australia, and globally, are becoming increasingly knowledgeable and aware of climate change issues. Moreover, this is impacting on their attitudes and behaviour, which in turn represents both challenges and opportunities for producers and marketers of tourism products.

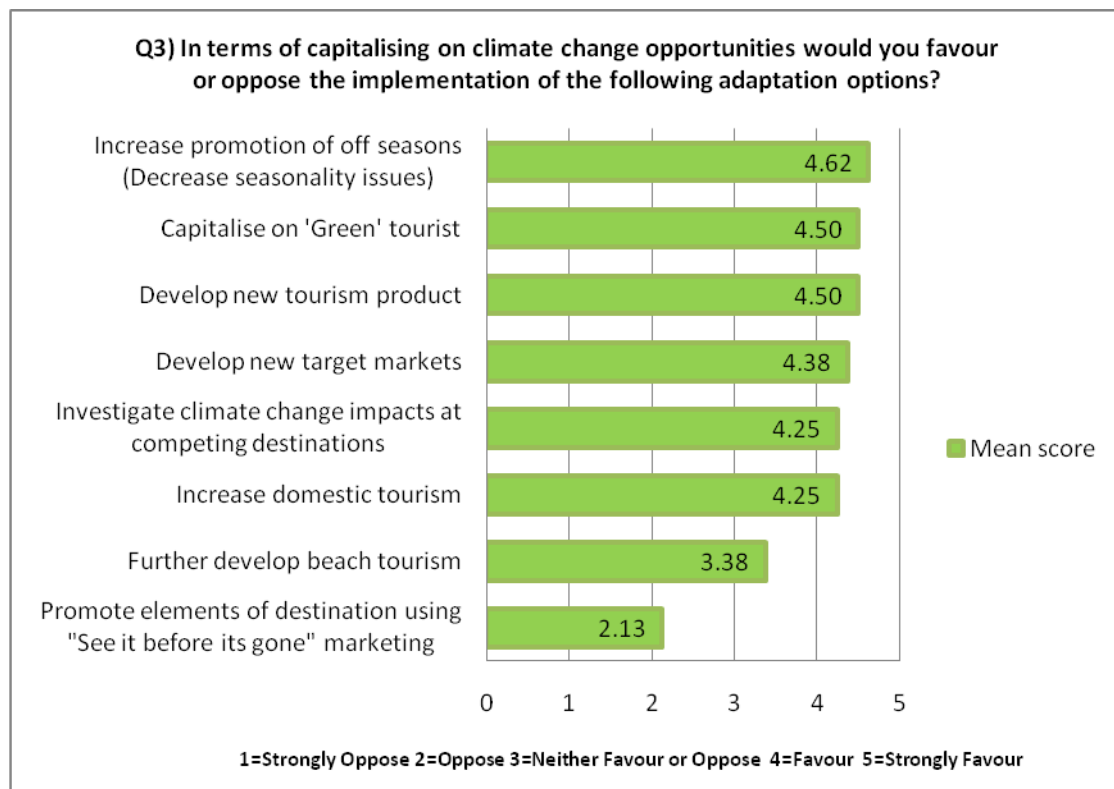
Indeed, the influence of climate change on consumer behaviour can be seen as an extension to so-called ‘Green Tourism’ whereby tourists became more environmentally aware, and consequently the tourism industry began supplying ‘environmentally friendly’ products marketed towards this new segment (Andereck, 2007; Straughn & Roberts, 1999; Swarbrooke & Horner, 1999). Furthermore, recent research predicting that climate change will influence tourist behaviour and choice of destinations (Amelung et al., 2005; Berrittella et al., 2006; Hamilton et al., 2005; Hamilton & Tol, 2004; McEvoy et al., 2008) presents destination managers with new marketing opportunities and challenges. This provides strong evidence to support the assertion in this thesis that possible adaptation options should be tested with consumers before being implemented.

It could also be argued that the high degree of support for developing new target markets (mean=4.38) could be associated with the potential to capitalise on the so called ‘green tourist’. However, further research is needed to determine if there are other

potential market segments, that the Surf Coast is currently not targeting, that may warrant greater attention given the potential impacts of climate change.

Adaptation may not only be used to minimise the risks of adverse climate change impacts, but also to capitalise on opportunities that may present themselves. These opportunities will become more apparent as the uncertainty surrounding climate change impacts diminishes. Improved climate change science, along with continued research into the potential effects on tourist behaviour, will likely realise further opportunities that will help offset the many challenges presented by climate change. Figure 7.6 demonstrates the relevant popularity of each of the adaptation options, in terms of their ability to capitalise on potential opportunities for Surf Coast tourism as a result of climate change.

Figure 7.6 Popularity of various adaptation options that capitalise on climate change opportunities



7.6 Chapter Summary

The various impacts resulting from climate change are a major concern for the development of regional tourism destinations. Lack of attention to these possible impacts may lead to a degradation of the very resources that the destination relies upon to attract visitation. Changes across the entire tourism system may permeate through to the destination itself, justifying the need to take an inclusive approach to adaptation. Furthermore, climate change may indeed present opportunities for tourism destinations, and adaptation that capitalises on these opportunities may assist in off-setting the negative impacts associated with climate change.

Upon a review of the literature, it was determined that the Delphi technique was an appropriate tool for assessing adaptation strategies to assist with the management of potential climate change impacts, as it allowed for the major issues to be identified and clarified. Whilst the results do not provide a definitive answer as to the “correct” adaptation option/s to implement, they do provide valuable insight into the potential opportunities, and would likely assist decision makers in planning for a sustainable future. The findings were somewhat limited by not including additional rounds in the Delphi process. However, in order to avoid excessive time pressure on participants, two rounds were deemed sufficient for this type of exploratory research.

The Delphi study yielded a variety of responses in regards to potential adaptation strategies ranging from broad over-arching business management and policy responses to technical adaptations and/or destination specific responses. One of the key issues that presented itself throughout the study was the need for further education and awareness campaigns for both those within the tourism industry and tourists themselves.

Whilst the majority of impacts and adaptation responses discussed were in relation to the bio-physical environment, socio-economic factors such as changing consumer ethics and the need for greater awareness and education throughout the tourism system were also discussed. From a solely bio-physical perspective there was almost unanimous agreement that the Surf Coast’s major threats were fire and coastal management issues.

Fire presented a major risk not only to property and human life, but also to destination appeal. Adaptation strategies widely discussed by the group included the development of early warning systems, opening up new/different tourism areas that are less vulnerable to fire, increasing fire-fighting capacity and developing awareness campaigns for tourists.

In regards to coastal issues such as sea-level rise, increased storm surge and coastal erosion, a number of adaptation options were presented, such as the construction of sea walls or the development of improved weather monitoring and early warning systems. Adaptation in this area was seen as a priority due to the major role coastal attractions and activities play in forming the appeal of the Surf Coast region.

The most commonly discussed business management adaptation options involved improved communication of likely climate change impacts with various tourism stakeholders, including tourists; and future planning, which included elements of so-called ‘smart design’ and the development of appropriate action plans to better prepare for frequent and severe weather events such as storms or bushfires. There was a clear link between the business management strategies identified and the technical adaptations discussed. For example, there would be significant opportunity to increase communication between tourism stakeholders given the development of early warning systems for extreme events.

Interestingly, a range of opportunities resulting from climate change were also identified. The three common suggestions were: 1) the potential to decrease seasonality and extend the peak summer season as regional temperatures increase; 2) the ability to capitalise on the emergence of the so called “green” consumer; and 3) the opportunity to take market share from competing coastal destinations, such as North Queensland, who may be adversely effected by climate change as temperatures and cyclone activity increase.

In summary, tourism destination management is already a complex area, involving an array of stakeholders, and the introduction of climate change provides yet another challenge for both managers and policy-makers. Consequently, the development of a regional adaptation framework for tourism destinations to evaluate and incorporate the

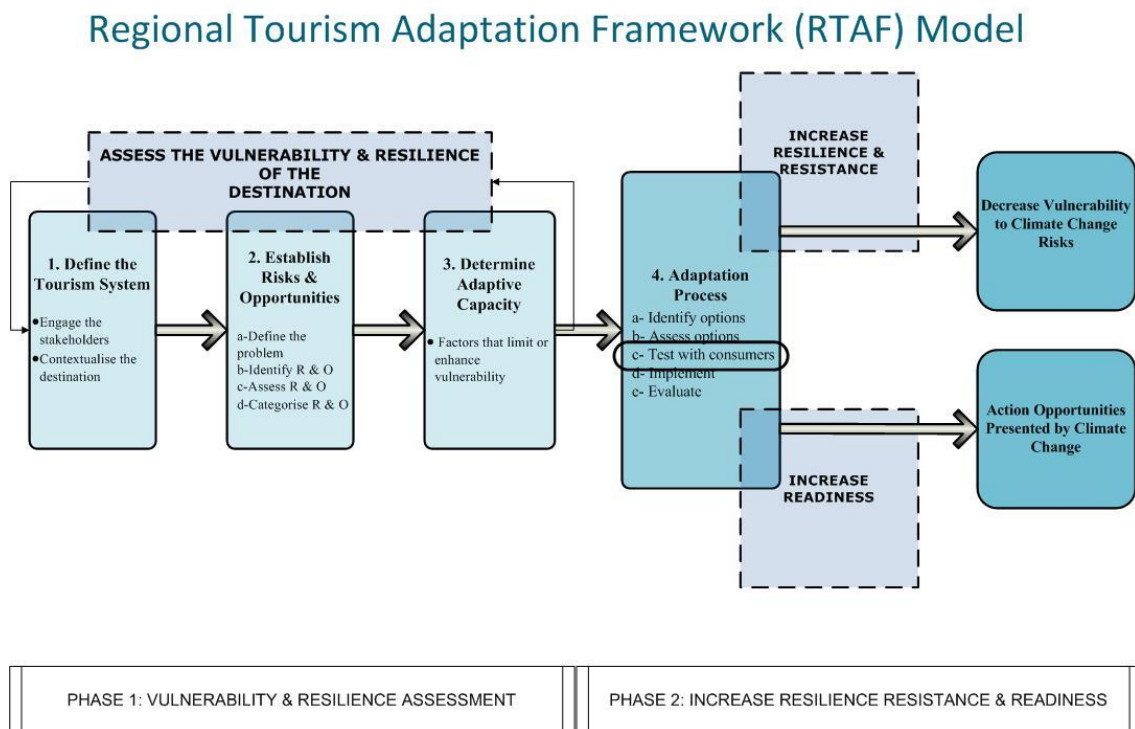
range of adaptation options is deemed to be of valuable contribution to knowledge. The use of a Delphi technique proved a valuable means of identifying and prioritising potential adaptation options. However, before decisions are made regarding adaptation strategies, the options identified through the application of the Delphi study must be tested with consumers. Ultimately, it is the tourist who decides whether or not to visit a destination, and as a consequence it would be ill-advised to implement any major adaptation strategies without investigating their potential impact on destination choice. Therefore, the next phase of the research will involve interviews of tourists at locations throughout the Surf Coast region, the aim being to determine different market segments' perceptions of the adaptation options identified in the Delphi study.

Chapter 8. Tourist Survey

8.1 Introduction

The aim of this chapter is to present an analysis of the tourist surveys conducted throughout the Surf Coast region. This chapter relates to Research Objective 2, in particular research questions d) What type of tourist is visiting the Surf Coast region? and e) What are these visitors' attitudes towards the proposed adaptation options? Testing consumer opinion regarding potential adaptation options is an important element of the adaptation process, as displayed in Figure 8.1. The tourist surveys represent a key component of the RTAF model, as this is one of the major differences between the proposed model and other tourism adaptation frameworks currently available (Jopp et al., 2010a). Indeed, understanding how consumers may respond to various adaptation options is fundamental to this research; particularly given the important role of tourists in the whole tourism system (see Section 1.2.4) and their relatively high degree of adaptive capacity (see Section 2.8.1).

Figure 8.1 The adaptation process (Stage 4 of the RTAF model)



The data analysed in this study were collected at the official Visitor Information Centres (VICs) at Lorne on the 23rd and 24th of October 2010 and Torquay on Saturday the 6th of November and Sunday the 7th of November 2010. Arrangements were also made with Wildlife Tours Australia (WTA) to administer the surveys on 1 and 2 day coach tours of the Great Ocean Road, during the months of October and November, 2010. Table 8.1 displays the different sources and the number of surveys collected through each means.

Table 8.1 Data collection, source and frequency

Data source	Frequency	Percentage
WTA Coaches	139	51.9
Lorne VIC	81	30.2
Torquay VIC	48	17.9
Total	268	100.0

The surveys were designed to determine the level of understanding visitors to the Surf Coast region have regarding climate change and climate change adaptation, and to determine their opinion regarding various adaptation options. The following sections of this chapter will provide information on the development and content of the surveys, the reliability and validity of the data collected, and analysis and discussion of the results. The analysis involved a detailed assessment of different opinions and degrees of knowledge amongst various groups, and conclusions were drawn regarding the potential impact of specific adaptations on tourists' intention to return to the Surf Coast.

8.2 Survey Development and Content

The tourist surveys represented the third research phase for this study and focused on tourist responses to the adaptation strategies initially developed in research phase two – The Delphi Study (Chapter 7). The surveys focused on adaptation options that would have a direct influence on the tourist experience, therefore options such as increasing domestic tourism or monitoring tourist behaviour and travel patterns were not included. Quantitative surveys were administered to investigate any relationships between the various adaptation options proposed and the propensity of respondents to return to the Surf Coast region.

The aim of the surveys was to determine tourist attitudes towards potential adaptation options (Research Question 2e). Both demographic and psychographic segmentation information was collected to allow the respondents to be segmented during analysis.

Basic demographic segmentation such as age, sex, and place of residence was combined with information collected on respondents' environmental worldview, using the new ecological paradigm (NEP). Although there are other tools available to measure environmental attitudes such as the Connectedness to Nature Scale (CNS) developed by Mayer and Frantz (2004), the NEP was selected due to its previous use in tourism, its flexibility in terms of determining the multi-dimensionality of results, and its fit with this particular research.

In particular, the incorporation of questions in the revised NEP scale that related to eco-crises fits well with the growing awareness of climate change globally. Subsequently, such variables are expected to provide a valuable means of profiling tourists visiting the Surf Coast. As such, the scale will be used to evaluate the environmental worldview of visitors to Victoria's Surf Coast region. There may be potential for future research that builds on this particular study by exploring the correlation between the CNS and the NEP scores for visitors to Victoria's Surf Coast; however this is beyond the scope of the current research.

Segmentation using the NEP provided a more comprehensive 'Test with consumers' (stage 4c of the RTAF model) by exploring the between-group differences in relation to the proposed adaptation options. Adding psychographic information to demographics has been shown to greatly enhance the effectiveness of segmentation efforts by investigating the meaning behind tourist behaviour (Kahle & Kennedy, 1989; Thrane, 1997). The NEP was included to determine similarities and differences amongst the tourists and respondents were to be classified as anthropocentric, mid-centric or ecocentric, dependent on their level of environmental concern.

The study used inferential statistical techniques and therefore a sample of approximately 300 was sought. Inferential analysis involves using data from the sample obtained to estimate the characteristics from the broader population (Blakie 2003). Three hundred cases is generally accepted as being suitable for a range of quantitative analyses (Blakie, 2003; Comrey & Lee, 1992; Field, 2000; Tabachnick & Fidell, 1996). Indeed, Comrey and Lee (1992, p. 217) state that the adequacy of sample size may be roughly evaluated on the following scale "50 – very poor; 100 – poor; 200 – fair; and 300 – good...". In fact, surveys and samples are frequently used in research involving 30 to 250 cases

(Denscombe, 2007). For this research, the ultimate decision on sample size was guided by the particular requirements and limitations of this study. The selection and sampling methods used in this research are further explained in Section 8.4.

Respondents were asked to use a rating system for several questions, including the NEP. In such cases a five-point Likert scale was used, with 1 indicating a highly negative opinion, and 5 equalling a highly positive opinion. A five-point scale format was chosen for consistency reasons, as the majority of researchers (83.45%), using the NEP scale, used this system (Hawcroft & Milfont, 2009). Although other methods of analysis such as ranking do exist, increasingly rating scales have become the preferred approach (Lee & Soutar, 2007). This information, when combined with demographic details, helped to further develop tourist profiles and provide a greater understanding of not only “who?” prefers particular forms of adaptation, but “why?” they do.

8.2.1 Survey Design

Self-administered questionnaires were chosen for this research, whereby the presence of the interviewer was not essential. As self-administered questionnaires are completed by the respondent rather than the interviewer, respondents have the ability to complete the questionnaire at their own pace. However, without the presence of the interviewer, self-administered interviews must rely on the clarity of the written word rather than the skills of the interviewer (Zikmund, 2003). To ensure the clarity of the questionnaires, comprehensive pilot testing was conducted prior to the field work, in order to reduce any unnecessary uncertainty (see Section 8.3). Zikmund (2003, p. 214) also claims that the interviewer’s absence may “induce respondents to reveal sensitive or socially undesirable information”. For these reasons the use of self-administered questionnaires was deemed more appropriate than other techniques, such as interviewer completed questionnaires. In addition, it was also less costly, involved less travel and most importantly avoided the potential for interviewer bias. Table 8.2 displays a summary of the advantages and disadvantages of using self-administered questionnaires.

Table 8.2 The advantages and disadvantages of self-administered questionnaires

Advantages	Disadvantages
Participants can complete the questionnaire at their own pace	The respondent is unable to seek clarification regarding a question unless the interviewer is present
If left with the participant, the questionnaire can be completed at a time convenient to the respondent	The respondent may not understand the language in the question
Questionnaires can be widely dispersed over large geographic areas	Lower response rates may occur if the researcher is not present
Questionnaires are relatively inexpensive in comparison to personal interviews or telephone surveys.	Potential for incomplete questionnaires due to apathy or respondents not understanding particular questions
Questionnaires can incorporate standardised questions which allow for statistical analysis	

Source: Adapted from (Jennings, 2010; Zikmund, 2003).

The final questionnaire (Appendix I) was divided into four main sections. The first section was designed to obtain details relating to respondents' knowledge of the Surf Coast region and climate change. The second section used the 15-point NEP to determine respondent's environmental worldview. The third section asked respondents to indicate how a number of potential adaptation options would affect their decision to return to the Surf Coast region. Finally, the fourth section collected demographic information such as, age, gender, nationality, etc. The wording and content used in each of these sections and the rationale for their use is explained in the following section.

8.2.2 Wording and Content of the Questionnaire

The construction of a questionnaire is paramount to the success of data collection and analysis (Jennings, 2010). Therefore, much thought must be taken when designing the questionnaire to ensure that it is appropriate given the aims of the research. This includes avoiding ambiguous or leading questions, providing necessary definitions, and using appropriate categories or response sets (Jennings, 2010; Veal, 1997; Zikmund, 2003). A copy of the questionnaire can be found in Appendix I.

The questions asked were designed to help answer the following research questions as outlined earlier in the chapter.

Research Question 2d: What type of tourist is visiting the Surf Coast region?

- i. What is their knowledge of the Surf Coast region?
- ii. What is their knowledge of climate change issues?

- iii. What is their environmental worldview?

Research Question 2e: What are these visitor's attitudes towards the proposed adaptation options?

- i. What are different segments attitudes towards the various adaptation options?
- ii. Will different segments have different opinions of the proposed adaptation options?

The first section of the questionnaire asked a range of questions designed to determine respondent's familiarity with the Surf Coast region and their knowledge of climate change and adaptation. This section is directly related to research Question 2d and was designed to learn about the type of tourist visiting the Surf Coast region. This section incorporated the following six questions:

Q1. How many times – including this visit – have you visited the Surf Coast region in your lifetime?

Q2. Are you currently on a one-day bus tour?

Q3. During this visit where you will be spending most of your time?

Q4. How would you rate your knowledge of the tourist attractions and activities available throughout the Surf Coast region?

Q5. How would you rate your knowledge of the issues surrounding climate change?

Q6. How would you rate your knowledge of the issues surrounding climate change adaptation?

For the first three questions, the respondents were simply asked to tick the appropriate answer. Question 1 was designed to determine the number of first time visitors to the region, in comparison to the number of respondents that had visited the region on two or more previous occasions. Whilst this question originally divided respondents into five groups, this was later recoded to simply identify whether the respondent was a first time

visitor to the region or not. Question 2 asked whether respondents were currently on a one-day bus tour of the region. This was designed to differentiate between respondents who were tourists staying in the region for more than 24 hours or day visitors simply travelling through the region. Those who were on one-day bus tours were then asked to skip Question 3 and go straight to Question 4. Question 3 was designed to determine the areas respondents were spending the majority of their time in whilst in the region. Respondents were given a choice of seven popular destinations throughout the region, as well as the opportunity to specify any 'other' destination. It was speculated that depending on where respondents spend the majority of their time, might impact on their opinion of various adaptation options.

Question 4 asked respondents to rate their knowledge of the tourist attractions and activities available throughout the Surf Coast region. Here the first of several 5-point Likert scales were used to help respondents identify their perceived knowledge regarding this item. Respondents were asked to select from the following five options: very good, good, average, poor and very poor. This was designed to help determine if knowledge of the tourist areas and attractions influenced respondent's opinions regarding adaptation.

Questions 5 and 6 asked respondents to rate their knowledge of climate change and climate change adaptation. The same scale used in Question 4 again applied. It was expected that respondents would have greater knowledge of climate change in general, in comparison to climate change adaptation. The questions were also designed to determine if knowledge of these issues was associated with a more or less positive opinion of the adaptation options presented.

The second section of the questionnaire (Question 7) incorporates 15 item statements designed by Dunlap et al. (2000) to evaluate respondents' environmental worldview. Respondents were asked to indicate how they felt about 15 statements, using a 5-point scale ranging from strongly agree to strongly disagree. The results of this section were used to determine if a respondent's environmental worldview was related to their opinions regarding adaptation. It was posited that those with a more ecocentric worldview would, in general, respond more favourably to the adaptation options put forward. The NEP was discussed in detail in Chapter 3.

The third section of the questionnaire included a question related to respondents' opinions of specific climate change adaptation options, as well a section labelled "About You" which was designed to collect important demographic information. The first part, Question 8, is central to this study, and was designed to measure the potential effect of various adaptation options on a respondent's decision to return to the Surf Coast region. Again, a 5-point Likert scale was used ranging from highly positive to highly negative (See Appendix I).

The final part of the questionnaire (About You) asked a series of questions based on demographic variables. This was designed to enable distinctions within various groups based on their particular demographic characteristics. The demographic variables used included gender, age, nationality and education, and each of these variables was examined to determine if they indicated any between-group differences in terms of both environmental worldview and opinions regarding various adaptation options. Finally, to address any issues not covered in the questionnaire, a section was included which enabled respondents to make any comments regarding this study or climate change adaptation in general.

8.3 Pilot Test and Amendments

To avoid unnecessary ambiguity or other problems with the questionnaire design, a pilot test was conducted prior to field work commencing. The preliminary version of the questionnaire was initially shared amongst several colleagues at Victoria University in Melbourne, Australia. One specific area that colleagues were asked to consider when reviewing the survey instrument was criterion validity – does the "scale logically appear to be accurately reflecting what was intended to be measured" (Zikmund, 1994, p. 290). The colleagues all agreed that the initial questions put forward were appropriate given Zikmund's statement.

After receiving the initial feedback from Victoria University colleagues, the survey instrument was then tested on 49 third year undergraduate tourism students at the university. It was explained to the students that the purpose of the pilot test was to seek

feedback on how the design of the instrument could be improved. It took students approximately 10 minutes to complete the survey.

This exercise proved very useful and several suggestions were taken on board for the final survey instrument. The changes to the questionnaire as a result of the pilot test included:

- the removal of a redundant question;
- a reduction in the use of technical terms such as adaptation and mitigation;
- the addition of a glossary at the end of the questionnaire; and
- a picture was added to the front page to improve its visual appearance and clearly indicate the Surf Coast region.

8.4 Sampling Method and Selection

Sampling is a technique used by researchers when circumstances or constraints prevent an entire population from being studied (Veal, 1997). Since not all visitors to the Surf Coast region could be surveyed, a sample of this population was selected. Therefore, in this case, due to time and cost constraints, a sample of all visitors to the region was surveyed. Quantitative researchers attempt to select a sample that is representative of the broader population by using probability sampling techniques (Neuman, 2006). However, in social sciences, achieving such representativeness is difficult due to an absence of a specific list, or sampling frame that allows for a more representative sample of the population to be drawn. If a sample is not representative of the target population, it is described as biased (Veal, 1997). It is acknowledged that achieving a representative sample presented a significant challenge due to the geographic size of the Surf Coast region and the lack of any detailed list of visitors to the region.

This research utilised a mix of purposive and convenience sampling in order to complete the survey process. In purposive sampling locations/cases are chosen based on the researcher's own knowledge of what is appropriate to the study (David & Sutton 2004). Purposive sampling was used to specifically target tourists visiting the Surf Coast region. Consequently, the VICs and the WTA tours were both chosen as they were expected to produce data relevant to the topic under investigation

(Denscombe2007). This provided a more economical and efficient manner of conducting the surveys. Convenience, availability and opportunity were all other considerations in the sampling process. The sampling techniques chosen were suitable for making contact with a relatively high number of visitors to the region, in a relatively short period of time. It is acknowledged this sampling technique may lead to results that are not generalisable to the population, however, this was deemed appropriate as this research formed part of a larger study, which is mainly exploratory in nature (Zikmund, 2003), and due to time and financial limitations (David & Sutton 2004).

For the questionnaires administered at the VICs, a pragmatic approach was taken, whereby respondents were asked at random upon entering the centre. Once the questionnaire was completed and checked for completeness, then the next person to enter the VIC was approached. The interviewer was conscious of not selecting respondents based on variables such as age or gender.

The sample from the WTA coaches included a range of domestic and international respondents on one-day tours of the Great Ocean Road. Since the aim of convenience sampling is easy access, each of the visitors on the coach was given the opportunity to complete the questionnaire. Although respondents on the coaches may not be representative of all visitors to the Surf Coast region, this approach enabled a large number of questionnaires to be administered economically and in a timely fashion.

The data collection methods, as discussed previously, somewhat limited the researcher's ability to attain a completely representative sample. This was highlighted by the high proportion of international respondents surveyed during this phase of the research. However, as the tourist surveys only represented one construct of the RTAF model and international tourists are considered important, high yield customers for the region (Tourism Victoria, 2009d), this information remained relevant. Furthermore, representative samples are not the aim of exploratory case-studies such as this; instead the aim was to develop further understanding of the phenomenon under investigation (Neuman, 2006; Yin, 1993).

8.4.1 Time, Location and Method of Questionnaire Completion

The surveys were administered on WTA coaches during the months of October and November 2010. The on-site data collection occurred at Lorne visitor information centre (VIC) on Saturday the 23rd of October and Sunday the 24th of October 2010 and at Torquay VIC on Saturday the 6th of November and Sunday the 7th of November 2010.

8.5 Analysis and Discussion

Initially, the total of 268 respondents will be described as one group. By doing this, a general understanding of the entire Surf Coast sample can be gained. This section will start by examining the demographics of the sample obtained, followed by a section comparing these results with information provided by Tourism Victoria. Following this there will be a detailed analysis of the remaining sections of the questionnaire, those being:

- the respondents familiarity with the Surf Coast and climate change;
- the respondents environmental worldview (NEP); and
- the respondents opinion of specific climate change adaptation options.

General hypotheses derived from the initial analysis will then be tested using various statistical techniques to determine if there are significant between-groups differences.

8.5.1 Sample Obtained

The following section will provide descriptive information related to the Surf Coast sample. This information was collected in the final section of the questionnaire titled “About You”. This section will provide general information, including frequencies and percentages, for the following demographic variables:

- gender;
- age;
- nationality;
- residence (if Australian); and
- education.

Following this there will be a brief section that compares the results of the Surf Coast sample with data from Tourism Victoria’s (2009b) market profile for the Great Ocean

Road. This comparison is conducted to explore the representativeness of the Surf Coast sample.

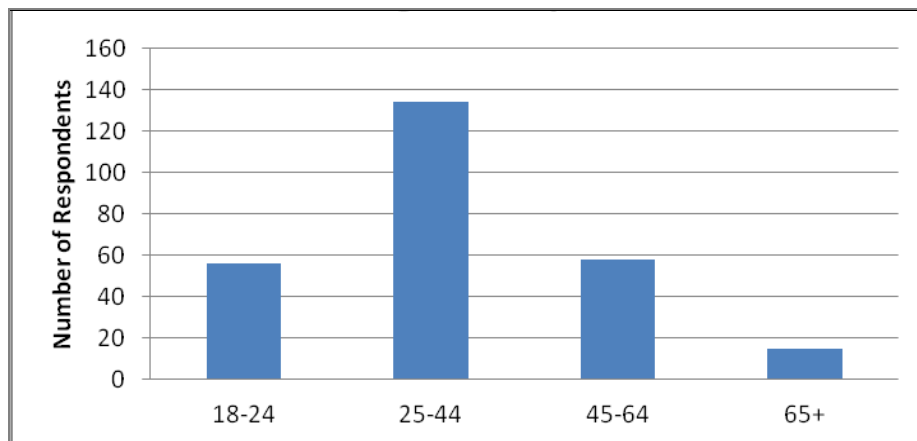
8.5.1.1 Gender

A total of 264 of the Surf Coast sample (n = 268) responded to the question on gender with 109 of these being male and 157 female. This equates to 41% of the sample being male and 59% of the sample being female.

8.5.1.2 Age

In total, 263 of the tourists surveyed responded to the question on age, with the average age of visitors being 36.25 years old. Figure 8.2 provides a graphical representation of visitors to the Surf Coast by age group. The categories used for grouping respondents were chosen as they match those used by Tourism Victoria, whose research is used later in this chapter as a means of comparison.

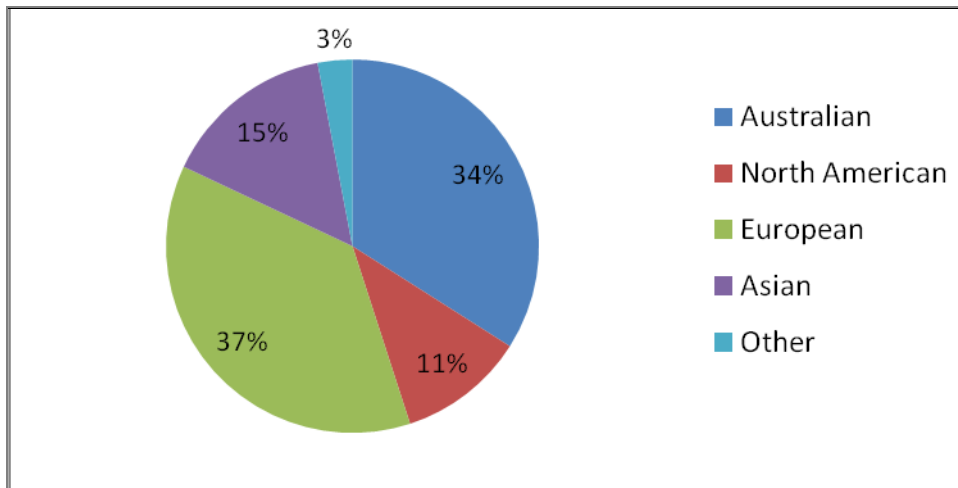
Figure 8.2 Age group of respondents



8.5.1.3 Nationality

The Surf Coast sample represented tourists from 31 different countries including Australia. However, for ease of analysis, the data on nationality of visitors was re-coded into 4 regions; Australia, North America, Europe and Asia. Figure 8.3 presents the breakdown of nationality by region, and showed that the majority of respondents were European (36.9%) and Australian (33.6%), followed by visitors from Asia (14.6%) and North America (10.4%).

Figure 8.3 Nationality (region) of all respondents

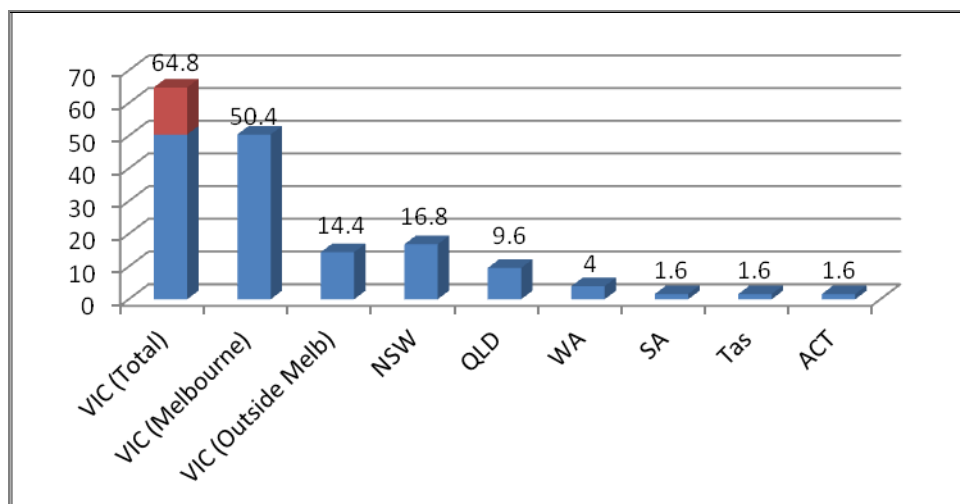


A further breakdown of international respondents showed that the majority of international respondents were from Europe (57%), which includes the United Kingdom, followed by Asia (22%) and North America (16%). Tourists presented in the 'Other' region included visitors from South Africa, New Zealand and Brazil and they represented only 5% of the sample.

8.5.1.4 Residence (if Australian)

Domestic tourists were also asked to nominate their place of residence. The vast majority of visitors were Victorian (64.8%), with 50.4% of those visitors being from Melbourne and 14.4% from outside Melbourne. Outside of Victoria, the largest domestic source markets were New South Wales (16.8%) and Queensland (9.6%). Figure 8.4 shows the state of residence for domestic visitors to the Surf Coast; and demonstrates the dominance of the intrastate market.

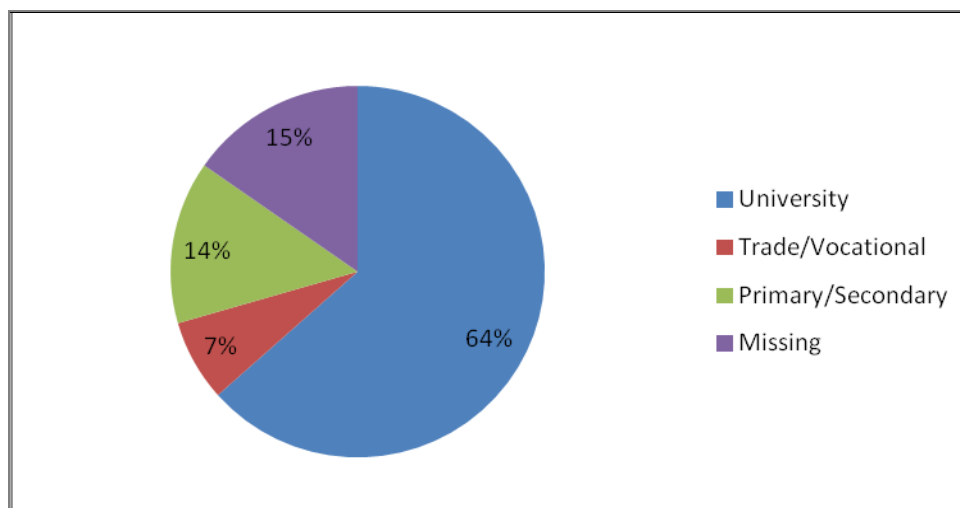
Figure 8.4 Residences of domestic visitors



8.5.1.5 Education

Respondents were asked to indicate their highest level education. Of the sample, the vast majority had completed a university/tertiary degree (40%) or a postgraduate degree (32.3%). The education level of tourists was also recoded to simplify the responses and to avoid any international discrepancies, particularly in regard to the terms university/tertiary degree and postgraduate degree. This was done as several respondents signified confusion regarding these two terms, and how they translated to the terms used in their country of origin. Consequently, two groups were combined and simply recoded as 'University'. For ease of analysis, the groups 'Primary/Some Secondary' and 'Secondary' were also combined to form the group 'Primary/Secondary'. The 'Trade/Vocational' segment remained unchanged. The percentages of the recoded education levels are presented in Figure 8.5.

Figure 8.5 Education levels of respondents, recoded



8.5.2 Comparative Analysis

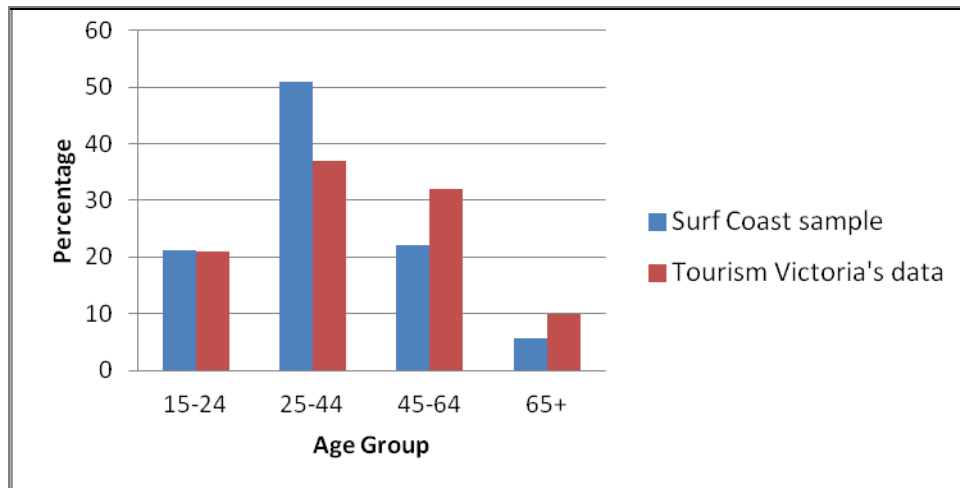
To help determine how representative the Surf Coast survey was, the following section will compare and contrast these findings with the results of Tourism Victoria's 2008 market profile for the Great Ocean Road (Tourism Victoria, 2009b). Tourism Victoria provides fact sheets that summarise the latest tourism data for Victoria's 11 campaign regions (Tourism Victoria, 2010b). They include information on domestic and international visitor numbers, visitor expenditure and domestic visitor profiles such as origin, purpose of visit, visitor activities, travel party and accommodation used (Tourism Victoria, 2010b). The Tourism Victoria data was chosen as it provides a reliable source for comparison and because it is the most recent study conducted in the Great Ocean Road region, of which the Surf Coast is a major section. This comparison was conducted in order to help corroborate the findings of the Surf Coast surveys and also to identify any contradictions that may be apparent. As discussed in Section 8.4, this comparison with the existing data from Tourism Victoria provides a degree of concurrent validity. Concurrent validity is a measure of how well the data compares to previously validated data from a similar time (Zikmund, 2003).

8.5.2.1 Age Comparison

Figure 8.6 compares the Surf Coast sample and Tourism Victoria's figures in terms of age group. Overall, the two samples are very similar. Those aged 25-44 represent the largest group in both samples; however this group is slightly larger in the Surf Coast

sample, representing 51% of total visitors in comparison to 37% for Tourism Victoria's figures. The figures are reversed for the next largest group, those aged 45-64, with this group representing 31% in Tourism Victoria's sample and only 22.1% in the Surf Coast sample.

Figure 8.6 Age group comparisons



8.5.2.2 Nationality Comparison

The number of international tourists in the Surf Coast sample represented 64.9% of the total sample. Tourism Victoria (2009b) states that 12% of visitors to the Great Ocean Road are international. Therefore, it appears that international visitors are overrepresented in the Surf Coast sample. One reason for this occurrence could be the implementation of around half the surveys (51.9%) on bus tours of the Great Ocean Road. Indeed, it would also be safe to assume that domestic tourists are much more likely to have access to their own vehicles, rather than relying on coach transportation. A cross-tabulation displaying actual and expected counts showed that Australians were dramatically under-represented on the tour buses (expected count = 45.7 versus actual count = 19). An analysis using Pearson's correlation coefficient indicates a statistically significant linear relationship between data source and nationality ($\chi^2 = 66.347$, $df = 6$, $p = 0.00$).

A further reason international tourists are highly represented, may be because they are more likely to go to a visitor information centre than domestic tourists. This could be

because they are less likely to have visited the region previously and/or have less knowledge of the activities and attractions on offer.

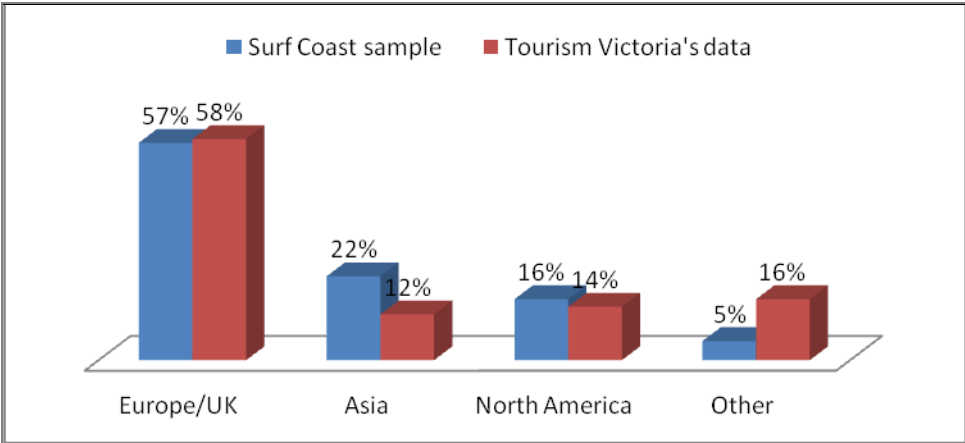
A t-test was conducted to investigate the relationship between prior visitation to the Surf Coast and self-reported knowledge of the touristic attraction, and activities available in the region. Perhaps surprisingly, the results of this test showed no significant difference between respondent's who had visited the region before and those who had not ($t = 1.510$, $df = 263$, $p = 0.132$). This suggested that prior visitation to the region did not necessarily indicate greater knowledge of the touristic attractions and activities available in the region.

Despite an overrepresentation of international visitors in the Surf Coast sample, for pragmatic reasons no further data collection was sought. Whilst cooperation with WTA and the VICs had allowed access to a consistent flow of tourists, attaining a higher percentage of domestic tourists would have proved more challenging and possibly required the adoption of different data collection methods. Furthermore, the tourist survey represented only one part of the overall data collection involved in this study, and consequently due to time and resource constraints the number of questionnaires completed was deemed to be sufficient. As such, for the remainder of this study the VIC and WTA samples are combined and discussed as one group.

A further justification for the use of this sample was the value of the international data collected. Tourism Victoria (2009d, p. 9) state that international visitors represent "some long-term opportunities" and could potentially prove valuable during off-peak periods (e.g. mid-week/shoulder seasons) which could have a positive impact on overall yield for regional Victoria. Furthermore, 70 percent of tourism expenditure growth in Victoria, over the next decade, is predicted to come from international visitation (Tourism Victoria, 2009d). Given that the Great Ocean Road region is the fastest growing tourism region in Victoria outside Metropolitan Melbourne (www.parkweb.vic.gov.au, 2009), the value of the data collected on international visitors should not be underestimated. Tourism Victoria (2009d, p. 31) state that the region is integral to the realisation of "increased international visitation and nature-based tourism" which is a key aim of Tourism Victoria's Regional Tourism Action Plan (2009-2012).

Tourism Victoria provided the most recent profile of visitors to the GOR region and was part of a reputable State government study (Tourism Victoria 2009b). Figure 8.7 compares the nationality (region) of international tourists in the Surf Coast sample with the statistics provided by Tourism Victoria (2009b). In general, these findings were consistent, with both samples clearly displaying that the largest source market for international tourists is Europe (including the UK).

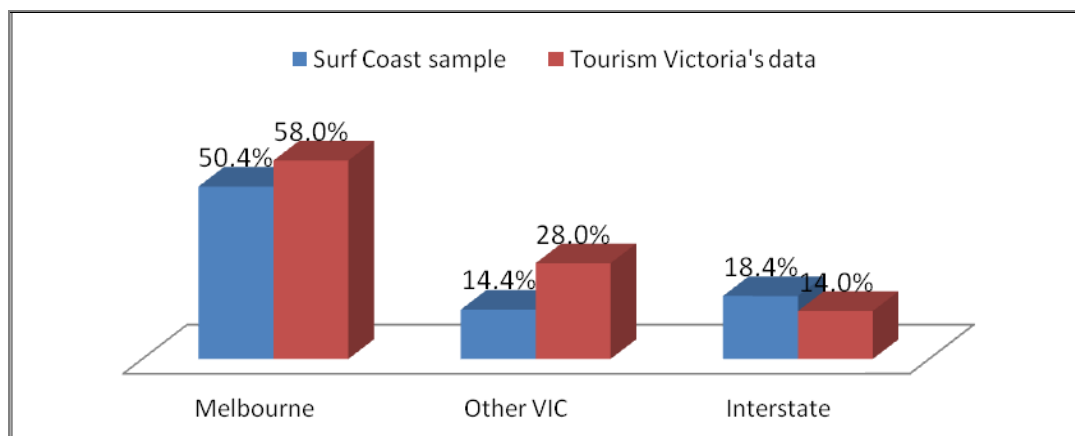
Figure 8.7 Nationality (region) comparisons of international tourists



8.5.2.3 Residence comparison (if Australian)

Figure 8.8 compares the state of residence for domestic tourists in the Surf Coast sample with Tourism Victoria's statistics for the Great Ocean Road. Again, the results of both studies are comparable, with 54% of the Surf Coast sample and 58% of the Tourism Victoria data indicating Melbourne as the major source market. However, there does appear to be some difference in terms of the number of visitors from Victoria, living outside of Melbourne, with Tourism Victoria's data indicating a larger percentage of visitors from this region.

Figure 8.8 Comparison of domestic tourists' residence



8.6 Reliability and Validity

According to Bashir, Afzal, and Azeem (2008, p. 36), “The most important issue in research is to ensure reliability and validity”. The following section will discuss the reliability and validity of the measure used to survey tourists visiting the Surf Coast region. According to Veal (1997, p. 35), “reliability relates to the extent to which research findings would be the same if the research were to be repeated at a later date or with a different sample of the subjects”. As this is a study of human beings, who despite any commonalities remain heterogeneous, it therefore cannot be said that the results from this sample will necessarily be consistent with another sample of respondents taken at a different time, or at different locations throughout the Surf Coast region. However, it is believed that the sample provides an accurate representation of the total population and can be viewed as generating a good understanding of visitors to the region. The population for this study is defined as all domestic and international visitors to the Surf Coast region.

Statistical reliability of the NEP was also tested using Cronbach’s alpha coefficient. This test measures the internal consistency reliability among a group of items combined to form a single scale (Luck, 2003). The coefficient can range from 0 to 1, with 0 indicating a completely unreliable test, and 1 indicating a completely reliable test; a score greater than 0.69 is generally considered acceptable (Hawcroft & Milfont, 2009). Table 8.3 illustrates that of all the identified studies using Cronbach’s alpha as an indicator of internal reliability, only one study by Uysal et al. (1994), failed to justify

the use of the NEP. In this study, Cronbach's alpha for both the ecocentric (pro-environmental) items and the anthropocentric (anti-environmental) items were 0.748 and 0.713 respectively, confirming the internal consistency of the NEP scale.

Table 8.3 Comparison of reliability, Cronbach's Alpha

Sample	Reliability (Cronbach's alpha)
Dunlap and Van Liere (1978)	0.813 & 0.758
Albrecht, et al. (1982)	0.66 & 0.78
Noe and Snow (1990)	0.61–0.71
Uysal, <i>et al.</i> (1994)	0.454; 0.699; 0.706
Lück (2000)	0.7756
Carmody (2007)	0.87

Source: Adapted from (Luck, 2003).

Reliability is a precursor to validity; indeed a measure cannot be valid unless it is reliable (Zikmund, 1994). Validity is defined by Veal (1997, p. 35) as “the extent to which the information collected by the researcher truly reflects the phenomenon being studied”. Clark-Carter (2004) discusses four checks for validity including face validity, content validity, construct validity and criterion-based validity. The use of these four measures in regards to the Surf Coast tourist survey will now each briefly be discussed.

Face Validity – This refers to the perception that people being measured, or the people administering the measures, have of the measure being used (Clark-Carter, 2004). In this study the questionnaire used was extensively pilot-tested, first with three academic colleagues and then 49 students at Victoria University. Whilst minor amendments were made to the measure after the pilot-tests, there was a general consensus that the survey being used was valid. The apparent face validity of the survey was used as an initial indicator of validity; however, it did not guarantee that the test actually measured the phenomena at hand. Consequently, further checks of validity were conducted.

Content Validity – This is similar to face validity in that it is a non-statistical measure of validity. Zikmund (2003, p. 302) describes content validity as “the subjective agreement among professionals that a scale logically appears to reflect accurately what it purports to measure”. Clark-Carter (2004) suggests that one way to check content validity is to ask experts in the field whether a measure covers the range that they would expect. Again, the content validity of this study was addressed by a process of peer review and

the survey instrument was scrutinised by both students and colleagues at Victoria University.

Construct Validity – Refers to the extent to which the implementation of a construct does actually measure what the theory says it does. An important example of construct validity for the survey instrument used in this study involved the use of the NEP. Whilst it is acknowledged that other measures of environmental attitudes are available, the NEP was deemed to be an appropriate tool for the measurement of environmental attitudes, as it is the most widely used environmental attitude scale used in tourism research (Luck, 2003).

Criterion-Related Validity – This addresses the question of whether a measure fulfils particular criteria. Clark-Carter (2004) discusses two types of criterion-related measures of validity; concurrent validity and predictive validity. For this survey, the concurrent validity is shown through a comparison of the survey results from a similar study conducted by Tourism Victoria (2009b). As discussed in Section 8.5.2, the demographic results of the Surf Coast survey are largely consistent with Tourism Victoria's study on visitors to the Great Ocean Road. Whilst it is acknowledged that the number of international respondents in the Surf Coast sample is not representative of the entire population, the breakdown of international visitors in terms of age, nationality and residence was very similar to the existing measure.

8.7 Statistical Analysis

This section of the chapter will provide analysis and discussion of the results from the remaining three sections of the questionnaire, namely:

- respondents' familiarity with the Surf Coast and climate change;
- respondents' environmental worldview (NEP); and
- respondents' opinion of specific climate change adaptation options.

This involves the analysis of inferential statistics to enable generalisable claims to be made regarding the findings. Numerous statistical tests were conducted including the chi-square test, the t-test and analysis of variance. A chi-square test was used to identify statistically significant linear relationships between sets of data. This test determines a

connection between sets of data by comparing what was expected and what was actually observed, to determine if we can have confidence in the significance of the relationship (David & Sutton, 2004; Denscombe, 2007) . This test is used to determine whether we can accept or reject various hypotheses explored in this chapter. However, it should be noted that the test only identifies if there is a significant relationship and does not identify the direction or strength of the relationship (David & Sutton, 2004).

A series of independent t-tests were carried out to determine any significant differences between diverse sets of data. This test compares the means and standard deviations of the two data sets to inform the researcher of the likelihood that the differences are due to chance (Blakie, 2003; Denscombe, 2007). To see if more than two groups were significantly related a one-way analysis of variance (ANOVA) was also conducted. This test analyses the variation within and between groups of data using a comparison of means (Denscombe, 2007). Again, this test is used to accept or reject a hypothesis. If the null hypothesis is rejected then it is concluded that the interaction between the various sets of data is significant (Veal 1997). Whilst other statistical tests were considered, the chosen analysis was determined to be appropriate given the objectives of the research and the size of the sample. Where appropriate, charts and figures are also used to illustrate the results of the statistical analysis.

8.7.1 Respondents Familiarity with the Surf Coast and Climate Change

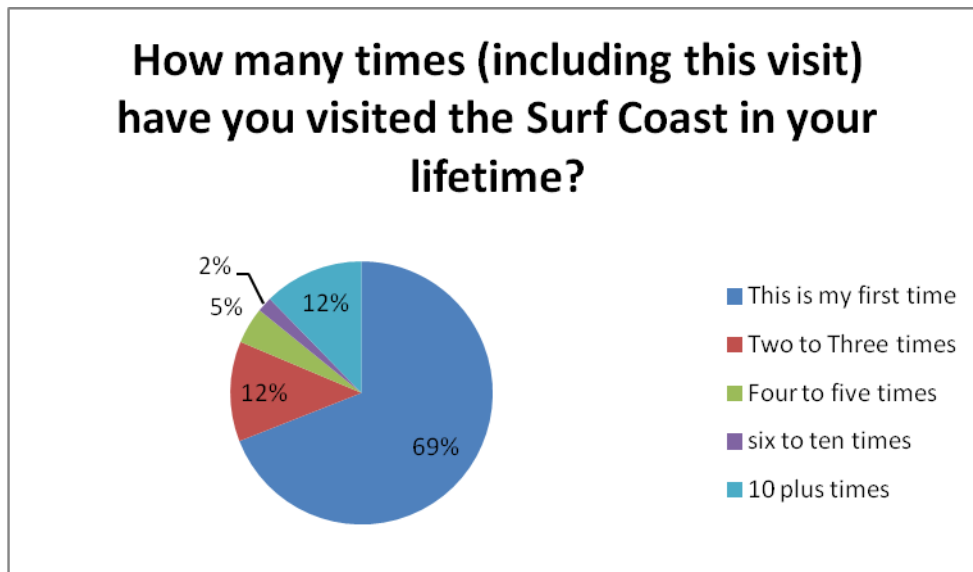
This section outlines the findings in regard to tourists' knowledge of the Surf Coast region and climate change. Each of the questions in this section will be discussed separately and graphics provided to illustrate the results for the entire sample.

Q1. How many times – including this visit – have you visited the Surf Coast in your lifetime?

Figure 8.9 shows that most of the respondents were first time visitors to the Surf Coast region. However, a substantial proportion (12%) had visited the region more than 10 times, indicating that the destination is a popular place to return for many people. This is in line with what Ritchie and Crouch (2003, p. 191) discuss as “the return to a single destination experience” whereby “a certain segment of the travel market eschews all the

glamour of international travel and simply wishes to return to a comfortable destination repeatedly”. Such tourists enjoy the familiarity they have with the destination and often return to the same location, at the same time, every year.

Figure 8.9 Number of times respondents had visited the Surf Coast region



Q2. Are you currently on a one-day bus tour?

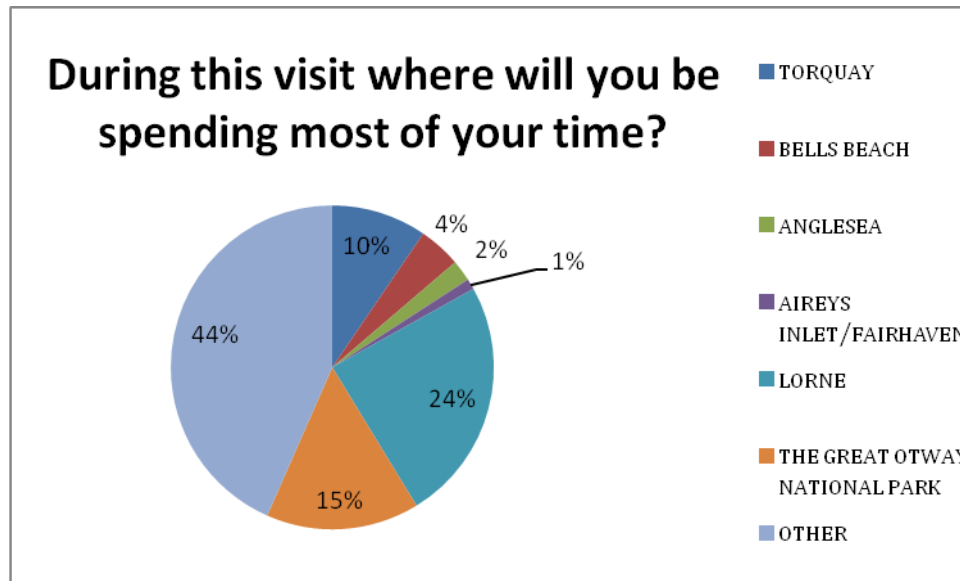
As discussed in Section 8.6.2 it was decided to combine the VIC and WTA coach samples for the remainder of the analysis. Therefore information relating directly to this question is not discussed.

Q3. During this visit where will you be spending most of your time?

Figure 8.10 shows that the majority of tourists who responded to this question stated ‘Other’. The next most popular responses were Lorne (24%), The Great Otway National Park (15%) and Torquay (10%). Figure 8.15 shows that 51% of respondents who replied ‘Other’ to this question did not specify where they were likely to be spending the majority of their time. This could have been because they had not yet decided, or because they were simply travelling through the region, and not staying in one particular destination for a prolonged period. The latter argument is further supported by the high number of respondents (29%) who specified that the ‘other destination’ they would be spending the majority of their time at was in fact the Great Ocean Road

(GOR) itself. This further emphasises the importance of the GOR as an attraction in itself.

Figure 8.10 Where tourists will be spending the majority of their time



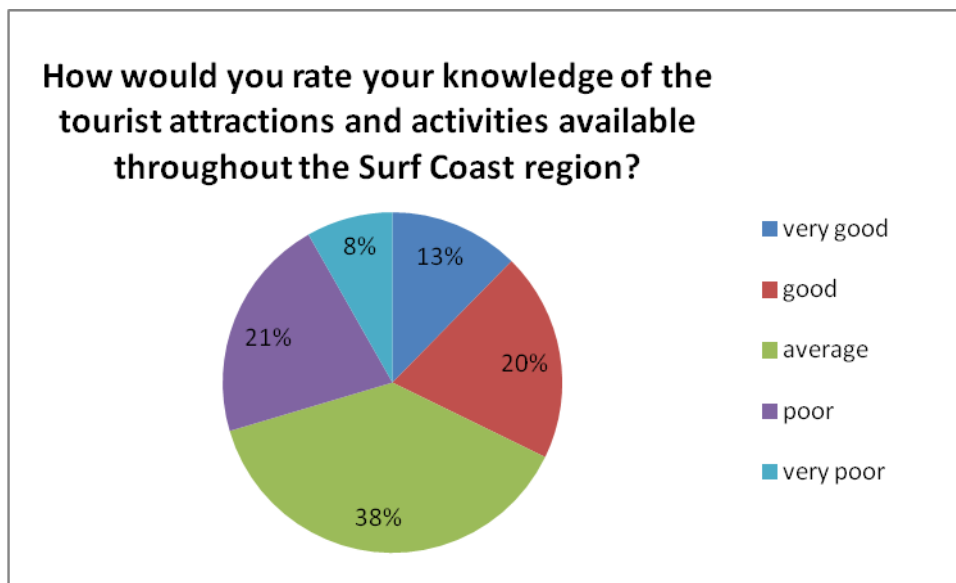
The current section has looked at whether respondents had visited the Surf Coast region previously and asked where they intended to spend the majority of their time whilst in the region. The next section will examine respondents' knowledge of the Surf Coast, as well as their knowledge of climate change and adaptation. It is expected that respondents will purport to have a greater knowledge of climate change in general than climate change adaptation in particular. Also, the research aimed to explore whether respondents with more or less knowledge of these issues will have differing opinions of the proposed adaption options.

Q4. How would you rate your knowledge of tourist attractions and activities available throughout the Surf Coast region?

A 5-point Likert-style scale was used to measure respondents' knowledge of the attractions and activities available throughout the Surf Coast region. The range was from 1 (very good) to 5 (very poor). However, these figures were reverse coded so that a higher mean score indicated a higher level of understanding. The mean score for the entire sample was 3.07, indicating that in general the respondents had an 'average' understanding of the touristic offerings throughout the Surf Coast. Figure 8.11 further

illustrates the large proportion of respondents who claimed to have only an average knowledge of the attractions and activities available throughout the Surf Coast, with only 13% of respondents answering ‘very good’ and only 8% answering ‘very poor’. Interestingly, the 13% that rated their knowledge of the tourist attractions and activities throughout the Surf Coast as ‘very good’ appeared to be aligned with the 12% of respondents who stated that they had visited the region more than ten times. However, a statistical analysis found no significant difference between first-time visitors and those who had visited the Surf Coast before. This was in contradiction to previous research that claimed that repeat visitors are destination-aware tourists who are knowledgeable of the range of activities available (Lau & McKercher, 2004).

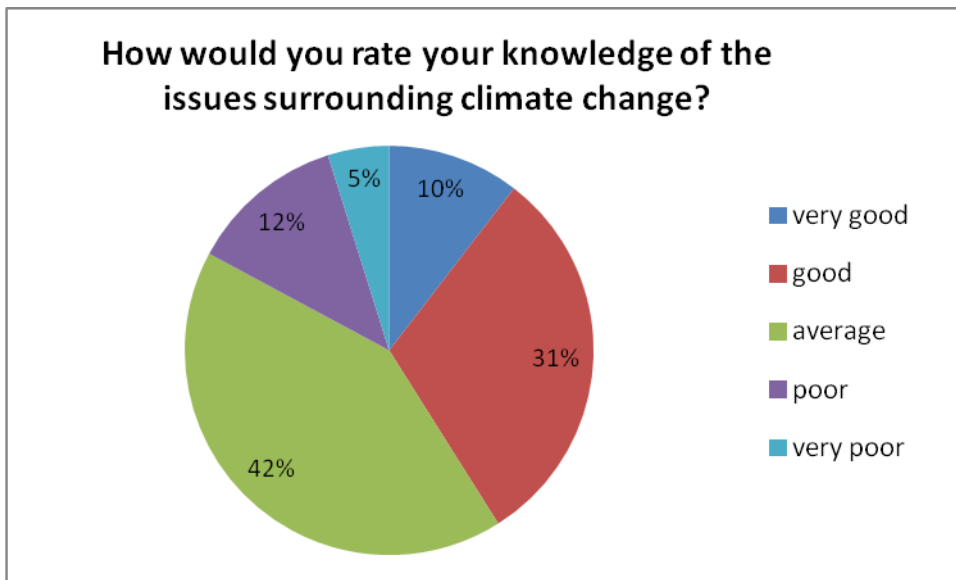
Figure 8.11 Respondents knowledge of tourist attractions and activities throughout the Surf Coast region



Q5. How would you rate your knowledge of the issues surrounding climate change?

A five-point likert-scale was once again used to determine respondents' understanding of the issues surrounding climate change. Once more, these figures were reverse coded so that a higher mean score indicated a higher level of understanding. The average score for the entire sample was 3.29, indicating that respondents believed they had an average to good understanding of the general issues surrounding climate change. Figure 8.12 illustrates that 42% of respondents indicated an average understanding of the issues surrounding climate change and 31% indicated a ‘good’ understanding.

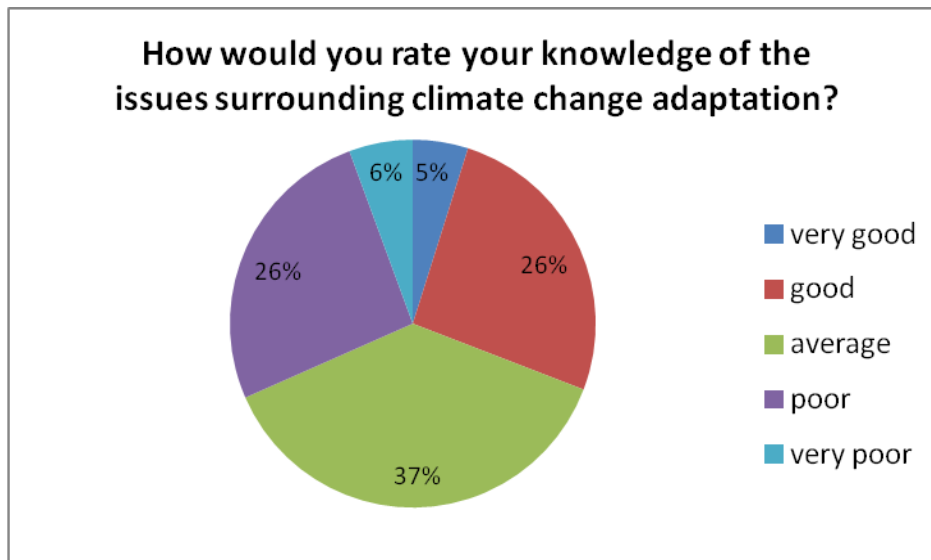
Figure 8.12 Respondents general understanding of climate change



Q6. How would you rate your knowledge of the issues surrounding climate change adaptation?

In terms of respondents' knowledge of the issues surrounding climate change adaptation, the mean score for the entire sample (reverse-coded) was 2.99, with the majority of respondents (37%), claiming to have an average understanding of the issues surrounding climate change adaptation. Figure 8.13 also illustrates a very even spread of responses across the scale with 32% of respondents claiming to have a poor or very poor knowledge of climate change adaptation and 31% of respondents claiming to have good or very good knowledge of these issues.

Figure 8.13 Respondents general understanding of climate change adaptation



From these initial findings it is apparent that respondents, in general, have a greater level of understanding of the general issues surrounding climate change (mean = 3.29) than they do of for issues surrounding climate change adaptation (mean = 2.99). Whilst this does not necessarily represent greater knowledge of mitigation options as opposed to adaptation measures, it does indicate that respondents' knowledge of climate change adaptation could be improved. Whilst the technical term 'mitigation' was purposefully left out of the questionnaire, it may have been useful to include, to get an idea of respondents understanding of mitigation in comparison to adaptation.

Furthermore, the questions related to respondents' knowledge of climate change and adaptation only report on their perceived knowledge of these issues and without further questioning these responses can only be taken at face value. Indeed, it is possible that many respondents do not have an understanding of the difference between climate change mitigation and climate change adaptation, and that their responses indicate an awareness of these issues, rather than a comprehensive understanding.

8.7.2 Environmental Worldview

This section provides some preliminary information on the environmental worldview of respondents using the NEP scale. Background information on the origins of the NEP and its use in tourism research are provided in Section 3.13 of this thesis.

Descriptive statistics for the NEP are shown in Table 8.4. The eight odd-numbered items in the scale indicate pro-environmental (ecocentric) questions, whilst the seven even-numbered items indicate anti-environmental (anthropocentric) questions. Consequently, a mean score of above 3.0 for the pro-environmental items (in bold) signifies that the respondent tends to have a positive environmental worldview and a mean score above 3.0 for the anti-environmental items signifies an anthropocentric worldview. For this study, the results showed a mean score above 3.0 for each of the pro-environmental items. In particular, the most highly evaluated pro-environmental items were “Plants and animals have just as much right to exist as humans” and “Despite our special abilities humans are still subject to the laws of nature” both achieving a mean score above 4.0, indicating that the majority of respondents strongly agreed with these statements.

The results for the anti-environmental questions garnered a mixed response with two of the seven items “The earth has plenty of natural resources if we just learn how to develop them” and “Human ingenuity will ensure that we do not make the earth unliveable” scoring a mean above 3.0, whilst the other five items all scored a mean below 3.0. The greater level of agreement on the pro-environmental items indicates that visitors’ to the Surf Coast have a generally pro-environmental, or ecocentric, worldview. Table 8.5 summarises the mean scores for each NEP item in this study and indicates whether these item represents a generally ecocentric or anthropocentric attitude.

Table 8.4 Detailed results of NEP for the Surf Coast sample

Do you agree or disagree that:	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean
We are approaching the limit of the number of people the earth can support	2.6	15.3	28.7	41.8	11.6	3.44
Humans have the right to modify the natural environment to suit their needs	17.5	38.1	21.3	20.5	2.6	2.53
When humans interfere with nature it often produces disastrous consequences	1.1	10.1	16.8	48.9	23.1	3.83
Human ingenuity will ensure that we do not make the earth unliveable	5.2	26.2	32.2	32.2	4.1	3.04
Humans are severely abusing the environment	1.1	10.4	14.6	47.4	26.5	3.88
The earth has plenty of natural resources if we just learn how to develop them	4.1	10.4	16.8	47	21.6	3.72
Plants and animals have just as much right to exist as humans	0	4.1	7.5	40.7	47.8	4.32
The balance of nature is strong enough to cope with the impacts of modern industry	15.7	51.5	19.4	10.8	2.6	2.33
Despite our special abilities humans are still subject to the laws of nature	0.7	4.9	10.1	60.1	24.3	4.02
The so called ecological crisis facing mankind has been greatly exaggerated	15.4	40.4	27.3	14.6	2.2	2.48
The earth is like a spaceship with very limited resources and room	3	16	23.1	44.8	13.1	3.49
Humans were meant to rule over the rest of nature	28.8	38.6	19.5	11.2	1.9	2.19
The balance of nature is very delicate and easily upset	0.4	7.5	15.3	54.9	22	3.91
Humans will eventually learn enough about how nature works to be able to control it	11.2	34.7	26.1	23.9	4.1	2.75
If things continue on their current course, we will soon experience a major ecological catastrophe	1.9	10.1	20.5	44	23.5	3.77

Note: Pro-environmental (ecocentric) items are highlighted in bold.

Table 8.5 Mean scores for various NEP items and the associated indicator of ecocentric or anthropocentric attitudes amongst the Surf Coast sample

Do you agree or disagree that:	Mean	Indication of ecocentric/anthropocentric attitude
We are approaching the limit of the number of people the earth can support	3.44	Ecocentric
Humans have the right to modify the natural environment to suit their needs	2.53	Ecocentric
When humans interfere with nature it often produces disastrous consequences	3.83	Ecocentric
Human ingenuity will ensure that we do not make the earth unliveable	3.04	Anthropocentric
Humans are severely abusing the environment	3.88	Ecocentric
The earth has plenty of natural resources if we just learn how to develop them	3.72	Anthropocentric
Plants and animals have just as much right to exist as humans	4.32	Ecocentric
The balance of nature is strong enough to cope with the impacts of modern industry	2.33	Ecocentric
Despite our special abilities humans are still subject to the laws of nature	4.02	Ecocentric
The so called ecological crisis facing mankind has been greatly exaggerated	2.48	Ecocentric
The earth is like a spaceship with very limited resources and room	3.49	Ecocentric
Humans were meant to rule over the rest of nature	2.19	Ecocentric
The balance of nature is very delicate and easily upset	3.91	Ecocentric
Humans will eventually learn enough about how nature works to be able to control it	2.75	Ecocentric
If things continue on their current course, we will soon experience a major ecological catastrophe	3.77	Ecocentric

To calculate a total NEP score for individual respondents, each of the anti-environmental items were reverse coded to align all of the items on the NEP scale from anti-environmental to pro-environmental. This process created a theoretical minimum score of 15, indicating a very strong anthropocentric worldview, and a theoretical maximum of 75, indicating a very strong ecocentric worldview. The minimum NEP score for this sample was 36 (lowest level of environmental concern) and the maximum score 75 (highest level of environmental concern). The top and bottom quartiles were then taken to represent the anthropocentric and ecocentric groups, with the remainder of the sample (the middle 50%) labelled mid-centrics. The scores for the anthropocentric group ranged from 36 to 47, whilst the mid-centrics ranged from 48 to 58, and the ecocentrics ranged from 59 to 75.

The mean score for the entire sample was 53.22 which is consistent with previous research. For example, Carmody (2007) found the mean of the NEP score for a sample of specialist accommodation operators in North Queensland was 54.5. This study also

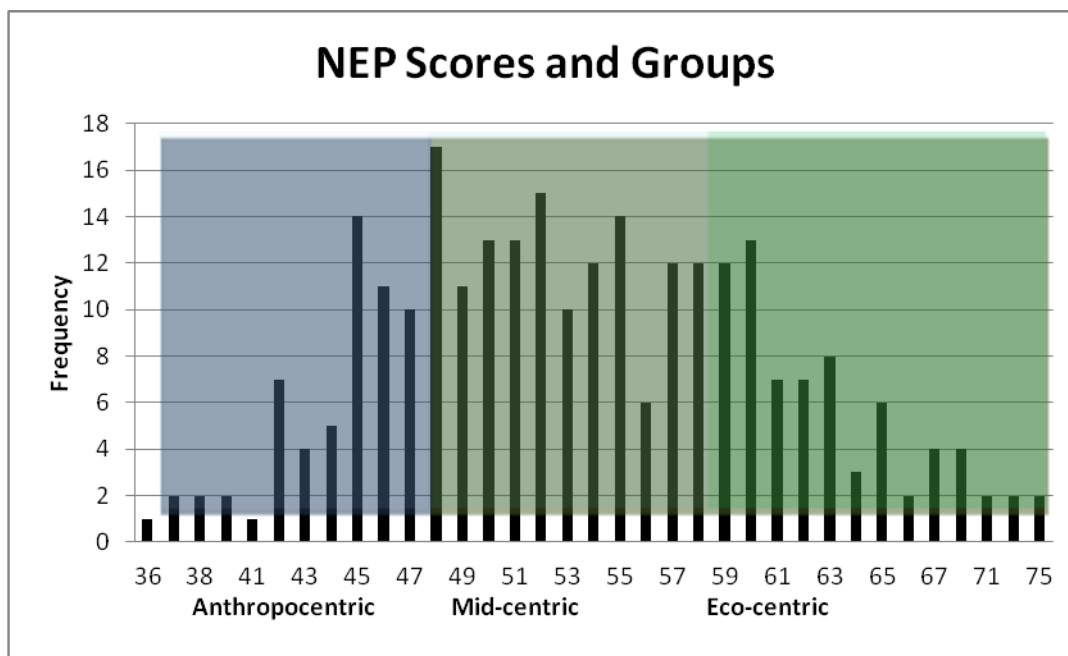
utilised quartiles to determine three classifications of environmental concern and the results were very similar. Table 8.6 shows a detailed comparison between these two studies, and an earlier study by Floyd Jang and Noe (1997). The comparison demonstrates that the results of this study are consistent with previous research, using the same methodology.

Table 8.6 Comparison of NEP classifications

Study	Anthropocentric low NEP group	Mid-centric moderate NEP group	Ecocentric high NEP group	Mean for entire sample
Jopp (2010)	<47	48-58	>59	53.22
Carmody (2008)	<46	47-60	>60	54.5
Floyd et al. (1997)	<46	47-61	>62	n/a

Figure 8.14 shows the spread of NEP scores and respondent's classification as anthropocentric, mid-centric or ecocentric. The following sections will provide a description of the characteristics of each of these groups.

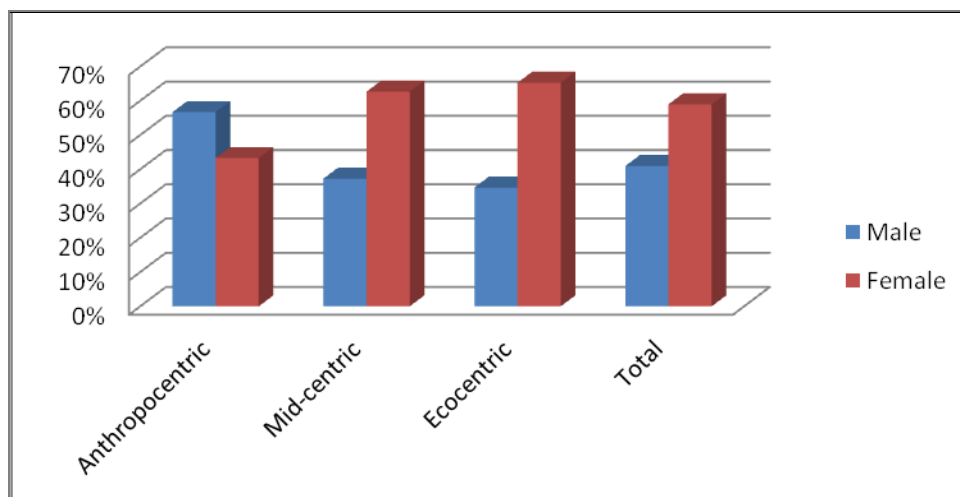
Figure 8.14 NEP score for Surf Coast sample



8.7.2.1 NEP Group and Gender

Although males only represented 41% of the total sample, they represented 56.7% of the anthropocentric group (Figure 8.15). In comparison, females represented 59% of the total sample, 62.7% of the mid-centric group and 65.3% of the ecocentric group. Therefore the results indicated that males in this sample tended to have a more anthropocentric worldview and females a more ecocentric worldview. This is consistent with previous studies, including research by Mair (2011) on tourist's carbon-offsetting behaviour, which found that 60% of anthropocentric respondents were male and 56.1% of ecocentric respondents were female.

Figure 8.15 Gender of NEP group members



To test whether gender played a significant role in determining the environmental worldview of respondents, an independent samples t-test was conducted to investigate the following hypothesis:

H1: There is a relationship between gender and respondents' environmental worldview.

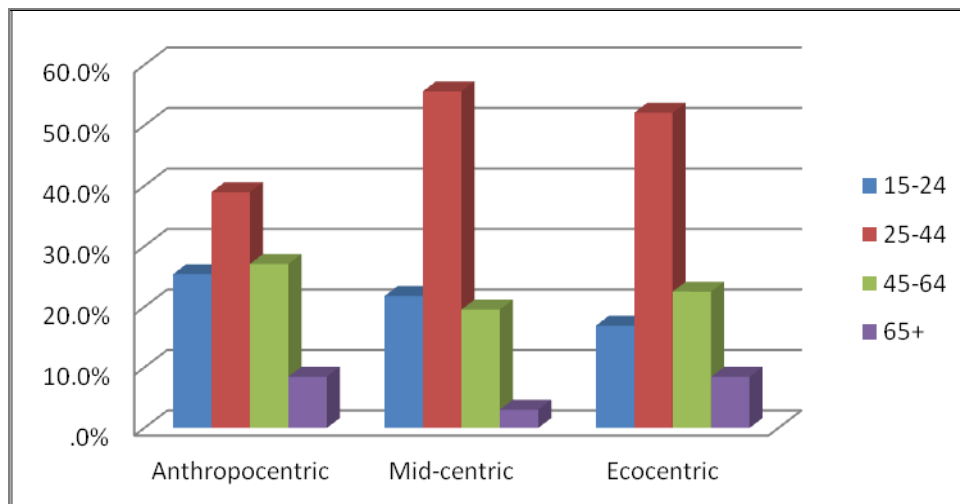
The results showed a significant difference ($t = -2.166$, $df = 264$, $p = 0.031$) between males and females, with females scoring significantly higher NEP scores (mean = 54.25) compared with males (mean = 51.87). Consequently, women in this sample were judged to be more ecocentric than men, therefore we can accept H1 and reject the null hypothesis. This is consistent with other research that investigated the relationship

between gender and environmental attitudes (Deng, Walker, & Swinnerton, 2006; C. Y. Johnson, Bowker, & Cordell, 2004; Luo & Deng, 2008). For example, Johnson, Bowker, and Cordell (2004, p. 180) stated that “women generally show more environmental concern than men” and found that “women were more likely than men to score higher on the NEP”.

NEP Group and Age Group

Figure 8.16 shows that the most common age group for all the NEP groups is 25-44. The spread of ages across the three NEP groups appears to be fairly consistent, with perhaps the only exception being the slight underrepresentation of the 25 to 44 year old age group in the anthropocentric group (expected count = 30.1, actual count = 23). This lower than expected count was distributed evenly amongst the other age groups.

Figure 8.16 Age of NEP group members



In order to test whether age played a significant role in determining respondent’s environmental worldview, the following hypothesis was tested:

H2: There is a relationship between age group and respondents’ environmental worldview.

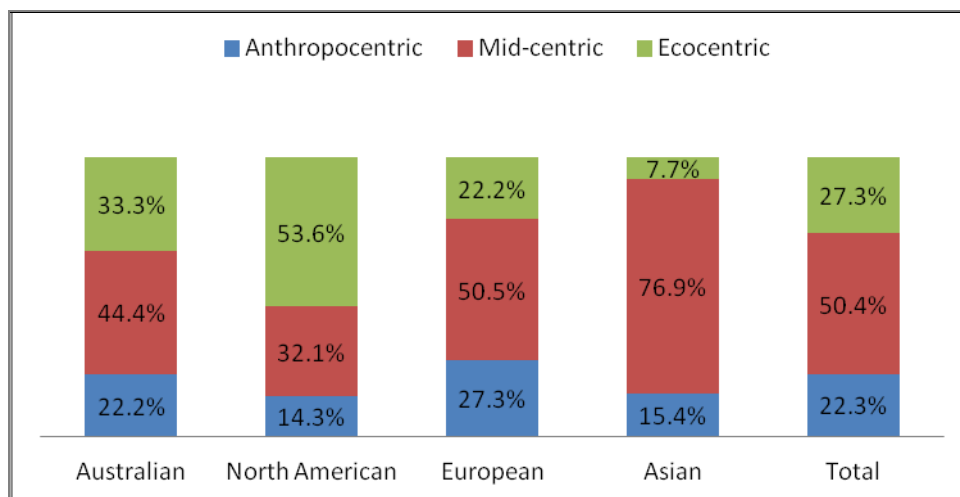
A one-way analysis of variance (ANOVA) was conducted to determine whether there was a between-groups difference with age as the grouping variable. The results showed no significant relationship ($f = 0.769$, $df = 3$, $p = 0.512$) between the NEP group and age group, therefore the null hypothesis must be accepted and it can be said that age plays

no significant role in determining respondent's environmental worldview. This is somewhat surprising as previous research has consistently found younger groups to have more pro-environmental attitudes than older groups (Dunlap et al., 2000; Hawcroft & Milfont, 2009).

8.7.2.2 NEP Group and Nationality

Figure 8.17 shows the proportions of different NEP groups for respondents from different regions. The total column illustrated that most respondents (50.4%) do not hold either an ecocentric or anthropocentric worldview; rather they fit into the mid-centric category. It appears that respondents from Australia, and in particular North America, tended to be more ecocentric than those from other regions. In contrast, the Europeans had a higher percentage of anthropocentric respondents than other regions, whilst respondents from Asia had a strong central tendency, with 76.9% being categorised as mid-centric.

Figure 8.17 NEP group and nationality, region



The following hypothesis was developed to further test the relationship between the nationality of respondents (region) and their environmental worldview (NEP Group).

H3: There is a relationship between nationality (region) and respondents' environmental worldview.

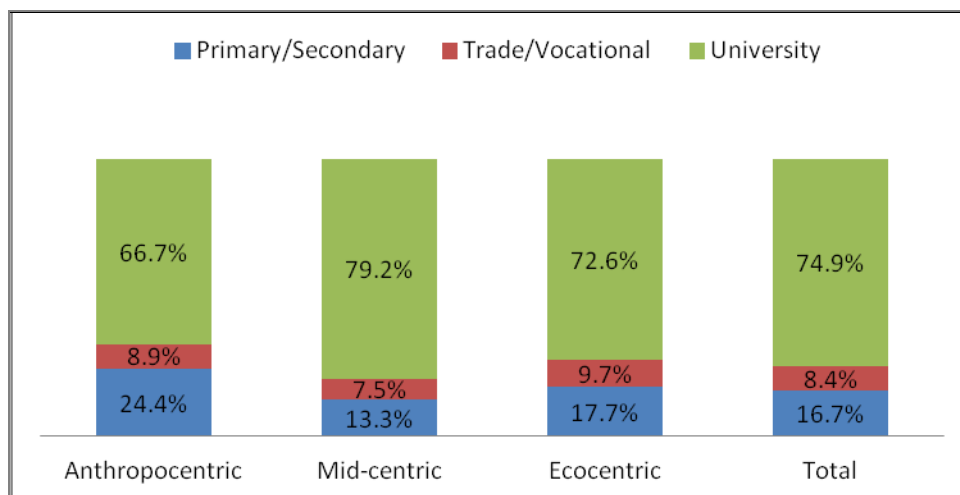
A one-way analysis of variance was conducted to determine whether NEP classifications differed depending on the nationality (region) of the respondent. This test showed a significant between group difference ($f = 3.646$, $df = 3$, $p = 0.13$) significant at the 0.05 level. A significant difference was shown between North American respondents (mean = 2.39) and European respondents (mean = 1.95), therefore we can confirm H3 and reject the null hypothesis. These findings support the initial assumptions and it can be said that nationality (region) does have an effect on the NEP classification of respondents.

Previous studies that looked at the effect of nationality or ethnicity also found significant differences between groups (Deng et al., 2006; C. Y. Johnson et al., 2004). Deng et al. (2006, p. 24) discuss the long tradition Chinese culture has of holding an “ecocentric or bio-spheric worldview, whereas Western cultures share a history of an anthropocentric worldview”. However, this hypothesis was not supported by their research (Deng et al., 2006). This initial assumption that Chinese will have a more ecocentric worldview is also contradicted by the findings of this study, where North Americans scored highest on the NEP. Whilst it is recognised that the Asian classification used in this study does not represent a wholly homogenous group, it can be assumed that those of Asian ethnicity do share many traits.

8.7.2.3 NEP Group and Education

Figure 8.18 illustrates the education levels of respondents from different NEP groups. The total column on the right of the figure shows that the majority of respondents (74.9%) had some form of university qualification. Whilst the initial findings do not show any obvious differences between the education levels of respondents from different NEP groups, those in the anthropocentric group appear to have a slightly lower percentage of people with university qualifications and a higher percentage of people whose highest level of education is primary or secondary school.

Figure 8.18 NEP group and education



Previous studies (Deng et al., 2006; Hawcroft & Milfont, 2009; Luo & Deng, 2008) have consistently found that higher levels of education are positively related to higher NEP scores. To explore this theory, the following hypothesis was tested:

H4: There is a relationship between respondents' level of education and their environmental worldview.

To test this hypothesis, a one-way analysis of variance (ANOVA) was conducted. The test showed no significant relationship ($f = 0.277$, $df = 2$, $p = 0.758$) between NEP group and education level. Therefore we can accept the null hypothesis and say that in this sample, education plays no significant role in determining respondent's environmental worldview.

8.7.2.4 NEP Group and knowledge of climate change and adaptation

Previous studies have found that environmental education or interpretation can positively influence visitors' environmental attitudes (Luo & Deng, 2008). Therefore, environmental education or levels of knowledge regarding environmental issues, such as climate change, may motivate people to visit destinations that promote and/or practice environmentally friendly behaviour. Consequently, the following hypotheses were developed to determine whether respondent's knowledge of climate change and adaptation were related to their environmental worldview (NEP).

H5: There is a relationship between respondents' knowledge of climate change and their environmental worldview.

H6: There is a relationship between respondents' knowledge of climate change adaptation and their environmental worldview.

To test these hypotheses, two separate ANOVA tests were conducted. An initial test was done to determine any significant difference between NEP groups and their knowledge of climate change. A significant difference was found ($f = 3.741$, $df = 2$, $p = 0.025$) between the ecocentric and mid-centric groups. Ecocentrics rated their knowledge (mean = 2.46), compared to mid-centrics with mean = 2.84, signifying that those with a stronger environmental worldview actually thought they knew less about climate change issues than the other groups. Whilst this result is somewhat surprising, it could suggest that ecocentrics have a greater understanding that there may be gaps in their knowledge when it comes to climate change.

There was no significant difference between respondents from different NEP groups and their knowledge of issues surrounding climate change adaptation ($f = 1.574$, $df = 2$, $p = 0.436$). This result may indicate a lack of awareness across the board when it comes to climate change adaptation.

A summary of the hypotheses used to identify significant between-group differences in relation to the NEP are provided in Table 8.7. The results show that the mean NEP scores were significantly different depending upon gender, nationality (region) and knowledge of issues surrounding climate change.

Table 8.7 Summary of hypotheses for NEP

Hypothesis	T or F value	Df	Sig. (p value)	Significant difference in mean results between groups
H1: There is a relationship between gender and respondents environmental worldview.	-2.166	264	0.031	Yes
H2: There is a relationship between age group and respondent's environmental worldview.	0.769	3	0.512	No
H3: There is a relationship between nationality (Region) and respondent's environmental worldview.	3.646	3	0.013	Yes
H4: There is a relationship between respondent's level of education and their environmental worldview.	2.77	2	0.758	No
H5: There is a relationship between respondents knowledge of climate change and their environmental worldview.	3.741	2	0.025	Yes
H6: There is a relationship between respondents knowledge of climate change adaptation and their environmental worldview.	1.574	2	0.436	No

Note: The mean difference is significant at the 0.05 confidence level.

8.7.3 Respondents' Opinion of Specific Climate Change Adaptation Options

This section provides information regarding respondents' opinions of specific climate change adaptation options developed during the Delphi study. Respondents were asked to rate how a range of specific adaptation options would affect their decision to return to the Surf Coast region. Seven of the eleven adaptation options identified by the expert panel were tested with the consumer. This was done for brevity reasons and because the omitted options were deemed unlikely to have a direct effect on the consumer decision-making process. The omitted adaptation options were future planning, communication with tourism stakeholders, further determine climate change vulnerability and monitor tourist behaviour.

Again, a 5-point Likert scale was used, whereby a score of 1 represented a highly negative effect and a score of 5 represented a highly positive effect. Table 8.8 a shows each of the adaptation options and their mean score. The higher the mean score, the more positive respondents are towards that adaptation option. Therefore the adaptation options are presented in order of how positive they would be in influencing return visitation to the Surf Coast region.

Table 8.8 Respondents opinions of specific adaptation options

Adaptation option	Early warning systems for extreme events	Fire breaks/controlled burning	Retreating	Construct sea walls/coastal defence systems	Close beaches	Construct artificial reefs	Make the GOR one way
Mean	3.91	3.34	3.16	3.14	3.11	2.88	2.52

The results show that respondents had a somewhat positive opinion for five of the seven adaptation options. However, the response was more positive towards the implementation of ‘Early warning systems for extreme events’ (mean = 3.91) and ‘Fire breaks/Controlled burning’ (mean = 3.34), with ‘Retreating’, ‘The construction of sea walls and/or coastal defences’, and ‘Closing beaches’ all receiving less positive results. The adaptation options ‘Construct artificial reefs’ (2.88) and ‘Make the GOR one way’ (2.52) were the only two options to achieve a mean score below 3, indicating a generally negative attitude towards these adaptations. This may indicate that the implementation of either of these options would have a negative impact on destination appeal and potentially lead to a reduction in visitor numbers. Overall, there were no adaptation options that received a mean score indicating a highly negative or highly positive effect on respondents’ decision to return to the Surf Coast, with all mean scores being between 2 and 4. It is acknowledged that this may be the result of a central tendency bias, as discussed in Section 8.2.1.

8.7.3.1 Tests of significance – Prior visitation to the Surf Coast and opinions of adaptation options

H7: There is a relationship between prior visitation to the Surf Coast and respondents’ opinions regarding specific adaptation options.

To simplify the analysis of this hypothesis, the responses to the question ‘How many times – including this visit – have you visited the Surf Coast in your lifetime?’ were re-coded into 2 groups: those who had visited the Surf Coast previously (n = 83), and those who had not (n = 185). There has been significant previous research which examines the differences between first-time and repeat visitors (Lau & McKercher, 2004; McKercher & Wong, 2004; Reid & Reid, 1994). First-time visitors are described as “destination

naïve” (Lau & McKercher, 2004, p. 279), and therefore it was deemed appropriate to investigate if prior visitation to the Surf Coast region impacted on respondents’ opinions regarding adaptation.

A series of independent t-tests were carried out to determine the relationship between prior visitation to the Surf Coast and respondents’ opinions regarding specific adaptation options. A significant difference was found ($t = -2.107$, $df = 264$, $p = 0.036$) between first time visitors to the Surf Coast (mean = 3.84) and those who had visited previously (mean = 4.06), and their opinions regarding early warning systems for extreme events. Although both groups felt positively towards the potential adaptation, those who had visited the region previously had a significantly higher opinion of this adaptation option. One explanation could be that people who had visited the region previously were more aware of its vulnerability to extreme events, and consequently saw the value in providing appropriate early warning systems. Whereas, first-time visitors established their expectation based on external sources such as tourism suppliers, the internet or word of mouth, and as such their understanding of the region’s climate change vulnerability was likely to be relatively low. No significant relationships were evident for any of the other adaptation options.

8.7.3.2 Tests of significance – Age Group and opinions of specific adaptation options

H8: There is a relationship between the age of respondents and their opinions regarding specific adaptation options.

Previous studies have stressed that age is negatively correlated with participation in environmental issues, because older people may not live to benefit from the long-term gains of preserving resources (Barber, Taylor, & Strick, 2010; Carlsson & Johansson-Stenman, 2010). As the effects of climate change and indeed the benefits of adaptation are often long term, it was decided to determine whether age plays a significant factor in respondents’ opinions on adaptation.

To test if a significant relationship existed between respondents' age (group) and their preference for specific adaptation options, a one-way analysis of variance (ANOVA) was carried out. A significant difference ($f = 4.445$, $df = 3$, $p = .005$) was found for the adaptation option 'Firebreaks/Controlled Burning'. A Sheffe post hoc test showed a significant difference between respondents aged 18-24 (mean = 2.96) and respondents aged 25-44 (mean = 3.43) and 45-64 (mean = 3.48) indicating that respondents in the 18 to 24 year old age group were significantly less positive towards this adaptation option. There is no obvious reason for this result and these findings are in contradiction to previous research into age and environmental attitudes and behaviour (Barber et al., 2010; Carlsson & Johansson-Stenman, 2010; Hawcroft & Milfont, 2009). However, it could be speculated that younger respondents are more concerned about the short-term impact of such adaptations on flora and fauna and/or the risk of controlled burns becoming 'out of control'. This was the situation at Wilsons Promontory National Park, also in Victoria, in April 2005 where a controlled burn broke its lines which lead to the fire burning 1920 hectares of the park and the evacuation of 600 people (Russell, 2005).

8.7.3.3 Tests of significance – Nationality (region) and opinions of specific adaptation options

H10: There is a relationship between the nationality (region) of respondents and their opinions regarding specific adaptation options.

Due to the recognition of international visitors as a significant export industry, it was deemed appropriate to investigate any significant differences between domestic and international visitor's opinions of the proposed adaptation options. To test if a significant relationship existed between the nationality of respondents and their preference for specific adaptation options, a one-way analysis of variance (ANOVA) was carried out. A significant difference amongst the groups was found for the following 2 adaptations:

1. Fire Breaks/Controlled Burning ($f = 5.787$, $df = 3$, $p = 0.001$)

A Sheffe post hoc test showed a significant difference between respondents from Australia (mean = 3.60), and those from North America (mean = 2.89) and Europe (mean = 3.21). These results indicated that Australians were significantly more positive towards this adaptation than the other groups. One possible explanation for this could be the increased awareness amongst domestic respondents, in particular those from Victoria, of the risk posed by bushfire since the 2009 'Black Saturday' bushfires which were estimated to have destroyed in excess of 3500 structures, claimed over 200 lives and displaced more than 7500 people (Walters & Clulow, 2010).

2. Make the GOR one-way ($f = 4.205$, $df = 3$, $p = 0.006$)

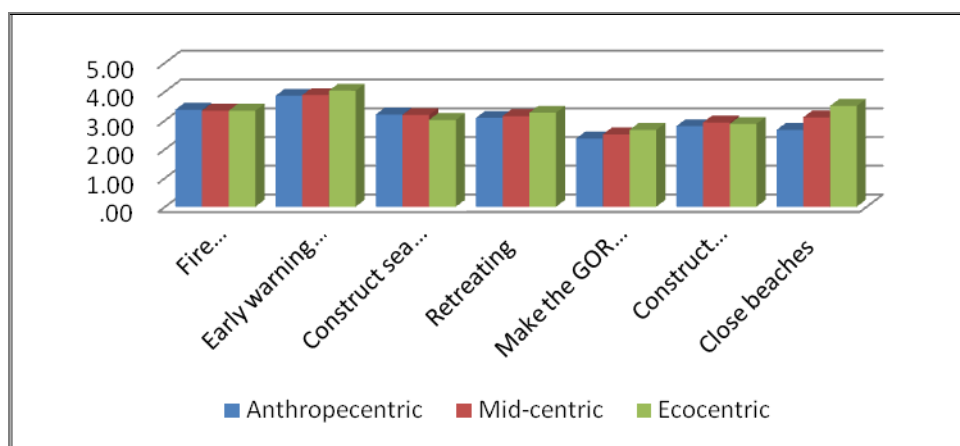
A Sheffe post hoc test showed a significant difference between respondents from Australia (mean = 2.29) and those from Asia (mean = 2.87), indicating that Asians were significantly more positive towards this adaptation option than Australians.

One possible reason for Asian respondents' more positive opinion of this adaptation could be that they more frequently travel on coach tours as part of a package holiday. This is supported by the findings in the most recent International Visitor Survey (Tourism Research Australia, 2011), which found that Japanese and Chinese visitors represented the highest number of international package tour visitors. Such tours of the GOR region often take a circular route on what is called the 'The Great Southern Touring Route'. As discussed in Section 6.2.6, this particular tour incorporates a 'loop' where buses travel west along the Great Ocean Road, north through the Grampians National Park, before returning to Melbourne via the Goldfields region of Ballarat (Australian Government, 2010). Therefore, the ability for such coach tours to travel in both directions along the GOR may not be such an important factor for this type of tourist. Conversely, it was previously discussed that domestic visitors' are more likely to use their own cars when travelling to/from the Surf Coast region, and consequently making the GOR one way would considerably restrict their touring options.

8.7.3.4 Tests of significance: NEP Group and opinions of specific adaptation options

Figure 8.19 compares the mean scores for each of the adaptation options using the NEP groups, keeping in mind that a score of 1 indicates a highly negative opinion of the potential adaptation and a score of 5 indicates a highly positive opinion. An initial review of the mean score shows very little variance in the scores between NEP groups, with the exception of the potential option to ‘close affected beaches’, with ecocentrics appearing to be more positive about this adaptation, particularly in comparison with the anthropocentric group.

Figure 8.19 Mean scores for adaptation options for each NEP group



In order to test for mean differences between NEP groups in regard to specific adaptation options, a one-way analysis of variance was conducted to test the following hypothesis:

H11: There is a relationship between respondents' environmental worldview (NEP group) and their opinions regarding specific adaptation options.

The results showed a significant difference ($f = 11.306$, $df = 2$, $p = 0.000$) between the mean scores of different NEP groups for the adaptation option to ‘close affected beaches’. The mean results for each NEP group, shown in Table 8.7, display a clear trend from anthropocentric (mean = 2.66), through mid-centrics (mean = 3.10), to ecocentrics (mean = 3.50). This indicated that ecocentric respondents have a

significantly more positive opinion of this adaptation option when compared to the other NEP groups.

One possible explanation for this result could be that ecocentric respondents are more willing to give up the amenity that the beach provides in terms of providing a pleasant space for activities such as swimming, surfing or sun-bathing. In comparison, mid-centric and anthropocentric respondents may see this amenity as essential to their touristic experience and not necessarily associate their use of the beach with any potentially negative consequences. This would be in line with item 3 on the NEP scale 'When humans interfere with nature it often produces disastrous consequences'. As a pro-environmental statement, it is suggested that those with an ecocentric worldview would be more likely to agree with this statement. Likewise, those with an ecocentric worldview may have a greater understanding of the potential harm they may have on the environment should they visit beaches that are already effected by climate change impacts such as sea-level rise, storm surge and coastal erosion.

No other significant between-group differences were found for any of the remaining adaptation options.

8.7.3.5 Tests of significance: Gender and knowledge of climate change and adaptation

As gender was a differentiating factor in the NEP classification, further tests were conducted to determine any relationship between gender and respondents' knowledge of both climate change in general and climate change adaptation.

H12: There is a relationship between the gender of respondents and their self-reported knowledge of issues surrounding climate change.

An independent samples t-test was initially carried out to check for gender difference in respondents' knowledge of the issues surrounding climate change. A significant difference was found ($t = -2.130$, $df = 261$, $p = 0.034$) between males and females, with females scoring significantly higher for this question. The mean score for women was 2.80 compared with a mean score of 2.55 for men. Therefore, women in this sample considered themselves more knowledgeable than men, in regards to the issues

surrounding climate change. Therefore we can reject the null hypothesis and say that there is a relationship between gender and self-reported knowledge of climate change.

H13: There is a relationship between the gender of respondents and their self-reported knowledge of issues surrounding climate change adaptation.

An independent samples t-test was then carried out to check for gender difference in respondents' knowledge of the issues surrounding climate change adaptation. A significant difference ($t = -2.517$, $df = 261$, $p = 0.012$) was again found between males and females, with female respondents also scoring significantly higher for this question. The mean score for females was 3.13 compared with males mean score of 2.84. Therefore, women in this sample also consider themselves to be more knowledgeable than men when it comes to the issues surrounding climate change adaptation.

The results of the hypotheses H7 to H13 are summarised in Table 8.9. The table identifies the areas where significant differences between groups were identified in relation to specific adaptation options (H7-H11), and gender and knowledge of climate change and adaptation (H12-H13).

Table 8.9 Summary of hypotheses results for specific adaptation option and gender

Hypothesis	T or F Value	df	Sig. (p Value)	Significant difference in mean results between groups
H7: There is a relationship between prior visitation to the Surf Coast and respondents opinions regarding specific adaptation options.	T = - 2.107	264	0.036	Yes (for the option to implement 'early warning systems for extreme events')
H8: There is a relationship between the age of respondents and their opinions regarding specific adaptation options.	F = 4.445	3	0.005	Yes
H10: There is a relationship between the nationality (region) of respondents and their opinions regarding 'Fire Breaks/Controlled Burning'.	F = 5.532	3	0.001	Yes
H10: There is a relationship between the nationality (region) of respondents and their opinions regarding 'Construct Sea Walls/Coastal Defence Systems'.	F = 3.739	3	0.012	Yes
H10: There is a relationship between the nationality (region) of respondents and their opinions regarding 'Making the GOR one-way'.	F = 4.077	3	0.008	Yes
H11: There is a relationship between respondents' environmental worldview (NEP group) and their opinions regarding specific adaptation options.	F = 11.306	2	0.000	Yes (for the option to 'Close affected beaches')
H12: There is a relationship between the gender of respondents and their knowledge of issues surrounding climate change.	T = - 2.130	261	0.034	Yes
H13: There is a relationship between the gender of respondents and their knowledge of issues surrounding climate change adaptation.	T = - 2.517	261	0.012	Yes

Note: The mean difference is significant at the 0.05 level.

8.8 Discussion

Stage 4c of the RTAF model focuses on tourist opinions regarding potential adaptation options. For this case-study, this involved conducting a survey to determine tourist's opinions of the adaptation options developed during the Delphi process. The consumer (tourist) has been identified as a vital ingredient in destination competitiveness and sustainability and their opinion regarding potential adaptation options is an important consideration in the overall adaptation process. Tourists have been shown to have a relatively high degree of adaptive capacity (Scott & Jones, 2006), and therefore the implications of any adaptation option on destination appeal and consumer satisfaction must be considered.

The results of this study demonstrate that adaptation has the potential to influence consumers' opinion of a destination and their choice of destination. This survey represents the first of its kind to focus on tourists opinions regarding specific adaptation options, and provides the first look at how adapting to climate change may impact on destination choice. An interesting extension of this study would be to evaluate the impact of any implemented adaptation options on destination appeal and indeed visitor numbers.

To gain a better understanding of consumers' views on specific adaptation options, a tourist survey was conducted whereby respondents were asked their opinion of various adaptation options. To gain an enhanced picture, survey respondents were also segmented using both demographic and psychographic means. This enabled the creation of more homogenous groups which allowed for statistical analysis to determine any between-group differences. This survey results showed that there were some significant differences between different groups when it came to the various hypotheses. These results are useful for predicting how the implementation of various adaptation options is likely to impact on different visitor segments. The following section summarises the findings discussed in this chapter and recommends the preferred adaptation options for various groups.

An initial analysis was done of the opinion of the entire sample regarding the seven specific adaptation options tested in the survey. In total, five of the seven adaptation options were considered positively, with only the construction of artificial reefs for surfing or diving and the option to make the GOR one-way receiving negative opinion ratings. The options to implement early warning systems for extreme events and firebreaks and/or controlled burning, received the most positive responses. However, scores for the adaptation options all ranged between two and four, which indicated that respondents held neither a strongly positive or strongly negative opinion towards any of the proposed adaptations.

Overall, the sample demonstrated the most positive opinion towards the adaptation option to develop early warning systems for extreme events. These events could be fires, floods, or severe storms, or indeed any other form of man-made or natural disaster. The potential to implement such a system clearly exists, as similar systems

were developed after the Black Saturday bushfires in Victoria to warn people via mobile phones of impending fire danger. Further analysis also showed that prior visitation, age and nationality all played a significant role in determining respondents' opinions of the adaptation options presented.

Prior visitation to the Surf Coast region had a significant influence on respondents' opinions regarding the implementation of early warning systems for extreme events, with those who had visited the region previously having a significantly more favourable attitude towards this adaptation option than those who had not. A possible reason for this distinction could be that respondents who have visited the region previously are more aware of the vulnerability of the region to extreme weather events such as floods, storm surge and bushfires. Many of these respondents who had visited the region on frequent occasions were also Australian and therefore were more likely to have been exposed to education and awareness campaigns regarding bushfires in particular.

Using age as the grouping factor, it was determined that there was a between-groups difference when it came to the option regarding firebreaks and controlled burning. Interestingly, the younger age group (18-24) showed a less favourable attitude towards this adaptation option than the older age groups (25-44 and 45-64). Whilst there is no obvious rationale for this result, it could be possible that the younger age group hold greater concerns concerning the impact of 'controlled burns' on native flora and fauna, and in particular the risk of such fires becoming 'out of control burns'.

When nationality was used as a grouping variable, several surprising results were discovered. Fire breaks and controlled burning again features, with Australian respondents proving to be significantly more positive towards this adaptation than those from Asia, North America or Europe; whilst Asian respondents were significantly more positive towards the option to make the GOR one-way than any of the other group. It would be safe to presume that Australian respondents understand the necessity for fire risk reduction techniques, such as controlled burning and fire breaks, as the memories of Victoria's disastrous 'Black Saturday' bushfires were still fresh in their minds. However, why Asian tourists would be more positive towards making the GOR one-way is less obvious. It could be suggested that because many of them are travelling on

coach tours that follow the Great Southern Touring Route, the benefit of being able to travel in both directions is not given as much importance.

When examining the opinions of different NEP groups towards various adaptation options, it was perhaps a little surprising that very little variance between-groups was found. In fact, the only adaptation to generate a significantly different between-groups result was the option to close beaches that are affected by sea-level rise, storm surge and/or erosion. Here it was discovered that ecocentric respondents were significantly more positive towards this option than the other groups. It could be argued that ecocentric respondents are more willing to 'give up' the amenity that the beach provides in terms of recreational activities, whereas respondents from the other groups see beaches as an essential component of their Surf Coast experience.

As well as gathering information on respondent's opinions regarding adaptation, the survey also allowed for data collection and analysis in many other areas. As discussed throughout the chapter, respondents were asked to indicate what they perceived to be their familiarity with climate change, climate change adaptation and the Surf Coast region. In addition to this, respondents were asked a range of demographic questions. It was found that overall; respondents considered that they had only an average understanding of the issues surrounding climate change and even less understanding of the issues surrounding adaptation. This demonstrated a need for further education and awareness when it comes to the role of climate change adaptation. The results also highlight the importance of gathering information before making a decision regarding adaptation. The results of this study would be useful not only for guiding the adaptation process, but also for the providers of tourism information. For example, tourism operators and visitor information centres could use the information gained to tailor the information they provide to specific groups of tourists.

Prior visitation to the Surf Coast was also used as a grouping variable to determine any between-groups differences in regards to the various adaptation options. Despite all groups responding positively towards the adaptation option involving early warning systems for extreme events, there was a significant difference between first-time visitors and those who had visited the region previously, with the latter group reporting a more positive opinion of this adaptation. As discussed, this may be due to the fact that

respondents who had visited the region previously had greater knowledge of the vulnerability of the region to bushfire and coastal deterioration.

Finally, the research also showed that females considered themselves to be significantly more knowledgeable than males in regards to the issues surrounding both climate change and climate change adaptation. The varying degrees of knowledge visitors proclaim to have regarding climate change and adaptation present significant managerial and marketing challenges for destination managers. For example, destination managers would need to be careful not to assume all visitors have the same level of understanding regarding climate change impacts and the need for adaptation, and this would impact upon decisions regarding marketing campaigns and the development of on-site interpretation and signage.

8.9 Conclusion

The literature review established that all regions are likely to be affected by climate change to some extent and that adaptation will be required to cope with these changes. In addition to mitigation efforts, adaptation is now widely accepted as necessary in reducing climate change vulnerability. However, previous to this research, there has been no evaluation of how the consumer may respond to adaptation. Given that tourism is a consumer driven industry and that we know tourists have a relatively high degree of adaptive capacity, particularly in terms of destination choice, this research provides important insight into the attitudes of tourists towards adaptation. Not only is an overall picture of tourists' preferences provided, but segmentation has allowed for analysis of differences between various segments. This is important because this allows specific marketing and promotional campaigns to be targeted to specific target markets.

This section has described the findings from the consumer survey and analysed respondents' opinions regarding adaptation. The following chapter will now analyse these results in conjunction with the findings from the Delphi study to provide practical recommendations regarding adaptation for the Surf Coast region.

Chapter 9. Recommendations for Surf Coast Tourism

9.1 Introduction

This chapter outlines the adaptation options recommended for tourism in the Surf Coast region. The recommendations are prioritised based on the findings from both the Delphi study and the tourist survey. Each of the adaptation options are classified as high priority, medium priority, low priority (future consideration) or not recommended. In addition, the implementation and evaluation of these adaptation strategies is discussed.

Table 9.1 displays the adaptation priorities recommended for Surf Coast tourism. The table includes the top eleven adaptations as ranked by the Delphi panel, as well as a consumer ranking of the seven adaptation options tested with consumers. Rankings were generally consistent across the two studies. As previously mentioned, only seven of the eleven adaptation options were tested with the consumer, as the remaining four adaptation options involved a business management approach (see Section 2.8) and as such were deemed unlikely to have a direct influence on a consumer's decision to return to the Surf Coast region.

Whilst the community and other industries were considered, the focus of these recommendations is on improving the sustainability of tourism throughout the Surf Coast region. Adaptation options have been prioritised according to their ability to reduce the vulnerability of Surf Coast tourism to the major climate change impacts previously identified. The priority given to various adaptation options also considered the following factors:

- The potential impact of the adaptation on tourism revenue.
- The ability for the adaptation to avoid significant costs.
- The ability for the adaptation to achieve a direct and measurable increase in the resilience of tourism throughout the Surf Coast region.
- The ability to respond to specific climate change risk/s that were identified as a significant threat to tourism in the region.

Table 9.1 Adaptation priorities for Surf Coast tourism

Delphi rankings for adaptation options	Consumer rankings for adaptation options	Recommendations
1. Future planning*	n/a	High priority
2. Communication with tourism stakeholders*	n/a	High priority
3. Determine climate change vulnerability*	n/a	High priority
4. Firebreaks/Controlled burning	2	Medium priority
5. Early warning systems for extreme weather events	1	High priority
6. Monitor tourist behaviour*	n/a	Medium priority
7. Retreating	3	Medium priority
8. Sea walls/Coastal defence structures	4	Low priority (future consideration)
9. Construct artificial reef	6	Low priority (future consideration)
10. Close beaches	5	Not recommended
11. Make the GOR one-way	7	Not recommended

Note: * These adaptation options were not tested with consumers as they were deemed unlikely to have a direct influence on their decision-making.

9.2 High Priority Adaptations

Many of the proposed adaptation strategies were based on improved planning and policy implementation. Therefore, the need for improved future planning that incorporated climate change adaptation into strategic thinking was given high priority. Other business management adaptations that were also given a high priority include improving communication with all tourism stakeholders and further determining the region's climate change vulnerability. The only technical adaptation to be given high priority was the development of early warning systems for extreme events. The rationale for these decisions and specific adaptation examples are provided in Table 9.2.

Table 9.2 High priority adaptation recommendations

Adaptation	Rationale	Examples
Future planning (High priority)	<p>Whilst the Surf Coast community and their various government representatives engage in at least some degree of future planning, it is highly recommended that the potential risks of climate change are incorporated into the region's strategic planning. Indeed, appropriate climate change adaptation options should be embedded within the region's strategic planning. Many of the adaptation options recommended require better informed decision-making ability in order to benefit both the natural and built environments.</p>	<p>Both new and existing tourism infrastructure and facilities should be developed with consideration to changing weather patterns. For example, buildings should be designed to manage increasingly hot summers and more intense rainfall and storm events. Further development of 'green spaces' will also provide shelter from the sun and natural protection from wind and rain. Incorporation of climate sensitive design into future planning may also increase destination appeal for many tourists.</p>
Communication with tourism stakeholders (High priority)	<p>An important theme throughout this research was the need for stakeholder involvement and education. An effective response to the impacts of climate change in the region will only be achieved if all stakeholders are actively engaged in planning and implementing adaptation strategies.</p> <p>Communication and coordination are seen as essential to an effective adaptation process. Research indicates that adaptation is best when planned and implemented at the local or regional level, and as such knowledge sharing should be encouraged between all stakeholders, including tourists.</p>	<p>Community and government's increasing interest in, and awareness of, climate change issues has lead to several research initiatives in recent years. Communication and involvement are therefore required to avoid any unnecessary repetition or inefficient use of resources.</p>
Determine climate change vulnerability (High priority)	<p>The appropriateness of specific adaptation options is largely dependent on the climate change and tourism data collected. It is therefore important that more data is collected and analysed to further clarify the vulnerability of the Surf Coast's tourism industry to climate change.</p>	<p>It is recognised that a degree of uncertainty exists regarding both potential changes to climate and the future effect of adaptation. Consequently, as new scientific data is collected and the apparent vulnerability of Surf Coast tourism changes, then the region's policy for adaptation should be reviewed and updated.</p>
Early warning systems for extreme weather events (High priority)	<p>Increased bushfire risk, more severe storms and more frequent floods were all identified as climate change impacts likely to affect tourism in the region. As such, the development of early warning systems is seen as a high priority adaptation response.</p>	<p>Major bushfire and flood events across Victoria in 2010/11 demonstrated the need for early warning systems for both residents and visitors. This could involve the use of evacuation alarms at major towns such as Lorne or Torquay, or the implementation of a messaging service whereby both residents and tourists throughout the region are provided emergency information on their mobile phones.</p>

9.3 Medium Priority Adaptations

Several of the adaptations are classified as 'medium priority'. These are options that should be strongly considered, however it is suggested that resources and funding should first go to 'high priority' adaptations. Adaptations that are given a medium

priority include ‘firebreaks/controlled burning’, ‘monitor tourist behaviour’ and ‘retreating’. Table 9.3 discusses the rationale for each adaptation and provide relevant examples.

Table 9.3 Medium priority adaptation recommendations

Adaptation	Rationale	Examples
Firebreaks/Controlled burning (Medium priority)	Whilst the use of firebreaks and controlled burning is already a common fire fighting practice in the Surf Coast region, it is important to note that from a consumer perspective this adaptation is also seen positively. The current research concluded that this type of adaptation would not negatively impact a visitor's decision to return to the Surf Coast.	Given that bushfires are predicted to become more frequent and more intense throughout the Surf Coast region, and the fact that visitors are not, in principle, likely to change their travel plans knowing that such an adaptation exists, it is recommended that the expanded use of these forms of adaptation be investigated further.
Monitor tourist behaviour (Medium priority)	Knowledge and awareness of climate change issues is becoming increasingly widespread and this likely to lead to a change in consumer attitude and potentially consumer behaviour. Significant research predicts that climate change will influence tourist behaviour and choice of destinations (Amelung et al., 2005; Berritella et al., 2005; Hamilton et al., 2005; Hamilton & Tol, 2004; McEvoy et al., 2008). It is therefore important to monitor any changes in consumer attitudes and behaviour in relation to travel and climate change.	This may involve re-positioning the destination to capitalise on a growing environmental ethic and promoting the implementation of environmental initiatives. Examples of this could include the development and promotion of more sustainable transportation options such as shuttle buses or bike paths, or the eco-certification of tourism providers throughout the region.
Retreating (Medium priority)	Both man-made and natural coastal assets are likely to be impacted by rising sea-levels and more frequent and intense storm surges. The feasibility of relocating for vulnerable tourism infrastructure should be investigated and planning for future tourism infrastructure and facilities should be moved away from coastal locations that are climate sensitive. The Victorian Government requires that planning for new coastal developments consider an anticipated sea-level rise of not less than 0.8 metres by 2100 (CCCAB, 2010). New development must be located and designed to take account of the impacts of climate change on coastal hazards such as the combined effects of storm surge, river flooding, coastal erosion and sand drift (CCCAB, 2010).	The future impact of floods should be considered when developing planning and building measures. Where possible, existing tourism infrastructure and facilities should be moved away from flood prone areas and prospective development should consider future flood projections for the region.

9.4 Low Priority Adaptations: Future Considerations

The two adaptation options given low priority are the construction of sea walls or other coastal defence systems and the construction of artificial reefs for surfing and/or diving. Whilst these adaptation options were ranked as of relatively low importance by both the Delphi panel and the consumer survey, they should not be completely ignored. This is largely due to the importance of coastal areas to tourism in the Surf Coast region. Throughout this study, it has been apparent that the coastal areas of the Surf Coast provide the ‘essence of appeal’ for the region. As such, adaptations that may serve to protect tourist amenity at important coastal locations should be considered for future implementation, particularly if these assets are likely to become increasingly vulnerable to future climate change impacts. Table 9.4 provides further justification for this decision and includes examples of specific adaptations.

Table 9.4 Low priority adaptation recommendations

Adaptation	Rationale	Examples
Sea walls/Coastal defence structures (Low priority /Future consideration)	The beach plays a large part in creating the appeal of the Surf Coast as a destination. However, sea-level rise and more frequent and severe storms surges are likely to lead to erosion of beaches and a reduction in amenity for visitors. Consequently, the implementation of sea-walls and other coastal defence structures should be considered as a future adaptation option. Whilst the implementation of such adaptations received a neutral response from visitors, any reduction in beach amenity would be expected to reduce visitor satisfaction.	Sea walls have traditionally been used to protect popular beach locations and valuable infrastructure from erosion and damage. However, a ‘Sand Study’ completed for the neighbouring town of Apollo Bay found that sea walls should generally only be constructed where there is no desire to maintain a beach or beach amenity, or when valuable infrastructure cannot be protected any other way (Colac Otway Shire & DSE, 2005).
Construct artificial reef (Low priority /Future consideration)	Surf culture and surfing itself represent a major drawcard for the region. Changes in climate are likely to mean changes in wave energy and direction. Increased wind and more frequent and intense storms may impact on future surfing conditions. Furthermore, the predicted rise in sea level will also have implications on the tidal range for the Surf Coast. This is likely to impact on the different surf breaks and may include changes to the power, the shape, the timing (relative to tidal cycle) and even location of the breaks (Surf Coast Shire, 2010; Victorian Coastal Council, 2008). Such adaptations may also benefit the marine environment by providing a suitable habitat for marine organisms.	Potential deterioration of surf conditions would likely impact on appeal for certain visitor segments. The construction of artificial reefs for surfing may mitigate deteriorating surf changes. The Gold Coast Reef at Narrownneck, Surfers Paradise, Australia was the world’s first multi-purpose artificial soft reef and a report 10 years after its implementation detailed improved surfing conditions (Black, 2009).

9.5 Adaptation Options not Currently Recommended

The following adaptation options are not currently recommended. The main reason for this is their potentially negative impact on tourism amenity and access.

Table 9.5 Adaptation options not currently recommended

Adaptation	Rationale	Examples
Close beaches (Not recommended)	Given the importance of beaches in providing the setting for many of the Surf Coast's most popular activities such as swimming, surfing and sunbathing, it is not recommended that this adaptation option be implemented. It is, however, recognised that certain beaches, or sections of beach, may need to be temporarily closed if soil erosion becomes a significant problem or if surf conditions make safety an issue. Loss of habitat and biodiversity may also be an issue. Shoreline zoning and changes in public access to beaches will need to consider the realities of climate change.	<p>The hooded plover is now extinct in Queensland and northern New South Wales, while in Victoria, hooded plovers are classed as a vulnerable species. Closing beaches where breeding occurs, or during the breeding season would help conserve this species.</p> <p>Climate change is likely to increase the frequency and intensity of storms, which may make beaches unsafe for surfing and other beach activities. Residents and visitors should be warned to stay away from affected beaches. In such circumstances clear on-site interpretation and signage is necessary. This should also be easily comprehensible for both domestic and international visitors.</p>
Make the GOR one-way (Not recommended)	Several sections of the GOR are affected by flooding and landslides. This is likely to become more common with increased rainfall, in particular heavy rainfall events, and increasingly severe and frequent storm surges. This, in conjunction with the fact that in certain areas there is little room for the GOR to relocate, provide some argument that in the future there will only be room for one-way traffic. An additional benefit of one-way traffic on the GOR would be a potential reduction in road accidents. However, this would have a significant impact on both visitor and resident amenity. Furthermore, this study shows it is likely to negatively impact on visitors' decisions to return to the region.	<p>The GOR is an iconic destination in itself, with this research showing that touring the GOR was a popular activity for many tourists. Clearly, allowing travel to only flow in one direction would have serious implications for both tourist and resident amenity. Consequently, this adaptation is not recommended at this point in time.</p> <p>The GOR is an established touring route and the potential impact of this adaptation on international visitors would likely be less than for domestic visitors, or indeed local residents. Many international visitors travel the Great Southern Touring Route (GSTR) from east to west and as such they would not be severely impacted by making the GOR one-way.</p>

The beaches and the GOR itself are almost certainly the Surf Coast's two major tourist drawcards. Whilst there may occasionally be cause to close certain sections of the road, or certain sections of beach, any long-term closures of this kind would undoubtedly impact on visitor arrivals and satisfaction. As previously mentioned, it is important to continually monitor climate change impacts and the vulnerability of various elements of the tourism system. In the short to medium term, there is no urgent need to implement

these adaptations. However, in the medium to long-term these options may need to be revisited. Further discussion of these two adaptations is provided in Table 9.5 above.

9.6 Additional Recommendations: The “Green” Market

As part of the broader adaptation to ‘Monitor Tourist Behaviour’ (Section 9.3) it is suggested that the Surf Coast consider specifically targeting the so-called ‘Green Tourist’. As discussed in the Literature Review and identified during the Delphi process, this type of tourist is more likely to be aware of the relationship between tourism and climate change (EC3 Global, 2008). Tourists with a heightened awareness of environmental issues, such as climate change, are inclined to choose a tour operator, accommodation provider, or destination which demonstrates commitment to sustainable practice (NT Tourism, 2012). Therefore, to attract a greater share of the visitors seeking green travel options the Surf Coast should investigate the opportunity to further develop ‘Green’ initiatives such as improvements to public transport, the development of renewable energies, and expansion of bike and walking paths.

A review of the psychographic characteristics of visitors to the broader Great Ocean Road region demonstrated that a large segment of visitors are socially active and have a strong sense of social responsibility. This group was classified by Roy Morgan as “Socially Aware” (Tourism Victoria, 2009e) and represented 24% of visitors to the region. As discussed in Section 6.2.3, this represents a substantially higher percentage of socially aware tourists than regional Victoria in general (19%), or indeed the state as a whole (18%). This is put forward as an important point, as not only do these types of tourists enjoy visiting cultural and natural attractions, but they are also likely to have a stronger sense of social responsibility when it comes to environmental issues such as climate change.

This visitor segment seeks information regarding new tourism opportunities and displays a strong desire to incorporate education and learning into their travels. Indeed, of those surveyed in this research, 41% purported to have a good or very good understanding of climate change, whilst 31% believed that they had a good or very good understanding of climate change adaptation. Interestingly, results of the NEP also

showed that visitors to the Surf Coast demonstrate a pro-environmental attitude, with the mean scores for 13 out of 15 of the NEP items indicating an ecocentric attitude (see Table 8.5). This represents an opportunity to further incorporate an educational or learning element into the regions tourism offerings to meet the demand of socially and environmentally aware visitors.

The results of the Delphi study give further weight to the suggestion that the Surf Coast can potentially capitalise on the emergence of the green tourist. As discussed in Chapter 7 the potential to capitalise on the emergence of the so-called “Green Tourist” was the most frequently discussed adaptation opportunity in the first round of the Delphi study (equal with the potential to re-position the destination). It scored 4.5 out of 5 in the second round, indicating that the panel of experts thought there was great potential to capitalise on this particular segment of the market.

Given these findings, it is recommended that the Surf Coast, as a matter of high priority, move to capitalise on the opportunity presented by the green market. It has been shown that this segment can be differentiated, at least to some degree, from other tourists in regards to their attitudes and intended behaviour (Bergin-Seers & Mair, 2009; Dolnicar & Matus, 2008; Straughn & Roberts, 1999). Furthermore, there is a wide range of measures, including many of the adaptations recommended in this study, that the Surf Coast can implement to improve the sustainability of tourism throughout the region and reduce negative environmental impacts. Whilst further research is required to determine what particular aspects of environmental sustainability are of most importance to green tourists, using a broad target marketing approach to promote the regions sustainability initiatives is recommended. Likewise, more information on the best way to communicate with green tourists should also be investigated. This could include determining how such tourists evaluate the environmental sustainability of a destination, how and why they develop strong environmental attitudes and how friends, family and the media can influence their decision to visit a particular destination.

The analysis done to determine significant differences between respondents NEP score (environmental worldview) and their opinion of various adaptation options also demonstrated a significant between-groups difference. This difference occurred for the option to ‘close affected beaches’, where a clear trend from ecocentric to

anthropocentric was apparent. Ecocentric respondents were significantly more favourable (mean = 3.5) than anthropocentric respondents (mean = 2.66), demonstrating a clear difference when it came to giving up the amenity of the beach. This type of information could prove useful for destination managers if the need to close beaches arises. If destination managers at the Surf Coast know that a large percentage of its visitors are socially and ecologically aware, they can use this information to guide their decision-making in regards to adaptation. However, it is also recommended that adaptation options, such as the closure of beaches, coincide with appropriate information provision.

As this segment is likely to seek out information before making travel arrangements, both on-site and off-site interpretation should be provided to ensure that tourists and potential tourists are suitably informed of the reasons for the closure. Interpretation involves communication and education, but it also enhances the visitor experience (Moscardo, 2003). Offsite interpretation could involve further development of websites and the inclusion of virtual tours. Onsite interpretation could involve increased signage and considered positioning of relevant information centres. Consideration should also be made regarding the use language, and symbols should be used rather than text, where practical. Onsite interpretation can also be improved by having trained, multi-lingual, staff available at popular tourism areas. Effective interpretation not only improves the visitor experience but can improve sustainability by influencing the behaviour of visitors (Weaver, 2001).

9.7 Implementation and Evaluation of Adaptation Strategies: Stages 4d and 4e of the RTAF Model

The results of both the Delphi study and the tourist survey provided a range of bio-physical and socio-economic adaptation strategies for the Surf Coast. However, the decision to implement any of the proposed adaptation options ultimately rests with destination managers and policy-makers at the local, regional, state and even national level. Whilst adaptation can be undertaken strategically at the national level (Barnett et al., 2011; COAG, 2007; McKibbin & Wilcoxon, 2003), implementation often occurs at the local destination business or project level (Lorenz et al., 2008; Simpson et al., 2008)

Consequently, this is for whom these recommendations are designed.

The RTAF model recognises that adaptation will be an iterative process of implementing and evaluating adaptation options as climate conditions continue to evolve and knowledge of both potential impacts and appropriate adaptation options progresses. This iterative process is illustrated in the vulnerability and resilience phase of the model (Phase 1), by the feedback loop from Stage 3 of the model back to Stage 1. The entire process of adaptation outlined in the RTAF model should be viewed as an ongoing process aimed at increasing the destination's resilience, resistance and readiness to manage climate change, within the broader tourism planning context. Furthermore, adaptation for the tourism sector should be integrated with the general formulation and implementation of national, regional and local level adaptation (Becken & Hay, 2007; IPCC, 2007; Simpson et al., 2008). The implementation phase will typically include the following components: clarification of specific tasks, timeline of events, roles of various stakeholders, and resource requirements and constraints (Simpson et al., 2008; USAID, 2007).

“Climate change adaptation represents a long-term investment of human and financial resources” (Simpson et al., 2008, p. 47). Therefore, it is important to continually monitor and evaluate the performance of such an investment. The purpose of evaluation is to determine whether the adaptation project or activity delivers the intended benefits and avoids any undesirable outcomes. As climate change often presents long-term impacts such as sea-level rise, or deals with infrequent events such as severe storms, the evaluation of adaptation is intrinsically problematic. Evaluation of adaptation must therefore occur over the long term and the situation should be continually monitored to determine if the intended benefit has eventuated. Indeed, the fact that an adaptation has not yet delivered the expected benefits does not necessarily mean the adaptation was inappropriate.

The proposed framework for regional tourism adaptation is a useful tool to assist tourism managers and policy-makers to improve their decision-making capabilities in the face of an inevitably changing climate. If the evaluation of selected adaptation options reveals that there has been little or no long-term success in tackling specific climate change impacts, then it would be appropriate to return to Stage 4a of the

adaptation process and reassess the adaptation options available. The evaluation of success will likely be based on comparisons to the situation prior to the implementation of the adaptation option/s and consideration of the environmental and socio-economic situations both before and after implementation.

9.8 Conclusions

The Surf Coast case study applied the RTAF model to determine possible adaptation options for the region. The process of adaptation aims to increase the resilience and resistance of tourism, throughout the Surf Coast region, and to increase its readiness to capitalise on potential opportunities. This is illustrated in the final constructs of the RTAF model (Figure 8.1). The results of both the Delphi study and the tourist survey have been synthesised, and the recommended adaptation option categorised accordingly.

This chapter presents a practical contribution to knowledge and provided real ideas for adaptation in the region. By categorising adaptation options high priority, medium priority, low priority or not recommended, decision-makers involved in the sustainability of Surf Coast tourism are clearly guided in terms of the appropriate adaptation options for the future.

The following chapter will move from the practical to the theoretical contributions of this research. This will include a review of the research and in particular the application of the RTAF model. This will also incorporate a detailed review of the RTAF model, discussions of its limitation and recommendations for its future use. Areas pertinent to the aims of the research will be summarised and both the theoretical and practical contributions to knowledge outlined.

Chapter 10. Conclusions

10.1 Introduction

Chapter 8 provided a discussion of the results from the tourist surveys conducted to determine consumers' opinions regarding potential adaptation options. Chapter 9 outlined the recommended adaptation options for Surf Coast tourism. This chapter presents a summary of the key findings of this research and discusses the development of the RTAF model, taking into account the research aims and objectives stated in Chapter 1. This will involve a brief review of the development and application of the RTAF model, including a section on the potential to update or improve the model. In addition, discussion of both the theoretical and practical contributions of this study, a review of the limitations of the research and discussion of future research opportunities will be provided. Finally, a summary of this chapter will be presented, followed by a statement concluding this thesis.

10.2 Review of the Research Aims

The study investigated climate change adaptation in tourism. Whilst mitigation continues to be a hotly debated topic both in Australia and abroad, the role of adaptation has been largely ignored by the media and researchers alike. This was particularly true when it came to tourism. Indeed, a review of the literature discovered significant gaps in the knowledge in regards to tourism destination adaptation. To counter these apparent shortcomings the following research objectives were developed:

- Develop a adaptation framework model for regional tourism destinations, which incorporates a consumer perspective.
- Apply the model using Victoria's Surf Coast region as a single case study.

The first research objective was to develop a framework model to assist regional tourism destinations adapt to potential climate change impacts. The RTAF model proposed in this thesis built upon previous adaptation models available, whilst attempting to fill apparent gaps in the literature to create a more holistic adaptation framework. A framework model was deemed appropriate in order to best illustrate the complex processes involved and the various relationships between constructs. The

second research objective was to test the RTAF model using the Surf Coast region as a single case study.

10.3 Development and Application of the RTAF Model

This section summarises the process of developing the RTAF model and applying it to the Surf Coast region. The first section outlines the development process and reiterates the factors that differentiate the RTAF model from the adaptation models currently available in the literature. The following section summarises the application of the model to the Surf Coast region.

10.3.1 Summary of RTAF Development Process

There are three main areas where the RTAF model expands and improves upon the adaptation models in the existing tourism literature. These include the incorporation of a consumer element, a regional dimension and the additional reference to potential opportunities presented by climate change.

The first differentiating factor of the RTAF model, in comparison to most other adaptation models, is the importance placed on the consumer. Although it was widely recognised in the literature that the consumer (tourists) demonstrate a relatively high degree of adaptive capacity (see Figure 2.2), existing adaptation models either ignored this fact or paid minimum attention to it. It was recognised that ultimately it is the tourist who decides whether to visit a destination or not, and this realisation had a major influence on the development of the RTAF model. As a result, this thesis has blended the fields of consumer behaviour with climate change to provide a more holistic adaptation framework model.

The literature review also identified that research into climate change was lacking at the regional level and that the research that did exist lacked a tourism component (PMSEIC, 2007). Consequently, this research aimed to identify potential adaptation options at the regional destination level, and consider the potential impact of these options on tourist behaviour. None of the existing models focused on regional tourism destinations, and this is important since as opposed to mitigation, adaptation is best applied at the local or regional level, as it is usually selected systems or locations that benefit from its implementation. Although regional climate change impacts will be

destination specific, the application of the RTAF model involves the same issues of vulnerability, resilience, stakeholder consultation, tourist satisfaction, and adaptation.

Finally, other adaptation models, particularly those taking a risk science approach (AGO & DEH, 2005; Australian Government, 2007; COAG, 2007) do not fully consider the opportunities made possible by climate change. Reducing the risks of climate change may be the priority for most destination managers, however, they should also aim to identify and take advantage of any potential opportunities that may arise. Indeed, early identification of potential benefits from climate change, whether this is decreased seasonality issues, or increasing hours of sunshine, can assist in offsetting the potential negatives of climate change.

10.3.2 Application of the RTAF Model to the Surf Coast Region

Once the RTAF model was developed, it was applied the Surf Coast region of Victoria, Australia as a single case-study. This destination was chosen due to its vulnerability to a number of different climate change impacts, including coastal erosion, sea-level rise and bushfires, and because of its relatively high reliance on tourism. The recommended adaptation strategies are outlined in Chapter 9.

The RTAF model was applied as a single case-study, whereby multiple sources of evidence were used to bring out details from various perspectives. Yin (1993) explains that the application of a case study aims to clarify complex causal links in real-life interventions. In this thesis, the impact of various adaptation options was linked to the consumer response. The methodology applied in this case study involved three distinct research phases; a model development stage, a Delphi study and a tourist survey. The first research phase involved the development of the RTAF model, based on information collected on climate change and adaptation, and on the Surf Coast as a destination. The Delphi study then involved asking members of an expert panel to identify climate change risks and opportunities, and develop appropriate adaptation options for the Surf Coast region. Finally, the tourist survey provided a demand-side perspective on adaptation, by asking respondents questions regarding the adaptation options developed by the expert panel.

The key recommendations as a result of this study are discussed in the previous chapter and summarised in Table 9.1. The adaptations given the highest priority include the following business management strategies: incorporation of adaptation into future planning; increased communication with all tourism stakeholders; and further clarification of the tourism industry's vulnerability to climate change. In addition, the following technical adaptation was also recommended as a high priority adaptation – the development of early warning systems for extreme events such as bushfires or floods.

This section provided a review of the application of the RTAF model as a single case study to the Surf Coast region. The following section will go on to discuss the options for updating and improving the RTAF model.

10.3.3 Updating the RTAF Model

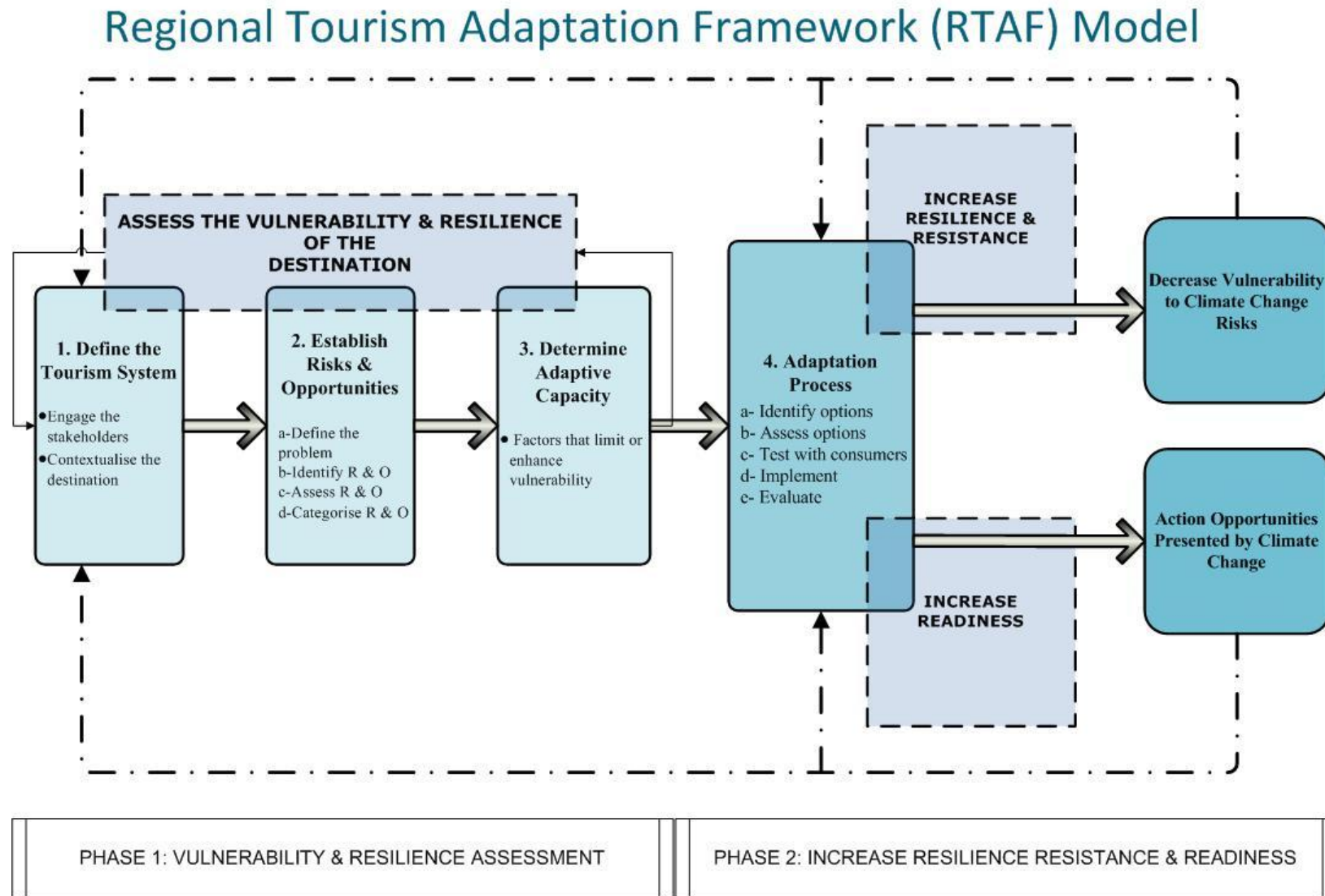
The adaptation framework proposed represents the ‘state of the art’ in terms of regional tourism adaptation. However, this does not mean that the model is ideal for every destination, or in every instance. From the commencement of this research, through to the application of the model to the Surf Coast region, every opportunity to update or improve the model has been taken. Indeed, the structure of the model and the number of constructs within changed numerous times. The development process was facilitated by continued discussion with colleagues and experts in climate change and destination management. This process of ongoing development ultimately lead to the model as it appears today.

Overall, the model proved to be a successful tool for developing appropriate adaptation options to increase a destination's resilience, resistance and readiness to manage the impacts of an inevitably changing climate. However, this process did suggest amendments that may further improve the RTAF model. This included the addition of further feedback loops to illustrate more visibly the iterative process of adaptation.

Despite the fact that the process of adaptation was always seen by the author as an ongoing process, the original version of the RTAF model appeared as a linear model. To further demonstrate the iterative process of adaptation, it is recommended that feedback lines be inserted that continue the process from the final two constructs, back to both the

start of the adaptation process, and the initial stage of the model (see Figure 10.1).

Figure 10.1 The revised RTAF model



Where the climate change risk or opportunity has been identified, but the adaptation itself has proved to be ineffective or inappropriate, then the process would return to Stage 4a and the process of identifying the appropriate adaptation option/s would recommence. However, when the adaptation proves inappropriate due to an apparent error in the establishment of the climate change risk or opportunity, then the process should return to the initial stage of the model, whereby the tourism system is reviewed, and the climate change risks and opportunities identified are reassessed. This may be necessary when there is little information available to evaluate accurately a particular risk or opportunity, and/or when the development of new knowledge provides a better guide to the potential impacts of climate change on tourism. Indeed, as evaluation of the adaptation process continues, and the degree of success for individual adaptations becomes apparent, lessons will be learned regarding whether the adaptations chosen are appropriate given the risks and opportunities identified, or whether in fact the risks and opportunities themselves need to be reassessed or redefined.

Climate change adaptation involves a long-term investment of resources, and all sectors, including tourism, will need to be part of an ongoing process of systematic implementation and evaluation. However, currently relatively few climate change adaptation processes have been initiated at the destination level (Simpson et al., 2008). It is important that tourism destinations have a voice in the adaptation agenda, as it is highly likely that representatives of different sectors and various stakeholder groups will have differing opinions on the best way of moving forward. The RTAF model provides a solid basis for destination managers to improve their decision-making in relation to climate change adaptation through a process of ongoing evaluation.

10.4 Contribution to Knowledge

The study provided a range of theoretical and practical contributions to knowledge which are outlined in the following sections. The research described in this dissertation makes a significant contribution to the existing literature on climate change adaptation and tourism. The major contributions are listed below, and then elaborated upon in the following sections.

- Identification of shortcoming in existing adaptation models for the tourism sector.

- No apparent consideration of a consumer perspective.
 - Little or no recognition of adaptation opportunities due to climate change.
 - No tourism adaptation models designed for regional destinations.
- Development of the RTAF model.
 - Application of the RTAF model as a single case-study
 - Presentation of a Delphi study to determine to identify and assess adaptation options for the Surf Coast region.
 - Analysis of tourist surveys conducted to determine consumer opinions regarding adaptation.

10.4.1 Theoretical Contributions to Knowledge

This thesis provided a comprehensive analysis of the tourism adaptation models available and analysed their efficacy for regional tourism destinations. It also demonstrated that there were several limitations of the existing adaptation models when related to regional tourism destinations. The primary deficiency of existing models was the lack of a demand-side perspective. As a result, by not only incorporating a consumer perspective, but making it a key construct, the RTAF model represents a more inclusive ‘state of the art’ adaptation model for regional tourism destinations. The combination of consumer behaviour and climate change theory presents a significant theoretical contribution, as this is the first time these two fields have been combined in relation to adaptation in the tourism sector. Tourism managers and policy-makers need to acknowledge the importance of the tourist when planning to adapt to climate change. The findings of this research show that there are a range of views regarding different adaptation options and this need to be considered during the adaptation process.

Also pertinent to this research is the importance of identifying opportunities that may arise due the impacts of a changing climate. As discussed throughout this thesis, most previous adaptation models focused on a risk management or risk reduction process, whereby the potential opportunities were largely ignored. Therefore, for the RTAF model to be more holistic in its approach, the recognition of the potential to capitalise

on opportunities also needed to be emphasised.

The tourist surveys that were conducted are the only example available in the literature, of potential adaptation options being tested at the consumer level. Due to this, there has already been great interest from fellow academics and industry partners, and there will be further academic papers and presentations that build on the results of these surveys. Results of the second and third phases of research were presented at the Council for Australasian University Tourism and Hospitality Education (CAUTHE) conferences (Jopp et al., 2010b; Jopp, Delacy, Mair, & Fluker, 2011) and published in relevant academic journals, including *Current Issues in Tourism* (Jopp et al., 2010a) and the *Asia Pacific Journal of Tourism Research* (Jopp, Mair, DeLacy, & Fluker, 2012).

10.4.2 Practical Contributions to Knowledge

Several practical implications also arose from this research which is likely to assist those involved in destination planning and management. As demonstrated in Figure 10.1, the expected outcomes of the RTAF model are to decrease vulnerability to climate change risks by increasing resilience and resistance, and to action opportunities presented by climate change by increasing readiness.

Resilience is the ability to absorb changes in climatic conditions, and resistance reduces the number of impacts that are likely to affect tourism (Birkmann, 2007; Lorenz et al., 2008; Sivell et al., 2008). The RTAF model assists destination managers to identify appropriate adaptation options that will increase the destination's resilience and resistance. This may include the provision of early warning systems for extreme events or the construction of sea walls.

The RTAF model could be applied to any regional tourism destination. The application of the model would be useful for Local Tourism Associations (such as Surf Coast Tourism) and Regional Tourism Associations (such as Geelong-Otway Tourism) and to private organisations with a specific interest in tourism, such as large tour operators and accommodation providers. The model encourages stakeholder involvement throughout the adaptation process and most importantly it identifies the potential tourist response to adaptation. It may also help identify different tourist segments and therefore provide the opportunity for more effective marketing and communication strategies.

The RTAF model also aims to increase a destination's readiness to capitalise on opportunities that may arise. This would involve the implementation of appropriate adaptation options that build the capacity of the destination to capitalise on the potentially positive effects of a changing climate. This may involve repositioning the destination to capitalise on a changing consumer ethic or altering marketing efforts to represent opportunities that prevail due to a warming climate and reduced rainfall. Both of these potential opportunities were identified during the initial stage of the Delphi study.

By increasing resilience and resistance to climate change impacts, the region's vulnerability will be reduced. And, by increasing its readiness, the region will be best positioned to capitalise on potential opportunities. Consequently, increasing resilience, resistance and readiness will improve the sustainability and therefore the competitiveness of the destination. Understanding that adaptation is an ongoing process of learning how to best deal with climatic change is particularly relevant in the context of local and regional scale decision-making, and as such the RTAF provides a valuable tool for management and policy-makers. Furthermore, the engagement of a range of tourism stakeholders throughout the adaptation process is likely to put concepts such as resilience and vulnerability into a more understandable context. This is important as receiving support and commitment from regional stakeholders is fundamental to the successful implementation of adaptation options.

10.5 Limitations of the Research

It is acknowledged that this research is bound by certain limitations which may have ramifications for the further application of the RTAF model. Indeed, many of the practical and theoretical implications that arose through the research process may have limited applicability dependent on individual circumstance. In particular, it is recognised that the RTAF model and the results of its application may not be generalisable to all regional tourism destinations. This is mainly due to the methodology chosen and the restrictions posed by a single case study.

Further, as this case study is mainly exploratory in nature, the results of the Delphi study and the tourist survey should only be used to draw general conclusions. Indeed, the aim of the research is not to provide concrete answers, but to provide a greater understanding of the phenomenon under investigation. Although a broader scope and larger scale of research would have been desirable, time and financial constraints did not allow for this.

There are also geographic and demographic constraints surrounding this study. This research was conducted in the Surf Coast region of Victoria, Australia, and consequently the data gathered and analysed may not be applicable to other regions in Australia or abroad. However, the choice of a coastal tourism destination was not incidental and is expected that some of the findings will be generalisable to other coastal destinations, particularly in Australia. This is important as coastal destinations are especially vulnerable to climate change related impacts such as storm surge inundation and erosion (Voice *et al.*, 2006), and also because eight of the top ten destinations in Australia are within a coastal zone, including the Great Ocean Road (Henrick *et al.*, 2000).

Furthermore, it is acknowledged that not all components of the RTAF model were fully applied in the case-study. Indeed the focus of this particular research was on the consumer perspective of adaptation. A more detailed analysis of the tourism system and investigation of other stakeholders opinions on adaptation, would have added further value to the study. Furthermore, more detailed analysis of the region's adaptive capacity and a scientific review of the regions specific climate change implications would also be useful. Whilst the importance of these elements is acknowledged, and the value of a more holistic study understood, a more detailed analysis of all components of the RTAF model was not feasible for this particular study.

Many of the limitations discussed could potentially be overcome through further research; therefore, the following section will outline some of the avenues available for future research.

10.6 Scope for Further Research

As the need to understand and manage climate change and the role of adaptation evolves, research in this area will undoubtedly continue to expand and develop. Similarly, researchers will undoubtedly continue to investigate the relationship that exists between tourism and climate change. Whilst there are numerous avenues for research across the spectrum of climate change and tourism, for the purpose of this chapter the scope for further research will only be discussed in terms of its ability to build upon the present study.

10.6.1 Further Research into Community Perceptions of Proposed Adaptation Options

The data collection methods used in this research aimed to gain the most complete view of adaptation possible, given the aforementioned resource constraints. However, further exploration of various stakeholder perspectives would add further value to this investigation. In particular, a more extensive community consultation process would provide a better overall picture of both the adaptation requirements and their likely acceptance by host communities. Such studies however, are not new, and various researchers including Brown and Raymond (2006) and Pfueller, Zhu, Whitelaw and Winter (2009) have examined community values in relation to environmental planning and climate change. Nonetheless, it is acknowledged that host communities play a major role in the tourism experience, and as such, greater knowledge of their perceptions of climate change risks, opportunities and adaptation options would certainly be beneficial. Therefore, it is acknowledged that the inclusion of a separate community consultation component, within the adaptation framework, would provide a more holistic review of the adaptation process.

10.6.2 Application of the RTAF Model to Other Tourism Regions

Further application of the model to other regional destinations would help to evaluate and further validate the utility of the RTAF model. The application of the model to destinations that are not in a coastal zone would undoubtedly bring about a different series of priorities in terms of adaptation. For example, this thesis identifies risks, opportunities and adaptation options for the Surf Coast region. However, further case studies would extend these findings and provide a more comprehensive picture of

climate change impacts and adaptation options for inland regional tourism destinations. Furthermore, by studying more than one destination, researchers are able to compare the similarities and differences of the results.

The application of the RTAF model in other countries, in particular developing nations, would also be of value. This would allow results to be compared and contrasted, and other economic and socio-cultural considerations to be analysed.

10.6.3 Research Facilitating Greater Knowledge of Adaptive Capacity

In this present study only limited resources were available to determine the adaptive capacity of the Surf Coast region. It is acknowledged that the adaptive capacity of a region plays a pivotal role in its ability to limit exposure to climate change risks and capitalise on opportunities that may arise. However, a detailed investigation of the adaptive capacity of the Surf Coast region was beyond the scope of this thesis.

The adaptive capacity of a region such as the Surf Coast incorporates diverse elements, including the degree of dependence on tourism for employment and income generation, the level of seasonality, and the strength of relationships between various levels of government. Future research should seek to broaden our understanding of regional adaptive capacity and further investigate the impact this may have on the successful implementation of various adaptation options.

10.6.4 Tourists Adaptation Preferences

This thesis generated significant knowledge on tourist perceptions of various adaptation options for the Surf Coast. However, further investigation into the underlying reasons behind their preferences for various adaptation options, could help destination managers to better understand the concerns of visitors. Whilst this study helped determine which adaptation options were preferable to which tourist segments, further research that helped explore why these preferences exist would also be of value.

10.7 Chapter Summary

Chapter 9 provided a summary of the research aims pertinent to this study, before reiterating the process of developing and testing the RTAF model. This included discussion of the implementation and evaluation of adaptation strategies. The value of

the RTAF model to destination managers and policy-makers was discussed and several avenues for improving the model were explored. Both the theoretical and practical contributions to knowledge were also addressed. Finally, the limitations of the research were outlined and the opportunities for future research discussed. It is hoped that the RTAF model will be used in subsequent research and that the knowledge gained through this experience will provide a platform for further studies into tourism destination adaptation.

10.8 Concluding Statement

This thesis aimed to explore the inextricably linked fields of tourism and climate change. Through the development of the RTAF model and the empirical research completed, this study has made a significant contribution to the selective number of studies in this area. However, this research has also made apparent the need for further research into tourism destination adaptation, as the full effects of climate change are realised over the forthcoming years.

The RTAF model can play a key role in identifying effective climate change adaptation strategies for regional tourism destinations. It gives all stakeholders greater insight into how a range of different climate change impacts are likely to impact on tourism at a regional destination level. In doing so, it enables the identification of both potentially positive and negative climate change impacts and allows destination managers and policy-makers to make appropriate decisions regarding adaptation to both minimise potentially negative impacts and capitalise on potential opportunities.

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Appendix A: Original 12-item New Environmental Paradigm (NEP) Scale

1. We are approaching the limit of the number of people the earth can support.
2. The balance of nature is very delicate and easily upset.
3. Humans have the right to modify the natural environment.
4. Humankind was created to rule over the rest of nature.
5. When humans interfere with nature it often produces disastrous consequences.
6. Plants and animals exist primarily to be used by humans.
7. To maintain a healthy economy we will have to develop a “steady state” economy where industrial growth is controlled.
8. Humans must live in harmony with nature in order to survive.
9. The earth is like a spaceship with only limited room and resources.
10. Humans need not adapt to the natural environment because they can remake it to suit their needs.
11. There are limits to growth beyond which our industrialized society cannot expand.
12. Mankind is severely abusing the environment.

Appendix B: Consequence Matrix

Level	Descriptor	More detail	Bio-physical impact	Socio-economic impact
1	Insignificant	Low impact, low profile	Very low	Very low
2	Minor	Public embarrassment, low impact, low news	Low	Low
3	Moderate	Some impact, public embarrassment, moderate news item	Medium	Medium
4	Major	Loss of tourism capabilities, public embarrassment, impact on image	High	High
5	Catastrophic	Tourism disabled, public embarrassment, high news, major impact on image	Very high	Very high

(Source: AS/NZS 4360 Risk Management standard).

Appendix C: Likelihood Matrix

Level	Descriptor	More detail
A	Almost certain	Is expected to occur in most circumstances
B	Likely	The changes will probably occur
C	Possible	The changes might occur
D	Unlikely	The changes are not likely to occur
E	Rare	The changes may occur only in exceptional circumstances

(Source: AS/NZS 4360 Risk Management standard).

Appendix D: Risk Register

Impact	Risk: What and how can it happen	Consequence for Tourism	Existing Controls	Consequence Rating	Likelihood Rating	Level of Risk	Risk Priority
Decreased Rainfall	IPCC predicts rainfall to decrease in region over	<ul style="list-style-type: none"> Increased destination appeal Increased pressure on water supply Water restrictions Increased bushfire risk Negative impact on native flora & fauna 	• ?	4	B	Extreme	1

Appendix E: Guidelines for Interviews

Delphi Study: Climate Change Adaptation Options for the Victorian Surf Coast

Introduction

Hello, how are you? Before we get started, as mentioned I would like to record this interview, do you mind if I start recording now?

Record

Firstly, I would like to thank you once again for taking the time to participate in this interview. As you know my name is Ryan Jopp and I am a PhD student at Victoria University.

The focus of my thesis, and of this interview, is on climate change and tourism at Victorias Surf Coast.

Just to let you know the questions I am about to ask you have been approved by the Victoria University ethics committee. The data collected will remain confidential, and when reporting the findings in this study, you will not be identified personally.

I would like to divide the 30 minutes we have for today's interview between three broad topics. In other words, it would be good if we could spend approximately 10 minutes discussing each of these following topics:

1. Climate Change **Impacts** for Surf Coast Tourism
2. Possible **adaptation** options for Surf Coast Tourism
3. Adaptation **opportunities** for Surf Coast Tourism

Are you ready to begin?

1. Firstly, could you please state your name, the organisation you work for, and give a brief description of your role within that organisation?

2. Thanks. Now I would like to get your thoughts on the potential impacts of climate change on Surf Coast Tourism. In other words, could you please identify what you see as the major concerns for Surf Coast Tourism as a result of climate change?

Bio-Physical Impacts	Socio-Economic Impacts
Drought/Decreased Rainfall <input type="checkbox"/>	Decreased Tourism Revenue <input type="checkbox"/>
Increased Temperature <input type="checkbox"/>	Decreased Tourism Employment <input type="checkbox"/>
Sea-level Rise/Storm Surge/Coastal Erosion <input type="checkbox"/>	Changing Consumer Ethics <input type="checkbox"/>
Bushfire <input type="checkbox"/>	Decreased Long-haul Flights <input type="checkbox"/>
Species loss <input type="checkbox"/>	Decreased Community Welfare <input type="checkbox"/>
	Decreased Community access to Infrastructure, Attractions, Amenities <input type="checkbox"/>
	Impact on Destination Appeal <input type="checkbox"/>

- You mentioned..... can you expand on the potential impact this could have on Surf Coast Tourism?
- You have discussed some of the important bio-physical impacts of climate change on tourism in the region, but what do you foresee as the socio-economic impacts? (or vice-versa)
- You have covered some very important issues, however, do you have any thoughts on.....?

3. Ok, Great. The next topic is about Adaptation. What adaptation options would you recommend for Surf Coast tourism, given the impacts you have just identified? (repeat topics mentioned)

Technical <input type="checkbox"/>	Business Management <input type="checkbox"/>	Behavioural <input type="checkbox"/>
1)	1)	1)
2)	2)	2)
3)	3)	3)

- Which stakeholders should be responsible for the implementation of the adaptation strategy suggested?
- Do you think that the local community would be supportive of that particular adaptation strategy?
- Which particular climate change impact/s will this adaptation strategy address?
- How effective do you believe this adaptation strategy will be in addressing these particular climate change impact/s?
- Are there areas of the Surf Coast region that should be the focus of adaptation efforts? Why?

4. Thanks. The next topic I would like to get your thoughts on involves adaptation opportunities. In other words, do you see any adaptation opportunities for Surf Coast Tourism as a result of climate change?

- Do you think the Surf Coast is well placed to capitalise upon an increasingly environmentally aware consumer?
- Do you believe there will be any changes in climate that are likely to be advantageous to the Surf Coast?

• Promotion of shoulder seasons/Reduce seasonality <input type="checkbox"/>
• Change Target market <input type="checkbox"/>
• Introduce new tourism activities <input type="checkbox"/>
• Change timing of special events <input type="checkbox"/>
• Reposition the destination <input type="checkbox"/>
• Promote new areas within destination <input type="checkbox"/>

5. **Ok, that's great, thanks. Before we conclude this interview do you have any final thoughts or comments you would like to make in regard to climate change and Surf Coast Tourism?**

Thank-you very much for your time, your input is greatly appreciated. Once I have transcribed and analysed the information from all the interviews I will contact you via email, regarding the next stage of the research.

Thanks again and goodbye for now.

Stop

Appendix F: Examples of Major Projected Climate Change Impacts by Sector

Phenomenon and direction of trend	Likelihood of future trends based on projections for 21st century using SRES scenarios	Examples of major projected impacts by sector			
		Agriculture, forestry and ecosystems	Water resources	Human health	Industry, settlement and society
Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights	Virtually certain	Increased yields in colder environments; decreased yields in warmer environments; increased insect outbreaks	Effects on water resources relying on snow melt; effects on some water supplies	Reduced human mortality from decreased cold exposure	Reduced energy demand for heating; increased demand for cooling; declining air quality in cities; reduced disruption to transport due to snow, ice; effects on winter tourism
Warm spells/heat waves. Frequency increases over most land areas	Very likely	Reduced yields in warmer regions due to heat stress; increased danger of wildfire	Increased water demand; water quality problems, e.g., algal blooms	Increased risk of heat-related mortality, especially for the elderly, chronically sick, very young and socially-isolated	Reduction in quality of life for people in warm areas without appropriate housing; impacts on the elderly, very young and poor
Heavy precipitation events. Frequency increases over most areas	Very likely	Damage to crops; soil erosion, inability to cultivate land due to water logging of soils	Adverse effects on quality of surface and groundwater; contamination of water supply; water scarcity may be relieved	Increased risk of deaths, injuries and infectious, respiratory and skin diseases	Disruption of settlements, commerce, transport and societies due to flooding; pressures on urban and rural infrastructures; loss of property
Area affected by drought increases	Likely	Land degradation; lower yields/crop damage and failure; increased livestock deaths; increased risk of wildfire	More widespread water stress	Increased risk of food and water shortage; increased risk of malnutrition; increased risk of water-and food-borne diseases	Water shortages for settlements, industry and societies; reduced hydropower generation potentials; potential for population migration
Intense tropical cyclone activity increases	Likely	Damage to crops; wind throw (uprooting) of trees; damage to coral reefs	Power outages causing disruption of public water supply	Increased risk of deaths, injuries, water- and food - borne diseases; post-traumatic stress disorders	Disruption by flood and high winds; withdrawal of risk coverage in vulnerable areas by private insurers, potential for population migrations, loss of property
Increased incidence of extreme high sea level (excludes tsunamis)	Likely	Salinisation of irrigation water, estuaries and freshwater systems	Decreased freshwater availability due to saltwater intrusion	Increased risk of deaths and injuries by drowning in floods; migration-related health effects	Costs of coastal protection versus costs of land-use relocation; potential for movement of populations and infrastructure; also see tropical cyclones above

Source: (IPCC, 2007b).

Appendix G: Information for Participants, Delphi Study

INFORMATION TO PARTICIPANTS INVOLVED IN RESEARCH

You are invited to participate

You are invited to participate in a research project entitled "Linking climate change, tourist destination adaptation and tourist attitudes: A case study of the Victorian Surf Coast". This project is being conducted by a student researcher, Mr Ryan Jopp, as part of his PhD study at Victoria University, under the supervision of Prof Terry De Lacy from the Centre for Tourism & Services Research.

Project explanation

The overall aim of this thesis will be to develop a conceptual framework for the tourism sector's adaptation to climate change at the regional level, using the Victorian Surf Coast as a case study. The primary aim is to develop appropriate adaptation strategies for the region, incorporating the opinions of various stakeholders. The secondary aim is to analyse consumer preferences for different adaptation scenarios, by testing how different consumer value segments respond to the proposed adaptation options.

What will I be asked to do?

You will be asked to take part in the first stage of the research whereby your opinions on adaptation for the region will be collated.

What will I gain from participating?

Respondents will be able to contribute their views and opinions on the important issues of climate change and in particular adaptation.

How will the information I give be used?

The information will be used in the production of a PhD thesis, as well as in scholarly publications.

What are the potential risks of participating in this project?

There are no anticipated risks to participants of participating in this project

How will this project be conducted?

The project will involve communication with 8 participants, all of whom will be provided with the same background information. Two rounds of communication will be undertaken. You will be provided with initial information on the context of the destination, outlining the tourism system and the possible impacts of climate change. From there the results of each round will be synthesised by the student and the results relayed via email back to participants.

The responses to each Delphi round will be analysed and collated and common themes will be identified. Although all responses will remain confidential, the information gathered will be shared with other participants with the aim being to achieve a consensus on the most appropriate forms of adaptation for the region.

Who is conducting the study?

The Centre for Tourism & Services Research, Victoria University.

Prof Terry De lacy (tdelacy@gmail.com)

Mr Ryan Jopp (ryan.jopp@vu.edu.au)

Any queries about your participation in this project may be directed to the Principal Researcher listed above. If you have any queries or complaints about the way you have been treated, you may contact the Secretary, Victoria University Human Research Ethics Committee, Victoria University, PO Box 14428, Melbourne, VIC, 8001 phone (03) 9919 4781.

Appendix H: Consent Form for participants, Delphi Study

CONSENT FORM FOR PARTICIPANTS INVOLVED IN RESEARCH

INFORMATION TO PARTICIPANTS:

We would like to invite you to be a part of a Delphi study into the development of regional tourism adaptation strategies to climate change. The study aims to incorporate the views of various experts in climate change and tourism destination management to gain a consensus on what adaptation strategies are most appropriate for the Victorian Surf Coast.

CERTIFICATION BY SUBJECT

I,
of

certify that I am voluntarily giving my consent to participate in the study:

“Linking climate change, tourist destination adaptation and tourist attitudes: A case study of the Victorian Surf Coast” being

Conducted at Victoria University by: Prof Terry De Lacy and Mr Ryan Jopp

I certify that the objectives of the study, together with any risks and safeguards associated with the procedures listed hereunder to be carried out in the research, have been fully explained to me by Prof. Terry De Lacy and/or Mr Ryan Jopp and that I freely consent to participation involving the below mentioned procedures:

- Delphi Study

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time and that this withdrawal will not jeopardise me in any way.

I have been informed that the information I provide will be kept confidential.

Signed:

Date:

Any queries about your participation in this project may be directed to the researchers, Mr Ryan Jopp (03) 99194895 or Prof Terry De Lacy 03 99195349

If you have any queries or complaints about the way you have been treated, you may contact the Secretary, Victoria University Human Research Ethics Committee, Victoria University, PO Box 14428, Melbourne, VIC, 8001 phone (03) 9919 4781

[*please note: Where the participant/s are aged under 18, separate parental consent is required; where the participant/s are unable to answer for themselves due to mental illness or disability, parental or guardian consent may be required.]

Appendix I: Climate Change Adaptation and the Surf Coast, Questionnaire

GLOSSARY

The following terms and definitions are related to the issues of climate change adaptation that are used throughout this survey. They are provided as general information only and this is not intended to be an exhaustive list.

Adaptation – Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC, 2007).

Climate change – Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external pressures, or to persistent human induced changes in the composition of the atmosphere or in land use (IPCC, 2007).

Coastal defences – A hard engineering structure built in the sea which, by breaking waves, protects a harbour, anchorage, and beach or shore area (IPCC, 2007).

Controlled burning – Also known as 'prescribed burning' is a land management tool undertaken to achieve any of the following land management objectives: fuel reduction, regeneration, site preparation (Bush Fire Front, 2010).

Erosion – The process of removal and transport of soil and rock by weathering, mass wasting, and the action of streams, glaciers, waves, winds and underground water (IPCC, 2007).

Firebreaks – A natural or constructed barrier such as a graded track or ploughed soil, or treated fire edge free from flammable vegetation, used in both fire suppression and prescribed burning to limit the spread of fire or to provide access for fire-fighters (Bush Fire Front, 2010).

IPCC – The Intergovernmental Panel on Climate Change (IPCC) was formed in 1988 by the two united UN Environmental Programme (UNEP) and World Meteorological Organization (WMO) to provide objective information about climate change to the public and to policy-makers. IPCC is made up of scientists and experts from all over the world and promotes the UN goals of human development (IPCC, 2007).

Storm surge – A rise in sea-level accompanying a hurricane or other intense storm. Storm surge height is usually measured as the difference between the observed sea-level height and the normal sea-level height. The main causes of storm surge are wind and reduction in atmospheric pressure (Nova, 2010).

Sea walls – A human-made wall or embankment along a shore to prevent wave erosion (IPCC, 2007).

MAP OF SURVEY REGION

This is a map of the Surf Coast Shire. This is the region you are asked to consider when answering these survey questions.



CLIMATE CHANGE ADAPTATION AND THE SURF COAST

The aim of this survey is to determine your opinions of various climate change adaptation options for this region known as the Surf Coast.

Adaptation is a process whereby governments, organisations, and the public aim to moderate, cope with, and benefit from the consequences of climate change, in order to manage risk and reduce vulnerability.

As a visitor to the Surf Coast you may well have a personal interest in its future. Consequently, this questionnaire asks for your opinions and ideas regarding climate change adaptation for the region.

The Surf Coast region includes part of the Great Ocean Road from Torquay to Lorne, as well as inland towns such as Winchelsea, and also part of the Great Otway National Park. Since the region stretches over a large area, you may be more familiar with some parts than others. This does not matter, as we request that you attempt to answer all the questions to the best of your knowledge.

This survey is anonymous; therefore you do not need to give your name at any stage. A glossary of terms is also provided for your convenience on the back page of this survey.

We greatly appreciate your participation in this study.

Ryan Jopp (PhD Scholar) & Prof. Terry DeLacy (Principal Supervisor)
Centre for Tourism & Services Research
Victoria University
Melbourne, Australia.



YOUR FAMILIARITY WITH THE SURF COAST AND CLIMATE CHANGE

- How many times – including this visit – have you visited the Surf Coast in your lifetime? (please tick one)

<input type="checkbox"/> This is my first visit	<input type="checkbox"/> Two to three times
<input type="checkbox"/> Four to five times	<input type="checkbox"/> Six to 10 times
<input type="checkbox"/> More than 10 times	
- Are you currently on a one-day bus tour? (If yes, please go to Question Four)

<input type="checkbox"/> Yes	<input type="checkbox"/> No
------------------------------	-----------------------------
- During this visit where you will be spending most of your time?

<input type="checkbox"/> Torquay	<input type="checkbox"/> Belts Beach
<input type="checkbox"/> Anglessea	<input type="checkbox"/> Airey's Inlet / Fairhaven
<input type="checkbox"/> Lorne	<input type="checkbox"/> Winchelsea
<input type="checkbox"/> The Great Otway National Park	
<input type="checkbox"/> Other: _____	
- How would you rate your knowledge of the tourist attractions and activities available throughout the Surf Coast region? (please tick one)

<input type="checkbox"/> Very Good
<input type="checkbox"/> Good
<input type="checkbox"/> Average
<input type="checkbox"/> Poor
<input type="checkbox"/> Very Poor
- How would you rate your knowledge of the issues surrounding climate change? (please tick one)

<input type="checkbox"/> Very Good
<input type="checkbox"/> Good
<input type="checkbox"/> Average
<input type="checkbox"/> Poor
<input type="checkbox"/> Very Poor
- How would you rate your knowledge of the issues surrounding climate change adaptation? (please tick one)

<input type="checkbox"/> Very Good
<input type="checkbox"/> Good
<input type="checkbox"/> Average
<input type="checkbox"/> Poor
<input type="checkbox"/> Very Poor



YOUR ENVIRONMENTAL WORLD VIEW

- Please answer each of these questions in terms of the way you generally feel.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
We are approaching the limit of the number of people the earth can support					
Humans have the right to modify the natural environment to suit their needs					
When humans interfere with nature it often produces disastrous consequences					
Human ingenuity will insure that we do not make the earth uninhabitable					
Humans are severely abusing the environment					
The earth has plenty of natural resources if we just learn how to develop them					
Plants and animals have as much right as humans to exist					
The balance of nature is strong enough to cope with the impacts of modern industries					
Despite our special abilities humans are still subject to the laws of nature					
The so-called "ecological crisis" facing humankind has been greatly exaggerated					
The earth is like a spaceship with very limited room and resources					
Humans were meant to rule over the rest of nature					
The balance of nature is very delicate and easily upset					
Humans will eventually learn enough about how nature works to be able to control it					
If things continue on their present course, we will soon experience a major ecological catastrophe					

YOUR OPINION OF SPECIFIC CLIMATE CHANGE ADAPTATION OPTIONS

- Assuming you were considering a return trip to the Surf Coast, how would the implementation of the following adaptation options positively or negatively affect your decision?

	Highly negative	Negative	No affect	Positive	Highly positive
Fire breaks / Controlled burning					
Early warning systems for extreme events					
Construct sea walls / coastal defence structures					
Retreating (moving communities and infrastructure back from the coast)					
Make the Great Ocean Road one-way (east to west)					
Construct artificial reefs for surfing / diving					
Close beaches to tourists that are affected by impacts (such as sea-level rise, erosion or storm surge)					

ABOUT YOU

- What is your gender? ☐ Male ☐ Female
- What is your current age? _____
- What is your nationality as shown on your passport? _____
- If you are Australian, where do you live?
- | | |
|---|---|
| <input type="checkbox"/> Australian Capital Territory | <input type="checkbox"/> New South Wales |
| <input type="checkbox"/> Northern Territory | <input type="checkbox"/> Queensland |
| <input type="checkbox"/> South Australia | <input type="checkbox"/> Tasmania |
| <input type="checkbox"/> Victoria (Melbourne) | <input type="checkbox"/> Victoria (outside Melb.) |
| <input type="checkbox"/> Western Australia | |
- What is the highest level of education you have completed?
- | | |
|--|---|
| <input type="checkbox"/> Post Graduate Qualification | <input type="checkbox"/> Tertiary/University degree |
| <input type="checkbox"/> Vocational / Technical Training | <input type="checkbox"/> Secondary School |
| <input type="checkbox"/> Primary / some Sec. School | <input type="checkbox"/> None |
| <input type="checkbox"/> Prefer not to answer | |
- Do you have any other comments you would like to make about this study in particular or about climate change adaptation in general?
- _____
- _____
- _____