BUILDING FUTURE TOURISM ENVIRONMENTS: TOWARDS MORE ECO-EFFICIENT DESTINATION TRANSPORTATION SYSTEMS

by

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ABSTRACT

Transportation is not only a key component of the tourism value chain, it is also a constraint to the sustainable development of tourism. Transportation consumes the greatest portion of energy in the tourism system. Strategies such as shifting visitors to more energy-efficient modes have the potential to improve the eco-efficiency of tourist transportation. This study examined how to successfully shift skiers from private to public modes of transport, using a case study in Whistler, British Columbia. Respondents were recruited for an online survey which employed both traditional and discrete choice survey methods to examine tourists' transportation choice behaviour. Based on study findings, implications for destination planners are identified. Long-haul tourists are identified as the prime target, and transportation strategies that should be considered by planners are described.

Keywords: tourism; transportation; eco-efficiency; sustainability; policy and planning; Whistler, British Columbia

To Kris ~ my heart

For his unfailing patience, love and support

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1 INTRODUCTION

1.1 Rationale

A good deal of tourism depends on the natural environment for its attractions and resources. It produces goods and services from those assets while simultaneously using significant amounts of energy, water and materials, and contributing to environmental challenges (Bates & Caton, 2002, Kelly & Williams, 2007a) such as global warming (Clark, Jager, Cavender-Bares & Dickson, 2001). Such consequences can be significant for destinations that rely on the quality of the natural environment for their attractiveness to visitors and residents.

Transportation is a significant and core component of tourism activity. A number of models have been proposed to describe and manage critical dimensions of transportation's functions in the tourism system (e.g., Hills & Lundgren, 1977; Leiper, 1979). Transportation, required for travel to and within destinations, is estimated to consume as much as 90% of the total energy required for tourism (Gössling, 2002; Mastny, 2002). A number of academic journals (e.g., Journal of Transport Geography, Transport Policy, Transportation, Transportation Research Record) present a growing body of research examining the effects of urban planning strategies on travel-related traffic flows and associated energy consumption patterns (e.g., Bhat & Guo, 2007; Boarnet & Sarmiento, 1998; Nepal, 2006; Newman & Kenworthy, 1996; Pinjari, Pendyala, Bhat & Waddell, 2007). Only more recently have such investigations focused on tourism-related travel impacts.

Conventional automobiles and public transit use fossil fuels as their primary energy source. The burning of fossil fuels generates many harmful chemicals including greenhouse gases which have local, regional, and global environmental effects (Gössling, 2000, 2002; Holden, 2000; Hunter & Green, 1995). Fossil fuel emissions may have a deleterious effect on the quality of tourism products and visitor experiences (Andereck, 1995; Gössling, 2002; Holden, 2000; Hunter & Green, 1995).

Destination planners can shape the tourism value chain through a variety of transportation strategies designed to reduce the level of energy consumed and the resulting wastes and pollutants generated by travelers. Examples of such strategies include developing public transit systems with higher per vehicle load capacities and increasing their occupancy rates (Sweeting, Bruner & Rosenfeld, 1999; Thrasher, Hickey & Hudome, 2000), as well as using more efficient energy technologies and renewable resources to power them (Bode, Hapke & Zisler, 2003). However, for successful implementation of such strategies, technological solutions must be accompanied by promotional programs and incentives that encourage shifts to such travel options. Knowing the preferences and probable responses of visitors to such strategies is an important initial step in developing the strategic programs needed to effectively shift tourists to these alternative modes.

Destinations that rely on the natural environment as an integral part of their tourism experiences can be adversely impacted by the consequences of excessive energy use. In a growing number of cases, the overall quality of tourist experiences is diminished by transport related congestion, noise and air quality factors. Whistler, British Columbia is one example of a destination that relies on its environment as a draw for tourists. It is

attempting to mitigate the potential negatives impacts of inefficient transportation systems.

Whistler, a four-season resort located 120 km north of Vancouver, receives about two million visitors annually (Resort Municipality of Whistler, 2004a). The Resort Municipality of Whistler is now preparing to co-host the 2010 Olympic Winter Games. Because of the many environmental and broader sustainability planning strategies Whistler is either contemplating and/or implementing, it is a useful case study region in which to explore planning options for reducing transport-related fuel consumption. While many of Whistler's planning approaches are seen as being especially proactive, there is a need to explore how tourists' might respond to various transportation options.

1.2 Research Purpose and Goals

The purpose of this research is to contribute to a larger investigation exploring stakeholder responses to a range of eco-efficiency management options available to planners and managers in resort destinations (Haider and Williams SSHRC, 2004-2007). The overriding goal is to examine the preferences and potential behaviours of tourists with respect to strategies designed to enhance the eco-efficiency of tourist transportation to resort destinations. These strategies are specifically associated with attempting to shift tourists from private to public modes of transport. The following specific questions guide the investigation:

1. What policy options encourage skiers to shift from private to public modes of transportation in order to increase the eco-efficiency of transportation in the tourism system?

2. How does the overall skier market respond in terms of preferences and probable behaviour to these transportation strategy options?
3. How do the responses of short- and long-haul skiers[1] to these transportation policies vary?
4. How do the responses of skiers and summer visitors to Whistler differ?
5. What are the implications of these responses for destination transport policy and planning decisions?

1.3 Methods

A two-phased research process guides the investigation. Initially, a literature review informs the creation of the research frame and key elements to be addressed in the ensuing phases. In the second phase, a two-part data collection process involving intercept and on-line surveys is employed to collect visitor responses to a range of socio-demographic, attitudinal and behavioural questions. More specifically, both traditional itemized and broader discrete choice experiment survey methods elicit preferences for the various transport options identified. These options relate to the choice of alternative modes of transportation between Vancouver and Whistler under varying circumstances.

Discrete choice analysis procedures are used to estimate tourists' choice behaviour, and their acceptance of and preferences for the different transportation alternatives. Choice behaviour (supplied by responses to the discrete choice experiment and actual transportation mode used on their trip to Whistler) is further examined using

[1] Short-haul visitors are those who reside in British Columbia, Alberta, Washington and Oregon. Long-haul visitors are those who reside elsewhere.

descriptive statistics to explore the differences between groups. This is done in order to describe short- and long-haul skiers according to their transportation mode choices.

1.4 Report Organization

This report is divided into six chapters. This chapter presented the rationale for the project, the purpose, goals and research questions associated with the study, and a brief description of the methods used. Chapter Two provides a review of relevant literature including discussions of sustainable tourism, transportation, the involvement of tourists, and a discussion of the relevance of this research for Whistler, BC. The third chapter presents a description of the methods used in the study. It includes descriptions of: overriding research questions; data collection techniques employed; content themes and questioning formats used to explore the questions; analytical techniques used to investigate key themes emerging from the responses received; and the strengths and weaknesses of the methods implemented. Chapter Four presents the results of the survey analyses. The management implications of these findings for Whistler stakeholders and other destinations are outlined in Chapter Five. In the final chapter, conclusions, study limitations and recommendations for further research are offered.

2 LITERATURE REVIEW

This literature review is comprised of four sections. The first section presents pertinent background information and definitions for sustainable tourism, as well as a discussion of related energy consumption and eco-efficiency. The next section examines tourism transportation, presenting research concerning transportation, energy consumption and tourism. The third section provides a description of Whistler and rationale for its use as a case study in this research. The final section concludes the literature review by developing key themes for guiding this study's research in the field of tourism transportation impacts.

2.1 Sustainable Tourism

2.1.1 Tourism and Sustainable Development

The link between the global environment and development was formally recognized at an international level in 1972 at the United Nations Conference on Human Environment. The first formally recognized concept of sustainable development was developed at the World Commission on Environment and Development [WCED] in 1987 (WCED, 1987). That concept of sustainable development has evolved over the years. The definition of sustainable development presented in *Our Common Future* describes it as a form of development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 8).

A number of documents have put forward frameworks for sustainability (e.g., Earth Charter Commission, 2000; United Nations, 1992). Common themes emerge from these frameworks. *The Earth Charter* presents a widely accepted set of principles including respect and care for the community of life, ecological integrity, social and economic justice, and democracy, non-violence and peace (Earth Charter Commission, 2000). Inskeep (1991) created a model of sustainable tourism which outlines a number of guiding principles that frame the notion of sustainable tourism. He suggests that tourism activities must be non-intrusive, non-depleting and renewable, scaled to the particular environment, natural in material make-up and presentation, focused on quality rather than quantity, and integrated into local physical, social, cultural and economic environments (Inskeep, 1991).

Tourism has frequently been viewed as an industry that complements and supports the goals and principles of sustainability (Butler, 1991; Hunter, 1997). Simultaneously, it has been criticized as having a number of economic, social and environmental impacts that are in opposition to the concept (Goeldner, Ritchie & McIntosh, 2000; Mathieson, 1982). While much research has focused on the positive impacts of tourism, a growing body of literature indicates that it can produce significant negative environmental consequences as well (e.g., Andereck, 1995; Briassoulis & van der Straaten, 2000; Butler, 1991; Cohen, 1978; Williams, 1994).

Environmental effects arise from the requirements for and the nature of the tourism industry. While local actions also contribute, tourism activities frequently generate negative environmental impacts such as air, water, noise and visual pollution, as well as congestion and ecological damage (Inskeep, 1987). The presence of the tourists

themselves, their length of stay, and the activities they pursue also influence the environmental impacts (Cohen, 1978). Consumption of resources and production of wastes, both requisite for tourism, have potentially significant environmental consequences (Cohen, 1978; Welford, Ytterhus & Eligh, 1999; Williams, 1994).

Research conducted as early as 1961 recognized that tourist travel had the potential to produce inappropriate ecological imbalances (as cited in Mathieson, 1982). Since then, researchers have noted that tourism environments require protection in order to maintain their environmental quality, and in turn, meet the expectations of tourists (Inskeep, 1987; Gunn, as cited in Pigram, 1980; World Tourism Organization [WTO], 2003). Traditionally, planning for environmental conservation at destinations was considered a potential threat to economic and social development (Coccossis, as cited in Leberman & Mason, 2002). More recently, the negative impacts caused by some tourism stakeholders are seen as having serious consequences for the long term sustainability of tourist destinations that rely on the quality of the natural environment for the production of their tourism experiences (e.g., Batta, 2000; Goeldner, Ritchie & McIntosh, 2000; Hunter & Green, 1995; Inskeep, 1987; WTO, 2003).

2.1.2 Tourism and Energy Consumption

From an environmental sustainability perspective, an important management issue involves minimizing tourism's use of energy, water, and materials. Energy use is one of the key consequences of tourism (Gössling, 2002). A large portion of global energy use is associated with fossil fuel consumption which results in a number of chemical emissions. Energy consumption and related greenhouse gas emissions are catalysts to global warming (Clark et al., 2001) and local air pollution (Bates & Caton, 2002). In this

context, recognition of tourism's contribution to such greenhouse gas emissions is growing (Kelly & Williams, 2007b; WTO, 2003; WTO, 2007).

Greenhouse gas emissions, including those associated with tourism energy use have negative consequences for tourist destinations. The World Tourism Organization [WTO] has organized two international conferences on climate change and tourism. At the first conference in Djerba, Tunisia in 2003, participants explicitly acknowledged the links between tourism and climate change. The *Djerba Declaration on Tourism and Climate Change* encouraged all stakeholders to subscribe to conventions for reducing climate change (e.g., *Kyoto Protocol*), to advance research into the links between tourism and climate change, and to encourage the use of renewable energy sources through incentives and technical assistance (WTO, 2003). The conference attendees recognized the need to explore the effects of energy efficiency strategies on the sustainability of tourism (WTO, 2003). The second conference, held in Davos, Switzerland in 2007, produced the *Davos Declaration* (WTO, 2007). It furthered the recommendations made in 2003 and called for a number of stakeholder actions that would help tourism move towards being carbon-neutral and encouraged the industry to "face climate change as one of the greatest challenges to sustainable development" (p. 4).

Energy consumption for tourism is intensive enough that viewing tourism as a sustainable industry may not be appropriate. Research suggests that energy consumption and related emissions for the tourism industry are no different than average consumption and emission rates for the global economy as a whole (Gössling, Peeters, Ceron, Dubois, Patterson & Richardson, 2005; Patterson, as cited in Peeters & Schouten, 2006). In

addition, energy use in tourism destinations is often significantly greater than in other communities of similar size (Tabatchnaia-Tamirisa, Loke, Leung, & Tucker, 1997).

Energy is required for the production of all tourism products and services. Addressing energy consumption patterns and management strategies in tourist attractions and activities is important for creating more sustainable forms of tourism (Becken & Simmons, 2002). Tourism's greenhouse gas emissions contribute to global environmental change, which affects the long-term viability of tourism (Gössling, 2002; Lipman, 2007). However, this link between tourism and energy consumption is only recently emerging as an area of research significance (e.g., Becken & Simmons, 2002; Gössling & Peeters, 2007).

The literature suggests an increasing awareness of the impacts of energy consumption due to tourism activities. Energy consumption has been identified as an area that requires further research (Gössling, 2002). Energy consumption and eco-efficiency have been identified as useful quantitative measures in tourism research (Becken & Simmons, 2002; Gössling et al., 2005). Transportation is oft cited as a key issue in terms of tourism-induced energy consumption. Table 2.1 summarizes key transportation-related research findings associated with the energy requirements of tourism.

Table 2.1: Research related to tourism and energy consumption

Key Findings	References
Transportation accounts for a significant portion (in some cases greater than 90%) of the energy requirements of tourism.	Gössling, Hansson, Horstmeier & Saggel, 2002 Gössling et al., 2005 Kelly & Williams, 2007b Peeters & Schouten, 2006 Tabatchnaia-Tamirisa et al., 1997
Air travel is a key environmental challenge and a critical component of energy consumption due to tourism transport.	Becken, 2002 Gössling et al., 2005 Peeters & Schouten, 2006
Transport mode choice is a key factor for determining eco-efficiency. Eco-efficiency can be improved by shifting to more energy efficient transport modes.	Becken, Simmons & Frampton, 2003a Becken, 2005 Gössling et al., 2005 Hoyer, 2000 Kelly & Williams, 2007b
Travel distance is a key factor for determining eco-efficiency.	Becken, 2005 Gössling et al., 2005 Peeters & Schouten, 2006
Tourist travel choices (including mode of transport) impact the level of energy consumption.	Becken et al., 2003a Becken, 2005 Hoyer, 2000 Kelly & Williams, 2007b Peeters & Schouten, 2006
Transportation policies should be informed by an awareness of factors that influence mode choice in order to successfully decrease energy consumption. Policy decisions can impact the mode choices of tourists.	Becken et al., 2003a Becken, Simmons & Frampton, 2003b Hoyer, 2000 Kelly & Williams, 2007b

Research shows that transportation is overwhelmingly the highest generator of energy consumption in the tourism system (Kelly & Williams, 2007b). If transportation policies can indeed influence the transport mode choices of tourists, policies that help shift tourists to more energy efficient modes will directly impact energy consumption and eco-efficiency. Given the portion of energy consumption in the tourism industry allocated

to transportation, the objective of this research project (to examine market responses to various proposed transportation policy and planning options) contributes to the knowledge base needed to appropriately measure market responses to differing transportation options from a sustainability perspective.

2.1.3 Tourism and Eco-Efficiency

As a concept, eco-efficiency involves producing goods and services with ever diminishing resource requirements (World Business Council for Sustainable Development [WBCSD], 2000). The outcome of eco-efficiency is the production of less waste and pollution, and subsequently smaller negative environmental impacts. Essentially, eco-efficiency involves increasing resource productivity or "doing more with less" (DeSimone & Popoff, 1997, p. 2).

The concept of eco-efficiency complements the notions of sustainable development presented previously. Eco-efficiency is particularly applicable to supporting the creation of more sustainable forms of tourism. Given the tourism industry's current dependence on energy consumption, a move towards increased eco-efficiency will help sustain future tourism operations. Tourist transportation is one sector of the tourism industry where eco-efficiency can be improved. Shifting tourists to more energy efficient transport modes would be one key way to improve the eco-efficiency of tourism.

In principle, service-based economies encourage reductions in materials used and waste produced per unit of output (Herman, Ardekani & Ausubel, 1990). However, tourism as a service industry relies on an extensive array of natural resources in the tourism value chain to provide experiences for visitors. Overall, the tourism industry has

been slow to adopt broad eco-efficiency improvement strategies (WBCSD & United Nations Development Program [UNDP], n.d.). To date, the accommodation sector has undertaken most of the efforts within the tourism industry to promote eco-efficiency, even though transportation appears to have the greatest impact.

Increased eco-efficiency is touted as a strategy for reducing the speed of global warming (DeSimone & Popoff, 1997). It is also viewed as an approach for reducing energy and material production flows that create negative environmental impacts (Bernardini & Galli, 1993). Eco-efficiency strategies have the potential to reduce tourism's contribution to energy consumption and subsequent climate change. They are a valuable means for exploring the "combined environmental and economic performance of tourism" and for assessing the environmental performance of different tourism industry sectors (Gössling et al., 2005, p. 431). Since tourism generated transportation is such a prominent energy user, it should be a focus for eco-efficiency improvements.

2.2 Transportation for Tourism

2.2.1 Transportation and the Tourism System

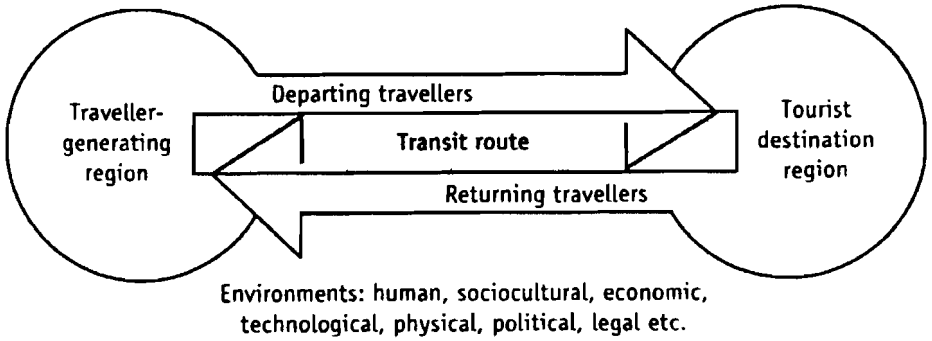
Transportation is essential for the tourism system to function (Gunn, 1988; Leiper, 1979; Leiper, 2004; Page, 1994). It has been referred to as "one of the most significant factors which has contributed to the international development of tourism" (Page, 1994, p. 1). Transportation is used for transit between geographic locations, as well as within destinations, and can also be the primary focus and attraction for certain types of travel (e.g., bus tours or cruises) (Lumsdon, 2006; Page, 1994). The popularity of

tourism has increased as various technologies have enabled tourists to travel longer distances (Prideaux, 2000) and improved the comfort and safety of travel (Gunn, 1988).

Transportation links tourists with travel destinations (Gunn, 1988; Leiper, 1979; Leiper, 2004), and conventional tourism would not be possible without it. A value chain is the set of structures and processes used to deliver goods and services to clients (Porter, 1985). The value chain incorporates "(1) the stock and flow structures for the acquisition of the inputs to the processes and (2) the management policies governing the various flows" (Sterman, as cited in Wynne, Berthon, Pitt, Ewing & Napoli, 2001). A value chain framework breaks down the sequence of functions required to produce a good or service into all the value-creating activities within the industry (Porter, 1985). The service being delivered, in the case of the tourism industry, is the tourism experience. Transportation is an important flow structure of the tourism value chain. The environment is another key component for destinations whose tourism experience is dependent on natural resources for creating tourist experience. Linkages between stocks and flows exist if one activity affects another (Porter, 1985), thus transportation and the environment are linked through the impacts of energy consumption on tourism experiences.

A number of models of the tourism system exist that include the transportation component. Page (1999) presents a tourism transport system in which several factors impact travel from the planning phase to completion of the trip (as cited in Lumsdon, 2006). Similarly, Leiper's model of the tourism system is comprised of three interactive elements (Leiper, 1979; Leiper, 2004) (Figure 2.1). These are the tourist generating region, the destination region and transportation routes linking the two locations.

Figure 2.1: The tourism system



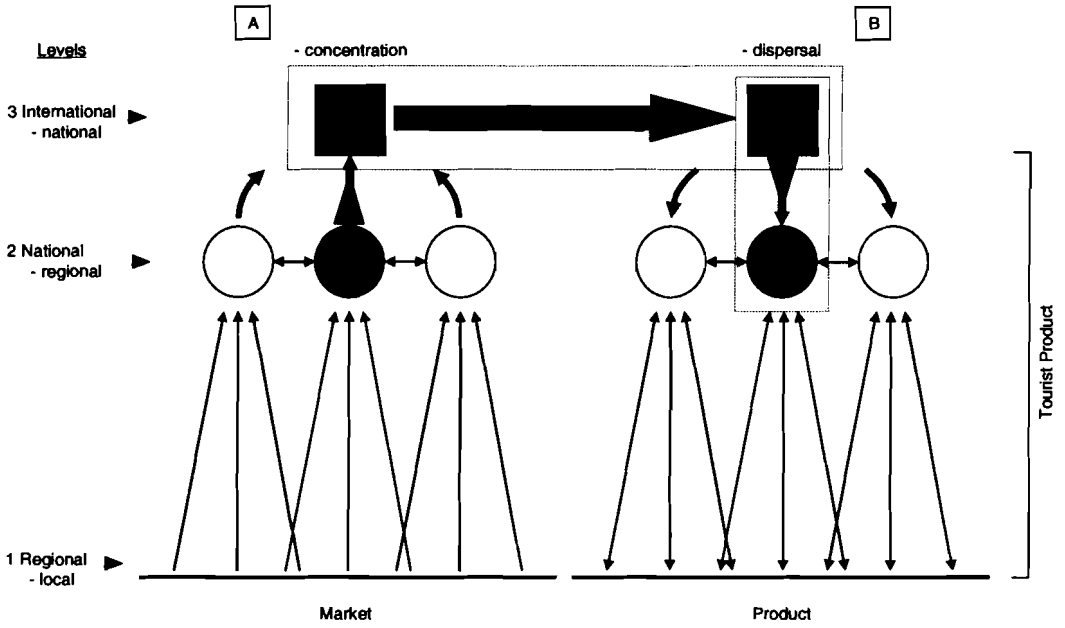
From Annals of Tourism Research, Volume 6, N. Leiper, The framework of tourism: Towards a definition of tourism, tourist, and the tourism industry, p. 390-407, ©1979, with permission from Elsevier.

While straightforward, Leiper's (1979; 2004) model demonstrates the necessity of transportation for tourism to occur. As illustrated by Figure 2.1, in order for destinations to be successful, destination managers must consider a number of variables to supply a well-functioning transportation system. These include human, socio-cultural, economic, technological, physical and political contexts. With the aim of improving destination eco-efficiency, tourism managers must not only address physical and technological variables (e.g., transportation infrastructure and energy efficiency of vehicles), but also the human and environmental elements (e.g., adoption of more eco-efficient transport modes by tourists). Differences in the travel behaviour of short- and long-haul tourists are not conveyed in Leiper's (1979, 2004) model.

Hills and Lundgren (1977) developed a model describing the functional mechanisms associated with tourist movement (Figure 2.2). This model contains two distinct structures – markets and products. These are synonymous with the tourist generating region and destination region offered by Leiper (1979; 2004). However, the Hills and Lundgren's model is more appropriately applied in a long-haul context. Tourists concentrate in one location in order to travel from their region of origin to that of

their destination. After arriving in the destination region, travelers disperse to a number of destinations for their individual tourism experiences.

Figure 2.2: Functional mechanism of tourist movement



† Adapted from Annals of Tourism Research, Volume 4, Theo Hills & Jan Lundgren, The impact of tourism in the Caribbean: A methodological study, p. 248-267, ©1977, with permission from Elsevier.
Notes: The left (A) and right (B) sides of the diagram are linked through transportation, the functional mechanism. B illustrates the dispersal of tourists on arrival at a central hub (international airport at destination) to resort facilities at the regional level (level 2). In B, the arrows linking levels 1 and 2 indicate interaction at the local level (i.e., within a resort destination). The dotted lines link integrated economic and logistical components.

Transportation is required in this model as well, although Hills and Lundgren separate long-haul travel (likely by air) and travel from the specific arrival point to the dispersed destinations of each individual. The model does not specifically differentiate short- and long-haul tourists (where long-haul tourists travel by air) in terms of their travel behaviour, although it is likely that they make unique transportation choices. No further research has elaborated on or adapted Hills and Lundgren's transportation model

to alternative tourism situations. This study considers Hills and Lundgren's model in a mountain resort context, and suggests how the concept of tourism value chain can be used to inform and guide the development of destination management strategies which may encourage greater transportation eco-efficiency.

Intermodal transit use is increasing (Gunn, 1988), and many tourists travel by a combination of modes (e.g., air and automobile). Up to 50% of travel in many industrialized countries is leisure related (Carlsson-Kanyama & Linden; Heinze; Knoflacher, as cited in Gössling, 2002; Hoyer, 2000) and the majority of this travel occurs in private automobiles (Gössling, 2002). While all modes of transport require improvements in their eco-efficiency performance, some need more attention than others.

2.2.2 Tourist Transportation and Energy Consumption

Conventional automobiles and public transit used for transportation burn fossil fuels as their primary energy source. The burning of fossil fuels generates many harmful chemicals including greenhouse gases which have local, regional and global environmental effects (Gössling, 2000, 2002; Holden, 2000; Hunter & Green, 1995). Burning fossil fuels may have a deleterious effect on the quality of the tourism product and the visitor experience (Andereck, 1995; Gössling, 2002; Holden, 2000; Hunter & Green, 1995). Contrary to other industries, consumers of tourism services must be transported to the destination where production and consumption coincide. Travel between a tourist's residence and destination is the greatest consumer of energy in the production of tourism experiences (Gössling, 2000, 2002; Hoyer, 2000). It utilizes as much as 90% of the total energy required for tourism (Gössling, 2002; Kelly & Williams, 2007b; Mastny, 2002).

Several planning options are available to tourism destinations who wish to shape the tourism value chain by encouraging energy reductions and thus further greater eco-efficiency associated with tourist transportation (Gunn, 1994; Holding, 2001; Inskeep, 1987). While many of these are associated with intra-destination transportation, a number of options address travel to and from destinations (Becken et al., 2003a; Holding, 2001). These include implementing policy options that increase the appeal of public transit (e.g., providing high-occupancy vehicle lanes, improving affordability, and enhancing transfer convenience and intermodal access) (Kelly, 2006). Certain features at destinations may also help reduce private automobile travel to and from destinations. These include introducing "no-vehicle zones", restricting parking availability (Holding, 2001), and implementing parking fees (Kelly, 2006) in order to make travel to the destination by private vehicle less appealing. Offering integrated multi-modal packages (e.g., the purchase of a train ticket from the airport to the destination includes local transit at the destination) is another alternative (Lumsdon, Downward & Rhoden, 2006). Improvements in technology, such as shifting to hybrid vehicles or vehicles using hydrogen or fuel cell technology may also help improve the eco-efficiency of transporting tourists (Peeters & Schouten, 2006).

External factors, such as increased gasoline prices or reduced availability of gasoline, may also assist in the reduction of energy consumption associated with tourism transportation. However, policies must be in place to ensure that while energy consumption is reduced, appropriate forms of tourist travel are not. Research done regarding the oil crisis of the 1970's indicated the effects of rising gas prices and possible rationing strategies on travel behaviour including transportation mode choice. Different

studies considered different price levels at which changes occur (United States Travel Data Center, as cited in Williams, Burke & Dalton, 1979).

In general, the findings from these studies suggested that the demand for gasoline is considered relatively inelastic compared to other consumer goods and services. However, there are different elasticities for different types of travel (Nesbit, as cited in Kamp, Crompton & Hensarling, 1979; Williams et al., 1979), with travel for tourism being more elastic than non-discretionary travel (Kamp et al., 1979, Trent & Pollard, 1983). Tourists tend to reduce their use of private automobiles for travel (at least temporarily) in response to rising gas prices (Becker, Brown & Sehary, 1976; Williams et al., 1979). In some cases, people were more likely to decrease their travel (Trent & Pollard, 1983) or to not travel (Kamp et al., 1979) than to shift to alternative modes of transportation due to rising gas prices.

Gas prices do, however, appear to directly impact peoples' selection of travel mode (Williams et al., 1979) with public modes increasing in popularity as gas prices increase (Morgan, 1986; Hunt, as cited in Williams et al., 1979; Williams et al., 1979). In cases where the cost of both public and private transit increases, the number of individuals traveling by public modes increases (Morgan, 1986). In some cases where travel from a central arrival point to a specific tourist site occurs, in this example the Grand Canyon, a greater portion of foreign tourists chose to travel to their final destination by public transit (Morgan, 1986). In terms of very long distance travel, the increase in local travel costs would have to be significantly higher in order to have much impact on demand (Dubois & Ceron, 2006).

2.2.3 Transportation Research and Tourism

The majority of transportation research is unrelated to tourism. It typically focuses on resident travel behaviour in urban commuting environments and the relationships between urban land use and transportation (e.g., Boarnet & Sarmiento, 1998; Frank & Pivo, 1994; Kenworthy & Laube, 1996; McNally & Kulkarni, 1997; Newman & Kenworthy, 1996). Most transportation studies overlook tourist travel and centre on such themes as the economics of transportation, and operational, organizational or management issues associated with different modes of transport. Some researchers have addressed either transportation or tourism in conjunction with the environment, but they have not been examined in tandem until recently. Given the significant amount of energy required for global tourism transportation and the challenges involved in shifting people to less energy intensive modes, further investigations concerning the eco-efficiency links between tourism and transportation energy consumption should be undertaken.

As illustrated in the previous section, even with rising gasoline prices, it is challenging to shift people from private to public modes of transportation. A segment of individuals are committed to private vehicle travel (Colin Buchanan and Partners & Travel Dundee, as cited in Hine & Scott, 2000) unless the supply of transportation infrastructure is sufficiently limited so they may not easily use a private automobile at their desired level of service (Sarker, Morimoto, Koike & Ono, 2002).

In general, the policy response to heavy traffic is to expand roads and other transportation infrastructure. Expansion of transportation infrastructure can lead to unexpected short- term expansion of traffic flows, greater overall long-term increases and greater growth in traffic during peak periods (Goodwin, 1996). Limiting transportation

infrastructure while simultaneously improving public transit is one solution to shifting people to public modes of transportation (Sarker et al., 2002). Improvements in public transportation without accompanying limits to infrastructure may not be successful (Sarker et al., 2002).

Public transportation must become more appealing in order to shift people out of their private automobiles. From a strategic planning perspective, key issues must be addressed in order to improve public transportation. These include using "carrots and sticks" policies (i.e., promoting and developing public transit while enacting policies to restrict private automobile travel), selecting an appropriate approach to transportation design (tourist-focussed or conventional), and addressing other factors that affect private automobile use (Cullinane & Cullinane, 1999; Hine & Scott, 2000; Holding & Kreutner, 2002; Lumsdon, 2006; Sarker et al., 2002). The development of partnerships between tourism operators and transit providers may provide the catalyst needed to stimulate modal shifts (Lumsdon, 2006).

The design of public transportation services is also important. Comfort, safety and security, frequency, reliability, service quality, pricing, ticketing and marketing communications are all issues that should be addressed (Hine & Scott, 2000; Lumsdon, 2006). Frequency, price and the extent of the transportation network have been identified as the three most significant deterrents to using public transit (Cullinane & Cullinane, 1999). In addition, passengers tend to choose modes which provides the fastest, most direct route (Conquest Research, as cited in Hine & Scott, 2000), especially in some tourism contexts. Emphasizing opportunities for social interaction, sightseeing (Guiver, as cited in Lumsdon, 2006), novelty travel (Cullinane & Cullinane, 1999) and

environmental values may be a useful means to encouraging modal shifts. Further research regarding the mode choice rationale of public transit users is required (Lumsdon, 2006). Public transit may not be able to compete with private modes when both are judged by the same criteria (Guiver, as cited in Lumsdon, 2006). In Kelly's (2006) study of summer tourists to Whistler[2], he found that many respondents were willing to shift from private to public modes. In particular, many tourists preferred public modes as travel time, parking fees and fuel costs increased.

Much of the emerging research with a tourism-specific transportation focus examines local transportation issues within tourist destinations (e.g., Dickinson & Dickinson, 2006; Holding, 2001; Wilhelm, as cited in Lumsdon et al., 2006). Very recently, air travel and its environmental impacts has become a focus for tourism researchers (Becken, 2007; Gössling & Peeters, 2007). Most existing tourism research addresses transportation as a component of larger investigations dealing with environmental impacts or tourist behaviour. Very little research focuses specifically on tourism transportation or considers specific tourist behaviours such as mode choice on influencing energy consumption levels.

Some recent research has addressed tourists' perceptions of their travel behaviour and its relationship to climate change (Becken, 2007; Gössling, Bredberg, Randow, Sandstrom & Svensson, 2006). No research addresses which transportation options tourists prefer or how the actions of tourists might contribute to reducing transportation-related energy consumption. Transportation and tourism research needs to examine the "technical issues, tourists' travel demands and attitudes, the logistics of multi-modal

[2] This study used the summer survey discussed in Section 3.1.

linkages and the interests of a wide range of essential stakeholders" (Becken, 2006, p. 114). There is also a need to conduct more integrated transportation (i.e., planning and technology) and tourism (i.e., travel behaviour) research (Kelly, Haider & Williams, 2007; Kelly & Williams, 2007b).

"Creating a travel option simply because it is sophisticated, or because the technology is available, or because the firm has some unused capacity simply will not work" (Poon, 2003, p. 140). The needs and desires of tourists must be considered by destination managers in order to match the supply of transportation services to the demands of consumers, while at the same time making policy choices that have a positive impact on the environment. This is an integral and growing part of the destination manager's responsibility in managing the tourism value chain. Today's tourists are more experienced, educated, and environmentally conscious. They tend to use information technology to research their travel from home prior to their trip (Poon, 1993). This pre-trip information may be used to influence tourists to make more eco-efficient transportation choices.

2.3 The Case of Whistler, British Columbia

Whistler, British Columbia is a world-class four-season resort community situated 120 km north of Vancouver. It has a permanent population of 9,500 people, as well as another 4,500 seasonal or part time residents. The average daily population in the winter tourist season is over 31,000 people (Resort Municipality of Whistler [RMOW], 2004a). During 2003/2004, Whistler received over five million visitor days and hosted two million visitors. Sixty-five percent of non-resident visitors arrive by air in Vancouver, then travel to Whistler by various modes (TSi Consultants, 2002b). The destination has

been a designated resort municipality for thirty years and currently generates over $1 billion in annual tourism revenues derived from both regional and international tourists (RMOW, 2004a).

Whistler is the final destination for over 60% of all trips on the Sea to Sky Highway, the route that connects Vancouver to Squamish, Whistler and Pemberton. Of these trips, 93% are by private automobile, 6% by bus and less than 1% by train. (RMOW, 2004a) In 2003, over 265,000 vehicles traveled on the Sea to Sky Highway, an annual increase of 4.4% since 1995 (RMOW, 2004a, p. 81). Whistler requires a well-organized, integrated transportation system at local, regional and international levels in order to accommodate its visitors in a more sustainable fashion.

Whistler intends to increase visitation by 20% between 2001 and 2020 (RMOW, 2004b). With the potential increase in tourist visits, it is critical for the community to address the impacts of inter-urban transportation on energy consumption. Whistler's Transportation Advisory Group [TAG], formed in 1996, has contributed to interurban transportation planning throughout the Sea to Sky Corridor (RMOW, 2004a). TAG aims to encourage more efficient forms of transportation in Whistler (RMOW, 1999). Between 1997 and 2002, TAG's initiatives for winter visitors have contributed to reducing private automobile traffic between Vancouver and Whistler from 59% to 45% (RMOW, 2004a, p. 82). Its current goal is to reduce the portion of visitors traveling by private automobile by another 15% through alternative transportation strategies. Recommendations made in a recent study for RMOW (Delcan, as cited in RMOW, 2005a) included implementing transportation demand management programs in conjunction with interurban bus operators. A key goal of this recommendation was to produce a modal shift from private

automobile to public transportation in order to increase the use of public transit by 50% over a ten year period (p. 6).

Whistler 2020: Moving Toward a Sustainable Future expresses the community's vision and strategic plan for moving towards becoming a sustainable community (RMOW, 2004b). The document outlines twenty strategies dealing with sustainable community issues. Of these, two address energy and transportation respectively. In the *Whistler 2020 Energy Strategy*, the effects of transportation on climate change and air quality are discussed in an intra-urban context (RMOW, 2005b). While the issue of tourist arrivals via single-occupancy vehicles is identified as an indicator of performance, no discussion addresses related inter-urban transportation strategies.

The *Whistler 2020 Transportation Strategy* (RMOW, 2005c) recognizes the necessity of transporting tourists to the resort while having minimal impact on the environment. It addresses transportation within, as well as to and from the destination. Whistler aims to increase the viability of alternative transportation options. However, support for alternative transportation must exist outside of Whistler for these strategies to be successful. The provincial government has a significant impact on transportation infrastructure decisions for inter-urban travel between Vancouver and Whistler.

Limited options currently exist for transportation between Vancouver and Whistler. Other than privately owned vehicles, private bus services run by Perimeter, Pacific Coach Lines, Snowbus and Greyhound are the main public transportation option. Perimeter offers an express bus that departs only from the Vancouver International Airport and downtown Vancouver (Perimeter Whistler Express, n.d.). Pacific Coach Lines runs an express bus that departs from the Vancouver International Airport and has

one stop in Squamish en-route to Whistler (Pacific Coach Lines, 2008). Perimeter and Pacific Coach Lines have almost identical schedules (Pacific Coach Lines, 2008; Perimeter Whistler Express, n.d.) leaving little flexibility for travelers. Snowbus offers two routes – one from the airport with five stops in Vancouver and West Vancouver, and one that begins in Vancouver and has seven stops in Burnaby, North Vancouver and West Vancouver before traveling to Whistler (Snowbus, 2008).

Currently, other options for transportation between Vancouver and Whistler are air transport, limousine and taxi service. In addition, Whistler Mountaineer offers train packages to Whistler (Rocky Mountaineer Vacations, 2007). These packages are not designed for commuter-type tourist travel. They emphasize rail travel as the main attraction. The price is prohibitive for general tourist transportation, and rather is set to reflect the value of the rail tour. Overnight packages all include accommodation and/or activities as well as transportation, so it is not suitable for many people. Only one train operates daily between Vancouver and Whistler (return).

A variety of intermodal transportation options between Vancouver and Whistler have been considered over the last decade (Actran Consultants, XCel Consulting Limited & Robinson Consulting and Associates Ltd., 1999; CANAC Inc. & Sutherland, D.A., 2001; Jonathon Seymour & Associates Inc., 2001; Reid Crowther & Partners Ltd., 2001; TSi Consultants, 2002a & 2002b). These include enhanced bus service, a variety of improved train options, high speed rail service and a passenger ferry-train combination. The feasibility of each of these services has been addressed in a series of studies sponsored by the Province of British Columbia.

Enhancing bus service has been identified as a possible means to shifting travelers from private automobile (TSi Consultants, 2002a & 2002b). Without highway expansion, the bus may be seen as having low service quality due to congestion (Actran Consultants et al., 1999). However, bus service has been identified as a promising option (Actran Consultants et al., 1999; TSi Consultants, 2002a & 2002b). Improved train options, including high speed rail service from downtown Vancouver, has been deemed unviable due to excess capital and operational costs (TSi Consultants, 2002b), geographical constraints (CANAC Inc. & Sutherland, D.A., 2001), lack of access to facilities, lack of convenience (Actran Consultants et al., 1999) and a required fundamental shift in travel behaviour (Reid Crowther & Partners Ltd., 2001; TSi Consultants, 2002a).

Passenger ferry has also been identified as an option with potential for shifting people out of private vehicles (Jonathon Seymour & Associates Inc., 2001; Reid Crowther & Partners Ltd., 2001; TSi Consultants, 2002b). For this option to be successful, effective multi-modal transportation linkages must be in place to effectively move people from one place to the next (Jonathon Seymour & Associates Inc., 2001).

The *Whistler 2020 Transportation Strategy* (RMOW, 2005c) indicates that both ferry between Vancouver and Squamish, and passenger rail service are under consideration. Many summer tourists to Whistler appear willing to shift from private to public modes (Kelly, 2006). These tourists are a potentially beneficial target market for new public transportation services.

The Resort Municipality of Whistler is preparing to co-host the 2010 Olympic Winter Games, positioned as the "Sustainable Games" (The Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games, 2008). This major event

has provided stimulus for several sustainability initiatives. One of the commitments for hosting the games is improvement of the Sea to Sky Highway in terms of safety and reliability (Province of British Columbia, 2001). These improvements will shape transportation flows and modal choices along this route. The British Columbia Ministry of Transportation claims that the improvements to the Sea to Sky Highway will meet the region's capacity requirements for a 50 year period (British Columbia Ministry of Transportation, 2006).

Given the commitments that RMOW has made for the 2010 Olympic Winter Games and expressed in its comprehensive sustainability plan (RMOW, 2004b), the implementation of viable eco-efficient transportation policies may help RMOW reach its long-term sustainability goals. Appropriate policies may prove successful in shifting tourists to more eco-efficient transport modes regardless of highway expansion. Knowledge of consumer responses to policy initiatives is critical to determining the social viability of these options.

2.4 Conclusion

Implementing eco-efficiency strategies can help reduce the rate of increase in the flow of energy as travel demand increases. Such strategies may help curtail some potentially negative environmental impacts associated with tourism's energy use, as well as contribute to the development of tourism value chains that match with the needs and preferences of travellers.

Transportation is regarded as the most prominent consumer of energy in tourism systems, but it is nevertheless necessary for the industry to prosper. However, emissions

due to tourism transportation contribute significantly to environmental degradation. This paradox creates a need for implementing thoughtful eco-efficient planning policies for transportation. Policies designed to shift tourists to more eco-efficient transport modes are one key solution.

The preferences and behaviours of tourists should be considered in the development of strategic transportation policies. Knowing how tourists are likely to respond to such policies is critical to their ultimate success in shaping future transportation flows and mode choice patterns, as well as contributing to a more cohesive and eco-efficient tourism value chain. A case study of Whistler, BC provides an opportunity systematically examine tourist behaviour and preferences for various transportation policies related to energy use in a tourism context. This study will add to Kelly's 2004 examination of summer tourists to generate a more complete picture of year-round travel to Whistler.

3 METHODS

In order to examine the preferences and probable behaviours of tourists with respect to a variety of transportation strategies, the following research questions are explored:

1. What policy options encourage skiers to shift from private to public modes of transportation in order to increase the eco-efficiency of transportation in the tourism system?
2. How does the overall skier market respond in terms of preferences and probable behaviour to these transportation strategy options?
3. How do the responses of short- and long-haul skiers[3] to these transportation policies vary?
4. How do the responses of skiers and summer visitors to Whistler differ?
5. What are the implications of these responses for destination transport policy and planning decisions?

A literature review identified a number of eco-efficient transportation options available to tourism destinations for decreasing energy consumption. To determine how the overall tourist market responded to various transportation options and how the responses of short- and long-haul visitors varied, a two-part data collection process involving intercept and online surveys was employed. These surveys collected visitor

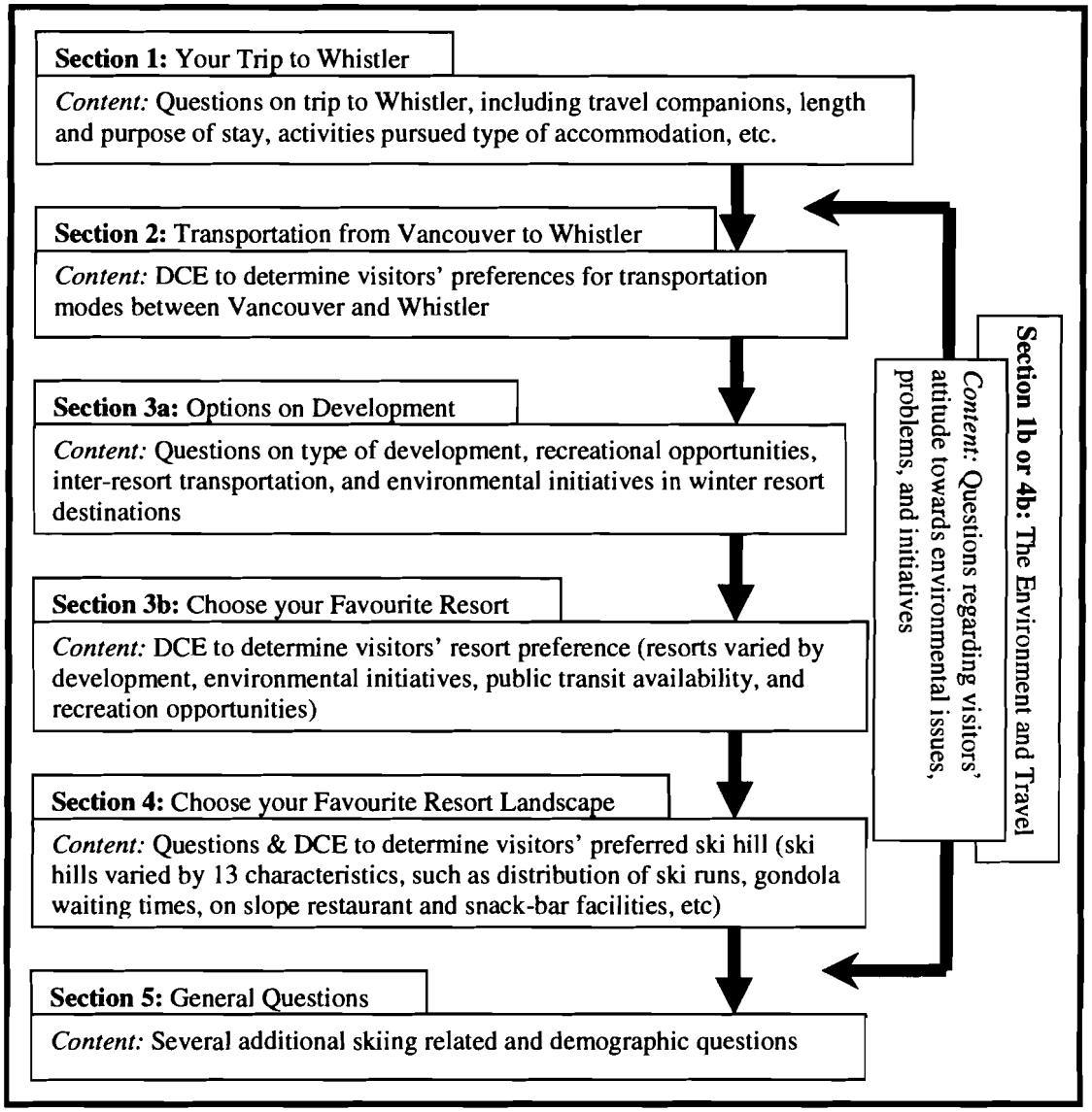
[3] Short-haul visitors are those who reside in British Columbia, Alberta, Washington and Oregon. Long-haul visitors are those who reside elsewhere.

responses concerning a range of socio-demographic, attitudinal and behavioural questions. Both traditional and discrete choice survey methods elicited tourists' preferences and trade-offs between varying eco-efficiency options for transportation. These response data were used to model the choice behaviour of tourists, and to estimate visitors' acceptance of and preferences for different transportation policy alternatives.

3.1 Survey Development

This study's survey design was guided by experience gained from a previous complementary research initiative conducted with summer tourists who traveled to Whistler in 2004. It was undertaken as part of a larger investigation exploring stakeholder responses to a range of eco-efficiency management options available to planners and managers in resort destinations (Haider and Williams SSHRC, 2004-2007). The summer tourists' survey was designed over a 6-month period in 2004, using existing literature and input from destination planners and managers in Whistler. The winter survey was updated and modified to enhance its relevance to winter tourists. It contained six sections. Figure 3.1 presents the main components of the winter survey. Section 2, the transportation discrete choice experiment for winter visitors is the focus of this study.

Figure 3.1: Design of the winter survey



3.2 Discrete Choice Experiments

3.2.1 Theoretical Background

A number of statistical methods are designed to forecast changes in travel behaviour and demand for transportation. Some of these methods are limited by poor data quality and high costs (Pearmain, Swanson, Kroes & Bradley, 1991). Stated preference techniques, such as discrete choice experiments [DCE], provide high quality data at an

affordable price (Pearmain et al., 1991). This type of data is particularly useful when considering new alternatives, since revealed preference data only addresses current alternatives (Hensher, Rose & Greene, 2005; Pearmain et al., 1991). Data on the preferences of individuals can be collected to measure variations in choice behaviour under different hypothetical policy and management options (Louviere, Hensher & Swait, 2000).

When using DCE, researchers typically administer a survey to present a hypothetical situation in which respondents are provided with several choice sets[4]. Each choice set displays a number of alternatives which are mutually exclusive. A profile[5] is described for each alternative, in which the alternative is described by a number of measurable attributes[6] to be evaluated as a package. The number of attributes included and the levels of each attribute presented are defined by the researcher and are selected for their value in providing a realistic explanation of respondents' choice behaviour. The profiles are constructed using statistical design principles with the goal of keeping attributes orthogonal from each other (Hensher et al., 2005; Montgomery, 2001; Raktoe, Hedayat & Federer, 1981) so the influence of each attribute is independent from all other factors.

Discrete choice experiments are similar to conjoint analyses, in which respondents are asked to rate or rank single profiles. However, DCE more closely replicate actual behaviour (Pearmain et al., 1991). In addition, discrete choice methods are grounded in economic theory, in particular random utility theory (Ben-Akiva &

[4] Choice set – "the set of alternatives over which an agent makes a choice" (Hensher et al., 2005, p. 696)
[5] Profiles – "combinations of attributes, each with unique levels" (Hensher et al., 2005, p. 703)
[6] Attributes – "characteristics of an alternative" (Hensher et al., 2005, p. 695)

Lerman, 1985; Hensher et al., 2005; McFadden, 1974). Random utility theory states that choices made by an individual are a function of the relative utility[7] of an available alternative based on its attributes. It assumes that individuals seek the alternative that yields the highest level of utility (Ben-Akiva & Lerman, 1985; Hensher et al., 2005; McFadden, 1974). Utility can be described by the following equation:

$$U_i = V_i + \varepsilon_i \tag{1}$$

in which the overall utility (U_i) contained in any single alternative is represented by a function containing both an objective (deterministic and observable) component (V_i) and a stochastic (random and unobservable) component (ε_i). The ability to estimate V_i depends on the accuracy with which attributes and their related levels are identified.

An individual will choose alternative i over alternative j if and only if $U_i > U_j$. The probability that one alternative will be chosen over another depends on the magnitude of difference in the deterministic components of their utilities, compared to that of the random components (Louviere et al. 2000). The random error component (ε_i) is commonly assumed to follow a type I or Gumbel distribution (McFadden, 1974). A result of this assumption is that alternatives must be independent of irrelevant alternatives. This means that "the ratio of choice probability for any two alternatives is unaffected by addition or deletion of alternatives" (Carson, Louviere, Anderson, Arabie, Bunch, Hensher et al., 1994, p. 354). In simpler terms, the independence of irrelevant alternatives requires alternatives to be autonomous from one another. Thus, the probability that person n will choose alternative i over alternative j is given by the equation:

[7] Utility – "the level of happiness that an alternative yields to an individual" (Hensher et al., 2005, p. 707)

$$\Pr ob(i|C) = \Pr ob\{V_{in} + \varepsilon_{in} > V_{jn} + \varepsilon_{jn}; \forall j \in C\} \quad (2)$$

where C is the complete set of all possible alternatives from which the individual can choose. Since the random error term is assumed to be Gumbel-distributed, the probability of choosing alternative i can be calculated by the multinomial logit model [MNL] (Adamowicz, Louviere & Williams, 1994):

$$\Pr ob(i) = \frac{\exp^{V_i}}{\sum_{j \in C} \exp^{V_j}} \quad (3)$$

The analysis produces regression estimates, along with standard error values and t-values for each attribute level. These regression estimates are also known as part-worth utilities[8], and can be used to calculate the choice probability of a given alternative as a function of its attributes and the attributes of each of the other profiles in the choice set.

Discrete choice experiments can provide information on travel behaviour and demand for transportation products. They can also produce information on respondents' preferences for hypothetical policies that conventional techniques are unable to measure (Pearmain et al., 1991). Transportation and market research investigations were the first to employ stated preference techniques (Train, 1986). Currently, this methodology is increasingly used in resource management and for environmental valuation studies (e.g., Adamowicz, Beckley, MacDonald, Just, Luckert & Murray, 1998; Boxall, Adamowicz, Swait, Williams & Louviere, 1996).

[8] Part worth utility – "the total utility associated with a given level of an attribute" (Adamowicz, Beckley, MacDonald, Just, Luckert & Murray, 1998, p. 34)

3.2.2 Strengths and Weaknesses of Discrete Choice Experiments

Stated preference techniques, in particular discrete choice experiments, can be used to prioritize or evaluate various policy and management options (Pearmain et al., 1991). Stated preference techniques have a number of advantages over revealed preference techniques and contingent choice valuation. Some of the advantages include the following:

- Useful to many stakeholders including transportation operators, policy makers and public authorities (Pearmain et al., 1991)
- Useful when no revealed preference data exists (Pearmain et al., 1991)
- Responses to hypothetical introduction of or changes to management regimes may be predicted (Haider & Ewing, 1990; Pearmain et al., 1991; Pettersson, 2002)
- Levels applied to each attribute are entirely controlled by the researcher and, when determined effectively, ensure high quality data (Pearmain et al., 1991)
- Effects of specific variables can be isolated, reducing the possibility of correlation between variables (Kroes & Sheldon, 1988; Pearmain et al., 1991)
- Many observations are possible for each respondent so that smaller, less costly surveys may provide adequate data (in revealed preferences, usually only a single observation per individual is possible) (Kroes & Sheldon, 1988; Pearmain et al., 1991)
- Preferences of large numbers of individuals can be obtained and modelled using this technique (Louviere et al., 2000)
- Actual behaviours may be predicted (Haener et al., 2001)

Stated preference techniques also have some key limitations. The results are based on respondents' stated behaviour in a hypothetical situation which may differ from respondents' actual behaviours (Kroes & Sheldon, 1988). It is possible for inaccurate setting of attribute levels (Pearmain et al., 1991) or inadvertent omission of key variables

by the researcher to skew results (Pettersson, 2002). In addition, respondents may choose to reply with answers they believe the researcher desires (Pettersson, 2002), which would create biased results. Nonetheless, stated preference techniques have been proficient at predicting actual behaviours (Haener et al., 2001; Timmermans, Borgers & van der Waerden, 1992). However, in order to predict actual behaviours, the researcher must present a realistic set of situations (Pearmain et al., 1991).

3.2.3 Choice Sets

In this study, respondents were shown four choice sets in the transportation choice experiment. Three of these choice sets were developed through the experimental design (described in Section 3.2.5), while the fourth question presented a hold-out set with attribute levels that generated a pro-transit scenario. In all four choice sets, respondents could choose from one of five options. These included four modes of transport (private automobile, rental automobile, bus and train) as well as a fifth option of not going on the trip. Each respondent was asked which mode they would be mostly likely to use to travel between Vancouver and Whistler given the proposed set of attributes (Figure 3.2).

Figure 3.2: Transportation profiles used in the choice set

 AUTOMOBILE		 EXPRESS BUS	 TRAIN	 WOULD NOT GO
Road Conditions: **Slushy and slippery sections.**		Road Conditions: **Slushy and slippery sections.**		
Travel time: **2 hours** from downtown Vancouver		Travel time: **Same as automobile**	Travel time: **25% slower than automobile**	
Door to door convenience		Departure Point: **Vancouver airport with downtown stops** Arrival Point: **Whistler Village**	Departure Point: **North Vancouver with free shuttle from airport or downtown** Arrival Point: **Whistler Village**	
Set your own schedule		Frequency: **Every 30 minutes**	Frequency: **Every 2 hours**	
One way fuel costs: **$30** Parking fees: **$15/night**		One way Fare: **$50**	One way Fare: **$50**	
	Rental fee: **$50/day + insurance**			
○ Private automobile	○ Rental automobile	○ Express bus	○ Would not go	○ Would not go

3.2.4 Development of Attributes and Levels

Each of the four modes presented (private and rental automobile, express bus, train) was described in terms of key attributes (i.e., travel time, frequency, cost, locations of departure from Vancouver and arrival in Whistler) (Table 3.1). The design closely followed that of the summer survey conducted in 2004 (Kelly, 2006). These a priori

defined attributes were selected for their relevance to tourists and importance in determining modal choice for tourist travel. The levels selected for each attribute facilitated the simulation of current and realistic hypothetical transportation conditions. Each attribute and its corresponding levels were determined through a review of existing transportation literature (Asensio, 2002; Ben-Akiva & Morikawa, 2002; Bhat, 1997, 1998; de Palma & Rochat, 2000; Horne, Jaccard & Tiedemann, 2005), stakeholder input, and feedback from the results of the summer survey.

The levels of attributes which appeared in the winter survey were adjusted from the summer survey to suit seasonal variations and realistic conditions, while still remaining similar enough for comparison purposes (Table 3.1). A road conditions attribute was added to improve realism. Travel time was increased to reflect realistic driving conditions. Vehicle rental fees were increased to in an attempt to increase the likelihood of a significant result, as this attribute was not significant in the summer survey at the levels provided. Train frequency was decreased to a more truly feasible level. An alternative specific design was used, meaning that each transportation mode had its own attributes with unique levels.

Table 3.1: Transportation choice experiment attributes and levels

Attributes	Summer Survey Attribute Levels	Winter Survey Attribute Levels
	Automobile	
Road conditions	N/A	1. Bare pavement. Some sections may be wet. 2. Slushy and slippery sections. 3. Snowy sections with limited visibility.
Travel Time	1. 1.5 hours from downtown Vancouver 2. 2 hours from downtown Vancouver 3. 2.5 hours from downtown Vancouver	1. 2 hours from downtown Vancouver 2. 3 hours from downtown Vancouver 3. 4 hours from downtown Vancouver
One-way fuel costs	1. $10 2. $15 3. $30	Same as summer survey
Rental fee	1. $40/day + insurance 2. $60/day + insurance 3. $80/day + insurance	1. $50/day + insurance 2. $70/day + insurance 3. $90/day + insurance
Parking fee	1. Free 2. $5/day for day visitors and $15/night for overnight visitors 3. $10/day for day visitors and $30/night for overnight visitors	Same as summer survey
	Express Bus	
Road conditions	N/A	1. Bare pavement. Some sections may be wet. 2. Slushy and slippery sections. 3. Snowy sections with limited visibility.
Travel/wait time	1. 10% faster than automobile 2. Same as automobile 3. 25% slower than automobile	Same as summer survey
One-way fare	1. $25 2. $50 3. $75	Same as summer survey
Frequency	1. Every 2 hours 2. Every 1 hour 3. Every 30 minutes	Same as summer survey
Departure point[†]	1. Vancouver airport with downtown stops	Same as summer survey
Arrival point	1. Whistler Village 2. Directly at accommodation	Same as summer survey

Attributes	Summer Survey Attribute Levels	Winter Survey Attribute Levels
	Train	
Travel/wait time	1. 10% faster than automobile 2. Same as automobile 3. 25% slower than automobile	Same as summer survey
One-way fare	1. $25 2. $50 3. $75	Same as summer survey
Frequency	1. Every 2 hours 2. Every 1 hour 3. Every 30 minutes	1. Once/day 2. Twice/day 3. Every 2 hours
Departure point	1. Vancouver airport with downtown stops 2. Downtown Vancouver with free shuttle from airport 3. North Vancouver with free shuttle from airport or downtown	1. Downtown Vancouver with free shuttle from airport 2. North Vancouver with free shuttle from airport or downtown
Arrival point	1. Whistler Village 2. Creekside (5 km south of Whistler Village) with free shuttle to Village	1. Whistler Village†

† Attribute displayed for context only. This variable is not part of discrete choice model.

3.2.5 Experimental Design

The survey employed a fractional factorial design (Louviere et al., 2000). Experimental design techniques generated the combinations of attributes and their corresponding levels required to ensure orthogonality. A full factorial design was not feasible given the number of responses needed. The survey used a Resolution III main effects design plan (Montgomery, 2001) requiring 54 unique choice sets. Each respondent viewed one of eighteen different groups of three choice sets ($18 \times 3 = 54$). In addition, each respondent saw a fourth hold-out set that presented attribute levels that were pro-transit in nature to explore their preferences when faced with a choice in which public transit is very appealing. No individual choice set was repeated for any respondent. The drawback to this experimental design is that most interaction effects between attributes can not be measured (Louviere et al. 2000).

3.3 Data Collection

3.3.1 Intercept Survey

Research assistants conducted intercept surveys at various locations throughout Whistler during March and April of 2005. A total of 1,644 winter visitors were recruited during their visit to the destination. See Appendix A for the complete winter intercept survey instrument.

To ensure randomness, two different intercept techniques were employed in distinct situations. First, research assistants were strategically located on thoroughfares. They intercepted every third party that approached them. Second, since winter tourists tended to congregate in certain areas, researchers intercepted them in these areas. If there was more than one individual in a party, the individual with the next birthday was surveyed. Only individuals over the age of 19 were surveyed.

The intercept surveys consisted of eleven questions that screened out residents and employees and ensured the sample was representative of Whistler's overall winter tourist population. In addition, researchers collected the email addresses of respondents willing to participate in a more comprehensive follow-up internet-based survey. Researchers offered Canadian flag pins to potential respondents as an incentive for completing the intercept survey.

Researchers intercepted visitors throughout the week at a number of locations in order to capture a representative sample of visitors to Whistler. Table 3.2 illustrates the percent of individuals recruited at each location. Researchers attempted recruiting at other locations that were ultimately determined ineffective. Due to time restrictions imposed by the proprietors, restaurants locations were infrequently used as survey intercept points.

Table 3.2: Recruitment locations

	% of Respondents Intercepted
Whistler/Blackcomb gondolas	58%
Whistler Village	32%
Visitor Information Centre/bus depot	4%
Roundhouse Lodge & Rendezvous[†]	3%

[†] Rendezvous & Roundhouse Lodge are restaurants at mid-mountain on Whistler and Blackcomb respectively.

The largest portion of tourists was recruited on weekends (54%). The largest portion of recruitment occurred before noon (65 %) and in particular before 10:00am (41%), which was when there were large numbers of tourists congregated in certain areas.

3.3.2 Online Survey

The online survey explored tourists' responses to various transportation planning alternatives. It was implemented in August, 2005. For the most part, it resembled the design of the summer survey. It was pretested by 15 peers and colleagues who completed the survey during mid-July 2005 and provided feedback based on their experiences. In addition, the link to the online survey was pretested with 50 recruited individuals on August 8, 2005. No significant changes were made after the pre-tests.

The link to the online survey was emailed in two batches on August 16 and 17, 2005. The link was sent as part of a personally addressed cover email introducing the survey (Appendix B). In order for individuals to be matched to their intercept data, as well as to allow respondents to leave the survey and return at a later time, each individual was issued a unique identification number for logging into the survey and corresponding password. These were embedded directly into the URL link provided in the email. After clicking on the URL, respondents were automatically logged onto the survey and

matched with the appropriate intercept survey record in the database. Entrance into a draw for prizes was offered as incentive to complete the survey. The grand prize was a $100 gift certificate to Mountain Equipment Co-op.

Of the 1,643 emails sent, 21% were undeliverable. Of the emails successfully delivered, 36% of respondents completed the survey. Of those who started the survey, 16% terminated their participation before completion (Table 3.3). The largest portion of respondents who terminated the survey stopped before completing the first section of the survey. Although the location of the questions examining environmental perspectives varied among respondents, almost no respondents stopped during this section regardless of when they encountered it (0% when at the beginning and 2% when at the end).

Table 3.3: Termination points of respondents in winter survey

Section Survey Terminated	Percent Termination	
	Environmental section at start	Environmental section at end
Section 1: Your Trip to Whistler	31.6	54.0
Section 2: Transportation from Vancouver to Whistler	26.3	16.0
Section 3: Development and Resort Planning	13.2	4.0
Section 4: Ski Hill Choice Experiment	23.7	22.0
Section 5: General Questions (travel patterns, motivations, and socio-demographic characteristics)	5.3	2.0
Section 1b or 4b: Environmental perspectives[†]	0	2.0

[†] The timing of environmental perspectives section varied amongst respondents to the winter survey. Some encountered this section immediately after Section 1 (start) and others immediately before Section 5 (end).

About a third (32%) of the survey responses were received during the week following the initial email. Three reminder emails were sent in the weeks following the initial email. Pulses in response frequency immediately followed reminder emails.

3.4 Data Analysis

Segmentation according to certain respondent characteristics is a simple and effective way to investigate for heterogeneity within a single sample. It also allows the researcher to highlight the differences between certain groups. Demographic characteristics are consistently cited as a main source of heterogeneity. However, some researchers suggest that perceptions, past experiences and attitudes may also be valuable (Boxall & Adamowicz, 2002). In this study, respondents were segmented a priori. The analyses focused solely on respondents who indicated they skied or snowboarded during their trip to Whistler in 2005. Skiers[9] were then grouped into two (non-mutually exclusive) groupings for further study. The first group encompassed day and overnight visitors from the Lower Mainland region of British Columbia. The second group included short- and long-haul overnight visitors.

3.4.1 Descriptive Statistics

Descriptive analyses were performed using the Statistical Package for Social Science (SPSS) 13.0. Similarities and differences between day and overnight visitors from the Lower Mainland, and between short- and long-haul overnight visitors were explored. Independent samples t-tests and chi-square tests were used to compare and contrast the different groups' responses.

3.4.2 Discrete Choice Experiment

Using LIMDEP 8.0 software, maximum likelihood procedures were used to estimate the coefficient for each attribute. All attributes were effects coded (Louviere et

[9] For reasons of brevity, the word "skier" refers to both skiers and snowboarders for the remainder of this document.

al., 2000). Despite the expectation that a number of attributes from the discrete choice model would be significant, only the intercepts (e.g., the mode itself) were significant at the p=0.05 level. Therefore, the intercept coefficients from the first model were used to run a second model. The coefficients of each of the new intercepts were then used to predict market share of each mode, using the following calculation:

$$\frac{\exp(INTP)}{\sum_{P}^{T}\exp} = marketshare \qquad (4)$$

Predicted market share for both public and private transportation was then compared with actual market share (based on respondents' travel behaviour during their 2005 trip).

4 RESULTS

This chapter presents selected findings from the survey of winter skiers[10] to Whistler in 2005. The analysis examines the preferences and potential behaviours of tourists with respect to a set of transportation strategies that offer varying levels of energy eco-efficiency. The results will be used to answer three of this study's research questions:

1. How does the overall skier market respond in terms of preferences and probable behaviour to these transportation strategy options?
2. How do the responses of short- and long-haul skiers[11] to these transportation policies vary?
3. How do the responses of skiers and summer visitors to Whistler differ?

This chapter begins with a brief description of the some of the broader behavioural and geographic characteristics of the respondents. It then presents the transportation mode choices of skiers, including the results of the DCE, the mode choice behaviour of tourists on their trip to Whistler in 2005, and the results of the pro-transit hold-out set. This is followed with a general profile of skiers from the Lower Mainland, along with a more detailed description of overnight skiers including their socio-demographic characteristics, travel behaviour, activities, motivations and environmental perspectives. The chapter concludes with an examination of overnight, long haul skiers based on their mode choice behaviour during their 2005 trip to Whistler.

[10] For reasons of brevity, the word "skier" refers to both skiers and snowboarders for the remainder of this document.

[11] Short-haul visitors are those who reside in British Columbia, Alberta, Washington and Oregon. Long-haul visitors are those who reside elsewhere.

4.1 General Survey Sample Characteristics

The sample used in this study was made up entirely of people who skied on their trip to Whistler in 2005. Two groups of interest were identified a priori. The two groups are not mutually exclusive. They are (1) day and overnight visitors from the Lower Mainland region of British Columbia (n=95) and (2) short- and long-haul overnight visitors (n=349). Short-haul visitors are those residing in British Columbia, Alberta, Washington and Oregon. Long-haul visitors encompass travelers from all other regions.

Of the 405 skiers who responded to the online survey, the largest proportions were from Canada (39%), followed by the United States (23%) and the United Kingdom (22%) (Table 4.1). The largest proportion of Canadian respondents (69%) was from British Columbia. About 80% of those from BC resided in the Lower Mainland region. One fifth of other Canadian respondents were from Ontario. Washington State was home to the largest proportion (30%) of US respondents.

Table 4.1: Place of origin

	Frequency	Percent
Canada	156	38.6
- British Columbia	*107*	
- Lower Mainland	*95*	
United States	92	22.7
- Washington	*28*	
United Kingdom	90	22.2

4.2 Transportation Mode Choices of Skiers

A number of transportation options exist for travel between Vancouver and Whistler. These include private automobile, rental automobile, bus, and limousine. The

following sections describe the mode choices of skiers traveling between Vancouver and Whistler. The first section presents skiers' general preferences for different transport modes. It includes the outcomes of the discrete choice experiment. The next two sections address day and overnight skiers from the Lower Mainland, and short- and long-haul overnight skiers independently. First, the actual mode choices of skiers on their trip to Whistler in 2005 is examined, comparing actual mode choices with preferences in the DCE. Next, the responses of skiers to the fourth discrete choice experiment concerning a pro-transit scenario are assessed.

4.2.1 Discrete Choice Experiment

In the online survey, skiers responded to a discrete choice experiment examining their mode choice to travel between Vancouver and Whistler as a function of several mode-specific attributes (Table 3.1 and Table 4.2). Even though attribute levels varied widely, no individual attribute was significant in determining the mode choices of respondents (Table 4.2).

Table 4.2: Parameter estimates for transportation mode choice model

	Attributes and Levels	Coeff.	St. Err.	Sig.
Road Conditions	Slushy and slippery sections	-0.141	0.174	0.418
	Snowy sections with limited visibility.	-0.003	0.179	0.987
Auto – travel time	3 hours from downtown Vancouver	0.038	0.077	0.619
	4 hours from downtown Vancouver	0.024	0.077	0.757
Auto – one-way fuel cost	$15	-0.014	0.078	0.856
	$30	0.072	0.077	0.348
Auto – rental cost	$70/day + insurance	-0.114	0.137	0.405
	$90/day + insurance	0.197	0.129	0.126
Auto – parking cost	$5/day for day visitors; $15/night for overnight visitors	0.001	0.078	0.994
	$10/day for day visitors; $30/night for overnight visitors	0.004	0.077	0.958
Bus – travel time	Same as automobile	0.089	0.085	0.295
	25% slower than automobile	-0.001	0.086	0.991
Bus – one-way travel cost	$50	-0.045	0.086	0.601
	$75	0.004	0.086	0.960
Bus – frequency	Every 1 hour	-0.103	0.087	0.238
	Every 30 minutes	-0.016	0.086	0.851
Bus – convenience	Directly at accommodation	-0.064	0.062	0.296
Train – travel time	Same as automobile	0.049	0.085	0.564
	25% slower than automobile	-0.069	0.086	0.422
Train – one-way travel cost	$50	-0.076	0.086	0.376
	$75	0.009	0.085	0.915
Train – frequency	Twice/day	-0.025	0.085	0.773
	Every 2 hours	0.008	0.085	0.926
Train – convenience	North Vancouver with free shuttle from airport or downtown	0.097	0.060	0.109
Intercept	Private automobile**	1.901	0.133	**0.000**
	Rental automobile**	0.628	0.153	**0.000**
	Express bus**	1.724	0.135	**0.000**
	Train**	1.776	0.134	**0.000**
Rho-square	0.112			
Log-likelihood	-1980.152			

** $p<0.05$

Only the intercepts were statistically significant ($p<0.05$) (Table 4.2). In other words, the mode itself was more important to respondents than the attributes of the modes. Therefore, the model was reduced to its most salient form (i.e., model mode

choice only) (Table 4.3). This model was then used to predict modal shares for the survey respondents (Table 4.4).

Table 4.3: Transportation mode choice model - intercepts only

	Coeff.	St. Err.	Sig.
Intercept – private automobile**	1.895	0.132	**0.000**
Intercept – rental automobile**	0.631	0.152	**0.000**
Intercept – bus**	1.729	0.134	**0.000**
Intercept – train**	1.764	0.133	**0.000**
Rho-square	0.109		
Log-likelihood	-1987.415		

** $p<0.05$

The predicted proportion of respondents who would select each transportation mode is presented in Table 4.4. Given the range of attributes and modes available in the DCE, public transportation modes received the greatest ridership (57%). The predicted market share for bus, train and private car was one-third, while rental car received just below 10% of choice.

Table 4.4: Predicted market share for transportation modes

Mode	Predicted Market Share
Private car	33.3%
Rental car	9.4%
Bus	28.2%
Train	29.2%

4.2.2 Mode Choice Behaviour and Preferences

This section presents the actual mode choices of skiers, and compares them to their responses in the discrete choice survey. The analysis is performed separately for skiers from the Lower Mainland and for overnight visitors.

4.2.2.1 Lower Mainland Skiers

The overwhelming majority of skiers (90%) from the Lower Mainland traveled in their own vehicle on their trip to Whistler in 2005 (Table 4.5). There were no significant differences between day and overnight visitors.

Table 4.5: Actual mode choices of Lower Mainland skiers

	Total Sample		Overnight Skiers		Day Skiers		Chi-Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Own vehicle	85	90.4	55	87.3	30	96.8	2.782 (0.249)
Rental car	5	5.3	5	7.9	0	0	
Bus	4	4.3	3	4.8	1	3.2	

In responding to the DCE, many individuals did not make trade-offs between private and public modes. Respondents were grouped according to those who willing to make trade-offs between options, those who chose only private modes, those who chose only public modes, and those who always chose the option of not going.

The most frequent response to hypothetical transportation options by Lower Mainland skiers was to always choose to travel by private automobile (Table 4.6). This situation existed regardless of whether the vehicle was owned or rented (60%), and despite variations in the attributes of the alternative modes. Only 34% of respondents chose to make trade-offs between the different modes depending on the levels of the attributes. There were no significant differences between overnight and day skiers from the Lower Mainland with respect to these choices.

Table 4.6: Mode choice responses to discrete choice experiment (Lower Mainland skiers)

	Total Sample		Overnight Skiers		Day Skiers		Chi Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Made tradeoffs[1]	32	33.7	19	29.7	13	41.9	1.471 (0.479)
Own/rental car[2]	57	60.0	41	64.1	16	51.6	
Bus/train[3]	6	6.3	4	6.3	2	6.5	
Would not go[4]	0	0.0	0	0.0	0	0.0	

1 Made trade-offs between the different modes provided
2 Always chose a private mode of transport
3 Always chose a public mode of transport
4 Always chose not to go

4.2.2.2 Overnight Skiers

The actual mode choices of short-haul overnight skiers were significantly different from long-haul skiers on their trip in 2005 (Table 4.7). Short-haul skiers were more likely to travel between Vancouver and Whistler using their own car (90%). Long-haul skiers appeared much more likely to travel by rental car (36%) or bus (52%) than short-haul skiers (6% and 5% respectively).

Table 4.7: Mode choice of overnight visitors

	Total Sample		Short Haul		Long Haul		Chi-Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Own vehicle	104	43.0	99	90.0	5	3.8	182.538 (.000)**
Rental car	53	21.9	6	5.5	47	35.6	
Bus	74	30.6	5	4.5	69	52.3	
Limo	11	4.5	0	0	11	8.3	

** Short- and long-haul skiers are significantly different at a 95% confidence level.

Short-haul skiers were most likely to choose travel by private modes (64%) (Table 4.8). Only 29% of short-haul skiers chose to make trade-offs among the different modes compared to 61% of long-haul skiers. Of long-haul skiers who did not make trade-offs, the next most common choice (26%) was to always select a public transportation mode (either bus or train).

Table 4.8: Mode choice responses to discrete choice experiment

	Total Sample		Short Haul		Long Haul		Chi-Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Made tradeoffs[1]	177	50.7	32	28.6	145	61.2	103.689 **(0.000)****
Own/rental car[2]	100	28.7	72	64.3	28	11.8	
Bus/train[3]	70	20.1	8	7.1	62	26.2	
Would not go[4]	2	0.6	0	0.0	2	0.8	

1 Made trade-offs between the different modes provided
2 Always chose a private mode of transport
3 Always chose a public mode of transport
4 Always chose not to go
** Short- and long-haul skiers are significantly different at a 95% confidence level.

Respondents' actual mode of transportation on their trip to Whistler in 2005 was compared to the preferences they indicated in the discrete choice survey. Table 4.9 indicates the significant differences between the actual mode used by short-haul skiers on

their trip in 2005 and their preferred mode in the DCE. The majority traveled by private mode and also chose private modes in the discrete choice survey (89%).

Table 4.9: Comparison of actual and chosen modes (short-haul visitors)

	Mode choice in DCE		Chi Square (p value)
	Private	Public	
Private	70 (88.6%)	6 (7.6%)	10.954 (0.001)**
Public	1 (1.3%)	2 (2.5%)	

** Short- and long-haul skiers are significantly different at a 95% confidence level.
Note: Only those respondents who always selected one mode type in the discrete choice survey are included.

For long-haul skiers, more disparity existed between actual transport mode used on their 2005 trip to Whistler and the mode they preferred in the DCE (Table 4.10). The largest portion of respondents traveled by the same mode type that they chose in the discrete choice survey (24% private; 54% public). However, almost a fifth of them (17%) who traveled by private mode preferred public modes in the survey.

Table 4.10: Comparison of actual and chosen modes (long-haul visitors)

	Mode choice in DCE		Chi-Square (p value)
	Private	Public	
Private	11 (23.9%)	8 (17.4%)	14.021 (0.000)**
Public	2 (4.3%)	25 (54.3%)	

** Short- and long-haul skiers are significantly different at a 95% confidence level.
Note: Only those respondents who always selected one mode type in the discrete choice survey are included.

4.2.3 Pro-Transit Scenario

In the discrete choice survey, respondents answered four discrete choice transportation questions. The fourth question was a hold-out set or fixed set always presenting the same scenarios. This question provided the respondent with a set of

choices in which either the bus or train was made to appear more appealing than the other options. Half of the respondents responded to a scenario where the bus attributes were set at the "best" levels and the train attributes were set at the "mid" levels. The other half of respondents responded to a scenario in which the train attributes were set at the "best" level and bus attributes at the "mid" levels. In both cases, the attributes for private modes were set to the "worst" levels.

4.2.3.1 Lower Mainland Skiers

Even in this extreme pro-transit discrete choice question, respondents from the Lower Mainland were most likely to choose a private mode (44%) (Table 4.11). Over 20% of skiers from the Lower Mainland chose not to go under these conditions. Again, there was no significant difference between overnight and day skiers with respect to these choices.

Table 4.11: Mode choices for pro-transit question (Lower Mainland skiers)

	Total Sample		Overnight Skiers		Day Skiers		Chi Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Own/rental car	42	44.2	32	50.0	10	32.3	3.291 (0.193)
Bus/train	32	33.7	18	28.1	14	45.2	
Would not go	21	22.1	14	21.9	7	22.6	

4.2.3.2 Overnight Skiers

In responding to the pro-transit scenario, the largest portion of short-haul overnight visitors (49%) chose a private mode of transportation, regardless of how appealing public transit was presented in the choice set (Table 4.12). Only 29% of short-haul skiers selected a public transit mode. Alternatively, long-haul overnight visitors

were most likely to choose a public transit mode (50%). This was closely followed by private mode (46%). Short-haul skiers were more likely to choose not to go (22%) than long-haul skiers (3%). The groups were significantly different in this regard.

Table 4.12: Mode choice for pro-transit question (overnight skiers)

	Total Sample		Short Haul		Long Haul		Chi Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Own/rental car	165	47.3	55	49.1	110	46.4	37.221 **(0.000)****
Bus/train	151	43.3	32	28.6	119	50.2	
Would not go	33	9.5	25	22.3	8	3.4	

** Short- and long-haul skiers are significantly different at a 95% confidence level.

4.3 Profile of Skiers from the Lower Mainland

This section presents an overall profile of visitors from the Lower Mainland region of British Columbia. Because there were very few differences between day and overnight visitors, only an overall profile is presented. This is supplemented with more detailed tables of results in Appendix C. Visitors from the Lower Mainland were comprised of day (n=31; 33%) and overnight (n=64; 67%) travellers.

The overwhelming majority of skiers from the Lower Mainland traveled to Whistler by private automobile on their trip in 2005 (96%). When responding to the DCE, almost two-thirds of skiers from the Lower Mainland were only interested in traveling by private vehicle. Only one third of Lower Mainland skiers were willing to make trade-offs among transportation modes. Even when provided with the pro-transit hold-out set, skiers were most likely to choose a private mode (60%).

Visitors from the Lower Mainland were young individuals with some post-secondary education and reasonably high incomes. Day visitors from the Lower Mainland tended to travel in small groups (2-3 people) while the group size of overnight visitors was more variable. When traveling to Whistler in 2005, the primary motivation for skiers from the Lower Mainland was getting value for the cost of the trip.

Skiers from the Lower Mainland were conscious of their interactions with the environment in the resort setting. Overnight visitors tended to feel somewhat more strongly than day visitors about the level of impact humans have on the environment and the sensitivity of the environment to human actions. When choosing a resort destination, both day and overnight visitors placed importance on environmental management factors including the provision of public transportation to the resort. They also felt strongly that specific management activities influence the environmental reputation of the resort. On their trip to Whistler in 2005, almost half of visitors from the Lower Mainland noticed a specific environmental problem. The most common environmental problem for both day and overnight visitors was high traffic volumes on the Sea to Sky Highway.

4.4 Profile of Overnight Skiers

This section presents a profile of overnight visitors to Whistler. Overnight skiers can be segmented into short-haul travelers, including individuals from British Columbia (including the Lower Mainland region), Alberta, Oregon and Washington (n=112; 32%) and long-haul travelers, including international travelers and individuals from other areas of North America (n=237; 68%). Section 4.4.1 begins by presenting a socio-demographic profile of overnight skiers. This is followed by an outline of their travel behaviour, activities, motivations, and environmental perspectives. Finally, long-haul overnight

skiers are explored in more detail according to mode of transportation used on their trip to Whistler in 2005.

4.4.1 Socio-Demographic Profile of Overnight Skiers

Two-thirds of overnight skiers were male (Table 4.13). They were highly educated with over 70% having at least an undergraduate education. The largest proportion (26%) of overnight skiers had an annual household income between $100,000 and $149,999 with 53% of respondents earning over $100,000. The largest portions of respondents were aged 26-35 (31%) and 36-45 (26%). There were no significant differences between short- and long-haul skiers in terms of socio-demographic characteristics.

Table 4.13: Socio-demographic profile of overnight visitors

		Total Sample		Short Haul		Long Haul		Chi-Square (p value)
		Freq.	%	Freq.	%	Freq.	%	
Gender	Male	229	65.8	70	62.5	159	67.4	0.801 (0.371)
	Female	119	34.2	42	37.5	77	32.6	
Education*	Elementary	3	0.9	1	0.9	2	0.8	8.213 **(0.084)**
	High School	36	10.3	8	7.1	28	11.8	
	College	57	16.3	27	24.1	30	12.7	
	Undergrad	131	37.5	39	34.8	92	38.8	
	Graduate	122	35.0	37	33.0	85	35.9	
Income	Under $24.999	27	8.0	8	7.3	19	8.3	7.784 (0.254)
	$25,000 - 49,999	34	10.0	9	8.2	25	10.9	
	$50,000 - $74,999	55	16.2	26	23.6	29	12.7	
	$75,000 - $99,999	43	12.7	11	10.0	32	14.0	
	$100,000 - $149,999	89	26.3	30	27.3	59	25.8	
	$150,000 - $199,999	38	11.2	11	10.0	27	11.8	
	$200,000 or over	53	15.6	15	13.6	38	16.6	
Age*	Under 25 years	53	15.2	15	13.4	38	16.0	10.895 **(0.053)**
	26 - 35 years	107	30.7	24	21.4	83	35.0	
	36 - 45 years	89	25.5	39	34.8	50	21.1	
	46 - 55 years	76	21.8	25	22.3	51	21.5	
	56 years or older	24	6.9	9	8.0	15	6.3	

* Short- and long-haul skiers are significantly different at a 90% confidence level.

4.4.2 Travel Behaviour of Overnight Skiers

The travel behaviour presented in this section includes travel party size, travel party composition and length of stay on the respondent's trip in 2005. A number of differences in the travel behaviours of short- and long-haul overnight skiers existed. The group size of overnight skiers typically ranged from two individuals to groups of greater than six (Table 4.14). Most respondents traveled with other adults (friends, family or colleagues) (61%) or with a spouse (45%). Short-haul respondents were more likely to travel with dependents (27%) than long-haul respondents (17%). In general, long-haul skiers stayed longer in Whistler than short-haul skiers.

Table 4.14: Travel party characteristics of overnight skiers

		Total Sample		Short Haul		Long Haul		Chi-Square (p value)
		Freq.	%	Freq.	%	Freq.	%	
Travel Party Size	1	18	5.3	9	8.3	9	3.9	5.432 (0.366)
	2	82	24.0	22	20.2	60	25.8	
	3	48	14.0	15	13.8	33	14.2	
	4	71	20.8	26	23.9	45	19.3	
	5	33	9.6	12	11.0	21	9.0	
	6+	90	26.3	25	22.9	65	27.9	
Travel Party Composition[1]	Alone	22	6.3	7	6.3	15	6.3	0.001 (0.977)
	With spouse	156	44.7	54	48.2	102	43.0	0.824 (0.364)
	Friends, family or colleagues	212	60.7	69	61.6	143	60.3	0.051 (0.821)
	Dependents**	70	20.1	30	26.8	40	16.9	4.657 **(0.031)**
	Tour group**	10	2.9	0	0.0	10	4.2	4.865 **(0.027)**
Length of Stay**	1-3 days	110	31.6	80	71.5	30	12.7	149.6 **(0.000)**
	4-7 days	136	39.1	27	24.1	109	46.3	
	8-14 days	86	24.6	4	3.6	82	34.8	
	>2 weeks	16	0	1	0	15	0	

[1] Respondents could select more than one response for Travel Party Composition.
** Short- and long-haul skiers are significantly different at a 95% confidence level.

4.4.3 Activities of Overnight Skiers

Overnight visitors to Whistler participated in a variety of activities on their trips in 2005. Long-haul skiers were more likely than their short-haul counterparts to participate in specific activities while in Whistler (Table 4.15). These include: dining at restaurants (98% vs. 84%), going shopping (94% vs. 66%), attending nightclubs (79% vs. 55%), using the terrain park (41% vs. 25%) and participating in a motorized activity (9% vs. 2%). However, both short- and long- haul visitors were most likely to dine at a restaurant (98% and 84% respectively)and go shopping (94% and 66% respectively).

They were least likely to go backcountry skiing or snowshoeing (10% and 7% respectively), or participate in a motorized tour or activity (9% and 2% respectively).

Table 4.15: Participation in activities

	Total Sample		Short Haul		Long Haul		Chi Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Dined out at a restaurant**	322	93.6	230	97.9	92	84.4	22.564 **(0.000)**
Attended nightclubs**	247	71.6	187	79.2	60	55.0	21.456 **(0.000)**
Went shopping**	238	86.9	192	94.1	46	65.7	36.842 **(0.000)**
Used a terrain park at Whistler/Blackcomb**	121	35.7	95	40.6	26	24.8	7.919 **(0.005)**
Attended a show, event, or festival	95	28.0	63	27.2	32	29.9	0.275 (0.600)
Skied/boarded out of bounds at Whistler/Blackcomb*	89	26.0	68	28.8	21	19.8	3.079 **(0.079)**
Participated in facility-based recreation*	49	14.5	28	12.1	21	19.6	3.328 **(0.066)**
Went backcountry skiing or snowshoeing in the Whistler area	30	8.8	23	10.0	7	6.5	1.102 (0.294)
Participated in a motorized tour or activity**	23	6.8	21	9.1	2	1.9	5.930 **(0.015)**

** Short- and long-haul skiers are significantly different at a 95% confidence level.
* Short- and long-haul skiers are significantly different at a 90% confidence level.

4.4.4 Motivations of Overnight Skiers

To more clearly understand what motivates overnight skiers to travel to Whistler, respondents were provided with a number of statements measuring motivations and asked to rate them in terms of their importance when visiting a mountain resort. The factors were rated on a scale from one to five, with one being "not important" and five being "very important".

In terms of motivations for visiting mountain resorts, both short- and long-haul overnight skiers placed the most importance on getting value for the cost of the trip (mean=4.4) and being physically active (mean=4.3) (Table 4.16). They placed the least importance on indulging in luxury (mean=2.4). Short-haul skiers placed more importance than long-haul skiers on: going to a place that is family oriented (mean=3.3), participating in outdoor activities (mean=4.2) and attending a festival or event (mean=2.9). Conversely, long-haul skiers placed more importance on shopping (mean=3.2) and nightlife and entertainment (mean=3.3).

Table 4.16: Motivations for visiting a mountain resort

	Mean†			t	Sig.
	Total Sample	Short Haul	Long Haul		
Getting value for the cost of the trip	4.4	4.4	4.3	1.206	0.229
Being physically active	4.3	4.3	4.3	0.253	0.801
Experiencing and seeing a mountain area	4.2	4.1	4.2	-0.824	0.410
Participating in outdoor activities**	4.0	4.2	3.9	2.115	**0.035**
Visiting a place that takes good care of its environment	4.0	4.0	3.9	1.094	0.275
Resting and relaxing	3.9	4.0	3.9	1.239	0.216
Visiting a place with unique and interesting restaurants	3.5	3.5	3.5	-0.538	0.591
Learning new things, increasing my knowledge	3.4	3.4	3.4	-0.085	0.932
Visiting wilderness and undisturbed areas	3.2	3.2	3.2	0.314	0.754
Enjoying nightlife and entertainment**	3.2	3.0	3.3	-2.097	**0.037**
Having opportunities to shop**	3.1	2.8	3.2	-2.951	**0.003**
Going to a place that is family oriented**	3.0	3.3	2.8	3.212	**0.001**
Viewing wildlife and birds	3.0	3.1	3.0	0.719	0.473
Enjoying cultural or historic sites/attractions	2.8	2.9	2.8	0.426	0.670
Attending a festival or event**	2.6	2.9	2.5	3.010	**0.003**
Indulging in luxury, staying at first class hotels*	2.4	2.2	2.5	-1.932	**0.054**

† Average level of agreement to statement (Scale ranging from 1 = not important to 5 = very important)
** Short- and long-haul skiers are significantly different at a 95% confidence level.
* Short- and long-haul skiers are significantly different at a 90% confidence level.

4.4.5 Environmental Perspectives of Overnight Skiers

Overnight skiers were asked a series of questions probing their environmental predispositions, their preferred environmental management practices at resorts, and the influence of environmental reputation factors on their destination choice decisions. This section presents the results to this portion of the study.

Respondents were asked questions based on a modified version of the New Ecological Paradigm construct (Dunlap, Van Liere, Mertig & Jones, 2000). Both short- and long-haul visitors shared similar perspectives with respect to human interventions in

mountain environments (Table 4.17). Both short- and long-haul skiers felt most strongly that 'humans are subject to the laws of nature' (mean=4.4) and that 'plants and animals have as much right as recreationists to exist' (mean=4.3). There were no significant differences between short- and long-haul skiers.

Table 4.17: Skier perceptions of human interventions in mountain environments

	Mean[†]			t	Sig.
	Total Sample	Short Haul	Long Haul		
Despite our special abilities to develop ski resort areas we are still subject to the laws of nature	4.4	4.4	4.3	0.795	0.427
Mountain plants and animals have as much right as recreationists to exist	4.3	4.3	4.4	-0.800	0.424
The balance of nature is very delicate and easily upset in mountain resort regions	3.8	3.8	3.7	0.906	0.365
Mountain resort areas have plenty of natural resources if we just learn to develop them	3.6	3.6	3.7	-1.125	0.262
Human's interference with mountain environments often produces disastrous consequences	3.5	3.6	3.5	0.209	0.835
We are approaching the limit of the number of people ski destinations can support	3.3	3.2	3.4	-1.340	0.181
Mountain resort areas are like a spaceship with very limited room and resources	3.3	3.3	3.3	0.317	0.751
Human integrity will ensure that we do not make the mountain resort areas unlivable	3.1	3.0	3.1	-1.078	0.282
If things continue on their present course, we will soon experience a major ecological catastrophe in some mountain resort areas	3.0	2.9	3.0	-0.567	0.571
Humans are severely abusing mountain resort environments	2.9	2.8	2.9	-0.199	0.842
Humans will eventually learn enough about how nature works to be able to control it in mountain regions	2.8	2.8	2.9	-0.252	0.801
Humans have the right to modify the mountain environment to suit their recreation needs	2.7	2.7	2.7	0.046	0.963
The balance of nature is strong enough to cope with the impacts of modern mountain resort developments	2.7	2.6	2.7	-0.864	0.388

[†] Average level of agreement to statement (Scale ranging from 1 = strongly disagree to 5 = strongly agree)

Respondents were asked questions regarding the environmental factors they considered when choosing a resort destination, and how their concern for the environment affected such decisions. Both short- and long-haul overnight visitors to Whistler indicated that most environmental factors are of some importance to them when selecting a ski resort (Table 4.18). Long-haul skiers rated public transportation access to the destination (mean=3.9) most important. The lowest level of importance for both short- (mean=3.0) and long-haul skiers (mean=3.2) was related to the provision of pre-trip information concerning the destination's environmental initiatives, although there was a significant difference between their responses.

Table 4.18: Factors influencing destination choice

	Mean[†]			t	Sig.
	Total Sample	Short Haul	Long Haul		
Public transportation access to the destination**	3.9	3.6	4.0	-2.541	**0.011**
Wildlife sensitive ski trail maintenance systems	3.8	3.9	3.8	1.127	0.261
On-site energy efficient buildings	3.7	3.7	3.8	-0.069	0.945
Vegetation sensitive ski trail maintenance systems	3.7	3.8	3.7	1.248	0.213
On-site solid waste recycling systems	3.5	3.6	3.4	1.482	0.139
Low-density visitor accommodation facilities**	3.3	3.0	3.4	-3.197	**0.002**
On-site water conservation systems	3.3	3.4	3.2	1.248	0.213
Pre-trip information concerning the destination's environmental initiatives**	3.2	3.0	3.2	-2.146	**0.033**

[†] Average level of agreement to statement (Scale ranging from 1 = strongly disagree to 5 = strongly agree)
** Short- and long-haul skiers are significantly different at a 95% confidence level.

The travel choices made by both short- and long-haul visitors to Whistler were influenced by their concern for the environment (Table 4.19). Many overnight visitors to

Whistler indicated they choose destinations with a solid environmental reputation (31%). There were a number of differences between short- and long-haul skiers in terms of how their travel choices were affected by their environmental concern. Short-haul skiers were more likely (42%) to limit the distance they travel than long-haul skiers (9%). Long-haul skiers were more likely to make choices influenced by their environmental concerns, including choosing destinations that are easily accessible by public transit (31%) and choosing not to use a rental car (21%).

Table 4.19: Impact of environmental concern on travel choices

	Total Sample		Short Haul		Long Haul		Chi-Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
I choose a region with a solid environmental reputation.	108	30.9	33	29.5	75	31.6	0.169 (0.681)
I choose destinations easily accessible by public transit.**	87	24.9	14	12.5	73	30.8	13.613 **(0.000)**
I limit the distance I travel.**	69	19.8	47	42.0	22	9.3	51.214 **(0.000)**
I choose not to use a rental car.**	62	17.8	12	10.7	50	21.1	5.612 **(0.018)**
I choose destinations with an environmental certificate or eco-label.	18	5.2	6	5.4	12	5.1	0.013 (0.908)

** Short- and long-haul skiers are significantly different at a 95% confidence level.

Respondents were asked to identify specific environmental problems they noted on their trip to Whistler. Almost 50% of short-haul skiers noted specific environmental problems during their trip to Whistler (vs. 30% of long-haul skiers) (Table 4.20). The only environmental problem with a significant difference between the groups concerned the extent of traffic observed. More short-haul visitors (31%) noted high traffic volumes

than long-haul visitors (14%). However, both groups observed this phenomenon most frequently of all issues witnessed.

Table 4.20: Environmental problems observed in Whistler

	Total Sample		Short Haul		Long Haul		Chi-Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Noticed a specific problem**	115	35.8	49	47.6	66	30.3	9.103 **(0.003)**
High volumes of traffic**	67	19.2	35	31.3	32	13.5	15.444 **(0.000)**
Noise pollution	34	9.7	15	13.4	19	8.0	2.500 (0.114)
Litter	31	8.9	11	9.8	20	8.4	0.180 (0.672)
Logging	22	6.3	10	8.9	12	5.1	1.924 (0.165)
Other	20	5.7	7	6.3	13	5.5	0.082 (0.774)
Deficient garbage disposal	17	4.9	7	6.3	10	4.2	0.677 (0.411)
Water pollution	6	1.7	2	1.8	4	1.7	0.004 (0.948)
Air pollution	5	1.4	1	0.9	4	1.7	0.340 (0.560)

** Short- and long-haul skiers are significantly different at a 95% confidence level.

In terms of identifying activities that are important for creating a more environmentally sound reputation for winter resort destinations, there were no significant differences between short- and long-haul skiers (Table 4.21). All activities examined were considered important (mean>3). Of most importance was minimizing environmental effects of transportation to and from the ski hill (mean=3.9). This was followed closely by minimizing the environmental effects of ski run construction (mean=3.8) especially as it related to vegetation impacts (mean=3.8).

Table 4.21: Management activities influencing environmental reputation

	Mean†			t	Sig.
	Total Sample	Short Haul	Long Haul		
Minimizing environmental effects of transportation to and from the ski hill	3.9	3.8	3.9	-1.166	0.244
Minimizing the environmental effects of ski run construction (rock blasting and slope grading)	3.8	3.7	3.8	-0.820	0.413
Mitigating any effects of ski run construction on the vegetation, mostly visible during the summer	3.8	3.8	3.8	0.224	0.823
Minimizing energy and water consumption for snow making	3.7	3.6	3.7	-0.748	0.455
Minimizing energy and water consumption of food services on the mountain	3.7	3.8	3.6	1.110	0.268
Minimizing energy consumptions for lifts	3.6	3.6	3.6	0.170	0.865
Reducing energy consumption by not providing night skiing opportunities	3.3	3.2	3.3	-0.786	0.432

† Average level of agreement to statement (Scale ranging from 1 = not at all important to 5 = very important)

4.4.6 Long-Haul Overnight Skiers: A Closer Look

Travel behaviour and environmental perspectives of skiers can also be explored by comparing:

- Individuals according to their actual transportation modes, and
- Individuals according to their responses to the discrete choice survey (those who consistently chose private transit with those who consistently chose public transit).

While both comparisons were conducted, the results were very similar. This section examines the travel behaviour and environmental perspectives of long-haul overnight skiers based on actual mode choice behaviour on their trip to Whistler in 2005. Appendix D presents the same analyses according to DCE responses.

In terms of their socio-demographic characteristics, there were no significant differences between the groups (Table 4.22).

Table 4.22: Socio-demographic profile of skiers (by actual mode)

		Total Sample		Private Mode		Public Mode		Chi-Square (p value)
		Freq.	%	Freq.	%	Freq.	%	
Gender	Male	159	67.4	30	57.7	45	66.2	0.905 (0.341)
	Female	77	32.6	22	42.3	23	33.8	
Education*	Elementary	2	0.8	0	0	2	2.9	8.157 **(0.086)**
	High School	28	11.8	3	5.8	10	14.5	
	College	30	12.7	3	5.8	11	15.9	
	Undergrad	92	38.8	24	46.2	23	33.3	
	Graduate	85	35.9	22	42.3	23	33.3	
Income*	Under $24.999	19	8.3	3	5.8	11	16.9	11.967 **(0.063)**
	$25,000 - 49,999	25	10.9	7	13.5	8	12.3	
	$50,000 - $74,999	29	12.7	3	5.8	13	20.0	
	$75,000 - $99,999	32	14.0	9	17.3	4	6.2	
	$100,000 - $149,999	59	25.8	15	28.8	15	23.1	
	$150,000 - $199,999	27	11.8	6	11.5	4	6.2	
	$200,000 or over	38	16.6	9	17.3	10	15.4	
Age	Under 25 years	38	16.0	7	13.5	13	18.8	5.674 (0.339)
	26 - 35 years	83	35.0	18	34.6	44.9	42.9	
	36 - 45 years	50	21.1	12	23.1	11	15.9	
	46 - 55 years	51	21.5	12	23.1	9	13.0	
	56 years or older	15	6.3	3	5.8	5	7.2	

* People who chose private and public modes are significantly different at a 90% confidence level.

Those long-haul skiers who traveled in large groups were more likely to travel by private modes of transportation (Table 4.23). However, those traveling as part of a tour group were more likely to travel by public modes (10%) than private modes (0%).

Table 4.23: Travel party characteristics of overnight, long-haul visitors (by actual mode)

		Total Sample		Private Mode		Public Mode		Chi-Square (p value)
		Freq.	%	Freq.	%	Freq.	%	
Travel Party Size**	1	9	3.9	0	0	4	5.9	
	2	60	25.8	10	19.6	21	30.9	
	3	33	14.2	6	11.8	15	22.1	11.748 **(0.038)**
	4	45	19.3	11	21.6	12	17.6	
	5	21	9.0	7	13.7	3	4.4	
	6+	65	27.9	17	33.3	13	19.1	
Travel Party Composition[1]	Alone	15	6.3	1	1.9	6	8.7	2.495 (0.114)
	With spouse*	102	43.0	28	53.8	26	37.7	3.136 **(0.077)**
	Friends, family or colleagues	143	60.3	35	67.3	38	55.1	1.855 (0.173)
	Dependents	40	16.9	10	19.2	8	11.6	1.366 (0.243)
	Tour group**	10	4.2	0	0.0	7	10.1	5.599 **(0.018)**

[1] Respondents could select more than one response for Travel Party Composition.
** People who chose private and public modes are significantly different at a 95% confidence level.
* People who chose private and public modes are significantly different at a 90% confidence level.

Table 4.24 describes environmental factors that influenced respondents' destination choices, according to their mode preferences. In general, regardless of the actual mode used to travel on their trip in 2005, respondents placed some importance on environmental factors in choosing winter destinations. Access by public transportation was of most importance to those who traveled by public transit on their trip (mean=4.3), and was more important than to those who traveled by private means (mean=3.7).

Table 4.24: Factors influencing destination choice (by actual mode)

	Mean†			t	Sig.
	Total Sample	Private Mode	Public Mode		
Public transportation access to the destination.**	4.0	3.7	4.3	-3.129	**0.002**
Wildlife sensitive ski trail maintenance systems.	3.8	3.8	3.9	-0.454	0.650
On-site energy efficient buildings.	3.8	3.8	3.8	0.024	0.981
Vegetation sensitive ski trail maintenance systems.	3.7	3.8	3.7	0.232	0.817
On-site solid waste recycling systems.	3.4	3.4	3.4	0.073	0.942
Low-density visitor accommodation facilities.*	3.4	3.6	3.3	1.806	**0.074**
On-site water conservation systems.	3.3	3.3	3.3	0.000	1.000
Pre-trip information concerning the destination's environmental initiatives.	3.3	3.2	3.4	-0.797	0.427

† Average level of agreement to statement (Scale ranging from 1 = not important to 5 = very important)
** People who chose private and public modes are significantly different at a 95% confidence level.
* People who chose private and public modes are significantly different at a 90% confidence level.

Overnight visitors made winter destination and related travel choices in part based on their concern for the environment (Table 4.25). In general, almost a third of skiers (32%) chose a region with a solid environmental reputation. Some of the factors varied according to whether the respondent traveled by private or public mode. Those who traveled by public transit on their trip in 2005 (39%) were more likely to choose winter destinations that were easily accessible by public transit. They were also more likely to choose not to rent a car (26%) than those who traveled by private transportation (10%) on their 2005 trip.

Table 4.25: Impact of environmental concern on travel choices (by actual mode)

	Total Sample		Private Mode		Public Mode		Chi-Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
I choose a region with a solid environmental reputation.	75	31.6	19	37.0	19	27.5	1.116 (0.291)
I choose destinations easily accessible by public transit.*	73	30.8	12	23.0	27	39.1	3.499 **(0.061)**
I choose not to use a rental car.**	50	21.1	5	9.6	18	26.1	5.226 **(0.022)**
I limit the distance I travel.	22	9.3	5	9.6	5	7.2	0.220 (0.639)
I choose destinations with an environmental certificate or eco-label.	12	5.1	3	5.8	4	5.8	0.000 (0.995)

** People who chose private and public modes are significantly different at a 95% confidence level.
* People who chose private and public modes are significantly different at a 90% confidence level.

Problems observed by travelers on their trip in 2005 are presented in Table 4.26. More respondents who traveled by private mode observed deficient garbage disposal (10%) than those who traveled by public mode (0%).

Table 4.26: Environmental problems observed in Whistler (by actual mode)

	Total Sample		Private Mode		Public Mode		Chi-Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Noticed a specific problem	66	30.3	17	34.0	19	29.7	0.242 (0.623)
High volumes of traffic	32	13.5	8	15.4	7	10.1	0.750 (0.387)
Litter*	20	8.4	6	11.5	2	2.9	3.585 **(0.058)**
Noise pollution	19	8.0	3	5.8	4	5.8	0.000 (0.995)
Other	13	5.5	2	3.8	5	7.2	0.629 (0.428)
Logging	12	5.1	3	5.8	2	2.9	06.17 (0.432)
Deficient garbage disposal**	10	4.2	5	9.6	0	0.0	6.921 **(0.009)**
Water pollution	4	1.7	1	1.9	1	1.4	0.041 (0.840)
Air pollution	4	1.7	0	0.0	1	1.4	0.760 (0.383)

** People who chose private and public modes are significantly different at a 95% confidence level.
* People who chose private and public modes are significantly different at a 90% confidence level.

Respondents who traveled to Whistler during their 2005 trip using different modes had no significant differences in their views of management activities at resorts related to improving environmental reputation (Table 4.27).

Table 4.27: Management activities influencing Whistler's environmental reputation (by actual mode)

	Mean[†]			t	Sig.
	Total Sample	Private Mode	Public Mode		
Minimizing environmental effects of transportation to and from the ski hill	3.9	4.1	4.1	0.199	0.843
Minimizing the environmental effects of ski run construction (rock blasting and slope grading)	3.8	4.0	3.9	0.528	0.598
Mitigating any effects of ski run construction on the vegetation, mostly visible during the summer	3.8	3.9	3.9	-0.241	0.810
Minimizing energy and water consumption for snow making	3.7	3.7	3.7	-0.086	0.932
Minimizing energy consumptions for lifts	3.6	3.7	3.7	0.408	0.684
Minimizing energy and water consumption of food services on the mountain	3.6	3.7	3.8	-0.522	0.603
Reducing energy consumption by not providing night skiing opportunities	3.3	3.2	3.3	-0.362	0.718

[†] Average level of agreement to statement (Scale ranging from 1 = not at all important to 5 = very important)

5 DISCUSSION

Transportation, often the most energy-intensive component of tourism systems, is a necessary part of the value chain for an industry in which the tourist (i.e., consumer) must be transported to the destination in order to consume a significant part of the overall tourism experience. Transportation has consequences for the natural environment, which is also a key component of the value chain for destinations such as Whistler whose ecosystems are at the core of the area's primary product. Destination managers can play an important role in shaping the tourism value chain through implementing policy and planning actions that not only reduce greenhouse gas emissions but also reinforce consumer values and preferences with respect to environmental factors. Such actions may provide enough extra 'added value' to travellers' experiences to create sustained competitive advantage for the destination in the tourist marketplace. .

Given the potential environmental costs of transportation-related energy consumption, adopting eco-efficient transportation strategies may help reduce negative environmental impacts by lessening the rate of increase in energy consumed as travel demand increases. Implementing policies which shift tourists to more energy efficient transport modes are a useful means of protecting the sustainability of the destination's environmental foundation. This study's findings can help tourism managers influence the future of tourism destinations by providing an empirically based rationale for implementing more eco-efficient transportation management strategies within the destination's overall tourism value chain. Given the strong role destinations play in

organizing travel products and services, as well as communicating these attributes to travellers, there is a powerful opportunity for them to influence the way in which visitors travel to and from the host region as part of their overall tourism experience.

This chapter outlines potential management implications associated with the study findings. The first section provides a summary of key results. The next discusses transportation mode choice behaviour and preferences. Methods of shifting tourists out of their cars are examined in the third section. The next section presents a comparison of these results with those of the transportation DCE that was conducted in Whistler during the summer of 2004 (Kelly, 2006; Kelly et al., 2007b). This chapter concludes with the implications of the discrete choice experiment findings.

5.1 Overview of Key Findings

The findings from the transportation DCE used in this study were unanticipated. None of the attributes used to describe the individual modes were significant. Only the intercepts were significant, indicating that the mode itself was more important to respondents than the attributes of each mode. Essentially, this suggests that people are dedicated to a particular mode of travel regardless of the appeal of alternative modes. Two non-mutually exclusive groups of interest were identified – (1) skiers from the Lower Mainland, and (2) overnight skiers – and were further explored using descriptive statistics. This section summarizes the key mode choice findings for each of these groups.

Skiers from the Lower Mainland were divided into day and overnight visitors. In general, day visitors from the Lower Mainland were quite similar to those staying overnight. The overwhelming majority of skiers from the Lower Mainland traveled to

Whistler by private modes (95%). When responding to the DCE, almost two-thirds of skiers from the Lower Mainland were only interested in traveling by private mode. Only one third of respondents were willing to make tradeoffs between private and public modes. When provided with the pro-transit hold-out set, the greatest portion of skiers from the Lower Mainland still chose a private mode (44%). One third of respondents indicated a willingness to travel by public modes, but a sizeable number (22%) chose not to travel under these circumstances.

Overnight skiers were divided into short- and long-haul visitors. There were significant differences between these groups in terms of their mode choice behaviours. The vast majority of short haul, overnight skiers traveled to Whistler by private modes on their trip in 2005 (96%). On the other hand, the largest portion of long-haul visitors traveled by public transit (52%). As indicated in Chapter 2, the only option for public transit between Vancouver and Whistler at the time of the survey was bus.

Noteworthy differences existed between short- and long-haul overnight skiers' responses to the DCE. Overnight skiers who traveled shorter distances were most likely to choose only private modes of transportation (64%). Some made tradeoffs between public and private modes (28%). Those from further away were more likely to make tradeoffs between modes (61%). While very few short-haul travelers always selected public modes (7%), over one quarter of long-haul travelers did. When comparing the transportation mode respondents actually used when traveling to Whistler with their choices in the DCE, almost one fifth of long haul travelers who traveled by private mode on their trip to Whistler in 2005 preferred public modes in the DCE.

In responding to the pro-transit hold-out set, almost half of short-haul overnight skiers chose to remain in private automobiles. Almost 30% of these selected public transit. In contrast, increasing the appeal of public transit influenced half of long-haul overnight travelers to select public transportation modes in this choice set. More skiers, both short- and long-haul showed an interest in public modes in the pro-transit hold-out set.

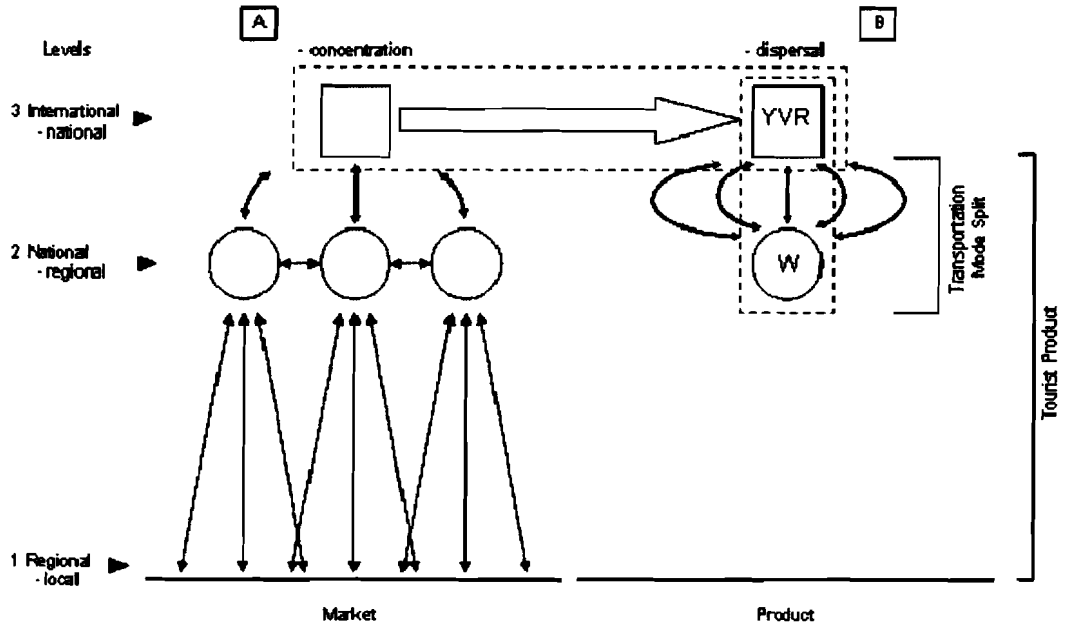
5.2 Transportation Mode Choice Behaviour and Preferences

Typically, destination managers do not play a significant role in shaping inter-urban transportation. However, the structure of transportation to and from a destination is directly impacted by policy and planning decisions through the value chain. As such, destination managers should recognize their potential role in shaping the eco-efficiency of tourist travel. Conventionally, transportation planning decisions are affected by factors such as geography, economic constraints, political feasibility, and technology. In addition, market responses to planning decisions should be considered.

Based on the results of this study, long-haul overnight skiers demonstrate willingness to trade-off between private and public transportation modes with many preferring public modes. In contrast, short-haul skiers are dedicated to private vehicle use. It will likely prove challenging to shift these individuals to more eco-efficient modes of transportation. However, under the right conditions (e.g., the pro-transit scenario in this study), some may shift to public modes. In order to most effectively increase eco-efficiency through shifting tourists to public transportation modes, destination planners should primarily target long-haul travelers. Section 5.3 considers how to best shift tourists to public modes.

The transportation model of Hills and Lundgren (1977) (see Figure 2.2 in Chapter 2) indicates dispersal of tourists on arrival at a central hub. Whistler, British Columbia is one of the "products" at the second level of the diagram. This model can be adapted to address mode choice behaviour. Figure 5.1 illustrates part of the tourism value chain. It represents the functional mechanism of long-haul tourist travel to Whistler. The left (A) and right (B) sides of the diagram are linked through transportation. B illustrates the dispersal of tourists on arrival at a central hub (YVR – Vancouver International Airport) to resort facilities at the regional level (W - Whistler). On their arrival at the Vancouver International Airport, tourists traveling to the same destination split according to transport mode choices. In B, the arrows linking levels 2 and 3 indicate this modal split. Currently, the only options available to travelers arriving at the Vancouver International Airport are rental car, bus and limousine. On arrival at Whistler, many visitors have no requirement for intra-urban transportation due to the pedestrian-oriented nature of Whistler Village (hence the removal of arrows depicting local travel between levels one and two on side B).

Figure 5.1: Functional mechanism of tourist movement to Whistler, BC



Adapted from Annals of Tourism Research, Volume 4, Theo Hills & Jan Lundgren, The impact of tourism in the Caribbean: A methodological study, p. 248-267, ©1977, with permission from Elsevier.

Tourists plan trip logistics from home. Therefore, mode choice decisions of long-haul travelers are made sight unseen before stepping off the plane on arrival in Vancouver. The way tourists make transportation mode choices has implications for tourism policy and planning. Travel choices are mainly influenced in the planning phases of tourist travel prior to departure. They may be influenced in part on arrival at the airport. Destination managers need to reach tourists in the planning phase of their trip in order to effectively mold the flow of tourists in the value chain.

5.3 Getting Skiers Out of their Cars

This section addresses how to successfully get skiers out of private modes and onto public transit. Long-haul travelers are considered the best target for modal shifts, but strategies directed at short-haul travelers are also addressed. In this study, attribute levels

presented in the DCE were not significant even in the pro-transit hold-out set. This suggests that in order to successfully shift people out of their cars, public transit needs to be more appealing or private transit significantly less attractive than respondents encountered in the DCE. Although the findings of this study do not clearly explain which attributes encourage a shift to public transportation, the literature identifies methods that have worked in other situations. Strategies used by destination managers need to be more aggressive than the attribute levels presented in the pro-transit DCE in order to have a major impact.

5.3.1 Carrots and Sticks

Destination managers shape travel flows in the value chain by implementing strategies that encourage tourists to shift to public transport modes. The literature review in Chapter 2 presents a number of strategies for encouraging people to choose public modes (e.g., Cullinane & Cullinane, 1999; Hine & Scott, 2000; Holding & Kreutner, 2002; Lumsdon, 2006; Sarker et al., 2002).

"Carrots and sticks" policies promote and develop public transit while simultaneously discouraging private vehicle travel. The current options for public transportation from Vancouver to Whistler are limited. The promotion and development of public transit requires consideration of design features that make public modes more appealing. These include increasing comfort, safety and security, convenience (e.g., frequency, reliability, extent of transportation network, speed, and directness of route), service quality, pricing, and marketing communications (Cullinane & Cullinane, 1999; Hine & Scott, 2000; Lumsdon, 2006). Destinations can play a role in facilitating more seamless travel for tourists.

Destinations must take a dynamic role in informing tourists of the features and availability of public transit options in order to positively influence mode choice behaviour. Access by public transportation was the most important environmental factor considered by overnight skiers when choosing a destination and almost one-third of long-haul travelers indicated that they choose destinations easily accessible by public transit. Because transportation mode choices are made from home, information on public transportation options must be made available to long-haul skiers prior to arrival at the Vancouver International Airport. In addition, destinations should actively promote public modes of travel.

Restricting private vehicle use at the destination will both reduce the necessity of having a private vehicle on arrival in Whistler and make it less appealing. In this study, parking fees were the only attribute that presented any restrictions to private vehicles. Currently in Whistler, a number of accommodations charge parking fees but the availability of free day-use parking is extensive. The costs of these fees are typically hidden. It is possible that making these fees more transparent to visitors would impact their mode choice behaviour. Restrictions may also be accomplished through increasing pedestrian-only routes (Inskeep, 1987, 1991; Lumsdon, 2000) and establishing no-vehicle zones and limited parking areas (Holding, 2001). This is currently occurring in Whistler with features such as the valley trail system and the pedestrian-only village.

Limiting transportation infrastructure also restricts private vehicles (Sarker et al., 2002). This study did not provide scenarios that restricted private vehicle travel as no plans were in place to do so on the Sea to Sky Highway. Given the current highway expansion, it appears that planners do not consider restricting private vehicles a serious

planning option in the future. Even with current expansion, certain policies would successfully restrict private vehicle travel. Given the expansion of the Sea to Sky Highway, a dedicated transit lane is a feasible option. This would improve the convenience of public transit (mainly due to improved travel times). It would simultaneously constrain the amount of private vehicle traffic the highway could handle. With a dedicated transit lane in place, highway speeds for private modes could be controlled to make transit time for private modes longer than for public modes. This would both restrict travel by private modes while making public modes more appealing in comparison. A highway toll for private vehicles could also effectively deter the use of private modes.

Educating skiers about the potential impacts of private vehicle travel on the quality of future ski trips may impact tourists' transportation mode choices. This may especially be the case as the awareness of energy consumption and its link to climate change and related environmental impacts becomes more prevalent in the public consciousness. Provision of education to tourists may include supplying information on transportation options including aggressive promotion of more eco-efficient alternatives. The environmental benefits of public transportation must be clear and well defined. Other policy directives may indirectly inform tourists about transportation options by bringing these issues to the forefront. For example, skiers from the Lower Mainland reading in a local newspaper about a toll on the Sea to Sky Highway for environmental purposes may reconsider their rationale in choosing private modes.

Public transportation for larger groups of travelers is often more cost prohibitive than traveling by private modes. Only 5% of skiers travel alone. These are the only skiers

who will have a lower overall travel cost if they travel by public modes given the current situation. Renting a car for travel from Vancouver to Whistler is less expensive for groups of two to four people than traveling by public transit. Since 59% of overnight skiers travel in groups of two to four individuals, providing incentives for traveling by public transportation while simultaneously making private modes less appealing is critical for destination planners hoping to influence mode choice behaviour.

5.3.2 Partnerships and Packaging

Given the apparent challenges in getting travelers to shift to public transportation modes, all possible strategy options must be considered including partnerships and packaging. Developing partnerships between tourism operators and transit providers is a useful method to shift people into public transportation modes (Lumsdon, 2006). In the case of Whistler, packages to the resort could be sold inclusive of transportation from the airport. According to Tourism Whistler (2008), no packages sold through the central reservations agency include transportation. A transportation option may be added to travelers' itineraries at extra cost. For the local market, the sale of season's passes or day lift tickets to Whistler/Blackcomb which include an integrated inter-urban public transportation component may be a successful innovative response.

Packaging provides a number of benefits. The awareness of public transportation options between Vancouver and Whistler will increase. Transit providers may experience higher levels of ridership thus increasing profitability. Tourism operators at the destination would be actively taking steps to protect the environmental component of the tourism value chain. This step towards environmental protection could in turn be used as a marketing tool in promoting Whistler as a sustainable destination.

Because transit services are offered by a number of different service providers, seamless multi-modal travel to Whistler can be challenging at best. One example is travelers who wish to travel by bus from Whistler to Horseshoe Bay to take the ferry to Vancouver Island. Based on 2008 winter schedules, travelers often arrive by bus in Horseshoe Bay either precisely as the ferry is leaving (up to 2.5 hours before the next ferry departure), or thirty minutes after the most recent ferry (up to 1.5 hours before the next ferry) (BC Ferries, 2008; Greyhound Canada Transportation Corp., n.d.).

All transit providers should work together to make travel to Whistler more seamless and easier to navigate. This could include the sale of single transit tickets that cover all public transportation to and from the resort, as well as within the destination. In addition, transfers from one mode to another need to be more convenient. Some buses (e.g., Perimeter and Pacific Coach Lines) pick up travelers at the airport and take them directly to Whistler. Other buses to Whistler (e.g., Greyhound) require the traveler to take local transit buses to and from central depots in Vancouver and Whistler. The Greyhound bus system is likely not used by long-haul travelers, but is currently the most available option for short-haul skiers who wish to travel by public modes. Clear information on how to successfully plot a course through this system is critical. Making transportation from Vancouver to Whistler more seamless will ensure that users have a positive public transit experience. This will create positive word of mouth promotion for the transportation providers and generate more return clientele. Destination planners can encourage and facilitate the process of creating more seamless travel.

Whistler is about 120 km north of Vancouver. Travel takes a substantial amount of time whether by private or public mode. Table 5.1 presents approximate travel times

for each mode, as well as whether travel by local transit is required and how many times tourists must transfer between or within modes.

Table 5.1: Travel logistics from Vancouver International Airport to Whistler

	Travel Time (not including mode transfers)	Local Public Transit Required	Mode Transfers Required
Private vehicle	2 hours	No	0
Express bus	2 hours 45 minutes	No	0
Non-express bus	3 hours 10 minutes	Yes	3
Train[1]	3 hours	Yes	3-4

[1] This is a purely hypothetical option. There is currently no passenger train option for travel between Vancouver and Whistler. Travel time and mode transfers required are estimated according to the location of the train station in North Vancouver, BC.

Although the differences in actual travel time are not vast, an express bus is the only option other than private vehicle that provides a seamless experience. If the differences in travel time and the multiple transfers often required for travel by public transit are not addressed by transportation planners, other features may also be required to successfully shift tourists to public transportation modes.

The trip between Vancouver and Whistler could be marketed as part of the tourist experience to certain groups. Providing opportunities for social interaction and sightseeing (Lumsdon, 2006) may influence some travelers' choice of modes. The concept of novelty travel (such as traveling by historic train between Vancouver and Whistler) could also encourage modal shifts (Cullinane & Cullinane, 1999). However, this study shows that these options may not be as valuable for shifting short-haul travelers from private modes. In addition, they are likely not useful for skiers on day trips. Their primary objective is to get to Whistler as quickly as possible to ski. In addition, public

transportation for larger groups of travelers is more cost-prohibitive than traveling by private modes.

5.4 Comparison of Summer and Winter Tourists to Whistler

The findings in this study of winter tourists to Whistler differ markedly from the results found by Kelly (2006) and Kelly et al. (2007) in studying summer tourists to Whistler in 2004. In the study of summer tourists to Whistler in 2004, respondents were willing to shift from private transport modes when public modes were sufficiently appealing (Kelly, 2006; Kelly et al., 2007). In particular, travel time and travel costs were significant factors in mode choice. As automobile travel time increased, the likelihood of choosing private transportation increased. The probability of choosing public transportation increased as parking fees at the destination increased (for overnight visitors only) and as fuel cost increased.

The differences in behaviour of summer and winter tourists are considerable. Activity participation may influence mode choice behaviour. Skiers must bring a sizeable amount of equipment with them (unless they are renting equipment onsite). This reduces the convenience of taking public transit, especially if they are only traveling to Whistler for the day. Some of the issues include dealing with mode transfers while encumbered by equipment and what to do with personal gear while skiing. Many summer tourists also travel to Whistler for equipment-intensive recreation activities (e.g., mountain biking). The summer study assessed summer tourists in general, not specifically targeting a particular recreation group. It is possible that mountain bikers share similarities with skiers.

Day skiers from the Lower Mainland may have more specific requirements in terms of travel departure and arrival times than those same tourists traveling to Whistler during the summer months. Earlier arrival in Whistler may be desirable when snow conditions are excellent, while poor conditions may bring about earlier departures from the resort. The operational hours of Whistler/Blackcomb also strongly impact when skiers wish to travel. The summer schedule at Whistler/Blackcomb would influence when resort-based mountain bikers require transit, but many summer tourists are not mountain bikers.

The issue of seasonality in tourist transportation has serious implications for destination planners and managers. Traffic flows are seasonal with less traffic in shoulder seasons. In addition, this study shows apparent differences between the transportation choice behaviours and preferences of summer and winter tourists to Whistler. Strategies used to shift summer tourists may be ineffectual for winter tourists. Transportation policies need to be economically feasible year-round. At the same time, they should effectively improve eco-efficiency by shifting tourists to public modes. For these reasons, the reactions of both summer and winter tourists need to be considered. This may require changing design features, such as timing or frequency of public transportation services, to suit each seasonal market.

5.5 Discrete Choice Experiment

In discrete choice experiments, respondents make trade-offs between different choice sets based on the attributes provided. In this DCE, attributes included road conditions, travel time, frequency, departure and arrival points, one-way fuel costs and rental fees. This DCE was based on a similar survey of summer tourists to Whistler

(Kelly, 2006, Kelly et al., 2007). However, the variable representing road conditions was added, and the levels for travel time, frequency and travel cost were magnified in order to more accurately reflect winter conditions in 2005. Respondents to the winter survey did not react in significant ways to the attributes at the levels provided. Even with the adjustments made to the winter survey, no individual attributes were significant enough to alter individuals' mode choices. A large portion of respondents, in particular short-haul skiers, were not prepared to change their transportation mode choice regardless of other options that were offered. Although a tendency to stay with a preferred mode in the DCE would not be remarkable, the lack of any significant attributes was unanticipated. In this case, the attribute levels may not have been extreme enough to cause respondents to switch modes.

Change in the attribute levels for each mode (at the levels provided in this experimental design) did not entice respondents to shift their transportation choices. This reinforces previous research showing that even with notably increased travel costs, tourists do not shift modes (Kamp et al., 1979; Trent & Pollard, 1983). It also supports the premise that certain individuals are committed to private automobiles and will simply not shift to alternative modes regardless of how those options are configured (Colin Buchanon & Partners, & Travel Dundee, as cited in Hine & Scott, 2000).

Past research found that as gas prices increase, public transport modes increase in popularity while private modes decrease (Becker et al., 1976; Morgan, 1986; Williams et al., 1979). Based on the price levels provided in this study, no modal shift occurred. This may indicate that the price levels used in this study did not push the limit enough. Dubois & Ceron (2006) found that in terms of long-haul travel, the increase in local travel cost

must be significant for behavioural changes to occur as it is such a small portion of overall trip cost. A higher cost threshold and more extreme levels of comfort and convenience may have triggered respondents to shift modes.

Some researchers have found that tourists have been more likely to decrease their travel (Trent & Pollard, 1983) or to not travel (Kamp et al., 1979) than to shift to alternative modes of transportation due to rising gas prices. This was also the case with skiers from the Lower Mainland in this study. Over 20% of skiers from the Lower Mainland chose to not travel under the conditions imposed by the pro-transit scenario. Destination planners must understand the preferences of tourists in order to successfully improve transportation eco-efficiency while not diminishing the number of travelers to Whistler.

While limiting transportation infrastructure for private users may encourage people to shift transport modes (Sarker et al., 2002), this study did not impose any specific limits on travel by private vehicle (other than establishing travel time). There are currently no strategic constraints to private vehicle travel between Vancouver and Whistler. It is possible that setting explicit limits on private vehicle travel in the hold-out set may have induced more people to shift modes. This may be a useful tactic for destination planners aiming to shift tourists to public modes of transportation.

6 CONCLUSION

6.1 Research Summary

This research set out to explore the preferences and potential behaviours of tourists with respect to a variety of strategies suited to enhancing the eco-efficiency of tourist transportation to resort destinations. The following questions were used to guide the investigation:

1. What policy options encourage skiers to shift from private to public modes of transportation in order to increase the eco-efficiency of transportation in the tourism system?
2. How does the overall skier market respond in terms of preferences and probable behaviour to these transportation strategy options?
3. How do the responses of short- and long-haul skiers to these transportation policies vary?
4. How do the responses of skiers and summer visitors to Whistler differ?
5. What are the implications of these responses for destination transport policy and planning decisions?

The findings with respect to each of the above questions are summarized below.

What policy options encourage skiers to shift from private to public modes of transportation in order to increase the eco-efficiency of transportation in the tourism system?

Through a literature review, a number of policy options for encouraging a shift to public modes were identified. A key method involves making public transportation more appealing while simultaneously restricting or decreasing the appeal of private vehicle use (Cullinane & Cullinane, 1999; Hine & Scott, 2000; Holding & Kreutner, 2002; Lumsdon, 2006; Sarker et al., 2002). Some approaches for doing this include the following:

- Provide dedicated high occupancy vehicle lanes (Kelly, 2006)
- Implement highway tolls for private vehicles
- Increase the cost of gasoline (Becker et al., 1976; Kamp et al., 1979; Trent & Pollard, 1983; United States Travel Data Center, as cited in Williams et al., 1979)
- Limit transportation infrastructure for private vehicles (Sarker et al., 2002)
- Improve public transportation networks (Kelly, 2006)
- Upgrade multi-modal transfers (Kelly, 2006)
- Offer integrated multi-modal transportation packages (Lumsdon et al., 2006)

Destination managers must be fully informed before implementing these strategies in order to ensure that tourists shift to public modes rather than deciding not to travel.

Destination planners must consider the design of transportation systems to make them attractive enough to get people out of their cars. The following features should be addressed:

- Affordability and pricing
- Service quality, reliability and comfort
- Safety and security

- Frequency of departures
- Travel time
- Marketing communications
- Enhancing transfer convenience

(Conquest Research, as cited in Hine & Scott, 2000; Cullinane & Cullinane, 1999; Hine & Scott, 2000; Lumsdon, 2006) Certain design features such as frequency may need to be adjusted from season to season to suit the requirements of different types of travelers.

Actions reducing the necessity of having a private vehicle within destinations may help reduce the appeal of private modes. These include:

- Establishing "no vehicle zones" (Holding, 2001)
- Restricting parking availability (Holding, 2001)
- Implementing parking fees (Kelly, 2006)
- Improving the quality of local public transit

Destination planners should facilitate proactive behaviours by tourism operators. Marketing transport as part of the destination experience, providing opportunities for social interaction and sightseeing (Guiver, as cited in Lumsdon, 2006), and promoting novelty travel (Cullinane & Cullinane, 1999) may all play a role in shifting long-haul tourists. Additionally, tourism operators can form partnerships with transportation providers to offer tourist packages that include a transportation component (Lumsdon, 2006). Shifting to vehicles with better energy-efficiency (e.g., hybrid vehicles, hydrogen vehicles) will also have an impact (Peeters & Schouten, 2006).

How does the overall skier market respond in terms of preferences and probable behaviour to these transportation strategy options?

The study findings indicate that the overall tourist market did not significantly respond to the options as presented in the transportation discrete choice experiment. The individual attributes used to describe the transportation modes in each choice set were not significant in determining market responses. The mode itself was more important than the specific attributes of each mode. Coming into the transportation DCE, respondents had already decided which mode they wished to use for travel and characteristics of other modes, for the most part, did not influence their decision. In order to affect a positive change in tourists' transportation behaviour, destination planners must be aware of the transportation choice behaviour of different tourist groups.

How do the responses of short- and long-haul skiers to these transportation policies vary?

The key differences in terms of visitor responses to assorted transportation policies were between short- (from BC, Alberta, Washington and Oregon only) and long-haul (from elsewhere) visitors. Short- and long-haul visitors face different travel decisions. Short-haul travelers make their local mode choices based on travel from home to Whistler. On the other hand, long-haul travelers arrive by air at the Vancouver International Airport and make their local mode choices based on travel from that central hub to Whistler.

Short-haul visitors, including those from the Lower Mainland region of British Columbia, traveled between Vancouver and Whistler almost exclusively by private

automobile on their trip in 2005. Their choice behaviour in the DCE also reflected a commitment to travel by private vehicle, with almost two-thirds of short-haul skiers always selecting private modes. Less than one-third of short-haul respondents were willing to make trade-offs between transport modes and very few respondents (7%) were dedicated to public modes. In responding to the pro-transit scenario, the proportion of short-haul skiers dedicated to private modes was reduced to 49%. Selection of public modes increased to 29% of short-haul respondents.

Long-haul visitors showed markedly different responses. On their trip in 2005, over half of long-haul skiers traveled between Vancouver and Whistler by bus, the only public transportation option available. In responding to the DCE, long-haul skiers were much more willing to make trade-offs between modes indicating that increasing the appeal of public modes could influence these travelers to switch modes. A quarter of long-haul respondents were dedicated to public modes in the DCE and very few (12%) were dedicated to private transport. In response to the pro-transit hold-out set, 50% of long-haul overnight skiers selected public modes.

How do the responses of skiers and summer visitors to Whistler differ?

Generally speaking, summer tourists are more willing to shift between transportation modes than skiers. If certain mode attributes (travel time and travel cost) are made more appealing, summer tourists will shift to public modes. Skiers, in particular short-haul travelers, prefer to travel by private modes.

What are the implications of these responses for destination policy and planning decisions?

Given the actions of winter tourists during their 2005 trip to Whistler and their responses to the transportation DCE, short-haul travelers are dedicated to private vehicle travel under current conditions. Long-haul tourists, however, are more willing to travel by public modes. Illustrating the differences in transportation mode choices of short- and long-haul travelers to Whistler allows an examination of Hills and Lundgren's (1977) transportation model. The timing of mode-choice decisions is a key factor for destinations trying to promote public transport to consider.

Long-haul tourists, in particular the group of tourists who traveled by private modes but show a willingness to switch to public modes (17%), are likely the best group to target. These tourists are the most likely group to be influenced through the value chain in order to make successful eco-efficiency improvements in transporting tourists between Vancouver and Whistler. Thus transportation policies that impact visitor travel from the airport to Whistler should be the focus in order to yield the greatest gains.

Destination policy and planning decisions must consider the transportation component of the tourism value chain. Promoting and developing public transit while simultaneously restricting private vehicles is recommended. The first research question – what policy options encourage tourists to shift from private to public modes of transportation in order to increase the eco-efficiency of transportation in the tourism system – drew attention to a number of issues that need to be considered by destination managers including:

- Limiting transportation infrastructure for private modes on the Sea to Sky Highway (Sarker et al., 2002)
- Considering design features of public modes to make them more appealing to tourists, and creating more seamless multi-modal travel (Conquest Research, as cited in Hine & Scott, 2000; Cullinane & Cullinane, 1999; Hine & Scott, 2000; Lumsdon, 2006)
- Providing information on public transportation options while tourists are in the planning phase of their trip, and educating tourists about potential impacts of private vehicle travel and benefits of public transit
- Developing partnerships between tourism operators and transit providers (Lumsdon, 2006)

In addition to these suggestions, encouraging tourists to stay for extended periods of time should be considered as the energy consumption per tourist per day would be significantly reduced. For the same number of visitor days in Whistler, less transportation (both air and local modes) would be required. In this study, 72% of short-haul skiers stayed for 1-3 days and 24% stayed for 4-7 days. It seems feasible to encourage these tourists to stay longer. It will likely be more challenging to entice long-haul skiers to stay for extended periods, as a large portion of them already have extended stays (46% stayed for 4-7 days and 35% for 8-14 days). Given the challenges of shifting individuals out of their own vehicles, regulation (i.e., more fuel efficient vehicle requirements) and education are policy options that should be further explored.

Finally, the differences between summer and winter tourists to Whistler are significant for destination managers. Summer tourists, regardless of where they traveled from, were much more willing to shift to public modes when the travel time and cost were appealing to them. In the winter, short-haul overnight skiers were less willing to shift to public modes. The primary focus must be on long-haul overnight skiers. This

necessitates a focus on travel between the Vancouver International Airport and Whistler in which the impacts of seasonality on transportation design are considered.

6.2 Suggestions for Future Research

The research presented here is a starting point in the study of transportation-related energy consumption in the tourism system. It unearths a number of extensions for further exploring the behaviour of skiers traveling to Whistler. Some of these extensions deal with application of the DCE:

- Use more extreme attribute levels than those employed in this study. In particular, increase fuel costs to more closely reflect present realities and future possibilities.
- Add a high-speed train as an alternative directly from the airport to Whistler. Since DCE allows researchers to explore hypothetical scenarios, this method could examine how skiers would respond to such a radically new public transit option.
- Extend the road conditions attribute to apply to all alternatives in the choice set. In this study, the road conditions attribute was presented as an attribute for three alternatives (own car, rental car and express bus) as those are the modes that are directly impacted by road conditions. It seems plausible that road conditions would also influence respondents' choice to take the train or not to go (i.e., choosing not to take the road).
- Extend realistic limits to private vehicle travel in the pro-transit hold-out set based on the current infrastructure. This could be done by presenting situations in which fewer highway lanes are available for private modes (due to the presence of a dedicated bus-lane), speeds for private vehicle travel is restricted, or private vehicles are charged a highway toll.
- Ask respondents for their choice rationale at the end of the transportation DCE. This would add to the study by supplying qualitative data to further explain tourists' choice behaviour.

Other research extensions include:

- Further explore both summer and winter visitors to enable a more thorough comparison of the two groups including dividing summer visitors into short- and long-haul segments to compare differences in choice behaviour and preferences, and exploring why they make particular mode choices.
- Compare and contrast the mode choice behaviour of mountain bikers (summer) and skiers (winter).
- Conduct a similar study at another winter resort to see how skiers differ between destinations.
- Further investigate what conditions are required to successfully get short-haul skiers out of private vehicles and onto public modes of transportation.

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APPENDICES

Appendix A: Intercept Survey Instrument

Interviewer: _____ Date: _____
Location: _____ .Time: _____

SIMON FRASER UNIVERSITY

Hi. My name is [*your name*] and I am conducting research with Simon Fraser University. We are trying to better understand what visitors think about future changes needed for Whistler to become a more sustainable resort destination. Would you be willing to take 2 minutes to answer a few questions?

1. Are you a full-time resident of Whistler or do you work in Whistler? ☐N [1] ☐Y [2] *[terminate]*

We will be conducting an Internet survey later this spring. By completing the online survey, you will be helping shape Whistler's future. By completing the online survey, you will be entered to win a number of draw prizes. Can we contact you by email in late March to complete the Internet survey? All personal information will only be used for the purposes of this study, and will not be released to any other individual or organization.

2. Email: _____ ***[double check!!]***

3. Is there a name we could use when we contact you by email? _____

Thank you. At this time, I have a few quick questions about your trip. Your participation is completely voluntary, and you may terminate the interview at any time.

4. Is this your first visit to Whistler?
☐ Y [1] ☐ N [2]

5. Where are you from? *Please write out in full.*
Country: _____
Province/State [if Canada/USA]: _____
City [if BC]: _____

6. What is the purpose of your trip? *Check one.*
☐ Business [1] ☐ Leisure [2]

7. Will you be skiing or snowboarding on this trip?
☐ Y [1] ☐ N [2]

8. Are you a day visitor or are you staying overnight? *[If day visitor, terminate.]*
☐ Overnight [1] ☐ Day [2]

9. How many nights are you staying in total?
_____ Nights

10. What type of accommodation are you using?

If you are staying at more than one, select the one you stayed at the longest.

- ☐ rented hotel room, condo, or chalet [1]
- ☐ timeshare [2]
- ☐ bed & breakfast, or pension [3]
- ☐ hostel, or club cabin [4]
- ☐ campground [5]
- ☐ home of friends or family [6]
- ☐ second home [7]
- ☐ other [8]: _____

11. Where is your accommodation located in Whistler?

- ☐ In Whistler Village or Village North [1]
- ☐ Within 2 km (1.25 miles) of Whistler Village [2]
- ☐ Further than 2 km (1.25 miles) from Whistler Village [3]
- ☐ Don't know [4]

Thank you for your time. You can expect to receive an email from Simon Fraser University in April. Please accept this pin as a token of our appreciation. The card has a link to our survey, and an email address in case you have any questions about our research. Have a nice day.

Appendix B: Cover Email for Survey Invitation

Hi (first name),

You are one of the few individuals invited to participate in Simon Fraser University's survey on mountain resorts during your trip to Whistler in Feb, 2005. Thank you for agreeing to take part - your opinions and perspectives are very important to us.

This survey, which has been designed to find out what you think about different aspects of mountain resorts such as Whistler, will take about 25 minutes to complete. As a thank you for taking the time to complete the survey, you will be entered in a draw to win prizes including a minimum $100 gift certificate for Mountain Equipment Co-op. Be sure to get your responses in by October 31st in order to be eligible for the prize draw.

Please be assured that this survey is for research purposes only. Participation in this survey is voluntary and your responses will be kept strictly confidential in accordance with Simon Fraser University's research ethics guidelines. Any personal identification information you provide will be used only to contact you in the event that you win one of the prizes.

CLICK ON THE FOLLOWING LINK TO BEGIN or RE-ENTER THE SURVEY:
http://www.whistlerwinter.rem.sfu.ca/?SS=yes&pw=3706whi&di=KJ12624PW

If clicking on this link does not take you directly to the survey, please go to http://www.whistlerwinter.rem.sfu.ca/ and enter your LoginID and Password:

LoginID: (login ID) Password: (Password)

This study is being conducted by the Centre for Tourism Policy and Research at the School of Resource and Environmental Management, Simon Fraser University, in partnership with the Resort Municipality of Whistler. If you have any comments or questions, please contact Dr. Wolfgang Haider by phone at (604) 291-3066 or by fax at (604) 291-4968. Thank you for your cooperation.

Sincerely,
Jen Reilly & Mathew Dickson
Graduate Students
School of Resource and Environmental Management
Simon Fraser University
Burnaby, B.C. Canada

Appendix C: Results for Skiers from Lower Mainland

This appendix outlines the results for skiers from the Lower Mainland, providing a comparison of day visitors (n=31; 33%) and overnight visitors (n=64; 67%).

Table AC.1 Socio-demographic profile of skiers from the Lower Mainland

		Total Sample		Overnight Skiers		Day Skiers		Chi-Square (p value)
		Freq.	%	Freq.	%	Freq.	%	
Gender	Male	65	68.4	41	64.1	24	77.4	1.724 (0.189)
	Female	30	31.6	23	35.9	7	22.6	
Education	Elementary	1	1.1	1	1.6	0	0.0	2.274 (0.685)
	High School	5	5.3	4	6.3	1	3.2	
	College	19	20.0	14	21.9	5	16.1	
	Undergrad	40	42.1	24	37.5	16	51.6	
	Graduate	30	31.6	21	32.8	9	29.0	
Income	Under $24.999	9	9.7	7	11.1	2	6.7	5.117 (0.529)
	$25,000 - 49,999	12	12.9	6	9.5	6	20.0	
	$50,000 - $74,999	28	30.1	18	28.6	10	33.3	
	$75,000 - $99,999	11	11.8	6	9.5	5	16.7	
	$100,000 - $149,999	16	17.2	13	20.6	3	10.0	
	$150,000 - $199,999	8	8.6	6	9.5	2	6.7	
	$200,000 or over	9	9.7	7	11.1	2	6.7	
Age	Under 25 years	18	18.9	11	17.2	7	22.6	2.824 (0.727)
	26 - 35 years	28	29.5	18	28.1	10	32.3	
	36 - 45 years	29	30.5	20	31.3	9	29.0	
	46 - 55 years	14	14.7	11	17.2	3	9.7	
	56 years or older	6	6.3	4	6.3	2	6.5	

Table AC.2 Travel party characteristics of Lower Mainland skiers

		Total Sample		Overnight Skiers		Day Skiers		Chi-Square (p value)
		Freq.	%	Freq.	%	Freq.	%	
Travel Party Size	1	8	8.5	7	11.1	1	3.2	9.777 **(0.082)**
	2	22	23.4	11	17.5	11	35.5	
	3	18	19.1	9	14.3	9	29.0	
	4	17	18.1	13	20.6	4	12.9	
	5	11	11.7	8	12.7	3	9.7	
	6+	18	19.1	15	23.8	3	9.7	
Travel Party Composition[1]	Alone	7	7.4	6	9.4	1	3.2	1.157 (0.282)
	With spouse	38	40.0	30	46.9	8	25.8	1.157 (0.282)
	Friends, family or colleagues**	60	63.2	37	57.8	23	74.2	3.863 **(0.049)**
	Dependents	19	20.0	14	21.9	5	16.1	2.408 (0.121)
	Tour group	0	0.0	0	0.0	0	0.0	0.431 (0.512)

[1] Respondents could select more than one response for Travel Party Composition.

* Day and overnight skiers from the Lower Mainland are significantly different at a 90% confidence level.

** Day and overnight skiers from the Lower Mainland are significantly different at a 95% confidence level.

Table AC.3 Activities participated in while in Whistler

	Total Sample		Overnight Skiers		Day Skiers		Chi-Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Dined out at a restaurant	75	79.8	51	81.0	24	77.4	0.161 (0.688)
Attended nightclubs	50	53.2	37	58.7	13	41.9	2.354 (0.125)
Went shopping*	31	48.4	23	57.5	8	33.3	3.508 **(0.061)**
Used a terrain park at Whistler/Blackcomb	27	30.0	17	28.3	10	33.3	0.238 (0.626)
Skied/boarded out of bounds at Whistler/Blackcomb	20	22.0	14	23.3	6	19.4	0.189 (0.664)
Attended a show, event, or festival	19	20.7	15	24.6	4	12.9	1.713 (0.191)
Participated in facility-based recreation**	13	14.1	12	19.7	1	3.2	4.582 **(0.032)**
Went backcountry skiing or snowshoeing in the Whistler area	6	6.5	4	6.6	2	6.5	0.000 (0.985)
Participated in a motorized tour or activity	2	2.2	1	1.6	1	3.2	0.234 (0.622)

** Day and overnight skiers from the Lower Mainland are significantly different at a 95% confidence level.
* Day and overnight skiers from the Lower Mainland are significantly different at a 90% confidence level.

Table AC.4 Skier motivations for visiting a mountain resort

	Mean†			t	Sig.
	Total Sample	Overnight Skiers	Day Skiers		
Getting value for the cost of the trip	4.4	4.4	4.3	0.707	0.482
Being physically active	4.3	4.3	4.3	0.432	0.667
Participating in outdoor activities	4.2	4.2	4.3	-0.270	0.788
Experiencing and seeing a mountain area	4.0	4.0	4.1	-0.401	0.689
Visiting a place that takes good care of its environment	4.0	4.0	3.9	0.746	0.457
Resting and relaxing	3.9	4.0	3.9	0.235	0.815
Learning new things, increasing my knowledge	3.4	3.3	3.5	-1.093	0.277
Visiting a place with unique and interesting restaurants	3.3	3.4	3.1	1.382	0.170
Visiting wilderness and undisturbed areas	3.2	3.3	3.2	0.370	0.712
Going to a place that is family oriented	3.0	3.1	2.8	1.006	0.317
Viewing wildlife and birds	3.0	3.0	3.1	-0.183	0.855
Enjoying nightlife and entertainment	3.0	3.1	2.9	0.555	0.580
Attending a festival or event	2.9	2.9	2.8	0.337	0.737
Enjoying cultural or historic sites/attractions	2.9	2.9	2.9	-0.082	0.935
Having opportunities to shop	2.6	2.7	2.5	1.102	0.273
Indulging in luxury, staying at first class hotels	2.1	2.1	2.2	-0.306	0.760

† Average level of agreement to statement (Scale ranging from 1 = not important to 5 = very important

Table AC.5 Skier perceptions of human interventions in mountain environments

	Mean[†]			t	Sig.
	Total Sample	Overnight Skiers	Day Skiers		
Despite our special abilities to develop ski resort areas we are still subject to the laws of nature	4.5	4.5	4.5	-0.041	0.968
Mountain plants and animals have as much right as recreationists to exist**	4.2	4.4	3.9	2.132	**0.036**
The balance of nature is very delicate and easily upset in mountain resort regions**	3.8	4.0	3.5	2.180	**0.032**
Human's interference with mountain environments often produces disastrous consequences**	3.5	3.7	3.2	2.100	**0.038**
Mountain resort areas have plenty of natural resources if we just learn to develop them	3.5	3.6	3.4	1.143	0.256
Mountain resort areas are like a spaceship with very limited room and resources	3.2	3.3	3.1	0.651	0.517
If things continue on their present course, we will soon experience a major ecological catastrophe in some mountain resort areas	3.1	3.1	3.0	0.514	0.609
We are approaching the limit of the number of people ski destinations can support	3.0	3.0	2.8	0.727	0.469
Human integrity will ensure that we do not make the mountain resort areas unlovable	3.0	3.0	3.0	0.119	0.906
Humans are severely abusing mountain resort environments	2.9	2.8	3.0	-0.739	0.462
Humans will eventually learn enough about how nature works to be able to control it in mountain regions	2.9	2.9	2.9	0.283	0.778
Humans have the right to modify the mountain environment to suit their recreation needs	2.8	2.7	3.1	-1.442	0.153
The balance of nature is strong enough to cope with the impacts of modern mountain resort developments*	2.7	2.5	3.0	-1.981	**0.051**

[†] Average level of agreement to statement (Scale ranging from 1 = strongly disagree to 5 = strongly agree)
** Day and overnight skiers from the Lower Mainland are significantly different at a 95% confidence level.
* Day and overnight skiers from the Lower Mainland are significantly different at a 90% confidence level.

Table AC.6 Factors influencing destination choice

	Mean[†]			t	Sig.
	Total Sample	Overnight Skier	Day Skier		
Wildlife sensitive ski trail maintenance systems.	3.9	3.9	3.7	0.900	0.370
Vegetation sensitive ski trail maintenance systems.	3.7	3.8	3.6	0.553	0.582
On-site energy efficient buildings.	3.7	3.6	3.8	-0.551	0.583
Public transportation access to the destination.	3.7	3.7	3.6	0.102	0.919
On-site solid waste recycling systems.	3.6	3.5	3.8	-1.350	0.180
On-site water conservation systems.	3.4	3.3	3.5	-0.983	0.328
Low-density visitor accommodation facilities.	2.9	2.9	3.0	-0.301	0.764
Pre-trip information concerning the destination's environmental initiatives.	2.8	2.9	2.7	0.636	0.526

[†] Average level of agreement to statement (Scale ranging from 1 = strongly disagree to 5 = strongly agree)

Table AC.7 Impact of environmental concern on travel choices

	Total Sample		Overnight Skiers		Day Skiers		Chi-Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
I limit the distance I travel.	44	46.3	32	50.0	12	38.7	1.071 (0.301)
I choose a region with a solid environmental reputation.	23	24.2	18	28.1	5	16.1	1.638 (0.201)
I choose destinations easily accessible by public transit.	14	14.7	9	14.1	5	16.1	0.071 (0.790)
I choose not to use a rental car.	13	13.7	9	14.1	4	12.9	0.024 (0.877)
I choose destinations with an environmental certificate or eco-label.	7	7.4	4	6.3	3	9.7	0.359 (0.549)

Table AC.8 Environmental problems observed in Whistler

	Total Sample		Overnight Skiers		Day Skiers		Chi-Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Noticed a specific problem	41	46.1	30	49.2	11	39.3	0.756 (0.385)
High volumes of traffic	34	35.8	23	35.9	11	35.5	0.002 (0.966)
Noise pollution	16	16.8	11	17.2	5	16.1	0.017 (0.897)
Litter	12	12.6	7	10.9	5	16.1	0.510 (0.475)
Logging	10	10.5	8	12.5	2	6.5	0.811 (0.368)
Deficient garbage disposal	7	7.4	6	9.4	1	3.2	1.157 (0.282)
Other	6	6.3	4	6.3	2	6.5	0.001 (0.970)
Air pollution	2	2.1	1	1.6	1	3.2	0.280 (0.596)
Water pollution	1	1.1	1	1.6	0	0.0	0.490 (0.484)

Table AC.9 Management activities influencing environmental reputation

	Mean[†]			t	Sig.
	Total Sample	Overnight Skiers	Day Skiers		
Minimizing environmental effects of transportation to and from the ski hill	3.9	3.9	4.0	-0.795	0.429
Minimizing energy and water consumption for snow making	3.8	3.7	3.8	-0.483	0.630
Minimizing the environmental effects of ski run construction (rock blasting and slope grading)	3.8	3.8	3.8	0.027	0.979
Mitigating any effects of ski run construction on the vegetation, mostly visible during the summer	3.8	3.9	3.6	1.159	0.250
Minimizing energy consumptions for lifts	3.7	3.7	3.6	0.346	0.730
Minimizing energy and water consumption of food services on the mountain	3.7	3.8	3.6	0.658	0.512
Reducing energy consumption by not providing night skiing opportunities	3.2	3.3	2.9	1.636	0.105

† Average level of agreement to statement (Scale ranging from 1 = not at all important to 5 = very important)

Appendix D: Profile of Long-haul Skiers based on Mode Preferences

Table AD.1 Socio-demographic profile of skiers (by DCE choice)

		Total Sample		Private Mode		Public Mode		Chi-Square (p value)
		Freq.	%	Freq.	%	Freq.	%	
Gender	Male	159	67.4	17	60.7	41	66.1	0.247 (0.619)
	Female	77	32.6	11	39.3	21	33.9	
Education	Elementary	2	0.8	0	0	2	3.2	3.443 (0.487)
	High School	28	11.8	3	10.7	10	16.1	
	College	30	12.7	2	7.1	9	14.5	
	Undergrad	92	38.8	9	32.1	20	32.3	
	Graduate	85	35.9	14	50	21	33.9	
Income	Under $24.999	19	8.3	2	7.1	5	8.6	5.479 (0.484)
	$25,000 - 49,999	25	10.9	3	10.7	2	3.4	
	$50,000 - $74,999	29	12.7	3	10.7	7	12.1	
	$75,000 - $99,999	32	14.0	4	14.3	7	12.1	
	$100,000 - $149,999	59	25.8	8	28.6	20	34.5	
	$150,000 - $199,999	27	11.8	6	21.4	6	10.3	
	$200,000 or over	38	16.6	2	7.1	11	19	
Age	Under 25 years	38	16.0	6	21.4 29	7	11.2 9	5.353 (0.374)
	26 - 35 years	83	35.0	5	17.8 57	19	30.6 45	
	36 - 45 years	50	21.1	8	28.5 71	15	24.1 94	
	46 - 55 years	51	21.5	6	21.4 29	16	25.8 06	
	56 years or older	15	6.3	3	10.7 14	5	8.06 45	

Table AD.2 Travel party characteristics of overnight, long-haul visitors (by DCE choice)

		Total Sample		Private Mode		Public Mode		Chi-Square (p value)
		Freq.	%	Freq.	%	Freq.	%	
Travel Party Size	1	9	3.9	1	3.7	2	3.3	6.556 (0.256)
	2	60	25.8	4	14.8	19	31.1	
	3	33	14.2	5	18.5	12	19.7	
	4	45	19.3	4	14.8	12	19.7	
	5	21	9.0	6	22.2	4	6.6	
	6+	65	27.9	7	25.9	12	19.7	
Travel Party Composition[1]	Alone	15	6.3	1	3.6	4	6.5	0.305 (0.581)
	With spouse	102	43.0	15	53.6	32	51.6	0.030 (0.863)
	Friends, family or colleagues	143	60.3	19	67.9	32	51.6	2.073 (0.150)
	Dependents	40	16.9	4	14.3	14	22.6	0.829 (0.362)
	Tour group	10	4.2	1	3.6	3	4.8	0.073 (0.787)

[1] Respondents could select more than one response for Travel Party Composition.

Table AD.3 Factors influencing destination choice (by DCE choice)

	Mean[†]			t	Sig.
	Total Sample	Private Mode	Public Mode		
Public transportation access to the destination.**	4.0	3.5	4.0	-2.112	**0.038**
Wildlife sensitive ski trail maintenance systems.	3.8	3.5	3.9	-1.629	0.107
On-site energy efficient buildings.	3.8	3.6	3.7	-0.297	0.767
Vegetation sensitive ski trail maintenance systems.	3.7	3.4	3.7	-1.502	0.137
On-site solid waste recycling systems.	3.4	3.2	3.3	-0.431	0.667
Low-density visitor accommodation facilities.	3.4	3.3	3.5	-1.201	0.233
On-site water conservation systems.	3.2	3.0	3.2	-0.792	0.431
Pre-trip information concerning the destination's environmental initiatives.	3.2	2.8	3.2	-1.412	0.161

[†] Average level of agreement to statement (Scale ranging from 1 = not important to 5 = very important
** People who chose private and public modes are significantly different at a 95% confidence level.

Table AD.4 Impact of environmental concern on travel choices (by DCE choice)

	Total Sample		Private Mode		Public Mode		Chi Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
I choose a region with a solid environmental reputation.	75	31.6	11	39.3	16	25.8	1.669 (0.196)
I choose destinations easily accessible by public transit.**	73	30.8	4	14.3	27	43.5	7.315 **(0.007)**
I choose not to use a rental car.**	50	21.1	0	0.0	18	29.0	10.161 **(0.001)**
I limit the distance I travel.	22	9.3	2	7.1	5	8.1	0.023 (0.880)
I choose destinations with an environmental certificate or eco-label.	12	5.1	2	7.1	6	9.7	0.153 (0.696)

** People who chose private and public modes are significantly different at a 95% confidence level.

Table AD.5 Environmental problems observed in Whistler (by DCE choice)

	Total Sample		Private Mode		Public Mode		Chi-Square (p value)
	Freq.	%	Freq.	%	Freq.	%	
Noticed a specific problem	66	30.3	9	39.1	17	29.3	0.729 (0.393)
High volumes of traffic	32	13.5	3	10.7	8	12.9	0.086 (0.769)
Litter	20	8.4	3	10.7	3	4.8	1.070 (0.301)
Noise pollution	19	8.0	2	7.1	3	4.8	0.195 (0.659)
Other	13	5.5	1	3.6	3	4.8	0.073 (0.787)
Logging	12	5.1	2	7.1	3	4.8	0.195 (0.659)
Deficient garbage disposal*	10	4.2	3	10.7	1	1.6	3.762 **(0.052)**
Water pollution	4	1.7	0	0.0	1	1.6	0.457 (0.499)
Air pollution**	4	1.7	2	7.1	0	0.0	4.529 **(0.033)**

** People who chose private and public modes are significantly different at a 95% confidence level.
* People who chose private and public modes are significantly different at a 90% confidence level.

Table AD.6 Management activities influencing Whistler's environmental reputation (by DCE choice)

	Mean[†]			t	Sig.
	Total Sample	Private Mode	Public Mode		
Minimizing environmental effects of transportation to and from the ski hill	3.9	3.7	3.8	-0.475	0.636
Minimizing the environmental effects of ski run construction (rock blasting and slope grading)	3.8	3.5	3.7	-1.047	0.298
Mitigating any effects of ski run construction on the vegetation, mostly visible during the summer**	3.8	3.3	3.8	-2.056	**0.043**
Minimizing energy and water consumption for snow making	3.7	3.5	3.6	-0.673	0.503
Minimizing energy consumptions for lifts	3.6	3.4	3.5	-0.459	0.648
Minimizing energy and water consumption of food services on the mountain	3.6	3.4	3.6	-0.943	0.348
Reducing energy consumption by not providing night skiing opportunities**	3.3	2.7	3.4	-2.827	**0.006**

[†] Average level of agreement to statement (Scale ranging from 1 = not at all important to 5 = very important)

** People who chose private and public modes are significantly different at a 95% confidence level.