# Passenger Preferences for Whale Watching Tour Attributes and Payment for Grey Whale Habitat Protection: A Case Study in Tofino, B.C.

**by**

**Sandra Warren**

B.Sc., (Wildlife Biology), McGill University, 2008

Research Project Submitted In Partial Fulfillment of the
Requirements for the Degree of
Master of Resource Management

**Report No. 553**

in the
School of Resource and Environmental Management
Faculty of the Environment



**SIMON FRASER UNIVERSITY**

**Fall 2012**

# Approval

**Name:** **Sandra Warren**

**Degree:** **Master of Resource Management (Planning)**

**Report No.** **553**

**Title of Project:** ***Passenger Preferences for Whale Watching Tour Attributes and Payment for Grey Whale Habitat Protection: A Case Study in Tofino, B.C.***

**Examining Committee:** **Chair:** Rachel White Collings
MRM
School of Resource and Environmental Management
Simon Fraser University

**Wolfgang Haider**
Senior Supervisor
Professor
School of Resource and Environmental Management, Simon Fraser University _____

**Duncan Knowler**
Supervisor
Associate Professor
School of Resource and Environmental Management, Simon Fraser University _____

**Pascal Haegeli**
Supervisor
Adjunct Professor
School of Resource and Environmental Management, Simon Fraser University
Researcher, Avisualanche Consulting _____

**Date Defended/Approved:** November 22, 2012

## Partial Copyright Licence

# Ethics Statement


The author, whose name appears on the title page of this work, has obtained, for the research described in this work, either:

a. human research ethics approval from the Simon Fraser University Office of Research Ethics,

or

b. advance approval of the animal care protocol from the University Animal Care Committee of Simon Fraser University;

or has conducted the research

c. as a co-investigator, collaborator or research assistant in a research project approved in advance,

or

d. as a member of a course approved in advance for minimal risk human research, by the Office of Research Ethics.

A copy of the approval letter has been filed at the Theses Office of the University Library at the time of submission of this thesis or project.

The original application for approval and letter of approval are filed with the relevant offices. Inquiries may be directed to those authorities.

Simon Fraser University Library
Burnaby, British Columbia, Canada

update Spring 2010

## Abstract

Whale watching has become an important coastal tourism activity in many regions across the globe. Worldwide, more people are participating in whale watching than ever before, highlighting the need to understand passenger interests and preferences for different tour characteristics. Furthermore, the growth of the industry has raised concern over the long-term welfare of the focal species since many are already considered *at risk* and in need of protection in multiple regions throughout their range. This raises the question of whether a significant opportunity for whale conservation lies with whale watchers. In this case study, whale watchers in Tofino, British Columbia, were surveyed using a Discrete Choice Experiment to assess preferences for tour attributes and willingness to pay to protect grey whale breeding habitat in Baja California, Mexico. The results of the study suggest that passengers were fairly homogeneous, differing only in their preferences for the type of onboard education received and their sensitivity to crowding by other tour boats in the surrounding waters. Additionally, whale watchers were supportive of paying an additional fee of up to $15 (on top of their tour costs) to protect habitat in a distant region most had never visited before. A Decision Support System (DSS) was built to compliment the study's results and further illustrate how participants evaluate different whale watching tours, thereby providing valuable information for further management and marketing strategies of operators. The DSS demonstrated how sensitive whale watchers are to the quality of the overall tour experience and price with market shares substantially lower when the overall quality declined and prices increased.



**Keywords**: whale watching; tour characteristics; grey whale; migratory species; discrete choice experiment; environmental valuation

## Acknowledgements

First, I would like to thank my supervisor, Dr. Wolfgang Haider, for guiding me through the research process with patience and support and for always having confidence in my abilities. Your sense of humour and good nature made my journey through REM enjoyable. I am also very thankful to Dr. Pascal Haegeli for providing guidance and a deeper understanding of the intricacies of Choice Modeling. Your advice and support was very much appreciated. Thanks to Dr. Duncan Knowler for teaching me about the complexities of environmental valuation. Your feedback was very much appreciated.

I owe huge thanks to Kati Martini and Don Travers of Remote Passages and Keith Phillips of West Coast Aquatic Safaris. Thank you for participating in this research project and providing me access to survey your clients. A special thanks to Marty Wig and Amanda Orlowski for helping me distribute and collect surveys.

To Adam King, Nina Mostegl, Ben Beardmore, Ryan Trenholm, and the rest of the tourism lab; thank you for patiently answering my endless questions and providing support and feedback as I prepared for presentations and conferences. I am also very thankful to Bastian Zeiger for translating my survey into German.

To my good friends Rachel white, Shannon Jones, and David Angus for going through the grinder with me and for always being there to support and take coffee breaks.

Thank you to my family who provided so much support and strength from afar. Without you, I wouldn't be where I am today. Finally, to Daniel, for your love and encouragement throughout this entire process.

# Table of Contents

# List of Tables

# List of Figures

# 1. Introduction

Over the past two decades, the whale watching industry has rapidly grown and now takes place in over 70 countries and in more than 500 communities (Hoyt, 2007). To appeal to the growing number of tourists and to accommodate varied interests and needs, whale watching tours differ in terms of duration, the quantity and quality of onboard interpretation, cost, and boat design (Hoyt, 2009). The rapid growth and diversification of the industry highlights the need to understand tourist profiles and preferences for tour characteristics (Ziegler, Dearden, & Rollins, 2012). Equally important is the need to gauge participants' support to protect the watched species and to assess whether additional fees could be collected as part of the tour. Many cetaceans popular for whale watching are classified as "endangered" or at risk of becoming endangered and are therefore in need of protection (Orams, 2000). With such a large number of people spending significant amounts of money to participate in whale watching activities, the potential to collect funds for conservation is great (Tapper, 2006).

A variety of factors that influence participant satisfaction have been identified in the literature, such as observing whales and having the opportunity to interact with an onboard naturalist (Andersen & Miller, 2006; Orams, 2000). However, past research has so far ignored passenger preferences for specific levels of these factors, such as the *number* of whales and *species* observed. As such, the first goal of this research project is to measure preferences of whale watchers for typical tour attributes. With this type of information, tour operators can design tours and services that best meet actual customer needs and not perceived needs (Moscardo & Saltzer, 2005; Ziegler et al., 2012).

This research project will also examine whether additional funds for whale conservation could be collected as part of the tour. While studies indicate that whale watchers are willing to pay to protect the species observed (Loomis & Larson, 1994; Shapiro, 2006), collected funds are typically used to finance efforts in the same country from which the money originated (Sultanian & van Beukering, 2008). However, ensuring the long-term survival of whales – many of which undergo cross-border migrations – may require protective measures implemented in

distant regions passengers have never visited before. Based on this concept, a more refined second goal is to measure the willingness to pay of whale watchers to protect the distant breeding habitat of the Eastern Pacific grey whale (*Eschrichtius robustus*) in Mexico.

Considering the two goals of this research project, the town of Tofino, located on the west side of Vancouver Island, British Columbia, provides an interesting case study. The small town is an increasingly popular tourist destination and launch point for several marine activities, including whale watching (Health Match BC, 2010). Tourists can choose from a variety of whale watching tours that differ in duration, service, onboard education, boat length and capacity, and price. This diversity presents a unique opportunity to survey individuals who have had a different tour experience and may hold different preferences for tour characteristics.

Tofino is also a suitable study area because the local whale watching industry is primarily focused on the Eastern North Pacific grey whale population. This whale population, which annually migrates along the West coast of North America between its Arctic feeding grounds and its Mexican breeding lagoons, has successfully recovered from commercial whaling. However, it is still classified as a "species of special concern" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), a designation primarily related to threats to its Mexican breeding lagoons (COSEWIC, 2004). Tofino-based passengers are therefore suitable candidates to examine whether users[1] would be willing to financially support the protection of habitat in an area they have not necessarily visited before, but benefit from through the observation of whales on their tour.

## 1.1. Purpose and Objectives

The purpose of this research project is twofold. First, it will determine the preferences of Tofino-based whale watchers for different features of a whale watching tour which could help operators develop a product that better suits passenger needs and desires. A study in Tofino will also provide the opportunity to examine the acceptance of a preservation fee paid on top of the tour price for protecting the Mexican breeding lagoons of the grey whale. This information

[1] Users are characterized as individuals who derive benefits from the use of, or interaction with, a species.

will contribute to the limited research on protecting migratory species using fees collected from beneficiaries originating outside the area in need of protection. Both goals will be addressed using a Discrete Choice Experiment (See Section 3.4).

Based on these two goals, this research project has the following objectives:

- Describe Tofino-based whale watchers in terms of socio-demographic characteristics, commitment to whale watching, and environmental orientation;
- Identify whale watcher satisfaction levels with various components of a whale watching tour;
- Assess whale watcher preferences for tour attributes; and
- Evaluate the support for an additional preservation fee by measuring whale watcher willingness to pay for protecting the grey whale breeding grounds in Baja California, Mexico.

### *1.1.1. Report Organisation*

This report consists of six chapters. The first chapter provides a brief overview of the research project, the purpose and objectives, and a layout for the remaining chapters. Chapter two introduces the relevant literature and discusses whale watching, whale watch passengers' preferences for tour characteristics, and interests in learning. Additionally, a discussion of the wildlife valuation literature is presented, focusing on whale watcher willingness to pay to protect the watched species, the type of values underlying the payment amount, and the benefits of collecting money for conservation. Chapter three describes the research methods used to survey whale watchers in Tofino, explains the models used to evaluate respondent preferences for tour attributes and for habitat protection, and outlines how to calculate WTP for protecting grey whale habitat in Mexico. The chapter finishes by describing a Decision Support System for evaluating whale watching tours. The results of the various analyses and the Discrete Choice Experiment are presented in Chapter four followed by a discussion of the results in Chapter five. Specifically, a description of Tofino-based whale watchers is presented, followed by an overview of passenger satisfaction, preferences for tours and tour attributes, and study implications. The final chapter summarises the study and presents concluding remarks.

# 2. Literature Review

Whale watching, a form of wildlife watching tourism, can be classified as an activity where an individual sets out to observe whales either from land, water, or air. In the mid-1950s, whale watching became commercialized and operations now exist in many regions of the world. The following section provides an overview of the history of the whale watching industry and describes what is currently known about passenger demographics, factors influencing satisfaction levels, and willingness to pay (WTP) to protect species observed on a whale watching tour. The section also includes a description of the grey whale breeding lagoons and the factors and challenges threatening the long-term health of these critical ecosystems.

## 2.1. Wildlife Watching Tourism

Wildlife watching tourism involves observing wildlife, which may include both flora and fauna, although the term typically refers to watching marine or terrestrial animals in the wild (Tapper, 2006). The term ‘wildlife watching’ is different from ‘wildlife tourism’ which can also be used to describe hunting or fishing tourism, or tourism associated with viewing captive animals in zoos or confined parks (Tapper, 2006). While wildlife watching tourism depends on the natural environment and wildlife, it is not necessarily equivalent to ‘ecotourism’, which focuses on tourism in a relatively undisturbed or uncontaminated natural area, with the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestations (both past and present) found within the area (Van der Merwe, 1996).

Over the past two decades, the wildlife watching tourism industry has grown rapidly in terms of the types of wildlife viewing activities available, the number of operators offering these activities, and the number of individuals engaging in them (Tapper, 2006). Wildlife watching activities range from butterfly and glow-worm viewing to safaris, bird watching, and whale

watching (Tapper, 2006). Whale watching has become an increasingly popular activity in many regions of the world, including several destinations in British Columbia (Hoyt, 2009).

### *2.1.1. Whale Watching*

Whale watching is the activity of encountering cetaceans in their natural habitat and can be water based (using platforms ranging from kayaks to cruise ships), air based (using sea planes and helicopters), or land-based (from cliffs and beaches) (Hoyt, 2009). Water based tours can offer very close encounters by allowing individuals to snorkel or SCUBA dive with the cetaceans. Land-based platforms are typically located in areas where the whales pass close to the shore. Boat-based whale watching tours often highlight other wildlife such as sea birds, seals, and other marine fauna (Hoyt, 2009).

Commercial whale watching began in 1955 in San Diego, where whale watchers were charged $1 US to observe the Eastern Pacific grey whale during its winter migration along the coast (Hoyt, 2009). During the 1960s and 1970s, new whale watching operations were slowly established along the west coast of the United States, from Washington to California. In Canada, the first Canadian whale watching tour took place in 1970 along the St. Lawrence River (Hoyt, 2009). In 1993, whale watching was formally recognized by the International Whaling Commission as a legitimate tourism industry that provides for the sustainable use of whales and dolphins (Orams, 2000).

Over the past two decades, the whale watching industry has experienced rapid growth with more than 12 million participants in 2006 (Hoyt, 2009). On a global scale, North America is the largest whale watching destination, accounting for 50% of the worlds' whale watchers in 2008 (O'Connor, Campbell, Cortez, & Knowles, 2009). With the industry's rapid growth and diversification, the potential for cumulative effects, both positive and negative, is great (Hoyt, 2009).

Whale watching can disrupt breeding patterns, feeding behaviors, and other social interactions, and can also result in direct injury to the observed species (Moore & Clarke, 2002; Richter, Dawson, & Slooten, 2006; Warburton, 1999). Poorly designed educational programs can result in inadequate conservation messages and less satisfied participants (Lück, 2003). In addition, in smaller or less developed communities, rapidly expanding whale watching

operations can strain local infrastructure (Hoyt, 2009). On the other hand, high quality whale watching can produce benefits that extend to the marine environment, the visitors, and the local community (Hoyt, 2007; Stamation, Croft, Shaughnessy, Waples, & Briggs, 2007; Tapper, 2006; Zeppel & Muloin, 2008). Visitors benefit from well organised and informative tours that minimize impacts on the whales and host communities can benefit economically from a stable whale watching industry (Hoyt, 2007). In addition, well-designed interpretation can enhance passengers' appreciation and knowledge of the species observed and the threats facing them, which has been shown to promote pro-environmental behaviors and engagement in conservation efforts to protect marine species (Powell & Ham, 2008; Zeppel & Muloin, 2008).

### *2.1.2. British Columbia's Whale Watching Industry*

British Columbia (B.C), Canada, has a large and established whale watching industry. Between 1998 and 2008, the industry grew 4.2% per year – a rate faster than the average growth rate for the global whale watching industry (O'Connor et al., 2009). In B.C., whale watching primarily occurs from April to October, with the peak season from June to September. Tours are primarily boat based and half day trips (two and a half to three hours long). Boats can accommodate between 12 to 80 passengers and can range from small rigid hull inflatable style boats (e.g., zodiacs) to larger cabin cruisers. Less common are multiple day trips that head north along the coast, sometimes as far as Alaska. B.C. based whale watching passengers are 60% international and 40% domestic and in 2008, adults paid an average of $114.00 CAD for a tour (O'Connor et al., 2009).

In British Columbia, tours occur within three principal regions: Johnstone Strait, Clayoquot and Barkley Sounds, and the cross-border waters off Southern Vancouver Island (Figure 1). The three regions offer very different whale watching experiences (Malcolm & Duffus, 2008).

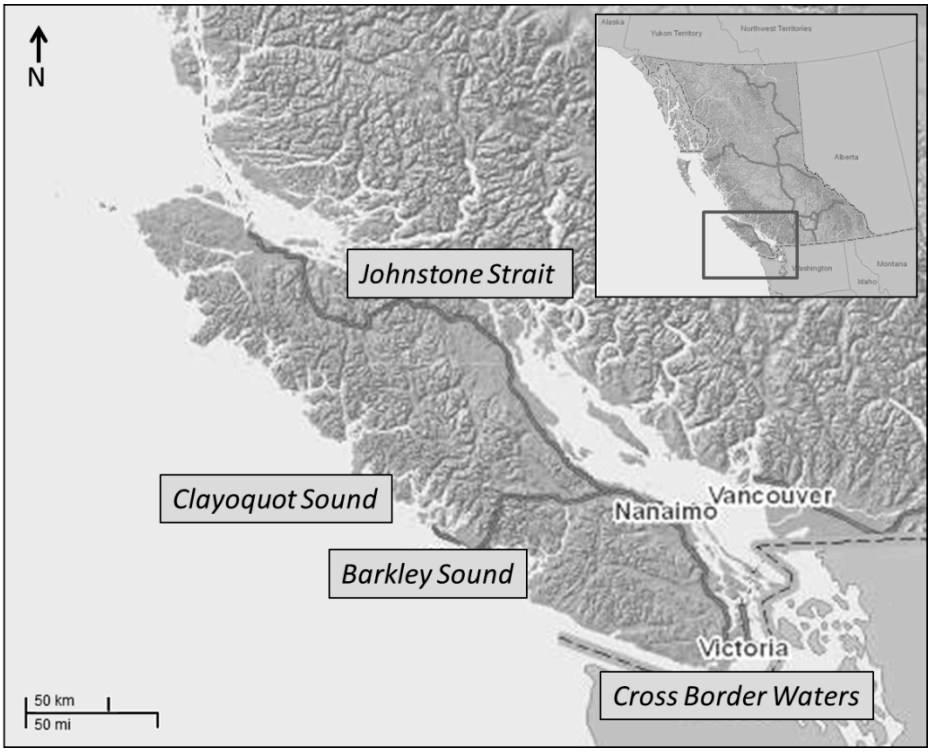



***Figure 1. Main whale watching regions in British Columbia in British Columbia***

The majority of tours take place in the cross-border waters off Southern Vancouver Island. Tours depart from Victoria and are primarily focused on the southern resident killer whale (*Orcinus orca)* population. In 2005, the whale watching fleet based in Victoria consisted of 50 vessels operated by 20 companies (Malcolm & Duffus, 2008).

Whale watching in the Johnstone Strait is focused on the northern resident killer whale population and tours depart from Telegraph Cove or surrounding communities (Malcolm & Duffus, 2008). Whale watching in Clayoquot and Barkley Sounds is primarily focused on the Eastern North Pacific grey whale population (*Eschrichtius robustus*) and more recently, on humpback whales as well (*Megaptera novaeangliae).* Up to 80 grey whales cut their northern migration short to feed in the coastal waters of Clayoquot Sound, where they are observed on whale watching trips (COSEWIC, 2004). On occasion, transient killer whales and minke whales are also observed. Tours depart from Tofino or Uclulet. Additional whale watching opportunities lie south of Tofino within Pacific Rim National Park, where tourists can watch the annual migration of the grey whale from the beach and shores of the park (Malcolm & Duffus, 2008). Each year, this event attracts up to 90,000 land based whale watchers to the region (O'Connor et al., 2009).

## 2.2. Whale Watch Passengers

The rapid growth of the whale watching industry and diversification of the tour product highlights the need to understand tourist profiles and preferences for tour characteristics (Ziegler et al., 2012). Human dimensions research on whale watching has primarily focused on three different areas: passenger motivation, satisfaction, and demographics (Kaufman & Smultea, 1987; Moscardo, 2000; Orams, 2000; Valentine, Birtles, Curnock, Arnold, & Dunstan, 2004); the exploration of the value of whales and whale watching (Duffus, 1996; Loomis & Larson, 1994); and the use of education as a management tool for conservation (Lück, 2003; Malcolm & Duffus, 2008; Stamation et al., 2007). Understanding the profile of Tofino-based passengers can help refine tour products. Additionally, identifying preferences for tour characteristics (e.g., the number of whales or species) and payment for habitat protection can help tailor whale watching tours to maximize participation while generating revenue for whale conservation. Furthermore, if visitors are satisfied, they are more likely to return or recommend the experience to others (Stamation et al., 2007) and are more likely to financially contribute towards the protection of the marine environment (Baral, Stern, & Bhattarai, 2008).

### *2.2.1. Profiles*

Previous studies on whale watchers found that passengers are well-educated, middle-aged individuals who are environmentally conscious and have significant disposable income (Duffus, 1988; Lück, 2003; Warburton, 1999; Warburton & Parsons, 2000). A study by (Forestell, 1993) however found that whale watchers are no more “environmentally inclined” than the average tourist. Individuals do not necessarily travel to the specific destination to whale watch (Valentine et al., 2004); instead the activity may be part of a larger tour program (Moscardo, 2000).

Participants in whale watching activities are generally first-timers (Forestell, 1993; Malcolm & Duffus, 2008; Neil, Orams, & Baglioni, 1996), although research by Meadows (2002) found that slightly over half of all participants surveyed had previously been whale watching. A study by Malcolm & Duffus (2008) on Tofino-based whale watchers noted that participants were primarily first time whale watchers who had some prior knowledge of whales, have some general expectations regarding whale watching management (minimum distance to the whales, number of whale watching boats in one area), and demanded high levels of tourism

infrastructure development. As noted by Moscardo (2000), whale watch participants have not necessarily planned the whale watching trip prior to their arrival.

### *2.2.2. Factors Influencing Passenger Satisfaction*

Satisfaction[2] is the most common method used to measure the quality of a participant's experience and to assess whether the activity has met their needs and expectations (Vaske, 2008). As noted by Orams (2000), whale watcher satisfaction is a complex phenomenon that incorporates a range of variables, both whale-related (e.g., satisfaction with the number of whales observed) and non-whale related (e.g., satisfaction with the quality of the service by the crew).

As expected, whale-related factors, such as whale behaviors and observing whales, are the single most important factors influencing passenger enjoyment (Moscardo, 2000; Orams, 2000). Similarly, Andersen & Miller (2006) report that "seeing a whale", "seeing whales in the natural environment", "what whales did" and "length of time spent with whales" were ranked as the top four most important factors influencing trip memorability. Having the opportunity to be out in nature and observe other marine wildlife was also reported to be an important aspect for swim-with-whale-shark divers in Ningaloo Marine Park, Australia (Davis, Banks, Birtles, Valentine, & Cuthill, 1997).

While observing whales is an important element for passenger enjoyment, participants do not necessarily report lower levels of overall satisfaction when no whales are observed (Orams, 2000; Warburton, 1999). Orams (2000) indicated that passengers of tours where no whales were observed stated that the boat crew still made the tour "fun and interesting." Similarly, dolphin watching passengers noted that "seeing a large number of dolphins" was ranked as the least important feature affecting their enjoyment of the tour (Mayes & Richins, 2009).

Researchers are divided about the importance of seeing whales up close. Focusing solely on boat-based tours, Duffus (1988) noted that passengers observing Orcas ranked "proximity to the whales" among the top two most important factors influencing their trip

[2] Satisfaction is typically measured on a 5, 7, or 9 point scale from Dissatisfied to Extremely Satisfied.

enjoyment. In contrast, Orams (2000) notes that geographic proximity was not a major factor influencing passenger satisfaction; other variables, such as the number of whales and whale behaviors were more important. To date, no published literature has suggested possible reasons for these differences in preferences; however one may speculate that individuals participating in tours two decades ago may have had different values or knowledge of boat impacts on whales. A recent study has shown that whale watchers are increasingly concerned about the impacts of the boats and noise on the whales and recognize the importance of observing whales from a distance (Finkler & Higham, 2004).

A number of factors unrelated to whales and their behavior also influence passenger enjoyment, including crowding, tour duration, service provided by the crew, construction of the boat and boat positioning for viewing purposes, seasickness, the type of education received (Orams, 2000), as well as the behavior of the boat crew and their concern for the environment (Andersen & Miller, 2006; Lück, 2003; Orams, 2000; Shapiro, 2006; Ziegler et al., 2012). While tour operators do not have complete control over some of these factors, they can influence others to ensure tours best meet passenger expectations and desires.

The majority of studies on perceived crowding have focused on “swim with whale” participants and have noted that the number of boats has a significant impact on the quality of the overall experience (Bell, 2010; Catlin & Jones, 2010; Ziegler et al., 2012). Focusing solely on boat-based passengers, Mayes & Richins (2009) found that dolphin watching passengers expressed their lowest satisfaction level about the number of other boats in the area.

### *2.2.3. Interests in learning*

In addition to observing whales and other wildlife, whale watch participants also expect to learn about the species observed and the marine environment (Andersen & Miller, 2006). Passengers’ increasing demand for interpretation requires an understanding of *how* tourists want to be educated and *what* types of information they want to receive (Lück, 2003). Creating a well-designed interpretation program can increase awareness and knowledge of the observed species, which can garner support from participants to protect the species being observed (Wilson & Tisdell, 2003).

Prior to boarding the boat, whale watch passengers can receive information through a variety of media such as videos and brochures. Once on the water, education primarily occurs via personal interpretation by a staff member (Lück, 2003). Andersen & Miller (2006) noted that passenger enjoyment was increased by the onboard interpreter and the time they spent answering questions and teaching new things. A study of swim-with-dolphin participants stressed the need for a knowledgeable guide on board. Furthermore, participants' comments suggest that this duty should not be performed by the boat captain, as it is thought to be too much work for the captain to handle the vessel, take care of the passengers, watch the dolphins, and provide sufficient interpretation (Lück, 2003).

While most tours provide basic information on the behavior and general biology of the observed wildlife, research by Birtles, Valentine, Curnock, Arnold, & Dunstan (2002) and Lück (2003) suggest that some participants want additional information about the wider environmental and conservation issues surrounding the wildlife observed. Similarly, participants of a dolphin watching tour in Florida rated the quality of onboard interpretation as low and the authors attributed this to a lack of information about guidelines, protective legislation, and ways to help conserve the dolphins (Whitt & Read, 2006).

## 2.3. Wildlife Valuation

Estimating the economic value of wildlife has become increasingly important for wildlife management as it can provide information to set priorities for conservation programs, policies, and actions (White, Bennett, & Hayes, 2001). In the absence of an actual market, valuation studies have primarily used stated preference techniques such as Contingent Valuation (CV) and Discrete Choice Experiments (DCE) to assess the monetary value of wildlife (Richardson & Loomis, 2009). Both techniques estimate the economic value of a species by creating a hypothetical market and measuring respondent's willingness-to-pay (WTP) to either avoid a loss or secure a gain. Studies of whale watchers confirm that users value the visited ecosystem and associated species observed and have the potential to make valuable contributions to conservation initiatives (Loomis & Larson, 1994; Shapiro, 2006). WTP may be driven by use or non-use values and can vary due to factors related to the respondent (Kotchen & Reiling, 2000; Martin-Lopez, Montes, & Benayas, 2007; Ressurreição et al., 2011) and the information presented in the survey (Tkac, 1998). Money raised through wildlife watching tourism can be

used for a variety of purposes that can benefit both the species and local community (Tapper, 2006).

### *2.3.1. Willingness to pay*

Whale watchers value the whales they observe and are willing to pay for their protection and long-term survival (Loomis & Larson, 1994; Shapiro, 2006). Using a DCE, Shapiro (2006) demonstrated that Hawaiian-based whale watchers were willing to pay anywhere from $1.00 US to $10.00 US on top of the tour price – although a $2.00 fee was most preferred – to help protect Humpback whales and the overall health the marine environment. Similarly, Loomis & Larson (1994) used the CV method to survey whale watchers observing the Eastern North Pacific grey whale along the coast of California. The authors reported that whale watchers were willing to pay between $25.00 US and $29.73 US per year to increase the size of the whale population.

Funds collected for conservation are typically used to finance protective measures in the country from which the money originates (Sultanian & van Beukering, 2008). However, protecting the long-term survival of migratory whale species may require international collaboration to ensure consistent and adequate protection is provided throughout their entire range (Knowler, Williams, & Garcia-Martinez, 2008). The only study that has examined the protection of migratory species using funds collected in a different country was conducted by Sultanian & van Beukering (2008) on migratory birds. Using CV, the authors demonstrated that Dutch citizens were willing to pay an annual fee of €10.75 per household or a one-time payment of €7.8 to protect habitat in several West African countries where species are hunted for sustenance and their habitats have been severely damaged. The concept illustrated by Sultanian & van Beukering (2008) provides the basis for the second goal of the current study, whereby whale watcher WTP for habitat protection in Baja California, Mexico, will be examined.

Stated WTP can vary due to characteristics related to the respondent, the species being valued, and the information presented in the survey. For example, the size of a respondent's family has a negative effect on WTP while income has a positive effect (Baral et al., 2008; Martin-Lopez et al., 2007). A respondent's attitude towards a species may also affect WTP, with WTP values higher for charismatic species compared to microscopic species or species that cause phobias (e.g., spiders) (Martin-Lopez et al., 2007; Tisdell, Nantha, & Wilson, 2007) also

note that the degree of endangerment influences WTP, with values higher for endangered species compared to those not at risk. Kotchen & Reiling (2000) noted that pro-environmental behaviors resulted in higher WTP to protect two endangered species.

The information presented in the survey can also affect WTP. The results of two meta-analyses of willingness-to-pay studies reported a positive correlation between the change in the population size and WTP (Martin-Lopez et al., 2008; Richardson & Loomis, 2009), suggesting that greater proposed changes elicit higher payment values. Sultanian & van Beukering (2008) also indicate that framing the WTP question as an annual versus one-time payment can elicit different stated WTP values. The amount and type of information disclosed in the survey can also affect stated WTP (Tkac, 1998).

### *2.3.2. Defining the underlying values*

An individual's likelihood of paying to protect an environmental good, such as a species they observe on a whale watching tour can be motivated by several values typically categorized into use and non-use (Freeman, 2003). Use values are only held by individuals who obtain an actual use out of the resource and can be split into direct use and indirect use values. Direct use values are those derived from the direct use or interaction with the resource or service itself, such as harvesting fish for food (consumptive) or whale watching for pleasure (non-consumptive). Indirect use values are the values typically associated with an ecosystem service that supports or contributes towards a resource or service an individual directly values (Barbier, 1994). For example, a whale watcher who enjoys observing whales will hold an indirect use value for the regulation service of the habitat that allows the whales to reproduce, and in turn, become available for the individual to watch. In contrast, non-use values, often referred to as existence values, can be held by both users and non-users and are the benefits obtained from knowing a species exists in the wild (Freeman, 2003).

While most valuation studies have focused on measuring the use and non-use values described above, whale watchers may hold additional non-use values that are often ignored in the economic valuation literature (Chan et al., 2011). For example, virtue or principle-based values – meaning the moral values associated with an individual's intent, duties, or rights – may influence an individual's support for conservation based on the idea that it is the right thing to do. Or, bio-centric values – meaning the non-human intrinsic value of nature – may increase an

individuals' likelihood of paying if conservation will protect the species just for its own sake (Chan et al., 2011).

From an economic perspective, the total value of an environmental good or service is considered the sum of its relevant use and non-use values. However, caution must be exerted when aggregating values to avoid the problem of double-counting (Turner, Morse-Jones, & Fisher, 2010). Double counting occurs when the same value is captured twice in separate estimates, which are then added together. In the current study, the value whale watchers associate with observing a grey whale on their tour (considered a use value) is entangled with the indirect use value individuals hold for the Baja California breeding lagoons. Because the breeding habitat allows the whales to reproduce, and in turn, become available for whale watchers to observe during their tour, both values are linked and their aggregation would result in double counting the value of the grey whale. Having recognized this issue, it is not of concern for this research project since the two values are not measured and aggregated separately.

### *2.3.3. Fee Collection*

Funds collected for conservation can be used for a variety of purposes, such as hiring of more staff to educate operators and enforce regulations, restoring damages that tourism activities may cause, supporting conservation activities and research, and providing for and maintaining appropriate facilities for tourists, thereby protecting the surrounding ecosystem (Tapper, 2006). For example, a portion of the money generated from whale watching tickets sold off the eastern coast of Australia is currently donated to the non-profit organisation *The Oceania Project* to help fund research on whales and dolphins in Hervey Bay, Australia (The Oceania Project, 2012). Closer to home, a Tofino-based operator is currently donating two dollars from every tour sold to *Strawberry Island Marine Research Society*, a non-profit organisation conducting research and monitoring of the marine environment of Clayoquot Sound (K. Martini, personal communication, October 21, 2012).

Raising funds for conservation requires a system for collecting and managing funds, gaining support from tour operators and the public, as well as training staff to ensure collection is smooth and funds are managed and used appropriately (Tapper, 2006). Careful consideration of who is collecting and managing the money is essential (Peters & Hawkins, 2009). A comparative review of 18 studies of wildlife watching tourists from around the world noted that

one of the reasons tourists visiting the Philippines refused to pay for the protection of coral reefs was because they did not trust the government to manage the funds (Peters & Hawkins, 2009). In contrast, visitors to a Marine Protected Area in Hawaii (who were primarily U.S. citizens) put greater trust in the public sector (i.e., state or federal) and non-government organisations (e.g., Nature Conservancy or Sierra Club) to collect fees compared to local communities and the private sector (i.e., operators, renters of equipment) (van Beukering, Cesar, Dierking, & Atkinson, 2004). As illustrated, the organisation in charge of collecting and managing money should be selected on a case by case basis for each area.

To summarize, wildlife watching tourists value the species they observe and are willing to financially contribute to the protection and management of the marine ecosystem. Studies show that respondents surveyed were not only willing to pay for local conservation initiatives but also for distant habitat protection in a region they have not necessarily visited. Factors affecting stated WTP and the different values underlying payment estimates were discussed, as well as the benefits of collecting money for conservation. The next section narrows the focus of valuing wildlife by examining the current status of the highly migratory Eastern North Pacific Grey Whale, a species commonly observed on a whale watching tour in Tofino, B.C. and therefore valued by whale watchers. An overview of the historical changes in population abundance as well as the difficulties protecting the species on its Baja California breeding lagoons is presented, thereby providing support for the estimation of whale watcher WTP.

## 2.4. The Grey Whale

The grey whale (*Eschrichtius robustus*) historically inhabited the northern waters of both the Atlantic and Pacific Ocean. In the early eighteenth century, the Atlantic grey whale population went extinct from over exploitation (Swartz, Taylor, & Rugh, 2006), leaving two genetically isolated populations to exist: the Western North Pacific and the Eastern North Pacific (Reilly et al., 2009).

The Eastern North Pacific grey whale undergoes one of the longest migrations of any mammal (COSEWIC, 2004), traveling 15,000 – 20,000 km roundtrip along the coast from the shallow sheltered bays in Baja California Sur, Mexico, towards their summer feeding grounds in the Bering, Chukchi, and Alaskan Beaufort Seas (Figure 2). A small population of a few hundred

individuals known as “summer resident” grey whales cut their northern migration short and feed in the inshore waters of Washington and British Columbia instead of continuing the migration to Alaska (COSEWIC, 2004).

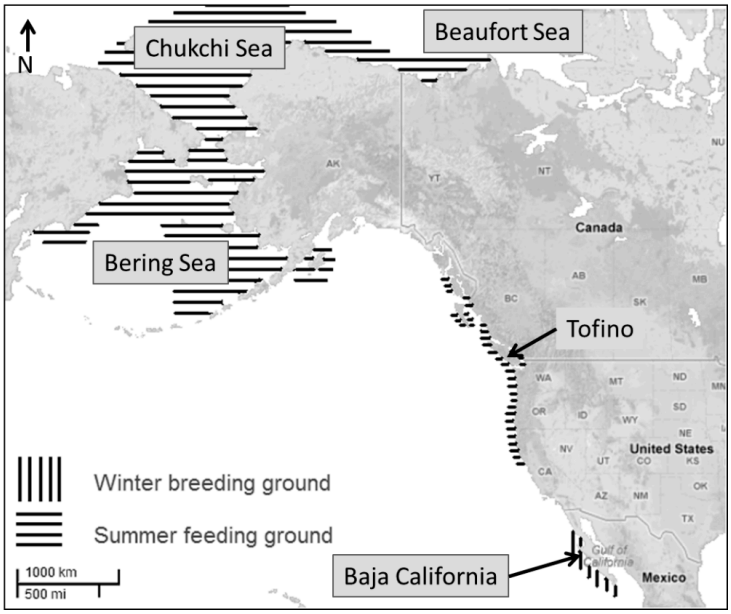



***Figure 2. Feeding and breeding habitats of the Eastern North Pacific Grey Whale***

Due to its coastal migration along the entire length of North America, the population was an easy target for commercial whalers. During the nineteenth and twentieth centuries, the population was hunted to very low levels (Swartz et al., 2006). However, thanks to international and national protection the Eastern population has successfully recovered to near pre-exploitation levels (Fisheries and Oceans Canada, 2011). The best population size estimate is 20,000 individuals, which appears to be approaching the estimated carrying capacity for this population (Rugh et al., 2008).

Although the Eastern North Pacific population has dramatically increased since the end of commercial whaling, it is still a recovering population listed as a “species of special concern” by COSEWIC (2004). While many current and potential threats exist throughout its range, the federal management plan created in conjunction with the species listing suggests that the principal threat lies in increased human activities in the Mexican breeding lagoons (Fisheries and Oceans Canada, 2011).

### 2.4.1. Breeding habitat in Mexico

In Mexico, the majority of grey whales breed and rear their young in four lagoons along the coast of the Baja peninsula: Guerrero Negro Lagoon, Ojo de Liebre Lagoon, San Ignacio Lagoon and Magdalena Bay (COSEWIC, 2004) (Figure 3). A small number of whales continue their journey around the southern tip of the Baja California peninsula and enter the Gulf of California (Urban et al., 2003). As noted by Urban et al. (2003), the recorded distribution of mothers and calves in the four breeding lagoons varies over time, although Ojo de Liebre Lagoon appears to consistently have the highest proportion of mothers and calves and is therefore considered the most important lagoon for breeding and calving.

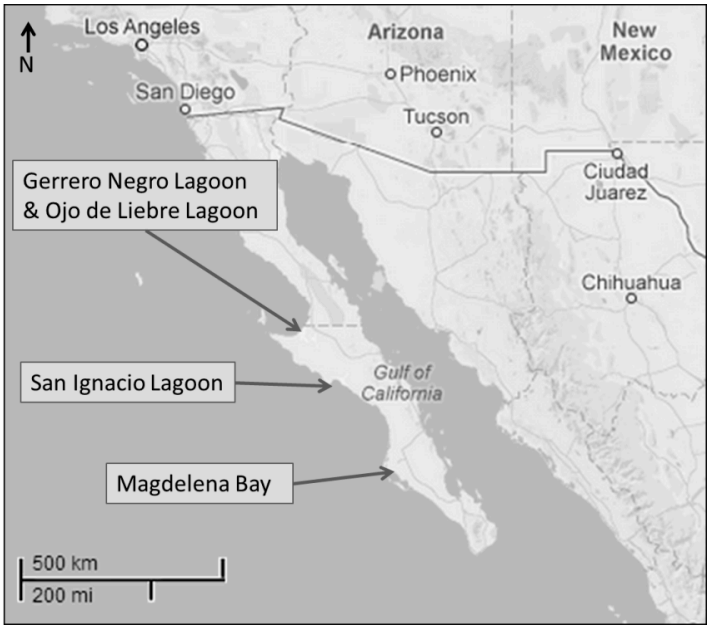



***Figure 3. The main grey whale breeding lagoons in Baja California, Mexico***

### 2.4.2. Protecting the breeding lagoons

The Mexican government began to formally acknowledge the importance of the grey whale breeding lagoons through the creation of whale sanctuaries and laws. Between 1971 and 1980, Ojo de Liebre, San Ignacio, and Guerrero Negro Lagoons were designated as whale refuges (Urban et al., 2003). The Vizcaino Biosphere Reserve was created less than a decade later to protect more than 2.5 million hectares of land and provide additional protection to three of the main breeding lagoons (except Magdalena Bay) (Knowler et al., 2008). Furthermore, from 1990 to 2000, the Mexican government created a series of laws to implement grey whale

conservation programs throughout the reserve, regulate human activities within the reserve, and minimize pollution from local communities and industrial development of the surrounding land (Hoyt & Iñíguez, 2008; Urban et al., 2003).

Despite efforts to protect grey whales and the breeding lagoons, several factors threaten the long-term viability and health of these important ecosystems. The first threat relates to the lack of formal protection for Magdalena Bay, which is not part of the Vizcaino Biosphere Reserve (COSEWIC, 2004). As a result, the Mexican agencies responsible for protecting grey whales do not have jurisdiction to manage the expanding whale watching industry and regulate commercial fishing, shrimp harvesting, and coastal development within the Bay (Hastings & Fischer, 2001)[3].

In 2006, over 15 times the number of boats offered whale watching tours in Magdalena Bay compared to Ojo de Liebre and San Ignacio Lagoons (Hoyt & Iñíguez, 2008). Additionally, intense crowding of tour boats has been regularly reported in some areas where whales congregate in high densities (> 200 whales) (Schwoerer, 2007). While the impacts of crowding on the whales is unknown, it is assumed to be of concern since grey whales have abandoned breeding lagoons in the past due to human disturbances (Dedina, 2000). Nevertheless, pressure by both the government and local whale watching operators exists to further expand the industry (Knowler et al., 2008) (S. Garcia, personal communication, May 23, 2010).

Due to the expanding whale watching industry, conflict for space has occurred with the long-established commercial fishing and shrimp harvesting operations (Schwoerer, 2007). Furthermore, industrial pollution, use of illegal and destructive fishing nets, tanker traffic, aquaculture, large-scale tourism development, and coastal urban development threaten the Bay's ecosystem (Knowler et al., 2008). While no study has investigated how the loss of Magdalena Bay as a breeding site would affect the overall grey whale population, taking a proactive approach to manage the human activities could help avoid potentially irreversible consequences.

[3] The Secretariat of the Environment and Natural Resources (SEMARNAT) was elected to be responsible for implementing grey whale conservation programs within the Reserve. It has two sub-agencies: the National Institute of Ecology and the Federal Bureau of Environmental Protection.

The second challenge is that SEMARNAT and its sub-agencies lack capacity, funding, and personnel, which undermines their ability to effectively manage the human activities within the Vizcaino Biosphere Reserve (Dedina, 1995; Dedina, 2000; Hastings & Fischer, 2001).

To summarise, the current section provided a general idea of who whale watchers are and what factors contribute to an enjoyable and satisfying experience. The section also examined the wildlife valuation literature on participant willingness-to-pay to protect species observed on whale watching tours. Furthermore, the section provided an overview of the legislation currently protecting the grey whale's Mexican breeding lagoons and discussed the challenges associated with regulating the various human activities that threaten the lagoons. The next section presents the methods used for data collection and analysis to identify preference of whale watchers for tour attributes and distant habitat protection.

# 3. Methods

To achieve the goals of this study, whale watchers in Tofino were recruited via an intercept survey during the summer of 2010 and invited to participate in a more comprehensive web survey. This chapter describes the respondent recruitment techniques, discusses the sampling issues associated with surveying and how they were minimized, and outlines the various sections of the web survey. It also discusses the use of stated preference techniques for assessing respondent preferences and values, and describes the design, layout, and statistical background of the Discrete Choice Experiment. Finally, the chapter describes the methods for data analysis and the development of a Decision Support System to aid managers and operators in evaluating whale watching tours.

## 3.1. Recruitment of Survey Respondents

During the months of July to September, 2010, a total of 800 passengers were recruited via intercept survey. Initially, whale watchers from several different outfitters in Tofino were intercepted (either before or after their tour) as they walked to or from the boat loading dock. However, it was immediately obvious that this technique would not work since it was difficult for passengers to fill out the survey while walking and individuals were typically in a rush. In the end, the most convenient location to recruit individuals was at the participating tour operators, since passengers often had sufficient idle time before their tour to answer the intercept survey. A smaller proportion of respondents were also recruited upon return from their tour. Since tour operators often ran several tours at the same time, it was not always possible to intercept passengers of all tours. In addition, blank intercept surveys and a sealed box (to ensure confidentiality) were left at the participating tour operators. Completed surveys were periodically collected by myself or the hired research assistant. When possible, the staff invited passengers to complete the survey.

The intercept survey consisted of eight questions (Appendix A) and asked if they had previously whale watched, if whale watching was their primary purpose for visiting Tofino, and some socio-demographic questions. The final question invited them to participate in a web survey. Individuals who agreed to participate in the web survey provided us with their electronic contact information and received a pin of the Canadian flag attached to the project's business card as a "thank you". The business card provided respondents with the researcher's contact information and the survey's website address. Only one individual per party (e.g., for families or groups living under the same roof) was asked to complete the intercept survey. Also, only adults aged 19 or older were recruited. Due to a large percentage of German tourists, both intercept and online surveys were available in English and German. Most individuals who were intercepted agreed to fill out the intercept survey and most provided an email address stating their intent to participate in the online survey.

All recruited passengers had participated in either a whale watching or a hot springs tour. While the main focus of the two differed, with the former being a three hour tour focusing on viewing whales and other marine wildlife, and the latter being a seven hour tour focusing on visiting old growth forest and natural hot springs, both provided opportunities to observe whales.

## 3.2. Web Survey

Individuals who stated their intent to participate in the web survey were contacted between January and February 2011 via a personalized email message (Appendix B) written in either German or English. The email included a link to the survey and a login id and password unique to each respondent. As an incentive, the email also explained that anybody who completed the web survey would be eligible to enter a draw for a $200 CAD cash prize or one of four copies of the book *Watching Giants: The Secret Lives of Whales* by Elin Kelsey. Individuals who had not responded to the survey between one to two weeks after the initial contact were sent a reminder email. Individuals who did not respond to the reminder email after one week were sent a final reminder message.

### *3.2.1. Survey Organisation*

The web survey (Appendix C) was designed to examine whale watchers' experience in Tofino, their environmental interests, awareness, and behaviors, and to evaluate their preferences for tour attributes and support for grey whale protection. The survey consisted of seven sections.

The first section aimed to gauge respondents' level of familiarity with whale watching and with the grey whale breeding habitat. Next, a series of questions were used to evaluate levels of prior knowledge of grey whales and humpback whales. Some questions however were not designed to evaluate respondents' level of knowledge, but instead contained important information that all individuals needed to read in order to complete the rest of the survey. By concealing information in the format of a question, it ensured that people received the information and minimized respondent fatigue.

The third section contained questions relating to the actual tour experience. Overall satisfaction was measured using a five point Likert scale from 1 (extremely dissatisfied) to 5 (extremely satisfied). In addition, the tour experience was broken down into 12 satisfaction items that were assessed individually following Vaske (2008), who suggests that "overall satisfaction is a function of more specific satisfaction with individual components of an experience" (pg. 31). The individual components used in the satisfaction questions were primarily derived from Mayes & Richins (2009), Orams (2000), and Valentine et al. (2004).

Section four gauged respondents' intention to whale watch again in the future along the West Coast of North America (including Tofino) using a Likert scale of 1 (definitely no) to 5 (definitely yes). Geographic locations for intended future whale watching were restricted to areas where individuals would have the chance to observe the Eastern Pacific Grey Whale along its migration route. Section five contained the main survey instrument – the Discrete Choice Experiment – and assessed respondents' preferences for tour attributes and habitat protection. Section six examined respondents' levels of environmental interests, awareness, and engagement in conservation behaviors using a five point Likert scale based on statements adapted from Ballantyne, Packer, & Hughes (2009) and Ballantyne, Packer, & Falk (2011). The seventh and final section of the survey contained socio-demographic questions.

### *3.2.2. Sampling Issues*

Sampling related biases are a concern for all surveys. According to Dillman (2007), sources of errors can be grouped into four main categories: sampling errors, coverage errors, measurement errors, and non-response errors.

Sampling error occurs when only a small portion of the sample is surveyed. I attempted to reduce sampling error by recruiting as large a number of respondents to the web survey as possible. However, out of the recruited respondents who did complete the web survey, several respondents had to be excluded from the analysis because of incomplete responses. In addition, time and financial constraints prohibited me from hiring another research assistant, and therefore respondents could not be surveyed at participating operators at the same time.

Coverage error, which occurs when certain portions of the target population have either a greater or lesser chance of being sampled, was minimized by sampling participants from operators who offered different experiences, and therefore potentially attracted different types of whale watchers. Coverage error was also reduced by offering both the intercept and online survey in German and English.

Measurement error occurs when questions are answered inaccurately, due to poor wording of questions, poor survey design, and/or the behavior of the respondent. Measurement error was reduced through pre-testing and sound survey design.

Furthermore, non-response error occurs when a portion of the target population, who would have provided different answers than those individuals who were surveyed, do not answer the survey. Non-response error was reduced by sending out reminder emails to individuals who had not responded to the web survey one to two weeks after the initial contact. Individuals who still did not respond to the reminder email after one week were sent a final reminder message. Despite the reminder emails, it is possible that invitations to participate in the web survey were automatically deleted or reported as spam mail before respondents ever saw them. Non-response error was also reduced by using prize incentives.

## 3.3. Stated Preference Techniques

Two types of stated preference techniques have primarily been used in the wildlife valuation literature: Contingent Valuation (CV) and Discrete Choice Experiments (DCE) (Adamowicz, Boxall, Williams, & Louviere, 1998). Both techniques aim to measure preferences for environmental goods and services not traded in a traditional market[4] and have various advantages and disadvantages. The current section describes and compares the two methods and argues that a DCE is the most appropriate method to fulfill the goals of this study.

In the traditional CV method, a situation facing an environmental good or service is described and respondents are asked whether they would be willing to pay to move away from the current situation towards a future scenario. The future situation defines the good or service itself, the context in which it will be provided, and the way it will be financed (Hanley, Wright, & Adamowicz, 1998). The payment amount is varied across the sample population, allowing the researcher to determine the average willingness to pay for the environmental good / service in question. While CV has been applied in hundreds of valuation studies (Hanley et al., 1998), this method has been plagued by problems with over-estimated values – possibly due to yea-saying[5] (Blamey, Bennett, & Morrison, 1999) – and the inability to measure trade-offs between attributes. Partly as a response to these problems, valuation studies have increasingly turned to DCE as an alternative method (Hanley, Mourato, & Wright, 2001).

The DCE elicits preferences for multi-attribute goods that are described in terms of their relevant attributes and the levels that they take[6]. Respondents evaluate a set of alternative descriptions of the good or service in question and then choose their most preferred option. DCE is based on random utility theory which assumes that respondents will choose the option that provides them with the most benefit (i.e., maximizes their utility) (Louviere, Hensher, & Swait, 2000). By modeling how people change their most preferred option in response to changes in the levels of attributes, it is possible to identify trade-offs made between the different

[4] In contrast, revealed preference techniques aim to measure preferences by collecting information on observed market choices.

[5] The tendency to agree with questions regardless of content or respondents' actual views.

[6] A good that can be described using several attributes. For example, a whale watching tour can be described in terms of the type of wildlife observed, the amount of onboard education, and the tour cost.

attributes (Train, 2009). An attribute reflecting the overall cost of the particular scenario enables the calculation of an implicit price for each attribute (Hanley et al., 2001). Implicit price provides a welfare estimate of the amount of money an individual is willing to pay to move from one level of a given attribute to another.

Compared to CV, the DCE provides greater flexibility for measuring values and produces a wealth of information. While CV gathers information about respondents' choices regarding one particular situation, a DCE can assess respondents' preferences for attributes describing a wide array of scenarios and can also determine the trade-offs made by the respondent when making their choice (Adamowicz et al., 1998).

While all experimental methods have various issues and limitations, the DCE is the most appropriate method to fulfil the objectives of this study. A whale watching tour is a good characterized by many different attributes (e.g., number of whales observed, type of onboard education, tour price, preservation fee for Baja California, Mexico) that can vary according to specific levels. A DCE can provide knowledge of preferences and values for each attribute and attribute level, as well as consumer trade-offs between attributes. This information can provide insights to operators about where to focus their time and efforts during a tour and can provide information on willingness to pay to protect the Eastern North Pacific grey whale population on its breeding grounds. The results from a DCE can also be used to create a Decision Support System, whereby managers and operators can build hypothetical whale watching tours and evaluate the market shares.

## 3.4. Discrete Choice Experiment

The DCE was separated into two tasks. First, respondents were asked to evaluate a set of hypothetical whale watching tours and to choose their most preferred tour. Second, respondents were asked to re-consider two sets of tours they had already made a choice for, given new information on the current threats to the grey whale breeding lagoons and the potential to pay a preservation fee to protect the habitat.

### 3.4.1. DCE Layout

The DCE was conducted in two steps. The first task asked each respondent to evaluate six different sets of hypothetical whale watching tours. Each set consisted of three options: Tour A, Tour B, or Neither tour (Figure 4).

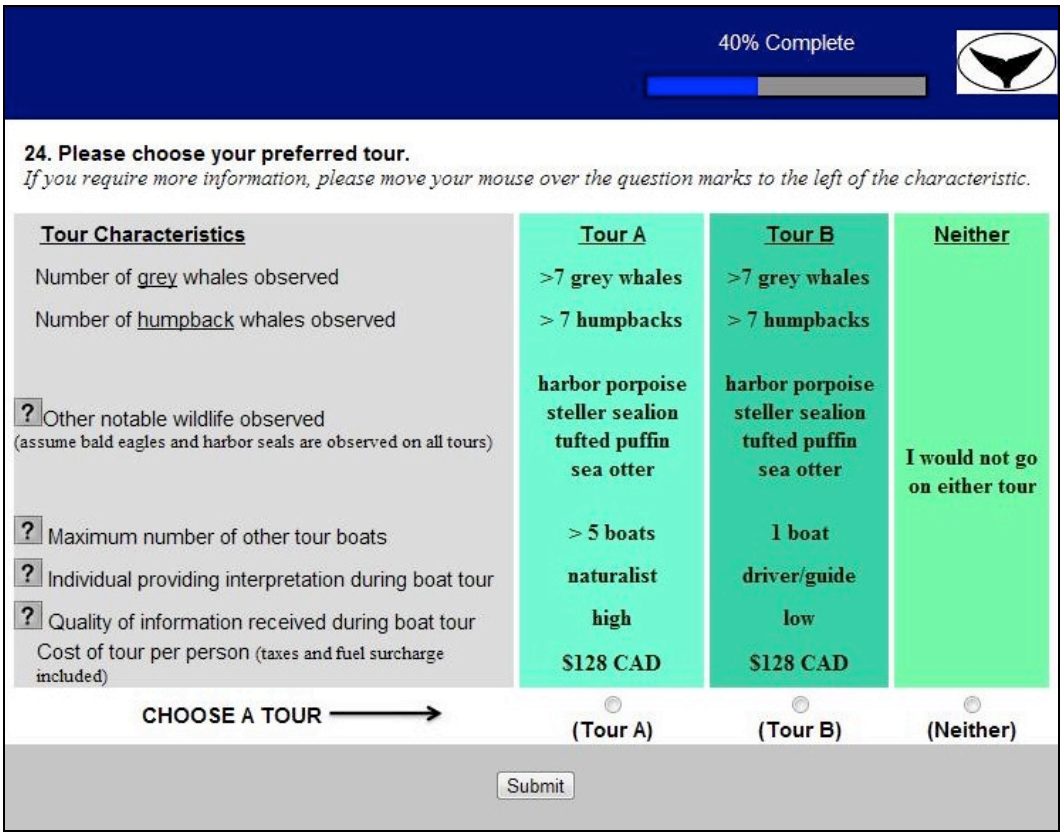



***Figure 4. Sample choice set from first task in whale watching tour DCE***

Because the DCE had respondents imagine they were returning to Tofino and to evaluate sets of whale watching tours, individuals who stated they had no intention of returning were more likely to drop out of the web survey at this point. To maximize participation of all respondents, the choice question was framed slightly differently depending on a respondent's future intended behavior. The different framings produced three segments that were later analysed for differences in survey responses.

For respondents who indicated they were likely[7] to return to Tofino and whale watch in the future, the instructions asked them to imagine they were returning and to choose their most preferred tour. For respondents who indicated they were likely to return to Tofino but unlikely[8] to whale watch, and, for those who were unlikely to return to Tofino at all, the task asked them to imagine that their friends were heading to Tofino to whale watch and were looking for a tour recommendation. Respondents were asked to make a tour recommendation based on their own preferences.

The second task in the DCE was designed to measure respondents' preferences for habitat preservation given their choice in the first task (Figure 5). First, each individual was informed of the threats to the grey whale breeding lagoons in Baja California, Mexico, and told that a fund had been established by a non-government organisation to preserve the lagoons. Respondents were told that paying a fee (on top of their tour cost) would reduce the threats, thereby avoiding a decline in the grey whale population over the next 10 years. Respondents were then asked to re-assess a set of tour options they had already seen and evaluated, given the new information and attributes. The two attributes (preservation fee and percent avoided decline in the grey whale population) were always presented as additional elements of the tour a respondent chose (either Tour A or Tour B) in the second to last and last choice set from task 1. If a respondent then chose to move away from the original choice (either to the other tour option or to neither tour), then no payment would occur, resulting in a decline in the grey whale population.

[7] Defined as those respondents who indicated they would definitely, probably, or maybe return to Tofino and/or whale watch.

[8] Defined as those respondents who indicated they would definitely not or probably not return and/or whale watch.

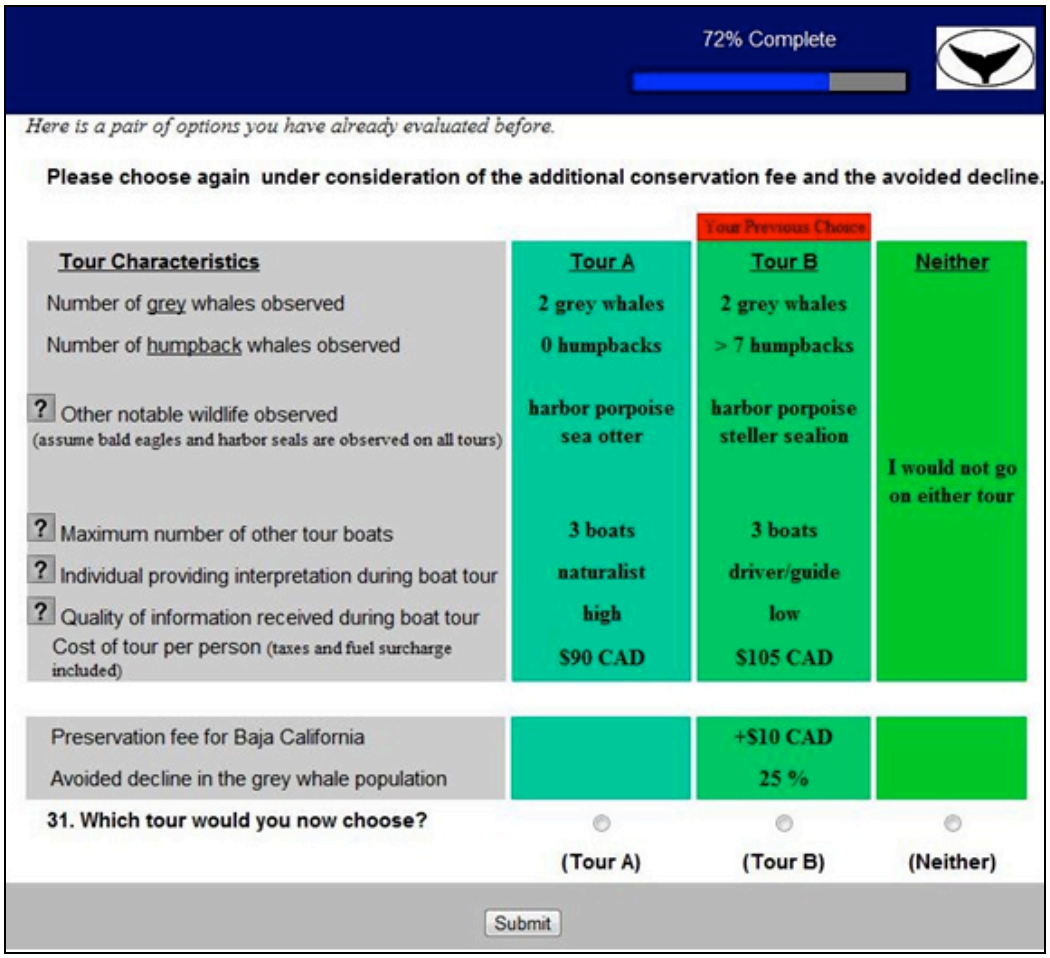



***Figure 5. Sample choice set for second task in whale watching tour DCE***

### *3.4.2. DCE Design*

The hypothetical whale watching tours in the first and second task were described by several attributes relating to the type of wildlife observed, the quality and delivery of onboard education, the amount of boat crowding, the tour cost, and paying for habitat protection (Table 1).

All attributes were determined through a review of the relevant literature, as well as discussions with key informants and tour operators. Relevant academic literature on whale watcher preferences was consulted and attributes that were commonly found to influence tour satisfaction and enjoyment were included in the initial DCE design. Attributes related to whale preservation were identified during pre-tests and through a review of similar studies assessing wildlife watching tourists` willingness to pay to protect species observed. Upon discussion with

key informants and operators, the initial attribute list was refined and the levels for each attribute were established to ensure that hypothetical tours represented possible scenarios that could be experienced by whale watchers in Tofino and the preservation attributes were realistic.

***Table 1. Attributes and levels for whale watching tour DCE***

| Attribute | Levels |
|---|---|
| **Task 1:** | |
| Expected number of grey whales observed | 0 whales; 2 whales; 5 whales; ≥7 whales |
| Expected number of humpback whales | 0 whales; 2 whales; 5 whales; ≥7 whales |
| Other notable wildlife observed† | Stellar sealion; Harbor porpoise; Sea otter; Tufted puffin |
| Individual delivering education | Separate naturalist; Trained boat captain |
| Quality of information | Low; Medium; High |
| Number of other boats observing the same whales as tour (crowding) | 0 boats; 1 boat; 3 boats; ≥5 boats |
| Tour Cost (per person in $CAD) | 75; 83; 90; 98; 105; 113; 120; 128 |
| **Task 2** | |
| Preservation fee in $CAD (on top of tour cost) | None; 1; 2; 3; 5; 7; 10; 12; 15 |
| Percent avoided decline (%)* | None; 10; 20; 25; 30; 40; 50; 60; 70 |

*Refers to the percent decline in grey whale population (relative to today's population level) that would be avoided over the next 10 years.

†Each species of wildlife was presented as a binary variable (present/absent)

The levels for the attributes related to the number of whales and wildlife observed were established through discussions with the two tour operators. Even though other species of whales can be observed during the summer, grey and humpback whales are the most commonly observed species and were therefore singled out in the DCE. As the majority of tours also observe bald eagles and harbor seals, all hypothetical scenarios included these two species. Other notable wildlife species that can be observed in addition to bald eagles and harbor seals were included in the design.

Onboard education has been identified as an important component of a whale watch tour and was therefore included as an attribute. The levels describing the structure of the onboard education encompassed the range of possible education styles currently used by tour operators in Tofino. Onboard education can either be given by the boat captain, who is trained and certified in interpretation, or by a separate naturalist. The description of the levels relating to the quality of information provided during the tour are: low (passengers are only informed about what species of marine life are observed; medium (passengers are informed about the marine life and its behavior); and high (passengers receive the same information as the two other levels but are also informed of the conservation issues surrounding the marine environment and what they can do to protect it). The levels were established through the literature review on whale watcher preferences for different types of education.

The academic literature also identified perceived crowding as a factor of concern for whale watch passengers and this attribute was therefore included in the DCE. The levels of this attribute represent the range of possible crowding scenarios a passenger could experience on a tour in Tofino.

The cost of the tour provides information on the willingness to pay for the tour in itself, which can vary significantly by tour operator and type of boat chosen. The levels for the tour cost attribute were informed by the price charged to adult passengers for a whale watching tour in 2010, which ranged from $94.00 to $106.00 CAD (including fuel surcharge and taxes). The cost attribute also included levels that went above and below the actual prices.

The second task of the DCE described the WTP question and consisted of two attributes: one describing a fee paid on top of the tour cost and the other describing the percent decline in the grey whale population that would be avoided if a respondent paid the fee. Preservation fee levels ranged from $1 to $15 CAD and were established primarily through discussion with tour operators and key informants. The percent avoided decline ranged from 10% to 70% and was established using similar valuation studies and through discussion with key informants.

Effects coding was used for the education attribute and for each of the other notable wildlife species that could be observed on a tour. The number of grey whales, humpback whales, and other tour boats observed, as well as the tour cost, preservation fee, and percent

avoided decline were coded with linear and quadratic polynominal coding. Only significant quadratic relationships were kept in the model, although the researchers did remove the quadratic estimate for the tour cost attribute (despite being significant) as its inclusion caused utility to diverge from traditional economic theory. The removal of the quadratic estimate for tour cost did not affect the overall performance of the model or the part worth utility estimates for the other tour attributes.

The hypothetical tour scenarios were constructed as an orthogonal fractional factorial design developed by Ngene 1.1.1 (ChoiceMetrics, 2012). For the first task in the DCE, a total of 160 individual profiles were combined into 80 choice sets. To account for possible interactions between respondent preferences for certain attributes, interactions between the number of grey whales and number of humpback whales, the number of grey whales and the tour cost, and the number of humpback whales and the tour cost were included in the design. A separate and independent orthogonal fractional factorial design was used in the second task of the DCE. One of 16 profiles was added to the alternative selected in the first task of the DCE.

### *3.4.3. Statistical Background*

A DCE attempts to estimate the utility associated with individuals' evaluations of a series of multi-attribute products (Louviere et al., 2000). The analysis of a DCE is based on random utility theory (McFadden, 1974) which states that individuals will select the alternative that provides them with the greatest benefit (or utility), and that for each respondent this utility contains a deterministic (observable) component and a random (unobservable or error) component of utility (Louviere, Hensher, & Swait, 2000):

$$U_{in} = V_{in} + \varepsilon_{in} \quad (1)$$

where $U_{in}$ is the overall utility that respondent $n$ obtains from alternative $i$, which is composed of $V_{in}$, the deterministic component that is observed and measured by the researcher, and $\varepsilon_{in}$, the random component which is unobserved by the researcher. The observable component of utility is measured for each attribute while the unobserved portion (error term) is measured for each alternative (Train, 2009). Based on random utility theory, a respondent will choose alternative $i$ only if $U_i > U_j$ for all $j \neq i$ (Louviere, Hensher, & Swait, 2000). Therefore, the probability of choosing alternative $i$ is:

$$P_i = prob[(V_i + \varepsilon_i) > (V_j + \varepsilon_j); \forall j \in J] \quad (2)$$

where *J* is the set of all possible alternatives. Even though it is assumed that choice behavior is deterministic and specific to the individual, the data can be analysed as a stochastic process for the aggregate sample population using Multinomial Logit (MNL) models:

$$P_i = \frac{\exp(V_i)}{\sum_{j=J} \exp(V_j)} \quad (3)$$

where the probability of choosing alternative *i* from all alternatives included (*J*) is equal to the exponent of $V_i$ over the sum of the exponent of all measurable elements of all alternatives *J* (Hensher et al., 2005). A MNL model assumes that the error term is IID distributed, meaning that all error terms are independent from each other (no correlation between error terms across alternatives) and have the exact same distribution (identically distributed) (Hensher et al., 2005). The MNL model also assumes that the error terms are distributed according to the type 1 extreme value distribution (also referred to as the Gumbel distribution) and have the same variance across alternatives (Train, 2009).

The specific characteristics of the alternatives can be incorporated into the MNL equation (3) by expanding the observable component of the utility, $V_i$ according to

$$V_i = \beta X_i \quad (4)$$

where $\beta$ is a vector of the part-worth utility coefficients associated with the vector $X_i$ that represents the various attributes that characterize the alternatives. The part-worth utility vector $\beta$ can be calculated for the sample population by fitting the expanded version of the choice model equation (3) to the observed aggregate stated choice probabilities following the experimental design of the DCE. The resulting part-worth utility values represent the overall importance or contribution of each attribute level to the choices made by the sample population.

### Latent Class Model

To account for heterogeneity in respondent choices, the basic MNL model can be expanded to the Latent Class Model (LCM) (Boxall & Adamowicz, 2002). The LCM assumes that the population of respondents can be grouped into mutually exclusive classes based on

their choices in the DCE and any relevant covariates (e.g., socio-demographic, attitudinal, or psychometric effects). The use of a LCM allows one to explain preference differences across individuals conditional on the probability of belonging to a given latent class. Once the classes have been created, additional observable characteristics, such as level of whale watching experience, can be used to help further characterise the different classes.

The LCM combines the joint probability estimates of belonging to a certain class and choosing a particular alternative. Therefore, the probability of respondent *n* choosing alternative *i* is the product of:

$$P_{in} = (P_{ns}) * (P_{ni|s}) \quad (5)$$

where $P_{nx}$ is the probability of respondent *n* belonging to class *s* based on the relevant covariates and $P_{ni|x}$ is the probability that the respondent will choose alternative *i* conditional on membership in class *s*. Assuming the error terms for both probability distributions are IID distributed across individuals and segments with Type 1 extreme value distribution, the two parts of equation 5 can be expanded into the following form:

$$P_{in} = \sum_{s=1}^{S} \left[ \frac{\exp(\lambda_s Z_n)}{\sum_{s=1}^{S} \exp(\lambda_s Z_n)} \right] \left[ \frac{\exp(\beta_s X_i)}{\sum_{j=1}^{J} \exp(\beta_s Z_J)} \right] \quad (6)$$

where $Z_n$ is a vector associated with socio-demographic, attitudinal, or psychometric effects of respondent *n*, $\lambda_s$ is a vector of parameters, and $\beta_s$ is the specific utility for class *s* for alternative *i* chosen from all possible alternatives (J) (Boxall & Adamowicz, 2002). The LCM assumes discrete changes in parameters across different classes that are distinguished by individual heterogeneity. Therefore, separate PWU parameters (β) are estimated for all specified classes, which can provide information on the different preferences held by the sample population. In turn, accounting for differences in preferences provides decision makers with a greater understanding of how one scenario can affect respondents differently.

The latent class parameter functions were estimated using Latent Gold Choice Version 4.5 (Statistical Innovations Incorporated, 2010). The maximum likelihood analysis produced PWUs, standard errors, and z-scores for each attribute level, which were compared among

classes using the Wald statistic. Following Louviere et al. (2000), only z-scores significant at the 90% level of confidence indicate significant PWU parameters.

## 3.5. Analytical Techniques

Data analysis progressed through a series of steps, which were motivated by specific objectives. Since each step consisted of different analytical methods, each will be described individually. Latent Gold Choice Version 4.5 (Statistical Innovations Incorporated, 2010) was used to analyse the Discrete Choice Experiment while all other analyses were performed using IBM SPSS Statistics 19, Release 19.0.0 (SPSS Incorporated, 2010). Following Vaske (2008), parametric procedures were conducted on both normal and non-normal continuous data, since "parametric procedures are robust and yield valid conclusions even when the data are distorted (i.e., not normally distributed)" (pg., 85). Similarly, Likert-scale questions with five or more categories were treated as continuous variables (Vaske, 2008).

The objective of the first step was to assess whether the three whale watcher segments (based on respondents' likelihood of returning to Tofino in the future and whale watching again) differed significantly from each other based on responses to the survey questions (excluding the DCE). A series of statistical tests were completed to identify significant differences. Pearson chi square tests for cross tabulations were used to test for relationships between two categorical or dichotomous variables. For continuous data, Student T-tests and one-way Analysis of Variance (ANOVA) tests were used to identify differences between two and multiple groups respectively. Levene's F test was used to determine if the variance (standard deviation) of the dependent variable were equal. When variances could be assumed equal, the Bonferroni statistics were used to assess significance; Tamhane's T2 statistics were used to assess significance when equal variances could not be assumed (Vaske, 2008). A Pearson correlation coefficient was used to measure the degree of linear relationship between two continuous variables. Furthermore, a Principal Components Analysis (PCA) with Varimax rotation was used to the explore relationships between responses to the tour satisfaction questions. Cronbach's alpha was used to measure the extent to which responses to the individual satisfaction items correlated with each other, thereby giving a measure of the internal consistency and reliability of responses.

The second step involved analysing the responses to the DCE to assess whale watcher preferences for tour attributes. First, the three *a priori* segments were specified as "known classes" in Latent Gold and separate MNL models were simultaneously estimated for each segment. Secondly, using only respondents in the first *a priori* segment, Latent Classes were derived based on responses to the DCE. Variables identified as significant in the first step (e.g., socio-demographics) were included in the DCE analysis as covariates, provided their inclusion improved the model results. Models were compared using the log likelihood, Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) statistics which measure the goodness of fit of the model to the data.

The final step involved analysing the choices made in the second task of the DCE, which assessed respondents' willingness to pay to avoid a certain decline in the grey whale population. Since respondents re-assessed a set of tours they had already evaluated and made a choice for, it was necessary to include an additional attribute to indicate the original tour chosen in task one. A series of both MNL and Latent Class models were run, compared, and the best model was selected based on criteria outlined above.

## 3.6. Decision Support System

To illustrate the results of the DCE analysis in an integrated and practical fashion, a Decision Support System (DSS) was created using Microsoft Excel. The DSS follows the concept of the choice set layout and allows the user to evaluate any combination of attribute levels that fall within the range of values used in the DCE. For each hypothetical whale watching tour created, the DSS calculates the total utility that each class identified by the Latent Class Model would receive. The DSS also generates market shares for each profile created by inserting the PWU estimates derived from the DCE analysis into Equation 3. This provides a measure of the percentage of each Latent Class that would choose the given tour. The user can examine how changes in attribute levels influence market shares and thus preferences for each hypothetical whale watching tour.

# 4. Results

This section presents the results of the 2010 Tofino whale watching survey. The chapter begins with a presentation of the survey response rates, followed by a description of whale watchers by socio-demographic characteristics, commitment to whale watching and the environment, and levels of reported satisfaction. Thereafter, respondent satisfaction with the tour experience is described in a Principal Component Analysis. Next, the *a priori* segmentation of respondents into segments based on future intention to return to Tofino and whale watch is presented, followed by the selection of a Latent Class model that best explains preferences of whale watchers who are likely to return and book another whale watching tour. Thereafter, differences in whale watcher preferences for tour attributes and payment for preservation are discussed, as well as other variations between the identified Latent Classes.

## 4.1. Intercept Survey

A total of 800 individuals were recruited by intercept survey during the summer of 2010. Approximately half of the recruited individuals were from North America (47%) and from Europe (47%) respectively, and 6% were from other regions (e.g., Australia, Israel, New Zealand). Slightly less than one-tenth of participants completed the intercept survey in German while the remaining 92% completed it in English. The vast majority (97%) of whale watchers were actively recruited either before or after their trip while the remaining 3% were passively recruited using the “drop off box” method. Approximately one quarter (21%) of recruited individuals had participated in a “hot springs” tour, 69% had participated in a “whale watching” tour, and the tour type was unknown in 10% of the cases.

## 4.2. Survey Response Rates

Of the 800 individuals intercepted, 50 did not provide their email address and 42 email addresses were undeliverable. Thus, a total of 708 invitations to the survey were successfully

sent to recruited individuals and 41% responded. Response rates for all three recruitment techniques fell between 41% and 50% (Table 2). Despite recruiting a relatively small number of individuals (n=18), the drop-off box technique had an equally high response rate compared to the active recruitment techniques. This is not surprising since the technique targeted individuals who actively took the initiative to sign themselves up to participate. The response rate of German whale watchers was ten percent lower (34%).

***Table 2. Recruitment methods for intercept survey and respective survey response rates***

| Recruitment Method | Number of Respondents Recruited to Web Survey* | Number of Respondents to the Web Survey | Recruitment Response Rate |
|---|---|---|---|
| **Active Recruitment Techniques** | | | |
| Personally intercepted at tour operator** | 672 | 274 | 41% |
| Personally intercepted during walk to/from dock | 18 | 9 | 50% |
| **Passive Recruitment Technique** | | | |
| Respondents recruited using Drop-off Box | 18 | 8 | 44% |
| **Total** | **708** | **291** | **41%** |

*Only includes individuals who successfully received the email invitation to complete the web survey.

**Respondents personally intercepted at the participant tour operators.

Of the 291 responses received to the web survey, 38 were incomplete and therefore excluded from the database. Another 17 individuals were removed for completing the survey in 8 minutes or less (the average completion time was 14 minutes) and an additional 37 individuals were excluded for making identical choices for at least 5 out of 6 of the choice sets (e.g., consistently chose 'Tour A').Once data cleaning was completed a total of 199 respondents remained for the analysis of the online survey.

### *4.2.1. Non response Bias*

An analysis for non-response bias was conducted to identify differences between the web survey respondents (n = 199) and non-respondents (i.e., recruits to the intercept survey

who did not attempt to complete the web survey). Figure 6 illustrates that older individuals were more likely to complete the web survey than younger recruits ($\chi^2(5, N = 678) = 30.312$, $p < 0.001$).

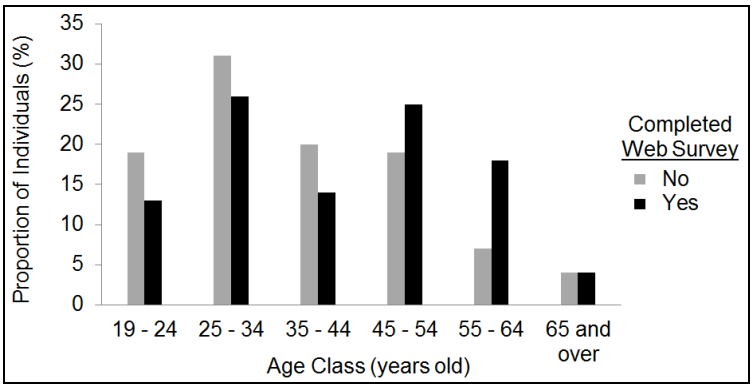



***Figure 6. Comparison of respondents and non-respondents to the web survey by age class***

A significantly higher proportion of individuals with prior whale watching experience completed the web survey compared to first time whale watchers (36% versus 24%) ($\chi^2(1, N = 694) = 9.596$, $p = 0.002$) (Figure 7). The number of whale watching tours previously taken ranged from none to 13, with an average of 1.11 tours.

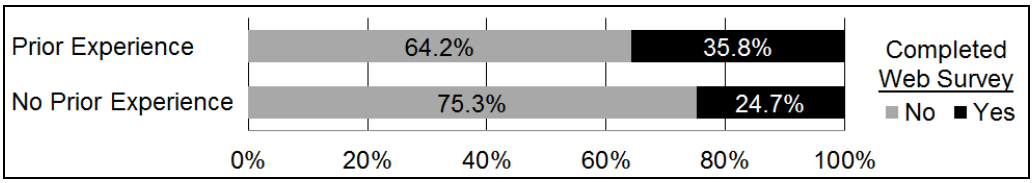



***Figure 7. Completion of web survey by prior whale watching experience***

While no other significant differences emerged between respondents and non-respondents, it is worth mentioning that although this survey focused on whale watching, individuals who participated in a hot springs tour were equally likely to complete the web survey compared to individuals who participated in a whale watching tour (25% versus 31% respectively) ($\chi^2(1, N = 653) = 2.408$, $p = 0.121$). Similarly, the two groups did not differ with respect to their origin (North American versus European).

## 4.3. Whale Watcher Profiles

The following section provides a profile of whale watchers, which consists of a description of socio-demographic characteristics, commitment to whale watching and the environment, and levels of reported satisfaction.

### *4.3.1. Socio-demographics*

The majority of respondents (79%) had participated in a three hour whale watching tour. Whale watch participants were split fairly evenly between genders, with 54% female and 46% male. Slightly less than one-fifth of all respondents (18%) had participated in a seven hour hot springs tour and participants were mostly female (73%) ($\chi^2(1, N = 190) = 4.285, p = 0.038$).

The age groups most commonly represented were the 25 to 35 year olds (26%) and the 45 to 54 year olds (25%) (Figure 8). Compared to whale watch participants, hot spring participants were significantly younger, with 70% of individuals falling under the age of 45 ($\chi^2(5, N = 192) = 17.863, p = 0.003$).

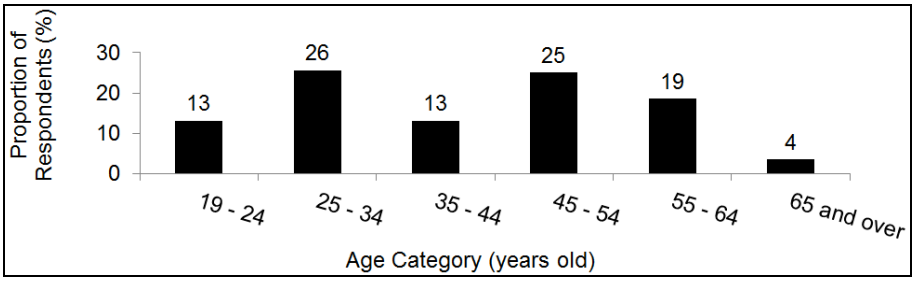



***Figure 8. Age distribution of respondents to the web survey***

The majority of respondents were well educated and had university level qualifications (undergraduate and graduate) (Figure 9). Despite being younger, hot springs participants did not differ on their highest level of completed education compared to whale watch participants ($\chi^2(3, N = 189) = 0.231, p = 0.972$).

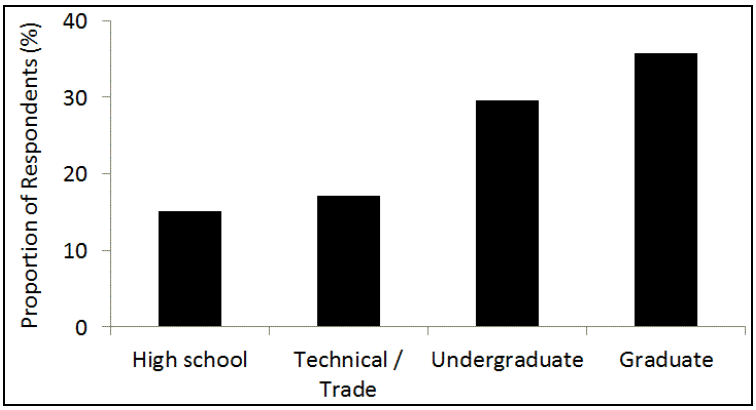



***Figure 9. Highest level of completed education***

Slightly more than half of all respondents (51%) were from North America, with the majority (91%) residing in Canada. The remaining respondents were international tourists either from Europe (42%) or countries such as Australia, the British Virgin Islands, Israel, or Nigeria. Canadian respondents were primarily from British Columbia (36%) or Alberta (21.5%) while European respondents were primarily from Germany (35%) or the United Kingdom (25%).

The most commonly reported annual household income bracket was greater than $90,000 CAD (42%) while 20% belonged to the second highest level of $60,000 to $89,000 CAD. Hot springs tours were relatively more expensive than the whale watching tours; however, no significant relationship between type of tour and income was recorded ($\chi^2(4, N = 181) = 0.846, p = 0.932$).

### *4.3.2. Commitment to Whale Watching*

Tofino-based whale watchers were split between first time (57%) and repeat whale watchers (43%). These results are very similar to Shapiro (2006), who also noted slightly less than half of respondents of a Hawaiian whale watching survey were repeat whale watchers. North American respondents were proportionately more experienced (55%) than individuals from Europe (41%) and other countries (5%), although this result was not significant ($F(2,189) = 1.032, p = 0.358$). Most individuals had taken one or two prior trips (76%) while almost one quarter (24%) were more experienced, having been on three to 12 whale watching tours. Only 16 individuals (8%) had previously been whale watching in Tofino.

Almost half (48%) of respondents' previous whale watching experiences had occurred along the West Coast of North America, while slightly less than one-fifth (18%) were taken along the East Coast of North America, one quarter (26%) outside North American waters all together, and 8% in Hawaii. Most of the tours taken along the west coast of North America occurred off the coast of British Columbia while very few tours were based out of Mexico. Of the eight individuals who had previously whale watched along the West Coast of Mexico, four had previously participated on a tour within the Baja California breeding lagoons.

Respondents were generally unsure or unlikely to whale watch in the future anywhere along the west coast of North America (Table 3). The only location where respondents indicated they were relatively more likely to whale watch was along the West Coast of British Columbia. Intention to return and whale watch anywhere along the West Coast of North America[9] was positively correlated to the number of prior whale watching tours taken ($r(189) = 0.148$, $p = 0.041$), suggesting that more experienced whale watchers are more likely to positively state their intention to book another tour. Likelihood of future whale watching did not vary by country of origin ($\chi^2$ (2, N = 198) = 0.977, $p = 0.613$) or by income ($\chi^2(2, N = 186) = 1.135$, $p = 0.567$).

***Table 3. Intent to whale watch in the future along the west coast of North America***

| | Proportion of Respondents in each Response Category* (%) | | |
|---|---|---|---|
| **Location** | **Definitely No or Probably No** | **Unsure** | **Probably Yes or Definitely Yes** |
| West Coast of Alaska | 29 | 47 | 22 |
| West Coast of British Columbia (outside Tofino) | 15 | 35 | 49 |
| West Coast of the United States | 33 | 47 | 18 |
| West Coast of Mexico | 43 | 38 | 17 |

Note: Percentages for each location do not add up to 100% due to missing data

*Based on responses to Likert scale question ranging from 1 (definitely no) to 5 (definitely yes).

[9] An average score was calculated based on reported intention to whale watch along the West Coast of Alaska, the West coast of B.C., the West Coast of the United States, and the West Coast of Mexico.

The majority of respondents had arrived in Tofino with high levels of prior knowledge about both whale species (Figure 10). Approximately one quarter of respondents had medium levels of prior knowledge while 10% or less had never heard of either species and were therefore unaware of the viewing opportunities.

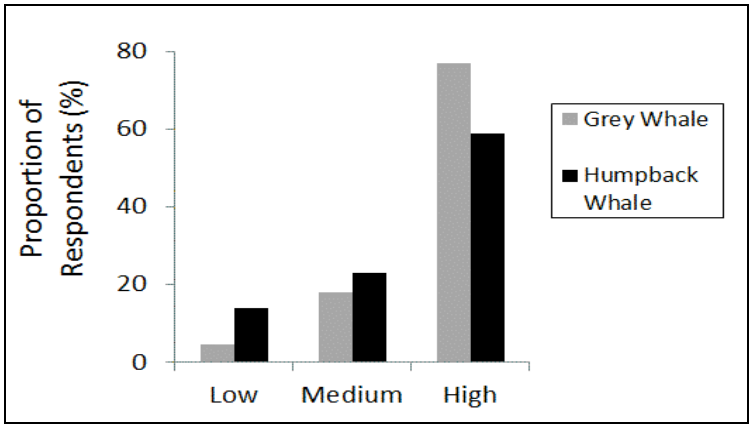



***Figure 10. Respondents' prior knowledge of grey and humpback whales***

Note: Low: Respondents had not heard of the species; Medium: Respondents had heard of but were unaware of the possibility of observing the species; High: Respondents had heard of and were aware of the possibility of observing the species.

### *4.3.3. Environmental Orientation*

The level of interest and awareness of environmental issues was assessed by asking respondents to rate how closely four statements described them (Table 4). The results indicate that most passengers are generally interested in and aware of environmental issues, although respondents reported lower interest in actively searching for information on what they can personally do to conserve the marine environment.

***Table 4. Reported interest in and awareness of environmental issues***

| Statement | Mean | SD |
|---|---|---|
| I am interested in learning more about environmental issues | 3.94 | 0.848 |
| I often think about whether my actions harm the environment | 3.89 | 0.827 |
| I regularly watch television programs about the natural environment | 3.57 | 1.195 |
| I actively search for information about how I can help conserve the environment | 3.22 | 1.096 |

Statements were rated on a Likert scale from 1 (does not describe me at all) to 5 (describes me perfectly).

Significant differences in reported interest and awareness were observed between all statements except “I am interested in learning more about environmental issues” and “I often think about whether my actions harm the environment” (Table 5).

***Table 5. Matrix of p-values from paired samples t-test: means comparisons of reported interest in and awareness of environmental issues***

| | Interest in learning | Think about my actions | Watch television programs | Actively search for information |
|---|---|---|---|---|
| **Interest in learning** | - | 0.280 | <0.001* | <0.001* |
| **Think about my actions** | 0.280 | - | <0.001* | <0.001* |
| **Watch television programs** | <0.001* | <0.001* | - | <0.001* |
| **Actively search for information** | <0.001* | <0.001* | <0.001* | - |

*Significant at 99%

Based on a respondent’s individual rating of the four interest and awareness statements, an index was created by adding up the ratings for each statement and placing respondents into one of three categories. Scores between 4 and 10 indicated ‘low’ interest and awareness, scores between 11 and 15 indicated ‘medium’ interest and awareness, and scores between 16 and 20 indicated ‘high’ interest and awareness. The majority of respondents expressed moderate levels of interest and awareness (53%) while 39% expressed high levels (Figure 11). No significant differences in respondent interest and awareness in the environment were found between whale watch participants and hot springs participants ($t(192) = 0.618$, $p = 0.540$).

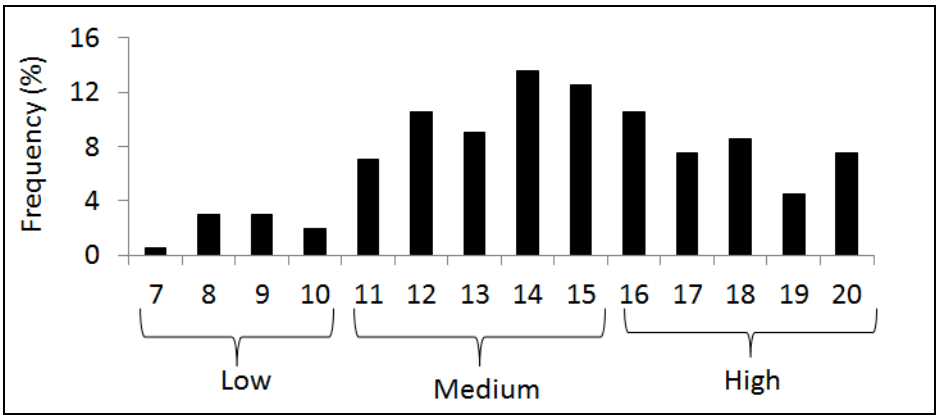



***Figure 11. Distribution of index scores of respondents' interest and awareness of conservation issues***

Note: index scores are the sum of four ratings of a respondent's interest and awareness in conservation.

Respondents were asked to rate the degree to which they engage in seven types of conservation behaviors. As illustrated in Table 6, the majority of respondents reported frequent engagement in conservation actions that require a low level of commitment (recycling, energy and water conservation). Reported engagement in medium level commitment behaviors was more variable, with more than half (53%) of respondents indicating they frequently buy environmentally-friendly products while only 39% of respondents frequently talk to others about the environment. Fewer individuals (34%) reported frequently picking up other people's litter. The majority of respondents (81%) reported rarely or never engaging in conservation actions that require a high level of commitment (public land or water clean-up).

***Table 6. Frequency of engagement in conservation behaviors (N=199)***

| | Never/Rarely | Sometimes | Often/Always |
|---|---|---|---|
| **Low commitment conservation actions** | | | |
| Turn off tap when brushing teeth | 9% | 15% | 76% |
| Recycle at home as much as one can | 4% | 11% | 85% |
| Turn down heat at night | 14% | 13% | 73% |
| **Moderate commitment conservation actions** | | | |
| Buy environmentally-friendly products | 8% | 39% | 53% |
| Talk to others about the environment and how we need to protect it | 26% | 35% | 39% |
| Pick up litter | 39% | 27% | 34% |
| **High commitment conservation actions** | | | |
| Participate in public land and water clean ups | 81% | 10% | 9% |

Statements were rated on a Likert scale from 1 (never) to 5 (always).

Information was also collected about respondents' current support of environmental organisations through financial donations or regular volunteering, both of which were considered actions requiring a high level of commitment as per Ballantyne et al. (2009). A small proportion of respondents (11%) reported regularly volunteering for an organisation primarily concerned with the conservation of wildlife or the natural environment while slightly less than half (41%) reported contributing financially to nature-based or conservation organizations. Of the individuals who do donate, the majority (69%) contribute $100 CAD or less per year (Figure 12).

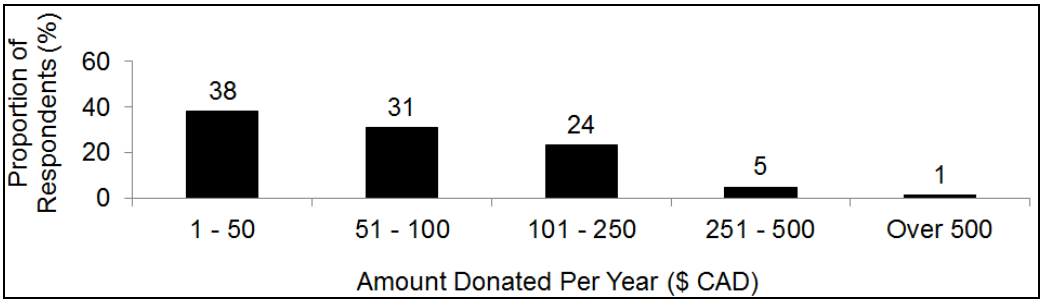



***Figure 12. Annual amount donated to conservation or nature-based organisations (N=80)***

An index was created based on an individual's frequency of engagement in low (recycling, energy and water conservation), medium (buy environmentally-friendly products, talk

to others, pick up litter), and high (public land and water clean-up, volunteer, donate) commitment behaviors. Ratings for each of the nine behaviors were added together and weighted[10] based on the amount of commitment required (Figure 13).

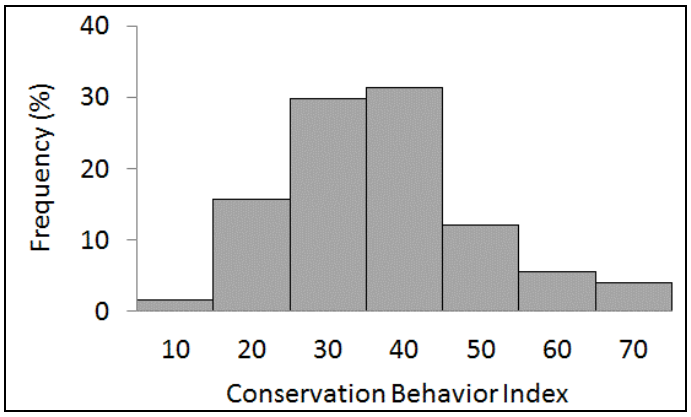



***Figure 13. Conservation index scores based on frequency of engagement in conservation related behaviors***

Note: Index can range from 0 (never engaging in any behavior) to 72 (always engaging in each behavior)

The distribution of overall conservation index scores generally follows a normal distribution with few individuals at either extreme, providing further evidence that whale watchers do engage in conservation related behaviors, although not on a frequent basis.

## 4.4. Satisfaction and Tour Experience

The majority of respondents reported high levels of overall satisfaction and were satisfied with the majority of tour components (Table 7). Reported levels of overall satisfaction did not vary by country of origin or whether individuals had any prior whale watching experience. Similarly, respondents surveyed were equally satisfied with the 12 tour items despite having participated on tour boats that differed in length, structure, and capacity. Respondents who reported being the most satisfied also indicated a higher likelihood of returning to Tofino and whale watching in the future.

[10] Ratings that indicated positively engaging in high commitment behaviors were multiplied by three while ratings that indicated positively engaging in medium commitment behaviors were multiplied by two.

***Table 7. Mean rating for satisfaction***

| Variable | N | Mean* | SD |
|---|---|---|---|
| Overall satisfaction | 199 | 4.22 | 0.836 |
| Service by boat crew and office staff | 198 | 4.31 | 0.769 |
| Boat structure for viewing purposes | 198 | 4.28 | 0.773 |
| Position of boat relative to whales for viewing purposes | 199 | 4.23 | 0.813 |
| Tour duration | 197 | 4.22 | 0.741 |
| Quality of education (before, during, and after tour) | 198 | 4.20 | 0.831 |
| Amount of education (before, during, and after tour) | 198 | 4.19 | 0.808 |
| Number of passengers onboard | 199 | 4.13 | 0.822 |
| Proximity to whales | 195 | 4.05 | 1.007 |
| Other wildlife observed | 197 | 3.92 | 0.897 |
| Number of whales | 199 | 3.83 | 1.109 |
| Number of other tour boats observing the same whales as given tour | 198 | 3.73 | 0.829 |
| Whale behavior | 198 | 3.70 | 1.1016 |

*Mean of satisfaction ratings based on a Likert scale from 1 (extremely dissatisfied) to 5 (extremely satisfied).

Using the 12 satisfaction items, a Principal Component Analysis (PCA) with Varimax rotation was conducted to group similarly rated items into components. Components with Eigenvalues greater than one were retained resulting in a three component solution that explains 66% of the total variance observed (Table 8).

***Table 8. Total variance explained for PCA analysis***

| Component | Eigenvalue | Percent of Variance (%)* | Cumulative Percent (%)* |
|---|---|---|---|
| 1 | 5.07 | 24 | 24 |
| 2 | 1.743 | 22 | 45 |
| 3 | 1.197 | 21 | 66 |

*Represents values after Varimax rotation

The emergence of three components – Wildlife (Component 1), Tour Structure and Viewing (Component 2), and Education and Services (Component 3) – suggests that participants' satisfaction with a whale watching tour can be simplified into three dimensions (Table 9).

***Table 9. Rotated component matrix of whale watcher satisfaction***

| Satisfaction Components | Varimax rotated factor loadings by component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Wildlife Dimension | | | |
| Number of whales | 0.812 | | |
| Whale behavior | 0.870 | | |
| Proximity to whales | 0.806 | | |
| Other wildlife observed | 0.560 | | |
| Tour Structure and Viewing Dimension | | | |
| Boat structure for viewing purposes | | 0.731 | |
| Position of boat relative to whales for viewing purposes | | 0.607 | |
| Number of passengers onboard | | 0.826 | |
| Number of other tour boats observing the same whales as given tour | | 0.585 | |
| Tour duration | | 0.560 | |
| Education and Services Dimension | | | |
| Amount of education (before, during, and after tour) | | | 0.891 |
| Quality of education (before, during, and after tour) | | | 0.911 |
| Service by boat crew and office staff | | | 0.698 |

### *4.4.1. Wildlife Dimension*

The Wildlife dimension explains slightly less than one quarter (24%) of the total variance in the satisfaction ratings. Four variables make up this dimension: the number, proximity, and behavior of the whales observed, as well as the other wildlife observed during the tour (Cronbach's Alpha: 0.809). Of the 12 satisfaction items, all four variables fall amongst the five lowest rated tour items.

Satisfaction with the number of whales observed received a mean rating of 3.83 (*SD* = 1.109*)*. Respondents most commonly observed a total of 4 to 6 whales on their tour and no respondent reported observing zero whales (Table 10). A series of Student t-tests reveals that respondent satisfaction increased as individuals observed more whales – up to a maximum of 9 ($t_1(138) = -6.872$, $p < 0.001$); $t_2(99) = -2.745$, $p = 0.007$; $t_3(45) = -0.551$, $p = 0.585$).[11]

***Table 10. Mean satisfaction with the total number of whales observed in relation to the actual number of whales observed***

| Total number of whales observed | N | Mean* | SD |
|---|---|---|---|
| 1 to 3 | 66 | 2.91 | 0.988 |
| 4 to 6 | 74 | 4.03 | 0.936 |
| 7 to 9 | 27 | 4.56 | 0.577 |
| More than 10 | 32 | 4.69 | 0.592 |

*Represents mean satisfaction with the number of whales observed measured on a Likert scale from 1 (very dissatisfied) to 5 (very satisfied)

The most commonly reported species observed was the grey whale followed by the humpback whale (Figure 14). Very few respondents (33%) observed Orcas and even fewer observed minke whales (2%). An equally small proportion of respondents could not remember if they saw a humpback, grey whale, or minke whale while most respondents remembered if they saw an Orca.

[11] $t_1$ indicates a significant difference between respondents who observed 1 to 3 whales and those who observed 4 to 6 whales.
$t_2$ indicates a significant difference between respondents who observed 4 to 6 whales and those who observed 7 to 9 whales
$t_3$ indicates a lack of significance between respondents who observed 7 to 9 and those who observed 10 or more whales

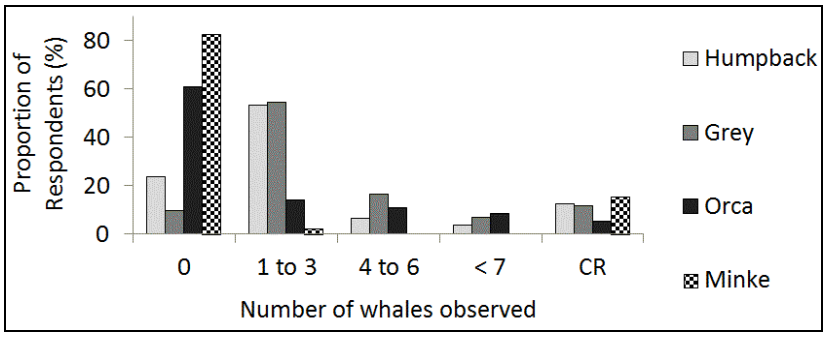



***Figure 14. Number of whales observed per species (CR = cannot remember)***

Of the 12 tour items, participants were least satisfied with the whale behaviors observed during their tour, although reported satisfaction with whale behavior was significantly higher when more whale behaviors were observed ($F(4,193) = 18.867$, $p < 0.001$) (Table 11). The lower satisfaction score may be attributed to the relatively few behaviors actually observed. In general, whale watchers observed one or two of the possible four behaviors, with the most commonly reported behavior being whale fluking (observed by 92% of whale watchers).

***Table 11. Mean satisfaction with whale behavior based on total number of behaviors observed***

| Total number of behaviors observed | N | Mean* | SD |
|---|---|---|---|
| No behaviors | 13 | 3.00 | 1.080 |
| 1 behavior | 70 | 3.20 | 0.894 |
| 2 behaviors | 71 | 3.82 | 0.867 |
| 3 behaviors | 32 | 4.38 | 0.871 |
| All 4 behaviors | 12 | 4.92 | 0.289 |

*Represents mean of satisfaction ratings based on a Likert scale from 1 (very dissatisfied) to 5 (very satisfied)

Satisfaction with the other wildlife observed on the whale watching tour was given a mean rating of 3.92 (*SD* = 0.897). The majority of respondents observed at least one of the six possible wildlife species and mean satisfaction showed a major increase from one to two species (Table 12). The most commonly observed species was stellar sealions (observed by 84.9% of respondents) followed by bald eagles (71%) while the least common was harbor porpoises and Tufted Puffins (13% and 5.5% of respondents respectively). Reported

satisfaction among individuals who saw a greater number of species was significantly higher than those who saw fewer ($F(5,196) = 11.345$, $p < 0.001$).

***Table 12. Mean satisfaction with wildlife observed based on total number of wildlife species observed***

| Number of other wildlife species observed | N | Mean* | SD |
|---|---|---|---|
| 0 species | 2 | 2.00 | 1.414 |
| 1 species | 26 | 3.15 | 0.834 |
| 2 species | 65 | 3.78 | 0.838 |
| 3 species | 54 | 4.15 | 0.810 |
| 4 species | 37 | 4.27 | 0.732 |
| More than 5 species | 13 | 4.29 | 0.515 |

*Represents mean of satisfaction ratings based on a Likert scale from 1 (very dissatisfied) to 5 (very satisfied)

### *4.4.2. Tour Structure and Viewing Dimension*

The Tour Structure and Viewing dimension explains 21% of the total variance in the satisfaction ratings. Five variables make up this dimension: the boat structure and positioning in relation to the whales for viewing purposes, the number of passengers onboard, the number of tour boats observing the same whales as a given tour, and the tour duration (Cronbach's Alpha: 0.803).

Of the 12 tour items, satisfaction with the boat structure ($M = 4.28$, $SD = 0.773$) and positioning ($M = 4.23$, $SD = 0.813$) for viewing purposes were amongst the highest items rated. Reported satisfaction with the structure or positioning of the boat did not differ by boat type, suggesting that passengers were equally satisfied with the view despite differences in boat structure.

Satisfaction with the number of passengers onboard and the number of other tour boats were used to assess levels of perceived crowding. Respondents were generally satisfied with the number of passengers onboard ($M = 4.13$, $SD = 0.822$). In contrast, participants were relatively less satisfied with the number of other tour boats in the surrounding waters ($M = 3.73$, $SD = 0.829$) and mean satisfaction decreased as the number of boats increased ($r(194) =$ -

0.315, $p$ <0.001) (Table 13). The majority of respondents participated in tours where 2 or 3 other tour boats were observing the same whales as them.

***Table 13. Mean satisfaction based on the maximum number of tour boats observing the same whales as a given tour***

| Number of other tour boats | N | Mean* | SD |
|---|---|---|---|
| 0 | 5 | 4.80 | 0.447 |
| 1 | 37 | 4.14 | 0.822 |
| 2 | 81 | 3.78 | 0.742 |
| 3 | 45 | 3.42 | 0.783 |
| 4 | 18 | 3.61 | 0.698 |
| 5 | 6 | 3.60 | 0.548 |
| 6 | 2 | 2.00 | 0.000 |

*Represents mean satisfaction rating with the number of tour boats measured on a Likert scale from 1 (extremely dissatisfied) to 5 (extremely satisfied)

Respondent satisfaction with the length of the tour received a mean rating of 4.22 ($SD$ = 0.741) and participants of the hot springs tour reported significantly higher levels of satisfaction with the tour duration than whale watch participants ($t$(190) = -2.193, $p$ = 0.004).

### *4.4.3. Education and Services Dimension*

The Education and Services dimension explains 21% of the total variance in the satisfaction ratings. Three variables make up this dimension: the quality and quantity of education provided before, during, and after the tour, as well as the service provided by the office staff and boat crew (Cronbach's Alpha: 0.869).

Respondents were equally satisfied with the quantity ($M$ = 4.19, $SD$ = 0.808) and quality ($M$ = 4.20, $SD$ = 0.831) of the education provided before and during the tour and satisfaction did not vary with age or level of education, although passengers aged 65 and over were the least satisfied (3.5 out of 5). The majority of respondents (83%) provided the exact same rating for both items, suggesting that individuals did not necessarily separate the items when evaluating them. A mean score between the two education ratings was calculated and a series of

ANOVA's reveal that reported satisfaction did not vary by respondent age, highest level of education, prior knowledge, type of tour (hot springs versus whale watch), or interest in environmental issues or engagement in conservation behaviors.

Comparing the mean ratings for all 12 tour components reveals that respondents were most satisfied with the service provided by the boat crew and office staff ($M$ = 4.31 and $SD$ = 0.769). Satisfaction of service did not vary by tour operator ($\chi^2(2) = 2.012$, $p = 0.366$), suggesting that operators in Tofino are providing services that meet their clients' needs.

## 4.5. A-priori Segmentation

The majority of respondents (77%) indicated they were likely to return to Tofino and to book another tour (Figure 15). Only a small proportion of whale watchers indicated they were likely to return to Tofino but unlikely to whale watch again and an equally small proportion were unlikely to return to Tofino at all. The small sample sizes of the two segments no longer interested in whale watching however cannot be considered representative as they might reflect a self-selection bias since these survey recruits were less likely to complete the web-based survey.

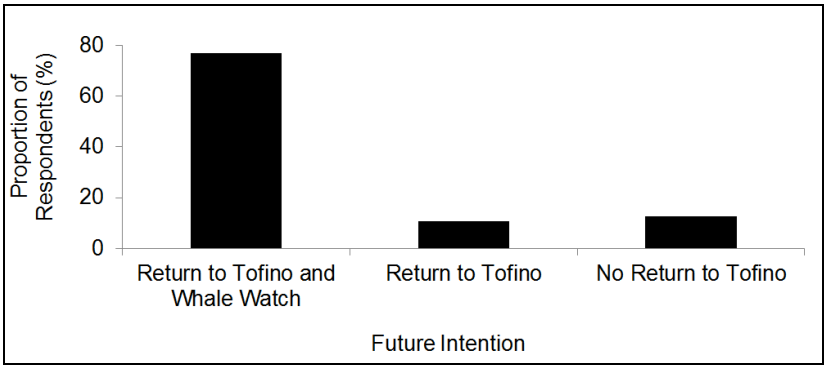



***Figure 15. Interest in returning to Tofino and in booking a whale watching tour***

The three segments differed significantly on only four variables: country of origin ($\chi^2$ (4, $N$ = 198) = 18.323, $p$ = 0.001), previous visits to Tofino ($\chi^2$ (2, $N$ = 193) = 9.755, $p$ = 0.008), their intentions to whale watch in the future along the West Coast of North America outside the Tofino area ($\chi^2(2) = 36.755$, $p$ <0.001), and reported levels of satisfaction (Table 14 and Table 15).

***Table 14. Significant differences between a-priori segments***

| | Return and whale watch N= 152 | Return and no whale watch N= 21 | No return N = 23 |
|---|---|---|---|
| **Origin** | | | |
| North America | 52% | 81% | 25% |
| Europe | 44% | 14% | 58% |
| Other* | 4% | 5% | 17% |
| **Prior Visit(s) to Tofino** | | | |
| Yes | 28% | 45% | 4% |
| No | 72% | 55% | 96% |
| **Likelihood of whale watching along the west coast of North America in the Future** | | | |
| Mean** | 3.17 | 2.26 | 2.63 |

*Other identifies respondents from countries outside North America and Europe, including Australia, the British Virgin Islands, Israel, and Nigeria.

**Mean score is a calculated average of a respondent's likelihood of whale watching in the future along the West Coast of Alaska, B.C. (outside Tofino), the United States, and Mexico. Score is based on a Likert scale from 1 (definitely no) to 5 (definitely yes).

The majority of respondents likely to return to Tofino and book another whale watching tour were primarily first time visitors to Tofino from both North America and Europe. Of the three segments, individuals likely to repeat their Tofino whale watching experience were more satisfied with nine out of 12 tour components and rated themselves the most satisfied overall. Additionally, these individuals were relatively more likely to repeat the whale watching experience at other destinations along the West Coast of North America compared to respondents likely to return but not whale watch ($t(172) = 6.499$, $p < 0.001$) and individuals unlikely to return at all ($t(176) = 4.017$, $p < 0.001$).

***Table 15. Reported mean satisfaction by likelihood of future repeat visit***

| Satisfaction Item | Segment Mean | | | p-value[d] |
|---|---|---|---|---|
| | [a]R+WW N=152 | [b]R N=21 | [c]NR N=23 | |
| Overall satisfaction | 4.34[b] | 3.62[a] | 4.00 | <0.001** |
| Service by boat crew and office staff | 4.41 [bc] | 4.00 [a] | 4.00[a] | 0.006** |
| Boat structure for viewing purposes | 4.32 | 4.00 | 4.25 | 0.202 |
| Position of boat relative to whales for viewing purposes | 4.31 [b] | 3.81 [a] | 4.08 | 0.019* |
| Tour duration | 4.30 [b] | 3.81 [a] | 4.04 | 0.007** |
| †Quality of onboard education | 4.31 [c] | 4.00 | 4.20 [a] | 0.002** |
| Amount of onboard education | 4.28[c] | 3.95 | 3.88 [a] | 0.026* |
| Number of passengers onboard | 4.15 | 4.14 | 3.96 | 0.562 |
| Proximity to whales | 4.15 [b] | 3.43 [a] | 3.96 | 0.008** |
| Other wildlife observed | 4.07 [bc] | 3.38 [a] | 3.92 [a] | <0.001** |
| Number of whales | 3.92 [b] | 3.29 [a] | 3.76 | 0.044* |
| Number of other tour boats observing the same whales as given tour | 3.78 | 3.62 | 3.48 | 0.196 |
| Whale behavior | 3.83 [b] | 3.05 [a] | 3.46 | 0.002** |

Responses were measured on a Likert scale from 1 (very dissatisfied) to 5 (very satisfied)

[a]Return to Tofino and Whale Watch; [b]Return to Tofino but no Whale Watch; [c]No Return

†The variance for this component is not equal and therefore Tamhane's T2 test statistics are presented

*Significant at 95% and **Significant at 99% as identified by Bonferroni Test Statistic

[d]Indicates a significant difference exists between at least two groups.

Respondents likely to return to Tofino but unlikely to book another whale watching tour were primarily North Americans, half of whom had visited Tofino before. Of the three *a priori* segments, respondents likely to return but not book another tour were least satisfied with their experience and were the least likely to whale watch in the future along the west coast of North America.

Respondents unlikely to return to Tofino at all originated from outside North America and had not visited Tofino before. For most satisfaction variables, respondents reported being

equally satisfied as individuals who indicated they would return to Tofino and whale watch, suggesting that individuals did not necessarily state their non-return due to being unsatisfied. Of the three segments, respondents stated they were the least likely to whale watch in the future along the west coast of North America.

## 4.6. The Discrete Choice Experiment

This section contains the results of the Discrete Choice Experiment. A discussion of the model selection process is provided, followed by whale watcher preferences for characteristics of a whale watching tour and for payment of a preservation fee.

When the responses to the DCE were analysed for the previously defined *a priori* segments, no significant differences in preferences for tour attributes emerged. The lack of difference can be attributed to several factors. For one, the sample size of respondents who indicated they would not whale watch again was rather small, and secondly, possibly reflecting this lack of interest in whale watching, the standard errors in their model were relatively large. A likelihood ratio test indicates that removing the two segments no longer interested in whale watching significantly improves the model fit[12] ($p$ <0.001) and therefore researchers decided to restrict the analysis of the DCE to responses only provided by individuals intending to return and repeat the whale watching experience (77% of respondents). The responses of this group not only provide the most robust model but are also the most meaningful for tour operators as they represent the preferences of prospective clients. Henceforth, all results pertain only to the preferences of returning individuals who state they are likely to book another whale watching tour in Tofino.

### *4.6.1. Model Selection*

The next step in the analysis of the DCE was to explore the results for possible heterogeneity (significant differences between respondents). One, two, and three Latent Class

[12] Likelihood ratio test = $2(LL_{\text{All } a \text{ priori segments}} - LL_{\text{Return to Tofino and whale watch}}) = 2(-606.4865 + 922.6060) = 632.239$

model were run to determine the most appropriate number of classes to best represent the data (Table 16).

***Table 16. Model statistics for Latent Class Model Selection***

| Number of Classes | LL[a] | BIC(LL)*[b] | AIC(LL)[c] | AIC3(LL)* | Npar[d] | $L^{2e}$ |
|---|---|---|---|---|---|---|
| 1 | -605.0 | 1295.5 | 1244.1 | 1261.1 | 17 | 1151.9 |
| 2 | -574.5 | 1289.6 | 1204.9 | 1232.9 | 28 | 1090.7 |
| 3 | -566.9 | 1309.6 | 1203.8 | 1238.8 | 35 | 1075.6 |

*Information criterion used to select most appropriate number of classes

[a]Log likelihood at convergence

[b]Bayesian Information Criterion

[c]Akaike Information Criterion

[d]Number of parameters

[e]$L^2$ Likelihood squared

Both the AIC3(LL) and the BIC(LL) suggest a two class Latent Class model is the best fit. Furthermore, the AIC(LL) for the three class model indicates that the additional class does not result in a meaningful improvement in the model. Therefore, the two class model was selected to represent the differences in whale watchers' preferences for tour attributes. The model was then run with a series of covariates to test if choices can be explained in associated with other variables from the survey. Prior whale watching experience was the only significant covariate included in the model.

### *4.6.2. Preferences for Tour Attributes*

The results of the LCM indicated that 53% of the sample (N = 81) fell into Class 1 and 47% of the sample (N = 71) fell into Class 2. The two classes separated well, with a mean class assignment probability of 0.85 (*SD* =0.16) for Class 1 and 0.86 (*SD* = 0.14) for Class 2. Each class was assigned a name based on significant parameters identified between the two groups. Class 1 members were labelled *Crowd Sensitive Novices* and Class 2 members were labelled *Dedicated Education Seekers*.

Table 17 and Figure 16 present the results of the LCM. Attributes with non-significant differences in preferences between the classes were modeled jointly for one shared estimate between the two classes. The columns on the left side of Table 17 represent the tour attributes and associated levels evaluated by respondents. The three columns under each segment title display the coefficients, the standard errors, and the z-value (represents significance of attribute in choice of a tour). The column furthest to the right presents the Wald (=) statistic which tests for differences in coefficient estimates between classes.

***Table 17. Results of Task 1 of DCE: 2-class LCM for Respondents Likely to Return to Tofino and Whale Watch***

| | | **Crowd Sensitive Novices** | | | **Dedicated Education Seekers** | | | |
|---|---|---|---|---|---|---|---|---|
| **Attribute** | **Attribute Level** | **Coef[a]** | **St.Er[b]** | **z-value** | **Coef[a]** | **St.Er[b]** | **z-value** | **Wald = (p-value)[c]** |
| Intercept | Tour A or B | 0.477 | 0.096 | 4.95** | 1.425 | 0.188 | 7.59** | < 0.001** |
| | Neither | -0.477 | 0.096 | -4.95** | -1.425 | 0.188 | -7.59** | |
| No. of grey whales | Linear | 0.340 | 0.043 | 8.00** | 0.268 | 0.045 | 6.02** | 0.27 |
| | Quadratic | -0.108 | 0.017 | -6.34** | -0.053 | 0.016 | -3.35** | 0.025* |
| No. humpback whales | Linear | 0.293 | 0.027 | 10.95** | *Model parameters represent one joint model between the two classes (no significant differences observed)* | | | |
| | Quadratic | -0.052 | 0.012 | -4.33** | | | | |
| Interaction effect[d] (gw x hw) | | -0.02 | 0.009 | -2.42** | | | | |
| Harbor Porpoise | Absent | -0.195 | 0.073 | -2.68** | | | | |
| | Present | 0.195 | 0.073 | 2.68** | | | | |
| Stellar sealion | Absent | -0.198 | 0.072 | -2.73** | | | | |
| | Present | 0.198 | 0.072 | 2.73** | | | | |
| Tufted puffin | Absent | -0.208 | 0.069 | -3.02** | | | | |
| | Present | 0.208 | 0.069 | 3.02** | | | | |
| Sea otter | Absent | -0.239 | 0.068 | -3.52** | | | | |
| | Present | 0.239 | 0.068 | 3.52** | | | | |
| Tour Cost | Linear | -0.127 | 0.024 | -5.21** | | | | |

***Table 17 (continued). Results of Task 1 of DCE: 2-class LCM for Respondents Likely to Return to Tofino and Whale Watch***

| | | Crowd Sensitive Novices | | | Dedicated Education Seekers | | | |
|---|---|---|---|---|---|---|---|---|
| **Attribute** | **Attribute Level** | **Coef[a]** | **St.Er[b]** | **z-value** | **Coef[a]** | **St.Er[b]** | **z-value** | **Wald = (p-value)[c]** |
| Crowding | Linear | -0.344 | 0.057 | -6.06 ** | -0.104 | 0.059 | -1.78 | 0.005** |
| | Quadratic | -0.097 | 0.028 | -3.45 ** | 0.064 | 0.031 | 2.08 ** | 0.00027** |
| Education | C– Low[e] | -0.985 | 0.188 | -5.25 ** | -1.518 | 0.271 | -5.61 ** | 0.0015** |
| | C – Med[f] | 0.415 | 0.208 | 2.00 ** | -0.425 | 0.216 | -1.97 ** | |
| | N – Med[g] | 0.395 | 0.199 | 1.99 ** | 0.743 | 0.189 | 3.92 ** | |
| | N-High[h] | 0.175 | 0.180 | 0.97 | 1.201 | 0.259 | 4.63 ** | |
| **Covariate** | | | | | | | | **P-value** |
| Prior ww experience | Yes | -0.341 | 0.125 | -2.73 ** | 0.341 | 0.125 | 2.73 ** | 0.0065** |
| | No | 0.341 | 0.125 | 2.73 ** | -0.341 | 0.125 | -2.73 ** | |
| $R^2$ | | 0.4380 | | | 0.4191 | | | |
| $R^2$ (0) | | 0.4825 | | | 0.5360 | | | |

*Significant at 95%; **Significant at 99%

[a]Coefficient; [b]Standard Error; [c]Wald = (p-value): a significant p-value indicates that the two classes had significantly different preferences for the corresponding attribute.

[d]Interaction between the number of grey whales and the number of humpback whales attributes.

[e]Boat captain acts as tour guide and informs passengers of the species observed; [f]Boat captain acts as tour guide and informs passengers of the species and behaviors observed; [g]Separate naturalist acts as tour guide and informs passengers of the species and behaviors observed; [h]Separate naturalist acts as tour guide and informs passenger not only of the species and behaviors observed but also about conservation issues facing the marine environment and what passengers can do to protect it.

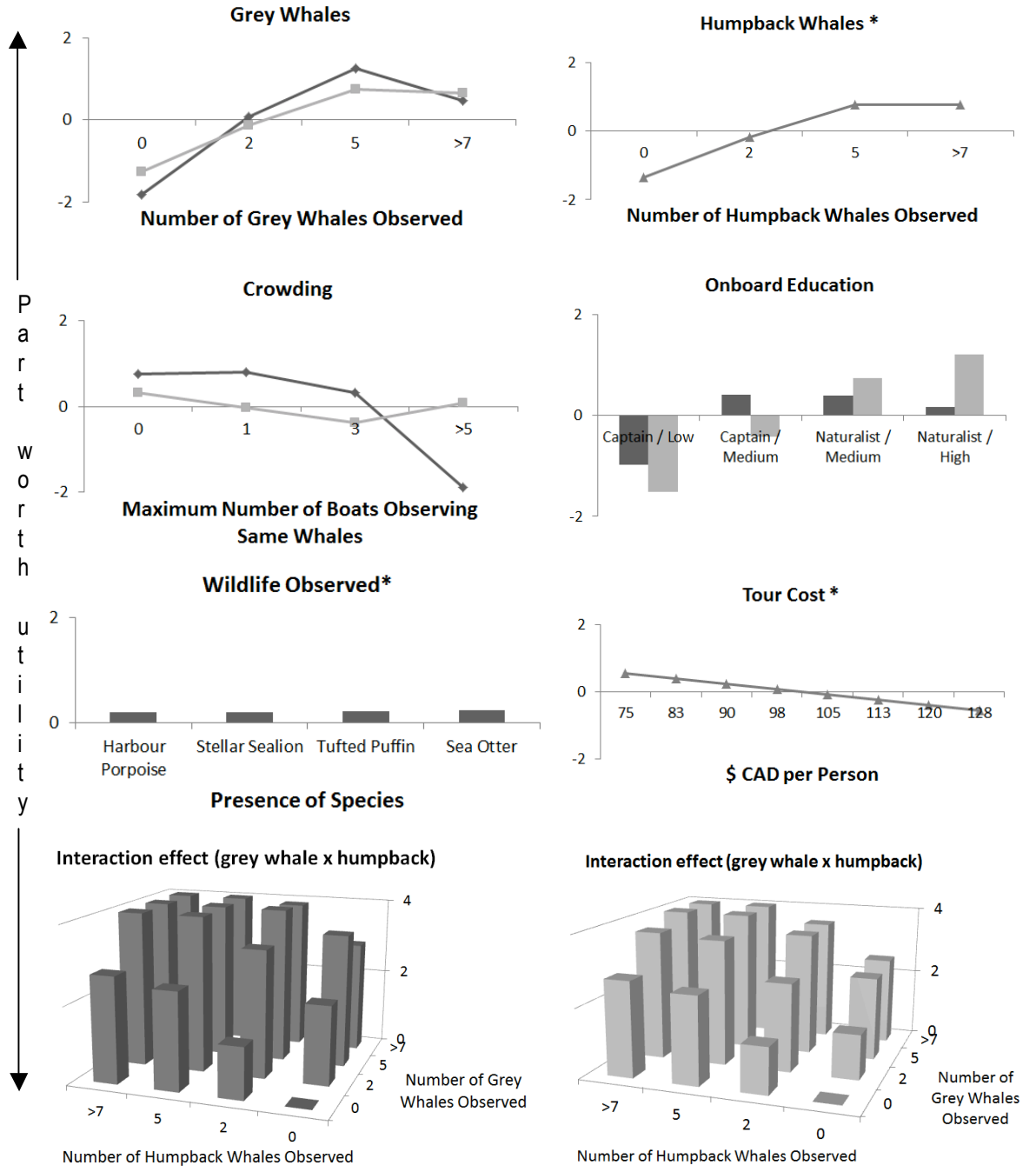



***Figure 16. Part Worth Utility for LCM of Returning Whale Watchers by attribute***

Note: Preferences of Crowd Sensitive Novices illustrated in dark grey and Dedicated Education Seekers illustrated in light grey.
*Indicates tour attributes where no significant difference in preference was observed between Crowd Sensitive Novices and Dedicated Education Seekers.

All tour attributes presented in the DCE were significant factors influencing a respondents' choice to participate in a whale watching tour. With respect to whales, whale watchers prefer to see more whales over fewer, although a negative quadratic estimate for both species indicates that the marginal utility for seeing additional whales declines with an increasing number of whales. No preference for observing one whale species over the other was observed, suggesting that respondents enjoy watching both grey and humpback whales equally. An interaction effect is reported between respondent preferences for the number of grey and humpback whales observed on a tour, indicating that preferences for one species are influenced by the presence of the other. Furthermore, the interaction effect illustrates that both *Crowd Sensitive Novices* and *Dedicated Education Seekers* prefer to see a balanced mix of grey and humpback whales during their tour, rather than a large number of one species and very few of the other. Both groups also enjoy observing wildlife on their tour, with preference estimates very similar for watching Harbor Porpoises, Stellar Sealions, Tufted Puffins, and Sea Otters.

Whale watchers prefer no other tour boats interfering with their experience. Of the two classes, *Crowd Sensitive Novices* exhibit a comparatively larger sensitivity to increases in the number of boats. Utility slightly decreases as the number of boats increases from 1 to 3 and sharply declines when more than 3 boats are present. *Dedicated Education Seekers* are not sensitive to the number of other tour boats in the surrounding waters.

The lowest level of education was considered the least desirable by whale watchers. *Dedicated Education Seekers* are very interested in learning about the species and behaviors observed, as well as the conservation issues surrounding the marine environment and what they can do to help. In contrast, *Crowd Sensitive Novices* have less interest in receiving a conservation-oriented message. *Dedicated Education Seekers* clearly prefer receiving information from a separate naturalist while *Crowd Sensitive Novices* gain very little utility when a separate naturalist provides the information instead of the boat captain.

With respect to tour cost, both *Crowd Sensitive Novices* and *Dedicated Education Seekers* prefer paying the lowest tour price of $75.00 and utility gradually declines as price increases. Finally, with respect to the intercept, which indicates whether or not respondents choose to participate in whale watching, both groups have a positive utility for going whale

watching (i.e., choosing Tour A or B); however, *Dedicated Education Seekers* respondents are significantly more likely to choose a tour compared to *Crowd Sensitive Novices*.

The LCM also included one covariate – prior whale watching experience – which was significant in distinguishing between the two classes. *Crowd Sensitive Novices* were more likely to be first time whale watchers while *Dedicated Education Seekers* were more likely to be repeat whale watchers (Figure 17).

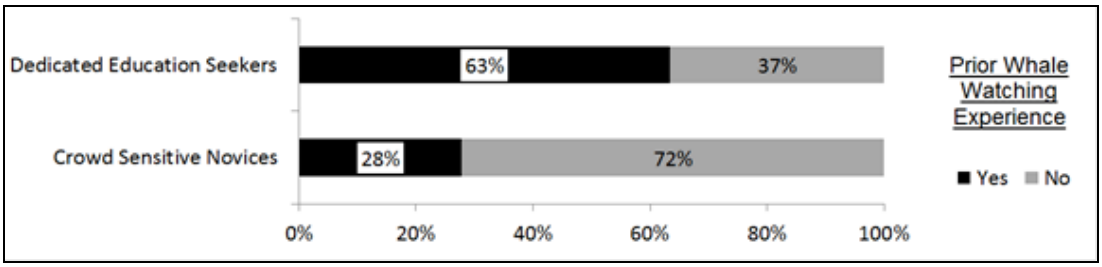



***Figure 17. Prior whale watching experience***

($\chi$2(1, N = 150) = 19.102, $p$<0.001)

In an attempt to further explain the differences in whale watcher preferences identified by the Latent Class model, a series of statistical analyses were performed using the responses to the other survey questions (e.g., tour experience, commitment to the environment, socio-demographics). Only three significant differences emerged suggesting that *Crowd Sensitive Novices* and *Dedicated Education Seekers* differed very little.

The two groups of whale watchers differed with respect to who they participated with as well as the number of grey and humpback whales observed during their 2010 whale watching tour. The 8% of individuals who participated in the whale watching experience alone fell into *Crowd Sensitive Novices* while no members of *Dedicated Education Seekers* participated alone ($\chi^2$ (1, $N$=152) = 6.432, $p$ = 0.011). A relatively small number of *Crowd Sensitive Novices* (4%) did not see any grey whales on their tour while almost one fifth (19%) of *Dedicated Education Seekers* saw no grey whales ($\chi^2$ (3, $N$=129) = 7.748, $p$ = 0.052). In contrast, a greater number of *Dedicated Education Seekers* (20%) observed at least 4 humpback whales while only 4% of *Crowd Sensitive Novices* observed more than 4 humpbacks ($\chi^2$ (3, $N$=123) = 9.153, $p$ = 0.027).

### *4.6.3. Payment for Habitat Protection*

No significant differences in preferences for payment fees or avoided decline were observed between *Crowd Sensitive Novices* and *Dedicated Education Seekers* and therefore a Multinomial Logit Model was run. The model statistics are presented in Table 18.

***.Table 18 Model statistics for Multinomial Logit Model***

| Model | LL[a] | BIC(LL)[b] | AIC(LL)[c] | AIC3(LL) | Npar[d] | $L^{2e}$ |
|---|---|---|---|---|---|---|
| 1 | -83.3 | 186.8 | 174.7 | 178.7 | 4 | 166.7 |

[a]Log likelihood at convergence
[b]Bayesian Information Criterion
[c]Akaike Information Criterion
[d]Number of parameters
[e]$L^2$ Likelihood squared

Table 19 illustrates the results of the MNL Model. The two columns on the left side of represent the tour attributes and associated levels evaluated by respondents in both the first and second task of the choice model exercise. Non-significant attributes were not included in the model; however, they are presented in the table to be complete. The remaining columns display the coefficients, the standard errors, and the z-value for each attribute, as well as the Wald statistic which tests for significance of coefficient estimates in respondents' choice.

Whale watchers were supportive of an additional conservation fee charged on top of the tour price. A respondents' decision to pay the preservation fee was not influenced by the amount requested (which ranged from 1$ to 15$) nor by the percent decline that would be avoided in the grey whale population (which ranged from 0% to 70%). The lack of sensitivity to the payment fee level is in contrast to White et al. (2001) who noted a decrease in the likelihood of paying for conservation as the amount of payment requested increased.

***Table 19. Results of Task 2 DCE - Multinomial Logit model of respondents likely to return to Tofino and whale watch***

| $R^2$ | | 0.7723 | | | |
|---|---|---|---|---|---|
| $R^2$ (0) | | 0.8217 | | | |
| **Attribute** | **Attribute Level** | **Coef[a]** | **St.Er[b]** | **z-value** | **Wald (p-value)[c]** |
| **Task 1 of the DCE** | | | | | |
| Prior Choice (ASC*) | Tour chosen | 2.417 | 0.443 | 5.45 ** | <0.001** |
| | Other tour | -0.911 | 0.307 | -3.00 ** | |
| | Neither tour | -1.497 | 0.339 | -4.41 ** | |
| **Task 2 of DCE** | | | | | |
| Preservation Fee | Linear | 0.014 | 0.049 | 0.278 | 0.78 |
| Avoided Decline | Linear | -0.769 | 1.239 | -0.621 | 0.53 |

*Alternative Specific Constant

**Significant at 99%

[a] Coefficient

[b] Standard Error

[c] Wald (p-value): a significant p-value indicates that the attribute is a significant factor in how respondents selected a tour

Instead, a respondent's decision to pay the fee was driven by their original choice of a tour selected in the first task of the DCE. Since the preservation fee was always added as an additional feature to a tour chosen in task 1, and because most respondents chose to stay with their original choice (as illustrated by the large positive utility of the part-worth utility estimate), respondents consistently agreed to pay the fee. An inspection of payment fee levels accepted by respondents shows the consistency of choosing to pay regardless of the dollar amount (Figure 18). Further discussion on the issues estimating WTP is presented in the next section.

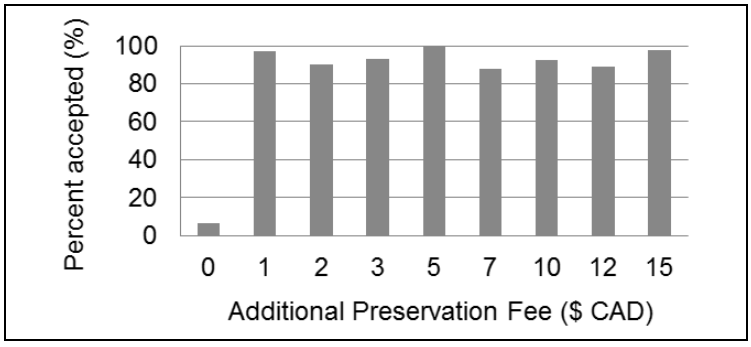



***Figure 18. Comparison of accepted preservation fees by payment level***

# 5. Discussion

The main goals of this research project were to understand the preferences of Tofino-based whale watchers for different tour characteristics and to measure willingness to pay for distant habitat protection of the Eastern North Pacific grey whale in Baja California, Mexico. This chapter begins with a general profile of Tofino-based whale watchers in terms of their socio-demographic characteristics, levels of prior knowledge, environmental interests and awareness, as well as frequencies of engagement in conservation behaviors. Next, passenger satisfaction with their 2010 whale watching experience is discussed, followed by an outline of whale watcher preferences for tour attributes and willingness to pay for habitat protection. Thereafter, a DSS is used to simulate whale watcher reactions to different tour options to evaluate possible management and operational strategies. The chapter concludes by providing some implications for tour operators in Tofino and for migratory species protection, as well as a discussion of study limitations and future research.

## 5.1. Tofino's Whale Watchers

Tofino-based whale watchers shared similar socio-demographic characteristics with the whale watchers in other destinations (Duffus, 1988; Lück, 2003; Warburton, 1999; Warburton & Parsons, 2000). Participants were generally between 25 and 55 years old and split fairly evenly between males and females, although hot springs passengers were somewhat younger and more likely female. Most respondents were well educated and had university level qualifications. Passengers also had significant disposable incomes which is not surprising given the amount of time and money required to travel and stay in Tofino. Similar to Valentine et al. (2004), only one third of all individuals who completed the intercept survey stated that their primary purpose for visiting Tofino was to whale watch. However, some caution should be taken when interpreting this result as it may be an over-estimation. Based on personal observation, the physical presence of the interviewer likely influenced how whale watchers responded to this question, as some positive answers were likely an attempt to please the researcher.

Whale watch participants in Tofino originated from North America (51%) and overseas (49%), with the majority of international tourists coming from Europe. Despite the large proportion of German tourists participating in whale watching activities in Tofino, and despite having offered the survey in German also, only a small proportion of German individuals were recruited to the web survey.

Considering the steady growth of the whale watching industry, with more than 12 million people participating in whale watching activities globally in 2006 (Hoyt, 2009), it is not surprising that the proportion of repeat whale watchers noted in this study is much higher than for similar studies completed in the 1990s (Forestell, 1993; Neil et al., 1996). Slightly less than half of all respondents surveyed had enjoyed whale watching before, with most having participated in one or two prior tours. Only a small proportion of respondents had previously whale watched along the west coast of North America within the migratory path of the grey whale and very few respondents had specifically whale watched in the Baja California breeding lagoons, indicating that most participants were unfamiliar with the actual breeding habitat of grey whales. When respondents were asked whether they would return to Tofino and whale watch again, most responded positively. However, an obvious discrepancy between the intended and actual behavior is apparent, since only 8% of all whale watchers surveyed had previously whale watched in Tofino and were therefore repeating the experience.

Most respondents arrived in Tofino with some general knowledge about the type of the whale species inhabiting the area and of the possibilities of observing both grey and humpback whales on their tours. These results confirm those of Malcolm & Duffus (2008) who reported that Tofino-based whale watchers have some knowledge of whales prior to participating in their tour. Similar to Ballantyne et al. (2009) who surveyed whale watchers in Australia, Tofino-based whale watchers were generally interested and aware of environmental issues, but relatively few stated that they actively search for information on how they can help protect the environment. Reported frequency of engagement in conservation behaviors decreased as the level of required commitment increased, although 40% of respondents did report donating money to conservation-based organisations (considered a high level commitment behavior) (Ballantyne et al. 2009).

## 5.2. Passenger Satisfaction

The majority of whale watchers were highly satisfied with their overall tour experience. Such a high degree of reported satisfaction has also been documented by Orams (2000) for humpback whale watchers off the coast of Australia and by Duffus (1988) for orca whale watchers off the coast of British Columbia. Whale watchers who were most satisfied with the overall experience, as well as with the majority of tour items, were the ones who were likely to repeat their whale watching experience in Tofino. The strong positive relationship confirms the findings of Stamation et al. (2007) who suggest that satisfied whale watchers are more likely to return to an area and recommend the experience to others.

Breaking the overall tour experience into individual items reveals that passengers were least satisfied with wildlife aspect of the tour and passengers hoped to see more whales, whale behaviors, and wildlife during their tour than they actually did. Of the 12 items, satisfaction with whale behaviors was given the lowest rating. Andersen & Miller (2006) also noted the influence of “seeing a whale” and “what whales did” for trip satisfaction. Nevertheless, whale watcher satisfaction did increase as the number of whales, whale behaviors, and wildlife observed increased. Whale watchers were also affected by the number of other tour boats in the surrounding waters and passenger satisfaction decreased as more boats crowded around to observe the same whales. Boat-based passenger sensitivity to crowding has also been noted by Mayes & Richins (2009) for dolphin watching participants in Australia.

Despite participating on boats with different viewing platforms and overall structures, whale watchers were generally satisfied with their ability to observe wildlife during the tour. Respondents were also satisfied with the distance at which they observed whales, although the large standard deviation suggests that some participants had different expectations. Since the actual distance to the whales was not recorded, it is difficult to know whether some passengers were relatively less satisfied because they were too close to the whales, or, because they were too far. It cannot be assumed that all whale watchers prefer to view whales close up since research by Finkler and Higham (2004) suggest that passengers are increasingly concerned about the impacts of the boats and noise on the whales and recognize the importance of observing whales from a distance.

Whale watchers were highly satisfied with the education provided during the tour and satisfaction was similar for all age groups and levels of education. In addition, reported satisfaction did not vary with prior knowledge or degree of environmental orientation. The results suggest that the amount and quality of education provided by operators was well suited to all levels of prior knowledge, age, affluence, and levels of environmental orientation.

## 5.3. Discrete Choice Experiment Findings

The preferences for whale watching tour attributes were estimated in the DCE only for the respondents with intent to return to Tofino and whale watch again. The Latent Class analysis of the DCE suggests these visitors consisted of two fairly equal sized classes labelled *Crowd Sensitive Novices* and *Dedicated Education Seekers*.

Observing whales was an important feature for both classes and preferences were stronger for observing more whales over fewer. However, the marginal utility of seeing additional whales diminished with an increasing number of whales, and no further utility was gained once participants had observed around 10 whales. The importance of seeing a large number of whales is not surprising given the impact of whales and wildlife on passenger satisfaction as noted by the current study as well as by previous studies (Davis et al., 1997; Moscardo & Saltzer, 2005; Orams, 2000). Contrary to what was expected by tour operators and researchers, watching humpback whales (a behaviorally more “showy” species) was not preferred over grey whales. Instead, preferences for the number of grey whales observed depended on the number of humpback whales observed and vice versa, indicating that passengers considered the two species together when evaluating a tour. Furthermore, passengers had the strongest preferences for observing an equal number of grey and humpback whales. Whale watchers equally preferred to see additional wildlife in the form of Harbor Porpoises, Stellar Sealions, Tufted Puffins, and Sea Otters.

Whale watchers enjoy watching whales in a tranquil environment with few or no other tour boats in the surrounding waters. Of the two classes, *Crowd Sensitive Novices* were more sensitive to having other tour boats around, especially when the limit of three boats was exceeded. This research supports the findings of Mayes & Richins (2009) who also recorded sensitivity among dolphin watching passengers to the number of other boats in the area. This

research contributes to the limited knowledge on whale watch passenger perceptions of crowding and provides evidence that, in addition to swim-with-whale participants, boat-based passengers are also influenced by the presence of other boats.

Similar to Birtles et al. (2002) and Lück (2003), the current research demonstrates that whale watchers are eager to learn about the general biology and behaviors of the whale species observed, although some participants – namely *Dedicated Education Seekers* – prefer the inclusion of an additional conservation-focused message. *Dedicated Education Seekers* also preferred to have a separate naturalist onboard (in addition to the boat captain), a finding similar to Lück (2003) who researched swim-with-dolphin tourists. In contrast, *Crowd Sensitive Novices* were not interested in the additional information on conservation and what they can do to help and this group did not gain additional benefit when the onboard education was provided by a naturalist compared to the boat captain. As expected, preferences for paying between $75.00 and $128.00 for a tour gradually declined as the price increased.

## 5.4. Simulating Behavior: A Decision Support System

The part-worth utility estimates of the two class LC model (Table 17) served as the basis of a DSS (for description see Section 3.6) to estimate the overall market shares for different possible whale watching tours to be chosen by the two respective classes. The following section presents different DSS configurations and discusses the influence of different attribute combinations on the choices of whale watchers.

Figure 19 presents a typical average whale watching tour that respondents may have experienced in Tofino during the summer of 2010. For this starting configuration, attributes in Tour A and Tour B were set to the same levels, enabling us to predict the proportion of respondents who would choose to participate in such a tour as opposed to the proportion who would not go whale watching at all (Neither).

Since this model is based on the 'self-declared' repeat visitors, it is not surprising that a very large proportion of both *Crowd Sensitive Novices* and *Dedicated Education Seekers* would choose to participate in approximately the same kind of tour they experienced in 2010 and deemed as very satisfactory. Such a high level of participation illustrates the success of Tofino as a whale watching destination and in meeting the preferences of most whale watchers.

Nevertheless, the average tour was considered undesirable by approximately one tenth of respondents who chose the “Neither” tour option (10% and 12% respectively for the two classes).

| Tour Characteristics | *2010 Tour Experience* **Tour A** | *2010 Tour Experience* **Tour B** | **Neither** |
|---|---|---|---|
| Number of grey whales | 2 | 2 | |
| Number of humpback whales | 2 | 2 | |
| Harbor Porpoise | Absent | Absent | |
| Stellar Sealion | Present | Present | |
| Tufted Puffin | Absent | Absent | |
| Sea Otter | Absent | Absent | I would not go on either of these tours |
| Bald Eagle | Present | Present | |
| Harbor Seals | Present | Present | |
| Max. number of other tour boats | 2 boats | 2 boats | |
| Structure and content of onboard education | Captain + Medium | Captain + Medium | |
| Cost per person $ CAD (includes fuel surcharge and tax) | 98 | 98 | |

| ***Market Shares:*** | **Tour A** | **Tour B** | **Neither** |
|---|---|---|---|
| Crowd Sensitive Novices | **44%** | **44%** | **12%** |
| Dedicated Education Seekers | **45%** | **45%** | **10%** |

***Figure 19. Demand for the average whale watching tour experienced by respondents in 2010 by whale watcher class***

Pursuing the question of how whale watching tours could be further improved, a second DSS configuration was created in which Tours A and B maximized the utility (i.e., benefit obtained from the tour) for *Crowd Sensitive Novices* and *Dedicated Education Seekers* respectively (Figure 20).

| Tour Characteristics | *Crowd Sensitive Novices* Tour A | *Dedicated Education Seekers* Tour B | Neither |
|---|---|---|---|
| Number of grey whales | 5 | 6 | |
| Number of humpback whales | 6 | 7 | |
| Harbor Porpoise | Present | Present | |
| Stellar Sealion | Present | Present | |
| Tufted Puffin | Present | Present | |
| Sea Otter | Present | Present | I would not go on either of these tours |
| Bald Eagle | Present | Present | |
| Harbor Seals | Present | Present | |
| Max. number of other tour boats | 1 boat | 0 boats | |
| Structure and content of onboard education | Captain + Medium | Naturalist + High | |
| Cost per person $ CAD (includes fuel surcharge and tax) | 75 | 75 | |

| ***Market Shares:*** | Tour A | Tour B | Neither |
|---|---|---|---|
| Crowd Sensitive Novices | 62% | 38% | 0% |
| Dedicated Education Seekers | 11% | 89% | 0% |

***Figure 20. Maximizing the experience of each of the two classes (for Crowd Sensitive Novices in Tour A and Dedicated Education Seekers in Tour B)***

By making two different products available, where each one is designed to appeal to one of the classes as much as possible, non-participation was reduced from 12% and 10% to 0%. Compared to the average tour, improving the experience requires an increase in the number of whales and diversity of other wildlife observed, a decrease in crowding, and a reduction in the tour price. In addition, providing a conservation message by a separate naturalist meets the educational preferences of *Dedicated Education Seekers*. Despite the general similarity between these two profiles, the market shares between the two respective classes differ remarkably, and under these conditions of maximum benefit, tour operators would ensure that virtually all visitors with an interest in returning to Tofino and whale watching again would participate in another tour.

While understanding how to maximize the overall experience of whale watchers is important, one must recognize that operators do not have control over all features of a whale watching tour – especially the number of whales and wildlife observed. Thus, a series of DSS configurations were created to assess the reaction of clients for sub-optimal conditions and identify how whale watchers trade off certain attributes.

The first scenario assessed whether respondents trade off observing fewer whales against a more tranquil experience. Tour A represented the average 2010 whale watching experience again, while Tour B represented a tour where only two whales were observed but the experience took place in a quiet environment where no other tour boats were around. All other attributes in Tour B were set to the same levels as the average tour (Figure 21).

| **Tour Characteristics** | *2010 Tour Experience* **Tour A** | *Fewer Whales, No Crowding* **Tour B** | **Neither** |
|---|---|---|---|
| Number of grey whales | 2 | 1 | |
| Number of humpback whales | 2 | 1 | |
| Harbor Porpoise | Absent | Absent | |
| Stellar Sealion | Present | Present | |
| Tufted Puffin | Absent | Absent | |
| Sea Otter | Absent | Absent | I would not go on either of these tours |
| Bald Eagle | Present | Present | |
| Harbor Seals | Present | Present | |
| Max. number of other tour boats | 2 boats | 0 boats | |
| Structure and content of onboard education | Captain + Medium | Captain + Medium | |
| Cost per person $ CAD (includes fuel surcharge and tax) | 98 | 98 | |

| ***Market Shares:*** | **Tour A** | **Tour B** | **Neither** |
|---|---|---|---|
| Crowd Sensitive Novices | **68%** | **16%** | **16%** |
| Dedicated Education Seekers | **54%** | **34%** | **12%** |

***Figure 21. DSS Configuration A: Observing fewer whales and no other tour boats in one scenario***

Despite offering a more tranquil experience, Tour B managed to attract only a small proportion (16%) of *Crowd Sensitive Novices,* but a comparatively larger share of *Dedicated Education Seekers*. Clearly, *Crowd Sensitive Novices* prefer fewer boats, but this class is less sensitive to crowding when the number of boats is kept below three. Furthermore, the marginal utility gained from having fewer boats (from two to none) in the surrounding waters does not exceed the marginal utility lost from observing fewer whales (from four to two). *Dedicated Education Seekers* exhibit similar behavior, although Tour B still attracted one third of this group (34%), illustrating that this class is relatively less sensitive to a decrease in the number of whales from four to two and one third of participants will make the trade-off. Noteworthy is also the slight increase in the proportion of whale watcher choosing the Neither option compared to Figure 21.

To further assess the demand for a tour where few whales but no boats are present, Figure 22 presents the next scenario with both tours having fewer whales and fewer boats (and hence the current alterative is no longer available). As to be expected, more respondents now choose the neither option – about one third of *Crowd Sensitive* Novices and 16% of *Dedicated Education* Seekers. However, since it is possible that such a scenario could occur in Tofino – perhaps during off-season when fewer tour boats are out whale watching and fewer whales are present – it should be somewhat reassuring that the majority of clients would still book a whale watching tour.

| **Tour Characteristics** | *Few Whales, No Crowding* **Tour A** | *Few Whales, No Crowding* **Tour B** | **Neither** |
|---|---|---|---|
| Number of grey whales | 1 | 1 | |
| Number of humpback whales | 1 | 1 | |
| Harbor Porpoise | Absent | Absent | |
| Stellar Sealion | Present | Present | |
| Tufted Puffin | Absent | Absent | |
| Sea Otter | Absent | Absent | I would not go on either of these tours |
| Bald Eagle | Present | Present | |
| Harbor Seals | Present | Present | |
| Max. number of other tour boats | 0 boats | 0 boats | |
| Structure and content of onboard education | Captain + Medium | Captain + Medium | |
| Cost per person $ CAD (includes fuel surcharge and tax) | 98 | 98 | |

| ***Market Shares:*** | **Tour A** | **Tour B** | **Neither** |
|---|---|---|---|
| Crowd Sensitive Novices | **33%** | **33%** | **34%** |
| Dedicated Education Seekers | **42%** | **42%** | **16%** |

***Figure 22. Demand for tours where few whales and no other tour boats in both scenarios***

The next DSS configuration assessed whether whale watchers trade off observing fewer whales for a more elaborate conservation-based message from an onboard naturalist (Figure 23). As illustrated by the market shares, slightly more than half of *Dedicated Education Seekers* would trade off observing fewer whales for the opportunity to interact with an onboard naturalist and receive additional information on conservation. In contrast, the majority of *Crowd Sensitive Novices* are attracted towards Tour A and will not make the trade-off, further highlighting their focus on actually observing whales and their relatively minor interest in having a separate naturalist onboard and receiving additional information.

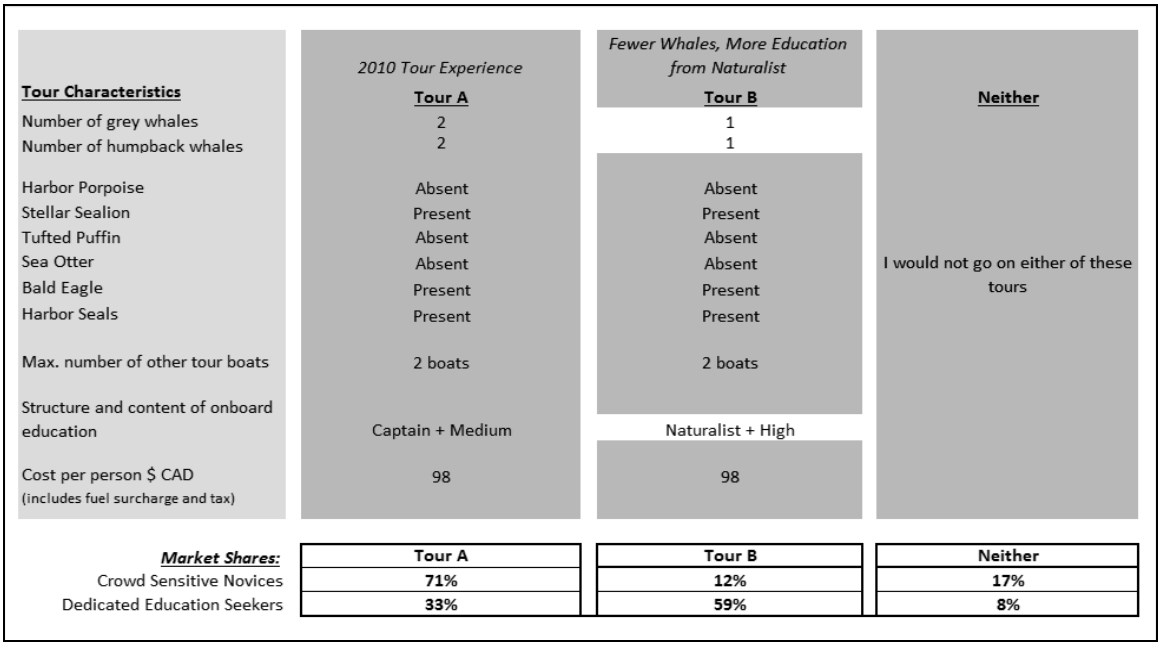



***Figure 23. DSS Configuration B: Observing fewer whales and receiving a conservation-based message in one scenario***

When Tour A and Tour B are set to this trade-off situation (i.e., only two tour options are available: go on a tour where fewer whales are observed but more education from an onboard naturalist is received, or, don't go whale watching at all), fewer respondents drop out of whale watching compared to Configuration A. Overall participation of *Dedicated Education Seekers* approaches 100%, which is not surprising since the available tour meets their educational preferences and this group has a strong preference for simply going whale watching. A higher proportion of *Crowd Sensitive Novices* (58%) would also rather participate in such a tour than not go whale watching at all (42%). The results indicate that, if such a tour was the only one available to whale watchers in Tofino, the majority of participants would still choose to go whale watching

The third DSS configuration assessed whether whale watchers trade-off a more expensive tour for the opportunity to interact with an onboard naturalist and receive an additional conservation-focused message (Figure 24). The DSS configuration further highlights the importance *Dedicated Education Seekers* place on the educational component of the tour. Even at a higher tour price, almost 75% of this class would trade off paying more for the opportunity to interact with a separate naturalist and receive information on what they can do to help protect the marine environment. In contrast, the majority of *Crowd Sensitive Novices* were

not willing to make this trade-off, further highlighting the relatively low importance of receiving more education from an onboard naturalist and the dislike for paying more when the option for a less expensive tour is present.

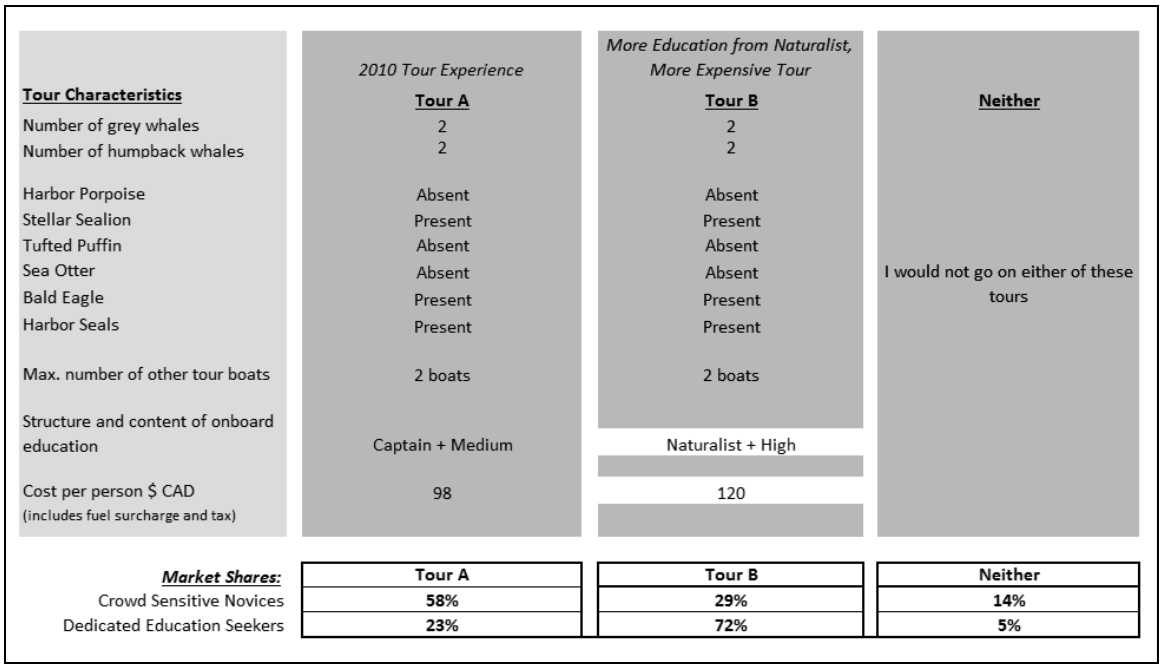
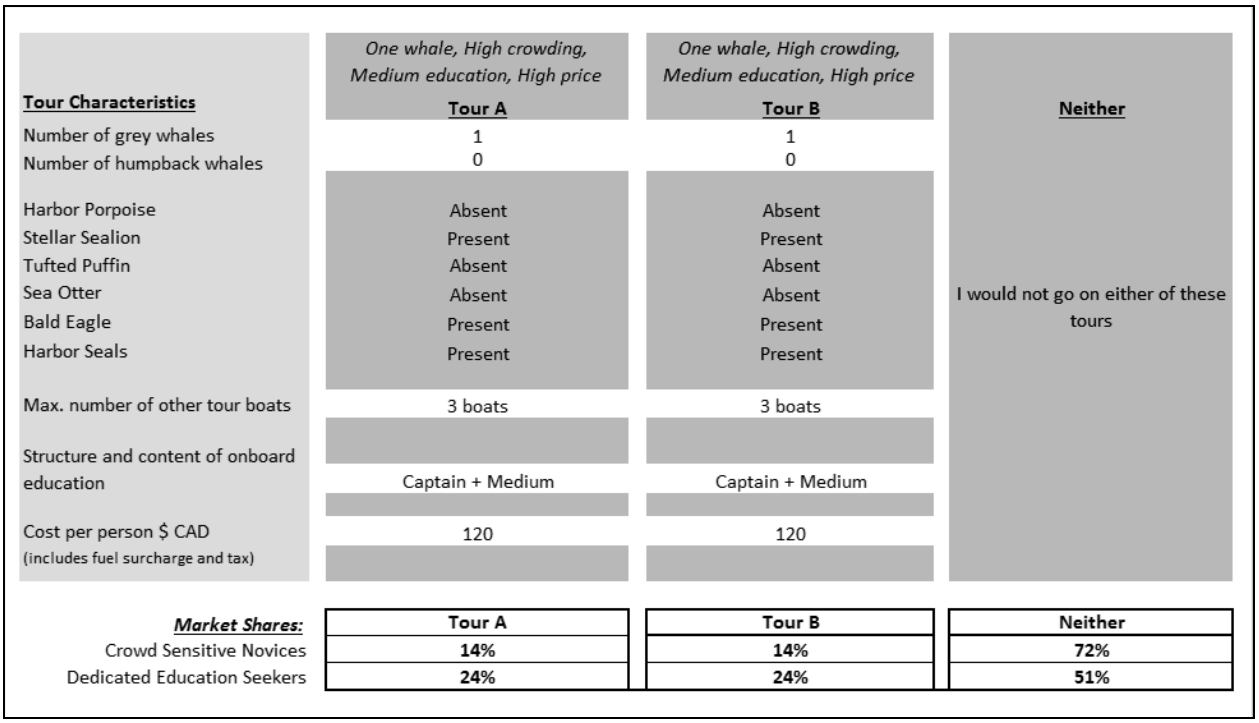



***Figure 24. DSS Configuration C: More education and higher tour cost in one scenario***

When both tour options are set to this trade-off situation (i.e., only two tour options are available now: go on a tour that is more expensive but more education from an onboard naturalist is provided, or, don't go whale watching at all), most *Dedicated Education Seekers* (96%) and *Crowd Sensitive Novices* (80%) would rather participate in such a tour than not go whale watching. Even though Tour B is more expensive, it provides both groups with the benefits from simply going whale watching, provides for the observation of four whales, and meets the educational preferences of *Dedicated Education Seekers*. The reader should keep in mind that this scenario and market shares are only applicable if such a tour were the only option available in Tofino.

While the majority of whale watchers would participate in the tours described by all three DSS scenarios thus far, Figure 25 illustrates a tour where multiple attributes diverge away from whale watcher preferences. As expected, the majority of both *Crowd Sensitive Novices* and *Dedicated Education Seekers* would rather not participate in whale watching at all than

participate in a tour where only one whale is observed, crowding and price are high, and no additional information from a separate naturalist is provided.



| Tour Characteristics | *One whale, High crowding, Medium education, High price* **Tour A** | *One whale, High crowding, Medium education, High price* **Tour B** | **Neither** |
|---|---|---|---|
| Number of grey whales | 1 | 1 | |
| Number of humpback whales | 0 | 0 | |
| Harbor Porpoise | Absent | Absent | |
| Stellar Sealion | Present | Present | |
| Tufted Puffin | Absent | Absent | |
| Sea Otter | Absent | Absent | I would not go on either of these tours |
| Bald Eagle | Present | Present | |
| Harbor Seals | Present | Present | |
| Max. number of other tour boats | 3 boats | 3 boats | |
| Structure and content of onboard education | Captain + Medium | Captain + Medium | |
| Cost per person $ CAD (includes fuel surcharge and tax) | 120 | 120 | |

| ***Market Shares:*** | **Tour A** | **Tour B** | **Neither** |
|---|---|---|---|
| Crowd Sensitive Novices | **14%** | **14%** | **72%** |
| Dedicated Education Seekers | **24%** | **24%** | **51%** |

***Figure 25. DSS Scenario D: One whale, high crowding, medium education, and high price in one scenario***

## 5.5. Paying for Habitat Protection

Whale watchers not only like seeing whales and learning about them, but they also support paying an additional preservation fee (charged on top of the tour price) for protecting habitat of the grey whale in Baja California, Mexico. The positive WTP of whale watchers for distant habitat protection supports the idea proposed by Sultanian & van Beukering (2008), who indicated that individuals in one region can be a potential source of funding to protect habitat of a migratory species in a neighboring country. Even though whale watchers preferred tours that were less expensive, they were willing to raise their total tour costs by $1 to $15 to help protect grey whale habitat. Since respondents were equally willing to pay any additional fee up to, and including $15, one must conclude that the $15 is a very conservative estimate. However, one needs to be cautious with this interpretation, because the stated WTP to protect the remotely located breeding habitats may be – at least to a certain extent – an artifact of the context and

structure of the WTP question. Presenting the fee as an additional feature of a tour previously chosen may have caused some reluctance among respondents to deviate away from their original choice and give the tour up.

Additionally, since WTP for habitat protection was asked of respondents who had already participated in a whale watching tour where grey whales were likely observed, the 'yea-saying' effect – a type of bias associated with stated preference methods – may have been further exaggerated, causing respondents to agree to pay any dollar amount presented to them.[13] Furthermore, whale watchers may have exhibited strategic behavior and purposefully overstated their WTP to gain some advantage or benefit. Since most stated they would return to Tofino and whale watching again, respondents' have an interest that there be more whales in the future, which may have affected their stated WTP.

Furthermore, estimating whale watcher WTP presented an additional challenge since the grey whale breeding habitat is considered an "impure good" as its effective protection would generate both public and private benefits (Kotchen, 2005). Whale watchers would privately benefit by avoiding a potential decline in the whale population while the general public would benefit from an improvement in the overall health of the environment. Under such a scenario, one cannot separately measure the demand for observing grey whales versus the demand for improving the quality of the environment. However, careful consideration of the wording used to describe the WTP scenario may have helped avoid this issue.

Despite the difficulties in estimating WTP, the results of the current study demonstrate that a significant opportunity for whale conservation lies within the whale watching tourism industry. Based on the number of individuals that participated in whale watching activities in British Columbia in 2009, a rough calculation[14] suggests that approximately 50,000 individuals participated in whale watching activities in Tofino in 2009 (O'Connor et al., 2009). This

[13] "The tendency to subordinate outcome-based or "true" economic preferences in favor of expressive motivations" (Blamey, Bennett, & Morrison, 1999, pg. 126). Expressive motivations may be socially motivated (e.g., social pressure) or internally motivated (e.g., express attitudes or held values).

[14] A total of 430,600 individuals participated in whale watching activities in British Columbia in 2009. Eighty percent of individuals took tours departing from Victoria, meaning that 86,120 individuals participated in tours originating outside of Victoria, from either Johnstone Strait, Tofino, or Uculet. Out of these three areas, most tours depart from Tofino, and therefore it is assumed that approximately 50,000 individuals departed from Tofino.

translates into as much as 1.5 million dollars per year of revenue that could potentially be captured from Tofino-based whale watchers. The above estimates demonstrate the large economic potential that lies within the whale watching industry, which is especially important from a global perspective given the relatively large number of whales targeted by the industry that are in need of protection (Orams, 2000).

## 5.6. Implications for Tour Operators in Tofino

While operators in Tofino likely have a good understanding of their clients, this study confirms that whale watchers were composed of both first time and repeat whale watchers from Europe and North America. Most passengers were highly educated, had significant household incomes, were knowledgeable about the occurrence of whale species common to Tofino, and held intermediate levels of environmental orientation. As such, operators should continue to advertise high quality tour experiences that generate interest among novice and experienced whale watchers alike. To accommodate more environmentally-oriented passengers, offering a take-home brochure that provides additional information on the whales observed and the marine environment may further enhance the overall learning experience. The positive benefits of offering this type of brochure is based on the findings of Stamation et al. (2007), who reported that brochures provided to whale watchers in New South Whales, Australia, helped raise awareness of whale conservation and enhanced participants' knowledge of the many threats facing the marine ecosystem.

Overall satisfaction ratings were high confirming that operators are meeting the general expectations and desires of whale watchers regardless of age, gender, prior level of experience, and level of environmental orientation. The number of whales, whale behavior, and wildlife species observed received the lowest ranked satisfaction ratings, suggesting room for improvement on such items. Preference estimates generated by the DCE provide further evidence of the importance of seeing a diversity of species during the tour. Passengers enjoy watching a large and equal number of grey and humpback whales, as well as other notable wildlife. However, operators should keep in mind that once a certain threshold is reached, passengers gain little from observing more whales. In addition, the various DSS configurations repeatedly illustrate the value of seeing whales, noting that most whale watchers were not willing to trade off observing fewer whales (less than 2 of each species) for having a more

tranquil experience. However, slightly more than half of *Dedicated Education Seekers* were willing to trade observing fewer whales for the chance to learn about conservation from an onboard naturalist.

While tour operators have little control over the whales and wildlife observed during a tour, they do decide on the price of a tour and the information provided. The DSS illustrates the importance *Dedicated Education Seekers* associate with having the opportunity to interact with a separate naturalist and receiving a conservation-focused message. In fact, more than half of this group was willing to trade observing fewer whales for more education. To accommodate for such educational preferences, tour operators could integrate a conservation-type message into their educational program. While *Crowd Sensitive Novices* gain little from receiving this information, providing it would not limit the experience or reduce the enjoyment of members of this class.

While whale watchers naturally prefer a cheaper tour over a more expensive one, the DSS configurations show that some will participate in a more expensive tour provided the other tour attributes more closely align with their stronger (versus weaker) preferences. However, operators should be cautious when interpreting this result and recognize that meeting the stronger preferences of passengers for the number of whales and wildlife observed may not be feasible as operators have little control over such attributes. Furthermore, the DCE indicates that the crowding levels experienced in 2010 are approaching the edge of *Crowd Sensitive Novices* perceive as acceptable. As a result, tour operators in Tofino could make a collective agreement to set certain standards about the number of boats to be pursuing the same whales at the same time, or if possible, operators could seek new areas to observe whales, thereby spreading themselves throughout Clayoquot Sound.

## 5.7. Study Limitations and Future Research

The potentially major limitation of this study rests with the sampling techniques, which may not have captured a very representative sample of all whale watchers visiting Tofino as clients from less than half of all whale watch operations were surveyed. In addition, survey recruits were invited to participate in the web survey approximately five months after the intercept occurred. This significant time gap may have introduced a recall bias and may have

biased the survey towards individuals with a stronger interest in whale watching and who were eager to share and reflect on their experience. Evidence of some self-selection bias is present in the proportions of the *a priori* segments. The relatively small sample sizes of the two segments no longer interested in whale watching likely reflects a self-selection bias as these types of survey recruits were less likely to complete the web survey. However, whether the recall period created a bias among the intended repeat visitors will remain unknown.

Caution should also be exercised when expanding the results of this study to whale watching in other destinations. Specifically, the description of whale watchers, their degree of environmental orientation, and their satisfaction with the tour experience is specific to Tofino and is not necessarily reflective of whale watchers' and their tour experiences in other regions. In British Columbia alone, the three local whale watching industries focus on different whale species, have varying levels of tourism infrastructure, and therefore attract different types of whale watchers with varying levels of experience and expectations (Malcolm & Duffus, 2008). However, the majority of the findings are very much in line with other published studies on whale watching, leading to the conclusion that overall, neither the whale watchers in Tofino nor the products offered differ significantly from whale watchers in other areas.

It is also important to remember that the DCE and associated DSS configurations assume that respondents have perfect knowledge of what will be observed on a tour prior to choosing to participate. This assumption does not accurately reflect the real-life situation that individuals face when deciding to participate in whale watching. Incorporating an additional attribute indicating the probability of observing a given whale or wildlife species would allow for the simulation of behavior under different levels of uncertainty, thereby more closely mimicking the real-life scenario. However, many other studies using the DCE in related areas of outdoor recreation and tourism, as well as in other applications, confirm that despite such a limitation, the resulting preference estimates are excellent.

While the current study examined preferences for the number of whales observed, it did not assess preferences for the type of whale behavior observed. Since both features have been shown to affect passenger satisfaction, identifying preferences for the number of whales and whale behavior would allow one to assess if passengers trade off observing fewer whales that are 'showy' for more whales that display fewer behaviors.

The reader should also remember that the WTP question was asked to individuals who had already gone whale watching and likely had a personal experience observing the grey whale on their tour. Therefore, it cannot be assumed that clients would be as open and supportive of paying a fee before having participated in the tour and having learnt about the grey whale. The reader should also keep in mind the institutional and organisational realities of implementing a collection fee system for habitat protection. Creating an effective and transparent system requires the necessary coordinating infrastructure, budget, and people to make it happen.

# 6. Conclusions

The present study assessed the desires of whale watch participants for various features of a whale watching tour and examined the possibility of collecting an additional fee (as part of the tour) for grey whale habitat preservation in Mexico. The results of the study demonstrate that tours currently being offered in Tofino align well with overall whale watcher expectations, levels of environmental orientations, and general preferences for tour attributes. Based on the responses to the Discrete Choice Experiment, the study identified two types of whale watchers – *Crowd Sensitive Novices* and *Dedicated Education Seekers* – who differed in terms of their preferences for four tour characteristics, their levels of prior whale watching experience, and their reported satisfaction for a handful of evaluated tour items. Other than the aforementioned differences, both groups shared similar socio-demographic characteristics, trip experiences, levels of environmental orientations, and willingness to pay estimates for habitat protection.

*Crowd Sensitive Novices* and *Dedicated Education Seekers* both preferred to observe a high number of whales and equally enjoyed observing grey whales and humpback whales. Similarly, both groups also enjoyed watching other notable wildlife such as Stellar Sealions and Harbor Porpoises on their tour, although observing whales was relatively more important. Both groups were sensitive to crowding and preferred a tranquil experience where few boats were around watching the same whales as them. The number of boats preferred is less than the average observed on a tour in Tofino in 2010, indicating that operators are approaching the limit of what clients perceive as acceptable. In terms of educational needs, both groups enjoyed learning about the general biology and behaviors of the whales species observed, although *Dedicated Education Seekers* preferred additional information about the wider environmental and conservation issues surrounding the whale species and what they can do to help. As expected, *Dedicated Education Seekers* and *Crowd Sensitive Novices* preferred to pay the least amount for a whale watching tour but will tolerate higher prices if other tour attributes most closely resembled their strongest preferences.

Despite preferring to pay less for a whale watching tour, passengers were open to the idea of financially supporting habitat protection in Baja California, Mexico, in order to ensure the long-term preservation of the grey whale population. The positive willingness to pay is important, not only for the long-term survival of the grey whale, but also for other migratory species that may require protection in a distant region. Despite several international agreements to collaboratively protect species across borders (e.g., *Convention on Migratory Species*), conservation efforts for marine mammals – including whales – have achieved mixed results, with some populations having recovered while others have perished (Reynolds, Marsh, & Ragen, 2009). Ensuring the effective conservation of whale populations requires, among other factors, a precautionary approach to protect habitat and the commitment of long-term funding and resources (Reynolds et al., 2009). The results of the current study demonstrate that whale watchers could be a potential source of funding to protect the species they observe and the habitat critical to its survival.

While the tour options currently offered by Tofino-based operators meets the needs of most whale watchers, tailoring tours to specifically meet the preferences identified by the current study may lead to increased satisfaction and participation. Since the profitability of the industry depends on the satisfaction of its customers, keeping visitors satisfied means they are more likely to return and recommend the experience to others. Ensuring a steady flow of participants is also a means of achieving conservation objectives by educating participants and securing a consistent source of funding for the protection of whales and whale habitat.

# References


Adamowicz, W., Boxall, P., Williams, M., & Louviere, J. (1998). Stated preference approaches for measuring passive use values: Choice experiments and contingent valuation. *American Journal of Agricultural Economics,* 64-75.

Andersen, M. S., & Miller, M. L. (2006). Onboard marine environmental education: Whale watching in the San Juan Islands, Washington. *Tourism in Marine Environments, 2*(2), 111-118.

Ballantyne, R., Packer, J., & Hughes, K. (2009). Tourists' support for conservation messages and sustainable management practices in wildlife tourism experiences. *Tourism Management, 30*(5), 658-664.

Ballantyne, R., Packer, J., & Falk, J. (2011). Visitors' learning for environmental sustainability: Testing short- and long-term impacts of wildlife tourism experiences using structural equation modelling. *Tourism Management, 32*(6), 1243-1252. doi: 10.1016/j.tourman.2010.11.003

Baral, N., Stern, M.J., & Bhattarai, R. (2008). Contingent valuation of ecotourism in Annapurna conservation area, Nepal: Implications for sustainable park finance and local development. *Ecological Economics, 66*, 218-227.

Barbier, E. B. (1994). Valuing environmental functions: Tropical wetlands. *Land Economics, 70*, 155-173.

Bateman, I. J., Langford, I. H., Munro, A., Starmer, C., & Sugden, R. (2000). Estimating four Hicksian welfare measures for a public good: A contingent valuation investigation. *Land Economics, 76*(3), 355-373.

Bell, C. M. (2010). Encounter norms of snorkelers and scuba divers at Molokini, Hawai'i: Methodological and managerial applications.

Birtles, A., Valentine, P., Curnock, M., Arnold, P., & Dunstan, A. (2002). *Incorporating visitor experiences into ecologically sustainable dwarf minke whale tourism in the northern Great Barrier Reef.* (Technical Report No. 42).CRC Reef Research Centre Townsville.

Blamey, R. K., Bennett, J. W., & Morrison, M. D. (1999). Yea-saying in contingent valuation surveys. *Land Economics, 75*(1), pp. 126-141.

Boxall, P. C., & Adamowicz, W. L. (2002). Understanding heterogeneous preferences in random utility models: A latent class approach. *Environmental and Resource Economics, 23*(4), 421-446.

Catlin, J., & Jones, R. (2010). Whale shark tourism at Ningaloo Marine Park: A longitudinal study of wildlife tourism. *Tourism Management, 31*(3), 386-394.

Chan, K. M. A., Goldstein, J., Satterfield, T., Hannah, N., Kikiloi, K., Naidoo, R., Woodside, U. (2011). Cultural services and non-use values. In P. Kareiva, H. Tallis, T. H. Ricketts, G. C.

Choice Metrics. (2012). *Ngene 1.1.1*

COSEWIC. (2004). COSEWIC assessment and update status report on the grey whale (eastern north pacific population) eschrichtius robustus in canada. Ottawa: Committee on the Status of Endangered Wildlife in Canada.

Davis, D., Banks, S., Birtles, A., Valentine, P., & Cuthill, M. (1997). Whale sharks in ningaloo marine park: Managing tourism in an australian marine protected area. *Tourism Management, 18*(5), 259-271.

Dedina, S. (2000). Saving the gray whale: People, politics, and conservation in Baja California. Tuscon, AZ: The University of Arizona Press.

Dedina, S. & Young, E. (1995). *Conservation and development in the gray whale lagoons of Baja California Sur, Mexico.* Prepared for. U.S. Marine Mammal Commision, Washington, D.C.

Dillman, D. (2007). *Mail and Internet Surveys: The Tailored Design Method.* (2nd ed.) Hoboken, NJ: John Wiley & Sons, Inc.

Duffus, D. A. (1988). *Non-consumptive use and management of cetaceans in British Columbia coastal waters.* (Unpublished P.h.D.). University of Victoria, British Columbia, Canada.

Duffus, D. A. (1996). The recreational use of grey whales in southern Clayoquot Sound, Canada. *Applied Geography, 16*(3), 179-190.

Finkler, W., & Higham, J. (2004). The human dimensions of whale watching: An analysis based on viewing platforms. *Human Dimensions of Wildlife, 9*(2), 103-117.

Fisheries and Oceans Canada. (2011). *Management plan for the grey whale (eschrichtius robustus) in Canada.* Species at Risk Management Plan Series. Ottawa: Fisheries and Oceans Canada.

Forestell, P. H. (1993). If Leviathan has a face, does Gaia have a soul?: Incorporating environmental education in marine eco-tourism programs. *Ocean & Coastal Management, 20*(3), 267-282.

Freeman, A. M. (2003). *The measurement of environmental and resource values: Theory and methods* (2nd ed.). Washington, D.C.: Resources for the future.

Hanley, N., Mourato, S., & Wright, R. E. (2001). Choice modelling approaches: A superior alternative for environmental valuation? *Journal of Economic Surveys, 15*(3), 435-462.

Hanley, N., Wright, R. E., & Adamowicz, V. (1998). Using choice experiments to value the environment - design issues, current experience and future prospects. *Environmental and Resource Economics, 11*(3-4), 413-428.

Hastings, R. M., & Fischer, D. W. (2001). Management priorities for Magdalena Bay, Baja California, Mexico. *Journal of Coastal Conservation, 7*(2), 193-202.

Health Match BC. (2010). *British Columbia community profile – Tofino and Ucluelet.* Retrieved August 1, 2010, from http://www.viha.ca/NR/rdonlyres/E591DCA5-0B04-42CF-A1FC-03B1F739A6C8/0/CommunityProfileTofinoandUcluelet.pdf

Hensher, D. A., Rose, J. M., & Greene, W. H. (2005). *Applied choice analysis: A primer*. New York, NY. Cambridge University Press.

Hoyt, E. (2007). *A blueprint for dolphin and whale watching development.* Washington, DC. Humane Society International (HSI).

Hoyt, E. (2009). Whale watching. In W. F. Perrin, B. Wursig & J. G. M. Thewissen (Eds.), *Encyclopedia of marine mammals* (2nd edition ed., pp. 1223-1227). Burlington, MA: Academic Press.

Hoyt, E., & Iñíguez, M. (2008). The state of whale watching in Latin America. Chippenham, UK, WDCS, The Whale and Dolphin Conservation Society.

Kaufman, G. D., & Smultea, M. (1987). A survey of whale watchers in Hawaii: A socio-economic profile. *Proceedings of the Seventh Biennial Conference on the Biology and Behavior of Marine Mammals,* Miami, Florida.

Knowler, D., Williams, P., & Garcia-Martinez, S. (2008). Community-based management of gray whale ecotourism in Baja California Sur, Mexico. In J. Loucky, D. K. Alper & J. C. Day (Eds.), *Transboundary policy challenges in the pacific border regions of North America* (pp. 218-235). Alberta: University of Calgary Press.

Kotchen, M.J. (2005). Impure public goods and the comparative statics of environmentally friendly consumption. *Journal of Environmental Economics and Management, 49,* 281-300.

Kotchen, M. J., & Reiling, S. D. (2000). Environmental attitudes, motivations, and contingent valuation of non-use values: A case study involving endangered species. *Ecological Economics, 32*, 93-107.

Loomis, J. B., & Larson, D. M. (1994). Total economic values of increasing gray whale populations: Results from a contingent valuation survey of visitors and households. *Marine Resource Economics, 9*(3), 286.

Louviere, J. J., Hensher, D. A., & Swait, J. D. (2000). *Stated choice methods: Analysis and applications*. New York, NY. Cambridge University Press.

Lück, M. (2003). Education on marine mammal tours as agent for conservation--but do tourists want to be educated? *Ocean & Coastal Management, 46*(9-10), 943-956.

Malcolm, C., & Duffus, D. (2008). Specialization of whale watchers in British Columbia waters. In J. Higham, & M. Luck (Eds.), *Marine wildlife and tourism management* (pp. 109-129). Cambridge, MA: CAB International.

Martin-Lopez, B., Montes, C., & Benayas, J. (2007). The non-economic motives behind willingness to pay for biodiversity conservation. *Biological Conservation, 139*, 67-82.

Martin-Lopez, B., Montes, C., & Benayas, J. (2008). Economic valuation of biodiversity conservation: The meaning of numbers. *Conservation Biology, 22*(3), 624-635.

Mayes, G., & Richins, H. (2009). Dolphin watch tourism: Two differing examples of sustainable practices and pro-environmental outcomes. *Tourism in Marine Environments, 5*(2-3), 201.

McFadden, D. (1974). The measurement of urban travel demand. *Journal of Public Economics, 3*(4), 303-328.

Meadows, D. (2002). Humpback whale whale-watch passenger knowledge and conservation attitudes and actions: Baseline data and changes as a result of naturalist interpretation. Report prepared by the Pacific Whale Foundation. Retrieved from http://www.pacificwhale.org. May 5, 2010.

Moore, S., & Clarke, J. T. (2002). Potential impact of offshore human activities on gray whales (*Eschrichtius robustus*). *Journal of Cetacean Research and Management, 4*(1), 19-25.

Moscardo, G., & Saltzer, R. (2005). *Understanding tourist wildlife interactions: Visitor market analysis.* (Technical Report). Australia: Cooperative Research Center for Sustainable Tourism.

Moscardo, G. (2000). Understanding wildlife tourism market segments: An Australian marine study. *Human Dimensions of Wildlife, 5*(2), 36-53.

Neil, D. T., Orams, M. B., & Baglioni, A. (1996). Effects of previous whale watching experience on participants knowledge of, and response to, whales and whale watching. In *Encounters with Whales, 1995,* Canberra: Australian Nature Conservation Authority. 193-210.

O'Connor, S., Campbell, R. Cortez, H., & Knowles, T. (2009). Whale watching worldwide: Tourism numbers, expenditures and expanding economic benefits, a special report from the International Fund for Animal Welfare. Yarmouth, MA. Economists at Large.

Orams, M. B. (2000). Tourists getting close to whales, is it what whale-watching is all about? *Tourism Management, 21*(6), 561-569.

Peters, H., & Hawkins, J. P. (2009). Access to marine parks: A comparative study in willingness to pay. *Ocean & Coastal Management, 52*(3-4), 219-228.

Powell, R. B., & Ham, S. H. (2008). Can ecotourism interpretation really lead to pro-conservation knowledge, attitudes and behaviour? Evidence from the Galapagos Islands. *Journal of Sustainable Tourism, 16*(4), 467-489.

Reilly, S. B., Bannister, J. L., Best, P. B., Brown, M., Brownell Jr., R. L., Butterworth, D. S., Zerbini, A. N. (2009). *Eschrichtius robustus: IUCN red list of threatened species.* Retrieved February 25, 2010, from www.iucnredlist.org

Ressurreição, A., Gibbons, J., Dentinho, T. P., Kaiser, M., Santos, R. S., & Edwards-Jones, G. (2011). Economic valuation of species loss in the open sea. *Ecological Economics, 70*(4), 729-739. doi: 10.1016/j.ecolecon.2010.11.009

Reynolds, J. E. I., Marsh, H., & Ragen, T. J. (2009). Marine mammal conservation. *Endangered Species Research, 7*, 23-29.

Richardson, L., & Loomis, J. (2009). The total economic value of threatened, endangered and rare species: An updated meta-analysis. *Ecological Economics, 68*(5), 1535-1548.

Richter, C., Dawson, S., & Slooten, E. (2006). Impacts of commercial whale watching on male sperm whales at Kaikoura, New Zealand. *Marine Mammal Science, 22*(1), 46-63.

Rugh, D., Breiwick, J., Muto, M., Hobbs, R., Shelden, K., D'Vincent, C., Nilson, S. (2008). *Report of the 2006-2007 census of the eastern north Pacific stock of gray whales.* Washington: AFSC Processed Report.

Schwoerer, T. (2007). The economic value of gray whales to local communities: A case study of the whale watching industry in two communities in Baja, Mexico. (Unpublished Masters of Resource Management). Simon Fraser University, British Columbia. (419)

Shapiro, K. R. (2006). *Whale Watch Passengers' Preferences for Tour Attributes and Marine Management in Maui, Hawaii.* (Masters Research Project). School of Resource and Environmental Management. Simon Fraser University, Canada.

SPSS Incorporated. (2010). *IBM SPSS statistics* (Version 19 ed.). USA:

Stamation, K. A., Croft, D. B., Shaughnessy, P. D., Waples, K. A., & Briggs, S. V. (2007). Educational and conservation value of whale watching. *Tourism in Marine Environments, 4*(1), 41-55.

Statistical Innovations Incorporated. (2010). *Latent gold CHOICE: Version 4.5.0.11145.* Retrieved

Sultanian, E., & van Beukering, P. J. H. (2008). Economics of migratory birds: Market creation for the protection of migratory birds in the inner Niger Delta (Mali). *Human Dimensions of Wildlife, 13*(1), 3-15.

Swartz, S. L., Taylor, B. L., & Rugh, D. J. (2006). Gray whale *Eschrichtius robustus* population and stock identity. *Mammal Review, 36*(1), 66-84.

Tapper, R. (2006). *Wildlife watching and tourism: A study on the benefits and risks of a fast growing tourism activity and its impacts on species.* United Nations Environmental Program and the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals.

The Oceania Project. (2012). *The Oceania Project: Caring for whales, dolphins, and the ocean.* Retrieved October 10, 2012, from http://www.oceania.org.au/index.html

Tisdell, C., Nantha, H. S., & Wilson, C. (2007). Endangerment and likeability of wildlife species: How important are they for payments proposed for conservation? *Ecological Economics, 60*(3), 627-633.

Tkac, J. (1998). The effects of information on willingness-to-pay values of endangered species. *American Journal of Agricultural Economics, 80*(5), 1214-1220.

Train, K. (2009). *Discrete choice methods with simulation* (2nd ed.). New York, NY: Cambridge University Press.

Turner, R.K., Morse-Jones, S. and B. Fisher. (2010). Ecosystem valuation: a sequential decision support system and quality assessment issues. *Ecological Economics Reviews 1185*, 79-101.

Urban, R. J., Rojas-Bracho, L., Perez-Cortes, H., Gomez-Gallardo, A., Swartz, S. L., Ludwig, S., & Brownell Jr, R. L. (2003). A review of gray whales *(Eschrichtius robustus*) on their wintering grounds in Mexican waters. *Journal of Cetacean Management, 5*, 281-295.

Valentine, P. S., Birtles, A., Curnock, M., Arnold, P., & Dunstan, A. (2004). Getting closer to whales—passenger expectations and experiences, and the management of swim with dwarf minke whale interactions in the Great Barrier Reef. *Tourism Management, 25*(6), 647-655.

van Beukering, P., Cesar, H., Dierking, J., & Atkinson, S. (2004). *Recreational survey in selected marine managed areas in the main Hawaiian Islands.* (Assessment of Economic Benefits and Costs of Marine Managed Areas in Hawaii. Report for the Hawaii Coral Reef Initiative Research Program). Hawaii: University of Hawaii.

Van der Merwe, C. (1996). How it all began: The man who coined the term" ecotourism" tells us what it means. *African Wildlife-Eppindust, 50*, 7-9.

Vaske, J. J. (2008). Survey research and analysis: Applications in parks, recreation and human dimensions. State Publishing, PA: Venture Publishing Inc.

Warburton, C. (1999). Marine wildlife tourism and whale watching on the Island of Mull, West Scotland. Report for The Hebridean Whale and Dolphin Trust.

Warburton, C. A., & Parsons, E. C. M. (2000). *Marine wildlife tourism and whale-watching on the Isle of Mull, Scotland.* ( No. SC/52/WW17). Australia: Report presented to the Scientific Committee of the International Whaling Commission.

White, P. C. L., Bennett, A. C., & Hayes, E. J. V. (2001). The use of willingness-to-pay approaches in mammal conservation. *Mammal Review, 31*(2), 151-167.

Whitt, A. D., & Read, A. J. (2006). Assessing compliance to guidelines by dolphin-watching operators in Clearwater, Florida, USA. *Tourism in Marine Environments, 3*(2), 117-130.

Wilson, C., & Tisdell, C. (2003). Conservation and economic benefits of wildlife-based marine tourism: Sea turtles and whales as case studies. *Human Dimensions of Wildlife, 8*, 49-58.

Zeppel, H., & Muloin, S. (2008). Conservation and education benefits of interpretation on marine wildlife tours. *Tourism in Marine Environments, 5, 2*(3), 215-227.

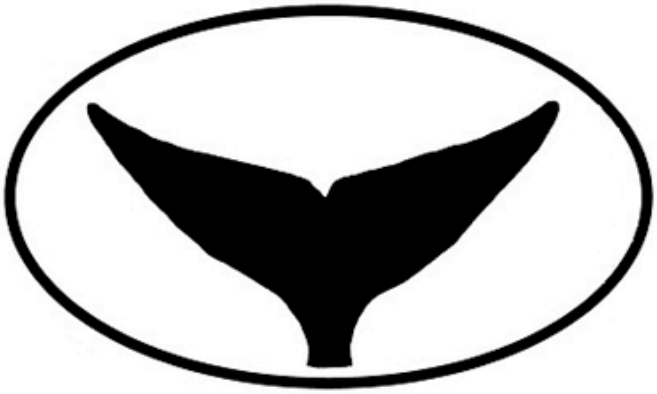
Ziegler, J., Dearden, P., & Rollins, R. (2012). But are tourists satisfied? importance-performance analysis of the whale shark tourism industry on Isla Holbox, Mexico. *Tourism Management, 33*(3), 692-701.

# Appendices

## Appendix A.

## Intercept Survey

2010 Whale Watching Survey
Tofino, B.C.



Conducted by:

SFU

Simon Fraser University

The School of Resource and Environmental Management

**Hello, we hope you had a great whale watching tour!**

Researchers from *Simon Fraser University* are currently conducting a study of whale watchers in Tofino, B.C. The goal of the study is to determine the preferences of whale watchers for various tour attributes and the importance of whale conservation. Your opinion is valuable to us and will influence the future of whale watching in Tofino!

Should you choose to participate, any information you provide will be strictly confidential. There are no risks to you as a participant and your participation is strictly voluntary. Any concerns or complaints about this research can be directed to Dr. Hal Weinberg, Director, Office of Research Ethics at: hal_weinberg@sfu.ca or 778-782-6593.

If you participated in your Tofino whale watching tour with your family, please have only one person (who is above the age of 19) fill out this survey. Once you have completed the survey, please return it to the individual from whom you received it.

*If you have **already** completed this survey please do **not** complete another one.*

*If you have not yet completed this survey please answer the following questions.*

*Please make sure to read the back of this pamphlet as well.*

**1. Have you ever been whale watching before today?**

[ ] Yes *(If yes, please proceed to Question **1.B.**)*
[ ] No *(If no, please proceed to Question 2)*

**1.B. Please indicate the total number of tours you have participated in prior to today.**

____ Number of tours **prior** to today

**2. Was whale watching the primary purpose of your trip to Tofino?**

[ ] Yes [ ] No

**3. Did you book your whale watching tour prior to arriving in Tofino?**

[ ] Yes [ ] No

**4. Please indicate the total number of individuals in your travel party who participated in whale watching in Tofino (include yourself in total number).**

____ Number of adults ____ Number of children (under 19 years old)

**5. Please indicate your gender.**

[ ] Female [ ] Male

**6. Please indicate which age category you fall into:**

[ ] 19-24
[ ] 25-34
[ ] 35-44
[ ] 45-54
[ ] 55-64
[ ] 65 +

**7. Where do you live?**

Country: _____
Province / State (if Can/USA): _____
Town / City: _____
Postal / Zip Code: _____

Please see back page

As a follow-up to this short survey, we will be conducting a more comprehensive online survey in the late summer or early fall of this year which will provide you with the opportunity to share your opinions about whale watching and whale conservation. If you choose to participate in the online survey, you will be eligible to enter a draw to win one of several prizes.

To participate in the online survey please provide us with your email address below. All personal information will be used for the purposes of this study only and will not be released to any outside agency.

**If you would like to participate in the online survey, please provide us with the following information:**

**Full Name:** _____

**Email Address:** _____

**Thank you for your time!**

*Once you have completed this survey please return it to the individual from whom you received it.*

We will be contacting you in the late summer or early fall to complete the online survey.

# Appendix B

## Contact email for recruited respondents

Dear <<insert name>>

Earlier this year during your visit to Tofino, you participated in a short whale watching survey. During that survey, you indicated that you would be interested in receiving our complete online survey, which is now ready. We hope that you enjoy this opportunity to share your experience and your opinion about whale watching with us.

To access the online survey, please click on the link below. The survey will take approximately 15 minutes to complete.

To access the survey, use this **user-id** and **password:**

User-id: XXXX

Password: XXXX

http://www.tofinowhalewatching.rem.sfu.ca

As an added incentive, you will have the option to enter a prize draw to win $200.00 CAD once you have completed the survey. The draw will be held at the end of February.

If you have any additional comments or questions please contact the research assistant Sandra Warren ( swarren@sfu.ca ) or the principal investigator, Dr. Wolfgang Haider ( whaider@sfu.ca ). Any complaints can be directed to Dr. Hal Weinberg, Director, Office of Research Ethics at hal_weinberg@sfu.ca or 778-782-6593.

We are looking forward to hearing from you and hope that you enjoy the survey.

Sincerely,

Sandra Warren

Research Assistant and Master's Candidate

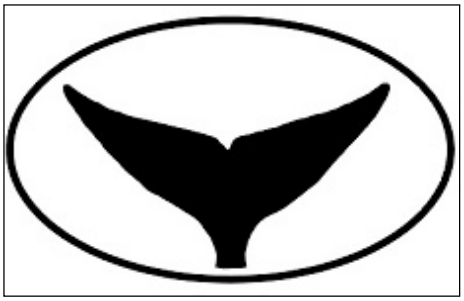
School of Resource and Environmental Management

Simon Fraser University, British Columbia

# Appendix C

# Web Survey

## Welcome to the Whale Watching Study, Tofino, BC



Thank you for joining our whale watching survey. This survey is being conducted by the Center for Tourism Research at Simon Fraser University and is funded by a grant from the Social Scientists and Humanities Research Council of Canada.

As a token of appreciation for participating in this online survey, you will be eligible to enter a draw to win one of 4 prizes! To view prize descriptions, please click here and a new tab/window will open.

To view our privacy policy, please click here, a new tab/window will open. To view our contact information, please click here, a new tab/window will open.

Please begin the survey by entering your email address and user-specific password in the boxes below. Then click the Login button to begin. Please DO NOT press the "back button" on your browser to revisit or change your answer.

If you would like to complete this survey in German, please click here and a new tab/window will open.

Fine-prints: *By filling out this survey, you are agreeing to participate. Your participation in this survey is voluntary and you may choose to not respond to any question or terminate the survey at any time. All information that you provide in this survey will be kept strictly confidential in accordance with Simon Fraser University's research ethics guidelines. Any personal identifying information you provide will be used only to contact you in the event that you win one of the prizes. Your response will be stored offline in a secure password-controlled cache. Individual records will be identified using a code for data analysis and all records will be destroyed once the data analysis is complete. Your responses will be analyzed in aggregate and will not be identifiable in any publications*.

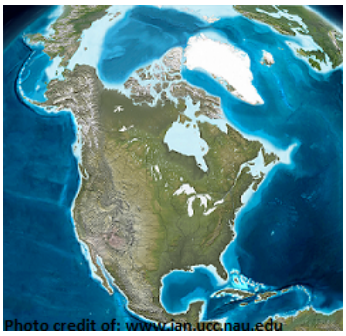
1. Prior to your tour in Tofino, had you ever been whale watching before (either from land or boat)?

Yes **[Go to Q1a]**

No **[Go to Q2]**

1a. Please complete the table below by entering the number of whale watching experiences you had in each of the following geographic regions ***(Do not include your last visit to Tofino)***

| | |
|---|---|
| West Coast of Alaska **[Go to Q2]** | 0 |
| West Coast of British Columbia **[Go to Q2]** | 0 |
| West Coast of the United States **[Go to Q2]** | 0 |
| West Coast of Mexico **[Go to Q1b]** | 0 |
| East Coast of Canada **[Go to Q2]** | 0 |
| East Coast of the United States **[Go to Q2]** | 0 |
| East Coast of Mexico **[Go to Q1b]** | 0 |
| Hawaii **[Go to Q2]** | 0 |
| Elsewhere in the World **[Go to Q2]** | 0 |




1b. You have indicated that you have been whale watching on the West Coast of Mexico. During your trip(s) to this area, did you ever go whale watching in any of the grey whale breeding lagoons, located along the length of the Baja California peninsula?

Yes **[Go to Q2]**

No **[Go to Q2]**

2. Other than your visit last summer, had you ever been to Tofino before?

Yes **[Go to Q2a]**

No **[Go to Q3]**

I live in Tofino **[Go to Q3]**

2a. During any of your previous visit(s) to Tofino, did you participate in a whale watching tour?

Yes **[Go to Q3]**

No **[Go to Q3]**

3. While in Tofino last summer, which of the following tours did you participate in?

Hot Springs Tour **[Go to Q3a]**

Whale Watching Tour **[Go to Q4]**

Whale Watching Tour **and** Hot Springs Tour **[Go to Q4]**

*If respondent chose “Whale Watching Tour **and** Hot Springs Tour” then the following message was presented: You have indicated that you participated in both a hot springs tour and a whale watching tour while in Tofino. Please answer the remaining questions in this survey based on your experience during your whale watching tour.

3a. Compared to visiting the hot springs, how important was it for you to have the chance to observe a whale on your hot springs tour?

Observing a whale was **much more** important than visiting the hot springs

Observing a whale was **more** important than visiting the hot springs

Observing a whale was **equally** as important as visiting the hot springs

Observing a whale was **less important** than visiting the hot springs

Observing a whale was **much less** important than visiting the hot spring

**[All respondents go to Q4]**

4. Which tour operator did you take your tour with?

West Coast Aquatic Safaris

Remote Passages

Other (*please specify)*

**[All respondents go to Q5]**

5. Which of the following images most closely depicts the type of boat on which you took your tour?

| | | |
|---|---|---|
|   |   |   |
| ☐ Zodiak | ☐ 36 passenger closed cabin | ☐ 12 passenger closed cabin |

**[All respondents go to Q6]**

6. Who did you participate in your whale watching tour with?

*Please check all that apply.*

My Family **[Go to Q6a]**

My Friends **[Go to Q7]**

My Business Partner **[Go to Q7]**

Alone **[Go to Q7]**

Other (please specify) **[Go to Q7]**

6a. How many people in your family (including yourself) participated in the tour?

_____ Number of Adults

_____ Number of Children (under 19 years old)

**[All respondents go to Q7]**

7. Prior to your arrival, had you ever heard of the grey whale?

Yes

No

**[All respondents go to Q8]**

8. Prior to your arrival, had you ever heard of the humpback whale?

Yes

No

**[All respondents go to Q9]**

9. Prior to your arrival, did you know there was a possibility of observing grey whales on a tour in Tofino?

Yes

No

**[All respondents go to Q10]**

10. Prior to your arrival, did you know there was a possibility of observing humpback whales on a tour in Tofino?

Yes

No

**[All respondents go to Q11]**

11. Please indicate whether you knew each of the following facts about grey whales prior to your arrival in Tofino.

| | I already knew this fact prior to my arrival | I knew parts of this fact prior to my arrival | I did not know this fact prior to my arrival |
|---|---|---|---|
| Grey whales migrate each year from their breeding grounds in Baja California (Mexico) to their feeding areas in Alaska, Russia, and Canada | ☐ | ☐ | ☐ |
| Most grey whales pass along the coastline of British Columbia and some whales spend their summers feeding in Tofino | ☐ | ☐ | ☐ |
| Grey whales are designated as a species of "special concern" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC); however, at the present time their population is **stable** | ☐ | ☐ | ☐ |
| Grey whales are given this designation due to various factors, including current threats to their breeding grounds in **Baja California, Mexico** | ☐ | ☐ | ☐ |

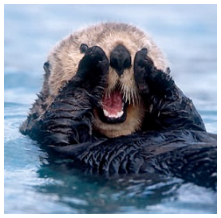
**[All Respondents go to 12]**

12. On your tour, did you see any of the following animals?

|   |  |  |
|---|---|---|
| **Harbor Porpoise** | **Harbor Seal** | **Stellar Sea Lion** |
| ☐Yes | ☐Yes | ☐Yes |
| ☐No | ☐No | ☐No |
| ☐I cannot remember | ☐I cannot remember | ☐I cannot remember |

**[All Respondents go to 13]**

13. On your tour, did you see any of the following animals?

|  |  |  |
|---|---|---|
| **Bald Eagle** | **Tufted Puffin** | **Sea Otter** |
| ☐Yes | ☐Yes | ☐Yes |
| ☐No | ☐No | ☐No |
| ☐I cannot remember | ☐I cannot remember | ☐I cannot remember |

**[All Respondents go to 14]**

14. During your tour you may have encountered other tour boats watching the same whales as you. What was the largest number of tour boats observing the same whales(s) as you at a given time?

0

1

2

3

4

5

More than 5

**[All Respondents go to 15]**

15. On your tour which of the following whale behaviors did you observe?

*Note that each species of whale can perform each behavior*

|  |  |  |  |
|---|---|---|---|
| **Breaching (whale leaps out of the water)** | **Spyhopping (whale rises straight out of the water)** | **Fin slapping (whale slaps tail or fin on surface of water)** | **Fluking (whale lifts tail above surface just before diving)** |
| ☐Yes | ☐Yes | ☐Yes | ☐Yes |
| ☐No | ☐No | ☐No | ☐No |
| ☐I cannot remember | ☐I cannot remember | ☐I cannot remember | ☐I cannot remember |

**[All Respondents go to 16]**

16. What was the total number of whales you observed on your tour?

0

1 to 3

4 to 6

7 to 9

10 to 15

More than 15

**[All Respondents go to 17]**

17. On your tour, how many whales of each species did you observe?

*For each species of whale, select the range that represents the number of whales you observed.*

| | **0** | **1 to 3** | **4 to 6** | **7 to 9** | **I cannot remember** |
|---|---|---|---|---|---|
| Humpback Whale | ☐ | ☐ | ☐ | ☐ | ☐ |
| Grey Whale | ☐ | ☐ | ☐ | ☐ | ☐ |
| Killer Whale | ☐ | ☐ | ☐ | ☐ | ☐ |
| Minke Whale | ☐ | ☐ | ☐ | ☐ | ☐ |

**[All Respondents go to 18]**

18. Please rate your overall satisfaction with your whale watching experience.

Extremely satisfied

Satisfied

Neutral

Dissatisfied

Extremely dissatisfied

**[All Respondents go to 19]**

19. Please rate your satisfaction with each of the following elements of your whale watching experience.

| | **Extremely satisfied** | | **Neutral** | | **Extremely dissatisfied** |
|---|---|---|---|---|---|
| The number of whales observed | ☐ | ☐ | ☐ | ☐ | ☐ |
| The behavior of the whales observed | ☐ | ☐ | ☐ | ☐ | ☐ |
| The proximity to the whales observed | ☐ | ☐ | ☐ | ☐ | ☐ |
| The other notable wildlife observed (other than the whales) | ☐ | ☐ | ☐ | ☐ | ☐ |
| The structure of the boat for viewing purposes | ☐ | ☐ | ☐ | ☐ | ☐ |
| The positioning of the boat relative to the whales (for viewing purposes) | ☐ | ☐ | ☐ | ☐ | ☐ |
| The number of passengers onboard | ☐ | ☐ | ☐ | ☐ | ☐ |
| The duration of the tour | ☐ | ☐ | ☐ | ☐ | ☐ |
| The **amount** of the information received from the tour operator regarding the marine life and the marine environment (before, during, and after the boat tour) | ☐ | ☐ | ☐ | ☐ | ☐ |
| The **quality** of the information received from the tour operator regarding the marine life and the marine environment (before, during, and after the boat tour) | ☐ | ☐ | ☐ | ☐ | ☐ |
| The service provided by the office staff and boat crew | ☐ | ☐ | ☐ | ☐ | ☐ |
| The number of tour boats observing the same whales as you at a given time | ☐ | ☐ | ☐ | ☐ | ☐ |

**[All Respondents go to 20]**

20. Are you likely to visit Tofino again in the future?

Definitely Yes **[Go to Q21]**

Probably Yes **[Go to Q21]**

Unsure **[Go to Q21]**

Probably No **[Go to Q22]**

Definitely No**[Go to Q22]**

21. If you do return to Tofino, are you likely to participate in a whale watching tour?

Definitely Yes

Probably Yes

Unsure

Probably No

Definitely No

**[All Respondents go to 22]**

22. In the future, are you likely to go whale watching in any of the following geographic regions?

| | **Definitely Yes** | **Probably Yes** | **Not Sure** | **Probably No** | **Definitely No** |
|---|---|---|---|---|---|
| West Coast of Alaska | ☐ | ☐ | ☐ | ☐ | ☐ |
| West Coast of British Columbia | ☐ | ☐ | ☐ | ☐ | ☐ |
| West Coast of the United States | ☐ | ☐ | ☐ | ☐ | ☐ |
| West Coast of Mexico | ☐ | ☐ | ☐ | ☐ | ☐ |

**[All Respondents go to the Discrete Choice Experiment]**

**********The Discrete Choice Experiment**********

**TASK ONE:**

Respondents were split into three segments based on responses to Q20 and Q21:

Segment 1 are those respondents who stated they were likely to return to Tofino and book another whale watching tour.[15] Respondents in this segment were shown Framing No.1 and the choice question was worded as "Please choose your preferred tour."

*Framing No. 1: For the following set of questions, imagine you return to Tofino and you are interested in participating in a whale watching tour. On each of the next six pages, you will find possible pairs of tour options (see example below). Each option describes a 3 hour tour.*

*Imagining that these two tours are the only two options available, please read them over carefully and choose the one you prefer. If neither tour option is acceptable to you, you may choose "Neither" tour. Please make your decision for each pair separately.*

Segment 2 are those respondents who stated they were likely to return to Tofino but unlikely to book another whale watching tour.[16] Respondents in this segment were shown Framing No.2 and the choice question was worded "Based on your own preferences, which tour would you recommend to your friends?

*Framing No. 2: For the following set of questions, imagine you return to Tofino and run into some friends who ask you to recommend them a whale watching tour. On each of the next six pages, you will find possible pairs of tour options to recommend (see example below). Each option describes a 3 hour tour.*

*Imagining that these two tours are the only two options available, please read them over carefully and choose the one you would recommend. If neither tour option is deemed acceptable by you, you may choose "Neither" tour. Your recommendation should reflect your own preferences. Please make your decision for each pair separately.*

Segment 3 are those respondents who stated they were unlikely to return to Tofino at all. Respondents in this segment were shown Framing No.3 and the choice question was worded "Based on your own preferences, which tour would you recommend to your friends?

*Framing No. 3: For the following set of questions, imagine some of your friends are going to Tofino and ask you to recommend them a whale watching tour. On each of the next six pages, you will find possible pairs of tour options to recommend (see example below). Each option describes a 3 hour tour.*

*Imagining that these two tours are the only two options available, please read them over carefully and choose the one you would recommend. If neither tour option is deemed acceptable by you, you may choose "Neither" tour. Your recommendation should reflect your own preferences. Please make your decision for each pair separately.*

Each segment was shown six different sets of tour options. Below is an example of one set:

[15] A respondent is considered *likely* if they responded "Definitely Yes", "Probably Yes", or "Unsure"

[16] A respondent is considered *unlikely* if they responded "Probably No" or "Definitely No"

**29. Please choose your preferred tour.**

*If you require more information, please move your mouse over the question marks to the left of the characteristic.*

| Tour Characteristics | Tour A | Tour B | Neither |
|---|---|---|---|
| Number of grey whales observed | 0 grey whales | 2 grey whales | |
| Number of humpback whales observed | 0 humpbacks | 5 humpbacks | |
| ? Other notable wildlife observed (assume bald eagles and harbor seals are observed on all tours) | harbor porpoise<br>tufted puffin<br>sea otter | tufted puffin | I would not go on either tour |
| ? Maximum number of other tour boats | 1 boat | 1 boat | |
| ? Individual providing interpretation during boat tour | driver/guide | naturalist | |
| ? Quality of information received during boat tour | low | medium | |
| Cost of tour per person (taxes and fuel surcharge included) | $120 CAD | $128 CAD | |
| CHOOSE A TOUR → | ○ (Tour A) | ○ (Tour B) | ○ (Neither) |

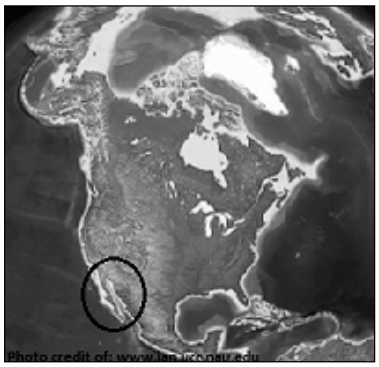
**TASK TWO:**

For the second task, respondents were asked to re-assess two sets of tour options they had already seen and evaluated, given new information about the challenges surrounding protection of the grey whale breeding habitat and an additional preservation fee.

All three segments were given the following information:

When making your choice for the next two pairs of options, you will need to consider the following information:

Experts are concerned that some of the breeding areas of the grey whale, located in the lagoons of the Baja California peninsula in Mexico (see map), may be threatened by tourism development within and around the lagoons, illegal fishing practices, and marine pollution. If these threats continue the grey whale population will decline over the next 10 years. Depending on the magnitude of these threats, experts predict that this decline could range between 10% and 70% (relative to today's population level).

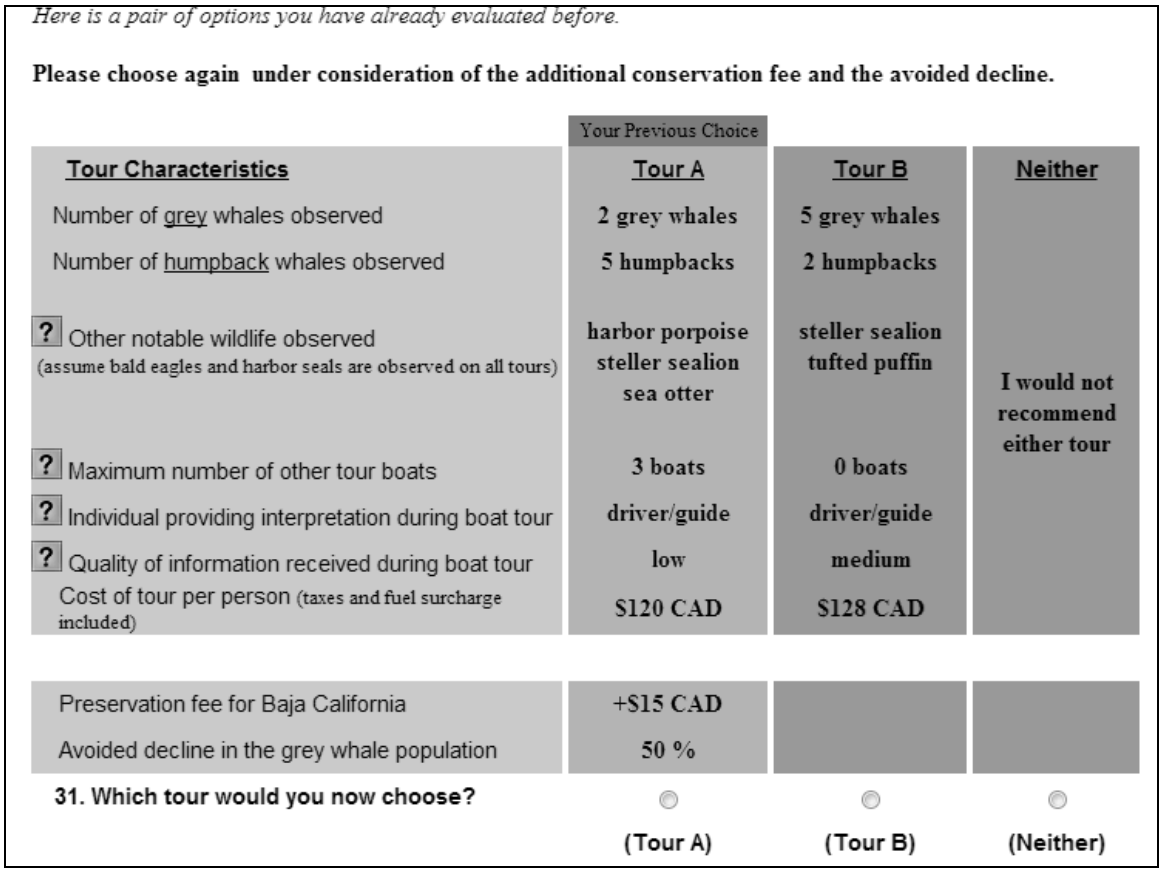


Therefore, non-governmental organisations have established a Fund to preserve the grey whale's major breeding habitats in Mexico to reduce the threats and prevent a decline in the grey whale population.

The new tour options:

The following tour options now describe by how much the whale population is predicted to decline (relative to today) and contain a preservation fee. The fee will support a program in Baja California to preserve the grey whale breeding grounds, thereby avoiding the predicted decline.

Below is an example of the choice set question that followed:



*Here is a pair of options you have already evaluated before.*

**Please choose again under consideration of the additional conservation fee and the avoided decline.**

| | Your Previous Choice | | |
|---|---|---|---|
| **Tour Characteristics** | **Tour A** | **Tour B** | **Neither** |
| Number of grey whales observed | 2 grey whales | 5 grey whales | |
| Number of humpback whales observed | 5 humpbacks | 2 humpbacks | |
| ? Other notable wildlife observed (assume bald eagles and harbor seals are observed on all tours) | harbor porpoise steller sealion sea otter | steller sealion tufted puffin | I would not recommend either tour |
| ? Maximum number of other tour boats | 3 boats | 0 boats | |
| ? Individual providing interpretation during boat tour | driver/guide | driver/guide | |
| ? Quality of information received during boat tour | low | medium | |
| Cost of tour per person (taxes and fuel surcharge included) | $120 CAD | $128 CAD | |
| Preservation fee for Baja California | +$15 CAD | | |
| Avoided decline in the grey whale population | 50 % | | |
| **31. Which tour would you now choose?** | ○ (Tour A) | ○ (Tour B) | ○ (Neither) |

32. Please indicate the extent to which each of the following statements describes you.

| | This describes me perfectly | | This describes me somewhat | | This does not describe me at all |
|---|---|---|---|---|---|
| I often think about whether my actions harm the environment | ☐ | ☐ | ☐ | ☐ | ☐ |
| I am interested in learning more about environmental issues | ☐ | ☐ | ☐ | ☐ | ☐ |
| I actively search for information about how I can conserve the environment | ☐ | ☐ | ☐ | ☐ | ☐ |
| I regularly watch television programs about the natural environment | ☐ | ☐ | ☐ | ☐ | ☐ |

[**All Respondents go to Q33]**

33. Please indicate the extent to which you engage in each of the following activities.

| | Always | | Sometimes | | Never |
|---|---|---|---|---|---|
| I turn off the tap when I brush my teeth | ☐ | ☐ | ☐ | ☐ | ☐ |
| I recycle at home as much as one can | ☐ | ☐ | ☐ | ☐ | ☐ |
| I turn down the heat at night | ☐ | ☐ | ☐ | ☐ | ☐ |
| I buy environmentally friendly products | ☐ | ☐ | ☐ | ☐ | ☐ |
| I talk with other people about the environment and how we need to protect it | ☐ | ☐ | ☐ | ☐ | ☐ |
| I pick up other people's litter | ☐ | ☐ | ☐ | ☐ | ☐ |
| I participate in public land/water clean up events | ☐ | ☐ | ☐ | ☐ | ☐ |

[**All Respondents go to Q34]**

34. Do you regularly volunteer for any organisations that are primarily concerned with the conservation of wildlife or the natural environment?

Yes

No

**[All Respondents go to Q35]**

35. Do you contribute financially to any organisations that are primarily concerned with the conservation of wildlife or the natural environment?

Yes **[Go to Q35a]**

No **[Go to Q36]**

35a. Please select the range that represents how much you donate annually.

Numbers are in Canadian Dollars.

$1-50 CAD

$51-100 CAD

$101-250 CAD

$251-500 CAD

More than $500 CAD

**[All respondents go to Q36]**

36. **This question was only asked to segment 1 respondents**

Finally, some whale watching operators in Tofino would like to purchase carbon offsets to account for the carbon released from their boat engines, and to also help protect the ancient temperate rainforest of Tofino and Clayoquot Sound. By protecting the forests from being logged, tour operators can save one tree at a time and maintain the forest's ability to store the carbon it has absorbed from the atmosphere.

If you were to go whale watching again in Tofino, what would be the maximum amount you would be willing to pay (on top of the cost of your tour) towards carbon offsetting?

$0 CAD

$1 CAD

$2 CAD

$3 CAD

$4 CAD

$5 CAD

More than $5 CAD

[All respondents presented Q37 to 42]

37. What is your gender?

Female

Male

38. What is your country of residence?

Canada

United States

Other (please specify) _____

39. What is your age?

19-24

25 to 34

35 to 44

45 to 54

55 to 64

65 and over

40. What is the highest level of education you have completed?

Elementary School

High School

Technical Training

Undergraduate Degree

Graduate Degree

Other (please specify) _____

41. What is your household gross income for 2010?

Under $30,000

$30,000 to $59,999

$60,000 to $89,999

$90,000 to $119,999

$120,000 or over

42. Are there any comments you would like to make about the issues covered by this survey?

# Thank you for participating in our survey

Please provide us with your name and email address if you would like to enter the draw for a chance to win one of the four prizes. You will only be contacted if you have won a prize.

Name: _____

Email address: _____