

**WHALE WATCH PASSENGERS' PREFERENCES FOR  
TOUR ATTRIBUTES AND MARINE MANAGEMENT IN  
MAUI, HAWAII**

by

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B. Sc. Natural Resources Conservation, UBC 2001

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## **ABSTRACT**

This research project examines whale watch passengers' preferences for tour attributes and marine management strategies in the Hawaiian Island Humpback Whale National Marine Sanctuary. Surveys were distributed to passengers on whale watching vessels during the winter season of 2005, in Maui Hawaii. The survey utilized both Likert and discrete choice question formats. Follow up key informant interviews were conducted with two operators and the state advisor to the marine sanctuary.

The sample population of whale watch passengers in Maui was fairly homogenous, exhibiting an overall environmental sentiment. Differences were examined between Hawaiian residents and visitors, as well as between passengers on an ecotour and a regular whale watch. Passengers on the ecotour expressed slightly higher rates of satisfaction with their tour. The Hawaii residents expressed more concern about the current level of protection for humpback whales in Hawaii. Overall the passengers were in support of implementing: speed limits for all boats, tougher regulations and increased penalties, sewage disposal at the harbours, and on-board education including a naturalist and hydrophone. The passengers showed a positive willingness to pay for all of these attributes.

This information is useful to the Hawaiian Island humpback Whale National Marine Sanctuary operators and managers as it informs them of the desired tour attributes, and passengers' preferences for potential marine management options in Hawaii.

## **DEDICATION**

*I would like to dedicate this research to all of the hard-working Hawaiian residents and enthusiasts who do so much to protect this unique archipelago and the diverse species that call it home. Mahalo Nui Loa!*

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## **GLOSSARY**

CVM.....Contingent Valuation Method

DCE.....Discrete Choice Experiment

HI.....Hawaii

HIHWNMS.....Hawaiian Island Humpback Whale National Marine Sanctuary

IIA.....Independent of Irrelevant Alternatives

MNL.....Multinomial logit model

PK.....Prince Kuhio

PWF.....Pacific Whale Foundation

PWU.....Part Worth Utility

RP.....Revealed Preference

SP.....Stated Preference

# 1 INTRODUCTION

## 1.1 Rationale

The state of Hawaii has experienced rapid growth in many sectors in recent years, particularly in tourism (D.B.E.D.T, 2006). In 2003, approximately half of the 2,131,904 visitors that arrived to Maui attended a marine based tour (Markrich, 2004). As the volume and diversified use of Hawaii's marine resources increases, so does public pressure on the managers to maintain a healthy marine environment (PWF, 2005; Mauitime Weekly, 2005).

Whale watching in Hawaii began in the 1980's, and rapidly grew into a very large industry (Hoyt, 2001). Today the island of Maui boasts an extensive fleet of whale watching vessels that offer two-hour excursions from dawn to dusk, throughout the whale watching season of December to May (Markrich, 2004). A recent study in Maui found that over half of the whale watch passengers had been whale watching before (Meadows, 2002), which emphasizes the need to keep the tour components fresh, exciting, and up-to-date. Ensuring the continued health of the endangered North Pacific Humpback whale (*Megaptera novaeangliae*) population in Hawaii is critical to sustaining the tourism industry, and meeting the objectives of the Hawaiian Island Humpback Whale National Marine Sanctuary (HIHWNMS, 2006). Humpback whales are primarily threatened by: collisions with vessels, marine debris, whaling, underwater noise, over-fishing, pollution and habitat degradation (Kaufman, 2006; Mauitime Weekly, 2005; WDCS, 2004; NMFS 1991). Threats to humpback whales in Hawaii are increasing: the marine tourism industry

is converting to larger boats, 2006 reported the most ever vessel/whale collisions, and in 2007 a fleet of high-speed inter-island ferries will begin service in Hawaii (Kaufman, 2006; Walters, 2006; Hawaii superferry, 2006). Public pressure is increasing as residents voice concerns over collisions, sewage dumping and the lack of regulation and enforcement (Star Bulletin, 2006; Mautime Weekly, 2005; PWF, 2005).

Nature-based tourism is often promoted as a way to help fund management of natural areas and conservation, as well as educate the public (Arin and Kramer, 2002; Orams, 2000; Laarman and Gregersen, 1996). This study will assess the support of whale watch passengers for possible new management policies designed to address the concerns directly related to whale watching within the HIHWNMS. Understanding the management preferences of passengers will help resource managers better meet the objectives of the sanctuary, and potentially fund its management and conservation. In addition, it is important to continually evaluate the motivations and expectations of tourism participants (Berrow, 2003) in order to maintain the ongoing popularity of the tourism experience. This study aims to collect that information to assist whale watch operators in better meeting the expectations of their clientele.

## **1.2 Hawaiian Islands Humpback Whale National Marine Sanctuary**

The Hawaiian Islands are the only area within the United States known to be a breeding ground for endangered humpback whales. Due to this region's importance for the lifecycle of the humpback whales, the Hawaiian Island Humpback Whale National Marine Sanctuary (HIHWNMS) was established in 1997. This sanctuary was designated

under the “Marine Protection, Research and Sanctuaries Act” of 1972 and today is one of 14 federally protected marine sanctuaries in the United States (NOAA, 2005). The goal of the HIHWNMS is to promote “comprehensive and coordinated management, research, education and long-term monitoring for the endangered humpback whale and its habitat” (HIHWNMS, 2006). With the creation of the HIHWNMS came the implementation of one regulation: a one hundred yard approach limit to the endangered humpback whales, applicable to all forms of marine users (EPA, 1995). Budgetary constraints, and the large size of the marine sanctuary (Cesar, 2004) make monitoring and enforcement of this regulation difficult.

### **1.3 Research Goal**

This research project will increase understanding of the motivations and management preferences of whale watch passengers in Maui. Results from this study will help the operators continue to deliver trips that meet the expectations of their passengers, and help the managers better meet the objectives of the National Marine Sanctuary.

#### **1.3.1 Research objectives**

1. Evaluate the effect of trip characteristics on whale watch passengers’ enjoyment of the tour.
2. Assess the passengers’ support for alternative potential management actions for whale watching within the Hawaiian Island Humpback Whale National Marine Sanctuary.



3. Inform operators and managers about the passengers' preferences for trip characteristics and marine management in the HIIHWNMS, so they can better meet passengers' expectations, and the objectives of the sanctuary.
4. Evaluate and recommend management strategies for marine tourism in the HIIHWNMS, based on passengers' preferences and the literature.

#### **1.4 Outline of Project Methods**

A survey instrument was designed to elicit responses from whale watch passengers using both Likert-scale and discrete choice formats. Both methods are well established in the literature and have been used to conduct research on environmental management issues (Hensher et al., 2005; Hanley et al., 2003; Hearne and Salinas, 2002; Tongson and Dygico, 2004). I undertook the intercept surveys during twenty-nine whale watching excursions in Maui, Hawaii, during the months of March and April 2005. The survey included questions on: demographics, tour satisfaction, preferred trip characteristics, and preferred management scenarios for the marine sanctuary. Four hundred and eighty-eight surveys were completed, which were then analysed using SPSS and Limdep (Green, 1998). The survey results were discussed with local operators and one resource manager, to engage them in a conversation about the respondents' tour and management preferences.

## **1.5 Report Organization**

There are five chapters in this report. Chapter Two introduces the relevant literature, including discussions of: whale watching, whale watch passengers' motivations and preferred trip characteristics, threats to humpback whales from ecotourism, and user fee systems to support management of natural areas. The third chapter presents an overview of the issues associated with intercept surveys, as well as a detailed description of the discrete choice survey instrument and methodology. Chapter Four presents the results of the survey. Chapter Five discusses the results and implications of this research for tour operators and managers in the Hawaiian Island Humpback Whale National Marine Sanctuary. That chapter also reviews the limitations of this study and makes recommendations for how this research could be expanded in the future.

## 2 LITERATURE REVIEW

This chapter reviews the relevant literature on whale watchers' motivations, threats to humpback whales, and user fee systems. Exploring these topics will set the context of this research project, describe the current threats to humpback whales, and identify possible management options for whale watching in the marine sanctuary.

### 2.1 Marine Ecotourism

*“Ecotourism is fundamentally about achieving change in the way people conceive of, contextualize and behave in natural environments, so that more sustainable relationships between humans and their environments may emerge”* (Garrod and Wilson, 2003, pg. 2)

Marine ecotourism, a subset of ecotourism, offers tours focussed on marine environments and their inhabitants. The popularity of marine ecotourism has increased such that in many regions it is now of significant economic and social importance (Garrod and Wilson, 2004; Cater, 2003). Examples of marine ecotourism include: whale watching, bird watching, kayak tours, snorkelling, and scuba diving. Defining the key attributes of an ecotour has been contentious. There is now emerging consensus that the ecotour should: focus on nature, include educational components, increase appreciation of the environment, minimize the negative impacts of tourism, and involve the local community in decision making (TIES, 2006; Luck, 2003; Garrod and Wilson, 2003;

META, 2001; Orams 1995). Ideally, any company offering “ecotours” should strive to achieve these goals.

### **2.1.1 Whale watching**

Commercial whale watching first began in 1955 in San Diego (Hoyt, 2001). Shortly thereafter, in the 1960’s, a paradigm shift began when collapsing commercial whaling industries attempted a transition to a newly emerging, more lucrative, and also more sustainable industry: ecotourism based on observing whales in the wild (Orams and Forestell, 1995). A 2001 review of the global whale watching industry highlighted its remarkable growth, claiming that in a few short years between 1983 and 1999, the number of countries offering whale watching excursions grew from 12 to 87 (Hoyt, 2001). Whale watching excursions are now undertaken off all continents and from a diverse group of countries, such as Ecuador, South Africa, Taiwan, Canada and Tonga. However, 47.8% of the worldwide commercial whale watching occurs in the United States alone (Hoyt, 2001; Orams, 2000; Hoyt, 1995). Whale watching is now considered the fastest growing wildlife-viewing industry in the world (Lien, 2001); the number of people whale watching grew at an annual rate of 13.6% during the mid to late 1990’s (Hoyt, 2001), well above the overall growth rate for tourism of 7.4% (WTO, 2001).

Worldwide, whale watching attracts more than ten million tourists annually, and therefore its potential cumulative effects, both positive and negative, are great (WDCS, 2005; Hoyt, 2001). The high volume of use means that the environmental and social costs associated with ineffectively managed whale watching can be high. Harassment, and

effects on the whales' behaviour (Richter et al. 2006; Neves-Graca, 2004; Erbe, 2002), strain on communities and infrastructure (Neves-Graca, 2004; IFAW, 1999), and inadequate educational programming (Luck, 2003; Forestell, 1993) are some of the negative consequences on human and whale populations associated with a poorly managed whale watching industry (Hoyt, 2005; Heckel et al., 2003).

Conversely, high quality whale watching can bring benefits to the whales, the visitors, and the local community (Hoyt, 2005; Berrow, 2003; Luck, 2003; Hoyt, 2001). The host community can greatly benefit from the long term financial security created by a stable tourism industry (Heckel et al., 2003). Well run trips offer an enjoyable, interactive and educational experience for participants (Berrows, 2003), which is believed to help inspire the participants to become more proactive in supporting wildlife conservation efforts (Egas, 2002; Orams, 2000; Forestell, 1993). Ideally, the whales will benefit from increased public awareness and commitment, fostered by a carefully managed whale watching industry. A side benefit of a well managed whale watching industry is the ability for research to be conducted from the vessels, by monitoring population trends as well as the effects of tour boats on whale behaviour and location (Hoyt, 2005).

### **2.1.2 Hawaii's whale watching industry**

Whale watching in Hawaii occurs primarily during the winter months (December to April), when the humpback whales return from their northern summer feeding grounds to breed and calve in the warm waters of Hawaii (NOAA Fisheries, 2004; Hoyt, 2001). Since 1975, when boat owners first began offering whale watching trips along the Maui

shoreline, the industry has grown substantially with the most recent estimates placing the statewide fleet at 57 vessels delivering more than 87 tours daily (Markrich, 2004; Hoyt, 2001; Utech, 2000). Whale watching occurs from many different types of vessels, including large power catamarans, sailboats, and small rafts (Hoyt, 2001). Maui is the hub of Hawaii's whale watching industry, hosting more than two-thirds of the state's total whale watch passengers (Utech, 2000). Marine based tourism is a very popular activity in Hawaii. In 2003, approximately half of the 2,131,904 visitors to Maui attended a marine based tour (Markrich, 2004). Whale watching prices in Maui are more affordable than the other Hawaiian Islands and have remained relatively constant over time (Markrich, 2004); Maui whale watching prices generally range from twenty to forty dollars per trip. The lower prices are possibly due to the longer establishment of Maui's industry, more intense competition, and the industry conversion from small six passenger vessels, to large 149 passenger vessels (Kaufman, 2006; Markrich, 2004; Utech, 2000). The largest whale watching company in the state, which runs six boats from Maui during the "whale season", is a non-profit research and education organization, called the Pacific Whale Foundation (Markrich, 2004).

Most whale watching excursions in Hawaii are offered as two hour trips, with the time divided between searching for the humpbacks and viewing them (Utech, 2000). Search time varies by season, with early and later season trips often spending over half of the time searching, compared to mid-season trips which often sight whales as soon as the boat leaves the harbour. As Hawaii is the breeding and calving ground for humpback whales, many exciting behaviours are often seen during a tour. It is common for tours to encounter female and calf pairs, and occasionally "competition pods" – groups of males

physically competing for the female's attention. Another exciting behaviour often witnessed during a tour is a male humpback singing, the purpose of which is still unknown. Speculation exists that singing may serve a male social ordering purpose, or be a call to attract females, however it is known that this behaviour occurs almost exclusively in the breeding grounds (Darling and Berube, 2001). Other marine life can be encountered during the tour, such as the commonly sighted green sea turtle, as well as: bottlenose dolphins, spotted dolphins, spinner dolphins, false killer whales, sea birds or manta rays. Most whale watching tours in Hawaii include interpretation by an onboard naturalist, who educates the passengers about the natural history of the animals, interprets behaviours seen during the tour, and answers questions (Utech, 2000). Watching whales in Hawaii attracts many international participants whose country of origin varies from boat to boat, with some operators attracting 90% American residents, and others 50% American and 50% international participants (Hoyt, 2001). This difference is likely attributable to visitor demographics for each island, as Oahu attracts a much higher proportion of international visitors than Maui (DBEDT, 2005). The most common countries of origin for whale watchers in Hawaii are Japan, Germany, Canada and the UK (Hoyt, 2001).

## **2.2 Whale Watch Passengers**

Many studies have been conducted to assess the effects of whale watching on whales (Jelinski et al., 2002; Erbe, 2002; Au and Green, 2000; Corkeron, 1995); however fewer studies have focused primarily on the effects of whale watching on the passengers themselves (Berrow, 2003; Luck, 2003; Orams, 2000). In order to establish and maintain

sustainable whale watching industries there is a continuing need to understand more about the passengers in general, and about their motivations and desires in particular. Studies of whale watchers in New Zealand and Hawaii have found that in general they are well educated, relatively affluent and very interested to learn about whales and their marine environment (Luck, 2003; Forestell, 1993; Kaufman et al., 1987). During the 1990's participant surveys found that the majority of whale watchers had not been whale watching before (Neil et al., 1996; Forestell, 1993), while a more recent study reported that slightly over half of the participants surveyed had been whale watching previously (Meadows, 2002). Forestell (1993) observed that the whale watch passengers were no more "environmentally inclined" than the average tourist. Whale watch passengers come from all over the world, and are most frequently middle aged (Valentine et al, 2004; Neil et al., 1996; Forestell and Kaufman, 1993).

While it is common to talk about managing "natural resources", in order to sustain nature based tourism, it is crucial to manage the people who are using the natural resources (Sorice et al., 2006; Orams, 2000; Forestell and Kaufman, 1993). Knowledge about passengers' motivations can assist in effectively managing whale watching tourism. This knowledge is also crucial to developing a sustainable marine tourism business, as it allows the operators to continually refine their product to meet the customers' actual current needs, and not perceived needs (META, 2001). In order to better understand the preferences of whale watch passengers, I will now discuss the factors that previous studies have shown to be most significant in affecting whale watcher satisfaction, including their motivations for learning and perspectives towards marine management.



### **2.2.1 Desired trip characteristics**

Research has shown that whale watchers have diverse motivations, and are sensitive to a range of factors influencing their trip satisfaction (Valentine et al., 2004; Luck, 2003; Orams, 2000). As can be expected, being able to observe whales in their natural environment is an important contributor to whale watchers' satisfaction. However, researchers are divided about how important proximity to whales is to the passengers (Valentine et al., 2004; Orams, 2000). For example, Orams (2000) found that proximity to whales was not a primary contributor to satisfaction for whale watchers, while a report describing passenger satisfaction on a "swim with dwarf minke whales" excursion contradicted those results and cited proximity to whales being of primary importance (Valentine et al., 2004). The difference in these tours' objectives, between swimming with the whales and watching them from the boat, likely explains this difference in passenger desire. Many factors besides close observation of the whales have been identified as influential to overall passenger satisfaction, and providing these elements can be as important as watching the whales (Berrow, 2003). Participant satisfaction is affected by: boat design, boat positioning relative to the whales, number of passengers on-board, service provided by the crew, duration of the trip and the educational commentary (Orams 2000).

### **2.2.2 Interest in learning**

Many studies have found that a primary reason for nature-based tourists to attend an organized tour is their desire to learn about the environment and focal species through interpretation (Orams, 2000; Fennell, 1999; Forestell, 1992; Rogenbuck et al., 1990).

Non-profit ecotourism certification organizations, such as the International Ecotourism Society (2003), recognize this important motivator and suggest that every ecotour should include educational components (TES, 1993). Ideally, the educational component should focus on teaching the participant about the environment they are visiting with the intent of inspiring them to choose more sustainable behaviours in three different contexts: during the tour, at the general destination location, and in their daily lives when they have returned home (Garrod and Wilson, 2003; Palmberg and Kuru, 2000; Forestell, 1993). It is therefore important to ensure that educational messages are delivered effectively, with both a local and global perspective.

Whale watchers, like other ecotourists, are genuinely interested in the environment and animals they observe, and expect to learn about them through interpretation during a tour (Hearne and Salinas, 2002; Luck, 2003; Orams, 2000; Forestell, 1992). However, not all whale watching trips around the world currently include structured interpretation by a naturalist. Participants aboard New Zealand marine mammal tours that did not offer a structured educational component expressed a desire for more education during the tour about the animals, human impacts, and local environment (Luck, 2003). These findings concur with Roggenbruck and Williams (1991) who reported that, “a chance to learn new things”, was among the top motivations for both men and women who participate in recreational/tourism activities. Some proponents believe that personal interpretation by a well-trained naturalist, as opposed to signage or flyers, is the most effective way to educate passengers (Luck, 2003). In response to the demand for interpretation, most (if not all) whale watch organizations in

Hawaii include structured interpretation by a naturalist as a main component of the experience (Utech, 2000).

In addition, one study demonstrated that nature based tourists often have different preferences for the amount and structure of their learning (Stein et al., 2003). Sensing the different learning desires, some whale watch operators in Maui, such as the Pacific Whale Foundation and Prince Kuhio, diversify their on-board educational component. Pacific Whale Foundation accomplishes this by distributing an informational flyer, having reference materials available, and by using a hydrophone to listen to the whales. The naturalist on Prince Kuhio often brings artefacts and whale models on the trip to entertain and educate the guests.

### **2.3 Threats to Humpback Whales and Their Environment**

Humpback whales are found worldwide, with distinct populations resident in all ocean basins. Prior to extensive commercial whaling, which took place from the 1800's through to the 1960's (Orams and Forestell, 1995), worldwide population estimates for the humpback whales are believed to have exceeded 125,000 animals (NOAA Fisheries, 2004). The commercial hunting of humpbacks, along with many other large species of whales, caused their populations to plummet. Humpback whales were harvested primarily for their blubber, baleen and meat (Orams and Forestell, 1995). The North Pacific humpback whales were hunted so heavily, that in 1965 the population numbered a mere 1,000 animals (NOAA Fisheries, 2005).

The worldwide collapse of commercial whaling industries raised enough concern to prompt protective measures to be taken. On June 2, 1970, the United States designated humpback whales as “endangered” throughout their range, under the *Endangered Species Act* (NOAA Fisheries, 2004). Humpback whales were further protected in 1972 under the *Marine Mammal Protection Act*, which prohibits harassing, hunting, capturing, collecting or killing marine mammals (MMPA, 2005, Sec. 216.1). The cessation of most large-scale commercial whaling, coupled with the implementation of protective legislation, allowed the humpback whale population to begin recovering. The North Pacific humpback whale population is now estimated to have grown to over 10,000 animals (NOAA, 2005), and is believed to be increasing at 7% per year (NOAA Fisheries, 2005).

Despite the recent good news about recovering populations, humpback whales continue to face many threats. Currently, humpback whale populations are predominantly threatened by: collisions with vessels, habitat degradation, underwater noise, harassment by whale watching vessels, and entanglement in marine debris (Kaufman, 2006; Walters, 2006; WDCS, 2004; Lammers et al., 2003; NMFS, 1991). I will now discuss those threats which are directly linked to the whale watching industry in Hawaii, and possible policy actions to mitigate them.

Concerns have been raised that whale watching can negatively affect whales by degrading their habitat due to vessel overcrowding (WDCS, 2004; NMFS, 1991). Whale watching excursions predominantly occur in areas where humpback whales are congregating to feed or raise young, further increasing the risk that the boats disturb or displace the whales (Corkeron, 1995; NMFS, 1991). Currently, no federal or state policies in Hawaii attempt to limit the distribution of whale watching vessels; however,

measures have been taken by some non-profit organizations to create a voluntary code that limits the number of vessels to 3 per pod (PWF, O.T.C., and H.W.D.W., 2005). Concerns over vessels crowding the whales in Hawaii are relatively minor, due to the large number of humpbacks and the size of the dispersion area, and the relatively small size of the industry. In addition, many operators voluntarily comply with the whale watching code guidelines.

Another issue that may be tied to vessel crowding is the creation of excessive underwater noise. While concern exists over the increasing amount of noise in the ocean, research in the waters around Maui found that the level of noise emitted by typical whale watching vessels, both rafts and larger boats, was not sufficiently intensive to negatively affect the auditory system of humpback whales (Au and Green, 2000).

The combination of a thriving humpback whale population and associated whale watching industry will likely result in more vessel/whale collisions (Kaufman, 2006; NOAA Fisheries, 2004; Lammers et al., 2003). Research on historic vessel/whale collisions in Hawaii between 1975-2003 showed an increase over time in the number of collisions, with most instances occurring around the island of Maui (Lammers et al., 2003). In recent years that number has risen further, with five and seven reported collisions during the 2005 and 2006 winter seasons, respectively (Walters, 2006). With seven collisions, 2006 had the highest number of vessel/whale collisions ever reported in the Hawaiian Islands (Star Bulletin (2), 2006; Kaufman, 2006). The public and operators have expressed concern over the number of vessel/whale collisions in Hawaii, which is expected to increase unless concrete measures are taken to address the problem (PWF(2), 2006; Lammers et al., 2003).

A contentious issue related to the marine tourism industry in Hawaii is the legally permitted dumping of effluent from tourism vessels in the HIHWNMS (MauiMagazine, 2006; Mauidtime Weekly, 2005). Hawaiian residents are concerned that the constant dumping of effluent into a concentrated section of waters in south Maui has the potential to negatively affect water quality and the whales themselves, a claim that has been substantiated by the government (Ho'oulu, 2006; Pumpdon'tdump, 2006; DOBOR, 2006). To address similar concerns about the negative effects of effluent dumping on ecosystem health, the Florida Keys National Marine Sanctuary recently banned vessels from discharging effluent within their sanctuary (EPA, 2002). Currently, the Clean Water Act (2002) states that vessels may dump effluent in the HIHWNMS as long as they are further than 3 miles off-shore. However public opinion on the matter has become so strongly opposed to dumping, that many vessel operators have chosen to hire a company to collect their sewage, rather than face the scrutiny of an angry public (Kaufman, 2006; Koehne, 2006). The operators in Maui are frustrated with the lack of adequate pump-out facilities at their harbours, particularly because they generate over fifty percent of Hawaii's total commercial revenue for the Division of Boating and Ocean Recreation, which is responsible for the maintenance and updating of harbour facilities (Markrich, 2004). While the local population and many operators have expressed concern about vessels discharging their effluent, the opinion of the tour participants is unknown. If the tourists express a clear preference for harbour disposal of the sewage, their concern may encourage the timely installation of a pump-out facility.

Researchers have pointed out that the cumulative effect from all these impacts may threaten the humpback's recovery, arguing for a precautionary approach to

management (Berrow, 2003; Forestell, 1992). The precautionary approach is a management approach that encourages pre-emptive action to anticipate potential problems and act to prevent them before serious and irreversible damage occurs (GESAMP, 2001). As such, I will now discuss potential management actions that can be taken to proactively minimize the known effects of whale watching on the whales and their environment.

### **2.3.1 Policies to decrease whale watching impacts on humpback whales**

While some whale watching industries around the world are closely regulated with rules that dictate acceptable vessel speed, conduct and industry size (NPWS, 2002; SDWF, 2002), Hawaii's industry faces only one official regulation – a 100 yard approach limit to humpback whales within two hundred nautical miles of the islands of Hawaii (EPA, 1995). This regulation was created to mitigate some of the potential negative effects from boating on whales, such as harassment affecting behaviour and survival (DLNR, HIHWNMS and USDHS, 2006). In 1968, Hardin alerted the world to the “tragedy of the commons”, describing an open-access natural resource scenario where each user's incentive is to increase their use of the resource, providing them with direct benefits while the costs are dispersed amongst all users (Hardin, 1968). Many researchers are concerned that a marine tourism industry using an open-access resource combined with few government regulations, could lead to the undesirable scenario of a marine “tragedy of the commons” (Sinden, 2006; Neves-Graca, 2004; Carter, 2003).

While Hawaii does not have a specific permitting system for commercial whale watching per se, the state has long had regulations limiting the total number of commercial operating permits for marine tourism (including fishing, diving, snorkelling, dinner cruises etc.) under the Division of Boating and Ocean Recreation's administrative rules (Honolulu Advertiser, 2006; Kaufman, 2006). Therefore, it would be inaccurate to describe Hawaii's whale watching industry as a classic "open-access" resource, as the total number of permitted vessels is regulated. Whale watching in Hawaii can more appropriately be described as a "common-pool" resource, one that is difficult to exclude users from and that suffers from subtractability (Ward, 2006, pg. 594), but one that nevertheless has some regulation of the number of users. Unfortunately, the regulation is minimal and there is little meaningful enforcement (Cesar, 2004).

To avoid a scenario of over-use leading to habitat and population degradation, many studies have proposed regulations for whale watching and the organization(s) that might best oversee their implementation (Hoyt, 2005; Berrow, 2003; NPWS, 2002; Williams and Gjerdalen, 2000). The following types of regulations for whale watching have frequently been recommended: vessel speed limits, minimum approach distances to the whales, maximum viewing time per pod, permits to regulate the size of the industry, and conservation fees to support management, regulation and education (PWF, OTC, and HWDWA, 2005; Heckel et al, 2003; Berrow, 2003; NPWS, 2002; SDWF, 2002). These regulations are designed to reduce the effects of whale watching on whales, by minimizing disruption or harassment, reducing the likelihood and severity of vessel/whale collisions, and ensuring sufficient education and monitoring programs are established.



In Hawaii a small coalition of NGO organizations, not the government, has made an attempt to recommend standards for the whale watching industry. Their voluntary “code of conduct” addresses some of the common policy recommendations: vessel speed limits, guidelines for vessel manoeuvrability around whales, maximum number of vessels viewing one pod of whales, and effluent dumping around cetaceans (PWF, OTC, and HWDWA, 2005). It is important to note that their code of conduct is entirely voluntary, not enforced, and only followed by a few operators. However, creating such a “code of conduct” indicates a willingness from some of the industry operators to support regulation (Williams and Gjerdalen, 2000). There is some incentive for operators to support regulations for the whale watching industry, as their livelihood relies on maintaining a healthy population of whales and a good rapport with their customers (Sorice et al., 2006). The discrete choice section of the survey will be used to assess passengers’ support for potential management options within the HIHWNMS.

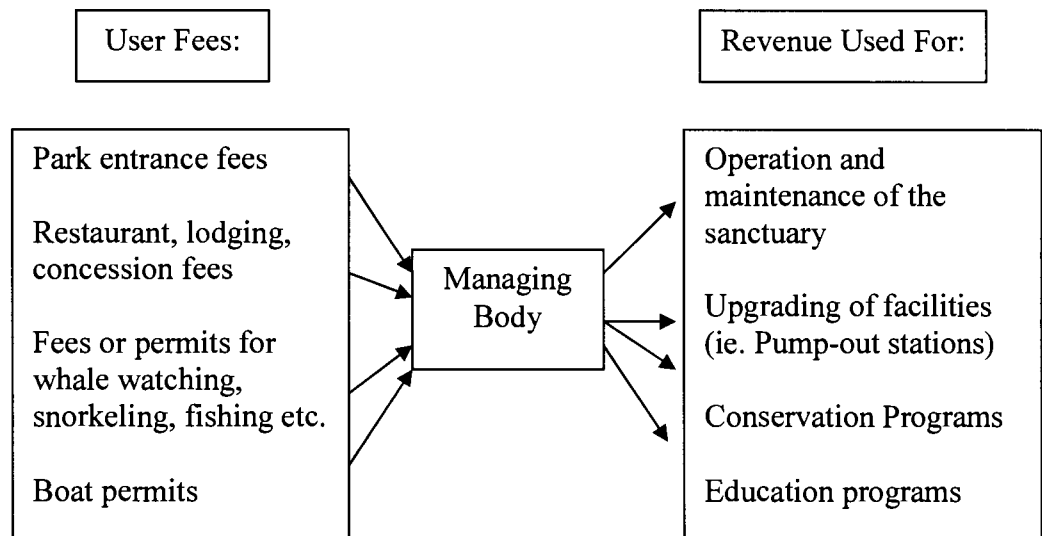
## **2.4 User Fee Systems for Management of Natural Areas**

Natural resource monitoring and enforcement agencies in Hawaii are currently understaffed and under-funded, and therefore unable to adequately address their existing responsibilities (Cesar, 2004). This situation is worsened by the fact that the state has no alternative funding mechanisms established to assist with natural resource management, such as entrance fees to marine parks (Cesar, 2004). As such, adding more responsibilities without providing additional funding would be ineffective (Walters, 2006; Cesar, 2004). The current lack of diversified financing may be undervaluing the resource and hindering marine management (GESAMP, 2001). The next few sections

will examine the literature on marine tourism user fees, a potential revenue generating strategy to support management, as well as associated implementation strategies, and public response, to assess if such a strategy may be appropriate for whale watching in Hawaii.

Many researchers agree that establishing a user-pay system, such as an entrance fee, is necessary to achieve adequately managed natural resources. It has frequently been demonstrated that nature based tourists are willing to pay a use fee that supports conservation of the natural area they are visiting (Tongson and Dygico, 2004; Arin and Kramer, 2002; Walpole et al., 2000; Van Sickle and Eagles, 1998; Laarman and Gregersen, 1996). The income generated by a user fee can bring many advantages; for example, more staff can be hired to educate operators and enforce regulations, and new infrastructure, such as educational signage and sewage treatment facilities, can be installed (Figure 1) (Van Sickle and Eagles, 1998; Laarman and Gregersen, 1996). The collection of sufficient fees also enables the managing agency to gain increasing independence from outside funding sources and establish more localized control over the natural resource, a factor found to increase the morale of the managers (Laarman and Gregersen, 1996). The potential disadvantages associated with user fee systems include opposition from the operators and/or the public, and difficulty formulating a pricing structure and a collection mechanism (Tongson and Dygico, 2004; Van Sickle and Eagles, 1998). Despite the difficulties that could arise, some areas around the world have successfully established user fees to generate funds to support marine management, enforcement, research and education programs (Tongson and Dygico 2004; Arin and Kramer, 2002; Walpole et al., 2001).

**Figure 1: Depiction of tourism user fee flows**



Based on: the Conservation Finance Alliance, 2006

#### **2.4.1 Undervalued natural areas**

A very small portion of the money spent by visitors actually goes to protecting the attractions they visit, and researchers insist that visitors are willing and able to pay far more than current rates to enter natural areas (Walpole et al., 2001; Laarman and Gregersen, 1996). Low rates to enter natural areas have made it difficult for the managers to cover their operating budgets, and thoroughly monitor impacts, enforce regulations and educate visitors (Walpole et al., 2001; Laarman and Gregersen, 1996).

Unfortunately it is often difficult to justify natural area protection, as many of the benefits derived from natural areas such as biodiversity, cultural and future existence

values are not traded on the market, and therefore are not easily assigned a monetary value (Walpole et al. 2001; Inamdar et al. 1999). Charging entrance fees to marine sanctuaries through ecotourism, has emerged as one way to finance their protection and capture the true economic value (Arin and Kramer, 2002; Walpole et al., 2001; Orams, 1995). Revenue generation through ecotourism presents itself as a tangible way to add economic value to a natural area without destructive use.

#### **2.4.2 Willingness to pay**

Walpole et al. (2001) report that visitors and residents often place a much higher value on natural areas protection than the current pricing structure indicates. As a result, some countries are now increasing the pricing for protected areas to better reflect their true value (Maille and Mendelsohn, 1993). Many case studies have been conducted recently to examine the acceptability of user fee systems for marine management and potentially acceptable levels (Walpole et al., 2001; Van Sickle and Eagles, 1998). A study that used a contingent valuation method to examine the acceptance of instituting a user fee system in Indonesia, found that the current entrance fee (US \$0.87) was insignificant to tourists, and the mean willingness to pay was \$11.70, over ten times the current level (Walpole et al., 2001).

Another study examined the willingness to pay (WTP) by scuba divers to enter marine sanctuaries in the Philippines, which currently had no fee. They found the average willingness to pay varied by site and ranged from \$3.40 to \$5.50 US (Arin and Kramer, 2002). Not surprisingly, as the proposed amount increased, the percentage of people

willing to pay decreased. A similar WTP study assessed entrance fee levels for divers, to support the operating budget of the Tubbataha Reef National Marine Park in the Philippines (Tongson and Dygico, 2004). The divers were presented with a potential price range of US \$25-\$75, and the mean willingness to pay was found to be US \$41.11. From that study a two tiered fee structure was designed and implemented (Tongson and Dygico, 2004). Revenue generated in the first two years suggests that continued annual collections will be able to cover about 28% of annual recurring costs and 41% of the core costs (Tongson and Dygico, 2004). The more common types of fees in marine sanctuaries are described in Table 1.

**Table 1: Types of Fees Collected at Marine Protected Areas**

Fee Type	Description	Examples
Entrance Fees	A “gate” fee that allows entrance into, and use of, the marine protected area	A fee to enter Hanauma Bay on Oahu
Use Fees	A fee associated with using services or facilities at the site	Fees for attending whale watch tours, visitor centres, etc.
Licenses and Permits	Required for private companies or individuals to operate a business in the marine protected area	A fee for tour operators, researchers, guides, and cruise ships to access the resource.
Voluntary Donations	Cash and in-kind gifts, often collected through non-profit organizations	Donations accepted at popular snorkelling or whale watching sites

Source: Based on Sherman and Dixon, (1991 p 109-112); and Conservation Finance Alliance (2006)

There is still debate as to whether the best administrative organization to over-see fee collection and subsequent distribution is a governmental or non-governmental organization (Sinden, 2006; Arin and Kramer, 2002). One study showed that ecotourists preferred the idea of an “environmental NGO” as the collection and managing agency (Arin and Kramer, 2002). This specific issue must be considered carefully, and selected on a case by case basis, so as to choose the most appropriate managing body or coalition for each natural area.

This chapter provided background information on marine tourism, visitor preferences for education, as well as the political, social, and environmental context for this research project. Information collected from the literature review will be used to create potential management options for the HIHWNMS, and recommend tour attributes that will be examined for their affect on passengers’ satisfaction with their tour. This study will use a passenger survey to assess whale watch passengers’ preferences for tour attributes and marine management options in the HIHWNMS. The next chapter will discuss the survey instrument in detail, paying particular attention to the discrete choice questions.

### **3 METHODS**

In the spring of 2005, I collected 488 intercept surveys on-board of two vessels operating whale watching tours from Ma'alaea Harbour on the island of Maui. In this chapter I present an overview of the survey method and design, and discuss potential sources of error. Special attention is given to describing the discrete choice method, and the theoretical premise behind it.

#### **3.1 Sampling**

During the months of March and April 2005, I surveyed passengers of two whale watching operators (Pacific Whale Foundation (PWF) and Prince Kuhio (PK)) during whale watching excursions. Both PWF and PK offer two-hour whale watching excursions on boats certified to hold up to 149 passengers, and all excursions include interpretation by a naturalist. PWF is a non-profit organization, and the largest commercial whale watching company in the state. PWF offers "ecotours" from their six boats which depart from the Ma'alaea and Lahaina harbours on Maui (PWF, 2006). PK is a smaller for-profit business that offers a "tourism" trip aboard their one boat that departs from Ma'alaea harbour (PK, 2006). I chose to sample from these two companies as they represent different operating sizes and styles within the whale watching niche. Both operators were very encouraging and helpful by allowing me to attend their whale watches and survey their customers. By allowing me to sample onboard their vessels, these operators

demonstrated a commitment to understanding their passengers and delivering the best tour possible, as well as an interest in learning about the passengers' preferences for marine tourism management.

### **3.2 Intercept Surveys**

Most whale watching tours in Maui follow one general schedule: 1) introduction to the crew and animals you will be seeing, 2) whale searching time, 3) whale viewing time and interpretation of behaviours, 4) transiting back to the harbour (Forestell, 1993). The consistent format allowed me to introduce the survey to the passengers after they had viewed the whales, and while they were on the boat transiting back to the harbour. I solicited the passengers to participate in the survey and offered them a small token, an "I Love Whales" bumper sticker, as an incentive. The survey was designed so that it could be completed in roughly 12 minutes. Most of the volunteer participants were able to complete and hand back the survey before the boat returned to the harbour.

I surveyed passengers on twenty-nine different whale watching trips, four on Prince Kuhio and twenty five on Pacific Whale Foundation. The discrepancy was partly due to the fact that PWF offered four trips a day on the boat I sampled, as opposed to PK which offered one trip daily. I was employed by PWF at the time of surveying, and as such was the naturalist on some of the tours from which I sampled. I made every effort to conduct each whale watch as PWF prescribes, and limit any bias associated with my narration. However, it did appear as though on tours where I had been the naturalist, passengers were more inclined to volunteer to complete a survey, possibly due to a



heightened feeling of connection with me. Because I joined each of the whale watches, I was able to collect information on the weather, whale behaviours, and the educational component to assess their effect on the respondents. While some variables, such as weather and number of whales, were fairly objective, other variables I collected, such as the quality of the naturalist and whale activity for the whole trip, were more subjective. To minimize the subjectivity, I recorded all of the data and attempted to evaluate each variable consistently using the same criteria. This information allowed me to describe the tour attributes and compare between them. See Appendix 1 for the data collection sheet.

### **3.2.1 Potential sources of error**

A certain bias inherent in all data collection. Dillman and Salant (1994) describe the four most common types of errors associated with surveying:

1. Coverage Error – when certain portions of the target population have more or less of a chance of being sampled;
2. Sampling Error – when the sample size is too small to ensure the needed level of precision;
3. Measurement Error – when the questions being asked are designed such that the respondents are either incapable or unmotivated to answer correctly;
4. Nonresponse Error – when a large proportion of the target population does not complete the survey, and differs significantly from the “respondents.”

When designing the survey and data collection method, I paid special attention to ensure these four errors were minimized. The coverage error was minimized by sampling on tours operated by both an ecotour and a regular whale watch company, which may attract different types of whale watchers. Requests were made to other operators for being allowed to survey on their vessels, however these requests were declined; as such, I achieved the best coverage possible.

I attempted to reduce the sampling error by collecting a large sample size. A total of 488 surveys were completed, from March 2<sup>nd</sup> to April 3<sup>rd</sup> 2005. Sampling error was also minimized by surveying on twenty-nine different whale watching tours, dispersed over weekdays and weekends. See Appendix 2 for information on the dates and times of the tours sampled.

All possible efforts were made to reduce the measurement error of the survey questions by rigorously pre-testing the survey, and soliciting feedback from experts on surveys and the specific content (Walters, 2005). Over a period of three weeks in February 2005, the survey was tested with passengers on-board the PWF vessel, and their feedback was requested. With their initial suggestions, I made changes to the questions and descriptions, and a new version was then tested. The survey went through three rounds of testing and revisions, before the final version was complete..

According to Dillman and Salant (1994) the best way to decrease nonresponse error in a survey is to increase the sample size. The fairly large sample size aided in decreasing the nonresponse error, as did the solicitation method for gathering participants. All passengers on-board the twenty-nine tours I surveyed were invited to participate in the survey, and no extra time was required of them. I asked volunteers to

identify themselves, stipulating one respondent per party, so that the naturalists and I could distribute the surveys. Only adults over the age of 18 were recruited. This distribution method could have propagated a non-response bias, because it is unknown if those who chose to participate differed significantly from those who chose not to participate. It is possible self-selection created a slight bias in two ways: (1) only a few operators chose to participate in this project, which leaves uncertainty as to how passengers may have differed on the non-participating vessels; and (2) the respondents who chose to participate from the two operators may have felt more strongly about the tour or subject of the survey than the passengers who chose not to participate. These biases may have culminated in respondents who were more environmentally inclined than the average whale watch passenger in Maui. While I am unable to calculate the exact effect of these self-selection biases, their potential existence should be noted. The survey was only offered in English, so it was unintentionally biased against any non-English speakers.

### **3.2.2 Confidentiality**

As with most surveying techniques, ensuring confidentiality of each individual's responses is very important. The first page of the survey instrument described the research project and guaranteed complete confidentiality to the respondents. The respondents were informed that should they choose, they could stop answering at any time, and that all results would be presented in the aggregate form so that no one respondent could be identified. Simon Fraser University ethics approval was granted before any research began.

### **3.3 Survey Organization**

The survey was designed to maintain interest from respondents and to encourage them to complete the instrument. Special attention was given to the visual aesthetics of the survey, by ensuring that the fonts were large enough to comfortably read on a rocking boat, and that the survey appeared uncomplicated and interesting. (See Appendix 3 for the survey instrument).

The survey had four distinct sections: 1) About your whale watch tour, 2) Preferences for management options, 3) Your views on wildlife conservation, and 4) About you. The first section utilized two different five-point Likert scale questions. These questions gathered information about which marine tour characteristics, such as whale behaviour or education, were particularly important to the respondents, as well as feedback on their whale watching experience that day.

The second section, “Preferences for management options”, began with a one-page description about the HIIHWNMS and discrete choice survey format. Discrete choice is a relatively new survey technique for resource management that asks respondents to choose between profiles of trips, and in effect provides information about their trade-offs. This section of my survey included four discrete choice questions. Each question consisted of two hypothetical whale watch scenarios describing different levels of seven common attributes, as well as the current scenario with a consistent description of these attribute levels. Section 3.4 will describe the discrete choice theory, my specific attributes, and the format in detail.

After asking the respondents to process a lot of information in section two, the third section, “Your views on wildlife conservation”, was purposely designed to be less

complex, again using the Likert scale question format. The Likert scale was: strongly agree, mildly agree, neutral, mildly disagree, strongly disagree. This section was designed to assess the “environmental ethic” of the respondent by asking questions about environmental protection and their commitment to environmental organizations.

The final section, “about you”, was designed to elicit demographic information about the respondent. Standard data were gathered, such as the respondent’s gender, age, household income and education.

### **3.4 Stated Choice Models**

Stated choice models were first utilized in market and transportation research (Hearne and Salinas, 2002; Train, 1986), however their power as a research tool has successfully brought them into use in the resource management arena (Hanley et al., 2003; Boxall et al., 1996). Stated choice models elicit information from respondents by asking them to select their preferred alternative when presented with a selection of hypothetical, mutually exclusive alternatives (Hensher et al., 2005). These alternatives consist of combinations of potential management options, which when statistically analyzed, may depict preferences for completely new alternatives (Haider, 2002). The ability of the stated choice research method to predict the response to currently non-existent alternatives makes it a very useful decision tool for managers contemplating policy changes in resource management. While concerns have been raised about the ability of participants to assimilate and consistently evaluate all the information in a discrete choice question (Hanley et al., 1998), many studies have successfully

demonstrated their use for understanding public preferences (Winslott Hiselius, 2005; Hanley et al., 2003; Rolfe and Windle, 2003).

The discrete choice survey method is often favourable for representing complex natural resource management issues, as the question format more closely resembles reality, and forces the participant to assess many variables in the context of each other (Haider, 2002). Some researchers have questioned the ability of stated preference surveys to predict future actions as effectively as revealed preference surveys, where actual choices are observed or respondents describe how they did behave in a situation (Hensher et al., 2005; Haener et al., 2001). To address this concern, Haener, et al. (2001) designed a study to test moose hunters' likelihood to act in the future as they predicted through a stated preference survey. The researchers found that the hunters' predictions through this questionnaire quite accurately predicted future hunting choices. Haener et al. (2001) also found that collecting stated preference data in person, as opposed through a mail survey, produced a better model and more accurate results.

Stated preference survey methods have some clear advantages over revealed preference survey methods. One advantage of SP surveys is that respondents consider the attributes in the context of each other, however each attribute can still be analyzed independently (Haider, 2002). Stated preference models are uniquely powerful because their design depicts the multi-attribute nature of resource management issues, and allows not-yet-existing alternatives to be explored (Haider, 2002). As such, many studies have successfully used stated preference models to test visitors' preferences for potential resource management scenarios, and simultaneously assess the visitors' willingness to

pay to protect or utilize the associated natural areas (Hensher et al., 2005; Hanley et al., 2003; Hearne and Salinas 2002; Walpole et al., 2001).

Stated preference models evolved from conjoint analysis, which is a method designed to elicit preferences from individual judgements of multi-attribute scenarios (Boxall et al., 1996). Discrete choice experiments are a complex form of stated preference; they ask respondents to select their favourite option when two or more, multi-attribute scenarios are combined in one choice question (Boxall et al. 1996; Louviere and Timmermans, 1990; see Appendix 4 for a sample question). Each unique profile or alternative is created by combining individual attribute levels. The profiles are constructed by following a statistical design plan to ensure attribute independence: this allows statistical analysis to clearly indicate how much preference is directly associated with each attribute (Haider, 2002; Raktoe et al., 1981). Research supports the claim that the results from a choice experiment more closely depict actual future behaviour than a simple rating or ranking experiment (Haider, 2002; Haener et al., 2001).

The discrete choice experiment is based on random utility theory, which states that from a set of options, an individual will choose the option that they believe provides them with the greatest utility (Haener et al., 2001; Boxall et al., 1996; Ben-Akiva & Lerman, 1985). Utility ( $U_i$ ) is comprised of two measures: a deterministic component ( $V_i$ ) and a stochastic component ( $E_i$ ) (Haener et al., 2001; Boxall et al., 1996). The stochastic component is included because the research process is unable to account for all influencing factors. Therefore, each alternative,  $i$ , in the choice set, has a utility for each respondent represented by (Boxall et al., 1996; McFadden, 1973):

$$U_i = V_i + E_i \quad (\text{equation 1})$$

In choosing one option, each respondent selects the hypothetical alternative that represents their preferred combination of attribute levels (Winslott Hiselies, 2005). The results of all these individual selections combined allow the researcher to predict the overall utility for any combination of the attribute levels, by summing the utilities of the component parts (Haener et al., 2001). Therefore, the probability that one option will be chosen over another option depends on the magnitude of difference in the deterministic components of their utilities, compared to their stochastic components (Beardmore, 2005; Louviere et al., 2000).

The error terms ( $E_i$ ) of the equation are frequently assumed to follow a Gumbel distribution (Boxall et al., 1996). An assumption of the Gumbel distribution is the property known as “Independence of Irrelevant Alternatives” (IIA), which means that “the ratio of the choice probabilities of any pair of alternatives is independent of the presence or absence of any other alternative in a choice set” (Hensher et al., 2005, p. 479). This assumption gives rise to the multinomial logit (MNL) model (Hensher et al., 2005, p. 340):

$$\text{Prob } \{i|j\} = \exp V_i / \sum_{j=1}^J \exp V_j \quad ; j = 1, \dots, i, \dots, J \quad i \neq j \quad (\text{equation 2})$$

Analysis of the data produces regression estimates, t-values and standard error values for each attribute and level. The regression estimates, or part worth utilities (PWU), can be interpreted as the relative “benefit” of each variable. Adding the part worth utility of one profile (as in equation 2) enables the researcher to predict the probability that a certain profile would be chosen.



### 3.4.1 Trip attributes

I chose the discrete choice experiment in this study, because I feel it most realistically represents the multi-attribute nature of the issues facing whale watching tourism and management in Hawaii. The discrete choice question consisted of seven attributes that describe different elements of a hypothetical whale watching situation, including trip and management characteristics. For example, one attribute was a cost parameter to assess the willingness to pay to visit the sanctuary, which enabled the analysis to compute a value scale for management options (Hensher et al., 2005).

Attributes were selected based on a few qualities: their feasibility for future management of the whale watching industry in Hawaii, and their relevance to both resident and visiting whale watchers (Hensher et al., 2005). A literature review, and consultation with Dr. Jeff Walters, the state advisor to the sanctuary (Walters, 2005), helped establish the appropriate attributes and levels. Dr. Walters was consulted as he is responsible for suggesting and implementing management actions for activities, including tourism, within the HIHWNMS. The attributes and levels presented to the respondents were the following:

*Attribute 1: Information during the tour.* This attribute presents various types of educational programs that are most frequently cited as effective or desirable for a whale watch setting (Forestell, 1992). The current scenario is different for each boat (and sometimes each trip), so it was termed “same as today”. The three other levels presented were: 1) guidebooks, 2) guidebooks and a naturalist, or 3) guidebooks, naturalist and a hydrophone.

*Attribute 2: Number of whales you see during your tour.* This attribute was based on a proportion of the number of whales the respondent saw on their trip today. The current scenario differed for each trip, and was assigned the value “Same as today”. In total four levels were presented: 1) 50% less whales, 2) 25% less whales, 3) Same as today, or 4) 25% more whales.

*Attribute 3: Pollution by tour boats.* This attribute described the management of effluent from the tour boats. The current situation was described as “sewage pumped directly into ocean”. This attribute was included because it has recently become a contentious issue in Hawaii, with increasing public opposition to the legal dumping of effluent three miles offshore (pumpdon’tdump, 2006). Two levels for this attribute were presented to the respondents: 1) sewage pumped directly into ocean, or 2) sewage pumped at harbour treatment center.

*Attribute 4: Reported incidences of boats hitting whales.* The fourth attribute defined the annual number of reported collisions between vessels and whales. This attribute was included because literature has documented recent increases in vessel/whale collisions, a pattern that has many operators and residents concerned (Star Bulletin, 2006; Lammers et al., 2003). After discussions with Dr. Jeff Walters and a literature review (Walters, 2005; Lammers et al., 2003), the current annual number of vessel/whale collisions was estimated to be five. The chosen attribute levels represent what is believed to be a realistic range for the annual number of vessel/whale collisions reported: 1) 3 collisions/year reported, 2) 5 collisions/year reported. 3) 7 collisions/year reported, or 4) 9 collisions/year reported.

*Attribute 5: Speed regulations for boats.* This attribute describes potential speed regulations for vessels. Speed regulations were included because many best practice guides for whale watching recommend regulating vessel speeds (PWF, OTC, and HWDWA, 2005; Laist et al., 2001). Currently there are no vessel speed regulations within the HIHWNMS. The attribute levels were defined as: 1) No speed regulations for boats, 2) Large boats must travel slower than 20mph, or 3) All boats must travel slower than 20 mph.

*Attribute 6: Enforcement of regulations for boats.* This attribute defined a number of potential enforcement strategies for whale watching in the HIHWNMS. Enforcement was included as an attribute in this study as it is recommended in many best practices codes for whale watching (Lien, 2001). The enforcement scenario in Hawaii was described as, “minimal monitoring”, as the current monitoring structure is generally perceived to be infrequent and insufficient (Walters, 2005; Cesar, 2004). The attribute levels that were included are: 1) All boating self-regulated, 2) Minimal monitoring, 3) Regular monitoring, or 4) Regular monitoring and increased penalties.

*Attribute 7: Conservation Access Fee - above the ticket price.* This attribute depicted a user fee, above the ticket price, that could be levied on whale watching excursions. The current whale watching scenario in Hawaii includes no user fees for the sanctuary. This attribute was incorporated because many researchers have encouraged the implementation of fees associated with ecotourism in natural areas, as a way to generate revenue for conservation, upkeep, management etc. (Laarman and Gregersen, 1996). Including a cost parameter with the discrete choice question allows the analysis to place a monetary value on all of the other attributes considered.

In order to develop a statistically valid model with a fractional factorial design, I used a Resolution III design, which needed 64 different choice sets to estimate all main effects (Montgomery, 2001). Sixteen different versions of the survey were created, each containing four different discrete choice questions. Each respondent was randomly assigned a version of the survey. While some discrete choice experiments have included more than four discrete choice questions per survey. However, given the less than ideal interviewing conditions on the boats, there was really only time (and patience) for four.

### **3.4.2 Choice model analysis**

To conduct the discrete choice analysis, most of the attributes were coded using an effects format. Effects coding was chosen because it assigns each attribute level a value, that when combined equals zero (Hensher et al., 2005). This overcomes a hurdle in commonly used dummy coding, where the attributes are coded in such a way that it ties the base level to the overall mean of the utility function (Hensher et al., 2005). This decoupling enables each attribute to be centered around its mean and enables the levels to be assessed independently (Hensher et al., 2005). Both dummy and effects coding are designed so that non-linear effects in the attribute levels may be measured (Hensher et al., 2005). Three attributes were coded to produce linear results: the number of whales seen, the number of collisions between boats and whales/year, and the conservation fee (Louviere et al., 2000). A multinomial logit (MNL) regression was used to conduct the analysis, and each individually coded frequency of response was used as the dependent variable. The data were analysed using the computer programs LIMDEP (Green, 1998), and SPSS 14.

## **4 RESULTS**

This chapter presents the results from my survey, beginning with the response rate and socio-demographic characteristics. Thereafter the results of passengers' satisfaction with their tour, desired trip characteristics, and their environmental ethic, as well as the discrete choice model results will follow. Throughout this chapter I will highlight questions where responses between Hawaiian residents and tourists, or between passengers onboard the different boats differed.

### **4.1 Response Rate**

Using the sampling technique described in the Methods Chapter, this survey had a 92% response rate. Because the respondents volunteered to participate, the vast majority of them completed the survey, with only a small proportion ( $n \approx 40$ ) not completing the survey. Those who did not finish the survey often mentioned the length as an issue. Test-runs had identified that the survey needed to be short; and despite paring the survey down substantially, it was still too long for some participants.

### **4.2 Whale Watch Trip Description**

I sampled passengers on-board whale watching trips between March 2<sup>nd</sup> 2005 and April 3<sup>rd</sup> 2005, which is considered the peak season for humpback whale watching in

Hawaii. Aggregate descriptions of the twenty-nine whale watching trips from which I sampled are summarised below in Table 2. As these data suggest, whale watch tours during the peak of the season generally encounter whales on every trip, and often see calves. Other marine life, such as turtles and dolphins, are seen with equal probability year round in Hawaii.

**Table 2: Whale watch descriptions**

<b>Description</b>				<b>Description</b>			
	<b>Description</b>	<b>Freq.</b>	<b>%</b>		<b>Description</b>	<b>Freq.</b>	<b>%</b>
<b>Time of tour</b>	morning	19	65.5	<b>Whale activity</b>	poor	1	3.4
	mid-day	8	27.6		average	10	34.5
	afternoon	2	6.9		great	18	62.1
<b>Weather</b>	sunny	23	79.3	<b># of whales</b>	one	1	3.4
	Partly cloudy	3	10.3		four to six	5	17.2
	cloudy	3	10.3		six to ten	3	10.3
			> ten		20	69	
<b>Wind</b>	calm	18	62.1	<b>Length of best whale encounter (min)</b>	0	1	3.4
	moderate	6	20.7		5	5	17.2
	strong	5	17.2		10	5	17.2
<b>Waves</b>	flat	13	44.8		15	9	31
	small waves	12	41.4		20	5	17.2
	white caps	4	13.8		25	3	10.3
<b>Precipitation</b>	none	28	96.6		40	1	3.4
	light showers	1	3.4				
<b>Turtles</b>	yes	26	89.7	<b>Breach</b>	yes	16	55.2
	no	3	10.3		no	13	44.8
<b>Dolphins</b>	yes	4	13.8	<b>Tail slap</b>	yes	9	31
	no	25	86.2		no	20	69
<b>See a calf</b>	no	2	6.9	<b>Pectoral fin Slap</b>	yes	10	34.5
	yes	27	93.1		no	19	65.5
<b># of calves</b>	0	2	6.9	<b>Competition Pod</b>	yes	9	31
	1	3	10.3		no	20	69
	2	14	48.3	<b>Fluke-up Dive</b>	yes	27	93.1
	3	5	17.2		no	2	6.9
	4	3	10.3	<b>Hydrophone</b>	yes	24	82.8
	5	2	6.9		no	5	17.2

### **4.3 Socio-Demographic Characteristics**

Socio-demographic characteristics of the respondents were collected at the end of the survey, and are summarized below in Table 3. The majority of respondents were female, well educated, affluent and American. A high proportion (65%) of the respondents were highly educated, having completed either an undergraduate or a graduate degree. The majority (56.5%) of respondents reported earning an annual household income greater than \$90,000 (USD); this reveals a striking socio-economic difference between the whale watching clientele and the “average” American household, which earns \$43,000 (USD) per year (US Census Bureau (2), 2005). All age categories were represented, with the majority of respondents falling within the 40-60 age range. This age distribution closely mirrors the current US population structure (US Census Bureau (1), 2005).

The majority of respondents were sampled on the ecotour whale watch (432 or 88.5%), while 56 respondents (11.5%) were sampled from the regular whale watch trip. Seventy-four Hawaiian residents completed the survey, representing 15.2% of the total sample size. The Hawaiian (HI) residents differed significantly from non-residents on three demographic categories: the HI residents were younger, slightly less educated, and had a lower household income.

**Table 3: Socio-Demographic Characteristics of Respondents**

		<b>General</b>		<b>HI res.</b>	<b>Non res.</b>
		<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>Freq.</b>
<b>Age Category</b> **	18-29	56	11.5	15	41
	30-39	92	18.9	20	72
	40-49	136	27.9	12	124
	50-59	120	24.6	20	100
	60-69	60	12.3	5	55
	70 or over	14	2.9	0	14
	Missing	10	2	2	8
<b>Gender</b>	Male	183	37.5	23	160
	Female	297	60.9	51	246
	Missing	8	1.6	0.0	8
<b>Maximum Level of Education Achieved</b> **	elementary school	2	0.4	1	1
	high school	57	11.7	12	45
	technical training	40	8.2	11	29
	undergrad degree	148	30.3	17	131
	graduate degree	168	34.4	20	148
	other	14	2.9	0	14
	Missing	59	12.1	14	45
<b>Annual Household Income</b> **	Under \$30,000	35	7.2	15	20
	\$30,000-\$59,999	70	14.3	23	47
	\$60,000-89,999	86	17.6	17	69
	\$90,000-\$119,999	108	22.1	8	100
	\$120,000 and over	140	28.7	8	132
	Missing	49	10	3	46
<b>Country of Residence</b>	USA	433	88.7	74	359
	Canada	36	7.4	0	36
	Other	11	2.2	0	11
	Missing	8	1.7	0	8

Note: \*\* Indicates Pearson Chi-Square 2-sided sig. at <0.05 difference between HI res. and Non res.



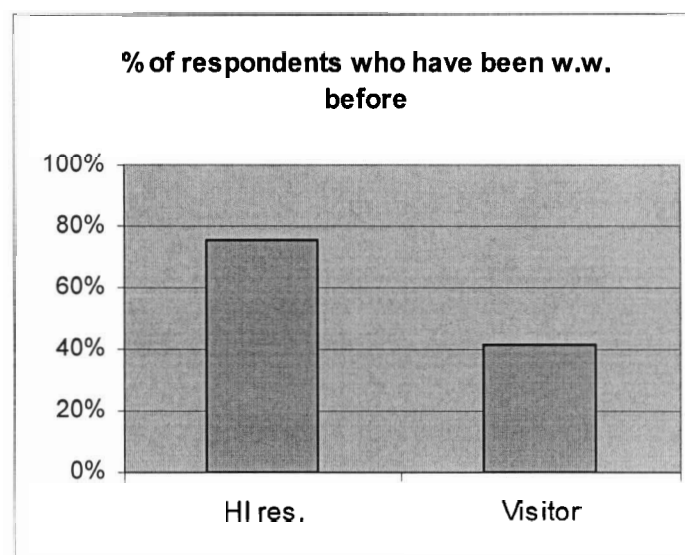
#### 4.4 Passenger Commitment to Whale Watching

A few questions were included in the survey to gauge the respondents' commitment to whale watching. The results show that just under half (45.1 %) of the respondents had been on a whale watch previously (Table 4). Hawaiian residents, as compared to non-residents (Figure 2), and passengers on-board the ecotour, as compared to those on the regular tour (Figure 3), were both more likely to have been whale watching before.

**Table 4: Previous whale watching experience**

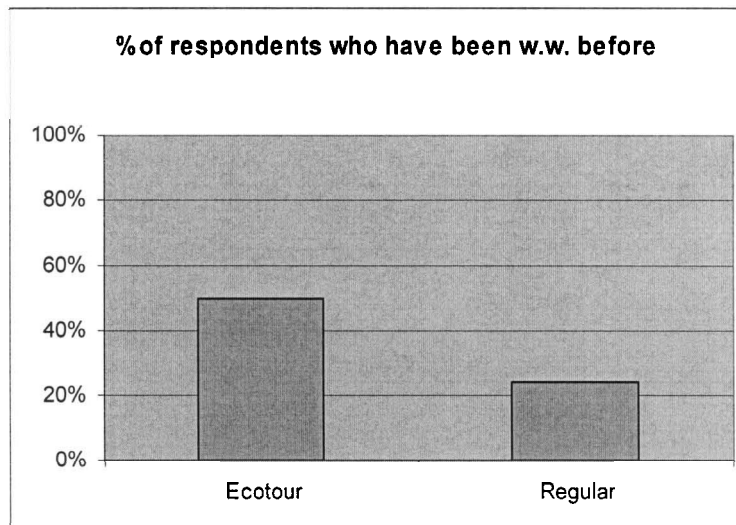
	<b>Freq.</b>	<b>%</b>
No	252	51.6
Yes	220	45.1
Missing	16	3.3

**Figure 2: Previous whale watching – by residence**



Note: 2 tailed Chi Square significance = 0.000

**Figure 3: Previous whale watching – by operator**



Note: 2 tailed Chi Square significance = 0.000

The second question asked those with previous whale watching experience (n=220), how many trips they had been on (See Table 5). Exactly half (50.5%) of those with previous whale watching experience had been once or twice before, and a further 37% had been on three to ten whale watches.

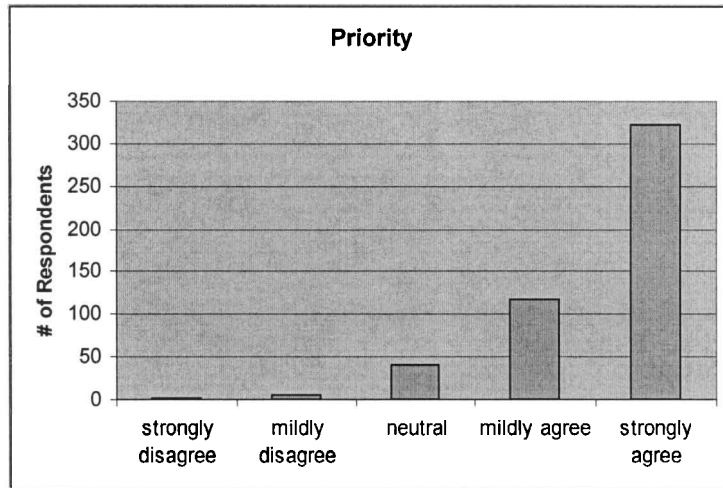
**Table 5: How many previous whale watches?**

	<b>Freq.</b>	<b>%</b>
1 to 2	108	49
3 to 6	60	27
7 to 10	19	8.6
11 to 20	17	7.7
More than 20	10	4.4
Missing	6	2.7

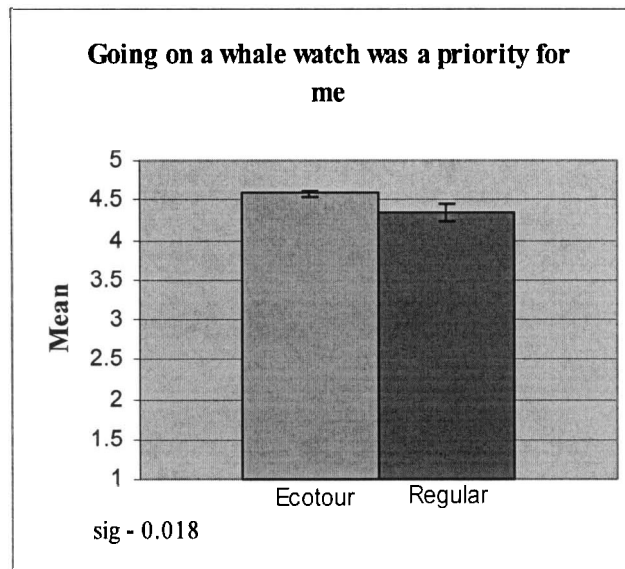
Two-thirds (66%) of the respondents strongly agreed that attending a whale watch was a priority for them (see Figure 4). Respondents from the two tours differed in

evaluating this priority (see Figure 5); the ecotour passengers rated attending a whale watch tour as a higher priority. These data demonstrate the respondents' high level of commitment to the activity.

**Figure 4: Going on a whale watch was a priority for me.**



**Figure 5: Whale watching priority – by operator**



Note: 1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree

## **4.5 Tour Satisfaction**

The first section of the survey used Likert scale questions to assess the respondents' satisfaction with different elements of their whale watching trip. Overall, the respondents showed very high levels of satisfaction with their tour (see Table 6) as all attributes, except one, received a mean score greater than 4.5. Only the attribute "on this tour I was told how I can help Hawaii's marine environment" received a lower score. While this attribute did received a mean of "mildly agree" (m=4.01), it was scored significantly lower then the other values.

The majority (72.7%) of respondents strongly agreed with the statement, "I was satisfied with the amount of information about whales that was delivered on today's tour." The respondents appear to have appreciated that both of the operators had a naturalist on-board each whale watch who provided a commentary during the tour.

**Table 6: Satisfaction with the whale watching tour**

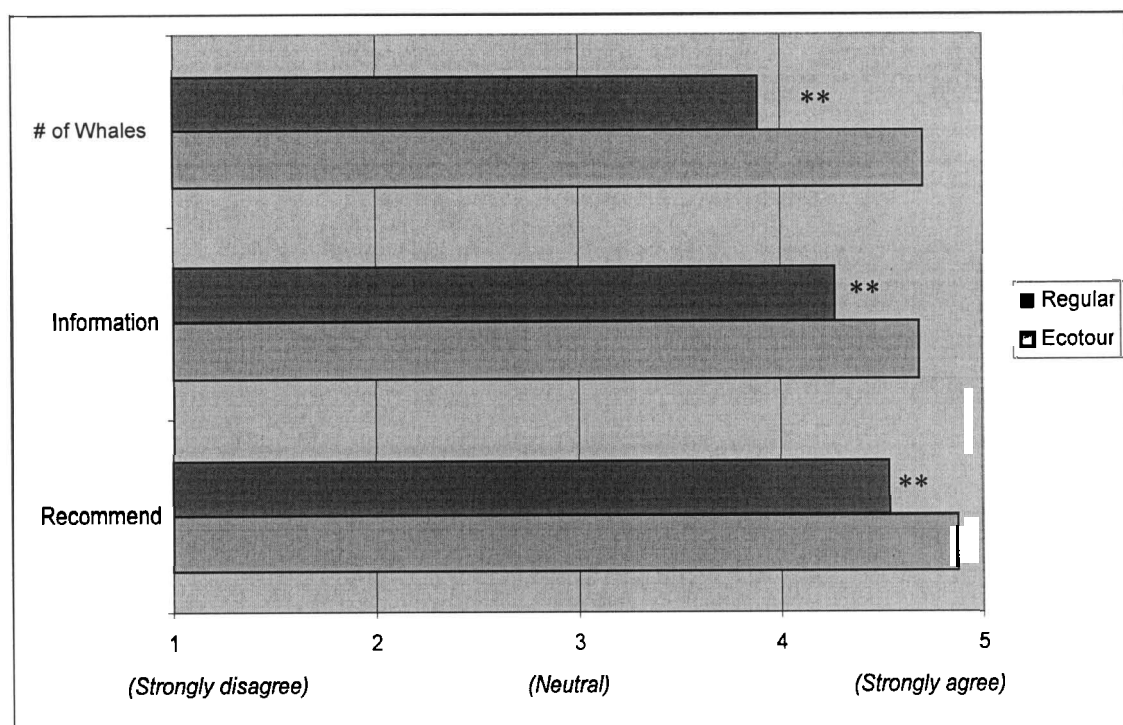
	Strongly disagree (%)	Mildly disagree (%)	Neutral (%)	Mildly agree (%)	Strongly agree (%)	Mean	SD
I would definitely recommend this trip to my friends and family	0.4	0	1.4	12.3	85.9	4.83	0.467
I was satisfied with the amount of information about whales delivered on today's tour	0.8	1.2	4.3	20.9	72.7	4.63	0.701
I was satisfied with how close we got to the whales	1	3.3	3.5	18.2	74	4.61	0.793
I was happy with the number of whales I saw on today's tour	0.8	3.9	4.1	16	75.2	4.61	0.809
The boat was not overly crowded	0.8	2.9	5.3	22	68.9	4.55	0.792
On this tour I was told how I can help Hawaii's marine environment	2.3	6.8	16.2	37	37.8	4.01	1.008

Note: 1 – Strongly disagree, 2 – Mildly disagree, 3 – Neutral, 4 – Mildly agree, 5 – Strongly agree

It is interesting to note that those passengers who had been on a whale watch tour previously were happier with the number of whales they saw on this excursion (mean=4.69), as compared to first time whale watchers (mean=4.52) (Sig. 2-tailed=0.031). Passengers on-board the ecotour appear to have been slightly more satisfied with their tour, as demonstrated by the following attributes: satisfaction with the

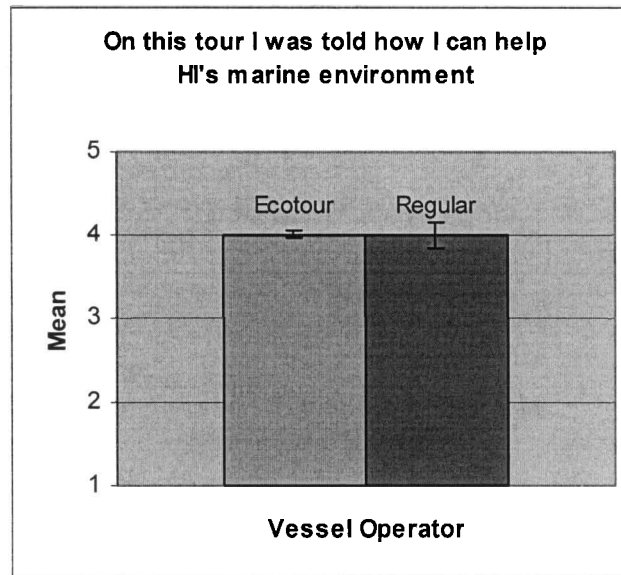
number of whales seen, satisfaction with the amount of information delivered, and likelihood to recommend the tour (see Figure 6). No significant differences emerged between respondents of the two different tour companies on the question, “on this tour I was told how I can help Hawaii’s marine environment.”

**Figure 6: Desired tour attributes – by operator**



Note: \*\* indicates significance at  $p < 0.01$

**Figure 7: Told how to help Hawaii's marine environment – by operator**

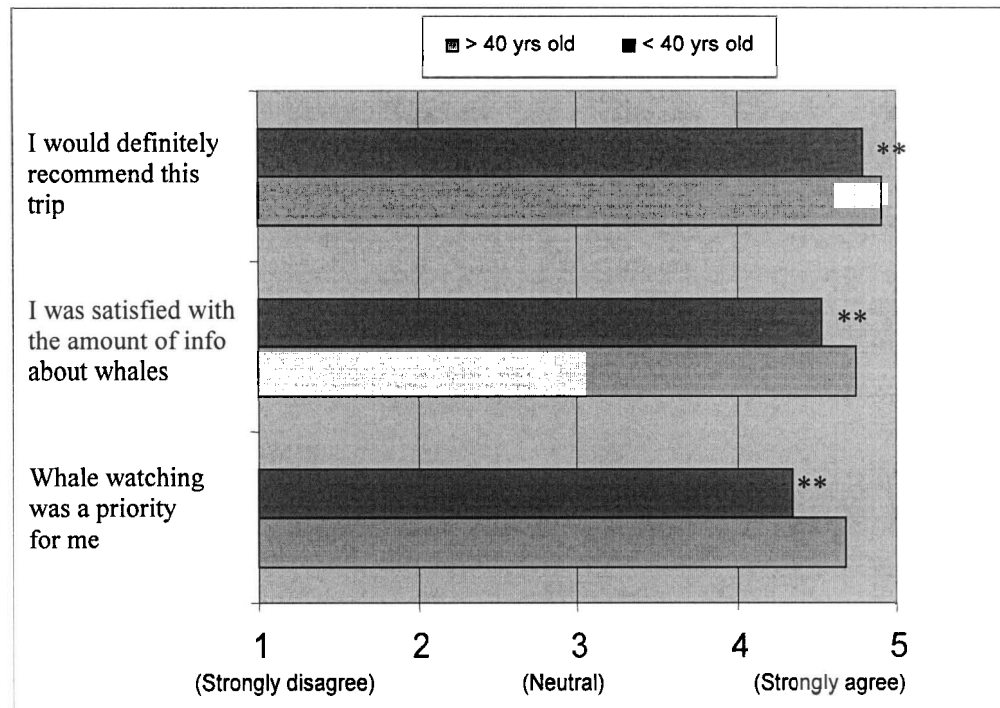


Note: 1=Strongly disagree, 2=Mildly disagree, 3=Neutral, 4=Mildly agree, 5=Strongly agree

#### **4.5.1 Demographic effects on tour satisfaction**

Satisfaction with the tour remained fairly consistent across different demographic sub-groups. While income and education levels had no significant effect on the passengers' satisfaction with their whale watching tour, the respondents' age had a significant impact on satisfaction (Figure 8). Younger participants (under the age of 40) listed whale watching as a lower priority, and were slightly less enthusiastic about the overall experience. Despite this difference, the younger audience were still very satisfied with the tour.

**Figure 8: Tour satisfaction – by respondent age**



Note: \*\* indicates significance at  $p < 0.01$

#### 4.5.2 Effect of tour attributes on passenger satisfaction

A few attributes of the tour were found to significantly improve the mean response to, “I would definitely recommend this trip to my friends and family”. The tour operator, using a hydrophone, as well as seeing a tail slap, turtles and more whales, all positively affected the mean likelihood to recommend the tour (Chi-Square significance  $< 0.05$ ). See Appendix 5.



#### **4.6 Desired Tour Attributes**

The next portion of the survey asked respondents to rate the importance of certain tour attributes for their enjoyment of a marine tourism experience (see Table 8). All but two of the attributes were evaluated as very important with a mean greater than 4. Viewing marine life, minimizing the boats' impacts on marine life, and learning, were cited as the most important tour attributes. Feeding marine life was the only attribute that was rated as somewhat unimportant, with a mean score of 2.29.

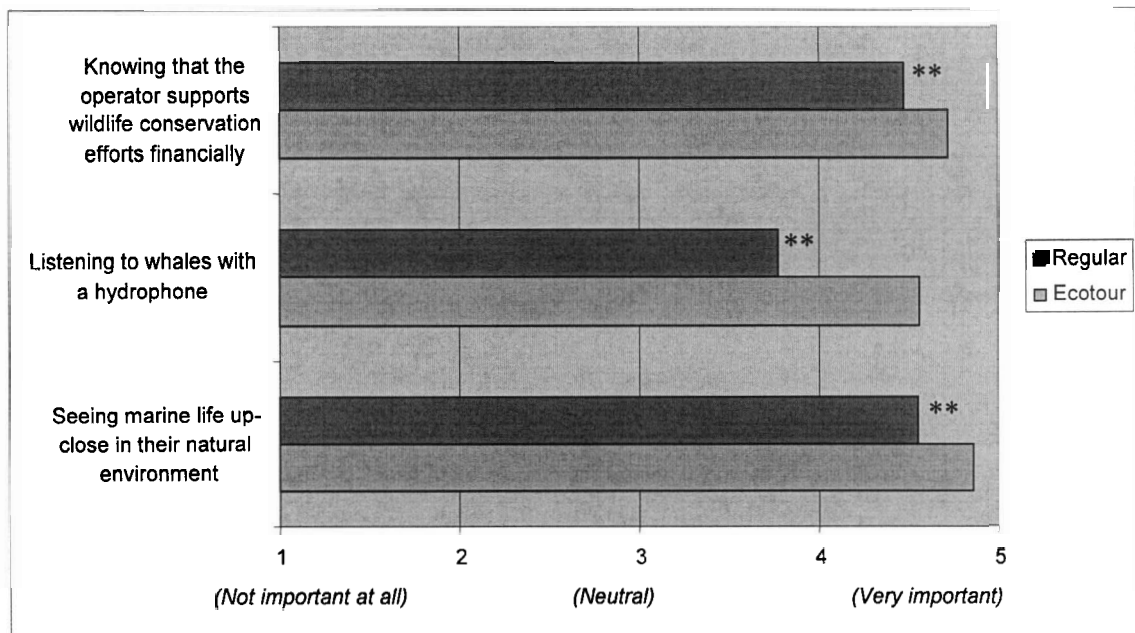
**Table 7: Importance of tour attributes for your enjoyment of a marine tourism experience**

	Not important at all (%)	Somewhat unimportant (%)	Neutral (%)	Somewhat important (%)	Very important (%)	Mean	SD
Seeing marine life up-close in their environment	0.4	0	0.8	14.5	84.2	4.82	0.46
Knowing that the tour operator financially supports wildlife conservation	0.8	1	4.6	15.1	78.4	4.69	0.68
Minimizing the tour boats' impacts on marine life	1	0.6	10.4	21.3	66.7	4.52	0.79
Listening to and interacting with a naturalist	0.2	0.8	5.8	35.3	57.9	4.5	0.66
Listening to whales through a hydrophone	0.4	0.8	9.1	30.7	59	4.47	0.73
Photography	1.3	3.6	11.9	40.4	42.9	4.2	0.87
Learning about marine life from written material	2.1	3.1	24.5	45.1	25.2	3.88	0.89
Feeding marine life	40.7	10.4	31.3	13.8	3.8	2.29	1.23

Note: 1=not important at all, 2=somewhat unimportant, 3=neutral, 4=somewhat important, 5=very important

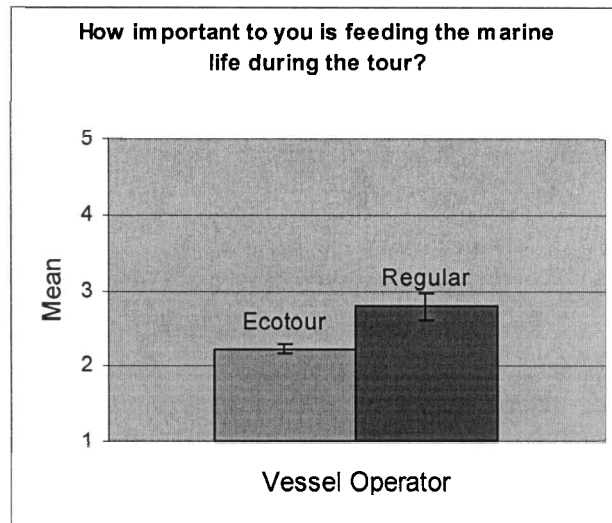
While Hawaiian residents did not differ significantly from the average respondent on the importance of various trip attributes, those passengers with previous whale watching experience did. Repeat whale watchers were more concerned about minimizing the impacts of whale watching boats on marine life (mean=4.63, Sig.=0.006), and ensuring that the operator supports conservation efforts financially (mean=4.77, Sig.=0.018). Participants from the ecotour and regular whale watch tours differed on several attributes, including: the importance of seeing the whales up-close, knowing that the operator supports conservation efforts, and listening to the whales with a hydrophone (see Figure 9). Interestingly, there was no significant difference between respondents from either operator on their sentiment towards feeding marine life (see Figure 10).

**Figure 9: Desired tour attributes – by operator**



Note: \*\* Indicates significance at  $p < 0.01$

**Figure 10: Importance of feeding marine life – by operator**



Note: 1=Not important at all, 2=Somewhat unimportant, 3=Neutral, 4=Somewhat important, 5=Very important

## **4.7 Environmental Ethic**

The third section of the survey was designed to elicit the respondents' over-all "environmental ethic", through questions assessing support for endangered species protection and the respondents' contributions to environmental organizations. Aggregate responses are presented below in Table 8. While these results demonstrate the respondents' general environmental sentiment, the mean values for these questions are noticeably closer to "neutral" than in any other part of the survey. Two attributes received greatest agreement among respondents: the passengers disagreed that plants and animals were primarily to be used by humans, and agreed that we must prevent any type of animal from becoming extinct even if it means making personal sacrifices.

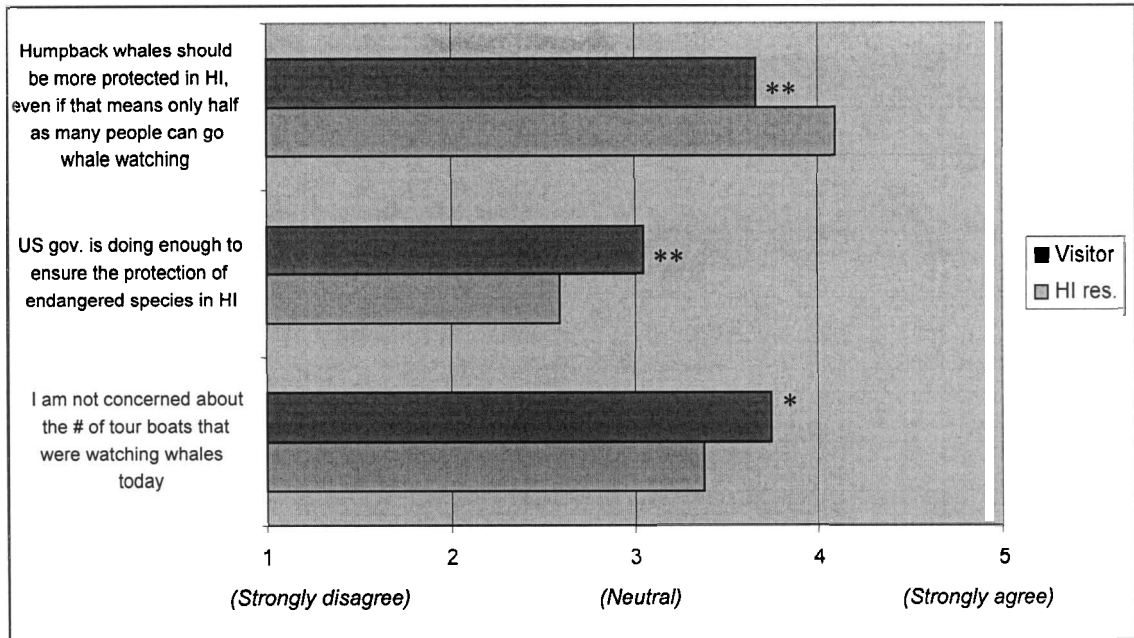
**Table 8: Passengers' Environmental Ethic**

	Strongly disagree (%)	Mildly disagree (%)	Neutral (%)	Mildly agree (%)	Strongly agree (%)	Mean	SD
The U.S. government is doing enough to ensure the protection of endangered species in HI	14.4	20.6	25.6	31.6	7.8	2.98	1.189
Plants and animals exist primarily to be used by humans	62.8	17.2	10.3	6.1	3.6	1.7	1.1
We must prevent any type of animal from becoming extinct, even if it means making personal sacrifices	7.9	7.1	6.7	25.7	52.5	4.08	1.261
Humpback whales should be more protected in HI, even if that means only half as many people can go whale watching	5.2	10.7	19.9	34.4	29.8	3.73	1.151
I am not concerned about the number of tour boats that were watching whales today	8	12.8	18.5	23.9	36.8	3.69	1.301

Note: 1=Strongly disagree, 2=Mildly disagree, 3=Neutral, 4=Mildly agree, 5=Strongly agree

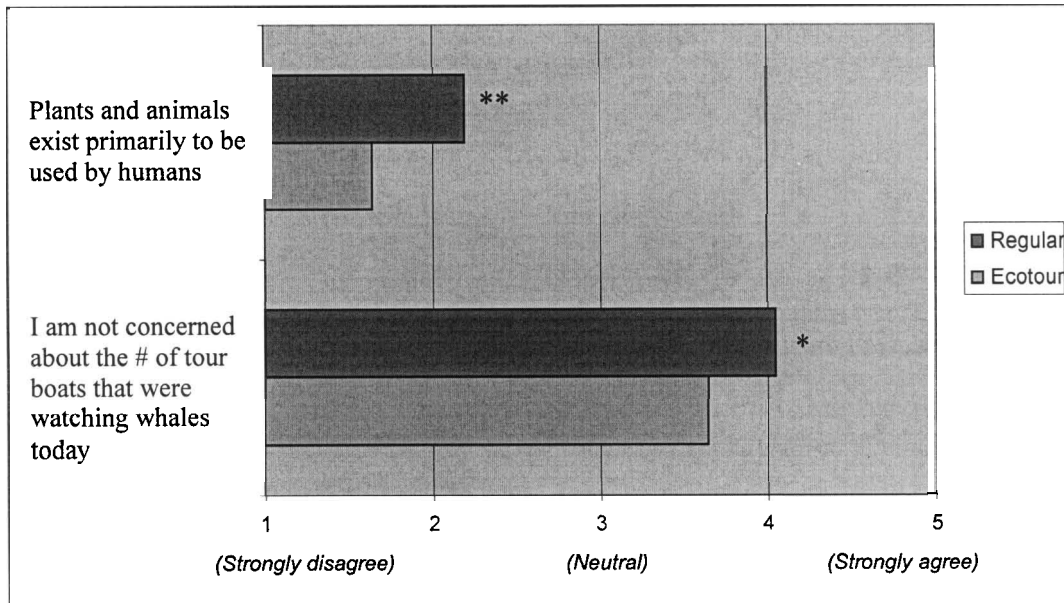
Respondents on the ecotour and HI residents answered some of these questions differently. Both the ecotour passengers and Hawaiian residents appear to be more concerned about environmental protection in Hawaii. For example, while the majority of respondents slightly agreed that the US government is doing enough to ensure the protection of endangered species in Hawaii, the Hawaiian residents clearly disagreed with that statement. These differences are highlighted in Figure 11 and Figure 12.

**Figure 11: Environmental concern – by residence**



Note: \* indicates significance at  $p < 0.05$ , \*\* indicates significance at  $p < 0.01$

**Figure 12: Environmental concern – by operator**



Note: \* indicates significance at  $p < 0.05$ ; \*\* indicates significance at  $p < 0.01$

Information was collected about the respondents' current support of environmental organizations through financial donations or volunteering. A significant portion of the respondents donate either their time or money, however most of those who donate money give less than \$100 over the year (see Tables 10, 11 and 12).

**Table 9: Volunteer**

**Do you regularly volunteer for any organizations primarily concerned with wildlife conservation or the natural environment?**

	Freq.	%
No	412	84.4
Yes	65	13.3
Missing	11	2.3

**Table 10: Donate money to any organization primarily concerned with wildlife conservation or the natural environment?**

	Freq.	%
No	285	58.4
Yes	190	38.9
Missing	13	2.7

**Table 11: How much do you donate?**

**If you do contribute financially, how much annually?**

	Freq.	%
\$1-50	54	28.4
\$51-100	55	29
\$101-250	41	21.5
\$251-500	24	12.6
more than \$500	12	6.3
Missing	4	2.1

#### **4.8 Discrete Choice Analysis: Whale Watching Model**

As was described in the methods chapter, a set of discrete choice questions featuring seven attributes describing hypothetical whale watching tours was also included in the survey. Three different categories of attributes were explored in the discrete choice section: trip characteristics (on-board education, # of whales seen, and collisions with whales); management options (speed regulations, sewage disposal, and enforcement); and a payment vehicle (conservation fund, and amount). The results of the choice model are summarized below in Table 12. This model is highly significant as all attributes have at least one significant level. All estimates point in the intuitively correct direction.

Table 12 provides the attribute levels, with their associated coefficient, standard error, t-value and p. For effects coded attributes (education, pollution, speed, enforcement), the coefficient value represents the difference for each level from the attribute mean value. The estimates can be graphed for each attribute for ease of interpretation. By comparing the PWU of one attribute level to another, we can understand the relative importance and value of each proposed option.

To remain consistent throughout the study results, separate models were calculated for Hawaiian residents and non-residents, and for passengers on-board the different vessels. No significant differences were found between the two boats. However, a significant difference emerged between Hawaiian residents and non-residents in their likelihood to select an alternative scenario versus the current situation. All else being equal, the Hawaiian residents were significantly more likely than the non-residents to select an alternative, and not the current scenario (Sig.  $p < 0.05$ ). This difference was evident in the Intercept value, where Hawaiian residents had a positive value, signifying



their likelihood to select an alternative scenario, compared to the near zero Intercept value of the non-residents, which demonstrating their indifference to the scenario label name.

**Table 12: Discrete Choice Model Results**

$R^2 =$  0.1710  
 $R^2(0) =$  0.1679  
 $L\text{-squared } (L^2) =$  -1735.1

Attributes	Levels	Coeff.	s.e.	t	P
Education during Tour	guide books	-0.2951			
	guide books and naturalist	0.0746	0.0374	1.9950	<b>0.0461</b>
	guide books, naturalist and hydrophone	0.2205	0.0642	3.4370	<b>0.0006</b>
Pollution by tour Boats	harbour disposal	0.3213			
	ocean disposal	-0.3213	0.0243	-13.242	<b>0.0000</b>
Speed regulations for boats	No speed regulations	-0.4264			
	Large boats speed limit	0.0806	0.0251	3.2060	<b>0.0013</b>
	All boats speed limit	0.3458	0.0565	6.1150	<b>0.0000</b>
Enforcement of regulations for Boats	self-regulated	-0.4886			
	minimal monitoring	-0.0462	0.0633	-0.7290	0.4658
	regular monitoring	0.0971	0.0656	1.4800	0.1388
	regular monitoring and increased penalties	0.4377	0.0649	6.7450	<b>0.0000</b>
Number of whales you see during your tour	Number of Whales (Linear)	0.3711	0.0351	10.5590	<b>0.0000</b>
	No of Whales (Quadratic)	-0.0912	0.0390	-2.3390	<b>0.0193</b>
Reported incidences of boats hitting whales					
	Incidents (Linear)	-0.3763	0.0348	-10.823	<b>0.0000</b>
Support conservation fund	Do not pay into Conservation Fund	-0.1545			
	Pay into Conservation Fund	0.1545	0.0576	2.6800	<b>0.0074</b>
Amount of conservation fee	Conservation Fee Amount	-0.0271	0.0130	-2.0800	<b>0.0375</b>
	INTERCEPT	0.0851	0.1344	0.6330	0.5266

Note: Bold indicates significance at  $p < 0.05$

#### **4.8.1 Discrete choice – trip characteristics**

The first set of attributes I will present are those describing the whale watching trip: on-board education, # of whales seen, and collisions with whales. Figures 13, 14 and 15 graphically present the data. Figure 13 shows the respondents preferences for structured on-board educational programming. The option with the greatest benefit consists of a diversified on-board educational package that includes guidebooks, a hydrophone and naturalist commentary.

Figure 14 demonstrates the respondents' sensitivity to the number of whales they see during a whale watch. The x-axis shows a range from 50% less to 25% more whales than the respondents saw on their tour. The respondents PWU for this attribute was best described using a linear/quadratic curve, which shows a large negative PWU associated with seeing fewer whales than they saw on their tour that day. Compared to all of the other attributes in this model, seeing much fewer whales received a substantially lower PWU.

Figure 15 demonstrates the respondents' concern over vessel/whale collisions. The graph depicts a negative linear relationship between PWU and the annual reported number of vessel/whale collisions; fewer vessel/whale collisions are associated with a higher PWU for the respondents.

Figure 13: Discrete choice results – on-board education

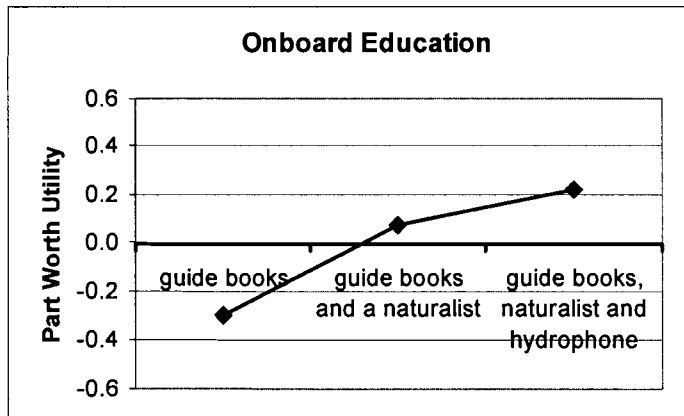


Figure 14: Discrete choice results – # of whales seen during tour in comparison with the current trip

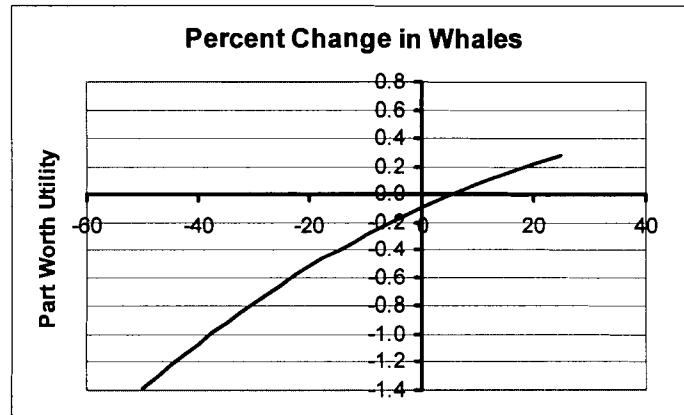
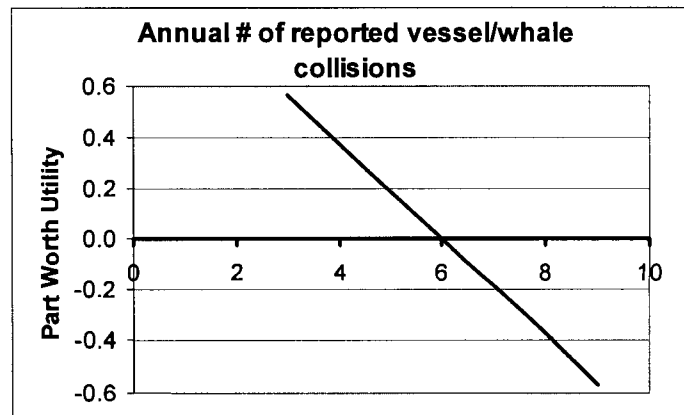


Figure 15: Discrete choice results – vessels colliding with whales



#### **4.8.2 Discrete choice - management tools**

The second group of attributes describe management options for whale watching in Hawaii: speed regulations, sewage disposal, and enforcement of regulations (see Figures 16, 17 and 18). Figure 16 presents the passengers PWU associated with regulating vessel speed in the Hawaiian Island Humpback Whale National Marine Sanctuary. The survey respondents show a positive PWU associated with speed regulations for large boats, and a greater PWU for speed regulations for all boats. There are currently no speed regulations in the HIHWNMS.

Figure 17 presents the passengers PWU associated with harbour versus ocean disposal of vessel sewage. Between these two options, the respondents had a clear preference for disposal of vessel sewage at a harbour treatment facility.

Figure 18 shows the passengers PWU associated with enforcement options for regulating boats. The two middle levels were not significantly different from the mean; however, the two outside levels were both significant. Ambiguous wording of the attribute levels may have caused the lack of significance. Regular monitoring and increased penalties was the preferred management option.

Figure 16: Discrete choice results – speed regulations for boats

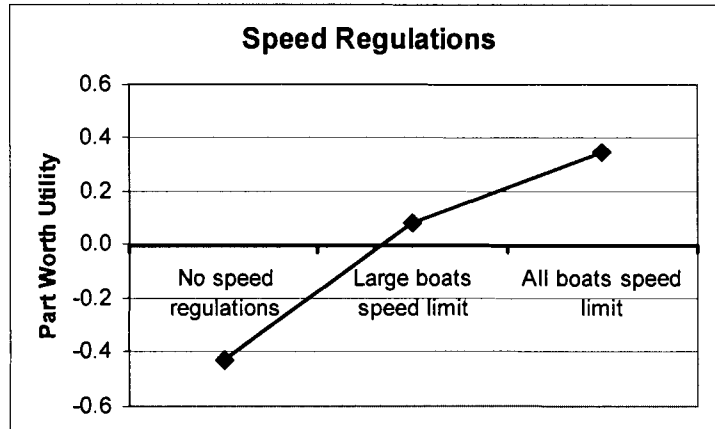


Figure 17: Discrete choice results – vessel sewage disposal

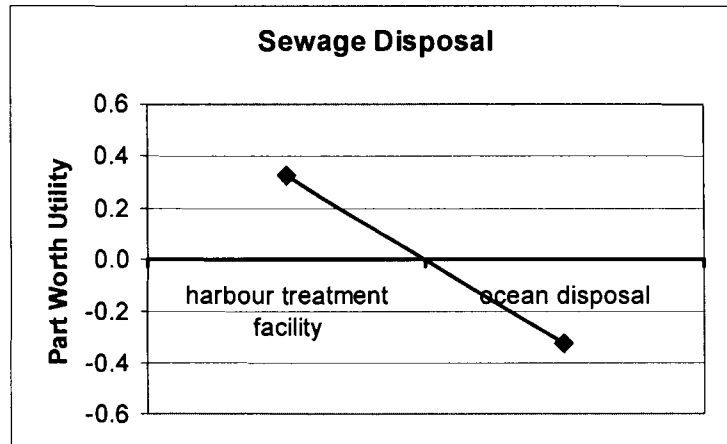
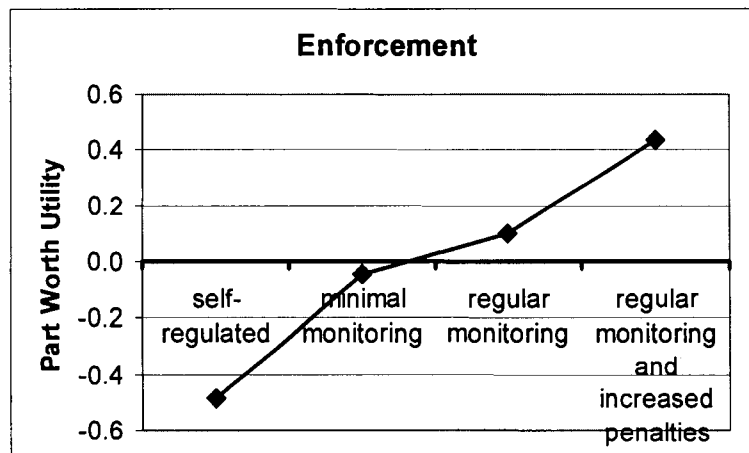


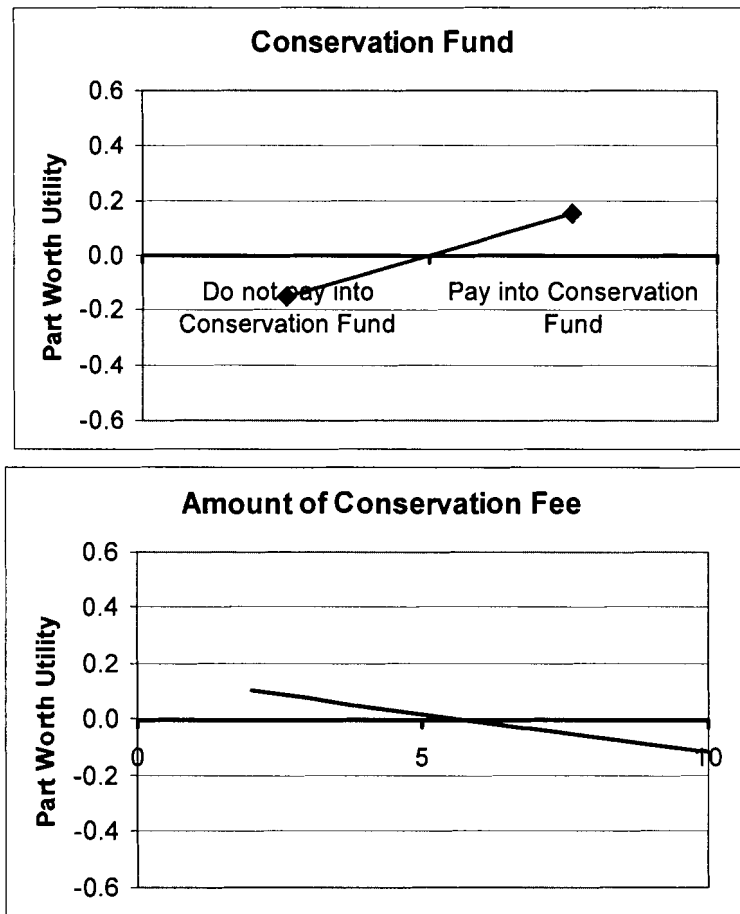
Figure 18: Discrete choice results – enforcement of regulations



### **4.8.3 Discrete choice – payment vehicle**

The final attribute in this model is the payment vehicle, a proposed conservation access fee used to support increased conservation, research and management for the marine sanctuary. Figure 19 presents two graphs associated with the conservation fund, the first graph shows the respondents interest in supporting such a fund in principle, and the second shows the PWU associated with potential amounts for a conservation access fee. It is interesting to note that there is an overall willingness to contribute to a conservation access fund. The PWU associated with the fee amount is demonstrated by a negative linear relationship, where paying less provides a greater PWU to the participant, although the slope is low. The small change in PWU over the potential price range indicates the passengers' relative insensitivity to this attribute.

Figure 19: Discrete choice results – conservation fund



These data combined with all other results, establish an overall whale watcher support for tour attributes, and management of the Hawaii whale watching industry. Chapter Five will discuss the implication of these results and their contribution to the larger body of knowledge around management of marine protected areas and whale watch passenger preferences.

## **5 MANAGEMENT IMPLICATIONS AND CONCLUSION**

The main goal of this study was to understand the preferences of whale watch passengers in Maui, Hawaii, for various attributes of the whale watch trip and possible marine management strategies. These results will provide the operators and managers with information about the whale watch passengers that can be used to make more informed decisions for future management of the whale watching industry in the HIHWNMS. This chapter begins with an assessment of the model validity and study limitations, and then follows with further discussion of the study results and implications for operators and managers in Maui. Finally, suggestions are presented for future research that could build on the findings from this study.

### **5.1 Maui's Whale Watch Passengers**

The combination of demographic results, discrete choice results, and survey comments paint a clear picture of the “typical” whale watch passenger in Maui. My results confirmed the findings of past studies on whale watch passengers that described the majority of passengers as female, well educated, and affluent (Meadows, 2002; Neil et al., 1996; Kaufman et al., 1987). It is worth noting that most tourists in Hawaii paid a substantial amount of money to fly to Hawaii and stay in accommodations, before they were able to join a tour. Therefore, it is not surprising that the average household income for whale watch passengers was over \$90,000/year (USD). Recognizing the relative



affluence of the passengers may encourage the operators and managers to consider implementing fees.

Some results of this study indicated different trends from past research; one such area was in the proportion of passengers who had been whale watching previously. Two studies published in the 1990's (Neil et al., 1996; Forestell, 1993) reported that fewer than a quarter of the whale watch participants had been whale watching previously; however, a whale watch study published in 2002 (Meadows) reported that a slight majority of passengers had been whale watching previously. Given the significant growth of the whale watching industry, it is not surprising that a 2002 study (Meadows) as well as my own both found that roughly half of the participants had been whale watching before. This finding is important to the operators for three reasons: 1) those passengers who chose to return were likely satisfied with their first whale watching tour; 2) knowing that passengers will return helps to provide long-term security for the industry; and 3) knowing that half of the passengers have previous whale watching experience emphasizes the importance of keeping the tour components new and fresh, so that passengers continue to have a reason to come back.

## **5.2 Educational Desires of Maui's Whale Watch Passengers**

The opportunity to learn during a tour is described as one of the main motivations for nature based tourists (Fennell, 1999; Roggenbuck et al., 1990), and is a desired outcome from attending a marine ecotour (Luck, 2003; Orams 2000). Data from this study support past studies in finding that a structured education program with a naturalist

was highly desired and appreciated by passengers (Luck 2003; Neil et al., 1996). The respondents in this study rated “listening to and interacting with a naturalist” as the fourth most important factor affecting their satisfaction with a marine tour, with a mean score between somewhat and very important.

Both tour operators from which I sampled offered comprehensive educational programs for their passengers, which included available written material, and interpretation by a naturalist. The PWF tour often included the use of a hydrophone to listen to the whales, and PK’s naturalist often brought educational props (such as whale models) to help educate and entertain the guests. With this high level of commitment from the operators and naturalists to deliver quality educational programs, it is not surprising that the respondents were very satisfied with the educational components of their tour. Many respondents commented on the educational program, or indicated specific educational attributes of the tour they enjoyed. For example:

*“I think the educational part (of the tour) helps build support for conservation”*

*“This was a totally enjoyable family experience! Mahalo”*

*“This was a good learning trip”*

*“We had an awesome experience and love to see the whales protected!”*

*“This was a very enjoyable trip. Excellent educational experience.”*

The results from the survey, combined with my observations during these tours confirm that these operators both have a structured educational program in place. This differed from previous studies that surveyed on tours in New Zealand where no

structured educational programs were in place, and found that the passengers were dissatisfied, because they had expected more interpretation and education (Luck, 2003; Orams, 2000). Both operators in the present study can feel confident that they are delivering high quality educational programs that are meeting the expectations of their passengers.

However, these passengers were less satisfied with one educational attribute. As described in the Results chapter, passengers desired more information during the tour about how they could help Hawaii's marine environment. Comments such as, "*Give more info on how to help, volunteer, contribute,*" emphasize this desire. This comment identifies an interesting opportunity, where whale watching organizations could work together to establish regularly scheduled weekly volunteer opportunities that interested passengers, as well as other visitor or residents, could get involved in. Beach clean-ups, turtle surveys, or turtle nesting beach patrols are examples of potential volunteer initiatives. One of the main arguments in support of ecotourism is that it provides a structured educational opportunity and informs participants about how they can help the environment that they are visiting (Luck, 2003; Townsend, 2003; Garrod and Wilson, 2003; Forestell, 1993). Unfortunately, the respondents in this study were only in mild agreement that they had learned how they could help Hawaii's marine environment (see Figure 7). It is particularly unfortunate to see that the ecotour company (PWF) received its lowest satisfaction score on this value, as The International Ecotourism Society (2006) states that an important tour objective for any ecotour should be to educate visitors about how they can help the environment they are visiting. Providing sufficient environmental

education and action opportunities appears to be one component that both of the operators could improve upon.

### **5.3 Desired Trip Characteristics**

In order to obtain information about the passengers' preferred tour attributes, respondents rated a series of attributes for their importance for enjoyment of a marine tourism experience. All of the tour attributes except "available written material" and "feeding marine life" received a mean score greater than somewhat important (> 4.0). The order in which passengers ranked important attributes for a marine tourism experience is very interesting, and clearly demonstrates the desires and motivations of the respondents (see Table 7). The characteristic which passengers ranked most important was "seeing marine life up-close in their natural environment," a response that is not surprising because that desire was likely the main motivation that brought them on-board the vessel. Similar studies on whale watch passengers have reported different findings on the importance of proximity to whales; Orams (2000) found that proximity of the boat to whales was not an important influence on whale watcher satisfaction. Valentine et al., (2004) found that getting closer to whales did significantly improve visitor satisfaction. However, there was a difference between these two studies in the type of tour they were surveying: Orams (2000) conducted his survey on dolphin watching tours, while Valentine et al. (2004), conducted their survey on-board of swim-with-whale excursions. The main objective of these respective tours likely caused the difference in their findings. Results of the present study more closely align with Orams' (2000) findings; while the

respondents in this study rated seeing whales up close as important to them, proximity did not significantly affect their likelihood to recommend the tour.

The second and third most important variables for tour satisfaction were: “knowing that the tour operator supports conservation efforts financially” and “minimizing the tour boats impacts on marine life”. These attributes emphasize the respondents’ environmental concern and interest in minimizing the vessels’ impacts on marine life. The discrete choice experiment similarly demonstrates these interests of the respondents, in their support for speed limits, harbour pump-out facilities and a conservation access fee. The fourth most important attribute described the importance of learning during a tour by listening to, and interacting with a naturalist. These results support the findings of Stein et al. (2003) who conducted a similar study on water based recreationists, where learning also ranked as the fourth most important attribute, close to “very important”. Diversifying the learning experience was appreciated by passengers, as listening to the whales through an onboard hydrophone was the next most important attribute. Other activities, such as photography and educational reading material were relatively less important for the enjoyment of a marine tour.

Confirming the demonstrated environmental concern of these passengers, the lowest ranked activity for enjoyment was “feeding the marine life”. Feeding the only tour attribute that received a negative rating, with a mean of “somewhat unimportant” (mean=2.29). The majority of passengers (82.4%) were disinterested in feeding wildlife which may be attributed to the numerous campaigns that have been launched to educate people about the negative consequences associated with feeding marine wildlife (CDNN, 2006; Watchable Wildlife, 2006; DCMilitary, 2005). The order of this list of important

attributes for a marine tourism experience clearly shows the participants' priorities for experiencing marine life in the wild, protecting wildlife and their environment, and learning during the tour (see Table 7).

Previous research established that a range of tour attributes besides seeing whales up-close, such as educational commentary, positioning of the boat and customer service, positively affect the passengers' enjoyment of the tour (Valentine et al., 2004; Luck, 2003; Orams, 2000). The results from this project agreed with those findings. This study did not include a question that asked simply if the passengers were satisfied with the tour; alternatively I used "likelihood to recommend the tour" as the descriptor for passenger satisfaction. Similarly to Orams' (2000) results, I found that closer proximity to the whales did not significantly increase the passengers' satisfaction. This is useful to captains of whale watching vessels, as it assures them that their passengers prefer to follow the federally established guidelines for maintaining a 100 yard approach limit to humpback whales. My results identify a few attributes that significantly increase the passengers' likelihood to recommend the tour, including: listening to the whales through a hydrophone, seeing dolphins, and seeing turtles. Not surprisingly, for those excursions that saw a large number of whales (>6) the respondents were also more likely to recommend the tour.

Knowing the attributes that positively affect passenger satisfaction with the tour enables the operators to offer, or improve on those attributes that they can control. Therefore, these results reinforce the importance of diversified education, such as using a hydrophone, as well as the importance of viewing as much marine life as possible during the whale watch tour. Whale watching tours leaving from Ma'alaea harbour travel past a

reliable location to view green sea turtles, and a stop to observe these turtles allows the operators to easily diversify the wildlife viewing and increase the satisfaction of their passengers.

#### **5.4 Ecotour and Regular Whale Watch Comparison**

One of the reasons for sampling passengers on both an ecotour and regular whale watching company was to better understand the similarities and differences of their passengers. This study found that ecotour passengers are more environmentally conscious and committed to the activity. Going on a whale watch tour was a higher priority for the ecotour passengers, as was knowing that the operator supports conservation efforts financially. The fact that PWF is a non-profit organization involved in education and research may have swayed some passengers to choose their tour. As one respondent commented, “I took a whale watching trip with the Pacific Whale Foundation because of your support for conservation.” This study also found differences between the passengers on both tours and their satisfaction with elements of the whale watch. The educational component of the ecotour received a higher satisfaction rating from their passengers than did the regular whale watching company. A further difference was found when comparing responses to the statement, “I would definitely recommend this tour to my friends and family.” The ecotour passengers had a mean response of 4.87, the highest rating of any variable, and the regular whale watch passengers had a mean response of 4.54. It should be noted that while these differences were found to be statistically significant, in practice many of them are small, as all of the whale watch passengers expressed a high level of satisfaction with their tour.

## **5.5 Differences Between Visitors and Hawaiian Residents**

Throughout this study I compared the responses from Hawaiian residents with the general survey population to better understand the Hawaiian residents' unique preferences and concerns. Previous studies have established that support and input from the residents and local operators is paramount if management changes are to be fully supported and successfully implemented (Berrow, 2003; Williams and Gjerdalen 2000; Laarman and Gregersen, 1996). Therefore, it is important to be aware of those topics and management issues about which the Hawaiian residents feel differently than visiting tourists, and understand how their views differ. Overall, the Hawaiian residents were significantly less likely to choose the "current" scenario in the discrete choice question set, signalling their interest in supporting changes to marine management in Hawaii. It appears the time may be ripe for management changes in Hawaii.

The support for change by Hawaiian residents has grown, and is shown by increased political activism regarding issues of marine management in Hawaii. Concerns have been raised in local papers over sewage dumping, vessel speeds, and increasing vessel/whale collisions (PWF, 2006; Star Bulletin, 2006; Mautime Weekly, 2005). The planned introduction of high-speed inter-island ferries in 2007 has caused concern for some residents, as the ferry route will pass through densely populated breeding and calving grounds for the endangered humpback whale (PWF, 2006). Hawaii (HI) residents were more concerned than visitors about the current number of whale watching vessels (see Figure 11). The number of whale watching vessels was rated by Hawaiian residents as close to neutral, signalling an issue that the HI passengers may be interested in seeing more closely managed in the future. The total number of vessels operating with



commercial permits in Hawaii has remained constant for many years, which may alleviate some residents' concerns over vessel crowding. However, whale populations in other parts of the world are believed to suffer negative consequences, such as increased risk of collision, noise pollution, and stress, from the pressure of too many whale watching boats (Jelinski et al., 2002; Baird, 2001). Understanding the potential negative effects on whale populations caused by a large and insufficiently regulated whale watching industry can help Hawaii's marine use managers be proactive and prevent potential threats to the whales before they arise.

Hawaiian residents are concerned that endangered species are not being sufficiently protected in Hawaii. Hawaiian residents had a significantly lower response than non-residents to the statement, "the US government is doing enough to ensure the protection of endangered species in HI" (see Figure 11). Such concerns have recently been voiced frequently in the media in Hawaii (PWF, 2006; Star Bulletin, 2006; Mauitime Weekly, 2005). Similarly HI residents had a significantly higher mean response to the statement, "humpback whales should be more protected in Hawaii, even if this means only half as many people can go whale watching" (see Figure 11). Hawaiian residents feel strongly that the humpback whales should be more protected and support making changes to the current system of managing the whale watching industry.

## **5.6 Discrete Choice Findings**

The discrete choice question set was an ideal format for testing responses to tour and management characteristics as it provided a more complete description of the tour product and forced respondents into a realistic trade-off process. Some passengers, however, expressed frustration or confusion with the format, while other passengers chose to write all of their preferred attribute levels in the comments section. Two comments on the discrete choice questions were: “these are hard trade-offs, pollution can’t help, collisions are bad, and self-monitoring doesn’t work,” and “the scenarios were tough, wish there was an option where we could choose from each aspect to develop a best case scenario.” Despite being a somewhat difficult task, the respondents managed to synthesize the information, and for all attributes clearly preferred levels emerged. This potential disadvantage is more than off-set by the fact that the discrete choice experiment provides the preference for variables which are traded off in the context of each other, and therefore provide a more reliable preference structure than simple Likert scaling.

### **5.6.1 On-board education programs**

The results from the education attribute of the discrete choice complemented the survey’s other data on the importance of educational attributes to passengers’ enjoyment of a marine tour. In all cases the respondents answered that on-board education with a naturalist was very important, as was listening to the whales with a hydrophone. Responses from the discrete choice and Likert scale sections of the survey both rated “available reading material” as less important. Logically having all three of these

educational tools created the most preferred scenario. Many respondents commented positively about the interpretation by the naturalist:

*“The hydrophone was amazing – but naturalists are so absolutely necessary!”*

*“Our family has several children/teenagers, and learning through written material does not interest them very much. They learned a lot through the information presented by the naturalist especially.”*

*“The guide did an awesome job.”*

These results concur with past studies that found a structured educational program with a trained interpreter was very important to the enjoyment of the tour (Luck, 2003; Orams, 2000). Many respondents commented positively about listening to the whales through a hydrophone. Because both tours included a naturalist, as most tours in Hawaii do, the use of a hydrophone was particularly novel and interesting. Some of the comments included:

*“More use of hydrophone.”*

*“Please don’t take away the hydrophone – it’s one of my favourite things about the whales.”*

*“Hydrophone was great – very informative.”*

It is helpful for the operators to know the relative importance passengers place on various elements of an educational package, as this will allow them to put their educational efforts in the tools that are most appreciated by their passengers. Whale watching tours have been promoted as effective platforms for educating the public about

marine life in general and motivating them to choose more environmentally conscious behaviours.

### **5.6.2 Whale population**

The relationship between part worth utility, or the relative benefit to the respondent, and the number of whales seen is very interesting (see Figure 14) as it demonstrates the concept of loss aversion (Tversky and Kahneman, 1991). In this attribute, the number of whales each passenger saw on their whale watch is their reference point. Seeing more whales during a whale watch is perceived to be a gain from the reference point: in fact 25% whales more provides a 0.276 increase in PWU. However, a 25% reduction in the number of whales seen during a trip from their initial reference point is perceived as a loss and elicits a stronger reaction, as indicated by a decrease of 0.647 PWU. This result was significant without adjusting the responses to account for the different number of whales each respondent saw; this demonstrates the participants' desire to maintain their "status quo" whale watch for the number of whales they saw regardless of whether they saw two or twelve whales. As such, ensuring that management plans promote the continued health of the humpback whale population in Hawaii is clearly important to the passengers. Current management and recovery actions appear to be working, as the North Pacific humpback whale population is estimated to be growing at 6% to 7% annually (NOAA Fisheries, 2005). Since most respondents saw at least 10 whales during their trip, these results should not be biased by varying reference points.

### 5.6.3 Vessel speed limits

The results from the discrete choice question show that whale watch passengers strongly support implementing vessel speed limits (see Figure 16). The current regulations for vessel operation in Hawaiian waters do not stipulate maximum speed limits; however, a few organizations have worked together to create a voluntary code for the whale watching industry that includes a recommended speed limit (P.W.F., O.T.C. and H.W.D.W.A., 2005). This voluntary initiative signals that some members of the whale watching community would likely support federally established speed regulations for all boats during the whale season. Respondents most preferred the attribute with the strictest speed regulations for all vessels. Many passengers commented further on this issue of speed regulations at the end of the survey:

*“High speed ferries are a real concern. The regulation issue is much broader than whale watch operators alone.”*

*“No motor with gas allowed in the south bay: only eco, sail boat, windsurfing, kayaking etc.”*

*“Hope speeds are regulated.”*

*“Too fast through some areas. Made me nervous of risk of injuring wildlife.”*

*“Concerned about boats ability to react when travelling too fast.”*

Implementing speed limits for all boats would likely reduce the number, and severity, of collisions with whales per year (Laist et al., 2001) – an outcome highly valued by the whale watch passengers.

#### **5.6.4 Vessel/whale collisions**

Results from the discrete choice question clearly demonstrated that the passengers have a strong negative reaction to an increase in the number of annually reported vessel/whale collisions. The steep slope of this negative linear relationship demonstrates the passengers' measurable dissatisfaction with every additional collision (see Figure 15). This attribute elicited a strong reaction, as nine collisions per year is associated with a PWU of -0.564. The 2006 humpback whale season had seven vessel/whale collisions, the highest number ever recorded, which translates to a PWU of -0.188 (see Figure 15). As such the passengers are already dissatisfied with the number of collisions, which may encourage the establishment of sufficient measures (such as speed limits) to reduce the number of vessel/whale collisions.

#### **5.6.5 Vessel sewage treatment**

The dumping of effluent by marine tourism operators in Hawaii has become a contentious issue among the resident population (Mauitime Weekly, 2005). Federal regulations currently allow sewage dumping by all vessels, as long as they are more than three miles off-shore (CWA, 2002). With increases in the passenger capacity of marine tourism boats operating in Maui's waters, some residents have complained that the environment is starting to show signs of negative effects from the effluent (Mauitime Weekly, 2005). The whale watch passengers expressed a strong preference for sewage disposal in a harbour treatment facility (see figure 17). These findings from the discrete choice section were reinforced by comments from many passengers, including:

*“We need to make pumping a law so our waters are pure and not a sewage toilet.”*

*“I am disgusted to find that sewage is pumped into the ocean, I imagine this affects the wildlife more than the number of collisions between boats and whales/year.”*

*“Sewage dumping is the big issue for me.”*

*“We should definitely have a harbor waste treatment facility at all Hawaii harbors.”*

*“I am very concerned about sewage being dumped and would like that regulated.”*

These comments as well as the results from the discrete choice attribute clearly show that the whale watch passengers prefer that all boats discharge their effluent at a harbour treatment facility. Passengers feel that sewage treatment facilities at harbours in Hawaii are a priority, which may provide further incentive to speed up the instalment of sufficient sewage treatment centres at all harbours. Given strong passenger preferences, while harbours are being upgraded it may be worth the expense for operators to have their sewage collected by an effluent management company and pumped out, and to advertise the fact that they are doing so.

### 5.6.6 Enforcement of regulations for boats

Whale watch passengers in Hawaii support more enforcement of regulations and increased penalties for non-compliance (see Figure 18). However, two main constraints, the lack of funding and large size of the sanctuary, have made monitoring of the marine tourism industry nearly impossible in Maui. Today most monitoring is opportunistic, occurring only when a member of the public calls in a complaint. Dr. Jeff Walters, the state advisor to the sanctuary, also expressed concern over the lack of monitoring (Walters, 2005). The results from the discrete choice section of this survey demonstrate that the whale watchers share the same concern regarding vessel regulation. The most preferred attribute level was regular monitoring and increased penalties for non-compliance. The two middle levels for this attribute, minimal monitoring and regular monitoring, were not significantly different from each other, likely due to their ambiguous description. Passenger comments supported the discrete choice findings:

*“The industry needs to be regulated, so the animals are there in the future for others to enjoy.”*

*“Need more regulation and fees.”*

*“Enforcing regulations and high penalties for boats is very important.”*

A study by Sorice et al. (2006) examined human-manatee interactions and found that tourism focussed on endangered species caused negative impacts on the target species to increase over time if there are no mechanisms in place to regulate the industry.



This finding illustrates the need to take precautionary measures to regulate the industry now, and to act before any serious damage is done to the humpback whale population.

#### **5.6.7 Conservation access fee**

The final attribute of the discrete choice question gave the respondents the choice to pay a conservation fee to support management of the sanctuary, above the ticket price of a whale watch. Such a fee is the mechanism by which the sanctuary managers may be able to financially support education, management, upkeep, and enforcement within the sanctuary. This attribute was divided into two sections (see Figure 19), the first demonstrated whether passengers would prefer to pay, or not, into a conservation fund that supports management of the marine environment in Hawaii. Interestingly, the passengers preferred to pay into such a fund. Their desire seems to fit with the general description of whale watchers in Hawaii as educated, affluent and environmentally conscious. Previous research has demonstrated that nature based tourists derive a benefit from contributing to a user-fee, as it gives them satisfaction to know that they are supporting sustainable management of the environment (Arin and Kramer, 2002; Walpole et al., 2000; Laarman and Gregersen, 1996). A further question involved assessing the appropriate fee amount. I tested a range of fees from \$0 to \$10, and the results confirmed what has been shown in the literature - passengers are willing to pay a fee, but a smaller fee is often considered to be better than a larger fee (Arin and Kramer, 2002; Laarman and Gregersen, 1996). The participants received a positive benefit knowing that they would be supporting a conservation fund designed to assist management of Hawaii's marine environment, with the highest PWU of 0.1, for a two-

dollar fee. However, for the majority of participants, the conservation fee range of \$0 to \$10 was insignificant, and not a deciding factor. Not surprisingly, many respondents commented about the proposed conservation fee:

*“I would like to see a conservation fee to be included in all options – more than willing to pay that!”*

*“Protect the whales at any cost.”*

*“Considering we paid \$110 p.p. to see TWO whales in NZ, we were astounded by the affordability here! I’d easily pay \$50 US to see what I saw today; especially knowing that the company is a non-profit and proceeds go toward marine conservation.”*

*“If you do charge make sure people are aware of where the money is going. It costs a lot now.”*

The passenger comments touched on a few of the key concepts in the literature for establishing fees in protected areas. One respondent commented that transparency in fee use was very important, a concern that is strongly supported in the literature (Laarman and Gregersen, 1996). Many of the comments emphasized the importance of what the fee would support, such as marine conservation. It is very advisable that any user fee should be implemented in such a way as to have a transparent collection process, clear program objectives for how the funds are being used, and a way to educate the users (and operators) about how they are supporting conservation, management and protection of the whales.

The fact that this research supports implementing a fee is very important. As such I will discuss the benefits and drawbacks of user fees, and recommend implementation and management strategies.

#### **5.6.8 Benefits and drawbacks of implementing a user fee**

Many scholars and practitioners support implementing user fees to offset costs associated with managing and protecting natural areas (Conservation Finance Alliance, 2006; Tongson and Dygico, 2004). Implementing a user fee system can assist natural areas to become more financially self-sufficient and less susceptible to fluctuations from funding agencies, as well as increase local control and moral (Laarman and Gregersen, 1996). Studies have shown that visitors welcome user fees as it allows them to directly contribute to conservation programs which are improving a natural area they already appreciate (Tongson and Dygico, 2004; Arin and Kramer, 2002).

However, several disadvantages exist around implementing user fee systems for natural areas. Most people prefer to pay less for a good rather than more, which causes tourism operators to fear a loss of customers, and therefore discourage the implementation of user fees. The operators' fear can become a reality if inappropriately high fees are instituted (Tongson and Dygico, 2004). Unfortunately, the managers overseeing the creation of a user fee may not have a good grasp of the tourism market and price elasticity for the good, which can make setting appropriate entrance fees difficult (Van Sickle and Eagles 1998, Tongson and Dygico 2004). Creating a reliable and transparent fee collection agency can be challenging, and relying on existing

bureaucracies may be inappropriate (Arin and Kramer, 2002). While these drawbacks for implementing a user fee system are real, they can be significantly reduced by pre-testing, thorough planning, and garnering community support (Conservation Finance Alliance, 2006; Laarman and Gregersen, 1996).

The results from this study agree with the literature, in that the whale watch passengers support implementing a user fee that is used to fund conservation, education and management within the HIHWNMS. Knowing that the passengers were relatively indifferent to the conservation access fee-range presented in this study may make the decision of implementing a fee and setting an appropriate level slightly easier.

#### **5.6.9 Implementation recommendations and strategies**

The fee collection strategy that is best suited to a particular location should be chosen very carefully (Walpole et al., 2001). In order to achieve acceptance from the tourism industry and users, managers should make concerted efforts to establish fee collection systems that are transparent and efficient (Tongson and Dygico, 2004; Van Sickle and Eagles, 1998; Laarman and Gregersen, 1996). While fee collection can aim to generate profit for the marine sanctuary, cost recovery for management, enforcement and education has been shown to be a more realistic goal (Arin and Kramer, 2002; Van Sickle and Eagles, 1998). Fee collection should be viewed as a way to diversify income sources and stabilize revenue generation.

When managers begin discussing implementing a user fee system for marine tourism to support management and conservation, round-table meetings should be

instigated with the affected community. Such a format will allow operators, as well as the interested public, to be involved in the formation of a system, understand the need for its implementation, and increase the likelihood for ownership and support by local residents (Van Sickle and Eagles, 1998; Laarman and Gregersen, 1996). Round table discussions would likely raise many common concerns and offer opportunities for the group to brainstorm creative ways to address any issues.

Revenue retention has been identified as very important for maintaining support from the local operators, and managers (Van Sickle and Eagles, 1998). Similarly visitors are far more interested in paying fees that generate funds for the affected area, and support increased conservation efforts and maintenance of infrastructure (Walpole et al., 2001).

The fees collected do not need to remain static throughout the year, or across types of visitors. Many conservation areas have found that varying the fee can allow the number of entrants to be somewhat regulated, and pressure to be reduced in peak times (Laarman and Gregersen, 1996). Fees are often set at lower levels for the local population, to encourage continued participation, especially if the majority of residents already support the marine sanctuary through their taxes (Tongson and Dygico, 2004; Walpole et al., 2001; Van Sickle and Eagles, 1998). Conversely higher fees are frequently set for foreign visitors, as they are usually more affluent and able to support them. Some destinations have chosen to increase the fees incrementally over time, as this enhanced support from the operators and helped the park cover increasing operating costs (Walpole et al., 2001). However, research suggests that pricing schedules should ultimately be maintained below the maximum acceptable level, so as not to discourage

too many users (Walpole et al., 2001). To assist the long term sustainability of the tourism destination, a portion of the fees collected may be used to promote the site internationally through coordinated advertising campaigns (Tongson and Dygico, 2004).

This literature recommends how best to implement a user fee and provides concrete advice that could assist this process in Hawaii. The main recommendations include: involve the local community, revenue retention, reduced fees for residents, and capping user fees below the maximum willingness to pay. These recommendations should be carefully considered and assessed for their applicability when considering a user fee system for marine tourism in Hawaii.

## **5.7 Operator and Manager Responses to Study Results**

Once the results from this study were generated, I presented them to the two host operators to get their feedback. Greg Kaufman, president of the Pacific Whale Foundation, generally agreed with the management sentiments of his passengers (Kaufman, 2006). His organization is currently paying to have the effluent from their Ma'alaea boats pumped at the harbour, and they follow the vessel speed regulations as outlined in their best practices guide. Mr. Kaufman's real concern became evident when we discussed implementing a user fee; he expressed concerns over how the state managers would allocate the money, and the common frustration that Maui generates the majority of revenue for the state division responsible for harbour maintenance, yet still has decrepit, run-down harbours. The Pacific Whale Foundation is strongly in support of conservation, conducting research, protecting the humpback whales, and educating the

public and operators. Mr. Kaufman believes the main threats to humpback whales today are: collisions with vessels, entanglement in marine debris, whaling, noise pollution, overfishing, and dumping of effluent.

Cindy Koehne, the owner of Prince Kuhio, expressed less concern over the conservation access fee (Koehne, 2006). She said that Prince Kuhio is currently supporting a reef conservation organization in Maui, by allowing their volunteers to join the PK snorkelling tours in south Maui and solicit donations from passengers. Ms. Koehne also mentioned the importance of equity across operators; if a fee is implemented it must be mandatory for all operators in the area. She expressed optimism by pointing out the potential advertising that could be generated, promoting the fact that her tours would then directly support conservation of the marine environment. The PK adheres to recommended speed limits, however Ms. Koehne was in favour of implementing and enforcing speed limits. The PK is also currently paying to have their sewage collected by a company at the harbour, and as such, Ms. Koehne was very much in favour of speeding up the time frame for the Division of Boating and Ocean Recreation to install adequate pump-out facilities at Ma'alaea harbour.

Dr. Jeff Walters, the state advisor to the sanctuary, was very enthusiastic to hear that the discrete choice section of the survey had found that the passengers are willing to pay a conservation access fee to enter the HIHWNMS (Walters, 2006). As was previously discussed, his department is under-funded and finds it difficult to adequately meet their objectives. Dr. Walters sees implementing a user fee as an opportunity to raise funds to support his department and their mandate to manage the sanctuary. He stated that creating a fee collection system would be tricky, and costly to run, therefore the fees

must be high enough to justify collecting. Dr. Walters feels that because the government is ultimately responsible for the management of the HIHWNMS and endangered species, they should be in charge of managing the revenue from such a fee. He sees a potential conflict of interest with the operators solely managing such a fund, however he was interested in the idea of a managing partnership. The literature emphasizes that such a partnership could include all interested stakeholders, such as the: relevant state and federal departments, environmental organizations, researchers, tour operators, Hawaiian residents, tour passengers and locally affected communities. Dr. Walters also sees a need to implement “marine patrol” vessels during the humpback whale season from all of the Hawaiian Islands to conduct research, enforce regulations, and educate the operators/visitors. While Dr. Walters agrees that vessel speed is an issue, he is concerned about operator opinion and feasibility to implement speed limits across the board. His preference for speed limits included establishing speed limits in the “hot spots” for whale activity, such as areas close to shore known to be frequented by cow and calf pairs, or creating “transit lines” that would allow boats to travel faster in certain areas. Dr. Walters reinforced that the number one management objective for the sanctuary is to protect the resource, with a very close second of promoting and encouraging appropriate public use.

## **5.8 Implications for Tour Operators**

This research project generated a lot of information for operators and some very concrete recommendations. The operators can be pleased with the comments from their passengers, as the vast majority were very satisfied with all elements of the tour. The most important tour attributes to the passengers include: seeing whales up close in their



natural environment (more than six whales is best), on-board commentary by a naturalist, listening to the whales with a hydrophone, knowing that the operator supports conservation efforts financially, and seeing other marine life (such as turtles, or dolphins). These are very concrete preferences, many of which the operator has direct control over, and is able to offer to passengers. As such, I recommend that all tours include a naturalist and use a hydrophone during every trip possible. I also recommend that the operators take advantage of viewing as much wildlife as possible during the tour, such as visiting known spots to view green sea turtles. The respondents were not interested in getting really close to the whales; their customers would prefer knowing that the captains operate at a safe and legal distance from the whales.

The passengers on these tours are well educated, affluent, and often repeat whale watchers. As such the operators should make concerted efforts to offer high quality tours with diverse education tools, and up-to-date information from a naturalist. Many passengers expressed an interest in learning more during the tour about how they can help the marine environment. To address this desire, the operators can prominently display petitions, fact sheets, information, or discuss conservation issues during the commentary. Volunteer programs that help local conservation initiatives, such as beach clean-ups and turtle nesting surveys, should be organized collaboratively by the marine tourism operators and promoted on their tours.

The operators should know that their passengers are generally environmentally aware, and concerned about marine management regarding vessel speed, collisions with whales, and effluent dumping. Some of these concerns can be minimized directly by the vessel operator using best practices, with the added benefit of promoting the adoption of

those practices to the passengers. Knowledge that their tour operator is using best practices will increase the passengers' enjoyment and satisfaction with the tour.

## **5.9 Implications for Management of the HIHWNMS**

The information gathered by this survey points to a need for further management action within the sanctuary waters. Whale watch passengers, and in many cases the operators as well, are in support of vessel speed regulations, updating the facilities at the harbour to include pump-out stations, increased regulation and enforcement of the whale watching industry, and implementing a user fee.

The results from this study agree with findings from a recently published Hawaii Ocean Resources Management Plan (HCZMP, 2006) which produced a list of the top seven issues facing marine management in Hawaii today. Three of their top seven issues were, boating infrastructure, ocean resource protection, and enforcement. Their recommended actions agree with the findings from this study, that funding should be increased to support resources, equipment and enforcement; community involvement should be promoted to assist marine management; and educational programs promoting resource protection should be increased.

Collecting a fee and deciding on its use will likely be a relatively contentious issue. As Dr. Jeff Walters said, "the devil is in the details." In an attempt to reach a solution agreeable to all, given the diverse set of interests and huge amount of local knowledge, I recommend establishing a round table co-management group of interested stakeholders in marine tourism management. As described above, stakeholders would

include: relevant state and federal departments, environmental organizations, researchers, tour operators, tour passengers, Hawaiian residents, and locally affected communities. It will be important to show the results from this study to such a group, and would be very helpful if a further study was conducted to assess fee preferences from passengers on more whale watching vessels, as well as other marine tourism activities. This group could discuss which management options are most feasible for implementation in the HIHWNMS, as well as the potential for creating a user fee, and how such funds would be allocated to different initiatives.

To provide an idea of what a user fee could generate, I will use 2003 passenger estimates from Markrich's report (2004) and the passengers' response towards my study's proposed conservation access fee. If a five dollar fee (one dollar of which goes to managing the fund) were to be levied on all whale watch passengers in Maui, assuming that 200,000 passengers whale watch in Maui each winter, such a fee would generate \$800,000/year net revenue for marine management and conservation in Maui. If a five dollar fee (one dollar of which goes to managing a fund) were levied on all marine based tours in Hawaii, assuming 2,700,000 passengers attend a marine based tour, this would generate \$10,800,000/year for marine conservation and management in Hawaii. These estimates demonstrate the huge economic potential associated with implementing user fees in Hawaii. However, it is very important to remember that the user fee as described in this study was directly linked to managing natural resources and supporting conservation, research and education efforts. Passengers demonstrated a willingness to pay such a fee only if the revenue were clearly demonstrated to be meeting the stated objectives through a transparent fee collection and distribution system.

If the co-management body believes that a user fee should be implemented, I recommend that they collaboratively decide on how such funds should be allocated, with the help of recent publications (HCZMP, 2006), their knowledge, and passenger preferences as outlined in this study. Whale watching passengers have expressed preferences for “speed limits for all boats” and “regular monitoring of marine tourism.” Enforcement of regulations could be funded by such a fee. These passengers also preferred fewer vessel/whale collisions and a growing humpback whale population; as such, a fee could also be used to educate tour boat captains about best practices for vessel manoeuvring around whales, improve whale avoidance technology, and conduct research on humpback whale populations. As the passengers preferred more education about how they could help Hawaii’s marine environment and requested direct ways they could get involved; such a fund could also be used to establish a volunteering program for the public to participate in marine conservation efforts in Hawaii. Informing the tour participants about how such a fee is being used will be very important for generating their support and establishing trust.

## **5.10 Study Limitations**

While this study was successful in meeting its goals and objectives, and produced definitive results, some caution should be taken when expanding this research beyond the immediate setting. The results regarding tourist demographics and feelings towards marine management are likely fairly uniform within the state of Hawaii, as all tourists pay a large fee to travel to Hawaii and often choose to vacation in Hawaii because of their appreciation for the environment (Markrich, 2004), however these results may be

less representative of tourists in other locations. While the sentiments of respondents were fairly uniform, a limited number of operators were used from which to conduct this study. As such, it may be wise to expand this study to include a broader base of whale watch operators, and potentially other marine tourism activities (such as snorkelling and SCUBA diving operators) to assess if these other passengers share the same desires for management.

All reasonable efforts were taken to ensure that the discrete choice attributes represented the most pertinent factors today affecting whale watch passengers' satisfaction with the tour and marine management. The study succeeded in presenting attributes that were considered equally important in the choice selection. However, it is also worth noting that this survey was conducted in 2005 and represents the issues that were most important to the whale watchers at that point in time. If management actions are not considered within the next few years, it would be advisable to conduct a similar study and re-assess the most salient issues at that time, as perceived by the whale watch passengers, public and operators.

### **5.11 Suggestions for Future Research**

This study examined the tour attributes and marine management preferences of passengers on-board tours from two whale watch operators in Maui, Hawaii. One of the main conclusions from this project is that whale watch passengers are willing to pay a user fee to recreate in the sanctuary. As such, it would be useful to increase the survey sample size and broaden it to include other marine recreationists. In addition it would be

useful to test an increase in the fee scale to discover the upper limits of passengers willingness to pay to conserve marine resources. Further research should be conducted through focus groups, or key informant interviews, to understand the operators concerns for marine tourism management, and their acceptance of a user fee.

## **5.12 Model Validity**

This study included a discrete choice experiment in order to model the trade-off behaviour of whale watch passengers for various marine management options in Hawaii. A drawback associated with stated preference research is that the resulting models may be difficult to test for validity. This is commonly overcome by including a “hold out” set in the survey that is common across all versions of the survey, and not a part of the orthogonal design. In the present case, due to the limited timeframe and attention span of the passengers, this study did not include such a set. Another method of assessing validity is to use a technique called “face validity.” Face validity involves comparing the obtained results to the expected results (Sim and Arnell, 1993). In the present study, expected results were formulated by comparison with similar studies in the literature and the researcher’s familiarity with marine management concerns; the obtained results were found to be consistent with expectations.

### **5.13 Final Remarks**

As was recommend by Berrow (2003) this study aimed to assess the needs of whale watch participants, and their desires for future management of marine tourism within the Hawaiian Island Humpback Whale National Marine Sanctuary, with the intent of informing operators and managers. The survey results demonstrated that whale watch operators in Maui are offering tours that meet and exceed the expectations of their passengers. Ensuring that all tours include educational commentary from a naturalist, and a hydrophone to listen to the whales, will provide visitor satisfaction with the educational components of the tour. This study confirmed previous findings (Orams, 2000) that closer proximity to whales did not improve the passengers' satisfaction with their tour. The discrete choice section of this survey demonstrated that whale watch passengers have clear preferences for management options for tourism within the HIHWNMS, and are willing to pay to support their implementation. The respondents' preferences for levels within each of the seven attributes of the discrete choice show their preferences for speed and effluent dumping restrictions, increased enforcement and penalties for non-compliance, increased fees, and more education during the tour. Further research should be conducted to assess the willingness to pay a user fee by a broader scope of whale watch passengers on different vessels, as well as other marine tourists using the HIHWNMS.

## APPENDIX 1: DATA COLLECTION SHEET

Date: \_\_\_\_\_ Time of day:  morning  mid-day  afternoon

Tour company: \_\_\_\_\_

Number of passengers: \_\_\_\_\_ What is max capacity for the boat? \_\_\_\_\_

Weather:  sunny  partly cloudy  cloudy

Precipitation:  dry  light showers  periodic heavy showers  fog  steady rain

Wind:  calm  moderate  strong

Waves:  flat  small waves  white caps  large swells

# of whales we watched:  0  1  2-3  4-6  6-10  >10

Cow and calf pairs:  no  yes, how many? \_\_\_\_\_

Other marine life:  turtles  dolphins  birds Other \_\_\_\_\_

Whale activity level for whole trip:  poor  average  great \_\_\_\_/10

How long was best encounter? \_\_\_\_\_

How close was the closest encounter (yards), and what was the behaviour?  
\_\_\_\_\_

What did they experience?

breach  logging  tail slap  pec slap  comp pod  fluke-up dive  
 dropped the hydrophone any props shown? \_\_\_\_\_

Education during the trip: Migration -  none  some  plenty

Mating/calving -  none  some  plenty

Federal/state protection -  none  some  plenty

Behaviour -  none  some  plenty

Biology (mammal, baleen) -  none  some  plenty

Naturalist:  engaging  boring  enthusiastic  knowledgeable  audible/articulate \_\_\_\_/10



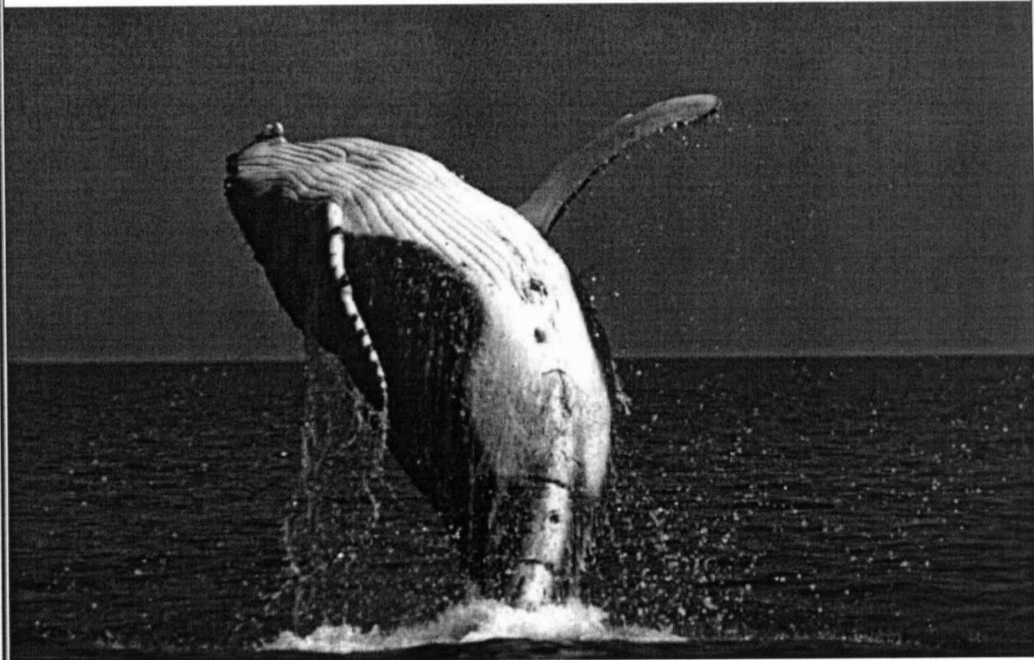
## APPENDIX 2: DATES AND TIMES OF TOURS SAMPLED

<b>Trip #</b>	<b>Date</b>	<b>Day of Week</b>	<b>Time</b>	<b>Boat</b>	<b># of Pax.</b>
1	March 2 2005	Wed.	8:00 AM	PWF	98
2	March 2 2005	Wed.	10:30 AM	PWF	92
3	March 3 2005	Thrs.	1:00 PM	PWF	63
4	March 3 2005	Thrs.	3:30 PM	PWF	69
5	March 6 2005	Sun.	8:00 AM	PWF	98
6	March 6 2005	Sun.	10:30 AM	PWF	99
7	March 11 2005	Fri.	12:30 PM	PK	100
8	March 13 2005	Sun.	8:00 AM	PWF	97
9	March 13 2005	Sun.	10:30 AM	PWF	101
10	March 13 2005	Sun.	1:00 PM	PWF	95
11	March 16 2005	Wed.	8:00 AM	PWF	99
12	March 16 2005	Wed.	10:30 AM	PWF	98
13	March 16 2005	Wed.	1:00 PM	PWF	98
14	March 18 2005	Fri.	12:30 PM	PK	100
15	March 20 2005	Sun.	8:00 AM	PWF	99
16	March 20 2005	Sun.	10:30 AM	PWF	94
17	March 21 2005	Mon.	12:30 PM	PK	85
18	March 23 2005	Wed.	8:00 AM	PWF	101
19	March 23 2005	Wed.	10:30 AM	PWF	101
20	March 23 2005	Wed.	1:00 PM	PWF	94
21	March 24 2005	Thrs.	8:00 AM	PWF	99
22	March 24 2005	Thrs.	10:30 AM	PWF	95
23	March 24 2005	Thrs.	1:00 PM	PWF	67
24	March 27 2005	Sun.	8:00 AM	PWF	90
25	March 27 2005	Sun.	10:30 AM	PWF	87
26	March 28 2005	Mon.	8:00 AM	PWF	95
27	March 28 2005	Mon.	10:30 AM	PWF	94
28	April 2 2005	Sat.	8:00 AM	PWF	85
29	April 3 2005	Sun.	12:30 PM	PK	20

## APPENDIX 3: SURVEY INSTRUMENT

# Humpback Whale National Marine Sanctuary Whale Watching Survey

Maui, Hawaii 2005



Simon Fraser University



# Humpback Whale National Marine Sanctuary Whale Watching Survey

Maui, Hawaii 2005

*Aloha!* Thank you for taking the time to fill out today's survey about your whale watch tour and your opinions about management for this very unique area. Results from today's survey will aid environmental managers in making more informed decisions for the future of this special marine environment.

All responses to this survey will remain strictly confidential. However, they will be combined with that of many other visitors to provide a fuller picture of how tourists feel about management of Hawaii's marine environment. Participation is entirely voluntary, and you may discontinue at any point should you wish. This questionnaire will take approximately twelve minutes to complete. Your help is much appreciated. *Mahalo!*

To obtain results from today's survey, please contact:

Kate Shapiro  
Masters Candidate  
*School of Resource and Environmental Management*  
Simon Fraser University  
Burnaby, British Columbia  
Canada, V4A 1S6  
E-mail: [kshapiro@sfu.ca](mailto:kshapiro@sfu.ca)

If you have any concerns regarding today's survey, please contact:

Dr. Frank Gobas  
*Director of the School of Resource and Environmental Management*  
Simon Fraser University  
Burnaby, British Columbia  
Canada, V4A 1S6  
E-mail: [gobas@sfu.ca](mailto:gobas@sfu.ca)



## SECTION ONE: ABOUT YOUR WHALE WATCH TOUR

1. Have you ever participated in whale watching before today?

No

Yes: if so, how many times? \_\_\_\_\_

2. Please indicate how much you agree or disagree with the following statements about today's tour: (please check one box per line)

	Strongly Disagree	Mildly Disagree	Neutral	Mildly Agree	Strongly Agree
On this tour I learned a lot about humpback whales.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On this tour I was told how I can help Hawaii's marine environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Going on a whale watch was a priority for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The boat was not overly crowded.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am not concerned about the number of tour boats that were watching whales today.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was happy with the number of whales I saw on today's tour.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was satisfied with how close we got to the whales.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was satisfied with the amount of information about whales that was delivered on today's tour.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would definitely recommend this trip to my friends and family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. How important is each of the following activities for your enjoyment of a marine tourism experience?

	Not Important At All	Somewhat Unimportant	Neutral	Somewhat Important	Very Important
Seeing marine life up-close in their natural environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeding marine life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Photographing marine life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Listening to and interacting with a naturalist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Learning about the marine life from available written material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimizing the tour boats' impacts on marine life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Listening to whales through an on-board hydrophone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Knowing that the tour operator supports wildlife conservation efforts financially	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please check one answer per question.

4. Are humpback whales an "endangered species"?

yes       no       don't know

5. Are humpback whales protected by federal legislation?

yes       no       don't know

6. How close do regulations in Hawaii allow tour boats to approach humpback whales?

50 yards       100 yards       200 yards       300 yards       don't know

## SECTION TWO: PREFERENCES FOR MANAGEMENT OPTIONS

The Hawaiian Islands Humpback Whale National Marine Sanctuary, where you were whale watching today, encompasses the main Hawaiian Islands. It received formal designation in 1997 with the primary goals of conservation, research and education for the protection of humpback whales. In consideration of these goals, several management actions have been proposed. On the next few pages we present you with possible management / whale watching scenarios for the Sanctuary.

*Each management scenario will describe:*

- Information provided during the whale watch
- Regulations for the boating industry
- A conservation access fee, to support management of the marine environment in Hawaii

### Your Task:

On each page there are three whale watching scenarios, one of which describes the current scenario. Imagining those are the only options available, please read them over carefully and choose one. There are a total of four such sets.

Some descriptions may involve difficult trade-offs. However your choices will help sanctuary managers to better protect the whales, while continuing to provide visitors with enjoyable whale watching experiences.

Currently several proposals are being considered for future management of the whale watching industry in Hawaii. If these were the only types of tours available, which one would you choose?

Management Characteristics	Scenario #1	Scenario #2	Current
Education during tour	Varies by company	Outboards, narrators and a hydroplane	Outboards, and a narrator
Number of whales you see during your tour	Same as today	Same as today	Same as today
Waste disposal by tour boats	Raw sewage pumped into the ocean	Raw sewage pumped into the ocean	Raw sewage pumped into the ocean
Risk of collisions to the whales by cruise boats	3 reported collisions per year	3 reported collisions per year	3 reported collisions per year
Speed regulations for boats	No speed regulations for boats	All boats must travel slower than 20mph	No speed regulations for boats
Enforcement of regulations for boats	Minimal monitoring	Whale watching self-regulated	Continuous monitoring of vessel regulations and increased penalties
Conservation Access Fee <small>*above the ticket price</small>	\$5	\$10	\$0

CHOOSE ONE →

SET 1. Please select your preferred management option.

Q. 1A

Currently several proposals are being considered for future management of the whale watching industry in Hawaii. If these were the only types of tours available, which one would you choose?


Management Characteristics	Scenario #1	Scenario #2	Current
Education during tour	Guidebooks, naturalist and a hydrophone	Guidebooks, and a naturalist	Same as today
Number of whales you see during your tour	50% less whales	25% more whales	Same as today
Pollution by tour boats	Sewage pumped at harbor treatment center	Sewage pumped directly into ocean	Sewage pumped directly into ocean
Reported incidences of boats hitting whales	7 collisions/year reported	3 collisions/year reported	5 collisions/year reported
Speed regulations for boats	All boats must travel slower than 20mph	No speed regulations for boats	No speed regulations for boats
Enforcement of regulations for boats	All boating self-regulated	Regular monitoring and increased penalties	Minimal monitoring
Conservation Access Fee <i>*above the ticket price</i>	\$5	\$10	\$0

**CHOOSE ONE** →

Q. 1B If the option you just selected was the only type of whale watching available during your next visit to the state of Hawaii, would you go on that tour?

YES

NO



## SECTION THREE: YOUR VIEWS ON WILDLIFE CONSERVATION

7. How strongly do you agree or disagree with each of the statements below?  
Please check the appropriate box.

	Strongly Disagree	Mildly Disagree	Neutral	Mildly Agree	Strongly Agree
The U.S. government is doing enough to ensure the protection of endangered species in Hawaii.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The U.S. government should introduce measures, such as banning cruiseships in Hawaii, because self regulation is not effective.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plants and animals exist primarily to be used by humans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We must prevent any type of animal from becoming extinct, even if it means making personal sacrifices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Humpback whales should be <u>more protected</u> in Hawaii, even if that means only half as many people can go whale watching.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

yes       no

If yes, please list them: \_\_\_\_\_

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

yes       no

If yes, please list them: \_\_\_\_\_

\_\_\_\_\_  
If yes, approximately how much do you donate annually?

\$1-50     \$51-100     \$101-250     \$251-500     more than \$500





**SECTION FOUR: ABOUT YOU**

**A reminder:** Your answers to the survey will remain completely confidential and will be released only as summaries in which no individual answers can be identified.

*Please have only one person complete this section. Thank you.*

10. What is your gender?

- Male  Female

11. What is your country of residence? \_\_\_\_\_

b) if you live in the US, which state? \_\_\_\_\_

12. What is your age?

- 18-29  
 30-39  
 40-49  
 50-59  
 60-69  
 70 or over

13. What is the highest level of

education you have completed?

- Elementary school  
 High school  
 Technical training  
 Undergraduate degree  
 Graduate degree  
 Other: \_\_\_\_\_

14. What was your household income in US currency, for 2004?

- Under \$30,000  
 \$30,000 - \$59,999  
 \$60,000 - \$89,999  
 \$90,000 - \$119,999  
 \$120,000 or over

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

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***Mahalo, thank you so much for completing this survey!***

## APPENDIX 4: SAMPLE DISCRETE CHOICE QUESTION

SET 1. Please select your preferred management option.

Q. 1A

Currently several proposals are being considered for future management of the whale watching industry in Hawaii. If these were the only types of tours available, which one would you choose?

Management Characteristics	Scenario #1	Scenario #2	Current
Education during tour	Guidebooks, naturalist and a hydrophone	Guidebooks, and a naturalist	Same as today
Number of whales you see during your tour	50% less whales	25% more whales	Same as today
Pollution by tour boats	Sewage pumped at harbor treatment center	Sewage pumped directly into ocean	Sewage pumped directly into ocean
Reported incidences of boats hitting whales	7 collisions/year reported	3 collisions/year reported	5 collisions/year reported
Speed regulations for boats	All boats must travel slower than 20mph	No speed regulations for boats	No speed regulations for boats
Enforcement of regulations for boats	All boating self-regulated	Regular monitoring and increased penalties	Minimal monitoring
Conservation Access Fee <i>*above the ticket price</i>	\$5	\$10	\$0

**CHOOSE ONE** →

Q. 1B If the option you just selected was the only type of whale watching available during your next visit to the state of Hawaii, would you go on that tour?

YES

NO

## APPENDIX 5: MULTIPLE REGRESSION

stepwise		Coefficients(a)				
Model		Unstandardized		Standardized	t	Sig.
		Coef.		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	3.09	0.12		26.29	0.00
	information	0.37	0.03	0.56	14.93	0.00
2	(Constant)	2.64	0.12		21.49	0.00
	information	0.29	0.03	0.43	11.24	0.00
	whales	0.18	0.02	0.32	8.26	0.00
3	(Constant)	2.15	0.14		15.51	0.00
	information	0.26	0.02	0.39	10.37	0.00
	whales	0.17	0.02	0.29	7.83	0.00
	priority	0.16	0.02	0.24	6.80	0.00
4	(Constant)	2.03	0.14		14.43	0.00
	information	0.24	0.03	0.37	9.74	0.00
	whales	0.12	0.03	0.20	4.60	0.00
	priority	0.16	0.02	0.24	6.88	0.00
	close	0.09	0.03	0.15	3.40	0.00
5	(Constant)	1.92	0.15		13.02	0.00
	information	0.21	0.03	0.31	7.29	0.00
	whales	0.11	0.03	0.20	4.40	0.00
	priority	0.15	0.02	0.22	6.44	0.00
	close	0.09	0.03	0.15	3.49	0.00
	learned	0.07	0.03	0.11	2.59	0.01
6	(Constant)	1.79	0.16		11.15	0.00
	information	0.20	0.03	0.31	7.11	0.00
	whales	0.12	0.03	0.20	4.56	0.00
	priority	0.14	0.02	0.22	6.30	0.00
	close	0.09	0.03	0.14	3.28	0.00
	learned	0.07	0.03	0.10	2.52	0.01
	crowded	0.04	0.02	0.07	2.02	0.04

a Dependent Variable: recommend

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