A CHOICE EXPERIMENT AND LATENT CLASS ANALYSIS OF VISITOR PREFERENCES AND WILLINGNESS TO PAY FOR CERTIFIED ECOTOURISM IN HAWAIʻI

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Abstract

Tourism is Hawaii's largest economic sector, ensuring that it is sustainable is of interest to policymakers. The Hawaii Ecotourism Association (HEA) is implementing an ecotour certification program and the demand for tours certified by a 3rd party auditor is not well understood. Little research on the actual value of ecologically sustainable tour certification to various types of consumers has been done. A survey was fielded as part of this research that involved 537 out-of-state visitors in a conjoint choice experiment for a guided hike. The experiment included three price levels, two different types of certifications, three different levels of native biodiversity, a waterfall view, and swimming under a waterfall for a half day hike. Latent class analysis was used to identify classes of consumers with similar preferences and estimate willingness to pay (WTP) premiums for the independent variables. The results show four distinct classes of consumers with significant preferences, with significant willingness to pay for certification among three of the four classes. Preferences for high native biodiversity along the hike were mixed, with some preferring medium or low biodiversity. A lower tour price was an important attribute for the largest class. Some classes show a significant preference for swimming in a waterfall and/or waterfall views. Residents of the US, especially, tend to be unclear about the meaning and/or importance of native biodiversity. Tours that safeguard ecosystem services appear to be marketable for certain consumer classes. Willingness to pay for sustainable tours exists and the need to educate visitors about environmental sustainability in Hawaii is clear.

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Introduction

Hawaii's tourism sector experienced significant growth during the 20th Century, replacing agriculture as the largest economic sector in the 1960s (Blackford 2001). The State's policymakers launched the 2050 Sustainability Task Force after the turn of the century in order to ensure that the State's largest economic sector, which relies on Hawaii's natural setting and unique culture, will become more sustainable in order to protect the State's fragile environmental and social resources. Currently, the Hawaii Ecotourism Association (HEA) is the only statewide non-governmental organization solely dedicated to diversifying Hawaii's tourism sector through advocacy for and promotion of ecotourism as a means to protect the island's ecosystems and cultural landscapes. Therefore, establishing a more ecologically sustainable tourism sector and understanding the relationships between ecotourism, nature tourism and sustainable tourism are activities of importance to communities across the state.

Many ecosystems and environmental components in the Hawaiian Islands are directly or indirectly impacted by the tourism industry. The state's economy relies heavily on tourism accommodations and activities. Tian, et al. (2011) determined that tourism's contributions to Hawaii's economy in 2010 were $10.931 billion out of a total GDP of $66.760 billion. Along with agriculture and defense, tourism is one of the primary industries in Hawaii determining development activities and natural resource and environmental uses. Therefore, the state's environmental services and biodiversity would be well served if tour operators are encouraged to adopt higher standards of

stewardship and protection for Hawaiian ecosystems. Best practices for ecotourism need to be not only identified, but also promulgated, but barriers exist to promulgation; barriers including confusion in the definition of ecotourism.

Ecotourism, when used as a marketing strategy in niche markets, may be perceived as "greenwashing" unsustainable products and services. Industry specialists and academic researchers have examined various definitions of ecotourism in contrast to nature-based tourism products and services. Differentiation normally stems from ecotourism's required conservation or regeneration components for ecological, and often social and cultural, systems (Blamey 2001; Weaver and Lawton 2007). The term nature tourism is used for activities that facilitate exploration of ecosystems and natural places of interest and vary widely in their degree of integrated sustainability components with many tours having none at all. Thus ecotourism may be classed as a niche market of nature tourism, i.e. ecotourism is "sustainable" nature tourism. At the same time, the definition used by HEA stressed the importance of respect for the Hawaiian culture, which is not found in ecotourism definitions in other areas of the world.

While the differentiation between ecotourism and nature tourism has become well accepted in academic literature, ecotourism businesses engage in various educational and sustainable activities. Ecotour operations can range from nature tours which subscribe to virtually no sustainable components, to ecotours which integrate science-based interpretation & education, ecological-footprint-based business decision structures, and tourist-volunteer ecological restoration activities. Difficulties have arisen

over the last several decades in distinguishing "authentic ecotourism" (*sensu* Honey and Stewart 2002) from greenwashed nature tourism.

The ecotourism market may contain many businesses which are, in fact, ecologically unsustainable. Nonetheless, the sector is the embodiment of sustainable nature-tourism in the global economy. Since the early 1990s, ecotourism has been among the fastest growing sectors of the tourism industry worldwide (Wearing and Neil 2009; Wight 2001). Thus, consumers need better market information so that they can support those that engage in ecological sustainability. In Hawaii, mass tourism markets dominate the visitor industry and the primary goal of both government and the business sector appear to revolve around attracting as many tourists as possible. The Hawaii Tourism Authority's (HTA) primary responsibilities center on advertising to promote the growth of the tourism industry (HTA 2012).

Economic well being and natural capital are interdependent in terms of their sustainability, and sustaining each depends upon new, diverse, and inventive approaches for economic growth. Organized by the Hawaii 2050 Sustainability Task Force as part of a 2007 report entitled *Hawaii Sustainability 2050 Building a Shared Future* key issues for the future of Hawaii are identified (Gangnes, et al. 2007):

> As Hawai'i residents look toward a sustainable future, their list of hopes is much the same as it is now: better job opportunities, improved education, more affordable housing, adequate healthcare facilities. They would like to see greater economic diversity and self-sufficiency, and worry about the impact of growth on the quality of their lives. These feelings exist against a shifting backdrop. The tourism industry has matured and no longer will be a major growth center for Hawai'i. Less-skilled workers likely will fall further behind those equipped for an

> increasingly knowledge-based economy. And population growth will place new demands on natural capital and the environment.

So, while ecotourism may be an economic subsector with potential for economic growth in Hawaii, it is important to encourage operations to refrain from greenwashing and to take initiatives to minimize environmental impacts while maximizing natural science based education opportunities for visitors. Furthermore, as ecotourism becomes a larger economic entity in Hawaii, actions must be taken to mitigate the increased tourist intake likely to accompany this type of growth. Thus, a certification process which can be trusted to address these issues can shield natural capital and the environment while simultaneously encouraging economic diversification and growth.

The Hawaii Ecotourism Association was established during the 1990s following a statewide Conference on Ecotourism in October of 1994. Since the late 1990s HEA has been active in promoting ecotourism in Hawaii, working with businesses & business organizations, university faculty, other non-profit groups, and the State of Hawaii (e.g. HTA). The efforts of HEA members and affiliates are a response to the ecotourism niche opening in Hawaii with a mission to “protect Hawaii’s unique environment and culture through the promotion of responsible travel and educational programs aimed at the public and visitor industry relating to ecotourism issues.” (HEA 2012).

Literature Review

Ecotourism can help safeguard ecosystem services and play a role in development decisions which affect natural areas (Gössling 1999). Assessing the environmental impacts of ecotours themselves, however, is often difficult due to the high variability of activities undertaken and of ecosystems involved. A diversity of systems have been developed for sustainability standards for various types of tours in various locations around the world, with the largest number of certification and labeling systems found in Europe (Hamele 2002). Certification researchers and practitioners in Europe have found that a successful set of ecological sustainability criteria for eco-labeling must both go beyond legal requirements and still be achievable by between 10 and 30 percent of the tourism providers under consideration (Hamele 2002). Such systems of standardizing and measuring environmental performance of ecotours take time to develop. Additionally, in order for such systems to be effective as a market-based solution to environmental problems, the resulting label must be recognized, trusted, and valued by the consumers of ecotours; see, for example, Yan, et al. 2008.

Among the most important sources of academic knowledge of ecotourism certification is a book edited by Martha Honey in 2002, *Ecotourism & Certification: Setting Standards in Practice*. The first chapter of this collection, "The Evolution of 'Green' Standards for Tourism" (Honey and Stewart 2002), identifies seven "vexing issues and areas of debate" in ecotourism research. They consist of:

1) “North-South Divide”, the issue caused by overly complex certification schemes that favor the powerful global ecotour companies often located in First World urban centers, over smaller and locally owned companies in destination countries;

2) “Consumer Demand”, with conflicting evidence about the demand for certificated ecotours;

3) “Consumer Awareness and Confusion” related to the complexity and diversity of certification schemes;

4) “Whom to Certify”, or the challenge of creating and adapting certification for diverse tourist activities;

5) “Marketing” to both the tourism providers to adopt certification and the consumers to understand the value of a certification;

6) “Financial Viability” of certification programs, including the role of governments and industry in financing;

7) “Private vs. Government Sector”, with the problems associated with each as a sole provider of certification and debate on the best mix of the two in designing, supporting, marketing, and administering certification.

Clearly among these vexing issues in ecotourism certification research, the attitudes and preferences of consumers is a key area where knowledge is lacking.

Though growth estimates for ecotourism as a whole vary, ecotourism growth is considerably higher in the tropics (Wight 2001). Political instability in many tropical developing countries may dissuade consumers from participating in ecotours in these regions. This, coupled with consumer desires for comfortable accommodations

accompanying their ecotours (Weaver and Lawton 2007), may create a large demand for ecotourism in Hawaii among some consumer classes.

In Hawaii, hiking and ecotourism locations are found within a relatively short distance from major urban tourism accommodations (e.g. Waikiki, Oahu), in part because the islands are generally small (Figure 1). Thus, tourist traffic at each high profile location, whether public or private, can result in high impacts for natural areas. Manoa Falls trail, for example is situated just a short, 5 minute, drive up the Manoa Valley from Waikiki. Most island locations can be reached by car in less than an hour.

Figure 1: Some Oahu ecotourism locations with proximity to Waikiki, Honolulu, HI

This study is an addition to several previous studies, reviews, and planning work involving sustainable tourism and ecotourism in Hawaii. These were carried out and administered primarily by Linda Cox and John Cusick with related masters theses carried out by former graduate students Melanie Saucier and Wendy K. Bauckham (Bauckham 2005; Cox, et al. 2008; Cox and Cusick 2006; Cusick, et al. 2010). The previous work of these individuals, and others, has led to identification of the importance of consumer choice in Hawaii ecotourism.

A primary means of encouraging ecotour operators to adopt ecological sustainability certification is to quantify the economic value of a system of standards for ecotourism via studies of consumer willingness to pay for certified-sustainable ecotours. Tour operators seek profitable ways of improving their environmental performance. At minimum, the value added through certification and labeling should cover the costs of maintaining certification. Either consumers are willing to pay a premium for certified-sustainable ecotours or public moneys will need to support the environmental sustainability standards. The Hawaiian Islands in particular require such standards in order to facilitate a healthy tourist industry over time (Bauckham 2005). Once a certification system is established, studied, and sought by ecotour operators, promotion of the certification label, and by extension sustainable tourism in Hawaii, the goal is to transition a large portion of Hawaii's mass tourism economy toward ecological and economic sustainability. Before any of these aims may be achieved, however, the preferences and values of the tour consumers must be examined in order to guide cost-bearing decisions and marketing efforts.

Recent societal paradigm shifts globally are likely to affect the ecotourism industry. These relate to global climate change, the rising cost of oil, energy shortages, primary and secondary school environmental education, and, in the US especially, the retirement of the baby boomers (Mihelj 2010; Wight 2001). The resulting recent, and on-going, changes in consumer attitudes, coupled with rising demand, indicate that a study of consumer ecotour preferences is both urgent and imperative for addressing the future of ecotourism in Hawaii.

Previous work by Cox, et al. (2008), established the importance of a sustainability evaluation system for tourism in Hawaii, primarily investigating the producer side of this issue. This study indicated that while accreditation and recognition help establish credibility for tour operators, both producers and consumers must understand the benefits of certification. On the consumer side of the implementation, much information is currently lacking because no substantial market exists for tourism ecolabels in Hawaii. Furthermore, no studies have established the market potential for certification, so the information needed to develop initial marketing efforts for the certification label is lacking.

Though not yet integrated into the market, a system has been established in Hawaii with the Hawaii Ecotourism Association for reviewing and labeling of tours as eco-friendly. The system includes a label distinguishing "HEA Reviewed Members" and another for "HEA Ecotour Operator of the Year" (HEA 2011). Recently a certification system was piloted which builds on and strengthens this review process by incorporating third-party audits of tour operators. This more stringent and systematic certification process will provide more credibility for ecotour operators and the label they display once certified. Problems persist, however, in creating an environment for adoption of the certification by tour operators and the related consumer recognition, which together determine the value of the label and certification process.

Problem Statement

A major challenge to implementing the ecotour certification system is a lack of quantitative evidence that the tour operators' cost of certification will be met or exceeded by the increased revenue the eco-label will provide. This study was undertaken in part to determine if consumer willingness to pay for certification exists so to provide operators information relative to the benefits of certification.

Conversely, given the importance of establishing sustainability standards for the tourism market in Hawaii, in terms of both ecological and cultural assets, if consumers are not willing to pay more for products and services from businesses that uphold sustainability standards, then that lack of WTP is also important information. A government subsidy may be necessary to correct the market's failure to support non-market ecosystem services. Whether the cost of certification is paid by consumers or the public, the support and protection of Hawaiian ecosystems and culture through sustainability certification is needed to encourage the adoption of best management practices by tourism businesses.

Research Objectives

The primary objectives of this research were: 1) to investigate consumer preference and willingness to pay (WTP) for the HEA eco-label/certification, in addition to other tour attributes, and 2) to reveal groups (consumer classes) most likely to prefer such labels and specific tour attributes.

Hiking tours were selected in order to facilitate grounded hypothetical responses from consumers. Results and implications, however, were expected to be useful in a variety of contexts. Quantifying and analyzing the preferences held by different groups of people should inform tour operators and perhaps encourage them to adopt sustainable practices via the certification process. The identification of a WTP for a certified tour over a non-certified tour, for example, and identification of classes most likely to pay, provides quantitative values which may encourage offerings of tour activities that minimize negative environmental impacts. With over 6 million visitors per year (Hawaii Department of Business, Economic Development, and Tourism 2009), even low WTP values may encourage adoption of a sustainable certification/labeling system by tour operators.

Though the WTP values and preferences estimated here will be useful in policy and business decisions, the use of a stated (individual) preference method for obtaining these values aims to estimate the likely direct price increase that certification will facilitate from different types of consumers. Thus, this study does not attempt to obtain a complete valuation of certification and labeling of sustainable tour operations (see "Methodology"). Such valuation would incorporate multiple criteria including societal goals of sustainability via democratic consensus, rather than simply the current individual preferences of consumers (Costanza and Folke 1997).

The primary objective aims to provide a "snapshot" of the current preferences and WTP values. These likely will evolve with social and environmental changes, and are expected to guide future efforts (among businesses, governments and non-profits) to

maximize sustainability of tourism operations, conservation of native habitats and biodiversity, and sustainable tourism growth as a subsector of tourism in Hawaii.

Purpose of Research

This research centered on the study of sustainability valuation involving visitors and their preferences and willingness to pay for sustainable tours and ecotour certification. Various visitor classes, correlated with socio-demographic and lifestyle criteria are hypothesized to show differences in their preferences for ecotours, with one or more classes willing to pay a premium for ecotours that have been certified as sustainable according to the Hawaii Ecotourism Association's standards. Though few studies have yet been carried out which assess consumer willingness to pay for certified-sustainable ecotours, with very little done in the United States (Chafe 2005) and none yet undertaken in Hawaii, this hypothesis was based on findings of an empirical analysis of Chinese tourists perceptions and willingness to pay for certified ecotours which found that, on average, survey respondents showed a WTP of a 35.1% premium for a certified ecotour product in China (Cheng and Zhou 2005).

This hypothesis was tested with a consumer survey experiment with conjoint choice and latent class variables (including, respectively, choice attribute variables and socio-demographic & lifestyle metrics, see methodology, below). Expected outcomes of this research will be especially useful in Hawaii where tourism is among the major industries sustaining the economy and highly significant threats to the unique (isolated

island) human-environmental systems, as well as rare ecosystems with abundant native and endemic biota.

Other Outcomes

The conjoint choice attribute of price is expected to be the most important relative to other attributes of the tour for most visitors, because consumers generally tend to prefer low cost as one of the most important attributes, as is true with organic produce (Byrne, et al. 1991). The empirical analysis of Chinese tourists perceptions and willingness to pay for certified ecotours found that, on average, survey respondents were WTP a 35.1% premium for a certified ecotour product (Cheng and Zhou 2005). WTP values in this study of tourists in Hawaii were expected to vary among classes, with class compositions likely to be divided largely by socio-demographic variables. In particular, education (Cheng and Zhou 2005) and age were expected to correlate with preferences and WTP for certified ecotours given that recently retired baby boomers (Mihelj 2010) and younger adults with higher education are expected to have increased awareness of the effects of environmental degradation. This is related to increased environmental mass media and environmental education efforts in primary and secondary schools over the last half century (Wight 2001). Females were found to dominate demand for ecotourism in the early 2000s, especially in “more biocentric” consumer classes (Weaver and Lawton 2007). Findings are also expected to include stronger preferences for the eco-certification among female consumers.

Methodology

Though environmental sustainability systems have been developed in various regions around the world, and some international tour certification programs exist, these are generally new and unproven (Chafe 2005). Other types of evaluation systems that are widely used, such as hotel customer satisfaction based on star rating systems, may be testable through the use of *revealed preference* methods, e.g. market price. Environmental certifications for tours, however, are generally under-developed and poorly integrated into the tourism markets. Market data was not sufficient to undertake revealed preference analysis and WTP would be unreliable with the certification systems not yet integrated in the consumer market structure.

Among the *stated preference* methods for valuation of product and service attributes, a conjoint-based choice (CBC) method (conjoint choice experiment or CCE) accompanied by latent class (LC) analysis allowed for useful, reliable, and appropriate results for these research questions. By forcing tradeoffs among levels of all attributes, CBC, as opposed to contingent valuation methods, offers the ability to reduce yea-saying (respondent desire to make themselves look good), as well as strategic bias (respondents' deliberate misrepresentation of preferences in order to influence results) (Bennett and Blamey 2001). Conjoint methods involving ranking and rating do not replicate the real-world choices made by consumers and may offer challenges involving "interpersonal comparisons" of ranking/rating data (Bennett and Blamey 2001). The ability to reduce these biases and challenges through the use of CBC is accompanied by

the methods allowance for comparison of probabilities for various alternatives being chosen in terms of product attributes.

CCE with Latent Class Analysis

The economic theory involved in CCE is the utility theory, which puts forward the idea that people tend to prefer choices that bring highest personal satisfaction. Utility is a measurement of satisfaction and its absolute value is difficult to evaluate, although comparing among relative levels of utility is more straightforward. The resulting part-worth utilities from a CCE may be compared relative to one another.

In CCE, each program, service, or good can be described by its characteristics, called *attributes* (e.g. color), and each attribute has different *levels* (or states, e.g. red or blue). In the design of CCE, different attributes with different levels can combine into different combinations or *profiles*. Respondents are asked to choose the most preferred combination from few choice profiles (two were used in this CCE) and repeat the task multiple times, usually between 10 and 20 choice sets. This CCE used 12 choice sets, or tasks. Using 12 tasks ensures that respondents' responses are not influenced by fatigue while still providing sufficient data for accurate measurements of each respondents' utilities (Chan-Halbrendt, et al. 2010).

Results can provide valuable information for marketers and decision makers. If a fee, cost, or price is involved in the design, as it was in this experiment, the researchers

may calculate the willingness to pay for shifts from one level to a more preferred level (e.g. from yellow to red, or from “no certification” to “HEA certified”).

The Latent Class Model is normally used to analyze CCE results; the respondents are generally divided into different groups in which they share the same preferences toward different attributes, and then sociodemographic and other survey questions may be used to identify the homogenous consumer groups. Producers use this information to develop niche markets. Researchers use this information to value environmental assets and select the best management practices from the community perspective. The values obtained, however, do not provide the total value of the environmental assets. In this experiment Hawaii residents were excluded from the sample because residents do not make up a substantial portion of customer base. Because much of the total values of the environmental goods and services in Hawaii are primarily relevant for these residents, a full valuation of the assets considered was beyond the scope of this study.

The CCE approach requires specific steps in design and implementation of a study. First, the researcher needs to determine the attributes that consumers desire and their levels that are used to describe the product. Websites of local tour operators, along with previous interviews of tour operators, were reviewed to determine the attributes of hiking tours which were most likely to serve as pricing points for individual guided hikes (see “Survey Design” below). The same were used to determine the market price range for the hypothetical hiking tour that respondents would be assessing. This study framed the issue for respondents by providing description in the questionnaire of “non-attribute” qualities of the hypothetical hiking tour in an initial description of the

hike (see “Survey Design” below) in addition to CCE attributes (e.g. eco-certification status).

Version 1, **Task** 7

If these were your only options, which would you choose?

	Choice A	**Choice B**
Price	$89	$43
Certification Status	No Certification	HEA Certified
Native Species Biodiversity Along Hike	High	Low
Waterfall	Waterfall (no swimming)	Waterfall (Swimming ok)

Figure 2: Sample choice card (task) used in CCE portion of questionnaire

The information on respondents’ preferences towards different levels of attributes was collected by showing the choice-based survey cards to the respondents to make choices. Profiles were made with the attributes and levels (Figure 2). Profiles are made selecting one level from each attribute. The profiles are assigned to different versions in which different sets of tasks (choices) are shown. Generally the number of possible profiles is the product of the level numbers of different attributes. Thus a complete factorial design for this CCE would produce 3*2*3*3 = 54 profiles, which is too many for individual respondents to choose from. Fractional factorial design was employed in the design of the choices of profiles to decrease the number of profiles shown to the respondents without losing major information. This was accomplished using Orthogonal arrays built on the Graeco-Latin squares using Sawtooth Software

(Orem, UT) SSI Web V. 7.0.22. A test of efficiency using the same software confirmed that nearly no precision was lost using each of the 7 sets of 12 choice cards created. No prohibitions were used in this study's CCE design, as any possible combination of levels from the various attributes was generally realistic and roughly feasible (e.g. a cheap tour with a waterfall and high biodiversity).

The third part of the study was to collect and analyze the data, with respondents chosen randomly to avoid bias (see "Population, Survey Locations, and Sample Composition," below). As discussed earlier, respondents were given the profiles from which to choose on 12 different tasks and, based on utility theory, respondents chose the one with the highest utility. The probability of choosing alternative A_j from a set of alternatives A' is given by equation $A = \{A_1, A_2,\ldots,A_J\}$ (McFadden 1974, in Magidson, et al. 2003). Magidson et.al (2003) summarizes the model used as follows:

(1) $$U_j = V_j + e_j$$

Where U_j represents total utility derived from the level choice, V_j a systematic component of the utility, and e_j denotes a stochastic error. Care was taken in attribute and level design to prevent possibilities that respondents base choices on excluded attributes potentially correlated with those presented. The systematic component is contained in the equation (1) is based on the assumption that people only consider the given attributes when making choices (in addition to the information given in the product description or, in this case, hypothetical guided hike description).

(2) $$P_j = \exp(V_j) / \sum_{k \in A'} \exp(V_k)$$

Regarding the Latent Class Model, Magidson et.al (2003) also provides equations for probability of respondents in class *t* choosing choice *j* (Equation 2) among all choices *k* (Equation3). The whole population is divided into T classes, and *t* =1,2,...,T. The probability for a respondent choosing a profile can be considered as a function of the attributes and levels.

$$P_{j.t} = \exp(V_{j.t}) / \sum_{k \in A'} \exp(V_{k.t}) \quad (3)$$

Choice card version and profile design and data collected from survey questionnaires were coded in Microsoft Excel 2007 in three files (Set, Alternatives, and Responses) and transferred into IBM SPSS Statistics V.19 to convert to a file type (".sav") readable by the LCA software (Statistical Innovations' LatentGOLD Choice V4.5). Latent classes, thus, are based on the respondents' CCE data (*a posteriori*), though covariate analysis depends upon and follows class grouping using respondents' CCE data. Within classes, the relative importance of CCE attributes is determined by the utility coefficients and correlation significance (z-scores) of each of these and the covariates.

Model (Class Number) Selection Using Bayesian Information Criterion (BIC)

Likelihood can be increased when fitting models, by adding classes, and overfitting can result. The Bayesian Information Criterion (BIC) resolves this problem by

instituting a penalty value for the number of classes in the model (Schwarz 1978). This value is lowest with the number of classes that provide the highest likelihood and was obtained from the LatentGOLD Choice V4.5 software to select the best number of classes. Estimations were run for models containing between 1-7 classes to find the model with the lowest BIC.

Sample Size in CBC

A general rule for CCE sample size follows the equation n*t*a / c ≥ 500, where "t" is the number of tasks (i.e. 12, in this design), "a" is the number of package profiles in each choice (i.e. 2, in this pairs design), and c is the number of levels within the attribute containing the highest number of levels (i.e. 3, in this "Price" attribute) (Johnson and Orme 2003). This indicated that the sample size required for this study would be only 500/8>n or a minimum sample of 63.

A more recent paper (Sawtooth Software 2008) points out, however, when segmentation is used, sample size must increase to, ideally, between 300 and 500 respondents. This study analyzed responses from 537 complete questionnaires.

Willingness to Pay (WTP)

As mentioned above, marginal WTP values for each class was calculated where significance of the utility scores allowed. This was accomplished by taking the difference between the utility score of two levels (e.g. "Waterfall swimming ok" utility minus "No

waterfall" utility), or "marginal utility" and dividing by the price coefficient (Hanley, et al. 2001). Thus, each class produced an estimated WTP for significant attribute levels.

Survey Design

One challenge in survey design was to keep the length and time needed per respondent low in order to prevent bias-inducing fatigue, as the CCE portion alone often takes several minutes. The questionnaire (Appendix A) for this study was designed with the CCE and LCA framework of analyses in mind. The questionnaire included basic socio-demographic questions to elicit responses, which would provide various data relating to consumers as tourists, and their preferences for hiking tours and environmental sustainability.

Certification Attribute and Typical Guided Hike

Among the CCE attributes was "certification of ecotour," including levels "no certification" and "HEA certified". HEA certification was chosen primarily because one primary objectives of this research was to determine the value of this specific organization's certification in Hawaii. While an additional level(s) might have been possible using different organizations, reducing respondent fatigue with only 12 CCE tasks was first priority. In order to determine whether HEA certification was of higher or lower value to respondents, a simple *stated valuation* was elicited for local HEA certification and the international scale "Green Globe" certification later in the

questionnaire (Appendix A) and printouts provided respondents comparable information for each. Green Globe was chosen because it is among the largest environmental certifiers (Koeman, et al. 2002) and respondents could easily recognize from its name that it is a global certifier (as opposed to the HEA local certification).

Websites for local ecotour operations were examined to determine the pricing points used to compete for consumer patronage and other characteristics of typical guided hikes. The websites reviewed also included similar types of tours, i.e. one bicycling and one driven nature tour. The aim was to uncover characteristics, which varied and were most likely to determine cost and appeal of particular hikes over others.

Additionally, typical characteristics of guided hikes were noted and used to develop a brief description of the hypothetical hike for respondents to review before beginning the choice portion. This description was shown as follows:
"A 4½-hour, easy-moderate hike in a mountain forest on Oahu, including hotel pickup, an experienced & knowledgeable guide, small lunch, and guaranteed scenic beauty of Hawaii. The group size is 10 people."

Additional Conjoint Choice Attributes

A recent choice experiment on bird-watching tour consumers in South Korea (Lee, et al. 2010) found that additional bird species at the tour site resulted in WTP premiums averaging $12.64 (a high value as a percent of these tours' prices). Websites of hiking tour operators in Hawaii tended to focus on biodiversity and native biodiversity

in particular as a pricing point. This survey included a biodiversity attribute within the choice experiment as well, as biodiversity on hiking tours also seems to be a pricing point for operators (based on review of their websites). The attribute was titled “Native Species Biodiversity along Hike,” with levels “High,” “Medium,” and “Low”.

Review of hiking tour operator websites showed that the market for guided hikes to waterfalls is quite large. Thus a waterfall attribute was also used in the CCE section with attributes including “No Waterfall,” “Waterfall (no swimming),” and “Waterfall (swimming ok)”. The distinction between waterfalls where swimming was allowed or not was made via inclusion of CCE levels for two reasons: 1) this did appear to be an attribute tour operators priced, and 2) a “no swimming” policy is more environmentally sustainable, due to erosion, sunscreen pollution, etc. caused by swimmers, thus environmentally conscious respondents might prefer not to swim.

Price levels were determined based on tour market prices to be most efficient and representative at $43, $89, and $167. Actual prices generally were $50-$100, and some half-day hikes did cost up to about $175. By including a price level on the high end (i.e. $167) respondents were forced to make a near maximum price trade-off when their “perfect hike” appeared among choices at this price. Thus the efficiency of the CCE portion was greater and WTP values more reliable.

Non-choice Questions (Sociodemographic and Lifestyle Metrics)

Questions in the survey, aside from the conjoint choices, aimed to fulfill inquiries about the social and demographic characteristics of visitor classes. A literature review

helped identify socio-demographic qualities, which were likely to be significantly correlated with certain types of tour consumers and other questions elicited information of interest relating to hiking, ecotourism, and perspectives on sustainability and conservation. All these variables were examined in the latent class analysis and dropped one at a time when they were found not to be significant. At the same time the BIC score was reviewed each time to ensure the number of classes remained most efficient.

A study from Norway found significant differences in socio-demographics between ecotourists on packaged tours and those traveling independently (Mehmetoglu 2006). Therefore, data were gathered which capture this information and integrated in the latent class analysis. Along with the possibility that native biodiversity would be highly valued by some consumers, the inclusion of a biodiversity choice attribute allowed for comparison among and within resulting classes in regard to: 1) how their value of sustainability certifications related; and 2) their personal level of support for sustainable travel. The former being from results for CCE HEA certification attribute as well as the additional stated values for HEA and Green Globe certification mentioned above, and the latter elicited through two additional questions. Question 2 was included which asked: “When planning your trip, was environmental sustainability an important factor for your decisions?” Question 3 asked respondents hypothetically whether they would be willing to donate money or time to support Hawaii’s environmental sustainability and/or protect its ecosystems (cf. Wessells, et al. 1999 for

seafood product ecolabeling study). The response choices were yes or no. Not only were latent class results of these two questions used to compare with native biodiversity, but with consumer class views & values of certification and other variables. Also, information may be useful in later marketing efforts for certification labels and certified tours.

In order to understand the relationship between visitors' (visitor classes') previous hiking experience and their preferences and WTP (and their additional socio-demographics), two questions asked (Question 4) how often they had gone on paid guided hikes in the last 5 years; and (Question 5) how often they had gone hiking independently over the last year. Most respondents were assumed not to have gone on many paid guided hikes in one year, so the timeframe was set to 5 years for that question. Each question asked them to fill in the estimated number of times they had gone for each activity, providing numerical, continuous data.

Based on a review of hiking tour operator and HEA-member websites, additional covariates included the following, which respondents were asked to mark as "important" or "not important" in choosing a guided hike (Question 6): small group size, view a waterfall, swim at a waterfall, easy to moderate strenuousness of the hike (not challenging), native wildlife biodiversity, general wildlife abundance (including non-native species), certified sustainable tour operator, tour operator's contributions to ecosystem conservation, and price of tour.

These selections were included for three reasons: 1) to "prime" respondents for the more complex choice portion which followed; 2) to determine whether or not

guided hike attributes left out of the CCE were “significantly important” among classes in the sample; and 3) to compare stated importance with revealed preferences from the conjoint choice attribute results.

The importance of general wildlife abundance, including non-native species, was of particular interest because significant results would allow for comparisons between respondents who may value viewing plants and animals, but care less about native biodiversity with those who see both as important, care only about native biodiversity, and/or have significant preference/WTP from CCE for native biodiversity. Furthermore, expectations were that those who claimed to plan their trip sustainably and were willing to donate time or money for Hawaii environmental sustainability (questions discussed above), or perhaps those with more education, would be more likely to say that native biodiversity was important while general abundance (including non-natives) was not.

Following the conjoint choice portion of the survey, was a set of stated and contingent valuations (Question 7). As mentioned above, the CCE certification attribute included only the levels “No certification” and HEA Certification,” so with an aim to determine whether a larger, global certification would be valued more or less than the local HEA one, respondents were asked to state how much extra money they would pay for each over a tour not certified. Responses were coded as HEA certification stated value and that of Green Globe, thus the analysis included two more variables with both positive and negative responses in a continuous, numerical form.

Immediately following this stated values question was a contingent valuation that asked respondents to check boxes of the level of each CCE attribute they most prefer to indicate their "perfect hike package," then write the dollar amount they would be willing to pay for this guided hike. Each selected level was coded as a nominal covariate and the stated WTP value as a numerical covariate. Results from attributes selected served as a tertiary check on the CCE preference data. Furthermore the WTP value served to complement both the price importance part of question 6 and the price preferences from CCE as a tertiary measure of price preference.

Finally, on page 6 of the questionnaire, respondents were asked to answer common socio-demographic questions. Question 10 asked respondents to provide their US zip code or home country. Initially responses were coded digitally as the specific country or US subregion according to the US Census Bureau Divisions of the US (e.g. the "South is divided into West South Central, East South Central, and South Atlantic) (USCB 2011). This made far too many categories to produce significant results, even with a large sample, so respondents were grouped into West US, East US, and Non-US. The West US included all Pacific and Mountain state residents (from Alaska to New Mexico), while the East US included all states East of the Mountain zone (Texas to Maine). Non-US included all residents of other countries. These 3 categories, though imprecise, were expected to produce significant and still meaningful generalizations regarding latent classes' origins.

Other questions in this final section of the survey included gender (nominal), age (numerical), education (numerical, as total years in school), and income (numerical). Respondents were reminded (in parentheses) that 13 years in school was a normal high school graduate's education level, thus removing potential confusion. Income was the final question wherein respondents provided their household size and estimated 2010 gross household income, and this covariate was coded as household income divided by household size.

Population, Survey Locations, and Sample Composition

The population under consideration was English-speaking non-resident visitors to the Hawaiian Islands, because these are the primary customers for tour operators. Japanese tourists make up about 18% of Hawaii's total of tourists (HTA 2011). Many of these and other visitors from outside the US speak and/or read English well enough to participate and these were not excluded from the survey. None of the hiking tour operators whose websites were examined advertise their tours in languages other than English and they did not offer guided hikes in other languages at the time of the survey. Investigation of the non-English tour markets was beyond the scope of this study, as they are separate and very small markets at present.

Generally, the number of respondents taking each of the 7 versions of the choice cards was equalized. A cost effective opportunity arose to survey at one location on

Hawaii (The Big Island) and one location on Kauai. Thus the sampling locations include these as additions to multiple locations around the island of Oahu (Table 1).

Respondents were selected randomly at each location for face-to-face surveys, though at some locations (e.g. smaller trailheads) every passerby was solicited. The surveying roughly approximated a stratified random sampling whereby the number of respondents per site was meant to be representational of the tourist population under study. Just as the majority of tourists are found on Oahu rather than other islands, the majority of tourists on Oahu (and likely statewide) are found in metropolitan Honolulu. Thus, much of the surveying was done, for example, at Waikiki Beach and Ala Moana Shopping Center, though efforts were taken to survey at locations in other areas of Oahu, such as the North Shore, Pali Lookout, and Makapuu. Additionally, as many respondents as possible were included at locations related to hiking and nature walks, such as Manoa Falls Trail, Lyon Arboretum, Hoomaluhia Botanical Gardens, Diamond Head Trailhead, and Makapuu Lighthouse Trailhead.

Table 1: Ecotour Survey Locations and Number of Respondents at Each Location

Location	**Island**	**Respondents**
Waikiki	Oahu	128
Ala Moana Bus Stop, Shopping Center, and Beach Park	Oahu	97
Diamond Head Crater and Kapiolani Community College Farmers	Oahu	89
North Shore (Unspecified)	Oahu	56
Manoa Falls Trailhead	Oahu	42
Hoomaluhia Botanical Garden, Kaneohe	Oahu	25
Poipu	Kauai	23
Kona	Hawaii	16
Pali Lookout	Oahu	12
Kapiolani Park	Oahu	10
Sharks Cove (North Shore)	Oahu	10
Sunset Beach (North Shore)	Oahu	7
Waimea Bay (North Shore)	Oahu	7
Haleiwa Beach (North Shore)	Oahu	5
Makapuu	Oahu	5
Hanauma Bay	Oahu	2
Lyon Arboretum	Oahu	2
Turtle Bay (North Shore)	Oahu	1
Total (n)		**537**

537 complete questionnaires were used in analyses. The sample was 56% male and 44% female, which slightly over-represents males in this visitor population. All respondents were age 18 or over with a majority in their 20s and 30s (Figure 3). Respondents' age mean was 37.4 years (standard error 13.4). This is comparable to Hawaii Tourism Authority's estimates of 43 (Japanese) and 44 (US residents) years average age for visitors (HTA 2011). Thus, some sampling or response bias toward younger adults may have occurred, however by including age in the latent class determination, results are expected to show very little affect from this possible bias.

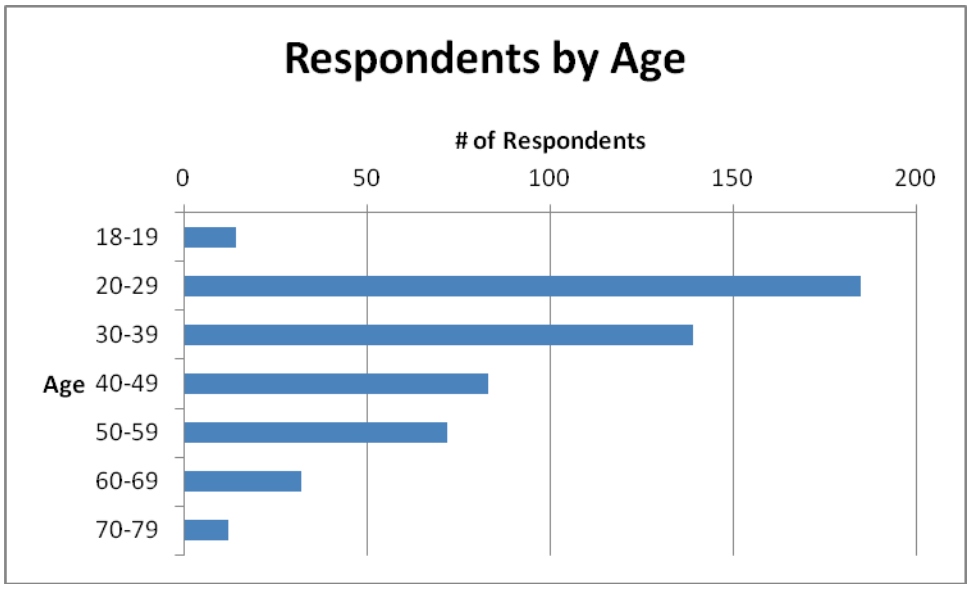

Figure 3: Number of Respondents by Age Group

Slightly more than half of the tourists surveyed were residents of the western United States, about 30% were from the eastern, southern or Midwestern US, and about 18% were from other countries (Table 2). Australian respondents constituted the largest group from outside the US, at 6.3%, followed by Canadians at 3.9%. The remaining 8.3% consisted of generally even numbers from Asia, Europe, and Latin

America, with two New Zealanders also represented (Table 2). The sample is fairly representative of the visitor statistics given by the State of Hawaii Department of Business, Economic Development & Tourism (DBEDT) for the time of survey, except that, since only English-speaking visitors were surveyed, the sample does not include as many Asian tourists (DBEDT 2011).

Table 2: Place of Origin for Respondents

Origins of Respondents	**Percent of Sample**	**# of Respondents**
Pacific US	36.9%	198
Mountain US	14.5%	78
Northeast US	10.1%	54
North Central US (Midwest)	8.0%	43
South Atlantic US	7.1%	38
Australia	6.3%	34
South Central US	5.0%	27
Canada	3.9%	21
Asia	3.0%	16
Europe	3.0%	16
Latin America (Mexico and Central & South Am.)	1.9%	10
New Zealand	0.4%	2
		n = 537
Consolidated Origins of Respondents	**Percent of Sample**	**# of Respondents**
Western US	51.4%	276
Eastern, Southern, & Midwest US	30.2%	162
Non-US (All Other Countries)	18.4%	99

Other Descriptive Statistics of Overall Sample

Data gathered on education level, and income showed the sample roughly matched expected population parameters (HTA 2010). Most respondents appear to have some college or an undergraduate degree or higher (Figure 4), though the sample included 15 respondents with less than 13 years of total education and many respondents with more than 18 years in school. The education distribution was approximately normal. The income distribution was skewed with most respondents having a “per-person-in-household” income average between $0 and $50,000, but quite

many with averages greater than $100,000 (Figure 5). This was expected given US visitor household income was reported by HTA to be $115,061 (HTA 2011). This was also expected given the distribution of wealth generally, worldwide (i.e. non-normal and skewed to higher income), and the fact that visiting Hawaii is expensive and thus easier for wealthy individuals.

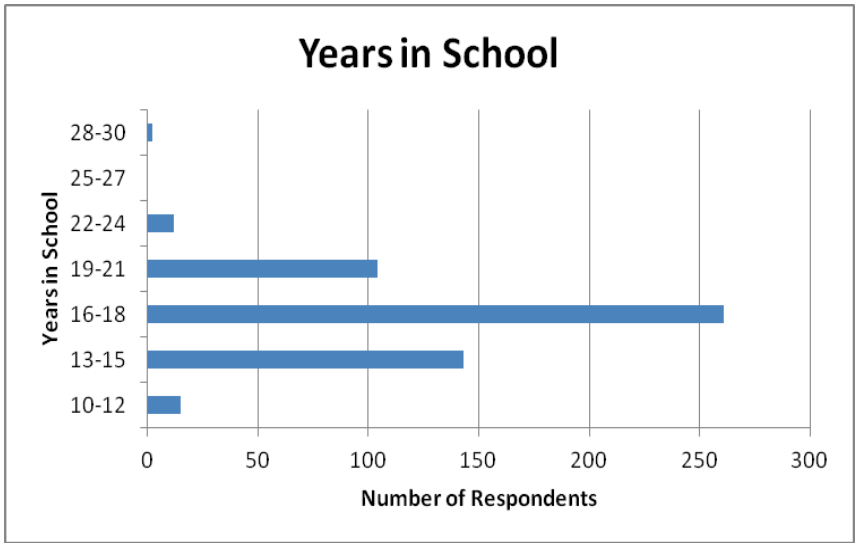

Figure 4: Years of Formal Education by Number of Respondents

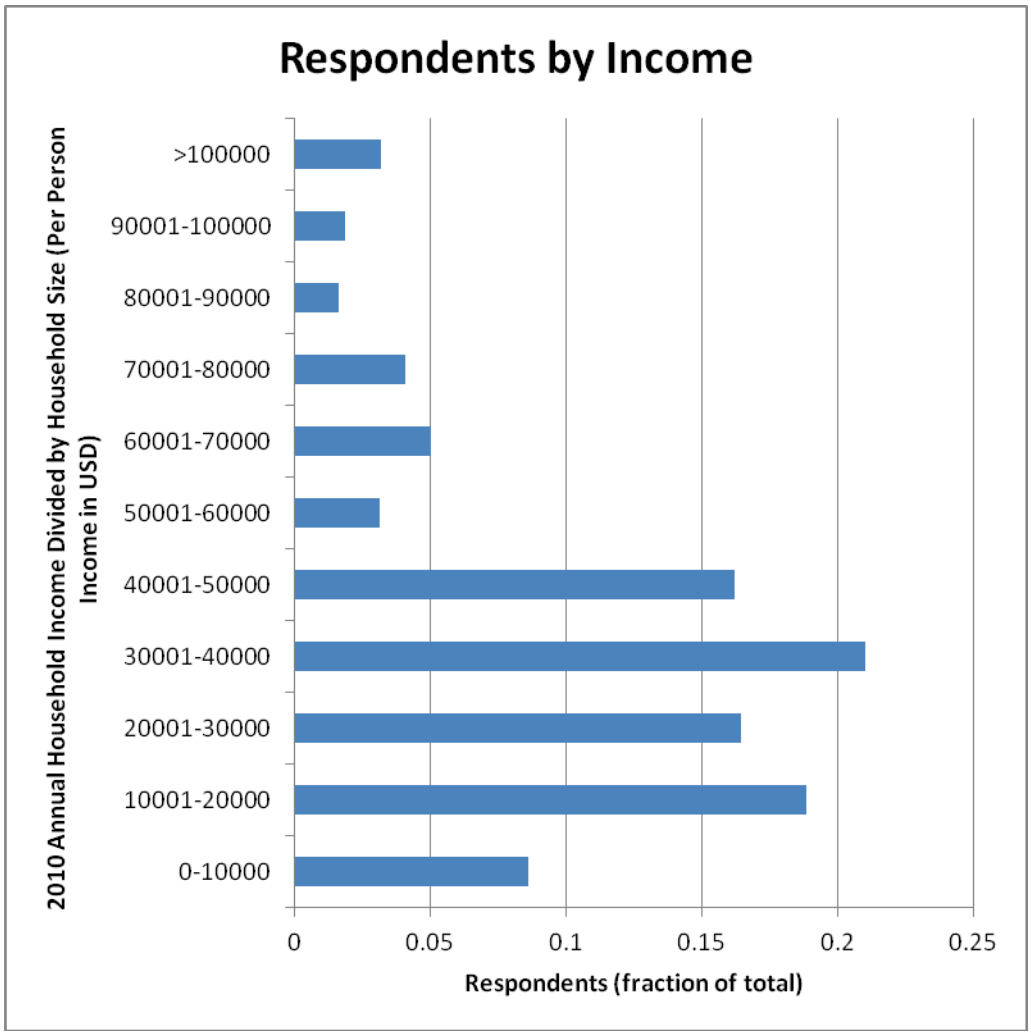

Figure 5: Individual Income[1] by Percentage of Respondents

[1] Estimated 2010 household income divided by number of people in household

Results

Number of Classes

A four-class model was found to have the lowest BIC (Table 3). Classes 1-4 contained 57.4%, 28.6%, 9.6%, and 4.4% of the sample, respectively.

Table 3: Optimal Number of Classes Using Bayesian Information Criterion (BIC)

	BIC(LL)
1-Class Model	7905.162
2-Class Model	7685.25
3-Class Model	7621.881
4-Class Model	7612.905
5-Class Model	7674.894

Relative Importance of CCE Attributes

Relative importance of CCE attributes varied among classes (Table 4). The largest class, Class 1, placed highest importance on the price, Classes 2 & 4 on waterfall, and Class 3 on certification status of hiking tour. Class 2 was unique in placing roughly equal importance on the other 3 attributes, while the other classes each had one attribute that was generally unimportant for them. For Class 1, this was certification; Class 3, native biodiversity along hike; and for Class 4, certification.

Table 4: Class Size and Relative Importance of Attributes by Class[2]

	Class1	Class2	Class3	Class4
Class Size (n=537)	57.4%	28.6%	9.6%	4.4%
Relative Importance				
Price	0.520	0.189	0.118	0.338
CertStatus	0.070	0.196	0.581	0.030
NativeDiversity	0.230	0.207	0.025	0.250
Waterfall	0.181	0.408	0.277	0.383

Class Descriptions

While the relative importance of attributes within a class is crucial for understanding visitor classes, actual preferences within each attribute were determined by each class's various positive or negative utility scores for significant levels of these attributes (Table 5). Meanwhile, statistically significant class characteristics for non-CCE and socio-demographic responses (Table 6 & Appendix B) further differentiated each class. Each class showed some marginal WTP values for shifts from one level of an attribute to a more preferred level (Table 7). Variables that were *not* significantly correlated with choices for any class were gender; income; independent hikes per year; hiking tour factors importance of group size, strenuousness, native wildlife biodiversity, and general wildlife abundance; and contingent valuation choices for certification status and waterfall.

Class 1, comprising 57% of the sample, was made up of mostly older and more educated individuals from the US, more from east of the US Mountain Time Zone. They

[2] Each class's most important attribute is shaded in Table 4.

tended be unwilling to volunteer or donate for Hawaii sustainability or conservation (90% confidence) and said tour operator conservation efforts were not important. Native biodiversity along the hike was important for Class 1, but they equally preferred "medium" and "high" biodiversity over "low" biodiversity (Table 5). Though they preferred HEA certified tours to non-certified tours, this class did not find certification to be important in choosing a tour. The certification CCE attribute relative importance was lowest among the four attributes, though their tendency to claim that certification was "not important" when asked directly was not significant. Though they showed a significant tendency to claim that viewing a waterfall was "not important" in a tour, CCE results showed that a view was preferred to no view, while a waterfall with swimming was preferred most.

Price was their primary concern according to CCE results (Table 4) and this is reinforced by their choice of "important" for tour price as a factor and their low stated WTP values for their "perfect hike" (Table 6 & Appendix B). Class 1's marginal WTP values (for shifts from a given level of an attribute to a more preferred level) were all less than $0.50 (Table 7). Interestingly, Class 1 was the only class to consistently claim to have gone on 1 or more paid guided hikes in the last 5 years.

Class 2 was also a large class with 29% of the sample. Mostly younger than the average with a significant tendency to live in another country, they preferred hikes with a waterfall in which they may swim (Table 5) and this preference is reinforced by the covariate "important to swim in waterfall" being significant (at 90% confidence) and positive (Table 6 & Appendix B). They were less thrifty than Class 1, as the CCE relative

importance of the price attribute was the lowest of the four attributes. Stated WTP values for their "perfect hike" (contingent valuation) were significantly higher than average. Class 2 was also more clear and consistent about native species biodiversity along hike, as they clearly preferred high over medium and especially low native biodiversity (Table 5). They also showed negative preference for low biodiversity when designing their own contingent valuation perfect hikes (though significant only at the 90% confidence interval). According to CCE results, though they most wanted a waterfall, they also showed roughly equal preference for low price, HEA certified tours, and native species biodiversity. Class 2 was the only one to claim significantly high stated WTP values for Green Globe certification, and the only one to show significantly low stated WTP for HEA certification (Table 6 & Appendix B), but they clearly preferred HEA certification to none in the CCE (Table 5) and were willing to pay more than Class 1 for HEA certification (Table 7).

When asked if environmental sustainability was important in their trip planning, they generally said "no" (90% confidence), yet among classes they had the second highest CCE-based WTP for sustainability (HEA) certification of tour and had the highest WTP values for native species biodiversity along hike (Table 7). None of their marginal WTP values were substantially high; all were below $1.50 except a shift from no waterfall to a waterfall with swimming, at $2.16.

Class 3 comprised 10% of the sample and its respondents originated mostly from the US, east of the Mountain Time Zone, and also included a few international tourists. Among CCE attributes, this class was most concerned about whether or not the tour was

certified-sustainable (Tables 4 & 5). They wanted to view a waterfall, and cared less for swimming in one (Table 5). Class 3 respondents said sustainability was part of their vacation planning (Table 6 & Appendix B). They did not, however, show any significant preferences in terms of native species biodiversity in the CCE (Table 5) or in the contingent valuation responses (Table 6 & Appendix B). Class 3 had significantly higher than average stated WTP values for their perfect hike, although no significant perfect hike characteristics were shown (Table 6 & Appendix B).

When asked directly, Class 3 respondents consistently claimed that swimming in a waterfall (Table 6 & Appendix B) was not important and this was reflected in their CCE choices. Their common response of "important" for the certification of tour operator in tour selection was also backed by the CCE choices and the highest CCE marginal WTP value among all classes and level shifts. Class 3 showed a $4.93 WTP for shifting from a tour with no certification to an HEA certified tour (Table 7). They also showed a value of $2.35 for a shift from no waterfall to a waterfall view (with no swimming), though no other CCE WTP values could be calculated for this class due to lack of significant CCE results (Tables 5 & 7).

Class 4 was the smallest of the classes, at 4% of the sample. On average, respondents were the least educated (at 90% confidence; Table 6 & Appendix B). They were younger (90% confidence) and most came from the western US (the Pacific and Mountain regions). Class 4 was the only class with a significant majority of package-tour travelers.

According to choices, Class 4 respondents preferred a waterfall at which they could swim over a waterfall with no swimming and a hike without a waterfall, though even in this, their most important CCE attribute, their highest marginal WTP value was just over $1 (Table 7). Their stated willingness to pay for their perfect hikes also significantly tended to be lower values, providing credence to their low CCE WTP values. Though not significant, their CCE results show a preference for no certification over an HEA certified tour. This was the only class that showed a positive utility score for non-certified tours and also the only class where the CCE results for certification were not significant. It was also the only class with a positive utility score for low native biodiversity and negative scores for both high and medium native biodiversity. The contingent valuation of their perfect hikes also showed a significant number of them selected low native biodiversity, confirming an intentional selection.
Interestingly, this was the only class with a significant majority (positive) for tour operator contributions to local conservation (Table 6 & Appendix B).

Table 5: Latent Class Choice Parameters[3][4]

	Class1 Utility	z-value	Class2 Utility	z-value	Class3 Utility	z-value	Class4 Utility	z-value
Attributes								
Price:	0.87	15.84	0.90	7.60	0.73	1.80	6.55	4.99
Cert. Status:								
HEA cert	0.06	3.04	0.46	8.87	1.80	7.48	-0.29	-1.55
No cert	-0.06	-3.04	-0.46	-8.87	-1.80	-7.48	0.29	1.55
Native Diversity:								
High	0.12	3.74	0.41	6.70	-0.07	-0.38	-1.64	-3.62
Low	-0.25	-8.01	-0.57	-8.48	-0.01	-0.06	3.20	5.00
Med	0.13	4.45	0.16	2.73	0.08	0.43	-1.56	-4.17
Waterfall:								
No Waterfall	-0.18	-5.06	-1.04	-10.60	-0.91	-3.21	-2.87	-4.22
Swim Waterfall	0.13	3.66	0.89	10.89	0.10	0.46	4.57	4.33
Waterf NoSwim in	0.05	1.69	0.15	2.58	0.81	2.93	-1.70	-3.69

[3] Note + or - utility scores and z-score significance with confidence of 99% in dark filled cells, and 90% in lightly-filled cells.

[4] Class r^2 values were, respectively: 1) 0.11, 2) 0.40, 3) 0.82, and 4) 0.77.

Table 6: Covariate Responses by Class[5]

Class 1	z-value	**Class 2**	z-value	**Class 3**	z-value	**Class 4**	z-value
No – Donate Time / Money for HI Conservation, Sustainability	1.803 *	No - Sustainable Trip Planning	1.904 *	Yes - Sustainable Trip Planning	2.340 **	Package Travelers	2.132 **
Have Paid for Guided Hikes Before	2.921 ***	Important - Swim in Waterfall	1.838 *	Not Important - Swim in Waterfall	2.515 **	Not Important - Certified Ecotour	3.000 ***
Not Important – View Waterfall	2.866 ***	High Stated WTP Value for Green Globe Certification	2.411 **	Important - Certified Ecotour	2.693 ***	Important – Tour Operator Contributes to Local Conservation	2.401 **
Not Important – Tour Operator Contributes to Local Conservation	3.143 ***	Low Stated WTP Value for HEA Certification	-2.636 **	High Stated Perfect Hike WTP	3.335 ***	Negative Preference – Med. Native Biodiversity	-2.057 **
Important – Tour Price	3.304 ***	Negative Preference – Low Native Biodiversity	-1.810 *	Low % West US Residents in Class	-3.642 ***	Positive Preference – Low Native Biodiversity	2.525 **
Low Stated Perfect Hike WTP	-2.552 **	High Stated Perfect Hike WTP	5.121 ***	High % East US Residents in Class	2.633 ***	Low Stated Perfect Hike WTP	-3.890 ***
High % East US Residents in Class	2.920 ***	Low % East US Residents in Class	-2.379 **			High % West US Residents in Class	2.961 ***
Low % Non-US Residents in Class	-3.637 **	High % Non-US Residents in Class	3.674 ***			Fewer Years in School	-1.867 *
Older on Average	2.668 ***	Younger on Average	-2.689 ***				
Many Years in School	2.289 **						

[5] Confidence of 99% = ***, 95% = **, 90% = *(See also Appendix B)

Table 7: Marginal Willingness To Pay (in USD) by Class for Changes in Attribute levels

Level Shift	Class1	Class2	Class3	Class4
NoCert->HEA Cert	$0.13	$1.03	$4.93	
Biodiv. Low->High	$0.43	$1.09		$-0.74
Biodiv. Low->Med	$0.44	$0.81		$-0.73
Biodiv. Med->High	$-0.02	$0.29		$-0.01
No Waterfall -> Waterfall No Swimming	$0.26	$1.33	$2.35	$0.18
Waterfall (No Swimming) -> Swimming OK	$0.09	$0.82		$0.96
No Waterfall -> Swimming OK	$0.35	$2.16		$1.14

Discussion and Conclusions

The overall hypothesis of this study was supported because four distinct visitor classes did show clear differences in their preferences for ecotours, correlated with socio-demographic and lifestyle criteria, and one class (class 3) was willing to pay a substantial premium for ecotours that have been certified as sustainable according to the Hawaii Ecotourism Association's standards. In general, classes of tourists were found to be diverse in several regards, and each class showed several significant results among CCE attributes and covariates which allow for interpretation of this diversity.

Among CCE results, only one preference was consistent among all classes: a negative preference for hikes with no waterfall. For two classes (2 & 4) this was the most important CCE attribute. Differences among classes exist, however, in whether or not they preferred a swim at the waterfall or not and in their WTP for shifts toward a waterfall view or swim. For the vast majority of tourists who responded a hike to a waterfall is preferred.

Class 1

Class 1's r^2 value was only 0.11, which indicates that other factors not accounted for in this study may have been important, especially for US tourists. Future studies may include distance from hotel or tour rating from a website like TripAdvisor.com. Low r^2 combined with very low WTP values for perfect eco-hike utility shifts, however, could mean that this large consumer class is simply not interested in paying for guided hikes in

Hawaii. This would be important, because they make up 57% of the sample. Future surveys should include a simple question asking whether or not the respondent would likely go on a paid guided hike in Hawaii to clearly identify those with interest. Class 1 was, however, the only class where respondents often have gone on more than one paid, guided hike before. These respondents tend to be older, however, so their chance of having past paid hikes is higher and having paid for guided hikes in the past may not indicate that they have interest in paying for guided hikes again. Another explanation for Class 1's general unwillingness to pay for even their most preferred hike is that they may expect paid guided hike to be priced much lower than they are in Hawaii. Similar guided hikes, for example, along California's central coast locations of Moro Bay and Big Sur, are priced similarly at about $90 and $120 respectively (CCO 2010). None of the other classes showed price as the most important attribute and the other classes' hiking tour patronage may result in higher market prices for guided eco-hikes. More simply, the guided hiking tour market is a niche market and Class 1 respondents are either not interested or are priced out. The majority of visitors (i.e. Class 1) may view Hawaii as a vacation destination intended for "sun and sand" or more relaxing activities than hiking. Though Class 1 respondents were likely not the primary target customers for certified eco-hikes, other types of HEA certified ecotours may interest them, though given the results, environmental sustainability does not appear to be a major driver for their tour choices. Given that this class was the only one with significantly more years in school, results ran counter to expectations that higher education levels correlate with increased values for environmental sustainability. Though occupational data were not gathered, it

may be that outliers, in this regard, such as lawyers, doctors, and other professionals and specialists. Though these professions require more years in school, the extra years are specialized education, which often has little to do with environment. These outliers may have been the cause of significantly more years in school. When the average education level is basically a bachelor's degree or equivalent, as it was in this sample, more years in school may not correlate with highly valuing the environment.

Class 1 was the only class for which native biodiversity along hike was more important than the waterfall attribute and they have a significant negative preference for low native biodiversity, so it seems that they are interested in viewing native wildlife. Unfortunately their slight preference for the native biodiversity level of medium over high may indicate that they lack a clear understanding of the meaning of "native species biodiversity." Those who understand this option would not be likely to ever prefer medium to high biodiversity.

Class 1 is a large group of US residents that shows no significant covariate responses that would indicate that they have serious aspirations to be environmentally sustainable in their trip to Hawaii. Given the timing of this study, during a slow recovery from the major economic recession of 2008-2009, the fact that the majority of tourists (at least those from the US) are concerned with cost above all else and are not WTP much for even their most preferred ecotour is not surprising. Venues for educating and/or enlightening these consumers as to the importance and fragility of Hawaii's ecosystem services and rare species are needed. Potential venues to increase such educational efforts would be government and non-government tourism information and

booking websites and perhaps via airlines through in-flight video entertainment. As a substantial portion of the total visitors to the islands, this class's lack of displayed personal responsibility for Hawaii's environmental sustainability also underscores the importance of local (government, business, and non-profit) support for standards and regulations, which will ensure the continued vitality of the natural capital of the state.

Class 2

Class 2 was the most "well-rounded" in terms of their CCE preferences and WTP for CCE level utility shifts and the second largest class of respondents. Their preferences match well the major pricing points that tour operators share on websites. Compared with Class 1, they appear far more likely to contain visitors that will be customers for a guided hike in Hawaii. Though they do not show any significant covariates indicating a strong applied environmental ethic, relative to Classes 1 & 4, their choices indicate a general awareness and concern for ecological and general environmental sustainability.

They were the only group of tourists who seemed to clearly appreciate native biodiversity and also the only group to be made up mostly of non-US residents. This may indicate American visitors have, on average, less understanding of or appreciation for native species biodiversity than people from some other countries. Another difference between this and Class 1, however, was that Class 2 respondents tended to be younger, which may also relate with their preference for and perhaps understanding of high native biodiversity along the hike. While their preferences for native biodiversity were

clear and made sense, their WTP values from the CCE level shifts to higher native species biodiversity along the hike were not particularly high. They were the highest among the classes, however, for this attribute (only Class 2 showed more than a $1 per respondent WTP to experience higher than "low biodiversity"). This class represents roughly 1.8 million visitors per year (DBEDT 2009) so the added value that may be captured from this class through conservation of native habitats may be enough to provide incentive for hiking tour operators to spend their own funds or volunteer time for conservation and restoration. Their WTP for certification, however, was over $1. Thus, conservation and perhaps restoration of native habitats should also be built into sustainability certification standards in clear and robust ways in Hawaii. (This is supported even more so in Class 3's CCE WTP values; see below).

The importance of a waterfall on the hike for Class 2 is clear, and though their WTP for a waterfall (swim or no) was not the highest among classes, within Class 2 marginal WTP to shift from no waterfall was higher than for other attribute utility shifts. While they appear to be generally environmentally conscious in their other choices, this does not extend to refraining from swimming at a waterfall; i.e. they do not appear aware or concerned about any erosion or pollution this may cause.

Class 2 accounted for more than a quarter of the respondents, and thus their CCE WTP values, though individually not appearing substantial, on the whole display support for ecotourism. This class appears far more likely, given their preferences to pay for guided eco-hikes, and perhaps ecotours generally, than Class 1. As a large consumer group, Class 2 would likely add revenue to ecotourism activities that appeal to them. In

the case of a hiking tour, if they were offered an HEA certified hike through a highly biodiverse native habitat to a waterfall where swimming was permitted, they appear to be willing to pay for it, and significantly and substantially more than for hikes lacking these characteristics. Such hikes may not currently be feasible due to the occurrence of multiple invasive species (and accompanying loss of biodiversity) at lower elevations where hikes to waterfalls normally take place, e.g. Manoa Falls, Oahu. Therefore native habitat restoration efforts at such locations would be economically beneficial to tour operators. Also, tour operators should consider ways to mitigate or prevent environmental damage from swimming, where swimming is allowed, at waterfalls and such measures might well be considered in certification standards.

Class 2 appeared to trust global eco-certifications over local ones given their stated WTP values for Green Globe and HEA certifications. This may be related to the fact that most of them are from other countries, including Australia, which has a strong market for large-scale sustainability labels (Chester and Crabtree 2002). Thus, they were more likely than US respondents to recognize the Green Globe "brand" (Bien 2002; Koeman, et al. 2002). Future studies should further test consumer awareness of internationally-based versus locally based certification.

Class 3

Class 3 tourists value certification and generally desire to act "sustainably". They may represent the primary customers of a certified-sustainable eco-hiking tour. Unlike

the other classes, they did not show a higher preference for swimming in a waterfall than simply viewing one, though the "swim" level of the waterfall attribute was not significant for this class. Since they also tended to say that swimming in a waterfall was not important, this class would be likely to patron the most environmentally sustainable tours. They may understand that swimming in a waterfall may not be good for the environment, and/or they may be aware of health concerns. In any case their desire to view a waterfall is high, and among classes they show the highest WTP to shift from no waterfall to view waterfall.

They are, however, in need of education on the importance of native biodiversity in sustainable environments and ecosystem services. They seem excited about sustainability and certification, but did not clearly show appreciation for native biodiversity. Again, Hawaiian environmental sustainability education is needed for these tourists to understand the importance of endemic, endangered, native, and invasive species in the ecosystems.

While the size of Class 3 at 10% of the sample appears relatively small, 10% of *all* English-speaking visitors to Hawaii, or about 600,000 visitors per year (DBEDT 2011), is not a small number. This class is particularly interested in certified tours and is willing to pay almost $5 more each for a hiking tour that is HEA certified. Along with Class 2 they showed significantly high stated "perfect hike" WTP (contingent valuation), so their overall cost-aversion is outweighed by their desire for eco-certified tours. In combination, Classes 2 and 3 represent almost 40% of the sample, showing that certified ecotourism at a premium is marketable to a very large "niche" of Hawaii's

tourists, though it should be reiterated that certification's added value per customer per trip is limited ($1-$5).

Class 4

Class 4's results for the CCE attribute of certification were, at least, divergent from other classes, in that they did not significantly prefer HEA certified tours. The z-score for these levels were +1.55 (Not Certified) and -1.55 (HEA Certified), so the preference for tours that are not certified by HEA, while not significant, should not be ignored. Possible explanations might include some negative preference for HEA in particular, but, though not significant, this class claimed the highest stated WTP for HEA certification and the lowest (negative) preference for Green Globe certification. Thus, a serious distrust for HEA (with some other certifier preferred) is unlikely. Further supporting the apparent preference for no eco-certification was a significant response of "not important" for "Certified-sustainable operator". Since the vast majority of members of Class 4 claim importance for operator contributions to local conservation, Class 4 tourists may feel that it is an inherent responsibility of businesses to take care of local environments (Portney 2005), but do not see the customer or certification as a good driver for this responsibility.

On average, respondents in this class spent fewer years in school (significant at 90% confidence interval). This seems to show that those with more education prefer certified tours and those with less education do not. The problem with significance in

this regard, however, is apparent, and though Class 1 showed significantly more years in school and preference for certified tours, their WTP for certification was low. Class 3 were less educated than the average respondent (not significant), and had the highest WTP for HEA certification in CCE results.

Class 4 had a lower education level and a significant CCE preference for "low" native biodiversity along the hike and negative preference for both medium and high biodiversity. When asked to choose their perfect hike, they showed the same tendency, again significantly. A relationship between less education and a preference for low native biodiversity may exist. Results seem to suggest that people with lower education are misguided by other (non-academic) sources of information on native biodiversity, more interested in Hawaii's exotic species than natives, or they were confused on the meaning of "native species biodiversity". Pacific states, including California with the largest state population and the origin of many Hawaii tourists, are known for progressive environmental initiatives (Press 2002; Wingfield and Marcus 2007; Rice, et al. 1996; Rolle 1998). Respondents from these states (36.9%), together with those of Mountain states (14.5%) made more than half of the sample. These respondents were spread throughout the four classes in such a way that they did not show significantly in any of the larger classes. Thus, diversity of respondents within, among, and between the US Pacific and Mountain states is clear, and especially apparent in comprising the majority of Class 4, which is not environmentally progressive. Again, however, preferences that indicate people from the US in the majority and this minority class may not yet have a land ethic (*sensu* Leopold 1949) that is ecologically sustainable. Whether

education, formal or not, would make a difference in this manner is not clear from this study. Since Class 4 was the only class made up significantly of package tour travelers, this characteristic may be among those that define this group.

Methodological Lessons Learned

In future choice studies, an attribute like "native species biodiversity along hike" might only have two levels: "high" and "low." Though inclusion of a "medium" level showed results with more precision, forcing a tradeoff that is more clearly "black and white" would make for results that identify respondents who clearly do or do not care about viewing a diversity of native wildlife. In this study, an attempt was made to add clarity by including items "Native wildlife biodiversity" and "General wildlife abundance (including non-native species)," in that order, to the important/not important section, but results were not significant.

Unexplained variance for Class 1 was very high, which could be expected from respondents largely composed of tourists who are just not interested in paid, guided hiking tours on their Hawaiian vacation. Surveying only respondents who claim an interest in Hawaii eco-hiking may have been considered, however, no information about the size of each class were know *a priori*. Class 2, also had a generally low r^2 value (0.40), and seemed to be a class that was interested in such tours. Therefore, some explanatory factors were unaccounted for in this study that may influence the choices of this class.

Recent decades have seen great increases of Internet (web-based) “star” ratings of quality or “like” (preference) whether crowd-based (e.g. on netflix.com) or critical-reviews (e.g. citysearch.com). Consumers have come to rely heavily on these votes and consolidated reviews in choosing tour activities (Gershoff, et al. 2003). Thus future studies should include some indication or variable regarding a “likability,” “fun,” or overall quality rating for the ecotour, perhaps using a recognized crowd-review source like Yelp.com with star rating levels.

Though group size, hike strenuousness, meal, etc. were accounted for in this study by including them in the short hypothetical description of the tour before the choice portion, these could have served as variables. Furthermore, tour-site distance from hotel, physical fitness of respondent, or some other factor not accounted for may have influenced responses, if included. Some of these are impractical (e.g. physical fitness question) to include in a person-to-person survey.

The tourists’ view of Hawaii as a cultural location might provide some explanatory power. Those who view modern Hawaii as more of a Polynesian place than an American place may have different values and feelings relating to their own responsibility in conservation of native biota and/or environmental sustainability in Hawaii. Adding a survey question such as: “If you had to choose only one, would you say that the Hawaiian Islands are part of Polynesia, or part of America?”, or some variation of this question might produce results that relate how feelings about land ownership and sovereignty relate to personal responsibility.

Conclusions

Class 2 was the only class with a significant preference for high native species biodiversity and a significant negative preference for low native biodiversity, although they did not have significantly more education (years in school). The difference between Class 2 and the others is that the respondents originated predominately from other countries and cultures than the U.S. and that they were significantly younger.

In 1949, Aldo Leopold, discussing a land ethic, suggested the following in his famous work *A Sand County Almanac* (Leopold 1949):

> No important change in ethics was ever accomplished without an internal change in our intellectual emphasis, loyalties, affections, and convictions. The proof that conservation has not yet touched these foundations of conduct lies in the fact that philosophy and religion have not yet heard of it. In our attempt to make conservation easy, we have made it trivial.

Classes dominated by respondents from the U.S. tended, in general, to prefer HEA certification, often were willing to pay more for eco-certified tours, and sometimes claimed to have planned their travel sustainably. Their general confusion and lack of interest in native habitats in Hawaii, among the especially diverse native habitats in the world, however, and their low or even negative WTP for native biodiversity exploration, show that their personal intellectual connection to biota is quite limited. A clear connection or mental link between environmental sustainability with native biota is, in most cases, absent for most respondents. Though respondents may feel social pressure in terms of environmental sustainability, in this analysis they displayed little interest in

the foundations of ecosystem services: native species biodiversity. Since 1949, many Americans (U.S.) have come to integrate a stronger sense of environmental loyalty (Dunlap and Mertig 1992; Kline 2011), and when they come to Hawaii at least, this loyalty often does not extend to connecting with (nor conservation of) native biota. This is apparently not the case, generally, for those English-speakers from other countries, though Class 2 also was the youngest class overall and was not devoid of U.S. residents.

The respondents' place of origin in terms of biodiversity preferences may not be as important as their age, which would indicate that enculturation and education in recent decades is changing views of, and preferences for, native biodiversity in Hawaii. These results do not clearly identify whether traveler origin or traveler age is more influential in preference for native biodiversity and some confounding or interaction may have occurred since most respondents from other countries surveyed were also younger than average. When only U.S. respondents are analyzed, age is not significant (a 2-class model; results not shown), although the class that is younger on average is more interested in native species biodiversity.

Future studies on ecotourism should focus on clarifying with greater precision the groups from the U.S. and other countries, which show interest in native biodiversity at various travel destinations within and beyond Hawaii. Terrestrial ecotours, especially those certified as sustainable, on the other hand, likely should provide engagement for all potential customers in native ecosystems through a framework of ecosystem conservation. These operations could serve as part of the enculturation machinery necessary for instilling a sustainable land ethic, especially for their U.S. customers.

Regardless of the respondent's place of origin, overall, respondents appear to be somewhat careless about stewardship of Hawaii. Class 2 respondents, who seemed to best appreciate biodiversity, more often than not, claimed that environmental sustainability was *not* a factor in planning their trip. No class gave significantly positive ("yes") responses that they were willing to donate time or money for Hawaii's environmental sustainability and/or ecosystem conservation (though Class 3's results for this covariate were positive and close to significant with a z-score of 1.28).

It was not clear from this study whether or not any of these classes might show preference for ecotours that focus on urban, rural, disturbed, and/or wild ecosystem attributes independent of native biodiversity which provision various benefits for society (e.g. general abundance of wildlife, urban parks and gardens; organic farms). No class significantly held general wildlife abundance to be either important or not important. Future studies should integrate questions or broaden the scope of surveys to understand consumer preferences relating to other types of ecotours in Hawaii and other destinations. Since the history of agriculture in Hawaii is very rich, and organic farms, rooftop agribusiness, and other environmentally sustainable farm practices are gaining presence in Hawaii, further study of the appeal of agro-ecotourism is warranted. The methodology used in this study could incorporate such investigations without difficulty in the future.

The disturbed state of most wild ecosystems in Hawaii which tourists are likely to visit (e.g. lower elevations) also warrants investigation of preferences in alternative types of ecotours. These might include ecosystem history tours (Che 2006) which focus

on wild ecosystems altered by human activities and incorporate history of these activities. With the prevalence and historical impact of invasive species so well displayed in Hawaii tours may even focus primarily on discussion of invasive flora and fauna and their impact in Hawaii; it is not clear from this study whether such a niche market of ecotourism is feasible.

Given that a similar previous study of Chinese tourists (in China) showed a WTP of a 35% premium for a certified ecotour product (Cheng and Zhou 2005), higher WTP values, at least for one class, were expected. One class (Class 3, 10% of the sample) showed substantial WTP for certification. Their WTP of $4.93 for a shift from no certification to HEA certification is slightly more than a 10% premium over the lowest price level used, and about a 3% premium on the highest price level used. These levels were accurate representations of actual hiking tour prices. Thus Class 3's WTP for HEA certification, though not as high as expected, are still considered substantial. Both Class 3 and Class 2 should be considered the target population for ecotour operators.

As mentioned above, Class 3 represents 10% of the English-speaking visitor population present at the time of the survey and given their preferences and higher r^2 value, they are likely to be among the primary consumers of ecotours. Thus a 3-10% increase in revenue from this class would likely cover the annual tour operator fee for HEA certification if it is marketed appropriately. Clearly, however, other costs may be involved in certification that must be carried by the operators, and though some of this may be feasibly covered through a price increase on certified tours, the increase should

account for other customers' preferences. These would include Class 2 respondents, whose certification marginal WTP was only $1.03.

Some operators may see increased profits after certification. With over 95% of the sample of visitors to Hawaii showing preference and at least some positive WTP for HEA certification, certified tour operators who display their certification label/status may be able to eventually institute a small price increase across their tours without losing business.

Several results were not expected or even contrary to expectations. These included findings of no significant correlation of gender within any of the classes. Females were expected to dominate the classes that showed preferences or covariate positive correlation relating to biocentrism (e.g. sustainable trip planning). This study showed no class to be "significantly female." An analysis including only U.S. respondents, however, does show significant gender difference with the female dominated class showing higher preference and WTP for certification and high biodiversity (2-class model; results not shown).

While Class 1 (57% of visitors surveyed) did show serious cost-aversion, as mentioned above this class may not be a primary customer base for ecotours. The remaining 3 classes, accounting for 43% of 537 visitors surveyed, showed a CCE relative attribute importance of either waterfall or certification status greater than the price attribute. Though their resulting WTP values were not high, having so many respondents less concerned with tour price than other tour attributes was unexpected. Since price levels for choice cards were carefully selected to include a high ($167), semi-prohibitive

level these results support a strong interest in Hawaii eco-hikes among Classes 2-4. Furthermore, none of these 3 classes showed significantly positive ("yes") responses when asked if tour price was important. This is certainly good news for tour operators. It appears that visitors, who may be cost-averse on their everyday goods and services at home, may relax cost aversion in Hawaiian ecotourism activity choices. None of these classes showed significantly higher income, so tour cost relative to respondent income (c.f. "wealthiness") was not shown to be important.

In summary, the HEA certification labels (i.e. "brand") must be marketed appropriately to capture the added value of certification. Consumer preferences and WTP values found in this study were based on a survey, which focused on certification. Thus visitor choices were, at least, influenced by having the existence of certified tours as an option brought to their attention. If marketing and display of the certification label is not properly instituted, visitors will remain unaware of the option of an HEA-certified tour. Marketing should include international sources of tourism information. Class 2 (non-U.S.) respondents appear to trust HEA certification less than an international one. Thus, if HEA certification is to add value to tours, it must not build a reputation for certifying operators that "greenwash" tours and operations which have high environmental impact. A technologically savvy generation of Internet users will constitute a large portion of the ecotour customer base in Hawaii (e.g. Class 2 visitors) and the value of the certification will depend on the, largely Internet-based, reputation on which these consumers depend. The value of certification of operators as ecologically sustainable relies upon the reliability of the certification process.

Local support is also fundamentally important for the success of the HEA certification program, e.g. integration of Hawaii Department of Land and Natural Resources (DLNR) enforcement of sanctioned commercial trails with HEA standards; Hawaii Tourism Authority cooperation in advertising an ecotour industry which discourages greenwashing. HEA must work with local resource managers (e.g. DLNR) to incorporate environmental impact reduction and mitigation at specific locations of operations on one hand, and encourage HTA to advertise ecotourism through the lens of community and global values of sustained ecosystems on the other. In working with state tourism and resource managers to build an effective standard for ecotourism, HEA may build a reputation among consumers, which enhances the value of its certification for its members.

The importance of HEA certification should also be made clear in an easy to understand format to visitors from various educational backgrounds. Non-significance of income in WTP for HEA certification suggests that focus on a broad range of socioeconomic classes is important in marketing the eco-labels. Many with lower than average income are willing to pay a premium for certification, if they are aware of and trust the choice.

Appendix A

Survey Questionnaire

College of Tropical Agriculture and Human Resources (CTAHR)
The founding college of the University of Hawai'i, established 1907

Willingness to Pay for Sustainable Ecotours in Hawai'i

First: Non-Hawaii residents (visitors) only. (IF HI RESIDENT, DO NOT TAKE THE SURVEY.)

READ THE STATEMENTS OF CONFIDENTIALITY AND SURVEY AGREEMENT TO RESPONDENT IF THEY ARE WILLING TO PARTICIPATE. (must be 18+yrs)

Background Information for Respondent

Many aspects of ecotourism activities relate to impacts on natural and human environments. Ecotour operations might create both environmental problems and solutions. By developing standards for certification of tour operations as sustainable ecotours, the Hawaii Ecotourism Association (HEA) offers tour operators a chance to show customers that they are ecologically and socially sustainable with a certification label.

This Univ. Hawaii survey is being conducted in order to assist HEA, researchers, the tourism sector, and policymakers in understanding consumer views toward ecotourism, especially in terms of consumer values of a label/certification for ecotours.

Willingness to Pay for Sustainable Ecotours in Hawai'i

Survey #: **Location:** **Date:** **Version#:**

Questions:

Thank you for taking part in this research. In this study we are interested in your opinions and choices of possible hiking tours. By "hiking tours" we mean guided group hiking tours in natural areas of Hawai'i.

We would like to start this survey by learning more about your visit to Hawaii.

1. Are you here on Oahu as part of a package-tour or are you traveling independently?

☐ Package Tour ☐ Independent

2. When planning your trip, was environmental sustainability an important factor for your decisions?

Yes	*No*
☐	☐

We would also like to know about your values for environmental sustainability in HI.

3. As a visitor would you likely donate some time or money to support Hawaii's environmental sustainability and/or protect its ecosystems if an opportunity was there?

Yes	*No*
☐	☐

Now we'd like to know more about your experience with hiking tours.

4. About how often do you go on **paid guided** hikes in **5 years?** _____times

5. About how often do you go **hiking on your own** in **1 year?** _____times

6. If you were to go on a hiking tour in Hawaii, which of these factors would be important in selecting one?

Hiking Tour Factor	***Important***	***Not Important***
Group size is small	☐	☐
View a waterfall	☐	☐
Swim at a waterfall	☐	☐
Strenuousness (Easy or moderate hike)	☐	☐
Native wildlife biodiversity	☐	☐
General wildlife abundance (*including non-native species)*	☐	☐
Certified as sustainable tour operation	☐	☐
Operator makes contributions to local conservation	☐	☐
Price of tour	☐	☐

PLEASE TAKE TIME TO CAREFULLY READ THE FOLLOWING INSTRUCTIONS BEFORE PROCEEDING

In the following section you will be presented with a series of options for hiking tours. Each option will include a description of different features. You will evaluate 12 choice situations. For each choice, you will be asked to indicate your preferred choice:

- **Please choose ONLY ONE OPTION in each situation**
- **Assume that the options in EACH situation are the ONLY ones available**
- **Do NOT compare options in different situations**

You may encounter a few options that seem counter-intuitive (e.g. lower price, but a higher quality in your opinion). Be assured that **this is not an error** but part of the design of the survey. Simply choose the one tour option that you prefer most based on its characteristics.

Now, suppose you are looking for an opportunity to be involved in a hiking tour. Each choice presents the ONLY OPTIONS AVAILABLE to you in the area where you currently are. These options are identical (i.e. service, hospitality, etc.) except for those features described.

For this study we use a **hypothetical ecotour**:

A 4½-hour, easy-moderate hike in a mountain forest on Oahu, including hotel pickup, an experienced & knowledgeable guide, small lunch, and guaranteed scenic beauty of Hawaii. The group size is 10 people.

The choice task is designed to allow you to make choices between "ecotour packages," which will each include one level of each the following 4 attributes:
(**Attributes in Bold:** Levels)
i. Price: $43**;** $89**;** $167
ii. Certification status: HEA-Certified; Not Certified
iii. Waterfall: Waterfall (no swimming); Waterfall (swimming ok); No Waterfall
iv. Native Species Biodiversity along Hike: High; Medium; Low

Conjoint Choice Questions (from laminated choice cards)

Task 1 (Circle One)	A	B
Task 2 (Circle One)	A	B
Task 3 (Circle One)	A	B
Task 4 (Circle One)	A	B
Task 5 (Circle One)	A	B
Task 6 (Circle One)	A	B
Task 7 (Circle One)	A	B
Task 8 (Circle One)	A	B
Task 9 (Circle One)	A	B
Task 10 (Circle One)	A	B
Task 11 (Circle One)	A	B
Task 12 (Circle One)	A	B

Now, please answer this related question.

7. If you had no environmental performance info, how much extra money would you pay for a
(a) "Green Globe certified sustainable" ecotour over the same type of tour with no certification?
(b)→If the label showed "HEA certified sustainable" over no certification?

a) $_____

b) $_____

8. We'd like to see your "perfect Hawaii hike" with these choices, so please check to the right of your preferred option in the table below, then see the question just under the table.

Attribute	☑ your most preferred					
Certification status:	HEA-Certified Ecotour		Not Certified			
Waterfall:	Waterfall (no swimming)		Waterfall (swimming ok)		No Waterfall	
Native Species Biodiversity along Hike:	High		Medium		Low	

9. How much would you be willing to pay for the hike you just designed?

$_____

Finally, we'd like to ask you some demographic questions. Remember that we do NOT take your name and the information you provide is ANONYMOUS.

10. What is your primary home zip code? (Do not include name/address/phone#)
-or if you are *not* a USA/Canada resident, what is your home city & country?

_____

11: Gender: ☐ Male ☐ Female

12. What is your age? _____

13. Your total # of years in school (for example, high school graduate = 13 yrs) _____

14. What is your household size and total household income before tax from all sources for 2010? (USD $; estimate is ok)

Number of people in your household: _____

Household income: $_____

15. **MAHALO!** Any comments?

Appendix B

Detailed Covariate Responses by Class[6]

Intercept	Class 1	z-value	Class 2	z-value	Class 3	z-value	Class 4	-value
	0.1913	0.1693	-1.2024	-0.927	-3.6265	-1.8103	4.6376	2.6576

Covariates	Class 1	z-value	Class 2	z-value	Class 3	z-value	Class 4	z-value
Travel Arrangement								
Package traveler	-0.0257	-0.1504	-0.218	-0.973	-0.4308	-1.632	0.6745	2.1321 **
Independent	0.0257	0.1504	0.218	0.973	0.4308	1.632	-0.6745	-2.1321
Sustainability Important in Trip Planning								
yes	-0.0126	-0.0772	-0.4119	-1.9038	0.4572	2.3403 **	-0.0327	-0.1307
no	0.0126	0.0772	0.4119	1.9038 *	-0.4572	-2.3403	0.0327	0.1307
Donate Time/Money for HI sustainability / conservation								
yes	-1.0358	-1.8025	-0.8089	-1.3499	2.163	1.2833	-0.3184	-0.5247
no	1.0358	1.8025 *	0.8089	1.3499	-2.163	-1.2833	0.3184	0.5247
How often go on paid guided hikes in 5 years								
	0.179	2.9214 ***	-0.033	-0.4753	-0.049	-0.6734	-0.0971	-0.7599
View Waterfall								
important	-0.5923	-2.866	0.0207	0.079	0.2426	0.799	0.329	0.8314
not important	0.5923	2.866 ***	-0.0207	-0.079	-0.2426	-0.799	-0.329	-0.8314
Swim In Waterfall								
important	0.0928	0.6181	0.3362	1.8382 *	-0.5291	-2.5154	0.1002	0.3691
not important	-0.0928	-0.6181	-0.3362	-1.8382	0.5291	2.5154 **	-0.1002	-0.3691
Certified Sustainable Operator								
important	-0.0475	-0.2804	0.1403	0.7046	0.7396	2.6932 ***	-0.8324	-3.0002
not important	0.0475	0.2804	-0.1403	-0.7046	-0.7396	-2.6932	0.8324	3.0002 ***
Operator Local Conservation Contribution								
important	-0.6346	-3.1431	-0.3432	-1.5414	0.2036	0.6971	0.7742	2.4005 **
not important	0.6346	3.1431 ***	0.3432	1.5414	-0.2036	-0.6971	-0.7742	-2.4005

[6] Confidence of 99% = ***, 95% = **, 90% = *

Tour Price								
important	0.9109	3.304 ***	-0.1511	-0.6517	-0.0998	-0.4213	-0.6601	-1.4849
not import.	-0.9109	-3.304	0.1511	0.6517	0.0998	0.4213	0.6601	1.4849
WTP Green Globe Certification (Stated Value)								
	0.0065	0.471	0.0339	2.4113 **	0.0114	0.7882	-0.0517	-1.5801
WTP HEA Certification (Stated Value)								
	0.0051	0.4987	-0.0314	-2.636 **	-0.0013	-0.1102	0.0276	1.1985
Perfect Hike Native Biodiversity								
High	-0.3759	-1.3014	0.594	1.5589	0.3195	0.717	-0.5376	-1.3137
Medium	0.064	0.2001	0.651	1.5058	0.435	0.8403	-1.15	-2.0567 **
Low	0.3119	0.6258	-1.2449	-1.8099 *	-0.7546	-0.9093	1.6876	2.5253 **
Perfect Hike WTP (Stated Value)								
	-0.017	-2.5521 **	0.0325	5.1211 ***	0.0194	3.3349 ***	-0.0349	-3.89 ***
Traveler Origin								
West US	0.188	0.9343	-0.296	-1.1518	-1.05	-3.6416 ***	1.158	2.9607 ***
East US	0.8356	2.9196 ***	-0.8896	-2.3787 **	0.7922	2.633 ***	-0.7382	-1.4053
Non US	-1.0236	-3.6367 ***	1.1856	3.6735 ***	0.2578	0.8394	-0.4198	-0.9884
Age Years								
	0.0285	2.6684 ***	-0.0411	-2.6892 ***	0.0006	0.0436	0.012	0.6649
Years In School								
	0.1437	2.2886 **	0.0865	1.2468	-0.0537	-0.7035	-0.1765	-1.8673 *

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