Assessing Direct Expenditure Associated with Ecosystem Services in the Local Economy of Uluwatu, Bali, Indonesia

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Acknowledgements

The author would like to acknowledge and thank individuals that have assisted in making this research possible. There have been numerous people who have contributed to the conceptual design of this research and those that have been unequivocal in implementing the strategic phases of the data collection. In particular I wish to thank;

- Conservation International Indonesia;
- Nikka Amandra Gunadharma form Conservation International without whom no aspect of this research would have been possible and for his exceptional level of professionalism and work ethic;
- Iwan Dewantama from Conservation International for his support and understanding; and
- Neil Lazarow for his advice in research design.
Summary

Understanding the value of non-market goods and services, for example ecosystem services, will have long-term benefits for industrial and economic development in both developed and developing economies. Countries such as Indonesia benefit from high levels of tourism as a consequence of favorable Ecosystem Services. Within the island of Bali, marine-related activities such as surfing, recreational scuba diving and whale and dolphin watching are common forms of tourism and thus local economic drivers. In the case presented here, we examine the existing economy of tourism associated with the recreational capacity of the marine ecosystem at Uluwatu, Bali. In particular, we focus on one area located within the general region of Uluwatu, an area known for surfing.

We examine the economic importance of this ecosystem-based tourism to the local economy of Uluwatu, and consider the impact that degradation of the marine environment would be likely to have on such economic activity. By identifying individual user expenditure (based on a direct expenditure analysis), a monetary metric was applied to reflect the actual expenditure by tourists who use Uluwatu for surfing and leisure tourism. Based on onsite data collection, the estimated population of surf tourists to the area is 243,939 per year, and together they generated an actual annual expenditure of US$35.3 million. When the economic multiplier for tourism in Bali is applied, this amounts to a macroeconomic impact of up to US$132.2 million, per year.

Survey results further indicated that the prospect of adverse environmental conditions would reduce the annual user population, and thus reduce annual expenditure. This research provides an insight into the extent to which the local economy and Ecosystem Services are linked, probable economic implications of environmental degradation at Uluwatu, and current perceptions of environmental issues and values at Uluwatu. This research has been designed to explain the value of environmental services.
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1 Introduction

Small and regional communities in Indonesia have adapted to cater for tourism as a means of generating income. On the lower South-western side of the island of Bali, Indonesia, Uluwatu, previously a subsistence community depending on farming and fishing, has developed a number of activities to take advantage of the growth of tourism.

Tourism in this area is largely focused on the predictable swell patterns and favorable seasonal winds that allow for ideal surfing conditions. In spite of the clear benefits from this, there is still a poor local understanding about the value of ecosystem services that support tourism. Indeed, the importance of maintaining a healthy environment for tourism-based economic development is largely ignored in policy and planning circles.

To address this knowledge gap, this study has been developed in consultation with representatives of the local conservation community, NGO Conservation International Indonesia, and Save The Waves Coalition. The study examines how actual expenditures associated with surf tourism contributes to the local economy at Uluwatu as well as contributing to our understanding of how ecosystem service values have a direct impact on human wellbeing.

In addition, this project offered an opportunity to gather further information related to stated preferences (in the form of ‘Willingness To Pay’ assessments) and population characteristics, as it was assumed that understanding these aspects of the sample would shed light on the best way of managing the recreational capacity of marine ecosystem services at Uluwatu. This information, relating to sample characteristics, was not necessary for this report and therefore has been omitted but is summarized in the appendix section.

The aim of this research is to understand the value of the Uluwatu surf area as expressed by direct expenditure on tourism activities and the role of environmental conditions and tourist perceptions in maintaining this value and conveying it into the future.

1.1 The Geographical Context of Uluwatu

Bali is located on the eastern reach of the archipelago of Indonesia. Like many other islands in the region, it is experiencing rapid development resulting in extensive land and water degradation, and other resource management challenges. These issues include, but are not limited to, waste management, increased pollution, decreasing water quality, deforestation and coastal erosion (Arifin and Nakagoshi, 2011).

The Bukit Peninsula, on the SW corner of the island of Bali, is internationally known for the quality of its surf for board riding. As a consequence of international surf recognition and locally pleasing environmental amenities, Uluwatu is a Bukit Peninsula community undergoing dramatic changes to support tourism development. The impact of these changes on social issues in the region is shown in Figure 1.1, illustrating how these impact pathways translate to environmental problems potentially affecting ecosystem services in the Uluwatu area.
1.1 Impact Pathways for Environmental Degradation at Uluwatu (Margules, 2011)

1.2 The Regional Economy and the Importance of Tourism in Bali

The regional economy of Uluwatu and Bali in general is largely dependent on tourism (Hitchcock and Putra, 2007). By 2004, visitor annual arrivals to Bali as a whole reached 1.5 million, which was a 44% jump from the previous year (Pambudi et al., 2008). According to The Bali Tourism Board, tourist numbers for the period from January to November 2010 reached 2.27 million (The Jakarta Post, 2011). The Bali Tourism Board (2014) provides total international tourist numbers for each year from 2008 (1.97 million) through to 2013 (3.28 million). For the local economy of Uluwatu, tourism is also vitally important, and while there are some tourists who go there to visit the important local temple, the vast majority visit that specific area to participate in some activity relating to surf tourism.

The visitor numbers reported above show the number of international tourists entering the country through Denpasar airport (those gathered from the Bali Tourism Board). This however, does not account for national tourism, those that enter Bali through a domestic portal. Further information gathered from the Bali Tourism Board indicates an even stronger trend in tourism increase during the time from 2008 (domestic tourists totaled 2.89 million) through to 2012 where domestic tourists totaled 6.06 million. These official figures show that the number of international tourist arrivals has, close to, doubled in a seven-year period and the same can be said for national tourism to Bali. The implication of this rapid growth is that all infrastructure services (including those provided by natural ecosystems) will be put under strain.

Tourism is an industry that consumes resources, creates waste and has specific infrastructure needs (McKercher, 1993). Furthermore, it is more often than not dependent on a high quality resource base for its survival (Hassan, 2000). As with other spending in the economy, the impact of tourism expenditure is magnified by the economic multiplier effect. Tourism multipliers provide an indication of the total increase in output, labor earnings, and employment through inter-industry linkages due to tourism expenditure (Fretchling and Horvath, 2009). When such multipliers are applied, a more accurate representation is provided of the impact of tourist spending on the macro economy.
Economic multipliers are very site specific, so tourism multipliers that have been calculated specifically for Bali have been applied. Toh et al. (2004) used an input-output approach to calculate a tourism multiplier, while Antara (1999) used a social accounting matrix (SAM) approach. According to Antara (1999), the total effects of tourism expenditure in Bali could be multiplied by a factor of 3.743, while Toh et al. (2004) found the multiplier to have a lower value of 1.4. According to Antara (1999), the majority of this multiplier effect is accounted for by the impact spending has on the production sector (multiplier value of 2.203) with multiplier effects in the labor, capital and institutional sectors accounting for the rest.

In addition to basic revenue generation and benefits from foreign exchange impacts on the local currency, tourism is also important to the local economy as a source of employment. According to Pambudi et al., (2008) there are 58,000 individuals officially employed in hotel and restaurant work in Bali. While this represents only 3.3% of Bali’s workforce, it has a more than proportionate impact on GDP. This result is challenged by other studies which suggest that tourism directly employs 25% of the workforce in Bali, and indirectly supports a further 55%, culminating in a contribution of 30% to Bali’s GDP (Cole, 2011). According to a World Bank funded study, (World Bank/UNDP, 2006), restaurants and hotels contribute 21% of Bali’s GDP and when the associated sectors of retail trade, manufacturing and construction are included, the figure is closer to 50%. While there is some variability in these figures, they do demonstrate the importance of this industry to the regional economy of Bali. As a result, it is clear that any factor that might lead to a reduction in tourist numbers, would significantly affect local livelihoods and the local economy.

1.3 Ecosystems and Their Values

Ecosystem services are increasingly recognized as being important to economic development (IUCN, 2012). Central to the notion of ecosystem services is the understanding that ecosystem function (e.g. biological processes) is core to our life support. There is a growing body of literature around environmental management that argues that conserving biodiversity is paramount to maintaining ecosystem services (Brooks et al., 2006; Hanley et al., 1995; Turner et al., 2007).

The Millennium Ecosystem Assessment (MEA, 2005) highlights the importance of recognising that biodiversity is a structural aspect of ecosystems. Biodiversity can be defined as:

“The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.” (Millennium Ecosystem Assessment, 2005).

The relationship between ecosystem services and biodiversity becomes even more apparent when examining the drivers of change within an ecosystem. Nunes and Berg (2001) identified that functional diversity, which refers to the capacity of ecosystems to absorb some level of shock without impeding the status quo, needs to be understood as part of ecosystem values. The need to minimize our impacts on this ecosystem functionality has been demonstrated recently by many authors, including Sullivan and O’Keeffe (2011).

The value of an ecosystem can be broadly understood as “the importance and necessity of objects and actions” (Harrington et al., 2010, p. 11). In economic terms, the value of an ecosystem is indicative of its potential contribution to human wellbeing (Wallace, 2007). Ecosystems can be valued by expressing the effect of a marginal change in ecosystem functions (or natural capital), in terms of tradeoffs against other things that people value (Turner et al., 2002). In other words, by identifying ecosystem services, it may be possible to
apply a valuation method to quantify their relative value based on a metric, usually a monetary metric (Pettanayak and Wendland, 2007). From a human perspective, ecosystems deliver two types of benefits: ecosystem goods (e.g. food, medicines) and services (e.g. waste assimilation or watershed protection). These can be understood as the benefit that ecosystems provide to humans through both direct and indirect means (Costanza et al., 1987). In his seminal work on this topic, Costanza et al., (1987) estimated the value of the world’s ecosystems to be between USD16-54 trillion/year. This was calculated by identifying the various components of ecosystems that contribute to human wellbeing, and summing their values based on published valuation studies. This work highlighted the importance of ecosystem values, and although it engendered much criticism, the effort to value the world’s ecosystems served the purpose of raising awareness of the issue well beyond the scientific community.

While it is relatively simple to define the value of ecosystem services as the benefits people obtain from ecosystems, the quantification of the services themselves and the application of economic valuation have proven difficult. There are many problems associated with conventional environmental valuation techniques, (e.g. travel cost method, contingent valuation, replacement cost approaches, etc.), and many practitioners have expressed skepticism about the usefulness of modeled data or hypothetical values.

This study attempts to contribute to this debate by identifying the total amount of international tourist expenditure resulting directly from the use of an ecosystem. In addition, the multiplier effect on the regional economy was estimated through the application of tourism multipliers. The aim of this research is to estimate the economic value of expenditure generated by recreational use of coastal ecosystem services at Uluwatu, Bali, and to examine factors that could interfere with the potential level of this income flow and thus contribute to the ongoing debate on appropriate methods for understanding the role and value of ecosystem functions and services in economic development and human wellbeing.

2 Methodology

Since this research was designed to elicit expenditure values from users, it was important to design a research method, which would facilitate the generation of data on which monetary estimates could be based. Reliable estimates of actual monetary expenditure require the quantification of the annual user population, as well as an assessment of expenditure by users. The approach developed also allowed the collection of a variety of qualitative information on how users perceived the resource, and their attitudes towards its degradation.

Current standards for survey design state that data validity is incumbent on minimal cognitive burden (Anseel, 2010; Bowling, 2005; Groves et al., 2009). In the elicitation process used in this study, care was taken to reduce this cognitive burden on the sample, and to take account of cultural variations within the respondents. As Anseel et al., (2010) has shown, difficulties of sampling exist in situations where a number of languages or regional dialects exist, and Lee et al., (1994) note that it is difficult to encourage individuals to participate in survey data collection during recreation or leisure.

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1 In survey methodology cognitive burden refers to the level of mental requirement necessary when recalling factual information.
In this study, however, we found that the international survey participants of Uluwatu were for the most part, cooperative. English was the language used with all respondents. Efforts were made to ensure individuals understood the context of the research, and how it related to their own interests. To ensure that survey methodology was appropriate, similar studies were consulted (Coffman and Burnet, 2009; Dolnicar and Fluker, 2003; Jedrzejczak, 2004; Lazarow, 2007). Further, the survey design was a collaborative and consultative process that drew on the collective technical expertise of the principal researcher, staff of Conservation International Indonesia, staff of Save the Waves Coalition and other research professionals working in Indonesia.

2.1 Quantitative Data Collection and Analysis

There were two approaches to the data collection process; quantitative (survey questionnaires that prompted a scaled or categorical response) and qualitative (recorded interviews to elicit attitudes towards current environmental conditions and future management of Uluwatu). The methods for these two components are outlined below.

2.1.1 Defining the User Population and the Sample

The user population is defined as anyone who visited the surf area of Uluwatu, even if they did not actually surf during their visit, since we are assessing the economy around a specific area rather than a specific activity. Respondents were selected randomly simply by their passing the data enumerator, in this case the data enumerator positioned at each entrance point for the Uluwatu surf recreation area. This is a pragmatic solution to randomization when study resources are limited. Initially, an online cohort was intended to be gathered to increase the sample size. However, after consideration, our limited resources were focused on expanding the onsite sample as it was decided that data gathered onsite would be of a higher quality through a reduction in the cognitive burden of respondents. Thus, all data used in the expenditure survey was gathered onsite, to avoid changes in values over time which could result if data had been collected online from visitors who had arrived in different years.

A pilot sample was undertaken in August 2013 over a two-week period during which time 74 individuals took part in the survey. The pilot sampling activity sought to identify the effectiveness of the survey in eliciting the required data. Following the pilot study two further sampling activities took place, the first round of sampling took place continuously over a four week period in August/September 2013 for the peak season data set (for seasonal parameters refer to section 2.1.5), where a total of 444 responses were collected and a further four week period during November/December 2013 where a total of 150 responses were collected.

The survey questions ranged from yes/no type answers to categorical data (e.g. for age and income. Refer to Appendix 1 for a full example of the onsite survey). There were a number of questions with Likert-style scale response options to understand respondents feeling towards the questions being posed. The categorical data gathered by the Likert-style scale questions allows for analysis through descriptive statistics and association tests. The other data gathered provides a deeper insight into the sample and their values and attitudes.

2.1.2 Statistical Analysis

The statistical analysis was designed to show frequency distributions within the Likert scale questions as well as identifying association patterns to characterize the sample. This analysis also provided a simple comparison between yes/no responses to categorical questions, **2** Likert-Style scale questions allow respondents to specify their level of response in the form of a symmetric agree-disagree scale (Clason and Dormody, 1993).
allowing for rapid appraisal of the respondents' views. All questions for the onsite survey were entered into Statistical Packaging for Social Sciences (SPSS) and treated as variables for analysis. Randomized data, such as the data in this research, should be treated under the interdependent assumption (De Veaux et al, 2009). Quantitative data on visit lengths and expenditure was used to support assessments of the economic significance of surf tourism at the study site. All other responses were used to reveal the significance that a range of adverse environmental and social issues would have on the individual travelers’ experience. This would clearly influence the recreational capacity of the available ecosystem services, and the revenues associated with it.

A number of questions within the survey required scoring on a Likert-type scale (i.e. questions 2, 10, 16, 18, 19, 20 and 21 refer to Appendix 1). The frequency analysis of the distribution of scores for these responses provided suitable information to refine categories. These categories were arranged according to the frequency, allowing factors to be accounted for in spite of irregular data frequency in the sample.

2.1.3 Estimating the User Population

To get an estimate of numbers of visitors to Uluwatu at different times of the year, key data sources and members of the community were consulted. These provided assessments of daily numbers of visitors in both the peak (during August/September, 2013) and off-peak season (November, 2013). The key community members were identified to be those who were prominent business owners, or upper management employees, and others who were identified by local NGO partners to have influence within the local community. The data gathered for peak and off-peak seasons was corroborated with count data carried out by the front gate-keeper at the surfing site (where car and motorcycle parking charges are made), the front gate data collection ran for three weeks during the peak season and a further three weeks during the off-peak season.

The sample area has one main entrance and a secondary entrance (refer to Appendix 4). During the project development there was a miscommunication between the researcher and the front gate staff tasked with collecting reliable count data. Subsequently, daily counts of the total tickets stubs, or vehicle passes, were collected rather than the actual number of individuals entering the vicinity. To amend this discrepancy, during the off-peak season count, the survey team was required to gather three weeks of ratio data (cars to motorbikes to scooters, etc.) and occupancy rates for all vehicles. The occupancy rates and vehicle ratios could thus be applied to initial peak season vehicle entry information to provide a projection of average daily individuals entering the area. Further, it became apparent that there was also a secondary entrance to the field site. Therefore, during the off-peak season sampling for estimating the user population, the survey team was required to count individuals passing the secondary entrance at random intervals for a given time interval. The information gathered on the secondary entrance was then assessed as a percentage of the total and applied to the peak season count data. The method for the above-mentioned calculations is outlined below in Section 2.1.6.

2.1.4 Calculating Seasonal Fluctuation in Tourist Numbers

Data triangulation from various data sources was used to account for seasonal fluctuations in tourist numbers. The qualitative data that was collected through interviews with local business owners and community members suggested that there were three distinct seasonal changes in visitation, which are peak, mid and off-peak seasons (Margules, 2011). All of these seasons were dependent on favourable surf conditions. The peak season was described
by local residents as the dry season, between May and September (Warung or Local business owner. Lovett, 2011, pers., comm; Margules, 2011). Annual seasonal fluctuation in surf use was also assessed based on wave conditions (see Section 2.1.5).

2.1.5 Using Meteorological Data to Evaluate Peak and Off-peak Surfing Conditions

Meteorological data were gathered from a surf-swell forecasting site, Magic Seaweed (www.magicseaweed.com), including averages of the daily wind direction and wave heights for the past ten years. For the purpose of this study, the limiting factors for desirable surfing waves, which directly influence tourism, were defined by wave height $h_i$ and wind direction $w_i$. The average estimates for the daily user population across three distinct seasons reflect the optimum swell conditions for surfing waves. Table 2.1.5 shows optimum wind conditions (as an average of the last ten years), for surfing from the months of April through to November. A number of tour operators and swell forecasting websites define peak tourist season as April through to October (Indonesian Vacations, 2009; Magic Seaweed, 2011; Surfing Bali, 2007; The Perfect Wave, 2010). During the peak season, wave height and favorable winds are consistent, with April to October as the most desirable surf season (Table 2.1.5). Climatic data indicates that the period April to September is usually the most mild and predictable in any given year, making it attractive to surf tourists. Thus, April through to the beginning of September or end of August was defined as the peak season.

### Table 2.1.5. Dominant Wind Direction and Average Wave Height (Source: www.magicseaweed.com, 2011)

<table>
<thead>
<tr>
<th>Month</th>
<th>Most Dominant Wind Direction and Portion of the Month it Blew for (%)</th>
<th>Second Most Dominant Wind Direction and Portion of the Month it Blew for (%)</th>
<th>Third Most Dominant Wind Direction and Portion of the Month it Blew for (%)</th>
<th>Average Wave Height (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>West 27 West South West 21 South West 10 5.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>West 31 West North West 19 West South West 14 5.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>West 18 West South West 14 East South East 10 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>East South East 32 East 16 South East 15 5.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>East South East 48 South East 22 East 16 5.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>East South East 52 South East 22 East 15 6.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>East South East 55 South East 29 East 8 7.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>East South East 45 South East 41 South South East 8 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>South East 47 East South East 28 South South East 19 6.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>South East 36 South South East 24 East South East 17 5.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>South East 24 South South East 19 East South East 15 5.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>West South West 18 South West 15 West 15 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Given that surf conditions are likely to be mostly indicative of tourist visitation rates to a surf location such as Uluwatu, the months that provide reasonable wave height and wind direction have been classified as mid or between seasons. The remaining months of December, January and February make up the Off-peak season. These are months with conditions that
may preclude surfing for some of the season, but as visitation to the area still occurs, it must be counted in the lower seasonal bracket, Off-peak season.

2.1.6 Calculating the Seasonal and Total User Population

Using the information detailed above, the total user population was calculated, taking account of the seasonal variation in numbers of surf tourists. The number of users is a key component in calculating the use value of the surf-dependent ecosystem service provided at Uluwatu, so this seasonal variability must be carefully addressed.

Total and seasonal user populations were estimated using the following approach:

The days in each of the three seasons were summed to apply to Equations 1, 2 and 3 consecutively, and totaled in Equation 4. The most suitable way of assigning a daily average for the mid-season was to formulate a midpoint between peak season daily average and off-peak season daily average. This was based on a review of favorable surf conditions (equation 1). Equations 1 and 2 explain the process of acquiring the estimates for daily use for the remaining two seasons.

\[ S_p = (T_s - P_m) \times V_o + (P_m \times M_o)/n \]  
(1)

Where \( S_p \) is the average of Peak Season Users per Day estimate and \( T_s \) is the number of tickets sold each day. \( P_m \) is the percentage of which are motorbikes and \( V_o \) is the car occupancy rate and \( M_o \) is the motorbike occupancy rate. The \( n \) value is the number of inputs that informs the average figure (e.g. count data gathered for three consecutive weeks) in this case it is 21.

During the peak season count data sampling only the primary entrance gate was assessed. Therefore, during the second count data sampling (off-peak season) the ratio of cars to motorcycles was required, as well as, the occupancy rates for both vehicles and the amount of entrants entering via the secondary entrance.

\[ S_o = (P_e + S_e)/n \]  
(2)

Where \( S_o \) is the average Off-peak Season Users per Day count, \( P_e \) is the number of entrants passing through the primary entrance and \( S_e \) is the number of entrants passing through the secondary entrance.

\[ S_m = (S_p - S_o)/2 + S_o \]  
(3)

Where \( S_m \) is Mid-Season User Population, this is based on ideal surfing conditions. \( S_p \) is the average of Peak Season Users per Day estimate and \( S_o \) is the average Off-peak Season Users per Day estimate.

After estimating total number of days in each season annually, the total annual user population was calculated (Equation 4).

\[ U_a=(S_m \times D_m) + (S_p \times D_p) + (S_o \times D_o) \]  
(4)

Where \( U_a \) is the total Annual Users and \( D_m \) is the estimate of the average Mid-season days per year. \( D_p \) is the estimate of the average Peak Season days per year and \( D_o \) is the estimate of the average Off-peak Season days per year.

2.1.7 Estimating Total User Expenditure

Total annual user expenditure was estimated in order to understand the contribution to the local economy that is generated either directly, or indirectly, by the ecosystem services at Uluwatu. Total annual user expenditure was estimated using primary expenditure data gathered from the on-site survey.
Individual expenditure data was gathered from each of the respondents in the sample. They were required to indicate their daily expenditure based on four categories: 1) Accommodation; 2) Meals; 3) Transport and additional expenses; 4) Other.

The total daily expenditure for each of the four categories was summed for each season. (Equation 5).

\[ E_p = \frac{\text{SUM: accommodation} + \text{SUM: meals} + \text{SUM: transport} + \text{SUM: other}}{n} \] (5)

Where \( E_p \) is the average Daily Expenditure per Person during the peak season. \( E_o \) is the expenditure per day in the off-peak season and \( E_b \) is the between season average, and \( n \) is the amount of respondents in each sample.

After calculating the average daily expenditure (per person per season), the total daily expenditure was calculated by applying this to the total number of users per season. This was summed to annual values based on annual user numbers, as shown in equation 6.

\[ E_a = (S_p \times E_p) + (S_m \times E_m) + (S_o \times E_o) - 10\% \] (6)

Where \( E_a \) is the Total Annual Expenditure \( E_p \) is the Daily Expenditure per Person and \( U_a \) is the estimate for Annual Users less 10% for local employment.

Although the figure generated by Equation 6 is an informed estimate of the total annual expenditure generated by tourism at Uluwatu, it is important to assess the actual impact of the contribution to the overall economy, by applying an appropriate economic multiplier.

The issue of the multiplier has been discussed in Section 1, and on the basis of the two-multiplier values available for Bali at the time of this study; the macroeconomic impact of this expenditure is assessed. These two multiplier values, 3.743, (Antara, 1999) and 1.4 (Toh et al., 2004) have been applied, providing an insight into the possible range in the monetary value of the impact of surf tourism in Uluwatu. This multiplied real expenditure value (which has been the result of the good surfing conditions underpinning tourism spending), will provide a measure of the economic significance of the effective functioning of the coastal ecosystem of Uluwatu.

### 2.2 Qualitative Data Methodology

Standard qualitative research techniques were employed to deliver and understanding of the ways in which different stakeholder groups perceive the environmental challenges facing Uluwatu and how important the environmental quality of the surfing environment is to tourists visiting the Bukit Peninsula. Five different stakeholder groups were identified and sampled using semi-structured in depth interviews. Stakeholder groups included Bukit Peninsula hoteliers (5), local (Indonesian) surfers (10), international surfing tourists (11), non-surfing international tourists (10) and Uluwatu warung owners (7) making a total of 43 interviews. Interviews were conducted in August 2013 and were digitally recorded and then transcribed for later analysis. Interviews ranged in duration from five to fifteen minutes and the quality and richness of the data collected was limited by the relatively brief interviews that often failed to ask questions and probe participants beyond the questions areas outlined in the semi-structured interview schedule. Common themes within and between stakeholder groups were identified as they related to perceptions of environmental issues and the importance, meaning and value of a healthy coastal and marine environment, however deeper understands and modes of valuing were difficult to ascertain given the limitations of data collection.
3 Results

The sample population was assessed according to season (as defined above) for the direct expenditure calculation. However, the sample population was assessed as a whole for the rest of the analysis (cultural diversity, visit recurrence, environmental state perceptions, and for the analysis of the Likert-style scale questions). It became apparent on data analysis that trends were occurring consistent throughout both samples (peak and off-peak) and that after the calculation of the direct expenditure the user population should be defined as whole for the purposes of tailoring management practices.

3.1 The Demographic Profile of Surf Tourists at Uluwatu

Cultural diversity in the study population was high, with many nations represented in the sample, as shown in Figure 3.1.1. 95.8% of respondents had to travel internationally to visit Bali. Australia, and to a lesser extent Germany, Hungary and the USA, represented the largest portion of the sample. There was a reasonably even distribution of individuals from European countries travelling in small groups, with Japan also represented. The other category represented in Figure 3.1.1 indicates the cumulative total of countries that accounted for > 0.6 percent of the sample (e.g. Italy, Belgium, Columbia, Finland, France, Romania, Singapore, South Africa, Venezuela, Argentina, Croatia, Holland, Philippines, India, Indonesia, Mexico, Morocco, Norway, Peru, Thailand and East Timor).

It is important to note that individuals from Bali or Indonesia are a relatively small portion of the sample (0.2%). This indicates that the value of the ecosystem service provided, as the surf break, is appreciated in greater numbers by foreigners than it is by local residents. Several studies have shown that the benefit from ecosystem services may be influenced by those associated with their use (Barkman et al., 2007; Fuller et al., 2004; Grimble and Wellard, 1997). In this case, the value of the ecosystem service provided by the reliable wave break at Uluwatu is certainly influenced by the user group who come specifically to the area to make use of it. This reflects the inevitably anthropocentric nature of ecosystem service values.

Figure 3.1.1. Country of Origin Distribution for the Onsite Sample
The Likert-style scale responses have been re-coded into three variable responses; *not important, important* and *very important*. Upon analysis there were defined trends in the data set and although the Likert-style scale questions allowed for a greater response range it became apparent that re-coding variables into three distinct categories offered an adequate display of the results as well as a clear presentation. For examples of the frequency distribution of the responses to the Likert-style scale questions, prior to recoding, refer to Appendix 2.

When asked how important certain factors were, survey respondents noted that activities associated with surfing (e.g. to watch the waves, watch the surfers, to surf Uluwatu) were *very important*, as shown in Figure 3.1.2. The latter range of response options (e.g. *to spend time with family and friends, to experience Balinese culture and to enjoy nature*) all had a high frequency for scoring *very important*. The latter response range in this question were activities that were not mutually exclusive and therefore were likely scored *very important* consistently across all ranges of the sample. The response results shown below indicate that the majority of the sample was present at Uluwatu to either directly or indirectly benefit from use of the marine ecosystem service, which facilitates surfing.

**Figure 3.1.2.** Frequency Distribution Response for *How Important* the Above Factors were to Individuals Being Sampled Using Likert-style Scale Scoring

In addition to the Likert-style scale scoring questions individuals were asked to indicate their primary reason for visiting Uluwatu in an open response style questions. Of the sample, 56.3% mentioned ‘surfing’ as their primary reason for travelling to Uluwatu. There was some minor difference between the *peak* and *off-peak* samples however, this did not prove significant upon analysis.
### 3.2 Annual Tourist Numbers

The number of users in the high season was estimated at 868 per day on average, while mid or between seasons, which were subject to fluctuation dependent on the prevailing winds, received an average of 730 users per day. Off-peak season, during the wet season provided the least favorable conditions for surfing and therefore received the fewest visitors, at 592 users per day. Table 3.2.1 illustrates the seasonal variation in expected number of surf tourists to Uluwatu, and provides an estimate of the annual total number of visitors (annual user population).

### Table 3.2.1. Seasonal Visitation and Annual User Population

<table>
<thead>
<tr>
<th>Months</th>
<th>Season</th>
<th>Average User per Day by Season</th>
<th>Average Days per Season</th>
<th>Total Average Users per Season</th>
<th>Total Estimated Average Annual User Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>December</td>
<td>Off-peak season</td>
<td>S₀ = 592</td>
<td>D₀ = 120</td>
<td>S₀ x D₀ = 71,034</td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>Between season</td>
<td>Sₘ = 730</td>
<td>Dₘ = 92</td>
<td>Sₘ x Dₘ = 67,168</td>
<td>243,939</td>
</tr>
<tr>
<td>February</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>October</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>Peak season</td>
<td>Sₚ = 868</td>
<td>Dₚ = 153</td>
<td>Sₚ x Dₚ = 132,840</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May</td>
<td></td>
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<td>June</td>
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<tr>
<td>July</td>
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<tr>
<td>August</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>September</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On the basis of this data, the estimated average annual user population was calculated, to be 243,939 individuals per year. This information was used in the computation of the total annual expenditure and average individual expenditure associated with use of that particular surfing break. While there is clearly some uncertainty in estimates of this type, this approach is acceptable in the context of rapid participatory appraisal. Further, since 56.3% gave surfing as their primary reason for visiting Uluwatu we can conclude that 137,337 individuals were contributing attributable expenditure annually as a direct consequence of the wave as an ecosystem service.

### 3.3 Expenditure Resulting from Surf Tourism, and Its Importance to the Local Economy

The survey carried out in this research captured a snapshot estimate of all expenditures made by surf tourists while visiting Uluwatu. This included all accommodation, local transport, guides, food and miscellaneous spending. At all times throughout the survey, lower bound estimates given by respondents were used in the calculation of total expenditure, so as to provide an overall conservative estimate. Consequently, we can argue that the average individual expenditure was in the lower bound of potential actual expenditure by each tourist, and the average total annual expenditure were equally restricted to reduce any exaggeration of the expenditure impact.

It is also important to note here that although a large percentage of the sample (92.8%) spent an additional average, $894.00 on travel cost to Bali, these costs were not included in the average total annual expenditure figures, as very little of this travel cost actually enters the
Balinese economy, and thus has little impact on the local economy of Uluwatu. Furthermore, no account is being taken of visa costs borne by surf tourists visiting Uluwatu, the revenue from which is likely to go to the central government treasury. These omissions ensure no overestimation is made of values, as an expression of the local economy, resulting from use of the marine ecosystem in Uluwatu.

On the basis of the method used in this study, the average individual expenditure (not including the cost of travelling to Bali and other external costs) was USD 160.74, 147.77 and 134.81 per day, for the off, mid and peak season respectively and when summed over the total annual user population, this amounted to a minimum estimate of total actual annual expenditure by surf tourists at Uluwatu, of USD 35.3 million annually (refer to Table 3.3.1).

**Table 3.3.1. Annual Expenditure Calculations**

<table>
<thead>
<tr>
<th>Season</th>
<th>Individual Visitors per Season</th>
<th>Calculated Expenditure (Average per Person in USD)</th>
<th>Expenditure per Season (USD)</th>
<th>Total Annual Expenditure (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>63,930</td>
<td>160.74</td>
<td>10,276,204.60</td>
<td>35,326,909.74</td>
</tr>
<tr>
<td>Between</td>
<td>60,452</td>
<td>147.775</td>
<td>8,933,274.22</td>
<td>35,326,909.74</td>
</tr>
<tr>
<td>Peak</td>
<td>119,556</td>
<td>134.81</td>
<td>16,117,430.87</td>
<td>35,326,909.74</td>
</tr>
</tbody>
</table>

As explained above, to understand the macroeconomic effects of such expenditure on the Balinese economy, the economic multiplier was then applied. Two tourism multipliers available for Bali are illustrated in Table 3.3.2. These figures indicate that the overall economic impact of surf tourism in Uluwatu ranges from USD 49.5 million to USD 132.2 million per year. Furthermore, the value of the actual expenditure at Uluwatu of USD 35.3 million per annum, will contribute to foreign exchange earnings for Indonesia as a whole.

**Table 3.3.2 The Range of Monetary Impact of Surf Tourism Expenditure on the Local Economy of Uluwatu, With Multipliers Applied**

<table>
<thead>
<tr>
<th>Estimated Annual Expenditure</th>
<th>Application of Toh et al., Input Output Multiplier (Toh et al., 2004)</th>
<th>Application of Antara’s SAM Based Multiplier (Antara, 2004)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35,326,909.74</td>
<td>49,457,673.63</td>
<td>132,228,623.10</td>
</tr>
</tbody>
</table>

In the local economy of the Bukit peninsula or rather, the Badung Regency, where Uluwatu is located, this level of spending is a significant figure. For the economy of Bali as a whole, it is also an important source of revenue, and of foreign exchange. Since the estimate of the annual user population for this study did not include local surf tourism arrivals, or international surf tourists arriving by land or boat from other parts of Indonesia, there is no doubt that in reality, the contribution of surf tourism to the region is even greater than the figures here suggest. Since tourism revenue for Uluwatu is incumbent on the healthy functioning of its marine ecosystem services, it is clear that measures should be taken to ensure its future sustainability.

### 3.4 Importance of Ecosystem Services to Economic Activities in Uluwatu

Healthy functioning of the recreational capacity of the marine ecosystem at Uluwatu has two broad components, firstly; there is the production of favorable, clean, swell conditions, along
with, the ideal aspect and submerged reef structure for the swell to meet and thus create the good surfing waves. These aspects rely on physical environmental conditions and are not compromised by localized environmental degradation such as vegetation clearing or water pollution.

The second aspect of healthy recreational ecosystem services at Uluwatu is incumbent on the individual participant’s level of comfort and overall experience in the water. The data gathered here would indicate that ideal conditions, those conditions that sustain the largest user-population, are those of a pristine marine environment (Table 3.5.1 and, Figure 3.5.2). Therefore certain environmental conditions can adversely affect the carrying capacity for surf tourism (e.g. sedimentation, marine pollution, species loss, etc.).

3.5 Visitor Views on the Importance of Environmental Quality and Ecosystem Services

As part of the survey carried out in this study, a number of questions were asked to elicit respondent’s views on a number of issues relating to the environment of the area, which they were visiting. The surveys indicated that the majority of the on-site respondents were staying in paid accommodation (92.8%) while others stayed with local friends. However, in the reasons for choosing accommodation, the data suggests that currently, environmental concern is not of major importance. Based on the understanding that economic development in the area has been aided by tourism, specifically surf tourism; it is reasonable to infer that healthy ecosystem services have had a bearing on economic development of the Uluwatu area. Moreover, we can also infer that currently, the marine ecosystem services of the area are the direct cause of monetary expenditure by tourists (the majority of which are a consequence of the marine ecosystem), of USD35.3 million annually, a significant amount in this economy.

Perceived feelings of surf users about local environmental conditions have been elicited by the question on which of these conditions would deter you from returning to Uluwatu. The question was posed as a scenario question; it inferred that if certain conditions were to arise then the respondent would be deterred from returning. Scoring frequency distributions suggest that marine debris, water quality, damaged ecosystems and coastal development were issues about which the surf users felt strongly. This clearly indicates that a majority of the individuals sampled were aware of potentially negative environmental conditions at Uluwatu, and conscious of the need for better management. Results suggested that if overcrowding and environmental conditions were to reach a certain point, they would impede the capacity of the marine ecosystem service to support recreational values. This would therefore adversely affect the average annual expenditure from surf tourism, and its beneficial impact on employment etc., for the local community.

Responses to three specific environmental management issues relating to tourism at Uluwatu are examined here in some detail.

**Issue 1: Is a well functioning ecosystem and good environmental condition important to economic development?**

As a way of investigating this issue with respondents, they were asked to indicate which negative factors could influence a possible return visit. The majority of respondents indicated that many things would influence their choice, and this is summarized in Table 3.5.1.

<table>
<thead>
<tr>
<th>Issue Influencing Likelihood of Future Visits</th>
<th>% of Respondents Reporting</th>
</tr>
</thead>
</table>


<table>
<thead>
<tr>
<th>Issue As Very Important</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine debris</td>
<td>86.3</td>
</tr>
<tr>
<td>Water quality</td>
<td>87.0</td>
</tr>
<tr>
<td>Damaged ecosystems</td>
<td>86.2</td>
</tr>
<tr>
<td>Coastal development</td>
<td>82.3</td>
</tr>
</tbody>
</table>

**Issue 2: Factors influencing the likelihood of tourists visiting Uluwatu again.**

As has been shown previously in Figure 3.1.2, respondents’ reasons for travelling to Uluwatu are mainly concerned with surf tourism, to either watch the waves, or watch surfing, enjoy nature and experience Balinese culture, with all being considered highly important. The respondents also considered the factors in figure 3.5.2 to be important in terms of repeat visitation. When asked which of the above factors would deter you from returning to Uluwatu the results favored environmental conditions associated with marine health.

**Figure 3.5.2.** Scoring Frequency for Factors that Would Deter Repeat Visitors to Uluwatu

In terms of accommodation choice, both location and price were considered very important (Figure 3.5.3). These figures suggest that if the location was no longer attractive to the international surfing community, due to environmental degradation, or loss of ecosystem services, numbers coming to visit Uluwatu would be likely to decline. Furthermore, while it is important that accommodation near to Uluwatu is available, it must not be priced too highly to be able to attract such tourists, who are often on a tight budget.
Figure 3.5.3. Frequency Distribution Responses for Factors that Influence Accommodation Choice for Individuals Within the Sample, Using Likert-Style Scale Scoring.

**Issue 3: Potential impact of environmental degradation on surf tourism revenue**

Location, environmental conditions and crowding are important to visitors to Uluwatu. From the onsite survey, 43.8% of the sample’s primary reason for visiting Bali was to travel to Uluwatu, and 38.2% were repeat visitors to Uluwatu. Furthermore, 29.7% of the sample would not travel to Uluwatu if there was no surf. As shown above, if environmental conditions were such that surfers stopped coming to the area, the financial impact on the region could be significant, as illustrated in table 3.5.2.

**Table 3.5.2. Estimates of Potential Revenue Losses that Could Occur if Poor Environmental Conditions Resulted in Reduced Tourist Numbers**

<table>
<thead>
<tr>
<th>Findings</th>
<th>Portion of the Sample (%)</th>
<th>Number of Affected Users per Year</th>
<th>Revenue Contribution of Those People (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uluwatu is the primary reason for visiting Bali</td>
<td>43.8</td>
<td>107,556</td>
<td>15,894,148.10</td>
</tr>
<tr>
<td>Repeat visitors to Uluwatu</td>
<td>38.2</td>
<td>93,805</td>
<td>13,862,019.60</td>
</tr>
<tr>
<td>Those that would NOT visit Uluwatu as there was no surf</td>
<td>29.7</td>
<td>68,512</td>
<td>10,614,982.10</td>
</tr>
</tbody>
</table>

The results presented here provide an explanation of the amount of revenue generated by the recreational capacity of the ecosystem services at Uluwatu, and the factors that would interfere with such revenue. The bulk of the sample cohorts were surfers (56.3%), or those intending to participate in surf related leisure tourism. The surfers sampled in this survey clearly indicated that a healthy functioning ecosystem is desirable for recreation. Furthermore, if the ecosystem were to be degraded, the annual user population and its associated revenue would decline.
3.6 Current Perceptions of Surf and Tourism at Uluwatu

The survey questionnaire sought to understand current perceptions of environmental conditions, experience and generally, to understand users’ level of satisfaction at Uluwatu. Within the survey there was also a specific set of question to be completed by those that were present at Uluwatu to surf (Table 3.6.1). Figure 3.6.1 presents the frequency of scoring for responses to questions associated current environmental conditions, the importance of environmental management in the area and how enjoyable respondents’ Uluwatu experience has been. The variables have been recoded (as mentioned in Section 3.1) due to distribution of the scoring. The response frequencies indicate that all of the following question generated an emotive response, as there were very few median score responses.

Figure 3.6.1. Scale Responses to Current Environmental Conditions at Uluwatu, How Important Environmental Management is and How Enjoyable Uluwatu Has Been to Individuals Within the Sample.

The current environmental state of Uluwatu showed the most even distribution along the Likert-Style scale. 31.5% of the sample rated the current environmental conditions to be good to not good. The response rates for the second questions displayed in Figure 3.6.1 reflect the theoretical importance of environmental management to an individual rather than an onsite assessment, the question posted in the onsite survey (refer to Appendix 1 and 2 Question 20) was designed to provoke a response that would explain the samples’ perceptions on environment. Finally, the response rates to how enjoyable Uluwatu has been imply that as the area exists today the majority of the sample was very pleased with their Uluwatu experience. The following table (3.6.1) displays the results of the questions within the onsite survey that were specifically related to surfers (56.3% of the sample).

Table 3.6.1: Responses to Questions Specifically Related to Surfing at Uluwatu

<table>
<thead>
<tr>
<th>Response Categories</th>
<th>What do You Think About the General Number of Surfers Around During Your Trip? (%)</th>
<th>How Satisfied were You With Your Overall Surf Experience in This Area? (Applicable Response delineated)</th>
<th>Will You Return to This Area for Surfing? (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Responses depicted in the Table 3.6.1 indicate that although respondents found the general number of surfers to be too great (84.8% though that the surf was too crowded), the overall surf experience was positive for 87% of the sample and 90.8% of the surfer respondents would return to surf Uluwatu.

The quantitative data set was designed to elicit expenditure data associated with an area in Uluwatu, Bali, Indonesia that has been a global focus for surfers and associated industry for the past 30 years. Initially, the principal researcher sought to apply more complex valuation methodology and so sought to gather the required information. Through the course of the research it became apparent that the application of more complex analysis methodology, specifically a Travel Cost Model, was not applicable in this instance. However, the data parameters to inform such a model as the TCM were collected. Data related to TCM could however, highlight some very interesting trends and association patterns and should be considered for further statistical analysis. For a brief analysis of the demographic data intended to inform a TCM refer to Appendix 3.

### 3.7 Results from the Qualitative Analysis

Two key findings emerged from the qualitative analysis.

1. All stakeholder groups hoteliers, local (Indonesian) surfers, international surfing tourists, non-surfing international tourists, and Uluwatu warung owners for a variety of reasons care about and place a high value on clean coastal and marine environments at Uluwatu.

2. While tourists related that declining environmental integrity and recreational/aesthetic amenity at Uluwatu has negatively impacted their experience, they would return, at least in the immediate term. Relatedly, Uluwatu business owners understand the value of a clean coastal and marine environment for the long-term viability of their businesses.

#### 3.7.1 The Importance of Environmental Integrity at Uluwatu

Almost all of the 43 research participants talked about the environmental challenges facing Uluwatu. Many noted the degraded aesthetic appeal of Uluwatu’s costal and marine environment as a result of inadequate management of solid waste. For example one non-surfing international tourist believed that “rubbish is the principle [environmental] problem” at Uluwatu. The lack of appropriate waste disposal facilities caught the attention of a US surfing tourist as follows.

*I was surprised with all the trash burning; I didn’t realize that was how they got rid of their trash. (Surf Tourist)*
Several surf tourists commented on not only the aesthetic impact of poor waste management but also the concomitant decline in the quality of the marine environment that had a real impact on the surfing experience.

*There appear to be lax [standards] in recycling or trash organization. As soon as you pile up the trash and the rain comes you can definitely see a big, big difference in the quality of the water.* (Surf Tourist)

Several additional surf tourists and several local (Balinese) surfers commented not only on the decline in water quality evidenced by floating trash and scum but also an unpleasant odor emanating from piles of solid waste along the shoreline and evident in the water while surfing Uluwatu after rain. All explained that this significantly diminished their surfing experience.

Hotel and business owners around Uluwatu also note the importance of environmental integrity for the future viability of their businesses.

*It is very important for us [that the coastline is clean]* (Hotel Owner)

*We have direct ocean views. If the water is dirty and nobody comes to that area of the beach it will not support our business* (Hotel Manager)

*Keeping this [area] clean is very important for business owners* (Business Owner).

Warung owners at Uluwatu noted the issues related to the management and disposal of solid waste at Uluwatu but also offered a deeper insight into the some of the root causes of the issue. It appears that a lack of solid waste collection infrastructure has led warung owners to believe their only two options for disposal are burning, or dumping in the surrounding environment. It was also noted that the impact of the solid waste disposal problem on the marine environment is considerably worse in Bali’s rainy season when the burning of trash (the primary method of plastic waste disposal) is less effective and the piles of waste alluded to by the local surfers and surf tourists are washed into streams and into the ocean. Concern was also expressed for the future as loads of solid waste increase with growing tourist visitation and hotel construction.

*“Honestly we don’t throw the plastic here we burn it. It’s the best way. It is not good but its better than throwing it to the beach or to the river. When the rain comes it all goes to the sea. Come here in this time [August] and the water is very clean, if you come here in January or February its very horrible here, a lot of rubbish in the sea. It’s a hard problem for the future”*. (Uluwatu Warung Owner)

A number of other environmental concerns were raised by stakeholders with a long term stake in the viability of Uluwatu as a tourist attraction, and local surfers and long term surfing residents with a stake in long term surfing amenity. The issues raised include overdevelopment, waterway pollution, and sand erosion.

### 3.7.2 The Importance and Value of Uluwatu

A number of surf tourists and foreign resident surfers noted that for them, the combination of crowds and pollution at Uluwatu had already diminished their surfing experience to the point that Uluwatu was no longer the premiere surfing destination it once was.
The surf in Uluwatu is not so important [to me] any more because it is too crowded” (Surfing Tourist).

I think this area, particularly in Uluwatu, gets so much traffic and there’s so many people in it that it is a turn off for anybody who knows what they’re doing or lives around here. It’s filled with a million people and it’s not the nicest place to surf anymore. (Foreign Resident Surfer).

Despite this, the research participants quoted above were at Uluwatu to surf when they were interviewed. When asked, they confirmed that they would still come back despite these issues. This serves to highlight the importance of Uluwatu as a destination for surfers based on the quality of the surf. Despite unpleasant pollution and crowded conditions Uluwatu still elicits a powerful sense of care and stewardship, particularly from foreign resident surfers and local/Indonesian surfers – and again this is based on the quality of the wave.

The surf here is everything in my life, without the surf here [at Uluwatu], I wouldn’t be living and working in Bali, especially Uluwatu. I’m kind of a one trick pony, I don’t surf anywhere else. (Foreign Resident Surfer).

Uluwatu is a really good wave, warm water and while you have the chance to surf a good wave you want to protect the place and the ocean. (Indonesian Professional Surfer).

It is imperative that the quality of the wave is not compromised by environmental degradation, and that the quality of the surfing experience does not decline further if Uluwatu is to maintain its appeal for tourists.

3.7.3 Considerations for Management

While not the focus of this enquiry, participants raised a number of issues related to any future management of Uluwatu. Several tourists both surfing and non-surfing expressed a level of skepticism about the likely transparency of the process and the ability of funds to be channeled appropriately to the effective management of Uluwatu. This appears to be, at least in part, based on negative tourist stereotypes about Indonesia. As one surf tourist commented in relation to contributing to the management of the area, “we would need to see where the money is going to go.”

Local surfers and business owners recognized the importance of initially focusing efforts towards educating the Uluwatu community in addressing the most pressing environmental issues.

The locals that do not surf, they do not know about the sea and how to keep it clean.” (Indonesian Professional Surfer).

I think first education [is the best way], education is very important. And then the government help. Education plus government help will be the best thing. [Education] because we need to know from the bottom, from the start, everybody needs to learn from the start.” (Surfer and Business Owner).
It’s really important that local people get involved for this kind of project. Because they should be aware about the environment right now because we are here, we can survive because of the tourists. And now we need to protect our environment. I think the good idea is now to just try to approach the local people here and I don’t think its really hard if we can explain about the environment.” (Hotel Manager).

Tourists also mentioned the need for education, but their priority was for other tourists to be educated about the environmental issues facing Uluwatu and Bali more broadly

Some people come to Bali but they don’t respect the Balinese, they don’t respect the culture [and] they don’t respect the environment because its Bali Bagus and they know they will return back to their country and return to normal life. (Non-surfing Tourist).

“I think a lot of people that are not here for very long don’t realize what is going on and what needs to be done. They come and just go down the stairs at Uluwatu and run right out because they are just trying to get their waves while they are here for 10 days but they don’t really see like behind like Project Clean Uluwatu putting in the sewerage systems and all that. I don’t think they even realize what that is.” (Surf Tourist).

“Education [is needed to] make them [tourists] aware, a lot of tourists don’t know how bad it is.” (Surf Tourist).

“When I am here for three weeks I think about [environmental concerns at Uluwatu] sometimes but for the rest of it it’s not in my mind.” (Surf Tourist).

A prominent Uluwatu surfer and business owner saw the need for both local and tourists to be involved in and benefit from solutions to the environmental issues facing the region.

Me myself, I would love if everybody come and try to help, its not just for all the Balinese people, its for everybody that comes here to surf.

3.8 Results from the Willingness to Pay Feasibility Assessment

The section of the report we refer to as the Willingness to Pay (WTP) section should be understood as a broad framework for gauging the sample populations’ attitude towards contributions for environmental management in the area. During the development stage of the methodology for this research it became apparent that embracing a conventional model for a WTP assessment was not appropriate given the sensitivity, of various stakeholders, to the notion of a user pay system. We therefore designed aspects of the survey that would allow us to gauge perceptions without explicitly introducing standardized entrance fees with measurable outcomes.

Figure 3.8.1 shows the percentage responses for Options for Contribution Collection. Of the total respondents, we received 410 positive responses (i.e. we viewed positive as those that would be willing to contribute something to environmental management at Uluwatu, in this case it was 75.23% of the sample).
Figure 3.8.1: Percentage Responses for the *Options for Contribution Collection*.

Figure 3.8.1 shows varied responses to the *options for contribution* question with a relatively small portion of the sample not willing to contribute at all (2.5% of the sample). On average, a tourist was willing to pay IDR 101,841.46 (s.e. ±2,954.25) to protect Uluwatu. Further, we sought to expand on the average contribution figure by displaying the results in their entirety (Figure 3.8.2)

Figure 3.8.2: Percentage Responses for *Options for Contribution Amount*.

The percentage scores for *Options for Contribution Amount* trend towards the smallest possible contribution. Although we provided an option for the response category “other” there were very few coherent response.

We conducted some linear regressions between income per annum and willingness to pay (WTP) to see possible correlations. Linear regression between the original income variable and WTP did not give a significant result nor a significant Pearson correlation (Pearson correlation p =.001, p =.571). The original variable was then transformed with log(10), square root, square and inversion; none of them gave significant correlations with WTP (Pearson correlation p=.003, p=.001, p=.002, p=.008 respectively). We conclude that WTP was not associated with income of the respondents.
We conducted stepwise regressions between WTP and respondents’ environmental concerns (marine debris, water quality, coral reef quality, and coastal development), factors that deterred them from returning to Uluwatu, their satisfaction with the overall experience at Uluwatu, their perception about the current state of the environment at Uluwatu, their ranks on the importance of environmental protection and management, their satisfaction with the surfing experience and their income per annum. The only significant variable was respondents’ concern on water quality or sewage (p=.011, b= -.251), although the Rsqr was only enough to explain 6.3% of the equation. The model means that the more concerns respondents had on water quality (sewage) the less likely they were willing to pay to improve the environmental management of Uluwatu. The low Rsqr indicated confounding factors in WTP determinants that were not captured during the study.
4 Discussion

This study has been designed to investigate the significance of recreational ecosystem services present at the high quality surf break at Uluwatu. To do this, actual expenditure resulting from the use of its specific ecosystem services has been calculated. The annual user population was calculated to determine the magnitude of this annual monetary contribution to the community. It is important to note that this research focuses on a single expression of ecosystem services in Uluwatu, which is surfing. The area of Uluwatu actually has a diverse range of ecosystem services providing other tourist attractions but surfing or tourism-associated surfing is the dominant recreation. Through this process we have endeavored to apply an easily communicable expression of significance, expenditure, without addressing other aspects of ecosystem services and/or aspects of cultural importance.

The population calculation carried out provided an informed estimate of the number of visitors to Uluwatu who were present in the area directly adjacent to the breaking waves and therefore associated with surf tourism. This estimate formed the basis of the calculation of total annual expenditure, summed from total daily expenditure. As explained in Section 2, this number was calculated from a variety of sources. In addition to on-site sample counts, additional qualitative information was gathered from 5% of the local business owners, and a number of community members, who identified seasons on the basis of ‘busy’ and ‘not busy’ days. The simple and recurring response recorded from the community members was ‘good wave, many tourists’ ‘not good wave, not many tourists.’ This supported user number estimates calculated through analysis of meteorological data deemed to facilitate favorable surf conditions. Within the constraints of this research project, the average annual user population was calculated specifically for Uluwatu, and although there will be some uncertainty in this number; it has been crosschecked through this data triangulation. Ideally, count data over a number of years and seasons would give a more accurate depiction of average annual user population. To address the issues of potentially overstating the population projection estimate, conservative estimates of all of the factors contributing to the final number were utilized.

The actual expenditure made on surf-related recreational activities was calculated to be USD 160.74, 147.76, 134.80 (for each season respectively, peak, mid and off) per day per visitor, which amounts to a total actual annual value of USD35.3 million per year. Such a figure for actual annual expenditure from tourism is significant as a signal to policy makers to put more attention on the issue of environmental protection of coastal ecosystems. This figure also serves to indicate a measure of the ‘direct use value’ of the Uluwatu wave break, and the ecosystem that generates it.

In the context of the Balinese economy, this figure represents a significant contribution. The generation of almost USD35.3 million of spending annually in Bali has a much more important impact than an equivalent figure in a developed economy such as the USA or Australia. In addition, while the employment generated by the surf tourism sector is difficult to quantify it is significant in the context of the Balinese economy. This highlights the urgency of action needed to ensure appropriate environmental management is supported by the local community to ensure continued benefit from this resource use.

The recreational capacity of the marine ecosystem at Uluwatu directly influences the calculated direct expenditure outlined in this research. The sample showed an association with surfing (56.3%) and activities related to ecosystem services. The cultural diversity of
the sample highlights the importance of Uluwatu as a tourism destination. Individuals forego numerous alternative attractions to spend time at Uluwatu. Further, 43.8% of individuals in the sample came to Bali primarily to visit Uluwatu. Currently, Uluwatu facilitates a significant tourist trade and this trade is dependent on environmental conditions. If environmental conditions were to worsen tourism would be adversely affected.

The sample responded very strongly to questions posed about environmental conditions. Section 3.5 explains the individual responses to questions associate with environmental conditions. The responses indicate a strong reaction within respondents (high frequency responses for very important) thus, environment or environmental management is important in the experience of Uluwatu. However, when individuals are posed with a choice in accommodation the factors that most affect accommodation choice are related to price and accommodation (Figure 3.5.3). This is likely a reflection of the income elastic nature of the environment; Pearce (1993) explains that subjects such as the environment are issues that will be looked after only after basic needs are met.

Even though there is ample literature explaining the validity of various valuation techniques (Hein et al., 2006; Pettanayak and Wendland, 2007; Turner et al., 2002; Costanza et al., 1987), it is widely recognized that any attempt to value the environment or ecosystem services is likely to be incomplete. We simply do not know how to value these effectively and accurately, so there is much potential for any such theoretically determined environmental values to be misunderstood. It is nevertheless essential to capture some measure of their economic importance, to ensure that governments and stakeholders respect these values and recognize the need to manage and protect them.

There are also difficulties associated with making assessments of value in different cultural contexts, and in making international comparisons of value. For these reasons, it was determined that in this study, a measure of actual expenditure on local goods and services would be a useful metric for local policy makers, to help them to realize the strategic economic significance of their coastal resources, and to make them aware of the fact that adverse environmental conditions and loss of ecosystem services is likely to result in a significant loss of this revenue.

In terms of willingness to pay, a tourist was willing to pay on average IDR 101,841.46 (s.e. +2,954.25) to protect Uluwatu. The only significant predictor for the willingness to pay for environment was respondents’ concern on water quality (sewage); they were less likely willing to pay when they had more concerns on water quality.

5 Conclusion

Uluwatu has a prosperous tourism industry, yet the findings of this research present a common paradox in tourist-driven development. The attributes of Uluwatu that have facilitated economic development may be adversely affected by that very development, thus reducing the potential for further expansion into the future. Such an outcome (frequently observed in many tourist destinations such as Torremolinos in Spain, Pattaya in Thailand etc) is clearly unsustainable. To explain the local and regional significance of the development paradox this study has quantified the direct expenditure associated with the dominant recreational ecosystem service at Uluwatu.
While the computed value of *actual annual expenditure* reflects the current economic importance of surf-related tourism in a specific location, it does not explain the *environmental value* of the area. Values can be variously defined and their measurement is fraught with difficulty. Therefore, this study has sought to explain existing markets rather than quantify theoretical markets. To date we do not yet fully understand the complete structure and function of ecosystems, and so to value them accurately is as yet impossible. Nevertheless, it is important to develop some means of including them in monetary assessments, so that policy makers can develop measures to support better management.

The *annual expenditure* on the use of recreational ecosystem services at Uluwatu presented here is not, and should not be viewed as a standalone figure as this research has not sought to holistically value ecosystem services at Uluwatu and further, does not communicate the importance or values of ecosystem services entirely. Rather, this research explains a consequence of desirable ecosystem services in terms a direct expenditure assessment. The data gathered during this research is of considerable importance in providing a baseline assessment of the use of specific recreational ecosystem services at Uluwatu, and as such, provides some measure of the economic value of its coastal ecosystem. It is hoped that this will be of use to those interested in developing more active and adaptive policies for effective coastal management. On the basis of these results it does appear that urgent action is needed to counteract the current negative environmental impacts of poorly regulated tourism development along the Bukit Peninsula.
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Appendix 1: On Site Survey

Uluwatu Tourism Survey

Please fill in this on site survey to determine what Uluwatu provides to the local community and to you in order to ensure the future sustainable management of the area. The information collected for this survey will inform research into the sustainable management of the Bukit Peninsula, thank you participating.

Please answer the following questions as an individual (i.e. if you came to Uluwatu as a group, answer only for yourself). All information provided will remain confidential.

1. What is your primary reason for visiting Uluwatu?

2. How important are the following factors to your visit (Please circle a number between 0-10 to indicate why you came to Uluwatu and how important that is to you. 0 = not important 10 = very important. You can circle the same number in more than one question.)

<table>
<thead>
<tr>
<th>Factor</th>
<th>0</th>
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<th>6</th>
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<tr>
<td>Watching the waves</td>
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<td>Watching surfing</td>
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<td>Surfing Uluwatu</td>
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<td>Spending time with the surfing community</td>
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<td>Spending time with family and friends</td>
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<td>Experiencing Balinese culture</td>
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<tr>
<td>Enjoying nature</td>
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<tr>
<td>Other</td>
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</table>

3. What country did you travel from to reach the area?
4. If you are not a permanent resident, did you fly to Indonesia to travel here?  Y
        N

        If “Y,” what was the cost of your ticket? (Please give the currency you are
        using)
        __________________

5. Or, did you fly within Indonesia to travel here?  Y  N

        If “Y,” what was the cost of your ticket? (Please give the currency you are
        using)
        __________________

6. How long do you plan to stay in the area? (Just in Uluwatu, not Bali)
        ________

7. Separate from this trip, how many times have visited Uluwatu in the past year?

8. Are you staying in paid accommodation?  Y  N

9. What area is your accommodation in?
        ______________________

10. How important are the following factors in choosing accommodation? (Please
        circle a number between 0-10 to indicate how important these factors are.  0= not
        important 10= very important. You can circle the same number in more than one
        question.)
        a. Price
        0  1  2  3  4  5  6  7  8  9  10
        b. Location
        0  1  2  3  4  5  6  7  8  9  10
        c. Quality of amenities
        0  1  2  3  4  5  6  7  8  9  10
        d. Environmental Concern / Company’s Environmental Practices
        0  1  2  3  4  5  6  7  8  9  10
        e. Other  ______________________
        0  1  2  3  4  5  6  7  8  9  10
11. Is visiting the area the primary reason for your trip to the Bali (e.g. if you are visiting the area to surf, is Uluwatu the primary area you would like to surf)? Y N

12. Is this your first visit to the area? Y N

13. If “N” then how many times have you visited the area before (not including this visit)?

14. Would you come to the area if there was no surf? Y N

15. While visiting the area, approximately how much per day do you think you spend on: (Please use Rupiah or U.S dollars)
   a. Accommodation ______________________
   b. Meals ______________________
   c. Transportation ______________________
   d. Other ______________________

16. What are your concerns of the environmental conditions at Uluwatu? (Please circle a number between 0-10 to indicate how concerned you are. 0= not concerned 10= very concerned. You can circle the same number in more than one question.)
   a. Marine Debris (Trash)
      0 1 2 3 4 5 6 7 8 9 10
   b. Water Quality (Sewage)
      0 1 2 3 4 5 6 7 8 9 10
   c. Damaged Ecosystems (Coral Reef Quality)
      0 1 2 3 4 5 6 7 8 9 10
   d. Coastal Development that Impacts Wave Quality
      0 1 2 3 4 5 6 7 8 9 10
   e. Other ______________________
      0 1 2 3 4 5 6 7 8 9 10

17. Which of these concerns would discourage you from returning to Uluwatu?
   ______________________
18. How satisfied are you with your overall experience at Uluwatu? (Please circle one of the following, 0 = not satisfied, 10 = very satisfied)

0 1 2 3 4 5 6 7 8 9 10

19. How do you feel about the current state of the environment at Uluwatu? (Please circle one of the following 0 = not good, 10 = very good)

0 1 2 3 4 5 6 7 8 9 10

20. How important is environmental protection and management to you (0 = not important, 10 = very important)?

0 1 2 3 4 5 6 7 8 9 10

This section is to be completed by people who participated in surfing at Uluwatu

21. What do you think about the general number of surfers around you during your entire trip (please circle one of the following 0 = uncrowded, 10 = too crowded)?

0 1 2 3 4 5 6 7 8 9 10

22. Will you return to this area for surfing?  Y  N

If you answered ’N’, would you be likely to surf in other areas as an alternative to surfing Uluwatu? (Please circle the category where you would be most likely to surf instead of Uluwatu)

a. Areas on the Bukit or in Bali

Please Specify________________________________________

b. Other areas in Indonesia

Please Specify________________________________________

c. Other areas outside of Indonesia

Please Specify________________________________________

23. How satisfied were you with your overall surfing experience in this area? (0 = not satisfied, 10 = very satisfied 10)
Further comment:

Background Information (All survey respondents)

Note: This information you provide is confidential and will only be used for research purposes

24. Gender (circle one) Male  Female

25. What is your age range? (Circle one)

18-25  26-29  30-39  40-55  56-70  71 or older

26. What is your nationality?

27. What is your current country of residence?

28. What is your current level of education? (Please tick one of the boxes)

No formal education  Masters Degree
High School certificate or equivalent  Doctorate or higher
Adult education (e.g. diploma)  Rather not specify
Bachelor degree – University  Other (please specify)

29. What is your current occupation?

30. What range encompasses your total annual income? (In US dollars, please circle one)

Under $15,000  $15,001 - $35,000  $35,001 - $45,000
$60,001 - $90,000  $45,001 - $60,000  $90,001 - $120,000
$120,001 - $200,000  $200,001 or higher  Rather not specify

Tourism in Bali has undergone rapid growth. In some instances commercial development and rapid urbanization have placed strain on the community infrastructure which has resulted in increased threats to Bali’s endemic environment. These threats may impact on the ecosystem services of this area. The Bukit Peninsula is particularly significant for the local inhabitants of Bali, as well as, tourists. Please fill out the following section to inform research into the feasibility of a ‘user based contribution’ to increasing the environmental management of the area.
31. Would you be willing to contribute to conservation projects focused on improving the environment of the Bukit Peninsula through the following (please tick one of the boxes)
   a. One-time entrance contribution at the regency level? ☐
   b. One-time entrance contribution at the provincial level? ☐
   c. Per-use entry contribution at Uluwatu? ☐
   d. Airport/entry contribution? ☐
   e. Contribution included in the Visa on Arrival? ☐
   f. Voluntary donation ☐
   g. In kind contribution (volunteer your time) ☐
   h. Prefer not to contribute ☐
   i. Other (please specify) ☐

32. If yes to any of the contribution options above, how much would you be willing to contribute annually? (Please consider that for this question we would like to know how much you would be willing to contribute per year in Indonesia Rupiah.)
   a. IDR 50,000
   b. IDR 100,000
   c. IDR 150,000
   d. IDR 200,000
   e. Other (please specify) ☐

33. Can you give some examples of either cultural or environmental projects that you would like to see implemented in the area with the proceeds of this type of contribution?

34. Who would you like to see managing the contribution?
   a. Community
   b. Government
   c. NGO
   d. Private sector
   e. A consortium of all of the above
   f. Others (please specify) ☐
35. Is there anything else you would like to add?

Please leave your email address if you wish to view the results of this survey.

Thank you for your help in understanding tourism and environmental management at Uluwatu.
Appendix 2: Frequency Distributions for Likert-Style Scale Questions

The following bar charts are displayed according to the percentage frequency of each score from 0 through to 10. Frequency responses are arranged in the order that they appear in the survey.

Question 2: How important are the following factors to your visit?
Question 10: What is the most important factor in choosing accommodation?
Question 16: What are your concerns of the environmental conditions at Uluwatu?
Question 18: How satisfied are you with your overall experience at Uluwatu?

Question 19: How do you feel about the current state of environment at Uluwatu?

Question 20: How important is environmental protection and management to you?
Question 21: What do you think of the general number of surfers around you during your entire trip?

Question 23: How satisfied are you with your overall surfing experience?
## Appendix 3: Initial Data Analysis of the Demographic Information

<table>
<thead>
<tr>
<th>Gender (%)</th>
<th>Age (%)</th>
<th>Level of Education (%)</th>
<th>Income (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>58.2</td>
<td>18-25</td>
<td>28.6</td>
</tr>
<tr>
<td>Female</td>
<td>41.8</td>
<td>26-29</td>
<td>30.6</td>
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<td></td>
<td>30-39</td>
<td>29.6</td>
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<td>40-55</td>
<td>9.8</td>
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<tr>
<td></td>
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<td>56-70</td>
<td>1.4</td>
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<td></td>
<td>71 or older</td>
<td>0</td>
<td>2.4</td>
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Appendix 4: Main Entry Points for the Uluwatu Field Site

Source: Google Earth ©, 2014