

**WILLINGNESS TO PAY FOR MARINE BASED TOURISM**  
WITHIN THE PONTA DO OURO PARTIAL MARINE RESERVE,  
MOZAMBIQUE

FINAL STUDY REPORT

by

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## **Abstract**

Marine protected areas (MPAs) can serve as a structure that ensures the continuing function of marine and coastal ecosystem goods and services. However, to be effective and sustainable, MPAs must be able to prove their economic worth and generate revenue. User-fees are a common system used to partially finance multi-use MPAs. This study applies contingent valuation as a method of economic valuation within an MPA in southern Mozambique. The objectives of this study are to determine the willingness to pay of combined user groups and of individual user groups of the Ponta do Ouro Partial Marine Reserve and to investigate the potential for the reserve to increase revenues for conservation through the implementation of a user-fee for marine based activities. The payment card contingent valuation method was employed to determine willingness to pay (WTP) of dolphin swim tourists, scuba divers and fishermen. Data was collected by face-to-face interviews of 120 respondents within two popular tourist locations in the PPMR. Results show that visitors within the PPMR are mainly South Africans and loyal to the area. Probit and OLS regressions were used to determine effects of various independent variables on willingness to pay. Results from the Probit model indicate that African residency, activity and environmental awareness were significant factors that influence visitors WTP more than R20. The OLS model found income, African residency and environmental awareness to be significant factors influencing visitors being willing to pay. The mean WTP was R43.75 per day. Using data supplied by the PPMR, conservative estimated annual revenues based on the implementation of this fee amount would range between R1 462 738 – R 3 308 244 per annum.

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# 1 Introduction

As a consequence of the exhaustive reach of humans, today there is not a single ocean or sea untouched by humans. Even the deepest oceans trenches have evidence of human influence. The only natural protection seems to be the ice of the poles, where human impact is very low but still present. Ultimately, human impact is medium high to very high in over one-third (41%) of the world's oceans (Halpern *et al.*, 2008).

Marine protected areas (MPAs) can be an effective approach to conservation of sea life and ocean ecosystems. With adequate enforcement and fishing restrictions, MPAs have proven to increase biomass of targeted species over time (Goñi *et al.*, 2011). Long-term positive effects of MPAs are known as 'spillover' effects. Spillover occurs when the increase in biomass within a restricted fishing area also leads to an increase in biomass in surrounding areas (Alban *et al.*, 2006). This is a positive effect not only for biology, but also for fisheries, recreation and economies as a whole. However, while the positive effects of MPAs may be vast (Claudet, 2011), indicators of an effective MPA can be difficult to quantify (Pelletier, 2011). Understanding all of the aspects of MPAs and the processes MPAs create ecologically and economically is a complex endeavour. Nonetheless, the establishment of an MPA is an "investment in natural capital" (Alban *et al.*, 2006:1) that has been proven as an effective tool for management (Alban *et al.*, 2006).

Lack of sustainable financing is the primary cause of failure for MPAs. Without adequate and consistent finances, it is impossible to effectively manage and enforce rules and regulations within an MPA. Internationally, while stakeholders and political leaders increasingly acknowledge the need for and benefits of MPAs, increased financial resources and sustainable financing plans have been slow to follow (Meliane *et al.*, 2010). One challenge that MPAs face is that they are often difficult to justify on financial grounds, especially when compared to other uses (Inamadara *et al.*, 1999). This is exacerbated within developing nations where daily subsistence fishing or farming take priority over future vitality (Lindberg, 2001). Therefore, to be sustainable and effective in the

long run, MPAs must demonstrate their ability to generate their own revenues. While sustainable financing is essential for the success of MPAs, financing need not come entirely from external sources. Many MPAs have the capacity to generate some of their own funding.

User fees are a common method used to help generate funds for MPAs (Lindberg, 2001). User fees can come in a variety of different forms, from a per day access fee to an annual visitors pass. However, for user fees to be a sustainable source of financing, the fees must be based on the willingness to pay (WTP) of the targeted users of the MPA. This ensures that the user fee maximises possible revenues and aids in the fair spreading of costs. Basing fees on users' WTP also avoids issues that may arise from a miscalculation of fee structures, like overestimation. Overestimation of visitors' WTP could result in a sharp decline in expected revenues ultimately driving tourists to substitute sites that have lower or no fee. Without the data provided by a WTP study, MPAs could stand to lose the very users needed to help economically sustain the park especially if there are close substitutes, such as another nearby park or recreational site.

This study applies the contingent valuation (CV) method to the Ponta do Ouro Partial Marine Reserve in southern Mozambique. This study will focus on marine based tourists who visit the MPA to swim with dolphins, scuba dive or fish to determine the willingness to pay (WTP) for a user fee to access the MPA.

## **1.1 MPAs in Mozambique**

With its expansive coastline, dotted with around 44 islands and diverse ecosystems of mangrove forests, coastal lagoons, sea grass beds and coral reefs, Mozambique has much to protect. Despite its history of conflict and economic woes, Mozambique has shown a commitment to conservation by signing and adhering to various international treaties and agreements on conservation initiatives (DNAC, 2010).

Mozambique has made a commitment to marine conservation that is evident in the number of MPAs in Mozambique, which includes Africa's second oldest MPA (Table 1.2). A focus on nature-based tourism is not necessarily in conflict with the promotion of protected areas that also are about biodiversity,

ecosystem and ecological processes. In some ways, Mozambique’s commitment to tourism above conservation has resulted in more and better managed MPAs. Mozambique has applied two Marine Conservation Agreements (MCAs) by transferring the rights of submerged lands from the state to private investors (Marine Conservation Agreements Toolkit, 2010). In particular, as a result of MCAs, the Vilanculos Coastal Wildlife Sanctuary and North Quirimbas add an additional 310km<sup>2</sup> of protected marine areas to Mozambique, one-third of which is a no-take zone, that otherwise would not exist.

**Table 1.2** Mozambique marine protected areas

| Site  | Established | Size (km <sup>2</sup> ) |
|---|-------------|-------------------------|
| Inhaca Island                                   | 1965        | 1                       |
| Bazaruto Archipelago National Park              | 1971        | 600                     |
|   | 2001*       | 1 430                   |
| Vilanculos Coastal Wildlife Sanctuary (Private) | 2000        | 80                      |
| Quirimbas National Park                         | 2002        | 1 522                   |
| North Quirimbas (Private)                       | 2008        | 230                     |
| Ponta do Ouro Partial Marine Reserve            | 2009        | 678                     |
| Primeras & Segundas Archipelago                 | 2012        | 10 400                  |

\* Expanded to include an additional 830 km<sup>2</sup>

(Sources: Wells *et al.*, 2007, DNAC, 2010, WWF, 2012)

While Mozambique adds to the Convention on Biological Diversity (CBD) goal of 10% of the marine realm protected by 2020, it lags behind other MPA recommendations. In 2003, at the World Parks Congress in Durban, it was recommended that 20-30% of MPAs be declared no-take zones where exploitation is prohibited (Wells *et al.*, 2007). This study has found it difficult to determine the percentage of MPAs in Mozambique that are no-take areas. Although Wells *et al.* (2007) put forward an estimate of 40 km<sup>2</sup> of no-take zones in Mozambique, the site was unspecified by the authors. In the North Quirimbas, a 3km radius of no-take zone surrounds Vamizi Island (Vamizi Island, 2012), which would be roughly 110 km<sup>2</sup>. Within the PPMR, 40 km<sup>2</sup> is a strict no-take zone protecting critically important ecosystems and species. It is unclear how much of the Primeras and Segundas Archipelago MPA is a no-take zone. With no other known

no-take zones in the remaining Mozambique MPAs, the result is a miniscule percentage of no-take zones within MPAs (Table 1.4).

**Table 1.4** No-take zones within Mozambique MPAs

|  |          |
|--|----------|
| Area MPAs (km <sup>2</sup> )                 | 14 341   |
| Area no-take <sup>a</sup> (km <sup>2</sup> ) | 150-190  |
| % MPAs no-take                               | 1.0-1.3% |

## 1.2 The Ponta do Ouro Partial Marine Reserve

The Ponta do Ouro Partial Marine Reserve (PPMR) is Mozambique's southern most MPA. The reserve stretches from the border with South Africa (S26° 51' 32.40", E32° 56' 45.60") 86km to its northern most point encircling Inhaca Island (S 25° 55' 40.8", E33° 01' 26.4") and into Maputo Bay at the Maputo River Mouth (-26° 11' 38.40", +32° 41' 27.60"). From the high water mark to three nautical miles out to sea along the coast and one nautical mile in the Maputo Bay, the MPA protects 678 km<sup>2</sup> made up of coral reefs, mangrove forests and sea grass beds (Appendix II). Approximately 6% of the PPMR is a no-take zone.

The PPMR is a relatively new MPA in Mozambique that protects globally important biodiversity areas, including a 40km sanctuary zone. Mozambique faces a great challenge in the management and enforcement of the MPA given the threats it faces. However, the PPMR has the potential to generate its own income thus making it more likely that it will be managed and enforced effectively.

The MPA includes habitats of many marine species vulnerable to or critically endangered with extinction, including five species of sea turtle, at least ten species of shark, dugongs, migratory birds (UNESCO, 2008), as well as a diverse Indo-Pacific fish community (Floros *et al.*, 2012). The park is under review by UNESCO as a potential World Heritage Site and it is classified as a globally important biodiversity site within the Eastern African Marine Ecoregion (EAME) (Guerreiro *et al.*, 2011). The Ponta do Ouro area is relatively undeveloped and, as a key biodiversity area, has high ecosystem service value and the potential to maintain the ecosystems necessary for such services (CEPF, 2010).

### 1.2.1 Deep-water Port

The PPMR is imminently threatened by the proposed construction of a substantial deep-water port within its core no-take zone (DNAC, 2010). The threat of the port has been looming since the 1960s and its specific location has changed through the years, but always within what is now the PPMR. Although there have been many seemingly false starts to the port, the Prime Minister of Mozambique, Alberto Vaquina, announced in a press release in April 2013 that a concession for the megaproject had been granted. Prime Minister Vaquina did not disclose to whom the concession had been granted.

The port megaproject is expected to cost US\$7 billion with the port complex occupying 30 000-hectares, 11 000 of which will be an industrial development zone (AIM, 2013). As there is no infrastructure at the site, the port must be built from scratch (AIM, 2013), including extensive roads and an estimated 1 100km of railway (Macauhub, 2010) which will certainly include “unplanned urbanization” (CEPF, 2010:71) of the area.

That Prime Minister Vaquina was unwilling to name the recipient of the concession (Macauhub, 2010) highlights the contentious and secretive nature of the port development. The source of the necessary US\$7 billion has remained undisclosed as well. A lack of transparency has worried stakeholders locally and internationally. Stakeholders include the Mozambican government; local businesses and villages; the development’s funders; the South African government; the World Heritage Commission in Paris; and other international and local conservation groups (Carnie, 2012).

Port development within the MPA poses a direct threat to the areas richest reefs and to the PPMA as a whole. The reefs found within the core area of the PPMA are unique as some of the highest latitude reefs in the world (Celliers and Schleyer, 2008). The reefs with the most coral cover and best quality are found on an 18km stretch of marginal reefs between Ponta Techobanine and Ponta Dobela directly where the port construction is proposed (DNAC, 2010). Leatherback turtles (*Dermochelys coriacea*) and clownfish (*Amphiprion sp.*), two of ten “hit list” species identified by the International Union for Conservation of Nature (IUCN) to highlight the negative impacts of climate change on marine habitats, are found within the PPMA (Keating, 2010).

However, the port development is not only a threat to the PPMA. The prospective effects of petro-chemical pollution, shipping traffic, light pollution, dredging and blasting pose threats locally, but also to the biodiversity and ecosystem services linked to, and found within, the IWP UNESCO World Heritage site about 20km from the proposed harbor site. Because the port poses threat to South Africa's UNESCO World Heritage site, legal action has been taken against the South African government for "apparent failure to safeguard its first world heritage site" (Carnie, 2012). Ultimately, the development of a megaport in the sanctuary zone of an MPA is a threat not only to the legitimacy of Mozambican MPAs, but also to the sanctity of international conservation treaties and initiatives, raising significant questions about the obligations of signatory countries.

The development of a deep-water port is a relatively short-term investment that destroys any opportunity for future use of both the pristine coast and the coral reefs surrounding it. Upholding the area as a sanctuary leaves the opportunity for future use, exploration and even exploitation open. Not only are future use values protected, but also, maintaining the PPMR provides the opportunity for tourism to thrive in the area.

## 2 Research Purpose and Objectives

The purpose of this study was to explore the potential of a user-pay system of finance for MPAs. The study took place within the Ponta do Ouro Partial Marine Reserve (PPMR) and study site consisted of two main tourist areas: Ponta do Ouro, approximately 2kms from the South African border; and Ponta Malongane, 6kms north of Ponta do Ouro. Each site comprised a unique range of clientele and amenities, ranging from high-end resorts to a dilapidated but heavily used campsite. Specifically, this study had the following objectives:

- 1 To determine the willingness to pay of combined user groups and of individual user groups above the current PPMR usage fee for the MPA; and
- 2 To investigate the potential for the PPMR to increase revenues for conservation through the implementation of a user-fee for marine based activities.

Using contingent valuation (CV), a questionnaire was used to survey dive tourists at the two sites within the PPMR. The research collected data through interview surveys following the guidelines for CV usage as recommended by the National Oceanic and Atmospheric Administration's (NOAA) panel of economic experts (Arrow *et al.*, 1993).

The reefs within the PPMR are some of the highest latitude coral reefs in the world (Celliers and Schleyer, 2008) and draw marine based tourists to the area for a host of recreational activities including boating, deep sea fishing, dolphin swims, jet skiing, kite boarding, scuba diving, snorkelling, spearfishing, surfing, swimming and others. The dive sites located within the southern section of the Ponta do Ouro Partial Marine Reserve are some of Mozambique's most popular dive destinations (DNAC, 2010). In 2001 and 2002, an estimated 42 500 and 62 000 dives were executed in the area, respectively (Pereira, 2003).

By using CV to survey tourists within the PPMR, WTP can be determined for the local resource. From this, MPA management can structure fee schedules around such data to maximize revenues from user fees, allowing for the financial sustainability of the park and consequently, the protection of a pristine ecosystem.

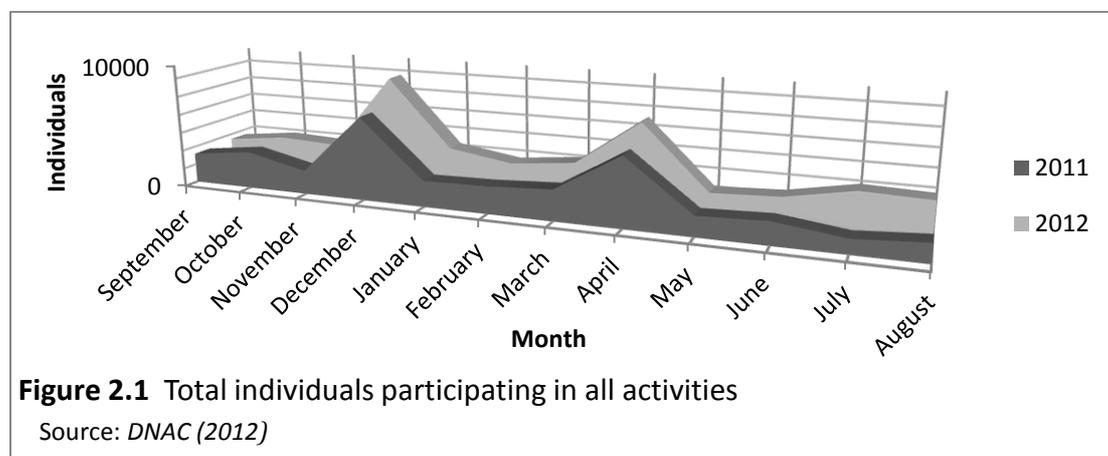
## 2.1 Study Site

This study took place in the two small coastal villages of Ponta do Ouro and Ponta Malongane, located 6km apart within the PPMR in the Matutuine district of Mozambique. Ponta do Ouro is the largest tourist town in the PPMR and has the busiest launch site. Ponta Malongane is a private campsite from which a single operation conducts scuba diving and dolphin swims. It is the next largest tourist area.

The targeted interview sites were eight diving centres, two dolphin swim centres and two fishing shops in the town of Ponta do Ouro and one activity centre for both dolphin swims and diving and one fishing shop in Ponta Malongane. Throughout the PPMR, regulations make it necessary to scuba dive and swim with dolphins only with licensed operators and not on private boats. However for fishing, there are both charter operations and private boats.

## 2.2 Sampling strategy and target population

This study consists of an empirical analysis of the WTP for marine based tourists. Marine based tourists are defined as individuals that engage in the commercial marine tourism activities of scuba diving, dolphin swims and fishing. This study uses both primary data, collected by means of a questionnaire, and secondary data, provided by PPMR and the National Directorate for Conservation Areas (Direcção Nacional de Áreas de Conservação, DNAC). Primary data collection occurred from November 2012 until April 2013, coinciding with the tourist seasons for the PPMR (Figure 2.1).



The target population for this study was tourists over the age of 18 who paid for their own travel to the area and engaged in scuba diving, fishing or swimming with dolphins while on holiday. Although there are other marine based tourism activities that occur within the PPMR, the target population has a point of contact with the PPMR, as each activity requires launching at a specific, monitored beach launch site. Therefore, the target population is the most cost effective population from which to collect a user fee. The PPMR has collected data on total individuals on launches of dive, dolphin and fishing boats since January 2011. Scuba divers made up more than half (67%) of all the launches within the PPMR, dolphin swims made up 20% and fishing boats, both chartered and personal, made up 13% of the launches. These data aided in the construction of a stratified sample of respondents and resulted in a representative population of the targeted user groups.

### **2.3 Data Collection**

Data consisted of responses to 120 usable questionnaires. The total number of collected surveys was constrained by project budget, the ability to engage tourists, and interviewer time. Administration of questionnaires was face-to-face at two tourist hotspots within the PPMR.

Depending on activity and location, the method of approach varied. Divers were most receptive, and therefore primarily surveyed, at their respective dive centres during dive planning in the evening or after returning from a dive. Likewise, dolphin tourist surveys took place at the dolphin activity centre after tourists returned from a dolphin swim. The best approach to fishermen was at the fishing shops and campsite in Ponta do Ouro, on the beach and at local restaurants.

Respondents were asked only questions that they qualified for, thus, there were thirty-two questions for scuba divers interested in sharks and twenty-two questions for non-divers. The questionnaire took between 8-12 minutes to complete, depending on whether the respondent was a diver, dolphin tourist or fisherman and could stretch on longer if the respondent had additional comments, questions or suggestions.

Data from questionnaires was captured directly into an Excel spreadsheet at the end of each survey day. Each questionnaire was dated and assigned a numerical code to keep track of the electronic entry and its corresponding hardcopy questionnaire. The data was checked for errors during entry and again at the end of the study. While there were very few entry errors, the numerical code assigned to each sample ensured an easy reference to entry errors.

## **2.4 Statistical Analysis**

Data was analysed in R using Probit and OLS regression (R Core Team, 2013). In both regression models, WTP was the dependent variable tested against independent variables. Independent variables were checked for correlations before analysis.

The linear model used the WTP bid based on the payment card as the dependent variable. Some studies presume the true WTP of the respondent falls within the range of the adjacent values on the card (Arin and Kramer, 2002), however, other studies use the actual value of the WTP bid to ensure conservative estimate of WTP figures (Thur, 2010). Thus, in keeping with the recommendations for conservative estimates in contingent valuation studies (Arrow *et al.*, 1993), this study used the stated WTP bid value in both models.

For the Probit analysis, if the respondent was willing (unwilling) to pay more than R20 as a daily user fee, the individual observation was denoted with a 1 (0). The value of R20 was chosen based on a clear break in the data at R20 with a significant gap on either side, providing a natural point of division.

Unlike the OLS model, where the estimated coefficient is the marginal effect of the variable, in the Probit model estimated coefficients show the multiplicative effect of a variable. Therefore, the estimated coefficients need to be transformed into marginal effects. This was done in R by calculating the average of the sample marginal effects as described by Fernihough (2011).

## **2.5 Sources of Bias and Study Limitations**

The payment card was chosen as the elicitation method for this study because of its ability to provide conservative estimates (Thur, 2010) which are deemed more reliable than overestimations (Arrow *et al.*, 1993). Additionally, the PC

generally has less protest-bids and a lower non-response rate than other methods such as dichotomous choice (DC) and open-ended (OE) (Reaves *et al.*, 1999). Steps against range and centring bias were taken by providing adequate upper values (Rowe *et al.*, 1996) and a visually pleasing format (Kerr, 2000).

Hypothetical bias may arise in different forms such as failure to consider budget constraints or lack of familiarity with the good in question. To address potential hypothetical bias based on the lack of familiarity, the valuation question centred on an access fee. An access fee is a tangible and realistic good compared to environmental quality or biodiversity itself, fulfilling the recommendation that the good being valued is specific and realistic to the respondent (Mitchell and Carson, 1989). Another source of hypothetical bias arises when the respondent fails to consider budget constraints. This survey reminded the respondent that they may have other things they wish to spend their money on while on holiday before being presented with a payment card.

While respondents generally had familiarity with the activities they were participating in, many did not know that they were in an MPA. Therefore, it was necessary to convey factual and unbiased information (Arrow *et al.*, 1993, Carson and Groves, 2007, Carson, 2012) about the MPA. Although the cognitive ability to absorb the consequences and significant details of the scenario were limited to the timeframe of the questionnaire, the questionnaire contained information that slowly built up a background of the MPA and the scenario. Thus by the time the valuation question was presented, the respondent had some time to understand and absorb the information before making a WTP decision (Arrow *et al.*, 1993).

Because sampling took place from November until April the following year, peak season and low seasons tourists were included in the study. Additionally, based on data from the MPA (DNAC, 2012), a stratified sample of user groups was taken to avoid sampling bias. By allocating a percentage of the total sample to each activity, a representative population was sampled.

Questions were carefully worded in an attempt to avoid bias (Carson *et al.*, 2001). In addition to reminding the respondent of budget constraints, questions that may lead to pro-social responses were formatted as forced choice (FC) whereby lessening the potential for pressure on the respondent to answer as

social norms may dictate. Respondents were encouraged to respond in terms of how they felt rather than what they thought the “right” answer should be.

Nonetheless, despite measures taken to avoid bias, sources of bias may still be present in this study. There were limitations to this study in terms of scope and budget, which opens the possibility that the sample data presents only a superficial understanding of the population that may not accurately reflect the population. The relative lack of comparable studies within the region also posed a challenge in verification of results; however, the study was compared to other studies at comparable sites internationally. Therefore, the results of this study must be viewed with caution and would benefit from a follow-up study or be viewed as a pilot to a larger scale study.

To test for accuracy of the results, resampling was done using the bootstrap R package (Canty and Ripley, 2012). Literally, a bootstrap is a loop at the back top of a boot that is used to pull it on. Although literally impossible, the phrase, “to pull oneself up by one’s bootstraps,” is a metaphor meaning one improves one’s position by using one’s own efforts and resources at hand. In statistics, bootstrapping is a resampling technique where repeated samples are drawn from the sample data which itself is used as a population (Efron and Tibshirani, 1993). In this study, a nonparametric bootstrap was used to avoid potential deficiencies that arise from assumptions about the form of the population and through deriving the sampling distribution explicitly (Fox, 2002). The original data was resampled as a data set the same size as the original data ( $n=120$ ) where the new sample values were taken from the original data with replacement. Thus, the while the original data sampled the population, the bootstrap data sampled the original data, or “the population is to the sample as the sample is to the bootstrap sample” (Fox, 2002:2).

## 3 Results

### 3.1 Sample Characteristics

Table 3.1 is a frequency chart of general socio-economic and demographic characteristics of the sample as a whole.

Respondents represented 11 countries on five continents. The majority of the 86% of African respondents were from South Africa (93%). The small proportion of respondents from Mozambique is consistent with the 4% of Mozambicans at another study site in Mozambique (Tibiriçá *et al.*, 2011) and the 2.8% Mozambicans at the same study site (Pereira and Schleyer, 2005). Of the respondents from South Africa (n=97), over half (55%) lived in Gauteng province, which is the most populated province and has the highest GDP in South Africa (*Census 2011: Census in Brief*, 2011). Correspondingly, 78% of the highest earning (>R81 000<sup>1</sup> per month after tax) South Africans resided in Gauteng. The majority of other South African respondents lived in coastal provinces, primarily KwaZulu Natal (32%).

Respondents represented seven language groups. All respondents who spoke Portuguese (6%) resided in Mozambique. Likewise, all respondents who spoke Afrikaans (27%) resided in South Africa.

Respondent age and gender show typical trends found in other similar recreational areas (Figure 3.1). This study had more male respondents than females. In other studies of marine protected areas, it is typical to have higher percentages of males (Arin and Kramer, 2002, Ahmad, 2009, Stithou and Scarpa, 2012). A slight majority of respondents between 21-30 years old indicates a younger trend than the mean age of 34,9 years found in a study at the same location in 2001-2002 (Pereira and Schleyer, 2005).

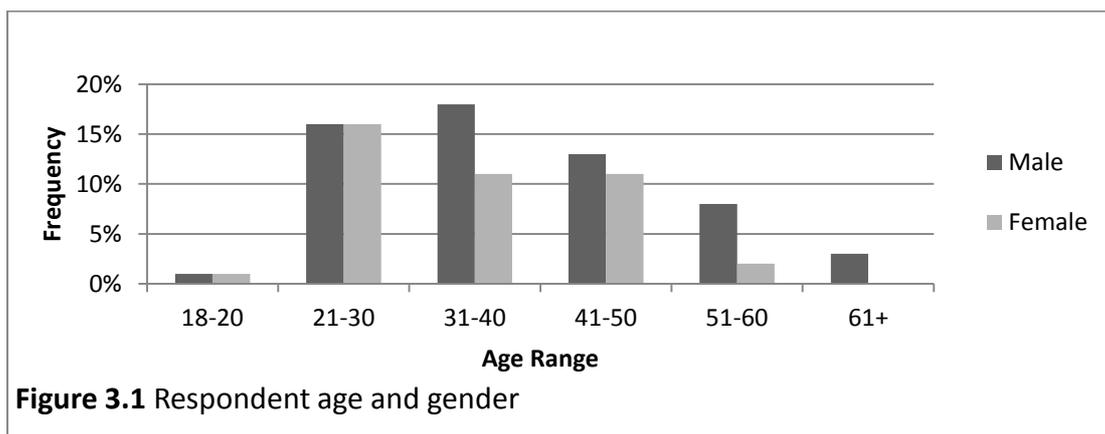
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<sup>1</sup> 1MZN = R0,35 (13 November, 2013)

**Table 3.1** Socio-economic and demographic characteristics

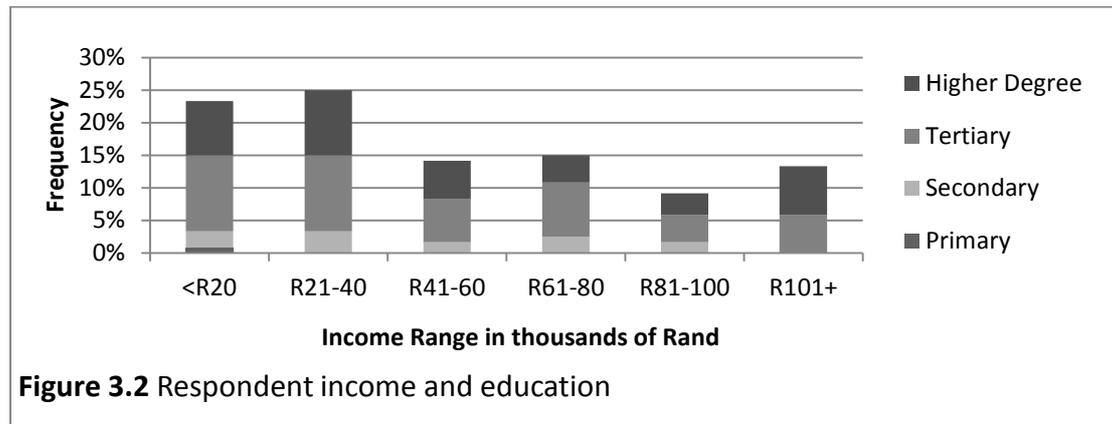
N=120

| Variable                            | n   | %          | Variable                | n  | %          | Variable                 | n   | %          |
|-------------------------------------|-----|------------|-------------------------|----|------------|--------------------------|-----|------------|
| <b><u>Continent</u></b>             |     |            | <b><u>Education</u></b> |    |            | <b><u>Race</u></b>       |     |            |
| Africa                              | 104 | <b>86%</b> | Primary                 | 1  | <b>1%</b>  | Black                    | 4   | <b>3%</b>  |
| Australia                           | 1   | <b>1%</b>  | Secondary               | 14 | <b>12%</b> | Coloured                 | 5   | <b>4%</b>  |
| Europe                              | 6   | <b>5%</b>  | Tertiary                | 58 | <b>48%</b> | Indian                   | 4   | <b>3%</b>  |
| Middle East                         | 1   | <b>1%</b>  | Higher Degree           | 47 | <b>39%</b> | White                    | 107 | <b>89%</b> |
| North America                       | 8   | <b>7%</b>  |                         |    |            |                          |     |            |
| <b><u>Language</u></b>              |     |            | <b><u>Gender</u></b>    |    |            | <b><u>Occupation</u></b> |     |            |
| Afrikaans                           | 32  | <b>27%</b> | Female                  | 48 | <b>40%</b> | Government               | 14  | <b>12%</b> |
| English                             | 77  | <b>64%</b> | Male                    | 72 | <b>60%</b> | Private sector           | 82  | <b>68%</b> |
| Portuguese                          | 7   | <b>6%</b>  |                         |    |            | Retired                  | 2   | <b>2%</b>  |
| Other                               | 4   | <b>3%</b>  |                         |    |            | Self-                    | 14  | <b>12%</b> |
|                                     |     |            |                         |    |            | Student                  | 5   | <b>4%</b>  |
| <b><u>Income (in thousands)</u></b> |     |            | <b><u>Age</u></b>       |    |            | Unemployed               |     |            |
| <R20                                | 28  | <b>23%</b> | 18-20                   | 2  | <b>2%</b>  | Other                    | 1   | <b>1%</b>  |
| R21-R40                             | 30  | <b>25%</b> | 21-30                   | 38 | <b>32%</b> |                          |     |            |
| R41-R60                             | 17  | <b>14%</b> | 31-40                   | 35 | <b>29%</b> |                          |     |            |
| R61-R80                             | 18  | <b>15%</b> | 41-50                   | 29 | <b>24%</b> |                          |     |            |
| R81-R100                            | 11  | <b>9%</b>  | 51-60                   | 12 | <b>10%</b> |                          |     |            |
| >R100                               | 16  | <b>11%</b> | 61+                     | 4  | <b>3%</b>  |                          |     |            |

**Figure 3.1** Respondent age and gender

The majority of respondents indicated a high level of education (88% with a tertiary education). This result is similar to that found at another beach destination in Mozambique where 84% of respondents had at least one university degree (Tibiriçá *et al.*, 2011). Of those respondents with a higher degree, 72% earned less than R60 000 a month after tax while all of the

respondents who earned over R100 000 per month after tax had at least one university degree (Figure 3.2).



### 3.1.1 Current and Previous Visits to Site

Respondents reported the number of previous visits and length of stay in days for their current visit (Table 3.2). With some respondents reporting visiting up to two hundred times, there is a large difference between the median and mean of previous visits; however, 36% of respondents were visiting for the first time.

The majority of foreign respondents (88%) and one-third of Mozambican respondents were visiting for the first time. In contrast, South Africans were more likely to be return visitors with 27% visiting for the first time. Nearly a quarter of South African respondents had previously visited more than ten times, suggesting a loyal group of repeat holidaymakers.

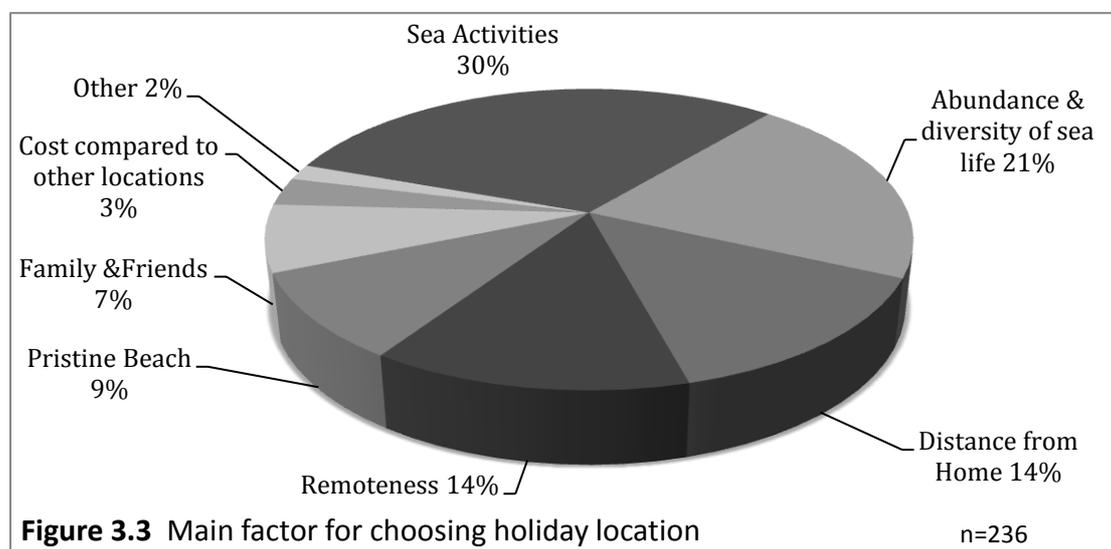
**Table 3.2** Respondent previous visits and length of current stay

|                        | Mean | Median | Mode | SD    | Min | Max |
|------------------------|------|--------|------|-------|-----|-----|
| <b>Previous visits</b> | 10   | 2      | 0    | 24,95 | 0   | 200 |
| <b>Length of Stay</b>  | 7    | 5      | 4    | 5,59  | 1   | 30  |

Corresponding to the tendency of increased visitor numbers over long weekends and holidays (DNAC, 2012), 45% of respondents reported their current visit length as 2-4 days. Nearly one-third of respondents stayed from five days to one week, with the mean length of stay seven days. However, respondents participating in dolphin swims tended to stay shorter periods, with half reporting their current visit as between 2-4 days. The most common dolphin swim packages are one-day excursions followed by three-day excursions

(Withers 2012, pers.comm.), which may explain the shorter stay for dolphin swim tourists. On the other hand, 47% of all fishermen stayed between four days to one week and 24% stayed between ten days and two weeks.

The questionnaire required respondents to provide their top two reasons for choosing the location as a holiday destination (Figure 3.3). There was little difference in response between user groups and just over half of all respondents cited natural attractions (sea activities and sea life) as the main drawcard of the location for a holiday. The low instance of choosing the 'other' category indicates that the options were well represented. Respondents that chose 'other' were asked to describe what mainly drew them to the area. Answers included turtle walks, off-road driving and drinking.



### 3.1.2 Environmental Awareness

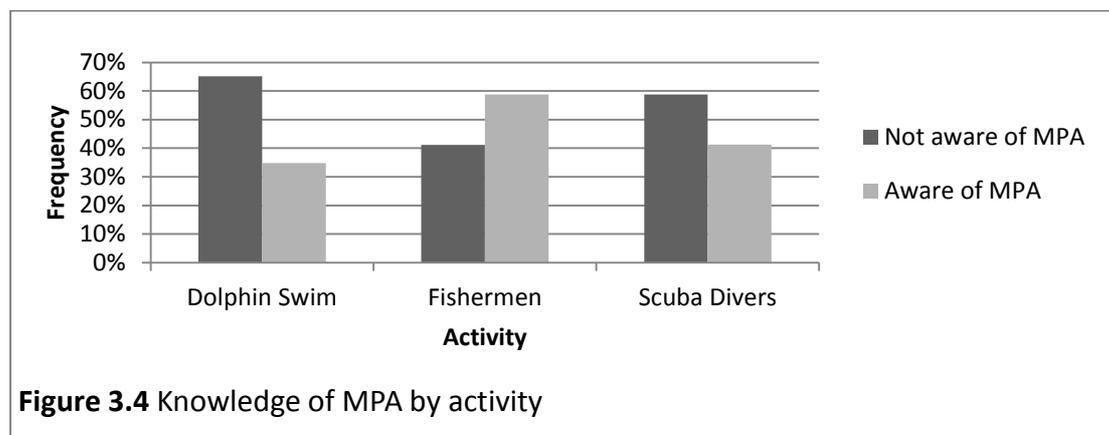
By self-evaluation, over half of respondents (54%) considered themselves to be very environmentally aware. Respondents also provided information about their awareness of MPA status as well as their personal consumer choices, which added further background to individual environmental awareness.

Individuals with at least one degree were more likely to consider themselves environmentally aware. This is consistent with other studies that reported on environmental awareness. In a study of user fees in the Philippines, Arin and Kramer (2002) discussed the expectation that higher education may lead to higher environmental awareness which was confirmed in a study on WTP for dusky kob restocking where results suggested a positive relationship between

higher levels of general education and environmental awareness (Palmer and Snowball, 2009).

Fishermen were most likely to consider themselves very or extremely environmentally aware (88%), followed by scuba divers (85%) and dolphin swim tourists (65%). Because a fisherman or diver must invest in equipment and education, he or she may be more likely to take an interest in the environment, particularly the ocean. This interest may lead to a higher level of environmental awareness. In contrast, dolphin swims are not a specialized activity compared to fishing and scuba diving; even individuals that cannot swim are able to participate in the activity (with a lifejacket). Thus using the same logic, the entry-level nature of dolphin swims may attract individuals having their first nature experience and who therefore consider themselves to be less environmentally aware.

In total, 42% of respondents were aware of being in an MPA. Amongst fishermen, 59% were aware of being in an MPA, the highest awareness level of the three activity groups (Figure 3.4).

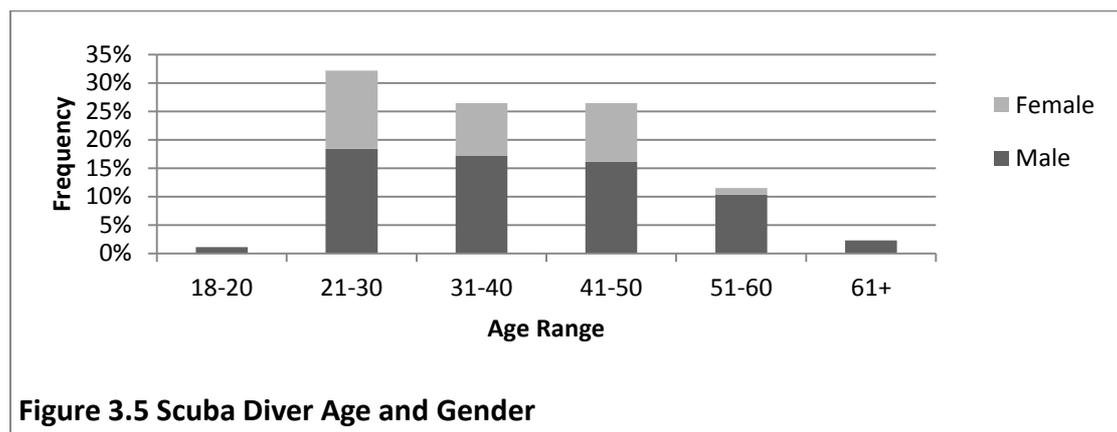


As consumptive users, fishermen face more rules and regulations, and often more personal responsibility, when compared to the other two activity groups. Fishermen are the only group allowed to operate from a private boat within the MPA whereas both scuba diving and dolphin swims are restricted to charter operations. Therefore, while the rules and regulations regarding these non-consumptive activities are the responsibility of the operator to abide by and pass on to the individual as necessary, the fisherman must have personal knowledge of the MPA. As non-consumptive users, less than half of scuba divers and dolphin swim tourists were aware of being in an MPA, with awareness levels at 41% and

35% respectively. Amongst scuba divers, this low level of awareness contrasted with the high percentage of individuals who considered themselves very or extremely environmentally aware as well as with the high knowledge (78%) of the current diver tax.

### 3.1.3 Scuba Divers

Of 87 scuba divers, 92% of respondents' primary activity on holiday was to dive. There was a shift in male female ratio and age distribution (Figure 3.5) compared to the larger sample (Figure 3.1). The higher percentage of males and the narrower female age range is consistent with a previous study of scuba divers in the same area (Pereira and Schleyer, 2005). This shift is also consistent with Professional Association of Diving Instructors (PADI) statistics. Worldwide, 66% of certified PADI divers are male (PADI, 2012). Overall, other demographics did not show any significant shifts from the larger sample.

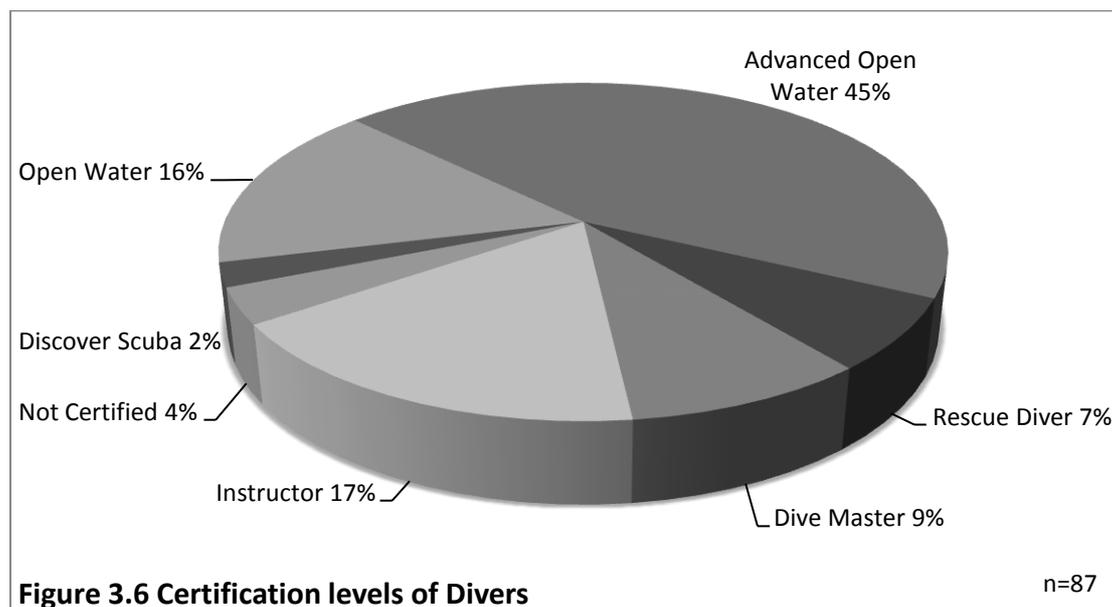


**Figure 3.5 Scuba Diver Age and Gender**

Figure 4.7 is a visual representation of diver certification levels, increasing in ability from “not certified” to “instructor”. The typical diver was a male, advanced diver with an average of 285 dives. Other studies in Mozambique have found similar results, with 40% of advanced divers at a site further north in Mozambique (Tibiriçá *et al.*, 2011) and 50% advanced divers at the same site (Pereira and Schleyer, 2005). While there were nearly equal proportions of respondents certified as open water divers and instructors, the number of divers with professional certifications, that is instructors and dive masters, was 26% of divers. This falls between what the previous Mozambique studies have found, where Tofo Beach had 18% professional divers (Tibiriçá *et al.*, 2011) and Ponta do Ouro had 32% professional divers (Pereira and Schleyer, 2005). The

experience levels in the area reflect both the specialist diving opportunity as well as the challenging conditions.

The range of total logged dives was from 0-3000 with a median of 80 and mode of 100. Males averaged higher logged dives (365) than females (133). The average number of dives were much higher than those found by Pereira and Schleyer (2005), especially for females. The 2005 study found an average of 220 logged dives for all divers, 287 for males and only 77 for females. That study also reported no female dive instructors while this study found one-third of instructors were female. As an instructor is required to have at least one hundred logged dives before certification, an increase in the number of female instructors would logically increase the average number of dives for females. While these data on may suggest an increase of females in the diving industry from 2005 to present, PADI data does not support this idea as female divers have consistently remained at 33% to 34% of all certifications since 2005 (PADI, 2012).



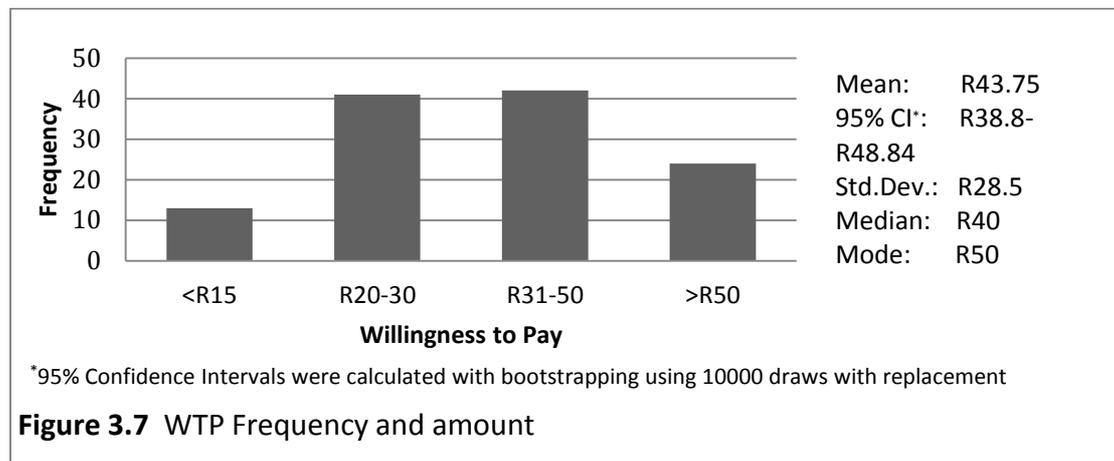
### 3.1.3.1 SCUBA diver tax

Although 78% of divers were aware of the dive tax, only one-third of divers were able to state the correct amount of the current dive tax. At the study site, the dive tax is included in the price of the dive. Of the one-third of divers who knew the price of the dive tax, most were from one dive operation that listed the

dive tax on the dive planning board. All divers surveyed at that operation were aware of the dive tax and knew the current charge.

### 3.2 Willingness to Pay

All respondents answered positively to the primer question “Do you think it is reasonable for users of a protected area to be charged a user fee?”. However, some respondents only agreed with the statement in theory (n=33) and raised concerns about user fees. Concerns included corruption and misuse of funds (46%), the payment vehicle or rate (27%), adequate management (21%) and foreign involvement (5%). The frequency and amount respondents were WTP for a usage fee is reported in Figure 3.7.



Throughout the design and application of the survey instrument, efforts were made to ensure a conservative estimate of WTP. The mean WTP of R43.75 is lower than the average found in a sample of thirty-three studies of per day usage fees at MPAs in the Caribbean, Gulf of Mexico and Southeast Asia (R60.8). This suggests that the mean WTP value is a conservative and accurate estimate of WTP for all user groups within the PPMR.

Foreign respondents had a higher mean WTP (R62.5) than African respondents (R32.7). Within Africa, South Africans had a higher mean WTP (R41.4) than Mozambicans (R36.7). While the mean WTP appears higher for foreign respondents, the mean percentage of monthly income that South Africans were willing to pay was slightly higher (0,16%) than foreign respondents (0,14%). Mozambicans were WTP an average of 0,13% of their monthly income.

Scuba divers had the highest mean WTP of the three activity groups at R45.2, which is also higher than the total sample mean. Both dolphin swim tourists and fishermen had a mean WTP below the total sample mean at R41.7 and R39.7, respectively. Respondents that viewed themselves as very or extremely environmentally aware had a higher mean WTP (R45.8) than those who considered themselves moderately or slightly environmentally aware (R29.9).

Mean WTP varied amongst activity groups depending on the respondent's awareness of being in an MPA but the effect varied and did not reach statistical significance. Nonetheless, it is of interest to note for future studies. Although fishermen were most aware of being in an MPA, the one-third that was not aware had a higher mean WTP (R46.4) than those who were aware (R35). The opposite was true with the other two activity groups. However, this difference was less obvious amongst scuba divers, with mean WTP of R47.6 of aware respondents and R43.5 of unaware respondents, than amongst dolphin swim tourists, with a mean WTP of R50.6 for those aware and R37 for those unaware.

Mean WTP decreased slightly with length of stay. The valuation question asked for WTP per day so the longer the visit, the longer the total user fee amount would be. Respondents staying between 2-4 days had a mean WTP of R46 while those staying one week had a mean WTP of R37. A similar trend arose in mean WTP of respondents who were visiting for the first time (R46.8) and those who had visited over ten times prior (R38.2).

Based on the data on total individuals on launches provided by the PPMR (Figure 2.1), it is possible to calculate an estimate of what implementing a user fee, based on the mean WTP of this study (R43.75), would bring in terms of revenues to the PPMR in a year. Over the years 2011 and 2012, the PPMR reported an average of approximately 36 800 total individuals on launches per year, which if paying a user fee of R43.75, would bring in R1 654 122 per year. However, this estimate must be viewed with caution. On one hand, marine based tourism operators have argued that the data provided by the PPMR may be an overestimation of total tourists to the area. During this study, some operators expressed concern regarding double counting of individuals on launches; activity guides are virtually indistinguishable from clients and are easily double or even triple counted at the launch site. Thus, to account for possible over counting, one

passenger was subtracted from the average passengers per launch data from the PPMR. The total individuals on launches per year then averaged 33 434. If these individuals paid R43.75 per day, the PPMR would see revenues of R1 462 738 per year. On the other hand, the PPMR data is likely an underestimation of total marine based tourists. The PPMR data is based on data primarily collected from Ponta do Ouro, the busiest launch site in the PPMR. PPMR management has little data from Ponta Malongane, the second busiest launch, which could account for up to double the launches of Ponta do Ouro (Wagner, per.comm). Due to limited resources, representatives of the PPMR are not able to monitor every launch site within the park and therefore cannot maintain an accurate count of marine based tourists. A 2001-2002 study of dives in southern Mozambique, which included both Ponta do Ouro and Ponta Malongane, estimated an average of 52 250 dives per year (Pereira and Schleyer, 2005), which suggests that the PPMR data on individuals on launches, at least for scuba diving, is a significant underestimate. Doubling the PPMR data results to 75 617 individuals, bringing revenues to the PPMR of approximately R3 308 244.

### **3.3 Econometric Analysis & Discussion**

Two regression models were used in the econometric analysis of the data, a linear model and a Probit model. This section is divided into subsections that detail the form and output of each model followed by a discussion and comparison of the two outputs in relation to this study as well as others. Details of the methods used as well as reasoning behind the determination of independent variables was discussed in both the literature review and methods chapters and will only be briefly touched on again in this section. Both the linear and the Probit models were multivariate models applied to the data to explain the causal effect of select independent variables (Table 3.3) on an individual's WTP bid or WTP more than R20, respectively. Variables were tested for multi-collinearity and no significant relationships were found.

*A priori* expectations for both models were as follows: an increase age, income, those with a university education, environmental awareness and knowledge of being in an MPA were expected to positively impact on WTP; residency in an African country was expected to negatively impact on WTP; as a respondent's

number of days visiting the site or previous visits to the site increased, it was expected that WTP would fall. *A priori* expectations for the influence of gender or activity on WTP are not possible.

**Table 3.3** Independent variables

|               |  |
|---------------|--|
| Age           | Age in years   |
| Income        | Monthly income: >R30 000 = 1, <R30 000 = 0                                 |
| African       | Home country: Resident of African country = 1, non-African countries = 0   |
| University    | Education: University degree or higher = 1, no university = 0              |
| Male          | Gender: male = 1; female = 0   |
| ActivitySCUBA | Scuba diver = 1; fisherman or dolphin swim = 0                             |
| ActivityFISH  | Fisherman = 1; scuba diver or dolphin swim = 0                             |
| MPA           | Awareness of being in MPA: aware = 1; unaware = 0                          |
| Enviro        | Environmental awareness: 1 = slight; 2 = moderate; 3 = very; 4 = extremely |
| Days          | Length of current stay in days   |
| Prior         | Number of prior visits, 0 = first visit                                    |

### 3.3.1 Linear Model

The linear regression used the least squares method. To ensure a conservative estimate, the actual bid WTP value was used as the dependent variable. The model assumes that the WTP value is linear but inexact taking the form of

$$\begin{aligned}
 WTP = & \beta_0 + \beta_1 Age_i + \beta_2 Income_i + \beta_3 African_i + \beta_4 University_i \\
 & + \beta_5 Male_i + \beta_6 Activity_i + \beta_7 MPA_i + \beta_8 Enviro_i + \beta_9 Days_i \\
 & + \beta_{10} Prior_i + u_i
 \end{aligned}$$

Table 3.4 shows the output of this model, illustrating the effects of the various independent variables on respondents actual WTP. The adjusted r-squared value shows that the model can account for 12% of variation in WTP. All *a priori* expectations were met in the OLS model.

In the OLS model, an income of over R30 000 per month after tax was significant as a determinant of WTP at the 5% level. An income of over R30 000 increased the WTP amount by R13.60, *ceteris paribus*. Environmental awareness also had a positive impact on WTP ( $p < 0.10$ ). Environmental awareness increased WTP amount by R6.70. Being an African resident (as compared to a resident of non-African countries) was a significant negative factor in determining WTP ( $p < 0.05$ ), which decreased the WTP amount by R17.50 holding all other variables in the model constant.

**Table 3.4** Linear regression model coefficients

|               | Estimate | Std. Error | t value | Pr(> t )  |
|---------------|----------|------------|---------|-----------|
| (Intercept)   | 23.9423  | 17.4849    | 1.369   | 0.1737    |
| Age           | 0.2432   | 0.2385     | 1.020   | 0.3101    |
| Income        | 13.5941  | 5.5792     | 2.437   | 0.0165 ** |
| African       | -17.4864 | 7.4815     | -2.337  | 0.0213 ** |
| University    | 5.1876   | 7.8389     | 0.662   | 0.5095    |
| Male          | -3.9428  | 5.2702     | -0.748  | 0.4560    |
| ActivityFISH  | -1.2122  | 9.4754     | -0.128  | 0.8984    |
| ActivitySCUBA | 0.4855   | 6.7737     | 0.072   | 0.9430    |
| MPA           | 4.0083   | 5.1384     | 0.780   | 0.4371    |
| Enviro        | 6.6636   | 3.5302     | 1.888   | 0.0618 *  |
| Days          | -0.6519  | 0.4636     | -1.406  | 0.1626    |
| Prior         | -0.1353  | 0.1039     | -1.303  | 0.1955    |

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Signif. codes: '\*\*\*' 0.05 '\*\*' 0.1 '\*'

Residual standard error: 26.66 on 107 degrees of freedom

Multiple R-squared: 0.2127, Adjusted R-squared: 0.1244

F-statistic: 2.409 on 12 and 107 DF, p-value: 0.008386

### 3.3.2 Probit Model

When the dependent variable is dichotomous, that is when there are two mutually exclusive and exhaustive categories, a Probit model is appropriate to avoid common problems with linear regression (Noreen, 1988). This model takes similar form as the linear model discussed in the above section but instead of the actual WTP bid made by the respondent, the dependent variable was binary. For the binary choice in this model, the sample was divided into individuals willing to pay more than R20 (1) and individuals willing to pay R20 or less (0). The model takes the form

$$\begin{aligned}
 WTP_i^* = & \beta_0 + \beta_1 Age_i + \beta_2 Income_i + \beta_3 African_i + \beta_4 University_i \\
 & + \beta_5 Male_i + \beta_6 Activity_i + \beta_7 MPA_i + \beta_8 Enviro_i + \beta_9 Days_i \\
 & + \beta_{10} Prior_i + u_i
 \end{aligned}$$

Table 3.5 shows the effects of the independent variables on individual WTP of over R20. The pseudo-R<sup>2</sup> was 0.12 indicating a 12% increase in the log-likelihood function (Hoetker, 2007) as derived and interpreted by McFadden (1974). *A priori* expectations were met and consistent with the OLS model except for education, which was negative.

**Table 3.5** Probit model coefficients

|               | Estimate  | Std.Error | t value | Pr(> z )  |
|---------------|-----------|-----------|---------|-----------|
| (Intercept)   | 1.293834  | 1.039696  | 1.244   | 0.2133    |
| Age           | 0.010081  | 0.013588  | 0.742   | 0.4581    |
| Income        | 0.307589  | 0.305153  | 1.008   | 0.3135    |
| African       | -1.050354 | 0.588362  | -1.785  | 0.0742 *  |
| University    | -0.228573 | 0.403046  | -0.567  | 0.5706    |
| Male          | -0.178119 | 0.290515  | -0.613  | 0.5398    |
| ActivityFISH  | -1.321587 | 0.577285  | -2.289  | 0.0221 ** |
| ActivitySCUBA | -0.933033 | 0.457844  | -2.038  | 0.0416 ** |
| MPA           | 0.267810  | 0.289197  | 0.926   | 0.3544    |
| Enviro        | 0.329534  | 0.191690  | 1.719   | 0.0856 *  |
| Days          | -0.004791 | 0.025250  | -0.190  | 0.8495    |
| Prior         | -0.003875 | 0.005165  | -0.750  | 0.4531    |

---  
Signif. codes: '\*\*\*' 0.05 '\*\*' 0.1 '\*'  
(Dispersion parameter for binomial family taken to be 1)

McFadden Pseudo R<sup>2</sup>: 0.12020691  
Null deviance: 130.39 on 119 degrees of freedom  
Residual deviance: 114.71 on 107 degrees of freedom

Four variables were statistically significant in the Probit model. The marginal effect of an African resident (as compared to a resident of non-African countries) decreased the probability of being WTP more than R20 by 28% when other variables are held at sample mean. Respondents whose main activity was fishing, rather than scuba diving or dolphin swims, had a 36% lower probability of being WTP more than R20 (significant at the 5% level) Similarly, the probability of being WTP more than R20 fell by 25% if respondents were in the MPA primarily for scuba diving, as compared to those who were there for fishing or dolphin swims (significant at the 5% level). Finally, for the four levels of environmental awareness, each increase in self-ranking of environmental awareness level (for example from slightly to moderately) would increase the probability of being WTP more than R20 by 8%.

### 3.4 Discussion

Both models present results that help to understand the variables that influence WTP in this study. The Probit model analysed how the independent

variables influenced the probability of respondents being WTP more than R20, while the linear model analysed the effects of the independent variables on the amount respondents were WTP.

Construct validity tests whether the results of a CV study are consistent with economic theory (Carson *et al.*, 2001). In this study, where *a priori* expectations were met in all but one case, the test of construct validity was met. The result of income positively correlating with respondent WTP adds to the reliability of a study (Whittington and Pagiola, 2012), showing that the results of this study can be viewed as meeting tests of both validity and reliability. In the OLS model, income had a positive impact on WTP significant at the 5% level. Although income was not statistically significant in the Probit model, its positive influence on WTP in both models is consistent with demand theory that a higher income would lead to a higher WTP. This positive relationship with WTP also suggests that the respondents considered their budget when giving their bid value and that they took the hypothetical situation of the user fee seriously.

In the Probit model, African residency had a negative effect on WTP ( $p < 0.10$ ) suggesting that foreign visitors were more likely to be willing to pay more than R20. Likewise, in the linear model, African residency had a negative impact on the amount respondents were WTP ( $p < 0.05$ ), suggesting that respondents from African countries had a lower WTP than respondents from overseas. The perception of an MPA with regards to effectiveness and regulation may vary between foreign and local respondents accounting for the variation in WTP. A variation in WTP between foreigners and residents is common. In a study of access fees at Pulau Payar Marine Park, Malaysia, foreigners' WTP was more than twice residents' WTP (Yeo, 2005). However, in a study of entrance fees to a national park in Costa Rica, residents' WTP was significantly higher than foreigners' WTP. The authors suggest that this result may be due to the high level of pride that Costa Ricans have for their parks and natural resources but they suspect rather that the result may be due to cultural-strategic bias (Shultz *et al.*, 1998).

A positive relationship between environmental awareness and WTP in both models ( $p < 0.10$ ) suggests that increased environmental awareness may increase WTP. These results also meet the test for construct validity as WTP is generally

higher amongst those who care for the environment (Carson *et al.*, 2001). Similarly, a study in Mexico found that providing information to respondents about the marine environment tended to lead to a higher WTP for a coral fund to raise revenues for coral protection in the area (Casey, 2006) which suggests that positively influencing environmental awareness is potentially a way to increase WTP within a specific park.

Activity influenced WTP in the Probit model; both scuba divers and fishermen were less likely to be willing to pay more than R20 ( $p < 0.05$ ) than dolphin swim tourists, holding other variables constant. Both scuba diving and fishing involve an investment in time and equipment and currently already have various fees associated with them in the PPMR such as fishing permits and diver tax which may cause them to be less likely to be willing to contribute more than R20 on top of other expenses. Dolphin swims require neither prior investment in learning skills nor acquiring of equipment and have no additional fees on top of the cost of the trip itself.

Knowledge of being in an MPA had a positive impact on WTP although it was not a statistically significant result. While this question in the survey was straightforward and was carefully worded to avoid bias, additional questions about specific knowledge of the MPA may have strengthened the parameters by which to measure general knowledge of the MPA. In this study, only about half of the sample knew they were in an MPA, by increasing information available to visitors, their value of the resource, and thus WTP, would increase, as this result has shown.

The negative impact of the respondent's days of current visit and prior visits on WTP suggest familiarity with or frequency of use of the site leads to decreasing WTP. This result is consistent with diminishing marginal utility. It was also congruous with mean WTP values, which decreased slightly with length of stay. Respondents staying a week or more had a lower WTP than those staying only 2-4 days. Similarly, respondents visiting for the first time were WTP R8.6 more than those who had visited over ten times prior.

## 4 Conclusion

This study had two objectives based on the concepts and methods of contingent valuation, willingness to pay and user fees. Primarily, the study aimed to determine the willingness to pay of the combined user groups of dolphin swim tourists, fishermen and scuba divers. Based on a stratified sample of these user groups, the mean WTP of all user groups was R43.75. Individual user groups were also of interest and there was some variation around the total mean WTP. Scuba divers were above the total mean WTP with a mean WTP of R45.2. Both dolphin tourists and fishermen had mean WTP below the total mean at R41.7 and R39.7 respectively. The mean WTP of user groups contrasted with the results of the Probit model, which showed that dolphin swim tourists were more likely than other user groups to be willing to pay more than R20.

The first objective of this study also included a more specific focus on scuba divers. Currently, scuba divers must pay a R20 diver tax. The proceeds of the diver tax do not go to the PPMR. All dive centres include the tax in the price of dives and divers are not issued a receipt of payment for the tax. Although 78% of divers were aware of the tax, few knew how much the dive tax was, which suggests that perhaps the percentage of individuals aware of the tax was in fact lower. The majority of divers who knew of the tax and its actual amount were from a single dive centre that posts a sign on its dive planning board, notifying divers of the tax. Divers who were unaware of the dive tax generally had a higher mean WTP than divers that were aware of the tax, which confirms a general interest in paying for conservation.

The second objective of this study was to investigate the potential for the PPMR to increase revenues through the implementation of a user-fee for marine based activities. The results of this study suggest that a user fee for scuba divers, dolphin swim tourists and fishermen could be a source of revenues for the PPMR. An estimate of R1.65 million in revenues from a user fee must be regarded with caution, as an accurate count of users at any launch site within the PPMR does not exist. While counts of how many divers, dolphin swim tourists or fishermen are on each boat when it launches, one participant may be counted multiple

times if participating in more than one launch for their activity or if participating in multiple activities over their holiday period. More likely is that R1.65 million is an underestimation of total marine based tourism participants because PPMR representatives are not present at every launch site within the park.

#### **4.1 Summary and Recommendations**

The majority of the stratified sample of 120 tourists to the PPMR were South Africans with a high level of education. 36% of respondents were visiting the PPMR for the first time, but these were mostly foreigners. One-third of Mozambicans and 27% of South Africans were visiting the PPMR for the first time. South Africans were found to be relatively loyal visitors, with one-fourth visiting the PPMR more than ten times prior to their current visit. Nearly half (45%) of respondents were visiting for two to four days and one-third of visitors were staying in the PPMR for five to seven days. Fishermen tended to stay the longest of the three user groups. Respondents were drawn to the area for the sea life and sea activities offered in the PPMR. Overall, there was a low level of awareness amongst respondents of being in an MPA.

Scuba divers were mostly advanced certified (45%) but there was also a high level of professional divers (divemasters and instructors) diving in the PPMR (26%). Although all divers currently pay a divers tax, only one-third were aware of the amount of the tax.

The mean willingness to pay for a per day user fee was R43.75. This is lower than an international average of thirty-three MPA per day user fee of R60.8. Scuba divers had the highest mean WTP (R45.2), followed by dolphin swim tourists (R41.7) and fishermen (39.7). However, in the statistical analysis of the data, dolphin swim tourists were more likely to be willing to pay a higher fee. Foreigners statistically were willing to pay more for a user fee, and had a mean WTP of R62.5.

A per day usage fee of R45 – R50 is recommended for fishing, dolphin swims and scuba diving in the PPMR. It is important that when implementing a user fee within the PPMR, PPMR management discuss terms with operators to ensure that an efficient and agreeable method of collecting the user fee is established.

Failure to engage these stakeholders may impede the successful implementation of a user fee.

**Use discriminatory pricing scheme.** This study found that foreign visitors to the PPMR had statistically significant higher WTP than tourists from Mozambique and neighbouring countries. Therefore, the PPMR may benefit from a discriminatory payment scheme based whether user is an African or non-African resident. This may be easiest to enforce and most effective at the upmarket luxury tourism areas of Ponta Mamoli and Ponta Chemucane where launch sites are managed by a single exclusive entity where guests stay, however, further study would be advisable in these areas. Given the large volume of tourists in Ponta do Ouro and Ponta Malongane, the enforcement of discriminatory payment schemes may prove too challenging where the costs of the discriminatory pricing scheme may outweigh the benefits. Distinguishing country of resident would likely fall to the marine based tourism operator, which would not be embraced by the operators.

**Offer multi-day and annual passes.** This study found that South Africans, as the majority group of tourists to the PPMR, are loyal, repeat users of the area. Nearly three-fourths of South Africans were repeat visitors. Two-thirds of Mozambicans were repeat visitors. On the other hand, the vast majority of foreigners were visiting for the first time. Correspondingly, days of current visit and number of prior visits had a negative impact on WTP. These results have two implications. First, it is unlikely that loyal, repeat visitors will actively support a single option per day usage fee. Multi-day or annual passes at decreased rates will likely be met with enthusiasm from this loyal group, especially if marketed effectively. Second, these results also support to a discriminatory payment scheme for African and non-African residents as foreigners are not only likely to have a higher WTP, but they are also less likely to be repeat visitors, also increasing their WTP.

**Increase environmental awareness.** Environmental awareness was also a statistically significant factor to WTP in both models. By making attempts to

increase marine tourists environmental awareness through signs, education centres and knowledgeable park rangers, there is potential to increase the amount charged as a user fee in the future. Simple signage and business participation is effective in passing along information within the PPMR, as seen with the one dive centre that had notices up about the dive tax and all divers there knew about the dive tax. Furthermore, because all user groups must use the launch site, the PPMR could run an effective campaign of providing information to user groups by capitalising on the captive audience at the launch site.

#### **Improve signage and information relating to MPA.**

In this study, only about half of the sample knew they were in an MPA. Increasing and improving information available to visitors would increase their value for the resource, and increase WTP. Activity centres informing user groups about the MPA could act as a passive approach to increasing awareness. The presence of park rangers at the launch site, an educational centre that highlights MPAs and research within it, as well as educational talks for user groups could result in more active engagement of user groups.

**Evaluate and consolidate current fee system.** Currently marine based tourists do not pay a usage fee for the PPMR however at both Ponta Malongane and Ponta do Ouro the entrance to the respective launch sites are monitored by private companies that collect an entrance fee from all vehicles entering the area. Additionally, there is the dive tax for scuba divers and various launching permits, crew taxes and fishing permits required for fishermen. For the user fee to be effective and sustainable, any additional fees must be unambiguous, official and transparent.

## **4.2 Future Study**

The Ponta do Ouro and Ponta Malongone areas will continue to grow as will tourism throughout the PPMR, nonetheless, PPMR management must use caution when implementing user fees to the area and policy decisions should be based on additional study of the area. Specific to the PPMR, a study that includes

other tourist areas such as Ponta Mamoli and Ponta Chemucane would include WTP bids of high-end tourism locations may provide insights into the potential for discriminatory pricing at luxury resorts. A more holistic study that includes local community input, specifically with regards to pro-poor tourism and fishing rights, would further enrich the understanding of the area. Applying other revealed preference models, such as a choice experiment would benefit as this study can be used as a comparison. Finally, recreating this study and comparing the results would add legitimacy to user fee structures.

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