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The role of divers' experience for their valuation of diving site conservation: The case of Sipadan, Borneo.

Diana Emang[a,b,*], Thomas Hedemark Lundhede[c,d,e], Bo Jellesmark Thorsen[c,d]

[a] Faculty of Forestry, Universiti Putra Malaysia, 43400, UPM Serdang, Selangor, Malaysia
[b] Laboratory of Sustainable Bioresource Management, Institute of Tropical Forestry and Forest Products, Universiti Putra Malaysia, 43400, UPM Serdang, Selangor, Malaysia
[c] Department of Food and Resource Economics, Faculty of Science, University of Copenhagen, Rolighedsvej 23, 1958, Frederiksberg C, Denmark
[d] Centre for Macroecology, Evolution and Climate, University of Copenhagen, Rolighedsvej 23, 1958, Frederiksberg C, Denmark
[e] Centre for Environmental Economics and Policy in Africa, Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, South Africa

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ABSTRACT:

Coral reefs ecosystems fulfil important ecological functions, but risk degradation not only from climate change but also from increasing demands for the socioeconomic functions they also offer to local communities and international tourism. Coral reef diving tourism is a source of environmental pressure but at the same time represents a source of conservation funding, balancing these pressures. Tailoring the divers' experience to extract increased payments requires insights into the role of diving experiences for willingness to pay (WTP) for the access to dive in the waters surrounding Sipadan. We developed a choice experiment and applied it to a sample of 507 recreational scuba divers at the diving site Sipadan, Borneo in Malaysia. We investigated the role of divers' most recent and overall diving experiences for their willingness to pay additional diving fees for features related to the conservation status and the diving operations. Results show that a majority of divers prefer lower litter pollution levels in the water and lower density of divers in each dive. When comparing the less experienced divers with the more experienced divers, the latter group express significant preferences over more of the marine biodiversity and recreational attributes of the diving experience. The less experienced group only tended to express significant preferences for fewer of these attributes. We also note that less experienced divers are more likely to have felt crowded and less likely to have seen pelagic species, suggesting, which may, in turn, explain their lower observed WTP.

Management implications

- Experienced divers appreciate more aspects of the diving experience and are willing to pay considerably more for diving access than less experienced divers. This economic evidence is beneficial for Sabah Parks in developing conservation policies for Sipadan.
- Less experienced divers are more likely to have experienced reduced quality in their recent dives. Therefore, diving operators might benefit from investing more in enhancing the diving quality experience for new divers, in turn increasing their likelihood of returning and their WTP for access.

1. Introduction

1.1. Balancing conservation with high value recreational use of sensitive marine ecosystems

The conservation of biodiversity and ecosystems sensitive to the impacts of human use and economic development remains a challenge for environmental policies globally (Mascia et al., 2003; Rands et al., 2010). Sensitive ecosystems like coral reefs suffer not only from climate change but also from destructive fishing activities, unsustainable tourism practices, and periodical coral bleaching, which disrupt ecological functions of marine ecosystems (Lange & Jiddawi, 2009). Several environmental policies including the United Kingdom Marine and Coastal Access Act (2009) and the United States National Ocean Policy (2013) have been employed to address such threats and ensure enforcement measures are taken to protect marine ecosystems (Börger

* Corresponding author. Faculty of Forestry, Universiti Putra Malaysia, 43400, UPM Serdang, Selangor, Malaysia.
E-mail address: dianaemang@upm.edu.my (D. Emang).

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et al., 2014).

However, in areas where resource users are poor and rely on unsustainable resource exploitation practices for livelihood, the design of suitable policy measures for securing conservation is often complicated by the need for economic development. Such conservation-poverty conflicts have underpinned the ideas of conservation through sustainable use and integrated conservation and development policies and projects (Adams et al., 2004; Bush, Hanley, & Colombo, 2008). It aims for poor communities to benefit from the sustainable use and protection of the ecosystems in need of protection and forms a better long-term path out of poverty. The success of this approach is contested by the imperfect governance contexts and lack of legitimacy in the general public (Kiss, 2004; Tisdell, 2014). Yet, considerable interest remains in the prospects of payment for ecosystem services (PES) and ecotourism and the analyses under what circumstances such measures may or may not be successful (Adams et al., 2004; Pattanayak, Wunder, & Ferraro, 2010; Wunder, 2008). A key aspect is if, e.g. affluent recreational users can be compelled to pay for conservation measures in ways that also enhance incomes among poor users.

Hence, this study was conducted in the context of a conservation-poverty conflict in association to coral reef protection at a high-quality scuba diving site called Sipadan, off the Borneo island in Malaysia. The area faces environmental threats from destructive fishing practices (e.g. blast or dynamite fishing, fish poisons, and overfishing) and litter pollution (Environmental Conservation Department, 2001; Prabhakaran, Nair, & Ramachandran, 2013). Such threats relate to the functioning of the struggling adjacent communities that can be remediated by measures like altered fishing practices or alternative livelihood options. Divers, which are largely affluent users, visit Sipadan by paying transportation and accommodation costs along with a dive permit fee.

Improved protection and quality of diving experiences might, in turn, sustain future demand, attract more experienced divers and increase resource rents for the diving communities, and hence sustain funding for environmental protection (Emang, Lundhede, & Thorsen, 2016). These arguments are relevant to management and conservation policies in Sipadan, and therefore, our investigation focus on the role of diver experience for the value divers assign to a recreational site. We carry out a stated preference choice experiment (CE) study to investigate the role of diver experience for willingness to pay for access to diving sites like Sipadan.

1.2. The role of users' experience in environmental valuation

The role of users' experience with environmental goods, particularly for their appreciation of it, is extensively covered in environmental valuation literature (Ackerberg, 2003; Erdem & Keane, 1996; Nelson, 1970). Users' experience with environmental goods is found to correlate with WTP for these goods (e.g. Breffle & Morey, 2000; Czajkowski, Hanley, & Lariviere, 2014; Ferrini & Scarpa, 2007; Hanley, Kriström, & Shogren, 2009; LaRiviere et al., 2014). More broadly, the heterogeneity of recreational users' preferences have been studied in association with environmental benefits (Carlsson, Frykblom, & Liljenstolpe, 2003; Hearne & Salinas, 2002). The issue of how user experience with a specific good affects preferences has also been studied in the methodological parts of the environmental valuation literature, including how information influence preferences (Hanley & Munro, 1992).

Prior research has shown that the more experienced users are with a good, the more they tend to value that good, and the lower is the unobserved variance in their stated valuations (Cameron & Englin, 1997). Czajkowski et al. (2014) investigated how respondents update and revise their preferences when presented with new information about a good or acquire actual experience with a good. From the context of marine users, Schuhmann, Casey, Horrocks, and Oxenford (2013) explained that experience with an environmental good could make users less sensitive to marginal differences in the quality of environmental goods. In our case, the measure of experience is more tangible as we elicit both information on the quality of the divers' recent diving experience and information about their overall experience as divers. Another relevant study is on rock climbers by Scarpa and Thiene (2005), which relates the experience to WTP.

A key feature to discuss in any environmental valuation study of this kind is the issue of the validity of the responses given. This relates to the perceived consequentiality of the survey, which is only secured if respondents are likely to think the survey could have an impact on real policies, in this case, park management decision on diver fees. As divers already experienced paying a fee, albeit modest, we believe the policy case should be credible and perceived as consequential (Carson & Groves, 2007), in the sense that their responses may indeed affect future fee policies. Divers were told that while their responses would be confidential and only available for scientific uses, the overall results and study would inform current and future management of Sipadan. A second issue concerns incentive compatibility, which addresses the question if the respondents are likely to answer truthful, given consequentiality. Our study is in particular incentive compatible for divers who think there is a positive probability they will return to the site or who think that policies implemented here may spill over to other sites they visit (Vossler, Doyon, & Rondeau, 2012; Vossler & Watson, 2013). Such divers have an incentive not to misrepresent their preferences. However, divers with no such expectations may have unclear incentives as the payment vehicle is not coercive for them; thus it will be harder to predict their choices, and we discuss this aspect thoroughly in our discussion.

1.3. Research questions

This is the first environmental valuation study in Sipadan, and specifically, this paper contributes to the literature on recreation and biodiversity protection by analysing how divers' recent and overall experience affect their WTP for protection of diving site and diving experience attributes. Using the stated preference CE method, we outline possible improvements in conservation status, specifically changes in litter pollution in the water, pelagic fish sightings and divers in each dive. We describe how they may be obtained using funds from changes in diving fees to support local communities in efforts to reduce negative environmental impacts. We furthermore elicited i) information from their recent on-site diving experience and (ii) their overall individual experience as a diver. We correlate this with WTP measures to answer our three research questions:

i. What are divers' preferences for the selected measures of conservation status and recreational experience?
ii. What are the differences in preferences of various diving attributes between the more experienced and less experienced divers?
iii. What are the differences in recent diving experiences between the experienced and less experienced divers?

We reviewed existing literature studying the relationship between experiences with environmental good and user preferences and WTP. On that basis, we expect the experienced divers to be able to express significant positive or negative preferences across more attributes than less experienced divers as a result of previous experiences with the good (Cameron & Englin, 1997; Czajkowski et al., 2014; Scarpa & Thiene, 2005). Experienced divers may also have higher WTP as a result of their preference for diving experiences.

2. Methodology

2.1. Study site

Sipadan is a small island (16.4 ha) and is part of the Coral Triangle Network (WWF, 2012). It is managed within the Parks Enactment (1984) legislation under the Ministry of Tourism, Culture and

Fig. 1. Study site of Sipadan Island within the Coral Triangle Network (Source: Google Maps, 2019 & adapted from The Coral Triangle Atlas, 2015)..

Environment and following the principles and management plans for marine parks (Sabah Parks, 2010). Geographically, Sipadan is located in the Celebes Sea off the east coast of Sabah, Malaysian Borneo (Fig. 1). It is approximately 30 km south of Semporna, one of many small towns in Sabah. The island is formed by a volcanic thrust from the Celebes Sea floor that rises 600 m from the seabed, forming a mushroom-like island that rises 3 m above the low tide water mark. Living corals grow abundantly in this area, making it one of the richest marine habitats, especially in the Indo-Pacific biogeographic sea region (WWF, 2019). As a popular diving site, it is frequented by scuba divers from at least 38 different countries (Emang, Lundhede, & Thorsen, 2017). The island received attention since it was mentioned by the world-renowned oceanographer, Jacques Cousteau in his 1989 film, "Borneo: The Ghost of the Sea Turtle" (Pejabat Daerah Semporna, 2012). Afterwards, resorts were built on the island to accommodate tourists and divers. Six tour operators were providing scuba-diving services to approximately 360 divers per day in 1998 (Musa, 2002). To date, there are approximately twelve tour operators currently operating with the license to

Table 1
Attributes and attributes levels used to design choice alternatives.

Attributes	Current management	Alternative I and II
[c]Daily Sipadan permit fee	RM40[a d] (USD12)	RM40, 80, 160, 240, 320, 640 (USD12, 24, 50, 74, 100, 198)
[c]Daily number of divers	120 divers[a d]	90 divers/day 120 divers/day 150 divers/day
[b]Coral cover	70% coral cover[a]	50% coral cover 70% coral cover 90% coral cover
[b]Fish diversity and shark sighting	50% of total fish diversity[a] and occasionally see sharks	30% of total fish diversity, rarely see sharks 50% fish diversity, occasionally see sharks 70% of total fish diversity, frequently see sharks
[c]Litter pollution (litter at diving sites)	Medium (litter pollution is noticeable) [a]	High (litter may become significantly noticeable) Medium (litter pollution is noticeable) Low (litter may become unnoticeable)

[a] The attribute level indicates the current management option.
[b] Levels of these attributes are derived from WWF (2012).
[c] Levels of this attribute are designed based on inputs from focus groups, expert consultations, and findings from the pilot study.
[d] Levels of these attributes are based on interviews with Sabah Parks and tour operators. RM refers to Ringgit Malaysia. RM3.18 = 1US$ (at the time of the survey interview).

bring divers to Sipadan (Sabah Parks, 2019). To safeguard its ecosystem and due to concerns about the impacts of tourism, overnight stays have been prohibited in Sipadan since 2004.

2.2. Choice experiment method

CE is an economic method used for valuing non-marketed goods and services, by eliciting responses from individuals in constructed hypothetical markets. The method applies a set of experimentally designed choice situations consisting of bundled alternatives, e.g. alternative conservation policies. Respondents are assumed to choose the alternative in each choice situation that provides the highest utility for them (Bateman et al., 2002; Hensher, Rose, & Greene, 2005). Using these choices of alternatives among competing bundles and building on random utility theory, probabilistic models enable the researcher to estimate preference parameters of the underlying utility functions for the different attributes of the potential policies. CE handles trade-offs across the attributes (Rolfe, Bennett, & Louviere, 2000) and does not need assumptions about order or cardinality of measurement (Louviere & Woodworth, 1983). Since CE is based both on Lancastrian consumer theory and random utility theory, it facilitates the modelling of trade-offs between multiple attributes. When assigning one of the attributes as a fee or cost, it will allow for the estimation of marginal WTP estimates.

2.3. Study design

We developed the survey questionnaire based on information obtained from the literature of similar contexts (e.g. Ahmed, Umali, Chong, Rull, & Garcia, 2007; Beharry & Scarpa, 2010; Fleming & Cook, 2008; Schuhmann et al., 2013; Wattage et al., 2011). These sources were used as references for formulating and scoping the relevant types of attributes. These studies shared a similar context of marine valuation and provided examples on how to design the CE attributes capturing the perspectives of the recreational and other marine users.

For example, Ahmed et al. (2007) focused on valuing the recreational and conservation benefits of coral reefs, while Beharry and Scarpa (2010) and Schuhmann et al. (2013) estimated WTP values of improvement in water quality and marine biodiversity, respectively. Meanwhile, Wattage et al. (2011) presented an empirical study to estimate economic values of conserving coral areas. Hence, most of the attributes used in our context include coral reefs, water quality or pollution level, and marine species diversity. The literature also inspired this study in term of how to visualise the design of the choice set and inspire the design and arrangements of pictures used to illustrate the (hypothetical) crowding effects in Sipadan.

The design was furthermore thoroughly developed and tested in the field obtained through several independent field visits, which also allowed us to observe daily operations of diving tourism in the area. It involved meetings with focus groups consisting of divers in the area and tour operators from Semporna District Tour Operators Association (SDTOA). These focus groups were used to qualitatively pre-test the survey instrument and to achieve information on tourism issues, diver experiences, activities and developments as well as on background information on the study area, i.e., history, geography and tourism statistical information. This ensured coherence between our understanding of the used formulations in the questionnaire and how they were perceived by end-users.

Finally, we made a quantitative pre-test in terms of a pilot study before the full-scale data collection to verify which attributes divers find important for diving trips. We used this to check correspondence to attributes that Sabah Parks finds essential in conservation management policy and ensure presentation and illustration of attributes. We administered the pilot study to a smaller sample of 37 respondents. Findings from this pilot study revealed that respondents were mostly concerned about environmental quality levels, the coral cover and fish species. They furthermore very often mentioned and criticised the presence of litter pollution in and around the water and highlighted crowding effects during the dives as important aspects that heavily influenced their satisfaction and enjoyment during the diving activity. These are, indeed, the attributes that affect diver decisions (Schuhmann et al., 2013).

Thus, we thoroughly tested our combination of specific quantitative attributes levels and the indicative graphic illustrations prior to data collection to ensure that respondents had the correct understanding of the attributes and the indicated alternative levels (Table 1). The attributes in the choice sets include: (i) litter pollution levels in the water, (ii) daily number of scuba divers, (iii) coral cover, (iv) fish diversity and (v) daily permit fee. Litter pollution poses a threat to the amenity of Sipadan and can be a nuisance to scuba divers and hazardous to marine life, especially broken glasses, plastics, water bottles, and occasionally discarded fishing nets. Current litter pollution is set to a medium level, where litters are noticeable. Future scenarios include both an increase in litter pollution level, where it may become significantly more noticeable at diving sites, and a decrease in litter pollution level where it may become unnoticeable resulting in most diving sites being free from litter pollution. We included a simple illustration to support the perception of what type of litter we address. The daily number of scuba

divers was included to elicit respondents' valuation of crowding levels. Two levels were set, one above (150 divers) and one below (90 divers) the current daily number of scuba divers (120 divers).

We know from our pre-testing that divers have a precise idea about this variable yet included a simple indicative illustration to focus on the experience during the dive. For the attributes that represent the extent of coral cover and fish diversity that are available in Sipadan, both were set to be 20% lower or higher than the current level. The fish diversity attribute included a reference to how often, in a relative sense, sharks would be sighted during a dive. These attributes represent the primary interest of scuba divers, and we use them as a simple representation of marine biodiversity in Sipadan. For visual balance, we included simple graphics to indicate more or less of the compared to the simple graphic illustration of current levels (Kumari & Raman, 2010; Meekan, Jarman, McLean, & Schultz, 2009; Sequeira, Mellin, Rowat, Meekan, & Bradshaw, 2012). The daily permit fee is the required payment asked from divers when diving in Sipadan. We selected the changes in the current permit fee as the payment vehicle because it fulfilled three criteria. First, it has good coverage, as the payment vehicle is applicable and relevant across the studied population; second as a payment vehicle it should be widely acceptable to the respondents and; third it is feasible, as changes in the current fee structure are easy and uncomplicated to implement in practice (Do & Bennett, 2009). In this way, the daily fee is a non-voluntary payment vehicle that is incentive compatible and prevents free riding. We selected six levels for the monetary attribute, with the lowest value was set to be equal to the current permit fee.

Alternatives were combined into choice tasks consisting of two policy options and a status quo alternative (see an example in Fig. 2) and scuba divers were asked to choose the most preferred option among the three alternatives. The design was calculated using the NGENE software, resulting in a D-efficient design with a D-error of 0.000663. Twelve choice tasks were created and divided into two versions of the questionnaire containing six choice tasks each. The final questionnaire took the following form: The purpose of the research was outlined on the front page of the questionnaire, followed by five sections. In section 1, we asked about trip characteristics and in section 2 about trip expenditures. Section 3 included the CE, whereas section 4 included questions on perceptions and perceived quality of the trip to Sipadan. Finally, section 5 contained socio-demographic questions.

2.4. Data collection

We collected data by face-to-face interviews during January and February 2014. We administered the survey to scuba divers aged 18 years and above, randomly interview individuals from the diver's population present at random sites, e.g. beach, cafe and jetty. As such, our sample resembles a convenience sample. Randomness results in part from the sequential nature of the interviews, with the population of diver's subject to the random interview at any time being a random result of divers arriving and leaving. We obtained a total of 3042 choice observations from 507 questionnaires (512 questionnaires were distributed, but five questionnaires were not fully completed and discarded). The sampling selection focused on divers who had already dived at least once in Sipadan, to take advantage of their recent diving experience in the analyses.

2.5. Econometric analysis

The choice data were analysed using discrete choice models with the application of LIMDEP 10 NLOGIT 5.0 (Econometric Software, Inc., Plainview, NY, USA). The econometric models build on the standard random utility model developed by McFadden (1974), which assumes that the utility of choice consists of a deterministic value component and a random element. When an individual i chooses an alternative, j, the utility U can be described as:

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

where V_{ij} is the deterministic part, and ε_{ij} represents the unexplained or random proportion of utility. The observed utility, V_{ij} is a function of all

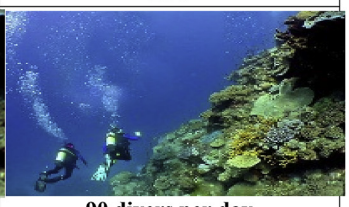
Attribute	Current management	Alternative I	Alternative II
Litter pollution	 Medium	 High	 Low
Number of divers	 120 divers per day	 150 divers per day	 90 divers per day
Coral cover	70% of live coral covers	90% of live coral covers	50% of live coral covers
Fish diversity	**50%** of total fish species diversity **Occasionally** see sharks	**70%** of total fish species diversity **Frequently** see sharks	**30%** of total fish species diversity **Rarely** see sharks
Daily permit fee	RM 40	RM 80	RM 80
Your Choice	❑ SQ	❑ 1	❑ 2

Fig. 2. Example of a choice set (each choice set had the heading "Suppose the following table represents the only management options available for Sipadan in your future visit. Please cross (x) one option that you prefer in the shaded column.").

attributes of the choice alternative j and the characteristics of the individual, i. When an individual opts to choose alternative j, it implies that the utility of choosing alternative j is greater than the utility of choosing other presented alternatives (e.g. alternative k). Then, the probability P of choosing alternative j over k for an individual i is:

$$P_{ij} = P\{V_{ij} + \varepsilon_{ij} > V_{ik} + \varepsilon_{ik},\ \forall\ j \neq k\} \tag{2}$$

Using the standard conditional logit model (CLM) assuming the error term is independently and identically distributed (IID) and follows a Gumbel distribution, the probability of choosing alternative j from a set of k alternatives can be expressed as:

$$P_{ij} = exp(V_{ij})/\Sigma\, exp(V_{ik}) \tag{3}$$

Collecting all the attributes that affect utility for alternative j and individual i in a vector X_{ij} and all the utility weights in a vector described by β, the CLM can be written as:

$$P_{ij} = \frac{\exp(\beta' x_{ki})}{\sum_k^K \exp(\beta' x_{ki})} \tag{4}$$

As this paper aims to identify heterogeneity in preferences between different groups, hence a Latent Class Logit Model (LCM) was used. This is based on the assumption that the population consists of a finite number of groups with substantial different preference structures and assigns individuals that share similar preferences into a particular number of classes or groups. LCM estimates the probabilities of membership to each class and its specific preference parameters (Greene & Hensher, 2003) by identifying utility parameters contingent on the probability of an individual's class membership (Train, 2003). Assuming that the vector β in Eq. (4) is specific to a group (instead of the total population or the individual) and that the utility weight is constant over choice situations n but varies over people, the joint probability of a set of choices n from the same individual becomes:

$$P(ni|g) = \prod_{n(i)}^{N} \frac{\exp(\beta'_g x_{ij})}{\sum_{k=1}^{K} \exp(\beta'_g x_{ik})} \tag{5}$$

The latent grouping of divers into different groups may be a function of their characteristics; in our case, their answers to a number of experience-related questions. As a result, the probability that an individual i belong to class g can be given by:

$$P_{ig} = \frac{exp^{\lambda'_g Z_i}}{\sum_{g=1}^{G} exp^{\lambda'_g Z_i}} \tag{6}$$

where λ denotes the group-specific parameter vector for class, and Z_i is the individual attitudes or experiences. Following Boxall and Adamowicz (2002), combined expression of Eq. (5) and Eq. (6) will make it possible to simultaneously estimate the group-specific utility weights and the group membership probabilities:

$$P_{(ij|g)} = \sum_{g=1}^{G} \left(\frac{exp^{\lambda'_g Z_i}}{\sum_{g=1}^{G} exp^{\lambda'_g Z_i}} \prod_{n(i)}^{N} \frac{exp^{\beta'_g x_{ij}}}{\sum_{k=1}^{K} exp^{\beta'_g x_{ik}}} \right) \tag{7}$$

The marginal WTP ($mWTP$) for a change in one particular attribute, A, is the ratio of coefficients:

$$mWTP_A = -\frac{\beta_A}{\beta_{WTP}} \tag{8}$$

where β_A is the coefficient of an attribute A and $\beta_{WTP}$is the coefficient of the fee attribute. The fee attribute is a continuous variable, hence the ratio represents the marginal rate of substitution between changes in monetary value and associated changes in the environmental attribute (Bennett & Blamey, 2001).

3. Results

3.1. Divers characteristics

Most divers in Sipadan are international divers (91.3%) and male divers dominated the sampled population (58.2%). The dominant age group is 30–39 years old (43.6%) and divers younger than 50 years make up more than 90% of the sample. Most divers are single with university-level education and the median of the monthly income ranges between RM7,000 to RM14,000 (USD2,000 to USD4,000) and almost 20% earned more than RM35,000 (USD10,000). Almost 76% of the sampled population is in full time or part-time employment. Only 14% of the respondents have visited before, indicating that most of the sampled population are first-time divers in Sipadan.

3.2. Determinants of diving experience

We elicited the indicators of divers' experience from the scuba divers themselves. The indicators used included the number of dives over the last year as a measure of the diver's overall experience as a diver. To capture the experience in their recent dive at Sipadan, we asked divers to rate on a Likert scale their recent dive experience including subquestions on whether they felt crowded during the dive and whether they saw pelagic species (Musa, Seng, Thirumoorthi, & Abessi, 2011; Todd, 2000; Todd, Cooper, & Graefe, 2000). We elicited other measures, e.g. divers' certification level, but these did not prove useful.

The distribution on the resulting measures of overall experience and the experience in their recent dive is as follows: (i) the inclusion of "seeing pelagic species" variable refers to the respondent's visual observation of marine species such as sharks and rays during their recent dive. Majority of the respondents (96.85%) saw pelagic species while diving in Sipadan, (ii) the variable "no crowding" measures the crowding effect as perceived by the divers in their recent dive. Although 79.68% of the respondents did not experience crowding during dives in Sipadan, measures to control the crowding effect is a primary concern when managing diving quality (Schuhmann et al., 2013), and (iii) the variable termed "more experienced divers" describes divers having more than ten dives over the last year. The descriptive statistics of the sample show only 38.07% of the respondents have done more than ten dives within the last 12 months. In this study, all variables are dummy coded, where 1 indicates "Yes" and 0 indicates "No".

3.3. Model estimations

The CLM is used as a benchmark model, which does not allow for any preference heterogeneity between respondents. The results are reported in Table 2. As expected, we find a negative utility parameter for

Table 2
Conditional logit model estimates based on choices between management attributes of Sipadan.

Attributes	Coefficient	Standard error
Fee	−0.001**	0.0004
ASC	1.092***	0.171
Low level of litter pollution	1.199***	0.170
High level of litter pollution	−0.624***	0.199
90 divers	−0.118	0.117
150 divers	−0.876***	0.097
50% coral cover	0.546***	0.189
90% coral cover	1.134***	0.151
30% fish diversity	−1.425***	0.154
70% fish diversity	−0.293	0.199
Log-likelihood	−2697.901	
Sample size respondents/choices	507/3042	

"***", "**","*" denote statistical significant at 1%, 5%, and 10% level, respectively. All data collected in 2014.

the fee attribute while the alternative specific constant (ASC) is estimated significant and positive, indicating a positive preference, *ceteris paribus*, for the current diving situation at Sipadan. For all other parameters of attributes, we note that we dropped the 'Current level' of each attribute and hence, all parameters are estimated relative to this dropped variable. The results show that divers prefer less litter compared to current levels of litter (a significant and positive parameter) and dislikes greater litter pollution even more (a significant and negative parameter). We also see a negative utility from increasing the number of daily divers to 150, relative to the current 120, but no significant effect of reducing the number of divers to 90 per day. This result tallies well with the finding that although the current daily permit is 120 divers, only around 20% of the sample reported crowding experiences in their recent dive. A larger daily quota of divers would increase the probability of crowding and is therefore associated with the negative utility.

Results show that a reduction in fish diversity to 30% is associated with significant negative utility. Since Sipadan is regarded as a world-class diving location (CNN-Travel, 2012), the insignificant parameter estimate related to more fish could reflect that it is hard for the divers to imagine a better marine life. Finally, increasing live coral cover to 90% from the current 70% resulted in a positive utility estimate. It is, however, peculiar that a reduction in live coral cover is also associated with positive utility, albeit lower than the one related to an increase. This could suggest that this part of the CLM is not well identified and be a result of the models' inability to model heterogeneity in our data.

The CLM rests on an assumption about the error term's distribution known as the independence of irrelevant alternatives (IIA) property. The IIA property implies that the probability of choosing one particular choice alternative is unaffected by the inclusion or removal of additional irrelevant alternatives. The Hausman-McFadden Test was performed to test the IIA assumption, and the assumption was found not to be justified (the tests statistics for both alternatives were 128.9 and 126.1 respectively, with *p*-values well below 0.01), which suggest that alternative models not sensitive to the IIA assumption, should be used for analysing data. Such models include random parameter models and latent class models (LCM) as we use here.

The LCM estimation requires that the analyst decides on the number of latent classes in the data as the maximum likelihood estimation requires a specification of the number of classes. While the theory may in some cases provide guidance on the number of classes, it is, in general, an empirical question. In our case, given our hypotheses, we would like the model to allow for at least two classes, that may capture less experienced separately from experienced divers. However, more classes may be relevant. In general, the use of statistical information criteria like the Bayesian Information Criterion (BIC) or Akaike's Information Criteria (AIC) is used in the literature to inform the selection (Milon & Scrogin, 2006; Scrogin 2006; Scarpa & Thiene, 2005). Before the final model selection, LCMs with one to five classes were analysed and compared with reference to a number of significant parameter estimates, the meaningful interpretation of model estimates and the statistical evaluation criteria (Table 3). While BIC and AIC can inform the selection, no specific statistical test gives conclusive answers regarding the correct number of latent classes. In our case, the selection of a model with four classes seems to offer the best data fit with the smaller values of AIC and BIC and the parametric fit; adjusted rho-squared, ρ^2 continue to increase as more classes are added to the model though not beyond four classes.

Table 3
Statistical fit criteria estimated to support the choice of the number of classes in the model (N = 507).

No. of class	Log-likelihood	McFadden's adjusted Pseudo R-square	Parameters	AIC	BIC
1	−2697.90	0.131	10	5415.8	5422.85
2	−2480.60	0.199	24	5009.2	5026.13
3	−2360.73	0.236	38	4797.5	4824.25
4	−2304.76	0.252	52	4713.5	4750.17
5	−2304.21	0.250	66	4740.4	4786.95

$BIC = -2LL + k \cdot \ln(N)$.

The estimation results for an LCM with four classes are presented in Table 4. Concerning the class membership functions (see equation (7)), the parameters of this function across classes can only be identified relative to each other across classes. Thus, for one of the latent classes, the coefficients in the class membership function are normalised to zero in the estimation procedure, and the coefficients of the other classes should be interpreted relative to this normalised class. In our estimation in Table 4, class four was selected by the estimation procedure to have the normalised membership function, and membership probabilities are therefore relative to this group. Note that it is of no consequence to the interpretation of the model results which class is normalised.

We note the LCM model is better at handling the large variation in data, which can be seen from the increase in the explanatory power of this model relative to the CLM as the McFadden's adjusted pseudo R-square increases (from 0.131 to 0.252). The large variation can also be seen from the substantial differences across the four classes. As in the CLM model, we drop the 'Current level' of all the attributes in the utility part of the model, and thus parameters are estimated and should be interpreted relative to this dropped level. The preferences shared across all classes are the significantly negative preference parameter for the increased quota of divers, and the insignificance of preferences for a reduced number of divers as well as for enhanced fish diversity.

Class one comprised 25.5% of the divers. This class is sensitive to increased crowd effects but has little preferences for any other aspects of the dive and conservation quality. While the parameter for the price variable is negative, it is not significant, and the group of respondents appears to have engaged little in actual trade-offs across attributes. The class membership functions reveal that they are significantly less likely to be more experienced divers and significantly more likely to have felt crowded during their recent dive, compared to class four. For this class, the variable of seeing pelagic species during the recent trip was not significant. Thus, this class tends to include divers that are less experienced and had a poorer experience in their recent dive.

The second class covers 15.4% of the sample of divers. This group relate to the fee and has a significant marginal utility of income with the expected negative sign of paying higher fees. They showed significant positive preferences for a lower level of litter pollution and expressed a negative preference for higher quotas of divers. Finally, this group expresses a significant and negative preference for reductions in fish diversity. Evaluated at the 10% level, the preference parameter for lower conservation level of coral reef is significant and somewhat surprisingly, positive.

Class three has the highest proportion of the diver population, covering 31.4%. These divers prefer a lower level of litter pollution and a higher level of coral cover, relative to the current status quo. Finally, they also have a negative preference for increasing the number of divers at the site. For this group, while the parameter of the price is negative, it is also not significant. Thus, while they trade among other attributes, they seem not to pay much attention to the cost of the alternatives. This class is less likely to have seen pelagic species and more likely to have felt crowded during their recent dive when compared to classes two and four. They are also less likely to be in the group of more experienced divers relative to class four, and they are comparatively more likely to have had a recent diving experience of poor to moderate quality compared to, e.g. classes two and four.

The fourth class covers 27.7% of the sample of divers. This group holds significant (positive or negative) preferences for most of the attributes and their levels, thus reacting to a wider set of attributes. They relate to the cost attribute as expected, and most of the attribute's parameters in this class are significant with signs as expected a priori. Only the attribute describing a decrease of divers per day, the attribute

Table 4
Latent class model estimates with four classes based on choices between management attributes of Sipadan.

Attributes	Class			
	1	2	3	4
Utility function				
ASC	2.673 (1.980)	- 1.026 (1.257)	0.577 (0.362)	1.278 (0.956)
Fee	- 0.007 (0.006)	- 0.012*** (0.005)	- 0.0001 (0.001)	- 0.006* (0.003)
Low level of litter pollution	1.607 (1.927)	2.992** (1.234)	0.645* (0.379)	2.948*** (0.925)
High level of litter pollution	- 0.281 (2.011)	- 4.399 (3.138)	- 0.086 (0.395)	- 2.625** (1.168)
90 divers	- 2.296 (1.636)	1.242 (0.833)	- 0.079 (0.219)	0.099 (0.673)
150 divers	−4.640* (2.798)	- 2.235* (1.350)	- 0.669*** (0.168)	−3.433*** (1.323)
50% coral cover	- 1.437 (3.147)	2.501* (1.515)	0.509 (0.334)	- 1.243 (1.010)
90% coral cover	2.398 (4.451)	2.126 (1.326)	1.105*** (0.259)	4.126** (1.717)
30% fish diversity	- 3.193 (4.442)	- 4.808*** (1.733)	- 0.219 (0.294)	- 7.707*** (1.918)
70% fish diversity	1.453 (3.257)	- 1.344 (1.543)	- 0.145 (0.393)	1.468 (1.112)
Class membership function				
Seeing pelagic species	- 2.146 (1.358)	2.527 (146.109)[a]	- 2.829** (1.347)	–
No crowding	- 0.689* (0.409)	- 0.339 (0.504)	- 1.413*** (0.417)	–
More experienced divers	- 0.969*** (0.294)	- 0.663* (0.353)	- 1.148*** (0.311)	–
Constant	3.025** (1.427)	- 2.513 (146.106)	4.476*** (1.423)	–
Model statistics				
Class size	0.255	0.154	0.314	0.277
Log-likelihood	−2304.757			
Chi-squared	2074.444			
Sample size respondents/choices	507/3042			

"***", "**","*" denote statistical significant at 1%, 5%, and 10% level, respectively. Adjusted ρ2 is computed as $\rho 2 = 1 - (LLm - k)/LL0$, where LLm and LL0 are the log-likelihoods of the full model and the intercept-only model respectively, and k the number of parameters. BIC is calculated $= -2LLm + k \cdot \ln(N)$ with N denoting the number of respondents. Standard errors are in the parenthesis. Note that Class 1 = Less experienced with crowding experienced; Class 2 = Less experienced, no crowding experienced; Class 3 = Less experienced with crowding experience and no pelagic sighting; and Class 4 = More experienced, no crowding experience, saw pelagic. Data collected in 2014.

[a] The large standard errors with non-statistically significant estimates for the variables of seeing pelagic species and the membership function constant in class two could be a result of small simple size in the class function (15% of ca. 500 respondents).

describing fewer coral covers and the attribute describing increased fish diversity are insignificant, but in all cases have the expected sign. The class membership functions indicate that this class is more likely to contain the more experienced divers, is more likely to include divers that have seen pelagic species, and divers are less likely to have felt crowded during their recent dive than classes one and three.

3.4. Willingness to pay

Marginal WTP was calculated for each level of diving attributes relative to the baseline level, according to Eq. (8), and they are reported in Table 5. Standard errors of WTP have been calculated using the Wald procedure (Delta method) that allowed for the generation of WTP estimates at 95% confidence intervals. As the parameter for the fee attribute is only significantly different from zero for classes two and four, it only makes sense to report WTP measures for these classes.

Comparing the WTP between the two classes, note that the confidence intervals of the WTP measures are rather large, and we abstain for actual testing of differences between the classes at the attribute level. Instead, we observe that both the less experienced divers and the more experienced divers have a significant and equitably large WTP for avoiding higher litter pollution. The measures are of similar size, just like none of them showed significant WTP for reducing litter pollution levels. The less experienced divers (more likely to have felt crowded) have a significant and positive WTP for reducing crowding; something the more experienced divers are agnostic about. Both, however, express a loss if the number of divers is increased.

The two groups relate differently to coral reef levels. The less experienced divers have a positive WTP for reductions in coral covers, reflecting less experience in assessing the differences that these

Table 5
Marginal WTP for diving attributes (in RM) calculated using eq. (8).

Attributes	Classes			
	1	2	3	4
Low level of litter pollution	N/S	N/S	N/S	N/S
High level of litter pollution	N/S	−113.98** (−209.25; −18.7)	N/S	−151.38** (−290.31; −12.44)
90 divers	N/S	32.19** (4.00; 60.37)	N/S	N/S
150 divers	N/S	−57.90** (−107.42; −8.39)	N/S	−197.98*** (−345.60; −50.37)
50% coral cover	N/S	64.81* (−1.20; 130.82)	N/S	N/S
90% coral cover	N/S	N/S	N/S	237.95* (−13.39; 489.29)
30% fish diversity	N/S	−124.58*** (−218.06; −31.12)	N/S	−444.47** (−879.64; −9.29)
70% fish diversity	N/S	N/S	N/S	N/S

"***", "**","*" denote statistical significant at 1%, 5%, and 10% level, respectively. 1US$ = RM3.18. N/S represents not significant estimations. Confidence intervals, at 95% level, are in the parenthesis. Note that Class 1 = Less experienced with crowding experienced; Class 2 = Less experienced, no crowding experienced; Class 3 = Less experienced with crowding experience and no pelagic sighting; and Class 4 = More experienced, no crowding experience, saw pelagic. We only calculate WTP for classes where the parameters for the fee was estimated significant in Table 5, and within those classes only for the variable with significant parameters in Table 5 (N = 507). WTP is the maximum amount of money a person would be willing to pay to get an increase in utility level from the utilisation of environmental resources.

attributes make for their experience. However, the more experienced divers have a significant and positive WTP for increases in coral covers. Both classes show significant WTP to avoid decreases in fish diversity. In particular, the more experienced divers of class four are willing to pay 35 times more than the current diving fee of RM40 (USD12) to avoid such degradation. Looking at all attributes, the WTP measures are all well above the current diver fee, and in some cases even above the maximum level of the fee attribute. This shows that the diver fee is a small part of the total travelling and accommodation costs the divers experience.

4. Discussion

4.1. Addressing the research questions

A significant group of scuba divers shows clear preferences for attributes capturing quality aspects of the diving experience through their WTP for improvements (or avoiding reductions) in environmental qualities of Sipadan. In answer to the first and second of our research questions, we find a large degree of heterogeneity among scuba divers' preferences. It includes the class that is more likely to include the more experienced divers. This class contains divers that express clear preferences, whether a positive or negative, over a broader set of attributes. Meanwhile, in other classes which are more likely to be the less experienced divers, the divers tend to express preferences over fewer aspects and be indifferent to more. The class of more experienced divers had higher marginal WTP measures (in absolute terms) for most variables and attribute levels.

The less experienced divers fall into two classes and, relating to the third of our research questions, this is where we find a clear effect of the divers' recent experience. First, a class of less experienced divers, who had experienced crowding in their recent dive (i.e. class two) and expressed preferences towards avoiding an increase in the number of divers (class two show clear WTP for two attributes that represent different crowding levels). This is in contrast to a comparable study by Schuhmann et al. (2013) where the average divers were willing to pay to avoid the crowd, and the less experienced divers welcomed others as they found comfort in crowds. In our study, it appears that they felt that the crowding could be a source of conflict that reduced their satisfaction and perhaps attention to the other attributes describing marine qualities. Thus, this group seems responsible for the same finding in CLM. Turning to the class membership function, they are less likely to be in the group of the more experienced divers than the divers in class four. They are not more or less likely to have experienced crowding or seen pelagic species in their recent dive, compared to class four.

Secondly, a group of less experienced divers had no WTP for increasing the quality of any of the possible attributes but demanded compensation for a decrease in the quality of all available attributes (i.e. class one and class three). Sipadan is regarded as one of the world's top dive sites; thus, this result is not unlikely. Less experienced divers may find it implausible to make the experience even better, but do not accept a degradation at Sipadan.

Divers' background appears to be closely correlated with the preferences they express across the presented levels of diving attributes. We speculate that different things may explain this. First, the integrated experience gained from numerous diving trips may imply learning and refining of preferences, enabling divers' to appreciate in greater detail and with more accuracy the many different characteristics of the diving experience. However, it may also be that divers that go on to be experienced divers are individuals that have stronger preferences over more attributes, to begin with; hence they self-select over time into the group of experienced divers. Less experienced divers, on the other hand, appear somewhat more susceptible to let their experiences from their most recent dive influence their stated preferences. This finding adds to the literature on the role of experiences in forming recreational preferences, e.g. Hanley and Munro (1992), Scarpa and Thiene (2005), and Czajkowski et al. (2014). Additionally, understanding the attributes deemed to influence tourist' preferences will help to identify appropriate management measures which could enhance vacation experiences and increase the level of satisfaction among tourists during their holiday (Haider & Ewing, 1990). Improving understanding of tourist behaviour through their preferences at holiday destination such as Sipadan could significantly contribute to the tourists returning to Sipadan.

4.2. Caveats and limitations

For two of the classes more likely to contain less experienced divers (class one and class three), the parameter for the fee, while negative, was not significantly different from zero. This could reflect that respondents have not made trade-offs between the fee and other attributes. In this case, although the chosen fee levels in the CE was up to six times higher than the current fee for a diving permit, the amount remains an insignificant proportion of the total travel budget (i.e. average total travel budget was estimated above RM 10,000/USD2,400 per diver). If some respondents had this relative cost in mind rather than the absolute fee per se, this might be the reason for insignificant estimates of the fee in the two groups. In other words, our range of fees was not sufficiently large to reach the choke-off fee for some of the divers. A final reason may also be that while most divers (about 87%) expressed interest in returning to Sipadan, and hence pay a fee also some time in the future, some divers may have assessed it less likely they would return. Such divers would have little preference for neither fee nor diving attributes. However, the observation of fee parameters for the classes which were not significantly negative does not imply that all respondents in those two classes ignored the fee or have a true zero sensitivity to the parameter. For all classes, the estimated parameters are negative as we would have expected. For class one, the fee parameter also has the same relative order of size as the fee parameter in class four. By construction, the LCM only describes the heterogeneity of the fee attribute with four discrete point estimates, but it seems likely that a more continuous heterogeneity of sensitivities to fee exists in the groups where some respondents might have small non-zero sensitivities to the fee. While we cannot rule out that some respondents have a very low sensitivity to the fee price, it is not correct to assume that it is identical to zero (Hess, Stathopoulos, Campbell, O'Neill, & Caussade, 2013). As a result, we argue that the insignificant parameters on fee appear unlikely to affect our findings regarding differences between experienced and less experienced divers.

A comment is also warranted regarding the sample of divers collected. We collected the data targeting divers with at least one recent dive at Sipadan and interviewing them at suitable times at random places during their daily activities. However, we only collect data during a one-time field period and not at systematic or random periods all over a full year. If diver composition varies across the year, we do not capture variation in our WTP measures, which then be extended beyond our sample with caution. However, we believe the findings regarding differences between experienced and less experienced divers are more likely of general relevance.

Thus, regarding the external validity of the findings, we argue that the finding that experienced divers have stronger and more detailed preferences is a finding which, due to its theoretical basis and support in the literature (Cameron & Englin, 1997; Czajkowski et al., 2014; Scarpa & Thiene, 2005) is perhaps likely to be also valid for other diving sites and diver populations. However, the WTP measures themselves are less likely to be generally valid for other sites, seasons or diver populations.

On the use of graphical illustrations including the graphical elements in the choice set design, these are there to support the interpretation of the text, e.g. we want the respondent to think about the litter in the water and not elsewhere and illustrating how it might look. Likewise, we wanted them to think about the experience of being with

more divers during the dive and not, e.g. at the food stall or restaurant. The extended field testing of the instrument before the final data collection suggested to us that indeed, the graphical illustrations supported the perception and intended meaning of numbers and text. Nevertheless, we acknowledge that the illustrations are mock-ups and schematics and may not ideally represent and capture the text and numbers. We note that the parameters for the different attributes, except the cost, are all estimated as dummy variables, indicating that the estimate represents a level shift in the attribute and not a WTP per diver/amount of coral reef/amount of fish. However, they may be a source of unknown heterogeneity in perceptions and hence expressed preferences of divers. We note, however, that the literature is rich on well-reputed valuation studies using graphics in similar ways (e.g. Campbell, Vedel, Thorsen, & Jacobsen, 2014; Hassan, Olsen, & Thorsen, 2018; Jacobsen and Thorsen, 2010, 2008) as many of those cited in the introduction do.

4.3. Policy implications

The WTP estimates are considerably higher than the current fee of RM40 (USD12). However, the current fee level can in no way be expected to reflect WTP of divers, and the use of quotas to control access is also a reflection of excess demand at the current price. While we acknowledge that the WTP estimates should be treated with caution as they are perhaps only valid for our sample here, we nevertheless, argue that they reflect that divers are able and willing to fund over a higher access fee measures that can protect and enhance diving qualities at Sipadan. Income from higher fees could be added into the existing governmental budget for Sipadan and allocated as an additional fund that could cover financial needs both for conservation programs and daily operations. On the other hand, the WTP estimates also show that a degraded environment, whether it is more litter or less fish diversity, will result in a negative WTP of significant magnitude. This suggests that severe deterioration of the environment would probably imply a reduction in divers visiting Sipadan. Note that even if the WTP measures estimated are much higher than current fees, they are still a small fraction of the abovementioned total costs of the diving trip for the average diver tourist.

Our estimations also revealed the importance of two aspects that influenced diving satisfaction in Sipadan. These aspects are the natural characteristics (i.e. coral cover and fish diversity), and the recreational qualities that are regulated by the tourism management (i.e. the number of divers per day and the litter pollution level). The results showed that there was a systematic preference heterogeneity across the diver's population on these aspects. The more experienced divers are not the largest group diving at Sipadan, but they may be an essential group for maintaining the brand and recognition, as they are the divers more likely to return and more likely to influence rankings and evaluations. They are also the group to which divers from the less experienced classes will move into, sharing their preferences, if they continue to dive. Thus, while crowding and litter pollution matters for all divers, coral reef quality, and fish diversity matters much more for the more experienced divers. However, also less experienced divers are affected by the poor recreational experience, e.g. crowding and not experiencing pelagic species. Thus, attention to the experience of newer divers may enhance the likelihood of repeat visits. In consideration of this relationship of user specialisation and experience as well as Sipadan evolution as a tourism site, management policies that have clear recreational goals with minimal impact on environmental resources should be in focus (Duffus & Dearden, 1990). Thus, it is important to ensure less experienced divers have a good and lasting experience of their Sipadan dive (e.g. by making sure they are not experiencing crowding effects) to improve the likelihood of their return to Sipadan. For the more experienced divers, the management intervention policy could include instruments tailored to protect environmental and recreational qualities of Sipadan from any form of environmental threats.

This study is also relevant to the debate on the concept of conservation through use. This concept is based on the idea that when divers, as an affluent group of beneficiaries, are compelled to pay, e.g. in the form of access fees for conservation measures, the monetary resources could be allocated to pay local communities, e.g. when they work to preserve the environment of Sipadan or to compensate them for loss of non-sustainable activities. In this way, the income and livelihood status of underprivileged local communities could be improved, indirectly reducing the conservation-poverty conflicts and empowering the participation of multiple parties to be involved in sustainable use and protection of Sipadan.

To enhance future conservation funding, it is crucial to increase the likelihood of divers to return to Sipadan or recommend others to go. Knowing that divers appreciate coral cover and fish diversity, efforts should include improved protection measures in conserving the sustainability of the marine biodiversity. Restrictions on fishing methods and compensating local fishers for not fishing in specific areas or applying appropriate conservation techniques could help improve fish diversity (Wunder, 2007). The PES approach could help local fishers to understand the biological value of having healthy coral cover in marine ecosystems and assists them in gaining a sustainable means of living. The PES programs are highly context-dependent and require a trust-building process between local fishers and service providers (Wunder, 2005). Hence it is vital for local stakeholders (e.g. Sabah Parks and tour operators) to actively cooperate in building a sense of responsibility and encourage communities to take care of Sipadan.

Divers also clearly indicate their disapproval of a higher level of litter pollution and crowding effects. Hence, mitigation actions under local stewardship programs could help reduce litter pollution. The fact that litter pollution is to a considerable degree caused by the local communities makes their involvement in the stewardship programs crucial. By engaging and hiring them to improve the amenity values of Sipadan, it could provide them with an alternative source of income and empower their participation in conservation programs. In managing crowding effects, the monetary incentive plays a significant role in reducing such adverse impacts and ensuring divers' satisfaction. Results show there is a willingness among divers to pay more than the current fee, thus allowing for increased diver fee in case of lower diver turnover. Note, however, that only a fraction of the interviewed divers felt crowded at the current level. Increasing prices can alternatively be used to compensate tour operators should they need to limit the daily number of divers (Schuhmann et al., 2013). A similar approach was also suggested to help mitigate underwater crowding and use to support rehabilitation programs in heavily used diving sites (Tratalos & Austin, 2001).

5. Conclusion

Using the CE method, we investigated the welfare impacts for divers from either deteriorating or enhanced qualities of one of the most visited diving spots in Malaysia. Results have answered questions concerning the role of diving experiences for the assessment of conservation qualities and indicate that there are positive and significant economic benefits associated with improving (or avoiding reductions) in the quality of the marine environment.

Two identified groups of scuba divers have a higher WTP, in the form of increased diving permit fees, to avoid reduced environmental quality or secure the enhanced quality marine biodiversity. Notably, the group of the more experienced divers is willing to pay a significant amount more than the current diving permit fee to prevent the degradation of fish diversity. Their WTP for conservation, if translated into higher fees, could be a direct source of finances for improving established management practices by minimising degrading impacts of unsustainable fishing practices. Protection measures for coral covers are also crucial as corals provide habitat for fish and other marine life, as

this symbiotic relationship is greatly affecting divers' satisfaction, especially for the more experienced divers and crucial for the sustainability of Sipadan' ecosystem.

The analysis of divers' characteristics revealed that divers are heterogeneous in their preferences, but generally, their preferences are in the same direction. They also revealed, however, that the more experienced divers were more capable of relating to all aspects of the diving qualities, whereas the less experienced divers were more influenced by their recent experiences and expressed preferences over a more narrow set of attributes linked to those experiences. Thus, the study documents a high degree of preference heterogeneity within the studied sample of divers. Results from this study suggest that the economic values and heterogeneity in the divers' valuation of management options should be taken into consideration by policymakers when making decisions about the conservation of Sipadan. The finding is informative and providing policymakers with current information, which could assist in improving management and conservation policy in Sipadan for the benefit of present and future generations.

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