

# Charging for Nature: Marine Park Fees and Management from a User Perspective

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**Abstract** User fees can contribute to the financial sustainability of marine protected areas (MPAs), yet they must be acceptable to users. We explore changes in the fee system and management of Bonaire National Marine Park (BNMP) from the perspective of users. Responses from 393 tourists indicated that 90% were satisfied with park conditions and considered current user fees reasonable. However, only 47% of divers and 40% of non-divers were prepared to pay more. Diver willingness-to-pay (WTP) appears to have decreased since 1991, but this difference could be due in part to methodological differences between studies. Although current fees are close to diver maximum stated WTP, revenues could potentially be increased by improving the current fee system in ways that users deem acceptable. This potential surplus highlights the value of understanding user perceptions toward MPA fees and management.

**Keywords** Contingent valuation · Willingness-to-pay · Tourism · Marine protected areas · Bonaire · Caribbean

## INTRODUCTION

The economic benefits associated with coral reefs are enormous. Cesar et al. (2003) estimated the value of the goods and services provided by coral reefs worldwide to be  $\sim$ US\$29.8  $\times$  10<sup>9</sup> year<sup>-1</sup>, of which tourism and recreation account for more than one third. Diving is one of the fastest-growing sectors within the tourism industry (UNWTO 2008). In the Caribbean alone, the goods and services provided by coral reefs in 2000 were estimated at US\$3.1–US\$4.6  $\times$  10<sup>9</sup>, of which US\$2.1  $\times$  10<sup>9</sup> derived from diving tourism (Burke and Maidens 2004). For small tropical island-nations, dive tourism can contribute a

substantial proportion of foreign earnings (Fernandes 1995; Dixon et al. 1993).

Although recreational diving can have detrimental impacts on coral reefs (e.g., Hawkins et al. 1999; Zakai and Chadwick-Furman 2002; Hasler and Ott 2008), it can also contribute to coral reef conservation. It has been suggested, for example, that  $\sim$ 78% of the financial shortfall of Caribbean protected areas could be raised through the establishment of user fees (Green and Donnelly 2003). Several studies have explored the potential for introducing such fees to support marine protected areas (MPAs) (e.g., Arin and Kramer 2002; Svensson et al. 2008; Edwards 2009; Reid-Grant and Bhat 2009). Most of these studies use contingent valuation (CV) (Venkatachalam 2004) to estimate user willingness-to-pay (WTP) (Arin and Kramer 2002; Yeo 2004; Asafu-Adjaye and Tapsuwan 2008; Peters and Hawkins 2009). Some studies have led to the establishment of user fees. However, the success of their implementation, especially in terms of user satisfaction, is rarely reported.

The Bonaire National Marine Park (BNMP) is often cited as an example of successful user fee implementation (Reid-Grant and Bhat 2009; Geoghegan 1998; Depondt and Green 2006) because it is wholly financed by such fees (STINAPA 2009). Remarkably, three WTP studies have been conducted in this park; one pre-dates the introduction of park fees in 1992 (Dixon et al. 1993) and the other two were conducted in 2002 (Uyarra 2002 and Thur 2010). The aims of this study were to first examine the current WTP for user fees among Bonaire tourists, and second, using this unique time-series of WTP studies, to explore changes in perceptions and attitudes of recreational users toward the BNMP and its fee system over time.

In order to achieve these aims, we explore (a) tourist awareness of the BNMP and current fees and whether

recent increases in diver fees and establishment of non-diver fees are acceptable to users, (b) changes over time in tourist attitudes toward user fees, as measured by fee acceptance and WTP of divers, and (c) we estimate the current consumer surplus (i.e., the difference between the income presently raised through fees and the maximum that could be raised by increasing fees to match WTP) and funds that could be raised by increasing visitor compliance. Additional funding for the already self-sustaining marine park would allow it to build capacity and engage in new education and information, for local and potentially regional activities.

### Marine Park User Fees in Bonaire

The BNMP surrounds the Caribbean island of Bonaire (BNMP 2009). It was first established as the Bonaire Marine Park (BMP) in 1979, with Dutch Government funding (BNMP 2009; Van't Hof 1997). From 1984 to 1991, funding was discontinued, and management effectively suspended (Dixon et al. 1993; BNMP 2009). In 1991, the Dutch Government renewed financial support to re-establish the BMP (BNMP 2009), and a Marine Environmental Ordinance, defining the limits (high water mark to 60-m depth) and rules of the BMP, was approved and implemented. In 1999, BMP acquired the status of National Park, becoming the BNMP (2009). The BNMP now attracts ~60,000 tourists annually (vs. a resident population of ~15,000), of which more than half are divers (TCB 2009, this study). The arrival of tourists via cruise-ship began in 2000, and the number of passengers now exceeds 250,000 year<sup>-1</sup> (TCB 2009).

The first attempt to establish user fees for divers (1 guilder, or ~US\$0.57 per air fill) occurred in 1984, and it failed due to insufficient governance and posterior dive operator opposition to these fees (Dixon et al. 1993). In 1991, Dixon et al. (1993)<sup>1</sup> examined the potential implementation of user fees in Bonaire. They asked 79 divers, in a closed-ended question, whether they would be willing to pay an annual fee of US\$10 to dive in the BMP, and 92%

of respondents agreed. To the follow-up question: “At what level would you find the admission fee to be unreasonable? US\$20, 30, 50 or 100,” 80% indicated a WTP of at the least US\$20, 48% US\$30, and 16% US\$50. Dixon et al. (1993) used these values to estimate an average WTP of US\$27.4 per visitor year<sup>-1</sup>, excluding respondents that were unwilling to pay any fee (8%). Including unwilling respondents reduces the average WTP of divers in 1991 to US\$24.1. In 1992, a US\$10 fee for divers was implemented, although the results from Dixon et al. (1993) suggested the potential for a higher fee.

A second WTP study was carried out in 2002. Uyarra (2002) asked 251 divers whether they were “satisfied paying the existing US\$10 fee” and 62 non-divers whether they “would be willing to pay a flat US\$10 fee per year to help maintain the management of BNMP.” Ninety-seven percent of divers were satisfied with the US\$10 fee, and 84% of non-divers were willing to pay the US\$10 fee. In another study, also conducted in 2002 (Thur 2010), American divers were asked “what is the most you would be willing to pay for a tag to go diving in Bonaire?” and were offered 15 possible responses ranging from US\$10 to US\$1,000. American divers indicated a mean WTP of US\$60.98. In April 2005, new annual fees (US\$25 for divers and US\$10 for non-divers), and day fees (US\$10 for divers and US\$2 for non-divers) were implemented. Among cruise-ship visitors, only divers must pay the day fee. For non-divers, the day fee is optional.

Fees are paid through dive shops and hotels. On fee payment, tourists receive an introductory briefing, a tag to be displayed within the BNMP, and a check-out dive for divers. In 2008, a total amount of US\$1,039,597 was raised through the sale of 57,304 tags (Rannou, BNMP Finance Manager, pers. commun. 2009). User fees represent ~93% of the income of the BNMP, with the remainder contributed by private donors, or generated from yacht mooring fees, sale of mooring blocks, interest, and exchange rate (STINAPA 2009).

## MATERIALS AND METHODS

### Questionnaire Survey

In September and October 2008, we administered a questionnaire survey to tourists on completion of their holiday at the Bonaire airport departure lounge. We approached tourists starting with those sitting closest to entrance and moving along the seat rows. We explained the objectives of the survey, described how to complete the questionnaire and asked for consent to use their responses. In order to test for clarity, we distributed 20 questionnaires and asked tourists to mark ambiguous or unclear questions, which

<sup>1</sup> Dixon et al. (1993) asked the following questions:

1. Were you aware before coming here that Bonaire waters are protected as a marine park?
2. Are you aware that starting in January 1992 there will be a US\$10.00 per year per person admission fee to be able to dive within the waters of the BMP?
3. The admission fee is specifically earmarked for the operation of the BMP. That is, revenues generated through the admission fees can only be used to defray the costs of park operation. Do you feel the US\$10.00 per year fee is reasonable?
4. Would you be willing to pay such a fee?
5. At which level would you find the admission fee to be unreasonable? US\$20?, US\$30? US\$50? US\$100?

were then refined so that all questions were suitable for self-completion.

The final version of the questionnaire comprised three sections: (I) respondent characteristics (e.g., gender, age, nationality, and last visit to Bonaire), (II) holiday-related questions (e.g., number of nights on the island, holiday cost, and value for money), and (III) questions about satisfaction with the BNMP fee system, prefaced with the following statement (derived from Dixon et al. 1993):

Bonaire National Marine Park includes all waters around Klein Bonaire and Bonaire itself. Different Marine Park Fees apply to different activities. The admission fee is specifically used for the operation of the Marine Park. That is, revenues generated through the admission fees can only be used to cover the cost of park operation (e.g., research, education, maintaining the moorings, enforcing rules in the development, fishing and diving sectors, etc.).

Two questions used by Dixon et al. (1993) were used to allow for direct comparisons: “Did you know before coming here that Bonaire waters are protected as a Marine Park?” and “Are you satisfied with the condition of BNMP?” We also asked which fee respondents had paid (diver/non-diver and annual/day), and whether they thought it reasonable. For those considering it unreasonable, we asked how much more they would be willing to pay. Although a payment card approach used by Dixon et al. (1993) and Thur (2010) is theoretically possible, we used instead an open-ended question (TCB 2009) because transforming to 2008 dollar equivalents would have meant that not all Dixon et al.’s (or Thur’s) options could have been included in our case for comparison.

Respondents who found the current fee to be unreasonable were asked to choose one or more of the following six reasons: (a) “I don’t get anything for paying the fee,” (b) “I don’t know what the fee is used for,” (c) “I don’t agree with being charged to access nature,” (d) “the fee is too high,” (e) “tourists pay many other taxes on the island,” and (f) “other reason.” Through an open-ended question, they were asked to indicate their maximum WTP toward the BNMP fee. We asked returning visitors to indicate the fee paid during their last trip and, if the fee was different from the current one, whether they agreed with the change. In order to add context to the WTP answers, we asked respondents to indicate the number of dives logged in total and during their holiday, their satisfaction with the briefing received upon fee payment and whether they belonged to an environmental NGO. Finally, we asked respondents to indicate their household income from a set of six after-tax income categories, derived from Uyarra (2002) and adjusted to 2008 dollar equivalents (discussed later).

## Statistical Analysis

We examined demographic differences between divers and non-divers and their attitudes toward the BNMP and its fee system using chi-square tests. Owing to limited numbers of non-divers, subsequent exploration of attitudes toward user fees focused on divers. We used logistic regression to investigate (a) diver satisfaction (satisfied vs. dissatisfied) with fee payment and (b) attitude (willing vs. unwilling) toward paying higher fees. Fourteen demographic, environmental, attitude, and perception variables were included in each regression (Table 1). The mean value of the income category chosen by each respondent was assumed to represent his/her household income (Madhoo 2007). Hurricane Omar hit Bonaire during the study (October 14–15, 2008); thus we included time of survey (i.e., pre- vs. post-Omar) to examine any effect of hurricane-induced reef damage on responses.

Total WTP of respondents willing to pay higher fees was calculated as the sum of the current fee paid and the stated extra WTP. For those considering current fees unreasonable, the maximum WTP indicated under the question “What would be the maximum you would be willing to pay for the BNMP fee?” was used. The effect(s) of the fourteen predictor variables on total WTP were explored using general linear models (GLMs). Zero bids were considered as true answers when the respondents had expressed satisfaction with paying the park fee. None of the divers that were unhappy to pay the current fee provided a zero value as maximum WTP toward the user fee. Respondents that did not provide an answer to the WTP questions were excluded from the analysis.

In order to compare the total WTP of divers in 2008 with that in 1991 and 2002 (Dixon et al. 1993; Thur 2010), we adjusted the stated WTP of divers in 1991 and in 2002 to 2008 dollar equivalent using the Consumer Price Index (Williamson 2009). As we did not have access to original earlier data, we conducted a one-sample *t*-test between the total WTP of divers in 2008 and the single adjusted WTP figure from 1991 and 2002. In order to match the nationality of respondents in Thur’s study (2010), we considered only the American tourists surveyed in the present study for this comparison.

## RESULTS

### Respondent Characteristics

Fifty-nine (13%) of the 471 people approached declined to participate. Nineteen questionnaires (5%) were discarded

**Table 1** Description of the variables considered in analyses of diver attitudes and willingness to pay toward Bonaire National Marine Park fees, their type (N = continuous and C = categorical) and role in analyses (D = dependent, I = independent)

Variable name	Role in the model	Variable type	Values/scores	Data characteristics
Opinion of nature fees	D	C	0: Unreasonable fee; 1: Reasonable fee	10% vs. 90%
Attitude toward “payment principle”	D	C	0: Unwilling to pay more than current fee; 1: Willing to pay more than current fee	54% vs. 46%
WTP amount	D	N	Total WTP amount toward the marine park fee (US\$)	33.5 ± 15.9
Hurricane Omar	I	C	0: Questionnaire completed before Hurr. Omar; 1: after Hurr. Omar	32% vs. 68%
Gender	I	C	0: Male; 1: Female	59% vs. 41%
Nationality	I	C	1: American; 2: Dutch; 3: Other	72%; 17%; 11%
Age	I	N	Age of respondent	47 ± 11
Income	I	C → N	Annual household income bracket after tax (US\$): A: <23,000; B: 23,000–57,500; C: 57,500–103,700; D: 103,700–150,000; E: 150,000–230,500; F: >230,500	80,650 [80,650, 126,850]
Membership of environ. NGO	I	C	0: Respondent does not belong to an environmental NGO; 1: Respondent belongs to an environmental NGO	76% vs. 24%
Price of holiday	I	N	Individual holiday cost (US\$)	1,877 [1,565, 2,252]
Opinion of value for holiday price	I	C	0: Poor value for price; 1: Good value for price	8% vs. 92%
Repeat visitor to Bonaire	I	C	0: First visit; 1: Repeat visitor	45% vs. 55%
Awareness of BNMP prior to arrival	I	C	0: Unaware of BNMP prior to arrival; 1: Aware of BNMP prior to arrival	11% vs. 89%
Satisfaction with conditions of BNMP	I	C	0: Unsatisfied; 1: Satisfied	10% vs. 90%
Total dives logged	I	N	Lifetime number of dives logged	125 [57, 345]
Dives logged in Bonaire	I	N	Total number of dives logged during current holiday	14 [10, 19]
Satisfaction with dive briefing	I	C	0: Unsatisfied; 1: Satisfied	6% vs. 94%

Data characteristics of divers are reported and expressed with mean ± SD, median [IQ25, IQ75] or percentages according to the variable type (continues or categorical) and its distribution

due to missing information, leaving 393 (58% men, 42% women) questionnaires.

There were more diver (89%) than non-diver (11%) respondents and, among divers, there were more men (59%) than women (41%) ( $\chi^2_1 = 8.6$ ,  $p = 0.003$ ). Respondents originated from 15 countries, including 68% from the USA, 22% from the Netherlands and 3% from Canada. The proportions of Americans, Dutch and other nationalities (combined) differed significantly between divers and non-divers (72% of divers were Americans vs. 62% of non-divers were Dutch;  $\chi^2_2 = 46.6$ ,  $p < 0.001$ ). Respondents were  $47 \pm 11$  (SD) years old, on average.

Fifty-six percent of respondents were repeat visitors to Bonaire, of which 25% had visited earlier in the same year, and 85% in the last 5 years. The median[IQ25, IQ75] holiday cost was US\$1,877[US\$1,500, and US\$2,319], and 92% of respondents considered their holiday to be good value for price. Overall, the median[IQ25, IQ75] household annual after-tax income of respondents was US\$80,650 [US\$80,650, US\$126,850].

### Awareness and Perceptions of the BNMP and its Fee System

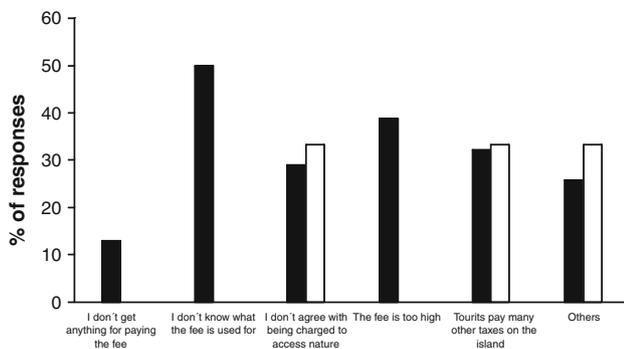
Most respondents (88%) were aware of the BNMP prior to their arrival, and 90% were satisfied with park condition (Table 2). Ninety-five percent of respondents ( $N = 374$ ) paid one of the four fees (annual diver fee: 91%, annual non-diver fee: 6%, diver day fee: 2%, non-diver day fee: 1%). Non-divers were less compliant than divers with fee payment (38% non-paying non-divers vs. 1% non-paying divers;  $\chi^2_1 = 119$ ,  $p < 0.001$ ; Table 2).

Ninety percent of fee-paying respondents considered the fee paid to be reasonable, with no difference in attitude among those paying different fees (diver/non-diver, day/annual) ( $\chi^2_3 = 2.1$ ,  $p = 0.54$ ). Respondents considering the fees unreasonable reported that they did not know what the fees were used for, the fees were too high, and there were already too many other taxes in Bonaire (Fig. 1). In addition, the likelihood of divers being satisfied with the US\$25 fee decreased with holiday cost, but increased with prior

**Table 2** Differences in awareness and perceptions of divers and non-divers toward the BNMP and fees

Proportion of respondents (%)	Divers (N = 348)	Non-divers (N = 45)
Awareness of existence of BNMP prior to visit		
No	11	20
Yes	89	80
Satisfied with conditions of BNMP		
No	10	7
Yes	90	93
Paid nature fee***		
No	1	38
Yes	99	62
Fee paid***		
Day-pass	2	18
Annual-pass	98	82
‘The nature fee is reasonable’		
No	10	9
Yes	90	91

Significant differences are indicated (\*  $p \leq 0.05$ , \*\*  $p \leq 0.01$ , \*\*\*  $p \leq 0.001$ )



**Fig. 1** Proportions of divers (filled bars, N = 34) and non-divers (open bars, N = 4) providing different reasons for their dissatisfaction with the payment of current marine park fees. Totals can exceed 100% because the majority of respondents (especially divers) gave more than one reasons reason for dissatisfaction

awareness of the BNMP and a positive impression of park condition (Table 3). This model classified 92% of responses correctly (log-likelihood ratio = 107.1,  $\chi^2_3 = 28.6$ ,  $p < 0.001$ ). However, while 99% of those who considered the fee reasonable were correctly classified, only 15% of those who did not were correctly classified, possibly because so few respondents considered the fee unreasonable. Ninety-four percent of divers described the briefings given by dive operators as good.

Among repeat visitors who correctly recalled a previous fee (N = 64), 80% agreed with the fee increase. However, only 20% of those that had paid previous fees noted improvements in the BNMP.

### Diver Willingness-to-Pay

Although most visitors considered the current fees reasonable (Table 2), only 46% of divers (and 40% of non-divers) were willing to pay more, irrespective of the type of fee paid ( $\chi^2_3 = 1.66$ ,  $p = 0.60$ ). The likelihood of divers being willing to pay more decreased significantly with increasing age but increased with repeat visits and the impression of good holiday value (log-likelihood ratio = 331.7,  $\chi^2_3 = 22.61$ ,  $p < 0.001$ ) (Table 3). This model correctly classified 62% of respondents unwilling vs. 61% willing to pay more than the current fee.

Divers who considered the US\$25 fee reasonable were willing to pay US\$10.3 ± US\$15.3 (median[IQ25, IQ75] = US\$5[US\$0, US\$17]) more. The total WTP (±SD) of all the divers who paid the annual fee (including those unwilling to pay more) was US\$33.5 ± US\$15.9 (median[IQ25, IQ75] = US\$25[US\$25, US\$40]), ~US\$8.5 above the current fee. The total WTP of divers in 2008 was significantly lower than that of divers in 1991 (US\$38.1, adjusted to 2008 values) ( $t_{291} = -4.9$ ,  $p < 0.001$ ), and the WTP of American divers in 2008 was significantly lower than that of Americans in 2002 (US\$73, adjusted to 2008 values) ( $t_{215} = -45.4$ ,  $p < 0.001$ ). Visiting Bonaire after Hurricane Omar, not being American, and considering the holiday good value for price, all weakly but significantly increased the total WTP of divers ( $R^2 = 0.06$ ,  $p = 0.002$ , Fig. 2).

In 2008, 45% of visitors paying fees other than the annual diver fee were also willing to pay higher fees; however, this represents only 9% of our respondents.

### Consumer Surplus and Other Potential Fee-Associated Revenues

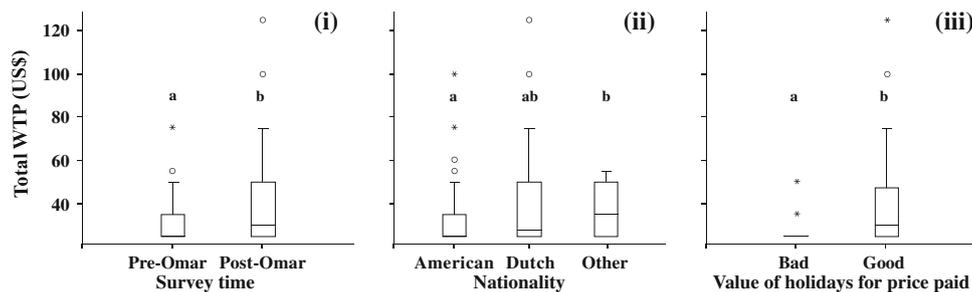
A total of 33,939 divers paid the US\$25 annual fee in 2008 (Rannou, pers. commun. 2009), and the results of this study suggest that the total WTP per diver in 2008 exceeded this by a minimum of ~US\$8.5 (or ~US\$10.3 if considering only respondents satisfied with the current US\$25 fee). A consumer surplus of at least ~US\$288,481 was therefore associated with annual diver fees in 2008. This estimate is not adjusted to include 100% diver compliance since it is virtually impossible to obtain SCUBA tanks without a park tag. We surmise that the 1% of divers who ‘failed’ to pay must have either paid on a previous trip within the year or did not know that the US\$25 diver fee they had paid was the fee referred to in the questionnaire.

In 2008, the BNMP also collected US\$167,054 through the sale of 15,769 non-diver annual tags and 4,682 non-diver day tags (Rannou, pers. commun. 2009). We did not calculate the consumer surplus associated with non-diver fees because of the uncertainty in WTP estimates for non-divers. However, if the 38% non-diver non-compliance rate

**Table 3** Results of logistic regression models of the effects of demographic, holiday, and environmental variables, and attitudes toward BNMP (see Table 1) on whether or not divers were (a) satisfied with the current US\$25 annual fee and (b) willing to pay higher fees

Dependent variable	Predictor variables	B	SE	Wald	d.f.	p	Exp ( $\beta$ )
(a) Satisfaction with current nature fee	Price of holiday	-0.001	0	4.16	1	0.04	0.99
	Awareness of BNMP prior to arrival	1.58	0.67	5.82	1	0.02	4.84
	Satisfaction with the conditions of BNMP	2.81	0.58	21.49	1	<0.001	15.03
(b) Willingness to pay higher fees	Age	-0.03	0.01	5.48	1	0.02	0.97
	Repeated visitor	0.69	0.28	6.31	1	0.01	2.00
	Good value for holiday price	2.00	0.77	6.69	1	0.01	7.36

Only significant variables are shown and the direction of each effect is indicated by the sign of  $\beta$



**Fig. 2** Differences in the total WTP of divers for marine park access in relation to **i** whether interviews took place before or after Hurricane Omar, **ii** respondent nationality, and **iii** opinions of holiday value for money. Total WTP includes the US\$25 fee currently paid by all

divers. GLM: Total WTP of divers =  $-4.3$  [Pre-Omar]  $- 4.1$  [American]  $+ 2.4$  [Dutch]  $- 9.0$  [Low holiday value]  $+ 40.2$ .  $R^2 = 0.06$ . Different subscripts indicate significant ( $p \leq 0.05$ ) differences between groups

found in our limited sample is representative, then an additional  $\sim$ US\$104,517 could potentially have been raised in 2008 through full non-diver compliance. Previous payment of the fee by non-complying non-divers was unlikely as most had either not visited Bonaire during that year or were unaware of fees.

Bonaire also received 250,136 cruise visitors in 2008 (TCB 2009), of which  $\sim$ 1,590 divers and 634 non-divers paid a fee. Although cruise visitors were beyond the scope of our study, we estimated that an additional  $\sim$ US\$495,824 could have been raised in 2008 if payment of day fees, which are currently mandatory for non-diving standard tourists, had been made mandatory for non-diving cruise visitors.

## DISCUSSION

This study indicates that the current user-fee system in Bonaire is successful from financial and user perspectives. The BNMP raises  $\sim$ US\$1 million annually through fees (STINAPA 2009), which covers 93% of management costs (STINAPA 2009) and represents 1% of all marine park fees raised annually worldwide (Costanza et al. 1997), and 90% of respondents were satisfied with park condition and considered the fees reasonable. Substantial additional funds could potentially be raised by improving compliance and

instigating new fees, although monitoring of perceptions and attitudes would be needed to measure realized acceptability.

## Current Awareness and Perceptions of the BNMP and its Fee System

Demographic factors can influence tourist attitudes toward user fees (Arin and Kramer 2002; Asafu-Adjaye and Tapsuwan 2008; Peters and Hawkins 2009; Oliveira and Pereira 2008). We found that holiday cost, age and nationality affected diver satisfaction with current fees, the attitude toward paying higher fees and total WTP amounts, respectively. Higher holiday prices decreased diver satisfaction with fees, even when the fee only represented  $\sim$ 1.2% of total holiday cost. In contrast, holiday price did not affect respondent WTP (but see Togridou et al. 2006; Mmopelwa et al. 2007). Younger divers had a more positive attitude toward paying higher fees (see also Arin and Kramer 2002), possibly because of limited experience of diving without paying a fee, compared to older generations who, in the past, did not pay fees and had better experiences (given general increases in crowding and environmental degradation). Interestingly, there was a trend for American divers to indicate lower WTP than divers from elsewhere. As income did not vary across nationalities (Kruskal–Wallis Test:  $\chi^2 = 0.98$ ,  $p = 0.61$ ), this may stem

from the relative weakness of the US dollar at the time of this study. Belonging to an environmental NGO and having more diving experience did not influence satisfaction with current fees, attitude toward paying higher fees or total WTP (but see Edwards 2009; Asafu-Adjaye and Tapsuwan 2008; Togridou et al. 2006).

The experiences and impressions gained during a holiday can also influence attitudes toward user fees (e.g., Edwards 2009; Pendleton 1995; Dharmaratne et al. 2000; Townsend 2008). Prior awareness of the existence of the MPA and a positive experience of the protected environment (i.e., coral reefs) increased fee acceptance. Having visited Bonaire previously (which may imply a prior positive experience) and having a good impression of holiday value were associated with positive attitudes toward paying higher fees and higher total WTP amounts, respectively.

Respondents surveyed after Hurricane Omar struck the island had a higher WTP than those responding prior to the impact, in contrast to studies showing higher WTP to conserve pristine than degraded environments (Svensson et al. 2008; McManus 1994; McCartney 2006). However, witnessing the damage caused by Hurricane Omar may have encouraged divers to contribute toward reef conservation; divers have been shown to be more willing to take part in reef conservation projects after perceiving the impacts of divers on reefs (Dearden et al. 2007).

### Changing Attitudes Toward BNMP User Fees

Diver WTP toward BNMP user fees appears to have declined from US\$38.1 in 1991 and US\$73 (American divers only) in 2002 (both adjusted to 2008 values) to US\$33.5 ± US\$15.9 and US\$32 ± US\$13.2, respectively, in 2008. This apparent decline should be viewed cautiously, in part because of the small sample size of Dixon's study but also because of the contrasting payment vehicles used in the studies considered. The open-ended nature of our questions often yield more conservative results than those obtained with a payment card approach where respondents tend to select middle options regardless of the alternatives presented (Walsh et al. 1984; Hanemann 1994). In addition, as our estimates are based on stated WTP rather than on actual payment behavior (Venkatachalam 2004; Bateman et al. 1995; White et al. 2001), WTP amounts may change as fees are implemented or raised. However, the introduction of a US\$10 diver fee in Bonaire in 1992 was widely accepted (by 97% of respondents in 2002; Uyarra 2002), as expected from the pre-implementation survey (92% in 1991; Dixon et al. 1993). In addition, the US\$10 fee for non-divers, which was supported by 84% of non-divers in 2002 (Uyarra 2002), was considered reasonable by 90% of non-divers

interviewed after implementation, and the US\$25 fee for divers, which was supported by 74–94% of American divers in 2002 (Thur 2010), was subsequently considered reasonable by 90% of American divers.

Declines in diver WTP for user fees may also be influenced by increased numbers of visitors, coastal development and/or declines in coral reef quality. A previous study suggested that the value of Bonaire's reefs could decrease by up to US\$538 million year<sup>-1</sup> if underwater visibility, coral cover and species diversity declined below certain thresholds (Parsons and Thur 2008). Although reef degradation has already occurred in Bonaire (Bak and Nieuwland 1995; Bak et al. 2005), we found no difference in the WTP of new and returning visitors. However, the typically short time between repeat visits (median[IQ25, IQ75]: 1[0, 3] years) may reduce the perception of environmental changes. Other possible causes of declines in WTP for nature protection that may have occurred since 1991 include the large increase in number of visitors to the island, increased coastal development, and perhaps shifts in Bonaire's clientele (TCB 2009).

Finally, the apparent decline in acceptance of diver user fees (97% for the US\$10 fee in 2002 (Uyarra 2002) vs. 90% for the \$25 fee in this study) may be because acceptance of higher fees may increase gradually over time, or the new fee may be close to the maximum WTP. If so, and WTP continues to decline as reefs becomes degraded, fee acceptance should continue to decline. Whereas the former explanation would imply that further fee increases would be possible, the latter would not.

### Management Implications

Only 25% of reef-bearing MPAs in the Caribbean and Central America charge user fees, and these fees are low (US\$2–US\$3; Green and Donnelly 2003). The high fees for the BNMP are therefore unusual, but our study suggests that, like many other marine reserves (e.g., Reid-Grant and Bhat 2009; Depondt and Green 2006; Barker and Roberts 2008), they are below user WTP. Raising additional funds via user fees would involve both improving the effectiveness of the current fee system and implementing new fees.

The current fee system could be improved by reducing dissatisfaction with fee payment (currently ~10% of respondents), for example, by providing information on how fees are used. Tourist awareness of the BNMP prior to arrival increased from 68% in 1991 to 88% in 2008, probably due to the creation of the BNMP website in 1995. On-site information panels, leaflets and briefings may also be effective methods of increasing awareness of fees and their uses (Townsend 2008). As diver satisfaction with park conditions also influences fee acceptance, improving coral

reef conditions should also enhance user expectations (Uyarra et al. 2009).

More effective systems to collect non-diver fees could also be developed. Although relatively few non-divers were questioned, fee evasion by non-divers seems to be substantial, primarily because of limited awareness of fees (non-diver fee payment was positively associated with awareness of the BNMP prior to arrival,  $\chi^2_1 = 15.1$ ,  $p = 0.001$ ). Fee awareness and enforcing non-diver payment both currently fall upon hotels, some of which are reluctant participants (Reid-Grant and Bhat 2009). Hotel co-operation may be encouraged by the finding that 90% of non-divers find the US\$10 fee reasonable, in addition to the tourism benefits derived from the MPA (Green and Donnelly 2003; Edwards 2009). Payment of user fees could also be mandatory for non-diving cruise-ship visitors, with fee collection being delegated to cruise-ships, although the associated cost implications would have to be assessed. The acceptability of mandatory fees for cruise-visitors is currently unknown.

Increasing fees to the total (average) WTP declared by divers in this study (US\$33.5) is likely to be more controversial than improving compliance with current fees (Reid-Grant and Bhat 2009; Spurgeon 2004). Although the recent implementation of higher BNMP fees was largely accepted, only a small proportion of users was willing to pay more. The total WTP of Bonaire divers is similar to that in St. Lucia (Barker and Roberts 2008), suggesting that current fees are close to the maximum WTP of divers.

Evidence of positive management can increase user acceptance of higher fees (e.g., Peters and Hawkins 2009; Depondt and Green 2006; Pendleton 1995; Dharmaratne et al. 2000). At present, 90% of tourists in Bonaire are satisfied with park conditions, but several respondents noted increased pollution, coastal development, and crowding (Uyarra 2009), all of which contribute to declining reef condition (Jobbins 2006; Mora 2008; Garrod and Gössling 2008). Given diver ability to correctly assess reef quality (Uyarra et al. 2009), a major challenge for the BNMP, and many other MPAs, will be managing land influences on reefs to reverse current trends in reef health.

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