Financing Marine Protected Areas Through Visitor Fees: Insights from Tourists Willingness to Pay in Chile

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Abstract Tourism is a financing mechanism considered by many donor-funded marine conservation initiatives. Here we assess the potential role of visitor entry fees, in generating the necessary revenue to manage a marine protected area (MPA), established through a Global Environmental Facility Grant, in a temperate region of Chile. We assess tourists' willingness to pay (WTP) for an entry fee associated to management and protection of the MPA. Results show 97 % of respondents were willing to pay an entrance fee. WTP predictors included the type of tourist, tourists' sensitivity to crowding, education, and understanding of ecological benefits of the MPA. Nature-based tourists state median WTP values of US\$ 4.38 and Sun-sea-sand tourists US\$ 3.77. Overall, entry fees could account for 10–13 % of MPA running costs. In Chile, where funding for conservation runs among the weakest in the world, visitor entry fees are no panacea in the short term and other mechanisms, including direct state/government support, should be considered.

Keywords Consumer surplus ·
Social–ecological systems · Nature-based tourism ·
Human dimensions · Contingent valuation · MPA ·
Aichi targets · Conservation

INTRODUCTION

In 1992 the Convention on Biological Diversity set ambitious targets for marine conservation, aiming to protect at

least 10 % of all marine ecological regions (Wells et al. 2007). This target was re-emphasized in 2010, with a new strategic plan to enhance international efforts at stopping degradation of the world's biological heritage termed the “Aichi Targets” (CBD 2013). The target includes developing a network of sustainable use and well managed marine protected areas (MPAs) defined by the World Conservation Union (IUCN), as “any area of inter- or sub-tidal terrain with its overlying water, associated biodiversity, historical and cultural features, which has been reserved by law or other effective means, to protect part or all of the enclosed environment” (Kelleher 1999; Wells et al. 2007).

During the last three decades MPAs have proliferated globally (WDPA 2010). However, many have been described as “paper parks”—they exist legally, but with limited on ground achievement of conservation objectives (Dharmaratne et al. 2000; Castilla 2008; Reid-Grant and Bhat 2009; Thur 2010). A primary reason for this is that they are not able to secure sufficient financial resources for management, boundary delineation, and enforcement (Depondt and Green 2006; Baral et al. 2008; Gravestock et al. 2008). Consequently, implementing financing mechanisms for management of MPAs is a challenge worldwide and a corner stone of successfully achieving the Aichi targets (Baral et al. 2008; Reid-Grant and Bhat 2009; Thur 2010).

Recreational benefits supplied by MPAs offer financing strategies that could generate revenue and contribute to their funding (Dharmaratne et al. 2000; Depondt and Green 2006; Togridou et al. 2006; Peters and Hawkins 2009). Many researchers have used contingent valuation surveys to elicit the willingness of visitors to pay (WTP) for access to MPAs as a tool for setting or reviewing entrance fees. For instance, a recent study of recreational benefits in the Bonaire Marine National Park shows how annual user fees,

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charged to recreational divers, could potentially increase six-fold, with no impact on visitation rates (Thur 2010). A user fee based on the estimated recreational value of Montego Bay Marine Park in Jamaica, could double annual income for management (Reid-Grant and Bhat 2009). In addition, tourists in China were willing to pay an additional 70 % for an entry fee into a protected area centered on a lake (Wang and Jia 2012). Moreover, research at the Mombasa Marine National Park and Reserve in Kenya, suggests that local citizens and foreign tourists were willing to pay an extra US\$ 2.20 and US\$ 8 per visit, respectively, to support reef quality improvements (Ramson and Mangi 2010).

Most studies that have conducted surveys on the willingness to pay for access to MPAs have done so in tropical ecosystems and have established the utility of WTP through contingent valuation surveys as a tool to determine visitor fee levels (see Peters and Hawkins 2009 for a review). In addition, the success of some visitor fee schemes, which have used WTP approaches to assess consumer surplus, have attracted worldwide attention and encouraged other MPAs to follow their lead (Peters and Hawkins 2009). Unfortunately, research concerning the role of visitor fee implementation for MPAs in temperate ecosystems, has not received the attention it deserves. This lack of knowledge may lead to underestimating fees for existing MPAs or to overestimating the potential revenues from user fee implementation when designing MPA financial models, with important consequences over the capacity of temperate MPAs to achieve effective conservation targets.

Chile has recently been classified as one of the 40 underfunded countries for biodiversity conservation (Waldron et al. 2013). Thus, the implementation of park visitor fees could provide an important alternative for financing MPA running costs. Here we assess the potential of increasing revenue generation by levying entry fees on visitors in Lafken Mapu Lahual, a temperate ecosystem MPA. From its original design the MPA project stated that administration and running costs should be achieved through revenues from tourism (PNUD 2005). Currently, the area is legally constituted, but has struggled to define and implement a zoning plan and a clear financial structure (PNUD 2011).

The purpose of this paper is to analyze whether entrance fees are an appropriate vehicle for funding the Lafken Mapu Lahual MPA and to examine characteristics which determine visitors WTP, which could provide challenges and opportunities for achieving financial sustainability through visitor fees. To our knowledge, this is the first study that explicitly investigates the economic potential of entrance fees for financing MPAs in a temperate region of Chile as a way to bridge the gap from planning to the practical implementation of MPAs.

MATERIALS AND METHODS

Study Area

There are currently 13 marine biodiversity conservation areas in Chile distributed between Natural Sanctuaries, National Monuments, Marine Parks, Marine Reserves, and Marine Coastal Protected Areas (Gelcich et al. 2011). Our study focussed on Lafken Mapu Lahual (DS 517/2005), one of three Multiple use MPAs created in Chile in 2005 and funded by a 5-year Global Environment Facility grant (GEF) named “Protecting Marine Biodiversity of Global Importance throughout the Chilean Coast” (PNUD 2005). Lafken Mapu Lahual extends for 32 km of exposed coast in a temperate region of southern Chile (Fig. 1; 40°37'S–40°48'S). Annual precipitation is high, and ranges from 1800 to 7000 mm year^{−1} (Armesto et al. 1996). The MPA protects 4463 ha of sandy beaches, intertidal–subtidal rocky shores and small islets. Emblematic marine species such as Peale's dolphin (*Lagenorhynchus australis*), South American sea lion (*Otaria flavescens*), the sea otter (*Lontra felina*), and both Humpback whale (*Megaptera novaeangliae*) and Blue whale (*Balaenoptera musculus*) are protected along its coast. MPA zonation developed by the government considers at least one “No-take,” “Sustainable use,” and “Buffer” zones (Plan general de Administracion Lafken Mapu Lahual 2009). Annual management costs estimated for Lafken Mapu Lahual's administration, surveillance and enforcement were estimated at US\$ 343 620 per year by the area management and administration plan (Plan general de Administracion Lafken Mapu Lahual 2009).

Approximately 700 people of Mapuche–Huillliche origin inhabit the surrounding terrestrial areas of the MPA (Cheuquepil 2005). Of these, only 20 % are permanent residents (Cheuquepil 2005), as women and children from March to December move to closer towns, where access to formal education, hospitals, and provision of basic resources is available. Agriculture, cattle ranching, artisanal fin-fishing and benthic resources extraction, are the main livelihoods of the Mapuche–Huillliche communities inhabiting those areas (Molina et al. 2006). There are six areas that grant exclusive territorial user rights for fisheries to local fisher unions for harvesting benthic resources (Gelcich et al. 2010) in the surrounding areas of Lafken Mapu Lahual.

A network of nine private terrestrial protected areas managed by indigenous Mapuche–Huillliche communities is adjacent to Lafken Mapu Lahual's coast and fosters Nature-based and ethnic tourism activities (Cheuquepil 2005). Approximately 2000–3000 tourists per year visit this network (Park authority, pers. comm., June 2010), at an entry fee of US\$ 1.80 per visit. The National Chilean

Fig. 1 Schematic representations of the survey sites (*black dots*), and Lafken Mapu Lahual MPA. Heterogeneity in the MPA environments and sampling areas can be observed in the photographs: **a** camping site near to the park, **b** coastal forest trails, **c** mouth of river Hueyelhue, **d** coastal cliffs

Tourism Service (SERNATUR) statistics has estimated that 10 000 tourists per year visit the MPA area and its surroundings.

Data Collection

From January to April 2010 we surveyed 604 tourists visiting the Lafken Mapu Lahual MPA. Surveys were first pre-tested with 35 pilot questionnaires that allowed both question rewording and reconfiguration. Four surveyors applied on-site questionnaires in a face-to-face manner at venues frequented by tourists. These included beaches, estuaries, forest trails, shops and the boat dock in Bahía Mansa (Fig. 1). Tourists interviewed were randomly chosen by selecting one of every three encounters. Out of a total of 650 respondents requested to complete the surveys only 46 declined. When approaching respondents we

explained the objectives of the survey and asked for consent to use their responses. The survey was divided into two main sections: (1) a contingent valuation of WTP for an entry fee, (2) determinants of tourists WTP for an entry fee.

The Survey

Contingent Valuation

To estimate tourists WTP for an access fee to Lafken Mapu Lahual, we applied a contingent valuation method (CVM) which is a stated preference approach (Vásquez-Lavín et al. 2007). The CVM determines a WTP that is contingent on a hypothetical set of circumstances, such as improving MPA management. The determinants of a WTP are therefore contingent upon those attributes of the resource being

realistically described to the respondent which forms the basis of the respondent's reasoned decision of an appropriate payment for those attributes (Peters and Hawkins 2009). In this way, CVM is able to assess an individual's willingness to pay for hypothetical increases in attributes of a MPA through a hypothetical change in the entry fees. Importantly for the Chilean context, where tourists frequently visit multiple sites in one trip, it can reliably value WTP regardless of whether the destination is the primary or secondary purpose of the trip (Vásquez-Lavín et al. 2007).

In the Lafken Mapu Lahual contingent valuation survey, respondents were asked to state their maximum WTP for an entrance fee to access the MPA in a hypothetical "better condition" from status quo. This "better condition" arose as a consequence of implementing four measures which are part of the future developments prioritized for the area: increased enforcement of the area to strengthen biodiversity conservation, implementation of programs offering nature-based recreational activities, implementation of a specific program for marine mammal conservation and implementation of an environmental education program. The four measures were developed in consultation with the MPA administration. The survey did not ask for existence or bequest values. To elucidate respondents' WTP within the contingent valuation scenario we used a payment card approach, where respondents were presented with a series of bid intervals ($n = 30$) to choose from. Respondents not willing to pay an entrance fee were requested to state the reason for their response.

The literature reports the existence of biases when applying CVM due to the hypothetical nature of the propositions to be valued (Diamond and Hausman 1994). Important sources of bias include: (a) design bias, involving subjectivity in the establishment of a payment vehicle, (b) hypothetical bias, usually an upward bias in WTP involving a discrepancy between the value that respondents state and what they think or believe due to the fact that the payment may not be present (Alfnes et al. 2010), (c) strategic bias, tendency to use their WTP value to make a political statement against the implementation of user fees (Vásquez-Lavín et al. 2007; Baral et al. 2008). While bias cannot be entirely removed from CVM, it can be controlled (Vásquez-Lavín et al. 2007; Baral et al. 2008). In this study we controlled for design bias by using the entrance fee as a familiar payment vehicle which provides a fairly concrete contingency factor. Hypothetical bias was diminished by describing the "better condition" of the MPA in detail (Alfnes et al. 2010). Surveyors complemented their oral explanation with visual images containing local maps and pictures. In addition, it was diminished by suggesting to the visitors that the MPA might in fact implement the entrance fee (Baral et al. 2008). To diminish any tendency of

respondents to state extreme WTP values, two different payment cards were used (Bateman et al. 2002). Follow-up questions were added in the survey, to identify WTP protest bids. Protest bids were excluded from final WTP analysis.

Determinants of WTP

Possible determinants of WTP were included in the survey. Respondents were asked basic socio-demographic information. They were also asked to prioritize the type of tourism experience they prefer in their holidays. Tourists' preferences could be broadly categorized as those prioritizing a specialist Nature-based experience or a more general interest, Sun-sea-sand tourism experience (Biggs et al. 2011; Christou 2012). Categories were defined as Nature-based or Sun-sea-sand. In addition respondents were asked to score, two statements related to the awareness of MPA existence prior to the visit, and the ecological benefits of MPAs. The statements were phrased as: "I was aware of the existence of MPAs prior to the visit to Lafken Mapu Lahual" and "The ecological benefits of MPAs are not well known." A continuous line with two anchor points, "strongly agree" and "strongly disagree," and a clear "indifference" line in the middle, was presented to interviewees to mark their responses. Marked answers were subsequently measured and scored as the positive or negative distances from the central zero point. This resulted in a coding of the statements in a continuous numerical scale from -10 to $+10$. These values were included as independent variables in the regression model for WTP. Finally, sensitivity to crowdedness was measured showing two images of local beaches with contrasting levels of crowdedness that were scored using a 20 point numerical scale with anchor points, "dislike a lot" and "like a lot." Images corresponded to a crowded beach in Chile (ca. 1 individuals per m^2) and a non-crowded beach of the MPA (ca. <0.1 individuals per m^2). Scores were grouped in four different categories: (1) non-sensitive, (2) indifferent, (3) sensitive, and (4) strongly sensitive. To include sensitivity to crowdedness in regression models a variable was constructed using the difference in scores from the crowded and non-crowded images.

Regression Model

Different regression approaches can be used to assess WTP and its determinants. We chose to use a Weibull Proportional Hazards Regression Model from survival analysis which allows the analysis of WTP interval bids as dependent variables. Different applications of this approach have been used for WTP estimates (Hanley and Kristrom 2002;

Hakansson 2008). Statistical procedures related to survival analysis (Klein and Moeschberger 2003) for WTP are based on accelerated failure time models (Wei 1992) and proportional hazards models (Kalbfleisch and Prentice 2002).

In essence, the Weibull regression is used to model the probability that a subject expresses a greater WTP than a determined fixed amount w . It assumes that the probabilistic behavior of this random variable follows a Weibull distribution. Please refer to Electronic Supplementary Material Appendix S1 for detailed statistical procedures on how WTP was derived and estimated.

Median WTP for Sun-sea-sand and Nature-based tourists was estimated with the adjusted Weibull model using average values for independent variables and the mode for education. Overall contribution from visitor fees at Lafken Mapu Lahual were estimated by aggregating the median maximum park fee that respondents were WTP across predictions of annual arrivals to the surrounding areas of the MPA (10 000 visitors: SERNATUR 2008). Thus, we associated welfare estimates from tourists WTP to actual fees.

RESULTS

In total we surveyed 604 tourists, the majority of respondents (63 %) have residences less than 300 km away from Lafken Mapu Lahual. Another 45 % live further than 300 km away and only 2 % are foreigners. The average monthly income of respondents is US\$ 1084 (min = US\$ 300, max = US\$ 4000). The majority of respondents (68 %) had university degrees, compared to a national average of 16 % (INE 2002). Of the total sample, 35 % of respondents are considered to be Nature-based tourists while the rest, Sun-sea-sand tourists. In general respondents were aware of the existence of the MPA (average score 6.5 SD 3.3). No significant differences were found between Sun-sand-sea and Nature-based tourists on the awareness of MPAs (Mann–Whitney test, $P = 0.17$). Tourists had little knowledge on the ecological benefits of the MPA, most agreed to the statement “The ecological benefits of MPAs are little known.” This response produced an average score of 6.6 (SD 3.5). No significant differences were found between Sun–sea–sand and Nature–based tourists (Mann–Whitney test, $P = 0.47$). Sensitivity to crowdedness on beaches showed high heterogeneity. However, Nature-based tourists showed to be more “sensitive” and “strongly sensitive” to crowdedness in beaches (Table 1). For example, 25 % percent of Sun-sea-sand tourists fell into the categories of non-sensitive or indifferent, while only 2 % of Nature-based tourists fell within those categories.

Table 1 Respondents (%) classified according to their level of sensitivity to crowding in beaches

Tourist category	Non-sensitive (%)	Indifferent (%)	Sensitive (%)	Strongly sensitive (%)
Nature-based ($n = 213$)	1	1	68	30
Sun-sea-sand ($n = 391$)	15	10	60	15

Contingent Valuation

Out of a total of 604 surveys, 18 WTP answers were considered as protest bids and excluded from final analyses. Protest bids related to the fact that “All coastal areas are public goods and therefore must have unrestricted and free access.” Ninety-seven percent of interviewed tourists stated positive WTP values. No significant differences were observed from different format value tables applied in the survey to ask for WTP values (Kolmogorov–Smirnov $D = 0.05$; $P < 0.05$).

Of six explanatory variables added in the Weibull Proportional Hazards Regression Model, four showed to be significant at a $P < 0.05$ level (Table 2): in essence, tourists with a higher educational level (as a block variable) stated higher WTP values; tourists with higher sensitivity to crowdedness stated higher WTP values; tourists who assigned higher scores to the statement “The ecological benefits of MPAs are not well known” stated lower WTP values and Nature-based tourists stated higher WTP (Table 2). “Awareness of the existence of MPAs prior to the visit to Lafken Mapu Lahual” was not a significant predictor of tourists WTP values for the entrance fee. Figure 2 shows the WTP probability for Sun-sea-sand and Nature-based tourists for the whole range of bids. Using the estimated Weibull distribution, we can determine that Nature-based tourists state median WTP values of US\$ 4.38 and sun-sea-sand tourists a value of US\$ 3.77. Considering this WTP welfare estimation and the maximum annual tourist flux reported by SERNATUR (10 000 visitors). If a fee was implemented considering Nature-based WTP values total welfare could reach US\$ 43 800. If a fee was implemented considering Sun-sea-sand tourists median WTP total welfare could reach US\$ 37 700.

DISCUSSION

Biodiversity conservation in Chile is underfunded (Castilla 2008; Godoy et al. 2010; Waldron et al. 2013). It is one of the four countries which can be found in both the bottom quartile of relative funding and the top quartile of threatened biodiversity globally (Waldron et al. 2013). Thus,

Table 2 Parameter estimates from a Weibull Proportional Hazards Regression Model to predict the maximum WTP value stated by respondents

Parameter	Value	SE	Z	P value
Intercept	1.434	0.203	7.085	<0.001*
Log (respondents monthly income (US\$))	−0.001	0.030	−0.018	0.985
Agreement with statement “I was aware of MPA before visiting Lafken Mapu Lahual”	0.0104	0.006	1.833	0.067
Agreement with the statement “The ecological benefits of MPAs are not well known”	−0.011	0.006	−1.981	0.047*
Primary studies	0.209	0.067	3.142	0.001*
Middle studies	0.132	0.074	1.769	0.077
Technical or undergraduate studies	0.185	0.146	1.264	0.206
Postgraduate studies	0.204	0.078	2.633	0.008*
Tourist preferences (1: sun-sea-sand; 0: nature-based)	−0.149	0.044	−3.359	<0.001*
Sensitivity to crowdedness in beaches	0.008	0.004	2.205	0.002*
Log (scale)	−0.693	0.031	−22.705	<0.001*
Scale	0.500			

* Level of significance at 0.05

Fig. 2 Sun-sea-sand and Nature-based tourists WTP probability to pay more than a specific visitor fee from the Weibull Proportional Hazards Regression Model. The figure indicates the whole range of bids

finding ways to fund biodiversity conservation in Chile is a critical challenge. Our study shows that an initial vision of the government and international donors for funding the

Lafken Mapu Lahual MPA through Nature-based tourism is unlikely to succeed in meeting expenditures, due to an insufficient income stream from visitor fees in the short term. In addition, we show that broader considerations such as the preferences of different tourist market segments and tourist sensitivity to crowdedness may provide opportunities and challenges for the potential for expansion of tourism to increase funding. The limited ability of visitor fees to meet MPA management costs suggests that proponents of MPAs such as NGOs and international donors need to explore alternative and additional funding streams to achieve the Convention of Biological Diversity Aichi targets with effective MPA conservation outcomes. We discuss each of these findings and their implications for funding MPAs in turn.

Insufficient Funding from Tourism Entry Fees

The inability to secure funds to regulate and enforce MPAs has globally been identified as one of the main causes that leads to their failure (Mora et al. 2006; Gravestock et al. 2008; Thur 2010). Results of this study show tourism is not a “panacea” needed to self-finance Lafken Mapu Lahual. In the attempt to get Lafken Mapu Lahual and other two MPAs approved in Chile, the GEF grant might have created a false sense of security and over-reliance on tourism. This is evident in the GEF project which created the areas and which states that the tourism industry (visitor fees) would be able to generate revenues equaling 98 % of their annual estimated administration costs (PNUD 2005, 2011). Although 96 % of tourists interviewed at Lafken Mapu Mahual are WTP an entrance fee the amounts are not enough to cover the management costs of this protected area even after the hypothetical improvements have been made. Calculated visitor fees could achieve an estimated 10–13 % of MPA management costs.

In contrast to tropical reefs ecosystems in the Caribbean and Australia, Nature-based tourism in relatively isolated temperate regions seems to be insufficient to finance the management costs of an MPA in the short term (Dhararatne et al. 2000; Geoghegan et al. 2001; Edwards 2009; Reid-Grant and Bhat 2009). Similar results have been found in terrestrial systems, where Nature-based tourism is also touted as a way in which conservation areas can be funded and benefits delivered to local communities—but where funding from Nature-based tourism alone has frequently been found to be insufficient to cover management and development costs (Kiss 2004; Biggs et al. 2011). Even in instances where funding is sufficient from Nature-based tourism, it is often wise to diversify income streams because of the risks and uncertainties involved in the global tourism market (Hall 2010). An MPA based on different income streams, and diversified livelihood strategies is

likely to be more resilient to crises and change than one based on Nature-based tourism alone (Biggs et al. 2011).

Additional and Alternative Income Streams

Our study suggests that specialist Nature-based tourists represent a potentially valuable source of additional income. Their WTP for an entrance fee is higher than Sun-sea-sand visitors (US\$ 4.3 as opposed to US\$ 3.7). In addition, foreign tourists at our study site are clearly under-represented. A recent study (SERNATUR 2012) found that 64 % of foreign visitors to Chile do so with the main purpose of enjoying nature and visiting protected areas. Specialist Nature-based tourists are willing to travel larger distances and pay higher fees for high quality biodiversity experiences (Balmford et al. 2009; Biggs et al. 2011). This source of income from foreign visitors is currently poorly developed at Lafken Mapu Lahual and in the surrounding region as it offers a great potential to increase visitor fees in the future. Maybe an entrance fee by tourist segment could be designed, where two or three tier pricing for local, foreign and dive tourists could result in different and increasing fees (Peters and Hawkins 2009). Evidence from another temperate MPA in Chile, where emblematic species (i.e., elephant seals, whales) are the main conservation target and where visitors are mainly foreigners with high expenditures, show income from visitors fees could be significantly higher (Miranda et al. unpublished data). Importantly, if a tiered pricing system is to be considered for MPA financing, tourist sensitivity to crowdedness on local beaches and coasts suggests that the attraction of larger numbers of tourists requires careful management (Dimmock 2012).

Furthermore, alternative income streams beyond visitor fees need to be developed. Research on funding conservation in terrestrial environments also suggests the importance of additional income streams beyond Nature-based tourism (Biggs et al. 2011). In Chile, studies have identified possible complementary income streams to scale up and finance MPAs in various forms. These include Payments for Ecosystem Services schemes (Gelcich et al. 2011), the sustainable harvesting of resources within the protected area (Gelcich et al. 2012), and the creation of additional income sources for the communities and protected area agencies in the surrounding region. Active collaboration between academics, regional governments, non-governmental authorities, fishers, private sector, and tourists, is required for the development of these types of alternatives (Gelcich et al. 2011). Due to regular changes in the organization of local authorities and the differing visions and priorities of local stakeholder groups such coordination requires a long-term commitment. Local time frames for management and action are often different to

those of international donors funding MPA implementation, thus state/government support becomes vital. This is a critical lesson from the experience at Lafken Mapu Lahual.

Where higher levels of social capital exist (Wondolleck and Yaffee 2000) and time frames are better adjusted to local realities, collaboration can lead to more sustainable bottom-up initiatives and to develop alternative income sources beyond tourism (Pretty and Smith 2004). For example, the “Council of Navidad” in Chile, began a grass root movement which took 7 years to generate a no-take MPA. This platform is acting as a seeding ground for future local tourism development (Gelcich et al. 2011).

Directions for Future Research

Our objective in this study was to ascertain the level of financing that could be generated from visitor fees to fund the management and protection of the Lafken Mapu Lahual MPA. Investigating the spatial distribution of the benefits and the contribution to that revenue by different groups was not part of the scope of our study. Future studies that evaluate these issues at Lafken Mapu Lahual or elsewhere can provide insight into how the distribution of financial contributions, costs and benefits of an MPA may affect longer term social and conservation outcomes (Walpole and Goodwin 2000; Robards et al. 2011).

The presence of high levels of social capital and a community of practice around the management of an MPA will increase the likelihood that challenges that stem from the unequal distribution of costs and benefits from an MPA can be negotiated and navigated (Berkes 2004; Cundill et al. 2012; Marin et al. 2012). A further valuable area of future research is exploring which social processes and mechanisms strengthen the capacity of different MPA stakeholders to successfully navigate potential conflict around the distribution of costs and benefits. In addition, an estimation of economic value of a suite of ecosystem services of the area which includes uses for multiple stakeholders could help government realize the benefit of the MPA and invest in its enforcement. This is something to be explored in the future.

CONCLUSION

Our findings suggest that the development and sustainable funding of MPAs through tourism is a complex process that goes beyond the establishment of visitor fees and requires a long-term commitment from proponents such as international aid agencies. Ample time is required to develop the necessary partnerships, social processes, and local communities of practice for a tourism-oriented MPA to successfully cope with the financial and other challenges that it

faces over time (Berkes 2004). Our suggestion echoes calls for longer funding time frames for community-based tourism and conservation initiatives more broadly (Kiss 2004; Mee et al. 2008; Biggs et al. 2011). Longer engagement periods with local communities and other stakeholders will support the emergence of a shared vision for action based on mutual understanding. International agencies and central government need to facilitate and support the necessary social processes for an initiative co-managed by multiple-partners, including local communities, regional governments, the private sector and NGOs to succeed (Cundill et al. 2012). The difficulties in generating sustainable finance for an MPA through tourism in temperate Chile demonstrated in this study provide a basis for the evaluation of planning and implementation gaps in Chile and elsewhere.

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