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Lifestyle values, resilience, and nature-based tourism's contribution to conservation on Australia's Great Barrier Reef

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SUMMARY

Innovative partnerships for conservation are required to stem the tide of continued ecosystem degradation. Nature-based tourism is one such partnership. Yet the natural attractions that nature-based tourism depends on are under increasing anthropogenic threat. Because of their dependence on international visitors, nature-based tourism enterprises are under additional pressure from socioeconomic and political crises in a globalized world. Recent research shows that lifestyle values, the motives that entice owners and staff of tourism enterprises to live and work in a chosen natural attraction, strengthen the resilience of enterprises to crises. This paper empirically explores the relationship between the lifestyle values of nature-based tourism enterprises, their resilience, and their support of and contribution to conservation of Australia's Great Barrier Reef. Semi-structured interviews with the owners and senior managers of 48 reef tourism enterprises showed that those that reported high lifestyle values had higher levels of conservation ethic and participated more extensively in conservation actions. The relationship between resilience and conservation ethic was not statistically significant. Bureaucratic, regulatory and cost constraints, and a lack of knowledge, limit enterprise participation in conservation. Conservation agencies can work to reduce some of these constraints to ensure that conservation benefits from nature-based tourism enterprises are maximized.

Keywords: coral reefs, crises, ecotourism, Great Barrier Reef, lifestyle values, marine conservation, nature-based tourism, resilience

INTRODUCTION

For conservation to succeed in the 21st century, innovative partnerships to conserve biodiversity are urgently needed (Vermeulen & Sheil 2007; Boutin 2010; Rands *et al.* 2010). Nature-based tourism has been much cited as providing one such partnership (Goodwin & Swingland 1996; Balmford *et al.* 2009; Hall 2010) because it can harness economic and human values to contribute to conservation (Diamantis 1999; Kiss 2004; Naidoo & Adamowicz 2005). The individuals, organizations and societies that rely on a nature-based tourist attraction have an interest in its conservation, otherwise their income base and livelihoods are at risk (Spenceley & Goodwin 2007; Buckley 2009; Hall 2010). Sustainable nature-based tourism is defined as the direct enjoyment of relatively undisturbed natural areas in a non-damaging way that contributes to the continued conservation and management of the areas used (Valentine 1992; Orams 1995).

Nature-based tourism can contribute to conservation through four mechanisms. First, agglomerations of tourism enterprises can make a significant regional economic contribution, leading to policy support for biodiversity conservation initiatives that attracts tourists, such as national parks and protected areas (Rotherham *et al.* 2005; Buckley 2009; Frost & Hall, 2009). Second, nature-based tourism enterprises can take direct conservation action to improve their local environment and generate environmental awareness (Carlsen *et al.* 2001; Curtin & Wilkes 2005; Russell *et al.* 2008), thereby mitigating against the negative impacts of tourism activities on the environment (Buckley 2009). These actions include responsible wildlife-viewing practices, minimizing energy and water use, and offsetting carbon emissions. Third, tourists may improve their environmental behaviours as a result of positive visitor experiences and improve environmental practices in their own lives, particularly when the experience is interpreted by a tour guide (Birtles *et al.* 2002; Zeppel & Muloin 2008). Finally, visitors can also become 'ambassadors' for conservation initiatives (Powell *et al.* 2008), for example by contributing to an international protest if a resource is under threat (for example see Dobson *et al.* 2010).

However, nature-based tourism enterprises are under increasing pressure as the biodiversity they promote to visitors continues to degrade in many areas (Gössling & Hall 2006; Marshall *et al.* 2010; Biggs *et al.* 2011). Recent research suggests that the lifestyle values of nature-based tourism enterprises may be important in building the resilience of enterprises to crises (Biggs 2011). A resilient enterprise is defined as one that can maintain or grow its income and employment in the face of crises and change (Biggs 2011).

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Lifestyle values refer to the desire of enterprise owners and staff to live in a particular location because of its amenity values and associated quality of life. They form part of an entrepreneurial strategy that has lifestyle goals, often including the desire to find a sense of place, as well as profit-driven motives (Ateljevic & Doorne 2000; Bensemann & Hall 2010; Lai & Lyons 2011). Lifestyle values are a type of tacit value that is closely related to 'sense of place' and 'attachment to place' (Davenport & Anderson 2005; Anthony *et al.* 2009), which respectively refer to the way in which people assign meanings to places and derive meaning in their lives from places. Some place meanings translate into strong emotional bonds that influence attitudes and behaviours within places (Davenport & Anderson 2005).

Tacit values, such as lifestyle values, are the most influential in determining stakeholder participation in efforts such as conservation, because they derive from and shape individual experiences and beliefs (Anthony *et al.* 2009). A community comprised of lifestyle-oriented entrepreneurs, such as the reef tourism sector, may therefore lead to the emergence of a community of practice for reef tourism and reef conservation (Barthel *et al.* 2010), where a group, or groups, of people share a concern for something that they do and learn how to do it better through regular interaction (Cundill *et al.* 2012). Such a community of practice in reef tourism, enabled by shared lifestyle values, can foster social learning for the management of reef tourism and conservation (Tidball *et al.* 2010). Thus, the emotional attachments of owners and staff of lifestyle tourism enterprises to their local environment and community create a community committed to a location and its conservation (Carlsen *et al.* 2001; Davenport & Anderson 2005; Cooke 2007).

Thus, enterprises whose owners and staff are motivated by lifestyle values are also likely to be reluctant to abandon the enterprise and location during difficult times (Getz 2004; Roberts & Tribe 2008). Lifestyle-driven entrepreneurs are therefore likely to stay in a nature-tourism sector for longer, and under more trying circumstances, than businesses solely driven by profit (Getz 2004; Biggs 2011), and participate in a community of practice (such as reef conservation; Davenport & Anderson 2005; Anthony *et al.* 2009; Barthel *et al.* 2010).

To date, relationships between lifestyle values and conservation behaviours have been explored in agricultural systems (see Davenport & Anderson 2005; Pannell & Wilkinson 2009) and the rural hospitality sector (for example Carlsen *et al.* 2001) The contribution of this paper is to empirically explore the relationship between lifestyle values, conservation ethics and actions, and the resilience of enterprises that operate in the coral reef tourism sector.

We focus on reef tourism enterprises on Australia's Great Barrier Reef (GBR) because of the reef's global significance for biodiversity (McCook *et al.* 2010) and nature-based tourism (Scott *et al.* 2012). Specifically, we address the following questions: (1) Are lifestyle values of tourism enterprises related to a higher level of enterprise support for conservation? (2) Are there differences in the extent of support for conservation between more resilient and less resilient enterprises? (3) What are the barriers and opportunities for tourism enterprises to contribute to conservation?

METHODS

Study area

The Great Barrier Reef Marine Park, created in 1975 (and subsequently designated as a World Heritage Area) to manage multiple uses and preserve the reef ecosystem, is managed by the Great Barrier Reef Marine Park Authority (GBRMPA). Domestic and international tourism to the GBR contributes AU$ 5.8 billion (AU$ 1 = US$ 1.07, May 2011) to the Australian economy per annum and sustains 55 000 jobs (Access Economics 2007). The majority of reefs on the GBR lie over 20 km offshore and require well-equipped boats to access. While there are over 900 active permits for conducting tourism operations in the GBRMP (GBRMPA 2009*a*), 50 enterprises are responsible for almost three-quarters of the tourist visitor days. Reef tourism enterprises on the GBR pay an Environmental Management Charge to GBRMPA of AU$ 5.50 per tourist per day (GBRMPA 2010), primarily to recoup a percentage of the cost of managing the Great Barrier Reef Marine Park; it contributed over AU$ 7 million (18.5%) to GBRMPA's annual budget in 2007 (GBRMPA 2009*a*).

The GBR is characterized by a strong relationship between reef tourism enterprises and reef management agencies (Harriot 2002). The contribution of tourism enterprises to control outbreaks of coral-feeding crown-of-thorns starfish (*Acanthaster planci*) provides an example of this relationship. Since the 1960s, outbreaks of crown-of-thorns starfish have led to mass mortality of corals (Brodie *et al.* 2005; De'ath & Fabricius 2010). Large-scale crown-of-thorns starfish outbreaks are a recent phenomenon probably related to a combination of fishing pressure and high nutrient loads from terrestrial run-off (Jackson *et al.* 2001; Brodie *et al.* 2005). The tourism industry has made large investments to preserve areas of living reef from crown-of-thorns starfish around tourist facilities by actively monitoring and removing starfish (Harriot 2002). Furthermore, since 2009, GBRMPA has actively provided incentives for conservation practices by allowing enterprises with Advanced Ecotourism certification with Ecotourism Australia to obtain an extended permit of 15 years for operating tours to certain areas on the GBR. Advanced Certification with Ecotourism Australia is awarded to enterprises that commit to achieving best practice in resource use, ecological sustainability and the provision of quality ecotourism experiences (Ecotourism Australia 2010). In addition, GBRMPA has also recently initiated a Climate Action Certification scheme that operators have begun to participate in (GBRMPA 2011; Zeppel 2011).

Interviews

Semi-structured interviews ($n = 48$) with owners and senior managers of reef tourism enterprises were conducted in the

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Table 1 The extent of participation in conservation action by enterprises were classified into three categories (where 0 = no participation, 1 = some participation and 2 = extensive participation).

Variable	*Description*	*Extent of participation in conservation action*			
		0	*1*	*2*	*n*
Recycle	Extent of enterprise recycling of materials in boats and offices	12%	18%	70%	34
Crown-of thorns-starfish eradication	Extent of participation in crown-of-thorns-starfish eradication	11%	4%	85%	27
Membership	Is your company a member of any voluntary reef or general conservation organization	22%	8%	70%	37
Donate	Does your company donate money to any reef or general conservation agencies?	54%	11%	35%	37
Fuel efficiency targets	Does your company have specific targets for energy conservation and minimal fuel use for the boats?	9%	19%	72%	32
Carbon	Does your company offset its carbon emissions?	73%	12%	15%	33
	Does your company have energy reduction targets for your offices	34%	37%	29%	35
	Does your company provide information to guests on how to offset carbon from their trip to Australia and with your company?	71%	8%	21%	38
	Does your company provide information to guests on increasing energy efficiency and reducing/offsetting emissions when back home?	66%	16%	18%	37
Education	Does your company educate guests on reef conservation issues?	3%	8%	89%	38
	Does your company make boats or space on boats available for environmental conservation?	6%	20%	74%	35

Cairns and the Whitsundays regions, where *c.* 88% of tourist visits to the GBR have occurred since 1994 (GBRMPA 2010). Our interviews targeted enterprises whose dominant source of income was taking visitors to reef attractions to dive and snorkel. Reef tourism enterprises that met this criterion were compiled using the GBRMPA list of Ecotourism Australia accredited operators, internet searches and meetings with local tourism offices (Biggs 2011) ($n = 76$). The 76 enterprises were contacted on at least three occasions by telephone and email, and the 48 enterprises willing to be interviewed were included in this study. We conducted one interview per enterprise. We interviewed enterprise owners and senior managers because they play a leading role in determining the fate of particularly small and medium-sized enterprises. We therefore assumed that the responses of the interviewees represented the response of the enterprises. This assumption, and the role that enterprise size plays in enterprise behaviour (Hall & Williams 2008; Biggs 2011), led us to eliminate one large enterprise from the sample because it had > 500 employees. This enterprise was nearly five times the size of the next largest enterprise measured by the number of employees. On average, the enterprises included in our analysis had 22.3 employees. In some cases, pertinent quotes were recorded verbatim (but interviews were not tape-recorded). Interviews varied in length from 25 to 90 minutes, and not all enterprises responded to all the survey questions.

Conservation support and action

We measured the conservation ethic of enterprises, their participation in conservation actions, their perceptions about climate change and the barriers that enterprises face in participating in conservation. We also investigated the conservation actions that enterprises participated in by asking about eight conservation actions: recycling materials, crown-of-thorns starfish eradication programmes, fuel efficiency targets, carbon emissions reduction programmes, contribution to education on reef conservation issues, membership of voluntary reef conservation organizations and donating to conservation (Table 1) (based on the method used by Trumbo & O'Keefe 2001). Participation in recycling and crown-of-thorns starfish eradication was measured with one question each (Table 1). Activities targeted towards the reduction of carbon emissions were measured using four questions pertaining to different energy and carbon reduction strategies. Education was measured by investigating the extent that enterprises educated tourists and used their boats and facilities for environmental education. We also measured whether enterprises were members of, or donated to conservation agencies. The extent of participation in conservation actions was measured on a three-point Likert scale (Likert 1967). The extent of enterprise participation in conservation actions was recorded in three categories in response to the question, 'to what extent does your enterprise participate in an action?' The response categories varied from 0 = no participation to 2 = extensive participation. Respondents were asked to provide details of their actions to illustrate the extent of their participation in conservation actions. Conservation ethic of enterprises was measured with a single item anchored by a five-point Likert scale of the response to the statement, 'Our business considers the conservation of the reef and the maintenance of its health, of utmost importance, no matter

Table 2 Descriptive statistics of the conservation, enterprise resilience and lifestyle variables. Measures of enterprise resilience and lack of resilience were assessed on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). *See Appendix 1 (supplementary material at Journals.cambridge.org/ENC) for details of composite scales.

Variable	*Description*	*n*	*Mean*	*SD*	*Range*
Conservation ethic	Extent of agreement with the statement, 'Our business considers the conservation of the reef and the maintenance of its health, of utmost importance, no matter how difficult and dire the situation for our business may be'.	47	4.70	0.55	2
Resilience	Enterprise resilience: a five-item composite scale*	47	3.77	0.63	2.6
	Exit now: extent of agreement with the statement, 'I am looking for opportunities to move out of the reef-based tourism sector'	47	2.28	0.99	4
Lifestyle	Lifestyle values: a five-item composite scale*	47	4.16	0.56	2.83

how difficult and dire the situation for our business may be' (Likert 1967; Table 2).

We selected the conservation actions that we measured from discussions with key informants in reef tourism and conservation. In addition, we measured the extent to which enterprises perceived climate change as important for their future well-being. We used open-ended questions and discussion to obtain information from enterprises on the perceived barriers and constraints in their contributions to conservation.

Enterprise resilience and lifestyle values

To gauge enterprise resilience, we developed a composite scale using five items, each measured with a five-point Likert scale, where 1 = strongly disagree and 5 = strongly agree (Likert 1967; Bernard 2002). The five items addressed interviewee's perceptions of: (1) their enterprise's ability to adapt to change, (2) confidence for the future, (3) availability of options to stay working in reef tourism, (4) likelihood of staying in the reef tourism industry in the future, and (5) ability to endure future changes in the industry (Appendix 1, Table S1, see supplementary material at Journals.cambridge.org/ENC; detailed further in Biggs 2011). We also measured the extent to which the owners and senior managers indicated that they were seeking opportunities to exit the reef tourism industry, as a measure of a lack of resilience, on a single item anchored by a five-point Likert scale (Table 2).

We developed another five-item composite scale to assess the extent to which lifestyle values motivate the participation of owners and senior managers in reef tourism enterprises (Appendix 1, Table S2, see supplementary material at Journals.cambridge.org/ENC and Biggs 2011 for a more detailed discussion of the lifestyle values scale). Each item was measured with a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The survey items addressed respondents': (1) love for the industry, (2) perception of reef tourism as the best working environment, (3) level of enjoyment from sharing experiences and knowledge of coral reefs with visitors, (4) enjoyment of the lifestyle of reef tourism, and (5) perspective on how important participation in reef tourism is for their personal identity (Appendix 1, Table S2, see supplementary material at Journals.cambridge.org/ENC). In addition, we collected qualitative data on the lifestyle values of interviewees by asking respondents, 'what are the best things about being involved in the reef-based tourism sector?'

Analyses

We calculated Spearman's rank correlation coefficient to ascertain (1) whether the lifestyle values of tourism enterprises are related to a higher level of enterprise support for, and participation in, conservation, and (2) whether there are differences in the extent of support for conservation between more resilient and less resilient enterprises. We also calculated the adjusted the p-values using the conservative Bonferroni correction for multiple testing (Quinn & Keough 2002; Field 2009). We coded and summed responses to the open-ended questions on barriers to enterprise participation in conservation. Finally, qualitative statements by interviewees about lifestyle values were coded, grouped into similar categories, and summed.

RESULTS

Conservation ethics and action, resilience and lifestyle value scores

Enterprises had high ethic scores (out of a maximum score of 5, 21% scored 4 and 75% scored 5; n = 47) (Table 2) and participated to varying extents in different actions. The majority of enterprises (> 70%) participated extensively in recycling, crown-of-thorns starfish eradication, membership, education and fuel efficiency targets (Table 1). Only 35% of enterprises donated extensively to conservation agencies, and extensive participation in carbon offsetting and emissions reduction activities varied between 15% and 29%. Thirty-seven enterprises (79%) felt that climate change is very important for their future due to adverse impacts on reefs. The majority of respondents (28/48 = 58%) mentioned participation in reef conservation as a critical part of their enterprise and its success during open discussion. Furthermore, enterprises felt that their clients want environmentally-conscious operations, as indicated by

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Table 3 Spearman's rank correlation matrix of the relationship between conservation ethic and actions, the lifestyle values of key enterprise staff and the levels of enterprise resilience. Results are exploratory and significance values are prior to the application of the conservative Bonferroni correction. $^{*}p < 0.05$. See Appendix 1 for details of composite scales.

Variable	*Conservation ethic*	*Recycle*	*Crown-of-thorns-starfish eradication*	*Membership*	*Donate*	*Fuel efficiency targets*	*Carbon*	*Education*
Lifestyle values composite scale	0.401*	0.420*	0.450*	0.093	0.047	0.101	0.067	0.218
Enterprise resilience scale	0.263	0.220	0.246	−0.038	0.038	−0.349	−0.186	−0.042
Exit now	−0.189	−0.269	−0.526*	−0.140	−0.351*	−0.019	−0.40	−0.050

the following quote from an enterprise owner, 'I contribute to conservation because it is my passion, it is the right thing to do and it makes sense for my business'.

The different measures of enterprise resilience (and lack of resilience) showed that enterprises were confident about their futures, other than in the face of a large crisis. The mean score on the composite scale for enterprise resilience was 3.77 (SD = 0.63, $n = 47$, Table 1). The mean score in response to the statement, 'I am looking for opportunities to move out of the reef-based tourism sector' was 2.28 (SD = 0.99, $n = 47$, Table 1).

The owners and senior managers of enterprises reported high lifestyle values associated with their participation in reef tourism (mean = 4.15, SD = 0.56, $n = 47$). Respondents reported that the most valued aspects of being involved in reef tourism included 'people you meet, interact and share the wonderful experience of the reef with' (64%), 'lifestyle' (57%), 'enjoying the beauty of the natural marine environment (45%), 'contributing to the education of people that you take out' (30%), and 'satisfaction in running an exciting and fun business professionally' (23%).

Relationship between lifestyle values, conservation and enterprise resilience

The conservation ethic of enterprises was positively correlated with the composite scale of the lifestyle values of enterprise owners and senior managers (Table 3). The extent to which enterprises participate in recycling and crown-of-thorns starfish eradication were also positively correlated with the lifestyle values of senior enterprise staff. However, after the application of the conservative Bonferroni correction (Quinn & Keough 2002), these relationships were no longer significant.

There was a negative correlation between enterprises currently seeking to exit reef tourism and the level of contribution to crown-of-thorns starfish eradication and level of donations given to conservation agencies (Table 3). However, this relationship did not remain significant after the application of the Bonferroni correction. There were no other significant correlations between measures of enterprise resilience and lack of resilience, and support for conservation.

Barriers to and opportunities for enterprise contribution to conservation

Four main barriers and opportunities to enterprise participation in conservation action emerged from our study based on responses by enterprises. These are regulatory and bureaucratic obstacles, infrastructure constraints, lack of knowledge and cost. Most respondents mentioned barriers, but some opportunities were highlighted as well. First, eight out of 38 enterprises (21%) mentioned regulatory and bureaucratic barriers to taking pro-conservation steps. More specifically, 16 out of 38 (43%) of enterprises were concerned about the bureaucracy and inefficiencies associated with how GBRMPA's Environmental Management Charge was spent to achieve conservation outcomes. One interviewee stated, 'We want to use alternative fuel sources for our boats, but the Marine Safety Authorities won't allow us'. Second, infrastructure constraints were mentioned as obstacles to conservation. Examples included lack of recycling facilities in the marinas in Cairns and the Whitsundays and difficulty using biodiesel. The latter was mentioned by several participants: 'we are trying to move to green (bio)diesel, but marina infrastructure challenges are a constraint'. Third, enterprises also reported that they lacked the knowledge to participate effectively in carbon offsetting.

Finally, cost was mentioned as a barrier. While certification for advanced ecotourism practices is an example of how the commercial and conservation interests of enterprises can be connected, the cost thereof was mentioned as a problem. Twenty out of 48 (42%) of interviewed enterprises had Advanced Ecotourism Australia certification. Enterprises indicated that the Advanced Ecotourism Australia accreditation was worthwhile because of the marketing value and the opportunity to gain access to a longer term permit, as reflected in the following quote, 'We have advanced Ecotourism certification which gets us to keep a longer GBRMPA permit (i.e. 15 years instead of seven). We are also doing Ecotourism Australia Climate Action certification. This is the right thing to do and it is good for marketing'. However, a few enterprises mentioned that the Ecotourism Australia certification was expensive, a lot of paperwork, and was more about branding than improved environmental practice. As a respondent said, 'Ecotourism Australia is too much paperwork, and is not that useful as a reflection of environmental consciousness'. Another had a similar

sentiment, 'Ecotourism Australia certification is a lot of paperwork and it is expensive'.

DISCUSSION

This paper is the first exploration of the relationship between the lifestyle values of owners and senior staff of coral reef tourism enterprises, contribution to conservation and enterprise resilience to crises. We showed that enterprises with higher lifestyle value scores considered reef conservation to be more important. They participated to a greater degree in selected conservation actions (but not all actions) compared to enterprises with lower lifestyle values. Overall, our results did not show a significant positive relationship between enterprise resilience and contribution to conservation. However, Biggs (2011) showed through regression analysis that lifestyle values are a significant predictor of enterprise resilience. Thus, even though there is no direct statistically significant relationship in our study, lifestyle values may serve as a potential link between enterprise resilience and enterprise contribution to conservation.

Our results align with research on tourism enterprises in several sectors that also highlight the importance of lifestyle considerations and an attractive environment in the establishment of rural enterprises (such as the accommodation sector; Dewhurst & Thomas 2003). Such lifestyle-motivated rural enterprises are typically also interested in contributing to the conservation of their chosen locale (Carlsen *et al*. 2001). Similarly, lifestyle values are important in decision-making among small scale fishers in south-east Asia (Pollnac *et al* 2001), farmers in Australia (Holmes & Day 1995; Pannel & Wilkinson 2009) and foresters in Virginia, USA (Kendra & Hull 2005). In addition, one study showed a relationship between the extent of lifestyle value orientation and a pro-environment and conservation attitude (Pannel & Wilkinson 2009).

Barriers to enterprise participation in conservation

Understandably, cost is an important consideration for tourism enterprises (Vernon *et al* 2003). Conservation actions that are simple and have a direct and visible benefit to tourism enterprises, and can be done at limited extra cost, such as the crown-of-thorns starfish removal in our study, are likely to be supported to a greater degree (Russell *et al*. 2008; Carmody & Zeppel 2009). In the GBR, because the majority of reef tour enterprises operate at only one or a few sites due to permit restrictions, keeping these sites in as healthy condition as possible is in their interest. In contrast, enterprise participation in conservation actions with higher cost of participation, and that yield public rather than private benefits (such as mitigation and offsetting of carbon emissions), is likely to be lower (Carmody & Zeppel 2009; Van Haastert & Grosbois 2010). Research from the hotel industry suggests that the majority of tourists are willing to pay only between 1 and 5% extra to cover the increased costs of renewable energy sources (Dalton *et al*. 2008). The cost of reducing carbon emissions is substantial for many tourism enterprises, particularly on the GBR due to the long travel distances to the reef. This cost factor may be important in explaining the low levels of participation in offsetting on the GBR (Table 1).

Regulatory and infrastructure constrains were also mentioned by interviewees as impediments to conservation. Regulatory barriers and bureaucratic delays directly limit pro-conservation activities (Carmody & Zeppel 2009) for example by restricting operating licenses for alternative greener technology on boats, or reuse of grey water in hotels (Gössling *et al*. 2012). Some delays are understandable (for example due to safety concerns), but unnecessary delays in the implementation of green technology is a barrier to conservation action and can be a financial burden, particularly on small enterprises (Russell *et al*. 2008; Biggs 2011). Similarly, infrastructure constraints (Carmody & Zeppel 2009), and a lack of knowledge about how to participate in conservation actions (such as mitigating carbon emissions through offsetting in the GBR) have been identified as a barrier to tourism enterprises participating in conservation actions elsewhere (Dewhurst & Thomas 2003; Carmody & Zeppel 2009; van Haastert & Grosbois 2010).

Removing obstacles to nature-based tourism's contribution to conservation

Conservation agencies (namely government, private sector and civil society organizations with a full or partial mandate of conservation) can actively contribute to reducing the obstacles that nature-based tourism enterprises face in contributing to conservation in three key ways. (1) By disseminating information and raising awareness about pro-conservation behaviours, such as improved carbon efficiency (see Simpson *et al*. 2008; Zeppel 2011; Zeppel & Beaumont 2011). (2) By contributing to, and lobbying for, the development of policies and infrastructure that enables enterprises to undertake pro-conservation actions (such as recycling and use of alternative fuels). (3) By promoting pro-conservation behaviours through incentives (for example longer term or more favourable operating permits to reward pro-conservation behaviours; see also Rivera 2002).

Harnessing nature-based tourism's potential contribution to conservation

Our finding that high lifestyle values and conservation efforts are linked present an opportunity to strengthen conservation outcomes in three key ways. First, enterprises characterized by strong lifestyle values can advance the conservation agenda within tourist associations and tourism representation bodies through partnerships with relevant government agencies and non-governmental organizations. For example, the Reef Water Quality Protection Plan on the GBR (Prange *et al*. 2009) emerged in part in response to the recognition of the

economic contribution of tourism to the GBR. Organized and vocal bodies that represent agglomerations of lifestyle-motivated nature-based tourism enterprises can increase the likelihood of such positive conservation outcomes emerging. Second, lifestyle and conservation-motivated enterprises are more likely to take direct conservation action to improve their local environment (for example the local eradication of crown-of-thorns starfish in the GBR, or a tourism company's efforts to reduce poaching in Zimbabwe's Hwange National Park; Wilderness Safaris 2011). Conservation actions by tourism enterprises are likely to become increasingly important as the threats to biodiversity continue to escalate through the 21st century (Rands *et al*. 2010). Third, enterprises characterized by higher lifestyle values are more likely to play an active role in generating awareness about the conservation value of the natural attractions their clients come to visit, and thus can play an important role in mobilizing awareness and contributing to an international outcry when a particular natural asset comes under threat. Nature-based tourism enterprises have added their voice to the international outcry against the proposed tarmac road through the Serengeti National Park (Dobson *et al*. 2010). This contribution to public awareness, and, if necessary, public opposition, to the degradation of natural areas may become increasingly important as pressure on natural resources increases.

Limitations and future research

This research was a first attempt to explore the link between the nature tourism enterprises' lifestyle values, contribution to conservation, and resilience. However, our sample size was limited, affecting the types of analyses and the significance values after the application of conservative Bonferroni correction (Kass 1980; Quinn & Keough 2002). Research with a larger sample size will allow for a more in-depth and sophisticated exploration of the relationship between lifestyle values, enterprise contribution to conservation and enterprise resilience. Moreover, further research may provide insights into why certain conservation actions (such as crown-of-thorns starfish eradication in our study) are positively correlated with higher lifestyle values and others (like education) are not.

A further limitation of the research is that conservation ethic was measured with a single-item scale. An individual's conservation ethic is a multi-faceted concept and future research can build on the findings presented here by developing composite measures of conservation ethics. Existing indexes and measures, such as the new environmental paradigm and the ecotourism ethics assessment, may provide a good starting point for such research (see Dunlap *et al*. 2000; Dunlap & York 2008; Nowaczek 2009; Moon & Cocklin 2011).

An area for future research is the perceived and real difficulties enterprises have with reducing their carbon footprint (Gössling 2010; Scott *et al*. 2012). Reef tourism is a carbon-intensive industry on Australia's GBR because of the distance to reefs from the main tourist ports. GBRMPA's Climate Change Action Strategy (GBRMPA 2009*b*) lists objectives and actions to reduce the carbon footprint of the reef tourism industry, for example by the revegetation of reef catchments to offset the industry's carbon emissions. The extent to which enterprises participate in these actions is an opportunity to further the understanding of the relationship between enterprises' lifestyle values, resilience and willingness to undertake conservation-oriented actions that have a cost to businesses. Similarly, the implementation of Australia's new Clean Energy Act (Australian Government 2011), also known as the carbon tax, presents an opportunity to investigate how reef tourism enterprises respond to a policy that supports healthy reef ecosystems but has a cost burden on enterprises (see Elks 2011; Scott *et al*. 2012). Moreover, there is a need to explore how the level of demand for carbon offsets by visitors affects the nature and the extent to which reef tourism enterprises aim to reduce their emissions (Doug Baird, Quicksilver Group, Australia, personal communication 2011; Mair 2011).

Additional research is warranted to further investigate the educational influence of nature-based tourism. There is evidence to suggest that the education and awareness benefits that visitors gain from a nature-based tourist experience depends on factors such as gender, levels of previous experience, and the type of wildlife encounter (for example boat or land-based) (Birtles *et al*. 2002; Zeppel & Muloin 2008). Guidance on educational strategies that work could inform programmes by nature-based tourism enterprises so that they can develop programmes that are effective at educating visitors.

We suggested in the introduction that a community of entrepreneurs motivated by lifestyle values may lead to the emergence of a community of practice for reef tourism and conservation (Barthel *et al*. 2010). We did not investigate this explicitly and the analysis of which types of enterprises, in which social and institutional contexts, enabled by which other factors support the emergence of a community of practice would be valuable. Evidence elsewhere suggests that government and other support, including appropriate legislation that enables the functioning of communities of practice for conservation, is important for communities of practice to succeed (Ostrom & Schlager 1996; Barthel *et al*. 2010). An understanding of the type of external and government support and facilitation that will enable communities of practice to emerge in conservation will be valuable.

CONCLUSIONS

Partnerships and synergies between conservation and other sectors are critical to stem the tide of biodiversity loss. Nature-based tourism enterprises whose owners and staff are motivated by lifestyle values are potentially valuable partners for conservation because of their conservation ethic. Conservation agencies can strengthen the opportunities for nature-based tourism enterprises to contribute to conservation

by (1) generating awareness and creating opportunities for enterprises to support and participate in conservation action; (2) actively supporting the development of infrastructure and policies that enable enterprise support of conservation; and (3) working in partnership with enterprises to reduce regulatory and other barriers that directly or indirectly hamper the ability and motivation for lifestyle-driven enterprises to contribute to conservation. Conservation agencies should grasp the opportunity that the nexus of lifestyle values and conservation, and potentially resilience, presents to ensure that nature-based tourism's contribution to conservation is maximized.

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