Conservation outcomes and sustainability of whale shark tourism in the Philippines

by

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B.Sc., University of Guelph, 2005
M.Sc., University of Victoria, 2011

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Supervisory Committee

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Abstract

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Biodiversity loss is one of the major environmental threats facing the planet. Incentive-based conservation is one means to reduce human pressure on wildlife by providing economic incentives for resource-dependent people to protect the environment. Marine wildlife tourism is one of the fastest growing tourism sectors globally and is viewed as an important incentive-based approach for achieving marine conservation goals. However, few studies have linked participation in the provisioning of marine wildlife tourism activities with positive social and ecological conservation outcomes. The goal of this dissertation is to provide greater understanding of the conservation value of marine wildlife tourism using whale shark tourism as a case study with a main focus on social conservation outcomes amongst tourism providers. Positive changes in perceptions, attitudes and values towards target species and their environments can be an important element of incentive-based conservation. The study has the following objectives: (1) to assess the status of the global whale shark tourism industry, including types (e.g., captive, non-captive), real and potential impacts, conservation value and management challenges and best practices; (2) to examine the ethics of provisioning whale sharks in Oslob, Philippines, the largest, non-captive viewing site in the world; (3) to determine if working in ecotourism changed the attitudes and behaviours of locals towards whale sharks and the ocean, and if tourism type affects those outcomes; (4) to assess the marine wildlife value orientations of locals

working in whale shark tourism to achieve greater understanding of the factors influencing their conservation attitudes and behaviours; (5) to explore the potential long-term impacts of poorly conceived incentive-based conservation projects on social and ecological conservation outcomes; and (6) to re-examine and update the conceptual and theoretical background for wildlife tourism in light of the findings of this study. Methods include a comprehensive literature review, tourist surveys, social media content analysis, and interviews with locals working in whale shark tourism at four sites in the Philippines. Results suggest that marine wildlife tourism can play an important role in changing locals' attitudes and behaviours towards the focal species and habitat; however, smaller-scale, more established sites had greater conservation value than the mass tourism or failed sites suggesting that small-scale, community-based ecotourism is the best approach to meeting conservation goals of marine wildlife tourism. Yet, few tourism sites meet these standards. Global standards are needed to ensure whale shark tourism activities meet desired conservation goals. Such standards should include management requirements (e.g., licensing, mandatory education program) and interaction guidelines (e.g. minimum viewing distances, limits on the number of swimmers/boats, etc.). The findings also emphasise that economics should not be the only or primary metric used to measure conservation success; rather, the focus should be on assessing a more comprehensive range of social and ecological conservation outcomes of these activities.

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Nomenclature

ACA = Annapurna Conservation Area

CBC = community-based conservation

CPR = common pool resource

DBCA = Department of Biodiversity, Conservation and Attractions

DOT = Department of Tourism

EFA = exploratory factor analysis

HWC = human-wildlife conflict

IATFMMC = Inter Agency Task Force on Marine Mammal Conservation

IBC = incentive-based conservation

IUCN = International Union for Conservation of Nature

LAC = Limits of Acceptable Change

LAMAVE = Large Marine Vertebrates Research Institution Philippines

MMWW = Mindanao Marine Wildlife Watch

MW = marine wildlife

MWT = marine wildlife tourism

NGO = non-governmental organization

PA = protected area

SCS = Stingray City Sandbar, Cayman Islands

TOSWFA = Tan-awan Oslob Sea Wardens and Fishermen Association

WSSA = Whale Shark Spotters Association

WST = whale shark tourism

WTM = wildlife tourism model

WVO = wildlife value orientation

WWF= World Wildlife Fund

Chapter 1 Introduction: Rationale and Objectives

1.1 Introduction

Biodiversity loss is a serious concern globally (Johnson et al., 2017). There has been an estimated 60% decline in wildlife populations over the last 40 years (WWF, 2018). Biodiversity provides a variety of ecosystem goods and services including crops, fisheries, biocontrol, carbon sequestration, primary production, soil nutrient mineralization, pollination, and freshwater purification (Cardinale et al., 2012). The main drivers of this biodiversity loss are overexploitation and habitat loss (Maxwell, Fuller, Brooks, & Watson, 2016).

Historically, biodiversity conservation has favoured the use of a top-down 'protectionist' perspective that focuses on excluding local communities from the natural resources in question under the belief it is the only way to achieve conservation goals (Adams et al., 2004; Brockington & Igoe, 2006; Terborgh, 2000; West, Igoe, & Brockington, 2006). However, these exclusionary approaches may be met with resistance and hostility from local communities, especially in developing countries where locals are highly dependent on the natural resources present in protected areas (PAs), resulting in noncompliance, including illegal and or unsustainable resource extraction (Adams et al., 2004; Adams & Hulme, 2001; Barkin, 2003; Brandon & Wells, 1992; Campbell, 2002; Gibson & Marks, 1995; Hackel, 1999; Kideghesho, Røskaft, & Kaltenborn, 2007; Struhsaker, Struhsaker, & Siex, 2005). Studies demonstrate that without community support and buy-in, ecological conservation outcomes are often difficult to achieve in the developing world (Baldus, Kibonde, & Siege, 2003; Barrow & Fabricius, 2002; Bawa, 2006; Brandon & Wells, 1992; Hackel, 1999; Kainer et al., 2009; Massey, King, & Foufopoulos, 2014; Stankey & Shindler, 2006; Vermeulen & Sheil, 2007).

Incentive-based conservation (IBC) emerged in the 1980s in response to this challenge. IBC focuses on the provisioning of incentives (e.g., employment, ecological services, compensation payments, health care, education, agroforestry, tourism development/promotion) as a means of gaining local support for conservation (Spiteri & Nepal, 2006; **Fig. 1.1**). IBC strives to integrate environmental protection with poverty reduction and community participation (Adams et al., 2004; Agrawal & Redford, 2006; Brockelman & Dearden, 1990; Campbell & Vainio-Mattila, 2003) based on the assumption that economic benefits derived directly from natural resources will lead to the conservation and sustainable use of those resources (Brooks, Franzen, Holmes, Grote, & Mulder, 2006; Campbell, 2007; Gibson & Marks, 1995; Salafsky et al., 2001; Stronza, 2007). Changes in locals' conservation awareness, attitudes and behaviours are considered social conservation outcomes. Community participation in conservation projects and the receipt of economic and social benefits from these projects is believed to lead to improved conservation perceptions (e.g., awareness and attitudes), which may, in turn, lead to pro-conservation behaviours (Chaigneau & Daw, 2015; Holmes, 2003; T. M. Lee, Sodhi, & Prawiradilaga, 2009; Pegas, Coghlan, Stronza, & Rocha, 2013; Spiteri & Nepal, 2006; Stem, Lassoie, Lee, Deshler, & Schelhas, 2003; Stronza & Gordillo, 2008). The reduction in negative behaviours (e.g., poaching) and increase in positive behaviours (e.g., participation in conservation projects) can lead to positive ecological conservation outcomes (e.g., increased species abundance and/or range) (Bajracharya, Furley, & Newton, 2005; Holmes, 2003; Mbaiwa, 2013; Pegas et al., 2013).

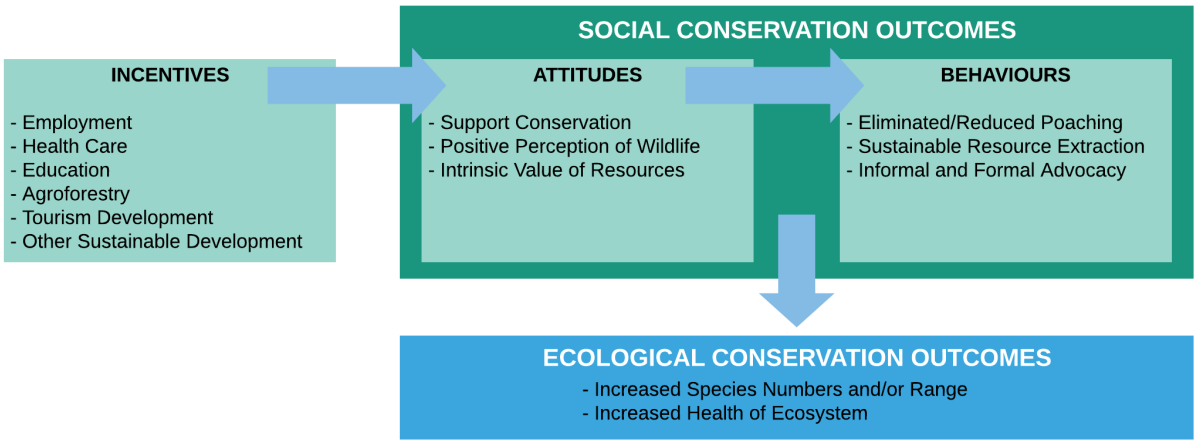

Figure 1.1 Incentive-based conservation framework.

However, the relationship between IBC projects and improved attitudes, awareness, and behaviours is complex (Chaigneau & Daw, 2015; Karki & Hubacek, 2015; Waylen, McGowan, Milner-Gulland, & Group, 2009). Economic benefits from IBC projects do not necessarily result in increased support for conservation (Mehta & Kellert, 1998; Walpole & Goodwin, 2001), nor do positive perceptions of conservation lead to pro-conservation behaviours (Karki & Hubacek, 2015; Mintzer et al., 2015; Nilsson et al., 2016; Waylen et al., 2009). Nevertheless, improving attitudes towards conservation may be an important mechanism for changing local behaviours when other more conventional methods (e.g., enforcement, strict no-take PAs) are inadequate or inappropriate (Waylen et al., 2009). The next section discusses the relationship between social and ecological conservation outcomes.

1.2 Relationship between social and ecological conservation outcomes

The success of a given IBC project in meeting its social and ecological conservation goals is highly dependent on the local context. Important factors that can affect local support towards conservation and pro-conservation behaviours include socio-demographics (e.g., education, economic status,

gender, wealth, ethnicity, age), human-wildlife conflict (HWC), local participation in IBC programs, the strength of local institutions, length of residency, distance from PA, dependency on resource, inequitable distribution of benefits, land use (e.g., pastoralist vs. agriculturalist), social benefits, relationships with park management and non-governmental organizations (NGOs), perceived sustainability of the natural resources, and length of the IBC project (Brooks, Waylen, & Mulder, 2013; De Boer & Baquete, 1998; Downie & Dearden, 2018; Gadd, 2005; Infield & Namara, 2001; Karki & Hubacek, 2015; T. M. Lee et al., 2009; Mamo, 2015; Salafsky et al., 2001; Spiteri & Nepal, 2006; Walpole & Goodwin, 2001). The following sections will examine the relationship between the different components of social conservation outcomes and their link to ecological conservation outcomes.

1.2.1 Link between benefits and support for conservation

One of the primary assumptions of the IBC approach is that communities receiving economic and social benefits from these projects will be more supportive of conservation interventions than communities who do not receive any benefits (Archabald & Naughton-Treves, 2001; MacNeil & Cinner, 2013; Spiteri & Nepal, 2006). Many studies have found this assumption to be true (Gadd, 2005; W. Hill, Byrne, & Pickering, 2015; Holmes, 2003; Mintzer et al., 2015; Pegas et al., 2013). For example, Kideghesho et al. (2007) found that communities that were allowed to hunt wildlife via a community-based conservation (CBC) project in Tanzania were significantly more positive towards conservation than those that were not, even if they were experiencing high levels of conflict with local PAs (e.g., forced evictions, loss of access to natural resources). Lyamuya, Masenga, Mbise, Fyumagwa, & Mwita (2014), meanwhile, found that Maasai pastoralists who received benefits from conservation programs were significantly more positive towards the

conservation of wild dogs and other large carnivores in the Loliondo Game Controlled Area, Tanzania, than those who were not involved in such programs.

However, receipt of benefits from IBC projects does not always translate into support of conservation initiatives or positive attitudes towards conservation (Acquah, Rollins, Dearden, & Murray, 2017). For example, Walpole and Goodwin (2001) examined local attitudes towards PA tourism and the effect of tourism benefits on local support of Komodo National Park, Indonesia, and found that those respondents dependent on tourism for part of their income were significantly less likely to support conservation of the PA than respondents who did not receive any benefits, despite recognition of the link between tourism and conservation. Issues such as the inequitable distribution of benefits, HWC, negative interactions between locals and park and NGO staff, and locals not recognizing the source of IBC related benefits can lead to a breakdown between receipt of benefits and support for conservation (Archabald & Naughton-Treves, 2001; Karki & Hubacek, 2015; Mehta & Kellert, 1998). For example, Infield and Namara (2001) found that despite extensive outreach work with communities known to have the highest conflicts with nearby Lake Mburo National Park, Uganda, many respondents did not recognize any park benefits whatsoever and were primarily interested in the development projects the CBC project could provide, rather than support for conservation or access to resources.

Conflict with park staff or wildlife, however, appears to be one of the primary issues hindering the relationship between receipt of benefits and positive conservation attitudes. Those communities that experience more conservation costs, whether it be loss of land via forced evictions, loss of access to critical natural resources, or depredation and or crop raiding by wildlife, tend to have more negative attitudes towards conservation than communities without any conflict (De Boer & Baquete, 1998; Espinosa & Jacobson, 2012; Gadd, 2005; Kideghesho et al., 2007),

especially if they feel they have not been appropriately compensated for the damages incurred (C. M. Hill, 1998; Karki & Hubacek, 2015; Mishra et al., 2003; Naughton-Treves, 1998). Land use (e.g., ranching, farming, tourism) can also affect local attitudes towards conservation due to different interactions with local parks and wildlife. For example, Gadd (2005) found that pastoralists were much more tolerant to elephants and more likely to perceive aesthetic and moral benefits of elephants than agriculturalists, who were least likely to perceive any benefits from elephants due to issues with crop raiding.

This contentious relationship between locals and parks and or wildlife has a significant impact on conservation success in these areas. For example, Karki and Hubacek (2015) found that despite receiving conservation benefits from development projects and widespread support for conservation and the PA in three villages within the buffer zone of Bardia National Park, Nepal, significant negative perceptions of NGOs resulted in negative perceptions towards park conservation benefits and extensive illegal resource extraction practices. Whether IBC benefits translate into positive attitudes towards conservation is therefore dependent on the local context, especially the presence of conflict. Thus, one of the main assumptions and goals of IBC, namely that providing benefits will lead to improved conservation support, is not always true. Local context and implementation issues play a key role in IBC project success and must be considered when designing and implementing an IBC project.

1.2.2 Link between conservation attitudes and pro-conservation behaviours

Another central assumption of IBC approaches is that positive conservation attitudes will translate into increased pro-conservation behaviours and therefore the protection of biodiversity. Studies have found mixed results in terms of the relationship between positive perceptions (i.e., awareness and attitudes) of conservation initiatives (e.g., PAs, tourism) and pro-conservation behaviours

(Brooks et al., 2013). Furthermore, many studies do not directly measure ecological conservation outcomes, but simply infer them from behavioural changes observed (Mintzer et al., 2015; Waylen et al., 2009) or do not discuss them at all (Chaigneau & Daw, 2015; Stem et al., 2003; Wunder, 2000). Linking direct cause and effect between behavioural changes and ecological conservation outcomes is challenging for many species, especially over shorter periods. Hence, researchers have often measured changes in the communities that it is hoped will lead to the desired ecological outcomes, such as changes in livelihoods from direct consumption of a species (e.g., hunting for food) to non-consumptive use (e.g., ecotourism) and changes in attitudes and behaviours (Pegas et al., 2013; Stem et al., 2003; Waylen et al., 2009). For example, Holmes (2003) investigated the relationship between local attitudes towards a nearby national park and fuelwood extraction behaviours (i.e., collecting live vs. dead wood) in three villages in Tanzania. He found that villagers with positive conservation attitudes were more likely to use more sustainable fuelwood extraction methods (e.g., collect dead rather than live wood). The author concluded that these findings support the assumption that positive conservation attitudes lead to positive behavioural changes in natural resource use, and thus positive ecological conservation outcomes. However, Holmes (2003) did not directly assess changes in local biodiversity but assumed improved ecological conservation outcomes based on the prevalence of more sustainable resource extraction practices. Further research would be needed to determine if the observed increase in pro-conservation behaviours actually translated into measurable positive biodiversity outcomes for the nearby PA.

Bajracharya et al. (2005), on the other hand, directly examined the effectiveness of the community-managed Annapurna Conservation Area (ACA) in Nepal in achieving its ecological conservation goal of improved biodiversity status. They found that areas surveyed within ACA

had higher tree species diversity and basal area than areas outside the PA, as well as stable or increasing wild animal populations. Furthermore, fuelwood collection from the forest had been reduced by half compared to ten years prior, along with a significant reduction in the number of tree species used as fuelwood (>90 species in 1990 vs. 29 species in 2005), a reduction in the collection of non-timber products, and the banning of cutting down large trees and stockpiling wood within the forest in ACA villages (Bajracharya et al., 2005). Along with an increase in tree species diversity and size in ACA, perceived and actual increases in wildlife sightings suggest that populations of wildlife are stable or increasing within ACA. The authors attribute this positive population trend to improved community-based enforcement of hunting bans. The authors concluded that the ACA CBC project was successful in changing conservation attitudes and behaviours of local communities, as well as improving the biodiversity of the PA due to the local culture (e.g., strong traditional resource management system, collective action, good leadership), widespread participation of residents, successful empowerment of the local community, as well as the development and strengthening of local institutions.

Negative perceptions of IBC projects, including management and benefits, however, can lead to pervasive illegal resource extraction. T. M. Lee et al. (2009) studied the relationship between attitudes towards PAs in 660 households near 8 PAs in Sulawesi, Indonesia, and found that negative perceptions of PAs and past conflict were the most significant predictors of the intensity of illegal natural resource extraction activities (e.g., wildlife hunting, timber extraction, non-timber product collection, forest gardens). Similarly, Karki and Hubacek (2015) found that despite high levels of support for conservation in a nearby PA and positive attitudes towards the park and wildlife, significant negative attitudes towards local NGOs and the park's conservation benefit programs meant that locals had an overall negative perception associated with the park.

This negative perception, along with negligible perceived impacts of resource extraction activities, explained local resource extraction behaviours. For example, locals did not perceive the removal of dead wood and branches from the park as having any negative impacts on park resources, as they were not cutting down any live trees; they were therefore unlikely to change behaviours to benefit conservation (Karki & Hubacek, 2015). Although the authors did not assess ecological conservation outcomes in this study, they do note that previous work in the area (i.e., Thapa & Chapman, 2010) found that the high extraction levels in these villages were causing significant negative impacts on the park's biodiversity, with significantly lower tree density and species richness in the areas closest to the villages compared to core areas.

Positive changes in pro-conservation behaviour, however, may not be related to conservation attitudes or IBC benefits. For example, studies have found that positive changes in behaviour of locals involved in IBC projects (e.g., reduced hunting rates) were due to lack of time, rather than changes in attitude or IBC benefits (Stem et al., 2003; Wunder, 2000). The latter suggests that locals may resume their extractive activities once the IBC project ends or the socio-economic incentives change.

In some cases, even when locals do have positive attitudes towards IBC projects and nearby PAs, this does not translate into pro-conservation behaviours (Chaigneau & Daw, 2015; W. Hill et al., 2015; Waylen et al., 2009). Karki and Hubacek (2015) note that dependence on natural resource use and lack of access to alternative resource collection also explained the mismatch between positive attitudes towards a nearby PA and illegal resource extraction activities. For example, two-thirds of households in one village in particular were dependent on the park's natural resources for their livelihoods without any alternative livelihood options. The authors concluded

that livelihood and contextual factors were more important in determining whether an individual would engage in illegal resource extraction than attitudes towards the park or conservation.

The type of incentive used may also have an effect on the link between conservation attitudes and pro-conservation behaviours. For example, Gibson and Marks (1995) found that an IBC project in Zambia using public goods (e.g., health clinics, schools) as incentivizing benefits to reduce poaching failed because it did not link benefits to individual behaviours; locals received benefits regardless of their behaviour. On the other hand, the project's success in matching individual scout behaviour with benefits (e.g., cash rewards, job retention) did result in increased enforcement and vigilance. This increased enforcement, especially of prized larger animals like elephants and rhinos, forced locals to switch to hunting smaller animals using snares, but did not stop them from poaching. Thus, the ecological conservation outcomes were mixed, with improved protection of charismatic megafauna, but increased hunting pressure on smaller animals.

Nilsson et al. (2016) compared the effectiveness of economic and non-economic (e.g., traditional values, community empowerment, access to local resources) incentives on improving local conservation perceptions and changing negative behaviours towards Sumatran orangutans in three communities with different CBC projects (i.e., community-based reforestation program, small-scale tourism, and mass tourism) outside Gunung Leuser National Park, Indonesia. The authors found that a combination of economic and non-economic incentives had a greater likelihood of creating behavioural changes towards orangutan conservation and their habitat than economic incentives alone. They further found that only non-economic incentives had any effect on changes in behaviours or attitudes towards protecting critical orangutan habitat, regardless of the nature of CBC projects present. The authors concluded that economic benefits are key to catalyze local support for conservation projects in the short-term, especially in developing

countries with limited economic opportunities, but that non-economic incentives are critical for the long-term viability of conservation projects and should be considered in the design and implementation of IBC projects.

Mixed results in terms of the relationship between positive perceptions of conservation initiatives and pro-conservation behaviours suggest that positive attitudes towards conservation do not necessarily result in increased pro-conservation behaviours, contradicting one of the basic assumptions of IBC. Whether positive perceptions of conservation projects translate into pro-conservation behaviours is dependent on the success of the project in addressing issues of inequitable distribution of benefits, past conflicts, incentives used, and weak institutions. Moreover, pro-conservation behaviours do not always translate into positive ecological conservation outcomes (Mintzer et al., 2015). Linking positive social conservation outcomes with ecological conservation outcomes is difficult, however, since many studies do not directly measure ecological conservation outcomes, but infer such outcomes based on behavioural changes identified or perceived status of the resources (Brooks et al., 2013).

1.2.3 Lessons learned and implications for management and research

Based on the discussion so far, it is clear that the success of a given IBC project in meeting its social and biodiversity conservation goals is dependent on its design, implementation and management (Brooks et al., 2006; Spiteri & Nepal, 2006). Meta-analyses of CBC projects have found that project design variables were critical for the overall conservation success (social and ecological) of IBC projects, including (1) building of local institutional capacity, (2) the equitable distribution of benefits, (3) positive interactions with local institutions and cultural beliefs and traditions, (4) the provision of social benefits and capital, and (5) local participation in project

implementation and daily management (Brooks et al., 2013; Waylen, Fischer, Mcgowan, Thirgood, & Milner-Gulland, 2010).

Part of the problem is the difficulty in gaining uniform community support (Spiteri & Nepal, 2006). As previously mentioned, local attitudes towards conservation are dependent on several factors, including socio-demographics (e.g., age, gender, education), historical relationships with parks and NGOs, perceived costs and benefits of conservation, local participation, conservation awareness and education, the strength of institutions, and the length of the program (Brooks et al., 2013; W. Hill et al., 2015; Infield & Namara, 2001; Karki & Hubacek, 2015; Mehta & Kellert, 1998; Salafsky et al., 2001; Spiteri & Nepal, 2006; Stem et al., 2003). IBC project success is therefore dependent on the project's ability to reflect the heterogeneous nature of local communities in its design and implementation (Spiteri & Nepal, 2006). Defining the target community is a pervasive problem (Spiteri & Nepal, 2006), with many IBC projects assuming community homogeneity in terms of social, political, and spiritual values (Agrawal & Gibson, 1999), thereby limiting who is included as a beneficiary (Spiteri & Nepal, 2006). The exclusion of some community members can lead to resentment and natural resource conflicts (Spiteri & Nepal, 2006). Furthermore, conservation costs vary within the community (e.g., natural resource dependence, human-wildlife conflicts, length of residency), but IBC benefits are typically provided uniformly, regardless of these differences (Abbot, Thomas, Gardner, Neba, & Khen, 2001; Adams & Infield, 2003; Wells, Guggenheim, Khan, Wardojo, & Jepson, 1999). Some projects provide benefits regardless of compliance or participation in IBC programs (Gibson & Marks, 1995; Wainwright & Wehrmeyer, 1998), while others provide inappropriate benefits for local traditions or lifestyles (e.g., pastoralists unable to use schools or clinics built using revenue-sharing funds) (Spiteri & Nepal, 2006). Spiteri and Nepal (2006) conclude that IBC projects must

ensure that local conservation costs are adequately compensated for and that the benefits provided reflect the needs and actions of the local communities involved.

Gaining extensive local participation in IBC projects is also essential to ensure the equitable distribution of benefits (Brooks et al., 2013; Spiteri & Nepal, 2006). Marginalized groups (e.g., poor, women) should especially be included within project decision-making and planning in order to ensure extensive community support and IBC success (Espinosa & Jacobson, 2012; Spiteri & Nepal, 2006). Local input is essential to ensure that IBC benefits address local needs and offer appropriate alternative livelihoods (Fiallo & Jacobson, 1995; Measham & Lumbasi, 2013; Spiteri & Nepal, 2006). Furthermore, those IBC projects created at the impetus of the communities themselves, rather than top-down initiation, tend to be the most successful (Measham & Lumbasi, 2013; Spiteri & Nepal, 2006). Community aptitude, or 'the capacity of local residents to participate in conservation projects' (Spiteri & Nepal, 2006, p. 10), and capacity building are also important components of project design and success (Brooks et al., 2013; Spiteri & Nepal, 2006). Without local buy-in and active participation, conservation outcomes suffer (Spiteri & Nepal, 2006).

1.3 Tourism as an incentive-based conservation approach

Wildlife tourism is viewed as an important IBC approach to help protect wildlife and critical habitats (Higham & Lusseau, 2007, 2008; Newsome, Lewis, & Moncrieff, 2004; Parsons, 2012; Reynolds & Braithwaite, 2001; Wilson & Tisdell, 2003) and has enjoyed some notable successes (Mbaiwa, 2011; Mbaiwa & Stronza, 2011; Pegas et al., 2013; Waylen et al., 2009). However, tourism can have negative impacts on the focal species and habitat if it is not managed correctly (Parsons, 2012); a challenge which was identified by Duffus and Dearden (1990) for non-consumptive wildlife use thirty years ago. In response, the authors proposed a framework to help guide planning and management of sustainable non-consumptive wildlife tourism. However,

wildlife tourism as an IBC approach has changed a lot in the last three decades. This section outlines the main elements of the conceptual framework with a view to a re-examination in light of the results of the dissertation (see **Chapter 7** section 7.4).

1.3.1 Non-consumptive wildlife tourism framework

Duffus and Dearden (1990, 1993) proposed a framework for understanding non-consumptive wildlife tourism (**Fig. 1.2**) that has been widely used as a theoretical framework for assessing the sustainability of such activities. The framework consists of three main components – the focal species or habitat, the human wildlife user (tourist), and the historical relationship between these two groups; these components interact with each other to create the non-consumptive wildlife tourism activity. The dynamic nature of these interactions results in changes to the wildlife user, the target species/habitat and the wildlife tourism activity itself, over time (Duffus & Dearden, 1990). For example, the wildlife tourism model (WTM, **Fig. 1.3**) predicts that, over time, the type of tourist present at a given wildlife tourism site will shift from a few specialized users requiring very little infrastructure and having minimal impact on the environment and target species (e.g., grey nurse shark diving, Australia; Smith, Scarpaci, Scarr, & Otway, 2014) to many generalist users who require increased infrastructure and services, as well as place increased pressure on the target species and the environment (e.g., whale shark tourism (WST), Holbox, Mexico; Ziegler, 2010). This transition to a generalist user results in the eventual displacement of the specialists, who move on to seek a less disturbed site. Ultimately the unmanaged process can lead to complete collapse of the site as an ecotourism venue.

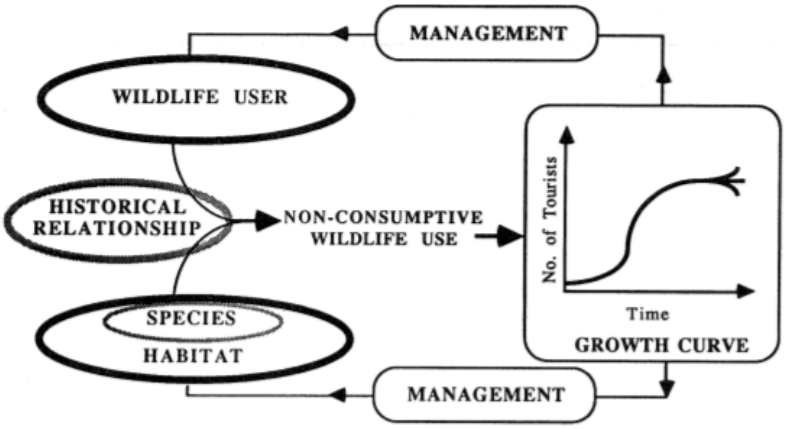

Figure 1.2 Original non-consumptive wildlife tourism framework proposed by Duffus and Dearden (1990).[1]

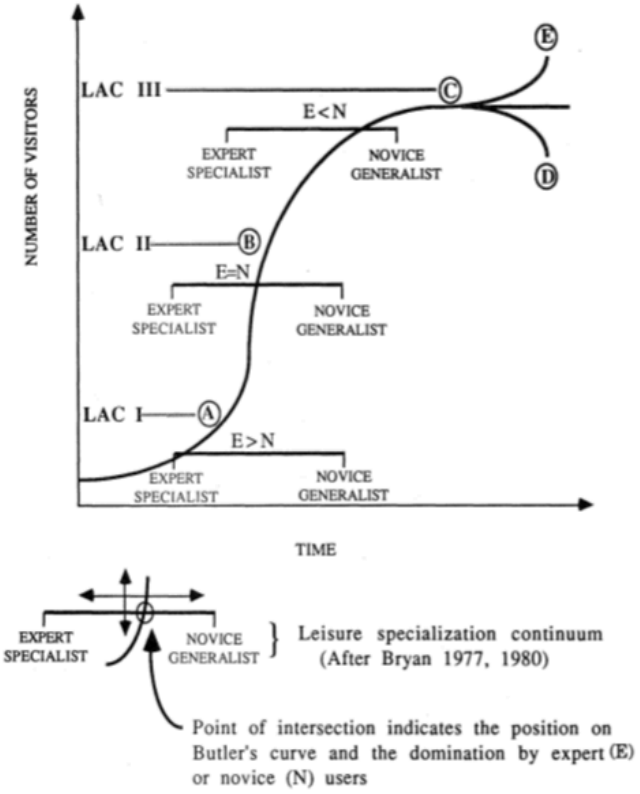

Figure 1.3 Duffus and Dearden's (1990) wildlife tourism model.[1]

[1] Reprinted from *Biological Conservation*, 53, David A. Duffus and Philip Dearden, Non-consumptive wildlife-oriented recreation: A conceptual framework, 213-231, Copyright (1990), with permission from Elsevier.

The framework has been widely used to understand and assess the sustainability of wildlife tourism (Augustine, Dearden, & Rollins, 2016; Catlin & Jones, 2010; Higham, 1998; Hines, Adulyanukosol, & Duffus, 2005; Malcolm, 2003; Sorice, Shafer, & Ditton, 2006; Wilson & Tisdell, 2001; Ziegler, 2010) and, in 2011, Catlin, Jones, & Jones (2011) provided a review and update of the WTM. However, most attention has been focused on the WTM, with little attention placed on the dynamic relationship between the wildlife user and the focal species, including the historical relationship mediating these two components and the role of management in determining the conservation outcomes of wildlife tourism. This dissertation will re-examine the framework to incorporate new developments in the wildlife tourism literature, including wildlife tourism ethics, advances in measuring biological impacts of wildlife tourism on the focal species, and the role of wildlife tourism as an IBC approach.

The framework was devised following research on orca viewing tourism on Vancouver Island, British Columbia, Canada, and has been commonly applied in the marine environment as MWT is one of the fastest growing tourism sectors globally (Cisneros-Montemayor, Barnes-Mauthe, Al-Abdulrazzak, Navarro-Holm, & Sumaila, 2013; Cisneros-Montemayor & Sumaila, 2010; Dearden, Topelko, & Ziegler, 2008; Gallagher & Hammerschlag, 2011; O'Connor, Campbell, Cortez, & Knowles, 2009; O'Malley, Lee-Brooks, & Medd, 2013) and is viewed as an important incentive-based approach for achieving marine conservation goals (Cisneros-Montemayor et al., 2013; Higham & Lusseau, 2007; Tisdell & Wilson, 2001). This dissertation focuses on assessing the effectiveness of MWT as an IBC approach; the next section provides a brief overview of MWT.

1.3.2 Marine wildlife tourism

Over five billion people worldwide are dependent on the ocean as a source of livelihood and food. However, there have been significant declines in key habitats (e.g., coral reefs, mangroves, seagrass beds) and species since the advent of industrial fishing in the 1950s (WWF, 2018). Overharvesting is a major problem in the marine environment; industrial fishing affects at least 50%, or 200 million square kilometres, of the world's oceans (Kroodsma et al., 2018). Illegal fishing is also a major problem globally; the industry is worth approximately US$10 billion to US$23 billion annually (Agnew et al., 2009). This loss of marine biodiversity could translate into a major humanitarian crisis for people living in coastal areas who are heavily reliant on marine resources for their livelihoods and as a source of food (e.g., Southeast Asia; WWF, 2018).

In light of this challenge, MWT has arisen as an important means of protecting marine resources. The premise of conservation through MWT is to protect marine wildlife by making the targeted species (e.g., dolphins, whales, sharks, rays, sea turtles) worth more alive than dead (Brunnschweiler, 2010; Graham, 2004; Vianna, Meekan, Pannell, Marsh, & Meeuwig, 2012). MWT thereby creates an attractive alternative for the local communities that are dependent on the marine environment for their livelihoods and allows them to transition away from consumptive uses of those resources (Brunnschweiler, 2010; Cagua, Collins, Hancock, & Rees, 2014; Clua, Buray, Legendre, Mourier, & Planes, 2011; Tisdell & Wilson, 2001; Vianna et al., 2012; Wilson & Tisdell, 2003). MWT, when it is implemented as an IBC approach, is considered ecotourism. MWT, when it is implemented as an IBC approach, is considered ecotourism. A key premise of ecotourism is that it results in ecological conservation outcomes for the focal species and or habitat (i.e., increased range or numbers) (Buckley, 1994).

Few studies have linked participation in MWT activities with positive social and ecological conservation outcomes (Ardoin, Wheaton, Bowers, Hunt, & Durham, 2015; Filby, Stockin, & Scarpaci, 2015; Jacobs & Harms, 2014; Mayes, Dyer, & Richins, 2004; Orams & Hill, 1998). Furthermore, only two studies looked at the impact of working in MWT on the conservation outcomes for local community members (Pegas et al., 2013; Waylen et al., 2009). Further research is therefore needed to determine the long-term conservation benefits of participating in MWT activities (Ardoin et al., 2015; Zeppel & Muloin, 2008c).

1.4 Research question and objectives

The goal of this dissertation is to assess the social conservation outcomes of MWT using whale shark tourism (WST) as a case study. Whale sharks (*Rhincodon typus*) are the largest fish in the ocean reaching lengths of 20 m and weights of over 34 t (C. Chen, Liu, & Joung, 1997). Whale sharks are highly migratory in nature and are attracted to areas of high biological productivity. These predictable aggregations, along with the shark's large size and docile nature make it an ideal species for tourism purposes (Dearden et al., 2008). Indeed, whale sharks are one of the most watched shark species in the world, with over 750,000 people watching them at 32 sites in 19 countries, as will be described in more detail in **Chapter 2**.

The whale shark was recently uplisted to endangered on the IUCN Red List of Endangered Species due to an estimated 63% population decline in the Indo-Pacific over the last 75 years; the primary threat whale sharks face is from a targeted fishery in China (Pierce & Norman, 2016). WST may therefore play an important role in helping to protect this endangered species via its role as an IBC approach. Tourists and locals participating in WST may become stewards for whale sharks and the greater marine environment through improved knowledge, attitudes and behaviours. This study focuses on MWT as a potential conservation mechanism for an endangered species

with an emphasis on understanding different management models and the outcomes of those models. The study has the following objectives:

1. To assess the status of the global WST industry, including types (e.g., captive, non-captive), real and potential impacts, conservation value and management challenges and best practices.
2. To examine the ethics of provisioning whale sharks in Oslob, Philippines, the largest, non-captive viewing site in the world.
3. To determine if working in ecotourism changes the attitudes and behaviours of locals towards whale sharks and the ocean, and if tourism type affects those outcomes.
4. To assess the marine wildlife value orientations of locals working in WST to achieve greater understanding of the factors influencing their conservation attitudes and behaviours.
5. To explore the potential long-term impacts of poorly conceived IBC projects on social and ecological conservation outcomes.
6. To re-examine and update the conceptual and theoretical background for wildlife tourism in light of the findings of this study.

Objective 1 is addressed using a comprehensive literature review, while Objectives 2 through 6 are explored using four case study sites in the Philippines. The Philippines was selected because it is the only country with a variety of community-based whale shark tourism sites, which vary in terms of scale (e.g., from small-scale to mass tourism), length of operation (0 years to 18 years), and activity (e.g., provisioned, non-provisioned). It also had a dedicated whale shark fishery prior to the 1998 hunting ban allowing for an exploration of the premise of MWT as an IBC to transition locals from a consumptive to non-consumptive use of the focal species.

1.5 Methods, sampling and analysis

The research process consisted of the following steps. Initially, I performed a literature review of the conservation outcomes of IBC approaches, including wildlife tourism. This information was used to develop the interview instruments used to assess the social conservation outcomes of locals working in WST at the four study sites (**Appendix III, Appendix IV**). I then applied for ethics approval through the University of Victoria (**Appendix I**). In January 2016, I travelled to the Philippines for an extended period from January through June 2016. Once on site, I received prior informed consent from the study communities with the help of my local research partner, Large Marine Vertebrates Research Institute (LAMAVE). The study sites were pre-selected based on differences in the type of tourism present (mass, mid-tier, small-scale, failed) and length of operations (0 to 18 years). At each tourism site, I interviewed locals working in WST with the help of a local interpreter. Interviews were conducted in the local dialect and translated into English at the time of the interview. Interviews at the ex-whale shark hunting site were completed in May to June 2017 by a research assistant due to travel restrictions to the region (Mindanao). I used a combination of approaches to explore the social conservation outcomes of MWT including methods (literature review, tourist surveys, social media content analysis, and interviews) and analysis (qualitative and quantitative). The following section provides an overview of the study sites, methods and analyses used.

1.5.1 Study sites

Oslob

Open since 2011, Oslob is a community-based mass tourism site (**Fig. 1.4**). It is the largest non-captive whale shark tourism site in the world with annual visitation exceeding 365,000 tourists and generating approximately US$10 million in revenue in 2017 (**Chapter 2**). Unlike most other whale

shark tourism sites that are dependent on seasonal aggregations of sharks, tour operators at Oslob feed the whale sharks daily from 6AM to 12PM. Tourists are paddled 50 metres from shore for a half-hour in the viewing area where feeder boats lead the sharks between lines of tourist boats. Viewing is guaranteed. This compares with tourist boats at non-provisioned locations that may spend three to four hours searching for sharks that they may or may not see. Provisioning is therefore critical to ensure activities can occur year-round and support a mass tourism business model at Oslob (**Chapter 2**). At the time of the study, there were 177 members of the local people's organization (TOSWFA) in charge of managing tourism operations at this site.

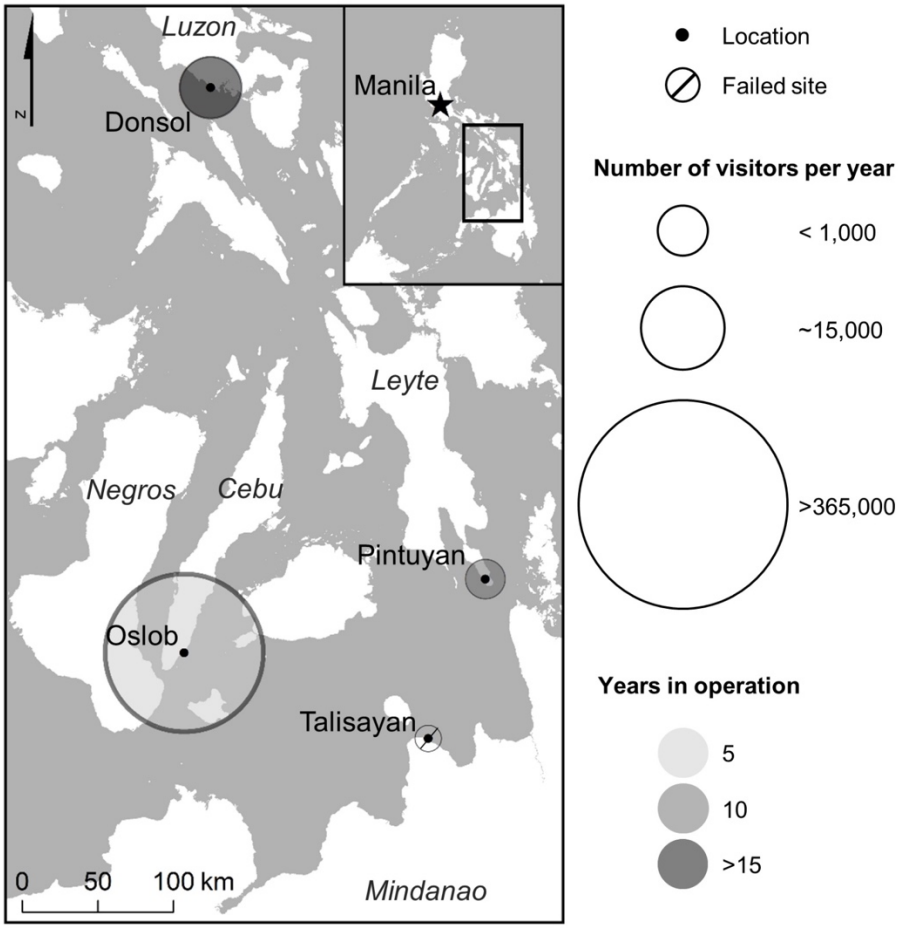

Figure 1.4 Map of study sites in the Philippines.

Donsol

Established in 1998, Donsol is the original whale shark tourism site in the Philippines. The local community, with the support of WWF-Philippines, pushed for the creation of tourism activities after the killing of seven whale sharks in Donsol municipal waters led to a ban on the hunting of whale sharks in the Philippines (Pine, 2007). This site represents a mid-tier tourism site – during the 2017 season, the site had 14,191 visitors and was worth US$800,000 (**Chapter 2**). Prior to 2012, Donsol was one of the largest non-captive sites in the world. However, recent issues with variability in whale shark sightings – few whale sharks were sighted during the 2014, 2015 and 2018 seasons – has resulted in a decline in visitation (**Chapter 2**). Tourism operations are run by the local Department of Tourism office. There were 41 guides and 56 boat captains active during the 2015/2016 season.

Pintuyan

Pintuyan is the smallest of the whale shark tourism sites assessed. Started in 2006, visitation is only a few hundred to a thousand people annually depending on the length of the season as whale shark sightings are highly variable. For example, the 2016 and 2017 seasons lasted less than two months, while the 2018 season lasted seven months. There is no tourism infrastructure present in the village (e.g., restaurants, hotels, etc.). Although whale shark guides and spotters are members of a community-based people's organization (KASAKA), they are reliant on foreign-owned dive shops for their clientele. A local ordinance requires dive shops offering whale shark tours to employ local spotters and guides. Guides are paid 300PHP (US$7) per day, while spotters are paid PHP250 (US$5) and must pay a PHP50 (US$1) rental fee if they do not own their own paddleboat. Net income for most spotters is therefore US$4 per day. The guides and spotters are assigned on a rotational basis, with the exception of one guide who is unparalleled in his ability at finding whale

sharks; regardless of the rotation, he is always assigned to the first tourist boat that arrives each day. At the time of the study, there were 40 KASAKA members.

Talisayan

Guiwanon, Talisayan, Misamis Oriental, Philippines was a traditional whale shark hunting village and one of the largest hunting sites in the Philippines prior to the passing of the whale shark hunting ban in 1998 (Alava, Dolumbaló, Yaptinchay, & Trono, 2002). Prior to the ban, national and international NGOs, researchers, private businesses and government agencies were promoting the transition of the whale shark hunters in Guiwanon from killing whale sharks to alternative livelihoods, including WST. However, within a five-month period the national ban on whale shark hunting had been passed and plans for tourism had fallen through because the geography of the area did not lend itself well to WST (A. Yaptinchay, personal communication) and the focus quickly shifted to Donsol with its large aggregation of sharks close to shore. The current mayor of Talisayan has expressed renewed interest in developing WST in his municipality and the ex-whale shark hunters would be given first priority for employment in this tourism venture (Araujo & Labaja, 2017). At the time of the ban, there were approximately 40 whale shark hunters; in 2017, only 17 ex-hunters remained.

1.5.2 Methods and analysis

1.5.2.1 Literature review (Objective 1, Objective 5, Objective 6)

A comprehensive literature review was undertaken to assess the conservation value of IBC approaches, as well as the conservation outcomes of WST, and the circumstances surrounding the whale shark hunting ban and the failed attempt to transition Guiwanon to WST in 1998. Documents included in the literature review process included peer-reviewed journal articles, reports, magazine

articles, newspaper articles, websites, unpublished reports and documents (e.g., proposals, minutes of meetings, field notes, etc.), and student dissertations and theses.

1.5.2.2 Tourist surveys (Objective 2, Objective 6)

My local research partner, LAMAVE, provided me with a dataset of tourist surveys completed in Oslob in 2014 (n=761). This survey included questions regarding overall satisfaction with the experience, tourists' opinions about whale shark provisioning, willingness to pay for the whale shark experience, and socio-demographics. These data were input into SPSS and used to assess tourist support of provisioned WST at this site.

1.5.2.3 Social media content analysis (Objective 2, Objective 6)

TripAdvisor comments were used to elucidate the ethical decision-making of tourists participating in provisioned WST at Oslob. A total of 947 TripAdvisor reviews were extracted from March 2012-January 2016 and coded into NViVO 10. Reviews mentioning ethical concerns (n=254) were then classified into three subcategories based on the overall score provided. Those expressing ethical concerns but with an overall positive review (i.e., 4- or 5-star rating) were classified into the "guilty pleasure" category, while those giving a negative review (i.e., 1- or 2-star rating) due to ethical concerns were classified into the "regretful participation" category. Those with a score of 3 were classified as "neutral". Those comments that included justifications for participating in the activity despite knowing of the ethical issues with provisioning activities (n=138) were coded for up to 8 possible themes (e.g., economic benefits, animal welfare, human enjoyment, etc.). These themes were determined based on a literature review and during the analysis itself.

1.5.2.4 Interviews (Objective 3, Objective 4, Objective 5, Objective 6)

In-depth interviews were conducted with 114 locals working in WST at the four WST sites in the Philippines.[2] These interviews included both qualitative open-ended and quantitative closed-ended questions regarding their perceptions of, and attitudes towards, whale sharks, changes in their behaviours towards whale sharks and the ocean, marine wildlife value orientations, livelihoods, demographics, and fishing (**Appendix V**, **Appendix VI**). At the ex-whale shark hunting site, respondents were also asked questions regarding their perceptions of the whale shark hunting ban, as well as information regarding the whale shark fishery at the site. Open-ended questions for all sites were input into NViVO and coded based on pre-determined themes, as well as codes that were identified during the analysis. Closed-ended questions were input into SPSS for quantitative analysis.

1.6 Overview of dissertation

This dissertation is organized into seven chapters. Since this is a manuscript-based dissertation, the following five chapters are stand-alone manuscripts that address the research objectives outlined above. Due to the nature of a manuscript-based dissertation, there is unavoidable overlap in some content among the papers. The papers included are as follows:

Chapter 2: Protecting an endangered species: The role of whale shark tourism as an incentive-based conservation approach

Chapter 3: A guilty pleasure: Tourist perspectives on the ethics of feeding whale sharks in Oslob, Philippines

Chapter 4: Can ecotourism change community attitudes towards conservation?

[2] I conducted interviews in Oslob, Donsol, and Pintuyan, while a research assistant, J. Labaja, conducted the interviews in Talisayan due to travel restrictions to the site

Chapter 5: Understanding the relationship between social conservation outcomes and wildlife value orientations of wildlife tourism providers

Chapter 6: Barriers to conservation: factors influencing community support for tourism development in an ex-whale shark hunting village in the Philippines

The final chapter summarizes and synthesises the key findings of this study, as well as provides recommendations for the management of the industry and gaps in knowledge that should be addressed in future research. It also re-examines and updates the conceptual and theoretical background for wildlife tourism in light of the findings of this study (**Objective 6**). Appendices include information regarding ethics approval, the interview instruments used, and interview results.

Chapter 2 Protecting an endangered species: The role of whale shark tourism as an incentive-based conservation approach

Abstract

This chapter discusses the role of whale shark tourism within the context of incentive-based conservation. Whale sharks are the most watched shark in the world, with tourism worth an estimated US$1.5 billion worldwide attracting over 21.4 million people annually at 42 sites in 22 countries. The largest collection of sites is in Asia. Tourist opportunities range from captive aquaria and seapen tourism to non-captive provisioned activities and wild encounters. Whale shark tourism can be an important means to protect whale sharks by providing economic incentives to local communities. However, research suggests that the activity can also lead to negative impacts on individual sharks and overall fitness. Effective management is critical in order to minimize impacts, incorporate community perspectives, build conservation awareness and ensure a satisfactory tourist viewing experience in line with expectations for a genuine ecotourism activity. Although codes of conduct exist for most sites these need to be reviewed to meet international standards and assistance provided to ensure that they are implemented and enforced.

2.1 Introduction

Whale shark tourism emerged in the late 1980s in Australia and the Maldives, along with an increasing interest in shark diving generally (Topelko & Dearden, 2005). It has since exploded to become the most popular shark-watching activity in the world. Tourism activities range from captive aquaria and seapen experiences to non-captive provisioned and wild encounters. Whale sharks' large size, docile nature, predictable presence, accessibility, and growing popularity as charismatic megafauna has made 'swim-with' non-captive whale shark tourism activities one of

the fastest-growing sectors of the marine wildlife tourism sector overall (Dearden et al., 2008; Gallagher & Hammerschlag, 2011). The activity now takes place in at least 42 sites worldwide, involving an estimated 21.4 million participants, in countries ranging from highly developed to chronically undeveloped.

Non-captive tourism activities can be an important incentive for protecting whale sharks. Incentive-based conservation (IBC) focuses on providing incentives (e.g., employment, ecological services, compensation payments, health care, education, agroforestry, tourism development/promotion) as a means of gaining local support for conservation (Spiteri & Nepal, 2006). IBC strives to integrate environmental protection with poverty reduction and community participation. The assumption is that economic benefits derived directly from natural resources will lead to the conservation and sustainable use of those resources (Brockelman & Dearden, 1990; Eshoo, Johnson, Duangdala, & Hansel, 2018). Social conservation outcomes of IBC projects may also include improved conservation awareness and attitudes and an increase in pro-conservation behaviors (Archabald & Naughton-Treves, 2001; Chaigneau & Daw, 2015; T. M. Lee et al., 2009; Pegas et al., 2013). The reduction in negative behaviors (e.g., poaching) and increase in positive behaviors (e.g., participation in conservation projects) can lead to positive ecological conservation outcomes (Holmes, 2003; Mbaiwa, 2011; Pegas et al., 2013).

However, whether a tourism activity results in overall positive conservation outcomes varies according to circumstance. The ideal situation occurs when a community that once hunted sharks transitions to working in shark tourism activities, as described by Bentz, Dearden, Ritter, & Calado (2014) in relation to shark fishing in the Azores and the rise in shark diving tourism. However, whale shark fishing is now banned in many jurisdictions and, where extraction still occurs (e.g., China), there are no developed tourism industries with economic benefits that can

surpass extractive values. In addition, the people who gain the financial benefits from tourism are often not the ones who are undertaking the extractive activity. Hence the conservation benefits of whale shark tourism are often somewhat indirect and intangible with management focusing on mitigation of possible negative environmental impacts. This chapter provides an overview of the global whale shark tourism industry and the main challenges it faces, as well as discuss management best practices to ensure this activity is contributing to the sharks' overall protection.

2.2 Global assessment of whale shark tourism

Whale shark tourism started in the late 1980s at several sites around the world where sightings were fairly predictable. It is possible that this interest was spurred by the rapid expansion of whale-watching tours and the fact that whale sharks could provide similar experiences (e.g., Duffus & Dearden, 1993). These early sites include Ningaloo Reef in Australia, the Maldives, Bahia de Los Angeles and Bahia de La Paz in Mexico, and Phuket, Thailand. These sites are still amongst the premium sites for whale shark watching but have been joined by many other sites worldwide.

The whale shark tourism industry has grown rapidly in the last 10 years (**Fig. 2.1**). Tourism now occurs at 42 sites (nine aquaria, one seapen site, six provisioned sites, 26 wild sites) in 22 countries, attracting over 21.4 million people (captive – 20.7 million, non-captive – 757,606), and worth an estimated US$1.5 billion[3] in 2017 (captive – $1.4 billion, non-captive – $102 million; **Table 2.1**, **Table 2.2**, **Table 2.3**). The actual value of the industry is much greater, as reliable economic information is not available for many sites, especially in Asia. Although whale shark-watching sites are spread throughout the tropics, the largest concentration of sites is in Southeast Asia; this region has also seen the most growth in tourism activities over the last decade (**Fig. 2.1**).

[3] All currency values in USD unless otherwise stated

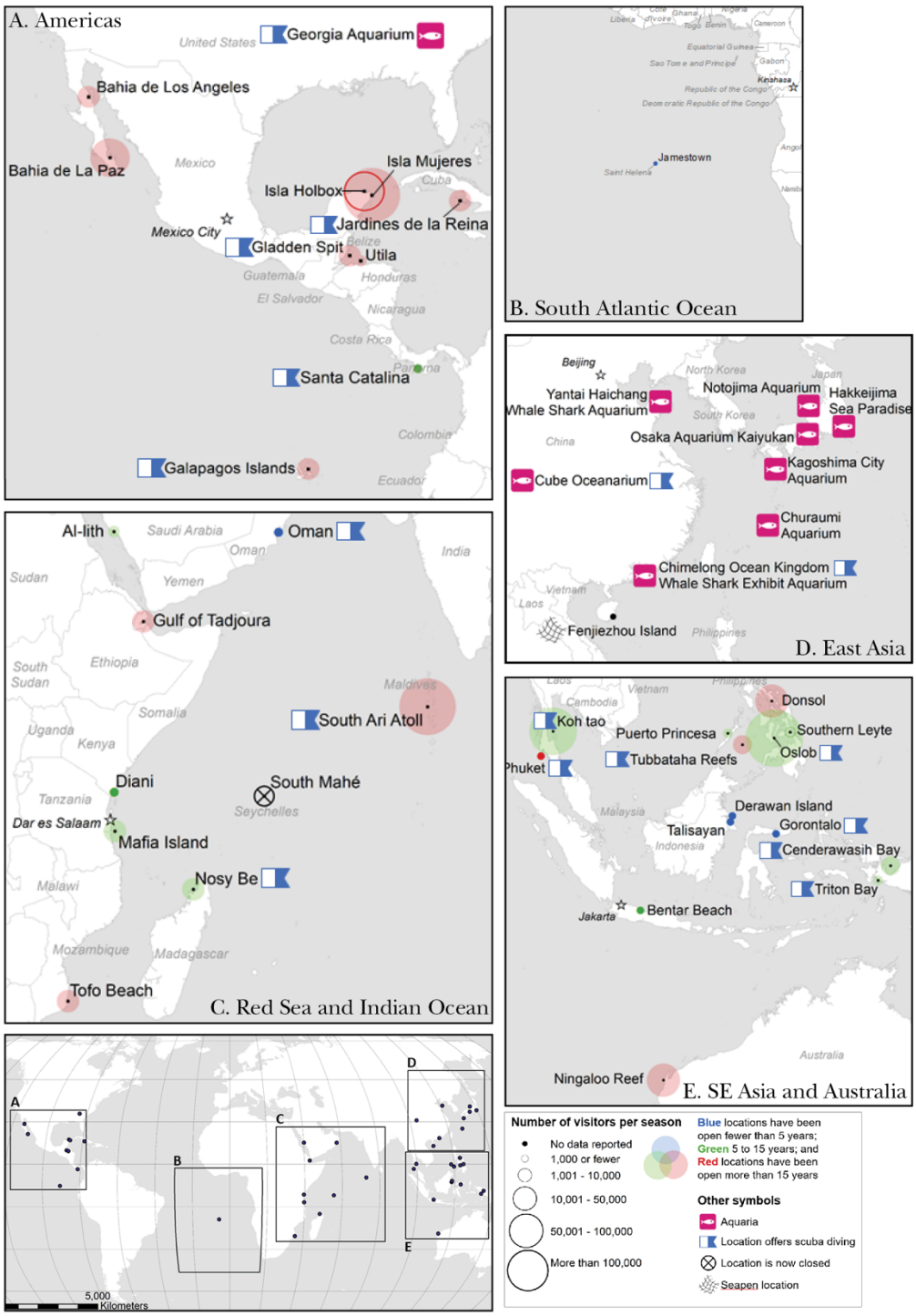

Figure 2.1 Map of captive and non-captive whale shark tourism sites around the world. A. Americas. B. South Atlantic Ocean. C. Red Sea and Indian Ocean. D. East Asia. F. Southeast Asia and Australia.

Table 2.1 Wild whale shark tourism sites

Tourism sites	No. tour operators	No. boats	No. permits	Year established	Visitation	Tour cost (USD)	Economic returns (USD)	Regulatory environment	Length of season	Issues	References
CARIBBEAN/ ATLANTIC											
Isla Holbox, Mexico	30	25	25	2003	17,000	150	$2.5 million	Legally enforceable regulations	4 months	Visitation decreased; crowding; lack of enforcement	Ziegler, Dearden, and Rollins (2016)
Isla Mujeres, Mexico	110	200	243	2002	93,000	150	$14.0 million	Legally enforceable regulations	4 months	Crowding; need better enforcement	
Gladden Spit, Belize	>30	30+	-	1997	2,032	$195 (snorkel), $265 (dive)	$3.7 million	Legally enforceable regulations	6 weeks	Declining sightings; crowding	Carne (2007); Graham (2004); Graham and Roberts (2007); Hargreaves-Allen (2009)
Utila, Honduras	15	25	none	1998	1,000	$60	$60,000	Voluntary code of conduct	year round	Variable sightings, high non-compliance;	

										lack of enforcement	
Jardines de la Reina, Cuba	2	5-6	-	2002	1,250	$348-571 per day (liveaboard)	$6.5 million	Legally enforceable regulations	5 months	Variable whale shark sightings	
Jamestown, St. Helena	2-3	-	-	2014	-	$112.50-$250 for boat	-	Voluntary guidelines	3 months	-	
SOUTHEAST ASIA											
Donsol, Philippines	41 BIOs	56	-	1998	14,191	$75 for boat with up to 6 tourists	$800,000	Legally enforceable regulations	8 months	Sharks disappeared 2013, 2014 and 2018; crowding; visitation down	-
Southern Leyte, Philippines	10 dive shops, 50 KASAKA members	-	-	2005	800+	$40-100 pp	$56,000	Voluntary code of conduct	9 months	Highly variable sightings and tourist numbers	Araujo, Vivier, Labaja, Hartley, and Ponzo (2017)

Puerto Princesa, Philippines	1	2	none	2007	200-300	$35 pp	$8,750	None present	7 months	Unregulated tourism; no guidelines	-
Tubbataha Reefs Natural Park, Philippines	-	15	-	1988	2,600	$2,000 -4,000	$7.8 million	Legally enforceable regulations	4 months	Well managed, remote	-
Koh Tao, Thailand	70 dive shops	-	none	2010	100,000	$10 (snorkel); $25 (diving)	$1.8 million	None present	year round	Sightings recently increased in last year	-
Phuket, Thailand	80+	-	none	1990	-	-	-	-	8 months	Sightings recently increased	Theberge and Dearden (2006)
Bentar Beach, Indonesia	-	-	none	2010	-	$0.75	-	-	4 months	-	-
AUSTRALIA											
Ningaloo Reef	11	15	15	1989	29,197	$325	$19 million	Legally enforceable regulations	6 months	Well managed; some issues with sharing sharks between operators	Catlin and Jones (2010); Huveneers et al. (2017)

INDIAN OCEAN											
South Mahé, Seychelles	1	2 to 3	none	1997-2014	560 in 2007, 60 in 2014, none since then	$155 (snorkel), $310 (ultralight)	$2.0 million	Voluntary code of conduct	4 months	Whale sharks disappeared in 2014, tourism no longer offered	Rowat and Engelhardt (2007)
South Ari Atoll, Maldives	150+	40+	none	1988	78,000	$97 (snorkel), $102 (dive), $247 (liveaboard)	$9.4 million	Voluntary code of conduct	year round	Crowding, high physical contact rates, lack of enforcement	Cagua, Collins, Hancock, and Rees (2014)
Diani, Kenya				2005					4 months		
Tofo Beach, Mozambique	4-7	10	4-7	late 1990s	4,608	$45	$317,952	Voluntary code of conduct	year round	Declining sightings	Lupton (2008); Pierce, Méndez-Jiménez, Collins, Rosero-Caicedo, and

											Monadjem (2010)
Mafia Island, Tanzania	6	10	none	2005	2,002	$50-100	$100,000	Voluntary code of conduct	6 months	Increasing issues with crowding, lack of enforcement	-
Nosy Be, Madagascar	2	25	none	2011	5,000-8,000	$70 (snorkel), $110 (dive), $745 (liveaboard)	$350,000	Voluntary code of conduct	4 months	Some issues with crowding, compliance	-
RED SEA/ARABIAN GULF/HORN OF AFRICA											
Gulf of Tadjoura, Djibouti	2 or 3	21	none	2003	3,000+	$30-50 (skiffs), $150-200 (liveaboard)	$120,000	Voluntary code of conduct	5 months	Crowding serious problem at site, high physical contact rates, lack of enforcement, high whale	-

										shark injury rates	
Oman	11	-	none	2017	-	$110 (dive)	-	Voluntary code of conduct	year round	Lack of enforcement	-
Al-lith, Saudi Arabia	1	2 to 5	none	2011	200-400	$400-$700	$165,000	Voluntary code of conduct	3 months	Some issues with crowding, lack of enforcement	-
PACIFIC OCEAN											
Galapagos Islands	7	8	8	2000	1,700	$5,000	$8.5 million	Legally enforceable regulations	5 months	Well managed	-
Bahia de Los Angeles, Mexico	28	28	28	1990	7,020	$11-$44	$193,050	Legally enforceable regulations	6 months	Variable sightings; low compliance	Cárdenas-Torres, Enríquez-Andrade, and Rodríguez-Dowdell (2007)
Bahia de La Paz, Mexico	56	79	79	1990	20,160	$11-$120 (snorkel), $1,700	$1.3 million	Legally enforceable regulations	7 months	Issues with compliance and high shark injury rates,	-

						- $3,000 (liveaboard)				trialling GPS chip in 2018 season to improve compliance	
Coiba National Park, Panama	3-4	-	-	2005	-	$120-160 (day trip diving); $460-699 (multi-day diving trips)	-	-	4 months	Issues with boat strike injuries to the sharks; lack of regulations; crowding; sharks showing signs of avoidance	-

Table 2.2 Captive whale shark tourism sites

Aquaria	Length of operations	Visitation	Cost of tour (USD)	Economic returns (USD)	Mode of interaction
North America					
Georgia Aquarium, Atlanta, USA	2005	2.4 million	$39.95 admission $235.95 snorkel $335.95 scuba $469.95 rebreather	Total: $85.5 million in 2016 (actual); $98 million in 2017 (estimated) From in-tank activities: $2.1 million in 2017 (estimated)	snorkel, scuba, viewing
Asia					
Churaumi Aquarium, Okinawa, Japan	1980	3.6 million	$16.25	$586.7 million (actual regional value); $58.5 million (estimated ticket sales)	viewing
Osaka Aquarium Kaiyukan, Osaka, Japan	1990	2.2 million (2009)	$22	$48.4 million (estimated)	viewing
Yantai Haichang Whale Shark Aquarium, Yantai, China	2011	360,000 (2011)	$19	$6.8 million (estimated)	viewing
Chimelong Ocean Kingdom Whale Shark Exhibit Aquarium, Hengqin, China	2014	9.8 million (2017)	$56 viewing $254 scuba	Total: $551 million (estimated) From in-tank diving: $2.0 million	viewing, scuba

Cube Oceanarium, Chengdu, China	2015	-	$21	-	viewing, scuba, mini-submersible
Kagoshima City Aquarium, Kagoshima, Japan	2000	691,186 (2009)	$14	$9.7 million (estimated)	viewing
Notojima Aquarium, Japan	2010	-	$18		viewing
Hakkeijima Sea Paradise, Yokohama, Japan	-	1.6 million (2009)	$28	$44.8 million (estimated)	viewing
Seapens					
Sanya and Fenjiezhou Island, China	-	-	-	-	viewing, snorkel

Table 2.3 Provisioned whale shark tourism

Provisioned sites	No. of tour operators	Year	Regulatory environment	Visitation	Cost of tour (USD)	Economic returns (USD)	Mode of interaction	Issues	References
Philippines									
Oslob	1	2011	Legally enforceable regulations	>365,000	$10 (viewing), $20 (snorkel), $30 (diving)	$10 million	snorkel, dive, viewing	Crowding; behavioral changes in sharks; high physical contact rates with sharks	Araujo et al. (2014); Schleimer et al. (2015); Thomson et al. (2017)
Indonesia									
Cenderawasih Bay	4 liveaboards, 1 resort	2009	Voluntary code of conduct	5,708 (no liveaboard), 402 (liveaboard only)	$225 (fast boats), $363 (package), $1,500-6,000 (liveaboard)	$10.54 million (no liveaboard), $1.3 million (liveaboard only)	snorkel, dive, liveaboard	No enforcement of code of conduct; crowding	Anna and Saputra (2017)
Talisayan	1 liveaboard, unknown number of local operators offering day trips	2015	Voluntary code of conduct		$3,000 (liveaboard)	$288,000 (liveaboard only)	viewing, snorkel, dive, liveaboard	Lack of enforcement, overfeeding of sharks, high physical contact rates	-
Gorontalo	-	2014	Voluntary code of conduct	-	-	-	-	Crowding	-
Triton Bay	1 dive shop, 4 liveaboards	2013	Voluntary code of conduct	256 (liveaboard only)	$40-50 (snorkel, dive),	$1.2 million	viewing, snorkel,	-	-

Derawan Island	-	2017	Voluntary code of conduct	-	$5,000 (liveaboard) $50-100	(liveaboard) -	dive, liveaboard viewing, snorkel, diving	Lack of enforcement, overfeeding of sharks, high physical contact rates	-

Whale shark tourism differs from most other forms of shark tourism in that there are several different modes of interaction. The sharks can be observed at the surface from boats, by snorkel and SCUBA gear, or in captivity in large tanks. Originally focused at sites where sightings were very predictable, other sites have developed recently where the normally transient whale sharks are attracted to stay via provisioning. Other sites have addressed the lack of natural aggregations by keeping whale sharks caught by fishermen in seapens for several weeks. Most tourists interact with whale sharks at aquaria, followed by wild sites, provisioned sites, and then seapen tourism. Although there are significant gaps in the participation data (**Table 2.1**, **Table 2.2**, **Table 2.3**), the majority of sites where tourism activities occur are wild sites (**Fig. 2.1**). This next section provides an overview of tourist activities at wild sites, provisioned sites, temporary seapen enclosures, and aquaria.

2.2.1 Wild sites

Whale shark tourism at wild sites is possible because of the occurrence of predictable, seasonal aggregations of whale sharks. The industry has rapidly expanded in the last decade to encompass 26 sites attracting over 386,000 visitors in 2017 and worth approximately $102 million (**Fig. 2.1**; **Table 2.1**). Visitation amongst these sites varies wildly. Most sites have less than 5,000 participants per year, but there are some sites where numbers are estimated to be many times that amount (e.g., South Ari atoll, Maldives: 78,000; Isla Mujeres, Mexico: 93,000; and Koh Tao, Thailand: 100,000). However, it should be emphasized that in most cases the numbers provided are gross estimates and rarely are accurate data available. In Koh Tao, for example, the total number of divers per year is about 500,000. While the possibility to see whale sharks has been excellent in recent years, there are no data currently available on how many of the divers come specifically to see

whale sharks. Hence, we have attempted to estimate that ratio, based on personal experience and conversations with other divers and dive operators on Koh Tao, at 1 in 5 divers, but obviously there is considerable room for error until further research is undertaken.

The length of the season can vary dramatically among sites, with some lucky to have 6 weeks (e.g. Gladden Spit, Belize), whereas others have virtually a year-round attraction (e.g. Mozambique, Honduras, Thailand, Maldives, Oman). Cárdenas-Torres et al. (2007) note high variability in whale shark seasonality in Bahia de Los Angeles, Mexico, with seasons starting as early as May in 2001 and as late as September in 2003 and ranging in length from 3 to 8 months. This variability makes tourism an unreliable source of additional income for locals (Cárdenas-Torres et al., 2007).

There is also great variability in price of the tour from site to site depending on the mode of interaction and development level of the country (**Table 2.1**, **Table 2.3**). The median price for such tours is $120. However, visitors can snorkel with whale sharks for as little as $0.75 at Bentar Beach, Indonesia, or SCUBA dive for as little as $25 at Koh Tao, Thailand. Alternatively, snorkeling at Gladden Spit, Belize, costs $195 and SCUBA diving $265 while a live-aboard SCUBA diving trip to the Galapagos may cost more than $5,000. In general, it is better in conservation terms to have fewer tourists paying more money per person to minimize the impact of ecotourism activities (Dearden, Bennett, & Rollins, 2007).

2.2.2 Provisioned sites

Feeding fish for tourist viewing is a widespread and growing activity that affects the target animals, the ecosystem, and the nature of the tourist experience (see Patroni, Simpson, &

Newsome, 2018 for a review). Much of the research has focused on shark provisioning, but relatively little attention has been directed towards whale sharks, perhaps due to the relatively recent development of the activity. However, whale shark provisioning activities have grown rapidly since first appearing in 2009 in Cenderawasih Bay, Indonesia, where whale sharks are attracted to large fishing platforms, or 'bagans', which have large nets full of small baitfish below them. There are now seven known sites where whale sharks are provisioned, attracting over 371,000 people and worth over $23 million in 2017 (**Table 2.3**).

Provisioning activities vary by site. For example, whale shark tourism is an incidental activity at the 'bagans' in Cenderawasih Bay. The primary activity at this site is puri fishing, in which fishermen use lights to attract puri baitfish to the 'bagans' during the night. The whale sharks come to feed on these aggregations of baitfish in between net hauls. During the day, the fishers feed the sharks additional fish from the previous night's catch for good luck and to keep them controlled while they are line fishing off the platforms (otherwise the sharks get tangled in the monofilament fishing line), and also in case there are any tourist boats that show up (A. Dove, personal communication).

In Oslob, Philippines, on the other hand, tourism is the primary goal of provisioning the sharks. It is the largest non-captive whale shark tourism site in the world in terms of number of visitors each year (**Table 2.3**). The whale sharks are hand-fed in a small viewing area. Tour operators paddle small outrigger canoes 50–100 m out from shore and tourists can view the sharks from the boat or enter the water (**Fig. 2.2**). The site is community-run, and tour operators are all from Oslob, or related to someone who is. Crowding is a serious concern (Ziegler et al., 2019), along with the almost complete lack of compliance or

enforcement of the encounter guidelines (Schleimer et al., 2015) and potential changes to the sharks' natural feeding and migratory behaviors (Araujo et al., 2014; Schleimer et al., 2015; Thomson et al., 2017).

Figure 2.2 Feeder boat with whale shark passing by tourists in Oslob, Philippines (credit: J. Ziegler)

The ethics of provisioning a wild, highly mobile, endangered animal are questionable (Ziegler et al., 2018). In the case of Oslob, while there are significant economic benefits for the community (e.g. the industry was worth approximately $10 million in 2017; **Table 2.2**), it is unclear if these benefits outweigh the costs to the sharks, the local community, and greater marine environment (Ziegler et al., 2018, 2019). A few studies have attempted to determine the impacts of provisioning activities on the sharks at Oslob in the Philippines. Araujo et al. (2014) concluded that differences in both residency

and probability of being resighted of provisioned and non-provisioned whale sharks suggest that provisioning is leading to behavioral change in Oslob. Schleimer et al. (2015) found that sharks at the site demonstrated both associative learning (i.e., associating the site with food and adapting their feeding behavior) and habituation (i.e., increased tolerance levels to proximity to people and other sharks), which suggests that a combination of habituation and conditioning is changing whale shark behavior while at the site. Whale sharks with greater experience at the site were also more likely to display vertical feeding behavior, which indicates that sharks are capable of learned behavior as a result of conditioning from positive reinforcement (Schleimer et al., 2015). Furthermore, experienced whale sharks were less likely to exhibit avoidance behaviors in response to either active or passive contact from humans, and contact with other sharks, which suggests that a combination of habituation and conditioning is changing whale shark behavior while at the site (Schleimer et al., 2015). Thomson et al. (2017) found that some whale sharks exhibited prolonged residency at the site and concluded that provisioning could influence foraging success, alter whale shark distributions and lead to dependency as the sharks get older. These findings suggest that provisioning activities are consumptive in nature, as they are affecting whale shark fitness and therefore survival.

2.2.3 Seapen tourism

A recent trend in Asia, particularly, is to keep whale sharks in ‘temporary exhibits’, which occur when local fishermen opportunistically catch whale sharks and keep them in seapens similar to those used in fish farming (Obura, Rowat, Nicholas, & Pierce, 2013). These seapens turn into temporary whale shark exhibits, where tourists pay to view the sharks and interact with them in the pens. The sharks are kept on the scale of weeks before being

released and potentially replaced with a freshly caught shark (Obura et al., 2013). Such exhibits are found off Sanya and Fenjiezhou Island in southern China, although additional locations are likely (Obura et al., 2013). For example, a company applied for a license to keep two whale sharks in a 2,000 m by 600 m enclosure (termed a "community based marine sanctuary", Gambo, 2012) off the coast of Diani, Kenya, for tourism, research and conservation purposes in 2012 (Reinl, 2013). They argued that the ticket price of $134 to snorkel with the sharks would help fund conservation projects to protect the sharks, as well as fund a research center and potential breeding program (Reinl, 2013; Spooner, 2012). Although their application was rejected, it does highlight the interest in monetizing the artificial presence of whale sharks in such enclosures when feeding aggregations do not naturally occur at the location.

2.2.4 Aquaria tourism

Whale sharks are kept in captivity at nine known aquaria, largely in Asia. Valuing this sector is difficult because keeping whale sharks in captivity is a controversial topic and many aquaria are reticent to provide information (**Table 2.2**). Economic information was only available for two aquaria – the Georgia Aquarium, USA ($85.5 million; Guidestar.org) and Churaumi Aquarium, Japan ($586.7 million; K. Sato, personal communication). Along with visitation and ticket prices for five of the remaining seven aquaria, over 20.7 million people spent over $1.4 billion to see whale sharks in 2017. Visiting aquaria can allow people to form an emotional connection with animals they may never otherwise encounter; this emotional connection can, potentially, improve social and ecological conservation outcomes for the sharks through an increase in pro-conservation attitudes, beliefs, and behaviors (Jensen, Moss, & Gusset, 2017; Skibins, Powell, & Hallo,

2013). Some aquaria, namely the Georgia Aquarium and Churaumi Aquarium, also conduct field research or fund projects that provide tangible conservation benefits for wild whale shark populations, including whale shark tagging (de la Parra Venegas et al., 2011) and DNA analysis (Alam, Petit, Read, & Dove, 2014; Read et al., 2017).

Most aquaria only allow the viewing of the sharks but the Georgia Aquarium, Chimelong Ocean Kingdom Whale Shark Exhibit Aquarium (China) and the Cube Oceanarium (China) also allow visitors to snorkel and scuba dive in the main tank with the whale sharks (**Table 2.2**). These activities, worth an estimated $4.1 million in 2017, may introduce an element of competition with wild sites where local communities benefit from the economic returns that whale shark tourism activities afford them. However, it is also plausible that those who see a whale shark in an aquarium may be more likely to visit a non-captive whale shark site. Aquaria may therefore act as a gateway for some people who may not have otherwise chosen to see the animals in the wild (Duffus & Dearden, 1993).

There are ethical concerns with keeping a highly mobile, long-lived, endangered shark in a tank similar to the more highly-publicized display of killer whales that has garnered global attention over the last few years. Some aquaria do not provide tanks of adequate size for whale sharks, nor do they have sufficient knowledge of how to care for these animals in captivity, particularly for the long-term (Master, 2018; Moore, 2011). There is the potential for high mortality rates, potentially resulting in continued pressure on already dwindling wild populations to supply new sharks for exhibit. For example, a study found that the average lifespan of 16 captive whale sharks kept at the Okinawa Expo Aquarium between 1980 and 1998 was only 502 days (range: 3 days to 2056 days; Uchida, Toda, Kamei, & Teruya, 2000), compared to an estimated 130 years in the wild. The

popularity and significant economic returns from having whale sharks on exhibit (i.e., 20.7 million visitors generating $1.4 billion in 2017; **Table 2.2**) may result in the black-market capture and sale of wild whale sharks ("Marine parks get popular in China," 2018; Master, 2018). For example, in 2016, a major supplier of large marine megafauna to the illegal international wildlife trade was found in possession of two juvenile whale sharks in a seapen in Indonesia, awaiting transport to China (Hilton, 2016). The poachers were selling the sharks for $1,476. The scope of the problem is hard to assess given the difficulty in tracking the illegal trade in endangered species and the fact it is often linked with other criminal activities (e.g. drugs) and international gangs (McConnell, 2017; Winter, 2018). However, given the fact that whale sharks are a protected species in most countries (including China), and the growing popularity of marine parks in China – 60 marine parks are already operating and a further 36 large-scale projects are planned by 2020, many of which feature threatened species like whale sharks, belugas, dolphins and manta rays (Master, 2018; The Strait Times, 2018) – it is likely that many of the sharks on exhibit are from the black market. Further research is needed to better understand the conservation value of keeping whale sharks on exhibit in aquaria. Research questions include whether tourists who visit the aquaria are more likely to become involved in conservation activities, are stimulated to visit whale sharks in the wild, have improved pro-conservation attitudes or awareness towards whale sharks, or are more likely to donate money towards conservation.

2.3 Economic valuation of whale shark tourism

Direct use value refers to the economic benefit from the direct use of an animal. This can either be consumptive, through the capture and sale of the animal, or non-consumptive

through wildlife tourism (Catlin, Hughes, Jones, Jones, & Campbell, 2013). Many whale shark fisheries are illegal, with the sharks caught and sold for meat and fins for restaurants (mainly for shark fin soup), oil for cosmetic and health products (e.g., lipstick, skin care, nutritional supplements), and skins for bags (Hilton & Hofford, 2014). The total number of whale sharks caught and sold at market annually is unknown. China is the largest market globally for whale sharks and their byproducts. Li, Wang, and Norman (2012) found that the recorded catch of whale sharks in China is grossly underreported: approximately 1,000 whale sharks are landed each year in coastal Chinese waters, although only 186 whale shark landings were reported between 1983 and 2011. In 2014, a factory in Zhejiang Province, China, was found to slaughter and process more than 600 whale sharks per year, despite the sharks being a protected species in China (Hilton & Hofford, 2014). It is believed that there are many such factories in the region, and the number of whale sharks processed at these plants is therefore presumably much higher ("Hundreds of whale sharks killed annually in illegal trade in China," 2014).

The price at which whale sharks are sold varies widely, depending on location and shark size. The average market price for whale sharks in China is estimated to be $30,000 for a whole shark (J. L. Lee, 2014), although in Taiwan prices ranged from $14,000 for a 2 tonne shark to $70,000 for a 14 tonne shark during the peak demand period (Chen & Phipps, 2002). Whale shark meat sold for up to $12-$17/kg in Taiwan, while individual fins could reach prices of $57,000 (Clarke, 2004). Chen and Phipps (2002) reported market prices of individual whale sharks in Taiwan from 1999 to 2002 of $7,116 to $23,543, with wholesale prices ranging from $2.10/kg to $6.92/kg and retail prices ranging from $4.91/kg to $17.16/kg. In Hong Kong, whale shark fins could sell for $247 in 2010 (Paddenburg,

2010). Although they were previously considered to be of relatively poor quality, and mainly used in restaurant displays to advertise the availability of shark fin soup (Chen & Phipps, 2002), whale sharks are now considered a high value shark and prices for their meat and fins may therefore increase as demand rises in the future (Li et al., 2012).

Norman and Catlin (2007), however, point out that these high prices are not the price paid to the fishermen who land these sharks. For example, a 370 kg whale shark caught in China in 2016 was sold for only $0.40/kg (Griffiths, 2016; "Whale shark killed and sold in Guangxi," 2016). Another Chinese fisherman planned to sell a 2 tonne whale shark caught in 2014 for $1,500–$3,500, or $0.75–1.75/kg, at a market before the police intervened (Newport, 2014; Withnall, 2014). A 3–4 tonne whale shark caught in 2014 in Pakistan sold for about $250 or $0.07/kg (Ilyas, 2014), while a 7.7 tonne whale shark sold for $2, 200 or $0.29/kg in 2012 (Vafeiadis, 2012). In 2008, a seafood hawker in Hong Kong paid a fisherman the equivalent of $2,550 to release a live whale shark that he was planning to sell at the market (Chiu & Lo, 2008). Similarly, a Russian tourist paid Indonesian fishermen $75 to release a live whale shark they had brought to the beach (Pearl, 2016). Norman and Catlin (2007) concluded that this discrepancy between the market value and the price paid to local fishermen "clearly highlights that there is minimal economic benefit on a regional/local scale from whale shark fishing, as the high prices are realized elsewhere" (p. 8).

The direct use value from tourism can bring significant economic returns to local communities. The valuation of whale sharks from tourism activities can occur at different scales, from individual animals to tourism sites to the national or global scale. For example, Graham (2003) estimated the individual value of a whale shark at Gladden Spit, Belize, at

$34,906 annually and $2,094,340 over its lifetime (assuming life expectancy of 60 years), or $104,718 per shark, per year, if it visits multiple aggregation sites in the region (**Table 2.4**). Norman and Catlin (2007) valued an individual whale shark at Ningaloo, Australia, at $9,000 per year and $216,000 over its lifetime (assuming a 24-year generation gap). Although attaching a value to an individual shark is appealing from a conservation campaign standpoint, and makes for a persuasive argument (i.e., the animal is worth more alive than dead), Catlin et al. (2013) argue that the individual valuation approach is not scientifically rigorous. They argue that such numbers are based on several assumptions, including a direct and positive relationship between the presence of wildlife and tourism value, a known population size of the targeted species at a specific location, the period over which the species is valued (e.g., life expectancy vs. generation gap), that all animals in a given population are equally exposed to tourism activities (which disregards demonstrated cases of habituation, attraction, and avoidance), and that estimated values of individual whale sharks for one location can be extrapolated to other locations (e.g. assuming that a whale shark at a smaller tourism site would have the same value as one from a more established site like Ningaloo).

Table 2.4 Tourism value of whale sharks

Location	Economic Value (USD)	Number of sharks	Individual valuation	References
Ningaloo	$19 million	1082*	$17,560 (individual); $421,442 ** (lifetime)	Huveneers et al. (2017)
Gladden Spit	$3.7 million	106	$34,906 (individual); $2.1 million*** (lifetime)	Graham (2003)
Isla Mujeres	$14 million	1101*	$12,716 (individual); $305,177 (lifetime)**	Table 2.1
Oslob	$10 million	208	$48,077 (individual); $1.2 million** (lifetime)	Thomson et al. (2017) ; Table 2.3
South Ari Atoll, Maldives	$9.4 million	101*	$93,069 (individual); $2.2 million** (lifetime)	Cagua et al. (2014)

* used total number of whale sharks identified at each location from Norman et al. (2017) to approximate population size in given season.

** used 24-year generation like Norman and Catlin (2007) to account for fact that aggregation dominated by juvenile males

*** used 60-year life expectancy

It is, therefore, more accurate to discuss the tourism value of whale sharks at the local or national level. The value of non-captive whale shark tourism at the local level ranges from a few thousand dollars at smaller sites like Puerto Princesa (Philippines) and Shib Habil (Saudi Arabia), to multi-million dollar industries at more established locations like Ningaloo (Australia) and Isla Mujeres (Mexico; **Table 2.1**, **Table 2.3**). Graham (2003) estimated the national value of the 6-week whale shark tourism season to be $3.7 million, with a local value of $1.35 million, for the five communities involved in the management of the Gladden Spit Marine Reserve. Huveneers et al. (2017) valued the whale shark

tourism industry at Ningaloo, Australia, at $8.8 million for the local economy and an additional $9.6 million to the regional economy for dedicated shark divers who specifically came to Ningaloo to swim with whale sharks.

Using a different approach, Davis and Tisdell (1999) assessed visitors' willingness to pay for the whale shark encounter at Ningaloo and found that respondents were willing to pay a maximum of $230 (range $40–1,150), while Ziegler (2010) found that whale shark tour participants at Holbox, Mexico, were willing to pay a maximum of $151–200 for the experience.

Regardless of any issues with the validity of methodologies used, it is evident that whale shark watching generates a significant amount of money. At the global scale, the non-captive whale shark tourism industry is worth over $100 million annually (**Table 2.1**, **Table 2.3**) and a significant proportion of this goes to developing nations.

2.4 Whale sharks and ecotourism

Activities such as whale and shark watching have often been promoted by conservationists as a way to attach a higher economic value to protecting species for viewing rather than extracting them for consumption (Duffus & Dearden, 1993). There are three key components to ecotourism: (1) the environment: ecotourism is a low-impact activity that occurs in natural environments and should contribute to the conservation of local flora and fauna, (2) local community: ecotourism should encourage local participation and management of socio-economically sustainable tourism activities for the local community, and (3) education: ecotourism should provide meaningful learning opportunities for tour participants (Sharpley, 2006). In addition, for any tourist endeavor to be successful, it must

continue to attract tourists, implying that tourists must continue to find the attraction satisfactory. This section looks at some of the challenges whale shark viewing faces in meeting these criteria, namely through environmental impacts, community involvement, educational awareness and tourist satisfaction, and some of the mitigating approaches that managers can take. We finish with an overall evaluation of whale shark tourism as ecotourism and a potential IBC mechanism.

2.4.1 Impacts of tourism on whale sharks

There are numerous actual and potential impacts of whale shark tourism activities (**Table 2.5**). *Actual* impacts are defined as those that are measurable by current scientific techniques, while *potential* impacts are those that are possible based on the wildlife tourism literature and knowledge of whale shark biology/ecology. Interpreting the results of impacts is difficult. For example, one generally cannot tell if sharks with boat propeller scars are due to collisions with whale shark tour boats or other private or commercial vessels at the site, or have occurred elsewhere, due to the highly migratory nature of whale sharks. Furthermore, only two preliminary studies (Raudino et al., 2016; Rowat & Brooks, 2012) have included a control group of sharks without the presence of tourism so there is no baseline benchmark of 'normal' whale shark behaviors in the absence of tourism activities. Preliminary focal animal monitoring in the presence and absence of swimmers and boats has been completed in the Seychelles and Australia; however, initial findings are contradictory. Rowat and Brooks (2012) found that whale sharks spend significantly less time at the surface when tourists or boats are present, while Raudino et al. (2016) found that whale sharks at Ningaloo maintained neutral behaviours (e.g. surface swimming, swimming at depth, resurfacing, no reaction) while in the presence of tourist boats. They

did, however, find that whale sharks were significantly more likely to make directional changes while in the presence of tourist boats suggesting that tourism may be affecting the sharks (Raudino et al., 2016). More research is needed to better understand natural whale shark behaviour in the absence of tourists.

Table 2.5 Real and potential negative impacts of whale shark tourism activities on the sharks

TOURISM IMPACTS	STUDIED	ISSUES	REFERENCES
Actual			
Injuries (e.g., boat strikes)	Yes	- Difficult to determine if observed injuries due to tourist boats or other private or commercial boats	Cárdenas-Torres et al. (2007); Rowat, Meekan, Engelhardt, Pardigon, and Vely (2007)
Short term behavioral changes	Yes	- Unclear if short-term behavioral changes affect shark fitness over longer term - No control available for 'natural' whale shark behaviors in absence of tourists	Araujo, Vivier, et al. (2017; Haskell et al. (2015); Norman (1999); Pierce et al. (2010); Quiros (2007); Schleimer et al. (2015); Thomson et al. (2017)
Changes in whale shark visitation/residency	Yes	- Sharks may return to a given site even if they experience disturbance; does not mean they are not experiencing stress - May still experience reduced fitness	Araujo et al. (2014); Sanzogni, Meekan, and Meeuwig (2015); Thomson et al. (2017)
Disruption of normal feeding activities	Yes	- Unknown if short-term disruptions to normal foraging behavior translates into longer term impacts on overall animal fitness	Quiros (2005); Thomson et al. (2017)
Physiological stress	No	- Difficult to obtain blood samples without affecting results	

		- Difficult to obtain baseline value from sharks not affected by tourism	
Disease transfer	No		
Parasite loads	No		
Potential			
Longer-term behavioral changes	Yes	- Longest period assessed is 4 years - Only completed at a few sites	Araujo, Vivier, et al. (2017); Haskell et al. (2015); Thomson et al. (2017)
Reduced health/fitness	No	- Difficult to assess in long-lived, highly migratory marine species	
Reduced reproductive success	No	- Difficult to assess in species for which mating behavior has never been observed in the wild, do not know where breeding/pupping occurs, and no parental care	
Loss of individuals	No	- Difficult to assess in long-lived, highly migratory marine species	

Attempts to assess the impacts of whale shark tourism on the sharks is relatively new and has focused primarily on short-term behavioral studies (**Table 2.6**). This technique involves creating an ethogram of a given shark's observed behaviors (e.g., feeding, diving, swim speed and direction) when interacting with humans in order to determine if there is a marked change in the shark's behavior in response to given human behaviors (**Table 2.7**). Araujo, Vivier, et al. (2017) found that over 50% of interactions in Southern Leyte ended within 2 minutes, mostly due to the sharks diving away from the surface, suggesting short term disturbance was occurring. Norman (1999) found an increase in the frequency of avoidance behaviors at Ningaloo over a 3-year period, from 56% in 1995 to 71% in 1997, suggesting that the sharks' tolerance to tourism activities may have decreased over that

time period. A similar pattern was observed in Mozambique. Pierce et al. (2010) found that 34.6% of observed encounters between an individual shark and swimmers resulted in avoidance responses at Tofo Beach, Mozambique, while Haskell et al. (2015) found that 64.7% of observed interactions resulted in avoidance responses at the same site suggesting that the sharks' tolerance for tourism activities also decreased over the study period. Furthermore, Pierce et al. (2010) and Haskell et al. (2015) found that sharks exhibiting avoidance behaviors resulted in shorter encounters indicating that tourist presence did affect the shark's short-term behavior. However, Pierce et al. (2010) noted that encounter length was also dependent on the shark's prior reaction to the boat, such that in-water interactions with sharks displaying boat avoidance behaviors were significantly shorter than interactions with sharks that did not display such avoidance behaviors.

Table 2.6 Whale shark tourism impact studies

METHOD USED	LOCATION	LENGTH OF STUDY	REFERENCE
Behavioral	Tofo Beach, Mozambique	20 months	Pierce et al. (2010)
		30 months	Haskell et al. (2015)
	Oslob, Philippines	2 years	Schleimer et al. (2015)
	Donsol, Philippines	2 years	Quiros (2007)
	Leyte, Philippines	4 years	Araujo, Vivier, et al. (2017)
	Ningaloo, Australia	3 years	Norman (1999)
Photo-ID and/or logbook data	Ningaloo, Australia	5 years	Sanzogni et al. (2015)
	Oslob, Philippines	21 months	Araujo et al. (2014)
		3 years	Thomson et al. (2017)

Table 2.7 Known whale shark avoidance behaviours and the tourist behaviours that elicit such responses

SHARK AVOIDANCE BEHAVIORS	DEFINITION
Banking	Shark rolls laterally and presents dorsal side to perceived threat
Eye-rolling	Shark rolls its eye into its head
Fast swimming	Shark increases swim speed in response to perceived threat
Diving	Shark dives away from surface
Change in direction	Shark alters its direction of swimming in response to swimmers
Violent shudder	Shark shakes its body violently along lateral axis
TOURIST BEHAVIORS	**DEFINITION**
Free diving	Person swims below surface to get closer to shark
Touching	Person makes physical contact with shark
Flash photography	Photography with flash, strobes or lights
Splash entry	Person forcefully enters water
Blocking path of shark	Person places body in path of oncoming shark
Swimmer proximity	Person too close to shark based on encounter guidelines

There are, however, conflicting results regarding the effect of swimmer presence on whale sharks. For example, Araujo, Vivier, et al. (2017) and Haskell et al. (2015) found that the number of previous encounters with tourists a shark experienced did not affect interaction duration in Leyte and Mozambique, while Quiros (2007) found that sharks that had been swum with repeatedly were more likely to exhibit a dive response compared to those that had been sighted for the first time, which suggests that sharks learn tourist

avoidance over time. Araujo, Vivier, et al. (2017), Haskell et al. (2015) and Quiros (2007) found that encounter duration was longer with scarred individuals, while Norman (1999) found the opposite to be true at Ningaloo. However, Norman (1999) reported that sharks with recent propeller wounds appeared calm with swimmers but would dive upon hearing the sound of an approaching vessel; vessel avoidance is therefore the likely cause of the avoidance behavior and not swimmer presence. Pierce et al. (2010), meanwhile, found that scarring had no effect on likelihood of exhibiting avoidance behaviors and therefore interaction length, although the authors noted that they did not specifically examine boat injuries in their analysis. Both Haskell et al. (2015) and Araujo, Vivier, et al. (2017) found that there was no relationship between shark size and interaction length, suggesting that these sharks do not display avoidance learning (i.e., larger, presumably older sharks avoiding tourist interactions due to previous experiences with tourists over past seasons). Araujo, Vivier, et al. (2017) conclude that the variability in observed interaction durations between sharks and tourists is likely due to differing personalities among the sharks, with some sharks more sensitive to tourist behaviors than others.

It is difficult to interpret the results of behavioral studies because we do not know if the observed short-term behavioral changes translate into longer-term impacts on shark health and fitness. Haskell et al. (2015) and Araujo, Vivier, et al. (2017) did not find any long-term behavioral changes in individual sharks, despite sharks displaying avoidance behaviors in the short term. For example, individual whale sharks were not more likely to display avoidance behaviors if they had done so in the past. Norman (1999) concluded that whale sharks appeared to be tolerant of any tourism pressure present at Ningaloo because they did not actively avoid swimmer interactions. However, the studies varied in length

from less than 2 years to 5 years (**Table 2.6**); it is unclear if this is a sufficient timeline to identify so-called 'long-term' impacts. Furthermore, none of the impact studies used baseline values or a control population of sharks without tourism present, nor do they assess the sharks' physiological state in the presence of tourism activities. Assessing the effects of tourism on the sharks would best be accomplished using physiological indicators (e.g., changes in hormone levels, heart rate, metabolic rate, growth rate; Bateman & Fleming, 2017). For example, an increased heart rate in the presence of tourists would result in increased energy expenditure even if there was no observed behavioral response to a tourist disturbance (Bateman & Fleming, 2017). Stressed animals may divert energy reserves away from the immune system, thereby becoming immunocompromised; immune suppression can result in animals carrying higher parasite loads (Bateman & Fleming, 2017). Other potential impacts of tourism activities can include increased metabolic rates, reduced growth rates, increased rate of injuries or slower wound healing, and reduced reproductive success (Bateman & Fleming, 2017).

Semeniuk, Bourgeon, Smith, & Rothley (2009) highlighted the main challenges in determining the impacts of tourism activities on marine animals, especially non-mammals, namely (1) the difficulty in accessing and/or observing animals that do not need to access the surface, (2) the difficulty in measuring reproductive success in animals that have communal nursing grounds or do not have any parental care, and (3) their long-lived nature precluding the direct measurement of mortality. Due to these difficulties, the authors suggest the use of physiological indicators to measure tourism impacts on non-marine mammal species since these indicators are able to reflect the health state and predict survival and reproduction of animals exposed to tourism activities. Possible indicators

include haematocrit, total serum protein concentration, blood pH, cortisol, lactate, glucose, differential white blood cell counts, and antioxidant capacity and oxidative status (A. Dove, personal communication; (Semeniuk, Bourgeon, et al., 2009). Semeniuk, Bourgeon, et al. (2009) used physiological indicators as evidence that provisioned stingrays at Stingray City Sandbar (SCS), Cayman Islands, were exhibiting symptoms of immunosuppression when compared to stingrays at non-tourist sites. The authors concluded that while there was no direct evidence of reduced survival at SCS, the physiological parameters measured suggest that it is quite likely. The authors further noted that the use of physiological stress indicators to determine tourism impacts is preferred over behavioral studies, as it provides a better understanding of the actual costs to the animals, especially when long-term population data are not available.

In the absence of any physiological data from whale shark tourism impact studies, researchers attempting to ascertain the longer-term impacts of short-term behavioral changes use whale shark aggregation characteristics. For example, most aggregations across the globe are dominated by juvenile males, suggesting that tourism activities do not disrupt reproduction of the species at these sites, as reproduction is not likely to occur in any case (e.g., Philippines, Mozambique, Tanzania, Djibouti, Australia, Mexico; Araujo, Vivier et al., 2017; Haskell et al., 2015; Sanzogni et al., 2015). Feeding habits are another characteristic that can be used to assess longer-term tourism impacts. At Ningaloo, for example, whale sharks feed at night and not during the day, when tours occur, suggesting that tourism activities do not disrupt whale shark feeding (Sanzogni et al., 2015). In Donsol, whale sharks do feed during tour hours and feeding sharks were more likely to exhibit avoidance behaviors including violent shudders, banking and abrupt changes in direction,

suggesting that sharks were diverting their energies from feeding to avoidance behaviors, which can affect their long-term survival (Quiros, 2007).

Shark residency or site fidelity is another criterion used to assess tourism impacts, as those aggregations with more resident sharks (e.g., Leyte, Tanzania) will likely experience greater tourism impacts than those consisting of mostly transient sharks (e.g., Honduras, Mozambique; Araujo, Vivier, et al., 2017; Haskell et al., 2015). Furthermore, tourism disturbance could affect site residency or fidelity, as individual sharks may no longer return to the aggregation site in future seasons due to disturbance from tourism activities at the site. For example, Graham (2007) suggested that whale shark numbers have decreased at Gladden Spit, Belize, because of increasing tourist numbers disturbing the spawning snappers, which attract the whale sharks to the site, although variability in sightings could also be due to environmental factors. Consequently, if sharks continue to return to the site, it suggests that they are not experiencing significant disturbance from tourism activities. For example, Sanzogni et al. (2015) assumed that if tourism activities were having negative impacts on the sharks at Ningaloo, that "total encounters per shark would decline, the day of first encounter would occur later each season, the days between encounters within a season would lengthen, residency time would decrease, and the rate of departure should increase" (Sanzogni et al. 2015, p. 5). The authors concluded that since sharks continued to return to key feeding habitat, they are not experiencing sublethal impacts from tourism activities at this site.

However, apparent wildlife tolerance of human presence is not necessarily a sign that tourism activities are harmless to the focal species (Higham & Shelton, 2011). Bejder, Samuels, Whitehead, Finn, and Allen (2009) outlined three factors that can explain this

apparent tolerance: (1) displacement – less tolerant individuals are displaced leaving more tolerant individuals at the site, (2) physiology – physiological impairment prevents an individual from reacting to human presence, and (3) ecology – there is no suitable habitat to which the animals may relocate. Shark residency or fidelity, therefore, may not be a good predictor of tourism disturbance (Araujo, Vivier, et al., 2017).

More research is needed to understand the impacts of whale shark tourism activities. Without data regarding the physiological impacts of these activities on the sharks, it is difficult to state with any scientific certainty that these activities do not negatively affect the health/wellbeing of the sharks in the long term. When scientific data are unavailable, especially when dealing with an endangered species in critical habitat, it is important to use a precautionary approach that minimizes potential negative impacts.

2.4.2 Community involvement

The success of IBC projects in meeting social and ecological conservation goals is highly dependent on local participation in these programs (Brooks et al., 2013; Salafsky et al., 2001). At some sites, tourism activities were developed at the impetus of the local community and they are directly involved in their management (e.g., Donsol, Oslob, Holbox, Isla Mujeres, Bahia La Paz). In Donsol, whale shark tourism developed after locals contacted the government regarding the tourism potential of a large aggregation of whale sharks in local waters. After news coverage resulted in poachers killing seven of the sharks, the waters were declared a whale shark sanctuary and the sharks were protected at the national level (Quiros, 2005). WWF-Philippines worked with the Donsol Municipal Tourism Council, local government, and local fishermen to develop a community-based ecotourism program, including the establishment of the marine sanctuary, the setting of

fees and regulations, and the training of guides and boatmen (Yaptinchay, 1999, as cited by Quiros, 2005). Boatmen and guides are selected using an alphabetic list such that everyone has an equal opportunity to work, and economic benefits are equitably distributed within the group (Ziegler, Dearden, & Rollins, 2012). At other sites, for example in Holbox, Mexico, local fishermen also work as tour guides but there are several competing tour companies ranging in size from a single boat to a fleet of 10 to 15 boats. Subsequently, three or four of the larger tour operators own at least 60% of the market, leaving the forty other operators to fight over the remaining 40% of the market (Zenteno, 2007). That leads to a high turnover rate of permit holders because the operating costs for the three-month season are often greater than the money generated from selling the tours (Zenteno, 2007).

In Oslob, only locals from the barangay of Tan-awan or their relatives are allowed to participate in whale shark tourism. This has created conflict within the community as neighbouring barangays also want to have access to this economic benefit. Potential solutions suggested included rotating the barangay responsible for running the tourism operations on a monthly basis or allowing multiple barangays within the municipality of Oslob to open their own whale shark tourism operations (J. Ziegler, unpublished data). The mayor at the time, however, decided against these options, only allowing tourism activities in Tan-awan, although economic benefits are shared with the municipality (e.g. infrastructure improvements). He did give the neighbouring barangay of Bangcogon a 50% share of the profits from the tourist entrance fees to Sumilon Island, across the bay from Oslob, which can translate into monthly payments of $20-30 or more to each household – a significant amount considering most households are living off $1 a day or less (J. Ziegler, unpublished data).

At most other sites, the majority of tourism activities are managed and run by foreign-owned companies (e.g., Madagascar, Southern Leyte, Galapagos, Mozambique, Saudi Arabia, Oman). For example, in Southern Leyte, Philippines, although there is a local whale shark tourism group (KASAKA) consisting of fishermen who work as guides and spotters in whale shark tourism activities, the activity itself is reliant on foreign-owned dive shops to bring them tourists. The dive shops made an agreement with the municipal government that they would hire members of KASAKA to work as spotters and guides for a set amount of money. Spotters are paid approximately $5/day but have to pay a $1 rental fee for the boat they use if they do not own one, while guides make $6/day and do not have to pay any additional fees (J. Ziegler, unpublished data). On average, spotters and guides work 2 to 3 days per week. The dive shops charge upwards of $100 per person with an average of 8 tourists per boat. Unfortunately, the local community does not have much bargaining power at this location because the whale sharks are not only found in their waters. The dive shops could therefore partner with other communities who may be willing to take less money to do the same jobs or they may simply bypass hiring local help altogether.

One of the primary justifications for whale shark tourism is that it helps protect the sharks by providing economic benefits to local communities. However, no studies to date have actually made a direct link between whale shark tourism and improved ecological conservation outcomes, such as increased whale shark numbers and or increased range. In fact, whale shark declines have been observed at several tourism sites (Mozambique, Belize, Seychelles, Thailand). A recent study of local fishermen involved in whale shark tourism activities at various sites in the Philippines did find that participation in whale

shark tourism resulted in improved environmental awareness and attitudes as well as pro-conservation behaviors (**Chapter 4**). For example, many of the fishermen were afraid of the sharks prior to tourism and would stop fishing activities altogether when the sharks appeared, and return to the village, because they were afraid the sharks would tip over their boats. Others would get angry because the sharks would get caught in their nets and destroy them. These fishermen would sometimes hit the sharks with their paddles or use stones to scare them away from their nets. Others still simply saw no value in the sharks and would throw rocks or live dynamite at them, as well as use harpoons to ride the sharks. Since tourism activities started, however, none of these behaviors occur. Some fishermen now see the intrinsic value (i.e., that sharks have value just by existing) of whale sharks and appreciate their presence in their waters, while others treat the sharks well because of their economic value to the local community. This change in perceptions of, and attitudes towards, whale sharks is partially due to participating in whale shark tourism activities, but also due to extensive workshops run by local NGOs and the government explaining whale shark biology, threats and conservation needs. These improved pro-conservation attitudes, awareness and behaviors towards the sharks have also translated into pro-conservation behaviors towards the ocean and greater environment, such as cleaning up the beaches when they see trash and not throwing their trash on the beach or in the ocean, telling others to not throw their trash in the ocean, and using more environmentally friendly fishing techniques (e.g., no more cyanide or dynamite fishing, muro ami – smashing coral heads with heavy rocks to flush out fish, buzo – hookah fishing with oxygen, or use of spearguns).

Whale sharks have also taken on an important cultural significance at many locations, as evidenced by the many murals, festivals and statues celebrating these sharks

at the various locations (**Fig. 2.3**). Whale shark festivals are held at many locations, including in the Mexican Caribbean (Isla Mujeres since 2007, Holbox since 2015), Donsol, Ningaloo, the Maldives (since 2013), and India (since 2001). The importance of these events on conservation outcomes is, as yet, unknown, although Dearden, Yasue, and Kockel (2018) suggest that the socio-psychological benefits of marine protected areas for local communities may exceed the more extrinsic economic and fishery benefits that are often emphasized.

Figure 2.3 Cultural importance of whale sharks (clockwise from top left): A Whale shark mural at a restaurant in Koh Phangan, Thailand (credit: P. Dearden), B Participant in the 2017 Donsol Butanding Festival, Philippines (credit: Jenny Hardy|LAMAVE), C Whale shark mural in Utila, Honduras (credit: D. Hughes), D Children dressed in whale shark costumes dancing during the 2017 Donsol Butanding Festival, Philippines (credit: Natalie Hancock|LAMAVE), E Participant in the 2017 Donsol Butanding Festival, Philippines (credit: Jenny Hardy|LAMAVE)

2.4.3 Building environmental awareness

Environmental interpretation and outreach can positively influence tourists' perceptions and attitudes towards conservation, as well as their pro-conservation behavioral intentions and behaviors (Ardoin et al., 2015; Zeppel & Muloin, 2008a), which may lead to long-term changes in their attitudes towards conservation and their pro-conservation behaviors (e.g., Ballantyne, Packer, & Falk, 2011; Filby, Stockin, & Scarpaci, 2015; Hughes, Packer, & Ballantyne, 2011). These social conservation outcomes may then translate into improved ecological conservation outcomes (Orams, 1996).

Studies have found mixed success in the implementation of interpretation (Pegas et al., 2013). Mayes et al. (2004) compared the social conservation outcomes of two wild dolphin feeding programs in Australia and found that the one with better environmental interpretation resulted in improved pro-environmental beliefs, attitudes, and behavioral intentions among its participants. Other studies have found that environmental interpretation leads to increased knowledge, but no changes in attitudes or behaviors (see Ardoin et al., 2015 for review).

Effective interpretation design is critical for achieving the desired social and ecological conservation outcomes. Increased information, regardless of its quality, does not always result in behavioral change (Fujitani, McFall, Randler, & Arlinghaus, 2016); neither does the accumulation of knowledge (Orams, 1994). Research into what makes for a memorable and effective interpretation experience highlights the importance of human connection in ensuring increased pro-environmental behaviors or intentions (Ballantyne et al., 2011; Jacobs & Harms, 2014). Topics related to connecting with humans within wildlife tourism include reproduction, birth, death, and social relationships (Lück, 2015;

Orams, 1996). For example, Jacobs and Harms (2014) found a causal link between the use of emotions during interpretation on a whale watching tour and an increased likelihood of participating in marine conservation actions (e.g., donating money, encouraging others to protect wildlife). The authors also found that experiencing the whales without interpretation had no effect on pro-environmental behavioral intentions, highlighting the importance of interpretation in ensuring the larger social and ecological conservation outcomes are achieved. However, this study did not assess if short-term changes in behavioral intentions translated into long-term changes in behaviors once participants returned home. Thus, it is unknown if the increase in positive behavioral intentions resulted in improved ecological conservation outcomes for whales or the marine environment.

Some studies have demonstrated that effective interpretation can reduce negative behaviors during the tour itself (Medio, Ormond, & Pearson, 1997). For example, Orams and Hill (1998) assessed the effectiveness of an interpretation program at a wild dolphin feeding site at Tangalooma, Australia, in reducing negative impacts on the dolphins (e.g., touching dolphins) and found a significant reduction in all negative behaviors after the implementation of the interpretation program. Camp and Fraser (2012) found that in-depth environmental interpretation resulted in the significant reduction of diver contacts with coral reefs. Reduced tourism impacts may translate into positive ecological conservation outcomes. However, this component was not included in the studies. Furthermore, these behavioral changes, although beneficial for the focal species during the encounter, may not necessarily translate into longer-term changes in pro-environmental behaviors once the participants return home, such as volunteering for conservation organizations, participating

in beach clean-ups or donating money for conservation. Thus, larger scale ecological conservation outcomes may not be realized.

Research in the field of marine wildlife tourism highlights the importance of providing examples of pro-environmental actions that could be taken once participants return home (e.g., participate in beach clean-ups, donate money, volunteer) and or opportunities to act during the tour itself (e.g., participate in research, clean-up, join a conservation organization, petitions) to improve the effectiveness of interpretation in changing pro-environmental behaviors (Ballantyne et al., 2011; Filby et al., 2015). Lück (2015) found that tourists explicitly requested this type of information be included during tours, with several respondents noting that they were provided information regarding human impacts on the environment and focal species, but nothing on how to help. Hughes et al. (2011) found that those participants provided with post-trip resources were significantly more likely to take pro-conservation actions. Other studies have noted the importance of explaining why behavioral changes are necessary to help improve compliance and therefore conservation outcomes (Camp & Fraser, 2012; Medio et al., 1997; Orams, 1996; Orams & Hill, 1998). These findings suggest that if participants are unaware of the harmful effects of their behavior (Dearden et al., 2007) or ways they can help address conservation issues, ecological and social conservation outcomes are unlikely to be realized.

The presence and quality of interpretation at whale shark tourism sites varies greatly; some sites do not offer any interpretation, while the quality varies greatly at those sites that do offer some form of interpretation. At many sites, including Madagascar, Southern Leyte, and Saudi Arabia, researchers interact directly with tour participants as

they have a working partnership with local operators and therefore are able to answer any questions the tourists have and provide in-depth information on research and conservation needs. Those operators who do not have researchers on their vessels at these sites are often unable to provide high quality interpretation. On the global survey undertaken for this chapter, only two sites had excellent interpretation – Australia (see **Box 1**) and the Galapagos. There is clearly much room for improvement in this area.

Box 1 Interpretation at Ningaloo Reef, Australia

Ningaloo, Australia, provides a key example of the type of interpretation program that could be mandatory at all whale shark tourism sites. Furthermore, the development and implementation of this program exemplifies how adaptive management can be used to improve the tourism experience. A 2005 tourist survey found that 25% of tour participants at Ningaloo reported a desire for more general information on the biology and ecology of whale sharks during the tour (E. Wilson, personal communication). In response, the Department of Biodiversity, Conservation and Attractions (DBCA) developed a whale shark education and interpretation program to train whale shark operators, as part of their operator license conditions, as well as to educate tourists participating in these tours. Tour operator training includes an eLearning component, an online assessment, and an in-person workshop in Exmouth or Coral Bay – the entry points for whale shark tours at Ningaloo (E. Wilson, personal communication). Once completed, the training results in certification good for five years and is mandatory for all boat-based employees (E. Wilson, personal communication). The materials provided during training include videos, audio, fact sheets, scientific papers, and quizzes (E. Wilson, personal communication). DBCA also provides operators with brochures,

posters, flipcharts and fact sheets for distribution in their shops and on-board the vessels. Topics covered include: whale shark biology, distribution, feeding, habits, migration, management, threats, and tourist conservation actions. Studies suggest this type of interpretation is more likely to result in improved social conservation outcomes, including increased awareness of the whale shark's conservation needs, as well as potential long-term changes in tourists' knowledge, attitudes and behavior towards whale sharks and the larger marine environment.

2.4.4 Tourist satisfaction

Unregulated tourism growth is an important concern at many sites and can negatively impact the tourist experience and financial viability of the site. Boat and swimmer crowding are therefore a pressing concern at many sites (**Table 2.1**, **Table 2.3**). However, only a few sites have assessed issues with crowding – Oslob, Donsol, Holbox, Ningaloo, and Gladden Spit. Ziegler et al. (2016) assessed perceived crowding of whale shark tour participants in Holbox, Mexico, and found that nearly half of respondents felt crowded. The authors further found that the number of boats in the whale shark viewing area may have a greater influence on perceived crowding than the number of swimmers in the water. Furthermore, those respondents who felt crowded were significantly more likely to perceive the tour as having negative impacts on the sharks and wider environment than those who did not feel crowded (Ziegler et al., 2016). A similar crowding issue was also identified at Ningaloo. Davis, Banks, Birtles, Valentine, and Cuthill (1997) found that swimmer crowding was reduced by increasing the minimum viewing distance between swimmers and the sharks, along with a reduction in physical contact rates with the sharks. Catlin and Jones (2010) also identified the number of boats as a growing concern for whale

shark tourism at Ningaloo, Australia, despite a cap on the number of licenses at 15, due to the growing trend of sharing sharks among multiple boats. Sharing sharks is a growing practice at many sites when shark sightings are low, regardless of regulations in place limiting the number of boats and or swimmers allowed to interact with them at one time (e.g. Donsol, Holbox, Honduras, Isla Mujeres). For example, Ziegler et al. (2012) observed over thirty boats around a single shark on a particularly bad day in Holbox, with up to twenty people in the water at one time despite restrictions of one boat per shark and only two swimmers at one time. Operators were more interested in guaranteeing a whale shark sighting than following the rules.

Many sites do not have permit requirements for offering whale shark tours (e.g., Honduras, Madagascar, Leyte, Thailand, Maldives, Mozambique, Oman, Saudi Arabia, Tanzania, Djibouti, Indonesia), or, if they do, do not limit the number of permits allowed (e.g., Mexico) or do not enforce the regulations in place (e.g., Donsol). Some locations limit the number of boats allowed in the viewing area at one time in order to prevent crowding issues. For example, in Donsol, only thirty boats are allowed out at one time. However, on holidays and weekends, when demand is highest, this rule is rarely respected (J. Ziegler, personal observation; Quiros, 2005). On such occasions, the number of boats is only restricted by how many boats, licensed or not, that can be found to offer tours. Such practices not only detract from the tourism experience but may also put undue pressure on the sharks.

Numbers of whale sharks also fluctuate wildly over time and have strongly influenced visitation at sites in Belize, Mexico, Philippines, Thailand, Seychelles, and Mozambique (Araujo, Vivier, et al., 2017; Cárdenas-Torres et al., 2007; Carne, 2007;

Rohner et al., 2013; Theberge & Dearden, 2006). While the Seychelles have experienced a complete loss of the whale sharks and their associated tourism industry (D. Rowat, personal communication), other sites have been affected by unpredictable seasons and or shark numbers. For example, in 2004, the likelihood of sighting a whale shark at Gladden Spit, Belize, declined to less than 20% from over 80% in 1999 (Carne, 2007). Similarly, Rohner et al. (2013) identified a 79% decline in whale shark sightings at Tofo Beach, Mozambique, from 2005 to 2011. Theberge and Dearden (2006) identified a 96% drop in whale shark numbers in Phuket, Thailand, from 1998 to 2001, although recent reports suggest whale shark sightings have increased again in the last few seasons. Donsol, Philippines, meanwhile, experienced a decline in whale shark sightings during the 2013 and 2014 seasons. Tourist visitation fell from a high of 27,159 in 2012 to a low of 12,911 in 2014. The whale sharks returned to previous numbers during the 2015-2017 seasons, but tourism numbers struggled as word spread of the missing sharks with only 14,191 visitors in 2017. So far, there have been no shark sightings in 2018 (G. Araujo, personal communication).

2.4.5 Is whale shark tourism ecotourism?

Ecotourism is predicated upon the tourist activities being essentially non-consumptive in nature. Duffus and Dearden (1990) define non-consumptive wildlife tourism as "a human recreational engagement with wildlife wherein the focal organism is not purposefully removed or permanently affected by the engagement" (p. 215). Non-consumptive wildlife tourism, however, will, by its very nature (i.e., people in close proximity to wild animals), have impacts on the focal organism or environment. The extent of these impacts, and whether they affect the long-term survival of the species, is dependent on management at

the site (Duffus & Dearden, 1990). Improperly managed marine wildlife tourism can have significant negative impacts on both the conservation status and welfare of targeted species, including the loss of individuals through injury, death, and disease, short- and long-term behavioral changes, stress or negative physiological responses, altered feeding and/or reproductive behavior, and habitat alteration and or loss (Araujo et al., 2014; Araujo, Vivier, et al., 2017; Corcoran et al., 2013; Parsons, 2012; Semeniuk, Bourgeon, et al., 2009). If these impacts translate into long-term changes in the animals' health and fitness, marine wildlife tourism may result in population decline (Parsons, 2012).

In light of the literature outlining the negative impacts of marine wildlife tourism on the focal species, some authors argue that marine wildlife tourism is actually a consumptive use of wildlife (e.g., Neves, 2010). For example, Higham, Bejder, Allen, Corkeron, and Lusseau (2016) argue that declines in a dolphin population in Fiordland, New Zealand, attributed to reduced calf survival because of exposure to repeated tour boat interactions, can be considered a consumptive use of that species. The authors conclude that whale watching, and wildlife tourism in general, should be considered "a form of non-lethal exploitation, which may impact animal morbidity (e.g., sub-lethal anthropogenic stress) and mortality (e.g., vessel strikes)" (Higham et al., 2016, p. 74).

Whether whale shark tourism can be considered ecotourism is site dependent; some sites meet the definition, but most clearly do not. As Neves (2010) noted with the whale watching industry, whale shark tourism business models vary greatly across the globe. Those business models that prioritize maximizing revenue over the conservation of the species may be considered consumptive, as they are not attempting to minimize the real

and potential negative impacts of tourism activities on the sharks. Two examples serve to illustrate these differing approaches.

Provisioned whale shark tourism activities in Oslob, Philippines, can be considered a form of mass tourism. Tourism operations at this location are designed to get as many people as possible in the water with the sharks, with little regard for the wellbeing of the sharks or the quality of the tourist experience. On an average day, there are over 26 outrigger boats tied to each other in an area no bigger than 0.065 km^2, each carrying 6 to 8 people, or more than 182 snorkelers, not including scuba divers below, and feeder boats moving in between the lines of tourist boats with sharks in tow. Viewing is possible from 6 am to 12 pm and interactions are limited to 30 minutes per boat. Most 'swimmers' do not, in fact, know how to swim. Local authorities state that there are a minimum of 1,000 people coming through this site daily in 2018 (Ziegler et al., 2019). This management approach is having a negative impact on the tourist experience at the site, with 79% of respondents feeling crowded with respect to the number of swimmers in the water and 96% feeling crowded with respect to the number of boats in the viewing area in a 2016 survey (J. Ziegler, unpublished data). Based on the categories in Vaske and Shelby (2008, p.120), Oslob's carrying capacity is considered "overcapacity" in terms of number of swimmers, and "greatly overcapacity" in terms of number of boats. Virtually no environmental interpretation is provided for tourists. There is no real enforcement of regulations, with 97% of swimmers in 2014 within 2 m of sharks, suggesting there is a very high likelihood of physical contact between swimmers and sharks (Schleimer et al., 2015). An analysis of TripAdvisor reviews found that getting close to – and touching – whale sharks is a highlight for many tourists, with 40% of respondents admitting to touching a shark in a 2014 survey

(Ziegler, Silberg, Ponzo, & Dearden, 2016). This whale shark tourism business model may be considered consumptive in nature, as money has clearly taken precedence over minimizing tourism impacts and enhancing whale shark conservation.

Ningaloo, on the other hand, has prioritized managing its tourism industry within sustainable limits – the number of licenses is limited to 15, tour operators are required to complete training prior to receiving a license, and licenses can be revoked if rules are broken or if a better operator applies during the license renewal process. There is legal enforcement of the industry, appropriate monitoring, and the social and biological impacts are well studied (Anderson et al., 2014; Catlin & Jones, 2010; Catlin, Jones, & Jones, 2012; Davis et al., 1997; Davis & Tisdell, 1999; Sanzogni et al., 2015). This industry is being managed to ensure the activities have minimal impact on the sharks.

Effective management is key to transforming whale shark watching to a genuine ecotourism activity. The next section reviews some of the main management challenges.

2.5 Management challenges

Given the discussion above, there are obviously considerable challenges in managing whale shark tourism so that it can be rightfully called an ecotourism activity. The global assessment identified the following management issues as being of serious concern: (1) social and environmental impacts (e.g., perceived crowding, tourists touching sharks, sharks showing avoidance behaviors, negative impacts on the sharks and environment), (2) the rules not being followed, and (3) a noticeable decline in whale shark sightings at a number of sites. Only four sites felt they were being managed effectively.

Managing whale shark tourism activities at most sites is difficult due to the remoteness of the location, the large physical area over which the activity occurs, the lack

of resources (staff, money, boat) to monitor and enforce the rules, and the highly migratory nature of the focal species. Many sites only have voluntary codes of conduct in place, while sites with legally enforceable regulations lack the resources to enforce those regulations (**Table 2.1**, **Table 2.3**). Noncompliance is therefore an important issue for whale shark tourism. In Utila, Honduras, for example, tourists on dive boats must pay the boat captain a mandatory $20 fee if they wish to swim with whale sharks sighted during surface intervals (D. Hughes, personal communication). The incentive for the captains is therefore to get as many people as possible in the water to see the sharks without any regard for correct vessel approach limits or swimmer numbers as they can make more from a single encounter with a whale shark than their entire weekly wages (D. Hughes, personal communication). Nearly 90% of observed encounters involved violations of the code of conduct with up to seven boats within 200 m of a shark and up to 33 people observed in the water at once on April 19, 2017, despite guidelines limiting swimmer numbers to eight and boats within 200 m to one (D. Hughes, personal communication). A recent decline in whale sharks may be due to tourism activities, although other factors cannot be ruled out. Despite these issues, there is little interest on the part of operators or government to make the guidelines legally enforceable at the site (D. Hughes, personal communication).

In Mexico, there are issues with private boats doing whale shark tours rather than authorized tour operators (Cárdenas-Torres et al., 2007; D. Ramirez, personal communication; A. Dove, personal communication). For example, in Bahia de La Paz, Mexico, there have been issues with too many boats present in the viewing area at the same time, including private boats (D. Ramirez, personal communication). The uncontrolled nature of whale shark tourism activities at this site resulted in up to 60% of whale sharks

bearing injuries from boat strikes (D. Ramirez, personal communication). During the 2017/2018 season, regulations changed such that only 14 boats are allowed to offer tours at one time and each boat is monitored by a chip in real time to ensure compliance (D. Ramirez, personal communication). The whale shark viewing area is also being patrolled, which was not possible in past seasons; the success of these management changes is not yet known (D. Ramirez, personal communication). At Ningaloo, considered the gold standard for whale shark tourism management, operator activities are monitored using Electronic Monitoring Systems on-board each vessel that record trip information such as the encounter length, the GPS coordinates of the whale shark encounter, and information regarding the sharks (e.g., sex, length, new or shared shark; Anderson et al., 2014). The Western Australia Department of Parks and Wildlife also carry out regular flights over the interaction area to monitor compliance to the code of conduct during the whale shark season (Sanzogni et al., 2015). This level of enforcement is difficult at most whale shark tourism sites as most do not have the resources to afford such monitoring practices. On a positive note, however, whale shark viewing may also contribute to monitoring species numbers and distributions (Theberge & Dearden, 2006) particularly where they are based on sound scientific principles and reporting.

2.6 Management best practices

Effective management is needed to encourage the sustainability of marine wildlife tourism and to ensure that they are non-consumptive in nature. There is a very large variation in management practices in whale shark tourism around the world. This section will bring together some aspects of best practices that have evolved.

2.6.1 Managing impacts

Duffus and Dearden (1990) suggest using limits of acceptable change (LAC) to set sustainable thresholds for wildlife tourism. Such an approach assesses the impacts of an activity on a target species or environment (e.g., perceived crowding or environmental impacts) and uses social and ecological evaluative standards to determine acceptable levels of impact and then implements monitoring and management interventions to ensure that these limits are not exceeded. Interventions range from capping the number of visitors or boats through to changing visitor and or boat behavior. This approach differs from the traditional carrying capacity approach as the activity is managed to meet desired conditions instead of a specific number of participants (Manning, 1999). The focus of LAC is on managing the extent to which the resource and experiential quality can be compromised, rather than the extent to which recreational use should be restricted. This is the ideal scientific way to manage the activity and involves setting both ecological and social limits (Bentz, Lopes, Calado, & Dearden, 2016; Roman, Dearden, & Rollins, 2007).

There are, however, several challenges related to applying a full LAC approach to whale shark management. The approach relies upon having baseline data and measuring deviation from that baseline. For example, if 100 whale sharks used to feed in a given area before tourism activities and only 50 visited after the start of tourism, then this would strongly suggest that tourism was having an unacceptable impact on whale shark behavior and distributions. However, difficulties arise due to the lack of available baseline data against which to assess change and the lack of monitoring to establish changes. Furthermore, observed changes may be the result of other factors, such as environmental change (Sanzogni et al., 2015).

The approach is iterative and if negative impacts exceed limits then additional management interventions will be required. However, in reality, it is often difficult to downsize the industry due to socio-political constraints. For example, management authorities at Isla Mujeres, Mexico, tried to reduce the number of boats in the whale shark viewing area while still allowing for the continued growth of the industry by doubling the number of permits but mandating operators work one day on/one day off rather than reducing the number of permits issued. The strategy led to significant backlash from the operators who threatened to shut down the main shipping port (Ziegler, Dearden, et al., 2016). In addition, the future growth of whale shark tourism is likely to be in developing nations where regulatory processes for managing these activities are limited to non-existent.

In lieu of such site-specific information, a more generic approach is to establish guidelines that may mitigate negative impacts. These may be legally codified, but most are voluntary codes of conduct. In effect, there may be little difference between the two in terms of effectiveness; strong peer monitoring on the water may be a more powerful tool for deterrence in some instances than distant legal rules. However, voluntary codes lack the penalties associated with legal prescriptions.

2.6.2 Best practices for whale shark tourism

Most whale shark tourism sites have at least a voluntary code of conduct for tourist/operator behavior based on the regulations in place at Ningaloo[4], which is considered the gold standard for whale shark tourism. A universal code is therefore

[4] https://www.dpaw.wa.gov.au/plants-and-animals/animals/whale-sharks?showall=&start=2

essentially already in place at most sites for tourist/operator behavior[5]; but in many sites there is no enforcement. **Table 2.8** outlines the key regulations that should be included at every site.

Table 2.8 Best practices for whale shark tourism activities

Swimmer behaviors
Do not touch or ride sharks
Do not restrict its normal movement or behavior, including impeding its path
Do not free dive, especially near the head of the shark
No flash photography
No use of jet ski or underwater propulsion device
No splash entry
Maintain a distance of at least 3 meters from head and 4 meters from tail (with some site variability)
Tour operator behaviors
Maintain a speed of 8 mph or less in areas known to have whale sharks
Inform tourists of code of conduct
Provide in-depth interpretation including whale shark threats and conservation needs
Motorized vessels should remain at least 20 m from sharks
Only 1 boat should be allowed to interact with a shark at one time; other boats should wait outside a 250 m exclusion radius
Limit the number of swimmers allowed in the water at one time with a shark; varies by site
Do not block the path of the shark with the boat
Limit amount of time boats interact with sharks
General Management
Monitoring of ecological, social and economic impacts of tourism activities

[5] Nonetheless establishment of a global code of conduct was one of the actions called for at the 12th CoP for the Convention on Migratory Species in Manila, 2017

Design effective management interventions
Limit the number of permits/licenses issued to tour operators
Provide training for guides and captains, including safety, tourist needs, shark ecology/biology, language
Enforce rules and regulations to ensure codes of conduct are being followed
Facilitate equitable distribution of benefits

However, there is still a need to take variability in conditions into account. For example, if tourists at sites with poor underwater visibility (e.g., Donsol, Holbox) had to abide by the minimum 3 m viewing distance in effect in Australia, they would not be able to see the sharks (**Fig. 2.4**). Guides in Donsol therefore encourage swimmers to approach within 1 m of the sharks (Quiros, 2005). In Holbox, the guidelines allow swimmers to approach within 2 m of the sharks to address issues of poor water quality, although this rule is frequently broken (J. Ziegler, personal observation). Similar issues with time limits also arise due to the differing types of whale shark encounters. For example, the 90 min limit observed in areas like Ningaloo Reef and Gladden Spit cannot apply in places like Utila, Honduras, where most encounters last less than a minute.

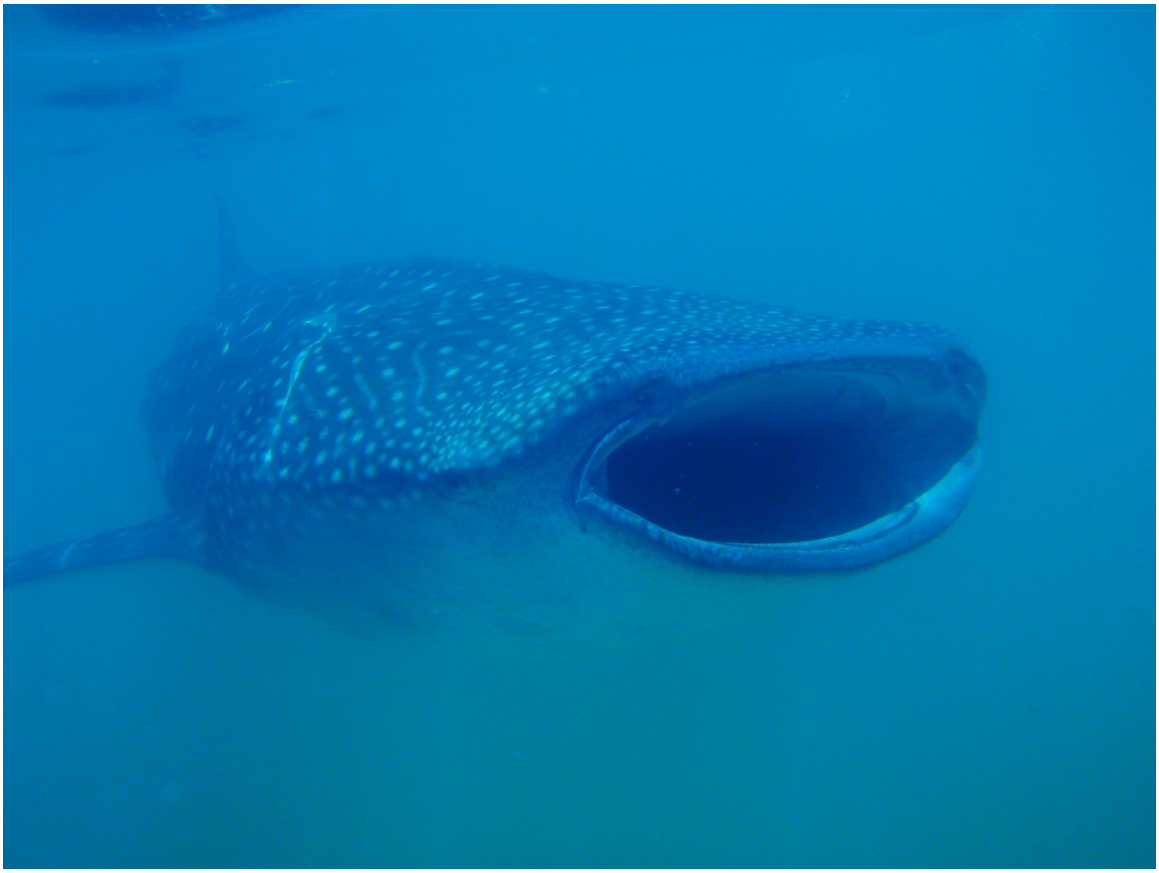

Figure 2.4 Whale shark emerging from the murky waters in Holbox, Mexico (credit: J. Ziegler)

In addition to on-the-water management there are additional best practices that management should aim towards. These are summarized in **Table 2.8** "General management" and several have been touched upon already. The main role of management is to ensure that the site is managed effectively to ensure a sustainable industry. To accomplish this, it is necessary to design and implement effective management interventions that can be enforced. Ongoing monitoring of the sharks and the activity is essential to achieve this. If site managers are unable to undertake this task, then they might look at partnerships with research organizations and NGOs for help. Other important issues include working with local communities to facilitate the equitable distribution of benefits

and providing interpretation training, although management authorities may not be the only or the best source for this training.

2.7 Conclusion

Whale shark tourism has grown rapidly in the last 10 years and is now worth a conservative $1.5 billion worldwide, with the non-captive industry worth over $102 million. Tourism can be an important IBC approach to protect whale sharks. However, there is a lot of variability in the quality of management at sites across the globe, with few achieving the rigorous requirements for ecotourism status. There needs to be a move towards implementing and enforcing best practices at all sites, so this activity is sustainable and can meet its conservation goals. Further research is also needed to better understand the link between whale shark tourism and improved social or ecological conservation outcomes. Little social science research has been completed with respect to whale shark tourism; yet, it can provide critical insights into the conservation value of whale shark tourism (Bennett, 2016; Duffus & Dearden, 1993; **Chapter 4**; **Chapter 5**; **Chapter 6**). It is important, however, that the methods used are rigorous (e.g. mixed methods, sufficient sample sizes; Teel et al., 2018) and appropriate for the research questions being addressed.

Chapter 3 A guilty pleasure: Tourist perspectives on the ethics of feeding whale sharks in Oslob, Philippines

Abstract

This study explored the ethics of provisioning wildlife to enhance tourist interactions at a whale shark tourism site in Oslob, Philippines. TripAdvisor comments (n=947) and tourist surveys (n=761) were used to better understand tourists' perceptions of whale shark provisioning in Oslob. The ethical decisions made were then critically assessed using utilitarian and animal welfare ethical philosophies. The majority of respondents supported whale shark provisioning, despite many being aware of the ethical complications of provisioning sharks for tourism purposes. Respondents justified their participation in this activity using mainly economic, human enjoyment, and animal welfare arguments. A utilitarian assessment of the potential costs and benefits of this activity highlighted the gaps in our knowledge regarding the economic and social benefits of this activity, as well as the negative impacts on the sharks' welfare. Until such analyses are completed, significant ethical questions remain regarding the provisioning of these sharks.

Keywords

Wildlife provisioning, Sharks, Marine wildlife tourism, Tourism ethics, Conservation, Tourist perceptions, TripAdvisor

3.1 Introduction

An emerging concern in marine wildlife tourism (MWT) is the ethics of tourism activities that involve the provisioning of animals. Provisioning or feeding wild animals is becoming more pervasive in MWT, especially for ray and shark diving activities (Brena, Mourier,

Planes, & Clua, 2015; Burgin & Hardiman, 2015; Gallagher et al., 2015). The practice is controversial as the long-term impacts of provisioning marine wildlife remain unclear (Gallagher et al., 2015; Hammerschlag, Gallagher, Wester, Luo, & Ault, 2012; Patroni et al., 2018). Provisioning enhances the tourism draw, since operators can guarantee close interactions with otherwise elusive wild animals (Newsome & Rodger, 2008; Orams, 2002; Patroni et al., 2018), thereby improving the economic viability of the site and providing an enhanced incentive for protection. However, there are also potential costs to the focal species and ecosystem (Burgin & Hardiman, 2015; Corcoran et al., 2013; Gallagher et al., 2015; Parsons, 2012; Rizzari, Semmens, Fox, & Huveneers, 2017). Only one study to date has assessed tourists' support for provisioning sharks or rays within MWT (Semeniuk, Haider, Beardmore, & Rothley, 2009); none have assessed tourists' ethical perceptions of such provisioning activities, despite a need for more studies exploring the social perspective of provisioning activities (Patroni et al., 2018). The goals of the current study were to assess tourists' support of provisioning activities at a MWT site and to gain a better understanding of tourists' ethical considerations when participating in such activities. The next section provides some context on ethics within wildlife tourism. This is followed by an introduction to the case study and the specific study objectives.

3.1.1 Ethics in wildlife tourism

Studies assessing the ethical implications of wildlife tourism activities have only emerged in the last two decades (Fennell, 2015a). There are several ethical philosophies that can be applied to wildlife tourism interactions (see Fennell, 2015b for a review). Animal welfare is an ethical philosophy interested in the welfare of individual animals (Fennell, 2015b). Individual animals are afforded some level of moral considerability, although they are not

necessarily afforded the same status as humans (Fennell, 2015b; Garrod, 2007). For example, it can be argued using this position that the harming of an individual animal through tourism activities is morally acceptable provided it is outweighed by benefits to humans.

Utilitarianism, on the other hand, is an ethical philosophy that requires that all costs and benefits of a given action be considered and the correct action is the one providing the greatest good to the greatest number of interests (Dobson, 2011). Although utilitarianism requires that all interests (human and animal) receive equal consideration, it does not require equal treatment; thus, humans may be given preference over animals due to their higher capacity to suffer (Dobson, 2011; Singer, 1995). Applying this theory to wildlife tourism, potential benefits of wildlife tourism include human enjoyment, education, funding for conservation, economic incentives to protect a species and or environment, scientific research, instilling a conservation ethic in participants, and community social and economic benefits (Ardoin et al., 2015; Ballantyne et al., 2011; Ballantyne, Packer, & Hughes, 2009; Bentz et al., 2014; Brooks et al., 2013; Brunnschweiler, 2010; Camp & Fraser, 2012; Catlin et al., 2013; Cisneros-Montemayor et al., 2013; Clua et al., 2011; Dobson, 2011; Filby et al., 2015; Higham & Lusseau, 2007, 2008; W. Hill et al., 2015; Lück, 2003; Mayes et al., 2004; Mintzer et al., 2015; Newsome et al., 2004; O'Malley et al., 2013; Orams, 2002; Parsons, 2012; Pegas et al., 2013; Powell & Ham, 2008; Reynolds & Braithwaite, 2001; Tisdell & Wilson, 2001; Topelko & Dearden, 2005; Vianna et al., 2012; Waylen et al., 2009; Wilson & Tisdell, 2003). The costs of wildlife tourism activities include negative impacts on the focal species, other wildlife, tourists, and potentially the local community (Archer, Cooper, & Ruhanen, 2005; Burgin & Hardiman, 2015; Dubois

& Fraser, 2013; Gallagher et al., 2015; Higham et al., 2016; Parsons, 2012; Patroni et al., 2018; Rizzari et al., 2017; Walpole & Goodwin, 2001). Using a utilitarian approach, one could argue that a MWT activity with legitimate conservation outputs (e.g., money from ticket sales is used to create a marine protected area for the focal species), but poor animal welfare conditions, is acceptable (Dobson, 2011; Moorhouse, D'Cruze, & Macdonald, 2017) since "it produces or intends to produce at least as great a balance of good over bad" (Fennell, 2015b, p.33). Tourism activities in which none of the revenue is invested in conservation, animal welfare, or local communities, would be considered an exploitation of the focal species for profit (Moorhouse et al., 2017).

Moorhouse, Dahlsjö, Baker, D'Cruze, and Macdonald (2015) assessed the impacts of twenty-four wildlife tourism attractions on animal welfare and conservation and compared these results to tourists' feedback on TripAdvisor. The authors found that six tourism attractions had a net positive impact, while the rest had net negative conservation and/or welfare impacts; however, only 7.8% of all tourist feedback on these activities was negative due to conservation or animal welfare concerns. The authors concluded that millions of tourists are participating in wildlife tourism activities that are detrimental to the animals involved but only a small percentage of tourists realize it and/or care (Moorhouse et al., 2015).

In the absence of any standardised global wildlife welfare laws or standards of practice for wildlife tourism attractions (Patroni et al., 2018), tourist dollars become the ultimate judge of what constitutes acceptable use of animals at wildlife tourism sites, and thus animal welfare standards become subject to market forces (Moorhouse et al., 2017). If tourists have a negative experience and tell other potential tourists, it is possible that

tourism numbers and revenue will decline leading to improved ethical standards or the closing of the site (Moorhouse et al., 2017). However, such feedback would not occur if tourists could not perceive negative welfare impacts, could not communicate their concern to others, or if they felt that the poor welfare conditions did not sufficiently detract from their enjoyment of the tourism attraction (Moorhouse et al., 2017). For example, Moorhouse et al. (2015) found that only a minority of tourists were aware of welfare issues at tourism sites; even attractions with the worst animal welfare conditions had over 80% positive reviews on TripAdvisor.

In some cases, tourists are simply ignorant of any ethical issues of a given wildlife tourism activity and therefore are not making a moral decision (Moorhouse et al., 2017). A number of studies, however, have shown that unethical behaviour is often due to behaviours people do not recognize as unethical due to "systematic and predictable ethical blind spots" (i.e., "bounded ethicality"; Sezer, Gino, & Bazerman, 2015, p.77). One such blind spot occurs due to tension between the "want self" and the "should self" – i.e., between the side that wants instant gratification and the side that wants to make ethical decisions (Sezer et al., 2015). In this case, people think they will behave more ethically in accordance with their "should self" before making a decision, but when it actually comes time to make that decision, the "want self" takes over (Tenbrunsel, Diekmann, Wade-Benzoni, & Bazerman, 2010). Termed "ethical fading", this occurs because the immediate reward from the unethical behaviour becomes much more important in the moment and the ethical implications much less so (Sezer et al., 2015; Tenbrunsel & Messick, 2004). Once the decision is made, however, the ethical implications come back to the forefront as the "should self" re-emerges and people attempt to reduce the cognitive dissonance stemming

from the contradiction between their values and their actions (Sezer et al., 2015) by avoiding or disguising the moral implications of their actions (Tenbrunsel & Messick, 2004) or by downplaying the consequences or justifying their actions (Curtin & Wilkes, 2007; Juvan & Dolnicar, 2014; Juvan, Ring, Leisch, & Dolnicar, 2016). For example, Curtin (2006) and Curtin and Wilkes (2007) assessed the ethical perceptions of tourists who swam with dolphins, both in the wild and in captivity. They found that both groups enjoyed the experience; however, those who swam with wild dolphins had a greater ethical concern for dolphins kept in captivity, while those who swam with captive dolphins exhibited cognitive dissonance. The latter group alleviated their cognitive dissonance by focusing on the positives of the experience and denying the negatives (e.g., the dolphins looked happy, better than circus shows; Curtin, 2006; Curtin & Wilkes, 2007). Shani (2009), meanwhile, examined the ethical perceptions of tourists who visited various captive wildlife tourism attractions (aquaria, zoos, safari or wildlife parks, animal theme parks, rodeos, bullfights, animal circus, animal racing) and found that tourists alleviated their cognitive dissonance by increasing their level of agreement with various justifications for a given attraction's existence. For example, a belief that captive animals were better off than animals in the wild may reduce the cognitive dissonance of watching wild animals perform unnatural tricks (Shani, 2009).

Moorhouse et al. (2017) identified three main reasons why tourists may be particularly susceptible to ethical blind spots when participating in wildlife tourism activities. First, tourists have a desire to escape from everyday life while on holiday and therefore may not apply the same ethical considerations in making decisions while on vacation that they would at home (Barr, Shaw, Coles, & Prillwitz, 2010; Ganglmair-

Wooliscroft & Wooliscroft, 2017; Juvan & Dolnicar, 2014). Second, tourists may not understand nor be able to assess the negative impacts their participation in a given tourism activity can have on the focal species' welfare and may assume that a given attraction would not be able to operate if it were unethical (Moorhouse et al., 2017). Third, they may feel reassured that a given activity is morally acceptable due to the large number of people present at some of these wildlife tourism attractions (Gino & Galinsky, 2012; Moorhouse et al., 2017).

3.1.2 Study objectives

In the last five years, a handful of sites in the Philippines and Indonesia have started provisioning whale sharks to facilitate tourist interactions (Thomson et al., 2017). Whale shark tourism is viewed as a means of protecting the endangered whale shark (IUCN Red List; Pierce, & Norman, 2016) by providing economic incentives for their protection (Graham, 2004). Concern over the ethics of feeding an endangered, highly mobile animal for tourism purposes has led to a disagreement within the conservation community over whether or not this activity should be allowed to continue (Hammerschlag et al., 2012). To date, no one has examined tourists' ethical considerations when participating in this type of activity, nor critically examined the justifications for supporting such activities. However, many scholars have highlighted the need for more studies investigating the ethical views and perceptions of visitors to wildlife tourism attractions (Bach & Burton, 2017; Davey, 2007; Frost & Roehl, 2007; Jiang, Lück, & Parsons, 2007; Moorhouse et al., 2017; Patroni et al., 2018). The aim of the current study was to address this knowledge gap by assessing tourists' ethical perceptions of whale shark provisioning activities in Oslob, Philippines, to understand why they participated, as well as using utilitarian and animal

welfare ethical philosophies to evaluate the justifications provided for supporting such activities.

3.2 Methods

3.2.1 Study site

Whale shark tourism in Oslob was first established in 2011 and has rapidly grown into one of the most visited whale shark tourism sites in the world. Unlike sites with seasonal whale shark tourism activities based on natural variation in nutrient availability (e.g., Mexico, Australia, Mozambique; Catlin & Jones, 2010; de la Parra Venegas et al., 2011; Pierce et al., 2010), whale sharks in Oslob are provisioned and therefore activities occur year-round (Thomson et al., 2017). Over 180,000 tourists visited the site in 2015, spending a minimum of US$5 million (Araujo, Vivier, et al., 2017).

Oslob is a municipality on the southern end of the island of Cebu (**Fig. 3.1**). Cebu lies in the Bohol Sea, one of the main sites for whale shark hunting in the Philippines in the decades prior to the 1998 federal ban, implemented in response to international outcry over the slaughter of whale sharks in Donsol, Philippines (Alava et al., 2002). However, fishermen in Oslob never hunted whale sharks. Instead, they targeted small shrimp, locally known as *uyap*, to use for bait and direct human consumption. Whale sharks were also attracted to the *uyap* and interfered with the fishers' practices. In some areas, fishers threw rocks in the direction of the whale sharks to scare the sharks away from the bait. Fishers in Tan-awan, a village in Oslob, used a different tactic – they lured the sharks away from their fishing areas by throwing small amounts of *uyap* into the water. The whale sharks would

follow the fishers out of the area, and the fishers would return to resume their fishing undisturbed.

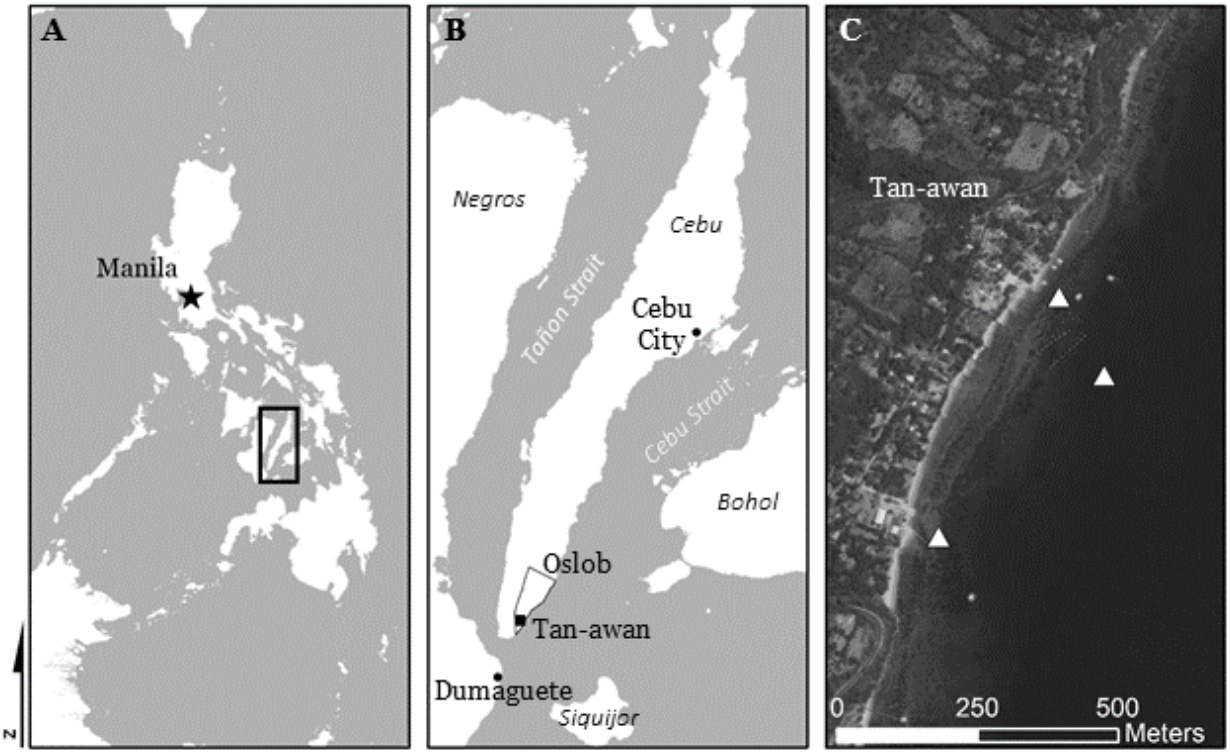

Figure 3.1 Map of study site. A. Location of the island of Cebu within the greater Philippine archipelago. B. Island of Cebu with the municipality of Oslob outlined. C. Whale shark viewing area in Tan-awan with the three buoys (triangle symbol) demarcating the interaction area.

By August 2011, foreign business owners and other tourism operators learned of this practice and began paying the local fishers to take them out to see the whale sharks. Through social media, local newspapers, and international articles, stories of these "friendly" whale sharks spread and whale shark tourism in Tan-awan began.

Tourists receive a five-minute briefing prior to boarding paddleboats, which take them to the interaction area 50 m from shore (**Fig. 3.1C**). The tourist boats tie up to each other and form a line. Tourists have the choice to remain in the boat or enter the water and

swim with the sharks. Many hold on to the paddleboat's outriggers rather than swim freely in the interaction area (**Fig. 3.2**). Feeder boats paddling parallel to this line feed the sharks to encourage them to swim past the waiting tourists. SCUBA diving is also possible at this site. Sharks are fed between 50 and 150 kg of *uyap* per day between 6AM and 1PM (Araujo et al., 2014).

Figure 3.2 Feeder boat with whale shark passing by tourists in Oslob, Philippines (credit: J. Ziegler)

3.2.2 Data Analysis

Two main data sources were used to address the research questions – participant surveys and TripAdvisor reviews.

3.2.2.1 Survey design and analysis

Surveys were opportunistically distributed to tourists as they returned to shore from the whale shark tour from May to October 2014. A total of 761 surveys were collected. This sample size is large enough to ensure a margin of error of 5.0% at the 95% confidence level (Vaske, 2008). This survey included questions regarding overall satisfaction with the experience, tourists' opinions about whale shark provisioning, willingness to pay for the whale shark experience, and socio-demographics. Questions were refined following an initial pilot test of the survey in 2013.

Satisfaction with the overall experience was measured using a five-point Likert scale with 1 being "very unsatisfied" and 5 "very satisfied". Respondents' willingness to return was measured using a five-point Likert scale from 1 "very unlikely" to 5 "very likely", while their willingness to recommend the tour was measured using a "yes/no" dichotomous rating. Tourist support for whale shark provisioning was measured using a five-point Likert scale ranging from 1 "strongly against" to 5 "strongly supportive", as well as an option for "I do not know/I am not sure". Willingness to pay for the whale shark experience was measured by asking respondents how much they would be willing to pay for provisioned and non-provisioned whale shark tours with different likelihoods of seeing whale sharks (i.e., 25%, 50%, 75% and 100% for non-provisioned tours and 100% for provisioned tours). Responses were compared by nationality.

3.2.2.2 TripAdvisor analysis

TripAdvisor comments were used to help understand the ethical decision-making of tourists. A total of 947 TripAdvisor reviews were extracted from the first posting in March 2012 until the end of January 2016 (TripAdvisor, 2016) and coded into NViVO 10 (QSR

International, 2016). Following the methodology in Moorhouse et al. (2015), reviews with scores of 4 or 5 were considered supportive of whale shark tourism activities in Oslob, while those with scores of 1 or 2 were considered negative and not supportive of these tourism activities. Unlike Moorhouse et al. (2015), reviews with a score of 3 were kept in the analysis and considered to represent a neutral stance towards whale shark tourism activities in Oslob.

Reviews mentioning ethical concerns (n=254) were then classified into three subcategories based on the overall score provided. Those expressing ethical concerns but with an overall positive review (i.e., 4- or 5-star rating) were classified into the "guilty pleasure" category, while those giving a negative review (i.e., 1- or 2-star rating) due to ethical concerns were classified into the "regretful participation" category. Those with a score of 3 were classified as "neutral". Those comments that included justifications for participating in the activity despite knowing of the ethical issues with provisioning activities (n=138) were coded for up to 8 possible themes (e.g., economic benefits, animal welfare, human enjoyment).

The demographics of TripAdvisor reviewers are not representative of the tourists who visit Oslob. The majority of whale shark tour participants in Oslob are national tourists based on the local government logbooks (63%, **Fig. 3.3**), while the comments posted were mostly from foreign tourists (72.9%). Furthermore, people who post on TripAdvisor may not be typical of all tourists who visit the site. Sampling bias may therefore be an issue in terms of over- or undersampling certain tourist segments. However, the TripAdvisor data does allow the analysis of unsolicited reviews of the tourism experience and therefore may be able to identify areas of concern not included in a traditional survey format.

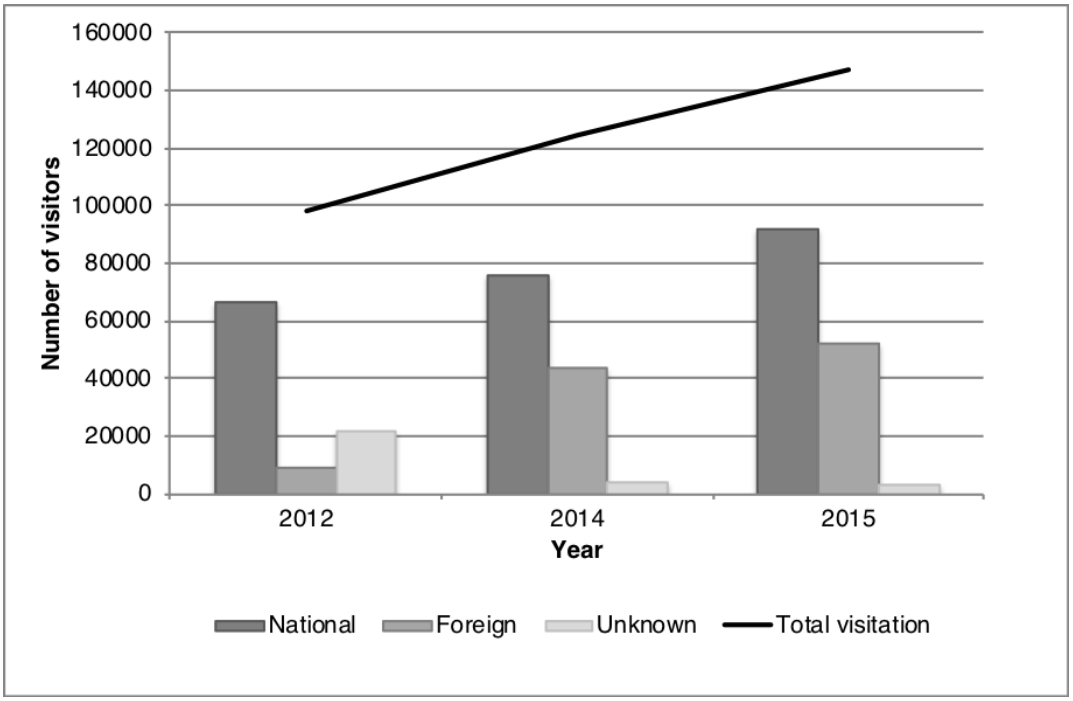

Figure 3.3 Annual visitation in Oslob, Philippines, by tourist type. Data from 2013 were omitted due to missing data from local government logbooks for this time period.

3.3 Results

3.3.1 Survey

The majority of respondents were young (57.3%, 18-30), foreign (52.4%), women (54.0%), of low annual income (51.4%, <US$15,000) with little to no experience shark watching (79.4% self-classified as novice/intermediate) and without any scuba certification (66.8%). Most respondents only spent one day in Oslob (76.2%) and would not have visited Oslob if whale sharks were not present (76.4%). Foreign tourists were significantly less likely to have gone to Oslob if no whale sharks were present compared to national tourists (85.6% vs. 68.7%; $\chi^2(2, N=701)=29.587$, p=0.000, Cramer's $V = 0.205$). The Cramer's V effect size of 0.205 suggests that the strength of this difference is minimal to typical (Vaske, 2008).

3.3.1.1 Satisfaction

Overall, respondents were satisfied with the whale shark tourism experience in Oslob (M=4.1). Foreign tourists, however, were significantly less likely to be willing to participate in whale shark tourism in Oslob again (62%) compared to national tourists (90%; $\chi^2(1, N=632)=67.686$, p=0.000, Cramer's $V = 0.327$). The Cramer's V effect size of 0.327 suggests that the strength of this difference is typical to substantial (Vaske, 2008). The vast majority of both foreign (93%) and national (99%) tourists would still recommend the tour, although foreign tourists were significantly less likely to do so ($\chi^2(1, N=632)=18.200$, p=0.000, Cramer's $V = 0.170$). The Cramer's V effect size of 0.170 suggests that the strength of this difference is minimal to typical (Vaske, 2008).

3.3.1.2 Support for provisioning

Respondents were then asked whether or not they supported whale shark provisioning activities in Oslob. Nearly half of respondents were supportive of whale shark provisioning (48.6%), while 13.2% were against such activities and 38.2% were neutral or unsure (**Table 3.1**). Foreign tourists were significantly less likely to support the feeding of whale sharks than national tourists (35% vs. 65%), with a further 47% and 26.9% neutral or unsure, respectively (**Table 3.2**). The Cramer's V effect size of 0.295 suggests that the strength of this difference is minimal to typical (Vaske, 2008).

Table 3.1 Support for whale shark provisioning in Oslob

SUPPORT FOR PROVISIONING	FREQUENCY	PERCENT (%)
Strongly against	28	3.9
Against	67	9.3
Neutral	207	28.8
Supportive	221	30.7
Strongly supportive	129	17.9
Don't know	68	9.4

Note: Mean, 3.55; sd, 1.05.

Table 3.2 Support for whale shark provisioning in Oslob by nationality

	PERCENT RESPONSE						
SUPPORT FEEDING	National	Foreign	Total response (N)	df	χ^2	*p*	Cramer's *V*
Yes	64.5	35.0	311	2	55.209	0.000*	0.295
No	8.6	18.0	86				
Neutral/ not sure	26.9	47.0	238				

*Significant at α=0.05.

Respondents were also asked how much they would be willing to pay for a whale shark experience, both provisioned and non-provisioned with different percent likelihoods of seeing a shark (**Table 3.3**). Foreign tourists were willing to pay the most for an experience where sharks were not fed, but there was a 100% chance of seeing a shark (US$64), followed by sharks not fed with a 75% chance of seeing sharks (US$45). National tourists on the other hand were willing to pay US$17 for an experience where there was a 100% chance of seeing a shark regardless of whether the sharks were fed (**Table 3.3**). The

point biserial correlation effect sizes of 0.297 to 0.427 suggest that the strength of these differences is typical to substantial (Vaske, 2008).

Table 3.3 Willingness to pay for different whale shark encounter types by nationality (in USD).

ENCOUNTER TYPE	AMOUNT (MEAN ± SE)					
	National	**Foreign**	***t***	**df**	***p***	r_{pb}
Provisioned						
100% chance of seeing whale shark	17.70±1.66	42.58±3.50	-6.417	279.604	0.000*	0.312
Not provisioned						
25% chance of seeing whale shark	7.83±2.18	23.32±2.29	-4.898	224.213	0.000*	0.297
50% chance of seeing whale shark	10.17±2.23	31.46±2.61	-6.204	237.513	0.000*	0.359
75% chance of seeing whale shark	13.51±2.85	44.45±3.54	-6.807	247.602	0.000*	0.381
100% chance of seeing whale shark	17.15±2.75	63.69±4.77	-8.453	264.233	0.000*	0.427

*Significant at α=0.05.

3.3.2 TripAdvisor analysis

3.3.2.1 Satisfaction with experience

TripAdvisor commenters' satisfaction with the whale shark tourism activities in Oslob was assessed using the provided star rating. The vast majority of comments were positive (i.e., score of 4 or 5; 86.8%) with only 6.4% negative comments (i.e., score of 1 or 2) (**Table 3.4**). The mean star rating of the Oslob whale shark experience was 4.4±1.0 and the mode was 5.

Table 3.4 TripAdvisor star rating for whale shark tourism in Oslob.

TRIPADVISOR SCORE	FREQUENCY	PERCENT (%)
1	40	4.2
2	21	2.2
3	64	6.8
4	261	27.6
5	540	59.2

Note: Mean, 4.4; sd, 1.00.

3.3.2.2. Ethical concerns

TripAdvisor comments mentioning ethical issues with this activity were coded and classified. Ethical concerns were mentioned in 27.2% (n=254) of all TripAdvisor reviews analysed. The TripAdvisor analysis identified three types of commenters concerned with the ethical nature of whale shark provisioning in Oslob. The "guilty pleasure" group was aware of the moral and ethical issues of provisioning a threatened species for tourism purposes, but still chose to do the tour and recommended it to others (i.e., a score of 4 or 5; **Table 3.5**):

> "We appreciate that this is a controversial practice and we had mixed feelings before we began, but wanted to judge for ourselves. The concerns which have been raised by others are entirely legitimate […] as an experience, however, it was incredible. Being so close to these beautiful, amazing creatures was unreal and is a memory we will hold dear for years to come."

Ethical concerns were either voiced as unease with the potentially negative impacts to the animal welfare of the sharks visiting Oslob or couched within justifications for why such tourism activities should exist.

Table 3.5 Classification breakdown of TripAdvisor comments concerned with the ethics of provisioning whale sharks.

CLASSIFICATION	FREQUENCY	PERCENT (%)
Guilty pleasure	173	68.1
Regretful participation	47	18.5
Neutral	34	13.4

The "regretful participation" group were aware of the ethical issues and did not recommend the tour to others (i.e., score of 1 or 2):

> "I feel like such a hypocrite for leaving this review but I must say, now that I have seen it first hand, I now know that it is a great injustice to the animals […] I'm sure there are safer, and better ways to see them in their natural habitat without hurting them."

The "neutral" group also mentioned ethical concerns with participating in this activity, but were unsure or neutral regarding whether or not to recommend it to others (i.e., score of 3):

> "Having such intimate interaction with such mammals [*sic*] [is] indeed a very amazing experience. However in order to have such interaction, we have to feed them. […] I will not

> say this activity is right or wrong. I am not a moral police. I will let you decide."

TripAdvisor commenters' justifications for participating in the whale shark provisioning activities in Oslob were classified in order to gain a better understanding of the ethical decisions being made (**Table 3.6**). The primary justifications provided were the fact that the whale sharks were free to leave the provisioning area ("the whale sharks are free to come and go as they please"), human enjoyment ("wanted to see them in the wild, but there was no guarantee that we would see them so we gave in and glad we did"), provision of economic incentive to protect the sharks ("I prefer that to hunting sharks or whales"), and improved livelihoods and or wellbeing of the local community ("this brings money to the village").

Table 3.6 Classification of justifications used to support whale shark provisioning activities in Oslob.

JUSTIFICATION	FREQUENCY	PERCENT (%)
Sharks are free to leave	68	26.8
Human enjoyment	54	21.3
Economic benefit to local community	44	17.3
Provides economic incentive to protect whale sharks	41	16.1
Well-regulated and enforced	37	14.6
Sharks are happy/healthy	27	10.6
Equivalent to keeping animals in zoo/aquaria	6	2.4
Fed only small amount	6	2.4

3.4 Discussion

3.4.1 Assessing support for whale shark provisioning activities in Oslob

When explicitly asked, a little under half of survey respondents supported the provisioning activities in Oslob and a further 40% were unsure or neutral. Foreign tourists were significantly less likely to support whale shark provisioning and willing to pay significantly more for a non-provisioned whale shark experience compared to national tourists. However, the vast majority of both groups (>90%) would recommend the tour to others. Based on Moorhouse et al.'s (2015) definition of support for a given ethically questionable wildlife tourism activity, anyone who provides a positive review is considered to support the unethical behaviour. Using this approach, over 90% of survey respondents supported feeding activities, tacitly or not, since they would recommend the tour to others. Similarly, TripAdvisor reviews were overwhelmingly positive (86.8%), with only 5.4% of overall comments negative due to the ethical issues associated with this activity.

Moorhouse et al. (2015) found that three quarters of wildlife tourism attractions assessed had net negative conservation and or welfare impacts, while only 7.8% of all tourist feedback on these activities was negative due to ethical concerns. The authors assessed the conservation status of a given wildlife tourism activity based on the IUCN Red List classification of the species of interest (i.e., activities targeting species considered vulnerable or near threatened on the IUCN Red List would be considered negative), while welfare was based on the 'five freedoms' of captive animals (i.e., negative status if only fulfills 2 to 3 of possible 5 freedoms). Based on these criteria, whale shark activities in Oslob would be considered to have a negative conservation status, since the whale shark is considered endangered on the IUCN Red List (Pierce & Norman, 2016). The welfare status

of whale sharks, on the other hand, is more difficult to assess. Whale sharks in Oslob are free from hunger and thirst, but whether they are free from discomfort, free from pain, injury or disease, free to express normal behaviours, or free from fear and distress is unclear. Apparent wildlife tolerance of human presence is not necessarily a sign that tourism activities are harmless to the focal species (Higham & Shelton, 2011). Bejder et al. (2009) outlined three factors that can explain this apparent tolerance: (1) displacement – less tolerant individuals are displaced leaving more tolerant individuals at the site, (2) physiology – physiological impairment prevents individuals from reacting to human presence, and (3) ecology – there is no suitable habitat to which the animals may relocate. Furthermore, some behaviours which may be perceived as positive interactions with humans (e.g., dolphins bowriding and leaping) may actually be under stimulus control (i.e., the presence of power boats is a stimulus not to rest) and not the result of choice (Higham & Shelton, 2011). Understanding the short- and long-term impacts of whale shark provisioning activities is therefore critical to ensure that it provides an overall positive conservation effect for the focal species.

A few studies have attempted to determine the impacts of provisioning activities on the sharks of Oslob. Schleimer et al. (2015) found that sharks at the site demonstrated both associative learning (i.e., associating the site with food and adapting their feeding behaviour) and habituation (i.e., increased tolerance levels in response to proximity to people and other sharks), which suggests that a combination of habituation and conditioning is changing whale shark behaviour while at the site. Araujo et al. (2014) concluded that differences in both residency and probability of being resighted of provisioned and non-provisioned whale sharks suggest that provisioning is leading to

behavioural change in Oslob. Thomson et al. (2017) found that some whale sharks exhibited prolonged residency at the site and concluded that provisioning could influence foraging success, alter whale shark distributions and lead to dependency as the sharks get older. These findings suggest that the whale sharks are not completely free to exhibit normal behaviours. Assessing whether the whale sharks are free from pain, injury and stress, free from discomfort, and free from fear and distress is more difficult to determine in sharks and has not yet been assessed in Oslob, although studies are planned to better understand the physiological stress levels these animals undergo (G. Araujo, personal communication). Semeniuk, Bourgeon, et al. (2009) successfully used physiological indicators to determine that fed stingrays at Stingray City Sandbar, Cayman Islands, were exhibiting symptoms of immunosuppression when compared to stingrays at non-tourist sites. The authors concluded that while there was no direct evidence of reduced survival at the site, the physiological parameters measured suggest that it is quite likely. In the face of the unknown welfare status of whale sharks at this site, a precautionary approach should be taken, especially considering this species is endangered, and a negative welfare status should be assumed until evidence is available to disprove it (Sorice, Shafer, & Scott, 2003).

3.4.2 Utilitarian assessment of the ethics of provisioning whale sharks for tourism purposes

Tourists clearly weighed the pros and cons but let their desire to see the guaranteed, close sightings of whale sharks (i.e., their "want self", Sezer et al., 2015) guide their decision-making. Some comments explicitly stated this process; for example, "we were torn between the poor ecological aspect of this tourist place and our curiosity to see these amazing fish […] curiosity was strongest". The ensuing cognitive dissonance from

participating in an activity they knew to be unethical is evident in the justifications provided. Similar to Curtin (2006), who found that people who participated in captive swim-with dolphin tourism activities justified their actions by saying the dolphins looked happy and that it was better than circus shows, many TripAdvisor reviewers defended their participation in provisioned whale shark tourism activities in Oslob by arguing that this activity could not be that bad since the sharks seemed happy and were not being held captive; "the sharks are not stressed and are able to come and go, they just like a free meal […] surely better than Seaworld?".

Dobson (2011) notes that any claims of benefits for a given tourism activity must be critically evaluated in order to determine if they are valid. If they are, then that activity can be deemed ethically valid from a utilitarian point of view as the suffering of the few is outweighed by the benefits of the activity to the many (Dobson, 2011). It is therefore necessary to determine if there are sufficient benefits of provisioning activities to the whale sharks and local community to justify the activity. Based on a literature review and justifications identified in the TripAdvisor analysis, the primary benefits of provisioned whale shark tourism activities in Oslob include human enjoyment, providing economic incentives to protect whale sharks and the greater environment, education, benefits to the local economy and community, and scientific research opportunities (e.g., tagging) (Apps, Dimmock, Lloyd, & Huveneers, 2017; Brunnschweiler, 2010; Cisneros-Montemayor et al., 2013; Clua et al., 2011; Dobson, 2011; Filby et al., 2015; Higham & Lusseau, 2007, 2008; Mayes et al., 2004; Orams, 2002; Pegas et al., 2013; Tisdell & Wilson, 2001; Vianna et al., 2012; Wilson & Tisdell, 2003; Zeppel & Muloin, 2008b, 2008a). Human enjoyment of the whale sharks is one of the primary benefits identified in this study with nearly 90% positive

reviews on TripAdvisor and over 90% of survey respondents stating that they enjoyed the tour and would recommend it to others.

The main justification identified in the TripAdvisor analysis and provided for non-provisioned whale shark tourism activities (Catlin et al., 2013; Graham, 2004) is that these activities generate economic benefits for the local communities thereby providing economic incentives to conserve the sharks rather than hunt them. This is a valid point. Although the fishermen participating in whale shark tourism in Oslob never hunted the whale sharks in their waters, whale sharks were recently uplisted from threatened to endangered on the IUCN Red List due to significant population declines in the Indo-Pacific linked to illegal harvesting (Pierce & Norman, 2016). Li et al. (2012) identified an emerging illegal harvest of these sharks in Chinese waters. In 2014, a factory in China was found to slaughter upwards of 600 whale sharks each year despite being a protected species in Chinese waters (J. L. Lee, 2014). A whale shark released from a fishing net in Taiwan travelled to Leyte, Philippines (Araujo, Snow, et al., 2017), a site known to share a degree of connectivity with Oslob (Araujo et al., 2014; Araujo, Snow, et al., 2017), and therefore the whale sharks in the Philippines, including Oslob, may be part of the same population that is targeted by illegal fisheries in China.

The economic benefit from whale shark tourism is worth millions of dollars each year. Economic valuations for non-provisioned whale shark tourism sites range from US$3.7 million in Belize (Graham, 2004) to US$9.4 million in the Maldives (Cagua et al., 2014) and US$19 million in Australia (Huveneers et al., 2017). The provisioned activities in Oslob are worth an estimated US$5 million to the local economy (Thomson et al., 2017) and have allowed for the socioeconomic development of the community. Prior to the start

of these activities, many of the fishermen turned tour operators in Tan-awan were living off just US$1 per day whereas now they can afford to put children and extended family through school, pay for hospital treatments for extended family, food, motorbikes and concrete homes (J. Ziegler, unpublished data). Villagers who had to leave Oslob in order to find jobs in Manila and other big cities were able to return home because of the job opportunities now present (J. Ziegler, unpublished data). Neighbouring villages are also benefitting from the increase in tourists participating in whale shark tours. For example, each household in neighbouring Bangcogon receives up to US$25 per month from entrance fees for Sumilon, a marine reserve located across the bay from Tan-awan (J. Ziegler, unpublished data). Locals in the municipality of Oslob can also generate income from providing boat tours to Sumilon, motor-taxi services, restaurants, hotels, grocery stores, and selling souvenirs.

Whether the economic benefits generated from whale shark provisioning translate into conservation outcomes for the sharks is unknown. Whether a given tourism activity is successful in achieving its conservation goals is strongly influenced by the local context (Brockelman & Dearden, 1990). For example, inequitable distribution of economic benefits from tourism activities can result in resentment and lack of support for these activities, as well as conflict over natural resources (Brooks et al., 2013; Hunt & Stronza, 2011; Spiteri & Nepal, 2006; Stem et al., 2003). Even if benefits are equitably distributed, they may not always result in increased conservation support (e.g., Walpole & Goodwin, 2001). In other cases, pro-conservation behaviours are a result of increased enforcement, not improved conservation awareness or attitudes (e.g., Mintzer et al., 2015). Furthermore, tourism activities may not include the most resource-dependent community members who

are most likely to participate in negative extractive behaviours, thereby missing an opportunity to improve ecological conservation outcomes in the community (Mehta & Kellert, 1998; Walpole & Goodwin, 2001). Finally, the economic benefits generated from MWT activities may not be sufficient to discourage locals from participating in negative behaviours, such as unsustainable and or illegal resource extraction (Young, 1999). This type of in-depth socio-economic assessment is needed in Oslob in order to better understand who is benefitting from these tourism activities and who is not and the implications of potential inequities.

The significant money generated from these activities in Oslob may increase the whale shark tour operators' (and greater community's) interest in ensuring the sharks return every day and potentially lead to increased care for the wellbeing of the sharks and greater marine environment. However, at the moment, there is little incentive for the operators in Oslob to manage the growth of this site sustainably and ethically when the future of the local community's livelihood remains uncertain. A primary concern for the local community is the fact that the federal government of the Philippines has not yet decided whether provisioned whale shark tourism should be legal in the country and, if not, if Oslob will be grandfathered in as the only legal site for this activity. If shark provisioning is deemed illegal at the site, there is the potential for the whale sharks to disappear from Oslob waters since this site only had sporadic whale shark sightings prior to the commencement of provisioning activities (Thomson et al., 2017). Without whale sharks, Oslob's tourism draw is in question, with the majority of both foreign and national tourists stating that they would not have visited the site if the sharks were not present. Oslob is a rural community five hours from Cebu City by bus. Unless the community develops alternative tourist

attractions that can compensate for a decline in tourist numbers due to dwindling whale shark numbers, the community is unlikely to see continued economic growth. Their motivation is therefore to make as much money as possible from this endeavour before it gets shut down and not on ensuring an ethical and sustainable tourism experience. Research is currently being conducted to better understand the link between the tour operators' participation in these tourism activities and conservation outcomes at this site.

Another potential benefit of this tourism activity is education as it is believed to lead to pro-conservation attitudes and behaviours post-trip (Apps, Dimmock, & Huveneers, 2018; Dearden et al., 2007; Filby et al., 2015; Mayes et al., 2004; Orams, 1996; Zeppel & Muloin, 2008b, 2008a). However, the literature is inconclusive as to whether education at MWT sites actually leads to long-term changes in tourist attitudes or behaviours (Apps et al., 2018; Ardoin et al., 2015; Mayes et al., 2004; Packer & Ballantyne, 2012; Powell & Ham, 2008; Zeppel & Muloin, 2008b, 2008a). If education is to be used as a justification for provisioning, then it must be proven that there are beneficial consequences beyond the immediate experience (Dobson, 2011). In the case of Oslob, no interpretation is provided on the whale sharks beyond the 5-minute pre-interpretation talk outlining the rules of the encounter (i.e., do not touch shark, stay 4 m away, no flash photography). This type of information does not typically lead to changes in pro-conservation attitudes or behaviours (Apps et al., 2018; Jacobs & Harms, 2014). Despite TripAdvisor reviews mentioning the potential educational benefit of this activity, research has found that simply participating in wildlife tourism without in-depth interpretation seldom results in educational benefits (Jacobs & Harms, 2014). Educational value is therefore not currently a valid justification for allowing this type of activity in Oslob.

Scientific research is also used to justify the value of wildlife tourism activities (Dobson, 2011). All of the scientific research being undertaken in Oslob is focused on understanding the impacts of provisioning on the whale sharks visiting the site (Araujo et al., 2014; Schleimer et al., 2015; Thomson et al., 2017). Photo-ID studies have found that some sharks found in Oslob can also be found at other tourism sites within the Philippines (Araujo et al., 2014; Araujo, Snow, et al., 2017), which increases our knowledge of whale shark movements. However, the value of provisioning in improving scientific knowledge beyond studying impacts is limited and therefore may not represent a valid claim for support of the practice.

3.4.3 Conclusion

Based on this examination of potential benefits of provisioned whale shark tourism activities in Oslob, the most salient factors in deciding whether this activity is ethically valid using a utilitarian approach are the significant economic benefits to the local community, the human enjoyment of those participating in the activity, and the real and potential costs to the focal species. It is important to remember that utilitarianism does not require equal treatment (Dobson, 2011). It is therefore possible for a wildlife tourism attraction to focus on human benefits, including human enjoyment and economic benefits to the local community, over issues of species conservation and animal suffering (Dobson, 2011). Dobson (2011) states that distinguishing between “trivial” (i.e., beneficial but not necessary for avoidance of pain and suffering) and “urgent” (i.e., relate to avoidance of pain and suffering) interests can help address problems with wildlife tourism activities where humans enjoy the experience, but the animals suffer. In the case of whale sharks, an endangered species experiencing potential negative impacts from both provisioned (Araujo

et al., 2014; Schleimer et al., 2015; Thomson et al., 2017) and non-provisioned (Anderson et al., 2014; Araujo, Vivier, et al., 2017; Haskell et al., 2015; Pierce et al., 2010; Quiros, 2007; Raudino et al., 2016) tourism activities and other currently unknown impacts (e.g., physiological stress from tourism activities, disease loads) and knowledge gaps regarding their ecology (e.g., migration, population connectivity, breeding/pupping locations, longevity; Rowat & Brooks, 2012), the need to avoid any possibility of negative impacts should supersede the "trivial" benefits of human entertainment. However, the significant economic benefits to the local economy could also be considered an "urgent" interest to avoid suffering of the local community and may supersede the "urgent" needs of the whale sharks. A determination must be made as to whether the suffering prevented in the local community is more important than the suffering incurred by the whale sharks. Until the impacts of these activities are fully understood, and the animal welfare status of this activity is fully assessed, a precautionary approach should be used, as the cost-benefit analysis required in a utilitarian approach cannot be realized without a complete picture of the ecological costs of the activity to the sharks.

The main critique of utilitarianism as an ethical approach is that it is nearly impossible to consider the interests of all humans and animals involved in a given wildlife tourism activity (Dobson, 2011). In Oslob, this would mean considering the interests of the whale sharks visiting Oslob, whale sharks in the wider population, all other marine animals both in Oslob and abroad, the animals in Oslob that depend on revenue of the tourism activity (i.e., their owners use money from tourism activity to buy them food, keep house, etc.), the local tour operators, their families, the local community and all those that receive economic benefits from the activity, and finally the tourists who come to see the sharks.

Matheny (2006), however, states that any wildlife tourism activity that claims to have benefits for either humans or the focal species should be able to provide evidence that not only fully supports such claims, but also demonstrates that a thorough cost-benefit analysis of the activity has taken place for all those who have an interest in the activity. This has not taken place in Oslob. Whale shark provisioning activities in Oslob should therefore, *ipso facto*, be considered unethical until such cost-benefit analyses are made.

Chapter 4 Can ecotourism change community attitudes towards conservation?

Abstract

A basic tenet of ecotourism is to enhance conservation. However, few studies have assessed its effectiveness in meeting conservation goals and whether the type of tourism activity affects these outcomes. This study examines whether working in ecotourism changes the attitudes and behaviours of locals towards the focal species and its habitat, and, if so, if tourism type affects those outcomes. We interviewed 114 respondents at four whale shark (*Rhincodon typus*) tourism sites in the Philippines (mass, mid-tier, small-scale, failed) to compare changes in perceptions of, and behaviours, towards whale sharks and the greater marine environment. We found that the smaller scale tourism sites had greater social conservation outcomes than the mass or failed tourism sites, including changes in perceptions of whale sharks, conservation ethic, and changes in behaviours towards whale sharks and the ocean. Furthermore, of the three active tourism sites, the smallest site with the lowest economic returns and the highest negative impacts on whale sharks prior to tourism activities had the largest proportion of respondents who reported a positive change in perceptions and behaviours towards whale sharks and the ocean. Our results suggest that tourism type, and the associated incentives, can have a significant effect on the social conservation outcomes of the activity and therefore the conservation of an endangered species.

Keywords

incentive-based conservation, shark tourism, conservation attitudes, perceived tourism benefits, community-based tourism, marine wildlife tourism, conservation outcomes

4.1 Introduction

Incentive-based conservation provides incentives (e.g., employment, ecological services, compensation payments, health care, education, agroforestry, tourism development/promotion) to gain support for conservation (Spiteri & Nepal, 2006). Incentive-based conservation approaches are based on the belief that benefits derived directly from natural resources will encourage conservation and sustainable use of those resources (Stronza, 2007). Social conservation outcomes of these projects include improved conservation awareness and attitudes and an increase in pro-conservation behaviours. Community participation in conservation projects and the receipt of economic and social benefits from these projects may lead to improved conservation perceptions (e.g., awareness and attitudes), which may, in turn, lead to pro-conservation behaviours (Pegas et al., 2013; Stem et al., 2003). The reduction in negative behaviours (e.g., poaching) and increase in positive behaviours (e.g., participation in conservation projects) can lead to positive ecological conservation outcomes (e.g., increased species abundance and/or range; Holmes, 2003).

However, the relationship between incentive-based conservation projects and improved attitudes, awareness, and behaviours is complex. Economic benefits from these projects do not necessarily result in increased support for conservation (Walpole & Goodwin, 2001), nor do positive perceptions of conservation always lead to pro-conservation behaviours (Mintzer et al., 2015; Nilsson et al., 2016). Nevertheless, improving attitudes towards conservation may be an important mechanism for changing behaviours when more conventional methods (e.g., enforcement, strict no-take protected areas) are inadequate or inappropriate (Waylen et al., 2009).

Although ecotourism has been widely adopted as a conservation tool, it is only in the last ten years that its effectiveness in meeting conservation goals has been evaluated, largely in the terrestrial environment (see Wardle, Buckley, Shakeela, & Castley, 2018 for a review). Ecotourism is sustainable, nature-based tourism that enhances conservation (Buckley, 1994). This often occurs through the economic benefits provided by tourism that supplant other economic and often extractive uses of the focal species. The focal species is worth more alive than dead, and it is in the community's interest to protect the species. Many studies have documented this economic impact analysis (Cisneros-Montemayor et al., 2013; Venables, Winstanley, Bowles, & Marshall, 2016). However, other impacts also occur in communities that host ecotourism. Changing perceptions of the target species by those involved in ecotourism may also benefit conservation outcomes (Bennett, 2016). These changing perceptions may lead to behaviours that are more supportive of conservation (Stem et al., 2003). Such changes may ultimately be more transformative and stable than economic impacts that are vulnerable to changing demands and the success of the enterprise. However, very little research has addressed these social conservation outcomes and the factors that may influence them (Wardle et al., 2018). This study addresses this gap through a comparative study of four different types of whale shark (*Rhincodon typus*) tourism in the Philippines. It seeks to understand whether changes have taken place in terms of local attitudes and behaviours towards whale sharks and the wider ocean environment and whether these differ according to the type of tourism undertaken.

4.1.1 Study sites

Oslob, Cebu, Philippines, has a population of 27,893 (Philippines Statistics Authority, 2019). Open since 2011, Oslob whale shark tourism is a community-based mass tourism

site (**Fig. 4.1**). It is the largest non-captive whale shark tourism site in the world with annual visitation exceeding 365,000 tourists and generating approximately US$10 million in revenue in 2018. Unlike most other whale shark tourism sites that are dependent on seasonal aggregations of sharks, tour operators at Oslob feed the whale sharks 50 to 150 kg of *uyap* (small shrimp) daily from 6AM to 12PM (Araujo et al., 2014). Tourists are paddled 50 metres from shore for a half-hour in the viewing area where feeder boats lead the sharks between lines of tourist boats. Viewing is guaranteed. This compares with tourist boats at non-provisioned locations that may spend three to four hours searching for sharks that they may or may not see. Provisioning is therefore critical to ensure activities can occur year-round and support a mass tourism business model at Oslob. A total of 208 individual whale sharks have been identified at this site, with a mean weekly shark abundance of 18.6 (Thomson et al., 2017).

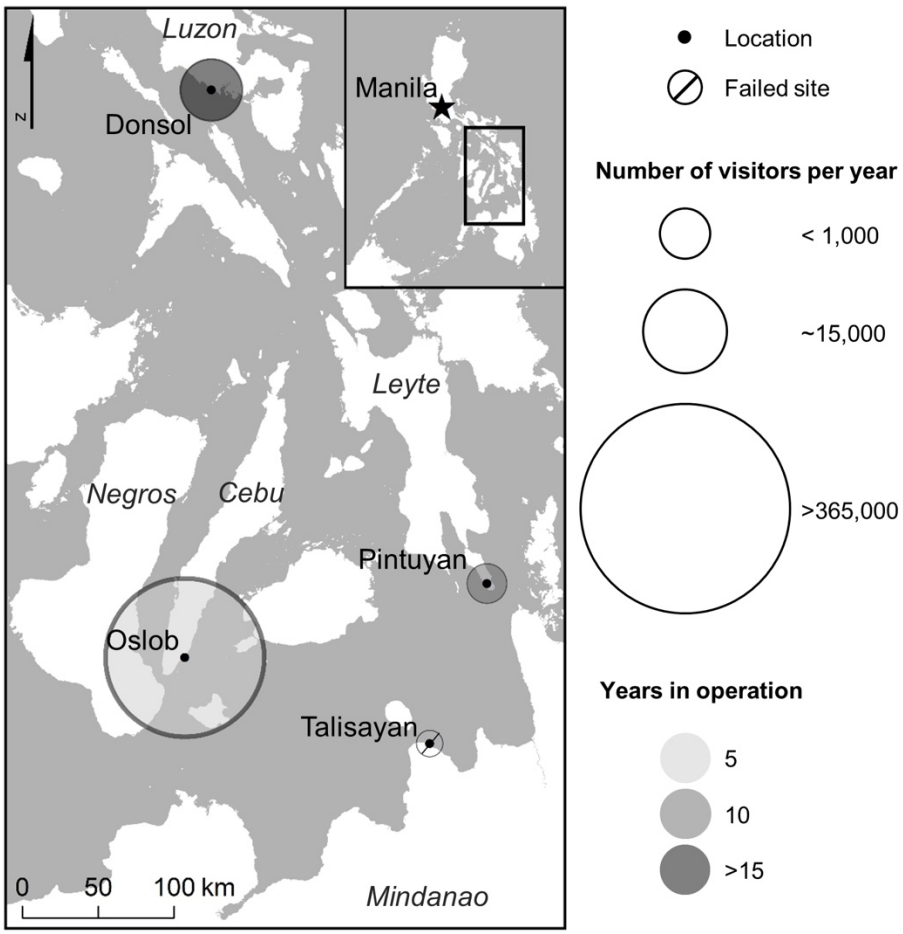

Figure 4.1 Map of the four sites in the Philippines

Donsol, Sorsogon, Philippines, has a population of 49,711 (Philippine Statistics Authority, 201). Established in 1998, Donsol is the original whale shark tourism site in the Philippines. The local community, along with the help of WWF-Philippines, pushed for the creation of tourism activities after the killing of seven whale sharks in their waters led to a ban on the hunting of whale sharks in the Philippines (Pine, 2007). This site represents a mid-tier tourism site – during the 2017 season, the site had 14,191 visitors and was worth US$800,000. Prior to 2012, Donsol was one of the largest non-captive sites in the world. However, recent issues with variability in whale shark sightings – few whale sharks were sighted during the 2014, 2015 and 2018 seasons – has resulted in a decline in visitation. A

total of 479 individual whale sharks have been identified at this site, with annual variation in sightings ranging from 185 individual sharks in 2009 to 15 in 2013 (McCoy et al., 2018).

Pintuyan, Southern Leyte, Philippines, has a population of 9,826 (Philippine Statistics Authority, 2019). It is the smallest of the whale shark tourism sites assessed. Started in 2006, visitation is only a few hundred to a thousand people annually depending on the length of the season as whale shark sightings are highly variable. For example, the 2016 and 2017 seasons lasted less than two months, while the 2018 season lasted seven months. A total of 93 individual whale sharks have been identified at this site, with 92 sharks encountered in 2013 and only 7 sharks in 2014 (Araujo, Vivier, et al., 2017). The industry was worth US$56,000 in 2018. There is no tourism infrastructure present in the village (e.g., restaurants, hotels, etc.). Although whale shark guides and spotters are members of a community-based people's organization (KASAKA), they are reliant on foreign-owned dive shops for their clientele. A local ordinance requires dive shops offering whale shark tours to employ local spotters and guides.

The final site, Talisayan, was one of the main whale shark hunting villages in the Philippines prior to the 1998 ban (Alava et al., 2002) and has a population of 24,505 (Philippine Statistics Authority, 2019). Prior to the 1998 hunting ban, hunters were promised a 300PHP (US$7) daily income from work in whale shark tourism if they agreed to no longer hunt the sharks. Although some hunters formed the Whale Shark Spotters Association in 1997 and worked as spotters for an international team tagging whale sharks in February 1998, whale shark tourism failed to develop. Despite the efforts of multiple local, national and international organizations (e.g., WWF-Philippines, Department of Tourism, Bureau of Fisheries and Aquatic Resources, Silliman University, local dive

resort), ecotourism largely failed because a feasibility assessment was never completed. It is quite difficult to find whale sharks for tourism purposes at this site (e.g., 3.5 hours per whale shark sighted in boat survey in 2017; Araujo & Labaja, 2017a). The whale shark aggregation at Donsol also became prominent during this time and the attention quickly shifted to protecting this aggregation (A. Yaptinchay, personal communication). This site is a failed tourism site due to the unsuccessful attempt to involve whale shark hunters in tourism activities.

4.2 Methods

We conducted interviews with whale shark operators at the three active tourism sites from April through June 2016 and with ex-whale shark hunters and fishers at the failed tourism site from May to June 2017. At each site, the first author and a local translator conducted the interviews in the local dialect and translated answers into English during the interviews. Due to travel restrictions to the island of Mindanao, a local research assistant conducted the interviews in Talisayan and translated the transcripts into English.

Sampling varied at each site. In Pintuyan, we interviewed all KASAKA members (n=40) due to its small size. In Oslob and Donsol, tour operators interviewed were randomly selected from those working at the tourism site each day. In Oslob (n=25), the final sample size was limited by the president of the Tan-awan Oslob Sea Wardens and Fishermen Association who had to give permission for workers to participate in the interviews. In Donsol (n=24), the final sample size was limited by the early departure of the whale sharks that season. In Talisayan (n=25), we interviewed all living ex-whale shark hunters in the village (n=17), as well as eight randomly selected fishermen. We reached data saturation at each of the sites (i.e., no new themes, no new coding, no new data; Guest,

Bunce, & Johnson, 2006) suggesting that the final sample sizes were adequate to reflect perspectives at each of the sites, as well as of a sufficient number to perform statistical analyses.

We used structured interviews, using a combination of open- and closed-ended questions, to collect information at the four sites. Respondents were asked livelihood information, their perceptions of whale shark tourism activities, including its impact on the economy, the environment, the community, and their families, as well as the perceived importance of whale sharks and the ocean. Respondents were also asked if their view of whale sharks and their behaviours towards whale sharks and the ocean have changed since whale shark tourism activities started in their communities (Oslob, Donsol, Pintuyan) or since the ban on whale shark hunting was implemented (Talisayan). Tour operators were asked if working in tourism changed the amount of fishing they did, and, if so, by how much, as well as their main income source pre and post tourism activities. Interview data were entered into SPSS for quantitative analysis and open-ended questions were input and coded in NViVO for qualitative analysis.

This study was approved by the University of Victoria's Human Research Ethics Board (Ethics Protocol Number #15-434).

4.3 Results

4.3.1 Livelihood characteristics

The majority of respondents at each site are fishers. Respondents at the failed site were more likely to fish full-time than the other sites (**Table 4.1**). The main income sources by

site were tourism at the mass tourism site, fishing at the failed and mid-tier sites, and "other" (e.g., labour, professional, agriculture) at the small-scale site.

Respondents from the mid-tier site have been working in tourism two to three times longer than respondents from other sites. However, respondents from the provisioned mass tourism site made double to triple the daily income of the non-provisioned sites and about eight to nine times their annual income (mass: US$5051.01, mid-tier: US$614.72, small-scale: US$592.08; **Table 4.1**). This number jumps to sixteen to thirty-four times the annual income of the non-provisioned sites during seasons with poor whale shark sightings (mass: US$5051.01, mid-tier: US$307.36, small-scale: US$147.74). This vast difference in income is due to the provisioned nature of tourism activities at the mass site where operators work seven days a week, twelve months a year because the sharks are present every day. Furthermore, tour operators at the mass site do more than one tour per day since each tour is limited to 30 minutes. At the non-provisioned sites, whale shark presence is seasonal; operators therefore only work six to seven months out of the year. Operators also work an average of three days per week because guides work on a rotational basis; if there are few tourists or sharks, an operator will only work every other day or two rather than every day like at the provisioned site.

Table 4.1 Livelihood characteristics at the four whale shark tourism sites in the Philippines.

	TOURISM SITES BY TYPE							
	Mass	Mid	Small	Failed				
	1. Oslob (n=25)	2. Donsol (n=24)	3. Pintuyan (n=40)	4. Talisayan (n=25)	test statistic	p	effect size[a]	post-hoc test p values[b]
% respondents who currently fish	60.0	79.2	85.0	84.0	$\chi^2 =$ 6.420	0.093		
% respondents who fish full time	5.6	26.3	17.5	66.7	$\chi^2 =$ 22.499	<0.001*	0.479	
Main income source					$\chi^2 =$ 79.949	<0.001*	0.590	

Fishing	2.0	50.0	20.0	60.0					
Tourism	90.0	41.7	11.2	0.0					
Other (agriculture, professional, labour)	8.0	8.3	68.8	40.0					
Mean years working in tourism (SE)	4.1 (0.28)	14.8 (1.10)	6.1 (0.68)	n/a	F = 48.539	<0.001*	0.728	1 vs. 2 1 vs. 3 2 vs. 3	<0.001* 0.021* <0.001*
Mean daily income from tourism (SE)	701.0 (80.40)	405.0 (40.13)	289.7 (31.98)	n/a	F = 17.673	<0.001*	0.542	1 vs. 2 1 vs. 3 2 vs. 3	0.006* <0.001* 0.073

Mean days a week work in tourism (SE)	6.7 (0.18)	3.0 (0.30)	2.6 (0.19)	n/a	F = 98.628	<0.001*	0.834	1 vs. 2 1 vs. 3 2 vs. 3	<0.001* <0.001* 0.460
Mean months per year work in tourism (SE)	11.5 (0.31)	5.8 (0.19)	6.7 (0.30)	n/a	F = 96.424	<0.001*	0.832	1 vs. 2 1 vs. 3 2 vs. 3	<0.001* <0.001* 0.032*
Mean estimated annual income from tourism in USD (SE)[c]	5,051.0 (639.08)	614.7[d] (79.52)	594.9[d] (219.03)	n/a	F = 47.407	<0.001*	0.726	1 vs. 2 1 vs. 3 2 vs. 3	<0.001* <0.001* 0.995

Note: * Significant at α=0.05, SE=standard error of mean

[a]Effect sizes reported are Cramer's V for Chi square test and Eta for analysis of variance (ANOVA)

[b]Post-hoc tests were calculated for ANOVA results using Least Significant Difference (LSD) if equal variance assumed (i.e., if Levene's statistic $p > 0.05$) and Games-Howell if equal variances not assumed (i.e., if Levene's statistic $p < 0.05$); normal distribution of data not tested because it does not affect the outcome of parametric tests (Vaske, 2008)

[c]Mean estimated annual income from tourism was calculated using individual reported values for mean daily income from tourism, mean days worked per week, and mean months worked per season for each site

[d]Adjusted mean estimated income from tourism if season shortened due to variability in whale shark sightings: Donsol value based on halving visitation from government logs of visitation in 2016 (regular season: 20,000 tourists) and 2014 (shortened season: 12,911 tourists) is US$307.36; Pintuyan based on a two-month season as observed in 2016 and 2017 is US$147.74 (calculated using mean income and days, but changed mean months to two rather than reported mean presented in table)

4.3.2 Perceived benefits of whale shark tourism

Perceived benefits of whale shark tourism were assessed from an open-ended question asking about the impact of tourism on their community, environment, family, and local economy. Categories used to code responses are outlined in **Table 4.2**. At all four sites, benefits were largely perceived to be economic; respondents from the more established, profitable sites (mid-tier, mass) were significantly more likely to report community improvement, improved job opportunities, and improved quality of life (e.g., "My children are now in school because of whale sharks; my house is possible because of whale sharks") compared to the small-scale and failed sites who mainly perceived the economic benefits as livelihood benefits (e.g., "The allowance from [my] job as a spotter […] helps us buy the basic necessities for the family, e.g., one kilo of rice"). Respondents from the smaller scale sites (small-scale, mid-tier) were significantly more likely to mention conservation outcomes of WST (e.g., "tourism has affected the ocean and whale sharks in a positive way because now they are protected"), compared to the mass tourism or failed tourism sites.

Table 4.2 Perceived benefits of whale shark tourism at each of the study sites.

PERCEIVED BENEFITS	TOURISM SITES BY TYPE				
	Mass	Mid	Small	Failed	
	1. Oslob	2. Donsol	3. Pintuyan	4. Talisayan	N
Economics (% response)	74.3	69.8	72.9	83.4	228
livelihood (N)	21	21	40	21	103
community improvement (N)	19	19	9	6	53
job opportunity (N)	12	14	6	2	34
improved quality of life (N)	17	11	0	1	29
tourist attraction (N)	0	2	7	0	9
Conservation outcomes (% response)	8.6	22.9	20.0	8.3	50

environmental (N)	4	14	5	3	26
improved knowledge (N)	1	8	11	0	20
educate others (N)	2	0	1	0	3
emotional connection to marine wildlife (N)	1	0	0	0	1
Social (% response)	15.1	7.3	7.1	8.3	32
learn languages (N)	10	5	4	0	19
cultural (N)	5	2	2	2	11
self-worth (N)	1	0	0	1	2
Total N	93	96	85	36	310

4.3.3 Social conservation outcomes

Respondents were asked closed-ended questions to assess social conservation outcomes at each site, including (1) change in fishing, (2) changes in perceptions towards whale sharks, (3) conservation ethic, and (4) changes in behaviour to protect whale sharks and the ocean (**Table 4.3**).

Table 4.3 Social conservation outcomes of whale shark tourism activities by site.

SOCIAL CONSERVATION OUTCOMES	TOURISM SITES BY TYPE				test statistic	p	effect size	post-hoc test p values[a]	
	Mass	Mid	Small	Failed					
	1. Oslob (n=25)	2. Donsol (n=24)	3. Pintuyan (n=40)	4. Talisayan (n=25)					
1. CHANGE IN FISHING									
% fishers for whom tourism has changed the amount of fishing they do (N)	87.5 (14)	40.9 (9)	19.4 (7)	n/a	χ^2 = 21.285	0.006*	<0.001		
	-54.9 (7.85)	-66.7 (7.55)	-5.7 (16.42)	n/a	F = 8.259	0.002*	0.616	1 vs. 2	0.389
								1 vs. 3	0.002*

Mean % change in fishing due to whale shark tourism (SE)							2 vs. 3	0.001*
% fishers who changed from fishing to tourism as main source of income (N)	92.3 (12)	31.8 (7)	0.0 (0)	n/a	χ^2 = 22.944	<0.001*		0.706
2. PERCEPTIONS OF WHALE SHARKS								
% respondents who changed their view of whale sharks	72.0	95.8	95.0	52.0	χ^2 = 23.218	<0.001*		0.451
% respondents who like whale sharks	100.0	100.0	100.0	76.0	χ^2 = 22.547	<0.001*		0.445

% respondents who believe whale sharks are an important animal in the Philippines	100.0	100.0	100.0	44.0	χ^2 = 56.818	<0.001*	0.706		
% respondents who believe whale sharks should be protected from being killed	100.0	100.0	100.0	16.0	χ^2 = 91.641	<0.001*	0.897		
% respondents who believe the Philippines will change if whale sharks go extinct	64.0	70.8	87.5	8.0	χ^2 = 42.550	<0.001*	0.611		
3. CONSERVATION ETHIC									
	4.0	4.0	4.0	2.9		<0.001*	0.624	1 vs. 2	0.751

Mean score for desire to protect whale sharks (SE)	(0.04)	(0.00)	(0.04)	(0.23)	F = 23.187			1 vs. 3	0.998
								1 vs. 4	0.001*
								2 vs. 3	0.487
								2 vs. 4	0.001*
								3 vs. 4	0.001*
Mean score for desire to protect ocean (SE)	3.8 (0.10)	4.0 (0.00)	3.9 (0.05)	3.3 (0.17)	F = 9.524	<0.001*	0.456	1 vs. 2	0.216
								1 vs. 3	0.804
								1 vs. 4	0.094
								2 vs. 3	0.177
								2 vs. 4	0.003*

						3 vs. 4	0.015*
4. CHANGE IN BEHAVIOUR							
% respondents who changed their behaviour to protect whale sharks	48.0	75.0	92.5	44.0	χ^2 = 22.940	<0.001*	0.449
% respondents who changed their behaviour to protect the ocean	64.0	79.2	95.0	64.0	χ^2 = 12.495	0.006*	0.331

Note: * Significantly different at α=0.05, SE=standard error of mean

[a] Post-hoc tests were calculated for ANOVA results using LSD if equal variance assumed (i.e., if Levene's statistic p >0.05) and Games-Howell if equal variances not assumed (i.e., if Levene's statistic p<0.05) ; normal distribution of data not tested because it does not affect the outcome of parametric tests (Vaske, 2008)

4.3.3.1 Change in fishing

Respondents were asked if their fishing had changed since they started working in whale shark tourism, and, if so, if it had increased or decreased, and by approximately what percent. A reduction in fishing due to participation in tourism is a potential conservation outcome since it represents reduced pressure on the marine ecosystem. Since respondents in Talisayan only worked in whale shark tourism a handful of times twenty years ago, this village was not included in the analysis.

Our results suggest that commercial success is important for overall reduction in extractive activities. Although the number of fishers who stopped fishing was not significantly different among the tourism sites, the majority of fishers from the mass tourism site reported a significant reduction in their fishing compared to the smaller scale tourism sites. Oslob is also the only site where the vast majority of respondents (n=24) get their main income from whale shark tourism activities. Nearly half the respondents transitioned from fishing to tourism as their main income source, while a further seven did not rely on fishing as their main income source prior to tourism activities, and five never fished. Since tourism activities are seasonal at the mid-tier site, only a third of respondents reported a change from fishing to tourism as their main income source, with a further three not relying on fishing as their main income source prior to tourism activities, and two having never fished. Fishers at the small-scale site, meanwhile, do not make enough money nor work enough days to warrant a significant change in the amount of fishing they do. Only five fishers reported a decrease in fishing due to tourism activities at this site. None of the respondents at this site had transitioned from fishing to tourism as their main income source.

4.3.3.2 Changes in perceptions of whale sharks

Respondents were asked whether they had changed their perceptions towards whale sharks since tourism activities started in their village or the whale shark ban was implemented in the case of the failed site (**Table 4.3**), and, if so, how. Respondents from the smaller scale sites (mid-tier, small-scale) had significantly higher reported changes in perceptions towards whale sharks compared to the mass and failed tourism sites. For example, most respondents at the small-scale site noted that they now cared about and valued whale sharks (n=36), while the majority of respondents from the mid-tier site noted they were no longer afraid of the sharks because of tourism activities (n=15). Other changes in perceptions at these sites included the benefit the presence of whale sharks brings to local fisheries ("my fishing has increased by 80% because whale sharks […] bring many small fishes to the community"), no longer perceiving whale sharks to be pests with regards to fishing ("before tourism, I would get really angry with the whale sharks because they eat plankton and fish like tuna or any small fishes, and it was competing with me for food"), as well as an emotional connection to the sharks thanks to tourism activities:

> "I really want to protect whale sharks because of one interaction I had with a whale shark as a spotter where I was very happy seeing the whale shark, I felt like we played or danced under water. I really felt very happy looking at the whale shark, that's why it should be protected."

At the failed tourism site, the vast majority of respondents held negative views of the sharks (n=20). Of the 13 respondents who did note a change in perception of whale sharks since the ban, this change was largely negative (n=12), mainly due to the perception that the sharks are now dangerous (e.g., "[whale sharks] are more ferocious [now], they destroy our boats") or a pest having a negative impact on their fishery (e.g. "the way I see it, [the whale shark] eats small fishes

[…] it is the reason for the crisis of fish offshore"). Only one respondent from the site reported a positive change related to improved fishing.

Nearly three quarters of respondents at the mass tourism site reported a positive change in perception towards whale sharks. Like the mid-tier site, many were no longer afraid of the sharks and/or held positive views of whale sharks because of the income they generate. Of those who noted their perceptions had not changed since tourism activities started (n=7), two already had a positive perception of the sharks and five encountered their first whale shark on their first day working in tourism.

Respondents were also asked closed-ended questions regarding whether they liked whale sharks, whether they believed whale sharks were an important animal in the Philippines, whether they believed whale sharks should be protected from being killed, and if they believed the Philippines would change if whale sharks were to go extinct. All respondents at the tourism sites reported liking whale sharks, while only 76.0% of respondents from the failed tourism site did so (**Table 4.3**). Two respondents at the failed site noted, however, that they only liked whale sharks for the purposes of hunting them and the vast majority of respondents at this site noted a desire to continue hunting the sharks if it were still legal (n=22). Less than half of the respondents from the failed site perceived whale sharks to be an important animal in the Philippines compared to all respondents from the three tourism sites, with one respondent noting that whale sharks were important in terms of food and/or livelihood from hunting. Only four respondents from the failed site felt that whale sharks should be protected from being killed, while all respondents from the tourism sites felt they should be protected. The majority of respondents from the tourism sites felt that the Philippines would change if whale sharks were to go extinct, with several noting that they would lose their source of income, while only two respondents from the failed site agreed.

4.3.3.3 Conservation ethic

Respondents were asked to rate their desire to protect whale sharks and the ocean on a four-point Likert scale from 1 “none” to 4 “a lot”. Respondents from the failed tourism site were significantly less likely to want to protect whale sharks compared to the tourism sites (**Table 4.3**). They were also significantly less likely to want to protect the ocean compared to the smaller scale sites, but not the mass tourism site; the mass site was not significantly different from any of the other sites (**Table 4.3**).

4.3.3.4 Change in behaviours

Respondents at each site were asked if they had changed their behaviours towards whale sharks and the ocean since tourism started at their site or since the whale shark ban was implemented, and, if so, how. Respondents from the smaller scale sites were more likely to have changed their behaviour to protect the whale sharks compared to the mass tourism and failed tourism sites (**Table 4.3**), mainly in terms of no longer hurting the sharks, telling others to protect the sharks, and ensuring everyone follows the encounter guidelines (**Table 4.4**). Most respondents at the small-scale site reported interacting with the sharks prior to tourism activities by hitting them with stones, harpoons, dynamite, and paddles or riding them (n=26):

> “We had bamboo sticks and we would sharpen the tip so [it was] like a harpoon and we would throw it at the whale sharks; [we] would also [attach] a fishing line when we would throw the stick so we could hold on and ride the shark, not to kill the shark, just to play”

while a handful (n=3) mentioned killing the sharks either incidentally as bycatch or intentionally, as follows:

> “Before tourism, I was bad, I did bad things to whale sharks. I killed them, I caught them on purpose to eat the whale shark. Some [sharks were] caught as bycatch in nets, others I killed by throwing

> dynamite sticks at them or using a harpoon. We would dry the meat and eat it. […] Now, we leave the whale sharks alone."

Nearly half of respondents at the small-scale site also noted they now tell others to protect the sharks or report those who harm them thanks to the presence of tourism activities at the site (n=17):

> "A neighbouring barangay had an incident last year where I saw people hurting a whale shark and I fought for the whale shark not to be harmed and it was eventually released unharmed. […] They had caught it in a net and the people there wanted to tie it and kill it".

Table 4.4 Self-reported behavioural changes towards whale sharks and the ocean at each of the four tourism sites in the Philippines

	TOURISM SITES BY TYPE			
	Mass	Mid	Small	Failed
	1. Oslob (n=25)	2. Donsol (n=24)	3. Pintuyan (n=40)	4. Talisayan (n=25)
CHANGED BEHAVIOUR TOWARDS WHALE SHARKS?[a]				
Yes (% response)	48.0	75.0	92.5	44.0
No longer harm or kill the sharks (n)	8	12	26	4
Tell others to protect the shark or report those who harm sharks to authorities (n)	3	7	17	-
Follow the encounter guidelines (n)	-	4	8	-
Release whale sharks from net or fish corral (n)	1	-	3	8
Change fishing gear or approach (n)	-	2	-	-

No longer throw garbage in the ocean (n)	-	1	2	-
Work in tourism (n)	-	-	-	1
No (% response)	52.0	25.0	7.5	56.0
Never hurt whale sharks (n)	10	6	2	-
CHANGED BEHAVIOUR TOWARDS THE OCEAN?[b]				
Yes (% response)	64.0	79.2	95.0	64.0
Pick up garbage or dispose of it appropriately (n)	13	13	23	3
Use more sustainable fishing gear/approaches (n)	4	3	10	5
Tell others to protect the ocean (n)	2	4	7	4
Report illegal activities (n)	-	-	3	4
Other environmental behaviours (n)	-	1	1	1
No (% response)	36.0	20.8	5.0	36.0
Always protected (n)	3	4	2	1

[a] $\chi 2(3, N=114)=22.940$, $p<0.001$, Cramer's V=0.449

[b] $\chi 2(3, N=114)=12.495$, $p=0.003$, Cramer's V=0.331

Less than half of respondents from the mass tourism site reported a behavioural change (n=12), mostly in terms of following the encounter guidelines, specifically no longer touching or riding the sharks (n=7). Ten respondents at this site did not report a behavioural change because they did not see a whale shark until their first day on the job (n=3) or they never hurt the sharks (n=7); however, this would not preclude them from behavioural changes mentioned at the other sites, such as telling others to protect the sharks or no longer throwing garbage in the ocean. These

results suggest that respondents at the mass tourism site were either less likely to change their behaviours to protect sharks and/or were less likely to recognize the importance of their behavioural changes on the whale sharks. For example, half the respondents at the mass tourism site reported properly disposing their garbage to protect the ocean, and yet none did so in the context of protecting whale sharks.

At the failed site, the majority of respondents reported no change in their behaviours to protect the sharks since the ban was implemented (n=14), with one respondent noting when asked if he would release a shark if it got caught in his net "no, kill it, kill the whale shark, drown it". Of the eleven respondents who did report a change in behaviour at the site, the majority reported releasing sharks from nets (n=8) or no longer killing them (n=4).

Respondents at the small-scale site were also significantly more likely to have reported behavioural changes with respect to the ocean compared to the other tourism sites (**Table 4.3, Table 4.4**). The vast majority of respondents from the tourism sites who reported a behavioural change did so with respect to how they dealt with garbage, both in terms of trash disposal and cleaning up garbage they find. Another important behavioural change at all four sites is telling others to care for the ocean (e.g., "I tell people who use illegal fishing methods like cyanide […] that it's not so good because it kills our future; they are eating now but children are our future and they won't have any fish"). At the small-scale and failed tourism sites, respondents also noted that they report those who are breaking the law. A handful of respondents at each site also noted that they now use more sustainable fishing practices or approaches. For example, they no longer use destructive fishing methods such as muru-ami (i.e., compressor diving with big nets that they use to drag over the reef in order to herd fish into the net), cyanide, night fishing with spearguns, bato bato (i.e., where the fisher hits and breaks the corals to get the fish), and fine gill nets. They are

also more selective in the fish they catch and respect fishing regulations in place: “I don’t catch any undersize fish and I don’t fish in the sanctuary. I give importance to the sanctuary as a place for the production of fishes”. One respondent from the mid-tier site even noted that he has stopped fishing “because I’m trying to protect the ocean”. Three others noted their participation in environmental activities, such as planting mangroves, the removal of crown of thorns from their local reef and removing a fishing line from a manta. Of the nine respondents each at the mass and failed sites who did not report a behavioural change towards the ocean, only three and one, respectively, said that it was because they always protected it.

4.4 Discussion

Our results suggest that participation in tourism results in significant positive changes in perceptions and behaviours of local operators, both towards the target species and the wider marine environment. However, the type of tourism activity does appear to affect conservation outcomes. Respondents from the smaller scale tourism sites had greater social conservation outcomes compared to the provisioned mass tourism or failed tourism sites, including changes in perceptions of whale sharks, conservation ethic, and changes in behaviours towards whale sharks and the ocean. They were also more likely to perceive whale shark tourism activities as providing conservation benefits to the sharks and community than the failed or mass tourism sites. While tourism businesses must be commercially successful in order to deliver benefits to conservation and local communities (Seales & Stein, 2012), our research suggests that the type of tourism is also important. Although respondents from the small-scale site reported the smallest economic returns of the three tourism sites assessed, they had the largest proportion of respondents who reported a positive change in perceptions and behaviours towards whale sharks and the ocean. Respondents from this site were also significantly more likely to have reported harming whale

sharks prior to tourism activities than the other active tourism sites. These findings suggest that even a small-scale tourism activity can have significant conservation outcomes for an endangered species and supports placing emphasis on establishing small-scale ecotourism initiatives within priority fishing communities (i.e., those with larger ecological impacts) for maximum conservation benefits.

Previous studies support the importance of non-economic incentives in generating conservation outcomes. Stem et al. (2003) found that non-cash benefits were more strongly associated with conservation perspectives than direct cash benefits. Similarly, Nilsson et al. (2016) found that behavioural changes towards orangutans were most likely to occur in villages with small-scale tourism or a community-based reforestation program, and least likely to occur in a village with mass tourism activities. The authors further found that only non-economic incentives had any effect on changes in behaviours or attitudes towards protecting critical orangutan habitat, regardless of the nature of conservation projects present. Nilsson et al. (2016) concluded that economic benefits are to catalyze local support for conservation projects in the short-term, especially in developing countries with limited economic opportunities, but that non-economic incentives are critical for the long-term viability of conservation projects and should be considered in the design and implementation of incentive-based conservation projects.

The current study also found a lack of connection between economic incentives and attitudinal and behavioural changes beyond the focal species. Respondents from the three active tourism sites were more likely to want to protect whale sharks than the failed tourism site. However, this did not translate into an equal desire to protect the ocean. While respondents from the smaller scale tourism sites were more likely to want to protect the ocean compared to the failed tourism site, respondents from the mass tourism site were not. This suggests that the significant

economic benefits the mass tourism site derives from whale shark tourism do not, as yet, translate into conservation benefits for the greater marine environment. Whether this will change in years to come remains to be seen.

NGOs are present at the three active tourism sites providing outreach and support to the communities and therefore may have played a role in the observed differences in social conservation outcomes at these sites. For example, WWF-Philippines provided capacity training and outreach to Donsol to facilitate the development of whale shark tourism there in 1997 and was involved in tourism management and outreach at this site from 2007 to 2015. The Large Marine Vertebrates Research Institute Philippines has been involved at all three tourism sites (Oslob since 2012, Pintuyan since 2012, Donsol since 2015), primarily doing scientific studies (photo-identification of sharks, tourism impact studies) but also providing some outreach and support for the communities involved. However, the smallest site with less NGO presence than Donsol and similar outreach to Oslob still reported more social conservation outcomes. NGO involvement may explain greater social conservation outcomes at Donsol, since NGOs have been present at this site twice as long as the other active tourism sites, however, it would not explain differences at the small-scale and mass tourism sites, which had the same NGO providing similar outreach over a similar period. This suggests that observed differences in attitudes and behaviours are likely due to the type of tourism present and not outside factors, although future studies should explore the role of NGOs in facilitating this shift in attitudes and behaviours over time.

Furthermore, results from the failed site suggest that tourism may not be the main driver of changes in behaviour. Although respondents at this site held largely negative attitudes towards whale sharks and reported a lower desire to protect both the sharks and ocean compared to the smaller scale tourism sites, many fishers reported releasing the sharks from corrals or fishing nets

and no longer killing them because of the risk of imprisonment if they are caught. Previous studies have found similar results (Stem et al., 2003). For example, Mintzer et al. (2015) found that fishers who did not like river dolphins still released them from their nets when near a protected area due to fear of being caught killing a protected species rather than an inherent conservation ethic.

Our results suggest that commercial success is important for overall reduction in extractive activities. Although the number of fishers who stopped fishing was not significantly different among the tourism sites, the majority of fishers from the mass tourism site reported a significant reduction in their fishing compared to the smaller scale tourism sites. Previous research has also found a similar link between employment in tourism and a reduction in extractive activities, such as hunting or farming (Stem et al., 2003; Stronza, 2007). However, this reduction in local fishing pressure may not result in healthier fish stocks if fisheries are not well managed. For example, interviews with fishers in a neighbouring barangay within the municipality of Oslob identified issues with decreased catch, use of illegal fishing methods, and commercial vessels fishing illegally within municipal waters (J. Ziegler, unpublished data), while in Donsol it was reported that commercial purse seiners in municipal waters removed ten times the municipal annual fishery harvest each year (Pine, 2007; The Manila Times, 2013). In 2013, there were 350 commercial fishing boats bottom trawl fishing in the Bicol region, which includes Donsol waters (The Manila Times, 2013); bottom trawl fishing in municipal waters, bays and fishery management areas is illegal in the Philippines, as is commercial vessels fishing in municipal waters (RA-8550 as revised by RA-10654). Part of the problem is the decentralized nature of fisheries governance in the Philippines; municipalities with little funding or resources are expected to enforce fisheries laws in their waters, including apprehending commercial fishing vessels (Almendral, 2018; Ignacio, 2018). The impacts of such continued overfishing are stark. An assessment of coral reef health in

the Philippines from 2015 to 2017 found that there were no remaining reefs in excellent condition, with over 90% of reefs classified as poor or fair (Almendral, 2018).

The type of tourism present may also have negative impacts on the marine environment. For example, (Wong et al., 2019) assessed the effect of provisioning activities at Oslob on the health of local coral reefs and found signs of increased reef degradation at the provisioning site relative a control site, including higher macroalgal cover, lower coral cover, and dominance of stress-tolerant coral genera (e.g., *Pocillopora*, *Porites*). Studies have also found that provisioning activities are likely negatively affecting whale shark health and wellbeing (Araujo et al., 2014; Schleimer et al., 2015; Thomson et al., 2017), although there is disagreement within the scientific community regarding these impacts (Meekan & Lowe, 2019a,b; Ziegler et al., 2019a,b). Furthermore, the high volume of tourists at the mass tourism site will increase the demand for food (>365,000 tourists in 2018 vs. Oslob municipal population of 27,893; Philippine Statistics Authority, 2019), which will increase pressure on local marine resources (e.g., King, 1997). Biological studies are needed to assess the health of local coral reefs and fish stocks at these sites before conclusions can be drawn regarding the positive impact of whale shark tourism on ocean conservation.

This study suggests that ecotourism can be an effective means of enhancing protection by positively changing local attitudes and behaviours towards target species and their respective ecosystems. However, the type of tourism present appears to play an important role in terms of the scale and scope of the conservation impacts. These findings suggest that while economic returns are important, they are not the main determinant of conservation outcomes and should not be the main metric used to assess conservation success of ecotourism sites. Conservation practitioners

should be aware that even small-scale tourism ventures can result in significant benefits for conservation.

Chapter 5 Understanding the relationship between social conservation outcomes and wildlife value orientations of wildlife tourism providers

Abstract

Marine wildlife tourism can act as an important incentive for the conservation of marine species and habitats. Many studies have documented the impacts of marine wildlife encounters on the attitudes and behaviours of tourist participants, but little attention has been paid to the impacts on those providing the tourist experience. This paper examines this deficiency with respect to whale shark watching in the Philippines and asks whether working in marine wildlife tourism changes locals' wildlife value orientations to a more protectionist perspective and whether this is reflected in their behaviour. We interviewed 114 respondents from four villages in the Philippines representing different stages of whale shark tourism development (0, 5, 10, 18 years), and identified two value orientation clusters, a more utilitarian group (n=30) and a more protectionist group (n=84). The protectionist group was significantly more likely to report positive attitudes towards whale sharks and behavioural intentions to protect whale sharks and the ocean, supporting cognitive hierarchy theory. The oldest tourism site had the highest wildlife value orientation score, while the pre-tourism site had the lowest score suggesting that participating in marine wildlife tourism can shift wildlife value orientations over time. These findings suggest that incentive-based conservation approaches, such as community-based marine wildlife tourism, can act as a change agent for communities to empower them to protect their marine resources.

Keywords

wildlife value orientations, marine wildlife tourism, whale sharks, conservation outcomes, cognitive hierarchy theory, conservation attitudes

5.1 Introduction

'Swim-with' whale shark tourism activities can be an incentive-based conservation tool to help protect this endangered species. By providing an alternative livelihood, marine wildlife tourism (MWT) may result in both positive economic and social conservation outcomes (e.g., changes in attitudes and/or behaviours) as proposed by Duffus and Dearden (1993) with respect to killer whale watching activities some 25 years ago. Studies have linked such positive social conservation outcomes with changes in wildlife value orientations (WVOs) in wildlife tourists (Jacobs, Vaske, & Sijtsma, 2014; Miller, Freimund, Metcalf, & Nickerson, 2018; Rickenbach, Reyes-García, Moser, & García, 2017). However, no study to date, has linked WVOs with changes in locals' attitudes and behaviours. This study addresses this knowledge gap by exploring WVOs of MWT providers to achieve greater understanding of the factors that influence their conservation attitudes and behaviours. The topic is significant since generating pro-conservation behaviours is fundamental to designing successful conservation initiatives. Although previous studies have linked conservation outcomes and WVOs, this is the first to be applied to MWT and the first in the Philippines. The next section provides a brief background to WVOs and introduces the specific study objectives.

5.1.1 Theoretical background

Value orientations are part of the cognitive hierarchy model (Vaske & Donnelly, 1999). This model suggests that lower order cognitions (e.g., values, value orientations) influence higher order cognitions, such as attitudes, behavioural intentions, and behaviours (Vaske, 2008). Values are abstract, few in number, difficult to change, and central to the cognitive structure (Fulton, Manfredo, & Lipscomb, 1996). They are also widely shared by people in a given culture; they are therefore not expected to explain much variation in people's attitudes or behaviours (Fulton et al.,

1996). Value orientations, on the other hand, "are defined by the pattern of direction and intensity" (Fulton et al., 1996, p.28) of an individual's basic beliefs towards general objects such as wildlife (Vaske & Donnelly, 1999). Attitudes are a mental state reflecting a positive or negative evaluation of an object such as wildlife. Behavioural intentions are "indications of how hard people are willing to try […] in order to perform [a] behaviour" (Ajzen, 1991, p.181).

The concept of values is central to the study of human dimensions of wildlife management. Kellert (1976, 1980) developed ten typologies of basic attitudes towards wildlife that could be considered value orientations (e.g., naturalistic, moralistic, utilitarian), although he did not use that term. Fulton et al. (1996) coined the term *wildlife value orientation* and developed a measurement scale, which has since been widely used in the terrestrial environment. Studies have found that WVO predicted attitudes and behaviours towards wildlife (Ceurvorst & Needham, 2012; Hermann, Voß, & Menzel, 2013; Jacobs et al., 2014; Miller et al., 2018; Rickenbach et al., 2017; Serenari, Peterson, Gale, & Fahlke, 2015; Teel et al., 2010). However, WVO has only recently been applied to the marine environment (Ceurvorst & Needham, 2012; Christensen, Rowe, & Needham, 2007; Needham, 2010). Furthermore, the latter studies focused on tourists' perceptions of marine resources. No study has assessed WVO of local people working in MWT.

Previous research has found that WVO fall along a continuum ranging from an anthropocentric or use orientation to a biocentric or protectionist orientation (Ceurvorst & Needham, 2012; Needham, 2010; Vaske & Donnelly, 1999). A use value orientation focuses on the instrumental value of wildlife and nature; that is, that nature's main value is in providing for humans (Vaske & Donnelly, 1999), regardless of whether that use is for subsistence, aesthetic, or commercial purposes (Ceurvorst & Needham, 2012). A protectionist value orientation recognizes the inherent value of nature and believes "these inherent values [should] be equally respected and

preserved, even if they conflict with human centered values" (Vaske & Donnelly, 1999, p.526). These WVO are not mutually exclusive, rather they reflect a continuum with use orientations at one end, protectionist views at the other and the mid-point reflecting a mix of the two value orientations (Ceurvorst & Needham, 2012; Shindler, List, & Steel, 1993).

WVOs have been mainly assessed in the United States (Teel, Manfredo, & Stinchfield, 2007). Recently, there has been an attempt to measure WVO in different cultures to determine if the same typologies are observed (Morais, Birendra, Mao, & Mosimane, 2015; Rickenbach et al., 2017; Tanakanjana & Saranet, 2007; Zainal Abidin & Jacobs, 2016). These studies found both use and protectionist value orientations suggesting that the scale used is valid across cultures. However, only a few of these studies linked the WVO of locals with their attitudes and behavioural intentions towards wildlife; most were general assessments of WVO for individual countries. Furthermore, no study, to date, has been done in the Philippines, an island nation with vast marine resources.

A shift in WVO from use to protectionist values has been observed in the United States over the last fifty years (Manfredo, Teel, & Bright, 2003). As societal well-being improves people become less reliant on wildlife to meet their daily needs and their values towards wildlife shift towards a protectionist view (Teel et al., 2007). However, no study, to date, has assessed if working in wildlife tourism has resulted in a shift in WVO over time. Since value orientations are lower order cognitions, they are expected to be more stable over time (Vaske, 2008). Manfredo et al. (2017) note that shifts in values (the lowest cognitive building block) are expected to occur on the order of decades; value orientations, which are an order or two of cognition higher than values, may therefore occur over a period of several years. Furthermore, since improved economic status has been linked to a potential shift towards a protectionist WVO, and working in MWT improves

economic status, one would expect that those working in MWT for a longer period of time and making a sufficient income would be most likely to exhibit a shift in their value orientations towards marine wildlife.

5.1.2 Site descriptions

Although no baseline pre-tourism WVO data were available for the sites used, the study sites were selected to reflect varying lengths of tourism operations (i.e., pre-tourism, 5 years, 10 years, 18 years; **Fig. 5.1**). Comparing sites which have been in operation across time scales allows exploration of the effect of time on WVO at four MWT sites in the Philippines.

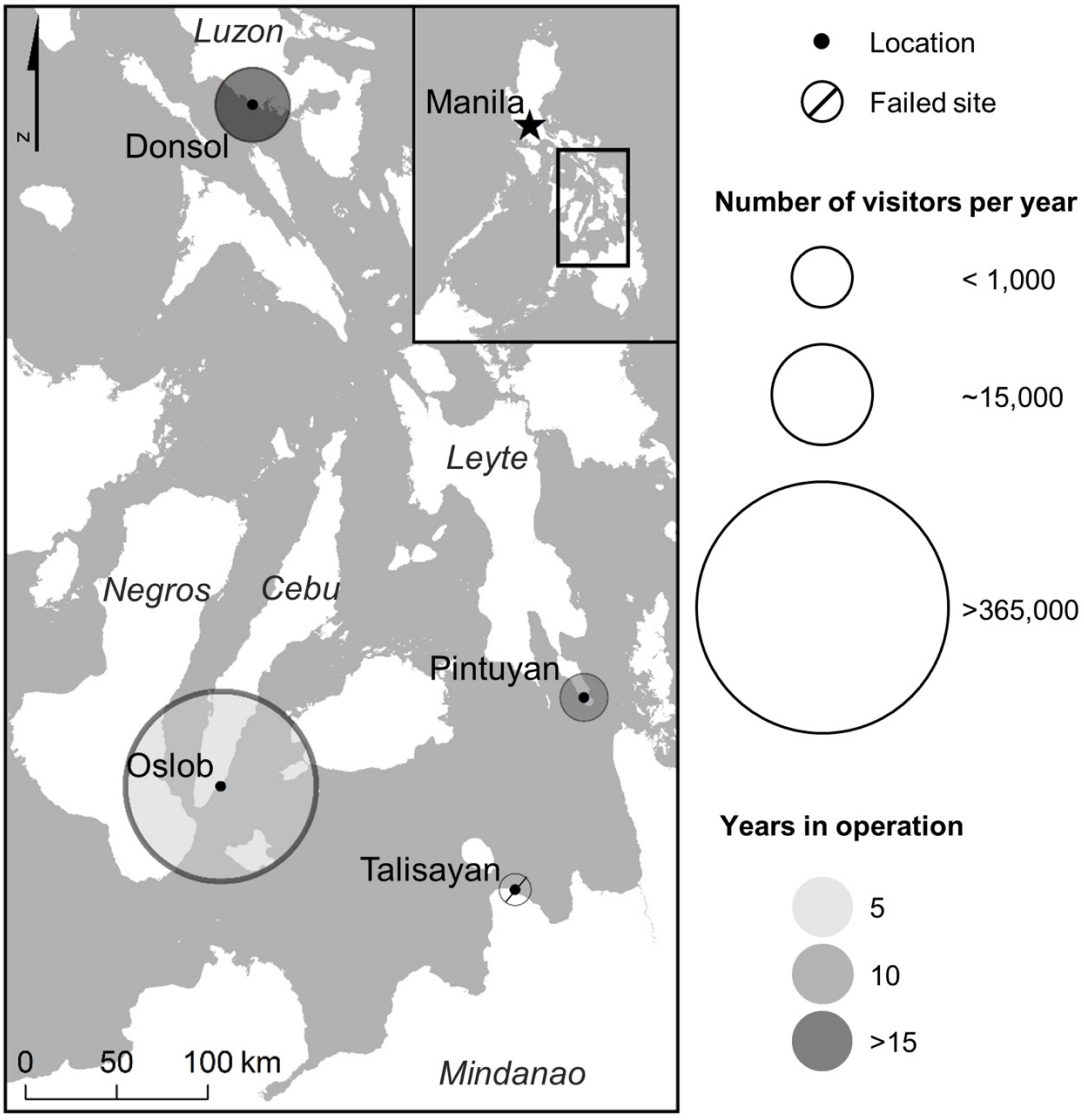

Figure 5.1 Map of the study sites in the Philippines.

Talisayan was one of the main whale shark hunting villages in the Philippines prior to the 1998 ban (Alava et al., 2002). The hunters were promised 300PHP (US$7) daily wages working in whale shark tourism in exchange for no longer hunting, but despite their brief inclusion as shark spotters in 1998, this transition of livelihoods never occurred. For the purposes of our study, Talisayan was a proxy for a pre-tourism site and was expected to reflect the WVO of fishermen

prior to the start of tourism activities (i.e., WVO expected to find in a typical fishing village in Philippines not exposed to tourism).

Donsol is the oldest whale shark tourism site in the Philippines. Established in 1998, Donsol reflects a well-established tourism site, with many of the guides working in tourism for the last two decades and heavily reliant on tourism for their main income source. Respondents at this site were expected to have greater protectionist value orientations towards marine wildlife than the other sites because they have been working in MWT for nearly two decades, which is potentially a sufficient amount of time to allow for a shift in WVOs.

Pintuyan is the smallest of the active tourism sites studied. Established in 2006, tourism at this site has grown slowly and does not represent a significant income source for the fishermen who work as guides or spotters. Fishermen are still heavily reliant on the ocean for subsistence. A shift in WVO is not posited to be observed at this site since tourism has only been present for ten years at the time of interviews and tourism does not reflect a significant income source.

Oslob is the newest site included in this study and has been open since 2011. It is the largest non-captive whale shark tourism site in the world, attracting over 365,000 tourists in 2017 (Dearden & Ziegler, 2019). Tourism is the main income source for many of the locals although some still fish for subsistence. Tour operators were not expected to have changed their WVO due to the relatively recent presence of tourism at the site. This mass tourism business model is posited to prevent a shift in WVO in the future.

This study design has several key assumptions. First, it assumes the sites had similar WVO prior to tourism activities and that any changes observed among the sites are due to length of operations. These differences may, in fact, be due to other factors, such as difference in the type of tourism present (e.g., mass, small-scale) or inherent differences in the sites themselves. Since

there are no control sites for each study site, any observed differences may also be due to inherent differences between the sites themselves. However, all villages used in the study were small, rural fishing villages prior to tourism activities and the people interviewed all work closely with the marine environment, whether in MWT or as fishermen, or both. It is therefore safe to assume that prior to tourism activities they had similar views of the ocean and marine wildlife.

5.1.3 Research objectives

This study was designed in order to assess whether participation in MWT affected value orientations towards marine wildlife. The research objectives were as follows:

1) To measure WVOs of marine tourism workers using adapted standard international techniques

2) To group locals working in MWT based on their WVOs

3) To explore the relationship between WVOs and social conservation outcomes (e.g., attitudes, behavioural intentions, and behaviours)

4) To determine how respondent demographics affect their WVO

5) To determine whether respondents' WVOs differ based on the length of operations at a given tourism site

5.2 Methods

5.2.1 Sampling

Sampling varied at each site. In Pintuyan, we interviewed all members of the local people's organization of whale shark spotters and guides (n=40) due to its small size. In Oslob and Donsol, tour operators interviewed were randomly selected from those working at the tourism site each day. In Oslob (n=25), the final sample size was limited by the president of the Tan-awan Oslob Sea Wardens and Fishermen Association who had to give permission for workers to participate in

the interviews. In Donsol (n=24), the final sample size was limited by the early departure of the whale sharks that season. In Talisayan (n=25), we interviewed all ex-whale shark hunters in the village who were able to participate (n=17), as well as eight randomly selected current fishers. We reached data saturation at each of the sites (i.e., no new themes, no new coding, no new data) suggesting that the samples reflected perspectives at each of the sites adequately, as well as of a sufficient number to perform statistical analyses.

5.2.2 Interviews

We conducted interviews with whale shark operators at the three active tourism sites from April through June 2016 and with ex-whale shark hunters and fishers at the pre-tourism site from May to June 2017. At each site, the first author and a local translator conducted the interviews in the local dialect and translated answers into English during the interviews. Due to travel restrictions to the island of Mindanao, JL conducted the interviews in Talisayan and translated the transcripts into English.

We used structured interviews, using a combination of open- and closed-ended questions, to collect information at the four sites. Questions included basic demographic information and WVO belief statements. Respondents were also asked a series of additional questions: whether they liked whale sharks, whether they believed whale sharks were an important animal in the Philippines, whether they believed whale sharks should be protected from being killed, if they believed the Philippines would change if whale sharks were to go extinct, if they had changed their behaviour to protect whale sharks or ocean since tourism started or the hunting ban was implemented, and whether they changed their perceptions of whale sharks since tourism started or the ban was implemented. They were also asked to rate their desire to protect whale sharks and the ocean (i.e., behavioural intention) on a four-point Likert scale from 1 “none” to 4 “a lot”.

Respondents were also asked an open-ended question regarding the perceived benefits of whale shark tourism for the local economy, community, environment, and family.

Interview data were entered into SPSS for quantitative analysis and open-ended questions were input and coded in NViVO for qualitative analysis.

5.2.3 Analysis

We measured WVOs using four statements designed to measure conservation beliefs and four statements designed to measure use beliefs. Respondents indicated their level of agreement to four conservation statements using a five-point Likert scale of 1 "strongly disagree" to 5 "strongly agree": (1) "marine wildlife should be protected for its own sake rather than to simply meet the needs of humans", (2) "marine wildlife should have similar rights to the rights of humans", (3) "recreational use of marine wildlife should not be allowed if it negatively affects these animals", and (4) "marine wildlife has value whether humans are present or not". The four use statements were: (1) "humans should manage marine wildlife so that humans benefit", (2) "the needs of humans are more important than the needs of marine wildlife", (3) "recreational use of marine wildlife is more important than protecting marine wildlife", and (4) "the primary value of marine wildlife is to provide for humans". With the exception of context (marine wildlife), these eight statements are identical to those used elsewhere in WVO studies (Bell, 2010; Fulton et al., 1996; Manfredo et al., 2003; Needham, 2010; Teel & Manfredo, 2010; Vaske & Donnelly, 1999). The use statements were recoded such that a score of 1 "strongly disagree" was changed to 5 "strongly agree", a score of 4 "disagree" was changed to "agree", and so on, in order to calculate a composite WVO score (score range from 6 to 30) where a higher score reflects a more protectionist view and a lower score reflects a more utilitarian view.

We performed an exploratory factor analysis (EFA) using principal axis factors extraction and varimax rotation to investigate the dimensionality of the data and tested for the groupings of WVO statements (Costello & Osborne, 2005). Measurement reliability of the belief statements was assessed using Cronbach's alpha reliability coefficient. Hair, Anderson, Tatham, & Black (1998) suggest that for small sample sizes a cut-off value of 0.6 is appropriate. Given our sample size of n=114, we used this cut-off value. If the Cronbach's alpha coefficient is greater than or equal to the cut-off value, this indicates that the variables are measuring the same concept reliably and justifies combining them in further analyses (Needham, 2010; Vaske, 2008). We then performed a k-means cluster analysis of respondents based on their WVO. We compared WVO groups based on social conservation outcomes (perceptions of whale sharks, behavioural changes) to identify differences amongst the clusters. Regression analysis was used to examine the influence of demographic factors on WVO (education, age, years fishing). WVO scores and cluster membership were compared amongst the four study sites to explore the relationship between length of tourism operations and changes in WVO.

5.3 Results

In general, respondents agreed with the protectionist statements and disagreed with the utilitarian statements (**Fig. 5.2).** For example, respondents agreed most strongly with the belief statement "marine wildlife has value whether humans are present or not" (90.3%) and agreed least strongly with the belief statement "recreational use of marine wildlife is more important than protecting marine wildlife" (28.1%). However, two utilitarian statements did not follow this trend. The vast majority of respondents strongly agreed that "humans should manage marine wildlife so humans benefit" (89.5%) and that "the primary value of marine wildlife is to provide for humans" (85.9%). EFA confirmed that these two use statements should be removed from the analysis as they loaded

with the protectionist statements. EFA identified two factors, with the four protectionist statements loading onto one factor and the two use statements loading onto the other factor, confirming the groupings of statements into two WVO (**Table 5.1**). Furthermore, alpha reliability analysis using all eight belief statements supported the removal of the use statements from the analysis; these items had negative item total correlations that did not meet the 0.40 cut-off value (Vaske, 2008). The remaining six statements were greater than or equal to 0.40, except for one protectionist statement (0.39), however removing this value did not significantly improve the alpha coefficient and it was therefore kept in the analysis (**Table 5.2**). The alpha reliability coefficients were 0.62 for the utilitarian orientation, 0.73 for the protectionist orientation, and 0.68 for the overall marine WVO score. These values are greater than 0.60 suggesting that the variables measured their respective value orientations reliably (Hair et al., 1998).

Table 5.1 Summary of exploratory factor analysis results for value orientation using principal axis factors extraction (n=114)

	Factor loadings	
Item	1	2
Marine wildlife has value whether humans are present or not	0.68	
Marine wildlife should have rights similar to the rights of humans	0.72	
Marine wildlife should be protected for its own sake rather than to simply meet the needs of humans	0.68	
Recreational use of marine wildlife should not be allowed if it negatively affects these animals	0.46	
Humans should manage marine wildlife so that humans benefit[a]	(-0.76)	
The primary value of marine wildlife is to provide for humans[a]	(-0.57)	
The needs of humans are more important than the needs of marine wildlife		0.82
Recreational use of marine wildlife is more important than protecting the species		0.54
Eigenvalues	2.39	1.34
% of variance	39.84	22.38

Note: Kaiser-Meyer-Olkin Measure of sampling adequacy = 0.695; Bartlett's Test of Sphericity $p<0.001$

[a]These two utilitarian statements were removed from further analysis because they loaded with protectionist statements and had negative loading factors. Statistics in this table reflect results without these variables in the analysis.

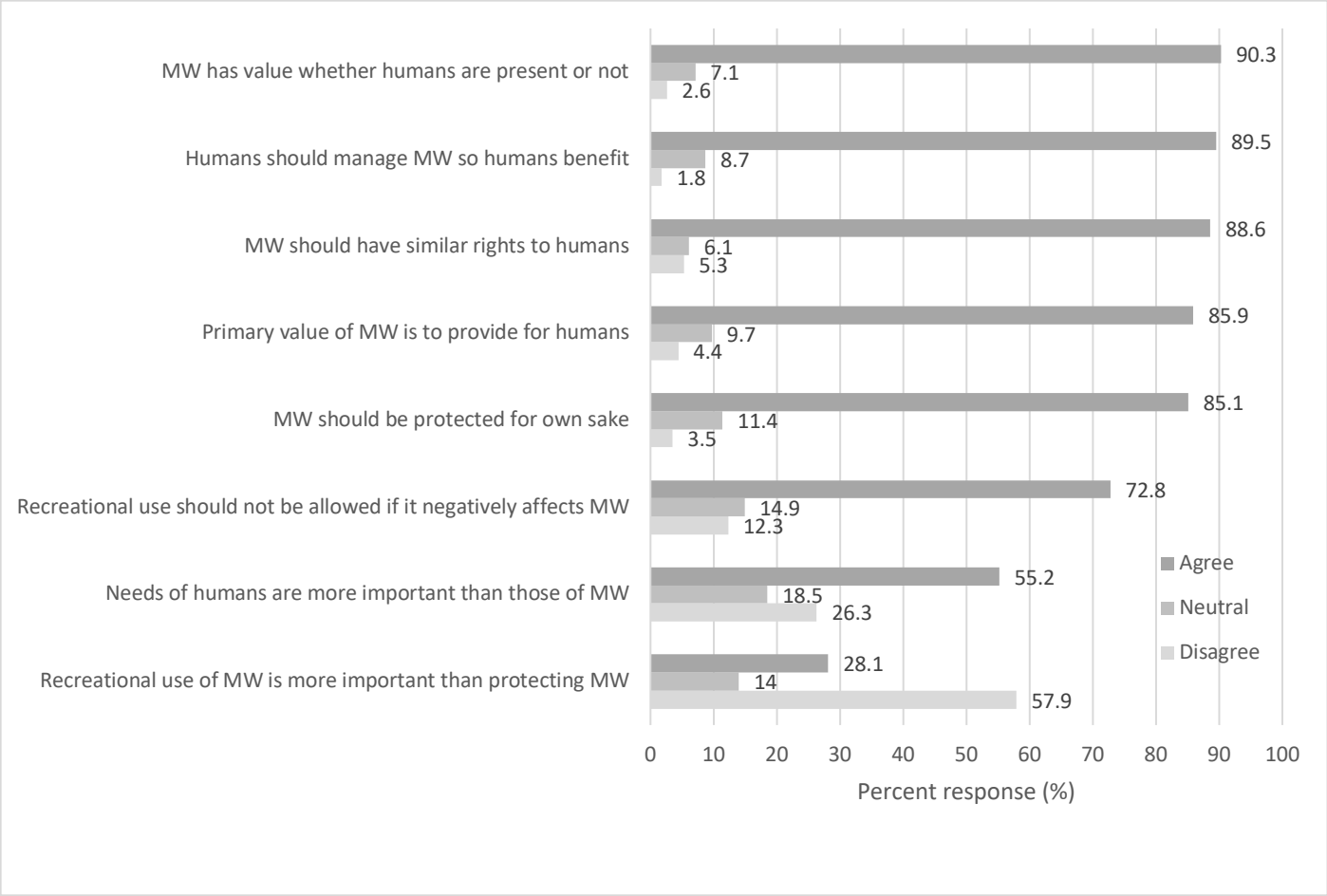

Figure 5.2 Percent response of locals working in whale shark tourism to eight marine wildlife value orientation statements (n=114).

Note: MW = marine wildlife; Agree (score of 4 or 5), Neutral (score of 3), Disagree (score of 1 or 2)

Table 5.2 Reliability analysis of protectionist and use value orientations towards marine wildlife

Orientations and variables	Mean[a]	SD	Item total correlation	Cronbach's alpha if deleted	Cronbach's alpha
Use orientation[b]					0.62
The needs of humans are more important than the needs of marine wildlife	3.4	1.31	0.45	-	
Recreational use of marine wildlife is more important than protecting the species	2.5	1.46	0.45	-	
Protectionist orientation					0.73
Marine wildlife has value whether humans are present or not	4.6	0.74	0.58	0.63	
Marine wildlife should have rights similar to the rights of humans	4.4	0.89	0.56	0.63	
Marine wildlife should be protected for its own sake rather than to simply meet the needs of humans	4.4	0.92	0.55	0.63	
Recreational use of marine wildlife should not be allowed if it negatively affects these animals	4.0	1.07	0.39	0.74	
Overall Cronbach's alpha					0.68

Note: SD = standard deviation

[a]Variables were measured on a five-point scale of 1 "strongly disagree" to 5 "strongly agree"; the two use statements were recoded such that a score of 1 "strongly disagree" was changed to 5 "strongly agree", a score of 2 "disagree" was changed to 4 "agree", etc.

[b]The variables "the primary value of marine wildlife is to provide for humans" and "humans should manage marine wildlife so that humans benefit" were removed from the analysis due to poor reliability. Statistics in this table reflect results without these variables in the analysis

A WVO composite score was calculated by combining an individual's score for each of the six statements. The two utilitarian statements were first recoded to create a utilitarian-protectionist continuum such that the six statements could be combined into a single WVO score with a possible range from a minimum score of 6 to a maximum score of 30 (M=23.5, SE=0.37, SD=3.91, range: 13-30).

5.3.1 Cluster analysis

K-means cluster analysis was then performed on group respondents based on their marine WVO. Two- through six-group cluster analyses showed that a two-group solution provided the best fit for the data. Two clusters were identified: (1) mixed utilitarian-protectionist WVO (n=30) and (2) protectionist WVO (n=84; **Table 5.3)**. Respondents with a mixed utilitarian-protectionist WVO had significant lower mean utilitarian, protectionist, and overall WVO scores than the protectionist cluster. The cluster analysis did not identify a group who had only utilitarian value orientations towards marine wildlife.

Table 5.3 Comparison of marine wildlife value orientation (WVO) scores by WVO cluster

	Cluster 1	Cluster 2			
	Mixed utilitarian-protectionist	Protectionist	t	p	Effect size
Mean utilitarian score[a] (SE)	2.1 (0.17)	3.4 (0.12)	-5.825	<0.001*	0.48
Mean protectionist score[a] (SE)	3.6 (0.13)	4.7 (0.04)	-8.220	<0.001*	0.81
Mean overall WVO score[b] (SE)	18.4 (0.43)	25.3 (0.27)	-13.330	<0.001*	0.78
n	30	84			

[a]calculated as the mean of the two utilitarian statements (mean utilitarian score) or four protectionist statements (mean protectionist score)

[b]calculated as the mean of the total score of the six belief statements (possible range of 6 to 30)

5.3.2 Social conservation outcomes

When comparing social conservation outcomes by cluster, the mixed utilitarian-protectionist group were significantly less likely to report changing their views towards whale sharks, liking whale sharks, believing whale sharks are an important animal to the Philippines that should be protected, believing the Philippines would change if whale sharks went extinct, were significantly less likely to want to protect either the ocean or whale sharks, perceived fewer benefits from whale shark tourism, and were less likely to have changed their behaviour to protect whale sharks or the ocean since tourism or the whale shark fishery ban was implemented compared to the protectionist group (**Table 5.4**). The effect sizes ranged from 0.17 to 0.59 suggesting that the strength of these

differences is minimal to substantial (Vaske, 2008). These findings further support the cluster analysis groupings.

Table 5.4 Bivariate differences in social conservation outcomes among wildlife value orientation clusters

Social conservation outcomes	Clusters		test statistic	p	effect size[a]
	Mixed utilitarian-protectionist (n=30)	Protectionist (n=84)			
% respondents who changed their view of whale sharks	63.3	86.9	χ^2 = 7.886	0.003*	0.26
Mean total perceived benefits from whale shark tourism (SE)	1.7 (0.18)	3.2 (0.17)	t = -6.105	<0.001*	0.56
% respondents who like whale sharks	83.3	98.8	χ^2 = 10.618	<0.001*	0.31
% respondents who believe whale sharks are an important animal in the Philippines	63.3	96.4	χ^2 = 22.475	<0.001*	0.44
% respondents who believe whale sharks should be protected from being killed	43.3	95.2	χ^2 = 39.629	<0.001*	0.59
% respondents who believe the Philippines will change if whale sharks go extinct	33.3	71.4	χ^2 = 13.536	<0.001*	0.35
Mean score for desire to protect whale sharks (SE)	3.2 (0.21)	3.9 (0.03)	t = -3.613	<0.001*	0.56
Mean score for desire to protect ocean (SE)	3.5 (0.15)	3.9 (0.04)	t = -2.638	0.007*	0.42
% respondents who changed their behaviour to protect whale sharks	53.3	73.8	χ^2 = 4.289	0.019*	0.19

% respondents who changed their behaviour to protect the ocean	66.7	82.1	χ^2 = 3.092	0.040*	0.17

Note: * Significant at α=0.05, SE=standard error of mean

[a]Effect sizes reported are Cramer's V for chi square test and point biserial correlation for t-test

5.3.3 Demographics

Multiple regression analysis was used to assess the importance of demographic characteristics (age, years fishing, education) on WVO score. The analysis identified education as a key determinant of a respondents' WVO score (R^2=0.148, F(3,109) = 6.330, p=0.001**)**, such that respondents with more years of education were expected to have a higher WVO score, after controlling for the other variables in the model (age, years fishing). Age and years fishing did not contribute to the multiple regression model.

5.3.4 Value orientation varied by study site

WVO scores and cluster membership varied significantly by site (**Table 5.5**). When mean WVO scores were compared amongst the four study sites, the pre-tourism site had the lowest mean WVO score (M=18.8) reflecting a mixed utilitarian-protectionist WVO, the most established tourism site (Donsol) had the highest mean WVO score (M=26.8) reflecting a protectionist WVO, and the newest (Oslob: M=23.6) and intermediate (Pintuyan: 24.4) tourism sites had moderate scores reflecting a moderate protectionist WVO. The Eta effect size of 0.697 suggests that the strength of these differences is substantial (Vaske, 2008).

Table 5.5 Wildlife value orientation analysis at the four study sites

	Sites								
	Newest, mass	Oldest, mid-tier	Intermediate, small-scale	Pre-tourism, failed					
	1. Oslob	2. Donsol	3. Pintuyan	4. Talisayan	test statistic	p	effect size[a]	post-hoc test p values[b]	
Mean wildlife value orientation score (SE)	23.6 (0.61)	26.8 (0.61)	24.4 (0.37)	18.8 (0.64)	F = 34.634	<0.001*	0.697	1 vs. 2	0.003*
								1 vs. 3	0.777
								1 vs. 4	<0.001*
								2 vs. 3	0.020*
								2 vs. 4	<0.001*
								3 vs. 4	<0.001*
Cluster analysis (% response)									
Mixed utilitarian-protectionist (N)	24.0 (6)	4.2 (1)	7.5 (3)	80.0 (20)	χ^2 = 50.602	<0.001*	0.666	1 vs. 2	0.024*
								1 vs. 3	0.030*
								1 vs. 4	<0.001*
Protectionist (N)	76.0 (19)	95.8 (23)	92.5 (37)	20.0 (5)				2 vs. 3	0.594
								2 vs. 4	<0.001*

	3 vs. 4	<0.001*

Note: * Significant at α=0.05, SE=standard error of mean

[a]Effect sizes reported are Cramer's V for Chi square test and Eta for analysis of variance (ANOVA)

[b]Post-hoc tests were calculated for ANOVA results using Scheffe because equal variance assumed (i.e., Levene's statistic p >0.05) and using 2 x 2 chi square comparisons of sites for cluster analysis results

Cluster membership varied significantly by site. Respondents from the most established (Donsol: 95.8%) and intermediate (Pintuyan: 92.5%) sites were significantly more likely to be in the protectionist cluster, followed by 76.0% of respondents from the newest site (Oslob) and 20.0% from the pre-tourism site (Talisayan). The Cramer's V effect size of 0.666 suggests that the strength of this difference is substantial (Vaske, 2008).

5.4 Discussion

5.4.1 Differences in value orientation by site

The results of this study are the first to suggest that local participation in MWT can shift marine WVO towards a more protectionist orientation. However, since we did not have control villages and the sites varied significantly in terms of scale of operations (failed, small-scale, mid-tier, mass) and geographical location within the Philippines (Cebu, Southern Leyte, Misamis Oriental, Sorsogon; **Fig. 5.1**), it is possible that the observed differences are due to other variables not related to the length of operations (e.g., socio-economics, cultural differences, etc.). Future work is needed to continue tracking marine WVO over time, as well as to expand the study to include control sites in order to confirm this relationship.

5.4.2 Findings support cognitive hierarchy

Our results support cognitive hierarchy theory. Respondents who scored higher on the WVO scale were significantly more likely to report positive attitudes towards whale sharks and positive behavioural intentions to protect whale sharks and the ocean. A comparison of social conservation outcomes by cluster also supported these conclusions – the protectionist cluster scored higher on all conservation outcome measures than the mixed

utilitarian-protectionist cluster. Previous studies have found a similar link between WVO and attitudes and behavioural intentions towards wildlife (Ceurvorst & Needham, 2012; Fulton et al., 1996; Hermann et al., 2013; Jacobs et al., 2014; Morais et al., 2015; Serenari et al., 2015; Teel et al., 2010; Vaske & Donnelly, 1999). However, this is the first study to assess locals' marine WVO and link it to their attitudes and behavioural intentions towards marine wildlife and the ocean. Communities can be the best advocates for conservation (Dearden, Chettamart, Emphandu, & Tanakanjana, 1996) and our findings suggest that MWT can act as a change agent for communities to empower them to protect their marine resources. However, the type of tourism present may play a role in the scope and scale of these conservation outcomes and should be further studied.

5.4.3 Demographics

Education was the key demographic factor predicting locals' WVO at the four tourism sites in the Philippines, while age and fishing were not significant. Those respondents with a higher education level were more likely to have protectionist WVO. Previous research has also found that education plays a key role in determining WVO (Jafarpour & Manohar, 2014; Rickenbach et al., 2017; Zinn, Manfredo, & Barro, 2002).

Previous research has also found that age, gender, and reliance on wildlife also influenced WVO (Dougherty, Fulton, & Anderson, 2003; Jafarpour & Manohar, 2014; Morais et al., 2015; Rickenbach et al., 2017; Vaske, Jacobs, & Sijtsma, 2011; Zinn et al., 2002). There is disagreement in the literature regarding the influence of reliance on wildlife on WVO. One thesis, termed "environmentalism of the poor" (Martínez-Alier, 1997) posits that those who are most reliant on natural resources will have a more protectionist WVO since it is in their best interest to protect and sustainably use the wildlife upon which their

livelihood depends. An opposing thesis posits that people who are less reliant on wildlife for fulfilling their basic needs will have a stronger protectionist WVO (Inglehart, 1990, 1997). For example, Rickenbach et al. (2017) found that hunters in Northern Congo who were reliant on wildlife for their livelihoods and food had stronger use value orientations.

In our case, respondents at the four sites were all men, the vast majority of whom fished. We therefore could not investigate the effect of gender or reliance on marine wildlife as predictors of WVO. It would be interesting to expand our research to a representative household survey of the communities involved in whale shark tourism along with control villages to determine if age, gender, reliance on wildlife, and education influence WVO at the community level. It would also help elucidate whether indirect benefits of tourism activities result in positive social conservation outcomes (e.g., positive attitudes and behavioural intentions towards whale sharks and the ocean) for households not directly benefitting from tourism activities.

5.4.4 Marine wildlife value orientations in the Philippines

This study is the first to assess marine WVO of locals working in MWT and the first to do so in the Philippines. Cluster analysis identified two groups, a mixed utilitarian-protectionist group and a protectionist group, supporting the existence of a WVO continuum, as found in other settings and countries (Bright, Manfredo, & Fulton, 2000; Dougherty et al., 2003; Fulton et al., 1996; Needham, 2010; Shindler et al., 1993; Vaske & Donnelly, 1999), and the application of this scale in non-Western countries. However, two of the utilitarian statements had to be removed from the analysis because they received strong support from the vast majority of respondents. This suggests that the WVO scale developed and tested mainly in the United States may not accurately reflect the full

spectrum of values towards marine wildlife in the Philippines. Respondents at the four sites in this study were heavily reliant on the marine environment for their livelihoods (fishing and tourism) and as an important source of food. Similarly, Zainal Abidin & Jacobs (2016) found that the WVO scale may need to be changed so it is more applicable for non-western countries, specifically Malaysia. Future research should consider using a qualitative approach to identify all possible value statements regarding wildlife to further elucidate the different types of WVO present in the Philippines (e.g., spiritual/religious, concern for safety, attraction/interest, existence) (Dayer, Stinchfield, & Manfredo, 2007). Our interviews revealed many of the wildlife values outlined by Dayer et al. (2007), some of which were not accounted for in the WVO scale used in the current study. For example, interviews revealed a spiritual link to marine wildlife (e.g., "Maria Cacao is a non-human being, a spirit, who lives in the mountains of Oslob linked to black magic; it is believed that she brought the whale sharks to Tan-awan (Oslob) and if we don't handle the income earned from whale sharks properly, she will transfer the whale sharks to Siquijor"), concern for safety ("my fear is gone because now I know that whale sharks are a harmless creature while the great whites are the bad ones"), attraction/interest ("I am really amazed that whale sharks are very gentle"), existence value ("sharks are part of the ecosystem so the food chain maybe would change [if they go extinct]"), and source of conflict (e.g., "the whale shark, the whales, and the other fish out there are the ones who eat all the small fish and fish eggs, that's why the fishes now don't increase"). These findings suggest that a qualitative assessment of marine WVO should focus on understanding locals' perceptions of different marine wildlife (e.g., sharks, dolphins, whales, sea turtles, commercial fish species, etc.). The research should also be expanded to a household-level approach in order

to get a better understanding of locals' relationships with marine wildlife beyond those who work directly in whale shark tourism.

5.4.5 Conclusion

Our study suggests that working in MWT may result in shifts in marine WVO towards more protectionist views over time. These findings suggest that MWT can act as a change agent for communities to empower them to protect their marine resources. However, the type of tourism present may play a role in the scope and scale of these conservation outcomes. Policy planners and protected area managers should utilize value orientation data in order to direct community development programming and encourage local buy-in for the conservation of targeted marine resources. Future research should include the use of control villages and expand the research to a household-level survey in order to better understand how the presence of MWT affects locals' WVO.

Chapter 6 Barriers to conservation: Factors influencing community support for tourism development in an ex-whale shark hunting village in the Philippines

Abstract

The success of a given incentive-based conservation project in meeting its conservation goals is highly dependent on the local context. Understanding the local context and identifying potential barriers to conservation is therefore essential when planning an incentive-based conservation approach. This paper uses a case study approach to identify potential barriers to success of a planned whale shark tourism development in one of the largest ex-whale shark hunting villages in the Philippines. We interviewed 25 ex-hunters and fishers in Guiwanon regarding their perceptions of the whale shark hunting ban, the whale sharks, and whale shark tourism. Key barriers to conservation at this site include human-wildlife conflict and negative perceptions of tourism and government agencies. Despite these issues, most respondents were willing to work in whale shark tourism if given the opportunity. However, it is critical that ex-hunters and other community members be included in the planning, implementation and management of any tourism activities developed in Guiwanon. Future initiatives should also include community education and outreach to ensure conservation outcomes are met. This study provides important lessons learned for the conservation community with respect to community-based development and conservation planning, specifically the long-term impacts of poorly planned incentive-based conservation initiatives and policy decisions.

Keywords

whale shark hunting, marine wildlife tourism, human-wildlife conflict, governance, incentive-based conservation, unequal distribution of benefits, conservation attitudes

6.1 Introduction

Incentive-based conservation (IBC) strives to integrate environmental protection with poverty reduction and community participation based on the assumption that economic benefits derived directly from natural resources will lead to the conservation and sustainable use of those resources (Eshoo et al., 2018). Community participation in conservation projects and the receipt of economic and social benefits from these projects is believed to lead to improved conservation perceptions (e.g., awareness and attitudes), which may, in turn, lead to pro-conservation behaviours (Chaigneau & Daw, 2015; Pegas et al., 2013; Spiteri & Nepal, 2006). The reduction in negative behaviours (e.g., poaching) and increase in positive behaviours (e.g., participation in conservation projects) can lead to positive ecological conservation outcomes (e.g., increased species abundance and/or range; Pegas et al., 2013).

The success of a given IBC project in meeting its social and ecological conservation goals is highly dependent on the local context. Important factors that can affect local support towards conservation and pro-conservation behaviours include socio-demographics (e.g., education, economic status, gender, age), human-wildlife conflict (HWC), local participation in IBC programs, the strength of local institutions, dependency on resource**,** inequitable distribution of benefits, relationships with government agencies and NGOs, and length of the IBC project (Brooks et al., 2013; Chaigneau & Daw, 2015;

Spiteri & Nepal, 2006). Studies demonstrate that without community support and buy-in, ecological conservation outcomes are difficult to achieve in the developing world (Bennett & Dearden, 2014; Vermeulen & Sheil, 2007). Understanding the local context is therefore critical.

Guiwanon, Talisayan, Misamis Oriental, Philippines (**Fig. 6.1**) was one of the primary whale shark hunting villages in the Philippines prior to the whale shark hunting ban passed in 1998 (Alava et al., 2002). Prior to the ban, various organizations and researchers attempted to transition the whale shark hunters of Guiwanon to whale shark tourism (WST). However, within a five-month period the national ban on whale shark hunting had been passed and plans for tourism had fallen through. The current mayor of Talisayan has expressed renewed interest in developing WST in his municipality and the ex-whale shark hunters would be given first priority for employment in this tourism venture (Araujo & Labaja, 2017). Understanding the locals' perceptions of tourism and their desire to support and/or work in the proposed tourism activity is critical for its success (Brooks et al., 2013; Spiteri & Nepal, 2006). The current research was undertaken to address this gap in knowledge and identify any barriers to the successful implementation of WST at the site. In the next section, we provide an overview of the historical importance of the hunt, the attempt to transition to tourism, and how the ban came to be in order to provide context to the results of the interviews with the whale shark hunters and fishermen from Guiwanon.

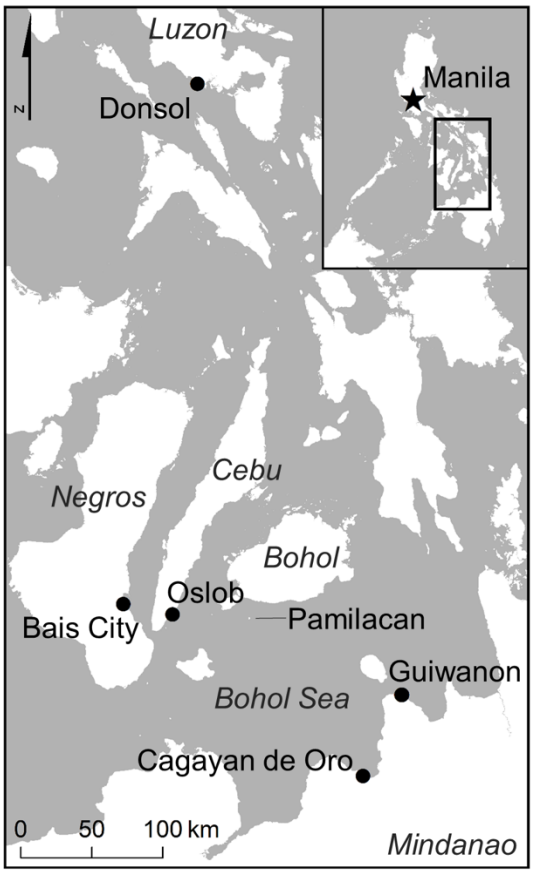

Figure 6.1 Map of the study area in the Philippines

6.1.1 Case study

6.1.1.1 The whale shark fishery in Guiwanon

Whale shark hunting in Guiwanon was a traditional practice dating back to at least the 1950s. Prior to the 1990s, the fishery was small-scale, and its products were mainly for local consumption or used for bartering for other food products (Alava et al. 2002). The fishery changed significantly in the 1990s with the arrival of foreign buyers based in Manila who exported the meat to Hong Kong, Singapore, and Taiwan (Acebes, 2013; Alava et al., 2002). The increased demand for whale shark products resulted in significant increases in price and effort. A preliminary fishery assessment completed in 1996 noted

that hunters in Guiwanon could sell a whale shark for approximately US$349 to US$465 ($559.80 to $744.19 in 2019 USD adjusting for inflation) which translated to a net income per hunter of US$19.45 to US$38.78 ($31.13 to $62.06 in 2019 USD adjusting for inflation) (WWF, 1996). This income was up to 8 times more than the daily minimum wage in Northern Mindanao in 1996 (approximately US$5.06 per day in 1996; National Wages and Productivity Commission, 2018). Fishermen, however, are among the lowest paid in the Philippines (e.g., US$3.03 mean daily wage in 1996 for Northern Mindanao; National Wages and Productivity Commission, 2018; World Bank, 2018), suggesting that the income from the whale shark fishery could represent a significantly higher amount.

The increased fishing effort, in turn, resulted in a noted decline in whale shark landing numbers. There was an estimated 70% to 80% decline in whale shark catches over a very short period of time (Yaptinchay, 1998). From 1993 to 1997, Guiwanon hunters reported a reduction in landings from approximately 96 whale sharks per year to 38 sharks (Alava et al., 2002). There was a sharp decline in catch per unit effort, in this case the number of whale sharks caught per boat, over the study period, from 10 whale sharks per boat in 1993 to 3.8 in 1997 (Alava et al., 2002). The authors concluded that while the fishery was viable, the declining catch numbers suggested that the whale shark population could soon collapse (Alava et al., 2002).

6.1.1.2 Pre-ban attempt to transition Guiwanon to tourism

Prior to the ban, national and international NGOs, researchers, private businesses and government agencies were promoting the transition of the whale shark hunters in Guiwanon from killing whale sharks to alternative livelihoods, including WST. In Guiwanon, the Inter Agency Task Force on Marine Mammal Conservation (IATFMMC)

formed the Mindanao Marine Wildlife Watch (MMWW) group, whose members included the Bureau of Fisheries and Aquatic Resources, Department of Tourism (DOT), Silliman University, the WWF-Philippines, and the local dive resort (Gold Star Daily, 1997). The MMWW, in turn, formed the Whale Shark Spotters Association (WSSA) in an effort to convert whale shark hunters to whale shark spotters (Gold Star Daily, 1997). To be a member of the WSSA, one had to be an active whale shark hunter in Guiwanon during the 1996 season and be willing to renounce the hunting of whale sharks and support whale shark conservation efforts. The local dive resort and DOT were actively involved in recruiting whale shark hunters to join this group (Gold Star Daily, 1997): "According to [the] WSSA president, their group initially had only a few fishermen as members. With the patience and determination of conservationist [local dive resort owner], who initiated several *pulong-pulong* (group meetings) with the fishermen encouraging them to join the cause of the MMWW … particularly saving the whale sharks … the association reached … 40 members." Members of the WSSA were formally inducted October 24, 1997, during a pre-departure dinner for the fishermen who would be going to Negros Oriental to observe whale and dolphin watching in Bais City (Gold Star Daily, 1997). This site was selected because it was managed by ex-whalers and, therefore, could help to inform the WSSA members' plans for WST in Guiwanon.

At the same time, whale shark hunting in Guiwanon came to the attention of the international media in 1997 in part due to the presence of an American filmmaker who made a documentary on the whale shark hunters (Fairweather, 1999). She was also involved in trying to recruit hunters to the WSSA.

By 1998, the potential to transition whale shark hunters in Guiwanon to WST had been discussed for at least two years (Baños, 1996; WWF, 1996). Despite WWF's (1996) recommendation "that an evaluation of the potential for non-consumptive exploitation activities involving these species be immediately conducted … [as they] could open new opportunities for the hunters to generate income without killing these magnificent creatures", no ecotourism feasibility assessment was conducted. Although the whale shark hunters did work as guides/spotters for a team of international researchers who came to Guiwanon to tag whale sharks in February 1998 (S. Snow, personal communication), the team had a difficult time finding sharks to tag (A. Yaptinchay, personal communication); the focus quickly shifted to Donsol for developing WST due to the discovery of a large aggregation of whale sharks in Donsol waters, along with the realization that the geography of the area did not lend itself well to WST (A. Yaptinchay, personal communication). The whale shark hunters in Guiwanon went far afield in open water to find whale sharks (2 to 3 hours one direction), much farther than is practical for a tourism operation (**Fig. 6.1**), while in Donsol the sharks could be found close to shore.

6.1.1.3 How the whale shark hunting ban was passed

Local divers, who were linked to influential families related to the then Secretary of Agriculture (A. Yaptinchay, personal communication), found out about whale sharks in Donsol waters and informed WWF-Philippines (Pine, 2007). News of this large aggregation of sharks spread quickly; hunters backed by foreign buyers arrived in Donsol waters in March 1998 (Yaptinchay, 1998). Seven sharks were killed over a two-week period (Yaptinchay, 1998). These killings resulted in a week straight of national headlines decrying the slaughter of the sharks (**Fig. 2**; Pine, 2007) and galvanized the national and

international communities' interest in protecting this species (A. Yaptinchay, personal communication). The national attention created political pressure to end the killing of these sharks because 1998 was an election year (A. Yaptinchay, personal communication). In response to the national outcry over the slaughter of these sharks, as well as lobbying by national and international organizations, President Ramos passed Fisheries Administrative Order 193 on March 25, 1998 ending the killing and selling of whale sharks in the Philippines (Acebes, 2013). The local BFAR office organized a meeting with the hunters in Guiwanon to explain the ban shortly after the ban was passed (M. Balacuit, personal communication). No further support was provided by the national or regional government. The municipal government, meanwhile, built a small whale shark hunting museum with plans for the hunters to manage it as an alternative livelihood and to build small businesses associated with it (e.g., eateries, souvenir shops). However, no capacity building was provided; since the hunters had no experience with this type of livelihood, the planned development of alternative livelihoods never occurred (M. Balacuit, personal communication).

Figure 6.2 Image of newspaper headlines highlighting the slaughter of whale sharks in the Philippines in 1998

Pine (2007) notes that "it was a policy developed overnight" (p.10). The condensed timeframe did not allow for time to work with the local communities affected by the ban (Acebes, 2013), nor consult with NGOs or researchers working on the whale shark fishery in the Bohol Sea. For example, WWF-Philippines, at the time, recommended stopping the hunt until sufficient data could be gathered regarding population size, movement and sustainable use (Yaptinchay, 1998). The lack of consultation and communication with the local communities resulted in misunderstandings, distrust, and conflict (Acebes, 2013; A. Yaptinchay, personal communication). In fact, hunters in Guiwanon killed a whale shark that got stuck in the fish corral after the ban was passed; the municipal government arrested the hunters as a show of enforcement rather than intent to imprison them as they were released after apologizing for their actions (M. Balacuit, personal communication). No

whale sharks have been killed in Guiwanon since (M. Balacuit, personal communication). Whale shark hunters from Pamilacan were also caught killing a whale shark after the ban; however, they were imprisoned and fined (Gallardo, 1999). No studies have been conducted in Guiwanon post-ban to understand how the whale shark hunters were affected by the ban nor their perceptions of the failed attempt to transition them to WST. With the renewed interest in developing WST today it is important to understand the local perspectives in an ecotourism feasibility assessment as community support and buy-in is critical to ensure IBCs, such as WST, are successful (Brooks et al., 2013; Spiteri & Nepal, 2006).

6.1.2 Research objectives

The research objectives of this case study were to:

1) Explore local fishermen's perceptions of why the whale shark hunting ban was implemented and its impacts on the local community

2) Identify any shifts in locals' perceptions of the sharks and their desire to protect them over a twenty-year period (1997 vs. 2017)

3) Assess locals' willingness to support the development of WST in Guiwanon today, and

4) Assess locals' desire to hunt whale sharks again if it were legal.

6.2 Methods

We conducted 25 interviews with fishers, including all living ex-whale shark hunters (n=17), in Guiwanon from May to June 2017. A local research assistant (J.L.) conducted the interviews in the local dialect and translated the transcripts into English. We reached data saturation (i.e., no new themes, no new coding, no new data; Guest et al., 2006)

suggesting that the final sample size was adequate to reflect perspectives at the site. We also used interview data reported in Alava et al. (2002) to compare perceptions of whale sharks in 2017 vs. 1997. Questions included their perception of the significance of whale sharks and whether whale sharks should be conserved.

We used structured interviews, using mainly open-ended questions, to collect information regarding livelihood information, their perceptions of WST and the whale shark hunting ban and why it was passed, and their support and willingness to work in future WST activities in Guiwanon. Interviews were input and coded in NViVO.

6.3 Results

6.3.1 Locals' perception of why the ban was implemented

When respondents were asked why their village stopped fishing whale sharks, only one respondent identified the decrease in whale shark numbers as the reason the ban was implemented (**Table 6.1**). Most respondents, however, blamed tourism ("It went wrong because [the wind carries] the smell of [dead] whale sharks, like the discarded liver, [over to the] tourists swim[ing] at [local resort owner]'s beach") and the WSSA ("We were taken to Dumaguete, we were taken around to places because we were spotters, on boats, maybe just to entertain us. It wasn't a seminar. We were tourists. When we came back home, we were asked to sign that we do not want to catch whale sharks. Because we didn't know, we just signed. And so they banned [whale shark fishing].") for the passing of the whale shark hunting ban (n=16) highlighting a problem with lack of communication between the federal government who implemented the ban and the affected communities of whale shark hunters.

Table 6.1 Locals' perceptions of why the whale shark hunting ban was implemented in the Philippines

Why whale shark hunting was banned	N
Tourism	16
No answer	6
I don't know	2
Declining whale shark numbers	1

6.3.2 Perceived impacts of ban

When asked their perceptions of the hunting ban, many respondents discussed the perceived changes in whale shark numbers (n=16). While two respondents felt whale shark numbers had decreased since the ban was passed, most respondents noted that the ban has resulted in a significant increase in the number and size of whale sharks in local waters (n=14). However, this increase in whale shark numbers is mainly viewed negatively by the ex-hunters who perceive the sharks as having a negative impact on the environment (**Table 6.2**). For example, they blame the sharks for poor catches in recent years (e.g., "It is still bad for the fishermen because they eat the fish – bolinao, sardines – they are not the same as the dolphins that only eat krill, whale sharks also eat fish") or perceive the sharks as direct competition for limited fish stocks:

> "Because whale sharks feed on anchovies too, my friends who fish for anchovies, they hit the sharks with a sharp knife. Sometimes, the krill occurs with the anchovies, so the whale sharks feed there and even push fishermen's boats. So I think it is better that the whale sharks are gone because they disrupt the fishing."

Still others perceive them as a pest damaging their fishing gear and threatening their safety:

> "Because the whale shark grew in numbers now […] the ones who get their livelihood from the sea are very pitiful because the nets […] are being destroyed because of the number of whale sharks that run through them. And even us fishermen, there were many instances of us capsizing because they are so many and they just suddenly surface. They really pick fights with us. That's why the others, their boats got destroyed because they (whale sharks) hit them."

Table 6.2 Perceived impacts of the whale shark hunting ban in Guiwanon

Perceived impacts of the ban	N
Negative	89.4% (n=42)
Loss of livelihood	22
Whale sharks are pest	12
Lower quality of life	4
Loss of culture/tradition	4
Positive	8.5% (n=4)
Improve fishery	2
Future generations	1
Safety	1
No effect	2.1% (n=1)

The most important perceived impact of the ban according to the fishermen was the loss of livelihood that ensued and its impact on the quality of life of people living in Guiwanon (n=22):

> "Before it was banned, we had a very high income. We followed our parents. My family was sustained by it. Even my kids have gone to school and our way of life is more comfortable. Even my brothers graduated high school. During the season we have a lot of income […] A big part of our income was gone [after the ban]."

Four respondents also noted not only the loss of tradition when the hunting ended, but also a change in the community:

> "[The beach landing area] used to be full of excitement because that's where we dry [the slices of whale shark meat]. We grill them, sometimes we boil them and mix with vegetables. There are a lot of people who eat this fish. Now, there is no more [of the excitement and eating] […] Of course we feel [bad] because ever since we were born that was the source of livelihood because when February comes up until May, the whale sharks are in Talisayan all the way to Bangcogon, Salay."

Three respondents did note some positive outcomes of the ban. An ex-hunter noted that he supported the ban because of safety issues associated with the fishery (e.g., whale sharks sinking pumpboats) and the declining whale shark numbers in the 1990s. Two respondents noted the positive impact the whale sharks have on the local fishery, while another respondent thought the ban was good because of the inherent value of the sharks: "For me, it is good that it was banned so that our children and grandchildren can see them. Unlike other [animals] that they won't know anymore because they have all been caught." The same respondent, however, said he would like to hunt whale sharks if it were legal again because of the income it would provide.

6.3.3 Perceptions of whale sharks 1997 vs. 2017

Alava et al. (2002) assessed the whale shark fishery in Guiwanon in 1997, including interviewing 16 whale shark hunters and asking them their perceptions of whale sharks and whether they thought the sharks should be protected. Comparing perceptions of whale sharks today (2017) versus before the ban (1997), fishermen in 2017 were more likely to mention that sharks are having a negative impact on the fishery than in 1997 (**Table 6.3**). They were also more likely to perceive the sharks as dangerous today than they did pre-

ban. One ex-hunter even perceived the sharks as having malevolent motives: “They are more ferocious; they destroy our boats… I think they have become more ruthless”. However, unlike 1997, three respondents believed that whale sharks helped the fishery and a non-hunter recognized their innate value.

Table 6.3 Comparison of perceptions of whale sharks and the need to protect whale sharks pre-ban (from Alava et al., 2002) and post-ban (2017)

	Percent response (%)	
	Pre-ban (1997)[a]	Post-ban (2017)
Perceptions of whale sharks		
No answer	50% (n=8)	-
Economically important	25% (n=4)	92% (n=23)
Negative impact on fishery	12.5% (n=2)	32% (n=8)
Helped the fishery	-	12% (n=3)
Inherent value	-	8% (n=2)
Dangerous	6.3% (n=1)	48% (n=12)
No value	6.3% (n=1)	-
Should whale sharks be protected		
Yes	18.8% (n=3)	16% (n=4)
No	43.8% (n=7)	20% (n=5)
Maybe/I don’t know	6.3% (n=1)	64% (n=16)
No answer	31.3% (n=5)	-

[a] from Alava et al. (2002)

When comparing support for protecting whale sharks in 1997 versus 2017, the results suggest that there has been no shift in desire to protect whale sharks over the twenty-year period since the ban. One ex-hunter noted in response to this question: "How am I going to answer that question when I really want to catch whale sharks?"

6.3.4 Continued desire to hunt whale sharks today

There is an overwhelming desire to hunt whale sharks again amongst the locals in Guiwanon (**Table 6.4**), along with continued frustration with the government for implementing the ban and affecting their livelihood and quality of life:

> "Yes, [I would like to hunt whale sharks again] because the money is easy. If you get one whale shark, you get PHP30,000 and you only share it with the five people on the boat, so you don't have to worry about [where to get money for] rice for your family. Because during the time we can still fish for whale sharks, we didn't feel any difficulty because you can sell dried meat when you run out of money, you have something to eat, the people from the mountains come down with their produce. Your family can eat three times a day. When the whale shark [fishing] was gone, you only eat once a day sometimes."

Table 6.4 Support for renewed hunt of whale sharks in Guiwanon, Philippines

Would you hunt whale sharks if it were legal again?	N
Yes	84% (n=21)
Livelihood	20
Quality of life	7
Whale sharks are a pest	2
Tradition	2
Whale shark is meant to be fished (instrumental value)	1
No	16% (n=4)
Inherent value	1
I don't know how	1
Afraid of whale sharks	1
Too old	1

A non-hunter who came from a family of hunters noted the important tradition of hunting whale sharks in Guiwanon: "That was our livelihood before; if it weren't prohibited, I think I would have been a whale shark fisherman now because we grew up with the [fishery]", while another respondent argued that the whale shark should be hunted again because its purpose is to be killed:

> "That fish, because it is very large, it should be fished. […] It sustained all the families in Guiwanon. […] I don't think it should be banned. God made it for consumption. So I don't think it is right. The whale shark has to be fished."

Only four respondents, three of whom were non-hunters, would not want to hunt the sharks again if it were legalized. The one ex-hunter cited his age as the reason for no longer wanting to hunt the sharks, while the non-hunters did not want to hunt them because they

did not know how, they were afraid of the sharks, or due to the inherent value of the sharks ("I will also feel sorry for that fish because they are [harmless]").

A handful of fishermen (n=3) believe whale sharks are still being hunted in Philippine waters, with one respondent noting his frustration that the ban was not applied equally across the board:

> "We have a difficult time here. The whale shark was banned to us whale shark fishermen but it is still being caught. There are big boats (commercial vessels). I can say this because I have seen whale shark meat [floating] offshore. Do you think it would've come from the shore when here in the entire Philippines [fishing] the whale shark is banned? Why are there boats who can go in [here] that are not from here? For us, we, the small fishermen, are the only ones who are policed by the government. But those big [vessels], because they have money, they can pay the tax (bribe)."

Another respondent noted that whale sharks are being taken as by-catch in the commercial tuna purse seine fishery. The third respondent, on the other hand, thought the fishery had simply gone underground: "I'm sure someone still catches them. [Fishers] from Bohol. They will only get the fins, they'll kill it, and then let it sink… It's the fins that are very expensive."

6.3.5 Perceptions of WST

6.3.5.1 Past experience with WST in Guiwanon

Respondents reported that they had worked in WST prior to the ban, but there was no consensus as to why WST failed beyond poor planning ("When we stopped the fishing, they also stopped the guiding; there was no clear arrangement that when the season (for

whale sharks) starts, we get a daily income") or blaming the local resort owner for no longer hiring them as guides/spotters. For example, one respondent noted:

> "We used to be tourist guides. […] We were okay with what was given to us, that we wouldn't fish and be tourist guides, but our president [of the WSSA] surrendered so it was not given to us… And then we stopped [the WSSA] since we can't be tourist guides as well because [the resort owner] wouldn't hire us anymore. He does the guiding because he has men to do it. We don't like it anymore (disheartened). Only when there are whale sharks trapped in the corral, they (tourists) can come and take pictures of it."

The failure of planned WST activities in Guiwanon resulted in significant anger for the local fishermen:

> "They were told not to fish [whale sharks] in exchange for taking [tourists] out for a daily income, but then they weren't given the promised income. That's why the people of Guiwanon got angry. I don't know [why they didn't give out the daily salary]."

6.3.5.2 Perceived impacts of future WST

When respondents were asked to discuss the potential impacts of future WST on the local economy, community, environment, and family, the majority of the perceived impacts were positive (54%; **Table 6.5**), primarily due to the expectation of an improved income and quality of life from working in tourism:

> "[The impact will be] very big. There is a source of livelihood, even though small as long as it is [reliable]. That's the only thing for me […] We can always buy rice. The family won't have to skip meals […] The people will have a more comfortable life."

Respondents also noted tourism could help improve the community, and, in turn, their families in terms of exposing them to foreign tourists. Two respondents noted that WST

would directly benefit the whale sharks, both in terms of improved numbers and improved vigilance ("I think it is very positive if there is someone watching [the whale sharks], [tourism] is good because they will guard the sea"). One respondent also voiced a hope that they would be allowed to hunt whale sharks again if tourism were to start.

Table 6.5 Perceived impacts of whale shark tourism in Guiwanon, Philippines

	N
Positive	27
Income	16
Quality of life	1
Improve community	7
Protect whale sharks	2
Hunt whale sharks again	1
Negative	17
Inequitable distribution of benefits	12
More government prohibitions	4
Cannot hunt whale sharks	1
I don't know	6
Total perceive impacts	50

Despite these perceived benefits, respondents also voiced significant distrust regarding potential tourism operations and how they would be managed mainly due to their past experiences with tourism. For example, some respondents would not even provide their opinion of potential costs or benefits of future tourism until they were presented with a concrete plan:

> "I don't think I can answer that because I don't know exactly why [tourists] are here and what their real motives are for being here [...] I might say it is positive but in reality it is negative instead because I didn't judge correctly […] It is better if they have a proposal they can present so they can ask us if we support it or not."

Fear of further government restrictions was brought up by multiple respondents, including one fisherman who was concerned he would lose his home if tourism were to be developed in Guiwanon:

> "If there are tourists, it will happen that this area here (pointing at the beach) will change because the government will improve [this area] for sure. So the people who live here will have to [move out]. The officials or the people who will work [for tourism] will be able to benefit. I will be in trouble because my hut, for sure I will be asked to move out. And then my source of income is fishing. If they are going to transfer us away from the shore, my fishing area will be farther away. And my pumpboat, I wouldn't be able to watch over it. I don't know what will happen to it because I won't be able to see it if I live far away. Especially that my livelihood is fishing."

Respondents, however, were primarily concerned with the continued inequitable distribution of tourism benefits:

> "Tourism? What tourism? Only they can benefit from that. The big guys there. We, the small fishermen, are very pitiful … Good if we get a share from the tourists there so we can make a living, but no it is only them."

Some respondents were also concerned of the potential for conflict within the community due to the unequal distribution of benefits:

> "There are a lot of whale shark fishers here, but the tourists will only take two or three [guides]. So only these people will get paid. The others will get jealous, upset. They will request for the guides they want. When it started, there was a rotation of people [for guides] but it didn't go around. That's why I said that only the tourists will be happy."

It is clear from the interviews that locals want to be included in any tourism planning and management decisions. One ex-hunter outlined the issue as follows: “If they want tourism, there should be a meeting to discuss how it is going to be. If they just discuss by themselves without including us, how are we going to help if we don’t know?”

6.3.5.3 Support for future WST

Less than two thirds of respondents (60%; **Table 6.6**) would support WST development in Guiwanon, mainly due to the potential for an alternative livelihood to increase their household income and improve their quality of life. A further 36% of respondents either were unsure if they would support or did not support a new tourism venture because of their past experience with tourism twenty years ago: “That's why I told you before, because we lost our source of livelihood, I don't want to [have anything to do with tourism anymore]. Because of their empty promises.” Some of the respondents also thought tourists were somehow profiting from WST at their expense:

> “I don’t like tourism because it only serves the tourists so that they can take photos and show/sell them. It is their business. If they will come here, the local people should also benefit [from their presence].”

Table 6.6 Support for whale shark tourism in Guiwanon, Philippines

Support WST	N
Yes	15
Livelihood	9
Government sanctioned	2
Knowledgeable	2
Quality of life	1
Enjoy	1
Depends	6
No	3
Not feasible	1
Others benefit	2
No answer	1

Some fishermen were also concerned about whether working for tourists would involve being paid:

> "For example, [if we are out on the tourist boat] and there is fish to catch right now [and we see a whale shark at the same time], how are we going to follow the whale shark if we haven't caught anything to sell for income or a meal? It is better [for tourism] if we follow the shark, but we haven't caught anything yet... So if the fisherman can get something out of finding a whale shark and if [tourists] can see it, then maybe I will do that."

6.3.5.4 Willingness to work in WST

Despite their past negative experiences with tourism, the vast majority of respondents were willing to work in WST if they were to be included (**Table 6.7**), mainly for economic reasons. As one respondent put it, "Anywhere (any work) as long as we can eat". Due to

distrust from their previous exposure to tourism, some respondents were not sure if they would work in tourism because they did not yet know how it would be managed. Only three respondents stated that they would not work in tourism if offered the opportunity.

Table 6.7 Desire to work in planned whale shark tourism in Guiwanon, Philippines

Work in WST?	N
Yes	18
Livelihood	15
If it's equitable	2
Government	1
No	3
Prioritize main income	2
Too old	1
I don't know	3
Unclear how it will be managed	2
Too old	1

Many of those who said they would not support tourism or were unsure said they would work in WST if asked. This discrepancy between support of, and willingness to work in, tourism highlights the main issue at this site, namely a fear that they will not be included again based on their past experiences with tourism twenty years ago. It also underscores the need to include the community in decision-making using a clear and transparent process that ensures benefits are equitably distributed in order to earn and sustain their trust.

However, three respondents noted that WST is not feasible in Guiwanon because there are few whale sharks in its waters (n=2) or due to the geomorphology of the bay (n=1):

> "Guiwanon will be very lucky if there is tourism here. But I don't think tourism will be feasible because here in Guiwanon it is shallow. You have [to take the tourists] to deeper waters. There is no chance seeing [whale sharks] just here (close to shore)."

Two respondents also highlighted the mayor's interest in provisioning whale sharks for tourism purposes like they do in Oslob, Cebu, Philippines:

> "When there was a whale shark that got in the corral, they tried to feed it. Because the mayor wanted to change the behaviour of the whale shark so that the tourists can see it […] [When the whale shark got in the corral], they immediately fed it. But it was unsuccessful. Not like Cebu (Oslob) was it? Where they culture whale sharks."

6.4 Discussion

6.4.1 Summary

The focus of this paper was to identify potential barriers to the successful implementation of WST in an ex-whale shark hunting village in the Philippines. We found that locals largely blamed the previous attempt to transition to WST for the whale shark ban, and this distrust translated into continued negative perceptions of future tourism ventures in the village. Most notably, locals were unhappy with their lack of inclusion in previous tourism planning and the subsequent perceived unequal distribution of benefits. The loss of livelihood and reduced quality of life post-ban has also resulted in significantly more negative perceptions of whale sharks today than twenty years ago. This study provides important lessons learned for the conservation community with respect to community-

based development and conservation planning, specifically the long-term impacts of poorly planned IBC initiatives and policy decisions.

6.4.2 Poor perception of government agencies and NGOs

Respondents in Guiwanon largely blamed the WSSA and its associated plans to transition hunters to WST for the passing of the ban. This perspective was reflected in other whale shark hunting communities in the Bohol Sea. For example, whale shark hunters in Pamilacan blamed WWF-Philippines for the passing of the whale shark hunting ban because the NGO was involved in a project to transition hunters to tourism providers in the months prior to the ban (Acebes, 2013). This perception is reasonable considering the induction of WSSA members in late October 1997 coincided fairly closely with the passing of the ban five months later, as did the arrival of national and international media and researchers lobbying for the end of whale shark hunting in the Philippines. Furthermore, MMWW did not assess the feasibility of ecotourism development in Guiwanon prior to forming the WSSA and convincing hunters to renounce hunting in exchange for work in tourism with promises of reliable income. By the time the hunting ban was implemented, MMWW members had realized that WST was not feasible in Guiwanon because the Bohol Sea represented too large an area in which to implement WST (A. Yaptinchay, personal communication; refer to **Fig. 6.1**) and no further support (economic or otherwise) was provided for the hunters in Guiwanon beyond the small museum the local government provided, which was never used (M. Balacuit, personal communication).

The ban was also passed with such haste that no socio-economic assessments were done to examine the impact the ban would have on the affected communities (Acebes, 2013). There was no consultation with the affected communities, nor experts, regarding the

ban and how it should be implemented. NGOs at the time were advocating against a ban because of the heavy reliance of these communities on the sharks for their livelihoods (e.g., WWF, 1996). Once the ban was announced, no federal government support was provided for any of the hunting communities, including Guiwanon (e.g., compensation for loss of livelihood, training for alternative livelihoods, etc.; Acebes, 2013), although the local BFAR office did organize a meeting with the hunters of Guiwanon to explain the ban once it was implemented (M. Balacuit, personal communication). In Pamilacan, hunters perceived this lack of communication from the government as "an act of serious negligence and apathy towards their wellbeing" (Acebes, 2013, p. 243). In Guiwanon, the whale shark hunters tried to petition the governor and national government to reverse the ban to no avail (S. Snow, personal communication). In fact, shortly after the ban was passed, the hunters in Guiwanon killed a whale shark trapped in the village's fish corral; the municipal government leveled charges against the hunters as a show of enforcement rather than an actual prosecution in order to dissuade future transgressions of the ban (M. Balacuit, personal communication).

Acebes (2013) concludes that the decisions of a few influential people, including scientists, government agencies, and NGOs, had a disproportionately large impact on the lives of fishers in the Bohol Sea, who are amongst the poorest in the Philippines and facing quickly deteriorating quality of marine resources (e.g., coral reef health, fishing stocks). Acebes (2013) found that communities with access to good farming land and fishing grounds were able to adapt to the ban by transitioning to other jobs, but Pamilacan, an island with no other alternative livelihoods and poor fishing grounds were unable to adapt: "In the aftermath of the introduction of the ban, with little or virtually no assistance and

support from their own local government, Pamilacan residents were left to their own devices to cope with changes in their life and work" (p. 237). Likewise, Guiwanon does not appear to be a resilient location; the main livelihood for each household interviewed in 2017 was still fishing, followed by labour, farming, and professional. Furthermore, the fishermen reported their fishing grounds have deteriorated due to an increase in fishermen and the use of illegal fishing methods (e.g., compressor fishing, fish poisoning, and ring nets); the fishermen are struggling to find income to feed their families.

6.4.3 Future WST development in Guiwanon

Boat surveys conducted to understand the presence and distribution of whale sharks in Talisayan waters in 2017 required significant effort to locate the sharks (i.e., 3.5 hours per whale shark observed), suggesting that a more general marine wildlife tour may be possible due to sightings of various wildlife during the surveys, including spinner dolphins, Risso's dolphins, melon-headed whales, Fraser's dolphins, billfishes, mobulid rays, turtles and other shark species (Araujo & Labaja, 2017). Furthermore, despite distrust and anger over their past experiences with tourism in Guiwanon, respondents in the current study were largely supportive of working in future tourism endeavours as long as they are directly involved in their development, management and implementation. Previous research has found that the success of IBC projects in meeting their conservation goals is dependent on their design, implementation and management, including building of local institutional capacity, the equitable distribution of benefits, and local participation in project implementation and daily management (Brooks et al., 2013; Spiteri & Nepal, 2006; Waylen et al., 2010). Sustainable marine wildlife tourism that involves the community at every step is critical considering their past experiences and the mayor's apparent interest in

provisioning the sharks like is done in Oslob (Philippines), the ethics and sustainability of which have been questioned in the literature (Ziegler et al., 2018, 2019).

6.4.4 Conclusion

Despite negative perceptions of tourism and sharks, respondents were largely willing to support new tourism opportunities. Key barriers to conservation at this site include HWC and fishermen's negative perceptions of tourism (and tourists) and government agencies. This case study highlights how a past attempt at using an IBC approach to protect whale sharks in Guiwanon was poorly executed and how the significant negative impacts remain twenty years later. It also discusses best-practices for how marine wildlife tourism should be developed and implemented, including a transparent, community-based approach that involves local fishermen in all phases of development and ensures equitable distribution of benefits. Any initiatives should also include community education and outreach to ensure conservation outcomes are met. It is hoped that these findings will help inform any future tourism ventures at this site and serve as a lesson learned for those interested in pursuing such IBCs elsewhere.

Chapter 7 Summary: Conclusions, Recommendations, and Contributions

7.1 Introduction

Marine wildlife tourism (MWT) is viewed as an important means of protecting the marine environment by transitioning local communities from consumptive uses of the marine environment (e.g., fishing) to non-consumptive ones (e.g., ecotourism) (Brunnschweiler, 2010; Cagua et al., 2014; Clua et al., 2011; Wilson & Tisdell, 2003). Participation in wildlife tourism activities is believed to foster a positive conservation ethic in both the local communities involved and the tourists (Filby et al., 2015; Lück, 2003, 2015; Mintzer et al., 2015; Stronza & Gordillo, 2008; Topelko & Dearden, 2005). This change in attitudes and/or behaviours may, in turn, lead to measurable conservation benefits for the focal species, such as increased abundance or range (Mbaiwa, 2011; Pegas et al., 2013; Waylen et al., 2009). Few studies, however, have linked participation in MWT with positive conservation outcomes, either for tourists or host communities (Filby et al., 2015; Pegas et al., 2013; Waylen et al., 2009). This study sought to address this knowledge gap by assessing the conservation value of MWT using whale shark tourism (WST) as a case study.

WST has been proposed as a means to help protect the endangered whale shark by providing economic and social benefits to the local communities that provide the tours in hopes that this will translate into conservation gains for the sharks. It is therefore considered an IBC approach. As an IBC, WST should meet the standards of ecotourism, namely sustainable, wildlife-based tourism that improves the environmental awareness of locals and tourists participating in tours, benefits the local communities, has minimal

environmental impacts, and helps protect the target species and wider environment (Wardle et al., 2018). However, no study to date has assessed whether the global WST industry meets these ecotourism standards, nor if it is achieving its conservation goals, both social and ecological. The overall goal of this study was to address these critical gaps in knowledge by assessing the overall sustainability of the global WST industry, evaluating its role as an IBC approach, and examining the social conservation outcomes of WST by using the Philippines as a case study. Specifically, the study had the following objectives:

1. To assess the status of the global whale shark tourism industry, including types (e.g., captive, non-captive), real and potential impacts, conservation value and management challenges and best practices.
2. To examine the ethics of provisioning whale sharks in Oslob, Philippines, the largest, non-captive viewing site in the world.
3. To determine if working in ecotourism changes the attitudes and behaviours of locals towards whale sharks and the ocean, and if tourism type affects those outcomes.
4. To assess the marine wildlife value orientations of locals working in whale shark tourism to achieve greater understanding of the factors influencing their conservation attitudes and behaviours.
5. To explore the potential long-term impacts of poorly conceived IBC projects on social and ecological conservation outcomes.
6. To re-examine and update the conceptual and theoretical background for wildlife tourism in light of the findings of this study.

This chapter is divided into four sections. The first section provides a summary of the major findings for each objective of the dissertation, followed by a summary of the major management recommendations, the contributions of this research to the literature and management, the limitations of this research, and future research needs.

7.2 Summary of findings

Objective 1 To assess the status of the global whale shark tourism industry

Chapter 2 identified several management issues of serious concern: social and environmental impacts, operator noncompliance, governance issues (e.g., government lack of interest in regulating tourism), and a noticeable decline in whale shark sightings at a number of sites. This study also found that while WST can be an effective way to protect the sharks if appropriately managed, most WST sites are not being managed sustainably. Whether WST achieves ecotourism standards and its conservation goals is site specific. Only a handful of sites meet those standards (e.g., Ningaloo). Overall, global WST sites are poorly managed and seldom achieve sustainability or conservation goals.

Objective 2 To examine the ethics of provisioning whale sharks in Oslob, Philippines

This study found that the majority of tourists supported whale shark provisioning, despite many being aware of the ethical complications of provisioning sharks for tourism purposes. Respondents justified their participation in this activity using mainly economic, human enjoyment, and animal welfare arguments. A utilitarian assessment of the potential costs and benefits of this activity highlighted the gaps in our knowledge regarding the economic and social benefits of this activity, as well as the negative impacts on the sharks' welfare. Until such analyses are completed, significant ethical questions remain regarding the provisioning of these sharks. At the moment, it is not clear that the social and economic

benefits of the activity outweigh the costs to the community, the whale sharks and the greater marine environment.

Objective 3 To determine if working in ecotourism changes the attitudes and behaviours of locals towards whale sharks and the ocean

This study suggests that WST results in significant social conservation outcomes, such as changes in attitudes, behavioural intentions and behaviours towards whale sharks and ocean, but tourism type, and the associated incentives, can have a significant effect on the conservation outcomes of the activity and therefore the conservation of an endangered species.

Objective 4 To assess the marine wildlife value orientations of locals working in whale shark tourism

This study identified two WVO clusters, a more utilitarian group (n=30) and a more protectionist group (n=84). The protectionist group was significantly more likely to report positive attitudes towards whale sharks and behavioural intentions to protect whale sharks and the ocean, supporting cognitive hierarchy theory. The oldest tourism site had the highest WVO score, while the pre-tourism site had the lowest score suggesting that participating in MWT can shift WVO over time. These findings suggest that incentive-based conservation (IBC) approaches, such as community-based MWT, can act as a change agent for communities to empower them to protect their marine resources.

Objective 5 To explore the potential long-term impacts of poorly conceived IBC projects on social and ecological conservation outcomes

This study identified key barriers to conservation including human-wildlife conflict with the whale sharks and negative perceptions of tourism and government agencies. Despite

these issues, most respondents were willing to work in whale shark tourism if given the opportunity. However, it is critical that ex-hunters and other community members be included in the planning, implementation and management of any tourism activities developed in Guiwanon. Future initiatives should also include community education and outreach to ensure conservation outcomes are met. This study provides important lessons learned for the conservation community with respect to community-based development and conservation planning, specifically the long-term impacts of poorly planned IBC initiatives and policy decisions.

Objective 6 To re-examine and update the conceptual and theoretical background for wildlife tourism in light of the findings of this study

This dissertation provides important contributions to Duffus and Dearden's (1990, 1993) non-consumptive wildlife tourism framework, which will be discussed in **Section 7.4**.

7.3 Contributions of this research

This dissertation provides several contributions to the research literature, including:

(1) An updated assessment of the global WST industry since the original overview a decade ago (Dearden et al., 2008). WST has grown exponentially in this time and has changed significantly including the introduction of provisioned whale shark tourism and increased popularity of keeping whale sharks in aquaria; whale sharks have also been uplisted to 'endangered' suggesting that it is even more important to ensure tourism activities are sustainable and provide conservation outcomes for the sharks.

(2) The first study to evaluate the ethics of provisioning whale sharks for tourism purposes and its implications for the conservation of an endangered species

(3) The first study to evaluate the social conservation outcomes of WST and suggest that the type of tourism can influence conservation outcomes in MWT

(4) Support of the cognitive hierarchy theory with respect to WVOs and its relationship with attitudes and behaviours

(6) The first study to examine the WVOs of locals working in MWT and its implications for social conservation outcomes, including the potential to shift locals' WVOs towards more protectionist views over time

(7) Important lessons learned for the conservation community with respect to community-based development and conservation planning, specifically the long-term impacts of poorly planned IBC initiatives and policy decisions

(8) The importance of social science for providing informed input into conservation planning.

(9) Important insights that enable a revision of wildlife tourism theory, as will be described in the next section.

7.4 Non-consumptive wildlife tourism framework

In 1990, Duffus and Dearden (1990, 1993) proposed a framework for understanding non-consumptive wildlife tourism (**Fig. 7.1**), which included three main components: the focal species, the human wildlife user, and the historical relationship between these two groups. These three components interact to create the non-consumptive wildlife tourism activity; the wildlife users interact with the site and with each other, thereby changing both over time (Duffus & Dearden, 1990). The framework has been widely used to understand and assess the sustainability of wildlife tourism (Augustine et al., 2016; Catlin & Jones, 2010; Catlin et al., 2011; Higham, 1998; Hines et al., 2005; Ziegler, 2010). However, most

attention has been focused on the wildlife tourism model linking changes in tourist type to site evolution and ultimately management concerns (i.e., "Growth curve" in **Fig. 7.1** below). The whale shark study in this dissertation now suggests that there are important additions to be made to the original model and this next section describes this evolution (**Fig. 7.2**).

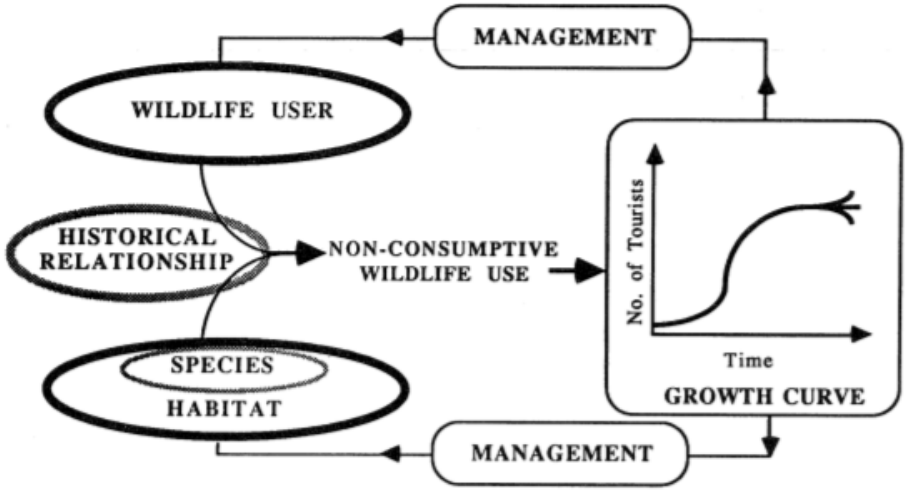

Figure 7.1 Original non-consumptive wildlife tourism framework proposed by Duffus and Dearden (1990).[6]

[6] Reprinted from *Biological Conservation*, 53, David A. Duffus and Philip Dearden, Non-consumptive wildlife-oriented recreation: A conceptual framework, 213-231, Copyright (1990), with permission from Elsevier.

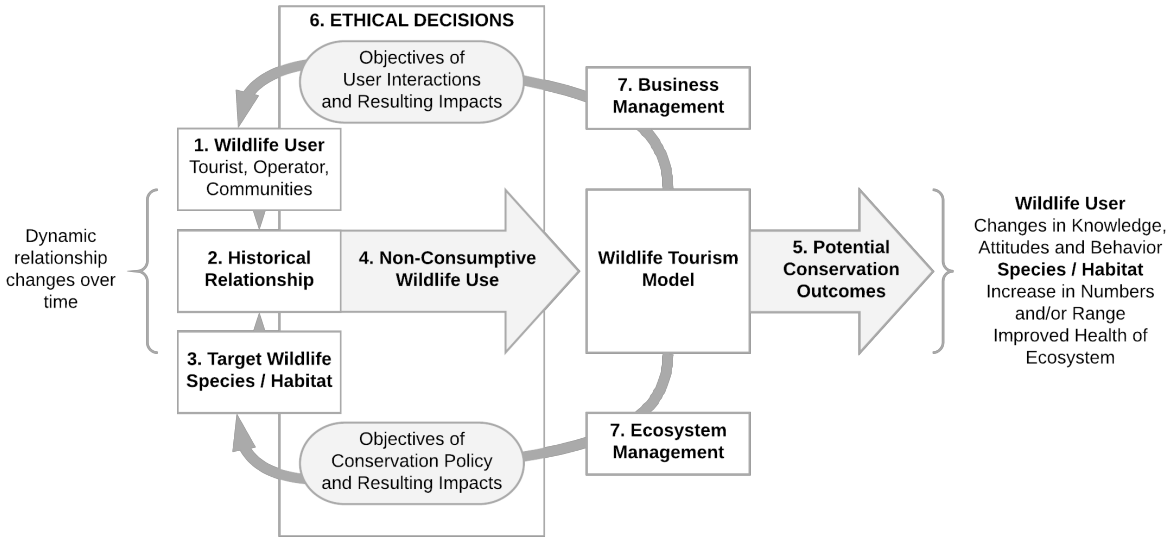

Figure 7.2 Updated framework for non-consumptive wildlife tourism.

7.4.1 Wildlife users

In the original framework, the wildlife user referred solely to the tourists participating in a given wildlife tourism activity. However, since the framework was advanced, wildlife tourism has expanded dramatically as an IBC approach to help protect species and provide alternative livelihoods for communities in developing countries (**Fig. 7.2**; Spiteri & Nepal, 2006; **Chapter 2**). In many cases, these wildlife tourism activities are proposed as a means to transition the local people from a consumptive use (e.g., hunting) to a non-consumptive one (e.g., tourism). Non-consumptive wildlife tourism therefore plays an important role in transforming the views of the local tour operators and host communities; this transformative change is fundamental for conservation and is new to the framework. This dissertation highlights the importance of including the perspective of locals working in wildlife tourism and the host communities, as their historical relationship with the focal

species (e.g., **Chapter 4**, **Chapter 5** and **Chapter 6)** affects their perceptions of, and attitudes and behaviours towards, wildlife.

7.4.2 Historical relationship

The historical relationship includes both the influence of humans on the animal species and their habitats (e.g., overabundance of certain species, habitat alteration, extirpation) and the "cultural conditioning of perceptions that have taken place over centuries" (e.g., to kill animals if perceived as predators or to eat animals if perceived as food source; Duffus & Dearden, 1990, p.218). The current research informs this historical context in two key ways. Firstly, it adds to our understanding of the historical relationship between tour operators and host communities and the focal species. This research highlights the fundamental change in the historical relationship from a primarily consumptive one to a non-consumptive one. Prior to tourism, this relationship was simple; locals mainly perceived the sharks as a source of food. However, with the development of several WST sites throughout the Philippines in the last twenty years, this relationship has grown more complex. Locals interviewed perceived the sharks as, among other things, a food source, pests negatively affecting their fishing, a dangerous animal threatening their safety, an animal with no value, an aid to their fishing, an animal that supports their livelihood, and a kind/harmless animal (**Chapter 4**, **Chapter 6**). Perceived value of the sharks varied significantly depending on the type of tourism present and historical relationships between host communities and various governance agencies (**Chapter 4**, **Chapter 6**).

Host communities also had complex relationships with government agencies, NGOs, researchers, and tourism (**Chapter 6**), which affects the success of a given wildlife tourism activity. For example, if there is significant conflict between the locals and

government agencies, this would affect their perceptions of, and their willingness to participate in, the tourism activity, and, therefore, the likelihood that the activity would even occur. Studies assessing the success of IBCs have found that historical issues between people and nearby protected areas (e.g., forced evictions from protected areas, militaristic enforcement of no-take rules), human-wildlife conflict, the marginalization of certain members of communities (e.g., landless squatters, pastoralists, women), and perceived or actual inequitable distribution of IBC benefits can affect local attitudes towards and support for IBC projects, including community-based tourism (Acquah et al., 2017; Brooks et al., 2013; Kideghesho et al., 2007; T. M. Lee et al., 2009; Spiteri & Nepal, 2006; Walpole & Goodwin, 2001). These relationships are now an important aspect mediating the relationship between focal species, habitats and human users that must be incorporated into the framework.

This dissertation also clearly illustrates that the cultural perceptions of the focal species can change over time via participation in non-consumptive wildlife tourism (**Chapter 4**, **Chapter 5**) or failed attempts to do so (**Chapter 6**). Past research has almost exclusively focused on changes over time among participants in wildlife tourism and has paid virtually no attention to changes that may occur among host communities and tour operators that could be key to assessing the success of IBC initiatives.

7.4.3 Wildlife

Research methods to assess the impacts of wildlife tourism on the focal species, especially in the marine environment, have advanced significantly since the original framework was proposed (see **Chapter 2** for overview of WST impacts). Some studies have identified potential indicators that could be used to monitor the impacts of MWT on charismatic

megafauna (e.g., dolphins, whales, sharks, rays), including population numbers, animal fatalities, reproductive rates, and demonstrated changes in behavioural budgets (Higham, Bejder, & Lusseau, 2008). For example, monitoring data of a population of dolphins in Shark Bay, Australia, identified a significant decline in the population abundance of dolphins exposed to tourism activities that was associated with reduced reproductive success in the females exposed to tourism activities (Higham & Bejder, 2008).

Although valid for marine mammals, these variables are difficult to measure in other marine species (e.g., sharks and rays). For example, the few behavioural studies assessing the impacts of tourism activities on non-marine mammals are mostly inconclusive because the authors were unable to determine if the observed short-term behavioural changes reflected long-term disturbances or simply the natural range of behaviours for that animal, whether tourism is present or not (e.g., Haskell et al., 2015; Sanzogni et al., 2015; **Chapter 2**). In some cases, the authors concluded there was no long-term impact on the focal species, despite short-term behavioural changes, because the sharks continued to return to the sites every year (Haskell et al., 2015; Sanzogni et al., 2015). These studies, however, do not take into account potential negative physiological effects of exposure to tourism activities, which can have long-term effects on individual and population level health and fitness.

Assessing the impacts of tourism activities on non-mammal marine animals is especially difficult; key challenges include accessing and/or observing animals that do not need to access the surface, measuring reproductive success in animals that have communal nursing grounds or do not have any parental care, and their long-lived nature precluding the direct measurement of mortality (Semeniuk, Bourgeon, et al., 2009). Due to these

issues, physiological indicators (e.g., hematocrit, total serum protein concentration, differential white blood cell counts) are preferred for measuring tourism impacts in non-marine mammal species as these indicators are able to reflect the health state and predict survival and reproduction of animals exposed to tourism activities (Semeniuk, Bourgeon, et al., 2009). These indicators were successfully used as evidence that fed stingrays at Stingray City Sandbar (SCS), Cayman Islands, were exhibiting symptoms of immunosuppression when compared to stingrays at non-tourist sites (Semeniuk, Bourgeon, et al., 2009). The authors concluded that while there was no direct evidence of reduced survival at SCS, the physiological parameters measured suggest that it is quite likely. The authors further noted that the use of physiological stress indicators to determine tourism impacts is preferred over behavioural studies, as it provides a better understanding of the actual costs to the animals, especially when long-term population data are not available. They conclude that baseline (control) and tourism-induced parameters are needed for monitoring purposes, and that physiological indicators should be integrated with general fitness indicators (injury rates, parasite loads, open wounds) as a basis for monitoring tourism impacts (Semeniuk, Bourgeon, et al., 2009). Newsome et al. (2004) also recommended the use of the following general fitness indicators to monitor tourism impacts on provisioned stingrays: number of skin lesions per animal, number of wounds in total population (e.g., propeller marks), number of aggressive interactions with other rays per hour at provisioning site and change in species population each year.

Provisioning is becoming more pervasive in MWT, especially for ray and shark diving activities (Araujo et al., 2014; Brena et al., 2015; Bruce & Bradford, 2013; Brunnschweiler, Abrantes, & Barnett, 2014; Brunnschweiler & Barnett, 2013; Gallagher

et al., 2015; Newsome et al., 2004; Orams, 2002; Schleimer et al., 2015). Assessing the impacts of these activities on the focal species is important when determining tourism impacts and setting standards for the activity. The few studies that have used a behavioural approach to assess the long-term impacts of shark and ray provisioning suggest that residency patterns and site fidelity to provisioning sites are site and species specific, and are unlikely to result in significant changes at large spatial and temporal scales (Brunnschweiler & Barnett, 2013). However, these studies are mainly focused on larger predatory sharks and may not be representative of other shark and ray species. For example, Corcoran et al. (2013) found that provisioning activities involving wild Southern stingrays (*Dasyatis americana*) at SCS resulted in long-term changes to individual stingray movements, habitat use patterns, and population dynamics, including unnatural grouping behaviour, the inversion of diel activity in fed females (diurnal vs. nocturnal), permanent site fidelity of all provisioned stingrays, associative learning (e.g., all rays return to provisioning site approximately 1 hour prior to boat arrival), and to stingray reproduction (e.g., SCS now a mating site).

Similarly, Schleimer et al. (2015) studied provisioning activities of whale shark tourism in Oslob, Philippines, and found that sharks at the site demonstrated both associative learning (i.e., associating the site with food and adapting their feeding behaviour) and habituation (i.e., increased tolerance levels in response to proximity to people and other sharks). Whale sharks with greater experience at the site were also more likely to display vertical feeding behaviour, which suggests that sharks are capable of learned behaviour as a result of conditioning from positive reinforcement (Schleimer et al., 2015). Furthermore, experienced whale sharks were less likely to exhibit avoidance

behaviours to both active and passive contact from humans and contact with other sharks, which suggests that a combination of habituation and conditioning is changing whale shark behaviour while at the site (Schleimer et al., 2015). These findings suggest that not all provisioning activities are having a minor impact on marine wildlife and these impacts should be considered when deciding which activities to allow at a given site.

Although behavioural studies can be helpful in understanding short- and long-term changes in spatial and temporal habitat use of a focal species due to provisioning activities, direct assessment of feeding impacts on animal health and fitness is also important. Essential fatty acid analysis and stable isotope analysis may be appropriate methods of assessing the impacts of these feeding activities on the focal animal's health and wellbeing (Semeniuk, Speers-Roesch, & Rothley, 2007; Shiffman, Gallagher, Boyle, Hammerschlag-Peyer, & Hammerschlag, 2012). For example, Semeniuk et al. (2007) used fatty acid analysis to determine the effects of provisioning on the stingrays at SCS and found that the diet provided did not meet the rays' appropriate nutritional requirements (e.g., essential fatty acids). The authors concluded this deficiency could lead to long-term impacts on immune function, resistance to parasites, and disease, and therefore their survival. Maljković & Côté (2011) used stable isotopes to study the effect of provisioning on a population of Caribbean reef sharks (*Carcharhinus perezi*) and found that fed sharks had significantly higher ^{15}N signatures than non-fed sharks.

The selection of which approach to use to measure tourism impacts requires a consideration of potential costs and benefits of each approach. Many of the indicators discussed would require capture and restraint of an animal in order to get the required blood or tissue samples. This type of intrusive sampling may introduce a confounding stress

factor (Smith et al., 2014) and or affect the animal's survival or health compared to more benign approaches such as behavioural observations. The choice of methods (e.g., physiological, behavioural, reproductive, general health, etc.) should therefore be site and species specific, and dependent on available resources and potential negative impacts. Management should consider consulting with species and or tourism experts for tourism impact assessments.

7.4.4 Redefining non-consumptive wildlife tourism

Duffus and Dearden's (1990) original framework distinguished between non-consumptive (e.g., wildlife watching, nature walks), low consumptive (e.g., zoos, aquaria, scientific research), and high consumptive (e.g., hunting, fishing, trapping) activities. However, in light of the literature outlining the negative impacts of wildlife tourism on the focal species (see "Wildlife" above), some authors have argued that all wildlife tourism is a consumptive use of wildlife (Neves, 2010). For example, Higham et al. (2016) argue that declines in a dolphin population in Fiordland, New Zealand, attributed to reduced calf survival because of exposure to repeated tour boat interactions, can be considered a consumptive use of that species. The authors conclude that whale watching, and wildlife tourism in general, should be considered "a form of non-lethal exploitation, which may impact animal morbidity (e.g., sub-lethal anthropogenic stress) and mortality (e.g., vessel strikes)" (Higham et al. 2016, p. 74). These issues affect the sustainability of the tourism activities, which often target threatened species in critical habitats, and therefore question the premise that wildlife tourism will lead to the conservation of the focal species (Moorhouse et al., 2015).

7.4.5 Conservation outcomes

Although the original framework did not explicitly include conservation outcomes as a component of non-consumptive wildlife tourism, with growing concern over biodiversity loss globally, and increased interest in using wildlife tourism as a means of protecting threatened and endangered species and habitats, conservation outcomes have become an important component to consider. Conservation outcomes can be divided into two categories: social conservation outcomes (i.e., positive changes in knowledge, attitudes and/or behaviours towards the target species and habitat) and ecological conservation outcomes (i.e., increased species abundance and/or range).

The success of a given IBC project in meeting its social and ecological conservation goals is highly dependent on the local context (i.e., the interaction of host communities, local operators, species, and historical context with respect to the tourism activity, governance agencies, the focal species and habitat). Important factors that can affect local support towards conservation and pro-conservation behaviours include socio-demographics (e.g., education, economic status, gender, wealth, ethnicity, age), human-wildlife conflict (HWC), local participation in IBC programs, the strength of local institutions, length of residency, distance from protected areas, dependency on resource, inequitable distribution of benefits, land use (e.g., pastoralist vs. agriculturalist), social benefits, relationships with park management and NGOs, perceived sustainability of the natural resources, and length of the IBC project (Brooks et al., 2013; Chaigneau & Daw, 2015; Salafsky et al., 2001; Spiteri & Nepal, 2006; Stem et al., 2003; Walpole & Goodwin, 2001; Waylen et al., 2010). For example, if locals perceive natural resources and extractive activities as sustainable prior to conservation intervention, they may be less likely to

support conservation efforts that attempt to change these behaviours (Karki & Hubacek, 2015; T. M. Lee et al., 2009). High dependence on natural resources also may result in a decline in conservation support, either via negative attitudes and or behaviours (Kideghesho et al., 2007; Marshall, Marshall, Abdulla, & Rouphael, 2010). Some studies have found that native residents are more likely to have significantly more negative perceptions and attitudes towards nearby PAs compared to newer residents to the region due to historically negative interactions between the parks and locals, including forced evictions without compensation (De Boer & Baquete, 1998; T. M. Lee et al., 2009). Other studies have found that locally born residents may be more willing to support conservation efforts because they have a vested interest in the long-term persistence of natural resources compared to people who are not from the region (Walpole & Goodwin, 2001). Understanding the local context therefore is critical (Dearden et al., 1996).

One of the main arguments in support of the continued development of wildlife tourism is that these activities can help conserve wildlife and their critical habitats through the provision of alternative economic incentives for local communities dependent on natural resources for their livelihoods (Brunnschweiler, 2010; Cagua et al., 2014; Clua et al., 2011; Higham & Lusseau, 2008; Parsons, 2012; Young, 1999). It is further believed that participation in wildlife tourism activities will foster a positive conservation ethic (i.e., improved conservation knowledge, attitude, and behaviour) in both the local communities involved and the tourists (Filby et al., 2015; Lück, 2003, 2015; Mehta & Kellert, 1998; Mintzer et al., 2015; Stronza & Gordillo, 2008; Topelko & Dearden, 2005).

Few studies have linked participation in MWT activities with positive social and ecological conservation outcomes (Jacobs & Harms, 2014; Mayes et al., 2004; Orams &

Hill, 1998; Waylen et al., 2009). For example, Filby et al. (2015) found that participants in swim-with dolphin tours in Port Phillip Bay, Australia, were significantly more likely to participate in conservation activities compared to pre-tour levels, even six months after their experience. Pegas et al. (2013), meanwhile, found that the local economic benefits generated from a community-based sea turtle tourism project in Praia do Forte, Brazil, resulted in improved awareness of and support for sea turtle conservation and contributed towards positive environmental behaviours (e.g., reduced consumption of sea turtle blood, meat and eggs; nest poaching), which could be linked to positive ecological conservation outcomes in the form of increased hatchling numbers over the project's three-decade lifespan. This dissertation highlighted the potential of wildlife tourism to change wildlife users' attitudes and behaviours towards the focal species (**Chapter 4**), wildlife value orientations (**Chapter 5**), as well as the long-term impacts of poorly planned and executed wildlife tourism on social conservation outcomes (**Chapter 6**). Further research is needed to determine the long-term conservation benefits of participation in MWT activities.

7.4.6 Ethics

Given the broad support for MWT as a means of protecting endangered species while providing viable alternative livelihoods to communities in developing countries, and the fact that most wildlife tourism sites may have significant negative impacts on the focal species and environment (see "redefining non-consumptive wildlife tourism" above), this dissertation also suggests that the framework should include a component that considers the ethical decision-making involved for the wildlife users and management. Tourists make ethical decisions when deciding which tourism activities in which to participate (**Chapter 3**). Tour operators make ethical decisions when deciding which business model to use for

a given wildlife tourism attraction (**Chapter 2**, **Chapter 3**, **Appendix II**). Host communities also make ethical decisions when deciding how to manage their natural resources, including how they will be used/managed by tour operators/tourists. Management, in the form of government agencies and NGOs, also make ethical decisions when deciding what type of wildlife tourism will be allowed (e.g., mass tourism, provisioned tourism, etc.) and deciding which impacts are acceptable on the focal species, the host community, and the environment (**Chapter 2**, **Chapter 3**, **Appendix II**). Ethics are therefore an important component to consider when discussing non-consumptive wildlife tourism, but have largely been ignored (Moorhouse et al., 2017).

Studies assessing the ethical implications of wildlife tourism activities have only emerged in the last two decades (Fennell, 2015a). However, it is an important concept to consider when determining if a given wildlife tourism activity should be allowed and how it should be managed (**Chapter 3;** Moorhouse et al., 2015, 2017). For example, **Chapter 3** provided an overview of one approach to assessing the ethics of a given wildlife tourism activity using a utilitarian cost-benefit analysis. This approach highlighted the required data necessary to make a decision as to whether an activity is ethical, including a household survey of the socio-economic impacts of tourism (positive and negative), environmental impact studies of the tourism activity on the animal, its habitat and the community, as well as an assessment of the conservation outcomes of the activity (e.g., increased knowledge, attitudes and/or behaviours towards the focal species or its habitat of both the tourists and the locals working in tourism and the host community, increased species abundance, etc.).

7.4.7 Management

How a site is managed (i.e., feedback loops in the framework) plays a critical role in whether the tourism activity achieves its conservation outcomes (social and ecological; **Chapter 4**) and is considered ethical (**Chapter 2**, **Chapter 3**, **Appendix II**). Management also influences the historical relationships between host communities, locals working in wildlife tourism and the species as well as governance structures in place (e.g., **Chapter 4**, **Chapter 5**, **Chapter 6**). For example, results from **Chapter 4** suggest that working in wildlife tourism can change locals' attitudes and behaviours towards the focal species and habitat - those working in tourism had more positive attitudes towards whale sharks than the ex-hunters from the failed tourism site. In other words, working in wildlife tourism can change the historical relationship between the tour operator/host community and the focal species/habitat.

However, it appears that the type of tourism present also affects the scope and scale of the conservation outcomes. Smaller scale tourism activities had significantly more social conservation outcomes than the mass and failed tourism sites. This suggests that the feedback loops in the model play a critical role in whether or not the wildlife tourism activity results in conservation outcomes. Results from **Chapter 6**, meanwhile, suggest that negative historical relationships between the host communities and the focal species or governance agencies can be overcome through appropriate management decisions, including using a transparent process that involves the host community in the planning, development and management in order to ensure local buy-in and support and achieve conservation goals.

Based on the overview of whale shark tourism sites globally in **Chapter 2**, managing wildlife tourism to achieve sustainability and conservation goals is difficult. Wildlife tourism can be viewed as a common pool resource (CPR) issue (Briassoulis, 2002; S. A. Moore & Rodger, 2010). This is especially true in the marine environment where it is difficult to enforce boundaries and restrict access. CPRs are defined by their non-excludability (i.e., accessible to everyone) and subtractability (i.e., use by one person reduces the amount available to others; Ostrom, 1990). These resources, when left unmanaged, can become depleted in what Hardin (1968) coined the "Tragedy of the Commons", in which individuals acting in their own self-interest deplete a resource at the long-term cost to the group. Wildlife tourism is a marked example of this. As private entities, tourists and tour operators are seeking specific experiences and livelihoods from an interaction with a given species. However, the interaction can have significant negative impacts on the natural resource. To mitigate these impacts on a public good, the wildlife and habitat are managed by operating policies, legal frameworks, and goodwill of resource advocates (NGOs, scientists). The relationship between the ecosystem (species and habitat) and wildlife users is marked by the tension between maximizing returns to the users (e.g., enjoyment of tourists, economic revenue of tour operators) and minimizing the impact of the tourism activities on the ecosystem. Due to poor governance and corruption, there are certainly examples where public goods, protected areas, and species are managed with negative conservation outcomes. Non-consumptive wildlife tourism requires that these choices being made with respect to a CPR have little to no impact on the focal species and its habitat while still delivering a quality experience to the tourist and improved livelihood for the tour operators and host community. Feedback loops are therefore critical in

managing the wildlife tourism activity. The dynamic nature of wildlife tourism requires a continual re-evaluation of the management of wildlife users and the ecosystem. Ethical decisions are constantly being made (and remade) as there is new information about the tourist experience, the livelihoods generated, and the impacts on the ecosystem. Ideally, wildlife users' decisions and conservation policy decisions will overlap to achieve both a positive tourism experience for wildlife users and positive conservation outcomes for the focal species/ecosystem. Actors should use these feedback loops to maximize the user experience (sustainable livelihoods, satisfaction for tourists) while also maximizing the conservation outcomes for the focal species and ecosystem.

The non-consumptive wildlife tourism framework can provide valuable inputs for the sustainable management of MWT activities. For example, Bentz et al. (2016) linked the Wildlife Tourism Model component of the framework (**Fig. 7.2**) to the management of MWT in the Azores. The authors identified tour operator sustainability concerns, assessed tourist satisfaction and motivations, and proposed key indicators that could be used to set standards of acceptable limits for SCUBA dive tourism in five Azorean islands. The current research provides important inputs to the planning, development, implementation, and management of WST, as will be discussed in the next section.

7.5 Management recommendations

7.5.1 Whale shark tourism should be managed as ecotourism

Based on the results of this study, all WST should be ecotourism. An ecotourism business model requires a net positive conservation outcome for the focal species and/or habitat, as

well as an educational component that raises the awareness of both locals and tourists about the target species and habitat. Conservation benefits of an ecotourism model include smaller scale tourism that minimizes potential negative impacts on the species and fostering social conservation outcomes such as changes in behaviours and attitudes for both locals and tourists. Results of this dissertation suggest that whale shark ecotourism can have significant positive social conservation outcomes for the sharks (**Chapter 4**). Whale shark ecotourism should therefore be expanded at sites around the world as new whale shark aggregations are discovered and there is local interest and support to develop such tourism opportunities. However, any such development should be predicated on fulfilling the precepts of ecotourism and incorporating the points discussed below.

7.5.2 Apply the precautionary principle to the development and management of WST

Since whale sharks were recently uplisted to 'endangered' on the IUCN Red List (Pierce & Norman, 2016) and WST often targets the sharks in critical feeding and potential breeding habitat, it is critical that WST use the precautionary principle. This principle states that "if a wildlife tourism action has a suspected risk of causing bodily harm to animals or their habitat, in the absence of scientific consensus that the action is harmful, then the burden of proof that it is *not* harmful falls on those proposing the action" (Burns, Macbeth, & Moore, 2011, p. 187). There is currently no scientific consensus regarding the impacts of tourism on whale sharks (**Chapter 2; Chapter 3; Appendix II**; Meekan & Lowe, 2019a, 2019b). The precautionary principle therefore requires that we err on the side of caution. A precautionary approach goes hand in hand with ecotourism, as it requires

minimizing potential negative impacts on the marine environment and the local communities, and ensuring activities are sustainable (social, ecological, economic).

Applying the precautionary principle is especially important when considering provisioned WST as is done in Oslob, Philippines (**Chapter 3**). This topic is an important, and controversial one, as evidenced by the response to the original paper (**Appendix II**; Meekan and Lowe, 2019a,b). Some scientists are advocating for the expansion of provisioned WST throughout Asia as a means of protecting the sharks (Gekoski, 2017) before the scientific community has a complete understanding of the impacts of this activity. For example, one whale shark scientist is quoted as stating: "if we could replicate Oslob across Southeast Asia, I think it would ensure the future of whale sharks in that region for many years. It would be the single most important conservation action you could do" (Gekoski, 2017). The article further states: "For [the whale shark scientist], having 'resident' sharks isn't a problem: "Anyway, even if some sharks are lost to the population forever, that would be a small price to pay for the conservation of the entire species" (Gekoski, 2017). These statements highlight not only the consumptive nature of provisioned whale shark tourism (i.e., some individuals may be permanently removed from the breeding population), but also the ethical choices being made when advocating for such a conservation approach. In light of the potential for significant negative impacts on an endangered species, the precautionary principle would not support expanding provisioned WST throughout Southeast Asia until further research is done to better understand the impacts of this activity on the sharks.

7.5.3 Include communities in decision-making and management

Successful IBC approaches should include the local communities in the planning, development and management in order to ensure local buy-in and support and achieve conservation goals. Although this approach has been the accepted practice for decades (Dearden et al., 1996; Spiteri & Nepal, 2006), it is not always done. **Chapter 6** examined the long-term effects of a poorly designed IBC project in Guiwanon, Philippines, and highlighted the lasting negative conservation outcomes (i.e., negative attitudes towards whale sharks) and conflict between locals and government agencies and other organizations involved in promoting tourism. This study also highlighted the importance of doing socio-economic impacts assessments and ecotourism feasibility assessments prior to making fundamental changes to locals' livelihoods.

7.5.4 Global standards needed for whale shark tourism

A set of global standards is needed to govern WST interactions (**Chapter 2**). Although a *de facto* universal code is essentially already in place at most sites for tourist/operator behaviour, there are pervasive enforcement issues. These findings support the call for a global WST code of conduct at the 12th Conference of the Parties for the Convention on Migratory Species in 2017 and emphasize the need for a global partnership to assist in implementation.

7.6 Limitations of study

7.6.1 Sampling

This study used different sampling approaches at each site. In Pintuyan, all tour operators were interviewed (n=40). Similarly, in Guiwanon, all ex-whale shark hunters were

interviewed (n=17), along with a few fishermen (n=8) to see if their perceptions varied significantly from the ex-hunters. However, ex-hunters would be prioritized if new whale shark tourism activities were to be developed and they had the best insights into historical whale shark hunting activity and perceptions of the previous attempt to convert hunters to tour operators since only hunters were allowed to join the WSSA. In Donsol, a total of 41 guides and 56 spotter/captain teams work in whale shark tourism. However, I was only able to interview 24 because the whale sharks disappeared during the field visit and spotters/guides no longer came to the visitor's centre so no new people to interview. However, I did reach saturation with no new themes or codes suggesting that it was a sufficient sub-sample. In Oslob, I interviewed 25 of 177 members of TOSWFA. This sample was limited by the president of TOSWFA. He also selected members for interviews potentially affecting the random sampling approach. However, I did reach saturation, with no new themes or coding suggesting that again it was sufficient.

Furthermore, since this study did not use representative sampling of the population of interest (tour operators) at all sites (exception: Pintuyan and Guiwanon), the results of this study cannot be generalized beyond the study sites studied.

7.6.2 Comparative analysis

The current study used a comparative approach to assess the effect of length and scale of tourism operations on social conservation outcomes and WVOs; however, no control sites were used in similar villages without tourism activities as a quasi-experimental technique (Brooks et al., 2013). It is therefore not possible to state whether the observed differences in social conservation outcomes are due to the type of tourism present or inherent differences between the sites (e.g., cultural). However, all sites were small-scale fishing

villages prior to tourism activities and respondents reported similar perceptions of the sharks prior to tourism activities (e.g., fear, no value, pest, etc.) suggesting that the observed differences are due to the tourism activities present.

7.7 Future research needs

Future research needs include:

(1) The focus of the current research was on interviewing those directly working in MWT; this research should be expanded to household surveys within the communities to see if the perceived benefits identified in this study extend beyond those directly involved in tourism.

(2) This study used a quantitative approach to measure WVO based on a scale developed and mainly tested in North America. The results of the WVO analysis suggest the need to develop a broader, complementary qualitative approach to measure all possible value orientations towards marine wildlife.

(3) The current study used a comparative approach to assess the effect of length and scale of tourism operations on social conservation outcomes; however, future studies should consider the use of control sites as a quasi-experimental technique to assessing conservation outcomes of given IBC (Brooks et al., 2013).

(4) There is also a need for the long-term tracking of conservation attitudes, behaviours, and WVOs to determine if the observed differences persist at the sites over time, as well as to determine if there are any changes in social conservation outcomes and WVOs over time with changes in management approach (e.g., if mass tourism shifts to sustainable approach) and/or length of operations (e.g., does mass tourism site at 20 years have same outcomes as mid-tier site at 20 years?).

(5) Assessing social conservation outcomes of MWT should also be tested at other sites and types of MWT to see if these identified relationships can be replicated elsewhere.

(6) The global assessment of WST highlighted the need for more social science research to be completed as it can provide critical insights into the conservation value of WST (Bennett, 2016; Duffus & Dearden, 1993).

7.8 Summary

MWT is viewed as an important incentive-based conservation approach for achieving marine conservation goals (Cisneros-Montemayor et al., 2013; Duffus & Dearden, 1993; Wilson & Tisdell, 2001). However, few studies have successfully linked participation in MWT activities with positive social and ecological conservation outcomes (Filby et al., 2015; Mayes et al., 2004; Pegas et al., 2013; Waylen et al., 2009). The goal of this dissertation was to address this gap in knowledge using WST as a case study. Results suggest that WST can result in significant social conservation outcomes and that MWT more generally can act as a change agent for communities to empower them to protect their marine resources. However, the scope and scale of these outcomes is dependent on the type of tourism present and the local context (e.g., historical relationship between the wildlife users and the focal species/ecosystem; the length of operations). Based on this study's findings, the best approach to achieve desired social conservation outcomes is small-scale, community-based ecotourism. This approach will allow for the sustainable management of the focal species and ecosystem through non-consumptive use while delivering a quality MWT experience for the wildlife users (tourists, host communities, tour operators).

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Appendix I
Human Research Ethics Board Certificate of Approval

University of Victoria | Office of Research Services | Human Research Ethics Board
Administrative Services Building Rm B202 PO Box 1700 STN CSC Victoria BC V8W 2Y2 Canada
T 250-472-4545 | F 250-721-8960 | uvic.ca/research | ethics@uvic.ca

Certificate of Approval

PRINCIPAL INVESTIGATOR:	**Jackie Ziegler**	**ETHICS PROTOCOL NUMBER** Minimal Risk Review - Delegated	**15-434**
UVic STATUS:	**Ph.D. Student**	ORIGINAL APPROVAL DATE:	05-Jan-16
UVic DEPARTMENT:	**GEOG**	APPROVED ON:	05-Jan-16
SUPERVISOR:	**Dr. Phil Dearden**	APPROVAL EXPIRY DATE:	04-Jan-17

PROJECT TITLE: **Conservation outcomes and sustainability of whale shark tourism in the Philippines**

RESEARCH TEAM MEMBER Co-principal Investigator (UVic): Phil Dearden
Co-investigators (UVic): Rick Rollins, Natalie Ban
Research Partner (NGO): Alessandro Ponzo (Large Marine Vertebrates Project, Philippines)

DECLARED PROJECT FUNDING: **SSHRC (under Dr. Dearden); Robin Rigby Trust (pending); PADI Foundation (pending)**

CONDITIONS OF APPROVAL

This Certificate of Approval is valid for the above term provided there is no change in the protocol.

Modifications
To make any changes to the approved research procedures in your study, please submit a "Request for Modification" form. You must receive ethics approval before proceeding with your modified protocol.

Renewals
Your ethics approval must be current for the period during which you are recruiting participants or collecting data. To renew your protocol, please submit a "Request for Renewal" form before the expiry date on your certificate. You will be sent an emailed reminder prompting you to renew your protocol about six weeks before your expiry date.

Project Closures
When you have completed all data collection activities and will have no further contact with participants, please notify the Human Research Ethics Board by submitting a "Notice of Project Completion" form.

Certification

This certifies that the UVic Human Research Ethics Board has examined this research protocol and concluded that, in all respects, the proposed research meets the appropriate standards of ethics as outlined by the University of Victoria Research Regulations Involving Human Participants.

Dr. Rachael Scarth
Associate Vice-President Research Operations

Certificate Issued On: 05-Jan-16

15-434 Ziegler, Jackie

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Certificate of Renewed Approval

PRINCIPAL INVESTIGATOR:	**Jackie Ziegler**	**ETHICS PROTOCOL NUMBER** Minimal Risk Review - Delegated	**15-434**
UVic STATUS:	**Ph.D. Student**	ORIGINAL APPROVAL DATE:	05-Jan-16
UVic DEPARTMENT:	**GEOG**	RENEWED ON:	12-Jan-17
SUPERVISOR:	**Dr. Phil Dearden**	APPROVAL EXPIRY DATE:	04-Jan-18

PROJECT TITLE: **Conservation outcomes and sustainability of whale shark tourism in the Philippines**

RESEARCH TEAM MEMBER
Co-principal Investigator (UVic): Phil Dearden
Co-investigators (UVic): Rick Rollins, Natalie Ban
Research Partner (NGO): Alessandro Ponzo (Large Marine Vertebrates Project, Philippines)

DECLARED PROJECT FUNDING: **SSHRC (under Dr. Dearden); Robin Rigby Trust (pending); PADI Foundation (pending)**

CONDITIONS OF APPROVAL

This Certificate of Approval is valid for the above term provided there is no change in the protocol.

Modifications
To make any changes to the approved research procedures in your study, please submit a "Request for Modification" form. You must receive ethics approval before proceeding with your modified protocol.

Renewals
Your ethics approval must be current for the period during which you are recruiting participants or collecting data. To renew your protocol, please submit a "Request for Renewal" form before the expiry date on your certificate. You will be sent an emailed reminder prompting you to renew your protocol about six weeks before your expiry date.

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Dr. Rachael Scarth
Associate Vice-President Research Operations

Certificate Issued On: 16-Jan-17

15-434 Ziegler, Jackie

Appendix II
Responses to Chapter 3

In response to: Meekan, M., and Lowe, J. (2019a). Does provisioning for tourism harm whale sharks at Oslob? A review of the evidence and reply to Ziegler et al. (2018). Tourism Management, in press. DOI: 10.1016/j.tourman.2019.02.003

Reference: Ziegler et al. (2019). Applying the precautionary principle when feeding an endangered species for marine tourism. *Tourism Management* 72: 155-158.

Abstract

Ziegler et al. (2018) assessed tourists' perceptions of the ethics of feeding an endangered species for tourism purposes. The ethical decisions made, and justifications provided, were assessed using utilitarian and animal welfare ethical philosophies. We concluded that despite the substantial social and economic benefits of this activity, it remains unclear whether these benefits outweigh the potential costs to the whale sharks, the community, and the greater environment. There is no evidence that provisioning is not detrimental to the sharks. Consequently, we invoke the precautionary principle whereby the onus to prove no detrimental impact should be on the proponents of provisioning whale sharks. Due to the lack of published, peer-reviewed "robust and unequivocal" scientific evidence of the impacts of this activity alluded to by Meekan and Lowe, our conclusions stand until thorough cost-benefit analyses are completed.

Keywords

Wildlife tourism ethics, Marine wildlife tourism, Tourism impacts, Precautionary principle, Shark tourism, Wildlife provisioning, Ecotourism

Introduction

We would wish to thank Meekan and Lowe for their comments on whale shark feeding at Oslob in the Philippines. Unfortunately, their comments were misdirected and failed to understand that we were reporting **tourist perspectives** of the activity. While their opinion piece was about whale shark tourism at Oslob, it did not pertain to the data or analysis presented in Ziegler et al. (2018). Below are our clarifications as well as our responses to Meekan and Lowe's broader claims.

We did not find evidence (nor was any provided by Meekan and Lowe) that studies have adequately demonstrated that provisioning does not have a detrimental impact on whale sharks. Consequently, we invoke the precautionary principle.

The precautionary principle states that "if a wildlife tourism action has a suspected risk of causing bodily harm to animals or their habitat, in the absence of scientific consensus that the action is harmful, then the burden of proof that it is *not* harmful falls on those proposing the action" (Burns et al., 2011, p. 187). We believe the onus to prove no detrimental impact should be on the proponents of provisioning whale sharks. Forty years ago, bears were regularly provisioned for tourism throughout many parks in North America; we now know this was very detrimental to their health, but it took a long time for that research to be conclusive, time during which ongoing impacts took place. Attaining baseline data, comparative studies, and physiological data is very time consuming and, in many cases, inconclusive in such a variable-noisy environment.

Meekan and Lowe incorrectly interpret the precautionary principle. For them, this is to protect the human component of the tourist interaction rather than the target species. According to the literature, their stance can be defined as a "business as usual" approach,

rather than an application of the precautionary principle (Burns et al., 2011; Dwyer, 2018; Fennell & Ebert, 2004; Higham et al., 2016; Rodger, Smith, Newsome, & Moore, 2011). Dwyer (2018) defines the "business as usual" approach as one in which "financial returns, economic growth, jobs, rising incomes, production, facilities, investment, and expanded numbers [are] indicators of a successful tourism industry" (p.31), rather than a tourism industry focused on triple bottom line sustainability (i.e., people, economy, and environment).

Our paper reports on a single aspect of a larger ongoing body of research on whale shark tourism in Oslob. We state clearly that (1) there is a need for more ecological impact research, (2) our findings are based on tourist perspectives and (3) those tourist perspectives are part of a larger ethical framework within the wildlife tourism literature. We advocate a precautionary approach based on our experience and literature concerning provisioning elsewhere, as well as the data deficient environment in which we work. We continue to support that recommendation.

The next sections discuss some of the claims made by Meekan and Lowe.

Claim 1: Biological impacts

Meekan and Lowe argue that "the lack of evidence of causal relationships between provisioning, behaviour and residency times" should negate the conclusions drawn in Ziegler et al (2018) regarding the ethics of this activity because they "lack any empirical basis". While Meekan and Lowe may disagree with the conclusions of previous peer-reviewed publications on the impacts of provisioning sharks in Oslob (e.g., Araujo et al., 2014; Schleimer et al., 2015; Thomson et al., 2017), this does not negate the conclusions drawn in Ziegler et al. (2018). Simply put, we did not base our conclusions on biological

impact data. Our paper outlined potential costs and benefits of this activity **based on the tourists' responses** in our data set as well as an exhaustive literature review. Potential benefits of shark tourism in Oslob included human enjoyment, providing economic incentives to protect whale sharks and the greater environment, education, benefits to the local economy and community, and scientific research opportunities. Costs included potential negative impacts on the focal species, the greater marine environment, and the community. Some of the potential benefits were eliminated because they were not applicable for this particular site (e.g., education, research), while we highlighted the social and economic benefits for the operators and local community.

We further discussed three peer-reviewed studies that assessed potential negative biological impacts of the activity at Oslob, as well as highlighted the need for more studies assessing the physiological impacts of provisioning on the sharks. We stated that "in the face of the unknown welfare status of whale sharks at this site, a precautionary approach should be taken, especially considering this species is endangered, and a negative welfare status should be assumed until evidence is available to disprove it" (p. 270), as suggested by Sorice et al. (2003). Meekan and Lowe argue that the impact studies to date do not provide adequate proof that these activities are having a negative impact on the sharks because of the "lack of baselines and limited methodological approaches". This assertion, in fact, supports our argument that there is currently insufficient data to make a final determination regarding the ecological costs of whale shark provisioning.

We concluded that "until the impacts of these [provisioned tourism] activities are fully understood and the animal welfare status of the activity is fully assessed, a precautionary approach should be used, as the cost-benefit analysis required in a utilitarian

approach cannot be realized without a complete picture of the ecological costs of the activity on the sharks" (p.271).

Claim 2: Tourists should feel guilty

Meekan and Lowe's argument that "the central claim of the work by Ziegler et al. (2018) that tourists visiting the site should feel guilty about enjoying their experience is not grounded in reality" shows a lack of understanding of the purpose of our paper. The data presented was directly from tourist comments and surveys. We did not assign feelings of guilt to the tourists—the tourists themselves reported feeling guilty for participating in an activity that they personally identified as ecologically questionable; something that has been observed in other wildlife tourism activities (Curtin, 2006; Curtin & Wilkes, 2007; Mkono & Holder, 2019; Shani, 2009), including provisioned pelagic bird tourism (Lück & Porter, 2018).

For example, one tourist review stated, "We appreciate that this a controversial practice and we had mixed feelings before we began, but wanted to judge for ourselves. The concerns which have been raised by others are entirely legitimate […] as an experience, however, it was incredible. Being so close to these beautiful, amazing creatures was unreal and is a memory we will hold dear for years to come" (p. 268). Another review stated, "I feel like such a hypocrite for leaving this review but I must say, now that I have seen it first hand, I now know that it is a great injustice to the animals […] I'm sure there are safer and better ways to see them in their natural habitat without hurting them" (p.268). Furthermore, the "guilty pleasure" category was a coding segment based on TripAdvisor reviewers who used this term when describing their experience (e.g., "it was a guilty pleasure for me", "it's a guilty pleasure environmentally", "this was a guilty pleasure on

my part", TripAdvisor 2018). Our analysis is therefore based on the reality of tourists' experiences at the site.

Claim 3: We discussed the ethics of locals

We never assessed nor claimed to assess the ethics of the local people, as claimed by Meekan and Lowe. The aim of our study was to assess "tourists' ethical perceptions of whale shark provisioning activities in Oslob, Philippines, to understand why they participated, as well as using utilitarian and animal welfare ethical philosophies to evaluate the justifications provided for supporting such activities" (p.266). The sentence referenced by Meekan and Lowe was a statement on the **institutional incentives** at play at the site, not an ethical claim of the community.

As we explained, the future of provisioning in the Philippines is uncertain. The national government of the Philippines has not yet decided if provisioned whale shark tourism will continue in the Philippines, and, if it doesn't, if Oslob will be grandfathered into new regulations. There is uncertainty about the future of this activity in Oslob and the sustainability of local livelihoods. Therefore, there is currently little institutional incentive or motivation to ensure activities are done in a sustainable manner.

The mass tourism business model employed at the site exemplifies this issue of incentives (Dearden & Ziegler, 2019). There is currently no limit on the number of people—viewers, snorkelers or divers—or boats allowed in the interaction area at one time. The limiting factor is the number of boats available. On an average day, there are over 26 outrigger boats tied to each other at any given moment in an area no bigger than 0.065 km^2 (Dearden & Ziegler, 2019). Each boat carries, on average, six to eight people, or more than 182 snorkelers. This number does not include scuba divers below the surface, or feeder

boats moving in between the lines of tourist boats with sharks in tow (Dearden & Ziegler, 2019). Local authorities state there are a minimum of 1,000 people coming through the site on a daily basis in 2018 (SunStar, 2018c). This means that half of the total visitors from a five-year period cited by Meekan and Lowe (i.e., 751,047 total tourists from 2012 to 2016) are now coming in a single year.

Crowding is a pressing issue at the site, both in terms of the number of swimmers and boats (Dearden & Ziegler, 2019; Ziegler, Dearden, et al., 2016). Virtually no environmental interpretation is provided for tourists beyond the basic do's and don'ts (e.g., no touching, stay two metres away, no sunscreen, etc.). There is little enforcement of regulations with 97% of swimmers in 2014 within two metres of the sharks suggesting there is a very high likelihood of physical contact between swimmers and sharks as many swimmers do not know how to swim (Schleimer et al., 2015). Furthermore, tourists do not "wear life jackets and no fins […] to prevent them from diving to touch sharks" at the site, as was claimed by Meekan and Lowe, but because many of the people participating in the activities do not know how to swim. Tourists may remove life jackets once in the viewing area and can wear their own fins or rent some on site. In fact, getting close to—and touching—whale sharks is a highlight for many TripAdvisor reviewers (e.g., "they swim so close to you that they end up touching you at some point with a tail or fin!", TripAdvisor, 2018), with 40% of respondents at Oslob admitting to making contact with the sharks in a 2014 survey (Ziegler et al., 2016). Many tourists are more concerned with getting a good picture with the shark than the shark's wellbeing (Ziegler et al., 2016): "Then [it's] time to start going [under] the water for your picture taking. Don't be afraid if you accidentally touch or step [on] the whale sharks when they come near you" (TripAdvisor, 2018).

Swimmers are permitted to swim freely in the interaction area although they are encouraged to stay near their boats as they must exit the area on the boat at the end of the 30-minute period. One TripAdvisor reviewer likened the experience to "a sausage machine, in one end and out the other" (TripAdvisor, 2018).

The uncontrolled growth of tourism activities at Oslob is not sustainable. The mass tourism management approach has myriad negative impacts on the community and the greater environment, as evidenced in recent press releases covering this site. For example, the Cebu provincial government is undertaking a carrying capacity assessment of Oslob to determine the appropriate number of visitors at this site (SunStar, 2018c). The assessment was prompted by a government inspection, which identified problems with "a foul smell" emitting from the whale shark interaction area, as well as complaints from tourists of rashes from swimming in the interaction area (SunStar, 2018c). The government further noted that the water quality at the site is currently unknown (SunStar, 2018c). This comes after Sumilon Island, an adjacent marine reserve also within Oslob, was closed for a one-week period in April 2018 due to significant problems with garbage—two tons of garbage was collected in a single day during the cleanup (SunStar, 2018b)—and concerns over solid waste management (SunStar, 2018a). Issues of garbage in the viewing area and adjacent waters affects both the tourist experience and whale shark health, since these sharks are filter feeders and therefore susceptible to ingesting garbage floating in the water column (Germanov, Marshall, Bejder, Fossi, & Loneragan, 2018). A recent carrying capacity assessment of Sumilon found that there are, on average, four times the allowable number of people on any given day with a carrying capacity of 522 people per day (Ambrad, 2018; Quijano, 2018). In Oslob, more than 1,000 people per day come through an area much

smaller than Sumilon Island to interact with an endangered species—a number that is expected to grow this year due to the six-month closure of Boracay (April-October 2018; (SunStar, 2018c) by the president of the Philippines due to over-development and waste management issues (Haynes, 2018). A recent inspection of Oslob by the Department of Environment and Natural Resources found that at least 47 establishments were built within the 20-metre easement zone and 34 small resorts had no wastewater discharge permits (Vestil, 2018). In fact, a government official warned Oslob that if they do not comply with environmental standards, they might face the same consequences as Boracay (Vestil, 2018). The unrestrained growth of these tourism activities in Oslob is also straining local resources. For example, in 2017, Oslob's groundwater table ran dry due to significant pressure from tourism activities (e.g., fresh water shower facilities at the interaction site, resort pools, etc.). The municipality had to rely on trucks to bring in water from Cebu City (a four-hour drive).

The management approach or business model implemented at this site is therefore one of mass tourism, not ecotourism or even sustainable tourism, and does emphasize maximizing revenue over minimizing tourism impacts and whale shark conservation (Neves, 2010).

Claim 4: Provisioned tourism has resulted in significant conservation outcomes in Oslob

While Meekan and Lowe argue that previous studies at Oslob lack "robust and unequivocal" data, the sources used to support claims of the ecological benefits in their opinion paper are unpublished and no data nor analysis are provided. For example, they claim "there are additional ecological benefits for local coral reefs with the reduction in

fishing pressure through the removal of effort". However, the validity of these claims cannot be assessed. Such a conclusion is unsubstantiated if based solely on interviews where respondents noted a decline in their fishing effort due to their participation in whale shark tourism activities—inferring a conservation outcome from self-reported behavioural changes is not the same as directly measuring those ecological benefits (Wardle et al., 2018). A perceived benefit is not "robust and unequivocal" scientific evidence that the local coral reefs are, in fact, in better health now that whale shark tourism is present, especially considering the significant environmental issues highlighted above. Meekan and Lowe would need a pre-tourism baseline dataset to prove these benefits occurred. To the best of our knowledge, such a baseline does not exist.

Conclusion

While not the focus of this research, Ziegler et al. (2018) clearly noted the substantial social and economic benefits of this activity discussed by Meekan and Lowe. However, as noted in the paper and above, it remains unclear whether these benefits outweigh the potential costs to the whale sharks, the community, and the greater environment. Based on the extensive environmental issues highlighted at the site by the local and regional government, and the lack of baseline data at the site to assess the health of the local coral reefs pre/post tourism, the environmental benefits at the moment remain unclear and are not "robust and unequivocal" as Meekan and Lowe requested in their opinion piece.

Proponents of whale shark provisioning tourism present a false dichotomy—that the choice is between hunting whale sharks or tourism. Whale sharks have been protected in Philippine waters since 1998 and there is no evidence that fishermen in Oslob ever hunted the sharks. Furthermore, we are not against locals earning a living from whale shark

tourism nor are we arguing for the site to be shut down. We do, however, believe the current conditions in Oslob are unsustainable. Our paper on tourists' perspectives is just one aspect of our investigations that seek to improve the management of whale shark tourism and make it more sustainable.

As we noted, "Matheny (2006) states that any wildlife tourism activity that claims to have benefits for either humans or the focal species should be able to provide evidence that not only fully supports such claims, but also demonstrates that a thorough cost-benefit analysis of the activity has taken place for all those who have an interest in the activity." (p.271). Due to the lack of published, peer-reviewed "robust and unequivocal" scientific evidence alluded to by Meekan and Lowe in their opinion piece, our conclusions stand until such time as thorough cost-benefit analyses are completed.

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Reference: Ziegler et al. (2019b). Using long-term integrated research programs to improve whale shark tourism at Oslob, Philippines. *Tourism Management* 74, 297-299.

In their responses to our paper (Ziegler et al., 2018, 2019a), Meekan and Lowe (2019a,b) continue to advance a straw man argument that misrepresents our past and continuing research of whale shark tourism in Oslob, Philippines. Their primary critiques center on the lack of interviews with locals and their disagreement with conclusions of three peer-reviewed biological impact studies (Araujo et al., 2014; Schleimer et al., 2015; Thomson et al., 2017). In contrast, our article is about tourists' self-reported ethical perceptions of whale shark provisioning. We have additional manuscripts focused on interviews with local operators that are currently under review. If they had issues with prior published biological and behavioural studies, then they should have responded to those studies directly, not a social science study focused on tourists' perceptions.

Their response contains direct, personal, and unfounded attacks on the ability of our research teams in Oslob. Meekan and Lowe use *ad hominem* attacks to question the integrity of the researchers involved when they insinuate that the outcomes of our studies "are predetermined by the viewpoints of researchers" and accuse us of "biased advocacy". We have a very experienced team of social scientists specializing in marine wildlife tourism. We do not have all the answers, but we are confident that both here and elsewhere

we conduct sound research that is undeserving of the accusations of Meekan and Lowe (2019a,b).

Contrary to Meekan and Lowe's assertions, our research teams are intimately familiar with the local situation. We have had researchers based at the site every day for the last 7 years who work closely with both the local community and the Local Government Unit of Oslob. Members of our team sit on the site advisory committee at Oslob. They are actively working with the community, as well as municipal and provincial government officials, to determine acceptable tourism carrying capacity numbers for the site.

Meekan and Lowe's experience at Oslob is restricted to 19 interviews conducted over a few weeks with unspecified local officials and community members, using an unspecified survey instrument (Lowe & Tejada, 2019). Our research record at the site consists of over 2,500 days in the water and over 2,000 visitor surveys over the last 7 years, as well as continual participation in local meetings with the community and officials since official tourism activities commenced at this site in 2012. Our "unsubstantiated claims" regarding negative impacts on whale shark health or poor water quality and rubbish discarded by tourists are based on the views of such officials, as are the threats to shut down the site if it isn't managed more sustainably. It is totally fallacious to fault the validity and effort we have invested at the site in comparison to the brief field sojourn made by Meekan and Lowe.

Meekan and Lowe claim the impetus for limiting tourist numbers at Oslob stems from the community (bottom-up approach), when, in fact, it was initiated by the provincial government (top-down approach). Furthermore, plans to limit tourist numbers are on hold after local stakeholders (i.e., local businesses) complained about the impact of such limits

on their income. The boatmen's association, TOSWFA, meanwhile, have accepted Ziegler et al.'s (2018) results on tourists' willingness to pay and they support limiting tourist numbers at Oslob if the tour price increases in due time. These outcomes are the result of meetings held with local, provincial, and regional stakeholders at which the authors participated.

Meekan and Lowe (2019a,b) also make unfounded claims regarding conservation benefits of whale shark tourism activities at Oslob, primarily based on key informant interviews outlined in Lowe and Tejada (2019). Key informant interviews as a standalone method is an inappropriate approach to assess ecological conservation outcomes (Bergseth, Russ, & Cinner, 2015; Coad et al., 2015; St John, Edwards-Jones, & Jones, 2011; Wardle et al., 2018); triangulation using a variety of approaches is essential (Bergseth et al., 2015). Participant observation is a more robust method to track behavioural changes in illegal fishing methods, and should be paired with biological assessments to assess coral reef health, fisheries health, and the effectiveness of marine protected areas (MPAs).

While Meekan and Lowe assert positive conservation outcomes, Sumilon Island, one of five MPAs supported by funds from whale shark tourism in Oslob[7], was shut down by the Cebu government in 2018 due to accumulated garbage and human waste management. Further, an assessment of coral reef health in Oslob found that whale shark provisioning was having a negative impact on the reefs (Wong et al., 2019), and interviews with TOSWFA members determined that most still fish despite working in whale shark tourism (Ziegler et al., under review). It is ironic that Meekan and Lowe critique us for a

[7] Sumilon Island was one of the first MPAs established in the Philippines in 1974; any positive ecological outcomes (e.g., coral and fish biomass, etc.) is therefore not due to whale shark tourism at Oslob, as it predates these activities by nearly four decades.

lack of data, but make unfounded assertions regarding conservation benefits of whale shark tourism. We invoked the precautionary principle for this exact reason; the onus needs to be on proof of conservation benefits, not proof of negative impacts.

Meekan and Lowe further claim that there are no problems with unequal distribution of benefits within the community of Oslob; yet Lowe and Tejada (2019), the publication upon which these claims are based, focused primarily on interviews with the locals of Tan-awan, only 1 of 21 barangays (or villages) within Oslob. Furthermore, Lowe and Tejada (2019) only conducted 19 interviews and did not state how many of each group (elected officials, TOSWFA members, Tan-awan fishermen, etc.) were interviewed. Based on approximately 4,600 households in Oslob (Philippine Statistics Authority, 2019), a representative, household-level socio-economic survey would require a minimum of 355 respondents from all 21 barangays (95% confidence interval, 5% error). It is therefore unclear how they can claim there are no conflicts within the larger community, nor can they claim that they have completed a thorough socio-economic assessment of the municipality (Meekan & Lowe, 2019a), as we suggested was needed at the site (Ziegler et al., 2018).

Despite Meekan and Lowe's claims, there are issues of unequal distribution of benefits at the site. To work in whale shark tourism, one must be a resident of Tan-awan or related to someone who is. The 177 TOSWFA members who work in tourism represent less than 1% of the total municipal population, while Tan-awan represents 5% of this population; yet TOSWFA and Tan-awan retain 70% of income generated from this site (equivalent to approximately US$7 million in 2018; Dearden & Ziegler, 2019). Interviews with locals from neighbouring barangays in Oslob identified problems with conflict and

unequal distribution of benefits in the broader community (Dearden & Ziegler, 2019). When whale shark tourism first started in Tan-awan, neighbouring barangays within Oslob wanted to develop similar activities in their own waters or rotate the barangay in charge of managing tourism in Oslob on a monthly basis. However, the mayor of Oslob at the time decided to allow only Tan-awan to offer whale shark tourism in municipal waters (Dearden & Ziegler, 2019). There is clearly a need to further explore issues with unequal distribution of benefits and conflict within the wider community.

In conclusion, as we noted in Ziegler et al. (2018, 2019), legitimate questions remain regarding provisioning this endangered species for tourism. Further research is needed to complete a thorough cost-benefit analysis of the activity to determine if the benefits to the community outweigh the costs, as well as to ascertain appropriate use levels (e.g., Limits of Acceptable Change; Bentz et al., 2016; Duffus & Dearden, 1990; Roman et al., 2007). Until such analyses are completed, the precautionary principle should be applied to minimize actual and potential negative impacts on the community, sharks, and wider marine environment.

We are not against locals earning a living from whale shark tourism; in fact, we have been amongst the earliest and strongest advocates for shark tourism as a conservation intervention (Bentz et al., 2014; Dearden et al., 2008; Topelko & Dearden, 2005; Ziegler, Dearden, et al., 2016; Ziegler et al., 2012). We are also not arguing for the site to be shut down, reflected in our active involvement with both local and regional stakeholders. However, our research strongly suggests that current conditions in Oslob are unsustainable and changes are required if the site is to deliver positive outcomes for conservation and livelihoods. We undertake daily research at the site to provide greater understanding of this

complex socio-ecological system and as an input to improve management. The paper which started this thread (Ziegler et al., 2018) was only one input into this complicated situation, but serves to illustrate the challenges faced by tourism management in our globalized world where endangered species, low-income communities, social media, science, and government meet.

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Appendix III
Tour Operator Interview Instrument

Semi-structured interviews: Whale shark tourism guides/captains

Interview date (DD/MM/YY)	
Length of interview	
Barangay	
Municipality	
Interviewer Name	

Part 1 Background

1. Which barangay do you live in? _____

2. How many years have you lived in this village? _____ years

3. Where are you from originally? _____

4. How old are you? _____ years

5. How many years of education have you completed? _____

6. How many people live in your household? _____ people

7. What are your household's main sources of income/livelihood?

Part 2 Fishing

8. Do you fish? 1 Yes 2 No

If no, were you ever a fisherman in the past? 1 Yes 2 No

If no, skip to Part 3 Whale shark tourism.

9. If you fish, currently or in the past, about how many years have you been a fisherman?

_____ years

10. Do/did you fish full time or part time?

1 Full time

2 Part time

If no longer a fisherman, skip to Part 3 Whale shark tourism.

11. Could you estimate your average daily income from fishing?

_____ PHP average daily income from fishing

12. Thinking about the past 12 months, please estimate what percent of your income for the year has come from fishing, and from other sources.

_____ percent income from fishing in the past year

_____ percent of income from other sources in the past year

13. During the past year, about how many fish do you catch on average per day?
_____ kg

14. Thinking now about the effort it took to catch this fish during the past year (i.e., amount of time to catch your average daily amount of fish), how would you compare this effort to the effort required to catch this much fish 10 years ago? Would you say this effort was about the same as 10 years ago, more effort than 10 years, or less effort compared to 10 years ago?

1 same as previous years

2 more effort than previous years

3 less effort compared to previous years

15. If effort has changed, about what percentage has it changed compared to previous years? _____

How has it changed?

Part 3 Whale shark tourism

16. How long have you been working in the whale shark tourism industry?
_____

17. In what capacity?

1 Guide 2 Feeder 3 Captain 4 Spotter 5 Other
_____

18. What is your average daily income from whale shark tourism?
_____ PHP

19. About how many days a week do you participate in whale shark tourism?

_____ days

20. About how many months of the year do you participate in whale shark tourism?

_____ months

21. What do you think of whale shark tourism here in (Donsol, Oslob, Leyte, Palawan)?

PROD:

(1) How has whale shark tourism affected the local economy?

(2) How has whale shark tourism affected the marine environment (and whale sharks)

(3) How has whale shark tourism changed your community?

(4) How have interactions with (foreign) tourists changed your community?

(5) How has whale shark tourism changed you and your family?

22. Has your view of whale sharks changed since the beginning of whale shark tourism?

1 Yes 2 No

If yes, how?

*** If stated that they do not fish, nor ever fished, skip to Part 4 Attitudes towards whale sharks ***

23. Has your participation in whale shark tourism changed the amount of fishing you do?

1 Yes

2 No

If yes, has it increased or decreased?

1 increased

2 decreased

By about what percentage has your fishing changed (e.g., by about how many hours do you fish more or less on a daily basis)? _____

Why has your fishing changed?

Why do you still fish?

24. Before whale shark tourism, was fishing your main income?

1 Yes

2 No

25. Since you started working in whale shark tourism, is fishing your main income?

1 Yes

2 No

If not, what is your main income?

Part 4 Attitudes towards whale sharks

26. Do you like whale sharks?

1 Like 2 Neutral 3 Dislike

27. Do you think whale sharks are an important animal in the Philippines?

1 Yes 2 No 3 I don't know

28. Do you think whale sharks should be protected from being killed?

1 Yes 2 No 3 I don't know

29. Will the Philippines change if whale sharks become extinct?

1 Yes 2 No 3 I don't know

30. How much do you want to protect whale sharks?

1 none 2 a little 3 mostly 4 a lot

31. How much do you want to protect the marine environment?

1 none 2 a little 3 mostly 4 a lot

32a. Have you changed your behaviour to protect whale sharks since whale shark tourism has been in your village?

1 Yes 2 No 3 I don't know

b. If yes, how have you changed your behaviour?

33a. Have you changed your behaviour to protect the marine environment since whale shark tourism has been in your village?

1 Yes 2 No 3 I don't know

b. If yes, how have you changed your behaviour?

Part 5 Value orientations

34. To what extent do you agree or disagree with the following statements about marine wildlife and the environment?

		Strongly disagree ⇩	Disagree ⇩	Neither ⇩	Agree ⇩	Strongly agree ⇩
A	Marine wildlife should be protected for its own sake rather than to simply meet the needs of humans	1	2	3	4	5
B	The primary value of marine wildlife is to provide for humans	1	2	3	4	5
C	Recreational use of marine wildlife should not be allowed if it negatively affects these animals	1	2	3	4	5

D	The needs of humans are more important than those of marine wildlife	1	2	3	4	5
E	Humans should manage marine wildlife so that humans benefit	1	2	3	4	5
F	Marine wildlife should have rights similar to the rights of humans	1	2	3	4	5
G	Recreational use of marine wildlife is more important than protecting the species	1	2	3	4	5
H	Marine wildlife has value whether humans are present or not	1	2	3	4	5

35. Is there anything else you would like to add?

Appendix IV
Ex-Whale Shark Hunter Interview Instrument

Semi-structured interviews: Talisayan interviews

Interview date (DD/MM/YY)	
Length of interview	
Barangay	
Municipality	
Interviewer Name	

Part 1 Background

1. Which barangay do you live in? _____

2. How many years have you lived in this village? _____ years

3. Where are you from originally? _____

4. How old are you? _____ years

5. Gender: _____

6. How many years of education have you completed? _____

7. How many people live in your household? _____ people

8. What are your household's main sources of income/livelihood?

Part 2 Fishing

9. Do you fish? 1 Yes 2 No

If no, were you ever a fisherman in the past? 1 Yes 2 No

If no, stop interview.

10. If you fish, currently or in the past, about how many years have you been a fisherman?

_____ years

11. Do/did you fish full time or part time?

1 Full time

2 Part time

If no longer a fisherman, skip to Part 3 Whale shark fishery.

12. Could you estimate your average daily income from fishing?

_____ PHP average daily income from fishing

13. Thinking about the past 12 months, please estimate what percent of your income for the year has come from fishing, and from other sources (listed in Q8).

_____ percent income from fishing in the past year

_____ percent of income from other sources in the past year

14. During the past year, about how many fish do you catch on average per day?
_____ kg

15. Thinking now about the effort it took to catch this fish during the past year (i.e., amount of time to catch your average daily amount of fish), how would you compare this effort to the effort required to catch this much fish in previous years? Would you say this effort was about the same as previous years, more effort than previous years, or less effort compared to previous years?

1 same as previous years

2 more effort than previous years

3 less effort compared to previous years

16. If effort has changed, about what percentage has it changed compared to 10 years ago? _____

How/why has it changed?

Part 3 Whale shark fishery

17a. Did you ever fish for whale sharks?

1 Yes 2 No

If no, skip to Q18*.

b. If yes, how many years did you fish for whale sharks? _____ years

c. About how many whale sharks did you catch per year? _____ whale sharks caught/year

d. How did you catch whale sharks (e.g., net, harpoon)?

e. Why did you hunt whale sharks (e.g., personal consumption, to sell meat, to sell fins, cultural)?

f. Was fishing for whale sharks your main source of income?

1 Yes 2 No

If no, what was your main source(s) of income?

_____

g. If you sold whale shark meat/fins, where did you sell it (local market, fish vendor, etc.)?

h. How much did you sell whale shark meat/fins for (price/kg), on average?

price for fins _____ /kg

price for meat _____ /kg

other (_____) _____ /kg

i. Did the price for whale shark meat/fins vary much over the years?

1 Yes 2 No

If yes, how did it vary?

18*. How many years did your village hunt whale sharks for? _____ years

19. Why did your village stop fishing whale sharks?

20. What do you think of the ban on whale shark hunting?

21. If it were still legal, would you like to continue hunting whale sharks today?

1 Yes 2 No

Why or why not?

22. Besides hunting whale sharks, have you had any other interactions with whale sharks?

1 Yes 2 No

If yes, please provide examples (e.g., caught in fishing nets, swam with them, etc.):

23. Has your view of whale sharks changed since you stopped hunting whale sharks (i.e., the way you think of them)?

1 Yes 2 No

If yes, how? If not, how do you think of whale sharks?

Before:

Now:

Part 4 Perceptions of whale shark tourism

24. Would you support starting whale shark tourism in your village?

1 Yes 2 No

Why or why not?

25. Would you work in whale shark tourism if it started in your village?

1 Yes 2 No

Why or why not?

PRODS (1) How do you think whale shark tourism will affect the local economy in your community?

(2) How do you think whale shark tourism will affect the ocean and whale sharks (positive or negative)?

(3) How do you think whale shark tourism will change your community?

(4) How do you think interactions with (foreign) tourists will affect your community?

(5) How do you think whale shark tourism will affect you and your family?

Part 4 Attitudes towards whale sharks

26. Do you like whale sharks?

1 Like 2 Neutral 3 Dislike

27. Do you think whale sharks are an important animal in the Philippines?

1 Yes 2 No 3 I don't know

28. Do you think whale sharks should be protected from being killed?

1 Yes 2 No 3 I don't know

29. Will the Philippines change if whale sharks become extinct?

1 Yes 2 No 3 I don't know

30. How much do you want to protect whale sharks?

1 none 2 a little 3 mostly 4 a lot

31. How much do you want to protect the marine environment?

1 none 2 a little 3 mostly 4 a lot

32a. Have you done anything to help protect whale sharks (e.g., release from net, etc.)?

1 Yes 2 No 3 I don't know

b. If yes, how have you helped protect whale sharks? If not, how do you treat them?

33a. Have you done anything to help protect the ocean (e.g., pick up garbage on beach, use more sustainable fishing methods, etc.)?

1 Yes 2 No 3 I don't know

b. If yes, how have you helped protect the ocean? If not, how do you treat the ocean?

Part 5 Value orientations

34. To what extent do you agree or disagree with the following statements about marine wildlife and the environment?

		Strongly disagree ⇩	Disagree ⇩	Neither ⇩	Agree ⇩	Strongly agree ⇩
A	Marine wildlife should be protected for its own sake	1	2	3	4	5

	rather than to simply meet the needs of humans					
B	The primary value of marine wildlife is to provide for humans	1	2	3	4	5
C	Recreational use of marine wildlife should not be allowed if it negatively affects these animals	1	2	3	4	5
D	The needs of humans are more important than those of marine wildlife	1	2	3	4	5
E	Humans should manage marine wildlife so that humans benefit	1	2	3	4	5
F	Marine wildlife should have rights similar to the rights of humans	1	2	3	4	5
G	Recreational use of marine wildlife is more important than protecting the species	1	2	3	4	5
H	Marine wildlife has value whether humans are present or not	1	2	3	4	5

35. Do you have any other issues or concerns you would like to talk about (e.g., local fishery, environment, tourism, etc.)?

Appendix V
Whale Shark Tourism Questions - Raw Data Tables

1. Which barangay do you live in?

Community (Municipality)			
Oslob	Donsol	Pintuyan	Talisayan
Alo, Kangkwaii, Tan-awan, Bunbun, Bangcogon	Tinanogan, Ogod, Vinisitahan, Dancalan, San Rafael, Sibago, Gimagaan, Mabini, Santa Cruz	Sonok I, Sonok II	Guiwanon

2. How many years have you lived in this village?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Mean years lived in the village (SE)	26.06 (2.893)	40.04 (2.363)	36.08 (2.365)	45.88 (17.894)

3. Where are you from originally?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Local (%)	64.0	95.8	80.0	80.0
Not local (%)	36.0	4.2	20.0	20.0

4. How old are you?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Mean age (SE)	35.12 (2.041)	42.67 (1.586)	42.15 (2.028)	55.96 (2.300)

5. How many years of education have you completed?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Mean years of education (SE)	10.12 (0.540)	9.79 (0.417)	9.38 (0.380)	6.40 (0.473)

6. How many people live in your household?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Mean number of people in household (SE)	5.80 (0.493)	5.88 (0.331)	5.73 (0.343)	6.04 (0.570)

7. What are your household's main sources of income/livelihood?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Fishing (%)	60.0	75.0	82.5	92.0
Labour (%)	4.0	12.5	47.5	52.0
Agriculture (%)	20.0	41.7	75.0	28.0
Tourism (%)	100	100	100	-

Professional (%)	12.0	16.7	25.0	16.0
Mean number of income sources per household (SE)	1.96 (0.158)	2.50 (0.659)	3.43 (0.107)	1.88 (0.167)

8. Do you fish?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Yes, current (%)	60.0	79.2	85.0	84.0
Yes, in the past (%)	16.0	12.0	15.0	16.0
No (%)	24.0	8.8	0.0	0.0

9. If you fish, currently or in the past, about how many years have you been a fisherman?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Mean years fishing (SE)	14.46 (2.924)	23.92 (2.532)	18.48 (1.934)	35.80 (2.412)

10. Do/did you fish full time or part time?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Full time (%)	5.6	26.3	17.5	66.7
Part time (%)	94.4	73.7	82.5	33.3

11. Could you estimate your average daily income from fishing?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan

Mean daily income from fishing in PHP (SE)	405.36 (77.927)	339.29 (61.613)	219.48 (28.132)	226.67 (44.766)

12. Thinking about the past 12 months, please estimate what percent of your income for the year has come from fishing, and from other sources.

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Mean % income from fishing (SE)	11.19 (3.344)	39.17 (5.356)	27.16 (3.239)	59.32 (7.395)
Mean % income from agriculture (SE)	4.55 (2.630)	6.67 (2.034)	29.65 (3.801)	12.73 (6.001)
Mean % income from tourism (SE)	80.24 (4.787)	40.08 (3.790)	18.05 (2.093)	-
Mean % income from other (SE)	3.64 (2.833)	15.33 (3.704)	27.84 (5.139)	34.77 (7.469)

13. During the past year, about how many fish do you catch on average per day?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Mean daily catch in KG in last year	2.667 (0.3297)	28.421 (5.1527)	10.029 (4.6456)	3.214 (0.6168)

14. Change in fishing effort in last 10 years

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan

Same as previous years (%)	20.0	5.3	5.9	31.3
More effort than previous years (%)	53.3	94.7	94.1	62.5
Less effort compared to previous years (%)	26.7	0.0	0.0	6.3

15. If effort has changed, about what percentage has it changed compared to previous years?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
Mean percent change in fishing effort in last 10 years	37.50 (28.415)	54.58 (6.197)	49.06 (3.637)	58.57 (12.427)

How/why has it changed?

Community (Municipality)			
Oslob	Donsol	Pintuyan	Talisayan
Fishes in group instead of alone, illegal fishing, fewer fishers, commercial vessels, lost access to fishing grounds (interaction area), increased experience/knowledge, many fishers, many types of fishing gear, climate change, fish numbers increased because interaction	Many fishers, fewer fish, commercial vessels	Harder now, many fishers, fewer fish, many types of fishing gear, increased human population, fishing ordinances/restrictions	Fewer fish, fish further away, many types of fishing gear, seasonal, many fishers, mechanized fishing, illegal fishing, fish day and night,

area acts as MPA, fish are smaller now			

16. How long have you been working in the whale shark tourism industry?

	Oslob	Donsol	Pintuyan	All sites
Mean years working in whale shark tourism (SE)	4.060 (0.2804)	14.771 (1.0968)	6.140 (0.6836)	

17. In what capacity?

	Oslob	Donsol	Pintuyan
Guide (%)	20.0	45.8	15.0
Feeder (%)	4.0	-	-
Captain (%)	-	33.3	-
Spotter (%)	-	4.2	82.5
Boatman (%)	64.0	8.3	-
Maintenance (%)	8.0	4.2	-
Frontliner (%)	4.0	4.2	-
Chairman	-	-	2.5

18. What is your average daily income from whale shark tourism?

	Oslob	Donsol	Pintuyan
Mean daily income from whale shark tourism in PHP (SE)	701.00 (80.396)	405.00 (40.127)	289.74 (31.982)

19. About how many days a week do you participate in whale shark tourism?

	Oslob	Donsol	Pintuyan	Talisayan
Mean number of days a week work in whale shark tourism (SE)	6.72 (0.178)	2.98 (0.302)	2.55 (0.193)	

20. About how many months of the year do you participate in whale shark tourism?

	Oslob	Donsol	Pintuyan
Mean months work in whale shark tourism per year (SE)	11.48 (0.312)	5.77 (0.190)	6.70 (0.298)

21. Perceptions of whale shark tourism

	Community (Municipality)			
Prompts	Oslob	Donsol	Pintuyan	Talisayan
Economy	Improved local economy, improved livelihood, improved the community, no effect on the local economy, improved quality of life	Improved the local economy, improved livelihood, improved quality of life, improved the community, no effect on the local economy	Improved livelihood, issues with local governance	Others will benefit, livelihood, no government follow through, loss of income (from ban), unclear because plans not yet explained, only tourists will benefit,
Affect the sharks/ocean	Improved protections for sharks and ocean, no effect, tourists don't	Improved ocean health, improved conservation awareness and knowledge,	Improved conservation awareness and knowledge, no effect,	no negative impacts on sharks, tourists will guard

	follow the rules, improved conservation awareness and knowledge	improved protections for sharks and ocean, no effect	scientific tagging/research may negatively affect whale sharks, improved protections for sharks and ocean, tourists don't follow the rules, tourists help protect the ocean and sharks	the sharks/ocean, increase whale shark numbers,
Affect the community	Improved job opportunities, improved quality of life, improved infrastructure, improved the community,	Improved job opportunities, improved infrastructure, improved quality of life, improved conservation knowledge and awareness	Improved job opportunities, improved livelihood, improved local fishery, improved conservation awareness	improves community (more festive), improved livelihood, more government prohibitions/restrictions,

	improved livelihood, no effect, improved conservation awareness and knowledge, jealousy		and knowledge, improved the community,	unclear because plans not yet explained, allowed to hunt sharks again, loss of income, jealousy, unequal distribution of benefits, no change
Interaction with foreign tourists	No impact, opportunity to practice English and learn other languages, improved self-esteem, negative effect on town - roads are congested and increased issue with garbage	No issues, improved foreign language skills, issue with foreigners wearing inappropriate clothes (e.g., bikinis in town)	Viewed as positive opportunity to interact with people from other cultures/places and practice English, no problems, issues with language barrier	Tourism not feasible here, no effect, language/education barrier, improve community, no effect, positive to interact with/see foreigners

Change you and your family	Improved quality of life, improved livelihood, improved conservation awareness and knowledge	Improved livelihood, improved quality of life, improved conservation awareness and knowledge	Improved livelihood, improved conservation awareness and knowledge, improved skills	Additional income, unclear because plans not yet explained, no effect, no change because we will be excluded, will be forced to move (hut near ocean), loss of income

22. Has your view of whale sharks changed since the beginning of whale shark tourism?

	Communities			
	Oslob	Donsol	Leyte	Talisayan
Change in perception towards whale sharks				
Yes	**18**	**23**	**38**	**13**
Positive (n=total number of interviews)	**18**	**23**	**38**	**1**
intrinsic value	5	1	2	-
aids fishery	-	-	9	1
emotional connection	-	2	4	-
no longer afraid	13	15	4	-
livelihood	9	8	30	-
value whale sharks	5	10	36	-
gentle/friendly	2	4	2	-
no longer perceived as pest	-	8	-	-
excited to see whale sharks	-	5	2	-
Negative	**0**	**0**	**0**	**12**
scared	-	-	-	2
dangerous	-	-	-	5
envious	-	-	-	7
pest	-	-	-	3
No	**7**	**1**	**2**	**10**
Positive	**1**	**1**	**2**	**2**
intrinsic value	**-**	-	-	2

aids fishery	-	-	-	1
emotional connection	-	-	-	1
no longer afraid	-	-	-	-
livelihood	-	-	-	-
value whale sharks	-	-	-	-
gentle/friendly	1	-	-	-
Negative	**0**	**0**	**0**	**8**
scared	-	-	-	1
dangerous	-	-	-	1
pest	-	-	-	5
Neutral	**6**	**0**	**0**	**2**

23. Has your participation in whale shark tourism changed the amount of fishing you do?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
No (%)	12.5	59.1	80.6	-
Why has your fishing not changed?		Tourism only part-time	Fish at night, work in tourism only part-time	
Yes (%)	87.5	40.9	19.4	-
Increased (N)	0	0	2	-
Mean percent increase in fishing (SE)	-	-	45 (35.0)	-
Decreased (N)	14	9	5	-

Mean percent decrease (SE)	-54.93 (7.848)	-66.67 (7.546)	-26.0 (9.138)	-
Why has your fishing changed?	Less time to fish, too tired	Less time to fish	Unreliable income, less time to fish, finds new place to fish while working in WST,	
Why do you still fish	Subsistence, enjoys fishing, prefers fresh fish, livelihood	Tourism seasonal, livelihood, subsistence, enjoys fishing	Subsistence, livelihood, enjoys fishing	
Why did you stop fishing?	Too tired, no time, sufficient income from tourism	No fish to catch, no time	No boat	

Q24. Before whale shark tourism, was fishing your main income?

	Community (Municipality)			
	Oslob	Donsol	Pintuyan	Talisayan
% respondents whose main income was fishing before WST	52.0	87.5	35.5	55.4
% respondents whose main income is fishing after WST	0.0	45.8	33.3	-
Main income after WST if not fishing	Tourism	Tourism, Labour, Professional	Agriculture, Labour, Tourism, Professional	-

Q26-Q29 Attitudes towards whale sharks

	Communities			
	Oslob	Donsol	Pintuyan	Talisayan
% respondents who like whale sharks	100.0	100.0	100.0	76.0
% respondents who believe whale sharks are an important animal in the Philippines	100.0	100.0	100.0	44.0
% respondents who believe whale sharks should be protected from being killed	100.0	100.0	100.0	16.0
% respondents who believe the Philippines will change if whale sharks go extinct	64.0	70.8	87.5	8.0

30. How much do you want to protect whale sharks?

	Communities			
	Oslob	Donsol	Pintuyan	Talisayan

None (N)	0	0	0	4
A little (N)	0	0	0	4
Mostly (N)	1	0	2	6
A lot (N)	24	24	38	10

31. How much do you want to protect the marine environment?

	Communities			
	Oslob	Donsol	Pintuyan	Talisayan
None (N)	0	0	0	0
A little (N)	1	0	0	5
Mostly (N)	3	0	4	6
A lot (N)	21	24	36	13

32. Have you changed your behaviour to protect whale sharks since whale shark tourism has been in your village?

	Oslob	Donsol	Pintuyan	Talisayan
Yes (% response)	48.0	75.0	92.5	44.0
No longer harm or kill the sharks (N)	8	12	26	4
Tell others to protect the shark or report those who harm sharks to authorities (N)	3	7	17	-
Follow the encounter guidelines (N)	-	4	8	-
Release whale sharks from net or fish corral (N)	1	-	3	8
Change fishing gear or approach (N)	-	2	-	-
No longer throw garbage in the ocean (N)	-	1	2	-
Work in tourism (N)	-	-	-	1
No (% response)	52.0	25.0	7.5	56.0
Never hurt whale sharks (N)	10	6	2	-

33. Have you changed your behaviour to protect the marine environment since whale shark tourism has been in your village?

	Oslob	Donsol	Pintuyan	Talisayan
Yes (% response)	64.0	79.2	95.0	64.0
Pick up garbage or dispose of it appropriately (N)	13	13	23	3
Use more sustainable fishing gear/approaches (N)	4	3	10	5
Tell others to protect the ocean (N)	2	4	7	4
Report illegal activities (N)	-	-	3	4
Other environmental behaviours (N)	-	1	1	1
No (% response)	36.0	20.8	5.0	36.0
Always protected (N)	3	4	2	1

34. Value orientations

A. Marine wildlife should be protected for its own sake rather than to simply meet the needs of humans

	Communities (%)			
	Oslob	Donsol	Pintuyan	Talisayan
Strongly disagree	0.0	0.0	0.0	12.0
Disagree	0.0	0.0	0.0	4.0
Neither	4.0	12.5	0.0	36.0
Agree	36.0	8.3	20.0	16.0
Strongly agree	60.0	79.2	80.0	32.0

B. The primary value of marine wildlife is to provide for humans

	Communities (%)			
	Oslob	Donsol	Pintuyan	Talisayan
Strongly disagree	0.0	0.0	2.5	0.0
Disagree	12.0	0.0	2.5	0.0
Neither	20.0	0.0	0.0	24.0
Agree	36.0	8.3	10.0	40.0
Strongly agree	32.0	91.7	85.0	36.0

C. Recreational use of marine wildlife should not be allowed if it negatively affects these animals

	Communities (%)			
	Oslob	Donsol	Pintuyan	Talisayan
Strongly disagree	0.0	0.0	2.5	4.0
Disagree	12.0	0.0	7.5	24.0
Neither	28.0	0.0	10.0	24.0
Agree	28.0	8.3	52.5	24.0
Strongly agree	32.0	91.7	27.5	24.0

D. The needs of humans are more important than those of marine wildlife

	Communities (%)			
	Oslob	Donsol	Pintuyan	Talisayan
Strongly disagree	0.0	25.0	10.0	8.0
Disagree	24.0	37.5	7.5	0.0
Neither	40.0	16.7	15.0	4.0
Agree	16.0	4.2	40.0	52.0
Strongly agree	20.0	16.7	27.5	36.0

E. Humans should manage marine wildlife so that humans benefit

	Communities (%)			
	Oslob	Donsol	Pintuyan	Talisayan
Strongly disagree	0.0	0.0	0.0	0.0
Disagree	4.0	0.0	2.5	0.0
Neither	4.0	0.0	2.5	32.0
Agree	20.0	4.2	5.0	40.0
Strongly agree	72.0	95.8	90.0	28.0

F. Marine wildlife should have rights similar to the rights of humans

	Communities (%)			
	Oslob	Donsol	Pintuyan	Talisayan
Strongly disagree	0.0	0.0	0.0	8.0
Disagree	4.0	0.0	0.0	12.0
Neither	4.0	0.0	5.0	16.0
Agree	24.0	4.2	32.5	40.0
Strongly agree	68.0	95.8	62.5	24.0

G. Recreational use of marine wildlife is more important than protecting the species

	Communities (%)			
	Oslob	Donsol	Pintuyan	Talisayan
Strongly disagree	20.0	54.2	50.0	8.0
Disagree	40.0	16.7	22.5	12.0
Neither	16.0	4.2	12.5	24.0
Agree	16.0	4.2	5.0	32.0
Strongly agree	8.0	20.8	10.0	24.0

H. Marine wildlife has value whether humans are present or not

	Communities (%)			
	Oslob	Donsol	Pintuyan	Talisayan
Strongly disagree	0.0	0.0	0.0	0.0
Disagree	0.0	0.0	0.0	120
Neither	12.0	0.0	0.0	20.0
Agree	20.0	8.3	22.5	36.0
Strongly agree	68.0	91.7	77.5	32.0

Appendix VI
Whale Shark Hunting Questions - Raw Data Tables

Table 1. Whale shark hunters

% respondents who hunted whale sharks	68.0%
% respondents whose main income was whale shark hunting pre-ban	31.3%
Main income If not whale shark hunting	Small-scale fishing for other fish, small businesses, sold land
Mean no. years respondents hunted whale sharks (SD, range)	16.41 (10.494, 3-31)
Mean no. whale sharks killed per season (SD, range)	25.59 (25.397, 5-100)
Why did you hunt whale sharks?	Livelihood, cultural, quality of life, subsistence

Table 2 Whale shark fishery

Mean no. years village hunted whale sharks (SD, range)	52.67 (45.28, 3-200)
% hunters who said price for whale shark products varied	88.2
Price increased	Post-ban, foreign buyers, many buyers (high demand)
How did you kill whale sharks?	Harpoon, gaff hook
Where did you sell whale shark products?	Landing area, local market, Camiguin, market in Cagayan de Oro and Butuan, buyers from Bohol, Medina, Gingoog, and Cagayan de Oro, foreign buyers, fish vendors
Mean price of whale shark fins per set in PHP (SD)	7089.29 (6289.19)
Mean price of dried whale shark meat per kg in PHP (SD)	81.82 (49.76)
Mean price dried whale shark meat per string in PHP (SD)	28.33 (18.93)
Mean price of fresh whale shark meat per kg in PHP (SD)	5.94 (4.69)
Mean price of whole whale shark in PHP (SD)	29,642.86 (9834.95)
Mean price of dried skin in PHP (SD)	50 (n/a)
Mean price of liver per drum in PHP (SD)	50 (n/a)

Table 3. The whale shark hunting ban

Why did your village stop fishing whale sharks?	Government, tourism, hunting ban, international media/foreigners
What do you think of the whale shark hunting ban?	Loss of livelihood, decreased quality of life, loss of culture, anger, negatively affected the ocean (sharks dangerous, pest), ban not uniformly enforced (commercial vessels catching sharks), support ban because hunting dangerous, no effect, whale sharks improve fishery
% respondents who would like to continue hunting whale sharks today if it were still legal	88.0%
Why	Better livelihood, improved quality of life, improve community, culture
Why not	Too old, I don't know how, afraid of whale sharks, whale sharks harmless

Table 4. Other interactions with whale sharks

	% response
No	36.0
Yes	64.0
When?	Fishing, trapped in fish corral, when worked in tourism (tagging trip)

Table 5. Whale shark tourism, past and future

% respondents who would support future whale shark tourism in Talisayan	80.0%
Why?	Livelihood, difficult to go against government, enjoys watching whale sharks,
Why not?	Unequal distribution of benefits, blame tourism for ban on hunting, plans unclear
% who would work in future whale shark tourism	80.0%
Why?	Livelihood, improve quality of life, government mandated
Why not?	Too old, need clarification on tourism plan, prioritize regular income