

Special Issue

Turtles, Ticos, and Tourists: Protected Areas and Marine Turtle Conservation in Costa Rica

Carter A. Hunt
Erick Vargas

Executive Summary

It has been 40 years since Costa Rican ecologist Gerardo Budowski first proposed a potential symbiotic relationship between tourism and environmental conservation. Given the attention that marine turtles enjoy from both conservationists and tourists, as well as the pressures that endanger and threatened them, their predicament brings sharp-relief examples to Budowski's proposal of conflict, co-existence, or symbiosis between tourism and conservation. Although marine ecosystems are among the most productive on the planet, they are also some of the most threatened. While limited-take regimes have become the most common management strategy for marine protected areas, conservation success depends on the history of local resource use, the presence and nature resource management institutions, and an understanding of competing resource use. As in terrestrial contexts, this means providing sustained benefits for communities dependent on marine ecosystems. Carefully managed marine turtle tourism can be a means of providing such benefits. As a contribution to a special issue of *JPra* focused on nature tourism in Latin America, this paper shares insights obtained during the stakeholder consultation process leading to the articulation of three marine protected area management plans in Costa Rica where marine turtle nesting and associated tourism activities occur. We seek to provide pragmatic answers to questions about the most effective way for park management to coordinate with

Carter A. Hunt is an assistant professor in the Recreation, Park, and Tourism Management Department at Penn State University.

Erick Vargas is an independent consultant and president of the firm Sustainable by Nature. Please send correspondence to Carter Hunt, cahunt@psu.edu

local communities to ensure that tourism contributes to extending the extinction horizon for endangered sea turtle species within each protected area. The descriptive case studies presented here make clear the ongoing lack of systematic data about visitor numbers, activities, and impacts in Costa Rican MPAs and nearby communities. Yet the inclusion of stakeholder consultation in the parks' strategic planning processes demonstrates movement in the needed direction. Coupled with the new forms of social organization around sea turtle conservation and the associated tourism activities, two of the three cases presented here provide compelling evidence of marine turtle tourism extending the extinction horizon of endangered marine turtle species, confirming that Budowski's hope for symbiosis between tourism and conservation is alive and well.

Keywords

Conservation, Costa Rica, ecotourism, marine protected areas, marine turtles, park management

Introduction

Marine ecosystems are among the most productive on the planet, yet they are also some of the most threatened (UNEP, 2006). Despite the understanding of human dependency on nature being at an all-time high (Brondizio et al., 2016), loss of productive marine ecosystems exceeds that of other ecosystems (Aswani et al., 2017; UNEP 2006). This has led scholars to recognize that conservation can only be effective and ethical if it supports local communities and their institutions (Kareiva & Marvier, 2012; Sandbrook, et al., 2013). Conservation requires a “people and nature” that places emphasis on sustaining benefits for local populations over time (Mace 2014). Trends in marine conservation reflect this emphasis, limited-take resource management occurs in 76% of all marine protected areas (MPAs), whereas no-take reserves are just 13% of MPAs (Guarderas, Hacker, & Lubchenko, 2008). While limited take regimes are most common, and by some measure the most effective, conservation success often depends on the history of local resource use, the presence and management of natural resource institutions, and competing uses of resources (Aswani et al., 2017; Pegas, Grignon, & Morrison, 2015).

Over 40 years after Costa Rican ecologist Gerardo Budowski first proposed a potential symbiotic relationship between environmental conservation and tourism (Budowski, 1976), tourism's potential to support conservation remains hotly debated. Social scientists and conservationists defend one form of tourism in particular—ecotourism—by pointing out its value as a “shield” for endangered species that not only extends far beyond the animals encountered to protect broader ecosystems but that also provides important conservation incentives to local communities (Fitzgerald & Stronza, 2016). It is this dual mandate of net benefits for conservation and or community communities that has long distinguished ecotourism from both other forms of development and other forms of tourism (Stronza, 2001).

While a full review of the scholarship on tourism that has exploded in the years since Budowski's writing is beyond the scope of this paper, we direct readers to a few

of the well-prepared discussions of these debates elsewhere (e.g., Buckley, 2009; 2010, 2011; Weaver & Lawton, 2007). Instead here we assume a degree of familiarity with ecotourism's competing schools of thought (Higham, 2007) in order to engage in one particular debate stemming from ecology literature that suggests that encounters with tourists diminish flight responses among animals, increase the likelihood they will be preyed upon, and thus reduce their overall fitness and survivability (e.g., Blumstein et al., 2018; Geffroy et al., 2016). Consideration of social science scholarship expands this thinking by demonstrating the critical support that tourism provides for broader habitat conservation leading to the extension of the extinction horizons of endangered Red List species, including amphibians (Buckley, Morrison, & Castley, 2016), birds (Steven, Castley, & Buckley, 2013), and mammals (Buckley et al., 2012), beyond what would otherwise be likely under other resource use regimes. Though still in the minority, ecologists have even recently acknowledged that tourism's negative impacts on wildlife may be overreported (Bateman & Fleming, 2017).

As a contribution to this special issue of *JPR* focused on nature tourism in Latin America, our paper shares insights obtained during the stakeholder consultation process leading to the articulation of three marine protected area management plans in Costa Rica where sea turtle nesting and associated tourism activities occur. Given the attention that marine turtles receive from both conservationists and tourists, as well as the pressures that endanger and threaten them (IUCN, 2017; Velez-Zuazo et al., 2017), their predicament brings sharp-relief examples to Budowski's characterization of the conflict, co-existence, and potential symbiosis between tourism and conservation. While these case studies were not designed with *a priori*, theoretically driven research questions and objectives, the resulting stakeholder engagement provides pragmatic insight to the following *a posteriori* question addressed in this paper: How does park management coordinate with local communities to ensure that tourism contributes to extending the extinction horizon for endangered sea turtle species within each protected area? This discussion is timely given the increasing scale and scope of threats to biodiversity (Dirzo et al., 2014) and the fact that tourism in practice remains part of the array of long-term solutions for operating large protected areas and building local support, stewardship, and institutional capacity necessary for reducing endangered species loss (Buckley, 2010; Buckley, Morrison, & Castley, 2016; Stronza & Durham, 2008).

Marine Turtle Conservation in Costa Rica

Costa Rica's wild protected areas are under the responsibility of the National System of Conservation Areas (SINAC). The country's 166 protected areas conserve 50% of the coastline and received over 2.4 million visitors in 2013 (Alvarado et al., 2012; SINAC, 2013). Yet SINAC faces numerous institutional challenges, including insufficient personnel to implement management plans, insufficient revenue generation, poor management of generated funds, ambiguous boundary delimitations, and inadequate staff training initiatives (Alvarado et al., 2012). As such, SINAC relies on coordination with government agencies, universities, NGOs, volunteer organizations, tour operators, and local communities to monitor natural resources.

SINAC's 20 MPAs house many species of marine turtles, including the olive ridley turtle (*Lepidochelys olivacea*); the leatherback turtle (east Pacific Ocean sub-population) (*Dermodochelys coriacea*); the hawksbill (*Eretmodochelys imbricata*), the green turtle

(*Chelonia mydas*), and the Pacific subspecies of the green sea turtle (*Chelonia mydas agassizii*), known locally as the Pacific black turtle. The IUCN Red List classifies green turtles as “Endangered,” olive Ridley turtles as “Vulnerable,” and both the leatherback turtle and hawksbill turtle as “Critically Endangered” (IUCN 2017). The primary threat to marine turtles is their high market value for eggs and shell byproducts, leading to heated conflicts over the turtle management and associated economic benefits (ibid.).

In the National Sustainable Tourism Plan for Costa Rica, responsible tourism practices are promoted within and between MPAs to reduce impacts on marine and coastal resources, including marine turtle nesting activities. MPAs are defined as “any area of intertidal or subtidal terrain, together with its overlying water and associated flora and fauna, and historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment (Kelleher, 1999, in Alvarado et al., 2012). Outside of dedicated MPAs, all coastline is also protected by national legislation. In much of the country, a belt of 200 meters of land along the coast forms a Maritime Terrestrial Zone. This zone is crucial for protection of sea turtle nesting sites, as it restricts buildings and permanent structures, use of artificial lighting, and maintenance of the vegetal barriers that offer protection against storms, flooding, and pollution. Tourism activities in this zone have direct consequences, both positive and negative, for marine turtle conservation.

Turtle Tourism Case Study Methods and Materials

The case study information presented here was gathered through a stakeholder engagement process associated with strategic planning in the three selected protected areas. Beginning in 2012, the first author was directly involved in these processes. Both authors made additional site visits and engaged in participant observations during turtle tours guided by official local guides in each of the three study sites. We also gathered archives that included prior park and tourism management plans, published visitor regulations for each site, and any available visitation data. For each site, key informant stakeholders from the area of influence of protected areas were interviewed for this research in a manner consistent with adaptive management (Wilhere, 2002).

Interviewees included protected area administrators and personnel; staff from public institutions (e.g., Costa Rica Tourism Board, Ministry of Agriculture and Livestock, Ministry of Health, police force, University of Costa Rica, municipalities); active members of community organizations (e.g., development associations, tourism chambers, water boards); entrepreneurs (e.g., hotel and tour operators, surfing schools, shopkeepers); members of tour guide associations; and staff from local conservation or research institutions. Extensive details of these consultations and management planning efforts are beyond the scope of this article and are instead articulated elsewhere (SINAC, 2013; SINAC, 2014a; SINAC, 2014b). Here we share our descriptive *a posteriori* insights drawn from the gathered information to highlight the role of local community institutions in marine turtle tourism and conservation.

Case #1: Tortuguero National Park (PNT)

PNT was established in 1970 to protect forests, wildlife, and sea turtle nesting sites in particular. The park hosts the largest green turtle rookery in the Western Hemisphere. It is also a nesting site for leatherback and hawksbill turtles. In terms of turtle management, PNT is managed as a strict no-take zone and is one of the

most important nature destinations in Costa Rica. PNT has an established visitor management program overseen by a staff of tourism professionals. Since there are few other tourist attractions in the region, aside from limited sport fishing, visitors' average length of stay is just two nights (SINAC, 2013).

There are three nearby communities that depend directly on tourism to PNT: Barra de Parismina, Barra de Tortuguero, and San Francisco. Barra de Tortuguero is most involved with tourism in the park, being located adjacent to PNT headquarters, the connecting canals, and the primary nesting beaches. The village provides budget lodging, restaurants, souvenir shops, convenience stores, and tour operators run by local residents. Along the canals outside the village are numerous upscale eco-lodges owned by non-local Costa Ricans and foreigners. These businesses provide the bulk of the accommodations for tourists and are the primary beneficiaries of tourism to PNT. Lodges are also the primary source of employment for local inhabitants.

Though poaching of sea turtles and eggs remains a serious challenge to turtle conservation, residents of Barra de Tortuguero are invested in the co-management of turtle tourism (Campbell & Vainia-Mattila, 2003). Through a permit provided by the government, two local community guide associations engage in the turtle tracking system under the Park's supervision. The Tourism Promotion Association of Tortuguero (ASOPROTUR) operates in the public beach and the Association for the Protection of Natural Species and the Environment (APENMA) operates within PNT. Sea turtle night tours to observe female turtles laying eggs take place between March and June for the leatherback turtle, and July through October for the green turtle. Turtle tours occur in two sectors of the Park: Tortuguero and Jalova. Typically, two tours are offered each evening: a first excursion between 8 p.m. to 10 p.m. and a second outing between 10 p.m. and midnight. Tours are limited to 600 visitors a night, 360 at public beach and 240 in the park. The system prevents groups of unaccompanied visitors wandering on the beach searching for turtles. Trackers and guides communicate by radio while groups of visitors wait in designated areas outside the beach. When authorized by the trackers, guides lead groups onto the beach to observe a specific nesting turtle.

Local perception of the national park is therefore positive due to the availability of income and employment provided through community involvement in guiding and tracking activities. The community's involvement in co-managing visitation to nesting sites via the tracking system has been a powerful mechanism for ensuring community benefit and support for conservation. Nevertheless, resident stakeholders complain that communication with PNT administration is challenging. They desire more active participation in park management and decision-making. They also question the no-take nature of park management, complaining that PNT efforts to eliminate or reduce poaching by non-local residents and by outsiders, largely through NGO efforts, have created perverse incentives. Economic outcomes of turtle tourism, and the associated conservation benefits, are currently positive, the relationship remain tenuous. The park will face further challenges as increasing number of visitors erode the visitor experience. Park visitors already acknowledge discomfort with large crowds at nesting events and the heavily managed viewing experience provided at PNT. Given the high visitor "through-put" at PNT, a concern for visitor experience is likely to become increasingly important management priority. Furthermore, while tourism has brought desired employment opportunities to the isolated communities, residents recognize that the upmarket hotels, owned by outsiders, are the principle beneficiaries of tourism.

Case #2: Ostional National Wildlife Refuge (ONWR)

ONWR is located on Costa Rica's North Pacific coast. This reserve was created in 1983, and later expanded in 1985 and 1993. ONWR is managed with support from an Inter-Institutional Advisory Council (CIMACO). CIMACO includes members of local communities and representatives of the local associations, the Universidad de Costa Rica (UCR), the National Fishing Institute (INCOPESCA), and representatives of local municipal governments. CIMACO's goal is to encourage local participation in the conservation, sustainable use, and management of the Refuge's natural resources. Nesting areas of ONWR are recognized as the most important site for the Olive Ridley turtle's synchronized, massive nesting events of up to thousands of turtles, known as *arribadas*. Arribadas take place only in ONWR's northernmost beaches, Ostional and Nosara, and occur a few days each month. Arribadas have long attracted researchers from the School of Biology at UCR, and the data gathered through these investigations have been influential on the plans for sustainable harvesting of turtle eggs carried out by the Ostional Development Association (ADIO). ONWR is thus an example of a limited-take resource management regime that exemplifies sustainable local management and legal commercialization of turtle eggs for consumption (Alvarado et al., 2012; Campbell, 2007; Orrego & Rodríguez, 2017).

ONWR has no fenced borders. Beaches are openly accessed by thousands of visitors each year. While visitors are generally aware that they are entering a wildlife refuge, the official entrance fee of US\$10 for non-residents and about US\$3 for residents is rarely gathered due to limited staffing at the reserve. Visitation records are therefore unreliable (Alvarado et al., 2012). Even though turtle tourism is popular among visitors and contributes valuable revenue to the management of ONWR, there is little interpretive material, facilities, or infrastructure to support it. Tourists often come from the popular neighboring beaches such as Guiones, Garza, and Sámara, though during the peak nesting events, tourists may be brought in from as far as Tamarindo. The nesting activity peaks between September and December, when nesting turtles are at the beach throughout the day and night. The rest of the year, arribadas last fewer days, often occurring only at night.

While ONWR is a national protected area, three local communities exist within its borders: Ostional, Peladas, and Guiones Sur. ONWR administration is technically responsible for guided tours, though in practice, visitation is managed by local community guide organizations. Independent guides are not allowed. Visitors may enter the beach only in the company of licensed guides from two local tour guide associations: ADIO and the Ostional Local Guide Association. Guides advise visitors on park regulations and share information on the turtles' natural history. Unfortunately, English and other language ability is poor in relation to the tourists' interpretive needs, as guides are often secondary school or university students. Individually, guides receive direct payment for services, income often supplemented with tips. Collectively, the associations' pooled profits are invested in community projects.

At ONWR, a tracking system to find nesting turtles is not necessary given the massive number of turtles that regularly visit. Members of community guide associations determine when an arribada is about to start, and then they notify regional hotels and tour operators. This leads to an inundation of tourists during nesting events. Although guide associations have registries with national and international visitor numbers, figures are not consistently gathered, are considered official, and are rarely shared with

ONWR administration. Nevertheless, overall visitation has been historically lower here than in other national protected areas due to poor transportation access and distance from larger tourism hubs in Guanacaste, and seasonal turtle tours themselves comprise but a small portion of the overall visitation (SINAC 2013a).

Although local guide associations participate actively in visitor control and management, unauthorized independent guides and unsupervised individuals trespass into the nesting sites through nonauthorized access points. These incursions not only result in lost economic capture by local guides, but it also creates unsupervised ecological disturbance to the nesting process. Beyond guiding income, local associations have facilitated employment of additional community members through work as receptionists, memento merchants, and security attendants for parked vehicles. Increasingly, surfing has become popular in the south-central part of ONWR. Associated growth in visitation to the reserve for purposes other than viewing turtles has resulted in the need to establish improved visitor coordination among ONWR officials, the police, and local guide associations.

Despite the lack of visitor regulation and a corresponding concern for growth of visitation in the future (SINAC, 2014a), ONWR remains successful from a conservation standpoint (Campbell, 2007). One reason is the limited-take program permitting use of turtle eggs that has resulted in an overall increase in turtle eggs (Orrego & Rodríguez, 2017). Such reward for ADIO's collective efforts to steward these resources provides a significant economic benefit and conservation incentive. Established extraction limits are scientifically informed and built into the management plan developed in coordination with the University of Costa Rica. Exceeding income from tourism, regulated use of eggs continues to be the principle economic activity for residents of Ostional (Campbell, 1998; Campbell, Haalboom, Orrego & Rodríguez, 2017; Trow, 2007). The program serves as a powerful conservation incentive that ensure the protection of nesting sites in the off season, in times of low visitation. Moving forward, to maintain a favorable visitor experience while also minimizing stress on nesting turtles, it will be important to manage tourism in ways that do not negatively influence the regulated use of turtle eggs. As long as institutional capacity continues to develop equally with a desired increase in visitation, and these standards of behavior can be maintained, turtle tourism in ONWR may continue to extend the survival time of Olive Ridley turtles as it has for endangered species in other contexts (e.g. Buckley, Morrison, & Castley, 2016).

Case #3: Las Baulas Marine National Marine Park (PNMB)

PNMB was established in 1991. Located in Costa Rica's North Pacific coast, its terrestrial sector consists of 740 hectares of highly threatened dry tropical forest, three wetland areas, beaches, and rocky cliffs. The marine sector is larger, covering 25,390 hectares (Alvarado et al., 2012). PNMB protects the most important nesting sites of leatherback turtles in the Pacific coast of the Americas. Leatherback nesting takes place in the park's Playa Grande, Ventanas, and Langosta beaches. The nesting population of leatherbacks declined from about 1,500 to about 100 turtles between 1988–1989 and 2006–2007. The primary reason is that for 15 to 20 years, an estimated 90% of eggs at Playa Grande were illegally removed for human consumption (Tomillo et al., 2008). To address this ongoing threat to turtle eggs, PNMB is managed with a strict no-take regime.

The park administration has not fenced its borders and the beaches are accessed freely by visitors throughout the year. Given a lack of signage and infrastructure, most visitors again do not know they are entering a national park. The park is understaffed and the entrance fee is rarely collected unless visitors register a reservation within the system managed by the park administration. Nevertheless, one recent study estimated that US\$64,782,945 in annual revenues are generated from tourism linked to PNMB and the surrounding area, including economic activity at hotels, restaurants, tour operators, car rentals, and direct employment (BIOMARCC-SINAC-GIZ, 2013). Little of this revenue can be directly attributed to turtle viewing, as the observation of marine turtle nesting activities represents a small part of the overall sand, sun, and sea tourism at PNMB.

Unlike PNT and ONWR, there are no local communities in the direct vicinity of PNMB. The nearest communities—Matapalo, Villarreal, and Huacas—are several kilometers from the coast. The Matapalo Local Guide Association provides tours at Playa Grande and neighboring beaches outside PNMB. The Tamarindo Local Guide Association offers turtle tours and boat trips to the adjacent mangroves. These associations represent the extent of local community involvement in turtle tourism at PNMB. Tourists participate in nesting tours in the company of these licensed local guides. PNMB works in collaboration with guide associations to manage and operate turtle tours. Sea turtle night tours take place between October 20 and February 15, with most activity occurring late at night. Only 120 visitors are permitted per night, and just 15 tourists per guided group. As at PNT, visitors wait at designated staging areas while members of the guides' associations patrol the beach looking for turtles. Visitors enter the beach only once females have emerged from the ocean and begin establishing their nest. While waiting, guides share interpretive information about the natural history of turtles and the park regulations.

In terms of conservation, there are beneficial outcomes from increased research and monitoring capacities supported by the Leatherback Trust, TLT. Research teams composed of scientists and volunteers measure nesting turtles, count eggs, and register nest temperatures. This information is useful in calculations of population size. The presence of scientist-led teams at nesting beaches also helps to minimize the presence of poachers and turtle predators, thus maximizing the number of hatchlings produced. The resulting scientific information also generates useful interpretive knowledge for tour guides that again may contribute to better earnings over time. Unfortunately, this information has revealed that tourism has led to mostly negative impacts. High turtle mortality rates prevent population recovery as currently managed (Tomillo et al., 2008). Tourism needs to be further regulated in ways that create community engagement and institutional capacity that push the extinction horizon for leatherback turtles within PNMB. Currently, low visitation and poor management of visitors and turtle resources do not provide enough conservation value. Turtles remain exposed to threats both within and beyond PNMB.

Discussion of Key Conservation Mechanisms Associated with Turtle Tourism

These descriptive case studies, summarized in Table 1, provide insight into the ongoing question, what are the ways that park management coordinates with local communities to ensure that tourism contributes to extending the extinction horizon

for endangered sea turtle species? While Tortuguero continues to achieve ecotourism, this protected area is on the verge of moving away from an ecotouristic model due to a continued increase in visitation, development of additional tourism infrastructure, and the growth of local populations. In Ostional, the reserve is moving toward more ecotouristic outcomes for both conservation and communities, though at this point in time, local communities appear more motivated to conserve turtle habitat for the opportunities that it provides for legal extraction of turtle eggs than for the economic contributions that tourism has provided to their livelihoods. Finally, in Las Baulas, despite high visitation levels, there is little economic benefit generated for local communities nor net positive outcomes for environmental conservation. Tourism to this site has yet to move in the direction of ecotourism and is thus not providing an ecotourism shield for the protection of marine turtles.

Table 1

Characterization of Marine Turtle Tourism Outcomes

Protected Area	Mgmt. Regime	Visitation Rate	Community Participation	Economic Impacts	Conservation Outcomes
<i>Tortuguero National Park</i>	No take	High	+	+	+
<i>Ostional National Wildlife Refuge</i>	Limited take	Medium	+	+/-	+
<i>Las Baulas National Marine Park</i>	No take	High	+/-	-	-

Recent scholarship has determined that tourism can be effective for extending the time to extinction of endangered Red List species (Buckley et al., 2012; Buckley, Morrison, & Castley, 2016; Steven, Castley, & Buckley, 2013). As tourism has done elsewhere (e.g., Buckley, Morrison, & Castley, 2016), we argue that under certain management plans, marine turtle tourism in Costa Rican protected areas is extending the time to extinction for IUCN Red List species, most notably the endangered leatherback and the critically endangered olive Ridley turtles. There is evidence to support this claim in PNT and ONWR, though the evidence is to the contrary in PNMB. Echoing the conclusions of Stronza and Pegas (2008), we outline how the key mechanism for ensuring successful conservation outcomes of ecotourism is the involvement of local community members in management and decision-making. Local resource management institutions and resource stewardship behaviors were strengthened by the presence of tourism activities in PNT and ONWR, though in another instance tourism was too dispersed to provide direct incentives for conservation. This lack of benefit is leading to a “tragedy of the commons” for turtle tourism in PNMB (Stronza, 2010).

Several conclusions drawn from these case studies are consistent with prior work on this topic by Campbell (e.g., 1998; 2007; Campbell, Haalboom, & Trow, 2007; Campbell & Vainio-Mattila, 2003). However, for the past decade, visitation to all three sites has unfolded in ways that were not entirely predictable and thus warranted this new look. Notably, recent conflicts over the use of marine turtle management turned tragic, resulting in the assault and murder of a conservationist working in sea turtle nesting areas on Costa Rica’s Caribbean coast (Nahill, 2013). Thus, even in the “Green Republic” (Evans, 1996), MPAs represent the front lines of tension between conservation and development. Given a growing trend toward sand, sun, and sea

tourism development in the Guanacaste region of the country, scholars working in Costa Rica have expressed concerns that the country is on the verge of losing its destination image as an alternative to mass tourism (Hunt, Driscoll, Durham, & Honey, 2015) and is thus moving toward a model of more environmentally destructive forms of tourism (Fletcher, 2012). As an alternative to other forms of development (Hunt, Durham, & Menke, 2015), and other forms of tourism development (Honey, Vargas, & Durham, 2010), continued pursuit of ecotourism not only has consequences for the nation's ability to enjoy its international image as a conservation-friendly, green destination, and laboratory for sustainable development, but also for the conservation of the country's globally significant biodiversity.

Both scholars and practitioners of conservation continue to engage in conservation tourism exploring further mechanisms for equitable distribution of benefits to local communities (Pegas, Coghlan, Stronza, & Rocha, 2013). Mounting evidence indicates limited harvest regimes mobilize the greatest stewardship efforts among local communities (Aswani et al., 2017; Campbell, Haalboom, & Trow, 2007; Cinner et al., 2013; Guarderas, Hacker, & Lubchenko, 2008; Orrego & Rodríguez, 2017). How these regimes are disrupted by a continual influx of external actors with little investment in local ecologies and communities will continue to challenge the ability of these protected areas to extend the survival rate of endangered species. In the three cases presented in this paper, at least some members of the communities involved in tourism around MPAs have come to see themselves as empowered custodians of a high-value natural resource (Stronza & Pegas, 2008). This is a notable outcome given the high rates of illegal egg and turtle harvesting in the 1990s (Campbell, 1998).

The case studies here show that important institutional strengthening is already occurring through guide associations that are effectively co-managing these sites along with SINAC staff. Further investment in natural resource management institutions may therefore not need be entirely made within the SINAC system. Given the economic motor that nature-based tourism provides to the country, the government would be wise to direct greater investment toward the institutions for natural resource management and for tourism management that currently lack capacity to enforce existing regulations. As demonstrated in Brazil, investment in environmental education and social inclusion projects has paid dividends for community-based marine turtle conservation (da Silva et al., 2016; Pegas, Coghlan, & Rocha, 2012). In order to ensure that tourism in Costa Rica continues to exist largely on the ecotouristic end of the spectrum, where net benefits for local environments and communities are more likely, the country would be wise to make investments in mechanisms targeting local residents at an early age in order to promote further stewardship among the local communities that are already invested in conservation efforts.

Conclusions

Marine ecosystems are among the most threatened on the planet (UNEP, 2006), and as is true with terrestrial ecosystems, conservation requires a "people and nature" that places emphasis on sustaining local economic benefits while strengthening stewardship institutions (Mace, 2014). Limited take regimes that provide partial access to natural resources are the most common form of marine protected area, though strict no-take reserves remain in many places (Aswani et al. 2017; Pegas, Grignon, &

Morrison, 2015). While scholars debate the appropriate management strategy to take and tourism's role in supporting conservation, conservationists are busy around the world pursuing ecotourism to help ensure the survival of threatened and endangered species. As this paper demonstrates, this pursuit of ecotourism and the strategic planning processes undertaken in protected areas across biodiverse regions of the tropics can lead to *a posteriori* insights that scholars and practitioners of ecotourism would be wise to consider given the frequent dearth of other existing data in lesser developed regions.

With that end in mind, this paper shared insights obtained from stakeholders of three marine protected area management plans in Costa Rica where sea turtle nesting and associated tourism activities both occur. Marine protected areas are rarely sophisticated in the collection of social science data (Cornu et al., 2014), and the cases presented here make clear the ongoing lack of systematic data about visitor numbers, activities, and impacts in Costa Rican MPAs and nearby communities. However, the inclusion of stakeholder consultation in the parks' strategic planning processes demonstrates movement in the needed direction. Coupled with the new forms of social organization around sea turtle conservation and the associated tourism activities, this analysis of marine turtle tourism in Costa Rica indicates that, in at least two of the three cases explored here, Budowski's hope for symbiosis between tourism and conservation is alive and well.

References

- Alvarado, J., Cortés, J., Esquivel, M. F., & Salas, E. (2012). Costa Rica's marine protected areas: Status and perspectives. *Revista de Biología Tropical (International Journal of Tropical Biology and Conservation)*, 60(1), 129–142.
- Aswani, S., Basurto, X., Ferse, S., Glaser, M., Campbell, L., Cinner, J. E., Dalton, T., Jenkins, L. D., Miller, M. L., Pollnac, R., & Vaccaro, I. (2018). Marine resource management and conservation in the Anthropocene. *Environmental Conservation*, 45(2), 192–202.
- Bateman, P. W., & Fleming, P. A. (2017). Are negative effects of tourist activities on wildlife over-reported? A review of assessment methods and empirical results. *Biological Conservation*, 211(Part A), 10–19.
- BIOMARCC-SINAC-GIZ. (2013). *Análisis de vulnerabilidad de las zonas oceánicas y marino-costeras de Costa Rica frente al cambio climático*. San José-Costa Rica: BIOMARCC-SINAC-GIZ.
- Blumstein, D. T., Geffroy, B., Samia, D. S., & Bessa, E. (2018). *Ecotourism's promise and Peril: A biological evaluation*. Cham, Switzerland: Springer.
- Brondizio, E. S., O'Brien, K., Bai, X., Biermann, F., Steffen, W., Berkhout, F., ... Chen, C. T. A. (2016). Re-conceptualizing the Anthropocene: A call for collaboration. *Global Environmental Change*. doi: 10.1016/j.gloenvcha.2016.02.006
- Buckley, R. (2009). Evaluating the net effects of ecotourism on the environment: a framework, first assessment and future research. *Journal of Sustainable Tourism*, 17(6), 643–672.
- Buckley, R. (2010). *Conservation tourism*. Wallingford, UK: CABI.
- Buckley, R. (2011). Tourism and environment. *Annual Review of Environment and Resources*. doi: 10.1146/annurev-environ-041210-132637

- Buckley, R. C., Castley, J. G., de Vasconcellos Pegas, F., Mossaz, A. C., & Steven, R. (2012). A population accounting approach to assess tourism contributions to conservation of IUCN-Redlisted mammal species. *PloS one*, 7(9), e44134.
- Buckley, R. C., Morrison, C., & Castley, J. G. (2016). Net effects of ecotourism on threatened species survival. *PloS one*, 11(2), e0147988.
- Budowski, G. (1976). Tourism and environmental conservation: Conflict, coexistence, or symbiosis? *Environmental Conservation*, 3(1), 27–31.
- Campbell, L. M. (1998). Use them or lose them? Conservation and the consumptive use of marine turtle eggs at Ostional, Costa Rica. *Environmental Conservation*, 25(4), 305–319.
- Campbell, L. M., & Vainio-Mattila, A. (2003). Participatory development and community-based conservation: Opportunities missed for lessons learned? *Human Ecology*, 31(3), 417–437.
- Campbell, L. M. (2007). Local conservation practice and global discourse: a political ecology of sea turtle conservation. *Annals of the Association of American Geographers*, 97(2), 313–334.
- Campbell, L. M., Haalboom, B. J., & Trow, J. (2007). Sustainability of community-based conservation: Sea turtle egg harvesting in Ostional (Costa Rica) ten years later. *Environmental Conservation*, 34(2), 122–131.
- Cornu, E. L., Kittinger, J. N., Koehn, J. Z., Finkbeiner, E. M., & Crowder, L. B. (2014). Current practice and future prospects for social data in coastal and ocean planning. *Conservation Biology*, 28(4), 902–911.
- da Silva, V. R., Mitraud, S. F., Ferraz, M. L., Lima, E. H., Melo, M. T. D., Santos, A. J., ... Tognin, F. (2016). Adaptive threat management framework: integrating people and turtles. *Environment, Development, and Sustainability*, 18(6), 1541–1558.
- Dirzo, R., Young, H. S., Galetti, M., Ceballos, G., Isaac, N. J., & Collen, B. (2014). Defaunation in the Anthropocene. *Science*, 345(6195), 401–406.
- Evans, S. (2010). *The Green Republic: A conservation history of Costa Rica*. Austin, TX: University of Texas Press.
- Fitzgerald, L. A., & Stronza, A. L. (2016). In defense of the ecotourism shield: A response to Geffroy et al. *Trends In Ecology and Evolution*, 31(2), 94–95.
- Fletcher, R. (2012). Using the master's tools? Neoliberal conservation and the evasion of inequality. *Development and Change*, 43(1), 295–317.
- Geffroy, B., Samia, D. S., Bessa, E., & Blumstein, D. T. (2015). How nature-based tourism might increase prey vulnerability to predators. *Trends in Ecology & Evolution*, 30(12), 755–765.
- Guarderas, A. P., Hacker, S. D., & Lubchenco, J. (2008). Current status of marine protected areas in Latin America and the Caribbean. *Conservation Biology*, 22(6), 1630–1640.
- Higham, J. E. (2007). Ecotourism: Competing and conflicting schools of thought. In J. E. Higham (Ed.), *Critical issues in ecotourism: Understanding a complex tourism phenomenon* (pp. 1–19). Oxford, UK: Routledge.
- Honey, M., Vargas, E., & Durham, W. (2010). *Impact of tourism related development on the Pacific Coast of Costa Rica: Summary report*. Washington, DC: Center for Responsible Travel.

- Hunt, C. A., Durham, W. H., Driscoll, L., & Honey, M. (2015). Can ecotourism deliver real economic, social, and environmental benefits? A study of the Osa Peninsula, Costa Rica. *Journal of Sustainable Tourism*, 23(3), 339–357.
- Hunt, C. A., Durham, W. H., & Menke, C. M. (2015). Social capital in development: Bonds, bridges, and links in Osa and Golfito, Costa Rica. *Human Organization*, 74(3), 217–229.
- IUCN. (2017). The IUCN Red List of Threatened Species. Retrieved from <http://www.iucnredlist.org/>
- Kareiva, P., & Marvier, M. (2012). What is conservation science? *BioScience*, 62(11), 962–969.
- Mace, G. M. (2014). Whose conservation? *Science*, 345(6204), 1558–1560.
- Nahill, B. (2013). The legacy of murdered sea turtle conservationist Jairo Mora Sandoval. National Geographic Voices. Retrieved from <https://voices.nationalgeographic.org/2013/06/13/the-legacy-of-murdered-sea-turtle-conservationist-jairo-mora-sandoval/>
- Pegas, F., & Stronza, A. (2010). Ecotourism and sea turtle harvesting in a fishing village of Bahia, Brazil. *Conservation and Society*, 8(1), 15.
- Pegas, F., Coghlan, A., & Rocha, V. (2012). An exploration of a mini-guide programme: Training local children in sea turtle conservation and ecotourism in Brazil. *Journal of Ecotourism*, 11(1), 48–55.
- Pegas, F. D. V., Coghlan, A., Stronza, A., & Rocha, V. (2013). For love or for money? Investigating the impact of an ecotourism programme on local residents' assigned values towards sea turtles. *Journal of Ecotourism*, 12(2), 90–106.
- Pegas, F., Grignon, J., & Morrison, C. (2015). Interdependencies among traditional resource use practices, sustainable tourism, and biodiversity conservation: A global assessment. *Human Dimensions of Wildlife*, 20(5), 454–469.
- Sandbrook, C., Adams, W. M., Büscher, B., & Vira, B. (2013). Social research and biodiversity conservation. *Conservation Biology*, 27(6), 1487–1490.
- SINAC. (2013). *Parque Nacional Tortuguero: Compendio de estudios de situación del 2013 para la actualización del Plan de Manejo*. Área de Conservación Tortuguero (ACTo). Guápiles-Costa Rica: SINAC.
- SINAC. (2014a). *Diagnóstico para El Plan General De Manejo Del Refugio Nacional De Vida Silvestre Ostional 2014*. Guanacaste, Costa Rica: SINAC.
- SINAC (2014b). *Diagnóstico para el Plan General de Manejo del Parque Nacional Marino Las Baulas*. Santa Cruz, Costa Rica: SINAC.
- Steven, R., Castley, J. G., & Buckley, R. (2013). Tourism revenue as a conservation tool for threatened birds in protected areas. *PloS one*, 8(5), e62598.
- Stronza, A. (2001). Anthropology of tourism: Forging new ground for ecotourism and other alternatives. *Annual Review of Anthropology*, 30(1), 261–283.
- Stronza, A. (2010). Commons management and ecotourism: Ethnographic evidence from the Amazon. *International Journal of the Commons*, 4(1), pp. 56–77.
- Stronza, A., & Durham, W. H. (Eds.). (2008). *Ecotourism and conservation in the Americas*. Cambridge, MA: CABI.
- Stronza, A., & Pegas, F. (2008). Ecotourism and conservation: two cases from Brazil and Peru. *Human Dimensions of Wildlife*, 13(4), 263–279.

- Tomillo, P. S., Saba, V. S., Piedra, R., Paladino, F. V., & Spotila, J. R. (2008). Effects of illegal harvest of eggs on the population decline of leatherback turtles in Las Baulas Marine National Park, Costa Rica. *Conservation Biology*, 22(5), 1216–1224.
- UNEP. (2006). *Marine and coastal ecosystems and human well-being: A synthesis report based on the findings of the Millennium Ecosystem Assessment*. United Nations Environment Program (UNEP): Nairobi.
- Velez-Zuazo, X., Mangel, J. C., Seminoff, J. A., Wallace, B. P., & Alfaro-Shigueto, J. (2017). Filling the gaps in sea turtle research and conservation in the region where it began: Latin America. *Latin American Journal of Aquatic Research*, 45(3), 501–505.
- Weaver, D. B. (2001). Ecotourism as mass tourism: Contradiction or reality? *Cornell Hotel and Restaurant Administration Quarterly*, 42(2), 104–112.
- Weaver, D. B., & Lawton, L. J. (2007). Twenty years on: The state of contemporary ecotourism research. *Tourism Management*, 28(5), 1168–1179.
- Wilhere, G. F. (2002). Adaptive management in habitat conservation plans. *Conservation Biology*, 16(1), 20–29.

Reproduced with permission of copyright owner. Further reproduction prohibited without permission.