Introduction

Tropical beaches and their offshore coral reefs are some of the most popular, idyllic destinations in the world and provide a range of ecotourism activities from diving and snorkeling, to shell collecting, sunbathing, and recreational fishing.

For an excellent book, see *Coral Reefs: Tourism, Conservation, and Management*, edited by Bruce Prideaux and Anja Pabel.

Historical Overview

Low-impact tourism likely began earlier, but in 1983, the term “ecotourism” was first coined by Mexican architect Héctor Ceballos-Lascuráin.¹

Other notable dates throughout the history of ecotourism include:

- 1923: In 1923, Barro Colorado Island (BCI), which is located within the Panama Canal’s Gatun Lake, “became one of the first biological reserves in the New World, and is now the most intensively studied area in the tropics.”²
- 1990: The International Ecotourism Society (TIES) was established and was “launched by a team organized by Megan Epler Wood at a conference in Florida in 1989 as the world’s first international non-profit dedicated to ecotourism as a tool for conservation and sustainable development.”³
- 1990: The Adventure Travel Trade Association (ATTA) is established.⁴
• 1993: “That reputation has brought definite payoffs, particularly in the tourism industry, which in 1993 surpassed bananas as the country’s [i.e., Costa Rica] leading revenue source.”

• 2002: The year is “declared International Year of Ecotourism. Quebec (Canada) holds the World Ecotourism Summit, which adopts the Quebec Declaration on Ecotourism.”

• 2003: Center for Responsible Travel (CREST) is established.

• 2007: Partnership for Global Sustainable Tourism Criteria was formed. In 2009, the Sustainable Tourism Stewardship Council was created. Both entities merged in August 2010 to form the Global Sustainable Tourism Council (GSTC).

**Mechanisms of Instrument**

There are a wide variety of revenue sources from ecotourism:

Tourism has the potential to generate sustainable funding for conservation in MPAs through tourism-based user fees (e.g., protected area entry fees, diving fees, and yachting fees); revenues from commercial activities of protected area agencies; airport, cruise ship, or hotel taxes; and voluntary donations of tourism operators or tourists. For tourism-based revenue sources to be viable, tourism sites need to be both attractive and accessible to tourists. The most successful revenue generation strategies are built on strong market research and collaboration between government agencies, conservation organizations, and private operators. Revenue generation strategies also need to address the additional infrastructure costs and environmental impacts of increasing numbers of tourists. Environmental impacts can be mitigated through the imposition of fines and taxes, and voluntary tourism certification programs provide a mechanism for tourism operators to be recognized for their investment in sustainable operations.

With this in mind:

Entry fees are the most common kind of MPA user fees and have the advantage that only those who use the protected area need to pay the fee. In some cases, entry fees can generate enough revenue to pay for most of a protected area’s operating costs, especially in cases where visitor numbers are high and entry fees are also relatively high. Many protected areas in developing countries charge entry fees that are far lower than what international visitors would be willing to pay. The introduction of two-tiered pricing, with substantially
higher rates for tourists than for local residents, can greatly increase the total amount of fees collected.\textsuperscript{10}

Income might be generated from operating tourist facilities such as visitor lodges, campsites, stores and restaurants, activities (i.e., rides and tours), concessions, and through the hire and rental of equipment and facilities (i.e., diving gear).

Some countries require all foreign tourists (i.e., not just divers or not just people who visit the MPA) to pay a small conservation fee when they enter or leave the country. Such visitor fees might be collected directly by the MPA or via a third-party such as a tour operator.

The destination—whether it be an MPA or a UNESCO World Heritage Site—is often public. While there are private islands which may contribute to the conservation of nearby coral reefs, these are relatively small scale.

Oftentimes, ecotourism operators are licensed by the subnational or federal government to operate within a given MPA. For instance, in Mexico, ecotourism operators are allowed to bring tourists to snorkel with whale sharks (\textit{Rhincodon typus}),\textsuperscript{11} and in the Dominican Republic, there are three operators for swimming with humpback whales (\textit{Megaptera novaeangliae}).\textsuperscript{12}

It is important to note that the visitors to such places are not necessarily tourists but may also be students and/or researchers. For instance, this includes students participating in the School for Field Studies’ Turks & Caicos program\textsuperscript{13} and researchers visiting the Smithsonian Tropical Research Institute in Panama.\textsuperscript{14}

Ideally, the destinations of ecotourism will have low impacts due to a restricted number of visitors that are both enforced and updated according to the sustainability of the location. Similarly, you often need a permit to visit the MPA and there are limits on the number of people who can visit.

**Size of Instrument**

The UN World Tourism Organization (UNWTO) estimates there were approximately 1.4 billion international tourist arrivals in 2018.\textsuperscript{15} In addition, the World Travel & Tourism Council reported that the “global travel and tourism sector grew at 3.9% to contribute a record $8.8 trillion and 319 million jobs to the world economy in 2018.”\textsuperscript{16} More specific to coral reefs, Mark Spalding et al.’s research estimates “some 30% of the world’s reefs are of value in the tourism sector, with a total value estimated at nearly US$36 billion, or over 9% of all coastal tourism value in the world’s coral reef countries.”\textsuperscript{17}
Introduction to Case Studies

The following case studies will examine the Galápagos Islands, ecotourism in Belize, the Bonaire National Marine Park, the Palau National Marine Sanctuary, and Lady Elliot Island. While the Galápagos Islands do not have much coral reef cover, the Islands are one of the most iconic places on Earth, is often on the bucket list for international travelers, and is home to a tremendous amount of endemic species. Belize, although a relatively small country located in Central America, has an extraordinary collection of terrestrial and marine biodiversity. The Bonaire National Marine Park generates a relatively substantial sum of revenue from reef-based tourism and the reefs are an important part of Bonaire’s culture. The Palau National Marine Sanctuary, which encompasses 475,077 km², helps to fund Palau’s marine conservation. Palau has many leading accomplishments including the world’s first shark sanctuary and the first nation-led, crowdsourcing funding campaign called “Stand with Palau.” Lady Elliot Island, the “home of the manta ray,” is a spectacular ecotourism lodge located on the Southernmost island of the Great Barrier Reef and within the well-preserved Green Zone.

Case Study #1: The Galápagos Islands

Introduction

While the Galápagos Islands do not have much coral reef cover, the Islands are one of the most iconic places on Earth and is often on the bucket list for international travelers. The Galápagos Islands, which are made up of approximately “127 islands, islets and rocks, of which 19 are large and 4 are inhabited,” are owned by Ecuador and are located approximately 600 miles (966 kilometers) off the coast of Ecuador (Fig. 12.1).

Tourism is one of the major revenue sources for Ecuador, and particularly for the Galápagos National Park Service. Few countries have entry taxes, while in contrast, the Galápagos Islands have an entry tax of USD$100 for every foreign tourist who is over the age of 12 and who is not a resident of Ecuador. This entry tax is split between the various actors such as the navy and the municipality as follows:

- 50%: Galápagos National Park;
- 25%: Galápagos municipalities;
- 20%: Government Council of Galápagos; and
- 5%: Galápagos parishes.
Thus, the Galápagos Islands have the financing mechanism in place and with a budget of approximately USD$15 million to USD$16 million a year, it is fairly well funded. There are a few other funding mechanisms in place. For instance, in the past, there was the Lindblad Expeditions Galápagos Conservation Fund and the Galápagos Emergency Response Fund. However, it is safe to say that a vast majority of the funding comes from tourism.

**Identify Problem**

There are some coral reefs located in the North, such as around Darwin Island. However, by 1997–1998, there were very few corals left around the Galápagos Islands. The University of San Francisco in Quito did an old study on coral reefs around San Cristobal island where they started to measure and monitor for any diseases and bleaching. Starting in 2009, and then particularly in 2010–2011 as a result of El Niño, some coral bleaching took place. In the central archipelago, the coral reefs were completely wiped out as the coral reefs could not sustain the extreme temperature fluctuations.

Prior to 1998, and before the “Special Law for Conservation and Sustainable Development of the Galápagos” was enacted, industrial tuna fishing
fleets (i.e., long liners) were also a major problem facing the Galápagos Islands. Once the special law was created, commercial tuna fishing fleets were no longer a major threat. The artisanal fishing fleets, with an estimated 1000 fisherfolk and 400 vessels, became a focus. Fishing is still prized and some of the activity is illegal.24

Around 2001, the Reserve got an airplane, which until today, has been relatively useful in monitoring for encroachment and illegal fishing. In 2006, legislation was starting to be written and then in 2009, the program went online with transceivers that essentially enabled one to view where the fishing vessels are and such vessels started to respect the Reserve areas. However, the fishing tactics started to change and you began to see the hauling of 6–8 small boats that would do the fishing for the mother ship. The mother ship would stay outside of the 40 nautical mile buffer zone and the smaller fishing boats would then unload the fish onto the mother boat and the mother boat would either go into port or do an exchange at sea.25

Asides from illegal fisherfolk and poachers, the Galápagos Islands are facing problems associated with the impacts of tourism and invasive species.26 From prior to 1998 to 2018, tourism has exploded. For instance, in 2017, a total of approximately 241,800 tourists arrived in the Galápagos Islands and in 2018, a further 275,817 tourists arrived (i.e., a 14% increase with approximately 34,000 additional tourists).27 Tourism has a footprint because the Galápagos Islands are located 600 miles off the coast of mainland Ecuador and nearly everything is imported. Alongside these imports comes the introduction of invasive species such as feral cats and goats, which for instance, eat the local floral and the tortoises are left with next to nothing to eat. Unfortunately, there are a lot of marine invasive species around the Galápagos Islands such as mussels and African clams, but the most difficult invasives are the ones not easily seen (i.e., parasites).28

Also, with respect to tourism, there is still poor management in many areas of the Reserve and the number of tourists is far too high. Dr. Judith Denkinger and the Universidad San Francisco de Quito (University of San Francisco in Quito) did a study back in 2015 that showed the levels of tourism the islands could support—150,000 annual visitors—had already been reached and that it should be frozen at this level. However nowadays, the number of visitors is far higher and is well above 225,000 annual visitors. The problem is not just the number of tourists, but everything they need (e.g., gasoline, food, etc.) and the effect of island hopping. A somewhat related problem of tourism is that the liveaboard operations primarily support international companies. The rise of ground-based tourism, although contributing to the increased number of tourists, at least supports local communities.29
Why the Problem Is Important

From the giant Galápagos tortoise (*Chelonoidis nigra*), to the Galápagos marine iguana (*Amblyrhynchus cristatus*), to Darwin’s finches, to being one of best places in the world to dive with scalloped hammerhead sharks (*Sphyrna lewini*), the Galápagos Islands are home to some of the most unique species and some of the highest levels of endemism on Earth. As explained by Mr. Marcel Bigue of WildAid, “I do not think there is one that possesses such high levels of endemism and that is as well preserved as the Galápagos.”

The Galápagos Islands provides opportunities for fishing, tourism, local incomes, and foreign revenue for the Ecuador Government. Furthermore, the Galápagos Islands is listed as a World Heritage Marine Programme.

How Problem Was Identified

The problems facing the Galápagos Islands have been identified by several actors, including the work of NGOs such as WildAid and the work of universities such as the University of San Francisco in Quito.

Effectiveness of Process for Identifying Problem

The process for identifying the problems appears effective as there is a lot of attention paid to the Galápagos Islands due to their historical importance and iconic stature.

Steps Taken to Address the Problem

There are numerous steps taken to establish the Galápagos Islands National Park and to address the problems associated with overfishing, tourism, and invasive species. For instance:

- A total of “97% of the total emerged surface (7,665,100 ha) was declared a National Park in 1959. Human settlements are restricted to the remaining 3% in specifically zoned rural and urban areas on four islands (a fifth island only has an airport, tourism dock, fuel containment, and military facilities). The islands are surrounded by the Galapagos Marine Reserve which was created in 1986 (70,000 km²) and extended to its current area (133,000 km²) in 1998”.
Also, in 1998, the Special Law for Conservation and Sustainable Development of the Galápagos was passed.\(^\text{32}\)

To help address problems associated with tourism, there is relatively strict regulation of the Galápagos Islands, including cutting down the amount of time tourists can spend from three months to six weeks. In addition, tourists need to apply for, and be granted, a visa.\(^\text{33}\)

WildAid also took steps to address the problems surrounding illegal fishing. WildAid first started by asking what were the biggest threats and what could WildAid do to help. Planning with the Marine Resources Department of the Park Service was undertaken. Ultimately, WildAid started to work on improving the management of the fisheries and to stop illegal fisherfolk. This was done through ranger training, along with an internal analysis and needs assessment of the human and financial gaps including looking at education levels and potential user errors. Then, WildAid provided training, helped get the right equipment, and implemented proper systems. Although its focus was on the fisheries, WildAid adapted to fill in gaps and this is how its biosecurity work came up. In addition, Sea Shepherd has helped finance patrols for shark poachers.\(^\text{34}\)

To address the issue of invasive species, there was a huge eradication project undertaken and the project was fairly successful on one of the islands. The process for WildAid was largely through its work with the Galápagos National Park System and later, WildAid worked with the Biosecurity Agency which was created. More specifically, WildAid worked with both senior level officials and field staff. WildAid also helped the field staff to lobby their senior staff. WildAid saw a need for a quarantine system as this was a huge gap and this is when WildAid started working with the Biosecurity Agency. Likewise, invasive species became more of a problem as the controls that were around in 1988 were the same controls being used in 2008. WildAid’s first step was to look at what the top three invasives were and also looked at how biosecurity was done in the United States, Chile, and other places that had the same level of resources as the Galápagos Islands. Unfortunately, there were more problems than the funds WildAid had to address the problems.\(^\text{35}\) Likewise, according to Mr. Marcel Bigue with respect to invasive species, “ideally the entire project would be completed in an additional five years, however, it is difficult to say with certainty, as we are already four years into the process. The total project cost is estimated at $40 M and the Government of Ecuador will be picking up 95% of all costs.”\(^\text{36}\)
Results

WildAid, which aims is to reduce global consumption of wildlife products, in part through use of celebrities and which also works to secure marine protected areas such as the Galápagos Islands, accomplished quite a bit. According to WildAid’s 2017 Annual Report:

- Using technology provided by WildAid, “park rangers apprehended 10 shark poaching vessels, including a Chinese cargo vessel with over 6,000 frozen sharks in its hold, and an Ecuadorian fishing vessel and its eight support boats with 300 juvenile sharks. The Chinese vessel’s crew was sentenced to 1-3 years in prison and owner charged a $6 million fine. The Ecuadorian vessel’s crew members were sentenced with 1.5-3 years in prison, and the owner charged a $300,000 fine. Galápagos rangers conducted 478 patrols and 1,001 inspections throughout the year {2017}, which resulted in 68 infractions.” 37

- WildAid “developed a 10-year fleet renewal plan that will increase surveillance in the new Darwin and Wolf shark sanctuary and update the Galápagos National Park fleet to better fit the park’s needs. Ultimately, this will reduce annual operating expenses by over $2 million.” 38

- WildAid “helped Galápagos National Park launch a pilot plastic-reduction campaign at an elementary school to promote the use of reusable bottles, resulting in a 95% reduction in the use of disposable bottles. In 2018, we will expand to three more schools.” 39

- WildAid also “launched a canine unit with three canine detection teams to prevent invasive species from entering the Galápagos. The teams can detect Giant African Land Snails {Achatina fulica}, one of the most destructive snail species in the world, and up to 10 prohibited products. Their work led to 40 detections of prohibited items in passenger baggage.” 40

- Furthermore, WildAid “invested in equipment for biosecurity labs and specialized training for 170 staff, which improved invasive species detection and response capacity. The team inspected over one million pieces of luggage and 17 million kg of cargo at entry points, resulting in 5,956 confiscations of prohibited or contaminated products. The lab analyzed over 3,000 samples suspected to contain invasive species.” 41

Similarly, according to WildAid’s 2018 Annual Report, WildAid also:
Published “a fleet renewal plan for Galapagos National Park (GNP), a 10-year project that will decrease GNP operating costs by millions annually, while providing greater protection for the reserve.”

WildAid, together with the GNP, “hosted the first regional enforcement workshop in Latin America, with attendees representing 30+ MPAs and seven countries. They shared lessons learned, successes and common challenges in MPA enforcement to strengthen protection in the region.”

Galapagos rangers “conducted more than 8,800 patrol hours, inspecting 1,760 artisanal/tourism vessels and finding 70 infractions, including fishing without required permits and the use of illegal fishing gear.”

Furthermore, “using electronic surveillance tools, rangers detected 31 industrial fishing vessels illegally entering the reserve. All vessels now face substantial fines.”

According to Dr. Judith Denkinger, results are still materializing. Dr. Denkinger works with sea lions and the sea lions had problems with pathogens to the degree where 60% of the pups were lost. Researchers found the sea lions had distemper/Leptospira, which is believed to have been from people, dogs, or cows and then possibly transmitted to sea lions. Vaccines are not allowed in the Galápagos Islands and there is little control over bringing non-vaccinated animals to the Islands. Likewise, there is a concern these vaccines could be reactivated (i.e., if it’s a live culture, it could be spread to wild populations). Despite the ongoing problems with rats and cats, Dr. Denkinger believes their invasive species program is successful. Yet on San Cristobal Island, wild cats are still a big problem due to the cats eating the eggs or eating young birds.

Dr. Denkinger also thinks the Galápagos Islands is doing a very good job of addressing the illegal fishing problem as evidenced by the recently seized Chinese boat. Unfortunately, the pressure is very high as shark fins get turned over to the international boats that are setup over the border of the marine reserve. In addition, large drift nets with satellite transmitters are let loose and they sometimes drift through the actual reserve because there is no control where they go and all the bycatch (i.e., sharks, turtles, sea lions, etc.) can be devastating. This said, commercial fishing in the reserve is not allowed and nor is the use of drift nets in the reserve allowed—but it still happens.
Challenges and How They Were Met

There are approximately 85 vessels that tour the Galápagos Islands and, in the past, you would go on a liveaboard. The archipelagos are very well regulated (i.e., habited versus uninhabited islands) and you need a guide to visit. Then around 2010, there was a shift. The Islands had maxed out vessel tours and a handful of operators were getting the lion share of revenue with very little of the revenue trickling down. There were populist mayors raising issues about people versus parks, and how we the people need to benefit. This is when land-based tourism started to explode in the Islands with lots of people starting to offer something akin to Airbnb. Now people are taking day trips from the Islands in fast boats and this is the big, new problem with tourism. There are now lots of people, making walking trails and doing locally based tourism.49 A related challenge is that there are powerful families in Ecuador who are a powerful force in the country that both run the country and who make a lot of money from mass tourism. This mass tourism versus controlled, good tourism is “like squeezing a balloon.”50

Another challenge is that at one point, park management was very decentralized and had lots of autonomy (i.e., and it still does to some degree today). However, as of recent, this could be changing and there is a greater likelihood the entry tax will go to the general fund of Ecuador as the price of oil declines (i.e., this is a similar situation as in Mexico).51 Likewise, Ecuador’s crude oil basket was above USD$80 per barrel from approximately 2011 to 2014, and was then under USD$50 per barrel for most of 2016 and 2017.52

Galápagos Islands is a challenging place. For instance, how do you prevent people from moving to the Islands if, for example, they have a friend living there, who is making 5× more money than on the mainland. How do you control population? Not only are salaries higher on the Islands than on mainland Ecuador, but a lot of living expenses and other items (e.g., plane travel, gasoline, etc.) are subsidized. This system encourages more people to move to the Islands. In addition, the system encourages people to buy cars as training cars are shipped from the mainland to the Islands to teach people how to drive.53

Beyond Results

It is important to note that, looking back at 1998, WildAid started with nothing as the marine reserve was not in the wheelhouse of the National Park Service; rather the Park Service was just focused on the terrestrial environment and this tends to be similar for other park services. As described
by Marcel Bigue, every site is different, but there is general stuff needed for all compliance such as capacity building, training systems, monitoring systems, outreach to stakeholders, and effective prosecution. Similarly, things are definitely scalable. There are templates and one does not need to replicate everything from scratch. For instance, boats may be different, but most marine parks are still using boats for monitoring and enforcement. These results are now being applied to other MPAs throughout Ecuador. WildAid, for example, helped setup a peer-to-peer network to show others in country how local staff at the Galápagos Islands are working. WildAid, and its partners, also took the results beyond the Galápagos Islands by, for instance, hosting a regional workshop for law enforcement who came to the Islands around July 2018 to learn how it was/is done there.54

In contrast, Dr. Judith Denkinger and colleagues fear the future will be even more dire. From 2002 to now, Dr. Denkinger has seen dramatic changes: more people, more cars, less fish, and less sea lions. While, the terrestrial side is kind of well organized—for example, with the control of invasive species—the marine reserve is very difficult. The marine reserve is a huge area, monitoring and enforcement are expensive, and only a few small areas are strictly conserved. A lot of the overall area is used for tourism or small-scale fisheries, while the prohibition is only on industrial fishers. Yet, tuna and grouper populations are still declining. Sea cucumbers and lobsters are kind of coming back, but they have not had the necessary time to recover.55

Lessons Learned

Marcel Bigue’s extensive experience working with WildAid, and at the Galápagos Islands, has resulted in numerous lessons learned. For instance, you can have the best technical assistance and the best technology package, but if there is not the political will to enforce fisheries regulations, you are not going to be very successful. Likewise, since 2004, Mr. Bigue has been connected to the Galápagos Islands and has seen the figuratively “high tide and low tide”—some administrations are very passionate about protecting and enforcing the fisheries, while other administrations “could care less.” Nowadays in Ecuador, along with Argentina, Brazil and the United States, the national governments are all tending to the right politically speaking. Rafael Vicente Correa Delgado, the former president of Ecuador, did an about face and the country has now entered a turbulent time. In conservation, you have your victories and you have backtracks, and right now Ecuador is in backtrack. However, the Park and the government have built a good foundation with lots of dedicated civil servants. In addition, tourism will continue as
the Galápagos Islands, mainly, still remains a high-end destination. Another important lesson learned is to recognize that no one technology does it all.56

Dr. Judith Denkinger thinks that while piracy and drift nets are hard to manage, one of the major problems is corruption in the institutions and the lack of political will. All the positions in the Park are political positions and all come from the same political background. However, the best should be chosen, not someone handpicked by the environmental minister. This said, there were recently three changes in the environmental minister and the current environmental minister is working with oil companies to explore how to drill in Yasuní National Park. Yet, the park director, who is handpicked by the environmental minister, will then assign everyone else (e.g., biologists, rangers; etc.). Instead, you need to hire someone from the Galápagos Islands, but if no such qualified person is available, then you can hire from the mainland afterward.57

Other Resources on the Galápagos Islands

Charles Darwin Foundation

- https://www.darwinfoundation.org/en/

Galápagos Conservation Trust

- https://galapagosconservation.org.uk/; and
- https://galapagosconservation.org.uk/what-we-do/projects/

Galápagos Conservancy

- https://www.galapagos.org/; and
- https://www.galapagos.org/wp-content/uploads/2019/05/Annual-Report-2018-web.pdf

Galápagos National Park Service

- https://www.galapagos.gob.ec/en/national-park/;
- 2017 Annual Report: http://www.galapagos.gob.ec/wp-content/uploads/downloads/2018/02/informe_visitantes_anual_2017.pdf; and
- 2018 Annual Report: http://www.galapagos.gob.ec/wp-content/uploads/downloads/2019/01/INFORME-ANUAL-DE-VISITANTES-A-LAS-ÁREAS-PROTEGIDAS-DE-GALÁPAGOS-2018.pdf
Case Study #2: Ecotourism in Belize

Introduction

Belize, a relatively small country located in Central America, has an extraordinary collection of terrestrial and marine biodiversity. Belize is “home to almost 1,400 species, {and} the Belize Barrier Reef is one of the most diverse ecosystems in the world. It has been recognized as a UNESCO World Heritage site since 1996”58 (Fig. 12.2).

Ecotourism is a major contributor to the Belize economy, in large part due to the fact that Belize has some incredible reefs and dive sites such as the Hol Chan Marine Reserve, Ambergris Caye, and the Great Blue Hole, which is rated as one of the top dives in the world.59 Furthermore, Belize has some relatively large reserves including the Southwater Caye Marine Reserve and the Corozal Bay Wildlife Sanctuary.60

From a financing perspective, in the beginning stages, “funding support for the MPA system {was} being provided by donor agencies such as the GEF / UNDP Coastal Zone Management Project, the EU, the GEF / World Bank Mesoamerica Barrier Reef System Project, TNC, WWF, and the Summit Foundation.”61

Today:

Belize’s system involves collecting the equivalent of a $3.75 conservation tax from all foreign tourists at the same time that they pay the $15 airport departure tax, and earmarking all of this revenue for conservation projects
administered by {Protected Areas Conservation Trust} PACT. Cruise ship passengers also pay the fee. Most foreign visitors to Belize are ecotourists who go there either to see the rainforests, or to swim, dive, snorkel, and fish in the world’s second longest barrier reef. A survey done before the fee was imposed showed that most foreign visitors were even willing to pay $20 as a conservation fee. However, the tourism industry feared, without any corroborating
evidence, that setting the fee at that level might cause many foreign tourists to decide not to come to Belize, but to visit cheaper neighboring countries instead.\textsuperscript{62}

It should be noted that while there is a departure tax that is channeled to PACT, this amount is not immediately redirected to reserves as it goes to the general fund. There is a need for more work on oversight to make sure it is channeled to MPAs. PACT is doing landscape and seascape conservation where there could be several MPAs. In Belize, there are different types of reserves such as marine reserves (i.e., under the Fisheries Department), wildlife sanctuaries, national monuments, and national parks (i.e., under the Forestry Department). In the land sector, user fees are kept and reinvested back into the forestry sector. Visitor fees from marine areas are now going to the Fisheries Department. Belize is almost at the point in time where the funds will go to PACT instead of the Fisheries Department.\textsuperscript{63}

One specific example is the Hol Chan Marine Reserve, which is right offshore and is a smaller MPA, but has significant biodiversity. This Reserve is somewhat self-sufficient from a financial perspective with their fees. As the oldest reserve in Belize, the Reserve is a good example as it has a trust, funds are reinvested, and it has a very good model of outreach. Because the Reserve is close to shore, there are lots of visitors and activities include snorkeling, diving and fly fishing.\textsuperscript{64}

Another example is with SEA Belize, which comanages the Gladden Spit & Silk Cayes Marine Reserve with the Fisheries Department and comanages the Laughing Bird Caye National Park with the Forestry Department. The Laughing Bird Caye National Park is a complete no-take zone and is adjacent to four communities that fish and use the entire reef system. The Gladden Spit & Silk Cayes Marine Reserve has a general use zone which allows for the catching of lobster, conch, and fish. SEA Belize’s work includes managing the commercial fisheries and upholding regulations for lobster, conch, finfish, and outer reef fish. In addition, SEA Belize uses protocols that are aligned with regional and national programs to monitor the health of corals and coral bleaching. Furthermore, SEA Belize makes sure that rangers are out at both marine protected areas and that there is monitoring taking place. Ultimately, there are lots of dynamics at play with an outreach program working directly with schools, fishing communities, private beach owners, and tour operators about marine conservation in general.\textsuperscript{65}

SEA Belize’s source of funding is primarily two sources. SEA Belize collects ticket fees from visitors, mainly foreigners, visiting both parks. The Fisheries and Forestry Departments are reworking the co-management agreements where the ticket fees will stay with SEA Belize. These funds then go directly
to the day-to-day management, particularly payment of staff, of both MPAs. Asides from ticket fees, at Laughing Bird Caye National Park there is a gift shop that sells local arts and crafts, along with personalized t-shirts and mugs that say SEA Belize or the name of the MPA. There are opportunities to expand this gift shop and to increase revenues.\textsuperscript{66} Second, traditional grant writing is another revenue stream. This involves finding thematic ways and different calls for proposals, then submitting a response to the funder, and going through the revision process. This grant funding is mainly project-based and for example, the Belize Marine Fund is funding the installation of new demarcation barriers, signage, and overall beautification of the areas.\textsuperscript{67} Similarly, the Protected Areas Conservation Trust (PACT), a subsidiary of the Belize Government, was looking for application submissions for conservation investments strategies. SEA Belize sought to improve Little Water Caye with better monitoring and to build a dormitory (i.e., to provide housing, food, etc.). There are also a few other donors, which reached out to SEA Belize as they wanted to specifically fund conservation activities in Southern Belize.\textsuperscript{68}

Furthermore, a “{…} loan from the Inter-American Development Bank to the Ministry of Tourism for implementing Belize’s Sustainable Tourism Plan” was extended.\textsuperscript{69}

\section*{Identify the Problem}

The Belize Barrier Reef Reserve System “was added in 2009 to UNESCO’s List of World Heritage in Danger and to date \{2017\} remains on this list based on threats related to the removal of mangrove cover, unsustainable coastal development, and offshore oil exploration.”\textsuperscript{70}

Historically, illegal fishing was a problem facing Belize in general and particularly within the Hol Chan Marine Reserve. Hol Chan was historically a fishing community and its designation was championed by fishers. Nowadays, there are different problems facing both Belize and the Hol Chan Marine Reserve. Illegal fishing is no longer an issue as many fisherfolk transitioned into tourism. For example, hotels and resorts hire people, who were once fisherfolk, for tourism-related jobs such as tour guides, boat drivers, and fishing guides.

Currently, the problems facing Belize and Hol Chan include overtourism, clearing of mangroves, disease, pollution, climate change and \textit{Sargassum}. The impact of tourism, which is related to the clearing of mangroves for development, has had a detrimental impact on the local environment due to the boost in tourism. Disease, particularly white disease, is becoming a problem. White disease started off in Florida and in early 2019, the white disease was
seen in Mexico. It was then positively identified in Belize in 2019. Climate change is a current problem due to increasing sea temperatures, and coupled with pollution runoff which brings nutrients to the sea, a perfect growth environment has been created for *Sargassum*.71

Problems inside Laughing Bird Caye National Park and Gladden Spit & Silk Cayes Marine Reserve include the changing climate, the changing seas, changing currents, the severity of storms, and the erosion. There is severe degradation, for instance, at South Silk Caye Island inside of the Gladden Spit & Silk Cayes Marine Reserve. Tourists are allowed to visit the island, but the island is suffering from severe erosion and “you have an island that is basically washing away.”72 Tour guides and tour operators are reaching out to SEA Belize and saying that we need to do something and we need do something fast. At Laughing Bird Caye National Park, there is also a lot of erosion. The ranger house is being exposed to the elements, such as wave action, and there is a need to maintain the integrity of the island for both visitors and staff. SEA Belize recently had a consultant do an analysis of the carrying capacity of the islands and there is now a need to ensure that access to the islands is controlled.73

Another problem is illegal fishing, which not only occurs in the MPAs, but also in adjacent areas. The Southern Barrier Reef of Belize is a complex ecosystem and is one of the most productive places in the country. While the coral reef has been categorized as doing very well and is a fairly healthy system, a lot of fisherfolk tend to congregate and there is a need to bump up enforcement (i.e., make sure rangers have enough fuel). There are three types of illegal fishing. First, there is small-scale fishing, which usually involves local, licensed fisherfolk in skiffs (i.e., 20-foot long boats with an outboard motor and typically with 3–6 people on board). While many respect the regulations, some will fish during seasonal closures and will not respect the size limitations. SEA Belize needs to make sure they have the manpower to regularly monitor. Second, there are sailboats, mainly licensed fisherfolk from Northern Belize communities, that will go out for a two-week trip (i.e., as opposed to the previously mentioned small scale fisherfolk who go out for a day trip) to range the reef from North to South. Third, there are foreigners who mainly fish at night and are coming from Honduras and Guatemala. These fisherfolk also use skiffs, but they will break into the no-take zones and take as much fish as possible.74

Another challenge is that the two MPAs are not contiguous; one is about 45 minutes from the SEA Belize office and the other is about one hour away.75
Why the Problem Is Important

These problems are important, in part, because Belize has some incredible reefs and dive sites such as the Hol Chan Reserve, Ambergris Caye, and the Great Blue Hole.

Despite a land area of just less than 23,000 km² and a population of about a quarter of a million people, Belize possesses a spectacular coastline nearly 400 km long and is home to a trove of coastal and offshore resources. Three largely undeveloped and awe-inspiring “atolls” (Turneffe, Lighthouse, and Glover’s Reefs) lie offshore the internationally acclaimed barrier reef. Belize continues to develop one of the world’s most advanced and visionary systems of marine protected areas.\(^{76}\)

If a significant die off of corals occur throughout Belize due to the white disease, or tourism visitation numbers are reduced due to the Sargassum problem, then Belize could lose a lot of tourism-related revenue. This said, Belize earned an estimated USD$427 million in tourism revenue in 2017,\(^{77}\) and in 2019, there were 500,000+ overnight visitors and one million cruise line passengers. The latest statistics show that Belize surpassed the half a million mark, welcoming a total of 503,177 overnight visitors in 2019. This represents more than 100% growth in the sector in the past decade (up from 241,119 in 2010). Cruise arrivals also surpassed the 1 million mark again for the fourth consecutive year.\(^{78}\)

In addition to reefs, Belize has several atolls (Glover’s Reef), which are not very common in the Caribbean. These atolls are far enough away (~40 miles) and thus, not very accessible to tourists and are relatively, quite pristine.\(^{79}\) Furthermore, the Belize Barrier Reef Reserve System is listed as a World Heritage Marine Programme.

How Problem Was Identified

The aforementioned problems were identified in different ways. For Sargassum, it is quite visible so everyone can see it and nearly everyone is aware (e.g., private sector hotels, government agencies, etc.) of the Sargassum problem.

With respect to illegal fishing, fisherfolk were complaining about catching less, while the stock assessment—particularly for finfish—by the Fisheries Department identified the catch per unit effort (CPUE) was decreasing.

White disease was originally identified by scientists in the Florida Keys and then it took approximately 1–2 years before it appeared in Mexico and Belize.
With respect to the Laughing Bird Caye National Park and Gladden Spit & Silk Cayes Marine Reserve, stakeholder engagement is very strong and there is an open-door policy. When, for instance, the tour operators association was facing problems and felt threatened (i.e., with the erosion at South Silk Caye), the association felt comfortable approaching SEA Belize and saying that intervention was needed. Likewise, communities notice the illegal fisherfolk, particularly the foreigners, and the communities will come to SEA Belize.\(^{80}\)

As a ten-year old organization, SEA Belize has the data and can see changes in some of the species (i.e., different abundance and dynamics). There are also ongoing surveys such as the national conch survey which is done every two years. When generating these reports, whether for conch or lobsters, you can tell what are the problems. In addition, SEA Belize works closely with the Fisheries Department.\(^{81}\)

**Effectiveness of Process for Identifying Problem**

Overall, while there is always room for improvement, the processes have been effective. There is always an attempt to get good consultation before the passage of a new regulation. For instance, MPA managers will consult with NGOs and local communities.\(^{82}\)

The process for identifying the *Sargassum* problem has so far been effective. There has been effective government collaboration as the Belize Government has organized a committee, is now chairing the committee, and has involved the private sector (i.e., beachfront hotels and resorts), along with other representatives from the government, private sector, and NGO community.\(^{83}\)

With respect to the effectiveness for identifying the problem of white disease, it has been challenging because practitioners are not really sure what is contributing to the disease. For instance, the disease could be related to sediment runoff and those have a land-based source.\(^{84}\) Alternatively, the disease could be related to something in the water such as an invasive parasite.

The Coastal Zone Management Authority and Institute (CZMAI) “reached out directly to stakeholders through regional CACs {Coastal Advisory Committees}, television and radio ads, announcements in print news and media, convened public meetings in coastal regions, and shared educational materials related to the process.”\(^{85}\)
Steps Taken to Address the Problem

There are numerous steps taken to address the aforementioned problems and to position Belize as a world leader in ecotourism.

For instance, “the first marine habitat to be included in a protected area in Belize was at Half Moon Caye, on Lighthouse Reef atoll, which was designated as a natural monument in 1982 (a portion of the caye itself having been protected since 1928 due to its booby colony).”

To address illegal fishing and overfishing, Belize announced in 2019 a drastic expansion of its MPAs and no-take zones from 4.5 to 11.6% of its waters. Nowadays, Belize is seeking to put limitations on the catch and to establish shorter fishing seasons for shellfish and conch.

The steps taken to address the Sargassum problem essentially are the Belize Government put together a Sargassum committee and has begun exploring how to collect Sargassum and use it in an economical manner.

Furthermore, “the Conservation Compliance Unit of the {Belize} Fisheries Department enforces fishery regulations. When first established, with funding from the USAID, it was well equipped and provided an enforcement capability considerably greater than that found in most other Caribbean countries.”

Results

In 1996, the Belize Barrier Reef Reserve System (BBRRS) was inscribed on the World Heritage List which “[…] is comprised of seven protected areas; Bacalar Chico National Park and Marine Reserve, Blue Hole Natural Monument, Half Moon Caye Natural Monument, South Water Caye Marine Reserve, Glover’s Reef Marine Reserve, Laughing Bird Caye National Park and Sapodilla Cayes Marine Reserve. The largest reef complex in the Atlantic-Caribbean region, it represents the second largest reef system in the world. The seven protected areas that constitute the BBRRS comprise 12% of the entire Reef Complex.”

More specific to the Hol Chan Marine Reserve, which is one of the oldest MPAs in Belize, one of the most significant results is that you can actually see the results of protection as several large species of fish can been seen in Hol Chan which you would not be able to see elsewhere.

The Laughing Bird Caye National Park was designated a national park in 1991 and became a World Heritage Site in 1996. There are a lot of additional results at the Laughing Bird Caye National Park, which is one of the biggest no-take zones in Belize. For instance, SEA Belize has ensured monitoring is
enforced and ensured finances are safeguarded for the MPA. The communities can see that SEA Belize is continuing their mission to completely preserve the area and the local fisherfolk know the benefit of the no-take zone due to the spillover effect. SEA Belize also supports Fragments of Hope, which is doing coral restoration in Laughing Bird Caye National Park and one can see an exponential increase in coral cover over the last seven years. Furthermore, both the local economy and the national economy have benefitted from tourism revenue.

**Challenges and How They Were Met**

Current challenges facing ecotourism in Belize, and particularly the Hol Chan Marine Reserve, include: climate change; managing tourism demand; community expansion; deforestation of mangroves; contamination due to erosion; and working with stakeholders.

Global climate change is creating a higher chance of storms hitting Belize and harming local residents, infrastructure, and the ecosystems. Starting in 2007, WWF Mesoamerica started to use the topic of climate change as an opportunity to formulate new partnerships with the local communities and private sector. WWF Mesoamerica started by increasing local communities and the private sector’s awareness of climate change, mapped their vulnerability, looked at adaptation strategies, and then went in and offered to help them implement measures.

In order to address the challenges of overtourism, community expansion, and contamination due to erosion and sediment runoff, Belize enacted its Coastal Zone Management Plan (“the Plan”) in 2016. The Plan, which seeks a blend of conservation and development, helps define the scale of development and the type of development. However, it is important to note the Plan is not a legal instrument and an entity can still go against the Plan. The Coastal Zone Management Authority and Institute, which is the governmental entity responsible for overseeing the Plan, is now in the process of revising the Coastal Zone Management Act. The challenge is that ideally you should have the act first, and then have a plan right afterward. While the Plan is good (i.e., it involves ecosystem services, establishes regional committees, and is based off lots of consultations), the Act is outdated. The first act was done in 1998, but there was no plan until 2016 and there is a need to update the act. Belize is now seeking to get the Plan incorporated into the new act and make it official law, which should be done in 2020.

Whale sharks are a popular attraction in Belize. In fact, Gladden Spit & Silk Cayes Marine Reserve “[…] attracts the most predictable and dense
aggregation of whale sharks in the world.” The whale sharks pass through Gladden Spit & Silk Cayes Marine Reserve as there is a spawning aggregation zone and this is where the whale sharks go. However, Belize is at the point where the whale shark sightings are starting to decrease. There is an increasing number of visitors, but the spawning aggregation still allows for mutton snapper fishing. While the tour guides are trying to look at fish and see whale sharks, the fisherfolk are trying to catch snapper. The question is, how does one move forward? Do you close tourism and/or fishing? Both groups are thinking in opposition. Looking at visitation rates, in 2017, Ms. Denise Garcia recalls talking to tour operators and fisherfolk who were saying they see nothing. In 2018, the number of visitors fell. Then in 2019, the number of visitors basically doubled. The question was, why do you sell tours, if you complain about the poor number of sightings? The reason is that the operators are still breaking even and they did not want to close the zone, or have stricter measures implemented.

Another challenge has been some unsound development on the island of Hol Chan, such as the clearing of mangroves and filling in of wetlands. Belize revised its mangrove regulation in June 2018, that assesses higher fees for applications and for licensing to clear mangroves. The previous mangrove act had a relatively small penalty of USD$250, that did not dissuade bad actors. A related challenge is that the government did not have the capacity to monitor everywhere—especially areas out of sight—and the mangrove clearing could have major impacts before it is detected. The new mangrove regulation levies fines for mangrove restoration if you illegally cleared a mangrove forest.

Working with stakeholders, particularly in the beginning, is challenging. For instance, SEA Belize has not been able to place a number on Laughing Bird Caye National Park regarding quantifying the benefits to fisheries of the no-take zone (i.e., how much fish is being replenished). WWF, particularly Nadia Bood and her team, are exploring what tools to use to put a number of the tourism figures and fisheries benefits, but they remain a challenge.

At Gladden Spit & Silk Cayes Marine Reserve, there is a different framework because there is a no-take zone and a general zone that allows some extraction. The question is, how do you maintain the preservation of the no-take zone and simultaneously regulate the extraction of commercial fish species in the general zone? There is also a delicate balance with allowing tourists to use South Silk Caye, but then to manage the other two cayes for protection. There are a lot of shorebirds using the islands and nesting sites for turtles. Yet, there is a constant challenge to balance the usage and to maintain the integrity.
Beyond Results

The results for ecotourism in Belize, while impressive to date, are facing some serious threats to their sustainability. For instance, there has been pollution impacts from Belize and Southern Mexico, and impacts from bleaching and disease.

With respect to SEA Belize, there have recently been conversations with the board and staff when researching for the strategic plan with respect to long-term financing plans. In SEA Belize’s perspective, there is a potential to maximize what SEA Belize already has out there. There is a goal to develop further financing mechanisms as the current status quo is not working as there is not as much money coming in. For instance, SEA Belize is rethinking how to use the Little Water Caye (i.e., SEA Belize owns a part of the Caye). The Caye has always been there for a ranger base; however, could SEA Belize use the island to divert some of the tourism from South Silk Caye? If so, how should SEA Belize put in place measures to make sure Little Water Caye is not impacted like South Silk Caye and to make sure no problems arise as a result of competition. Furthermore, SEA Belize, in collaboration with Fragments of Hope, are looking to expand the restoration efforts beyond Laughing Bird Caye National Park to other marine protected areas such as the Gladden Spit & Silk Cayes Marine Reserve. 102

Further, regarding the coastal zone management plans:

Belize’s National Emergency Management Organization also used maps and graphs from the Plan to support their disaster risk reduction plans, specifically to illustrate where changes in coastal protection services would lead to more at-risk populations and infrastructure, including coastal access points, schools, and emergency services.103

Lessons Learned

According to Ms. Nadia Bood of WWF Mesoamerica, it has been a struggle and a battle—particularly for members of the conservation community, but “we are getting there.” Likewise, Belize has a strong NGO and conservation community that is able to collaboratively work together. While it has not always gone smoothly, Belize is going in the right direction. Likewise, sometimes you need to call out the government, but you also need to work with the government. For instance, WWF Mesoamerica was a leading advocate for the Coastal Zone Management Plan and WWF Mesoamerica later became part of the task force to do the regulation.104
An additional lesson learned, according to Ms. Bood, is that if you really want to stem the problem of Sargassum, you need a multi-country, regional approach because you have a lot of nutrients coming off of South America and from the Southern United States which are also contributing to this problem.\textsuperscript{105}

According to Ms. Denise Garcia of SEA Belize, there are a lot of lessons learned. The classic model in Belize is that you have an NGO who applies for the co-management of a protected area with the government. The NGO will then seek out the funding (i.e., apply for grants and work with donors to try to meet the gap in financing). After ten years of doing this traditional approach, it does not seem to be sustainable. NGOs have to be constantly evolving the manner in which they seek financing through creative fundraising and creative management of the protected areas. The tradition approach of grant writing and proposals does not take you far. Ticket fees do help with financing, but when there is a change in government, those fees could be removed. Instead, you need to have a very structured finance team to support your work. You need to develop a strategic plan to seek financing and to diversity revenues.\textsuperscript{106}

Another lesson learned by Ms. Garcia is that one should not just focus only on their own protected areas. Rather, you are looking at a system. Ask, is what you are doing innovative? Is it replicable? Can other countries use it? NGOs need to consider all of this and oftentimes we are not collaborating enough and we are not sharing data enough. It is quite often the case that someone is working on a similar issue and if we openly share data on a systems level, then we can make a bigger impact.\textsuperscript{107}

Lastly, access and visitor usage are ever evolving issues and we need to always rethink how we manage protected areas.\textsuperscript{108}

According to Verutes et al.,

Based on findings from surveys and interviews conducted during the planning process, we learned that repeated engagement made stakeholders feel more committed to the process and optimistic about the potential for positive outcomes. We heard that the technical elements of our approach (e.g., use of maps and quantitative data, incorporation of stakeholder ideas and values into the assessment) were some of the main reasons stakeholders were continuing to participate in the process.\textsuperscript{109}
Other Resources on Ecotourism in Belize

Association of Protected Areas Management Organizations
- https://apamobelize.org/

Belize Audubon Society
- http://www.belizeaudubon.org/

Belize Marine Fund
- https://marfund.org/en/belize-marine-fund/

Blue Solutions
- www.bluesolutions.info

Blue Ventures—Belize
- https://blueventures.org/volunteer/belize/

Coastal Zone Management Authority and Institute
- https://www.coastalzonebelize.org/

ECOMAR
- http://www.ecomarbelize.org/

Gladden Spit & Silk Cayes Marine Reserve
- http://www.fisheries.gov.bz/gladden-spit-silk-caye/

Green Reef
- https://ambergriscaye.com/greenreef/index.html
Laughing Bird Caye

- [https://www.laughingbird.org/](https://www.laughingbird.org/); and
- [https://fragmentsofhope.org/laughingbirdcaye/](https://fragmentsofhope.org/laughingbirdcaye/)

Protected Areas Conservation Trust

- [https://www.pactbelize.org/](https://www.pactbelize.org/)

The Sarstoon Temash Institute for Indigenous Management

- [https://www.satiim.org.bz/about-satiim/](https://www.satiim.org.bz/about-satiim/)

Southern Environmental Association (SEA Belize)

- [http://www.seabelize.org/](http://www.seabelize.org/)

TIDE Tours (a subsidiary of TIDE, the Toledo Institute for Development and Environment)

- [https://www.tidetours.org/](https://www.tidetours.org/)

Toledo Ecotourism Association

- [http://belizemayatourism.org/](http://belizemayatourism.org/)

Turneffe Atoll Sustainability Association

- [http://www.turneffeatollmarinereserve.org/home](http://www.turneffeatollmarinereserve.org/home)

Ya’axché Conservation Trust

- [https://ecotourismbelize.com/](https://ecotourismbelize.com/)
Case Study #3: Bonaire National Marine Park

Introduction

Formerly part of the Netherlands Antilles and now an island municipality of the Netherlands, Bonaire is located in the southern Caribbean near Venezuela and is home to some of the best shore diving in the world (Fig. 12.3).

In addition to Bonaire, the Dutch Caribbean also consists of the islands of Aruba, Curaçao, Klein Bonaire, Sint Maarten, Saba, and Sint Eustatius. Bonaire was one of the first countries in the Caribbean to pass legislation to establish an MPA and one of the first to charge divers. Initially:

The driving forces behind the creation of a Marine Park on Bonaire included Bonaire devotees Captain Don Stewart and Carel Steensma and The Netherlands Antilles National Parks Foundation. Carel Steensma was a personal friend of HRH Prince Bernhard of the Netherlands, Chairman of the WWF at the time. The project of the BNMP {Bonaire National Marine Park} started in 1979, with funding from WWF Netherlands, the Dutch Government, the Government of the Netherlands Antilles, and the Island Government of Bonaire.110

The Bonaire National Marine Park (“Marine Park”) was officially established in 1992. Shortly afterward, in December 1999, Klein Bonaire was added:

Klein Bonaire had been in private hands for almost 130 years when a group of divers began working on assuring the islet’s continued undeveloped condition. Their goal was realized in December of 1999, when the government purchased Klein Bonaire for US$ 5 million. The management of Klein Bonaire was assigned to the Bonaire National Marine Park; thus, Klein Bonaire may be the only terrestrial area in the world which is managed by a Marine Park.111

In the past:

In the Caribbean islands of Bonaire and Saba, diving fees that were introduced more than 10 years ago now finance a large share of the costs of managing the MPAs. Divers in Bonaire are required to pay a flat annual fee of ten dollars, while divers in Saba pay a fee of three dollars per dive. On both islands, all of the revenue generated by these fees goes into a nonprofit conservation foundation that manages the protected areas, based on a long-term contract with the government. The admission fees have enjoyed widespread support from visiting divers, and the existence of well-managed and maintained parks has become a strong positive marketing tool for the islands themselves. The system
Fig. 12.3 Map of Bonaire National Marine Park (Credit Public Entity Bonaire, Department of Spatial Planning & Development)
is self-policing since divers are required to display a plastic tag, which has since become a collectors’ item.\textsuperscript{112}

Today:

In Bonaire, in the Netherlands Antilles, well known for its scuba diving, Bonaire National Marine Park (BNMP) has, since 1992, covered the cost of basic park operations through a fee charged to divers and other users of the park. BNMP receives no government funding. After park managers judged funding to be insufficient for sound management of the MPA, because of several issues (inflation, expansion of managing team and materials needed, reorientation of park policies, etc.), several ideas were tested to keep the BNMP self-sufficient financially. Among them, STINAPA (the BNMP’s multistakeholder management body) started to charge mooring fees for boats, increasing self-generated incomes. However, BNMP remains at an 80-90\% level of self-financing. BNMP has teamed up with the Coral Reef Alliance (CORAL), a US-based NGO, to accept donations through CORAL’s tax-exempt status, to supplement its budget.\textsuperscript{113}

In 2019, the fee was USD$45 per year for divers and USD$25 per year for other users.\textsuperscript{114} Approximately 80–90\% of the fees goes to management salaries, boats and vehicles, mooring maintenance, outreach materials, and law enforcement. The remaining 10–20\% raised from grants goes to boat purchases, research, and monitoring.\textsuperscript{115}

With respect to cruise ships, if you stay on the cruise ship, you do not pay the fee. Similarly, if you get off the cruise ship and, for instance, go to lunch onshore, then you also do not pay the fee. However, if you get off the cruise ship and go to a dive shop (i.e., to snorkel or dive), then you need to pay the fee and get the tag.\textsuperscript{116}

Although a bit outdated, in 2001, the annual total economic value of Bonaire’s natural environment was estimated at USD$110 million.\textsuperscript{117}

\textbf{Identify the Problem}

Historically, one of the problems facing the terrestrial ecosystem on Klein Bonaire was the overgrazing by goats:

The flora of Klein Bonaire has undergone severe degradation in the past due to intensive grazing by goats. Historical photos from the 1930s show vegetation consisting of large, full-grown trees and the absence of a shrub layer. At the time the island can be presumed to have been heavily populated with
goats, which while largely not affecting adult trees, affected regeneration of new plants. The absence of goats for over forty years has allowed the natural flora of Klein Bonaire to make a comeback, so that it has become home to many varieties of plants and animals, some not even present on Bonaire itself. 118

There are perceived concerns about too many people using the reefs of the Marine Park and about sewage runoff. 119

Another problem is that historically, agriculture was a bigger part of peoples’ livelihoods and a lot of people live from fishing. Bonaire’s ancestors already had a system in place to balance nature, where for instance, fisher-folk would voluntarily leave a place alone for fish to rebound or otherwise, there would be no food. Today, there are policies regulating these matters. For instance, lobsters need to be a certain size and only caught during the open season, and you are not allowed to catch queen conchs. Yet, queen conchs are still being caught. 120 In addition, some people get insulted a bit by the policies, but it is necessary because new migrants to Bonaire (i.e., like new investors or entrepreneurs) do not understand this ancestral system. 121

A further problem is Sargassum. 122

Why the Problem Is Important

Bonaire has some of the most beautiful coral reefs in the Caribbean. This said, “Bonaire’s fringing coral reefs are home to virtually every species of hard and soft coral found in the Caribbean. More than 340 fish species live here, making it one of the healthiest and most bio-diverse reefs in the region.” 123 Similarly, the Marine Park “is world famous for its easy access and has ranked in the top 5 shore diving destinations for many years.” 124

With respect to Klein Bonaire, it is “[…] an important stopover for migratory birds and includes the most important nesting grounds for endangered Hawksbill (Eretmochelys imbricata) and Loggerhead (Caretta caretta) sea turtles on Bonaire.” 125 Furthermore, “Lac and Klein Bonaire are both a RAMSAR site and therefore internationally recognized as important wetlands areas.” 126

It should also be noted that the problems are important because Bonaire generates a relatively substantial sum of revenue from reef-based tourism and the reefs are an important part of Bonaire’s culture.
How Problem Was Identified

Essentially, the Bonaire Government makes the policies and STINAPA does the management and supervision of the Marine Park. STINAPA collects the fees that are paid to use the park and if people are violating regulations, STINAPA is in charge.

Effectiveness of Process for Identifying Problem

The process for identifying the problems appears to be effective.

Steps Taken to Address the Problem

Bonaire has a long history of steps taken to conserve its coral reefs and to address the problems:

Beginning with turtle protection in 1961, the prohibition of spear fishing in 1971, and protection for coral, dead or alive, in 1975. The driving forces behind the creation of a Marine Park on Bonaire included Bonaire devotees Captain Don Stewart and late Carel Steensma and The Netherlands Antilles National Parks Foundation. The Bonaire National Marine Park was established in 1979.\(^{127}\)

Another important step took place in 1978 and 1980, when “{…} the park instituted a permanent mooring system, first in the world, for boats to moor instead of dropping anchors.”\(^{128}\)

With respect to addressing the problem of sewage runoff, new legislation was enacted around 2017 which requires septic tanks to be installed a minimum of 500 meters from the ocean, which should help.\(^{129}\) In 1994, Bonaire adopted a planning and zoning ordinance,\(^{130}\) and in 2008, a Nature Policy Plan was implemented by the Bonaire Government. In 2015, the Public Housing, Spatial Planning, and Environmental Protection Act BES (Wet vrom BES) of the Ministry of Infrastructure and Environment came into force.\(^{131}\) There are also a Bonaire Nuisance Ordinance and a Bonaire Waste Ordinance.\(^{132}\) Collectively, these are important steps as there are now different zones in Bonaire and likewise, different activities are allowed in different zones.\(^{133}\)
Results

The Marine Park, which covers 2700 hectares (6672 acres), was established in 1979 and is currently managed by the nonprofit organization Stichting Nationale Parken Bonaire (STINAPA Bonaire). In 1992, Bonaire became “one of the first dive destinations to introduce admission fees for scuba divers.”

Challenges and How They Were Met

As described by STINAPA, the main challenge is balancing the interests of the multiple stakeholder groups:

The primary challenge of managing the Bonaire National Marine Park is dealing with the varied groups and individuals who use the waters around Bonaire, and encouraging the sustainable use of natural resources. BNMP employees work with government departments, divers, boaters, fishermen, businesspeople, homeowners, contractors and other diverse groups who have, in some cases, nothing in common but their relationship to the Marine Park. The challenges to managing the ecosystems that form the Bonaire National Marine Park are dramatically increasing as the economy of Bonaire has grown in the past years.

Another challenge, although not as pronounced as on the island of Sint Maarten, is the presence of cruise ships. With one cruise ship, let alone with two cruise ships, the beaches and reefs of Bonaire can quickly become full. This creates friction between the cruise tourists and the stayover tourists, as the stayover tourists (i.e., who are mainly from the Netherlands and the United States) cannot even book tours. In addition, the cruise ship tourists do not spend a lot of money on the islands as compared to the stayover tourists.

When you have a proposed project that wants to develop a certain area on Bonaire, there needs to be a Management Effectiveness Report completed. This report is quite detailed (i.e., the way you are going to build, how you are going to put in infrastructure, etc.) and its quite costly, especially if looking at areas of mangroves. After spending a lot of money, the result might be that you cannot do the project and this presents a challenge.

Managing tourism is another challenge. For instance, users of the Marine Park are not allowed to touch certain corals. However, humans do not always listen and tourists who visit the Marine Park on their own are not being supervised by a dive shop instructor. In addition, when it comes to cruise
tourism, one must know: who are the actors, what is happening when the ship arrives, what do people do, how do they move, who is selling them services, and what services are being provided. The main challenge is how to do all of this in a coordinated manner and correctly organize it. A related challenge is that Bonaire does not have a lot of statistics on tourists, except for the number of visitors and how much was collectively spent. However, it is unknown how many people visited the Marine Park in a given year, what those people did (i.e., diving and/or snorkeling), and there is no entry card (i.e., indicating how long people will stay, where they will stay, etc.). This said, an exit survey has been proposed to shed light on these questions.

Beyond Results

Bonaire has developed its economy around the tourism sector as the island “does not have miles of shopping malls or miles of white beaches, and does not have 10,000 casinos. Instead, Bonaire has the sun, the sea, and nature.” Similarly, Bonaire does a lot of conservation because that is their source of income and there are a lot of regulations and policies concerning conservation so that visitors do not destroy nature.

Lessons Learned

According to Ms. Helvig D. W. Cecilia-Thode, an important lesson learned is that you need to create international awareness. There is a lot of awareness in Bonaire, but it is mostly geared toward the locals. However, when tourists visit, they are the ones who are not really taking care of the reefs and of nature. The awareness needs to be broader and more international, so that before tourists arrive, they are aware (i.e., awareness provided on board the cruise ships—before the tourists arrive). Another important lesson learned, shared by Ms. Paulina E. Martis-van Arneman, is that you can have development and you can maintain nature, but you need guidelines and regulations.

Other Resources on Bonaire

Dutch Caribbean Nature Alliance

- [https://www.dcnanature.org/bonaire-national-marine-park/](https://www.dcnanature.org/bonaire-national-marine-park/)
Stichting Nationale Parken Bonaire (STINAPA Bonaire)

- https://stinapabonaire.org/stinapa/; and
- https://stinapabonaire.org/resources/

Tourism Corporate Bonaire 2017–2027 Strategic Tourism Plan

- https://www.tourismbonaire.com/strategictourismplan

What’s Bonaire’s Nature Worth? Analysis by the Economics of Ecosystems and Biodiversity on Bonaire

- https://www.ivm.vu.nl/en/Images/2001_TEEB_Bonaire_total_tcm234-310328.pdf

Case Study #4: Palau National Marine Sanctuary

Introduction

Palau is an archipelago nation in the Micronesia region of the South Pacific with some of the best corals in the world (Fig. 12.4). The Palau National Marine Sanctuary (“Sanctuary”) encompasses 475,077 km² (183,000 square miles) and to help fund Palau’s marine conservation, there have been several initiatives:

Fig. 12.4 Map of Palau (Credit Peter Hermes Furian)
In 2015, Palau became the first country to close 80% of its EEZ to extractive activities. In 2009, it had already implemented a green fee of US$15 per tourist, used for financing local communities’ conservation efforts under the Protected Areas Network in Palau. This initiative raised approximately US$2.6 million in 3 years.

In 2012, the green fee was increased to US$30 to improve the entire public water and sewerage system of Palau, and contribute to the endowment fund which will help Palau achieve its promise to effectively conserve at least 30% of the nearshore marine resources and 20% of the terrestrial resources by 2020 under the Micronesia Challenge. The US$30 green fee will be merged with the US$20 departure tax and an additional US$50 to form the US$100 Palau visitor’s fee, according to a decision taken by the senate in March 2017 {…}.

The Palau visitor’s fee will go into the Palau Security Fund, to be used first to finance projects related to aviation, transportation, immigration, and border security. The remainder of the fund will be disbursed at the discretion of the Palau Congress for ‘projects and undertakings that will ensure the security and well-being of the national and state governments.’ This announcement in 2017 created some doubts, as the Palau visitor’s fee avoids specific earmarking. However, US$10 of the visitor’s fee will be restricted and earmarked for the Fisheries Protection Trust Fund used to finance the Palau National Marine Sanctuary.143

Palau has a USD$100 visitor’s fee, similar to Galápagos Islands’ entry tax of USD$100 for every tourist. In addition, Palau set up the first nation-led, crowdsource funding campaign called “Stand with Palau.”144

Palau is not a particularly representative as its case is a bit easier than other profiled countries. Likewise, the President of Palau was supportive of conservation, there has been a long history of conservation, there were only about 21,500 people living in Palau as of July 2018,145 and there is high-end tourism with an estimated USD$4 million to $5 million a year from foreign fishing as compared to USD$90 million a year from tourism.146

Identify the Problem

Palau is facing several problems, “from climate change and ocean acidification to increasing pollution and illegal fishing.”147

Many generations ago, there may have been some overfishing. However, Palauans as a people and through their traditional practices, have a deep conservation ethic. The chief would declare “blu,” in order to help manage the local fisheries by closing off a species to fishing or to establish fishing seasons.
Palau gained independence in 1994 and it was during this same year that the Palau Conservation Society (PCS) was founded. Back in the early-to-mid 1990s, there was little tourism. However, as Palau opened up as a new nation, tourism significantly increased, primarily due to Japanese tourism. The over-fishing, particularly of reef fish, that may be happening by local people is often in response to demand from outsiders (i.e., such as due to the increase in tourism over the last dozen years).

As part of the negotiation to become independent from the United States, there was a proposal to build a road on Babeldaob (i.e., the largest island of Palau). However, the topography of Babeldaob includes a lot of hills and there is very little topsoil. The soil that does exist is often clay and mud soils. Thus, the impact of building the road, in conjunction with erosion, has led to sedimentation being both a historical and current issue facing the nearby reefs of Palau.

These problems are being exacerbated by climate change and elevated temperatures, with some reported bleaching events.\(^{148}\)

**Why the Problem Is Important**

The aforementioned problems are important because Palau:

\[\ldots\] is world renowned for its healthy and incredibly diverse marine ecosystem. Home to more than 1,300 species of fish and 700 species of coral, the Micronesian island nation has been called one of the seven underwater wonders of the world. The nutrient-rich waters are teeming with sharks, turtles, manta rays, dugongs and tropical fish.\(^{149}\)

Such iconic locations include the Sanctuary and more specifically the Blue Corner Palau and Eil Malk Island. Furthermore, the problems are important because the reefs are important to Palau’s culture, their generation of tourism revenue, and it is home to many rare and endangered species such as Napolean wrasse (*Chelinus undulates*) along with green (*Chelonia mydas*) and hawksbill turtles (*Eretmochelys imbricate*).\(^{150}\)

Furthermore, Palau’s Rock Islands Southern Lagoon is listed as a World Heritage Marine Programme.

**How Problem Was Identified**

With a conservation ethic and a close relationship to nature existing for hundreds of years, it is Ms. Abolade (Bola) Majekobaje’s deduction that the
problems were probably identified by local people (i.e., probably local fisherfolk) who were noticing that the fish populations were declining. However, it is hard to discern what came first: were fisherfolk telling NGOs that fish are declining, or did NGOs first conduct monitoring and then inform the communities?\textsuperscript{151}

It was reported that fisherfolk from some of the islands were coming to the PCS and saying that the fish were smaller and that it took longer to catch what they needed. The science then came behind those stories, where scientists would catch, measure, and analyze the results. The local fisherfolk were originally blaming people from the other states, but it ended up being the local fisherfolk themselves.\textsuperscript{152}

The role of nonprofit organizations, both local and international, have been important. For instance, the Governor of Ngermeskang, which now has the Ngermeskang Bird Sanctuary, did not know how unique the area was for birds until the PCS and BirdLife started doing the monitoring. Furthermore, there are a lot of scientists doing data collection, who are affiliated with NGOs such as TNC or with the U.S. NOAA through PCS.\textsuperscript{153}

**Effectiveness of Process for Identifying Problem**

It appears as though the process for identifying problems has been effective.

**Steps Taken to Address the Problem**

There have been many steps taken to address the various problems facing Palau. This includes:

- In 1994, “the same year Palau became independent, it passed the Marine Protection Act, which included a moratorium on fishing for bumphead parrotfish \emph{Bolbometopon muricatum}”;\textsuperscript{154}
- Also, in 1994, the PCS was established;
- The world’s first shark sanctuary is established in Palau in 2009\textsuperscript{155};
- Palau declares a marine mammal sanctuary in 2010\textsuperscript{156};
- Rock Islands Southern Lagoon becomes a UNESCO World Heritage site in 2012\textsuperscript{157};
- In 2014, Palau’s Dugong Protection Act is signed into law\textsuperscript{158}; and
- “On October 28, 2015, President Tommy E. Remengesau, Jr. signed into law the Palau National Marine Sanctuary Act, one of the world’s most ambitious ocean conservation initiatives to date aimed at not only
protecting Palau’s marine resources, but also at protecting the world’s tuna stocks.”

Results

With a rich history of conservation, Palau and particularly the Sanctuary, has accomplished a lot. This includes:

- Establishing “[…] landmark legislation {which} creates a no-take Marine Sanctuary (approximately 500,000 km$^2$) covering 80% of Palau’s Exclusive Economic Zone (EEZ), in which no-fishing will occur, and creates a Domestic Fishing Zone covering approximately 20% of Palau’s EEZ in which traditional and domestic fishing activities will be allowed to provide fish solely for the domestic market.”
- Creating the world’s first shark sanctuary.
- Palau setup the first nation-led, crowdsourced funding campaign called “Stand with Palau.”
- In 2019, the PSC celebrated its 25th anniversary and “as a Birdlife International Partner, this program also stewards Important Bird Areas (IBAs).”

The PCS has helped to modernize conservation in Palau. Palau is still a culturally traditional society and having PCS as a moderator and trusted local group has been very helpful. PCS goes out, learns, and gets exposed to the big ideas, and then makes it have a local Palau twist. In this sense, PCS acts as a conservation catalyst, yet sometimes is acting behind the scene. In addition, another important result for PCS has been to move from a species conservation approach to more of a landscape conservation approach. PCS has established a research institute and individuals who were at PCS are able to access financing from GEF.

Challenges and How They Were Met

Some of the challenges facing Palau have been cultural. For instance, there was no idea of private property until the Japanese came in and said we need to map the whole country. Another cultural challenge is that Micronesian society is maternal and women have a lot of power. Similarly, the resources are owned by the state and the clans. The Federal Government basically does not own anything, and nor do NGOs.
Another challenge raised by Dr. Rob Dunbar is when you compare the Galápagos Islands with Palau. Most people immediately get on boats in the Galápagos Islands; in contrast, in Palau, with approximately 80,000–150,000 annual visitors, most people get on boats during the day and then everybody returns to the same small town in the evening (i.e., which puts pressure on the local ecosystem due to sewage, supplying food to restaurants, etc.). Likewise, the continued growth of reef fishing to supply high-end tourism is probably not sustainable.  

There have also been some political challenges. There was a somewhat controversial, recent legislation that banned foreign fishing exports. However, the only fish processing plant in Palau was a Taiwan-owned company which got its fish from Taiwan boats. Thus, Taiwan did not like this legislation and nor did Japan which imports a lot of tuna. In addition, Delta was earning revenue from this cargo (i.e., making money bringing tuna to Japan). Further, Palau recognized Taiwan as an independent country, which angered China, and China banned its citizens from going to Palau. This is a challenge because Chinese citizens were the largest group of tourists visiting Palau. While Palau wanted its citizens to get into domestic fishing, there were very few who wanted to buy boats, to learn how to fish, and to crew boats.

For the PCS, competition for funding has been a main challenge as there are conservation organizations in each state in Palau. Human capacity is another broad issue. Palau is a small island country with approximately 20,000 people and 1000 foreigners in the tourism sector. Likewise, it is hard to find locals with the capacity and yet, there is a lot of demand for employees, so Palau is seeing people move to Palau. Yet in contrast, as a young nation, Palau’s outward migration is also a challenge for good governance. It is difficult to keep human resources in place (i.e., keep the people after they have been trained), as many people are leaving to the United States where Palauans can live and work in the United States with just a passport. While Palauans live in paradise, things—such as housing and food—are getting very expensive.

Tourism and development do not need to be in competition to one another; however, development is happening a lot faster than policy and regulations. This is particularly true with land use, and to a degree ocean use, and presents a huge threat. Palau wants its economy to grow and to be less dependent on foreign aid, but at the same time cannot undertake unsustainable coastal development. Likewise, the government needs to map out areas that are okay for development (i.e., maintain mangroves) and planners need to lead these efforts.
Beyond Results

The Palau visitor’s fee is divided up with a part of it going to the PCS trust fund, a part of it goes to the states, and a part of it goes to the Sanctuary. As long as tourism stays a core part of the Palau economy, it looks like there will be a sustainable, long-term funding mechanism for the Sanctuary.\(^\text{170}\)

Even if the PCS were to disappear, the conservation sector had modernized and there are more NGOs now working in Palau such as TNC, BirdLife International (i.e., PCS is their local partner), Island Conservation, and CI.\(^\text{171}\)

Furthermore, as Dr. Rob Dunbar notes, “the history of protection in Palau is long enough, that you can see the improvements. Take Blue Corner Palau, for example, where you are ‘guaranteed’ to see fifty sharks.”\(^\text{172}\)

Lessons Learned

As shared by Dr. Dunbar, tackling tough topics like, how to create a marine sanctuary, what use is allowed, and where is this use allowed, is not easy and it will take a lot of work to find out the answer because you just do not simply know the answer. Likewise, it is important to start early with smart, engaged people to start figuring out the answers. There is a group, including Dr. Dunbar, of about 15 people with permission from the Palau Government, tasked with looking at how do we think through this for the benefit of the Palauan people.\(^\text{173}\)

An important lesson learned for Ms. Abolade (Bola) Majekobaje and the PCS is that having communities at the center of what you are doing and community buy-in is very important. The PCS really tries to live and breathe by this belief. PCS will not go into a community unless there is a community buy-in. Similarly, it is important to know that money is not everything.

Another lesson learned and what may not be the first thing you think of when you think of conservation, is that governance is very important. One can have lots of money for a project, but if you want it to be sustained beyond you, there needs to be enabling conditions for proper ongoing governance (e.g., community buy-in, community likes the project, resources, and ability to sustain the idea and project, etc.).\(^\text{174}\)

Other Resources on Palau National Marine Sanctuary

Big Ocean Managers
- https://bigoceanmanagers.org/

Coral Reef Research Foundation
- https://coralreefpalau.org/; and
- http://www.glispa.org/glispa-bright-spots/163-palau-s-protected-areas-network-act

Global Island Partnership
- http://www.glispa.org/glispa-bright-spots/163-palau-s-protected-areas-network-act

Island Conservation
- https://www.islandconservation.org/palau/

PSC (Annual Reports, State of Birds, etc.)
- https://www.palaucconservation.org/programs/resources/

Palau International Coral Reef Center (PICRC)
- http://picrc.org/

Palau Visitors Authority
- https://www.pristineparadisepalau.com/national-marine-sanctuary/

The Pew Charitable Trusts’ Global Ocean Legacy
- https://www.pewtrusts.org/en/projects/archived-projects/global-ocean-legacy-palau
Case Study #5: Lady Elliot Island

Introduction

In 1816, “[…] a lesser-known sea captain, Thomas Stewart discovered and named the most southern coral isle of the Great Barrier Reef,” Lady Elliot Island. Lady Elliot Island is the southernmost coral cay of the Great Barrier Reef and the only coral cay throughout the Great Barrier Reef where one can land a fixed-wing aircraft (Figs. 12.5 and 12.6).

Located approximately 90 kilometers (56 miles) off the coast of Bundaberg, Lady Elliot Island is located within the Green Zone of the Great Barrier Reef (GBR) and is one of the most spectacular locations throughout the GBR. Further, Lady Elliot Island—which is managed in part with a lease agreement with the Lady Elliot Island Eco Resort—appears to be one of the operations that is most committed to ecotourism. For instance, upon arrival, a detailed orientation to the ecotourism resort includes discussions around:

- Do not waste food and all food waste is composted;
- Climate change and the island’s carbon offset project with Greenfleet;
- History of the island’s restoration activities and location of onsite tree nursery; and
- Solar-powered island, which is on track of 100% renewable energy generation by 2020.

In addition, Lady Elliot Island’s dedication to ecotourism includes humpback whale fact sheets in guest rooms, recycling bins, a Reef Education Center, and Peter Gash and his team have developed an Environmental Management Plan. Overall, Lady Elliot Island is a smaller island with fewer people and “just” a fringing reef around the Island.

Identify the Problem

Historical problems associated with Lady Elliot Island include the impact of guano miners and “the destructive foraging of feral goats that had been brought to the island in the 1880s as a source of food {…}.”

From 1863 to 1873, “Mr. J. Askunas was principally responsible for the large-scale destruction of the natural environment of Lady Elliot Island. He was a guano miner.” Guano, which is essentially “{…} the cemented deposits formed by accumulations of bird droppings – and rock phosphate represent natural resources that have been extracted from some islands of the
Fig. 12.5  Map of Lady Elliot Island (*Credit* Lady Elliot Island Eco Resort)
Great Barrier Reef in order to supply phosphatic fertiliser for agriculture.” Other than guano mining, which was also good for gunpowder, there were really no other activities taking place at Lady Elliot Island. There is a bit of conflict as to what happened to the guano from Lady Elliot Island and there is some talk that some of the guano went to gunpowder. This was a significant problem because “in addition to the disruption caused to seabirds, the removal of material threatened the stability of the cay and increased its susceptibility to erosion during storms.”

In addition, there were numerous shipwrecks including the Port St John in May 1939, the Vansittart in August 1975, the Tahuna in November 1975, the Huzure and Thisby in early 1980, and the Apollo I in May 1980.

**Why the Problem Is Important**

The problem, particularly of guano mining, is important because it disrupts both the island’s terrestrial ecosystem, along with the surrounding marine ecosystem. Take for instance:

The cycle starts with the nutrients in bird poo finding their way into the aquifer beneath the island, and the island’s steady revegetation over the past 50 years...
has attracted thousands of noodies and other birds, re-starting and intensifying a process that had almost switched off during the century after the guano mining when the island was a bare rock; kept that way by a herd of goats. Water samples from boreholes show particularly high concentrations of nutrients in the aquifer near the bird rookeries in the Pisonia forest and the data show how very good the aquifer is at providing a constant and substantial drip-feed of nutrients to the surrounding waters, supporting the island’s marine biodiversity, which in turn provides food for the birds, and so the cycle begins again.  

This said, Lady Elliot Island has some of the best visibility of the entire GBR with world-renowned dive sites and snorkeling sites offshore including the Lighthouse Bommie. Lady Elliot Island is known as the “home of the manta ray,” and likewise, Lighthouse Bommie is a known cleaning station for manta rays (Fig. 12.7).

Furthermore, Lady Elliot Island is an important nesting site for green and loggerhead turtles and Lady Elliot Island is one of the most important seabird rookeries throughout the GBR. Case-in-point:

In 1973, a group from the Bundaberg branch of the Wildlife Preservation Society of Queensland visited Lady Elliot Island and during an 18-hour

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**Fig. 12.7** Picture of Manta Ray at Lady Elliot Island (Credit Brigitta Jozan)
observation period recorded 25 species of birds. These included wedgetailed shearwater (mutton bird), brown booby, greater frigate bird, reef heron, pied oyster catcher, sooty oyster catcher, pacific golden plover, red capped dotterel, Mongolian dotterel, whimbrel, bar tailed godwit, greenshank, grey tailed tattler, turnstone, sharp tailed sandpiper, silver gull, black naped tern, little tern, crested tern, roseate tern, bridled tern, common noddy, common tern, house sparrow and sacred kingfisher.\textsuperscript{184}

In addition, migrating humpback whales often pass by the island.

**How Problem Was Identified**

Don Adams, “the man who gave Lady Elliot Island back its vitality,” recognized the problem associated with a lack of transportation to and from the Queensland islands, including Lady Elliot Island.\textsuperscript{185} Such problems were identified via flyovers. In addition, one could observe the former problems of guano mining as the island’s vegetation was severely degraded.

**Effectiveness of Process for Identifying Problem**

The process for identifying the historical problem of Lady Elliot Island’s guano mining and subsequent degradation of the island’s vegetation was effective.

**Steps Taken to Address the Problem**

There were many historical steps taken at Lady Elliot Island, including:

- Messrs J & J Rooney completed the construction of the lighthouse and the keeper’s cottage in 1873.\textsuperscript{186}
- In the 1960s, Don Adams originally paved the way for a tourism lease on Lady Elliot Island when he received a one-year, renewable lease.\textsuperscript{187}
- In 1969, the airstrip was constructed.\textsuperscript{188}
- The “last of the goats was shot in 1969 by Don {Adams} and the lighthouse keepers.”\textsuperscript{189}
- A “functional, glass-bottom boat was brought to the island and on 28 September 1969, the airstrip and terminal building were officially opened by the Premier of Queensland the Hon. Joh. Bjelke-Petersen.”\textsuperscript{190}
It “was during this time {1969} that Don commenced a programmed restoration of the island’s flora. He collected coconuts from Dunk Island, pandanus, casuarinas and shrubs from the mainland. Gradually as the trees took hold and multiplied, the island once again became a haven for sea birds. In recognition of his wonderful conservation work on Lady Elliot Island, the Wildlife Preservation Society of Queensland presented Don Adams with a conservation award in February 1974.”

“Around the year 2000, the Queensland National Parks and Wildlife Service and the island resort manager, Steve Heath and his staff planted about 50 pisonia trees on the western side of the runway as part of the continuing re-growth strategy.”

The “Bundaberg News Mail reported on 16 July 2004 that Federal authorities had recognised the importance of the historic Lady Elliot Island lighthouse by having the structure placed on the Commonwealth Heritage List.”

Also, in 2004, when Australia’s zoning changed, Ms. Virginia Chadwick was very instrumental as she had the responsibility for putting in Green Zones and she initiated in 2004 for Lady Elliot Island to be a Green Zone.

More recently, one of the major, initial steps taken to address the aforementioned problems was that Mr. Peter Gash, and his associates, received a lease in 2005 for Lady Elliot Island from the Commonwealth Government (i.e., federal government) of Australia. Likewise, “when the lease on the island came up for renewal in 2005, Peter invited business associates Gold Coast lawyer Michael Kyle and former Australian Surf Life Saving Champion Grant Kenny to be his partners in the LEI venture. This group became the successful leaseholder.”

While Lady Elliot Island, and a few other islands of the GBR such as Dent Island and Low Isles are owned by the Commonwealth Government, the islands of the GBR are predominantly managed and controlled by the Queensland Government. The old system was a 99-year lease and in the past, it was often known as a peppercorn lease (i.e., a very low-cost lease) and people would use the leased island for sheep, goats, and/or cows. Mr. Gash’s lease is a ten-year block for three terms (i.e., thirty years), which is much more expensive than the old state island leases, and Mr. Gash, who is currently about halfway through the thirty-year lease, is seeking to request another fifteen-year extension. The lease for the island is to the low water mark and in addition, Mr. Gash and his associates have a permit to essentially do no harm and to look after the place.
Additional steps taken with the new lessees included the removal of invasive species and weeds such as lantana, along with restoration including “the pisonia tree, pandanus palm, octopus bush, natural ground cover and the tournefortia tree.” In 2013, a larger reforestation project was launched called “The Re-Greening, Revegetation/Weed Eradication Programme.” Furthermore, solar photovoltaic panels have been installed throughout the island and “all vessels on Lady Elliot Island have been fitted with jet drives, replacing the old style and un-environmentally friendly propellers to ensure the reduction of environmental impact on the reef and its inhabitants.”

Results

There have been numerous results achieved at Lady Elliot Island. It is important to note that when the trees were cut down, the birds disappeared, and the forest-reef-forest nutrient cycle was disrupted. Since then, trees have been planted, the birds have returned, and the cycle is reestablished. In addition, these restorations efforts have raised awareness and the coral reefs are recovering.

In the past, you could fish or spear, but now with the Green Zone established, the wildlife is getting bigger around Lady Elliot Island.

Another result has been the installation of solar power, which has helped reduce energy costs, reduced greenhouse gas emissions, and further helped to raise awareness.

Yet, the single greatest result to date, according to Mr. Peter Gash, the Managing Director and Custodian of Lady Elliot Island, is that as he gets older, Lady Elliot Island has loaned itself and made itself a platform for people to experience nature, learn about nature, and highlight our ability to live in harmony with nature with a limited human footprint. Likewise, visitors have a great holiday at Lady Elliot Island and then take that passion back home and spread the awareness.

Challenges and How They Were Met

As explained by Mr. Gash, we are in a challenging position because millions of tiny actions got us to where we are—not just one thing—by millions of people and the same thing is going to turn us around. Mr. Gash plays a large role in educating people and particularly younger people. Similarly, the biggest asset of Lady Elliot Island is the people and consequently, the biggest challenges are also the people. You need to get the right people, get
them motivated, and keep them motivated—which can all be a challenge. For example, and keeping in mind that Lady Elliot Island is a small island, when one person gets sick, then everyone gets sick.

Other challenges included the fact that the old buildings were in terribly bad shape and getting a sustainable cash flow (i.e., Mr. Gash started with a small pot). For instance, Mr. Gash reinvested a significant amount of money back into the island, such as tree plantings. Big government and big business are driven by finances and the government asked, how much money is Lady Elliot Island making us? Yet, it was not even Mr. Gash’s responsibility to look after the forest and the government was originally like, what are you doing? However, Mr. Gash did the plantings at his own expense and the government helped draw up a revegetation plan. The plantings started small, with a few trees initially planted and then got up to 1000 trees. After four years, the government came to Peter and said they still did not have money. However, the Government talked to the Great Barrier Reef Foundation and the Government indirectly helped by getting the Foundation to go see Lady Elliot Island. A total of five sites were targeted and approximately USD$15 million was raised around the middle of 2018. Lady Elliot Island started to get some real funding from the Foundation, in conjunction with approximately USD$1 million of Lady Elliot Island’s own money, and this in part, helped to scale up the restoration activities to about 9000 trees with another 9000 trees in the nursery.

Whereas other resorts could borrow USD$50—USD$100 million and make the resort very nice, this comes with more tourists, more waste, more food, and more sunscreen—all of which, can impact the health of the coral reefs. At Lady Elliot Island, the resort is allowed to have 150 guests a night and 250 visitors during the day. However, the resort does not go anywhere close to this limit, as they usually have 80–90 guests at night and bring in a total of approximately 20–30 guests per day. This is less than half the overall permitted people and is needed for conservation.203

Don Adams “[…] first major problem was a logistical one. There was no jetty on which to land the heavy earthmoving equipment necessary to build the airstrip and, more importantly, no aircraft available at the time in the Maryborough district capable of carrying the machinery across the open stretch of Pacific Ocean to the island.”204

Running an island resort 80 km out to sea presents a multitude of challenges on a daily basis. ‘There is a 150-bed resort with around 30 staff on duty at any one time and the logistics are all our responsibility compared with a similar sized complex on the mainland. We generate our own power, desalinate the
seawater for drinking purposes and ablutions, maintain a sewerage treatment plant and recycle most of our rubbish.'

‘The issues associated with transporting diesel to the island, handling it here, the on-going maintenance of the generators every two hundred hours and of course the quest to respond to climate change were the drivers towards increasing solar power,’ Peter {Gash} recalled. ‘{…} This on-going installation reached a significant milestone in March 2018 with 100 kilowatts of available power and the counter achievement of the need for the diesel falling from nearly 600 litres a day, down to around 70 litres a day, getting us closer to our goal of 100% renewable by 2020.’

The buildings are a very expensive component of the overall cost of operating this island because it is such a hostile and salty environment and added to that is a good dose of bird droppings on the roofs during the birdlife breeding season.

Running a dive shop is also challenging. For instance, there are multiple types of insurance that must be acquired and annual maintenance costs, for a smaller outfitter, can cost upward of USD$50,000. In addition, it is hard to find help and even harder to keep good help. This is, in part, because there is not a long training process for dive masters and dive instructors as opposed to training required to become a marine biologist. This shorter training process and transferrable skills results in dive masters and dive instructors leaving for a competitor or traveling aboard to Mexico, the Maldives, Indonesia, etc. It is also important to note that what keeps dive shops operating is the snorkelers. The approximate ratio is 60–70% snorkelers to 30–40% divers. Likewise, dive shops can earn more money from snorkelers due to less insurance and less equipment needs.

Beyond Results

The successes of Lady Elliot Island are reaching audiences beyond those who have visited the Island. For instance:

Produced for the BBC in 2015, the iconic three-part series, *The Great Barrier Reef with Sir David Attenborough*, featured Sir David in the second episode referring to the wonder of the Manta ray cleaning stations off Lady Elliot Island. ‘{…} The series went on to win a British Academy of Film and Television Arts (BAFTA) Award in 2017.’
Lessons Learned

There are many lessons learned by Mr. Peter Gash, the Managing Director and Custodian of Lady Elliot Island. The big one, as explained by Mr. Gash, is that you need to believe in yourself, be who you are, and if you have a goal—for example—to convert a degraded island into an ecotourism destination, you need to trust yourself, trust your values, and trust your judgment. Likewise, if is not helpful to blame others, such as blaming the government for the current predicament. A related lesson learned that was shared by Mr. Gash is that when we are shown the right way, we often go the right way. This said, one should always be positive. Although the negativity flows so strongly—particularly from the media—and we can tend to gravitate to the negative, it helps to keep positive because people like positivity.210

Another lesson learned is that you must listen to others—whether they are the smallest, the youngest, and/or the perceived least educated. Everyone, such as guests and friends, can have contributions by relaying things they see or by offering up suggestions. Similarly, you should look for support in amazing places by doing amazing work. By doing amazing work and by acknowledging people for the effort they put in, you can receive support from local people, local councils, foundations and nongovernmental organizations, and governments.211

When making decisions, one should weigh how the decision is going to affect the environment (i.e., conservation and sustainability impacts) and how the decision is going to impact the finances. While Mr. Gash will take the environment over finances at any time, it is important to note that financial sustainability is critical. Ultimately, it is a balance and nature will pay you back.212

Lastly, “[…] it is worth remembering that no matter how many laws are made, how many research papers are produced, how many programmes planned or how many restrictions are enforced, the Great Barrier Reef heritage will only be passed on intact to the next generation if each individual who visits this marine wonderland takes nothing home but photographs and happy memories.”213
Other Resources on Lady Elliot Island

Great Barrier Reef Marine Park Authority’s History of Commonwealth Islands

- http://www.gbrmpa.gov.au/our-work/Managing-multiple-uses/managing-commonwealth-islands/history-of-commonwealth-islands

Lady Elliot Island

- http://www.ladyelliot.com.au/

Project Manta

- https://www.sites.google.com/site/projectmantasite/

The Great Barrier Reef with Sir David Attenborough

- https://www.bbc.co.uk/programmes/b06vbz1l; and
- https://www.smithsonianchannel.com/shows/david-attenboroughs-great-barrier-reef/1005189

Tourism and Events Queensland

- https://teq.queensland.com/

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Financial Analysis

The following financial analysis will look at return and risk.

Return

The revenue stream is often visitor fees and licensing fees for operators which, depending on the site and the host country, will be returned to the relevant
ministry, the general fund, or back to the particular MPA. There is also a huge job market associated with reefs from dive shops to boat operators.

**Risk**

Ecotourism, and especially conventional forms of tourism, can have both positive and negative impacts on tropical coral reefs. One major risk is having too many tourists, but this can be managed via a restriction on the number of tourists allowed to visit, say a particular MPA. Tourists can negatively impact reefs via their use of sunscreen, disturbing reefs with their snorkel and scuba fins, and wastewater discharge from their lodges, while park fees can go toward conservation of the same reefs.

For instance, the Seychelles was absolutely untouched and there was “a feeling that no one ever snorkeled there.” However, over the course of a decade, tourism started to fill up the empty places. Tourists were seeking sun and fun and many tourists would go snorkeling for ten minutes and then go to the beach. Yet, just dropping anchor started to change the environment. A “50-pound steel chunk (i.e., anchor) should not be dropped onto the reef every time you pull up to a site.” A mooring initiative is obvious and only takes a little organization. This said, the reefs that have the most impacts are those that have the most potential due to their proximity and accessibility.

**Business Risk**

Many business risks associated with ecotourism are similar to other industries. Such business risks include:

- Theft of property or money from visitors or employees; and
- Staff morale, retention, recruitment, and training.

Furthermore, a significant external event—such as a global recession, terrorist attack, global pandemic such as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the coronavirus’s COVID-19 disease, or a severe storm—can result in a business risk due to a drop in tourism and travel.

**Strategic Risk**

Strategic risks for ecotourism companies include:
• Ferocious competition from other ecotourism companies;
• Inability to pay higher commissions and lost revenue share; and
• How to structure tours which require upward of two years of advance planning, such as trips to remote atolls.

Another strategic risk is for tour operators to choose the right type of tourism offering and be able to respond to market demands; otherwise, a tourist staying at an ecotourism lodge may book offsite activities with another business.

**Reputation Risk**

The level of corruption and the ease of doing business in many countries can be very challenging. For instance, there could be a tendency to pay bribes to the general manager of a hotel or to the park rangers in order to receive preferential treatment.

Another reputation risk—although more a risk to the MPA—is the fact:

In some countries, the fees collected do not always benefit conservation, as many park systems lack incentives for their staff to rigorously collect and account for entry fees. Additionally, in many countries entry fees are deposited into the general government treasury rather than allocated back to the park system. To ensure an effective financial stream, revenue from protected area entry fees should be channeled directly back into the protected area system to cover operational needs such as staff salaries or investment needs such as infrastructure.217

This lost revenue can result in delayed maintenance and upkeep at the MPA, which in turn can lessen the visual appeal to tourists. If visitors are harmed or lose their lives during the trip, which is possible in part due to a location’s remoteness and its wildlife, this can present a reputational risk for both the tour operator and the MPA.

Greenwashing, in the sense of falsely stating or overstating one’s sustainability practices, can also generate reputational risk. For instance, the cruise line industry has generated negative press due to dumping garbage at sea including a USD$40 million fine to Princess Cruise Lines Ltd.,218 having numerous outbreaks of the illness norovirus,219 and their generation of air pollution.220 This said, “passengers often believe that the ship’s waste is treated or stored for land removal, but in fact most of it is dumped at sea, sometimes illegally.”221
Furthermore, overtourism poses a threat to local communities and biodiversity, along with presenting a reputation risk. For instance, the island of Boracay in the Philippines was temporarily closed to tourism due to excessive waste. Similarly, bleached corals or having charismatic species go locally extinct can pose additional risks.

**Liquidity Risk**

There is a liquidity risk because ecotourism companies have few hard assets to sell. While lodges, dive boats, or websites may be transferred, it is unlikely that an ecotourism company could transfer their ecotourism operating license. This could be the case because the government may not allow the license, whether or not it is exclusive, to be transferred.

**Operational Risk**

In Mexico, a substantial amount of money is raised from visitors to protected areas and this money is collected by the federal government. The collected fees are then distributed to approximately 170 protected areas throughout Mexico. Thus, there is a disincentive for a particular protected area to increase visitation, when the funds are distributed throughout the country.

As explained by Mr. Kenneth Johnson, founder of Mexico-based ecotourism company EcoColors, it is necessary to learn lessons, you need passion to protect the reef, you need to have someone who understands business, and you need to have quality standards in place to protect the reef. Mr. Johnson has done some great outreach to SCUBA diver groups where he spoke to the economics (i.e., you make money by protecting the reef). In addition, Mr. Johnson has participated in “train the trainers” events where he briefed 20 SCUBA instructors who then taught 1000 diver guides. As explained by Mr. Johnson, there are operational risks as people are “too busy, have things to do, and people don’t want to change the way they do things.”

Furthermore, wholesalers are pushing for too high of commissions and this is creating a significant operational risk. In fact, wholesalers are asking for 40–55% commission, if not 60% commission, and Mr. Johnson heard of commissions as high as 72% paid to wholesalers. Refusing to pay this high of commission can lead to lost business. However, paying the commission is tough and although it forces operators to be creative (which can be a good
thing), it can also lead to less quality equipment, fewer staff benefits, less maintenance of boats or vehicles, and a higher ratio of customers to guides.224

**Legal and Regulatory Risk**

There are numerous legal and regulatory risks associated with ecotourism. This includes obtaining an operating license, obtaining the required permits to visit some marine protected areas, and following all the various rules, regulations, and policies.

For instance, offering differentiated fees depending on whether tourists are from the country or from abroad may be considered illegal discrimination.

Another risk is if a government decides to open up a previously designated MPA for recreational and/or commercial fishing, which then impacts the quality of the ecotourism experience.

Political risk, including social unrest and terrorism, can also be significant and have a detrimental impact on ecotourism. For example, it was reported in January 2020 by Stratfor, “the world’s leading geopolitical intelligence platform,” that the Al-Qaeda affiliate in East Africa Al Shabaab “is poised to surge in East Africa.”225 This could directly impact tourists’ willingness to visit marine parks in Kenya and possibly in Tanzania.

Legislation or certification standards can assist to minimize risks associated with the physical impact of overfishing and overtourism where MPAs are poorly managed and where people are not educated. Likewise, one should not kick or stand on reefs. Thus, tour operators must uphold code of conducts, provide a certain level of engagement/education, and have a tour guide present as opposed to just “dumping people in the water.”

**Credit Risk**

Credit risk includes default risk, bankruptcy risk, downgrade risk, and settlement risk.

**Market Risk**

Market risk includes interest rate risk, equity price risk, foreign exchange risk, and commodity price risk.

Market risks are particularly concerning for ecotourism, since travel—especially travel to distant tropical places like the Maldives or Palau—is oftentimes a luxury item.
Risk, Return, Time (Horizon), Taxes, Liquidity, Legal, and Unique (RRTTLLU)

Risk and Return

Please see above for the risk and return associated with ecotourism.

Time Horizon

The time horizon for ecotourism is a medium-term to long-term commitment. Reserves can involve capital intensive investments such as hotels, restaurants, and vehicles. Shorter time horizons may exist for smaller investments such as investments into the creation of a concession or for establishing ecotourism companies that facilitate tours.

Taxes

There are likely a variety of taxes such as property, business, sales, employment, and/or some form of tourism tax for visitors (e.g., if visitors stay at onsite facilities).

Liquidity

Liquidity might exist with concessions or other onsite facilities (e.g., tourist attraction or lodging) that could be transferred to another owner.

Legal

Legal considerations associated with ecotourism will vary from country to country. Similarly, different permits may be required to visit an MPA versus a marine sanctuary, and many countries require visitors to obtain tourist visas.

Unique

One unique aspect is that the assets of ecotourism can be hard to sell, especially as opposed to sustainable, certified commodities. In addition, factors outside of the control of the ecotourism operators (such as changing consumer behaviors or a global recession) can present a unique risk.
Policy Analysis

The following policy analysis will look at: defining the problem; establishing goals; selecting a policy; implementing a policy; and evaluating the policy. This said, ecotourism depends on a wide variety of policies to be in place.

Defining the Problem

Ecotourists have numerous destinations to choose from, are likely traveling with friends and/or family, and will be spending a relatively large sum of disposable income. With these factors in mind, most tourists want to travel to a place that is safe, easy to get to, and that is relatively affordable. Unfortunately, many countries that host tropical coral reefs, such as the Maldives, Palau, and the Seychelles, are far from the EU and the United States, are relatively difficult to travel to (e.g., due to distance, poor local infrastructure, and/or language barriers), and/or are relatively unsafe.

Establishing Goals

Some of the policy goals for ecotourism are to encourage travelers to visit your country, while simultaneously preserving the natural landscape and providing local economic opportunities.

Selecting a Policy

One of the world’s leading ecotourism destinations is Costa Rica, which is due to the country’s rich biodiversity, safe environment (e.g., low crime rates, less violence, and less poverty), high literacy rates, and relatively modern facilities including an international airport, good highway systems, and quality healthcare. Some of the leading ecotourism countries, in terms of supportive policies, are Australia, Belize, Bonaire, and Palau.

Furthermore, the global rankings of the top 20 countries with the largest coral reefs as of July 2019 for ease of doing business, according to the World Bank, were as follows:

- #8: U.S.
  - #16: enforcing contracts
  - #36: trading across borders
  - #50: protecting minority investors
  - #53: starting a business
- #118: Bahamas
  - #84: enforcing contracts
  - #105: starting a business
  - #132: protecting minority investors
  - #161: trading across borders
• #9: U.K.
  – #15: protecting minority investors
  – #19: starting a business
  – #30: trading across borders
  – #32: enforcing contracts
• #15: Malaysia
  – #2: protecting minority investors
  – #33: enforcing contracts
  – #48: trading across borders
  – #122: starting a business
• #73: Indonesia
  – #51: protecting minority investors
  – #116: trading across borders
  – #134: starting a business
  – #146: enforcing contracts
• #77: India
  – #7: protecting minority investors
  – #80: trading across borders
  – #137: starting a business
  – #163: enforcing contracts
• #92: Saudi Arabia
  – #7: protecting minority investors
  – #59: enforcing contracts
  – #141: starting a business
  – #158: trading across borders
• #94: Vanuatu
  – #110: protecting minority investors
  – #132: starting a business
  – #136: enforcing contracts
  – #147: trading across borders
• #101: Fiji
  – #79: trading across borders
  – #97: enforcing contracts
  – #99: protecting minority investors
  – #161: starting a business
• #108: Papua New Guinea
  – #89: protecting minority investors
  – #140: trading across borders
  – #143: starting a business
  – #173: enforcing contracts
• #115: Solomon Islands
  – #98: starting a business
  – #110: protecting minority investors
  – #156: enforcing contracts
  – #160: trading across borders
• #18: Australia
  – #5: enforcing contracts
  – #7: starting a business
  – #64: protecting minority investors
  – #103: trading across borders
• #32: France
  – #1: trading across borders
  – #12: enforcing contracts
  – #30: starting a business
  – #38: protecting minority investors
• #120: Egypt
  – #72: protecting minority investors
  – #109: starting a business
  – #160: enforcing contracts
  – #171: trading across borders
• #124: Philippines
  – #104: trading across borders
  – #132: protecting minority investors
  – #151: enforcing contracts
  – #166: starting a business
• #139: Maldives
  – #71: starting a business
  – #125: enforcing contracts
  – #132: protecting minority investors
  – #155: trading across borders
• #144: Tanzania
  – #64: enforcing contracts
  – #131: protecting minority investors
  – #163: starting a business
  – #183: trading across borders
• #150: Marshall Islands
  – #75: trading across borders
  – #75: starting a business
  – #103: enforcing contracts
  – #180: protecting minority investors
• #160: Micronesia
  – #61: trading across borders
  – #170: starting a business
  – #184: enforcing contracts
  – #185: protecting minority investors
• #189: Eritrea
  – #103: enforcing contracts
  – #164: trading across borders
  – #174: protecting minority investors
  – #187: starting a business
The global rankings by Transparency International of the Corruption Perceptions Index 2018 for the top 20 countries with the largest coral reefs were as follows\textsuperscript{227}:

- #11 (Tied): U.K.
- #13: Australia
- #21: France
- #22: United States
- #29: Bahamas
- #58: Saudi Arabia
- #61 (Tied): Malaysia
- #64 (Tied): Vanuatu
- #70 (Tied): Solomon Islands
- #78 (Tied): India
- #89 (Tied): Indonesia
- #99 (Tied): Philippines
- #99 (Tied): Tanzania
- #105 (Tied): Egypt
- #124 (Tied): Maldives
- #138 (Tied): Papua New Guinea
- #157: Eritrea
- Unranked: Fiji
- Unranked: Marshall Islands
- Unranked: Micronesia

The global rankings by the UNDP of the 2017 Human Development Index (HDI),\textsuperscript{228} which combines life expectancy, education, and per capita income indicators, for the top 20 countries with the largest coral reefs were as follows:

- #3: Australia (HDI of 0.939)
- #13: United States (0.924)
- #14: United Kingdom (0.922)
- #24: France (0.901)
- #39 (Tied): Saudi Arabia (0.853)
- #54: Bahamas (0.807)
- #57: Malaysia (0.802)
- #92 (Tied): Fiji (0.741)
- #101 (Tied): Maldives (0.717)
- #106 (Tied): Marshall Islands (0.708)
- #113 (Tied): Philippines (0.699)
- #115: Egypt (0.696)
- #116 (Tied): Indonesia (0.694)
- #130: India (0.640)
- #131: Micronesia (0.627)
- #138: Vanuatu (0.603)
- #152: Solomon Islands (0.546)
- #153: Papua New Guinea (0.544)
- #154: Tanzania (0.538)
- #179: Eritrea (0.440)

**Implementing a Policy**

Palau has implemented several policies including a ban that goes into effect in 2020 on non-reef friendly sunblock,\textsuperscript{229} and Palau has banned certain types of fishing (i.e., such as shark fishing). All of this would not be possibly without tourism. Whereas small island nations without a lot of options could choose to undertake resource exploitation, Palau has focused on resource conservation. The entity primarily responsible for tourism in Palau is the Palau Visitors Authority.\textsuperscript{230}
Evaluating the Policy

Thus far, Palau appears to be quite effective in its policies. Non-reef friendly sunblock is really a bad thing and it a significant step for a nation to go to that level, where there is no such sunblock sold in Palau. Likewise, “the Government has signed a law that restricts the sale and use of sunscreen and skincare products that contain a list of ten different chemicals. The ban will be put into place in 2020.”

Furthermore, Palau has introduced the Palau Pledge, whereas “upon entry, visitors need to sign a passport pledge to act in an ecologically responsible way on the island, for the sake of Palau’s children and future generations of Palauans.”

Future Outlook for Instrument

As explained by Ted Cheeseman, anything that creates stability—be it political, social, or economic stability—helps tourism. A key takeaway is that associations, when effective, on one hand can create much-needed clarity for operations and, on the other hand, can also be a major resource through which conservation issues can be addressed.

One future direction is to utilize tourism revenue to promote greater sustainability including the deployment of renewable energy systems:

‘Take the Caribbean,’ he says. ‘Half the GDP is in tourism, so investment in preserving beaches and marine life is essential. Yet here are economies that rely on diesel for electricity, which is both dirty and expensive, and at the same time have lots of wind and sun. They need investments in renewable energy projects, and the reduction in cost of electricity could provide the returns.’

There is also the emerging concept of ridge-to-reef, which could link tourism activities from reefs to onshore forests and hillsides.

As predicted by Mr. Kenneth Johnson, the future of Mexican tourism, and which seems relevant to a host of other areas, is that there will likely be more construction of hotels and more tourism, particularly more massive tourism but also more specialized tourism. This increase in tourism will likely include more snorkelers and divers. With this in mind, if we cannot develop the awareness, people will just go with the cheapest option and the cheapest option is not always the best—as it could entail more pollution or more environmental impact. It is also important to note that what is cheap at the moment, is not always the cheapest in the long term.
Another challenge, going forward, is that once something is nice and people like it, it gets publicized and massive amounts of people want to do it. For instance, Mr. Johnson met the director of a gorilla reserve in Rwanda. The director explained that the gorilla activity had too many people, so they set a capacity limit, put the price at USD$200 per person for the activity, and all the spots were full. They decided to further limit the amount of people, put the price up to USD$500 per person, and again all the spots were full. They upped the price to USD$1000 and still all the spots were full, so they finally decided to leave the price at USD$1500 per person and they had approximately thirty people sign up. The reserve now has a reduced environmental impact and there is a lot of money for local schools and hospitals, but the activity is limited to only rich people.²³⁶

Other Resources on Ecotourism

Center for Responsible Travel

- http://www.responsibletravel.org/

Global Sustainable Tourism Council

- https://www.gstcouncil.org/en/

International Institute for Peace through Tourism

- http://www.iipt.org/AboutUs.html

Professional Association of Diving Instructors (PADI) and PADI’s ScubaEarth

- https://www.padi.com/; and
- https://www.scubaearth.com/

Scuba Schools International

- https://www.divessi.com/

The Adventure Travel Trade Association
http://www.adventuretravel.biz/

The International Ecotourism Society

http://www.ecotourism.org/

Travel and Tourism Satellite Account Program

http://travel.trade.gov/research/programs/satellite/

UNWTO

http://www2.unwto.org/en;
http://media.unwto.org/content/infographics; and
Word Tourism Barometer: http://www.unwto.org/facts/eng/barometer.htm

World Travel & Tourism Council

http://www.wttc.org/research/

WWF’s Pay for Nature View

http://assets.panda.org/downloads/paypernatureviewphotos.pdf

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