



***DRAFT***

# Risking the Atoll

Analysis of Environmental and Economic Effects of Improperly Regulated Development at Turneffe Atoll

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# ACRONYMS

EIA	Environmental Impact Assessment
BDHRM	Belize Dive Haven Resort and Marina
BTB	Belize Tourism Board
CBA	Central Building Authority
CZMAI	Coastal Zone Management Authority and Institute
DOE	Department of Environment
ECP	Environmental Compliance Plan
EPA	Environmental Protection Act
GOB	Government of Belize
GSDS	Growth and Sustainable Development Strategy
INCAE	Instituto Centroamericano de Administración de Empresas
ICZMP	Integrated Coastal Zone Management Plan
MTCA	Ministry of Tourism and Civil Aviation
NSTMP	National Sustainable Tourism Master Plan
NPV	Net Present Value
OS	Oceanic Society
SWOT	Strength, Weakness, Opportunities, Threats
TAMR	Turneffe Atoll Marine Reserve
UB	University of Belize
WHS	World Heritage Site

# EXECUTIVE SUMMARY

This case study was commissioned to evaluate and quantify the negative effects of improperly regulated development at Turneffe Atoll. The intention is to use this study for the benefit of decision makers, environmental advocates and other interested parties by demonstrating the consequences of improperly designed and permitted projects in remote and sensitive areas.

The Turneffe Atoll was designated a marine reserve in 2012. The Atoll is located approximately 40 kilometers east of Belize City, and is the largest and most biologically diverse atoll in the Caribbean. Turneffe is a self-contained coastal marine ecosystem approximately 48 kilometers long and 16 kilometers wide. It is made up of a complex pattern of coral reef, back-reef flats,

## SOME DEVELOPMENTS ON THE ATOLL HAVE CIRCUMVENTED OR IGNORED...NATIONAL PLANS AND REGULATIONS

developments, including three high-end resorts, a mega-hotel, and two educational/research facilities focused on the marine environment. There are also an estimated twenty-five semi-permanent fishing camps, scattered across the atoll. The Belize National Coast Guard maintains a manned station on Calabash Caye, while the Belize Port Authority has lighthouses on Mauger Caye and Caye Bokel. The Atoll contains approximately 38 cayes comprised mostly of mangrove-covered swamp; areas with high land are quite limited.

For decades, Turneffe has been a major contributor to Belize's commercial harvest of lobster, conch and finfish. Additionally, the atoll is known worldwide as a sport fishing and scuba diving destination, and it is also an important center for marine research. Over the past decade, development pressures have increased enormously. Since 2000, the transfer of property from national ownership to private ownership has skyrocketed with large stands of mangroves cleared and critically important marine areas dredged and destroyed. Reversing this ominous trend will be difficult, if not impossible, without sustainable management of the atoll.

The main development impacts on Turneffe Atoll come from tourism development, which often involves dredging, and pollution. Although most development at the Turneffe Atoll has been done in a reasonably sustainable manner, there have been a few developments that appear to

cayes, channels and lagoons. The atoll supports several threatened and endangered species.

Tourism and fisheries are the main economic activities at Turneffe Atoll. There are several tourism

have had significant negative impacts to the atoll and which, if repeated, will cause severe, long-lasting environmental and economic damage to Turneffe and Belize.

There are various laws and regulations, as well as national development plans, which have a direct bearing on development activities on the Turneffe Atoll. However, some developments on the Atoll have circumvented or ignored these national plans and regulations.

A case in point is the Belize Dive Haven Resort and Marina (hereinafter referred to as Belize Dive Haven), a mega-scale tourism development originally located on a 47-acre parcel of land, and now expanded to 240 acres, on Ropewalk Caye. This development consists of a main building comprised of 90 regular rooms, 7 penthouse suites and a service support facility; two very large pools; and an access canal measuring 1,800 feet long by 150 feet wide by 6 feet deep that goes from the inner lagoon to near the center of the property.

The scale of the development at Belize Dive Haven appears to be against the principal management purpose of the TAMR, which is to “balance development with the conservation of the natural resources in this unique and fragile environment”. An Environmental Impact Assessment (EIA) was not carried out for this development, even though the project fits the definition of a Schedule I project under the Environment Protection Act.<sup>1</sup> Under Section 20 of the Environment Protection Act, any project that may significantly affect the environment requires an EIA. An Environmental Compliance Plan (ECP) was prepared for the project after construction had advanced considerably. Other developments on the Atoll have followed a similar course.

The impacts of unmanaged development extend beyond the natural environment all the way to the stakeholders who depend on the goods and services of the Atoll. There are several groups of stakeholders that directly benefit from the ecosystem services provided by the Turneffe Atoll, namely, traditional fishermen, tourism operators and their staff, scientific researchers, and government departments.

The Turneffe Atoll makes a tremendous contribution to the economy of Belize which comes mainly from its recreational value. When considering only direct expenditures related to Turneffe Atoll tourism activities, fisheries benefits, and storm protection values, the annual economic contribution of the atoll is slightly more than US\$62.3 million.

Although the economic contribution from Turneffe’s commercial fishery appears to have diminished over time, it still plays an important economic role for several coastal communities by creating income and employment for hundreds of fishers. Additionally, Turneffe plays a

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<sup>1</sup> The Belize Dive Haven project was started in 2005, well before TAMR was established in 2012. Even so, the scope of this project in a sensitive marine environment should definitely have required an EIA, even prior to the marine protected area designation.

significant role in protecting the Belize mainland, and particularly Belize City, from the impact of storms. The overall annual economic contribution of Turneffe Atoll to Belize when factoring in income and employment exceeds US\$75.8 million.

The damages to and degradation of back-reef flats, mangroves, corals, sea grass and water quality at the Turneffe Atoll puts in jeopardy significant economic benefits derived from a healthy and functioning ecosystem.

Nonetheless, there is still an opportunity to correct the course of development activities within the TAMR. The pace of development is still manageable and better compliance can be achieved. This, however, requires vigilance on the part of the stakeholders and managers of the protected area. There is a need to develop greater awareness among stakeholders, decision makers and the public of the critical importance and value of the ecosystems within the Turneffe Atoll.

# INTRODUCTION

Although most development at the Turneffe Atoll has been done in a reasonably sustainable manner, there have been a few developments that appear to have had significant negative impacts to the atoll and which, if repeated, would cause severe, long-lasting environmental and economic damage to Turneffe and Belize. The purpose of this case study is to evaluate and quantify the negative effects of improperly regulated development at Turneffe Atoll. The intention is to use this study for the benefit of decision makers, environmental advocates and other interested parties to demonstrate the consequences of improperly designed and permitted

THE INTENTION IS TO USE THIS STUDY FOR THE BENEFIT OF DECISION MAKERS, ENVIRONMENTAL ADVOCATES AND OTHER INTERESTED PARTIES TO DEMONSTRATE THE CONSEQUENCES OF IMPROPERLY DESIGNED AND PERMITTED PROJECTS IN REMOTE AND SENSITIVE AREAS.

projects in remote and sensitive areas.

This report firstly presents a summary description of the Turneffe Atoll Marine Reserve (TAMR) covering a brief history and current status. The TAMR management plan guidelines and relevant regulations are then

reviewed for establishing the expected process of development that is allowable on the Atoll. The incongruence and conflict between current development experiences and established guidelines and regulations are then examined and discussed. Overarching national development plans are also reviewed along the same vein.

Specific development activities are then discussed in further detail to demonstrate specific areas where violations have taken place. The Belize Dive Haven Resort and Marina is undoubtedly the largest development on the island and the financial feasibility of this project is examined in close detail. The report presents areas of potential impacts and implications of this project. However, specific violations can only be verified by the Department of Environment which enforces the Environment Compliance Plan committed to be the developer.

Turneffe Atoll, the Turneffe Atoll Marine Reserve, are highly valuable resources. However, the stream of benefits therefrom is threatened by degradation caused by improperly managed development. The estimated economic value of the Atoll is discussed to demonstrate the tremendous value that is being placed at risk by activities that can and should be properly managed. There are various stakeholders who benefit from the current stream of ecosystem



goods and services from the Atoll. They stand to lose the most from the degradation of this important marine resource.

There is an urgent need for all stakeholders, including developers, to be familiarized with the development guidelines for the Atoll. The regulatory agencies need to strengthen the enforcement and application of all regulations and guidelines.



# THE RESERVE

## TURNEFFE ATOLL MARINE RESERVE

The Turneffe Atoll was designated a marine reserve in 2012. The reserve, which is located approximately 25 miles east of Belize City, is the largest and most biologically diverse atoll in the Caribbean. Turneffe is a self-contained coastal marine ecosystem approximately 48 kilometers long and 16 kilometers wide. It is made up of a complex pattern of coral reef, back-reef flats, cayes, channels and lagoons. The atoll supports several threatened and endangered species, including the American Saltwater Crocodile (*Crocodylus acutus*) Antillean Manatee (*Trichechus manatus*), Hawksbill Turtle (*Eretmochelys imbricata*), Goliath Grouper (*Epinephelus itajara*), and Nassau Grouper (*Epinephelus stiatius*).

Two regionally important spawning aggregation sites are located on the north-east and south walls of the Atoll, and are managed under Fisheries regulations (Statutory Instrument 161 of 2003). A third site, Mauger Caye, has regulated fishing of Nassau Grouper during spawning season, under Statutory Instrument 49 of 2009. A Public Reserve was also declared by the Forest Department to protect part of Cockroach Beach and the associated lagoon, in recognition of its importance as the primary American Saltwater Crocodile nesting site in the country.



There are no settlements on the atoll; however, there are several developments, including three high-end resorts (Turneffe Flats, Turneffe Island Resort, and Blackbird Caye Resort), a mega-hotel Belize Dive Haven, and two educational/research facilities focused on the marine environment. These facilities are namely the University of Belize's Environmental Research Institute at Calabash Caye and The Oceanic Society located at Blackbird Caye. There are also an estimated twenty-five

semi-permanent fishing camps, scattered across the atoll. The Belize National Coast Guard maintains a manned station on Calabash Caye, while the Belize Port Authority has lighthouses on Mauger Caye and Caye Bokel. There are approximately 38 substantive cayes on high lands, and several mangrove islands at Turneffe Atoll.

For decades, Turneffe has been a major contributor to Belize's commercial harvest of lobster, conch and finfish. Additionally, the atoll is known worldwide as a sport fishing and scuba diving destination, and it is also an important center for marine research. Over the past decade, development pressures have increased enormously. Since 2000, the transfer of property from national ownership to private ownership has skyrocketed with large stands of mangroves cleared and critically important marine areas dredged and destroyed. Reversing this ominous trend will be difficult, if not impossible, without major efforts to sustainably manage the atoll coordinated between stakeholders, TAMR and decision makers.



# THE RULES

## DEVELOPMENT AND MANAGEMENT GUIDELINES FOR THE ATOLL

In developing the integrated coastal zone management plan, the CZMAI developed regional coastal zone management guidelines to provide support for planned development and resource management along the coastline and offshore areas of the entire country. These guidelines have been prepared for nine (9) coastal planning regions which were demarcated based on commonalities, geographic definition and regional characteristics.

The Turneffe Atoll Coastal Zone Management Guidelines were developed in conjunction with the stakeholder groups of the Turneffe region and pertinent government agencies including Fisheries, Forestry, Mining and Geology and the Department of Environment. These management guidelines are meant to ensure that anthropogenic use of the coastal region occurs in consideration of the carrying capacity of the environment in addition to other ecological, cultural, social and economic development priorities of the region. The guidelines are expected to be implemented by all those agencies that have legal mandates and/or permitting powers that impact resource utilization in the coastal zone of Belize, in partnership with this region's stakeholder groups.

Among the several objectives of the coastal zone management guidelines<sup>2</sup> are:

- a) Protecting the fishing resources and fishing rights especially for the fisherfolk from the communities of Belize City, Sarteneja, Chunox and Copper Bank
- b) Promoting orderly and sustainable development, based on suitable land use planning, and with effective development guidelines that will meet the needs of current and future generations.
- c) Maintaining and protecting ongoing and future conservation, recreational and tourism areas and uses.
- d) Preventing inappropriate high-impact, unsustainable developments that are incompatible with community needs.
- e) Protecting and preserving significant national and international natural features and ecological biodiversity of special interest or uniqueness that define the character and scientific importance of the Turneffe Atoll.
- f) Prevent development practices that damage commercial fishing and sport fishing habitats, particularly the back-reef flats and sea grass beds.

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<sup>2</sup> Turneffe Atoll Management Guidelines, CZMAI, 2013. Pg. 22

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## **TOURISM DEVELOPMENT**

Under the guidelines, the long-term objective for sustainable tourism development in the area along the reef system, including Turneffe Atoll, is to limit growth, allowing for only necessary improvements and small enlargements for existing homes, resorts, lodges and other tourism facilities. Preservation of the reef system, marine habitats and ecosystem is to be the primary concern when assessing the need to make improvements of those existing facilities.

Specifically, the guidelines on tourism state the following:

- a) Promote low-impact, environmentally-sensitive, nature-based tourism with care to avoid practices that destroy Turneffe Atoll's sensitive and valuable habitats;
- b) Avoid high-impact, environmentally-destructive tourism development;
- c) All tourism facilities should meet the Belize Tourism Board's minimum standards, including disaster preparedness and evacuation plans; and meet the "Tourism and Recreation Best Practices Guidelines for Coastal Areas in Belize" produced by CZMAI.

In 2004, the CZMAI produced a set of "Cayes Development Guidelines" for the cayes within nine coastal planning regions including the Turneffe Atoll. These development guidelines were produced in consultation with stakeholders from each planning region, with full involvement of the fisheries department, forestry department and, Department of Environment. Within each guidelines document, land use classes were developed along with accompanying standards for the varying degrees of development that can occur on each caye. Use classes were also assigned to each caye based on development suitability assessments. The use class categories developed ranged from residential to conservation, and commercial to research and education, representing the various degrees of allowable development intensities on cayes. The original cayes development guidelines for this region in which Turneffe is located identified ninety-four (94) "development sites" and specified the type of land use, lot size, building density, means of utility supply and other relevant performance standards for each site. For instance, the "Cayes Development Guidelines" stipulated that the height of buildings permitted on the islands can only go up to twenty-eight (28) feet or two floors maximum.

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## **DREDGING AND MINERAL EXTRACTION**

The Turneffe Atoll Coastal Zone Management Guidelines also address marine dredging and mineral extraction. The guidelines point out that the Turneffe Atoll has sufficient high land for resort and/or residential development and so conversion of swamp into "beaches" or "land" is not needed for the development of the Atoll. Furthermore, the guidelines emphasize that the protection of Turneffe's environment, particularly the reef, back-reef flats and seagrass beds, is essential to the survival of its two major economic sectors – commercial fishing and tourism.

According to the guidelines, dredging invariably destroys critical habitats for these enterprises – namely back-reef flats, sand flats and seagrass beds. Additionally, Turneffe Atoll’s coral reefs are easily damaged by silt and runoff from dredging. The reef system at Turneffe has been under increasing stress in recent years due to coral bleaching from climatic changes as well as damage from hurricane impact. The guidelines highlight that it is particularly important to limit significant man-made stresses from activities such as dredging.

Specifically, the guidelines point out that dredging conflicts with all the management objectives for Turneffe Atoll. The guidelines further states that no dredging, sand mining, or land filling, except for a limited hand dredging around docks, should be allowed at Turneffe without: 1) a comprehensive Environmental Impact Assessment to include a vetting process involving relevant stakeholders, and 2) compliance with the guidelines.

The guidelines go even further to stipulate that “in consideration of the objectives of these guidelines which include sustainability of commercial fishing sector and support of low-impact, nature-based tourism, development should be confined to areas naturally supportive of such development. Additionally, land without feasible access should not be developed and only minimal manual dredging for boat access should be allowed<sup>3</sup>.”

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## **CORALS, MANGROVES AND SEAGRASS**

In addressing corals, the guidelines rightly acknowledge that the firm-bottomed back-reef flats at Turneffe are recognized world-wide for their beauty and they sustain healthy populations of bonefish (*Albula vulpes*) providing the backbone for Turneffe’s sport fishing sector. Turneffe’s back-reef flats also serve the commercial fishing sector in that they are important conch nurseries and conch harvesting locations. Furthermore, the back-reef flats provide juvenile habitat for numerous fish species and play an integral role in limiting storm damage by providing critical protection to the eastern side of the atoll during hurricanes. The total coral cover at Turneffe Atoll is approximately 45 km<sup>2</sup>.

Similarly, the guidelines underscore that mangroves are important for a variety of ecological and economic purposes including their role as fisheries nurseries and as habitat for birds, reptiles and marine invertebrates. Additionally, mangroves offer protection from hurricanes, provide flood control, and improve water purification through natural filtration services. Turneffe Atoll contains the largest area of mangroves found on Belize’s cayes and the variety and extent of mangrove habitats found there is extraordinary. The total mangrove cover in this region is approximately 65 km<sup>2</sup>. Just like mangroves, extensive, healthy seagrass beds throughout Turneffe are essential to the commercial fishery as well as sport fishing. Additionally, they are important

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<sup>3</sup> Turneffe Atoll Management Guidelines, CZMAI, 2013. pg. 78



in sustaining Turneffe Atoll's manatee population. The total seagrass cover at Turneffe Atoll is approximately 366 km<sup>2</sup>.

To ensure protection of corals, mangroves and seagrass, the guidelines state that:

- a) Clearing of vegetation should be kept to a minimum and valuable littoral forest should be identified with GPS coordinates, clearly mapped and zoned for protection.
- b) Preservation of seagrass beds should be a priority in all management decisions at Turneffe Atoll.
- c) Due to the economic and ecological importance of Turneffe's fringe reef, patch reef and back-reef flats, management of Turneffe Atoll should ensure that the integrity and health of these areas is carefully protected.

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## **UTILITIES**

Given that tourism is one of the main activities on Turneffe Atoll, the guidelines identify the provision of utilities as having potential impact on the ecology of the area. To address this, the guidelines state that:

- a) Tourism and residential developments should be required to provide detailed plans about how they will provide adequate fresh water which will not degrade natural fresh water resources used by wildlife.
- b) Rainwater collection, recycling of gray water, and other water preservation methods, should be utilized as much as possible.
- c) Maximal use of solar and wind power is recommended, yet it is recognized that some fuel based power will be necessary.
- d) Power requirements should be minimized to the extent possible using power-saving measures and other efficiencies.

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## **FOSSIL FUELS**

The guidelines note that transportation and storage of fossil fuels present risks of serious contamination, and that adequate policies and procedures for these activities should be required and approved for all residential and tourism developments. The guidelines stipulate that fuel related contaminants must be disposed of responsibly and all tourism and residential development proposals should include responsible plans for these processes.

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## **SOLID WASTE AND POLLUTION**

For pollution control, the guidelines highlight the fragile nature of the atolls and as such underground septic tanks and soak-aways are not recommended as a means of handling liquid

wastes. Furthermore, the “Cayes Development Guidelines” recommend the use of above-ground septic tanks with drain fields in several of the development sites. In 2010, Central Building Authority (CBA) produced detailed specifications for the construction of soak-aways and septic tanks for residential and other low-impact buildings. The CZMAI recommends that developers must consult with the CBA on standards for the construction of above-ground septic tanks with drain fields.

The guidelines further stipulate that:

- a) For tourism and residential developments, solid waste from toilets should be treated by means of an earth tub or similar type technology with the resulting compost used in landscaping. Open septic tanks should not be permitted for tourism or residential facilities and closed septic tank/drain-field systems should be permitted only with pre-approval from the Department of the Environment and Central Building Authority.
- b) Gray water should be recycled and reused as much as possible.
- c) Food waste from tourism and residential properties should be composted and used on-site as fertilizer.
- d) All hazardous waste, including batteries, tires, propellant cans and petroleum-based products, should be properly stored to avoid contamination and transported to the mainland for final disposal.
- e) Metal containers should be used for incinerating burnable inorganic waste, although such incineration should be done in a manner that is not a nuisance to neighbors. Large-scale resorts (yet to be defined) should be required to utilize incinerators for these purposes.
- f) There are no basic health care facilities on the atoll, and as such the guidelines stipulate that all residents should be prepared to provide at least basic medical care and resorts are encouraged to aid the wider community when needed.

The guidelines described above all form part of the Turneffe Atoll Coastal Zone Management Guidelines which in turn form part of the Belize Integrated Coastal Zone Management Plan being developed by the CZMAI. The Plan has been approved by CZMAI’s Board of Directors and the House of Representatives, and is now official government policy. As such, there is an expectation of adherence to them by both public and private entities.

## REGULATIONS DIRECTLY RELEVANT TO DEVELOPMENT AT TURNEFFE

### GENERAL RULES AND REGULATIONS

There are various laws and regulations that have a direct bearing on development activities on the Turneffe Atoll. The following table lists the existing pieces of legislation that apply to the TAMR.

**Table 1: Legal Framework for TAMR**

Legislation/Statutory Instruments	Description	Relevant Provisions
<b>Fisheries Act</b>	Passed in 1948, revised in 1983, and is currently being overhauled (2011); It is administered under the Fisheries Department and is the principal governing legislation to regulate the fishing industry.	Directly concerned with maintaining sustainable fish stocks and protecting the marine and freshwater environments. Provides protection for marine turtles and nest sites. Requires that artisanal fishers and fishing vessels are licensed annually to fish for commercial purposes.
<b>Sport Fishing regulations (SI 114 and 115 of 2009)</b>	Whilst the regulations are legislated under the Fisheries Act, the issuing of Sport Fishing licenses falls under the Coastal Zone Management Authority and Institute.	Established to better manage the economically important sport fishing species in Belize, and more specifically address the management and conservation of the three major sport fish in Belize - bonefish, tarpon & permit.
<b>Environmental Protection Act (1992)</b>	Was developed under the Department of the Environment with the aim of ensuring that development initiatives within Belize are planned for minimum environmental impact.	Important in managing development impacts from cayes in the seascape of the Atoll.
<b>Environmental Impact Assessment Regulations (SI 105 of 1995)</b>	Requires an EIA for cayes development, which the Regulations control and regulate.	An accepted EIA result in the production of an ECP, which is then approved and monitored by the Department of Environment (DOE).

		<p>Requires the DOE to respond to human impacts on the reef, such as pollution, boat groundings and fuel spills.</p> <p>Requires an EIA for “any proposed development project, undertaking or activity within any protected area (terrestrial or marine)”.</p> <p>Provides a mechanism for assessment of damage from boat groundings, based on the area impacted.</p>
<b>Forest (Protection of Mangrove) Regulations (SI 52 of 1989, under revision, 2011)</b>	Provides for the protection of mangroves, with restrictions on mangrove alteration and/or clearance.	Before granting a permit for mangrove alteration, Belize law requires the Forest Department to consider whether the project will adversely affect the conservation of the area’s wildlife, water flow, erosion and values of marine productivity, and to find either ‘that the proposed alteration will not significantly lower or change water quality’ or that the degradation of water quality is in the "larger and long-term interest of the people of Belize". <sup>4</sup>
<b>Wildlife Protection Act (SI 12 of 1982, revised 2000)</b>	Falls under the Forest Department	Provides protection for West Indian manatee, whales and dolphins, with the prohibition of hunting and commercial extraction.
<b>Mines and Minerals Act (1989)</b>	Falls under Department of Geology (Ministry of Finance and Natural Resources)	Regulates the exploration and extraction of all non-renewable resources, including oil.  Controls activities such as dredging which, if conducted in the adjacent seascape, have the potential to impact the Atoll.
<b>Petroleum Act (1991)</b>	Falls under Department of Petroleum (Ministry of Economic Development, Petroleum, Investment, Trade and Commerce)	Regulates the exploration and extraction of petroleum.  Controls activities such as oil prospecting and drilling which, if

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<sup>4</sup> Chapter 213, Section 5.5, Belize's Forest Act

		<p>conducted in the adjacent seascape, have the potential to impact the Atoll.</p> <p>Under this legislation, Princess Petroleum Ltd. holds a concession area covering most of the northern half of Turneffe Atoll and the seabed to the east.</p>
<p><b>Belize Port Authority Act, 1976; revised, 2003</b></p>	<p>The Port Authority is mandated to ensure the safety of navigational channels, through the installation of navigational aids and installation and maintenance of demarcation buoys.</p>	<p>Port Authority maintains two lighthouses at Turneffe Atoll (Dog Flea Caye to the north and Caye Bokel to the south).</p> <p>It also has a role in the registration of boats and monitoring of vessels using navigational channels and the removal of boats from the reef, when groundings occur.</p>

A series of legislated regulations under the Fisheries Department provide a mechanism for management of commercial marine resources, as do statutory instruments Statutory Instrument 161 of 2003 and Statutory Instrument 49 of 2009. Regulations specific to the Turneffe Atoll are incorporated into the Statutory Instrument that defines the Marine Reserve.

**THE FISHERIES (TURNEFFE ATOLL MARINE RESERVE) ORDER, 2012**

The following management zones have been established for the TAMR:

- a) Zone 1: Maugre Caye Conservation Zone;
- b) Zone IIA: Dog Flea Conservation Zone;
- c) Zone IIB: Cockroach - Grassy Caye Special Management Area;
- d) Zone III: Vincent's Lagoon Special Management Area;
- e) Zone IV: Blackbird Caye Conservation Zone;
- f) Zone V: Long Bogue Conservation Zone;
- g) Zone VI: Caye Bokel Conservation Area;
- h) Zone VII: Preservation Zone; and
- i) Zone VIII: General Use Zone.

The following activities are regulated or not permitted within the management zones except with the authorization of the Fisheries Administrator:

**Table 2: Management Zones of TAMR**

<b>Management Zones</b>	<b>Regulated or Prohibited Activities</b>	<b>Section of Regulation</b>
<b>Zone 1: Maugre Caye Conservation Zone</b>	Extractive fishing	Section 7
	Spear fishing	Section 10
<b>Zone IIA: Dog Flea Conservation Zone</b>	Extractive fishing	Section 7
	Spear fishing	Section 10
<b>Zone IIB: Cockroach - Grassy Caye Special Management Area</b>	Extractive fishing for conch	Section 8
	Spear fishing	Section 10
<b>Zone III: Vincent's Lagoon Special Management Area</b>	Only traditional users shall engage in extractive fishing	Section 9(1)
	Spear fishing	Section 10
<b>Zone IV: Blackbird Caye Conservation Zone</b>	Extractive fishing	Section 7
	Spear fishing	Section 10
<b>Zone V: Long Bogue Conservation Zone</b>	Extractive fishing	Section 7
	Spear fishing	Section 10
<b>Zone VI: Caye Bokel Conservation Area</b>	Extractive fishing	
	Spear fishing	Section 10
<b>Zone VII: Preservation Zone</b>	Spear fishing	Section 10
	Extractive fishing, sport fishing, snorkelling, diving or any other water activity	Section 11(1)
	Motorized boat (except in cases of emergency)	Section 11(2)
<b>Zone VIII: General Use Zone</b>	The use of beach traps or fish traps are permitted in the General Use Zone only	Section 6(2)

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## THE FISHERIES (TURNEFFE ATOLL MARINE RESERVE) REGULATIONS

The Fisheries (Turneffe Atoll Marine Reserve) Regulations, which were made law via Statutory Instrument No. 111 of 2012, is the main legal instrument that regulates activities and provides further development guidelines within the TAMR.

The following “prohibitions within the reserve” are stipulated. These regulations listed in Statutory Instrument No. 111 of 2012 also serve as development guidelines for the TAMR.

### **Section 6(3):**

A person shall not engage in any activity which may cause negative environmental impact on species, habitats or ecosystems without written approval from the Fisheries Administrator.

### **Section 25:**

A person shall not --

- (a) remove from its place or disturb any species of flora or fauna, including rocks, dead corals, shells or sand unless authorized to do so in accordance with these Regulations;
- (b) have in his possession any flora or fauna, unless authorized to do so in accordance with these Regulations;
- (c) discharge or deposit any toxic material, garbage or litter in the reserve;
- (d) mark or tamper with any sign, buoy or notice which is installed within the reserve.

### **Section 27:**

A person who contravenes these Regulations commits an offence and is liable on summary conviction to the penalty specified in section 15 of the Fisheries Act.

The Fisheries (Turneffe Atoll Marine Reserve) Regulations also lists regulations for activities in the reserve, including the following: a) Use of long lines, seine nets or gill nets in the reserve; b) engaging in commercial fishing, sport fishing or recreational fishing within the reserve; c) casting or dragging an anchor; d) engaging in water-skiing or jet-skiing; and e) using beach traps or fish traps.

## NATIONAL DEVELOPMENT PLANS

In addition to specific regulations, and guidelines, national developments plan also provide a higher-level vision for the management and use of Belize’s natural resources. Three of these main plans include the Growth and Sustainable Development Strategy (GSDS), National Sustainable

Master Plan (NSTMP) and the National Biodiversity Strategy and Action Plan (NBSAP). These are discussed in more detail below.

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## **GROWTH AND SUSTAINABLE DEVELOPMENT STRATEGY**

The GSDS 2016-2019 is Belize’s primary development planning document, providing detailed guidance on priorities and on specific actions to be taken, including actions that contribute to longer term development objectives beyond 2019. The GSDS encompasses issues covered by previous medium-term economic development plans; but it incorporates, for the first time, both poverty reduction and long-term sustainable development issues. It builds on previous documents including the Horizon 2030: National Development Framework for Belize 2010-2030.

**THE GSDS ALSO RECOGNIZES THAT TOURISM IS COMPLETELY DEPENDENT FOR ITS SUSTAINABILITY ON CARE OF THE ENVIRONMENT AND THE INTEGRITY OF BELIZE’S ECOSYSTEMS**

The GSDS notes that the development of the tourism industry will be guided by the National Sustainable Tourism Master Plan 2030 (NSTMP). A key action proposed by the GSDS is as follows:

“Action 33: Foster inclusive growth in the development of the tourism industry.”

The GSDS states: “In pursuing tourism development, special care will be taken to ensure that the sector pursues an inclusive growth pathway. ... Efforts will be made to attract investors in hotel plants where the “all inclusive” hotel model will not be pursued, to spread the economic benefits of tourism more broadly to surrounding communities.”<sup>5</sup>

Under the section on protected areas, the GSDS lists the following special issues and implementation priorities to be addressed during the planning period:

- a) Strengthening enforcement to reduce haphazard and unplanned coastal development; and
- b) Highlighting the social and economic benefits of protected areas and integrating consideration of these benefits — as well as valuations (as available and appropriate) — into national development planning decisions.

Under the section on marine and aquatic resources, the GSDS proposes the following action:

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<sup>5</sup> Growth and Sustainable Development Strategy (2016-2019), Ministry of Economic Development, GOB



“Action 11: Implement the Integrated Coastal Zone Management Plan (ICZMP), including the development of a marine spatial plan.”<sup>6</sup>

The GSDS cites the Coastal Zone Management Authority and Institute (CZMAI) to lead a multi-stakeholder process to harmonize implementation of the recently approved ICZMP with other plans, including the Sustainable Tourism Master Plan and land-based planning documents, leading to the development of a Marine Spatial Plan for Belize.

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## **NATIONAL SUSTAINABLE TOURISM MASTER PLAN**

As part of the development of the National Sustainable Tourism Master Plan (NSTMP), an environmental assessment of each district was undertaken to identify measures for safeguarding of natural assets of Belize. Relevant gaps at the district level were identified. Information for the Atolls were not included, which suggests that these were not included in the assessment.

Nonetheless, several coastal areas such as Belize City, Placencia and Punta Gorda, as well as the northern islands (Ambergris Caye and Caye Caulker), were included in the assessment.

The relevant gaps identified for these areas that are relevant to the Turneffe Atoll include:

- a) The improper disposal of solid waste can have negative impacts to the surrounding Caribbean Sea and the recreational waters of [Turneffe Atoll]. Many substances in common domestic waste have the potential to negatively affect the environment because of their chemical properties.
- b) Dredging on the windward coast is supposedly severely restricted because of the potential impacts this activity could have on the reef system, but it continues to be a huge problem. The wave action caused by the increased depth of shoreline water due to illegal dredging can severely erode the nearby coastline especially during tropical storms and hurricanes.
- c) Beach erosion, although a natural phenomenon, has accelerated in recent times and is attributable to numerous causes —mainly those of man’s activities in various forms such as the clearance of mangroves, the reclamation of land from the sea, seawalls, the construction of piers, and the dredging of sand offshore, all of which affect the littoral drift and the consequent shift and deposition of sand.
- d) Despite the significant importance that mangroves have on the environment, they are rapidly being cleared to make way for new mega-developments. Sea walls are often put up in their absence, to prevent erosion, but with little effect.

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<sup>6</sup> Ibid.

- e) A UNESCO report raised special concern on several sites within the Belize Barrier Reef System World Heritage Site stating that some of these sites are “poorly protected and that there is no clear recognition and understanding of the management implications”. The Belize World Heritage Site (WHS) has been placed on the list of World Heritage in Danger.
- f) Coastal development is not presently guided by any zoning plan or master plan.
- g) Waste water discharge and the potential for pollution of the recreational waters is a major issue to be considered as part of the future development of the area.
- h) Beach erosion because of coastal structures and developments is always a major issue to consider.
- i) Another area of concern has been the mass visitation of cruise ship tourist to reefs, protected areas and other sites perhaps surpassing the carrying capacities of several of these sites. A study conducted by the Instituto Centroamericano de Administración de Empresas (INCAE) provides indications of environmental damage by cruise tourism, especially to the marine areas visited.
- j) Offshore oil exploration is another area of concern focused on the devastating impacts an oil spill could have on Belize’s very sensitive marine ecosystem, as well as its tourism and fishing industries.<sup>7</sup>

The NSTMP project also conducted a SWOT analysis as part of a Diagnostic of the Tourism Sector in Belize. The main conclusions obtained from this diagnostic are summarized as follows:

*Belize as a tourism destination has a wide range of strengths that should be promoted in terms of tourism development. Its tourism attractiveness has its foundation on biodiversity, an ecotourism ethic, and cultural sites. However, sustainable practices should be integrated into all tourism operations to avoid environmental damage of the natural and cultural sites of Belize. The country also faces many weaknesses highlighting lack of basic service provision and infrastructure, technical skills and quality of tourism facilities, a low promotion of the destination in potentially lucrative markets, lack of tourism product services and other socio-economic constraints that should be minimized.*<sup>8</sup>

The NSTMP identified the following constraints for sustainable tourism development as well as potential negative impacts that may be applicable to the Turneffe Atoll:

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<sup>7</sup> National Sustainable Tourism Master Plan for Belize 2030, BTB and MTCA (June 2011).

<sup>8</sup> Ibid.

### **Constraints for sustainable tourism development (NSTMP):<sup>9</sup>**

- Lack of asset management, mainly due to lack of awareness, knowledge and financial issues. Results in:
  - ❖ Over-visitation of sites;
  - ❖ Serious environmental and social negative impacts;
  - ❖ Decrease of destination image: from eco-tourism or cultural sites to mass tourism;
  - ❖ Risk of serious deterioration, due to lack of diversification of product offering (marine assets, nature assets);
  - ❖ Damage of marine habitat due to larger vessels, especially at anchor.
- Insufficient waste disposal, resulting in:
  - ❖ Mosquito infestation;
  - ❖ Malaria and dengue infection risk.
- Insufficient sewage systems, result in:
  - ❖ Water contamination;
  - ❖ Diseases due to water contamination;
  - ❖ Negative image of the country's development.
- Lack of land planning and regulation, resulting in:
  - ❖ Haphazard and inadequate urban development;
  - ❖ Incompatible development of commercial, industrial and residential activities;
  - ❖ Environmental concerns;
  - ❖ Degradation of the landscape;
  - ❖ Beach erosion and navigational safety hazards due to coasts clustered with piers and jetties;
  - ❖ Uncomfortable feeling for residents and visitors.
- Lack of public awareness programmes, resulting in:
  - ❖ Degradation of beaches and the natural environment, due to poor promotion of ecotourism and sustainability issues;
  - ❖ Inappropriate usage of natural resources, such as the reef, national parks and rainforests.

As part of a strategy to enhance sustainability of tourism, the NSTMP lays out a destinations development strategy for a set of seven tourism destinations. These seven destinations include the following: 1) Northern Belize, 2) Northern Islands, 3) Central Coast Belize, 4) Western Belize,

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<sup>9</sup> Ibid.

5) South Eastern Coast Belize, 6) Southern Belize and, 7) Belize Reef. Turneffe Atoll falls within the Belize Reef tourism destination.

To achieve sustainability, the NSTMP lays out three strategies as follows:

- a) Design and develop a wide set of cluster programs to develop products structured as national clusters, being very cautious to avoid any negative environmental and social impact.
- b) Focused and controlled development, facilitating control of the positive and negative impacts as well as managing development properly. The NSTMP states that the strategic model for tourism in Belize should be focused on “a mid-level growth in terms of overnights – low in rural or sensitive sites – and low in terms of density, except in certain areas allowing higher densities.”
- c) Due to the constrained economic resources Belize has for tourism development, it is required to set priorities for investment and define a clear phased program. This will also improve benefits from tourism allowing the projects to be completed, and their results achieved, before new investments are starting in other programs or sites.<sup>10</sup>

An analysis of the importance and implementation ease of Belize’s product portfolio characterizes the Belize Reef tourism destination as third priority for development – low priority in urgency and ease of implementation, and low priority in importance of implementation. In other words, Belize Reef’s development is not regarded to be urgent or important for the general development of the Belize tourism product.

According to the NSTMP, “this rating was especially a result of [the Belize Reef’s] low potential to generate overnights, the low level of projects planned, its lack of management capacity, its current development level within the destination and their poor connectivity to other tourism destinations. However, this does not mean that Belize Reef should be left out, as its investment and development is required to diversify and complete Belize’s tourism destination portfolio.”<sup>11</sup>

The NSTMP’s National Destination Physical Plan defines the following as the destination development objective for the Belize Reef:

*Conservation is key, and development completely subservient in quality and extent. The main objective is to limit growth, only allowing it for necessary improvements to existing homes, resorts, lodges and other facilities. Preservation*

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<sup>10</sup> National Sustainable Tourism Master Plan for Belize 2030, BTB and MTCA (June 2011).

<sup>11</sup> Ibid.

*of the Barrier Reef and all other marine habitats should be the primary concern when assessing any alterations to these.<sup>12</sup>*

The **Model of Development** for the Belize Reef is stated to be: “Only allow improvements and small enlargements for existing tourism facilities to complete maximum growth allocated of 37 new hotel rooms. The proposed strategy for conservation is to establish and promote a day visitation formula.”<sup>13</sup>

FROM 2025 UNTIL 2030, BELIZE REEF COULD DEVELOP 37 NEW ACCOMMODATION ROOMS IN LOW DENSITY FACILITIES.

The **Accommodation Growth Model** is as follows: “From 2012 to 2020, Belize Reef should not develop any additional hotel accommodation rooms. Existing facilities should be encouraged to restructure their offerings for day

visitor activities. New development should not be promoted, as they would eventually become detrimental to the occupancy rates and the existing accommodation businesses. From 2025 until 2030, Belize Reef could develop 37 new accommodation rooms in low density facilities. New investments are recommended to be made in facilities devoted to nautical, sun & beach and nature-based activities.”

To summarize, the Belize Reef was identified by the NSTMP to “remain as long as possible a natural and generally untouched destination, which will mostly develop water-based day visitor attractions and enhance its nautical tourism product. Only at a later stage, Belize Reef [should] start developing its low-density sun & beach tourism product”.<sup>14</sup>

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## NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

The National Biodiversity Strategy and Action Plan 2016-2020 (NBSAP) is another key planning document that is relevant to the TAMR. The NBSAP presents the following vision for biodiversity in Belize: “Belize’s natural environment is valued, enhanced and enjoyed by all, and contributes to improving the quality of life of its people.”<sup>15</sup>

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<sup>12</sup> National Sustainable Tourism Master Plan for Belize 2030, BTB and MTCA (June 2011).

<sup>13</sup> Ibid.

<sup>14</sup> Ibid.

<sup>15</sup> National Biodiversity Strategy and Action Plan, Belize. Ministry of Agriculture, Forestry, Fisheries, the Environment and Sustainable Development, Belmopan, Belize, 2016.

The NBSAP is a five-year plan set within a fifteen-year framework (aligning with the Horizon 2030 national development framework), and is designed to achieve this national Vision, through five thematic areas: mainstreaming, reducing pressures, protection, benefits, and implementation.

The NBSAP identifies coastal forests (littoral forests) and beach vegetation (tropical coastal vegetation on very recent, moderately drained sediments) as highly vulnerable, lying in areas targeted for coastal tourism development. Even with the declaration of the TAMR, protection of littoral forest is still under the 10% national target. The NBSAP states that “these ecosystems will be further stressed in the future with the predicted short-term increase in coastal development and long-term rise in sea level”.<sup>16</sup>

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<sup>16</sup> Ibid.



# THE DAMAGE

## DEVELOPMENT ACTIVITIES WITHIN TURNEFFE ATOLL

There are several developments that appear to have contravened the EPA's EIA requirements, TAMR Regulations and the Integrated Coastal Zone Management Plan. These include the resort development on Ropewalk Caye, land clearing and excavation on property owned by Timothy and Ann Smith in the Northern Bogue area and development activities on the northeast coast of Turneffe Atoll.

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### BELIZE DIVE HAVEN RESORT AND MARINA

Belize Dive Haven is a mega-development project being constructed by Canadian businessman, Karim Hakimi on Ropewalk Caye<sup>17</sup>. According to a promotional video of the development on YouTube, the resort is a "unique world class diving hub with great proximity to the longest living reef and the Blue Hole<sup>18</sup>." The Belize Dive Haven ECP states that this tourism development is on a 47-acre parcel of land on Ropewalk Caye and consists of the following<sup>19</sup>:

- a) One main building comprised of 90 regular rooms, 7 penthouse suites and a service support facility;
- b) One (1) 200 feet long by 40 feet wide swimming pool with a restaurant;
- c) One (1) 260 feet long by 40 feet wide swimming pool;
- d) An access canal measuring 1,800 feet long by 150 feet wide by 6 feet deep that goes from the inner lagoon to near the center of the property. This includes a mooring lagoon at the center of the property with finger piers for small boats;
- e) One (1) 200 feet long by 12 feet wide main pier on the windward side near the center of the property;
- f) One (1) 100 feet long by 8 feet wide service pier on the southern end of the windward side of the property;
- g) A 490,000 gallons capacity fresh water catchment measuring 160 feet by 58 feet by 6 feet under the main building; and
- h) A tertiary level sewage treatment plant.<sup>20</sup>

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<http://www.responsibletravel.org/home/documents/Turneffe%20Atoll%20Report%20Master%20January%202013%20%20FINAL.pdf>

<sup>18</sup> <https://www.youtube.com/watch?v=VR9kXcr-b7w>

<sup>19</sup> The Belize Dive Haven property was expanded to 240 acres on Ropewalk Caye.

<sup>20</sup> BDHRM Environmental Compliance Plan, DOE (August 2014).



A technical site visit on January 12, 2017, confirmed that all the development components listed above are now in place, in addition to other components not on that list.

The ECP lists several generic “potential sources of environmental impact during development of the project” and instituted several measures for the developer to undertake to mitigate the potential negative impacts associated with the development.<sup>21</sup> While it cannot be determined if all the mitigation measures were undertaken during the development of the project, the January 2017 site visit confirmed the following environmental impacts via personal observation:

- a) Full-scale dredging of the back-reef flats in front of the center of the property for land fill. This has caused irreversible damage to prime habitat for conch, lobster, bonefish, permit, tarpon, and other species and damaged the reef in front of the dredged area.
- b) Brine from two desalinization plants that have the capacity to produce up to 20,000 gallons of fresh water per day per unit are being dumped onto a marshy area on the leeward side the property. This is contaminating the soil in this area and possibly the wider marine and reef ecosystem.
- c) With the new property being purchased, the size of the property will reportedly increase to approximately 240 acres;
- d) Vegetation clearance is underway to put in a 2,300 feet long landing strip that can take Caravan-type passenger planes.

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<sup>21</sup> BDHRM Environmental Compliance Plan, DOE (August 2014).

**Figure 2: Open Discharge of Brine at Belize Dive Haven**



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### **NORTHERN BOGUE AREA**

The Smiths own approximately 25 acres of land of which about 5 acres has been completely cleared of vegetation; and, an access channel and harbor have also been dug on the property. There is evidence of sea grass mortality directly in front of this property, quite probably because of high levels of nutrients from rotting detritus emanating from the property. Other environmental impacts noted include shoreline erosion.

According to an affidavit signed by the Chief Environmental Officer, the DOE received an application from Timothy and Ann Smith for the private non-commercial development of a “private family retreat.” As communicated by the Smiths to the DOE, the development would be a residential, non-commercial “private family retreat” consisting of the following:

- a) An access channel 350 feet long by 50 feet wide by 12 feet deep access channel through the center of the property leading to a safe harbor for personal “watercraft” of approximately 50 feet long by 100 feet wide and 12 feet deep;

- b) One (1) wooden and concrete structure containing a kitchen, dining and living area, and a maximum of 6 bedroom units;
- c) One (1) wooden and concrete watchman quarters and storage building;
- d) An organic garden with a chicken coop;
- e) Use of a reverse osmosis water system, backup power generator, wastewater treatment facility, etc.

The DOE granted Environmental Clearance on 29 July 2015 to the Smiths to proceed with the development. An ECP was issued on that same date outlining “all that was required to be done in relation to the project and conditions that if the terms were not complied with that DOE was vested with the power to stop the project.” The developers subsequently were issued a stop order by the DOE on 12 February 2016 halting the project. On 16 March 2016, the DOE mandated that an EIA needed to be carried out for the development and that the project could not proceed “without the procedures for an EIA being properly followed and carried out.”

There is a lawsuit currently underway related to the Development, whereby the Developers are accused of contravening several laws and regulations. The developers claim to have complied with the respective laws.

The Northern Bogue area lies within the TAMR General Use Zone. It is worthwhile to note that the Fisheries (Turneffe Atoll Marine Reserve) Regulations is the main legal instrument that regulates activities and provides development guidelines within the TAMR. The Smith project also seems to have contravened Clauses 6(3) and 25 of these Regulations (see Section 4.3.3), which state (only relevant sub-clauses listed):

Section 6(3):

A person shall not engage in any activity which may cause negative environmental impact on species, habitats or ecosystems without written approval from the Fisheries Administrator.<sup>22</sup>

Section 25:

A person shall not --

- (a) remove from its place or disturb any species of flora or fauna, including rocks, dead corals, shells or sand unless authorized to do so in accordance with these Regulations;
- (c) discharge or deposit any toxic material, garbage or litter in the reserve.

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<sup>22</sup> The developers did receive written approval from the Fisheries Administrator but contravened the requirements to maintain a fringing area of mangroves along the shore.

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## OTHER DEVELOPMENT ACTIVITIES

Tropical littoral forest and beach vegetation is Belize's most threatened ecosystem, and this was highlighted under Belize's National Protected Areas System Plan as being significantly under-represented within the current protected area system. Only 8.6% of the national coverage is under protection, as compared with the national target of 60% for this ecosystem. In 2004, this ecosystem was mapped as having a coverage of approximately 230 hectares on Turneffe Atoll<sup>23</sup> with much of this being herbaceous beach communities and shrubs, rather than the taller littoral forest.

The TAMR management plan states that "much of the littoral forest was historically cleared for coconut plantations, and has more recently been superseded by tourism developments. The higher sandy ridges that support littoral forest are some of the most valuable real estate in Belize. Indeed, most areas identified as being littoral forest in 1990 (Murray et al., 1990) can now be identified primarily by the presence of cleared lands for tourism development projects or existing tourism developments – Cockroach Bay, Blackbird Caye, Calabash Caye, Ropewalk, and Turneffe Flats."

Nationally, Turneffe is considered a critical area for the American crocodile (*Crocodylus acutus*)<sup>24</sup>. Turneffe Atoll has the largest population of this crocodile in the Belize, with an estimated 200-300 non-hatchlings (juveniles/sub-adults) and 15-25 breeding females inhabiting the Atoll<sup>25</sup>. The existence of a large, low-salinity nursery lagoons, elevated beach ridges for nesting and extensive cover protecting hatchlings and adults provides near optimal conditions for this increasingly uncommon species.

In 2006, Meerman reported that mangroves were cleared in Cockroach Bay on Northern Caye, where the beach and littoral forest is now exposed. The largest clearance was carried out on two parcels of land that had been recently acquired at the time. According to information from the Forest Department, no Mangrove Clearing Permit was requested or issued for this clearing. Further ground-truthing revealed that much of the littoral forest on this site was also cleared. Similar mangrove clearing and opening of the littoral forest was also noted on several locations on Blackbird Caye.

Nesting of American Crocodiles has only been confirmed from the eastern shores of Turneffe. The key sites being Cockroach Bay, Northern Blackbird Caye, Southern Blackbird Caye and Bull Caye. Historical nesting records exist from Northern Blackbird (central lagoon shore) and

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<sup>23</sup> (Meerman, 2004),

<sup>24</sup> (Vulnerable - IUCN, 2011).

<sup>25</sup> (Platt, et al., 2004)

Deadman's Caye. By far the most important location is Cockroach Bay. On average 65% of all the reported nests on Turneffe were found there.

In recognition of the national importance of some of the nesting beaches and nursery areas at Turneffe Atoll, and the developmental pressures threatening their existence, the Forest Department declared a portion of Cockroach Bay on Northern Caye a Crocodile Reserve in November 2005 (Figure 43; Belize Gazette, 2005). The declaration of this reserve, however, does not mean that the crocodiles at Cockroach Bay are now fully protected.

**Figure 3: Crocodile Reserve Threatened by Mangrove Clearings**



A land registration search conducted in 2006 revealed that essentially all the Cockroach Bay shoreline has been surveyed and leases have been issued. In total 9 parcels of land were traced by Meerman (2006)<sup>26</sup>, two of which have now been recalled (the two 8100/20 parcels) and

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<sup>26</sup> Meerman (2006)

declared the public/crocodile reserve. With the property map superimposed on the ecosystems map and the known crocodile nests, it became immediately clear that:

- The critical lagoon is not entirely covered by the Public/Crocodile Reserve;
- The new reserve does not incorporate all the recorded nesting locations;
- There are still 7 properties directly adjacent or within the immediate proximity of the areas critical to the crocodiles;
- There are still 7 properties which can be expected to be developed in ways incompatible with the continued existence of the crocodiles; and
- All but one (as far as we know) of these properties are currently being offered for sale on international market.

## **CONFLICTS WITH DEVELOPMENT AND MANAGEMENT GUIDELINES FOR THE ATOLL**

The tourism industry at the Turneffe Atoll, according to the Integrated Coastal Zone Management Plan (ICZMP) development guidelines, should be directed towards “low-impact, environmentally sensitive tourism while cautiously avoiding destructive practices which would compromise the source of the atoll’s attraction as a tourism destination<sup>27</sup>.”

While the tourism industry generates much needed economic development, on both local and national levels, it has been identified as also leading to reef damage, illegal camping, and litter. It is also noticeable that it has had the effect of generating speculative, though not always well-informed, development.

Consequently, the ICZMP development guidelines recognize the need to limit growth, allowing for only necessary improvements and small enlargements for existing homes, resorts, lodges and other tourism facilities on the Atoll. The preservation of the reef system, marine habitats and ecosystem, these guidelines states, is to be the primary concern when assessing the need to make improvements of those existing facilities.

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<sup>27</sup> Turneffe Atoll Management Guidelines, CZMAI, 2013. pg. 33

**Figure 4: Belize Dive Haven - A 97-Room Resort at Turneffe**



The table below provides a detailed review of specific guidelines and whether they have been breached by the unmanaged developments taking place at Turneffe Atoll.

**Table 3: Development Conflicts with TAMR Development Guidelines**

Guidelines	Impacts Observed
Promote low-impact, environmentally-sensitive, nature-based tourism with care to avoid practices that destroy Turneffe Atoll’s sensitive and valuable habitats;	The building of a 96-room resort at Ropewalk Caye and the full-scale clearance of mangroves at the Northern Bogue area cannot be considered low-impact and environmentally-sensitive practices.
Avoid high-impact, environmentally-destructive tourism development;	Evidence of high impact and environmentally insensitive activities observed in several areas of the Atoll.

<p>All tourism facilities should meet Belize Tourism Board's (BTB) minimum standards, including disaster preparedness and evacuation plans; and meet the "Tourism and Recreation Best Practices Guidelines for Coastal Areas in Belize" produced by Coastal Zone Management Authority and Institute (CZMAI).</p>	<p>Standards being applied at Belize Dive Haven on Ropewalk Caye unknown.</p>
<p>Height of buildings permitted on the islands can only go up to twenty-eight (28) feet or two floors only</p>	<p>The Belize Dive Haven Resort is up to five stories high and far exceeds the 28 feet guidelines.</p>
<p>The protection of Turneffe's environment, particularly the reef, back-reef flats and seagrass beds, is essential to the survival of its two major economic sectors - commercial fishing and tourism.</p>	<p>Extensive dredging of the back-reef flats at the Belize Dive Haven Resort has been carried out and seagrass damage is evident at the Northern Bogue at the Smith property due to the clearing of mangroves.</p>
<p>Limit significant man-made stresses from activities such as dredging.</p>	<p>Extensive dredging of back-reef flats carried out at the Belize Dive Haven Resort and dredging of a canal has been done at both the Belize Dive Haven Resort and the Smith property at the Northern Bogue.</p>
<p>No dredging, sand mining, or land filling, except for limited hand dredging around docks, should be allowed at Turneffe without, 1) a comprehensive Environmental Impact Assessment to include a vetting process involving relevant stakeholders, and 2) compliance with the guidelines.</p>	<p>Extensive mechanical dredging, well beyond hand dredging, has been carried out in at least two locations at Turneffe Atoll without an EIA and in contravention of these guidelines.</p>
<p>Land without feasible access should not be developed and only minimal manual dredging for boat access should be allowed.</p>	<p>Dredging at various properties for the purposes of access has been carried out on Ropewalk Caye and in the Northern Bogue area.</p>
<p>Clearing of vegetation should be kept to a minimum and valuable littoral forest should be identified with GPS coordinates, clearly mapped and zoned for protection.</p>	<p>Clear cutting of mangroves has been carried out in several areas of the Atoll on various properties.</p>
<p>Preservation of seagrass beds should be a priority in all management decisions at Turneffe Atoll.</p>	<p>Damage to seagrass beds is observed in various locations at Turneffe Atoll.</p>



Due to the economic and ecological importance of Turneffe's fringe reef, patch reef and back-reef flats, management of Turneffe Atoll should ensure that the integrity and health of these areas is carefully protected.	Extensive damage to back-reef flats from dredging observed at Belize Dive Haven on Ropewalk Caye.
Tourism and residential developments should be required to provide detailed plans about how they will provide adequate fresh water which will not degrade natural fresh water resources used by wildlife.	Most resorts on Turneffe Atoll use a combination of water harvesting and desalination. Belize Dive Haven Resort at Ropewalk Caye has a significant rate of water consumption and is using both methods currently.
Rainwater collection, recycling of gray water, and other water preservation methods, should be utilized as much as possible.	Most resorts on Turneffe Atoll are using rainwater collection, as a matter of necessity including Belize Dive Haven Resort. Gray water recycling is currently only being done at Turneffe Flats.
Maximal use of solar and wind power is recommended, yet it is recognized that some fuel based power will be necessary.	Belize Dive Haven Resort at Ropewalk Caye is dependent on two large diesel generators and does not appear to be planning to use solar and wind power for electricity generation.
Power requirements should be minimized to the extent possible using power-saving measures and other efficiencies.	Power conservation measures at Belize Dive Haven Resort are unknown.
Fuel related contaminants must be disposed of responsibly and all tourism and residential development proposals should include responsible plans for these processes	Plan for proper disposal of fuel related contaminants at Belize Dive Haven Resort are unknown.
Underground septic tanks and soak-aways are not recommended as a means of handling liquid wastes.	Belize Dive Haven Resort at Ropewalk Caye is not planning to use underground septic tanks and soak-aways.
The use of above-ground septic tanks with drain fields in several of the development sites recommended.	Belize Dive Haven Resort has an above ground septic tank currently with injection wells planned.
The CZMAI recommends that developers must consult with the Central Building Authority on standards for the construction of above-ground septic tanks with drain fields.	Consultation of the CBA by Belize Dive Haven Resort unknown.

For tourism and residential developments, solid waste from toilets should be treated by means of an earth tub or similar type technology with the resulting compost used in landscaping. Open septic tanks should not be permitted for tourism or residential facilities and closed septic tank/drain-field systems should be permitted only with pre-approval from the Department of the Environment and Central Building Authority.	All resort facilities are complying or are in the process on becoming compliant with this guideline. Whether the Smith family vacation home would be compliant is unknown.
Gray water should be recycled and reused as much as possible.	Gray water recycling is currently only being done at Turneffe Flats.
Food waste from tourism and residential properties should be composted and used on-site as fertilizer.	The full extent of compliance with this guideline by all established resorts is unknown. Food waste management plans at Belize Dive Haven Resort unknown.
All hazardous waste, including batteries, tires, propellant cans and petroleum-based products, should be properly stored to avoid contamination and transported to the mainland for final disposal.	The full extent of compliance with this guideline by all established resorts is unknown. Plan for disposal of hazardous waste at Belize Dive Haven Resort is unknown.
Metal containers should be used for incinerating burnable inorganic waste, although such incineration should be done in a manner that is not a nuisance to neighbors. Large-scale resorts (yet to be defined) should be required to utilize incinerators for these purposes.	The full extent of compliance with this guideline by all established resorts is unknown. Plan for disposal of inorganic waste at Belize Dive Haven Resort is unknown.
There are no basic health care facilities on the atoll, and as such the guidelines stipulates that all residents should be prepared to provide at least basic medical care and resorts are encouraged to aid the wider community when needed.	The full extent of compliance with this guideline by all established resorts is unknown. Plan for the basic provision of health services at Belize Dive Haven Resort is unknown.

**CONFLICTS WITH EXISTING ENVIRONMENTAL LAWS AND REGULATIONS**

The TAMR Management Plan (2012-2017) recognized that “the increasing development pressures [within the Atoll] may lead to conflicts between user rights and the need to balance development with the conservation of the natural resources in this unique and fragile

environment.” It was therefore recommended that “the Atoll and surrounding deep waters be integrated into the conservation framework of the country as a marine protected area”.

The scale of the development at Belize Dive Haven Resort appears to conflict with the principal management purpose of the TAMR the Turneffe Atoll Marine Reserve, which is to “balance development with the conservation of the natural resources in this unique and fragile environment”. It is worthwhile to note that Ropewalk Caye lies within the TAMR General Use Zone, which lies outside the more critical protection zones, and allows for the sustainable management of existing uses. Nonetheless, the management plan notes the “existence of high connectivity between reef, seagrass and mangrove and a number of fishing banks and nearby replenishment areas” which make the General Use Zone a valuable and fertile fishing grounds<sup>28</sup>.

The project’s ECP on the other hand notes that “environmental clearance does not absolve the need [for the Developer] to obtain required permits and approvals from other relevant agencies”. However, the following rules and regulations of the General Use Zone appear to have been contravened during the construction of the Belize Dive Haven project. These rules are:

- a) No clearing of mangroves shall be conducted without the approval of the Forest Department and the Management Board.
- b) No dredging shall be conducted without the approval of the Fisheries Department and the Management Board.
- c) All proposed tourism development must go through the EIA process, and be conducted following relevant guidelines and legislation, with adequate monitoring.<sup>29</sup>

Probably most egregious of all, is that an EIA was not carried out for this development, even though the project fits the definition of a Schedule I project under the Environment Protection Act. Under Section 20 of the Environment Protection Act, any project that may significantly affect the environment requires an EIA.

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<sup>28</sup> TAMR Management Plan

<sup>29</sup> The size and extent of the Belize Dive Haven project should have required an EIA, even though the project started well before 2012. After the marine reserve was established, all development at Turneffe requires an EIA by law.

**Figure 5: Dredging of Back Reef Flats at Ropewalk Caye**



A full EIA is required for Schedule I projects<sup>30</sup>, which are those projects that are likely to have significant adverse impacts that may be sensitive, irreversible and diverse. Since Turneffe Atoll is now a marine protected area, all developments now require an EIA. Schedule I projects often have one or more of the following attributes that make the potential impacts significant:

- a) coastal erosion and the disturbance of the barrier reef;
- b) large-scale physical disturbance of the site and/or surroundings;
- c) direct pollutant discharges that are large enough to cause degradation of air, water, or soil;
- d) extraction, consumption or conversion of substantial amounts of forest and other natural resources;
- e) measurable modification of the hydrological cycle; and
- f) hazardous materials in more than incidental quantities.

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<sup>30</sup> Procedures Manual for the Preparation of an EIA in Belize, DOE (July 2011 version),

The ECP was reportedly prepared to “regularize” the project by the DOE in August 2014, well after construction on the project had been going on for at least 9 years.

While the Fisheries Department approved dredging for the access canal that goes from the inner lagoon to near the center of the property, the Department did not give its approval for dredging of the back-reef flats in front of the center of the property. The Department made it known to the developer that anything other than what was on the ground at the time required an EIA. That, apparently, is why the Department did not approve any further dredging by the developer<sup>31</sup>.

THE ECP WAS REPORTEDLY PREPARED TO “REGULARIZE” THE PROJECT BY THE DOE IN AUGUST 2014, WELL AFTER CONSTRUCTION ON THE PROJECT HAD BEEN GOING ON FOR 9 YEARS.

The Forest Department also reportedly granted only one mangrove clearance permit (in late 2015) for the runway/landing strip based on “an amended ECP which was given by DOE”, years after most of the mangrove clearing had

already been done (in 2005 and 2006). No other mangrove clearance permit has been granted for Ropewalk Caye since. The Forest Department has a record for late 2012 when they sought to charge the developer for illegal clearance. However, the Department did not proceed because the DOE should have instead charged the Developer with an offense since the penalties under the EPA are “more substantial”<sup>32</sup>. It appears that no charges have ever been brought on the developer.

The Belize Dive Haven project also appears to have contravened Clauses 6(3) and 25 of the Fisheries (Turneffe Atoll Marine Reserve) Regulations (see Section 4.3.3), which state (only relevant sub-clauses listed)<sup>33</sup>:

Section 6(3):

A person shall not engage in any activity which may cause negative environmental impact on species, habitats or ecosystems without written approval from the Fisheries Administrator.

Section 25:

A person shall not --

(a) remove from its place or disturb any species of flora or fauna, including rocks, dead corals, shells or sand unless authorized to do so in accordance with these Regulations;

<sup>31</sup> (pers. comm., Fisheries Administrator).

<sup>32</sup> (pers. comm., Chief Forest Officer).

<sup>33</sup> These contraventions would apply after 2012.

(c) discharge or deposit any toxic material, garbage or litter in the reserve.

## CONFLICTS WITH EXISTING MASTER PLANNING AND OTHER DEVELOPMENT PLANS

The construction of the Belize Dive Haven – a mega-scale tourism development compared to other resorts in Turneffe Atoll – started three years after the National Sustainable Tourism Master Plan (NSTMP) was approved. The development appears to breach all the provisions and guidelines of the Belize Reef tourism destination in the NSTMP as summarized in table 4 below.

**Table 4: Development Conflicts with NSTMP**

NSTMP Guidelines for tourism development within the Belize Reef region	Development activities at Belize Dive Haven Resort (Ropewalk Caye)
Tourism development should avoid any negative environmental and social impact.	Dredging of back-reef flats undertaken for land fill.
A mid-level growth in terms of overnights – low in sensitive sites – and low in terms of density.	At 90 regular rooms, 7 penthouse suites, two Olympic-sized pools, plus other support facilities, Belize Dive Haven is a high-density development, and is one of Belize’s largest hotels despite being in an ecologically-sensitive area.
Limit growth, only allowing it for necessary improvements to existing homes, resorts, lodges and other facilities.	Belize Dive Haven is a new facility, constructed three years after the NSTMP was developed.
Preservation of the Barrier Reef and all other marine habitats should be the primary concern when assessing any alterations to existing tourism investments.	Belize Dive Haven has irreversibly damaged a critical component of the reef system of Turneffe Atoll, as well as prime habitat for conch, lobster, bonefish, permit, tarpon, and other species.
Only allow improvements and small enlargements for existing tourism facilities to complete maximum growth allocated of 37 new hotel rooms.	Belize Dive Haven is a development consisting of 90+ rooms which is still under construction.
From 2012 to 2020, Belize Reef should not develop any additional hotel accommodation rooms.	Despite this guideline, construction of Belize Dive Haven started in 2004/2005, and continues to the present day.

From 2025 until 2030, Belize Reef could develop 37 new accommodation rooms in low density facilities. New investments are recommended to be made in facilities devoted to nautical, sun & beach and nature-based activities.	Construction of Belize Dive Haven has rendered this guideline redundant and useless.
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The Belize Dive Haven project on Ropewalk Caye, the Smith’s development in the Northern Bogue area (which is under a stop-order as of the date of this publication), and activities in the Cockroach Bay area are also contrary to the recommendations of the Growth and Sustainable Development Strategy (GSDS) and the National Biodiversity Strategy and Action Plan (NBSAP), as outlined in table 5 below.

**Table 5: Development Conflicts with National Plans**

National Development Planning Guidelines for tourism development within TAMR	Actual development and impacts at Ropewalk Caye, Northern Bogue area, Cockroach Bay
Efforts will be made to attract investors in hotel plants where the “all inclusive” hotel model will not be pursued. (GSDS)	At 90 regular rooms, 7 penthouse suites, two Olympic-sized pools, plus other support facilities, Belize Dive Haven is a high-density, all-inclusive development in an ecologically-sensitive area.
Tourism is “completely dependent for [its] sustainability on care of the environment and the integrity of Belize’s ecosystems”. (GSDS)	Belize Dive Haven has irreversibly damaged a critical component of the reef system of Turneffe Atoll, through the dredging of a large area of back-reef flats for land fill.  Vegetation clearance at the Smith’s property (Northern Bogue area) has destroyed about 5 acres of highly vulnerable littoral forests.  Vegetation clearance (deforestation of mangroves) has been carried out in the Cockroach Bay area.
Reduce haphazard and unplanned coastal development. (GSDS)	The Belize Dive Haven development was carried out without an EIA being conducted. An ECP was developed and approved by the DOE for said property to attempt to mitigate and control environmental impacts several years after development had commenced. As has been noted, the Belize Dive Haven

	development is wholly inconsistent with the NSTMP guidelines for this area of Belize. This development is a prime example of haphazard and unplanned coastal development.
Coastal forests (littoral forests) and beach vegetation (tropical coastal vegetation on very recent, moderately drained sediments) are highly vulnerable and deserve protection to help meet the 10% national target for littoral forest protection.	Littoral forest has been cleared at Ropewalk Caye, the Smith’s property (Northern Bogue area), Cockroach Bay, Blackbird Caye, Calabash Caye, Turneffe Flats, and other areas.

## AFFECTED STAKEHOLDERS OF TURNEFFE ATOLL

The impacts of unmanaged development extend beyond the natural environment all the way to the people who depend on the goods and services of the Atoll. As a matter of fact, there are



**COMMERCIAL FISHERMEN WHO USE THE TURNEFFE ATOLL FREQUENTLY COME MAINLY FROM BELIZE CITY, SARTENEJA, CHUNOX AND COPPER BANK**

several groups of stakeholders that benefit from the ecosystem services provided by the Turneffe Atoll.

The TAMR management plan identifies the principal stakeholders as traditional fishermen whose livelihoods are based on the marine

resources of the area namely lobster, conch and finfish. Along with this group are the fishing cooperatives who process and export products supplied by the fishermen. Commercial fishermen who use the Turneffe Atoll come mainly from Belize City, Sarteneja, Chunox and Copper Bank. They produce a substantial amount of the marine products in the country. Approximately two hundred or more fishers work in Turneffe on a regular basis, based from 25 active fishing camps that focus entirely on the Atoll, and approximately 20 sailboats that regularly fish the Atoll and are considered economically dependent on its resources. While there appears to be a production decline<sup>34</sup> from Turneffe, it still provides employment and income for many fisherfolks especially for Belize’s northern communities and Belize City.

Another affected stakeholder group is the tourism. This includes the tourism resorts at Turneffe that employ approximately 100 individuals, tourism operators from Belize City, San Pedro and as

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<sup>34</sup> Decline is based on sales to the processing Cooperatives. It could be that fishers are bypassing the Coops and selling directly to hotels, resorts and restaurants in greater numbers.



far away as Placencia who utilize Turneffe for scuba diving, snorkeling and sport fishing and employing tour guides and dive operator.

Researchers, mainly from the University of Belize (UB), and the Oceanic Society (OS) are another group who are important stakeholders of the Atoll. They regularly host Belizean and international students on field courses based on Turneffe. Conservation organizations also participate in field research in the area. Research activities product direct economic benefits at Turneffe Atoll.

The Fisheries Department, which regulates both fishery and spawning aggregation sites and are responsible for enforcement of Fisheries legislation, is also a stakeholder as they are the entity responsible for the management of the reserve. Working alongside the Fisheries Department is the Forest Department which is responsible for enforcement of mangrove legislation and protection of wildlife, such as the vulnerable West Indian manatee and the American crocodile.

Similarly, the Department of the Environment is responsible for regulation of development activities on the Atoll, and the implementation of the EIA process. The Geology and Petroleum Department is responsible for the regulation of dredging and oil exploration / extraction activities. In terms of tourism promotion and development, the Belize Tourism Board has an interest in the sustainable development of tourism on the Atoll.

According to the TAMR Management Plan, six communities on the Belize mainland are identified as key stakeholders in the Atoll area through tourism and/or commercial fishing. While there is no population center established on the Atoll, there are three all-inclusive resorts operating either seasonally or throughout the year at Turneffe with employees originating from communities across Belize. Whilst not considering key stakeholders in the TAMR Management Plan, several communities do benefit from the presence of employment opportunities at Turneffe.

While the stakeholders of the Turneffe Atoll are varied and diverse, those affected the most by the degradation of the resources are tourism stakeholders including those directly employed in the industry and the fisher folks from coastal communities. According to an economic valuation study done for Turneffe Atoll<sup>35</sup>, most of, much of diving at Turneffe Atoll originates from independent dive shops, dive shops operated by hotels or resorts outside of Turneffe, or from live aboard dive boats. A smaller percentage of diving activity is derived from the all-inclusive resorts at Turneffe. Sport fishing and eco-touring, on the other hand, mostly originates from the all-inclusive resorts on the atoll and relatively few traveling from off-atoll locations to fish or eco-tour. Tourists from cruise ships also utilize Turneffe Atoll for diving and snorkeling excursions.

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<sup>35</sup> Fedler, A. J. and Hayes, C. 2011. Economic Value of Turneffe Atoll, Human Dimensions Consulting, Florida, USA.



# THE IMPLICATIONS

## ECONOMIC FEASIBILITY OF THE BELIZE DIVE HAVEN PROJECT

This section presents a financial analysis of the Belize Dive Haven Hotel and Marina Resort. This development has had significant negative effects on the environment of the Atoll and falls outside of the type of tourism development envisioned for the Turneffe Atoll in the National Sustainable Tourism Master Plan. This development may not only be unsustainable from an environmental point of view but may also not be financially viable given the scale and the direct constraints presented by its remote location.

The case presented here is based on the components and features of the development obtained from the official Environmental Compliance Plan (ECP) prepared by the Department of Environment, first-hand observations during a site visit to the project and application of general financial principles. The ECP lists the main components of the project which were used to estimate costs based on local market prices. We do not have the specific details of the development and as such, this analysis is based upon standard construction and tourism industry standards rather than the actual costs of the development.

Estimate of costs are divided into fixed and variable costs of operations. Fixed costs include the cost of construction<sup>36</sup>, start-up, equipment, insurance, property taxes and wages and salaries. Variable costs on the other hand, include administrative, operating, maintenance, transportation and food and beverage.

The totals cost of construction is based on standardized building costs for the physical footprint of the building at 108,000 square feet and its various features based on the information provided in the project's ECP. Start-up and equipment costs are estimated based on the demand of the type of facility in place and services it intends to provide in a remote location. The replacement of equipment is estimated to occur every five years. Meanwhile, wages and salaries are estimated using employee to guest ratios from Belize Tourism Board (BTB) 2015 figures multiplied by the average salary per employee of a comparable resort in the area. Insurance cost is based on similar expenditures of resorts in the area and taxes are based on government real estate taxation formula of 1% of value of island property. Estimate of variable costs are based on similar facilities in the area, and the demands of the various features of the resort facility calculated per guest or per year as appropriate.

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### COSTS

FIXED		NOTES
CONSTRUCTION	\$19,896,250	Current quantity costs based on project features
START-UP	\$500,000	Lump sum estimate

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<sup>36</sup> Construction estimates were provided by a local engineer.

EQUIPMENT	\$300,000	Replace every 5 years
INSURANCE	\$100,000	Lump sum estimate
PROPERTY TAXES	\$2,350	Based on GOB annual valuation
WAGES & SALARIES	\$1,480,390	Based on average employee salary of similar resorts in the areas per year
<b>VARIABLE</b>		
ADMINISTRATIVE	\$25	Per guest
OPERATING	\$3,465,000	Annual
MAINTENANCE	\$1,015,688	Annual
TRANSPORTATION	\$100	Per guest
FOOD & BEVERAGE	\$25	Per guest

Revenue estimates are based on the number of rooms at the resort (97), and a varying occupancy rate for three different time periods, Years 1 – 5, Years 6 – 11, Years 12 – 30 and increasing over time. The maximum occupancy rate is based on BTB 2015 figures for average room occupancy. Guest days per year is the estimate of days the rooms are occupied from which revenue can be generated. This is calculated by multiplying the maximum occupancy by the occupancy rate for the entire year. This estimate was also done over the three phases and which increases over time.

NUMBER OF GUESTS	
MAX OCCUPANCY	97
OCCUPANCY RATE	
<b>YEARS 1 - 5</b>	35%
<b>YEARS 6 - 11</b>	40%
<b>YEARS 12 - 30</b>	45%
GUEST DAYS/YEAR	
<b>YEARS 1 - 5</b>	12,392
<b>YEARS 6 - 11</b>	14,162
<b>YEARS 12 - 30</b>	15,932

The price per guest or guest charges is estimated based the average room rates from BTB's 2015 figures. A 15% price increase for each time was used prices are generally expected to increase over time. The price per guest figure includes tour activities such as diving, fishing, eco-tours and lodging.

REVENUES	
PRICE/GUEST DAY	
<b>YEARS 1 - 5</b>	\$400

YEARS 6 - 11	\$460
YEARS 12 - 30	\$529

Cash flow for the investment has been projected over a 30-year period with year 0 being the year the initial capital investment is made with a residual value at the end of the period at 10%. The total cost of the project construction is estimated to be \$19,896,250. The cash flow analysis assumes that operations begin in year 1 which is when operating costs are included. Based on the projected revenue and estimated costs over a 30-year period, the project shows both a negative net benefit and discounted net benefit until year 30 when the discounted net benefit is \$95,391.23, using a discount rate of 10%.

The Net Present Value was calculated using the formula:

$$NPV = \frac{B_0 - C_0}{(1+i)^0} + \frac{B_1 - C_1}{(1+i)^1} + \dots + \frac{B_T - C_T}{(1+i)^T}$$

where:  $t$  = year,  $B$  = benefits,  $C$  = cost,  $i$  = discount rate.

The Net Present Value, which is the sum of the discounted net benefits over the 30-year period as shown by the formula above, is (\$36,812,689.64). This represents a net loss for the project over the period considered. Furthermore, the project has a negative rate of internal return at -13%. The Payback Period, which is the accumulation of present value of each until the cost of initial investment is recovered remains unachieved over the 30-year period. Considering the consistent negative cash flows, the developer will be unable to recover the initial investment making the project financially unfeasible within the estimated timeframe.

This is a conservative estimate as other features may be added before the facility becomes operational or there may be features which we are unaware of. There may be further increase in costs such as additional building materials that must be transported from the mainland to the island with a barge which will likely increase costs significantly.

The Belize Dive Haven Resort development is a major investment project that has been under construction for at least ten years and is yet to be completed. There is no published master plan for the development, and it is unclear when the project will be ready for business. From the

**THE NET PRESENT VALUE OF THE PROJECT IS (\$36,812,689.64) WHICH REPRESENTS A NET LOSS OVER A PERIOD OF 30 YEARS.**

outset, the project should have triggered an EIA, and based on the scale and location of the project in a sensitive marine protected area, the developer should have been required to submit a benefit/cost

analysis for the project. Using generally accepted accounting and financial principles and conservative estimates, the project is not likely to be financially viable.

## ECONOMIC IMPLICATIONS FOR THE FUTURE ECONOMIC VALUE OF TURNEFFE

The damages to and degradation caused to reef, back reef flats, mangroves, corals, sea grass and water quality at Turneffe Atoll put in jeopardy significant economic benefits derived from a healthy and functioning ecosystem. Turneffe Atoll contributes considerably to the economy of Belize and this comes mainly from its recreational value which depends directly upon a healthy environment. World class scuba diving and sport fishing, and the unique and diverse wildlife of Turneffe Atoll draws tourists from around the world and results in economic benefits totaling US\$36.9 million annually<sup>37</sup>.

Also, when considering **only direct expenditures** related to Turneffe Atoll tourism activities, and the fisheries benefits and storm protection values, the annual economic contribution of the atoll increases to just over US\$62.3 million<sup>38</sup>. Considering the **overall annual economic contribution** of Turneffe Atoll to Belize, which includes income and employment of fishers and taxes paid to the Government, the contribution exceeds US\$75.8 million<sup>39</sup>.

### THE OVERALL ANNUAL ECONOMIC CONTRIBUTION OF TURNEFFE ATOLL TO BELIZE EXCEEDS US\$75.8 MILLION.

Turneffe Atoll possesses about 14.7% of Belize's 116,136 acres of coral reefs and 11.7% of the 237,094 acres of the country's mangrove forests. Considering this, the value of Turneffe Atoll's storm

protection related to its coral reefs and mangroves totals US\$22.0 million and US\$16.2 million annually respectively<sup>40</sup>. The mangrove forests on the atoll are therefore an asset for Belize, particularly as it relates to the protection of Belize City.

The total economic impact of sport fishing for Bonefish, Permit and Tarpon in Belize in 2007 alone was estimated to be approximately \$56.5 million. Fishing activity associated with Bonefish, Permit and Tarpon generated slightly less than \$30 million in wages and salaries and supported

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<sup>37</sup> This study was done in 2011. The value has likely increased since then.

<sup>38</sup> Fedler, A, J. and Hayes, C. 2011. Economic Value of Turneffe Atoll, Human Dimensions Consulting, Florida, USA.

<sup>39</sup> Ibid.

<sup>40</sup> Fedler, A, J. and Hayes, C. 2011. Economic Value of Turneffe Atoll, Human Dimensions Consulting, Florida, USA.

1,864 full-time equivalent jobs. Total taxes paid to the Government of Belize by independent fishing guides and fishing lodges amounts to approximately \$2.3 million during 2007<sup>41</sup>.

Calculated at US\$587 per acre<sup>42</sup>, the loss of 52 acres of mangroves on Turneffe (47 acres at Ropewalk Caye and 5 acres at Northern Bogue) represents a loss in value of US\$30,524. This however only captures the benefits of mangroves through avoided losses from storm surges to the coastline. It does not capture other functionalities of mangroves such as habitats for birds and nursery areas for juvenile fishes. The already declining commercial fishery will certainly be negatively affected by the loss of habitats and impacts to the ecosystem on which commercial species, conch and lobster, depend. As the value of real estate on the coastline increase so will the value of coastal protection services provided by mangroves and coral reefs. The benefits over time will only grow larger. Inversely, the loss of those benefits or the damages and degradation that have been done to those same resources will become even more costly to the Belizean economy.

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<sup>41</sup> Fedler A J. and Hayes C, 2008. Economic Impact of Recreational Fishing for Bonefish, Permit and Tarpon in Belize for 2007. Human Dimensions Consulting, Florida, USA.

<sup>42</sup> Fedler, A, J. and Hayes, C. 2011. Economic Value of Turneffe Atoll, Human Dimensions Consulting, Florida, USA.

# CONCLUSION

The management of protected areas in general is rife with challenges. Even though there has been numerous efforts and established regulations to ensure the proper protection and conservation of the Turneffe Atoll, it has still been subjected to several improperly managed development activities with detrimental impacts on the environment.

Several approved guidelines have been breached and established regulations contravened. Additionally, notwithstanding the importance of the Turneffe Atoll for the tourism sector, development activities are taking place within the reserve that are incongruent with the spirit and letter of the National Sustainable Tourism Master Plan. Significant economic benefits for the Belizean are being put at risk by the degradation of the Atoll's resources.

These are major and serious challenges. Many of these challenges are related to lack of compliance with environmental regulations. On the inverse of this is lax level of enforcement within the reserve. It is possible that some of the non-compliance by developers should do with a lack of knowledge about what is expected in terms of environmental protection and sustainable development.

Some of the damages observed will take an extended period to reverse through regeneration, while others are simply irreversible. Nonetheless, there is still an opportunity to do course correction in terms of development within the TAMR and ensure that developed is approached sustainably. This, however, will require vigilance on the part of stakeholders and managers of the protected area and expanded awareness of the critical importance of protecting the valuable ecosystems within the Turneffe Atoll.