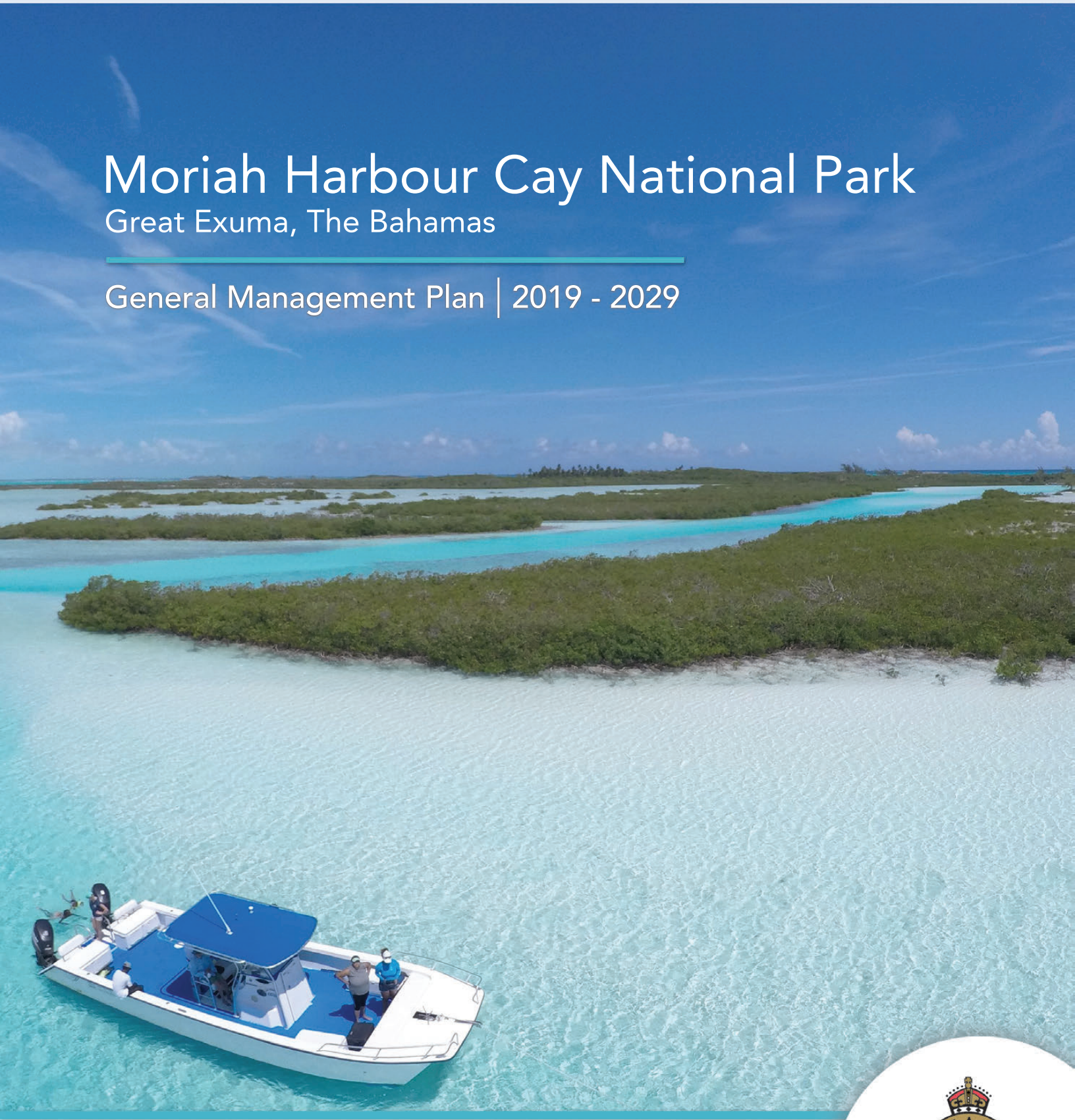
Moriah Harbour Cay National Park

Great Exuma, The Bahamas

General Management Plan | 2019 - 2029



The Exuma Foundation

BAHAMAS NATIONAL TRUST

Moriah Harbour Cay National Park
Great Exuma, The Bahamas

General Management Plan
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This document was developed under the Bahamas Protected project
with a grant from Oceans 5

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LIST OF ACRONYMS AND ABBREVIATIONS

AMMC	Antiquities Monuments and Museums Corporation
BNPAS	Bahamas National Protected Area System
BNT	Bahamas National Trust
BPAF	Bahamas Protected Areas Fund
CBD	Convention on Biological Diversity
DMR	Department of Marine Resources
ECLSP	Exuma Cays Land and Sea Park
EF	Exuma Foundation
EHCP	Elizabeth Harbour Conservation Partnership
IAS	Invasive Alien Species
IUCN	International Union for Conservation of Nature
MHC	Moriah Harbour Cay
MHCNP	Moriah Harbour Cay National Park
MOT	Ministry of Tourism
MPA	Marine Protected Area
PA	Protected Area
RBDF	Royal Bahamas Defense Force
RBPF	Royal Bahamas Police Force
SIDS	Small Island Developing States
TNC	The Nature Conservancy
UN	United Nations

1.0 Executive Summary

The General Management Plan for Moriah Harbour Cay National Park presents the long-term vision for the overall management of the Moriah Harbour Cay National Park (MHCNP) which spans 27,286 acres (approximately 42 square miles), protecting representative nearshore marine habitats that connect Great and Little Exuma. The planning process for MHCNP was undertaken through a collective partnership between the Bahamas National Trust (BNT), the Exuma Foundation, the Elizabeth Harbour Conservation Partnership (EHCP), The Nature Conservancy (TNC) and the government of The Bahamas.

This General Management Plan (GMP) details the vision, goals and objectives for the park and identifies broad issues and strategies for managing MHCNP. It is a living document, intended to be updated periodically and used as a tool to guide park managers in their efforts to manage the area effectively. The GMP provides information on the geographic location of MHCNP, the history of its establishment, how the area is used, park priorities, financial planning, zoning and other strategies that are key to successfully achieving the overall vision for MHCNP. The plan also provides opportunities for local and international visitors, teachers, and students, to support park efforts, explore, and experience the natural wonders of this complex and unique place.

The park was initially classified as a Category II protected area under the IUCN category system, but after extensive consultations with stakeholders, it was re-assigned as Category VI. It showcases ecologically diverse habitats; sand flats, tidal creeks, lagoons, mangroves, coral reefs, rocky and sandy shorelines, sand dunes, blue holes, and coastal plant communities. It also encompasses important areas for spawning, nursery, nesting, and migration of marine and terrestrial species, such as queen conch, spiny lobster, bonefish, white crown pigeons and other bird species.

The majority of MHCNP will be managed as a conservation zone, protecting natural resources and processes while accommodating compatible uses and experiences. Areas within the park that are unusually fragile, have limited geography, or provide seasonal habitat for vulnerable species will require area-specific protection. These areas will be managed as part of the sensitive resource zone and includes endangered Elkhorn and Staghorn coral, bird nesting areas, and bonefish habitat.

Management of MHCNP will require a staff compliment of eight persons for on-site park management and operations, science programmes, community education, and outreach activities. The GMP calls for collaborative management of the area between government agencies, nonprofit organizations, and the local community on Exuma.

Funding to finalize the GMP was provided by The Nature Conservancy with a grant from Oceans 5. Consultations for the development of the management plan began in 2013 and a significant consultative process was undertaken. It involved a broad range of stakeholders including local communities, tour operators, educators, scientists, the public, government agencies, community leaders, and protected area managers and experts, at the local and international level.

2.0 Introduction

2.1 Protected Areas

The Bahamas National Protected Area System (BNPAS) is a network of protected areas comprised of national parks and marine reserves (Figure 1). It is primarily managed by two agencies: the Bahamas National Trust (BNT)[1] and the Department of Marine Resources (DMR). Different features within the network may dictate full or co-management by The Forestry Unit, Antiquities Monuments and Museums Corporation, Clifton Heritage Authority and the Ministry of Environment & Housing (based on the Wild Birds Act).

There are three protected areas on Exuma, two national parks and one marine reserve:

- The Exuma Cays Land and Sea Park (ECLSP)
- Moriah Harbour Cay National Park (MHCNP); and
- Jewfish Cay Marine Reserve (JCMR)

The ECLSP was established in 1959, by an Act of Parliament that led to the formation of The Bahamas National Trust. It was the first protected area of its kind to be established in the Caribbean. Located in the Exuma Cays, ECLSP is bound by Wax Cay Cut at the north and Conch Cut at its southern boundary. It spans 174,194 acres (272 square miles) and supports healthy populations of marine species, which spill over into areas beyond its boundary supporting populations of commercially important marine species elsewhere.

In more recent times MHCNP and JCMR were established, with the creation of MHCNP in 2002. MHCNP is closest to Great Exuma, just south east of Georgetown with its southern boundary stretching along the coast and to the shores of the Forbes Hill settlement. In 2015 it was expanded from about 16,800 acres (approx. 26 square miles) to 27,286 acres (approximately 42 square miles).[2] Moriah Harbour Cay, the park's namesake cay, is the largest cay in the park. The surrounding area in the park boasts intact landscapes, sandy shores, blue holes, coral reefs, an array of wildlife, and important nursery habitats including tidal creeks, mangroves, wetlands, and seagrass.

In 2009, JCMR was established and is situated west of Great Exuma. It falls under the portfolio of the Department of Marine Resources and is designated as a no-take marine protected area. At 37,165 acres (58.07 square miles), JCMR was established to protect important mangrove, seagrass, and reef habitats; key habitats for bonefish and spiny lobster populations in the area.

ECLSP was the first protected area in the BNPAS for which a management plan was developed. Since its development in 2006, five other management plans have been completed, including the GMP for MHCNP. JCMR does not currently have management plan.

1 The Bahamas National Trust manages national parks under the Bahamas National Trust Act (1959) and its Amendment (2010).

2 The National Implementation Support Partnership declared the expansion of the BNPAS in 2015 (Bahamas National Implementation Support Programme 2015).

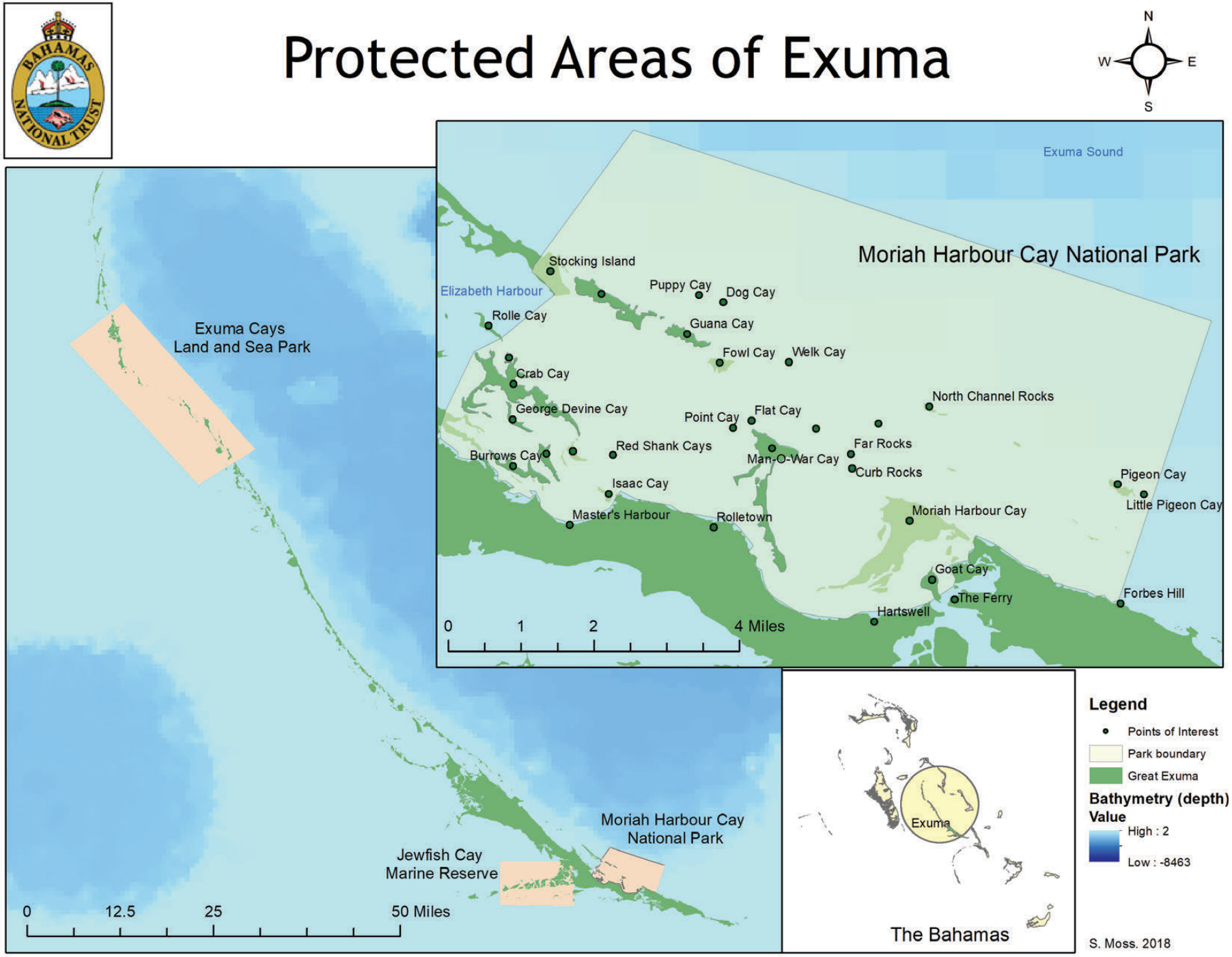

Figure 1. The Protected Areas of Exuma

2.2 History of MHCNP

As early as the mid 1980s concerned citizens began expressing the need to protect Moriah Harbour Cay and its surrounding areas. Led by Basil Minns, an avid birdwatcher, fisherman, and respected member of the community, a campaign was forged and gained momentum in the late 1990's. A broad spectrum of stakeholders got involved, including students and adults from across Exuma, wrote numerous letters to the Prime Minister and other government officials. They called for the Government to establish the national park and within months, the "Save Moriah Harbour Cay Project" had attracted a significant following and national attention.

Widespread support for the national park continued, with the Exuma Tourism and Environmental Advisory Committee, Local Government, bonefish guides, and other civic groups endorsing the effort. Exuma residents and other supporters wrote articles and letters to the editor about Moriah Harbour Cay and the need for a national park. Meetings were held on Exuma to discuss boundaries and rules for what would be a national park. It was agreed during these early sessions that traditional uses of the area would be maintained, including bonefishing and harvesting of silver top.

In April 2002, the Government of The Bahamas declared the area a national park, conveying Moriah Harbour Cay National Park (MHCNP) to BNT, along with nine other new national parks. The designation of the new areas effectively doubled the inventory of BNPAS, from approximately 320,000 acres to over 650,000 acres[3]. The following year, when the boundaries were gazetted for Exuma, Moriah Harbour Cay and about half of the proposed area was excluded. BNT and supporters of the original proposal continued to advocate for the excluded area and eventually succeeded. The expansion of MHCNP was approved in 2015, as part of a national declaration by The Government of The Bahamas.

The effort to save Moriah Harbour Cay, with its humble beginnings, evolved into a campaign that took the national stage. Its success is attributed to the tireless efforts of persons like Jane and Basil Minns, and many other concerned individuals, groups, and organizations that took part in the grassroot movement.

The area south of the bridge was recently identified as an area of interest in recent marine gap analysis and was proposed with protected areas in the 2018 White Paper[4]. The White Paper submitted to the Government proposes an expansion of MHCNP by an additional 5,349 acres (2,165 ha). If designated, the new expansion to MHCNP would encompass mangroves, tidal creeks, sand/mud, and seagrass in areas adjacent to (and south of) The Ferry settlement. The proposed area is a known nursery habitat for fish and lobster and includes expansive shallow water flats. These flats are critical habitats for bonefish, sea turtles, and the illusive Caribbean whiptail stingray. The proposed expansion would ensure the connected and thriving ecosystem is managed collectively.

2.3 Benefits of MHCNP

The marine and terrestrial environment of The Bahamas supports a diversity of species, many of which have economic, ecological, or cultural significance to local communities. However, these critical habitats are experiencing significant direct and indirect pressure from activities that undermine the ability of these systems to function. Promoting well managed and functioning ecosystems ushers in many benefits or services, not only for the environment, but also for the economy and people living in and around protected areas, like MHCNP. Effectively managed protected areas can continue to provide these ecosystem services and be sustained well into the future. Recent studies analyzing the economic value of ecosystem services in The Bahamas have found that within marine protected areas[5]:

- Nursery habitats contribute over $23 million to the Bahamian economy.
- Marine habitats, including coral reefs and mangroves, protect 39,000 people from coastal hazards[6] and $806

3 BNT Newsletter Currents Vol 8. No 1. June 2002 https://www.bsc-eoc.org/download/BNT-newsletter_June02.pdf

4 20 by 20 White Paper: Marine Protection Plan, proposes a set of 43 areas to protect important marine resources across The Bahamas and achieve the country's 20 by 20 goal, which the Government of The Bahamas has committed to doing. These areas were selected based on the best available science from the marine gap analysis and through an extensive stakeholder consultative process, supported by an active PR campaign.

5 The IUCN defines a marine protected area as an area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of its enclosed environment.

6 Coastal hazards include storms and sea-level rise

million in annual income for those people.
    - » The three (3) protected areas on Exuma protect 1,482 persons from coastal hazards and saving the same people almost $16 million dollars in annual income.

- Visits to marine protected areas annually account for $67 million in tourist expenditures. MHCNP is the seventh most visited marine protected area in The Bahamas and ranks 6th in visitor expenditure; and
- Mangroves and seagrass store 400 million metric tons of carbon equating to over $5 billion in avoided damages from global carbon emissions.

MHCNP contributes about 1 million metric tons or $12 million in avoided damages.[7]

Some of the direct and indirect social benefits of MHCNP are listed below and in Table 1 include:

- Increasing catch (spill over) benefits beyond park boundaries,
- New and diversified opportunities for local economies,
- Coastal protection for communities from hazards like storms,
- Enhanced tourism and recreation products,
- Assistance with managing conflicts between stakeholders in MHCNP,
- Improved public access and infrastructure to MHCNP,
- Ensured management and accountability for park resources and activities,
- New training and capacity building opportunities for communities, and
- Increased opportunities for learning about the local environment and sharing knowledge.

7 Arkema, K., D. Fisher, K. Wyatt. 2017. Economic valuation of ecosystem services in Bahamian marine protected areas. Prepared for BREEF by The Natural Capital Project, Stanford University.

Table 1. Benefits of Moriah Harbour Cay National Park.

Park Benefits	**Benefits of Moriah Harbour Cay National Park**
Fisheries	Protection of the life cycle of numerous species including commercially important marine species (Nassau Grouper, Spiny Lobster, Queen Conch, and species of Snapper). Channels between Moriah Harbour Cay and the islands of Great and Little Exuma have some of the highest post-larval recruitment rates in The Bahamas for Spiny Lobster and Nassau grouper. These nurseries likely support fisheries in the Great and Little Exuma and Long Island areas.
Non-Fisheries	Supporting nature-based recreational activities (such as scuba diving, snorkeling, flats fishing, and bird watching). Promoting sustainable livelihoods opportunities for the local community. Creating new and diversified economic opportunities for Exuma. Improving access and enhancing visitor experiences. Allowing for the harvesting of renewable and non-renewable resources.
Management Opportunities	Facilitating enforcement and compliance to laws and regulations in management of MHCNP. Supporting stakeholder involvement. Reducing user conflicts. Creating partnership opportunities in the public and private sectors. Enhancing the management effort in existing protected areas on Exuma.
Education Opportunities	New opportunities for training and capacity building for local communities. Providing outdoor classrooms, long-term monitoring areas, and sites for high-level graduate education and research. Opportunities for short and long-term research on species and ecological systems.
Historical and Cultural	Maintaining traditional uses and activities that have benefited local communities for generations. Enhancing aesthetic experiences in MHCNP and improved public relations can promote preservation of fragile ruins and historical knowledge facilitating cultural resource management.
Process	Providing physical refuge for species, maintaining global climate regulation and sustaining evolutionary processes
Ecosystem	Maximizing ecosystem and coastal resilience. Ensuring biodiversity protection and maintaining food webs. Promoting water quality. Coral reefs, mangroves, wetlands, tidal creeks, and seagrass beds are important for ecological functioning. Larval recruitment to Moriah Harbour Cay is likely to be so high because the area possesses the combination of high larval influx from oceanic gyres, that retain larvae in the southern part of Exuma Sound, and a broad area containing high quality juvenile habitats.
Natural Population	Protecting natural population structure, genetic resources and spawning populations of Elkhorn coral (Acropora palmata) and Staghorn coral (A. cervicornis), which have been in decline across the wider Caribbean region for over three decades, and are considered threatened or endangered in many places, are found in MHCNP. Their numbers are now limited in The Bahamas.
Species	Protecting keystone, slow-growth, and migratory species. Serving as a refuge for an abundance and diversity of marine fauna and flora that breed, rest, shelter, or feed within MHCNP, preventing loss of vulnerable species, a number of which are considered threatened or endangered nationally and internationally (see Appendices for list of species).

2.4 Management Planning Process for MHCNP

The goal of the management planning process is the development of a general management plan (GMP) for a designated protected area (Figure 2). For Moriah Harbour Cay National Park (MHCNP), it began with the formation of a Management Planning Team (MPT) in 2013. Team members were selected based on their affiliation with the park, The Bahamas National Trust (BNT), related expertise or agency's mandate. In the summer of 2015, news of the expansion of MHCNP reinvigorated the MPT, which was raising awareness and support for MHCNP at the time. Under the guidance of the MPT, BNT advanced its management planning efforts for MHCNP. The management planning process was officially initiated under the Bahamas Protected project in 2017, with the engagement of local, national and international stakeholders. Funding to finalize the GMP was provided by The Nature Conservancy with a grant from Oceans 5.

A literature review, site visits, and a series of stakeholder engagements were carried out to compile existing data and information for MHCNP. Stakeholders included local communities, the private sector, local and central government officials, non-profit groups, scientists and educators. BNT used a participatory approach to engage key stakeholders on Exuma. These consultations were focused on documenting current uses and threats, potential opportunities, challenges, visions and expectations for park management. It also allowed BNT to identify critical issues, answer questions, and address the concerns of the community. Throughout the process, stakeholders provided insight and input on the suitability of locations for park infrastructure, mapping and zoning considerations.

By the end of 2017, a first draft of the GMP was distributed to various stakeholder groups and the general public. Local community meetings, focus groups, and one-on-one consultations were held with key stakeholders to gather input on the draft GMP. BNT council members, local partner organizations and project partners also provided feedback. The input received was incorporated into a revised draft plan in 2018, which BNT took to stakeholders on Exuma once again for feedback.

The second draft was also made available to the public through print and electronic media. After the 30-day public commenting period was concluded, the final draft of the GMP was prepared and submitted to the BNT Council, government agencies, and partners for approval. The final GMP for MHCNP represents a concerted effort led by the MPT and BNT with support from Exuma residents, project partners, scientists, government agencies, as well as, local and international experts in park management and planning.

The next steps on the management planning process includes the development of a 5-year strategic plan and an annual work plan and budget. The planning process for MHCNP was advanced through a collective partnership between the Bahamas National Trust (BNT), the Exuma Foundation, the Elizabeth Harbour Conservation Partnership (EHCP), and The Nature Conservancy (TNC).

Management Plan Process

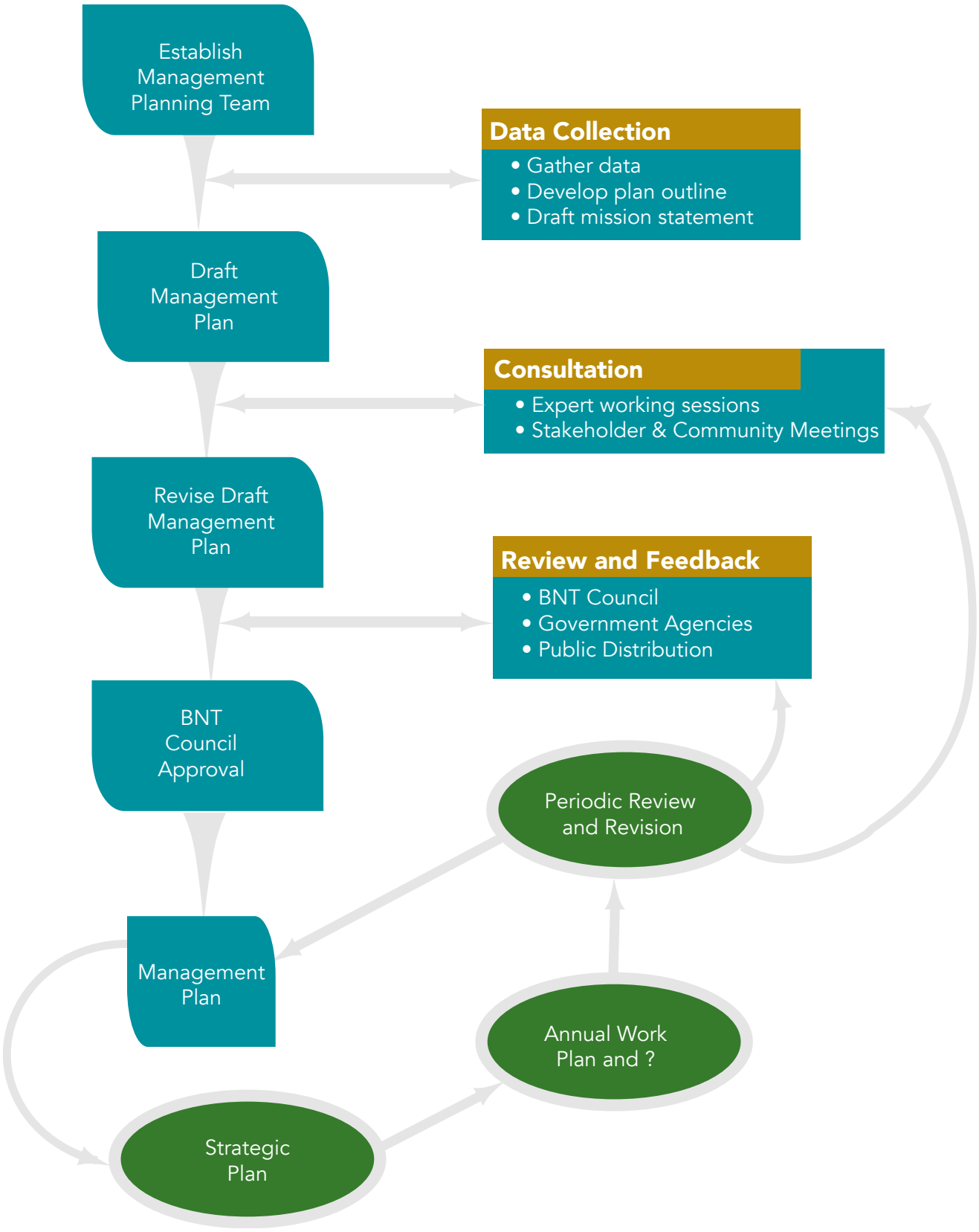

Figure 2. BNT's General Management Planning Process

3.0 Description of Moriah Harbour Cay National Park

3.1 Geographic Location

Exuma, with its chain of 365 islands, cays, and rocks, is located east-southeast of New Providence and stretches approximately 150 miles southeast towards western Long Island. It is situated on the Exuma Bank and is bordered on the north by Exuma Sound. The northern extent is referred to as the Exuma Cays and the south is comprised of Great and Little Exuma and the adjacent cays. Just north of the tidal creek that separates Great and Little Exuma is Moriah Harbour Cay (MHC). In addition to MHC is an assemblage of small islands, cays, rocks, and shallow reefs, all serving as natural barriers protecting the mainland from the unremitting wave energy of the Exuma Sound. The climate throughout The Bahamas is tropical, with mean monthly temperatures in George Town, Great Exuma of 22-28°C. Temperatures in the cays and Great Exuma are tempered by the persistent northeast trade winds. There are only two distinct weather seasons in The Bahamas: summer (May-September) and winter (October-April).

Moriah Harbour Cay National Park (MHCNP) is located southeast of Georgetown and north of The Ferry settlement on Little Exuma (Figure 3). The extent of the park encompasses over 27,286 acres of nearshore marine habitats, several cays and rocks, including Moriah Harbour Cay, 50 acres on the east end of Stocking Island (within park boundaries) and the shallow banks and reef north of Moriah Harbour, and out to the depths of Exuma Sound. The largest cays within the park are Crab Cay, Man-O-War Cay, Elizabeth Island, Fowl Cay, and Pigeon Cay.

The leeward side of Moriah Harbour Cay is protected from strong winds and is comprised of a lagoon, creeks, mangroves and wetlands, all tidally influenced. Shifting sand bars also dominate the shallow waters on the leeward side of Moriah Harbour Cay, where movement and expansion of sand bars can be observed through historical photos and satellite imagery. The southeastern boundary of Moriah Harbour Cay is comprised of shallow sand plains, tidal creeks, mangroves, and sparse seagrass. Goat Cay is located on this southeastern boundary of the park, but was not included in the designation.

The benthic habitat between Moriah Harbour Cay and nearby Man-O-War Cay (not included in the park designation) to the west is primarily shallow sand bars interwoven with sparse seagrass. This area and the sand bars, which run west of Man-O-War Cay, are strongly influenced by tidal activity. West of Man-O-War Cay, in the southwestern portion of the MHCNP are several cays less than a mile from mainland Exuma. They include Crab Cay, Little Crab Cay, George Devine Cay, John Devine Cay, Burrows Cay, and Red Shank Cays. The benthic habitat in this portion of the park is similar to that of Man-O-War and Moriah Harbour Cays, except for the presence of blue holes.

The northern boundary of MHCNP stretches from Stocking Island (in the northwest) to Forbes Hill and extends northeast to the 100-fathom line. This area is characterized by non-reef flat, gorgonian, and Montastrea habitats and extends to depths of 30 to 1,000 meters (approx. 98-3,280 feet). The 2018 White Paper proposes an expansion of MHCNP (including Goat Cay) by an additional 5,349 acres to encompass mangroves, tidal creeks, sand/mud, seagrass, and expansive shallow water flats (Figure 4).

Moriah Harbour Cay National Park

Figure 3. Map of MHCNP

Moriah Harbour Cay National Park

Existing Boundary & Proposed Expansion (2018)

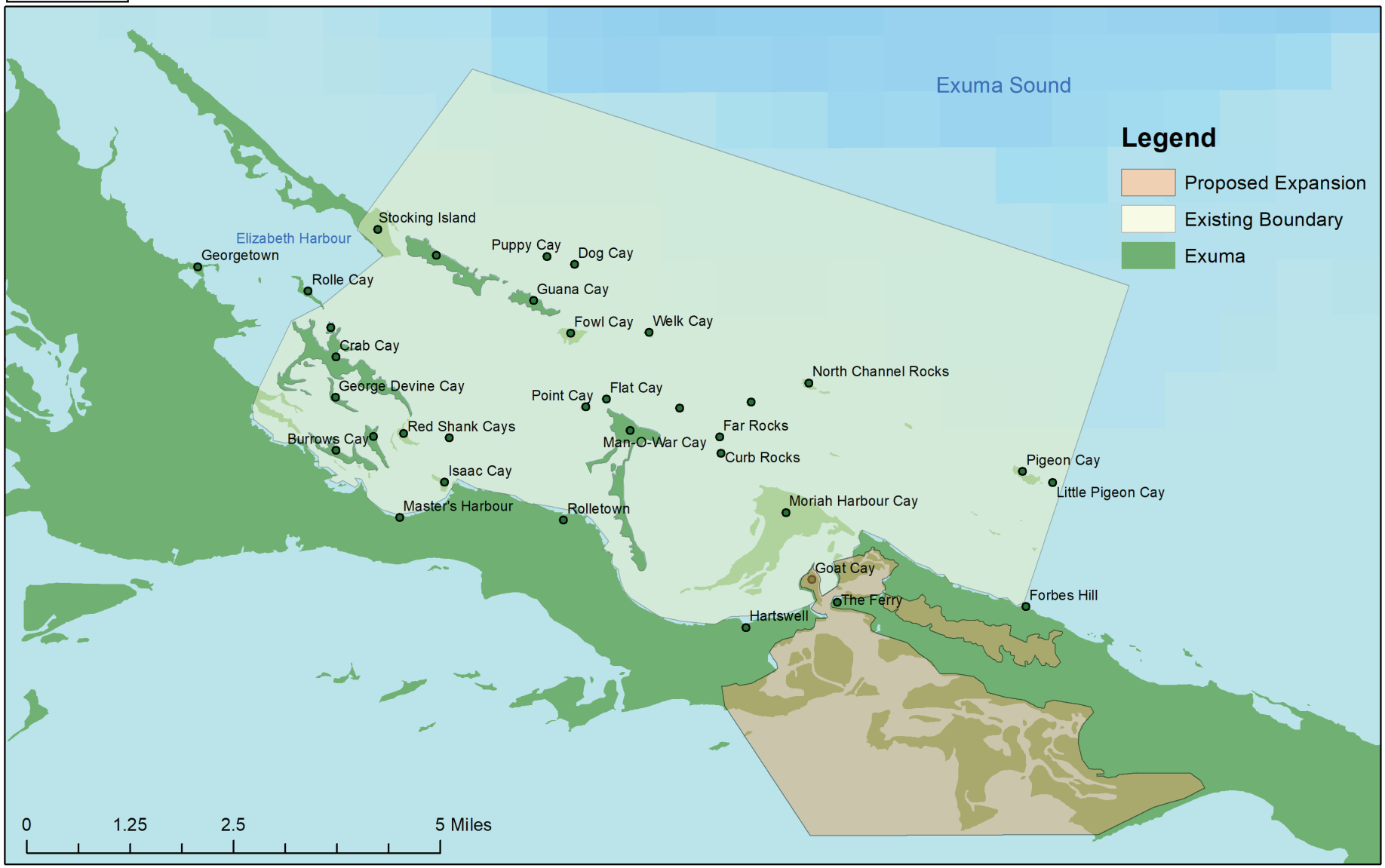

Figure 4. Map of MHCNP Proposed Expansion

S. Moss. 2018

3.2 Socioeconomic Context

According to the most recent census, the Bahamian population is over 350,000 and Exuma's population represents less than 2% of that estimate. While the overall growth rate of the Bahamian population continues to decline over the past two decades, Exuma has shown substantial growth. Since the 2000 census, the population grew from 3,571 to 6,928 (a growth rate of 94%), representing the highest rate of all Bahamian islands. The ratio of males to females on Exuma is almost equal, whereas male to female ratios tend to be high countrywide.[8]

The Bahamas has an annual poverty line of $4,247 per person and over 17% of the Exuma population lives below the poverty line, about five percent higher than nation-wide figures. However, employment rates on the family islands, including Exuma, are higher overall than on New Providence and Grand Bahama[9]. On the family islands, at least 50% of the population have a per-capita expenditure of less than $7,686.[10] About one third of persons on Exuma are under the age of 15 and about 13% are over 65 years of age (the highest in the country). The majority of the working class is 25-44 years of age, followed closely by those 45-64 years-old. About 20% of the employed did not complete high school, but a significant portion is self-employed, at the subsistence level. The primary economic drivers of the local economy are tourism and fishing. Almost one quarter of persons are employed by the government and about 50% work in construction, wholesale/retail, and the hotel/restaurant industries. Only about 13% work in agriculture and the fisheries industry.[11]

Over 75% of residents own the home in which they live and there are approximately 2,900 dwellings on Exuma's islands and cays. Georgetown is the economic and population hub of Exuma, with over 1,400 residents and the majority of the economic activity occurring in the settlement. There are seven settlements that fall within or are adjacent to MHCNP, with a combined population of less than 500 residents: including Hartswell, The Ferry, Forbes Hill and Rolle Town (Figure 3). The land area of Exuma is 110 square miles and the distribution of the population is 62 persons per square mile. Exuma has no public transportation and private transportation services are costly (most expensive in the country).

Exuma consistently has over 32,000 stopover visitors[12] each year, the majority of which are from the United States, Europe, and Canada. The average length of stay for stopover visitors to Exuma is eight nights and it has one of the highest rates of stopover visitors who are repeat visitors[13]. In 2013, the two primary reasons visitors came to Exuma was for vacation or to enjoy their honeymoon. They chose Exuma because of the beaches, climate, the perception that they could relax while there. Of all the islands in The Bahamas, Exuma has the highest visitor satisfaction rate.

The islands, rocks and cays within MHCNP have few residents. The majority are crown land (government-owned), undeveloped and uninhabited. Privately owned lands have few, and in most cases, no residents. The eastern end of Stocking Island is crown land and included in the park designation. The remained of the Stocking island is a mix of crown and private land. Table 2 shows land ownership details for MHCNP, specifically which areas are included in or excluded from the park designation.

A number of rocks are scattered throughout the park, many of which are unnamed. Small cays and rocks less than an acre in size have not been included in Table 1. They are; Welk Cay, Middle Channel Rocks, South Channel Rocks, Far Rocks, Curb Rocks, Flat Cay, Point Cay, Red Shank Cays. There are sixteen (16) islands and cays that range between one and five hundred and fifty acres in size. Of the sixteen, ten (10) are Crown land and six (6) private land.

8 Department of Statistics: 2010 Census of the Population

9 No Exuma specific statistics are available for employment rates

10 Statistics for Exuma and Long Island are group as one region in the Bahamas Living Conditions Survey 2001

11 Department of Statistics: Bahamas Living Conditions Survey 2001

12 The term "stopover visitor" is used interchangeably with "visitors" as Exuma does not have a cruise port/visitors

13 Ministry of Tourism: Stopover Customer Evaluation, Exit Study Report, Main Findings 2007

Table 2. Land Ownership within the MHCNP

LAND OWNERSHIP WITHIN THE MHCNP BOUNDARY

ISLAND/CAY/ROCK	SIZE (APPROX. ACRES.)	PRIVATE OR CROWN LAND	INCLUDED IN PARK DESIGNATION
Moriah Harbour Cay	550 acres	Crown	Yes
Crab Cay	245 acres	Private	No
Man-O-War Cay	200 acres	Private	No
Elizabeth Island	98 acres	Private	No
Stocking Island (East)	50 acres	Crown	Yes
Guana Cay	35 acres	Private	No
Burrows Cay	31 acres	Private	No
Goat Cay	29 acres	Crown	No
John Devine Cay	25 acres	Crown	No
Fowl Cay	25 acres	Crown	Yes
Pigeon Cay	21 acres	Crown	Yes
George Devine Cay	11 acres	Crown	No
Little Crab Cay	4 acres	Private	No
Red Shank Cays	3 acres	Crown	Yes
Isaac Cay	1 acre	Crown	Yes
North Channel Rocks	1 acre	Crown	Yes

3.3 Biological Features

The marine and terrestrial habitats of Moriah Harbour Cay (MHC) area and the adjacent Exuma mainland are typical of islands in the central Bahamas; with rocky headlands, sandy beaches, and coral reefs on the windward (east) side, and seagrass beds and sandy areas on the leeward (west) side. These habitats are present throughout the Exuma chain and are connected physically and ecologically, which is evident of intact coastal ecosystems. Moriah Harbour Cay National Park (MHCNP) provides critical 'reef to ridge' ecosystem connections for a variety of marine and terrestrial species (Figure 5).

The Government of The Bahamas established the MHCNP in 2002 because of the intrinsic value of the marine environment. The areas around MHC are home to diverse populations of bird, fish and other marine species, and are ecologically important serving as nursery and nesting areas. As a nesting area, it is important to a variety of seabirds and shorebird, including plovers, oystercatchers, gull-billed and least terns, nighthawks, and resident pair of ospreys. Seagrass beds, mangroves, creeks and lagoons are vital nursery habitat for juvenile crabs, queen conch, groupers, snappers, and spiny lobster. Terrestrial habitats are comprised of intact buttonwood, palmetto, sea oats, and other plant species found in healthy coastal ecosystems in The Bahamas.

Terrestrial Habitats

Beach strand and Dry Broadleaf Evergreen Formations (DBEF) or coppice are the primary plant communities found throughout Moriah Harbour Cay National Park (MHCNP). Coastal disturbances, including hurricanes and storms, strongly influences plant composition. Coppice communities consist of trees, shrubs, and herbaceous plants. MHC and most of the other islands and cays within composed of rocky shorelines scattered sandy beaches and dunes, wetlands and mangroves, silver tops, some with shallow brackish to saline lagoons, and some coppice. Coppice is present throughout MHCNP, with formations ranging from the shore to the interior of islands. Whiteland coppice, occurring in the sandy and organic soils, while blackland coppice is found further inland and usually at higher elevations.

The windward sides of the larger islands and cays within the park consist of rocky headlands and dunes with vegetated plant habitats. MHC offers stunning aesthetic land and seascapes, with intact native coastal plant populations, including sea oats, bay geranium, purple seaside bean, goat's foot, sea purslane, sea grape, bay cedar, and numerous vines and grass species. Further inland buttonwood, white mangrove, and palmetto cover the landscape. The low energy leeward side of MHC contains sandy beaches and lagoons lined with black and red mangroves and small pockets of shrubs. Resident and migratory bird populations depend on these habitats for nesting, roosting, and feeding, and can be found in abundance throughout the park. Amphibians and reptiles also utilize these habitats. Mangroves grow throughout Moriah Harbour Cay National Park (MHCNP) along tidal creeks, inside lagoons, and in nearshore environments along mainland Exuma. These habitats serve as nurseries, filter pollutants, and stabilize sediments. Red, black, white, and buttonwood are present throughout the park.

Marine Habitats

At over 550 acres, Moriah Harbour Cay is the largest and most biologically diverse cay in the Park and was the inspirational factor that galvanized local residents to petition The Government of The Bahamas to declare the area as a national park. On the windward side, Moriah Harbour Cay has similar features as other barrier islands, with a sandy beach, dune, and rocky headland. The benthic habitat to the north is a mix of hard bottom, sandy bottom, and seagrass beds. Several hard bottom areas have coral reef communities; turf algae and soft coral dominate others.

Blue Holes

There are ten blue holes[14] within the boundary of MHCNP, congregated in the southwestern part of the park. Blue hole experts propose that many are connected to each other, making these sensitive habitats vulnerable. An area of particular interest is Crab Cay (privately owned) where four marine blue holes are present a few feet from the shoreline. Cave walls are completely covered with encrusting sponges, hydroids and hydrocorals; these caves are home to a myriad of marine fishes and crustaceans. These caves are also tidally influenced, with reversing currents on incoming and outgoing tides.

Forereef

In The Bahamas there are three major reef zones—reef crest, patch reef, and fore reef—each with its own set of species. The reef crest is where waves may be seen breaking offshore (barrier reefs) or near rocky shorelines (fringing reefs). This zone can be formed by large stands of branching Elkhorn coral. In lagoons sheltered by reef crests are patch reefs, small reefs that rise above the surrounding seafloor. The forereef area extends from the drop-off at the edge of the island shelf at depths of 30 - 40m (approx. 98 – 131 ft.) and extend up the reef slope to depths of 5m or less. The *Orbicella* plains found in MHCNP extend outside the park in both directions.

Hardbottom

MHCNP has significant areas of rocky substrate, with little hard coral living and extensive gorgonian (sea fans and whips) plains, sponges and other benthic organisms present. These hard bottom communities, commonly referred to as shoals, occur seaward of the reef crest towards Exuma Sound. While they are generally lower in fish diversity than coral reef habitats, these habitats may harbour significant abundances of several fish species, including juvenile Nassau grouper.

Patch Reefs

Patch reefs also form on shallow banks as can be seen in the area between the cays and islands in the northeast part of the park and the cays in the middle of the park. Patch reefs are scattered across areas northeast of Moriah Harbour Cay. Offshore from the reef crest is the fore reef, which extends out to the drop-off and into Exuma Sound.

Reef Crest & Back Reef

Reef crest habitats are areas where the forereef reaches the water surface. This habitat is characterized by large coral formations interspersed with deeper (3-5m) channels. The zone usually has high surge and wave energy. Reef crests are typically found where some of the massive corals transition to large branching corals, particularly *Acropora palmata*, and smaller brain or mounding corals, such as some *Diploria spp*. and Porites astreoides. Algae in this zone include some of the heartier species, such as *Sargassum spp*. and *Turbinaria spp*., as well as other fleshy macro-algae and crustose coralline algae. These habitats can be found in areas between two islands or cays, such as Guana Cay and Elizabeth Island.

14 A blue hole is a submarine cave or sinkhole that develops in carbonate banks and islands. They are open to the earth's surface; contain tidally influenced waters of fresh, marine, or mixed chemistry; extend below sea level for a majority of their depth; and may provide access to cave passages.

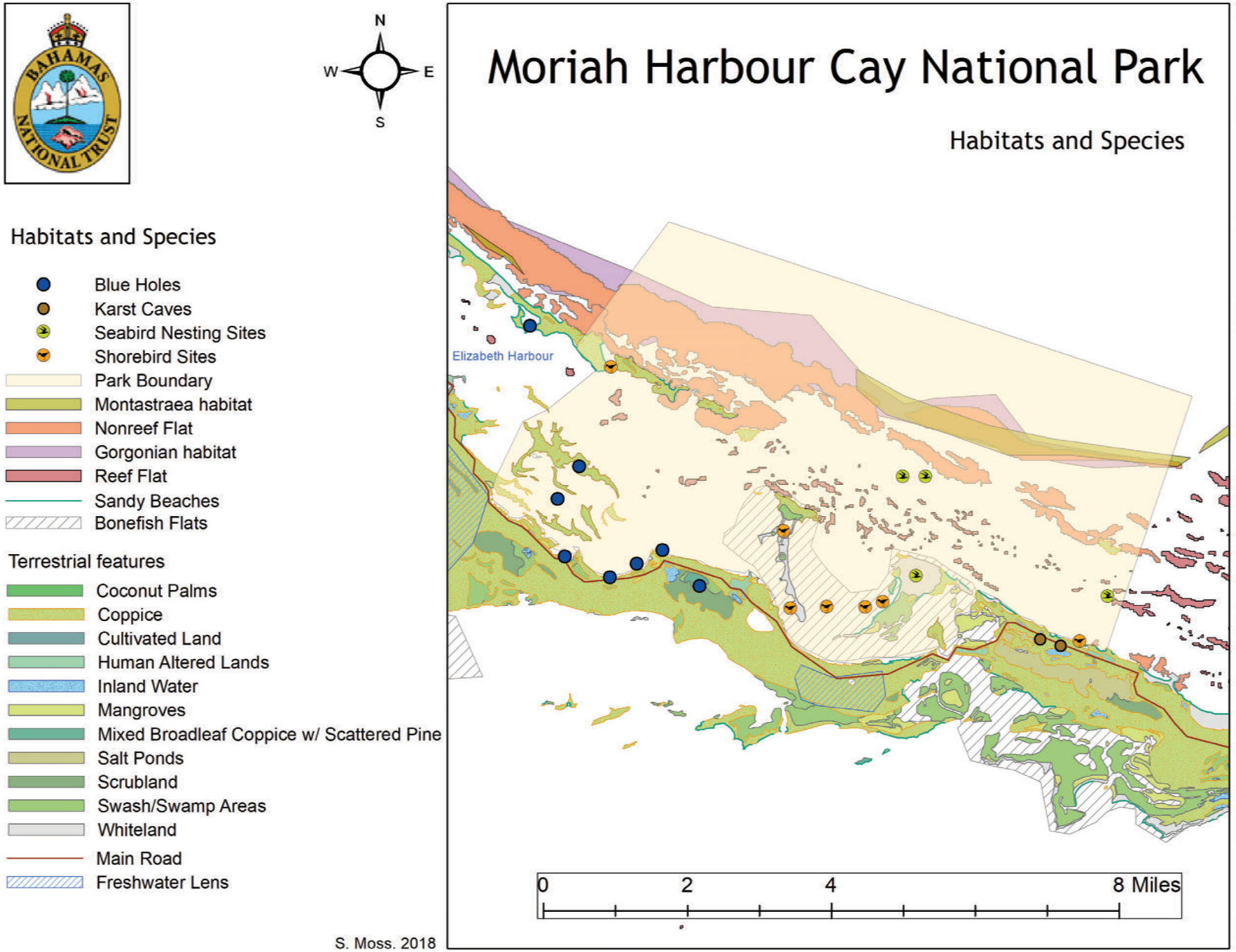

Figure 5. Map of Habitats and Species within MHCNP

Sand

Sand plays a significant role as a habitat in MHCNP. Sand banks and sandy creeks and channels are home to an abundance of marine animals in MHCNP, the vast majority of which remain well hidden beneath the sand during daylight hours. Various fish species that refuge in mangroves or seagrasses feed in the sand. Over time, the natural process of sand movement within MHCNP has modified the seascape in certain areas. Some changes have been temporary and others more permanent.

The most dramatic example is at MHC where sand accretion over time has connected small cays, on what is now the northwest and northeastern ends of the island. Bands of vegetation can be observed from satellite imagery, demonstrating the buildup of sand, formation of dunes, and establishment of plant communities. Further south, along the western side of MHC, shifting sand has created a well-defined sand dune and beach, which was not documented in the resource maps completed for The Bahama Islands in the 1970s. Additionally, sand movement affects sand flats, creeks, channels, and shorelines throughout the park.

Seagrass Beds

The waters of MHCNP contain various species of macro algae and seagrasses, marine vegetation vital to the health of the ecosystem. Seagrasses are a specialized group of marine plants that can be found throughout MHCNP. Dense seagrass can be found on the south side of Stocking and Elizabeth Islands. Seagrass beds form a distinctive habitat type that serves as home and/or primary foraging grounds for many rare and valued species of fish and invertebrates; common inhabitants include queen conch, spiny lobster, snappers, and grunts. For larger fishes, there is scarce shelter here above the grass blades. Thus, the animals active in seagrasses by day are mainly small invertebrates and fishes that rely heavily on concealment, typically either through camouflage or burrowing. Juvenile fish of many species are able to utilize the limited shelter available in seagrass beds as does the economically important mollusk, the Queen Conch, and other species that may have some commercial value, such as sea cucumbers. Seagrass habitat is also important for green turtle species which forage seagrass beds.

FAUNA

Birds

Species include shorebirds, such as the endangered piping plover, seabirds, and birds of prey, all of which can be found nesting, roosting, feeding, or migrating through MHCNP. Important areas for shorebirds and seabirds include: Stocking Island (east), Crab Cay, Man-O-War Cay, MHC, North Channel Rocks, Pigeon Cay and Little Pigeon Cay. Nesting areas can be found on islands, cays, and rocks throughout the park, particularly MHC, North Channel Rocks, Pigeon Cay and Little Pigeon Cay.

Bonefish, *Albula vulpes*

In addition to Nassau grouper and spiny lobster, bonefish of all ages and sizes have been reported in the sand bars around Moriah Harbour Cay. The low energy beaches and sand flats adjacent to seagrass, mangrove and channel habitats provide bonefish with the full range of habitats they require throughout their life cycle. These areas extend beyond the boundary of the park through the channel separating Great and Little Exuma and onto the west sides of Great and Little Exuma.

Caribbean spiny lobster, *Panulirus argus*

The area around Moriah Harbour Cay (MHC) is home to diverse fish and benthic communities and harbor many key species. Channels between MHC and the islands of Great and Little Exuma have some of the highest post-larval recruitment rates in the Bahamas for Caribbean spiny lobster and Nassau grouper. Preliminary results of 2006 research indicates that the MHC area had the highest recruitment rates of all sites surveyed in the Bahamas during the survey period and are among the highest recruitment rates ever reported from the Bahamas (second only to studies conducted from Cat Island more than 10 years prior). Recruitment to Moriah Harbour Cay is likely to be so high because the area possesses the combination of high larval influx from oceanic gyres that retain larvae in the southern part of Exuma Sound, and a broad area containing high quality juvenile habitats. These nurseries are likely to support fisheries in the Great Exuma, Little Exuma and Long Island areas.

Caribbean whiptail Stingray, *Himantura schmardae*

Little is known about the taxonomy, population, and distribution of the Caribbean whiptail stingray. It is categorized as a species for which almost no data exists, according to the IUCN Red List. Several small specimens and a stingray egg case have been observed in the lagoon area of Moriah Harbour Cay. There were no records of the species as far north in the Atlantic as Exuma until 1968 when Basil Minns provided two specimens to the Academy of Natural Sciences in Philadelphia for identification. Forty-eight years later efforts by scientist to fill the knowledge gap for this species revealed a large aggregation, some 17 large adult individuals, at Hummingbird Cay, about 20 miles from MHCNP. Research also showed that smaller individuals are likely to be found in mangrove creeks, like those in MHCNP. Elasmobranchs like the Caribbean whiptail stingray are vulnerable to habitat degradation and overfishing occurring in coastal areas like The Bahamas. More research is needed on the Caribbean whiptail stingray subpopulations found in and around MHCNP.

Fish

Most vertebrates found in MHC come and go with the tide. Juvenile grunts (Haemulon spp.), parrotfish (Scarus spp. and Sparisoma spp.), grouper (Epiniphelus spp.) and snapper (Lutjanus spp. and Ocyurus chrysurus) species can be found in the mangrove, lagoon, and tidal creeks on MHC and adjacent areas in the MHCNP. These areas also serve as a nursery habitat and feeding ground for sharks and rays. Marine mammals have also been observed in and around MHCNP.

Nassau grouper, *Epinephelus striatus*

Large grouper species are among the most important fishery species on reefs and play an important role as predators, maintaining the delicate ecological balance on reef ecosystems. In The Bahamas, the Nassau Grouper is the most important finfish species in the Bahamian fishing industry and is culturally important as a preferred food fish. However, it has been overfished throughout its range and while it has been historically common in Bahamian waters, recent surveys indicate a decline in the presence of the species on reefs. The 2016 Coral Reef Report Card documented Nassau groupers on less than 1/3 of the surveys conducted over the 4-year countrywide survey. Healthy populations of predatory species like large groupers are important for maintaining reef ecosystems. Habitats within MHCNP are suitable nurseries for the Nassau grouper, and channels between MHC and Great and Little Exuma has some of the highest post-larval recruitment rates in the Bahamas for Nassau grouper.

Preliminary results of a 2006 report characterizing the ecological characterization of MHC and the surrounding area indicated that the area had the highest recruitment rates of all sites surveyed in the Bahamas during 2002-2004 and are among the highest recruitment rates ever reported from the Bahamas (second only to studies conducted from Cat Island more than 10 years prior). Recruitment to Moriah Harbour Cay National Park is likely to be so high because the area possesses the combination of high larval influx from oceanic gyres that retain larvae in the southern part of Exuma Sound, and a broad area containing high quality juvenile habitats. These nurseries are likely to support fisheries in the Great Exuma, Little Exuma and Long Island areas.

Parrotfish, *Scaridae spp.*

In The Bahamas, large parrotfish play a key role in reducing the amount of algae that can overgrow corals, particularly new recruits. They are key in building resilience on Caribbean reefs, and while they are not fully protected in The Bahamas, all parrotfish species will be protected within the marine protected areas managed by the BNT, including Moriah Harbour Cay National Park. In the wider Caribbean in places like Belize, Bermuda, and Bonaire, it is illegal to harvest parrotfish. Bans in these locations have had a positive impact on parrotfish populations. Protecting seagrasses and mangroves, the nursery areas is key to maintaining healthy populations of parrotfish and other reef fish species.

Sea Turtles

Endangered hawksbill and green sea turtles (*Eretmochelys imbricata* and *Chelonia mydas*) can be observed in MHCNP, sometimes foraging. No nesting sites have been confirmed in the park.

Queen conch, *Lobatus gigas* (formerly ***Strombus gigas***)
Queen conch support commercial and subsistence fisheries in The Bahamas and are of cultural significance. In MHCNP, there are several areas where significant numbers of juvenile conch can be found. Throughout The Bahamas, conch populations are on the decline due to high fishing pressure. Marine parks and protected areas can be an effective way of protecting conch spawning stock to replenish populations outside of their boundaries. Protection of juvenile conch within these areas prevents their illegal harvest and protecting spawning stock, at a density of 50 conch per hectare or more, will ensure reproductive success and replenishment of populations.

Snapper, *Lutjanus spp.*
Snappers are also important commercial fish species for The Bahamas. Like some grouper species, snappers use several habitats as they grow, settling as larvae into seagrass and mangrove nurseries, where they live as juveniles, and then moving to patch reefs, reef crest, and fore reef habitats as they mature. The reef areas of MHCNP has a high abundance and diversity of snappers, *Lutjanus spp*. Gray snapper (*L. griseus*), schoolmaster snapper (*L. apodus*), cubera snapper (*L. cyanopterus*) and other snapper species. Snappers use shallow seagrass beds and mangroves as juvenile and adult habitats. There is at least one known spawning aggregation of snappers within MHCNP. These snapper species support subsistence in Exuma, and commercial fishing in The Bahamas.

3.3 Physical Features

No physical buildings exist on the crown lands that fall within MHCNP and the Bahamas National Trust (BNT) does not currently have any other infrastructure in the park or boats for park operations. There are nine (9) mooring buoys within the park, installed to protect reefs and the seabed. These moorings were deployed privately and are currently being maintained by the Elizabeth Harbour Conservation Partnership, tour operators, dive operators, and are financed by private sector donors.

The Elizabeth Harbour Conservation Partnership (EHCP) secured grant funding in 2017 from the Global Environment Facility, Small Grants Programme (GEF SGP) entitled “Building a Park for the Next Generation”, to promote sustainable tourism by developing infrastructure in MHCNP. Interpretive signage will be developed and installed at the eastern end of Stocking Island, in addition to a gazebo to provide shade and a resting area for park visitors. BNT will work collaboratively with EHCP to execute this grant and advance the development of this infrastructure.

3.4 Cultural and Historic Resources

The year 1784 marked the end of the Revolutionary War in America and over 3,000 Americans, who remained loyal to Britain, relocated to The Bahamas and established cotton plantations. Several settled on Great Exuma, including William Walker, whose plantation was set up on Crab Cay. The ruins of the plantation still exist and include a walled in botanical garden, down the hill southwest of the ruins. In 1789, Walker was elected to the House of Assembly as the representative from Exuma. The plantations on Great Exuma were plagued by attacks from pirates and Crab Cay was no exception. East of the main ruins, Walker had a gun emplacement installed with a 360-degree line of fire. These ruins represent a fascinating period of Bahamian history and culture and should be included in the historical and general information developed by park managers.

Crab Cay and Little Crab Cay are privately owned and were part of a private home development that stalled midway through its execution. A bridge was built from the mainland to Crab Cay to provide access to the cay. Some land clearing and infrastructure was installed, but the development was never fully operational, with much of the proposed lots remaining unsold.

While BNT has no management authority over Crab Cay, it is hoped that discussions with the property own can be established and information exchanged to ensure the preservation of the historical ruins on the cay. Antiquities, Museums, Monuments Corporation (AMMC) has assets on private cays that are part of the national registry. BNT will work cooperatively with private land owners to identify and manage historical and cultural resources throughout MHCNP and where appropriate make recommendations for restoration.

3.5 Stakeholder Activity at MHCNP

Exuma has long been considered an attraction for residents and visitors who enjoy nature-based activities. Adjacent to MHCNP is Elisabeth Harbour, a natural anchorage, which is the central location for the yachting community year-round and during annual peak times. At MHCNP, stakeholders have been utilizing and enjoying the area for generations. These stakeholders utilize MHCNP for fishing, swimming, boating, bonefishing, kite boarding, windsurfing and birdwatching. Stakeholders who visit, transit, utilize, and have organizational mandates or business interests in the area of MHCNP include, but is not limited to:

- Local residents and members of communities adjacent to MHCNP
- Commercial Fishermen from Exuma and Long Island
- Private land owners and their guests
- Local Government Officials
- Port Department
- Department of Marine Resources
- Subsistence Farmers and Fishers
- Local Nongovernmental Organizations
- Boat builders and Repair Operations
- Local Marina and Boat Storage Facilities
- Tour Operations (including scuba, snorkeling, and sightseeing)
- Scientific researchers and educators

Historically, the area was heavily fished by the local community. In recent times, fishing by the local community is mainly in the form of subsistence, either by small boat or from the shore, using hand lines. During the peak boating season, the yachting community has been known to fish the park. Other stakeholder activities include bird watching, beach combing, kayaking, snorkelling, scuba diving, and bonefishing, which have become more popular. Tourism represents about 50% of the Gross Domestic Product (GDP) of The Bahamas, employing some 50-60% of the workforce. On Exuma, tourism, with over 500 hotel rooms, is the primary economic driver and is significantly responsible for the increased population numbers between the 2000 and 2010 census. The top activities visitors engaged in were snorkelling, golf, diving, sailing, and fishing (bonefishing and deep sea). The busiest months for visitors on Exuma are February to July and December.[15]

15 Ministry of Tourism: Research and Statistics Department, Exuma Brochure 2015

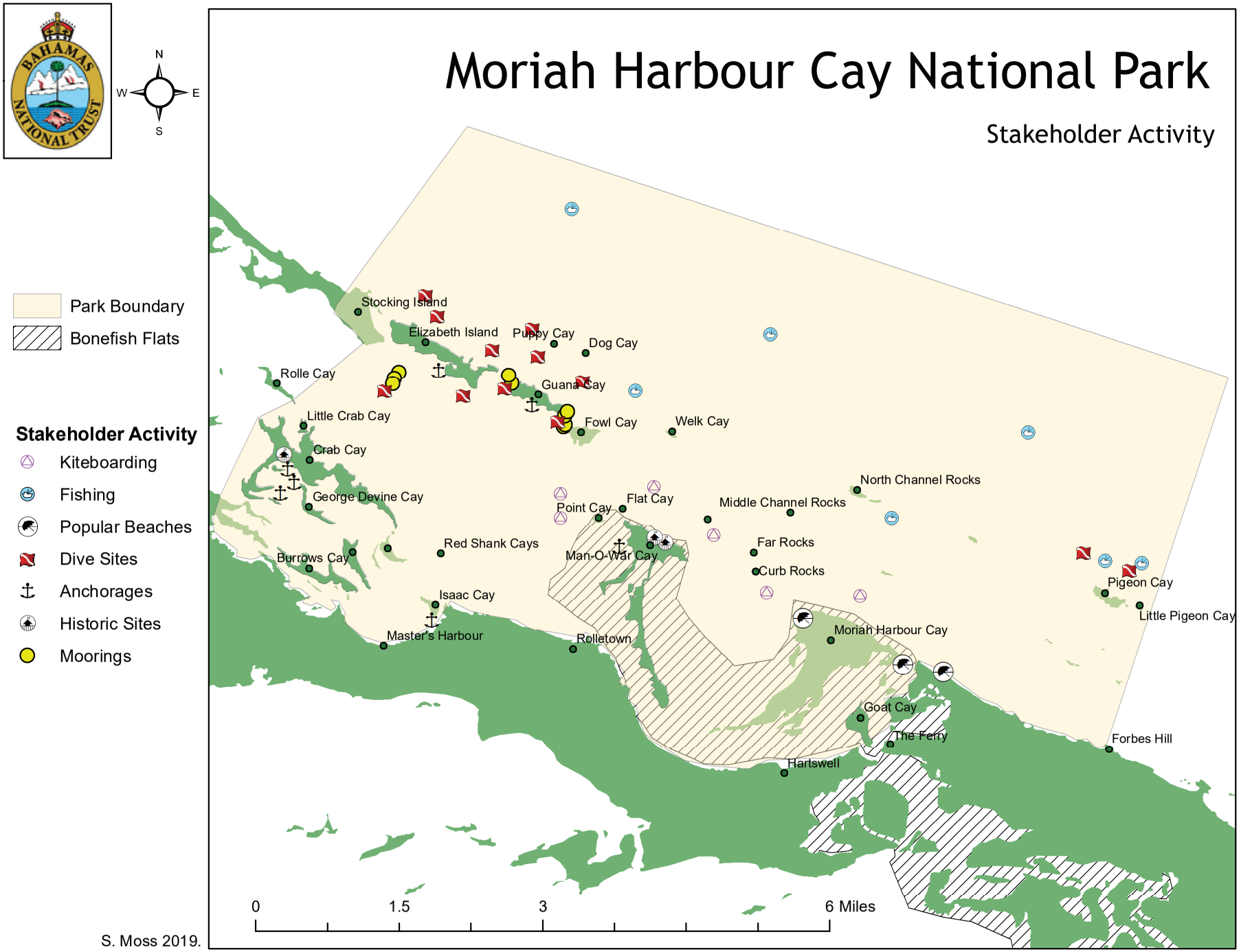

Figure 6. Map of Stakeholder Activity at MHCNP

4.0 Critical Threats & Potential Issues

While a management plan documents an explicit set of goals, outcomes, and activities that will be undertaken over a specified period of time and area, it also articulates how the conservation strategy being used is designed to address the threats present. Current threats to Moriah Harbour Cay National Park (MHCNP) are throughout the park boundaries, as well as, in areas adjacent to the protected area.

Threats are composed of stresses and sources of stress.[16] The sources of a stress are the action or entity that produces the stress (e.g., the dredging operation). The following are critical threats that have been identified in MHCNP. While emphasis is on critical threats identified during the planning process, it is important to recognize that threats change over time. It is therefore important to anticipate potential issues that may arise as a result of certain activities and take these into consideration making management decisions and amendments to the management plan.

This GMP identifies and addresses the critical threats and potential issues that were identified in the planning process for MHCNP. Additionally, this GMP recommends zoning, water craft size and speed limits, sensitive species protection, resource monitoring and other actions to appropriately manage these issues. In implementing this GMP, constructive and on-going dialogue will be necessary among all stakeholders.

The planning process identified significant threats to the achievement of the actions contemplated by this plan (See Appendix III for Threat Definitions. These threats, and the stresses they create, include, but are not limited to:

Incompatible Development
Incompatible development can adversely affect the various habitats and species within the park. If developments are not carefully planned, they will cause long-term difficulties for not only the flora and fauna, but also dive operators, tour operators, bonefish guides and charter service providers.

Coastal development projects, which undergo activities such as channel dredging and land reclamations, can be significant sources of sedimentation and nutrient pollution. Sedimentation and nutrient pollution can cause degraded coral health and will reduce the value of the tourism experience enjoyed by divers and snorkelers within the park. Sensitive resource habitats, such as the bonefish flats will also undergo a drastic decline in bonefish populations, which is also a key livelihood for residents within the neighbouring community.

Development of Private Lands
Increasing development of private lands for tourism experiences will change the unspoiled perception of the Moriah Harbour Cay National Park (MHCNP). This is not to say that tourism development must be avoided, it simply should conform to environmental best practices and be implemented in ways that allow traditional activities to continue.

The pressure of large numbers of visitors on the environment can have a significant adverse impact, and in areas with a low density of population, such as around MHCNP, it may be possible to receive more return per visitor by targeting a high value market through ecotourism initiatives.

Some private islands, such as Crab Cay, contain inland blue holes that are directly connected to MHCNP. The Bahamas National Trust works cooperatively with private landowners and organizations in surrounding communities to encourage planning and activities compatible with the protection of park resources.

Boat Groundings and Sunken Vessels
In the past, the park experienced damage to coral reefs from boat groundings caused by inaccurate charts. The local community has worked on marking some of these potential areas, and through the management under the Bahamas National Trust, more will be added to prevent further damage to coral reefs.

Within the park, near Crab Cay, there are sunken vessels (local and foreign), some of which are intentionally abandoned. These vessels can pose significant threats to natural resources. They can physically destroy sensitive

16 A stress is a process or event with direct negative consequences on the natural resource (e.g., sedimentation in a dredging operation is a stress on corals).

marine and coastal habitats, sink or move during coastal storms, disperse oil and toxic chemicals still on board, become a source of marine debris, and spread derelict nets and fishing gear that entangle and endanger marine life.

Invasive Species (terrestrial and marine)
Invasive plants and animals are a serious threat to park habitats. BNT will work with local organizations to further document threats of invasive plants and animals to the park.

The information gathered will assist with an invasive species management plan. Highest priority for future control efforts will be determined by the level of threat to the park and the potential for effective control.

Casuarina equisetifolia is a problematic invasive throughout most of the islands in The Bahamas. The species is known to decrease plant diversity and facilitate coastal erosion in the areas they inhabit. The establishment of *Casuarina equisetifolia* on Moriah Harbour Cay and other cays within and around the park coastline poses a threat to the integrity of the dunes and diversity of surrounding ecological communities.

A serious threat has appeared in the marine environments surrounding Exuma are red lionfish (*Pterois volitans*), a venomous marine species originally from the Indo-Pacific. Lionfish are a popular saltwater aquarium fish that were first sighted in southern Florida waters in the early-1990's. Lionfish populations have been expanding exponentially ever since and are now known throughout the east coast of the US, the West Indies, and the Gulf of Mexico. They prefer reefs and turbid water in in-shore areas, lagoons, and harbours. Lionfish are voracious and prey on invertebrates, mollusks, and small fish including juvenile forms of grouper, snapper, and other commercially important fish.

Climate Change & Natural Disasters
Climate change due to global warming and the resulting sea level rise and sea surface temperature increases represent a very serious threat to small-island developing states, including The Bahamas, and their associated ecosystems. However, this issue is too broad in scope to be addressed in this management plan. The Bahamas National Trust, as part of a larger national effort, works closely with appropriate government and non-government organizations on the development of national strategies to address this global challenge.

The impacts of climate change are already being experienced and will continue for years to come. Increased intensity of storms, sea level rise, elevated sea surface temperatures and ocean acidification are a reality we are facing today, that will affect Exuma's natural and cultural resources and beyond. The BNT is committed to integrating climate change adaptation into national park management, and actions will be included in this plan and will be ongoing to mitigate impacts to a changing climate.

One of the first steps in addressing climate change for the MHCNP, will be to prohibit the harvesting on all species of parrotfish, as they are critical to reef recovery following mass bleaching events caused by elevated water temperatures. Parrotfish are herbivores and are therefore of ecological importance in controlling algae growth on coral reefs. Other actions will be considered in the Climate Change Action Plan for National Parks and Protected Areas managed by the Bahamas National Trust, including developing strategies for monitoring for coral reef resiliency, developing a bleaching response plan, and responding to mass bleaching events.

Other Potential Issues at MHCNP include:

- Ship groundings
- Anchor damage
- Natural disasters
- Conflicts between recreational users and fishing activities
- Illegal fishing, which is categorized as the lack of adherence to Fishing Regulations set forth by The Bahamas Government
- Commercial fishing of spawning populations

Land owners, residents and guests of the cays throughout Exuma use MHCNP and the surrounding areas for fishing, swimming, boating activities and boat maintenance. The creation of by-laws with respect to allowed and prohibited activities in the MHCNP will require engagement of these stakeholders to define alternatives and to support the management plan.

5.0 Conservation Features and Targets

Protected area (PA) managers use the geospatial planning to get a comprehensive picture of the spatial extent of an area, inclusive of its resources, the interactions of various stakeholders and the extent of the impact of activities occurring within the space. The process uses Geographic Information Systems (GIS) mapping as a tool to visually display data for species, habitats, populations, sensitive areas, important ecological processes, stakeholder activities, and key information for protected areas. Conservation planning also incorporates the use of complex geospatial analysis to support decision making related to protected areas. It offers park managers a systematic and adaptive means to identify priority areas, monitor conservation features, or adjust management strategies to account for changes in the protected area.

The GIS mapping process requires data and while some data exists for MHCNP, there are many data gaps that need to be filled. This can be accomplished, in part, by way of field assessments. Better data provides for better map creation and analysis, which can streamline management efforts and aid in informed decision making. PA managers incorporate conservation features and targets specific to the PA. The term conservation feature describes an element of biodiversity selected for a specific conservation planning action or initiative. These features can include ecological classifications or processes, species observations, physical landscapes, habitat types, and other information that can be measured and is relevant to or proposed for protection.

Conservation features and targets are important to the implementation of the management plan, identifying potential conflicts or threats, and the development of monitoring and evaluation strategies. The Ecological Gap Analysis completed for The Bahamas and in other areas worldwide incorporate conservation features and targets. Conservation features for MHCNP, listed in Table 3, are based on those outlined in the 2012 Master Plan for The Bahamas National Protected Area System and the 2014 Ecological Gap Analysis. Conservation targets[17] will be identified once the rapid ecological assessment for MCHNP is conducted and stakeholders have been consulted and agree to specific targets. These targets will also align with those identified in the most recent Ecological Gap Analysis for The Bahamas.

The cumulative result of geospatial planning is a more coordinated, science based, sustainable approach to park management and achieving the goals and objectives of the protected area. The maps included in the MHCNP should be updated periodically, as new information about the area and activities are obtained.

17 Conservation target refers to the actual numerical endpoint that allows for measurable analysis. Targets are also used to establish conservation or management actions for a protected area.

Table 3. MHCNP Conservation Features

Conservation Features	Definitions
Acropora palmata framework	Coral framework composed primarily of Acropora palmata, typically building to within a meter of sea level. Live coral cover usually sparse (<10%) but may include patchy or continuous coral thickets with up to 50-80%. Shallower than -10 m.
Blue Holes	A blue hole is a submarine cave or sinkhole that develops in carbonate banks and islands. They are open to the earth's surface; contain tidally influenced waters of fresh, marine, or mixed chemistry; extend below sea level for a majority of their depth; and may provide access to cave passages Blue holes are karst depressions with >10 m diameter throats located in platform-interior and shelf environments. The depressions have vertical to near-vertical walls. In some cases, scleractinian corals colonize the upper margins and perimeter, and rich *Halimeda* assemblages colonize the vertical surfaces. Rich mollusk and echinoderm fauna develop in the sediment filled depressions as the organisms become trapped. Depending on rates of sediment in-fill, these depressions have depths varying from >100 m, to completely sediment filled. Found from -10 m to -200 m.
Bonefish Habitat	Flats areas — shallow coastal areas that the bonefish use for foraging and where they are intercepted by the recreational fishing industry. Areas indicated represent both fishing grounds that are known to be utilized by Bahamian guides, as well as flats areas that are likely to be used by local guides in other areas.
Coppice	A dry broadleaf evergreen (DBE) formation (otherwise known as "coppice") is by far the most diverse terrestrial habitat found in the Bahamas. Different types of coppice can be found throughout The Bahamas due to the variability resulting from differing environmental conditions affecting the vegetation structure and floristic composition. Blackland coppice are located on higher elevations or ridges. The flora of the DBE forests is mainly broadleaved angiosperms, although some areas have scattered pine. The canopy is closed and typically 5-12 meters high. Whiteland coppice occurs at a lower elevation and the canopy is not closed in the woodland but is characterized as having scattered patches of emergent trees with interspersed shrubs.
Coral walls 30-200m	Coral reef face which plunges from 30-200 meters.
Coral walls 200-1000m	Coral reef face which plunges from 200-1000 meters.
Dense seagrass	This habitat is dominated by the seagrass *Thalassia*, also called Turtle Grass, but may contain the tube-like seagrass *Syringodium*. Dense Seagrass habitats have high density seagrasses and a low amount of visible sand and silt.
Gorgonian-dominated hardground	Low rugosity hardground that may have a thin sediment layer hosting high density of gorgonians (>10 m-2), from -5 m to -15 m.
Gorgonian plain	Characterised by dense gorgonians (typically sea fans are most abundant) on hard bottom with some macroalgae.
Macroalgal-dominated hardground	Low rugosity hardground dominated by macroalgae with <5% cover of invertebrates (scleractinians, gorgonians, poriferans), from -5 m to -15 m.
Mangroves	Mangrove trees grow in shallow, brackish waters along coasts and up creeks of Bahamian islands. Their roots provide nursery habitat for many important fish species. Mangroves in and around estuaries also trap sediments that might otherwise flow onto reefs and smother corals to death.

Conservation Features	Definitions
Mangrove Stand	Found on shorelines, tidal creeks and offshore islands. Prop roots are typically covered in a diverse community of sponges and algae. Mangrove stands usually support numerous juvenile and sub-adult fish, particularly grunts, snappers and damselfish.
Marine Mammal habitat	Habitat modeled from Blainville beaked whale, dwarf sperm whale, and Cuvier's beaked whale sightings data and bathymetry (all slopes between 7 and 10 degrees and depths from 400m to 1700m).
Medium density seagrass	This habitat is dominated by the seagrass *Thalassia*, also called Turtle Grass, but may contain the tube-like seagrass *Syringodium* (manatee grass) and the thin-bladed seagrass Halodule (shoal grass). Occasionally one also finds small coral colonies within the seagrass. Medium Density Seagrass habitats have medium biomass (medium plant height, medium density) and a medium amount of substratum is visible, when compared to Dense and Sparse Seagrass. This habitat is found in lagoonal environments where sediment is sufficiently deep. Dominated by *Thalassia* (turtle grass) but may contain *Syringodium* and *Halodule*. May occasionally be small coral colonies. Differentiated from sparse and dense seagrass by medium biomass (medium plant height, medium density) and medium amount of substratum visible.
Moderately dense to dense seagrass	Luxuriant meadows of seagrass (>60% cover) dominated by *Thalassia testudinum*. Other seagrasses (e.g., *Syringodium filiforme*) and macroalgae are typically present, but at low density, shallower than -15m.
Orbicella reef	*Orbicella annularis* is the most common coral species, but there is a diverse benthic community including corals, sponges, gorgonians and algae. *Montastraea* reef also supports a diverse and abundant fish community.
Non-reef flat	All geomorphic reef types occurring on the shelf break in 20-30m (approx. 65-98 feet) of water.
Piping Plovers	Piping Plovers are listed under the Endangered Species Act in the United States, with a global population estimated at 8,092 of mature individuals (Haig et al. 2005, Elliott-Smith et al. 2009). The species is "Highly Imperiled" by the U.S. Shorebird Conservation Plan, and Near Threatened under the IUCN Red List.
Reef flat	All geomorphic reef types occurring on the shelf in less than 20m of water.
Rocky shore	Consolidated sediments, typically porous grey or black rock. There are distinct zones up from the water line starting with the rocky shore, bluff and ridge. The rocky shores can be low relief (less than 4 meters from mid tide line to ridge) and high relief (greater than 4 meters)
Sand	This habitat includes both clean sand and sand with a sparse algal community. It is found in lagoonal areas and near reefs.
Sandy beach	Unconsolidated shorelines which, depending on wave energy can vary in width and height of the dunes. Shore profiles on beaches begin at the high tide mark and are characterized by distinct zones. Starting from the water, there is a sparsely vegetated pioneer zone, a grassy or shrubby foredune, back dune, and then swale.
Sea turtle foraging habitat	Preferred seagrass habitat where sea turtles are either known or predicted to spend a part of their life cycle foraging.

Conservation Features	Definitions
Shorebird sightings	These datasets were produced by National Audubon Society and the United States Geological Service and are based on shorebird census results for the 2011 and 2012 winter season where birds of conservation concern were targeted in the Bahamas which include the Piping Plover, Snowy Plover, Wilson's Plover, Red Knots and Reddish Egrets. Sightings represent the occurrences of these shorebird species at known survey sites.
Shrub/scrub	Shrublands are located inland from the beach strand or coastal rock communities. The substrate is a mixture of rocky limestone, sand, or a mixture of the two. Shrubland canopy is 2-4 meters tall. Dwarf shrubland areas are highly influenced by wind and the location of the water table. High winds prune the branch tips and roots are limited by the water table being so close to the surface. Both of these environmental influences do not allow the plants to grow into shrubs and trees.
Sparse seagrass	This habitat is dominated by the seagrass *Thalassia*, also called Turtle Grass, but may contain the tube-like seagrass *Syringodium* and the thin-bladed seagrass *Halodule*. Occasionally, one also finds small coral colonies within the seagrass. Sparse Seagrass habitats have relatively low biomass (short plants, low density) and a high amount of substratum is visible. This habitat found in lagoonal environments where sediment is deep enough for the seagrasses to take.
Spawning Aggregations (SPAGs)	Locations where fish gather for the purpose of spawning. Fish densities or numbers will be significantly higher than those found in the area of aggregation during the non-reproductive periods.
Tidal creeks	Wetlands situated in channels where water flows both directions due to the tides.

6.0 Park Statements

6.1 Park Purpose

The park purpose reaffirms the reasons the park was set aside for protection. The purpose of Moriah Harbour Cay National Park is:

- To protect the tranquil and undisturbed nature of Moriah Harbour Cay, and its surrounding environments,
- To preserve essential marine nursery habitats for Spiny lobster (crawfish), conch, and commercially important fish species such as snappers and groupers;
- To protect critical bird nesting habitats;
- To preserve an outstanding example of Bahamian coastal ecosystem (marine and terrestrial)
- To provide access to and opportunities for locals and visitors

6.2 Park Mission

To protect and manage the national and internationally important natural, historical and cultural resources associated with Moriah Harbour Cay National Park.

6.3 Park Vision

The park vision is a set of conditions to strive for upon the execution of activities to achieve park objectives and goals identified in this plan. The vision for Moriah Harbour Cay National Park (MHCNP) is:

- To conserve the natural and cultural resources associated with Moriah Harbour Cay and the surrounding environs by minimizing threats and promoting eco-friendly uses.
- Provide entrepreneurial opportunities to neighbouring communities through eco-tourism opportunities
- Maintain an untouched feel with sustainable infrastructure that does not drastically alter the landscape

6.4 Park Significance

Moriah Harbour Cay National Park protects critical marine ecosystems, natural marine and terrestrial resources that provides significant benefits to the local community, and to the entire country. Key features of Moriah Harbour Cay National Park include:

- Productive breeding grounds for lane snappers (spawning aggregation),
- An abundance of juvenile spiny lobster,
- Diverse populations of stingrays, including the rare Caribbean Whiptail Stingray,
- Extensive mangrove and tidal creek systems that are essential nursery ground for juvenile crabs, and juvenile reef fish including snappers and groupers;
- Extensive bonefish flats that support the multi-million-dollar fly-fishing industry,
- Healthy coastal communities including pristine sandy beaches, sand dunes, sea oats
- Mangrove and wetland communities,
- Diverse bird populations, including plovers, oystercatchers, least terns, nighthawks and osprey and nesting sites for species like the White Crown Pigeon, and
- Juvenile Queen Conch habitat.

7.0 Principles

Management of the MHCNP is based on the same principles as the Master Plan for The Bahamas National Protected Area System:

Principle 1: Representativeness
All major habitats are represented in the boundaries of MHCNP, since the park was expanded in 2015.

Principle 2: Replication
The MHCNP is a protected area where the habitats of The Bahamas are replicated. MHCNP is spatially separate from other protected areas within the network, to safeguard against unexpected failures or collapse of populations.

Principle 3: Viability
Declaration of MHCNP along with the other protected areas in the network enables the creation of a network of geographically dispersed sites that are self-sustaining and independent (as far as possible) of what happens in the surrounding areas. The network should be ecologically viable with protected areas achieving viability collectively and avoiding (genetic) isolation.

Principle 4: Precautionary design
The MHCNP was declared using the precautionary approach, i.e. use of the best available information to make decisions rather than delaying action while waiting for more and better information. Where there is uncertainty, the precautionary approach would favor erring on the side of biodiversity protection.

Principle 5: Adaptive Management
Adaptive management enables BNT to function under dynamic and fluctuating ecological resources and conditions. Being successful at adaptive management requires establishment of a monitoring and evaluation system to track progress in achieving national park goals, objectives and activities.

Principle 6: Participatory Approach
Management of the MHCP recognizes the full range of users, uses and the trade-offs between them. BNT promotes management that is inclusive with the participation of all stakeholders, and as such, has convened several focus group sessions and public meetings to involve locals in the decision-making process for MHCNP.

8.0 Management of Moriah Harbour Cay National Park

In 2014, a management effectiveness evaluation was executed for the national protected areas system and Moriah Harbour Cay National Park (MHCNP) was included in the evaluation. At the time, MHCNP had no infrastructure, staff, or individual finances to advance management efforts.[18] As a result, it was ranked low in overall management effectiveness and was identified as one of the protected areas in most need of improved management. One of the results from the evaluation was to list MHCNP as a priority for the development of a management plan.
The MHCNP General Management Plan (GMP) documents the features, relevant governance and management options for the protected area. In its management of the MHCNP, the Bahamas National Trust seeks to:

1. Develop management systems that support the main goals of the MHCNP;
2. Base management decisions on the best available scientific information;
3. Ensure that park infrastructure will serve as a model of environmentally sensitive development.

Management of MHCNP will require a staff compliment of six persons for on-site park management and operations, science programmes, community education, and outreach activities. The GMP calls for collaborative management of the area with Government agencies, including the Port Department, Department of Immigration, Department of Physical Planning, Bahamas Customs Department, the Department of Marine Resources, the Royal Bahamas Police Force and the Royal Bahamas Defense Force, nonprofit organizations, and the local community on mainland Exuma.

8.1 Management Goals and Objectives

The MHCNP GMP includes eight broad management goals that accomplish international, regional, national, and local objectives. These goals are to:

1. Conserve natural resources in a state that promotes natural ecological processes responsible for maintaining ecosystem integrity and supporting biodiversity;
2. Conserve historical and cultural resources;
3. Protect and enhance natural landscapes and seascapes for their scenic value;
4. Conserve marine resources in the parks to support the local and national economy;
5. Promote a greater understanding of species and ecosystems within the parks;
6. Provide education, outreach and interpretation opportunities;
7. Ensure sufficient capacity and regulations for effective park management; and
8. Promote visitor experiences compatible with the objectives of the MHCNP.

Management goals and objectives for the MHCNP set the direction for future management that achieves the parks' vision. In establishing these goals and objectives, the local, national, regional, and international significance of the parks were considered. To achieve the vision of the MHCNP specific goals and objectives were identified and are listed in Table 4.

18 The 2014 Bahamas Protected Area Network Management Effectiveness Evaluation Workshop was conducted to assess progress made on protected area management since 2009 and prioritize future management planning.

Table 4. MHCNP Management Goals and Objectives

Management Goals	Objectives
1. Conserve natural resources in a state that allows for the continuity of evolutionary and ecological processes	1.1. Maintain all-natural communities, landscapes, seascapes and landforms. 1.2. Improve and maintain water quality. 1.3. Minimize impact of private landholdings adjacent to the parks. 1.4. Minimize impact all visitors to the parks. 1.5. Reduce impacts from solid waste. 1.6. Restore human-altered habitats and ecosystems to natural conditions, where appropriate and when consistent with the Zoning Plan. 1.7. Protect rare, endemic, threatened and endangered flora and fauna. 1.8. Protect ecologically and economically important species 1.9. Maintain healthy populations of other native species and control populations of non-native species.
2. Conserve historical and cultural resources	2.1. Work cooperatively with Antiquities, Monuments and Museums Corporation (AMMC) to identify and manage historical and cultural resources and where appropriate, make recommendations for restoration.
3. Protect and enhance natural landscapes and seascapes for their scenic value	3.1. Minimize impacts of park infrastructure. 3.2. Manage visitor use patterns. 3.3. Work with private landowners to minimize adverse impacts. 3.4. Protect unique natural features and landscapes
4. Conserve marine resources in the park and help to support the local and regional economy	4.1. Maintain and improve marine resources within the parks to support subsistence, commercial, sport and recreational use within and beyond park boundaries. 4.2. Protect marine resources by supporting compatible tourism activities.
5. Promote a greater understanding of species and ecosystems within the parks	5.1. Identify research and monitoring priorities for natural communities 5.2. Identify research and monitoring priorities for socioeconomic data. 5.3. Develop a research management plan, which will include performance measures and research and monitoring programs needed to provide information on the effectiveness of all management measures. 5.4. Provide and encourage opportunities for research that support management objectives. 5.5. Develop a data management system and protocol to ensure that natural and cultural resource data are properly archived and accessible.
6. Provide education, outreach and interpretation opportunities	6.1. Encourage and promote a sense of user stewardship regarding the park's resources. 6.2. Promote the park as a nationally and internationally significant marine protected area. 6.3. Communicate the scientific results to all stakeholders.
7. Promote visitor experiences compatible with the objectives of the MHCNP	7.1. Provide visitor management systems compatible with the objectives of the MHCNP 7.2. Develop and implement a park-wide zoning system that provides a range of visitor experiences while minimizing resource impacts. 7.3. Establish a system for measuring, evaluating, and mitigating visitor impacts. 7.4. Ensure that all park infrastructures do not adversely affect park resources and is necessary for park purposes.
8. Ensure sufficient capacity and regulations for effective park management	8.1. Ensure adequate staff and infrastructure to achieve park mission and purpose. 8.2. Ensure a financial plan to implement the objectives stated in this plan. 8.3. Ensure the implementation of a comprehensive and coordinated regulatory program for the MHCNP.

8.2 IUCN Protected Area Management Categories

The International Union for Conservation of Nature (IUCN) is widely recognized as the global authority on the status of the natural world and what measures are needed to maintain it. In 1994, the IUCN developed a protected areas categories system which allows for the classification of protected areas[19] based on their management objectives. International bodies, including the United Nations (UN), recognize this system as the global standard for defining protected areas. The Bahamas is party to many multilateral environmental agreements including the Convention on Biological Diversity (CBD), which requires regular reporting on protected areas (PAs).

BNT is a member of the (IUCN), but has not officially adopted the IUCN category system for categorizing PAs. In 2014, BNT approached the IUCN for technical assistance, which led to the collaborative coordination and facilitation of a series of workshops. The goal of the workshops was to review the application of the IUCN categories to PAs within The Bahamas. One of the results of the workshops was the assignment of MHCNP as category II, national park. During the development of the general management plan for MHCNP and through the stakeholder consultations conducted, it was agreed that MHCNP was better suited as a category VI protected area.

The IUCN recognizes six protected area (PA) categories[20] and a single PA can fit into more than one IUCN category:

Category Ia

Strict Nature Reserve: Category Ia are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphical features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring

Category Ib

Wilderness Area: Category Ib protected areas are usually large unmodified or slightly modified areas, retaining their natural character and influence without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

Category II

National Park: Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities.

Category III

Natural Monument or Feature: Category III protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas, and often have high visitor value.

Category IV

Habitat/Species Management Area: Category IV protected areas aim to protect particular species or habitats and management reflects this priority. Many Category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.

Category V

Protected Landscape/ Seascape: A protected area where the interaction of people and nature over time has produced an area of distinct character with significant, ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

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19 1 The IUCN defines a protected area as a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values and a marine protected area as an area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of its enclosed environment.

20 Category I is considered one category, with two subcategories (a) and (b)

Category VI
Protected area with sustainable use of natural resources: Category VI protected areas conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area.

8.3 Description of Functional areas and Programmes

Table 5 describes what each of the five functional areas and associated programmes entail. As the General Management Plan is updated and any of the listed objectives expand or change, it can be added to the existing areas and programmes. This allows for ease of monitoring and tracking by managers over the long term. This system of categorizing management activities can also be replicated across the national park system and by extension the entire Bahamas National Protected Area System to enable comparisons across protected areas.

Table 5. Description of MHCNP Functional Areas and Programmes

Functional Area	Programme	Description
1. Resource Management and Protection	a. Surveillance and Enforcement	Primarily through patrols to ensure compliance with park bylaws, national laws and zoning restrictions.
	b. Scientific Monitoring and Research	Priorities for initial attention will include coral reef health, fishery assessments, uses and user impacts.
	c. Species and Habitat Management	Plans for management of targeted species and habitats developed, based on monitoring, research, or identified adverse impacts.
	d. Zoning and Boundaries	The limits of the park and specific use zones will be clearly demarcated.
2. Community Outreach	a. Awareness and Education	Designed to improve local and visitor attitudes and use of the marine and terrestrial resources leading to reduced negative impacts.
	b. Public Outreach and Information	Building support among the local communities and users for the park.
3. Tourism and Recreation	a. User Fee Collection	Feasibility to be explored through use of installed mooring buoys, park entry fees or other user fees.
	b. Visitor Awareness and Interpretation	Design and installation of interpretive signage, infrastructure, preparation of brochures and other documentation, as well as scheduled activities for visitors when appropriate.
4. Management and Administration	a. General Management and Administration	Administrative activities related to operation of field office, including procurement of goods and services, recruitment of staff and staff accommodation.
	b. Training	Mainly in-house training to build the capacity of staff to effectively carry out management activities at the park.
	c. Financial Management	Developing systems for managing disbursements, income and donations for upkeep of the park.
	d. Partnership Relations	Developing and maintaining relationships with individuals, local organizations, and institutions that can assist in achieving the objectives of the park.

Functional Area	Programme	Description
4. Management and Administration (continued)	e. Government Relations	Developing and maintaining relationships with government agencies and departments that are directly or indirectly involved in the establishment and management of protected areas or natural resource management.
	f. Information Technology	Acquisition, technical support and maintenance of communication systems and equipment.
5. Facilities Operations and Management	a. Docking Facilities	Deployment and maintenance of mooring buoys.
	b. Buildings, Ground and Utilities	Acquisition or construction of a field office for the park, and provision of utilities and services.
	c. Boat & Vehicle Operations and Maintenance	Acquisition and maintenance of fully equipped patrol vessels.
	d. Trail Operations and Maintenance	Development and maintenance of trail systems, any interpretive signage and associated infrastructure.

9.0 Opportunities and Constraints

9.1 Legislative Management and Authority

The creation of the Bahamas National Trust (BNT) represented the culmination and integration of the earlier efforts of two groups of conservationists, which had been rallying for the conservation of natural resources in The Bahamas. Around 1900, one group formed to protect flamingos in the southern Bahamas. Then in the 1950s, the famous World War II Colonel and Ichthyologist, Ilia Tolstoy, approached a group of Bahamians to discuss setting aside islands which would serve as buffer areas to development and which might eventually become national parks. In 1958, the team's report was received and adopted by The Government of The Bahamas and the Exuma Cays Land and Sea Park, the first of its kind in the world, was officially established.

As a result of the compelling findings by the Colonel's team, the Bahamas National Trust was created by a special Act of Parliament on July 13, 1959. The Act conferred upon the Trust the powers to manage "places of historic interest and natural beauty", and BNT was immediately given responsibility for management of the Exuma Cays Land & Sea Park. Thus, was created a unique non-profit, non-governmental, statutory organization, which eventually came to be responsible for the entire national park system of The Bahamas.

The Act also empowers the BNT to create its own subsidiary legislation in the form of bylaws. Once these bylaws are gazetted nationally, they then become part of The Bahamas' national laws. The bylaws prohibit specific actions in national parks and outline the penalties for committing an offense within such parks. Under this authority, the BNT is responsible for managing Moriah Harbour Cay National Park. No bylaws exist for MHCNP at this time but will be developed in future management efforts.

The 2012 Master Plan for The Bahamas National Protected Area System recognizes four governance options for The Bahamas' system of protected areas:

- Government managed
- Co-managed
- Private
- Community served

As the legislated management authority BNT would be under the government managed option. In recent times, BNT has explored the co-management option and has adopted a co-management policy. As part of that policy, BNT intends to initially explore developing a co-management agreement for national parks with an organization on one of the Family Islands. Based on success and interest, further agreements may be sought.[21]

9.2 Institutional Capacity

Moriah Harbour Cay National Park (MHCNP) has no staff at this time. Currently, BNT staff on other islands, local partners and volunteers provide support for the park. A recent study[22] identified the need for a minimum of six (6) staff for MHCNP to perform duties related to:

- Park Maintenance & Natural Resource Management
- Law Enforcement
- Fundraising
- Environmental Education & Community Outreach
- Park Administration

Improvements to the park would enhance visitor experiences, improve natural conditions (e.g., water quality, population structure and biodiversity), and facilitate park management by reducing human impacts (e.g., navigational aids and mooring buoys to reduce damage to the reefs). While the specific needs of the park will be further developed over the course of the GMP, certain items are identifiable as priority resource issues.

21 Taken from the National Marine Protected Area Guidance Document of The Bahamas 2018.

22 The needs of MHCNP for staffing and infrastructure, was developed in the *Cost Verification for an Effectively Managed National Parks System in The Bahamas, 2016* study, commissioned by the Inter-American Development Bank (IDB) for the BNT.

These include the following:

- staffing and procuring major equipment,
- solid waste management within and around the edges of the park,
- additional access points for visitors, with signage and other considerations,
- additional assessments and monitoring of the parks effectiveness for protecting natural ecosystems (socioeconomic studies, habitat and species inventory etc.), and
- restoration of natural habitats in areas where possible (e.g., restoring reefs damaged by vessel groundings and human impacts or other a combination of stressors).

Monitoring the MHCNP requires laws, policies and procedures, regulations and standards be implemented and enforced by the various entities.

9.3 Relevant National Policies and Legislation

BNT Policy

Appropriate policies and legislation are necessary for effective protected area management, fisheries management, and biodiversity conservation. While policy does not guarantee effective management or compliance by stakeholders, it is a foundational element for managing protected areas. It is at the core of enforcement of rights and responsibilities and identifies the entities involved. It also empowers protected area managers and supports efforts to achieve the desired goals and objectives of the park. Specifically, with respect to natural resources, BNT Policies provide that:

BNT will strive to understand, maintain, restore, and protect the inherent integrity of the natural resources, processes, systems, and values of the parks. The BNT recognizes that natural processes and species are evolving and will allow this evolution to continue minimally influenced by human actions. Natural resources will be managed to preserve fundamental physical and biological processes, as well as individual species, features, and plants and animals.

The BNT manages the natural resources of parks to maintain them in an unimpaired condition for future generations. With respect to fishing and harvesting other life from the sea as well as harvesting from the land, BNT management policies provide that public harvesting of designated species of plants and animals, or their components, may be allowed in park units only when BNT finds that such activities are compatible with park purposes. As is the case at MHCNP, traditional subsistence fishing will be allowed.

Feeding of wildlife by the public or the BNT is not generally consistent with the goal of conserving natural population density, diversity, abundance, and behaviour. In botanical gardens or cultural landscapes and zones within parks, placement of bird feeders may be acceptable as part of programmes to educate visitors about park resources and values. Supplemental feeding may also be appropriate as part of a program to support populations of threatened or endangered species.

There are several national policy and legislative instruments that are relevant to the management of the MHNCP including:

National Environmental Policy

The goal of this policy is the sustainable use of the environment of The Bahamas to meet the needs of the present and future generations through the following specific objectives:

- to prevent, reduce, or eliminate various forms of pollution to ensure adequate protection of the environment and the health of its citizens;
- to conserve the biological diversity of the country and the stability, integrity, resilience and productivity of ecosystems; and
- to provide for the environment to be fully integrated into policy, plans, programmes and development project decisions that might be detrimental to the continued health safety and productivity of the country's environment.

National Wetlands Policy

The goal of this policy is to conserve, restore and manage wetlands wisely in conjunction with sustainable development practices. The specific objectives are to:

- Manage human activity on or near wetlands in a manner which will achieve no loss of significant wetland habitat and no net loss of wetland functions;
- Promote the recognition and integration of wetland functions in resource management and economic development decision-making with regard to sector policies and programmes;
- Promote and facilitate the development of wetland stewardship, awareness and education through government initiatives, and cooperative relationships with local citizens, private sector stakeholders, and municipal, provincial and local governments;
- Develop a shared vision between all spheres of government and promote the application of wise practices in relation to wetland management and conservation;
- Meet The Bahamas' commitments as signatory to relevant international treaties, in relation to the management of wetlands.

National Invasive Species Strategy (NISS)

The objectives of the NISS approved in 2003 and revised in 2013 include:

- Identification of priority species for eradication.
- Identification of priority species for control.
- Increasing awareness of invasive species through the development of an IAS database;
- Building capacity amongst officers within the public service about invasive species and how to identify, safely handle, hold or transfer these species. Officer to be targeted are those within the Customs Department, Ministry of Agriculture and Fisheries and enforcement officers of the Royal Bahamas Police Force and Royal Bahamas Defense Force.
- Prioritization of those sites to be monitored for invasive species. These were identified as all public areas, national parks, protected areas, freshwater sources and field stations.

The Bahamas 2020 Declaration

The Government of the Commonwealth of The Bahamas, as representatives of the people, is committed to the following:

- Ensuring that critical ecosystem services provided by our forests and oceans are kept intact;
- Acting responsibly as stewards of unique biodiversity;
- Ensuring that we act to sustain our livelihoods and the livelihoods of Bahamians in generations to come;
- Ensuring that future generations of Bahamians will enjoy the quality of life and beauty that our islands have provided us;
- Contributing to global targets set out in the Millennium Development Goals, the Johannesburg Plan of Implementation for the World Summit on Sustainable Development, the Mauritius Strategy for Small Island Developing States and the relevant Programmes of Work of the Convention on Biological Diversity and related regional and sub-regional initiatives and obligations.

The Bahamas also committed to preserve the 10% of marine and terrestrial environments by meeting the targets established by the Convention for 2010 and 2012. The Government further commits to effectively conserve at least 20% of the near-shore marine resources across The Bahamas by 2020 and ensure a minimum of 50% of existing marine, and 50% of existing terrestrial national parks and protected areas are effectively managed by 2020. This is to be achieved by provision and facilitation of necessary core staff, infrastructure, policies, regulations, bylaws and management plans to make them effective protected areas where sustainable activities occur inclusive of research, education, habitat rehabilitation and conservation, as deemed appropriate.

Legislation

The Bahamas National Trust Act (1959)
This Act establishes The Bahamas National Trust and provides for its operation, including the acquisition of properties, terrestrial or marine, and the development of regulations (bylaws) for their management. Lands or buildings vested in the Trust are to be held for the benefit of The Bahamas and are inalienable.

Amendment to the Bahamas National Trust Act (2010)
This amendment to the BNT Act serves to strengthen the organization's duties and responsibilities to protect Bahamian natural resources. It confirms BNT's role as an advisor to the Government and private sector on development, conservation and biodiversity issues. It reduces the risk of encroachment on Trust lands and gives the Trust the ability to control activities occurring in the marine environment of its parks, such as dredging and filmmaking. Other aspects of the amendment relate to operation of the Trust with respect to membership, procedures for Annual General Meetings and execution of contracts for goods and services.

Fisheries Resources (Jurisdiction and Conservation) Act (1977)
This Act provides for the establishment and management of exclusive fishery zones, the regulation of Bahamian fishing vessels and the declaration of protected areas. The Minister may by order declare any area of the waters within the exclusive fishery zone, whether alone or together with any area of land adjacent to such waters, to be a protected area for the purposes of this Act.

Wild Birds Protection Act (1952)
The killing or capture of wild birds in the closed season is prohibited and punishable. It shall be lawful for the Minister to establish reserves for the protection of any wild bird and from time to time to vary, enlarge or reduce the extent of such reserves. Such reserves may comprise any land belonging to the Crown or to any private owner. Several species of birds are listed with a closed season in the Schedule.

Wild Animals (Protection) Act (1968)
This Act was intended to control the taking and export of wild animals. Any animal in the wild or feral cannot be captured or removed without a license issued by the Minister. Only three animals are listed in the Schedule for licenses for capture and export.

Archipelagic Waters and Maritime Jurisdiction Act (1993)
This Act defines the territorial sea, archipelagic waters, internal waters and the exclusive economic zone of The Bahamas and the uses thereof. The inner limits of the territorial sea is defined and hence the jurisdiction of the Department of Marine Resources (DMR).

Antiquities, Monuments and Museum Act (1998)
This Act provides for the preservation, conservation and restoration of historical, paleontological and archaeological resources.

Conservation and Protection of the Physical Landscape of The Bahamas Act (1997)
Excavation, mining (including beach sand), quarrying and landfill operations are regulated under this Act. The Minister may also declare any tree a protected species requiring a permit for harvest. Currently ten species of trees are listed as protected.

Forestry Act (2010)
The Forestry Unit is mandated under this Act to develop the forest resources of the Bahamas to their maximum potential by applying sound, scientific, and sustained yield forest management principles and concepts.

Planning and Subdivision Act (2010)
This Act provides for:

- A land use planning based development control system led by policy, land use designations and zoning
- Prevention of indiscriminate division and development of land
- Promotion of sustainable development in a healthy natural environment
- Maintenance and improvement of the quality of the physical and natural environment
- Protection and conservation of the natural and cultural heritage of The Bahamas
- Planning for the development and maintenance of safe and viable communities

Agriculture and Fisheries Act (1964)
This Act provides for the supervision and development of agriculture and fisheries in The Bahamas and gives the Minister of Agriculture and Fisheries the authority to declare an area protected.

9.4 Community Engagement

Moriah Harbour Cay and its surrounding areas have historically been used for fishing, recreation, scuba diving, snorkeling, boating, beachcombing, picnicking and flats fishing. These activities preceded the establishment of the park and stakeholders and the local community will need to be made aware of new management efforts as they will likely affect how they use the park.

Raising awareness about MHCNP is necessary and will be an ongoing activity. Residents and visitors to Exuma need to be made aware of MHCNP, guidelines for activities in the park, any associated by-laws. Specific community engagement will be required to engage key stakeholders regarding their use of and impact on MHCNP. Landowners and developers in and around MHCNP, including private homeowners on the cays and islands, need to be engaged as their activities may have a direct or indirect impact on the park. Commercial interests in the area, including marinas and boat repair operations, and other businesses along the southern boundary of the park also need to be engaged. The yachting community which frequents Elizabeth Harbour on an annual basis will need to be engaged as they utilize areas in and around MHCNP.

The development and enforcement of bylaws for MHCNP regarding what will and will not be allowed in the park will require engagement of all key stakeholders, including those mentioned above. Local government and the Ministry of Tourism can be approached to assist with information on existing and planned activities around MHCNP. Further detailing of how key stakeholders will be engaged, how managers will communicate with stakeholders and the communities on Exuma regarding the park, can be achieved through the development of a Communications Plan.

10.0 Management Zones

10.1 Overview of Zoning

Establishing management zones and the zoning of areas is an integral component of effective management of national parks and protected areas. Marine protected areas worldwide implement zonal management,[23] each designed to meet the objectives of the protected area and to include stakeholder input in the process. It helps parks managers, enforcement agencies, local communities, visitors, and other stakeholders, understand the value of the park, its geographic location, and which activities are permitted within park boundaries.

Zoning is important to the management of protected areas like MHCNP because it allows managers to balance the needs and interests of the local community with conservation goals and objectives. Zoning is an effective tool for park management is widely accepted within protected area literature and ties in with other management approaches. It allows for the spatial delineation of marine and terrestrial areas where or specific activities will or will not be permitted. It also assists with reducing user conflicts and allows managers to zone areas based on spatial or temporal considerations, such as breeding or nesting seasons. Zoning facilitates efforts for greater protection of ecologically sensitive areas, while permitting other areas to be used for tourism, recreation and limited extractive purposes.

BNT's *Policies for National Parks and Protected Areas (2007)* notes that parks or zones within parks may be classified in various ways that correspond to the different categories of protected.

10.2 Zoning for MHCNP

The MHCNP GMP details three management zones, which consider the location and presence of conservation features, stakeholder use and activities, visitor and recreation patterns, and administrative needs. The three zones to be implemented are; a conservation zone, sensitive resource zone, and an administrative/visitor services zone. The administrative/visitor services zone includes administrative, camping and day use areas. These zones reflect BNT policies and input from stakeholders and the local community. The map of management zones (Figure 7) shows the locations of each of the zones and areas within the park.

The generalized locations for administrative, camping, and day use areas are shown on the Map of Management Zones, but actual site selection and development of the areas will require future field surveys. In determining proper locations for this zone, sites that have high resource values will be avoided and previously disturbed sites would be preferred. Table 6: Management Zoning Classification and Expectations provides an overview of the resource conditions, visitor experiences, and appropriate activities and sustainable development for each zone. These zones will guide future management actions and efforts within MHCNP and are described in the remainder of this chapter. Zones may be modified, or additional zones be added as indicated by research, monitoring and stakeholder input as part of the five-year strategic plan review process.

Conservation Zone

Lands and waters in the conservation zone will be managed to conserve natural resources and processes while accommodating uses and experiences that do not adversely affect the ecological integrity or the scenic quality and serenity of the area. Regulations on levels and methods of fly-fishing, and subsistence fishing will continue. Sustainable harvesting of silver thatch palm will continue. Hunting will not be permitted in the park. New development within the zone will be limited to BNT foot trails or board walks for public use. No major new construction or unsustainable extractive activities would be permitted in the zone.

Sensitive Zone

This zone consists of places in the park that support resources that are (1) unusually fragile, (2) limited geographically, and (3) would benefit from area-specific protection. Areas in this zone will be managed to restore

23 Zonal management is a way to delineate areas of the coastal and marine environment to specific allowable or prohibited activities in time or space

and perpetuate target species and their habitat and to limit or remove potentially disruptive activities. Areas where active reef restoration is being conducted may also be included in these zones to allow the restoration activities to become established without human intervention.

Park Administration/Visitor Services Zone

This zone will be managed to enhance visitor experience and safety, protect park resources, minimize impacts from visitor and commercial use, restore disturbed areas, and facilitate park administration. It will consist of the buildings, grounds, and space for staging park operations, education programmes, and other visitor services.

Facilities in this zone will be primarily based in communities on the eastern coast of Great Exuma and the eastern end of Stocking Island. The headquarters for Moriah Harbour Cay National Park (MHCNP) will be based in or near Georgetown. Office space will be provided for the senior warden, deputy wardens, the education officer, and the office clerk/assistant. In addition to staff offices, the headquarters structure will also include room to meet with the public and provide information and orientation to MHCNP.

Administrative areas will be strategically located within the MHCNP to allow for park signage, interpretative displays, boundary markers, access points, and other related management activities. Visitor facilities will include educational spaces, outdoor exhibits, parking areas, and
public restrooms. Future planning may consider limited expansion of this zone in the park for visitor services and administrative facilities.

For the purpose of managing public access for recreation and enjoyment of the park, camping and day use areas are proposed. Up to a total of three camping areas and five-day, use area may be provided. The purpose of these areas is to support water-based activities in the park including snorkelling; scuba diving; bird watching; kayaking, paddle boarding; sightseeing; picnicking; and educational programs. Commercial guides and organized groups may reserve use of these sites on a daily basis for picnics or comfort breaks, small group educational programmes, and wildlife viewing. These areas may also be used for staging transfers to smaller boats, such as kayaks and canoes, to explore the waterways.

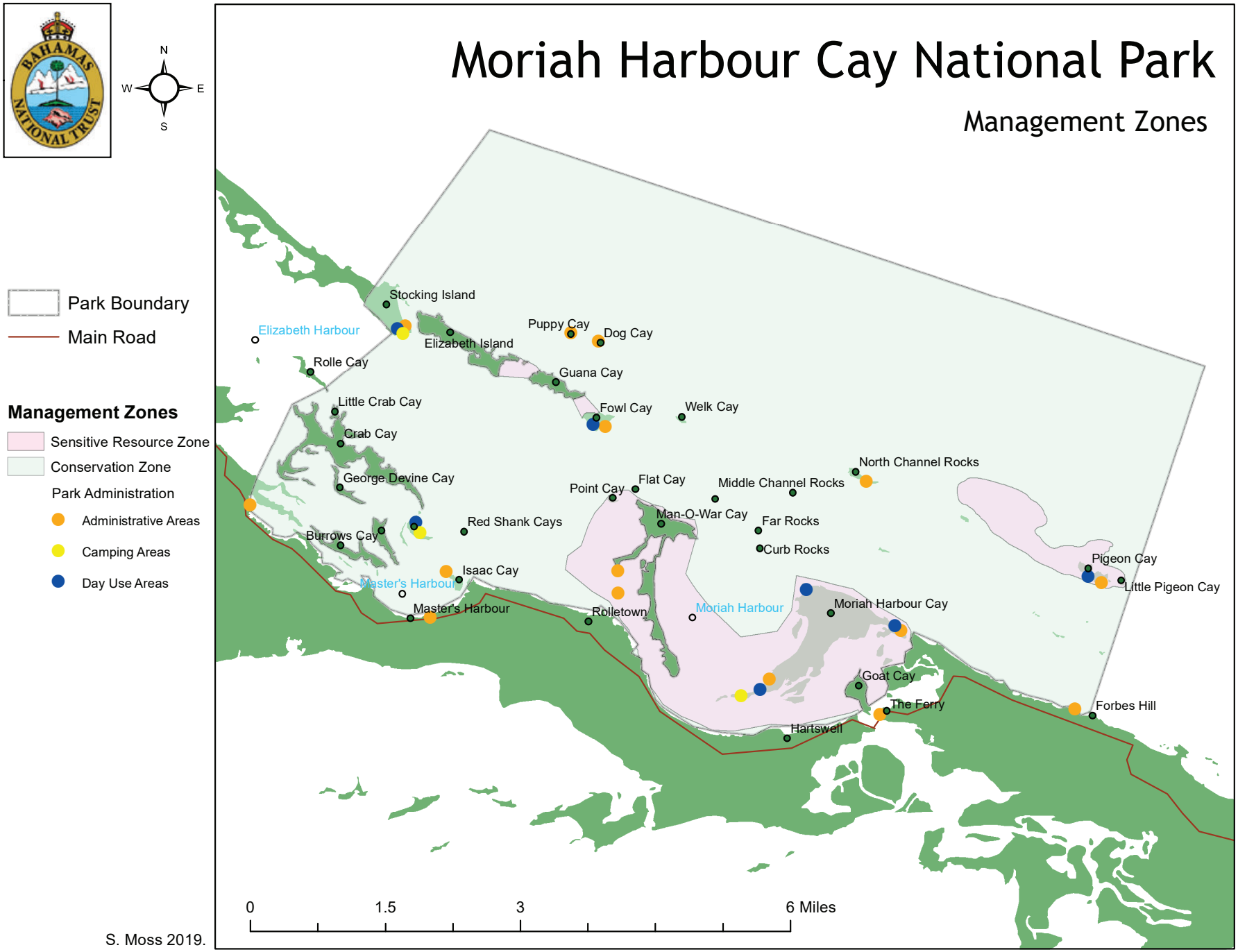

Figure 7. Map of Management Zones for MHCNP

Table 6.Management Zones Classification and Expectation

ZONES	Resource Conditions	User/Visitor Experiences	Management Actions
CONSERVATION ZONE	Natural environment with allowable uses and recreation Natural conditions, processes, and soundscapes predominate; resource harvesting limited to established activities Tolerance for moderate resource impacts related to established uses Managed to enhance visitor experience and safety, protecting resources, minimizing impacts from visitor and commercial use, and restoring disturbed areas	Wide range of uses and recreational opportunities in the wilderness Established subsistence, and fly fishing continue Low to moderate probability of encountering other people Activities could be limited at times to protect resources and enhance public safety Visitor opportunities include fishing, diving, snorkeling, boating, kayaking, paddle boarding, swimming, hiking, nature study & picnicking Recreation disruptive to the park environment (e.g., water skiing, jet skis, motocross) would be prohibited	Patrol, monitoring, and distress assistance Management focuses on patrol, monitoring, interpretation, boating distress assistance, search and rescue, regulation enforcement, and resource management actions Facilities may include way markers, trails, monitoring and research apparatus; potential for non-intrusive communication tower; no permanent structures or paved road access would be provided Vessel type, size, speed, and acoustic properties could be regulated to protect benthic environment and natural soundscapes

ZONES	Resource Conditions	User/Visitor Experiences	Management Actions
SENSITIVE ZONE	Complete protection of exceptional and critical resources Natural conditions, processes, and soundscapes would predominate Disturbance to or harvesting of target species and their habitat would be prohibited No tolerance for impacts to exceptional and critical resources and processes Lasting signs of human use would not be apparent. Intervention and restoration could occur to mitigate and stabilize human-caused disturbance. Otherwise, alterations to natural resources would not occur. The significance and vulnerability of natural resources would be evaluated, and appropriate management actions would be determined	Observation of target resources by guided tour and resource sensitive protocols Within the zone human activities will be limited to places, times, and activities that avoid disturbance of exceptional species and their habitat with a registered guide, visitors may observe target species from an appropriate distance Monitoring and research may be allowed under a special permit by BNT Vessels and vehicles would be restricted from the zone except for administrative, monitoring, research, or emergency purposes	Management by monitoring and regulation enforcement Target species actively monitored and evaluated No permanent facilities allowed; monitoring or research apparatus may be temporarily installed

ZONES	Resource Conditions	User/Visitor Experiences	Management Actions
ADMINISTRATIVE/VISITOR SERVICES ZONE	A limited area (<0.5 acres) cleared and managed for intensive use The landscape within the zone would be designed for group activities including outdoor cooking, outdoor dining, tent camping Human sights and sounds predominate Managed to enhance visitor experience, health, and safety Tolerance for intensive resource impacts related to concentrated visitor use; sanitary facilities would be designed and located to avoid impacts to surrounding Conservation Zone	Visitors camp in a wilderness Setting The campsite would have a social, interactive environment In addition to overnight camping, visitor opportunities include fishing, snorkeling, swimming, nature study, and picnicking at the site	Patrol, monitoring, and distress assistance Management focuses on patrol, monitoring, interpretation, distress assistance, and site maintenance

11.0 Management Strategies

Moriah Harbour Cay National Park (MHCNP) is one of thirty-two (32) national parks in The Bahamas' National Park System managed by The Bahamas National Trust (BNT). BNT's established policies for national parks and protected areas provides the organization's philosophy and direction for management decisions and have been adopted by BNT's Council in 2007.

The BNT will maintain as parts of the natural ecosystems of parks all native plants and animals. Maintaining includes:[24]

- Preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviours of native plant and animal populations and the communities and ecosystems in which they occur;
- Restoring native plant and animal populations in parks when they have been extirpated or reduced by past human actions;
- Minimizing human impacts on native plants, animals, populations, communities, and ecosystems and the processes within;
- Collecting data through monitoring, for use in both plant and animal management programs;
- Providing information about species life cycles, ranges, population dynamics, and other ecological information in park interpretive programmes to increase public awareness of management needs for all species; and
- Preventing the introduction of exotic species into units of the national park system and removing populations of these species when they intrude on native species (except in established botanical gardens, or historic gardens.)

Although the GMP provides a roadmap to achieve effective management of MHCNP, detailed management actions will be defined in a separate strategic plan. With a five-year horizon, the strategic plan is based on the mission and long-term goals for MHCNP, organizing each goal into clear achievable targets. The strategic plan focuses on the highest priority issues for the next five years as identified by the management planning process. Additionally, a strategic plan articulates a decision-making process that balances goals with available resources. BNT staff is responsible for developing and implementing annual work plans and budgets that would achieve the goals and objectives of the strategic plan.

11.1 Institutional Arrangements

BNT is the lead institution for the designation and management of MHCNP, which will be managed according to the Bahamas National Trust Act (1959), the Bahamas National Trust Act (Amended) 2010, Policies for national parks and PAs (adopted by the BNT Council in 2007 to guide decisions by the Executive Director, BNT Staff, and individual park managers). BNT acknowledges that establishing inter-agency relationships and partnerships with government agencies, non-government organizations, private organizations and individuals is critically important for effective management of national parks throughout The Bahamas. Accordingly, MHCNP will be managed by a management team, which is a core group comprised of representatives from BNT, key partners from the national agencies, and agencies with responsibility for resources within national parks. The composition of the MHCNP Management Team will include representatives from the following:

- Bahamas National Trust
- Department of Environmental Health Services
- Department of Marine Resources
- Elizabeth Harbour Conservation Partnership
- The Exuma Foundation
- Exuma Chamber of Commerce

24 Taken from BNT's Policies for National Parks and Protected Areas 2007

- Exuma Tour Operators Association
- Local Government
- Ministry of Tourism
- Port Department
- Royal Bahamas Defence Force
- Royal Bahamas Police Force

The MHCNP Management Team will be responsible for:

1. Designing and implementation of a governance processes to implement the management plan through inter-agency partnerships.
2. Monitoring and evaluation of achievement of the management plan vision and objectives and employ appropriate adaptive management strategies as necessary.

11.2 Community Participation and Education

Public involvement in the long-term management of MHCNP is crucial in minimizing threats, monitoring activities, and achieving the overall objectives of the park. BNT has had success with involving the public through its Partnership for the Parks Programme. The programme provides an avenue for BNT members and corporate citizens to help with national park infrastructure and fundraising activities or serve as volunteer visitor guides.

A public awareness campaign for MHCNP, promoting the existing park and the proposed expansion, would bring visibility to MHCNP and create opportunities for the public to participate. Through this campaign residents can learn of opportunities to get involved with efforts at MHCNP.

BNT staff, in addition to local and national partners, will initiate regularly scheduled informal meetings at multiple locations on Exuma to meet with local community members, fishing and tour operators, educators, hotel managers, and other relevant stakeholders. The purpose of the meetings will be to maintain open communications with the public about MHCNP and discuss topics related to park management efforts, opportunities to get involved, results of monitoring or research in the park, and any number of informative and exciting exchanges.

As BNT develops various opportunities to engage the community, it will seek to work with the public and private sector, to maximize efforts and impact on Exuma.

Education staff will collaborate with the Exuma Foundation, Elizabeth Harbour Conservation Partnership, the University of The Bahamas (satellite campus), researchers and scientists, and others to arrange presentations on park and environmental topics with local schools and civic organizations. BNT will also explore ways to expand its existing branch of Discovery Club to include educational activities within the park including visits, camping, and citizen science. Students and teachers on Exuma could learn to develop citizen science skills through efforts like Bird Conservation in The Bahamas Initiatives.

Nature-based tourism provides opportunities for local entrepreneurs and BNT encourages and supports park related activities. Such activities can bring economic benefits to local communities and strengthen support for MHCNP. These activities may include, but not limited to:

- kayaking
- bird watching
- guided watercraft tours
- bonefishing
- snorkelling and scuba diving
- day camping

BNT will coordinate with the Ministry of Tourism (MOT) on Exuma to promote training workshops for stakeholders interested in nature-based tourism. Informing and building upon local skills for eco-tourism activities along with providing assistance in getting the necessary permits. Efforts will also include helping residents to apply for grants or special loans to start eco-tourism businesses.

BNT will develop displays and materials about the park to participate in local community events and festivals where feasible. BNT will develop a focused program to take guests to the park, accommodating stakeholders from all walks of life. This will also include overnight camps and adventure programs for youth in the park.

MHCNP is rich in opportunities for scientific research and is conveniently located near Georgetown, which has an international airport and modern amenities. BNT will work with individuals and entities doing major scientific or other professional studies and facilitate their work at MHCNP. BNT will also promote opportunities for Bahamians to participate in and conduct research and monitoring programmes. Researchers will be encouraged by BNT to share their results with local communities at BNT sponsored events. Overall, MHCNP is an important resource for scientists, educators and the community due to the variety of aesthetic, recreational, educational, and economic opportunities it offers.

12.0 Management Plan Implementation

Once management goals, objectives, strategies, and zoning considerations are established, the next step in the planning process is implementation which identifies the activities needed to achieve goals for the protected area. The success of protected areas as a management tool for conservation is contingent on effective implementation.

The MHCNP GMP is expected to be implemented over a period of 10 years. At the end of that period, an independent evaluation of the implementation of the plan should be conducted. The evaluation will serve as a tool to measure progress in achieving the goals and objectives of MHCNP. The objectives and activities to be implemented over the 10-year period (2019-2029) are listed in Table 7.

Table 7. MHCNP Management Objectives and Activities

Management Goals	Management Objective	Management Activity	Functional Area	Functional Programme
I. Conserve natural resources	A. Conserve natural resources, ecological processes and the aesthetic environment	1. Establish water quality monitoring protocol for inland and coastal waters	Resource management and protection	Scientific monitoring and research
		2. Develop Zoning Plan	Resource management and protection	Zoning and boundaries
		3. Identify and implement research and monitoring priorities for natural communities	Resource management and protection	Scientific monitoring and research
		4. Develop research management plan	Resource management and protection	Scientific monitoring and research
		5. Provide and encourage research opportunities that support management objectives	Resource management and protection	Scientific monitoring and research
		6. Develop biological inventory of the parks	Resource management and protection	Species and habitat management; Scientific monitoring and research
		7. Update protected area database to include natural and cultural resource data	Resource management and protection	Scientific monitoring and research
		8. Include species data from biological inventory within protected area database	Resource management and protection	Species and habitat management; Scientific monitoring and research

Management Goals	Management Objective	Management Activity	Functional Area	Functional Programme
		9. Implement IAS management plan	Resource management and protection	Species and habitat management
		10. Develop by-laws specific to protection of threatened and endangered species	Resource management and protection	Species and habitat management
	B. Minimize anthropogenic impacts	1. Research feasibility of establishing buffer zones with private landholdings within and adjacent to parks	Resource management and protection; Community outreach	Species and habitat management; Partnership relations
		2. Identify and implement research and monitoring priorities for socioeconomic data	Resource management and protection	Scientific monitoring and research
		3. Establish 3R's protocol for Park to reduce solid waste generation	Resource management and protection; Facilities operations and management	Species and habitat management; Buildings, grounds and utilities
		4. Maintain existing mooring buoys and demarcation markers	Resource management and protection; Facilities operations and management	Zoning and boundaries; Docking facilities
		5. Restore human-altered habitats and ecosystems to natural conditions where appropriate and when consistent with Zoning Plan	Resource management and protection	Species and habitat management
	C. Conserve natural landscapes and seascapes for scenic value	1. Design park infrastructure so it is not visually intrusive	Facilities operations and management	Buildings, grounds and utilities
		2. Work with private land owners and settlements to minimize adverse impacts	Management and administration	Partnership relations

Management Goals	Management Objective	Management Activity	Functional Area	Functional Programme
2. Conserve historical and cultural resources	A. Work cooperatively with AMMC to identify and manage historical and cultural resources and where appropriate make recommendations for restoration	1. Request existing information from AMMC for sites within MHCNP	Management and administration	Government relations
		2. Review existing information from AMMC and provide written recommendations	Management and administration	Government relations
3. Community outreach	A. Promote education and outreach amongst stakeholders	1. Develop communication plan	Community outreach	Public outreach and information
		2. Promote sustainable fishing practices amongst local and visiting fishermen and communities	Community outreach	Awareness and education
		3. Promote best practices for divers and other recreational users	Community outreach	Awareness and education
		4. Promote park as a nationally and internationally significant MPA	Community outreach	Public outreach and information
		5. Communicate scientific results to all stakeholders	Community outreach	Awareness and education
4. Manage visitor enjoyment and experience (VEE)	A. Provide visitor management systems compatible with parks' objectives	1. Assess visitor carrying capacity to determine baseline	Resource management and protection	Scientific monitoring and research
		2. Promote best management practices for tour service providers	Community outreach	Awareness and education
		3. Minimize impact of all visitors to parks	Community outreach	Awareness and education
		4. Establish monitoring programme for visitor impacts	Resource management and protection	Scientific monitoring and research

Management Goals	Management Objective	Management Activity	Functional Area	Functional Programme
		5. Develop and place interpretive signage	Tourism and recreation; Facilities operations and management	Visitor awareness and interpretation; Trail operations and maintenance
5. Ensure sufficient capacity and regulations for effective park management	A. Ensure an operational work plan for MHCNP	1. Develop operational work plan on an annual basis	Management and administration	General management and administration
	B. Ensure a financial plan to implement the objectives stated in this plan.	1. Develop five-year financial plan	Management and administration	Financial management
		2. Develop and implement sustainable financing strategies	Management and administration	Financial management
	C. Ensure adequate staff and infrastructure to achieve park mission and purpose.	3. Develop human resource capacity including first aid response training for staff	Management and administration	Training
	D. Ensure the implementation of a comprehensive and coordinated regulatory program for MHCNP	1. Harmonize Park by-laws with fisheries, environment and other legislation and regulations	Management and administration	General management and administration

13.0 Monitoring and Evaluation

An integral component of effective protected area management and implementation of a management plan is monitoring and evaluation. It is a valuable strategy that provides managers with information to assess the status of threats and conservation targets. It also allows for the evaluation of management actions and approaches, and it provides a feedback loop for learning about the protected area.

At certain intervals in the management of a protected area, managers may need to know the status of an area as it relates to the health of a conservation feature or the current level of a threat in the area. With monitoring in place, managers can better gauge the state of the factor(s) in question and decide on the appropriate course of action.

With specific objectives established for science and management, managers can focus limited resources and human capacity in a useful and cost-effective manner. Monitoring and evaluation provide information about the behaviour and dynamics of the monitored system and can direct research efforts toward set objectives for the protected area. For example, annual bird counts over time can provide information on the status of the population and can inform management actions or future research needs.

Work plans should be developed and executed by MHCNP staff and should include aspects of the general management plan (GMP) that are scheduled for implementation. These work plans should be quarterly and also factor in available human resource capacity, financial allocations for the period, and any existing administrative challenges of the BNT.

Periodic review of progress made in implementing the GMP should occur quarterly or twice a year to allow managers to identify and resolve any issues or barriers to implementation. BNT has established functional areas and programmes, as well as several indicators of progress by which progress can be measured (Table 8).

Table 8. Indicators of Progress for Monitoring and Evaluation

Functional Area	Programme	Indicators of Progress
1. Resource Management and Protection	a. Surveillance and Enforcement	☐ Number of marine patrols per month ☐ Number of beach patrols per month ☐ Number and type of infringement of MHCNP bylaws per month ☐ Number and type of follow-up action with offenders
	b. Scientific Monitoring and Research	☐ Number and location of monitoring stations identified ☐ Monitoring stations established and mapped ☐ Number and type of measurements taken per quarter ☐ Data analysis reports ☐ Number of monthly park user surveys conducted ☐ Research priorities identified ☐ Number of research activities initiated ☐ Recommendations for management interventions prepared
	c. Species and Habitat Management	☐ Number of activities executed for control of alien species ☐ Number of activities executed for debris and pollution abatement ☐ Oil and chemical response plan developed
	d. Zoning and Boundaries	☐ Number of meetings held with stakeholders ☐ Identification of number and types of zones ☐ Stakeholders agreement on size, shape and location of zones ☐ Zoning plan completed ☐ Designation and trial of use of zones

Functional Area	Programme	• Indicators of Progress
2. Community Outreach	a. Awareness and Education	☐ Programme of activities for priority groups developed ☐ Number of different types of awareness materials prepared ☐ Number of awareness events planned ☐ Number of awareness events executed ☐ Evaluation of effectiveness completed ☐ Redesign of future activities (if needed)
	b. Public Outreach and Information	☐ Programme of activities for target groups developed ☐ Profile of each group prepared ☐ Number of outreach events planned ☐ Number of outreach events executed ☐ Evaluation of effectiveness completed ☐ Redesign of future activities (if needed)
3. Tourism and Recreation	a. User Fee Collection	☐ Feasibility study completed ☐ Fee collection system implemented
	b. Visitor Awareness and Interpretation	☐ Number of signs prepared ☐ Number of different types of awareness materials prepared ☐ Number of awareness events planned ☐ Number of awareness events executed ☐ Evaluation of effectiveness completed
4. Management and Administration	a. General Management and Administration	☐ Personnel recruited for MHCNP ☐ Types of equipment procured ☐ Office supplies procured
	b. Training	☐ Mechanism to facilitate in-house learning developed ☐ Number and type of training activities per quarter
	c. Financial Management	☐ Accounting system in place ☐ Quarterly financial reports prepared
	d. Partnership Relations	☐ Number of partners engaged per year ☐ Number of meetings to develop relationships ☐ Number of partners actively collaborating in the management of the MHCNP
	e. Government Relations	☐ Number of agencies engaged per year ☐ Number of meetings to develop relationships ☐ Number of Government agencies actively collaborating in the management of the MHCNP
	f. Information Technology	☐ Number and types of equipment procured ☐ Number of staff trained to use equipment
5. Facilities Operations and Management	a. Docking Facilities	☐ Number of mooring buoys acquired ☐ Buoy accessories acquired ☐ Agreement by stakeholders on location for deployment ☐ Number of mooring buoys deployed
	b. Buildings, Ground and Utilities	☐ Land for office obtained ☐ Plan for construction approved ☐ Building constructed and utilities connected ☐ Building utilized by staff
	c. Boat & Vehicle Operations and Maintenance	☐ Insurance paid for boat & vehicle ☐ Maintenance schedule developed and utilized
	d. Trail Operations and Maintenance	☐ Trail systems constructed ☐ Interpretive signage installed along trails

14.0 Financial Plan

Financial planning is a key component to achieving the long-term vision for Moriah Harbour Cay National Park (MHCNP) and allows for the management goals and objectives detailed in this general management to be achieved. Day-to-day management of the MHCNP is not sufficiently captured in the overall budget for the Bahamas National Trust (BNT). Therefore, sustainable financing mechanisms should be explored to meet the financial needs of the park, without which the MHCNP would be rendered a "paper park". To address this critical issue, the MHCNP financial plan includes an initial budget estimate for year one and four sustainable finance mechanisms (detailed below).

14.1 User Fees

Entrance fees and other user fees for protected areas and properties in The Bahamas are commonplace and are used by managers as a source of income to support operations. The Exuma Cays Land and Sea Park (ECLSP) is the only marine protected area in The Bahamas that currently charges user fees. Visitors passing through the ECLSP have the option of securing their vessels to moorings in the park for a fee, which is collected by park staff. The fees are used to support park operations. BNT is also considering the introduction of a general entrance fee.

MHCNP is similar to ECLSP in relation to what offerings are available for visitors and in the case of moorings, there are areas where additional buoys could be installed. Using ECLSP average annual park fees over the period 2002 to 2006, the total amount collected was B$66,000 and with annual collections increasing at a rate of 8.3% per annum, it is conservatively estimated that MHCNP user fees could conservatively generate B$10,000 in year one, with a potential increase of up to B$50,000 per annum over a ten-year period.

A comprehensive user fee system can benefit MHCNP twofold, firstly as a source of funding and also as a conduit for collecting data on the visitor demographics, reasons for visiting, length of stay, and planned activities within the park. This information can assist with improved marketing and streamlining offerings and facility upgrades.

14.2 Bahamas Protected Area Fund

In 2014, the Government of The Bahamas passed legislation for the Bahamas Protected Area Fund (BPAF). The BPAF Act allows for a broad range of revenue sources including public and private donations, gifts and bequests, fees, investments and proceeds from the sale of tangible and intangible property. BPAF currently receives funding from the Government of The Bahamas through subventions, a one-time allocation from the Global Environment Facility, conditional disbursements from the Caribbean Biodiversity Fund, and any interest that the Fund accrues.

An Executive Director was hired in 2017 and the Strategic Plan and Grants Framework was developed in 2018. The framework outlines parameters by which agencies and nonprofits can apply for grants. In 2017, a Sustainable Financing Plan was developed for the Bahamas National Protected Areas System which identified seven priority funding options for BPAF. The BPAF funding mechanism, once fully instituted, has that potential to fund a variety of activities and efforts within MHCNP and should be explored to the fullest extent allowed.

14.3 Grants

Grants for marine protected area management exist nationally and internationally and can range in size from small to large grants. Nonprofit organizations, including foundations, the private sector, and some government agencies provide funding in the form of grants for the types of activities envisioned for MHCNP. In considering the pursuit of grant opportunities, BNT should account for the upfront cost of dedicated staff time for researching grants, following-up, and in the instances where grants are awarded, administration of the grant; which also includes financial and project reporting.

14.4 Private Donors

BNT has a successful track record with private donors capitalizing the Heritage Fund and supporting projects and activities across the 32 national parks that BNT manages. Similar donations should be pursued for MHCNP, particularly with private landowners, second homeowners, tour operators, private sector and commercial/corporate interests on Exuma that utilize and benefit or may benefit from MHCNP.

14.5 Initial Budget Estimate for MHCNP[25]

The park will have eight staff a Senior Warden, two Deputy Wardens, a part-time Science officer, an Outreach/ Education officer, an Office manager, a Programme Coordinator and a Clerk/ Visitor centre assistant. Annual operations costs are estimated at $202,195 per year for patrols, mooring buoy installations and maintenance, community education and outreach, science programmes, field trips to the park and support for the local BNT chapter.

Investment needs are estimated at $417,500 - $846,000 for an office on Great Exuma Island, cabanas on Stocking Island and Moriah Harbour Cay, a lookout tower, trails, signage, demarcation, mooring buoys, a vehicle, a boat, invasive species management activities, a business plan for the park, science equipment, visitor centre, campsites, restrooms, and a portion of the island-wide investment needs. Cost of Island-Wide Investments are shared between the Islands' parks (Table 9).

Table 9. Initial Budget Estimate for MHCNP

Staffing Needs	Infrastructure/Investment Needs	Annual Operations Needs	Investment Needs
Senior Warden 2 Deputy Wardens Science Officer Outreach/Ed Officer Office Manager Clerk/Visitor Centre	Office on Great Exuma Cabana on Moriah Harbour Cay Trails and Lookout Tower Campsites Signage Demarcation Mooring Buoys Vehicle and Boat Invasive Species Management Business Plan Science Equipment	$317,250	$846,000

25 Based on the Cost Verification for an Effectively Managed Parks System in The Bahamas. September 2016

APPENDICES

Appendix I – Species Lists

BIRD SPECIES LIST FOR EXUMA

Taken from Birdlife Caribbean checklist ver. 9.1 https://avibase.bsc-eoc.org/checklist.jsp?region=BSex

Common name	***Scientific name***
American oystercatcher	*Haematopus palliatus*
Piping plover	*Charadrius melodus*
Indian Peafowl	*Pavo cristatus*
West Indian Whistling-duck	*Dendrocygna arborea*
Fulvous Whistling-duck	*Dendrocygna bicolor*
Ruddy Duck	*Oxyura jamaicensis*
Red-breasted Merganser	*Mergus serrator*
Wood Duck	*Aix sponsa*
Redhead	*Aythya americana*
Ring-necked Duck	*Aythya collaris*
Lesser Scaup	*Aythya affinis*
Northern Shoveler	*Spatula clypeata*
Blue-winged Teal	*Spatula discors*
Gadwall	*Mareca strepera*
American Wigeon	*Mareca americana*
Mallard	*Anas platyrhynchos*
White-cheeked Pintail	*Anas bahamensis*
Northern Pintail	*Anas acuta*
Common Teal	*Anas crecca*
Least Grebe	*Tachybaptus dominicus*
Pied-billed Grebe	*Podilymbus podiceps*
White-tailed Tropicbird	*Phaethon lepturus*
Rock Dove	*Columba livia*
Eurasian Collared-dove	*Streptopelia decaocto*
White-crowned Pigeon	*Patagioenas leucocephala*
Key West Quail-dove	*Geotrygon chrysia*
White-winged Dove	*Zenaida asiatica*
Zenaida Dove	*Zenaida aurita*
Mourning Dove	*Zenaida macroura*

Common Ground-dove	*Columbina passerina*
Common name	***Scientific name***
Common Nighthawk	*Chordeiles minor*
Antillean Nighthawk	*Chordeiles gundlachii*
Chuck-will's-widow	*Antrostomus carolinensis*
Chimney Swift	*Chaetura pelagica*
Bahama Woodstar	*Calliphlox evelynae*
Ruby-throated Hummingbird	*Archilochus colubris*
Smooth-billed Ani	*Crotophaga ani*
Yellow-billed Cuckoo	*Coccyzus americanus*
Mangrove Cuckoo	*Coccyzus minor*
Clapper Rail	*Rallus crepitans*
Sora	*Porzana carolina*
Purple Gallinule	*Porphyrio martinicus*
Common Gallinule	*Gallinula galeata*
American Coot	*Fulica americana*
Limpkin	*Aramus guarauna*
Wilson's Storm-petrel	*Oceanites oceanicus*
Band-rumped Storm-petrel	*Hydrobates castro*
Leach's Storm-petrel	*Hydrobates leucorhous*
Black-capped Petrel	*Pterodroma hasitata*
Sooty Shearwater	*Ardenna grisea*
Great Shearwater	*Ardenna gravis*
Cory's Shearwater	*Calonectris borealis*
Manx Shearwater	*Puffinus puffinus*
Audubon's Shearwater	*Puffinus lherminieri*
White Ibis	*Eudocimus albus*
Glossy Ibis	*Plegadis falcinellus*
American Bittern	*Botaurus lentiginosus*
Least Bittern	*Ixobrychus exilis*
Black-crowned Night-heron	*Nycticorax nycticorax*
Yellow-crowned Night-heron	*Nyctanassa violacea*
Green-backed Heron	*Butorides striata*
Cattle Egret	*Bubulcus ibis*
Great Blue Heron	*Ardea herodias*
Great White Egret	*Ardea alba*

Reddish Egret	*Egretta rufescens*
Common name	***Scientific name***
Tricolored Heron	*Egretta tricolor*
Little Blue Heron	*Egretta caerulea*
Snowy Egret	*Egretta thula*
Brown Pelican	*Pelecanus occidentalis*
Magnificent Frigatebird	*Fregata magnificens*
Red-footed Booby	*Sula sula*
Masked Booby	*Sula dactylatra*
Double-crested Cormorant	*Phalacrocorax auritus*
Neotropical Cormorant	*Phalacrocorax brasilianus*
American Oystercatcher	*Haematopus palliatus*
American Avocet	*Recurvirostra americana*
Black-winged Stilt	*Himantopus himantopus*
Grey Plover	*Pluvialis squatarola*
American Golden Plover	*Pluvialis dominica*
Semipalmated Plover	*Charadrius semipalmatus*
Wilson's Plover	*Charadrius wilsonia*
Killdeer	*Charadrius vociferus*
Piping Plover	*Charadrius melodus*
Snowy Plover	*Charadrius nivosus*
Northern Lapwing	*Vanellus vanellus*
Upland Sandpiper	*Bartramia longicauda*
Whimbrel	*Numenius phaeopus*
Ruddy Turnstone	*Arenaria interpres*
Red Knot	*Calidris canutus*
Stilt Sandpiper	*Calidris himantopus*
Sanderling	*Calidris alba*
Dunlin	*Calidris alpine*
Least Sandpiper	*Calidris minutilla*
White-rumped Sandpiper	*Calidris fuscicollis*
Pectoral Sandpiper	*Calidris melanotos*
Semipalmated Sandpiper	*Calidris pusilla*
Western Sandpiper	*Calidris mauri*
Short-billed Dowitcher	*Limnodromus griseus*
Wilson's Snipe	*Gallinago delicata*

Wilson's Phalarope	*Steganopus tricolor*
Common name	***Scientific name***
Red-necked Phalarope	*Phalaropus lobatus*
Spotted Sandpiper	*Actitis macularius*
Solitary Sandpiper	*Tringa solitaria*
Willet	*Tringa semipalmata*
Lesser Yellowlegs	*Tringa flavipes*
Greater Yellowlegs	*Tringa melanoleuca*
Brown Noddy	*Anous stolidus*
Bonaparte's Gull	*Larus philadelphia*
Laughing Gull	*Larus atricilla*
Ring-billed Gull	*Larus delawarensis*
Arctic Herring Gull	*Larus smithsonianus*
Sooty Tern	*Onychoprion fuscatus*
Bridled Tern	*Onychoprion anaethetus*
Least Tern	*Sternula antillarum*
Common Gull-billed Tern	*Gelochelidon nilotica*
Black Tern	*Chlidonias niger*
Roseate Tern	*Sterna dougallii*
Common Tern	*Sterna hirundo*
Forster's Tern	*Sterna forsteri*
Sandwich Tern	*Thalasseus sandvicensis*
Royal Tern	*Thalasseus maximus*
Arctic Jaeger	*Stercorarius parasiticus*
Pomarine Jaeger	*Stercorarius pomarinus*
Common Barn-owl	*Tyto alba*
Burrowing Owl	*Athene cunicularia*
Osprey	*Pandion haliaetus*
Swallow-tailed Kite	*Elanoides forficatus*
Northern Harrier	*Circus hudsonius*
Sharp-shinned Hawk	*Accipiter striatus*
Belted Kingfisher	*Megaceryle alcyon*
Yellow-bellied Sapsucker	*Sphyrapicus varius*
American Kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Peregrine Falcon	*Falco peregrinus*

Eastern Kingbird	*Tyrannus tyrannus*
Common name	***Scientific name***
Grey Kingbird	*Tyrannus dominicensis*
La Sagra's Flycatcher	*Myiarchus sagrae*
Acadian Flycatcher	*Empidonax virescens*
Eastern Wood-pewee	*Contopus virens*
Philadelphia Vireo	*Vireo philadelphicus*
Red-eyed Vireo	*Vireo olivaceus*
Black-whiskered Vireo	*Vireo altiloquus*
Yellow-throated Vireo	*Vireo flavifrons*
White-eyed Vireo	*Vireo griseus*
Thick-billed Vireo	*Vireo crassirostris*
Cliff Swallow	*Petrochelidon pyrrhonota*
Cave Swallow	*Petrochelidon fulva*
Barn Swallow	*Hirundo rustica*
Collared Sand Martin	*Riparia riparia*
Tree Swallow	*Tachycineta bicolor*
Bahama Swallow	*Tachycineta cyaneoviridis*
Purple Martin	*Progne subis*
Blue-grey Gnatcatcher	*Polioptila caerulea*
House Wren	*Troglodytes aedon*
Common Starling	*Sturnus vulgaris*
Grey Catbird	*Dumetella carolinensis*
Pearly-eyed Thrasher	*Margarops fuscatus*
Northern Mockingbird	*Mimus polyglottos*
Bahama Mockingbird	*Mimus gundlachii*
Grey-cheeked Thrush	*Catharus minimus*
American Robin	*Turdus migratorius*
Cedar Waxwing	*Bombycilla cedrorum*
Buff-bellied Pipit	*Anthus rubescens*
Chipping Sparrow	*Spizella passerina*
Grasshopper Sparrow	*Ammodramus savannarum*
White-crowned Sparrow	*Zonotrichia leucophrys*
Savannah Sparrow	*Passerculus sandwichensis*
Lincoln's Sparrow	*Melospiza lincolnii*
Bobolink	*Dolichonyx oryzivorus*
Baltimore Oriole	*Icterus galbula*

Brown-headed Cowbird	*Molothrus ater*
Common name	***Scientific name***
Ovenbird	*Seiurus aurocapilla*
Worm-eating Warbler	*Helmitheros vermivorum*
Louisiana Waterthrush	*Parkesia motacilla*
Northern Waterthrush	*Parkesia noveboracensis*
Blue-winged Warbler	*Vermivora cyanoptera*
Black-and-white Warbler	*Mniotilta varia*
Prothonotary Warbler	*Protonotaria citrea*
Swainson's Warbler	*Limnothlypis swainsonii*
Tennessee Warbler	*Leiothlypis peregrina*
Orange-crowned Warbler	*Leiothlypis celata*
Nashville Warbler	*Leiothlypis ruficapilla*
Connecticut Warbler	*Oporornis agilis*
Kentucky Warbler	*Geothlypis formosa*
Common Yellowthroat	*Geothlypis trichas*
Hooded Warbler	*Setophaga citrina*
American Redstart	*Setophaga ruticilla*
Kirtland's Warbler	*Setophaga kirtlandii*
Cape May Warbler	*Setophaga tigrina*
Northern Parula	*Setophaga americana*
Magnolia Warbler	*Setophaga magnolia*
Bay-breasted Warbler	*Setophaga castanea*
Blackburnian Warbler	*Setophaga fusca*
American Yellow Warbler	*Setophaga petechia*
Chestnut-sided Warbler	*Setophaga pensylvanica*
Blackpoll Warbler	*Setophaga striata*
Black-throated Blue Warbler	*Setophaga caerulescens*
Palm Warbler	*Setophaga palmarum*
Myrtle Warbler	*Setophaga coronata*
Yellow-throated Warbler	*Setophaga dominica*
Prairie Warbler	*Setophaga discolor*
Black-throated Green Warbler	*Setophaga virens*
Western Spindalis	*Spindalis zena*
Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Dickcissel	*Spiza americana*
Indigo Bunting	*Passerina cyanea*

Blue Grosbeak	*Passerina caerulea*
Common name	***Scientific name***
Painted Bunting	*Passerina ciris*
Scarlet Tanager	*Piranga olivacea*
Summer Tanager	*Piranga rubra*
Bananaquit	*Coereba flaveola*
Greater Antillean Bullfinch	*Pyrrhulagra violacea*
Black-faced Grassquit	*Melanospiza bicolor*

AMPHIBIANS AND REPTILES

(Taken from Franz, C. Dodd, Jr. and Buden, D.. Distributional Records of Amphibians and Reptiles from the Exuma Islands, Bahamas. https://bnt.bs/wp-content/uploads/2016/09/exumareptiles.pdf)

Common Name	***Scientific name***
Frogs	
• Greenhouse frog	*Eleutherodactylus planirostris*
• Cuban tree frog	*Osteopilus septentrionalis*
Lizards	
	Ameiva auberi
• Cuban twig anole	*Anolis angusticeps*
• Bark anole	*Anolis distichus*
• Brown anole	*Anolis sagrei*
• Bahamian green anole	*Anolis smaragdinus*
• Northern curlytail lizard	*Leiocephalus carinatus*
	Sphaerodactylus nigropunctatus
	Sphaerodactylus notatus
	Hemidactylus mabouia
Snakes	
• Bahamian brown racer	*Alsophis vudii*
	Epicrates striatus
• Bahamian pygmy boa	*Tropidophis canus*
• Earthworm blind snake	*T. lumbricalis*
Turtles	
• Loggerhead sea turtle	*Caretta caretta*
	Trachemys sp. Hybrid
• Leatherback sea turtle	*Dermochelys coriacea*
• Hawksbill sea turtle	*Eretmochelys imbricate*
• Kemp's ridley sea turtle	*Lepidochelys kempii*

• Olive ridley sea turtle	*Lepidochelys olivacea*

FISH SPECIES LIST FOR MORIAH HARBOUR CAY AREA
(Taken from Dahlgren, C.. 2006. Personal communication, 2017)

Common Name	***Scientific name***
Snappers	*Lutjanus spp. and Ocyurus chrysurus*
	Abudefduf saxatilis
Sergeant major	*Acanthurus bahianus*
Ocean surgeon	*Acanthurus coeruleus*
	Acanthurus maculatus
	Balistes vetula
Queen triggerfish	*Bodianus pulchellus*
	Bodianus rufus
Spanish hogfish	*Canthigaster rostrate*
Caribbean sharpnose puffer	*Caranx ruber*
	Cephalopholis fulvus
	Chaetodon capistratus
Foureye butterflyfish	*Chaetodon striatus*
Banded butterflyfish	*Chromis cyanea*
	Clepticus parrae
	Coryphopterus glaucofrenum
	Coryphopterus personatus
	Diodon hystrix
	Epinephelus guttatus
Red Hind	*Epiniphelus spp*
Groupers	*Epinephelus striatus*
Nassau Grouper	*Gerres cinereus*
Cleaning Goby	*Gobiosoma genie*
Fairy Basslet	*Gramma loreto*
French Grunt	*Haemulon flavolineatum*
Sailor's Choice	*Haemulon parra*

	Haemulon plumierii
	Haemulon sciurus
	Haemulon striatum
	Halichoeres bivittatus
	Halichoeres garnoti
	Halichoeres radiatus
	Halichoeres maculipinna
Common name	***Scientific name***
	Heteropriacanthus cruentatus
	Holacanthus tricolor
	Holacanthus adscensionis
	Holacanthus rufus
	Hypoplectrus puella
	Lutjanus apodus
	Lutjanus griseus
	Lutjanus mahogoni
	Lutjanus synagris
	Malacanthis plumeri
	Malacoctenus triangulates
	Microspathodon chrysurus
	Mulloidichthys martinicus
Queen Parrotfish	*Scarus vetula*
Kingfish	*Scomberomorus regalis*
Tobacco Basslet	*Serranus tabacarius*
	Sparisoma atomarium
	Sparisoma aurofrenatum
	Sparisoma viride
	Sphyraena barracuda
	Stegastes diencaeus
	Stegastes fuscus
	Stegastes leucostictus
	Stegastes partitus
	Stegastes planifrons
	Stegastes variabilis
	Thalassoma bifasciatum
	Urolophus jamaicensis

SPECIES FOUND IN BLUE HOLES NEAR CRAB CAY, EXUMA
(Compiled by Brian Kakuk. 3/21/06. Bahamas Underground. www.bahamasunderbround.com/)

Common name	***Scientific name***
VERTEBRATES:	
• Blue Stripe Grunt	*Haemulon sciurus*
• Blue Tangs	*Acanthurus coeruleus*
• Cuberra Snapper	*Lutjanus cyanopterus*
• Gray Angelfish	*Pomacanthus arcuatus*
• Green Moray Eel	*Gymnothorax prasinus*
• Grey Angelfish	*Pomacanthus arcuatus*
• Mangrove Snapper	*lutjanus griseus*
• Porcupine Fish	*Diodon holocanthus*
• School Master	*Lutjanus apodus*
• Squirrel Fish (two species)	*Sargocentron sp.*
• White Stripe Grunts	*Haemulon plumier*
• Yellowtail Snapper	*Ocyrus chrysurus*
INVERTEBRATES:	
• Sea Cucumbers	*Holothuria*
• Spiny Lobsters	*Panulirus Argus*
• Spotted Lobster	*Panulirus guttatus*
• Sponges (5 species)	*Proifera*
• Pen Shell	
• Hydrocorals hydrozoa	
• Hydroids cnidaria	

MARINE MAMMALS

Bottlenose Dolphin	*Tursiops truncata*
Short-finned pilot whales	*Globicephala macrorhynchus*
Sperm Whale	*Physeter macrocephalus*

Appendix II – Summary of Related Guidelines, Rules & Regulations

Moriah Harbour Cay National Park will be managed as a multi-use area, to ensure that traditional fishing and harvesting practices carried out by the local community continues; with proper management to minimize user conflicts and to ensure sustained health of the natural environment.

BNT Guidelines
BNT's Policies for National Parks and Protected Areas notes that parks or zones within parks may be classified in various ways that correspond to the different categories of protected. MHCNP will have three managed zones: Conservation Zone, a Sensitive Resource Zone, and an Administrative Zone/Visitor Areas. BNT guidelines and MHCNP bylaws will speak to activities such as:

- Hunting and fishing
- Harvesting of timber and non-timber products
- Motorized vehicles
- Non-motorized recreation
- Road and trails maintenance and construction
- Economic corridors
- Infrastructure development
- Fire management
- Cultural and heritage resources
- Minerals and geology
- Tourism activities
- Scientific research
- Community rights and development

Activities restricted within each zone are listed below.

Conservation Zone
Lands and waters in the conservation zone will be managed to conserve natural resources and processes while accommodating uses and experiences that do not adversely affect the ecological integrity or the scenic quality and serenity of the area. Regulations on levels and methods of fly-fishing, and subsistence fishing will continue. Sustainable harvesting of silver thatch palm will continue. Hunting will not be permitted in the park. New development within the zone will be limited to BNT foot trails or board walks for public use. No new major construction or unsustainable extractive activities would be permitted in the zone.

Sensitive Resource Zone

- No jet skis allowed
- This area will be a "No Wake Zone" with a speed limit to avoid disturbances to sensitive habitats and species
- Non-motorized water sports will be allowed in this area (e.g. kayaking and paddle boarding)

Existing Laws
Existing laws will govern the rules and regulations of the park and are summarized below.

Fisheries Regulations

- Any conch harvested should have a well-formed flared lip with 15mm thickness
- Harvesting of sharks is prohibited
- Minimum size requirement of 3lbs for Groupers or Rockfish
- Closed season for Nassau grouper is applicable upon announcement by the Department of Marine Resources (during the spawning season of Dec-Feb). All species of Grouper landed during the Nassau grouper closed

season shall be landed whole with skin intact.
- No spearfishing within the boundaries of the park
- Fishing for bonefish with nets is strictly prohibited. Selling or buying bonefish is also illegal in The Bahamas. Catch and release method only
- No harvesting of sea turtles, no disturbance to their nests, and no removal of turtle eggs.
- Closed season for crawfish is 1st April – 31st July (inclusive). Harvesting for "egg bearing" crawfish is strictly prohibited; minimum size requirements for crawfish tails is 5½ inches or 3¼ of carapace for whole crawfish.

Wild Bird Protection Act
All wild birds are protected in The Bahamas, with the exception of designated game birds. Hunting of wild birds is **not** allowed in the park. No person shall kill, harm or capture West Indian Flamingos in The Bahamas. Pigeon Cay is a Wild Bird Preserve, a designation established under this Act.

Wild Animal Protection Act
All species of Iguanas are protected in The Bahamas, and shall not be killed, harmed or harvested in the park.

Physical Landscape Act
The following trees are protected in The Bahamas, and as such, in the park:

- Beefwood/Blolly
- Black Ebony/Bullwood
- Brasiletto
- Candlewood
- Caribbean Pine
- Horseflesh
- Lignum Vitae
- Mahogany (Madeira)
- Rauwolfia
- Red Cedar
- Silk Cotton

Park Rules & Regulations
1) Areas in the park are designated as "No Fishing" or "Sensitive Zones". No person shall kill, capture, fish, take, injure, harass, or wilfully chase any organism or species within sensitive zones, which restricts extraction of all resources.
2) Fishing will be allowed in zoned areas within the park, with some being designated seasonal or year-round.
3) Restricted species in areas which are zoned for fishing include:
   - parrotfish
   - sea urchins
   - sea cucumbers
   - Chitons
   - West Indian Top Shell
   - sea horses
   - octopus
   - Sharks, rays, and chimera
4) No spearfishing, Commercial Netting or traps are allowed in zoned fishing areas in the park
5) No feeding of wildlife, unless otherwise posted.
6) No person shall add to or erect any rock cairn, shed or other structure within the Park, without permission.

7) No person shall take ashore or release any animal or other living organism into any area of the Park whatsoever. A person shall be permitted to take a dog into the park, however it must be accompanied at all times and properly leashed. A leash must not exceed 2 meters (6.5ft).
8) No dumping or depositing of any solid material or litter in the park at any time.
9) All other Bahamian laws apply within the boundaries of the national parks.

Appendix III – Threat Definitions

Incompatible Development
The development or urbanization of coastal areas can entail stripping coastal lands of natural vegetation, dredging boat channels, the building of seaside marinas, hotels, resorts, houses, restaurants, etc. In support of these uses, the thin and sensitive tropical soils are often cleared, or mangroves cut and dredged in ways that create irreparable environmental damage not only to the terrestrial system, but also to the adjacent near shore marine life. Park boundaries extend to the shore of mainland Exuma, in addition to privately owned cays, and unsustainable development will have a negative impact to park resources. Such activities may result in changes to nutrients and sediments within the park as well as changes to the nursery or breeding habitats used by species that inhabit the parks as sub-adults and adults.

Sedimentation
The main development activities that have negative impacts on marine communities are those that involve disturbance to the soil or rock resulting in increased erosion and the loss of wetland habitat through land reclamation. The removal of vegetation or the movement of soil without appropriate stabilization (e.g., sediment traps, barrier walls, and pavement) can often lead to increases in water turbidity, nutrient levels, and sediment loads. Similarly, dredging operations can re-suspend sediments that may produce similar impacts. Both seagrass communities and reefs within Moriah Harbour Cay National Park rely on high light levels (low turbidity), low nutrient levels, and low sediment loads to persist long term. Furthermore, the addition of sediments to soft substrate communities can change the physical characteristics of the substrate and alter the structure of natural communities there, which changes the prey base for fish and larger invertebrate assemblages.

Nutrient overload (eutrophication)
Typical areas of concern in coastal areas include discharge or release of wastewater, fertilizers, or other forms of nutrient-loaded substances from vessels, homes, agriculture and businesses. Nutrients responsible for eutrophication need to not be released directly into the marine environment to have an impact. Nutrients released from terrestrial sources can be quickly carried directly to the sea by runoff or may percolate down through porous substrata into the underlying groundwater to eventually emerge in coastal waters.

Nearshore marine habitats require precise nutrient levels for their maintenance. Changes in nutrient levels change the distribution of various macroalgae species and the distribution of seagrass meadows. Nutrient increases can cause long term shifts from seagrass and coral reef communities to habitats dominated by ephemeral algae (Bell 1992, Lapointe 1997, Lapointe et al. 1994). In high nutrient conditions, filamentous algae will out-compete the structurally and ecologically important seagrass coral and macroalgal communities (Lapointe et al. 1994). For these reasons, any and all human activities that result in substantive and or continuing nutrient enrichment of coastal waters must be considered serious threats to the ecological integrity of tropical marine ecosystems.
The inputs of nutrients to the MHCNP are from sewage from yachts which frequent Elisabeth Harbour seasonally. There is currently no sewage collection service on Exuma. The extent of the impact to MHCNP has not been established. Once day-to-day management MHCNP is established water quality monitoring will be put in place to monitor water quality. Other sources of inputs include septic systems of nearby communities. There is little to no treatment of wastewater in the communities along the Exuma coast near the MHCNP, so untreated wastewater can leach into the nearshore environment and be transported to areas within both parks. While there is no large-scale agriculture right along the shoreline near the parks, runoff from agriculture (including animal waste) farther inland may also contribute to nutrient loads. Dredging adjacent to the park and runoff from roads can further contribute to this problem.

Other Pollution
The discharge of toxic substances into MHCNP waters can directly or indirectly negatively impact marine life in a number of ways. Often, substances that are not known or believed to be harmful or toxic are inadvertently discharged by otherwise well-meaning persons. For this reason, the discharge or release of any substance into park

waters is generally considered undesirable. In the coastal zone near the MHCNP, disposal of solid waste in the mangrove and creeks was once a practiced, but this practice has become less common. Dumping of liquid waste materials (e.g., used engine oil) may also occur in the area. Pieces of plastic from this trash can cause entanglements of various animals and can affect habitats. Chemicals released from dumping trash can may kill marine life or have sub lethal affects that alter populations.

Invasive Species

On land, invasive plant species can have severe impacts to native habitats. While The Bahamas has not seen large-scale plant species invasions in nearshore marine systems, animal species such as the Indo-Pacific Lionfish, Pterois spp., have spread throughout the Bahamas and have a major impact on native fish assemblages (e.g., Albins and Hixon 2008). Over the past decade, lionfish have invaded the reef and mangrove systems throughout the Bahamian archipelago and are now commonly observed within MHCNP. While eradicating these invaders from the parks may be possible with enough targeted removals at frequent intervals, this will require large amounts of manpower on a continuous basis.

Fishing, Hunting and Collecting

Providing protection to fish and fishery species within the MHCNP makes the park a valuable asset to fisheries management. Furthermore, fishing may not be compatible with swimming and snorkelling in some parts of the park. While fishing is an important recreational or subsistence activity allowed in parts of the park, regulating fishing is necessary to prevent user group conflicts and ensure that marine resources receive appropriate levels of protection to provide other recreational benefits and benefits to fisheries. Without increased protection through education and enforcement, the effectiveness of the Park as a fishery replenishment area will be reduced.

Recreational Impacts

Moriah Harbour Cay National Park is ideally situated to provide nature-based recreation for Bahamians and tourists alike. Scuba diving, boating, snorkeling, swimming, fly-fishing and sustainable fishing practices are all activities that should be promoted and managed within the park. Scuba diving, boating, snorkelling, swimming, and fishing are all activities that should be promoted within the parks. The proximity of MHCNP to Elizabeth Harbour makes this park ideally suited for commercial tourism. There are currently no guidelines regulating recreational activities in the park at this time.

MHCNP can be easily accessed by visitors, as the park is adjacent to Elizabeth Harbour, which is a popular boating destination for mainland Exuma. At present, there are minimal boating or kayak tours that take place within the park but encouraging this sort of eco-tourism and the economic benefits it provides is desirable within the park. As this activity, increases and more people access remote areas of the park and some of the more reef, there is an increasing chance that species and habitats may be disturbed. Boaters and Kayakers must be educated about the damage they can do if their vessels contact the reef or seagrass habitats. Anchoring can also cause permanent damage to corals and seagrass habitats. Navigational markers, mooring buoys or other aids may help prevent unintentional damage to park resources.

Diving/Snorkelling

Scuba diving and snorkelling are one of the best ways for park visitors to experience the resources that the park has to offer. Beautiful coral formations; schools of colourful fish; sea fans rods and plumes that sway in the surge; and a vast diversity of life that cannot be seen on land all serve to inspire a sense of wonder, awe, and a natural curiosity that leads to increasing knowledge about these resources. For these reasons, these activities are critical for the park to achieve its objectives. Nevertheless, these activities can also cause harm to park resources when visitors are careless or fail to follow proper practices for visiting coral reefs.

On shallow reefs, divers and snorkellers can also cause sedimentation damage to corals and other sessile organisms by swimming in a manner that causes their fins to raise clouds of sand or finer sediments that then settle on, and adversely affect nearby living corals or other marine life. Careless swimming can also break off pieces of fragile corals, as can handling corals or sea fans on the sea floor. Collection of souvenirs such as shells and other sea life, or

even just picking them up for a closer look, can also affect populations of these species. Education of park visitors on best practices for snorkelling and diving and other park management that will minimize impacts to resources is a necessary part of park management.

Wildlife Disturbance

Wildlife viewing, including viewing of marine fish and turtles is growing in popularity in parks in The Bahamas. If not properly regulated however, such activities can negatively impact the fishes and other wildlife of parks in a number of ways. Simply approaching animals too closely, or in a threatening manner, can cause stress or cause wildlife to leave an area. Fish and shark feeding also takes place within protected areas in The Bahamas. While this does not appear to occur at the MHCNP yet, there are no rules preventing fish feeding.

The feeding of wildlife and marine fishes negatively impacts "fed" individuals as well as the ecosystems of which they are a part and can endanger visitors as well due to the animals dependence on hand outs and association of humans with food. Touching or moving wildlife can also be problematic. Attempting to touch some animals can cause them stress. The precise positioning and orientation of simple marine invertebrates is often critical to their survival; picking up an animal to examine it more closely may prove lethal to the disturbed animal. Also, touching fishes, corals, and some other marine animals can compromise the natural protective mucous layer that serves as a barrier to infection and the loss of water to the surrounding sea. Lastly, the take of wildlife and plants (i.e., shells, corals, vegetation, eggs, etc.) adds to the negative impacts that humans can have on natural resources.

BIBLIOGRAPHY

Aronson RB, Precht WF. Conservation, precaution, and Caribbean reefs. Coral Reefs. 2006;25:441–450. https://link.springer.com/article/10.1007/s00338-006-0122-9

Arkema, K., D. Fisher, K. Wyatt. 2017. Economic valuation of ecosystem services in Bahamian marine protected areas. Prepared for BREEF by The Natural Capital Project, Stanford University.

Bahamas National Trust. (no date). National Parks – National Treasures. Available at the office of The Bahamas National Trust. East Bay Street, Nassau, Bahamas.

Bahamas National Trust. 1991 Marine Policy Statement for National Parks. Available at the office of The Bahamas National Trust. East Bay Street, Nassau, Bahamas.

Bahamas National Trust. 1992. Marine Mammal Survey Report Andros Island, Nassau Bahamas. Available at the office of The Bahamas National Trust. East Bay Street, Nassau, Bahamas.

Bahamas National Trust. 1998. Summaries of legislation affecting wildlife and national parks in The Bahamas. 19pp. Available at the office of The Bahamas National Trust. East Bay Street, Nassau, Bahamas.

Bahamas National Trust. 2006. General Management Plan: Exuma Cays Land & Sea Park. 42pp. Available at the office of The Bahamas National Trust. East Bay Street, Nassau, Bahamas.

Bahamas National Trust. 2006. Proposed Bylaws for The Pelican Cays Land and Sea Park (PCLSP)
Abaco, Bahamas. Available at the office of The Bahamas National Trust. East Bay Street, Nassau, Bahamas.

Bahamas National Trust. 2007. Policies for National Parks and PAs. 18pp. Available at the office of The Bahamas National Trust. East Bay Street, Nassau, Bahamas.

Bahamas National Trust. 2013. Andros West Side National Park: General Management Plan. 86pp. Available at the office of The Bahamas National Trust. East Bay Street, Nassau, Bahamas.

Bahamas National Trust, 2014. Protected Areas Management Categories Analysis for the Bahamas: January-September Final Report. 54pp.

Bahamas National Trust. 2015. North and South Marine Park Areas: Draft General Management Plan. 47pp. Available at the office of The Bahamas National Trust. East Bay Street, Nassau, Bahamas.

Bahamas National Trust. 2017. Abaco Marine Parks: General Management Plan. 86pp. Available at the office of The Bahamas National Trust. East Bay Street, Nassau, Bahamas.

Bahamas National Trust. 2017. San Salvador National Parks: General Management Plan. 67pp. Available at the office of The Bahamas National Trust. East Bay Street, Nassau, Bahamas.
Bahamas Protected. 2017. Interim Report: Sustainable Financing for The Bahamas National Protected Area System. Prepared for The Nature Conservancy. Nassau, The Bahamas. 86pp.

Bahamas Protected. 2017. Expanding The Bahamas Marine Protected Area Network: A Gap Analysis. Nassau, The Bahamas. 72pp. http://marineplanning.org/wp-content/uploads/2018/07/Bahamas_2017_-Protected-Report_FINAL.pdf

Bahamas Protected. 2018. 20 by 20 White Paper: Marine Protection Plan. Nassau, The Bahamas. 137pp. http://bahamasprotected.com/wp-content/uploads/2018/02/Bahamas-Protected-Marine-Protection-Plan.pdf

BEST Commission. 1999. The Commonwealth of The Bahamas National Biodiversity Strategy and Action Plan. Re: Convention on Biological Diversity (1992). BEST, Nassau, The Bahamas. 106 pp. https://www.cbd.int/doc/world/bs/bs-nbsap-01-en.pdf

BEST Commission. 2003. The National Environmental Policy for The Bahamas. Bahamas Environment Science and Technology (BEST) Commission, Nassau, The Bahamas. 5 pp. http://www.best.gov.bs/Documents/Draft%20NEP.pdf

BEST Commission. 2003. The National Invasive Species Strategy for The Bahamas. Bahamas Environment Science and Technology (BEST) Commission, Nassau, The Bahamas. 34 pp. http://www.best.gov.bs/publications/

BEST Commission. 2005. National Environmental Management Action Plan (NEMAP) for The Bahamas. Bahamas Environment Science and Technology (BEST) Commission, Nassau, The Bahamas. 58 pp. https://www.thegef.org/sites/default/files/ncsa-documents/ncsa-bahamas-nemap.pdf

BEST Commission. 2005. National Policy for the Adaptation to Climate Change. Bahamas Environment Science and Technology (BEST) Commission, Nassau, The Bahamas. 58 pp. http://www.best.gov.bs/Documents/ClimateChangePolicy.pdf

BEST Commission. 2007. The Bahamas National Wetlands Policy. Bahamas Environment Science and Technology (BEST) Commission, Nassau, The Bahamas. 30 pp. http://www.best.gov.bs/Documents/Bahamas_national_wetlands_policy.pdf

BEST Commission. 2014. Bahamas Protected Area Network Management Effectiveness Evaluation Report. Bahamas Environment Science and Technology (BEST) Commission, Nassau, The Bahamas. 101 pp. http://www.seatoneconsulting.com/wp-content/uploads/2017/03/Bahamas-Management-Effectiveness-Evaluation-2014.pdf

Chiappone M, Sullivan Sealey KM. Marine reserve design criteria and measures of success: lessons learned from the Exuma Cays Land and Sea Park, Bahamas. Bull Mar Sci. 2000;66:691–705.

Dahlgren, C., K. Sherman, J. Lang, P.R. Kramer, & K. Marks. 2016. Bahamas Coral Reef Report Card Volume 1: 2011–2013. http://www.agrra.org/wp-content/uploads/2016/05/Bahamas-2016-Coral-Reef-Report-Card.pdf

Dahlgren, C.. 2006. Ecological Characterization of the Moriah Harbour Cay area. Perry Institute for Marine Science. Stocking Island, Exuma, The Bahamas. Personal communication.

Final Report: Ecological, Socioeconomic and Governance Evaluation of the Exuma Cays Land and Sea Park. Perry Institute for Marine Science. Stocking Island, Exuma, The Bahamashttps://pdfs.semanticscholar.org/e75e/2d68eaa83d07e11aa31c98f5fad3eb4f9ab6.pdf

Franz, C. Dodd, Jr. and Buden, D.. Distributional Records of Amphibians and Reptiles from the Exuma Islands, Bahamas. Including the First Reports of a Freshwater Turtle and an Introduced Gecko. Caribbean Journal of Science, Vol. 29, No. 3-4, 165-173, 1993

Government of The Bahamas. 1952. Wild Birds Protection Act (Ch. 248). http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/1968/1968-0021/WildAnimalsProtectionAct_1.pdf

Government of The Bahamas. 1959. The Bahamas National Trust Act. https://bnt.bs/wp-content/uploads/2016/03/bntact.pdf

Government of The Bahamas. 1963. Agriculture and Fisheries Act (Ch. 242). http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/1963/1963-0050/AgricultureandFisheriesAct_1.pdf

Government of The Bahamas. 1965. The Bahamas National Trust Act (Chapter 18) Rev. Ed. 1965 Bye Laws for The Exuma Land/Sea Park.

Government of The Bahamas. 1968. Wild Animals Protection Act (Ch. 229). http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/1968/1968-0021/WildAnimalsProtectionAct_1.pdf

Government of The Bahamas. 1977. Fisheries Resources (Jurisdiction & Conservation) Act (Ch. 244). http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/1977/1977-0013/FisheriesResourcesJurisdictionandConservationAct_1.pdf

Government of The Bahamas. 1986. Fisheries Resources (Jurisdiction & Conservation) Regulations. http://laws.bahamas.gov.bs/

cms/images/LEGISLATION/SUBORDINATE/1986/1986-0010/FisheriesResourcesJurisdictionandConservationRegulations_1.pdf

Government of The Bahamas. 1993. The Archipelagic Waters and Maritime Jurisdiction Act, 1993. http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/1993/1993-0037/ArchipelagicWatersandMaritimeJurisdictionAct_1.pdf

Government of The Bahamas. 1997. Conservation and Protection of the Physical Landscape of The Bahamas Act (No 12 of 97). http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/1997/1997-0012/ConservationandProtectionofthePhysicalLandscapeofTheBahamasAct_1.pdf

Government of The Bahamas. 1998. Antiquities, Monuments and Museum Act (Ch. 51). http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/1998/1998-0005/AntiquitiesMonumentsandMuseumAct_1.pdf

Government of The Bahamas. 1999. Antiquities, Monuments and Museum Regulations (Ch. 51). http://laws.bahamas.gov.bs/cms/images/LEGISLATION/SUBORDINATE/1999/1999-0038/AntiquitiesMonumentsandMuseumRegulations1999_1.pdf

Government of The Bahamas. 2010. Bahamas National Trust (Amended) Act. http://laws.bahamas.gov.bs/cms/images/LEGISLATION/AMENDING/2010/2010-0031/BahamasNationalTrustAmendmentAct2010.pdf

Government of The Bahamas. 2010. Department of Statistics: Census of Population and Housing Report: Exuma and Cays. https://www.bahamas.gov.bs/wps/wcm/connect/8a82e5af-1d79-406d-b651-65f315e43c6b/EXUMA+%26+CAYS+2010+CENSUS+REPORT.pdf?MOD=AJPERES

Government of The Bahamas. 2010. Forestry Act. http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/2010/2010-0020/ForestryAct2010_1.pdf

Government of The Bahamas. 2010. Planning and Subdivision Act. http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/2010/2010-0004/PlanningandSubdivisionAct2010_1.pdf

Government of The Bahamas. 2014. Bahamas Protected Areas Fund Act. http://laws.bahamas.gov.bs/cms/images/LEGISLATION/PRINCIPAL/2014/2014-0028/BahamasProtectedAreasFundAct2014_1.pdf

Government of The Bahamas. 2014. Forestry Regulations. http://laws.bahamas.gov.bs/cms/images/LEGISLATION/SUBORDINATE/2014/2014-0038/ForestryRegulations2014_1.pdf

Government of The Bahamas. 2015. Fisheries Resources (Jurisdiction & Conservation) (Amendment) Regulations. http://laws.bahamas.gov.bs/cms/images/LEGISLATION/SUBORDINATE/2015/2015-0071/FisheriesResourcesJurisdictionandConservationAmendmentRegulations2015_1.pdf

Harborne AR, Mumby PJ, Kappel CV, Dahlgren CP, Micheli F, et al. Reserve effects and natural variation in coral reef communities. J Appl Ecol. 2008;45:1010–1018.

Hawkins, J.P., Roberts, C.M., VantHof, T., deMeyer, K., Tratalos, J., Aldam, C., 1999. Effects of recreational scuba diving on Caribbean coral and fish communities. Conservation Biology 13 (4), 888–897.

Hoegh-Guldberg O, Mumby PJ, Hooten AJ, Steneck RS, Greenfield P, et al. 2007. Coral reefs under rapid climate change and ocean acidification. Science. 318:1737–1742. [PubMed]
Kramer PA, Kramer PR, Ginsburg RN. Assessment of the Andros Island reef system, Bahamas (Part 1: Stony corals and algae). 2003. Atoll Res Bull. 496:77–100.

Minns, B. 2017. History of the Save Moriah Harbour Cay Project. Exuma, The Bahamas. Personal communication.

Minns, J. 2002. Proposal Moriah Harbour Cay Project. Exuma, The Bahamas. Personal communication.