



# STATE OF CONSERVATION REPORT

## *Belize Barrier Reef System*

(1996, Ref. 764)

BELIZE

42 COM



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## State of Conservation Report

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GOVERNMENT OF BELIZE

STATE PARTY REPORT

ON THE STATE OF CONSERVATION OF THE BELIZE BARRIER REEF RESERVE SYSTEM  
(BELIZE) (N 764)

March 2018

## WHC Decision 41 COM 7A.2

Forty-first Session.

Krakow, Poland.

2 -12 July, 2017.

### Belize Barrier Reef Reserve System (Belize) (N 764)

The World Heritage Committee,

1. Having examined Document WHC/17/41.COM/7A.Add;
2. Recalling Decision **40 COM 7A.32**, adopted at its 40th Session (Istanbul/UNESCO, 2016);
3. Welcomes the progress achieved with the finalization of the Draft Forest (Protection of Mangroves) Regulations, and requests the State Party to finalize the legal drafting and adoption of the Regulations as a matter of priority and to submit the final legal document to the World Heritage Centre, as soon as it becomes available;
4. Also welcomes the commencement of the implementation of the Integrated Coastal Zone Management Plan (ICZMP) and encourages the State Party to continue to ensure that the resources required for the long-term implementation of the Plan are secured;
5. Notes the progress achieved towards developing concrete regulations based on the Cabinet Decision to ban offshore petroleum exploration within the property, but reiterates its position that the adequacy of the one-kilometre buffer zone needs revision to secure the protection of the property's Outstanding Universal Value (OUV) and the full implementation of the Desired state of conservation for removal of the property from the List of World Heritage in Danger (DSOCR);
6. Also requests the State Party to submit to the World Heritage Centre the exact maps of the areas where oil exploration will be prohibited by the proposed ban, as soon as they become available, and prior to completion of the legislation of the ban;
7. Taking note of the ongoing revision of the Petroleum Exploration Framework, reiterates its request to the State Party to ensure that the protection of the property's OUV is fully integrated into this process;
8. Also taking note of the confirmation by the State Party that the voluntary moratorium on sale and lease of lands within the property remains in place, notes with concern that the cartographic information provided by the State Party shows a high proportion of private land within the property, and also reiterates its request to the State Party to develop a legally binding instrument to ensure a permanent cessation of all sales and leases of state owned land throughout the property;
9. Further welcomes the ongoing revision of the Environmental Impact Assessment system and urges the State Party to fully integrate the protection of the property's OUV into this process to ensure that the revised regulations guarantee that no areas within the property and in its immediate vicinity can be developed in ways that would negatively impact on its OUV, consistent with the requirements under the DSOCR;
10. Further requests the State Party to submit to the World Heritage Centre, by **1 February 2018**, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its 42nd session in 2018;
11. **Decides to retain Belize Barrier Reef Reserve System (Belize) on the List of World Heritage in Danger.**

## **Executive Summary**

This report embodies the advancements made by the Government of Belize to maintain the outstanding universal values of the Belize Barrier Reef Reserve System (BBRRS) and to substantiate its removal from the 'List of World Heritage Sites in Danger'.

The year 2017-2018 was a significant year for the State Party as it has implemented several key measures to address the main issues identified by the World Heritage Committee (WHC) and the indicators of the Desired State of Conservation Report (DSOCR) with the ultimate objective to remove the property from the aforesaid list in 2018.

A principal measure already implemented by the government was the enactment on December 30, 2017 of the Petroleum Operations (Maritime Zone Moratorium) Act No. 54 of 2017, which establishes a moratorium on the exploration of petroleum and other petroleum operations in the entire maritime zone of Belize, including internal waters, territorial sea and exclusive economic zone. Another principal measure of the Government of Belize is the finalization of the revised Forests (Protection of Mangroves) Regulations in March 2018, which have been tabled at Cabinet. These finalized regulations have the support of the NGO community who share the interest of the government in maintaining the outstanding universal values of the World Heritage Site. Furthermore, the environmental impact assessment checklist has been amended forthwith in March 2018 to incorporate consideration of the outstanding universal values in the environmental impact assessment process of any proposed development to ensure that no areas within the property and in its immediate vicinity can be developed in ways that would negatively impact on its OUV. During the ongoing revision to the Environmental Impact Assessment Regulations, the property's OUVs have been integrated into the provisions relating to the terms of reference for the EIA process to reflect the amendment made to the checklist that ensures the protection of the property's OUVs.

Progress made on other current initiatives continue to demonstrate the country's commitment to manage, protect and conserve the BBRRS through more informed management, through providing socio-economic benefits, and through the maintenance of the integrity of the OUVs of the World Heritage Site and surrounding areas.

## **INTRODUCTION**

The 41<sup>st</sup> meeting of the World Heritage Committee held in Krakow, Poland during the period 2 -12 July, 2017 maintained the decision to retain the Belize Barrier Reef Reserve System on the List of World Heritage Sites in Danger, which was originally listed in 2009 in Seville, Spain.

During the 41<sup>st</sup> meeting of the World Heritage Committee, the Committee welcomed the progress achieved with the finalization of the Draft Forest (Protection of Mangroves) Regulations and the commencement of the implementation of the Integrated Coastal Zone Management Plan (ICZMP). The Committee also noted the progress on the Cabinet Decision to ban offshore petroleum exploration within the property and to secure the protection of the property's Outstanding Universal Value (OUV) and the full implementation of the Desired State of Conservation (DSOC) for removal of the property from the List of World Heritage in Danger. The Committee requested the State Party to submit to the World Heritage Centre the exact maps of the areas where oil exploration will be prohibited by the proposed ban.

This report represents the State of Conservation of the Property for the year 2017-2018 and it includes the significant advances and Belize's progress to address the recommendations of the World Heritage Committee upheld at the 41<sup>st</sup> Session. The report also includes the implementation and progress of the adopted Desired State of Conservation (DSOC) for the removal of the Belize Barrier Reef Reserve System from the List of World Heritage in Danger.

The response to Decision **41 COM 7A.32** is now being presented for examination by the World Heritage Committee at its upcoming 42<sup>nd</sup> session in 2018.

## **Response from the State Party to the World Heritage Committee's Decision 2017**

1. ***Welcomes the progress achieved with the finalization of the Draft Forest (Protection of Mangroves) Regulations, and requests the State Party to finalize the legal drafting and adoption of the Regulations as a matter of priority and to submit the final legal document to the World Heritage Centre, as soon as it becomes available;***

In March 2018, the Forest (Protection of Mangroves) Regulations were finalized by the Ministry of Fisheries, Forestry, the Environment and Sustainable Development and the Attorney General's

Ministry, and tabled at the Cabinet. Subsequent to approval of Cabinet, the regulations will be ascended to Parliament where if approved, will become law. The anticipated date of ascension at Parliament is at the end of the first quarter of the fiscal year. The final draft has the support of the NGO community. The approval of these Regulations will meet yet another target under the Desired State of Conservation to remove the Belize Barrier Reef Reserve System (BBRRS) from the List of World Heritage in Danger.

The revised Forest (Protection of Mangroves) Regulations, herein referred to as the Mangrove regulations, illustrates the importance of mangroves in the World Heritage Site/Protected Areas as well as provide stricter measures/control mechanisms for mangrove alteration and protection (**See Annex 1**). The revision will:

- (a) Expand the scope of definitions to include different types of mangroves and permissible activities;
- (b) Expand the requirement for a permit to include the selective trimming of mangroves;
- (c) Expand the requirements for technical considerations in the grant of permits to encompass tourism value, economic benefits, climate change, cumulative environmental impacts, impacts and proximity to the World Heritage site, and requirement for mitigating actions that would avoid or prevent impacts, such as restoration, buffer zones, or different work methods;
- (d) Increase the penalty for contravention of the regulations;
- (e) Establish a technical review panel encompassing expertise from coastal zone management, fisheries management, environmental impact assessment and land management to review applications for certain types of mangrove clearance.

**2. Also welcomes the commencement of the implementation of the Integrated Coastal Zone Management Plan (ICZMP) and encourages the State Party to continue to ensure that the resources required for the long-term implementation of the Plan are secured;**

Since the effective date of the adoption of the ICZM Plan in February 2016, the Coastal Zone Management Authority and Institute (CZMAI) has been working to operationalize the plan as well as working closely with partners in implementing key recommendations. The following are a list of major activities being done by the CZMAI:

- a) Reactivation of the Coastal Advisory Committees (CACs):
  - i. Reviewed and revised the CAC Terms of Reference.
  - ii. Convened meetings with 6 of 9 CACs.
  - iii. Developed concept for the mobile application to facilitate information dissemination and reporting.
- b) Developed a “road map” of activities recommended within the Implementation Plan annexed to the ICZM Plan.
- c) Ongoing collection of baseline data on development/human use in three planning regions in order to monitor the implementation of the zoning schemes within the ICZM Plan.

- i. Drone mapping completed for 2 out of 3 planning regions.
  - ii. Data collected in addition to drone mapping completed for Caye Caulker.
- d) Development and implementation of a water quality monitoring programme to collect environmental data to be used as indicator for assessing risk in sensitive habitats.

Of note, the CZMAI also sits on the National Environmental Appraisal Committee which vets all Environmental Impact Assessments and makes recommendations to the Department of the Environment on proposed developments based on the ICZMP. These recommendations form part of the decision-making process.

Likewise, as stated above (in the mangrove regulations), the Forest Department shall consider the impacts of mangrove alteration on nearby coastal and reef areas known to be of outstandingly high ecological value, highlighted within the ICZMP. Area specific coastal zone management guidelines under the ICZMP, also provides criteria and development standards based on residential or commercial developments. Standards are given for density, lots per acre, permitted use, secondary use, setbacks, site coverage (percentage), building heights, number of piers, among others (**See Annex 2 & 3**).

3. ***Notes the progress achieved towards developing concrete regulations based on the Cabinet Decision to ban offshore petroleum exploration within the property, but reiterates its position that the adequacy of the one-kilometre buffer zone needs revision to secure the protection of the property's Outstanding Universal Value (OUV) and the full implementation of the Desired state of conservation for removal of the property from the List of World Heritage in Danger (DSOCR);***
4. ***Also requests the State Party to submit to the World Heritage Centre the exact maps of the areas where oil exploration will be prohibited by the proposed ban, as soon as they become available, and prior to completion of the legislation of the ban;***
5. ***Taking note of the ongoing revision of the Petroleum Exploration Framework, reiterates its request to the State Party to ensure that the protection of the property's OUV is fully integrated into this process;***

In last year's State of Conservation Report, the Government of Belize had committed to ban offshore petroleum exploration within the WHS property and along the main barrier reef as well as to designate a one-kilometre buffer zone. However, on December 30, 2017 the Government of Belize passed the Petroleum Operations (Maritime Zone Moratorium) Act No. 54 of 2017 to:

- a) Impose a moratorium on the exploration of petroleum and other petroleum operations in the entire maritime zone of Belize (this includes the internal waters, territorial sea and exclusive economic zone);
- b) Prevent pollution from installation devices and vessels used in the exploration and exploitation of petroleum resources of the seabed and subsoil of the maritime zone;
- c) Make further provisions for the protection of the Belize Barrier Reef Reserve System inclusive of the World Heritage Site.

For clarity, the aforesaid law defines the Belize Barrier Reef Reserve System as all that area bounded on the north by geographical coordinates UTM 412384 E, 2009873 N and bounded to the south by geographical coordinates UTM 361402 E, 1777501 N, in NAD 27 Zone 16, without limit to the East and West, comprising corals, coral reefs, atolls, islands, seagrass beds, mangroves and other associated critical habitats and their inhabitants.

Anyone who commits an offence against this new Act, will be liable as indicated below:

- a) In the case of an individual, to a fine not exceeding two hundred thousand dollars or to imprisonment for a period not exceeding five years;
- b) In the case of a corporate body, to a fine not exceeding three million dollars.

The Petroleum Exploration Framework, which was ongoing, is no longer a priority at this time due to the fact that its development was largely on the development/expansion of the offshore exploration component. The inland exploration of petroleum is fully developed and controlled through various mechanisms (i.e. Legislation, PSAs, EIA process, etc...)

Due to this historic achievement by the Government of Belize (Petroleum Operations (Maritime Zone Moratorium) Act No. 54 of 2017) (**See Annex 4**), oil exploration and exploitation is now prohibited in the entire maritime zone of Belize, therefore fully protecting the Outstanding Universal Value of the WHS Property.

- 6. Also taking note of the confirmation by the State Party that the voluntary moratorium on sale and lease of lands within the property remains in place, notes with concern that the cartographic information provided by the State Party shows a high proportion of private land within the property, and also reiterates its request to the State Party to develop a legally binding instrument to ensure a permanent cessation of all sales and leases of state owned land throughout the property;***

The Government of Belize continues its voluntary moratorium on the sale and lease of public lands within the Property. In order to fully consider the development of a legally binding instrument to ensure the permanent cessation of all sales and leases of state owned land throughout the property, the Government of Belize needs to undertake a comprehensive study to verify land tenureship and to conduct a ground-truthing exercise, and subsequent to that compilations of individual plans can be performed and available public lands can be formally surveyed and described for declaration as mangrove reserves. Due to the extensiveness of the Property, the scattered nature of the islands, continuous beach erosion and accretion, and the illusiveness of some forms of evidence of tenure, this study would require a substantial amount of time and financial and human resources in order to complete. The importance of the land verification and surveying exercise is such that if it is not done accurately, land set aside for reserves may appear to be national land due to the absence of a survey when in fact it is already issued or occupied, exposing the Government of Belize to compensation claims. These scenarios are to be avoided.

A study was commissioned by World Wildlife Funds in 2017 on Land Use and Land Tenure Analysis within the BBRRS (**See Annex 5**). The study found that of the total land mass of approximately 13,253.6 acres within the BBRRS, around 86 acres of public lands potentially exists. The study had myriad challenges and drawbacks and so accuracy of the estimates cannot be guaranteed. When the Forestry Department examined the cartographic results of the study against the boundaries of individual islands, there was a substantial mismatch and incompleteness that rendered the boundary data unusable. However, if the results of the study are considered at the level of the entire property, it indicates that out of the 7 protected areas that comprise the BBRRS the majority or 99% of potential public lands that exists, are situated within one protected area – the South Water Caye Marine Reserve.

The Ministry of Natural Resources and the Ministry of Fisheries, Forestry, the Environment, and Sustainable Development has agreed, with financial support via WWF, to partner on the goal of completing the above mentioned detailed on-ground and archival tenure study and subsequent land surveys to verify land tenureship within the South Water Caye Marine Reserve and Sapodilla Caye Marine Reserve with the aim of establishing mangrove reserves for the remaining national lands that qualify. To achieve the aforementioned, a step by step method has been proposed by the Ministry of Natural Resources in a letter to the Ministry of Fisheries, Forestry, the Environment and Sustainable Development and the UNESCO Secretary General of Belize (**See Annex 6 & 7**). This approach is welcomed by the NGO community who are partnering to raise the necessary funds.

***7. Further welcomes the ongoing revision of the Environmental Impact Assessment system and urges the State Party to fully integrate the protection of the property's OUV into this process to ensure that the revised regulations guarantee that no areas within the property and in its immediate vicinity can be developed in ways that would negatively impact on its OUV, consistent with the requirements under the DSOCR;***

The Environmental Impact Assessment Checklist utilized by the Department of the Environment has been amended in March 2018 (**See Annex 8**) to include consideration for the assessment of potential negative impacts on the maintenance of the outstanding universal values of the WHS for any development in the area. EIA developers will be required to include an assessment against the OUVs in EIAs.

While the EIA regulations is still undergoing a revision exercise, the current amended Environmental Impact Assessment (EIA) regulations (Statutory Instrument No. 24 of 2007) ensures that any proposed development project, undertaking or activity within a protected area (including the BBRS-WHS) requires an EIA. Likewise under Schedule 1 of the regulations, it states that any construction of hotels, resort facilities and golf courses within or in close proximity of the boundaries of a protected area or a World Heritage Site requires an EIA. By definition in the law, this tool identifies, predicts, evaluates, mitigates and manages the environmental, and key social and economic impacts of development projects, undertakings, programmes, policies or activities. In order to ensure that no areas within the property and in its immediate vicinity can be developed in ways that would negatively impact on its OUV, during the ongoing revision to the Environmental Impact Assessment Regulations, the property's OUVs have been integrated into the provisions relating to the terms of reference for the EIA process to reflect the amendment made to the checklist that ensures the protection of the property's OUVs.



**Table 1** below shows the implementation progress of the DSOCR:

Indicators	Method of Verification	Timeframe	Progress
1. The area of mangrove coverage in the property is maintained at least at the same level as when the property was inscribed on the List of World Heritage in Danger in 2009. There is no further loss of mangrove cover within the entire property, including all mangrove types that are unique and irreplaceable, measured against the 2009 baseline.	<ul style="list-style-type: none"> <li>Strengthening, adoption, implementation, and effective enforcement, of the currently proposed Mangrove Regulations</li> <li>Satellite imagery/aerial photography of the property indicating the current mangrove coverage, measured against the 2009 baseline</li> <li>Maps showing the distribution of the different categories of land ownership within the property and cadastral data of land tenure compared against the 2009 base year (the date when the site was inscribed on the List of World Heritage in Danger)</li> <li>Adoption by law of a permanent cessation of all sales and leases of state owned land throughout the property, measured against the 2009 baseline</li> <li>Adoption by law of a zoning plan covering the entire property that specifies clearly defined regulation for allowed development and use for each zone, based on scientific, ecological and biological information about the property's OUV and its attributes.</li> </ul>	Completed by 31 December 2016	<p>Revised Mangrove Regulations were finalized in March 2018 by the Ministry of Fisheries, Forestry, the Environment and Sustainable Development and the Attorney General's Ministry, and tabled at Cabinet.</p> <p>GEF-SGP project on mangrove coverage, measured against the 2009 baseline completed (<b>see Annex 9</b>). The mangrove coverage is 95.3% of what it was in 1996 (year of inscription).</p> <p>The government maintains a voluntary moratorium on the sale of nationally held lands. A comprehensive land analysis study needs to be completed before considering the instrument to declare mangrove reserves.</p> <p>Adoption of Integrated Coastal Zone Management Plan in 2016. Area specific plans define what types of developments and standards are suitable for the various coastal areas.</p>
2. No areas within the property and in its immediate vicinity are developed in ways that	<ul style="list-style-type: none"> <li>Adoption by law, implementation and adequate enforcement regulations that specify the type, scale and density of coastal development consistent with the</li> </ul>	Completed by 31 December 2016	Revision of EIA regulations are under way under the GEF-KBA Project. The final briefing notes for the revision of the environmental clearance process

affect the property's natural outstanding beauty and status as a globally significant natural phenomenon of Outstanding Universal Value	requirements to maintain the property's natural outstanding beauty and that of its immediate surroundings, including establishment of areas where no development should be permitted		<p>is in the process of being finalized.</p> <p>Area specific development guidelines were developed under the ICZMP (<b>see Annex 2 &amp; 3</b>)</p> <p>Mangrove regulations provide special protection/stricter measures to mangroves in "Priority Mangrove Areas".</p>
3. All areas within the property and the surrounding areas that support the ecological functioning of the system are excluded from oil exploration and exploitation	<ul style="list-style-type: none"> <li>▪ A map that defines, on the basis of oceanographic, ecological and other scientific information, the property's surrounding areas where no oil exploration and exploitation can be permitted</li> <li>▪ Legal adoption of a permanent exclusion of the entire property and the defined surrounding areas from oil exploration and exploitation</li> </ul>	Completed by 31 January 2016	The Parliament of Belize approved the Petroleum Operations (Maritime Zone Moratorium) Act No. 54 of 2017 in December 2017, which states that all oil exploration and exploitation is now prohibited in the entire maritime zone of Belize.
4. The property is managed effectively and in an integrated way that will ensure the protection of its Outstanding Universal Value, and appropriately allows for achieving both sustainable socio-economic and environmental goals	<ul style="list-style-type: none"> <li>▪ Adoption, implementation and effective enforcement of the Integrated Coastal Zone Management Plan, reflecting the World Heritage status of the property and its conservation and sustainable use requirements and consistent with the plan's draft version of January 2015</li> </ul>	Completed by 31 December 2016	<p>ICZM plan approved on Feb. 9<sup>th</sup>, 2016.</p> <p>The ICZM plan is being implemented through funding under the Marine Conservation and Climate Adaptation Project (MCCAP).</p> <p>Area specific development guidelines were developed under the ICZMP</p>

**Updates on other conservation initiatives/issues identified by State Party**

- I. The Belize Audubon Society, the co-manager for the Blue Hole and Halfmoon Caye National Monuments (WHS), commissioned a mangrove and littoral forest coverage study within the BBRRS in 2017 under the GEF Small Grants Programme named "Highlighting 20 years of World Heritage designation, BBRRS: Working toward better monitoring, management, and awareness". The study by Emil Cherrington *et al.* (2017) revealed that a total of 89 hectares of mangrove forest were cleared between 1996 (year of WHS inscription) and 2017 within the BBRRS. As a result, the property has remained fairly intact with keeping 95.3% mangrove coverage from 1996 (**See Annex 9** for complete study). Within the BBRRS, the South Water Caye Marine Reserve is the most susceptible to future land clearing due to the number of private land properties within the protected area.

*This study has met the 1<sup>st</sup> indicator of the Desired State of Conservation in an effort to maintain and/or manage mangrove coverage within the World Heritage Site.*

- II. The draft revised Fisheries Bill has been prepared and submitted to the Attorney General's Ministry for legal review before its submission to Cabinet and subsequent approval in the House of Representatives. The draft bill has undergone recent revisions and consultations with key stakeholders for its resubmission to the Attorney General and subsequent submission and approval by Cabinet before mid-2018. The revision process was led by a Task Force comprised of several NGOs and key stakeholders.
- III. In addressing the corrective measure 6(g) of DEC 33 COM 7B.33, the "National Replenishment Zone Expansion" initiative continues to be implemented along with its NGO and private sector partners. The project seeks to increase the current functional 'NO TAKE' areas in Belize from the current 3.15% (58,699.4 ha) to 10% (186,541.7 ha) of the territorial seas taking into consideration both near shore and deep sea areas deemed critical for the overall ecosystems functioning of Belize's coastal systems and safeguarding of marine biodiversity. The consultant, who was hired, has submitted his final report and maps illustrating the revised zones which were ground truthed with the aid of the key stakeholders including but not limited to: the Fisheries Department, the Forest Department, Lands and Survey Department and the University of Belize. Currently, the Land Information Centre (Ministry of Natural Resources) has received the

consultant's legal description of the zones, however, the Department needs to verify the description of the coordinates before any drafting of legislation can be done.

- IV. The management plans for the Glover's Reef Marine Reserve and South Water Caye Marine Reserve, two of the seven sites with World Heritage status are still being updated since consultation meetings for the revision were conducted in 2017. The first draft of the SWCMR Management Plan has been recently submitted to the Fisheries Department who will then circulate it to the SWCMR Advisory Committee for review and vetting in April 2018. It is envisioned that the new 5-year management plan will include amendments and improvements to reflect more detailed development guidelines such as the Integrated Coastal Zone Management Plan and take on board the recommendations from both reserves' Advisory committees as it relates to activities within these protected areas.
- V. The draft 2016-2021 National Lionfish Management Strategy, a national initiative for the long-term control of the Lionfish population (*Pterois spp.*) funded by Meso American Reef Fund (MARFund), has been submitted to the Fisheries Department for review. The strategy addresses mechanisms to manage the lionfish population in no-take zones, determining density and population size and the marketing of lionfish to control the population.

#### **Measures/Efforts to maintain and improve OUV of the Property**

- I. In June 2017, a Belize Delegation, including the Minister responsible for Fisheries, participated in the UN Ocean Conference and presented its voluntary commitments under SDG 14: Conserve and sustainable use the oceans, seas and marine resources for sustainable development. The Voluntary commitments are as follows:
  - By 2018, enact and implement the new Fisheries Bill;
  - Promote the implementation of FAO Voluntary Guidelines for Securing Sustainable Small-scale fisheries;
  - By 2020, commit to collaborate and cooperate with all relevant national agencies to access markets and develop new fisheries products in support of long-term tenureship to traditional and future fishers;
  - By 2020, adopt the "Fish right, Eat right" certification program;

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- By 2020, increase economic benefits by promoting value added products, improving efficiency within the supply and value chains and seeking higher value markets for the fisheries sector;
  - By 2020, implement best practices for sustainable seaweed aquaculture as supplemental income for fishers that include smart sighting, sustainability standards and provides ecosystem services that is incorporated into a policy framework for Belize;
  - By 2020, establish sustainable catch limits for the Caribbean Spiny Lobster;
  - By 2020, develop and implement the National Fisheries Policy;
  - By 2020, develop and implement fisheries management plan and adaptive management plans for main commercial species such as conch , lobster and fin fish; and
  - By 2021, achieve the full implementation of the Integrated Coastal Zone Management Plan by Government agencies, developers and relevant stakeholders.
- II. The Fisheries Department continues to implement the national roll-out of managed access, through its licensing program. It is focussed on ending open access fishing in Belizean waters and empowering fishers and managers to collaborate as stewards of the resource. The manage access program tracks who, what and how fishers fish. This rights-based approach to managing Belize's fisheries resources is aimed for better management and sustainability of the fish stock and to help improve the livelihoods of fishers and fishing communities. The offshore area is divided into 9 main fishing zones to which each have an advisory committee to vet and review fishing license applications. Information gathered can then be used for future management interventions.
- III. Coral restoration efforts in Southern Belize are still ongoing from its inception nine years ago. Under the MCCAP project, Fragments of Hope Limited has received funding support to the estimated sum of US\$340,000 for coral restoration work and capacity building targeting the South Water Caye Marine Reserve and the Turneffe Atoll Marine Reserve. Restoration efforts are also being carried out within the Laughing Bird Caye Natural Park.

## **Conclusion**

In conclusion, this report reiterates the commitment in implementing the DSOCR and the corrective measures as well as other concerns of the World Heritage Committee in maintaining the inscription of the Belize Barrier Reef Reserve System as a World Heritage Site. In achieving the indicators of the Desired State of Conservation, it is anticipated that the property could be removed from World Heritage List in Danger in 2018.

**BELIZE:**

**CHAPTER 213**

**FORESTS (PROTECTION OF MANGROVES) REGULATIONS,**  
**2018**

**ARRANGEMENT OF REGULATIONS**

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SCHEDULE 2



**BELIZE:****STATUTORY INSTRUMENT****No.            of 2018**

**REGULATIONS** made by the Minister responsible for forests in exercise of the powers conferred upon him by section 5 of the Forests Act, Chapter 213 of the Substantive Laws of Belize, Revised Edition 2011, and all other powers thereunto him enabling.

*(Gazetted                      , 2018)*

**WHEREAS-**

- (a) mangroves border much of the coastline and cayes of Belize and form an important and cherished component of the natural vegetation of the country;
- (b) mangroves provide protective functions and mitigate the destructive forces of tidal waves and other natural disasters;
- (c) mangroves function as a significant sink for the greenhouse gas carbon dioxide which is responsible for global warming;
- (d) each species of mangrove provides habitat for a diverse community of flora and fauna, including breeding and nursery areas for commercially important species of fish;
- (e) mangroves provide a dependable nesting area for a host of species of birds;
- (f) mangroves play a crucial role in the ecology of coastal areas, coral reefs and estuaries by trapping and releasing concentrations of organic matter used by marine organisms in coastal food webs;

- (g) mangroves are aesthetically attractive and can be incorporated into landscaping of waterfront development;

**AND WHEREAS** it is desirable in the national interest to establish rules and regulations to protect mangroves for the benefit of the coastal and marine ecosystems and further for the benefit of the people of Belize;

**NOW, THEREFORE**, the following regulations shall have effect:

- Citation. 1. These Regulations may be cited as the **FORESTS (PROTECTION OF MANGROVES) REGULATIONS, 2018.**
- Interpretation. 2. In these Regulations,
- “alter” or “alteration” means to cut, remove, defoliate, bury, block, drain, restrict the natural water flow, or otherwise destroy by any means or affect by any means, mechanical or otherwise, but does not include “selective trimming”;
- “Department” means the Department for the time being charged with responsibility for mangroves;
- “fringe mangrove” means mangrove communities that grow as a relatively thin fringe along the coastline and that are partially flushed by tides;
- “issuing authority” means the head of the Department for the time being charged with responsibility for mangrove forests or other senior officer from the Department authorized in writing by the head;
- “jurisdictional waters” means the water and wetlands, and shoreline areas within the territory of Belize;
- “lateral limbs and other branches” means limbs or other branches situated on or coming from the side of the main trunk of a mangrove;
- “mangrove” means any tree occurring in natural stands of the following species,
- (a) black mangrove (*Avicennia germinans*);
  - (b) red mangrove (*Rhizophora mangle*);
  - (c) white mangrove (*Laguncularia racemosa*);
  - (d) any other species of mangrove or concomitant tree, which the Minister may by Order publish in the *Gazette*;

“mangrove community” means a naturally occurring stand of mangrove trees and all concomitant plants associated with mangroves;

“overwash mangrove” means mangrove communities situated on islands that are typically wholly inundated or subject to complete inundation by the tide;

“Priority Mangrove Area” includes any area listed in Schedule 1 to these Regulations;

“protected area” has the same meaning as in the National Protected Areas System Act;

“selective trimming” means removal of less than a quarter of all limbs and branches from any one tree, or removal of tips only of some limbs and branches from any one tree for the purpose of achieving a reduction in vertical or horizontal extent of trees, provided that no trees are killed and no roots are cut.

## PART 2

### *Protection of Mangroves from Alteration unless by Permit*

3. (1) Unless specifically exempted under these Regulations, no person shall alter, allow or cause to be altered any mangrove in Belize without first obtaining a permit from the Department responsible for mangroves. This prohibition applies to privately-owned lands, public lands and jurisdictional waters.

Prohibition on alteration without permit.

(2) Every person desiring to alter mangroves shall submit an application to the Department using the form set out as Form A of Schedule 2.

(3) A non-refundable application fee prescribed in Schedule 3 shall be payable in respect of an application for a permit for alteration of mangroves.

Schedule 3.

(4) An applicant under paragraph (3) shall submit a written authorization from the property owner with the permit application if the applicant is not the owner of the property for which the permit application relates.

4.-(1) The Department shall publish a notice in the Gazette upon receipt of any application for the alteration of mangroves of an area larger than one acre.

Procedure on receipt of application.

(2) Applications for permits in respect of circumstances specified in regulation 16 (1) shall be forwarded as soon as practicable but not later than fifteen days from receipt of the application to a review panel established under regulation 15 (1) for deliberation, and the review panel shall return its

written recommendations to the Department as soon as practicable but not later than thirty days from receipt of the application.

(3) The recommendations of the review panel provided under regulation 4 (2) and any comments or objections received under regulation 5 (2) shall be taken into account by the Department when applications are being considered for approval or disapproval.

(4) As soon as practicable but not later than sixty days from receipt of an application, the Department shall either grant or refuse a permit. If a permit application is refused, the issuing authority shall inform the applicant in writing of the reasons for refusal.

(5) The Department may refuse a permit if the application, after receiving written notice of intent to refuse the permit, fails to provide required information or fails to correct errors or omissions or does not furnish the additional information to the satisfaction of the issuing authority within the time specified in the notice.

Notice of  
application.

5.-(1) A notice under regulation 4 (1) shall contain the following,

- (a) name and address of the applicant;
- (b) name of the land owner;
- (c) location of the land where the mangrove alteration will be made;
- (d) map of the location;
- (e) the proposed development;
- (f) proposed times and periods when the alteration of mangroves will be made;
- (g) any other relevant information.

(2) The general public shall have thirty days from the date of issuance of the notice to submit written comments or objections to the Department, stating the reasons for any objection.

6. (1) In addition to the requirements under regulation 4 (3), in considering whether to grant a permit, the Department shall not grant any permit for the alteration of mangroves unless it is satisfied that -

- (a) water quality of the area shall not be significantly lowered or changed as a result of the proposed alteration; and
- (b) the proposed mangrove alteration is not contrary to the public interest, or if the alteration significantly degrades or

Considerations  
for the grant of a  
Permit.

changes the environment that such action shall be, on the whole, beneficial and in the larger and long-term interest of the people of Belize.

- (c) public health, safety, welfare or property of others shall not be significantly negatively affected;
- (c) fish nursery, nesting sites, endangered or threatened species, other wildlife or their habitats shall not be significantly negatively affected;
- (d) navigation or the flow of water shall not be adversely affected and that the alteration will not cause harmful erosion, siltation, deposition or shoaling;
- (e) fishing, recreation values or marine productivity in the vicinity of the proposed alteration, or more generally along the coast, shall not be adversely affected;
- (f) tourism value of the area shall not be significantly reduced;
- (g) historical or archaeological resources shall not be adversely affected;
- (h) storm surge protection function of the area shall not be significantly reduced.

(2) If any one or more of the considerations under sub-regulation (1) are not satisfactory, in determining whether to grant a permit despite environmental damage, the Department shall consider and balance the following factors –

- (a) the proximity of the proposed alteration to a designated park or other type of protected area, including World Heritage Site;
- (b) impact on nearby coastal and reef areas known to be of outstandingly high ecological value, including those within the National Integrated Coastal Zone Management Plan;
- (c) potential for economic benefits;
- (d) the cumulative impact on existing projects or projects already under construction, or other applications under consideration for which the lands are affected;
- (e) existing or proposed national, regional and local land-use plans;
- (f) whether the impacts of the alteration will be of a temporary or permanent nature;

- 
- (g) presence of overwash mangroves;
  - (h) carbon storage and sequestration potential of the mangroves;
  - (i) the current condition of the mangroves and relative value of the functions being performed by or in the areas to be affected by the alteration.

(3) If the considerations under sub-regulation (1) and (2) are not immediately favourable, in deciding whether to proceed to grant or deny a permit, the Department shall consider conditional measures proposed by or acceptable to the applicant to mitigate adverse effects focused on the following:

- (a) actions that would avoid or prevent mangrove alteration, such as buffer zones;
- (b) alternative site placement, facility design, work methods or equipment that would eliminate impacts to mangrove;
- (c) offsetting through restoration or planting of new mangrove communities in adjacent degraded areas or other areas;
- (d) subject to sub-paragraph (c), the restoration and reforestation of two times the amount of mangrove that was cleared; and
- (e) a bond sufficient to ensure the successful completion of restoration activities with eighty percent survival rate after a minimum one year since planting.

(4) If the application is unable to meet the criteria set out in sub-regulations (1), (2) and (3), the Department shall deny the application and refuse the permit.

Grant and  
conditions of  
Permit.

7.—(1) Permits issued by the Department for the alteration of mangroves shall take the form set out in FORM B of Schedule 2 and the applicant shall pay the permit fees prescribed in Schedule 3.

(2) A surety bond in the sum of ten-thousand dollars per acre issued to the benefit of the government may be required of the applicant as a condition for the grant of certain permits where,

- (a) mitigating factors are required under regulation 6 (3);
- or
- (b) the permit is for a priority mangrove area.

(3) The Department may impose such conditions on a permit as may be reasonable and necessary to ensure compliance with the general spirit and intent of these Regulations.

(4) A condition of every permit shall relate to the manner of disposal of the mangroves altered. Plant material removed during alteration shall be disposed of in an orderly and inconspicuous manner. Small trunk and limbs (less than one inch in diameter) may be left in the mangrove habitat, but larger trunks and limbs (greater than one inch in diameter) shall be disposed of in an upland location so as not to impede or restrict water movement or create a hazard to navigation.

8.-(1) No person shall selectively trim, allow or cause to be selectively trimmed any mangrove in Belize without first obtaining a permit from the Department responsible for mangroves.

Permit for selective trimming of mangroves.

(2) Every person wishing to selectively trim mangroves shall apply to the Department for a permit using the form set out as Form A of Schedule 2 to these Regulations, and by paying the required non-refundable fee prescribed in Schedule 3 to these regulations.

(3) A permit for the selective trimming of mangroves shall only be granted by the Department if the trimming to be performed meets the definition of selective trimming under Regulation 2.

(4) Permits issued by the Department for the selective trimming of mangroves shall take the form set out in FORM B of Schedule 2 to these Regulations, and shall carry no permit fee.

9.-(1) A person granted a permit for the selective trimming of mangroves shall not selectively trim more than 50% of mangroves along the waterfront where that person's property has water frontage.

Requirements for selective trimming permit for mangroves.

(2) Selective trimming of mangroves shall be undertaken so that the bark on the remaining trunk, limbs or other branches are not damaged.

(3) No defoliant, herbicides, pruning paint or other chemicals shall be used during selective trimming. Only mechanical trimming is allowed.

(4) Plant material removed during selective trimming shall be disposed of in an orderly and inconspicuous manner. Small trunk and limbs (less than one inch in diameter) may be left in the mangrove habitat, but larger trunks and limbs (greater than one inch in diameter) shall be disposed of in an upland location so as not to impede or restrict water movement or create a hazard to navigation.

10.-(1) Every permit holder shall install at the location where the mangrove alteration or selective trimming, as applicable, will occur, a prominently displayed sign on which a waterproof copy of the permit shall be affixed, and the sign shall remain in place for the duration of the alteration.

Duty of permit holder.

(2) The dimensions of the sign under sub-regulation (1) shall be 4 feet by 4 feet and contain the words “Mangrove Alteration in Progress”.

Assessment  
report.

11.-(1) Within fifteen days of the grant or refusal to grant a permit for the alteration of mangroves, the Department shall prepare a detailed assessment report of the facts and evidence supporting its determination to grant or refuse to grant the permit.

(2) The assessment report shall include,

- (a) a description of the proposed development;
- (b) a thorough evaluation of each of the considerations under Regulation 6;
- (c) the facts and evidence in support of determinations in respect of each consideration; and
- (d) recommendations in respect of the application.

Publication of  
decision.

12. Within fifteen days of the grant of a permit in relation to Regulation 16 (1), the Department shall publish the assessment report in the Gazette.

Cancellation of  
permit.

13. The issuing authority may cancel a permit if satisfied that the permit holder has breached a condition of the permit, or is not in compliance with any requirement under these Regulations.

Circumstance  
where permit  
shall not be  
issued.

14.-(1) No permit shall be issued for alteration of mangroves by means of chemical defoliant or herbicides.

(2) No permit shall be issued for the alteration of,

(a) mangroves in areas known to be an active nesting site or resting or breeding area for a colony or conspicuous concentration of birds, including but not limited to pelicans, spoonbills, herons, storks, boobies, frigate birds, and egrets;

(b) overwash mangroves;

(c) mangroves within existing national parks, nature reserves, wildlife sanctuaries, natural monuments or other protected areas as defined and described in the National Protected Areas System Act.

Act No. 17 of  
2015

### PART 3

#### *Administration*

Appointment of  
Review Panel.



15.-(1) To facilitate the consideration of permit applications in respect of circumstances specified in regulation 16 (1), the Minister may appoint a review panel comprising the following persons, namely, the

- (a) Chief Forest Officer;
- (b) Fisheries Administrator;
- (c) Chief Environmental Officer;
- (d) Commissioner of Lands and Surveys;
- (e) Inspector of Mines;
- (f) Head of Coastal Zone Management Authority and Institute;
- (g) Head of a leading non-government organization working in research or management of the marine or coastal realm; and
- (h) A reputable marine or coastal scientist not affiliated with any of the above.
- (i) Private sector representation.

(2) The Minister shall appoint a Chairperson from among the members of the review panel. Other functionary posts shall be decided by the members of the review panel.

16.– (1) The review panel shall consider and make recommendations to the Department in relation to permit applications in the following circumstances,

Function and powers of the review panel.

- (a) more than ten acres of mangroves;
- (b) mangroves situated on cayes;
- (c) mangroves situated in priority mangrove areas;
- (d) within the World Heritage Site; or
- (e) where it is for a public good or essential service.

(2) The review panel may from time to time invite independent experts in World Heritage Sites, marine, coastal or mangrove ecology to its meetings to assist its consideration of permit applications.

(3) The review panel shall submit its recommendations on a permit application within thirty days of receipt of the application.

(4) The quorum for a meeting of the review panel shall be four members, including the Chairperson.

Fast track option  
for public good.

17.- (1) Notwithstanding anything in Regulation 14 (2) or any of these Regulations, upon receipt of an application for alteration of mangroves for public good, and upon receipt of the required recommendation from the review panel, the Department may grant a permit if,

(a) it is for a public good or essential service by a duly constituted communication, water, sewer, electrical or other utility company:

Provided such alteration is limited to those areas necessary for maintenance of existing lines or facilities or for construction of new lines or facilities to provide utility service to the public, and that such alteration is conducted so as to avoid or minimize any unnecessary alteration of mangroves;

(a) it is for a public good carried out by a licensed land surveyor in the performance of his duties:

Provided such alteration is limited to a swatch for survey sighting three feet or less in width;

(b) it is for a public good carried out by a government agency or agent of the government:

Provided that such alteration is limited to those areas absolutely necessary for the installation or construction of any facility to provide service to the public, and that such alteration is conducted so as to avoid or minimize any unnecessary alteration of mangroves.

(2) In relation to permits issued under Regulation 17 (1), no fees shall be payable in respect of the application or the permit.

(3) Notwithstanding Regulation 16 (3), the review panel shall submit its recommendations on a permit application for public good as soon as practicable but no later than fifteen days from receipt of the application.

(4) The Department shall issue its decision as soon as practicable but no later than thirty days from receipt of the application.

## PART 4

### *Offences and Penalties*

Prohibition on  
method of  
alteration.

18.-(1) No person shall use pruning paint in the alteration or selective trimming of mangroves.

(2) No person shall alter or selectively trim mangroves by the means of chemical defoliant or herbicides.

19.—(1) Any person who contravenes or aids in the contravention of any of the provisions of these Regulations intended to protect mangrove stands from damage or destruction, or a condition of a permit issued under these Regulations, commits an offence and is liable on summary conviction to a fine not exceeding twenty-five thousand dollars, or to imprisonment for a term not exceeding twelve months, or to both.

General penalty.

(2) In addition to any sentence imposed under subsection (1) above, the court may order the cancellation of any license or permit granted under the provisions of this regulation and the forfeiture of any vehicle, vessel or other transport or equipment used in the commission of the offence. All objects forfeited shall, with the approval of the Minister, be disposed of by the Department in such manner as the Minister may prescribe.

(3) When any person has been convicted of a mangrove offence, the court may, in addition to any other penalty provided under this regulation, assess the amount of any damage which may have been caused by such offender and cause the same to be recovered in such manner as if it were a fine or, in the case of unauthorized structures or clearance, may order the removal of the same within such period as may be fixed and the restoration of the places as nearly as possible to their previous condition.

## PART 5

### *Miscellaneous*

20.—(1) A person who is aggrieved by a decision of the issuing authority or the Review Panel, as the case may be, to grant or refuse to grant a permit or to cancel a permit may, within twenty-one days of the decision, apply to a Judge in Chambers of the Supreme Court for review of the decision.

Application for review..

(2) Notwithstanding section 112 of the Supreme Court of Judicature Act, an application for review shall not itself result in the suspension of the decision in relation to which the application is made, but the applicant may, within the time prescribed under the Supreme Court of Judicature Act, for making such application, apply to the Supreme Court for stay of execution of the decision, pending the determination of the application.

(3) Upon hearing an application, the Supreme Court may—

(a) dismiss the application; or

(b) remit the matter back to the Chief Forest Officer or the Review Panel, as the case may be for further consideration with such directions as it considers fit.

21. The Forests (Protection of Mangroves) Regulations, 1989, are hereby repealed.

Repeal .



**SCHEDULE 1**

(Regulation 2)

## Priority Mangrove Areas

1. Pelican Cayes & Twin Cayes, SWCMR. (unique, unparalleled marine biodiversity)
2. Turneffe Islands and Lighthouse Reef (supports marine biodiversity, reef connectivity and fisheries values)
3. Ryders, N Drowned and Drowned Cayes (critical storm protection and fisheries values for Bz City)
4. Haulover Creek, Belize City (unique ecosystem – tourist potential for city)
5. Sibun Bight (unique black mangrove forests – largest examples; ecotourism potential)
6. Sittee River Mouth (N and S of mouth), (best examples of old growth forest type red and black?)
7. Rio Hondo Estuary
8. New River Estuary
9. Senis River mouth and cayes
10. Shipstern Lagoon and cayes to sea
11. Sapodilla lagoon
12. Ambergris Caye, Cangrejo
13. Caye Caulker
14. Price Bank
15. Belize River mouth and cayes
16. Burdon Canal
17. Placencia Lagoon

18. Golden Stream (protected)
19. Sartstoon Temash (protected)
20. All other cayes (inside barrier and atolls)
21. Four Mile Lagoon
22. Little Rocky Point to Vista Del Mar

**SCHEDULE 2****FORM A**

(Regulation 3 (1) and 8 (1))

*Application for Permit to Alter or Selectively Trim Mangrove*

1. Name of the Applicant.
2. Description of the property on which mangroves are to be altered or selectively trimmed.
3. Copy of property documents including title, land tax receipts, authenticated copy of survey, location plan, etc.
4. Description of the mangroves.
5. Proposing to ☐ alter ☐ selectively trim
6. Nature of proposed alteration or selective trimming.
7. Whether the property belongs to the applicant or to another person.
8. The manner in which alteration is to be effected.
9. Means of alteration or selective trimming.
10. Prescribed fee of \$..... has been deposited in the Treasury vide Receipt No. .... dated.....

I....., owner/occupier of.....  
do hereby declare that the particulars furnished hereinbefore are true to the best of my knowledge and belief.

\_\_\_\_\_  
Date

\_\_\_\_\_  
*Signature and Address of the Applicant*

---

**FOR OFFICIAL USE**

Date of receipt of application: \_\_\_\_\_

Additional information: ☐ errors ☐ omissions☐ supply of information: \_\_\_\_\_Review panel: ☐ yes ☐ noPublication of information to alter mangrove: ☐ yes ☐ noApplication: ☐ approved ☐ refused ☐ modification☐ measures to mitigate impacts

Surety bond amount: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**FORM B**

(Regulation 7(1) and 8 (2))

**FORESTS (PROTECTION OF MANGROVES) REGULATIONS***Permit to Alter or Selectively trim Mangrove*

Ref. No \_\_\_\_\_

Permit # \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Permission is hereby granted to the above-named to alter or selectively trim mangroves at

\_\_\_\_\_,  
(Description of property location)

comprising of \_\_\_\_\_ acres of land situated at  
(size)

\_\_\_\_\_,  
(address)

and is subject to the following conditions:

1. The permit is

(a) Valid for \_\_\_\_\_, only;  
and (Permit Holder)

(b) Valid until \_\_\_\_\_.  
(Duration)

2. This permit is valid for the removal of

\_\_\_\_\_  
(Size and type of mangrove)

3. Failure to complete the alteration or selective trimming in the period specified by this permit will require a new assessment and another permit. No fire or chemical defoliant is to be used in the alteration process granted by this permit.

4. Only fill material from upland quarries and material extracted during dredging operations process under an official dredging operators permit granted by the Department responsible for mining will be allowed as filling to minimize pollution to surrounding water.
5. The permit holder must immediately report the commencement and completion of alteration to the Department at least one week ahead of schedule and after completion in order for proper monitoring of the process.
6. Precaution to avoid spillage of excavated materials to other surrounding mangroves and water outside the specified altered site must be strictly adhered to during the dredging process, thereby preventing the killing off and siltation of mangroves and surrounding marine ecosystem, respectively.
7. This permit holder will be held responsible for any unnecessary alteration of siltation damage due to negligence on the part of the operator conducting alteration on his behalf.
8. All other necessary permits must be adhered to. This permit does not relinquish the need to obtain all the other necessary permits specified under the Laws of Belize.
9. If required, environmental clearance must be obtained from the Department of Environment prior to the start of the mangrove clearance.
10. This permit may be cancelled at any time at the discretion of the Minister responsible for Mangroves.

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Issuing Authority

## SCHEDULE 3

**APPLICATION AND PERMIT FEES***(Regulations 3 (3) & 7 (1) )***APPLICATION FEES**

	Mainland	Within Barrier Reef	Outside Barrier Reef
Residential	\$50.00	\$100.00	\$200.00
Commercial	\$500.00	\$1,000.00	\$2,000.00

**PERMIT FEES**

	Mainland	Within Barrier Reef	Outside Barrier Reef
Residential	\$800 (per acre)	\$1,600 (per acre)	\$3,200.00 (per acre)
Commercial	\$2,500.00 (per acre)	\$5,000.00 (per acre)	\$10,000.00 (per acre)

**MADE** by the Minister responsible for mangrove forests this \_\_\_\_\_  
day of \_\_\_\_\_ 2018.

\_\_\_\_\_  
**Hon. Omar Figueroa**  
**Minister of State**  
**Ministry of Agriculture, Fisheries, Forestry, the**  
**Environment and Sustainable Development and Immigration**  
 (Minister responsible for Forests)

# SOUTH CENTRAL REGION COASTAL ZONE MANAGEMENT GUIDELINES



Photo Credit: Coastal Zone Management Authority & Institute



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## ACKNOWLEDGEMENTS

The Belize Coastal Zone Management Authority and Institute (CZMAI) extends its sincere gratitude to all those individuals and organizations who participated in the development of the South Central Region Coastal Zone Management Guidelines. The process of developing management guidelines for the region began with the Placencia and Laughing Bird Cayes Region Development Guidelines, which had a specific focus on development issues for the region's cayes. The cayes development guidelines for this region were prepared in 2004 by a small stakeholder group of interested, and led by Melanie McField, PhD.

CZMAI also acknowledges all those interested individuals and stakeholder groups of the region for their time commitments in updating the cayes development guidelines that have led to the preparation of the present coastal zone management guidelines for the region. The individuals that participated in the process during 2011-2012 are namely:

NAME	ORGANIZATION/AFFILIATION
Hassan Palacio	Seine Bight Village Council
Albert Nunez	Hopkins Village Council
Adrian Vernon	Peninsula Citizens for Sustainable Development
Mary Toy	Peninsula Citizens for Sustainable Development
Annelise Hagan, PhD	Southern Environmental Association
Julie Robinson	The Nature Conservancy
Harald Wallen	Placencia Village Council
Melanie McField, PhD	Smithsonian – Healthy Reefs Initiative
David Vernon	Placencia Village Council
Steve Christensen	Southern Environmental Association
Alex Martinez	The Nature Conservancy

The Peninsula 2020 Steering Committee also contributed valuable information to the process. Specifically, the Committee provided CZMAI with the document, ***Peninsula 2020 Initiative: A Consensual Vision of the Future of the Placencia Peninsula***, which helped to inform the social and environmental components of the coastal zone management guidelines.

CZMAI held a series of consultation meetings that were open to the general public during the mandatory 60-day public review period following the completion of the first comprehensive draft of the Belize Integrated Coastal Zone Management Plan document. The meeting for the South Central Region was held in Placencia Village on Wednesday June 5, 2013, and had participation from the following individuals:

<b>NAME</b>	<b>ORGANIZATION/AFFILIATION</b>
George S. Westby	Westwind Hotel
Mark Thompson	Fisherman
Rene Nunez	Laru Beya Resort
Mary Toy	Peninsula Citizens for Sustainable Development
Annelise Hagan, PhD	Independent Consultant
Matthew James	CONCH
Ilsa Villanueva	Placencia Village Council
Conrad Villanueva	Placencia Tour Guides Association
Nicole Auil-Gomez	Southern Environmental Association
Dan Santos	Southern Environmental Association

A final round of consultations was held July 7<sup>th</sup> 2015-September 7<sup>th</sup> 2015 as-the re-constituted CZMA Board of 2014 directed a re-opening of the public comment period.

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## **LIST OF ACRONYMS**

<b>BTIA</b>	Belize Tourism Industry Association
<b>CAC</b>	Coastal Advisory Committee
<b>CBA</b>	Central Building Authority
<b>COMPACT</b>	Community Management of Protected Areas for Conservation
<b>CZAC</b>	Coastal Zone Advisory Council
<b>CZM</b>	Coastal Zone Management
<b>CZMAI</b>	Coastal Zone Management Authority and Institute
<b>DOE</b>	Department of the Environment
<b>GOB</b>	Government of Belize
<b>HRA</b>	Habitat Risk Assessment
<b>InVEST</b>	Integrated Valuation of Ecosystem Services and Trade-offs
<b>ICZM</b>	Integrated Coastal Zone Management
<b>NGO</b>	Non-governmental Organization
<b>SCRCAC</b>	South Central Region Coastal Advisory Committee
<b>SEA</b>	Southern Environmental Association
<b>STP</b>	National Sustainable Tourism Master Plan of Belize
<b>USBF</b>	Upflow Sludge Blanket Filtration

## GLOSSARY OF TERMS

Certain technical terms have been used in the text of these guidelines. The following represents an explanation of such terms where they have not provided within the text.

**Artisanal/Subsistence Fishing** *means traditional fisheries involving fishing households (as opposed to commercial companies), using relatively small amount of capital and energy, relatively small fishing vessels (if any), making short fishing trips, close to shore, mainly for local consumption*

**Building Height** *means the recommended maximum building height allowed for each building to be measured from ground level to roof*

**Building Setback** *means the recommended minimum distance between buildings or between buildings and site boundaries*

**Commerce** *means the storage and retail of consumer goods*

**Commercial Development** *means land use involving the construction of a building or buildings that are used solely for commerce and business activities by the owners or others to the exclusion of all other uses within the density requirements of these guidelines*

**Commercial Fishing** *means the harvesting of fish, either in whole or in part, for sale, barter or trade*

**Conservation** *means the retention of the natural features but with allowance of limited non-disruptive development*

**Conservation Area** *means areas including the 66ft reserve and other reserves, canal buffers, water bodies, flood prone lands; areas with ecological significance such as mangrove wetlands*

**Community Facilities** *means spaces set aside in large residential or commercial subdivisions for public purposes. They may include facilities such as public parking lots, schools, cemeteries, churches, public sporting areas, youth centers, police stations or health facilities*

**Coverage** *means any building, including balconies and verandas, and expressed as a percentage of total lot size*

**Density** *means a level of development within a site, as measured by the number of lots per acre, number of dwelling units per acre, or maximum site coverage*

**Development** *means any activity which involves mining, engineering, building operations or change of use of land or building in, under, over or on land*

**Dwelling Unit** means a living area consisting of contiguous rooms intended for convenient, long-term occupancy by one family and providing complete, independent facilities for living, eating, cooking, sleeping and sanitation

**Fish camp** means a building that is permanently or temporarily used for ancillary housing, trap-making and storage, boat repair and docking by full or part time commercial fishermen as licensed by the Fisheries Department

**Habitable Room** means any room except that used for a kitchen or bathroom

**Land** means all incorporeal hereditaments of every tenure or description that are either permanently or temporarily above the surface of the sea, whether through natural or man-made activity. The seabed, while not 'physical' land, is defined as National Land

**Liquid Waste** means grey water from bath, basin and sink and sewage waste that consist mainly from discharge of body waste

**Low-Density Development** means development of a site that does not exceed 20 dwelling units per acre, 6 lots per acre and a maximum site coverage of 50 percent

**Low-Impact Development** means an ecologically-friendly approach to site development and storm water management that mitigates development impacts to land, water and air; through conserving natural systems and hydrologic functions of the site. Site development includes residential dwelling units and community facilities and impervious surface cover is a maximum of 30 percent of total cover

**Marina** means a mooring facility for four or more recreational vessels

**Maximum Human Carrying Capacity** means the maximum population size of humans in an area that the local environment can sustain indefinitely, given accessibility to the food, habitat, water, and other necessities

**Maximum Number of Floors** means the recommended maximum number of floors a building will be allowed to have including attics or roof space designed for habitation

**Maximum Number of Lots** means the recommended maximum number of lots in which an acre of land can be subdivided and alienated

**Maximum Habitable Rooms** means the recommended maximum number of rooms to be allowed and measured per acre of land

**Maximum Building Coverage** means the recommended maximum ground coverage of any building including balconies and verandahs and expressed as a percentage of total lot size

**Maximum Site Clearance** means the recommended maximum amount of land that will be allowed to be cleared expressed as a percentage of the total site area

**Medium-Density Development** means development of a site that does not exceed 40 dwelling units per acre, 8 lots per acre and a maximum site coverage of 66 percent

**Medium-Impact Development** means an ecologically-friendly approach to site development and storm water management that mitigates development impacts to land, water and air; through conserving natural systems and hydrologic functions of the site. Site development includes a combination of residential dwelling units, community facilities and commercial activities, and impervious surface cover is a maximum of 50 percent of total cover

**Minimum Lot Size** means the recommended smallest size a parcel will be allowed to be alienated

**National Land** means all lands, including cayes and parts thereof not already located or granted, and any lands which have been, or may hereafter become, escheated to, leased by, or otherwise acquired by the Government

**Piers per Site** means the recommended number of piers that will be allowed to be constructed on any site

**Primary Land Use** means the recommended preferred use for the site

**Residential Development** means land use that involves the construction of a building or buildings that are used solely for permanent or temporary domiciles by the owners or others on a non-commercial basis to the exclusion of all other uses within the density requirements of these guidelines

**Resort** means a building, buildings or site which offers accommodation and general amenities to visitors with other uses such as bars, restaurants, general storage and repair facilities and docking

**Secondary Land** means the recommended next preferred use to be applied to the site either in conjunction with the primary land use or as an alternative to the primary land use if that is not applicable

**Solid Waste** means any unwanted material that is useless and thrown away or, discarded

**Swamp** means an area of very shallow lagoon with mud, savannah or very low vegetation

**Utility** means the service and infrastructure used for the supply of energy, water, communication and waste disposal

## **PREAMBLE**

The Belize Coastal Zone Management Authority and Institute (CZMAI), a statutory body established by the Coastal Zone Management (CZM) Act of 1998, is tasked with the broad responsibility of assisting with the development of policies, strategies and guidelines for the improved management and sustainable use of the country's coastal resources at a national level. In keeping with its mandate to prepare an integrated coastal zone management plan, CZMAI has developed regional coastal zone management guidelines to provide support for planned development and resource management along the coastline and offshore areas of the entire country. These guidelines have been prepared for nine (9) coastal planning regions (**Map 1**), which were demarcated based on commonalities, geographic definition and regional characteristics. The coastal zone management guidelines will help to integrate management efforts across the land-sea interface.

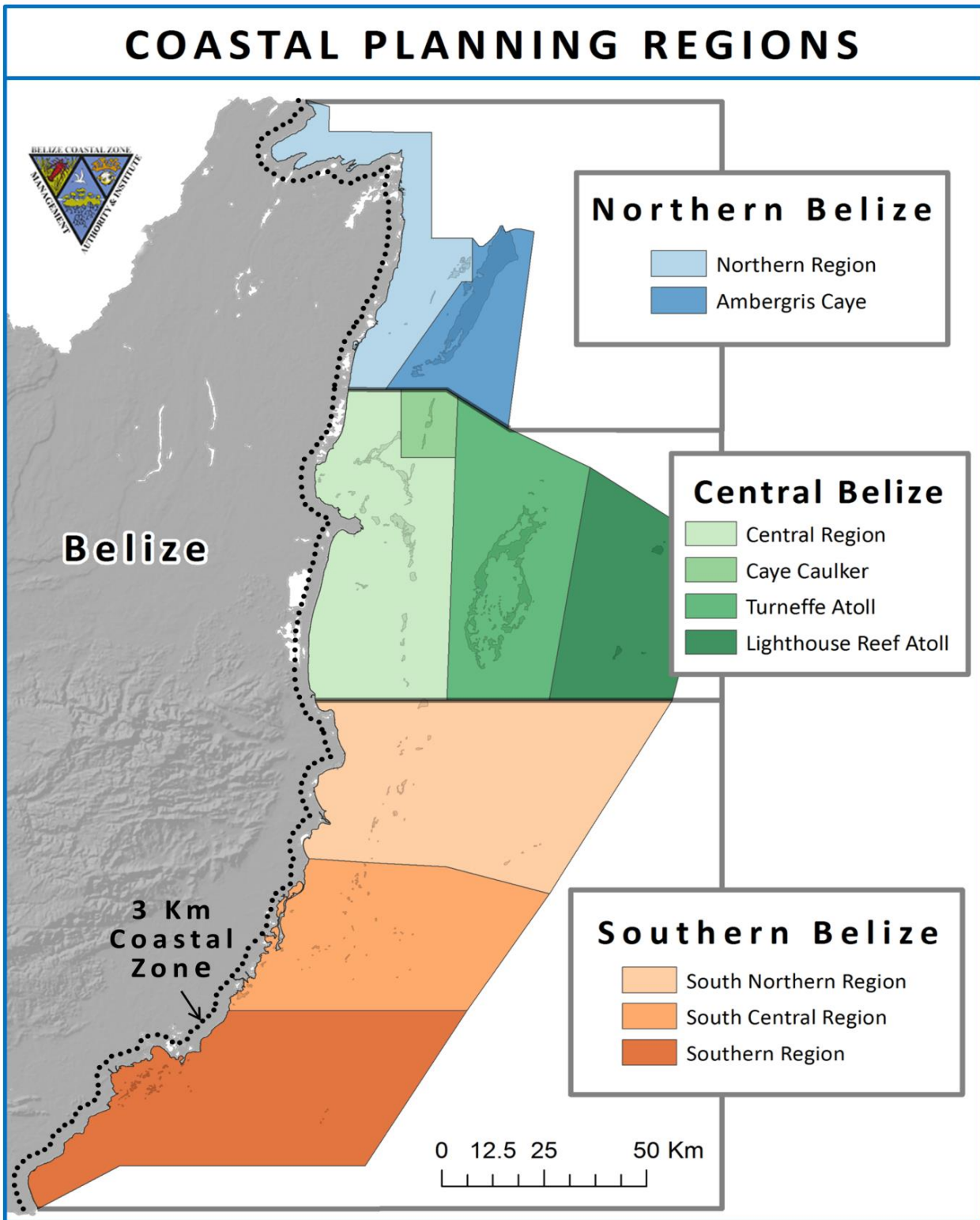
The South Central Region Coastal Zone Management Guidelines were developed in conjunction with the stakeholder communities within the region. The South Central Region; which includes the coastal communities of Seine Bight Village, Maya Beach community, Placencia Village, Riversdale community, and Independence Village, is relatively developed but is also known for its diverse flora and fauna as well as its coastal and marine ecosystems. The region is home to Laughing Bird Caye National Park-a World Heritage Site. Using the expert subjective information from stakeholders in addition to the best available objective data, CZMAI was able to produce this guideline with the following goals:

1. Encourage and promote the sustainable development of coastal and offshore areas within the South Central Region that will promote economic growth while simultaneously ensuring ecosystem stability and the efficient delivery of ecosystem services.
2. Protect and preserve the traditional way of life of the stakeholders within the South Central Region
3. Ensure sustainability of coastal resources by identifying areas in need of conservation and reducing user conflicts

These goals are culturally informed, and rooted, where possible, on sound science and local knowledge. These guidelines represent the views and recommendations of the stakeholders of the South Central Region. They are also a response towards addressing the management gaps identified by stakeholder communities through an extensive consultation process. The coastal zone management guidelines will ensure that human use of the coastal region occurs in consideration of the carrying capacity of the environment in addition to other ecological, cultural, social and economic development priorities of the region. These guidelines will aid policy development for integrated coastal zone management. They will be implemented by all those agencies that have legal mandates and/or permitting powers that impact resource utilization in the coastal zone of Belize, in partnership with this region's stakeholder groups.

### **South Central Region Coastal Zone Management Guidelines**





**Map 1: Coastal Planning Regions of Belize**

## 1.0 INTRODUCTION

The South Central planning region, formerly the Placencia/Laughing Bird Cayes region, comprises approximately seventy-five (75) cayes and five (5) communities located on the Placencia Peninsula (**Table 1**). The sea and cayes lying in this region make up one of the nine coastal planning regions of Belize that have shared social, economic, geographic and administrative factors.

**Table 1: Coastal Communities and Cayes within the South Central Planning Region**

<b>Coastal Communities:</b>	
Seine Bight Village	Placencia Village
Maya Beach Community	Riversdale Community
Independence Village	
<b>Cayes:</b>	
Abigail Caye	Bakers Rendezvous Caye: North Caye
Booby Caye	Bakers Rendezvous Caye: South Caye
Bugle Cayes: West Caye	Bugle Cayes: East Caye
Buttonwood Caye	Cary Caye: North
Cary Caye: South	Channel Caye: North
Channel Caye: South	Colson Caye
Crawl Caye	Dredge Caye
Elbow (Saddle) Caye	False Caye
Funk Cayes: Eastern Caye	Funk Cayes: Western Caye
Gladden Cayes: Eastern Caye	Gladden Cayes: Western Caye
Great Monkey Caye (Long Caye)	Harvest Caye: East Caye
Hatchet Caye	Harvest Caye: West Caye
Ivan Caye	Jack's Caye
Lagoon Cayes: Southern Caye	Lagoon Cayes: Northern Caye
Lark Caye Range	Lark Caye
Lazy Caye	Laughing Bird Caye
Little Monkey Caye	Little Harvest Caye
Little Water Caye	Little Morris Caye
Long Coco Caye	Loggerhead Caye
Moho (Trapp's) Caye	Long Coco (LONG) Caye
Mosquito Caye	Morris (Owen) Caye
Norval (Bread and Butter) Caye	Palmetto Caye: Western Caye
Palmetto Caye: Eastern Caye	Pelican Cayes: Godfrey Caye
Pelican Cayes: North East Caye	Pelican Cayes: Little East Caye
Pelican Caye: Faux Caye	Pelican Cayes: Northern Lagoon Cayes
Pelican Cayes: South Central Caye	Pelican Cayes: Cat Caye

Pelican Cayes: South West Caye	Pelican Cayes: Big East Caye
Pelican Cayes: South East Caye	Peter Douglas (Old Rendezvous) Caye
Placencia Caye	Pompion (Pumpkin) Caye
Queen Cayes	Quamino Caye
Rendezvous Caye	Rocky Point Caye
Rosanna Caye	Round Caye
Round (French Louis') Caye	Saddle Caye
Samphire Caye	Scipio Caye
Silk Cayes: North Caye	Silk Cayes: South Caye
Silk Cayes: Middle Caye	Spider Caye
Robert's Caye	Tarpon (Tarpum) Caye
Wippiari Caye	

The cayes in the region range in size from about 65 acres (Lark Caye) to only several square yards. The majority of the cayes are predominantly in their natural state. Development consists of fishing camps, small eco-type resorts (maximum of ten people), and residential housing. There are a small number of individuals who are either planning or expanding small-scale resort type facilities. The great majority of cayes have some claim (either ownership or lease) on them, either wholly or partly.

Located at the southern-most tip of the Placencia Peninsula is Placencia Village, traditionally a Creole fishing village that is now mostly focused on tourism. Just a few miles north of Placencia Village is Seine Bight, a predominantly Garifuna village that is quite arguably one of the most economically-distressed communities on the entire peninsula. The Maya Beach community is technically within the municipal boundary of Seine Bight, however residents of have little social or political involvement in the village. Residents of Maya Beach are largely full and part-time expatriate residents from the United States, Canada and Europe (to a lesser extent than the latter two). North of Maya Beach is the Riversdale community that is comprised of a few families, most of whom fish for a living. Independence Village, while not located directly on the peninsula, is an important stakeholder community for this region. It is the largest community with a more diverse group of residents that have multiple livelihood portfolios. It contains two primary schools and one secondary and one tertiary institution, all of which host students from its neighboring communities.

The coastal zone management guidelines have been prepared with a view to guiding current and future development activities on the Placencia Peninsula and all the cayes that lie in the region. The guidelines are based on provisions set out in the National Integrated Coastal Zone Management Strategy for Belize 2003 for sustainable coastal area use and management. The policy recommendations draw on those presented in the recently completed "Peninsula 2020 Initiative", which represents a consensual vision by the peninsular communities for the future of the Placencia Peninsula. The policy recommendations include, but are not limited to, the following: fishing and tourism development, land use planning and development management,

land tenure, conservation of natural resources, mineral extraction, waste disposal, and national strategic considerations.

## **2.0 REGION BOUNDARIES**

### **Location and Geographic Definition**

The South Central Region, for which these coastal zone management guidelines have been prepared, is one of nine regions into which the coastal zone has been demarcated (**Map 1**). The region encompasses 2315 square kilometers, and extends along the coast from the mouth of South Stann Creek River, to the mouth of Monkey River, extending seaward to include the barrier reef, with Norval Caye in the north, Pompion Caye in the south, and Gladden Spit in the east (**See Maps 2, 3, 4, 5**). It is comprised of all that area enclosed by the lines joining points that have the following UTM 16 coordinates:

Point 1: (1849442 N, 357790 E)

Point 2: (1847114 N, 395043 E)

Point 3: (1840234 N, 420020 E)

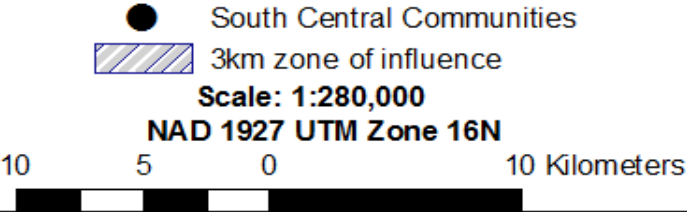
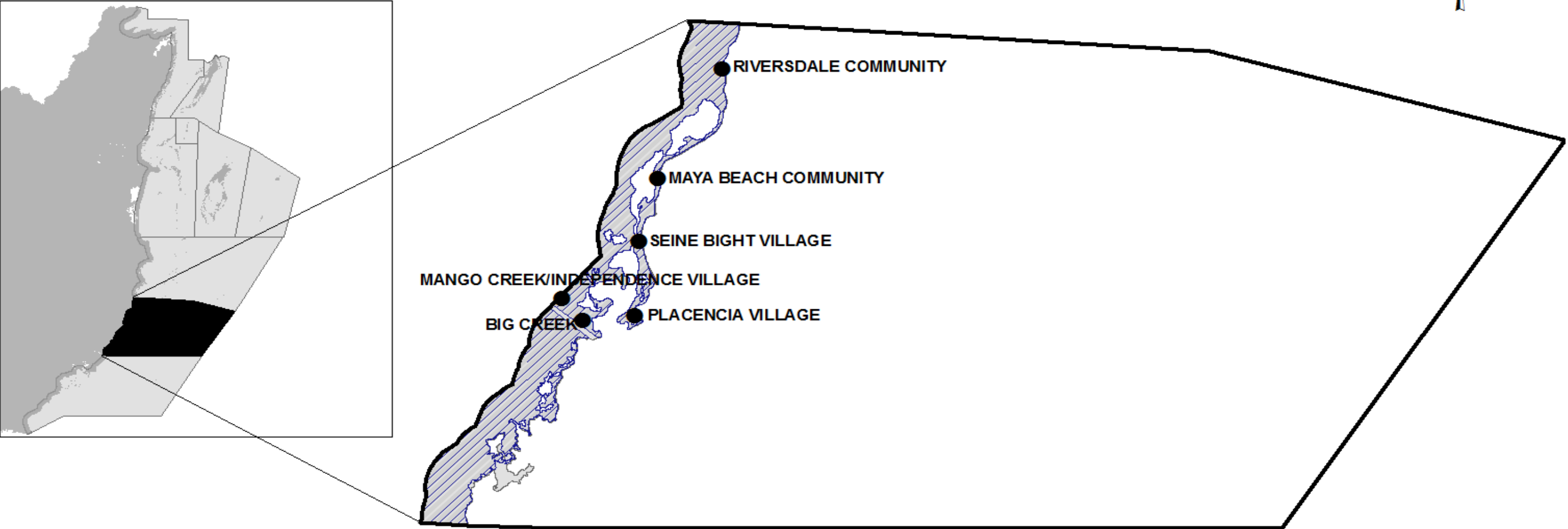
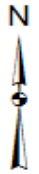
Point 4: (1809860 N, 399912 E)

Point 5: (1810495 N, 338846 E)

### **Regional Context**

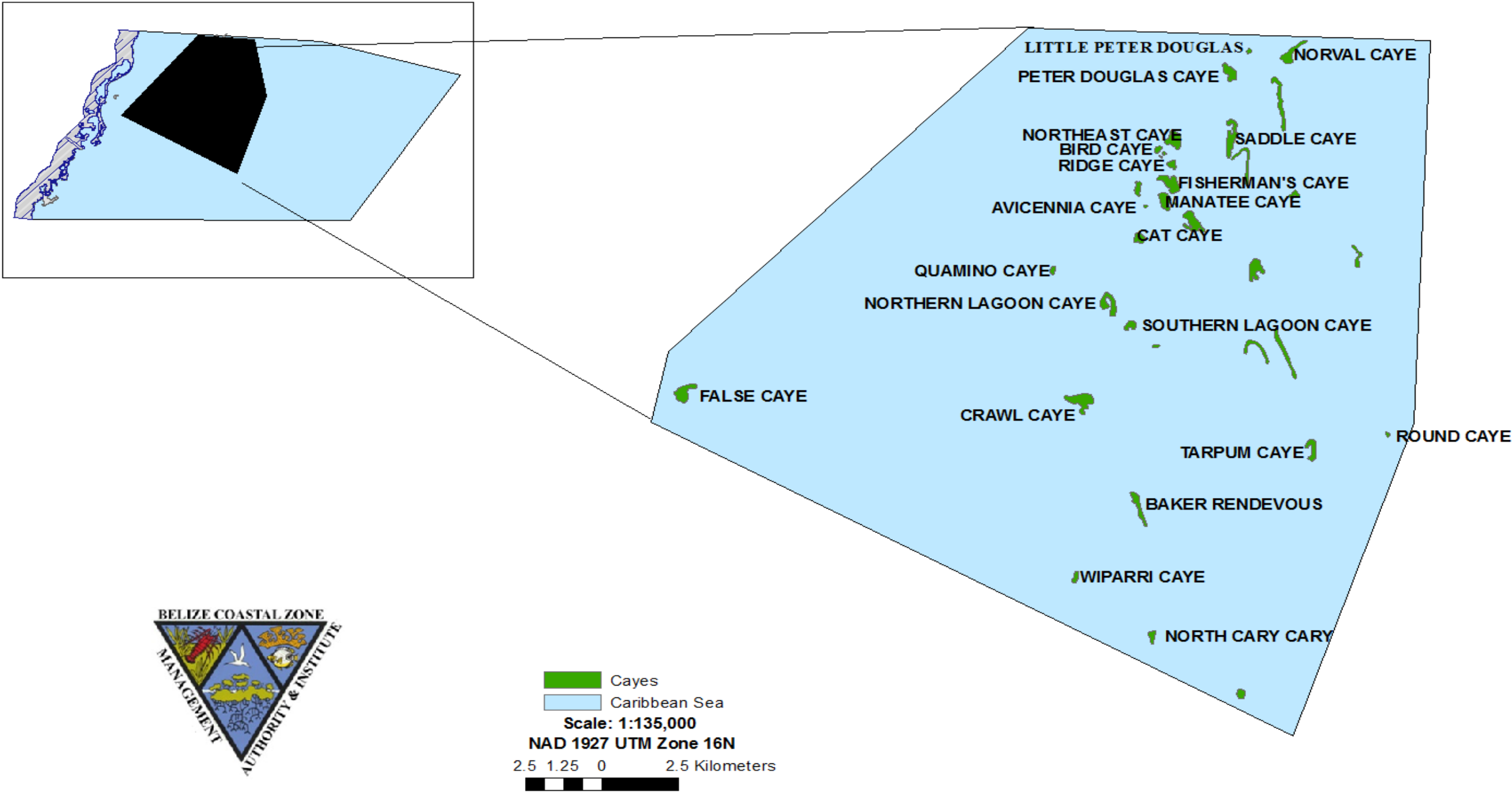
The South Central Region comprises approximately 2716 square kilometers of terrestrial and aquatic environment. The mainland portion of this region includes five coastal communities that fall within three kilometres of the coastline from the mean high water mark. This area accounts for approximately 139 square kilometers

**SOUTH CENTRAL COASTAL ZONE  
PLANNING REGION**



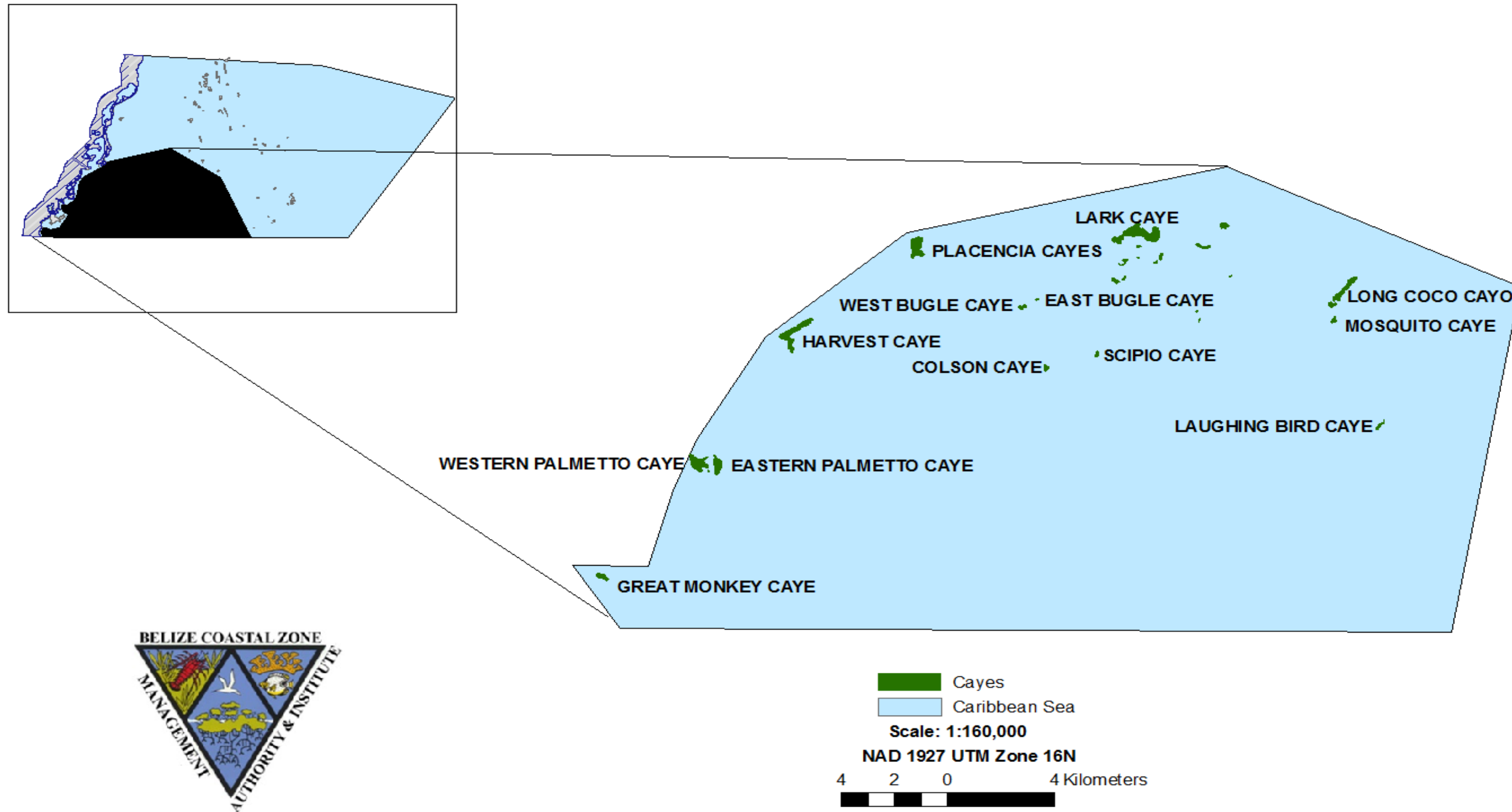
Map 2: South Central Coastal Zone Planning Region

# **SOUTH CENTRAL CAYES NORTHERN SUB-REGION**



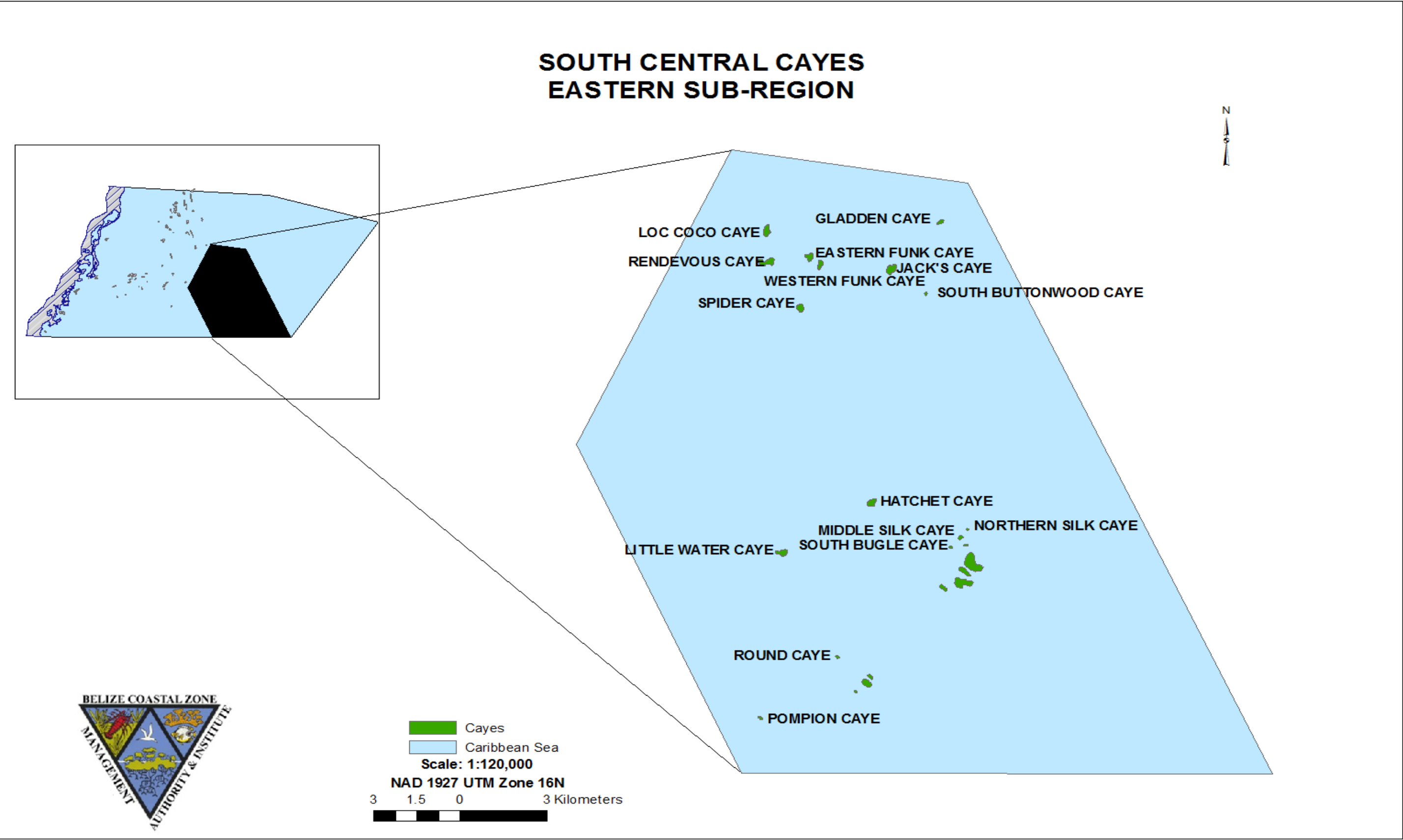
Map 3: South Central Region Cayes (Northern Sub-region)

## SOUTH CENTRAL CAYES WESTERN SUB-REGION



Map 4: South Central Region Cayes (Western Sub-region)





Map 5: South Central Region Cayes (Eastern Sub-region)

### **3.0 OBJECTIVES**

The management of the South Central region's coastal zone must be linked to the goals and aspirations of the people of Belize, particularly the residents of coastal communities within the Stann Creek District. Consequently, it must be intrinsically tied to the socio-economic, cultural and other basic needs of the people of the south and of Belize, and their use and demand for land and marine resources. In order to ensure the continued protection of nationally significant species, biotic communities and physical features and the continued delivery of ecosystem services to the several thriving communities within the region, the objectives of these coastal zone management guidelines include:

1. Protecting the fishing resources and traditional fishing rights, especially for the fisherfolk from the communities of Placencia, Seine Bight, Riversdale, Independence and Maya Beach
2. Promoting orderly and sustainable development, based on suitable land use planning, and with effective development guidelines that will meet the needs of current and future generations
3. Maintaining and protecting on going and future conservation, recreational and tourism areas and uses
4. Preventing inappropriate high-impact, unsustainable developments that are incompatible with community needs
5. Protecting and preserving significant national and international natural features and ecological biodiversity of special interest or uniqueness that define the character and scientific importance of the South Central coastal zone
6. Preserving the social and cultural values of the people and communities of the region that are connected to the environment
7. Fostering and supporting a continued partnership among stakeholders for managing the coastal resources
8. Establishing a framework for regulating the development and use of resource of the region through the continuation of CZMAI's coastal planning program activities and coastal advisory committee process

#### **4.0 LEGISLATIVE AND INSTITUTIONAL FRAMEWORK FOR INTEGRATED COASTAL ZONE MANAGEMENT IN BELIZE**

The Coastal Zone Management Act, hereinafter referred to as “the Act”, was enacted in 1998 and has been described as reflective of the trend in legislation in Belize towards more accountability and transparency for government actions, and more direct participation by the public in decision making, particularly public resources. The intent of the Act is to promote the sustainable development of coastal and ocean areas through coordination of existing legislation affecting coastal resources and through building capacity and expertise to manage coastal resources. The main purpose of the Act is to:

- Provide for the improvement of coastal zone management in Belize through the establishment of a Coastal Zone Management Authority and a Coastal Zone Management Institute;
- Provide for the establishment of a Board of Directors to control and manage the affairs of the Authority;
- Provide for the preparation of a Coastal Zone Management (CZM) Plan;
- Provide for the establishment of mechanisms to improve monitoring of various activities within the coastal zone;
- Provide for the payment of fees and charges related to the use of the coastal zone and
- Provide for matters connected therewith and incidental thereto

The Coastal Zone Management Authority is the policy making and planning institution for coastal zone management. Its functions are primarily in the realm of planning, advising, cooperating, collaborating and monitoring. It is given no jurisdiction to permit or regulate activities which may affect the sustainable development of the coastal zone. The Coastal Zone Management Institute is the research and technical arm of the Authority. As is indicated above, the Coastal Zone Management Authority is mandated to develop a comprehensive Coastal Zone Management (CZM) Plan for Belize. The CZM Plan is to be developed by the Chief Executive Officer (CEO) of the Authority through consultation with all affected government agencies, non-governmental agencies, statutory bodies and the private sector. The Act mandates that the plan address certain areas. These include:

- Guidelines to be used in determining the suitability of particular development activities in the coastal zone;
- Guidelines for the general monitoring of the coastal zone, including its biological species, communities and habitats;
- Proposals, including existing proposals from Government agencies, relating to the coastal zone that deal with the following subjects:
  - Land use
  - Planning for the establishment of marine protected areas and for the conservation of threatened or potentially threatened or endangered species;
  - Preservation and management of the scenic, cultural and other natural resources;
  - Recreation and tourism;
  - Monitoring of the environment and natural resources, mineral extraction, living resources, human settlements, agriculture, aquaculture, and industry
- Proposals for the reservation of land or water in the coastal zone for certain uses, or for the prohibition of certain activities in certain areas of the coastal zone;
- Recommendation for the improvement of public education as well as public participation in the management of coastal resources;
- Recommendations for strengthening governmental policies and powers and the conduct of research for the purposes of coastal resources conservation and management

The process for approval of the CZM Plan is as follows: The Act requires the CEO of the Authority to submit the CZM Plan to the Board of the Authority, who has sixty days to make modifications. Thereafter, the Board is to notify the public of the availability of the CZM Plan by an order published in the Gazette. Any member of the public may submit comments within sixty days. Upon completion of the sixty days, the Board may approve the CZM Plan, subject to modifications, if they deem it fit in regard to the comments submitted, and then submit the same to the Minister for approval. The Minister, after approving the CZM Plan, shall table it in the House of Representatives for approval by the House by affirmative resolution. Subsequent to approval by the House, the CZM Plan must be published in three consecutive issues of the Gazette. The CZM Plan is to come into operation on the date of the last publication or such later date as may be specified therein. The Act requires the CZM Plan to be revised during the four year period after it comes into operation.

It was agreed by the CZMAI that the CZM Plan would be developed in phases, with the first phase being the development of an Integrated Coastal Zone Management Strategy document, which underwent extensive public consultation. It was endorsed by the cabinet in

2003, and is an official policy document of CZMAI. The second phase involved the formulation of cayes development guidelines for eight of the nine coastal planning regions into which the coastal zone has been sub-divided by the CZMAI. This subdivision was based on geographical, biological, administrative and economic similarities. The Ambergris Caye Development Master Plan serves as a guide for regulating the use and development of land in the Ambergris Caye Planning Region. See **Map 1** for the definition of the nine coastal planning regions.

The development guidelines were formulated using the Cayes Development Policy (2001) as a framework. During 2010-2012, the cayes development guidelines were updated to include new information on the cayes, but also to include human use of the coastline and marine waters. As such, the development guidelines have been renamed the coastal zone management guidelines. Thus, the Integrated Coastal Zone Management Strategy (2003), together with the coastal zone management guidelines for the nine coastal planning regions, contributes to the development of the comprehensive Integrated Coastal Zone Management Plan.

## 5.0 GUIDING PRINCIPLES

It is important that the coastal zone management guidelines for the region be formulated as a part of a sustainable plan geared towards contributing to national, regional and local development policies, goals and aspirations. They must therefore be holistic and pragmatic, yet underpinned by certain fundamental principles. These can be detailed as follows:

**Principle 1:-** *Recognition that the South Central Region needs special protection and management because of its physical, economic, scientific, cultural and aesthetic attributes*

**Principle 2:-** *Recognition of the need to avoid placing undue strain on the terrestrial and aquatic environment of the region by ensuring that proposed development activities do not exceed the carrying capacity of the region*

**Principle 3:-** *Recognition of the rights and interests of traditional users and stakeholders while acknowledging the national development policy which promotes tourism and job creation*

**Principle 4:-** *Recognition that environmental concerns are best handled with the participation of all concerned stakeholders at all levels and from all sectors*

**Principle 5:-** *Recognition that planning guidelines represent a preventative and precautionary approach to environmental degradation and a tool for pursuing sustainable development of the region*

## 6.0 SECTORAL ISSUES AND POLICIES

These policies are organized into ten sectors that address current and potential issues within the South Central coastal zone, and provide recommendations from stakeholders. They include: Fishing, Marine Tourism and Recreation, Land-Use, Marine Dredging, Sensitive Habitats, Utilities, Pollution Control, Social Amenities, Conservation, and Research & Education. They were developed by stakeholders of the region in consultation with the Coastal Zone Management Authority and Institute.

### 6.1 *Fishing*

The cayes of the South Central coastal planning region and their surrounding waters have provided a reliable source of fishing for centuries. The very nature of the land, sea and the over wash mangroves acts as ideal breeding grounds that could be devastated by inappropriate development and unsustainable use. Commercial and subsistence fishing has been an economic mainstay for the Peninsula region perhaps as far back as the earliest occupation by the ancient Maya. The industry in this region reached a peak in the 1970s, particularly through the activities of the Placencia Fishermen's Cooperative. Although fishing as an economic activity has been largely supplanted by tourism, it is still important, both culturally and as a viable economic diversifier and a source of fish protein for residents, local resorts and restaurants.

Commercial fishing in the region employs fishers from Placencia Village, Seine Bight Village, and Monkey River Village (although it is claimed that most Monkey River fishermen fish further south). Fishermen from Hopkins and Sarteneja also frequent the area. Common catches include lobster, conch, barracuda, groupers, jack, snappers, mackerel, and grunts. Permits, tarpon and bonefish are sought after for sport fishing and until very recently, the harvesting of both sea cucumber and seaweed has emerged as viable fisheries.

The total spiny lobster coverage for the South Central was determined to be approximately 869 km<sup>2</sup>. Using InVEST's ecosystem service model for Spiny Lobster, it was estimated that the lobster tail catch for the current zoning scheme is 28,026 lbs and generating revenue of approximately BZ \$0.75 million (**Fig 4, Appendix**). In addition, model results suggest that a Conservation Zoning Scheme could increase catch to 44,667 lbs; and generate an annual revenue of BZ \$1.2 million by 2025. However, a development zoning scheme would decrease the catch significantly to 3,673 lbs; with exports of tail meat amounting to 4,512 lbs, and generating annual revenue of only BZ \$0.12 million by 2025. The model results indicate that the proposed zoning (Informed Management) scheme (**Map 6**) for this region could increase catch to 37,361 lbs. Exports of tail meat would be in the amount of 24,696 lbs, generating annual revenue of BZ \$0.99 million by 2025. This represents a 21% increase from 2010 returns.

Compared to the Informed Management Zoning Scheme (**Map 6**), the Conservation Zoning Scheme is the better option for maintaining increased lobster catch and revenue through to 2025. This is mainly attributed to the fact that under the Conservation Zoning Scheme,

habitats that support the lobster fishery are under relatively less stress from human activity than in the Informed Management scheme. However, while the zoning scheme under a Conservation Scenario is good for habitats and the provision of important ecosystem services, such as protein from lobster, significantly less human activities occur in this zoning scheme. Although there may be some loss to habitat quality and lobster production, the Informed Management zoning scheme represents a balance between managing the resources of the coastal zone and the continued allocation of areas for human use through to 2025.

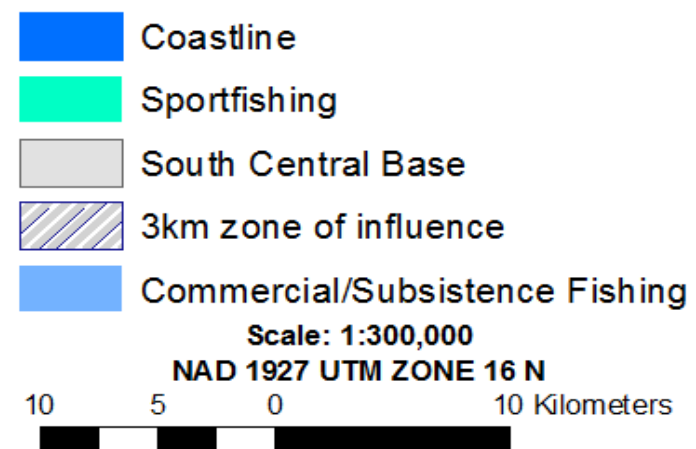
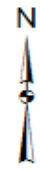
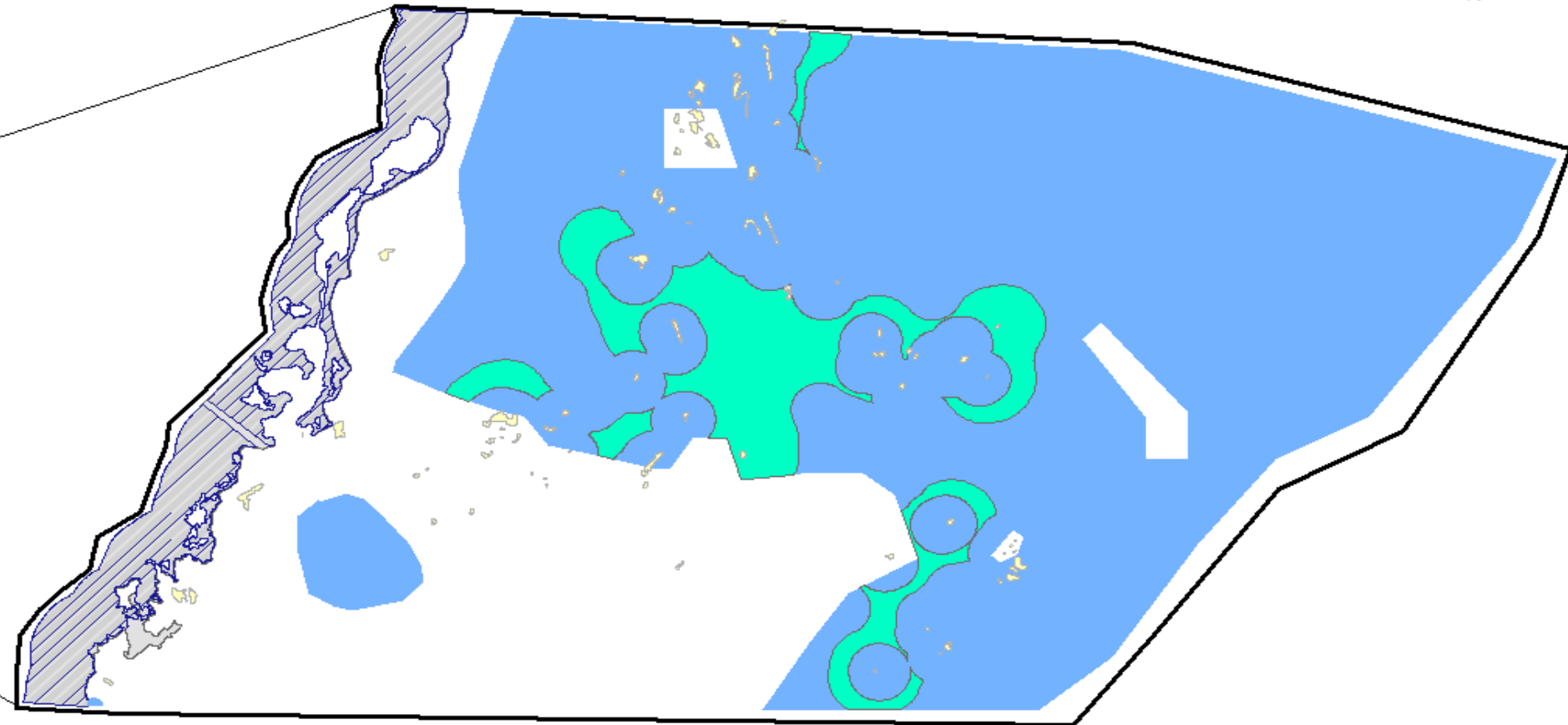
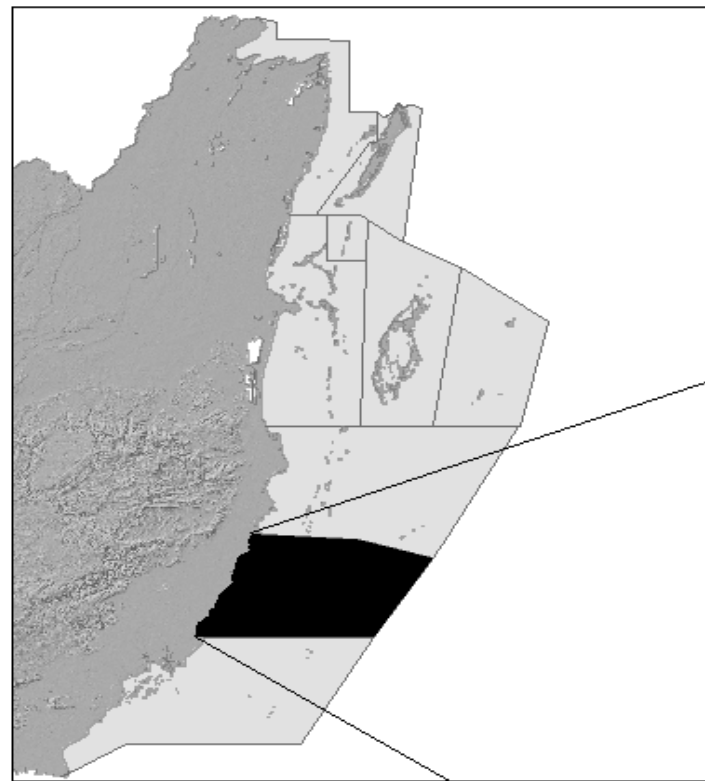
In discussing the results of the InVEST ecosystem models, and in particular the lobster fishery model, there is the need to consider limitations of the model, which are highlighted below:

- Population growth parameters are nationwide, not region-specific
- Habitat dependencies are obligatory (e.g., habitat substitutability is not explicit represented).
- The population responds to change in habitat quantity (i.e., areal extent of mangrove, seagrass, and coral reef), not quality of those habitats.
- The fishery is assumed to take place at the start of the year, before natural mortality
- The model assumes near knife-edge selectivity in harvest function
- Harvest selectivity (and catchability) is invariant, such that technological improvements to gear or changes in fishing practices are not modeled.
- Market operations are fixed, such that they do not vary in response to amount of harvest, shifts in market or consumer preference, or technological changes.
- Climate change impacts are not directly accounted for in model

Additional information on how this model works can be found in **Appendix B.4** of the Belize Integrated Coastal Zone Management Plan.



# INFORMED MANAGEMENT ZONING SCHEME FOR FISHING: SOUTH CENTRAL REGION



Map 6: Informed Management Zoning Scheme for Fishing in the South Central Region

Each community seems to focus its fishing effort on a particular marine product. For instance, Placencia and Monkey River specialize in lobster fishing, while it appears that Seine Bight does not. There are marketing variations too. Placencia has a well-organized co-operative and freezing facility, and markets its fish through the Belize City-based fishing co-operatives. In Seine Bight and Monkey River, although some individuals belong to the Placencia Fishermen's Co-operative, catches are frequently sold locally. A new co-operative has recently been established in Independence.

One particular trend has been repeatedly reported by fishers is a general depletion in commercial species, particularly conch, but also lobster, sharks, snook, and Goliath grouper. The vicinity around Buttonwood, Funk, Gladden, Jack's cayes is a historically rich fishing area, principally for grouper and snapper, and fishermen from several communities use it. However fishermen have identified a distinct decrease in the area. The False Bight area has also been seen to be on the decline, as has the Ranguana Caye area to the south. Straight forward over-fishing may be the cause of the decline, though locals point to the constant illegal fishing by fishermen from Guatemala and Honduras, and, indeed, there is ample evidence of their presence, particularly in the night. The decline is manifested in the switch many fishermen are making to tour guiding and the development of small tourist accommodations on the cayes.

The coastal area inland from the region is dominated by shrimp farming, with at least 7 active farms in operation. While these make a hefty contribution to the national economy, local employment is relatively small. There are concerns too over the concentration of nutrients from the farms in the poorly flushed Placencia Lagoon, and this may be having a deleterious impact on the waters around and south of Placencia. It is noteworthy to mention that one potentially viable, low-impact and sustainable mariculture venture that has been considered in the region is the cultivation and harvesting of seaweed. This venture is being piloted by the Placencia Producers Cooperative Limited with support from the Community Management of Protected Areas for Conservation Initiative (COMPACT) and the World Wildlife Fund.

The Fisheries Act, administered under the Fisheries Department, is the principal governing legislation to regulate the fishing industry (**Table 2**), and is directly concerned with maintaining sustainable fish stocks and protecting the marine and freshwater environments. In order to protect the fisheries resources of the Corozal Bay area and the traditional fishing rights of fishing communities of the region, the following action steps are recommended, to complement the existing Fisheries regulations and to enhance regional management of the fisheries resources.

Table 2: Framework for Implementing Informed Fisheries Management in the South Central Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Fishing	Marine area defined for the extraction of fish for food and commercial trade, except for sport fishing which only involves the catch and release of fish	1.Sportfishing(bonefish, tarpon, permit); 2.Wild capture of commercial fish species using only permitted fishing gear 3. Subsistence fishing using traditional fishing gear 3. Wild capture of invasive species	Marine recreation and eco-tourism Passage/entry of fishing vessels Research and Education within marine reserves Establishment of fish pots and traps Seaweed culture	Sport fishing Commercial fishing Research and Education	1. Illegal extraction of catch and release species, endangered marine species and organisms under seasonal management regime; 2.Extraction within legally specified “no-take”/replenishment zones 3. Dredging 4. Use of prohibited fishing gear 5. Trawling 6. Shipping and navigation 7. Dumping of solid and liquid wastes 8. Oil exploration and extraction	Fisheries Act Coastal Zone Management Act	Fisheries Department Coastal Zone Management Authority

## **Recommended Actions:**

1. Protect spawning aggregation sites, traditional fishing grounds and critical areas of the South Central coastal zone including, but not limited to, replenishment zones and no-take areas, through the clear identification and demarcation of these areas.
2. Provide stronger enforcement of the Belize Fisheries Act and its regulations, including foreign fishing in Belizean waters, closed seasons, and size limits. Increased training of enforcement officer could serve an effective enforcement mechanisms
3. Incorporate fishing areas into development planning for the region
4. Amend the Fisheries Regulations to include harsher penalties for non-compliance with fisheries management policies
5. Preserve mangrove areas important for the provision of fish nursery habitats
6. Disseminate information to the general public via public awareness campaigns on an ongoing basis on fisheries legislations, especially the protection of fish species of conservation and/or commercial significance
7. Secure long-term alternative livelihood options for traditional fishers of the region
8. Limit dredging activities from areas within close proximity to important fishing grounds
9. Conduct research on the relationship between abiotic factors, (such as salinity, temperature) and fish stocks
10. Conduct regular patrols targeting non-registered fishermen and transboundary incursions—increasing use of night patrols, monitoring of creeks etc.
11. Establish protocol and collaborative agreements with Fisheries Department and Belize National Coast Guard for fast response to reports of transboundary incursions
12. Implement the recommended Informed Management zoning scheme for fishing for this region (**Map 6**)

13. Enforce a total ban on gill netting along the entire Peninsula coast and also in the Placencia Lagoon, as continued netting of creeks threatens snook and tarpon stocks
14. Lower financing costs for fisher folk
15. Improve education in new technologies for fisher folk
16. Integrate tightly the fishing and tourism sectors in terms of culture, tourist activities, and supply chain
17. Support sustainable, low-impact mariculture options for the region, such as seaweed harvesting
18. Protect fishermen's right of access to camping areas. There has been a high degree of uncertainty over the security of fishermen's camps in some areas, and there has been a prolonged campaign to give them a proper legal basis. As the fishermen are, essentially, one the main custodians of the cayes and waters of the region, the protection of their camps is critical to the effective management of the cayes.

## 6.2 *Marine Tourism and Recreation*

Tourism activities on peninsula and on the cayes in the region are, for the most part, an extension of resort/hotel activities based in Placencia, Maya Beach, Seine Bight and to a lesser extent in Independence. There are numerous tour destinations, whether for diving, snorkeling, kayaking or sport fishing, yet the Gladden Spit area is perhaps the most popular. It is estimated that 75% of all visitors to the region visit Laughing Bird Caye National Park, and the cayes can be subject to up to 100 visitors in a day in the height of the season. The deep water of the Victoria Channel allows small pocket cruise ships access into the heart of the region, and several use Laughing Bird Caye as a destination.

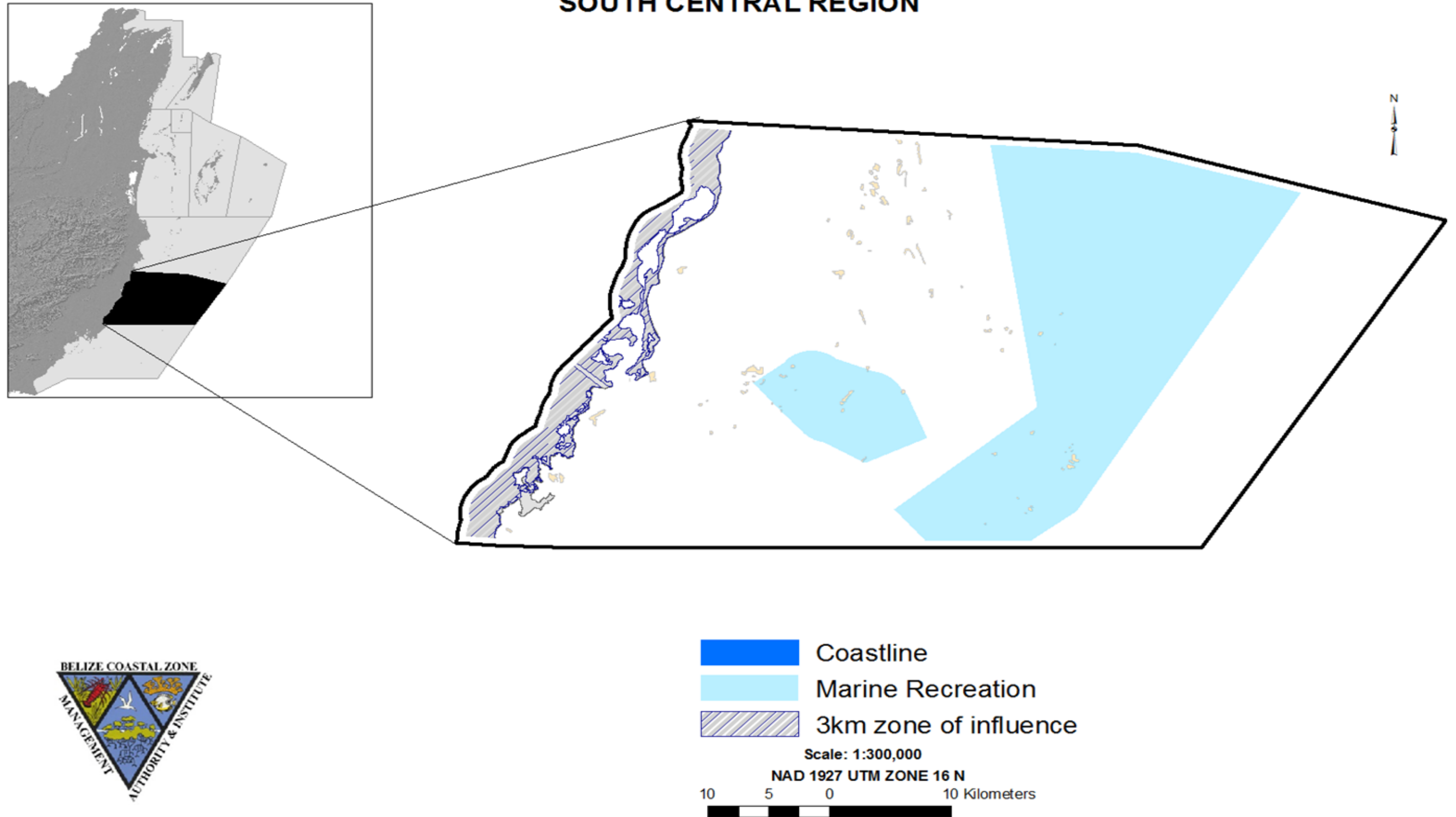
InVEST Recreation and Tourism ecosystem service model results suggest this region is projected to experience an increase in its tourist visitation by 2025 (**Fig. 5, Appendix**). In 2010, approximately 290 thousand people visited this region generating revenue of BZ \$34 million annually (**Fig. 6, Appendix**). In a Conservation Zoning Scheme, InVEST Recreation model results indicate that there may be an increase in tourist visitation to approximately 372 thousand, generating annual revenue of BZ \$41 million. In a Development Zoning Scheme, there would also be an increase in the current tourist visitation to approximately 383 thousand, and generating annual revenue of BZ \$42 million. In the proposed Informed Management Zoning Scheme (**Map 7**), InVEST Recreation model results indicate that there will also be an increase in tourist visitation to approximately 568 thousand and that tourist expenditure would generate an annual revenue of BZ \$98 million. The supporting framework for implementing the Informed Management Zoning Scheme for marine recreation and tourism is outlined in **Table 3**.

In discussing the results of the InVEST ecosystem models, and in particular the recreation model, there is the need to consider limitations of the model, which are highlighted below:

- The model assumes that people will respond similarly in the future to the attributes that serve as predictors in the model. In other words, the assumption is that people in the future will continue to be drawn to or repelled by a given attributes to the same degree as currently.
- Some of the attributes that are used as predictors of visitation are representations of areas managed for particular human use (e.g. transportation). The model assumes that future management of the zones and the type of activities that they represent are similar to current.
- Since there are no fine-scale data on the distribution of visitors to Belize, we use photo-person-days as a proxy for the relative density of actual person-days of recreation across the coastal zone.
- Climate change impacts are not directly accounted for in model

Additional information on how this model works can be found in **Appendix B.3** of the Belize Integrated Coastal Zone Management Plan.

# INFORMED MANAGEMENT ZONING SCHEME FOR MARINE RECREATION: SOUTH CENTRAL REGION



Map 7: Informed Management Zoning Scheme for Marine Recreation in the South Central Region

Table 3: Framework for Implementing Informed Marine Recreation in the South Central Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Marine Recreation	Marine areas especially suited to swimming, snorkeling, diving, kayaking, surfing, jet skiing, kite boarding, and other water sports	1. Swimming 2. Snorkeling 3. Diving 4. Kayaking 5. Surfing, 6. Jet skiing, 7. Kite boarding 8. Other water sports	Passage/entry of water taxis, tour boats, cruise vessels  Research and education within marine protected areas  Sport fishing	Research and Education  Eco-tourism activities within marine protected areas  Sport fishing	1. Commercial fishing  2. Establishment of fish pens/cages, mariculture  3. Oil exploration and extraction  4. Dredging  5. Passage of commercial fishing vessels  6. Shipping and navigation  7. Trawling  8. Dumping of solid and liquid wastes from ships and boats	Belize Tourism Board Act  Fisheries Act  Coastal Zone Management Act  Hotel and Tourist Accommodation Act  National Sustainable Tourism Master Plan	Belize Tourism Board    Fisheries Department    Coastal Zone Management Authority



While the tourism industry generates much needed economic development, on both local and national levels, it has been identified as also leading to reef damage, illegal camping, and litter. It is also noticeable that it has had the effect of generating speculative, though not always well-informed, development. As the region becomes more of an internationally known tourism destination relative land values have risen. The cayes, as well as the mainland, are becoming increasingly subject to spiraling “hope values” that may not reflect their true market value yet often lead to damaging improvements, such as indiscriminate clearance, intended to push their supposed value higher.

The National Sustainable Tourism Master Plan (STP) strongly recommends that tourism growth and development within the region should be contained and consolidated. This recommendation is strongly echoed in the Peninsula 2020 Vision document. Specifically, the STP document articulates that the overwhelming sentiment and collective desire of peninsular residents is that the Placencia Peninsula should not become a mass tourism destination, such as cruise tourism and large all-inclusive resorts. Instead, it is recommended that the focus for this region be on promoting “low-impact” tourism activities that would focus on improving the quality of the tourism product offered by the region. Marketing should focus on the region as an authentic destination where overnight visitors have the opportunity to participate in community life.

### **Recommendations:**

1. Tourism, or tourism related, growth should be from low-scale development, though not necessarily low-investment or low-income
2. New resorts should fall into the “boutique” category. Small locally owned inns or bed and breakfasts should be encouraged in the villages. “Mega” resorts should be prohibited outright.
3. The development of “all inclusive” resorts (those which include all food, drink and entertainment) should be discouraged as they isolate tourists from the surrounding community.
4. Resort rather than condominiums or strictly residential enclaves should be encouraged because resorts promote greater employment and opportunities for advancement as well as wider distribution of tourist expenditure.
5. Placencia **village** should not become a cruise port save for small ships. The definition of small is difficult to agree on but one suggestion is to limit visits to only those ships (not tenders) that could actually berth at the new municipal pier being constructed as part of the National Sustainable Tourism Project. Economic activity from any such ships would

be handled by the Village Council or bodies it designates such as the Placencia Tour Guide Association, with an aim to spread benefits as widely as possible.

6. The determination of acceptable limits of change and capacity restrictions must be established for marine sites that serve as major tourism and recreational areas
7. The recommendations of the National Sustainable Tourism Master Plan for this region are to be supported in order to encourage a long-term sustainable tourism future
8. BTB and/or DOE should not recommend or approve tourism facilities that do not conform to these coastal zone management guidelines.
9. All tourism facilities should meet BTB's minimum standards, including disaster preparedness and evacuation plans; and also meet the *"Tourism and Recreation Best Practices Guidelines for Coastal Areas in Belize"* produced by CZMAI
10. Implement the Recreation informed management zoning scheme for this region (**Map 7**)

### 6.3 *Land-Use*

The land use component of these management guidelines for the South Central coastal zone are based on the carrying capacity of the terrestrial and aquatic environment, combined with the existing and projected types of land tenure patterns and use activities. The demand for land for current and future human settlement activities is a critical element of determining the land-use classification. The land use assignment of residential, commercial and conservation must then be based upon the development suitability assessment, the current development trends, existing land use and property rights, socio-economic and other data to facilitate development. It is important that these coastal zone management guidelines maintain some flexibility to enable a response to the ever changing socio-economic and physical environment.

Keeping in mind the high percentage of national lands, protected reserves, existing uses and ecological sensitivity of the region, it is recommended that conservation, commercial and residential use classes with associated performance standards be assigned to guide and regulate the development of the southern mainland in the agreed zones. These use classes are intended to accommodate existing resorts, residential homes, scientific research, ecological tourism and commercial development. For instance, residential land use includes permanent residences and vacation homes, whether to be used by the owner or rented out for certain periods or times of the year, and can be duplexes, semi-detached or detached units, and home industries. On the other hand commercial denotations are for purposes associated with hotels, resorts, motels and guesthouses, which have in addition to residential purposes shops, offices, entertainment facilities, etc.

In the case of privately held undeveloped lands, the development standards presented within these guidelines presents the most sustainable and appropriate future land use. Although the CZMAI recognizes the right of the landowner to develop their land in any matter they see fit there must be measures in place to steer future development in order to ensure sustained ecosystem services. Therefore, in the case of these lands, if there is no development activity within the first five (5) years of the passage of this planning document then all future development activities, after the time period, **MUST** follow development standards as outlined within this coastal development guideline.

#### 6.3.1 Coastal Development Standards

The existing standards for subdivision of land (Land Utilization Act, Chapter 188 of the Substantive Laws of Belize, Revised Edition 2000) did not anticipate the magnitude of urban expansion, tourism and other development that Belize has experienced over the past decade. In 2010, the National Guidelines for Subdivision and Consolidation of Land in Belize was revised to address such issues and provide transparency and equitability to the process of subdividing and developing land. Although revised, the amendments made were general in scope and lacked

the specificity needed for sensitive areas such as the cayes and atolls. Therefore CZMAI recommends the standards contained within the National subdivision guidelines only for developing the 3km **coastline** of the Northern Region. The framework for implementing the zoning scheme for the development of coastal lands is found in **Table 4**.

Table 4: Framework for Implementing Informed Coastal Development in the South Central Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Coastal Development	Residential settlements, infrastructure, commercial/economic activities on land above water within 3km buffer of the coastline and offshore cayes	1. Expansion of existing communities	Small-scale, light industry	Subdivision of land	1. Large-scale coastal agriculture production	Belize Building Act	Central Building Authority
		2. Small-medium scale residential development	Tourism facilities, such as small guest houses	Establishment of small and medium-scale commercial and light-industrial development	2. Coastal aquaculture	Cayes Development Policy	Coastal Zone Management Authority
		3.Small-medium scale commercial development	Subsistence agriculture production, and landscaping with decorative, native, non-invasive crops	Establishment of residential expansion	3. Dumping of solid, toxic, hazardous waste and untreated liquid wastes, including grey water and sewage	Coastal Zone Management Act	Coastal Zone Management Authority
		4. Community facilities		Solid and liquid waste management	4. Commercial or light-industrial development within residential zone	Environmental Protection Act	
		5. Supporting infrastructure			5. Residential development within commercial or light industrial development zone	Forest Act	Department of the Environment
					6. Squatting/informal settling	Hotels and Tourist Accommodation Act	Forest Department
					7. Unregulated clearing of mangrove forest, including the conversion of mangrove areas into other uses	Housing and Town Planning Act	Belize Tourism Board
					8. Oil exploration, extraction and establishment of oil refinery	Land Utilization Act	Ministry of Housing

The situation of land use on the Peninsula is multi-faceted. Firstly, there is the situation of high land prices, attributable mainly to the rapid rise of tourism. With land prices second only to San Pedro, Ambergris Caye, very few Belizean residents of the Peninsula can afford to buy land in their neighborhoods at current market prices. This is, of course, a double edged sword in that those residents who own property are quite literally sitting on a gold mine. The second issue is that there is little public land left for the Belize government to give out at subsidized prices. Those parcels that have been given to locals have, in many cases, been quickly resold to foreigners at a significant profit.

The National Sustainable Tourism Master Plan for Belize (STP) 2030 recognizes that the South Central Region is facing increased pressure from the real estate sector to develop areas that contain highly sensitive natural ecosystems. As such, it has identified a “sacrifice zone” where to concentrate new future developments while conserving the fragile ecosystems that make this region a place of attraction. Thus, the Plan recommends a model of development for the South Central region that involves the infilling and completion of existing settlements in Riversdale community, Seine Bight Village, Placencia Village and Maya Beach Community. Although mention is not made in the of the tourism master plan specifically about Independence Village, the model of development that seems most appropriate for this village is also the extension of the community’s edges. The density proposed is “**very low density**”, which includes around 4 units/acre-10 units/hectare.

The tourism master plan also recommends that tourism development occur in two phases; 751 new hotel rooms by 2020, followed by an additional 2,249 from 2021 to 2030. However, the majority of these new hotel rooms will be allocated within the region south of Hopkins Village and north of the Riversdale community. This region is outside of the South Central planning region, and thus this proposed development is addressed in the South Northern Region Coastal Zone Management Guidelines. Residential development standards for are found in **Table 5** below, and these correspond to the recommended Informed Management Zoning Scheme for Coastal Development (**Map 8**).

**Residential Development:** Land use in which housing predominates, as opposed to industrial and commercial areas.

**Table 5: Residential Development Standards for Placencia Peninsula Communities**

<b>Subdivision Criteria</b>	<b>Residential Development Standard</b>
Primary Permitted Use	Single and Multi-Family Residential
Secondary Use	Commercial Low Density (convenience stores, small service shops, guest houses); Conservation, Parks/Playgrounds, Community Facilities
Maximum Lot Size	0.25 acre (4 lots/acre)
Width/Length Ratio	1:3
Net Density (dwelling units per acre)	4 du/acre
Maximum Site Coverage	33%
Minimum Frontage	65 feet
Minimum Setbacks:	
Front	8 feet
Side	8 feet
Back	15 feet
Car Parking	1 per dwelling unit
Maximum Building Height	As per requirements/standards of the Central Building Authority
Maximum # of floors per building	As per requirements/standards of the Central Building Authority
Services	Water, Electricity, Telecommunications, Sewerage Treatment, Waste Disposal

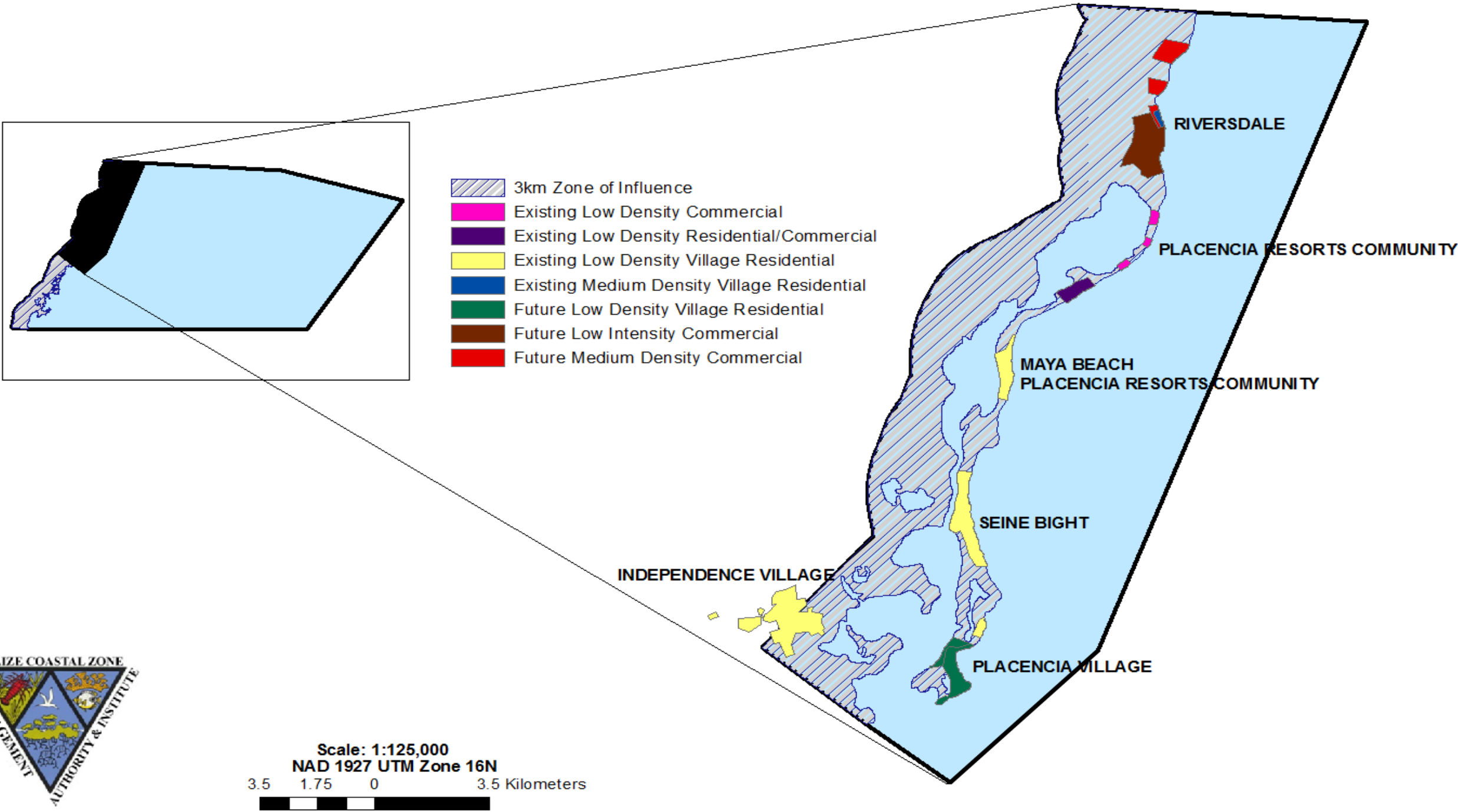
**Institutional Use and Community Facilities:** Land use in which public services and social upliftment predominates. Includes schools, community centers, public health clinics, libraries, embassies, police stations, and other public agencies. Also additional for other public purposes including public parking, cemeteries, churches, sporting areas, police stations, etc.

**Table 6: Development Standards for Institutional Use and Community Facilities**

<b>Subdivision Criteria</b>	<b>Development Standard</b>
Building Setbacks:	
Front:	25 feet
Side:	12 feet
Back:	15 feet
Maximum Site Coverage	40%
Permitted Use	Education, Health, Religious, Community Centre etc.
Secondary Use	Conservation & Parks/Playground
Minimum Frontage	1/6 of Perimeter of Lot
Services	Water & Sewerage or Septic Tank, Electricity

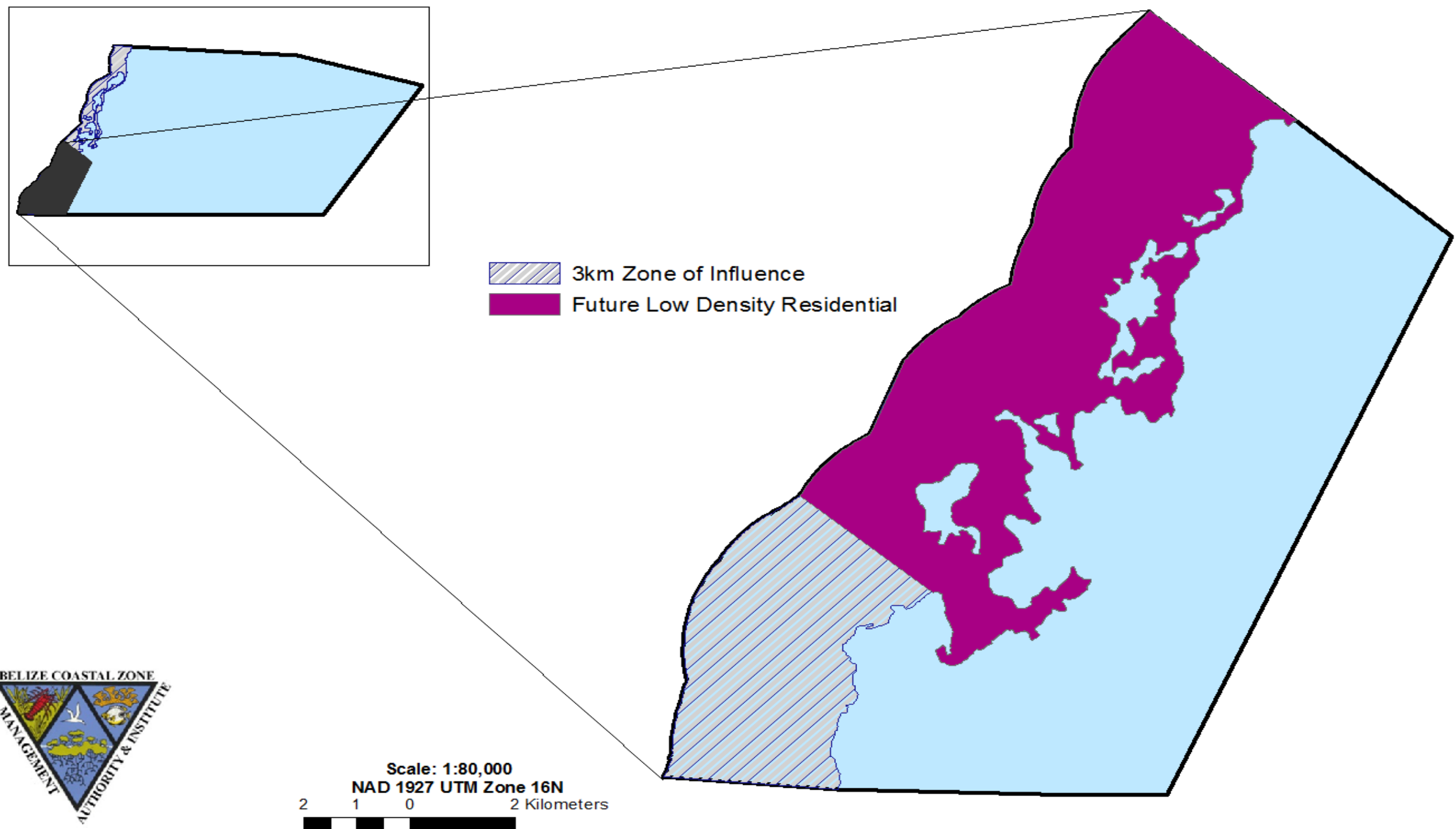


# INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL DEVELOPMENT: SOUTH CENTRAL REGION



Map 8: Informed Management Zoning Scheme for Coastal Development in the South Central Region

# INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL DEVELOPMENT: SOUTH CENTRAL REGION



9: Informed Management Zoning Scheme for Coastal Development in the South Central Region

### 6.3.2 Cayes Development Standards

Development on cayes and atolls require specific building standards since these areas are in close proximity to important sensitive habitats such as sea grass beds, mangroves and coral reefs. Ad hoc or uncontrolled development in these areas can have severe negative effects on surrounding ecosystems. For example the construction and proliferation of piers can cause destruction of the beach, sea grass bed and seabed and sedimentation, particularly if they are positioned on the windward side. Furthermore, the movement of debris during storms from buildings constructed on piers can be dangerous. Sustainable development is crucial in maintaining our natural resources and the benefits that Belizeans receive from them. Proper planning is required for this to be achieved.

In 2004, CZMAI produced a set of Cayes Development Guidelines for the cayes within each coastal planning region (**Map 1**). These development guidelines were produced in consultation with stakeholders from each planning region along with technical input from government relevant agencies. Within the document land use classes were developed along with accompanying standards for the varying degrees of development that can occur on a caye. Use classes were also assigned to each caye according to suitability. The use class categories developed include residential, commercial and conservation, representing the various degrees of development intensities allows on cayes.

In terms of the cayes in the South Central Region, there has been much speculation about the capability of several of the cayes for relatively large-scale development schemes, such as golf-courses, cruise ship facilities and marinas. Long Coco (north of Mosquito) Caye, Harvest Caye and Lark Caye are particular examples. Such developments may require undertaking dredging and filling, construction of coastal defense structures such as seawalls, and the application of pesticides and heavy fertilizer use. There might also be the need to consider options for the disposal and management of huge volumes of liquid and solid wastes that could potentially be generated from these developments. On the other hand, many of these cayes are in reality very small, ranging between 3-5 acres in area. The lack of naturally occurring high lands on these cayes make them unsuitable for high-impact development.

The original cayes development guidelines for this region identified 83 ‘development sites’ and specified the type of land use, lot size, building density, means of utility supply and other relevant performance standards for each site. Most of these are expressed as minimum or maximum requirements, allowing for flexibility between these margins. It is intended that development should take place only on these sites; the remainder of the land, whether it is high or low, should be kept, at least until further review, in reserve. A presumption against development should be exercised on all areas outside the development sites.

Each development site is given a series of performance standards, ranging from the size of the site to the means of waste disposal. However it should be noticed that the great majority of sites are given two ‘land use’ options: the primary being the most recommended, the secondary being considered as suitable as a development option, but only so long as the primary ‘land use’

is utilized. These standards are found in the development sites table below (**Table 7**) and correspond with the proposed land use maps for the cayes (**Maps 9, 10, 11**).

**Table 7: Land Use Development Standards for Cayes Development Sites in the South Central Region**

Site Number	<b>1</b>
Name / location	<b>ABIGAIL CAYE</b>
Primary land use	Resort
Secondary land use	Fishing camp
Maximum lot size	1.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	4
Maximum hab-room density	8
Maximum guest capacity	6
Maximum building coverage	600 sq ft per building
Maximum site clearance	67% (1 acre)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof / reverse osmosis under approval from the relevant authorities
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Development should take place only around the existing camp / resort in the northern part of the caye, with access to the lagoon on the west. The remainder of the caye should be left undisturbed
Natural features	The caye is generally low with low red mangrove. Access is poor from the east side.
Ownership	National

Site Number	<b>2</b>
Name / location	<b>BAKERS RENDEZVOUS CAYE: NORTH CAYE</b>
Primary land use	Guesthouse
Secondary land use	Fishing camp
Maximum lot size	1.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	8
Maximum guest capacity	6
Maximum building coverage	600 sq ft
Maximum site clearance	50% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Owing to the generally low lying nature of the caye, its relatively small size, and poor access due to surrounding reefs and shoals the caye should only accommodate one development. This should take place on the marginally high land and have its access to the west. The rest of the caye should remain in its natural state.
Natural features	The caye has a low-lying red mangrove dominated exterior with a ridge of relatively high land running along the centre with some black mangrove and palmetto. Bird nesting has been noted. The cayes is surrounded by reef which extends to the north and south. Access is difficult from the deep water lying on the west side.
Ownership	Property

Site Number	<b>3</b>
Name / location	<b>BAKERS RENDEZVOUS CAYE: SOUTH CAYE</b>
Primary land use	Guesthouse
Secondary land use	Fishing camp
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	4
Maximum building coverage	600 sq ft
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	The caye is particularly small yet has some marginally high land it and could accommodate one development. This should take place on the high land and have its access to the northwest. The rest of the caye should remain in its natural state.
Natural features	A generally low-lying mangrove caye though with sufficiently high land to allow for some black mangrove in the interior. The caye is a bird nesting site. As with the northern caye it lies within a north – south reef system which drops off directly on the east.
Ownership	National

Site Number	<b>4</b>
Name / location	<b>BOOBY CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye should be not be developed and should be left undisturbed. Management should be exercised by a local or national NGO with the capacity for conservation management
Natural features	This is a low mangrove caye with some marginally high land in the center north and on the extreme northeast. Vegetation consists of high red mangrove. The caye has been identified locally as an important bird nesting site.
Ownership	National

Site Number	<b>5</b>
Name / location	<b>BUGLE CAYES: WEST CAYE</b>
Primary land use	Lighthouse
Secondary land use	Residence
Maximum lot size	2 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	6
Maximum guest capacity	n/a
Maximum building coverage	700 sq ft per building
Maximum site clearance	75% (150 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft (except for the lighthouse)
Maximum No of floors	2 (except for the lighthouse)
Water	Roof
Electricity	Generator / solar / wind / connection to Placencia
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	2
Other	Any new development should take place only on the high land and in the vicinity of existing development. The remainder of the caye should be left undisturbed
Natural features	The caye has high land on the west side with coconuts and mixed vegetation. Otherwise it is generally low with high red mangrove. There is shallow water to the north, south and east.
Ownership	National

Site Number	<b>6</b>
Name / location	<b>BUGLE CAYES: EAST CAYE</b>
Primary land use	Fishing camp
Secondary land use	n/a
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	1
Maximum hab-room density	4
Maximum guest capacity	n/a
Maximum building coverage	600 sq ft per building
Maximum site clearance	50% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	The caye could accommodate one low-impact fishing camp should demand arise. Any development should take place on the south or north sides to avoid the shallower water on the east and west. The remainder of the caye should be left undisturbed.
Natural features	A generally low caye with yet with a rocky ridge running along the south side. Vegetation is mainly high red mangrove, yet also some mixed vegetation along the southern shoreline.
Ownership	National

Site Number	<b>7a</b>
Name / location	<b>BUTTONWOOD CAYE: North</b>
Primary land use	Fishing camp
Secondary land use	Recreation
Maximum lot size	1.46 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	4
Maximum hab-room density	10
Maximum guest capacity	15
Maximum building coverage	700 sq ft per building
Maximum site clearance	50% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	New development should take place around the existing facilities. Access should avoid surrounding reef areas. The natural vegetation on the remainder of the caye should be left undisturbed
Natural features	The caye has generally high land with coconuts and some mixed vegetation. There is a small beach running along the west side. The east and south sides have fringing mangroves. Reef extends to the north, east and south. The surrounding waters are a popular fishing area.
Ownership	Property

Site Number	<b>7b</b>
Name / location	<b>BUTTONWOOD CAYE: South</b>
Primary land use	Residential
Secondary land use	Guesthouse
Maximum lot size	1.46 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	4
Maximum hab-room density	10
Maximum guest capacity	15
Maximum building coverage	700 sq ft per building
Maximum site clearance	50%
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Any development should take place only on high land. Preferably in the interior where there is a larger area. Current occasional camping use should continue either at the south end or in the vicinity of new development if undertaken. The remainder of the caye should be left undisturbed.
Natural features	The caye has generally high land with coconuts and some mixed vegetation. There is a small beach running along the west side. The east and south sides have fringing mangroves. Reef extends to the north, east and south. The surrounding waters are a popular fishing area.
Ownership	Property

Site Number	<b>8a</b>
Name / location	<b>CARY CAYE: North</b>
Primary land use	Resort
Secondary land use	Residence and research
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	4
Maximum hab-room density	12
Maximum guest capacity	24
Maximum building coverage	1500 sq ft per building
Maximum site clearance	80% (0.50 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilets
Piers per site	Any development should take place only on high land. Preferably in the interior where there is a larger area. Current occasional camping use should continue either at the south end or in the vicinity of new development if undertaken. The remainder of the caye should be left undisturbed.
Other	
Natural features	The caye has a generally low shoreline dominated by red mangrove, though further interior is higher and has some coconuts, black mangrove and mixed vegetation. The centre of the caye is swamp. There is a high area at the extreme south end with a beach on the west side. It appears that the small caye to the immediate south, which has a small area of high land, insufficient for development, on its northern side, has been cut off from the main caye within the last ten years or so. The surrounding waters are shallow with reefs extending north, northwest and south.
Ownership	Property

Site Number	<b>8b</b>
Name / location	<b>CARY CAYE: South</b>
Primary land use	Research
Secondary land use	Fishing camp
Maximum lot size	1 acre
Minimum lot size	
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	6
Maximum building coverage	600 sq ft per building
Maximum site clearance	50%
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilets
Piers per site	1
Other	Any development should take place only on high land. Preferably in the interior where there is a larger area. Current occasional camping use should continue either at the south end or in the vicinity of new development if undertaken. The remainder of the caye should be left undisturbed.
Natural features	The caye has a generally low shoreline dominated by red mangrove, though further interior is higher and has some coconuts, black mangrove and mixed vegetation. The centre of the caye is swamp. There is a high area at the extreme south end with a beach on the west side. It appears that the small caye to the immediate south, which has a small area of high land, insufficient for development, on its northern side, has been cut off from the main caye within the last ten years or so. The surrounding waters are shallow with reefs extending north, northwest and south.
Ownership	Property



Site Number	<b>9a</b>
Name / location	<b>CHANNEL CAYE: North</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	7
Maximum guest capacity	6
Maximum building coverage	600 sq ft
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Development should only take place at the site of the present camp on the small caye lying to the north of the main. The rest of the caye should remain in its natural state.
Natural features	The caye consists of a main with one small caye to the immediate north and several very small ones to the east and southeast. All are low-lying and dominated by red mangrove. Reef extends slightly on the north and extensively on the south. Access to the lagoon to the direct south is obscured by shoals and small cayes.
Ownership	National

Site Number	<b>9b</b>
Name / location	<b>CHANNEL CAYE: South</b>
Primary land use	Preservation
Secondary land use	Fishing camp
Maximum lot size	1 acre
Minimum lot size	2 acres
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	7
Maximum guest capacity	6
Maximum building coverage	600 sq ft
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Development should only take place at the site of the present camp on the small caye lying to the north of the main. The rest of the caye should remain in its natural state.
Natural features	The caye consists of a main with one small caye to the immediate north and several very small ones to the east and southeast. All are low-lying and dominated by red mangrove. Reef extends slightly on the north and extensively on the south. Access to the lagoon to the direct south is obscured by shoals and small cayes.
Ownership	National

Site Number	<b>10</b>
Name / location	<b>COLSON CAYE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	8
Maximum guest capacity	6
Maximum building coverage	600 sq ft per building
Maximum site clearance	50% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Any development should take place only around the existing fishing camp on the north west side of the caye. The natural vegetation on the remainder of the caye should be left undisturbed
Natural features	The caye has a high ridge on the northwestern side, and becomes generally lower in the center. Vegetation is mainly red high mangrove with some coconuts on the ridge, which were apparently much more plentiful in the early 1980's. This was a popular bird-nesting site prior to Hurricane Iris. The westward side has deeper water.
Ownership	Property

Site Number	<b>11</b>
Name / location	<b>CRAWL CAYE</b>
Primary land use	Resort
Secondary land use	Residence
Maximum lot size	5.9 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	5
Maximum hab-room density	12
Maximum guest capacity	24
Maximum building coverage	600 sq ft per building
Maximum site clearance	50% (3 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof / reverse osmosis under approval from the relevant authorities
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilets
Piers per site	2
Other	The land is low and will require some filling which should be undertaken with strict attention to avoidance of environmental degradation. All large trees should be retained, as should fringing mangroves. The remainder of the caye should be left in its natural state.
Natural features	This is a generally low-lying caye though it does have some marginally high land especially on the western promontory, where this Site is located. Vegetation consists of a mix of red and black mangrove, with many of the black mangrove trees being exceptionally large and reaching heights of approximately 50 feet. Reef extends to the northwest, southwest and south, and access is difficult. The surrounding waters are noted for lobster.
Ownership	National

Site Number	<b>12</b>
Name / location	<b>DREDGE CAYE</b>
Primary land use	Resort
Secondary land use	Residence
Maximum lot size	1 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	1
Maximum hab-room density	4
Maximum guest capacity	8
Maximum building coverage	600 sq ft per building
Maximum site clearance	50% (0.25 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	The caye has been identified as requiring preservation yet should any development take place attention should be taken to minimize any impact on the surrounding area. Natural vegetation should be encouraged on the remainder of the caye and should be left undisturbed.
Natural features	The caye was created from the spoil from the dredging of the Big Creek channel. The land is high and stabilized.
Ownership	National

Site Number	<b>13</b>
Name / location	<b>ELBOW (SADDLE) CAYE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	8
Maximum guest capacity	6
Maximum building coverage	600 sq ft per building
Maximum site clearance	50% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	2
Other	Any development should take place only on the marginally high land on the north end of the northern caye, though with access to the lagoon. The natural vegetation on the remainder of the caye should be left undisturbed
Natural features	The caye is split into two parts separated by a deep lagoon; the larger part lying to the south. Both are low-lying and covered by low mangrove except for a marginally high area on the north end of the northern caye. Both cayes are surrounded by the same ring of reef. Access is by the deep lagoon lying between the two. The surrounding waters are noted for lobster.
Ownership	National

Site Number	<b>14</b>
Name / location	<b>FALSE CAYE</b>
Primary land use	Residence
Secondary land use	Guest house
Maximum lot size	1.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	7
Maximum guest capacity	6
Maximum building coverage	700 sq ft
Maximum site clearance	50% (1.15 acres)
Minimum building set backs	66 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	As the caye is generally very low-lying it should only accommodate limited development, and this should take place on the west or south sides, with access from the west or south. The plan of survey includes a 66 feet reserve that, due to the size of the caye, should be complied with. Attention should be taken to avoid damaging the archaeological site. The rest of the caye should remain in its natural state.
Natural features	This is a generally low caye with high mangrove, though with a marginally high ridge fringing the south and west sides. The interior has two areas of swamp. Reef extends to the north east. The surrounding waters are good for lobster diving.
Ownership	Property / National

Site Number	<b>15</b>
Name / location	<b>FUNK CAYES: WESTERN CAYE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	8
Maximum guest capacity	8
Maximum building coverage	600 sq ft per building
Maximum site clearance	75% (1.15 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	2
Other	Although there are two leases listed for this caye it is recommended that it can only accommodate one. Any new development should take place only in the vicinity of the existing camp. The natural vegetation on the remainder of the caye should be left undisturbed.
Natural features	The caye has some high land in its center which reaches to both the center west side and center south side. The remainder is generally low dominated by mangrove. The high area has some mixed vegetation. A reef extends to the north to north west. The surrounding waters are a popular fishing area.
Ownership	National

Site Number	<b>16</b>
Name / location	<b>FUNK CAYES: EASTERN CAYE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	8
Maximum guest capacity	6
Maximum building coverage	600 sq ft per building
Maximum site clearance	75% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Any development should take place only on the high land towards the north end of the caye. Attention should be taken to ensure that access avoids surrounding shallow water and reefs. The remainder of the caye should be left undisturbed.
Natural features	The caye is mostly low, though with a small area of high land towards the north end. Mangrove dominates. Reef extends to the north, west and south, though there is a relatively deep lagoon also on the west side.
Ownership	National

Site Number	<b>17</b>
Name / location	<b>GLADDEN CAYES: WESTERN CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye should not be developed and should be left undisturbed. Conservation management of this caye is exercised by the Southern Environmental Association (SEA) and Fisheries Department.
Natural features	This is a small low caye dominated by red mangrove in close proximity to the barrier reef. Reef and shoals surround both this and the eastern caye, giving poor access. The surrounding waters are a popular fishing area.
Ownership	National

Site Number	<b>18</b>
Name / location	<b>GLADDEN CAYES: EASTERN CAYE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	6
Maximum building coverage	600 sq ft per building
Maximum site clearance	75% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Although there are two leases listed for the caye, its size and limited developable land make it suitable for only one development which should take place only on the high land in the center of the caye. It is recommended that one of the leases is re-located to another Development Site on another caye. Attention should be taken to maintain shoreline mangroves and access should be by pier / boardwalk, preferably from the eastern side of the caye, and should avoid the surrounding reef and shoals. Dredging should not be permitted. The remainder of the caye should be left undisturbed.
Natural features	The caye has a high area in its centre which does not quite extend to the shoreline. Otherwise the land is low and dominated by mangrove. The high area has coconuts. A reef surrounds both this and the western caye, giving poor access. The surrounding waters are a popular fishing area.
Ownership	National

Site Number	<b>19</b>
Name / location	<b>GREAT MONKEY CAYE (Long Caye)</b>
Primary land use	Preservation
Secondary land use	Residence
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	1
Maximum hab-room density	4
Maximum guest capacity	n/a
Maximum building coverage	600 sq ft per building
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	The caye has minimal development potential and would be most appropriately left in its natural state, yet should any development take place it should be located on the western side which may have the higher land and better access. The natural vegetation on the remainder of the caye should be left undisturbed. Dredging should be discouraged.
Natural features	The caye has a high rocky ridge on the eastern side, though otherwise it is low. Red mangrove predominates, becoming low to the west. The surrounding waters are shallow.
Ownership	Property

Site Number	<b>20</b>
Name / location	<b>HARVEST CAYE: WEST PART</b>
Primary land use	Residence
Secondary land use	Resort
Maximum lot size	10 acres
Minimum lot size	5 acres
Maximum No of lots per site	Option A: residence = 10 lots Option B: resort = 1 lot
Net site housing density	Option A: residence = 1 per lot Option B: resort = 6 cabanas and / or 1 main building
Maximum hab-room density	40
Maximum guest capacity	18
Maximum building coverage	Residence or resort main building = 1,600 square feet cabanas = 500 square feet
Maximum site clearance	75% (3.75 acres)
Minimum building set backs	50 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof / well / reverse osmosis under approval from the relevant authorities
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilets / liquid waste management system
Piers per site	3
Other	The western part of the caye has a sizeable extent of developable high land, and could accommodate a medium scale resort, a low-density residential development, or a private residence. A resort could involve one main building, cabanas, or a mix. Any development should take place only on the high land. Attention should be paid to ensuring that access avoids shallow waters. The natural vegetation on the remainder of this part of the caye should be left undisturbed. Any resort development should require environmental screening. Dredging should not be permitted.
Natural features	A ridge of marginally high rocky land extends along most of the east side with a few small beaches, particularly at the centre. High land extends inland especially in this part of the caye where it reaches in the centre into the western promontory. The western side to the south is low. Vegetation consists of a mix of low scrub, mangrove, some coconuts and some palmetto. A small creek cuts across the caye from the east centre to the west south. A surface breaking reef lies off the south east side.
Ownership	Property

Site Number	<b>21</b>
Name / location	<b>HARVEST CAYE: EAST PART</b>
Primary land use	Residence
Secondary land use	Preservation
Maximum lot size	2 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	8
Maximum guest capacity	n/a
Maximum building coverage	1,000 sq ft per building
Maximum site clearance	75% (1.50 acres)
Minimum building set backs	30 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet / liquid waste management system
Piers per site	1
Other	This part of the caye has far less developable land than the western / southern part and, consequently, is not suitable for large or medium scale development. Any development should take place only on the higher land. Although the plan of survey indicates a 20 feet reserve along the shoreline it is recommended that this should be extended to a minimum of 30 feet as there is high land in the interior, though not so much as in the western part of the caye.. Access should avoid shallow waters. No dredging or filling should be permitted. The remainder of this part of the caye should be left undisturbed.
Natural features	A ridge of marginally high rocky land extends along most of the east side with a few small beaches, particularly at the centre. High land extends inland especially in the centre where it reaches into the western promontory. The western side to the south is low. Vegetation consists of a mix of low scrub, mangrove, some coconuts and some palmetto. A small creek cuts across the caye from the east centre to the west south.
Ownership	Property

## South Central Region Coastal Zone Management Guidelines

Belize Integrated Coastal Zone Management Plan

Coastal Zone Management Authority & Institute 2016

<p>Site Number Name / location Primary land use Secondary land use Maximum lot size Minimum lot size Maximum No of lots per site Net site housing density</p> <p>Maximum hab-room density Maximum guest capacity Maximum building coverage Maximum site clearance Minimum building set backs Maximum building height Maximum No of floors Water Electricity Solid waste Liquid waste Piers per site Other</p> <p>Natural features</p> <p>Ownership</p>	<p><b>22</b> <b>HATCHET CAYE</b> Residence Resort 3 acres (approximately) n/a 1 Option A: residence = 3 Option B: resort = 3 houses and 3 cabanas 12 8 Residence = one building of 1,500 sq ft per building, all others 1,000 sq ft 75% (3.75 acres) 66 ft 28 ft (except the existing 3 floor building) 2 (except the existing 3 floor building) Roof / reverse osmosis under approval from the relevant authorities Generator / solar / wind Removal to mainland / incineration of non-hazardous waste at least 30 ft from water Liquid waste management system / Compost toilets 2 Any new development should avoid impacting the remaining mangroves and other natural vegetation. No dredging should be permitted. Attention should be taken to avoiding any impact on possible turtle nesting areas. This is a generally high sand caye except for on the west side. Although once densely wooded the caye it is now dominated by coconuts, with some fringing mangroves particularly on the west and east. There is one exceptionally large black mangrove tree in the centre. Reef extends to the north and southwest. Turtles are reported as occasionally nesting. Property</p>
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<p>Site Number Name / location Primary land use Secondary land use Maximum lot size Minimum lot size Maximum No of lots per site Net site housing density Maximum hab-room density Maximum guest capacity Maximum building coverage Maximum site clearance Minimum building set backs Maximum building height Maximum No of floors Water Electricity Solid waste Liquid waste Piers per site Other</p> <p>Natural features</p> <p>Ownership</p>	<p><b>23</b> <b>IVAN CAYE</b> Fishing camp Guest house 0.5 acres n/a 1 2 6 4 600 sq ft per building 90% ( 0.45 acres) 20 ft 28 ft 2 Roof Generator / solar / wind Removal to mainland / incineration of non-hazardous waste at least 30 ft from water Compost toilet 1 Development should take place around the existing camp on the north side of the caye. The natural vegetation on the remainder of the caye should be left undisturbed. This is a low caye with low red mangrove. Access is from the north. National</p>
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Site Number	<b>24</b>
Name / location	<b>JACK'S CAYE</b>
Primary land use	Preservation
Secondary land use	Fishing camp
Maximum lot size	0.75 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	n/a
Maximum building coverage	500 sq ft per building
Maximum site clearance	50% (0.375 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	2
Other	Any development should take place only on the marginally high land in the center of the caye, though with access probably to the west. The natural vegetation on the remainder of the caye should be left undisturbed
Natural features	This caye has generally low land covered in red mangrove, though the centre is slightly higher with some high black mangrove. There is a very small over-wash caye to the northwest. The caye appears to be a popular bird nesting site, and a reef extends around the caye though there is a deep lagoon on the west side. The surrounding waters are a popular fishing area.
Ownership	National

Site Number	<b>25</b>
Name / location	<b>LAGOON CAYES: NORTHERN CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye should be not be developed and should be left undisturbed. Management should be exercised by a local or national NGO with the capacity for conservation management.
Natural features	The caye is low-lying and dominated by mangrove. It is surrounded by a ring of shallow coral though there is access from the southwest into a deep lagoon that gives access to the central parts of the caye. The surrounding waters are noted for lobster.
Ownership	National

Site Number	<b>26</b>
Name / location	<b>LAGOON CAYES: SOUTHERN CAYE: NORTH EAST SIDE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	0.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	7
Maximum guest capacity	6
Maximum building coverage	600 sq ft
Maximum site clearance	75% (0.375 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Development should only take place at the site of the present camp on the north east side of the caye. The rest of the caye, apart from Site 27, should remain in its natural state.
Natural features	This caye is generally low-lying though it does have some marginally high land on the north and east sides. It is dominated by mangrove. It is surrounded by shallow coral and has a relatively shallow lagoon on its south side. The surrounding waters are noted for lobster.
Ownership	National

Site Number	<b>27</b>
Name / location	<b>LAGOON CAYES: SOUTHERN CAYE: EAST SIDE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	0.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	7
Maximum guest capacity	6
Maximum building coverage	600 sq ft
Maximum site clearance	75% (0.375 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Development should only take place at the site of the present camp on the north east side of the caye. The rest of the caye, apart from Site 26, should remain in its natural state.
Natural features	This caye is generally low-lying though it does have some marginally high land on the north and east sides. It is dominated by mangrove. It is surrounded by shallow coral and has a relatively shallow lagoon on its south side. The surrounding waters are noted for lobster.
Ownership	National

Site Number	<b>28</b>
Name / location	<b>LARK CAYE: NORTH EAST</b>
Primary land use	Resort
Secondary land use	Fishing camp
Maximum lot size	1.18 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	Option A: 3 housing units Option B: 2 houses and 3 cabanas
Maximum hab-room density	10
Maximum guest capacity	10
Maximum building coverage	650 sq ft per building
Maximum site clearance	75% (0.90 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilets
Piers per site	2
Other	Any development should take place in the vicinity of the existing fishing camp and should avoid any need for extensive filling. Access should continue to be via the lagoon. The remainder of the caye should be left undisturbed except for Sites 29 & 30. The 66 feet reserve indicated on the plan of survey would most probably include the most developable land, requiring development to be undertaken on less suitable land that may require filling. It is therefore recommended that the reserve is reduced to 20 feet.
Natural features	The caye is predominantly low though there is an intermittent fringe of soft high land running along the north side. Vegetation consists mainly of red mangrove though with some coconuts around the two currently developed parts, of which this Site is one. The south side of the caye consists of a mix of low mangrove and lagoons in which manatees have been noted. Access is poor on the north side.
Ownership	National

Site Number	<b>29</b>
Name / location	<b>LARK CAYE: NORTH</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	0.88 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	4
Maximum building coverage	600 sq ft per building
Maximum site clearance	80% (0.70 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilets
Piers per site	2
Other	Development should take place only around the existing camp. Attention should be paid to retaining the mangroves along the lagoon side. The natural vegetation on the remainder of the caye, apart from the Development Sites 28 & 30, should be left undisturbed
Natural features	The caye is predominantly low though there is an intermittent fringe of soft high land running along the north side. Vegetation consists mainly of red mangrove though with some coconuts around the two developed parts one of which is this Site. The south side of the caye consists of a mix of low mangrove and lagoons in which manatees have been noted. Access is poor on the north side.
Ownership	National

Site Number	<b>30</b>
Name / location	<b>LARK CAYE: WEST</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	A fishing camp with low impact guesthouse facilities could be accommodated in the vicinity of this site, which has access from the north and from the lagoon to the south. Any development should maximize the marginally high ridge running along the north side. The remainder of the caye, apart from the Development Sites 28 & 29, should be left undisturbed.
Natural features	The caye is predominantly low though there is an intermittent fringe of soft high land running along the north side. Vegetation consists mainly of red mangrove though with some coconuts. The south side of the caye consists of a mix of low mangrove and lagoons in which manatees have been noted. Access is poor on the north side.
Ownership	National

Site Number	<b>31</b>
Name / location	<b>LARK CAYE RANGE: CAYE LYING DIRECTLY SOUTH OF LARK CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	Any development should seek to avoid any damaging impacts on the surrounding waters and the remainder of the caye. An environmental impact assessment should be required prior to any approval for development.
Natural features	The caye is low-lying and dominated by low red mangrove. There is a small lagoon in the interior. The surrounding waters are deep.
Ownership	National

Site Number	<b>32</b>
Name / location	<b>LARK CAYE RANGE: THREE CAYES LYING WEST OF IVAN CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	These 3 cayes are all low-lying and have minimal land with development potential. As such it is recommended that they are held in reserve.
Natural features	The cayes are low-lying and dominated by low red mangrove. Reef and shoal extend between them and to the east and west.
Ownership	National

Site Number	<b>33</b>
Name / location	<b>LARK CAYE RANGE: TWO CAYES LYING SOUTH WEST OF IVAN AND ABIGAIL CAYES</b>
Primary land use	Preservation
Secondary land use	Fishing camps
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	1
Maximum hab-room density	4
Maximum guest capacity	n/a
Maximum building coverage	600 sq ft per building
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	n/a
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	One fishing camp could be accommodated on one of these two cayes, should the demand arise. Whichever caye is developed, the remainder of that caye, and the whole of the other, should remain un-developed.
Natural features	Both cayes are low-lying and dominated by low red mangrove. Reef and shoal extend between them and to the west.
Ownership	National

Site Number	<b>34</b>
Name / location	<b>LAUGHING BIRD CAYE</b>
Primary land use	Preservation
Secondary land use	Recreation
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	Compost toilets
Piers per site	n/a
Other	The caye lies in the center of the Laughing Bird National Park and is managed by the Southern Environmental Association (SEA).
Natural features	A high narrow caye characterized by coral beaches with coconuts. Very picturesque. The extreme north end, separated from the main by a stretch of open land, is dominated by mangrove. Hawksbill turtles occasionally nest here. There are reefs extending north and south and main access is from the west.
Ownership	National Park

Site Number	<b>35</b>
Name / location	<b>LAZY CAYE</b>
Primary land use	Preservation
Secondary land use	Recreation
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye should be not be developed and should be left undisturbed. Management should be exercised by a local or national NGO with the capacity for conservation management
Natural features	The caye consists of a small sand bore which has minimal vegetation. It is surrounded by shoals.
Ownership	National

Site Number	<b>36</b>
Name / location	<b>LITTLE HARVEST CAYE</b>
Primary land use	Fishing camp
Secondary land use	Residence
Maximum lot size	0.047 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	1
Maximum hab-room density	4
Maximum guest capacity	n/a
Maximum building coverage	400 sq ft per building
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 10 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	n/a
Natural features	This is a very small caye with either naturally high or artificially filled land. Vegetation consists of only a few coconuts.
Ownership	National

Site Number	<b>37</b>
Name / location	<b>LITTLE MONKEY CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye should be not be developed and should be left undisturbed. Management should be exercised by a local or national NGO with the capacity for conservation management
Natural features	A low caye with red mangrove. Egrets were in evidence in July 2001. Other birds identified as using the caye are frigates, and hawks.
Ownership	National

Site Number	<b>38</b>
Name / location	<b>LITTLE MORRIS CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye should be not be developed and should be left undisturbed. Management should be exercised by a local or national NGO with the capacity for conservation management.
Natural features	There is little high land on this caye except for small areas on the north and east sides, and it is dominated by high red mangrove. The surrounding waters are shallow. The caye has been locally recommended for protection as an important bird-nesting site.
Ownership	National



Site Number	<b>39a</b>
Name / location	<b>LITTLE WATER CAYE: EAST</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Natural features	The caye is generally high with coral sand and a beach on the south side. Vegetation consists of coconuts and other trees, with some fringing mangrove. The south side of the caye has been noted in the past for erosion. Reef and shoals extend to the east, north, and northeast. The caye has historically been a source of fresh water for local fishermen.
Ownership	Property

Site Number	<b>39b</b>
Name / location	<b>LITTLE WATER CAYE: WEST</b>
Primary land use	Resort
Secondary land use	Residence
Maximum lot size	5 acres (approximately)
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	6 (including 4 cabanas)
Maximum hab-room density	12
Maximum guest capacity	10
Maximum building coverage	900 sq ft per building (400 sq ft for cabanas)
Maximum site clearance	80% (4 acres)
Minimum building set backs	30 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof / reverse osmosis under approval from the relevant authorities
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilet
Piers per site	2
Other	Any new development should seek to avoid areas which may be liable to erosion. The use of septic tanks in close proximity to the sea should be discontinued.
Natural features	The caye is generally high with coral sand and a beach on the south side. Vegetation consists of coconuts and other trees, with some fringing mangrove. The south side of the caye has been noted in the past for erosion. Reef and shoals extend to the east, north, and northeast. The caye has historically been a source of fresh water for local fishermen.
Ownership	Property

Site Number	<b>40</b>
Name / location	<b>LOGGERHEAD CAYE: CENTRAL PART OF CAYE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1.01 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	8
Maximum guest capacity	6
Maximum building coverage	600 sq ft per building
Maximum site clearance	75% (0.75 acres)
Minimum building set backs	66 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Any development should take place only on the marginally high land on the north side of the caye.
Natural features	The caye has relative height on the north only, with large black mangrove trees. The remainder is low and under red mangrove. Corals lie on the northwest, east and south.
Ownership	National

Site Number	<b>41</b>
Name / location	<b>LOGGERHEAD CAYE: EASTERN AND WESTERN PARTS</b>
Primary land use	Preservation
Secondary land use	Fishing post
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland or Site 40 (central part of caye)
Liquid waste	n/a
Piers per site	n/a
Other	Following the Guidelines' policy of one development on small cayes, the eastern and western parts of this caye are recommended for preservation. Management could be exercised by Site 40 or by a local NGO.
Natural features	The caye has relative height on the north only, with large black mangrove trees. The remainder is low and under red mangrove. Corals lie on the north west, east and south.
Ownership	National

Site Number	42
Name / location	LONG COCO CAYE
Primary land use	Residence
Secondary land use	Resort
Maximum lot size	4 acres
Minimum lot size	2 acres
Maximum No of lots per site	Option A: residence = 4 lots Option B: resort = 1 lot
Net site housing density	Option A: residence = 1 / lot Option B: resort = 4 cabanas and / or one main building
Maximum hab-room density	Option A: residence = 6 / acre Option B: resort = 6
Maximum guest capacity	12
Maximum building coverage	Option A: residence = 1,200 sq ft per building Option B: resort = 750 sq ft per building
Maximum site clearance	80% (4 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof / reverse osmosis under approval from the relevant authorities
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilet
Piers per site	3
Other	The caye has developable land along its eastern side and around the lagoon at the south. Two options are recommended; (A) residential use, or (B) resort use. Any development should take place on the high land so that dredging and filling can be avoided. Main access should be via the lagoon at the south, though some may be possible from the western side conditional on maximized maintenance of fringing mangroves. Attention should be paid to avoiding the shallow reef and shoals to the north and east. The natural vegetation on the remainder of the caye should be left undisturbed
Natural features	This long narrow caye has a rocky high ridge running along its eastern side, though the interior and the west sides are low. Vegetation along the ridge is a mix of coconut, palmetto and scrub, with low mangrove dominating the center and west. The high land extends to the west side near, but not at, the south end. A small caye lies to the immediate south of the main with some high land with coconuts on its north side, though the remainder is low and dominated by red mangrove. The surrounding waters are shallow, though the lagoon lying between the main and the small caye to the south is deep (accessible only from the west) and gives the main access to the caye.
Ownership	Property

Site Number	<b>44</b>
Name / location	<b>MOHO (TRAPP'S) CAYE</b>
Primary land use	Residence
Secondary land use	Guest house
Maximum lot size	2 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	8
Maximum guest capacity	6
Maximum building coverage	600 sq ft per building
Maximum site clearance	75% (1.50 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilets / liquid waste management system
Piers per site	2
Other	Development should only be undertaken on the high land on the north, west or south sides of the caye. The natural vegetation on the remainder of the caye should be left undisturbed.
Natural features	The caye is generally high on the north, west and south sides with coconuts, mixed vegetation and some fringing red mangrove. There is a marginal beach on the north side though the interior is low. Pelicans use the caye for nesting. The immediate surrounding waters are shallow (and good for bone fish), with a reef extending to the north east, though the caye is located in the deep water Victoria Channel.
Ownership	Property

Site Number	<b>45</b>
Name / location	<b>MORRIS (OWEN) CAYE</b>
Primary land use	Resort
Secondary land use	Fishing camp
Maximum lot size	1.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	5
Maximum hab-room density	8
Maximum guest capacity	10
Maximum building coverage	600 sq ft per building
Maximum site clearance	75% (1.15 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof / reverse osmosis under approval from the relevant authorities
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilet
Piers per site	1
Other	Any new development should take place only around the existing resort area. The remainder of the caye should be left undisturbed except for the trimming of the mangroves.
Natural features	The caye is generally low though it has some high sand and shingle land in the center and has been partially filled. Vegetation consists of fringing mangroves with some coconuts in the center. Surrounding waters are generally shallow.
Ownership	National

Site Number	<b>46</b>
Name / location	<b>MOSQUITO CAYE</b>
Primary land use	Residence
Secondary land use	n/a
Maximum lot size	5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	12
Maximum guest capacity	n/a
Maximum building coverage	1,000 sq ft per building
Maximum site clearance	90% (4.50 acres)
Minimum building set backs	40 ft
Maximum building height	30 ft
Maximum No of floors	2
Water	Roof / reverse osmosis under approval from the relevant authorities
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilets
Piers per site	5
Other	The caye is already substantially developed. Any further development should seek to complement existing development. There is minimal natural vegetation left on the caye, though the planting of fringing mangroves is recommended in areas susceptible to erosion. Further dredging should be avoided.
Natural features	There are few, if any, natural features on the caye as it has been extensively developed. There is a reef extending to the north east.
Ownership	Property

Site Number	<b>47</b>
Name / location	<b>NORVAL (BREAD AND BUTTER) CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye could support one fishing camp should the demand arise. The natural vegetation on the north and south of the caye should be left undisturbed
Natural features	This is a small low mangrove-dominated caye. Reef and shoal extend to the north and south. The surrounding waters are good for lobster diving
Ownership	National

Site Number	<b>48</b>
Name / location	<b>PALMETTO CAYE: WESTERN CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye has minimal development potential and is considered as forming a part of the natural shoreline barrier of mangrove cayes. It is also likely that it is valuable as a fish breeding area. It should not be developed and should be left undisturbed. Management should be exercised by a local or national NGO with the capacity for conservation management
Natural features	There are two Palmetto cayes and both are generally low though they have a rocky ridge fronting their east sides. This western one has less developable land than the eastern. Vegetation is predominantly mangrove with some small coconuts and mixed scrub, including palmetto, along the eastern ridges. A surface breaking reef fronts the cayes on the east.
Ownership	National

Site Number	<b>49</b>
Name / location	<b>PALMETTO CAYE: EASTERN CAYE</b>
Primary land use	Fishing camp
Secondary land use	Residence
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	n/a
Maximum building coverage	600 sq ft per building
Maximum site clearance	50% (0.50 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	The caye has limited developable land running along its eastern side that could support one low-density fishing camp or residence. Any development should take place only on the marginally high land on the east side, and attention should be paid to ensuring that access avoids the shallow waters. Dredging should not be permitted. The remainder of the caye should be left undisturbed.
Natural features	The two cayes are generally low though with a rocky ridge fronting their east side, though this eastern one appears to have more developable land than the western.. Vegetation is predominantly mangrove with some small coconuts and mixed scrub, including palmetto, along the eastern ridges. A surface breaking reef fronts the cayes on the east.
Ownership	National

Site Number	<b>50</b>
Name / location	<b>PELICAN (CAT) CAYES: NORTHEAST CAYE: NORTH EAST PART</b>
Primary land use	Resort
Secondary land use	Fishing camp
Maximum lot size	3.2 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	8
Maximum hab-room density	13
Maximum guest capacity	10
Maximum building coverage	900 sq.ft per building
Maximum site clearance	80% (2.5 acres)
Minimum building set backs	20ft
Maximum building height	28ft
Maximum No of floors	2
Water	Roof / reverse osmosis under approval from the relevant authorities
Electricity	generator / solar / wind
Solid waste	removal to mainland / incineration of non-hazardous waste at least 30ft from water
Liquid waste	Compost
Piers per site	2
Other	Attention should be paid to maintaining mangroves beside the sea and especially alongside the lagoon. The remainder of the caye, apart from Development Sites 51 & 52, should be left in its natural state.
Natural features	This site on the north east of the caye is generally low with low mangrove; however it has been partially cleared and filled. The surrounding waters are shallow on the north side and deep on the lagoon side, and are noted for sport fishing.
Ownership	Property

Site Number	<b>51</b>
Name / location	<b>PELICAN (CAT) CAYES: NORTHEAST CAYE: NORTH WEST PART</b>
Primary land use	Fishing camp
Secondary land use	n/a
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	1
Maximum hab-room density	3
Maximum guest capacity	n/a
Maximum building coverage	600 sq ft
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Development should take place only on the small area of marginally high land lying on the north west side of the caye. Attention should be paid to ensuring that development does not disturb possible turtle nesting sites along the shore. The remainder of the caye, apart from Development Sites 50 & 52, should be left in its natural state.
Natural features	This is a generally low caye with low mangrove. There is, however, some marginally high land fringing the north side of the caye, where this site is located, with low land behind. The surrounding waters are shallow.
Ownership	National

Site Number	<b>52</b>
Name / location	<b>PELICAN (CAT) CAYES: NORTHEAST CAYE: SOUTH WEST POINT</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	8
Maximum guest capacity	6
Maximum building coverage	600 sq ft per building
Maximum site clearance	50% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	2
Other	Any development should take place only on the marginally high land on the western part of the cayes though with access to the west side of the cayes and to the lagoon. Attention should be paid to avoiding any disturbance to possible turtle nesting sites on the small beaches. Mangroves should be maintained especially on the lagoon side. The remainder of the cayes, apart from Development Sites 50 & 51, should be left in its natural state.
Natural features	This is a generally low cayes with low mangrove although there is some relatively high land towards the west with small beaches on both the north and south sides. There is evidence of turtle nesting on the western beaches. The surrounding waters are shallow on the north side and deep on the southwestern lagoon side.
Ownership	National

Site Number	<b>53</b>
Name / location	<b>PELICAN (CAT) NORTHWEST CAYE (GODFREY CAYE): SOUTHERN PART OF CAYE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	8
Maximum guest capacity	6
Maximum building coverage	600 sq ft per building
Maximum site clearance	50% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	2
Other	Development should take place only around the existing camp with the rest of the cayes remaining in its natural state
Natural features	A low-lying mangrove cayes with a marginally high ridge running intermittently along the western side. Reef and shoals run along the west side and extend southwest. There is deep water access on the east / lagoon side
Ownership	National



Site Number	<b>54</b>
Name / location	<b>PELICAN (CAT) CAYES: TWO CAYES LYING WITHIN THE NORTHERN PART OF THE LAGOON</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	n/a
Liquid waste	n/a
Piers per site	n/a
Other	Neither caye should be developed, and both should be left undisturbed. Management should be exercised by a local or national NGO with the capacity for conservation management
Natural features	These are low-lying mangrove cayes. They have little reef around them and are surrounded by generally deep water. They are identified as important bird habitats.
Ownership	National

Site Number	<b>55</b>
Name / location	<b>PELICAN (CAT) LITTLE EAST CAYE: WEST PART OF CAYE</b>
Primary land use	Fishing camp
Secondary land use	n/a
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	1
Maximum hab-room density	4
Maximum guest capacity	n/a
Maximum building coverage	600 sq ft per building
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	The caye could accommodate a low impact fishing camp should there be the demand. Development should take place only the south west point of the caye to avoid the shallow waters on the east side. The rest of the caye should remain in its natural state
Natural features	This is a low-lying mangrove caye. Reef extends to the north and south. Deep-water access lies on the west / lagoon side.
Ownership	National

Site Number	<b>56</b>
Name / location	<b>PELICAN / CAT CAYE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1.5 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	8
Maximum guest capacity	6
Maximum building coverage	600 sq ft
Maximum site clearance	50% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Development should only take place on the relatively high land in the north of the caye. The remainder of the caye should be left in its natural state
Natural features	The caye is generally low though it has relatively high land near the northern end and running along a ridge extending south. Two small beaches lie on the east and west sides near the north end. The interior in the north is low. Vegetation is predominantly mangrove though there were many coconuts reported in the early 1980's. Reef extends to the north, south and northeast. Deep water lies on the west and (partially) east sides.
Ownership	National

Site Number	<b>57</b>
Name / location	<b>PELICAN (CAT) BIG EAST CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye has minimal development potential and is considered as forming a part of the natural shoreline barrier of mangrove cayes. It is also likely that it is valuable as a fish breeding area. It should not be developed and should be left undisturbed. Management should be exercised by a local or national NGO with the capacity for conservation management
Natural features	The caye is low lying and is covered by mangrove. Reef and shoal extend on the north, northwest and south sides. Deep water lies to the east though access is found on the southwest.
Ownership	National

Site Number	<b>58</b>
Name / location	<b>PELICAN (CAT) SOUTHERN CENTRAL CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	n/a
Liquid waste	n/a
Piers per site	n/a
Other	The caye should be not be developed and should be left undisturbed. Management should be exercised by a local or national NGO with the capacity for conservation management
Natural features	The caye is low-lying and dominated by mangrove. It has reef or shoal extending to the southeast. The caye, being located within the lagoon yet facing a break in the east side of the Pelican Cayes faro which gives access to the deep waters of the channel lying between the Pelican Cayes and Channel / Tarpon cayes, is considered as having the potential of making a critical contribution to the conservation of the marine and terrestrial wildlife values of the Pelican Cayes group.
Ownership	National

Site Number	<b>59</b>
Name / location	<b>PELICAN (CAT) UN-NAMED CAYE LYING TO THE EAST OF SOUTHERN CENTRAL CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye has minimal development potential and is considered as forming a part of the natural shoreline barrier of mangrove cayes. It is also likely that it is valuable as a fish breeding area. It should not be developed and should be left undisturbed. Management should be exercised by a local or national NGO with the capacity for conservation management
Natural features	The caye consists of low land with generally low mangrove. A narrow ring of reef or shoal surrounds the caye.
Ownership	National

Site Number	<b>60</b>
Name / location	<b>PELICAN (CAT) FAUX CAYE</b>
Primary land use	Fishing camp
Secondary land use	n/a
Maximum lot size	0.20 acres (approximately)
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	1
Maximum hab-room density	4
Maximum guest capacity	2
Maximum building coverage	450 sq ft
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland
Liquid waste	Compost toilet
Piers per site	1
Other	There is a fishing camp at this site built over the water.
Ownership	National

Site Number	<b>61</b>
Name / location	<b>PELICAN (CAT) SOUTHEAST CAYE: WEST SIDE</b>
Primary land use	Fishing camp
Secondary land use	n/a
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	1
Maximum hab-room density	4
Maximum guest capacity	n/a
Maximum building coverage	600 sq ft
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Should the demand arise this caye could accommodate one fishing camp. Development could take place only on the west side to avoid the shallow waters on the east, north and south sides. Apart from the one camp the remainder of the caye should be left in its natural state.
Natural features	The caye is low lying and dominated by low to medium mangrove. Shoals lie in patches to the west and reef lies along the east and north sides and extends to the south.
Ownership	National

Site Number Name / location Primary land use Secondary land use Maximum lot size Minimum lot size Maximum No of lots per site Net site housing density Maximum hab-room density Maximum guest capacity Maximum building coverage Maximum site clearance Minimum building set backs Maximum building height Maximum No of floors Water Electricity Solid waste Liquid waste Piers per site Other  Natural features Ownership	<b>62</b> <b>PELICAN (CAT) SOUTHWEST CAYE</b> Fishing camp n/a 1 acre n/a 1 1 4 n/a 600 sq ft 50% (0.5 acres) 20 ft 28 ft 2 Roof Generator / solar / wind Removal to mainland / incineration of non-hazardous waste at least 30 ft from water Compost toilet 1 One fishing camp could be accommodated on this caye on the east to northeast side, where there is more immediate access to deep waters. The rest of the caye should remain in its natural state. The caye is low lying and dominated by low mangrove. Reef and shoals extend to the north, west and south. National
Site Number Name / location Primary land use Secondary land use Maximum lot size Minimum lot size Maximum No of lots per site Net site housing density Maximum hab-room density Maximum guest capacity Maximum building coverage Maximum site clearance Minimum building set backs Maximum building height Maximum No of floors Water Electricity Solid waste Liquid waste Piers per site Other  Natural features Ownership	<b>63</b> <b>PETER DOUGLAS (OLD RENDEZVOUS) CAYE</b> Fishing camp n/a 1 acre n/a 1 1 4 n/a 600 sq ft per building 50% (0.50 acres) 20 ft 28 ft 2 Roof Generator / solar / wind Removal to mainland / incineration of non-hazardous waste at least 30 ft from water Compost toilet 2 The caye could support one fishing camp. The natural vegetation on the north and south of the caye should be left undisturbed A small low mangrove caye with two smaller cayes lying to the immediate south which appear to be bird nesting sites. Reef and shoal extend to the north, south and south west. The surrounding waters are good for lobster diving. National

Site Number	<b>64</b>
Name / location	<b>PLACENCIA CAYE</b>
Primary land use	Residence
Secondary land use	n/a
Maximum lot size	1,500 square metres
Minimum lot size	1000 square metres
Maximum No of lots per site	40
Net site housing density	1 per lot
Maximum hab-room density	5 per lot
Maximum guest capacity	n/a
Maximum building coverage	800 sq ft
Maximum site clearance	90 % per lot
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof / connection to Placencia
Electricity	Generator / solar / wind / connection to Placencia
Solid waste	removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilets
Piers per site	n/a (use of canal)
Other	Any development should take place only on the surveyed lots. No more than twenty-one other lots are recommended, the remainder of the caye should be left in its natural state.
Natural features	The caye consists of mangrove on the north, east and south sides, with some coconuts and low non-mangrove vegetation on the filled area on the west. The mangrove becomes high on the north west point.
Ownership	Property

Site Number	<b>65</b>
Name / location	<b>POMPION CAYE (Pumpkin Caye)</b>
Primary land use	Residence
Secondary land use	Research
Maximum lot size	1.5 acres (approximately)
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	n/a
Maximum building coverage	600 sq ft
Maximum site clearance	80% (1.20 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilet
Piers per site	1
Other	The rocky and / or sandy bores in the vicinity of the caye should not be developed.
Natural features	This is a high coral sand caye with coconuts, some mixed vegetation and little mangrove. It has an encircling reef around a shallow lagoon on the south side. Loggerhead and Hawksbill turtles are reported as nesting here. A rocky bar lies to the west ('White rock') that has been built up by Hurricane Mitch.
Ownership	Property

Site Number	<b>66</b>
Name / location	<b>QUAMINO CAYE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	4
Maximum building coverage	600 sq ft
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	As the caye consists entirely of low land only one of the two claims on the caye should be accommodated. Development should only take place at the site of the abandoned camp on the west side. The rest of the caye should remain in its natural state.
Natural features	The caye is generally low-lying with red mangrove. Reef extends to northeast.
Ownership	National

Site Number	<b>67</b>
Name / location	<b>RENDEZVOUS CAYE</b>
Primary land use	Residence
Secondary land use	Resort
Maximum lot size	n/a
Minimum lot size	2 acres
Maximum No of lots per site	1
Net site housing density	3
Maximum hab-room density	10
Maximum guest capacity	8
Maximum building coverage	1,000 sq ft
Maximum site clearance	50% (1.5 acres)
Minimum building set backs	30 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof / reverse osmosis under approval from the relevant authorities
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilet
Piers per site	2
Other	New development should take place only in the vicinity of the existing buildings and cleared land. The western portion of the caye should remain in its natural state. Any dredging should not be permitted.
Natural features	The western part of the caye is generally low and the eastern part high, though areas have been filled. The low parts are dominated by mangrove, with the higher lands having coconuts and mixed vegetation. There are small beaches on the east and south. Reefs extend to the northeast and northwest, though there is deep-water access at the center north and center south.
Ownership	Property

Site Number	<b>68</b>
Name / location	<b>ROCKY POINT CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye has minimal development prospects that would not entail filling and related infrastructure; moreover it acts as a natural barrier between the sea and the shrimp farm located around Indian Hill Lagoon. It is recommended that it should be not be developed and should be left undisturbed. This, however, should be reviewed within 3 to 4 years. Management should be exercised by a local or national NGO with the capacity for conservation management.
Natural features	The caye has a high rocky ridge fronting most of the east side, though with occasional low areas intervening. The southern tip is high though it has lagoons behind. Most, if not all, the western side is low. A channel passing through a mix of open water and mangrove clumps separates the caye from the mainland. Vegetation is predominantly low mangrove with some mixed scrub, palmetto and coconuts along the eastern ridge. The sea is shallow all along the eastern side.
Ownership	National

Site Number	<b>69</b>
Name / location	<b>ROSANNA CAYE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	4
Maximum building coverage	600 sq ft
Maximum site clearance	75% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Development should take place around the existing fishing camp and on the higher land. The remainder of the caye should be left undisturbed.
Natural features	There was a small area of high land on the south end of the caye, otherwise the caye is low and dominated by low red mangrove.
Ownership	National



Site Number	<b>70</b>
Name / location	<b>ROUND CAYE (east of Tarpon)</b>
Primary land use	Residence
Secondary land use	Guest house
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	4
Maximum building coverage	600 sq ft
Maximum site clearance	75% (0.75 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilet
Piers per site	1
Other	Any development should take place only on the high land. The remainder of the caye should remain in its natural state.
Natural features	This caye is generally low with red mangrove though there is a higher area at the base of the northern promontory with reaches to both the east and west sides of the caye. The higher area has some coconuts. The surrounding waters are shallow, though less so on the west side. Frigates and pelicans are known to nest on this caye.
Ownership	Property

Site Number	<b>71</b>
Name / location	<b>ROUND CAYE (north of Pompion)</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	This is a very small caye with minimal development potential and located in a very sensitive area near the barrier reef and the Gladden Spit / Silk Cayes Marine Reserve. Moreover the owners apparently have proposals for its use in marine research. It is therefore recommended for preservation with management by the owners
Natural features	This is a small high coral sand caye with coral rubble, with a few coconuts. Loggerhead turtles have been reported as nesting here. Reef and shoal extend to the northwest and southeast.
Ownership	Property

Site Number	<b>72</b>
Name / location	<b>ROUND (FRENCH LOUIS'S) CAYE</b>
Primary land use	Guesthouse
Secondary land use	Residence
Maximum lot size	1.964 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	4
Maximum guest capacity	10 (including campers)
Maximum building coverage	650 sq ft
Maximum site clearance	75% (1.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof / reverse osmosis under approval from the relevant authorities
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	Any new development should avoid impacting the fringing mangroves.
Natural features	The caye has been filled and has coconuts, though it has fringing mangroves on the north, east and west sides.
Ownership	National

Site Number	<b>73</b>
Name / location	<b>SADDLE CAYE (south west of Loggerhead): WESTERN SIDE</b>
Primary land use	Fishing camp
Secondary land use	Guest house
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	4
Maximum building coverage	600 sq ft
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	One fishing camp with low impact guesthouse facilities could be accommodated on this part of the caye on or around the existing camp on the western point of the caye. The area of the caye lying between this Site and Site 74 should not be developed and should remain in its natural state.
Natural features	The caye has two small areas of marginally high land on the extreme west, with a small beach, at which this Site is located, and extreme east, separated by generally low land. Red mangrove predominates. There is relative deep water on the south side.
Ownership	Property

Site Number	<b>74</b>
Name / location	<b>SADDLE CAYE (south west of Loggerhead): EASTERN SIDE</b>
Primary land use	Fishing camp
Secondary land use	n/a
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	4
Maximum guest capacity	n/a
Maximum building coverage	600 sq ft
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	One fishing camp could be accommodated on this eastern part of the caye on the small area of marginally high land. The area between this Site and Site 73 on the western side should not be developed and should remain in its natural state.
Natural features	The caye has two small areas of marginally high land on the extreme west, with a small beach, and extreme east, where this Site is located, separated by generally low land. Red mangrove predominates. There is relative deep water on the south side.
Ownership	National

Site Number	<b>75</b>
Name / location	<b>SAMPHIRE CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	n/a
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	n/a
Liquid waste	n/a
Piers per site	n/a
Other	Should the caye arise again from the waters it should be managed on a preservation basis by local or national NGO with the capacity for conservation management.
Natural features	The caye currently exists only as a sand bar just south of Silk (Queen) Cayes. It was last identified as a caye in 1913. The caye is being used as a camp by Hondurans.
Ownership	National

Site Number	<b>76</b>
Name / location	<b>SCIPIO CAYE</b>
Primary land use	Residence
Secondary land use	Fishing camp
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	n/a
Maximum building coverage	600 sq ft
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Generator / solar / wind
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	One residence or fishing camp could be accommodated on this caye on the east to north east side, where there is more immediate access to deep waters. The rest of the caye should remain in its natural state.
Natural features	There is a relatively high ridge on the northwestern side, yet the remainder of the caye is generally low with red mangrove predominating. There are some coconuts on the high ridge, though there were many more in the early 1980's. There are shallow waters to the north and south.
Ownership	Property

Site Number	<b>77</b>
Name / location	<b>SILK CAYES: NORTH CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	850 square metres
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye has minimal development potential and is recommended for preservation to compliment the 'conservation zone' of the Gladden Spit and Silk Cayes Marine Reserve in which it is located.
Natural features	The caye has been significantly altered in size and vegetation through recent hurricanes and currently exists as little more than a high sand bar with coral rubble and scrub vegetation. The caye is entirely surrounded by reef and has poor access except on the south side. Hawksbill and loggerhead turtles occasionally nest here.
Ownership	National

Site Number	<b>78</b>
Name / location	<b>SILK CAYES: MIDDLE CAYE</b>
Primary land use	Preservation
Secondary land use	Research / picnicking
Maximum lot size	1,813 square metres
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye has minimal development potential and is recommended for preservation to compliment the 'conservation zone' of the Gladden Spit and Silk Cayes Marine Reserve in which it is located. Low-impact picnicking by no more than 10 persons should be permitted only under supervision.
Natural features	This is a small yet high sand caye with much coral rubble and a several coconuts. Hawksbill and Loggerhead turtles are reported to occasionally nest here. Reefs extend to the west and southeast.
Ownership	National

Site Number	<b>79</b>
Name / location	<b>SILK CAYES: SOUTH CAYE</b>
Primary land use	Preservation
Secondary land use	Research
Maximum lot size	784 square metres
Minimum lot size	n/a
Maximum No of lots per site	n/a
Net site housing density	n/a
Maximum hab-room density	n/a
Maximum guest capacity	n/a
Maximum building coverage	n/a
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	n/a
Maximum No of floors	n/a
Water	n/a
Electricity	n/a
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	The caye has minimal development potential and is recommended for preservation to compliment the 'conservation zone' of the Gladden Spit and Silk Cayes Marine Reserve in which it is located. Low-impact picnicking and over-night camping by no more than 10 persons should be permitted only under supervision.
Natural features	The largest of the Silk Cayes, this consists of high sand, coral rubble and coconuts. Hawksbill and Loggerhead turtles are reported as occasionally nesting. Reef extends to the east, north and west.
Ownership	National

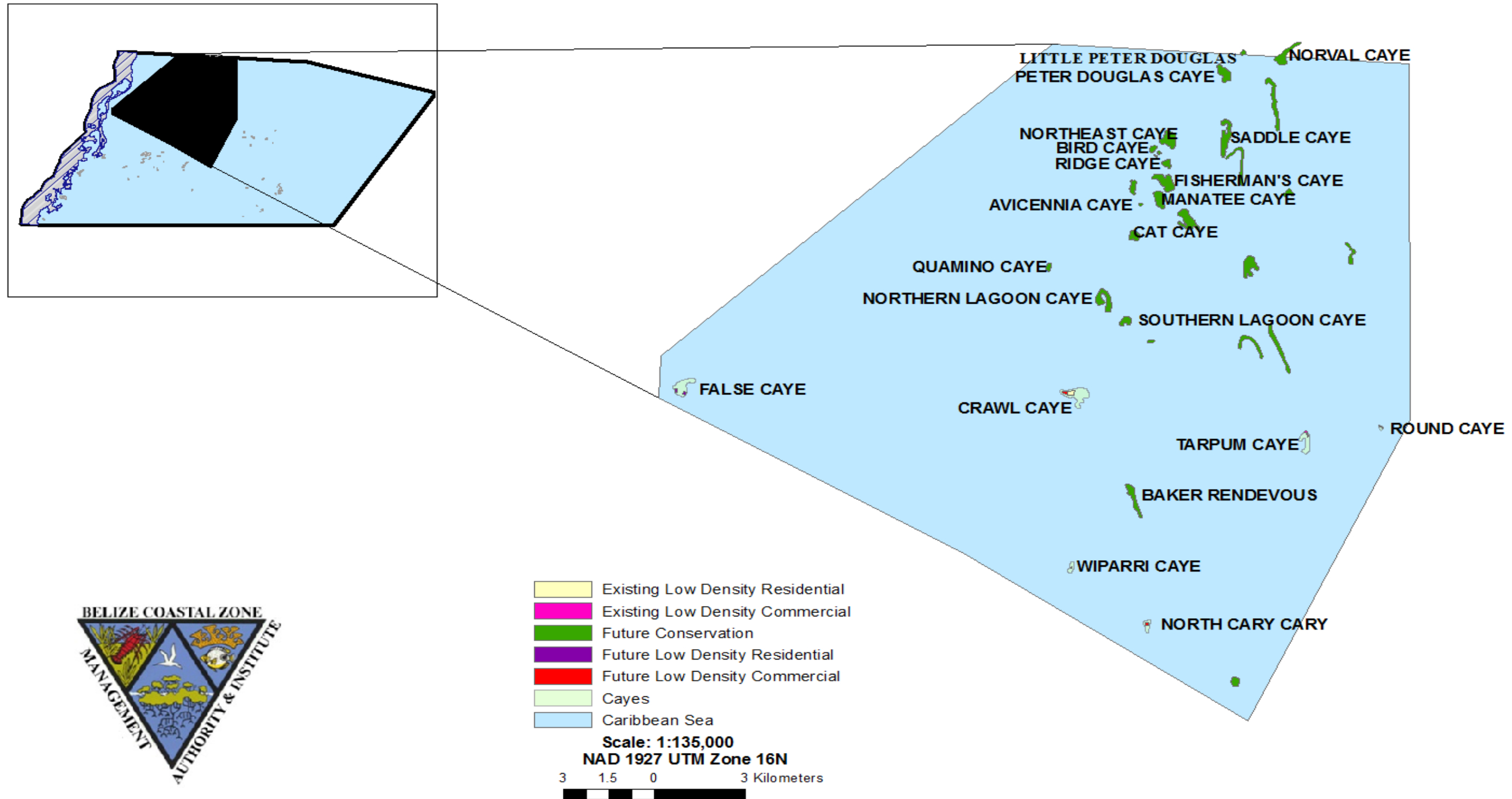
Site Number	<b>80</b>
Name / location	<b>ROBERT'S CAYE</b>
Primary land use	Preservation
Secondary land use	Touring camp
Maximum lot size	225 square feet
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	1
Maximum hab-room density	1
Maximum guest capacity	4
Maximum building coverage	225 square feet
Maximum site clearance	n/a
Minimum building set backs	n/a
Maximum building height	12 ft
Maximum No of floors	1
Water	Roof
Electricity	Solar / wind
Solid waste	Removal to mainland
Liquid waste	n/a
Piers per site	n/a
Other	This site has minimal development potential and has been identified as requiring preservation as a nesting site. However one very low-impact touring camp development may be possible conditional on the following: construction should consist only of wood and should be elevated, occupation should consist only of over-night camping, all solid and liquid waste should be removed from the caye, fires and external lights should be prohibited. The remainder of the caye should remain undisturbed.
Natural features	This is a small sand bar that has been severely damaged through sand extraction. It has no vegetation and may be subject to inundation or alteration through current changes.
Ownership	Property

Site Number	<b>81</b>
Name / location	<b>SPIDER CAYE</b>
Primary land use	Fishing camp
Secondary land use	n/a
Maximum lot size	1 acre
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	2
Maximum hab-room density	6
Maximum guest capacity	n/a
Maximum building coverage	400 square feet
Maximum site clearance	50% (0.5 acres)
Minimum building set backs	20 ft
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof
Electricity	Solar / wind/ generator
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Compost toilet
Piers per site	1
Other	The caye could accommodate one fishing camp at the site of the current abandoned one. The remainder of the caye should be left in its natural state.
Natural features	The caye is mostly low though has a mix of red and black mangrove. The surrounding waters are shallow on the north and east, with a sand bar lying to the north.
Ownership	National

Site Number	<b>82</b>
Name / location	<b>TARPON (TARPUM) CAYE</b>
Primary land use	Resort
Secondary land use	Fishing camp
Maximum lot size	1.25 acres
Minimum lot size	n/a
Maximum No of lots per site	1
Net site housing density	5
Maximum hab-room density	10
Maximum guest capacity	8
Maximum building coverage	600 square feet
Maximum site clearance	50 % (0.65 acres)
Minimum building set backs	20 ft (excluding current building situated on water's edge)
Maximum building height	28 ft
Maximum No of floors	2
Water	Roof / reverse osmosis under approval from the relevant authorities
Electricity	Solar / wind / generator
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilets
Piers per site	1
Other	New development should take place only around the existing resort area. The remainder of the caye should be left in its natural state, including the smaller cayes to the immediate west of the north part of the caye.
Natural features	This is a generally low caye with medium to high mangrove. Reef extends to the south and deep-water access is by the lagoon on the west side.
Ownership	National

Site Number	<b>83</b>
Name / location	<b>WIPPARI CAYE</b>
Primary land use	Resort
Secondary land use	Fishing camp
Maximum lot size	1.5 acres
Maximum No of lots per site	1
Net site housing density	7
Maximum hab-room density	12
Maximum guest capacity	12
Maximum building coverage	700 square feet
Maximum site clearance	78 % (1.15 acres)
Minimum building set backs	20 ft
Maximum building height	12 ft
Maximum No of floors	2
Water	Roof / reverse osmosis under approval from the relevant authorities
Electricity	Solar / wind / generator
Solid waste	Removal to mainland / incineration of non-hazardous waste at least 30 ft from water
Liquid waste	Liquid waste management system / Compost toilets
Piers per site	2
Other	The remainder of the caye should be left in its natural state
Natural features	The caye has high land in the center, but is low-lying on the north and south ends. The low land is dominated by mangrove and the high land has mixed vegetation including coconuts and Caribbean pine. Reef extends to the northwest, northeast and southwest. Deep-water access is from the east and west.
Ownership	Property

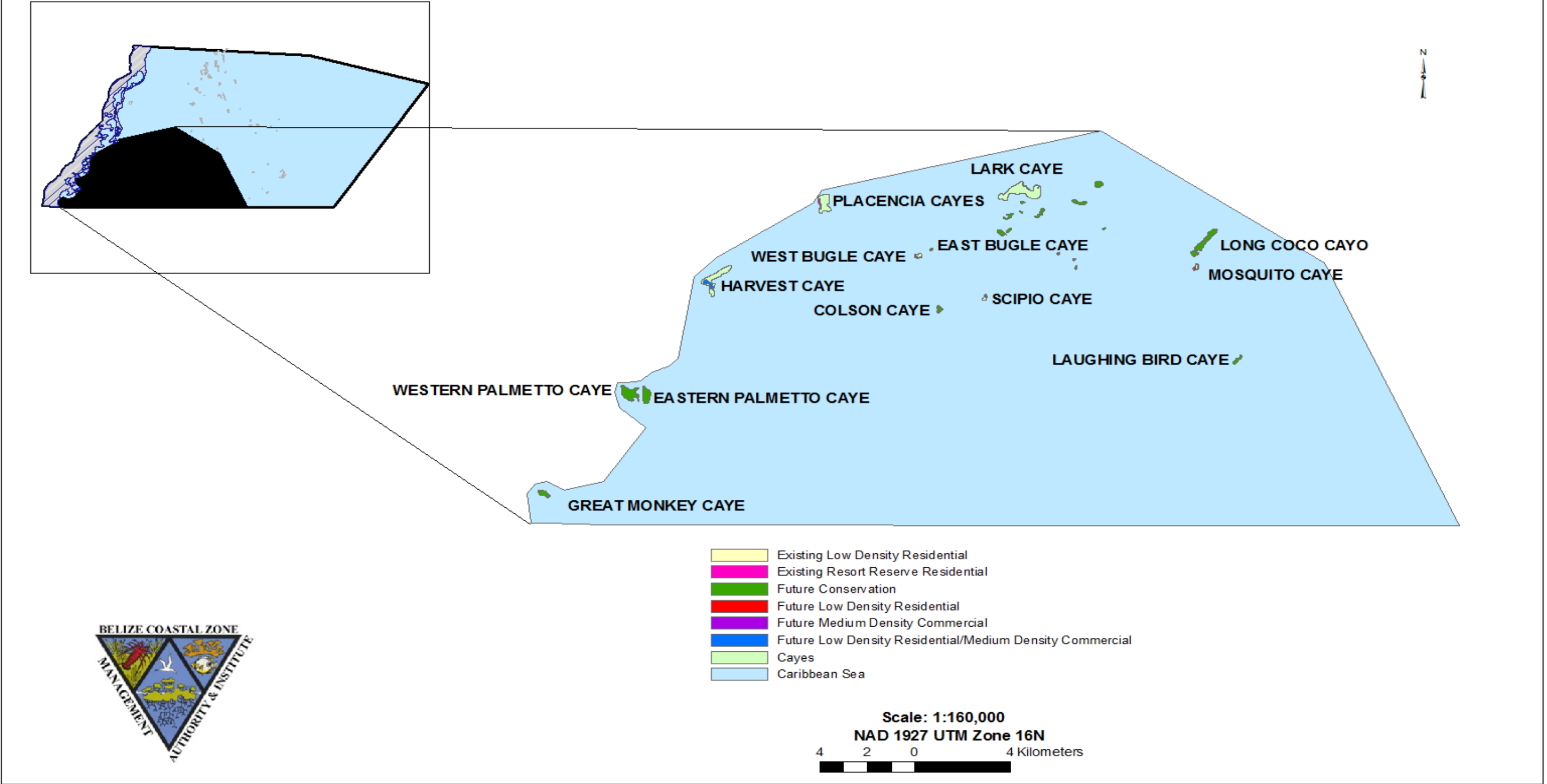
# INFORMED MANAGEMENT ZONING SCHEME FOR DEVELOPMENT OF CAYES NORTHERN SUB-REGION



Map 10: Informed Management Scheme for Development of Cayes in the Northern Sub-region

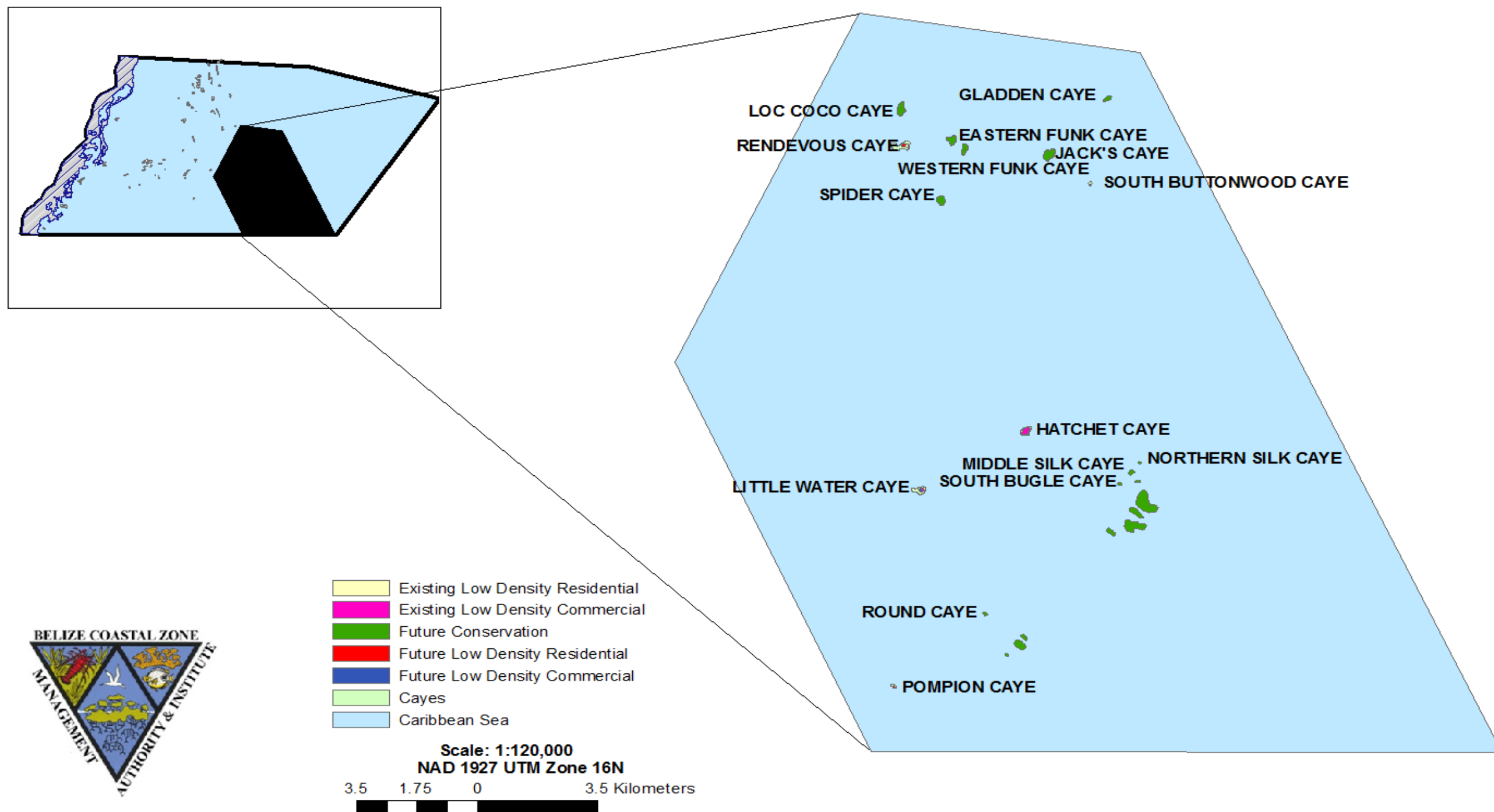


# INFORMED MANAGEMENT ZONING SCHEME FOR DEVELOPMENT OF CAYES WESTERN SUB-REGION



Map 11: Informed Management Zoning Scheme for Development of Cayes in the Western Sub-region

# INFORMED MANAGEMENT ZONING SCHEME FOR DEVELOPMENT OF CAYES EASTERN SUB-REGION



Map 12: Informed Management Zoning Scheme for Development of Cayes in the Eastern Sub-region

As indicated in **Table 7: Land Use Development Standards for Cayes Development Sites** in the South Central Region, land tenure of the cayes within the South Central region is a combination of private and state ownership. Out of the 75 of the cayes in the region, 84% are identified as National Lands and 16% identified as property. 41% are nationally-owned cayes have with leases, while the remaining 43% have no identifiable leases on them (this includes Laughing Bird Caye, North and South Silk Cayes, and Little Monkey Caye). Those lands which are nationally owned should remain as such as this state of affairs provides the opportunity for decision-makers to have greater input in land management concerns. Where land is private property, the right to alienate and develop must be recognized, but regulated to ensure that the subdivision of land subscribes to guidelines which ensure that the resulting parcels can sustain the type of permitted development activity. The seabed is national land and thus any proposals to develop the seabed or to construct piers within this region need to receive clearance from the Lands Department and Department of Environment.

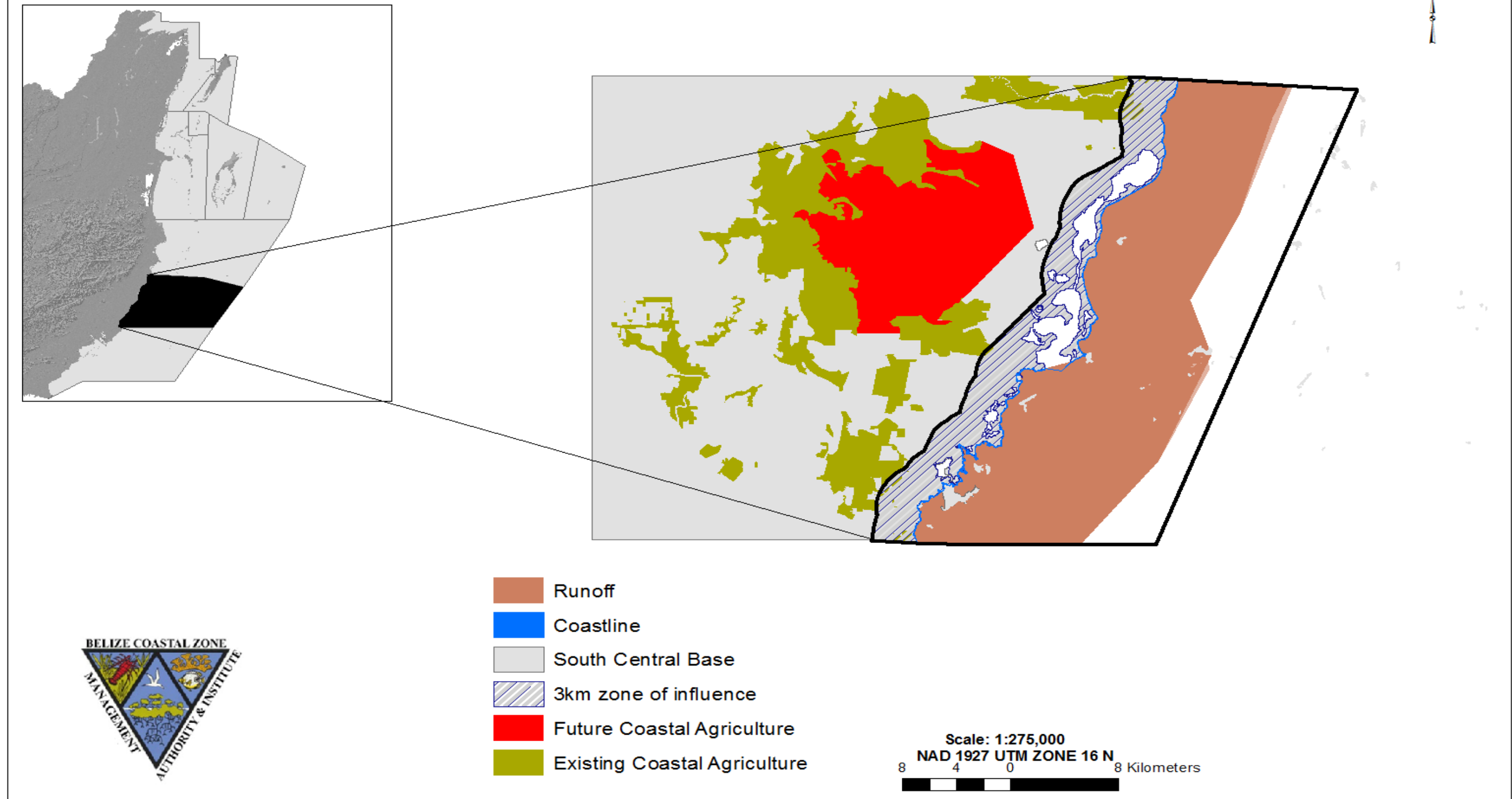
### **6.3.3 Coastal Agriculture Development**

Even though the lands that have been identified as having potential use for coastal agriculture falls just outside of the 3km coastline of the South Central region, it is important to integrate this human use activity in these management guidelines (**Map 12**). This type of development includes land use in which the production of food, feed, livestock and poultry, fruits and vegetables, and horticultural crops are raised, grown, or produced for commercial purposes. Development standards for coastal agriculture are found in **Table 8**. The framework for implementing the zoning scheme for the development of coastal lands for agriculture production can be found below in **Table 9**.

**Table 8: Development Standards for Coastal Agriculture**

<b>Subdivision Criteria</b>	<b>Development Standards</b>	
Density	Low Density	Medium Density
Minimum Size	25 acres	6-24 acres
Permitted Use	Crop Growing and Harvesting	Crop Growing and Harvesting
Secondary Use	Light Industry, Conservation, Parks/Playground, R1, C1, Institution	Light Industry, Conservation, Parks/Playground, R1, C1, Institution
Width/Length Ratio	1:8	1:6
Services	Water & Sewerage or Septic Tank, Electricity	Water & Sewerage or Septic Tank, Electricity

# INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL AGRICULTURE: SOUTH CENTRAL REGION



Map 13: Informed Management Zoning Scheme for Coastal Agriculture in the South Central Region

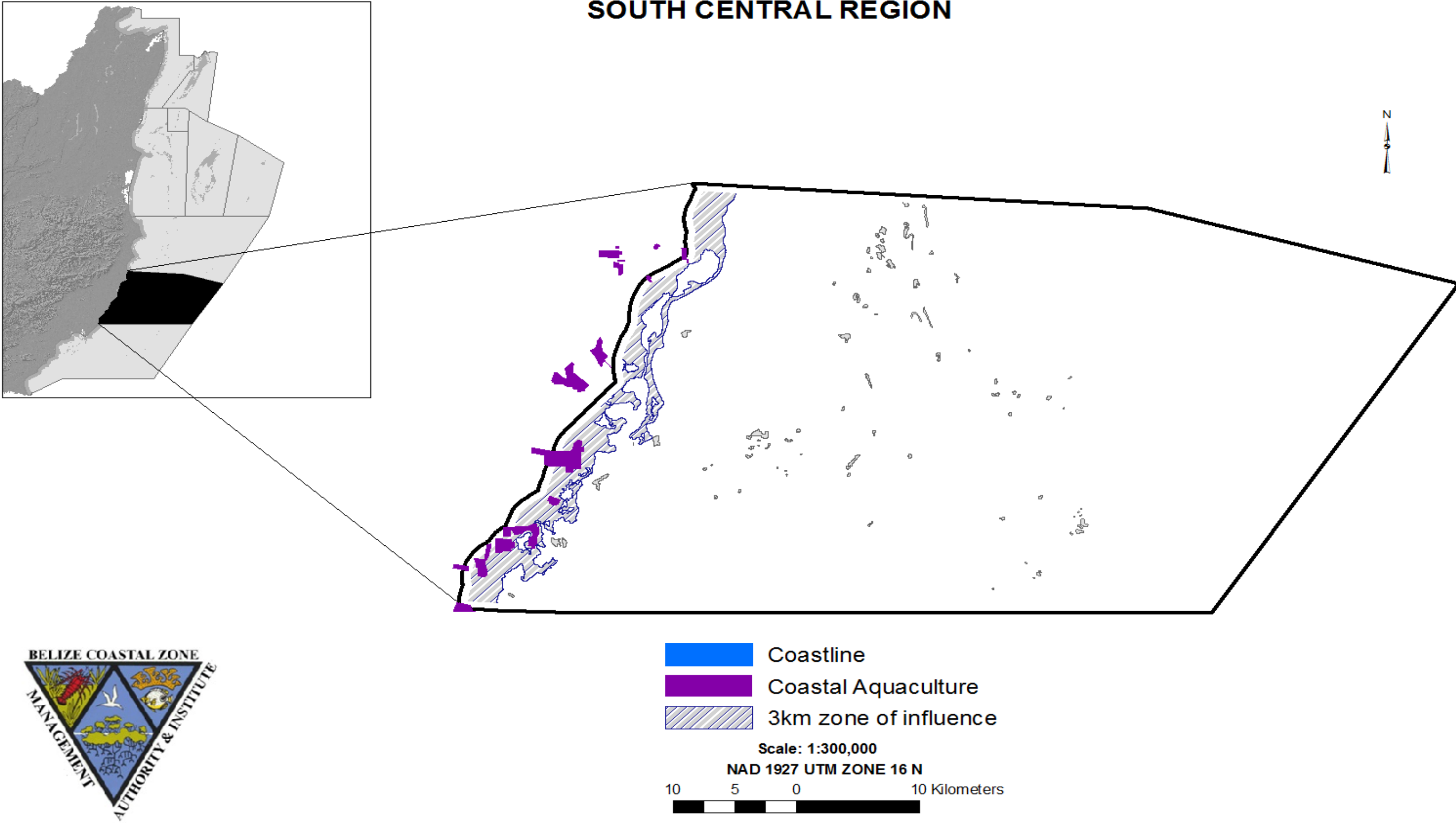
Table 9: Framework for Implementing Informed Coastal Agriculture in the South Central Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Coastal Agriculture	Coastal lands with fertile, irrigable soil especially suited for agricultural production of crops, and rearing of livestock for local consumption and export revenue	1. Production of crops such as banana, citrus, papaya, sugar cane, etc	Living quarters for employees and/or owners of agricultural company  Research and education	Subdivision of land for agricultural purposes  Application of agrochemicals	1. Use of unregistered agrochemicals (pesticides and fertilizers)	Banana Industry Act	Banana Control Board Ministry of Agriculture
		2. Production of meat and livestock			2. Use of registered agrochemicals (pesticides and fertilizers) outside of the legally prescribed limit	Belize Agricultural Health Authority Act	Belize Agricultural Health Authority
					3. Oil exploration, extraction and establishment of oil refinery	Citrus (Processing and Production) Act	Citrus Control Board Ministry of Agriculture
					4. Mining and dredging	Environmental Protection Act	Department of the Environment
					5. Disposal of hazardous and toxic chemicals, solid wastes, untreated liquid wastes	Land Utilization Act	
					6. Squatting/informal settling	Meat and Livestock Act	Land Utilization Authority
						Papaya Growers Association Act	Ministry of Agriculture
					7. Unregulated land clearing,	Pesticides Control Bard Act	Ministry of Agriculture
						Sugar Cane Industry (Control) Act	Pesticides Control Board
					8. Fish farming, coastal aquaculture		Ministry of Agriculture

#### **6.3.4 Coastal Aquaculture Development**

The coastal lands within the South Central coastal zone that have been zoned for land-based aquaculture (**Map 13**) fall within Zone 3 of the National Aquaculture Policy (2005). Zone 3 areas represent inland areas available for aquaculture development that are classified as “moderately suited” to food production by aquaculture by virtue of having “mixed-quality fresh and marine water resources suited to land-based systems”. The Informed Management zoning scheme for coastal aquaculture represents a reduction in the current area of land under aquaculture production in the region. The aquaculture policy recommends small to medium scale freshwater-based aquaculture production facilities in this region. These guidelines recommend a **maximum** cultivation of 75 hectares of land, equivalent to an annual production of less than 400 tons per annum. Surface water requirement is between 0.4-400 cubic meters per minute. The framework for implementing the zoning scheme for the development of coastal lands for aquaculture production can be found below in **Table 10**.

**INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL AQUACULTURE:  
SOUTH CENTRAL REGION**



**Map 14: Informed Management Zoning Scheme for Coastal Aquaculture in the South Central Region**

Table 10: Framework for Implementing Informed Coastal Aquaculture in the South Central Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Coastal Aquaculture	Coastal lands especially suited for the culture of farm-raised fish via land-based pond systems	1. Construction of land-based pond systems for farming of non-invasive species	1. Office spaces, living quarters for employees and/or owners of aquaculture farms  2. Supporting facilities for culturing of species, such as hatcheries and nurseries  3. Mangrove planting	Subdivision of land for aquaculture purposes  Fishpond operations	1. Use of unregistered chemicals and biological materials, such as antibiotics  2. Use of registered chemicals and antibiotics outside of the legally prescribed limit  3. Oil exploration, extraction and establishment of oil refinery  4. Mining and dredging  5. Disposal of hazardous and biological wastes  6. Release of untreated liquid wastes  7. Squatting/informal settling  8. Unregulated land clearing, and alteration of mangrove forests	Environmental Protection Act  Fisheries Act  National Aquaculture Policy (Draft)	Department of the Environment  Fisheries Department  Aquaculture Unit, Ministry of Agriculture



## **Recommended Actions:**

1. Establish mechanisms to encourage the retention of local ownership of Peninsula land. While it is difficult to fight market forces or interfere with rights of private ownership, one such mechanisms could include technical advice on how to create unique income producing businesses on property as an alternative to outright sale.
2. Identify remaining areas for potential subsidized residential development with lots made available on a non-political basis by central government and representative lot committees. Restrictions should be placed on titles that prevent sale to non-Belizeans for a given time period.
3. Where subsidized lots on the Peninsula are not available or remain unaffordable, residents should be given early preference on lots available in Santa Cruz or Independence Villages.
4. Encourage “soft” and permeable coastal defense structures such as the planting of mangrove to avoid related erosion, the acceleration of off-shore currents, and impediments to wildlife
5. Discourage heavy and unregulated use of herbicides, pesticides and fertilizers
6. Maintain the 66 feet reserve, and ensure that minimum setbacks from property lines and beaches, and minimum distances between buildings are enforced
7. Implement landscape design awareness that would facilitate the preservation of mangroves for shoreline protection
8. Identify and zoning priority areas for the development of parks and other recreational facilities
9. Support the institution of a system of restrictive code of covenants between land owners and developers that favor integrated development planning
10. Educate developers, contractors and real estate agents on the existence of all applicable legislation, processes and procedures pertaining to land development
11. Ensure the standards and engineering approval process established by the Central Building Authority for building construction are adhered to

12. Provide for low-density development with the least possible site clearance to maintain the characteristics of the natural environment as much as possible
13. Preserve remaining crown or government-owned lands in the region
14. Require that developers who remove habitats must finance their restoration

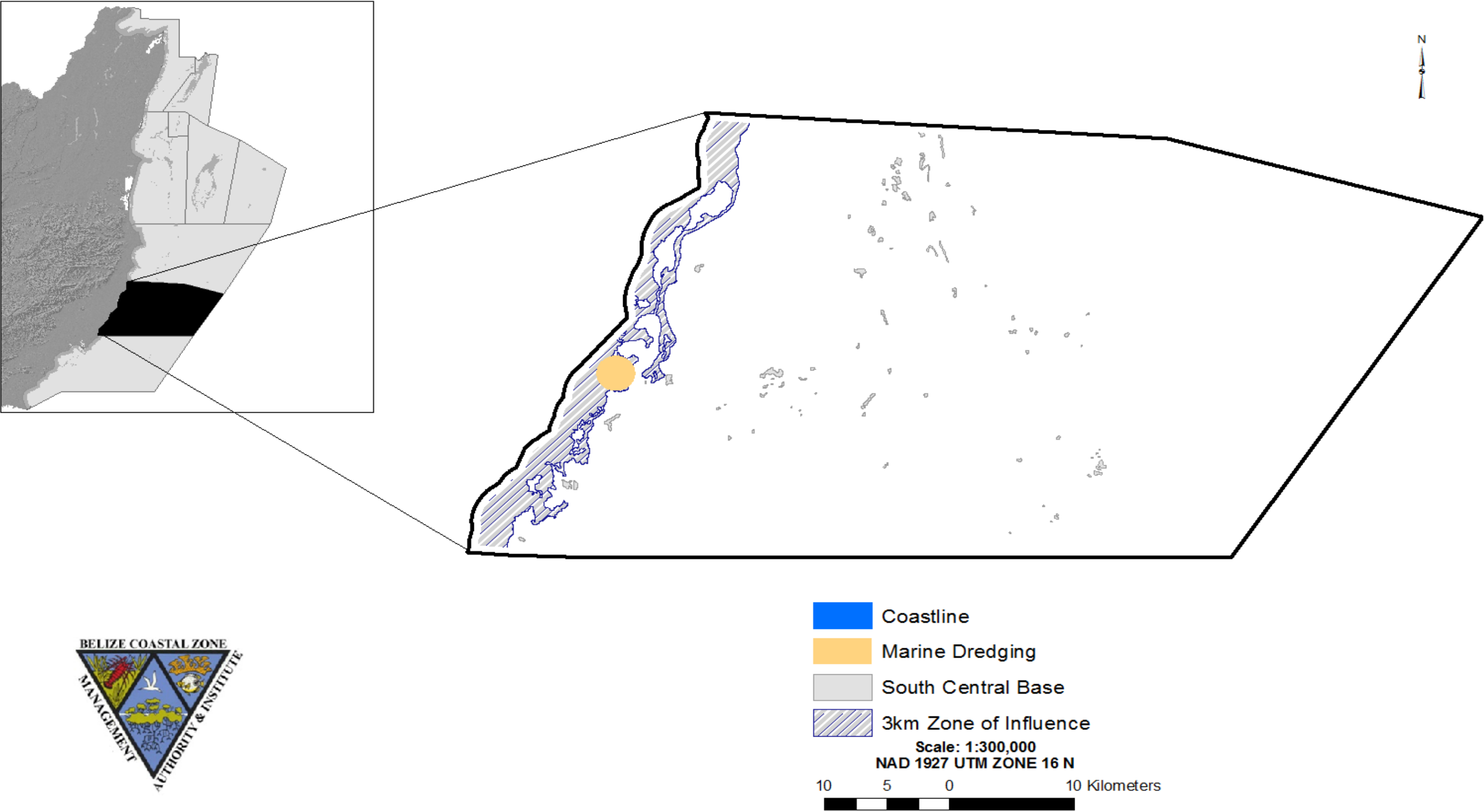
## **6.4 Marine Dredging and Minerals Extraction**

Dredging and sand mining can have disastrous effects on the habitats of particular species and on other economic and recreational use of the region. Erosion of the coastline in this region is an occurrence that has resulted from human disturbance, including mining and abstraction of huge volumes of water, in nearby watersheds. Most instances of dredging and/or sand mining activity observed in the region was to increase land mass or land rehabilitation, particularly post-storm disruption. Considering the planning objective of these management guidelines to minimize the impact of over-development in the region, limited marine dredging activity has been recommended for this region (**Map 14**). These guidelines recognize that some sites may require a certain amount of filling in order to allow meaningful occupation. Through these guidelines, unsuitable development sites are avoided, including sensitive areas, and areas of poor access. The conversion of swamp, wetlands, mangrove forests or sea for resort and/or residential use would only be detrimental to the environment, create land unsuitable for effective liquid waste disposal, distort land/swamp values, and set a harmful precedent for future development. In addition to the recommended actions below, implementation of the framework for enforcing low-impact marine dredging activities in the region (**Table 11**) is strongly recommended.

### **Recommended Actions:**

1. Discourage dredging activity that falls outside of the Informed Management zoning scheme for marine dredging (**Map 14**)
2. Require developers to finance and undertake replanting of seagrass and mangroves in areas that have been dredged
3. Encourage the use of sufficiently high land for resort and/or residential use to reduce the need for dredging and filling activity
4. Discourage the creation of “beaches” and new cayes by depositing sand. This activity obviously requires dredging for boat access (barging often being too costly), which disrupts the sea flow, causes accelerated erosion or accretion, adversely affects the local wildlife, and gives a false impression of the area’s natural character.
5. Address beach erosion through the implementation of a watershed use policy and scientific research

**INFORMED MANAGEMENT ZONING SCHEME FOR MARINE DREDGING:  
SOUTH CENTRAL REGION**



Map 15: Informed Management Zoning Scheme for Marine Dredging in the South Central Region

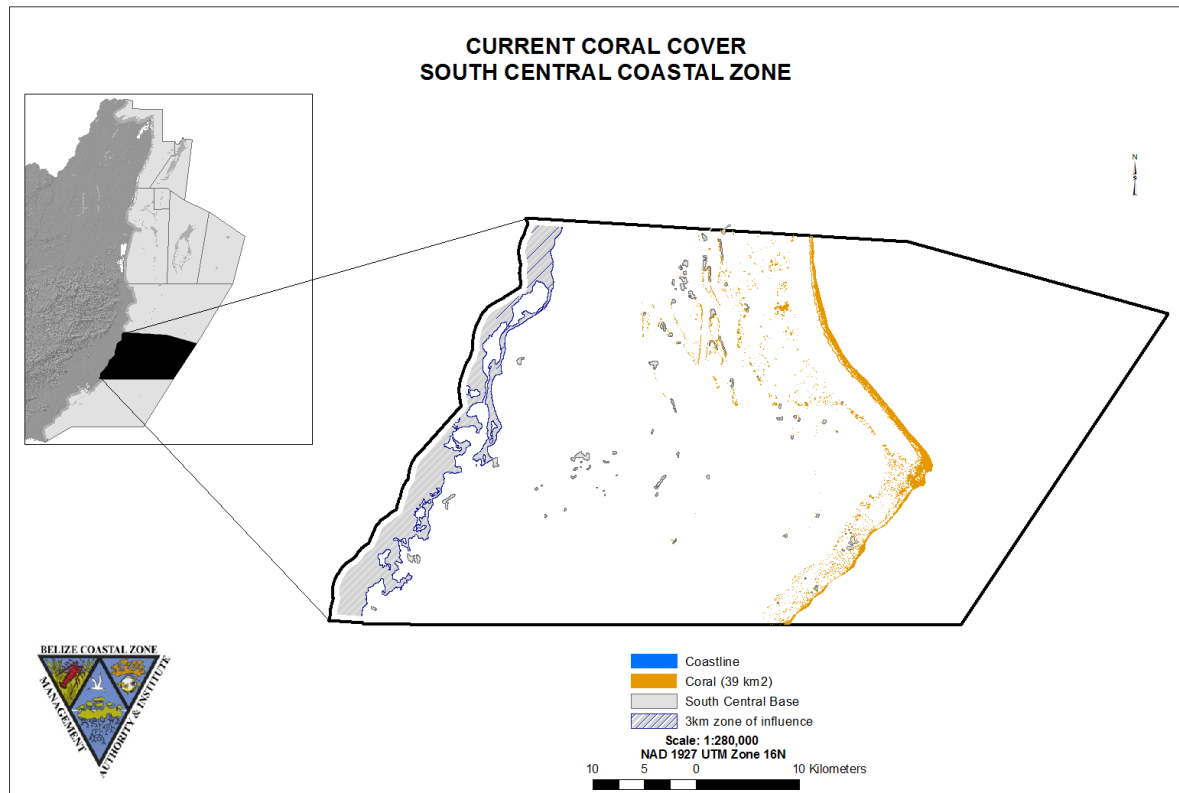
Table 11: Framework for Implementing Informed Marine Dredging in the South Central Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Marine Dredging	Areas for the excavation of bottom sediments for the maintenance of navigable waterways and ports of entry	I. Excavation of bottom sediments for the maintenance of navigational lanes and ports of entry	I. Shipping and navigation; passage/entry of commercial vessels	Sediment extraction	1. Aquaculture  2. Disposal of solid and liquid wastes  3. Disturbance and destruction marine ecosystems, including but not limited to, coral reef system, seagrass beds, etc  4. Marine recreation  5. Fishing  6. Extraction of petroleum  7. Extraction of water from natural saltpans	Environmental Protection Act Mines and Minerals Act Marine Dredging Policy (Draft) Land Utilization Act	Department of the Environment  Mining Unit, Ministry of Natural Resources          Land Utilization Authority

## 6.5 Sensitive Habitats

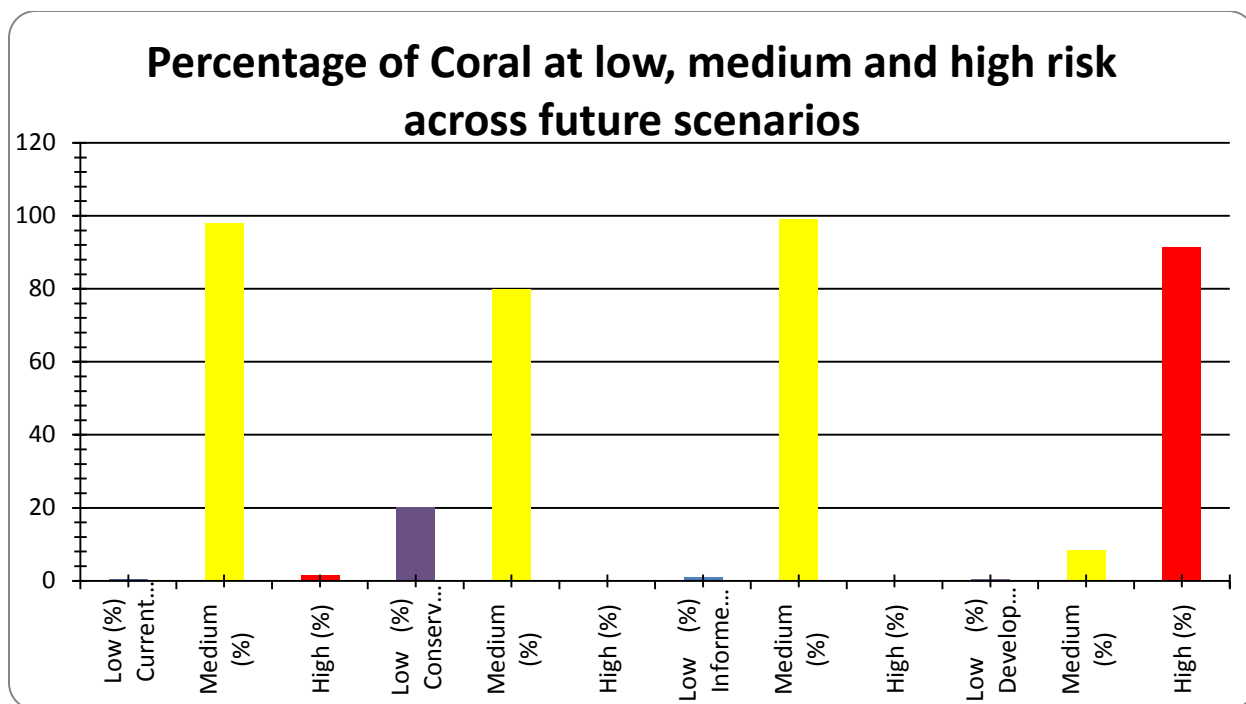
### 6.5.1 Corals

Coral cover in this region is about 39 square kilometers (**Map 15**).



**Map 16: Coral Cover in the South Central Coastal Zone**

Results of the InVEST Habitat Risk Assessment (HRA) model suggest that currently 0.4% of the region's mangroves are at low risk, 98% at medium risk, and 1.6% at high risk (**Fig. 1**).

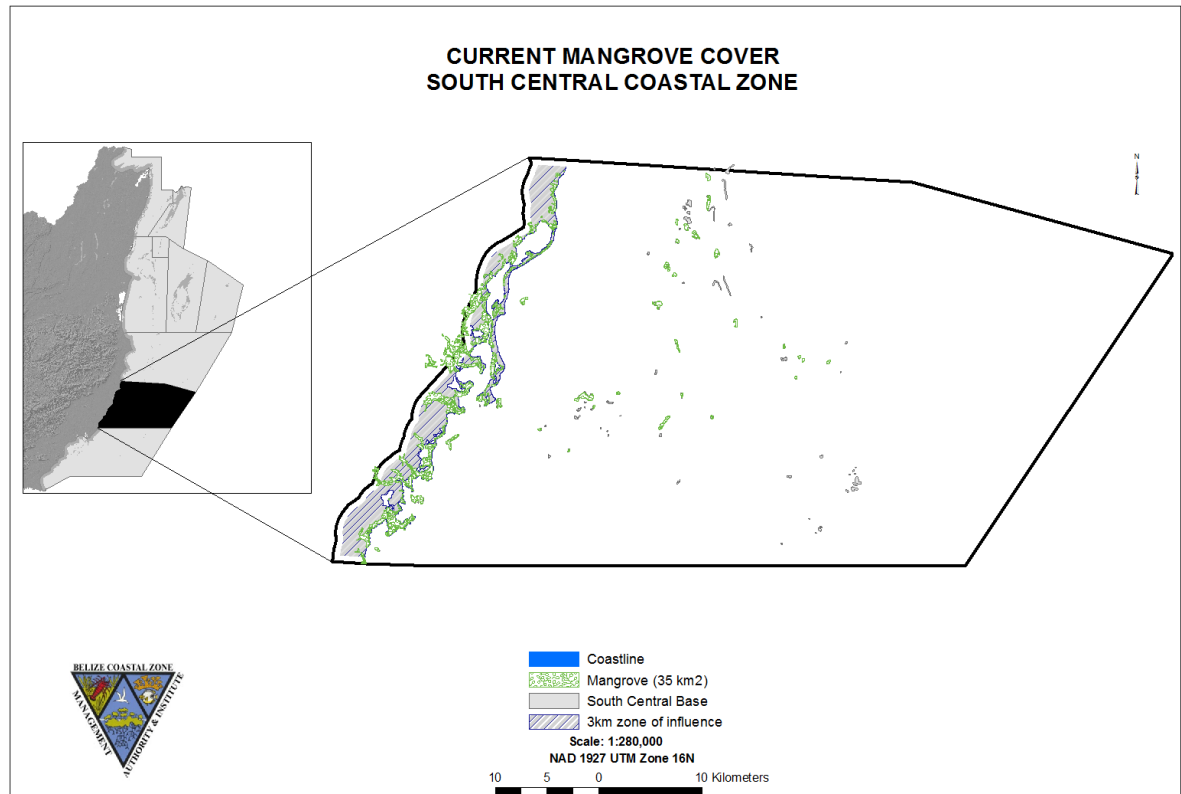


**Figure 1: Risk to Corals in the South Central Region by Scenario**

The results also suggest that in a Conservation Zoning Scheme no corals would be at high risk. There would also be proportionately less corals at medium risk than in the current. According to HRA model results, 18% of corals that were formerly at medium risk in the current scenario would be at low risk in a future Conservation Zoning Scheme, making the total percentage of corals at low risk in this scenario 20%, and at medium risk 80% (**Fig. 1**). In a Development Zoning Scheme, HRA model results suggest that the threat to corals would become increasingly higher. Only 0.4% of corals would be at low risk whereas 8.3% and 91.3% of present corals would be at medium and high risk, respectively (**Fig. 1**). In the proposed Informed Management Zoning Scheme, HRA results are indicating that no corals would be at high risk, 1% of present corals would be at low risk, and 99% at medium risk (**Fig. 1**).

### **6.5.2 Mangroves**

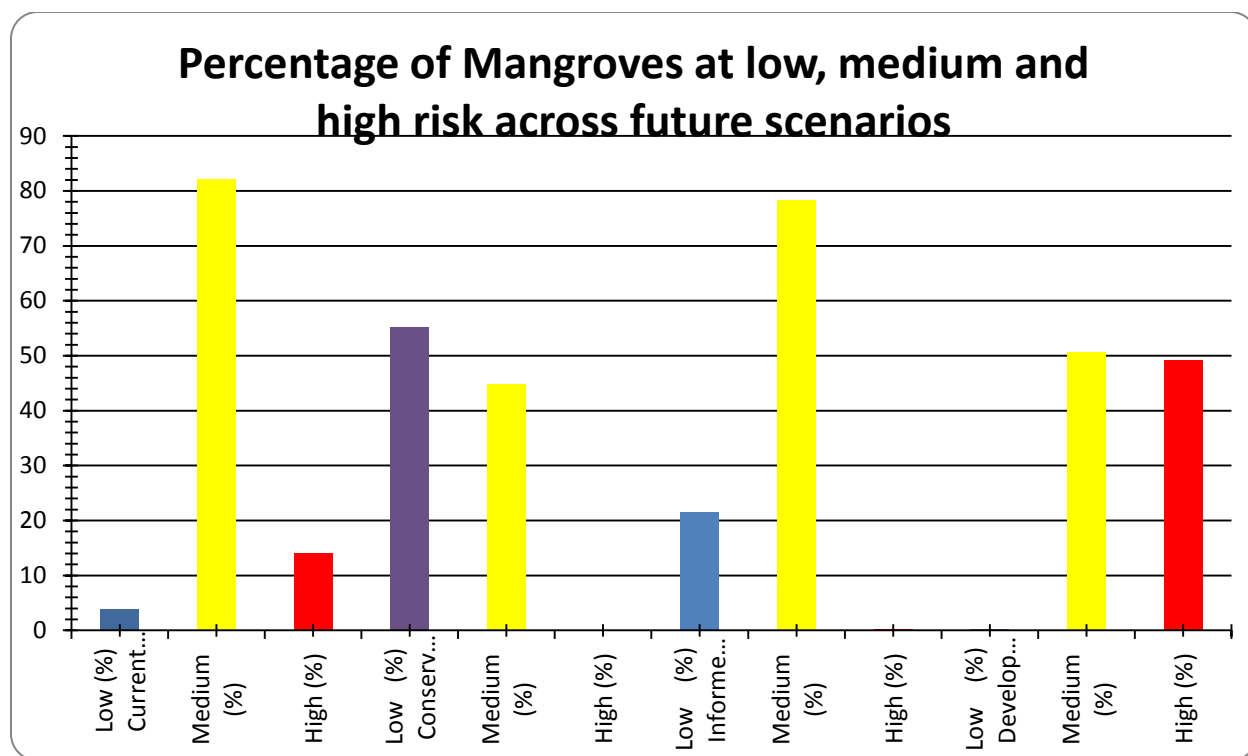
Mangroves are important in this region as they support a diverse range of coastal birds, mammals, fish and crustaceans. Their role is multi-functional in maintaining the integrity of coastal and marine ecosystems; they form the basis of a complex marine food web, create breeding habitat, stabilize bottom sediments and protect the shoreline from erosion. However, with the high market value of waterfront properties, mangroves are being cleared at a rapid rate, despite a moratorium on mangrove clearance. In this region, the total mangrove cover is approximately 31 square kilometers (**Map 16**).



**Map 17: Mangrove Cover in the South Central Coastal Zone**



Results of the InVEST Habitat Risk Assessment (HRA) model suggest that currently 4% of the region's mangroves are at low risk, 82% at medium risk, and 14% at high risk (**Fig. 2**).

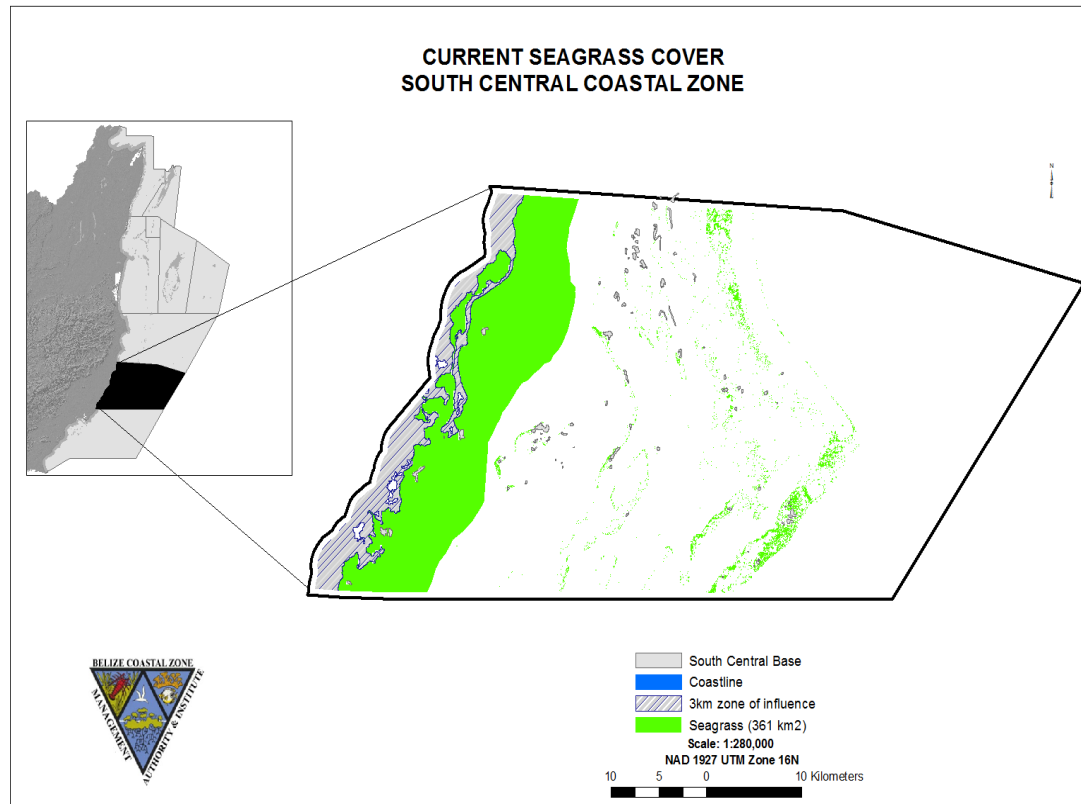


**Figure 2: Risk to Mangroves in the South Central Region by Scenario**

The results also suggest that in a Conservation Zoning Scheme no mangroves would be at high risk. There would also be proportionately less mangrove at medium risk than in the current. According to HRA model results, 37% of mangroves that were formerly at medium risk in the current would be at low risk in a future Conservation Zoning Scheme, making the total percentage of mangroves at low risk in this scenario 55%, and at medium risk 45% (**Fig. 2**). In a Development Zoning Scheme, HRA model results suggest that the threat to mangroves would become increasingly higher. Only 0.1% of mangroves would be at low risk whereas 50.7% and 49.2% of present mangrove would be at medium and high risk, respectively (**Fig. 2**). In the proposed Informed Management Zoning Scheme, HRA results are indicating that only 0.2% of mangroves would be at high risk, 21.4% of present mangroves would be at low risk, and 78.4% of medium risk (**Fig.2**).

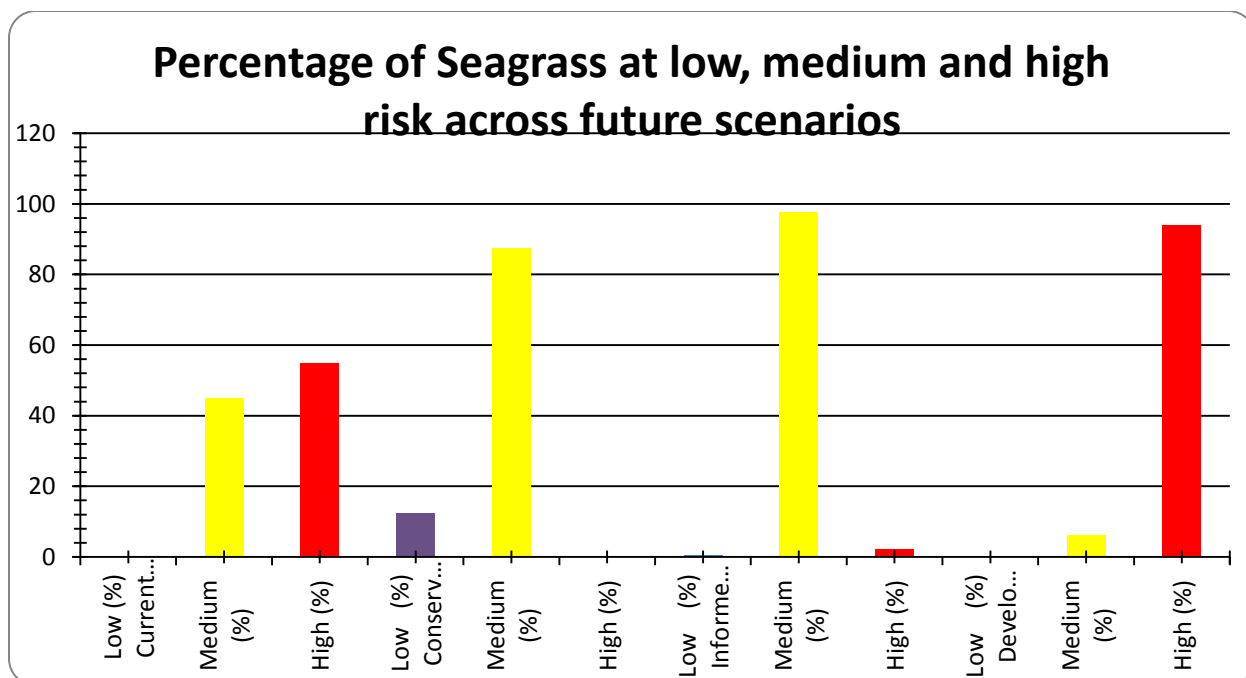
### 6.5.3 Seagrass

The total seagrass cover for the South Central region is approximately 359 square kilometers (**Map 17**).



**Map 18: Seagrass Cover in the South Central Coastal Zone**

Based on the Habitat Risk Assessment (HRA) conducted for this region, approximately 0.1% of the region's seagrass are currently at low risk, 44.9% at medium risk, and 54.9% at high risk (**Fig. 3**).



**Figure 3: Risk to Seagrass in the South Central Region by Scenarios**

In a Conservation Zoning Scheme, HRA model results suggest a dramatic reversal of the level of risk to current seagrass in this region whereby only 0.3% of seagrass would be at high risk, 12.2% of seagrass would be at low risk and 87.5% at medium risk in 2025 (**Fig. 3**). In a Development Zoning Scheme, model results suggest that 93.8% of present seagrass would be at high risk. This zoning scheme also represents the only scenario in which seagrass are at high risk. The results also suggest that in the Development Zoning Scheme, 6% of seagrass would be at medium risk and 0.2% at low risk in 2025 respectively (**Fig. 3**). In the proposed Informed Management Zoning Scheme, the HRA model results suggest an improvement in the amount of seagrass that are currently at risk. Under this zoning scheme, 97.5% of present seagrass would be at medium risk. Additionally, the model results reveal that under this zoning scheme, 0.5% of present seagrass would be at low risk and 2% at high risk in 2025 (**Fig. 3**).

In discussing the results of the InVEST ecosystem models, and in particular the habitat risk assessment model, there is the need to consider limitations of the model, which are highlighted below:

- Results should be interpreted on a relative scale within a study region and across habitats and stressors, but not to results from separate analyses.
- Results do not reflect the effects of past human activities.
- Results are based on equal weighting of criteria unless the user weights the criteria by importance or data quality.
- Cumulative risk is additive (rather than synergistic or antagonistic)
- Climate change impacts are not directly accounted for in model

Additional information on how this model works can be found in **Appendix B.1** of the Belize Integrated Coastal Zone Management Plan

**Recommended Actions:**

1. Implement the Informed Management Zoning Scheme that will support multiple human activities in the region while limiting activities in specific areas in order to reduce impacts to critical and sensitive habitats and to maintaining their integrity
2. Analyze current human impacts on habitats in order to prioritize areas requiring immediate management intervention
3. Enhance collaboration among management and permitting agencies to ensure impacts to critical habitats are reduced and controlled
4. Raise awareness and outreach in community stakeholders about the importance of reducing impacts to habitats

## **6.6 Utilities**

This section of the guidelines addresses the issue of electricity and water supply (potable and otherwise). The matter of the level of requirement and the means of supply falls, in many ways, into two categories: the fishing camps and the resort / residential / guesthouse sites on the Peninsula and the cayes. It is not anticipated that fishing camps, as they are presently used, will consider it necessary to invest in expensive power generating equipment; however those that may become more developed might find it convenient to up-grade their facilities. Generators subtracts from the undeveloped unspoiled character of the area.

### **6.6.1 Energy**

Energy supply for the most part is dependent upon the type, intensity and area of development activity. Specifically, the requirements for fishing camps and guesthouses on the cayes development sites would differ for residential development on the Placencia peninsula. The only source of energy supply that may potentially threaten the environment is the use of gasoline and/or diesel generators because of the noise and air pollution, the transportation and improper disposal of used lubrication oil, and the transportation and handling of fuel, which can result in spills. The latter two can be mitigated against by proper handling and storage, and subsequent transportation of used oils back to the mainland. Solar and wind energy are environmentally friendly and are recommended for use by residences, eco-resorts and research stations. Cost effectiveness of this option may be a factor. However, this can be combined with the use of the generator as a constant source.

### **6.6.2 Water**

Water is essential to life and the supply of water for various human purposes cannot be understated. Where water is demanded in large quantities, this can be particularly problematic and impact on the development capability of the region, especially in the case of large developments. Dependence on the public water supply system and reverse osmosis could be an alternative. However, reverse osmosis requires a consistent energy source, and will require a waste disposal plan for waste products produced, such as brine.

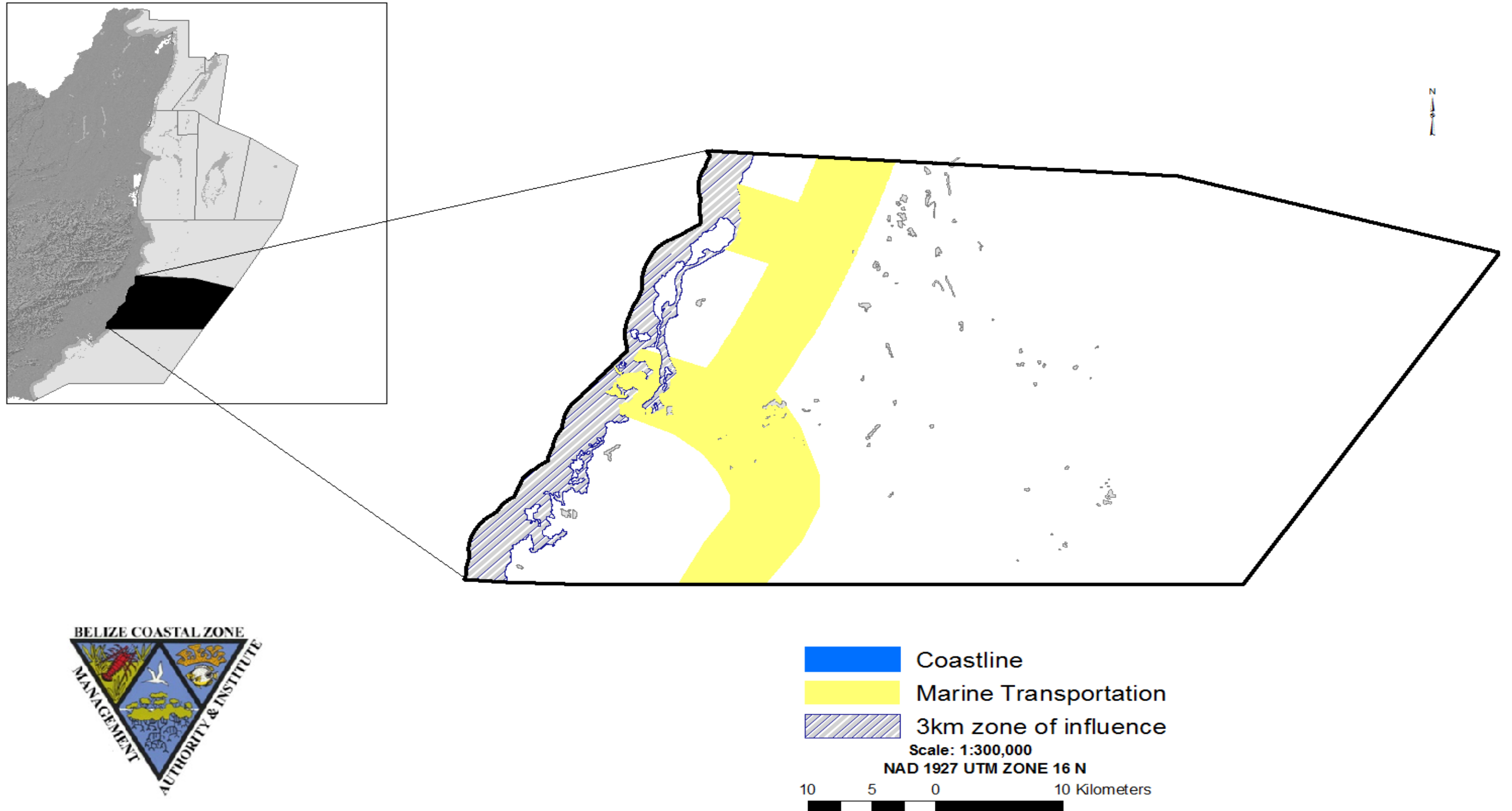
### **6.6.3 Transportation**

With one of the newest and finest paved road in the country, Peninsula residents can no longer complain of the punishment they endured for so many years at the hands of mud, dust, and potholes. But a road is not the same as a transportation system. The single largest transport problem the area faces is the lack of regularly scheduled public transport from one end of the Peninsula to the other. This absence affects the movement of tourists from their hotels to shops, restaurants and nightlife, but, perhaps more importantly, the ability of residents to move up and down the Peninsula from home to places of employment. This lack of local labor mobility makes it more difficult and expensive for residents to find, and keep, employment. Traffic and

parking in Placencia Village is also a growing problem that will no doubt become worse due to a lack of available land and the Village's position at the tip of the Peninsula. Consideration should be given for Aerodrome development in this area in order to support anticipated tourism activities in this area.

The Port of Big Creek is a deep water sea port facility. It is situated 2.5 kilometers inland from the entrance of Big Creek, which is to the immediate west of the South Central region. The Inner Channel, one of Belize's main shipping routes, passes through the region from north to south. The port deals mainly in the import and export of a number of items and other forms of cargo, such as bananas, citrus concentrate, fertilizers, etc. The port requires maritime infrastructure along its shipping routes, principally marker buoys. Ancillary infrastructure, such as, buoys and markers should be placed in the sea to direct vessels and humans away from fragile and sensitive ecosystems. These guidelines recognize existing marine transportation routes in the region, which have been captured in the Informed Management spatial zoning scheme (**Map 18**). In addition to the recommended zoning scheme for marine transportation, the framework for implanting the recommended transportation routes for this region is found in **Table 12**.

## INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL TRANSPORTATION: SOUTH CENTRAL REGION



Map 19: Informed Management Zoning Scheme for Marine Transportation in the South Central Region

Table 12: Framework for Implementing Informed Marine Transportation in the South Central Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Marine Transportation	Marine area delineated for the use of watercraft, such as water taxis, cruise ships, etc, to transport people, goods and cargo between multiple destinations	1.Shipping operation activities 2. Port development and operation 3. Vessel traffic use	Dredging for the maintenance of navigational lanes and ports of entry	Passage/entry of vessels  Operation and construction of ports	1. Fishing  2. Marine recreational activities  3. Anchoring that leads to disturbance and destruction marine habitats, including but not limited to, coral reef system, seagrass beds, etc  4. Exploration and extraction of petroleum  5. Construction of any illegal structure that would obstruct shipping and navigation  6. Disposal of solid and liquid wastes from boats and ships  7. Transportation of illegal goods, such as drugs and weapons, and human trafficking	Belize Port Authority Act Belize National Coast Guard Service Act Customs Regulation Act Defence Act Environmental Protection Act Harbours and Merchant Shipping Act Immigration Act Maritime Areas Act Marine Dredging Policy (Draft) Mines and Minerals Act	Belize Port Authority  Belize National Coast Guard   Customs Department  Belize Defence Force Department of the Environment Belize Port Authority  Immigration Department Ministry of Foreign Affairs Mining Unit, Ministry of Natural Resources Geology and Petroleum Department



**Recommended Actions:**

1. Develop proper handling, transportation, storage and waste disposal practices of spent oils used for energy generation
2. Close collaboration with relevant agencies to ensure that water and energy supply, and infrastructure in the region are provided through environmentally friendly and cost effective means
3. Close collaboration with relevant agencies in the placement and maintenance of buoys, lighthouses and protected area boundary markers in the sea
4. Upgrade existing power network to accommodate certain increased energy needs as the area develops and expands
5. Extend and upgrade existing water supplies in order to meet future demand
6. Encourage the use of solar and wind power in the case of resorts and any residential development, as they are unlikely to cause the environmental problems (spillage, fumes, noise) associated with diesel generators
7. Allow the use of generators as a secondary power source only during daylight hours for the recharging of solar or wind-driven power sources
8. Take all precautions to avoidance of pollution and noise generation in accordance with the Pollution Regulations, 1996 of the Department of the Environment
9. Store and dispose of batteries at the appropriate sites on the mainland
10. Import potable water for the cayes from sources on the mainland
11. The government should license and provide fiscal incentives for a shuttle service for intra-Peninsula transport.
12. The private sector should be encouraged to support such a service through direct investment or the generous purchase of advertising on the shuttle vehicles.
13. A study should be carried out to explore ways to reduce the flow of vehicular traffic into Placencia Village or better ways to deal with the increased flow.

## 6.7 *Pollution Control*

Degrading water quality and pollution associated with urbanization is one of the greatest threats in the South Central region. Pollution from sewage, aquaculture farms, agricultural land wastes, and increased boat traffic have also been identified as having a high impact on the health of the biodiversity and coastal and marine environment in the region. When wastewater is disposed of directly into the sea with little or no treatment, the bacteria present immediately begin to work to decompose the solids using oxygen in the process. The higher the quantity and quality of waste, the more oxygen is required for its decomposition. The oxygen demand by the bacteria usually creates depletion for use by other species if it is not replenished quickly. Prolonged oxygen deprivation usually results in the demise of aquatic leads to their demise. One way of preventing oxygen depletion is to ensure that sufficient oxygen is present in the water at all times for the species to thrive. It can be done by two methods:- ensuring wastewater is pre-treated, and by reducing the strength of wastewater so that its impacts will not be detrimental when disposed of into receiving waters.

Improper solid waste disposal also contributes towards significant environmental and ecological degradation that can lead to serious public health problems. For example, solid waste that is indiscriminately disposed of can pollute the air when waste is inadequately incinerated, and smoke and odor can become a problem. In addition, the leaching of liquid from the garbage contaminates soil, surface and ground water. This increase in bacterial action may significantly deplete the oxygen present, which could be detrimental to other life forms present in the soil. Furthermore, from a public health standpoint, uncontrolled and inadequate disposal of solid waste attracts flies, insects and rodents. These may act as vectors of infectious diseases that affect humans. Solid waste that is improperly disposed of is also an eyesore.

### **Soak-a-ways and Septic Tanks on Coastal Developments**

The Central Building Authority (CBA) is the agency mandated by the Belize Building Act 2003 to control building operations in the interest of public safety and health. In 2010, CBA produced detailed specifications for the construction of soak-aways and septic tanks for residential and other low impact buildings. Detailed diagrams can be found in the **Figure 10** of the Appendix of this document. A summary of required specifications for septic tanks servicing residential and other low impact buildings can be seen in **Table 13**. The CZMAI recommends that these standards be used for construction of septic tanks and soak-aways on the **coastal mainland**.

**Table 13: Specifications for Residential and Low-Impact Septic Tanks and Soakaways**

Max # of persons served	Liquid capacity of tank		Internal dimensions							
			Length (l)		Width (w)		Liquid depth (ld)		Total depth (h)	
	Gallons (approx.)	Cubic ft.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
4	500	67	6	0	3	0	4	0	5	2
6	600	81	7	0	3	0	4	0	5	2
8	750	101	7	0	3	6	4	0	5	2
10	900	121	7	6	3	6	4	6	5	8
12	1100	148	8	6	4	0	4	6	5	8
14	1300	174	10	0	4	0	4	6	5	8
16	1500	201	10	0	4	6	4	6	5	8

### **Treatment of Wastes on Cayes**

Due to the fragile nature of the cayes and atolls septic tanks and soakaways are not recommended as a means of handling household waste. Also, since there are no established solid waste management guidelines for the cayes, CZMAI recommends the following based on the Long Caye Eco-Guidelines produced by Pleasure Island Limited for the handling of waste on Long Caye, Lighthouse Reef Atoll:

- Human waste must be treated with composting toilets. Septic tanks, cesspools and sewers should be prohibited.
- Gray water must be treated, and all dwellings and buildings must have a gray water treatment system approved by DOE before construction.
- Organic wastes must be collected and disposed of in composting bins.
- Recycling and garbage separation is encouraged.
- Frequent removal of solid waste from the cayes for treatment and proper disposal on the mainland

### **Recommended Actions:**

1. With respect to resort and residential developments, solid wastes on the cayes should be removed and transported to the mainland (which is recognized as having its own solid waste disposal problems)
2. In the case of fishing camps, solid wastes may be incinerated on site given adequate precautions such as being done at least 30 feet from open water or water courses
3. Should a fishing camp be upgraded to its secondary use of guesthouse facilities, Recommendation (1) will apply
4. In developments that are likely to generate a relatively high volume of waste, the relevant authorities (the Public Health Bureau, Department of the Environment, Solid Waste Management Authority) should be consulted
5. Ensure that new and existing development applications include a Solid Waste Management Plan that is closely guided by the management recommendations from the National Solid Waste Management Plan. Opportunities for recycling of solid wastes should be explored
6. Although the use of composting toilets is recommended for the entire region, an alternative for resort facilities is the use of cleaner technologies, for instance, Upflow Sludge Blanket Filtration (USBF) and Aquarius Systems for the purpose of liquid/sewage waste disposal. The system of choice must have the approval of the DOE.
7. Septic tanks will not be utilized for resort facilities. Small residential developments shall utilize closed septic tanks with grey-water gardens while guesthouse facilities shall utilize lined grey water gardens or composting toilets.
8. Collaborate with small scale farmers and the aquaculture industry to reduce the waste load that enters the watersheds in the region

## **6.8    *Social Amenities and Recreation***

Much of the social situation on the Peninsula mirrors that of the country as a whole. Concerns over health care, education, crime, and other issues are debated daily on a national scale and the Placencia Peninsula is no exception. There are some specifically local concerns, however, largely arising from the area's rapid growth and the feeling that social services are lagging behind that growth. These concerns are documented below, and excerpted verbatim from the Peninsula 2020 Vision document.

### **Preservation of Culture**

Two cultural trends occurring globally come into play on the Placencia Peninsula: one, traditional cultures are disappearing rapidly, and two, cultural tourism is a fast growing segment of the tourism industry. What this means for the Peninsula is that the growing demand for local cultural experiences by the tourism industry can help revive and enhance traditional cultural practices, particularly in Seine Bight and Placencia Villages, with their respective Garifuna and Creole cultural traditions. It is potentially a win-win situation in that cultural strengthening as well as increased economic benefits accrue when tourism and culture join forces.

### **Recommended Actions:**

1. Community cultural leaders should be assisted in tapping into national/regional/global initiatives designed to promote cultural preservation
2. Local and national marketing campaigns should promote cultural tourism and set aside funding for initiatives that enhance the quality of cultural presentations.
3. The three communities on the Peninsula must work more closely together to promote cultural tourism as a Peninsula-wide product instead of belonging to solely one village or the other.

### **Health**

Peninsula residents generally agree that current arrangements for medical care on the Peninsula are inadequate to serve the present needs of residents or visitors. The health center in Seine Bight is irregularly staffed by a single nurse and Placencia Village has a single doctor with nursing staff but in less than ideal surroundings. Most residents use the government polyclinic in Independence, Southern Regional Hospital in Dangriga, or private doctors off the Peninsula. The lack of nearby emergency medical care (particularly at night) is concerning to residents as

well as those potential retirees from abroad (including the Belizean diaspora) who would seek to settle here.

**Recommended Actions:**

1. Establish an emergency medical clinic on the site earmarked near the Placencia airstrip.
2. Encourage the establishment of a private medical clinic on the Peninsula to provide care options for both residents and visitors.

**Crime**

Crime on the Peninsula, while periodically raising concerns, has not yet reached the crisis proportions experienced elsewhere in the country. However, residents, particularly those in the tourism industry, acknowledge that the threat of increased criminal activity is ever present and many further believe that the current level of policing on the Peninsula is and will continue to be inadequate. This is particularly true outside of Placencia Village, where a single corporal in Seine Bight, with no vehicle, is responsible for law enforcement on the entire northern two-thirds of the Peninsula. Recognizing that increased crime hurts residents directly and has the potential to destroy tourism, the Placencia branch of the Belize Tourism Industry Association (BTIA) formally submitted a set of recommendations to the Commissioner of Police, which have yet to be addressed by the Belize government.

**Recommendations:**

1. Upgrade the position of the Placencia station's commander from Sergeant to Inspector.
2. Upgrade the Seine Bight station position from Corporal to Sergeant and increase staffing.
3. Institute a permanent mobile checkpoint on the Placencia Road as a way of deterring and foiling crime caused by criminals who reside outside the Peninsula.
4. Initiate a crime reporting system in which the BTIA and Village Councils receive reports of crimes on a daily basis so they may follow up on all cases and be aware of the level of criminal activity on the Peninsula.
5. Encourage more community policing and neighborhood crime watches as well as improve liaison between police and private security operations.

## 6.9 Conservation

Currently there are only four areas in the region that have statutory protection: Laughing Bird Caye (and its surrounding waters) as a National Park, Little Monkey Caye as a Bird Sanctuary under the old Crown Lands Act (now replaced by the National Lands Act); and the South Water Caye Marine Reserve and the Gladden Spit and Silk Cayes Marine Reserve. There are, however, several cayes and related marine areas that warrant immediate protection and preservation. The Placencia Lagoon is one such area. The Lagoon serves as a nursery for much of the marine life in the area, including lobster, bonefish, permit, Jewfish/Goliath grouper, rays and the endangered Antillean manatee. It is also an integral part of the regions coastal environment as are the cayes and reef. Much of the marine life that the area residents depend on for fisheries and tourism services will be adversely affected by the continued degradation of the Lagoon through uncontrolled degradation and mangrove removal. A concerted effort is underway to obtain protected status for the Lagoon-an effort endorsed by the Fisheries and Forest Departments, as well as 95% of the area residents surveyed during the Peninsula 2020 effort.

The Pelican Cayes, in particular, have been identified as requiring special attention several times over the preceding years, and the South Water Caye Marine Reserve was extended south especially to include them. The cayes and the lagoon constitute one of the several extensive faros surrounded by deep channels that characterize the inner reef cayes, Laughing Bird Caye, and its faro, being another. Some of the rationale for conservation is based on the objective of avoiding over-development of marginal lands and its accompanying need for dredging, filling, vegetation and habitat destruction, and increased potential for erosion. Several other cayes in the region have been identified as noteworthy bird habitats. It appears that there has been some variability in these sites in the past; some cayes that used to support large bird populations no longer do, and others have been effectively vacated due to clearance or other forms of interference.

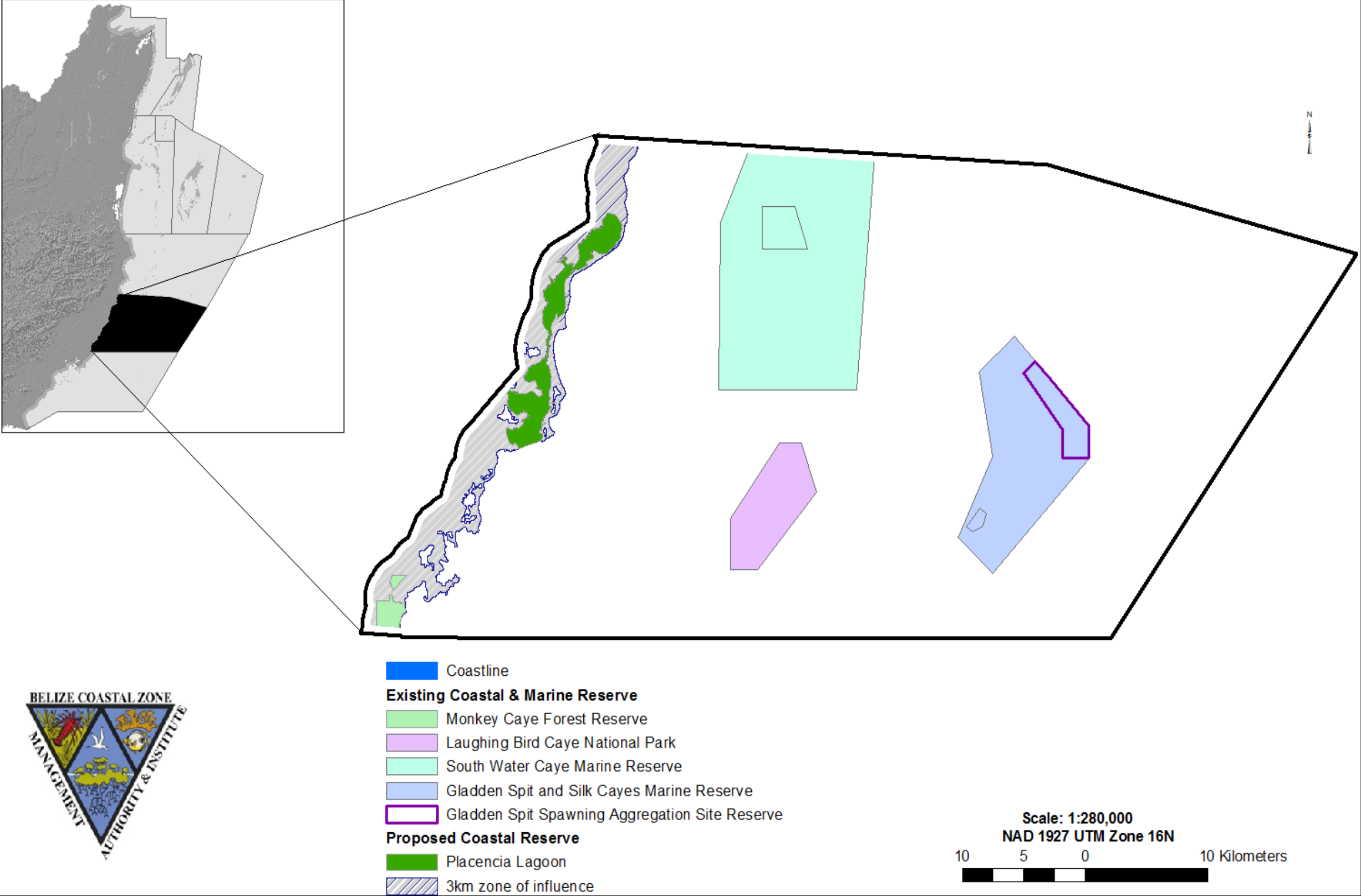
In an effort to support continued national efforts to conserve biological diversity and reduce the pressures impacting them to ensure their long-term ecological integrity, the CZMAI has recommended areas that could benefit from conservation (**Map 19**) on the basis of the sensitivity of habitats and future threats from human activities. The framework for implementing the Informed Management Zoning Scheme for Conservation in the South Central Region is found in **Table 14**.

## **Recommended Actions:**

1. Maintain existing coastal and marine protected areas, and extend protection to sites with ecosystems of conservation importance in Informed Management Zoning Scheme for protected areas
2. Seek protected status for the Placencia Lagoon in order to protect its important coastal resources while also safeguarding the usufruct fishing rights for traditional (non-gill net) fishers of the area
3. Strengthen management effectiveness for the four existing protected areas in the region
4. Several sites that no longer support healthy mangrove populations for nesting sites for shore birds and are undeveloped are recommended for preservation
5. Other undeveloped nationally owned cayes that are considered as being especially sensitive, either terrestrially or in relation to their marine environment, are also proposed for preservation, mostly also with research as a secondary use
6. Concerned NGOs and other institutions such as colleges should be made aware that the cayes' integrity as "preserved areas" is dependent on effective management and are encouraged to take interest. These measures are designed to ensure that, despite the constraints on resources of the Forest and Fisheries Departments, all areas are afforded on-site management with a high degree of local participation.
7. Implement management recommendations of these guidelines in coordination with the management plans for Laughing Bird Caye National Park (2011-2016), Gladden Spit and Silk Cayes Marine Reserve (2011-2016) and South Water Caye Marine Reserve (2010-2015)



# INFORMED MANAGEMENT ZONING SCHEME FOR CONSERVATION: SOUTH CENTRAL REGION



Map 20: Informed Management Zoning Scheme for Conservation in the South Central Region

Table 14: Framework for Implementing Informed Conservation in the South Central Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Marine Conservation	Coastal and marine areas delineated for the retention of critical habitats and ecosystems for a diversity of marine life, fish spawning aggregation sites, replenishment zones, biodiversity areas	1. Coastal and marine reserves 2. Breeding, spawning, feeding area for marine life 3. Replenishment zones 4. Seagrass rehabilitation 5. Mangrove planting 6. Foraging area for manatees, dolphins, crocodiles 7. Nesting beaches for sea turtles	1. Research and education 2. Marine Recreation and Tourism	Tourism and recreation (snorkeling and diving) Research and education Establishment of new reserves	1. Fishing within “no-take”/replenishment zones, and spawning aggregation sites 2. Development of shoals 3. Anchoring that leads to disturbance and destruction marine habitats, including but not limited to, coral reef system, seagrass beds, mangrove forests, etc 4. Exploration and extraction of petroleum 6. Disposal of solid and liquid wastes from boats and ships 7. Shipping	Belize Port Authority Act Belize National Coast Guard Service Act Customs Regulation Act Defence Act Environmental Protection Act Harbours and Merchant Shipping Act Immigration Act Maritime Areas Act Marine Dredging Policy (Draft) Mines and Minerals Act	Belize Port Authority Belize National Coast Guard Customs Department Belize Defence Force Department of the Environment Belize Port Authority Immigration Department Ministry of Foreign Affairs Mining Unit, Ministry of Natural Resources Geology and Petroleum Department

### **6.10 *Scientific Research and Education***

The management plans for Laughing Bird Caye National Park, South Water Caye Marine Reserve and Gladden Spit and Silk Cayes Marine Reserve all call for an integrated research and monitoring programme for the region as a strategy to maintain the long-term ecological integrity of biological diversity and sustainable resource use by dependent communities. These management plans also outline a framework for effective integrated research and monitoring of conservation targets, the development of a data management facility and the incorporation of community involvement from the buffer communities. .

#### **Recommended Actions:**

1. Implement the recommended research and educational activities for the region as outlined in the management plans for Laughing Bird Caye National Park, South Water Caye Marine Reserve and Gladden Spit and Silk Cayes Marine Reserve

## **7.0 IMPLEMENTATION STRATEGY**

The South Central Region Coastal Zone Management Guidelines form a part of the Belize Integrated Coastal Zone Management Plan being developed by the CZMAI. After approval of the Plan by CZMAI's Board of Directors, it will be offered to the House of Representatives for endorsement. Implementation of these coastal management guidelines will be undertaken through two mechanisms: (a) centralized statutory control through the various Government departments, and (b) localized community and stakeholder participation. Following the mechanism of centralized statutory control, the regulatory and permitting agencies with management mandates for the coastal zone will implement the specific policy actions and informed management spatial zoning scheme that are recommended in the Plan.

While the government agencies have the authority of the law to back up its procedures, it is constrained by limited resources. In several instances, however, local NGOs and community-based stakeholder organizations have greater access to, and knowledge of, local conditions and activities, though they have no statutory powers to either assist or control development beyond those available through the Village Councils and Towns Councils Acts. For this reason, it is recommended that localized community and stakeholder participation complement the management efforts of centralized government and statutory agencies in implementing integrated coastal zone management.

The formation of the South Central Region Coastal Advisory Committee (SCRCAC) for this region is recommended subsequent to Cabinet's adoption of the Belize Integrated Coastal Zone Management Plan. The South Central Region CAC would be locally based and largely constituted of voluntary organizations charged with the role of monitoring the state of the coast and development of the region, making reports and recommendations on issues they identify. This region's CAC will work closely with the Coastal Zone Advisory Council (CZAC) to monitor the implementation of the guidelines. The proposed membership of the reformed South Central Region CAC is to be drawn from, but not limited to, the following sources:

- Village councils of Independence, Placencia, Seine Bight;
- Placencia Fishermen's Cooperative Association;
- Placencia Tour Guide Association;
- Northern Fishermen Cooperative Society;
- National Fishermen Cooperative Association;
- National Garifuna Council;
- Independence High School;
- Southern Environmental Association;
- Fisheries Department;
- Lands and Surveys Department;
- Geology and Petroleum Department;

- Forest Department ; and
- Placencia Chapter, Belize Tourism Industry Association

Objectives of the South Central Region CAC include, *inter alia*, contributing to the drafting of the coastal zone management guidelines for their coastal region, supporting their initial approval, and monitoring and reporting to the Coastal Zone Advisory Council (CZAC) on the implementation of the guidelines. This means that the Committee will be expected to undertake the following tasks:

1. Develop, assess and approve the draft guidelines;
2. Forward the approved draft guidelines to CZMAI for approval;
3. Monitor the implementation and effectiveness of the guidelines;
4. Identify the appropriate time for a review of all or part of the guidelines;
5. Review and update the guidelines.

Planning is a continual process of recommendation, participation, implementation and review. These guidelines shall be monitored on a continual basis in order to establish its strengths and weaknesses. Through a management planning mechanism, the SCRCAC, along with CZMAI, will regularly update the guidelines, which will hopefully set a good example of representative, cooperative and adaptive management that is environmentally sound, rational and equitable.

Additional studies are needed in liaison with the relevant authorities and region's stakeholders. Such studies should reveal information which may help to further support sustainable development and to address the social, cultural and economic human use of the region and its resources.

## **8.0 CONCLUSIONS**

The coastal zone management guidelines recommended for the South Central Region are not intended to be rigid, as changing socio-economic, cultural and environmental conditions may necessitate modifications. Noteworthy, however, these guidelines and Informed Management spatial zoning scheme have identified sites for specific human uses of the coastal zone, and the disqualification of sites for not conducive to sustainable development. It is hopeful that the objectives outlined at the beginning can be realized through the recommended sector policies guidelines and spatially-explicit zoning scheme as they will ensure the sustainable use and development of the South Central Region.

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## **10.0 APPENDICES**

### **10.1 Background**

The coastal zone is one of Belize's greatest assets and its magnificent Barrier Reef Reserve System is a renowned World Heritage Site. It is the longest barrier reef in the Western Hemisphere, extending approximately 280 km from the northern to southern borders of the country (Cooper et al. 2009). Belize's coastal zone has complex and dynamic marine ecosystems that support innumerable ecological processes and a vast array of marine life and habitats. In addition to its important ecosystem functions, the coastal zone is vital to the Belizean way of life. The highly productive coastal zone is the resource base for a broad range of economic activities. In fact, approximately thirty-percent of the country's gross domestic product is directly linked to these commercial activities that take place within the coastal zone (Cho 2005). The coastal zone also has important social and cultural values to the Belizean people, especially to approximately 40% of the population that reside on the coast and in offshore areas (SIB 2010).

Over the past decades, rapid economic development and population growth have taken place in the coastal zone and inland areas of Belize. World-renowned snorkeling and diving draw over 800,000 tourists to the region annually, driving the construction of new development (BTB 2008). These occurrences have led to increasing pressures on coastal and marine resources, with implications to the livelihoods of those that depend upon them. These anthropogenic threats stem from various developmental activities associated with tourism and recreational facilities, population growth and expansion, utility supply, dredging and mineral extraction, land clearance, pollution, waste disposal, fisheries and aquaculture. These threats are compounded by natural hazards, global warming, rising sea levels, and the vulnerability of sensitive ecological systems to climate change. Thus, it is imperative now more than ever to ensure that the coastal zone is utilized in a manner that will continue to support important ecological functions, as well as social, cultural and economic prosperity for current and future generations.

For many years, and even today, management of the Belizean coastal zone has been under the regime of sectoral planning. However, The need for an integrated approach to optimally manage Belize's coastal resources was made resoundingly clear at a historic meeting in 1989 when a wide cross-section of stakeholders from various sectors, including scientists, marine managers, private sector, and coastal communities converged in San Pedro, Ambergris Caye (Gibson 1989). Integrated coastal zone management (ICZM) brings together all decision-making agencies to ensure integration among their policies and management plans, to ultimately improve and maintain the quality of coastal and marine ecosystems. A defining feature of Belize's ICZM plan is balancing national economic development needs with conservation priorities within a spatially defined area over a specified timeframe. The development of site-specific coastal zone management guidelines, as a component of the Belize ICZM Plan, serves as a means to guide management decisions and to form the basis on which decisions are made to regulate the development and use of coastal and marine resources within the coastal zone.

## **10.2 Summary Of Enabling Legislation And Implementing Agencies For Enforcement Of The Informed Management Zoning Scheme**

The various governmental organizations and agencies with management mandates for the coastal zone that are needed to implement these guidelines, to synchronize the efforts of the CZMAI via the Belize Integrated Coastal Zone Management Plan, and to strengthen inter-agency coordination for integrated coastal zone management include:

*Banana Control Board* – The Banana Industry Act requires applications for the cultivation of designated areas for banana production for the region. The South Central Region CAC should be included in any discussion on policy formulation on banana production as it affects the region.

*Belize Agricultural Health Authority* – The Belize Agricultural Health Authority Act requires applications for licenses, permits or certificates to import and export animal products, animal feed, and plant products into and out of Belize following inspection as it affects the region. The South Central Region CAC should be included in any discussion on policy formulation on agricultural import and export as it affects the region.

*Belize Port Authority* – The Belize Port Authority Act requires applications for boat and captain licenses and for the construction and operation of private ports for the region. Also, The Harbors and Merchant Shipping Act requires the Authority to regulate the passage of vessels in and out of Belizean waters as well as the maintenance and delineation of vessel routes, lighthouses and wharfs. The South Central Region CAC should be included in any discussion on policy formulation on vessel licencing and shipping as it affects the region

*Belize Tourist Board* – The Belize Tourist Board Act requires applications for hotel licenses for the region. The South Central Region CAC should be included in any discussion on policy formulation on hotel development as it affects the region.

*Belize Trade and Investment Development Service (BELTRAIDE)* – The Belize Trade and Investment Development Service Act requires that foreign trade and investment be liaised through the BELTRAIDE organization. The South Central Region CAC should be included in any discussion on policy formulation on major developments as it affects the region.

*Central Building Authority* – The Housing and Town Planning Act provides for the regulation of the use and development of land through qualitative measures that is, building densities, land use class assignments etc. However, it does not address the structural integrity of buildings, a component of the development. The Central Building Authority, by way of the Belize Building Act, is legislated specifically to address this, and provides for the appointment of Local Building Authorities to administrate the Act. Thus, the South Central Region CAC can be appointed as the Local Building Authority for the Northern Region. However, this may require strengthening the Northern Region CAC with technical expertise to do this. The alternative is to coordinate this function with the Village Councils of Independence, Placencia and Seine Bight.

*Department of Environment* – The Environmental Protection Act requires applications for environmental clearance for the region. The South Central Region CAC should be included in any discussion on policy formulation on environmental protection as it affects the region.

*Fisheries Department* – The Fisheries Act requires applications for fishing license for the region. The South Central Region CAC should be included in any discussion on policy formulation on fisheries as it affects the region.

*Forest Department* – The Forest Act requires applications for the removal of mangroves in coastal areas for the region. The National Parks System Act requires the establishment of National Parks, Nature Reserves, Wildlife Sanctuaries, and Natural Monuments to preserve ecologically important and sensitive areas. The Wildlife Protection Act empowers the Forest Department to determine species to be prohibited from hunting practices as it sees fit. The South Central Region CAC should be included in any discussion on policy formulation on mangrove removal and designation of protective status to sensitive areas and species as it affects the region.

*Geology & Petroleum Department, Ministry of Energy, Science & Technology, and Public Utilities* – The Petroleum Act requires applications for oil exploration and issuing of parcel contracts for the region. The South Central Region CAC should be included in any discussion on policy formulation on petroleum activities as it affects the region.

*Hydrology Unit, Ministry of Natural Resources and Agriculture* - The Water Industry Act requires all entities to apply for a Water Abstraction License where the water source is limited to a natural water body: surface or groundwater. The South Central Region CAC should be included in any discussion on policy formulation on water use as it affects the region.

*Lands and Surveys Department* - The Land Utilization Act requires applications for subdivisions for the region, any demarcation of special development areas, and any allocation of land in the coastal region, this includes any construction on seabed. The South Central Region CAC should be included in any discussion on policy formulation on land as it affects the region.

*Meat and Livestock Commission* – The Meat and Livestock Act requires applications for the rearing, breeding, sale and exportation of meat and livestock for the region. The South Central Region CAC should be included in any discussion on policy formulation on the sale of meat and livestock as it affects the region.

*Mining Unit, Ministry of Natural Resources & Agriculture* – The Mines and Minerals Act requires applications for dredging, oil exploration and sand mining permits for the region. The South Central Region CAC should be included in any discussion on policy formulation on dredging and oil exploration as it affects the region.

*Ministry of Health* – The Public Health Act requires the Director of Health to make arrangements for health inspectors to enforce building and health standards for the region. The South Central Region CAC should be included in any discussion on policy formulation on public safety as it affects the region.

*Ministry of Housing and Urban Development* – The Ministry of Housing & Urban Development formulates policy for housing and human settlements. Its added function is to assist with the alleviation of poverty due to urban growth. The Ministry coordinates planning and development control functions through municipal bodies. The Ministry also provides the services of Planners, Building inspectors and Engineers to provide the required necessary assistance. In accordance with Section 6 of the Act, the South Central Region CAC can be delegated the powers and duties of the Central Housing and Planning Authority (CHPA) with regard to approving, with or without conditions, and prohibiting further development in the region as well as powers to serve prohibition notices. This delegation should be supported by the Solicitor General's Office or an Attorney at Law for the enforcement of the provisions of the Act.

*National Emergency Management Organization* – The National Emergency Management Act requires that sites be declared as vulnerable areas for the region and policy formulation on disaster management be effectuated. The South Central Region CAC should be included in any discussion on policy formulation on issues of national preparedness as it affects the region.

*Pesticide Control Board* – The Pesticide Control Act requires applications for the importation, manufacturing, sale and storage of restricted pesticides for the region. The South Central Region CAC should be included in any discussion on policy formulation on pesticide use as it affects the region.

*Solid Waste Management Authority* – The Solid Waste Management Act requires the Solid Waste Management Authority to make arrangements for garbage collection or the engagement of contractors for the region. The South Central Region CAC should be included in any discussion on policy formulation on garbage collection as it affects the region.

**South Central Region Coastal Zone Management Guidelines**

### 10.3 Checklist For Human Use/Development Of The Coastal Zone

DEVELOPMENT ACTIVITY/HUMAN USE	PONSIBLE AGENCIES
<b>1. Coastal Agriculture</b>	
<b>Governing Legislation/Policy:</b>	
Banana Industry Act	<input type="radio"/> Banana Control Board <input type="radio"/> Banana Growers Association <input type="radio"/> Ministry of Agriculture
Belize Agricultural Health Authority Act	<input type="radio"/> Belize Agricultural Health Authority
Citrus (Processing and Production) Act	<input type="radio"/> Citrus Control Board <input type="radio"/> Citrus Growers Association <input type="radio"/> Ministry of Agriculture
Environmental Protection Act	<input type="radio"/> Department of the Environment
Land Utilization Act	<input type="radio"/> Land Utilization Authority <input type="radio"/> Ministry of Natural Resources
Meat and Livestock Act	<input type="radio"/> Belize Livestock Producers Association <input type="radio"/> Belize Agricultural Health Authority <input type="radio"/> Ministry of Agriculture
Papaya Growers Association Act	<input type="radio"/> Papaya Growers Association <input type="radio"/> Ministry of Agriculture
Pesticide Control Act	<input type="radio"/> Pesticide Control Board <input type="radio"/> Ministry of Agriculture
Sugar Cane Industry (Control) Act	<input type="radio"/> Belize Sugar Cane Board

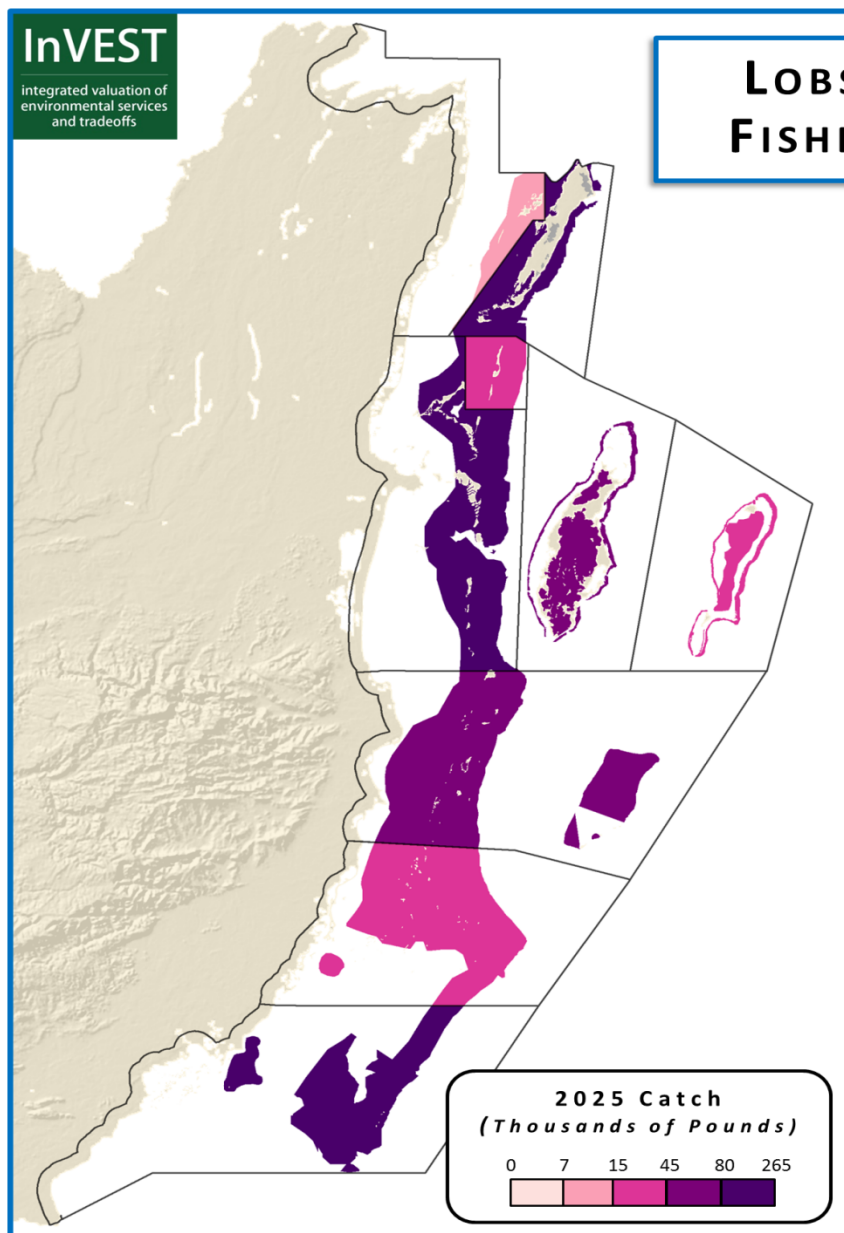
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>2. Coastal Aquaculture</b> <b>Governing Legislation/Policy:</b> Fisheries Act National Aquaculture Policy (Draft)	<input type="radio"/> Fisheries Department <input type="radio"/> Aquaculture Unit, Ministry of Agriculture
Environmental Protection Act	<input type="radio"/> Department of the Environment
Belize Trade and Investment Promotion Service Act	<input type="radio"/> Belize Trade and Investment
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>3. Coastal Development</b> <b>Governing Legislation/Policy:</b>	
Belize Building Act	<input type="radio"/> Central Building Authority
Belize City Council Act	<input type="radio"/> Belize City Council
Belize Trade and Investment Promotion Service Act	<input type="radio"/> Belize Trade and Investment Development Services
Cayes Development Policy Coastal Zone Management Act	<input type="radio"/> Coastal Zone Management Authority
Disaster Preparedness and Response Act	<input type="radio"/> National Emergency Management Organization
Electricity Act	<input type="radio"/> Belize Electricity Limited
Environmental Protection Act	<input type="radio"/> Department of the Environment
Forest Subsidiary Act	<input type="radio"/> Forest Department
Hotels and Tourist Accommodation Act	<input type="radio"/> Belize Tourism Board
Housing and Town Planning Act	<input type="radio"/> Ministry of Housing
Land Utilization Act	<input type="radio"/> Land Utilization Authority
Mines and Minerals Act	<input type="radio"/> Mining Unit, Ministry of Natural Resources
Private Works Construction Act	<input type="radio"/> Ministry of Works and Transport

Public Health Act	<input type="radio"/> Ministry of Health
Public Utilities Commission Act	<input type="radio"/> Public Utilities Commission
Solid Waste Management Authority Act	<input type="radio"/> Solid Waste Management Authority
Telecommunications Act	<input type="radio"/> Belize Telemedia Limited
Town Councils Act	<input type="radio"/> Town Councils
Trade Licensing Act	<input type="radio"/> City/Town Councils
Water and Sewerage Act	<input type="radio"/> Belize Water Services Limited
Water Industry Act	<input type="radio"/> Hydrology Unit, Ministry of Natural Resources & Agriculture
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>4. Conservation</b>	
<b>Governing Legislation/Policy:</b>	
Fisheries Act	<input type="radio"/> Fisheries Department
Forest Act	<input type="radio"/> Forest Department
Private Forests (Conservation) Act	<input type="radio"/> Forest Department
National Parks System Act	<input type="radio"/> Ministry of Agriculture, Fisheries, Forestry, the Environment and Sustainable Development
National Protected Areas Policy and System Plan	<input type="radio"/> National Protected Areas Secretariat
Wildlife Protection Act	<input type="radio"/> Forest Department
Coastal Zone Management Act	<input type="radio"/> Coastal Zone Management Authority
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>5. Marine Dredging</b>	
<b>Governing Legislation/Policy:</b>	
Mines and Minerals Act	<input type="radio"/> Mining Unit, Ministry of Natural Resources
Dredging Policy	<input type="radio"/> Mining Unit

Environmental Protection Act	<input type="radio"/> Department of the Environment
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>6. Fishing</b> <b>Governing Legislation/Policy:</b> Fisheries Act	<input type="radio"/> Fisheries Department
Coastal Zone Management Act	<input type="radio"/> Coastal Zone Management Authority
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>7. Marine Transportation</b> <b>Governing Legislation/Policy:</b> Belize Port Authority Act Harbours and Merchant Shipping Act  Private Works Construction Act  Customs Regulation Act  Maritime Areas Act  Defence Act  Immigration Act  Dredging Policy  Environmental Protection Act	<input type="radio"/> Belize Port Authority  <input type="radio"/> Ministry of Works and Transport  <input type="radio"/> Belize Customs Department <input type="radio"/> Ministry of Foreign Affairs <input type="radio"/> Belize Defence Force <input type="radio"/> Immigration Department  <input type="radio"/> Mining Unit, Ministry of Natural Resources  <input type="radio"/> Department of the Environment
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>8. Marine Recreation</b> <b>Governing Legislation/Policy:</b> Fisheries Act  Ancient Monuments and Antiquities Act  National Institute of Culture and History Act  Belize Tourism Board Act  Public Health Act	<input type="radio"/> Fisheries Department <input type="radio"/> Archaeology Department <input type="radio"/> National Institute of Culture and History  <input type="radio"/> Belize Tourism Board  <input type="radio"/> Ministry of Health
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>9. Oil Exploration</b> <b>Governing Legislation/Policy:</b> Environmental Protection Act  Petroleum Act	<input type="radio"/> Department of the Environment  <input type="radio"/> Geology and Petroleum Department



# 10.4 Figures



## INFORMED MANAGEMENT

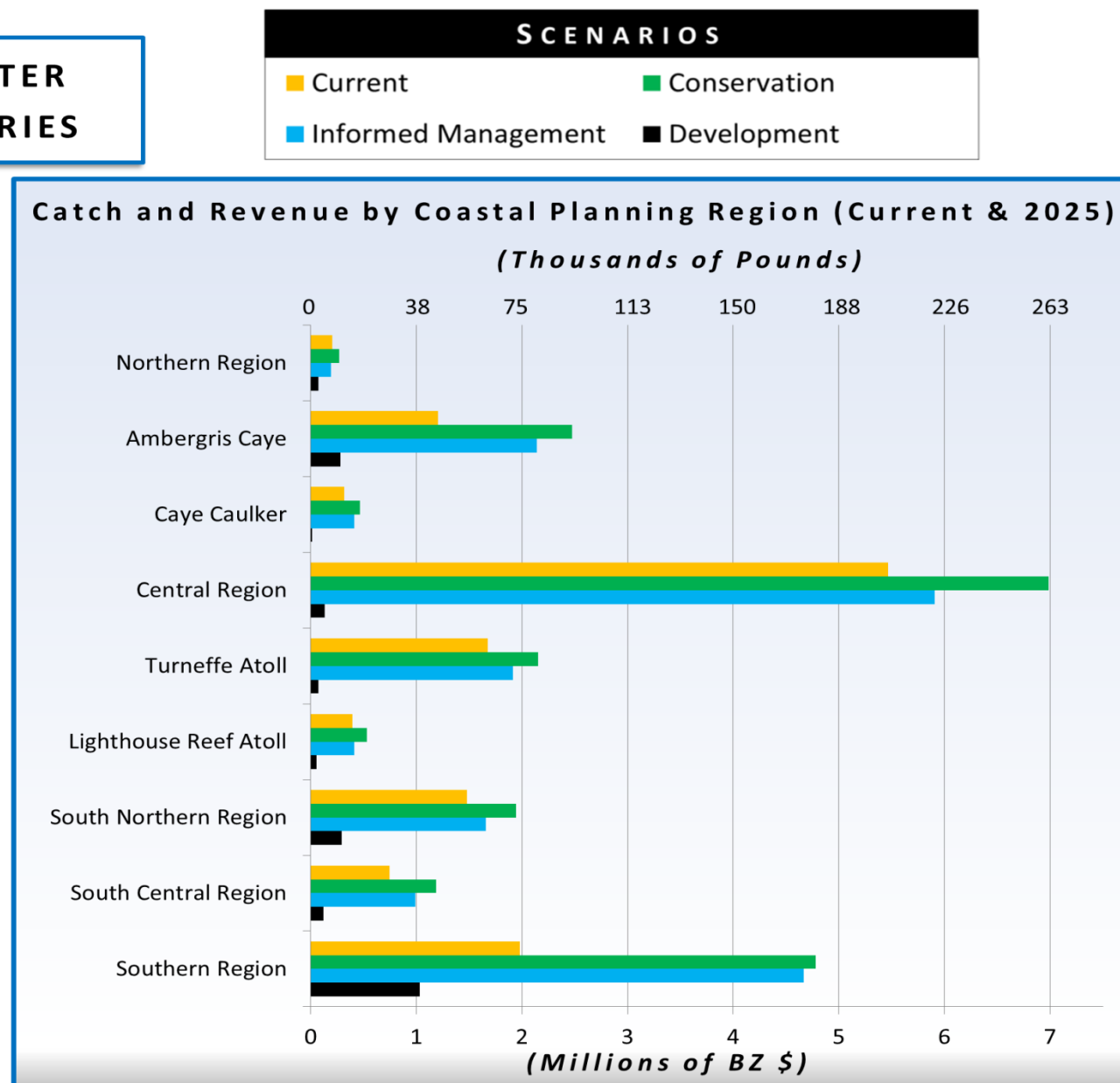


Figure 4: Lobster Fisheries Catch and Revenue by Scenario

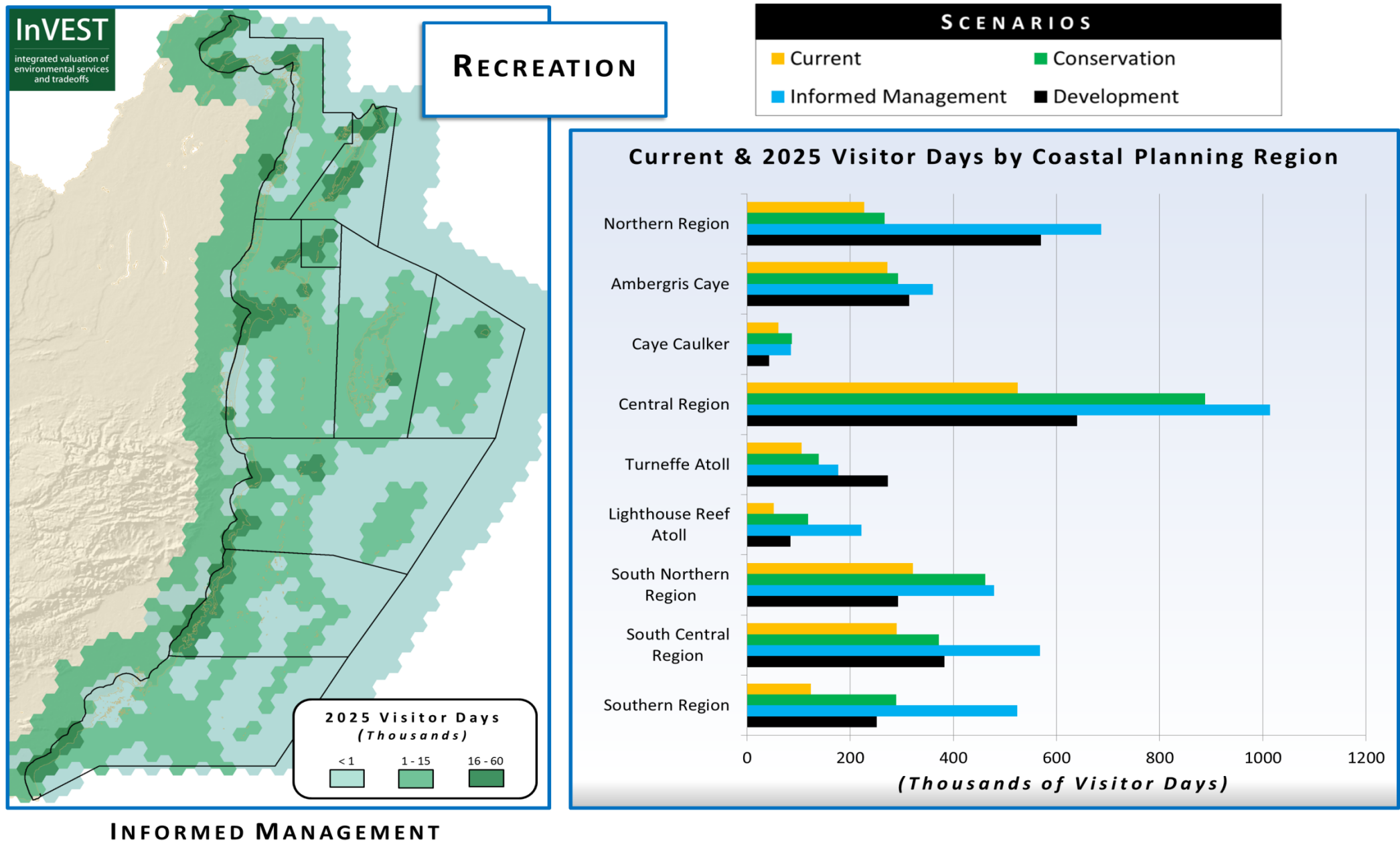
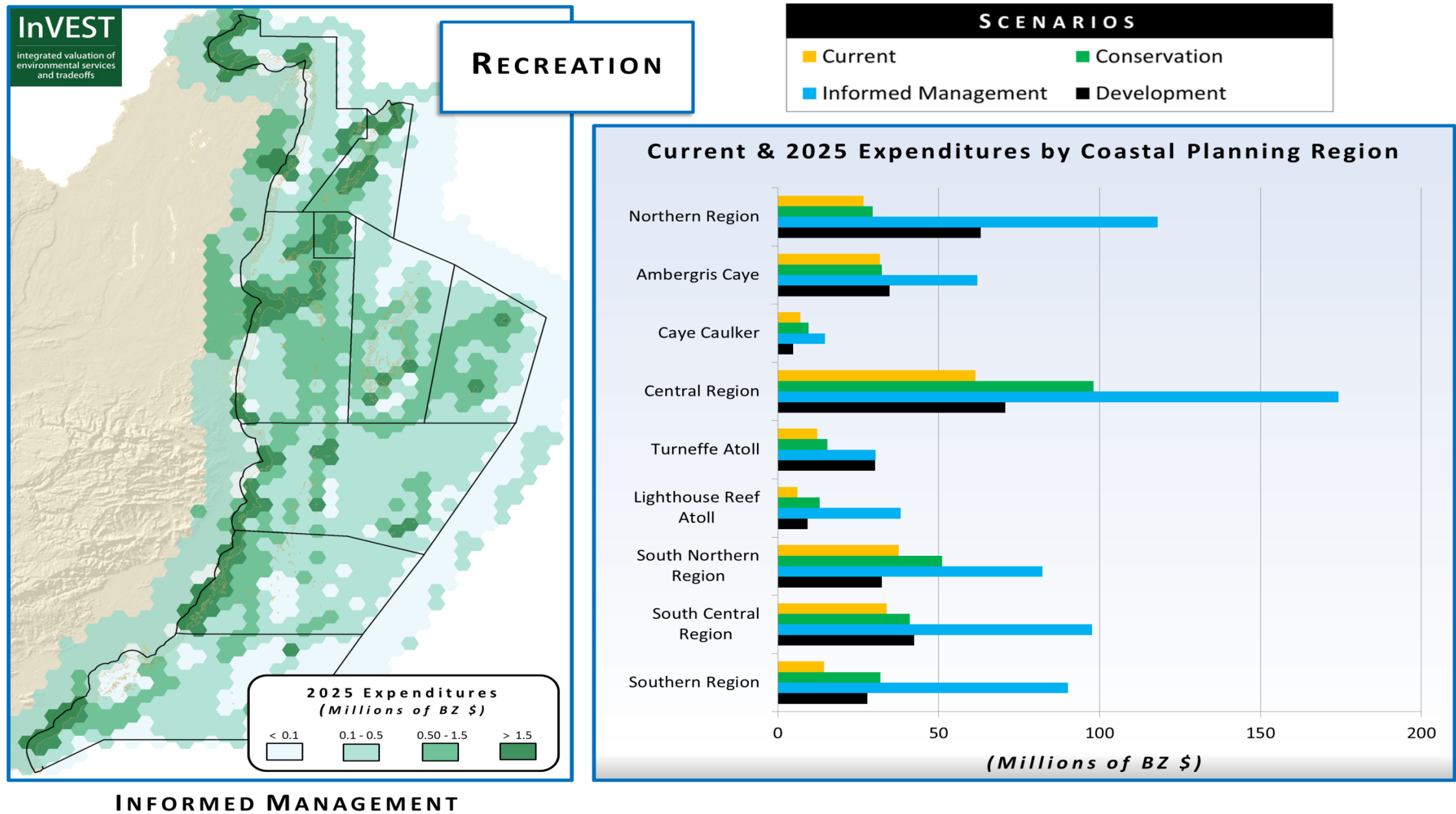
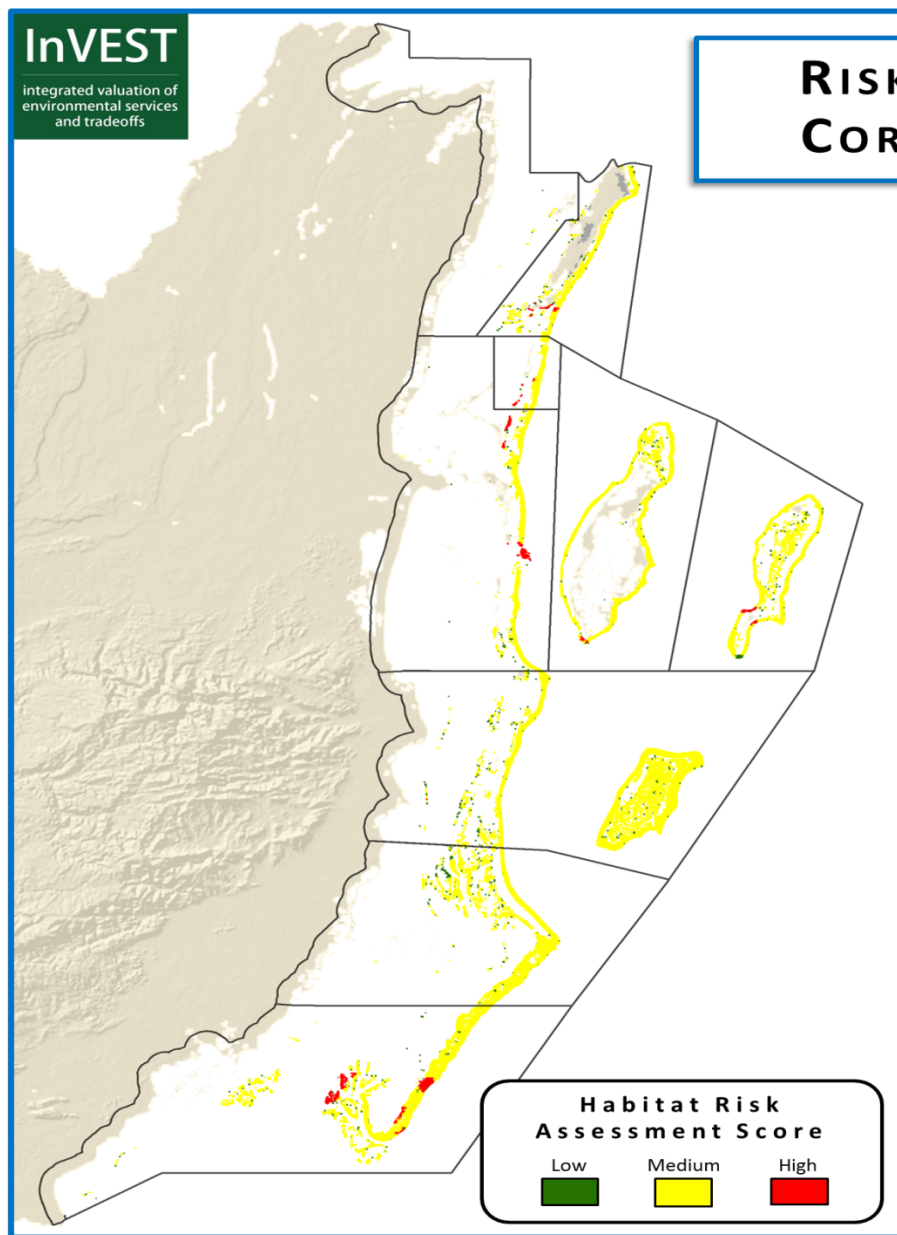


Figure 5: Annual Visitation for Marine Tourism and Recreation by Scenario



**Figure 6: Annual Expenditures for Marine Tourism and Recreation by Scenario**



## INFORMED MANAGEMENT

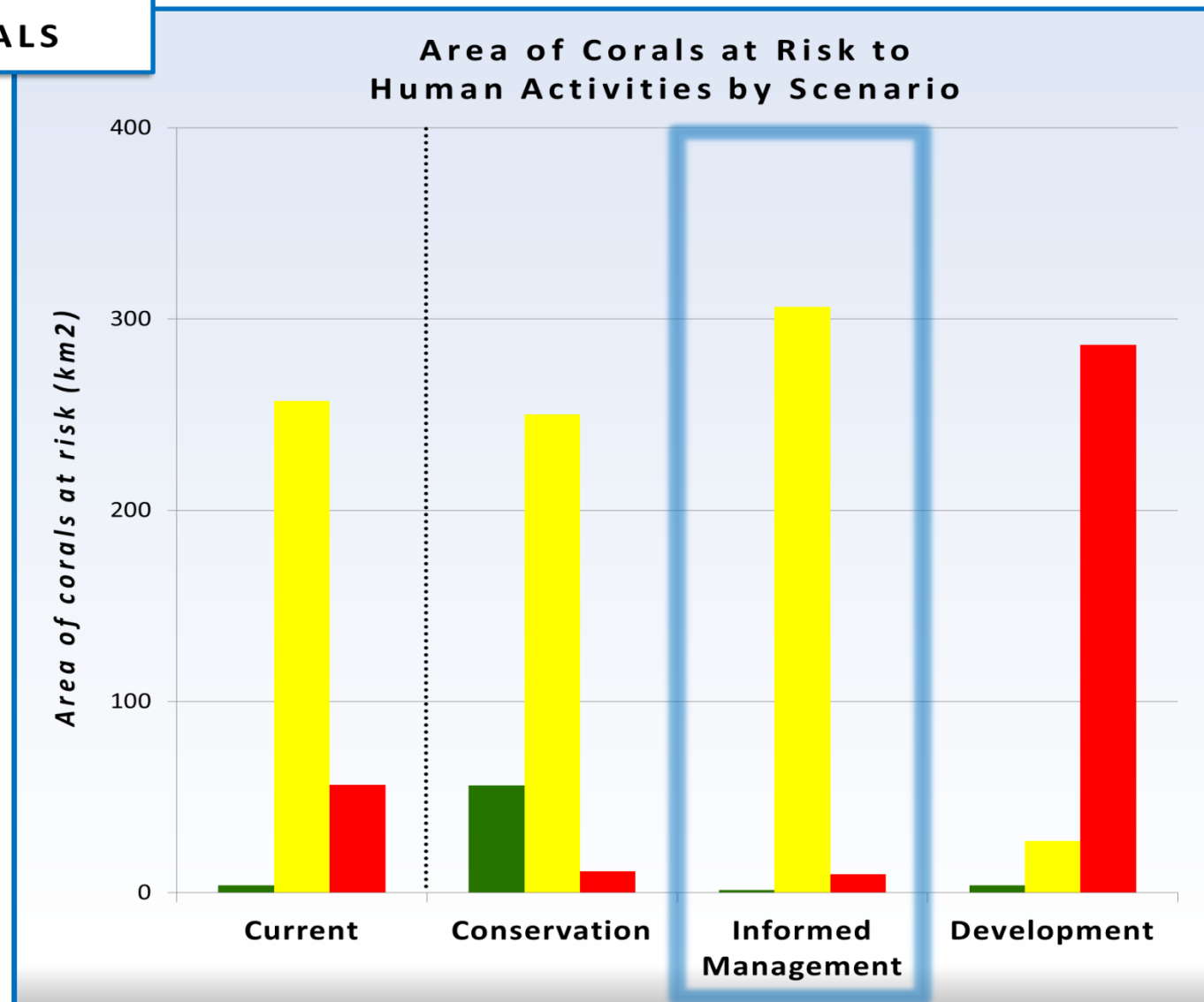


Figure 7: Area of Corals at Risk from Human Activities by Scenario

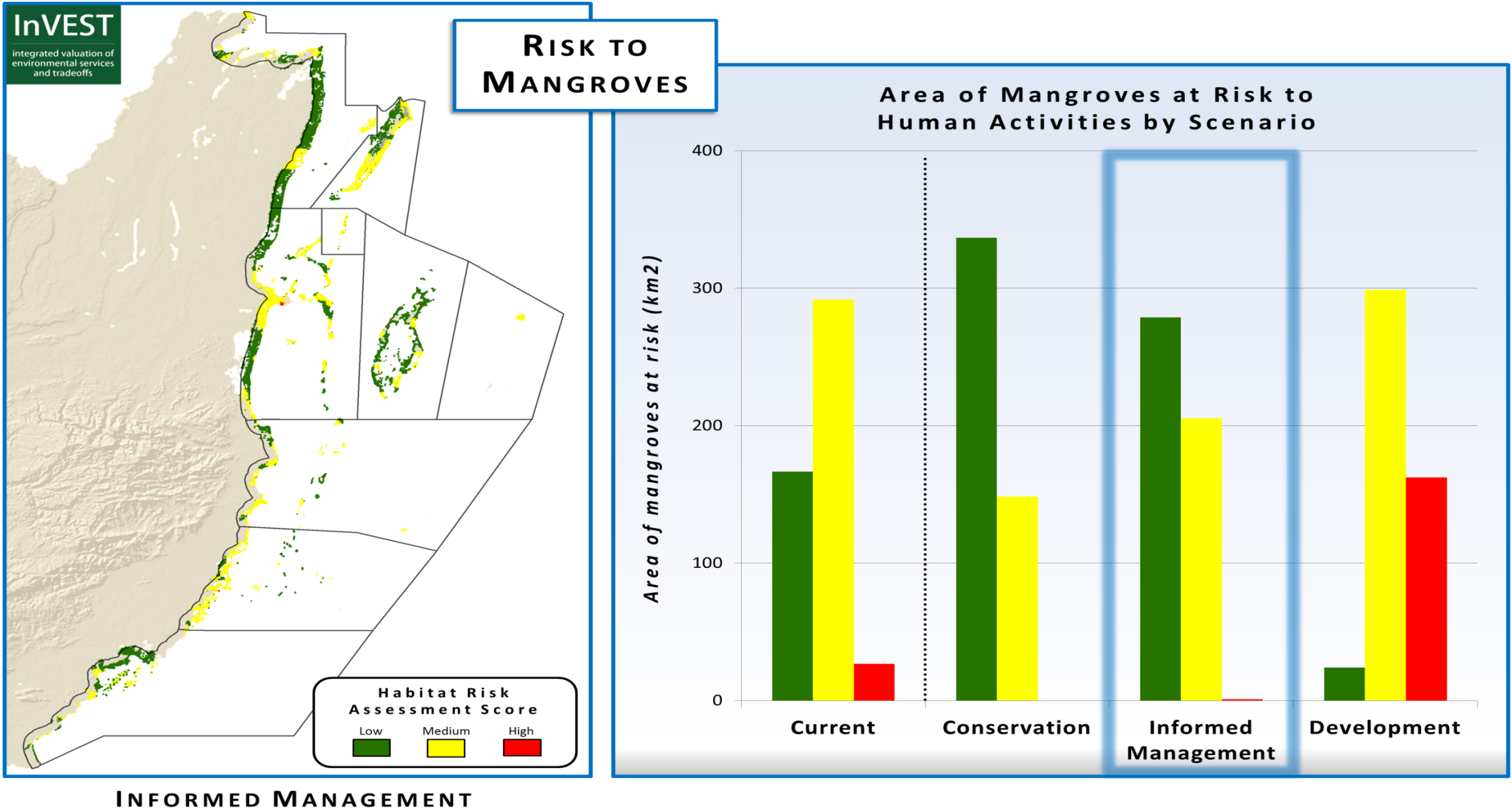
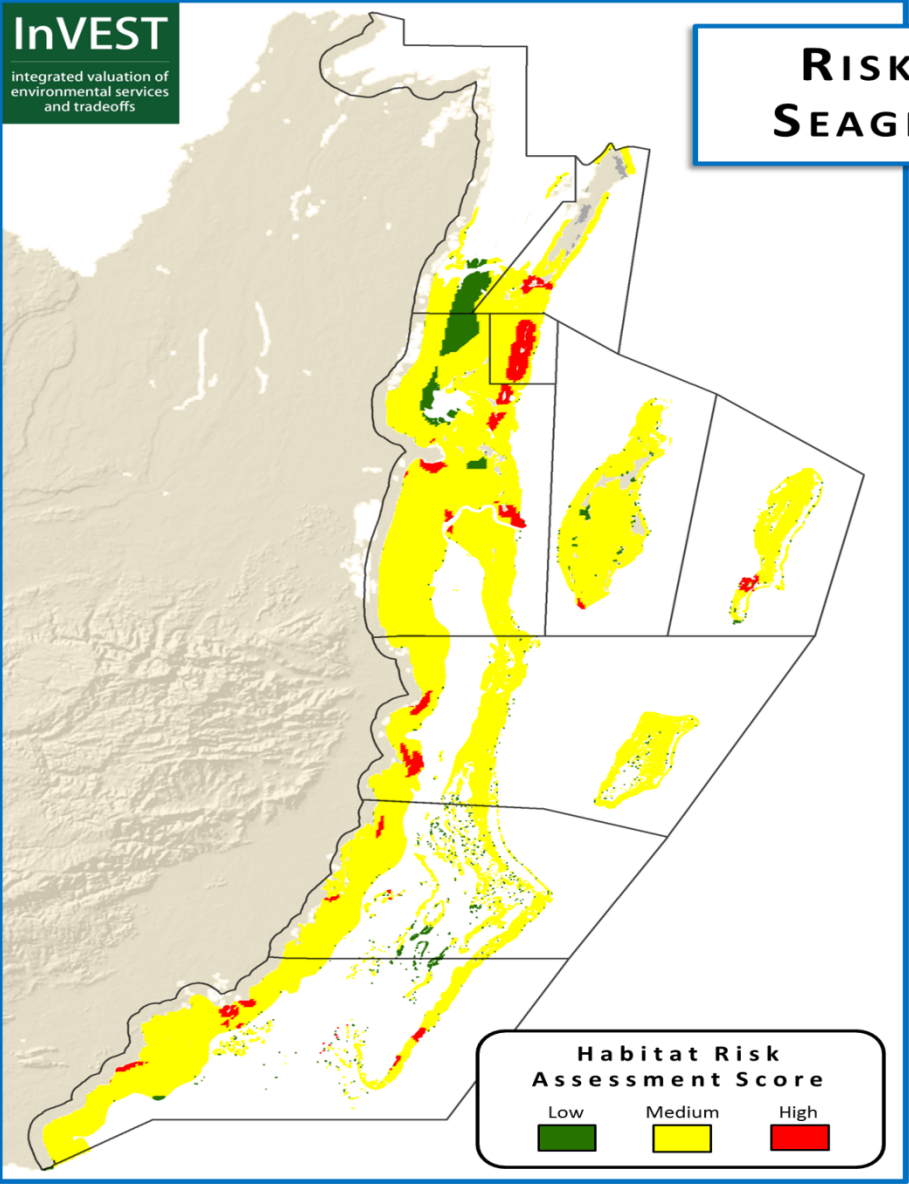


Figure 8: Area of Mangroves at Risk from Human Activities by Scenario

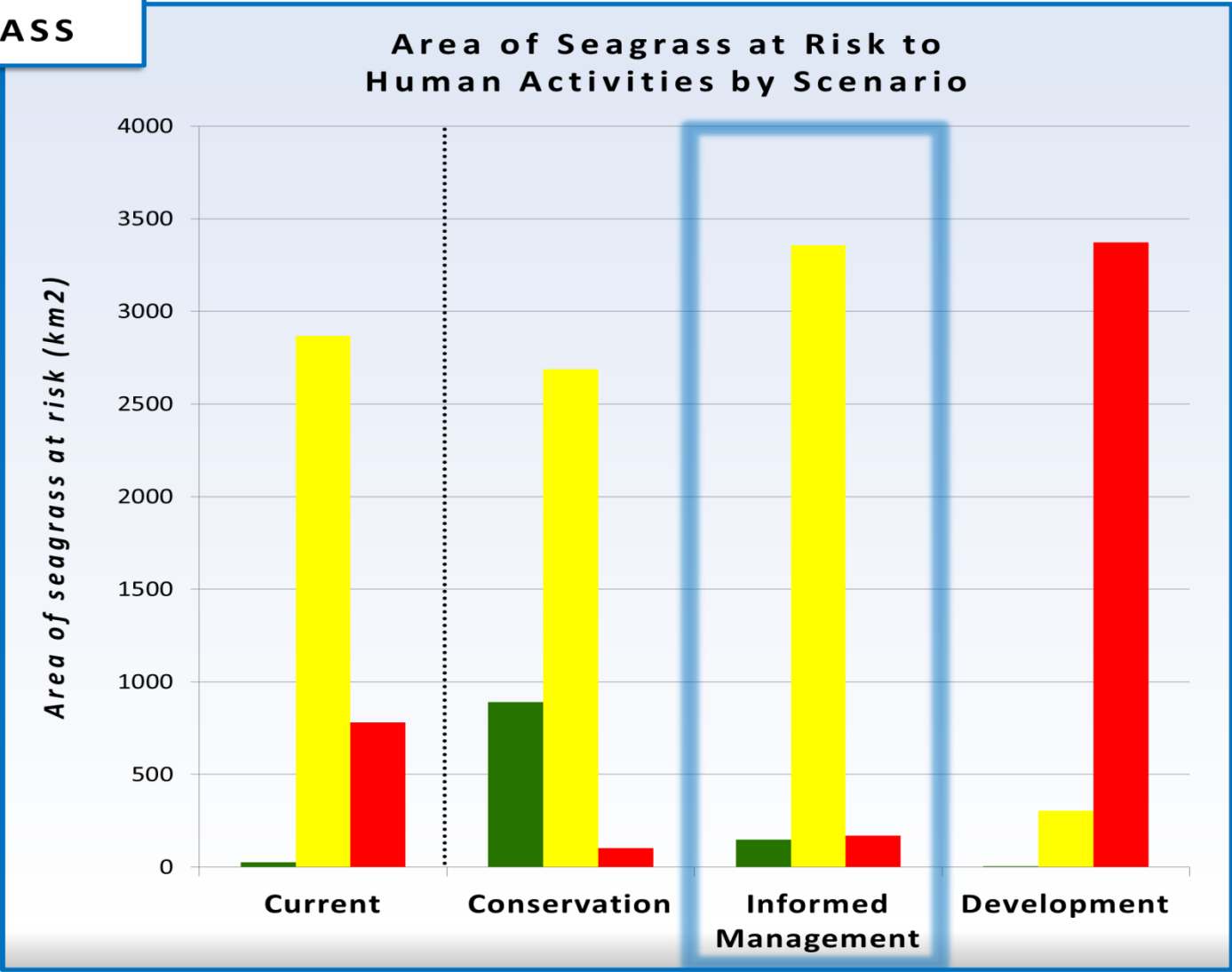


**RISK TO  
SEAGRASS**

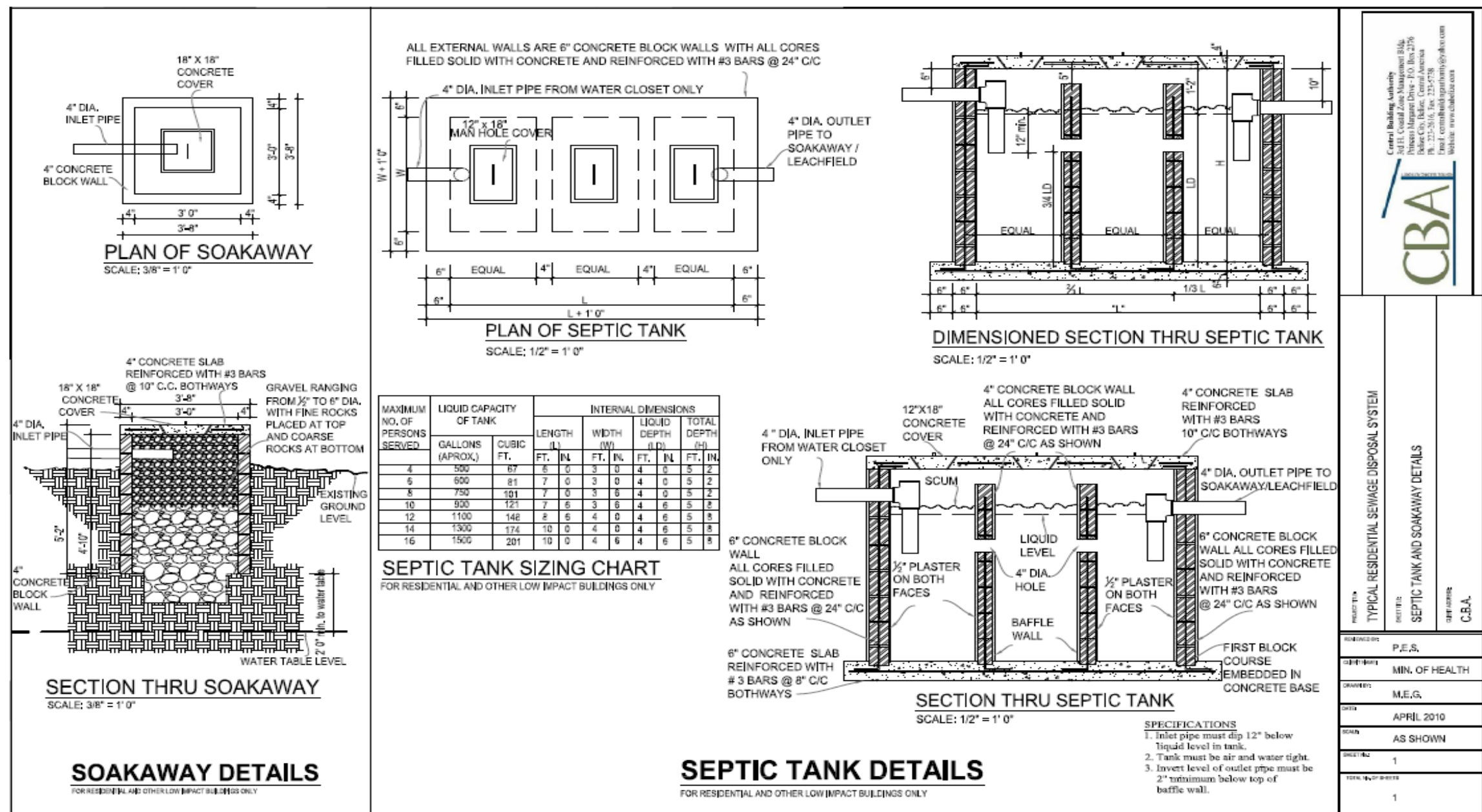


**INFORMED MANAGEMENT**

**Area of Seagrass at Risk to  
Human Activities by Scenario**



**Figure 9: Area of Seagrass at Risk from Human Activities by Scenario**



PROJECT TITLE	TYPICAL RESIDENTIAL SEWAGE DISPOSAL SYSTEM				
	DRAWN BY	SEPTIC TANK AND SOAKAWAY DETAILS			
		DATE			
		SCALE			
DESIGNED BY	P.E.S.				
CHECKED BY	MIN. OF HEALTH				
DRAWN BY	M.E.G.				
DATE	APRIL 2010				
SCALE	AS SHOWN				
SHEET NO.	1				
TOTAL NO. OF SHEETS	1				



# SOUTH NORTHERN REGION COASTAL ZONE MANAGEMENT GUIDELINES

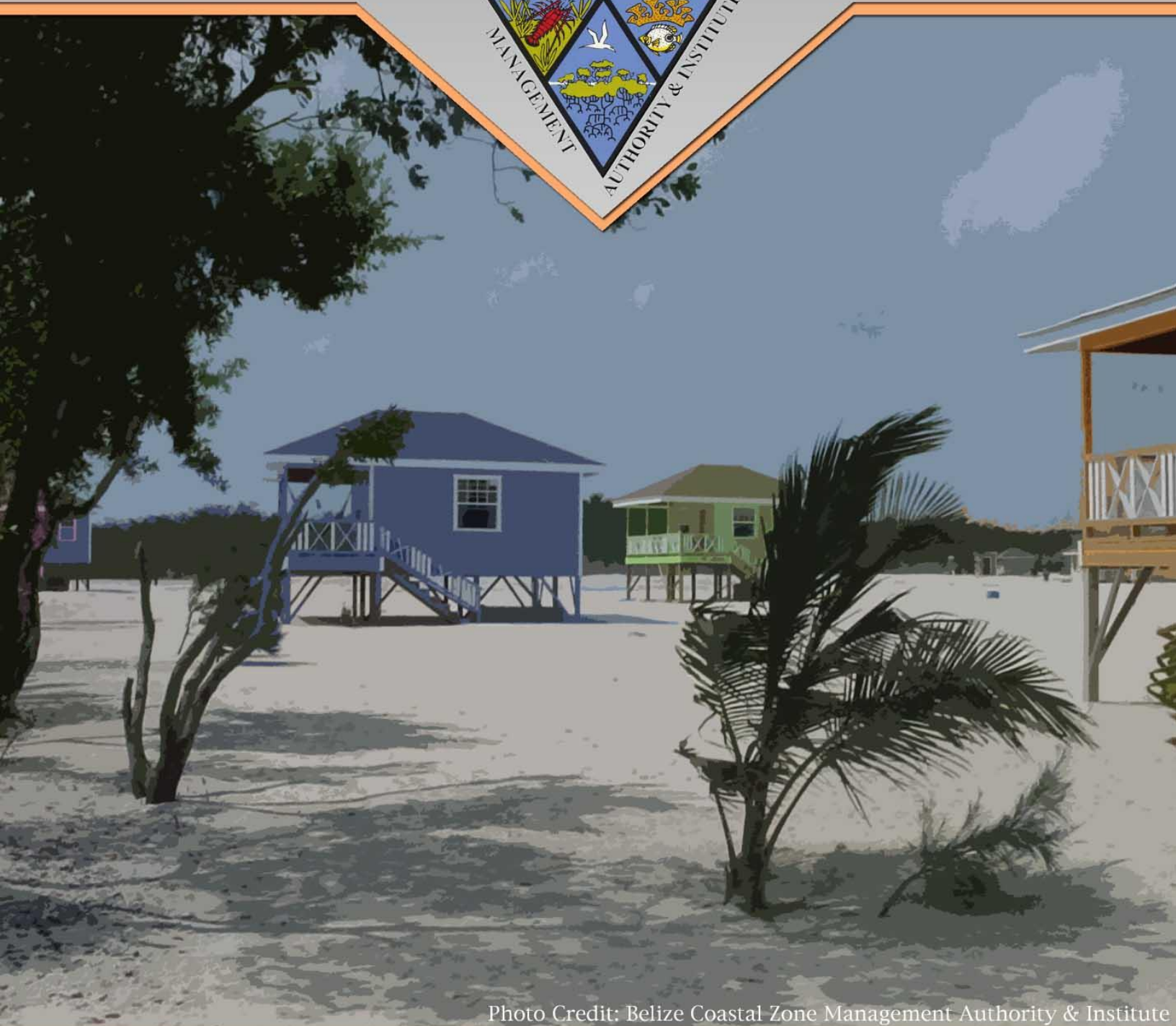


Photo Credit: Belize Coastal Zone Management Authority & Institute

Coastal Zone Management Authority & Institute  
2016



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### **Agencies:**

Archives Department  
Belize Tourist Board  
Belize Port Authority  
Department of Environment  
Lands and Surveys Department  
Geology and Petroleum Department  
Ministry of Economic Development  
Wildlife Conservation Society

### **Individuals:**

Aaron Gongora.	Forest Department
Rennick Jackson	Fisheries Department
Anthony Andrews	Housing and Planning Department
Julian Lewis	Friends of Gra Gra Lagoon
Dan Miller	Smithsonian Institution
Claudette Miller	Smithsonian Institution
Nolan Jackson	Reef's End Lodge
Nidia Ramirez	South Water Caye Marine Reserve
Basilio Zabaneh	Land Owner
Malcolm Zabaneh	Land Owner
Yvonne Hartshorn	Alpha & Omega Belize Real Estate
James Hartshorn	Alpha & Omega Belize Real Estate
Rosella Zabaneh	Blue Marlin Lodge
Michael Jackson	
Brenton Ritoraic	
A. Middleton	
R. Craig	
Nerly Thompson	
Edwin Coleman	
Jim Scofield	
Kendra Scofield	
Matt Flores	

### **South Northern Region Coastal Zone Management Guidelines**

Belize Integrated Coastal Zone Management Plan  
Coastal Zone Management Authority & Institute 2016

Lana Evans  
Travis Holum  
Devon Gongora  
Carmelita McDougal  
Jason Edwards

The following individuals of the South Northern region participated in CZMAI's coastal planning consultations, and are thus acknowledged for their valuable input towards revising and updating the coastal zone management guidelines for the region. These individuals are namely:

**South Northern Region Consultee List (2012):**

Janet Gibson	Wildlife Conservation Society
Therese Rath	Pelican Beach Resort
Steven Hewitt	Thatch Caye Resort
LaBelle Saucier	Stann Creek Tour Guides Association/ C& G Tours
Jorge Rosado	South Water Caye Landowners Association
Julian Lewis	Friends of Gra Gra Lagoon
Nolan Jackson	Tobacco Caye Resort
Peter Ciego	National Garifuna Council
Dr. Annelise Hagan	Southern Environmental Association
David Gabiel	Belize Property Agents
Alexander Dewar	Marine Farms Belize Ltd.
Samuel Choc	Marine Farms Belize Ltd.
Rosella Zabaneh	Blue Marlin Lodge
Roberto Carballo	South Water Caye Marine Reserve
Judith Williams	Citrus Growers Association
Domingo Valerio	Stann Creek District Association of Village Councils
Andre Usher	Hamanasi Resort/Dangriga BTIA
Major Gilbert Swaso	Mayor (Dangriga Town Council)/Wafagua Nautical Safety Institute
Alicia Eck	Glovers Reef Marine Reserve
Melanie McField	Healthy Reefs Initiative
Isaias Majil	Belize Fisheries Department
Sam Mathias	Banana Growers Association
Patrick Flores	Paradise Shrimp Farm
Nolan Lamb	Dangriga Fisherman Association
Matthew James	Belize Organic Producers Association
Marcelina Guerrero	Thatch Caye Resort
Nadia Chamberlain	Private Citizen
Toby Truelove	Hamanasi Resort

Danny Wesby

Land Owner, Tobacco Caye Range

CZMAI held a series of consultation meetings that were open to the general public during the mandatory 60-day public review period following the completion of the first comprehensive draft of the Belize Integrated Coastal Zone Management Plan document. The meeting for the South Northern Region was held in Dangriga Town on Thursday June 6th, 2013, and had participation from the following individuals:

**Public consultations 2013:**

Glenn Cayetano	Fisherman
Alice Bowman	Hotelier – Pelican Beach Resort
Matthew James	CONCH
George Herrera	Fisherman
Howard Melendez	Dangriga Town Council
Tony Fajardo	Fisherman
Arthur Matthews	Citizen
Carlene Sanchez	Blue Marlin Resort
Rennick Jackson	Statistical Institute of Belize
Michael Sabal	Fisherman
Matt Flores	Agriculturalist
Eugene Martinez	Businessman
Alfonso Coc	Police Department
Scott Henry	Police Department
Mark McKenzie	Stann Creek Fishers Association
Cecil Williams	Stann Creek Fishers Association

A final round of consultations was held July 7<sup>th</sup> 2015-September 7<sup>th</sup> 2015 as-the re-constituted CZMA Board of 2014 directed a re-opening of the public comment period.

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## **LIST OF ACRONYMS**

CZAC	Coastal Zone Advisory Council
CZMAI	Coastal Zone Management Authority & Institute
DOE	Department of Environment
EIA	Environmental Impact Assessment
GOB	Government of Belize
HRA	Habitat Risk Assessment
LUA	Land Utilization Authority
Marine InVEST	Marine Integrated Valuation of Ecosystem Services and Trade-off
SNRCAC	South Northern Coastal Advisory Committee
STP	Sustainable Tourism Master Plan
SWMP	Solid Waste Management Plan

## GLOSSARY OF TERMS

Certain technical terms have been used in the text of these guidelines. The following represents an explanation of such terms that were not provided within the text.

**Artisanal/Subsistence Fishing** means traditional fisheries involving fishing households (as opposed to commercial companies), using relatively small amount of capital and energy, relatively small fishing vessels (if any), making short fishing trips, close to shore, mainly for local consumption.

**Building Height** means the recommended maximum building height that should be allowed for each building to be measured from ground level to roof

**Building Setback** means the recommended minimum distance that should be allowed between buildings or between buildings and site boundaries

**Commerce** means the storage and retail of consumer goods

**Commercial Development** means land use involving the construction of a building or buildings that are used solely for commerce and business activities by the owners or others to the exclusion of all other uses within the density requirements of these guidelines

**Commercial Fishing** means the harvesting of fish, either in whole or in part, for sale, barter or trade.

**Conservation** means the retention of the natural features but with allowance of limited non-disruptive development

**Conservation Area** means areas including the 66ft reserve and other reserves, canal buffers, water bodies, flood prone lands; areas with ecological significance such as mangrove wetlands,

**Community Facilities** means Spaces set aside in large residential or commercial subdivisions for public purposes. They may include facilities such as public parking lots, schools, cemeteries, churches, public sporting areas, youth centers, police stations or health facilities

**Coverage** any building, including balconies and verandas, and expressed as a percentage of total lot size

**Density** means a level of development within a site, as measured by the number of lots per acre, number of dwelling units per acre, or maximum site coverage

**Development** means any activity which involves mining, engineering or building operations or change of use of land or building in, under, over or on land

**Dwelling Unit** means a living area consisting of contiguous rooms intended for convenient, long-term occupancy by one family and providing complete, independent facilities for living, eating, cooking, sleeping and sanitation

**Fish camp** means a building that is permanently or temporarily used for ancillary housing, trap-making and storage, boat repair and docking by full or part time commercial fishermen as licensed by the Fisheries Department,

**Habitable Room** means any room except that used for a kitchen or bathroom

**Land** means all incorporeal hereditaments of every tenure or description that are either permanently or temporarily above the surface of the sea, whether through natural or man-made activity. The seabed, while not 'physical' land, is defined as National Land

**Liquid Waste** means grey water from bath, basin and sink and sewage waste that consist mainly from discharge of body waste.

**Lots** acre should be subdivided and alienated

**Low-Density Development** means development of a site that does not exceed 20 dwelling units per acre, 6 lots per acre and a maximum site coverage of 50 percent

**Low-Impact Development** means an ecologically-friendly approach to site development and storm water management that mitigates development impacts to land, water and air; through conserving natural systems and hydrologic functions of the site. Site development includes residential dwelling units and community facilities and impervious surface cover is a maximum of 30 percent of total cover

**Marina** means a mooring facility for four or more recreational vessels

**Maximum Human Carrying Capacity** means the maximum population size of humans that the environment can sustain indefinitely, given the food, habitat, water and other necessities available in the environment.

**Maximum Number of Floors** means the recommended maximum number of floors a building should have, including attics or roof space designed for habitation

**Maximum Number of Lots** means the recommended maximum number of lots in which an acre of land can be subdivided and alienated

**Maximum Habitable Rooms** means the recommended maximum number of rooms to be allowed and measured per acre of land

**Maximum Building Coverage** means the recommended maximum ground coverage of any building including balconies and verandahs and expressed as a percentage of total lot size

**Maximum Site Clearance** means the recommended maximum amount of land that should be allowed to be cleared and expressed as a percentage of the total site area

**Medium-Density Development** means development of a site that does not exceed 40 dwelling units per acre, 8 lots per acre and a maximum site coverage of 66 percent

**Medium-Impact Development** means an ecologically-friendly approach to site development and storm water management that mitigates development impacts to land, water and air; through conserving natural systems and hydrologic functions of the site. Site development includes a combination of residential dwelling units, community facilities and commercial activities, and impervious surface cover is a maximum of 50 percent of total cover

**Minimum Lot Size** means the recommended smallest size a parcel of land should be allowed to be alienated

**National Land** means all lands, including cayes and parts thereof not already located or granted and also includes any lands which have been, or may hereafter become, escheated to, leased by, or otherwise acquired by the Government;

**Piers per Site** means the recommended number of piers that should be allowed to be constructed on any site

**Primary Land Use** means the recommended preferred use of the site

**Residential Development** means land use that involves the construction of a building or buildings that are used solely for permanent or temporary domiciles by the owners or others on a non-commercial basis to the exclusion of all other uses within the density requirements of these guidelines

**Resort** means a building, buildings or site which offers accommodation and general amenities to visitors with other uses such as bars, restaurants, general storage and repair facilities and docking

**Secondary land Use** means the recommended next preferred use to be applied to the site either in conjunction with the primary land use or as an alternative to the primary land use if that is not applicable

**Solid Waste** means any unwanted material that is useless, thrown away or discarded

**Swamp** means an area of very shallow lagoon with mud, savannah or very low vegetation

**Utility** means the service and infrastructure used for the supply of energy, water, communication and waste disposal

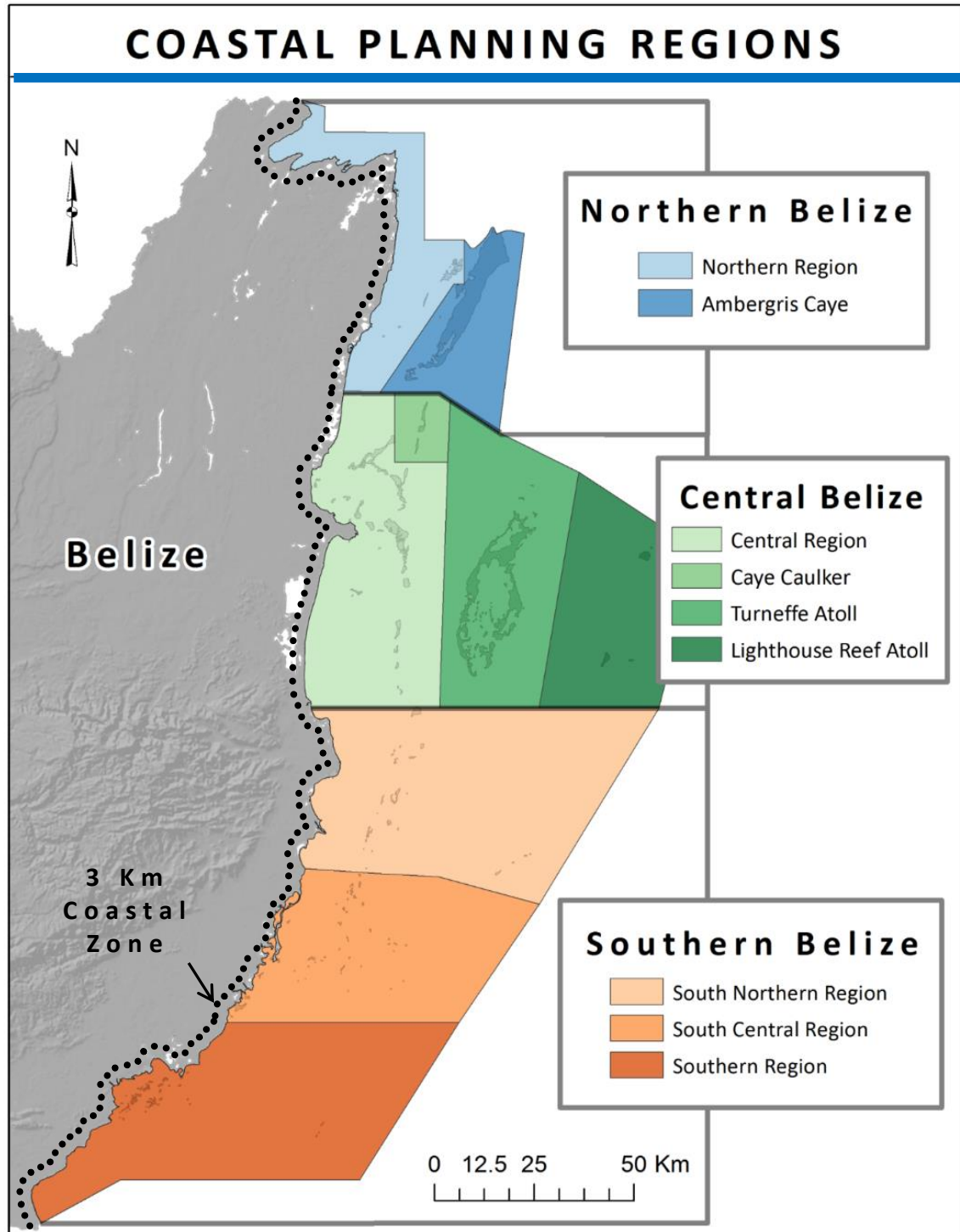
## **PREAMBLE**

The Belize Coastal Zone Management Authority and Institute (CZMAI), a statutory body established by the Coastal Zone Management (CZM) Act of 1998, is tasked with the broad responsibility of assisting with the development of policies, strategies and guidelines for the improved management and sustainable use of the country's coastal resources at a national level. In keeping with its mandate to prepare an integrated coastal zone management plan, the agency has developed regional coastal zone management guidelines to provide support for planned development and resource management along the coastline and offshore areas of the entire country. These guidelines have been prepared for nine (9) coastal planning regions (**See Map 1**), which were demarcated based on commonalities, geographic definition and regional characteristics. The coastal zone management guidelines will help to integrate management efforts across the land-sea interface.

The South Northern Region Coastal Zone Management Guideline was developed in conjunction with the stakeholders of the communities within the South Northern Region. The South Northern Region; which encompasses the coastal communities of Dangriga Town, Sittee River, Hopkins and Commerce Bight; is relatively undeveloped and known for its rich diverse flora and fauna as well as its sensitive and pristine ecosystems. Using the expert subjective information from stakeholders in addition to the best available objective data, CZMAI was able to produce this guideline with the following goals:

1. Encourage and promote the sustainable development of coastal and offshore areas within the South Northern Region that will promote economic growth while simultaneously ensuring ecosystem stability and the efficient delivery of ecosystem services.
2. Protect and preserve the traditional way of life of the stakeholders within the South Northern Region
3. Ensure sustainability of coastal resources by identifying areas in need of conservation and reducing user conflicts

These goals are culturally informed, and rooted, where possible, on sound science and local knowledge. These guidelines represent the views and recommendations of the stakeholders of the South Northern Region. They are also a response towards addressing the management gaps identified by stakeholder communities through an extensive consultation process. The coastal zone management guidelines will ensure that human use of the coastal region occurs in consideration of the carrying capacity of the environment in addition to other ecological, cultural, social and economic development priorities of the region. These guidelines will aid policy development for integrated coastal zone management. They will be implemented by all those agencies that have legal mandates and/or permitting powers that impact resource utilization in the coastal zone of Belize, in partnership with this region's stakeholder groups.



**Map 1: Coastal Planning Regions of Belize**

## 1.0 INTRODUCTION

The South Northern region, includes coastal communities of Dangriga, Hopkins, Freetown Sibun and Sittee River, and a wide array of islands with varying sizes, shapes, elevations, topography, geological history, substrate, flora and faunal composition. These cayes are also varied in terms of development status and development potential. Communities and cayes included within the region can be seen in Table 1.

**Table 1: Coastal Communities and Cayes within the South Northern Region**

<b>Coastal Communities:</b>	
Dangriga Town	Hopkins
Freetown Sibun	Sittee River
<b>Cayes:</b>	
Southern Long Caye	Glory Caye
Mosquito Caye	Sandfly Caye Range
Garbutt Caye	Cross Caye
Columbus Caye	Tobacco Caye Range
Coco Plum Caye Range	Man of War Caye
Ragged Caye	Rockers Caye
Twin Caye Range	South Water Caye
Carrie Bow Caye	Curlew Caye
Northeast Caye	Long Caye
Middle Caye	Southwest Caye #1
Southwest Caye #2	Blue Ground Range
Stewart Caye	Bread and Butter Caye
Wee Wee Caye	Crows Nest Caye

The region contains two marine reserves, namely the South Water Caye Marine Reserve and the Glovers Reef Marine Reserve. Both of these reserves are also World Heritage Sites. It is a rich and diverse habitat in both the terrestrial and aquatic province. The species of animals range from corals to fishes, conch and lobster, sea turtles and birds, and dolphins and crocodiles. The plant species include mangroves and sea grasses.

The coastal zone management guidelines have been prepared with a view to guiding current and future development activities on the coastline and all the cayes that lie in the region. The guidelines are based on provisions set out in the National Integrated Coastal Zone Management Strategy for Belize 2003 for sustainable coastal area use and management. The policy recommendations include, but are not limited to, the following: fishing and tourism



development, land use planning and development management, land tenure, conservation of natural resources, mineral extraction, waste disposal, and national strategic consideration.

## **2.0 REGION BOUNDARIES**

### **Location and Geographic Definition**

The South Northern Region is one of nine regions into which the coastal zone has been demarcated. It encompasses approximately 3318.14 sq. kilometres of land and sea and can be described as the area enclosed within the following UTM 16 coordinates. It is situated north of the Placencia/Laughing Bird Cayes Region, south of the Central, Turneffe and Lighthouse Reef Atoll regions, and extends 3km inward from the eastern coast of the Stann Creek district. (See **Maps 2,3,4, 5, & 6**)

Point 1: (1889654 N, 359787 E)

Point 2: (1890051 N, 450010 E)

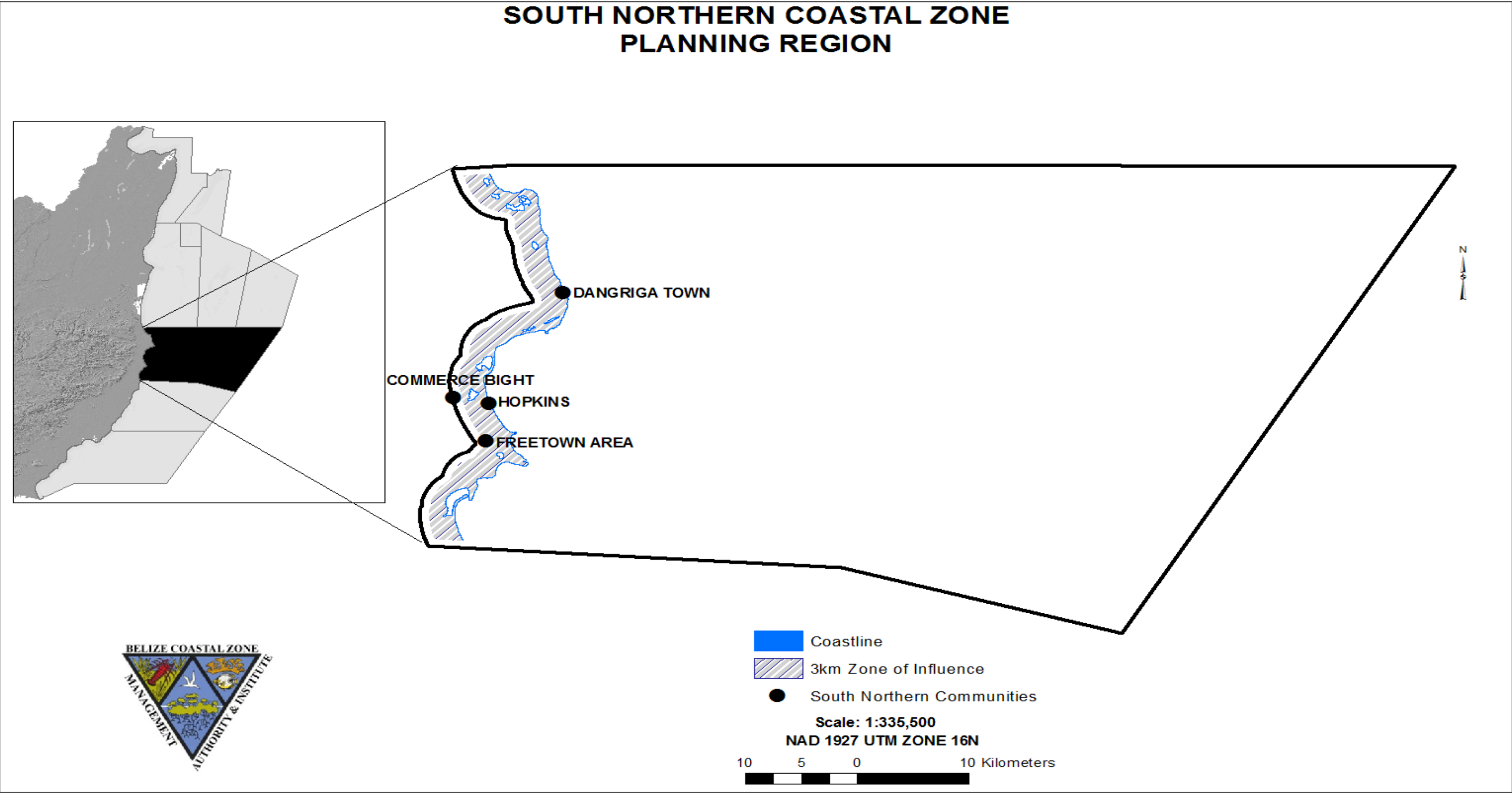
Point 3: (1840309 N, 419979 E)

Point 4: (1847056 N, 395109 E)

Point 5: (1849438 N, 357670 E)

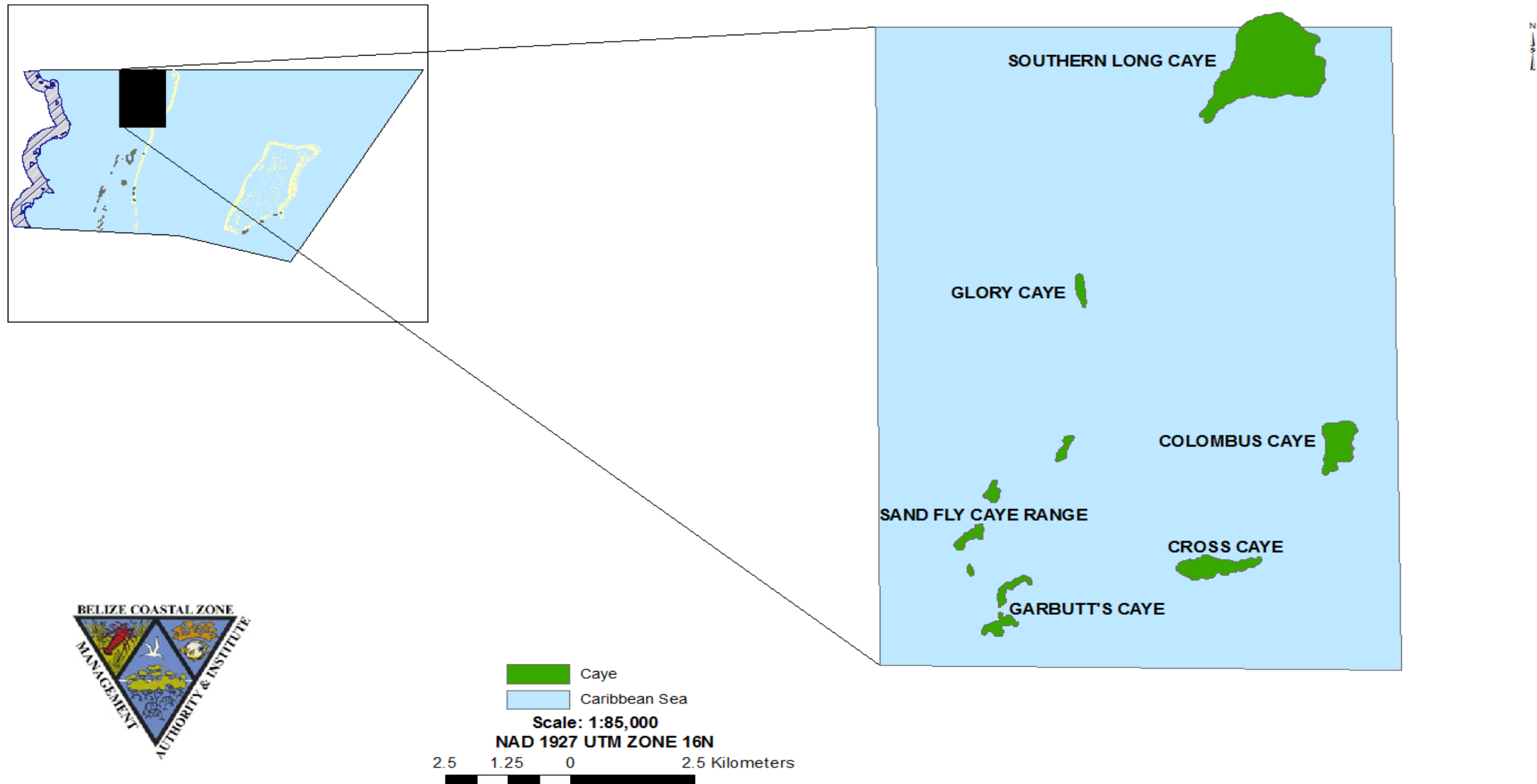
### **Regional Context**

The South Northern Region is made up of approximately twenty two (22) cayes and range of cayes strung in a west to east direction and comprising approximately 3165.95 sq. kilometres of terrestrial and aquatic environment including flats and reefs of which 4.7 sq.km or 0.15% is terrestrial and 3161.25 acres or 99.74 % is aquatic. Within the aquatic area are the Glover's Reef Marine Reserve and a portion of the South Water Caye Marine Reserve. The mainland portion ranges from just south of Mullins River to North of Riversdale.



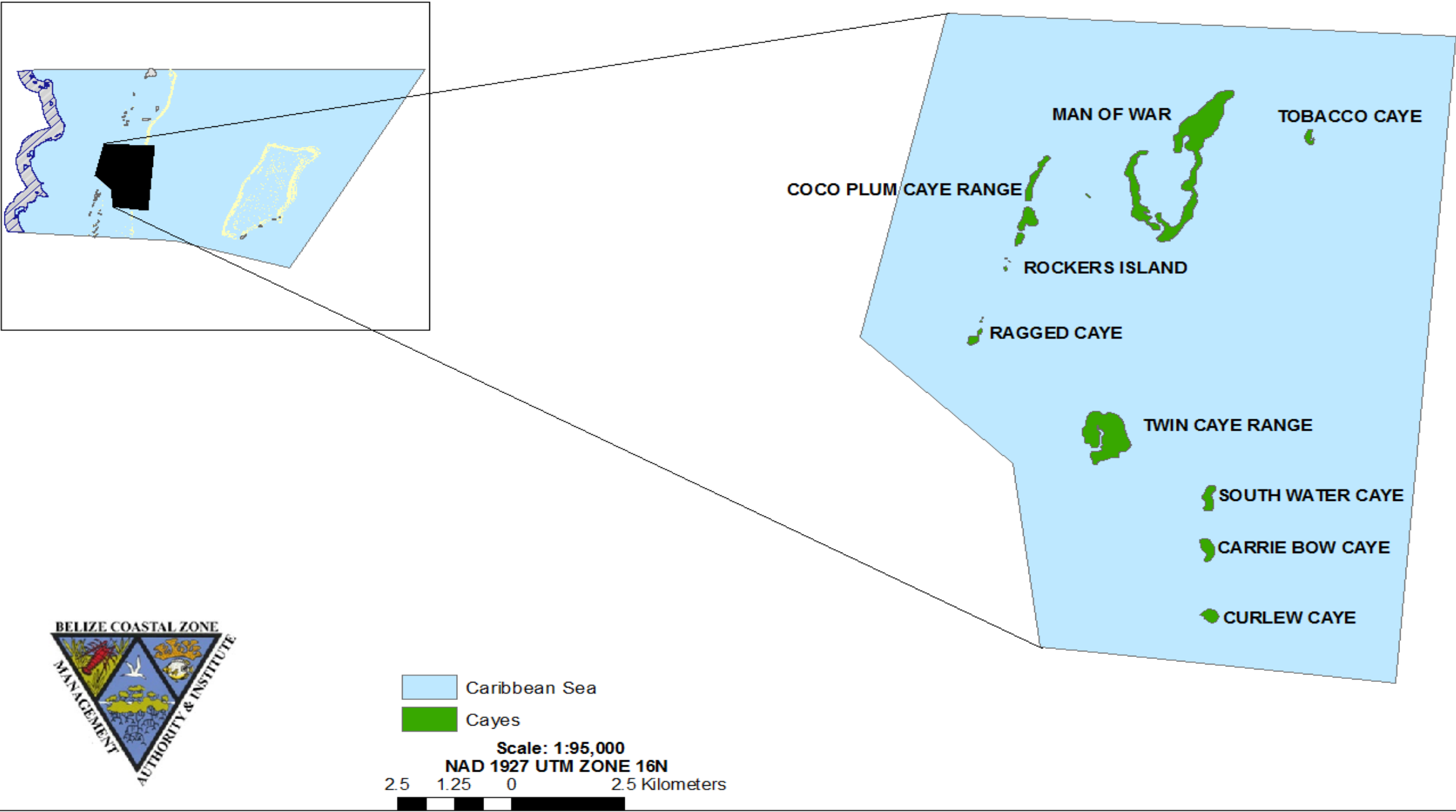
**Map 2: South Northern Region Coastal Zone Planning Region**

# **SOUTH NORTHERN CAYES NORTHERN SUB-REGION**



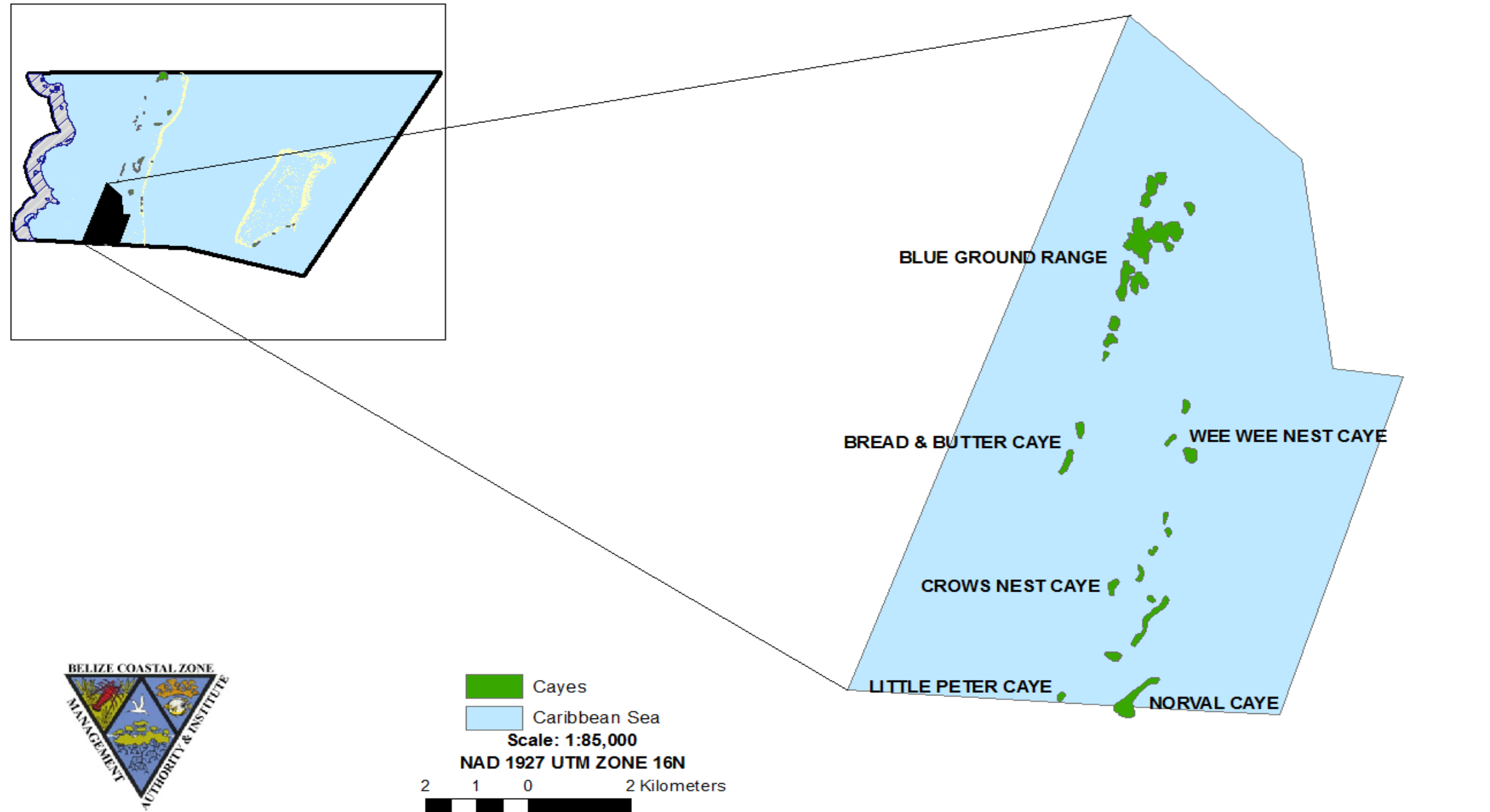
**Map 3: South Northern Region Cayes (Northern Sub-region)**

**SOUTH NORTHERN CAYES:  
CENTRAL SUB-REGION**

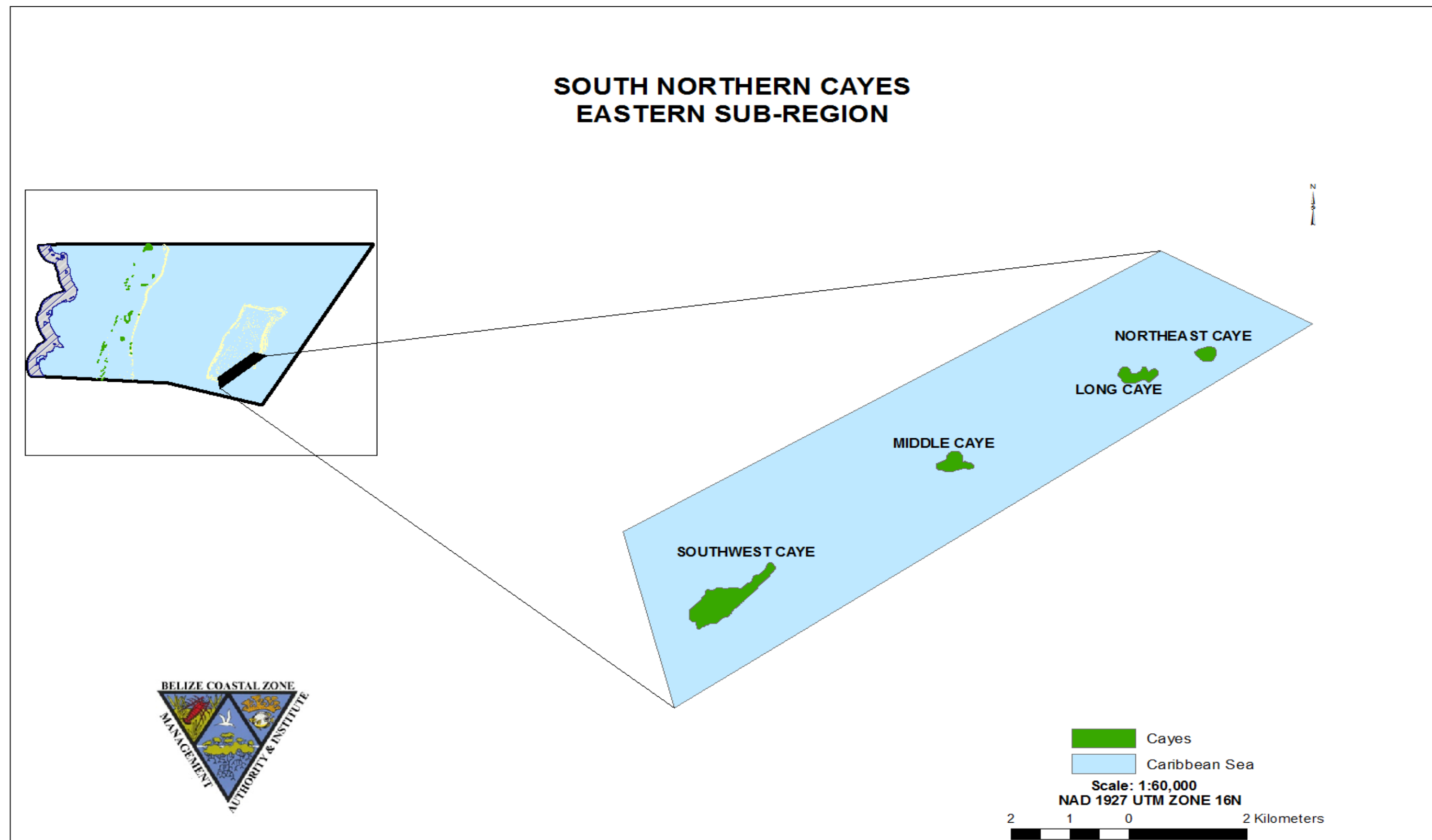


**Map 4: South Northern Region Cayes (Central Sub-Region)**

# **SOUTH NORTHERN CAYES SOUTHERN SUB-REGION**



**Map 5: South Northern Region Cayes (Southern Sub-Region)**



**Map 6: South Northern Region Cayes (Eastern Sub-region)**

### **3.0 OBJECTIVES**

The management of the South Northern Region region's coastal zone must be linked to the goals and aspirations of the people of Belize, particularly the residents of the district of Toledo. Consequently, it must be intrinsically tied to the socio-economic, cultural and other basic needs of the people of the south and of Belize, and their use and demand for land and marine resources. Thus the key objectives of the South Northern Region region coastal zone management guidelines may be summarized as follows:

1. Protecting the fishing resources and traditional fishing rights, especially for the fisher folk from the communities of Dangriga, Hopkins, Sittee River and Freetown Sibun.
2. Promoting orderly and sustainable development, based on suitable land use planning, and with effective management guidelines that will meet the needs of current and future generations
3. Maintaining and protecting on going and future conservation, recreational and tourism areas and uses
4. Preventing inappropriate high-impact, unsustainable developments that are incompatible with community needs
5. Protecting and preserving significant national and international natural features and ecological biodiversity of special interest or uniqueness that define the character and scientific importance of the South Northern coastal zone
6. Preserving the social and cultural values of the people and communities of the region that are connected to the environment
7. Fostering and supporting a continued partnership among stakeholders for managing the coastal resources
8. Establishing a framework for regulating the development and use of resource of the region through the continuation of CZMAI's coastal planning program activities and coastal advisory committee process

#### **4.0 LEGISLATIVE AND INSTITUTIONAL FRAMEWORK FOR INTEGRATED COASTAL ZONE MANAGEMENT IN BELIZE**

The Coastal Zone Management Act, hereinafter referred to as “the Act”, was enacted in 1998 and has been described as reflective of the trend in legislation in Belize towards more accountability and transparency for government actions, and more direct participation by the public in decision making, particularly public resources. The intent of the Act is to promote the sustainable development of coastal and ocean areas through coordination of existing legislation affecting coastal resources and through building capacity and expertise to manage coastal resources. The main purpose of the Act is to:

- Provide for the improvement of coastal zone management in Belize through the establishment of a Coastal Zone Management Authority and a Coastal Zone Management Institute;
- Provide for the establishment of a Board of Directors to control and manage the affairs of the Authority;
- Provide for the preparation of a Coastal Zone Management (CZM) Plan;
- Provide for the establishment of mechanisms to improve monitoring of various activities within the coastal zone;
- Provide for the payment of fees and charges related to the use of the coastal zone and
- Provide for matters connected therewith and incidental thereto

The Coastal Zone Management Authority is the policy making and planning institution for coastal zone management. Its functions are primarily in the realm of planning, advising, cooperating, collaborating and monitoring. It is given no jurisdiction to permit or regulate activities which may affect the sustainable development of the coastal zone. The Coastal Zone Management Institute is the research and technical arm of the Authority. As is indicated above, the Coastal Zone Management Authority is mandated to develop a comprehensive Coastal Zone Management (CZM) Plan for Belize. The CZM Plan is to be developed by the Chief Executive Officer (CEO) of the Authority through consultation with all affected government agencies, non-governmental agencies, statutory bodies and the private sector. The Act mandates that the plan address certain areas. These include:



- Guidelines to be used in determining the suitability of particular development activities in the coastal zone;
- Guidelines for the general monitoring of the coastal zone, including its biological species, communities and habitats;
- Proposals, including existing proposals from Government agencies, relating to the coastal zone that deal with the following subjects:
  - Land use
  - Planning for the establishment of marine protected areas and for the conservation of threatened or potentially threatened or endangered species;
  - Preservation and management of the scenic, cultural and other natural resources;
  - Recreation and tourism;
  - Monitoring of the environment and natural resources, mineral extraction, living resources, human settlements, agriculture, aquaculture, and industry
- Proposals for the reservation of land or water in the coastal zone for certain uses, or for the prohibition of certain activities in certain areas of the coastal zone;
- Recommendation for the improvement of public education as well as public participation in the management of coastal resources;
- Recommendations for strengthening governmental policies and powers and the conduct of research for the purposes of coastal resources conservation and management

The process for approval of the CZM Plan is as follows: The Act requires the CEO of the Authority to submit the CZM Plan to the Board of the Authority, who has sixty days to make modifications. Thereafter, the Board is to notify the public of the availability of the CZM Plan by an order published in the Gazette. Any member of the public may submit comments within sixty days. Upon completion of the sixty days, the Board may approve the CZM Plan, subject to modifications, if they deem it fit in regard to the comments submitted, and then submit the same to the Minister for approval. The Minister, after approving the CZM Plan, shall table it in the House of Representatives for approval by the House by affirmative resolution. Subsequent to approval by the House, the CZM Plan must be published in three consecutive issues of the Gazette. The CZM Plan is to come into operation on the date of the last publication or such later date as may be specified therein. The Act requires the CZM Plan to be revised during the four year period after it comes into operation.

It was agreed by the CZMAI that the CZM Plan would be developed in phases, with the first phase being the development of an Integrated Coastal Zone Management Strategy document, which underwent extensive public consultation. It was endorsed by the cabinet in 2003, and is an official policy document of CZMAI. The second phase involved the formulation of cayes development guidelines for eight of the nine coastal planning regions into which the coastal zone has been sub-divided by the CZMAI. This subdivision was based on geographical, biological, administrative and economic similarities. The Ambergris Caye Development Master Plan serves as a guide for regulating the use and development of land in the Ambergris Caye Planning Region. See Map 1 for the definition of the nine coastal planning regions.

The management guidelines were formulated using the Cayes Development Policy (2001) as a framework. During 2010-2012, the cayes development guidelines were updated to include new information on the cayes, but also to include human use of the coastline and marine waters. As such, the development guidelines have been renamed the coastal zone management guidelines. Thus, the Integrated Coastal Zone Management Strategy (2003), together with the coastal zone management guidelines for the nine coastal planning regions, contributes to the development of the comprehensive Integrated Coastal Zone Management Plan.

## 5.0 GUIDING PRINCIPLES

It is important that the coastal zone management guidelines for the region be formulated as a part of a sustainable plan geared towards contributing to national, regional and local development policies, goals and aspirations. They must therefore be holistic and pragmatic, yet underpinned by certain fundamental principles. These can be detailed as follows:

**Principle 1:-** *Recognition that the South Northern Region needs special protection and management because of its physical, economic, scientific, cultural and aesthetic attributes*

**Principle 2:-** *Recognition of the need to avoid placing undue strain on the terrestrial and aquatic environment of the region by ensuring that proposed development activities do not exceed the carrying capacity of the region*

**Principle 3:-** *Recognition of the rights and interests of traditional users and stakeholders while acknowledging the national development policy which promotes tourism and job creation*

**Principle 4:-** *Recognition that environmental concerns are best handled with the participation of all concerned stakeholders at all levels and from all sectors*

**Principle 5:-** *Recognition that planning guidelines represent a preventative and precautionary approach to environmental degradation and a tool for pursuing sustainable development of the region*

## 6.0 SECTORAL ISSUES AND POLICIES

These policies are organized into ten sectors that address current and potential issues within the Southern coastal zone, and provide recommendations from stakeholders. They include: Fishing, Marine Tourism, Land-Use, Dredging, Sensitive Habitats, Utilities, Pollution Control, Conservation, Social Amenities & Recreation and Research & Education. They were developed by the South Northern Region Coastal Advisory Committee in consultation with the communities of Dangriga, Hopkins, Freetown Sibun, Sittee River and the Coastal Zone Management Authority & Institute.

### 6.1 *Fishing*

Fishing has traditionally been an important component of the economy of South Northern Region. The cayes and their surrounding waters have provided a steady source of fishing for centuries. The waters and the coral reef system act as both fishing and breeding grounds, augmented by the presence of deep waters and extensive flats between the cayes. Fishermen, for economic and recreational reasons, from Sarteneja, Belize City, Punta Gorda and Dangriga utilize the resources of the region. While the region is rich in fishing resources, illegal and unregulated fishing activities have been threatening the fish stocks. Fishermen from Guatemala and Honduras are known to also encroach on these fishing grounds. The use of gill nets has also been problematic. In order to ensure that fishing remains a viable industry and continues to remain a viable economic activity in the region, improved fisheries management in the region must be implemented. The usury rights of both groups of fishermen.

The total spiny lobster coverage for this region was determined to be approximately 1000 km<sup>2</sup>. Using InVEST's ecosystem service model for Spiny Lobster, it was estimated that under the current scenario the exports of tail meat amounts to 55,528 lbs, and generating revenue of approximately BZ \$1.4 million (**Fig 4, Appendix**). In addition, model results suggest that a conservation zoning scheme could increase catch to 73,064 lbs; and generate an annual revenue of BZ \$1.9 million by 2025. However, a development zoning scheme would drastically decrease exports to 11,053 lbs and generating annual revenue of only BZ \$294 thousand by 2025. The model results indicate that the proposed zoning (Informed Management) scheme for this region could increase export in the amount of 62,431 lbs, generating annual revenue of BZ \$1.6 million by 2025. This represents a 17% increase from 2010 returns.

Compared to the Informed Management Zoning Scheme (**Map 7**), the Conservation Zoning Scheme is the better option for maintaining increased lobster catch and revenue through to 2025. This is mainly attributed to the fact that under the Conservation Zoning Scheme, habitats that support the lobster fishery are under relatively less stress from human activity than in the Informed Management scheme. However, while the zoning scheme under a Conservation Scenario is good for habitats and the provision of important ecosystem services, such as protein from lobster, significantly less human activities occur in this zoning scheme. Although there

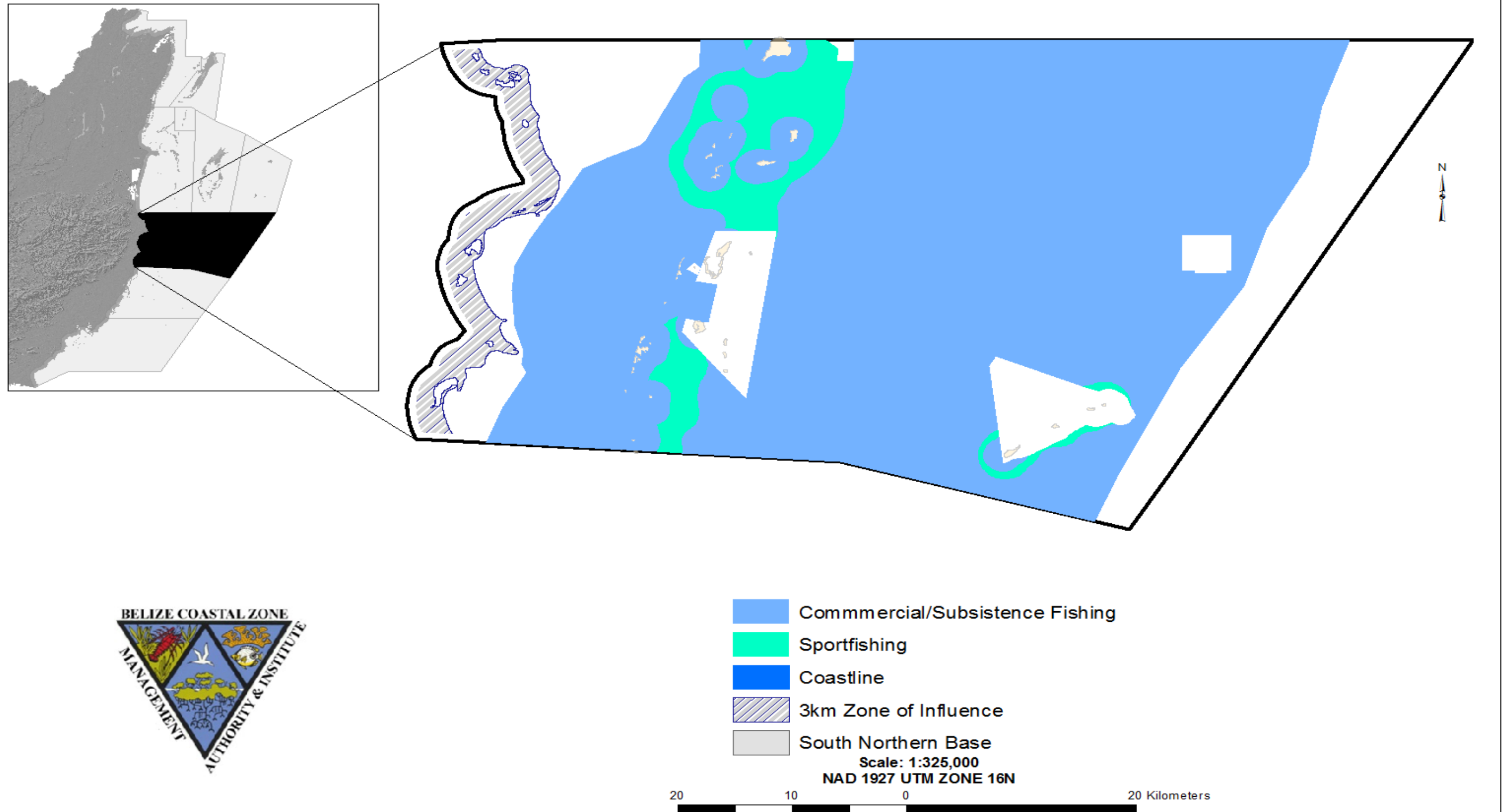
may be some loss to habitat quality and lobster production, the Informed Management zoning scheme represents a balance between managing the resources of the coastal zone and the continued allocation of areas for human use through to 2025.

In discussing the results of the InVEST ecosystem models, and in particular the lobster fishery model, there is the need to consider limitations of the model, which are highlighted below:

- Population growth parameters are nationwide, not region-specific
- Habitat dependencies are obligatory (e.g., habitat substitutability is not explicit represented).
- The population responds to change in habitat quantity (i.e., areal extent of mangrove, seagrass, and coral reef), not quality of those habitats.
- The fishery is assumed to take place at the start of the year, before natural mortality
- The model assumes near knife-edge selectivity in harvest function
- Harvest selectivity (and catchability) is invariant, such that technological improvements to gear or changes in fishing practices are not modeled.
- Market operations are fixed, such that they do not vary in response to amount of harvest, shifts in market or consumer preference, or technological changes.
- Climate change impacts are not directly accounted for in model

Additional information on how this model works can be found in **Appendix B.4** of the Belize Integrated Coastal Zone Management Plan.

## INFORMED MANAGEMENT ZONING SCHEME FOR FISHING: SOUTH NORTHERN REGION



**Map 7: Informed Management Zoning Scheme for Fishing in the Southern Region**

Table 2: Framework for Implementing Informed Fisheries Management in the South Northern Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Fishing	Marine area defined for the extraction of fish for food and commercial trade, except for sport fishing which only involves the catch and release of fish	1.Sportfishing(bone fish, tarpon, permit); 2.Wild capture of commercial fish species using only permitted fishing gear 3. Subsistence fishing using traditional fishing gear 3. Wild capture of invasive species	Marine recreation and eco-tourism Passage/entry of fishing vessels Research and Education within marine reserves Establishment of fish pots and traps Seaweed culture	Sport fishing Commercial fishing Research and Education	1. Illegal extraction of catch and release species, endangered marine species and organisms under seasonal management regime; 2.Extraction within legally specified “no-take”/replenishment zones 3. Dredging 4. Use of prohibited fishing gear 5. Trawling 6. Shipping and navigation 7. Dumping of solid and liquid wastes 8. Oil exploration and extraction	Fisheries Act  Coastal Zone Management Act	Fisheries Department  Coastal Zone Management Authority

The Fisheries Act, administered under the Fisheries Department, is the principal governing legislation to regulate the fishing industry (**Table 2 above**), and is directly concerned with maintaining sustainable fish stocks and protecting the marine and freshwater environments. In order to protect the fishing resources of the South Northern Region, including the Glover's Reef and South Water Cayes area, and the user rights of the traditional fishing communities, the following action steps are recommended, to complement the existing Fisheries regulations and to enhance regional management of the fisheries resources.

### **Recommended Actions:**

1. Protect the ecological integrity of the spawning and traditional fishing grounds of the region, as well as the interests and user rights of the traditional Belizean fishermen of the region
2. Assess the implementation of the catch shares pilot program at Glovers Reef Marine Reserve and expand the program to wider area of the region, in consultation with all affected groups and individuals. With priority being encouraging and promoting the usage of the area by traditional fishers.
3. Zone the usage of gill nets, especially along the coastline. In general, it should not be used within 5 miles of the barmouth. If discontinued altogether alternative livelihoods should be presented to the fishermen of the region.
4. Patrolling efforts for the region by the Fisheries Department and other enforcement agencies must be frequent and coordinated in order to deter the use of illegal fishing and fishing practices. Violators must be punished according to the severity of the crime committed.
5. Establish a national policy for 'security of tenure' for MPA license holder to ensure that in the death the license can be assumed by an immediate family member.
6. Explore and promote the sportfishing industry in the region to open new markets and sources of income.



## 6.2 *Marine Tourism and Recreation*

Tourism is a vibrant economic activity in the South Northern region and opportunities abound within the sector. It is an alternative to fishing and other income generating activities, and contributes substantially to the national economy. Many of the cayes within the region are being used for tourism and recreational purposes, such as Tobacco, South Water, Coco Plum, Northeast, Long and Southwest Cayes. Over the past two decades, particularly with the aggressive marketing of tourism, and promotion of the World Heritage Status of the area, the number of users of the region has multiplied tremendously. However, if not planned and managed correctly, tourism activities can result in destructive and devastating damage to the natural environment.

The National Sustainable Tourism Master Plan recommends the construction of various new resort developments along the coast from Dangriga Town to north of Riversdale. The primary tourism product being sun and beach tourism as well as nautical tourism. Pocket cruise tourism, culture tourism and ecotourism and adventure tourism were identified as secondary tourism products. Nautical tourism is recommended for Hopkins and Sittee River. The model for development forecasts the creation of 1,335 new hotel rooms by 2030.

InVEST Recreation and Tourism ecosystem service model results suggest this region is projected to experience an increase in its tourist visitation by 2025 (**Fig 5, Appendix**). Currently, 322 thousand people visit this region generating revenue of BZ \$37 million annually. In a conservation future scenario, InVEST Recreation model results indicate that there may be an increase in tourist visitation to approximately 462 thousand, generating annual revenue of BZ \$51 million. (**Fig 6, Appendix**) In a development future scenario, there would also be a decrease in the current tourist visitation to approximately 292 thousand, and generating annual revenue of BZ \$32 million. In the proposed Informed Management scenario (**Map 8**), InVEST Recreation model results indicate that there will also be an increase in tourist visitation to approximately 479 thousand and that tourist expenditure would generate an annual revenue of BZ \$82 million. The supporting framework for implementing the Informed Management Zoning Scheme for marine recreation and tourism is outlined in **Table 3**.

In discussing the results of the InVEST ecosystem models, and in particular the recreation model, there is the need to consider limitations of the model, which are highlighted below:

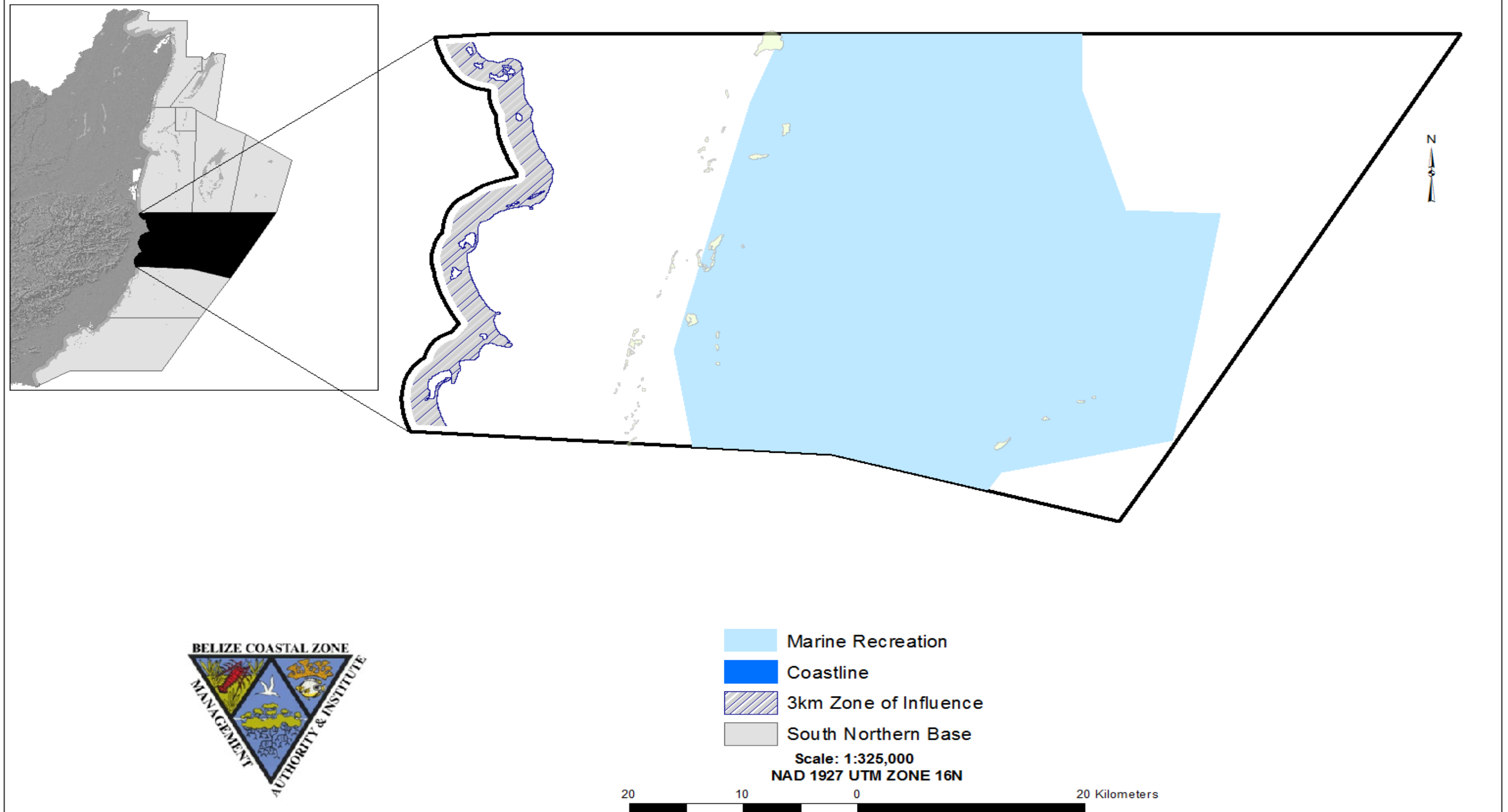
- The model assumes that people will respond similarly in the future to the attributes that serve as predictors in the model. In other words, the assumption is that people in the future will continue to be drawn to or repelled by a given attributes to the same degree as currently.
- Some of the attributes that are used as predictors of visitation are representations of areas managed for particular human use (e.g. transportation). The model assumes that future

management of the zones and the type of activities that they represent are similar to current.

- Since there are no fine-scale data on the distribution of visitors to Belize, we use photo-person-days as a proxy for the relative density of actual person-days of recreation across the coastal zone.
- Climate change impacts are not directly accounted for in model

Additional information on how this model works can be found in **Appendix B.3** of the Belize Integrated Coastal Zone Management Plan.

# INFORMED MANAGEMENT ZONING SCHEME FOR MARINE RECREATION: SOUTH NORTHERN REGION



**Map 8: Informed Management Zoning Scheme for Marine Recreation in the Southern Region**

Table 3: Framework for Implementing Informed Marine Recreation in the South Northern Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Marine Recreation	Marine areas especially suited to swimming, snorkeling, diving, kayaking, surfing, kite boarding, and other water sports	1. Swimming 2. Snorkeling 3. Diving 4. Kayaking 5. Surfing, 7. Kite boarding 8. Other water sports	Passage/entry of water taxis, tour boats, cruise vessels  Research and education within marine protected areas  Sport fishing	Research and Education  Eco-tourism activities within marine protected areas  Sport fishing	1. Commercial fishing 2. Establishment of fish pens/cages, mariculture 3. Oil exploration and extraction 4. Dredging 5. Passage of commercial fishing vessels 6. Shipping and navigation 7. Trawling 8. Dumping of solid and liquid wastes from ships and boats 9. Gill netting within Marine Reserves 10. Setting of traps within Marine Reserve.	Belize Tourism Board Act  Fisheries Act  Coastal Zone Management Act  Hotel and Tourist Accommodation Act  National Sustainable Tourism Master Plan	Belize Tourism Board  Fisheries Department  Coastal Zone Management Authority

**Recommended Actions:**

1. Confine land use assignments for resort type development to those areas where they already exist with minimal scope for intensification or new development
2. Enforce the maximum carrying human capacity for those areas under stress because of over-use or point use and likely to be impacted negatively from excessive human activity which does not involve mining, engineering, building or re-building operations
3. Combine ecological and nature-based tourism and non-damaging traditional economic generating activities are combined with conservation policies in those ecologically sensitive but potentially attractive natural environments which are also traditional fishing grounds
4. Implement the recommendations for tourism management for this region as prescribed in the National Sustainable Tourism Master Plan.
5. Encourage the participation of local stakeholders in new industries surrounding new resort developments.

### 6.3 *Land-Use*

Most of the lands in the region are low lying. However, there are several cayes, particularly the cayes on the reef, Tobacco, South Water and Carrie Bow and on the atoll, Northeast, Long, Middle and Southwest Cayes, which have elevated land. Land use in the region can be categorized in one of the following: Residential; Resort and Research/Scientific Station and Undeveloped. While some of the cayes are elevated or have high firm land, and their soil profile suggests their suitability for development activity, their ecological sensitivity, protected status, and world heritage designation in the instances of Glovers Reef and South Water Caye, directs that a precautionary approach be applied to future development of the region. This entails that development be more toward conservation and low intensity residential activity. Thus the inner cayes are zoned primarily for conservation use, which is in keeping with the designations of the management plan of the region, and the outer cayes as a combination of commercial and conservation, in recognition of existing uses and objects of the marine reserve. These are Residential, (Cross and Garbutt Cayes) Commercial (Tobacco, Coco Plum, South water, Northeast, Long and South west Cayes) and Conservation( Middle, Curlew, Carrie Bow, Twin, Rockers Island, Tobacco Range, Sand fly, Columbus and Southern Long Cayes). –

In the case of privately held undeveloped lands, the development standards presented within these guidelines presents the most sustainable and appropriate future land use. Although the CZMAI recognizes the right of the landowner to develop their land in any matter they see fit there must be measures in place to steer future development in order to ensure sustained ecosystem services. Therefore, in the case of these lands, if there is no development activity within the first five (5) years of the passage of this planning document then all future development activities, after the time period, **MUST** follow development standards as outlined within this coastal development guideline.

#### 6.3.1 Coastal Development Standards

The existing standards for subdivision of land (Land Utilization Act, Chapter 188 of the Substantive Laws of Belize, Revised Edition 2000) did not anticipate the magnitude of urban expansion, tourism and other development that Belize has experienced over the past decade. In 2010, the National Guidelines for Subdivision and Consolidation of Land in Belize was revised to address such issues and provide transparency and equitability to the process of subdividing and developing land. Although revised, the amendments made were general in scope and lacked the specificity needed for sensitive areas such as the cayes and atolls. Therefore CZMAI recommends the following from the National Subdivision Regulations as standards for developing within **3 km** of the **mainland coastline** of the South Northern Region. The framework for implementing the zoning scheme for the development of coastal lands is found in **Table 4**.

Table 4: Framework for Implementing Informed Coastal Development in the South Northern Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Coastal Development	Residential settlements, infrastructure, commercial/economic activities on land above water within 3km buffer of the coastline and offshore cayes	1. Expansion of existing communities	Small-scale, light industry	Subdivision of land	1. Large-scale coastal agriculture production	Belize Building Act	Central Building Authority
		2. Small-medium scale residential development	Tourism facilities, such as small guest houses	Establishment of small and medium-scale commercial and light-industrial development	2. Coastal aquaculture	Cayes Development Policy	Coastal Zone Management Authority
		3.Small-medium scale commercial development	Subsistence agriculture production, and landscaping with decorative, native, non-invasive crops	Establishment of residential expansion	3. Dumping of solid, toxic, hazardous waste and untreated liquid wastes, including grey water and sewage	Coastal Zone Management Act	Coastal Zone Management Authority
		4. Community facilities		Solid and liquid waste management	4. Commercial or light-industrial development within residential zone	Environmental Protection Act	Department of the Environment
		5. Supporting infrastructure			5. Residential development within commercial or light industrial development zone	Forest Act	Forest Department
					6. Squatting/informal settling	Hotels and Tourist Accommodation Act	Belize Tourism Board
					7. Unregulated clearing of mangrove forest, including the conversion of mangrove areas into other uses	Housing and Town Planning Act	Ministry of Housing
					8. Oil exploration, extraction and establishment of oil refinery	Land Utilization Act	Land Utilization Authority
					9. Dredging and Mining	Mines and Minerals Act	Mining Unit, Ministry of Natural Resources
						Solid Waste Management Authority Act	Solid Waste Management Authority
						Water and Sewerage Act	Belize Water Services Limited

The National Sustainable Tourism Master Plan for Belize 2030 (NSTMP) recommends **low to moderate development** for the South Northern Region. Within the South Northern Region there are numerous new developments proposed for the area between Dangriga Town and north of Riversdale. Infill and completion of existing infrastructure is recommended for Dangriga Town and Hopkins and a new development North of Maya King River up to Sapodilla. Building densities under an Informed Management Zoning Scheme (**See Maps 9 & 10**) for these areas are recommended to be 20 units/acre – 50 units/hectare which is consistent with Residential (R2) development standards. New low density resorts are recommended for False Sittee point, around the point (south Hopkins) and Commerce Bight. Building densities recommended are around 4 units/acre – 10 units/hectare. This is consistent with Residential (R1) development standards. Finally north of Riversdale there is the construction of an international airport with recommended development standards consistent with Commercial (C2) developments also medium level densities (40 – 100 units/hectare) was recommended for this area.

**Residential Development:** Land use in which housing predominates, as opposed to industrial and commercial areas. Housing may vary significantly between, and through, residential areas. These include single-family housing and multi-family residential. These areas are also characterized by lower lots per acre and units per acre.

Low Density Residential development is recommended for **False Sittee point, around the point (south Hopkins) and Commerce Bight**

Medium Density Residential development is recommended for **Dangriga Town, Hopkins and the area North of Maya King River up to Sapodilla**



**Table 5: Residential Development Standards for Coastal Communities within the South Northern Region**

<b>Residential Development Standards</b>		
<i>Subdivision Criteria</i>	<i>Development Standards</i>	
Density	Low Density (R1)	Medium Density (R2)
Lot Size	4 lots per acre (0.25 acre; 10,890 sq.ft.; 1,012 sq.m; 1210 sq.yd.)	6 lots per acre (0.167 acre; 7275 sq.ft.; 676 sq.m.; 808 sq.yd.)
Permitted Use	Single Family Residential Detached	Single and Multi Family Residential
Secondary Use	Institution, Conservation, Parks/Playground	Commercial Low Density, Institution, Conservation, Parks/Playground
Net Density (dwelling units per area)	4 dwelling units/acre	20 dwelling units/acre 120 guestbeds/acre
Width/Length Ratio	1:3	1:2
Minimum Setbacks:		
Front:	8 feet	6 feet
Side:	8 feet	6 feet
Back:	15 feet	12 feet
Max. Site Coverage (Percentage)	33%	50%
Minimum Frontage	65 feet	50 feet
Car Parking	1 per dwelling	1 per dwelling
Services	Water & Sewerage or Septic Tank, Electricity	Water & Sewerage or Septic Tank, Electricity

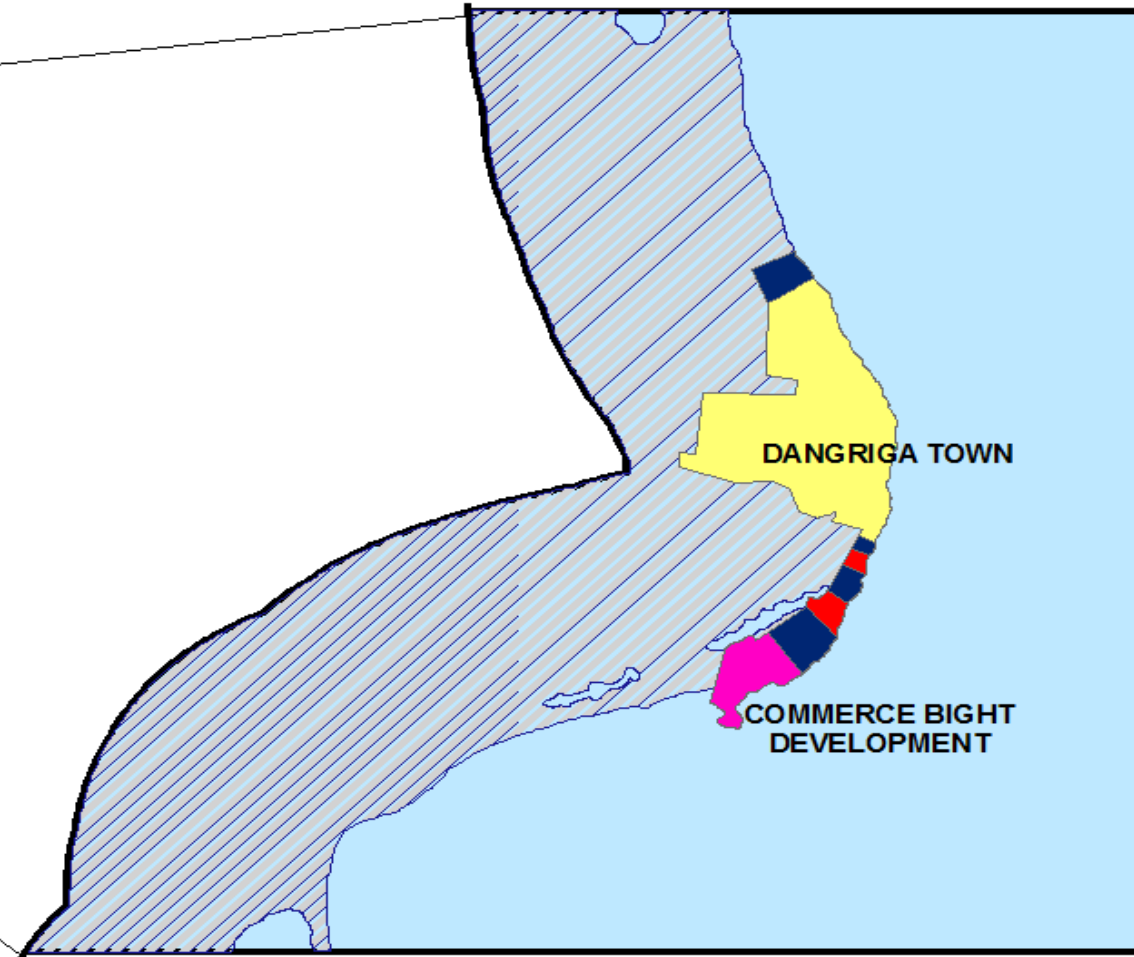
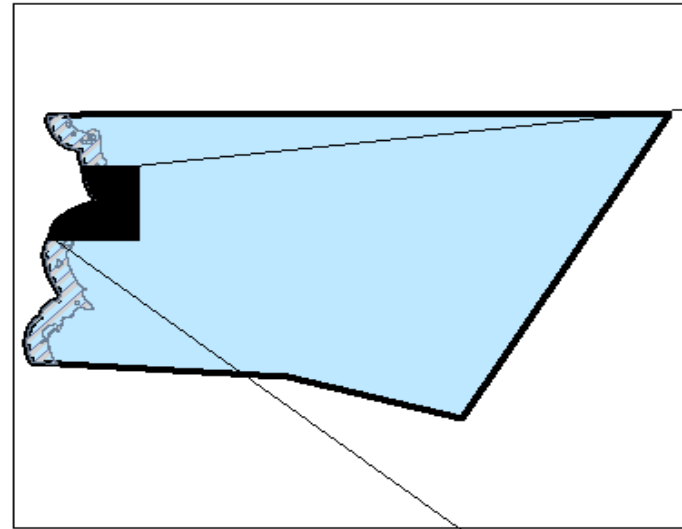
**Commercial Development:** Land use in which income is generated and commerce is predominant. Includes shops, stores, hotels, office buildings, and warehouses.

Commercial (C2) development standards are recommended for the area north of Riversdale for the construction of the international airport.

**Table 6: Commercial Development Standards for Coastal Communities within the South Northern Region**

Commercial Development Standards	
<i>Subdivision Criteria</i>	<i>Development Standards</i>
Density	Medium Density (C2)
Lot Size	6 lots per acre (0.5 acre; 21,780 sq.ft.; 2,023 sq.m.; 2,420 sq.yd.)
Permitted Use	Conservation Low Density, Other Goods & Services, Offices
Secondary Use	R1, R2, Institution, Conservation Park/Playground, Commercial Low Density
Net Density (dwelling units per area)	NA
Width/Length Ratio	1:3
Minimum Setbacks: Front: Side: Back:	4 feet 4 feet 10 feet
Max. Site Coverage (Percentage)	60%
Minimum Frontage	50 feet
Services	Water & Sewerage or Septic Tank, Electricity

# INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL DEVELOPMENT: SOUTH NORTHERN REGION



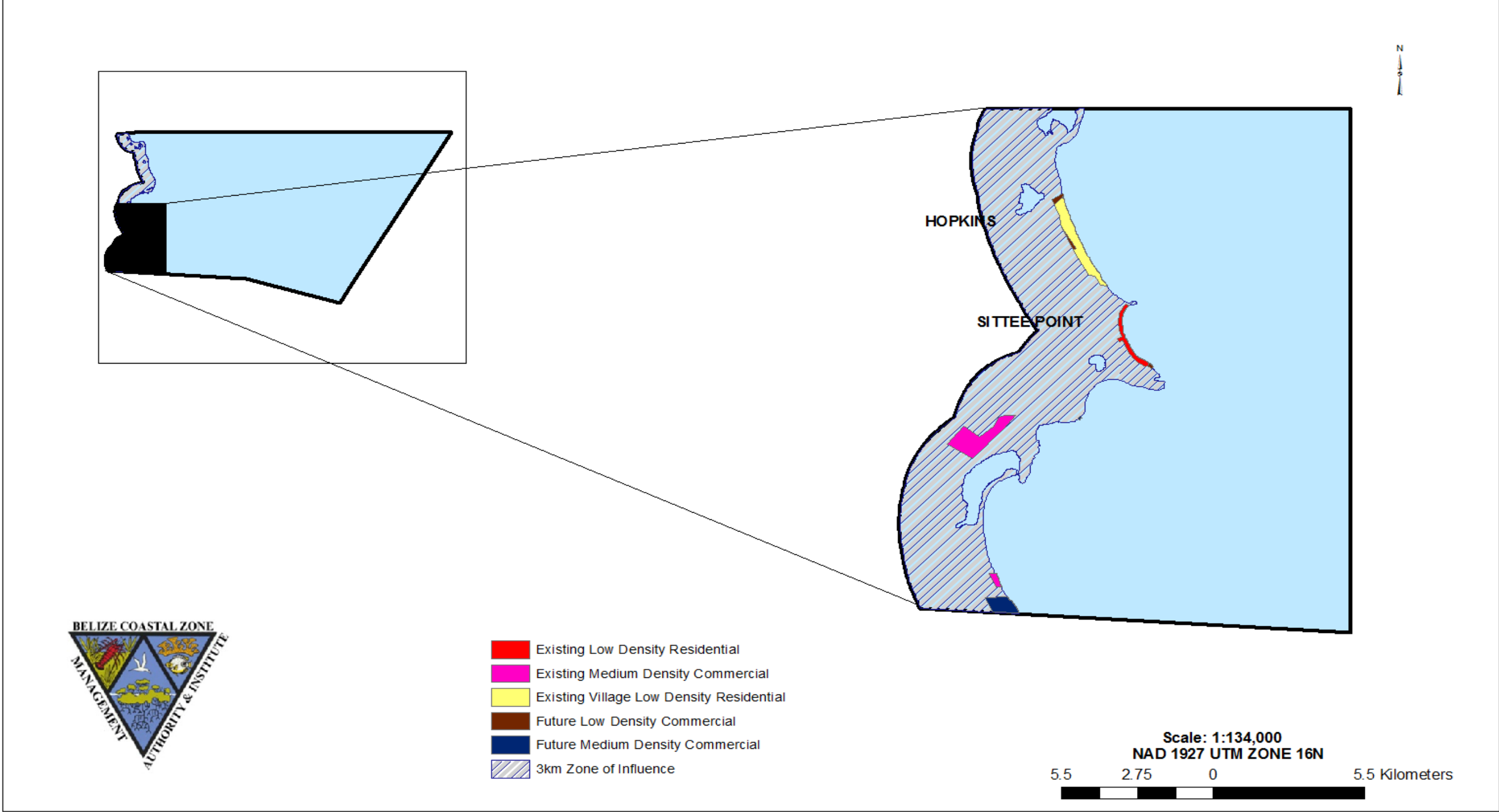
- Existing Low Density Town Residential
- Existing Medium Density Town Residential
- Existing Low Density Residential Commercial
- Future Medium Density Town Commercial
- 3km Zone of Influence

Scale: 1:80,000  
NAD 1927 UTM ZONE 16N

3.5      1.75      0      3.5 Kilometers

**Map 9: Informed Management Zoning Scheme for Coastal Development in the South Northern Region (Northern Portion)**

# INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL DEVELOPMENT: SOUTH NORTHERN REGION



Map 10: Informed Management Zoning Scheme for Coastal Development in the South Northern Region (Southern Section)

### **Institutional Use and Community Facilities:**

Land use in which public services and social upliftment predominates. Includes schools, community centers, public health clinics, libraries, embassies, police stations, and other public agencies. Also additional spaces set aside in large residential or commercial subdivisions for public purposes including public parking, cemeteries, churches, sporting areas, police stations, etc. (**Table 7**)

**Table 7: Institutional and Community Facilities Development Standards for Coastal Communities within the South Northern Region**

Subdivision Criteria		Development Standard	
Building	Setbacks:	25	feet
Front:		12	feet
Side:		15 feet	
Back:			
Maximum Coverage	Site	40%	
Permitted Use		Education, Health, Religious, Community Centre etc.	
Secondary Use		Conservation & Parks/Playground	
Minimum Frontage		1/6 of Perimeter of Lot	
Services		Water & Sewerage or Septic Tank, Electricity	

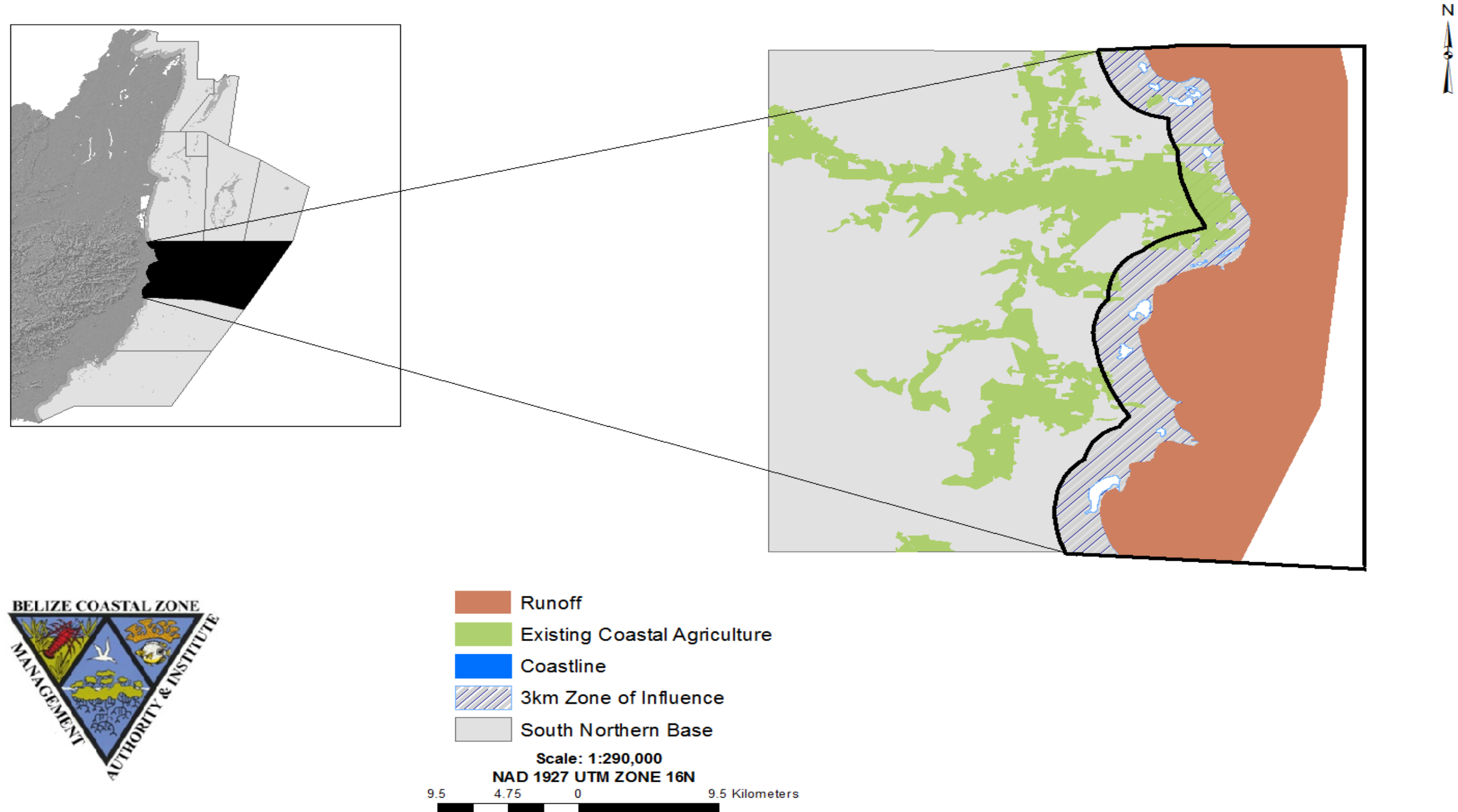
### 6.3.2 Coastal Agriculture Development

In addition to residential and commercial development, coastal agriculture has been identified as a potential use of lands within the 3km coastline of the South Northern region (**Map 9**). This type of development includes land use in which the production of food, feed, livestock and poultry, fruits and vegetables, and horticultural crops are raised, grown, or produced for commercial purposes. Development standards for coastal agriculture are found in **Table 8**. The framework for implementing the zoning scheme for the development of coastal lands for agriculture production can be found below in **Table 9**. Areas zoned for Coastal Agriculture can be seen in **Map 11**.

**Table 8: Coastal Agriculture Development Standards for Coastal Communities within the South Northern Region**

Subdivision Criteria	Development Standards	
	Low Density	Medium Density
Density	Low Density	Medium Density
Minimum Size	25 acres	5 acres
Permitted Use	Crop Growing and Harvesting	Crop Growing and Harvesting
Secondary Use	Light Industry, Conservation, Parks/Playground, R1, C1, Institution	Light Industry, Conservation, Parks/Playground, R1, C1, Institution
Width/Length Ratio	1:8	1:6
Services	Water & Sewerage or Septic Tank, Electricity	Water & Sewerage or Septic Tank, Electricity

**INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL AGRICULTURE:  
SOUTH NORTHERN REGION**



**Map 11: Informed Management Zoning Scheme for Coastal Agriculture in the South Northern Region**

Table 9: Framework for Implementing Informed Coastal Agriculture in the South Northern Region

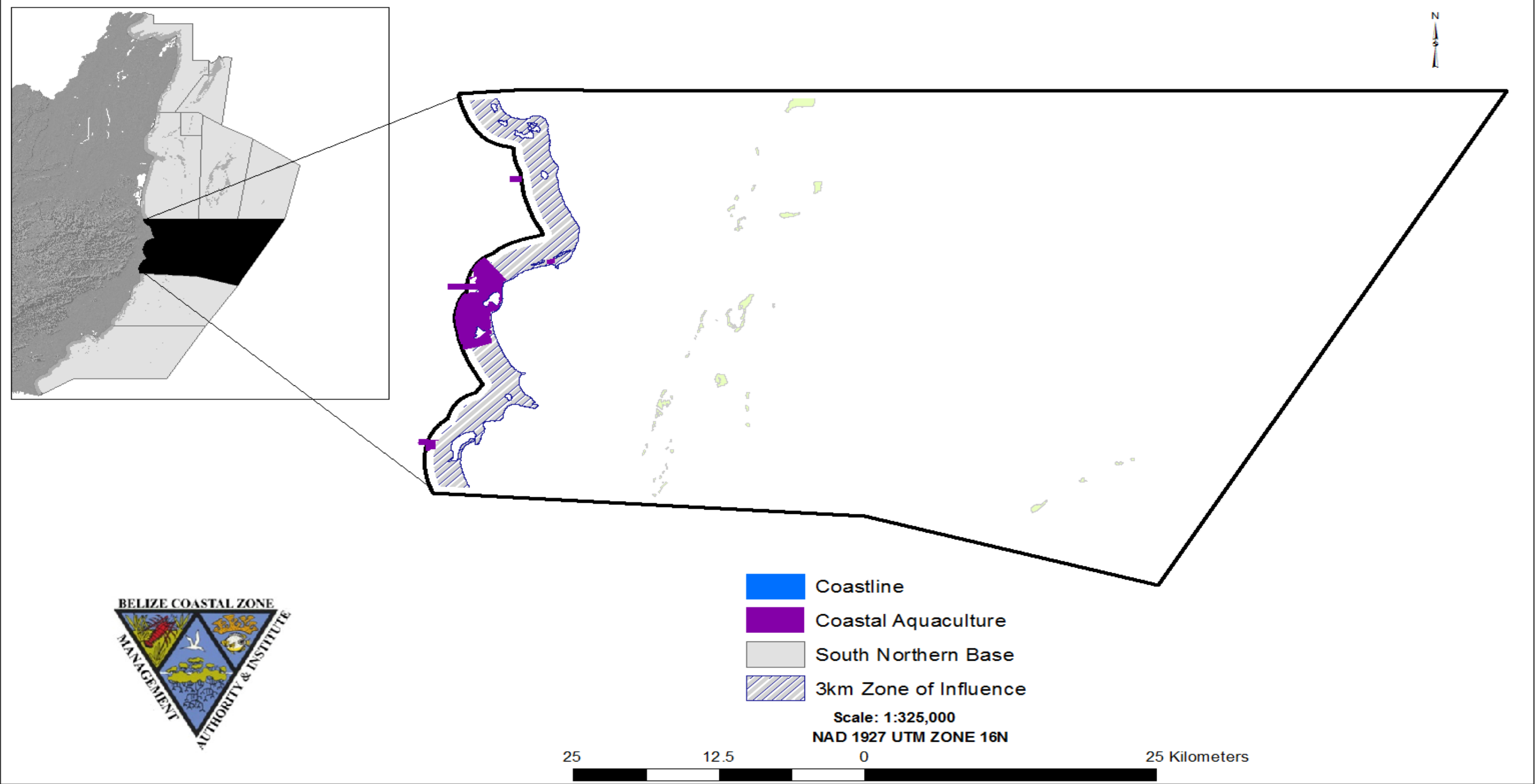
ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Coastal Agriculture	Coastal lands with fertile, irrigable soil especially suited for agricultural production of crops, and rearing of livestock for local consumption and export revenue	1. Production of crops such as banana, citrus, papaya, sugar cane, etc  2. Production of meat and livestock	Living quarters for employees and/or owners of agricultural company  Research and education	Subdivision of land for agricultural purposes  Application of agrochemicals	1. Use of unregistered agrochemicals (pesticides and fertilizers)	Banana Industry Act	Banana Control Board Ministry of Agriculture
					2. Use of registered agrochemicals (pesticides and fertilizers) outside of the legally prescribed limit	Belize Agricultural Health Authority Act	Belize Agricultural Health Authority
					3. Oil exploration, extraction and establishment of oil refinery	Citrus (Processing and Production) Act	Citrus Control Board Ministry of Agriculture
					4. Mining and dredging	Environmental Protection Act	
					5. Disposal of hazardous and toxic chemicals, solid wastes, untreated liquid wastes	Land Utilization Act	Department of the Environment
					6. Squatting/informal settling	Meat and Livestock Act	Land Utilization Authority
					7. Unregulated land clearing,	Papaya Growers Association Act	Ministry of Agriculture
					8. Fish farming, coastal aquaculture	Pesticides Control Bard Act	Ministry of Agriculture
						Sugar Cane Industry (Control) Act	Pesticides Control Board  Ministry of Agriculture



### **6.3.3 Coastal Aquaculture Development**

The coastal lands within the South Northern coastal zone that have been zoned for land-based aquaculture (**Map 12**) fall within Zone 3 of the National Aquaculture Policy (2005). Zone 3 areas represent inland areas available for aquaculture development that are classified as “moderately suited” to food production of ornamental livestock not consumed as food by virtue of having “Mixed-Quality Fresh & Marine Water Resources Suited to Land Based Systems”. These areas are already surrounded by existing agriculture and the areas identified that are free from pesticide pollution. The aquaculture policy recommends small to large scale freshwater developments in the South Northern region involving the maximum cultivation of 160 hectares of land. Surface water requirement is between 0.04 - 40 cubic meters per minute. The framework for implementing the zoning scheme for the development of coastal lands for aquaculture production can be found below in **Table 10**.

**INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL AQUACULTURE:  
SOUTH NORTHERN REGION**



**Map 12: Informed Management Scheme for Coastal Aquaculture Development in the South Northern Region**

Table 10: Framework for Implementing Informed Coastal Aquaculture in the South Northern Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Coastal Aquaculture	Coastal lands especially suited for the culture of farm-raised fish via land-based pond systems	1. Construction of land-based pond systems for farming of non-invasive species	1. Office spaces, living quarters for employees and/or owners of aquaculture farms  2. Supporting facilities for culturing of species, such as hatcheries and nurseries  3. Mangrove planting	Subdivision of land for aquaculture purposes  Fishpond operations	1. Use of unregistered chemicals and biological materials, such as antibiotics  2. Use of registered chemicals and antibiotics outside of the legally prescribed limit  3. Oil exploration, extraction and establishment of oil refinery  4. Mining and dredging  5. Disposal of hazardous and biological wastes  6. Release of untreated liquid wastes  6. Squatting/informal settling  7. Unregulated land clearing, and alteration of mangrove forests	Environmental Protection Act  Fisheries Act  National Aquaculture Policy (Draft)	Department of the Environment  Fisheries Department  Aquaculture Unit, Ministry of Agriculture

### **6.3.4 Cayes Development Standards**

Development on cayes and atolls require specific building standards since these areas are closer in proximity to important sensitive habitats such as sea grass beds, mangroves and coral reefs. Ad hoc or uncontrolled development in these areas can have severe negative effects on surrounding ecosystems. For example the construction and proliferation of piers can cause destruction of the beach, sea grass bed and seabed and sedimentation, particularly if they are positioned on the windward side. Furthermore, the movement of debris during storms from buildings constructed on piers can be dangerous.

Sustainable development is crucial in maintaining our natural resources and the benefits that Belizeans receive from them. Proper planning is required for this to be achieved. For example, currently there are not enough docking facilities for boaters and fisher folks across the southern region. Thus, docking is done all over the place. It could be that the development of a new purpose built dock might provide material for beach reclamation via a controlled dredging program. Space is needed for bars/restaurants/rest area and boardwalks. This would facilitate more recreational space for locals and tourists.

In 2004, CZMAI produced a set of development guidelines for the cayes within each planning region. These development guidelines were produced in consultation with stakeholders from each planning region along with technical input from government relevant agencies. Within the document land use classes were developed along with accompanying standards for the varying degrees of development that can occur on a Caye. Use classes were also assigned to each Caye according to suitability. The use class categories developed include residential, commercial and conservation, representing the various degrees of development intensities allows on cayes. Therefore CZMAI recommends the following as development standards for developing **the cayes** within the South Northern Region:

Land tenure of the cayes within the South Northern region is a combination of private and state ownership (See **Table 11**): Summary of Land Tenure of the South Northern Region Cayes). Those lands which are nationally owned should remain as such as this state of affairs provides the opportunity for decision-makers to have greater input in land management concerns. Where land is private property, the right to alienate and develop must be recognized, but regulated to ensure that the subdivision of land subscribes to guidelines which ensure that the resulting parcels can sustain the type of permitted development activity. The seabed is national land and thus any proposals to develop the seabed or to construct piers, marinas and seawalls within this region needs to receive clearance from the Lands Department and Department of Environment. This action is particularly relevant in the case of the seabed within the South Water Caye Marine Reserve and Glovers Reef Marine Reserve, which has zonation with areas under a non-extractive regime, under the Fisheries Department.

**Table 11: Summary of Land Tenure for Cayes in the South Northern Region**

<b>Land Tenure and Ownership of the Cayes in the Southern Region</b>							
	National		Lease		Private Property		Total Size (acres)
Name of Caye	Size (acres)	%	Size	%	Size	%	
Glory Caye	1.00	100	0	0	0	0	1.00
Southern Long Caye	380.00	95.2	19.42	4.8	0	0	400
Mosquito Caye	0	0	0	0	6.84	100	6.84
Sandfly Caye	96.13	75.7	26.78	21.1	4.06	3.2	127
Garbutt's Caye	0	0	0	0	4.6	100	4.6
Columbus Caye	17.44	17.6	39.54	40.4	41.18	42	98
Cross Caye	68.48	85.6	6.78	8.4	4.8	6	80
Coco Plum Caye/Range	13.02	29.6	9.38	21.3	21.61	49.1	44
Tobacco Range	82.58	58.7	27.99	10.2	71.32	29.7	140.69
Tobacco Caye	0	0	0	0	5.86	100	5.86
Man-O-War Caye	1	100	0	0	0	0	1
Ragged Caye	0	0	0	0	2.33	100	2.33
Rockers Caye	1.5	100	0	0	0	0	1.5
Twin Cayes	74	77.9	13.83	14.6	7.12	7.5	95
South Water Caye	0	0	0	0	13.27	100	13.27
Carrie Bow Caye	0	0	0	0	1	100	1
Curlew Caye	0.5	100	0	0	0	0	0.5
Glovers Reef Caye (5)	0	0	0	0	56.08	100	56.08
Blue Ground/ Cockney Range	34	678	8.35	16.7	7.68	15.3	50
Stewart Caye	12	100	0	0	0	0	12
Bread and Butter Caye	14	100	0	0	0	0	14
Wee Wee Caye	5.16	86	.84	14	0	0	6
Spruce/Crow's Nest Caye	0	0	0	0	1.10	100	1.1
<b>TOTAL</b>	<b>786.81</b>		<b>153.91</b>		<b>254.44</b>		<b>1266.17</b>

The development potential of the cayes is a function of the size, ecological sensitivity and level of exposure. The cayes that were unsuitable or limited in their development prospects are the smaller and more ecologically sensitive cayes in exposed locations. Ecological sensitivity relates both to the aquatic environment and the terrestrial province. In general, both the coral reef areas of the aquatic environment and the mangrove dominated areas of the terrestrial province, with particular faunal associations such as bird nesting sites, are sensitive.

The development status of the cayes in the Dangriga area ranged from developed to situations where cayes were uninhabited or only temporarily inhabited. The development potential of the cayes that are either undeveloped or not fully developed is a direct function of the “ecological sensitivity” of the area. This is predicated on the extent and nature of the current development in the area, as well as the policy focus of the relevant natural resource management agencies of the Government of Belize (GOB) to encourage and support developments that are amenable to the natural environment, and whose ecological impacts are within the „carrying capacity“ of the environment.

The ecological sensitivity of a particular area is based on the „health status“ and ecological fragility of the flora and fauna in the near shore waters of the cayes, as well as on the land-based flora and fauna inhabiting the cayes. The most sensitive areas in relation to sub-tidal near shore waters are areas that are richly invested with reef building corals and sea grass beds. Other sub tidal areas of note in this regard are critical habitats, such as spawning and nursery areas for fish.

Areas of heightened sensitivity in regard to the terrestrial areas are vegetation that stabilize shore lines and makes special contribution to critical life stages of fauna in the area such as mangroves, which are important nursery ground for a wide variety of fin-fishes and invertebrates such as the Spiny Lobster (*Panulirus argus*) and the Queen Conch (*Strombus gigas*). Survival of these species are also linked to the sea grass beds/shallow reef beds of loose sand. This is particular to the reef from **South water Caye to the north pointer reef and the reef east of Cross Caye pass Columbus up to Emily and from Cross Caye to Tobacco Caye**. Terrestrial areas of special note are those providing a habitat for fauna to perform critical life functions such as nesting and breeding areas. This is of particular note for a number of seabirds occurring in the Dangriga area.

The developments on the Dangriga cayes are either residential in nature, or they are based on recreational tourism, fishing, and research and education. The cayes that are developed, that is, **Tobacco Caye, Southwater Caye Carrie Bow Caye, Long Caye and Southwest Caye # II**, are all located in a coral dominated environment on the “barrier platform”, in the immediate lee of the reef crest of the main barrier reef and on the atoll. This is an ecologically sensitive environment, and although no systematic ecological impact survey or carrying capacity studies

have been undertaken, the visual impact of the saturated development coverage these cayes have would invariably lead one to err on the side of caution. In this regard, it is strongly recommended that further developments be limited on these cayes. The other caye that is developed and for which no further development is advisable is **Wee Wee Caye**, which is the site of an education and research facility. This Caye has developed on a patch reef system that is surrounded by coral patches and sea grass beds.

Cayes that are located in areas that are dominated by coral reef and sea grass beds, and that are either too low lying and inappropriate to accommodate development due to their small sizes or both are: **Stewart Caye, Man-of-War Caye, Ragged Caye and Curlew Caye. Man-of-War Caye** is also inappropriate for development due to the presence of nesting colonies of Frigate Bird or Man-of-War (*Fregata magnificens*) and the Brown Booby Bird (*Sula leucogaster*).

Cayes that are considered least suitable for development due also to their low lying nature but in effect are mangrove wetland systems or unique biodiversity and sensitive ecologies are: **Mosquito, Columbus, Twin, Sand –Fly, Southern, Garbutt, lower Tobacco Range, Ragged, Stewart, Bread and Butter, lower Crows Nest and Middle Cayes**) and those not suitable are ( **Glory, upper Crows Nest, Blue ground Range, Curlew, upper Tobacco Range, Rockers Island and Mosquito Cayes.**) In the case of **Twin Cayes**, it is the headquarters and ranger station of the South Water Caye Marine Reserve. Apart from falling within the boundaries of the protected area, the Twin Cayes area is known as a spawning area for the Jew Fish (*Epinephelus itajara*), an important commercial fin-fish species which is increasingly rare and a declining fishery resource.

The cayes that are considered most suitable for development are **Coco Plum and Cross Cayes**. The former one is one of the larger more stable cayes, and not generally known to support any nesting or roosting sites for sea birds or within any sensitive ecological environment. However, more detailed soil testing may be required prior to any major development activity.

In late 2013, the Wildlife Conservation Society released the *South Water Caye Marine Reserve Cayes Inventory July 2011 – May 2013*. The inventory is a comprehensive ground-truthing exercise by WCS in which they catalogued all the islands within the marine reserve along with existing infrastructure and potential usage. This reserve spans across two of CZMAI's planning regions which include this region and the South Central Region. Below is a description of the most current level of development on major cayes within this planning region:

### **Twin Caye**

Recommendation of the CZMAI Guidelines: Twin Cayes were recommended as a Conservation 2 area, and this status has been maintained. Two buildings for the marine reserve headquarters were present in 2003, and there is now a third small building, also part of the reserve station.

### **South Water and Tobacco Caye**

Recommendation of CZMAI Guidelines: Tobacco Caye, South Water Caye and Carrie Bow Caye were classified as being fully developed, verging on being overdeveloped and no further development was recommended. It appears that the level of development remained more or less the same on these cayes in 2011.

### **Tobacco Range**

Recommendation of CZMAI Guidelines: Upper Tobacco Range was recommended as a Conservation 1 area, which meant it should be set aside for conservation. Lower Tobacco Range was designated as Conservation 2, which means no development is preferable but residential use could occur with a density of only 1 house/10,000 sq. ft. and building coverage of 6%. Use of the Range is more or less at this level, with only 12 small buildings presently located in this area, but some are also situated within the Upper Tobacco Range, or proposed conservation area.

### **Cocoplum caye**

Recommendation of the CZMAI Guidelines: Coco Plum Caye was identified as the most suitable for development, with the category of Commercial 1 recommended, which allows for resort use at a density of 4 units per acre and a maximum building coverage of 10%. In 2011, Coco Plum Caye Range housed three resorts: Thatched Caye on the north end with 19 buildings, Coco Plum Caye resort in the centre comprised of 17 buildings, and a resort on the southern end comprised of two over-the-water homes. This high level of development is not in keeping with the recommended guidelines.

### **Ragged Caye**

Recommendation of CZMAI Guidelines: Ragged Caye was proposed as least suitable for development and recommended as Conservation 2, which means no development is preferable but residential use could occur with a density of only one house/10,000 sq. ft. and building coverage of 6%. Again, the proposed guidelines were not followed and this island is the location of a resort comprised of 10 buildings.

### **Pelican Cayes and North East Caye**

Recommendation of CZMAI Guidelines: This caye is suitable for a small resort and fishing camp. However, the mangroves should be maintained, and apart from the areas used for the small developments, the rest of the island should be left in its natural state.

For Cayes within the South Northern Region, only one category is assigned. That is Residential I to **Cross and Garbutt Cayes**

**Residential Development:** Recommended for General residential purposes – permanent residence, vacation home, time share, fisherman camps and other home industries (**Table 12**):



**Table 12: Standards for Residential Development on Cayes Within the South Northern Region**

<b>Subdivision Criteria</b>	<b>Development Standard</b>
Primary Use	Residential
Secondary Use	Conservation
Minimum Lot Size	1 acre
Maximum # of lots per acre	1
Net Housing Density	1 house per acre
Maximum # of Habitable Rooms/acre	5
Maximum Building Coverage	5%
Maximum Site Clearance	50%
Building Setback Front	25 ft
Building Setback Side	25 ft
Building Setback Back	50 ft
Between Buildings	30 ft
Building Height	28 ft
Maximum # of Floors	2
# of Pier per site	1

For Cayes in the South Northern Region only Commercial I apply. These are for cayes which are already developed as resorts. That is, **Coco-plum, Tobacco, South water, South west, Long and Northeast Cayes.**

**Commercial Development:** Recommended for accommodations and associated services – hotels, resorts, motels, guesthouses; associated bars, shops, offices, entertainment facilities, marinas, gas stations/pumps (**Table 13**)

**Table 13: Standards for Commercial Development on Cayes Within the South Northern Region**

Subdivision Criteria	Development Standard
Primary Use	Commercial
Secondary Use	Residential
Minimum Lot Size	1 acre
Maximum # of lots per acre	1
Net Housing Density	4 units per acre
Maximum # of Habitable Rooms/acre	8
Maximum Building Coverage	10%
Maximum Site Clearance	30%
Building Setback Front	50 ft
Building Setback Side	30 ft
Building Setback Back	50 ft
Between Buildings	30 ft
Building Height	28 ft
Maximum # of Floors	2
# of Pier per site	1

Southwater Caye and Glovers Reef Atoll are marine reserves and World Heritage Sites. They both have protected status. However, the contribution of the other cayes to the protection of the mainland from storm surges, the linkages to the fishing and tourism industries, its scientific and economic opportunities and its relationship to the survival of the barrier reef cannot be avoided. Furthermore, the unique biodiversity and social and cultural importance of some of the Cayes mandates that particular areas of the Dangriga Cayes Region to remain in their natural state. To facilitate this, it is recommended that certain areas be zoned for Conservation Use (**Maps 13, 14, 15, & 16**):

**Conservation Development:** Not recommended for major development but can accommodate very small scale infrastructure – Research stations, low scale ecotourism lodge, residential/fisherman’s camps with temporary structures. (**Table 14**)

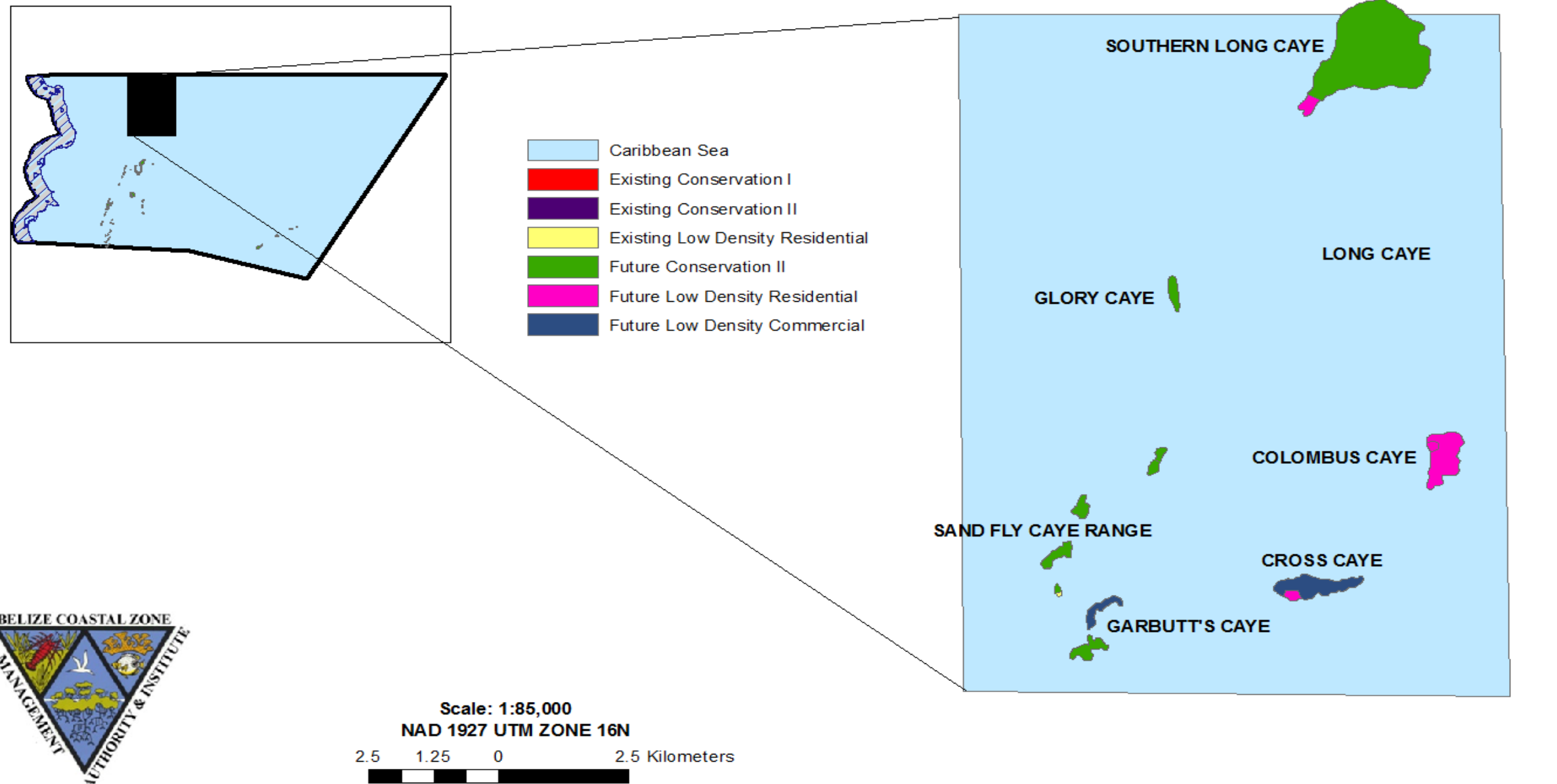
Cayes assigned **Conservation I** land use category are: **upper Tobacco Caye Range, Curlew Caye and Blue Ground Range.**

Cayes assigned **Conservation II** land use category are: **Southern Long Caye, Glory Caye,9 Columbus Caye, Sand Fly Range, lower Tobacco Caye Range, Rockers Island, Ragged Caye, Twin Caye Range, Carrie Bow Caye, Stewart Caye, Bread and Butter Caye, Wee Wee Caye, Crows Nest Caye and Middle Caye.**

**Table 14: Standards for Conservation Development on Cayes Within the South Northern Region**

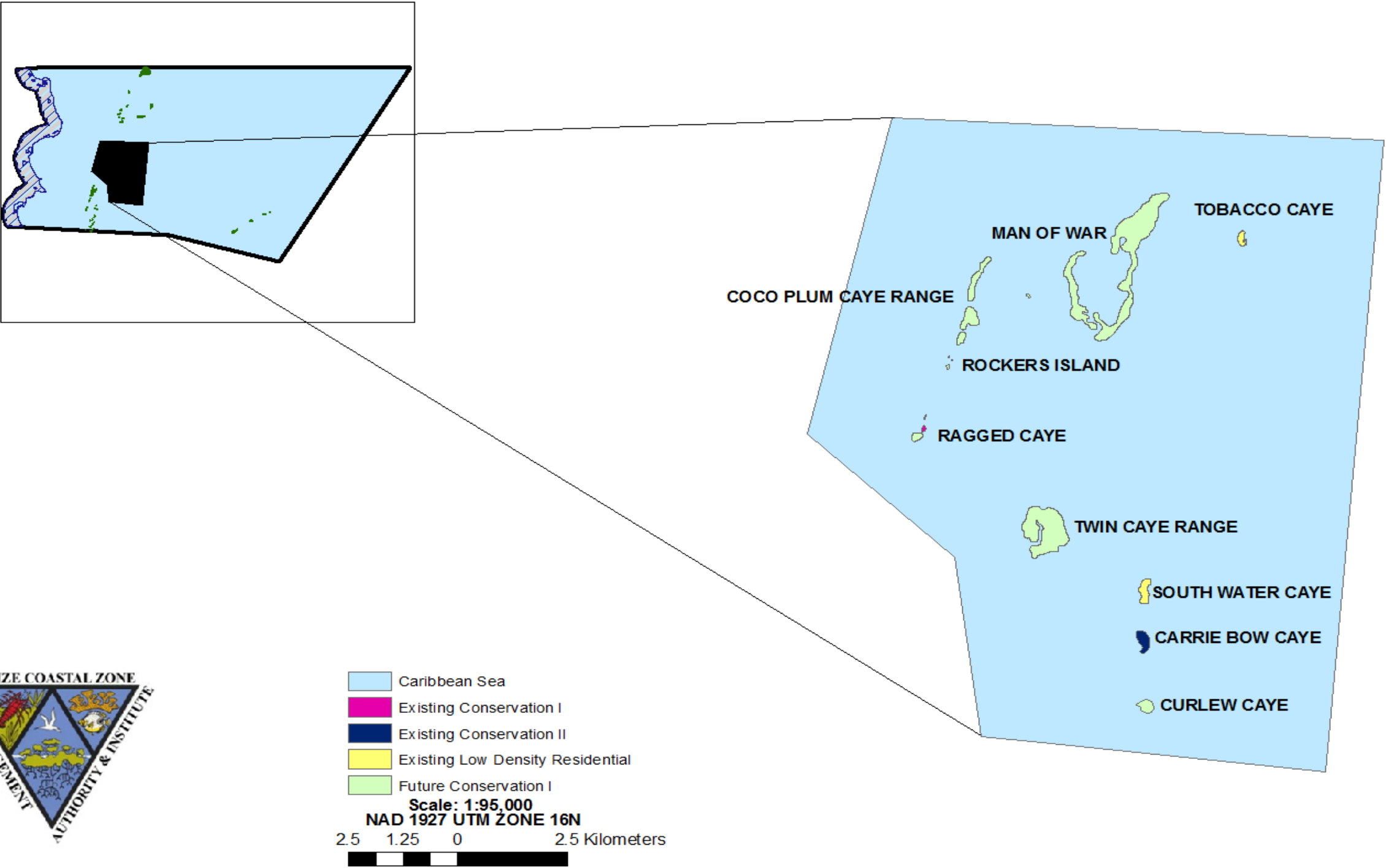
Subdivision Criteria	Development Standards	
	Conservation I	Conservation II
Use Category	Conservation I	Conservation II
Primary Use	Conservation	Conservation
Secondary Use	Fisherman Camp	Residential I
Minimum Lot Size	1 acre	1 acre
Net Housing Density	2 per acre	2 per acre
Maximum # of Habitable Rooms/acre	4	4
Maximum Building Coverage	4%	6%
Maximum Site Clearance	50%	50%
Building Setback Front	50 ft	50 ft
Building Setback Side	25 ft	25 ft
Building Setback Back	50 ft	50 ft
Between Buildings	25 ft	25 ft
Building Height	28 ft	28 ft
Maximum # of Floors	2	2
# of Pier per site	1	1

## INFORMED MANAGEMENT ZONING SCHEME FOR DEVELOPMENT OF CAYES: NORTHERN SUB-REGION



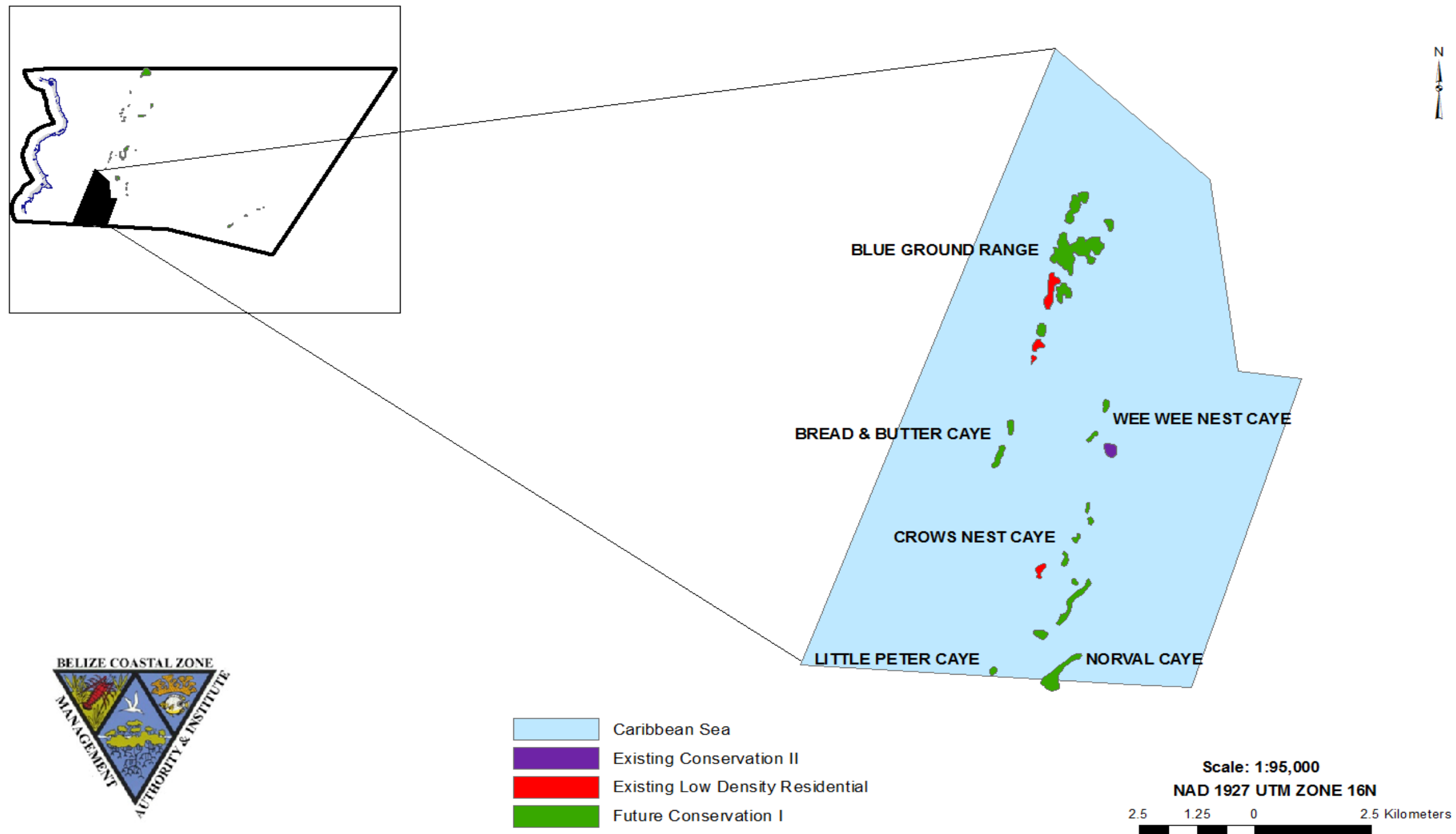
**Map 13: Informed Management Scheme for Development of Cayes in the Northern Sub-region**

# INFORMED MANAGEMENT FOR DEVELOPMENT OF CAYES: CENTRAL SUB-REGION



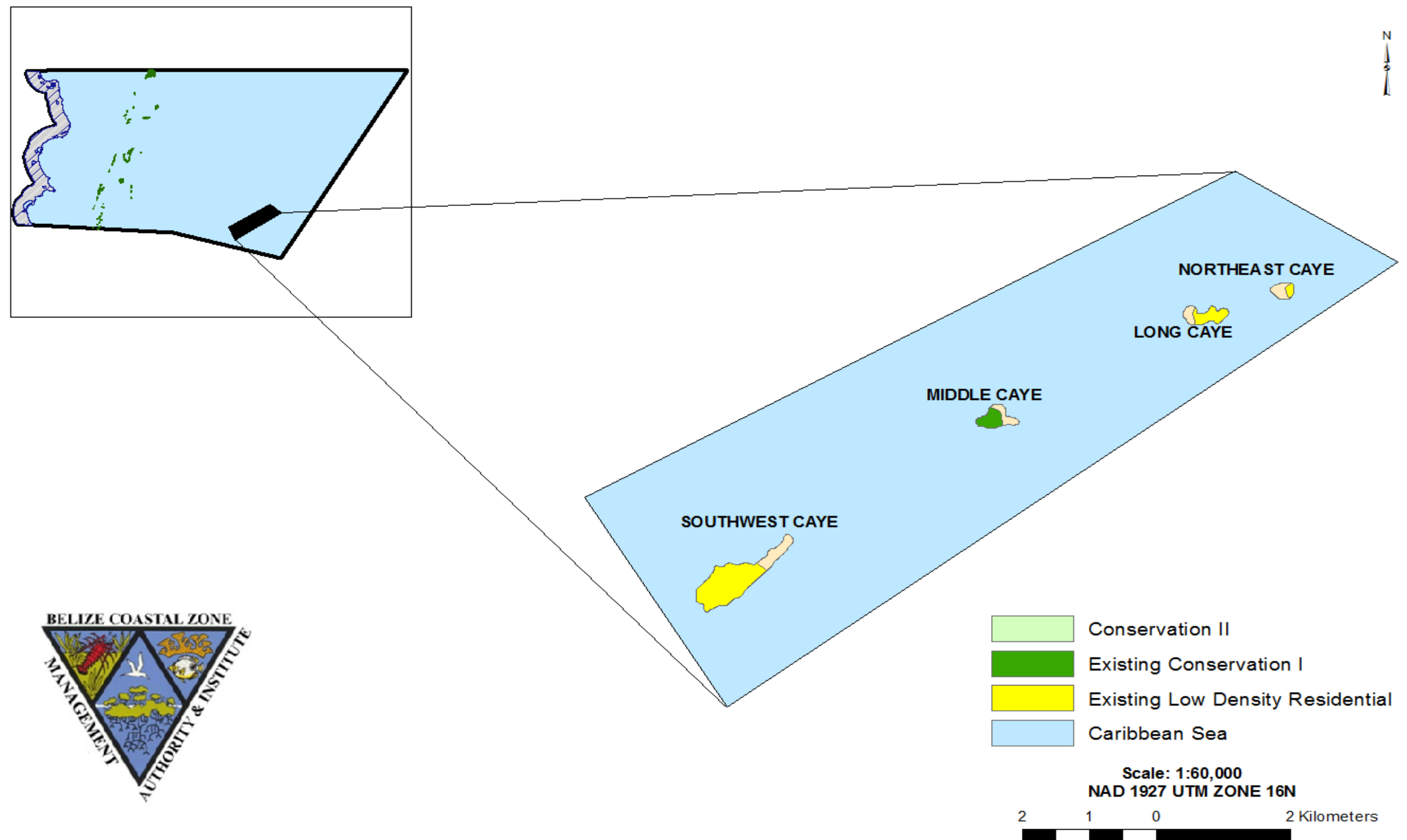
Map 14: Informed Management Zoning Scheme for Development of Cayes in the Central Sub-region

# INFORMED MANAGEMENT ZONING SCHEME FOR DEVELOPMENT OF CAYES: SOUTHERN SUB-REGION



**Map 15: Informed Management Zoning Scheme for Development of Cayes in the Southern Sub-region**

# INFORMED MANAGEMENT ZONING SCHEME FOR DEVELOPMENT OF CAYES: EASTERN SUB-REGION



**Map 16: Informed Management Zoning Scheme for Development of Cayes in the Eastern Sub-region**

**Recommended Actions:**

1. Increased collaboration among local stakeholders, interest groups and the agencies responsible for land allocation, including the conditions applied to lease approval and the regulation of lot sizes
2. Limit the number of piers per property or caye
3. Prohibit the construction of buildings on piers
4. Preserve remaining crown lands in the region
5. All new developments must be constructed using the standards developed by LUA and CZMAI in the creation of these management guidelines.
6. Although permitted, coastal agriculture and aquaculture activities must be closely monitored and not allowed to occur near important watersheds and lagoons. Relating to this, proper pesticide use and waste water disposal is key to ensuring that the marine environment is not polluted. Therefore enforcement agencies will be required to conduct regular water testing.



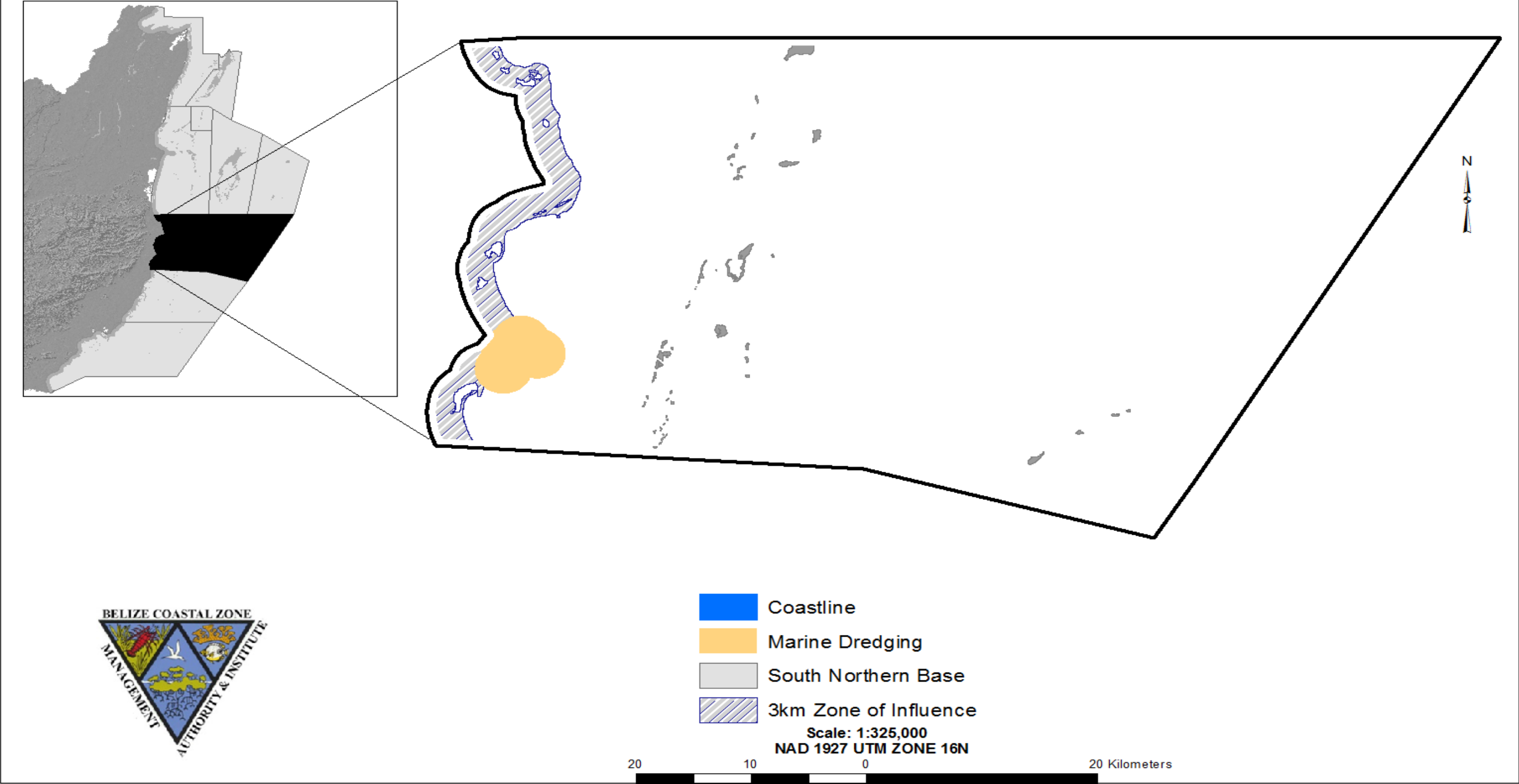
#### **6.4     *Marine Dredging and Mineral Extraction***

Dredging and sand mining can have disastrous effects on the habitats of particular species and on other economic and recreational use of the region. Significant dredging activity in the region has been noted and there is concern that the pattern of dredging or sand mining activity to increase land mass or land rehabilitation, particularly post storm disruption, may be extended into the future. Requests must be carefully monitored by the Geology and Petroleum Department and other relevant permitting agencies in order to avoid these potential impacts.

##### **Recommended Actions:**

1. Discourage dredging activity outside of Informed Management Marine Dredging Zoning Scheme for this region (**Map 17**). Requests for land rehabilitation activities associated with post-storm disruption of land mass must be reviewed on a case by case basis. The precautionary approach must be use in respect of approvals, and the activity must not disrupt the marine ecosystems or impact negatively on existing uses by other individuals or operations, and must be approved by the Department of the Environment and National Environmental Appraisal Committee
1. Ensure that fees collected for the issuing of dredging permits are allocated to the local town or village councils to mitigate effects of nearby dredging activities.

# INFORMED MANAGEMENT ZONING SCHEME FOR MARINE DREDGING: SOUTH NORTHERN REGION



**Map 17: Informed Management Zoning Scheme for Marine Dredging in the South Northern Region**

Table 15: Framework for Implementing Informed Management Marine Dredging Scheme

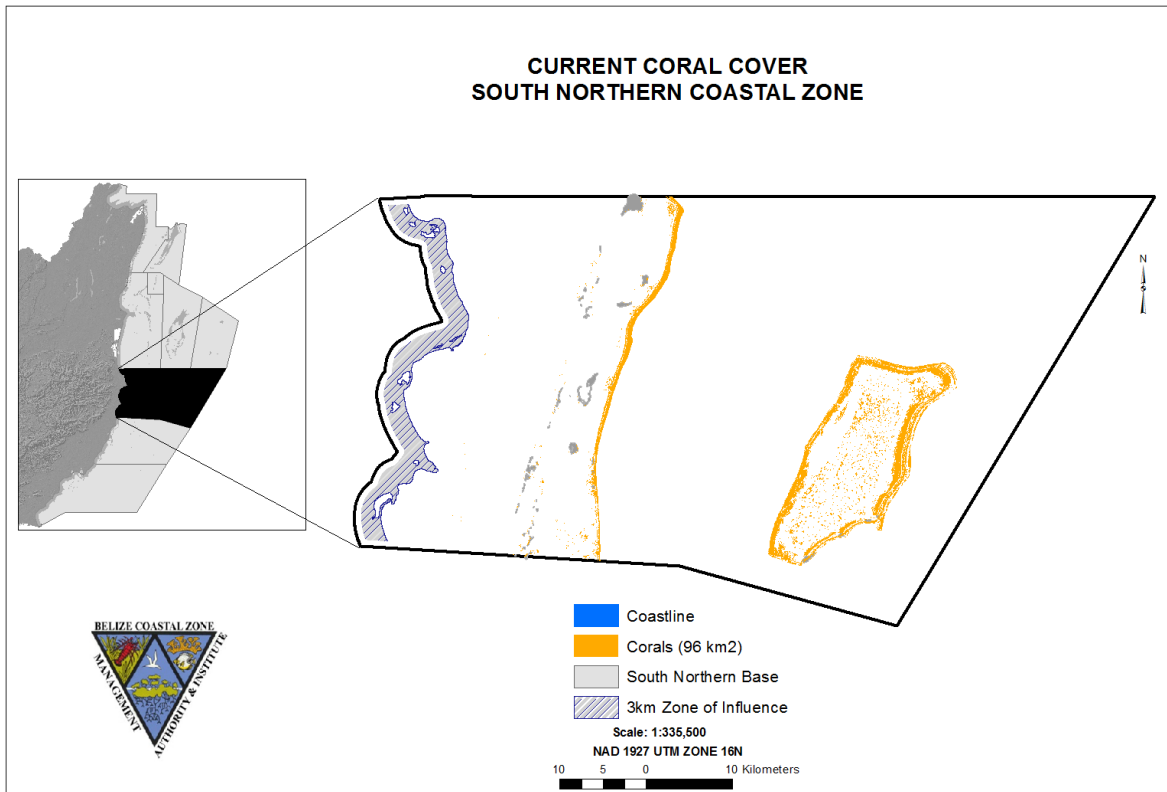
ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Dredging	Areas for the excavation of bottom sediments for the maintenance of navigable waterways and ports of entry	1. Excavation of bottom sediments for the maintenance of navigational lanes and ports of entry	1. Shipping and navigation; passage/entry of commercial vessels	Sediment extraction	1. Aquaculture  2. Disposal of solid and liquid wastes  3. Disturbance and destruction marine ecosystems, including but not limited to, coral reef system, seagrass beds, etc  4. Marine recreation  5. Fishing  6. Extraction of petroleum  7. Extraction of water from natural saltpans	Environmental Protection Act  Mines and Minerals Act  Marine Dredging Policy (Draft)  Land Utilization Act	Department of the Environment  Mining Unit, Ministry of Natural Resources          Land Utilization Authority

## **6.5     *Sensitive Habitats***

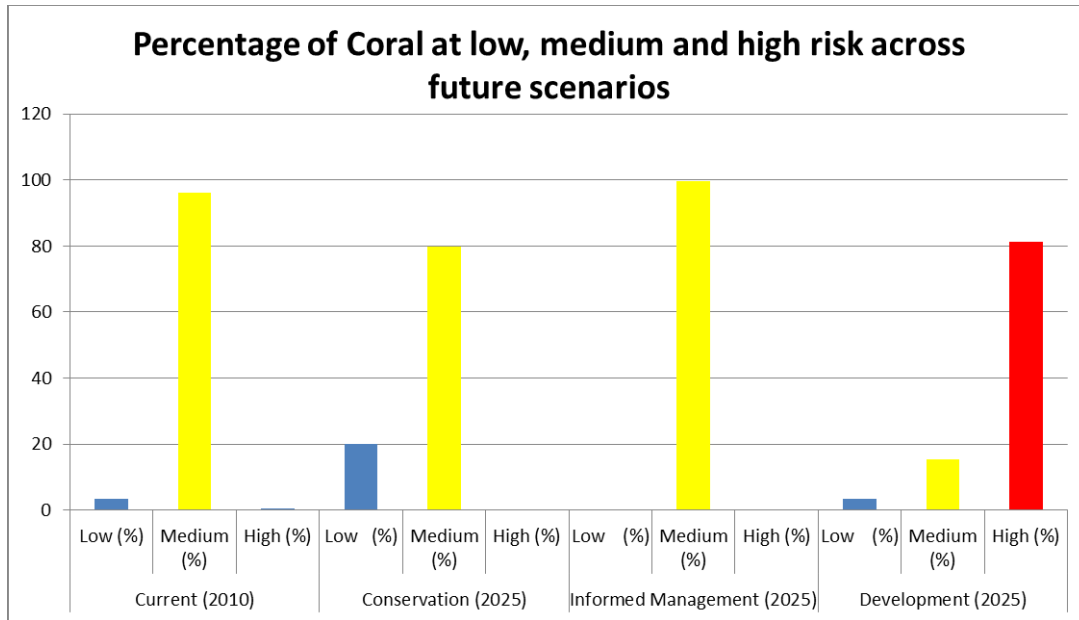
The South Northern region contains rich and diverse habitat. These habitats include those found in both the terrestrial areas, as well as the sub-surface or aquatic province. The species of animals range from corals, to fishes, sea turtles, crocodile and dolphins. Plant species includes land-based or emergent forms such as mangroves and those on the seafloor as the sea grasses.

### **6.5.1     Corals**

There are two principal types of reef systems in the waters of the region. These include a barrier reef system, popularly known as the Belize Barrier Reef Reserve System, and is characterized by a prominent reef crest. The second type of reef system is referred to as a patch reef system. The patch reefs are generally found on gently raised sub-tidal promontories in the immediate area of the back-reef, as well as the shallower areas of the barrier lagoon, including the nearshore areas surrounding various cayes. The reef crest is characterized by semi-emergent coral forms. The deeper fore reef areas are dominated by branching, bolder-type and plate-like corals. The reef crest and back-reef areas are characterized by palmate and bolder-type coral forms.



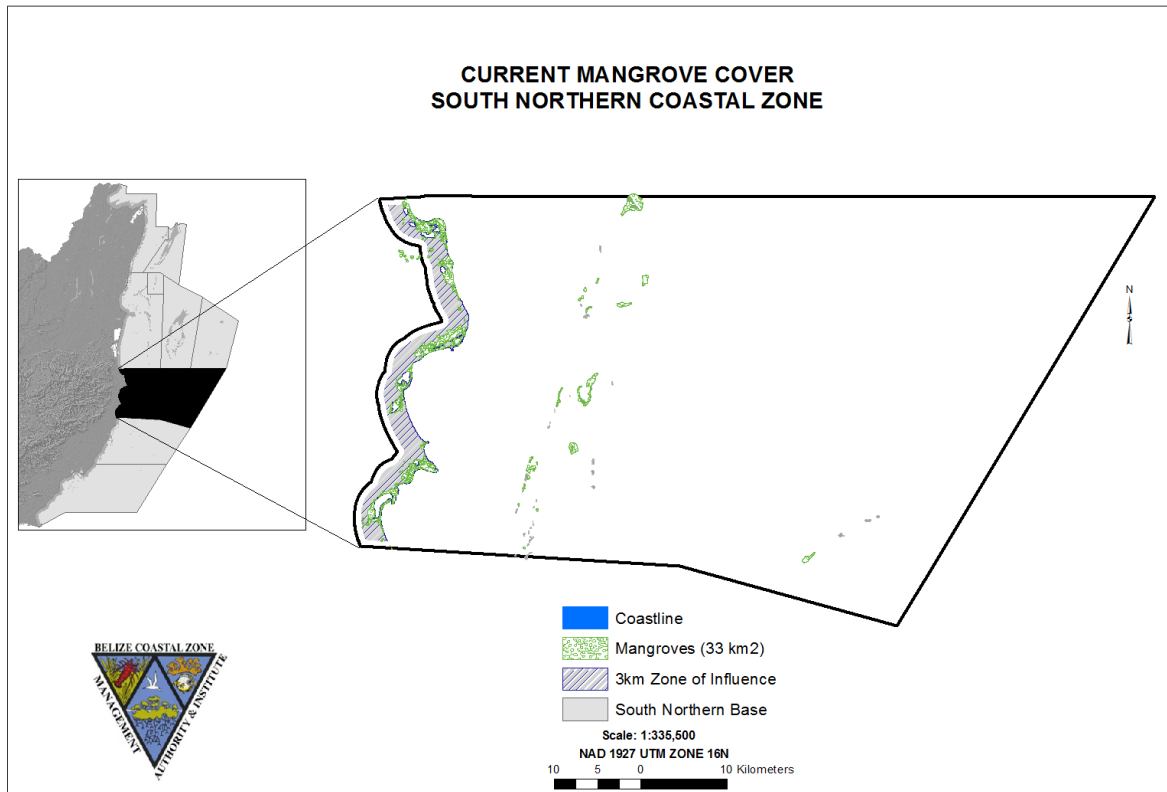
Coral cover in this region is about 98 square kilometres (**Map 16**). Results of the InVEST Habitat Risk Assessment (HRA) model suggest that currently 3.4% of the region's corals are at low risk, 96.08% at medium risk, and 0.53% at high risk (**Fig. 1**). The results also suggest that in a Conservation Zoning Scheme no corals would be at high risk. There would also be proportionately less corals at medium risk than in the current. According to HRA model results, corals that were formerly at medium risk in the current scenario would be at low risk in a future Conservation Zoning Scheme, making the total percentage of corals at low risk in this scenario 20.06%, and at medium risk 79.94% (**Fig. 1**). In a Development Zoning Scheme, HRA model results suggest that the threat to corals would become increasingly higher. Only 3.39% of corals would be at low risk whereas 15.38% and 81.23% of present corals would be at medium and high risk, respectively (**Fig. 1**). In the proposed Informed Management Zoning Scheme, HRA results are indicating that no corals would be at high risk, 0.2% of present corals would be at low risk, and 99.8% at medium risk (**Fig. 1**).



**Figure 1: Risk to Corals in the South Northern Region by Scenario**

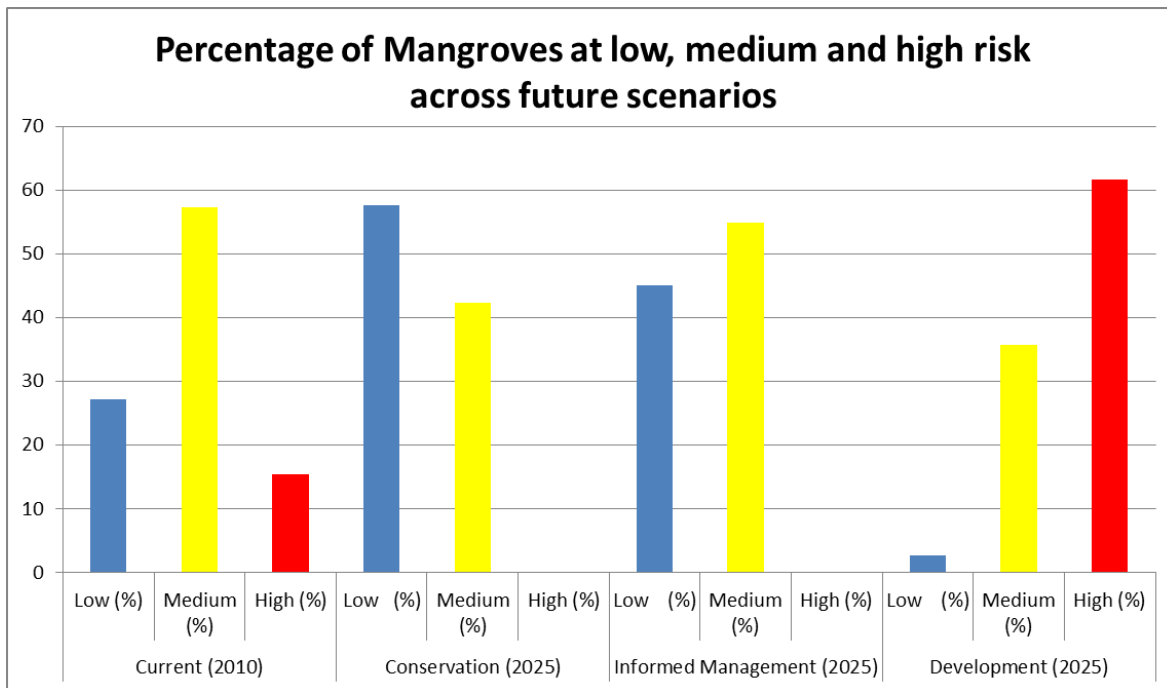
### 6.5.2 Mangroves

The dominant intertidal or wetland species in the region is mangrove. These include the Red Mangrove (*Rhizophora mangle*), the White Mangrove (*Laguncularia racemosa*) and the Black Mangrove (*Avicennia germinans*). The mangrove-associate species such as the Button Wood (*Conocarpus erectus*), and the Poisonwood (*Metopium brownie*) are also found on a number of the cayes, especially those that have not been overtaken by development. Other frequently encountered woody vegetation on the cayes that are either untouched by development or that have not been fully developed, are the Red Gumbo Limbo (*Bursera simaruba*), the Wild Cocoplum (*Hirtella Americana*) and the Genip (*Grias cauliflora*).



**Map 19: Mangrove Cover within the South Northern Region**

In this region, the total mangrove cover is approximately 31 square kilometers (**Map 17**). Results of the InVEST Habitat Risk Assessment (HRA) model suggest that currently 27.22% of the region's mangroves are at low risk, 57.34% at medium risk, and 15.44% at high risk (**Fig. 2**). The results also suggest that in a Conservation Zoning Scheme no mangroves would be at high risk. There would also be proportionately less mangrove at medium risk than in the current. According to HRA model results, mangroves that were formerly at medium risk in the current would be at low risk in a future Conservation Zoning Scheme, making the total percentage of mangroves at low risk in this scenario 57.67%, and at medium risk 42.33% (**Fig. 2**). In a Development Zoning Scheme, HRA model results suggest that the threat to mangroves would become increasingly higher. 2.71% of mangroves would be at low risk whereas 35.68% and 61.62% of present mangrove would be at medium and high risk, respectively (**Fig. 2**). In the proposed Informed Management Zoning Scheme, HRA results are indicating that no mangroves would be at high risk, 45.11% of present mangroves would be at low risk, and 54.89% of medium risk (**Fig.2**).

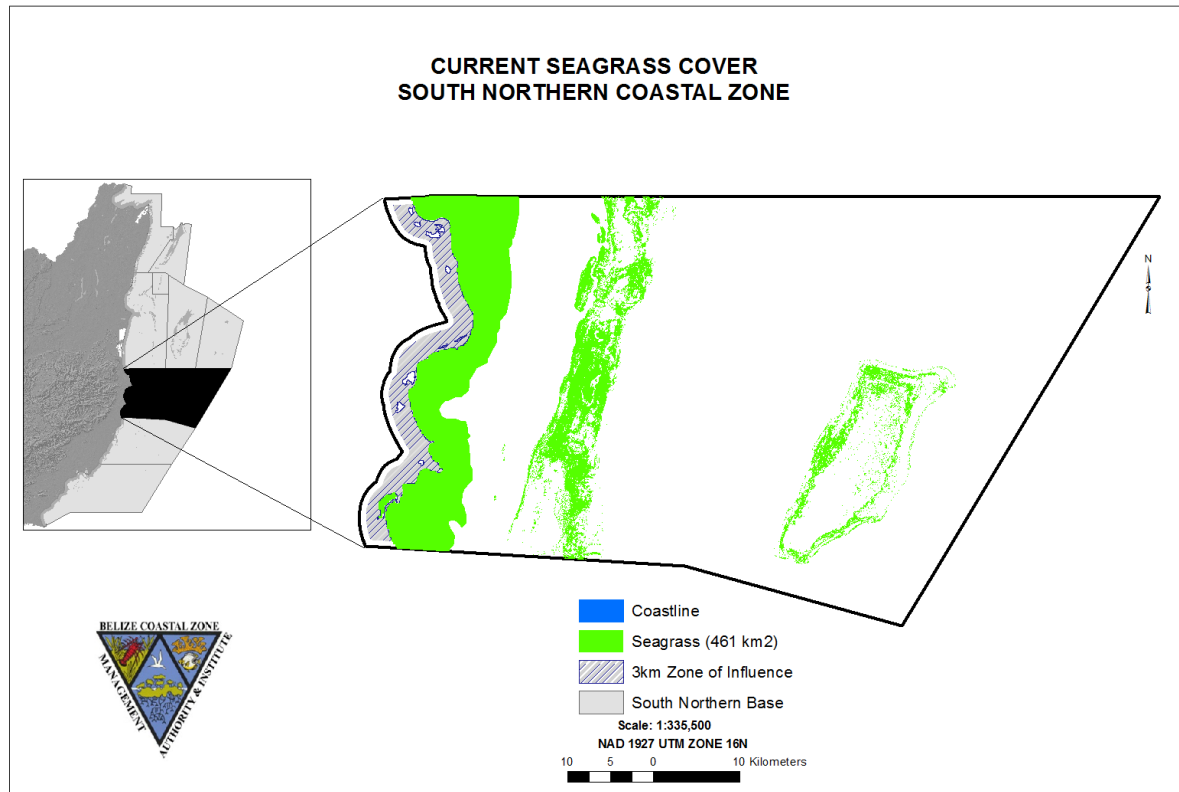


**Figure 2: Risk to Mangroves in the South Northern Region by Scenario**

### 6.5.3 Seagrass

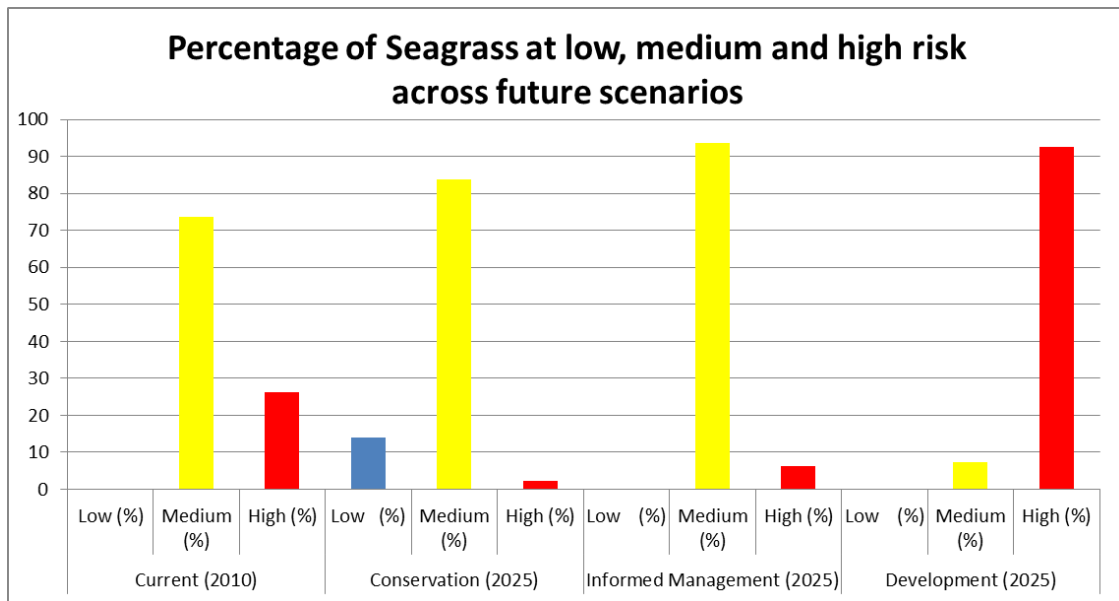
Seagrass beds dominate much of the areas of the barrier lagoon, including the waters around the patch reefs and near-shore areas of the cayes, as well as the shallower and less turbid areas of the shelf lagoon. The predominant species is the Turtle Grass (*Thalassia testudinum*). Other sea grass species found in the area, particularly near the cayes and intermingled with the Turtle Grass (*Thalassia testudinum*) are the Manatee Grass (*Syringodium filiforme*) and Halodule (*Halodule wrightii*).





**Map 20: Seagrass Cover in the South Northern Region**

The total seagrass cover for the South Central region is approximately 98 square kilometres (**Map 18**). Based on the Habitat Risk Assessment (HRA) conducted for this region, approximately 0.24% of the region's seagrass are currently at low risk, 73.59% at medium risk, and 26.17% at high risk (**Fig. 3**). In a Conservation Zoning Scheme, HRA model results suggest a dramatic reversal of the level of risk to current seagrass in this region whereby only 2.21% of seagrass would be at high risk, 14.08% of seagrass would be at low risk and 83.72% at medium risk in 2025 (**Fig. 3**). In a Development Zoning Scheme, model results suggest that 92.55% of present seagrass would be at high risk. This zoning scheme also represents the only scenario in which seagrass are at high risk. The results also suggest that in the Development Zoning Scheme, 7.22% of seagrass would be at medium risk and 0.23% at low risk in 2025 respectively (**Fig. 3**). In the proposed Informed Management Zoning Scheme, the HRA model results suggest an improvement in the amount of seagrass that are currently at risk. Under this zoning scheme, 93.54% of present seagrass would be at medium risk. Additionally, the model results reveal that under this zoning scheme, 0.09% of present seagrass would be at low risk and 6.37% at high risk in 2025 (**Fig. 3**).



**Figure 3: Risk to Seagrass in the South Northern Region by Scenario**

In discussing the results of the InVEST ecosystem models, and in particular the habitat risk assessment model, there is the need to consider limitations of the model, which are highlighted below:

- Results should be interpreted on a relative scale within a study region and across habitats and stressors, but not to results from separate analyses.
- Results do not reflect the effects of past human activities.
- Results are based on equal weighting of criteria unless the user weights the criteria by importance or data quality.
- Cumulative risk is additive (rather than synergistic or antagonistic).
- Climate change impacts are not directly accounted for in model

Additional information on how this model works can be found in **Appendix B.1** of the Belize Integrated Coastal Zone Management Plan.

### **Recommended Actions:**

1. Implement the Informed Management Zoning Scheme to limit certain activities, such as dredging, in specific areas in order to reduce the impacts to sensitive habitats

## **6.6 Utilities**

### **6.6.1 Energy**

Energy for the mainland areas in this region is supplied by the Belize Electricity Limited (BEL). Energy for the cayes is supplied through several sources, namely, generator, wind, solar and butane. Fisherman camps use mostly butane lamps while the resorts, research station, residential/ vacation and residential employment homes use mostly generators, in combination with either wind or solar.

### **6.6.2 Water**

Water supply for mainland South Northern region is acquired from the public water supply system provided by the Belize Water Services (BWS), bottled water suppliers and basic roof catchment. On the cayes, the primary source of water is from the rain, possibly because of the costs which cover basic catchment roof and rudimentary storage systems as against elaborate roofs and storage systems. Other water sources include bottled water, water from the public supply system from the mainland, the latter mainly during the dry season, and water produced through reverse osmosis and from wells.

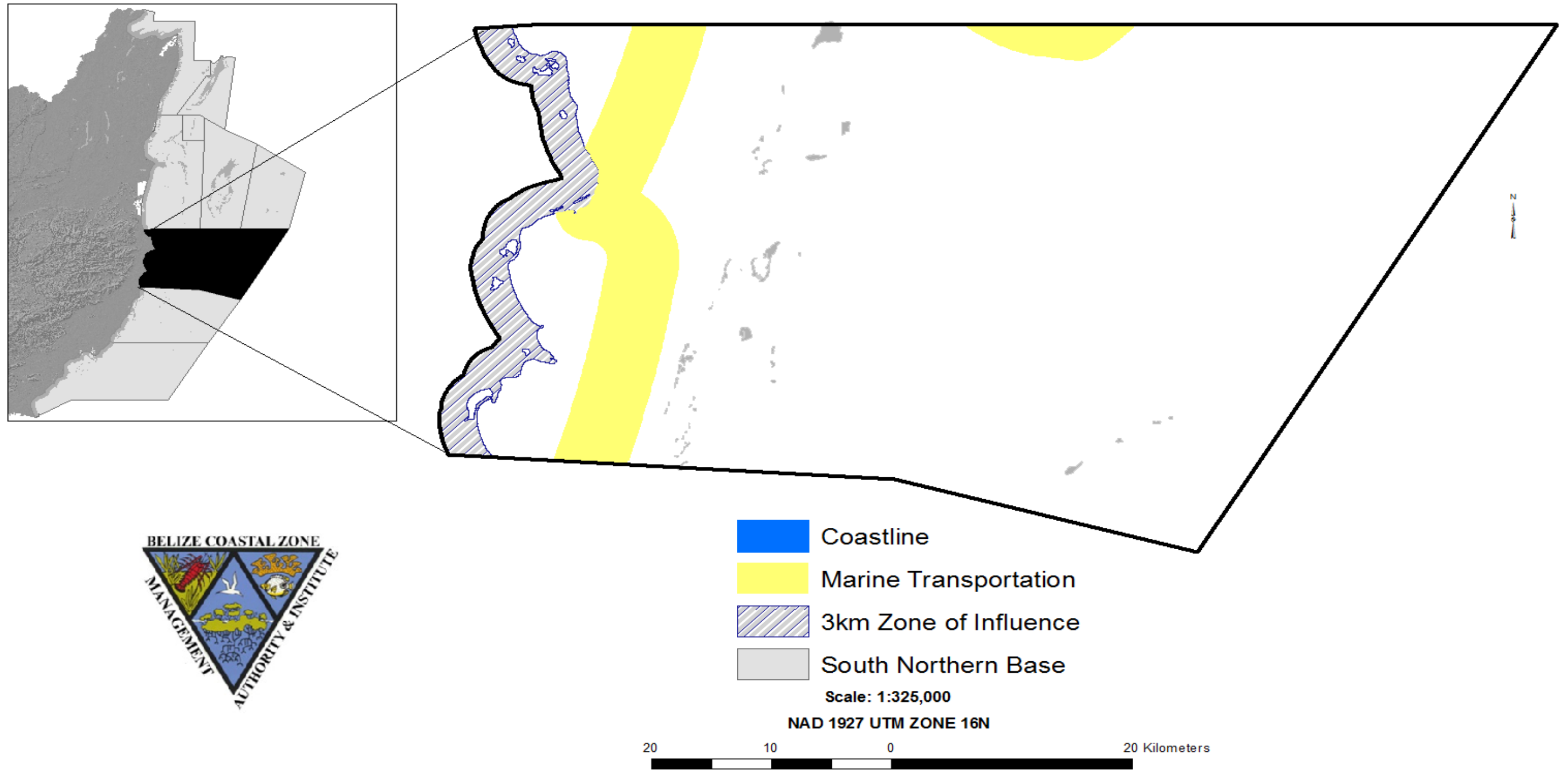
### **6.6.3 Marine Transportation**

To 2030, development in this region is expected to increase with the construction of several new low to medium density resorts recommended in the NSTMP. Therefore transportation in and out of these areas will be necessary by both land and sea. For land travel new roads will need to be constructed linking these areas to already existing road infrastructure. In terms of the marine environment, lighthouses, buoys and markers should be placed in the sea to direct vessels and humans away from fragile and sensitive ecosystems. As such, the coastal zone management guidelines were formulated to attach as conditions to development approvals for the placement of walkways, lighthouses, buoys, and markers on sea and land. However with increased traffic in the area a centralized enforcement agency such as the Port of Belize and/or Belize Coast Guard will need to be present to enforce boating speeds and standards. More specifically, the Commerce Bight area is an area of consideration for such port facilities/upgrades. Also, there might be special consideration for aerodrome development in this region, Specifically in Dangriga Town.

**Recommended Actions:**

1. Close collaboration with relevant agencies to ensure that energy and water supply are provided through environmentally friendly means.
2. As developments begin construction enforcement agencies must be present to ensure that increased activity does not disturb sensitive ecosystems

# INFORMED MANAGEMENT ZONING SCHEME FOR MARINE TRANSPORTATION: SOUTH NORTHERN REGION



Map 21: Informed Management Zoning Scheme for Marine Transportation in the South Northern Region

Table 16: Framework for Implementing Informed Marine Transportation in the South Northern Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Marine Transportation	Marine area delineated for the use of watercraft, such as water taxis, cruise ships, etc, to transport people, goods and cargo between multiple destinations	1.Shipping operation activities 2. Port development and operation 3. Vessel traffic use	Dredging for the maintenance of navigational lanes and ports of entry	Passage/entry of vessels  Operation and construction of ports	1. Fishing  2. Marine recreational activities  3. Anchoring that leads to disturbance and destruction marine habitats, including but not limited to, coral reef system, seagrass beds, etc  4. Exploration and extraction of petroleum  5. Construction of any illegal structure that would obstruct shipping and navigation  6. Disposal of solid and liquid wastes from boats and ships  7. Transportation of illegal goods, such as drugs and weapons, and human trafficking	Belize Port Authority Act Belize National Coast Guard Service Act Customs Regulation Act Defence Act Environmental Protection Act Harbours and Merchant Shipping Act Immigration Act Maritime Areas Act Marine Dredging Policy (Draft) Mines and Minerals Act	Belize Port Authority  Belize National Coast Guard  Customs Department  Belize Defence Force Department of the Environment Belize Port Authority  Immigration Department  Ministry of Foreign Affairs Mining Unit, Ministry of Natural Resources  Geology and Petroleum Department

## **6.7 Pollution Control**

Presently, solid waste generated on the mainland is disposed off at the municipal dumpsite. There is concern that Dangriga garbage dump site is located near a creek and that leachate from the site is entering the Gra Gra Lagoon National Park. In terms of solid wastes generated on the cayes, and in particular on the fisherman camps, the practice has been to dispose of them mainly by burying inorganic non-recyclables, burning and organic waste while waste such as paper and some plastics are disposed of by incineration or used for land filling. The resorts transport some of their waste to mainland Dangriga. At the research stations, particularly WCS at Middle Caye, the garbage is separated in to compost, where the waste vegetables and fruits are mixed and used to reconstitute soil for plants and other trees, and some plastics and glass products are transported to mainland Dangriga.

There is concern that septic tanks located in close proximity to the coastline are contributing to poor water quality by means of inadequately treated sewage. At the fish camps, sewage waste is disposed of in latrines located on piers over the sea, in the mangrove interior or on the edge of the mangroves. Due to very low usage, impact of the waste is insignificant due to the relatively high volume of and assimilative capacity of the surrounding seawater. The resorts and more developed cayes dispose of their waste by individual septic tanks and soak aways and compost. There is some uncertainty as to where septic tank effluent was disposed in absorption fields. Grey water is mostly disposed directly into the soil, or in containment (soak-away) for the more developed cayes. The waste loads that enter into the coastal and marine areas from both the agriculture runoff and aquaculture section is a huge concern in this region. Wastes from citrus and banana crops, and shrimp farms are believed to be compromising water quality.

### **Soak-aways and Septic Tanks on Coastal Mainland**

The Central Building Authority (CBA) is the agency mandated by the Belize Building Act 2003 to control building operations in the interest of public safety and health. In 2010, CBA produced detailed specifications for the construction of soak-aways and septic tanks for residential and other low impact buildings. Detailed diagrams found within the document can be found in the Appendices sections at the end of this document. A summary of required specifications for septic tanks servicing residential and other low impact buildings can be seen in Table 16. The CZMAI recommends that these standards be used for construction of septic tanks and soak-aways on the **coastal mainland**.

**Table 17: Specifications for Residential Low Impact Septic Tanks and Soak-a-ways**

Max # Of Persons Served	Liquid Capacity Of Tank		Internal Dimensions							
			Length (L)		Width (W)		Liquid Depth (Ld)		Total Depth (H)	
	GALLONS (Approx.)	CUBIC FT.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.
4	500	67	6	0	3	0	4	0	5	2
6	600	81	7	0	3	0	4	0	5	2
8	750	101	7	0	3	6	4	0	5	2
10	900	121	7	6	3	6	4	6	5	8
12	1100	148	8	6	4	0	4	6	5	8
14	1300	174	10	0	4	0	4	6	5	8
16	1500	201	10	0	4	6	4	6	5	8

### **Treatment of Wastes on Cayes**

Due to the fragile nature of the cayes and atolls septic tanks and soak-aways are not recommended as a means of handling household waste. Also, since there are no established solid waste management on cayes the CZMAI recommends the following based on the Long Caye Eco-Guidelines produced by Pleasure Island Limited for the handling of waste on **cayes**:

- Human waste must be treated with composting toilets. Septic tanks, cesspools and sewers should be prohibited.
- Gray water must be treated, and all dwellings and buildings must have a gray water treatment system approved by DOE before construction.
- Organic wastes must be collected and disposed of in composting bins.
- However possible, recycling and garbage separation is encouraged.
- Frequent removal of solid waste from the cayes for treatment and proper disposal on the mainland.



**Recommended Actions:**

1. Implement the National Solid Waste Management Plan (SWMP) recommendations for this region in order to improve solid waste management. The leachate originating from the Dangriga dump site must be monitored to ensure that it is not entering and affecting the Gra Gra Lagoon National Park
2. Ensure that development applications include as a component management plans for both solid and liquid wastes
3. Close collaboration among the relevant agencies to ensure that the solid and liquid waste disposal management activities are carried out through environmentally friendly mechanisms
4. Conduct water quality tests on a regular basis to monitor effluents, especially the creeks
5. Construct septic tanks three feet above ground for houses built close the shoreline to minimize flooding of the sewer system during major storm events
6. Develop incentive programs to encourage fishers to collect solid waste dumped on cayes and in the marine environment
7. Require DOE inspection of sewage treatment systems on cayes.

## **6.8      *Social Amenities***

At the South Northern region consultations, stakeholders identified beach reclamation and overall upkeep of beaches in Dangriga as a major problem. Due to recent construction in Dangriga, many of the beach area has become littered with construction debris leaving stakeholders without necessary leisure space. This also effectively eliminates any potential sun and beach tourism that could occur in Dangriga town. Also mentioned was the opening of the barmouth in Dangriga town. As a result of a combination of low tide and rapid sedimentation, the bar mouth in Dangriga town is constantly closed. Therefore sea access is cut off which affects the livelihoods of many families as fishing remain a top income earner in Dangriga. In the past, the town council would pay to have the barmouth cleared once a year, however this practice was determined as not lucrative since sand removed could not be sold due to saturation by sea water. Therefore this practice was discontinued leaving many stakeholders at the mercy of the tides for movement in and out of Dangriga Town.

### **Recommended Actions:**

1. Government must allocate fund to efforts for the reclamation of shoreline in southern Belize.
2. Thorough research must be done prior to the issuance of dredging permits in order to prevent further increase in erosion rates and decrease harmful sedimentation.
3. Allocate funding for Dangriga town council to clear the barmouth area annually in order to ensure livelihoods of stake holders.

## 6.9 Conservation

South Water Caye and Glovers Reef are marine reserves and World Heritage Sites. They both have protected status. However, the contribution of the other cayes to the protection of the mainland from storm surges, the linkages to the fishing and tourism industries, its scientific and economic opportunities and its relationship to the survival of the barrier reef cannot be avoided. Furthermore, the unique biodiversity and social and cultural importance of some of the Cayes mandates that particular areas of the Dangriga Cayes Region to remain in their natural state.

An obstacle to conservation identified by the stakeholders of the south northern region is land tenure. Many privately owned properties are located within ecologically sensitive areas along watersheds and lagoons that are important for surrounding ecosystems. Currently, there are no legal mechanisms through which the government can steer development of these privately owned properties. However, the stakeholders have identified Conservation Covenants as a mechanism through which the government can enter into legally binding agreements with private land owners to regulate or restrict the development of these properties.

Conservation Covenants can be either positive (requires land owner to perform actions that will keep the status of the property environmentally stable) or negative (restricts land owner from performing certain actions considered detrimental to the surrounding ecosystem), and in return land owners receive compensation in the form of easements or tax incentives. For example, in Australia, land owners that enter into a conservation covenant and received capital proceeds (money, land, etc.) are eligible for Capital Gains Tax treatment. Those that didn't can also receive Capital Gains Tax treatment as well as income tax deductions.

In 2009, the Ya'axché Conservation Trust and Belize Association of Private Protected Areas presented the Conservation Covenant Act to government. This act was not passed into law on the grounds that:

1. Only the current land owner is bound to the burden of the covenant. Subsequent land owners are not obligated to enter into a similar agreement.
2. The only way in which the burden of the covenant can be perpetuated with the land is if the original covenant touches or concerns the land, the original covenantee was the legal owner of the land benefitted, and the subsequent owner has the same interest in the land. However, very often this is not the case and there are no legal mechanisms to ensure it.
3. In order to receive benefits from the agreement, land owner must have another parcel of land nearby.

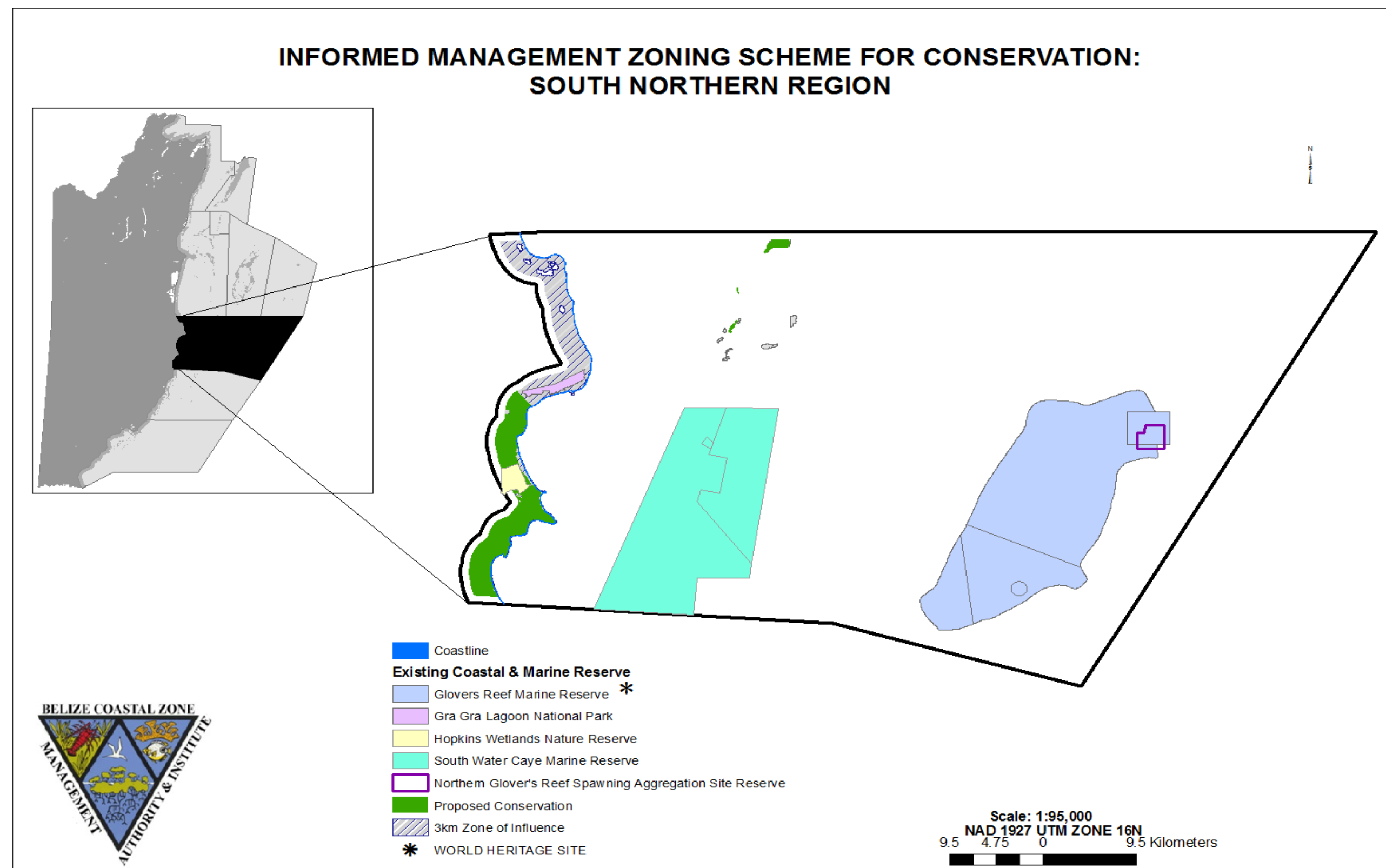
The Government has acknowledged that improving legal enforcement mechanism is key in promoting conservation efforts. Therefore improvements must be made on the legislative

framework of the Conservation Covenant as well as legally enforceable economic incentives for parties involved. Improvements required are as follows:

1. Recognize negative covenants for conservation
2. Recognize covenants in gross
3. Ensure that rights of third-party enforcement are binding to subsequent land owners
4. Allow for conservation covenants to be for a specific period of time and subject to variation and termination to add flexibility.

**Recommended Actions:**

1. Provide the foundation for the protection and preservation of the priority cayes named above
2. Provide a foundation for any management plan which may be conceived for the region
3. Encourage stakeholders participation in the monitoring of the application of the planning guidelines
4. Ensure the continuity of conservation efforts for the entire region, including the wetland area in Hopkins Village
5. Provide foundation for any new initiatives for protected areas for the region through land use assignment provisions
6. Complement existing management plans for the two protected areas in the region



Map 22: Informed Management Zoning Scheme for Conservation in the South Northern Region

Table 18: Framework for Implementing Informed Management Conservation Scheme

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Marine Conservation	Coastal and marine areas delineated for the retention of critical habitats and ecosystems for a diversity of marine life, fish spawning aggregation sites, replenishment zones, biodiversity areas	1. Coastal and marine reserves  2. Breeding, spawning, feeding area for marine life  3. Replenishment zones  4. Seagrass rehabilitation  5. Mangrove planting  6. Foraging area for manatees, dolphins, crocodiles  7. Nesting beaches for sea turtles	1.Research and education  2. Marine Recreation and Tourism	Tourism and recreation (snorkeling and diving)  Research and education  Establishment of new reserves	1. Fishing within “no-take”/replenishment zones, and spawning aggregation sites  2. Development of shoals  3. Anchoring that leads to disturbance and destruction marine habitats, including but not limited to, coral reef system, seagrass beds, mangrove forests, etc  4. Exploration and extraction of petroleum  6. Disposal of solid and liquid wastes from boats and ships  7. Shipping	Belize Port Authority Act  Belize National Coast Guard Service Act  Customs Regulation Act  Defence Act  Environmental Protection Act  Harbours and Merchant Shipping Act  Immigration Act  Maritime Areas Act  Marine Dredging Policy (Draft)  Mines and Minerals Act	Belize Port Authority       Belize National Coast Guard       Customs Department    Belize Defence Force  Department of the Environment   Belize Port Authority     Immigration Department  Ministry of Foreign Affairs  Mining Unit, Ministry of Natural Resources   Geology and Petroleum Department

## **6.10 *Scientific Research and Education***

Erosion has been identified as a major threat to the stakeholders and residence of the South Northern Region. All of which has been attributed to mining operations that have occurred throughout the region over the past 10 – 15 years which have caused changes in the natural flow of sediments that replenish beaches and shorelines. However, it is impossible to plan or prevent the effects of natural processes such as erosion. There are scientifically proven methods of reclaiming shoreline by natural and unnatural means that may help to mitigate this high rate of erosion. However, it will require contracting consultants to assess the erosion problem in the region in order to determine which method would be most effective and efficient. Therefore funds must be available for specialists to aid in addressing this major problem as it not only pertains to just the south northern region but the entire southern portion of the country.

The management plans for South Water Caye Marine Reserve and Glovers Reef Atoll Marine Reserve all call for an integrated research and monitoring programme for the region as a strategy to maintain the long-term ecological integrity of biological diversity and sustainable resource use by dependent communities. These management plans also outline a framework for effective integrated research and monitoring of conservation targets, the development of a data management facility and the incorporation of community involvement from the buffer communities. .

### **Recommended Actions:**

1. Implement the recommended research and educational activities for the region as outlined in the management plans for South Water Marine Reserve and Glovers Reef Atoll Marine Reserve.
2. Government must allocate fund to efforts for the reclamation of shoreline in southern Belize.
3. Thorough research must be done prior to the issuance of dredging permits in order to prevent further increase in erosion rates.

## 7.0 IMPLEMENTATION STRATEGY

The South Northern Region Coastal Zone Management Guidelines form a part of the Belize Integrated Coastal Zone Management Plan being developed by the CZMAI. After approval of the Plan by CZMAI's Board of Directors, it will be offered to the House of Representatives for endorsement. Implementation of these coastal management guidelines will be undertaken through two mechanisms: (a) centralized statutory control through the various Government departments, and (b) localized community and stakeholder participation. Following the mechanism of centralized statutory control, the regulatory and permitting agencies with management mandates for the coastal zone will implement the specific policy actions and informed management spatial zoning scheme that are recommended in the Plan.

While the government agencies have the authority of the law to back up its procedures, it is constrained by limited resources. In several instances, however, local NGOs and community-based stakeholder organizations have greater access to, and knowledge of, local conditions and activities, though they have no statutory powers to either assist or control development beyond those available through the Village Councils and Towns Councils Acts. For this reason, it is recommended that localized community and stakeholder participation complement the management efforts of centralized government and statutory agencies in implementing integrated coastal zone management. The South Northern Region Coastal Advisory Committee (SNRCAC), and other interested stakeholders of this region, will work closely with the Coastal Zone Advisory Council (CZAC) regarding monitoring and implementation of the guidelines.

Objectives of the South Northern Region CAC include, *inter alia*, contributing to the drafting of the coastal zone management guidelines for their coastal region, supporting their initial approval, and monitoring and reporting to the Coastal Zone Advisory Council (CZAC) on the implementation of the guidelines. This means that the Committee will be expected to undertake the following tasks:

1. Develop, assess and approve the draft guidelines;
2. Forward the approved draft guidelines to CZMAI for approval;
3. Monitor the implementation and effectiveness of the guidelines;
4. Identify the appropriate time for a review of all or part of the guidelines;
5. Review and update the guidelines.

Planning is a continual process of recommendation, participation, implementation and review. These guidelines shall be monitored on a continual basis in order to establish its strengths and weaknesses. Through a management planning mechanism, the SNRCAC, along



with CZMAI, will regularly update the guidelines, which will hopefully set a good example of representative, cooperative and adaptive management that is environmentally sound, rational and equitable.

Additional studies are needed in liaison with the relevant authorities and region's stakeholders. Such studies should reveal information which may help to further support sustainable development and to address the social, cultural and economic human use of the region and its resources.

The reformation of the Coastal Advisory Committee for this region is recommended subsequent to Cabinet's adoption of the Belize Integrated Coastal Zone Management Plan. The South Northern Region CAC would be locally based and largely constituted of voluntary organizations charged with the role of monitoring the state of the coast and development of the region, making reports and recommendations on issues they identify. The proposed membership of the reformed South Northern Region CAC is drawn from the following sources; however the proposed list is not exhaustive as new interest groups are constantly emerging, especially in the fisheries sector:

- Village councils of Sittee River, Hopkins and Commerce Bight;
- Dangriga Town Council
- Stann Creek Fishermen Association or relevant fisher group representing majority of fishermen in the Stann Creek area<sup>1</sup>;
- Dangriga Tour Guide Association;
- National Fishermen Cooperative Association;
- National Garifuna Council;
- Ecumenical High School;
- Fisheries Department;
- Lands and Surveys Department;
- Geology and Petroleum Department;
- Forest Department ; and
- Dangriga Chapter, Belize Tourism Industry Association

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<sup>1</sup> It has been brought to CZMAI's attention that there are several other interest groups including CONCH, WABAFU etc. that represent interest of fishermen in this area. Therefore, CZMAI will meet with all the fisher groups to ensure that the group with majority membership from fishermen in in the south northern region will be represented in the CAC.

## **8.0 CONCLUSIONS**

The coastal zone management guidelines recommended for the region are not intended to be rigid, as changing socio-economic, cultural and environmental conditions may necessitate modifications. Similarly, changing shapes of the cayes and the health of habitats of the terrestrial and aquatic environments may also require this. As well, land tenure needs to be clarified.

Noteworthy however, is that it has resulted in the identification of sites for uses which may not otherwise have been considered for such, and the disqualification of sites for intended uses not conducive to sustainable development. This can transfer and disperse certain activities from accumulated point impacts, to the wider and other areas to reduce the pressures on environments that apparently are under stress from over use.

It is hopeful that the objectives outlined at the beginning can be realized through the recommended sector policies and management guidelines. More importantly though, is that the formulation of coastal zone management guidelines is a starting point to ensuring the sustainable use and development of the South Northern Region.

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**South Northern Region Coastal Zone Management Guidelines**

Belize Integrated Coastal Zone Management Plan

Coastal Zone Management Authority & Institute 2016

## 10.0 APPENDICES

### 10.1 BACKGROUND

The coastal zone is one of Belize's greatest assets and its magnificent Barrier Reef Reserve System is a renowned World Heritage Site. It is the longest barrier reef in the Western Hemisphere, extending approximately 280 km from the northern to southern borders of the country (Cooper et al. 2009). Belize's coastal zone has complex and dynamic marine ecosystems that support innumerable ecological processes and a vast array of marine life and habitats. In addition to its important ecosystem functions, the coastal zone is vital to the Belizean way of life. The highly productive coastal zone is the resource base for a broad range of economic activities. In fact, approximately thirty-percent of the country's gross domestic product is directly linked to these commercial activities that take place within the coastal zone (Cho 2005). The coastal zone also has important social and cultural values to the Belizean people, especially to approximately 40% of the population that reside on the coast and in offshore areas (SIB 2010).

Over the past decades, rapid economic development and population growth have taken place in the coastal zone and inland areas of Belize. World-renowned snorkeling and diving draw over 800,000 tourists to the region annually, driving the construction of new development (BTB 2008). These occurrences have led to increasing pressures on coastal and marine resources, with implications to the livelihoods of those that depend upon them. These anthropogenic threats stem from various developmental activities associated with tourism and recreational facilities, population growth and expansion, utility supply, dredging and mineral extraction, land clearance, pollution, waste disposal, fisheries and aquaculture. These threats are compounded by natural hazards, global warming, rising sea levels, and the vulnerability of sensitive ecological systems to climate change. Thus, it is imperative now more than ever to ensure that the coastal zone is utilized in a manner that will continue to support important ecological functions, as well as social, cultural and economic prosperity for current and future generations.

For many years, and even today, management of the Belizean coastal zone has been under the regime of sectoral planning. However, The need for an integrated approach to optimally manage Belize's coastal resources was made resoundingly clear at a historic meeting in 1989 when a wide cross-section of stakeholders from various sectors, including scientists, marine managers, private sector, and coastal communities converged in San Pedro, Ambergris Caye (Gibson 1989). Integrated coastal zone management (ICZM) brings together all decision-making agencies to ensure integration among their policies and management plans, to ultimately improve and maintain the quality of coastal and marine ecosystems. A defining feature of Belize's ICZM plan is balancing national economic development needs with conservation priorities within a spatially defined area over a specified timeframe. The development of site-

specific coastal zone management guidelines, as a component of the Belize ICZM Plan, serves as a means to guide management decisions and to form the basis on which decisions are made to regulate the development and use of coastal and marine resources within the coastal zone.

## 10.2 SUMMARY OF ENABLING LEGISLATION AND IMPLEMENTING AGENCIES FOR ENFORCEMENT OF THE INFORMED MANAGEMENT ZONING SCHEME

The various governmental organizations and agencies with management mandates for the coastal zone that are needed to implement these guidelines, to synchronize the efforts of the CZMAI via the Belize Integrated Coastal Zone Management Plan, and to strengthen inter-agency coordination for integrated coastal zone management include:

*Banana Control Board* – The Banana Industry Act requires applications for the cultivation of designated areas for banana production for the region. The South Northern Region CAC should be included in any discussion on policy formulation on banana production as it affects the region.

*Belize Agricultural Health Authority* – The Belize Agricultural Health Authority Act requires applications for licenses, permits or certificates to import and export animal products, animal feed, and plant products into and out of Belize following inspection as it affects the region. The South Northern Region CAC should be included in any discussion on policy formulation on agricultural import and export as it affects the region.

*Belize Port Authority* – The Belize Port Authority Act requires applications for boat and captain licenses and for the construction and operation of private ports for the region. Also, The Harbors and Merchant Shipping Act requires the Authority to regulate the passage of vessels in and out of Belizean waters as well as the maintenance and delineation of vessel routes, lighthouses and wharfs. The South Northern Region CAC should be included in any discussion on policy formulation on vessel licencing and shipping as it affects the region

*Belize Tourist Board* – The Belize Tourist Board Act requires applications for hotel licenses for the region. The South Northern Region CAC should be included in any discussion on policy formulation on hotel development as it affects the region.

*Belize Trade and Investment Development Service (BELTRAIDE)* – The Belize Trade and Investment Development Service Act requires that foreign trade and investment be liaised through the BELTRAIDE organization. The South Northern Region CAC should be included in any discussion on policy formulation on major developments as it affects the region.

*Central Building Authority* – The Housing and Town Planning Act provides for the regulation of the use and development of land through qualitative measures that is, building densities, land use class assignments etc. However, it does not address the structural integrity of buildings, a component of the development. The Central Building Authority, by way of the Belize Building

Act, is legislated specifically to address this, and provides for the appointment of Local Building Authorities to administrate the Act. Thus, the Southern Region CAC can be appointed as the Local Building Authority for the South Northern Region. However, this may require strengthening the South Northern Region CAC with technical expertise to do this. The alternative is to coordinate this function with the Town and Village Councils of Dangriga, Hopkins, and Commerce Bight.

*Dangriga Town Council* – The Town Councils Act requires applications for liquor licenses for the region. The South Northern Region CAC should be included in any discussion on policy formulation on issuing of liquor licenses as it affects the region.

*Department of Environment* – The Environmental Protection Act requires applications for environmental clearance for the region. The South Northern Region CAC should be included in any discussion on policy formulation on environmental protection as it affects the region.

*Fisheries Department* – The Fisheries Act requires applications for fishing license for the region. The South Northern Region CAC should be included in any discussion on policy formulation on fisheries as it affects the region.

*Forest Department* – The Forest Act requires applications for the removal of mangroves in coastal areas for the region. The National Parks System Act requires the establishment of National Parks, Nature Reserves, Wildlife Sanctuaries, and Natural Monuments to preserve ecologically important and sensitive areas. The Wildlife Protection Act empowers the Forest Department to determine species to be prohibited from hunting practices as it sees fit. The South Northern Region CAC should be included in any discussion on policy formulation on mangrove removal and designation of protective status to sensitive areas and species as it affects the region.

*Geology & Petroleum Department*, – The Petroleum Act requires applications for oil exploration and issuing of parcel contracts for the region. The South Northern Region CAC should be included in any discussion on policy formulation on petroleum activities as it affects the region.

*Hydrology Unit, Ministry of Natural Resources* - The Water Industry Act requires all entities to apply for a Water Abstraction License where the water source is limited to a natural water body: surface or groundwater. The South Central Region CAC should be included in any discussion on policy formulation on water use as it affects the region.

*Lands and Surveys Department* - The Land Utilization Act requires applications for subdivisions for the region, any demarcation of special development areas, any allocation of land in the

coastal region, this includes any construction on seabed. The South Northern Region CAC should be included in any discussion on policy formulation on land as it affects the region.

*Meat and Livestock Commission* – The Meat and Livestock Act requires applications for the rearing, breeding, sale and exportation of meat and livestock for the region. The South Northern Region CAC should be included in any discussion on policy formulation on the sale of meat and livestock as it affects the region.

*Mining Unit, Ministry of Natural Resources & the Environment* – The Mines and Minerals Act requires applications for dredging, oil exploration and sand mining permits for the region. The South Northern Region CAC should be included in any discussion on policy formulation on dredging and oil exploration as it affects the region.

*Ministry of Health* – The Public Health Act requires the Director of Health to make arrangements for health inspectors to enforce building and health standards for the region. The South Northern Region CAC should be included in any discussion on policy formulation on public safety as it affects the region.

*Ministry of Housing*– The Ministry of Housing formulates policy for housing and human settlements. Its added function is to assist with the alleviation of poverty due to urban growth. The Ministry coordinates planning and development control functions through municipal bodies. The Ministry also provides the services of Planners, Building inspectors and Engineers to provide the required necessary assistance. In accordance with Section 6 of the Act, the South Northern Region CAC can be delegated the powers and duties of the Central Housing and Planning Authority (CHPA) with regard to approving, with or without conditions, and prohibiting further development in the region as well as powers to serve prohibition notices. This delegation should be supported by the Solicitor General’s Office or an Attorney at Law for the enforcement of the provisions of the Act.

*National Emergency Management Organization* – The National Emergency Management Act requires that sites be declared as vulnerable areas for the region and policy formulation on disaster management be effectuated. The South Northern Region CAC should be included in any discussion on policy formulation on issues of national preparedness as it affects the region.

*Pesticide Control Board* – The Pesticide Control Act requires applications for the importation, manufacturing, sale and storage of restricted pesticides for the region. The South Northern Region CAC should be included in any discussion on policy formulation on pesticide use as it affects the region.



*Solid Waste Management Authority* – The Solid Waste Management Act requires the Solid Waste Management Authority to make arrangements for garbage collection or the engagement of contractors for the region. The South Northern Region CAC should be included in any discussion on policy formulation on garbage collection as it affects the region.

### 10.3 CHECKLIST FOR HUMAN USE/DEVELOPMENT OF THE COASTAL ZONE

DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>1. Coastal Agriculture</b>	
<b>Governing Legislation/Policy:</b>	
Banana Industry Act	<input type="radio"/> Banana Control Board <input type="radio"/> Banana Growers Association <input type="radio"/> Ministry of Agriculture
Belize Agricultural Health Authority Act	<input type="radio"/> Belize Agricultural Health Authority
Citrus (Processing and Production) Act	<input type="radio"/> Citrus Control Board <input type="radio"/> Citrus Growers Association <input type="radio"/> Ministry of Agriculture
Environmental Protection Act	<input type="radio"/> Department of the Environment
Land Utilization Act	<input type="radio"/> Land Utilization Authority <input type="radio"/> Ministry of Natural Resources
Meat and Livestock Act	<input type="radio"/> Belize Livestock Producers Association <input type="radio"/> Belize Agricultural Health Authority <input type="radio"/> Ministry of Agriculture
Papaya Growers Association Act	<input type="radio"/> Papaya Growers Association <input type="radio"/> Ministry of Agriculture
Pesticide Control Board Act	<input type="radio"/> Pesticide Control Board <input type="radio"/> Ministry of Agriculture

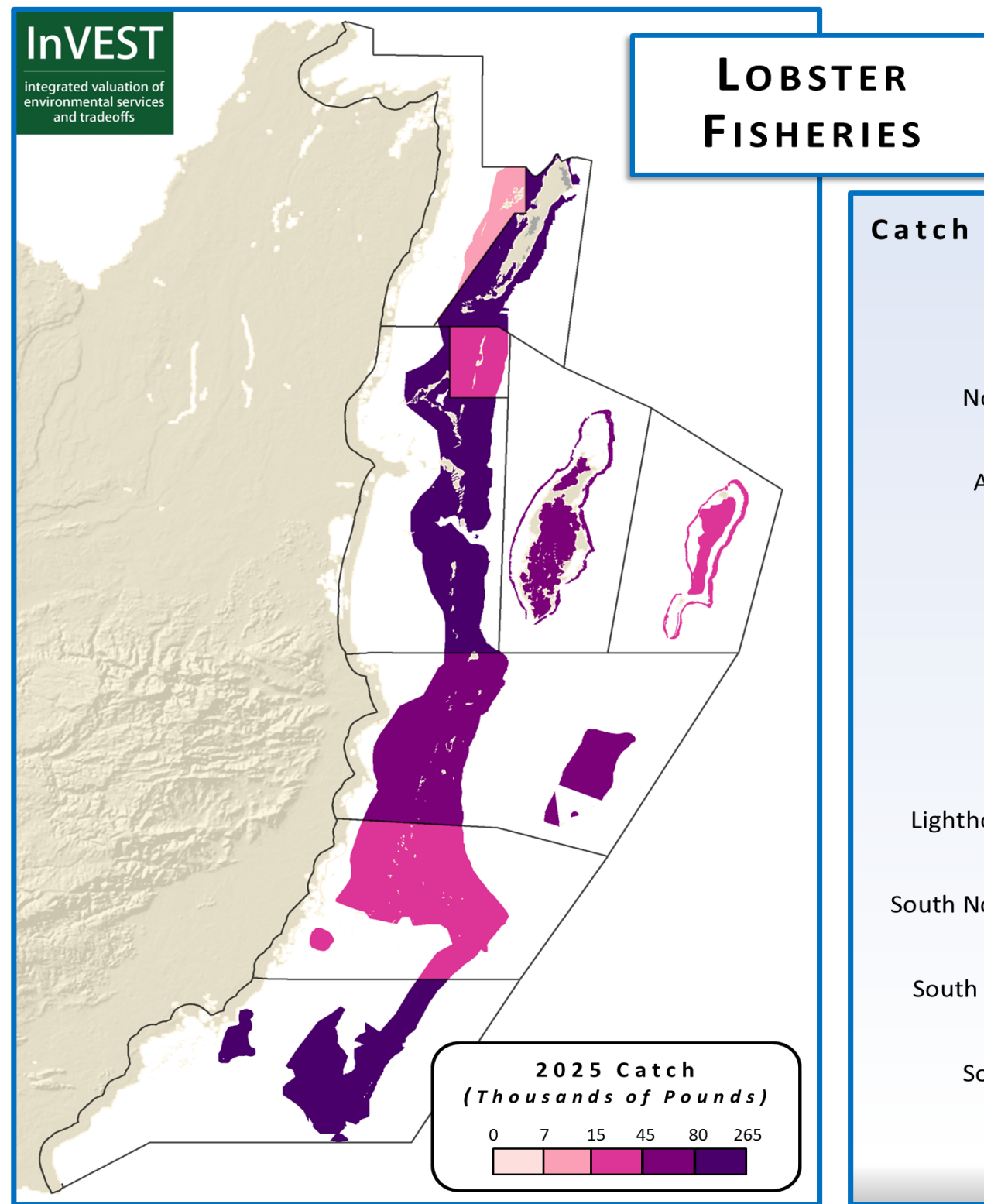
Sugar Cane Industry (Control) Act		<input type="radio"/> Belize Sugar Cane Board <input type="radio"/> Ministry of Agriculture
DEVELOPMENT ACTIVITY/HUMAN USE		RESPONSIBLE AGENCIES
<b>2. Coastal Aquaculture</b> <b>Governing Legislation/Policy:</b> Fisheries Act National Aquaculture Policy (Draft)		
		<input type="radio"/> Fisheries Department <input type="radio"/> Aquaculture Unit, Ministry of Agriculture
Environmental Protection Act		<input type="radio"/> Department of the Environment
Belize Trade and Investment Promotion Service Act		<input type="radio"/> Belize Trade and Investment
DEVELOPMENT USE	ACTIVITY/HUMAN	RESPONSIBLE AGENCIES
<b>3. Coastal Development</b> <b>Governing Legislation/Policy:</b>		
Belize Building Act		<input type="radio"/> Central Building Authority
Belize City Council Act		<input type="radio"/> Belize City Council
Belize Trade and Investment Promotion Service Act		<input type="radio"/> Belize Trade and Investment Development Services
Cayes Development Policy Coastal Zone Management Act		<input type="radio"/> Coastal Zone Management Authority
Disaster Preparedness and Response Act		<input type="radio"/> National Emergency Management Organization
Electricity Act		<input type="radio"/> Belize Electricity Limited <input type="radio"/> Department of the Environment

Environmental Protection Act	
Forest Subsidiary Act	○ Forest Department
Hotels and Tourist Accommodation Act	○ Belize Tourism Board
Housing and Town Planning Act	○ Ministry of Housing
Land Utilization Act	○ Land Utilization Authority
Mines and Minerals Act	○ Mining Unit, Ministry of Natural Resources
Private Works Construction Act	○ Ministry of Works and Transport
Public Health Act	○ Ministry of Health
Public Utilities Commission Act	○ Public Utilities Commission
Solid Waste Management Authority Act	○ Solid Waste Management Authority
Telecommunications Act	○ Belize Telemedia Limited
Town Councils Act	○ Town Councils
Trade Licensing Act	○ City/Town Councils
Water and Sewerage Act	○ Belize Water Services Limited
Water Industry Act	○ Hydrology Unit, Ministry of Natural Resources & Agriculture
DEVELOPMENT ACTIVITY/HUMAN USE RESPONSIBLE AGENCIES	
<b>4. Conservation</b>	
<b>Governing Legislation/Policy:</b>	
Fisheries Act	○ Fisheries Department
Forest Act	○ Forest Department
Private Forests (Conservation) Act	○ Forest Department

National Parks System Act	○ Ministry of Agriculture, Fisheries, Forestry, the Environment and Sustainable Development
National Protected Areas Policy and System Plan	○ National Protected Areas Secretariat
Wildlife Protection Act	○ Forest Department
Coastal Zone Management Act	○ Coastal Zone Management Authority
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>5. Marine Dredging</b> <b>Governing Legislation/Policy:</b> Mines and Minerals Act	○ Mining Unit, Ministry of Natural Resources
Dredging Policy	○ Geology and Petroleum Department
Environmental Protection Act	○ Department of the Environment
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>6. Fishing</b> <b>Governing Legislation/Policy:</b> Fisheries Act	○ Fisheries Department
Coastal Zone Management Act	○ Coastal Zone Management Authority
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>7. Marine Transportation</b> <b>Governing Legislation/Policy:</b> Belize Port Authority Act Harbours and Merchant Shipping Act	○ Belize Port Authority
Private Works Construction Act	○ Ministry of Works and Transport
Customs Regulation Act	○ Belize Customs Department
Maritime Areas Act	○ Ministry of Foreign Affairs

Defence Act	○ Belize Defence Force
Immigration Act	○ Immigration Department
Dredging Policy	○ Mining Unit, Ministry of Natural Resources
Environmental Protection Act	○ Department of the Environment
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>8. Marine Recreation</b>	
<b>Governing Legislation/Policy:</b>	
Fisheries Act	○ Fisheries Department
Ancient Monuments and Antiquities Act	○ Archaeology Department
National Institute of Culture and History Act	○ National Institute of Culture and History
Belize Tourism Board Act	○ Belize Tourism Board
Public Health Act	○ Ministry of Health
DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
<b>9. Oil Exploration</b>	
<b>Governing Legislation/Policy:</b>	
Environmental Protection Act	○ Department of the Environment
Petroleum Act	○ Geology and Petroleum Department

# 10.4 FIGURES



## INFORMED MANAGEMENT

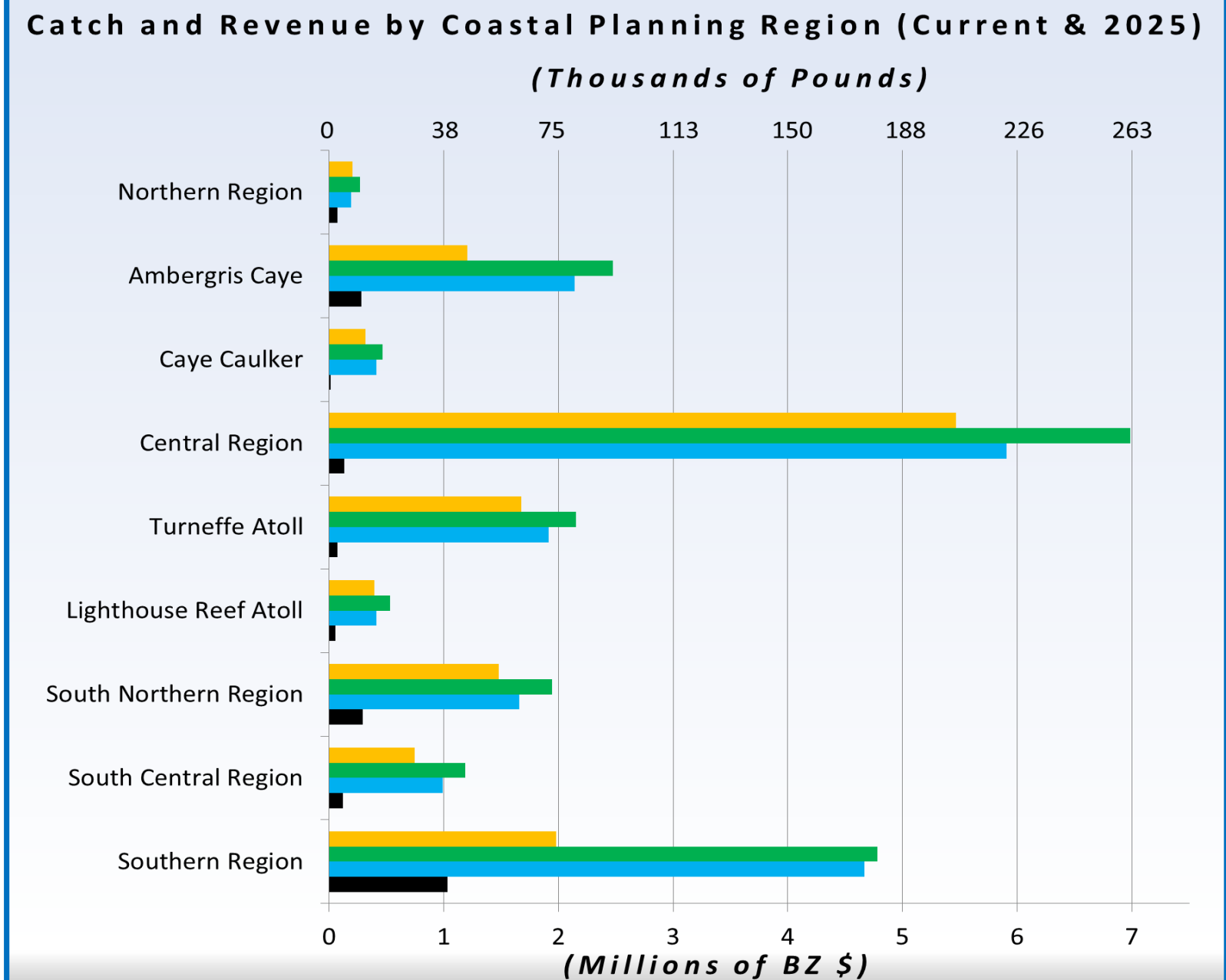


Figure 4: Lobster Fisheries Catch and Revenue by Scenario

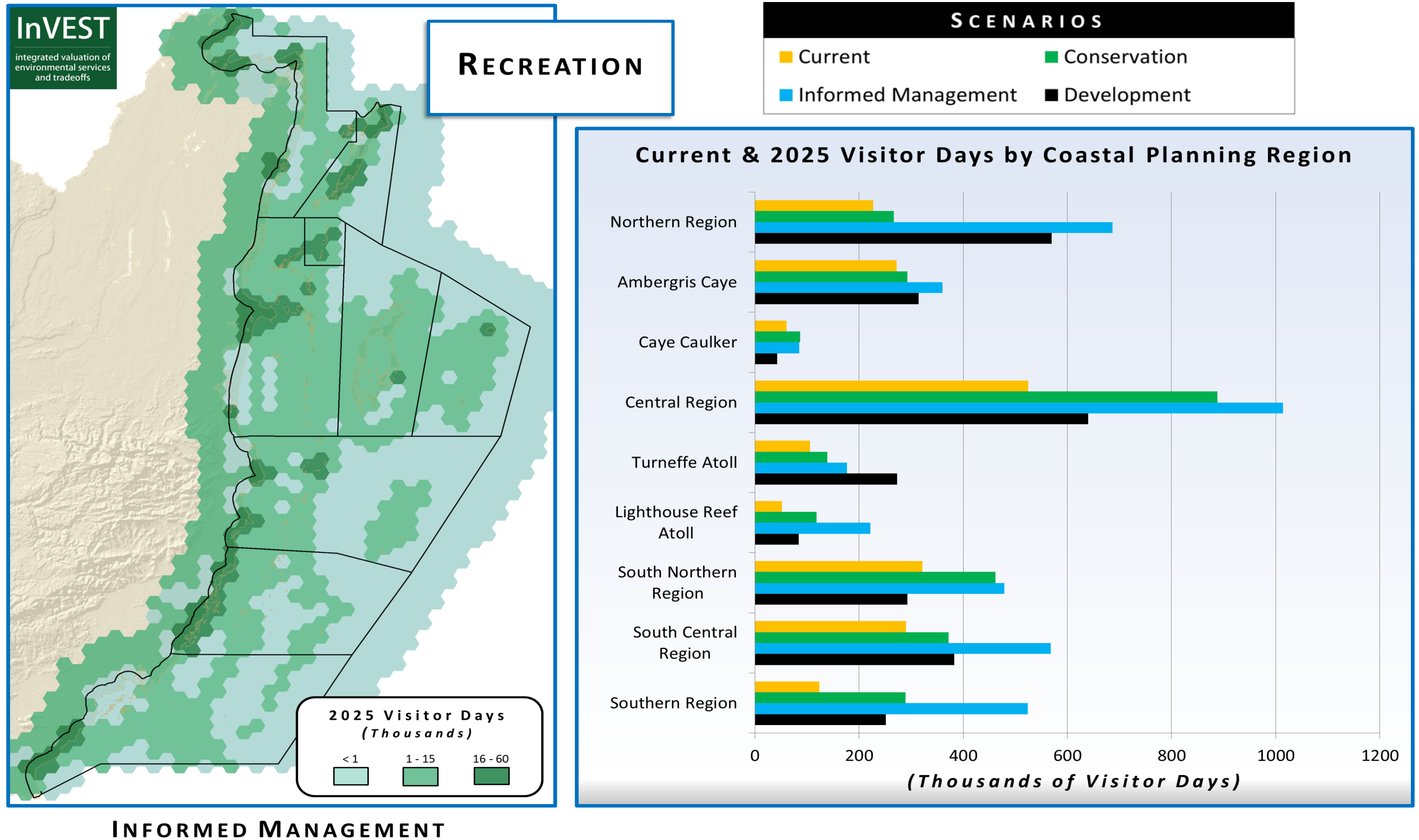


Figure 5: Annual Visitation for Marine Tourism and Recreation by Scenario



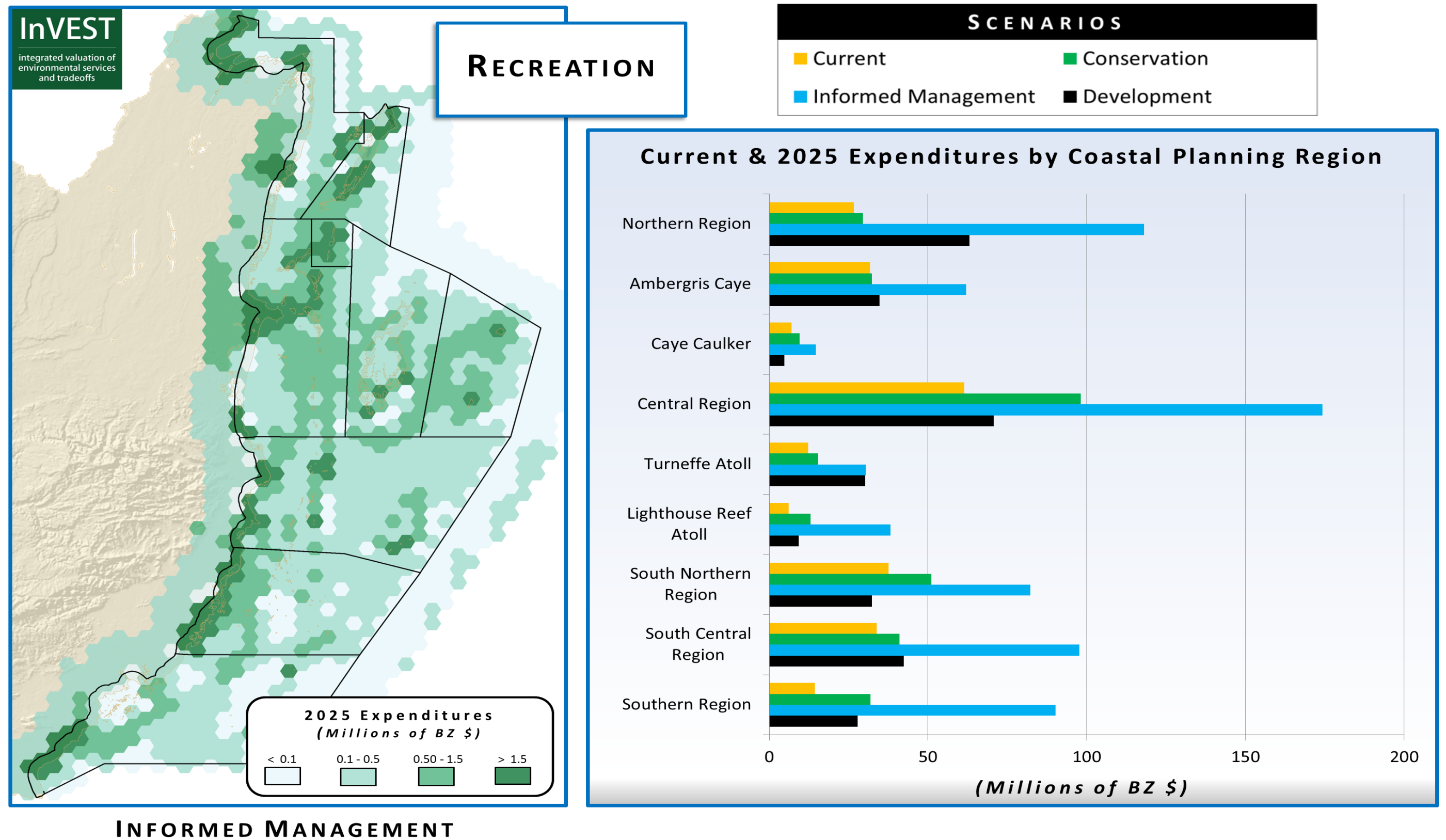
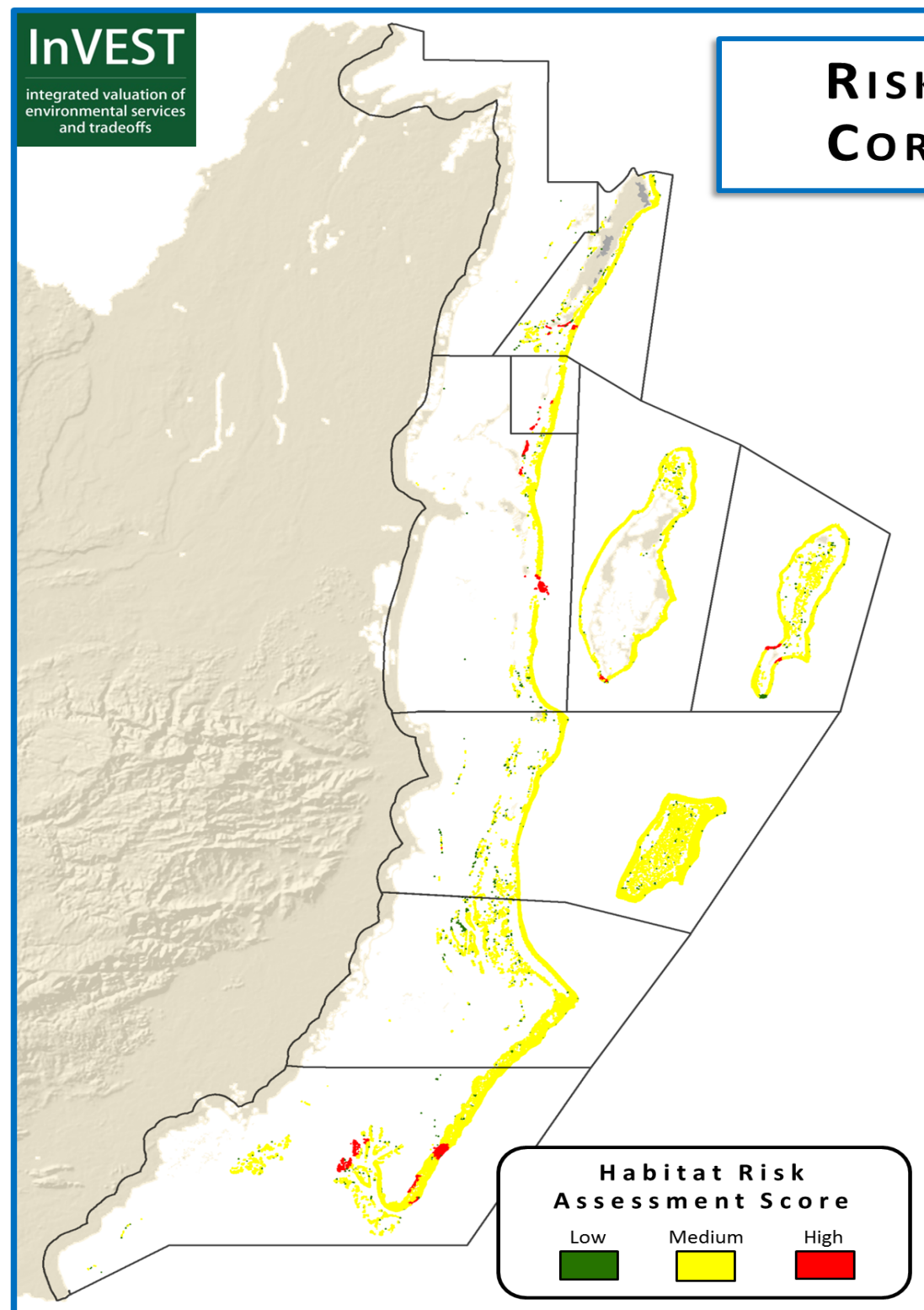


Figure 6: Annual Expenditures for Marine Tourism and Recreation by Scenario



## INFORMED MANAGEMENT

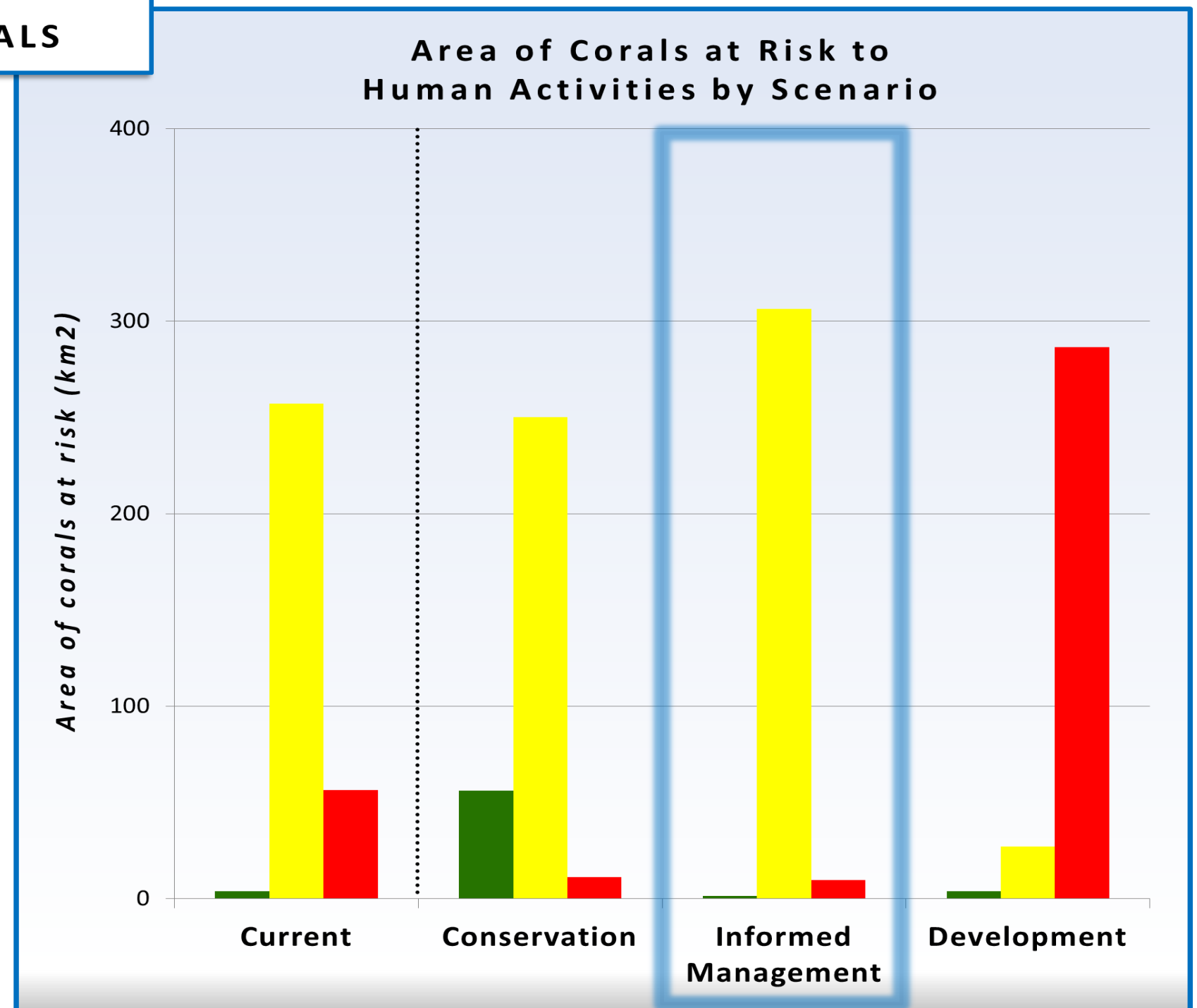


Figure 7: Area of Corals at Risk from Human Activities by Scenario

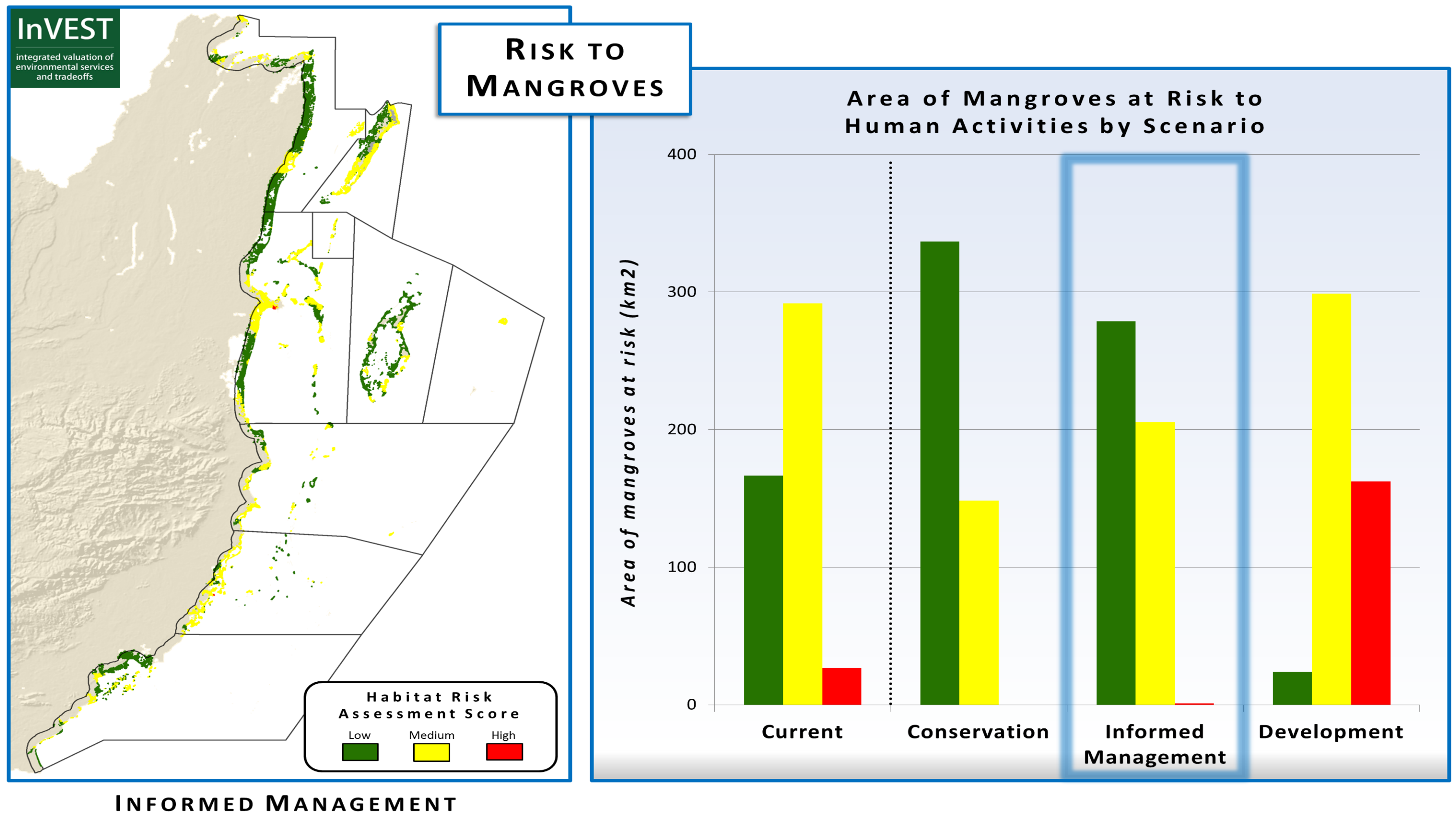
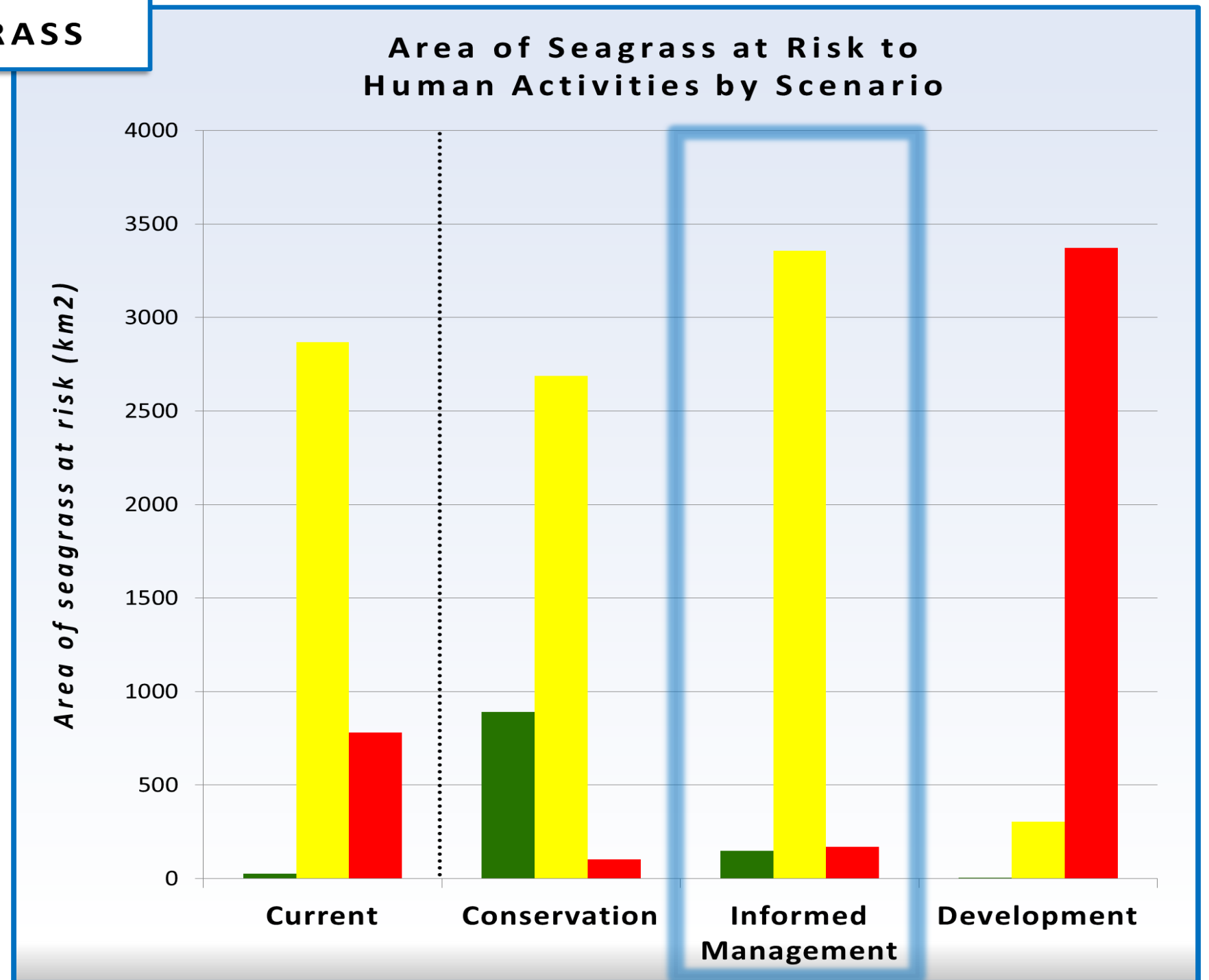
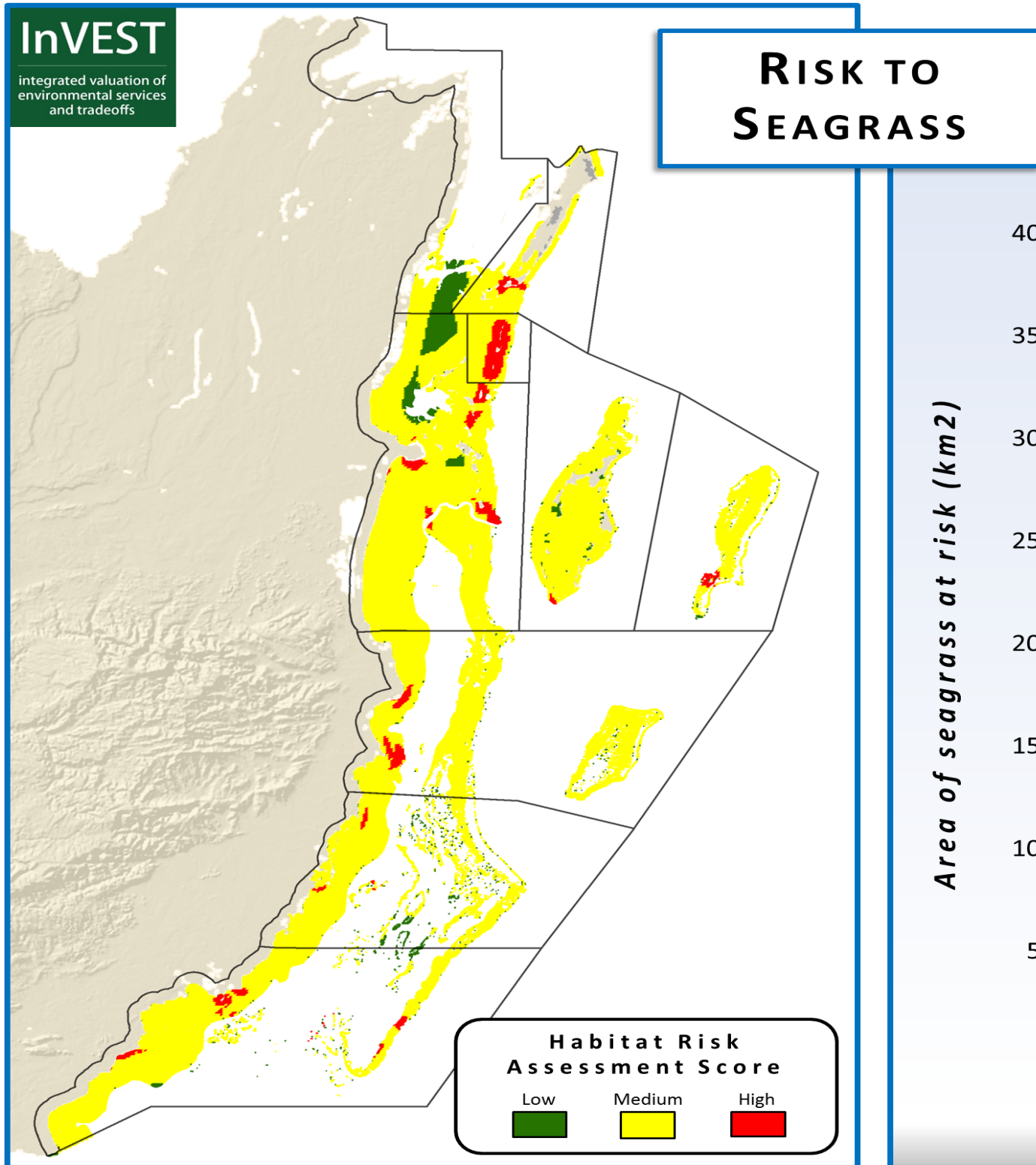


Figure 8: Area of Mangroves at Risk from Human Activities by Scenario



## INFORMED MANAGEMENT

Figure 9: Area of Seagrass at Risk from Human Activities by Scenario



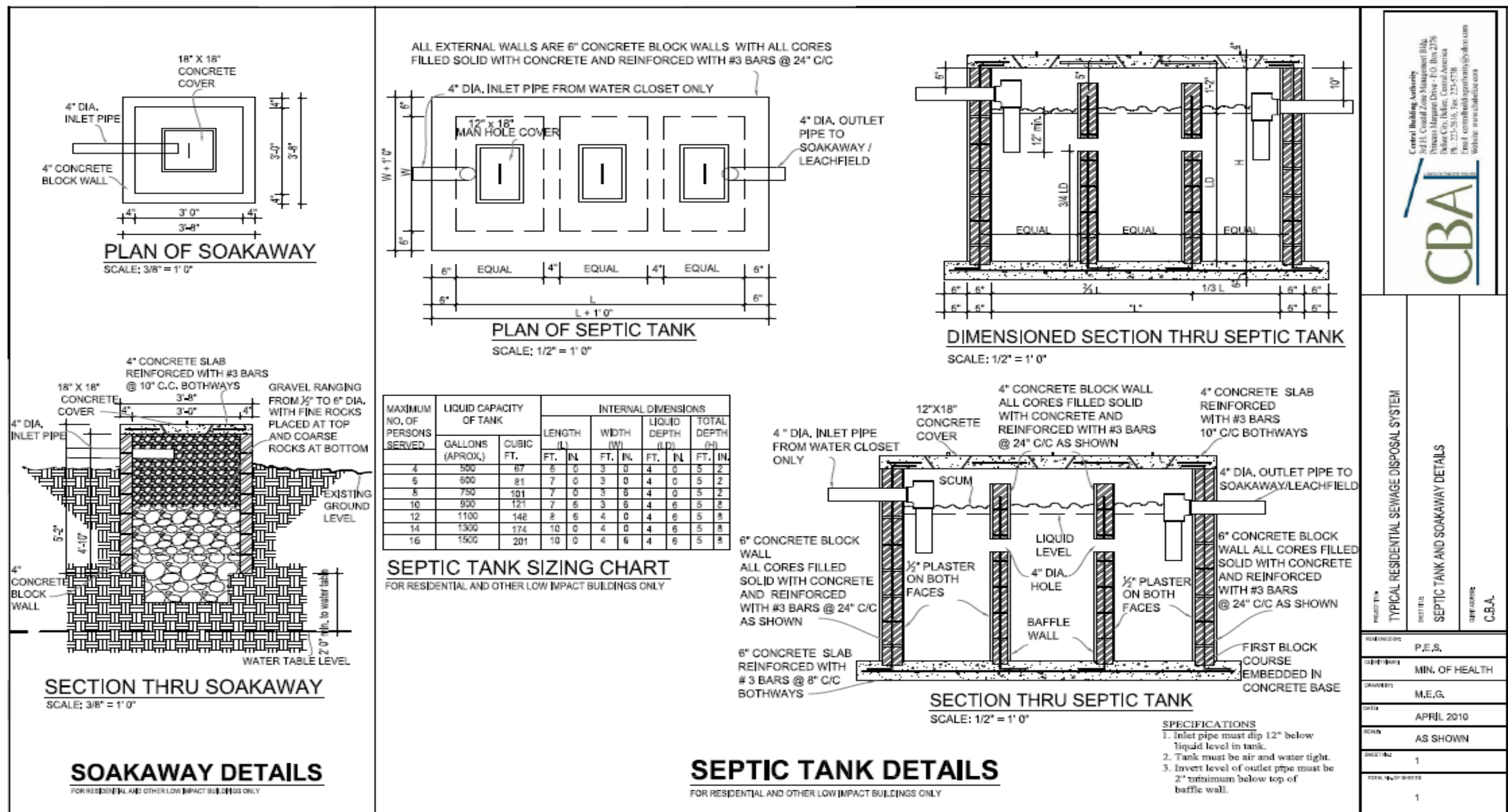


Figure 10: Septic Tank and Soakaway Details for Residential and Low-Impact Buildings

## **BELIZE:**

### **PETROLEUM OPERATIONS (MARITIME ZONE MORATORIUM) ACT, 2017**

#### **ARRANGEMENT OF SECTIONS**

1. Short title.
2. Interpretation.
3. Prohibition of petroleum operations in maritime zone.
4. Offence against prohibition.
5. Other Acts not generally affected, unless inconsistent.
6. Prior rights subject to prohibition.
7. Regulations.
8. State to be bound.



**No. 54 of 2017**

**I assent,**

**(SIR COLVILLE N. YOUNG)**

*Governor-General*

29<sup>th</sup> December, 2017.

**AN ACT to impose a moratorium on the exploration for and exploitation of petroleum and other petroleum operations in the maritime zone of Belize, to prevent pollution from installation devices and vessels used in the exploration or exploitation of petroleum resources of the seabed and subsoil of the maritime zone; to accordingly, make further provisions for the protection of the Belize Barrier Reef System inclusive of the World Heritage Site; and to provide for matters connected therewith or incidental thereto.**

*(Gazetted 30<sup>th</sup> December, 2017)*

***BE IT ENACTED, by and with the advice and consent of the House of Representatives and Senate of Belize and by the authority of the same, as follows:***

1. This Act may be cited as the

Short title.

**PETROLEUM OPERATIONS (MARITIME ZONE  
MORATORIUM) ACT, 2017.**

**Interpretation.**

2. In this Act, unless the context otherwise requires,

“Belize Barrier Reef System” means all that area bounded to the north by geographical coordinates UTM 412 384 E, 2009 873N, and bounded to the south by geographical coordinates 361402 E, 1777501 N, in NAD 27 Zone 16, without limit to the East and West, comprising corals, coral reefs, atolls, islands, seagrass beds, mangroves and other associated critical habitats and their inhabitants;

“maritime zone of Belize” means,

- (a) the internal waters,
- (b) the territorial sea, and
- (c) the exclusive economic zone,

as respectively defined in the Maritime Areas Act, and includes the Belize Barrier Reef System, but does not include that part of the internal waters that is landward of the low-water line along the coast of the mainland of Belize;

“Minister” means the Minister with the responsibility for petroleum;

“natural gas” means all petroleum which at atmospheric conditions of temperature and pressure is in a gaseous state; and includes wet mineral gas, wet gas and residue gas remaining after the extraction, processing or separation of liquid petroleum from wet gas, as well as non-petroleum gas or gases produced in association with liquid or gaseous petroleum;

“petroleum” means all natural organic substances composed of carbon and hydrogen which may be removed from the earth (including the seabed) and includes crude oil, natural gas and the oils derived from tar, sands, shale and coal, natural gas, and all other mineral substances, products, by-



products and derivatives that are found in conjunction with those substances;

“petroleum operations” means the operations related to the exploration, development, extraction, production, field separation, transportation, storage, or disposal of petroleum, but does not include any transportation or other operations in relation to petroleum that is imported into or exported from Belize by way of the maritime zone.

3. Notwithstanding the provisions of any other law, the carrying out of petroleum operations within the limits of the maritime zone of Belize is prohibited.

Prohibition of petroleum operations in maritime zone.

4. Any person who contravenes section 3 commits an offence and is liable on conviction on indictment,

Offence against prohibition

- (a) in the case of an individual, to a fine not exceeding two hundred thousand dollars or to imprisonment for a period not exceeding five years;
- (b) in the case of a corporate body, to a fine not exceeding three million dollars.

5. This Act does not affect the operation of any other enactment, the application of which is not inconsistent with the prohibition imposed under section 3, however, whenever the provisions of or under this Act are in conflict with or inconsistent with the provisions of any other enactment relating to pollution or environmental control, the provisions of this Act and any Regulations made under it shall prevail.

Other Acts not generally affected, unless inconsistent.

6.-(1) The provisions of this Act shall apply, notwithstanding the existence, in relation to any person, of any rights to carry out petroleum operations in the maritime zone of Belize, that were in existence at the date of coming into operation of this Act.

Prior rights subject to prohibition.

(2) For the purposes of subsection (1), the Minister may enter into compensation arrangements with persons who have been adversely affected by the prohibition under this Act.

**Regulations.**

7. – (1) The Minister may make regulations for the better carrying out of the purposes of this Act.

(2) Regulations made under this section may provide that a contravention thereof shall be punishable on conviction by a fine not exceeding three million dollars or by a term of imprisonment not exceeding two years, or by both the fine and imprisonment.

**State to be bound.**

8. This Act binds the State.



**REPORT  
2018**

# BELIZE UNESCO WORLD HERITAGE SITE

**Land Use and Land Tenure Analysis**

Case Study, February 2018



**A REPORT FOR WWF BY  
THE BELIZE ASSOCIATION OF PLANNERS**

## **ACKNOWLEDGEMENTS**

The report was co-written by the Belize Association of Planners represented by Carolyn Trench-Sandiford, Keisha Rodriguez and Carren Williams, and the World Wildlife Fund, represented by Nadia Bood.

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### **Belize Association of Planners**

The Belize Association of Planners (BAP) is a proactive professional planning organization committed to assuring social justice and promoting sustainability in the natural and built environment. BAP's mission is to address relevant planning and development issues in Belize by working in partnership with the public, private sector and civil society organizations, and the people of Belize through research, education, advocacy and action.

### **WWF**

WWF is one of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global network active in more than 100 countries.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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# EXECUTIVE SUMMARY

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The Belize Barrier Reef Reserve System (BBRRS), a UNESCO World Heritage (WH) site, has one of the highest levels of marine diversity in the Atlantic. However, since 2009, the BBRRS has been on the list of World Heritage in Danger (at risk of losing the characteristics that made it a WH site) due to several reasons, but primarily, the sale and

lease of public lands within the boundaries of the site and the destruction of fragile ecosystems. According to UNESCO, these threats resulted in extensive mangrove cutting, dredging and infilling for tourism and other commercial and housing developments. To date, the sale and lease of national lands and development expansion on private property within the BBRRS WH sites remain key concerns due to the impact they could have on the Outstanding Universal Value (OUV) of the BBRRS.

The World Heritage Committee in its 2017 decision to retain the BBRRS on the Danger List, stressed the urgency of addressing development issues within the BBRRS. The BBRRS's OUV is strongly tied to its terrestrial ecosystems and to their interaction with associated marine counterparts. Terrestrial ecosystems represent a proportionately tiny surface of the BBRRS which makes it crucial that development does not undermine the coverage and ecological connectivity of these ecosystems within the boundaries of the site.

The study found that of the total land mass of approximately 13,253.6 acres within the BBRRS, approximately 2,019.6 acres or 15% has private, leasehold or unknown tenure, and 11,234 acres or 85% are national lands. However, when considering the marine reserves only, the picture drastically changes with only approximately 86 acres of public lands available. The marine reserves of the BBRRS are where most of the private land tenure and developments are concentrated; South Water Caye Marine Reserve (SWCMR) with 79 of 452 acres remaining public land, Sapodilla Caye Marine Reserve (SCMR) with 5.89 out of 29.87 acres public lands, and Glover Reef Atoll Marine Reserve (GRMR) with, except for a small parcel, has almost its entire 70.9 acres under private ownership. The figure for SWCMR may be very conservative considering the unknown factor of undeclared land status. Of the six marine protected areas analyzed, Bacalar Chico National Park has the highest remaining public land with approximately 11,102.6 acres (87.6%). The Bacalar Chico Marine Reserve does not have any land mass.



The study also found that of 224 development sites identified and analyzed, 71 or 32% are within the BBRRS. Of these, 24 or 34% are used for commercial-tourism-hotel activity; 18 or 25% are for residential-fisher camps; 15 or 21% are for education-research, port-outpost; 9 or 13% are for residential-vacation homes; 2 or 3% are partial settlements and commercial-tourism-leisure respectively; and 1 or 1% is vacant hotel infrastructure.

The study revealed that South Water Caye Marine Reserve is the core site under development pressure, depicting a 64% increase in the number of development sites and accompanying challenges of dredging and mangrove destruction, waste disposal, trampling on fragile ecosystems etc., and a 56% decrease in national lands, which may be more, for the period 2003 to mid 2017.

This is particularly troubling when combined with the intensification and concentration of multiple uses transitioning some cayes into settlements with no governance structures, the formation of new land and decreasing availability of national land, the high demand for land and increasing land value, and the rapid pace of unregulated and unplanned development between the coastal communities of Riversdale and Placencia Peninsula and on the inner cayes.

The other sites emerging as areas of concern are the Sapodilla Caye Marine Reserve (SCMR), the Laughing Bird Caye National Park (LBCNP) and Half Moon Cayes National Monument (HMCNM). In the case of the former, it is not so much for the increase in development activities, but rather the change of use and intensification of use, caused primarily by leisure and recreational tourism for which footprints go unmeasured, and the formation of new national land in an area with no national land.

In the case of the LBCNP, it is the increase pace of unregulated and unplanned development occurring in neighbouring cayes, and for the HMCNM, the proximity to other cayes, which while undeveloped at this time, have the potential for intense tourism and residential development, particularly Long Caye, with 500+ parcels of private land. Within the Glover's Reef Marine Reserve, Southwest Caye must be kept on the radar, having 27 or 75% of all private parcels of land in the reserve.

Other areas of concern within the built environment, particularly SWCMR, is the approximately 1/3 non-compliance with the coastal zone development guidelines, which though not legally binding, gives an indication of site carrying capacity to maintain environmental health and integrity; the concentration of buildings and high site development densities, Tobacco

Caye and South Water Caye has 93 or 45% or of total number of buildings in the reserve; the proliferation of piers, of which 18 or 29% of the 63 documented piers are on South Water Caye. Notwithstanding, opportunities to explore are environmentally friendly development practices by some developers, including but not limited to increasing use of solar and wind energy, integrating mangrove vegetation into caye landscaping, recycling and sustainable building construction practices, to name a few.

RECOMMENDATIONS FOR SUSTAINABLE MANAGEMENT FRAMEWORKS TO STEM EXISTING DEVELOPMENT PRESSURES WITHIN THE BBRRS AND TO CONSERVE THE INTEGRITY OF THE OUV OF THE BBRRS ARE:

- 1) Declaration of protected status for the remaining areas of national land
- 2) Preparation and enforcement of detailed guidelines to regulate the development of the built environment of the cayes, with a priority on SWCMR
- 3) Establishing partnerships with developers to engage in sustainable development best practices
- 4) Strengthening the role of protected area managers in regulating development of the built environment
- 5) Declaration of WHS for compulsory registration to provide a true picture of land tenure status
- 6) Revision of mangrove regulations with specific and stricter provisions for private and public mangrove clearance within the WHS.

These combined measures would help to mitigate any adverse effect of prospective development activities on private land within the world heritage site.

# INTRODUCTION

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The Belize Barrier Reef Reserve System, designated a UNESCO World Heritage site in 1996 due to its Outstanding Universal Value, consists of seven Marine Protected Areas (MPA): Bacalar Chico National

Park and Marine Reserve, Blue Hole Natural Monument (BHNM), Half Moon Caye Natural Monument, Glover's Reef Marine Reserve, South Water Caye Marine Reserve, Laughing Bird Caye National Park and Sapodilla Cayes Marine Reserve.

BBRRS was designated as a WHS because of its superlative natural phenomena and natural beauty, ongoing biological and ecological processes, and biological diversity, including several threatened species. The OUV of the BBRRS is closely associated with intact marine and littoral forest ecosystems, including mangroves and related marine and terrestrial wildlife communities (UNESCO 2009).

The seven protected areas that constitute the BBRRS comprise 12% of the entire Belize Reef Complex and the network of protected areas is believed to be large enough to maintain the necessary ecological processes and support the BBRRS for the long term. Its geographic spread and diversity offer an opportunity for enhanced resilience, an essential factor in this time of climate change.

The BBRRS has one of the highest levels of marine diversity in the Atlantic (Gibson 2011). In 2009, however, the BBRRS was added to UNESCO's List of World Heritage in Danger for three key reasons: firstly, the sale and lease of public lands within the property; secondly, the destruction of fragile ecosystems due to resort and housing development; and thirdly, the impact of introduced species (UNESCO 2009). According to UNESCO, the first two threats resulted in extensive mangrove cutting and infilling for private developments and a significant amount of commercial development on the islands within the property were noted (including boutique resorts and sports fishing camps).

Some of these developments had existed prior to the BBRRS's inscription as a WHS in 1996, but others had been allowed to proceed subsequent to inscription. For example, while all the lands in the GRMR except the portion occupied by the Lighthouse were private property prior to inscription, 3 (Slickrock Adventure [1986]<sup>\*</sup>, Island Expedition [1987]<sup>\*\*</sup> and World Conservation Society [1995]<sup>\*\*\*</sup>) or 37.5% of the 8 development sites existed prior to inscription. Of the remainder, 2 (Isla Marisol [2002]<sup>\*\*\*\*</sup> and Off the Wall Dive Shop [2000]<sup>\*\*\*\*\*</sup>) came into existence post inscription, and it is unknown when the remaining 3

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\* <https://www.slickrock.com/slickrock.html> downloaded 12/04/2017

\*\* <http://www.islandexpeditions.com/30> downloaded 12/04/2017

\*\*\* <https://belize.wcs.org/Glovers-Reef-Research-Station/Welcome-to-Glovers-Reef-Research-Station.aspx> downloaded 12/04/2017

\*\*\*\* <http://www.islamarisolresort.com/isla-marisol-history> downloaded 12/04/2017

\*\*\*\*\* <http://www.offthewallbelize.com/story.html> downloaded 12/04/2017

[Residential-Fishing Camp, Manta Resort and Glover's Reef Atoll Resort] or 37.5% came into existence.

The BBRRS's OUV is strongly tied to its terrestrial ecosystems and to their interaction with associated marine counterparts. Terrestrial ecosystems represent a proportionately tiny surface of the BBRRS which makes it crucial that development does not undermine the coverage and ecological connectivity of these ecosystems within the site's boundary. According to UNESCO, existing private or leased lands within the property should also be strictly managed to ensure minimal impacts, with the long-term objective of reducing their presence and restoring previously disturbed lands (UNESCO 2009).

Development along Belize's coast is one of the main factors that is putting significant pressure on mangroves and associated littoral forests that are very important to having healthy reefs (Verutes 2016). Coral reef and mangrove ecosystems host high biodiversity and, together, form strong barriers that protect Belize's shorelines from the destructive forces of wind, waves and pollutants runoff from land. These living structures decrease the erosion and physical damage that can often impose significant economic and environmental costs on coastal communities, infrastructure and properties. To a large extent, they both help to form and shape the coastline.

To date, the sale and lease of public lands and development expansion on private property within the BBRRS WHS remains a key concern, potentially impacting the site's OUV. The World Heritage Committee in its 2017 decision to retain the BBRRS on the in danger list, stressed the urgency in addressing this issue.

This cursory study was aimed at carrying out an updated coastal-marine land tenure and land use analysis for the BBRRS to provide a better understanding on the current status of land ownership and development threats to the site and to provide needed information for evidence based decision making around the BBRRS's removal from the UNESCO's in danger list. This study is a component of a more detailed report 'Coastal and Marine Land Use and Land Tenure Analysis Report' (BAP 2017). It documents the land tenure and land use in the BBRRS from 2003 to June 2017. The project took approximately a year to complete, June 2016 to June 2017. Annex I provides the limitations encountered in executing the project.

# BACKGROUND

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WWF commissioned the Belize Association of Planners to execute a grant for a project 'Coastal and Marine Land Tenure Analysis', the aim of which was to produce an updated coastal-marine land tenure inventory for Belize (within a 1-3 km inland area of interest and cayes (excluding Ambergris Caye, Caye Caulker and Bacalar Chico National Park and Marine Reserve), that includes ownership, tenancy (e.g. lease) and other arrangements for the use of the lands. The project required that consideration be given to forms of land use and resource holdings such as: private ownership, national lands, protected areas, collective ownership, common ownership, customary and informal tenure, concession, leasehold, sharecropping, use right, squatting, ownership and access by commercial interests, ownership and access by foreign interests among others.

Annex II provides further insights into the land use and land tenure analysis process.

# METHODOLOGY

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Generally, the project team relied on multiple data collection tools in conducting research, analysis and synthesis of data, which produced qualitative and quantitative findings that informed the

conclusions and recommendations contained in the 'Coastal and Marine Land Use and Land Tenure Analysis Report' (BAP 2017).

These tools included desktop literature review, internet searches, in-depth examination of literature and reports provided by WWF and identified and sourced by the project team, designing questionnaires and outlines for structured and semi-structured interviews on Open Data Kit (ODK) forms on tablets and notebooks, GIS analyses and review of satellite imagery. The process also included discussions with key stakeholders and observations. Each tool was deployed based on the most practical approach.

## SPECIFICALLY, THE METHODOLOGY APPLIED WAS AS FOLLOWS:

- The Belize base map layer which includes the cayes was overlaid on the base map imagery.
- Due to the lands in the marine realm having undeclared status, that is, it is not subject to compulsory registration in accordance with the Registered Land Act, Chapter 194 of the Laws of Belize, and therefore no land cadastre registry exists for reference, and the quick realization that only a very small percentage of land in the marine realm are being used and they are widely dispersed, a different approach from that of 1-3 k coastline was taken.
- Data from the 2003 Coastal Development Guidelines along with base map satellite imagery were utilized to demark potential development sites, that is, areas where some activity was or seem to have been taking place, and to identify surveyed parcels linked to these where applicable, and to note tenure status, that is, freehold (private), leasehold, unknown or national land.
- Development sites were defined as a point activity and not within a spatial context due to absence of cadastral maps for the marine realm and the broad base spatial scope and resolution of the study. This range from a single building and use to multiple buildings and uses.
- Maps of each of these areas with the potential development sites were created and used as a guided in field verification. Thereafter, field work entailed the use of the application Open Data Kit on android tablets linked to an online Google Server. The application allows for the creation of forms with various data fields



that are customized according to the user's needs.

- Forms were created with fields including 'Site Name', 'Site ID', 'Caye Name', 'Land Use', 'Description', 'Land Owner' and 'Land User', the latter for the purpose of distinction if different and 'Location' and 'Image'. 'Location' allows the tablet to obtain a GPS point for each site while Image allows a Geo-Tagged image to be assigned to each site.

- Other fields created for which data was documented were 'number of structures' and 'type of structure', 'energy source', 'water source' and 'notes', the latter enabling the documentation of information from unstructured interviews where it was possible.

- Field work was conducted by boat in all planning regions, with the exception of Lighthouse Reef Atoll and Glovers Reef, using the previously mentioned maps along with personnel from Southern Environmental Association and Fisheries Department as guides, stops were made at the various existing sites in the cayes, where a form was filled for each site.

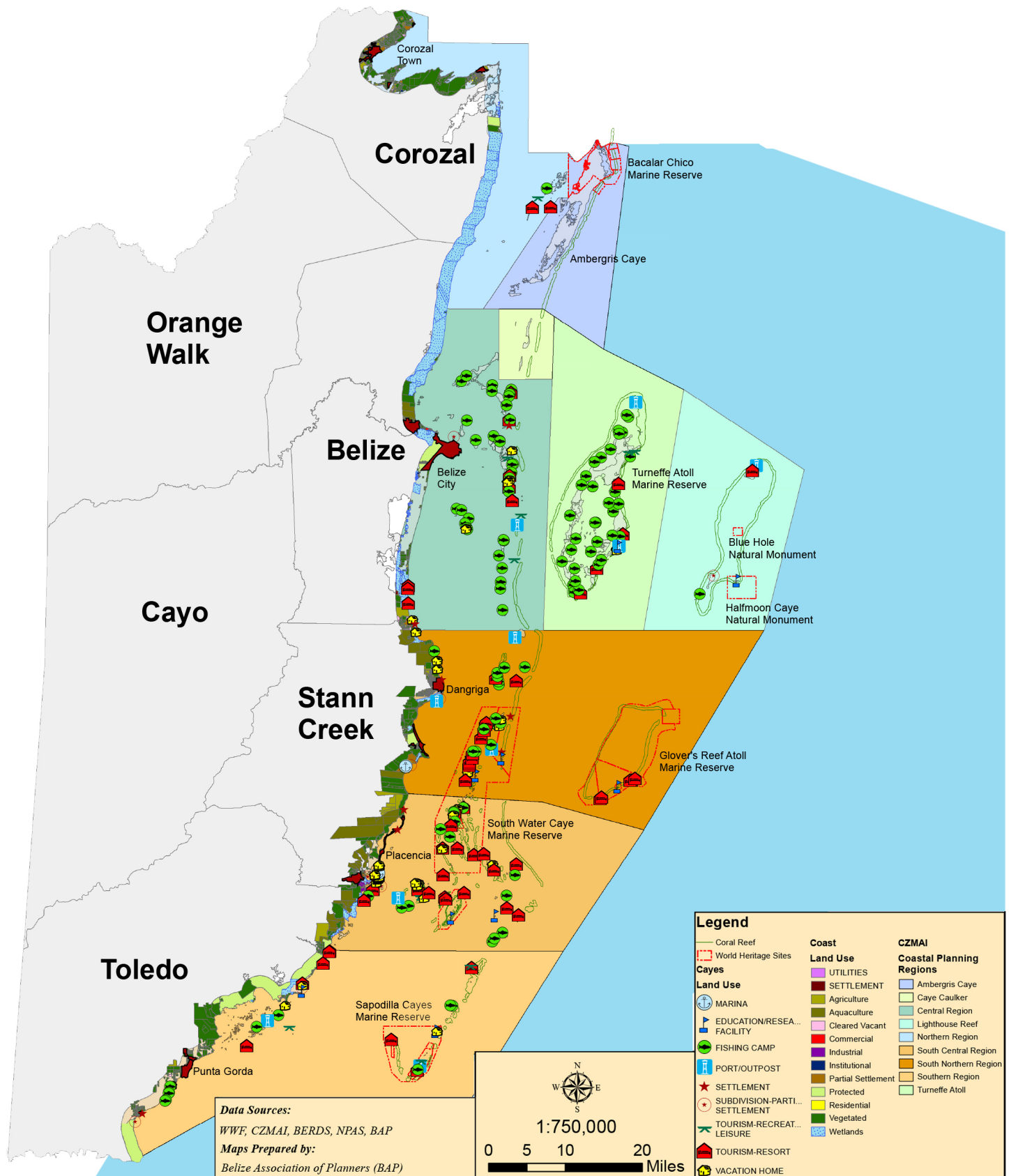
- Data for Glovers Reef and Lighthouse Atolls were collected from satellite imagery and Inventory reports. Upon returning from the field, the data collected was downloaded to the server and exported in KML and excel format which allow for integration into a GIS as the 'Development Sites' layer which created a digital data base inventory.

- This data was then compared with that of the status of development sites and land tenure documented in the 2003 coastal development guidelines for comparative analysis.

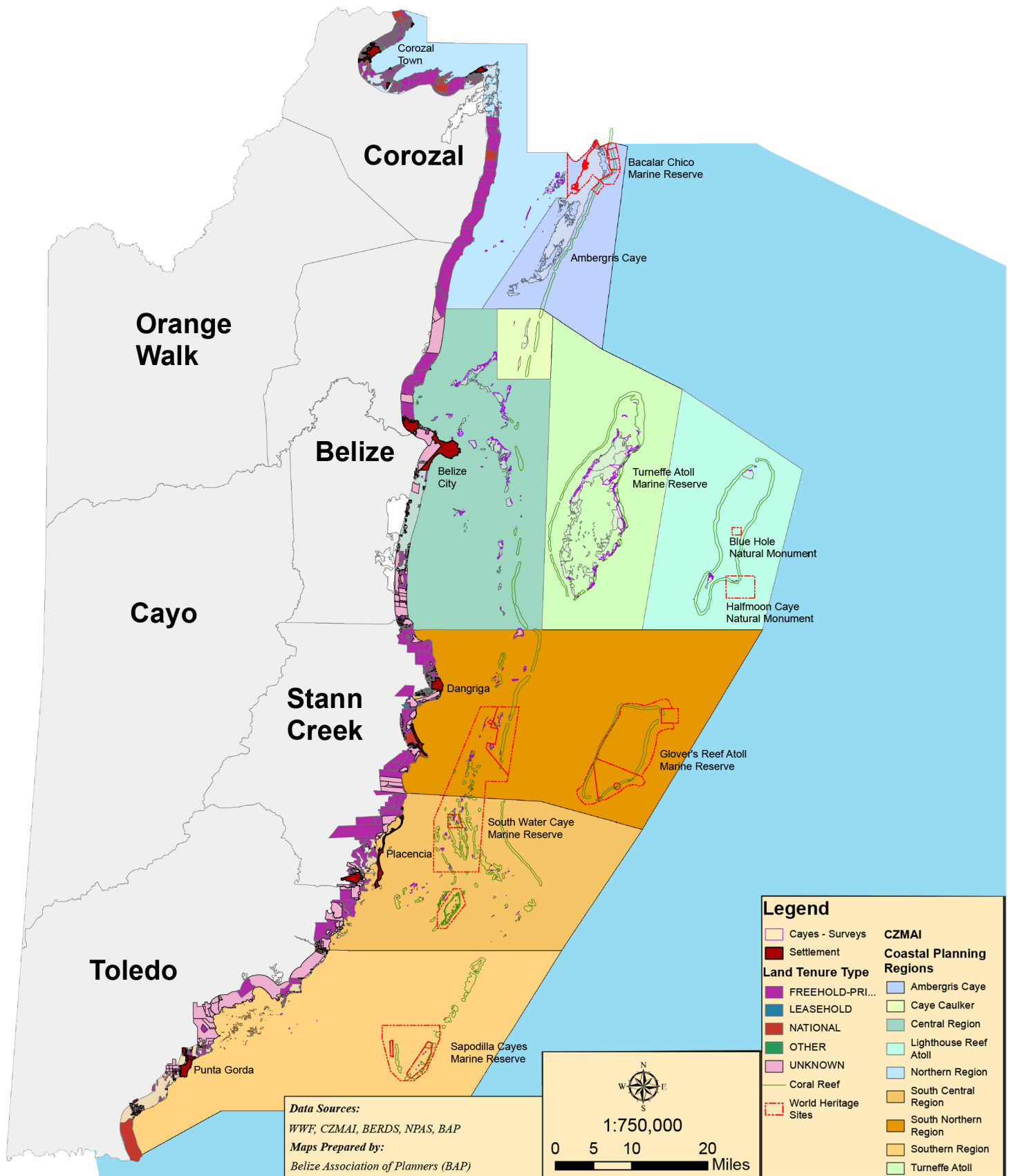
- Additionally, surveyed parcel data acquired from the Ministry of Natural Resources was layered over the development sites harmonizing with data entry.

As reflected in the following maps, the broader study analyzed land tenure and land use within Belize's coastal zone (1-3 km area of interest) but also carried out a magnified analysis to better understand the existing situation within the BBRRS.

# COASTAL ZONE - EXISTING LAND USE



# COASTAL ZONE - LAND TENURE BY TYPE



# RESULTS

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A land use analysis becomes necessary in areas where change is ongoing or expected to occur in order to make a determination as to how best to use the land in order to strike a balance between the public interest, achieving global, national and local development goals and private property rights. In addition, it provides a set of tools to understand (1) how land is currently used? (2) What land use changes can be made in accordance with a set of rules? and (3) What are the impacts of land use changes? As it is noted in ANNEX II, available and accessible data, and the spatial scope and resolution of the terms of reference allowed for responding primarily to question 1.

There are seven marine protected areas that make up the BBRRS WHS: Bacalar Chico National Park and Marine Reserve, Blue Hole Natural Monument, Half Moon Caye Natural Monument, Glover's Reef Marine Reserve, South Water Caye Marine Reserve, Laughing Bird National Park, and Sapodilla Cayes Marine Reserve. Bacalar Chico National Park and Blue Hole Natural Monument were excluded from original study. In the case of the former, as it forms part of Ambergris Caye, which was excluded within the terms of reference, and the latter, since it does not have a landmass. However, for the purpose of this study, some basic data was included for the former.

The study found that the total land mass within the BBRRS is approximately 13,253.6 acres, of which 2,019.5 acres are under private ownership, lease or unknown, and 11,234.1 acres remain national lands. These findings indicate that 85% of terrestrial property within the BBRRS are national lands as of August 2017. However, if Bacalar Chico National Park and Marine Reserve is excluded, the picture drastically changes to only 23 % for the remaining 5 sites, with 52 % and 38% of that located in the SWCMR and HMCNM respectively, the latter being the epicenter of development pressure of the BBRRS. This figure may be very conservative considering the unknown factor in undeclared land status. The study also found that marine reserves have the least remaining public lands: SWCMR with 79 of 452 acres remaining public land, SCMR with 6.75 out of 29.87 acres public lands, and GRMR with, except for a small parcel, has almost its entire 56 acres under private ownership.

<b>BBRRS</b>	<b>TOTAL LANDS (ACRES)</b>	<b>PRIVATE LANDS OWNERSHIP, LEASE AND UNKNOWN (ACRES)</b>	<b>AVAILABLE PUBLIC LANDS (ACRES)</b>	<b>PUBLICLY AVAILABLE (%)</b>
South Water Caye Marine Reserve	452	373	79	17.3
Sapodilla Caye Marine Reserve	29.87	23.98	5.89	15%
Glover's Reef Marine Reserve	70.9	70.08 (est)	A parcel	A parcel
Laughing Bird National Park	4.23	0	4.23	100
Half Moon Caye Natural Monument	41.5	0	41.5	100
<b>SUB-TOTAL</b>	<b>583.60</b>	<b>452.12</b>	<b>131.48</b>	<b>22.5</b>
<b><i>TOTAL AVAILABLE ON OUTER CAYES</i></b>				
Bacalar Chico National Park and Marine Reserve	12,670	1,567.4	11,102.6	87.6
<b>TOTAL AVAILABLE OVERALL</b>	<b>13,253.6</b>	<b>2,019.5</b>	<b>11,234.1</b>	<b>84.7</b>

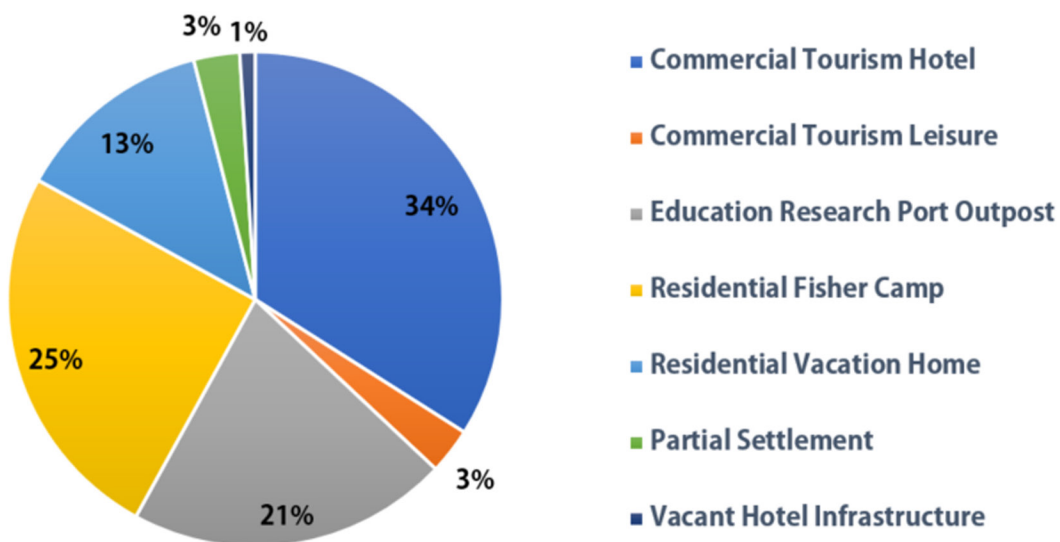
The study also found that 71 (32%) of the 224 development sites analyzed in the broader study were in the BBRRS. It also found that of the 71 sites, 24 sites (34%) are used for commercial-tourism-hotel activity; 18 (25%) are for residential-fisher camps; 15 (21%) are for education-research, port-outpost; 9 (13%) are for residential-vacation homes; 2 (3%) are partial settlements and commercial-tourism-leisure respectively; and 1 (1%) is vacant hotel infrastructure.

Additional information on each site can be accessed from the spatial digital data base. Such information includes ‘Caye Name’, ‘Land Use’, ‘Description’, ‘Land Owner’ and ‘Land User’ if different, ‘Location’ geo-reference, ‘images’, ‘number of structures’ and ‘type of structure’, ‘energy source’, ‘water source’ and ‘notes’. The following table and map provide a detailed analysis of the land tenure of the SWCMR by named caye or caye range as far as could be

The following table and map provide a detailed analysis of the land tenure of

## BBRRS WORLD HERITAGE SITE EXISTING LAND USE 2017

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THE FOLLOWING PROVIDES A  
SNAPSHOT OF THE LAND TENURE  
AND LAND USE PATTERNS AND  
CHANGES OF SIX OF THE SEVEN  
MARINE PROTECTED AREAS THAT  
MAKE UP THE BBRRS WHS  
BETWEEN 2003-2017. THE  
RESULTS PRESENTED EXCLUDES  
BLUE HOLE NATURAL MONUMENT,  
AS THIS SITE DOES NOT HAVE A  
LAND MASS.



# SOUTH WATER CAYE MARINE RESERVE

The South Water Caye Marine Reserve spans approximately 117,875 acres, including 25 named cayes and caye ranges as well as sand bars, the former comprising approximately 452 acres. This is distinguished in the table below as un-bracketed acreages, which are sourced from the coastal development guidelines reports, while the bracketed acreages are sourced from the SWCMR Cayes Inventory Report prepared by the Wildlife Conservation Society.

In some cases, for example Tobacco Caye, Twin Cayes and Carrie Bow Caye, the bracketed and un-bracketed are similar. In others, they are extreme differences and efforts must be made to reconcile, as this has implications to calculation of tenure status of acreages. Examples are Bakers Rendezvous Caye, Channel Caye and Saddle Caye.

The SWCMR was established in 1996 in accordance with the Fisheries Act, Chapter 210 of the Laws of Belize, being a nationally important nursery area for conch, having clear sheltered waters, extraordinarily biological diversity and being one of the best examples of a barrier reef. It is managed by the Fisheries Department. The SWCMR straddles the South North and South Central Coastal Planning Regions of the Belize Integrated Coastal Zone Management Plan.

## LAND TENURE ANALYSIS

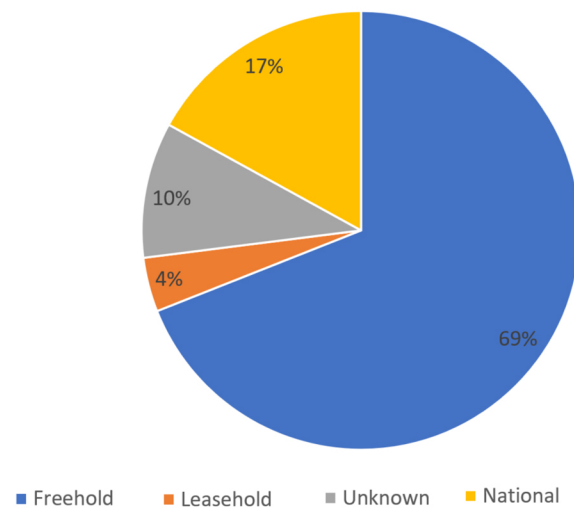
As of 2017, 79+/- acres (17.3 %) of the approximate total of 452 acres appears to be of national tenure and the remainder as follows, based on the 167 parcels for which survey records were accessed. Of the 167 parcels totaling approximately 373 acres or 87% of all land, 121 parcels or approximately 310 acres (69%) are freehold tenure (private); 16 parcels or approximately 17 acres (4%) are leasehold tenure; and the tenure of 30 parcels or approximately 45 acres (10%) is unknown.

This appears to represent a decrease of 99 acres (56%) from 178 acres (39.4%) of national lands in 2003. This is a significant change and may be

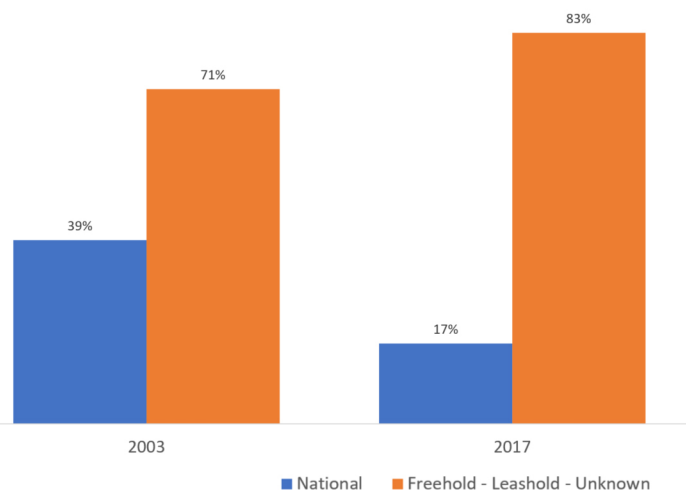


higher. SWCMR is also the marine protected area that concern was raised about development within, and one of the key reasons the BBRRS was inscribed on the in danger list. Of note also is the formation of new national land (sand bars) upon which fisher camps are being established and for which applications to lease and purchase may be forthcoming, as anecdotal conversations suggests.

## SWCMR LAND TENURE BY INTEREST 2017



## SWCMR REDUCTION IN NATIONAL LANDS 2013 - 2017



# SOUTH WATER CAYE MARINE RESERVE

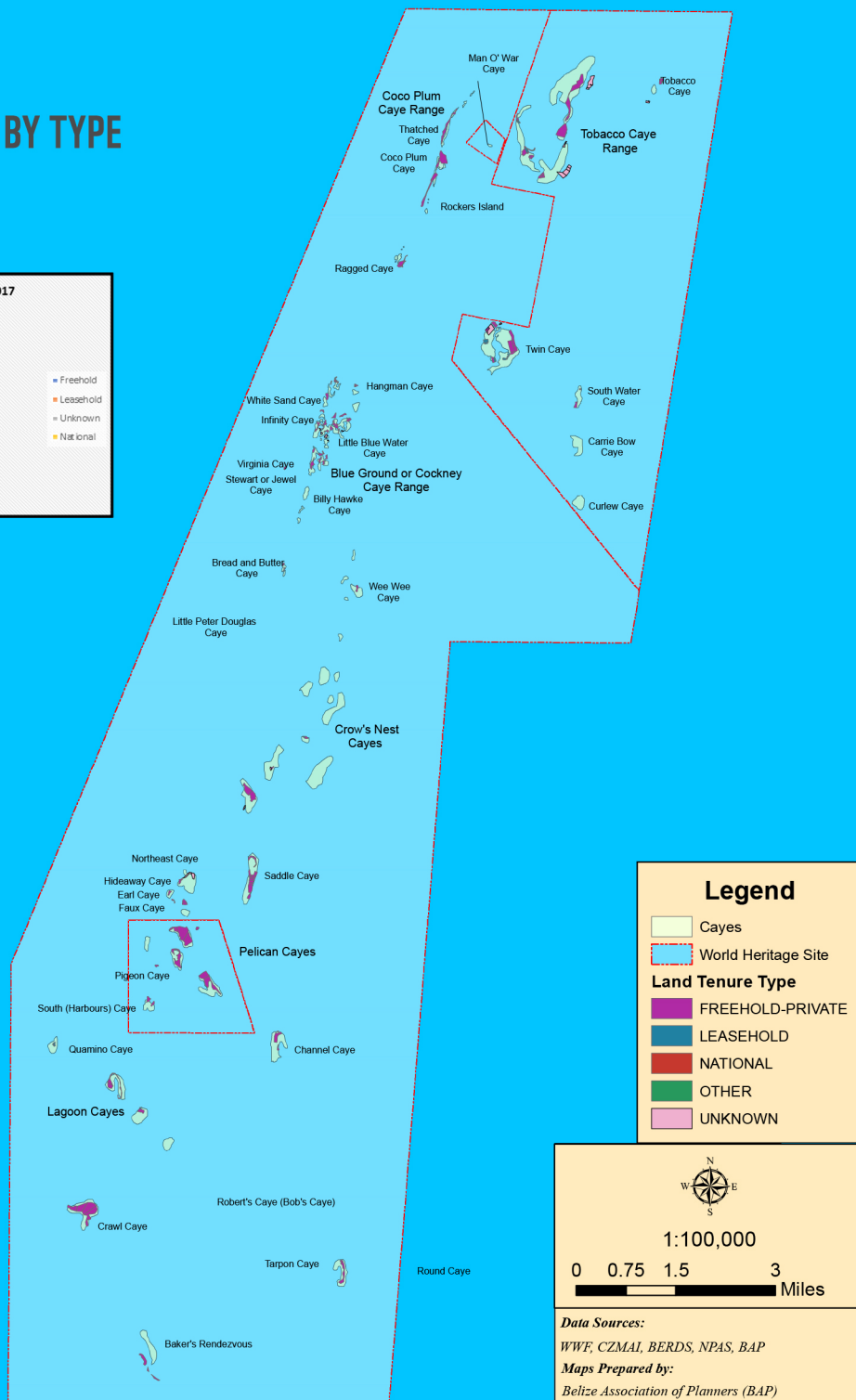
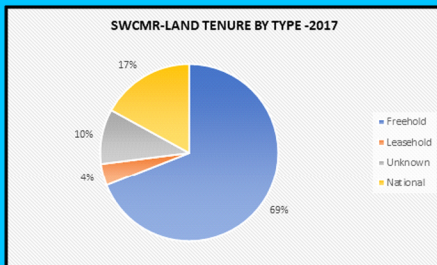
the SWCMR by named caye or caye range as far as could be discerned from the research.

#	NAME OF CAYE	SIZE (ACRE)	MID-2017 PRIVATE OWNERSHIP, LEASE OR UNKNOWN ACRES)	% PRIVATE, LEASE OR UNKNOWN	% PUBLIC
1	Coco Plum Caye Range	44.00	10.29	23.4	76.6
	- Coco Plum Caye	(44)			NA
	- Thatch Caye	(1.5)			
	- Ragged Caye	2.33	0	0	
	- Rockers (Usher) Caye	1.50	0	0	
2	Tobacco Caye Range	(140.7) 141.00	110.81	78.6	21.4
3	Tobacco Caye	(5.87) 5.90	5.14	87.1	12.9
4	Man-of-War (Bird) Caye	1.00	0	0	100
5	Twin Cayes	(95) 95.0	71.62	75.4	24.6
6	Southwater Caye	13.27	3.14	23.7	76.3
7	Carrie Bow Caye	(1) 1.00	Believe to privately owned		
8	Curlew Caye	0.50	0	0	100
9	Cockney/Blueground Range	50.00	44.20	88.4	11.6
	- Hangman Caye				
	- White Sand Caye				
	- Infinity Caye	(2)			
	- Little Blue Water Caye	(2.44)			
	- Virginia Caye				
	- Stewart (Jewel) Caye	12.00			
	- Hangman Caye				
	- Billy Hawke				

10	Bread and Butter Caye	(14) 14.00	1.40	10.0	90
11	Wee Wee Caye	(6.0) 6.00	2.09	34.8	65.2
12	Spruce/Crow's Nest Caye	(1.1) 1.10	1.77	1.60	0
	- Little Peter Douglas		Believe to be privately owned		
	- Peter Douglas	(2.0)	Believe to be privately owned		
13	Bakers Rendezvous Caye	(15) 3.46	9.03		
14	Channel's Caye	(19.7) 5.83	8.81		
15	Crawl Caye	(45) 8.61	54.35		
16	Lagoon Cayes	10.36	11.82		
	- Lee Lagoon (Ridge) Caye	(7.54)			
	- Big Lagoon Caye				
	- Little Lagoon Caye				
17	Saddle Caye/Elbow	(47) 7.32	27.02		
18	Pelican (Bird ) Cayes	21.14	Believe to be privately owned		
	- Hideaway Caye	(3.48)			
	- Earl Caye				
	- Faux Caye				
	- Northeast Caye	(30)			
	- Pigeon Caye				
	- South (Harbour) Caye				
19	Fisherman Caye	(42)	Believe to be privately owned		
20	Cat Caye		Believe to be privately owned		
21	Manatee Caye		Believe to be privately owned		
22	Tarpon Caye	4.14	9.56		
23	Robert's (Bob) Caye	(0.25)	Believe to be privately owned		
24	Quamina Caye	(5) 2.00	2.19	1.01	0
25	Round Caye		Believe to be privately owned		
		451.46	373.24	82.7	(78.2a)17.3

# SOUTH WATER CAYE MARINE RESERVE

## SUMMARY LAND TENURE BY TYPE

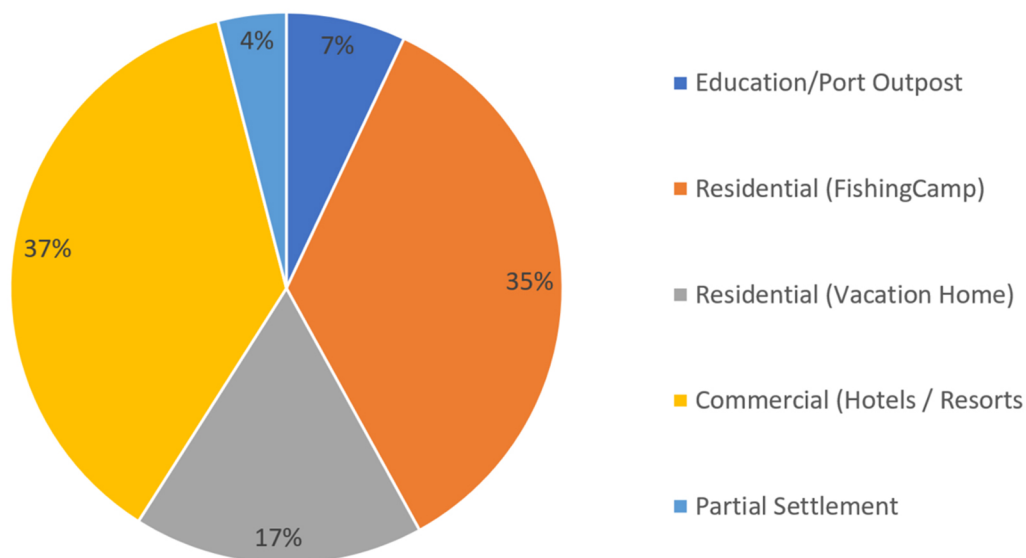


## LAND USE ANALYSIS

Forty-six development sites were recorded in the SWCMR. These include 3 (7%) used as education-research-port/outpost on Carrie Bow-Smithsonian Institute, Twin and Wee Wee Cayes; 16 (35%) as residential (fishing camp); 17 (16 existing and 1 under construction at South (Harbour Caye) (37%) as commercial (tourism-resort); 8 (17%) as residential (vacation home) and 2 (4%) as partial settlement.

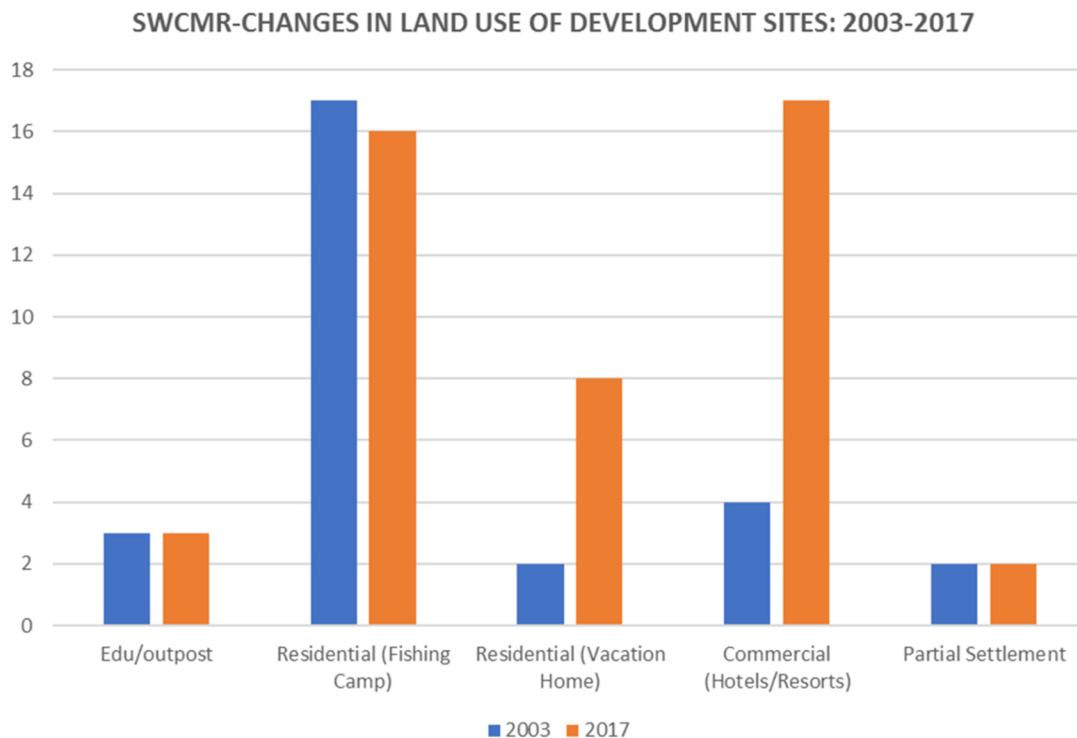
The partial settlements are Tobacco Caye and South Water Caye, both of which have multiple uses (tourism, vacation homes and research stations) and where 93 (45%) of the total number of buildings in the reserve are located, and where there is a proliferation of piers (18 or 29% of the 63 documented piers are on South Water Caye). See digital inventory for details of development activities per site. There is no established data-base to ascertain the percentage of land activity at the time of inscription, but anecdotal references and conversations suggest development activities on Tobacco Caye, Southwater Caye, Twin Cayes, Wee Wee Caye and Carrie Bow Caye to name a few.

## SWCMR EXISTING LAND USE

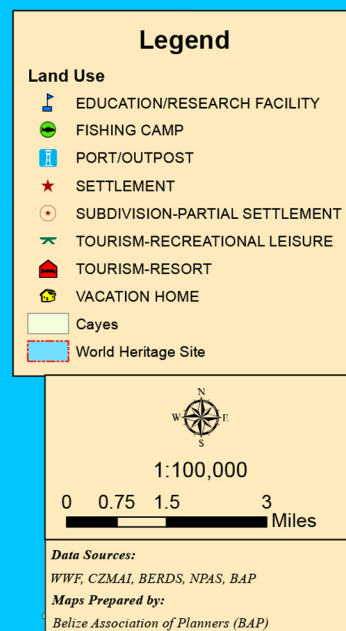
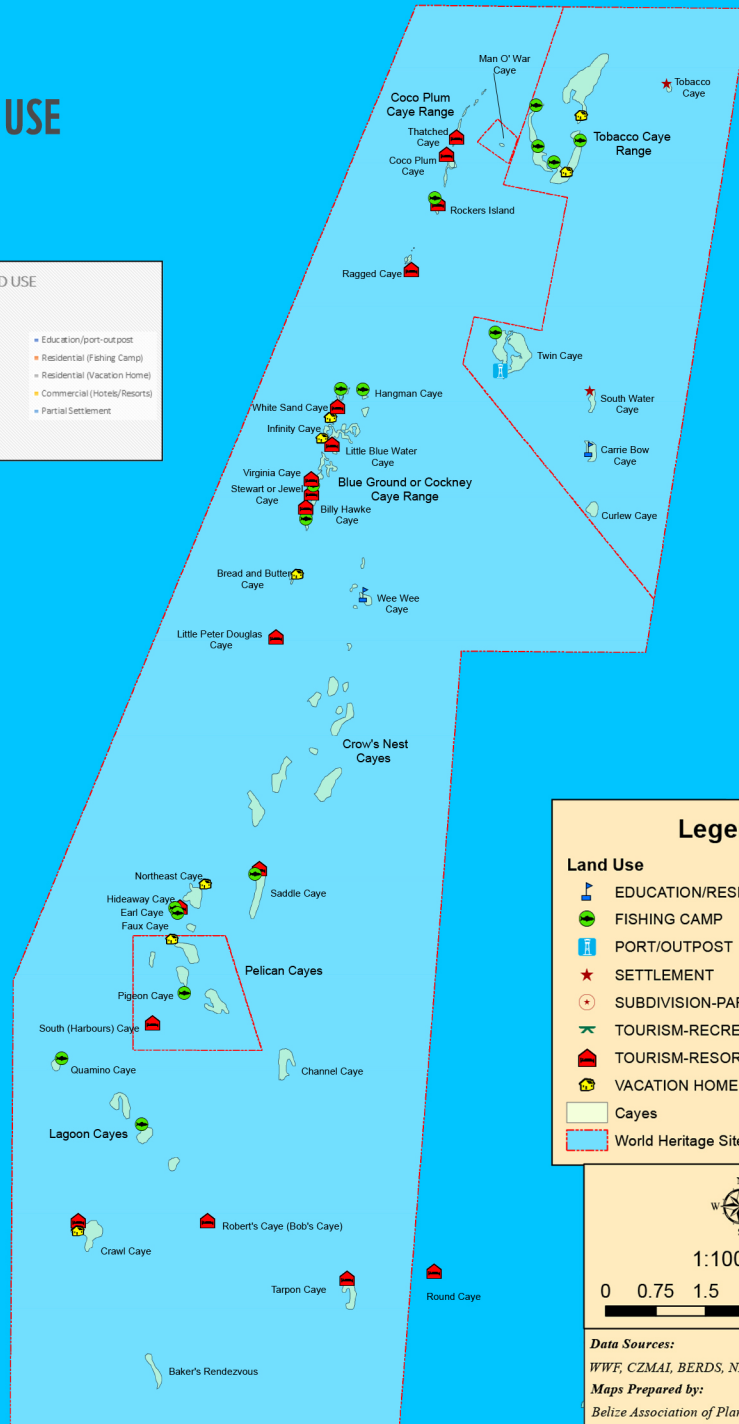
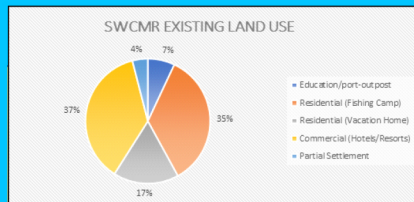


# SOUTH WATER CAYE MARINE RESERVE

This represents an increase of 18 (64%) from 28 development sites recorded in 2003. There was a slight reduction in the number of fisher camps, from 17 to 16, but strong increases in the number of resorts and residential vacation homes, from 4 to 17 or by 325% and from 2 to 8 or by 300% respectively (see below graph).



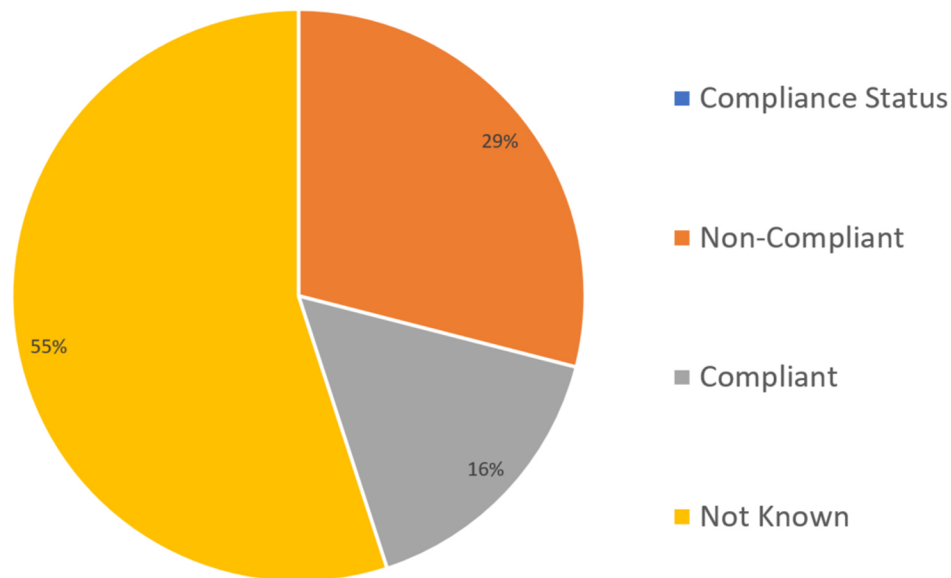
## SUMMARY EXISTING LAND USE



# SOUTH WATER CAYE MARINE RESERVE

Based on a cursory comparative analysis of land development activities of 38 named cayes to the general parameters contained in the coastal zone development guidelines for the SWCMR, it can be stated that 11 (29%) are not compliant with these guidelines, 6 (16%) are more or less compliant and no comment or no development activity were considered for the remaining 21 (55%).\*

SWCMR-COMPLAINE WITH CZMAI DEVELOPMENT GUIDELINES



\* Wildlife Conservation Society (2014) South Water Caye Marine Reserve Cayes Inventory July 2011-May 2013 data aggregated to inform this status



# SAPODILLA CAYES MARINE RESERVE

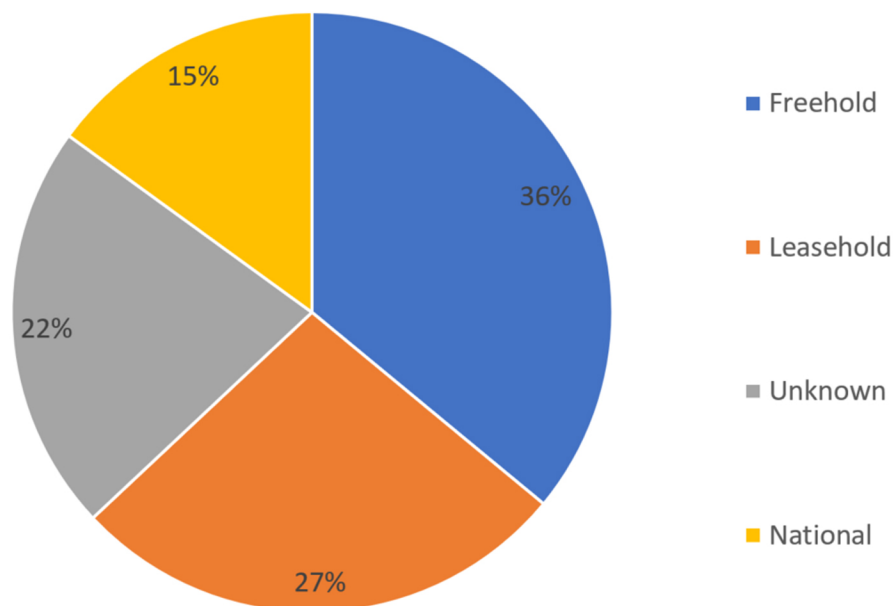
THE SAPODILLA CAYES MARINE RESERVE SPANS 38,595 ACRES AND INCLUDES 8 NAMED CAYES AND SAND BARS, THE FORMER COMPRISING 29.87 ACRES.

IT WAS ESTABLISHED IN 1996, PRIMARILY FOR ITS NATIONALLY RECOGNIZED SPAWNING AGGREGATION SITES, NICHOLAS CAYE, RISE AND FALL BANK AND SEAL CAYE. IT IS REPRESENTATIVE OF THE DISCONTINUOUS REEFS OF THE SOUTHERN BARRIER REEF AND IS MANAGED BY THE BELIZE FISHERIES DEPARTMENT.

# SAPODILLA CAYES MARINE RESERVE

As of 2017, approximately 5.80 acres (about 20%) of the approximate total of 29.87 acres of land appears to be of national tenure and the remainder as follows, based on the 9 parcels for which survey records were accessed (see below chart and table). It must be noted that with the exception of Tom Owens Jr. all lands were either privately owned or leased prior to the inscription\*. There appear to be no change in land tenure from 2003 to 2017.

SCMR LAND TENURE BY INTEREST 2017



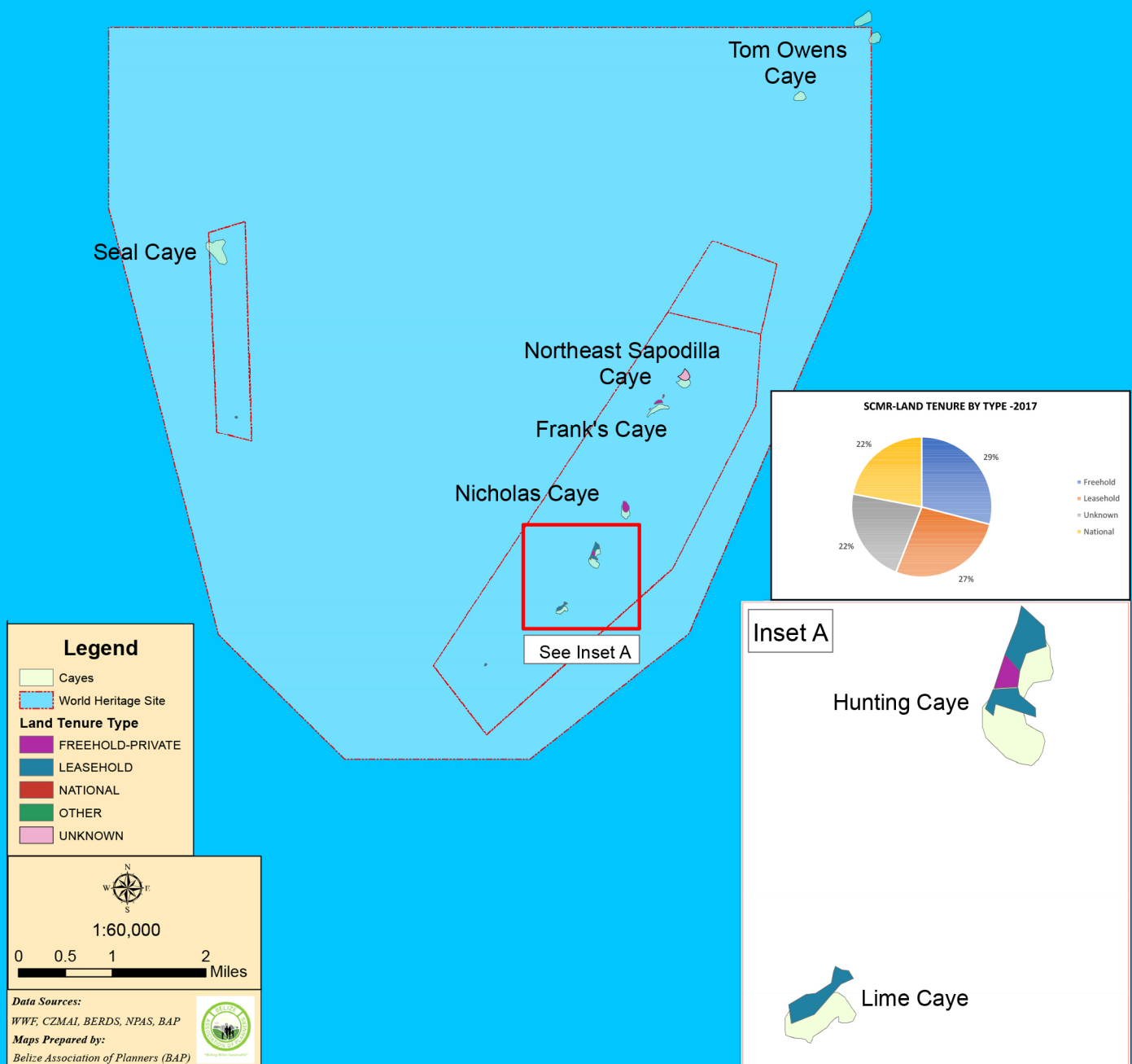
\* Per conversation with Wil Maheia 06/2017 and TASTE (2005) Sapodilla Cayes Marine Reserve Strategic Management Plan

	NAME OF CAYE	SIZE (ACRE)	MID-2017 PRIVATE, LEASED OR UNKNOWN (ACRE)	% PRIVATE, LEASE OR UNKNOWN	% PUBLIC
1	Northeast Sapodilla Caye	4.80 (new est. size 6.51 due to accretion)	6.51	100	0
2	Frank's Caye	4.00	2.38	59.5	40.5
3	Nicholas Caye	6.00	4.99	83.2	16.8
4	Hunting Caye	10.71	6.54	61	38.9
5	Lime Caye	3.50	2.70	77.1	22.8
6	Seal Caye	0.50	0.50	100	0
7	Tom Owens Sr.	0.25	0.25	100	0
8	Tom Owens Jr.	0.11	0.11	100	0
		<b>29.87 (31.58)</b>	<b>23.98</b>	<b>85.1</b>	<b>14.9</b>

Of the 9 parcels totaling approximately 23.98 acres (80%) of all land, 5 parcels of approximately 9.54 acres (36 %) are freehold tenure; 3 parcels or approximately 7.95 acres (27%) are leasehold tenure; and the tenure of 1 parcel or approximately 6.52 acres (22 %) is unknown (see below pie chart). Of note also is the formation of new national land (sand bars) upon which temporary fisher camps are being established and for which applications to lease and purchase may be forthcoming, as anecdotal conversations suggests.

# SAPODILLA CAYES MARINE RESERVE

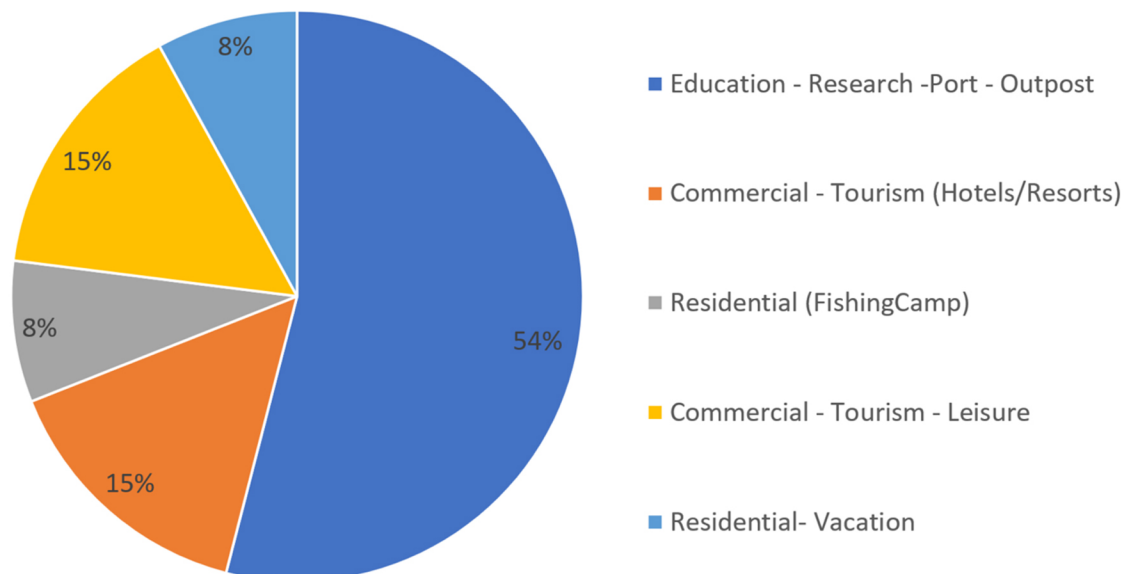
## SUMMARY LAND TENURE BY TYPE



## LAND USE ANALYSIS

Thirteen development sites were recorded in the SCMR. These include 7 (54%) used as education-research and port-outpost (Hunting Caye-Belize Coast Guard/Belize Defense Force, University of Belize, Fisheries Department, Port of Belize, Belize Tourist Board and Immigration) and Tom Owens Sr.-Reef Conservation International); 1 (8%) as residential (fishing camp); 2 (15%) as commercial (tourism-resort); 1 (8%) as residential (vacation home) and 2 (15%) as commercial-tourism-leisure (see below pie chart). The commercial-tourism-leisure are representative of the intensification of Hunting Caye and Nicholas Caye as sites for day cruises.

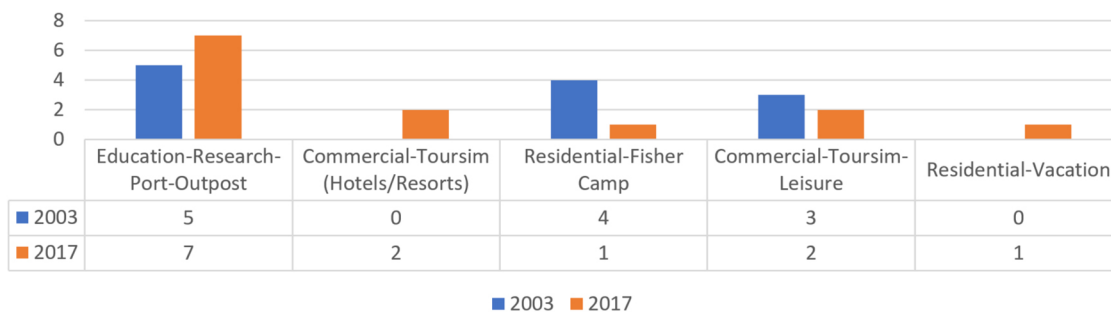
### SCMR EXISTING LAND USE



# SAPODILLA CAYES MARINE RESERVE

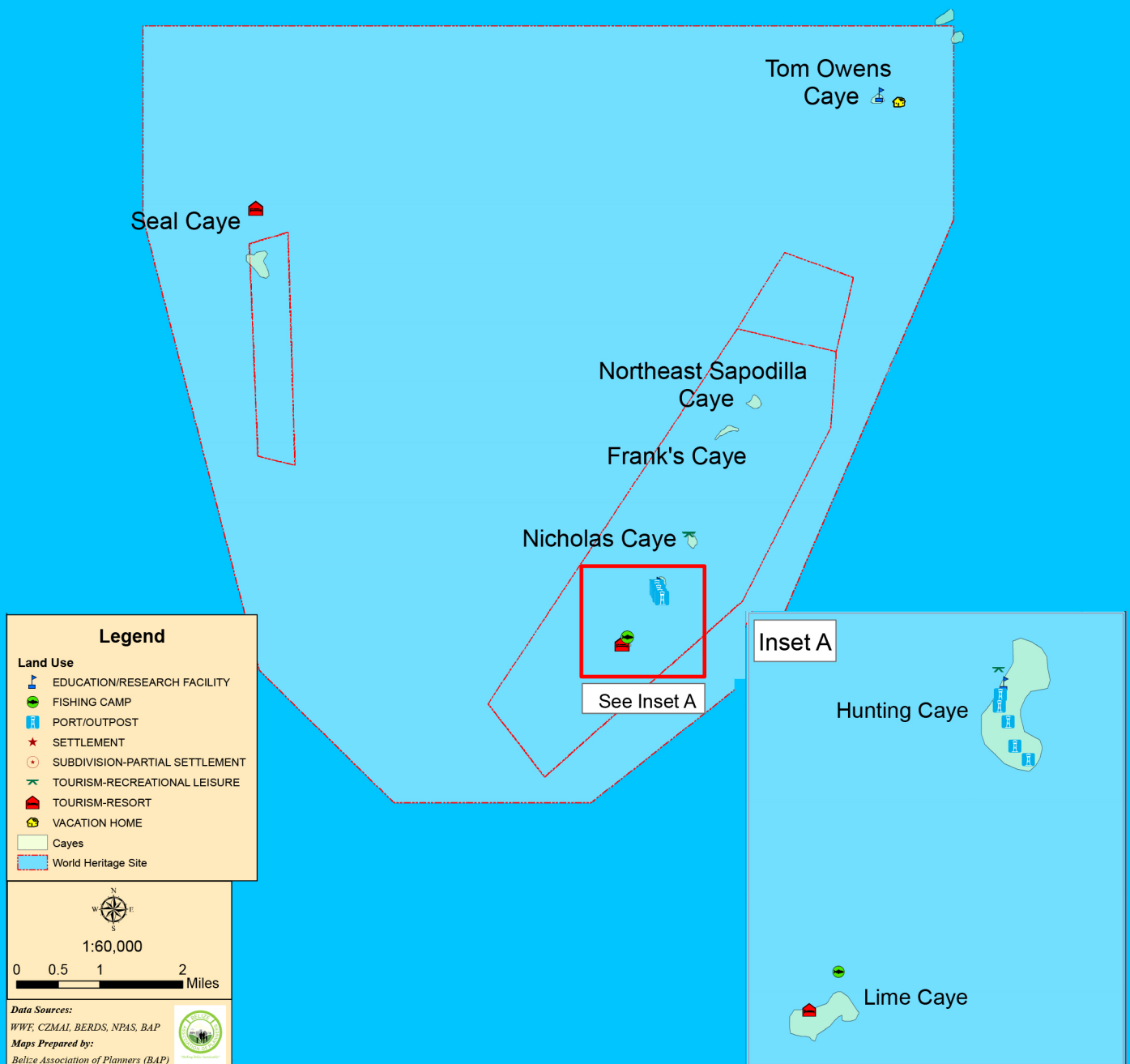
The findings (see below graph) represent a small increase of 1 (8%) from 12 development sites recorded in 2003. There was a significant 75% reduction in the number of fisher camps, from 4 to 1; a moderate increase in the number of education-research and port/outpost sites, from 5 to 7 or by 40%; and the entry of new categories of use, namely a change of use from a bird sanctuary to 1 residential vacation home (Tom Owens Caye Jr.), and the intensification of use for commercial-tourism-leisure to accommodate day cruises. There was also a 33% reduction in the number of resorts, from 3 to 2; this reflects one on Nicholas Caye being converted to commercial-tourism-leisure day cruise, 1 on Franks Caye in a condition unfit for human habitation and a third on Lime Caye that's operational.

## SCMR LAND USE CHANGES 2003 - 2017



Limitations, spatial scope and resolution of the study do not provide sufficient data to establish a compliance status with coastal zone development guidelines of the SCMR.

## SUMMARY EXISTING LAND USE



# HALF MOON CAYE NATURAL MONUMENT

THE HALF MOON CAYE NATURAL MONUMENT SPANS APPROXIMATELY 9,700 ACRES INCLUDING 1 CAYE, HALF MOON CAYE, COMPRISING 41.5 ACRES AND SURROUNDING WATERS. IT WAS ESTABLISHED IN 1982 IN ACCORDANCE WITH THE NATIONAL PROTECTED AREAS SYSTEM ACT (CHAPTER 215 OF THE LAWS OF BELIZE RE 2003) TO PROTECT AND PRESERVE THE BOOBIE BIRDS. THE HMCNM IS LOCATED ON THE LIGHTHOUSE REEF ATOLL AND IN THE LIGHTHOUSE REEF PLANNING REGION. IT IS MANAGED BY BELIZE AUDUBON SOCIETY (BAS), AN NGO IN PARTNERSHIP WITH THE FOREST DEPARTMENT.



## **LAND TENURE ANALYSIS**

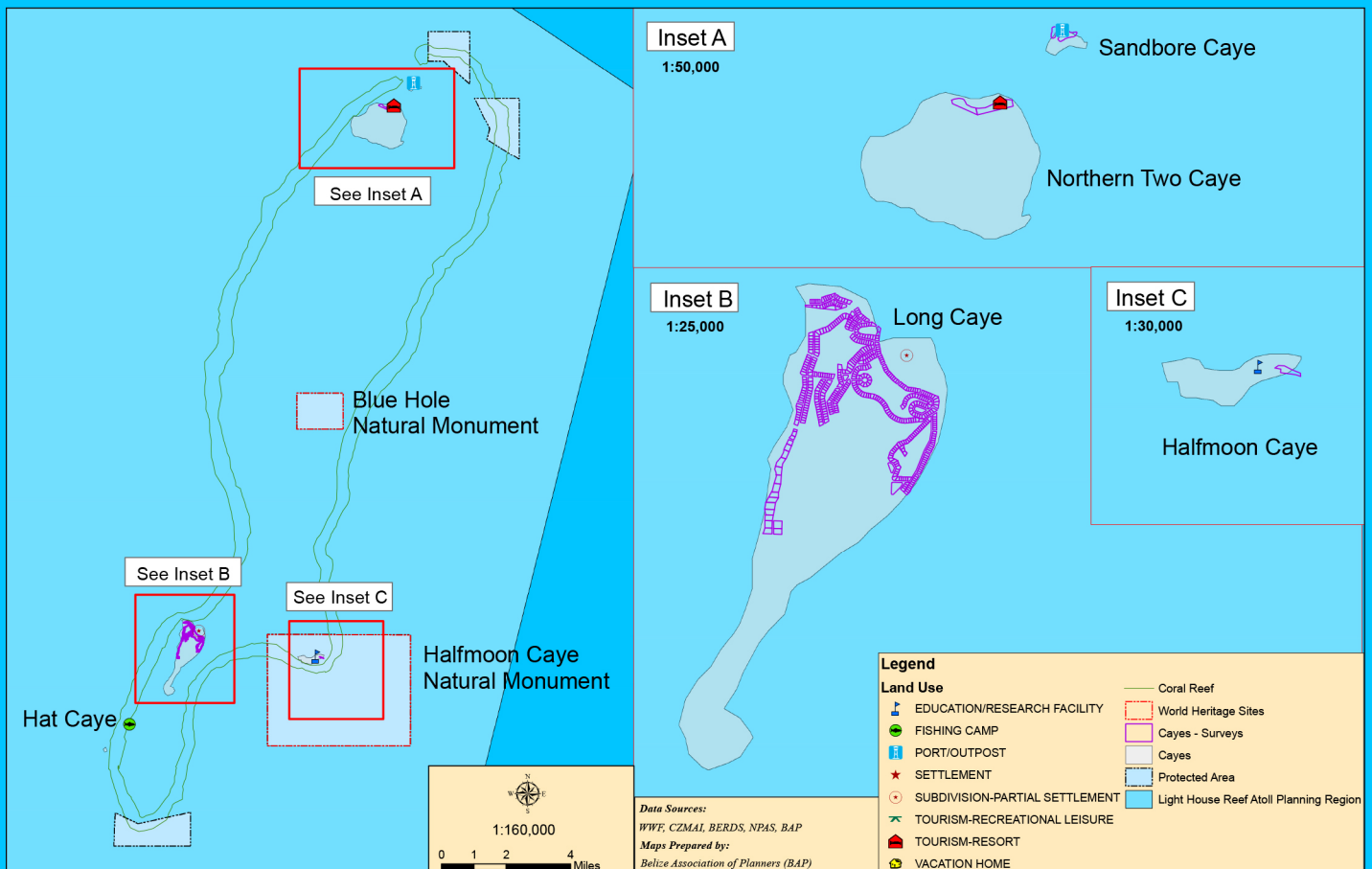
As of 2017, all 41.5 acres of Half Moon Caye appear to be national lands. No record of survey activity for HMCNM was found for the period 2003-2017.

## **LAND USE ANALYSIS**

Half Moon Caye serves as an education-research and tourism facility. Almost all of the land is in a natural state. There is no indication of change of land use for the period 2003-2017 and it complies with the coastal zone development guidelines. Half Moon Caye is depicted in Inset C on the below map. There are, however, several development activities surrounding the HMCNM which can have potential impact on its environmental health and integrity (see below map).

# HALF MOON CAYE NATURAL MONUMENT

## CENTRAL BELIZE LIGHTHOUSE ATOLL PLANNING REGION - EXISTING LAND USE AND SURVEYS



# GLOVERS REEF MARINE RESERVE

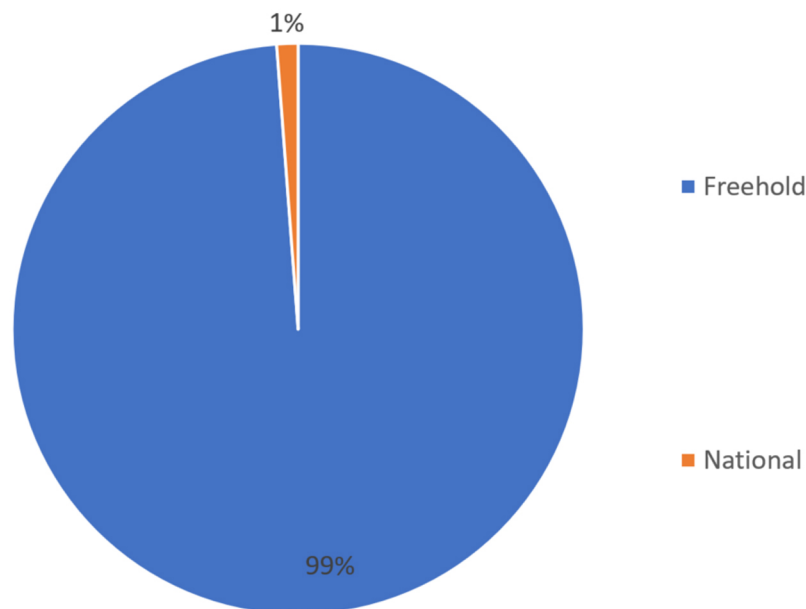
THE GLOVER'S REEF MARINE RESERVE SPANS 86,665 ACRES, INCLUDING 5 NAMED CAYES COMPRISING APPROXIMATELY 70.9 ACRES. IT WAS ESTABLISHED IN 1993 AS AN IMPORTANT FISHING GROUND PROVIDING RECRUITMENT, NURSERY, FEEDING AND DWELLING AREAS FOR LOBSTER, CONCH AND FINFISH. IT IS MANAGED BY THE BELIZE FISHERIES DEPARTMENT.

# GLOVERS REEF MARINE RESERVE

## LAND TENURE ANALYSIS

As of 2017, the records show surveys for 36 freehold (i.e. private) parcels of land, of which 27 (75%) are on Southwest Caye I. No survey record was found for Middle Caye, which serves as a research station for the Wildlife Conservation Society but anecdotal reference indicates it is privately owned. No record of survey activity for the GRMR was found for the period 2003-2017 and there appears to be a parcel of national lands on Southwest Caye II upon which the Lighthouse occupies. Anecdotal reference indicates that there was an intent to survey the same.\*

### GMR LAND TENURE BY INTEREST - 2017

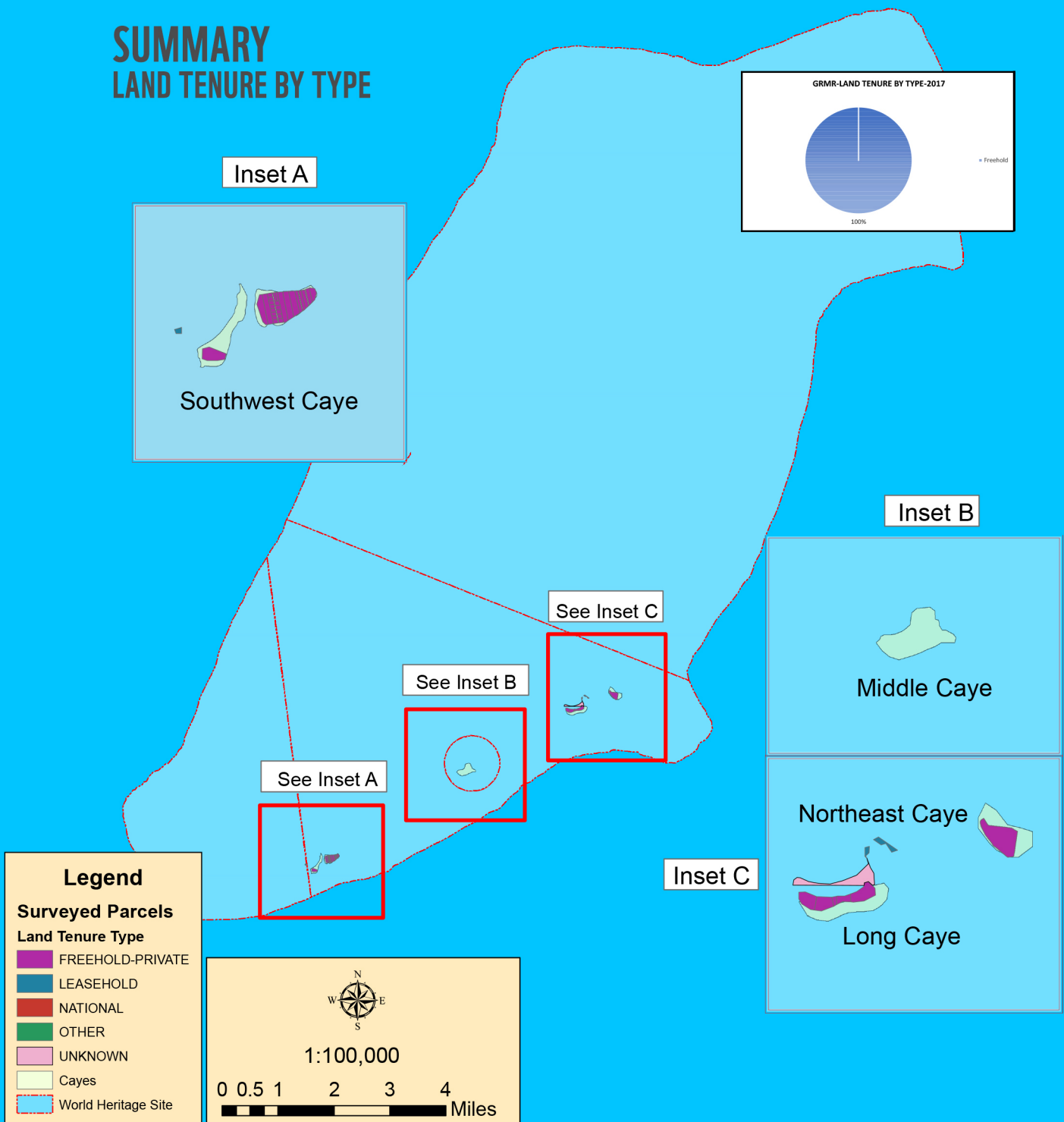


\* Per Major Lloyd Jones 06/2017.

#	Name of Caye	Size (acre)	Mid-2017 Private, leased or unknown (acre)	% Private or lease	% public
1	Northeast Caye	9.00 (12.35)	9.00	100	0
2	Long Caye	13.50 (19.76)	13.50	100	0
3	Middle Caye	10.00	10.00	100	0
4	Southwest Caye II	23.58	23.58	100	0
5	Southwest Caye I	14.82	est.14.00	All except 1 small parcel appears to be public (est. 0.18)	1 small parcel
		<b>70.9</b>	<b>70.08</b>	<b>est. 98.8</b>	<b>est. 1.2</b>

# GLOVERS REEF MARINE RESERVE

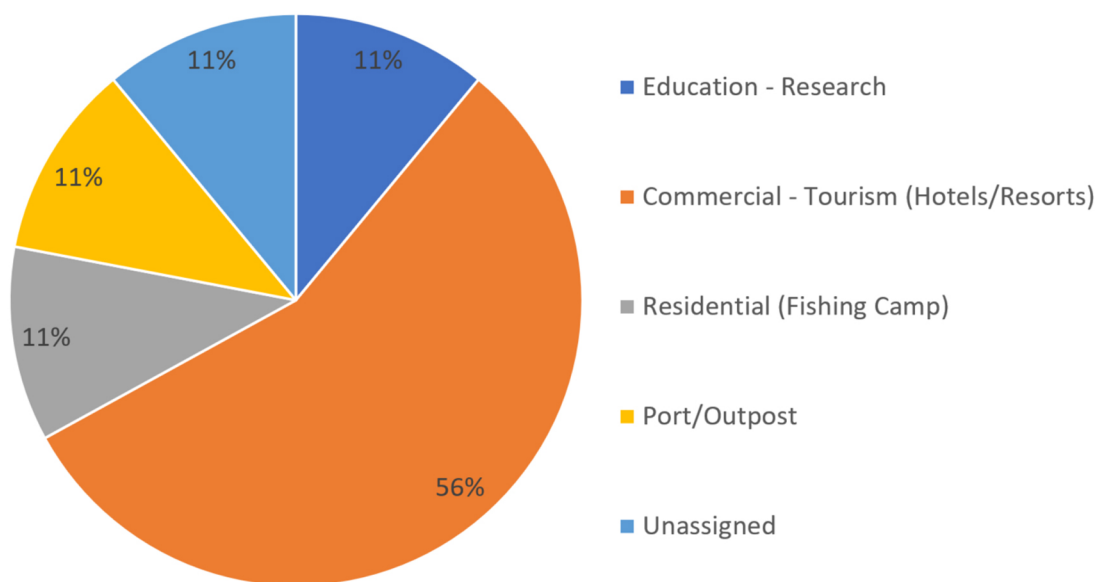
## SUMMARY LAND TENURE BY TYPE



## LAND USE ANALYSIS

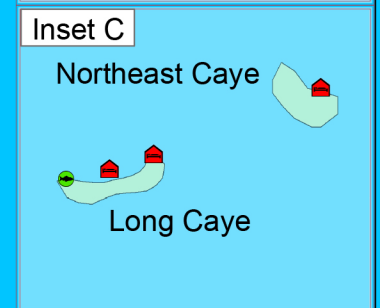
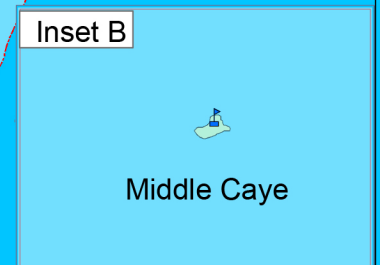
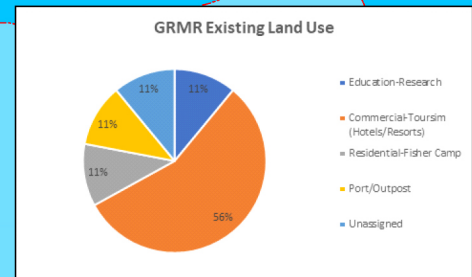
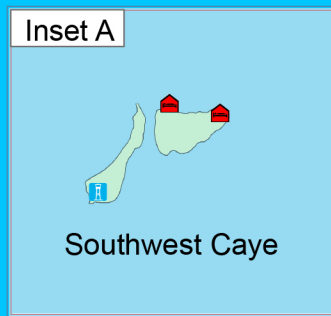
As of 2017, 9 development sites are recorded for the GRMR. These comprise 5 (83%) commercial-tourism-resorts, 1 education-research, 1-port/outpost, 1-residential-fisher camp and 1-vacant resort or 11% respectively, the latter being the only indication of change of land use of these sites between 2003-2017.

### GMR LAND TENURE BY INTEREST - 2017



# GLOVERS REEF MARINE RESERVE

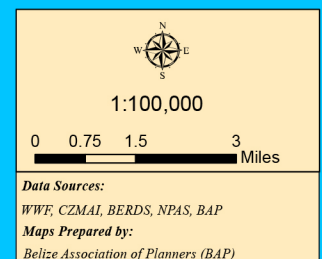
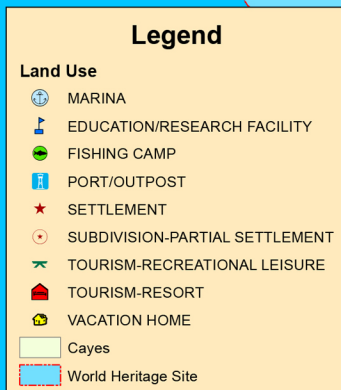
## SUMMARY EXISTING LAND USE



See Inset C

See Inset B

See Inset A





Noteworthy is that some of these developments had existed prior to the BBRRS's inscription as a WHS in 1996, but others had been allowed to proceed subsequent to inscription. For example, while all the lands in the Glovers Reef Marine Reserve except the portion occupied by the Lighthouse were private property prior to the inscription, 3 (Slickrock Adventure[1986]<sup>\*</sup>, Island Expedition [1987]<sup>\*\*</sup> and World Conservation Society [1995]<sup>\*\*\*</sup>) or 37.5% of 8 of the 9 development sites existed prior to inscription. Of the remainder, 2 (Isla Marisol [2002]<sup>\*\*\*\*</sup> and Off the Wall Dive Shop [2000]<sup>\*\*\*\*\*</sup> came into existence post inscription, and it is unknown when the remaining 3 [Residential-Fishing Camp, Manta Resort (now defunct) and Glover's Reef Atoll Resort] or 37.5% came into existence.

Limitations, and spatial scope and resolution of study does not provide sufficient data to ascertain compliance status of the GRMR with the coastal zone development guidelines.

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\* <https://www.slickrock.com/slickrock.html> downloaded 12/04/2017

\*\* <http://www.islandexpeditions.com/30> downloaded 12/04/2017

\*\*\* <https://belize.wcs.org/Glovers-Reef-Research-Station/Welcome-to-Glovers-Reef-Research-Station.aspx>  
downloaded 12/04/2017

\*\*\*\* <http://www.islamarisolresort.com/isla-marisol-history> downloaded 12/04/2017

\*\*\*\*\* <http://www.offthewallbelize.com/story.html> downloaded 12/04/2017

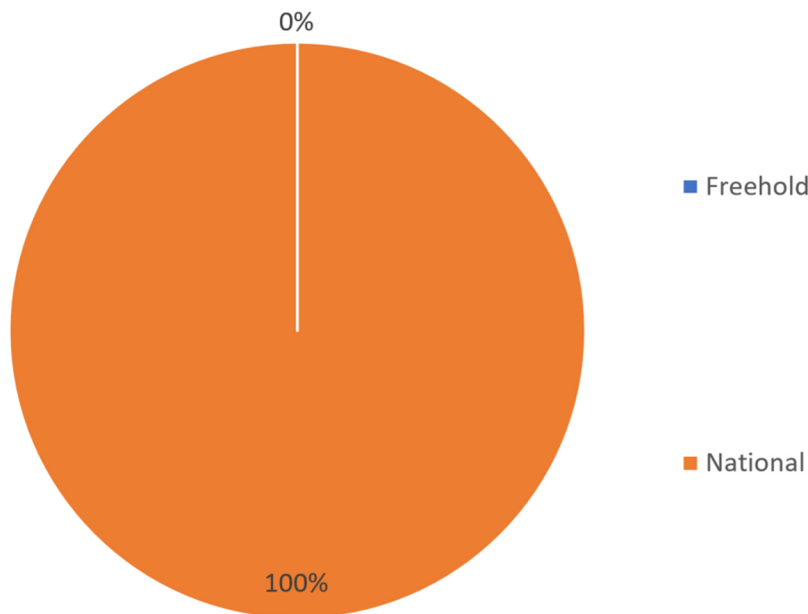
# **LAUGHING BIRD CAYE NATIONAL PARK**

**LAUGHING BIRD NATIONAL PARK SPANS 10,119 ACRES, INCLUDING ONE CAYE, LAUGHING BIRD CAYE COMPRISED OF 4.23 ACRES. IT WAS ESTABLISHED IN 1996 TO PROTECT ONE OF BELIZE'S FAROS, A SERIES OF UNUSUALLY STEEP-SIDED RHOMBOID REEF SYSTEMS FOUND ON THE COASTAL PLATFORM IN SOUTHERN BELIZE. IT IS CO-MANAGED BY THE SOUTHERN ENVIRONMENTAL ASSOCIATION (SEA), A NGO, IN PARTNERSHIP WITH THE FOREST DEPARTMENT.**

## LAND TENURE ANALYSIS

As of 2017, all 4.23 acres of Laughing Bird Caye appear to be national lands. However, a survey marker was found but consultations with the Southern Environmental Association that co-manages the LBCNP confirmed that the entire caye is public land. No record of survey activity for the LBCNP other than the single survey was found for the period 2003-2017.

### LBCNP LAND TENURE BY INTEREST - 2017

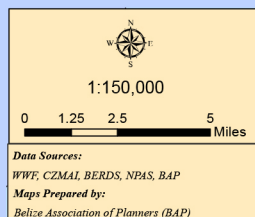
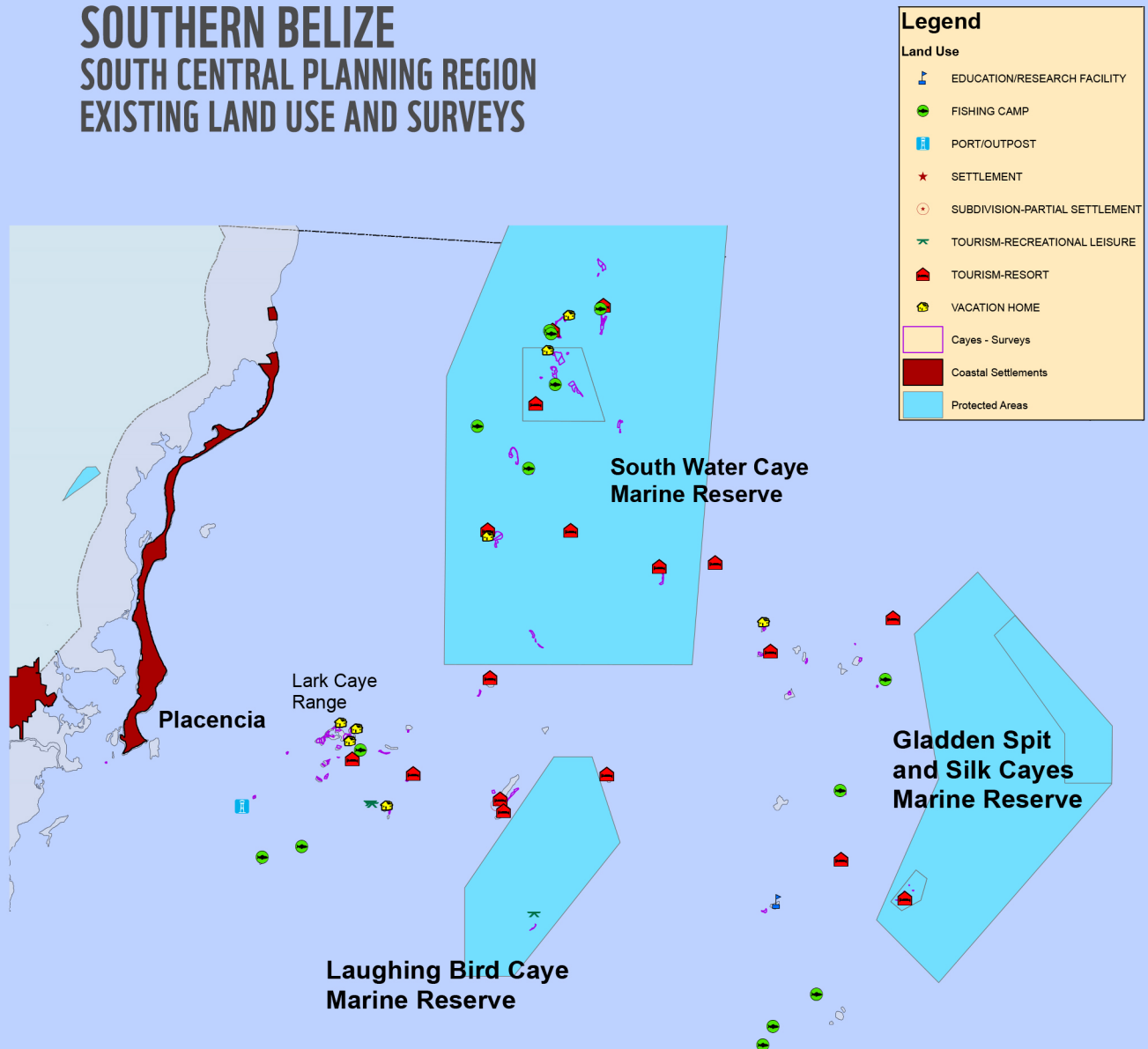


## LAND USE ANALYSIS

LBCNP serves as an education-research and tourism facility. Almost all of the land is in a natural state. There is no indication of change of land use for the period 2003-2017. There are, however, several development activities surrounding the LBCNP which can have potential impact on the environmental health and integrity of the LBCNP.

# LAUGHING BIRD CAYE NATIONAL PARK

## SOUTHERN BELIZE SOUTH CENTRAL PLANNING REGION EXISTING LAND USE AND SURVEYS



# BACALAR CHICO MARINE RESERVE

BACALAR CHICO NATIONAL PARK AND MARINE RESERVE MANAGEMENT UNIT COVERS THE MARINE AND TERRESTRIAL COMPONENTS REPRESENTATIVE OF NORTHERN COASTAL BELIZE. THE BCNPMR SPANS 28,169 ACRES AND IS SITUATED AT THE NORTHERN-MOST TIP OF AMBERGRIS CAYE, THE LARGEST AND MOST POPULAR OF BELIZE'S OFFSHORE CAYES. IT INCLUDES THE MOST NORTHERLY PART OF THE BELIZE BARRIER REEF, THE MARINE RESERVE COVERING 15,529 ACRES OF PATCH, BARRIER AND SPUR AND GROOVE CORAL REEF, SHALLOW LAGOON AND DEEP SEA, AND THE TERRESTRIAL PORTION COVERING 12,640 ACRES, INCLUDING LAGUNA DE CANTENA. THE MARINE PROTECTED AREA ALSO OVERLAPS WITH THE ROCKY POINT SPAWNING AGGREGATION SITE.

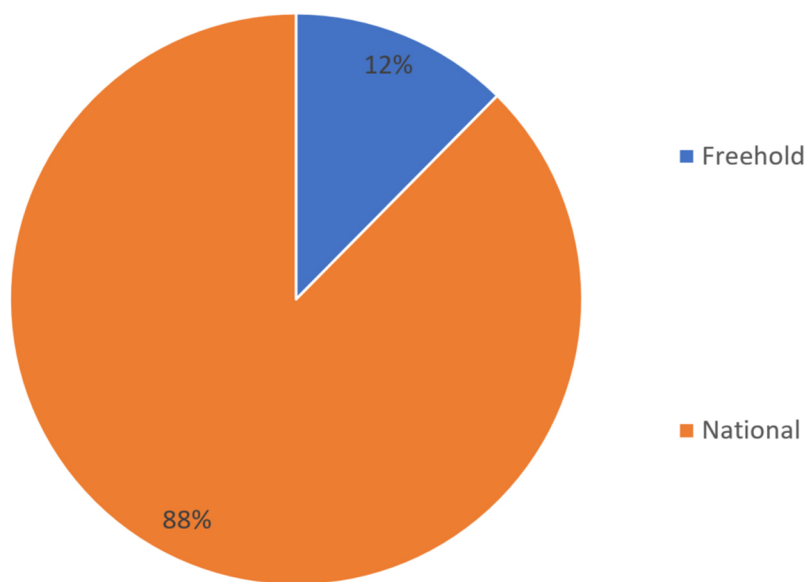
# BACALAR CHICO MARINE RESERVE

The Bacalar Chico National Park was designated through a Statutory Instrument in 1996 (S.I. 89 of 1996). The marine reserve was designated that same year (S.I. 88 of 1996) but the boundary was adjusted in 2003 to include the Rocky Point spawning aggregation site (S.I. 161 of 2003).

The Marine Reserve provides protection for a number of species of both national and international conservation concern, including the critically endangered Goliath grouper, hawksbill turtle, and both staghorn and elkhorn corals. The east-facing beaches, adjacent to the protected area, are important nesting sites for loggerhead and green turtles, along with the occasional hawksbill. The protected Rocky Point spawning aggregation site, located 1 km off shore, provides ideal conditions for mating congregations of commercially important species – including grouper, snapper, and jack. The reef drop-off is also an important conch nursery for both the Belize and adjacent Mexican fishing sectors. The National Park protects some of the best littoral forest in Belize; largest contiguous expanse remaining in the country.

## LAND TENURE ANALYSIS

There is approximately 12,640 acres of land existing within the national park. As of 2017, there is a strip of private land on the eastern section of the national park that is approximately 1,567.4 (12.4%) acres (see below chart and map). This private strip of land has been in existence since 1996 when the site was designated; as prescribed by S.I. 89 of 1996. The remainder of the national park appears to be national land. There is no landmass within the marine reserve.

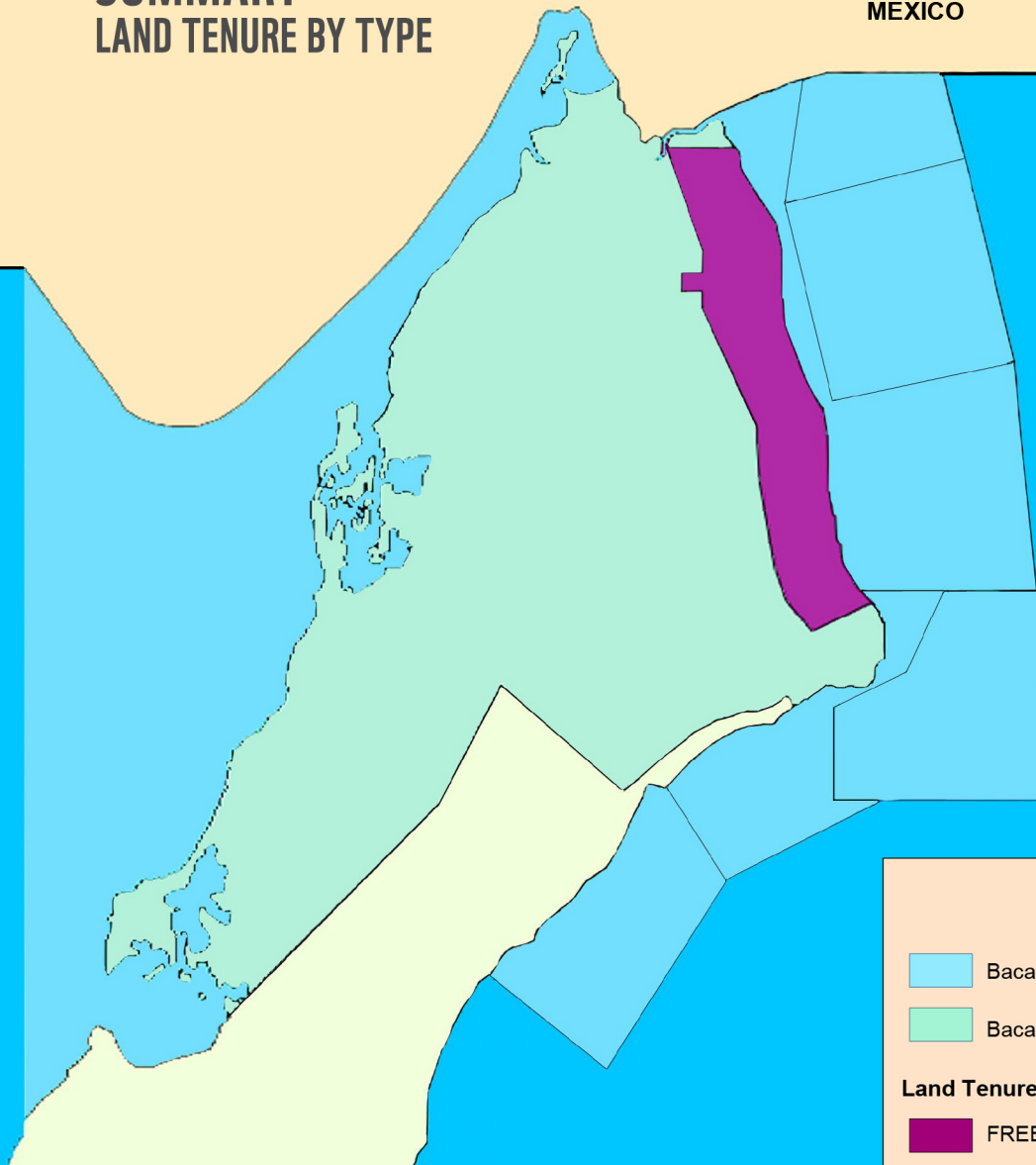
**BCNPMR LAND TENURE BY INTEREST - 2017****LAND USE ANALYSIS**

The BCNPMR serves as an education-research, fishing and tourism area. Almost all of the land is in a natural state. There is no indication of change of land use for the period 2003-2017.



# BACALAR CHICO MARINE RESERVE

## SUMMARY LAND TENURE BY TYPE

MEXICO



### Legend

-  Bacalar Chico Marine Reserve
-  Bacalar Chico National Park

### Land Tenure Type

-  FREEHOLD-PRIVATE



1:60,000

0 0.5 1 2 Miles



# CONCLUSION

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Coastal and tourism developments are posing a threat to the BBRRS and consequently, impacting the integrity of this WHS. These threats, common to marine protected areas in general, are showing an increasing trend due to development interest.

There is still a high proportion of lands in the property that is public land. As of August 2017, 85% is considered national or public lands. Only 15% is considered private or otherwise outside of the public domain. However, there has been an increase in the conversion of public lands into private land from the period 2003 to 2017, particularly for SWCMR.

The findings of this analysis indicate that South Water Caye Marine Reserve is the core site under development pressure depicting a 64% increase in the number of development sites and accompany challenges of waste disposal, trampling on fragile ecosystems etc. and a 56% decrease in national lands (which may be more) for the period 2003 to mid-2017. This is particularly troubling when combined with the intensification and concentration of use transitioning some cayes into settlements with no governance structure, the formation of new land and decreasing national land, the high demand for land and increasing land value, and the rapid pace of unregulated and unplanned development between the coastal communities of Riversdale and Placencia Peninsula and on the inner cayes.

The other sites emerging as areas of concern are the Sapodilla Caye Marine Reserve, the Laughing Bird Caye National Park and Half Moon Cayes National Monument. In the case of the former, it is not so much for the increase in development activities but the change of use and intensification of use, caused primarily by leisure and recreational tourism for which footprints go unmeasured, and the formation of new national land in area with no national land with similar environment as SWCMR.

In the case of the LBCNP, it is the increase pace of unregulated and unplanned development occurring in neighboring cayes, and for the HMCNM, the proximity to other cayes, which while undeveloped, have the potential for intense tourism and residential development, particularly Long Caye, with 500+ parcels of private land. Within the Glover's Reef Marine Reserve, Southwest Cayes must be kept on the radar, having 27 or 75% of all private parcels of land in the reserve.

Other areas of concern within the built environment, particularly SWCMR, is the approximately 1/3 non-compliance with the coastal zone development guidelines, which though not legally binding, gives an indication of the site's carrying capacity to maintain environmental health and integrity; the concentration of buildings and high site development densities, Tobacco Caye and South Water Caye has 93 (45%) or of total number of buildings in the

reserve; the proliferation of piers, of which 18 (29%) of the 63 documented piers are on South Water Caye. Notwithstanding, opportunities to explore are environmentally friendly development practices by some developers, including but not limited to increasing use of solar and wind energy, integrating mangrove vegetation into caye landscaping, recycling and sustainable building construction practices, to name a few.

Sustainable management frameworks are critically needed to stem existing development pressures and manage emerging land use and land tenure conflicts within the BBRRS and conserve the integrity of the OUV of the BBRRS. Some management options exist, including:

Declare protected the remaining areas of public land within the marine reserves of the BBRRS;

Prepare detailed guidelines to regulate the development of the built environment of the cayes, with a priority on SWCMR;

Work in partnerships with developers to apply sustainable development best practices;

Strengthen the role of protected area managers in regulating development of the built environment;

Declare WHS for compulsory land registration to provide a true picture of land tenure status; and

Revise mangrove regulations with specific and stricter provisions for private and public mangrove clearance within the WHS.

Combined, the above measures would help to mitigate any adverse effect of prospective development activities on private land within the WHS.

# ANNEX I – LIMITATIONS

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Several limitations were experienced in executing the project. These were as follows:

Undeclared status of land increased the unknown factor in tenure and would have require a much more extensive research over a longer period of time;

Resource limitations due to a change in methodology compromised ground truthing and drilling down into data layers;

The closure of the lobster season reduced interaction with fisher folks in most of the planning regions;

Weather conditions prevented some field validation visits to the outer cayes and closer scrutiny of the coastline;

Topography and shoal conditions also limited closer scrutiny of development sites on coast and cayes;

The user of land is not necessarily the owner of land;

Many cayes go by different names which at times was confusing for data collection;

There are no rules for determining whether land development is in accordance with approved land use and zoning schemes

# ANNEX II

## PURPOSE OF LAND USE AND LAND TENURE ANALYSIS

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The purpose of a land use analysis is to study where and what type of human activities are taking place. Humans utilize land for a number of reasons. These include domicile, employment, worship, recreation and leisure, growing food and internment, to name a few. A land use study is one way of understanding these activities. It stands to reason therefore, that land use is human use.

Thus, a land use analysis becomes necessary in areas where change is ongoing or expected to occur in order to make a determination as to how best to use land to strike a balance between the public interest, achieving global, national and local development goals and private property rights. In addition, it provides a set of tools to understand (1) how land is currently used? (2) What land use changes can be made in accordance with a set of rules? (3) What are the impacts of land use changes?

Conducting a land use analysis relies on accessibility and availability of land data sets - including but not limited to:

Location: All land is linked to a spatial coordinate system

Activity: The purpose of the use of land according to a land use class description

Natural qualities: The surface and subsurface characteristics and vegetative cover of land which influences the type and intensity of the use of land

Improvements: Human modification of land that is, clearing, filling, construction, dredging, intensification of use etc. over time which requires a baseline year

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\* Clawson and Steward (1965)

Intensity: The amount of activity on the land per unit of area

Land tenure: Type of interest and rights in land, that is, legal (freehold or leasehold), equitable or usufructuary (Maya Lands) rights

Land price: The land market activity in the purchase and sale of land

Interrelations: No piece of land stands on its own so access to land affects activity on land and activities on one parcel of land are closely related to activity on another parcel of land

The extent to which data was accessible and available determined the percentage population of the database inventory and consequently, conducting the land use analysis. It must be noted that most of what was available and accessible was only able to respond to 1 of the 3 questions, that is, 'How land is currently used?'

To respond to question (2), 'What land use changes can be made in accordance with a set of rules?', would require the existence of permitted land use classes and development standards from which to engage in a comparative analysis of what types of development exist vis-a-vis what types of development ought to exist.

There are no land use classes and development standards which developers of land within the coastal zone are legally mandated to comply with. However, in existence are Coastal Zone Management Guidelines that have been developed for all planning regions and which contain <sup>\*\*</sup> standards to guide residential development; commercial development; institutional use; cayes with conservation I and II; coastal agriculture and a framework for coastal aquaculture, to name a few. These standards were developed subsequent to extensive research and analysis of socio-economic and physical and environmental data and in consultation with the stakeholder communities within the region and should form the backcloth to regulate the use and development of land.

The goals of the management guidelines are stated as:

<sup>\*\*</sup> <https://www.coastalzonebelize.org/archives/1390>

To encourage and promote the sustainable development of coastal and offshore areas that will promote economic growth while simultaneously ensuring ecosystem stability and the efficient delivery of ecosystem services.

To protect and preserve the traditional way of life of the stakeholders within the planning region.

To ensure sustainability of coastal resources by identifying areas in need of conservation and reducing user conflicts.

Finally, to respond to question (3) What are the impacts of land use changes? This requires a far more extensive study of the coastal zone over time to make a determination of the socio-economic, physical and environmental impacts of land use changes on coastal communities and the health and integrity of the marine environment than this project TOR and resources can provide for. Notwithstanding, the database inventory sets the foundation for additional layers of data to be introduced over time to respond to the other two questions and for a baseline to monitor and track these changes.

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# BELIZE UNESCO WORLD HERITAGE SITE

Land Use and Land Tenure Analysis

Case Study, February 2018



A REPORT FOR WWF BY  
THE BELIZE ASSOCIATION OF PLANNERS





**MINISTRY OF NATURAL RESOURCES**  
**H.M. Queen Elizabeth II Boulevard, Belmopan, Belize C.A.**  
Email: [ceo@naturalresources.gov.bz](mailto:ceo@naturalresources.gov.bz), [info@naturalresources.gov.bz](mailto:info@naturalresources.gov.bz)  
Tel: (501) 802-2711, (501) 802-2630 Fax: (501) 802-2333, (501) 802-2083

***Please Quote:***

***CEO/MNR/21/13/18(19)***

March 20, 2018

Mr. Roosevelt Blades  
UNESCO Secretary General – Belize  
Ministry of Education, Youth, Sports and Culture

and

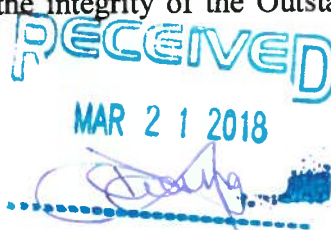
Percival Cho  
Chief Executive Officer  
Ministry of Agriculture, , Forestry, Fisheries, the Environment, Sustainable Development  
and Immigration

Dear Sirs,

**Subject: Belize Barrier Reef Reserve System- Desired State of Conservation for removal of the property from the List of World Heritage in Danger**

The Ministry of Agriculture, Fisheries, Forestry, the Environment, Sustainable Development and Immigration (MAFFESDI) submitted and received approval for a Cabinet Memorandum dated December 12<sup>th</sup> 2017, titled “Removing the Belize Barrier Reef Reserve System World Heritage Site from the list of sites in danger”.

This memorandum stated that the “*only substantial outstanding matter is that of the cessation of land sales and leases of state owned land throughout the seven (7) protected areas comprising the World Heritage Site*”. It also stated that an inventory of the land tenure in the property had been conducted by WWF and that the report would be submitted to the MAFFESDI by December 2017. The Memorandum further stated that according to that land tenure study, only 20% (or 85.75 acres) of land in the World Heritage Site remains available national lands. The Memorandum therefore requested that Cabinet approves a “policy decision to reserve these lands under protected status to ensure the integrity of the Outstanding Universal Value of the property”, which was approved.



Subsequent to the approval of the abovementioned Cabinet Paper, the WWF Land tenure data that was used to inform said Cabinet Paper was presented to the Ministry of Natural Resources for validation. Upon review of the data provided by the WWF, the technical experts flagged that the information does not contain any new or updated survey plans and/or satellite imagery that was anticipated based on the presentation by WWF during the meeting on February 9<sup>th</sup>; it was not clear what other source of data had been used by the WWF consultants to conclude that 20% of the lands of the world Heritage Sites are available national land; the data they provided on development was in 'point' form and thus lacks spatial extent or geographical coverage. While additional information collected such as development on properties (evidenced by pictures) and other attribute data is good and could be used by other agencies, no tenure maps nor satellite imagery was presented, which we understood would have been included and from which new maps/plan could be derived.

Both Ministries along with the UNESCO Secretary General and the WWF met in February and March to review and discuss a way forward. As was discussed in February and March meetings, the Ministry of Natural Resources advised that the proper method to establish the location and total acreage of national lands especially in sprawling marine areas such as South Water Caye is through surveys and compilation of individual plans already surveyed using either conventional survey methods (using survey instruments) or centimetre-accurate Global Positioning Systems. The Ministry further underscores that there is continuous erosion and accretion and what may have existed 20 or even 10 years ago would be different today hence surveys to demarcate and delimit the boundaries of the reserves are important to clearly define, record and register the boundaries of each reserve. Of the approximately 1,100 acres of land Southwater Caye Marine Reserve alone, just under 500 acres is already surveyed, and purportedly leased or titled to private entities.

The Ministry of Natural Resources explained that in Belize there are a myriad of legal instruments which can lend to legal land claim. In the Property in particular these instruments may include but not be limited to a Minister's Fiat Grant, Minister's Fiat Lease, First Certificate of Title, Transfer Certificate of Title, Lease Approval, Approved Purchase Price, many types of Deeds under the General Registry Act, etc. In some cases these documents have been legally issued without having conducted a survey. Therefore, there may be instances in which land may appear to be Crown or national land due to the absence of a survey when in fact it is already issued and/or occupied including already issued or occupied lands within the protected areas system can result in monetary compensation claims against the Government of Belize. Further, there are also situations whereby lands have been illegally occupied; in attempting to exercise its right to expel illegal occupants from national land the Government of Belize has had to compensate for land development. The Ministry of Natural Resources maintains that any action which has the potential to result in a compensation scenario is to be avoided.

In order to mitigate from any further potential for compensation claim against the Government of Belize it is necessary for proper verification of land tenure be conducted prior to declaration of any land within the national protected area system. The Ministry of Natural Resources recommends the following steps:

- Proper ground truthing: Lands are to be checked on the ground for any form of

- occupation by the responsible permitting agencies
- Land tenure research is to be conducted for all potential national lands; this includes what is termed root of parcel research and its ensuing report. This research and report is to confirm National Lands encumbered and unencumbered, National Lands subject to lease, National Lands subject to a paid purchase price in full, National Lands subject to a part payment of purchase price and Private Lands
- Once areas have been determined to be available and unencumbered national land, proper legal surveying can proceed, followed by declaration as a protected area utilizing the relevant legal instrument

***The MAFFESDI's stated the following:***

- It is concerned primarily with the inclusion of mangrove areas within the World Heritage Site
- It is not concerned with islands already under legal protected area status
- South Water Caye Marine Reserve is the only protected area within the World Heritage Site, which has national land comprised of mangroves and which is not yet legally under protected area status

Considering the above and based on the notion that islands already under a protected area designation of the Protected Area Systems Act, the only two areas to be looked at for potential inclusion of cayes under protected status under the new NPASA would be Sapodilla Cayes and Southwater Caye Marine Reserve. Both Ministries agreed that surveying the remaining national land found within the Southwater Caye Marine Reserve is necessary. The survey information will thereafter be utilized to provide the legal description of lands to be declared utilizing the National Protected Areas System Act. Surveying of these national lands will also serve to have them excluded from the saleable national land inventory and to easily demarcate them on the ground, thereby discouraging illegal occupation.

The Ministry of Natural Resources advised a recommended process forward for the surveying of these lands in the Southwater Caye Marine Reserve to proceed as follows:

- Field verification of all potential areas to be surveyed by the relevant permitting agencies, including the Lands and Surveys Department, Department of the Environment, Mining Unit, Physical Planning Section, Forest Department, and Fisheries Department, to ensure that lands are not legally, illegally, or improperly held;
- Historical land tenure research on all potential national land in the site to ensure that they are in fact crown;
- Once verified, issuance of Permissions to Survey for all parcels by the Ministry of Natural Resources;
- Surveying of lands in the site by a Licensed Surveyor, to be contracted by the MAFFESD and the WWF;
- Authentication of survey entries by the Ministry of Natural Resources;
- The Ministry of Natural Resources will then prepare legal descriptions for all surveyed areas for declaration under the NPASA and submit to the MAFFESDI for further action.

The Ministry understands that the WWF has agreed to finance the surveying of the remaining national land in the site for further declaring as a protected area under the National Protected Area System Act (NPASA). The Ministry has agreed to provide the requisite permissions so that both the MAFFESDI and the WWF can proceed with the necessary research and surveying based on the process outlined above.

I trust this brings more clarification to the efforts being undertaken to satisfy the Desired State of Conservation for removal of the property from the List of World Heritage in Danger.

Sincerely,



**SHARON RAMCLAM –YOUNG (Mrs)**  
**CHIEF EXECUTIVE OFFICER**

Copy: Hon Patrick Faber, Deputy Prime Minister and Minister of Education, Youth Sports and Culture

Mrs Adele Catzim-Sanchez, Chief Executive Officer, Ministry of Education, Youth, Sports and Culture

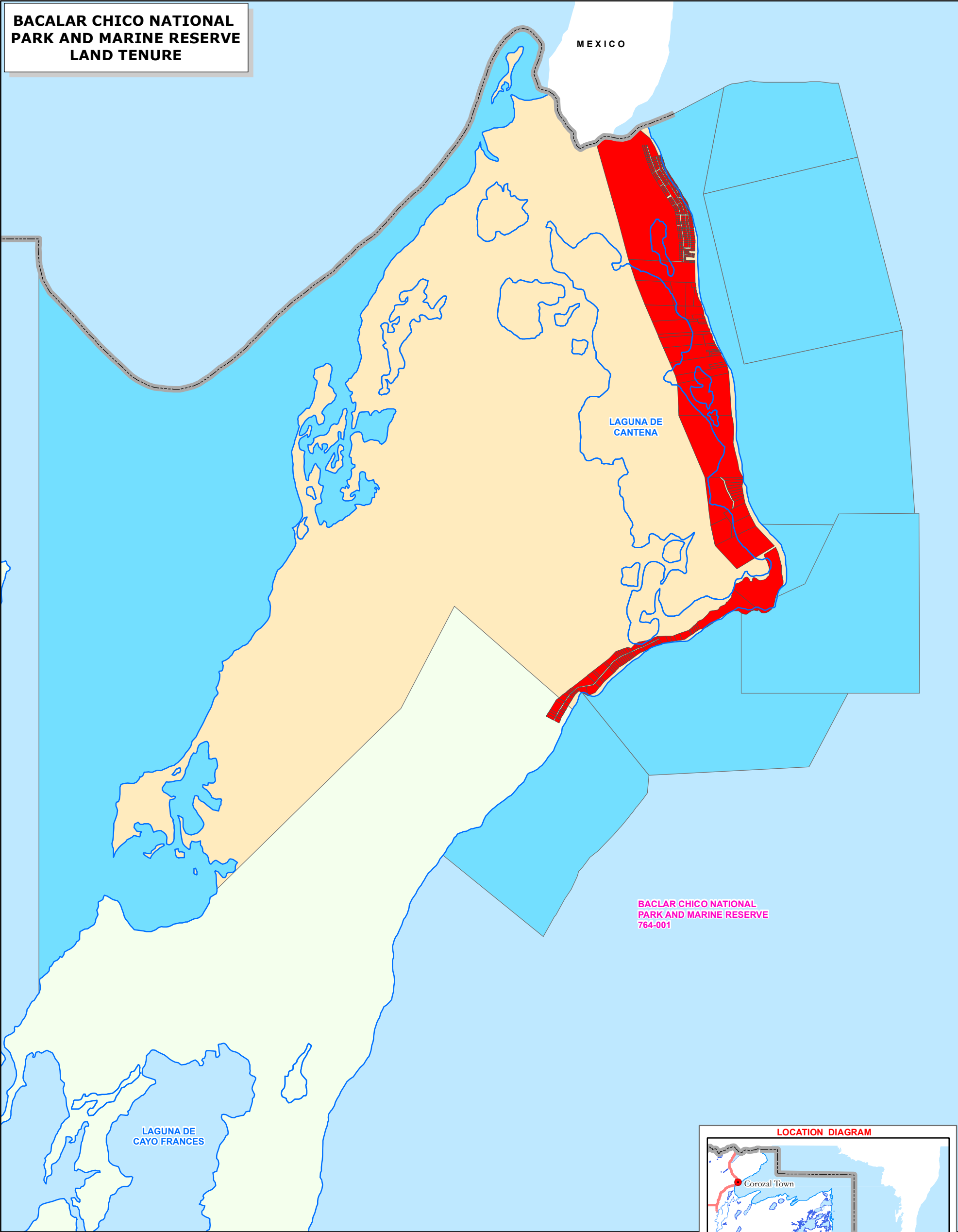
Hon. Dr. Omar Figueroa, Minister of Agriculture, **Forestry, Fisheries, the Environment and Sustainable Development**

Hon. Dr. Carla Barnett, Minister of State in the Ministry of Natural Resources-

Mr. Carlos Perdomo, Cabinet Secretary

Mr. Wilbert Vallejos Commissioner of Lands and Surveys

**BACALAR CHICO NATIONAL  
PARK AND MARINE RESERVE  
LAND TENURE**

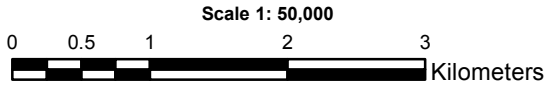


**LEGEND**

- Bacalar Chico Marine Reserve
- Bacalar Chico National Park

**LAND TENURE**

- Private/Freehold
- Towns & Cities
- Coast Boundary
- International Boundary
- Primary Road
- River
- Caye Boundary
- Water body



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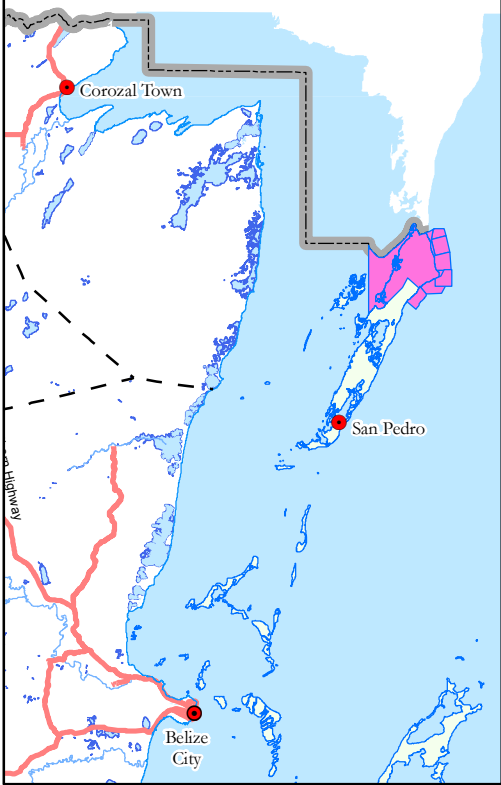


Prepared by:  
Land Information  
Cayman  
April, 2015

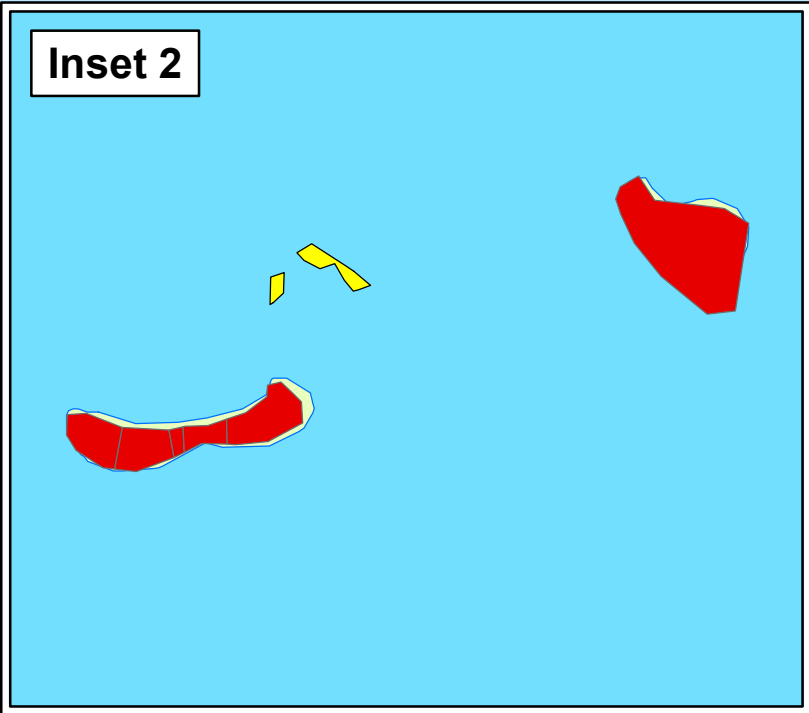
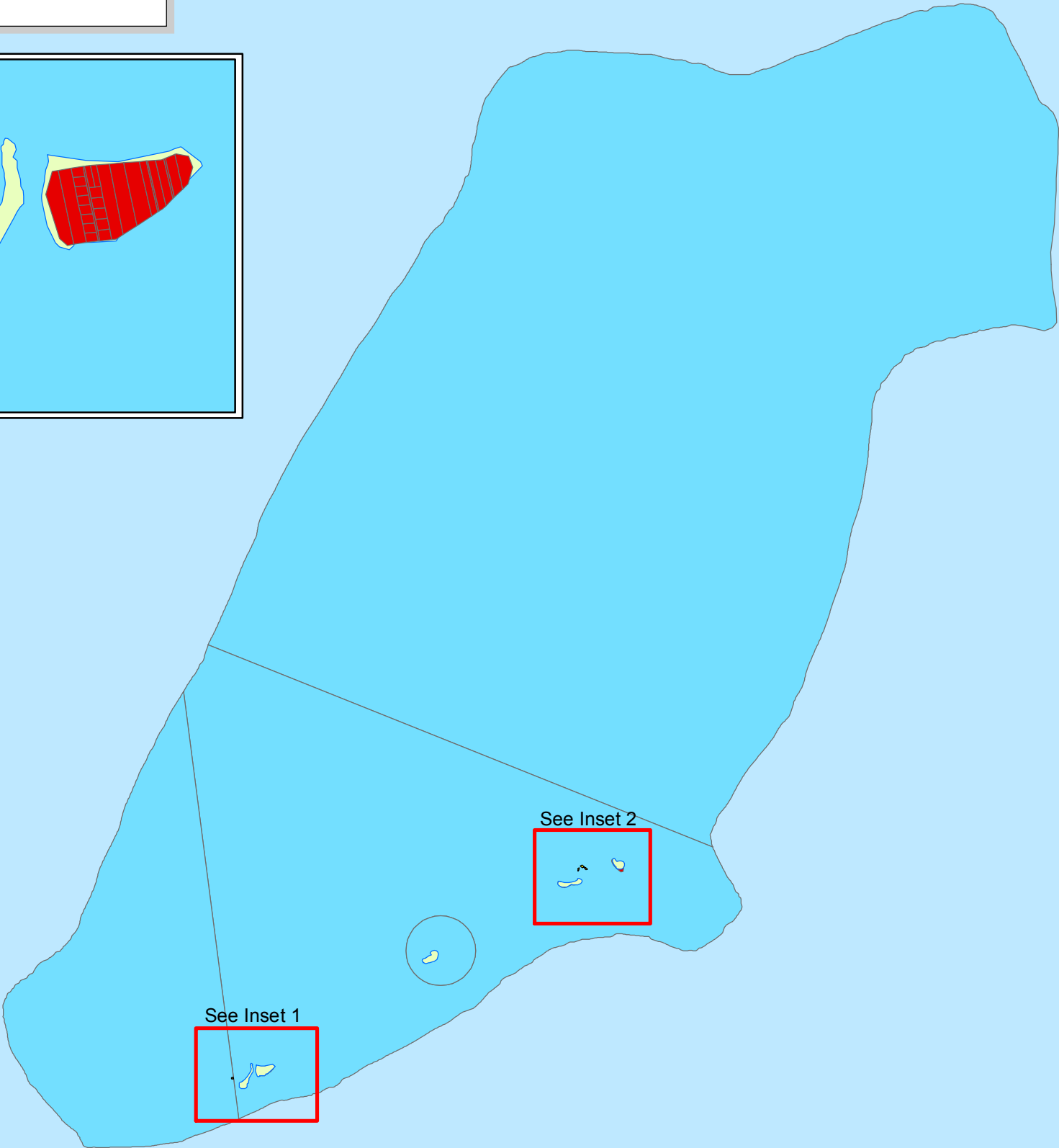
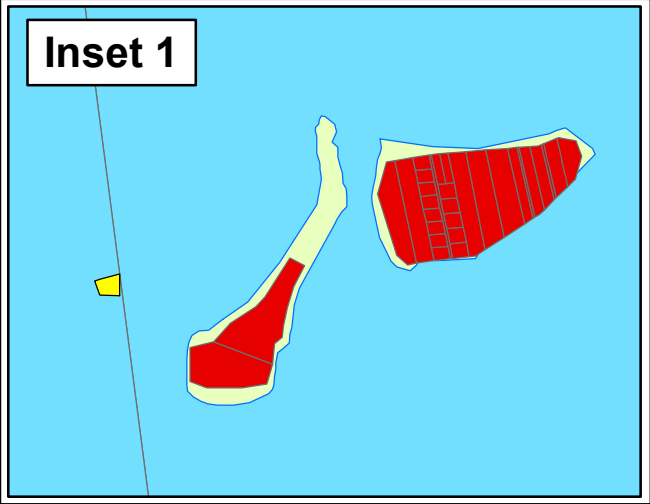


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Spheroid - Clarke 1866  
Unit of Measurement - Meter

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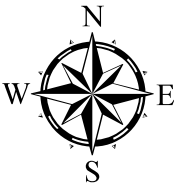
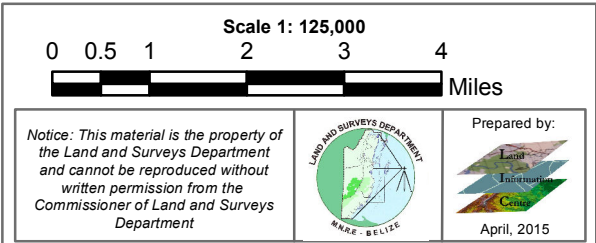


GLOVER'S REEF MARINE RESERVE  
LAND TENURE

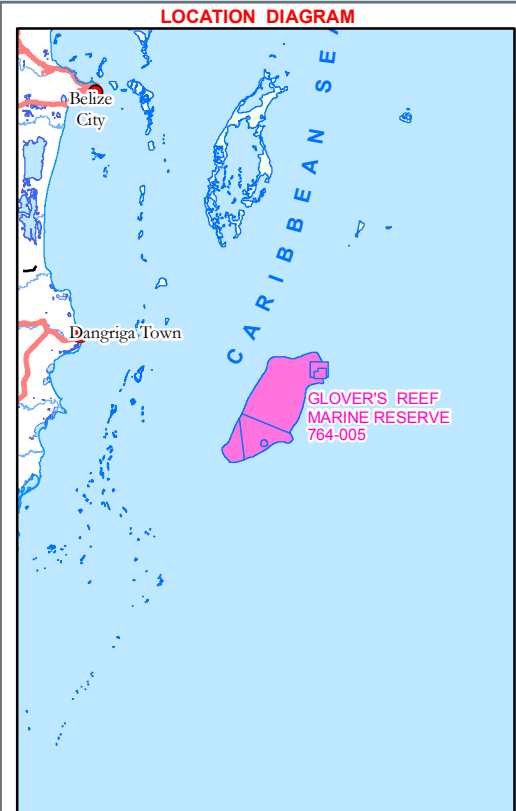


**LEGEND**

- Glover's Reef Marine Reserve
- Full Purchase Price Paid
- Lease
- National
- Private/Freehold
- Unknown
- Towns & Cities
- Coast Boundary
- International Boundary
- Primary Road
- River
- Caye Boundary
- Water body

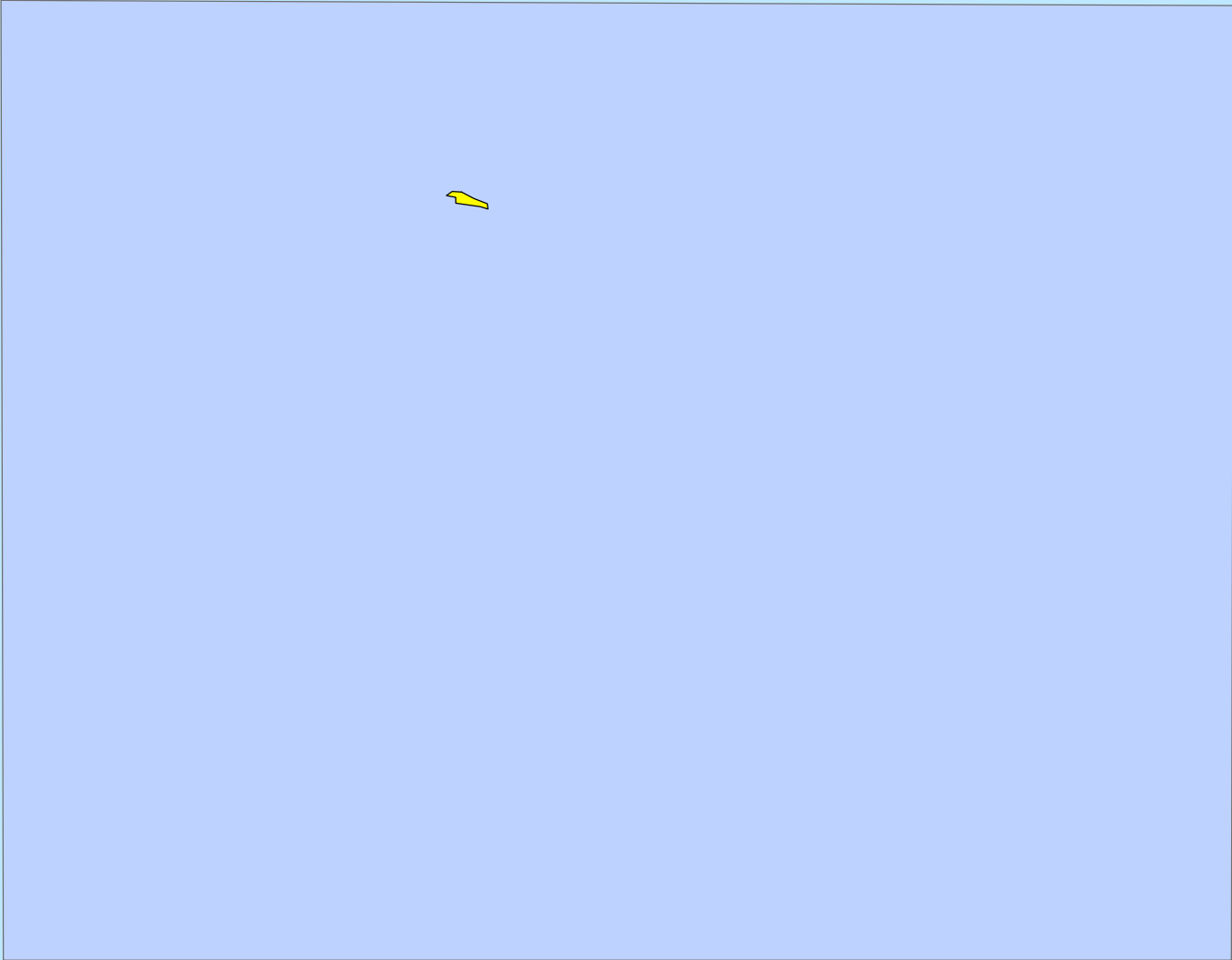


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Unit of Measurement - Meter



HALFMOON CAYE NATURAL MONUMENT  
LAND TENURE

Caribbean Sea



Caribbean Sea


LEGEND

- Halfmoon Caye Natural Monument
- LAND TENURE**
  - Full Purchase Price Paid
  - Lease
  - National
  - Private/Freehold
  - Unknown
- Towns & Cities
- Coast Boundary
- International Boundary
- Primary Road
- River
- Caye Boundary
- Waterbody


Scale 1: 40,000

0 1 2 Kilometers

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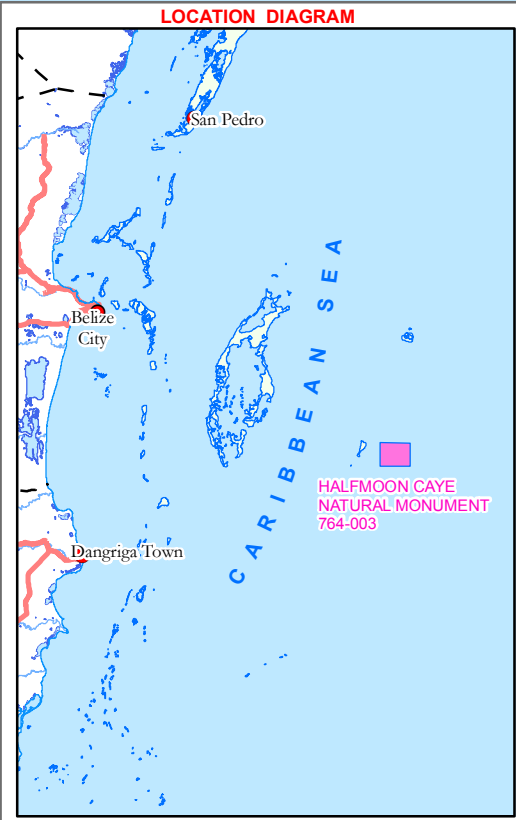
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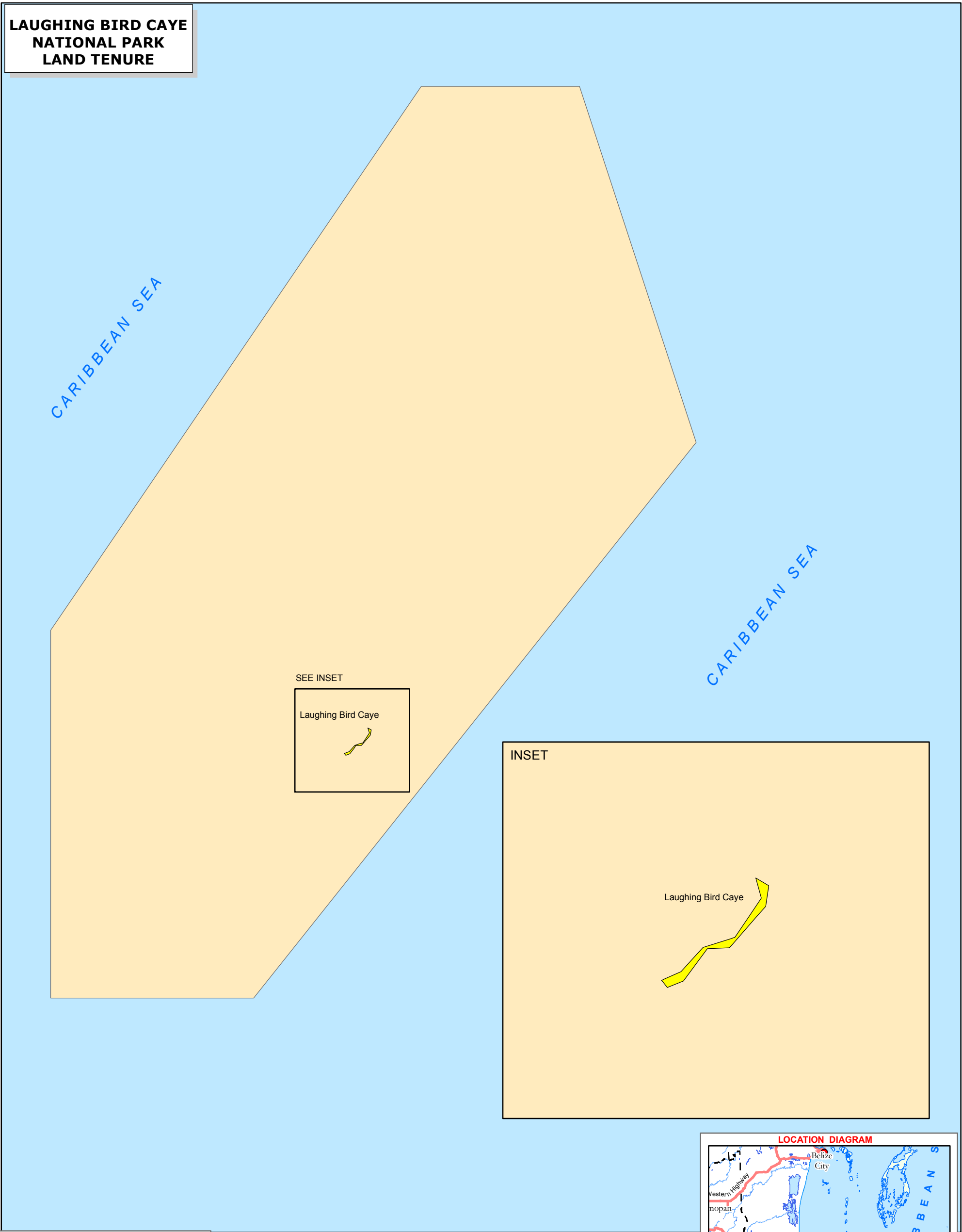
April, 2015



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Projection - Transverse Mercator  
Spheroid - Clarke 1866  
Unit of Measurement - Meter



LAUGHING BIRD CAYE  
NATIONAL PARK  
LAND TENURE



LEGEND

- Laughing Bird Caye National Park
- LAND TENURE**
- Full Purchase Price Paid
- Lease
- National
- Private/Freehold
- Unknown
- Towns & Cities
- Coast Boundary
- International Boundary
- Primary Road
- River
- Caye Boundary
- Water body

Scale 1: 40,000

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LAND AND SURVEYS DEPARTMENT  
BARRIERS - BELIZE

Prepared by:  
Land Information Centre  
April, 2015



Grid - UTM Zone 16  
Projection - Transverse Mercator  
Spheroid - Clarke 1866  
Unit of Measurement - Meter





SAPODILLA CAYES MARINE RESERVE  
LAND TENURE

Inset 1

Caribbean Sea

See Inset 3

See Inset 1

See Inset 2

See Inset 4

Inset 2

Inset 3

Inset 4

LEGEND

Sapodilla Cayes Marine Reserve

LAND TENURE

Full Purchase Price Paid

Lease

National

Private/Freehold

Unknown

Towns & Cities

Coast Boundary

International Boundary

Primary Road

River

Caye Boundary

Waterbody

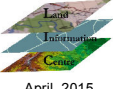
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Kilometers

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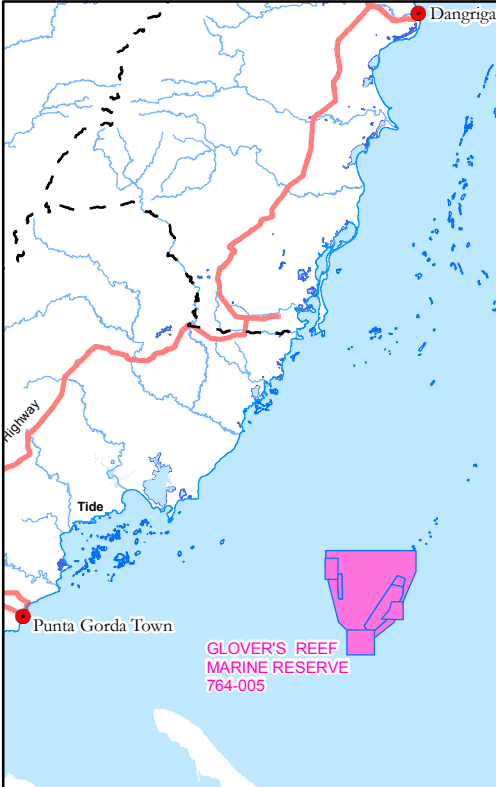


April, 2015



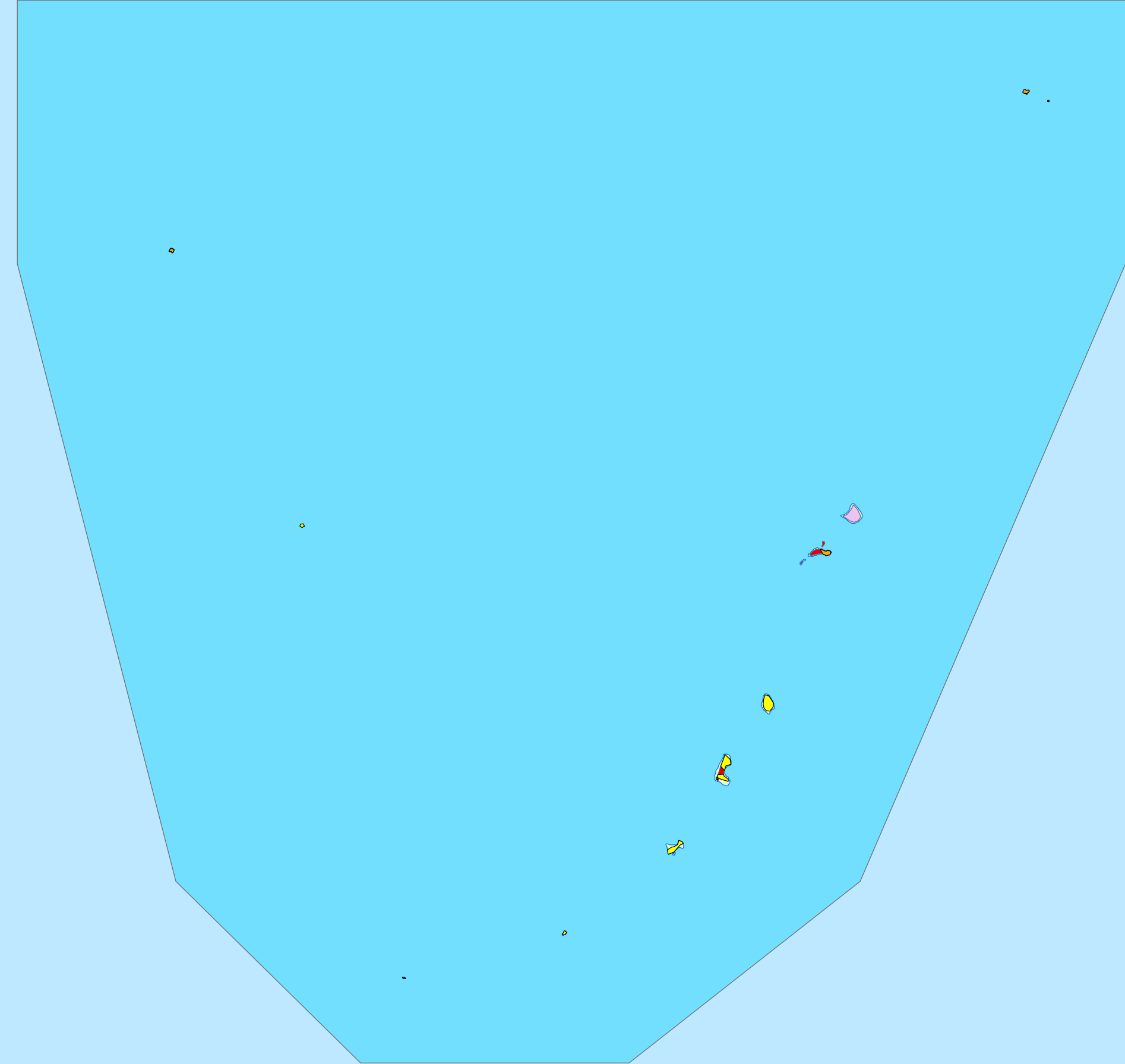
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Unit of Measurement - Meter

LOCATION DIAGRAM



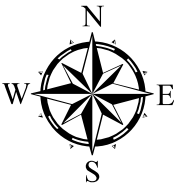
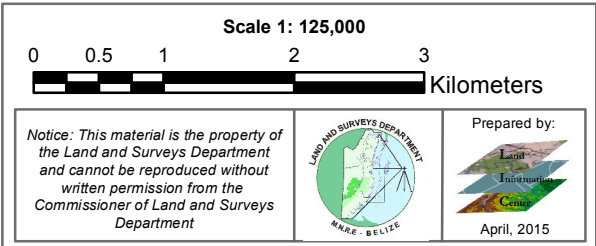
SAPODILLA CAYES MARINE RESERVE  
LAND TENURE

Caribbean Sea

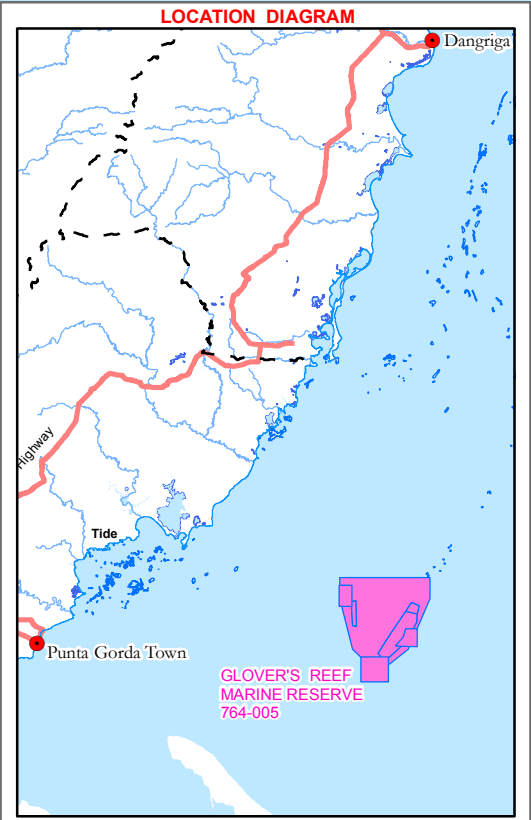


LEGEND

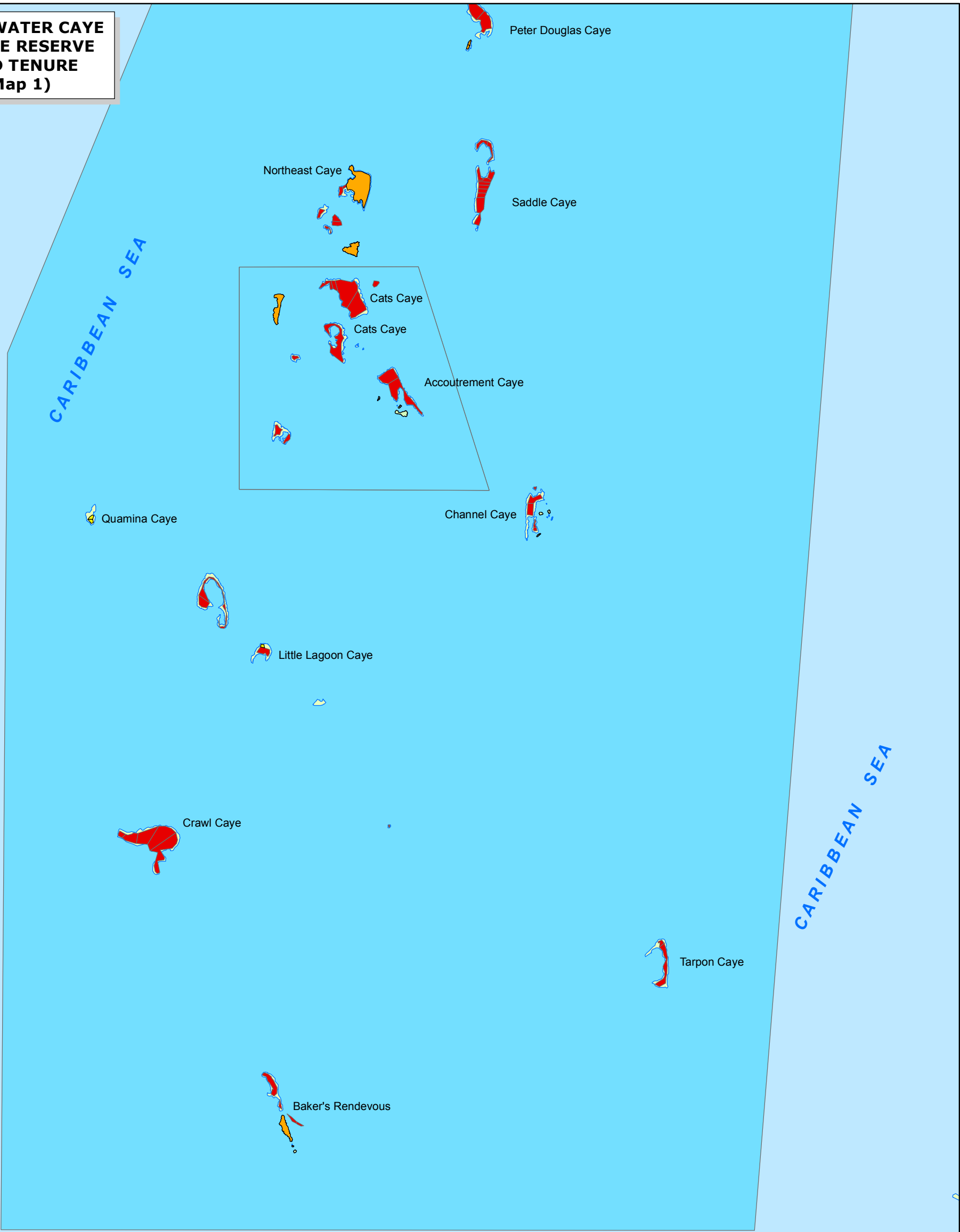
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- Full Purchase Price Paid
- Lease
- National
- Private/Freehold
- Unknown
- Towns & Cities
- Coast Boundary
- International Boundary
- Primary Road
- River
- Caye Boundary
- Waterbody



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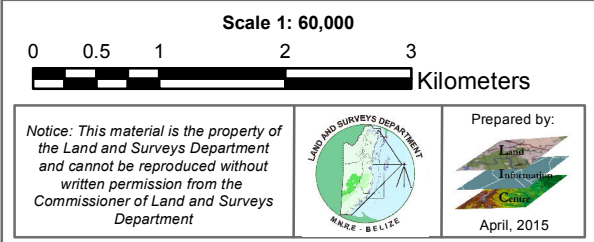


SOUTHWATER CAYE  
MARINE RESERVE  
LAND TENURE  
(Map 1)

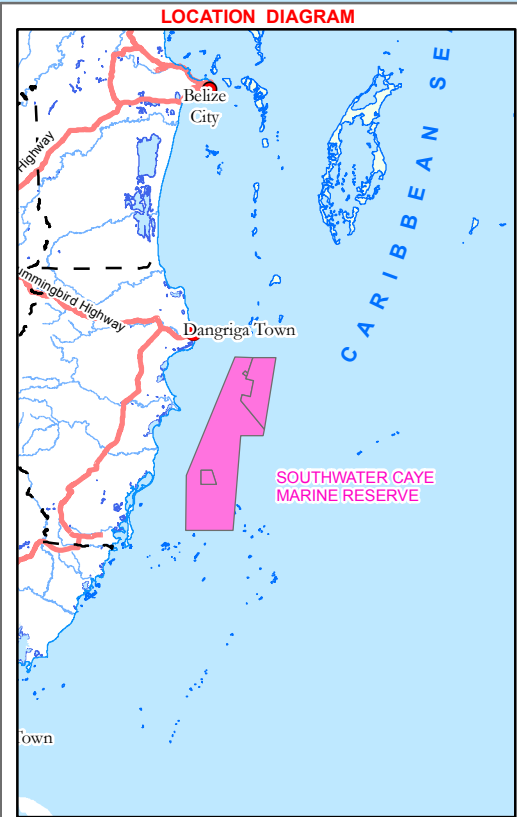


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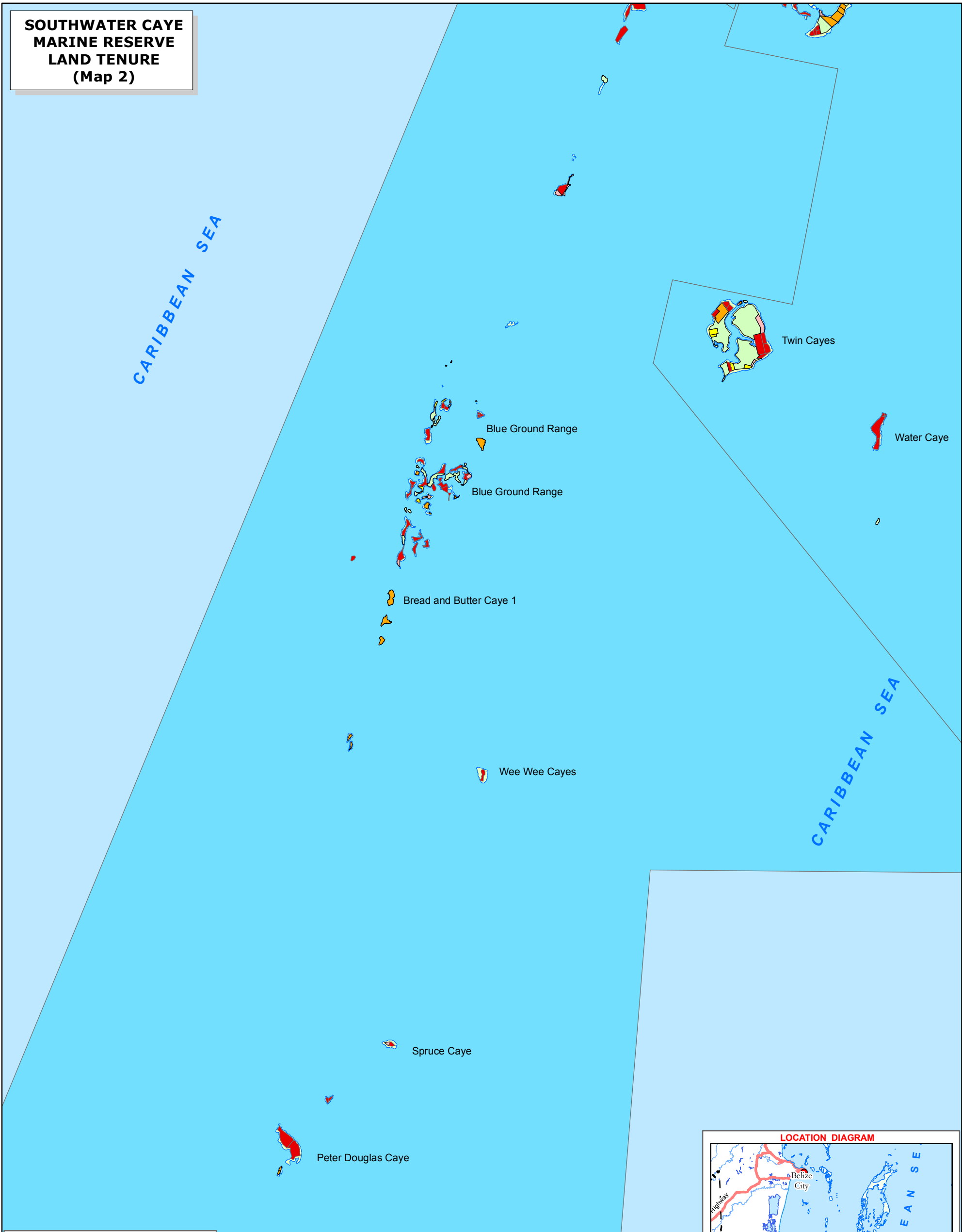
- Marine Reserve
- LAND TENURE**
- Full Purchase Price Paid
- Lease
- National
- Private/Freehold
- Unknown
- Towns & Cities
- Coast Boundary
- International Boundary
- Primary Road
- River
- Caye Boundary
- Water body



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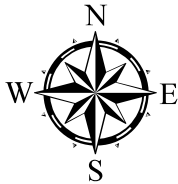
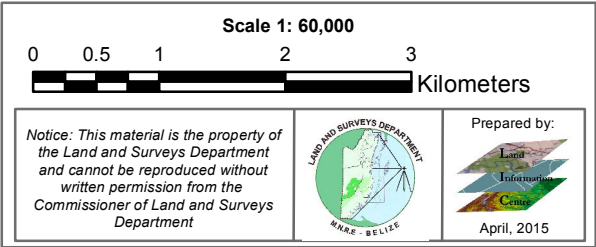


**SOUTHWATER CAYE  
MARINE RESERVE  
LAND TENURE  
(Map 2)**

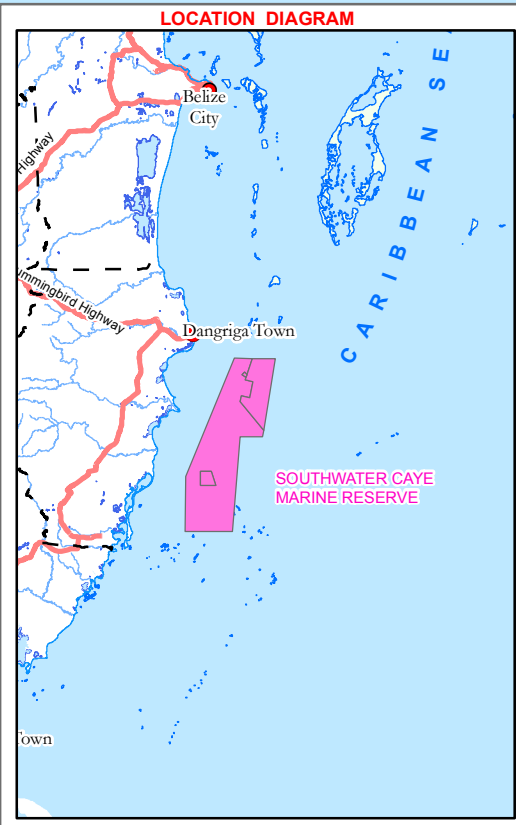


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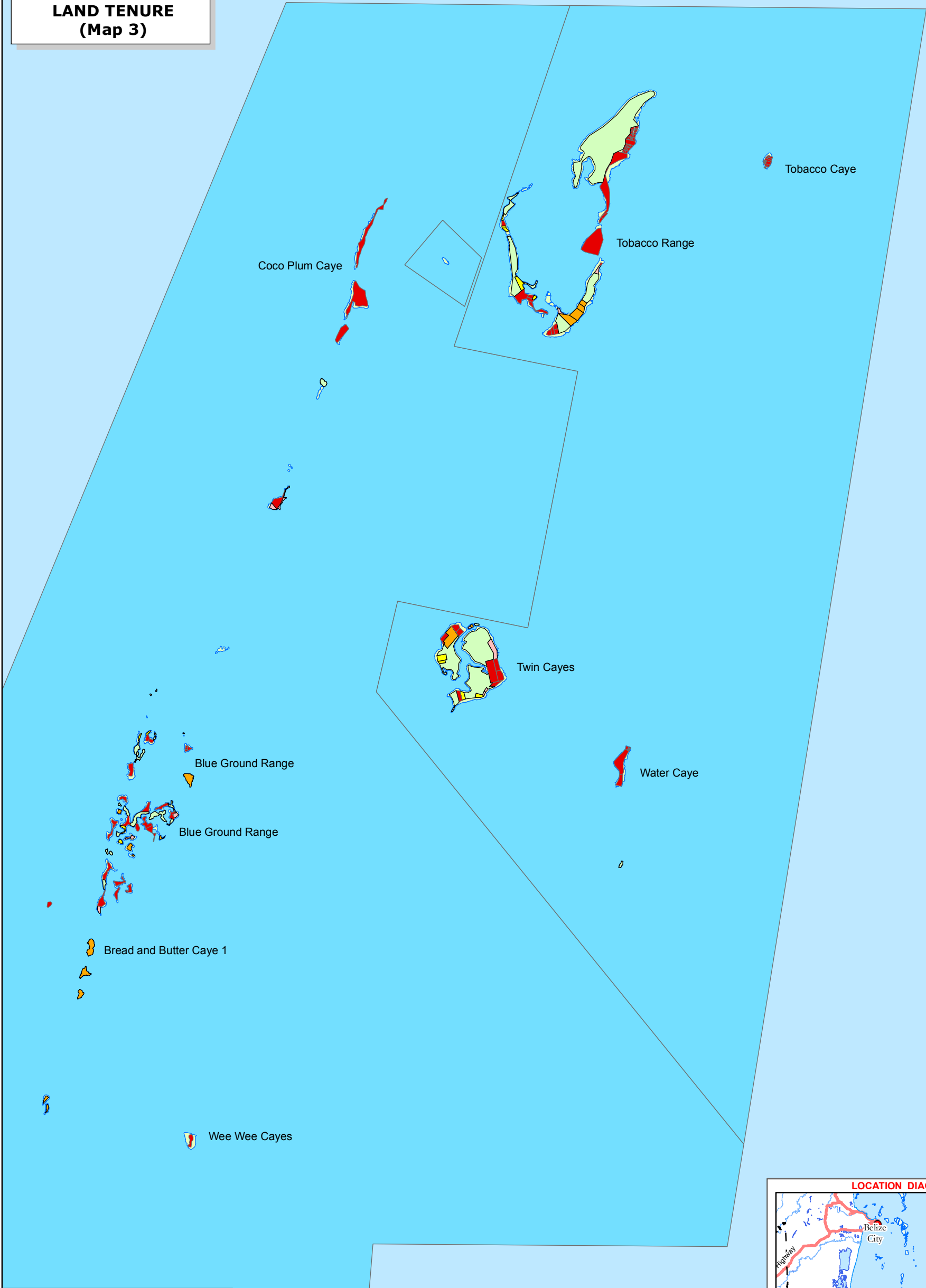
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- LAND TENURE**
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- Towns & Cities
- Coast Boundary
- International Boundary
- Primary Road
- River
- Caye Boundary
- Water body



Grid - UTM Zone 16  
Projection - Transverse Mercator  
Spheroid - Clarke 1866  
Unit of Measurement - Meter



**SOUTHWATER CAYE  
MARINE RESERVE  
LAND TENURE  
(Map 3)**



**LEGEND**

- Marine Reserve
- LAND TENURE**
- Full Purchase Price Paid
- Lease
- National
- Private/Freehold
- Unknown
- Towns & Cities
- Coast Boundary
- International Boundary
- Primary Road
- River
- Caye Boundary
- Water body

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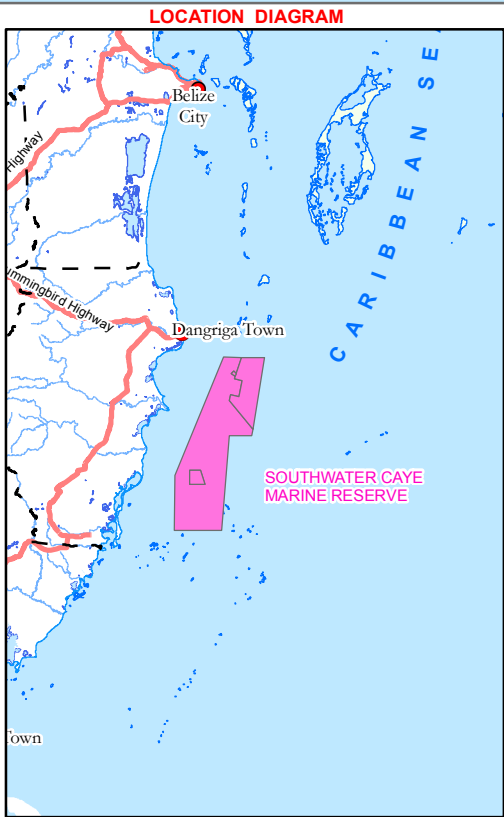
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LAND AND SURVEYS DEPARTMENT  
Belize

Prepared by:  
Land  
Information  
Centre  
April, 2015

Grid - UTM Zone 16  
Projection - Transverse Mercator  
Spheroid - Clarke 1866  
Unit of Measurement - Meter



## **MINING AND MINERAL PROCESSING PROJECTS AT THE SITE**

### **Environmental Checklist**

**(As part of the exercise to determine the need or not for an Environmental Impact Assessment in Belize)**

#### **PURPOSE OF CHECKLIST**

The Department of the Environment requests all public and private agencies, corporations and individuals to consider the environmental impacts of a proposed project before making decisions. In accordance with the Environmental Protection Act, an environmental impact assessment (EIA) must be prepared for all project proposals with potential adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to assist the proponent and the Government of Belize, identify impacts of a proposal and to take adequate and practical measures to mitigate any adverse environmental effect that may result from the proposal. This checklist will also help the Department of the Environment decide whether an E.I.A. is required for said proposal.

#### **INSTRUCTIONS FOR APPLICANTS**

This environmental checklist asks you to describe some basic information about your proposal. The Department of the Environment will use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIA. Please answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If a question does not apply to your proposal, write **"DOES NOT APPLY"**.

Complete answers to the questions now may avoid unnecessary delays later. Some questions ask about governmental regulations. Answer these questions if you can. If you have problems, the governmental agencies can assist you. The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The Department of the Environment, to which you must submit this checklist, may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

*TO BE COMPLETED BY THE APPLICANT*

Before you fill out this form, please ensure you have read and understand the environmental regulations of Belize (Environmental Impact Assessment Regulations, SI 107/1995 as amended in March 2007-SI 24 of 2007). All information should be typed clearly.

File Number: \_\_\_\_\_

Existing Development	Yes/No	Surface Mining	Yes/No
Extension to existing Development	Yes/No	Riverbed Mining	Yes/No
New Development	Yes/No	Underground Mining	Yes/No
		Underwater Mining	Yes/No

**1. GENERAL INFORMATION DESCRIBING THE PROJECT**

**(A) Project Title**

**(B) Purpose and brief description for the project:**

List all elements of the project and off site ancillary developments to be included in this application (e.g.: buildings, plants, roads, pipelines, wells, camps, etc.)

**(C) Name of the owner and/or Company:**

- (I) Address:
- (II) Name of the Contact Person:
- (III) Telephone:
- (IV) FAX Number:
- (V) Email:
- (VI) Web page:
- (VII) Commercial or industrial registration Number:
- (VIII) Previous Applications or Work in following countries:

**(D) List all other Permits or Licenses held by you for the same location and/or related operations.**

**(E) Location**

(Attach a copy of Land Registration, Lease agreement, maps, layout plans, diagrams, photographs), and if available give GPS coordinates):

- (I) Reasons for selecting this particular location:
- (II) Other locations considered:
- (III) Distance to the nearest residential area and public roads:

**(F) Area of land required for the project and existing land uses**

(farmland, residential, industrial, recreational, etc):

- (I) Area required during construction:
- (II) Area required during operation:
- (III) Area reserved for future development:
- (IV) Area required for ancillary development, housing and recreation:
- (V) Area required for new roads and amenities:

**(G) Project schedule:**

- (I) Estimated date of the beginning and end of construction:
- (II) Estimated date for the beginning of operation:
- (III) Estimated date of the end of the project or decommissioning:
- (IV) Other significant dates:

**(H) Number of people utilizing the site:**

	<u>Skilled</u>	<u>Unskilled</u>	<u>Total</u>
(I) During construction:			
(II) During operation:			
(III) Foreigners:			
(IV) Nationals:			

**(I) Types and Number of Equipment to be used:**

- (I) On-site:
- (II) Off-site:



## **2. PROJECT DETAILS**

### **(A) Area/size, construction method and appearance of buildings and installations:**

Architectural Design and/or Site Plan:

Geo-physical Information:

Describe landscaping if applicable:

### **(B) Approximate location of:**

- (I) Construction camps:
- (II) Temporary access roads:
- (III) Material storage sites:  
(Please attach maps)

### **(C) Describe project's infrastructure and utilities requirements. Indicate whether they exist or need to be developed:**

- (I) Water:
- (II) Electricity:
- (III) Fuels: (Types/Quantities):
- (IV) Roads, airports, etc.:

### **(D) Describe associated projects and off site development which are NOT INCLUDED in this application:**

(roads, power plants, desalination plants, wastewater treatment plants, crushers, borrow pits, quarries, housing and recreational facilities, etc.)

### **(F) Describe production processes/services:**

- (I) Production processes/services:
- (II) List products and production rates:
- (III) (Please attach production process flow diagrams, floor plans with machinery layout, list of machinery and machinery catalogues)

### **(G) Periods of operation:**

(seasonal, shifts, business hours)

### **(H) Raw materials, chemicals, fuels:**

(Scientific and commercial names, types, quantities, chemical composition, sources of raw materials or energy consumed and attach Material Safety Data Sheets)

### **(I) Describe methods of transportation, handling and storage of raw materials, chemicals, fuel and final products:**

### **3. ENVIRONMENTAL IMPACTS**

(This includes direct, indirect, secondary, cumulative, short, medium, and long-term, permanent and temporary impacts of the project)

#### **(A) Expected impacts on people, building and man-made structures:**

#### **(B) Expected impacts on plants, animals:**

- loss or damage to habitats of trees, and other plants, and animal species including marine
- endangered species

#### **(C) Expected impacts on land:**

( topography, soil or beach erosion, land use, natural drainage, etc)

#### **(D) Solid non hazardous waste/hazardous waste**

(during construction and operation phase):

- (I) Source and nature:
- (II) Quantities:
- (III) Methods of treatment/control:
- (IV) Final disposal site/method:

#### **(E) Expected impacts on water:**

(Impacts on surface, underground/aquifer, coastal waters and estuarine hydrology, impacts of pollutants on water quality)

#### **(F) Outstanding Universal Values (where applicable):**

(Impacts on outstanding universal values as enshrined in the declaration to establish the UNESCO world heritage site – Belize Barrier Reef Reserve System.)

#### **(G) Wastewater, drainage and surface runoff (during construction and operation phase):**

- (I) Source and Nature:
- (II) Volumes:
- (III) Methods of treatment/control:
- (IV) Final disposal site/method:

#### **(H) Expected impacts on air quality**

(Emissions from existing and future sources of air pollution during the construction and operation phases)

- (I) Sources and nature of air emissions:
- (II) Quantities:
- (III) Methods of treatment/control:
- (IV) Final discharge (indicate the proposed physical stack height and location):

(V) Monitoring/modeling of air emissions:

**(I) Identify and quantify noise and vibration sources**

- (I) Public environment (outdoors):
- (II) Working environment (indoors):

**(J) Toxic and Hazardous Materials:**

- (I) Source and nature:
- (II) Quantities:
- (III) Methods of treatment/control:
- (IV) Final disposal site/method:
- (V) Bulk storage tanks and facilities:  
(Provide information as per the requirements of the relevant Government Departments)

**(K) Explosives:**

- (I) Type, name and purpose of using:
- (II) Quantities:
- (III) When and Duration of use:

**(L) Radioactive materials :**

Do you intend to use any radioactive materials or equipment?

No ( )

Yes ( )

**(M)Other Impacts**

Provide information on any other impacts specific to this development:

Relocation of people:

Health Issues:

Social Issues:

General Environmental Issues:

#### 4. SUMMARY OF ISSUES

EIA Aspects	Questions of Verification	Yes	No	Additional Information required
<b>1. Sources of Impact</b>	1. Does it require significant land conversion for superficial excavations, mineral processing or waste disposal? (e.g. > 20 hectares)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2. Does it require housing services to support labor force? (e.g. > 100 operators)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. Does it require significant quantities of local raw material, water or energy (the significance depends on the availability, conflict with other users, operation sensibility, e.g. dredging for gravel)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4. Does it produce significant quantities of waste from construction, mining, or eroded material (the significance depends on the type of waste and the precipitation)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5. What chemicals will be used in the mining operation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Impact Receptors</b>	6. Does it require excavation or dredging of material from: 1000 yds away from reef 1000yds from coastal community or area of cultural and historical importance? In or near a conservation area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	7. Does it require the relocation or compensation of the local people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	8. Does it consist of superficial or deep mining in areas prone to high recurrence of flooding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Environmental Impacts</b>	9. Does it pose a threat to the labor force, the human settlements, land and water ecosystems, flora and fauna or species of commercial fishes due to:			
	• Run-off of residual waters from mining activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Excessive noise or vibration?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Deposit and subsequent leaching of contaminated material?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Emission of contaminated particles and gases due to the process?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Accidents caused by the use or transportation of dangerous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Impacts associated with sedimentation?			

	10. Does it induce secondary development (e.g. access roads, agricultural settlements, mineral prospecting, services for the workers, removal of mangrove habitat)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Mitigation Measures</b>	11. Does it require significant levels of management and training to establish or sustain the project (e.g. at long term > two years; intense training; regulation of dangerous materials, water basins)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	12. Could it require mitigation measures that could result in the project being socially and economically unacceptable?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments</b>				

Source: Directorio General para la Comision de Desarrollo de las Comunidades Europeas, 1993

**5. DESCRIBE MITIGATION MEASURES AND MONITORING PROGRAMS**

(Measures which have been incorporated into the project to reduce environmental impacts during all phases of the project)

List the attachments and supporting documents:

Additional Information (if required attached additional pages):

**6. DECLARATION BY APPLICANT**

**I HEREBY DECLARE THAT THE ABOVE MENTIONED INFORMATION IS COMPLETE AND TRUE.**

SIGNATURE OF APPLICANT:

Printed Name: -----

Official Position: -----

DATE: -----

STAMP or SEAL:

SIGNATURE OF OWNER OR AUTHORIZED OFFICER: -----

Printed Name: -----

Official Position: -----

DATE: -----

STAMP or SEAL:

7. **DETERMINATION: (To be completed by the Department of the Environment)**

On the basis of this initial evaluation:

- ☐ It is determined that the proposed project MAY NOT HAVE A SIGNIFICANT IMPACT on the environment and a **LETTER OF ENVIRONMENTAL CLEARANCE can be granted.**
- ☐ It is determined that the proposed project MAY HAVE SOME IMPACTS on the environment but which can be mitigated for easily, and hence an ENVIRONMENTAL COMPLIANCE PLAN (ECP) can be developed and signed before Letter of **ENVIRONMENTAL CLEARANCE can be granted.**
- ☐ It is determined that the proposed project MAY HAVE SIGNIFICANT IMPACTS on the environment and that it qualifies under the **types of projects not to be entertained by DOE.**
- ☐ It is determined that the proposed project COULD HAVE POTENTIALLY SIGNIFICANT IMPACTS and falls under Schedule 2 of the EIA Regulations, hence a **LIMITED LEVEL STUDY is required.**
- ☐ It is determined that the proposed project MAY HAVE SIGNIFICANT IMPACTS on the environment and an **ENVIRONMENTAL IMPACT ASSESSMENT is required.**

Signature: -----

Printed Name: -----

Official Position: -----

Date: -----

DOE Stamp:



## TOURISM INDUSTRY

### **Environmental Checklist**

**(As part of the exercise to determine the need or not for an Environmental Impact Assessment in Belize)**

#### **PURPOSE OF CHECKLIST**

The Department of the Environment requests all public and private agencies, corporations and individuals to consider the environmental impacts of a proposed project before making decisions. In accordance with the Environmental Protection Act, an environmental impact assessment (EIA) must be prepared for all project proposals with potential adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to assist the proponent and the Government of Belize, identify impacts of a proposal and to take adequate and practical measures to mitigate any adverse environmental effect that may result from the proposal. This checklist will also help the Department of the Environment decide whether an E.I.A. is required for said proposal.

#### **INSTRUCTIONS FOR APPLICANTS**

This environmental checklist asks you to describe some basic information about your proposal. The Department of the Environment will use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIA. Please answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If a question does not apply to your proposal, write "**DOES NOT APPLY**".

Complete answers to the questions now may avoid unnecessary delays later. Some questions ask about governmental regulations. Answer these questions if you can. If you have problems, the governmental agencies can assist you. The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The Department of the Environment, to which you must submit this checklist, may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

*TO BE COMPLETED BY THE APPLICANT*

Before you fill out this form, please ensure you have read and understand the environmental regulations of Belize (Environmental Impact Assessment Regulations, SI 107/1995 as amended in March 2007-SI 24 of 2007). All information should be typed clearly.

File Number: \_\_\_\_\_

Existing Development	Yes/No
Extension to existing Development	Yes/No
New Development	Yes/No

Types of Construction:  
Condominiums:  
Hotel:  
Resort:  
Palapas:  
Other (specify):

**1. GENERAL INFORMATION DESCRIBING THE PROJECT**

**(A) Project Title:**

**(B) Purpose and brief description for the project:**

List all elements of the project and off site ancillary developments to be included in this application (e.g.: buildings, plants, roads, pipelines, wells, camps, etc.)

**(C) Name of the owner and/or Company:**

- (I) Address:
- (II) Name of the Contact Person:
- (III) Telephone:
- (IV) FAX Number:
- (V) Email:
- (VI) Web page:
- (VII) Commercial or industrial registration Number:
- (VIII) Previous Applications or Work in following countries:

**(D) List all other Environmental Permits or Licenses held by you for the same location and/or related operations.**

**(E) Location**

(Attach a copy of Land Registration, Lease agreement, maps, layout plans, diagrams, photographs), and if available give GPS coordinates):

- (I) Reasons for selecting this particular location:
- (II) Other locations considered:

(III) Distance to the nearest residential area and public roads:

**(F) Area of land required for the project and existing land uses**

(farmland, residential, industrial, recreational, etc):

(I) Area required during construction:

(II) Area required during operation:

(III) Area reserved for future development:

(IV) Area required for ancillary development, housing and recreation:

(V) Area required for new roads and amenities:

**(G)Project schedule:**

(I) Estimated date of the beginning and end of construction:

(II) Estimated date for the beginning of operation:

(III) Estimated date of the end of the project or decommissioning:

(IV) Other significant dates:

**(H) Number of people utilizing the site:**

	<u>Skilled</u>	<u>Unskilled</u>	<u>Total</u>
(I) During construction:			
(II) During operation:			
(III) Foreigners:			
(IV) Nationals:			

**(I) Types and Number of Equipment to be used:**

(I) On-site:

(II) Off-site:

## **PROJECT DETAILS**

### **(A) Area/size, construction method and appearance of buildings and installations:**

Architectural Design and/or Site Plan:

Geo-physical Information:

Describe landscaping if applicable)

### **(B) Approximate location of:**

(I) Construction camps:

(II) Temporary access roads:

(III) Material storage sites:

(Please attach maps)

### **(C) Describe project's infrastructure and utilities requirements. Indicate whether they exist or need to be developed:**

(I) Water:

(II) Electricity:

(III) Fuels: (Types/Quantities):

(IV) Roads, airports, etc.:

### **(D) Describe associated projects and off site development which are NOT INCLUDED in this application:**

(roads, power plants, desalination plants, wastewater treatment plants, crushers, borrow pits, quarries, housing and recreational facilities, etc.)

### **(E) Periods of operation:**

(seasonal, shifts, business hours)

### **(F) Raw materials, chemicals, fuels:**

(Scientific and commercial names, types, quantities, chemical composition, sources of raw materials or energy consumed and attach Material Safety Data Sheets)

### **(G) Describe methods of transportation, handling and storage of raw materials, chemicals, fuel and final products:**

### **3. ENVIRONMENTAL IMPACTS**

(This includes direct, indirect, secondary, cumulative, short, medium, and long-term, permanent and temporary impacts of the project)

#### **(A) Expected impacts on people, building and man-made structures:**

#### **(B) Expected impacts on plants, animals:**

- loss or damage to habitats of trees, and other plants, and animal species including marine
- endangered species

#### **(C) Expected impacts on land:**

( topography, soil or beach erosion, land use, natural drainage, etc)

#### **(D) Solid non hazardous waste/hazardous waste**

(during construction and operation phase)

- (I) Source and nature:
- (II) Quantities:
- (III) Methods of treatment/control:
- (IV) Final disposal site/method:

#### **(E) Expected impacts on water:**

(Impacts on surface, underground/aquifer, coastal waters and estuarine hydrology, impacts of pollutants on water quality)

#### **(F) Wastewater, drainage and surface runoff (during construction and operation phase):**

- (I) Source and Nature:
- (II) Volumes:
- (III) Methods of treatment/control:
- (IV) Final disposal site/method:

#### **(G) Expected impacts on air quality**

(Emissions from existing and future sources of air pollution during the construction and operation phases)

- (I) Sources and nature of air emissions:
- (II) Quantities:
- (III) Methods of treatment/control:
- (IV) Final discharge (indicate the proposed physical stack height and location):
- (V) Monitoring/modeling of air emissions:

#### **(H) Identify and quantify noise and vibration sources**

- (I) Public environment (outdoors):
- (II) Working environment (indoors):

**(I) Explosives:**

- (I) Type, name and purpose of using:
- (II) Quantities:
- (III) When and Duration of use:

**(J) Other Impacts**

Provide information on any other impacts specific to this development:

Relocation of people:

Health Issues:

Social Issues:

General Environmental Issues:

#### 4. SUMMARY OF ISSUES

EIA Aspects	Questions of Verification	Yes	No	Additional Information required
<b>Sources of Impact</b>	1. Does it require significant land acquisition or conversion for construction of hotel infrastructure, e.g. sources of drinking water, treatment and elimination of waste, energy sources (> 250 acres rural; >5 urban; > 3,000 feet rural coastline; > 600feet urban)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2. During construction of infrastructure, does it result in large quantities of waste or eroded material (significance depends on the type of waste, collection of major precipitation)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. Does it require housing services to support labor force during construction of the project? (e.g. > 100 operators)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4. Once in operations, does it result in generation of large quantities of domestic waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5. Are there studies on the cumulative impacts by a series of similar type development in an ecosystem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6. Will traditional terrestrial and marine transportation routes be affected?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Impact Receptors</b>	7. Does it consist in locating hotel infrastructure in areas that support conservation of ecosystems, valued flora and fauna (e.g. forests, protected areas, wetlands, mangroves, lagoons, critical habitats, endangered species), or areas of cultural and historical importance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	8. Does it enter into conflict with land use, water extraction, use of water bodies, use of energy sources, local salaries of existing labor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Environmental Impacts</b>	9. Does it lead to the physical damaging of land and water ecosystems, valued flora and fauna, due to the type of tourism activity or the excessive number of tourists?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	10. Due to the domestic waste, does it pose a threat in contamination of sources of drinking water or internal/marine water bodies that support the conservation of valued ecosystems/species or stock of commercial fish species?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	11. Does it cause people to change the means by which they sustain their lifestyles (the significance depends on the socioeconomic scale and type of impact, e.g. inertia towards change, lopsided benefits)? Does the activity require land reclamation or dredging? Clearing of Mangroves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	12. Does it lead to a tourism explosion that can leave the local environment damaged permanently and cause a progressive decrease of opportunities for arrivals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Mitigation Measures</b>	13. Could it require mitigation measures that could result in the project being socially and economically unacceptable?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments</b>				

Source: Directorio General para la Comision de Desarrollo de las Comunidades Europeas, 1993



**5. DESCRIBE MITIGATION MEASURES AND MONITORING PROGRAMS**

(Measures which have been incorporated into the project to reduce environmental impacts during all phases of the project)

List the attachments and supporting documents:

Additional Information (if required attached additional pages):

**6. DECLARATION BY APPLICANT**

**I HEREBY DECLARE THAT THE ABOVE MENTIONED INFORMATION IS COMPLETE AND TRUE.**

SIGNATURE OF APPLICANT:

Printed Name: -----

Official Position: -----

DATE: -----

STAMP or SEAL:

SIGNATURE OF OWNER OR AUTHORIZED OFFICER: -----

Printed Name: -----

Official Position: -----

DATE: -----

STAMP or SEAL:

**7. DETERMINATION: (To be completed by the Department of the Environment)**

On the basis of this initial evaluation:

- ☐ It is determined that the proposed project MAY NOT HAVE A SIGNIFICANT IMPACT on the environment and a **LETTER OF ENVIRONMENTAL CLEARANCE can be granted.**
- ☐ It is determined that the proposed project MAY HAVE SOME IMPACTS on the environment but which can be mitigated for easily, and hence an ENVIRONMENTAL COMPLIANCE PLAN (ECP) can be developed and signed before Letter of **ENVIRONMENTAL CLEARANCE can be granted.**
- ☐ It is determined that the proposed project MAY HAVE SIGNIFICANT IMPACTS on the environment and that it qualifies under the **types of projects not to be entertained by DOE.**
- ☐ It is determined that the proposed project COULD HAVE POTENTIALLY SIGNIFICANT IMPACTS and falls under Schedule 2 of the EIA Regulations, hence a **LIMITED LEVEL STUDY is required.**
- ☐ It is determined that the proposed project MAY HAVE SIGNIFICANT IMPACTS on the environment and an **ENVIRONMENTAL IMPACT ASSESSMENT is required.**

Signature: -----

Printed Name: -----

Official Position: -----

Date: -----

DOE Stamp:

## URBANIZATION/SUB-DIVISION/CONSTRUCTION PROJECTS

### **Environmental Checklist**

**(As part of the exercise to determine the need or not for an Environmental Impact Assessment in Belize)**

#### **PURPOSE OF CHECKLIST**

The Department of the Environment requests all public and private agencies, corporations and individuals to consider the environmental impacts of a proposed project before making decisions. In accordance with the Environmental Protection Act, an environmental impact statement (EIA) must be prepared for all project proposals with potential adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to assist the proponent and the Government of Belize, identify impacts of a proposal and to take adequate and practical measures to mitigate any adverse environmental effect that may result from the proposal. This checklist will also help the Department of the Environment decide whether an E.I.A. is required for said proposal.

#### **INSTRUCTIONS FOR APPLICANTS**

This environmental checklist asks you to describe some basic information about your proposal. The Department of the Environment will use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIA. Please answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If a question does not apply to your proposal, write "**DOES NOT APPLY**".

Complete answers to the questions now may avoid unnecessary delays later. Some questions ask about governmental regulations. Answer these questions if you can. If you have problems, the governmental agencies can assist you. The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The Department of the Environment, to which you must submit this checklist, may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

*TO BE COMPLETED BY THE APPLICANT*

Before you fill out this form, please ensure you have read and understand the environmental regulations of Belize (Environmental Impact Assessment Regulations, SI 107/1995 as amended in March 2007-SI 24 of 2007). All information should be typed clearly.

File Number: \_\_\_\_\_

Existing Development	Yes/No
Extension to existing Development	Yes/No
New Development	Yes/No

Types of Construction:  
Ferro Concrete:  
Lumber and Zinc Roof:  
Palapas:  
Residential Subdivision  
Subdivision and Housing

**1. GENERAL INFORMATION DESCRIBING THE PROJECT**

**(A) Project Title:**

**(B) Purpose and brief description for the project:**

List all elements of the project and off site ancillary developments to be included in this application (e.g.: buildings, plants, roads, pipelines, wells, camps, etc.)

**(C) Name of the owner and/or Company:**

- (I) Address:
- (II) Name of the Contact Person:
- (III) Telephone:
- (IV) FAX Number:
- (V) Email:
- (VI) Web page:
- (VII) Commercial or industrial registration Number:
- (VIII) Previous Applications or Work in following countries:

**(D) List all other Environmental Permits or Licenses held by you for the same location and/or related operations.**

**(E) Location**

(Attach a copy of Land Registration, Lease agreement, maps, layout plans, diagrams, photographs), and if available give GPS coordinates):

- (I) Reasons for selecting this particular location:
- (II) Other locations considered:

(III) Distance to the nearest residential area and public roads:

**(F) Area of land required for the project and existing land uses**  
(farmland, residential, industrial, recreational, etc):

- (I) Area required during construction:
- (II) Area required during operation:
- (III) Area reserved for future development:
- (IV) Area required for ancillary development, housing and recreation:
- (V) Area required for new roads and amenities:

**(G) Project schedule:**

- (I) Estimated date of the beginning and end of construction:
- (II) Estimated date for the beginning of operation:
- (III) Estimated date of the end of the project or decommissioning:
- (IV) Other significant dates:

**(H) Number of people utilizing the site:**

	<u>Skilled</u>	<u>Unskilled</u>	<u>Total</u>
(I) During construction:			
(II) During operation:			
(III) Foreigners:			
(IV) Nationals:			

**(I) Types and Number of Equipment to be used:**

- (I) On-site:
- (II) Off-site:

## **2. PROJECT DETAILS**

### **(A) Area/size, construction method and appearance of buildings and installations:**

Architectural Design and/or Site Plan:

Number of Buildings:

Geo-physical Information:

Access and Internal Roads Design:

Describe landscaping if applicable)

### **(B) Approximate location of:**

- (I) Construction camps:
- (II) Temporary access roads:
- (III) Material storage sites:  
Please attach maps)

### **(C) Describe project's infrastructure and utilities requirements. Indicate whether they exist or need to be developed:**

- (I) Water:
- (II) Electricity:
- (III) Fuels: (Types/Quantities):
- (IV) Roads, airports, etc.:

### **(D) Describe associated projects and off site developments which are NOT INCLUDED in this application:**

(roads, power plants, desalination plants, wastewater treatment plants, crushers, borrow pits, quarries, housing and recreational facilities, etc.)

### **(E) Periods of operation:**

(seasonal, shifts, business hours, Phases)

### **(F) Raw materials, chemicals, fuels:**

(Scientific and commercial names, types, quantities, chemical composition, sources of raw materials or energy consumed and attach Material Safety Data Sheets)

### **(G) Describe methods of transportation, handling and storage of raw materials, chemicals, fuel:**

### **3. ENVIRONMENTAL IMPACTS**

(This includes direct, indirect, secondary, cumulative, short, medium, and long-term, permanent and temporary impacts of the project)

#### **(A) Expected impacts on people, building and man-made structures:**

#### **(B) Expected impacts on plants, animals:**

- loss or damage to habitats of trees, and other plants, and animal species including marine
- endangered species

#### **(C) Expected impacts on land:**

( topography, soil or beach erosion, land use, natural drainage, etc)

#### **(D) Solid non hazardous waste/hazardous waste**

(during construction and operation phase)

- (I) Source and nature:
- (II) Quantities:
- (III) Methods of treatment/control:
- (IV) Final disposal site/method:

#### **(E) Expected impacts on water:**

(Impacts on surface, underground/aquifer, coastal waters and estuarine hydrology, impacts of pollutants on water quality, surface water collection, aesthetics)

#### **(F) Wastewater, drainage and surface runoff (during construction and operation phase):**

- (I) Source and Nature:
- (II) Volumes:
- (III) Methods of treatment/control:
- (IV) Final disposal site/method:

#### **(G) Expected impacts on air quality**

(Emissions from existing and future sources of air pollution during the construction and operation phases)

- (I) Sources and nature of air emissions:
- (II) Quantities:
- (III) Methods of treatment/control:
- (IV) Final discharge (indicate the proposed physical stack height and location):
- (V) Monitoring/modeling of air emissions:

#### **(H) Identify and quantify noise and vibration sources**

- (I) Public environment (outdoors):
- (II) Working environment (indoors):



**(J) Other Impacts**

Provide information on any other impacts specific to this development:

Relocation of people:

Health Issues:

Social Issues:

General Environmental Issues:

#### 4. SUMMARY OF ISSUES

EIA Aspects	Questions of Verification	Yes	No	Additional Information required
<b>Sources of Impact</b>	1. Does it require significant land acquisition or conversion (rural > 12 acres)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2. Is it located in a place that would benefit the settlers (e.g. hillsides, soil type, rain patterns, local climate, access to markets, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. Does it result in significant amounts of eroded materials, effluent or domestic waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4. During the design stage, was the capacity of the water sources and treatment systems calculated not to exceed or to accommodate the sewage, waste treatment and elimination systems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5. Does it require housing services to support labor force during construction? (e.g. >100 workers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6. Does it require the construction and operation of infrastructure (e.g. water sources, waste treatment and elimination infrastructure, energy provision, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Impact Receptors</b>	7. Does it require the relocation or compensation of local settlers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	8. Does it consist of conversion of lands that support conservation of ecosystems, valued flora and fauna (e.g. forests, protected areas, critical habitats, endangered species, recreational (parks, play areas or green areas), or areas of cultural and historical importance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9. Is it located in areas that actually support a significant part of the population (the significance depends on the capacity of the land, the distance of the relocated with respect to the host population)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	10. Does it enter into conflict with land use, water extraction, use of water bodies, use of energy sources, local salaries of existing labor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11. Once in operation, does it enter into conflict with existing water extraction of the region (e.g. by other communities and agriculture)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	12. Does it introduce a culture that is incompatible for the existing population?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Environmental Impacts</b>	13. Does it cause people to change the means by which they sustain their lifestyles (the significance depends on the socioeconomic scale and type of impact, e.g. inertia towards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	change, lopsided benefits)?			
	14. Does it lead to an unequal provision of facilities and services in favor of the new settlers with respect to the host population?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	15. Does it attract unplanned settlers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	16. Does it lead to social conflict between the new settlers and the host population?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	17. During construction, does it present a significant danger of contamination for the workers and local communities (e.g. dust, chimneys, accidents with dangerous materials)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	18. Does it significantly affect, negatively or positively, the value of land around the site (e.g. >10% or requires the provision of an economic compensation)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	19. Once in operation, does it present any risk of contamination of sources of drinking water, or significantly reduces the river's waste absorption capacity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Mitigation Measures</b>	20. Does it ensure that the compensation includes a long-term provision of security for the settlers, including the needs of an expanding population?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	21. Does it require competent health and security personnel with a separate minimum budget?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	22. Could it require mitigation measures that could result in the project being socially and economically unacceptable?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments</b>				

Source: Directorio General para la Comision de Desarrollo de las Comunidades Europeas, 1993

**5. DESCRIBE MITIGATION MEASURES AND MONITORING PROGRAMS**

(Measures which have been incorporated into the project to reduce environmental impacts during all phases of the project)

List the attachments and supporting documents:

Additional Information (if required attached additional pages):

**6. DECLARATION BY APPLICANT**

**I HEREBY DECLARE THAT THE ABOVE MENTIONED INFORMATION IS COMPLETE AND TRUE.**

SIGNATURE OF APPLICANT:

Printed Name: -----

Official Position: -----

DATE: -----

STAMP or SEAL:

SIGNATURE OF OWNER OR AUTHORIZED OFFICER: -----

Printed Name: -----

Official Position: -----

DATE: -----

STAMP or SEAL:

**7. DETERMINATION: (To be completed by the Department of the Environment)**

On the basis of this initial evaluation:

- ☐ It is determined that the proposed project MAY NOT HAVE A SIGNIFICANT IMPACT on the environment and a **LETTER OF ENVIRONMENTAL CLEARANCE can be granted.**
- ☐ It is determined that the proposed project MAY HAVE SOME IMPACTS on the environment but which can be mitigated for easily, and hence an ENVIRONMENTAL COMPLIANCE PLAN (ECP) can be developed and signed before Letter of **ENVIRONMENTAL CLEARANCE can be granted.**
- ☐ It is determined that the proposed project MAY HAVE SIGNIFICANT IMPACTS on the environment and that it qualifies under the **types of projects not to be entertained by DOE.**
- ☐ It is determined that the proposed project COULD HAVE POTENTIALLY SIGNIFICANT IMPACTS and falls under Schedule 2 of the EIA Regulations, hence a **LIMITED LEVEL STUDY is required.**
- ☐ It is determined that the proposed project MAY HAVE SIGNIFICANT IMPACTS on the environment and an **ENVIRONMENTAL IMPACT ASSESSMENT is required.**

Signature: -----

Printed Name: -----

Official Position: -----

Date: -----

DOE Stamp:

## **CHECKLIST FOR LIGHT INDUSTRIAL PROJECTS**

### **Environmental Checklist as a Scoping Exercise for Preparing Environmental Impact Assessment Terms of Reference**

#### **PURPOSE OF CHECKLIST**

The Department of the Environment requests all public and private agencies, corporations and individuals to consider the environmental impacts of a proposed project before making decisions. In accordance with the Environmental Protection Act, an environmental impact assessment (EIA) must be prepared for all project proposals with potential adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to assist the proponent and the Government of Belize, identify impacts of a proposal and to take adequate and practical measures to mitigate any adverse environmental effect that may result from the proposal. This checklist will also help the Department of the Environment decide whether an E.I.A. is required for said proposal.

#### **INSTRUCTIONS FOR APPLICANTS**

This environmental checklist asks you to describe some basic information about your proposal. The Department of the Environment will use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIA. Please answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If a question does not apply to your proposal, write "**DOES NOT APPLY**".

Complete answers to the questions now may avoid unnecessary delays later. Some questions ask about governmental regulations. Answer these questions if you can. If you have problems, the governmental agencies can assist you. The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The Department of the Environment, to which you must submit this checklist, may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

*TO BE COMPLETED BY THE APPLICANT*

Before you fill out this form, please ensure you have read and understand the environmental regulations of Belize (Environmental Impact Assessment Regulations, SI 107/1995 as amended in March 2007-SI 24 of 2007). All information should be typed clearly.

File Number: \_\_\_\_\_

Existing Development	Yes/No
Extension to existing Development	Yes/No
New Development	Yes/No

Types of Industry:  
Market for Products:

**1. GENERAL INFORMATION DESCRIBING THE PROJECT**

**(A) Project Title:**

**(B) Purpose and brief description for the project:**

List all elements of the project and off site ancillary developments to be included in this application (e.g.: buildings, plants, roads, pipelines, wells, camps, etc.)

**(C) Name of the owner and/or Company:**

- (I) Address:
- (II) Name of the Contact Person:
- (III) Telephone:
- (IV) FAX Number:
- (V) Email:
- (VI) Web page:
- (VII) Commercial or industrial registration Number:
- (VIII) Previous Applications or Work in following countries:

**(D) List all other Environmental Permits or Licenses held by you for the same location and/or related operations.**

**(E) Location**

(Attach a copy of Land Registration, Lease agreement, maps, layout plans, diagrams, photographs), and if available give GPS coordinates):

- (I) Reasons for selecting this particular location:
- (II) Other locations considered:
- (III) Distance to the nearest residential area and public roads:



**(F) Area of land required for the project and existing land uses**

(farmland, residential, industrial, recreational, etc):

- (I) Area required during construction:
- (II) Area required during operation:
- (III) Area reserved for future development:
- (IV) Area required for ancillary development, housing and recreation:
- (V) Area required for new roads and amenities:

**(G) Project schedule:**

- (I) Estimated date of the beginning and end of construction:
- (II) Estimated date for the beginning of operation:
- (III) Estimated date of the end of the project or decommissioning:
- (IV) Other significant dates:

**(H) Number of people utilizing the site:**

	<u>Skilled</u>	<u>Unskilled</u>	<u>Total</u>
(I) During construction:			
(II) During operation:			
(III) Foreigners:			
(IV) Nationals:			

**(I) Types and Number of Equipment to be used:**

- (I) On-site:
- (II) Off-site:

## **2. PROJECT DETAILS**

### **(A) Area/size, construction method and appearance of buildings and installations:**

Architectural Design and/or Site Plan:

Number of Buildings:

Geo-physical Information:

Access and Internal Roads Design:

Describe landscaping if applicable)

### **(B) Approximate location of:**

- (I) Construction camps:
- (II) Temporary access roads:
- (III) Material storage sites:  
Please attach maps

### **(C) Describe project's infrastructure and utilities requirements. Indicate whether they exist or need to be developed:**

- (I) Water:
- (II) Electricity:
- (III) Fuels: (Types/Quantities):
- (IV) Roads, airports, etc.:

### **(D) Describe associated projects and off site developments which are NOT INCLUDED in this application:**

(roads, power plants, desalination plants, wastewater treatment plants, crushers, borrow pits, quarries, housing and recreational facilities, etc.)

### **(E) Periods of operation:**

(seasonal, shifts, business hours, Phases)

### **(F) Raw materials, chemicals, fuels:**

(Scientific and commercial names, types, quantities, chemical composition, sources of raw materials or energy consumed and attach Material Safety Data Sheets)

### **(G) Describe methods of transportation, handling and storage of raw materials, chemicals, fuel:**

### **3. ENVIRONMENTAL IMPACTS**

(This includes direct, indirect, secondary, cumulative, short, medium, and long-term, permanent and temporary impacts of the project)

#### **(A) Expected impacts on people, building and man-made structures:**

#### **(B) Expected impacts on plants, animals:**

- loss or damage to habitats of trees, and other plants, and animal species including marine
- endangered species

#### **(C) Expected impacts on land:**

( topography, soil or beach erosion, land use, natural drainage, etc)

#### **(D) Solid non hazardous waste/hazardous waste**

(during construction and operation phase)

- (I) Source and nature:
- (II) Quantities:
- (III) Methods of treatment/control:
- (IV) Final disposal site/method:

#### **(E) Expected impacts on water:**

(Impacts on surface, underground/aquifer, coastal waters and estuarine hydrology, impacts of pollutants on water quality, surface water collection, aesthetics)

#### **(F) Wastewater, drainage and surface runoff (during construction and operation phase):**

- (I) Source and Nature:
- (II) Volumes:
- (III) Methods of treatment/control:
- (IV) Final disposal site/method:

#### **(G) Expected impacts on air quality**

(Emissions from existing and future sources of air pollution during the construction and operation phases)

- (I) Sources and nature of air emissions:
- (II) Quantities:
- (III) Methods of treatment/control:
- (IV) Final discharge (indicate the proposed physical stack height and location):
- (V) Monitoring/modeling of air emissions:

#### **(H) Identify and quantify noise and vibration sources**

- (I) Public environment (outdoors):
- (II) Working environment (indoors):

**(I) Explosives:**

- (I) Type, name and purpose of using:
- (II) Quantities:
- (III) When and Duration of use:

**(J) Other Impacts**

Provide information on any other impacts specific to this development:

Relocation of people:

Health Issues:

Social Issues:

General Environmental Issues:

#### 4. Summary Issues

EIA Aspects	Questions of Verification	Yes	No	Additional Information required
<b>Sources of Impact</b>	1. Does it require significant land acquisition or conversion for industrial production, storing or elimination of waste (e.g. > 5 hectares rural, >5 urban)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2. Does it require housing services to support labor force during construction of the project? (e.g. > 10 operators)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. Does it require significant quantities of local raw material, local water or energy (the significance depends on the availability, conflict with other users, operation sensibility, e.g. dredging for gravel)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4. Does it result in significant quantities of eroded material, waste or solid or liquid industrial emissions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Impact Receptors</b>	5. Does it consist in locating industrial plants, infrastructure for the treatment of waste, garbage sites or infrastructure in areas that support conservation of ecosystems, valued flora and fauna (e.g. forests, protected areas, wetlands, mangroves, lagoons, critical habitats, endangered species), or areas of cultural and historical importance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6. Does it require the relocation or compensation of the local settlers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Environmental Impacts</b>	7. Does it present a risk for the human beings, land or aquatic ecosystems, valued flora and fauna, or commercial fish species due to:			
	• Discharge of contaminated industrial effluents?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Discharge of cooling waters?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Deposit and subsequent leaching of solid industrial waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Emission of contaminated gases and particles as a result of the process?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Accidents caused by the use or transportation of dangerous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Air Pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	• Noise pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	8. Does it induce secondary development (e.g. access roads, agricultural settlements, mineral prospecting, services for the workers)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>Mitigation Measures</b>	9. Does it require significant levels of management and training to establish or sustain the project (e.g. at long term > two years; intense training; regulation of health and security, regulation of water extraction, dangerous materials, effluents, liquid or solid waste water basins)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	10. Could it require mitigation measures that could result in the project being socially and economically unacceptable?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments</b>				

Source: Directorio General para la Comision de Desarrollo de las Comunidades Europeas, 1993

**5. DESCRIBE MITIGATION MEASURES AND MONITORING PROGRAMS**

(Measures which have been incorporated into the project to reduce environmental impacts during all phases of the project)

List the attachments and supporting documents:

Additional Information (if required attached additional pages):

**6. DECLARATION BY APPLICANT**

**I HEREBY DECLARE THAT THE ABOVE MENTIONED INFORMATION IS COMPLETE AND TRUE.**

SIGNATURE OF APPLICANT:

Printed Name: -----

Official Position: -----

DATE: -----

STAMP or SEAL:

SIGNATURE OF OWNER OR AUTHORIZED OFFICER: -----

Printed Name: -----

Official Position: -----

DATE: -----

STAMP or SEAL:



**7. DETERMINATION: (To be completed by the Department of the Environment)**

On the basis of this initial evaluation:

- ☐ It is determined that the proposed project MAY NOT HAVE A SIGNIFICANT IMPACT on the environment and a **LETTER OF ENVIRONMENTAL CLEARANCE can be granted.**
- ☐ It is determined that the proposed project MAY HAVE SOME IMPACTS on the environment but which can be mitigated for easily, and hence an ENVIRONMENTAL COMPLIANCE PLAN (ECP) can be developed and signed before Letter of **ENVIRONMENTAL CLEARANCE can be granted.**
- ☐ It is determined that the proposed project MAY HAVE SIGNIFICANT IMPACTS on the environment and that it qualifies under the **types of projects not to be entertained by DOE.**
- ☐ It is determined that the proposed project COULD HAVE POTENTIALLY SIGNIFICANT IMPACTS and falls under Schedule 2 of the EIA Regulations, hence a **LIMITED LEVEL STUDY is required.**
- ☐ It is determined that the proposed project MAY HAVE SIGNIFICANT IMPACTS on the environment and an **ENVIRONMENTAL IMPACT ASSESSMENT is required.**

Signature: -----

Printed Name: -----

Official Position: -----

Date: -----

DOE Stamp:

## **CHECK LIST FOR AGRICULTURAL PROJECTS**

### **Environmental Checklist**

**(As part of the exercise to determine the need or not for an Environmental Impact Assessment in Belize)**

#### **PURPOSE OF CHECKLIST**

The Department of the Environment requests all public and private agencies, corporations and individuals to consider the environmental impacts of a proposed project before making decisions. In accordance with the Environmental Protection Act, an environmental impact assessment (EIA) must be prepared for all project proposals with potential adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to assist the proponent and the Government of Belize, identify impacts of a proposal and to take adequate and practical measures to mitigate any adverse environmental effect that may result from the proposal. This checklist will also help the Department of the Environment decide whether an E.I.A. is required for said proposal.

#### **INSTRUCTIONS FOR APPLICANTS**

This environmental checklist asks you to describe some basic information about your proposal. The Department of the Environment will use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIA. Please answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If a question does not apply to your proposal, write "**DOES NOT APPLY**".

Complete answers to the questions now may avoid unnecessary delays later. Some questions ask about governmental regulations. Answer these questions if you can. If you have problems, the governmental agencies can assist you. The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The Department of the Environment, to which you must submit this checklist, may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

*TO BE COMPLETED BY THE APPLICANT*

Before you fill out this form, please ensure you have read and understand the environmental regulations of Belize (Environmental Impact Assessment Regulations, SI 107/1995 as amended in March 2007-SI 24 of 2007). All information should be typed clearly.

File Number: \_\_\_\_\_

Existing Development	Yes/No
Extension to existing Development	Yes/No
New Development	Yes/No

Types of Agricultural Production:

Grains:

Livestock:

Fruit for Export:

Agro-industry:

Food packaging

**1. GENERAL INFORMATION DESCRIBING THE PROJECT**

**(A) Project Title:**

**(B) Purpose and brief description for the project:**

List all elements of the project and off site ancillary developments to be included in this application (e.g.: buildings, plants, roads, pipelines, wells, camps, etc.)

**(C) Name of the owner and/or Company:**

(I) Address:

(II) Name of the Contact Person:

(III) Telephone:

(IV) FAX Number:

(V) Email:

(VI) Web page:

(VII) Commercial or industrial registration Number:

(VIII) Previous Applications or Work in following countries:

**(D) List all other Environmental Permits or Licenses held by you for the same location and/or related operations.**

**(E) Location**

(Attach a copy of Land Registration, Lease agreement, maps, layout plans, diagrams, photographs), and if available give GPS coordinates):

(I) Reasons for selecting this particular location:

(II) Other locations considered:

(III) Distance to the nearest residential area and public roads:

**(F) Area of land required for the project and existing land uses**

(farmland, residential, industrial, recreational, etc):

(I) Area required during construction:

(II) Area required during operation:

(III) Area reserved for future development:

(IV) Area required for ancillary development, housing and recreation:

(V) Area required for new roads and amenities:

**(G) Project schedule:**

(I) Estimated date of the beginning and end of construction:

(II) Estimated date for the beginning of operation:

(III) Estimated date of the end of the project or decommissioning:

(IV) Other significant dates:

**(H) Number of people utilizing the site:**

	<u>Skilled</u>	<u>Unskilled</u>	<u>Total</u>
(I) During construction:			
(II) During operation:			
(III) Foreigners:			
(IV) Nationals:			

**(I) Types and Number of Equipment to be used:**

(I) On-site:

(II) Off-site:

## **2. PROJECT DETAILS**

### **(A) Area/size, construction method and appearance of buildings and installations:**

Architectural Design and/or Site Plan:

Number of Buildings:

Geo-physical Information:

Access and Internal Roads Design:

Describe landscaping if applicable)

### **(B) Approximate location of:**

- (I) Construction camps:
- (II) Temporary access roads:
- (III) (III)Material storage sites:  
Please attach maps)

### **(C) Describe project's infrastructure and utilities requirements. Indicate whether they exist or need to be developed:**

- (I) Water:
- (II) Electricity:
- (III) (III)Fuels: (Types/Quantities):
- (IV) (IV)Roads, airports, etc.:

### **(D) Describe associated projects and off site developments which are NOT INCLUDED in this application:**

(roads, power plants, desalination plants, wastewater treatment plants, crushers, borrow pits, quarries, housing and recreational facilities, etc.)

### **(E) Periods of operation:**

(seasonal, shifts, business hours, Phases)

### **(F) Raw materials, chemicals, fuels:**

(Scientific and commercial names, types, quantities, chemical composition, sources of raw materials or energy consumed and attach Material Safety Data Sheets)

### **(G)Describe methods of transportation, handling and storage of raw materials, chemicals, fuel:**

### **3. ENVIRONMENTAL IMPACTS**

(This includes direct, indirect, secondary, cumulative, short, medium, and long-term, permanent and temporary impacts of the project)

#### **(A) Expected impacts on people, building and man-made structures:**

#### **(B) Expected impacts on plants, animals:**

- loss or damage to habitats of trees, and other plants, and animal species including marine
- endangered species

#### **(C) Expected impacts on land:**

( topography, soil or beach erosion, land use, natural drainage, etc)

#### **(D) Solid non hazardous waste/hazardous waste**

(during construction and operation phase)

- (I) Source and nature:
- (II) Quantities:
- (III) Methods of treatment/control:
- (IV) Final disposal site/method:

#### **(E) Expected impacts on water:**

(Impacts on surface, underground/aquifer, coastal waters and estuarine hydrology, impacts of pollutants on water quality, surface water collection, aesthetics)

#### **(F) Wastewater, drainage and surface runoff (during construction and operation phase):**

- (I) Source and Nature:
- (II) Volumes:
- (III) Methods of treatment/control:
- (IV) Final disposal site/method:

#### **(G) Expected impacts on air quality**

(Emissions from existing and future sources of air pollution during the construction and operation phases)

- (I) Sources and nature of air emissions:
- (II) Quantities:
- (III) Methods of treatment/control:
- (IV) Final discharge (indicate the proposed physical stack height and location):
- (V) Monitoring/modeling of air emissions:

#### **(H) Identify and quantify noise and vibration sources during Construction and Operation**

- (I) Public environment (outdoors):

(II) Working environment (indoors):

**(I) Explosives:**

(I) Type, name and purpose of using:

(II) Quantities:

(III) When and Duration of use:

**(J) Importation of Genetically Modified Organisms (GMOs)**

(I) Measures to prevent contamination of local species used traditionally:

(II) Presentation of Studies locally and abroad on the safe use of these

(III) introduced species:

**(K) Other Impacts**

Provide information on any other impacts specific to this development:

Relocation of people:

Health Issues:

Social Issues:

General Environmental Issues:

#### 4. Summary Issues

EIA Aspects	Questions of Verification	Yes	No	Additional Information required
<b>Sources of Impact</b>	1. Does it require the conversion of significant land areas (e.g. >200 hectares)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2. Does it require clearing or leveling of large areas of land (e.g. >200 hectares), or land with steep slope (e.g. > 5%)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. Does it require de significant use of fertilizer and pesticides (the significance depends in the type of chemical, volume/proportions used in application, user experience)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4. Does it require housing services or agricultural lands to support the labor force (e.g. > 100 operators)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5. Does it require an increase in the agriculture processing capacity (e.g. 25%)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6. Will GMOs be imported and introduced in local environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Impact Receptors</b>	7. Does it consist of converting lands that support the conservation of valued land and aquatic ecosystems, flora and fauna (e.g. protected areas, wild habitats, forest reserves, critical habitats, and endangered species); or that contain sites of cultural or historical importance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	8. Does it enter into conflict with existing uses of land, use of drinking water sources, labor demands?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9. Will traditional species/varieties used by Belizean farmers be exposed to these GMOs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Environmental Impacts</b>	10. Does it lead to land erosion, land degradation, decreasing crop yield, etc. due to incompatibility between adaptation and land management practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11. Does it cause people to change the means by which they sustain their lifestyles (the significance depends on the socioeconomic scale and type of impact, e.g. consent of change, lopsided benefits)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	12. Does it present risk of contamination, due to run-off of pesticides or fertilizers into water bodies that support the conservation of ecosystems and valued species, or pools of commercially significant fish species?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



	13. Does it induce unplanned development through the construction of access routes and local roads?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Mitigation Measures</b>	14. Does it require significant services to establish and sustain the project (e.g. at long term > 2 years, intense training)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	15. Could it require mitigation measures that could result in the project being socially and economically unacceptable?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments</b>				

Source: Directorio General para la Comision de Desarrollo de las Comunidades Europeas, 1993

**5. DESCRIBE MITIGATION MEASURES AND MONITORING PROGRAMS**

(Measures which have been incorporated into the project to reduce environmental impacts during all phases of the project)

List the attachments and supporting documents:

Additional Information (if required attached additional pages):

**6. DECLARATION BY APPLICANT**

**I HEREBY DECLARE THAT THE ABOVE MENTIONED INFORMATION IS COMPLETE AND TRUE.**

SIGNATURE OF APPLICANT:

Printed Name: -----

Official Position: -----

DATE: -----

STAMP or SEAL:

SIGNATURE OF OWNER OR AUTHORIZED OFFICER: -----

Printed Name: -----

Official Position: -----

DATE: -----

STAMP or SEAL:

**7. DETERMINATION: (To be completed by the Department of the Environment)**

On the basis of this initial evaluation:

- ☐ It is determined that the proposed project MAY NOT HAVE A SIGNIFICANT IMPACT on the environment and a **LETTER OF ENVIRONMENTAL CLEARANCE can be granted.**
- ☐ It is determined that the proposed project MAY HAVE SOME IMPACTS on the environment but which can be mitigated for easily, and hence an ENVIRONMENTAL COMPLIANCE PLAN (ECP) can be developed and signed before Letter of **ENVIRONMENTAL CLEARANCE can be granted.**
- ☐ It is determined that the proposed project MAY HAVE SIGNIFICANT IMPACTS on the environment and that it qualifies under the **types of projects not to be entertained by DOE.**
- ☐ It is determined that the proposed project COULD HAVE POTENTIALLY SIGNIFICANT IMPACTS and falls under Schedule 2 of the EIA Regulations, hence a **LIMITED LEVEL STUDY is required.**
- ☐ It is determined that the proposed project MAY HAVE SIGNIFICANT IMPACTS on the environment and an **ENVIRONMENTAL IMPACT ASSESSMENT is required.**

Signature: -----

Printed Name: -----

Official Position: -----

Date: -----

DOE Stamp:

# An assessment of changes in mangrove cover across the Belize Barrier Reef Reserve System World Heritage Site: 1996-2017

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**Abstract:** This study examines changes in mangrove cover across the Belize Barrier Reef Reserve System (BBRRS) since its inscription as a World Heritage Site (WHS) with the United Nations Educational, Scientific and Cultural Organization (UNESCO) in December 1996. Remote sensing data, derived mainly from the Landsat series of satellites, were used in conjunction with statistical adjustments to estimate rates of change for the years since the site's WHS designation. Specifically within the BBRRS, an estimated total of 89 hectares were cleared between 1996 and 2017, entirely within the South Water Caye Marine Reserve. Cumulatively across all of Belize, an estimated 2,792 hectares of mangrove had been cleared across Belize from 1996 and 2017, and between 1980 and 2017, a total of almost 4,100 hectares had been cleared. Compared to the mangroves outside of the BBRRS, the annual rate of mangrove loss within the BBRRS over that period was much smaller: 4.24 hectares per year inside the BBRRS versus 129.11 hectares per year outside of it. Those clearings outside the BBRRS were, for the most part, concentrated in three particular geographic zones – the mainland and offshore cay areas around Belize City, the vicinity of the Placencia Peninsula, and Ambergris Caye – with almost  $\frac{3}{4}$  of the 1996-2017 mangrove clearings occurring in those zones. It was therefore estimated that Belize's overall mangrove cover declined 5.4% over 36 years, from 76,250 hectares in 1980 to 72,169 hectares in 2017.

**Key words:** barrier reef, Belize, change detection, CLASlite, coastal zone, ecosystems, Landsat, littoral forests, mangrove, wetlands

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## I. Introduction

Given the important ecosystem services provided by mangroves, their rates of clearing worldwide have been alarming (Giri et al. 2010). While studies (e.g. Giri et al. 2010) have provided global perspectives on the status of mangroves, they have tended to lack national-level detail in terms of their changes. Other studies such as Hansen et al. (2013) have focused on forest cover change at the global level, but not on change in specific types of forests such as mangrove or littoral forests. Focusing on a more local context, and under commission from the World Wildlife Fund (WWF), researchers from the Centro del Agua del Tropico Húmedo para America Latina y el Caribe (CATHALAC) assessed the change in mangrove cover across Belize's mainland and offshore territory (Cherrington et al. 2010). That study followed up from an earlier work by Simon Zisman (Zisman 1998) which mapped the different mangrove ecosystems of Belize, and which is considered the authoritative work on the topic.

The 2010 study – led by some of the authors of the present study – used remote sensing data to examine how mangrove cover had changed over a 30-year period (1980-2010). It concluded that there was a net clearing approximately 1,566 hectares of mangroves over that 30-year period, equivalent to an annual clearing rate of 52.2 hectares per year. With nearly a decade having passed since the 2010 CATHALAC study, there has been a renewed interest in quantifying the clearing rates of Belize's mangrove cover over the past 7 years. In that time, the Belize Barrier Reef Reserve System (BBRRS) World Heritage Site – established in December 1996 – has been placed on UNESCO's list of "World Heritage Sites in Danger."

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In conjunction with its sister non-governmental organizations (NGOs), the Belize Audubon Society (BAS) has commissioned the current study to quantify the changes in mangrove cover within the BBRS since 2010.

Specifically, this study addresses the following research questions:

1. How have the areal extents of littoral and mangrove forest ecosystems *within the BBRS* changed between 1996 and 2017?
2. How has the areal cover of such ecosystems *outside the BBRS* changed over the same period?
3. How has the areal extent of such ecosystems changed between 2010<sup>1</sup> and 2017, and have annual rates of mangrove change accelerated or decelerated over that period?
4. Which are the areas of mangrove cover most susceptible to future clearing?

## **II. Methods**

### *Geographic scope*

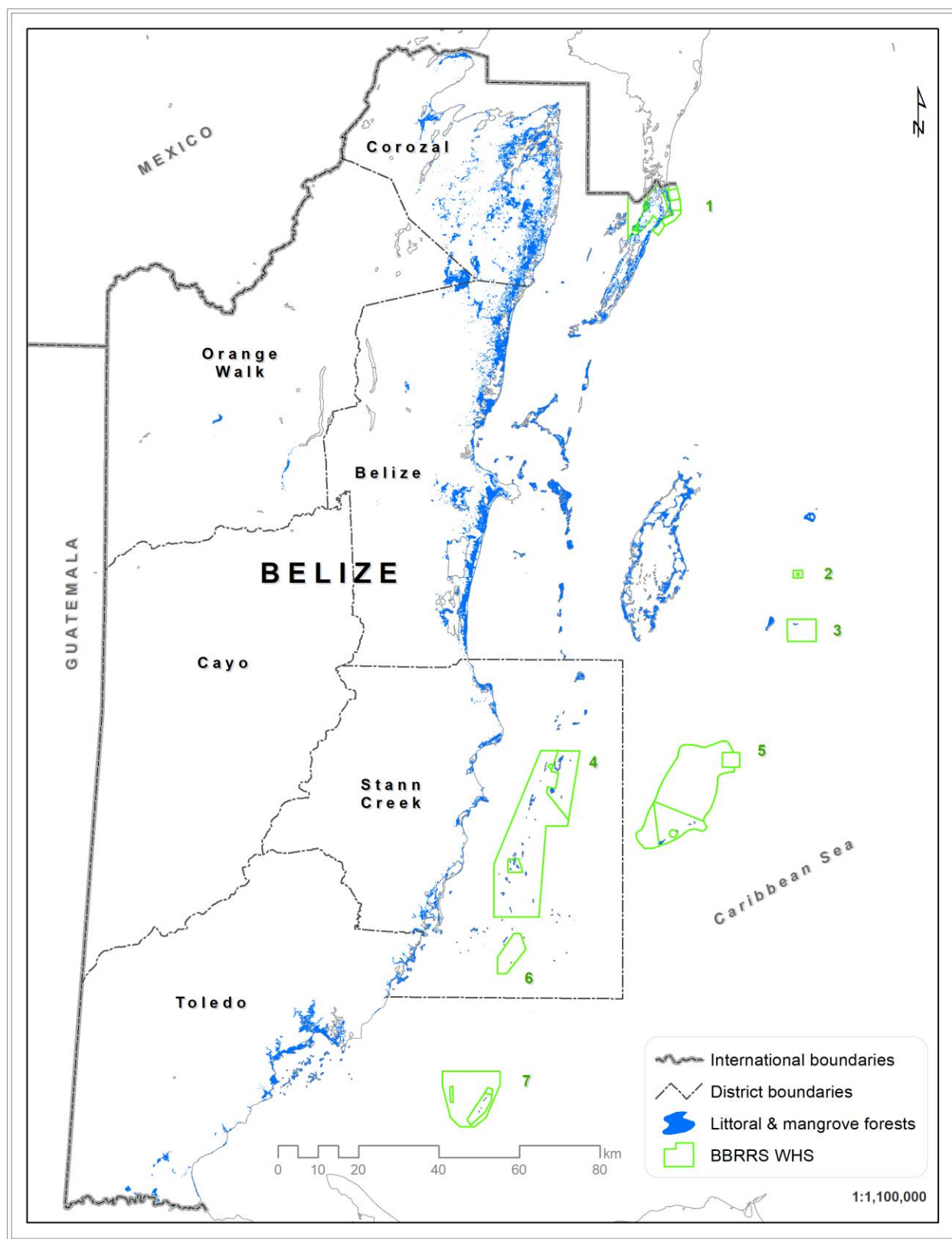
The area of interest for the study corresponds to three geographic areas: (i) the BBRS WHS, (ii) littoral and mangrove forest zones outside the BBRS WHS, and (iii) all of Belize (i.e. the sum of the previous two extents). The entirety of mangrove ecosystems<sup>2</sup> across Belize had previously been mapped comprehensively by Zisman (1998), which is considered the authority on the subject. Zisman's study indicated that mangroves were located predominantly along the coast of mainland Belize, and on the majority of Belize's offshore cayes, but also far inland in some instances (e.g. in the Orange Walk district, roughly 65km from the coast). In the adjustment of the Zisman study done by Cherrington et al. (2010), it was estimated that in 2010, the total areal extent of mangroves was approximately 74,684 hectares.

Additionally, this project addresses a need to map changes in littoral forests, which are separate from mangrove ecosystems, and somewhat more loosely defined. Meerman & Sabido (2001) mapped 'tropical littoral forest and beach communities' as its own class (legend code no. 69), and with an area of 2,045 hectares across all of Belize. Littoral forests as defined in this study do not include mangrove forests. The 2001 areal estimate, was revised in the Meerman (2005) update of the national ecosystem map, with the estimate of the coverage of littoral forests (now termed "tropical coastal vegetation on recent sediments," in the UNESCO nomenclature) revised down to 1,591 hectares. The total extent of those littoral and mangrove forest ecosystems is illustrated in **Figure 1**, while the coverage of those ecosystems within the BBRS WHS is indicated in **Table 1**.

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<sup>1</sup> The BBRS WHS was placed on UNESCO's 'List of World Heritage in Danger' in 2009, so 2010 also serves as a suitable year for a benchmark, and it also provides comparability with the earlier Cherrington et al. (2010) study.

<sup>2</sup> The main mangrove formations described by Zisman (1998) are: (i) sparse mangroves in open water, (ii) mangrove savannas, (iii) mangroves in mixed forest, (iv) dwarf mangrove, (v) medium height mangrove, and (vi) tall mangrove.



**Figure 1:** 2010 littoral and mangrove forest extent, and location of the Belize Barrier Reef Reserve System World Heritage Site; site names are listed in **Table 1**.

**Table 1:** BBRRS WHS constituent protected areas, and approximate area (2010) of littoral & mangrove forest.<sup>3</sup>

No.	Protected area	Area (ha.)			Site area (ha.)
		Littoral	Mangrove	Total	
1	Bacalar Chico National Park & Marine Reserve	2	1,047	1,049	10,898
2	Blue Hole Natural Monument	0	0	0	414
3	Half Moon Caye Natural Monument	21	0	21	3,954
4	South Water Caye Marine Reserve	0	759	759	47,703
5	Glovers Reef Marine Reserve	6	57	63	35,068
6	Laughing Bird Caye National Park	1	0	1	4,095
7	Sapodilla Cayes Marine Reserve	0	19	19	15,619
<b>TOTAL</b>		<b>30</b>	<b>1,882</b>	<b>1,912</b>	<b>117,751</b>

#### Data sources

Whereas the Cherrington et al. (2010) study relied heavily on the use of Landsat-1, Landsat-5, and Landsat-7 data for mapping change across 3 decades, this study utilizes data from the Landsat-5, Landsat-7, and Landsat-8 satellites. That imagery was acquired in 8-bit digital number (DN) format from the U.S. Geological Survey (USGS) via the Global Visualization (Glovis) platform: <http://glovis.usgs.gov>. Imagery for Belize was acquired in the original Landsat World Reference System (WRS) path-rows, i.e. specifically images corresponding to path 19 and rows 47-49. **Table 2** summarizes the specific Landsat granules and dates acquired for the study. The images were selected for having the lowest cloud cover for the periods chosen, although some images had upwards of 20% cloud cover.

**Table 2:** Characteristics of the Landsat data used in the analysis.

Period	Satellite	Sensor	Spectral range (μm) <sup>4</sup>	Spatial resolution	Date acquired
1996	Landsat-5	Thematic Mapper (TM)	0.45-2.35	30m	17 March 1996
2000					28 March 2000
2010	Landsat-7	Enhanced Thematic Mapper+ (ETM+)	0.45-2.35		11 Jan. 2010
					28 Feb. 2010
2011					4 April 2011
2012					21 March 2012
2013					24 March 2013
2014					27 March 2014
2015					15 April 2015
2016					1 April 2016
2017	Landsat-8	Operational Land Imager (OLI)	0.435-2.294		23 Feb. 2017

Unlike the earlier study (Cherrington et al, 2010), the present study did not rely as heavily on the use of NASA / JAXA ASTER imagery for examining changes in the offshore cayes. ASTER images (AST140TH product) from the following 2 days were used for reference: 25 March 2010 and 30 January 2017. Both

<sup>3</sup> Such figures are based on GIS analysis, using data modified from Zisman (1998) for the mangrove areas, and on Meerman (2005) for the littoral forest extent calculations.

<sup>4</sup> That does not include the thermal infrared spectral bands present in the Landsat-5, -7, and -8's sensors.



scenes covered a significant portion of coastal Belize but did not extend far beyond the Turneffe Atoll. Via the University of Alabama in Huntsville's Cooperative Agreement with the U.S. National Aeronautics & Space Administration (NASA) for supporting the implementation of SERVIR, a number of very high spatial resolution (VHSR) satellite images from DigitalGlobe, Inc., mainly from 2017, were also leveraged for the validation component of this study. Those images were acquired under the U.S. Government's NextView license with DigitalGlobe.

### *Change detection*

This study's focus was change detection for mapping the areas where mangrove cover had been lost, particularly due to land clearing for infrastructure development. (The term 'clearing' is used extensively from this point forward to refer to such change.) With regard to such change, spectral reflectance in the visible and infrared portions of the electromagnetic spectrum is significantly and categorically distinct between vegetation (e.g. mangroves) and impervious or developed surfaces (e.g. house lots), following earlier research by Zisman (1998) and Cherrington et al. (2010).

Although there are a range of change detection techniques available, the Carnegie Landsat Analysis System-lite (CLASlite) was chosen (Asner et al. 2009) for this study. Compared to other methods, CLASlite has a higher speed in mapping forest cover, a semi-standardization of outputs by using the Vegetation Continuous Fields (VCF) data, and a built-in, rapid atmospheric correction (an implementation of 6S). Since the use of CLASlite for change detection differed from the Forest Canopy Index method used in Cherrington et al. (2010), it is assumed that the change detection methods were sufficiently similar to allow for comparability between results.

The Landsat imagery indicated in **Table 2** were ingested as DN data into CLASlite, and subsequently cloud-masked using CLASlite, and atmospherically corrected using 6S (Kotchenova et al. 2007). Due to the Scan Line Corrector malfunction, Landsat-7 images had to be gap-filled, and that was done using a focal mean approach. The pixels of the output surface reflectance data were then spectrally unmixed into fractions of bare substrate, photosynthetic vegetation (PV), and non-photosynthetic vegetation (NPV), with the unmixing adjusted using MODIS VCF data, aiding in standardizing the results across various images. The spectral mixture analysis (SMA) outputs were then converted into maps of forest cover (with 0 representing water or missing data due to cloud cover, 1 representing forest cover, and 2 representing non-forest). Those maps were then reclassified, becoming the basis of this study's change detection.

In the case of the two 2010 datasets, these were combined into a single 2010 forest cover map by taking the minimum pixel values. Sequential data (e.g. 1996-2000, 2000-2010) were then merged by using the Raster Calculator function in ArcGIS v10.4, as follows: the earlier of each sequence was multiplied by 10, and then added to the subsequent of the pair. It resulted in data having mostly<sup>5</sup> 4 potential values:

- 11: Forest remaining forest
- 12: Forest in the first period being converted to non-forest in the second period
- 21: Non-forest in the first period reverting to forest in the second period
- 22: Non-forest remaining forest

Even where changes were confined to the values 12 and 21, and where CLASlite performs a robust cloud and cloud-ring masking, it was observed, however, that the datasets derived from imagery with cloud cover displayed spurious changes in forest cover likely due to artefacts from cloud rings. Since the February 2017

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<sup>5</sup> Other values like 00 (cloud cover in both periods), 01 (cloud in period 1, forest in period 2), 02 (cloud cover in period 1, non-forest in period 2), 10 (forest in period 1, cloud in period 2), and 20 (non-forest in period 1, cloud in period 2) were also possible, but only represented a small percentage of values in any given temporal stack.

dataset was without any cloud cover over Belize, a solution was derived where the respective sequential temporal ‘stacks’ were combined with the 2017 forest cover data. Areas showing up as change in the original stacks were only considered to be true change if such areas were also shown to be non-forested in the 2017 data. This had the effect of virtually eliminating the effects of the cloud rings. The data were then subset to the mask of mangrove cover from Cherrington et al. (2010), which had been merged with littoral forest polygons from Meerman (2005). This allowed for visualizing only changes in the littoral and mangrove cover, although changes in mangrove savanna were not considered due to difficulty in separating them from bare soil. However, mangrove savannas are also located mainly in northeastern Belize where conversion to other land use is not evident.

The change rasters were subjected to majority filtering to remove individual pixels that might have represented spurious changes. Following that, the rasters were then converted to polygons, whose approximate dates of clearing were recorded. Across the study area, this resulted in the generation of thousands of individual polygons. Filtering by size was then applied, where for the mainland areas, only polygons above 0.5 hectares were retained, and for the offshore areas, since there was a need to examine potential changes in mangrove cover on small islands, all change polygons (as small as 0.09 ha.) were retained. The reduced number of prospective change polygons were individually visually inspected, comparing them to the reference Landsat (and ASTER) images. The results from 1996-2017 were then merged with the earlier results from Cherrington et al. (2010), whose change polygons were likewise further inspected and filtered. This led to the development of a dataset spanning mangrove change from 1980 to 2010 in roughly 5-year intervals, and 2010-2017, in 1-year intervals.

#### *Modeling susceptibility to future clearing*

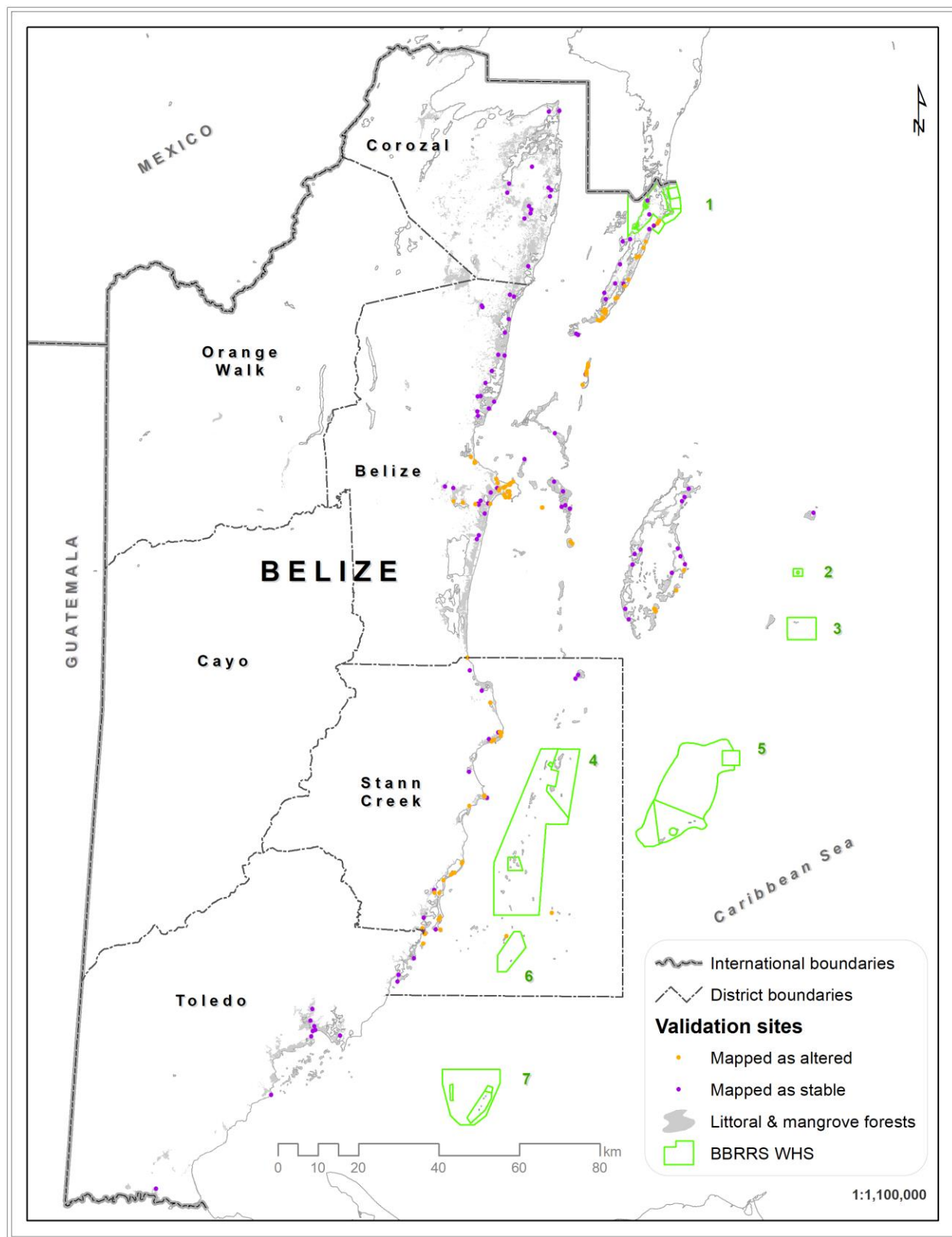
To evaluate the susceptibility of littoral and mangrove forest to future clearing, a simple model to assess such susceptibility was developed, based on the following factors and relative weights:

1. Proximity to coast (weight: 1)
2. Proximity to earlier clearing (weight: 2)
3. Proximity to protected areas (weight: 2)
4. Proximity to roads (weight: 1)
5. Proximity to settlements (weight: 1)

Those proximities were calculated using the ‘Euclidean Distance’ calculation function of ArcGIS, and in the case of protected areas, the inverse of its proximity was used.

#### *Validation*

Validation of the dataset involved sampling the change polygons and comparing those samples to the VHSR imagery that had been acquired. A total of 200 random points – confined to the bounds of the littoral and mangrove forest extent – were generated (using the ‘Create Random Points’ tool of ArcGIS), with 100 points assigned to the change polygons, and another 100 points assigned to the areas indicated to have no change (see **Figure 2**). If mangrove cover was not observed in the sample points, these were classified as “change,” whereas if mangrove cover change was observed (from the base year of 1996), the samples were classified as “no change.” An error matrix was then calculated, with 13 of the 200 points excluded from the analysis either because of cloud cover or difficulty in determining whether there was or wasn’t mangrove cover beneath a point. The results of that error matrix were then used to develop unbiased estimates of mangrove change following Olofsson et al. (2013).



**Figure 2:** Locations of the 200 validation sites.

### III. Results

#### a. Estimated rates of littoral and mangrove forest clearing

While remote sensing enables the mapping areas that have been cleared, within the limits of the change detection techniques, recent studies have pushed for estimating changed areas using “unbiased estimators of change and accuracy,” instead of traditional “pixel-counting” approaches to change detection (Olofsson et al. 2013). **Table 3** presents the estimates of change derived directly from “pixel counting,” while the error matrix presented in **Table 4** provides the means by which to un-bias those estimates, for the generation of adjusted estimates provided in **Table 5**. The estimates provided in **Table 3** are therefore considered biased estimates, as statistical techniques have not yet been applied to generate unbiased estimates of change. Based on the results shown in **Table 4**, and per Olofsson et al. (2013), error-adjusted estimates of change can be derived, taking into account errors of commission and errors of omission. Based on such errors, an unbiased estimate of clearing can be calculated as follows:

$$(\text{Weighting of “change” class} \times (\text{probability}) + (\text{weighting of “no change” class} \times (\text{probability of omission error of “change” class})) = (0.0210 \times \frac{95}{99}) + (0.9790 \times \frac{3}{88}) = \mathbf{0.0535}$$

Thus, what this indicates is that 5.23% of the area of mangrove likely changed over the time period established, compared to the original biased estimate of 1.20% (i.e. 904 ha. / 75,750 ha.). Taking that 5.23% into account, the stratified estimator of mangrove change would thus be:

$$\text{Total area of mangrove} \times \text{estimated proportion} = 76,250 \text{ ha.} \times 0.0535 = \mathbf{4,081 \text{ ha.}}$$

The final step in generating the unbiased estimate of change involves estimation of the standard error, as follows (with a confidence interval of 95%):

$$\left[ \frac{(0.0210)^2 \left( \frac{95}{99} \right) \left( 1 - \frac{95}{99} \right)}{(99 - 1)} + \frac{(0.9790)^2 \left( \frac{3}{88} \right) \left( 1 - \frac{3}{88} \right)}{(88 - 1)} \right]^{0.5} = 0.0191$$

The standard error is therefore estimated as:

$$\text{Total area of mangrove} \times \text{error estimate} = 76,250 \text{ ha.} \times 0.0191 = \mathbf{1,453 \text{ ha.}}$$

Therefore, the final, unbiased estimate of mangrove change, with its margin of error based on a 95% confidence interval is:

$$\mathbf{4,081 \text{ ha.} \pm 1,453 \text{ ha.}} \text{ (i.e. } \mathbf{2,629 \text{ to } 5,534 \text{ ha.)}}$$

Based on the results presented here, over the period from November 1980 through February 2017, the rate of mangrove clearing across all of Belize *likely* ranged from 72.5 to 152.6 hectares / year. Within the BBRRS WHS, the rate of mangrove clearing between March 1996 and February 2017 is estimated to have ranged from between 2.73 to 5.79 hectares / year (i.e.  $4.24 \pm 1.51$  ha. / year, and  $88.8 \pm 31.6$  hectares cumulatively). The magnitude of such is that the clearing of approximately 89 hectares of mangrove forest from the BBRRS WHS (between 1996 and 2017) represents 4.7% of the extent of the World Heritage Site’s total mangrove cover. In contrast, the clearing of about 2,700 hectares outside the WHS during the same period represents the loss of 3.7% of total mangrove cover existing in 1996.

**Table 3:** Initial, pixel-based estimates of mangrove clearing rates across the BBRRS WHS, outside of the BBRRS WHS, and across all of Belize.

Period			Area cleared (ha.)	Annual clearing rate (ha. / year)*	Area cleared (ha.)	Annual clearing rate (ha. / year)	Area cleared (ha.)	Annual clearing rate (ha. / year)
from	to	years	<i>inside BBRRS WHS</i>		<i>outside BBRRS WHS</i>		<i>across all of Belize</i>	
14-Nov-80	17-Mar-96	15.34	-	-	507	33.04	507	33.04
17-Mar-96	23-Feb-17	20.94	35	1.67	1,063	50.75	1,098	52.42
14-Nov-80	23-Feb-17	36.27	35	1.67	1,569	43.26	1,604	44.23

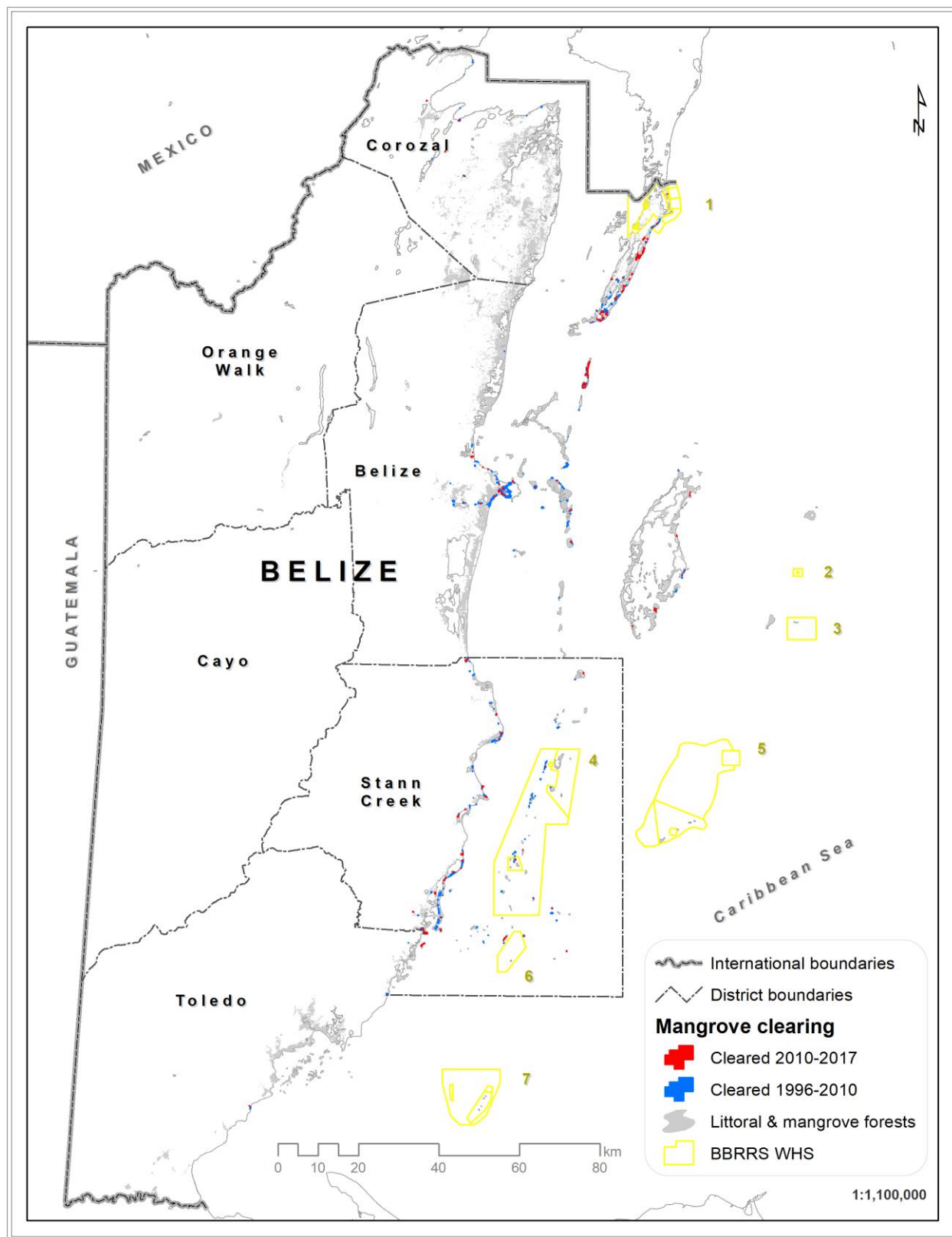
\* Estimated by dividing the total area cleared over the period by the number of years

**Table 4:** Error matrix for the 2017 mangrove cover map.

Producer classification dataset (2017 mangrove cover map)	User validation dataset (VHSR imagery)							
	Class	No change	Change	TOTAL	User accuracy	Total class accuracy	Map area (ha.)	Weighting
	No change	85	3	88	96.59%	92.39%	74,646	0.9790
	Change	4	95	99	95.96%	93.14%	1,604	0.0210
	TOTAL	89	98	187			76,250	1.0000
	Producer accuracy	95.51%	96.94%			96.26%		

**Table 5:** Adjusted estimates of mangrove clearing rates across the BBRRS WHS, outside of the BBRRS WHS, and across all of Belize.

Period			Area cleared (ha.)	Annual clearing rate (ha. / year)	Area cleared (ha.)	Annual clearing rate (ha. / year)	Area cleared (ha.)	Annual clearing rate (ha. / year)
from	to	years	<i>inside BBRRS WHS</i>		<i>outside BBRRS WHS</i>		<i>across all of Belize</i>	
14-Nov-80	17-Mar-96	15.34	-	-	1,289	84.05	1,289	84.05
17-Mar-96	23-Feb-17	20.94	89	4.24	2,703	129.11	2,792	133.35
14-Nov-80	23-Feb-17	36.27	89	4.24	3,993	110.06	4,081	112.51



**Figure 3:** Locations of mangrove clearings between March 1996 and February 2017.

*b. Clearing within the BBRRS WHS*

Within the World Heritage Site, mangrove clearings were only detected within the South Water Caye Marine Reserve, on 17 islands from Coco Plum Cay in the north to Crawl Cay in the south. **Table 6** provides estimates of clearing rates derived from the combination of direct remote sensing, and statistical adjustments (based on the methods suggested by Olofsson et al. 2013). Those data indicate that of the clearings detected, almost 98% occurred in the decade from 2000 to 2010, and almost  $\frac{3}{4}$  of the clearing occurred in the span between 2004 and 2010. The data likewise indicate that almost no new changes have occurred since 2010, although the imagery used and the spatial filtering limited detection of change to mangrove clearings at or above 0.5 hectares.

**Table 6:** Adjusted estimates of mangrove clearings within the South Water Caye Marine Reserve.

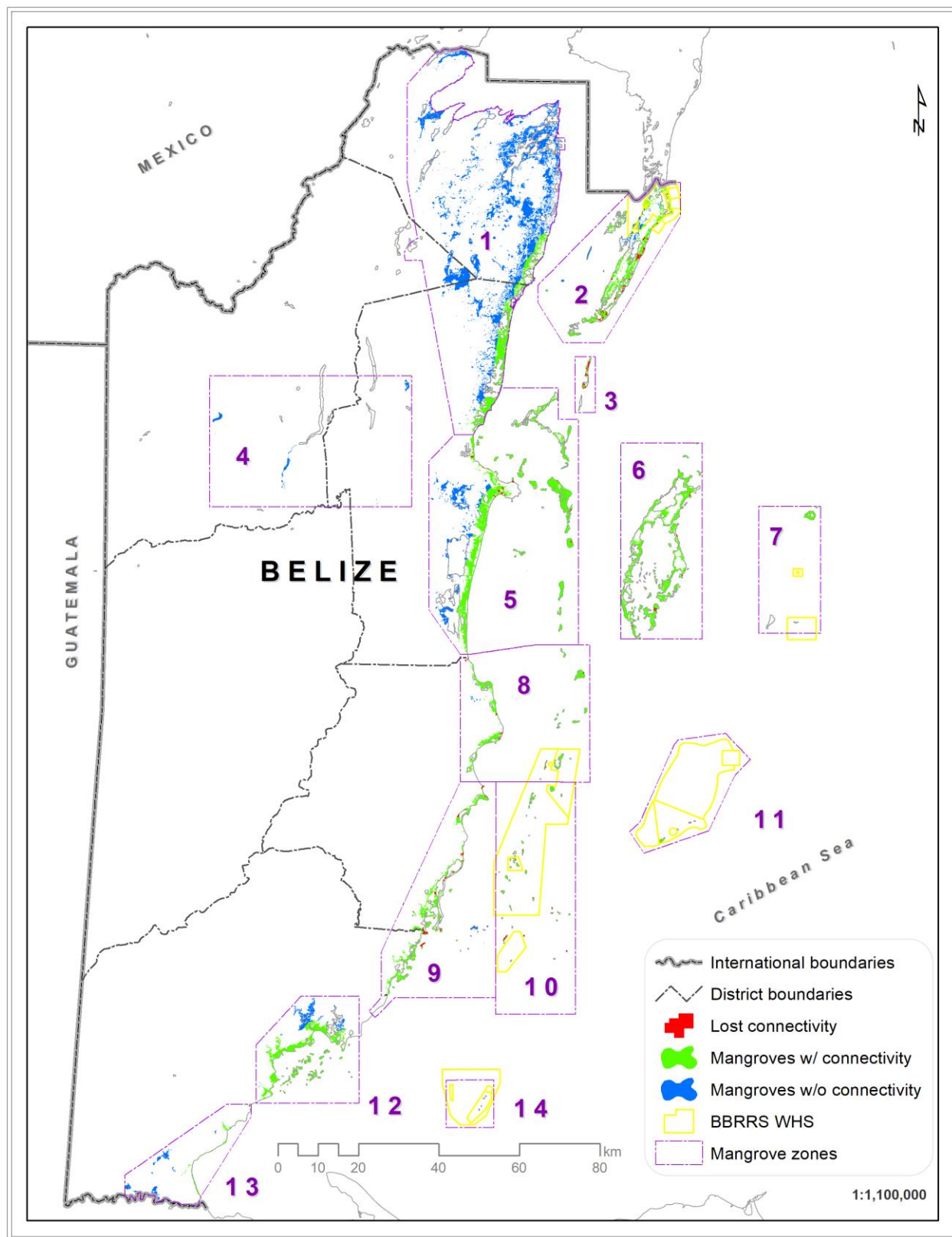
Period			Area cleared (ha.)	Annual clearing rate (ha. / year)*	% of change
from	to	years			
17-Mar-96	28-Mar-00	4.03	0	0	0
28-Mar-00	12-Feb-04	3.88	23	5.9	25.8%
12-Feb-04	28-Feb-10	6.05	64	10.5	71.9%
28-Feb-10	04-Apr-11	1.10	0	0	0
04-Apr-11	21-Mar-12	0.96	0	0	0
21-Mar-12	24-Mar-13	1.01	0	0	0
24-Mar-13	27-Mar-14	1.01	1	0.9	1.1%
27-Mar-14	15-Apr-15	1.05	0	0	0
15-Apr-15	01-Apr-16	0.96	0	0	0
01-Apr-16	23-Feb-17	0.90	1	1.2	1.1%
<b>17-Mar-96</b>	<b>23-Feb-17</b>	<b>20.94</b>	<b>89</b>	<b>4.2</b>	<b>100%</b>

\* Estimated by dividing the total area cleared over the period by the number of years

*c. Clearing outside of the BBRRS WHS*

In contrast to the mangrove clearing in the BBRRS WHS being concentrated in in the South Water Caye Marine Reserve, mangrove clearing outside the BBRRS WHS was across both the mainland and offshore cayes. This included a range of hotspots including Ambergris Caye, near Belize City, Caye Caulker, near Dangriga, the Drowned Cayes, Harvest Caye, near Hopkins, and on and around the Placencia Peninsula, and the Turneffe Atoll. **Table 7** (accompanied by **Figure 4**) provides an overview of the geographic zones where most of the clearings occurred over the period 1996-2017.

The area where most change occurred was the area around Belize City, including the nearby cayes, with over a third of the mangrove clearings between 1996 and 2017. The area that experienced the second greatest magnitude of change was Ambergris Caye (almost a fifth of clearings), followed by closely by the Placencia Peninsula and surroundings, the Dangriga area and nearby cayes (almost a tenth of clearings), and the zone comprising Caye Caulker and Caye Chapel. The Turneffe Atoll had the 6<sup>th</sup> greatest rate of clearing (3.4%), while Pelican Cayes range (exclusive of the South Water Caye Marine Reserve) was the area with the 7<sup>th</sup> greatest rate of clearing over the period indicated (2.4% of all clearings). Altogether, the 7 zones represented 98% of the clearings observed over that period, with the first 3 zones mentioned representing almost  $\frac{3}{4}$  of the clearings. Further, as shown in **Figure 4**, some 92% of the mangroves cleared from 1996-2017 were mangroves with marine connectivity to seagrass beds and coral reefs (over 2,500 hectares cleared).



**Figure 4:** Mangroves with seagrass and coral reef connectivity, with respect to the 14 geographic zones where mangroves are located.



Further regarding such connectivity, the concept was borrowed from Belize's 2005 National Protected Areas Policy & System Plan (NPAPSP) project. As such, of marine connectivity corresponds to mangroves' distribution in relation to both seagrass beds and coral reef. Per Cherrington et al. (2010), mangroves within a 2.5km distance of seagrass and reef were considered the most ecologically important and thus of higher priority for protection (NPAPSP 2005). Those mangroves are considered integral to the functioning of the Belize Barrier Reef Complex, along with the seagrass and coral reefs that such mangrove ecosystems interface with.

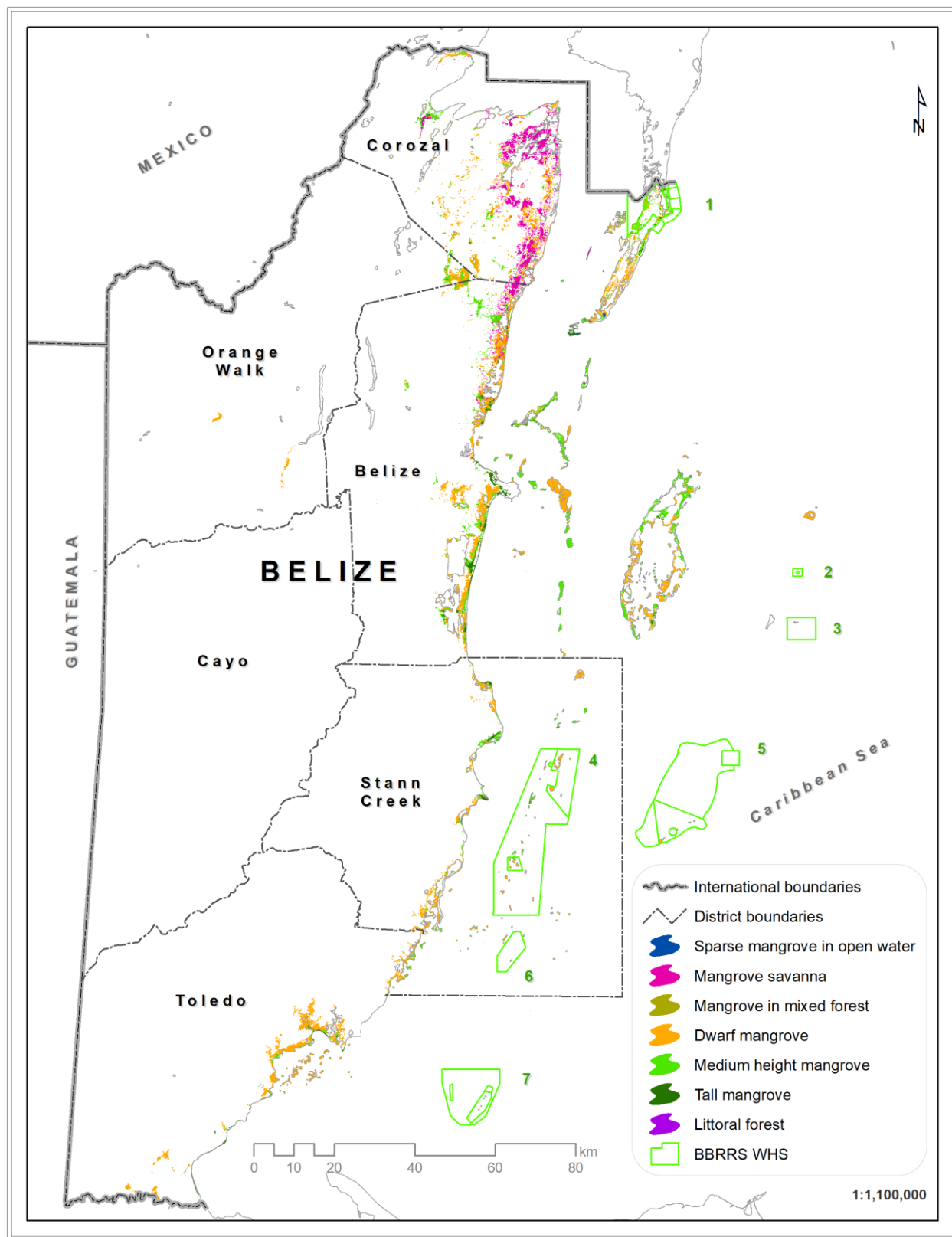
**Table 7:** Mangrove cover change by geographic zone, 1996-2017.\*

No.	Zone	Change (ha.)	% of clearings
1	Corozal & northern Belize District	49	1.8%
2	Ambergris Caye area	509	18.8%
3	Caye Caulker & Caye Chapel	248	9.2%
4	Far inland mangroves	0	0%
5	Belize City and nearby cayes	1,007	37.3%
6	Turneffe Atoll	93	3.4%
7	Lighthouse Reef Atoll	0	0%
8	Dangriga and nearby cayes	259	9.6%
9	Placencia Peninsula and nearby cayes	467	17.3%
10	Pelican Cayes range	65	2.4%
11	Glover's Reef	0	0%
12	Punta Ycacos & Port Honduras	0	0%
13	Sarstoon-Temash	7	0.2%
14	Sapodilla Cayes	0	0%
<b>TOTAL</b>		<b>2,703</b>	<b>100%</b>

\* Includes only clearings outside of the BBRRS WHS

*d. Current status of littoral and mangrove ecosystems*

Based on the figures previously presented in **Tables 5** and **7**, both the current extent and a retrospective of mangrove cover can be estimated, also taking advantage of pre-1996 data from Cherrington et al. (2010). **Table 8** temporally aggregates that data and indicates how mangrove cover in particular has changed over the ~36-year period spanning November 1980 and February 2017. Using the bias-adjusted clearing rates, the data indicate that as of early 2017, only approximately 5.4% of the 1980 mangrove cover extent had been lost, across all of Belize.



**Figure 5:** Mangrove and littoral forest formations, after Zisman (1998) and Meerman (2005).

**Table 8.** Changes in national-level mangrove cover and revised estimates of remaining cover, 1980-2017.

Period		Area (ha.)		Clearing rate (ha. / year)	% remaining
from	to	Cleared	Remaining		
14-Nov-80	27-Dec-89	687	75,563	75	99.1%
27-Dec-89	17-Mar-96	602	74,961	97	98.3%
17-Mar-96	28-Mar-00	419	74,542	104	97.8%
28-Mar-00	12-Feb-04	625	73,917	161	96.9%
12-Feb-04	28-Feb-10	1,249	72,667	207	95.3%
28-Feb-10	23-Feb-17	499	72,169	71	94.6%
<b>14-Nov-80</b>	<b>23-Feb-17</b>	<b>4,081</b>	<b>72,169</b>	<b>113</b>	<b>94.6%</b>

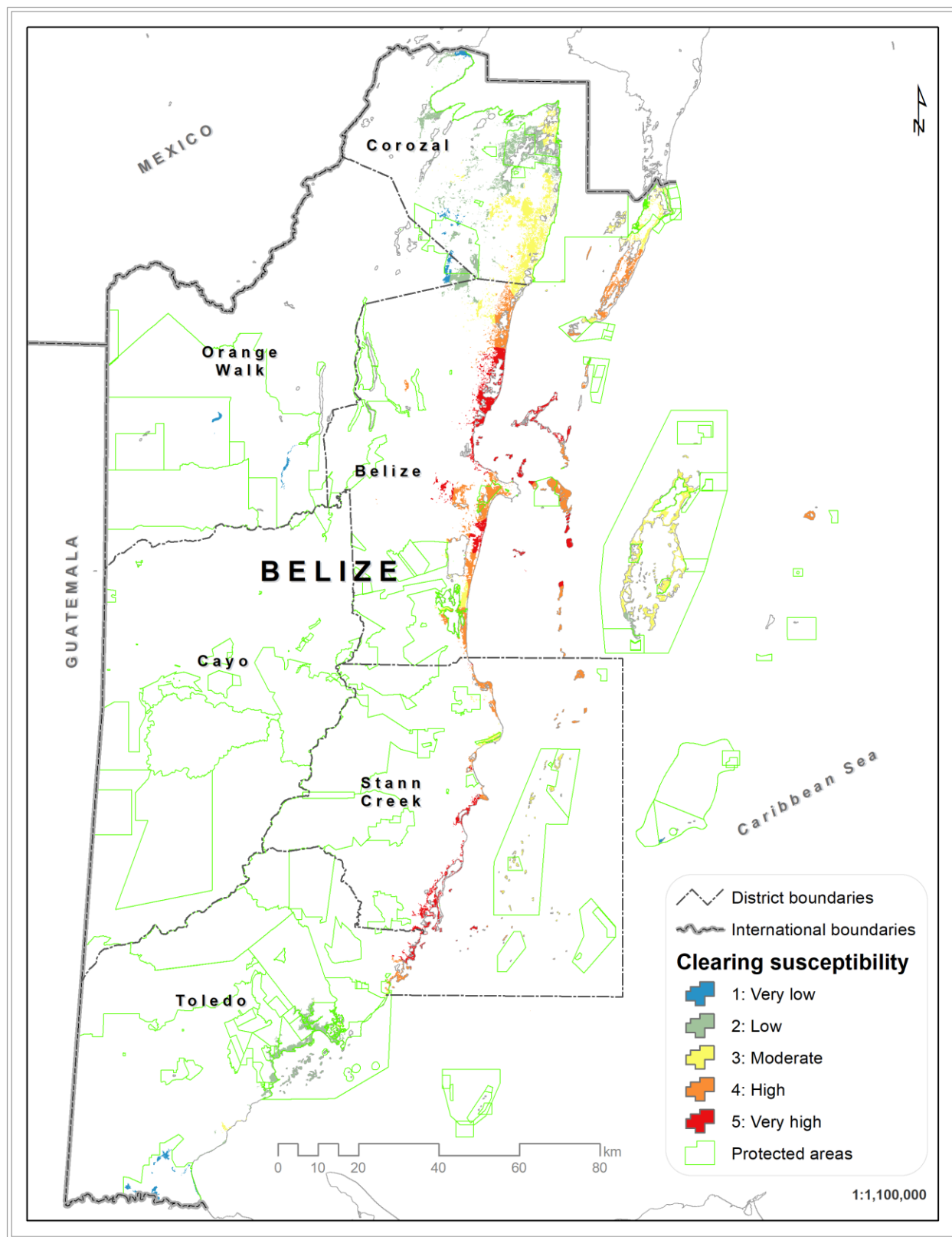
While the analysis did not consider changes in all of the mangrove and littoral ecosystems, regarding their composition, **Table 9** shows that in 2017, the mangrove communities with the greatest areal extents are dwarf mangrove communities (54.9%), communities of medium-height mangrove (21%), and the mangrove savannas located mainly in northern Belize (16.7%). In contrast, at less than 1,000 hectares, Belize's littoral forests represent barely 1% of the overall conglomeration of mangrove and littoral forest ecosystems.

**Table 9.** Distribution of littoral and mangrove ecosystems in 2017.

Community	Area (ha.)	%
Sparse mangroves in open water	124	0.2%
Mangrove in mixed forest	43	0.1%
Mangrove savanna	12,184	16.7%
Dwarf mangrove	40,123	54.9%
Medium height mangrove	15,361	21.0%
Tall mangrove	4,333	5.9%
Littoral vegetation	853	1.2%
<b>TOTAL</b>	<b>73,022</b>	<b>100%</b>

*e. Susceptibility to future land clearing*

Based on the change detection and other factors, areas generally prone to future clearings were mapped (**Figure 6**). As the proximity to previously-cleared areas was weighted higher than most of the other factors, areas with already high rates of clearing were identified as having higher susceptibility of clearing (i.e. the areas shown in orange and red in the map). These areas include the cayes and mainland areas near Belize City and the Placencia Peninsula, and land on the southern part of Ambergris Caye. Other areas, like the mangrove savannas of the Corozal district, the Turneffe Atoll, the Port Honduras area, and the Sarstoon-Temash National Park are estimated to have moderate to very low susceptibility to future clearing. With the exception of most of the mangroves in the Corozal District, the other areas have the added benefit of being located within protected areas. In fact, of the approximately 72,169 hectares of mangrove forest estimated to be extant in early 2017, about 21,266 hectares or  $\frac{1}{3}$  of that area is within the current protected areas network.



**Figure 6:** Simple model of the susceptibility of 2017 mangrove cover to future clearing.

#### **IV. Discussion**

##### *National and regional context*

In a national context, the study's findings indicate that over 5% of the country's mangrove cover was lost between November 1980 and February 2017. The implication is that across Belize, mangroves have been cleared at an average rate of 113 hectares per year over that 36-year period. In the regional context of Central America, the rate and overall extent of mangrove clearing in Belize over the past 30 years is very low. For instance, in neighboring Panama, it is estimated that approximately 55% of the country's mangroves had been cleared in the 38-year period between 1969 and 2007 (ARAP 2013). The loss of approximately 190,000 hectares in 38 years would therefore equate to clearing roughly 5,000 hectares per year. Similarly, a report from El Salvador indicates that roughly 60% of that country's mangrove cover (60,000 hectares) had been lost between 1950 and 2010, equating to a very rough estimated clearing rate of 1,000 hectares per year (MARN 2013). Statistics on clearing rates are generally unavailable for other countries in Central America, but in any event, Belize's rate of clearing is roughly  $\frac{1}{10}$  that of El Salvador's, and  $\frac{1}{50}$  that of Panama's.

Per the "Forests (Protection of Mangroves) Regulations" within the Forests Act of the Laws of Belize, any alteration of mangroves (with the exception of "selective trimming") is not permitted without permission from the Forest Department, whether such alteration is on private or public land. Because of concerns about the indiscriminate clearing of mangroves, particularly near the Belize Barrier Reef, a temporary, 9-month moratorium on mangrove alteration was declared by the Forest Department in August 2008, but that moratorium has long since expired. It remains to be seen whether all mangrove area being cleared is done legally vis-à-vis the Forests Act. Additionally, **Table 8** also indicates that the most clearings over the last 36 years occurred in the 2004-2010 timeframe, and that the present (2010-2017) period has seen the lowest rates of mangrove clearing. Whether the decline in clearing is due to the enforcement of laws, or an inevitable consequence of changing economic conditions, also remains to be seen, and should probably be a topic for future research.

##### *"True" rates of change*

This study sheds light on the discrepancies between changes mapped directly by change detection (i.e. "pixel counting") and estimates based on statistical adjustments (e.g. the methods proposed by Olofsson et al. 2013). The differences between the two ways of estimating change may be a concern for protected area managers wanting to know what the "true" rates of mangrove clearing are. For instance, the rates estimated in the present study exceed the rates reported in the precursor study (Cherrington et al. 2010). The precursor study relied on a "pixel counting" approach, while this study did not, and as noted by Olofsson et al. (2013), the pixel counting approach may result in a much lower estimate of change than when one applies a more rigorous statistical approach.

As indicated in **Table 3**, change detection directly estimated that only 35 hectares of mangrove were cleared within the BBRRS WHS between 1996 and 2017. Factoring in errors of omission and errors of commission, on the other hand, revises up the estimate to  $88.8 \pm 31.6$  hectares (i.e. 57.2 to 120.4 hectares) over that ~21-year period. That estimate of 88.8 hectares represents two and a half times the magnitude of the change determined by the remote sensing "pixel counting" change detection approach. Error adjustment in the statistical correction thus takes into account clearings that might not have been picked up by the change detection. Statistically adjusting the change estimates is likewise consistent with guidance coming from sources such as the Methods & Guidance Documentation (MGD) of the Global Forest Observation Initiative (GFOI). The MGD proposes that quantifying the uncertainties in land change-related estimates should, in fact, become a standard part of remote sensing-based change detection activities.

In this study's phase of visual inspection of the change polygons, it was also qualitatively noted that the change detection appeared somewhat conservative in picking up more drastic changes, but likely missing some areas. To that effect, a cumulative change of  $88.8 \pm 31.6$  hectares over 21 years would seem reasonable. Additionally, it ultimately translates to a rate of clearing of only 4.2 hectares per year over that time period, which seems feasible given the clearings visible on the 17 islands in and around the Pelican Cayes range.

### *Limitations*

Limitations of the present data analysis include the medium-resolution pixel size of the Landsat data, implying that the smallest changes that could be detected were on the order of a single 30m x 30m pixel (i.e. 0.09 hectares) and that clearings smaller than that could not likely be detected. Furthermore, the filtering that was done on the data generally led to the removal of such small changes, in order to try to eliminate 'noise.' This may in turn contribute to the observation that areas estimated by "pixel counting" would have under-estimated the area cleared. Additionally, the physical limitations of the sensors on the Landsat satellites, and potential for geometric mis-registration may likewise have played parts in potential errors of commission or omission. In terms of future steps, one worthwhile activity would be comparing the sizes of areas shown as cleared in the Landsat with what is visible in the high resolution imagery, to characterize the effects of spatial resolution on errors of commission or omission.

### *Future efforts*

At times, inconsistencies were noted when comparing Zisman's mangrove cover data to the available satellite data. For instance, the boundaries of mangroves seemed to have changed or otherwise didn't seem to correspond to the imagery. Additionally, mangrove datasets from other efforts (e.g. the 2008 ESA DIVERSITY project, Giri et al. 2010) seemed inconsistent with Zisman, although the rigorous work that went into the production of his mangrove map have led to it being considered the authoritative source on the boundaries of Belize's mangroves. A comprehensive re-mapping of mangrove ecosystems to truly update the work of Zisman (1998) would seem in order, especially given the almost two decades which have passed. Availability of very high spatial resolution data could assist this, as well as the open availability of other high-fidelity sources of data with enhanced spectral range, such as from Landsat-8 or Sentinel-2.

Future efforts might also include a rigorous assessment of the optimal methods for assessing change in Belize's mangroves, and understanding how phenological or other cyclical changes might affect their spectral reflectance, which in turn affects the ability of change detection methods to pick up on true changes. It was already noted, for instance, that – at the spatial resolution of Landsat – the mangrove savannas of Belize exhibit spectral reflectance patterns similar to bare land and urban areas, making them difficult to distinguish from the latter. It might be useful to evaluate, for instance, how mangrove clearings might be detected using thermal infrared data from Landsat, given that bare land should appear warmer than vegetation. Also, given the need to update the mangrove change map over time, it would likewise be useful to look into other, non-desktop computational platforms (e.g. Google Earth Engine, GEE) that can take advantage of the increasing volumes of remote sensing data now available from the combinations of Landsat-7 and Landsat-8 (available every 8 days), and Sentinel-2A and Sentinel-2B (available every 5 days). Toward that end, the authors of this study have been exploring automated GEE scripts which would allow for more rapid detection of mangrove clearing.

## **V. Conclusions**

This study's research questions focus on rates of change within and outside of the Belize Barrier Reef Reserve System World Heritage Site, including how those rates of change might have accelerated or

decelerated in recent years, and also focused on modeling susceptibility to future change. Focusing on the BBRRS WHS, it was found that approximately 89 hectares had been cleared in the 21 years since the site's establishment, translating to a rate of loss of 4.24 hectares a year. Compared with the mangroves outside of the BBRRS – some of which also enjoyed some level of protected area status – the annual rate of mangrove loss within the BBRRS was much smaller: 4.24 ha. / year compared to 129.11 ha. / year. And while 89 hectares of mangrove had been cleared inside the BBRRS between 1996 and 2017, in that same period, about 2,700 hectares of mangrove had been cleared outside of the BBRRS. As such, an estimated 2,792 hectares of mangrove had been cleared across Belize between 1996 and 2017, and between 1980 and 2017, a total of almost 4,100 hectares had been cleared. Those clearings were, for the most part, concentrated in 3 specific geographic zones – the mainland and offshore areas around Belize City, the vicinity of the Placencia Peninsula, and Ambergris Caye – with almost  $\frac{3}{4}$  of the 1996-2017 clearings occurring in those zones.

Belize's overall mangrove cover consequently declined 5.4%, from an estimated 76,250 hectares in 1980 to an estimated 72,169 hectares in 2017. In terms of 'hotspots' for future loss of mangroves, simple spatial modeling indicates that the areas around Belize City, the Placencia Peninsula, and Ambergris Caye would likewise be the areas most prone to future clearing. The mangroves of the Sarstoon-Temash National Park, the mangrove savannas of the Corozal District, and the inland mangroves of the Orange Walk District appear less likely to be cleared, although future change will likely hinge on a number of factors.

### **Acknowledgements**

This study was completed under a contract between the Belize Audubon Society and the University of Alabama in Huntsville. The funding for that contract was provided via the United Nations Development Programme (UNDP) / Global Environment Facility-Small Grants Programme (GEF-SGP), under a project entitled "Highlighting 20 years of World Heritage designation, BBRRS: Working toward better monitoring, management, and awareness," executed by BAS and the Belize Tourism Industry Association (BTIA). The support and feedback of the Belize Audubon Society's personnel is greatly appreciated. This includes the BAS Executive Director, Amanda Burgos-Acosta, Marine Protected Areas Manager, Shane Young, Conservation Director, Dominique Lizama, Marine Conservation Officer and GIS Analyst, Eli Romero, and the Finance Director, Marnie Santana. The BTIA is also recognized. Revision of the report benefited from the feedback provided by Nicole Auil-Gomez, the Belize country program director for the Wildlife Conservation Society (WCS), Janet Gibson (formerly of the WCS), and Dr. Fanny Douvere, the Coordinator for the Marine Programme of UNESCO's World Heritage Centre. Execution of this project would also not have been possible without the support of Laurie Collins, Linda Berry, and Erika San Soucie of UAH. This study also benefited greatly from UAH's Cooperative Agreement with NASA, and the support of the following NASA personnel is greatly appreciated: Dr. Nancy Searby, NASA's Capacity Building Program Manager, Daniel Irwin, the SERVIR Program Director, Raymond French, the SERVIR Project Manager, and Dr. Ashutosh Limaye, the SERVIR Chief Scientist. Nadia Bood of the World Wildlife Fund, and Dr. Melanie McField of the Healthy Reefs Initiative are also recognized for their support of the earlier research upon which this project was developed. Dr. Gregory Asner and the CLASlite Team at the Carnegie Institute for Science are also acknowledged.

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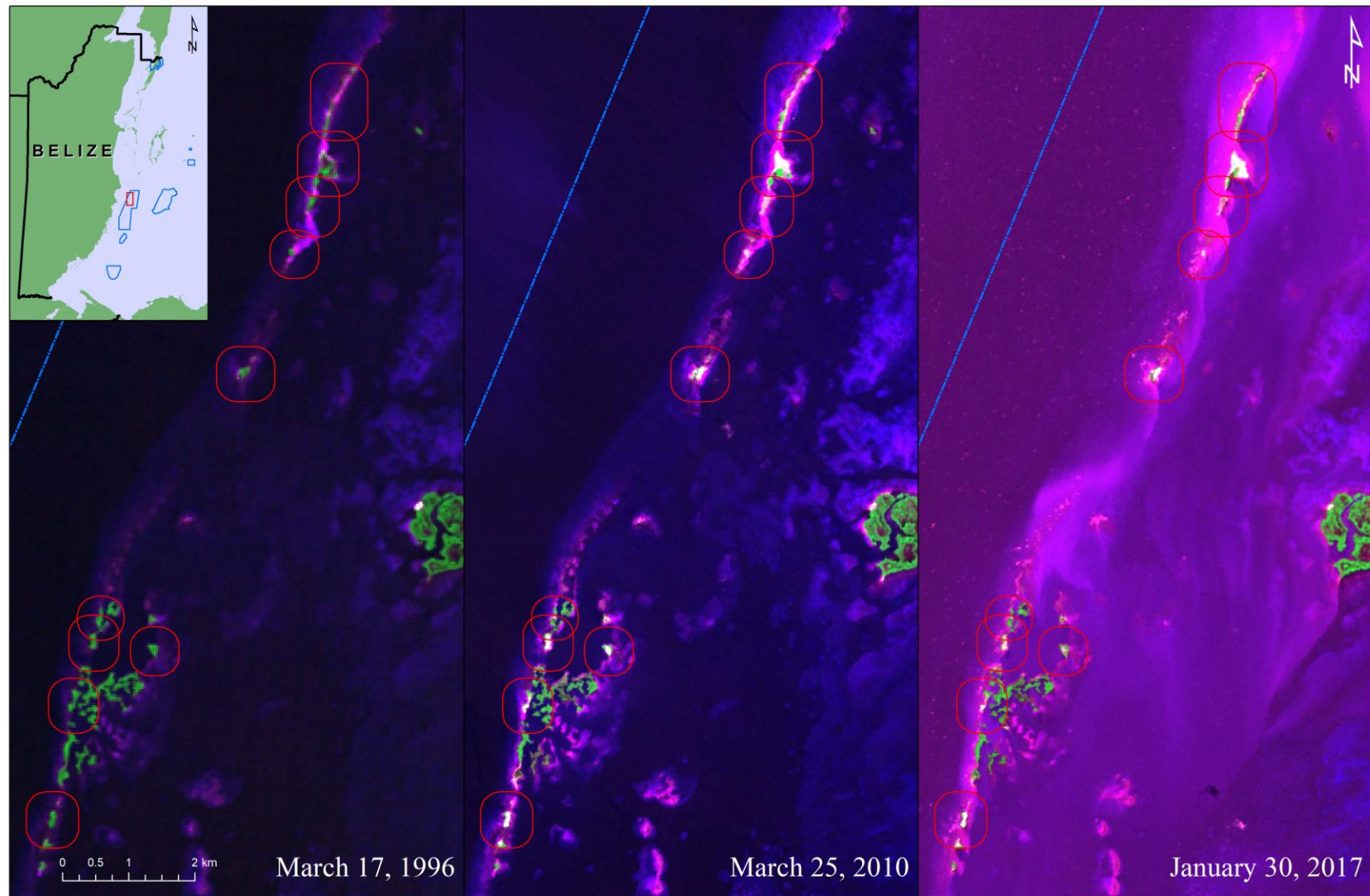
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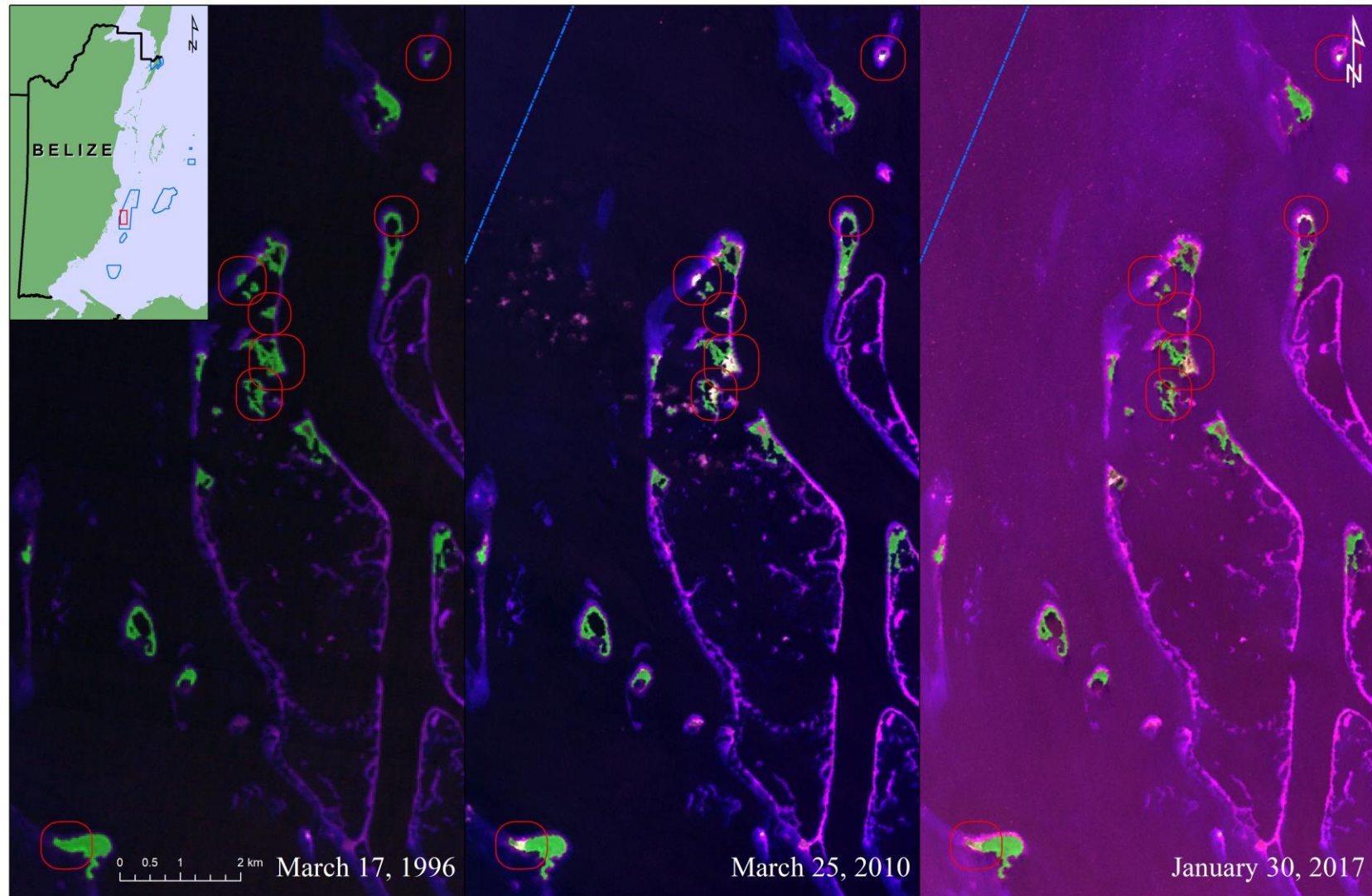
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**Appendix 1:** False color satellite imagery showing changes in mangrove cover within the northern portion of the South Water Caye Marine Reserve, 1996-2010-2017 (left: Landsat-5, middle: ASTER, right: ASTER; *data credits: NASA, USGS, JAXA*)





**Appendix 2:** False color satellite imagery showing changes in mangrove cover within the central portion of the South Water Caye Marine Reserve, 1996-2010-2017 (left: Landsat-5, middle: ASTER, right: ASTER; *data credits: NASA, USGS, JAXA*)





## Belize National Commission for UNESCO

Cor. St. Thomas & St. Joseph Streets,  
Belize City, Belize,  
Central America.



Mr. Roosevelt Blades,  
Secretary-General  
National Commission for UNESCO- Belize  
Cor. St. Thomas and St. Joseph St.  
Belize City, Belize.

13<sup>th</sup> April, 2018

Ms. Mechtild Rossler  
Director  
World Heritage Centre- UNESCO  
7, Place de Fontenoy  
75352 Paris CEDEX 07, France.

Dear Madam Rossler,

Greetings from Natcom Belize. Attached please find endorsement letters from World Wild Life Fund, Belize Tourism Industry Association and Belize Audubon Society. Kindly attach these letters to our State Party Report.

We are currently in the process of preparing some follow-up information that will include an MOU which is attached for your perusal, and the Cabinet approved mangroves regulations. It is our intention to have these signed documents sent to you by Monday, 30<sup>th</sup> April, 2018. We humbly ask that these additional information be taken into account, when the World Heritage Committee makes their final assessment with regards to Belize's SCOR. As you may have noticed we are doing all we can to ensure that BBRRS is removed from the list of world Heritage in danger.

Please accept the assurance of my highest consideration

Best regards,

Roosevelt Blades.

cc. IUCN



*for a living planet®*

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April 13<sup>th</sup>, 2018

Mr. Roosevelt Blades  
Secretary-General  
National Commission for UNESCO  
Belize, Central America

Dear Mr. Blades,

This letter serves to indicate that the World Wildlife Fund (WWF) has reviewed the 2018 State of Conservation (SOC) report on the Belize Barrier Reef Reserve System World Heritage Site that was submitted by the Government of Belize to the World Heritage Center.

Through this medium, we hereby express WWF's support of the SOC report and our commitment to work collaboratively with the Government of Belize to address the remaining indicator to achieve the ban on further sale and lease of public lands within the Belize World Heritage Site.

Yours truly,

---

Nadia Bood  
Country Representative  
Belize Field Program Office  
World Wildlife Fund





BELIZE TOURISM  
INDUSTRY  
ASSOCIATION

13<sup>th</sup> April 2018

Mr. Roosevelt Blades  
Secretary-General  
National Commission for UNESCO  
Belize, Central America

***Subject: Endorsement of 2018 State of Conservation Report UNESCO***

Dear Sir:

The Belize Tourism Industry Association (BTIA) as the leading private sector tourism association promotes the sustainable development of the tourism industry in Belize through its mission and vision.

The BTIA welcomes the opportunity to fully support and endorse the revised version of the 2018 State of Conservation Report UNESCO. We strongly believe that it's a key step towards the protection of our natural resources that will lead to the removal of the Belize Barrier Reef Reserve System from the List of World Heritage in Danger.

We express our continuous support towards the positive actions undertaken by the current government administration.

Yours in Tourism,

John M. Burgos  
Executive Director

10 North Park Street,  
Belize City, Belize  
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## BELIZE AUDUBON SOCIETY

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P.O. BOX 1001, 16 North Park Street  
BELIZE CITY BELIZE, CENTRAL AMERICA

April 13<sup>th</sup>, 2018

Mr. Roosevelt Blades  
Secretary General,  
National Commission for UNESCO  
Belize, Central America

Mr Blades,

Kindly note the Belize Audubon Society (BAS) has reviewed the State of Conservation and Annexes. We find the document to be a fair representation of the recent progress, and as such endorse it.

Granted two matters are pending; that of the Mangrove Legislation and the Land matters, BAS is confident that with the current momentum we have gained, these items can be resolved and materialized, shortly.

It is our hope, as that of many of our colleague, we can finally see a positive conclusion to the matter of WHS-Belize Barrier Reef Reserve System, by coming of the “danger” list.

Sincerely,  
In Conservation,

Mrs. Amanda Acosta,  
Executive Director



**BELIZE**

**MEMORANDUM OF UNDERSTANDING**

**AMONG**

**MINISTRY OF FISHERIES, FORESTRY, THE ENVIRONMENT AND  
SUSTAINABLE DEVELOPMENT,**

**MINISTRY OF NATURAL RESOURCES**

**AND**

**WORLD WILDLIFE FUND, INC.**

**REFERENCE THE SURVEY OF REMAINING  
NATIONAL LANDS IN THE BBRRS WORLD HERITAGE SITE**

## 1. DEFINITIONS, PARTIES AND PURPOSE OF THIS AGREEMENT

In these Articles, unless the subject or context otherwise requires:

“WWF” means **World Wildlife Fund, Inc.**;

“WHS” refers to the UNESCO World Heritage Site the Belize Barrier Reef Reserve System;

“Survey” means the same as a survey of parcel of land for sale.

Save as aforesaid, any words or expressions defined in the Fisheries Act, Forest Act, and National Protected Areas System Act (Statutory Instrument No. 79 of 2015) of the Laws of Belize, except whereas the subject or context forbids, bear the same meaning in these Articles.

This Memorandum of Understanding (hereinafter referred to as ‘the MOU’) is entered into this 15th day of April 2018, among the Ministry of Fisheries, Forestry, the Environment and Sustainable Development, the Ministry of Natural Resources and **World Wildlife Fund, Inc.** to guide the work of surveying and designating remaining national lands in the Belize Barrier Reef Reserve System as reserves, and shall expire on the 31<sup>st</sup> day of December 2018.

*Whereas* the Ministry of Fisheries, Forestry, the Environment and Sustainable Development recognizes the need and is responsible for promoting the beneficial use of resources within the Belize Barrier Reef Reserve System;

*Whereas* the Ministry of Natural Resources is responsible for the administration and distribution of all national land;

*Whereas* **World Wildlife Fund, Inc.** is desirous of assisting with funding the survey and designation of remaining national lands in the WHS as reserves;

And *whereas* all parties above, in consultation with the UNESCO Secretary General in Belize and the World Heritage,

*Recognize* the ecological and economic value of the Belize Barrier Reef Reserve System as a marine ecosystem of biodiversity and geo-physical significance that also contributes to the global pool of unique natural formations; therefore,

*Agree* to formalize this MoU with the objective of: (i) jointly developing, through physical survey, verification and compilation of remaining national lands in the WHS over the next 8 months, a boundary description to enable the designation of the remaining national lands to mangroves reserves under the Forests Act, and (ii) in the interim period to maintain a moratorium on issuance of any new tenure over remaining national lands in the WHS.

## **2. PROVISIONS OF THIS AGREEMENT**

*Whereas* all parties to this MoU are in agreement with the designation of remaining national lands within the WHS as mangroves reserves for the purpose of maintaining the Outstanding Universal Values of the WHS;

All parties therefore *Agree* that remaining national lands will be surveyed over the next 8 months, and thereafter designated as mangroves reserves;

**NOW THEREFORE IT IS HEREBY AGREED** as follows:

### **2.1 CARRYING OUT OF SURVEY**

- 2.1.1 The Ministry of Natural Resources will facilitate the carrying out of the survey with the necessary permissions;
- 2.1.2 The Ministry of Natural Resources, the Ministry of Fisheries, Forestry, the Environment and Sustainable Development and World Wildlife Fund, Inc., will develop the terms of reference for the survey work;
- 2.1.3 World Wildlife Fund, Inc., will finance the survey to a maximum of US\$ 50,000, and tender out the survey work via advertisement and a bidding process;
- 2.1.4 An independent land surveyor contracted via 2.1.2 will carry out the survey and present completed plans.

### **2.2 DESCRIPTION OF BOUNDARIES**

- 2.2.1 The Ministry of Natural Resources will compile the surveys and prepare the description of the boundaries of the parcels of national land.

### **2.3 DESIGNATION OF THE RESERVES**

- 2.3.1 The Ministry of Fisheries, Forestry, the Environment and Sustainable Development will draft the statutory instrument for declaration of the surveyed parcels of national lands as mangroves reserves.

**2.4 THE PARTIES FURTHER AGREE THAT**

All undertakings given pursuant to this MoU are also subject to other laws of Belize and may be amended as agreed in writing by the Parties.

AS WITNESS the hands of the parties hereto the day and year first above mentioned,

**SIGNED:**

\_\_\_\_\_  
Minister of **Fisheries,  
Forestry, the Environment,  
Sustainable Development**

\_\_\_\_\_  
Minister of Natural Resources

\_\_\_\_\_  
World Wildlife Fund, Inc.  
Director \_\_\_\_\_  
WWF Guatemala/Mesoamerica

\_\_\_\_\_  
Unesco Secretary General for Belize  
Witness \_\_\_\_\_

**BELIZE:****FORESTS (PROTECTION OF MANGROVES) REGULATIONS,**  
**2018****ARRANGEMENT OF REGULATIONS****PART I***Preliminary*

1. Citation.
2. Interpretation.

**PART II***Protection of Mangroves from Alteration or selective Trimming**Unless by Permit*

3. Prohibition on alteration of Mangroves without a permit.
4. Procedure on receipt of application.
5. Notice of application.
6. Considerations for the grant of a permit.
7. Grant and conditions of permit.
8. Permit for selective trimming of mangroves.
9. Requirements for selective trimming permit of mangroves.
10. Duty of permit holder.
11. Assessment report.
12. Publication of decision.
13. Cancellation of permit.
14. Circumstances where permit shall not be issued.

**PART III***Administration*

- 15. Appointment of Review Panel.
- 16. Functions and powers of the Review Panel.
- 17. Fast track option for public good.

**PART IV***Offences and Penalties*

- 18. Prohibition on method of alteration.
- 19. General penalty.

**PART V***Miscellaneous*

- 20. Application for review.
- 23. Repeal.

SCHEDULE 1

SCHEDULE 2

SCHEDULE 3

**BELIZE:****STATUTORY INSTRUMENT**

No.            of 2018

**REGULATIONS** made by the Minister responsible for forests in exercise of the powers conferred upon him by section 5 of the Forests Act, Chapter 213 of the Substantive Laws of Belize, Revised Edition 2011, and all other powers thereunto him enabling.

(Gazetted            , 2018)

**WHEREAS** mangroves border much of the coastline and cayes of Belize and form an important and cherished component of the natural vegetation of the country, and among other things, provide habitat, and have aesthetic, ecological and environmentally protective functions;

**AND WHEREAS** it is desirable in the national interest to make regulations to protect mangroves for the benefit of the coastal and marine ecosystems and further for the benefit of the people of Belize;

**NOW, THEREFORE**, the following Regulations are hereby made:

**PART I***Preliminary*

1. These Regulations may be cited as the **FORESTS (PROTECTION OF MANGROVES) REGULATIONS, 2018.** Citation.

2. In these Regulations, Interpretation.

“alter” in relation to mangroves, means to cut, remove, defoliate, bury, block, drain, restrict the natural water flow, or otherwise destroy by any means or affect by any means, mechanical or otherwise, but does not include selective trimming, and “alteration” shall be construed accordingly;

“applicant” means an applicant for a permit;

“application” means an application for a permit;

“Department” means the Department of the Government for the time being charged with responsibility for mangrove forests;

“fringe mangrove” means any mangrove in mangrove communities that grow as a relatively thin fringe along the coastline and that are partially flushed by tides;

“issuing authority” means the head of the Department or other senior officer of the Department authorized in writing by the head;

“mangrove” means any tree occurring in natural stands of the following species-

- (a) black mangrove (*Avicennia germinans*);
- (b) red mangrove (*Rhizophora mangle*);
- (c) white mangrove (*Laguncularia racemosa*);
- (d) any other species of mangrove or concomitant tree, which the Minister may by Order publish in the *Gazette*;

“mangrove community” means a naturally occurring stand of mangroves and all concomitant plants associated with mangroves;

“overwash mangrove” means any mangrove in mangrove communities situated on islands that are typically wholly inundated or subject to complete inundation by the tide;

“permit” means a permit granted under these Regulations;

“priority mangrove area” includes any area listed in Schedule 1;

“protected area” has the same meaning as in the National Protected Areas System Act;

“review panel” means a review panel established under Regulation 15;

“selective trimming” means removal of less than a quarter of all limbs and branches from any one tree, or removal of tips only of some limbs and branches from any one tree for the purpose of achieving a reduction in vertical or horizontal extent of trees, and which does not involve any trees being killed or roots being cut;

“World Heritage Site” means the Belize Barrier Reef Reserve System, inscribed as a UNESCO World Heritage Site in 1996.



## PART II

*Protection of Mangroves from Alteration or Selective Trimming unless by Permit*

3. (1) A person shall not alter, allow or cause to be altered any mangrove, unless the alteration is carried out pursuant to a permit .

Prohibition on alteration without permit.

(2) A person desiring to alter mangroves shall submit to the Department an application for a permit in the form set out as Form A of Schedule 2, and accompanied by a non-refundable application fee, as prescribed in Schedule 3, having regard to whether the proposed development is for a residential purpose or for a commercial purpose (which shall apply even where a commercial activity also includes residential premises).

(3) Where the applicant is not the owner of the land to which the application relates, the applicant shall submit with the application a written authorization from the land owner.

4.-(1) The Department shall, where it receives an application for the alteration of mangroves of an area exceeding one acre, publish a notice to that effect in the Gazette not later than ten days from the date of its receipt of the application (herein called the “receipt date”).

Procedure on receipt of application.

(2) Where an application is made in any circumstance specified in Regulation 16 (1), the Department shall forward it, as soon as practicable but not later than fifteen days after the receipt date, to the review panel for deliberation, and the review panel shall return its written recommendations to the Department, as soon as practicable but not later than thirty days after the receipt date.

(3) The Department, when considering an application for alteration –

- (a) shall take account of any recommendations of the review panel and any comments or objections received under Regulation 5 (2);
- (b) may notify the applicant in writing of its intent to refuse the application if the applicant fails to provide required information, correct errors or omissions, or furnish additional information requested, to the satisfaction of the issuing authority within the time specified in the notice.

(4) The Department shall make its decision to approve or refuse an application for alteration not later than sixty days after the receipt date, and the issuing authority shall notify the applicant in writing forthwith.

(5) Where the Department refuses the application, the notification under sub-regulation (4) must state the reasons for refusal.

(6) The Department may refuse to grant a permit for alteration if the applicant, after receiving the notice of intent to refuse the permit under sub-regulation (3) (b), fails to provide the required information, correct errors or omissions, or furnish the additional information to the satisfaction of the issuing authority within the time specified in the notice.

Notice of application.

5.-(1) A notice under Regulation 4 (1) must contain the following information -

- (a) the name and address of the applicant;
- (b) the name of the land owner;
- (c) the location of the land where the mangrove alteration will be made;
- (d) a map of the location;
- (e) the proposed development involving mangrove alteration, and, in particular, the size of the development in acres, size of the stands of mangroves to be cleared, the class of development (such as whether a resort, pier, or over-water structure) and the purpose of the development;
- (f) the proposed times and periods when the alteration of mangroves will be made;
- (g) a statement that written comments upon or objections to the application, stating the reasons for any objection may be submitted to the Department not later than thirty days after the date of publication of the notice;
- (g) any other information considered by the Department to be relevant for the purpose.

(2) Any person may, not later than thirty days after the date of publication of the notice, submit to the Department written comments upon or objections to the application, stating the reasons for any objection.

6. (1) The Department shall not grant a permit for alteration unless, after its consideration of the relevant application, it is satisfied as to the following matters, namely that -

- (a) water quality of rivers, streams, lagoons, the sea or any other body of water that flows from or surrounds the immediate vicinity of the location of the proposed

Considerations for the grant of a permit.

alteration will not be significantly lowered or changed as a result of the proposed alteration;

- (b) the proposed alteration is not contrary to the public interest, and that, even if the alteration degrades or changes the environment, such action will be, on the whole, beneficial and in the larger and long-term interest of the people of Belize;
- (c) public health, safety, welfare or property of others will not be adversely affected;
- (d) fish nursery, nesting sites, endangered or threatened species, other wildlife or their habitats will not be adversely affected;
- (e) navigation or the flow of water will not be adversely affected and that the alteration will not cause harmful erosion, siltation, deposition or shoaling;
- (f) fishing, recreation values or marine productivity in the vicinity of the proposed alteration, or more generally along the coast (where applicable), will not be adversely affected;
- (g) tourism value of the area will not be significantly reduced;
- (h) historical or archaeological resources will not be adversely affected; and
- (i) storm surge protection function of the area will not be significantly reduced;
- (j) overwash mangroves will not be altered or adversely affected.

(2) If any of the matters under sub-regulation (1) is not immediately fully satisfactory to the Department, but the Department is nevertheless satisfied that any potential adverse environmental impacts are not significant, then in determining whether to grant a permit, the Department shall further consider and balance the following factors –

- (a) the distance of the proposed alteration away from a designated park or other type of protected area, including the World Heritage Site;
- (b) impact on nearby coastal and reef areas known to be of outstandingly high ecological value, including those within the National Integrated Coastal Zone Management Plan;
- (c) potential for direct and indirect economic benefits from the development;

- 
- (d) the cumulative impact on existing projects or projects already under construction, or other applications under consideration that may affect the lands under the proposed development;
  - (e) alignment of the development with existing or proposed national, regional and local land-use plans;
  - (f) whether the impacts of the alteration will be of a temporary or permanent nature;
  - (g) presence of overwash mangroves;
  - (h) carbon storage and sequestration potential of the mangroves;
  - (i) the current condition of the mangroves and relative value of the functions being performed by or in the areas to be affected by the alteration.

(3) If after consideration of matters and factors under sub-regulation (1) in conjunction with sub-regulation (2), the outcome appears to the Department to be favourably balanced, in deciding whether to proceed to grant or refuse to grant a permit, the Department shall impose conditional measures that shall be accepted and undertaken by the applicant to mitigate or remedy any adverse effects identified under sub-regulation (1) and (2) to the satisfaction of the Department, focused on the following:

- (a) actions that would avoid or prevent mangrove alteration, such as buffer zones;
- (b) alternative site placement, facility design, work methods or equipment that would eliminate impacts to mangrove;
- (c) offsetting through restoration or planting of new mangrove communities in adjacent degraded areas or other areas;
- (d) subject to paragraph (c), the restoration and reforestation of two times the amount of mangrove that was cleared; and
- (e) a bond sufficient to ensure the successful completion of restoration activities with eighty percent survival rate after a minimum one year since planting.

(4) If the application does not immediately meet the criteria set out in sub-regulation (1), and after further consideration under sub-regulation (2) and further consideration and imposition of conditions under sub-regulation (3), as applicable, the applicant fails to accept to undertake the conditions set out under sub-regulation (3), the Department shall refuse the application and refuse to grant the permit.

7.-(1) A permit for alteration shall be in the form set out as Form B of Schedule 2 and the applicant shall pay the permit fees prescribed in Schedule 3, having regard to whether the proposed development is for a residential purpose or for a commercial purpose (which shall apply even where a commercial activity also includes residential premises).

Grant and conditions of permit.

(2) The Department may impose as a condition for the grant of the permit a requirement that the applicant post a surety bond in the sum of ten thousand dollars per acre of the land where the alteration is to be made, issued to the benefit of the Government, where -

(a) mitigating measures are required under Regulation 6 (3); or

(b) the permit is for a priority mangrove area.

(3) The Department may impose such other conditions on the permit as it considers may be reasonable and necessary to ensure compliance with these Regulations.

(4) A condition applicable to every permit for alteration relates to the manner of disposal of the mangroves altered; so, the permit holder shall ensure that plant material removed during alteration be disposed of in an orderly and inconspicuous manner; accordingly, small trunks and limbs (less than one inch in diameter) may be left in the mangrove habitat, but larger trunks and limbs (greater than one inch in diameter) shall be disposed of in an upland location so as not to impede or restrict water movement or create a hazard to navigation.

8.-(1) A person shall not selectively trim, allow or cause to be selectively trimmed any mangrove, unless the trimming is carried out pursuant to a permit.

Permit for selective trimming of mangroves.

(2) A person desiring to selectively trim mangroves shall submit to the Department an application for a permit in the form set out as Form A of Schedule 2, and accompanied by a non-refundable application fee, as prescribed in Schedule 3.

(3) A permit for selective trimming shall be in the form set out as FORM B of Schedule 2, and has no fee payable.

9.-(1) A person granted a permit for selective trimming shall not selectively trim more than 50% of mangroves along the waterfront where that person's land has water frontage.

Requirements for selective trimming permit of mangroves.

(2) The permit holder shall undertake selective trimming of mangroves mechanically, and in a manner that -

(a) avoids damage to the bark on the remaining trunk, limbs or other branches;

- (b) does not involve the use of defoliants, herbicides, pruning paint or other chemicals;
- (c) ensures that plant material removed during selective trimming is disposed of in an orderly and inconspicuous manner; accordingly, small trunks and limbs (less than one inch in diameter) may be left in the mangrove habitat, but larger trunks and limbs (greater than one inch in diameter) shall be disposed of in an upland location so as not to impede or restrict water movement or create a hazard to navigation.

Duty of permit holder.

10.—(1) A permit holder shall install at the location where the mangrove alteration or selective trimming, as applicable, will occur, a prominently displayed sign with a waterproof copy of the permit affixed, and the sign shall remain in place for the duration of the alteration or selective trimming.

(2) The dimensions of the sign under sub-regulation (1) shall be 4 feet by 4 feet and contain the words “Mangrove Alteration in Progress” or “Mangrove Selective Trimming in Progress”.

Assessment report.

11.—(1) Within fifteen days after the grant of or refusal to grant a permit for the alteration of mangroves, the Department shall prepare a detailed assessment report of the facts and evidence supporting its determination to grant or refuse to grant the permit.

(2) The assessment report shall include,

- (a) a description of the proposed development;
- (b) a thorough evaluation of each of the considerations under Regulation 6;
- (c) the facts and evidence in support of determinations in respect of each consideration; and
- (d) recommendations in respect of the application.

Publication of decision.

12. Within fifteen days after the grant of a permit for alteration, the Department shall publish the assessment report in the Gazette.

Cancellation of permit.

13.—(1) The issuing authority may, subject to the provisions of this Regulation, cancel a permit if satisfied that the permit holder has breached a condition of the permit, or is not in compliance with any requirement under these Regulations.

(2) The issuing authority shall notify a permit holder, in writing, of his proposal to cancel a permit and give reasons therefor.

(3) A permit holder who is served with a notice under sub-regulation (2) may respond to the notice in writing, within twenty days of service showing cause why the permit should not be suspended or cancelled.

(4) The issuing authority shall not determine a matter under sub-regulation (1) without considering submissions or representations received within the period for responding under sub-regulation (3).

(5) If the issuing authority cancels a permit, the issuing authority shall notify the permit holder, in writing, of the cancellation and of the right of review under Regulation 20.

14.- (1) The issuing authority shall not issue a permit for alteration or selective trimming of mangroves by means of chemical defoliant or herbicides.

Circumstances where permit shall not be issued.

(2) The issuing authority shall not issue a permit for the alteration or selective trimming of -

- (a) mangroves in areas known to be an active nesting site or resting or breeding area for a colony or conspicuous concentration of birds, including but not limited to pelicans, spoonbills, herons, storks, boobies, frigate birds, and egrets;
- (b) overwash mangroves;
- (c) mangroves within existing national parks, nature reserves, wildlife sanctuaries, natural monuments or other protected areas as defined and described in the National Protected Areas System Act.

Act No. 17 of  
2015

### PART III

#### *Administration*

15.-(1) To facilitate the consideration of applications in respect of circumstances specified in Regulation 16 (1), the Minister may appoint a Review Panel comprising the following persons, namely, the -

Appointment of  
Review Panel.

- (a) Chief Forest Officer;
- (b) Fisheries Administrator;
- (c) Chief Environmental Officer;
- (d) Commissioner of Lands and Surveys;

- 
- (e) Inspector of Mines;
  - (f) head of the Coastal Zone Management Authority and Institute;
  - (g) head of an organization appearing to the Minister to be a leading non-government organization working in research or management of the marine or coastal realm; and
  - (h) an individual appearing to the Minister to be a reputable marine or coastal scientist or technician not affiliated with any of the above stated individuals or organizations.

(2) The Minister shall appoint a Chairperson from among the members of the Review Panel.

Function and powers of the Review Panel.

16.— (1) The review panel shall consider and make recommendations to the Department in relation to permit applications in the following circumstances,

- (a) more than ten acres of mangroves;
- (b) mangroves situated on cayes;
- (c) mangroves situated in priority mangrove areas;
- (d) within the World Heritage Site; and
- (e) where it is for a public good or essential service.

(2) The Review Panel may from time to time invite independent experts in World Heritage Sites, marine, coastal or mangrove ecology to its meetings to assist its consideration of permit applications.

(3) The Review Panel shall submit its recommendations on a permit application within thirty days of receipt of the application.

(4) The quorum for a meeting of the Review Panel shall be four members, including the Chairperson.

(5) Subject to the provisions of Regulation 15 and the preceding provisions of this Regulation, the Review Panel may regulate its own procedure, including the division of functions among its members.

Fast track option for public good.

17.— (1) Notwithstanding anything in Regulation 14 (2) or any other provision of these Regulations, upon receipt of an application for alteration



of mangroves for a public good, and upon receipt of the required recommendation from the Review Panel, the Department may grant a permit if -

- (a) it is for a public good being an essential service carried out by a duly constituted communication, water, sewer, electrical or other utility entity:

However, the alteration is to be limited to those areas necessary for maintenance of existing lines or facilities or for construction of new lines or facilities to provide utility service to the public, and shall be conducted so as to avoid or minimize any unnecessary alteration of mangroves;

- (b) it is for a public good being carried out by a duly licensed land surveyor in the performance of his duties:

However, the alteration is to be limited to a swatch for survey sighting three feet or less in width;

- (c) it is for a public good carried out by a Government agency :

However, the alteration is limited to those areas absolutely necessary for the installation or construction of any facility to provide service to the public, and that such alteration is conducted so as to avoid or minimize any unnecessary alteration of mangroves.

(2) In relation to permits issued under sub-regulation (1), no fees shall be payable in respect of the application or the permit.

(3) Notwithstanding Regulation 16 (3), the Review Panel shall submit its recommendations on a permit application for public good as soon as practicable but no later than fifteen days from receipt of the application.

(4) The issuing authority shall issue the Department's decision as soon as practicable but no later than thirty days from receipt of the application.

## PART IV

### *Offences and Penalties*

18.-(1) No person shall use pruning paint in the alteration or selective trimming of mangroves.

Prohibition on  
method of  
alteration.

(2) No person shall alter or selectively trim mangroves by the means of chemical defoliant or herbicides.

General penalty.

19.— (1) Any person who contravenes or aids in the contravention of any of the provisions of these Regulations that would or are intended to protect mangrove stands from damage or destruction, or a condition of a permit issued under these Regulations, commits an offence and is liable on summary conviction to a fine not exceeding twenty-five thousand dollars, or to imprisonment for a term not exceeding twelve months, or to both.

(2) In addition to any sentence imposed under subsection (1), the court may order the cancellation of any permit granted under the provisions of this Regulation and the forfeiture of any vehicle, vessel or other means of transport or equipment used in the commission of the offence.

(3) All objects forfeited shall, with the approval of the Minister, be disposed of by the Department in such manner as the Minister may prescribe.

(3) When any person has been convicted of an offence, the court may, in addition to any other penalty provided under this Regulation, assess the amount of any damage which may have been caused by the offender and cause the same to be recovered in such manner as if it were a civil penalty and without limit of amount or, in the case of unauthorized structures or clearance, may order the removal of the same within such period as it may specify, and the restoration of each location of the damaged area as nearly as possible to its previous condition.

## PART V

### *Miscellaneous*

Application for review.

20.— (1) A person who is aggrieved by a decision of the issuing authority or the Review Panel, as the case may be, to grant or refuse to grant a permit or to cancel a permit may, within twenty-one days of the decision, apply to a Judge in Chambers of the Supreme Court for review of the decision.

(2) Notwithstanding section 112 of the Supreme Court of Judicature Act, an application for review shall not itself result in the suspension of the decision in relation to which the application is made, but the applicant may, within the time prescribed under the Supreme Court of Judicature Act, for making such application, apply to the Supreme Court for stay of execution of the decision, pending the determination of the application.

(3) Upon hearing an application, the Supreme Court may—

(a) dismiss the application; or

- (b) remit the matter back to the Department or the Review Panel, as the case may be, for further consideration with such directions as it considers fit.

21. The Forests (Protection of Mangroves) Regulations, 1989, are hereby repealed. Repeal .

**SCHEDULE 1**

(Regulation 2)

## Priority Mangrove Areas

1. Pelican Cayes & Twin Cayes, SWCMR. (unique, unparalleled marine biodiversity)
2. Turneffe Islands and Lighthouse Reef (supports marine biodiversity, reef connectivity and fisheries values)
3. Ryders, N Drowned and Drowned Cayes (critical storm protection and fisheries values for Bz City)
4. Haulover Creek, Belize City (unique ecosystem – tourist potential for city)
5. Sibun Bight (unique black mangrove forests – largest examples; ecotourism potential)
6. Sittee River Mouth (N and S of mouth), (best examples of old growth forest type red and black?)
7. Rio Hondo Estuary
8. New River Estuary
9. Senis River mouth and cayes
10. Shipstern Lagoon and cayes to sea
11. Sapodilla lagoon
12. Ambergris Caye, Cangrejo
13. Caye Caulker
14. Price Bank
15. Belize River mouth and cayes
16. Burdon Canal

17. Placencia Lagoon
18. Golden Stream (protected)
19. Sartstoon Temash (protected)
20. All other cayes (inside barrier and atolls)
21. Four Mile Lagoon
22. Little Rocky Point to Vista Del Mar

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**SCHEDULE 2**
**FORM A**

(Regulation 3 (2) and 8 (2))

*Application for Permit to Alter or Selectively Trim Mangrove*

1. Name of the Applicant.
2. Description of the land on which mangroves are to be altered or selectively trimmed.
3. Copy of property documents including title, land tax receipts, authenticated copy of survey, location plan, etc.
4. Description of the mangroves.
5. Proposing to      ☐ alter      ☐ selectively trim
6. Nature of proposed alteration or selective trimming.
7. Whether the land belongs to the applicant or to another person.
8. The manner in which alteration is to be effected.
9. Means of alteration or selective trimming.
10. Prescribed fee of \$..... has been deposited in the Treasury  
vide Receipt No. .... dated.....

I....., owner/occupier of.....  
do hereby declare that the particulars furnished hereinbefore are true to  
the best of my knowledge and belief.

\_\_\_\_\_  
Date

\_\_\_\_\_  
\_\_\_\_\_  
*Signature and Address of the Applicant*

---

**FOR OFFICIAL USE**

Date of receipt of application: \_\_\_\_\_

Additional information: ☐ errors ☐ omissions☐ supply of information: \_\_\_\_\_Review panel: ☐ yes ☐ noPublication of information to alter mangrove: ☐ yes ☐ noApplication: ☐ approved ☐ refused ☐ modification☐ measures to mitigate impacts

Surety bond amount: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**FORM B**

(Regulations 7(1) and 8 (3))

**FORESTS (PROTECTION OF MANGROVES) REGULATIONS***Permit to Alter or Selectively trim Mangrove*

Ref. No \_\_\_\_\_

Permit # \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Permission is hereby granted to the above-named to alter or selectively trim mangroves at

\_\_\_\_\_

(Description of property location)

comprising of \_\_\_\_\_ acres of land situated at  
(size)

\_\_\_\_\_

(address)

and is subject to the following conditions:

1. The permit is

(a) Valid for \_\_\_\_\_, only;  
and (Permit Holder)

(b) Valid until \_\_\_\_\_.  
(Duration)

2. This permit is valid for the removal of

\_\_\_\_\_  
(Size and type of mangrove)

3. Failure to complete the alteration or selective trimming in the period specified by this permit will require a new assessment and another



permit. No fire or chemical defoliants are to be used in the alteration process granted by this permit.

4. Only fill material from upland quarries and material extracted during dredging operations process under an official dredging operators permit granted by the Department responsible for mining will be allowed as filling to minimize pollution to surrounding water.
5. The permit holder must immediately report the commencement and completion of alteration to the Department at least one week ahead of schedule and after completion in order for proper monitoring of the process.
6. Precaution to avoid spillage of excavated materials to other surrounding mangroves and water outside the specified altered site must be strictly adhered to during the dredging process, thereby preventing the killing off and siltation of mangroves and surrounding marine ecosystem, respectively.
7. This permit holder will be held responsible for any unnecessary alteration of siltation damage due to negligence on the part of the operator conducting alteration on his behalf.
8. All other necessary permits must be adhered to. This permit does not relinquish the need to obtain all the other necessary permits specified under the Laws of Belize.
9. If required, environmental clearance must be obtained from the Department of Environment prior to the start of the mangrove clearance.
10. This permit may be cancelled at any time at the discretion of the Minister responsible for Mangroves.

## SCHEDULE 3

**APPLICATION AND PERMIT FEES***(Regulations 3 (2) & 7 (1) )***APPLICATION FEES**

	Mainland	From the mainland to the reef	Beyond the reef
Residential	\$50.00	\$100.00	\$200.00
Commercial	\$500.00	\$1,000.00	\$2,000.00

**PERMIT FEES**

	Mainland	From the mainland to the reef	Beyond the reef
Residential	\$800 (per acre)	\$1,600 (per acre)	\$3,200.00 (per acre)
Commercial	\$2,500.00 (per acre)	\$5,000.00 (per acre)	\$10,000.00 (per acre)

**MADE** by the Minister responsible for forests this \_\_\_\_\_ day of \_\_\_\_\_ 2018.

\_\_\_\_\_  
**Hon. Omar Figueroa**  
**Minister of State**  
**Ministry of Agriculture, Fisheries, Forestry, the**  
**Environment and Sustainable Development and Immigration**  
 (Minister responsible for forests)