

# SOUTHERN REGION COASTAL ZONE MANAGEMENT GUIDELINES

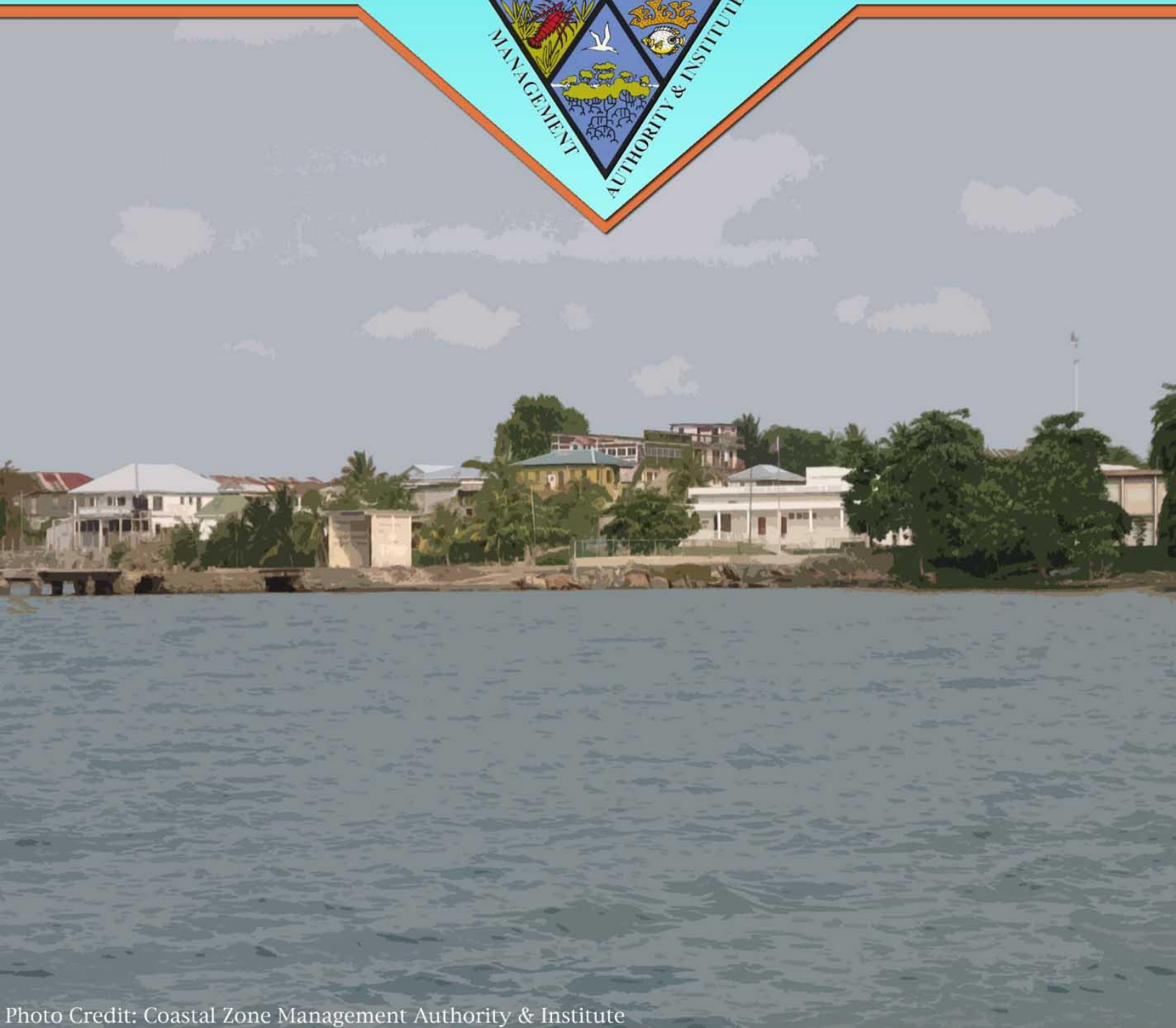


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Coastal Zone Management Authority & Institute  
2016



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## ACKNOWLEDGEMENTS

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### Agencies:

Archives Department  
Belize Tourist Board  
Department of Environment  
Geology and Petroleum Department  
Ministry of Economic Development

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Seleem Chan	Sapodilla Cayes Marine Reserve
Gregorio Chuc	Sarstoon-Temash Institute for Indigenous Management (SATIIM)
Thomas Garbutt	Tour Guide
Avelina Hibberd	Tour Guide

CZMAI would also acknowledges the Southern Region Coastal Advisory Committee (SRCAC), and other important interested individuals and stakeholder groups from the region for their time commitments during 2011-2012 in updating the cayes development guidelines that led to the preparation of the present coastal zone management guidelines. The individuals that participated in the process are namely:

**SRCAC membership 2010-2012:**

Mario Chavarria	Toledo Development Corporation (Chairperson)
Jorge Ramirez	Rio Grande Fishermen Coop. Society (Vice Chairperson)
Karen Stein	Sarstoon-Temash Institute for Indigenous Management (Treasurer/Fundraising Manager)
Christina Garcia	Southern Environmental Association
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Rachel Graham	Belize Tourism Industry Association - Toledo
Floyd Lino	Punta Gorda Town Council
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Dennis Garbutt	Toledo Tour Guide Association
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Christian Bech	Monkey River Management Company/Tour Guide
Will Maheia	People’s National Party
Jack Nightingale	Toledo Association of Businesses

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 Southern Region was held in Punta Gorda Town on Thursday June 4th, 2013, and had participation from the following individuals:

**Public consultations 2013:**

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Maelyn Rodney	Citizen
Evin Aranda	Citizen
Devon Paulino	Citizen
Devina Bol	Citizen
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Andrei Price	Toledo Children and Adolescence Corporation

Jack Nightingale	TAB/SUMA
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Dennis Garbutt	BTIA/TTGA
Karena Mahung	Citizen
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Ashton Martin	Citizen
Glen Hinds	Citizen
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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.

## Table of Contents

<b>ACKNOWLEDGEMENTS</b> .....	0
<b>LIST OF MAPS</b> .....	5
<b>LIST OF FIGURES</b> .....	5
<b>LIST OF TABLES</b> .....	6
<b>LIST OF ACRONYMS</b> .....	7
<b>GLOSSARY OF TERMS</b> .....	8
<b>PREAMBLE</b> .....	11
<b>1.0 INTRODUCTION</b> .....	13
<b>2.0 REGION BOUNDARIES</b> .....	15
Location and Geographic Definition.....	15
Regional Context .....	15
<b>3.0 OBJECTIVES</b> .....	20
<b>4.0 LEGISLATIVE AND INSTITUTIONAL FRAMEWORK FOR INTEGRATED COASTAL ZONE MANAGEMENT IN BELIZE</b> .....	21
<b>5.0 GUIDING PRINCIPLES</b> .....	24
<b>6.0 SECTORAL ISSUES AND POLICIES</b> .....	25
6.1 Fishing.....	25
6.2 Marine Tourism and Recreation .....	30
6.3 Land-Use.....	35
6.4 Marine Dredging and Mineral Extraction .....	56
6.5 Sensitive Habitats.....	58
6.5.1 Corals .....	58
6.5.2 Mangroves.....	60
6.5.3 Seagrass.....	62
6.6 Utilities.....	65
6.6.1 Energy .....	65
6.6.2 Water.....	65
6.6.3 Transportation .....	65

6.6.4	Boat Hangers.....	66
6.7	Pollution Control.....	70
6.8	Infrastructure and Social Amenities.....	73
6.9	Conservation .....	75
6.10	Scientific Research and Education.....	80
<b>7.0</b>	<b>IMPLEMENTATION STRATEGY .....</b>	<b>81</b>
<b>8.0</b>	<b>CONCLUSIONS.....</b>	<b>83</b>
<b>9.0</b>	<b>REFERENCES .....</b>	<b>84</b>
<b>10.0</b>	<b>APPENDICES.....</b>	<b>85</b>
10.1	BACKGROUND .....	85
10.2	SUMMARY OF ENABLING LEGISLATION AND IMPLEMENTING AGENCIES FOR ENFORCEMENT OF THE INFORMED MANAGEMENT ZONING SCHEME.....	87
10.3	CHECKLIST FOR HUMAN USE/DEVELOPMENT OF THE COASTAL ZONE.....	90
10.4	FIGURES .....	94

## LIST OF MAPS

Map 1: Coastal Planning Regions of Belize .....	12
Map 2: Southern Coastal Zone Planning Region.....	16
Map 3: Southern Region Cayes (Northern Sub-region).....	17
Map 4: Southern Region Cayes (Western Sub-region).....	18
Map 5: Southern Region Cayes (Southern Sub-region).....	19
Map 6: Informed Management Zoning Scheme for Fishing in the Southern Region.....	27
Map 7: Informed Management Zoning Scheme for Marine Recreation in the Southern Region.....	32
Map 8: : Informed Management Zoning Scheme for Coastal Development in the Southern Region (Northern Portion).....	38
Map 9: Informed Management Zoning Scheme for Coastal Development in the Southern Region (Southern Portion).....	39
Map 10: Southern Region Cayes with Proposed “Residential I” Land-Use Class .....	47
Map 11: Southern Region Cayes with Proposed “Commercial I” Land-Use Class.....	49
Map 12: Southern Region Cayes with Proposed “Conservation I & II” Land-Use Class .....	51
Map 13: Informed Management Zoning Scheme for Coastal Agriculture in the Southern Region .....	53
Map 14: Coral Cover in the Southern Region.....	58
Map 15: Mangrove Cover in the Southern Region.....	60
Map 16: Seagrass Cover in the Southern Region .....	62
Map 17: Informed Management Zoning Scheme for Marine Transportation in the Southern Region.....	67
Map 18: Informed Management Zoning Scheme for Conservation in the Southern Region.....	78

## LIST OF FIGURES

Figure 1: Risk to Corals in the Southern Region by Scenario .....	59
Figure 2: Risk to Mangroves in the Southern Region by Scenario.....	61
Figure 3: Risk to Seagrass in the Southern Region by Scenario.....	63
Figure 4: Lobster Fisheries Catch and Revenue by Scenario .....	95
Figure 5: Annual Visitation for Marine Tourism and Recreation by Scenario.....	96
Figure 6: Annual Expenditures for Marine Tourism and Recreation by Scenario.....	97
Figure 7: Area of Corals at Risk from Human Activities by Scenario .....	98
Figure 8: Area of Mangroves at Risk from Human Activities by Scenario.....	99
Figure 9: Area of Seagrass at Risk from Human Activities by Scenario.....	100
Figure 10: Septic Tank and Soakaway Details for Residential and Low-Impact Buildings.....	101



## LIST OF TABLES

Table 1: Coastal Communities and Cayes within the Southern Region .....	13
Table 2: Framework for Implementing Informed Fisheries Management in the Southern Region .....	28
Table 3: Framework for Implementing Informed Marine Recreation in the Southern Region .....	33
Table 4: Framework for Implementing Informed Coastal Development in the Southern Region.....	36
Table 5: Residential Development Standards for Communities within the Southern Region .....	37
Table 6: Commercial Development Standards for Communities within the Southern Region .....	40
Table 7: Institute and Community Facilities Development Standards for Communities within the Southern Region .....	41
Table 8: Summary of Land Tenure of the Cayes within the Southern Region .....	43
Table 9: Residential Development Standards for Cayes within the Southern Region .....	46
Table 10: Commercial Development Standards for Cayes within the Southern Region .....	48
Table 11: Conservation Development Standards for Cayes within the Southern Region.....	50
Table 12: Development Standards for Coastal Agriculture .....	52
Table 13: Framework for Implementing Informed Coastal Agriculture in the Southern Region.....	54
Table 12: Framework for Implementing Informed Management Marine Transportation Scheme .....	68
Table 13: Specifications for Residential Low-Impact Septic Tanks and Soak-a-ways .....	71
Table 14: Framework for Implementing Informed Management Marine Conservation Scheme .....	79

## **LIST OF ACRONYMS**

CZAC	Coastal Zone Advisory Council
CZMAI	Coastal Zone Management Authority & Institute
EIA	Environmental Impact Assessment
GOB	Government of Belize
GUARD	Galen University Applied Research & Development
HGV	Heavy Goods Vehicles
HRA	Habitat Risk Assessment
Marine InVEST	Marine Integrated Valuation of Ecosystem Services and Trade-off
MRTGA	Monkey River Tour Guide Association
RBC	Rotating Biological Contactor
SATIIM	Sarstoon-Temash Institute for Indigenous Management
SEA	Southern Environmental Association
SRCAC	Southern Region Coastal Advisory Committee
STMP	Sustainable Tourism Master Plan
SWMP	Solid Waste Management Plan
TIDE	Toledo Institute for Development and Environment

## 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

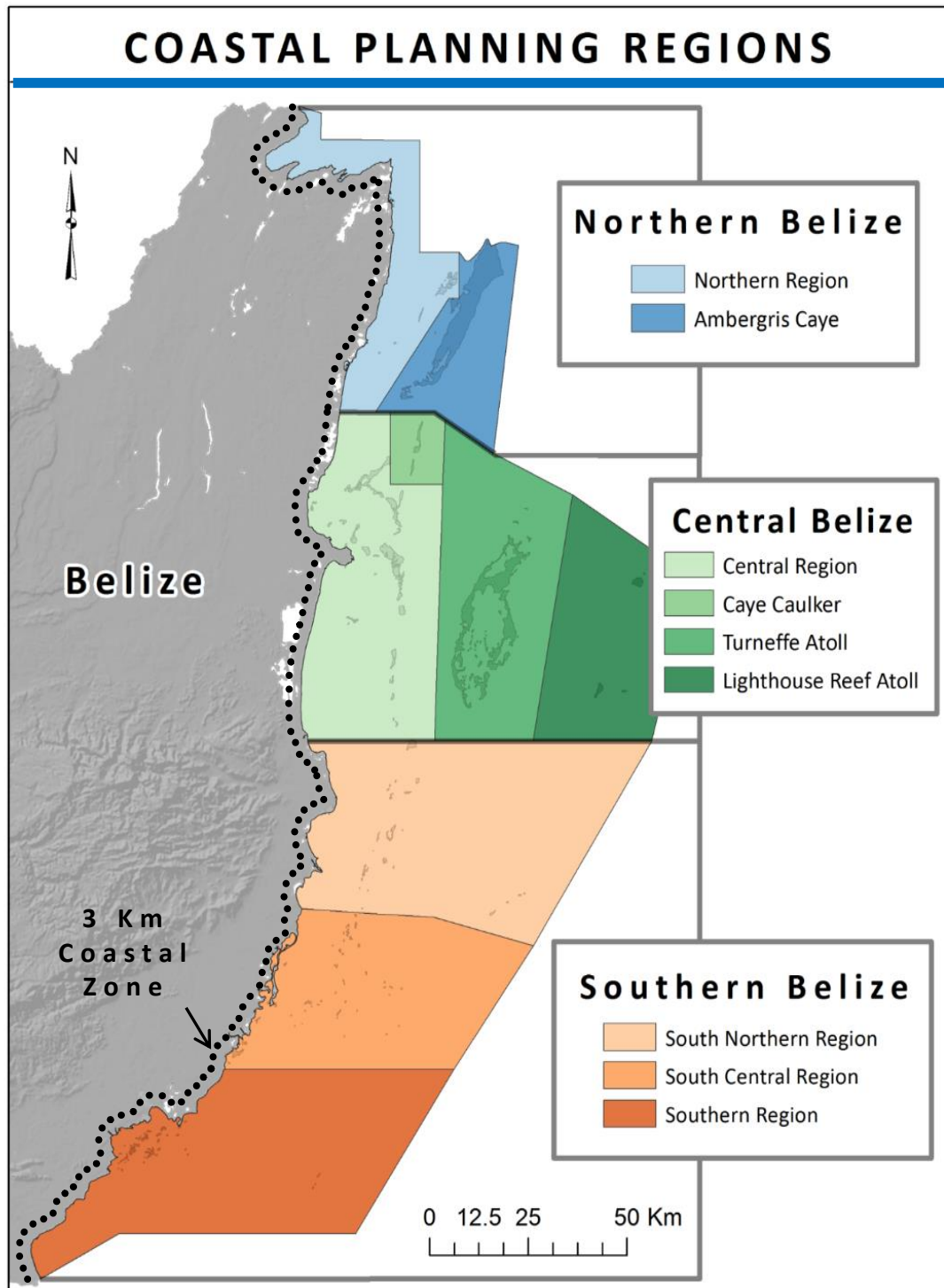
## **PREAMBLE**

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 Southern Region Coastal Zone Management Guideline was developed in conjunction with the stakeholders of the communities within the Southern Region. The Southern Region; which encompasses the coastal communities of Monkey River, Punta Negra, Punta Gorda, Cattle Landing and Barranco; 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 Southern 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 Southern 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 Southern 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 Southern region consists of five coastal communities and over sixty-nine cayes, representing the greatest number of cayes found in any of the nine coastal planning regions. This region is also home to four important protected areas that are namely, the Port Honduras Marine Reserve, Payne’s Creek National Park, Sarstoon Temash National Park, and Sapodilla Cayes Marine Reserve, a World Heritage Site. This region is also rich and diverse in history, people, culture and natural capital. Communities and cayes included within the planning region can be seen in **Table 1**. There are also several unnamed cayes, which have been assigned numbers.

**Table 1: Coastal Communities and Cayes within the Southern Region**

<b>Coastal Communities:</b>	
Barranco Village	Punta Ycacos Comm.
Punta Gorda Town	Punta Negra Village
Cattle Landing Village	Monkey River Village
<b>Cayes:</b>	
Range 2	Nicholas Caye
Frenchman Lagoon Area	#2 Outer Cross Caye
Range 1	Man of War Caye
Outside Sheep Head Caye	East Snake Caye
#9 - 20	NE Sapodilla Caye
Inside Sheep Head Caye	#4 Caye
Range 3	Franks Caye
Wil Cane Caye	Lime Caye
Peter Caye	Head Caye
Frenchman Caye	Moho Caye
Wilson Caye	Hen and Chickens Caye
Stewart Caye	#8 Caye
#1 Inner Cross Caye	#3 Caye
Sickle Caye	Bird Caye
Long Caye	Sand Bore
Hunting Caye	#6 Caye
McBride Caye	Abalone Caye
Middle Snake Caye	Seal Caye
West Snake Caye	Ragged Caye
#7 Caye	Tom Owens Caye
#5 Caye	Tom Owens Jr. Caye
South Snake Caye	Reef Patch
Small Caye	Sand Bore
Ranguana Caye	North Spot
Bobby Caye	



Development intensity varies within the region with minimal to no development on the coastline and inner cayes. The only two inner cayes with any significant development are Abalone Caye, which houses a research station for the Toledo Institute for Development and Environment (TIDE), and Long Caye, where family homes and fishermen's camps are located. On the other hand, most of the outer cayes are heavily developed, particularly Nicholas Caye, which has no scope for future development. As most of the cayes are low-lying mangrove islands with little or no emergent lands, these cayes are unsuitable for high-impact development.

The southern coastline is an area of outstanding natural beauty. It is largely undeveloped with some very attractive beaches as well as long stretches of mangrove and other important natural features. Currently, the main municipalities in this region include Monkey River Village, Punta Negra Village, Cattle Landing Village, Punta Gorda Town, and Barranco Village. There are other very small settlements, such as Mother Bush and Panty Beach but these areas are essentially highly undeveloped. For this reason the area is attracting the attention of developers.

Within the last decade, this region's shoreline has experienced unprecedented rates of erosion, mainly due to human disturbance within the Monkey River Watershed that have affected sediment transport and erosion processes. This phenomenon continues today and is of concern to the affected communities. With a steadily eroding coastline, and poor infrastructure including accessibility to some of the coastal communities, stakeholders are advocating that their coastline does not undergo high-impact development and that the shoreline mangrove buffer remain intact.

The fully paved Southern Highway from Dangriga right down to Punta Gorda, and the planned road through to the Guatemalan border are sure to lead to development in Toledo district, as well as an influx of tourists and potentially heavy commercial traffic. These developments have potential implications not only for inland development, but also for coastal development to support tourism. There are also implications for increased infrastructure to accommodate these kinds of development, as well as waste and sewerage management, electricity and potable water supply. Demand may also emerge for the enlargement of the airstrip at Punta Gorda, or possibly even a new facility altogether. All of these potential changes could have an impact on existing communities.

The likely expansion in the southern region of Belize is to be welcomed broadly, but it is vital that the lessons learned on the Placencia Peninsula are born in mind. Roads inevitably attract traffic. This means more people. The infrastructure must be in place before the demand arises otherwise shortages are certain to occur. The relatively low cost of land along such a remote coastline is certain to lead to piecemeal development by individual incomers, and the risk of a major development is always there. Development control mechanisms must be put in place in order to regulate and guide development in a sustainable manner so that development potential of the region can be capitalized upon without substantial detriment to the environment. The needs and wishes of the community, and especially groups such as the Mayan people, Mennonite and Amish need to be born in mind as development in the area moves ahead.

## **2.0 REGION BOUNDARIES**

### **Location and Geographic Definition**

The Southern Region is one of nine regions into which the coastal zone has been demarcated. It encompasses approximately 3204 sq. kilometres of land and sea and can be described as the area enclosed within the following UTM 16 coordinates. It is situated south of the Placencia/Laughing Bird Cayes Region and extends 3km inward from the eastern coast of the southern district. (**Maps 2, 3, 4, & 5**)

Point 1: (1810565 N, 338741 E)

Point 2: (1810088 N, 399939 E)

Point 3: (1757621 N, 292385 E)

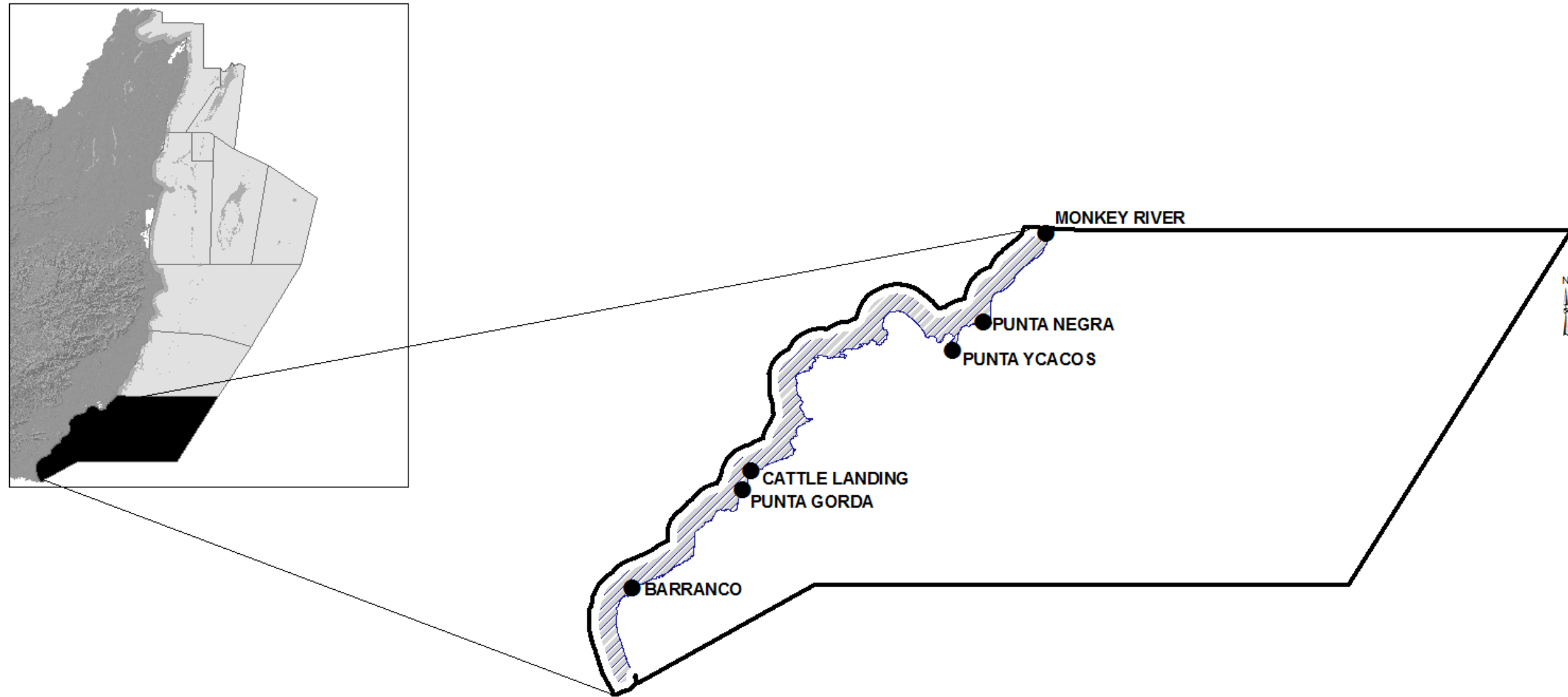
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### **Regional Context**


The Southern Region is made up of approximately sixty-nine (69) cayes and range of cayes strung in a west to east direction and comprising approximately 2940 sq. kilometres of terrestrial and aquatic environment including flats and reefs of which 7.70 sq.km or 0.26% is terrestrial and 9232.3 acres or 99.74 % is aquatic. The cayes of the region are all located within a forty-eight and a half miles radius from Punta Gorda Town. The smallest named caye in size is Tom Owens Jr. with 0.05 acre and the largest is Outside Sheppard Caye with 224.7 acres. The cayes that are the closest and the most distant from the coastline are Sickle and Ranguana respectively. Similar to the Northern Region, it shares its waters with an international neighbor. The mainland portion ranges from Monkey River Village to the Southern Border with Guatemala and three kilometres inwards from the mean high water mark. This accounts for an area of approximately 273.75 sq. kilometres.

## SOUTHERN COASTAL ZONE PLANNING REGION



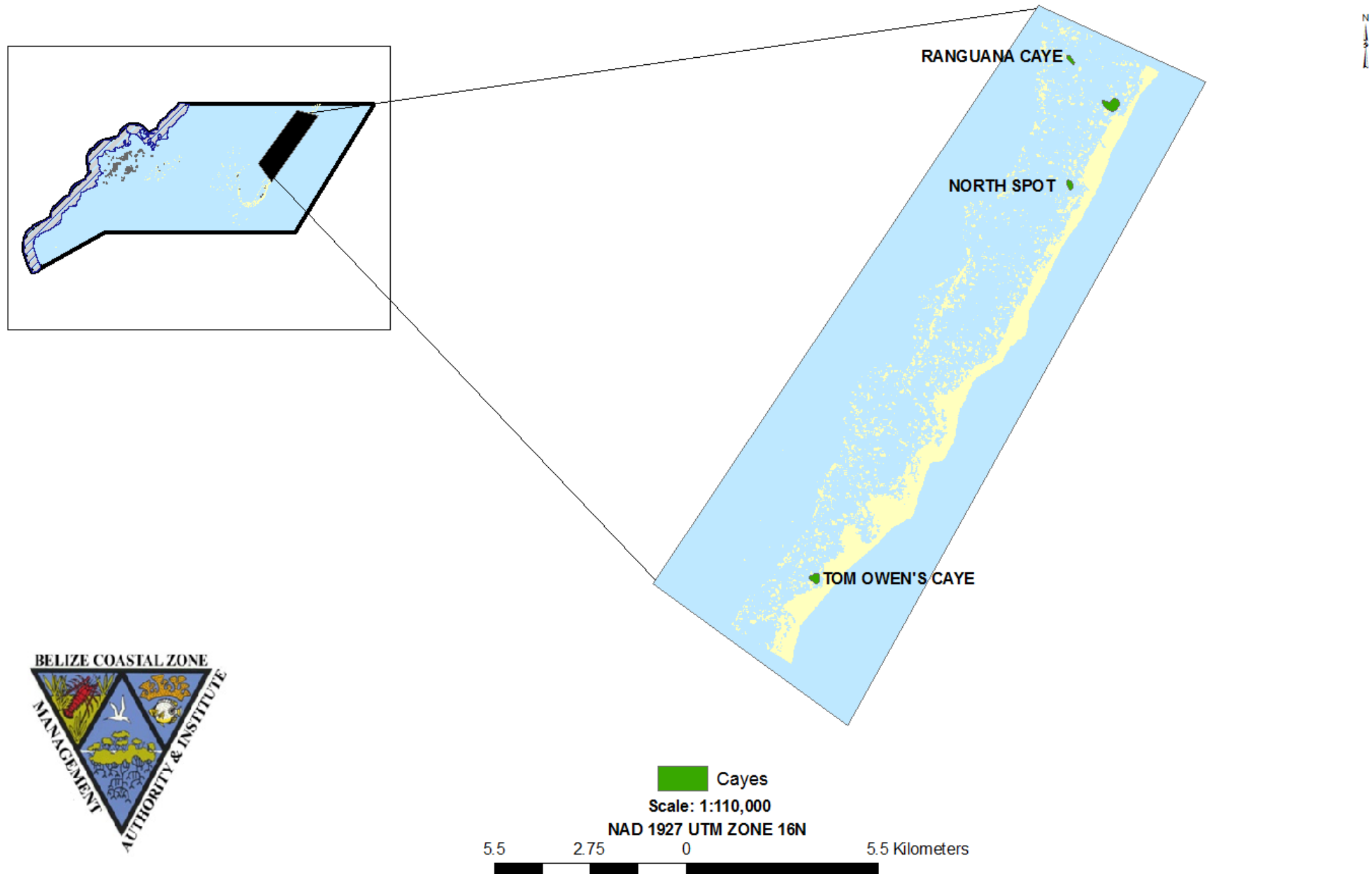
-  3km Zone of Influence
-  Southern Coastal Communities

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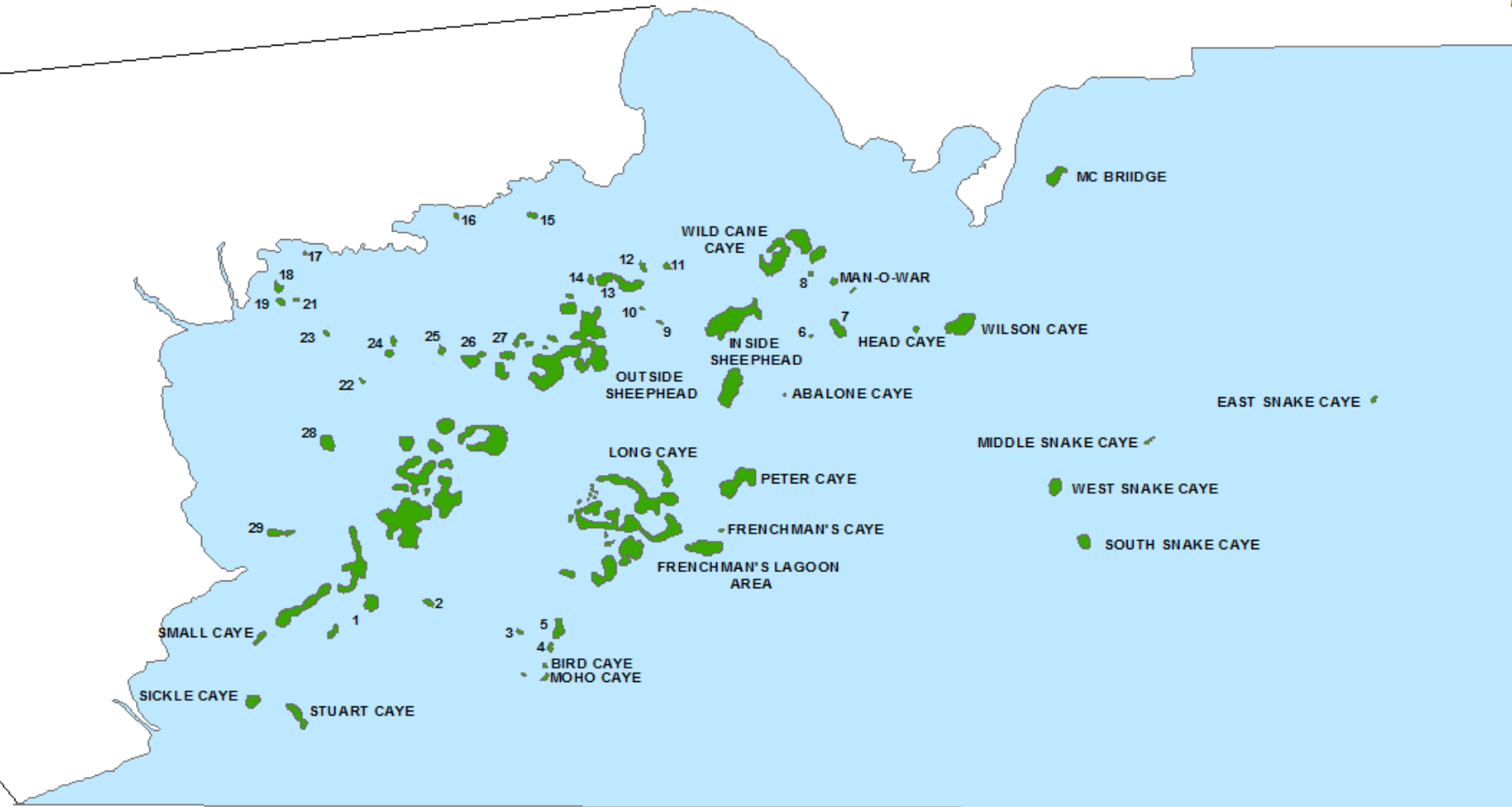
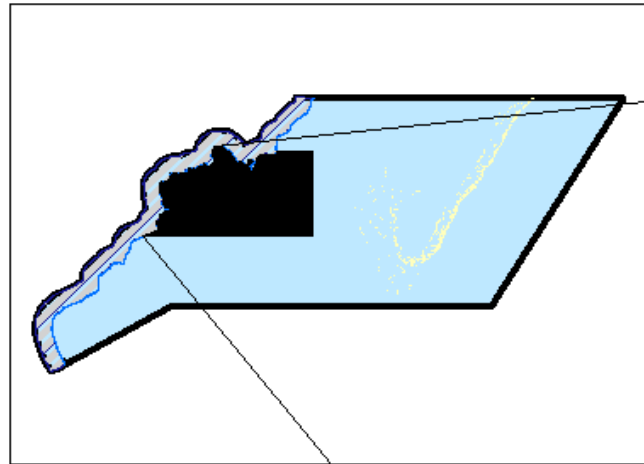
**Map 2: Southern Coastal Zone Planning Region**


# SOUTHERN CAYES NORTHERN SUB-REGION



Map 3: Southern Region Cayes (Northern Sub-region)

# SOUTHERN CAYES WESTERN SUB-REGION



 Cayes

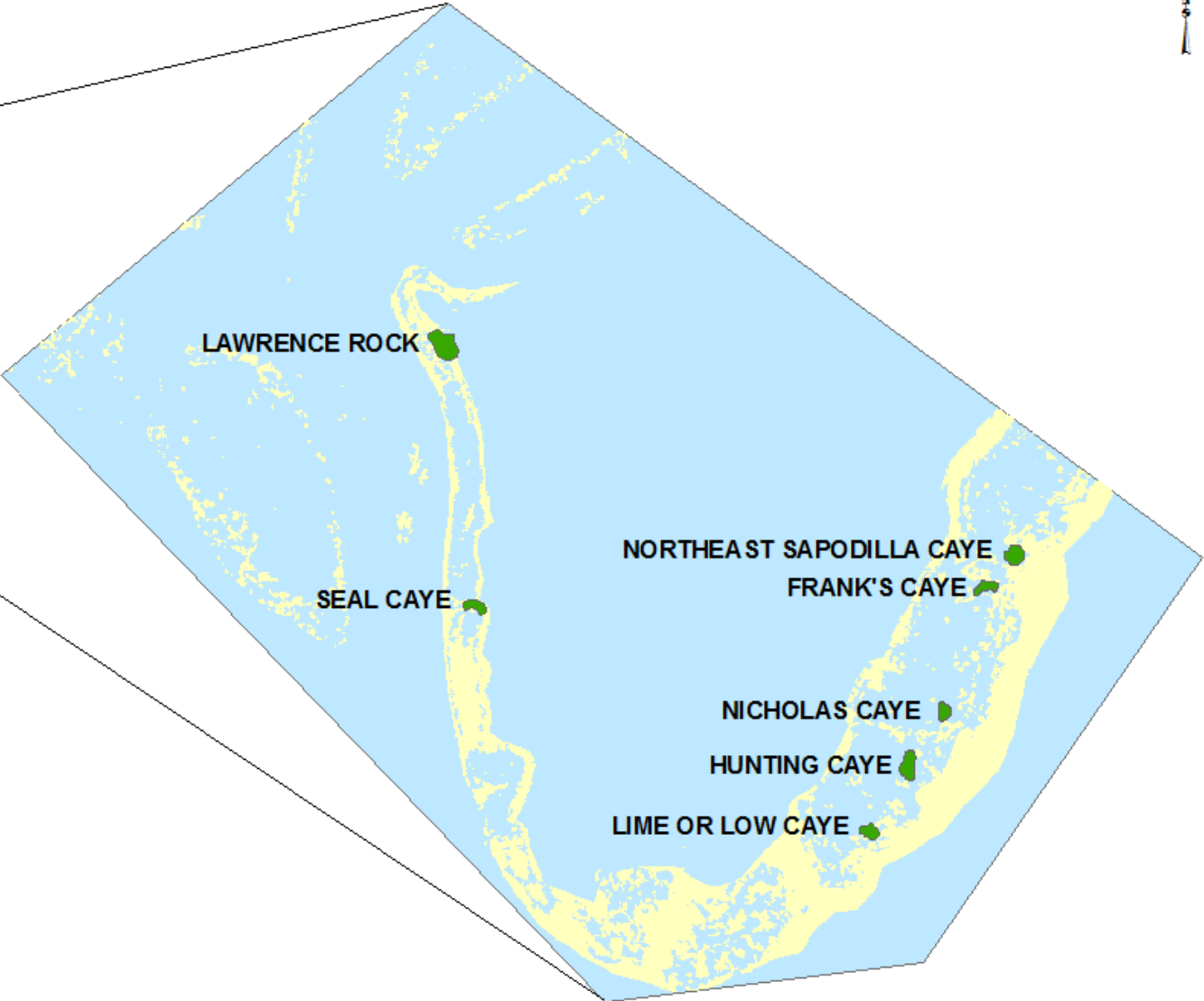
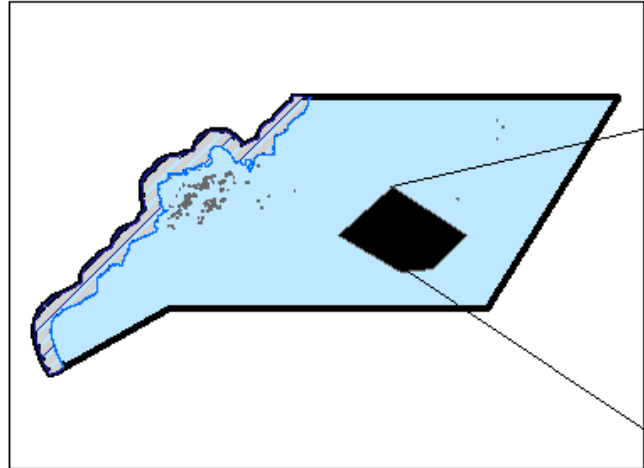
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6.5 3.25 0 6.5 Kilometers

Region Cayes (Western Sub-region)

Map 4: Southern

# SOUTHERN CAYES EASTERN SUB-REGION



Cayes

Scale: 1:90,000  
NAD 1927 UTM ZONE 16N



Map 5: Southern Region Cayes (Eastern Sub-region)

### 3.0 OBJECTIVES

The management of the Southern 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 Southern 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 Monkey River, Punta Negra, Punta Ycacos, Cattle Landing, Punta Gorda, and Barranco.
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 Southern coastal zone
6. Preserving the social and cultural values of the people and communities of the region that are connected to the environment
7. Representing trans-border cooperation to address territorial disputes and impacts to the region's natural resources originating beyond national borders
8. Fostering and supporting a continued partnership among stakeholders for managing the coastal resources
9. 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 Southern 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, Social Amenities/Recreation, Conservation, and Research & Education. They were developed by the Southern Region Coastal Advisory Committee in consultation with the communities of Punta Gorda, Barranco, Punta Negra, Monkey River and the Coastal Zone Management Authority & Institute.

### 6.1 *Fishing*

Fishing has traditionally been an important component of the economy of southern Belize. In fact, anecdotal accounts are that Belize's best fishing grounds are in the south. The cayes and their surrounding waters have provided a steady source of fishing for centuries for both personal use and as an income generating activity. The waters and the coral reef system act both as fishing and breeding grounds, augmented by the presence of deep waters and extensive flats between the cayes. Fishermen, for economic and recreational reasons, from all over the country use this area. However, illegal fishing by fishers from neighboring Guatemala and Honduras, and inadequate regulatory enforcements mechanisms have contributed to the diminishing fish stocks. To ensure that the fishing industry remains viable, both for this region and the country, it is important that the traditional user rights of Belizean fishermen are protected.

Commercial fishing in southern Belize has been mainly artisanal and broadly speaking, sustainable, although long term declines are expected because of environmental factors. The needs of local people make the continuance of small scale artisanal fishing imperative. In the longer term, it will become evident that the food needs of Belize will become more important than the current exporting of our fish catches. Both lobster and conch are in overall decline. Both of these are primarily export commodities which would benefit from extended no-catch areas.

Southern Belize offers world class sport fishing opportunities. This fishing activity in the region remains highly underdeveloped. The main reasons for this are lack of appropriate accommodation, lack of publicity, and a lack of investment in larger boats equipped for fishing outside the reef. Fly fishing for permit and bonefish is popular, but that particular aspect of the sport represents only 3% of the total US market for fishing activities. There is therefore much scope for encouraging sport fishing tourism. The overall impact of sport fishing on the environment is relatively low compared to some other human activities. Its regulation is thought to be satisfactory, although enforcement needs to be improved.

The total spiny lobster coverage for this region was determined to be approximately 621 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 14,507 lbs.; with exports of tail meat amounting to 12,766 lbs., and generating revenue of approximately BZ \$0.38 million (**Fig. 4, Appendix**). In addition, model results suggest that a conservation zoning scheme could increase catch to 37,132 lbs.; and generate an annual revenue of BZ \$0.98 million by 2025. However, a development zoning scheme would decrease the catch to 5,668 lb.; with tail meat exports amounting to 4,988 lbs., and generating annual revenue of only BZ \$0.15 million by 2025. The model results indicate that the proposed zoning (Informed Management) scheme for this region could increase catch to 34,629 lbs. Exports would be in the amount of 30,474 lb., generating annual revenue of BZ \$0.15 million by 2025. This represents a 139% increase from 2010 returns.

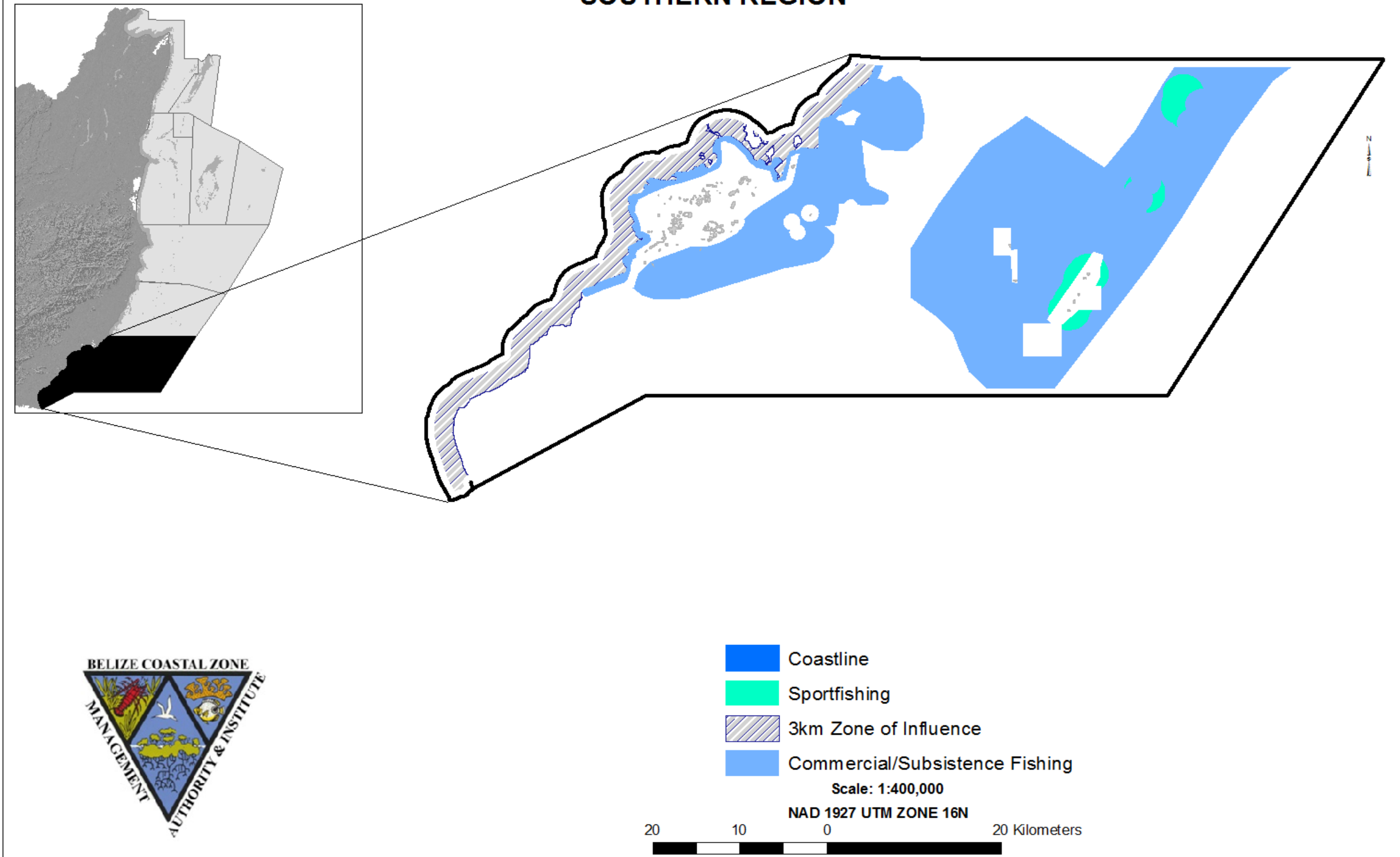
Compared to the Informed Management Zoning Scheme (**Map 6**), the Conservation Zoning Scheme is the better option for maintaining increased lobster catch and revenue through to 2025. This is mainly attributed to the fact that under the Conservation Zoning Scheme, habitats that support the lobster fishery 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. The framework for implementing the Informed Management zoning scheme can be seen in **Table 2**.

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: SOUTHERN REGION



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

**Table 2: Framework for Implementing Informed Fisheries Management in the Southern Region**

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
<b>Fishing</b>	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 Southern Region, including the Port Honduras and Sapodilla 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 spawning and traditional fishing grounds of the Southern region as well as the interest of Belizean fishermen
2. Provide for more effective regulatory mechanisms for development activities which can complement the initiatives of other agencies, and which can significantly impact on a sustainable fishing industry
3. Protect the traditional user rights of Belizean fishermen from foreign fishers that invade the waters of the southern region, using gill nets and other destructive forms of fishing techniques. The Fisheries Department, National Coast Guard and community-based groups such as Toledo Institute for Development and Environment (TIDE), Southern Environmental Association, and border security agencies others should work together on these issues
4. Catch quotas could be directed to the local market to ensure the supply of fish protein to the communities
5. Assess the implementation of the catch shares pilot program at Port Honduras Marine Reserve and expand the program to wider area of the region, in consultation with all affected groups and individuals. Limits on the number of fisher folk in a given area as well as catch quotas on fish stocks will ensure the program's success.



## 6.2 *Marine Tourism and Recreation*

Tourism is an alternative to fishing in this region as it would not be desirable for the local economy to be fully dependent on fishing. However, if not planned and managed correctly, tourism activities can result in destructive and devastating damage to the natural environment, which can have implications to the Subsistence of the fishing industry.

The northern portion of the southern region has two main tourist attractions at present. The main one is the Monkey Trail, owned by Monkey River Tour Guides Association (MRTGA). The other is the Village of Monkey River itself. The village is one of the last remaining pure Creole villages in Belize. Cut off from direct road access, the village still preserves many of the old Creole ways and traditions. Both of these attractions could be better commercialized. A recent study carried out by MRTGA suggests a daily tourist loading of around 124 per day. The possibility of cruise ship tourism being extended into southern Belize is viewed by many with great concern due to the fragile nature of many local tourist attractions.

In the southern zone, the Garifuna village of Barranco and the tranquil fishing town of Punta Gorda are also attractions for culture-based tourism. The local resorts all offer sport fishing to their guests, and given a return to a better economy especially in the US and Canada, this opportunity could revert to being a major source of income for local villagers. Other tours such as night croc watching, manatee spotting, bird watching and snorkeling are also offered, but these tend to be lower priority. There is scope for more jungle type tours and perhaps a more in-depth environmental orientated tour or even high quality short courses for tourists.

The Ministry of Tourism, Culture, and Civil Aviation is considering this area for increased tourism development along this coastline. This includes the establishment of Punta Gorda as a tourism hub to provide logistic and functional connections to key tourism assets in the region. These include Port Honduras, Payne's Creek, Sapodilla Cayes, Barranco and Punta Negra for low density nature based tourism. In addition, this region should be considered for nautical tourism, focused cultural tourism and agro-tourism which would take advantage of Cacao and Banana belt value chain.

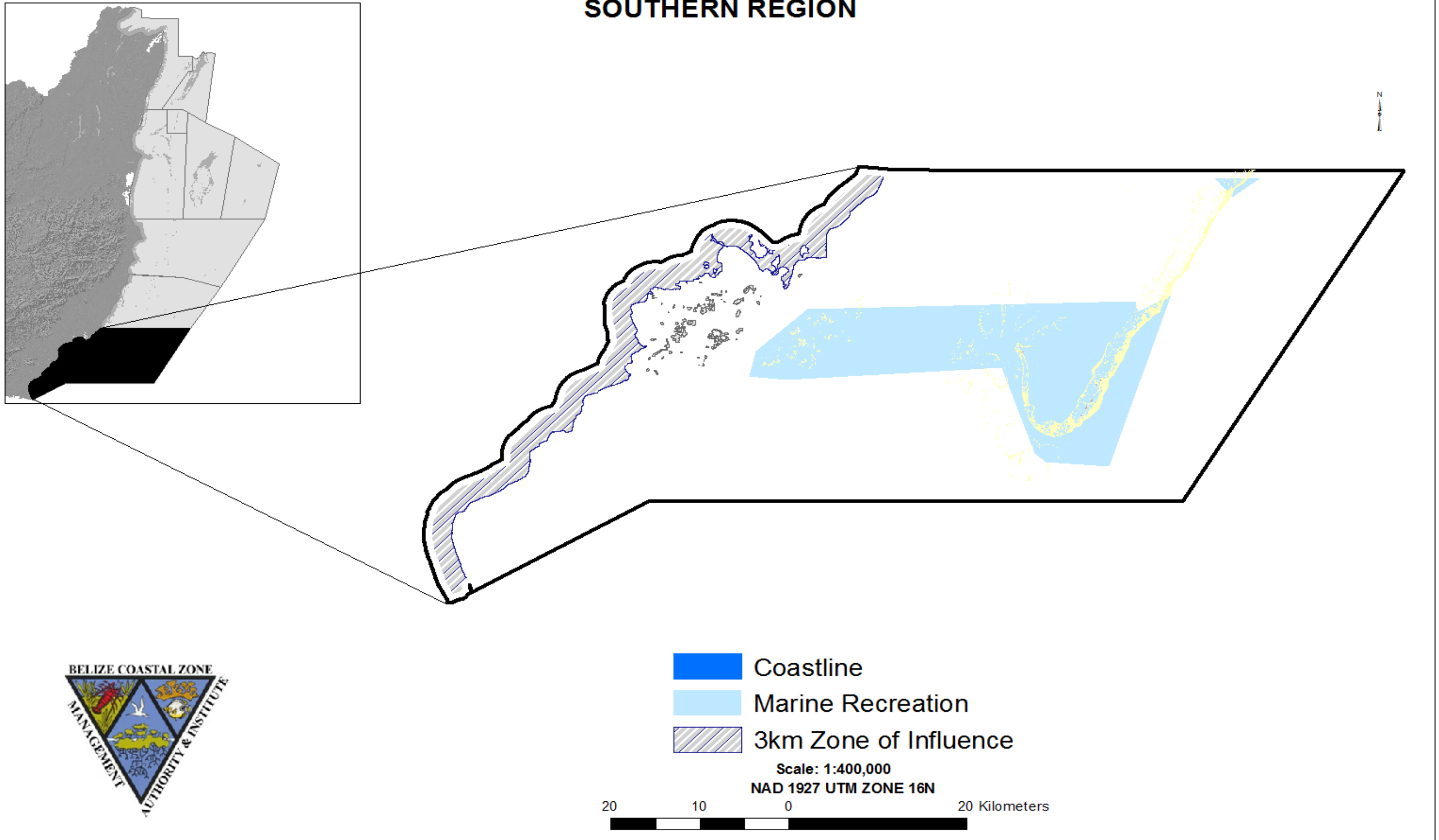
InVEST Recreation and Tourism ecosystem service model results suggest this region is projected to experience a drop in its tourist visitation by 2025 (**Fig 5, Appendix**). Currently, approximately 125 thousand people visit this region generating revenue of BZ \$14 million annually (**Fig 6, Appendix**). In a conservation future scenario, InVEST Recreation model results indicate that there may be an increase in tourist visitation to approximately 280 thousand, generating annual revenue of BZ \$30 million. In a development future scenario, there would also be an increase in the current tourist visitation to approximately 483 thousand, and generating annual revenue of BZ \$51 million. In the proposed Informed Management scenario (**Map7**), InVEST Recreation model results indicate that there will also be an increase in tourist visitation to approximately 474 thousand and that tourist expenditure would generate an annual revenue of BZ \$80 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: SOUTHERN REGION



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

**Table 3: Framework for Implementing Informed Marine Recreation in the Southern Region**

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
<b>Marine Recreation</b>	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	Belize Tourism Board Fisheries Department Coastal Zone Management Authority

**Recommended Actions:**

1. Mass cruise ship tourism is felt to be a potential threat to the coastal environment of Toledo and should be advised against unless subject to strict control
2. Confine land use zoning for resort type development to those areas where they already exist, including the coastline and cayes, with minimal scope for intensification or new development
3. Incorporate maximum carrying human capacity in the land use zoning for those areas under stress because of over-use or point use and likely to be impacted negatively from excessive human activity
4. Combine ecological and nature tourism with conservation policies in those ecologically sensitive but potentially attractive natural environments
5. Implement recommendations by the National Sustainable Tourism Master Plan for this region's long-term tourism growth

### 6.3 *Land-Use*

The land use component of these guidelines for the Southern 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 management guidelines maintain some flexibility to enable them to respond 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, bars, offices, entertainment facilities, marinas, gas stations/pumps.

#### 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 Southern 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 Southern Region**

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

The National Sustainable Tourism Master Plan for Belize 2030 (STP) recommends moderate development for the southern region, with the bulk of the enhancements to be done in Punta Gorda Town. Generally, the STP promotes “**low density/impact land use**” for the region to preserve the intended natural allure. Also it encourages infill development for most areas within the region and improvement of infrastructure including tourism centers, public spaces and international pier. New development proposed for the region include a small, low density marine eco-lodge in Punta Negra to promote nautical tourism. Building densities for both Barranco and Punta Negra are consistent with low density residential (R1) (see Table 2) building standards of 4 – 20 dwelling units/acre. Although not mentioned, Cattle Landing, Punta Yacos and Monkey River are all recommended to have low building densities with infill of the villages. Punta Gorda Town, on the other hand, is recommended to have a density of 40 – 100 units per area by 2030. This density exceeds the limit recommended by CZMAI for coastal areas, however it is necessary in order to encourage the economic stability of the town and people of Punta Gorda.

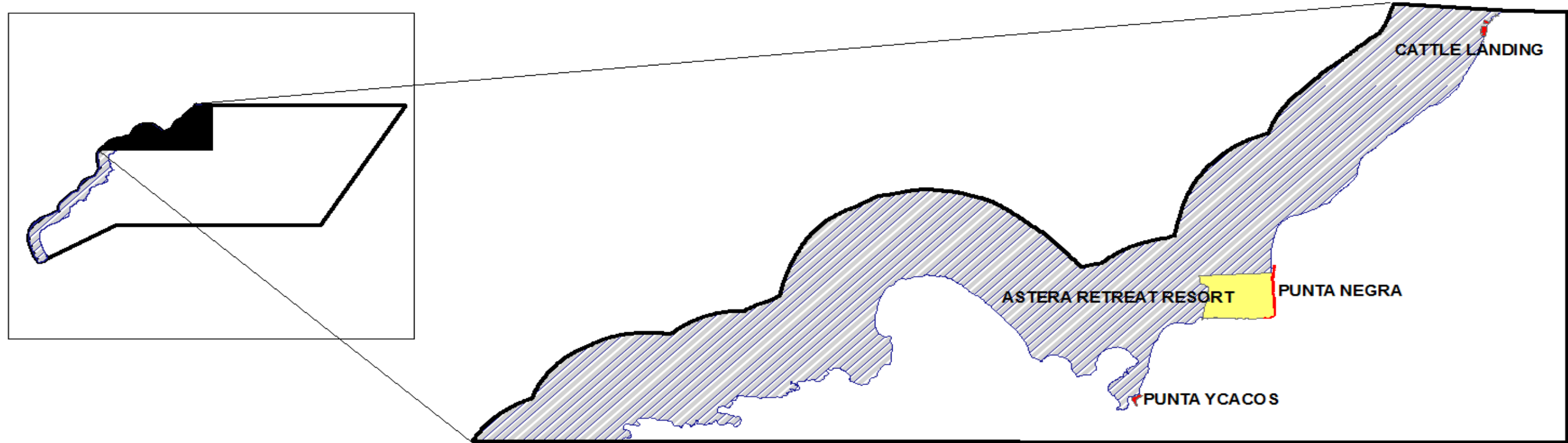
**Residential Development:** Land use in which housing predominates, as opposed to industrial and commercial areas. Housing may vary significantly between, and through, residential areas. These include single-family housing and multi-family residential. These areas are also characterized by lower lots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

**Table 5: Residential Development Standards for Communities within the Southern Region**

<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); Parks/Playgrounds, Community Facilities
Maximum Lot Size	0.167 acre (6 lots/acre)
Width/Length Ratio	1:2
Net Density (dwelling units per acre)	20 du/acre
Maximum # of Habitable Rooms per acre	120 guest beds/acre
Maximum Site Coverage	50%
Minimum Frontage	50 feet
Minimum Setbacks:	
Front	6ft
Side	6ft
Back	12ft
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



# INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL DEVELOPMENT: SOUTHERN REGION



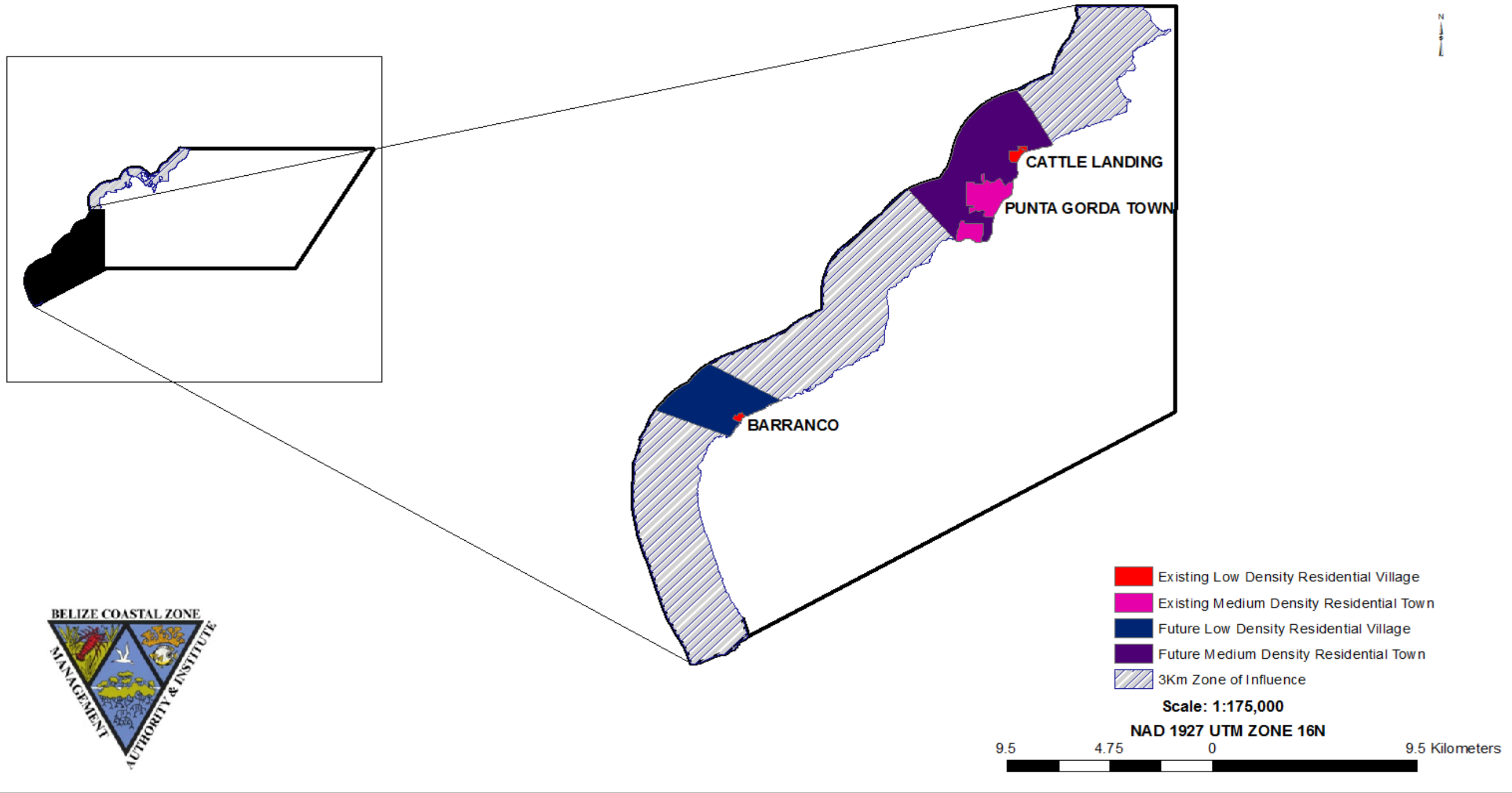
- Existing Low Density Residential Village
- Future Low Density Marine Eco-Lodge
- 3km Zone of Influence

Scale: 1:125,000  
NAD 1927 UTM ZONE 16N

6.5      3.25      0      6.5 Kilometers

**Map 8: Informed Management Zoning Scheme for Coastal Development in the Southern Region (Northern Portion)**

# INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL DEVELOPMENT: SOUTHERN REGION



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

The STP recommends improvements to the International Pier and promotion of nautical and sun and beach tourism for the Southern region. In order to keep the natural ambiance of the South only low density commercial developments are recommended for the Southern region. Development standards for this commercial development can be found in Table 6, and these correspond to the area zoned for this activity in the Informed Management Coastal Development Zoning Scheme (**Maps 8 & 9**).

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

**Table 6: Commercial Development Standards for Communities within the Southern Region**

<b>Subdivision Criteria</b>	<b>Commercial Development Standard</b>
Primary Permitted Use	Commercial Low Density (Convenience stores, small service shops, small hotels)
Secondary Use	None
Maximum Lot Size	0.25 acre (4 lots/acre)
Width/Length Ratio	1:4
Net Density (dwelling units per acre)	20 du/acre
Maximum Site Coverage	33%
Minimum Frontage	65 feet
Minimum Setbacks:	
Front	4ft
Side	4ft
Back	4ft
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 spaces set aside in large residential or commercial subdivisions for public purposes including public parking, cemeteries, churches, sporting areas, police stations, etc.

**Table 7: Institute and Community Facilities Development Standards for Communities within the Southern Region**

<b>Subdivision Criteria</b>	<b>Development Standard</b>
Building Setbacks: Front: Side: Back:	25 feet 12 feet 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

### 6.3.2 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 Southern Region:

Land tenure of the cayes within the Southern region is a combination of private and state ownership (See **Table 8: Summary of Land Tenure of the Southern 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 Port Honduras Marine Reserve and Sapodilla Cayes Marine Reserve, which has zonation with areas under a non-extractive regime, under the Fisheries Department.

**Table 8: Summary of Land Tenure of the Cayes within the Southern 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	%	
Small Caye	6.61	100	0	0	0	0	6.61
Sickel Caye	13.55	100	0	0	0	0	13.55
Stuart Caye	16.88	100	0	0	0	0	16.88
#1 Inner Cross Caye	14.50	100	0	0	0	0	14.50
#2 Outer Cross Caye	5.70	100	0	0	0	0	5.70
#3 Caye	2.10	100	0	0	0	0	2.10
Moho Caye	0	0	2.8	100	0	0	2.80
Bird Caye	1.55	100	0	0	0	0	1.55
#4 Caye	4.10	100	0	0	0	0	4.10
#5 Caye	8.80	100	0	0	0	0	8.80
Bobby Caye		100	0	0	0	0	
Frenchman Lagoon Area	290.20	100	0	0	0	0	290.20
Long Caye	12.11	100	0	0	0	0	12.11
Frenchman Caye	38.38	100	0	0	0	0	38.38
Peter Caye	70.6	100	0	0	0	0	70.6
Outside Sheppard Caye	227.78	100	0	0	0	0	227.78
Inside Sheppard Caye	154.35	100	0	0	0	0	154.35
Wild Cane Caye	79.89	94.1	2.0	5.9	0	0	84.89
#6 Caye	.50	100	0	0	0	0	0.50
Man of War Caye	5.00	100	0	0	0	0	5.00
#7 Caye	8.90	100	0	0	0	0	8.90
# 8 Caye	2.40	100	0	0	0	0	2.40
Abalone Caye	0.5	100	0	0	0	0	0.50
Head Caye	3.00	100	0	0	0	0	3.00
McBride Caye	10.00	100	0	0	0	0	10.00
Wilson Caye	32.85	100	0	0	0	0	32.85
East Snake Caye	4.80	100	0	0	0	0	4.80

Middle Snake Caye	10.00	100	0	0	0	0	10.00
West Snake Caye	9.70	100	0	0	0	0	9.70
South Snake Caye	3.74	52	4.06	48	0	0	7.80
#9 – 29	171.40	100	0	0	0	0	171.40
Hen and Chicken	2.50	100	0	0	0	0	2.50
Range 1	225.50	100	0	0	0	0	225.50
Range 2	326.20	100	0	0	0	0	326.20
Range 3	107.00	100	0	0	0	0	107.00
Seal Caye	0	0	0.50	100	0	0	0.50
Ragged Caye	0.25	100	0	0	0	0	0.25
Reef Patch	0.05	100	0	0	0	0	0.05
Sand Bore	0.05	100	0	0	0	0	0.05
Lime Caye	3.50	100	0	0	0	0	3.50
Hunting Caye	10.71	89.25	0	0	1.29	10.72	12.00
Nicholas Caye	0	0	6.00	100	0	0	6.00
Franks Caye	0	0	4.00	100	0	0	4.00
NE Sapodilla Caye	4.80	100	0	0	0	0	4.80
Tom Owens Caye	0	0	0	0	0.25	100	0.25
Tom Owens Jr. Caye	0.11	100	0	0	0	0	0.11
North Spot	0.05	100	0	0	0	0	0.05
Sand Bore	1.00	100	0	0	0	0	1.00
Ranguana Caye	0	0	6.61	100	0	0	6.61
Total	1888.61	98.42	28.97	1.50	1.54	0.08	1919.12

The environment of the Southern Cayes Region is in general, ecologically fragile and particular care needs to be exercised to determine its ability to maintain a balance between the environment Subsistence and the need to facilitate economic and other human activities. Thus, the implications of human activities to the sustainability and life of the cayes is very important. Furthermore, human activity can increase the vulnerability of cayes to natural hazards and compound the destructive effect on the natural and built environment in the event of natural or manmade hazards.

The development status of the southern cayes ranges from situations verging on „over-development“, to situations where the cayes are 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 which 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 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 infested 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, as well as calving areas for manatees.

Areas of heightened sensitivity in regard to the terrestrial areas are vegetation that stabilize shore lines and which makes a special contribution to the critical life stages of the associated fauna of the area. Important in this regard are mangroves, which are nursery habitats for a wide variety of fin-fishes and invertebrates such as the Mutton Snapper (*Lutjanus analis*), the Spiny Lobster (*Panulirus argus*) and the White Shrimp (*Penaeus schmitti*). Terrestrial areas of special note are those providing a habitat for fauna to perform critical life functions such as nesting and breeding activities. This is of particular note in relation to nesting sites for Sea Turtles, as well as for a number of seabirds and shore birds.

The developments on the southern cayes are either residential in nature, or they are based on recreational tourism and fishing. The cayes that are fully developed are: **Hunting Caye, Wild Cane Caye, Frenchman Caye, and Nicolas Caye**. These cayes are all located in the coral dominated environment of either the barrier reef of the **Snake Cayes** areas. These areas are ecologically sensitive and it is strongly recommended that no further developments be permitted in these areas.

Apart from issues of immediate ecological sensitivity, the protected status accorded to the Sapodilla Cayes Marine Reserve and the Port Honduras will require that and developments in these areas be consistent with existent management plans or management orientation otherwise. Most of the cayes of the Southern Region are situated within the Port Honduras Marine Reserve and are not suitable for development due to their small size, shoal environs, mangrove dominated vegetation and low lying and inundated character with no emergent land. In addition, some are within ecologically sensitive environments surrounded by coral patches and strands interspersed by sea grass beds. Consequently any development activity will require extensive dredging, sand mining and engineering applications. These include **Sickle, Stewart, Bird Caye, Outside Sheep head, Inside Sheep head, Frenchman, McBride, Range 1, Range 2, #1 Inner Cross (Calabash), #2 Outer Cross, #3 Caye, #4 Caye, #5 Caye, #7-#16 Caye, #16 A & 16B Cayes, #17- #21 Caye, #21A & 21B Cayes, #22-#29 Caye, South and Middle Snake and Ragged Caye**.

Other cayes which have high land but of which some portions are swamps are **East and West Snake Cayes, McBride, Long, Wilson and Frenchman Cayes**. Those that are characterized by high lands and are most to highly suitable for development are **Moho Caye, Wild Cane Caye, Northeast Sapadilla Caye, Lime Caye, Tom Owens Caye and North Spot**. Noteworthy is that the small size of the latter two cayes precludes any development and consideration must be given to the location and surrounding ecologies of **Northeast Sapadilla and Lime Cayes**. Cayes which are extensively developed and which have none or minimal scope for further development are **Abalone Caye, Seal Caye, Hunting Caye, Nicholas Caye, Franks Caye and Ranguana Caye**. Noteworthy also is that the **outer Snake Cayes and the Sapadilla Cayes and Ranguana Caye** are all habitats for adult lobsters, the latter two being habitat also for juvenile conch. In addition, the inner cayes are habitats for fin fishes, particularly the Mackerel, Jew Fish and the Silk Snapper and spawning grounds for lobster, while the outer cayes are known habitats for Jimmy hinds, Yellowtail Snappers and Deepwater Silk Range and spawning grounds for groupers. Dialogue with fishermen of the region and other research findings suggest that the fishing stock in the region have been reduced compared to previous years.



The development suitability assessment, the current development trends and land transactions, and the socio-economic and other data of the Southern Cayes Region lends to low intensity development in the near future. When this is combined with a high percentage of national lands, 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 use and development of the cayes in the region. These use classes can accommodate existing resorts, residential homes, scientific research, ecological tourism activities and the traditional use of fishermen camps without propelling development at a faster rate than what it currently is and in harmony with the environment. This represents a precautionary approach to development and the protection of the environment even where all the scientific evidence have not been finalized to make a determination of the clear link between an activity and environmental damage. These use class assignments are further divided into categories, each providing for varying degrees of development intensity.

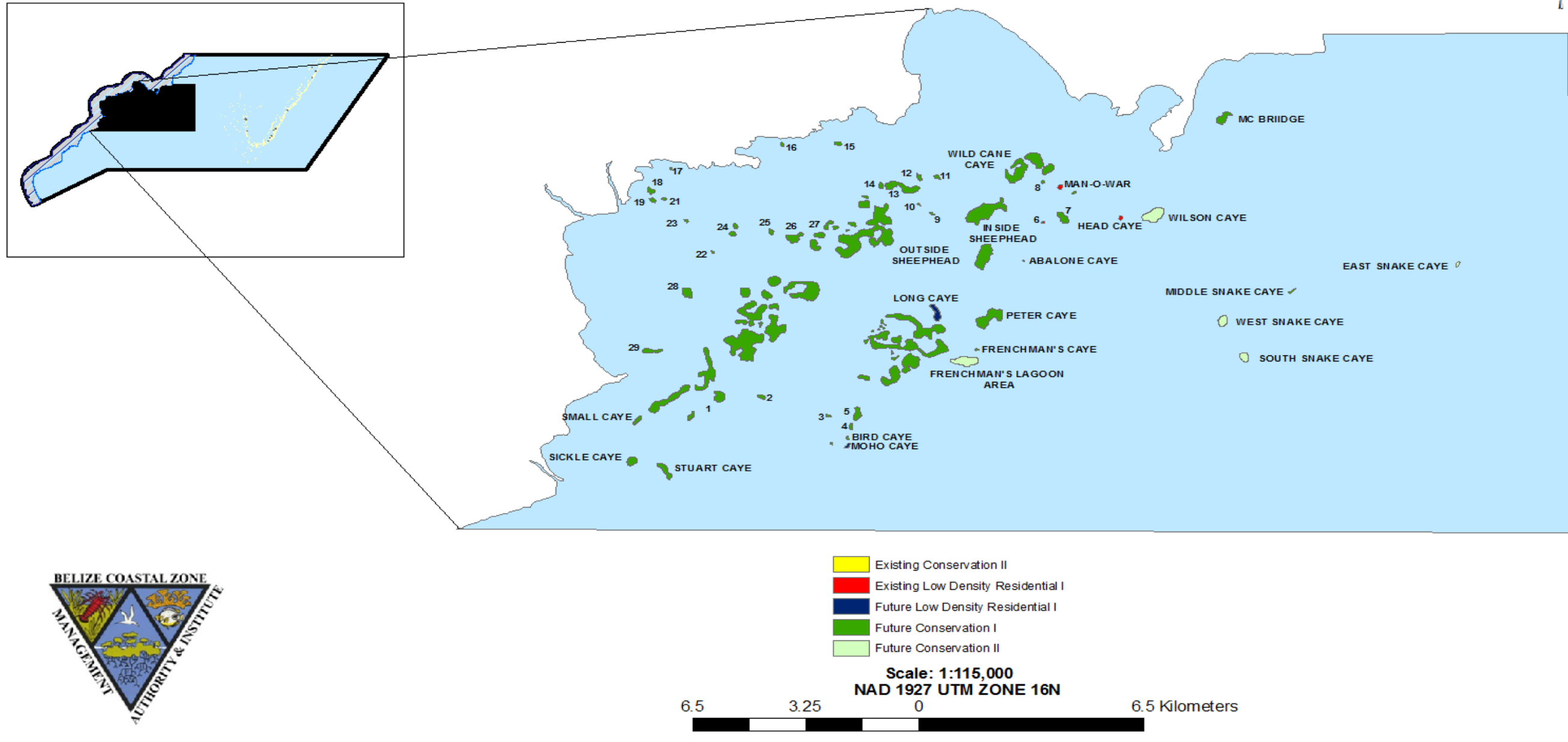
For Cayes within the Southern Region, only one category is assigned. That is Residential I to **Lime and Hunting Caye** in the outer cayes and **Long Caye** and **Moho Cayes** in the inner cayes.

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

**Table 9: Residential Development Standards for Cayes within the Southern Region**

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

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



Map 10: Southern Region Cayes with Proposed "Residential I" Land-Use Class

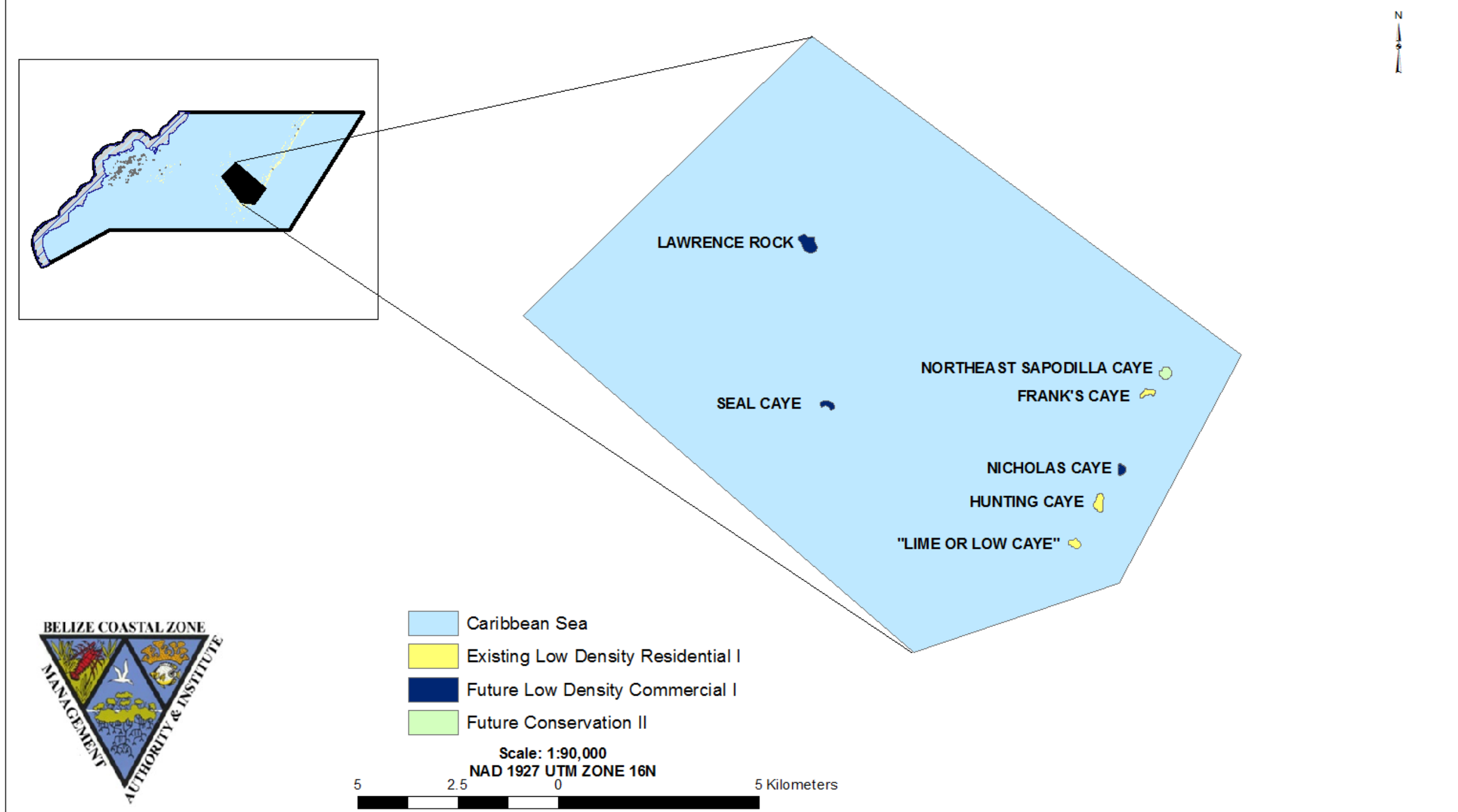
For Cayes in the Southern Region only Commercial I apply. These are for cayes which are already developed as resorts. That is, **Ranguana, Nicholas, Seal and Frank’s Cayes.**

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

**Table 10: Commercial Development Standards for Cayes within the Southern Region**

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

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



**Map 11: Southern Region Cayes with Proposed "Commercial I" Land-Use Class**

The Southern Cayes Region has two marine reserves, but three cayes are excluded from the boundaries of the reserves. The contribution of these cayes to 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 the other three cayes be protected as well. To complement the existing and proposed management plans of the area it is recommended that certain areas be zoned for Conservation Use, which is to be divided into two categories:

**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

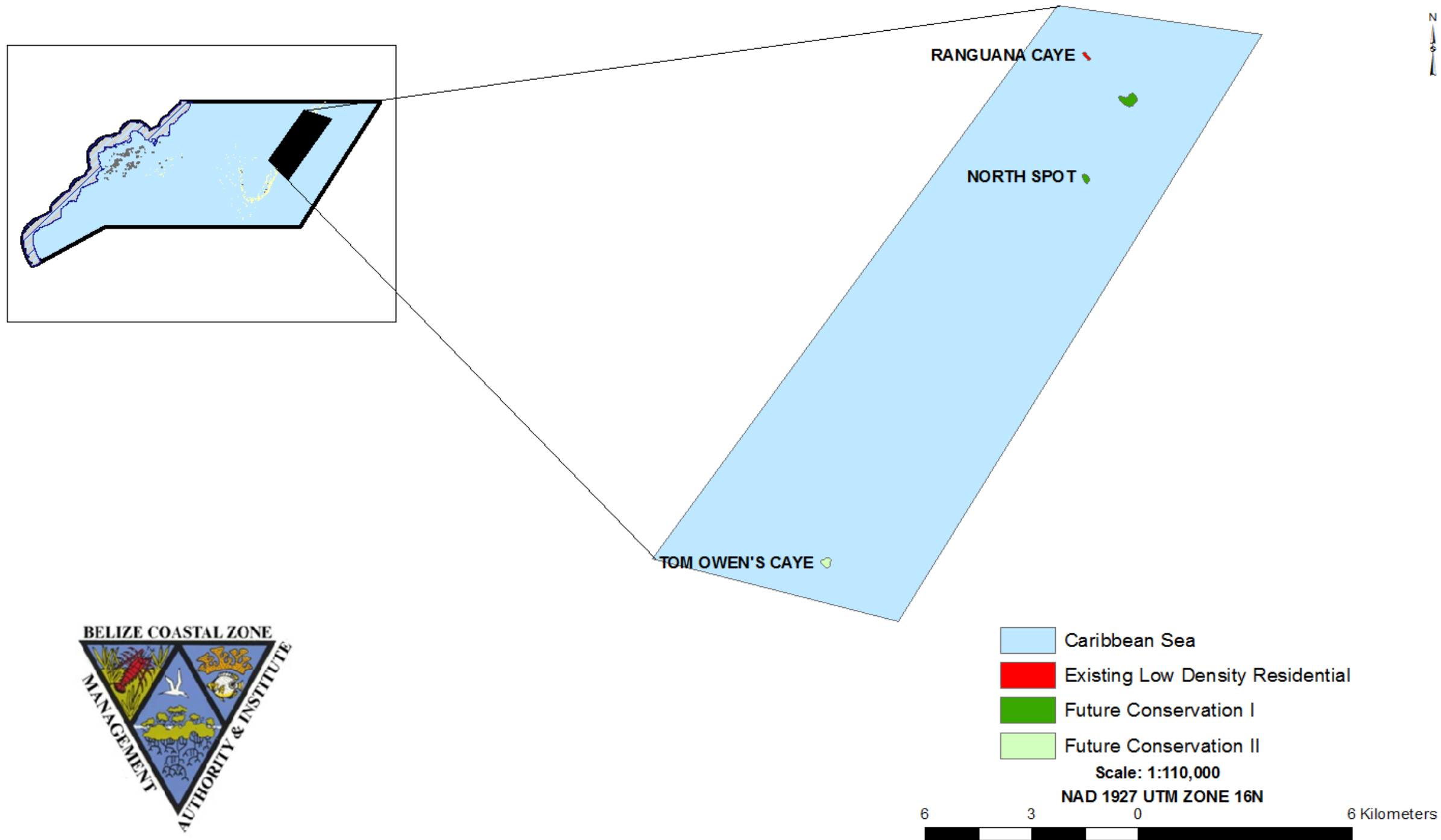
Cayes assigned **Conservation I** land use category are: **Wild Cane, Inside and Outside Sheephead, Peter, Abalone, Sickle, Small, Bird, Middle Snake, North Spot and Ragged Cayes and all other numbered cayes**

Cayes assigned **Conservation II** land use category are: **Northeast Sapodilla, Tom Owens, McBride, Wilson, Head, Frenchman, West Snake, South Snake and East Snake Cayes**

**Table 11: Conservation Development Standards for Cayes within the Southern Region**

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

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



Map 12: Southern Region Cayes with Proposed “Conservation I & II” Land-Use Class

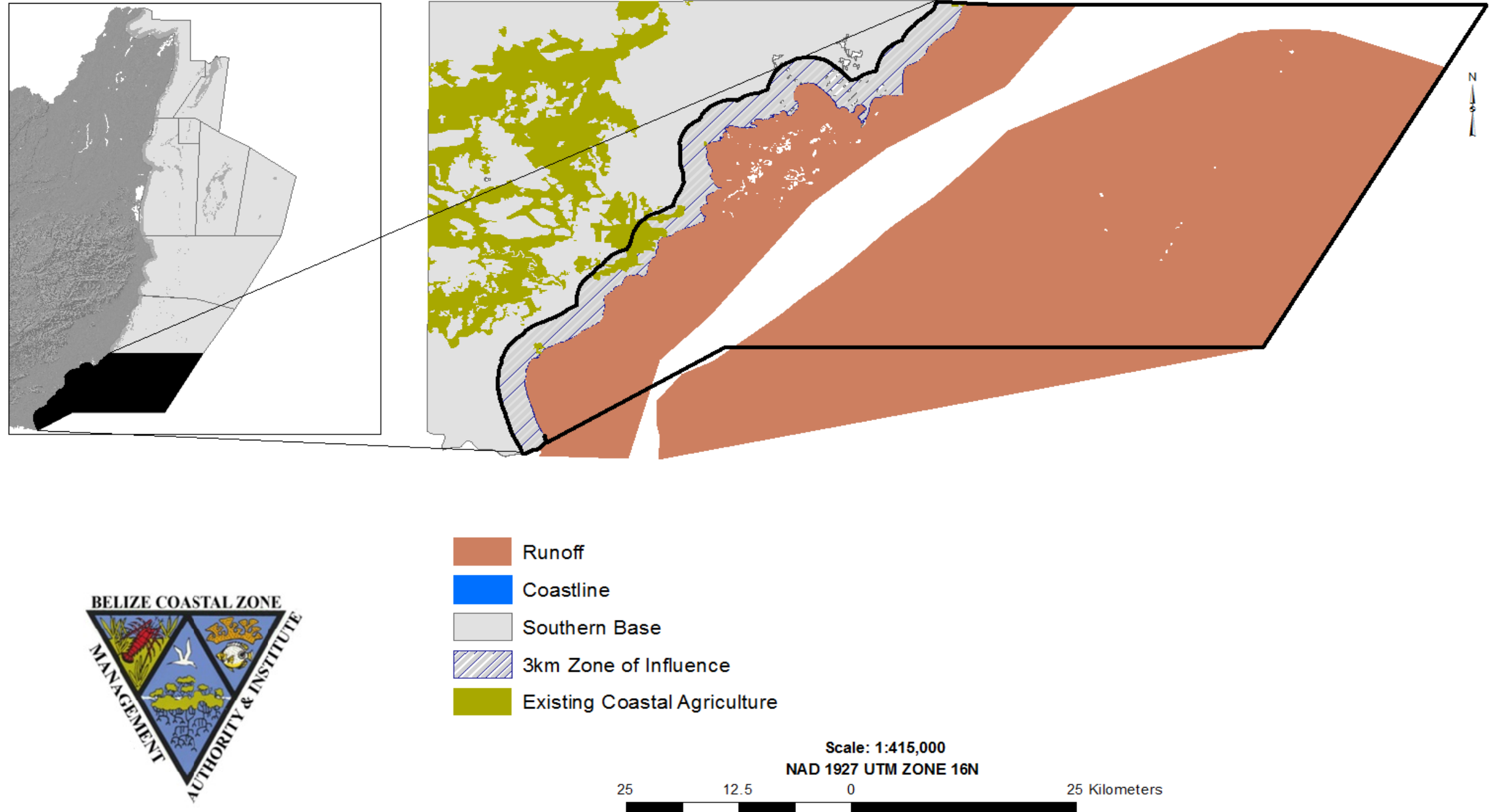
### 6.3.3 Coastal Agriculture Development

In addition to residential and commercial development, coastal agriculture has been identified as a potential use of lands within the 3km coastline of the Southern region (**Map 13**). 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 12**. The framework for implementing the zoning scheme for the development of coastal lands for agriculture production can be found below in **Table 13**.

**Table 12: Development Standards for Coastal Agriculture**

Subdivision Criteria	Development Standards	
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: SOUTHERN REGION



**Map 13: Informed Management Zoning Scheme for Coastal Agriculture in the Southern Region**



**Table 13: Framework for Implementing Informed Coastal Agriculture in the Southern Region**

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
<b>Coastal Agriculture</b>	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) 2. Use of registered agrochemicals (pesticides and fertilizers) outside of the legally prescribed limit 3. Oil exploration, extraction and establishment of oil refinery 4. Mining and dredging 5. Disposal of hazardous and toxic chemicals, solid wastes, untreated liquid wastes 6. Squatting/informal settling 7. Unregulated land clearing, 8. Fish farming, coastal aquaculture	Banana Industry Act Belize Agricultural Health Authority Act Citrus (Processing and Production) Act Environmental Protection Act Land Utilization Act Meat and Livestock Act Papaya Growers Association Act Pesticides Control Board Act Sugar Cane Industry (Control) Act	Banana Control Board Ministry of Agriculture Belize Agricultural Health Authority Citrus Control Board Ministry of Agriculture Department of the Environment Land Utilization Authority Ministry of Agriculture Ministry of Agriculture Pesticides Control Board Ministry of Agriculture

The southern region coastal advisory committee believes that environmental impact assessments (EIAs) should include upfront charges for monitoring of all development projects, and that this money should be apothecated for this purpose. Outside of Punta Gorda, the traditional design of housing and small buildings falls well short of standards in Belize City, Belmopan and other major conurbations. These guidelines must recognize the need for a gradual uplifting of building standards without compromising either safety or traditional rural building methods and materials in Toledo, as well as the stylistic preferences of minority communities such as the Maya and Mennonites.

### **Recommended Actions:**

1. Evaluate development of resorts and subdivisions along the coastline on environmental grounds with regard to planning suitability.
2. Maintain the present 1000ft minimum distance between piers.
3. Restrict construction of over-water structures
4. Develop a new dock facility project in the region subject to environmental assessment
5. Provide for low density development with the least possible site clearance to maintain as much as possible the natural environment
6. Provide for minimum setback from property lines and beaches to buildings and minimum distances between buildings
7. Attach conditions which require engineering approval for building construction
8. Attach conditions which avoid architectural and engineering designs which conflict with the concept of what is essentially rural life.
9. Where an EIA is not statutorily required, an assessment of liquid and solid waste disposal, energy and water supply for all proposed commercial activities. Attach conditions to the approval if issued to ensure minimal negative environmental impacts. This would specifically include a commitment from the developer to provide an all-weather road access prior to the commencement of building
10. Prohibit the sale of swamp and mangrove lands along the coast as these areas are not suitable for development
11. Enforce the development standards produced by LUA and CZMAI as presented in these management guidelines
12. Discourage heavy and unregulated use of herbicides, pesticides and fertilizers

#### **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. The impact of sand mining and dredging on rivers and their watersheds is also potentially serious. Currently much of this is unregulated. Human disturbance within Belize's Monkey River Watershed have consequently resulted in rapid, ongoing loss of shoreline within the country's southern coastal zone. Human activities within the watershed, such as large-scale land clearance and catchment disturbance, dam construction, water abstraction and sand mining are all affecting sediment transport and erosion processes.

Encompassing a drainage area of 1275 km<sup>2</sup>, the Monkey River Watershed is the 4<sup>th</sup> largest river in Belize and is comprised of three major tributaries, Swasey, Trio and Bladen Rivers. At the confluence of the Swasey and Bladen rivers is a high sediment load that was historically flushed out of the Monkey River, thereby delivering the fluvial sediment supply to nourish the southern portion of Belize's shoreline that extends from Monkey River Village to Barranco Village.

The erosion assessment and mitigation study of the region conducted in 2007 by Galen University's Applied Research and Development (GUARD) Institute reveals that the abstraction of millions of gallons of water for crop irrigation during the dry season and low-flow periods, sand mining, and the destruction of the riparian zone have all resulted in a sediment-starved shoreline in southern Belize. In other words, the southern shoreline of Belize is experiencing rapid erosion; this occurrence is not because sand is not being generated within the Monkey River Watershed system. Instead, the generated sand is not accreting on the shoreline and the beach is rapidly eroding.

Except for its lower reaches, Monkey River is no longer navigable in the dry season, and the accumulation of sandbars at the river mouth is testament to the very low flow rates. The need for Monkey River to be dredged requires further evaluation, but may eventually become a necessity if serious flooding is to be avoided. There are possible land reclamation benefits to be achieved, as well as an end to the seasonal flooding of the Monkey River road, cutting off residents from land access to the rest of the country. The risk of damaging spawning grounds, fisheries, and upsetting natural sediment drift is all the more serious in the shallow waters in our southern coastal region.

### **Recommended Actions:**

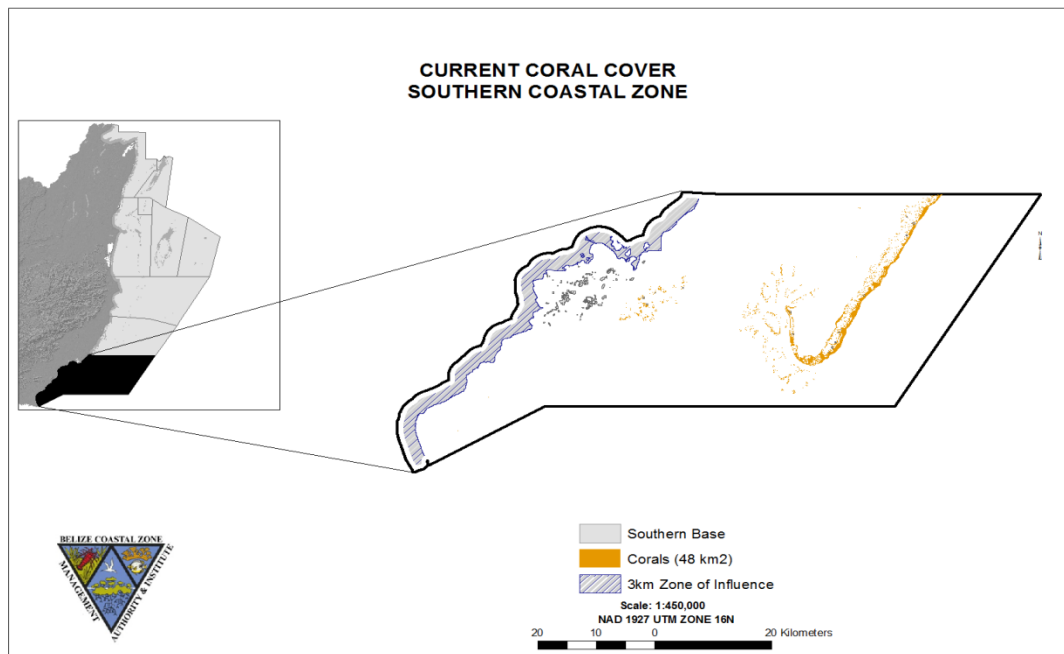
1. Discourage dredging activity unless required for land rehabilitation or in those cases where it will not disrupt the marine ecosystems or impact negatively on existing uses by other individuals or operations through collaboration with agencies mandated to issue permits and licenses for dredging and sand mining
2. Formalize and implement a water use policy for fresh, brackish and marine waters that must include a policy on water allocation and abstraction. In this region, it is relevant to focus on water drainage and abstraction from the Monkey River Watershed by agricultural farms.
3. Revise and update dredging policy to include dredging and mining activities within watershed, especially the Monkey River Watershed
4. Explore a potential land reclamation project for the region, including an evaluation of the erosion mitigation strategies and recommendations in the GUARD 2007 and apply where feasible

## 6.5 Sensitive Habitats

Monitoring of the health of the terrestrial and aquatic environment is fundamental for maintaining biodiversity and ascertaining the development capability of the region. If there are mechanisms in place to make a determination of the impacts of human and other activity on the environment, mitigative measures can be introduced to reduce or prevent environmental degradation. Current arrangements between the Fisheries Department and other governmental and non-governmental organizations, e.g. TIDE, SEA and SATIIM for monitoring of the health of habitat and ecosystem within the region should continue and be strengthened, where necessary.

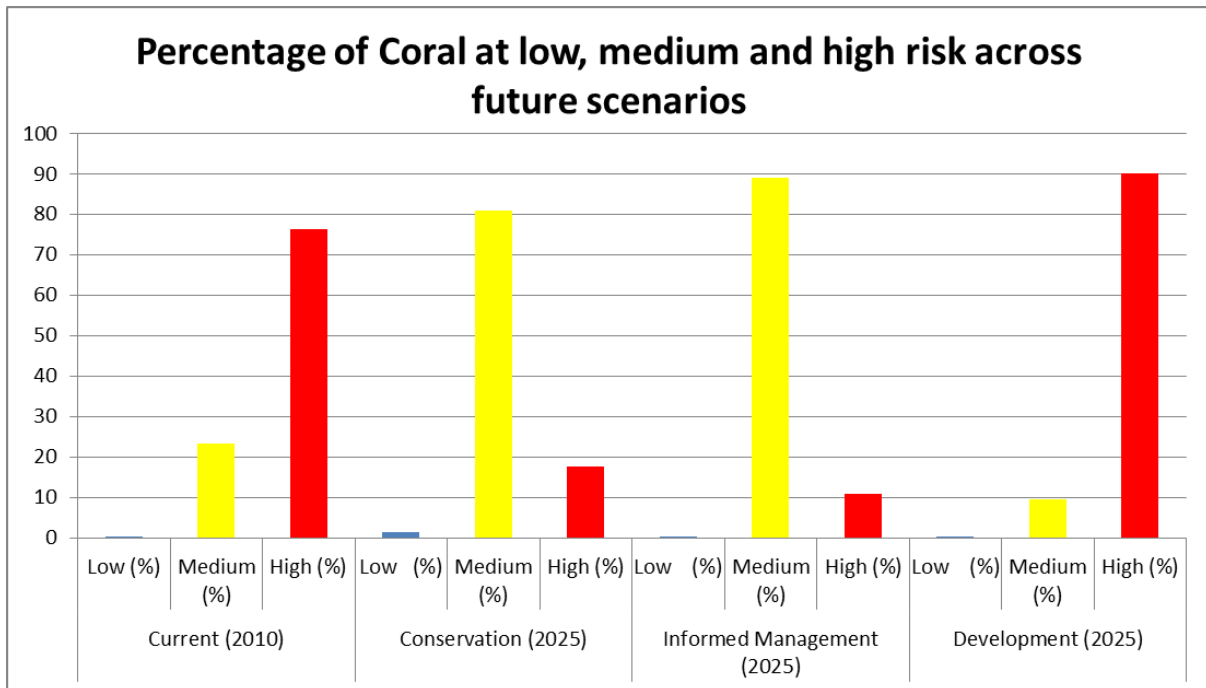
### 6.5.1 Corals

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.



**Map 14: Coral Cover in the Southern Region**

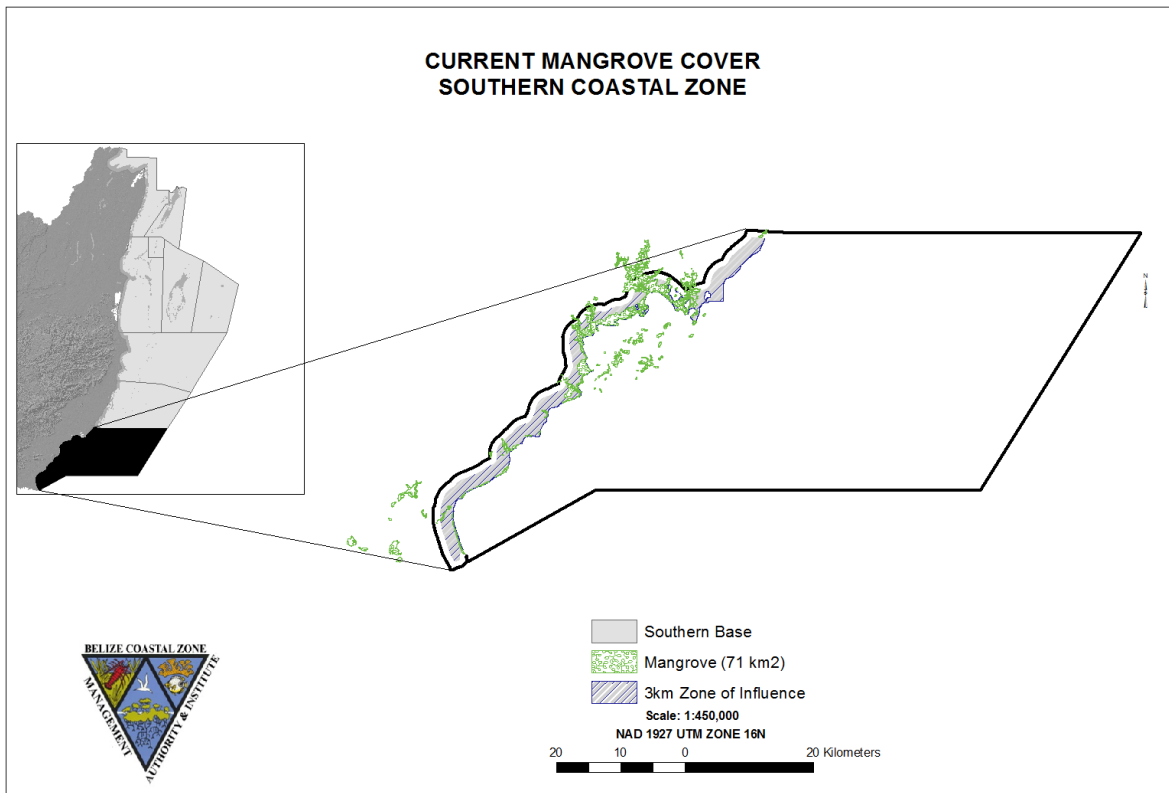
Coral cover in this region is about 48 square kilometres (**Map 15**). Results of the InVEST Habitat Risk Assessment (HRA) model suggest that currently 0.2% of the region’s corals are at low risk, 23.36% at medium risk, and 76.37% at high risk (**Fig. 1**). The results also suggest that in a Conservation Zoning Scheme 17.73% of 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 1.46%, and at medium risk 80.8% (**Fig. 1**). In a Development Zoning Scheme, HRA model results suggest that the threat to corals would become increasingly higher. Only 0.27% of corals would be at low risk whereas 9.57% and 90.16% 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 10.8% of corals would be at high risk, 0.28% of present corals would be at low risk, and 88.92% at medium risk (**Fig. 1**).



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

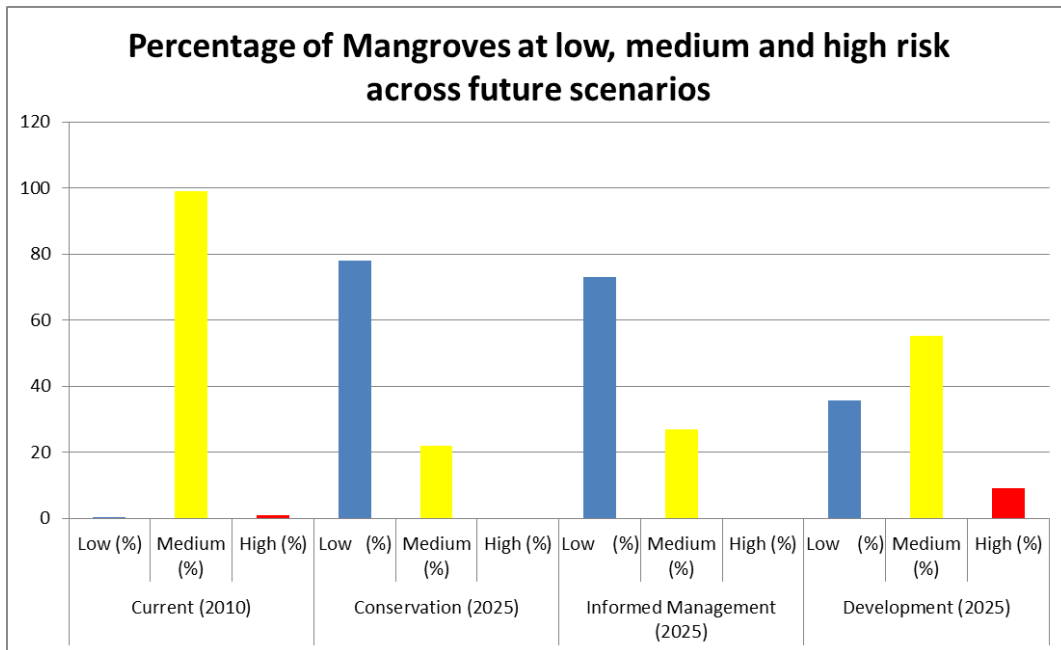
## 6.5.2 Mangroves

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.



**Map 15: Mangrove Cover in the Southern Region**

In this region, the total mangrove cover is approximately 50 square kilometers (**Map 14**). Results of the InVEST Habitat Risk Assessment (HRA) model suggest that currently 0.2% of the region’s mangroves are at low risk, 98.97% at medium risk, and 0.83% 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 77.95%, and at medium risk 22.05% (**Fig. 2**). In a Development Zoning Scheme, HRA model results suggest that the threat to mangroves would become increasingly higher. 35.74% of mangroves would be at low risk whereas 55.32% and 8.94% 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, 72.99% of present mangroves would be at low risk, and 27.01% of medium risk (**Fig.2**).

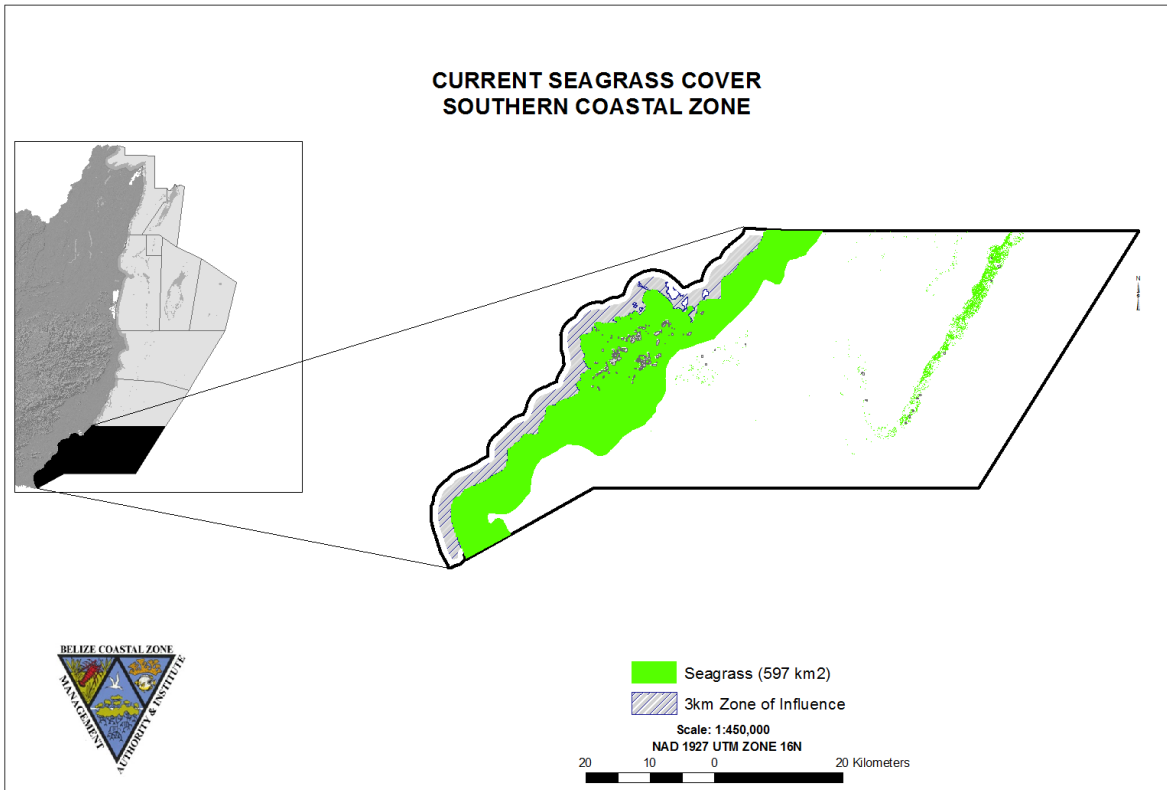


**Figure 2: Risk to Mangroves in the Southern Region by Scenario**



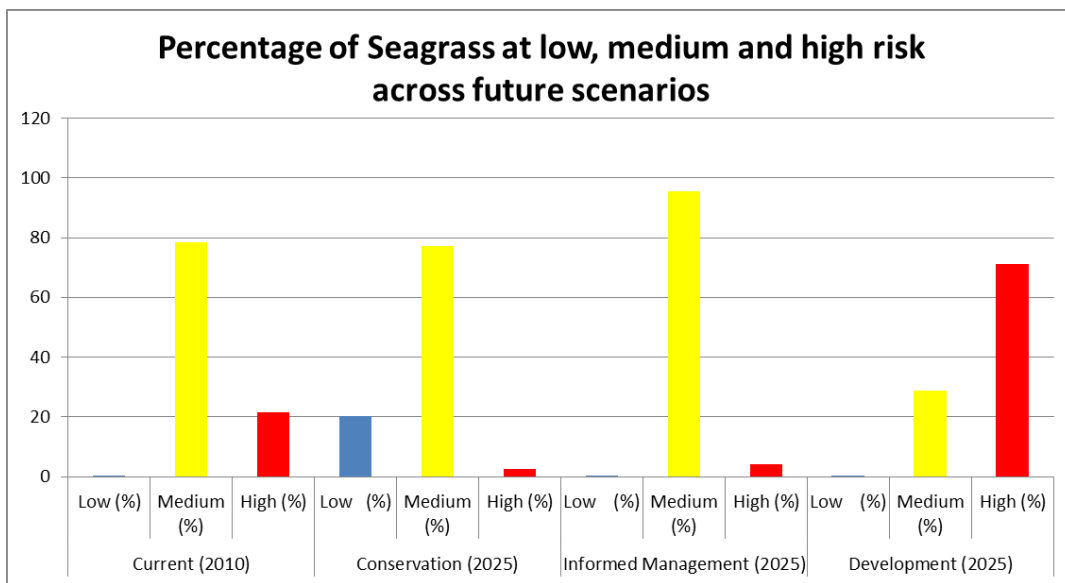
### 6.5.3 Seagrass

Seagrass is also an important component of marine flora within this region. Seagrass meadows are essential for the maintenance of ecosystem health through nutrient cycling and sediment stabilization. They also form a critical ecosystem for many fish and marine invertebrate species, and the endangered West Indian manatee population. Unfortunately, extensive information on seagrass beds in the region does not exist. Current efforts include efforts are being made by SeagrassNet and Wildtracks to collect baseline data.



**Map 16: Seagrass Cover in the Southern Region**

The total seagrass cover for the South Central region is approximately 73 square kilometres (**Map 15**). Based on the Habitat Risk Assessment (HRA) conducted for this region, approximately 0.06% of the region’s seagrass are currently at low risk, 78.52% at medium risk, and 21.42% 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 2.6% of seagrass would be at high risk, 20.23% of seagrass would be at low risk and 77.17% at medium risk in 2025 (**Fig. 3**). In a Development Zoning Scheme, model results suggest that 71.05% 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, 28.88% of seagrass would be at medium risk and 0.06% 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, 95.44% of present seagrass would be at medium risk. Additionally, the model results reveal that under this zoning scheme, 0.33% of present seagrass would be at low risk and 4.23% at high risk in 2025 (**Fig. 3**).



**Figure 3: Risk to Seagrass in the Southern 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 are 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. Protect mangrove and littoral forest along the entire stretch of southern coastline
2. 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**

The principal energy source in the southern region is from grid power. This will need to be upgraded and extended to cover more of the inland villages and communities. It will not be practical for the coastal areas which in the main will continue to rely on diesel generators and solar systems. In low lying areas like the southern coastline it is unlikely that wind power will make a significant contribution. The only source of energy supply which may be of potential threat to the environment in the region is the use of diesel generators because of the noise and air pollution, the transportation and improper disposal of used lubrication oil and transportation and handling of fuel which can result in spills. Remote communities may be better and more efficiently served by solar power but it is not certain who can/would bear the cost of installing and connecting communities to this energy source.

### **6.6.2 Water**

Coastal zone water supply will depend on rainwater, bottled water and the public water supply system. Where water quantity is demanded in large supply, this can be particularly problematic, and impact on the development capability of the region, especially in the case of large developments and commercial development. Reverse osmosis has been suggested as an alternative, but the environmental implications of this need to be carefully studied before this is approved. The issue of the control of water abstraction for the agriculture sector needs to be addressed and a clearly defined policy on water allocation needs to be determined and agreed upon by all relevant stakeholders.

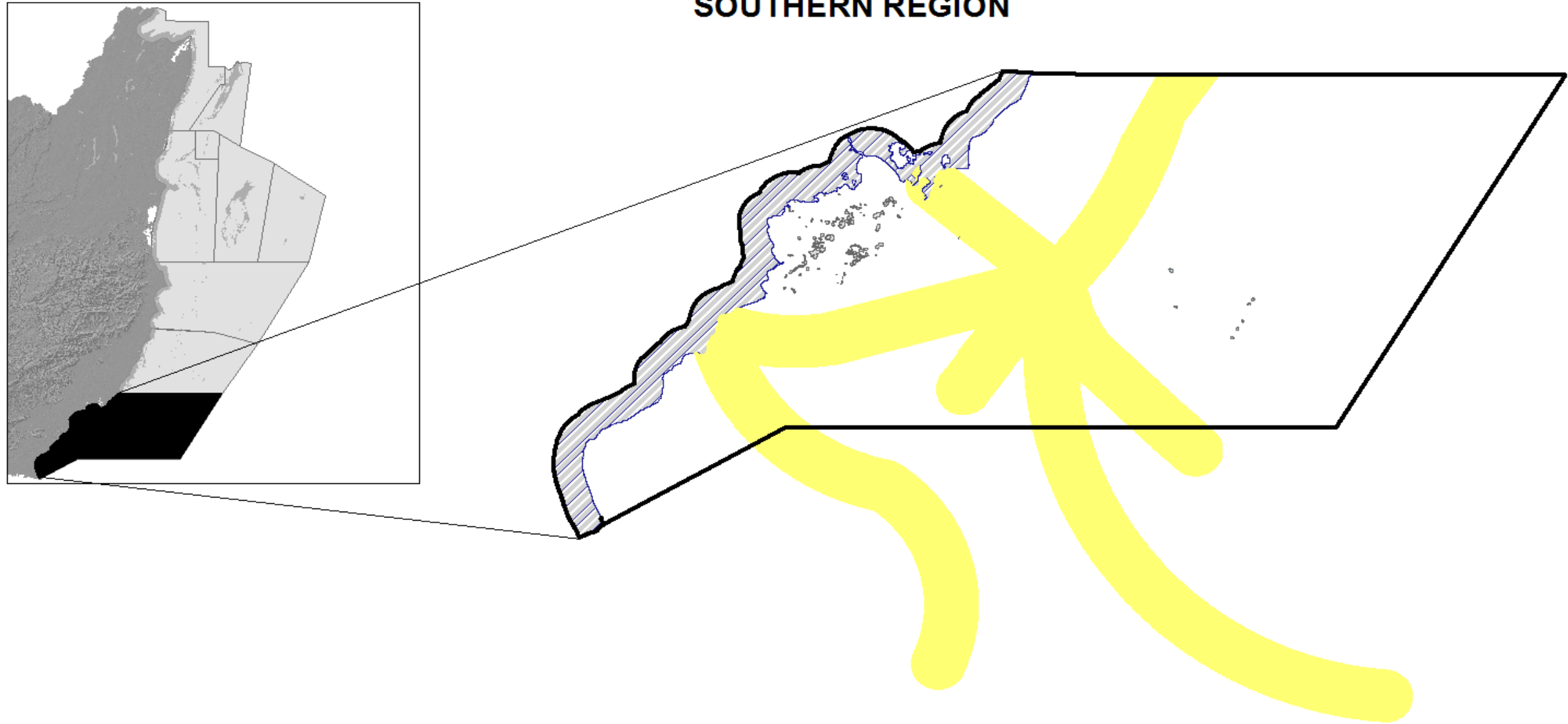
### **6.6.3 Transportation**

It is very likely that the opening of a border access road in and out of Guatemala will lead to a major increase in commercial traffic in both directions. If and when the proposed new port at Big Creek comes into effect, this traffic volume is likely to increase by several orders of magnitude. For this reason the access road will need to incorporate a Punta Gorda bypass road to re-route heavy traffic away from the town. This bypass road should avoid congestion, noise pollution and improve road safety for local residents. It is important to note, however, that a higher traffic volume may also mean increased trading opportunities for Punta Gorda businesses sending and bringing goods to and from Bella Vista, Independence, Belmopan, San Ignacio and Belize City., as well as imports from Mexico. Parking and overnight truck stops, especially for heavy goods vehicles (HGVs) will also be needed.

#### **6.6.4 Boat Hangers**

The Southern Region Coastal Advisory Committee (SRCAC) discussed the installation of a boat hanger in Punta Gorda Town and its associated environmental impacts. The Committee agreed that the installation of the hanger could create jobs and contribute to socio-economic development for the region. However, the impacts will have to be assessed. Such a facility might be possible in combination with the new dock proposed above.

# INFORMED MANAGEMENT ZONING SCHEME FOR MARINE TRANSPORTATION: SOUTHERN REGION



- Coastline
- Marine Transportation
- 3km Zone of Influence

Scale: 1:400,000  
NAD 1927 UTM ZONE 16N



**Map 17: Informed Management Zoning Scheme for Marine Transportation in the Southern Region**

**Table 14: Framework for Implementing Informed Management Marine Transportation Scheme**

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
<b>Marine Transportation</b>	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. Support further electrification via the national grid for more villages and communities in Toledo district
2. Upgrade existing power network to accommodate certain increased energy needs as the area develops and expands
3. Extend and upgrade existing water supplies in order to meet future demand.
4. Discourage the use of ion exchange and reverse osmosis from existing sources of surface water from rivers, lakes, especially for commercial purposes, for environmental reasons.
5. License and control water abstraction for irrigation purposes from any water source in this region
6. Permit drainage of water into any watercourse only via a licensing system
7. Construct feeder roads from the existing Southern Highway into the interior to accommodate the needs of new developments.
8. Mandate developers to put in access roads before building commences, which should be written in to any planning agreements, environmental impact assessments (EIAs) and Compliance Plans.
9. Support the installation of boat building and repair facilities in Punta Gorda Town as an appropriate development activity for this community, subject to assessment of environmental risk



## 6.7 *Pollution Control*

It is imperative that the relevant authorities monitor and seek solutions to the issue of disposal of waste (both solid and liquid) in the coastal area, which ultimately impacts the marine environment. An alternative plan must be developed urgently. The most common method of waste water disposal is into the ground via a septic tank and field drains. The most important factor in disposing of wastewater (grey water or septic tank effluent) is the permeability of the soil and its ability to allow the effluent to past through at a rate that will facilitate the soil bacteria to sufficiently down grade the strength of the wastewater before it reaches the ground water. The ability of the soil to absorb wastewater will depend on its chemical composition, grain size and structure and the level of the water table. Care must be taken not to overload the soil as this would render it ineffective in treating the effluent.

There are a number of other ways to dispose of effluent that includes ponds/lagoon and activated sludge system, or other biological methods. The main objective is to treat the waste to meet environmental standards while at the same time remaining cost effective. The type of treatment system will depend on the quantity of waste to be treated, land area and resources available (technological, human and financial). More elaborate and refined treatment systems are available such as trickling filters, bio tower or rotating biological contactors (RBC). The use of these depends on the type and quantity of waste, level of treatment required and sensitivity of the area into which the final effluent will be disposed.

Urban solid waste disposal is a major concern in the southern region, and especially in Punta Gorda town. It is a public nuisance and an eyesore. It is very important that the Solid Waste Management Plan (SWMP) component for this region be implemented.

### **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 13. The CZMAI recommends that these standards be used for construction of septic tanks and soak-aways on the **coastal mainland**.

**Table 15: 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. Installation of a subcommittee of the Punta Gorda Town Council to undertake an urgent assessment and appropriate action plan to address urban waste disposal in Punta Gorda Town, seeking central government support if necessary
2. Treat human liquid waste (sewerage) by certified methods, and all such systems must be inspected and approved. All other liquid effluents must be treated to internationally accepted quality levels before discharge off site, and such methods and disposal sites licensed.
3. Maintain all septic systems on a regular basis with booster bacteria to ensure proper function of the breakdown process
4. Dispose of domestic solid waste on a licensed waste landfill. Commercial waste shall be licensed according to type and disposed of appropriately. Solid Waste Management Programs (SWMPs) shall be enforced for all areas.

## **6.8 Infrastructure and Social Amenities**

It is important that planned improvements to infrastructure are driven by the need of the various zoned areas. Priority needs to be given to the development of supporting infrastructure to areas of employment and economic activity. There is a major risk of piecemeal development along the southern shoreline for which the necessary infrastructure (roads, schools, healthcare etc) may not be installed. Therefore further shoreline development should not be permitted outside these existing areas as defined by the present boundaries.

### **Monkey River Village**

A community development plan already exists and has been adopted by the village and its village council. There are currently two private dwellings and a resort in Englishtown, (population seven), plus a further five private dwellings and a resort on the north bank of the river in the area traditionally known as Catfish Nose (population 8 people). The number of dwellings will rise by at least a further two within two years, and further resort development can be expected. In the village itself, on the south bank of the river, there are some forty six dwellings, plus one small hotel and two overnight lodging places, plus two bars and two restaurants, two churches, a health centre/police accommodation and a primary school. The current population is around 160 people. With the coming of grid electricity to Monkey River, there are major expansion possibilities but only from outside investment. It is a key development issue for the Village Council to ensure that further development meets the needs of the community and, of course, falls within these coastal zone management recommendations for development.

### **Punta Negra Village**

This small coastal fishing hamlet lies around seven miles south from Monkey River, and approximately 14 miles from the Southern Highway. It consists of a small number of original fishermen's houses, with larger dwellings having been built to the north of the point over a number of years largely by incomers. Punta Negra is only accessible by boat, and has no access to the national water or grid power supplies. The opportunities for major development are therefore limited. Unless the necessary infrastructure is put in place by developers of this region, further private development north along the beach should be limited to one mile north towards Monkey River.

### **Inland Communities**

Although not of direct concern to this planning exercise, it should be recalled that Bella Vista and surrounding villages on the Southern Highway are fast growing communities, which in

years to come will become more prosperous and will look to the coastal area for recreation opportunities. This tendency is already beginning to happen in Monkey River.

**Recommended Actions:**

1. Discourage further shoreline development outside existing areas as defined by the present boundaries unless the necessary infrastructure and social amenities are installed for communities, at the developer's expense

## 6.9 Conservation

The Southern region has long been recognized as an area with unique biodiversity and ecological value of scientific importance to Belize, the world and humankind. As such these values must be protected. Due to the existence of two key protected areas within the marine realm, the Port Honduras and Sapodilla Cayes Marine Reserves, most of the cayes in this region have some form of protection and management. Both of these reserves have actively implemented management plans that prescribe management interventions focused on preventing overfishing, providing for education and research, and preserving fragile habitats and threatened species. It is important to note that the Sapodilla Cayes Marine Reserve, a World Heritage Site, has seen increased tourism visitation over the past decades, primarily by tourists seeking short vacations and one-day outings.

There is a mile long saltwater lagoon open to the sea known locally as Black Lagoon which lies behind Englishtown. This is an important nursery for junior tarpon, as well as being home to large numbers of hatchlings of various fish species. Apart from many sea birds including a healthy osprey population, the lagoon shoreline is home to crocodiles, several snake species, lizards, green iguanas, coati, agouti, raccoon, possum, tayra, otters and gibnut.

Monkey River itself, although badly silted up and deteriorating, is the prime environmental concern for the northern portion of the southern region. The fish, bird and animal profile is still good but some species are less evident, such as iguanas and sea turtles. This is thought to be due to predation mainly human. Iguana and sea turtles are still eaten in the village, although it is probable that the main culprits are the laborers from the nearby fruit farms and villagers from Bella Vista. There is evidence of bank-side vegetation being removed to allow access for fishing. Apart from the environmental damage this causes, it should be born in mind that this is a prime tourist attraction. The fishing itself is not likely to be a threat to fish stocks, but collateral bank-side damage is.

South of Monkey River Village is mainly swamp land behind the beach, containing lakes. One of these lakes, "Big Pond", is the prime water supply for Punta Negra, as well as being an obvious focal point for wildlife. This lake is vulnerable to pressures of water abstraction by new developments in the area.

Two areas identified as critical sites for the endangered West Indian Manatees (*Trichechus manatus manatus*) in successive aerial surveys were the Port Honduras area and the Indian Hill Lagoon area. These areas serve as both foraging and calving sites for manatees. In 1996, the poaching of manatee in the Port Honduras Marine Reserve was a major issue. However, this issue has been largely addressed with the increased management presence of the Toledo Institute for Development and Environment.

An obstacle to conservation identified by the stakeholders of the southern 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 instruments in law through which the government can steer development of these privately owned properties. However, the stakeholders of the southern region 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:

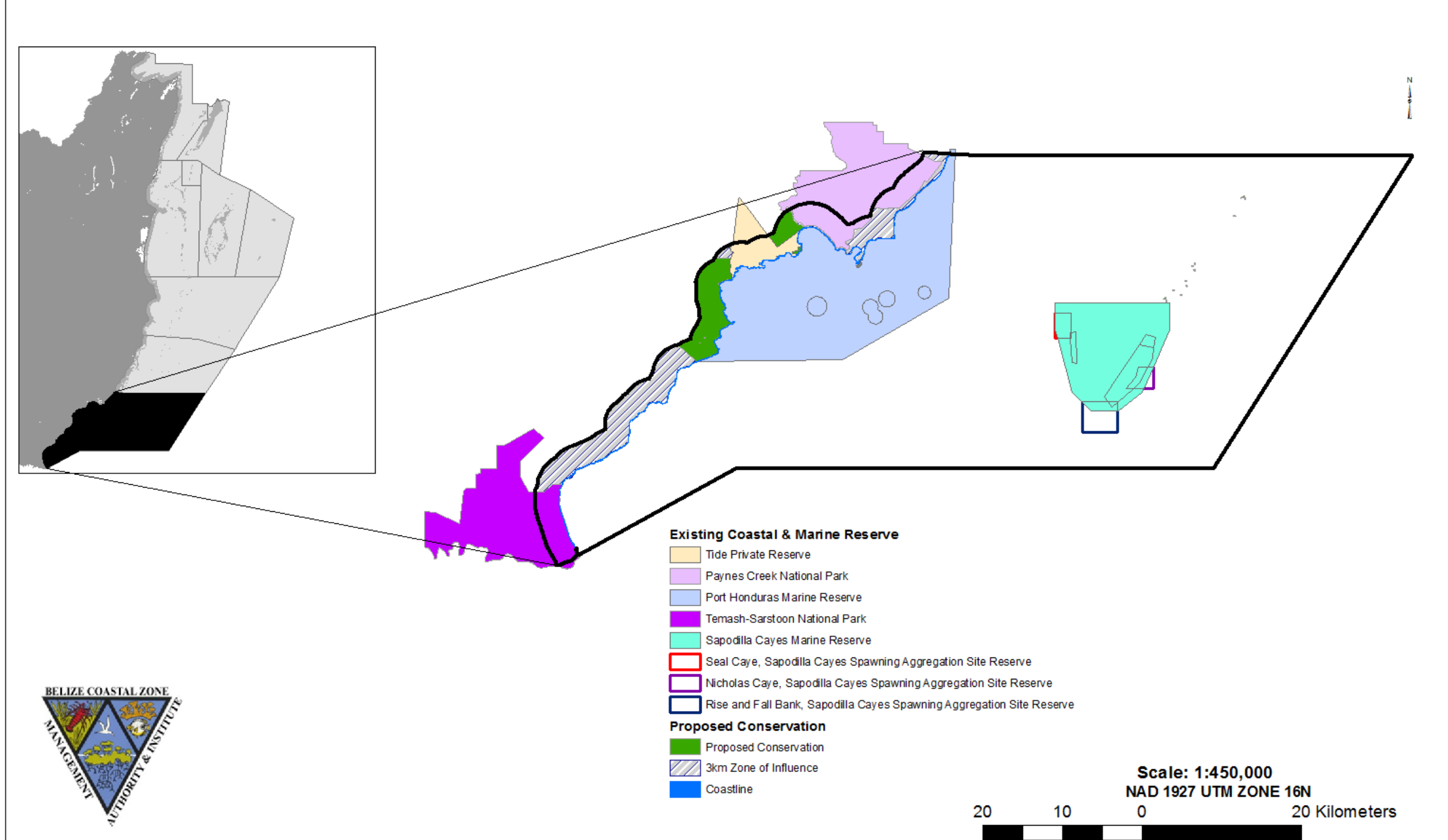
1. Recognize negative covenants for conservation
2. Recognize covenants in gross
3. Ensure that rights of third-party enforcement are binding to subsequent land owners
4. Allow for conservation covenants to be for a specific period of time and subject to variation and termination to add flexibility.

## **Recommended Actions:**

1. Seek protective status for Black Lagoon give its biological importance to the region and country, and “Big Pond” as it serves as the water supply for Punta Negra Village and a focal point for wildlife conservation
2. Enforce Forest Act regulations and species protection policies to address illegal predation of protection wildlife and damage to riverbanks and bank-side vegetation
3. Identify and protect manatee breeding and foraging grounds in this region, especially lagoons and creeks
4. No development should be permitted the following cayes: Wild Cane, Inside and Outside Sheephead, Peter, Abalone, Sickle, Small, Bird, Middle Snake, North Spot and Ragged Cayes and all other numbered cayes. This is because their terrestrial and marine environments cannot support development. If permitted, developing these cayes would require tremendous financial input and significant dredging and sand mining, resulting in the disruption and destruction of important and critical habitats, which can have disastrous implications to the economy, the environment, culture and social values. Consequently, these lands are to remain in their natural state.
5. Limited development should be permitted in these areas: Northeast Sapodilla, Tom Owens, McBride, Wilson, Head, Frenchman, West Snake, South Snake and East Snake Cayes. Low intensity traditional usages (residential/vacation) and economic activity (residential/fisherman camp) basic infrastructure for research and low scale ecological tourism can be permitted.
6. Encourage continued stakeholder participation in the management of protected and managed areas



# INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL DEVELOPMENT: SOUTHERN REGION



**Map 18: Informed Management Zoning Scheme for Conservation in the Southern Region**

**Table 16: Framework for Implementing Informed Management Marine Conservation Scheme**

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
<b>Marine Conservation</b>	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 Port Honduras Marine Reserve and Sapodilla 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 Port Honduras Marine Reserve and Sapodilla Cayes Marine Reserve.

## 7.0 IMPLEMENTATION STRATEGY

The Southern 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 Southern Region Coastal Advisory Committee (SRCAC), 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 Southern 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 SRCAC, 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 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 Southern Region.

## 9.0 REFERENCES

Belize Tourism Board. 2008. Travel and Tourism Statistics. Belize City, Belize.

Belize Tourism Board. 2011. *National Sustainable Tourism Master Plan for Belize 2030*. Available from [http://www.sustainabletourismbz.org/dmdocfree/final\\_compiled\\_plan.pdf](http://www.sustainabletourismbz.org/dmdocfree/final_compiled_plan.pdf) (accessed June 2012)

Cho, L. 2005. Marine Protected Areas: A tool for integrated coastal management in Belize. *Ocean and Coastal Management* 48: 932-947.

Coastal Zone Management Authority and Institute (CZMAI). 2001. *Cayes Development Policy*

Coastal Zone Management Authority and Institute. 2003. *The National Integrated Coastal Zone Management Strategy for Belize*. Prepared by Halcrow Group. 94p. Available from [http://www.coastalzonebelize.org/wp-content/uploads/2010/04/national\\_integrated\\_CZM\\_strategy.pdf](http://www.coastalzonebelize.org/wp-content/uploads/2010/04/national_integrated_CZM_strategy.pdf) (accessed October 2012).

Cooper, E., Burke, L., Bood, N., 2009. Coastal Capital Belize: The economic contribution of Belize's coral reefs and mangroves. WRI working paper, World Resources Institute, Washington D.C. 53 p. Available from [http://pdf.wri.org/working\\_papers/coastal\\_capital\\_belize\\_wp.pdf](http://pdf.wri.org/working_papers/coastal_capital_belize_wp.pdf)

Development Solutions. 2004. *Southern Cayes Region Volume 10. Development Guidelines*. Coastal Zone Management Authority & Institute.

Gibson, J. (Ed.) 1989. Proceedings of the International Coastal Resources Management Workshop. San Pedro, Ambergris Caye, Belize, 23 -25 August, 1989. Wildlife Conservation International, Belize. 193p

Government of Belize. 1998. *Belize Coastal Zone Management Act*, Chapter 329, Laws of Belize, Revised Edition, 2000.

Grimshaw, T. 2003. *Draft National Aquaculture Zoning Plan*. Tunich-Nah Consultants & Engineering, ECOWORKS. Belize City, Belize.

Lands and Surveys Department. 2012. *Draft National Guidelines for Subdivision and Consolidation of Land in Belize*. Ministry of Natural Resources and Agriculture, Belmopan, Belize.

Statistical Institute of Belize. 2010. Belize Population and Housing Census 2010.

## **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 Southern 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 Southern 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 Southern 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 Southern 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 Southern 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

### **Southern Region Coastal Zone Management Guidelines**

Authorities to administrate the Act. Thus, the Southern Region CAC can be appointed as the Local Building Authority for the Southern Region. However, this may require strengthening the Southern Region CAC with technical expertise to do this. The alternative is to coordinate this function with the Punta Gorda Town Council and Village Councils of Monkey River, Cattle Landing, and Barranco.

*Punta Gorda Town Council* – The Town Councils Act requires applications for liquor licenses for the region. The Southern 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 Southern 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 Southern 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 Southern 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 Southern 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 Southern 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 Southern 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 Southern 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 Southern 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 Southern 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 Southern 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 Southern 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 Southern 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 Southern 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	<input type="radio"/> Fisheries Department
National Aquaculture Policy (Draft)	<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

### Southern Region Coastal Zone Management Guidelines

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
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"/> Geology and Petroleum Department
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	<input type="radio"/> Belize Port Authority
Harbours and Merchant Shipping Act	
Private Works Construction Act	<input type="radio"/> Ministry of Works and Transport
Customs Regulation Act	

**Southern Region Coastal Zone Management Guidelines**

Maritime Areas Act	<input type="radio"/> Belize Customs Department
Defence Act	<input type="radio"/> Ministry of Foreign Affairs
Immigration Act	<input type="radio"/> Belize Defence Force
Dredging Policy	<input type="radio"/> Immigration Department
Environmental Protection Act	<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	<input type="radio"/> Fisheries Department
Ancient Monuments and Antiquities Act	<input type="radio"/> Archaeology Department
National Institute of Culture and History Act	<input type="radio"/> National Institute of Culture and History
Belize Tourism Board Act	<input type="radio"/> Belize Tourism Board
Public Health Act	<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	<input type="radio"/> Department of the Environment
Petroleum Act	<input type="radio"/> Geology and Petroleum Department



# 10.4 FIGURES

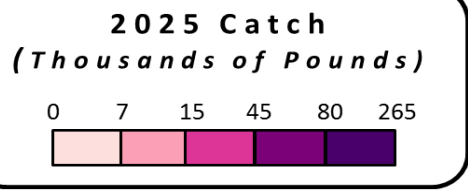
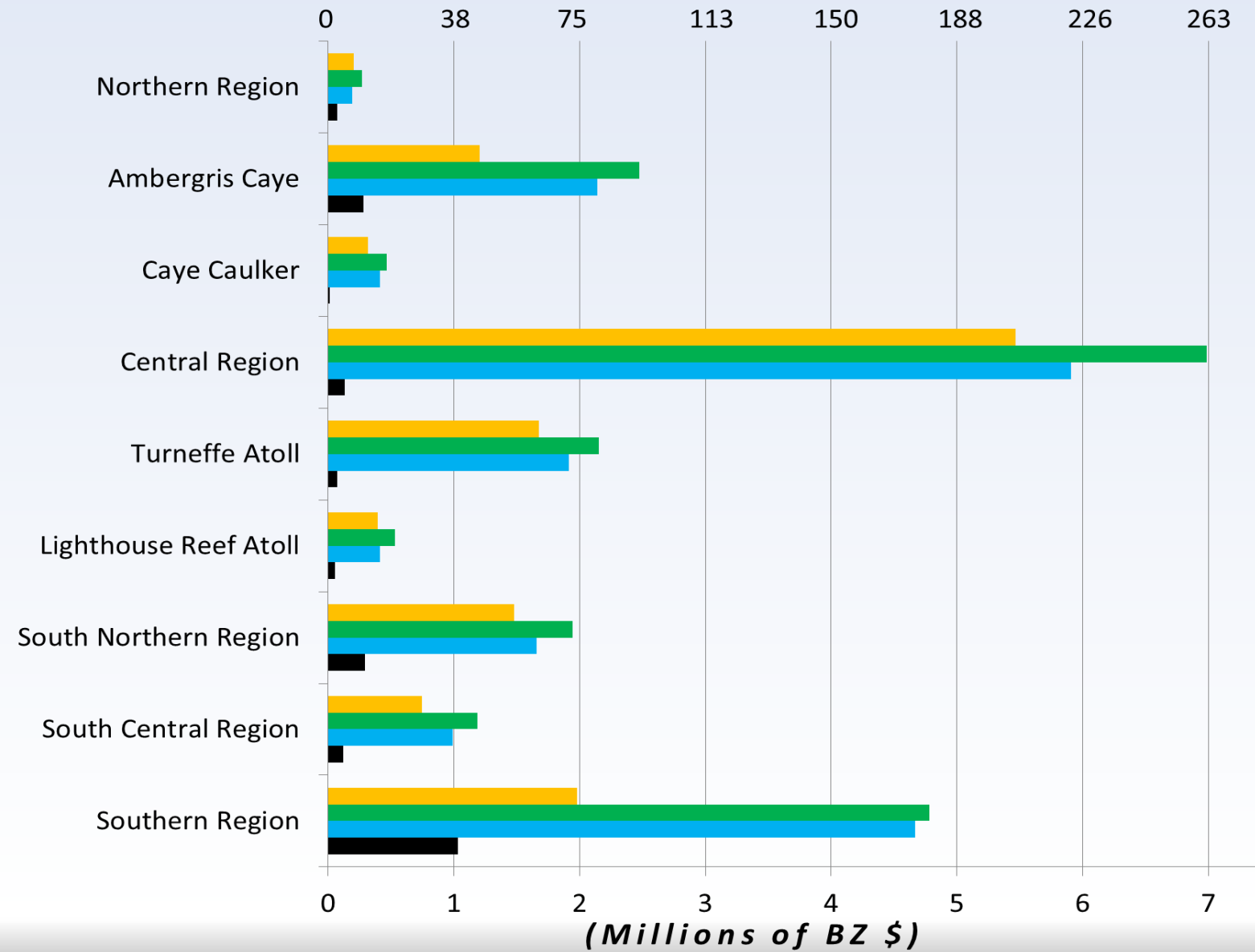
**LOBSTER FISHERIES**

**SCENARIOS**

- Current
- Conservation
- Informed Management
- Development

**Catch and Revenue by Coastal Planning Region (Current & 2025)**

*(Thousands of Pounds)*



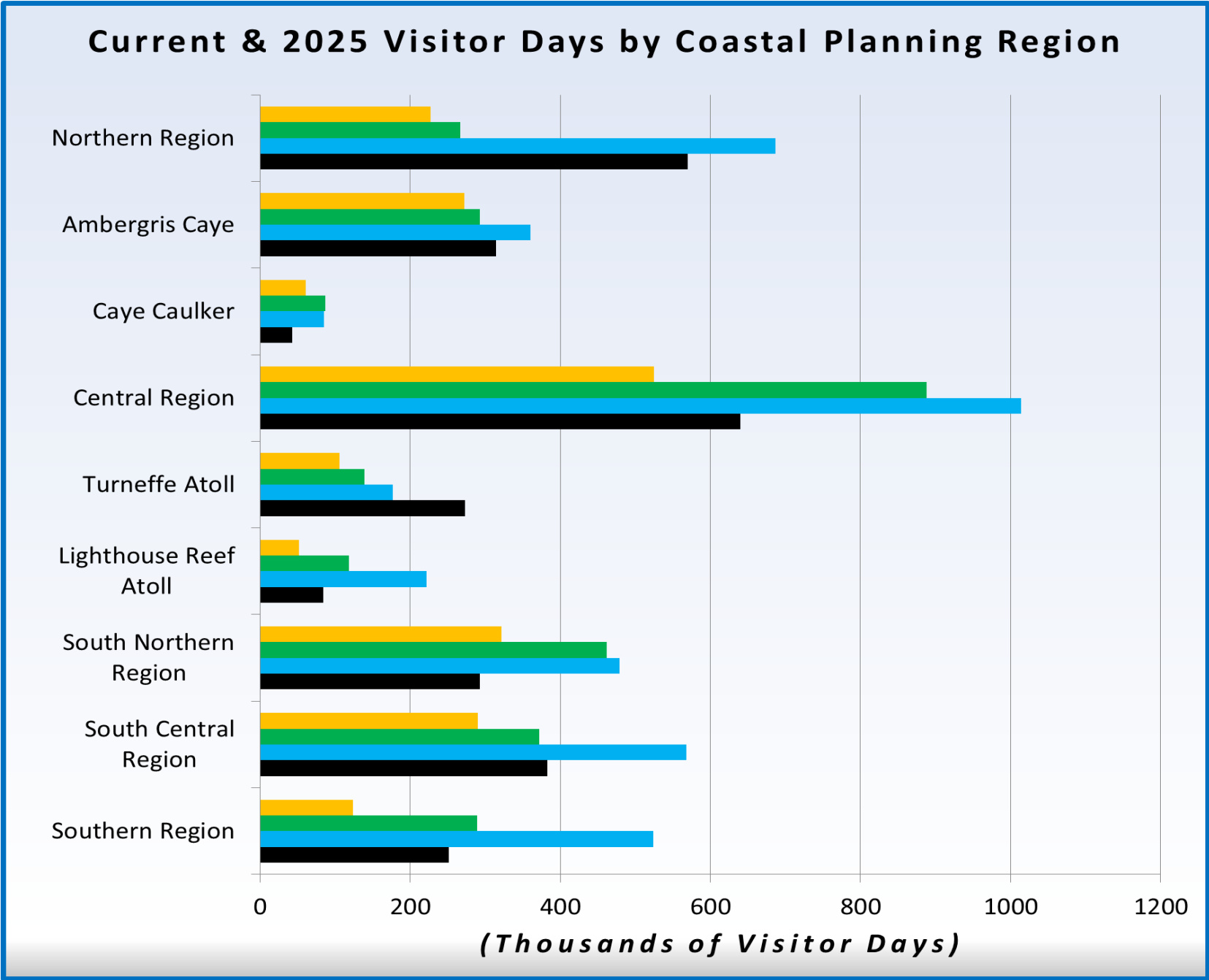
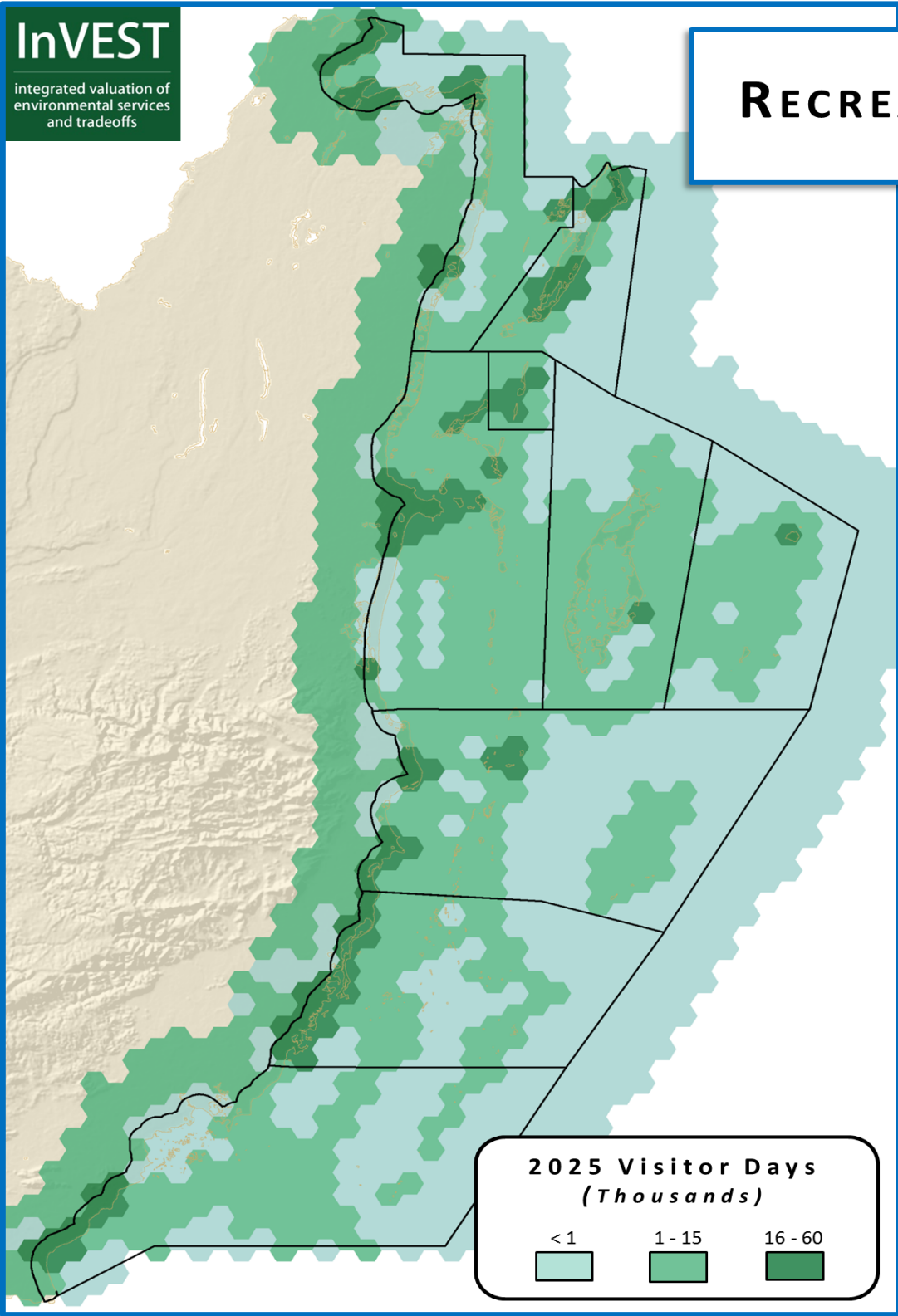
**INFORMED MANAGEMENT**

**Figure 4: Lobster Fisheries Catch and Revenue by Scenario**

**RECREATION**

**SCENARIOS**

- Current
- Conservation
- Informed Management
- Development



**INFORMED MANAGEMENT**

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

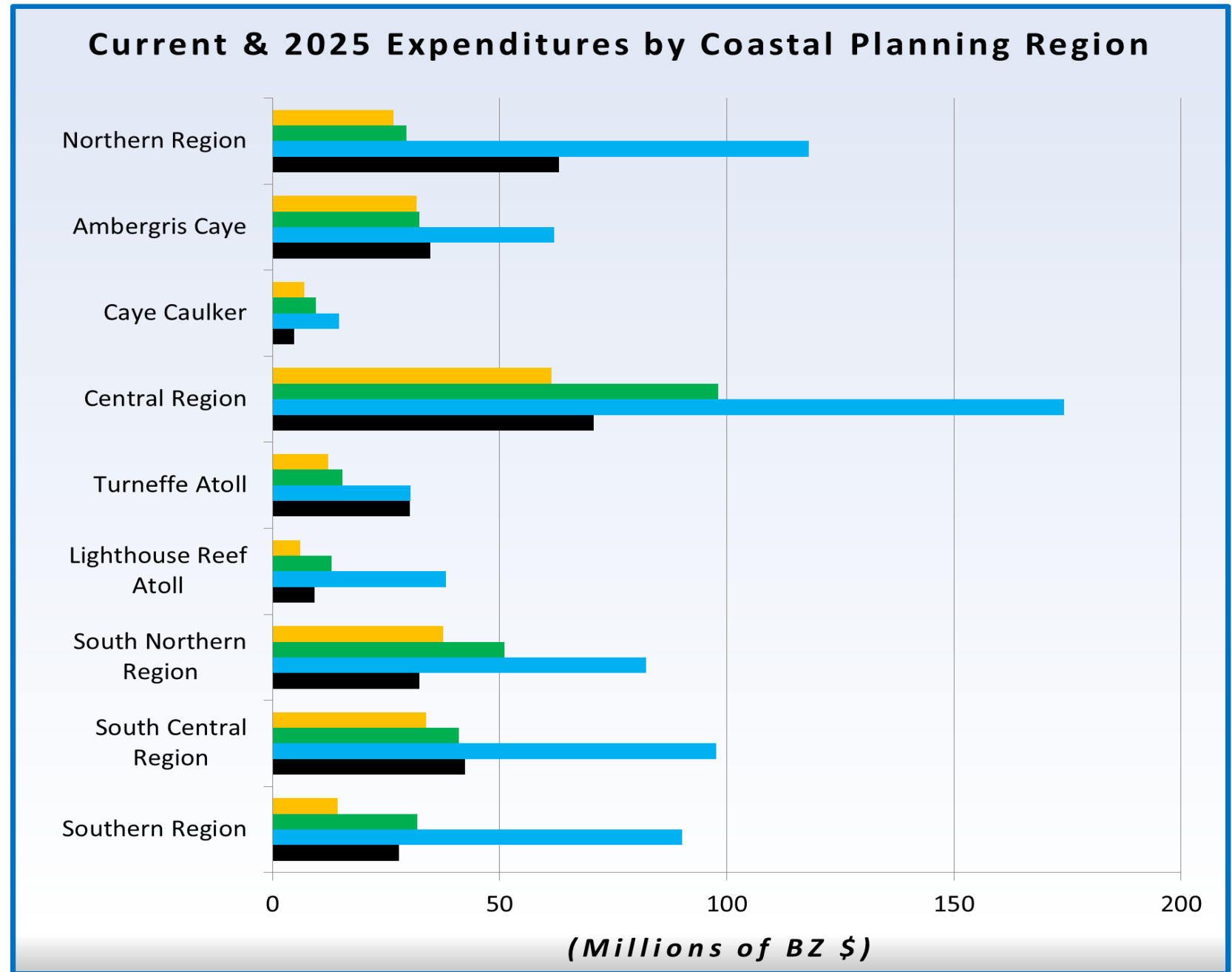
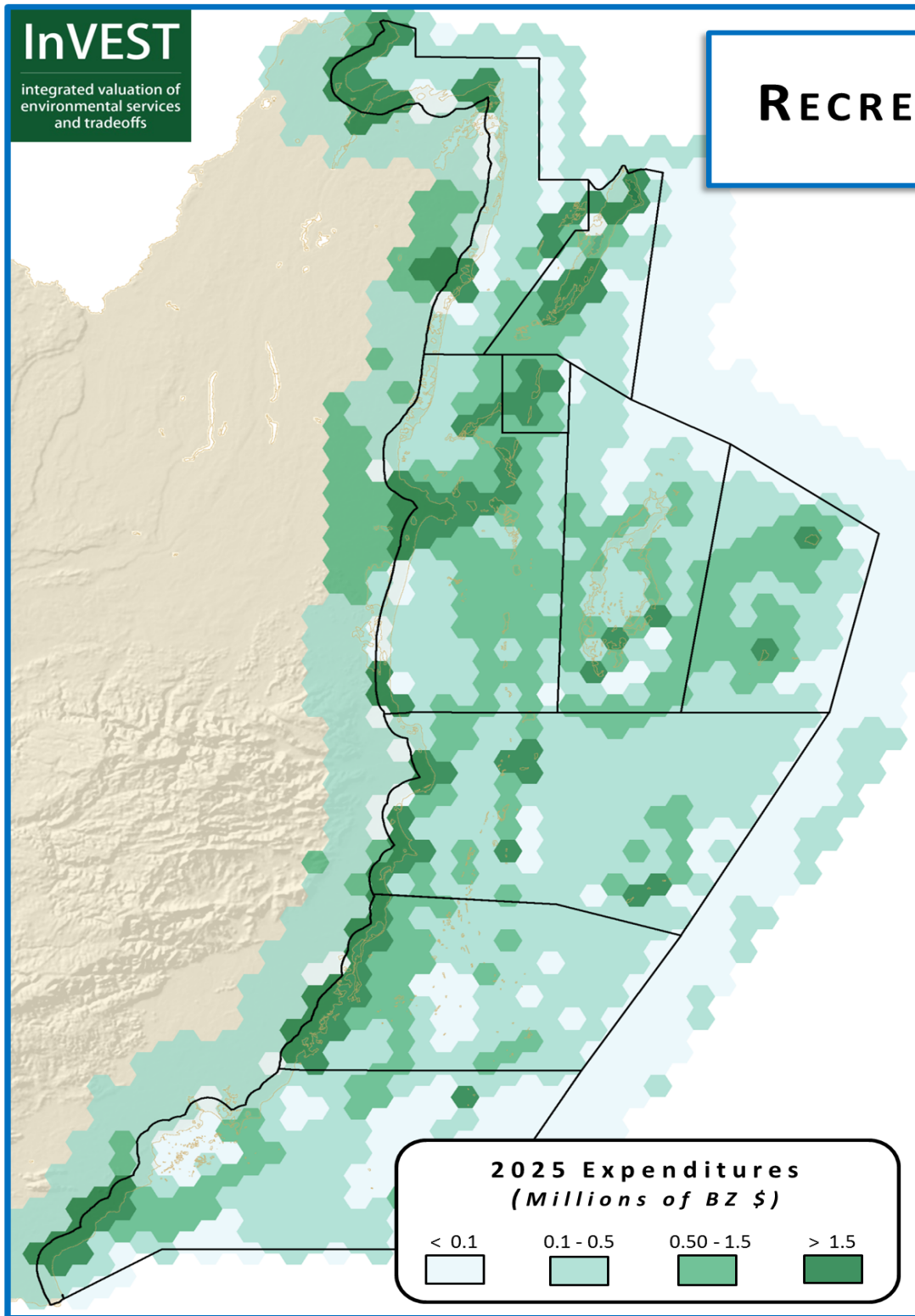
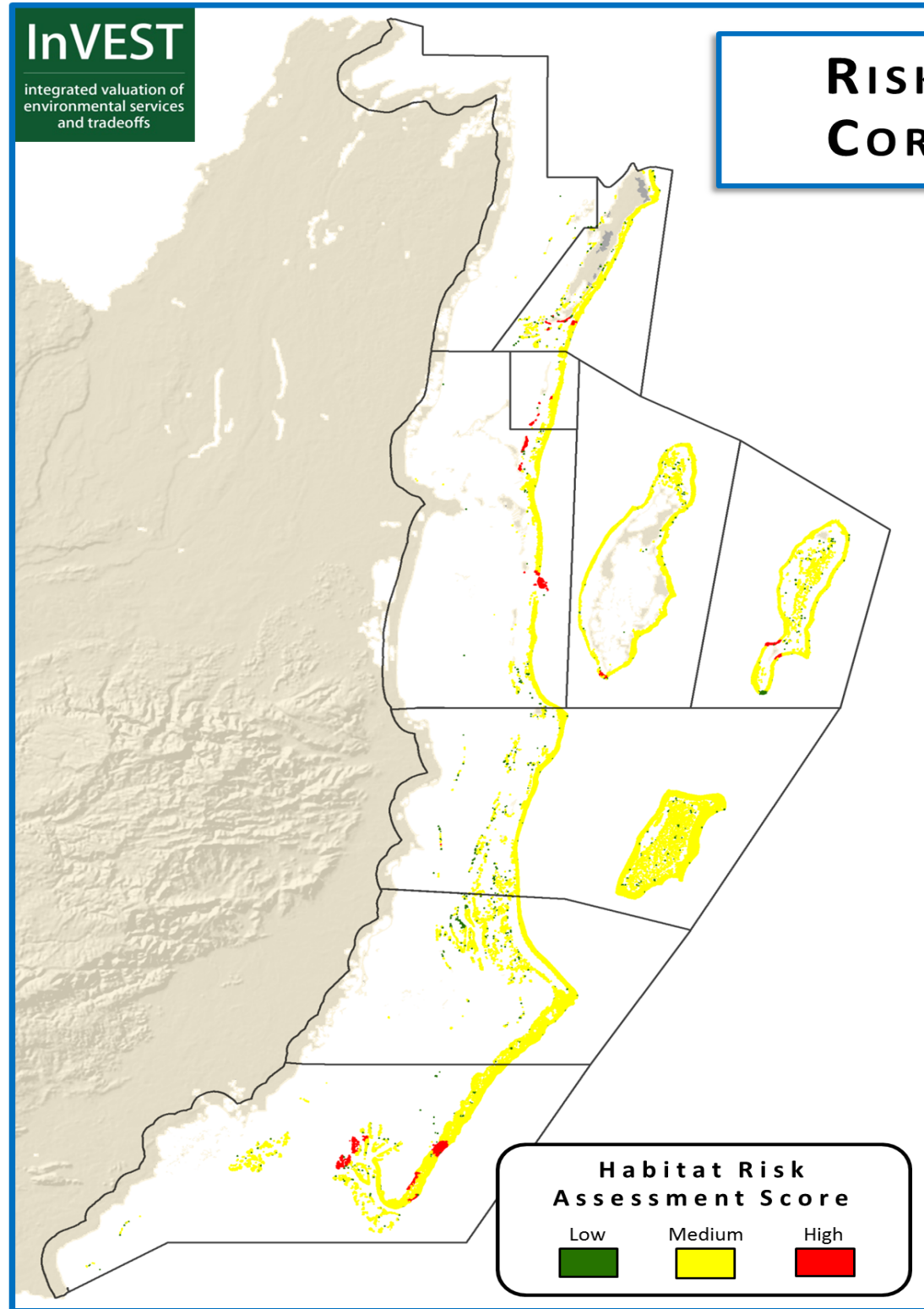


Figure 6: Annual Expenditures for Marine Tourism and Recreation by Scenario

**RISK TO  
CORALS**



**INFORMED MANAGEMENT**

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

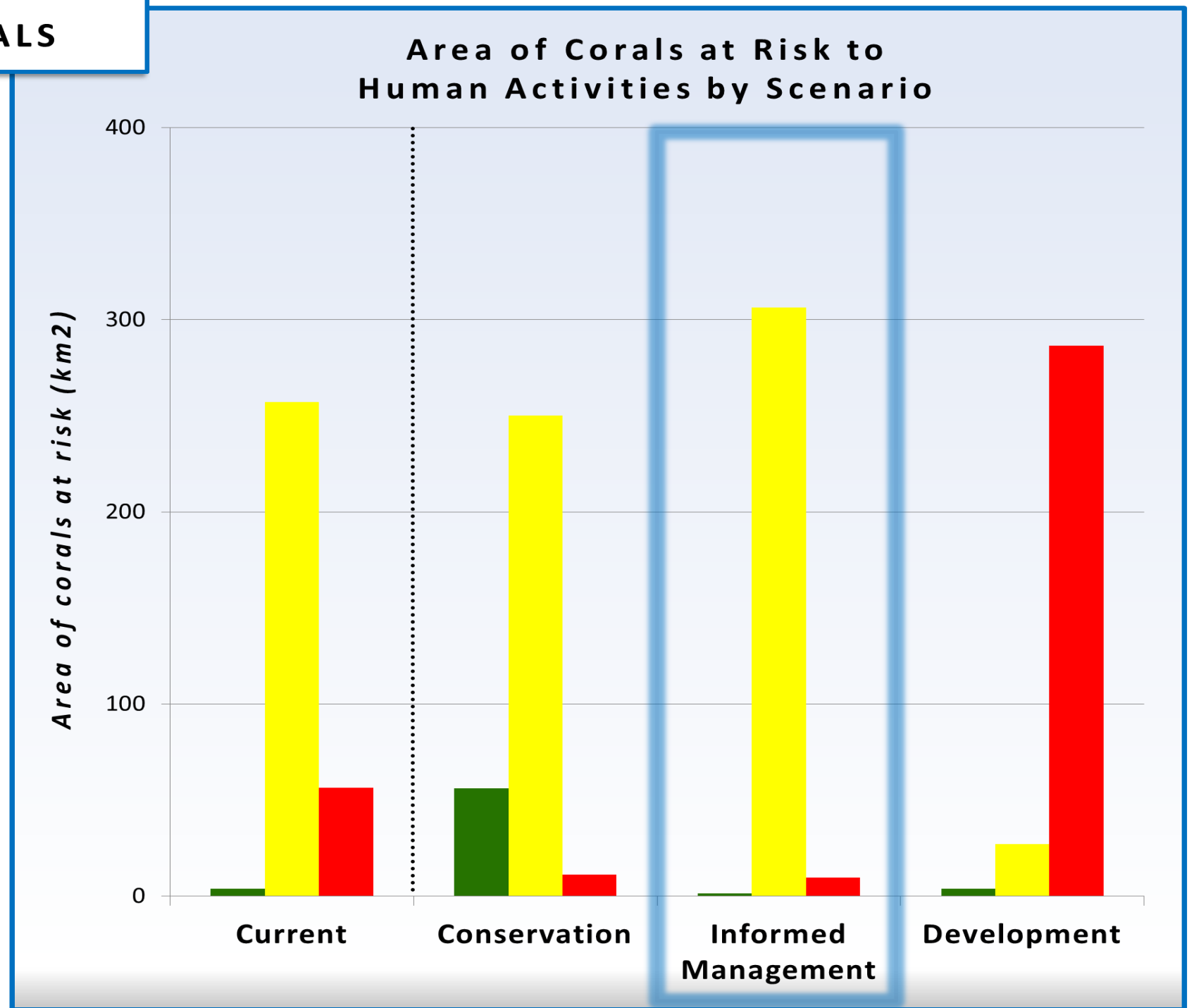
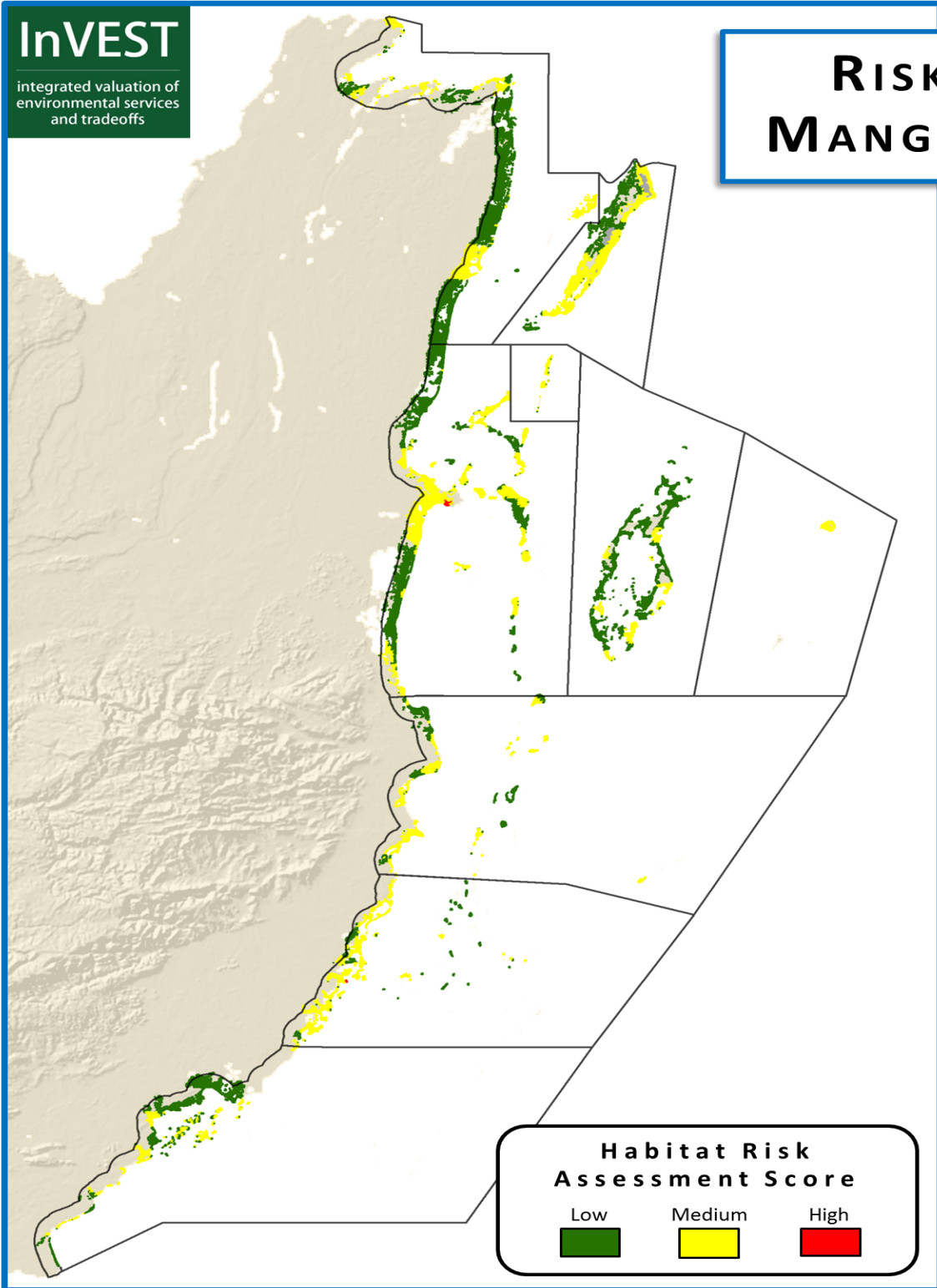


Figure 7: Area of Corals at Risk from Human Activities by Scenario

**RISK TO  
MANGROVES**



**INFORMED MANAGEMENT**

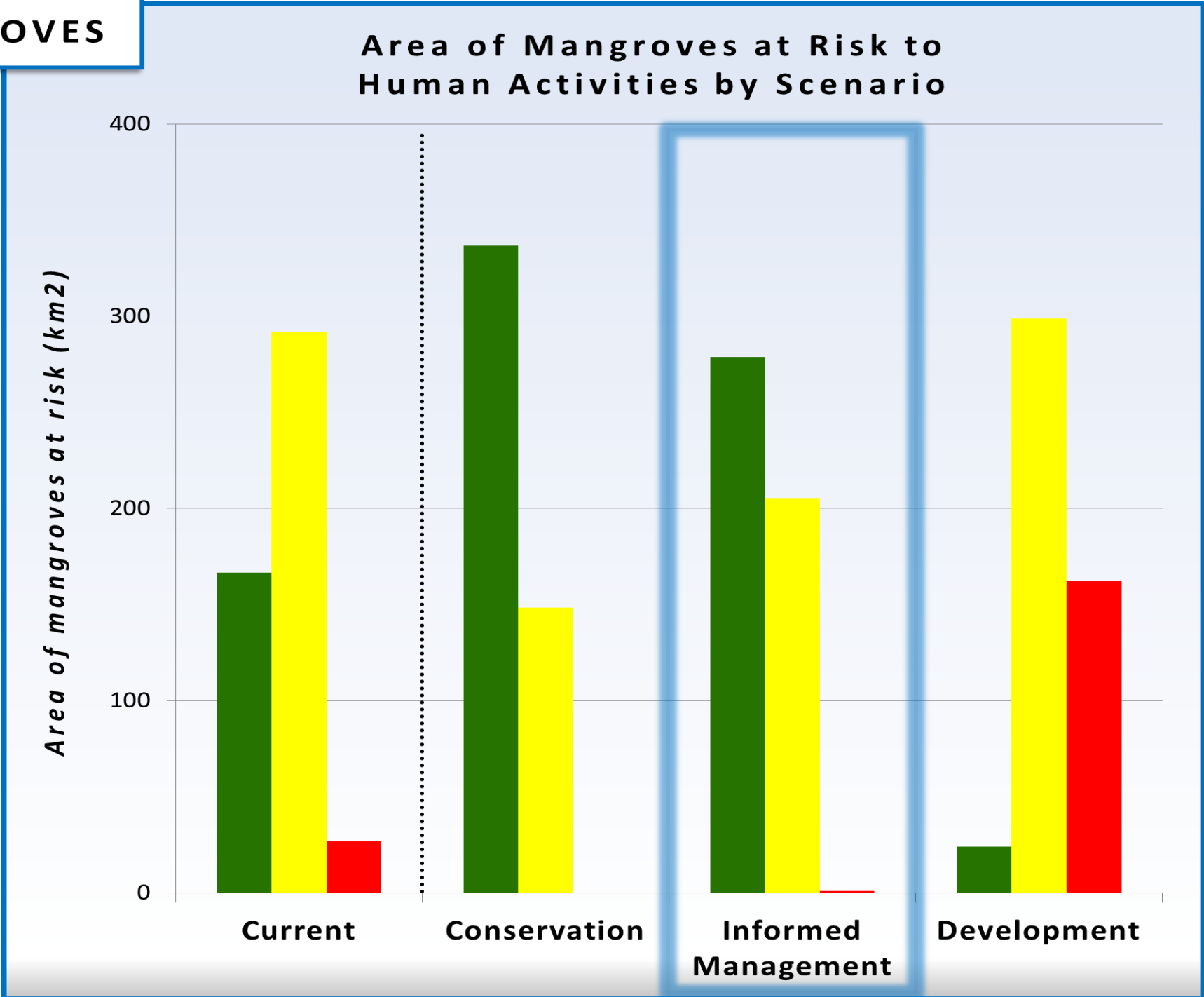
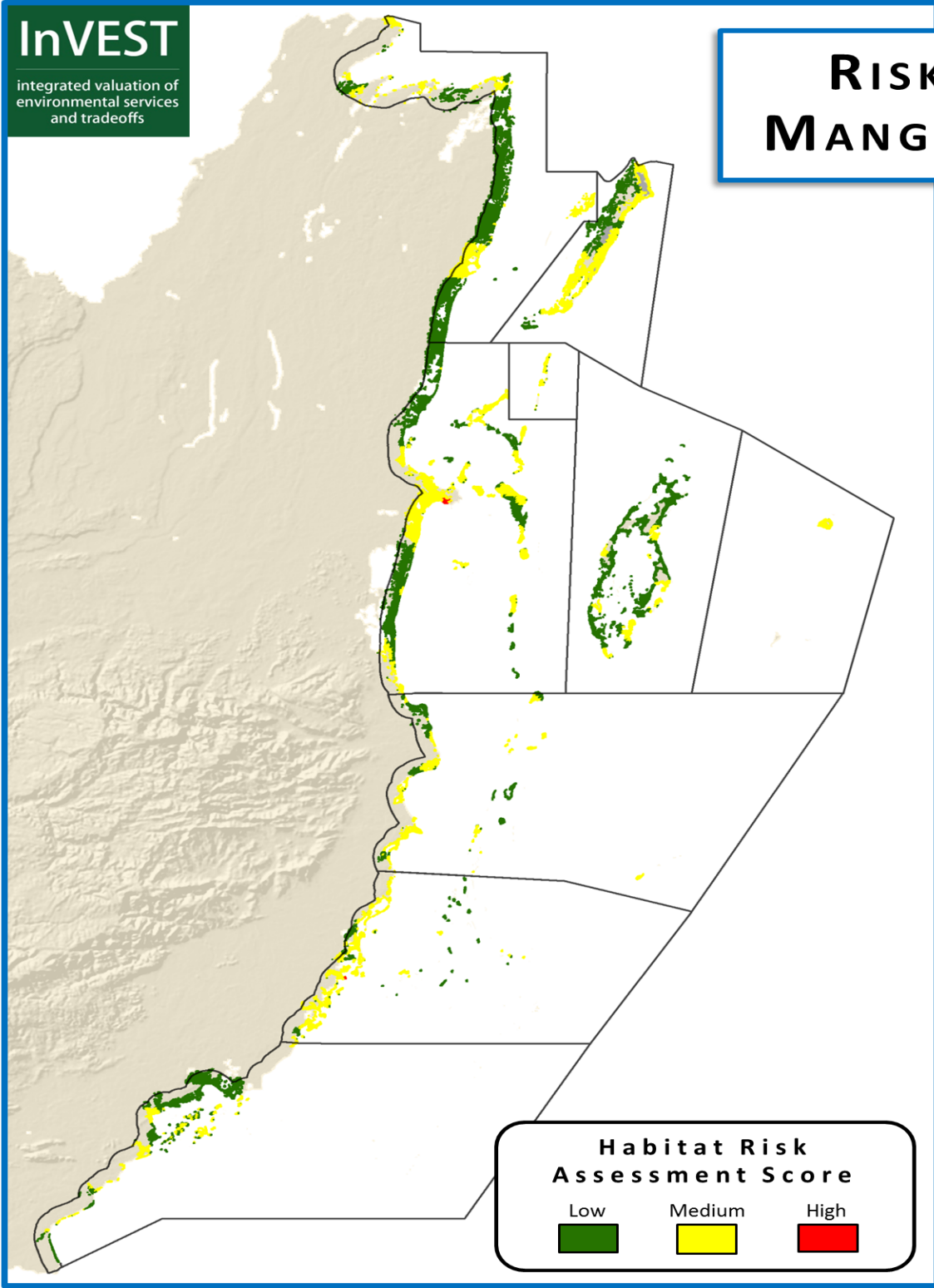
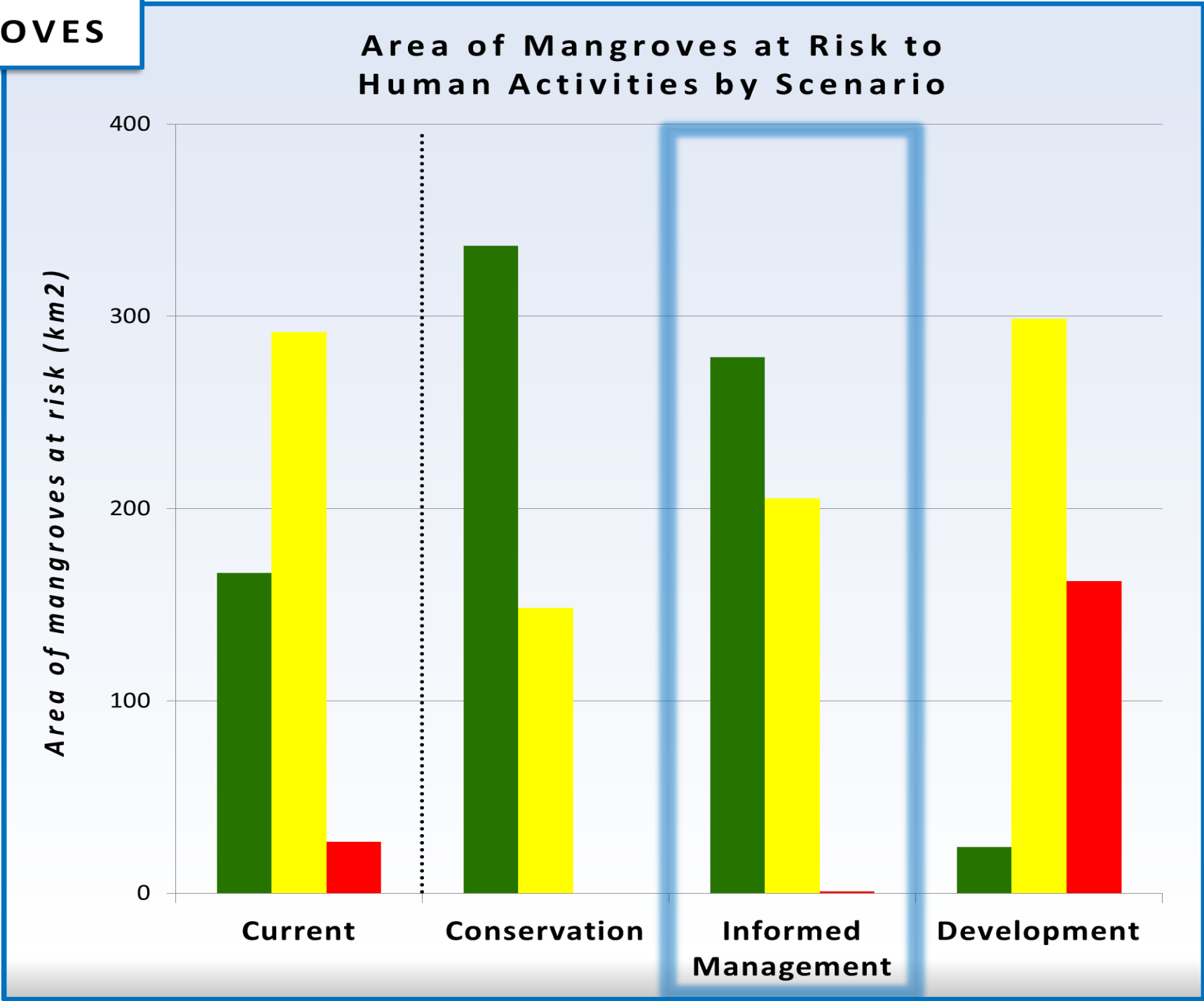


Figure 8: Area of Mangroves at Risk from Human Activities by Scenario

**RISK TO  
MANGROVES**

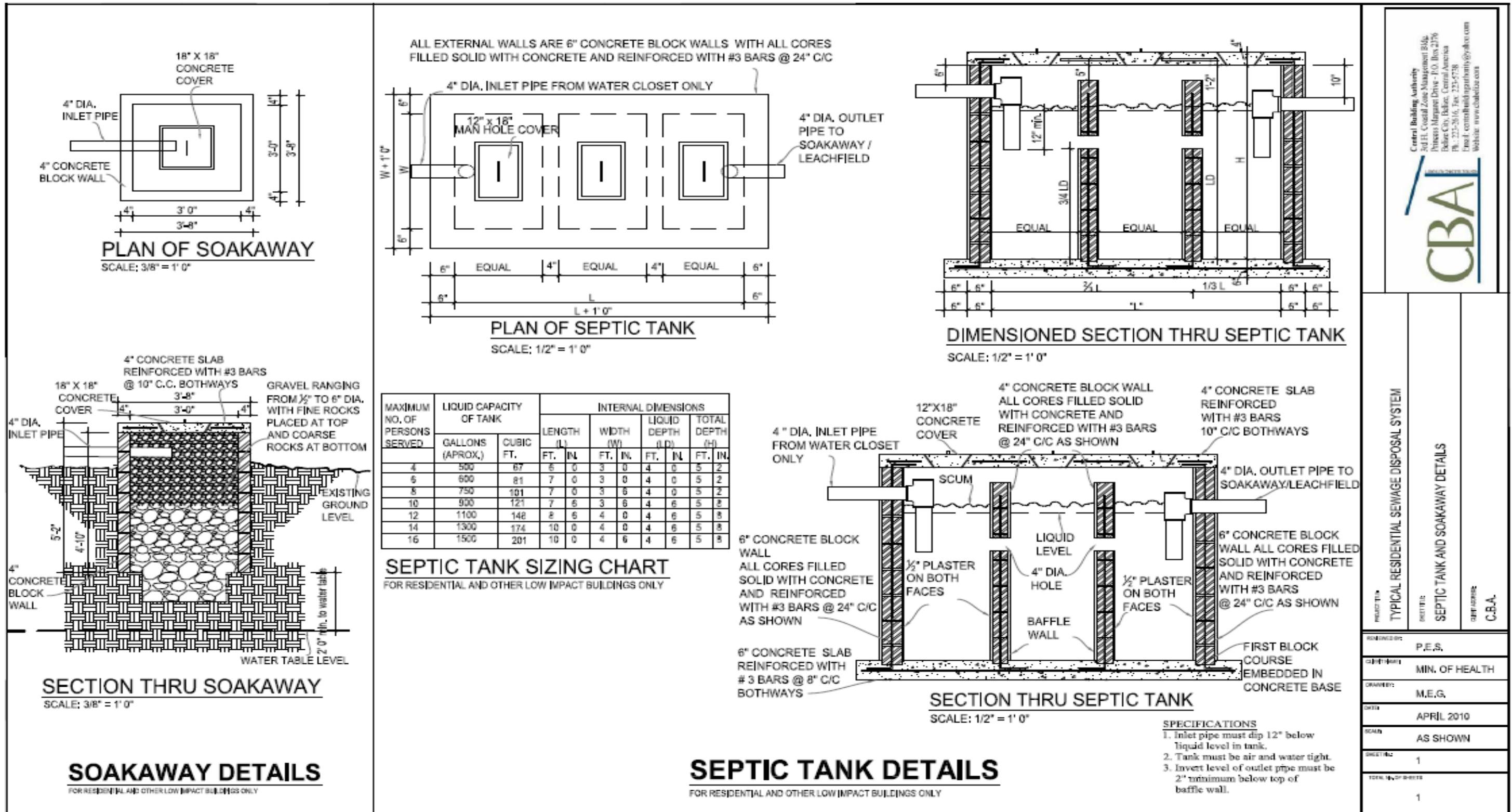


**Area of Mangroves at Risk to Human Activities by Scenario**



**INFORMED MANAGEMENT**

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



Central Building Authority  
3rd FL, Coastal Zone Management Bldg,  
Princess Margaret Drive - P.O. Box 2176  
Belize City, Belize, Central America  
Tel: 223-2616, Fax: 223-5738  
Email: centralbuildingauthority@cbca.com  
Website: www.cbca.bz

**CBA**

TYPICAL RESIDENTIAL SEWAGE DISPOSAL SYSTEM

PROJECT TITLE: SEPTIC TANK AND SOAKAWAY DETAILS

DESIGNED BY: P.E.S.

APPROVED BY: MIN. OF HEALTH

DRAWN BY: M.E.G.

DATE: APRIL 2010

SCALE: AS SHOWN

SHEET NO.: 1

TOTAL NO. OF SHEETS: 1

Figure 10: Septic Tank and Soakaway Details for Residential and Low-Impact Buildings