

CENTRAL REGION COASTAL ZONE MANAGEMENT GUIDELINES



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Agencies:

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Belize City Council
Belize Port Authority
Belize Tourist Board
Department of Environment
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*** Indicates CRCAC member**

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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 Central Region was held in Belize City on May 16th, 2013, and had participation from the following individuals:

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Shane Young	Belize Audubon Society
Julie Robinson	The Nature Conservancy

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

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LIST OF ACRONYMS

CBA	Central Building Authority
CRCAC	Central Region Coastal Advisory Committee
CZAC	Coastal Zone Advisory Council
CZMAI	Coastal Zone Management Authority & Institute
DOE	Department of Environment
EIA	Environmental Impact Assessment
GOB	Government of Belize
HRA	Habitat Risk Assessment
Marine InVEST	Marine Integrated Valuation of Ecosystem Services and Trade-off
NSTMP	National Sustainable Tourism Master Plan
SWMP	Solid Waste Management Plan

GLOSSARY OF TERMS

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

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

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

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

Commerce means the storage and retail of consumer goods

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

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

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

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

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

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

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

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

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

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

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

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

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

Lots acre should be subdivided and alienated

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

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

Marina means a mooring facility for four or more recreational vessels

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

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

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

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

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

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

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

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

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

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

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

Primary Land Use means the recommended preferred use of the site

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

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

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

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

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

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

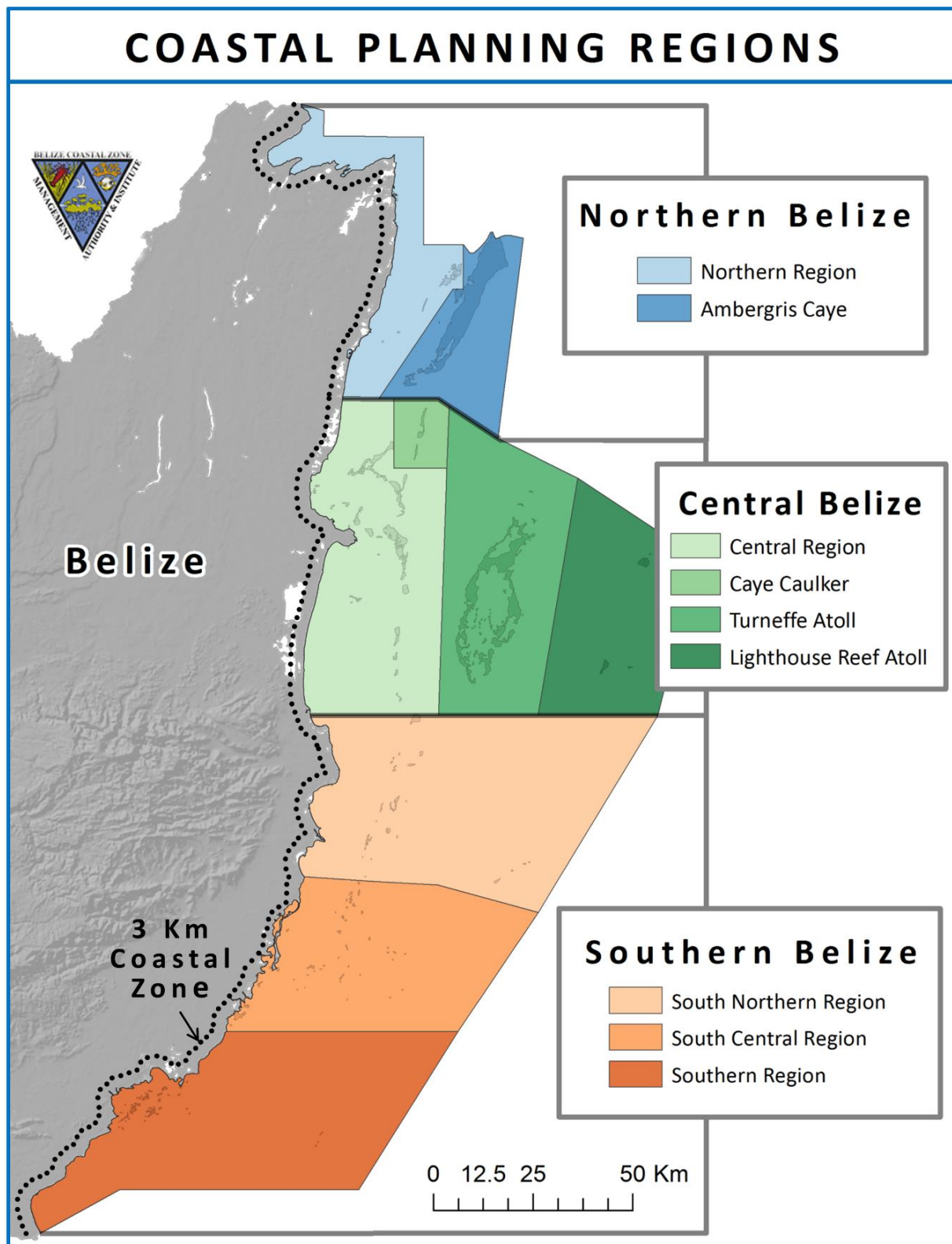
PREAMBLE

The Belize Coastal Zone Management Authority and Institute (CZMAI), a statutory body established by the Coastal Zone Management (CZM) Act of 1998, is tasked with the broad responsibility of assisting with the development of policies, strategies and guidelines for the improved management and sustainable use of the country's coastal resources at a national level. In keeping with its mandate to prepare an integrated coastal zone management plan, the agency has developed regional coastal zone management guidelines to provide support for planned development and resource management along the coastline and offshore areas of the entire country. These guidelines have been prepared for nine (9) coastal planning regions (**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 Central Region Coastal Zone Management Guideline was developed in conjunction with the stakeholders of the communities within the Central Region. The Central Region; which encompasses the coastal communities of Belize City, Ladyville, Mullins River and Gales Point, is relatively undeveloped. The exception is Belize City, which was once the capital of Belize and continues to be the major center of commerce for the country. 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 Central Region that will promote economic growth while simultaneously ensuring ecosystem stability and the efficient delivery of ecosystem services.
2. Protect and preserve the traditional way of life of the stakeholders within the Central Region
3. Ensure sustainability of coastal resources by identifying areas in need of conservation and reducing user conflicts

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



Map 1: Coastal Planning Regions of Belize

1.0 INTRODUCTION

The Central region refers to the majority of the coastline of the Belize district and all those cayes, privately and nationally owned, that surround the mainland. It includes the coastal communities of Gales Point, Mullins River, Ladyville and Belize City, the largest municipality in this region. This region also includes approximately 46 named and unnamed singular cayes and ranges of cayes as seen in **Table 1**.

Table 1: Coastal Communities and Caye within the Central Planning Region

Coastal Communities:	
Belize City	Mullins River
Gales Point	Ladyville
Cayes:	
Frances Cayes	Hens & Chickens Cayes
Moho Caye	Riders Caye
Coffe Caye	Hicks Caye
Unnamed N of Long Caye	Long Caye #1
Montego Caye	Frenchman Caye
St. Georges Caye	North Drowned Caye
Mapp Caye	Foreman Caye
Drowned Cayes	Swallow Caye
Stake Bank Caye	Shag Caye
Austin Caye	Bannister Bogue Caye
Brown Caye	Unnamed S of Goring Bogue
Spanish Lookout Caye	Paunch Caye
Sergeant Caye	Curlew Spit
Water Caye	Goff Caye
English Caye	Robinson Point Caye
Horseshoe Caye	Ramsey Caye
Grennel Caye	Spanish Caye
Long Caye#2	Pigeon Caye
Lovers Ranch Caye	Eiley Caye
Holmes Caye	Triangles Caye
Unnamed W Holmes Caye	Middle Long Caye
Rendezvous Caye	Bluefield Range Caye
Alligator Caye	Colson Caye

This region has rich and diverse habitats in both the terrestrial and aquatic province, except for those areas where the fish stocks have been depleted. The species of animals range from corals to fishes, sea turtles, which are endangered species, to birds and manatees, which are constantly under threat from increased marine traffic in the region, and crocodiles and dolphins. The plant species include mangroves and sea grasses, which are inhabited by crabs, tree worms, lobsters, conch, crabs, sea stars and octopuses among others. Many of these species are also under threat from illegal fishing and over fishing.

The Central region is also referred to as the historic gateway to modern Belize, going back about four hundred years. It is believed to be situated on one of the ancient Maya trade routes, a belief substantiated by the numerous archaeological sites of this era. In addition, historic St. Georges Caye, where the infamous Battle of St. Georges Caye was fought, is also located in this region, and many relics of the battle can be found on the caye.

Undoubtedly, there are a number of users of the Central region, namely, fishermen, vacationers, tourists, tour Guides, developers, hoteliers, each pursuing differing purposes, some complimentary, while others conflicting. This is within a region that is characterized by varying geomorphic and physical characteristics, defined by a habitat that is ecologically vulnerable and one which supports a diverse population of species, some endangered. While there exist some form of legislative and institutional mechanisms to support implementation of these guidelines, these are undermined by legislative deficiencies and centralized and under resourced institutions.

2.0 REGION BOUNDARIES

Location and Geographic Definition

The Central Region is one of nine regions into which the coastal zone has been demarcated. It encompasses approximately 2529.2 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 Northern Region, west of the Caye Caulker and Turneffe Regions, north of the South Northern Region, and extends 3km inward from the eastern coast of the Belize district (**See Maps 2, 3, 4, 5**).

Point 1: (1969979 N,368132 E)

Point 2:(1969979 N, 384007 E)

Point 3: (1952516 N, 383901 E)

Point 4: (1952411 N, 397024 E)

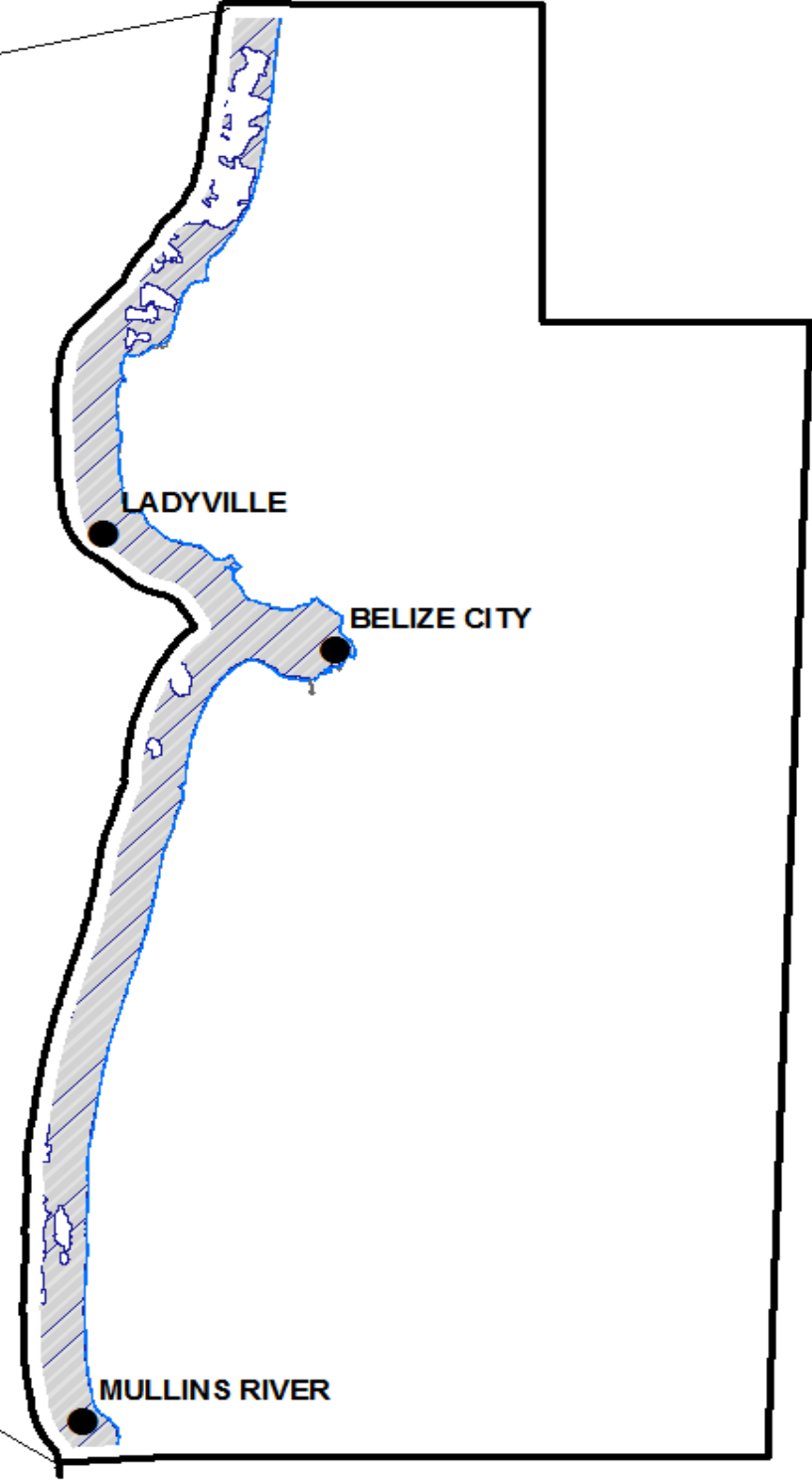
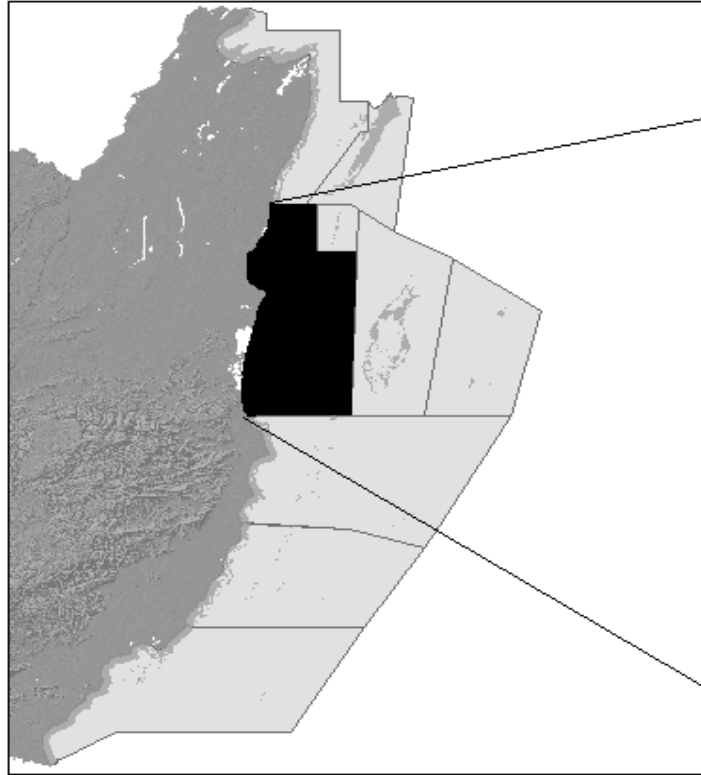
Point 5: (1889863 N, 395119 E)

Point 6: (1889969 N, 359877 E)

Regional Context

The Central Region is made up of approximately forty six (46) named and unnamed singular cayes and ranges of cayes, and comprises approximately 2245.2 sq. kilometers of terrestrial and aquatic environment including inlets, channels, flats and reefs of which 51sq. kilometers or 2 % is terrestrial and 2194.2 sq. kilometers or 98% is aquatic. The cayes of the region reflect appreciable variation in sizes, composition, elevation and geographic placement. The two smallest singular cayes are Eiley and Rendezvous Cayes with 0.5 acre each, and the two largest are Drowned and Hicks Cayes with 3503 and 3556 acres respectively. The latter two are considered ranges of cayes. The mainland portion of the region ranges from approximately twenty six (26) miles north of Belize City along the coast to Mullins River locator north of the Stann Creek District. This accounts for an area of approximately 233 sq. kilometers.

CENTRAL COASTAL ZONE PLANNING REGION



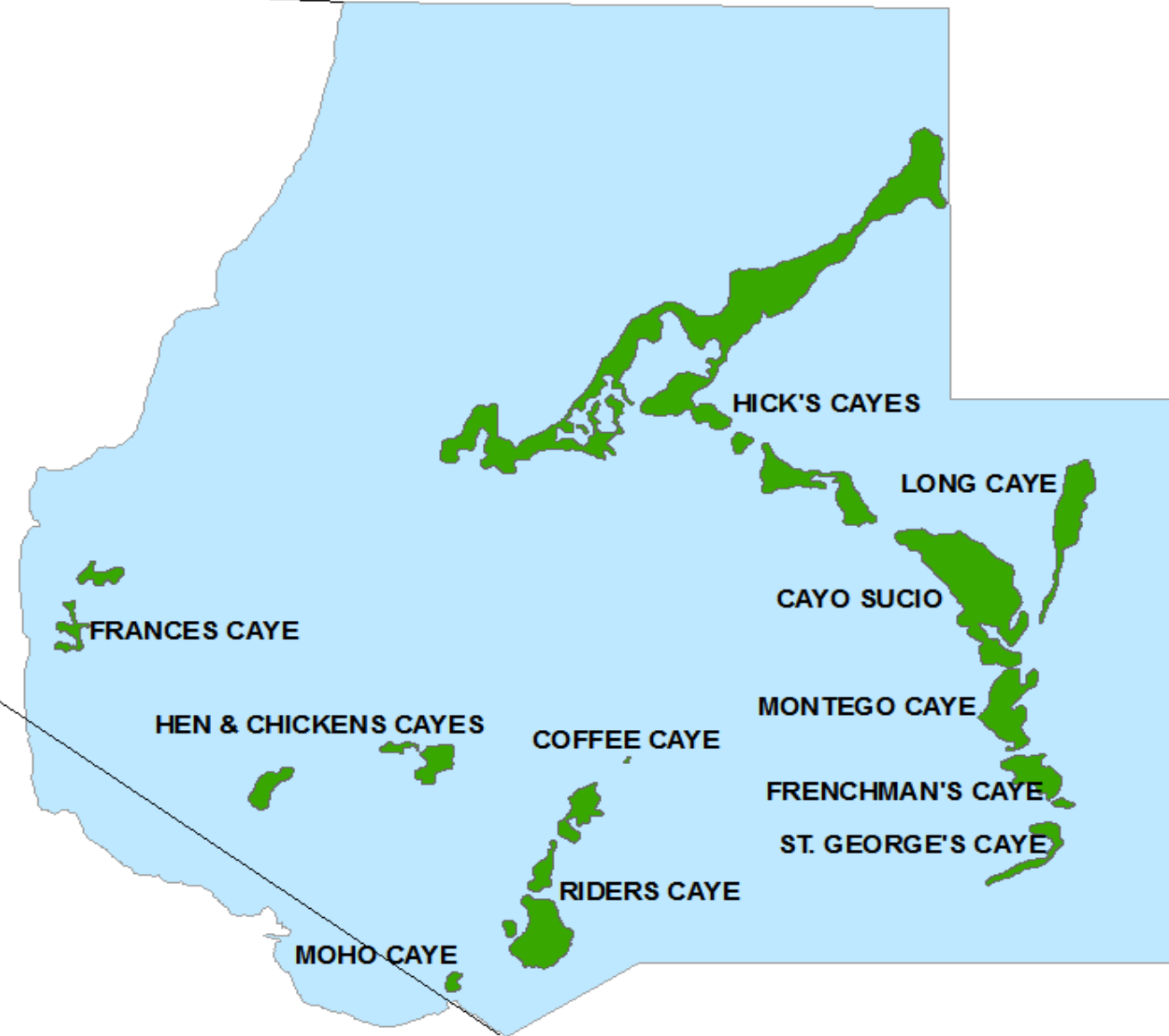
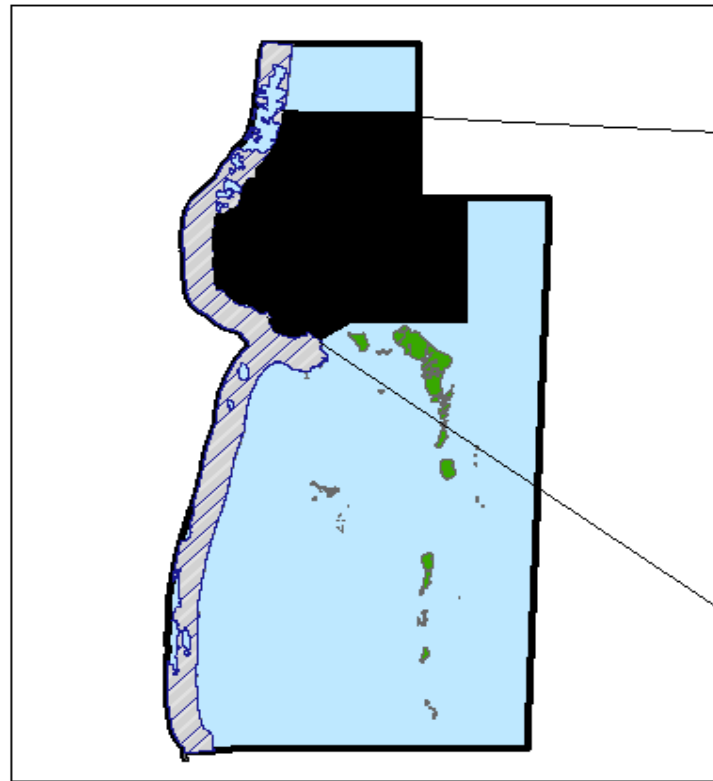
- Coastline
- 3km Zone of Influence
- Central Coastal Communities

Scale: 1:350,000
 NAD 1927 UTM ZONE 16N
 10 5 0 10 Kilometers



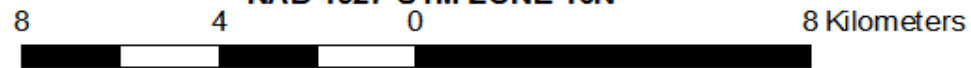
Map 2: Central Coastal Zone Planning Region

CENTRAL REGION CAYES NORTHERN SUB-REGION



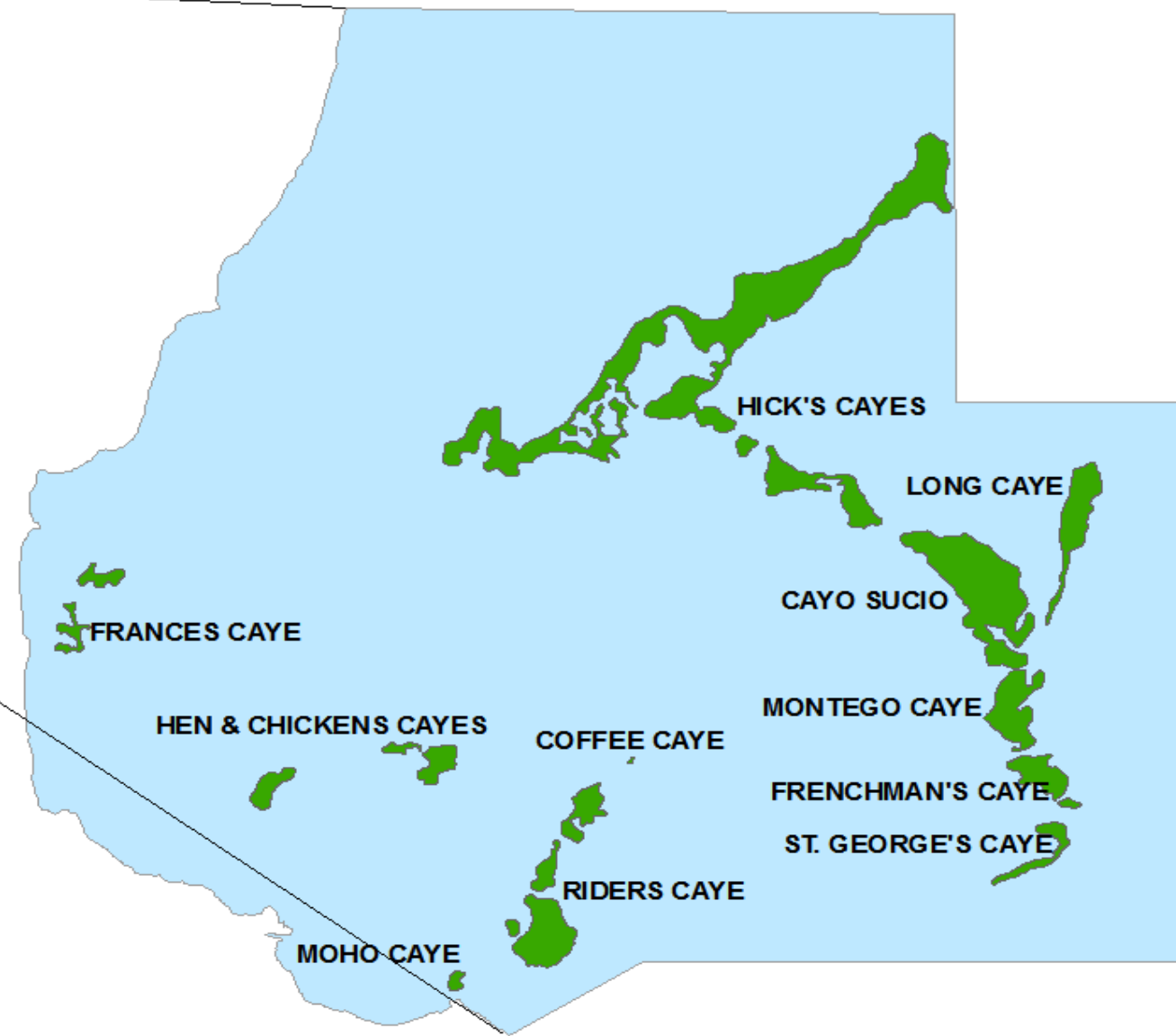
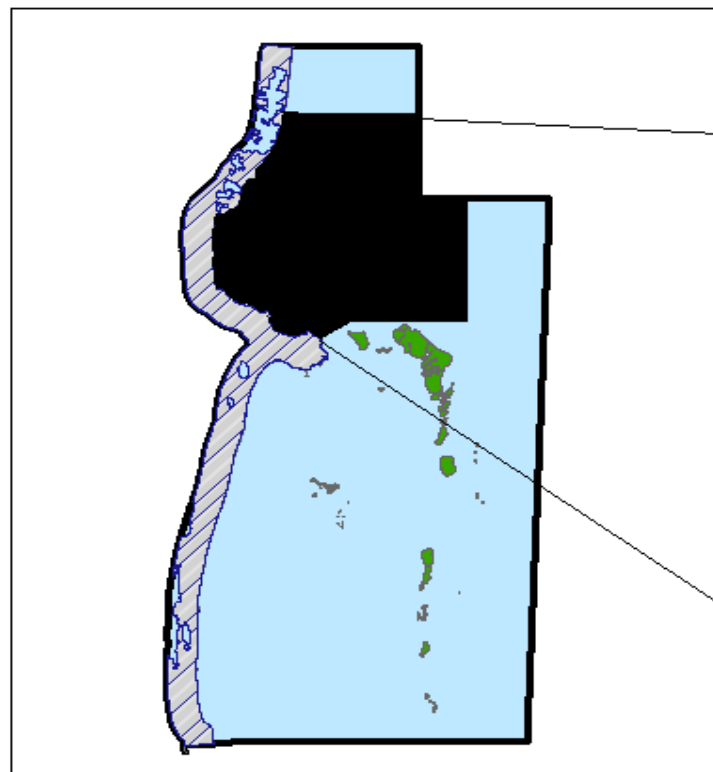
- Cayes
- Caribbean Sea

Scale: 1:144,320
NAD 1927 UTM ZONE 16N



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

CENTRAL REGION CAYES NORTHERN SUB-REGION

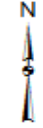
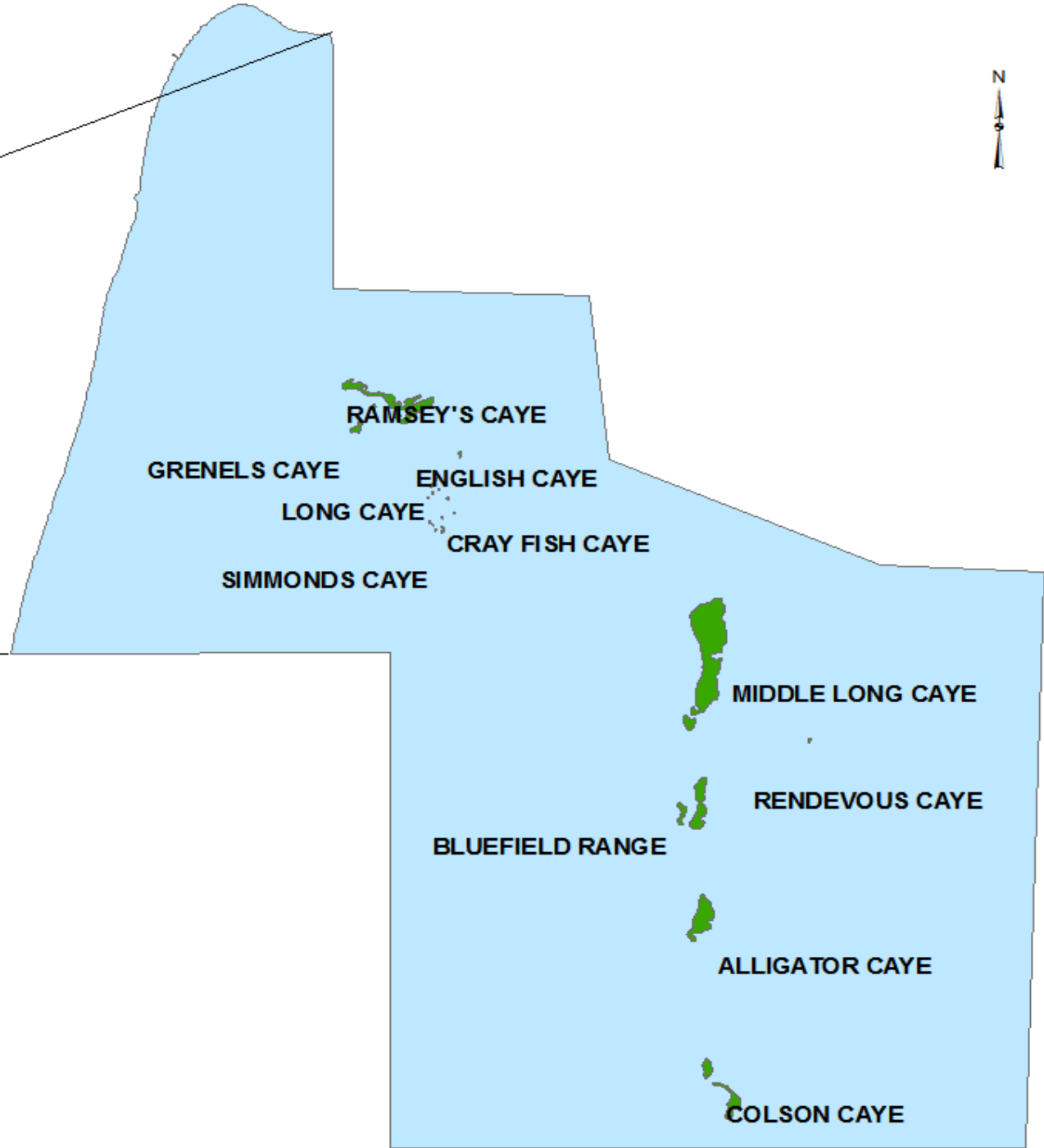
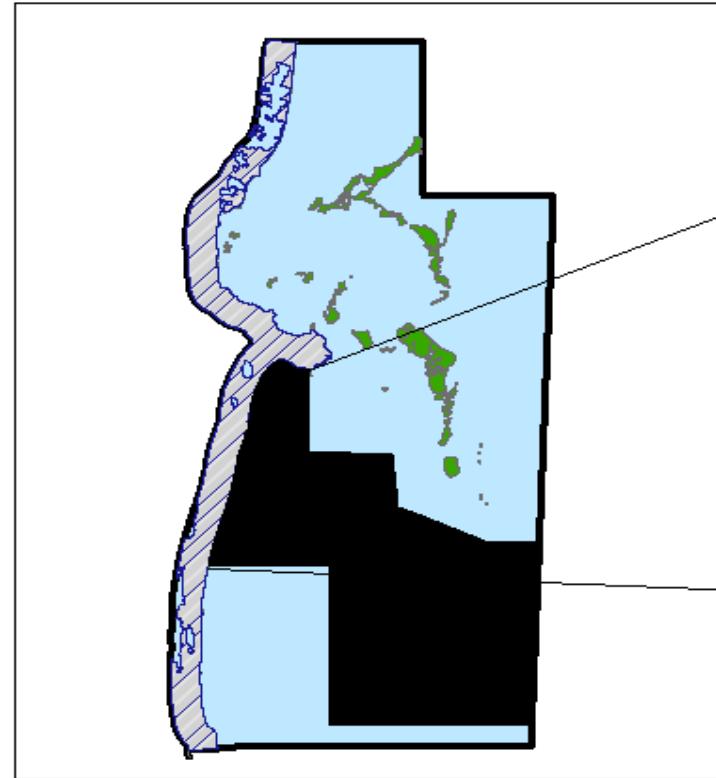


Cayes
 Caribbean Sea

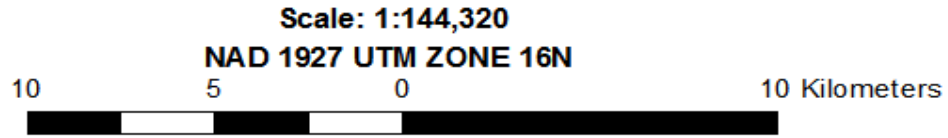
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Map 4: Central Region Cayes (Central Sub-region)

CENTRAL REGION CAYES SOUTHERN SUB-REGION



Cayes
 Caribbean Sea



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

3.0 OBJECTIVES

The management of the Central region's coastal zone must be linked to the goals and aspirations of the people of Belize, particularly the residents of the district of Belize. Consequently, it must be intrinsically tied to the socio-economic, cultural and other basic needs of the people of Belize, and their use and demand for land and marine resources. Thus the key objectives of the Central 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 Belize City, Ladyville, Gales Point and Mullins River.
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. Preserving the social and cultural values of the people and communities of the region that are connected to the environment
6. Representing trans-border cooperation to address territorial disputes and impacts to the region's natural resources originating beyond national borders
7. Fostering and supporting a continued partnership among stakeholders for managing the coastal resources
8. Establishing a framework for regulating the development and use of resource of the region through the continuation of CZMAI's coastal planning program activities and coastal advisory committee process

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

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

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

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

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

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

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

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

5.0 GUIDING PRINCIPLES

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

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

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

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

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

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

6.0 SECTORAL ISSUES AND POLICIES

These policies are organized into ten sectors that address current and potential issues within the Southern coastal zone, and provide recommendations from stakeholders. They include: Fishing, Marine Tourism, Land-Use, Marine Dredging, Sensitive Habitats, Utilities, Pollution Control, Infrastructure and Social Amenities, Conservation, and Scientific Research and Education. They were developed by the Central Region Coastal Advisory Committee in consultation with the communities of Belize City, Ladyville, Mullins River, Gales Point and the Coastal Zone Management Authority & Institute.

6.1 *Fishing*

Fishing has traditionally been an important component of the economy of Central region and other parts of the country. Tourism activities, illegal and over fishing and inadequate regulatory enforcement mechanism have all contributed to diminishing fishing stocks. Fishers occupy several of the low-lying mangrove islands for establishment of campsites, which they occupy for durations of 1 to 3 weeks at a time with an approximate range of 3 to 7 persons at each camp. Some 28 active campsites were identified during past field surveys, and as such it can be deduced that at a minimum there are 84 resident artisanal fishers in the region and at a maximum there are 196. This is a stark contrast from the 1100+ registered fishermen for the Belize District and suggests that many no longer fish within this region, quite possibly because of reducing fishing stock. It also is an indication that there is still much dependency on the fish resources by local fishermen and potential displacement by rapid growth in the tourism sector due to use of land for more productive tourism.

The Central region represents one of the most important areas for lobster catch for the country. The total spiny lobster coverage for this region was determined to be approximately 877 km². Using InVEST's ecosystem service model for Spiny Lobster, it was estimated that under the current conditions lobster tail meat exports amounts to 205,559 lbs., generating revenue of approximately BZ \$5.4 million (**Fig 4, Appendix**). In addition, model results suggest that a conservation zoning scheme could increase exports to 262,695 lbs.; and generate an annual revenue of BZ \$6.9 million by 2025. However, a development zoning scheme would drastically decrease the exports of tail meat to 4990 lbs, and generating annual revenue of only BZ \$132 thousand by 2025. The model results indicate that the proposed zoning (Informed Management) scheme for this region could increase exports in the amount of 222,256 lbs, generating annual revenue of BZ \$5.9 million by 2025. This represents a 43% 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

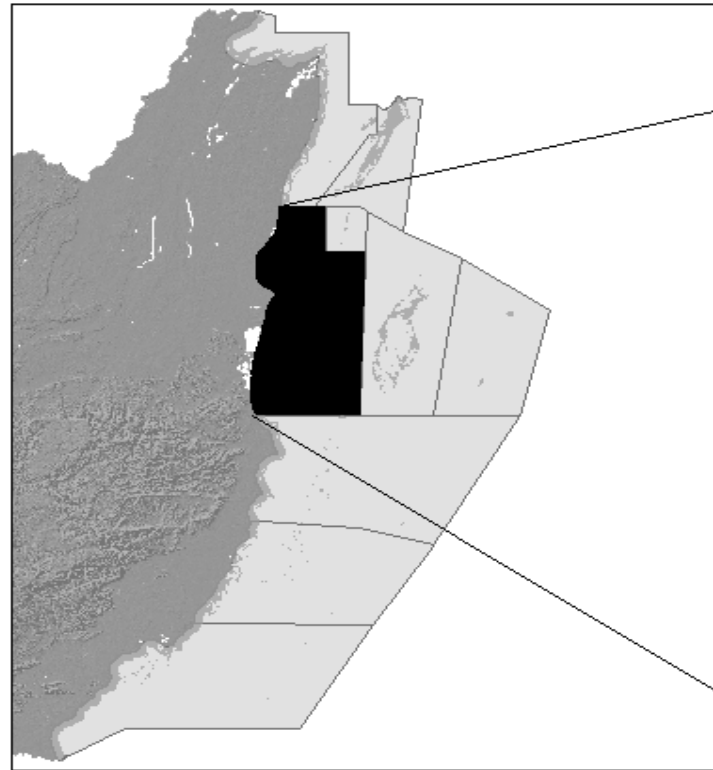
Scenario is good for habitats and the provision of important ecosystem services, such as protein from lobster, significantly less human activities occur in this zoning scheme. Although there may be some loss to habitat quality and lobster production, the Informed Management zoning scheme represents a 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:

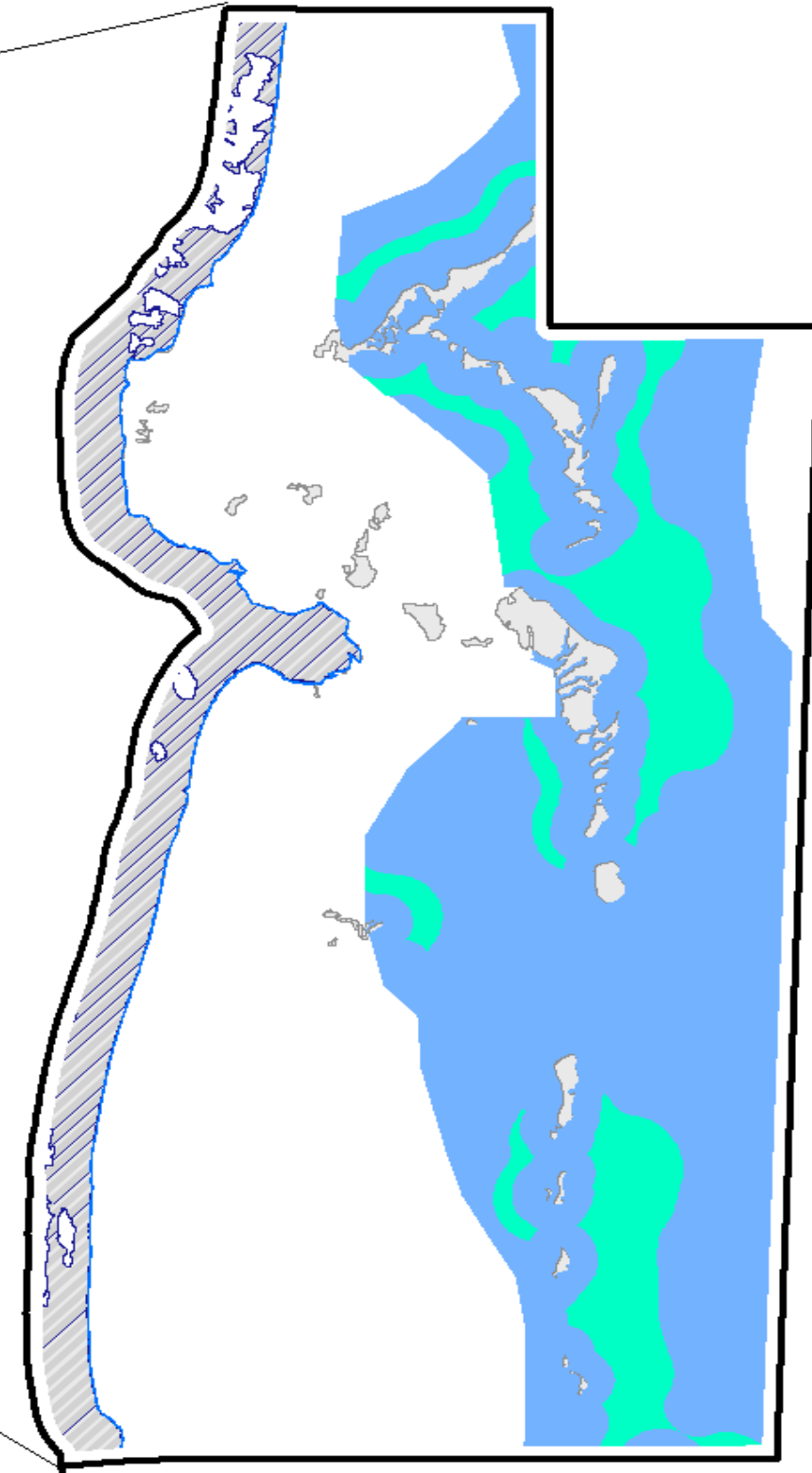
- Population growth parameters are nationwide, not region-specific
- Habitat dependencies are obligatory (e.g., habitat substitutability is not explicit represented).
- The population responds to change in habitat quantity (i.e., areal extent of mangrove, seagrass, and coral reef), not quality of those 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: CENTRAL REGION



- Coastline
- Sportfishing
- Central Region Base
- 3km Zone of Influence
- Commercial/Subsistence Fishing



Scale: 1:330,000
 NAD 1927 UTM ZONE 16
 10 5 0 10 Kilometers

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

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

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Fishing	Marine area defined for the extraction of fish for food and commercial trade, except for sport fishing which only involves the catch and release of fish	1.Sportfishing(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 Central Region 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:

To ensure that fishing remains a viable industry and continues to contribute to the local economy for this region, the following are recommended:

1. Protect the spawning and traditional fishing grounds of the Central region as well as the interest of Belizean fishermen through zoning provisions
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

6.2 *Marine Tourism & Recreation*

Tourism is a vibrant economic activity in the Central region and opportunities abound within the sector. It is an alternative to fishing and other income generating activities, and contributes substantially to the national economy. However, if not planned and managed correctly, tourism activities can result in destructive and devastating damage to the natural environment, which can inevitably have alarming impacts to the Subsistence of the fishing industry and the tourism industry alike. To minimize any negative impacts that may result from unplanned tourism development, and to ensure that any tourism development activity complements national goals for the development of the tourism sector, the National Sustainable Tourism Master Plan was developed. A key component of this national plan is the Destination Management Plan for Belize City, which focuses on enhancing the core of the city's downtown area to reflect the legacy of historic structures and buildings. This region, however, requires consideration of different tourism products found in this area, particularly as it relates to Hotel Development, Cruise Tourism and Nautical Tourism.

As Belize City is the main hub for ground, water and air transportation, and point of entry and exit for the vast majority of cruise and overnight international visitors, this city plays a key role in the country's tourism sector. Despite global economic situations, the country has in fact experienced tremendous growth in the tourism sector over the past two decades. With the help of a targeted and increasingly aggressive marketing campaign of Belize's tourism product by the Belize Tourism Board, tourism arrivals is expected to increase in the near future. This increase may in turn increase the development pressures on cays that are within this region.

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 525 thousand people visit this region generating revenue of BZ \$61 million annually. In a conservation future scenario, InVEST Recreation model results indicate that there may be an increase in tourist visitation to approximately 887 thousand, generating annual revenue of BZ \$98 million. In a development future scenario, there would also be an increase in the current tourist visitation to approximately 639 thousand, and generating annual revenue of BZ \$70 million. In the proposed Informed Management scenario (**Map 7**), InVEST Recreation model results indicate that there will also be an increase in tourist visitation to approximately 1 million and that tourist expenditure would generate an annual revenue of BZ \$174 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:

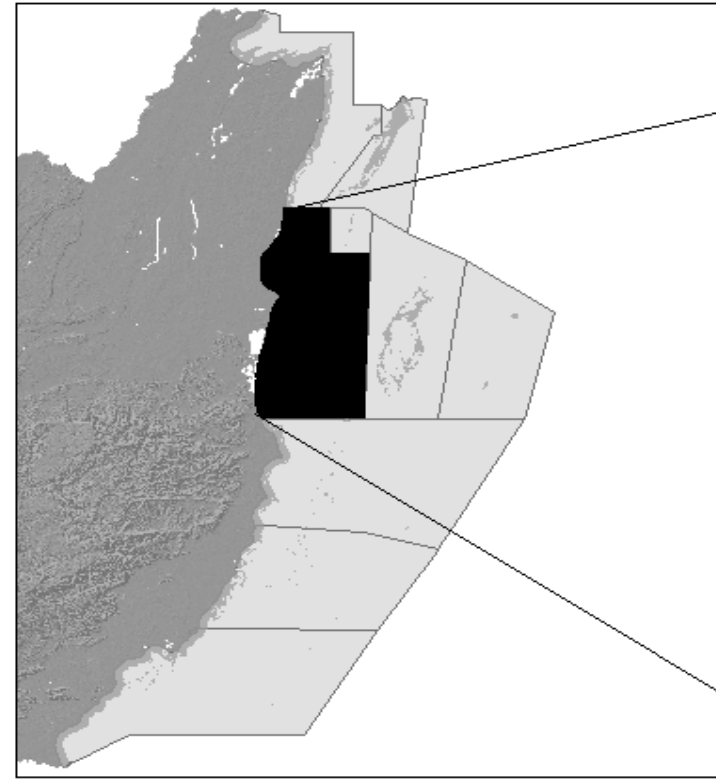
- The model assumes that people will respond similarly in the future to the attributes that serve as predictors in the model. In other words, the assumption is that people in the


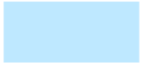

future will continue to be drawn to or repelled by a given attributes to the same degree as currently.

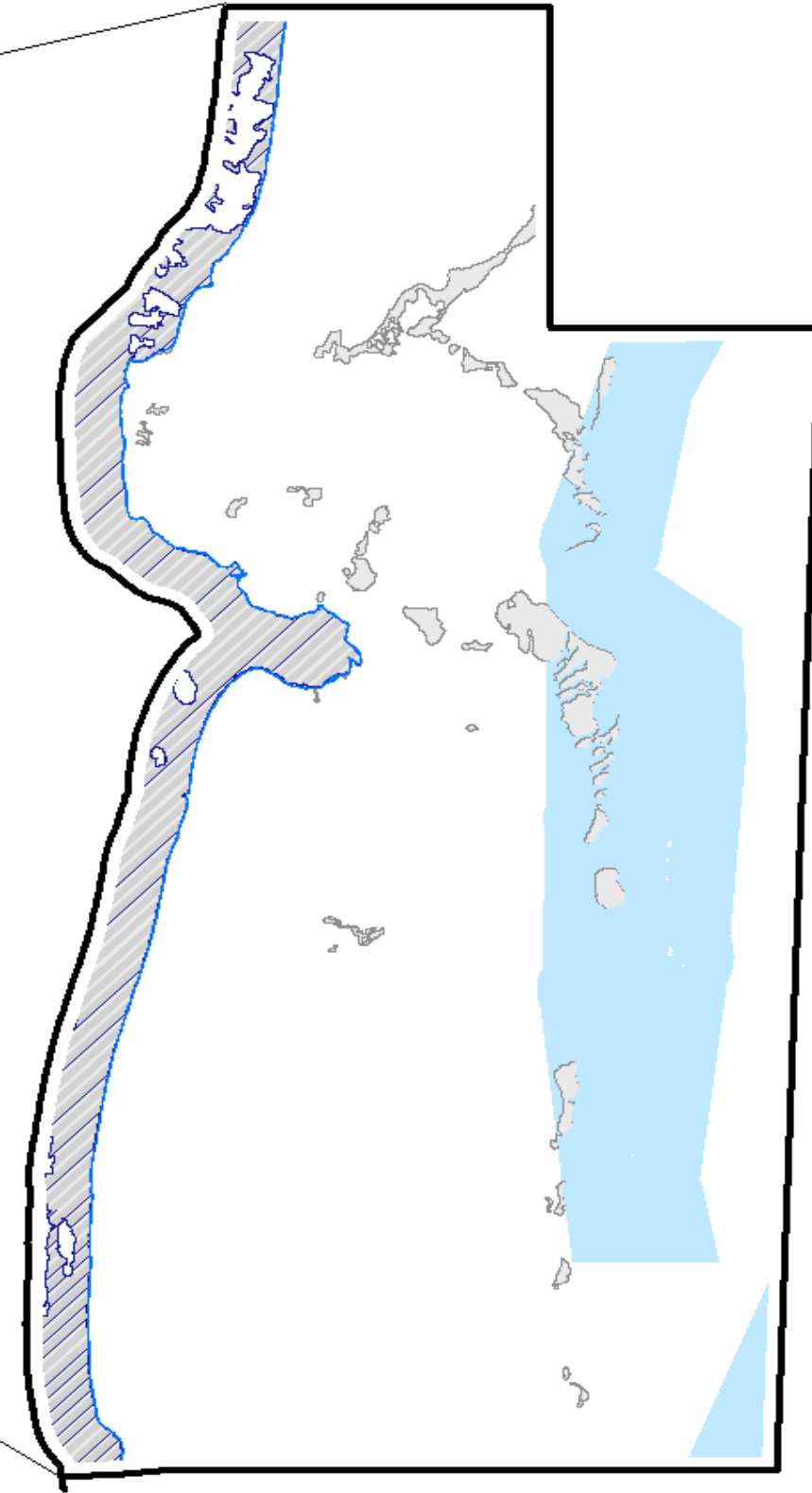
- Some of the attributes that are used as predictors of visitation are representations of areas managed for particular human use (e.g. transportation). The model assumes that future management of the zones and the type of activities that they represent are similar to current.
- Since there are no fine-scale 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: CENTRAL REGION



-  Coastline
-  Marine Recreation
-  3km Zone of Influence



Scale: 1:330,000
NAD 1927 UTM ZONE 16
10 5 0 10 Kilometers

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

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

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF	SCHEDULE OF	SUPPORTING	IMPLEMENTING AGENCY	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Marine Recreation	Marine areas especially suited to swimming, snorkeling, diving, kayaking, surfing, jet skiing, kite boarding, and other water sports	<ol style="list-style-type: none"> 1. Swimming 2. Snorkeling 3. Diving 4. Kayaking 5. Surfing, 6. Jet skiing, 7. Kite boarding 8. Other water sports 	<p>Passage/entry of water taxis, tour boats, cruise vessels</p> <p>Research and education within marine protected areas</p> <p>Sport fishing</p>	<p>Research and Education</p> <p>Eco-tourism activities within marine protected areas</p> <p>Sport fishing</p>	<ol style="list-style-type: none"> 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 	<p>Belize Tourism Board Act</p> <p>Fisheries Act</p> <p>Coastal Zone Management Act</p> <p>Hotel and Tourism Accommodation Act</p> <p>National Sustainable Tourism Master Plan</p>	<p>Belize Tourism Board</p> <p>Fisheries Department</p> <p>Coastal Zone Management Authority</p>

Recommended Actions:

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

6.3 *Land-Use*

Most of the lands within the Central region are nationally owned. This state of affairs should be allowed to continue as nationally owned lands provide the opportunity for decision makers to have greater input in land management concerns, particularly in the review of applications for leases and purchases, where the latter was an option under the initial lease approval. Where lands are property, the right to alienate and develop must be recognized but also regulated to ensure that the only the recommended development activity is permitted in individual parcels, and that the subdivision of land subscribes to these guidelines. The construction and proliferation of piers in this region is an issue requiring attention. They 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.

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

6.3.1 Coastal Development Standards

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

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED USES			SCHEDULE OF RESTRICTED USES	SUPPORTING NATIONAL POLICIES	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Coastal Development	Residential settlements, infrastructure, commercial/economic activities on land above water within 3km buffer of the coastline and offshore cayes	1. Expansion of existing communities 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 Central Region contains the highest population in comparison to all other planning regions. Belize City, the country's major metropolis, has a population of close to 30,000 and is the center of commerce and industry for the country. As a result, Belize City, like all other major cities, require high concentrations of people and a mixture of land use in order to maintain the economic activities. Recognizing this, the National Sustainable Tourism Master Plan (NSTMP) recommends high density infill for **Belize City** not exceeding 30 to 40 units per acre. However, after reviewing the results of the InVEST Coastal Vulnerability Analysis, CZMAI recommends that only **medium density** development of 20 units per acre be allowed in Belize City due to its high vulnerability to flooding and erosion. Improvement of already existing infrastructure including the Central Historic District, Belize City Waterfront, and Parks and Tourism Recreation areas are also recommended.

Although not mentioned in the NSTMP, the other communities in the Central Region are smaller in scale and are more suitable for low and medium density development. **Gales Point and Mullins River** are relatively small and bolster a population of almost 200 people. Therefore, under an Informed Management Zoning Scheme (**Map 8**) it is recommended that the building densities be consistent with **low density** Residential (R1) development standards; 4 units/acre. **Ladyville**, on the other hand, is a rapidly growing community with an already existing mix of commercial and residential land use. Therefore, building densities for this community should not exceed 20 units/acre, which is consistent with **medium density** Residential (R2) development standards.

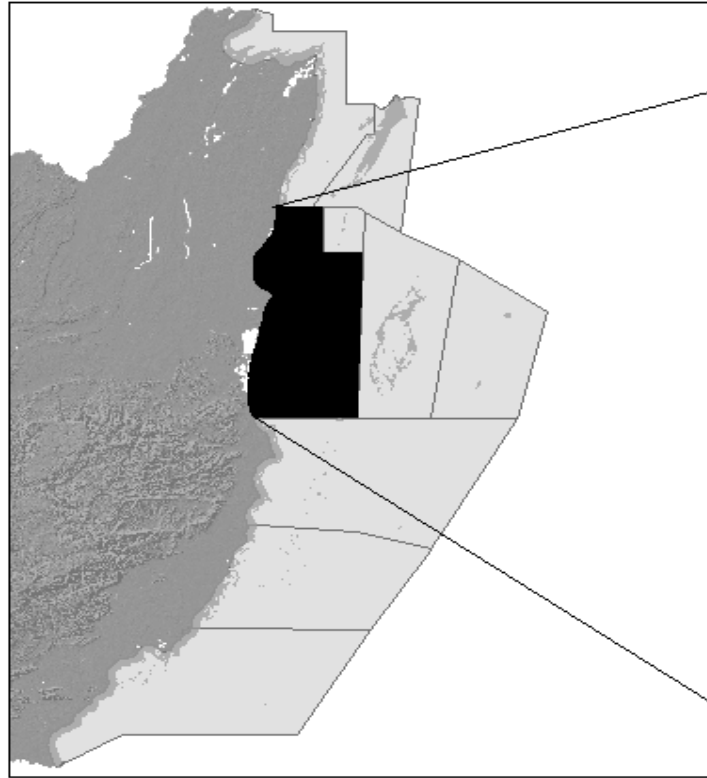
Residential Development: Land use in which housing predominates, as opposed to industrial and commercial areas. Housing may vary significantly between, and through, residential areas. These include single-family housing and multi-family residential. These areas are also characterized by lower lots per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

Table 5: Residential Development Standards for Coastal Communities within the Central Region

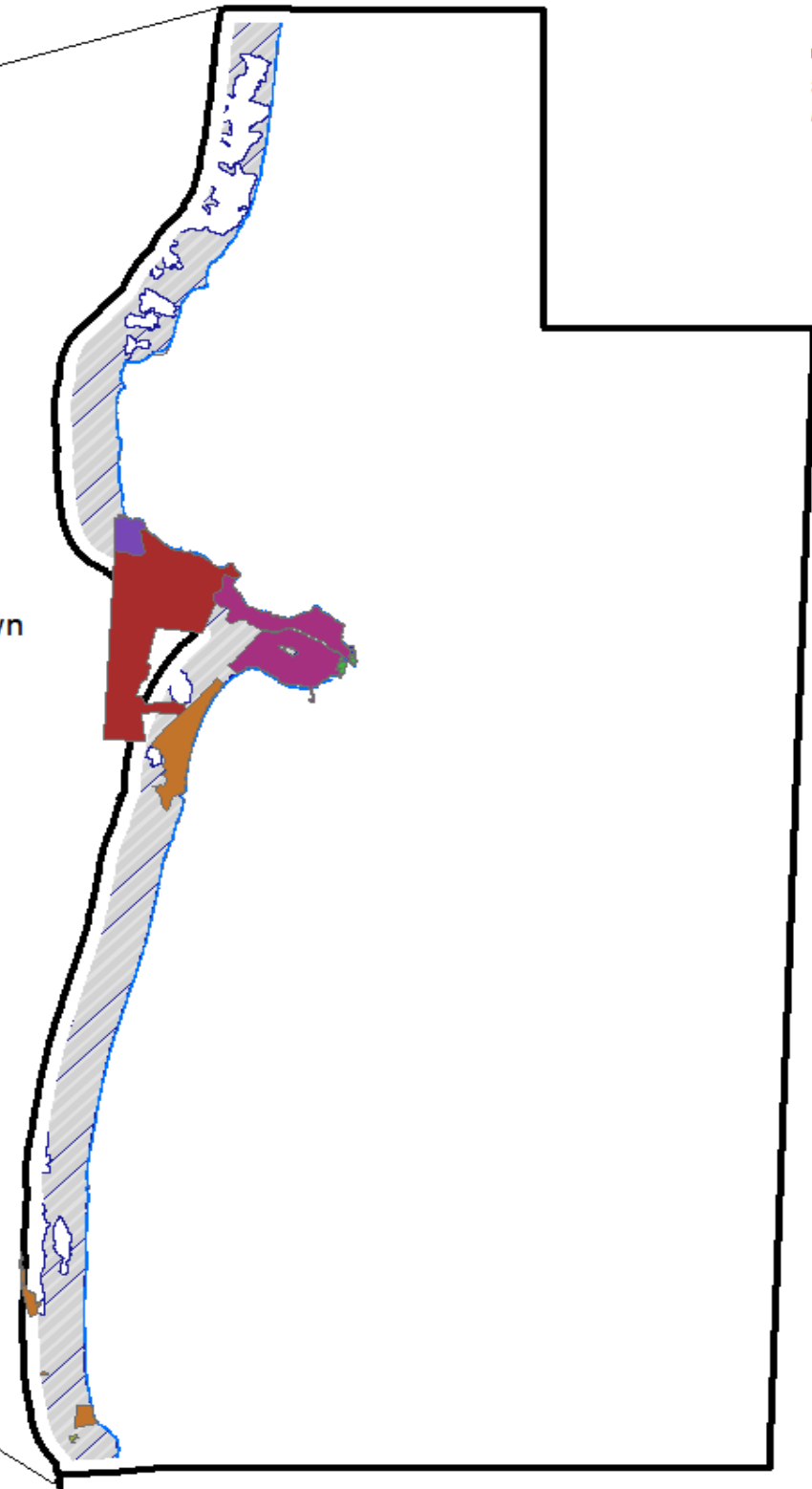
Subdivision Criteria	Residential (R1): Gales Point and Mullins River	Residential (R2): Belize City and Ladyville
Primary Permitted Use	Single Family Residential Detached	Single and Multi-Family Residential
Secondary Use	Institution, Conservation, Parks/Playground	Commercial Low Density (convenience stores, small service shops, guest houses); Parks/Playgrounds, Community Facilities
Maximum Lot Size	0.25 acre (4 lot/acre)	0.167 acre (6 lots/acre)
Width/Length Ratio	1:3	1:2
Net Density (dwelling units per acre)	4	20 du/acre
Maximum # of Habitable Rooms per acre		120 guest beds/acre
Maximum Site Coverage	33%	50%
Minimum Frontage	65 feet	50 feet
Minimum Setbacks:		
Front	8 feet	6ft
Side	8 feet	6ft
Back	15 feet	12ft
Car Parking	1 per dwelling unit	1 per dwelling unit
Maximum Building Height	As per requirements/standards of the Central Building Authority	As per requirements/standards of the Central Building Authority
Maximum # of floors per building	As per requirements/standards of the Central Building Authority	As per requirements/standards of the Central Building Authority
Services	Water, Electricity, Telecommunications, Sewerage Treatment, Waste Disposal	Water, Electricity, Telecommunications, Sewerage Treatment, Waste Disposal

The vision articulated in the National Sustainable Tourism Master Plan is that by 2030, Belize City will have an established mid-high end Leisure and Entertainment Center that will include a shopping center hosting restaurants, cafes, bars and entertainment facilities such as theatres and casinos. The recommended density proposed for Leisure and Entertainment Center in Belize is “**medium density**”, which equates to 40 units/acre – 100 units/hectare. Also, in the interest of growth it is recommended that “**low density**” commercial developments are recommended for Ladyville. 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 (**Map 8**).

INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL DEVELOPMENT: CENTRAL REGION



- Existing High Density Commercial
- Existing Leisure Destination
- Existing Low Density Residential
- Existing Low Density Residential Town
- Existing Low Density Residential Village
- Existing Low Density Village Residential
- Existing Medium Density Residential Town
- Existing Plaza Parks
- Future Low Density Residential
- Future Medium Density Commercial
- Future Medium Density Residential
- Coastline
- 3km Zone of Influence



Scale: 1:335,000
NAD 1927 UTM ZONE 16N
10 5 0 10 Kilometers

Map 8: Informed Management Coastal Development Zoning Scheme

Commercial Development: Land use in which income is generated and commerce is predominant. Includes shops, stores, hotels, office buildings, and warehouses. (**Table 6**)

Table 6: Development Standards for Commercial Development

Subdivision Criteria	Commercial Development Standard	
Primary Permitted Use	Commercial Low Density (Convenience stores & small service shops); Ladyville	Commercial Medium Density (restaurants, cafes, bars, casino) Belize City
Secondary Use	None	None
Maximum Lot Size	0.25 (4 lots/acre)	0.5 acre (8 lots/acre)
Width/Length Ratio	1:4	1:3
Maximum Site Coverage	33%	66%
Minimum Frontage	65 feet	50 feet
Minimum Setbacks:		
Front	4feet	6ft
Side	4feet	6ft
Back	4 feet	12ft
Car Parking	As per requirements/standards of the Central Building Authority	As per requirements/standards of the Central Building Authority
Maximum Building Height	As per requirements/standards of the Central Building Authority	As per requirements/standards of the Central Building Authority
Maximum # of floors per building	As per requirements/standards of the Central Building Authority	As per requirements/standards of the Central Building Authority
Services	Water, Electricity, Telecommunications, Sewerage Treatment, Waste Disposal	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**).

Table 7: Development Standards for Institutional Use and Community Facilities

Subdivision Criteria	Development Standard
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 (**Map 1**). These development guidelines were produced in consultation with stakeholders from each planning region along with technical input from government relevant agencies. Within the document land use classes were developed along with accompanying standards for the varying degrees of development that can occur on a Caye. Use classes were also assigned to each caye according to suitability. The use class categories developed include residential, commercial and conservation, representing the various degrees of development intensities allows on cayes. Therefore CZMAI recommends the following as development standards for developing **the cayes** within the Central Region:

Land tenure of the cayes within the Central region is a combination of private and state ownership (See **Table 8: Summary of Land Tenure of the Central 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.

Table 8: Summary of Land Tenure of the Central Region Cayes

Land Tenure and Ownership of the Cayes in the Southern Region							
	National		Lease		Private Property		Total Size (acres)
Name of Caye	Size (acres)	%	Size	%	Size	%	
Frances Cayes	99	100	NA	0	NA	0	99
Hens and Chickens	70	33	140	67	NA	0	210
Moho Caye	NA	0	NA	0	15	100	15
Riders Caye	623	99	NA	0	7	1	630
Coffee Caye	1.5	50	NA	0	1.5	50	3
Hicks Caye	3493.34	99.8	8.66	.2	NA	0	3503
Unnamed Caye N of LC	27	100	0	0	NA	0	27
Long Caye #1	39.06	13	37.83	13	218.11	74	295
Montego Caye	315	98.81	2.75	.86	1.06	.33	319
Frenchman Caye	174	100	NA	0	NA	0	174
St. Georges Caye	58.52	38	NA	0	95.48	62	154
North Drowned Caye	NA	0	538.95	99.7	2.05	.3	541
Mapp Caye	318.35	98	2.17	.6	4.5	1.4	325
Foreman Caye	NA	0	1.2	100	NA	0	1.2
Drowned Caye	3210.54	90	12.11	.3	333.35	9.7	3556
Swallow Caye	88.77	99.8	.23	.2	NA	0	89
Stake Bank	9.92	38	NA	0	16.08	62	26
Shag Caye	107.56	89	5	4	8.44	7	121
Austin Caye	94.4	96	NA	0	2.6	4	97
Bannister Bogue Caye	31.62	38	6.2	7	46.18	55	84
Brown Caye	34	83	7	17	NA	0	41
Caye S of Goring Bogue	3	33	6	67	NA	0	9
Spanish Lookout Caye	NA	0	1.1	1	298.9	99	300
Paunch Caye	NA	100	NA	0	NA	0	0
Sergeant Caye	.05	100	NA	0	NA	0	.05
Curlew Spit	NA	100	NA	0	NA	0	0
Water Caye	263	47	NA	0	300	53	563

Goff Caye	1.43	95	.07	5	NA	NA	1.5
English Caye	.97	49	NA	0	1.03	51	2
Robinson Point Caye	89.48	82	NA	0	19.52	18	109
Horseshoe Caye	NA	0	21.28	38	34	62	51
Ramsey Caye	69.98	99	NA	0	1.02	1	71
Grennel Caye	1	6	11	61	6	33	18
Spanish Caye	NA	0	NA	0	8	100	8
Long Caye #2	10	90	1	10	NA	0	11
Pigeon Caye	NA	0	2	100	NA	0	2
Lovers Ranch Caye	2	100	NA	0	NA	0	2
Eiley Caye	.5	100	NA	0	NA	0	.5
Holmes Caye	NA	0	NA	0	2.5	100	2.5
Triangles Caye	8	100	NA	0	NA	0	8
Unnamed Caye W of H/T	.77	77	.23	23	NA	0	1
Middle Long Caye	723.54	93	53.43	7	NA	0	777
Rendezvous Caye	NA	0	NA	0	1.5	100	1.5
Bluefield Range	121.67	97	NA	0	4.33	3	126
Alligator Caye	220.48	99	1.52	1	NA	0	222
Colson Caye	93	99	1	1	NA	0	94
TOTAL	10288.38		860.73		1540.14		12689.25

The environment of the Central Cayes Region is in general, ecologically fragile and particular care needs to be exercised to determine its development suitability to maintain a balance between environmental Subsistence and the need to facilitate economic and other human activities. When human activity and natural hazards interact with the environment, often times the health of the environment becomes threatened. This can have far reaching repercussions on the social and economic well-being of the residents of the region and the country. Consequently, the implications of human activities and the occurrences of natural hazards to the sustainability and life of the cayes cannot be underscored (**Maps 9, 10, 11**).

To date, only one major development proposal has been approved within the Central Region. The Ocean View Grand (North Drowned Caye) is a 2 phase proposal on which phase 1 is a proposed mixed residential and commercial tourist resort to be built across 515 acres on North Drowned Caye. Developments planned for this development include 2 hotels (160 rooms), a 200+ slip marina, bars, restaurants, casinos, entertainment center, and 410 residential units. Phase 2 will have an additional hotel with 100+ rooms and an additional 400 residential units with town lots and condominium towers. In addition, this project includes the creation of a resort

and theme park on Stake Bank Caye. The project will entail the creation of 20.35 acres of land increasing the acreage to 42 acres, a main pier for the berthing of up to four voyager class cruise vessels, 60 slip marina, 80 room hotel and casino, shopping centres, restaurants, bars, and a water theme park. The proliferation of two major motor vehicle causeways linking both islands to Belize City has also been proposed. This project has received clearance from the Government of Belize.

Data from the research revealed that most of the Central Cayes Region is limited in its potential for development by reason of its geomorphic and soil character, physical definition and ecological fragility, all determining its carrying capacity and subsequently, development suitability. Most of the land is generally colonized by mangroves, which function as a mitigative mechanism to protect the city and mainland from the devastation associated with natural hazards, and as a breeding and nurturing ground for the fishing industry. It is also low lying with poor soil bearing capacity and inundated, which does not auger well for development activity. This is evident along the western, southern and eastern portions of **Hicks Caye, portions of Frances Cayes, most of Cayo Suncio, Montego Caye, Frenchman Caye, Hens and Chickens, Riders and Coffee Cayes, the Drowned Cayes, Long Caye # 2, Crayfish and Simmonds Caye and Middle Long and Alligator Cayes.**

However, there exist some marginal lands, which while not inundated fully, are low lying with limited high spots, which may be capable of accommodating some type of development. These are located on the **southern Frances Cayes, northern-central north Hicks Caye, and northeast portions of south Hicks Caye, west-central of the caye south of Porto Stuck, north and west of Long Caye, east of Frenchman's Caye, north and south of east Hens and Chickens Caye, southern portion of Riders Caye, northern tips of Mapp Caye, most of Shag, Austin, Bannister Bogue, farl and Goring Bogue Cayes and Spanish Lookout Caye, and south east portion of Water Caye, portions of Robinson Point and Ramsey Cayes, north and southwest portions of Middle Long Caye, north Alligator Caye and Bluefield Range.**

High lands capable of sustaining major development activity are few, and can be found on the **southwest portion of north Hicks Caye, eastern coast of Long Caye, northwest coast of north Riders Caye, the mid portion of east Hens and Chickens Caye, a narrow portion of the central east coast and south west portion of Drowned Caye.** On both **St. George's and Moho Cayes**, extensive development has taken place that is, with the exception of the south western portion of the former, which is unsuitable for development as it is low lying and inundated. In the case of **English Caye**, there is no scope for further development.

For Cayes within the Central Region, Residential I use class was assigned to **Long Caye, Moho Caye, Drowned Caye, Bluefield Range, Water Caye and Colson Caye and all of Bannister Bougue, Farl’s Bogue, Goring Bogue and Brown’s Caye**

For Cayes within the Central Region, Residential III use class was assigned to **a portion of St. George’s Caye, Long Caye and Moho Caye.**

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

Table 9: Standards for Residential Development on Central Region Cayes

Use Category	Residential I	Residential III
Primary Use	Residential	Residential
Secondary Use	Conservation	Comercial
Minimum Lot Size	1 acre	10000 sq ft
Maximum # of lots per acre	1	4
Net Housing Density	1 house per acre	4 houses per acre
Maximum # of Habitable Rooms/acre	5	20
Maximum Building Coverage	5%	75%
Maximum Site Clearance	50%	50%
Building Setback Front	25 ft	25 ft
Building Setback Side	25 ft	25 ft
Building Setback Back	50 ft	25 ft
Between Buildings	30 ft	20 ft
Building Height	28 ft	28 ft
Maximum # of Floors	2	2
# of Pier per site	1	1

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

For Cayes within the Central Region, Commercial I use class was assigned to **existing resort developments on St. George’s Caye, Moho Caye, Bannister Caye, Spanish Lookout Caye and Drowned Caye.**

For Cayes within the Central Region, Commercial II use class was assigned to **Moho Caye.**

Table 10: Standards for Commercial Development on Central Region Cayes

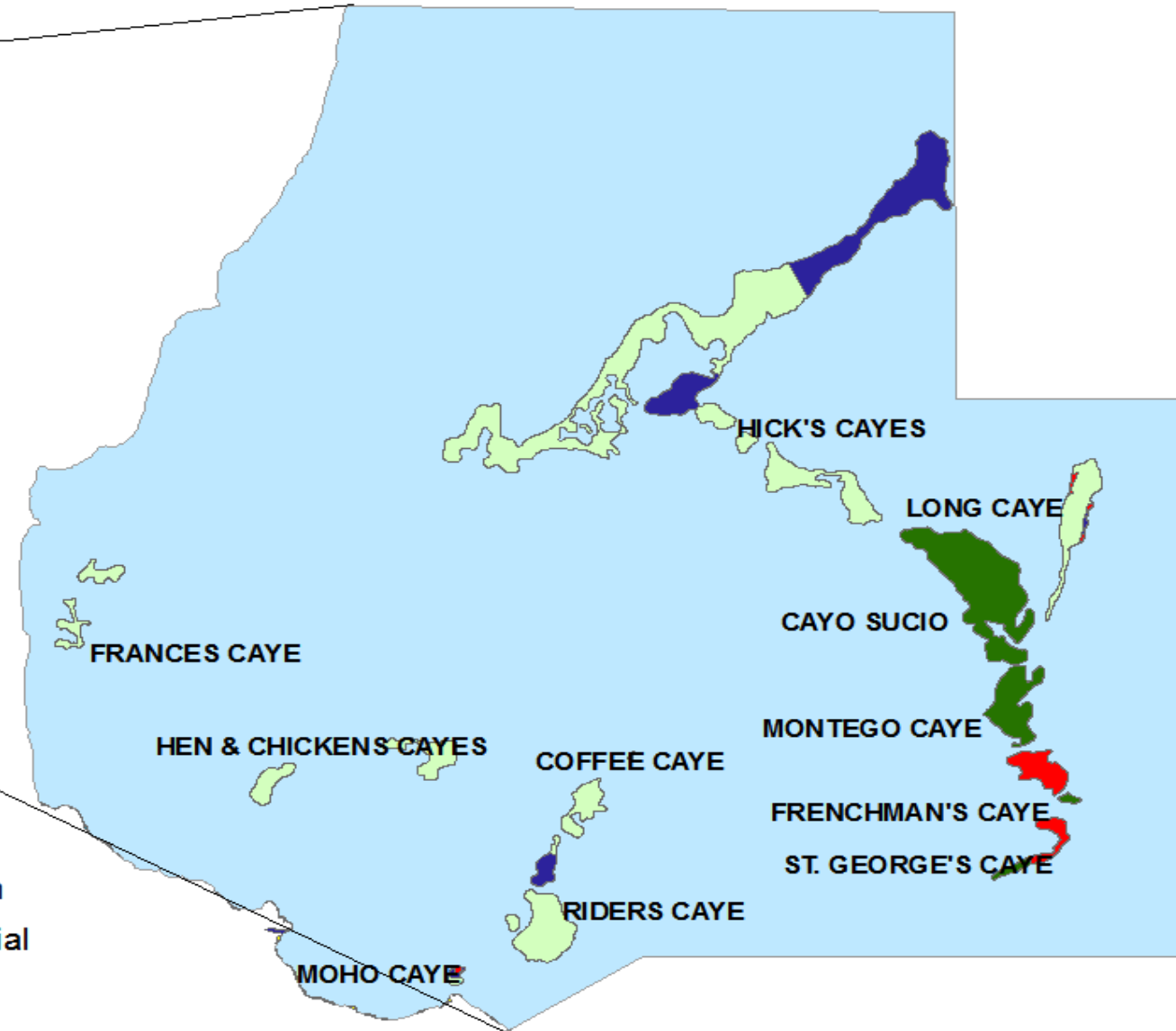
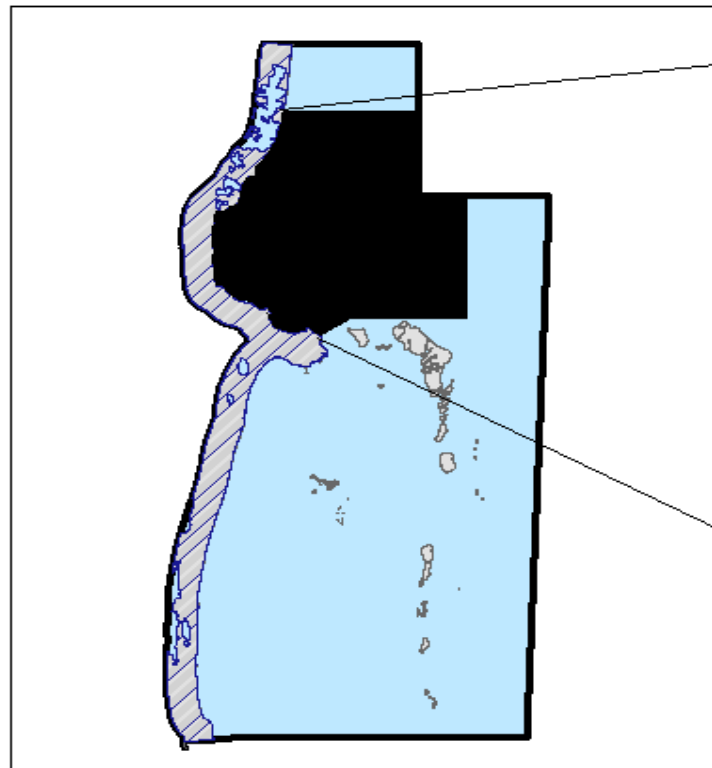
Use Category	Commercial I	Commercial II
Primary Use	Commercial	Commercial
Secondary Use	Residential	Residential
Minimum Lot Size	1 acre	21500 sq ft
Maximum # of lots per acre	1	2
Net Housing Density	4 units per acre	8 Units per acre
Maximum # of Habitable Rooms/acre	8	16
Maximum Building Coverage	10%	20%
Maximum Site Clearance	30%	40%
Building Setback Front	50 ft	30 ft
Building Setback Side	30 ft	25 ft
Building Setback Back	50 ft	30 ft
Between Buildings	30 ft	25 ft
Building Height	28 ft	28 ft
Maximum # of Floors	2	2
# of Pier per site	1	1

For Cayes within the Central Region, recommended for Conservation use class are **the Drowned Cayes, Montego and French Caye Range and the Goff Caye, English Caye and Sergeant Caye Area**

Table 11: Standards for Conservation Development on Central Region Cayes

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

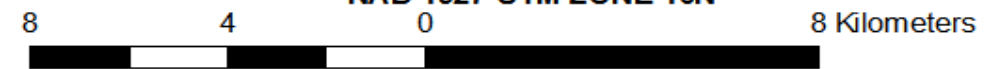
INFORMED MANAGEMENT ZONING SCHEME FOR DEVELOPMENT OF CAYES: NORTHERN SUB-REGION



- Existing Low Density Residential
- Existing Low Density Residential Town
- Existing Low Density Village Residential
- Future Low Density Residential
- Conservation I
- Conservation II
- Caribbean Sea

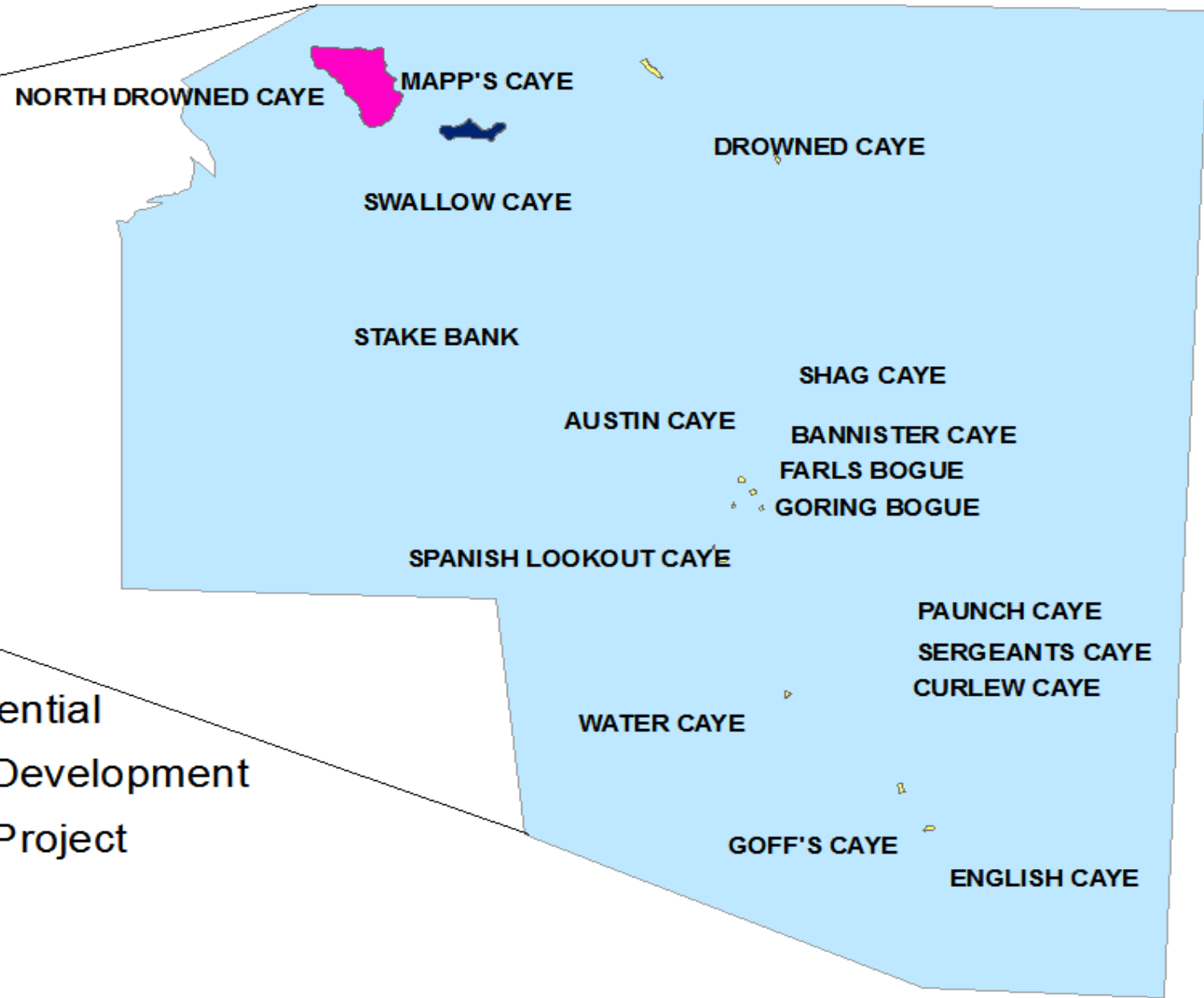


Scale: 1:144,320
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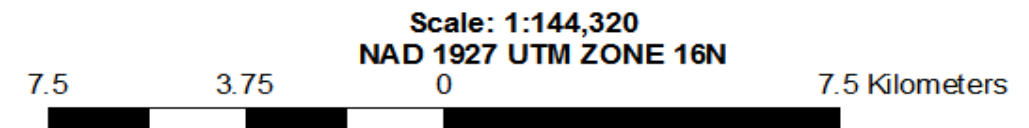


Map 9: Informed Management Scheme for Development of Cayes in the Northern Sub-region

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

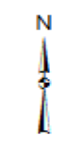
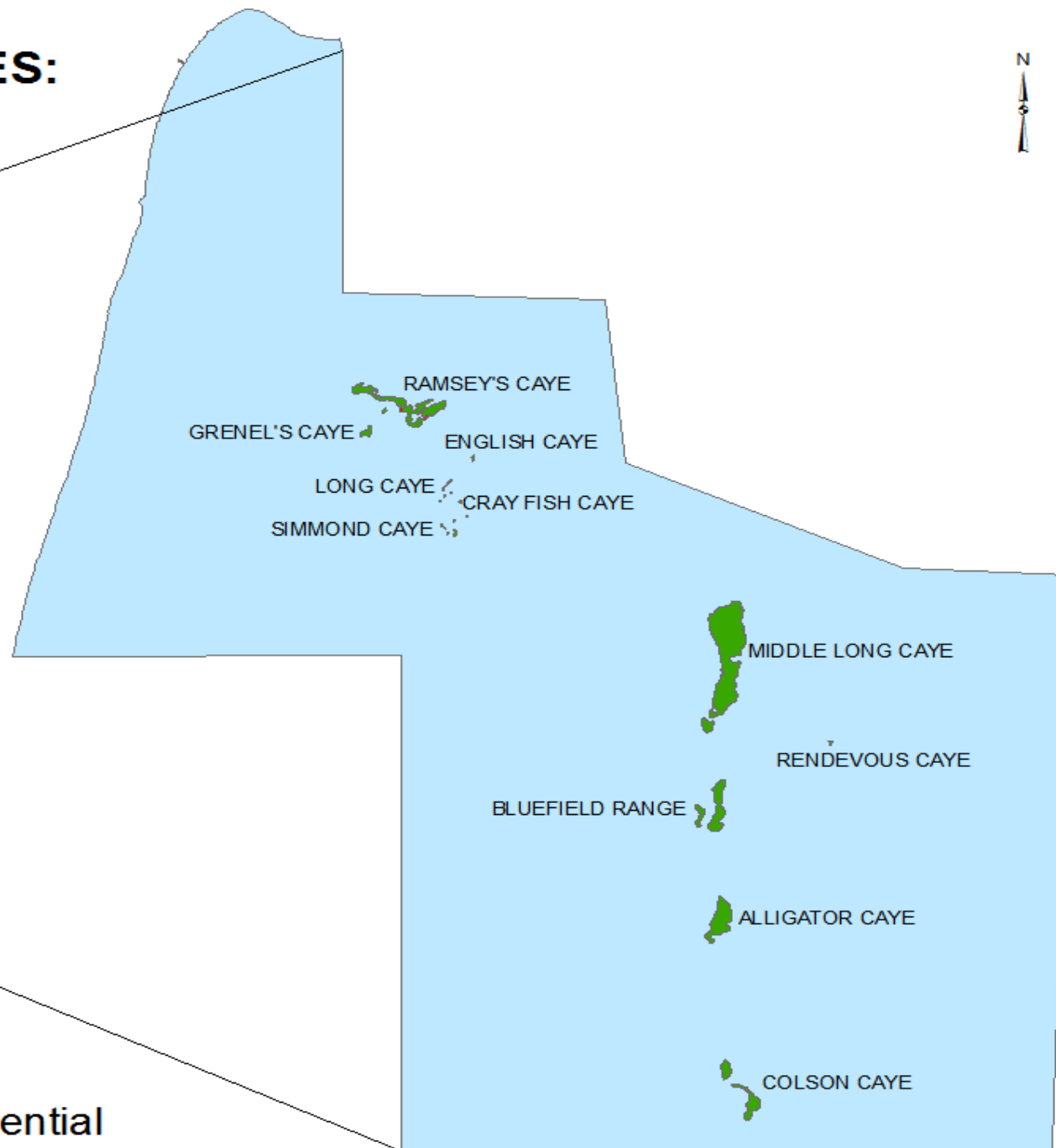
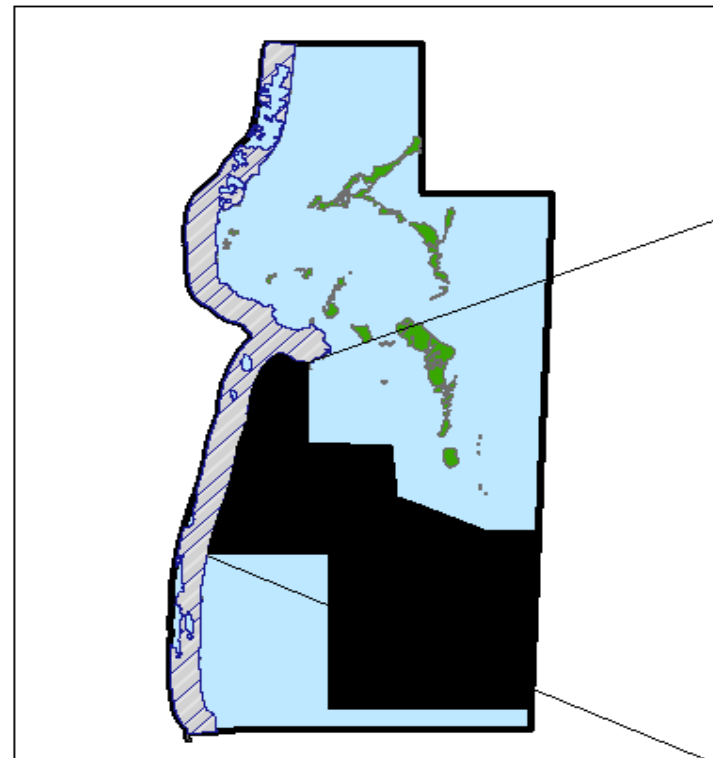


- Existing Low Density Residential
- Future Ocean View Grand Development
- Future Stakebank Tourism Project
- Caribbean Sea
- Conservation I
- Caribbean Sea

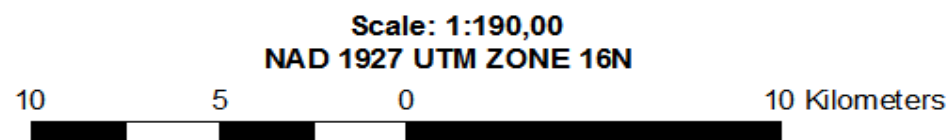


Map 10: Informed Management Zoning Scheme for Development of Cayes in the Central Sub-region

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



- Conservation I
- Caribbean Sea
- Existing Low Density Residential

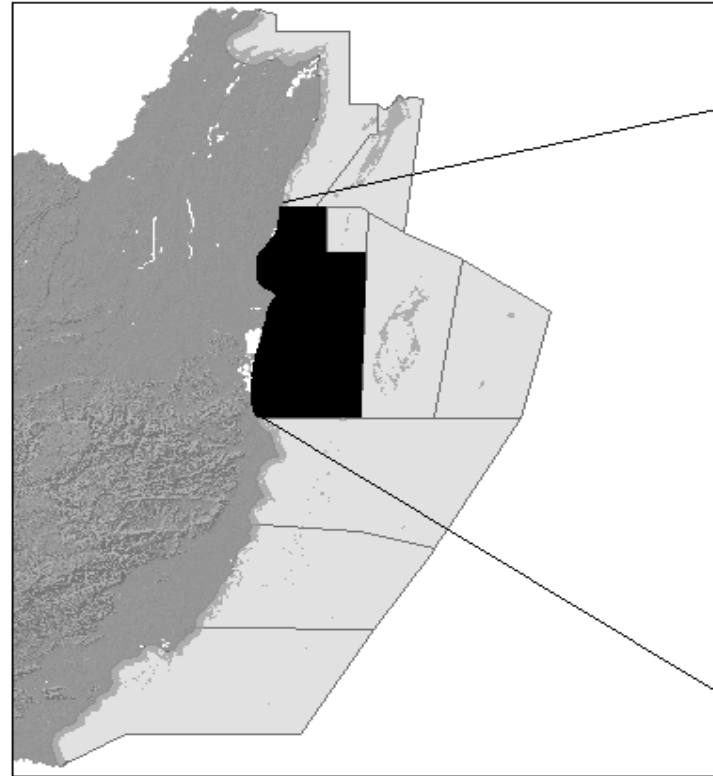


Map 11: Informed Management Zoning Scheme for Development of Cayes in the Southern Sub-region

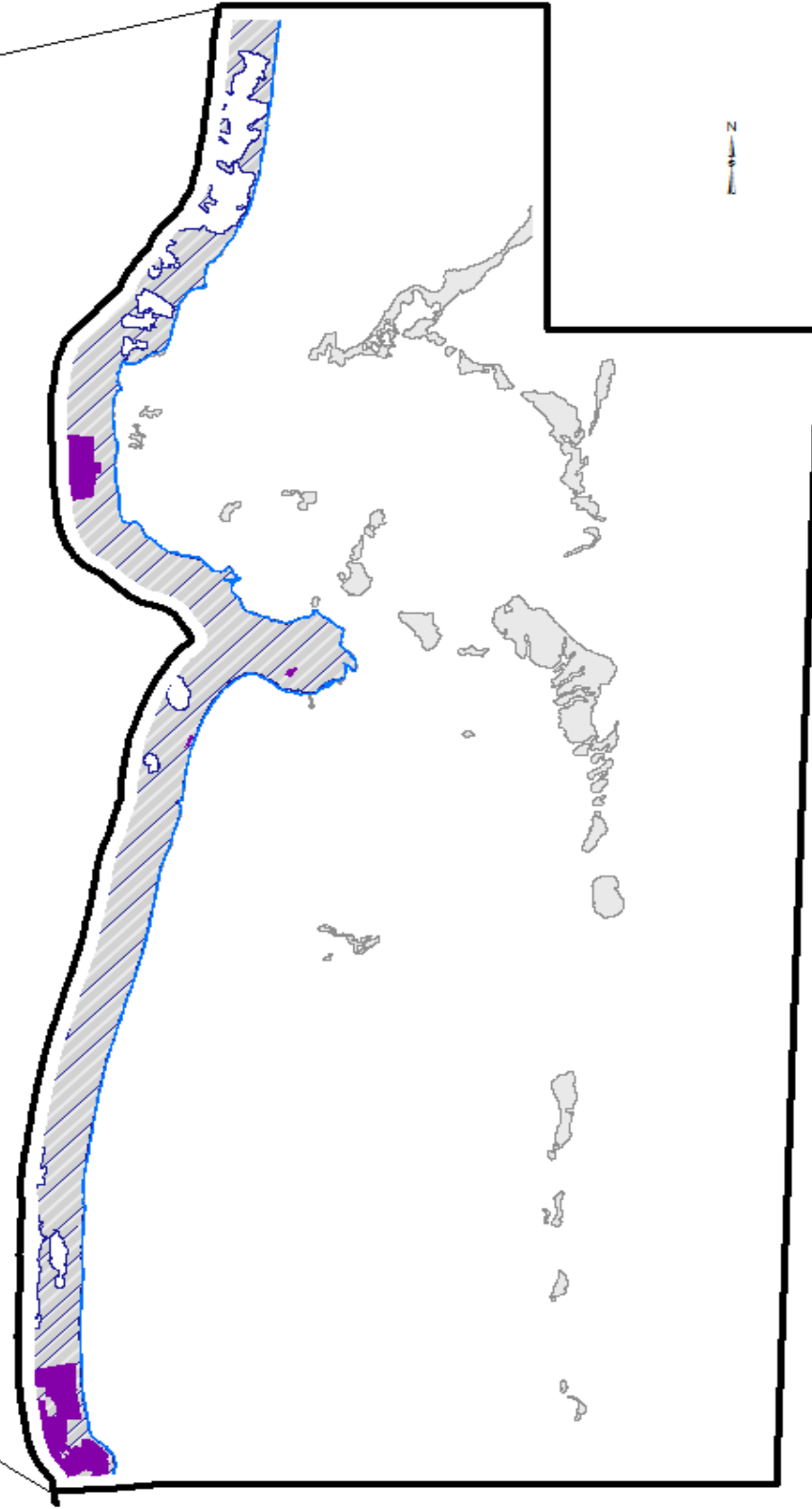
6.3.3 Coastal Aquaculture Development

The coastal lands within the Central coastal zone that have been zoned for land-based aquaculture (**Map 12**) fall within Zone 1 of the National Aquaculture Policy (2005). Zone 1 areas represent inland areas available for aquaculture development that are classified as “highly suited” to food production by aquaculture by virtue of having “high quality fresh and marine water resources suited to land-based and pond systems”. The aquaculture policy recommends small to medium scale aquaculture production facilities in this region, involving the **maximum** cultivation of 75 hectares of land, equivalent to an annual production of less than 200 tons per annum. Surface water requirement is between 40-400 cubic meters per minute. The framework for implementing the zoning scheme for the development of coastal lands for aquaculture production can be found below in **Table 12**.

INFORMED MANAGEMENT ZONING SCHEME FOR COASTAL AQUACULTURE: CENTRAL REGION



- Coastline
- Aquaculture
- 3km Zone of Influence



Scale: 1:330,000
NAD 1927 UTM ZONE 16
10 5 0 10 Kilometers

Map 12: Informed Management Zoning Scheme for Coastal Aquaculture in the Central Region

Table 12: Framework for Implementing Informed Management Coastal Aquaculture Scheme

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

Recommended Actions:

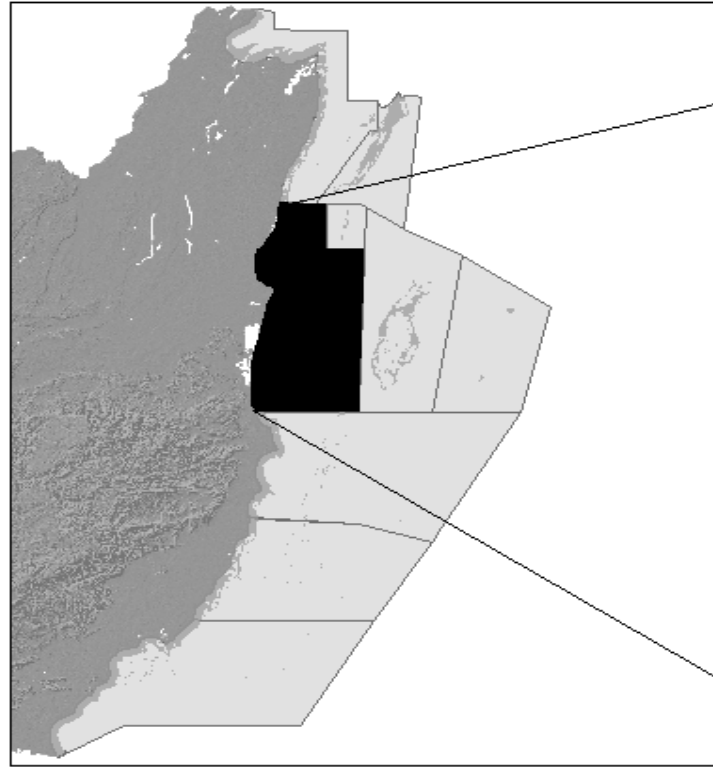
1. Increased collaboration among local stakeholders, interest groups and the agencies responsible for land allocation, including the conditions applied to lease approval and the regulation of lot sizes
2. Limit the number of piers per property or caye
3. Prohibit the construction of buildings on piers
4. Provide for a minimum distance between piers
5. Encourage construction of piers on the leeward side
6. Regulate the length of piers to minimize engineering works for boat access
7. Regulate the type of material used in the construction process
8. Maintain the 66 feet reserve, and ensure that minimum setbacks from property lines and beaches, and minimum distances between buildings are enforced
9. Ensure the construction of sea walls and piers follow due process by the relevant permitting agency
10. Educate developers, contractors and real estate agents on the existence of all applicable legislation, processes and procedures pertaining to land development
11. Ensure the standards and engineering approval process established by the Central Building Authority for building construction are adhered to
12. Preserve remaining crown or government-owned lands in the region
13. Require that developers who remove habitats must finance their restoration
14. Detailed site plan approval required by Central Building Authority





6.4 Marine Dredging and Mineral Extraction

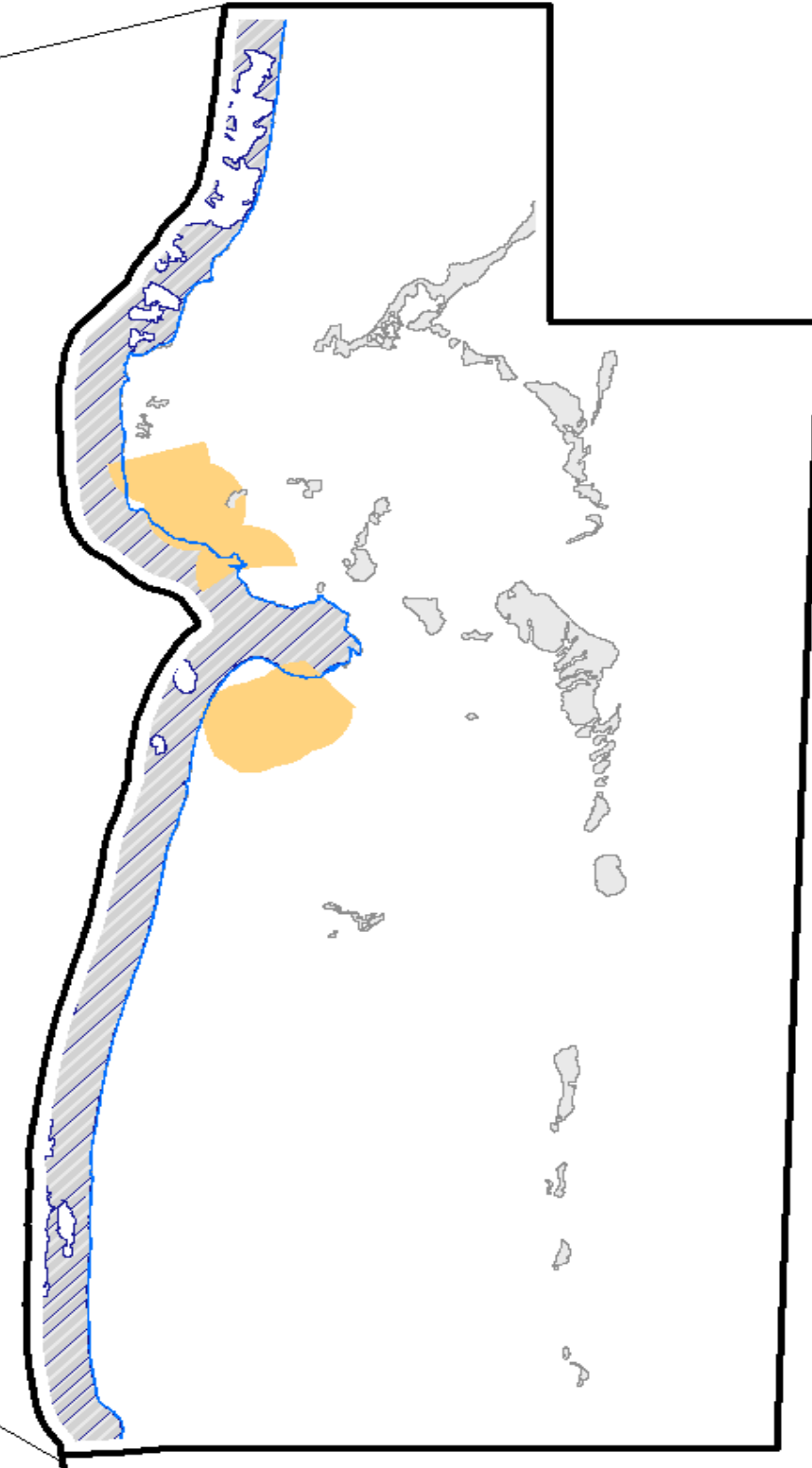
Dredging and sand mining can have disastrous effects on the habitats of particular species and on other economic and recreational use of the region. Requests must be carefully monitored by the Geology and Petroleum Department and other relevant permitting agencies in order to avoid these potential impacts. Major dredging activity in the region has included the maintenance of the port facility, sand mining and the rehabilitation and nourishment of beaches, particularly during post-storm periods.

To avoid or minimize disruption of the marine environment and the negative impacts, which may occur on either the terrestrial or aquatic ecology, limited marine dredging activity has been recommended for this region (**Map 13**). Through these guidelines, unsuitable development sites are avoided, including sensitive areas, and areas of poor access. The conversion of swamp, wetlands, mangrove forests or sea for resort and/or residential use would only be detrimental to the environment, create land unsuitable for effective liquid waste disposal, distort land/swamp values, and set a harmful precedent for future development. In addition to the recommended actions below, implementation of the framework for enforcing low-impact marine dredging activities in the region (**Table 13**) is strongly recommended.


INFORMED MANAGEMENT ZONING SCHEME FOR MARINE DREDGING: CENTRAL REGION



-  Coastline
-  Central Base
-  Marine Dredging
-  3km Zone of Influence



Scale: 1:330,000
NAD 1927 UTM ZONE 16



Map 13: Informed Management Zoning Scheme for Marine Dredging in the Central Region

Table 13: Framework for Implementing Informed Marine Dredging in the Northern Region

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

Recommended Actions:

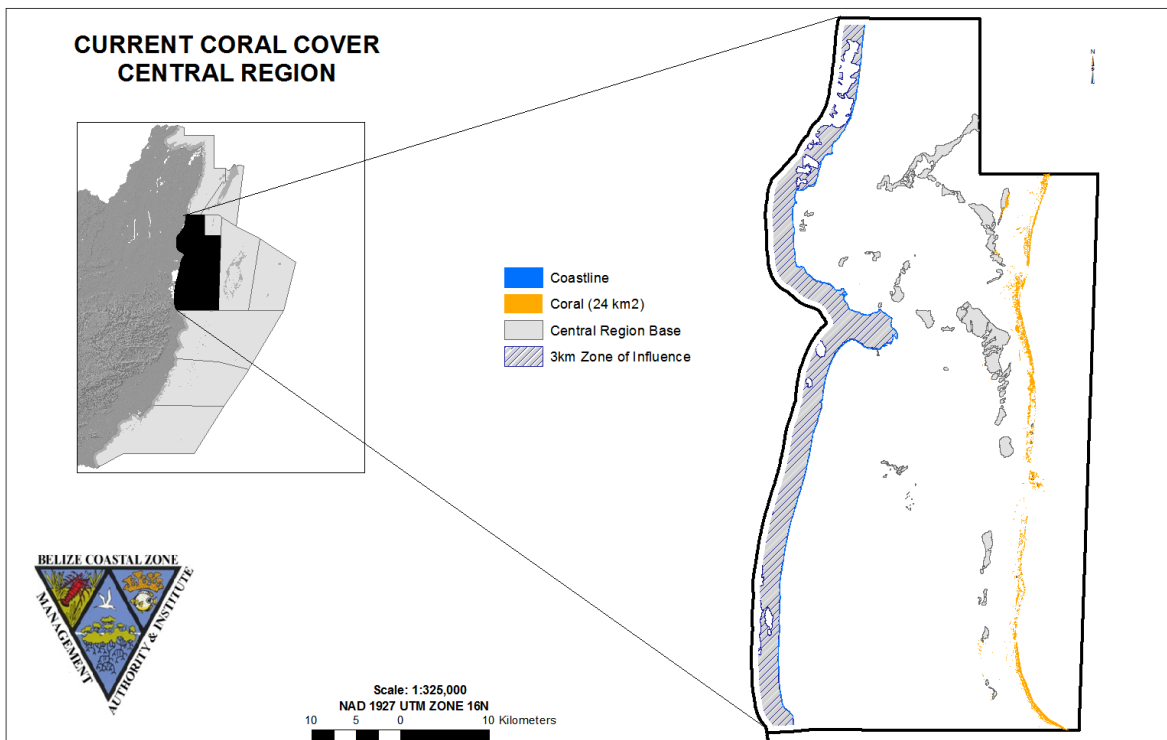
1. Discourage dredging activity unless required for land rehabilitation or the maintenance of the Port facility. In these cases, the activity must not disrupt the marine ecosystems or impact negatively on existing uses by other individuals or operations, and must be approved by the Department of the Environment and National Environmental Appraisal Committee
2. Require developers to finance and undertake replanting of seagrass and mangroves in areas that have been dredged
3. Proper impact analysis of potential must be conducted and cleared by DOE prior to dredging activities to minimize risk to sensitive habitats.

6.5 Sensitive Habitats

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

6.5.1 Corals

Coral growth occurs abundantly in the leeward and westward of the barrier platform in the Barrier Lagoon in circular patches in the vicinity of Gallows Point, Sergeants Caye, Goff Caye and Rendezvous Caye. Significant coral growth also occurs in the Southern Shelf Lagoon in the vicinity of Robinson Point Cayes, Grennel Cayes, Spanish Caye and Crayfish Cayes. Other locations include Middle Long Caye, Bluefield Range, Alligator Caye and Colson Cayes. Dominant types of coral in the area are Elk Horn, Stag Horn, Mountainous Star, Giant Brain and Leaf Coral.



Map 14: Coral Cover in the Central Region

Coral cover in this region is about 24 square kilometres (**Map 13**). Results of the InVEST Habitat Risk Assessment (HRA) model suggest that currently 0.24% of the region’s corals are at low risk, 92.78% at medium risk, and 7.58% at high risk (**Fig. 1**). The results also suggest that in a Conservation Zoning Scheme 7.75% 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 18.29%, and at medium risk 73.95% (**Fig. 1**). In a Development Zoning Scheme, HRA model results suggest that the threat to corals would become increasingly higher. Only 0.24% of corals would be at low risk whereas 0% and 99.76% 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 8.05% of corals would be at high risk, 0.24% of present corals would be at low risk, and 91.71% at medium risk (**Fig. 1**).

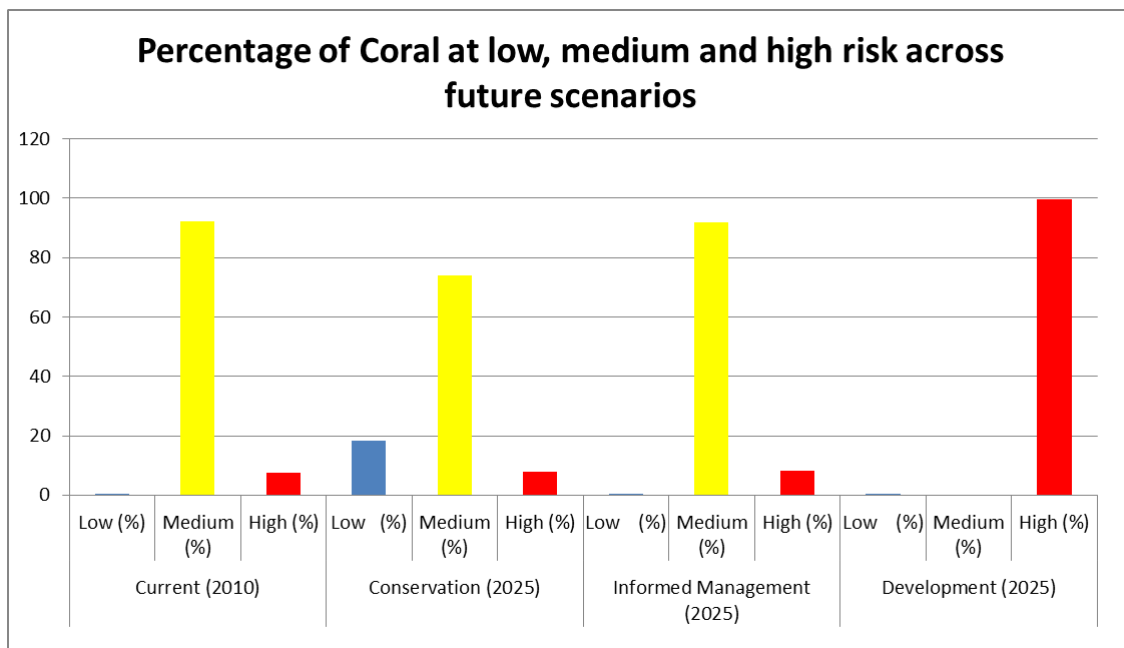
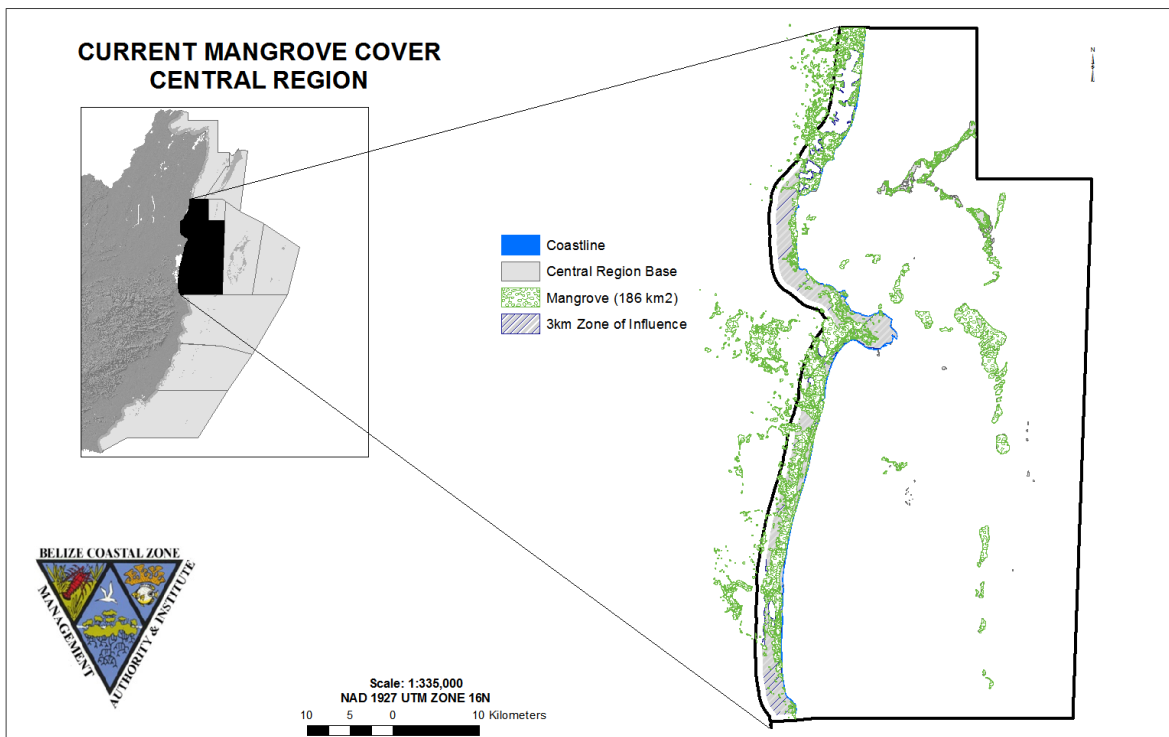


Figure 1: Risk to Corals in the Central Region by Scenario

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. The dominant tree species in this region is the red mangrove, while the white, black and buttonwood mangrove species are also present. These inhabit mostly on the mangrove cayes.



Map 15: Mangrove Cover in the Central Region

In this region, the total mangrove cover is approximately 147 square kilometers (**Map 14**). Results of the InVEST Habitat Risk Assessment (HRA) model suggest that currently 33.78% of the region’s mangroves are at low risk, 61.97% at medium risk, and 4.26% 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 61.32%, and at medium risk 38.68% (**Fig. 2**). In a Development Zoning Scheme, HRA model results suggest that the threat to mangroves would become increasingly higher. 0.04% of mangroves would be at low risk whereas 37.04% and 62.91% 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 0.53% of mangroves would be at high risk, 52% of present mangroves would be at low risk, and 47.16% of medium risk (**Fig.2**).

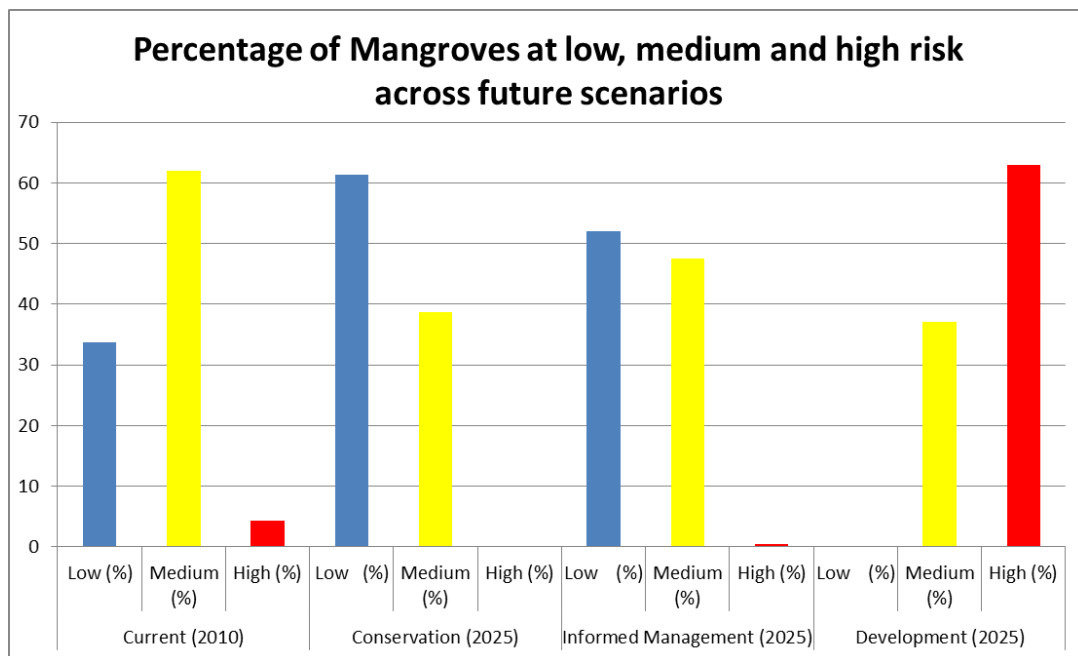
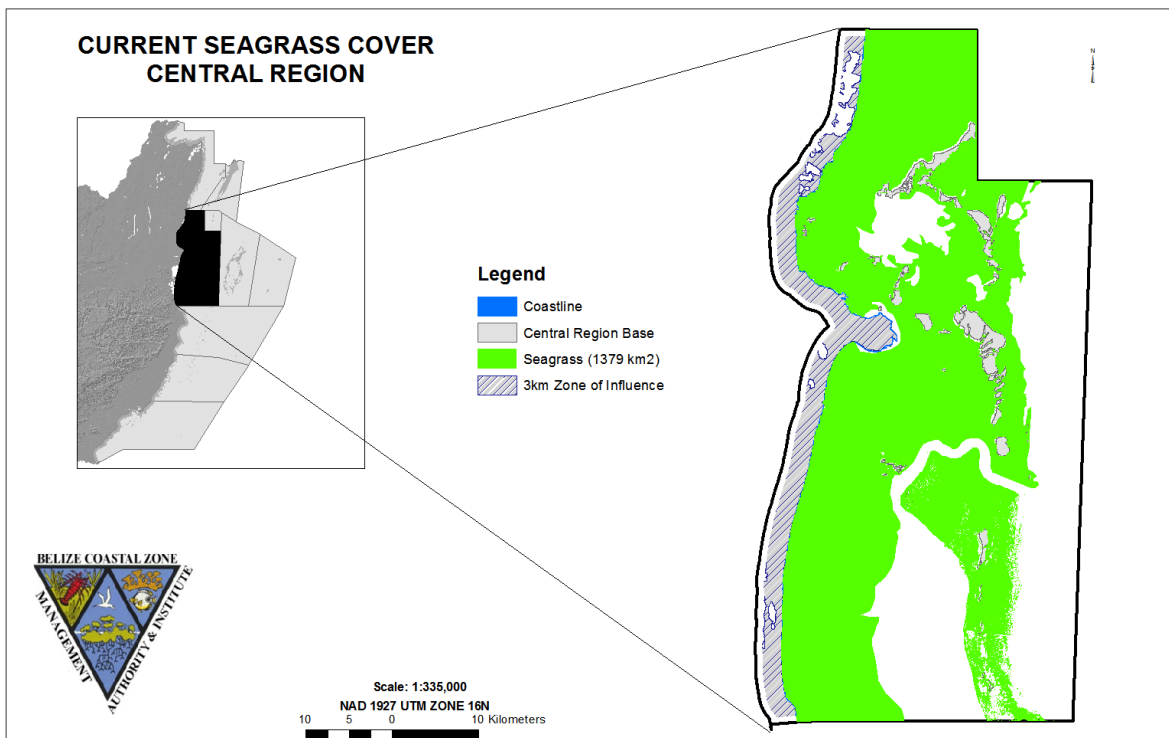


Figure 2: Risk to Mangroves in the Central Region by Scenario

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.

Other significant vegetation includes coconut trees, red gumbo limbo and sea grape trees. The most abundant se floor vegetation is the turtle grass. Other marine plant species include manatee grass, and a number of benthic green and brown Algae.



Map 16: Risk to Seagrass in the Central 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 1.39% of the region’s seagrass are currently at low risk, 87.05% at medium risk, and 11.57% 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 1.71% of seagrass would be at high risk, 32.21% of seagrass would be at low risk and 66.09% at medium risk in 2025 (**Fig. 3**). In a Development Zoning Scheme, model results suggest that 97.54% 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, 2.43% of seagrass would be at medium risk and 0.03% 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, 90.4% of present seagrass would be at medium risk. Additionally, the model results reveal that under this zoning scheme, 6.38% of present seagrass would be at low risk and 3.21% at high risk in 2025 (**Fig. 3**).

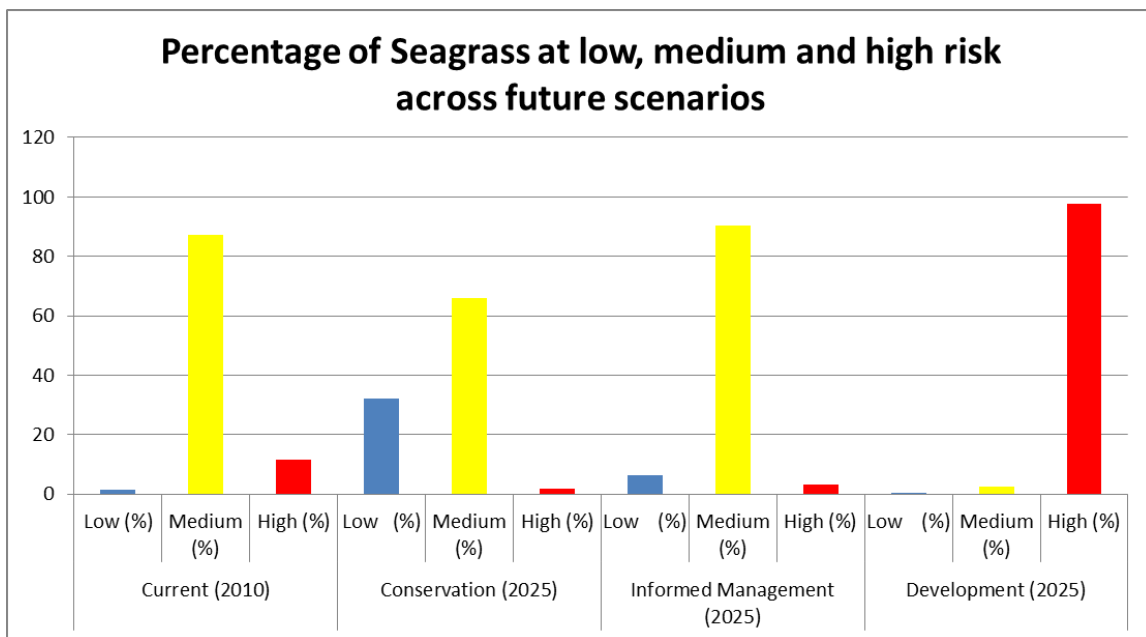


Figure 3: Risk to Seagrass in the Central Region by Scenario

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. 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
2. Analyze current human impacts on habitats in order to prioritize areas requiring immediate management intervention
3. Enhance collaboration among management and permitting agencies to ensure impacts to critical habitats are reduced and controlled
4. Raise awareness and outreach in community stakeholders about the importance of reducing impacts to habitats

6.6 Utilities

6.6.1 Energy

Energy for the mainland areas in this region is supplied by the Belize Electricity Limited (BEL). In terms of the cayes, energy is provided through several sources, namely, generator, wind, solar and butane. There is one incidence of direct supply from mainland BEL source on Moho Caye. However, most of the fishermen camps use butane lamps, with the larger and more established ones using generators, while the residential vacation homes mostly use generators, with a few using solar panels. Similarly, the resorts use mostly generators, in combination with either wind or solar, or as the case of the resort at Spanish Lookout Caye, in combination with both. It is important that the variety energy needs are met for the communities continue to be met now and in the future.

Energy supply for the cayes is, for the most part, dependent on the type and intensity of development activity. For this region, low-to moderate intensity development is proposed. The major source of energy supply, which may be potential threat to the environment in the region, is the use of diesel generators. Noise and air pollution is a nuisance, and the transportation and improper disposal of spent fuel can result in spills. The latter can be mitigated against by proper handling and storage and subsequent transportation of used oils back to mainland. Solar and wind energy are environmentally friendly means of the natural means by which energy is harnessed energy. These two sources of energy, in combination with the use of the diesel generators, could provide a reliable source of energy for the cayes. However, acid from chemicals from batteries used in connection with wind and solar power supply are toxic.

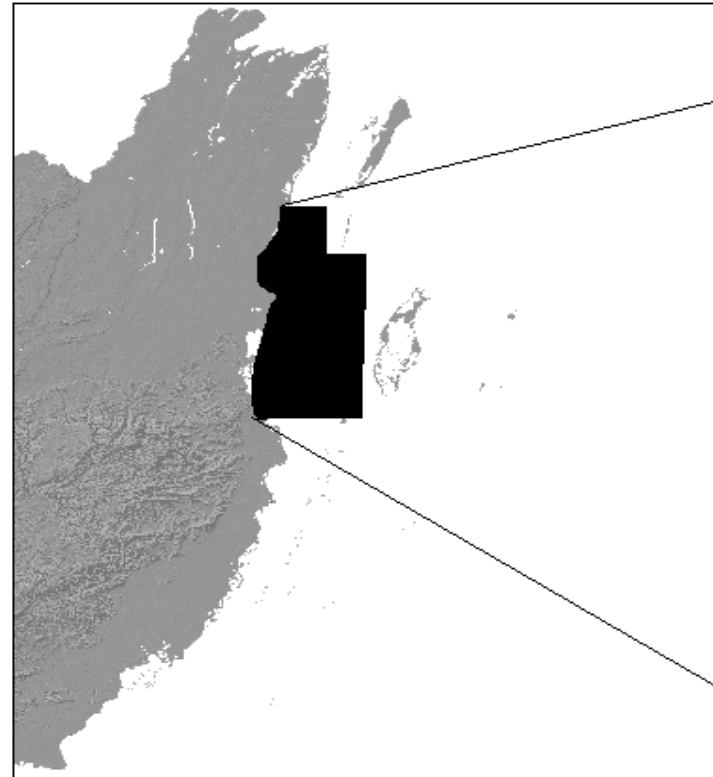
6.6.2 Water




Water supply for mainland Central region is acquired from the public water supply system provided by the Belize Water Services (BWS), bottled water suppliers and basic roof catchment. On the cayes, the primary source of water is storm water catchment and bottled water. The only documented instance of water being produced through reverse osmosis was at the Spanish Lookout Caye Resort. The adverse impact of the type of water sources on the cayes are associated with the disposal of plastic bottles and damaged or discarded plastic and metal tanks which can be aesthetically unsightly, and in the case of the tanks, introduce chemicals into the terrestrial and aquatic environment. Reverse osmosis could be an alternative. However, this process requires a consistent energy source and an environmentally appropriate means by which to adequately manage brine disposal.

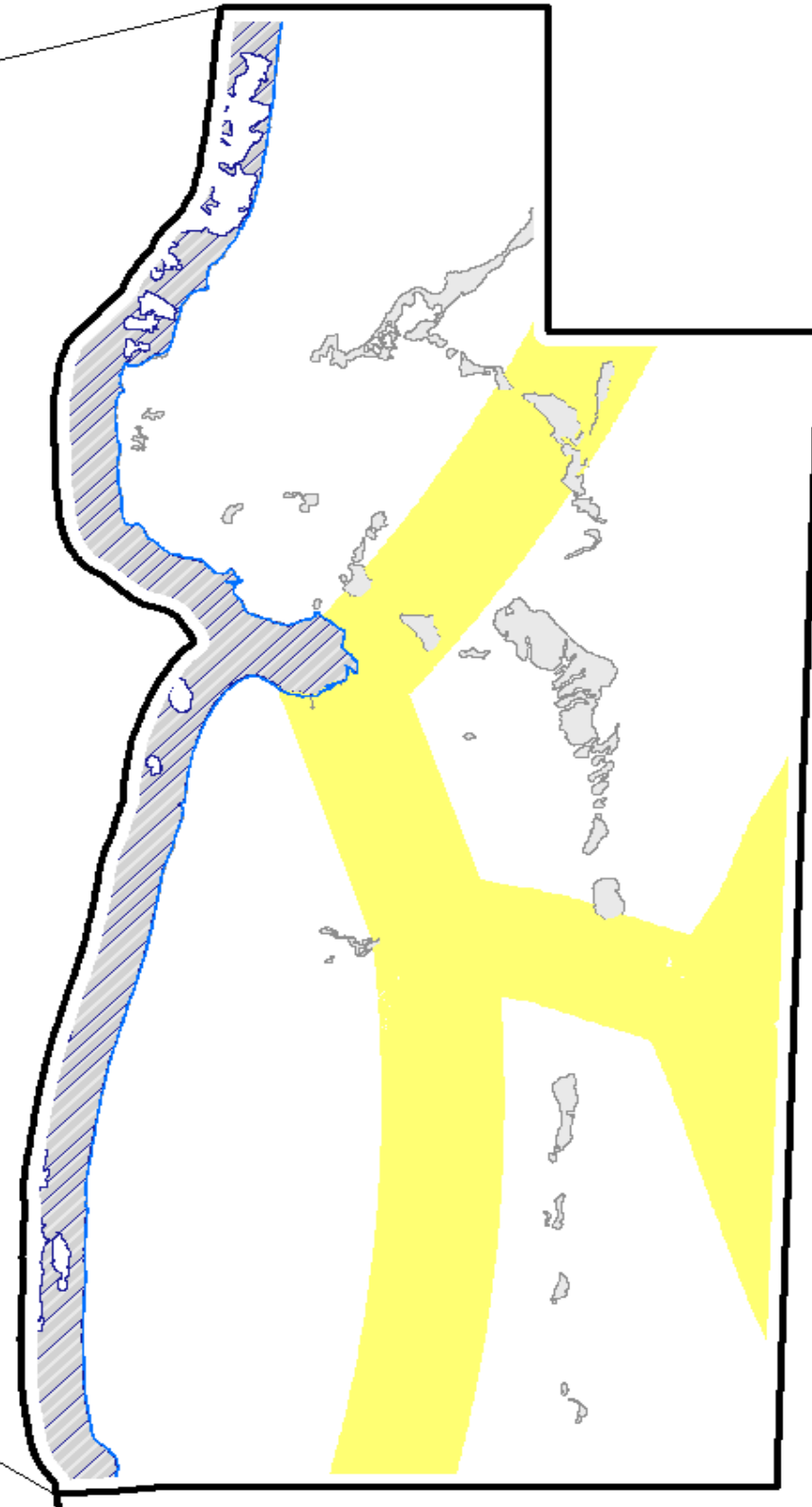
6.6.3 Marine Transportation

As the most economically productive region, the Central Region hosts the major port, water taxi operations and cruise landings in the country of Belize. Therefore there the waterways in this region are amongst the most traversed in the country. As a result, it is necessary for lighthouses, buoys and markers to be placed in the sea to direct vessels and humans away from fragile and sensitive ecosystems. As such, the coastal zone management guidelines were formulated to attach as conditions to development approvals for the placement of walkways, lighthouses, buoys, and markers on sea and land. These guidelines recognize existing marine transportation routes in the region, which have been captured in the Informed Management spatial zoning scheme (**Map 17**). However, improvements in the demarcation of these areas via marker buoys and clearly mark channels are needed, especially as it related to cruise and pleasure vessels associated with tourism activity. In addition to the recommended zoning scheme for marine transportation, the framework for implanting the recommended transportation routes for this region is found in **Table 15**.


INFORMED MANAGEMENT ZONING SCHEME FOR MARINE TRANSPORTATION: CENTRAL REGION



-  Coastline
-  Marine Transportation
-  3km Zone of Influence



Scale: 1:330,000
NAD 1927 UTM ZONE 16



Map 14: Informed Management Zoning Scheme for Marine Transportation in the Central 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			
Marine Transportation	Marine area delineated for the use of watercraft, such as water taxis, cruise ships, etc, to transport people, goods and cargo between multiple destinations	1. Shipping operation activities 2. Port development and operation 3. Vessel traffic use	Dredging for the maintenance of navigational lanes and ports of entry	Passage/entry of vessels Operation and construction of ports	1. Fishing 2. Marine recreational activities 3. Anchoring that leads to disturbance and destruction marine habitats, including but not limited to, coral reef system, seagrass beds, etc 4. Exploration and extraction of petroleum 5. Construction of any illegal structure that would obstruct shipping and navigation 6. Disposal of solid and liquid wastes from boats and ships 7. Transportation of illegal goods, such as drugs and weapons, and human trafficking	Belize Port Authority Act Belize National Coast Guard Service Act Customs Regulation Act Defence Act Environmental Protection Act Harbours and Merchant Shipping Act Immigration Act Maritime Areas Act Marine Dredging Policy (Draft) Mines and Minerals Act	Belize Port Authority Belize National Coast Guard Customs Department Belize Defence Force Department of the Environment Belize Port Authority Immigration Department Ministry of Foreign Affairs Mining Unit, Ministry of Natural Resources Geology and Petroleum Department

Recommended Actions:

1. Close collaboration with relevant agencies to ensure that energy and water supply are provided through environmentally friendly means
2. Close collaboration with relevant agencies in the placement and maintenance of buoys, lighthouses and protected area boundary markers in the sea
3. Encourage the use of solar and wind power in the case of resorts and any residential development, as they are unlikely to cause the environmental problems (spillage, fumes, noise) associated with diesel generators
4. Take all precautions to avoidance of pollution and noise generation in accordance with the Pollution Regulations, 1996 of the Department of the Environment

6.7 Pollution Control

Inadequately treated wastewater that is disposed of directly into the sea has implications both for water quality and marine biodiversity. In this region, poor water quality is mostly linked to the disposal of improperly treated domestic wastes. On the other hand solid waste, if not properly managed, can create significant environmental and ecological degradation that can lead to serious public health problems. Solid waste that is indiscriminately disposed of can pollute, and odor can become a problem for communities. Uncontrolled and inadequate disposal attracts flies, insects and rodents, which may all act as vectors of diseases. The leaching of liquid from the garbage can contaminate soil, surface and ground water. Solid waste such as plastic bags, nets, monofilament lines and other types of plastic are harmful marine species, including mammals, birds and sea turtles.

Presently, solid waste generated by the fishermen camps on the cayes is disposed of mainly by burying inorganic non-recyclable and organic waste, while waste such as paper and some plastics are disposed of by open incineration. On the larger weekend and resorts cayes such as St George's Caye, English Caye, Goff Caye, Blue Field Caye, and Spanish Caye, residents/visitors usually transport their garbage back to mainland Belize City for disposal. Where industrial or hazardous waste is generated this should be dealt with on an individual basis.

Soak-a-ways and Septic Tanks on Coastal Developments

The Central Building Authority (CBA) is the agency mandated by the Belize Building Act 2003 to control building operations in the interest of public safety and health. In 2010, CBA produced detailed specifications for the construction of soak-aways and septic tanks for residential and other low impact buildings. Detailed diagrams 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 14. 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. Implement the National Solid Waste Management Plan (SWMP) recommendations for this region in order to improve solid waste management
2. Ensure that development applications include as a component management plans for both solid and liquid wastes
3. Close collaboration among the relevant agencies to ensure that the solid and liquid waste disposal management activities are carried out through environmentally friendly mechanisms
4. Treat the waste water in a cost-effective manner on cayes to meet environmental standards. The type of treatment system will depend on the type and quantity of waste to be treated, land area and resources available (i.e. technological, human and financial). Treatment systems must be verified by DOE prior to construction.

6.8 Social Amenities

Even though development in the region is envisaged to be moderate to low intensity, it is important that infrastructure, especially in the marine environment, is provided. Such recommended necessary infrastructure includes buoys and markers to direct vessels and humans away from fragile ecosystems and no-wake zones. No wake zones are especially important for the endangered West Antillean manatee in this region that forage this area and are constantly subject to boat strikes. Also due to multiple types of boating activities that take place throughout the marine environment, major activities such as shipping lanes, cruise channels and water taxi routes should be clearly marked in near shore areas to prevent accidents with leisure boaters and local sailing associations.

Recommended Actions:

1. Implement infrastructure buoys and markers to direct vessels and humans away from fragile ecosystems and no-wake zones
2. Enforce policy on no-wake zones in respect of conserving the remaining population of the endangered West Indian manatee

6.9 Conservation

This region is home to two wildlife sanctuaries, namely Gales Point and Swallow Caye Wildlife Sanctuaries. Both of these sanctuaries serve to protect important habitat and foraging areas for the endangered West Indian Manatee. Swallow Caye is only caye with protected status by virtue of Statutory Instrument No. 102 of 2002. Noteworthy is the existence of the Goff's Caye Special Management Area, located in the central province of the Belize Barrier Reef Reserve System and which is managed by CZMAI. There are other cayes within the region that have protective, socio-economic, scientific and cultural importance as well.

The mangrove, sea grass beds and reef systems are a productive habitat for a wide range of vertebrate including the Giant Anemone, the Christmas Tree Worm, the Queen Conch, the Octopus and the Sea Star. The area is also a productive habitat for many vertebrates, including fin fishes, sea turtles. Fin fishes are relatively abundant and some common fish species include among others the Spotfin Butterfly Fish, the Yellow Tail Snapper, the White Grunt, The Nassau Grouper and the Snook. Sea turtles can be found in this region and include the Green Turtle, the Hawksbill Turtle and the Loggerhead Turtle. The sandy beaches are nesting sites for many of these turtles, particularly, Gallows Point, Middle Long Caye and the Bluefield range. These have all been identified as endangered species according to the International Union for the Conservation of Nature (IUCN) as the sea turtles are heavily targeted and their numbers have reduced over the years.

Crocodiles are abundant in areas which are mostly uninhabited by humans. Some of the more notable areas include Hicks Caye, North Drowned Caye, Gallows Point and Water Caye. The Atlantic Bottlenose and the Spotted dolphins are commonly seen around the cayes of the Central region, and in particular, mostly in the environs of Spanish Caye, English Caye, Swallow Caye and Stake Bank. Surveys show healthy Manatee populations in the region and important nesting and foraging sites include Hicks Caye, Montego Caye, Frenchman Caye, Gallows Point, the Drowned Cayes and Swallow Caye, the latter a Wildlife Sanctuary to protect the Manatees. However, manatees are still considered threatened, particularly by the intensified tourism activity in the region. Many seabirds inhabit the region, using it a feeding, roosting and nesting site, particularly the mangrove cayes. Some of the more important birds are the Cormorant, the Brown Pelican, the Herring Gull, the Great Tailed Grackle and the Yucatan Vireo.

In terms of the cayes, specific priority areas recommended for preservation of their natural state include the Drowned Cayes, Montego and French Caye Range and the Goff Caye, English Caye and Sergeant Caye Area. The remaining mangrove wetland on St. George's Caye should also be preserved.

An obstacle to conservation identified by the stakeholders of the central 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.

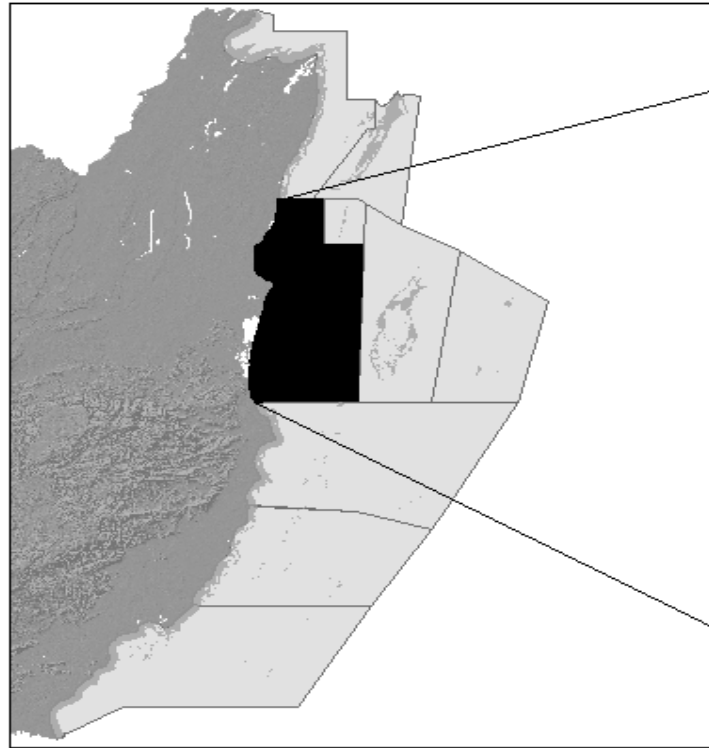
The Government has acknowledged that improving legal enforcement mechanism is key in promoting conservation efforts. Therefore improvements must be made on the legislative framework of the Conservation Covenant as well as legally enforceable economic incentives for parties involved. Improvements required 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. Provide the foundation for the protection of the priority cayes named above and the wetland area at St. George's Caye. The expansion of the Swallow Caye Wildlife Sanctuary should also be considered to include the Drowned Cayes
2. Provide a foundation for any management plan which may be conceived for the region
3. Encourage stakeholders participation in the monitoring of the application of the planning guidelines
4. Revise the proposed Conservation Covenants Act to allow NGO and other organizations to identify and work to protect land considered ecologically important.

INFORMED MANAGEMENT ZONING SCHEME FOR CONSERVATION: CENTRAL REGION

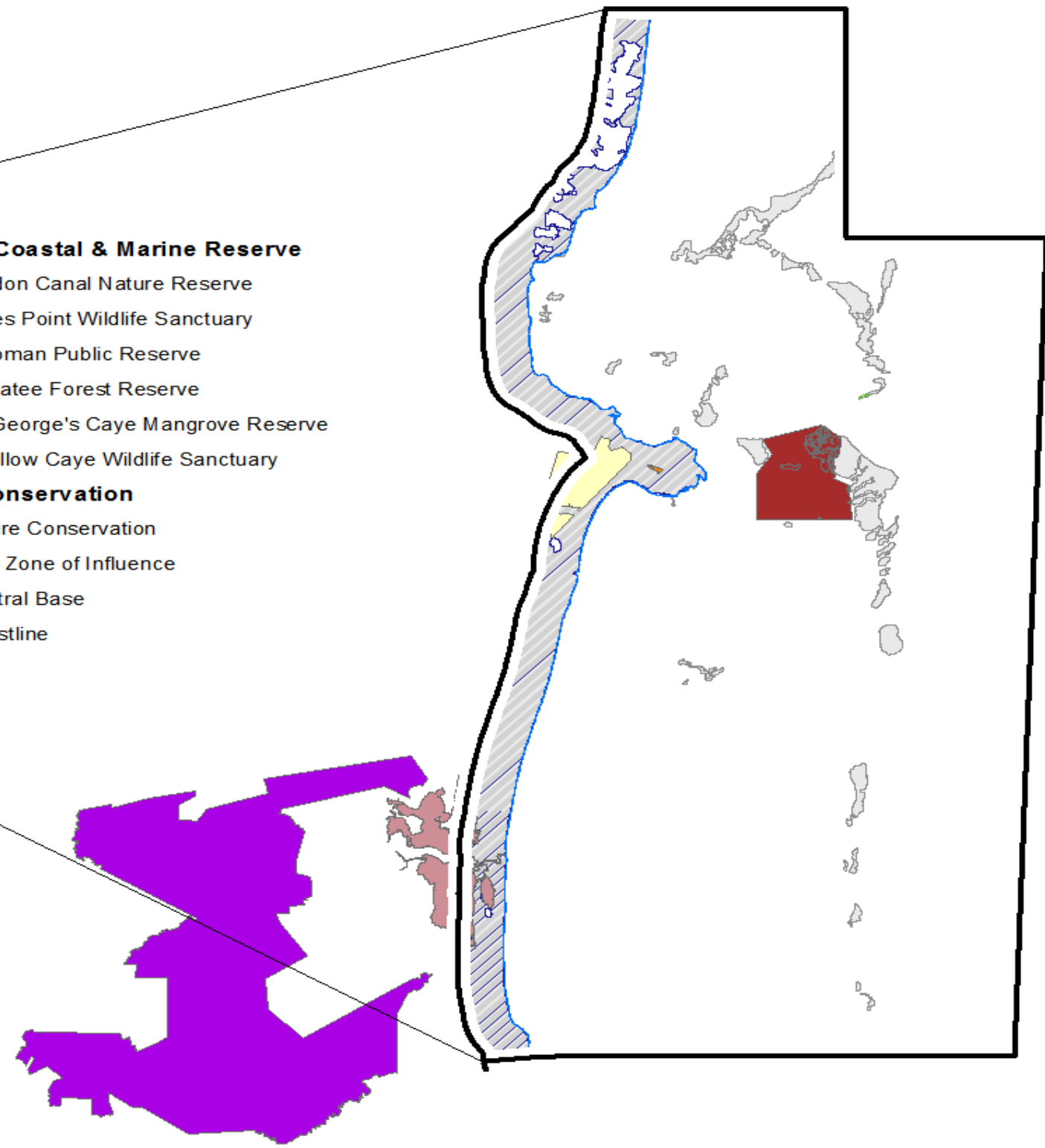


Existing Coastal & Marine Reserve

- Burdon Canal Nature Reserve
- Gales Point Wildlife Sanctuary
- Krooman Public Reserve
- Manatee Forest Reserve
- St. George's Caye Mangrove Reserve
- Swallow Caye Wildlife Sanctuary

Future Conservation

- Future Conservation
- 3km Zone of Influence
- Central Base
- Coastline



Scale: 1:350,000
NAD 1927 UTM ZONE 16N
10 5 0 10 Kilometers

Map 17: Informed Management Zoning Scheme for Conservation in the Central Region

Table 16: Framework for Implementing Informed Conservation in the Central Region

ZONE	CHARACTERISTICS OF ZONE	SCHEDULE OF PERMITTED	SCHEDULE OF	SUPPORTING	IMPLEMENTING AGENCY	SUPPORTING NATIONAL	IMPLEMENTING AGENCY
		Dominant	Compatible	Regulated			
Marine Conservation	Coastal and marine areas delineated for the retention of critical habitats and ecosystems for a diversity of marine life, fish spawning aggregation sites, replenishment zones, biodiversity areas	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Research and education 2. Marine Recreation and Tourism 	<p>Tourism and recreation (snorkeling and diving)</p> <p>Research and education</p> <p>Establishment of new reserves</p>	<ol style="list-style-type: none"> 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 	<p>Belize Port Authority Act</p> <p>Belize National Coast Guard Service Act</p> <p>Customs Regulation Act</p> <p>Defence Act</p> <p>Environmental Protection Act</p> <p>Harbours and Merchant Shipping Act</p> <p>Immigration Act</p> <p>Maritime Areas Act</p> <p>Marine Dredging Policy (Draft)</p> <p>Mines and Minerals Act</p>	<p>Belize Port Authority</p> <p>Belize National Coast Guard</p> <p>Customs Department</p> <p>Belize Defence Force</p> <p>Department of the Environment</p> <p>Belize Port Authority</p> <p>Immigration Department</p> <p>Ministry of Foreign Affairs</p> <p>Mining Unit, Ministry of Natural Resources</p> <p>Geology and Petroleum Department</p>

6.10 Scientific Research and Education

The Swallow Caye Wildlife Sanctuary (SCWS) was established to protect the endangered West Antillean manatees that live and frequent Belizean waters. It presents a rare opportunity for Belizeans and tourists to see and interact with these creatures in a very sustainable and non-threatening way. The Sea to Shore Alliance (S2S) is a non-profit organization responsible for providing data, expertise and scientific exchange to be used by the government to establish sanctuaries, speed zones, and other actions that help ensure the survival of manatees in Belize. Another part of their program is educational outreach. S2S conducts tour guide and boating training and school visits to educate the public on the importance of manatees and best practices to ensure their safety. Currently S2S and CZMAI, with funding from the Conservation Leadership Programme, are in the process of raising awareness for introducing protective management to the Belize River Mouth area. Management plans would outline a framework for effective integrated research and monitoring of manatees, 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 to ensure the population of manatees in Belize.

7.0 IMPLEMENTATION STRATEGY

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

While the government agencies have the authority of the law to back up its procedures, it is constrained by limited resources. In several instances, however, local NGOs and community-based stakeholder organizations have greater access to, and knowledge of, local conditions and activities, though they have no statutory powers to either assist or control development beyond those available through the Village Councils and Towns Councils Acts. For this reason, it is recommended that localized community and stakeholder participation complement the management efforts of centralized government and statutory agencies in implementing integrated coastal zone management. The Central Region Coastal Advisory Committee (CRCAC), 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 Central Region CAC include, *inter alia*, contributing to the drafting of the coastal zone management guidelines for their coastal region, supporting their initial approval, and monitoring and reporting to the Coastal Zone Advisory Council (CZAC) on the implementation of the guidelines. This means that the Committee will be expected to undertake the following tasks:

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

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

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10.0 APPENDICES

10.1 BACKGROUND

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

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

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

a means to guide management decisions and to form the basis on which decisions are made to regulate the development and use of coastal and marine resources within the coastal zone.

10.2 SUMMARY OF ENABLING LEGISLATION AND IMPLEMENTING AGENCIES FOR ENFORCEMENT OF THE INFORMED MANAGEMENT ZONING SCHEME

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

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

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

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

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

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

Central Building Authority – The Housing and Town Planning Act provides for the regulation of the use and development of land through qualitative measures that is, building densities, land use class assignments etc. However, it does not address the structural integrity of buildings, a

component of the development. The Central Building Authority, by way of the Belize Building Act, is legislated specifically to address this, and provides for the appointment of Local Building Authorities to administrate the Act. Thus, the Central Region CAC can be appointed as the Local Building Authority for the Central Region. However, this may require strengthening the Central Region CAC with technical expertise to do this. The alternative is to coordinate this function with the Belize City, Ladyville, Mullins River & Gales Point.

Belize City Council – The Belize City Council Act requires applications for liquor licenses for the region. The Central 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 Central Region CAC should be included in any discussion on policy formulation on environmental protection as it affects the region.

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

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

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

Hydrology Unit, Ministry of Natural Resources - 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 Central Region CAC should be included in any discussion on policy formulation on water use as it affects the region.

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

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

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

Ministry of Health – The Public Health Act requires the Director of Health to make arrangements for health inspectors to enforce building and health standards for the region. The Central 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 Central Region CAC can be delegated the powers and duties of the Central Housing and Planning Authority (CHPA) with regard to approving, with or without conditions, and prohibiting further development in the region as well as powers to serve prohibition notices. This delegation should be supported by the Solicitor General’s Office or an Attorney at Law for the enforcement of the provisions of the Act.

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

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

Solid Waste Management Authority – The Solid Waste Management Act requires the Solid Waste Management Authority to make arrangements for garbage collection or the engagement of

contractors for the region. The Central 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	POSSIBLE AGENCIES
1. Coastal Agriculture	
Governing Legislation/Policy:	
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	
2. Coastal Aquaculture		
Governing Legislation/Policy:		
Fisheries Act	○ Fisheries Department	
National Aquaculture Policy (Draft)	○ Aquaculture Unit, Ministry of Agriculture	
Environmental Protection Act	○ Department of the Environment	
Belize Trade and Investment Promotion Service Act	○ Belize Trade and Investment	
DEVELOPMENT USE	ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
3. Coastal Development		
Governing Legislation/Policy:		
Belize Building Act	○ Central Building Authority	
Belize City Council Act	○ Belize City Council	
Belize Trade and Investment Promotion Service Act	○ Belize Trade and Investment Development Services	
Cayes Development Policy Coastal Zone Management Act	○ Coastal Zone Management Authority	
Disaster Preparedness and Response Act	○ National Emergency Management Organization	
Electricity Act	○ Belize Electricity Limited	
Environmental Protection Act	○ Department of the Environment	

Forest Subsidiary Act	<input type="radio"/> Forest Department
	<input type="radio"/> Belize Tourism Board
Hotels and Tourist Accommodation Act	
	<input type="radio"/> Ministry of Housing
Housing and Town Planning Act	
	<input type="radio"/> Land Utilization Authority
Land Utilization Act	
	<input type="radio"/> Mining Unit, Ministry of Natural Resources
Mines and Minerals Act	
	<input type="radio"/> Ministry of Works and Transport
Private Works Construction Act	
	<input type="radio"/> Ministry of Health
Public Health Act	
	<input type="radio"/> Public Utilities Commission
Public Utilities Commission Act	
	<input type="radio"/> Solid Waste Management Authority
Solid Waste Management Authority Act	
	<input type="radio"/> Belize Telemedia Limited
Telecommunications Act	
	<input type="radio"/> Town Councils
Town Councils Act	
	<input type="radio"/> City/Town Councils
Trade Licensing Act	
	<input type="radio"/> Belize Water Services Limited
Water and Sewerage Act	
	<input type="radio"/> Hydrology Unit, Ministry of Natural Resources
Water Industry Act	

DEVELOPMENT ACTIVITY/HUMAN USE

RESPONSIBLE AGENCIES

4. Conservation

Governing Legislation/Policy:

Fisheries Act

Fisheries Department

Forest Act

Forest Department

Private Forests (Conservation) Act	<input type="radio"/> Forest Department
National Parks System Act	<input type="radio"/> Ministry of Forestry, Fisheries 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
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5. Marine Dredging	
Governing Legislation/Policy:	
Mines and Minerals Act	<input type="radio"/> Mining Unit, Ministry of Natural Resources
Dredging Policy	<input type="radio"/> Mining Unit
Environmental Protection Act	<input type="radio"/> Department of the Environment

DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
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6. Fishing	
Governing Legislation/Policy:	
Fisheries Act	<input type="radio"/> Fisheries Department
Coastal Zone Management Act	<input type="radio"/> Coastal Zone Management Authority

DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
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7. Marine Transportation	
Governing Legislation/Policy:	
Belize Port Authority Act Harbors and Merchant Shipping Act	<input type="radio"/> Belize Port Authority
Private Works Construction Act	<input type="radio"/> Ministry of Works and Transport

Customs Regulation Act	<input type="radio"/> Belize Customs Department
Maritime Areas Act	<input type="radio"/> Ministry of Foreign Affairs
Defense Act	<input type="radio"/> Belize Defense Force
Immigration Act	<input type="radio"/> Immigration Department
Dredging Policy	<input type="radio"/> Mining Unit, Ministry of Natural Resources
Environmental Protection Act	<input type="radio"/> Department of the Environment

DEVELOPMENT ACTIVITY/HUMAN USE	RESPONSIBLE AGENCIES
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8. Marine Recreation

Governing Legislation/Policy:

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
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9. Oil Exploration

Governing Legislation/Policy:

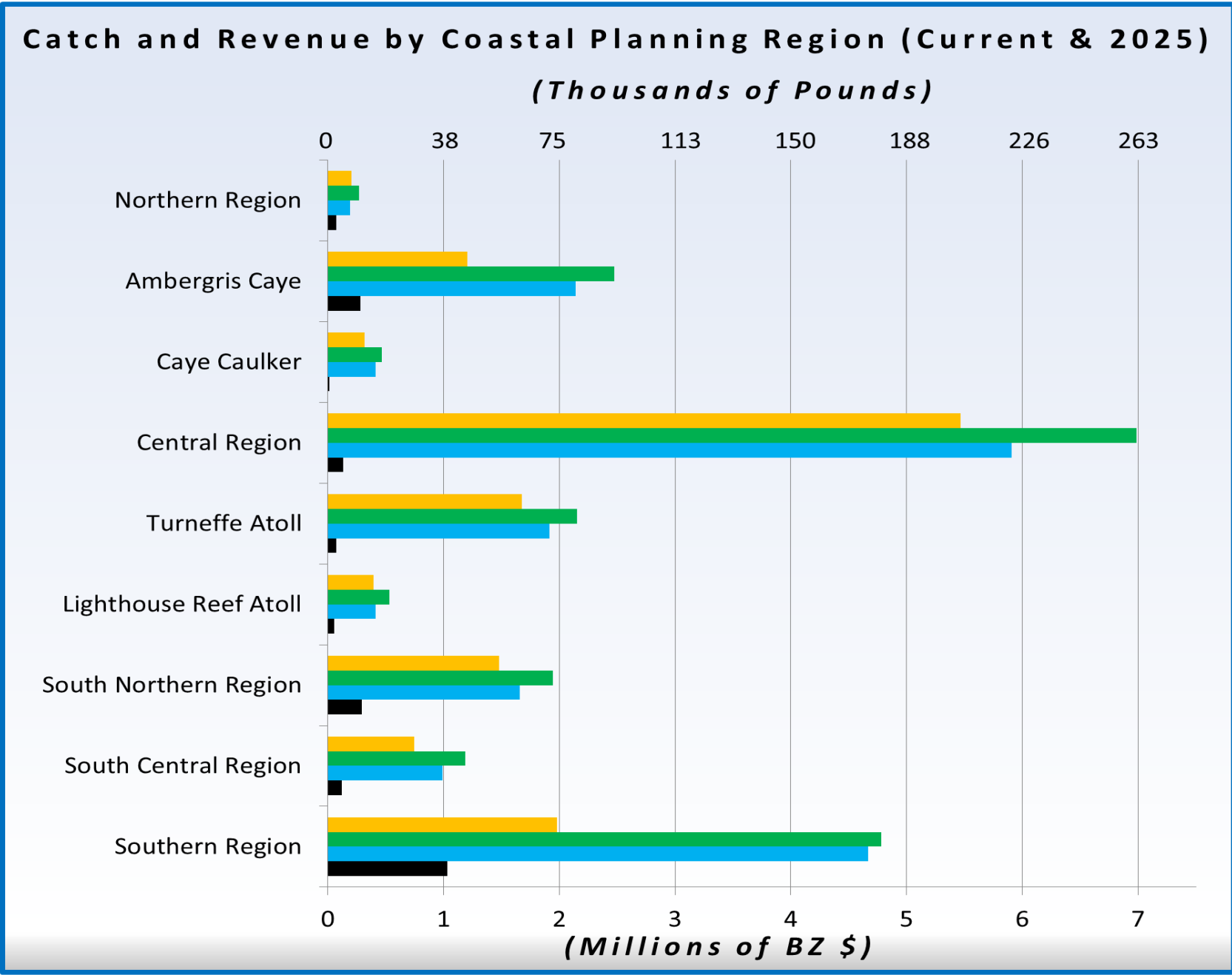
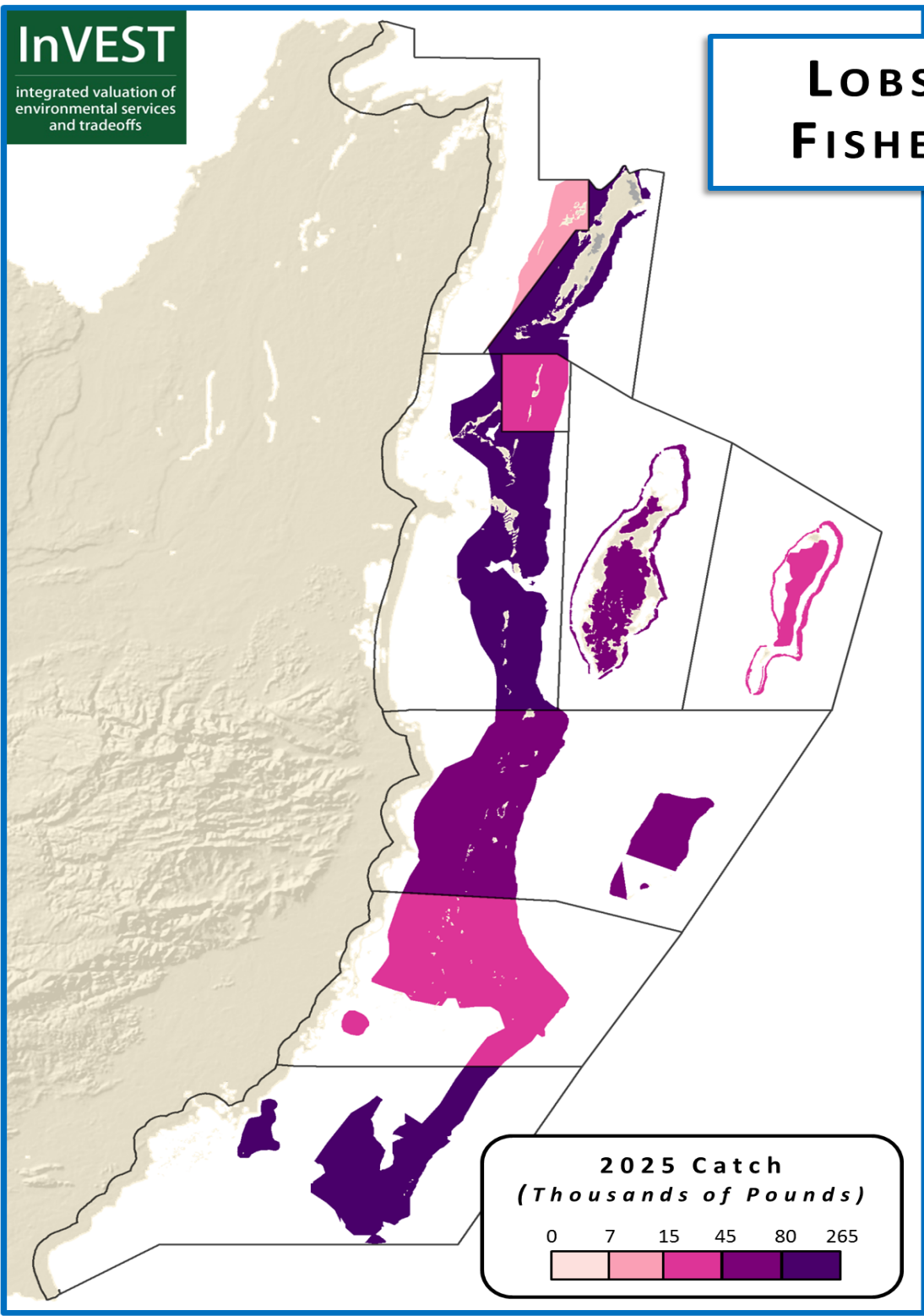
Environmental Protection Act	<input type="radio"/> Department of the Environment
Petroleum Act	<input type="radio"/> Geology and Petroleum Department

10.4 FIGURES

**LOBSTER
FISHERIES**

SCENARIOS

- Current
- Conservation
- Informed Management
- Development



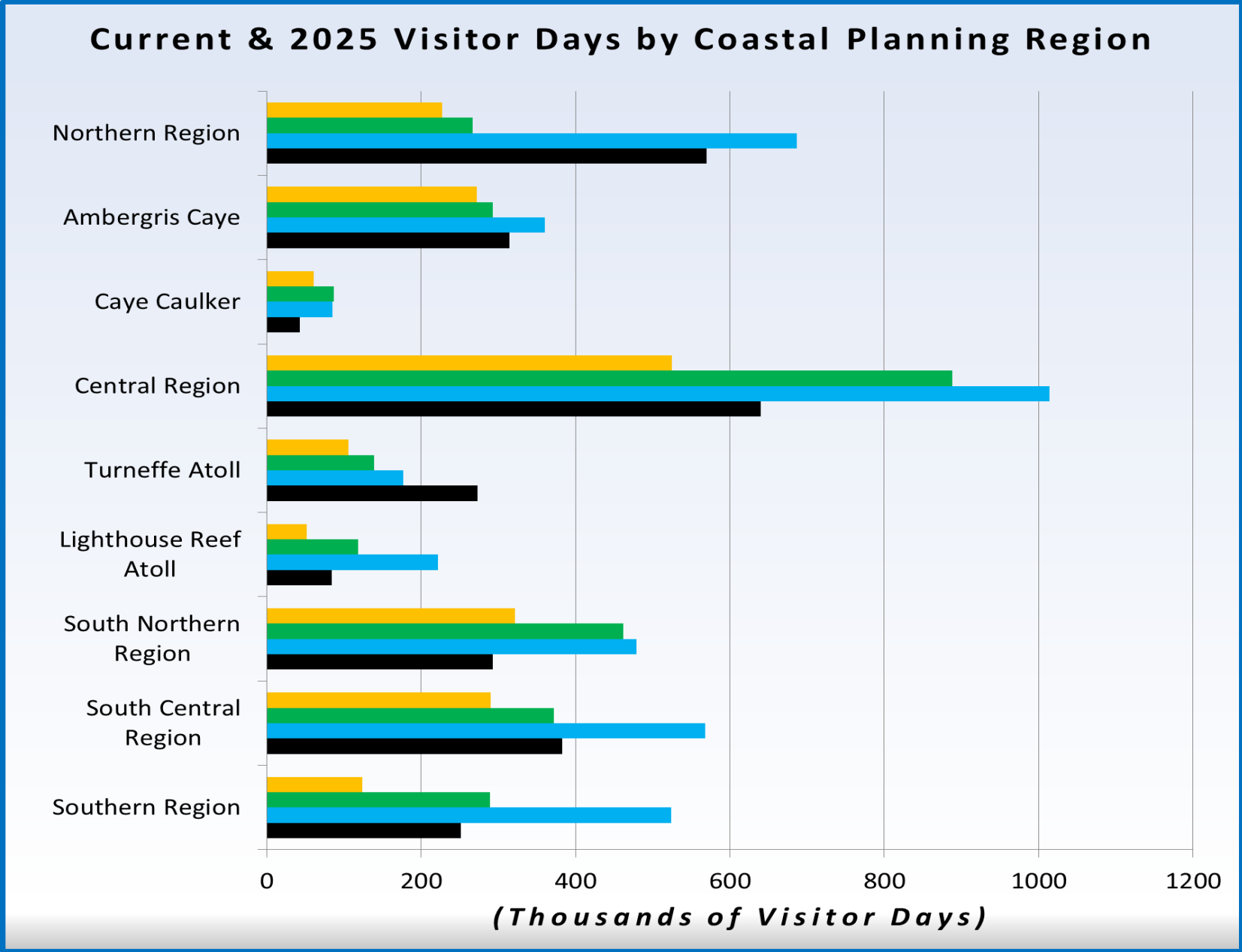
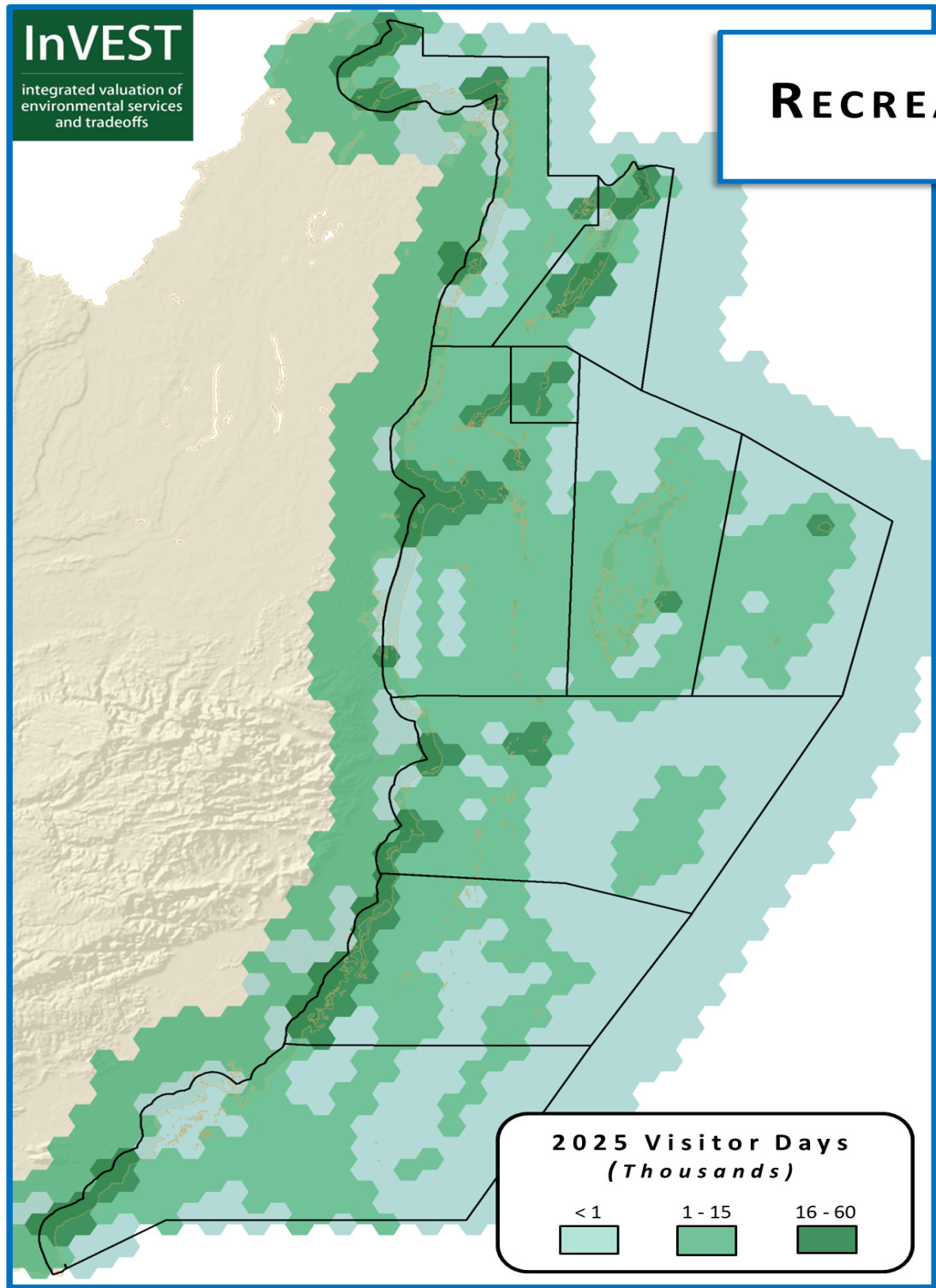
INFORMED MANAGEMENT

Figure 4: Lobster Fisheries Catch and Revenue by Scenario

RECREATION

SCENARIOS

- Current
- Conservation
- Informed Management
- Development



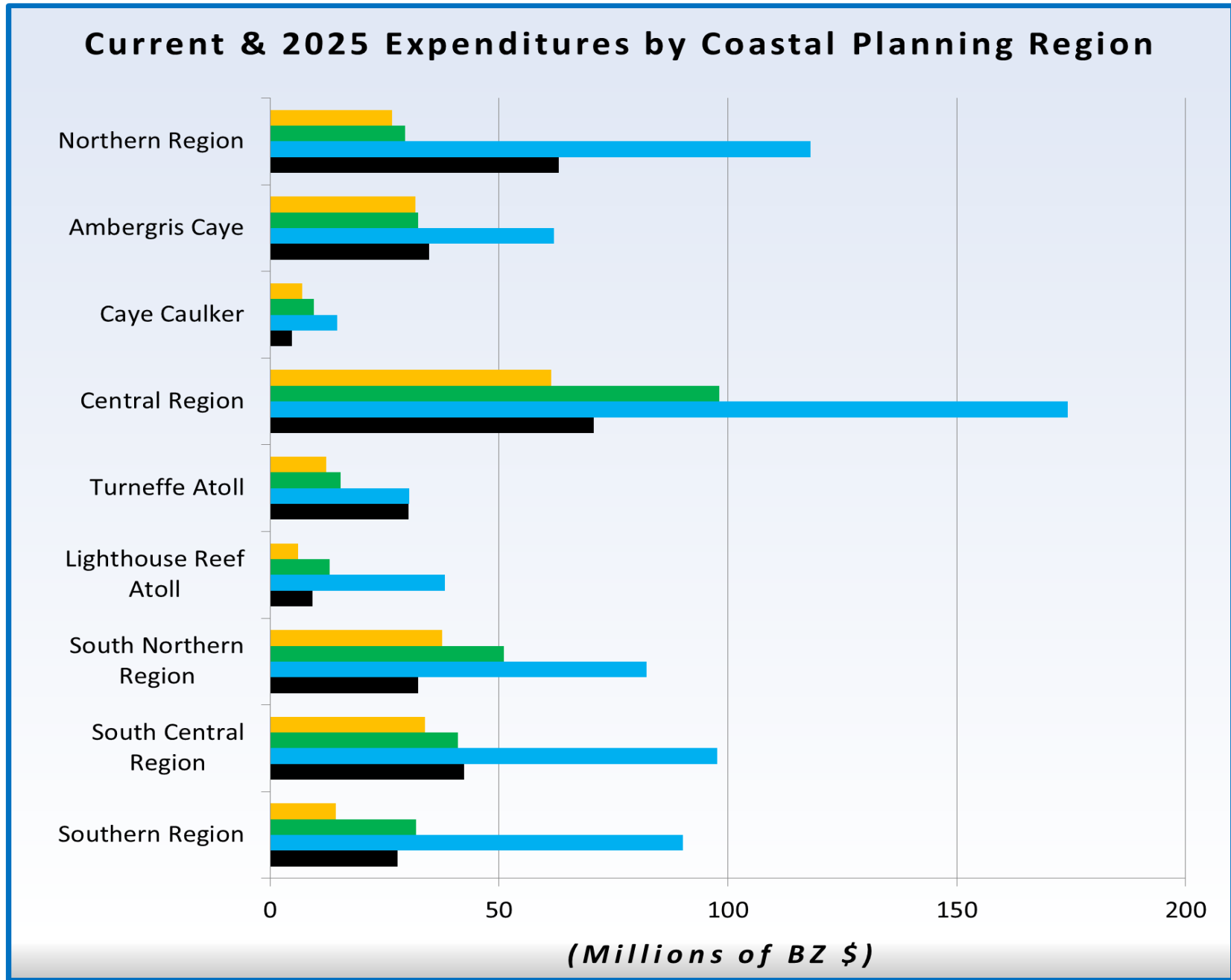
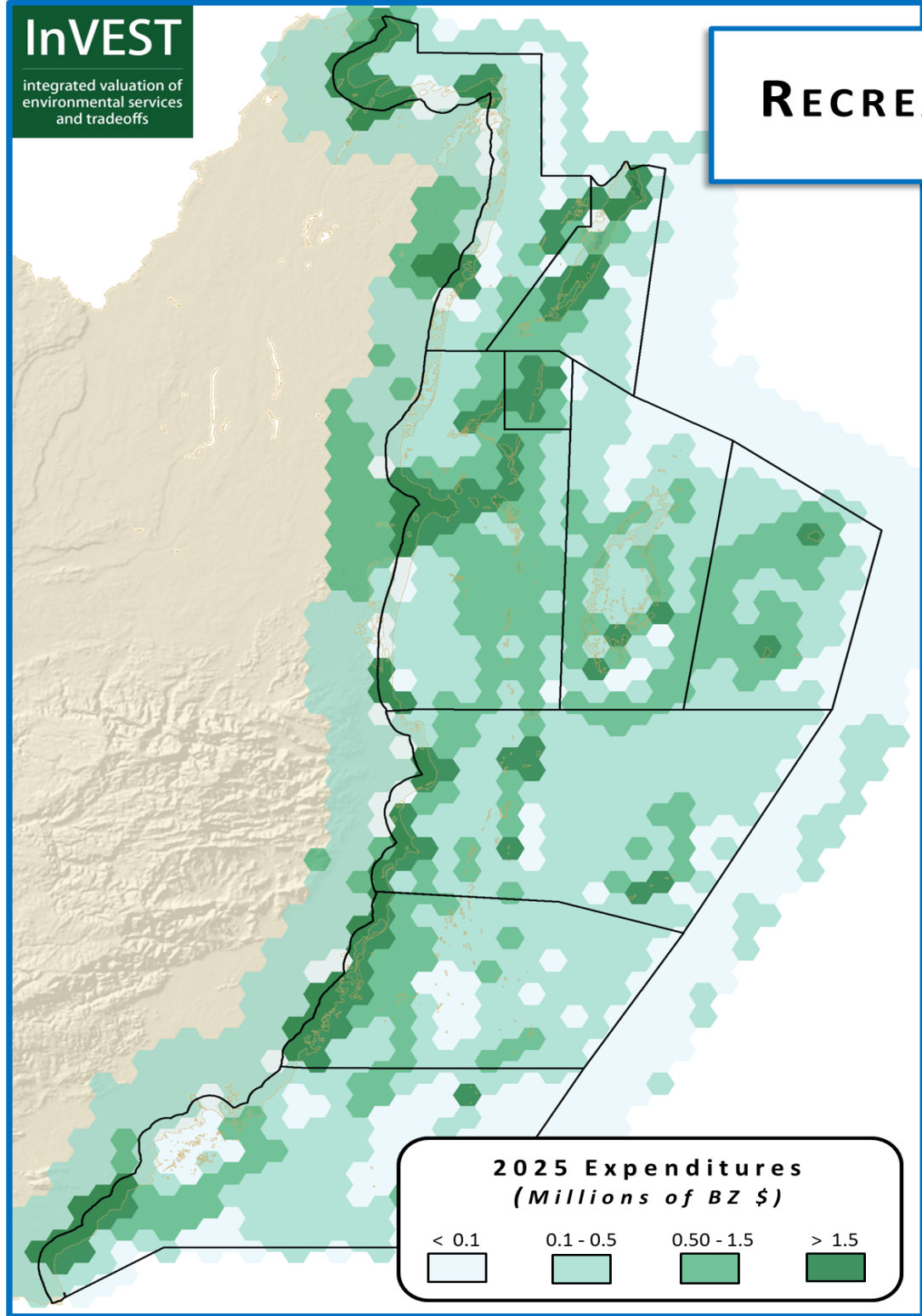
INFORMED MANAGEMENT

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

RECREATION

SCENARIOS

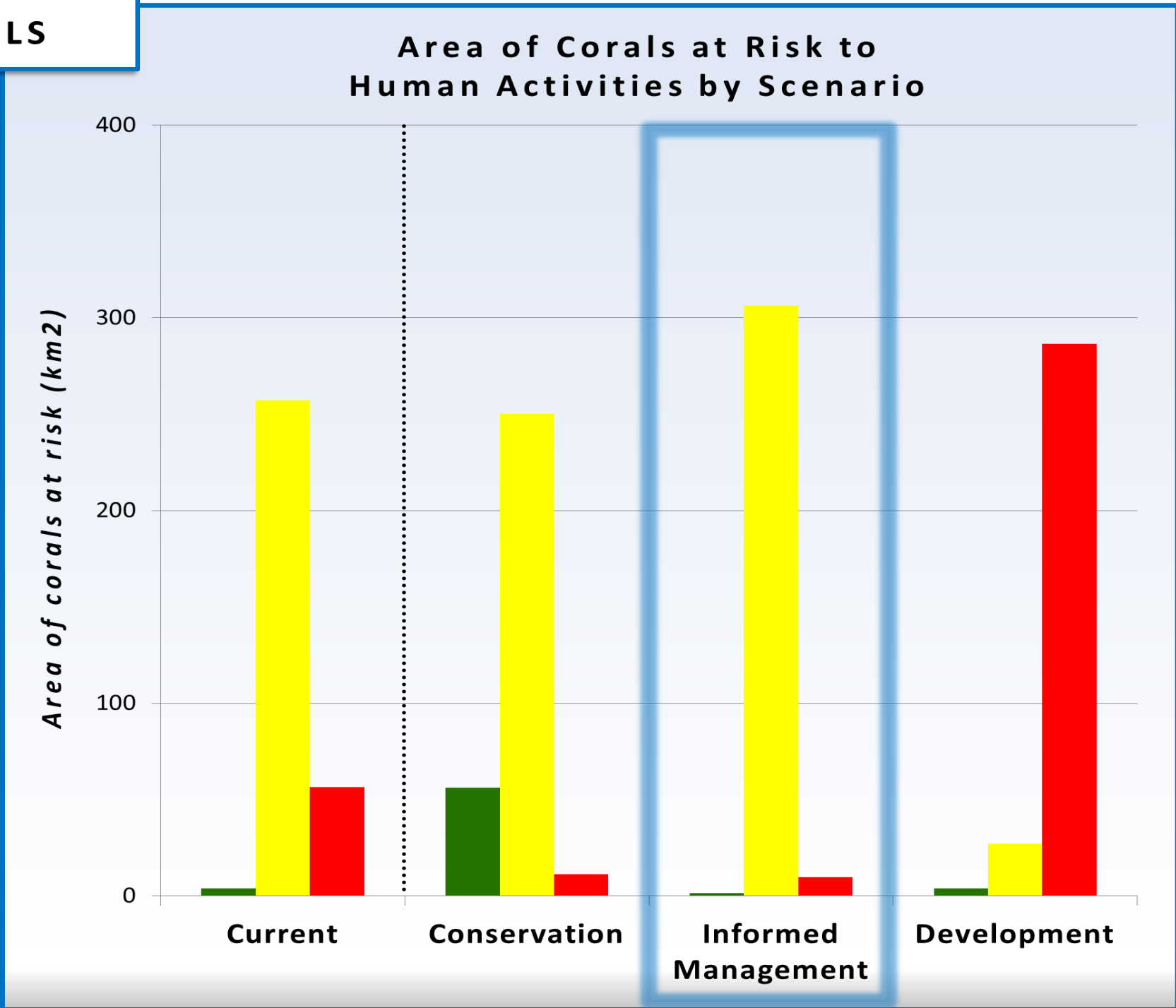
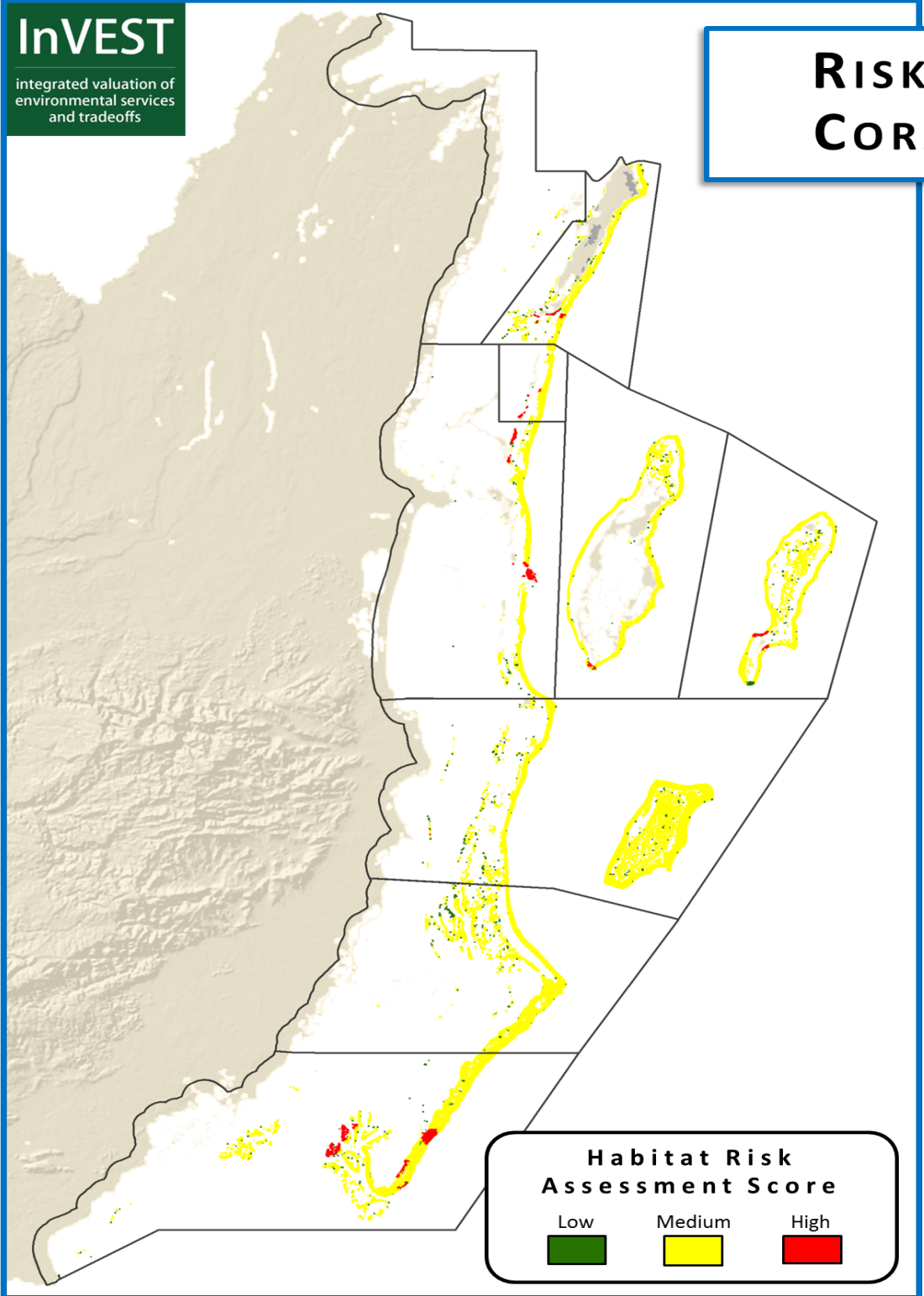
- Current
- Conservation
- Informed Management
- Development



INFORMED MANAGEMENT

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

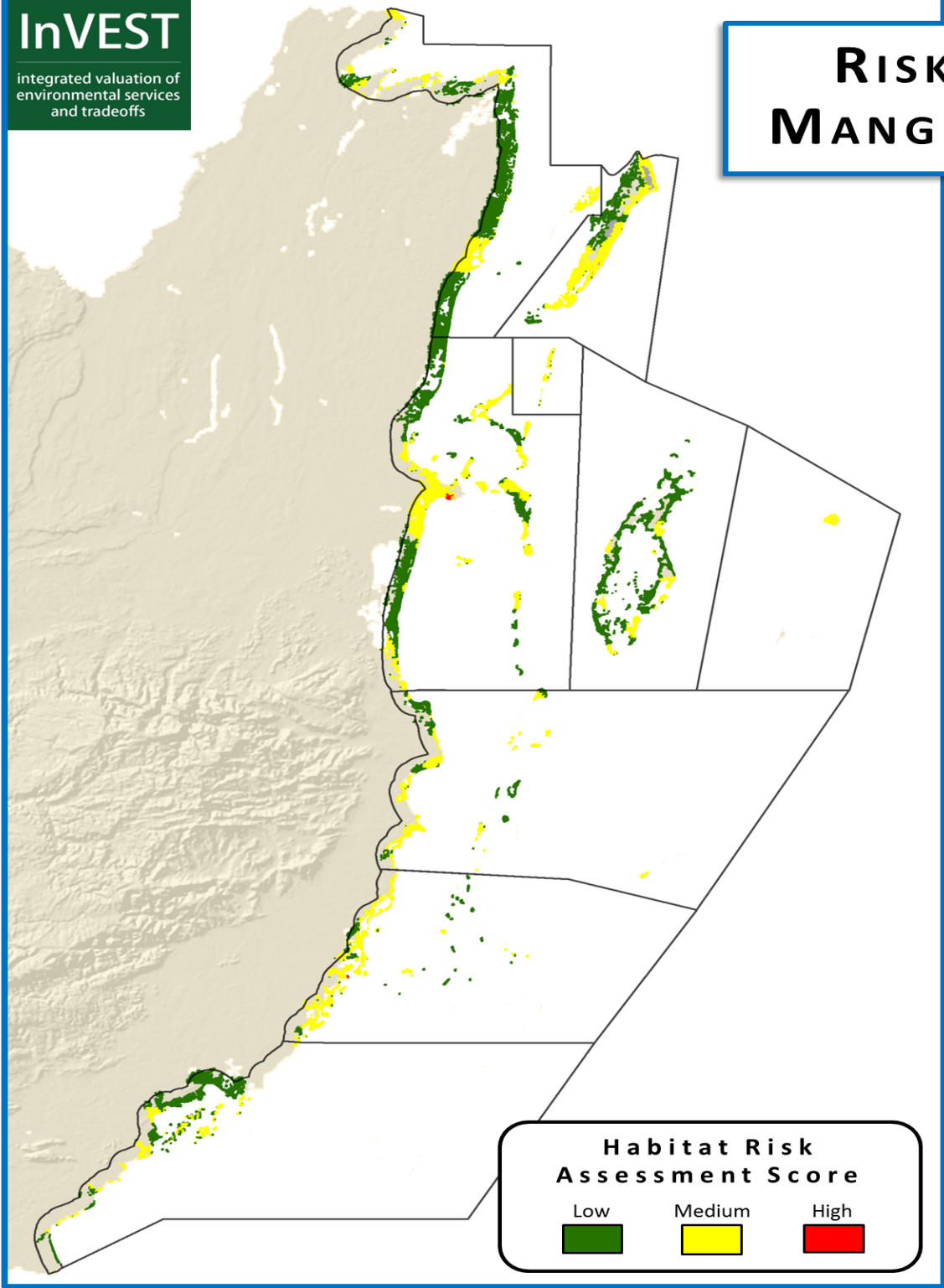
RISK TO CORALS



INFORMED MANAGEMENT

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

**RISK TO
MANGROVES**



INFORMED MANAGEMENT

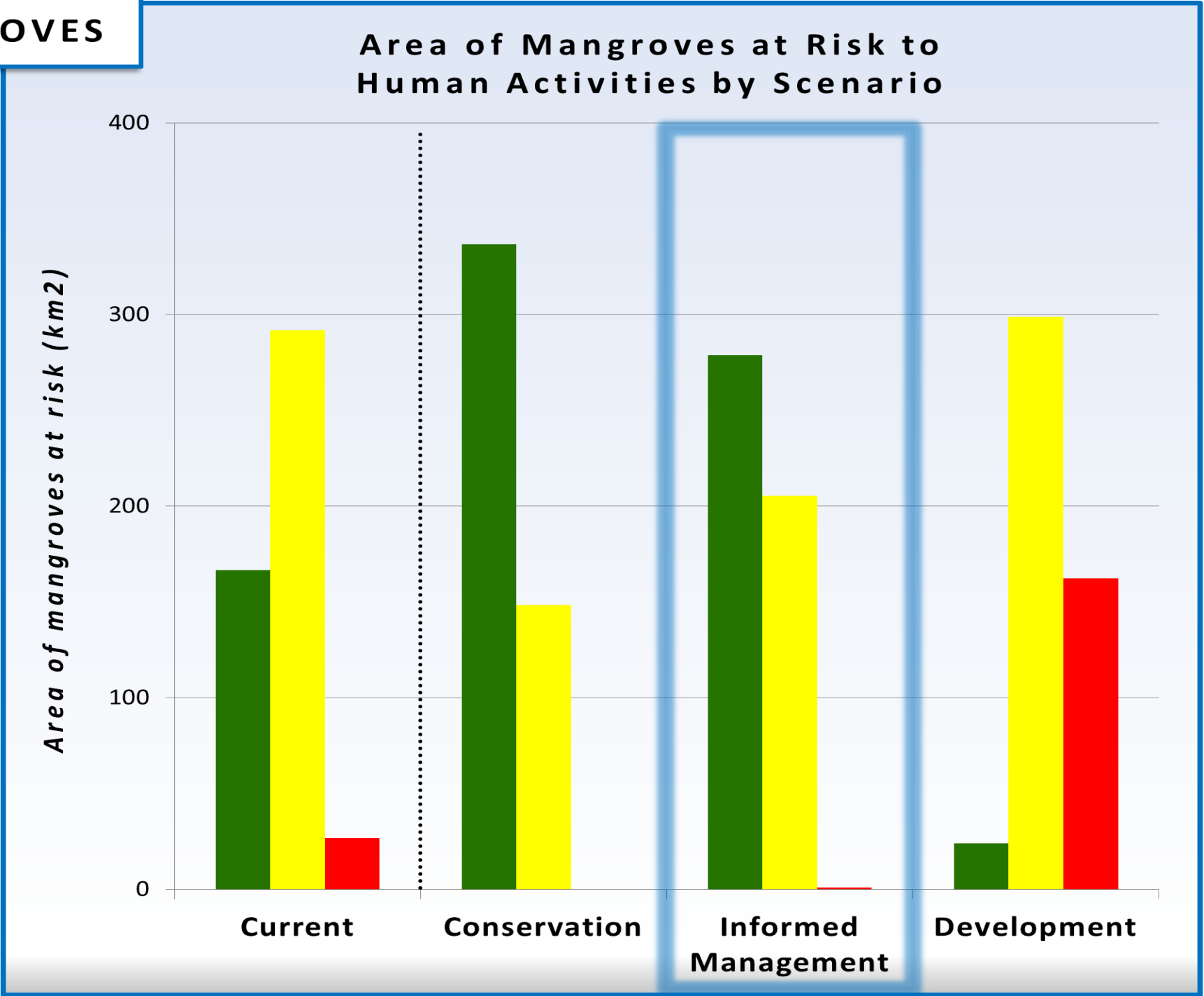
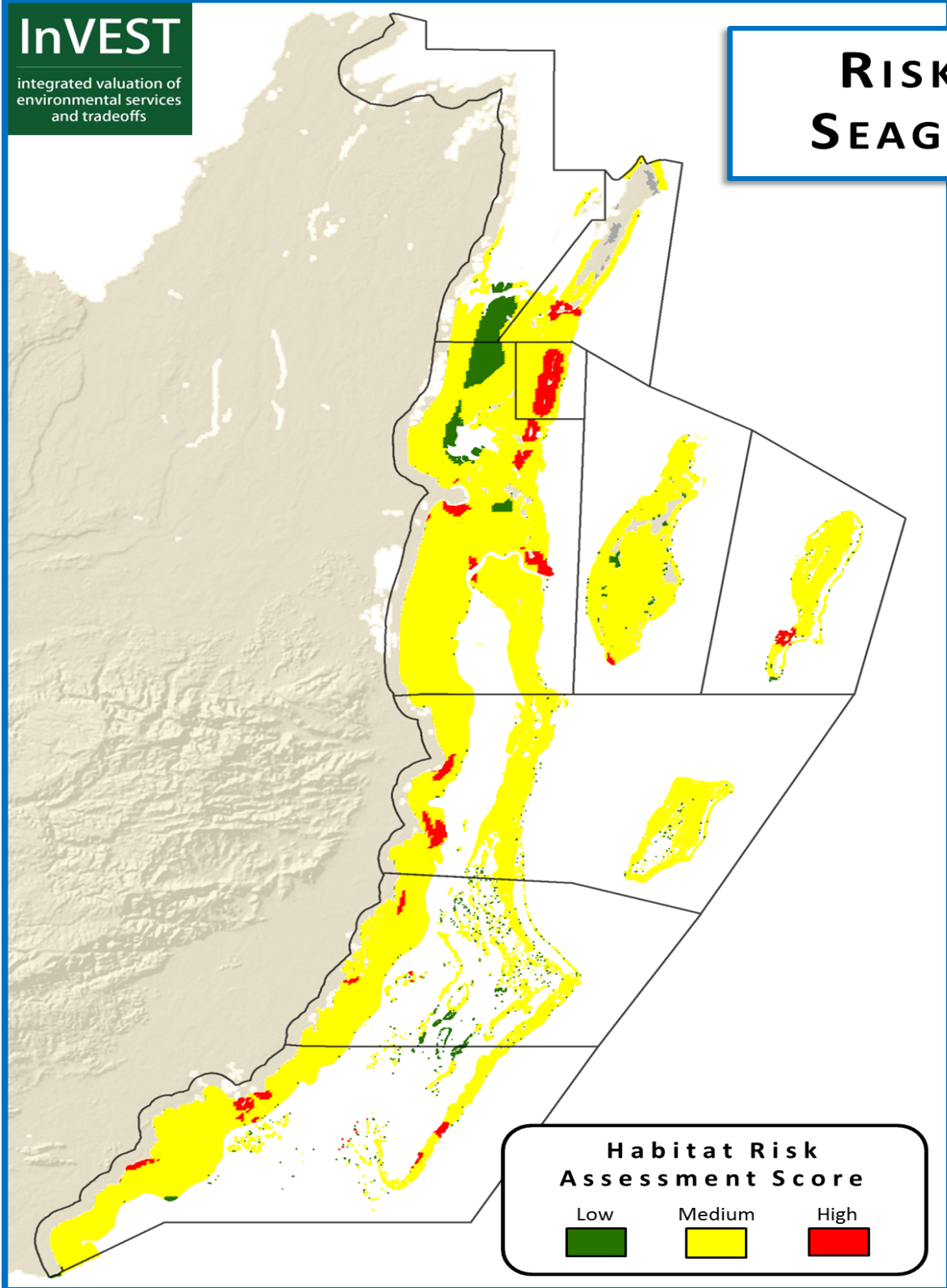
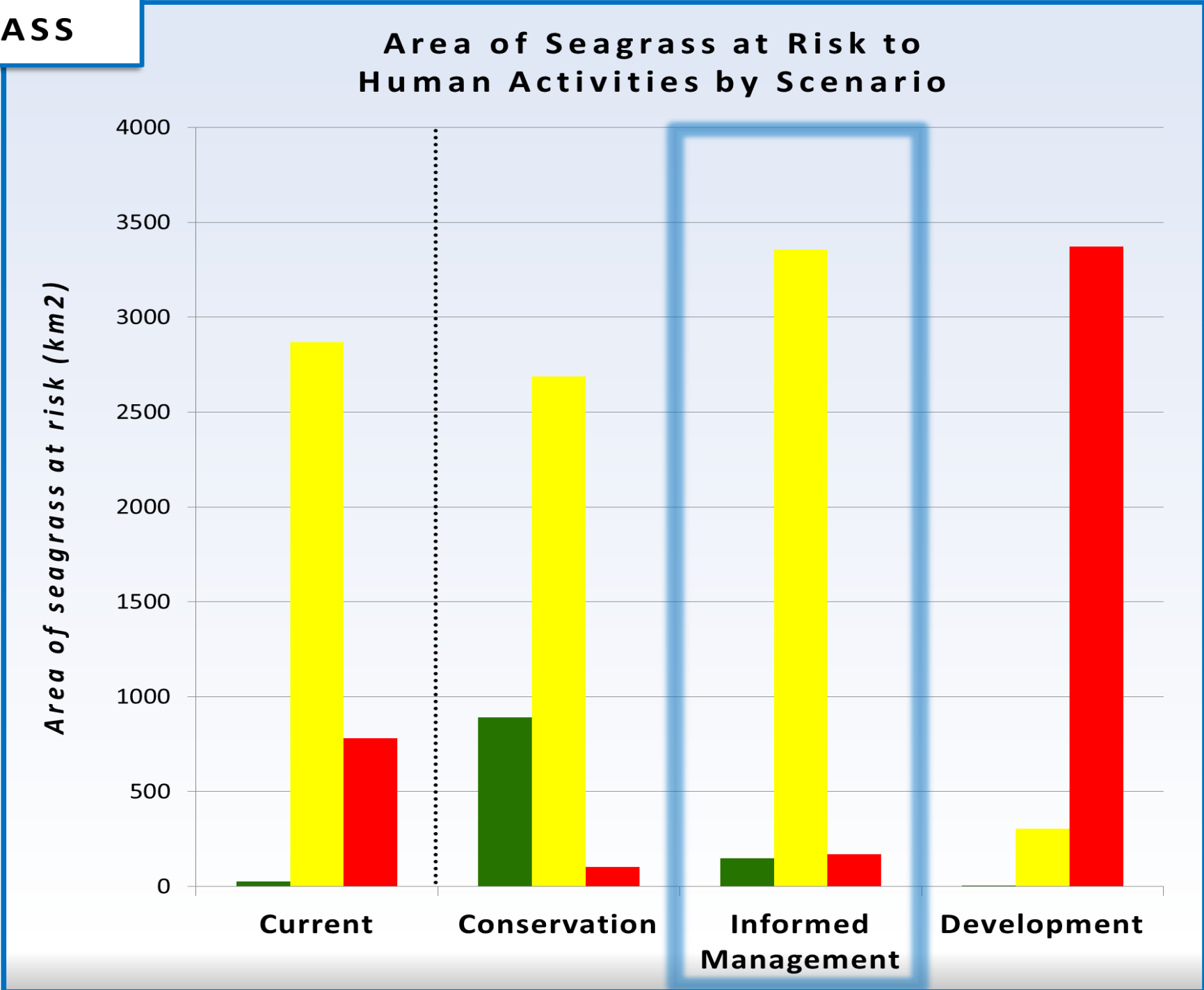


Figure 8: Area of Mangroves at Risk from Human Activities by Scenario

**RISK TO
SEAGRASS**

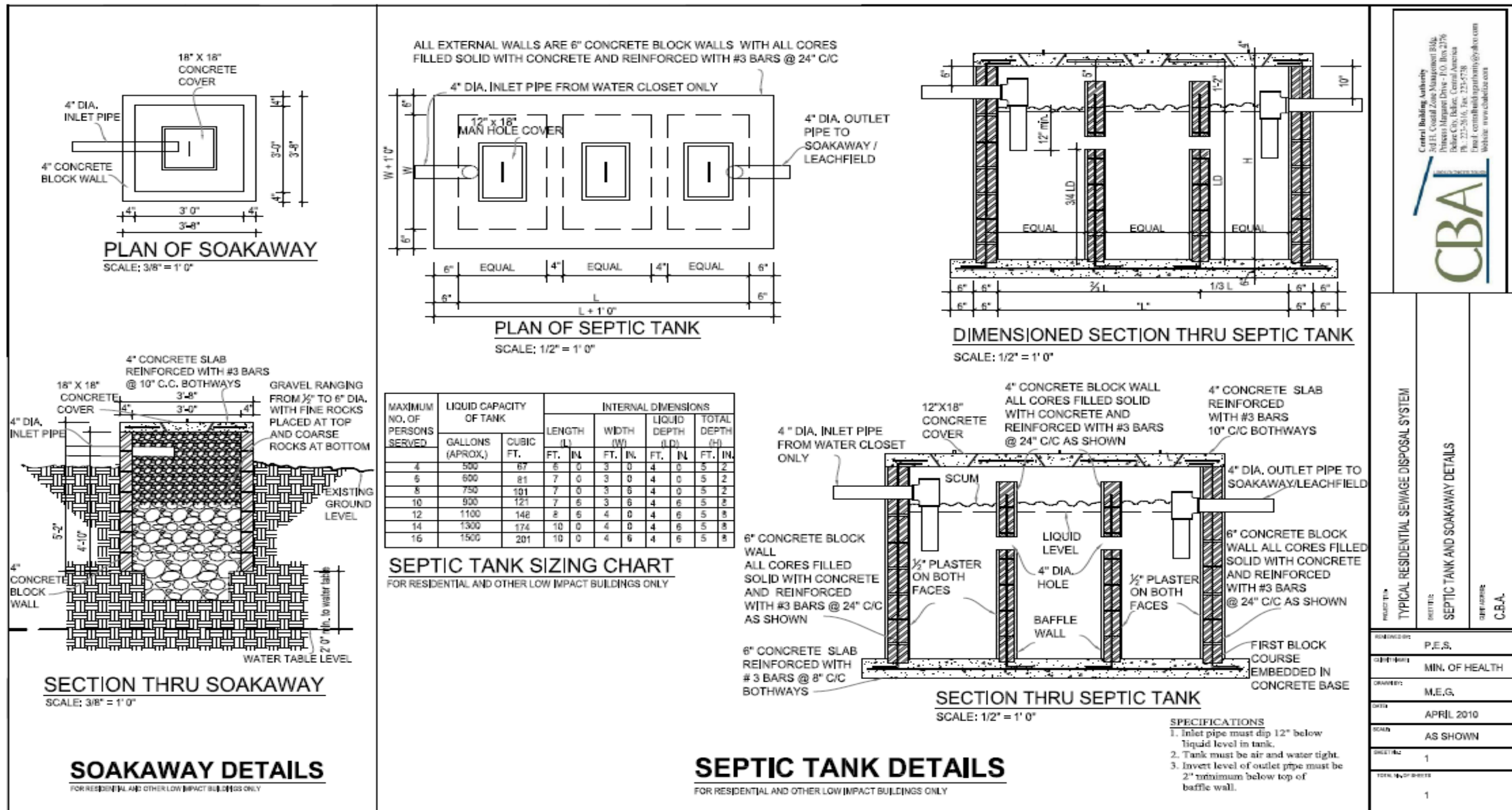


**Area of Seagrass at Risk to
Human Activities by Scenario**



INFORMED MANAGEMENT

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



PROJECT TITLE	TYPICAL RESIDENTIAL SEWAGE DISPOSAL SYSTEM
DRAWN BY	SEPTIC TANK AND SOAKAWAY DETAILS
DATE	
REVISIONS	
APPROVED BY	P.E.S.
DATE	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 Building