



# Coastline newsletter

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### Special Points of Interest

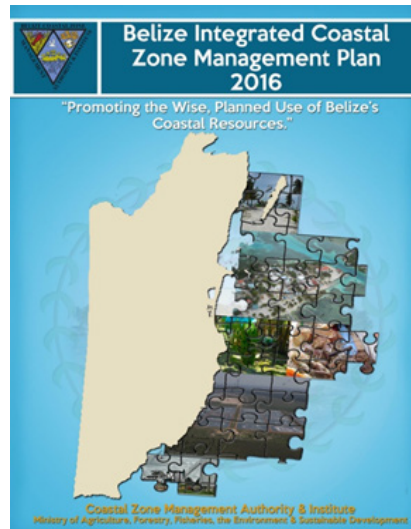
- Education and Outreach
- GIS Advancement
- Sportfishing
- Youth and the Environment
- Water Quality Monitoring
- Climate Change
- Community Engagement

## STRENGTHENING INTEGRATED COASTAL ZONE MANAGEMENT (ICZM)

### PLANNING IN BELIZE

BY: ARLENE YOUNG, DIRECTOR

The process for the development of the draft ICZM Plan started in 2010 and was completed in 2013. However, challenges with the endorsement process mandated by the CZM Act resulted in the ICZM plan being put on hold until 2014 when the CZM Board was re-established. An Implementation Plan and Monitoring Protocol was developed in 2015 to ensure successful implementation and reporting on the progress towards implementation of the ICZM plan. Subsequently, the ICZM Plan was endorsed by the Government of Belize in 2016 and the implementation of the plan commenced.



However, the CZM Act stipulates that the Plan shall be revised during the period of four years commencing from the date of its coming into operation, and during such revision, the provision of subsections (2), (3) and (4) shall apply in respect of the revision.

As a result, CZMAI has received funds for the two-year project “Strengthening Integrated Coastal Zone Management (ICZM) Planning in Belize” under a regionally funded project from the Global Environment Facility (GEF) entitled “Integrated Ridge to Reef Management of the Mesoamerican Reef System (MAR)” which aims to contribute to the conservation and sustainable use of fresh water, coastal and marine shared resources, in the transboundary MAR eco-region.

The general objective of the project is to improve ICZM planning through evaluation and updating of the ICZM Plan and support for capacity building.



The specific objectives are as follows: 1. Conduct an external evaluation of the development and implementation of the ICZM Plan to report on progress, achievements, gaps and challenges.  
 2. Update the ICZM Plan (2016) and management guidelines to address gaps and challenges as well as to improve the aspects related to Disaster Risk Management (DRM) and Climate Change Adaptation (CCA). 3. Identify and conduct a training workshop on ICZM tools including the Plan/Guidelines, INVEST Models etc.




# Goff's Caye



**Palapa Area**



**Changing & Restroom**



**Public Grill**



**Pier**



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## Message from the Chief Executive Officer

Dear Partners, Colleagues, Friends:

I am pleased to share the first issue of our semi-annual Coastline Newsletter for 2020! Through this medium, CZMAI has the opportunity and distinct pleasure to communicate our accomplishments, challenges and opportunities for the foreseeable future. CZMAI continues to work diligently to strengthen the Authority and Institute so that the mandate for improved coastal area management in Belize can be effectively fulfilled. CZMAI is also grateful for your continued support, interest and commitment as we continue to deliver on our mission and purpose.

The start of 2020 has been very unusual to say the least, and we are certainly living and working in very challenging times as we try to adapt to a “new normal”. The advent of the novel Coronavirus, and the declaration of the COVID-19 disease as a pandemic on March 11, 2020 by the World Health Organization (WHO) sent shockwaves across the globe. Regrettably, the number of confirmed COVID-19 cases and associated deaths reported have increased steadily at a very alarming degree around the world, in the millions actually, during the months that would follow the declaration of the Coronavirus pandemic.

As a global community, we were not prepared for the socio-economic impact of COVID-19. The global economy has taken a major hit. Global supply chains have been disrupted. Many businesses have closed their doors leaving many persons jobless. Key productive sectors have experienced sharp declines. On the home front, Belize has not been immune to these impacts as it has experienced a direct blow to its tourism industry, foreign exchange earnings, government and private sector revenue, to name a few.

CZMAI, as most other similar agencies, has been impacted by COVID-19. The work modality for the delivery of sustainable integrated coastal zone management (ICZM) has been continuously evolving ever since. The unavoidable fiscal constraints have required a re-ordering of priorities and scaling back of operations and programs in the short term.

On a positive note, CZMAI has used the opportunity to be creative and proactive in its response to the pandemic in order to mitigate disruptions in the delivery of its mandate. Some of these mitigating actions have included:

- Accelerating the digitization of its operations
- Adapting flexible work arrangements to facilitate remote work from home
- Strengthening occupational health and safety measures
- Encouraging and participating in more online collaborations
- Exploring possible avenues to build organizational resilience to external shocks.

Despite the pandemic looming over us, I would like to highlight some accomplishments during for the first half of 2020 that CZMAI was able to achieve:

- Development of a New CZMAI Strategic Plan for 2020-2025
- Publication of the State of the Coastal Zone Report (2014-2018)
- Commencement of the implementation of the regional “Integrated Ridge to Reef Management of the Mesoamerican Reef Eco-region” project in Belize, which will focus on strengthening integrated coastal zone management and planning.

The continued partnership and support of key partners, such as yourselves, is critically important for the successful attainment of improved coastal and marine area management in Belize. I encourage you to stay in touch with us throughout the year for other updates via our semi-annual Coastline Newsletter and by connecting with us on our website, Instagram and social media!

Stay safe everyone!

Chantalle Samuels (Mrs.)  
Chief Executive Officer





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This success will be manifested in:

- An increased economic contribution of Coastal Zone resources and activities to the Belizean Economy
- Healthy productive coastal zone ecosystems
- Improved socio-economic conditions of the coastal communities
- A strengthening of the Belize's brand as a global centre for sustainable development of coastal zones,

It is important to note that an online Stakeholder Survey was conducted, the results of which fed into the strategic planning process but also provided some helpful insights to the CZMAI Team. Eighty-seven percent of respondents rated their interaction with CZMAI as excellent and good in terms of accessibility, availability, helpfulness, timeliness, knowledge and expertise and quality of information provided. Stakeholders rated CZMAI's performance on attaining certain strategic goals for the 2015-2020 period as generally "Good". Two major areas highlighted by stakeholders for improvement include 1) Strengthening the legislative framework and 2) developing and implementing an actionable strategy for Climate Change adaptation and mitigation in the coastal zone. Almost 90% of stakeholders rated CZMAI highly on the use of its communication tools with respect to brand communications and messaging. However, stakeholders strongly recommended increasing the use of conventional mass media and more public signage can greatly assist CZMAI to improve communication of its mandate and new strategy. Arising out of deliberations at three strategic planning retreats held in February 2020 with CZMAI's Board of Directors, Advisory Council and staff are five (5) priorities that will be the strategic focus for the 2020-25 planning period. These are:

- 1) Coastal Zone Knowledge Acquisition and Dissemination
- 2) Coastal Zone Sustainable Development
- 3) Resource Mobilization
- 4) Institutional Strengthening
- 5) Stakeholder Engagement

Accompanying these strategic priorities are ten (10) actionable strategic initiatives that have been prioritized for strategy execution from the standpoint of available resources (financial and human), mitigating risk factors, and national importance.



Strategic Planning Session with CZMAI's Staff



Strategic Planning Session with CZMAI's Board of Directors



Strategic Planning Session with the Coastal Zone Management Advisory Council

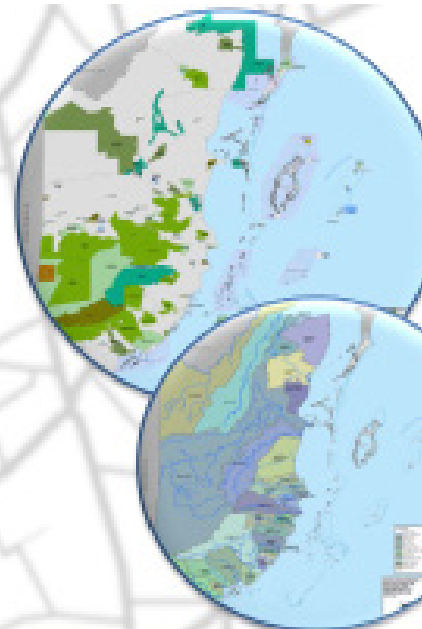




# Cartographic Map Production

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## Map Printing Service



**Cartographic Maps  
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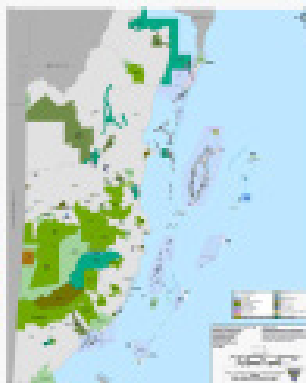
Map customisation based on  
**CLIENT SPECIFICATION**

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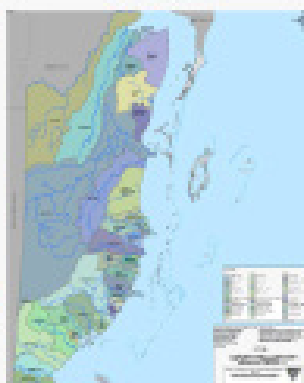
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TIME**



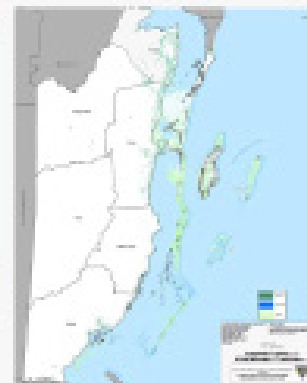
Baseline Map of Belize



Protected Areas of Belize



Watersheds of Belize



Marine Ecosystems of Belize

### Printing Prices Only

Type	Size	Area	Per Sq Inch	Total Cost (BZE)
Plain Paper	42 x 36	1512	0.04	\$60.48
	24 x 36	864	0.04	\$34.56
	36 x 48	1728	0.04	\$69.12
	20 x 30	600	0.04	\$24.00
	11 x 17			\$2.50

Type	Size	Area	Per Sq Inch	Total Cost (BZE)
Glossy Paper	42 x 36	1512	0.05	\$75.60
	24 x 36	864	0.05	\$43.20
	36 x 48	1728	0.05	\$86.40
	20 x 30	600	0.05	\$30.00

\*\*\* Personalized map creation based on map content is available\*\*\*





# METADATA MANAGEMENT: LAMPv2

BY: DELWIN GUEVARA, GIS TECHNICIAN

During the months of April and May, CZMAI's Data Manager and GIS Technician took an online course titled "Metadata Management and Latin American Metadata Profile version 2(LAMPv2)". This six-week course, from April 6 to May 22, was organized by the Ministry of Natural Resources of Belize, National Geographic Institute of Spain, National Geographic Information Center and the Pan American Institute for Geography and History (PAIGH). This training course was given to stakeholders of Belize's National Spatial Data Infrastructure (BNSDI), which includes several government bodies, statutory bodies and private sector organizations such as Port Authority, BEL, DIGI Belize, Belize Tourism Board, Ministry of Agriculture and Central Building Authority just to name a few.



Several stakeholders from BNSDI learnt topics such as International metadata standards used by Latin America and European Countries, Data catalogue and services provided by the Geospatial Network Latin America and the Caribbean (GeoSUR) and Latin American Metadata Profile. At the end of the course, participants gained an understanding of metadata standardization to support the sharing and use of data between Belize and the Caribbean, and Latin America. Belize has many partnerships on a regional and international scale and Belize is gaining the capacity, through this course; to update and maintain metadata for Belize's spatial data. This will ensure improved data quality that can be found on the BNSDI Geoportal.

CZMAI being part of BNSDI also has its Coastal and Marine Data Center (CMDC) that manages a large amount of spatial and non-spatial information. A major role of the CMDC is to maintain a centralized center for information and research related to marine areas and Coastal areas. Building capacity on metadata management improves the data center's capacity to support sharing of data and the quality of data housed within CMDC.

# INSTALLATION OF SIGNS FOR THE COASTAL ZONE MANAGEMENT AUTHORITY & INSTITUTE TO PROMOTE AWARENESS

BY: ARIESE BRICENO, MARKETING ASSISTANT

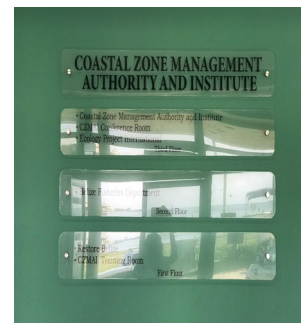
The Coastal Zone Management Authority and Institute (CZMAI) has evolved in many ways over the past 22 years of existence. One of the ways its' current management had decided to contribute to garnering awareness of the organization's location and existence was by the creation and installations of Four (4) crucial signs; The Core Value, Directional, CZMAI Pylon sign and a Front door Sign. Each sign has been strategically placed throughout the office and the company's compound.



The Core Value sign was designed with the purpose of reminding staff and informing visitors of CZMAI's identity – its' principles, beliefs or philosophy of values. Its placement in the waiting area that is frequented by staff and in customers direct view serves to encourage and motivate support in the work done by CZMAI.

As for the purpose of the Directional Sign, CZMAI's management took into consideration the two other organizations located in its building, and the need for each location to be clearly displayed.

The sign's placement in the lobby area is in a prime location because it is in the direct view for any who enters the building.

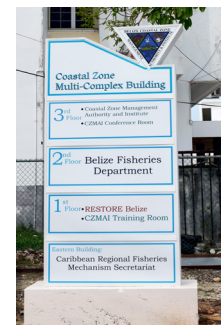


The decision to redo CZMAI's Front Door sign was simply a matter of the old version being outdated, and as well a need for additional information to be included. The importance of having a visually appealing and informative front door sign is not only for a clear indication of which organization is in operation at the location, but also it displays a level of professionalism.



Lastly, CZMAI Pylon sign was designed with the intention of clearly displaying all the organizations locations found within the compound. The sign's placement was done in an area where it

will be visible when driving by or upon entering the compound.



These four (4) signs have definitely increased awareness of CZMAI's office location and has prompt the need for continuous creative socialization of the CZMAI brand.

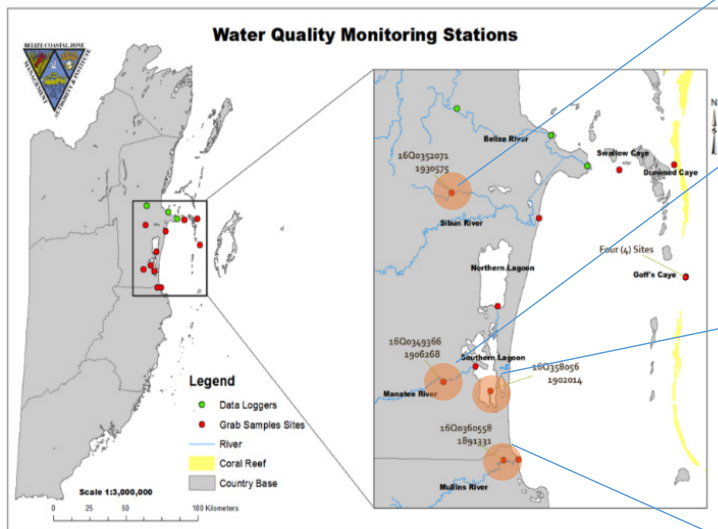


# COASTAL PLANNING AND MONITORING UNIT UPDATE

By: SAMIR ROSADO, COASTAL PLANNER

## Central Coastal Region:

The CZMAI WQM Unit conducted two water quality sampling trips in the Central Coastal Region from Jan to June 2020. The averages from our sample sites are as follows:



### Hector Creek:

Total Nitrogen: 0.61 mg/L (Norm: 1 mg/L, Excess 10 mg/L)  
Nitrite: 0.19 mg/L (Norm: 1mg/L, Excess: 10mg/L)  
Nitrate: 0.31 mg/L (Norm: 1 mg/L, Excess: 10mg/L)  
Phosphorous: 0.05 mg/L (Norm:0.05mg/L, Excess: 1mg/L)  
Fecal Coliforms: 26 col./L (Excess: Above 200 col./L)

### Manatee River:

Total Nitrogen: 0.22 mg/L (Norm: 1 mg/L, Excess 10 mg/L)  
Nitrite: 0.01 mg/L (Norm: 1mg/L, Excess: 10mg/L)  
Nitrate: 0.19 mg/L (Norm: 1 mg/L, Excess: 10mg/L)  
Phosphorous:0.01mg/L (Norm:0.05mg/L, Excess: 1mg/L)  
Fecal Coliforms: 23 col./L (Excess: Above 200 col./L)

### Gales Point:

Total Nitrogen: 0.55 mg/L (Norm: 1 mg/L, Excess 10 mg/L)  
Nitrite: 0.13 mg/L (Norm: 1mg/L, Excess: 10mg/L)  
Nitrate: 0.21 mg/L (Norm: 1 mg/L, Excess: 10mg/L)  
Phosphorous:0.01 mg/L (Norm:0.05mg/L, Excess: 1mg/L)  
Fecal Coliforms: 18 col./L (Excess: Above 200 col./L)

### Mullins River:

Total Nitrogen: 0.31 mg/L (Norm: 1 mg/L, Excess 10 mg/L)  
Nitrite: 0.12 mg/L (Norm: 1mg/L, Excess: 10mg/L)  
Nitrate: 0.14 mg/L (Norm: 1 mg/L, Excess: 10mg/L)  
Phosphorous:0.03 mg/L (Norm:0.05mg/L, Excess: 1mg/L)  
Fecal Coliforms: 58 col./L (Excess: Above 200 col./L)

From the period January to June 2020, only two sample trips were conducted in January and February 2020. The averages of the parameters being measured during these months were within the range for normal aquatic ecosystems. It was observed that sample sites near populated areas showed slightly higher averages, however none of them were over or near the threshold that would trigger eutrophication/algal bloom events. With regard to fecal coliforms, the E Coli levels averaged within range of normal systems.

## Central Reef Region:

The CPMU conducted one sample trips to the Central Reef region during the period of Jan to June. Due to lack of collection there is no meaningful information to report at this time.

## COMMUNITY WARDENS PROGRAMME MEETINGS:

During the period, January to June, the Coastal Planning Unit held introductory meetings with local government representatives to discuss the Community Wardens Programme. The objectives of the programme includes:

- To receive on the ground reports on coastal issues from communities
- To utilize this mechanism to report to CZM Advisory Council and CZMA Board
- To utilize information to provide guidance for efficient management

Through these objectives, the unit plans to utilize the local inputs from communities to improve coastal resource management while forging partnerships and promoting integrated management. There were a total of 2 meetings

The graphic features the Belize Coastal Zone Authority & Institute logo on the left, which includes a shield with various symbols and the text 'BELIZE COASTAL ZONE MANAGEMENT AUTHORITY & INSTITUTE'. The main title 'Sport Fishing License Online!' is written in a large, blue, cursive font. Below the title, the text 'To minimize In-person purchases/ Interactions please follow steps below:' is centered. Three steps are outlined: Step 1 (Application) with an email icon and a globe icon; Step 2 (Submission) with a deposit slip icon and a passport/ID card icon; and Step 3 (Delivery/ Pick Up) with a truck icon and two people icons. Each step has a corresponding text block below it. The background is a light blue sky with clouds.

# Sport Fishing License Online!

To minimize In-person purchases/ Interactions please follow steps below:

**Step 1**

**Application**

Send an email or call to request a Sport Fishing License application form and Bank details for payment or visit our website to purchase from our online portal @[coastalzonebelize.org](http://coastalzonebelize.org)

**Step 2**

**Submission**

Submit completed application form along with Belize passport/ Proof of permanent residency / ID card and a deposit slip as proof of payment.

**Step 3**

**Delivery/ Pick Up**

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## *SPORT FISHING AND THE COVID-19 PANDEMIC*

*By: VICTOR SHO, SPORT FISHING COORDINATOR*

The people, the fish, the pandemic and the economy

At the end of 2019, CZMAI engaged in consultations with its institutional partners and community stakeholders on how best to implement the newly signed Memorandum of Understanding (MOU) which outlined key areas of synergies in the realm of data collection, mapping and compliance monitoring. These activities would build upon CZMAI's previous work in public sensitization and education & outreach which include our national sign campaign, sport fishing summer course, and community meetings. Additionally, these activities are designed to allow CZMAI to support our institutional partners in realizing their goals. The intended date for a soft roll out of the activities under these MOUs was April of 2020, however tragedy struck in March 2020.

Belize, along with the rest of the world had to make quick decisions to limit the spread of the COVID-19 virus which has now been categorized as a global pandemic which resulted in a global decrease in the movement of people which negatively impacted global tourism. This also led to a severe decrease in Belize's tourism activities and the sport fishing sector was no exception as our international clientele was lost. This sudden loss of clientele, restriction on movement and increase operational cost for some businesses no doubt had some immediate and long-term economic consequences. However, these economic consequences have yet to be quantified nor has the current needs of the stakeholders been properly identified or assessed. CZMAI recognizes the need to collect data on the impacts of the pandemic on the sport fishing sector in order to properly develop an effective strategy to work with stakeholders and inform prioritization of strategic activities and interventions. Thus, CZMAI is in the process of reassessing its operational plans and how best to move forward in supporting the proper management of the sport fishing sector through collaboratively working with its partners.

In order to inform the prioritization of activities and better inform management decisions as we learn to cope with the new reality, CZMAI is planning to collect and compile inputs from stakeholders engaged in the sport fishing industry. To this end, CZMAI will be conducting a data gathering exercise in the form of a survey. This survey will be used to collect data on the impacts of the COVID-19 pandemic on Belize's sport fishing sector, identify the needs of stakeholders and quantify these impacts. The data collected will then be used to guide CZMAI's future work as well as allow us to better understand the needs of our stakeholders and how best we can work together to ensure inclusive and proper planning as we work together to improve Belize's sport fishing sector.

The survey can be accessed through on social media platforms and will also be shared through our mailing list. If you or anyone you know is a stakeholder of Belize's sport fishing industry, feel free to fill out a survey so that you can help us develop practical plans and prioritize strategic activities and investments that will lead to an improved, sustainable and resilient sport fishing industry.

*...Cont'd on Page 13*

# Coastal Zone Management Authority and Institute



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# POSTERS FOR THE SOCIALIZATION OF THE INTEGRATED COASTAL ZONE MANAGEMENT PLAN 2016

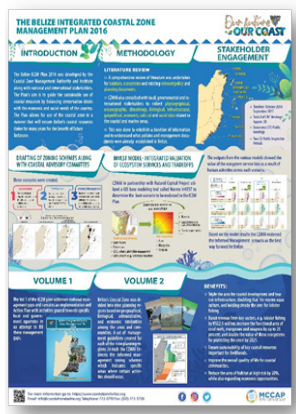
BY: AZELEA GILLETT, COASTAL PLANNING TECHNICIAN

The Integrated Coastal Zone Management Plan 2016 was created to improve the management of Belize's coastal zone. The document has relevant information on the national issues that were being faced at the time and recommendations to address those issues. Also, the document contains an implementation and action plan aimed at filling management gaps identified in the management of the coastal zone. Admittedly the document is lengthy and technical which may be overwhelming for most. Therefore, in order to socialize the relevant information in the document CZMAI decided to develop three versions of posters with different levels of information. These included a kid's version, a teen's version and a technical version.



The kid's poster was developed to simply show to younger kids, the consequences of not managing the coastal zone properly. It displays a before and after concept to visually show what those consequences might look like to encourage the younger kids to do their part in protecting the coastal zone. At the bottom of the posters are pointers of how they can do their part in their everyday lives.

The teen's version highlighted the idea of the coastal zone being a multiple use zone and therefore focused on the importance of integrated management. The aim was to create an attractive and easy to follow poster to spark teenager's minds and promote the importance of CZM in their community and Belize.



The technical version was created to display in an attractive way, detailed information and model results that are present in the document. These posters will be given to relevant stakeholders such as government agencies and NGOs for them to better understand the plans importance to encourage use of the document.

# SPATIAL ASSESSMENT OF THE TOTAL MANGROVE AND LITTORAL FOREST COVER FOR BELIZE 2014-2019

BY ANDRIA ROSADO, GIS MANAGER

In March 2020, a spatial assessment of total mangrove and littoral forest cover from 2014-2019 for Belize was conducted by Dr. Emil Cherrington & Dr. Robert Griffin from RH consulting, funded by the Belize's Marine Conservation & Climate Adaptation Project (MCCAP), via the Protected Areas Conservation Trust (PACT), with the beneficiary being the Coastal Zone Management Authority & Institute (CZMAI).

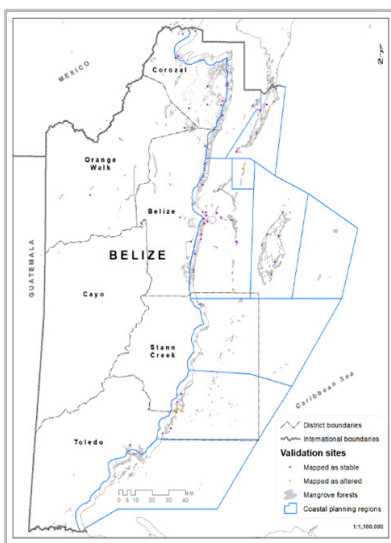
The assessment was titled "Technical Report: Spatial Assessment of the Total Mangrove and Littoral Forest Cover for Belize, 2014-2019". The overall objective of the report was to conduct a comprehensive spatial assessment of total mangrove coverage and littoral forests for Belize to facilitate future monitoring of mangroves. The spatial assessment will contribute to improved monitoring, sustainable use and management practices of critically important coastal and marine ecosystems.

The study utilized remote sensing tools to examine how the coverage of mangrove and littoral forest ecosystems have changed across Belize's landscape the six-year period. The study assessed mangrove cover change at a national scale but also focused on changes within coastal planning regions identified by the CZMAI. This study updates the most recent assessment of Belize's mangrove cover, which was completed in 2018 by Cherrington et al. (site)

As with the two earlier studies conducted by Cherrington et al. (2010, 2018), the basis of this new study was to identify areas where mangroves and littoral forest ecosystems were cleared, and areas where they may have regenerated. Cherrington & Griffin (2020) noted that "at the national level, Belize lost approximately 94 ha." which translates to 0.13% of its total mangrove cover over a 6-year period from 2014 to 2019. The 0.13% loss "can be considered relatively small when compared to the mangrove clearing rates of neighboring countries, if one is able to consider longer time spans" than just a 6-year period.

The study also found that "all of the clearings of mangroves occurred either offshore or within the three-kilometer buffer from the coast". Furthermore, "of the nine coastal planning regions, mangrove clearings were not observed in three zones (i.e. the Northern Region, the Lighthouse Reef Atoll, and the Southern Region)" and possibly this is due to the effective marine protected area management. Also, "most of the clearings were observed to have occurred in the Central Region which includes the area around Belize City – and closely followed by the South-Central Region which includes the Placencia Peninsula – the region with the highest relative rate of change was actually the Caye Caulker region." Since the Caye Caulker region is relatively small, "the clearing of only 3.24 ha. of mangrove between 2014 and 2019 translated to a loss of 1.8% of the region's 2014 mangrove cover."

As part of the deliverables under the contract, a presentation of the results along with a short training session on the methodology used was also conducted virtually on March 25, 2020. Key stakeholders were invited to participate in the session. The Cherrington & Griffin (2020) spatial assessment conducted will contribute to informed management, better policies and practices within Belize's coastal and marine areas. Additionally, the assessment will be integrated into the InVEST tool to produce climate-risk resilience and ecosystem-based approach scenarios for Belize's coastal zone.



Locations of the sites used for validating the 2014-2019 mangrove change map (Cherrington & Griffin, 2020)

# STATE OF THE COASTAL ZONE REPORT 2014 - 2018

By: AZELEA GILLET, COASTAL PLANNING TECHNICIAN



The Coastal Zone Management Authority & Institute (CZMAI) has continuously developed a state of the coast report throughout the years. This report is developed in order to keep track of important factors within the coastal zone to allow for better management. One major objective of the document is to determine what changes in the coastal zone occurred since the last report in order to compare progress or issues that may have arose over the years.

CZMAI hired a consulting firm through the Marine Conservation and Climate Adaptation Project (MC-CAP) to develop the 2014-2018 report. The consulting firm BIOSFERA is based in Mexico and representatives include: Mr. James Azueta, Mr. Gilberto Enriquez-Hernandez, Fernando Garcia Flores, Vicente Torres-Rodriguez and Azucena Libertad Garcia Cisneros. These persons worked diligently to develop the document.

In the first phase, data collection was carried out in order to establish a baseline of information. Using this information, a questionnaire was developed and sent to relevant stakeholders such as the Fisheries Department, Ministry of Natural Resources, Department of Environment etc. for further data collection. Next, the consultants in partnership with CZMAI, held a stakeholder workshop where the various departments, institutions and NGOs were presented with the baseline information and asked to rank threats based on their knowledge of their respective area. This information was compiled and analyzed to develop the final version of the State of the Coast Report 2014-2018.

This document encompasses all the threats currently present in Belize and ranks these threats by sector. Along with the development of the comprehensive document, BIOSFERA also developed an infographic that visually displays all the relevant information found in the document. This was developed to facilitate quick understanding of the major findings for socialization of the information. In March 2020 the State of the Coast report 2014-2018 was finalized and accepted by the CZMAI.

The following infographics summarize the main messages from the report: (see pages 17 - 20)





# What are the pressures on Belize's coastal zone and its environmental services?

(Based on literature, a survey and the perception of national experts)

## Energy

No new energy plants were constructed in the coastal zone. Therefore, there are no impact on mangroves, littoral forests or beaches by energy generation.

## Tourism

Development for tourism and recreational activities has direct impacts on mangroves, littoral forests and modify wildlife's breeding, feeding and resting areas.

## Dredging

Dredging activities are necessary for navigational channels maintenance, beach replenishment and land reclamation.

## Coastal development and land use

These two activities displace mangroves, littoral forest and turtle nesting areas. Additionally, inappropriate disposal of garbage and wastewater has impacts faraway from the source.

## Climate and weather

The barrier reef, mangroves and littoral forests provide protection against hurricanes and tropical storms and up to now they have low impacts from climate change. However settlements and the productive sectors experience strong impacts from climate change and severe weather events.

## Sediment transport

The construction of beach protection infrastructure extracts sediments that are not rapidly replenished by natural process.

## Saline intrusion

Saltwater intrusion contaminates coastal freshwater aquifers. However, the extent is unknown.

## Erosion

There are severe erosion problems along the entire coast of Belize with rates of up to -2.61 m/year and beach losses of 113 meters in 50 years.

## Aquaculture

There is evidence that aquaculture has impacts on the health of biodiversity due to the unwanted introduction into the wild of exotic species; however, it is not clear what the trend is.

## Sport fishing

Species populations for sport fishing are vulnerable to fish nets and coastal development.

## Marine transport

Vessels collide with marine species and engine noise pollution displaces others.

## Resource extraction

Except for dredging, resource extraction has no impact on coastal resources. No toxic substances are produced by these processes.

## Invasive species

Invasion of the lionfish is a threat to various fisheries in the Caribbean region. The lionfish invasion in Belize is extensive.

## Sargassum

The tourism sector was severely affected by the unprecedented levels of sargassum that reached the beaches of the Caribbean in 2018 and that resulted in estimated cleaning costs of US \$ 120 million.

## Lobster fishery

Fisheries impacts in Belize are minimal. There are impacts through illegal, undeclared and unregulated fishing activities.

## Nutrient pollution

Agricultural, livestock and aquaculture activities contribute to nutrient pollution through runoff.

## Sea level rise

37 localities with more than 200 inhabitants along the coast are located below a height of 1 meter.

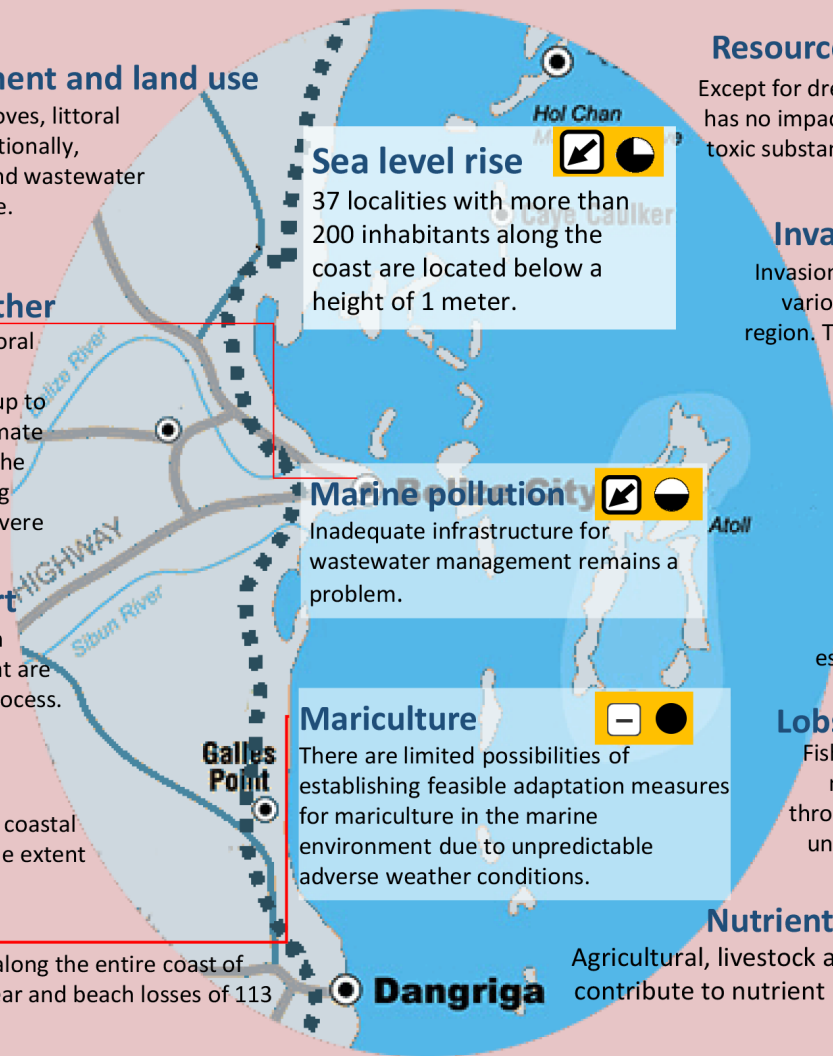
## Marine pollution

Inadequate infrastructure for wastewater management remains a problem.

## Mariculture

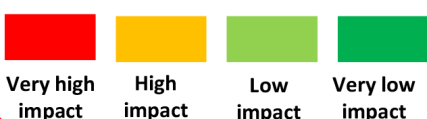
There are limited possibilities of establishing feasible adaptation measures for mariculture in the marine environment due to unpredictable adverse weather conditions.

## Dangriga

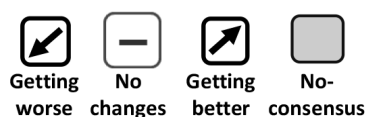


## Symbols

### Level of impact

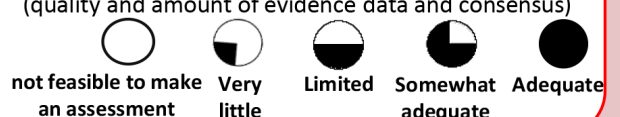


### Trend



### Confidence level on the trend

(quality and amount of evidence data and consensus)

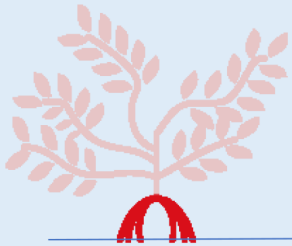


# What is the state of the coastal habitats and species ?

(Based on literature, a survey and the perception of national experts)

## Coastal habitats

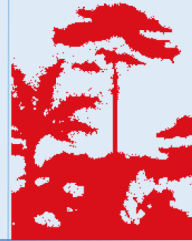
### Mangroves



**2 %** of the original mangrove has been lost since 2010

Land clearing for urban development was the main cause of mangrove deforestation.

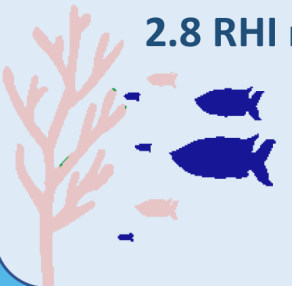
### Littoral forest



Estimated area covered by **25 Km<sup>2</sup>** littoral forest

Defined as a narrow band of trees which grow along the sandy beaches bordering the coastlines, coastal littoral forests are severely threatened and can become globally extinct.

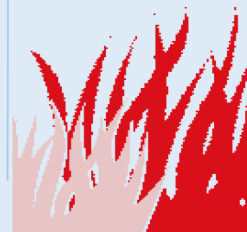
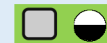
### Coral reef



**2.8 RHI** In 2018 the Healthy Reefs Report

The overall reef health in Belize was in fair condition. The coral cover was still fair compared to 2015. In Belize, parrotfish biomass continued to increase after protection in 2009.

### Seagrasses



Seagrass was dying due to the lack of sunlight for photosynthesis and anaerobic conditions created by the decaying sargassum along the coastline and cayes.

## Species populations



### Antillean manatee

**175** manatee stranding between 2014-2018

Mortalities were mainly due to collisions with watercrafts. There were more females stranding than males.

### Marine turtles



**934**

Marine turtles nesting sites protected between 2014-2018

The number of nest were almost stable for the green and hawksbill turtles while there was a decrease in number of nest for loggerheads.



### Fish spawning aggregations

**13**

Nassau grouper spawning aggregations sites were fully protected in 2014. These sites are used by various other species such as the mutton, cubera and yellowtail snappers.

## Water quality



Along the coastal zone, mainly in front of coastal settlements, there is a significant increase of chlorophyll content in the water. This is an indicator of nutrient pollution as a result of wastewater discharges.

## Protected areas



**21.7 %** of Belize national marine area is protected

There are 16 protected areas under the Fisheries and Forest Departments with co-management of some areas by non-governmental organizations.

## Symbols

### Level of impact

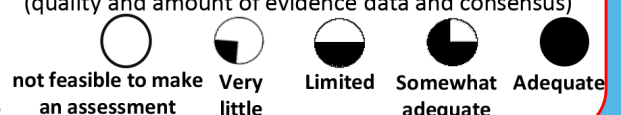


### Trend



### Confidence level on the trend

(quality and amount of evidence data and consensus)





# What is the effectiveness of the coastal management?

(Based on literature, a survey and the perception of national experts)

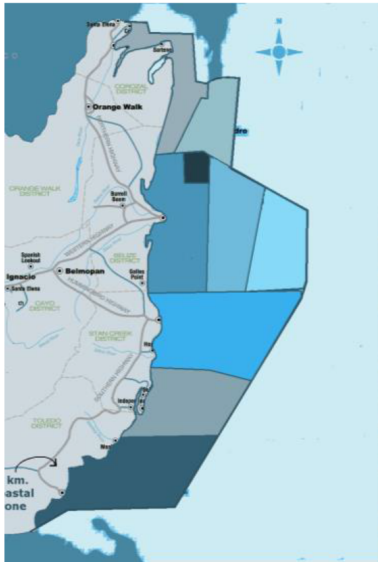
## Coastal management

### 9 coastal management zones

### Biodiversity conservation

### Tourism –Urban development

#### Spatial planning



#### Plans/actions launched in 2014-2018



- Integrated Coastal Zone Management Plan
- Coastal Zone Management Guidelines

- There are 16 protected areas to promote marine conservation
- Protection of 13 spawning aggregation sites
- Maritime Zone Moratorium for petroleum exploration and extraction

- Sustainable Tourism Master P.
- Destination Physical Plan
- Tourism Dev. plans in four destinations
- Revised Master Dev. Plan for Ambergris Caye
- Belize City Master Dev. Plan
- Regional Sanitary Landfill

## Public participation



59 entities participates in the design and implementation of programs and plans.

#### Sectors



## Beach and shoreline management



There is no effective beach management for recreational activities, sargassum and erosion impacts.



## Research, Monitoring & Enforcement

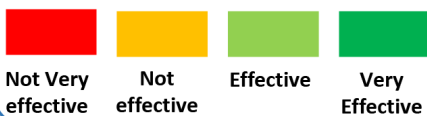


There are no sustained research, monitoring and enforcement that result in better coastal zone management.



## Symbols

### Level of impact



### Trend



### Confidence level on the trend

(quality and amount of evidence data and consensus)



### More information:

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[Full report is here](#)

### This report was elaborated with the support of:





## MISSION STATEMENT

OUR MISSION IS TO LEAD THE SUSTAINABLE USE AND PLANNED DEVELOPMENT OF BELIZE'S COASTAL RESOURCES THROUGH INCREASED KNOWLEDGE AND THE BUILDING OF ALLIANCES FOR THE BENEFIT OF ALL BELIZEANS AND THE GLOBAL COMMUNITY.

Chantalle Samuels  
Arlene Young

Chief Executive Officer  
Director

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