

# Climate-Resilient Integrated Coastal Zone Management Performance Indicators: application in Belize

Environment, Rural  
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## Executive Summary

The Inter-American Development Bank (IDB) and the World Resources Institute (WRI) have developed a set of climate-resilient Integrated Coastal Zone Management (ICZM) performance indicators during 2018 which were pilot tested in Belize in early 2019. The indicators highlight key conditions and good practices that can help a country support ICZM, climate adaptation and resilience building in coastal areas. The indicators were developed as a diagnostic tool to assist countries in the Latin American and Caribbean (LAC) region evaluate if they have the governance conditions, institutions, implementation practices and monitoring frameworks in place, as well as the right information available, to help them sustainably manage coastal areas - considering the changing climate. The indicators are not intended for comparison between countries; rather, they are intended to support better within-country-understanding of strengths and weaknesses with regard to ICZM and climate preparedness in coastal areas. The indicators were developed under the Technical Cooperation (TC): Knowledge and Innovation: Disaster and Climate-Resilient Coastal Zone Management, which aims to catalyze sustainable, replicable, and innovative investments in disaster and climate-resilient ICZM. The methodology of the indicator development is available as the IDB technical note, *Climate-Resilient ICZM Performance Indicators*.

**Indicator structure.** There are 15 indicators under four categories, which cover a) legal and institutional framework for ICZM and climate preparedness; b) the availability and quality of information – both on the coastal environment, as well as on vulnerability and adaptation potential to climate change; c) whether the requisite technical capacity is present to develop and evaluate initiatives to reduce climate-related risk; and d) whether there is sufficient and sustainable financing for ICZM. Each indicator has component criteria which are evaluated individually, and subsequently averaged to arrive at the indicator score. Scores are in the form of a percentage – the percent of criteria achieved within each indicator. Indicator scores can also be averaged to arrive at the category score. The indicators were developed based on an extensive literature review (on coastal management, governance, disaster risk reduction and management, climate vulnerability and adaptation, and on financing of ICZM) complemented by interviews with experts on coastal zone management and disaster risk management in the LAC region.

The primary audience for these indicators of climate-resilient ICZM performance includes government officials working on coastal zone management, disaster risk reduction, and climate preparedness, as well as those working in sectoral agencies in coastal areas. A secondary audience is donor agencies and other potential investors in coastal areas that seek information on the preparedness of the country (or area) for climate change.

**Pilot Application in Belize.** During January – March of 2019, a team including IDB, WRI and World Wildlife Fund engaged stakeholders within the Government of Belize (GoB) to apply the set of Climate Resilient ICZM Performance Indicators in Belize to evaluate Belize's performance across these indicators – to help the GoB identify areas where factors contributing to successful climate-resilient ICZM are advanced, versus areas where there is potential for improvement.

**Results for Belize.** Implementation of the fifteen indicators of climate-resilient ICZM performance reveals that while Belize is performing well in some areas, there are other key areas that need to be addressed to foster effective climate-resilient ICZM. Belize's strongest category is *Assessing Climate Risks in the Coastal Zone*. Within this category, Belize is performing reasonably well with regard to collecting environmental data, conducting and using climate vulnerability and risk assessments, and regularly doing environmental assessments. The greatest hindrance in this category is the lack of a fully-integrated data hub for sharing data and information on climate, risk, and the coastal environment. Belize had a moderate score for *Legal and Institutional Framework for ICZM*. This was helped by the strength of the ICZM national regulatory framework and the regulatory environment for coastal development but was hindered by the lack of a national regulatory framework for climate change adaptation and Disaster Risk Management (DRM), weak institutional coordination among ICZM, climate change adaptation (CCA), and DRM. Belize also had a moderate score for the category *Identifying Adaptation Options and Protecting Investments*. Here, Belize is reasonably effective at identifying solutions to reduce risk from climate change and has most of the requisite skills but is weak on monitoring and evaluation (M&E) of coastal investments. In terms of the *Financing ICZM* category, Belize again achieved a moderate score. Belize has good experience accessing international development finance but has not been strong on providing sustained funding for ICZM operations, or on providing financial incentives to promote private sector action.

Based on the results of the ICZM Performance Indicator results, priority areas were identified, and recommendations made for Belize to improve its ICZM practice with an eye toward climate resilience. Application of these indicators in the future could assist Belize in tracking progress and identifying remaining gaps.

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## Introduction

### Importance of Climate-Resilient Integrated Coastal Zone Management

Coastal ecosystems provide a wide variety of goods and services in countries across the Latin America and Caribbean (LAC) region, including protection of the shoreline, carbon sequestration, fisheries habitat, and are a magnet for tourism.<sup>1</sup> More specifically, the Caribbean region is one of the world's most complex mosaics of marine and coastal habitats, comprising 10 percent of global coral reefs, 18 percent of seagrass beds, and 12 percent of mangrove forests.<sup>2</sup> It also boasts 1,400 species of fish, which are important for both fisheries and recreation. Most of the region's 40 million people are directly or indirectly dependent on the health of coastal marine ecosystems, including through tourism. Coral reefs, for example, are estimated to account for over \$7.9 billion of expenditure and over 11 million visitors, through both in-water activities, such as diving and snorkeling, but also through indirect benefits, such as provision of sandy beaches and sheltered water.<sup>3</sup>

To maintain the value that coastal ecosystems provide in a sustainable manner, countries need to implement effective Integrated Coastal Zone Management (ICZM) with an emphasis on managing climate change-related vulnerabilities and risks. ICZM is an iterative, dynamic, consultative process by which decisions are made for the sustainable use, development and protection of coastal and marine areas and resources. ICZM is particularly appropriate for responding to climate change as it takes a holistic approach to risk assessment, planning, and management. It emphasizes long-term sustainable use, resilience-building, and ecosystems-based management, in which the provision of ecosystem services and co-benefits are considered (e.g., the ability of mangroves to protect coastlines, provide habitat, and serve as a sink for carbon). Such "natural capital" is vital for reducing risk and increasing resilience under a changing climate. With its emphasis on co-management and collaboration, ICZM is a valuable framework, as it helps address information and institutional silos by bringing relevant agencies and stakeholders together.

### Belizean Context of Climate-resilient ICZM

Belize is a country heavily reliant on its coastal ecosystems. Coral reefs, mangroves and sandy beaches are the cornerstone of a burgeoning tourism industry and coastal communities rely on

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<sup>1</sup> Burke, L., J. Maidens. *Reefs at Risk in the Caribbean*. Washington, DC: World Resources Institute. 2004. [http://pdf.wri.org/reefs\\_caribbean\\_full.pdf](http://pdf.wri.org/reefs_caribbean_full.pdf).

<sup>2</sup> <https://oceanwealth.org/project-areas/caribbean/>

<sup>3</sup> Spalding et. al, 2019. *Estimating Reef-adjacent coral reef tourism values in the Caribbean*. <https://oceanwealth.org/wp-content/uploads/2019/01/Reef-Adjacent-Tourism-Value-Caribbean-Study.pdf>

mangrove and reef-based fisheries for food security and income.<sup>4,5</sup> These ecosystems also play a critical role in coastal protection. However, rapid economic development and population growth put mounting pressures on coastal and marine resources, with implications to livelihoods and economic safety nets linked to them. Anthropogenic threats are also being compounded by climate-driven natural hazards (coral bleaching owed to increased sea temperatures, storms events, flooding, etc.) that are increasing the vulnerability of ecosystems and Belize’s coastal zone.

According to a climate change policy assessment carried out by the International Monetary Fund and the World Bank for Belize in 2018, “*planning for resilience-building, and engagement with development partners on environmental reforms, have been central to Belizean policymaking for many years*”<sup>6</sup>. The assessment looked at Belize’s climate response plans and policies from a macroeconomic and fiscal perspective, while exploring potential impacts from both climate change and natural disasters. The assessment report points out that Belize falls short on its legal and regulatory framework on climate change and that key enabling frameworks for climate action remains to be developed.

Building and maintaining resilience of Belize’s coastal zone to climate change, and enabling continued provision of ecosystem services, are key to ensuring that Belize is well placed to adapt to climate change. The following policies reference adaptation and resilience building for Belize’s coastal zone. A perfunctory analysis of their strengths and weaknesses is presented in Table 1.

*Table 1- Key Relevant Climate, Coastal, Environmental, and Development Policies in Belize*

<b>Policies</b>	<b>Characteristics</b>
National Climate Resilience Investment Plan (NCRIP), 2013 <sup>7</sup>	<ul style="list-style-type: none"> <li>• The NCRIP focuses strongly on addressing climate risk and vulnerabilities from a development perspective; seeks to thoroughly integrate climate adaptation, variability and comprehensive disaster management within national development planning processes and actions.</li> <li>• The plan is mostly focused on infrastructure- both development of new infrastructure and maintenance of existing.</li> </ul>
National Climate Change Policy, Strategy and Action Plan (NCCPSAP), 2014 <sup>8</sup>	<ul style="list-style-type: none"> <li>• The NCCPSAP is multi-sectoral (not only for the coastal zone) but includes a section on addressing climate change in the coastal /marine sector. It provides some general ideas for climate adaptation, while aiming to promote suitable strategies in coastal areas by means of formulation and implementation of land-use planning policies, fortification of sea and river defenses, implementation of early warning systems for storm surges, and development of substantial physical infrastructure – both grey and green.</li> </ul>

<sup>4</sup> Coastal Zone Management Authority and Institute (CZMAI). 2016. Belize Integrated Coastal Zone Management Plan. CZMAI, Belize City. <https://www.coastalzonebelize.org/wp-content/uploads/2015/08/BELIZE-Integrated-Coastal-Zone-Management-Plan.pdf>

<sup>5</sup> Cooper, E., L. Burke, N. Bood. “Coastal Capital: Belize. The Economic Contribution of Belize’s Coral Reefs and Mangroves.” *WRI Working Paper*. Washington, DC: World Resources Institute. 2009. [http://pdf.wri.org/working\\_papers/coastal\\_capital\\_belize\\_wp.pdf](http://pdf.wri.org/working_papers/coastal_capital_belize_wp.pdf).

<sup>6</sup><https://www.imf.org/en/Publications/CR/Issues/2018/11/16/Belize-Climate-Change-Policy-Assessment-46372>

<sup>7</sup> [http://med.gov.bz/wp-content/uploads/2016/10/BelizeNCRIP\\_final2013.pdf](http://med.gov.bz/wp-content/uploads/2016/10/BelizeNCRIP_final2013.pdf)

<sup>8</sup> <http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2018/03/1082.pdf>

	<ul style="list-style-type: none"> <li>• It also calls for the integration of such strategies within economic development policies, disaster mitigation and management plans, and the ICZMP.</li> <li>• Investment in strengthening the resilience of infrastructure connectivity—roads and bridges—was flagged as the most urgent priority.<sup>9</sup></li> </ul>
Integrated coastal zone management plan (ICZMP) <sup>10</sup> with accompanied regional management guidelines, 2016	<ul style="list-style-type: none"> <li>• The ICZMP includes area specific planning that defines the types of development and standards suitable for various coastal areas.</li> <li>• It also outlines a vision and implementation plan for sustainable use of coastal resources and supports an integrated approach to development planning.</li> </ul>
Growth and Sustainable Development Strategy (GSDS), 2016-2019 <sup>11</sup>	<ul style="list-style-type: none"> <li>• The GSDS is aimed at bringing economic, social, and environmental policies into synergistic balance to enable optimal outcomes and helps to increase resilience in the face of a volatile global economy and changing global climate.</li> <li>• Though it is a national policy aimed at growth and development, it includes a section on disaster risk management and climate change resilience.</li> </ul>
Nationally Determined Contribution under the United Nations Framework Convention on Climate Change (2018) <sup>12</sup>	<ul style="list-style-type: none"> <li>• Belize’s NDCs look at a sectoral approach to addressing emissions and considers both mitigation and adaptation targets.</li> <li>• It is highly focused on energy.</li> <li>• There is a mitigation strategy, with costs estimated (though some baselines and policy actions are missing), and a partly-costed adaptation strategy.</li> <li>• A discussion on coastal-marine ecosystems, including a mangrove target, is included.</li> </ul>

With the progress made in ICZM and climate adaptation/resilience to date, it could be timely for Belize to assess the degree to which its institutions, legislations, policies, regulations, plans and procedures, and other policy frameworks are helping to support or enhance the country’s climate-resilient ICZM performance.

**Climate-Resilient ICZM Performance Indicators**

IDB and WRI developed a set of Climate Resilient Integrated Coastal Zone Management (ICZM) Performance Indicators as a tool to assist countries in the Latin American and Caribbean (LAC) region to evaluate progress toward sustainable, climate-resilient management of coastal areas. ICZM is defined as a continuous and dynamic process by which decisions are made for the sustainable use, development and protection of coastal and marine areas and resources. [.....] It is multipurpose oriented: it analyzes implications of development, conflicting use, and interrelationships among physical processes and human activities, and it promotes linkages and harmonization between sectoral coastal and ocean activities.<sup>13</sup>

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<sup>9</sup> <https://www.imf.org/en/Publications/CR/Issues/2018/11/16/Belize-Climate-Change-Policy-Assessment-46372>  
<sup>10</sup> <https://www.coastalzonebelize.org/wp-content/uploads/2015/08/BELIZE-Integrated-Coastal-Zone-Management-Plan.pdf>  
<sup>11</sup> [http://cdn.gov.bz/mof.gov.bz/files/FINAL%20GSDS\\_March\\_30\\_2016.pdf](http://cdn.gov.bz/mof.gov.bz/files/FINAL%20GSDS_March_30_2016.pdf)  
<sup>12</sup> [https://unfccc.int/files/focus/ndc\\_registry/application/pdf/belize\\_ndc.pdf](https://unfccc.int/files/focus/ndc_registry/application/pdf/belize_ndc.pdf)  
<sup>13</sup> Cicin-Sain, B. and Knecht, R. *Integrated Coastal and Ocean Management*. Island Press. (1998)

As such the indicators were designed to explore whether the country has the policies, institutions, information management, implementation practices, and monitoring frameworks, in place, to enable them to sustainably manage coastal areas, considering changing climate. The indicators are intended to support better within country-understanding of strengths and weaknesses with regard to ICZM and climate preparedness in coastal areas. The indicators were developed by the IDB and WRI under the TC: Knowledge and Innovation: Disaster and Climate-Resilient Coastal Zone Management, which aims to catalyze sustainable, replicable, and innovative investments in disaster and climate-resilient ICZM.

Development of these Indicators relied on extensive review of the literature (on coastal management, governance, disaster risk reduction and management, climate vulnerability and adaptation, and on financing of ICZM, as well as adaptation measures), complemented by interviews with experts on coastal zone management and disaster risk management in the LAC region. In our literature review, we were unable to find an existing index or diagnostic that covered the wide-ranging topics addressed by ICZM, which also had the desired focus on climate resilience. Some references focused on coastal governance; some focused on coastal protection and management; some looked at climate vulnerability and risks and disaster risk reduction (DRR)/disaster risk management (DRM); while some were tools for countries to map their own risks and vulnerabilities. Some lacked any consideration of future climate risk, and most lacked consideration of the institutional and policy structure required for ICZM. (For details on the literature review, see IDB technical note, *Climate-Resilient ICZM Performance Indicators*.)

The indicators cover a range of legal, institutional, technical, physical, social, and fiscal issues associated with ICZM were assessed as part of the Performance Indicators. The suite of indicators is based on the degree to which they highlight good practices that can increase the likelihood of countries to be able to sustainably manage coastal areas while increasing climate resilience and reducing climate-related risk in these areas.

### Application of the Indicators in Belize

The application of the Climate-Resilient ICZM Performance Indicators was conducted through a collaboration of the World Wildlife Fund (WWF), IDB, and WRI. During application, the Indicators were shared beforehand with the key government informants that were to be interviewed, so that they could have time to review and record any potential challenges in interpretation. During the interviews, the Indicators were also reviewed one-by-one to obtain clarity from interviewees as to the usability and usefulness of the Indicators in measuring Belize's Climate-resilient ICZM Performance.

The result of the fifteen indicators under four categories are shown below and are further discussed under the results section of this report. Each indicator has component criteria which are evaluated individually, and subsequently averaged to arrive at the indicator score. The number of criteria varies by indicator. Most criteria are binary (yes/no, achieved/not achieved), though some allow for more graded responses (such as whether a given environmental variable has been assessed once, multiple times, or is routinely monitored), or the criteria might include a

list of variables monitored (with one point for each). As such, the potential total point score of criteria varies, but the scores are standardized based on the percentage of criteria achieved (percentage of total points possible achieved). So, ultimately, indicator scores are in the form of a percentage – the percent of criteria achieved within each indicator. Indicator scores can also be averaged to arrive at the category score. The number of criteria and possible total point score for each indicator are listed in Table 2.

Table 2- Indicator Categories, Indicators and number of criteria

Indicators	Number of criteria	Maximum points possible
<b>1. Legal and Institutional Framework for ICZM and Climate Preparedness</b>		
1A. Status of National ICZM Regulatory Framework (8 criteria;	8	8
1B. Status of National Regulatory Framework on Climate Change Adaptation and Disaster Risk Management	4	4
1C. Regulatory Environment for Coastal Development	5	5
1D. Interagency Coordination of Entities Relevant to ICZM, DRM and Climate Change	5	5
1E. Institutional Responsibility for Monitoring and Evaluation of ICZM Activities and Projects	3	3
<b>2. Assessing Climate Risks in the Coastal Zone</b>		
2A. Data on Environmental Condition and Trends in Coastal Areas	22	66
2B. Shared Information Platform	17	17
2C. Climate Vulnerability and Risk Assessment (VRA)	7	31
2D. Timeliness of Data and Assessments	6	6
<b>3. Identifying Adaptation Opportunities and Protecting Investments</b>		
3A. Identifying ICZM-related Responses to Climate Change	3	3
3B. Skills and Experience Developing and Evaluating Adaptation Solutions	5	5
3C. Monitoring and Protecting Investments in Infrastructure	5	5
<b>4. Financing ICZM</b>		
4A. Sustainable Funding for ICZM Operations	5	5
4B. Access to International Development Finance	4	4
4C. Financial Incentives and Schemes to Incentivize Private Action	3	3

In this application, the criteria for each indicator were assessed to collect details on how Belize is doing on each given topic (indicator). The application in Belize was carried out by means of desktop research and key interviews with government stakeholders. Stakeholders from the following organizations were interviewed (Table 3).

*Table 3- List of Belize Government Entities interviewed*

<b>Entities</b>
Ministry of Agriculture, Fisheries, Forestry, Sustainable Development, the Environment, Climate Change and Solid Waste Management
Coastal Zone Management Authority and Institute (CZMAI)
National Climate Change Office
National Emergency Management Organization
Ministry of Tourism
Belize Fisheries Department
Ministry of Economic Development
Ministry of Work
Natural Resources (Mining, Physical Planning, and Hydrology Division)

Overall, the application of the Performance Indicators went smoothly; no major challenges were encountered and there were only a few recommendations for edits or other improvements to the indicators.

## Results

This section presents the results for Belize for the four categories and 15 associated indicators. For each category, an overview of results is presented in tabular form, with a summary score for the category. In addition, scores for each indicator in the category are included to show how the category score was reached. This is followed by a short interpretation of results in narrative form. Next, results for each indicator within the category are presented, including a description of the indicator and a table summarizing the findings for all criteria under that indicator, as well as an interpretation of results for that indicator. For full details of the results at the criteria-level, including the evidence which supports the scoring for each criterion, please see details in the tables in Appendix A.

### Category 1: Legal and Institutional Framework for ICZM and Climate Preparedness

This category covers the legislative and institutional arrangements that support planning, coordination, and service delivery for ICZM and climate preparedness. For this assessment, we considered several measures, such as whether Belize has in place framework legislation for ICZM that incorporates climate change and disaster risk management and whether a lead institution has been identified with designated counterparts across sectors. In addition, we examined the regulatory environment governing development in the coastal zone, the degree of interagency coordination for ICZM and DRM, and the existence of an M&E system to monitor the success of coastal zone management efforts.

Five indicators were assessed under this category, resulting in an average category score of 0.40 (40%) (See Table 4). Results for each of the five indicators are provided in Tables 5 – 9. In addition, more detailed results for all criteria for each of the 5 indicators are provided in Appendix A in Tables A-1A to A-1E.

Belize performs well in two areas - having the policy and regulatory environment for ICZM and having a regulatory framework for coastal development. The country's planned climate response is well-articulated, however, key enabling frameworks for climate action remains to be developed and implementation capacity remains a challenge. Belize also falls short in fostering a cross-sector coordinated approach to addressing ICZM, DRM and climate adaptation targets. There is also only limited institutional action on assessing and evaluating the degree of impact of ICZM project investments.



*Table 4- Indicator Scores for Category 1 - Legal and Institutional Framework for ICZM and Climate Preparedness*

		Average Category Score	Indicator Score
<b>1 Legal and Institutional Framework for ICZM and Climate Preparedness</b>		0.40	
a.	Status of National ICZM Regulatory Framework		0.75
b.	Status of National Regulatory Framework on CC Adaptation and Disaster Risk Management		0.25
c.	Regulatory Environment for Coastal Development		0.60
d.	Interagency Coordination of Entities Relevant to ICZM, DRM and Climate Change		0.40
e.	Institutional Responsibility for Monitoring and Evaluation of ICZM Activities and Projects		0.00

#### 1A. Status of National ICZM Regulatory Framework

This indicator evaluates the extent to which ICZM legislation provides the mandate, structure and processes that enable effective coastal zone management. It has eight criteria.

*Table 5- Criteria Results for Indicator 1A – Status of National ICZM Regulatory Framework.*

Criteria	Finding
1. ICZM-specific or inclusive legislation has been approved, which designates a lead agency.	Yes
2. Legislation designates sectoral competencies, including an agency responsible for environment, planning, public works, and fisheries.	Yes
3. Legislation establishes collaboration with the agency responsible for climate change adaptation.	No
4. Legislation establishes a process for public participation, review and comment on the ICZM planning process and on the approval of coastal development public-investment projects. (“Public” includes citizens, community groups, as well as stakeholders with vested economic interests.)	Yes
5. A coastal zone management plan has been officially published.	Yes
6. Regulations have been officially published to implement the ICZM plan.	No
7. Regulations establish a system of penalties to public and private entities when ICZM-related regulations are violated.	Yes
8. A system for reporting violations of ICZM or related regulations is in place.	Yes

Belize currently achieves five of eight of the criteria for a score of 0.75 (See Table 5 and for more details *Annex A Table A-1A.*). In terms of Achievements: Belize approved a CZM legislation in 2000 which designates a lead agency and is in the process of revising this legislation to give legal

teeth to its integrated coastal zone management plan (ICZMP) and to meet current social and environmental realities. The agency with the mandate to oversee coastal management currently has the competencies to participate in ICZM planning. The legislation establishes a process for public participation, review and comment on ICZM planning. In terms of gaps: The legislation does not establish collaboration on ICZM with the National Climate Change Office, the agency coordinating the national response to climate change. Though an ICZMP has been officially published, the current ICZM Act does not include any ICZM regulations. Once revised and enacted, the new CZM Act will set in place the legal requirements for implementation of the ICZMP.

In addition, there are other permitting agencies (such as the Department of Environment - DOE) that are given the mandate through regulation to implement penalties for violation of development-related legislations, including the CZM Act, Environmental Protection Act and Environmental Impact Assessment Regulations. Finally, there is currently a community warning system (i.e., watch dog system) being rolled out by the Coastal Zone Management Authority and Institute (CZMAI) to report violations related to the ICZMP. Communities will be able to report violations directly to CZMAI and DOE.

#### 1B. Status of National Regulatory Framework on Climate Change Adaptation and Disaster Risk Management

This indicator evaluates the level to which policy/legislation provides the mandate, structure and processes that enable national planning and management for climate and disaster preparedness, including coordination with key sectoral agencies. It has four criteria.

*Table 6- Criteria results for Indicator 1B - Status of National Regulatory Framework on CCA and DRM*

Criteria	Finding
1. National legislation to implement DRM has been officially published (not only for an emergency preparedness. See the definition of DRM).	No
2. There is an officially published national policy or legislation focused on climate change adaptation.	Yes
3. National regulations on DRM coordinate with related standards on climate change adaptation, integrated water resources management, and land use planning.	No
4. National policy / legislation on both DRM and climate change adaptation establishes a process for public participation, review and comment in the development of disaster risk management and / or climate adaptation plans.	No

Belize currently achieves one of the four criteria (score of 0.25; See Table 6 and for more details Annex A *Table A-1B*). In terms of Achievements: Belize has a National Climate Change Policy, Strategy and Action Plan (NCCPSAP) to address climate change, including adaptation. In terms of gaps: The country falls short on: i) having a disaster risk management legislation that fully addresses preparedness response and management, including rehabilitation and reconstruction

planning, and financial protection; ii) having clear specifications within the Disaster Preparedness and Response Act (DPRA) for coordination with standards on climate change adaptation, integrated water resources management, and land use planning; and iii) having clearly established processes for public participation, review and comment in the development of climate adaptation plans and disaster risk management. The DPRA sets out the structure and functions of the National Emergency Management Organization (NEMO) and general procedure for disaster management.

### 1C. Regulatory Environment for Coastal Development

This indicator evaluates the rules governing development in the coastal zone and whether they are helping the government ensure that investments incorporate climate risks into decision-making processes. It has five criteria:

*Table 7 - Criteria Results for Indicator 1C - Regulatory Environment for Coastal Development*

Criteria	Finding
1. The regulations that standardize the carrying out of environmental impact assessments (or equivalent process) integrate climate-hazard analysis.	No
2. The regulations that standardize the carrying out of project impact assessments (or equivalent process) prior to project implementation require evaluation of social and environmental impact (and natural capital opportunities).	Yes
3. The National Development Plan (or equivalent instrument) contains objectives, targets and / or indicators about climate risk reduction and / or climate resilience.	Yes
4. Regulations establish a system of penalties to public and private entities when coastal development-related regulations are violated.	Yes
5. The lead agency for ICZM has defined priority (or critical) areas for coastal management.	No

Belize currently delivers on three of five criteria (score 0.60; See Table 7 and for more details Annex A *Table A-1C*). In terms of Achievements: Belize has Environmental Impact Assessment (EIA) Regulations that call for addressing environmental, social and economic impacts of projects. Belize has also established climate risk reduction and/or resilience targets/indicators through the country’s national development instruments – the Growth and Sustainable Development Strategy (GSDS, 2016-19), Horizon Development Vision2030 (2010-2030) and National Climate Resilient Investment Plan (2013). In terms of gaps: The EIA Regulations do not integrate climate-hazard analysis. There are no ICZM regulations in place via the CZM Act, but other permitting agencies (such as the Department of Environment) have regulations that task them with the mandate to establish penalties on entities for violations within the coastal zone. CZMAI has not defined priority (or critical) areas for management.

## 1D. Interagency Coordination of Entities Relevant to ICZM, DRM and Climate Change Adaptation

This indicator evaluates whether authority over coastal ecosystem resource use, management, and development resides across multiple agencies and sectors, and explores the extent of collaboration. In addition to coastal resource managers, the cooperation of the land use planning authority, business development authority, waste managers, fisheries managers, and disaster risk management authorities are needed for truly integrated and effective coastal zone management. It looks at five criteria:

*Table 8 - Criteria Results for Indicator 1D - Interagency Coordination of Entities Relevant to ICZM, DRM and Climate Change Adaptation*

Criteria	Finding
1. An inter-institutional framework for ICZM has been officially established.	Yes
2. The framework includes the agency(ies) responsible for DRM and climate change adaptation.	No
3. The framework includes provisions for a technical-information sharing mechanism necessary for ICZM development planning decision making, and relevant agencies/entities share data for this purpose.	Yes
4. Relevant agencies/entities meet regularly (at least twice per year) to discuss and make joint planning decisions or development monitoring plans on climate-related ICZM.	No
5. The relevant agencies/entities develop joint multi-year work plans to coordinate and collaborate on assessing and addressing climate-related risks in coastal areas.	No

Belize currently delivers on two of five criteria (score 0.40; See Table 8 and for more details Annex A *Table A-1D*). In terms of Achievements: Belize utilizes an inter-institutional framework, including a CZM Board, Coastal Advisory Council and coastal advisory committees, as per mandated via CZM Act. This framework calls for technical information sharing, led by the Coastal Zone Management Institute (the research arm of the CZMAI), in collaboration with the CZM Board, Advisory Council, and the advisory committees. In terms of gaps: The framework does not include representation by the agencies responsible for DRM or climate change adaptation. Relevant agencies do not have regular meeting to discuss and make joint planning decisions or develop monitoring plans on climate-related ICZM; this, however, occurs on a haphazard or project basis. For example, CZMAI collaborated with the Ministry of Tourism on a project geared at enhancing resilience of the tourism sector, but the relevant entities do not develop multi-year work plans nor do they have a formal mechanism to collaborate on assessing and addressing climate-related risks in coastal areas.

## 1E. Institutional Responsibility for Monitoring and Evaluation of ICZM Activities and Projects

This indicator evaluates whether there is consistent and targeted Monitoring and Evaluation (M&E) that enables the extraction of lessons learned and which make future ICZM-related projects more sustainable and allow for adaptive ICZM management. It includes three criteria:

*Table 9 - Criteria results for Indicator 1E - Institutional Responsibility for M&E of ICZM Activities and Projects*

Criteria	Finding
1. Regulations assign a public or academic entity or a third party to undertake independent monitoring during implementation of ICZM-related projects.	No
2. Regulations assign a public or academic entity or a third party to undertake independent technical performance evaluations at the end of ICZM-related projects.	No
3. Regulations mandate the project monitoring results are presented to the ICZM authority at regular intervals (at least annually) and inform updates to management plans.	No

Belize does not fulfill any of the criteria, as currently defined (score 0.0; See Table 9 and for more details Annex A *Table A-1E*). In terms of Achievements: Regulations achieve some of what is desired in this category, but not the specific criteria. CZMAI produces State of the Coast Reports with contributions from independent entities and individuals that are knowledgeable in coastal-marine research areas. CZMAI also collaborates with the Healthy Reefs Initiatives to produce reef report cards and eco-audits. In terms of gaps: The CZM Act does not assign a third-party entity to independently evaluate initiatives related to ICZM-related project and does not mandate that project monitoring results be used to inform the updating of management plans.

## Category 2: Assessing Climate Risks in the Coastal Zone

This category focuses on understanding status and trends of ecosystems, as well as current and potential future climate-related hazards and risk in coastal areas, essential to planning actions to reduce risk and build coastal resilience. The category examines a) what data are collected through environmental monitoring and the frequency and density of data collection; b) whether data are integrated (available in a central or shared information hub); c) the quality and completeness of data on risk from climate change in coastal areas; and d) the frequency of update of assessments.

Four indicators were assessed under this category; receiving an average category score of 0.62 (62%) (See Table 10). Although there are several public information platforms housing ecological and physical information, there is no fully active integrated sharing platform or information hub. There is, however, a plan to compile and store GIS information in the Belize Spatial Data Infrastructure (BSDI) which is under development. Belize has been progressing well in using technology, equipment and science to update assessments. The country, however, falls short on

having long-term temporal and broad spatial datasets and information on some coastal habitats and coastal condition to help address risk and climate-related hazards. Some physical parameters and social indicators are also lacking from vulnerability and risk assessments.

*Table 10- Indicator Scores for Category 2 - Assessing Climate Risks in the Coastal Zone*

		Average Category Score	Indicator Score
<b>2 Assessing Climate Risks in the Coastal Zone</b>		0.62	
a.	Data on Environmental Condition and Trends in Coastal Areas		0.53
b.	Shared Information Platform		0.47
c.	Climate Vulnerability and Risk Assessment (VRA)		0.65
d.	Timeliness of Data and Assessments		0.83

## 2A. Data on Environmental Condition and Trends in Coastal Areas

This indicator evaluates the extent of monitoring of coastal habitats and environmental conditions for management of coastal areas, including the planning of actions to reduce risk from climate-related hazards. Initial assessment (creating a baseline), complemented by repeat observations, allows tracking of change and is an important input to both the design and evaluation of actions. Environmental or ecological variables were assessed both for a) spatial extent of monitoring coverage and b) temporal frequency of monitoring. This indicator has 22 criteria, each of which could score 3 points for a potential total of 66 points). Spatial extent and density of coverage, as well as temporal frequency, of monitoring of the following 22 variables were evaluated:

*Table 11 - Criteria for Indicator 2A - Spatial extent and density of coverage of monitoring for Environmental and Ecological Variables*

Environmental / Ecological Variable	0 – not assessed	1- single location / limited area	2- covers all “critical” areas	3- monitored across country at adequate density
a. Coral reef condition			X	
b. Mangrove extent				X
c. Sea grass extent		X		
d. Commercial fish stocks and condition (for at least 50% of commercial fish species)			X	
e. Bycatch from fishing activities	X			
f. Coastal water quality – bacteria	X			
g. Coastal water quality – nutrients		X		
h. Physical shoreline change – coastal erosion / beach profile change		X		
i. Waves and surge – tides, wave height, storm surge		X		
j. Precipitation in coastal areas			X	
k. Water temperature			X	

*Table 12 - Criteria for Indicator 2A - Temporal Frequency of monitoring for Environmental and Ecological Variables*

Environmental / Ecological Variable	0 – none	1- baseline available	2- info available for multiple time periods	3- regularly monitored
a. Coral reef condition			X	
b. Mangrove extent			X	
c. Sea grass extent			X	
d. Commercial fish stocks and condition (for at least 50% of commercial fish species)			X	
e. Bycatch from fishing activities	X			
f. Coastal water quality – bacteria	X			
g. Coastal water quality – nutrients			X	
h. Physical shoreline change – coastal erosion / beach profile change		X		
i. Waves and surge – tides, wave height, storm surge				X
j. Precipitation in coastal areas				X
k. Water temperature				X

Belize currently scores 35 out of 66 possible (score 0.53; See Table 11 and Table 12 and for more details *Annex A Tables A-2A1 and A-2A2*). In terms of Achievements: Coral reef coverage and health, mangrove coverage, fish stocks, and physical variables such as tides, wave height, precipitation and temperature are well monitored, both in terms of spatial coverage and temporally. In terms of gaps: There are major gaps in monitoring of other important variables such as bycatch, physical shoreline change, historical wind data, currents, coastal water quality and seagrass extent.

## 2B. Shared Information Platform

This indicator evaluates climate risk assessment in the context of ICZM which requires information from multiple sources to come together for integration, unified display and analysis. This indicator evaluates 17 criteria:

*Table 13 - Criteria for Indicator 2B - Shared Information Platform*

Criteria	Finding
1. An information hub or integrated information sharing platform exists supporting the management of coastal areas.	Yes

The information hub or platform includes:

2. Information on ecosystem extent and condition - both mapped location and data on the condition of each of the following ecosystems (if present in the country) – coral reefs, mangroves, sea grass, salt marsh, other wetlands, sandy beach	Yes
3. Information on monitoring of coastal waters – all of the following: water quality, tidal range / storm surge / wave heights	Yes
4. Information on land use and the built environment – including all of the following - location of roads, public infrastructure and public/private housings, wastewater treatment facilities, and energy facilities (if present in area)	Yes
5. Information on shoreline areas with built coastal protection infrastructure present (such as sea walls, jetty, breakwater, etc.), as well as information on the condition of the infrastructure	No
6. Information on permits for infrastructure construction and operation	No
7. Information on elevation in coastal areas	No
8. Projections of sea level rise	Yes
9. Information on drainage system – both natural (rivers, creeks) and built (canals, culverts, etc.) if such features exist	No
10. Information on land use zoning (for urbanized areas)	No
11. Information on marine zoning / marine protected areas / fisheries management areas	Yes
12. Information on shoreline change – including all the following: coastal erosion; change in beach profile; shifting of the coastline	No
13. Information on proposed coastal development (applications pending approval, including preliminary design information which contains type of development, proposed location, and building footprints)	No
14. Information on past flooding in coastal areas (extent and date)	No
15. Information on estimates of damage from past storms (for at least one storm event)	No
16. Information on ecological impacts in coastal areas (such as algal blooms, fish kills, marine mammal strandings)	No
17. The system includes some projections related to climate change (at least one of the following - projections of temperature, changes in storm intensity, change in intensity and frequency of precipitations, or probabilities of loss due to future hazards)	Yes

Belize currently delivers on 7 of 17 criteria (score 0.47; See Table 13 and for more details Annex A Table A-2B).

In terms of Achievements: Several independent databases exist for Belize which, if connected, could support integrated information sharing for coastal areas, including spatial and numerical datasets, and reports. Information from these could also be included within Belize’s National



Spatial Data Infrastructure (BNSDI) that is being developed. A public platform for viewing and downloading spatial and non-spatial data is available via the Biodiversity and Environmental Resource Data System of Belize (BERDS). CZMAI also has a Coastal and Marine Data Center that stores spatial and tabular data derived under different technical/research units and projects of the Institute. Also, the Caribbean Community Climate Change Center (5Cs) has a data clearance house that has climate-related data. The National Climate Change Office also has a database with information generated through their Climate Vulnerability Response Program.

There is information on habitat extent but less so on the condition. For BERDS and CZMAI, most of the information is on extent of coverage of the ecosystem. Other databases such as the HRI database and University of Belize's Environmental Research Institute, have information on condition, which can be made available upon request. Information on condition is mainly for coral reefs.

CZMAI's data center houses water quality data. Up until 2010, 75 water quality stations were strategically designated in the coastal zone. The stations were monitored once per month for basic physical and physicochemical parameters. Presently, due to limited financial resources, CZMAI is only conducting water quality monitoring along the Belize River mouth and eastward. The Meteorology Service has data regarding storm surge and wave heights. Such data are available online on the Meteorology Service website.

Information on land use and the built environment is dispersed, available through different departments such as the Lands Information Centre (LIC), Ministry of Housing, Belize Central Building Authority, Ministry of Works (Roads), The Statistical Institute of Belize, and CZMAI. The CZMAI has location of building footprints and drone imagery for 40% of all cayes in Belize. This data was collected under the Marine Conservation and Climate Adaptation Project (MCCAP) and is currently stored within the CZMAI's Data Center. The data is also planned for incorporation within the BNSDI; hopefully before the end of the year. Information on roads and settlements are included within BERDS.

Information on temperature projections, changes in storm intensity, changes in sea level, change in intensity and frequency of precipitation, and probabilities of loss due to future hazards is included in the Caribbean Community Climate Change Center 's data clearing house. Information needs to be integrated within the BNSDI.

In terms of gaps: The following information is not currently collected, georeferenced or included in an information hub: i) sea walls, jetties, breakwaters, and other coastal infrastructure; ii) permits for infrastructure construction and operation; iii) elevation in coastal areas; iv) land use zoning (for urbanized areas); v) shoreline change; vi) proposed coastal development (applications pending approval, including preliminary design information which contains types of developments, proposed location, and building footprints); vii) past flooding in coastal areas (extent and date); viii) estimates of damage from past storms (for at least one storm event); and ix) on ecological impacts in coastal areas (such as algal blooms, fish kills, marine mammal strandings).

## 2C. Climate Vulnerability and Risk Assessment (VRA)

Understanding risks posed by climate hazards across the land and seascape is an important step toward being able to manage for climate-associated vulnerabilities. Relevant factors include: who conducted the analysis; which climate hazards are included; which sectors are included; whether all priority/critical areas are covered; whether national/local climate data is used; and whether multiple climate change scenarios/projections are incorporated. This indicator has seven criteria:

*Table 14 - Criteria for Indicator 2C - Climate Vulnerability and Risk Assessment (VRA)*

Criteria	Finding
1. At least one climate VRA is available for the country or pre-identified priority/critical area.	Yes – national
2. Data on ecosystems (reflecting the protective role of ecosystems for ecosystem-based adaptation) were included in the climate VRA.	Yes – coral reefs, mangroves, wetlands N/A – sand dunes
3. Multiple hazards have been evaluated in the VRA.	Yes – coastal flooding Yes – fluvial flooding No – damage from wind Yes – temperature stress Yes – coastal erosion No – coastal landslides
4. Multiple economic sectors have been evaluated for climate-related vulnerability in the VRA.	No – Coastal Development Yes – Tourism Yes – Agriculture Yes – Fisheries and Aquaculture No – Energy Yes – Water and wastewater No – Cultural Assets No – Marine transportation
5. Within the VRA, multiple social and economic factors were evaluated for influence on climate vulnerability.	Yes - Economic factors (wealth and poverty levels) Yes - Environmental factors (ecosystems / natural capital) No - Demographic characteristics (age, gender, etc.) No - Social factors (education, literacy, access to internet, etc.) No - Public service provision (drinking water, shelters, etc.) No - Construction materials
6. Within the VRA, multiple climate variables were examined for their contribution to climate-related risk.	Yes - Projected change in temperature, including intensity and duration of extreme heat events Yes - Projected change in precipitation and precipitation variability Yes - Projected change in frequency and intensity of storm events No - Exploration of thresholds – Examining past impacts in coastal areas (such as floods or coral bleaching) in conjunction with the temperature and precipitation events at the time.

7. The climate VRA evaluates different possible futures by doing the following:	Yes - Using multiple climate projections (for multiple emissions scenarios) Yes - Using projections from multiple models
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Belize scored 20 out of 31 possible points across the seven criteria (score 0.65; See Table 14 and for more details Annex A *Table A-2C*). In terms of Achievements: Belize has made good strides in evaluating climate risks related to factors such as changing temperature and precipitation; analyzing risk impacts from erosion and flooding; risk impacts on natural ecosystems; and evaluating potential impacts to varied sectors such as fisheries, tourism, water and agriculture. In terms of gaps: Lacking are evaluation of risk on other important sectors such as social factors, demographic characteristics, public services, construction, transport, among others.

**2D. Timeliness of Data and Assessments**

This indicator evaluates the timeliness (recentness) of data and assessments focused on the coastal zone and climate risks; whether these are routinely updated and whether monitoring equipment is maintained. This indicator consists of a total of six ranking criteria:

*Table 15 - Criteria for Indicator 2D - Timeliness of Data and Assessments*

Criteria	Finding
1. The entity/ies responsible for data collection on coastal environmental condition maintain or replace equipment periodically (checked at least every two years).	Yes
2. Early warning systems for coastal flooding are in place and are checked at least annually by the responsible entity/ies.	No
3. Satellite (or other data) are used to revise coastal ecosystem maps periodically (at least one habitat, such as coral reefs or mangroves updated within the past 5 years).	Yes
4. The responsible entities update climate VRA periodically (within the past five years) and make these publicly available.	Yes
5. The responsible entities update coastal ecosystem assessments (such as a state of the coasts report) periodically (within the past five years) and make these publicly available.	Yes
6. The responsible entities update coastal ecosystem economic valuations periodically (within the past five years) and make these publicly available.	Yes

Belize currently delivers on five of six criteria (score 0.83; See Table 15 and for more details Annex A *Table A-2D*). In terms of Achievements: Belize is performing well in terms of using recent data and updating assessments. Equipment are being maintained; satellite data are being used to update information on ecosystems (as information becomes available); VRA are being updated, state of the coast reports are being produced, and information on coastal-marine ecosystem services are analyzed and shared. In terms of gaps: Belize MIGHT be limited in terms of early warning systems for coastal flooding as there are no coastal flooding gauges available. The Belize Meteorology Office, however, does monitors storm surge.

### 3: Identifying Adaptation Opportunities and Protecting Investments

This category focuses on evaluating the extent to which good information on coastal ecosystem conditions and climate-related hazards, coupled with broad stakeholder input are being used to inform key policies, plans and actions to reduce climate-related risk in coastal areas. This category looks at the degree to which data on climate risks has been translated into appropriate risk-mitigation actions and whether some of the key skills required to do this are present. It also looks at whether monitoring of coastal infrastructure occurs – to protect investments made in both built and natural infrastructure.

Three indicators were assessed under this category, with Belize receiving an average score of 0.49 (49%) (see **Table 16**). Belize performs reasonably well on two indicators - the identification of ICZM-related responses to climate change and possession of skills and experience to interpret vulnerability and risk assessment (VRA) results for coastal areas and turn these into operationalizable actions. The country, however, falls short on indicator 3, monitoring and protecting Investments in infrastructure.

*Table 16 – Indicator Scores for Category 3 - Identifying Adaptation Opportunities and Protecting Investments*

		Average Category Score	
<b>3. Identifying Adaptation Opportunities and Protecting Investments</b>		0.49	
A.	Identifying ICZM-related Responses to Climate Change		0.67
B.	Skills and Experience Developing and Evaluating Adaptation Solutions		0.600
C.	Monitoring and Protecting Investments in Infrastructure		0.20

#### 3A. Identifying ICZM-related Responses to Climate Change

Once information is available on climate risks, actions need to be identified that can most effectively help reduce these risks and prepare for a changing climate<sup>14</sup>. This indicator looks at the degree to which the government has been able to identify appropriate responses to reduce climate-related risk in coastal areas. This indicator has three criteria:

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<sup>14</sup> [https://www.epa.gov/sites/production/files/2014-09/documents/being\\_prepared\\_workbook\\_508.pdf](https://www.epa.gov/sites/production/files/2014-09/documents/being_prepared_workbook_508.pdf)

Table 17 - Criteria for Indicator 3A - Identifying ICZM-related Responses to Climate Change

Criteria	Finding
1. Specific actions for responding to climate-related risks in the coastal zone have been identified and listed in one or more national plan (e.g., in national development plans, ICZM plan, National Adaptation Program of Actions, National Adaptation Plan or Nationally Determined Contributions).	Yes – general and not tested/implemented
2. Potential actions to reduce climate-related risk have <i>been prioritized</i> with consideration of where climate impacts will be most severe (geographically) and who among the country’s population is the most vulnerable, as identified in the climate VRA.	No
3. In developing actions to reduce climate-related risk in coastal areas, ecosystem-based adaptation options (e.g., restoration or protection of ecosystems providing natural infrastructure) have been evaluated (in at least one of the proposals in the last three years).	Yes

Belize currently meets two of the three criteria under this indicator (score 0.67; See Table 17 and for more details Annex A *Table A-3C*). In terms of Achievements: Actions to respond to climate-related risks is highlighted in a general manner within various plans, including the ICZM Plan, National Climate Change Policy Strategy and Action Plan (CCPSAP), National Determine Contribution to UNFCCC (NDC), Growth and Sustainable Development Strategy (GSDS), Horizon National Development Plan 2030 and National Climate Resilience Investment Plan (NCRIP). The Ministry of Tourism has looked at climate risks and vulnerability for a few key tourism destinations - Corozal, Caye Caulker and Punta Gorda - and how the country can invest in infrastructure at these prioritized destinations. On the ground exploration of ecosystem-based approach to adaptation is being given more and more attention in Belize. In terms of gaps: The country has not taken effective steps to prioritize, test and implement actions from the VRA to reduce climate-related risk to severely vulnerable areas (geographically), nor have the most vulnerable populations been identified for adaptation interventions.

**3B. Skills and Experience Developing and Evaluating Adaptation Solutions**

A variety of technical skills are required to interpret VRA results for coastal areas and turn these into operationalizable actions<sup>15</sup>, such as restoring mangroves to reduce wave energy. Some of these requirements are commonly outsourced to engineering or consulting firms. There are, however, some core skills which are valuable either for understanding and applying the technical specification of consultant or engineering reports, or for developing comparisons of project options. This indicator looks at evaluating skills and experience on this topic. This indicator has a total of five ranking criteria.

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<sup>15</sup> [https://climate-adapt.eea.europa.eu/knowledge/adaptation-information/adaptation-measures/index\\_html?widgets.impact%3Alist=--NOVALUE--&widgets.impact-empty-marker=1&widgets.sector%3Alist=COASTAL&widgets.sector-empty-marker=1](https://climate-adapt.eea.europa.eu/knowledge/adaptation-information/adaptation-measures/index_html?widgets.impact%3Alist=--NOVALUE--&widgets.impact-empty-marker=1&widgets.sector%3Alist=COASTAL&widgets.sector-empty-marker=1)

*Table 18 - Criteria results for indicator 3B - Skills and Experience Developing and Evaluating Adaptation Solutions*

Criteria –	Finding
Whether agencies collaborating on ICZM have staff who have experience in the following in the past two years:	
1. Conducting or evaluating environmental impact assessments (based on the national standards /regulations, if such exist)	Yes
2. Conducting or evaluating reports on ecosystem service valuation	Yes
3. Conducting or evaluating cost-benefit analysis (as a tool for comparison of options) - based on the national standards / regulations, if such exist	No
4. Conducting or evaluating studies on effectiveness of natural infrastructure (green infrastructure solutions)	No
5. Conducting or evaluating analyses of coastal processes / dynamics.	Yes

Belize achieves 3 of 5 criteria (score 0.60; See Table 18 and for details Annex A *Table A-3B*). In terms of Achievements: Several departments and agencies in Belize possess relevant skills and experience. The Department of Environment and National Environmental Appraisal Committee have skills and experience in evaluating environmental impact assessment. In addition, the NCCO has skills in evaluating reports on VRA. The CZMAI has skills and experience in conducting and evaluating reports on ecosystem service and have some basic experience in evaluating analysis of coastal processes/dynamic. In terms of gaps: Belize falls short on conducting/evaluating cost-benefit analysis based on national standards/regulations and conducting or evaluating studies on effectiveness of natural infrastructure (green infrastructure solutions).

### 3C. Monitoring and Protecting Investments in Infrastructure

Climate-resilient ICZM performance usually requires (green/conventional) infrastructure operations with a long-lasting life span (typically 25-40 years), and these require periodic monitoring and maintenance<sup>16</sup>. This indicator evaluates the extent to which Belize is monitoring and maintaining its infrastructure. This indicator has five ranking criteria.

*Table 19 - Criteria Results for Indicator 3C - Monitoring and Protecting Investments in Infrastructure*

Criteria	Finding
1. Standards and metrics exist for monitoring and evaluating the integrity of coastal infrastructure and for upgrades or decommissioning.	No
2. The national entity responsible for ICZM undertakes periodic monitoring and maintenance work of existing conventional coastal infrastructure (monitoring at least every three years).	Yes

<sup>16</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69269/climate-resilient-infrastructure-full.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69269/climate-resilient-infrastructure-full.pdf)

3. The national entity responsible for ICZM undertakes periodic monitoring of the natural (green) infrastructure which are or have been a subject of a coastal project to assess function and integrity (monitoring at least every three years).	No
4. Evaluating the effectiveness of built coastal protection investments – temporal data on storm conditions and storm surge / water height are combined with information on coastal flooding to evaluate the effectiveness of built coastal protection structures. (Conducted within the past 5 years).	No
5. Evaluating the effectiveness of natural (green) coastal protection investments – temporal data on storm conditions and storm surge / water height are combined with information on coastal flooding to evaluate the effectiveness of investment in green infrastructure (such as mangroves, coral reefs, sand dunes, etc.) (Evaluation conducted within the past 5 years).	No

Unfortunately, Belize fails on most of the five criteria (score 0.20; See Table 19 and for more details Annex A *Table A-3C*). In terms of Achievements: Though there are currently no standards or metrics for evaluating infrastructure, and no legal code for infrastructure, the Ministry of Works (MoW) is interested in collaborating with the Central Building Authority to develop a guide or code for infrastructure development in coastal areas. This is something currently being planned under an existing MoW project. Once drafted, this guide or code will be submitted to the Government's Cabinet for approval. There is a preference for having a code instead of a guide since guides are not enforceable. The MoW, moreover, has a mandate for roads and highways throughout the country, including monitoring of roads, bridges and highways within the coastal areas, and does undertake periodic monitoring. The CZMAI undertakes monitoring of natural (green) infrastructure – but only when assessing feasibility of development projects. Once proposed projects are greenlighted, however, CZMAI does not carry out repeat monitoring. The feasibility monitoring is carried out via CZMAI's participation on the National Environmental Appraisal Committee which is chaired by the Department of Environment. In terms of gaps: Standards and metrics for monitoring coastal infrastructure do not yet exist; The national entity responsible for ICZM, CZMAI, does not do routine monitoring of natural coastal infrastructure, and there is no evaluation of effectiveness of built and natural coastal protection investments, and there is no national approach for addressing it.

**4: Financing ICZM**

This category focuses on evaluating whether there are adequate financial resources available to implement relevant ICZM activities. Funding sources for coastal management agencies vary by country, but sources of funding can include annual budget allocations, taxes, dedicated fees (e.g. for marine protected areas), maintenance funds, etc.<sup>17</sup> These domestic sources of financing can be complemented by external funds (e.g., from development finance institutions), most appropriately for capital investments.

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<sup>17</sup> Ehler, Charles, and Fanny Douvère. Marine Spatial Planning: a step-by-step approach toward ecosystem-based management. Intergovernmental Oceanographic Commission and Man and the Biosphere Programme. IOC Manual and Guides no. 53, ICaM Dossier no. 6. Paris: UneSCO. 2009 (english). Printed by imprimerie Celer-91550 Paray Vieille Poste (IOC/2009/MG/53) © UneSCO IOC 2009

Three indicators were assessed under this category, receiving an average category score of 0.53 (53%) (See Table 20). Of the three indicators, Belize scored very well on Access to International Development Finance for climate adaptation (1.0), where it has accessed external sources of finance to support ICZM, including from development finance institutions, climate funds, and private foundations. In support of this, Belize has in place relevant focal points/designated authorities and accredited entities to facilitate access to international funds. Belize achieves a moderate score (0.6) on having sustainable sources of financing to foster effective ICZM, including both operating costs and capital investments. There is no strategy or policy in place to finance ICZM, nor is there a requirement for estimating the financial needs for ICZM. ICZM-related projects are not categorized as an indicative budget line within annual government budgets but collected marine protected area (MPA) fees (e.g., from visitation) are used to support MPA management, which is a part of ICZM. And finally, like much of the LAC region, Belize is not providing financial incentives or schemes to incentivize private action aligned with ICZM and climate adaptation (scoring 0.0 for that indicator).

*Table 20 - Indicator Scores for Category 4 - Financing ICZM*

		Average Category Score	
<b>4 Financing ICZM</b>		0.53	
a.	Sustainable Funding for ICZM Operations		0.60
b.	Access to International Development Finance		1.00
c.	Financial Incentives and Schemes to Incentivize Private Action		0.00

#### 4A. Sustainable Funding for ICZM Operations

Successful ICZM requires sustainable sources of financing to cover operating costs as well as capital investments<sup>18</sup>. Adequate and predictable government financing is at the core of a permanent climate-resilient ICZM Program. This indicator evaluates whether there are sustainable sources of financing available for ICZM. This indicator has five criteria:

*Table 21 - Criteria Results for Indicator 4A - Sustainable Funding for ICZM Operations*

Criteria	Finding
1. ICZM regulatory framework includes strategy or policy for financing ICZM including an estimation of financial demand necessary for successful ICZM studies, planning, implementation /maintenance and M&E.	No
2. Annual government budget contains a dedicated (not discretionary) line item to support operating costs of government entities responsible for implementing ICZM.	No

<sup>18</sup> [https://www.ucc.ie/research/crc/papers/ICZM\\_Report.pdf](https://www.ucc.ie/research/crc/papers/ICZM_Report.pdf)



3. In the most recent fiscal year, the government (e.g., ministry of finance) dispersed the annual budget allocation to support operating costs of government entities responsible for implementing ICZM.	Yes
4. The government makes use of dedicated fees (e.g., for marine protected areas) to raise funding to support ICZM.	Yes
5. The government dispersed more than 50% of the dedicated fees collected (described in 4.a.4) in direct financial support to marine protected areas (MPAs) or to the ICZM agency during the most recent fiscal year.	Yes

Belize currently achieves two of the five criteria (score 0.60; See Table 21 and for more detail Annex A *Table A-4A*). In terms of Achievements: On a positive note, the CZMAI receives an annual budget that supports approximately 25% of the core operating costs for ICZM. Also, MPA co-managers collect and use fees for MPA management. In terms of gaps: There is no strategy or policy in place to finance ICZM, nor is there a requirement for estimating the financial needs for ICZM. ICZM-related projects are also not categorized as an indicative budget line within annual government budgets. MPA fees (e.g., from visitation) do not support ICZM. The government does not make use of dedicated fees to help raise funds to support ICZM.

**4B. Access to International Development Finance**

In addition to funding at the national level, LAC countries can access external sources of finance to support ICZM. This includes, for example, resources from development finance institutions (e.g., World Bank, IADB, GEF), dedicated funds (e.g., climate funds such as the Green Climate Fund or Adaptation Fund), or private foundations. This indicator looks at whether Belize has the requisite institutions in place, and whether these institutions have knowledge on coastal zone activities. This indicator has four criteria.

*Table 22- Criteria results for indicator 4B - Access to International Development Finance*

Criteria	Finding
1. The country has accessed public international finance (loans, grants or other types of finance) for ICZM in the past (e.g., from multilateral development banks or bilateral aid agencies) within the last five years.	Yes
2. Country has accessed grant funding from private sources of finance for ICZM implementation (e.g., private foundations) in the last five years.	Yes
3. The country has accessed finance for coastal zone activities from multilateral climate funds and has not reached its funding cap for any of the climate funds (e.g., the Adaptation Fund or the Least Developed Countries Fund - LDCF).	Yes
4. The country has in place all relevant focal points/designated authorities and accredited entities for international funds and these have knowledge of ICZM.	Yes

Belize currently delivers on all four criteria (score 1.0; See Table 22 and for more detail Annex A *Table A-4B*). In terms of Achievements: Belize is experienced and well-positioned to access international finance. The country has accessed and benefited from public international finance such as the Adaptation Fund and the German Federal Ministry for Economic Cooperation and Development (BMZ). Belize has also accessed funds from private donors and multilateral climate funds. Belize has relevant designated authority/ focal points in place, as well as a national

implementing entity – the Protected Areas Conservation Trust (PACT) accredited to the Green Climate Fund (GCF) and Adaptation Fund.

#### 4C. Financial Incentives and Schemes to Incentivize Private Sector and Individual Action

Public financial incentives and schemes for ICZM can encourage activities that align with ICZM and climate risk reduction and/or discourage those that are misaligned.<sup>19</sup> This indicator measures the degree to which a government has applied incentives to encourage actions that align with ICZM and climate adaptation. This indicator has three criteria:

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<sup>19</sup> Winnie W.Y.Lau, 2013. "Beyond carbon: Conceptualizing payments for ecosystem services in blue forests on carbon and other marine and coastal ecosystem services" in *Ocean & Coastal Management*. Volume 83, October 2013, Pages 5-14 (<https://doi.org/10.1016/j.ocecoaman.2012.03.011>)

*Table 23- Criteria Results for Indicator 4C - Financial Incentives and Schemes to Incentivize Private Sector and Individual Action*

Criteria	Finding
1. The government provides tax incentives for actions that support resilient ICZM activities (e.g., restoration of mangroves or sand dunes).	No
2. There exist government-supported grant programs to fund ICZM efforts.	No
3. The government provides concessional finance (e.g., loans, equity) to support climate-compatible ICZM investments by private actors.	No

Belize does not currently achieve any of the 3 criteria (score 0; See Table 23 and for more detail *Table A-4C*). In terms of gaps: At present, there are no tax incentive schemes to support resilient ICZM activities. There are no government grants for ICZM efforts, although PACT provides some support for MPA management.

**Summary of Results for Belize**

Evaluation of the 15 indicators across four categories reveals that while Belize is performing well in some areas, there are other key areas that need addressing to foster effective climate-resilient ICZM. Belize’s highest category score was 0.59 for Assessing Climate Risks in the Coastal Zone. Within this category, Belize is performing reasonably well with regards to collecting environmental data, conducting and using climate vulnerability and risk assessments, and regularly doing environmental assessments. The greatest hindrance in this category is the lack of a fully-integrated data hub for sharing data and information on climate, risk, and the coastal environment. The three other categories had scores under 0.50. They were 0.47 for Financing ICZM, 0.44 for Legal and Institutional Framework for ICZM and Climate Preparedness, and 0.42 for Identifying Adaptation Opportunities and Protecting Investment. The Legal and Institutional Framework for ICZM (category score of 0.47) was helped by the strength of the ICZM national regulatory framework and the regulatory environment for coastal development but was hindered by the lack of a national regulatory framework for climate change adaptation and DRM, and weak institutional coordination among ICZM, CCA, and DRM. Within the category Identifying Adaptation Options and Protecting Investments (category score 0.42), Belize is reasonably effective at identifying solutions to reduce risk from climate change and has most of the requisite skills. Belize is, however, weak on M&E of coastal investments. In terms of Financing ICZM (category score 0.47), Belize has good experience accessing international development finance, but has not been strong on providing sustainable funding for ICZM operations, or on providing financial incentives to promote private sector action. All indicator and category scores are presented in Table 24.

Table 24 - Summary of Climate Resilient ICZM Indicator Scores for Belize – as of January 2019

		Average Category Score	Indicator Score
<b>1 Legal and Institutional Framework for ICZM and Climate Preparedness</b>		0.40	
a.	Status of National ICZM Regulatory Framework		0.75
b.	Status of National Regulatory Framework on Climate Change Adaptation and Disaster Risk Management		0.25
c.	Regulatory Environment for Coastal Development		0.60
d.	Interagency Coordination of Entities Relevant to ICZM, DRM and Climate Change		0.40
e.	Institutional Responsibility for Monitoring and Evaluation of ICZM Activities and Projects		0.00
<b>2 Assessing Climate Risks in the Coastal Zone</b>		0.62	
a.	Data on Environmental Condition and Trends in Coastal Areas		0.53
b.	Shared Information Platform		0.47
c.	Climate Vulnerability and Risk Assessment		0.65
d.	Timeliness of Data and Assessments		0.83
<b>3 Identifying Adaptation Opportunities and Protecting Investments</b>		0.49	
a.	Identifying ICZM-related Responses to Climate Change		0.67
b.	Skills and Experience Developing and Evaluating Adaptation Solutions		0.60
c.	Monitoring and Protecting Investments in Infrastructure		0.20
<b>4 Financing ICZM</b>		0.53	
a.	Sustainable Funding for ICZM Operations		0.60
b.	Access to International Development Finance		1.00
c.	Financial Incentives and Schemes to Incentivize Private Action		0.00

Results from application of the 15 indicators of climate-resilient ICZM point to some areas where Belize could improve performance.

Within **Category 1 - Legal and Institutional Framework for ICZM and Climate Preparedness:**

Belize has a solid ICZM regulatory framework and regulatory environment for coastal development, but would benefit from:

- (1B) A national regulatory framework for climate change adaptation and DRM.
- (1D) Stronger interagency coordination of entities relevant to ICZM, DRM and climate change- There is a need for stronger engagement/coordination on coastal risk management between the CZMAI, the National Climate Change Office (NCCO) and the National Emergency Management Organization (NEMO). Currently, this is only being done on an ad hoc basis or as the need arises. This criterion, however, received a low score because it evaluates mandates for collaboration under legislation which does not currently exist in Belize.
- (1E) Stronger institutional responsibility for monitoring and evaluation of ICZM activities and projects - The CZM Act and other legislation and regulations relevant for coastal development do not mandate the integration of climate hazard analysis in planning and project implementation. For example, the Tourism Master Plan and Land Use Plans should be updated to reflect sustainability considerations and the impact of sea-level rise.
- Other recommendations:
  - Strengthen capacity for effective appraisal of public investment, climate screening projects and monitoring, for example, within the Ministry of Finance and other relevant ministries.
  - Pass a Procurement Law which reflects international green, resilience or sustainability standards.

Within **Category 2 - Assessing Climate Risks in the Coastal Zone:**

Belize is doing a good job collecting environmental data, conducting and using climate vulnerability and risk assessments, and regularly doing environmental assessments. However, Belize still needs:

- (2A) More thorough collection of data on environmental condition and trends in coastal areas – There is a lack of information on critical indicators such as fisheries bycatch, coastal water quality and physical shoreline change, which are very important for analyzing and understanding threats to ecosystems.
- (2B) Integration of existing databases into a truly integrated information hub– Several independent databases exist for Belize which, if connected, could support integrated information sharing for coastal areas, including spatial and numerical datasets, and reports. Completing construction of the National Spatial Data Infrastructure (BNSDI) could serve this function.
- (2C) A more integrated approach to Climate Vulnerability and Risk Assessment (VRA) – VRAs carried out thus far do not integrate important parameters, such as wind damage, and existing and perceived impacts to climate change on coastal development, marine transportation, demographic and social factors, public service, and availability of

construction material. Belize would also benefit from development of a damage and loss data collection and reporting system, systematized across all ministries.

Within **Category 3- Identifying Adaptation Opportunities and Protecting Investment:**

Belize has been reasonably effective in using information to identify solutions to reduce risk from climate change. However, Belize needs to:

- (3B) Build capacity for climate screening of infrastructure investment and improve skills and experience developing and evaluating adaptation solutions – There is a lack of focus on conducting or evaluating cost-benefit analysis as a tool for comparison of options, and no national standards or regulations to facilitate this. There is no proactive approach to conducting or evaluating studies on effectiveness of natural infrastructure to inform risk reduction.
- (3C) Have stronger focus on monitoring and protecting investments in infrastructure – Belize is not using any standards or metrics for monitoring and evaluating the integrity of coastal infrastructure and operations, nor for upgrades or decommissioning. There is no national entity undertaking periodic monitoring of natural (green) infrastructure to assess function and integrity after they have been subjected to or impacted by development; and no entity routinely evaluates built and green infrastructure investments.

Within **Category 4 - Financing ICZM:**

Belize has good experience accessing international development finance, but would benefit from:

- (4A) Building sustainable funding for ICZM operations - Although there is a rough estimate for the expected costs for effective ICZM (i.e. US \$500K/yr.), the ICZM regulatory framework does not integrate a strategy or policy to support financing for ICZM.
- (4C) Institutionalizing financial incentives and schemes to incentivize private action on ICZM - Belize is not currently employing tax incentives for actions that support resilient ICZM activities nor is the government supporting grant programs to fund ICZM efforts. Additionally, there are no concessional finance opportunities (e.g., loans, equity) to support climate-compatible ICZM investments by the private sector. The government could benefit from using one or more of these tools to support ICZM.
- Other recommendations:
  - Reform budget classification and reporting to identify and account for disaster- and climate-related spending.
  - Formalize a disaster risk management and climate resilience financing strategy and implementation plan, including clarifying budget processes and engaging with development partners on financing modalities.
  - Develop, refine and explore, with consideration of climate risks, enabling legal documents such as building codes and private public partnership arrangements for the coastal zone.

## Recommendations for Belize

The application of the set indicators has identified several areas where Belize could improve its climate-resilient ICZM. Belize should aim to address the shortcomings identified through the application of these indicators to improve climate resilience within its coastal zone. Once progress is made, Belize may consider updating the results of this assessment– to track progress and remaining limitations over time.

Key short-term recommendations (or actions needed to be taken within 1-3 years) include:

- 1) Finalize revision of the CZM Act and develop corresponding regulations to guide implementation of the ICZM Plan and regional management guidelines.
- 2) Explore feasibility of legal enactment of stricter development code of covenants for development on privately owned lands within marine protected areas; aspiration should be for development to occur in harmony with the environment.
- 3) Seek public-private opportunities for sustainable management of the coastal zone, including wiser development practices (voluntary green landscape development options) and conservation investment.
- 4) Harmonize climate (mitigation and adaptation), coastal development and land-use policies, programmes, plans and projects to better meet climate and sustainable development goals and targets, including stronger investment in nature-based solutions for risk reduction and resilience.
- 5) Prioritize development and enactment of a Climate Change Act to have a clear and binding framework for addressing climate change risks and vulnerabilities, adaptation and resilience, including for the coastal zone and interlinked sectors.
- 6) Consider formally adding representation from both the National Climate Change Office (NCCO) and the National Emergency Management Organization (NEMO) as members on the CZM Coastal Advisory Council. CZMAI, NCCO and NEMO should also collaborate more closely on climate and risk reduction initiatives for the coastal zone (e.g., through programs and projects, and national planning).
- 7) Invest in a national level roll-out of the CZMAI's community 'watch dog' warning systems with user-friendly frameworks (phone, online, etc.) for reporting on development violations in the coastal zone. Such should include clearly defined mechanism and methodology for validating reports against data from regulatory agencies.
- 8) Use the criteria and guidance highlighted for indicator 2A (*Data on Environmental Condition and Trends in Coastal Areas*) to help prioritize data collection targets to monitor and address climate risks for the next 5 years, as major gaps still exist.
- 9) Proactively encourage entities to use the BNSDI to house the varied datasets stored in isolated data storage platforms. The BNSDI could function for what it was designed for - a national information hub. The BNSDI should also be better funded and have a clear work plan to integrate information.

Key medium-term recommendations (or actions needed to be taken within 4-6 years) include:

- 10) Make climate-hazard analysis a requirement to be addressed within the environmental impact assessments regulations.

- 11) Set aside a set percentage of the country's GDP for the execution of its climate response strategy and plan.
- 12) Invest in the installation of flood and tide gauges at key locales along Belize's coast.
- 13) Invest in conducting, evaluating, or building capacity to do cost-benefit analysis of adaptation solutions.
- 14) Invest in conducting/evaluating studies on effectiveness of natural infrastructure (green infrastructure solutions).
- 15) Develop and enact standards and metrics for monitoring and evaluating different coastal infrastructure types (traditional, hybrid or nature-based).
- 16) Develop and enact standards or codes for climate-smart built coastal protection investments.
- 17) Invest in sustainable financing mechanism for ICZM, for example, through implementation of financial incentives to encourage ICZM action, including implementation of fees, taxation systems, and concessional finance mechanisms that award private action on ICZM, and payment for ecosystem service schemes, among others.



## Appendix A. Indicator Tables and Criteria Details

### Tables for Category 1 - Legal and Institutional Framework for ICZM and Climate Preparedness

Table A-1A: Findings for Indicator 1A - Status of National ICZM Regulatory Framework

Ranking Criteria	Response	Main Finding Supporting Response
<p>1. ICZM-specific or inclusive legislation has been approved, which designates a lead agency.</p>	<p>Yes</p>	<p>An ICZM legal instrument should provide a broad framework for coordinating uses of coastal resources, including regulations, permits, environmental assessment, and development planning, operating through administrative process. There is not an ICZM-specific legislation in existence for Belize but there is a CZM Act enacted to foster coastal zone management that <i>“includes the conservation of the Barrier Reef and other coastal resources, and the planning, management and sustainable development of resources within the coastal zone”</i>.</p> <p>The CZM Act designates a lead agency to foster CZM as per below. Coastal Zone Management (CZM) Act 1998 <i>revised edition 2000, CHAPTER 329, Section 3</i> calls for the establishment of the Coastal Zone Management Authority</p> <p>Coastal Zone Management (CZM) Act 1998 <i>revised edition 2000, CHAPTER 329, Section 6</i> calls for the establishment of an Advisory Council</p> <p>Coastal Zone Management (CZM) Act 1998 <i>revised edition 2000, CHAPTER 329, Section 8</i> calls for the establishment of a Coastal Zone Management Institute (as the technical arm)</p> <p>Coastal Zone Management (CZM) Act 1998 <i>revised edition 2000, CHAPTER 329, Section 14</i> calls for the establishment of a Board of Directors.</p> <p>The Act laid out the functions of each but does not call for/integrates CZM regulations and permitting.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1a: <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a></li> </ul>

<p>2. Legislation designates sectoral competencies, including at least 75% of the following agencies listed - an agency responsible for environment, planning, public works, and fisheries.</p>	<p>Yes</p>	<p>The Coastal Zone Management Act 1998 <i>revised edition 2000</i>, CHAPTER 329, Sections 6 and 15 spells out the sectoral players that should be at the table in terms of monitoring, coordination, decision-making, and evaluation of policies that guide what should happen in the coastal zone. Section #6 describes the required composition of the CZM Advisory Council and Section #15 describes the required constitution of the Board of Directors.</p> <p>The aim is for management to be integrated with all relevant permitting agencies having a role to play to help guide ICZM. Includes entities with mandate to lead on environment (Environmental Protection Act), physical planning (Lands Act), fisheries (Fisheries Act, Chapter 210 (Revised Edition 2000)). Public Works, however, is not currently included.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Folder Indicator 1a: <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a></li> <li>• CZMAI's website- <a href="http://www.coastalzonebelize.org">www.coastalzonebelize.org</a></li> </ul>
<p>3. Legislation establishes collaboration with the agency responsible for climate change adaptation.</p>	<p>No</p>	<p>The Coastal Zone Management Act 1998 revised edition 2000, CHAPTER 329 does not establish collaboration with the agency responsible for climate change adaptation (CCA). The National Climate Change Office (NCCO) is the national entity responsible for coordinating implementation of climate change adaptation and mitigation actions and programmes; however, there is not a legislation in place to foster climate change adaptation in country nor that establish collaboration between Coastal Zone Management Authority and Institute (CZMAI) and NCCO.</p> <p>A need for stronger engagement between the CZMAI and the NCCO was flagged during interviews held with representatives from both entities. It was mentioned that the government is trying to address this on a case by case basis (as the need arises).</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Feedback received during interviews with CZMAI and NCCO. February 2019.</li> </ul>
<p>4. Legislation establishes a process for public participation, review and comment on the ICZM planning process and on the approval of coastal development public-investment projects. ("Public" includes citizens, community groups, as well as</p>	<p>Yes</p>	<p>The Coastal Zone Management Act 1998 revised edition 2000, CHAPTER 329 Section 23-1e allows "for the improvement of public education as well as public participation in management of coastal resources". Section 23-2 calls for consultation on the CZM Plan "with all affected governmental agencies, statutory bodies, non-governmental organizations and the private sector". Section 23-3 calls for consultation with the public on the CZM Plan.</p>

stakeholders with vested economic interests.)		<p>Given the above, the CZM Act does seem to establish a process for public participation and review and comment on CZM planning processes In addition, If the coastal development project needs to get clearance via the Department of Environment (DOE), then DOE would invite CZMAI to provide inputs since they are a member of the national environmental appraisal committee.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder 1 Indicator a: <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a></li> </ul>
5. A coastal zone management plan has been officially published.	Yes	<p>An Integrated Coastal Zone Management Plan for Belize (ICZMP) was published in 2016.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1a: <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a></li> <li><a href="https://www.coastalzonebelize.org/wp-content/uploads/2015/08/BELIZE-Integrated-Coastal-Zone-Management-Plan.pdf">https://www.coastalzonebelize.org/wp-content/uploads/2015/08/BELIZE-Integrated-Coastal-Zone-Management-Plan.pdf</a></li> </ul>
6. Regulations have been officially published to implement the ICZM plan.	No	There are no regulations to implement the ICZM Plan.
7. Regulations establish a system of penalties to public and private entities when ICZM-related regulations are violated.	Yes	<p>There are no ICZM-related regulations to allow for this, however, while not currently reflected within the CZM Act, there are regulations that mandate other permitting agencies to regulate development issues in the coastal zone. For example, the Department of Environment (DOE) is mandated through the Environmental Protection Act 2000, CHAPTER 328 to develop and enforce regulations, including within the coastal zone. Such regulations establish a system of penalties when violated (see Environmental Protection Act 2000 revised edition, <i>CHAPTER 328 Section 22</i>).</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1a: <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a>;</li> <li><a href="http://www.doe.gov.bz/index.php/about-us/objectives">http://www.doe.gov.bz/index.php/about-us/objectives</a></li> </ul>
8. A system for reporting violations of ICZM or related regulations is in place	Yes	The Environmental Protection Act 2000, CHAPTER 328, Section 27 allows for the reporting of violations to the Department of Environment. The Department has an

		<p>Environmental Enforcement &amp; Compliance Monitoring Unit to which reports of violations should be submitted.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Folder Indicator 1a:  <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a>;</li> <li>• <a href="http://www.doe.gov.bz/index.php/about-us/organizational-structure">http://www.doe.gov.bz/index.php/about-us/organizational-structure</a></li> </ul>
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Table A- 1B: Findings for Indicator 1B - Status of National Regulatory Framework on Climate Change Adaptation and Disaster Risk Management

Ranking Criteria	Response	Main Finding Supporting Response
1. National legislation to implement DRM has been officially published (not only for an emergency preparedness. See the definition of DRM).	No	<p>According to IDB (<a href="https://riskmonitor.iadb.org/">https://riskmonitor.iadb.org/</a>), effective DRM legislation should include all components necessary for DRM: - risk identification (technical/academic aspect); risk reduction (engineering aspect); emergency assistance, rehabilitation and reconstruction planning (preparedness and response aspect); and financial protection (financial aspect).</p> <p>A Disaster Preparedness and Response (DPR) Act 2000, CHAPTER 145 exists for Belize that sets out the structure, functions and procedure for disaster management (preparedness and response) in country. It calls for creation of the National Emergency Management Organization (NEMO) and a national emergency coordinator and their functions (Sections 3 and 4); calls for a national DPR advisory committee (Sections 6), DPR policy review and DRP Plan (Sections 7 and 8); identification of especially vulnerable areas and preparation of precautionary plan for such areas (Sections 15 and 16); among others.</p> <p>The Disaster Preparedness and Response (DPR) Act 2000, CHAPTER 145 does not clearly include rehabilitation and reconstruction planning, and financial protection. On this basis, the legislation is not comprehensive enough.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Folder Indicator 1b:  <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a></li> </ul>

<p>2. There is also an officially published national policy or legislation focused on climate change adaptation.</p>	<p>Yes</p>	<p>A National Climate Change Policy, Strategy and Action Plan (NCCPSAP) to address climate change in Belize was approved 2014. Section 7 addresses the strategy and action plan, including for climate change adaptation. This policy considers both adaptation and mitigation with the goal of guiding short, medium and long-term processes for adaptation and mitigation to climate change.</p> <p>In Section 4 of the NCCPSAP, states that there is a need for legislative and institutional framework to support the NCCPSAP.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1b: <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a></li> </ul>
<p>3. National regulations on DRM coordinate with related standards on climate change adaptation, integrated water resources management, and land use planning.</p>	<p>No</p>	<p>The Disaster Preparedness and Response (DPR) Act 2000, CHAPTER 145, Section 6 calls for a National Disaster Preparedness and Response Advisory Committee. The Committee includes representation from public health, environment, public works, among others but it does not call for the coordination of related standards on climate change adaptation, integrated water resources management, and land use planning.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1b: <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a></li> </ul>
<p>4. National policy / legislation on both DRM and climate change adaptation establishes a process for public participation, review and comment in the development of disaster risk management and / or climate adaptation plans.</p>	<p>No</p>	<p>Disaster Preparedness and Response (DPR) Act 2000, CHAPTER 145 Section 4-2g calls for programmes to be conducted for public information sharing and education <i>“on the mitigation of, preparedness for, response to and recovery from emergencies and disasters”</i>. Section 17 and 18, and Schedule A of the Act also calls for public inputs relating to development of special area precautionary plans.</p> <p>National Climate Change Policy, Strategy and Action Plan (NCCPSAP) 2014, Section 5.4, calls for national sectors to be adequately prepared to address the negative impacts of global climate change; and encourages private and public sectors to invest in climate change adaptation and mitigation initiatives. Section 6-K calls for an aggressive, innovative and on-going public awareness programme that targets all sectors in Belize. NCCPSAP, however, does not clearly establish a process for public participation, review and comment in the development of climate adaptation plans nor disaster risk management.</p>

		<p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1b:  <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a></li> </ul>
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Table A-1C: Findings for Indicator 1C- Regulatory Environment for Coastal Development

Ranking Criteria	Response	Main Finding Supporting Response
1. The regulations that standardize the carrying out of environmental impact assessments (or equivalent process) integrate climate-hazard analysis.	No	<p>Belize’s Environmental Impact Assessment Regulations do not currently integrate climate-hazard analysis.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1c: Review of EIA Regulations in  <a href="https://drive.google.com/drive/folders/17wnRNR1SPB4fY44oC2Lhg_8y1mamWYA?usp=sharing">https://drive.google.com/drive/folders/17wnRNR1SPB4fY44oC2Lhg_8y1mamWYA?usp=sharing</a></li> <li><a href="http://www.doe.gov.bz/index.php/component/content/article?id=75:environmental-clearance-process">http://www.doe.gov.bz/index.php/component/content/article?id=75:environmental-clearance-process</a></li> </ul>
2. The regulations that standardize the carrying out of project impact assessments (or equivalent process) prior to project implementation require evaluation of social and environmental impacts.	Yes	<p>Environmental Impact Assessment (Amendment) Regulations 2007, Statutory Instrument 24 of 2007, Section 2 (4<sup>th</sup> paragraph) stipulates that impact assessment should address environmental, social and economic impacts of propose developments.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1c:  <a href="https://drive.google.com/drive/folders/17wnRNR1SPB4fY44oC2Lhg_8y1mamWYA?usp=sharing">https://drive.google.com/drive/folders/17wnRNR1SPB4fY44oC2Lhg_8y1mamWYA?usp=sharing</a></li> </ul>
3. The National Development Plan (or equivalent instrument) contains objectives, targets and / or indicators about climate risk reduction and / or climate resilience.	Yes	<p>Belize’s Growth and Sustainable Development Strategy (2016-2019), Horizon Development Vision2030 (2010-2030) and National Climate Resilient Investment Plan (2013) contain climate risk reduction/resilience targets/indicators.</p> <ul style="list-style-type: none"> <li>Growth and Sustainable Development Strategy 2016-2019, Section 3.1.3 stipulates the planned actions for disaster risk management and climate change resilience.</li> <li>Horizon Development Vision2030 (2010-2030) embodies the vision for Belize in the year 2030 and the core values that are to guide citizen behavior and inform the strategies to achieve this common vision for the future. It represents the consolidated views of many stakeholders and has a clear strategic focus on social and economic development.</li> </ul>

		<ul style="list-style-type: none"> <li>National Climate Resilient Investment Plan, 2013, Section B climate resilience targets. 'The overall goal of the NCRIP is to improve the resilience of the people, the economy and the environment of Belize to the effects of climate change, climate variability, weather, and natural hazards by strengthening the capacity of the national and local governments, private sector, and civil society to cope with the ever increasing climate and weather related hazards' (mentioned on page #75). Describes key climate risk and vulnerability context for Belize. Some adaptation objectives are provided on page 66. Key results, measures of success and methods of assessment are provided on pages 7 -77. Risk and resilience measures are also provided (pages 78-83).</li> </ul> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1c: <a href="https://drive.google.com/drive/folders/17wnRNR1SPB4fY44oC2Lhg_8y1mamWYA?usp=sharing">https://drive.google.com/drive/folders/17wnRNR1SPB4fY44oC2Lhg_8y1mamWYA?usp=sharing</a></li> </ul>
4. Regulations establish a system of penalties to public and private entities when coastal development-related regulations are violated.	Yes	<p>There are no ICZM regulations in place under the CZM Act, but other permitting agencies (such as the Department of Environment) have regulations that task them with the mandate to implement penalties for contravention of regulations related to development in the coastal zone.</p> <ul style="list-style-type: none"> <li>Environmental Protection Act 2000, CHAPTER 328, Sections 9, 18, 46, 50-2, 55-2, 57-2, 58-2</li> </ul> <p>Environmental Impact Assessment (Amendment) Regulations 2007, Section 22A-4.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1c: <a href="https://drive.google.com/drive/folders/17wnRNR1SPB4fY44oC2Lhg_8y1mamWYA?usp=sharing">https://drive.google.com/drive/folders/17wnRNR1SPB4fY44oC2Lhg_8y1mamWYA?usp=sharing</a></li> </ul>
5. The lead agency for ICZM has defined priority (or critical) areas for coastal management.	No	<p>To facilitate management of Belize's coastal zone, the coast was divided into 9 management regions (north to south) as reflected within Belize Integrated Management Plan 2016 and there are management guidelines for each of the planning regions which are synced to ICZM Plan. There are, however, no defined priority (or critical) areas defined within the management regions for coastal management.</p> <p>Sources:</p>

		<ul style="list-style-type: none"> <li>Folder Indicator 1c:  <a href="https://drive.google.com/drive/folders/17wnRNR1SPB4lfY44oC2Lhg_8y1mamWYA?usp=sharing">https://drive.google.com/drive/folders/17wnRNR1SPB4lfY44oC2Lhg_8y1mamWYA?usp=sharing</a> </li> </ul>
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Table A-1D - Findings for Indicator 1D- Interagency Coordination of Entities Relevant to ICZM, DRM and Climate Change Adaptation

Ranking Criteria	Response	Main Finding Supporting Response
1. An inter-institutional framework for ICZM has been officially established.	Yes	<p>Inter-institutional framework exists via the mandated functions of a CZM Board (Section 14 of CZM Act 2000) and Coastal Advisory Council (Section 6 of the CZM Act 2000); Coastal Zone Management Act 1998 revised edition 2000, CHAPTER 329.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1a:  <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a> </li> </ul>
2. The framework includes the agency(ies) responsible for DRM and climate change adaptation.	No	<p>Framework does not include the National Emergency Management Organization (DRM agency) nor the National Climate Change Office (climate change agency). At the CZM Board level, the Ministry responsible for CC is included but not DRM. All three entities (CZMAI, NEMO and NCCO) recommend that NEMO and the NCCO be included within the framework even if it is only as the need arises. Disaster Preparedness and Response Act CHAPTER 145 Revised Edition 2000, Section 3 and 4 calls for the creation of NEMO and a National Coordinator for <i>“coordinating the general policy of the Government of Belize relating to the mitigation of, preparedness for, response to, and recovery from emergencies and disasters in Belize”</i>.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Indicated through interviews with CZMAI (Chantalle Samuels and Arlene Young), NEMO (Colin Gillett) and NCCO (Johanna Pacheco).</li> </ul>
3. Actions of the framework includes provisions for technical-information sharing mechanism necessary for ICZM development planning decision making, and relevant agencies/entities share data for this purpose.	Yes	<p>Coastal Zone Management Act 1998 revised edition 2000, CHAPTER 329, Section 8 calls for the creation of the Coastal Zone Management Institute. Section 10e stipulates one of its being an <i>“information center for the collection and dissemination of information relating to economic, social, technological, scientific, environmental and legal developments in the marine areas and coastal zones”</i>.</p> <p>Sources:</p>



		<ul style="list-style-type: none"> <li>Folder Indicator 1d:  <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a> </li> </ul>
4. Relevant agencies/entities meet regularly (at least twice per year) to discuss and make joint planning decisions or development monitoring plans on climate-related ICZM.	No	Relevant agencies do not meet regularly to discuss and make joint planning decisions or development monitoring plans on climate-related ICZM.
5. The relevant agencies/entities develop joint multi-year work plans to coordinate and collaborate on assessing and addressing climate-related risks in coastal areas.	No	Relevant agencies/entities do not develop joint multi-year works plans to coordinate and collaborate on assessing and addressing climate-related risks in coastal areas.

Table A-1E - Findings for Indicator 1E - Institutional Responsibility for Monitoring and Evaluation of ICZM Activities and Projects

Ranking Criteria	Response	Main Finding Supporting Response
1. Regulations assign a public or academic entity or a third party to undertake independent monitoring during implementation of ICZM-related projects.	No	<p>The Regulations do not assign a public or academic entity or a third party to undertake independent monitoring during implementation of ICZM-related projects.</p> <p>The Coastal Zone Management Act 1998 revised edition 2000, CHAPTER 329 calls for the Coastal Advisory Council to advise the CZM Institute on technical and other related matters; formulate draft policies, plans and programmes relating to coastal zone; and review the Coastal Zone Management Plan, (Section 7 of CZM Act) but the Act does not go so far as to assign an entity to undertake independent monitoring during ICZM-related projects.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator ?:  <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a> </li> </ul>
2. Regulations assign a public or academic entity or a third party to undertake independent technical performance	No	There are no regulations that assign a public or academic entity or a third party to undertake independent technical performance evaluations at the end of ICZM-related projects.

evaluations at the end of ICZM-related projects.		<p>The Coastal Zone Management Act 1998 revised edition 2000, CHAPTER 329, Section 23-9 mandates that the ICZM Plan must be updated every 4yrs. Section 10 of the Act calls for the Plan to be implemented by governmental and non-governmental agencies responsible for aspects of the Plan. Section 11 states that the CZM <i>“Authority shall, in consultation with all affected governmental and non-governmental agencies, monitor the implementation of the Plan”</i>.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 1a: <a href="https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing">https://drive.google.com/drive/folders/1RMT1nPeywcQ48pGiOA-JV6CMbXACxC30?usp=sharing</a></li> </ul>
3. Regulations mandate the project monitoring results are presented to the ICZM authority at regular intervals (at least annually) and inform updates to management plans.	No	<p>Progress updates are provided on a quarterly basis but there are no regulations that mandate that project results be integrated within updated plans.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Feedback received from interviews with Arlene Young (Director, CZMI) and Chantalle Samuels (CEO, CZMA)</li> </ul>

## Tables for Category 2 - Assessing Climate Risks in the Coastal Zone

Table A-2Ai - Findings for Indicator 2A - Spatial extent (and density) of coverage of assessment

<b>Environmental / Ecological Variable</b>	<b>Response</b>	<b>Main Finding Supporting Response</b>
a. Coral reef condition	Covers all “critical” areas	<p>Coral reef condition information is collected within marine protected areas by MPA staff (limited to MPA boundary). In addition, coral reef condition information is collected for some additional areas by the Healthy Reefs Initiative (HRI).</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Indicated during interview with Andrea Rosado, CZMAI's GIS Manager</li> <li><a href="http://www.healthyreefs.org/cms/">http://www.healthyreefs.org/cms/</a></li> </ul>
b. Mangrove extent	Monitored across Country at Adequate Density	<p>Datasets exist in the CZMAI's Data Center that depict Belize's national mangrove cover (for the years 1980, 1989, 1994, 2000, 2004, and 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017).</p>

		<p>Sources:</p> <ul style="list-style-type: none"> <li>• Cherrington, E. A., Griffin, R. E., et al. 2018. An assessment of changes in mangrove cover across the Belize Barrier Reef Reserve System World Heritage Site: 1996-2017</li> <li>• Indicated during interview with Andrea Rosado, CZMAI's GIS Manager</li> </ul>
c. Sea grass extent	Single Location/ limited area	<p>Data collected within MPAs and target sites of <a href="http://www.seagrassnet.org/">http://www.seagrassnet.org/</a></p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="http://www.seagrassnet.org/">http://www.seagrassnet.org/</a></li> <li>• Belize State of the Coast Report, 2013</li> </ul>
d. Commercial fish stocks and condition (for at least 50% of commercial fish species)	Covers all "critical" areas	<p>Commercial fish stocks are monitored within MPAs (by MPA staff) as well as more broadly by the Healthy Reefs Initiative (HRI).</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="http://www.healthyreefs.org/cms/">http://www.healthyreefs.org/cms/</a></li> <li>• Indicated through interview with Adriel Castaneda, Fisheries Department</li> </ul>
e. Bycatch from fishing activities	Not Assessed	Bycatch from fishing is not monitored as a target.
f. Coastal water quality – bacteria	Not Assessed	Coastal water quality monitoring for bacteria is not monitored as a target.
g. Coastal water quality – nutrients	Single Location/ limited area	<p>Currently monitored on a limited scale (Belize River and eastward), however, in the past was carried out at somewhat national level by CZMAI</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Feedback received from interviews held with Andria Rosado, CZMAI's GIS Manager</li> <li>• <a href="https://www.coastalzonebelize.org/?s=water+quality+monitoring">https://www.coastalzonebelize.org/?s=water+quality+monitoring</a></li> </ul>
h. Physical shoreline change – coastal erosion / beach profile change	Single Location/ limited area	<p>Very limited information currently available and for one location - Sapodilla Cayes Marine Reserve.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="https://www.tandfonline.com/doi/abs/10.1080/02723646.2014.913932">https://www.tandfonline.com/doi/abs/10.1080/02723646.2014.913932</a></li> </ul>
i. Waves and surge – tides, wave height, storm surge	Single Location/ limited area	<p>Sea state (waves heights and surge), wind and tides monitored at 8 stations (representative of north, central, south and outlying cayes) are being monitored by Belize Meteorology Office.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="http://www.hydromet.gov.bz/forecasts/marine-forecast">http://www.hydromet.gov.bz/forecasts/marine-forecast</a></li> </ul>
j. Precipitation in coastal areas	Covers all "critical" areas	<p>The Belize Meteorology Office has weather stations along the coast at a number of locations: - Corozal region (2), Ambergris Caye (1), Belize City/Ladyville region (3 - Port Authority,</p>

		<p>Municipal Airstrip and International Airport), Dangriga (1), Placencia (1), Punta Gorda (1), and in South Water Caye Marine Reserve. This offers good coverage from north to south of the country. Data on precipitation, temperature, wind and solar radiation are collected.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="http://www.hydromet.gov.bz/about-us/index.php?option=com_content&amp;view=article&amp;id=10&amp;Itemid=17">http://www.hydromet.gov.bz/about-us/index.php?option=com_content&amp;view=article&amp;id=10&amp;Itemid=17</a></li> <li>• <a href="http://www.hydromet.gov.bz/observations/weather-station-data?station_id=122">http://www.hydromet.gov.bz/observations/weather-station-data?station_id=122</a></li> </ul>
k. Water temperature	covers all “critical” areas	<p>The Met Office monitors general sea surface temperature. Some MPAs also monitor sea surface temperature with temp loggers.</p> <p>Source:</p> <ul style="list-style-type: none"> <li>• <a href="http://www.hydromet.gov.bz/forecasts/marine-forecast">http://www.hydromet.gov.bz/forecasts/marine-forecast</a></li> <li>• Feedback Fisheries Department</li> </ul>

Table A-2Aii - Findings for Indicator 2A- *Temporal frequency of assessment*

<b>Environmental Ecological Variable</b>	<b>Response</b>	<b>Main Finding Supporting Response</b>
a. Coral reef condition	Info available for multiple time periods	<p>Coral reef condition is collected annually by marine protected areas staff of the Fisheries Department and co-management agencies such as Hol Chan, Belize Audubon Society, Toledo Institute for Development and Environment, Southern Environmental Association, among others. Reef condition is also monitored every two years since 2006 by the Healthy Reefs Initiative (HRI). Protocols used to monitor reef condition are the Manual of Methods for the MBRS Synoptic Monitoring Program (<a href="http://mbrs.doe.gov.bz/dbdocs/tech/SMPMan03.pdf">http://mbrs.doe.gov.bz/dbdocs/tech/SMPMan03.pdf</a>) and the Atlantic and the Gulf Rapid Reef Assessment (AGRRA) protocol (<a href="http://www.agrra.org/coral-reef-monitoring/">http://www.agrra.org/coral-reef-monitoring/</a>). Healthy Reefs Initiative uses AGRRA protocol as well.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Indicated during interview with Andria Rosado, CZMAI’s GIS Manager</li> <li>• <a href="http://www.healthyreefinitiative.org">www.healthyreefinitiative.org</a></li> <li>• Folder Indicator <span style="float: right;">2a:</span> <a href="https://drive.google.com/drive/folders/1c7CUUpUm8B_YXOVpl8KrRTchm8Z1ysrO0?usp=sharing">https://drive.google.com/drive/folders/1c7CUUpUm8B_YXOVpl8KrRTchm8Z1ysrO0?usp=sharing</a></li> </ul>

b. Mangrove extent	Info available for multiple periods for time	<p>National datasets exist for the years 1980, 1989, 1994, 2000, 2004, and 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017).</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="https://www.researchgate.net/project/An-assessment-of-changes-in-mangrove-cover-across-the-Belize-Barrier-Reef-Reserve-System-World-Heritage-Site-1996-2017">https://www.researchgate.net/project/An-assessment-of-changes-in-mangrove-cover-across-the-Belize-Barrier-Reef-Reserve-System-World-Heritage-Site-1996-2017</a></li> <li>• <a href="https://www.coastalzonebelize.org/wp-content/uploads/pdfs/mangroves.pdf">https://www.coastalzonebelize.org/wp-content/uploads/pdfs/mangroves.pdf</a></li> <li>• Folder Indicator 2a/bz_mangrove_type_2017: <a href="https://drive.google.com/drive/folders/1zTWrTeBOFIVzZg_YbPiyqlz_euOYRu3Q?usp=sharing">https://drive.google.com/drive/folders/1zTWrTeBOFIVzZg_YbPiyqlz_euOYRu3Q?usp=sharing</a></li> <li>• <a href="https://www.coastalzonebelize.org/wp-content/uploads/2014/10/State-of-the-Belize-Coastal-Zone-Report-2003-20134.pdf">https://www.coastalzonebelize.org/wp-content/uploads/2014/10/State-of-the-Belize-Coastal-Zone-Report-2003-20134.pdf</a></li> <li>• Folder Indicator 2a: <a href="https://drive.google.com/drive/folders/1c7CUUpUm8B_YXOVpl8KrRTchm8Z1ysrO0?usp=sharing">https://drive.google.com/drive/folders/1c7CUUpUm8B_YXOVpl8KrRTchm8Z1ysrO0?usp=sharing</a></li> <li>• Included in the CZMAI Data Center as mentioned during interview with Andria Rosado, CZMAI's GIS Manager</li> </ul>
c. Sea grass extent	Info available for multiple periods for time	<p>Sea grass extent was first monitored in 1997 and subsequently for 2001, 2011, 2013 and 2017. Source: Included in the CZMAI Data Center as mentioned during interview with Andria Rosado, CZMAI's GIS Manager</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="https://www.coastalzonebelize.org/wp-content/uploads/2014/10/State-of-the-Belize-Coastal-Zone-Report-2003-20134.pdf">https://www.coastalzonebelize.org/wp-content/uploads/2014/10/State-of-the-Belize-Coastal-Zone-Report-2003-20134.pdf</a></li> <li>• Folder Indicator 2a: <a href="https://drive.google.com/drive/folders/1c7CUUpUm8B_YXOVpl8KrRTchm8Z1ysrO0?usp=sharing">https://drive.google.com/drive/folders/1c7CUUpUm8B_YXOVpl8KrRTchm8Z1ysrO0?usp=sharing</a></li> </ul>

d. Commercial fish stocks and condition (for at least 50% of commercial fish species)	Info available for multiple periods time	<p>Commercial fish stocks have been monitored since 2006 by HRI, and constantly since 2000 for some MPAs, including Port Honduras Marine Reserve, Hol Chan Marine Reserve, Half Moon Caye Natural Monument, Glovers reef Marine Reserve, Laughing Bird Caye National Park. Among others.</p> <p>Source:</p> <ul style="list-style-type: none"> <li>• Included in the CZMAI Data Center as mentioned during interview with Andria Rosado, CZMAI's Data manager and Adriel Castaneda, MPA Coordinator, Fisheries Department;</li> <li>• <a href="http://www.healthyreefs.org/cms/">http://www.healthyreefs.org/cms/</a></li> <li>• <a href="https://www.coastalzonebelize.org/wp-content/uploads/2014/10/State-of-the-Belize-Coastal-Zone-Report-2003-20134.pdf">https://www.coastalzonebelize.org/wp-content/uploads/2014/10/State-of-the-Belize-Coastal-Zone-Report-2003-20134.pdf</a></li> <li>• Folder Indicator 2a: <a href="https://drive.google.com/drive/folders/1c7CUpUm8B_YXOVpl8KrRTchm8Z1ysrO0?usp=sharing">https://drive.google.com/drive/folders/1c7CUpUm8B_YXOVpl8KrRTchm8Z1ysrO0?usp=sharing</a></li> </ul>
e. Bycatch from fishing activities	None	Not monitored
f. Coastal water quality – bacteria	None	Not monitored
g. Coastal water quality – nutrients	Info available for multiple periods time	<p>Nutrient data for some coastal areas exists for 1992, 1993, 1994 and 1997 (22 sites dispersed north to south of Belize), 2016, 2017, and 2018 (offshore central Belize).</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="https://www.coastalzonebelize.org/?s=water+quality+monitoring">https://www.coastalzonebelize.org/?s=water+quality+monitoring</a></li> <li>• Included in the CZMAI Data Center as mentioned during interview with Andria Rosado, CZMAI's Data Manager</li> </ul>
h. Physical shoreline change – coastal erosion / beach profile change	Baseline Available	<p>Very limited information currently available for Sapodilla Cayes Marine Reserve</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="https://www.tandfonline.com/doi/abs/10.1080/02723646.2014.913932">https://www.tandfonline.com/doi/abs/10.1080/02723646.2014.913932</a></li> </ul>
i. Waves and surge – tides, wave height, storm surge	Regularly monitored (more than once within last 2 years)	<p>Sea state (waves heights and surge), wind and tides monitored at 8 stations daily.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="http://www.hydromet.gov.bz/forecasts/marine-forecast">http://www.hydromet.gov.bz/forecasts/marine-forecast</a></li> </ul>

j. Precipitation in coastal areas	Regularly monitored (more than once within last 2 years)	Monitored daily by the Belize Meteorology Service. Sources: <ul style="list-style-type: none"> <li>• <a href="http://www.hydromet.gov.bz/about-us/index.php?option=com_content&amp;view=article&amp;id=10&amp;Itemid=17">http://www.hydromet.gov.bz/about-us/index.php?option=com_content&amp;view=article&amp;id=10&amp;Itemid=17</a></li> <li>• <a href="http://www.hydromet.gov.bz/observations/weather-station-data?station_id=122">http://www.hydromet.gov.bz/observations/weather-station-data?station_id=122</a></li> </ul>
k. Water temperature	Regularly monitored (more than once within last 2 years)	Monitored daily by the Belize Meteorology Office Sources: <ul style="list-style-type: none"> <li>• <a href="http://www.hydromet.gov.bz/forecasts/marine-forecast">http://www.hydromet.gov.bz/forecasts/marine-forecast</a></li> </ul>

Table A-2B - Findings for Indicator 2B - *Shared Information Platform*

Ranking Criteria	Response	Main Finding Supporting Response
1. An information hub or integrated information sharing platform exists supporting the management of coastal areas. (see scoring note under justification.)	Yes	<p>Several platforms exist in Belize which supports integrated information sharing for coastal areas, including spatial and numerical datasets, and reports. A public platform for viewing and downloading spatial and non-spatial data is available via the Biodiversity and Environmental Resource Data System of Belize (BERDS). CZMAI has a Coastal and Marine Data Center that stores all spatial and tabular data derived under the different technical/research units and projects of the Institute. Finally, there is the Caribbean Community Climate Change Center's (5Cs) data clearance house that has climate related data.</p> <p>There is also a National Spatial Data Infrastructure that is being populated with various datasets for including for coastal and marine areas. Whether this will be open to the public is still yet to be determined.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Meerman, J. and Clabaugh, J. 2017. Biodiversity and Environmental Resource Data System of Belize. Online. <a href="http://www.biodiversity.bz/">http://www.biodiversity.bz/</a> ; <a href="http://biological-diversity.info/projects.htm">http://biological-diversity.info/projects.htm</a></li> <li>• <a href="http://www.healthyreefs.org">www.healthyreefs.org</a></li> <li>• <a href="http://clearinghouse.caribbeanclimate.bz/?db_type=0&amp;country=&amp;collection=V501&amp;s=&amp;sector=&amp;topic=">http://clearinghouse.caribbeanclimate.bz/?db_type=0&amp;country=&amp;collection=V501&amp;s=&amp;sector=&amp;topic=</a></li> <li>• <a href="https://www.coastalzonebelize.org/archives/262">https://www.coastalzonebelize.org/archives/262</a></li> <li>• Included in the CZMAI Data Center as mentioned during interview with Andria Rosado, CZMAI's Data Manager</li> </ul>

<b>The information hub or platform includes:</b>		
2. information on ecosystem extent and condition - both mapped location and data on condition for each of the following ecosystems (if present in the country) – coral reefs, mangroves, sea grass, salt marsh, other wetlands, sandy beach	Yes	<p>There is spatial information on habitat extent for all relevant coastal habitats in Belize (coral reefs, mangroves, sea grass, and wetlands. For BERDS and CZMAI, most of the information in on extent of coverage of the ecosystem. Other databases such as HRI database University of Belize’s Environmental Research Institute, have information on condition, which can be made available upon request. Information on condition is mainly for coral reefs.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="http://www.biodiversity.bz/">http://www.biodiversity.bz/</a> ; <a href="http://www.healthyreefs.org">www.healthyreefs.org</a></li> <li>• <a href="https://www.coastalzonebelize.org/archives/262">https://www.coastalzonebelize.org/archives/262</a></li> <li>• Included in the CZMAI Data Center as confirmed during interview with Andria Rosado, CZMAI’s Data</li> </ul>
3. information on monitoring of coastal waters – all of the following: water quality, tidal range / storm surge / wave heights	Yes	<p>CZMAI’s data center houses water quality data. Up until 2010, <a href="#">75 water quality stations</a> were strategically designated in the coastal zone. The stations are monitored once per month for basic physical and physicochemical parameters. Presently, due to limited financial resource, water quality monitoring is occurring along the Belize River mouth and eastward.</p> <p>The Meteorology Service have data regarding storm surge and wave heights. Such data are available online on the Meteorology Service website.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="https://www.coastalzonebelize.org/?s=water+quality+monitoring">https://www.coastalzonebelize.org/?s=water+quality+monitoring</a></li> <li>• <a href="http://www.hydromet.gov.bz/forecasts/marine-forecast">http://www.hydromet.gov.bz/forecasts/marine-forecast</a></li> <li>• <a href="https://www.coastalzonebelize.org/archives/262">https://www.coastalzonebelize.org/archives/262</a></li> <li>• Included in the CZMAI Data Center as confirmed during interview with Andria Rosado, CZMAI’s Data Manager</li> </ul>
4. information on land use and the built environment – including all of the following - location of roads, public infrastructure and public/private housings, wastewater treatment facilities, and energy facilities (if present in area)	Yes	<p>This data is dispersed through different departments such as the Lands Information Centre (LIC), Ministry of Housing, Belize Central Building Authority, Ministry of Works (Roads), The Statistical Institute of Belize, and Coastal Zone Management Authority and Institute (CZMAI). The CZMAI has location of building footprints and drone imagery for 40% of all cayes in Belize. This data was collected under the Marine Conservation and Climate Adaptation Project (MCCAP) and is currently stored within the CZMAI’s Data Center. The data is also planned for incorporation within the National Spatial Data Infrastructure (BNSDI); hopefully before the end of the year. Information on roads and settlements are also included within BERDS.</p>



		<p>Sources:</p> <ul style="list-style-type: none"> <li>• Included in the CZMAI Data Center as confirmed during interview with Andria Rosado, CZMAI's Data Manager</li> <li>• <a href="https://www.coastalzonebelize.org/archives/262">https://www.coastalzonebelize.org/archives/262</a></li> <li>• <a href="http://www.biodiversity.bz/">http://www.biodiversity.bz/</a></li> </ul>
5. information on shoreline areas with built coastal protection infrastructure present (such as sea walls, jetty, breakwater, etc.), as well as information on the condition of the infrastructure	No	Limited information as it relates to this. The CZMAI only has information relating to piers that exist within the coastal zone. Information on sea walls, jetty, breakwater, etc. needs to be collected, georeferenced and included in database.
6. information on permits for infrastructure construction and operation	No	Land Information Center (LIC)/ Physical Planning Unit and Department of Environment have these data. Information needs to be compiled and included in shared data platform.
7. information on elevation in coastal areas	No	CZMAI currently only has a 30m digital elevation model (DEM) for Belize. However, a 30m DEM is not of sufficient resolution.
8. projections of sea level rise	Yes	The Caribbean Climate Change Center (5Cs) have data on sea level rise.
9. information on drainage system – both natural (rivers, creeks) and built (canals, culverts, etc.) if such features exist	Yes	<p>Ministry of Works have data on canals, culverts etc. The Biodiversity and Environmental Resource Data System of Belize (BERDS) and the Belize Hydrology Unit have spatial information on rivers, creeks, etc.</p> <p>Source:</p> <ul style="list-style-type: none"> <li>• <a href="http://www.biodiversity.bz/">http://www.biodiversity.bz/</a></li> </ul>
10. information on land use zoning (for urbanized areas)	No	<p>Currently only the Belize City Council have some of this data for Belize City but it is not included in a data platform or information hub. They recently conducted a current and proposed zoning scheme for 2016 and 2040. Information is not included in information hub.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Indicated through interview with Andrea Rosado, CZMAI's GIS Data Manager</li> </ul>
11. information on marine zoning / marine protected areas / fisheries management areas	Yes	<p>Information on protected terrestrial and marine area of Belize inclusive of candidate Private Protected Areas as well as Fisheries Managed Access Zones are included in CZMAI's Data Center and BERDS. Information also needs to be integrated in the BNSDI.</p> <p>Sources:</p>

		<ul style="list-style-type: none"> <li>• Included in CZMAI Data Center as indicated through interview with Andrea Rosado, CZMAI's GIS Data Manager</li> <li>• <a href="http://www.biodiversity.bz/">http://www.biodiversity.bz/</a></li> <li>• <a href="http://protectedareas.gov.bz/largemap/">http://protectedareas.gov.bz/largemap/</a></li> <li>• <a href="http://www.fisheries.gov.bz/units/cfu-function-structure/managed-access-program/">http://www.fisheries.gov.bz/units/cfu-function-structure/managed-access-program/</a></li> </ul>
12. information on shoreline change – including all the following: coastal erosion; change in beach profile; shifting of the coastline	No	Very limited and isolated information on shoreline change exists but is not included in an integrated data platform or information hub. Some coastal shoreline erosion studies are being done by Ministry of Tourism (Caye Caulker, PG, and Corozal), but information is not included in an integrated platform or information hub.
13. information on proposed coastal development (applications pending approval, including preliminary design information which contains type of development, proposed location, and building footprints)	No	The Department of Environment has this information, but it is not included within a shared information platform or hub. Needs to be included in the BNSDI and CZMAI's Data Center.
14. information on past flooding in coastal areas (extent and date)	No	<p>NEMO has started to do some mapping of flood prone areas, but the information is not included in a shared information platform or hub. NEMO is just starting to look at capacity to carry out spatial analysis for hazard mapping.</p> <p>A national flood hazard mapping has been carried out for Belize to provide a large-scale overview of flood risk across the entire country. Interactive maps from the assessment are accessible online.</p> <p>Information on flood prone areas for Belize City is also available, but such information is not included in a shared information platform or hub.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="http://www.charim.net/sites/default/files/handbook/maps/BELIZE/CHARIM_Flood_Report_BEelize.pdf">http://www.charim.net/sites/default/files/handbook/maps/BELIZE/CHARIM_Flood_Report_BEelize.pdf</a></li> <li>• <a href="http://www.charim-geonode.net/documents/210">http://www.charim-geonode.net/documents/210</a></li> <li>• <a href="http://www.charim.net/Belize/maps">http://www.charim.net/Belize/maps</a></li> <li>• Information received through interview with Colin Gillett, Deputy Coordinator, NEMO.</li> </ul>
15. information on estimates of damage from past storms (for at least one storm event)	No	NEMO has some information; however, it is the Lands Information Center (LIC) that carries out the damage assessment. There is no evidence of such information existing in shared platform or information hub.

16. information on ecological impacts in coastal areas (such as algal blooms, fish kills, marine mammal strandings)	No	Information is not included in a common information hub. CZMAI has some information on manatee strandings. The Sea-to-Shore Association also has manatee stranding information. Information needs to be included in the BNSDI.  Sources: <ul style="list-style-type: none"> <li>Information received through interview with Andrea Rosado, CZMAI's GIS Data Manager</li> </ul>
17. The system includes some projections related to climate change (at least one of the following - projections of temperature, changes in storm intensity, change in intensity and frequency of precipitations, or probabilities of loss due to future hazards)	Yes	Information exist in the 5C's data clearing house. Information projections of temperature, changes in storm intensity, change in intensity and frequency of precipitations, or probabilities of loss due to future hazards is included in the assessment that informed the development of Belize's 3rd National Communication to the UNFCCC 2016. Information needs to be integrated within the BNSDI.  Sources: <ul style="list-style-type: none"> <li>Folder Indicator 2b: <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a></li> </ul>

Table A-2C - Findings for Indicator 2C - Climate Vulnerability and Risk Assessment (VRA)

Ranking Criteria	Response	Main Finding Supporting Response
1. At least one climate VRA is available for the country or pre-identified priority/critical area.	For the country or priority/critical areas	Two national vulnerability assessments carried out thus far (2011 and 2014) to inform Belize 2 <sup>nd</sup> and 3 <sup>rd</sup> National Communication to the UNFCCC and planning for a third is underway to inform the fourth National Communication to the UNFCCCC. <ul style="list-style-type: none"> <li>See Belize Vulnerability Assessment 2014 and Final Vulnerability Assessment Report for Belize 2014</li> <li>See Belize Second National Communication 2011</li> </ul> Sources: <ul style="list-style-type: none"> <li>Folder Indicator 2c: <a href="https://drive.google.com/drive/folders/10CMCfv6h23Q6CbuA-7lrNTofdWKIDoWI?usp=sharing">https://drive.google.com/drive/folders/10CMCfv6h23Q6CbuA-7lrNTofdWKIDoWI?usp=sharing</a></li> </ul>
2. Please indicate whether data from the following ecosystems (reflecting the protective role of ecosystems for ecosystem-based adaptation) were included in the climate VRA. (ecosystems which were not included in the VRA can be marked "N/A" - "not applicable"):		
Map of Coral Reefs	Yes	Third National Communication to the UNFCCC, 2016, Pages 17-18, 64, 66, 68, 70, 75, 95, 102 Second National Communication to the UNFCCC, 2011, Pages 56-58, 105, 107, 134, and 143

		<p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 2c:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a> </li> </ul>
Map of Mangroves	Yes	<p>Third National Communication to the UNFCCC, Pages 17-18, 64, 66, 68, 70, 75, 95, 102</p> <p>Second National Communication to the UNFCCC, 2011, Pages 56-58, 105, 107, 134, and 143</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 2c:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a> </li> </ul>
Map of salt marsh and / or wetlands	Yes	<p>Wetlands included in Third National Communication to the UNFCCC, Pages 17-18, 64, 66, 68, 70, 75, 95, and 102</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 2c:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a> </li> </ul>
Map of sand dunes	N/A	Not applicable.
3. Please indicate which of the following hazards have been evaluated in the VRA. (Hazards which are not relevant in the area can be marked "N/A" - "not applicable"):		
Coastal flooding (from tide / waves / storm surge)	Yes	<p>Flooding from sea level rise and storm surges were evaluated, included in Third National Communication to the UNFCCC 2016, Pages 7-9, 62, 71, 73-77, and 104</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Folder Indicator 2c:  <a href="https://drive.google.com/file/d/1tTU6X15M8jTghTIgCOO1f_afQhznJnCG/view?usp=sharing">https://drive.google.com/file/d/1tTU6X15M8jTghTIgCOO1f_afQhznJnCG/view?usp=sharing</a> </li> </ul>
Flooding from rainfall and over-flowing rivers and drains	Yes	<p>Flooding from precipitation/rainfall modelled.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Third National Communication to the UNFCCC, Pages 61, 104 in Folder Indicator 2b:</li> </ul>

		<a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a>
Damage from winds	No	No modelling of wind impact.
Temperature-related hazards (stress to plants, coral bleaching, water quality impacts, etc.)	Yes	Temperature hazards are modelled.  Sources: <ul style="list-style-type: none"> <li>• Third National Communication to the UNFCCC, Pages 7-10, 60, 62, 63, 65,66, 96-98 in Folder Indicator 2b:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a> </li> </ul>
Coastal erosion	Yes	Coastal zone inundation and erosion were assessed.  Sources: <ul style="list-style-type: none"> <li>• Third National Communication to the UNFCCC, Page 8, 13, 71, 77, 107, 153, in Folder Indicator 2b:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a> </li> </ul>
Coastal landslides	No	Not assessed.
4. Please indicate which of the following economic sectors have been evaluated for its climate-related vulnerability (sectors which are not relevant for the area can be marked "N/A" - "not applicable"):		
Coastal development (housing, roads, coastal protection)	No	Only impacts to ecosystems (mangroves, sea grass, coral reefs) and communities (fishing villages) were assessed.  Sources: <ul style="list-style-type: none"> <li>• Third National Communication to the UNFCCC in Folder Indicator 2b:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a> </li> </ul>
Tourism	Yes	Tourism is included in the assessment for the 3rd National Communication to the UNFCCC, Pages 9, 27, and 101-108. Ministry of Tourism (MoT) will be looking at their own climate vulnerability and risk assessment to include in the 4th National Communication.  Sources: <ul style="list-style-type: none"> <li>• Third National Communication to the UNFCCC in Folder Indicator 2b:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a> </li> </ul>

		<ul style="list-style-type: none"> <li>Also, through information derived from interviews with NCCO (Johanna Pacheco) and MoT (Abil Castaneda and Safira Vasquez).</li> </ul>
Agriculture	Yes	<p>Impact to the agriculture sector was evaluated. Attempts to correlate and examine changing yields of the major crops, namely, sugarcane, rice and beans using the Decision Support System for Agrotechnology Transfer (DSSAT) crop model, the possible impacts of water shortages on citrus and bananas using the CROPWAT1 model and trends from the literature on climate and non-climate factors.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Third National Communication to the UNFCCC, Pages 8, 24, 41-47, and 85-91 in Folder Indicator 2b:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkc">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkc</a>  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkc">B?usp=sharing</a></li> </ul>
Fisheries and aquaculture	Yes	<p>Sector was assessed in the 3rd assessment and planned for the 4th assessment. Impact of changes in air temperature and rising sea level on the fishing industry were assessed.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Third National Communication to the UNFCCC, Pages 9, 25-26, 93-100 in Folder Indicator 2b:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkc">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkc</a>  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkc">B?usp=sharing</a></li> </ul>
Energy	No	<p>Mostly looked at energy from a mitigation perspective, e.g., in greenhouse gas inventory</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Feedback received through interview with NCCO rep</li> </ul>
Water and wastewater	Yes	<p>The influence of changes in temperature and precipitation on the water resource sector was evaluated. This examined both the increase (excess water and flooding) or decrease (more extreme droughts) based on the relationship between precipitation and evaporation.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Third National Communication to the UNFCCC, Pages 8, 80-85, and 153 in Folder Indicator 2b:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkc">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkc</a>  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkc">B?usp=sharing</a></li> </ul>

Cultural assets	No	Were not evaluated.  Source: • Feedback received through interview with NCCO rep
Marine transportation	No	Was not evaluated.  Sources: • Feedback received through interview with NCCO rep
5. Please indicate which of the following factors relevant for climate vulnerability were evaluated in the VRA (factors which are not relevant can be marked "N/A" - "not applicable"):		
Economic factors (wealth and poverty levels)	Yes	Impacts in terms of economic damage - crops loss, fisheries; temperature, how hot and wet days could affect tourism visitation were evaluated.  Sources: • Third National Communication to the UNFCCC, Pages 4, 9-10, 11, 12, 15, 22, 23, 26, 27, 29, 47, 60, 77, 79, 80, 81, 83, 91, 93 in Folder Indicator 2b: <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a>
Environmental factors (ecosystems / natural capital)	Yes	Impacts on coral reefs, mangroves, seagrass, wetlands, and forest were evaluated.  Sources: • Third National Communication to the UNFCCC, Pages 7-9, 12, 13, 18-19, 25, 42, 73-79, 80-91, 93-101, 125 in Folder Indicator 2b: <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a>
Demographic characteristics (age distribution, disability, gender, ethnicity)	No	Not evaluated.
Social factors (education, literacy, phone ownership, access to internet)	No	Not evaluated.  Sources: • Feedback received through interview with NCCO rep
Public service provision (drinking water, trash-pickup, shelters, cooling centers)	No	Not evaluated
Construction materials	No	Not evaluated
6. Please indicate which of the following parameters were included in the VRA (if not relevant, mark "N/A" - "not applicable"):		

Projected change in temperature, including intensity and duration of extreme heat events	Yes	<p>The projected change in temperature and anomalies, including intensity and duration of extreme heat events was evaluated</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Third National Communication to the UNFCCC, Pages 60-62, 64 in Folder Indicator 2b:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a></li> </ul>
Projected change in precipitation and precipitation variability	Yes	<p>The projected change in precipitation and precipitation variability have been evaluated.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Third National Communication to the UNFCCC, Pages 61, 66, 68, 70 in Folder Indicator 2b:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a></li> </ul>
Projected change in frequency and intensity of storm events	Yes	<p>The change in frequency and intensity of extreme events and implications for storm surge were evaluated. As noted in the 3<sup>rd</sup> National Communication, “under “Output Summary’. This is the text – ‘Furthermore, Climate Change will provoke a rise in mean sea level in excess of 0.5 m by the end of the century. Storm surges are also expected to increase in intensity as a result of increases in the intensity of tropical storms and hurricanes.”</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Third National Communication to the UNFCCC, Page 71 (4<sup>th</sup> para) in Folder Indicator 2b:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a></li> </ul>
Exploration of thresholds – Examining past impacts in coastal areas (such as floods or coral bleaching) in conjunction with the temperature and precipitation conditions at the time	No	<p>Only current state and future conditions have been modelled.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Third National Communication to the UNFCCC in Folder Indicator 2b:  <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a></li> </ul>
7. The climate VRA evaluates different possible futures by doing the following:		



Using multiple climate projections (such as for multiple emissions scenarios, such as RCP4.5 and RCP8.5)	Yes	ECHAM5/A1B and HadCM3Q11/A1B PRECIS-downscaled seasonal data on mean temperature and rainfall were used.  Sources: <ul style="list-style-type: none"> <li>• Third National Communication to the UNFCCC, Page 60 in Folder Indicator 2b: <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a></li> </ul>
Using projections from multiple models (either through comparing results from more than one climate model, or through using the mean value from an ensemble of models)	Yes	PRECIS-downscaled scenarios of the ECHAM5 and HadCM3Q11 climate models were used.  Sources: <ul style="list-style-type: none"> <li>• Third National Communication to the UNFCCC, Page 63 in Folder Indicator 2b: <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSpuk6zyQUxnTTkcB?usp=sharing</a></li> </ul>

Table A-2D - Findings for Indicator 2D - *Timeliness of Data and Assessments*

Ranking Criteria	Response	Main Finding Supporting Response
1. The entity/ies responsible for data collection on coastal environmental condition maintain or replace equipment periodically (checked at least every two years).	Yes	CZMAI tries to maintain their equipment in good condition. They check at least every two years to try to maintain them in good condition (equipment replacement tends to happen only with project funding).
2. Early warning systems for coastal flooding are in place and are checked at least annually by the responsible entity/ies.	No	Only some river gauges are installed.  Sources: <ul style="list-style-type: none"> <li>• Feedback received from CZMAI's GIS Data Manager</li> </ul>
3. Satellite (or other data) are used to revise coastal ecosystem maps periodically (at least one habitat, such as coral reefs or mangroves updated within the past 5 years).	Yes	Satellite data was used to revised Belize's Ecosystems Map (2017) which includes seagrass, corals and mangrove cover for 2017  Sources: <ul style="list-style-type: none"> <li>• <a href="http://www.biodiversity.bz/">http://www.biodiversity.bz/</a></li> <li>• Belize State of the Coast Report, 2013</li> <li>• Indicated through interview had with Andria Rosado, CZMAI's GIS Data Manager</li> </ul>

4. The responsible entities update climate VRA periodically (within the past five years) and make these publicly available.	Yes	<p>The Belize Government updates climate VRA periodically. Some of these are mentioned below.</p> <p>Final Vulnerability Assessment Report 2014 – Enhancing Belize’s Resilience to Adapt to the Effects of Climate Change, 2014</p> <p>Vulnerability Assessment report for the Coastal Zone 2014</p> <p>Vulnerability Assess of the Belize Coastal Zone 2007</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSbuk6zyQUxnTTkcB?usp=sharing">https://drive.google.com/drive/folders/1IM5oeJ76oUGYu3TGSbuk6zyQUxnTTkcB?usp=sharing</a></li> <li>• <a href="https://drive.google.com/drive/folders/10CMCfv6h23Q6CbuA-7lrNTofdWKIDoWI?usp=sharing">https://drive.google.com/drive/folders/10CMCfv6h23Q6CbuA-7lrNTofdWKIDoWI?usp=sharing</a></li> <li>• <a href="https://www.thegef.org/project/fourth-national-communication-and-first-biennial-update-report-unfccc">https://www.thegef.org/project/fourth-national-communication-and-first-biennial-update-report-unfccc</a></li> </ul>
5. The responsible entities update coastal ecosystem assessments (such as a state of the coast report) periodically (within the past five years) and make these publicly available.	Yes	<p>CZMAI does this. The first State of the Belize Coastal Zone Report was developed in 1995 and others were subsequently produced in 1999, 2001/2002, and one for the period 2003-2013. CZMAI currently has a consultancy call to update the report for 2016-2019/2020. Reports can be downloaded from the CZMAI's website.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="https://www.coastalzonebelize.org/archives/1231">https://www.coastalzonebelize.org/archives/1231</a></li> <li>• Feedback received from CZMAI interviews (Chantalle Samuels and Arlene Young).</li> </ul>
6. The responsible entities update coastal ecosystem economic valuations periodically (within the past five years) and make these publicly available.	Yes	<p>Ecosystem service analysis is included in Belize Integrated Coastal Zone Management Plan 2016. Section 2, Page 39-51. The ICZMP will be updated in 2020.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="https://www.coastalzonebelize.org/wp-content/uploads/2015/08/BELIZE-Integrated-Coastal-Zone-Management-Plan.pdf">https://www.coastalzonebelize.org/wp-content/uploads/2015/08/BELIZE-Integrated-Coastal-Zone-Management-Plan.pdf</a></li> </ul>

### Tables for Category 3 - Identifying Adaptation Opportunities and Protecting Investments

Table A-3A - Findings for Indicator 3A - Identifying ICZM-related Responses to Climate Change

Ranking Criteria	Response	Main Finding Supporting Response
1. Specific actions for responding to climate-related risks in the coastal zone have been identified and listed in one or	Yes	Actions for responding to climate change have been included in the Belize Integrated Coastal Zone Management Plan (Page 132); Climate Change Policy, Strategy and Action Plan (CCPSAP), Pages 92-120; National Determine Contribution to UNFCCC

<p>more national plan (e.g., in national development plans, ICZM plan, National Adaptation Program of Actions, National Adaptation Plan or Nationally Determined Contributions).</p>		<p>(NDC), Pages 11-13; Growth and Sustainable Development Strategy (GSDS), Page 65; Horizon National Development Plan 2030, Pages 27 and 34; National Climate Resilience Investment Plan (NCRIP), Pages 103-108 and Belize's third National Communication to the UNFCCC (3rdNC)- Page 76.. Some specific actions include: -</p> <ul style="list-style-type: none"> <li>• Improve and encourage interagency coordination to address climate change (ICZM Plan)</li> <li>• Develop and Implement management approaches and policies that strengthen the livelihood asset bases and improve understanding of existing response mechanism to climate variability to assist in planning adaption (CCPSAP).</li> <li>• Manage further development of the coastline, especially in vulnerable areas such as the Belize and Corozal districts (CCPSAP).</li> <li>• Develop policy and plan to conserve and protect sensitive and healthy habitats (mangrove, sea grass, reefs) to improve resilience of main commercial species to climate change (CCPSAP).</li> <li>• Develop an information clearing house to provide regular and accessible public information on Climate Change effects in the marine ecosystems and coastal zone to promote behavior change designed to minimize climate risks in MPAs and replenishment zones (CCPSAP).</li> <li>• In order to protect the low-lying coastal area that is near sea level in the vicinity of Belize City, hard structures in the form of sea walls are being built around the city, however, a more continuous barrier will be required to fully protect the low-lying areas. (3rdNC).</li> </ul> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="https://drive.google.com/drive/folders/17wnRNR1SPB4IfY44oC2Lhg_8y1mamWYA?usp=sharing">https://drive.google.com/drive/folders/17wnRNR1SPB4IfY44oC2Lhg_8y1mamWYA?usp=sharing</a></li> </ul>
<p>2. Potential actions to reduce climate-related risk have been prioritized with consideration of where climate impacts will be most severe (geographically) and who among the country's population is the most vulnerable, as identified in the climate VRA.</p>	<p>No</p>	<p>This has only happened for limited areas. For example, the Ministry of Tourism sustainable tourism project (STP) component #1 looks at climate risks, vulnerability and how the country can invest in infrastructure at prioritized tourism destinations for a few limited locations, such as Corozal, Caye Caulker and Punta Gorda.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Indicated during interviews with reps from CZMAI (Chantalle Samuels and Arlene Young) and Ministry of Tourism (Abil Castaneda and Safira Vasquez)</li> </ul>
<p>3. In developing actions to reduce climate-related risk in coastal areas, ecosystem-based adaptation options (e.g., restoration</p>	<p>Yes</p>	<p>Current focus on looking at coastal protection measures that are green or mixed. Coral restoration is being supported by an existing 4-year project 'Marine Conservation and Climate Adaptation' that is funded by the Adaption Fund. Also</p>

<p>or protection of ecosystems providing natural infrastructure) have been evaluated (in at least one of the proposals in the last three years).</p>		<p>related, the Ministry of Tourism sustainable tourism project has activities that will focus on a green or ecosystem-based approach for its targeted destination sites.</p> <p>The” informed management” spatial zone scheme of the ICZM Plan took into account ecosystem-based approach where ecosystems were assessed based on risks. (The analysis, however, did not thoroughly looked at how climate change will impact ecosystem services.). In partnership with WWF, the government (via the CZMAI), through a recently initiated International Climate Initiative funded project, is planning on do this. The project is entitled ‘Climate-smarting Marine Protected Areas and Coastal Management in the Mesoamerican Reef’.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• <a href="http://www.fisheries.gov.bz/mccap-technical-reports/">http://www.fisheries.gov.bz/mccap-technical-reports/</a></li> <li>• <a href="https://drive.google.com/open?id=1DDOEJuuqGMqUitoleqazKvDp-7i3Fa37">https://drive.google.com/open?id=1DDOEJuuqGMqUitoleqazKvDp-7i3Fa37</a></li> <li>• <a href="https://drive.google.com/open?id=1doMSOJOR5GUPor95MwplwA0DktkzNKF9">https://drive.google.com/open?id=1doMSOJOR5GUPor95MwplwA0DktkzNKF9</a></li> <li>• Indicated during interviews with reps from CZMAI (Chantalle Samuels and Arlene Young) and Ministry of Tourism (Abil Castaneda and Safira Vasquez)</li> </ul>
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Table A-3B - Findings for Indicator 3B - Skills and Experience Developing and Evaluating Adaptation

Ranking Criteria	Response	Main Finding Supporting Response
<p>1. Conducting or evaluating environmental impact assessments (based on the national standards /regulations, if such exist)</p>	<p>Yes</p>	<p>The Department of Environment (DOE) and National Environment Appraisal Committee (NEAC) do analysis of potential environmental risk and impacts</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Indicated through interview with Johanna Pacheco, Climate Change Officer, NCCO</li> </ul>
<p>2. Conducting or evaluating reports on ecosystem service valuation</p>	<p>Yes</p>	<p>Skill exist within the CZMAI. CZMAI has a long-standing partnership with the Natural Capital Project, through Stanford University, to build capacity on ecosystem service analysis. Results of this collaboration has been integrated into the ICZM Plan.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>• Indicated through interviews with Chantalle Samuels (CEO, CZMA) and Arlene Young (Director, CZMAI).</li> </ul>
<p>3. Conducting or evaluating cost-benefit analysis (as a tool for comparison of</p>	<p>No</p>	<p>The skills are not currently present. CZMAI is trying to attain some capacity to do cost benefit analysis via the IKI funded project. No standards or regulations exist to guide this.</p>

options) - based on the national standards / regulations, if such exist		
4. Conducting or evaluating studies on effectiveness of natural infrastructure (green infrastructure solutions)	No	Skills and experience do not exist.
5. Conducting or evaluating analyses of coastal processes / dynamics	Yes	Skills exist on this topic. The Ministry of Tourism contracted studies to look at shoreline dynamics and options for shoreline management to cope with waves and currents. A plan is underway by NCCO to train government institutions to assess this. They are interested in building capacity to assess sea level rise and storm impacts, etc.  Sources: <ul style="list-style-type: none"> <li>• Indicated through interview with Ms Johanna Pacheco, Climate Change Officer, NCCO</li> </ul>

Table A-3C- Findings for Indicator 3C - Monitoring and Protecting Investments in Infrastructure

Ranking Criteria	Response	Main Finding Supporting Response
1. Standards and metrics exist for monitoring and evaluating the integrity of coastal infrastructure and operations and for upgrades or decommissioning.	No	There are currently no standards or metrics for evaluating infrastructure, and no legal code for infrastructure. There is, however, interest by the MoW to collaborate with the Central Building Authority to develop a guide or code for infrastructure development in coastal areas. This is something currently being planned under an existing MoW project. Once drafted, this guide or code will be submitted to the government's Cabinet for approval. There is a preference for having a code instead of a guide since guides are not enforceable.
2. The national entity responsible for ICZM undertakes periodic monitoring and maintenance work of existing conventional coastal infrastructure. (monitoring at least every three years).	YES	Neither CZMAI nor the National Climate Change Office are currently doing this. However, the MoW has a mandate specifically for roads and highways throughout the country. The MoW regularly monitors roads, bridges and highways within the coastal areas as well.
3. The national entity responsible for ICZM undertakes periodic monitoring of the natural (green) infrastructure which are or have been a subject of a coastal project to assess function and integrity. (monitoring at least every three years).	No	This is not occurring. As part of the environmental clearance process for development projects, the Department of Environment (DOE) is mandated to carry out analysis of projects' potential development impact on the natural environment and natural ecosystems. However, during post project development, there is a requirement for the developers to do 'self-monitoring'.

4. Evaluating the effectiveness of built coastal protection investments – temporal data on storm conditions and storm surge / water height are combined with information on coastal flooding to evaluate the effectiveness of built coastal protection structures. (Evaluation conducted within the past 5 years).	No	This not occurring and there is no national approach for addressing it. The MoW indicated that such information would be looked at if it's included within the project's design.
5. Evaluating the effectiveness of natural (green) coastal protection investments – temporal data on storm conditions and storm surge / water height are combined with information on coastal flooding to evaluate the effectiveness of investment in green infrastructure (such as mangroves, coral reefs, sand dunes, etc.) (Evaluation conducted within the past 5 years).	No	Temporal data on storm conditions and storm surge / water height are not at present being combined with information on coastal flooding to evaluate the effectiveness of investment in green infrastructure. This is not occurring and there is currently no national approach to doing so.

#### Tables for Category 4 - Financing ICZM

Table A-4A - Findings for Indicator 4A - Sustainable Funding for ICZM Operations

Ranking Criteria	Response	Main Finding Supporting Response
1. ICZM regulatory framework includes strategy or policy for financing ICZM including an estimation of financial needs for successful ICZM studies, planning, implementation /maintenance and M&E.	No	Does not exist. There is no strategy and policy in place to finance ICZM, nor is there a requirement for estimating the financial needs for ICZM. <i>[Note: the implementation plan for the ICZM Plan included an indicative budget needed for its implementation.]</i>
2. Annual government budget contains a dedicated (not discretionary) line item to support operating costs of government entities responsible for implementing ICZM.	No	ICZM-related projects are not categorized as an indicative budget line within annual government budget.
3. In the most recent fiscal year, the government (e.g., ministry of finance) disbursed the annual budget allocation to	Yes	The CZMAI receives an annual budget. The budget supports a percentage of the core operating costs for ICZM.  Sources:

support operating costs of government entities responsible for implementing ICZM.		<ul style="list-style-type: none"> <li>Indicated through interviews with CZMAI reps (Chantalle Samuel and Arlene Young) and CEO Percival Cho</li> </ul>
4. The government makes use of dedicated fees (e.g., for marine protected areas) to raise funding to support ICZM.	YES	<p>Collected MPA fees (e.g., from visitation) are not used to support ICZM but rather used for MPA management. CZMAI collects fees from sportfishing licensing but has been helping to cover a small percentage of core operating costs.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Indicated through interviews with CZMAI reps (Chantalle Samuel and Arlene Young) and CEO Percival Cho</li> </ul>
5. The government disbursed more than 50% of the dedicated fees collected (described in 4.a.4) in direct financial support to marine protected areas (MPAs) or to the ICZM agency during the most recent fiscal year.	Yes	<p>MPA co-managers currently collect and use fees for MPA management.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Indicated through interview with CEO Percival Cho, Ministry of Forest, Fisheries, Sustainable Development and the Environment</li> </ul>

Table A-4B - Findings for Indicator 4B - *Access to International Development Finance*

Ranking Criteria	Response	Main Finding Supporting Response
1. The country has accessed public international finance (loans, grants or other types of finance) for ICZM in the past (e.g., from multilateral development banks or bilateral aid agencies) within the last five years.	Yes	<p>Belize receives public international finance from bilateral and multilateral sources. CZMAI recently entered into an agreement with the World Wildlife Fund for the implementation of a five-year project entitled “Climate-Smarting Marine Protected Areas in the Meso-American Reef Region,” which aims to strengthen adaptive capacity of coastal ecosystems and local communities. The project is financed by the Ministry of Environment of the Federal Republic of Germany (BMU).</p> <p>The Adaptation Fund has provided US\$6 million for a Marine Conservation and Climate Change Adaptation Project (MCCAP) to support implementation of ecosystem-based marine conservation and climate adaptation measures. MCCAP is managed by the World Bank and implemented by the Protected Areas Conservation Trust.</p> <p>In 2018, CZMAI entered into an agreement with the World Wildlife Fund, financed by the Ministry of Environment of the Federal Republic of Germany (BMU), for the implementation of a five-year project entitled “Climate-Smarting Marine Protected Areas in the Meso-American Reef Region” which aims to strengthen adaptive capacity of coastal ecosystems and local communities.</p>

		<p>Sources:</p> <ul style="list-style-type: none"> <li>Indicated through interviews with CZMAI reps (Chantalle Samuel and Arlene Young) and CEO Percival Cho</li> </ul>
2. Country has accessed grant funding from private sources of finance for ICZM implementation (e.g., private foundations) in the last five years.	Yes	<p>Belize has received grants for ICZM from private donor through the Protected Areas Conservation Trust (PACT), which is Belize's National Trust. PACT provides funds for supporting conservation and promoting environmentally sound management of Belize's natural and cultural resources to foster sustainable development.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Indicated through interview with CEO Percival Cho, Ministry of Forest, Fisheries, Sustainable Development and the Environment</li> </ul>
3. The country has accessed finance for coastal-zone activities from multilateral climate funds and has not reached its funding cap for any of the climate funds (e.g., the Adaptation Fund or LDCF).	Yes	<p>Finance received through MCCAP - Adaptation Fund and GEF. Funding cap has not been reached. \$4 M remain in Adaptation Fund to be accessed via the national accredited entity PACT.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Indicated through interview with CEO Percival Cho, Ministry of Forest, Fisheries, Sustainable Development and the Environment</li> </ul>
4. The country has in place all relevant focal points/designated authorities and accredited entities for international funds and these have knowledge of ICZM.	Yes	<p>Focal Point/designated authority exists via the Protected Areas Conservation Trust (PACT). PACT is the national accredited entity for both GCF and Adaptation Fund. PACT coordinates or laisses with CZMAI and seeks advice on relevant issues.</p> <p>The role of the Trust has expanded to include national implementing entity (NIE) status for the Adaptation Fund as well fiduciary services for such agencies as the World Bank, the Meso-American Reef Fund (MAR Fund), the Global Environment Facility (GEF) and the Belize Nature Conservation Foundation (BNCF). (See: <a href="https://www.pactbelize.org/fiduciary-services/">https://www.pactbelize.org/fiduciary-services/</a> )</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Indicated through interview with CZMAI reps (Chantalle Samuel and Arlene Young) and CEO Percival Cho</li> </ul>



Table A-4C: Findings for Indicator 4C - Financial Incentives and Schemes to Incentivize Private Action

Ranking Criteria	Response	Main Finding Supporting Response
1. Tax incentives for actions that support resilient ICZM activities (e.g., restoration of mangroves or sand dunes).	No	<p>There are no tax incentives to support resilient ICZM activities as well as ecosystem and habitat restoration.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Indicated through interviews with CZMAI reps (Chantalle Samuel and Arlene Young) and CEO Percival Cho</li> </ul>
2. Government-supported grant programs to fund ICZM efforts.	No	<p>There are no government support grants for ICZM efforts. PACT, however, provides some support to protected areas managers for management.</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Indicated through interviews with CZMAI reps (Chantalle Samuel and Arlene Young) and CEO Percival Cho</li> </ul>
3. Concessional finance (e.g., loans, equity) to support climate-compatible ICZM investments by private actors.	No	<p>This does not exist. [Notes: The facility exists through GCF but no actual access currently available for ICZM]</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Indicated through interviews with CZMAI reps (Chantalle Samuel and Arlene Young) and CEO Percival Cho</li> </ul>