Blue Economy Scoping Study for Dominica

Stocktake and Diagnostic Analysis

Prepared by Dr Julian Roberts

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Acronyms

CARICOM	Caribbean Community
CBD	Convention on Biological Diversity
CCI	Caribbean Challenge Initiative
CDB	Caribbean Development Bank
CDPF	Commonwealth of Dominica Police Force
CEP	Caribbean Environment Programme
CFO	Chief Fisheries Officer
CLME	Caribbean Large Marine Ecosystem Project
CMEP	Commonwealth Marine Economies Programme
CREAD	Climate Resilience Execution Agency for Dominica
CRFM	Caribbean Regional Fisheries Mechanism
CROP	Caribbean Regional Oceanscape Project
CSC	Caribbean Sea Commission
DASPA	Dominica Air and Sea Ports Authority
DCG	Dominica Coast Guard
DDA	Discover Dominica Authority
DMRI	Commonwealth of Dominica Maritime Registry Inc
EAA	Ecosystem Approach to Aquaculture
ECROP	Eastern Caribbean Regional Ocean Policy
ECU	Environmental Control Unit
EEZ	Exclusive Economic Zone
FAD	Fish Aggregating Device
FAO	Food and Agriculture Organisation
FRP	Fibre Reinforced Plastic
GDP	Gross Domestic Product
GEF	Global Environment Facility
IMO	International Maritime Organisation
LAMA	Local Area Management Authority
MCS	Monitoring, Control and Surveillance
MRE	Marine Renewable Energy
MPA	Marine Protected Area
MSP	Marine Spatial Planning
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-Governmental Organisation
NOGC	National Ocean Governance Committee
NPDP	National Physical Development Plan
NRDS	National Resilience Development Strategy
OECS	Organisation of Eastern Caribbean States
OTEC	Ocean Thermal Energy Conversion
SCUBA	Self-Contained Underwater Breathing Apparatus

SDG	Sustainable Development Goal
SFO	Senior Fisheries Officer
SIDS	Small Island Developing States
(M)SME	(Micro) Small and Medium-sized Enterprise
SSMR	Soufriere/Scott's Head Marine Reserve
TDA	Tourism Development Area
TEU	Twenty-foot Equivalent Unit (Shipping Container Measure)
TNC	The Nature Conservancy
UNDP	United Nations Development Programme
UNEP	United Nations Environment Plan

Executive Summary

Overview

Following the devastating hurricane that struck the island of Dominica in 2017, the Government of Dominica is focusing on the development of a long-term strategy to become the world's first Climate Resilient country. In this regard, the Government has signalled its desire to integrate the Blue Economy into future resilience building initiatives. The United Nations Development Programme is supporting them in this aspiration and is extending technical support to Dominica to explore options to integrate the blue economy into its broader resilience building activities.

This report, prepared on behalf of UNDP, underpins this technical support and represents the first two of three deliverables under the UNDP programme of assistance, namely: a Stocktake; and a National Diagnostic Analysis. The purpose of these outputs is to provide both UNDP and the Government of Dominica with some understanding of the possible opportunities that the blue economy presents. They provide an overview of current context and opportunities, a technical analysis of impediments, and makes recommendations for ways forward. The report focusses on the key economic sectors that rely on the marine environment, namely tourism and leisure, capture fisheries and ports and shipping. In this regard this report puts forward a range of possible options for the Government's consideration.

The Blue Economy in Dominica

OCEAN ECONOMY IN CONTEXT	AVAILABLE INFORMATION
Land area (square km)	751
Coastline (km)	148
Exclusive Economic Zone (square km)	28,500
Population (2017 values)	73,925
Coastal population	Approximately 50,000
Key Blue Economy Sectors	- Marine capture fisheries - Tourism - Ports and shipping
Ocean economy	>US$26 million*
Employment in ocean economy	Employment of tourism** and fisheries alone accounts for nearly 17,000
Estimated value of coastal and marine ecosystems	Not Estimated
Marine protected area (percentage of territorial waters)	- 11 sq. km - Approximately 0.006 percent
Ocean health index (OHI)	52 (*Dominica ranks 205 among 221 countries and territories)*
Gross domestic product (2017 values)	US$560,540,740.40
Human development index (HDI)	0.715 - high human development category (*Dominica ranks 103 among 189 countries and territories*)
Gross national income (GNI) per capita (PPP 2017 prices)	10,170

* This estimate is based solely on the value of landed fisheries, cruise tourism and a proportion of stay over tourism - The figure assumes that 20 percent of stay-over tourists are attracted because of the marine environment. The true figure is likely to be significantly higher than this but the data available to the consultant does not allow an accurate calculation. As a priority, further work is required to disaggregate the contribution made by marine -focussed tourism.

** This figure is total employment in the tourism sector and is not disaggregated for those only working in marine tourism

Dominica already derives significant benefits from its maritime waters which extend to approximately 28,500 square kilometres. Marine uses and activities already contribute significantly to the overall

economy of Dominica, through direct economic activities, indirect support to service industries and the provision of environmental services. The key economic activities that are relevant to the Dominica blue economy include marine capture fisheries, tourism and ports and shipping.

The importance and "value" of the marine environment in underpinning these activities cannot be underestimated. This is not adequately reflected in government policy at this stage and there is a clear need for the Government to fully understand the value of such resources when making planning decision relating to the marine environment and marine resources.

Many of the challenges facing these economic sectors are exacerbated by failures to adopt an integrated approach to governance of Dominica's maritime space. The current approach to ocean affairs in Dominica reflects a traditional sector-specific approach to management and planning and thus shows symptoms of the problem facing a great many states – marine resource management remains highly 'balkanized'. A more harmonised and integrated approach is therefore key to developing the "blue economy", so that economic benefits are maximized while damage to the environment is minimized.

Future Blue Opportunities

By embracing the blue economy, a number of opportunities are apparent, which can contribute to sustainable economic growth, ensure protection and sustainable utilisation of the ocean and its resources, and contribute to the Governments objectives for climate resilience. The realisation of these opportunities will require strategies that:

1. Further support and develop existing sectors;
2. Promote investment and innovation to support the development of new sectors; and
3. Strengthen the management and protection of Dominica's maritime waters.

Based on the scoping study undertaken as the first part of this assignment, it seems clear that the greatest opportunities for developing existing 'blue economy' sectors reside within the tourism and fisheries sectors, with further limited opportunities in the ports and shipping sector. For each of these, the following separate but inter-related opportunities have been identified for consideration and further discussion with UNDP and Government officials.

While some of these opportunities are sector-specific, others create synergies and linkages across the different functions. This is by no means an exhaustive list but captures the key issues and opportunities that were identified during the scoping study.

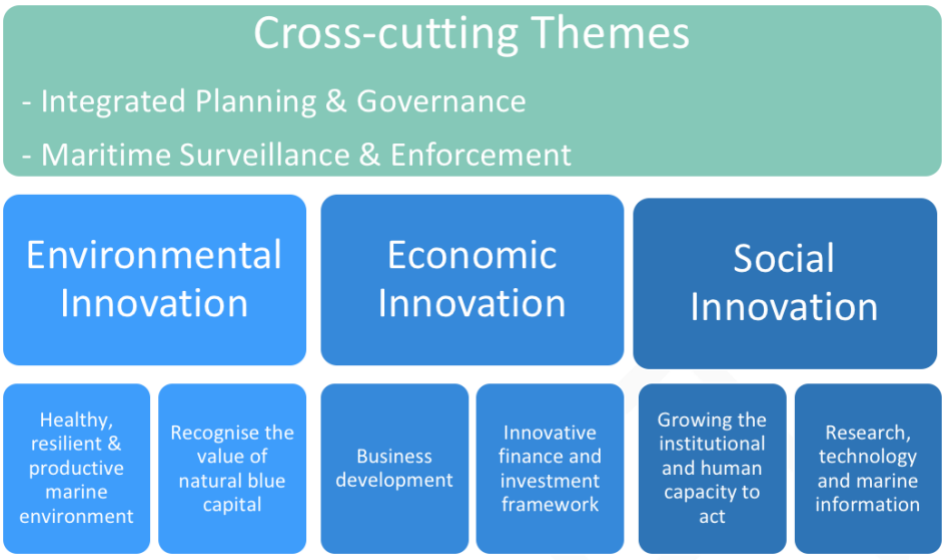
1. Tourism & Leisure	
Opportunity 1:	Create linkages between the tourism sector and marine conservation
Opportunity 2:	Undertake a study to explore the opportunities and constraints to expanding the existing SCUBA and whale watching sub-sectors
Opportunity 3:	Create strong trade linkages between the fishery sector and the tourism sector
Opportunity 4:	Develop infrastructure to support the growing yachting community, including marine and shore-based facilities
Opportunity 5:	Further expand the existing visitor fees payment system
2. Food Nutrition & Health	
Opportunity 1:	Improve the health of the nearshore demersal and reef fisheries
Opportunity 2:	Build resilience in the fishing fleet through better shore-based storage facilities
Opportunity 3:	Reduce post-harvest losses in the fishery sector
Opportunity 4:	Develop and strengthen the model of fishery co-management using the existing Cooperatives as a model
Opportunity 5:	Develop new fishery-based products to diversify fish trade
3. Ports & Shipping	

Opportunity 1:	Develop the existing interisland ferry service to include a domestic coastal ferry service between key locations
Opportunity 2:	Grow the registry and target "green shipping"
Opportunity 3:	Invest in renewable energy sources to provide low carbon shore-based power for visiting ships
4. Habitats, Marine Ecosystem Services & Coastal Protection	
Opportunity 1:	Improve marine protection through expansion of the existing MPAs
Opportunity 2:	Explore opportunities to implement the CCI including the development of conservation Trust Funds for marine conservation
Opportunity 3:	Develop a Sustainable Finance Framework
Opportunity 4:	Habitat mapping and marine research

In terms of future uses of the marine environment and their contribution to an emerging blue economy, aquaculture, ocean-related tourism and leisure activities and marine biotechnology are among the activities identified as having greater potential here.

Implementing the Blue Economy

While the development of individual sectors is an important component of this, they cannot be viewed in isolation since each is inextricably linked to the other economic activities in the marine space. Therefore, there is a need to holistically facilitate the development of the blue economy concept as a whole, with the development of a comprehensive enabling framework that facilitates and complements sector-specific frameworks. In order to move toward a pathway of sustainable blue growth, this analysis identifies **eight critical enablers** that must be pursued if Dominica is to integrate the blue economy into its wider development and resilience building programme.



The timing of this initiative is fortuitous, since it comes at a time when the Organisation of Eastern Caribbean States is implementing the World Bank-funded Caribbean Regional Oceanscape Project (CROP), of which Dominica is a participating country. The CROP project will deliver a number of outputs that will assist the Government of Dominica create a robust enabling environment to support better management of its maritime space and, therefore, support the development of a national blue economy framework.

The next stage of this assignment will involve a detailed discussion of the findings of this analysis with senior officials from both the Government of Dominica and UNDP. At this stage, these discussions are scheduled to be held in Dominica and Barbados during the week of 14 January 2019.

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1. Background

1.1 Background

The sustained supply of ocean derived goods and services will be critical to the future wellbeing and prosperity of many Small Island Developing States (SIDS), particularly those that benefit from the conferral of extensive areas of ocean-space. To this end, the emerging concept of the 'blue economy' has been embraced by many SIDS as a mechanism to realise sustainable economic development from an ocean-based economy.

Efforts by the United Nations Development Programme (UNDP) to assist countries in the Eastern Caribbean to recover from the damaging hurricanes of 2017, have identified a number of significant challenges in the region. Not the least of these is the need to build resilience to future natural and economic shocks, with the need to diversify and transition to innovative approaches being a priority. In this regard, the Government of Dominica has signalled its desire to integrate the Blue Economy into future resilience building initiatives and has sought the assistance of UNDP in better understanding what opportunities may be presented by the blue economy.

Dominica already derives significant benefits from its maritime waters[1] which extend to approximately 28,500 square kilometres. If managed effectively, these waters offer Dominica new opportunities for creating employment, generating incomes and contributing to overall social and economic development and thus realising sustained [blue] growth. Notwithstanding this potential, however, Dominica's maritime waters are under increasing pressure from many uses and threats resulting from overexploitation and multi-user conflict, as well as existential threats such as climate change. If Dominica is to effectively develop its maritime waters in a sustainable way, an approach is needed that integrates environmental management directly with economic development, fiscal policy and social goals; and which secures the support of international development partners to build the enabling environment for a national "Blue Economy".

1.2 The Blue Economy

The blue economy is an evolving development approach centred on utilizing oceans for their full economic potential. It seeks to promote economic growth, social inclusion and the preservation or improvement of livelihoods while at the same time ensuring environmental sustainability of the oceans and coastal areas.[2] The salient factors that distinguish a blue economy from "business as usual" include:

- providing social and economic benefits for current and future generations;
- restoring, protecting, and maintaining the diversity, productivity, resilience, core functions, and intrinsic value of marine ecosystems; and
- being based on clean technologies, renewable energy, and circular material flows that will reduce waste, energy consumption, and promote recycling of materials. (Figure 1 below).

1 Measured from the baseline to the limits of the exclusive economic zone as defined under the United Nations Convention on the Law of the Sea, 1982.

2 World Bank and United Nations Department of Economic and Social Affairs (2017). The Potential of the Blue Economy: Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries. (World Bank: Washington DC, 2017).

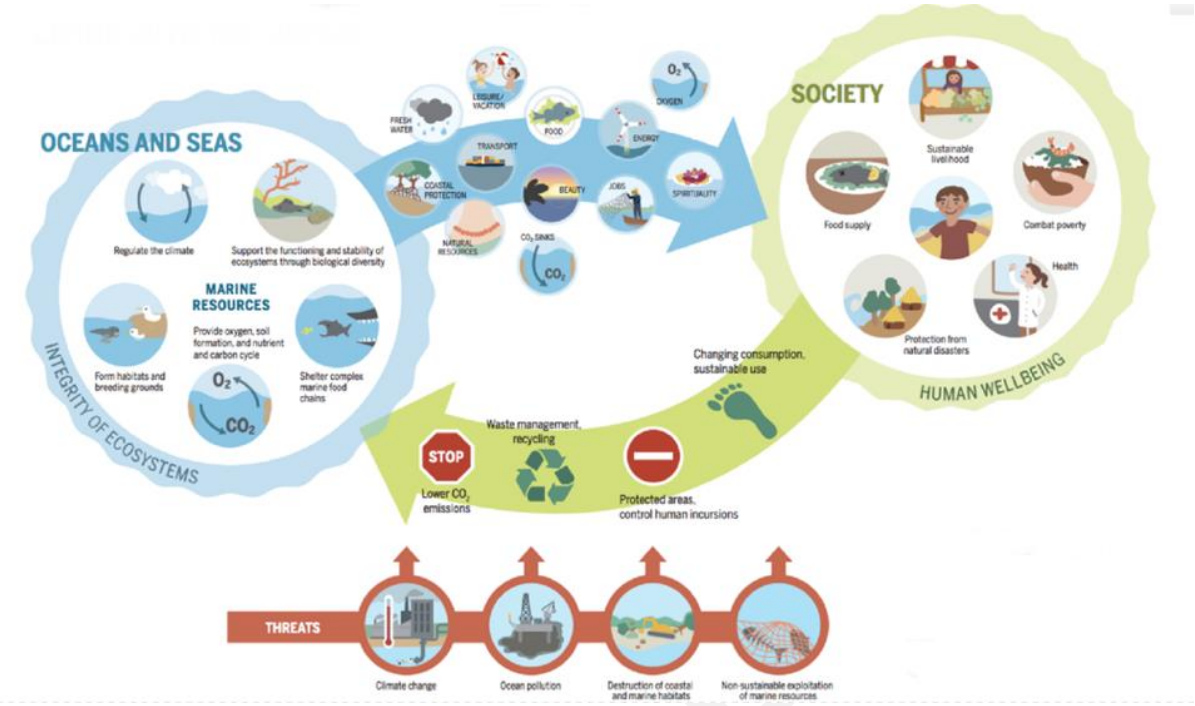

Figure 1: How the oceans support society (Source: Oceans Atlas, 2017[3])

The blue economy presents a promising avenue for SIDS to overcome some of their inherent economic challenges, by developing blue businesses, and increasing economic sustainability. Currently, for most SIDS the traditional 'blue' sectors of fisheries, aquaculture and tourism play an important economic role and are key sectors for employment and hard currency. With recent advances in technology, potential blue economy growth areas have also increased and now include aquaculture, ocean-based renewable energy, deep seabed minerals and marine biotechnology.

1.2.1 Priorities for a Blue Economy

In developing any national blue economy framework, the Government of Dominica has not specifically identified any objectives or priorities. Instead, there is broad recognition that the blue economy is seen as one component for the broader goal of achieving "resilience" to future economic, environmental and physical shocks. Thus, the Government's overarching goal appears to be to build resilience to future shocks.

The theme of resilience is one that was highlighted by many of the senior officials and policy makers with whom the consultant met during the scoping study mission. In this context resilience building refers to: economic resilience, by strengthening and diversifying the economy; physical resilience to natural hazards; resilience to the impacts of climate change; and, social resilience to support improved livelihoods across Dominica.

1.3 Purpose and Scope

In order to develop a long-term strategy aimed at achieving blue growth, the Government of Dominica requires robust and realistic analysis of possible future scenarios and policy options to support such smart, sustainable and inclusive growth from its maritime space. In identifying the priorities, care should be taken that these are driven both by the fragility of the oceans and by realities of the national situation.

3 https://www.boell.de/sites/default/files/web_170607_ocean_atlas_vektor_us_v102.pdf?dimension1=ds_ocean_atlas

This project, being executed by UNDP, aims to analyse the potential ocean-based development opportunities that Dominica could pursue as a mechanism for building resilience. This analysis reflects the following three thematic areas:

1. Realising the value of the ocean-based economy

The oceans deliver a broad range of services, many of which have particular economic or social value. However, the oceans also provide a broader range of essential services that support economic well-being and human health which are often either undervalued or have no value, in current decision-making frameworks.

In order for countries to fully realise the economic potential of their living and non-living marine resource, a more holistic evaluation approach is required that fully accounts for all marine resources and environmental services whereby economic valuation can guide coastal policy making, investment and decision making in the long-term interest of local communities and the country.

2. Sectorial transformation and reform

Ocean industry sectors such as fisheries, tourism and maritime transport can take steps to reduce their impact on the marine environment. In doing so, these sectors can themselves become more efficient, profitable, sustainable and can contribute directly to the sustainability and productivity of other businesses and the livelihoods of people that depend on healthy oceans and coasts.

3. Enabling conditions

Growing an ocean-based economy will require governance and policies that integrate environmental and economic considerations. The mix of marine resource development will be determined by existing governance structures but will require new legislation, rules, strengthening institutions and in potentially the establishment of entirely new institutions.

According to the project Terms of Reference (Annex A), the project will consist of the following three phases:

(i) Undertake a **Stocktake** to assess the full range of activities currently undertaken in Dominica and the range of resources utilised.

(ii) Preparation of a **National Diagnostic Analysis** document setting out development options based on both the stocktake and knowledge of new and emerging sectors that could be developed; and

(iii) Development of an **initial Action Plan** that will set the direction for the future development of a sustainable ocean-based economy in Dominica.

This report represents the combined outputs of phases 1 and 2 above.

In the medium-term it is envisaged that the initial Action Plan will be developed further into a more comprehensive National Blue Economy Roadmap that will set the direction and development pathways for future investment in and development of a sustainable ocean-based economy in Dominica, with UNDP providing policy and implementation support.

1.4 Scope and Elements of the Report

The findings contained in this report have been prepared having regard to the documents and materials provided to the consultant or otherwise collected through the review process. These include a broad range of policy and legal documents, a large number of technical reports and analysis and face-to-face interviews with officials and stakeholders.

A number of assessments of Dominica's marine sectors have been undertaken in recent years by various organisations. While this analysis aims to synthesise and summarise much of this information, it will also inevitably duplicate some of the previous work in some form. This is unavoidable but necessary in order

to present a comprehensive overview of the current situation with which to formulate future strategies for a transition to a blue economy. It is also useful for UNDP to develop a complete understanding of the current situation. As such, this stocktake is not intended as new advice to the Government of Dominica, but rather a mechanism for clarifying our understanding of the present situation in Dominica.

This report is divided into six (6) main parts, as set out below:

- Following this introduction, Section 2 provides an overview of the current environmental context;
- Section 3 provides an overview of the various maritime uses and activities currently undertaken and their economic importance, where this has been possible;
- Section 4 provides a review of the existing ocean governance arrangements in place with specific reference to the existing policy, legal and institutional arrangements;
- Section 5 some initial thoughts on the future economic opportunities that may be realised through a blue economy approach, with particular reference to tourism, fisheries and maritime transport;
- To conclude the analysis, section 6 provides some initial thoughts on the mechanisms that will be required to support implementation of the opportunities identified in section 5 and provides some initial thoughts on what might be included in the Initial Action Plan, that is the final deliverable of this assignment.

While the analysis is comprehensive, it is not an exhaustive list of all the issues, gaps and opportunities that may exist in Dominica. Instead, the report focusses on those issues that are seen as most pressing. The next stage in this process will therefore be to consider in more detail, the range of possible opportunities that Dominica could pursue, and to undertake both an analysis of their feasibility and the priority with which the Government of Dominica wishes to progress these further.

Stocktake

2. Environmental Context

2.1 Regional Setting

Dominica is the largest and most northerly of the Windward Islands, in the Lesser Antilles chain, which lie at the southern end of the eastern border of the Caribbean Sea where the latter meets the Atlantic Ocean. The island faces the Atlantic Ocean to the east and the Caribbean Sea to the west. With a population of approximately 73,500 persons,[4] and a total land area of 751 square km., the island is characterized by a high-relief terrestrial topography and a narrow sublittoral zone, surrounded by deep offshore waters (Figure 2). Approximately 70 percent of the population lives in the low lying coastal strip, which extends for 148 km around the island.[5]

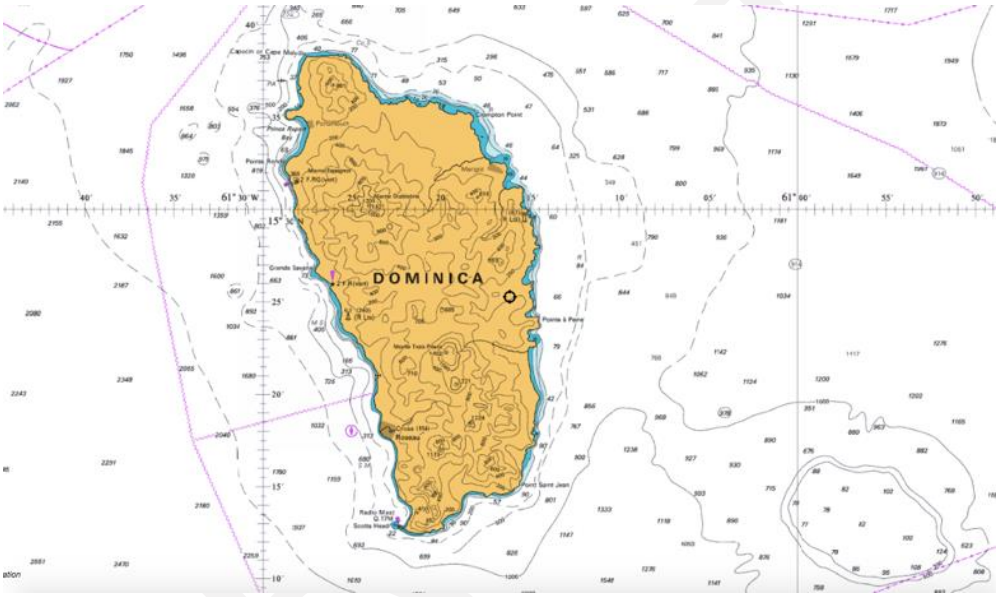

Figure 2: Dominica's topography and near shore hydrography

Pursuant to the United Nations Convention on the Law of the Sea, Dominica has claimed a 12 nautical mile territorial sea, a 24 nautical mile contiguous zone and a 200 nautical mile exclusive economic zone (EEZ). With the exception of the disputed boundary with Venezuela, Dominica has also settled all maritime boundaries with neighbouring countries, agreeing their boundaries with France - in respect of Martinique and Guadeloupe - in 1987.[6] This gives Dominica jurisdiction and rights over a maritime area of approximately 28,500 square km – approximately 38 times its land area (Figure 3).

4 Source: *National Resilience Development Strategy*. However, it is understood that, since Hurricane Maria, as many as 7,000 persons have left the island, representing some 10 percent of the total population.

5 The Nature Conservancy (2016). Commonwealth of Dominica Coral Reef Report Card 2016.

6 http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/TREATIES/FRA-DMA1987MD.PDF

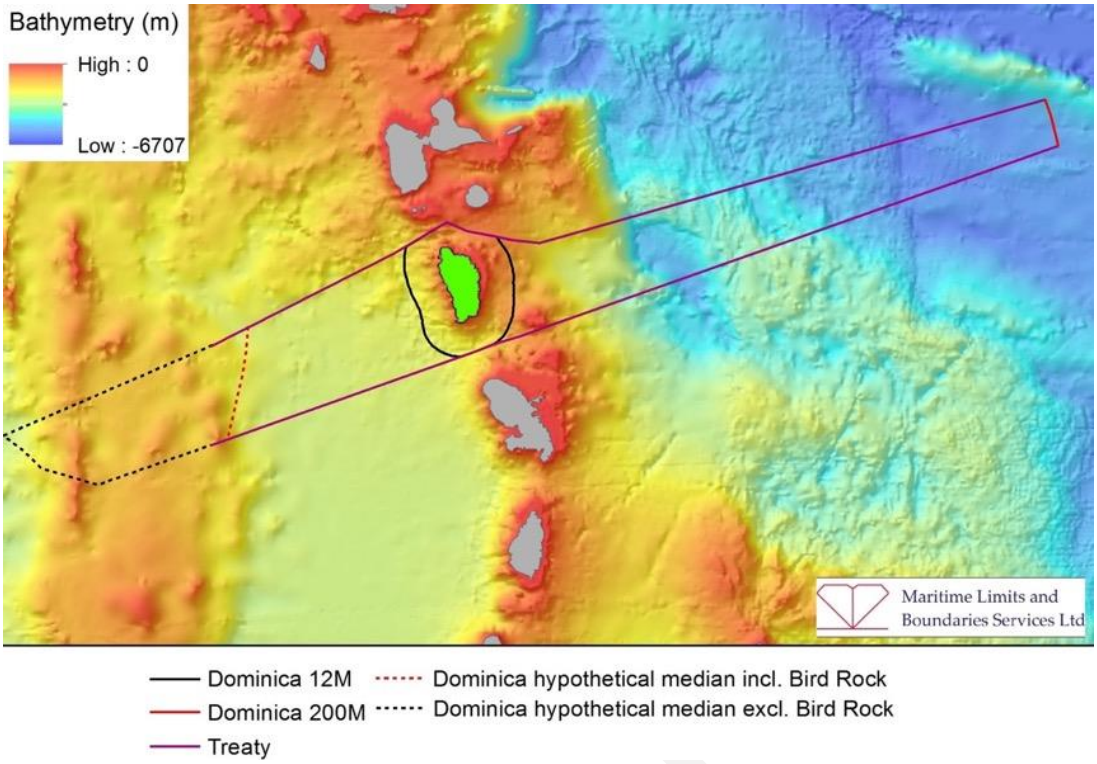

Figure 3: Dominica's maritime space

2.2 Marine Habitats and Resources

Dominica's maritime space is broadly divided into two discrete sub-regions: (i) the north, east and south coasts (windward side), high energy environments exposed to the Atlantic Ocean; and (ii) the west coast (leeward side), exposed to the more sheltered and shallower waters of the Caribbean Sea (Figure 3). Due to its exposure to the Atlantic, with the exception of some specific sites, the windward side is poorly mapped and characterized, although local fishermen have a good knowledge of the southern coast.

While the west coast drops off rapidly to depths of up to 2,000m, the north coast has the widest shelf areas of Dominica, with a width of over 1 km at some locations possibly including extensive deep reef systems. This wide shelf area supports the largest fringing reefs on the east coast - the largest area of this habitat type in Dominica.[7] Some of the best tourist beaches are also found in this region.

The more sheltered west coast supports the greatest diversity of marine habitats in Dominica. These include coral reefs (fringing shallow, fringing deep) along the west coast, banks of stony corals, extensive seagrass beds, and a variety of rocky and sandy habitats within and between the habitats mentioned.

The largest river of Dominica (Layou) opens into the sea along the west coast. It brings sediment to build the shelf and contributes to ample spaces for seagrass beds. The shelf surrounding the Grande Savane area is the widest along the west coast that is also well flushed by ocean currents. Shallow illuminated waters provide ideal conditions for coral reef development and growth.

7 http://www.itme.org/mhdm/regionnor.htm.

2.2.1 Coastal and shallow shelf ecosystems

Coral reefs

Coral reefs around Dominica are comparatively isolated, as broad tracts of contiguous reefs have not developed. The island supports 46 coral species including shallow patch reefs of pencil or finger coral, fields of volcanic boulder rocks colonized by small corals, deep (5-40 m) fringing reefs of mountainous star coral, pencil or finger coral and remnant elkhorn.[8]

Overall, coral reefs cover 0.84 sq. km[9] of the narrow, steep western shelf and broader shallow east coast. The largest reef complexes are within the areas between Anse Soldat and Calibishie in the northeast, but west coast reefs, especially between Batali and Mero, have higher coral cover, diversity and structural framework. Together they make up 74 percent of the island's documented coral reef area. This relatively limited coral cover is largely a product of the narrow shelf around the island, meaning that coral reefs are in close proximity to land influences and high energy.

Overall Dominica's coral reefs are considered to be in relatively good health. A Reef Health Index analysis published by TNC in 201610 concluded *inter alia* that:

(1) Coral cover was high and fleshy macroalgae was low, suggesting these reefs could support larger fish populations; and

(2) Biomass of fish was low due to the low abundance of parrotfish and large predatory fish.

Overall the analysis assessed Dominica's coral reefs to be slightly better than the average for all countries in the Eastern Caribbean.

Despite these conclusions, however, it is noted that the analysis is based on 2005 survey data. According to the TNC analysis, at least 10-15 percent of live coral cover has been lost on many Caribbean reefs since the bleaching event of 2005.[11] As such, the analysis notes that the actual scores are likely to be lower due to the loss of coral from coral bleaching events.

The effects of climate change are increasingly impacting the health of coral reefs. The most obvious impact is physical damage from hurricanes. Several hurricane events have resulted in significant reef damage and alteration. In recent years a number of coral bleaching events, usually associated with sea surface warming, have also been observed, most notably in 2005 when a mass bleaching occurred in coral around the Eastern Caribbean. Bleaching or structural damage to reefs are likely to impact negatively on scuba diving and snorkeling activity (loss of earnings and/or jobs).

In the future, sea level rise can be expected to have adverse impacts on the protective function of coral reefs, except where reef growth is fast enough to maintain wave energy attenuating functions at existing levels.

Seagrass beds

Seagrass beds represent one of the most important and extensive of the tropical coastal ecosystems of Dominica, although the extent of this habitat type is poorly mapped. Seagrass meadows are important indicator species of the overall health of coastal ecosystems, as they have high biodiversity and are sensitive to changes in water quality. Seagrass meadows also form important nursery areas and habitat for reef fish, invertebrates and sea turtles. As such, seagrass beds must be seen as an important aspect of fisheries habitat.

8 Steiner, S.C. (2015). "Coral Reefs of Dominica (Lesser Antilles)". *Ann. Naturhist. Mus. Wien*, B, Vol 117. pp. 47-119.
9 Sascha Steiner, personal communication.
10 TNC, note 5 above.
11 *Ibid*.

Several species of seagrass have been recorded around Dominica, including *Syringodium filiforme* (manatee grass), *Thalassia testudinum* (turtle grass), *Halodule wrightii* and *Halophila decipien*. More seagrass occurs along the west coast, even into deep waters. The largest meadows, between Canefield to Point Ronde, have more manatee grass. The NE and East coasts have turtle and manatee seagrass in calm waters behind reefs and in bays (Marigot, Calibishie, Anse Soldat, Hodges Bay). The invasive seagrass *Halophila stipulacea*, first observed in 2007, has replaced several native seagrasses on the west coast and colonized new areas, but not found in NE areas.[12]

Mangroves and wetlands

Mangroves are found at the intersection between land and marine environment. They protect shorelines by trapping sediments eroded from the land and also against wave erosion. Mangroves are not common in Dominica and limited to only two mangrove species - black (*Avicennia germinans*) and white (*Laguncularia racemosa*) mangroves. White mangroves are found near Cabrits on the northwest coast and black mangroves are found at Bout Sable near La Plaine on the east coast. Although uncommon, protecting these mangroves will provide habitat and nursery areas, protect shorelines and improve water quality.[13]

2.2.2 Offshore ecosystems

From a comprehensive literature search it appears that Dominica's offshore marine habitats are not well described. Coastal pelagic habitats in Eastern Caribbean are known to be quite productive, although data on upwelling areas is scarce. However, given the presence of resident sperm whales in the deep offshore waters to the west of the island, it is assumed that local upwelling occurs along the west coast. The waters are also known to support extensive stocks of migratory pelagic species such as tuna, dolphin fish and marlin.

Beyond the narrow shelf areas, the EEZ also contains extensive deep-water areas. To the west the Caribbean basin has average depths of 2,000 m with depths exceeding 4,000 on the Atlantic coast to the east. One interesting feature that lies to the south west of the island is the *Makuba Bank*, a shallow submarine bank that is reported to be a highly productive fishing ground. Otherwise, these deep-sea areas have been little studied.

2.3 Marine Species and Biodiversity

2.3.1 Marine mammals

One of the prominent features of the west coast of Dominica is the rich marine mammal biodiversity. Dominica's sheer underwater drop-offs create deep sheltered bays along its western coastline. These deep coastal waters are the feeding grounds for at least six different species of cetaceans seen on a regular basis and an additional 16 on an occasional basis. (Table 1).[14]

The most commonly sighted cetaceans include short-fin pilot whales, false killer whales, melon head whales, pygmy sperm whales, and humpback whales. The most iconic species, however, is the sperm whale, juveniles of which remain resident off the west coast throughout the year. All in all, 22 of the species listed in table 1 above have been seen in Dominican waters.

These resources support a thriving whale watch tourism sector.

12 TNC, note 5 above.
13 *Ibid*.
14 UNEP (2001). Elements for the Development of a Marine Mammal Action Plan for the Wider Caribbean: A Review of Marine Mammal Distribution. Document No. UNEP(DEC)/CAR IG.20/INF.3.24 September 2001.

BALEEN WHALES	KILLER WHALES, PILOT WHALES AND DOLPHINS
Blue whale	Killer whale
Fin whale	Pygmy killer whale
Sei whale	False killer whale
Bryde's whale	Pilot whale
Humpback whale	Melon-headed whale
Minke whale	Fraser's dolphin
TOOTHED WHALES	Pan-tropical spotted dolphin
Sperm whale	Atlantic spotted dolphin
Pygmy sperm whale	Spinner dolphin
Dwarf sperm whale	Clymene dolphin
Cuvier's beaked whale	Common dolphin
Gervais' beaked whale	Bottlenose dolphin
Blainville's beaked whale	Striped dolphin
	Risso's dolphin
	Rough-toothed dolphin

Table 1: Known species of cetaceans found in the Eastern Caribbean

2.3.2 Sea turtles

There are three species of sea turtles found in Dominican waters: Green turtle; Hawksbill turtle; and Leatherback turtle. All three species nest on beaches in the country (Figure 4).

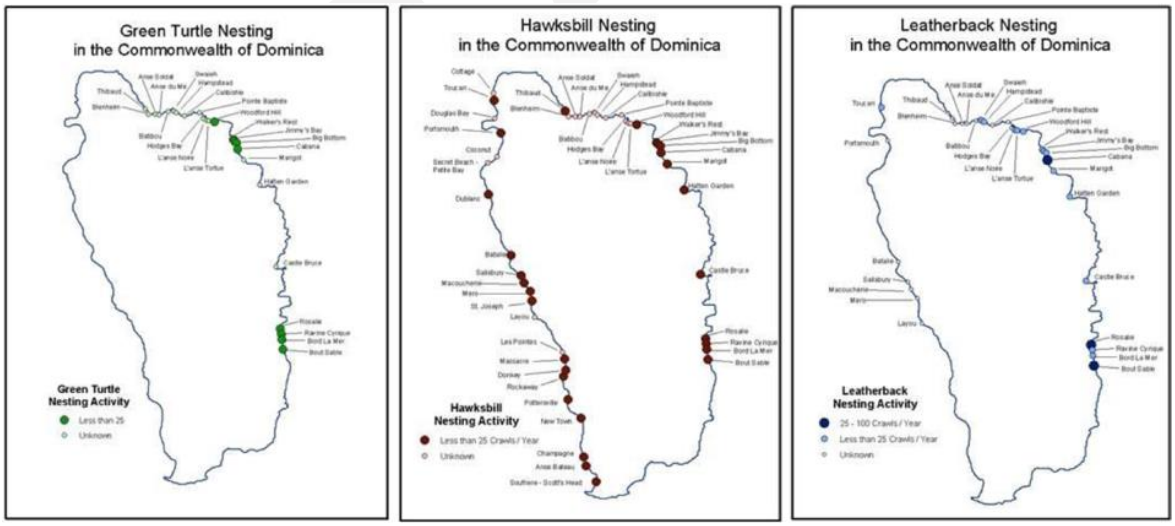

Figure 4: Turtle nesting sites around Dominica. Source: National Physical Development Plan.

3. Marine Economic Activities in Dominica

Marine uses and activities already contribute significantly to the overall economy of Dominica, through direct economic activities, indirect support to service industries and the provision of environmental services. The economic benefit from ocean activities offer the potential for future growth through both the expansion of existing sectors and the development of new activities.

Within each of the maritime functions, a number of different economic activities may be identified. The EU Blue Growth study also applies a categorisation to the different economic activities, namely **Mature Economic Activities**, **Growth-stage Activities** and **Pre-development Stage Activities**.

The key economic activities that are relevant to the Dominica blue economy are outlined briefly below. In selecting these activities, this report has focussed on the most significant activities currently operating, those which have witnessed strong growth and those which it is considered have most potential for the future.

Box 1. Maritime Function Development Stages

Mature economic Activities

These activities currently are the bedrock of Blue Growth and provide high levels of value addition and employment. The main challenge for these activities is to continue to perform in the light of strong external pressures and fierce competition from global players. Much will depend on the strategies and business models implemented and on the ability to adopt increasingly sustainable practices, and to export to global markets. Examples of mature stage activities in Dominica include the fisheries, the tourism industry, and international shipping.

Growth-stage Activities

These are the maritime economic activities which already have critical mass at a global level, which have already grown during the last five years and which can further grow in the years to come. While these may create immediate employment opportunities, important investments and preconditions are required to achieve the full potential of these activities. Activities in this category may not have developed in Dominica but capacity and infrastructure may exist to support their establishment. An example of a growth stage activity in Dominica is aquaculture.

Pre-development stage Activities

These are new and emerging activities that may still be at the R&D stage at a global level and where no capacity or infrastructure currently exists either in Dominica or in the region. These will take time and investment to develop and will require a long-term view.

Applying a modified version of the analytical framework developed as part of the EU Blue Growth study,[15] the major beneficial uses of the marine environment can be categorised under six "maritime function" headings (Table 2 below):

15 EU (2012). *Blue growth: Scenarios and drivers for sustainable growth from the oceans, seas and coasts*. Third Interim Report prepared for the European Commission, DG Mare. March 2012.

MARITIME FUNCTION	DESCRIPTION	SUB-SECTOR	STATUS IN DOMINICA
Tourism and leisure	This function covers those aspects of tourism and leisure directly supported by the ocean and the services it provides. The tourism component is of particular importance and covers economic activities related to coastal tourism.		Mature
Ports and shipping	This function concerns the transport of goods by sea and the associated services.	Shipping	Mature
		Ports	Mature
Food, nutrition and health	This function concerns the capacity of the marine environment to supply resources for direct consumption or for processing into food products or other consumer products. Historically, the fishing industry has been at the forefront of this function.	Fishing	Mature/Growth
		Aquaculture	Growth/ Pre-development
		Biotechnology	Pre-development
Habitats, marine eco-system services and coastal protection	Habitats and the marine ecosystem services they support are different from other sectors as this is not an economic function in itself, but rather a *conditio sine qua non* for the use of the ocean and coastal areas and for allowing other functions to flourish. The economic relevance of marine ecosystem services is substantial, and efforts in research and technological development must be made better understand their true value and their contribution to the blue economy.	Marine habitats and conservation	Growth
		Marine ecosystem services	Growth
Energy and raw materials	This function covers the exploration and production of energy and of raw materials on and from the seas.	Petroleum	N/A
		Marine Renewable Energy	Pre-development
		Marine Minerals	Pre-development
Maritime monitoring and surveillance	This function concerns the monitoring and surveillance of activities taking place at sea, as well as the monitoring of the environmental state and development of the seas and coastal areas in which these activities take place.	Maritime Surveillance	Growth
		Environmental Monitoring	Growth

Table 2: Descriptions of the various maritime functions

3.1 Tourism and Leisure

Overall, tourism and agriculture are the most important non-government sectors of Dominica's economy, with tourism and tourism-related activities producing 37.6% of the total GDP in 2017 (the direct contribution is 12.4 percent of GDP) and contributing approximately 56.4% of total foreign exchange earnings. Compared to many other Caribbean SIDS, Dominica has a high proportion of GDP derived from the tourism sector; according to the World Travel and Tourism Council,[16] Dominica is ranked as the 16th most tourism dependent country in the world, well above the average ranking for the Caribbean as a whole.

Tourism is also a major generator of employment with over 4,000 Dominican workers directly depend on tourism for their living. This includes employment by hotels, travel agents, airlines and other passenger transportation services. The overall contribution of this sector to employment, including wider effects from investment, the supply chain and induced income impacts is even higher, accounting for some 13,000 jobs in 2017 (34.4% of total employment).[17]

Visitors to Dominica fall into four broad categories – stay-over tourists, excursionists, cruise visitors and yacht visitors. Recent trends in these main categories are illustrated in Table 3 below:

CATEGORY	2013*	2014*	2015	2016*	2017
Stay-over Tourists	78,277	81,511	74,474	78,369	72,228
Cruise Visitors	230,587	286,573	79,474	277,131	157,040
Excursionists	1,904	2,195	1,534	1,003	N/A
Yacht Visitors	12,775	12,134	12,175	N/A	N/A

Table 3: Visitor Arrivals by Main Category[18]

*Includes Ross University Students

In 2017, over 229,000 tourists visited the island.[19] Of these, about 72,200 were overnight visitors and the remaining ones arrived by cruise ship. Overnight visitors stayed an average of 9.9 nights. It should be noted that the number of tourists, particularly cruise ship tourists, was lower in 2017 due to the impact of hurricane Maria (Table 4).

Generally speaking, there is no overall pattern of sustained growth. The numbers of stay-over tourist arrivals and indeed yacht visitors have changed little over the last 5 years, or indeed over the last decade. Although numbers were never high, few excursionists currently visit the island.[20]

There are varying estimates concerning tourism's contribution to Dominica's economy. Figures from the World Travel and Tourism Council suggest that visitors to the island spent an estimated total of EC$ 173.6 million in 2017. Of this, approximately 80 percent is contributed by over-night visitors, compared with only 20 percent from cruise visitors.

16 World Travel and Tourism Council (2018). Travel & Tourism Economic Impact 2018: Dominica.
17 *Ibid*.
18 Source: Discover Dominica Authority: http://tourism.gov.dm/statistics
19 Provisional figures from Dominica Hotel and Tourism Association. Kevin Francis personal communication.
20 *Ibid*.

PURPOSE OF VISIT	2012[21]	2016	2017
A). Stay-Over Arrivals			
i) Vacation	51,000	52,781	47,631
– General leisure	19,000		
– Weddings and Honeymoons	-	580	439
– Nature tourism	29,000	N/A	N/A
– SCUBA diving	3,000	3,500	N/A
ii) Visit Friends and Relatives	8,500	9,498	11,112
iii) Business, Meetings, Conventions	9,500	8,029	7,487
iv) Study, Research and Sport	5,000	5,464	4,273
v) Carnival and World Creole Music Festival	4,500	1,798	13
vi) Other	500	219	1,273*
Total Stay Over Arrivals	79,000	78,369	72,228
B). Yacht Visitors	11,800	N/A	N/A
C). Excursionists	1,500	N/A	N/A
D). Cruise-Ship	266,200	277,131	157,040

Table 4: Indicative breakdown of visitor arrivals by purpose of visit

*Includes 988 Hurricane Maria relief workers

3.1.1 Cruise ships

Cruise tourism represents by far the largest contributor to actual visitor numbers to Dominica, although this number has fallen in the last few years. The cruise sector in Dominica is seasonal, with the peak cruise season being between October and April. Dominica has two key destinations for cruise ships, in Roseau and Portsmouth (Cabrits) respectively. Both towns have dedicated cruise ship berthing facilities as well as "complementary" facilities to support cruise passengers onshore (Table 5).

DESTINATION	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Roseau (Roseau Cruise Berth)	106	85	86	7	-
Roseau (Woodbridge Bay Port)	39	31	46	0	-
Roseau (Anchorage)	6	10	6	0	-
Portsmouth (Cabrits Cruise Berth)	37	37	39	7	-
TOTAL	188	163	177	7	180*

Table 5: Cruise ship calls (Source: Dominica Air and Sea Ports Authority). **Projected for cruise season*

21 Source: CHL Consulting (2013). *Dominica Tourism Master Plan 2012 – 2022*. Final Report, 7th June 2013.

These numbers are set against a global growth of the sector of 7% year on year over the last decade. The high point for cruise ship visits to Dominica occurred in 2010 with a total of 515,405 visitors. In 2011 Carnival Cruise Lines withdrew from the market leading to a significant reduction in cruise ship visits in subsequent years. Carnival have recently introduced a limited schedule for this cruise year to "test" the market once again.

Cruise ships are possibly the most difficult sector to target in terms of improving the level of income that remains in country. The evidence suggests that, in general, cruise ship tourists spend considerably less in the destination than stay over tourists. The direct expenditure of cruise ship visitor is estimated at US$50.81/passenger representing a total expenditure of US$11.5 million/year (2014/2015 cruise year).[22] The Government's own figures for 2016 suggest that this figure is even lower (US$32.96)[23] This expenditure is largely on taxis, food and drink and shore-based excursions and activities.

Crew expenditure represents a similarly modest contribution with the average crew members spending US$34. on shore, representing a total crew expenditure of some US$1.1 million (2014/2015 cruise year).[24] Other cruise related income is also modest. Typically, a cruise ship with 2,000 passengers would contribute less than US$1,000 through port fees. In addition, Dominica receives revenue from wharfage, bunkering and fuel charges. In addition to net payments to local tour operators, cruise lines also provided data for two other categories: 1) payments to ports for passenger taxes and port services, such as navigation and utility services, and 2) payments to local businesses for supplies and services, such as food and beverages and other stores. US£1.6 million (2014/2015 cruise year).25

Whatever the true figure is, it seems clear that, for Dominica, the total cruise tourism spend of US$14.2 million is significantly lower than all other countries in the eastern Caribbean, with the exception of Grenada (Table 6).

COUNTRY	TOTAL CRUISE TOURISM EXPENDITURE (US$ MILLION)	AVERAGE PASSENGER EXPENDITURE (US$)
Antigua and Barbuda	43.9	64.88
Barbados	57.3	78.03
British Virgin Islands	26.2	69.43
Dominica	14.2	50.81
Grenada	12.2	46.55
Guadeloupe	38.2	90.06
Martinique	22.7	68.99
St Lucia	57.2	78.44
St Kitts and Nevis	84.3	111.30

Table 6: Total Cruise Tourism Expenditures ($US Millions) by Destination, 2014/2015 Cruise Year[26]

22 Business Research & Economic Advisers (BREA) (2015). Economic Contribution of Cruise Tourism to the Destination Economies: A Survey-based Analysis of the Impacts of Passenger, Crew and Cruise Line Spending. Report Prepared for the Florida-Caribbean Cruise Association and Participating Destinations.

23 Source: Government of Dominica (2017). Post-Disaster Needs Assessment: Hurricane Maria, September 2018, 2017.

24 *Ibid*.

25 *Ibid*.

26 Source: BREA (note 22 above).

3.1.2 Recreational yachting

Dominica is a popular stop-over for sailing vessels cruising the Caribbean. It is strategically situated between two large nearby yachting centres, Guadeloupe and Martinique, making it an attractive destination for French charter vessels in particular. However, compared with competing destinations such as Antigua, St. Bart's, St. Lucia and the BVI, Dominica has been slow to exploit the full potential of the yachting market: Although the number of yachts calling at Dominica has increased steadily, there is no consistent pattern in the evolution of yacht visitors, who currently number about 12,000, not much more than in 2007.

Based on 2012 figures, it is estimated that yachting activities attract about 5% of non-cruise ship visitor arrivals in Dominica and this is therefore a small but not insignificant sector. While only employing a small number of people, the sector consumes goods and services such as fuel, food, landing & docking fees, maintenance and repair services, harbour fees, souvenirs and land-based tourism services such as accommodation, taxis, car hire, restaurants and diving.

The major sub-groups of yachts include:

- Mega or super yachts/ luxury yachts
- Bare boat charters
- Crewed charters
- Cruisers/ live aboards
- Power boats
- Sports fishing
- Day sailing

Unlike cruise ship visitors, who stay for a matter of days, the yachting tourist (and yachts) generally stay longer. In addition, the visiting yachting tourist can, and frequently will, spend time at different anchorages and moorings, therefore the number of yachts within a given location is variable and subject to change. The most popular anchorage at Prince Rupert Bay, Portsmouth can often have over 100 yachts at one time.

3.1.3 SCUBA diving

Dominica is considered to be a niche market for SCUBA divers, with divers coming specifically for diving rather than undertaking courses or one of dives during a holiday. The major attraction for international divers are the steep drop-offs and the quality of corals on those drop-offs – a reported 60-70 percent of divers wish to dive only in the south of the island due to the impressive wall diving.

Prior to Hurricane Maria, there were ten dive operators in Dominica. There are currently only seven.27 The numbers of divers visiting the island have remained relatively static at around 3,000-4,000. In 2007, it was estimated that around 400,000 divers visited Caribbean destinations such as Aruba, the Cayman Islands, Bonaire and Curacao. Carrying capacity in terms of number of divers and/or of dives is not a constraint and industry representatives believe that the island could accommodate a threefold increase in the number of visiting divers, without overcrowding.

Presently, businesses are operating at about one-third of capacity in terms of boats, equipment, etc. As such, there would appear to be considerable growth potential in Dominica if operators can be encouraged to invest. However, air access (connectivity and price), rather than demand, plus the lack of space for dive

27 Daniel Perryman (Dominica Watersports Association) personal communication.

equipment on airlines using small aircraft, are seen as the main constraints holding back the further development of this key sector.[28]

3.1.4 Whale watching

The deep sheltered bays along Dominica's western coast provide a haven for a number of species of whales and dolphin, most notably the Sperm Whale. Although possible all year long, sightings are most common between November and March. Prior to Hurricane Maria there were seven whale watching operators but that number is currently thought to be 2-3.[29] Whale watching tours are undertaken on day charter boats operating from Portsmouth and Roseau under licence from the Fisheries Division. The Fisheries Division also issues a limited number of licences for operators to run "swim with whale" tours. Approximately six to ten of these licenses are issued each year and the tours are limited to only three persons in the water. These tend to be allocated for professional purposes such as photography and filming rather than for general tourist purposes.

3.1.5 The marine environment and tourism

Tourism is a major and growing income earner for Dominica, and the success of the sector is based on a healthy natural environment which includes healthy marine ecosystems.

It is clear that reef related tourism and recreation is a significant contributor to the national economies of SIDS in the Caribbean region. However, the level of aggregation of the data used limits any further analysis or understanding of the spending habits of this particular niche market. Given that tourists are clearly motivated to visit these destinations by the natural marine assets, it seems prudent to understand this niche market better.

That notwithstanding, the study does highlight the importance the marine environment generally, and coral reefs specifically, play in supporting economic activity in Dominica and other Caribbean SIDS. Whether this is reflected in government policy is unclear at this stage but there is a clear need for the Government to fully understand the value of such resources to the economy when considering 'costs' associated with conservation and environmental protection.

3.1.6 Impact of Hurricane Maria

According to the Government's post-disaster needs assessment, Hurricane Maria caused damage to the tourist sector amounting to US$20.1 million with total losses amounting to US$70.9 million. Most of this damage was to the hotel room stock, with as many as 500 rooms being lost.[30] Other obvious losses resulted from the cancellation of cruise ship visits with knock on effects for those tour operators reliant on cruise tourists as a source of income as well as direct damage to those tour operators' facilities (for example, the two largest dive operators reported losses totalling EC$1.5 million).

Some physical damage has also been reported to reefs at depths below 12 m depth. Deeper reefs appear to have survived well.

28 CHL Consulting (note 21 above).
29 Daniel Perryman (Dominica Watersports Association) personal communication.
30 Colin Piper (DDA) personal communication.

3.2 Ports and Shipping

3.2.1 International shipping

Dominica, like most island nations, is almost entirely dependent on shipping for imports and exports. According to the Dominica Air and Sea Ports Authority (DASPA), over 95% of imports by weight arrived by sea in 2018.

While not busy by global standards, a significant number of vessels do transit the Dominican EEZ each year. This includes cruise ships, vessels transiting from Europe en route to/from the Panama Canal, tankers transiting to/from Venezuela and vessels transiting from the east coast of the USA (Figure 5). In addition to the cruise ship visits discussed above, an average of 4 commercial vessels visit/depart the main port in Roseau each week (see Table 7 below). These included general cargo carriers, bulk carriers, product carriers delivering refined product and LNG, container ships, reefers and vehicle carriers.

Figure 5: Shipping routes through the Caribbean

The main import commodities include refrigerated products, food and drink, construction materials, vehicles and machinery and petroleum products. The main export commodities include pumiceous materials, packing materials, agricultural products (bananas, coconuts, dasheen and fruits) and alcoholic beverages. As such, international shipping and associated infrastructure is vital to the economy of Dominica.

3.2.2 Domestic shipping

Dominica has a very small domestic maritime sector. There are two main ferry services in Dominica operating daily to and from the islands of Guadeloupe and Martinique with connecting service to St.Lucia,

Marie Galante and Les Saintes. Both Portsmouth and Roseau are serviced, but it is interesting to note that there is no domestic ferry service that operates between ports within Dominica.[31]

	2015/2016	2016/2017
Roseau		
Cargo/Freight ship calls	1,149	1,256
Cruise Ship Calls	126	138
Ferry Calls	549	603
Portsmouth		
Cargo/Freight ship calls	507	539
Cruise Ship Calls	52	39
Ferry Calls	12	0

Table 7: Vessel call history 2015-2017. Source: Post-Disaster Needs Assessment. Hurricane Maria, November 2017.

3.2.3 Port facilities

Dominica has two main ports in Roseau and Portsmouth respectively. However, only the port of Roseau has the facilities to receive and handle international cargo vessels. The main shipping port in Dominica is situated in Woodbridge Bay, Roseau. The current port was constructed in 1976, primarily to service the banana export sector. Since then, some improvements have been made but the port is extremely limited in the number and size of vessels it can handle. The port is the only port in Dominica capable of handling containers and receives approximately 14,000 TEUs/year. The ability to increase this capacity is also severely constrained.

Additional port facilities in Roseau include a dedicated cement wharf to the south of Woodbridge Bay, a passenger ferry on the downtown waterfront and an offshore tanker offloading buoy to service the Belfast product terminal. (Table 8).

FACILITY	LENGTH (M)	DRAFT LIMIT (M)	OPERATIONS
Woodbridge Bay – Main Wharf	244	10	– Cargo handling – Cargo discharge – Container handling – Berthing of Passenger Ships – Warehouses for storage of goods
Woodbridge Bay - Inner Wharf Extension	91	8	
Woodbridge Bay – Schooner Wharf	55	2.7 - 10	
Roseau – Cruise Ship Berth	49	13	– Berthing of cruise ship
Roseau – Passenger Ferry Terminal		3.5	– Inter-island passenger ferries
Cabrits – Cruise Ship Berth	90	11 - 15	– Berthing of cruise ships – Inter-island passenger ferries

Table 8: Port facilities in Dominica (Source DASPA)

31 https://www.caribjournal.com/2018/09/19/a-new-dominica-guadeloupe-ferry/#

3.2.4 Impact of Hurricane Maria

As with other sectors, the shipping/ports sector suffered substantial losses as a result of Hurricane Maria. These losses comprise two elements:

(1) Damage to port infrastructure (Table 9); and

(2) Loss of traffic (due in part to infrastructure damages). This had a knock-on effect in terms of a loss of port revenue of approximately 75 percent.

During hurricane Maria in 2017 the Woodbridge Bay port suffered US$18 million worth of damage. As a result of this and the age of the port there is a need to upgrade and extend the current port facilities. There have been some discussions concerning moving the port entirely to a new site further north at Canefield which would include a new, dedicated cruise ship facility.

FACILITY	US$ M
DAMAGES	18.89
Cargo Port Woodbridge Bay	3.70
Longhouse Portsmouth	2.96
Roseau Ferry Terminal	3.89
Roseau Cruise Ship Berth	1.85
Cabrits Cruise Ship Berth	3.33

Table 9: Summary of Damage and Losses to Maritime Transport Infrastructure. Source: Post-Disaster Needs Assessment. Hurricane Maria, November 2017.

3.3 Food Nutrition and Health

3.3.1 Fisheries sector overview

Fisheries in Dominica is small-scale and artisanal in nature, comprising individual fishers or sometimes fisher co-operatives, utilizing small, open fishing vessels making short trips that last only a few hours each day.[32] In 2014, the sector supported 1,344 direct jobs, mainly in marine coastal fishing. A further 4,047 persons were employed in other fisheries dependent activities representing 17.9 percent of the workforce in 2014. Since the crash of Dominican banana production, many farmers have become dependent on fishing to make a living. Additionally, there is greater demand for fish in the country, which is directly correlated to an increase in the number of tourists visiting Dominica.

Various estimates of the economic contribution of fisheries have been reported. According to Peteru *et al*[33] fishing officially contributes about 2.5 percent to Dominica's GDP. The Chief Fisheries Officer indicated a figure closer to 2 percent of GDP (Reviere Sebastian, personal communication). However, according to the Eastern Caribbean Bank, fisheries represents only 0.33 percent of GDP.[34] Whatever the true figure, it is clear that the direct contribution fisheries makes to the economy is small. However, these figures underestimate the total contribution that fisheries make: The contribution of fishing to GDP also does not include much of the fish that is exchanged in the informal economy. Moreover, smallscale

32 Theophille, D (2015). *Collection, Management and Primary Analysis of Fisheries Data in the Commonwealth of Dominica*. United Nations University Fisheries Training Programme [final project]. Available at: http://www.unuftp.is/static/fellows/document/derrick15aprf.pdf.

33 Peteru, P., S. Regan and T. Klak (2010). "Local Vibrancy in a Globalizing World: Evidence from Dominica, Eastern Caribbean." *FOCUS on Geography*, Vol. 15. 125-133.

34 Theophille (note 32above).

fisheries in Dominica have always contributed to the food security of the island's small population, although this appears not to be accounted for in official statistics.[35]

Official landing estimates indicate that, in 2014, the capture fishery sector landed only 479 tonnes of fish, valued at approximately US$2.7 million in 2014.[36] This is equivalent to only 0.3 percent of the total annual production for the wider Caribbean. This represents a decreasing trend from a reported high of 824 tonnes in 2007 (Table 10).

2007	2008	2009	2010	2011	2012	2013	2014
824	732	686	560	665	561	479	479*

Table 10: Annual marine capture fish production 2007-2014 for Dominica (Source: CRFM)

All catches of demersal and pelagic species are for local consumption (either for direct subsistence or sale at local markets), with exports of fish and fishery products being almost non-existent. Moreover, during the off season, some fish is also imported to offset the shortage[37] (in 2014, for example, imports of fish and fishery products were valued at US$2.6 million). Per capita fish consumption in Dominica is significant: In 2010 it is estimated that Dominicans consumed an average of 26.4 kg/year. However, anecdotal evidence suggest that this is declining with the introduction of cheaper forms of protein, mostly imported chicken and pork.

Most fish landed in Dominica is sold directly to the public at the landing sites. Limited facilities exist for processing and storage, resulting in wastage when the supply of pelagic fish exceeds local demand. Since 1997, following the completion of the Roseau Fisheries Complex, fishermen had been selling their catch directly to the Fisheries Division, which runs the complex, particularly in times of heavy glut on the market. Processing and marketing of catches is done either by dedicated vendors or by the fishers themselves.

Inadequate cold storage facilities have been a great handicap to the fishermen in the past. This is particularly the case since Hurricane Maria damaged the Roseau Fisheries Complex cold storage and ice machine facility, since fishermen from the south are currently unable to sell excess catch to the complex and must find other outlets. The Fisheries Division has assisted the fishermen by distributing containers to some of the rural landing sites, in order to permit the overnight storage of fish, prior to moving the catch to the Roseau Fisheries Complex the following day.

Overall, fishery resources are considered to be underutilized as a source of domestic nutrition and food security, employment generation and foreign currency earnings.

3.3.2 Structure of the fishery

Fishing in Dominica is largely artisanal in nature with many fishers operating at a subsistence and artisanal level. While a small recreational fishing sector has developed in recent years due to the development of the tourism sector, the sector can broadly be categorised into four fishery types, namely:

1) Small coastal pelagic fishery - jacks, scads, herrings, balao, flying fish etc.
2) Small offshore pelagic fishery - black-fin tuna dolphin-fish, wahoo, etc.
3) Large offshore pelagic fishery – yellow-fin tunas, billfishes swordfish etc.
4) Shallow shelf and reef finfish fishery - grunts, snappers, doctorfish etc.

35 Ramdeen, R., S. Harper and D. Zeller (2014). "Reconstruction of total marine fisheries catches for Dominica (1950-2010)". pp. 33-42. In: Zylich, K., Zeller, D., Ang, M. and Pauly, D. (eds.) Fisheries catch reconstructions: Islands, Part IV. Fisheries Centre Research Reports 22(2). Fisheries Centre, University of British Columbia [ISSN 1198-6727].

36 Caribbean Regional Fisheries Mechanism (2015). CRFM Statistics and Information Report - 2014. (CRFM: Belize, 2015) 82pp.

37 Source: FAO. http://www.fao.org/fishery/docs/DOCUMENT/fcp/en/FICPDM.pdf

The artisanal sector consists predominantly of part-time fishers who operate from motorized vessels, including dugout canoes up to 6 m in length, "keel" boats which range from 4-7 m and fiber reinforced plastic vessels.[38] The sector is made up primarily of fishers, who are supported by co-operatives, boat and gear builders, vendors (who are frequently also fishers) and outboard engine mechanics. Most fishers operate part-time, supplementing their income with agricultural or as construction work. During the most recent fisheries industry census, undertaken with the support of the Japan International Cooperation Agency (JICA),39 over 41 percent of fishers that participated in the census reported that they earned all or most of their income from fishing, a combined 58 percent got about half or less than half of their income from that activity.

About a third of fishers operate within 8 km from the coast. These tend to be the older fishers who work the traditional dug-out canoes. Nets are used from canoes targeting small coastal pelagics. Fish pots or traps are used for demersals such as snappers or groupers. The remainder of the fishers operate up to a reported 130 km offshore, using keel or fibre-reinforced plastic (FRP) vessels (also known as pirogues).

The keel and FRP boats are multi-purpose vessels that are usually under 8 metres in length, powered by at least one outboard engine, and carrying a two-man crew. Small coastal pelagics, large migratory (ocean) pelagics and demersals are caught from these boats at varying distances and depths, with the implementation of an assortment of fishing gear and methods (fish pots, hook and line and nets). In 2011, there were approximately 434 fishing vessels registered with the Fisheries Division (of a total of 650), of which 20 percent were canoes, 52 percent keels and 28 percent FRP.

Pursuant to the *Fishery (Berthing) Regulations, 2001* there are 33 designated landing sites around Dominica. Most of these are located on the west coast (Caribbean Sea), due to calmer waters that allow for safe mooring and landing. Few landing sites are located on the Atlantic side, which is less favourable to safe mooring and landing due to the turbulent sea and difficult terrain.

There are three major fish landing and handling facilities in Dominica in Roseau, Portsmouth and Marigot respectively. These facilities provide sheltered harbours, landing slips and boatramps, boat and engine maintenance facilities fisherman and vendor locker and storage facilities, ice-making and cold storage facilities and fish vending facilities (fish market). Since Hurricane Maria the cold storage and ice-making facilities at the Roseau fish complex have not been functioning and are not expected to be serviceable until at least 2020. As a result, fisherman and vendors have to travel to either Portsmouth or Marigot.

Around Dominica many communities are associated with Fishery Cooperatives, which provide their members with a number of tangible benefits, such as the provision of ice, price setting for fish, the ability to sell excess fish through the cooperative and in some cases access to finance and pension facilities. At present there are 11 such cooperatives with between 600-700 members, representing around half of the existing fishers in Dominica. The cooperatives are at different stages of development and maturity which presumably is reflected in the numbers of members. It is clear that many fisherman are not seeing the benefits of membership but it is clear that, where the cooperative functions well, there are a number of benefits in such cooperative.

Fish aggregating devices

A major feature of the offshore pelagic fishery is the use of Fish Aggregating Devices (FADs) to increase catches of large migratory pelagics. FADs attract pelagic species that may associate with the structure for days or weeks. By concentrating fish in a known location, FADs increase the efficiency of fishing and are widely employed in artisanal and industrial-scale tropical, pelagic fisheries. Between 2000-2010 total fish production from FADs increasing from 5 percent to 74 percent respectively in Dominica.

38 Ramdeen *et al* (note 35 above).

39 Fisheries Division (2012). 2011 Fisheries Industry Census – Dominica: Report of the Second Fisheries Industry Census for Dominica.

When first introduced, most FADS deployed were privately owned. Fishers who deploy such FADs effectively restrict access of others to the aggregated fishery resources, either by placing FADs in secret or far-off locations or by defending territories around their FADs. Access restrictions are economically beneficial to the fishers deploying the FADs but can lead to conflict with others. The growing conflicts surrounding the use of FADs lead to intervention by fisher's organizations and government to find solution to these problems. As a result, since 2011 the Government of Dominica has been deploying FADs in conjunction with the National Association of Fishers Cooperatives (NAFCOOP) to function as a Resource Management Organization.

Evidence from speaking to fishermen in Scott's Head indicates that a large number of FADs were destroyed during Hurricane Maria and have not yet been replaced. At present, the Scotts Head/Soufriere fishery has access to only one public FAD, although some private FADS are present further offshore. This is presumably reflective of the wider situation around Dominica and has resulted in a lack of opportunity for many fishermen, who complain about the lack of FADs at present.

3.3.3 Fishery resources

While there are minor reef and demersal fisheries, historically, pelagic species have been the major focus of the Dominican fisheries due to the very narrow continental shelf. Dominica's nearshore waters tend to be very deep, and demersal resources such as conch and lobster, that are a major component of the fishery in other eastern Caribbean States, are very limited. That said, those nearshore fisheries resources that do exist are severely depleted. By the mid-1980s, snappers, groupers, parrotfishes, grunts and squirrelfishes were considered overexploited.[40]

The fishery is seasonal, with a high season from January to June when pelagic species such as tuna, dolphinfish and kingfish are targeted. By contrast, yellowfin and blackfin tuna appear to be more prevalent in the latter half of the year (July to December). Catches for marlin and flyingfish show two peaks within one calendar year. Demersals are caught in greater numbers during the second half of the year, beginning in June or July, when demersal species are targeted with handlines and fishpots. Anecdotally, at some ports demersal catches increased with the end of the dolphinfish season.[41]

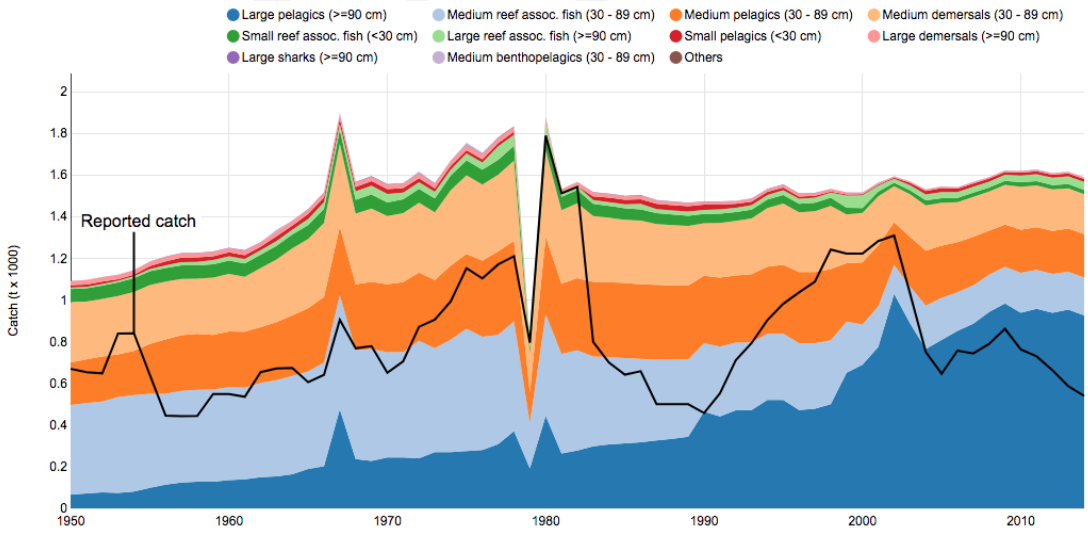

Figure 6: Reconstructed capture fish landings for Dominica (1950-2015).[42]

40 Ramdeen *et al* (note 35 above).
41 Theophille (note 32 above).
42 Source: Sea Around Us Project. http://www.seaaroundus.org/data/#/eez/212?chart=catch-chart&dimension=taxon&measure=tonnage&limit=10

Figure 6 above illustrates the landing history for the major fish groups. These catch histories are based on reconstructed histories undertaken by Ramdeen *et al*43 and are estimated to be 1.8 times higher than the official landings reported by the Government to Dominica to FAO. The difference can be attributed to underreporting of small-scale fisheries, from both subsistence and artisanal sectors. It clearly shows a significant increase in landings of large pelagics since 1990, with a corresponding drop in landings of reef fish. The substantial decline in catches in 1979 was the result of damages from Hurricane David in August of that year.

Reconstructed total domestic fisheries catches for the period 1950-2010 were estimated to be nearly 85,000 t, compared with official reported landings of 46,523 t as supplied to FAO. Reported landings fluctuate between a low of 400 t/year and a high of 1500 t/year over the period 1950-2010, with average annual reported landings of 765 t/year. Theophille has suggested that these reconstructed figures may be overestimated and calculated historic landings approximately 30 percent higher than the FAO reported data.[44]

Whatever the true values are, it seems clear that the actual landings are considerably higher than official records would suggest. This is a cause for concern since it provides an underestimate of the pressure on the fishery. It also suggests that the true economic contribution of fisheries to Dominica has been substantially underestimated. Clearly local fish products contribute significantly to the island's dietary requirements, something that had previously been understated in market analysis of the sector.[45]

Of the main species caught in Dominica, dolphinfish, ballyhoo, yellowfin tuna, marlins, flyingfish and jacks are among the most commonly occurring species and species groupings in the catch (Figure 7). Catch of small pelagics, such as ballyhoo and flyingfish, appear to be on the decline as catch in large pelagics, such as dolphinfish and yellowfin tuna, is increasing. In general, demersal catches show a decline since before 2000, however, catches for snappers have remained fairly stable for much of the time series.[46]

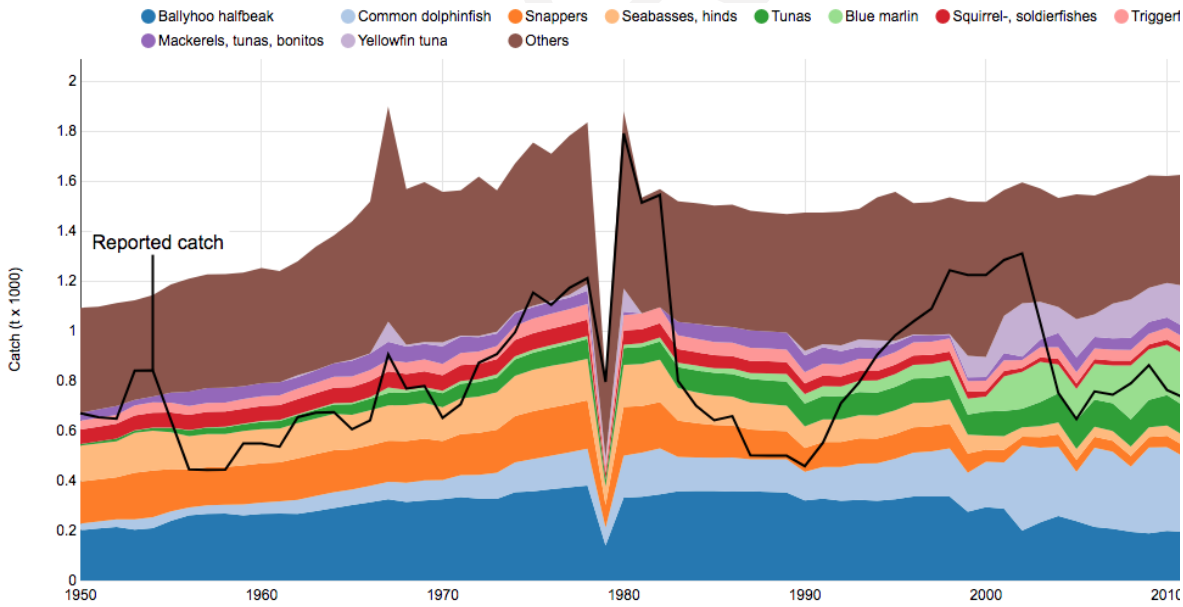

Figure 7: Catches by commercial species (1950-2015). Source: The Sea Around Us Project

43 Ramdeen *et al* (note 35 above).
44 Theophille (note 32 above).
45 Ramdeen et al (note 35 above).
46 Theophille (note 32 above).

3.3.4 Key challenges facing the fisheries sector

Due to the socio-economic importance of fishing in Dominica, by far the greatest challenges relate to the state of fishery resources and their current management. The pressure on the fishery is a result of numerous factors including:

- Knowledge of stocks is generally poor, and management decisions are being made without the benefit of reliable and timely scientific data.
- A key issue facing the fishery sector is the lack of any approved fisheries management plans, which are a requirement under the Fisheries Act.
- Many of the stocks are migratory stocks that migrate seasonally through Dominica's waters. This leaves the government with very little scope to address management of the stocks, since this must be done at a regional level.
- Evidence suggest that the shallow shelf (demersal) and reef fishery has been severely overfished and is now not sustainable. There is therefore a critical need for conservation and management measures to protect and improve the fishery.
- There is evidence that fish being taken from FADS are getting smaller, suggesting that less mature fish are being caught, which has serious implications for the future productivity of the pelagic fishery.
- Limited support from the Fisheries Division for the expansion of the existing number of marine reserves.
- Conflicts arise between fisherman at FADs because of the lack of such structures following Hurricane Maria.
- Enforcement of domestic fishery regulations appears to be problematic and fisheries management is challenged by open access policies that encourage over-exploitation. Too few fisheries officers are available resulting in a lack of presence of enforcement officers at landing sites and on the water. There is therefore a need to develop co-management arrangements so as to have shared responsibility between the enforcement authorities and fishes in order to have an overall improvement in fisheries management capacity.
- Lack of financial and human capital to allow fishermen to scale up existing operations to take advantage of deeper water fisheries, further offshore. This includes both commercial fishing and sport fishing for tourists.
- Poaching by foreign vessels from neighbouring countries and violations by domestic fishermen are reportedly common, especially to the south east of the island.

3.3.5 Impact of Hurricane Maria

Hurricane Maria caused significant damages and losses to the fisheries sector in Dominica. The first assessment indicated approximately 128 vessels and 126 engines suffered damages or were lost. Fisheries cooperatives lost ice-making machines, fuel pumps and supplies for market vendors. Fishers have lost a large percentage of their fishing gear. Most of the damage took place on the east coast, whereas the west coast was less affected.

The total losses in terms of lost fishing days for the various fisheries (reef fisheries, coastal pelagics and offshore pelagics) was estimated at approximately 60 days. Averaging the estimated catches per day, the total losses are US$500,222. In addition, it was calculated that 10,000 pounds of fish stock were damaged by the hurricane resulting in a loss of US$29,629 in value. This contributed to a wider issue relating to food security on the island. Based on current assessments, total damages amount to EC$6.52 million (US$2.41 million) and losses amount to EC$1.35 million (US$0.5 million) (Table 11 below). Total cost for the recovery need is estimated at EC$6.87 million (US$2.54 million).

FACILITY	PUBLIC (US$)	PRIVATE (US$)
DAMAGES	0.57	2.07
Equipment	-	1.85
Infrastructure	0.50	0.22
Damage to fish stocks	0.03	
LOSSES		0.50
Fish production		0.50

Table 11: Summary Table of Damage and Losses Sustained by the Fisheries Sector. (Source Post-Disaster Needs Assessment)

3.3.6 Aquaculture

Although there is no aquaculture activity currently undertaken in Dominica, several attempts have been made in the past to culture both marine and fresh water species.47 The farming of seamoss was trailed in in Calibishie, Jimit and Canefield, while farming of Asian freshwater prawn and Nile tilapia was undertaken at a small, semi-commercial level, with farms located at Melville Hall, Garden Garden, Stowe Estate, Canefield, Sherwood Estate and Belfast. Maximum estimated annual production yields were reported by FAO as 1 tonnes of prawns and 5 tonnes of tilapia respectively.

Aquaculture infrastructure was damaged as a result of heavy rainfall and flooding over the period 2011 - 2014. Eventually all aquaculture efforts failed due to damage, a lack of support from government and inadequate available knowledge on the subject.

3.4 Dredging and Coastal Aggregate Mining

Historically the coastal area has been an important source of aggregates for construction, with sand, gravel and coral rubble being extracted. However, as a result of improved regulation and the availability of onshore supplies, coastal aggregates mining is limited with small amounts of sand extracted. Aggregates are still extracted for major capital infrastructure projects but this is done on a case-by-case basis and is subject to strict regulation.

Dredging is not a significant activity in Dominica since there is no need for maintenance dredging of the ports.

3.5 Conservation and Environmental Protection

3.5.1 Marine protected areas

Dominica currently only has two marine protected areas designated: (i) the Soufriere/Scott's Head Marine Reserve (SSMR); and (ii) the Cabrits National Park, located in the south and north of the island respectively. These two MPAs are managed by Local Area Management Authorities (LAMAs) comprising a broad range of stakeholders (governmental, civil society and the private sector) with interests in the MPAs.

Cabrits Marine Reserve

The Cabrits Marine Reserve is part of the 525ha Cabrits National Park, established in 1986. The park biodiversity in the watershed stretching from upland ridge to adjacent coastal marine habitats. The marine reserve supports areas of seagrass and the only stands of white mangroves in Dominica. The

47 Andrew Magloire, personal communications.

reserve provides key nursery areas for numerous fish, nesting habitat for birds, and nesting beaches for sea turtles. which straddles both marine and terrestrial area.

Soufriere-Scott's Head Marine Reserve

A major attraction in Dominica is the Soufriere/Scott's Head Marine Reserve (SSMR), located in the southwest of Dominica. The reserve supports many rare and unusual creatures which are found in relative abundance in the area. As a result, the reserve has been listed several times by various international magazines as being one of the top dive sites in the world.

The SSMR was established by Statutory Order under the *Fisheries Act*. The aim of the reserve is to protect the marine environment at the same time as providing structure and balance to the demands of both tourism and the traditional fishing heritage of the villages in this region. Within the SSMR there are four zones. Each set aside for its own particular activity.

Fish nursery area: this area at Soufriere was determined to be a valuable spawning ground for many pelagic and reef fish; there is no fishing allowed in this region.

Recreation area: The section located at Tout sable is set aside as a recreational area for swimming and snorkelling from shore.

Fishing priority area: This part of the SSMR is set aside for the local fishery. There are strict guidelines governing this area.

Scuba diving: There are several areas set aside for scuba diving activities. These are all demarcated by a buoy placed there for dive boats only.[48]

A marine reserve has also been proposed along the coast off Salisbury, on the west coast. However, this has not been Gazetted as yet and remains a proposal only.

It is estimated that the two existing MPAs cover an area of approximately 11 sq. kilometres, which represents less than 0.001 percent Dominica's total maritime space. According to the most recent *National Biodiversity Strategy and Action Plan*, the government's target for 2020 is that at least 15 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem service, are conserved.

As a first step in reaching these targets, it is understood that the Government is currently implementing the GEF-funded project entitled *Supporting Sustainable Ecosystems by Strengthening the Effectiveness of Protected Areas System*. The emphasis of this project is the development of a protected area system management plan that strengthens national institutional and systemic structures, protected areas network, protected areas enabling environment, and civil society role on biodiversity management.

3.5.2 Habitat degradation and modification

There is currently a lack of national legislation dealing with environmental management with a number of functions split across different Acts and administered by different agencies. As such, there is currently no statutory basis for the requirement of environmental impact assessments for activities in marine environment and some activities remain unregulated. The risk of this approach is that such decision making is undertaken in isolation of the broader planning and environmental management framework. This lack of a consistent approach for assessing the environmental and other impacts of proposals could be a significant barrier to investment and future development of certain sectors.

A number of activities have been highlighted as causing physical damage to habits, including anchor damage from yachts and the discharge of sediment and pollution to coastal waters. A key gap in this

48 https://whc.unesco.org/en/tentativelists/6022.

regard is the lack of a national vision for the use of ocean space and the lack of a harmonised multi-use planning framework.

3.5.3 Marine pollution

According to the *Environmental Health Services Act, 1997* the discharge of any contaminant or pollutant is an offence. The Act applies to coastal waters although these are not defined. At face value this would indicate that no vessels may discharge sewage into the marine environment.

Notwithstanding this, it is noted that Dominica has not ratified Annex IV of MARPOL 73/78 relating to sewage. There are no provisions under any legislation prohibiting the discharge of sewage from ships and no specific controls or requirements on the discharge of sewage from yachts. A major impediment to controlling such discharges is the lack of shore-based reception facilities.

3.5.4 The 'Value' of the marine environment

In addition to the specific activities listed above, the marine environment provides a variety of goods and services essential to economic growth and social development in Dominica. The sustained supply of goods and services from the marine environment is central to the future wellbeing and prosperity of the islands. This supply depends not just on the presence, but also the quantity and quality of marine biodiversity. A recent study on The Economics of Ecosystems and Biodiversity (TEEB)[49] expressed this by stating that, in addition to the diversity of species, genes and ecosystems, it is the sheer abundance of individual animals and plants, as well as the extent of ecosystems that are critical components of 'natural capital' and key determinates of the scale and nature of the benefits derived.

This link between nature and the economy is often described using the concept of ecosystem services, or the flows of values to human societies as a result of the state and quality of natural capital. The Millennium Ecosystem Assessment provides a useful four category framework within which to view ecosystem services that contribute to human well-being, each underpinned by biodiversity:

Provisioning services – for example wild foods, crops, freshwater and plan derived medicines;

Regulating services – for example filtration of pollutants by wetlands, climate regulation through carbon storage and water cycling, pollination and protection from disasters;

Cultural services – for example recreation, spiritual and aesthetic values, education; and

Supporting services – for example soil formation, photosynthesis and nutrient cycling.

The concept of ecosystem services provides a framework to recognise the many benefits of nature – by maintaining stocks of this natural capital we can allow the sustained provision of flows of ecosystem services, and thereby ensure future human well-being. Some, such as provisioning services can be valued in financial terms, whilst other non-use values are often influential in decision-making but are rarely valued in monitory terms.

49 TEEB, (2008). The Economics of Ecosystems and Biodiversity (TEEB): An Interim Report. (European Commission). 69 p. Available at: http://www.teebweb.org/wpcontent/uploads/Study%20and%20Reports/Additional%20Reports/Interim%20report/TEEB%20Interim%20ReportEnglish.pdf .

3.6 Summary

OCEAN ECONOMY IN CONTEXT	AVAILABLE INFORMATION
Land area (square km)	751
Coastline (km)	148
Exclusive Economic Zone (square km)	28,500
Population (2017 values) [50]	73,925
Coastal population*	Approximately 50,000
Key Blue Economy Sectors	- Marine capture fisheries - Tourism - Ports and shipping
Ocean economy	>US$26 million**
Employment in ocean economy	Employment of tourism*** and fisheries alone accounts for nearly 17,000
Estimated value of coastal and marine ecosystems	Not Estimated
Marine protected area (percentage of territorial waters)	- 11 sq. km - Approximately 0.006 percent
Ocean health index (OHI)	52 (*Dominica ranks 205 among 221 countries and territories)*
Gross domestic product (2017 values)[51]	US$560,540,740.40
Human development index (HDI)	0.715 - high human development category (*Dominica ranks 103 among 189 countries and territories*)
Gross national income (GNI) per capita (PPP 2017 prices)[52]	10,170

* Estimated as 70 percent of total population.

** This estimate is based solely on the value of landed fisheries, cruise tourism and a proportion of stay over tourism - The figure assumes that 20 percent of stay-over tourists are attracted because of the marine environment. The true figure is likely to be significantly higher than this but the data available to the consultant does not allow an accurate calculation. As a priority, further work is required to disaggregate the contribution made by marine -focussed tourism.

*** This figure is total employment in the tourism sector and is not disaggregated for those only working in marine tourism.

Table 12:Dominica's Blue Economy in Context

50 Source: https://data.worldbank.org/country/Dominica.
51 Source: https://data.worldbank.org/country/Dominica.
52 Source: UNDP (2018). Human Development Indices and Indicators: 2018 Statistical Update: Briefing Note for Countries on the 2018 Statistical Update - Dominica.
http://hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf

4. Existing Governance Arrangements

A key step in understanding the status quo is to assess the current governance arrangements and to identify what gaps or areas of duplication exist that could be addressed to streamline and harmonize the current arrangements thereby delivering a more integrated governance framework. In particular, this should focus on the existing policy, institutional and legal arrangements.

4.1 Policy Environment

There is currently no comprehensive national ocean policy for Dominica and, with the exception of a draft National Fisheries Policy, prepared in 2012 but not yet adopted,[53] no specific plan for development of marine resources and activities. However, it is noted that the Organisation of Eastern Caribbean States (OECS) is currently delivering a parallel initiative, the Caribbean Regional Oceanscape Project (CROP), which, as a member of the OECS, Dominica is participating in.

CROP will deliver a number of outputs that will assist the Government of Dominica create a robust enabling environment to support better management of its maritime space and, therefore, support the development of a national blue economy framework. As one outcome of this project, the OECS will be preparing comprehensive national ocean policy and planning frameworks for several member countries, including Dominica. This work will include undertaking national level marine spatial planning activities, development of national ocean policies and the development of national Blue Economy Master Plans.

Hence, while no policy framework currently exists, the development of any future blue economy initiatives should be framed against not only the relevant regional and international treaties and conventions the country is party to, but also the specific activities and outputs anticipated under the CROP project.

4.1.1 International framework

The international ocean governance framework comprises a complex network of international and regional agreements, intergovernmental and civil society organisations and economic/market-based drivers.

The overarching framework governing the management of the oceans is provided by the 1982 United Nations Convention on the Law of the Sea (1982 Convention). The Convention contains an internationally agreed framework of rules and principles governing the use of ocean space and resources. This includes rules on the determination and delimitation of certain maritime zones, together with rules concerning the exercise of various rights by States, balanced by adherence to certain obligations.

In addition to UNCLOS, there are a number of other global and regional agreements that supplement UNCLOS regarding specific activities or regions, including the 1995 UN Fish Stocks Agreement, the Convention on Biological Diversity (CBD) and Chapter 17 of Agenda 21. Of these, the CBD is especially relevant as an international treaty that calls for conservation of all biodiversity.

53 SOFRECO (2012). *Fisheries Policy for Dominica, 2012-2037*. First Draft Report ACP Fish II – Strengthening Fisheries Management in ACP States. 19th April 2012.

Chapter 17 of Agenda 21 is devoted to the protection of the ocean, seas and coastal areas as well as the protection, rational use and development of their living resources. It proposes a plan of action and how to implement the principle of sustainable development that governments and local authorities can use.

More recently, the post-2015 development agenda, adopted by the UN General Assembly in September 2015,[54] included a broad framework which reflects the multifaceted nature of development. Of particular importance to the discussion on the blue economy are the Sustainable Development Goals (SDGs), adopted as part of the post-2015 agenda. They include, in Goal 14, a specific reference which articulates the link between oceans and sustainable development in a way that has previously not been explicitly stated.

Numerous sector-specific instruments have also been adopted under the auspices of relevant governing bodies such as the International Maritime Organization (IMO) for shipping and the International Whaling Commission.

In terms of fisheries, it is notable that Dominica has not yet ratified the *1993 FAO Compliance Agreement*, the *1995 UN Fish Stocks Agreement* and *2009 FAO Port State Measures Agreement*. However, at the 14th session of the FAO Western Central Atlantic Fishery Commission (WECAFC) in 2012, the country actively supported a resolution to strengthen the implementation of international fisheries instruments in the region.[55]

4.1.2 Regional governance arrangements

Over 30 different regional and sub-regional organisations with some level of engagement in governance of the ocean and its resources operate in the region and support these arrangements. They include UN organisations and regional intergovernmental organisations, oriented towards all aspects of ocean governance and marine resource management. A number of key organisations are outlined below:

OECS and the Eastern Caribbean Regional Ocean Policy

To promote an integrated approach to ocean governance1, the Organization of Eastern Caribbean States (OECS) has taken a first step through the adoption of the Eastern Caribbean Regional Ocean Policy (ECROP) and its Strategic Action Plan. The ECROP was endorsed by the OECS Heads of Government in 2013 after the Heads recognized the importance of the ocean to food and livelihood security and economic development within the OECS region.

The ECROP encourages the collaborative formulation of well-integrated governance frameworks capable of addressing marine user conflicts and protecting the fragile legacy of their marine environment. ECROP outlines key threats and challenges faced by policy makers and managers; the basis for such a national policy; a future Vision for the ocean; and a suggested set of principles, and goals for ocean governance in the Eastern Caribbean Region.

Policy 4 of the ECROP highlights the need for the adoption of multiple-use ocean planning and integrated management and calls on member countries to establish legal frameworks that reflect an integrated approach to planning and management of marine space. The policy states "*the ECROP will be implemented through regional and national institutional arrangements that emphasize national responsibility and regional cooperation, consultation and stakeholder participation*." The elements of this institutional framework include:

- An Ocean Governance Unit of the OECS Commission (to lead and coordinate activities at the regional level);

54 Further information about the Post-2015 Development Agenda can be found at: https://sustainabledevelopment.un.org/post2015. Accessed 8 April 2016.

55 http://www.fao.org/fishery/facp/DMA/en.

- An OECS Ocean Governance Team (comprised of representatives from each country as well as the OECS Commission and any needed advisory groups);
- Coordination Agencies at the national level in all member countries;
- National Ocean Governance Focal Points in all member countries

As a participating country in the World Bank-funded CROP, the Government of Dominica has initiated the country's trajectory towards developing a national ocean policy and planning framework in support of strengthened ocean governance and the realization of the blue economy.

Caribbean Environment Programme and the Cartagena Convention

The Caribbean Environment Programme (CEP) is one of the 18 UNEP administered Regional Seas Programmes. The CEP is managed for the countries of the Wider Caribbean Region through the Caribbean Action Plan (1981). The Action Plan led to the 1983 adoption of the *Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region* (Cartagena Convention), a comprehensive, umbrella agreement, which provides the operative legal framework for much of the ocean governance activity in the wider Caribbean.

The Cartagena Convention covers the combined EEZs of its Caribbean region parties. As well as requiring the adoption of measures aimed at preventing and controlling marine pollution, the Convention also requires parties to take appropriate measures to protect and preserve fragile ecosystems.

The Convention is supplemented by three protocols:

- The Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region (Oil Spill Protocol);
- The Protocol Concerning Specially Protected Areas and Wildlife in the Wider Caribbean Region (SPAW Protocol); and
- The Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol).

The Cartagena Convention provides support to the implementation of sub-regional, regional and global initiatives involving the countries of the Wider Caribbean. These include the Caribbean Sea Commission, Sustainable Development Goals and several multilateral environmental agreements.

Caribbean Sea Commission

The Association of Caribbean States (ACS) and partners have been pursuing the Caribbean Sea Initiative since 1998 as a way of seeking to persuade the UN General Assembly to pass a resolution declaring the Caribbean Sea a "Special Area" in the context of sustainable development. The major thrust of this work has been through the promotion of the UN Resolution 'Towards the sustainable development of the Caribbean Sea for present and future generations'.56

In the process, the Caribbean Sea Commission (CSC) was established in 2008 to promote and oversee the sustainable use of the Caribbean Sea. The CSC has adopted the large marine ecosystem (LME) Governance Framework as its working model for regional ocean governance arrangements. It will focus first on living marine resources which are the basis for livelihoods in fisheries, tourism and domestic recreation, as well as providing many other ecosystem services.

56 In the resolution the UNGA 'Recognises that the Caribbean Sea is an area of unique biodiversity and a highly fragile ecosystem that requires relevant regional and international development partners to work together to develop and implement regional initiatives to promote the sustainable conservation and management of coastal and marine resources…',.

Caribbean Large Marine Ecosystem Project

The Caribbean Large Marine Ecosystem and Adjacent Regions (CLME) project is a large-scale Global Environment Fund project, with the overall objective of promoting the sustainable management of cross-border resources, based on an ecosystem approach. More specifically, the CLME Project will facilitate the strengthening of the governance of key fishery ecosystems in the Wider Caribbean Region (WCR). For this purpose, CLME will give particular attention to the strengthening the existing governance arrangements in the region.

The first phase of the project (2009-2014) enabled the development of a Strategic Action Programme (CLME+ SAP, 2015-2025). The SAP was endorsed at high political levels by over 20 countries, including Dominica, in 2013. The SAP puts considerable focus on priority actions that aim at dealing with root causes of environmental degradation such as weak governance arrangements and capacity and information gaps, and overall lack of coordination of efforts, as a result of geopolitical and sectoral fragmentation at the regional, sub-regional, national and local levels.

The project is now in its second phase (2015-2020) which is focussed on supporting the implementation of the 10-year CLME+ SAP.

CARICOM - Caribbean Regional Fisheries Mechanism

The Caribbean Regional Fisheries Mechanism (CRFM) was established in March 2003, with its mission being to "To promote and facilitate the responsible utilization of the region's fisheries and other aquatic resources for the economic and social benefits of the current and future population of the region".

The objectives of the CRFM are:

- Efficient management and sustainable development of marine and other aquatic resources within the jurisdictions of its Member States;
- Promotion and establishment of co-operative arrangements among interested Member States for the efficient management of shared, straddling or highly migratory marine and other aquatic resources;
- Provision of technical advisory and consultative services to fisheries divisions of Member States to assist with the development, management and conservation of their marine and other aquatic resources.

Conservation and protection of fish stocks and ecosystems is a priority objective of the CRFM. As a member country, Dominica's activities in this regard are guided by the CRFM's Strategic, Medium-Term and Annual work plans.

4.1.3 National policy initiatives

Although Dominica has no overarching national ocean policy, a number of national and sector specific policies have been prepared (or are in preparation) that are highly relevant for the management of marine resources.

National Resilience Development Strategy: Dominica 2030

In response to the devasting impacts of Hurricane Maria in 2017, the Government of Dominica has prepared a National Resilience Development Strategy: 2030 (NRDS) in an attempt to integrate climate resilience and disaster risk management into the broader national growth and development framework. The NRDS is therefore the government's strategy for sustained growth with the emphasis placed on building climate resilience across all sectors of society and the economy. The NRDS overrides existing national policies and changes the focus of Government from that solely of socioeconomic growth to building a more resilient nation.

This NRDS therefore factors, more firmly, climate and non-climate considerations in the development process, and presents the priorities that Government must pursue in the pursuit of sustainable economic growth while maintaining a prudent fiscal stance in the face of global realities, in particular climate change.

The highest priority areas identified in the NRDS include poverty reduction and progress towards achieving the sustainable development goal targets by 2030. This will require focus on several key socio-economic spheres including, but not limited to:

- robust and equitable macro-economic growth;
- significant increases in the output of productive enterprises and productivity;
- growth in the services sector;
- protection and enhancement of the environment;
- strengthening and improvement of infrastructure;
- robust industrial development;
- creation of employment and incomes;
- reforms in public administration; and
- social protection.

In particular, the NRDS recognises *inter alia* that productive enterprises are one of the main drivers for growth, development and employment in Dominica. As such, the NRDS explicitly recognises the blue economy, and fisheries specifically, as a core component of the future growth strategy for the country.

Of critical importance for an understanding of how the blue economy can contribute to climate resilience vision of the NRDS is an understanding of what resilience means. For Dominica, the NRDS suggest that resilience comprises seven multiple development objectives:

1) The promotion of food security and self-sufficiency through Climate Resilience Agriculture and Fisheries Development;
2) Enhancing the resilience of Ecosystems and sustainable use of natural resources (Forestry, Marine, Water resources);
3) Enhancing Infrastructure Resilience;
4) Promotion of Sustainable Human Settlements/Communities;
5) Provision of adequate and sustainable social protection systems with the ability to respond rapidly to the impact of shocks at the individual and household levels;
6) Implementing a Comprehensive Risk Management Framework (including National Vulnerability Risk Resilience Fund) and pursuing the Low Carbon Development Pathway (the greening of the economy); and
7) Economic empowerment and innovations through sustainable Climate Financing.

National Physical Development Plan, 2016

The Draft National Physical Development Plan (NPDP) was prepared to complement the National Land Use Policy (NLUP) as the core documents with which to fulfil the requirements of the Physical Planning Act. Together the NLUP and NPDP are to guide planning for future land use and development in Dominica.

The overarching purpose of the NPDP is to facilitate rational, integrated long-term planning of all uses of land in the country.

Four development concepts provide the overarching structure for the NPDP:

- Concept One: Recognition of Constraints;
- Concept Two: Mainstreaming Climate Change Mitigation and Adaptation;

- Concept Three: Prioritization of Environmental Protection and Tourism; and,
- Concept Four: Focus of Planning and Development in Centres.

In terms of *Mainstreaming Climate Change Mitigation and Adaptation* the NPDP recognises that physical planning has an important role to play in both mitigation and adaptation of climate change. It recognises *inter alia* that protecting and enhancing the natural environment protects carbon sinks, and encouraging efficient land use planning and the use of renewable energies can reduce the carbon footprint of the community. In terms of adaptation: directing development away from areas at risk from natural hazards and low-lying coastal areas, encouraging decentralized infrastructure, and protecting existing agricultural lands will increase resiliency to the expected impacts of climate change.

In terms of *Environmental Protection and Tourism* the NPDP identifies the protection of the natural environment and investment in tourism facilities as priorities, given that tourism is recognized as a key opportunity to increase economic development.

Draft Fisheries Policy

Dominica does not have an operative fisheries policy but has taken steps to develop one. In 2012 the Fisheries Division embarked on an EU-sponsored project under the "*Strengthening Fisheries Management in African Caribbean and Pacific (ACP) Countries (ACP FISH 11)*". A review of this draft is instructive in identifying the general direction for fisheries in Dominica.

In addition, and notwithstanding the lack of a sector-specific policy, a review of the NRDS is also instructive in identifying the Governments overarching strategy vis-à-vis fisheries. The NRDS notes that:

> *during the planning horizon Government endeavours to enhance the adaptive capacity of the fisheries sector through the introduction of improved fishing technology, land-based operations and promoting practices that will reduce vulnerability, mitigate against and build resilience to the effects of climate change on the fisheries sector.*

Moreover, the NRDS identifies the following specific strategies with respect to fisheries:

1) Sustainable development and diversification strategy. The strategy will consider the fisheries value chain, encourage the use of improved fishing and post-harvest handling practices and will support fishers in identifying and developing more diverse markets;
2) Sustainable Fishing Communities and Livelihoods Strategy. The strategy will develop an equitable and enforceable management plan that will include protection of access to resources for existing and especially vulnerable fishers and fish farmers;
3) Sustainable Resource Management Strategy. The overall strategy for these fisheries is to maintain them as a 'reserve' in the event of significant environment-driven change in the offshore fishery. This will be achieved via effort reduction as required, along with marine inshore habitat protection; and
4) Governance and Institutional Development Strategy. The overall aim of the strategy is to support the implementation of ECROP (Eastern Caribbean Regional Ocean Policy) by proposing the means to create a more integrated, better-funded, more efficient and useful framework for marine research in the OECS region.

The Draft National Fisheries Policy is broadly in-line with these four strategic areas, although it goes further and also includes specific reference to aquaculture. The draft policy articulates eight specific policy objectives, which are broadly consistent with FAO *Code of Conduct for Responsible Fisheries*.

1. Governance;
2. Development and research;
3. Marketing and trade

4. Support for fishing communities
5. Sustainability and environment issues
6. Regulation and enforcement
7. Aquaculture
8. Regional and international integration and alignment.

Tourism Policy

The Government of Dominica has designated tourism as a priority sector as the country has the ecological and cultural resource base upon which to develop a sustainable industry on the one hand and on the other, take advantage of the expanding market for international travel to and within the Caribbean. The NRDS clearly identifies tourism as a key development priority for the future. It identifies the following main objective of Government policy:

To promote sustainable tourism development through the protection, conservation and development of the natural environment within its carrying capacity.

To this end it is anticipated that the tourism sector will seek to further increase initiatives to promote development and transformation of the economy through continuance of its thrust of promoting the local tourism industry.

To support this sector, the Government has developed the *National Tourism Policy 2020* and the *Tourism Master Plan 2012-2022*. These two documents provide policy and implementation guidance respectively.

The Tourism Policy identifies the following Vision for the sector:

> *Dominica will pursue sustainable tourism that enriches the lives of all citizens by creating economic, social and cultural opportunities, protecting the natural resources and scenic, heritage and cultural features of the country, nurturing community involvement in tourism at sustainable levels, and by creating career paths for the young people of Dominica.*

The Policy recognizes that the current tourism brand " The Nature Island" is limited and identifies the need to re-position its tourism sector to expand market positioning from that of a nature destination to one that encompasses culture and heritage, beach resorts, yachting, golf, health and wellness and a range of interesting things to do and see. This intent provides some useful guidance for how the blue economy can be developed vis-à-vis tourism development. In this regard, the policy also identifies a number of specific policy areas that are directly relevant to the blue economy, including:

Product Development Policy – To develop and diversity the existing tourism product as well as introduce new elements. These could include an increase the existing focus on dive tourism as well as the development of the yachting sector (particularly in Portsmouth) and recreational fishing; and

Cruise Tourism Policy – To enhance the existing cruise facilities and cruise tourism product with a view to Enhance the quality of the experience at nature sites for cruise (as well as other) visitors, without compromising the integrity of the resource while at the same time maximising the benefits of cruise tourism for the Government and people of Dominica.

Translating the Vision into reality is the objective of the updated *Tourism Master Plan 2012 – 2022*, which aims to:

- provide a comprehensive planning framework for the development of the tourism sector so that it can play a key role in the diversification of the Dominica economy.
- elaborate a vision of the future direction and content of the sector, which can help to focus and guide the actions of the various stakeholders towards a shared goal.

- identify priority areas for tourism development, related tourism facilities and supporting infrastructure.
- specify the major programmes, roles and responsibilities of key players, institutional arrangements and resource requirements for achieving the vision

The Tourism Masterplan introduces the concept of Tourism Development Areas (TDAs)[57] to guide the future development of tourism in Dominica (Figure 8). Designation of TDAs provides the basis for integrated planning of the area so that it functions efficiently and is relatively self-contained. From the planning perspective the importance of having designated TDAs is that they:

- Help create critical mass – making it economic to provide a range of facilities and services in an area.
- Diversify the product offer in a way that can be promoted to different niche markets, thereby facilitating product branding.
- Allow different forms of tourism development to co-exist – designating particular areas for nature tourism only, other areas for more intensive use.

Figure 8: Tourism Development Areas for Dominica: Source: Tourism Master Plan

57 A TDA is an area that contains tourist attractions, accommodation and other tourist facilities and services, all well serviced by a road network.

It is clear that these areas are centred around coastal areas which creates both opportunities for the development of the blue economy but also challenges in managing the increased impacts on the marine environment.

National Biodiversity Strategy and Action Plan (NBSAP)

Dominica adopted its first *National Biodiversity Strategy and Action Plan* (NBSAP) in 2001, as a requirement of the CBD, with the aim of protecting and conserving the country's biodiversity. The plan was revised in 2013 and the current NBSAP remains valid until 2020.[58]

The overarching theme of the revised NBSAP is that the basis for development in Dominica is through the sustainable use of terrestrial and marine biological resources. This is a critical element that supports the Government's push towards a blue economy development approach in Dominica.

The Strategic Goals are as follows:

1. The conservation and sustainable management of Dominica's terrestrial and marine biodiversity.

2. The promotion of sound and sustainable agricultural practices and technology within existing agricultural human capital.

3. To ensure that biotechnology knowledge and concerns are widely distributed so that all life is guaranteed and benefits derived are equitably shared.

These goals are supported by the following five strategic objectives:

1. To ensure that the biological resource of Dominica remains rich and diverse.
2. The promotion of sound and sustainable agricultural practices and technology within existing agricultural human capital.
3. To ensure that biotechnology knowledge and concerns are widely distributed so that all life is guaranteed and benefits derived are equitably shared.
4. To ensure that the basis for development is through the sustainable use of terrestrial and marine biological resources.
5. To ensure the equitable and sustainable distribution of social and economic benefits from the use of terrestrial and marine biological resources

From the perspective of the blue economy, the following identified targets are highly relevant:

1. By 2020, pollution, including from excess nutrient, has been brought to levels that are not detrimental to ecosystem function and biodiversity.
2. By 2020, at least 15% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem service, are conserved through comprehensive ecologically representative and well-connected systems of effectively managed, protected areas and other means, and integrated into the wider land and seascape.
3. By 2020, ecosystem resilience and the contribution of biodiversity to carbon stock has been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation, and to combating desertification.

58 Dominica National Biodiversity Strategy and Action Plan 2014-2020.

4.2 Institutional Arrangements

At least 13 government/parastatal agencies have been identified as having some form of statutory or functional mandate relating to management of ocean resources and ocean affairs. Furthermore, there are numerous sectorial sub-divisions and different hierarchical levels in each governmental structure (Table 13 below).

MINISTRY	BLUE ECONOMY RELATED ROLE
Ministry of Agriculture, Food and Fisheries	- Development and management of the fisheries sector through the Fisheries Division - Management of online fishing infrastructure - Protection of marine ecosystem and resources - Designation and administration of Marine Reserves - Licensing of whale watching tourism activities
Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal	- Responsible for environmental management through the Environmental Management Unit. This includes aspects relating to marine pollution prevention and control, coastal zone management - Management of forestry resources (including mangroves) through the Forestry Division - Designation and management of national Parks, Forest Reserves and Wildlife Reserve
Ministry of Justice, Immigration and National Security	- Responsible for the protection of the nation's borders and national assets. This includes maritime border security and enforcement through the Marine Unit of the Police Fore (Coast Guard)
Ministry of Finance	- National economic planning and development - Budget allocation to Ministries - Collection and analysis of economic data and statistics
Ministry of Foreign and CARICOM Affairs	- Responsible for representing Dominica's interest in international forums - Negotiating maritime boundaries - Ratification of international agreements
Ministry of Planning and Economic Development	- Land use planning and development through the Physical Planning Division - Management of national spatial data sets (GIS)
Ministry of Tourism and Culture	- Responsible for the promotion and development of the tourism sector through Discover Dominica Authority. This includes development and implementation of the Tourism Master Plan.
Ministry of Public Works, Water Resource Management and Ports	- Responsible for the key infrastructure to support the maritime transport sector. This includes oversight of the Dominica Air and Sea Ports Authority - Responsible for the national maritime authority (Maritime Administration Unit) and the Dominica Register of Ships under that Authority
Ministry of Trade, Energy and Employment	- Creating the enabling environment for tourism and other private sector investment through the Invest Dominica Authority (IDA)
Climate Resilience Execution Agency for Dominica (CREAD)	-

Table 13: Government agencies with a role in maritime affairs and the development of the blue economy

The numerous organizations that have competence in this area are located within a governmental structure, which leads to mostly top-down and segmented decision-making processes and, in some cases, gaps in the overall administration of ocean affairs.

A number of the key agencies are discussed briefly below.

4.2.1 Fisheries Division

The Fisheries Division, of the Ministry of Agriculture, Food and Fisheries, is the lead government agency responsible for fisheries. The Ministry has one Principal Secretary responsible for Fisheries, Agriculture and Food Safety.

The Division is responsible for negotiating fishing agreements, and for the specification and implementation of fisheries policy. The primary function, however, is the promotion and management of marine fisheries and the wider protection of marine resources that support the fisheries sector. This includes the sustainable development of both fisheries and other marine living resources (such as marine habitats, turtles and marine mammals).

According the Division's website, the mission of the Fishery Division is:

> *To create an enabling environment for employment, enhance food security, reduce poverty and contribute to economic diversification in Dominica.*

The Division is not large, being led by the Chief Fisheries Officer (CFO), who is supported by a Senior Fisheries Officer (SFO) and a number of Fisheries Officers and Fisheries Liaison Officers. This limits the capacity of the Division to undertake substantive work relating to the development and improvement of the fishery sector.

The Division is structured along functional lines as follows:

a) Research and development

b) Extension and Training

c) Education and Public Awareness

Pursuant to the *Fisheries Act*, the Division is responsible for the establishment and management of marine reserves in Dominica. In this regard, the Division plays a key role in working with local bodies and stakeholders in the management of marine reserves. The Division is also involved in monitoring, control and surveillance (MCS) of the fisheries sector. Other government departments are empowered to assist in this regard and play significant roles especially with regard to interdiction at sea. This in particular includes the Dominica Coastguard – the Marine Unit of the Dominica Police Force.

Opportunities are clearly seen for the fisheries sector to contribute more to the economy of Dominica, through improved fishing technology and expansion of the portion of the EEZ currently harvested, thereby catching more fish for export. In this way, it is hoped that, the fishing industry can generate revenue, create employment and thus contribute to poverty alleviation. The realisation of such opportunities will, necessarily, require some strengthening and enhancement of the Division.

4.2.2 Ministry of Environment Climate Resilience, Disaster Management and Urban Renewal

The newly created Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal is set to take on overall responsibility for coordination of environmental management activities in Dominica. While the primary focus will be on climate resilience and terrestrial environmental issues, there is clearly an important role to play in terms of protection and management of Dominica's maritime

space. Within the Ministry the Environmental Coordinating Unit (ECU) has a specific role with respect to environmental management.

Environmental Control Unit

The ECU was originally established in 1999 under the then Ministry of Environment, Natural Resource, Physical Planning and Fisheries. The ECU is now permanently established as part of the newly formed Ministry. The Units Mission is to:

> *Function as the coordinating, facilitating, administering and collaborating body for all environmental and sustainable development management programmes, projects and activities in the Commonwealth of Dominica.*

It is also responsible as the lead agency for the implementation of a number of multilateral environmental agreements relating to the environment, to which Dominica is a party.

In fulfilling this brief, the Unit liaises with other government and private sector agencies on issues relating to the environment, advises government on the development of coherent environmental policies and promotes public participation in environmental management through its public awareness activities. As such, while it is considered to be the lead agency for matters of environment, in reality this function is undertaken by a number of different agencies, sometimes with competing mandates.

Despite the stated Mission of the Unit, the Unit is funded primarily from projects with international funding. A significant amount of ECU programming is supported by United Nations agencies namely UNDP and UNEP. Funding from the Global Environmental Facility (GEF) comes to Dominica through these implementing agencies. Over the past decade the Unit has implemented small and medium size projects in the areas of biodiversity management and conservation, biosafety protocols and policy development, climate change adaptation and mitigation, and sustainable land management.

There clearly remains a key role for the ECU in terms of the future development and implementation of the blue economy in Dominica but, at this stage, the scope and precise nature of this role is unclear.

Forestry Division

The Forestry Division is the lead agency responsible for the management of the nations forest resources and, as such, also plays a crucial role in watershed management. While the Division does not have a mandate for marine management *per se*, the definition of "forest" appears broad enough to include mangroves forests. As such, the Forestry Division could play a crucial role insofar as coastal habitat protection is concerned. This includes the Power of the Minister to declare wildlife reserves pursuant to section 22 of the Forestry and Wildlife Act.

The National Parks Unit is the largest section within the Division and is responsible for the maintenance and upkeep of the island's National Parks System, including the Morne Diablotin National Park, Morne Trois Pitons National Park and the Cabrits National Park.

4.2.3 Ministry Public Works, Water Resource Management and Ports

The Ministry of Public Works and Ports is the arm of the Government responsible for the national infrastructure. As such, the Ministry is responsible for planning, designing, implementing, monitoring and coordinating development activities relating to maritime transport and ports, energy and meteorological services

The Ministry is primarily made up of nine functional units including those responsible for ports and maritime affairs (Maritime Administration Unit). Ministry also has responsibility for the Dominica Air and Sea Ports Authority (DASPA).

Maritime Administration Unit

The Maritime Administration Unit is the enforcement agency for all matters concerning seaworthiness, safety, and seafarer qualification. The function of the Authority is to register vessels, enforce ship safety requirements and constantly monitor and improve standards. This includes:

- Formulating and administering Dominica's Maritime Policy (not yet developed) and to become the focal point of all maritime matters;
- Registration and certification of vessels;
- Administration of marine pollution regulations;
- Representation the Government at international maritime forums; and
- Implementation of maritime projects.

Under the auspices of the Maritime Administration Unit, Dominica operates the Commonwealth of Dominica Maritime Registry Inc. (DMRI). The registry is operated by an agent under licence and is not resident in Dominica, but rather in the USA.

Dominica is a founding member of the Memorandum of Understanding on Port State Control in the Caribbean Region (Caribbean MOU). However, neither the Port nor the Maritime Administration Unit has the requisite officers to fulfil the duties relating to PSC inspections.[59]

Dominica Air and Sea Ports Authority

The Authority was established under the *Dominica Air and Sea Ports Authority Act, 2006* with the responsibility for operation of the ports, regulation and control of navigation and provision of navigational services and aids in relation to ports. The Authority has responsibility for the management of the Woodbridge and other ports as well as the cruise ship berthing at Roseau and Cabrits.

4.2.4 Ministry of Tourism and Culture

The overarching role of the Ministry of Tourism and Culture is the promotion of Dominica as a tourist destination and development of the tourism industry. As noted above, the Ministry has developed a Tourism Policy and Tourism Master Plan to drive growth in the sector.

The Ministry has the responsibility for the sustainable development of tourism with special emphasis on the promotion and marketing of eco-tourism and the development of products and services in keeping with that emphasis. As part of the marketing and development of the sector the Discover Dominica Authority (DDA) has been established. The Tourism Sector Development Programme has been setup to assist with infrastructural development technical assistance, community development, as well as destination and service marketing.[60]

According the Ministry's website, the mission of the Ministry is:

> *To position Dominica as the premier Eco-tourism destination in the region, supported by an enabling justice system and facilitated by efficient and effective support services.*

The Ministry supports a standing Tourism Coordinating Committee, chaired by the PS for Tourism, which includes representatives from a number of the key agencies that have a role in managing aspects of the tourism product (including forestry and wildlife, environmental management and capacity building). The Committee is supposed to meet every two months.

59 Mr Benoit Bardouille (DASPA), personal communication.
60 http://tourism.gov.dm/about-us/our-responsibilities.

Discover Dominica Authority

The DDA is a statutory body established under the *Discover Dominica Authority Act, 2007*. The functions of the DDA include:

- Promote, assist and facilitate the efficient development of tourism;
- Encourage the establishment of amenities and facilities appropriate for proper engagement of Dominica and a tourism destination
- Manage, licence and supervise the tourism licensing programme and other tourism services in accordance with the *Tourism (Regulation and Standards) Act 2005*
- Identify training needs for the tourism service sector

DDA also is taking the lead role in relation to air and sea access transport, although this is not part of its core mandate.

4.2.5 Ministry of Justice, Immigration and National Security Commonwealth of Dominica Police Force – Marine Unit (Coast Guard)

The Ministry of Justice, Immigration and National Security has responsibility for *inter alia* the Commonwealth of Dominica Policy Force (CDPF). The CDPF has a number of different branches including a marine unit, otherwise known as the Dominica Coast Guard (DCG). The DCG is a non-military force responsible primarily for border security and policing Dominica's waters against illegal activities, such as smuggling (drugs, weapons and people), piracy and, to a lesser degree, fisheries non-compliance. DCG is also the primary response agency for maritime search and rescue operations. The DCG does not have a legal mandate of its own to undertake fisheries enforcement operations, but works closely with the Fisheries Division, which does not have any waterborne enforcement assets of its own.

The DCG has limited capability to fully protect Dominica's maritime space. The current fleet consists of 1 x 40' and 3 x 33' inshore patrol vessels. These vessels have limited range and can only accommodate a crew for a short period, making extended, multi-day voyages extremely challenging.

There is only one base in Roseau which has to cover the entire coastline. Furthermore, the current infrastructure at the Roseau base does not allow for a permanent waterborne presence since the vessels must be taken out of the water during the peak of the hurricane season. There is no slip large enough to launch the 40' vessels which therefore has to be taken out of the water by crane.

It is also notable that Dominica does not have any electronic surveillance of its own waters. There is limited AIS coverage for the port authority but no country-wide AIS or radar network to monitor the EEZ.

4.2.6 Ministry of Foreign and CARICOM Affairs

The Ministry of Foreign and CARICOM Affairs has responsibility for formulating and implementing the foreign policies of the Government of the Commonwealth of Dominica.

The Ministry conducts all diplomatic and consular relations with foreign governments and represents Dominica in international organisations. It also participates in relevant bilateral and multilateral negotiations, furthering and protecting Dominica's domestic and international interests.

While the Ministry has no direct role in terms of the blue economy, it is the primary agency responsible to negotiating bilateral agreements with neighbouring states and, given the multilateral nature of the wider Caribbean Sea environment, the Ministry has conceivable a strong role to play in the future negotiations of agreements relating to the protection and management of shared marine resources.

4.2.7 Climate Resilient Execution Agency for Dominica (CREAD)

Following the devastation wrought by Hurricane Maria, the Government has committed to establishing an executive agency that will rebuild Dominica as a climate resilient nation. To this end, the Government is currently progressing the *Climate Resilience Bill, 2018* through parliament. The Bill provides for the establishment of the Climate Resilient Execution Agency for Dominica (CREAD) and various subsidiary bodies.

CREAD will have three governing committees:

1) an independent Supervisory Committee that will be responsible for overseeing an international-standard assurance system that protect against fraud and corruption and that set the highest standards of transparency.
2) a Policy Advisory Committee that will be charged with establishing Dominica's Climate Resilient Recovery Plan. The Plan will establish the recovery priorities, targets and goals from which CREAD's work plan and operations will flow.
3) an Executive Management Committee (EMC) who will be responsible and accountable for implementing the goals and targets set by the Policy Advisory Committee.

CREAD's primary role will be to coordinate all recovery action and all projects. CREAD will identify critical gaps between Dominica's Recovery Plan, and funded projects and will engage with international development partners to reduce these gaps.

According to the Climate Resilience Bill, the functions of CREAD are extensive,[61] and include:

- to ensure the climate-resilience of the physical and other infrastructure of Dominica;
- to coordinate recovery action following a climate related disaster, including the construction, reconstruction or restoration of physical or other infrastructure and the execution of projects aimed at building national climate resilience;
- to identify, develop, and recommend to the Board, climate-resilient systems;
- to identify, develop, and recommend to the Board, climate-resilient systems;
- to review relevant government policies and plans to advise on their consistency with the Dominica Climate Resilience and Recovery Plan; and
- to support Government Ministries to enable them to implement climate-resilient policies and priority recovery projects.

CREAD will have a four-year mandate, and as the need for recovery action normalises to 'development' it will establish and implement a strategy to transfer its capacities, skills, knowledge and information. As its mandate draws to a close, it will work to 'mainstream' the more efficient delivery practices it developed to relevant ministries in Dominica and across the region.

61 Climate Resilience Bill, 2018 Section 9.

4.3 Legal Framework

4.3.1 Overview

Dominica does not possess policies or legislation to adequately regulate problems or conflicting uses in the marine environment on a comprehensive basis. Currently, relevant regulation is found in diverse sectoral and *ad hoc* legislation. In some instances, the legislation is outdated and requires review and careful consideration to ensure conformity with the broad range of international agreements that Dominica is a party to.

A number of the main instruments are discussed in more detail below.

4.3.2 Maritime claims and legislation

Under the 1982 Convention Dominica benefits from the conferral of a range of rights in respect of extensive maritime zones. In this regard, Dominica has enacted domestic legislation to establish its principle maritime zones under the *Territorial Sea, Contiguous Zone, Exclusive Economic and Fisheries Zone Act, 1981*. Subject to this Act, Dominica asserts sovereignty and exclusive authority over the resources of the EEZ.

Territorial Sea, Contiguous Zone, Exclusive Economic and Fisheries Zone Act, 1981

The *Territorial Sea, Contiguous Zone, Exclusive Economic and Fisheries Zone Act, 1981 (Act 26 of 1981)* provides for the establishment of baselines and maritime zones in accordance with the provisions of the 1982 Convention.

In accordance with the Act, Dominica has declared a territorial sea (Section 3), a contiguous zone (Section 4), and an EEZ (Section 5) of 12, 24, and 200 nm, respectively. The breadth of each of these zones is measured from a baseline constructed along the coastline.

In addition, the Act recognises a 200 nm Exclusive Fisheries Zone (EFZ) (Section 6) within which Dominica shall exercise the sovereign right and exclusive authority to explore and exploit, conserve and manage the fishery resources of the suprajacent waters, the seabed and subsoil therein, in accordance with International Law (Section 9). This appears to be a relic of the pre-1982 Convention period where states declared EFZs to secure rights to fishing. The 1982 Convention superseded this mechanism.

Dominica shares a number of maritime boundaries with neighbouring States, namely Guadeloupe, Martinique and Venezuela. To date Dominica has signed a bilateral Treaty with France to agree on the delimitation of its northern and southern boundaries with Guadeloupe and Martinique respectively.[62] With regard to the outstanding overlapping claim between Dominica and Venezuela concerning Aves (Bird) Island, the Government appears not to wish to pursue this matter further at the present time.

4.3.3 Marine Resource Management

Fisheries Act, 1981

The *Fisheries Act, 1981 (Cap 61:60)* is the principal legislation governing fisheries and aquaculture management in Dominica and provides a general framework for the regulation of fishing and aquaculture in Dominica's waters. The Act is supplemented by the *Fisheries (Marine Reserve) Regulations 2001, (SRO 7 of 2001)*, and the *Fisheries (Berthing) Regulations, 2001 (SRO2 23 of 2001)* and subsequent amendments.

62 http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/TREATIES/FRA-DMA1987MD.PDF.

The Act has four substantive parts, with Part II dealing with management and development, Part III dealing with marine reserves and conservation measures and Part IV dealing with enforcement respectively. Part V is a general part providing for the making of regulations and other administrative matters.

The main management actions defined in Part II of the Act are vested in the Minister who, pursuant to section 3, may appoint a Chief Fisheries Officer (CFO) who is required to prepare and keep under review plans for the management and development of fisheries.[63] These plans shall indicate the current state of fisheries, the objectives to be achieved and the management, development and licensing measures to be applied including the amount of fishing to be allocated to foreign fishing vessels. Each fisheries management plan shall be submitted to the Minister for approval. To date, no such plans have been prepared for any fishery resource in Dominica.

The legislation also allows the Minister responsible for fisheries to prescribe management measures including: closed seasons, closed areas, gear specifications, fishing methods or gear types, specification of species sizes or other characteristics of aquatic organisms that are permitted or forbidden to catch, and schemes for limited entry into the fishery.

The Act authorises the Minister to enter into agreements for the allocation of fishing rights to foreigners and provides in general for foreign fishing in Dominica's waters.[64] Licences to foreign fishing vessels shall be granted only pursuant to an agreement except when the Minister determines that an agreement is not practical and the applicant provides sufficient financial and other guarantees for the fulfilment of obligations under this Act. Other provisions of Part II deal with fishing by local vessels and for pleasure and with aquaculture.

The Act requires that all boats undertaking fishing activities are required to hold a valid licenced, issued by the Minister. This applies both to foreign[65] and local fishing vessels[66] but excludes sport fishing and fisheries research activities. Any licence issued under the Act for the use of a vessel, net or activity shall be subject to general operating and management requirements as the Minister may prescribe and such conditions that are endorsed on the licence.

Pursuant to Section 18(1) of the Act, the Minister may, by Gazette Notice, designate any area as a local fisheries management area. Such areas should be under the control of an appropriate Local Fisheries Management Authority for the area. Where no such body exists, the Minister may promote the establishment of such a body.[67] Any such body may make By-Laws establishing controls on the conduct of fishing within the designated area.

To date only one such Notice has been Gazetted, in respect of the Soufriere/Scott's Head Fishing Priority Area.[68]

Similarly, pursuant to Section 20 the Minister may, by Order, declare any area to be a fishing priority area, where it is considered that special measures are necessary to ensure that authorised fishing within the area is not impeded or otherwise interfered with. Similarly, the Minister may also declare any area of the fishery waters as a marine reserve where it is considered that special measures are necessary to:

a) Afford special protection to the flora and fauna of the area to protect and preserve the natural breeding ground and habitats of aquatic life;
b) To allow for the natural regeneration of aquatic life in areas where such life has been depleted;

63 *Fisheries Act*, section 4(1).
64 *Fisheries Act*, sections 7-8.
65 *Fisheries Act*, Section 8.
66 *Fisheries Act*, Section 11.
67 *Fisheries Act*, Section 18(2).
68 Fisheries (Soufriere/Scott's Head Fishing Priority Area). Notice No. 20 of 1998.

c) To promote scientific study and research; and

d) To preserve and enhance the beauty of such areas.

To date only one such Order has been issued, in respect of the Soufriere/Scott's Head Marine Reserve.[69]

Strict penalties are provided for against any person found fishing within any marine reserve without permission of the Minister, which may be granted for the purpose of undertaking scientific research.70

The Act also provides the Minister with the power to grant any person with a licence to operate a fish processing establishment[71] and to lease any land (including areas of foreshore and the sea-bed) for the purposes of aquaculture, subject to conditions.[72]

Enforcement and related provisions of the Act are the most detailed compared with the other provisions of the Act. Section 27 as amended gives the typical powers of stopping, boarding and searching any fishing vessels in Dominica's waters as well as local vessels on the high seas. The Act also vests the power of seizure of vessels, its stores and cargo, fish and fishing gear; the power of hot pursuit; sale of seized fish or other perishable items; and, release of vessels on receipt of satisfactory bond or security.

The Minister responsible for fisheries is also vested with the powers to make regulations concerning management and conservation measures such as closed seasons, closed areas, use of gear, species and size of fish.[73] Fisheries regulations currently exist for the designation of landing sites (*Fisheries (Berthing) Regulations, 2001*) and for the establishment of controls in the Soufriere/Scott's Head Marine Reserve (*Fisheries (Marine Reserves) Regulations, 2001*).

4.3.4 Maritime transport and port facilities

Maritime transport is not well regulated compared to other countries in the Caribbean. Given the broad range of international instruments adopted by the International Maritime Organisation, to which the Government of Dominica is obliged to give full effect as a Flag State, this situation is a cause for concern, especially given that Dominica will be subject to a Mandatory IMO Audit in the coming years.

To date the Government has enacted the following main instruments relating to shipping:

1. *International Maritime Act, 2000*; and
2. *Dominica Air and Sea Ports Authority Act, 2006*.

International Maritime Act

The *International Maritime Act, 2000 (Act 9 of 2000)* is the main instrument for regulating international and domestic shipping in Dominica and supersedes the *Registration of Ships Act, 1991*. The Act provides for the establishment of the national maritime administration for the purpose of operating an international ship registry and provides the basis for regulating Dominican registered ships wherever they may be. The Act does not appear to provide any regulatory controls for international vessels within a port or within the territorial waters of Dominica. No other regulatory instrument giving effect to these international requirements could be identified in the course of this assignment.

The Act consists of seven Chapters, each giving effect to different aspects of ship registration and regulations.

69 Fisheries (Soufriere/Scott's Head Marine Reserve) Order, 1998.
70 *Fisheries Act*, Section 22(3).
71 *Fisheries Act*, Section 17.
72 *Fisheries Act,* Section 21.
73 *Fisheries Act*, Sections 4 and 27.

In providing for the establishment of the maritime administration, Chapter 1 provides for the appointment of a number of functional marine officers including; the Maritime Administrator, the Deputy Administrator of Maritime Affairs, the Deputy Administrator of Financial Affairs, the Deputy Administrator of Marine Personnel as well as the appointment of Special Agents to act on behalf of the Maritime Administrator. Chapter 1 also addresses the requirements for vessel inspection, though in a cursory manner and enshrines the International Regulations for the Prevention of Collisions at Sea in domestic legislation.

Chapter 2 deals exclusively with the documentary requirements for ship registration including vessel measurement and registration of bareboat charters, while Chapter 3 deals with mortgages and liens.

Chapter 4 deal with duties and liabilities of ship owners vis-à-vis carriage of goods and passengers at sea while Chapter 5 establishes limits of liability for maritime claims.

With the exception of Chapter 6, which deals with civil liability for oil pollution, the Act is silent on the regulation and control of pollution from ships, and Chapter 7 deals with maritime salvage and the investigation into maritime casualties.

Dominica Air and Sea Ports Authority Act

The *Dominica Air and Sea Ports Authority Act, 2006 (Act 8 of 2006)* provides for the establishment of the Air and Sea Ports Authority. Mostly this Act relates to the establishment, administration and operation of the Authority itself. However, it does provide that the functions of the Authority shall include:

- To regulate pilotage within the port limits (Part VII); and
- The levying and collection of port fees and duties.

Under Part VII of the Act, sea ports are considered to be compulsory pilotage ports requiring all ships to carry an Authority pilot when within port limits. Such pilots are authorised by the Authority itself, subject to satisfactorily passing a Pilot Exam.

There appears to be no provision for the appointment of a Harbour Master under the Act, but the Act does provide for specific functions, powers and duties of the General Manager for vessels within the port limits (Part VIII).

4.3.5 Conservation and environmental protection

Dominica has a limited number of legal instruments pertaining to biodiversity conservation, and, at the time of undertaking this assignment, no specific legislation dealing environmental management.

Forestry and Wildlife Act

The *Forestry and Wildlife Act, 1976 (CAP 60:02 – as amended*), as its name implies, is primarily focussed on forest management. The Act is administered by the Forestry Division, now under the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal. The purpose of the Act is to provide for the protection, conservation and management of wild mammals, freshwater fishes, amphibians, crustaceans and reptiles. In this regard, the Act does explicitly apply to marine turtles and marine crustacea.

For the purposes of this assignment, Part V – Wildlife Management appears to be most relevant. Under this Part, the Minister may declare any area *As a wildlife reserve in which hunting and fishing or taking of one or more species shall be prohibited.*[74] There is no definition of the scope of the area that can be

74 Forestry and Wildlife Act, Section 22.

designated and it is assumed that, since the Act applies to marine turtles, it is assumed that such areas can also include marine areas.

As such, given that, pursuant to Section 23, no person may remove any protected species, the Act could be used to complement the provisions of the *Fisheries Act*, visi-a-vis the designation of marine reserves and in particular the protection of certain species of marine mammals and marine turtles.

Moreover, this Act does provide one of only two legal mechanisms to provide protection to the marine environment from pollution since, pursuant to Section 27, *no person shall deposit or permit the deposit of a deleterious substance of any type into water frequented by fish, shrimps or crabs or in any place where the deleterious substance may enter the water*.

Draft Climate Change, Environment and Natural Resource Management Bill

There is currently no operative environmental management legislation in place in Dominica. However, with the creation of the Ministry of Environment, Climate Resilience, Disaster Management and Urban Renewal a draft Bill is currently being developed. While the primary driver for this Bill is clearly climate change and climate resilience, the Bill addresses a broad range of environmental matters that have important implications for the management of ocean space and the blue economy.

The Bill places an obligation on the Government to protect the environment for the benefit of present and future generations including *inter alia*:

a) managing the environment in a sustainable manner by integrating and giving due consideration to environment concerns in decisions on socio-economic and other policies and development programs; and
b) taking preventive and remedial measures necessary to address and abate all forms of environment degradation in the Commonwealth of Dominica in accordance with the polluter pays principle and the precautionary principle.[75]

It also requires the Minister responsible for Environment to establish the *Council on Environment, Climate Change and Development* which shall function as the highest authority on environment and natural resource management matters.[76] The functions of the Committee shall include:

- the coordination of all government activities which directly affect the environment and natural resource use;
- the review, approval or rejection of any application for a permit or approval in regards to any activity which directly affects the environment and natural resource use;
- resolution of any dispute between government agencies concerning any activity which directly affects the environment and natural resource use.

This is an extensive Bill comprising 354 Sections under 20 Parts, each Part dealing with a different aspect of environmental management. It is beyond the scope of this analysis to provide any detail with respect to the Bill, and a full copy of the Bill has not been made available. However, the key Parts that may be relevant from the point of view of the blue economy are highlighted below:

75 Climate Change, Environment and Natural Resource Management Bill, Section 6.
76 Climate Change, Environment and Natural Resource Management Bill, Section 8.

PART		KEY PROVISIONS
Part III	Administration	Provides for the: - Establishment of the Council on Environment, Climate Change and Development - Establishment of Climate Change and Environment Trust Fund - Establishment of Sustainable Development Tribunal
Part VII	Environmental Management	Provides for the: - Control of waste and pollution control - Process to Establish Code of Environmental Practice - Development of standards, procedures and guidelines for the environmental management
Part IX	Water Quality Management	Provides for the: - Development of policy on water quality management - Controls on discharges to water
Part X	Marine Pollution Management	Provides for the: - Control of discharges from vessels – giving effect to the MARPOL 73/78 Convention - Control of dumping of waste at sea – giving effect to the London Convention - Liability for pollution arising from vessels - Establishment of an Ocean Disposal Management Committee to oversea the licencing of waste disposal at sea activities - Licensing and management of leisure ports and marinas - Port State Control inspections of vessels in Dominican ports and the powers to investigate pollution incidents
Part XIII	Integrated Coastal Resource Management	Provides for the: - Control of coastal activities including prohibited and controlled activities - Establishment of a Coastal Resource Management Committee - EIA requirements for activities in the coastal area
Part XVI	Biodiversity Conservation and Access/Benefits Sharing	Provides for the: - Establishment of a Biodiversity and Conservation Authority - Review of Dominica's Biodiversity Strategy and Action Plan - Biodiversity Prospecting

Table 14: Summary of key Parts of the draft Environmental Bill

Beach Control Act

The *Beach Control Act, 1966 (CAP 42:04 as amended)* provides for the control and protection of beaches in Dominica. Pursuant to the Act all rights in and over the foreshore of Dominica and the floor of the sea are vested in the State.[77] In this regard, the Act requires that any person undertaking any trade, business or commercial enterprise requires a license granted under the Act.[78]

The Act also makes it an offence to remove beach material (sand, stone shingle or gravel) from any beach without approval from the Minister.[79]

National Parks and Protected Areas Act

The *National Parks and Protected Areas Act, 1975 (CAP 42:02)* provides for the establishment and protection of national parks and protected areas in Dominica. Although the focus of the Act is clearly on terrestrial parks and protected areas, it is clear from current practice that such parks can include areas of foreshore that are adjacent to marine areas. Hence there are important elements relating to integrated management of marine reserves that is addressed under this Act. Furthermore, and notwithstanding the forgoing, pursuant to Section 5 of the Act, the Minister may, by Order, set apart any State lands as a Protected area for the purpose of:

(a) preserving the natural beauty of such area, including flora and fauna thereof;
(b) creating a recreational area;
(c) commemorating an historic event of national importance; or
(d) preserving any historic landmark or any area or object of historic, pre-historic, archaeological or scientific importance.

Given that the foreshore and seabed are vested in the State (pursuant to the *Beach Control Act*) it is arguable that the *National Parks and Protected Areas Act* could also be applied to marine parks and protected areas, although to date this has not been Government practice.

An important element of the Act is the preparation of management plans in respect of any national park or protected area[80] that should include a scheme of operations proposed to be undertaken in respect of the area. The Act provides a general Regulation making provision for the Minister[81] which can provide for *inter alia*:

- the preservation of the flora and fauna;
- the regulation and prohibition of hunting and fishing;
- the regulation and control of transportation within the national parks system;
- the regulation and control of any trade, occupation or business within the national parks system;
- the regulation and control of development, construction and building within the national parks system; and
- the charging of fees.

The Act also provides for enforcement powers for park wardens and police officers to enforce the provisions of the Act including powers to stop, search and seize property from persons found in breach of the Act.

77 Beach Control Act, Section 3.
78 *Beach Control Act* Section 4(1).
79 *Beach Control Act* Section 12.).
80 National Parks and Protected Areas Act, Section 11.
81 National Parks and Protected Areas Act, Section 16(1)

Environmental Health Services Act, 1997

The Environmental Health Services Act, 1997 (Act 8 of 1997) is administered by the Environmental Health Unit of the Ministry of Health and Social Services. Its primary purpose is:

> *The conservation and maintenance of the environment in the interest of health generally and in relation to places frequented by the public.*[82]

While not directly related to the marine environment, the Act does include provisions relating to the control of pollution and discharges to the environment. In particular, Section 10 of the Act requires that no person shall:

(a) construct, alter, extend or replace any plant, structure, equipment, apparatus, mechanism or thing that may emit or discharge, or from which may be emitted or discharged a contaminant or pollutant into any part of the environment;

(b) carry on or alter a process or rate of production with the result that a contaminant or pollutant may be emitted or discharged into any part of the environment; or

(c) carry on or alter a process or rate of production with the result that the rate, or manner of emission or discharge of a contaminant or pollutant into any part of the environment may be altered,

Without the permission of the Chief Environmental health Officer.

In the absence of any other existing legislation dealing with pollution, arguably these provisions could be applied to the marine environment, particularly relating to land-based sources of pollution that could either impact the amenity of coastal areas of impact the quality of fisheries resources.

4.4 Summary

Overall, the governance framework relating to ocean management in Dominica is considered to be quite weak with many key sectors not having strong policy direction to underpin their development. This lack of policy direction has important implications for the identification of priority areas in a blue economy context. Many of the policies have not been well implemented and, in many cases, have now been superseded, to some extent, by the impact of Hurricane Maria and the government's desire to pursue a climate resilient agenda.

At least 13 government/parastatal agencies have been identified as having some form of statutory or functional mandate relating to management of ocean resources and ocean affairs. However, the current institutional set-up reflects a traditional sector-specific approach to management and planning and thus shows symptoms of the problem facing a great many states – marine resource management remains highly 'balkanized'. As a generalisation, governmental attempts to mitigate or adapt to particular resource uses on a sector-by-sector basis normally prove ineffective and are unable to respond to the cumulative and synergistic impacts and pressures from human activities

However, and notwithstanding the aforementioned, taken together, in the context of future management of the nation's ocean space, a broad policy direction does emerge from the analysis of the existing policy framework, namely:

- To increase economic activity and diversify the current economy;
- To create a climate resilient economy that provides a secure future for all Dominicans; and
- To do this in a manner that does not jeopardise the natural capital upon which much of Dominica's economy (especially tourism) is based.

82 Preamble to Environmental Health Services Act.

Furthermore, the Government clearly understands that one of the key resource bases for Dominica's economy and future development is the quality and diversity of its terrestrial and marine environments and that these also offer considerable potential for future economic development opportunities, if managed wisely. It is in this context that the development of any future blue economy Strategy should be framed.

The Government is also participating in the World Bank-funded CROP project, which will deliver a number of outputs that will assist the Government of Dominica create a robust enabling environment to support better management of its maritime space and, therefore, support the development of a national blue economy framework. As one outcome of this project, the OECS will be preparing comprehensive national ocean policy and planning frameworks for several member countries, including Dominica. This work will include undertaking national level marine spatial planning activities, development of national ocean policies and the development of national Blue Economy Master Plans.

The development of any future blue economy initiatives should therefore be framed against not only the relevant regional and international treaties and conventions the country is party to, but also the specific activities and outputs anticipated under the CROP project.

Diagnostic Analysis

5. Applying the Blue Economy for Growth and Resilience Building in Dominica

By embracing the blue economy, a number of opportunities arise for Dominica, which can contribute to sustainable economic growth, ensure protection and sustainable utilisation of the ocean and its resources, and contribute to the Governments objectives for climate resilience. The realisation of these opportunities will require strategies that:

1. Further support and develop existing sectors;
2. Promote investment and innovation to support the development of new sectors; and
3. Strengthen the management and protection of Dominica's maritime waters.

Based on the scoping study undertaken as the first part of this assignment, it is suggested that clear that the greatest opportunities for developing the blue economy reside within the tourism and fisheries sectors, with further limited opportunities in the ports and shipping sector. Underpinning these sectors is the fundamental requirement for a healthy marine ecosystem. Hence this analysis will focus on these four of the key Marine Functions that were outlined in Section 4 above.

For each of the Marine Functions, up to five separate but inter-related opportunities have been identified for consideration and further discussion with UNDP and Government officials. While some of these opportunities are sector-specific, others create synergies and linkages across the different functions. This is by no means an exhaustive list but captures the key issues and opportunities that were identified during the scoping study.

5.1 Support and Develop Existing Sectors

5.1.1 Tourism & Leisure

Despite Dominica's natural attractions, the tourism sector has been slow to translate its marine resource base into a growing industry, in that visitor numbers have changed little over the last decade.[83] According to research undertaken during the development of the most recent Tourism Master Plan, the reasons for this include:

- inadequate air and sea connectivity;
- shortage of 'market ready' accommodation;
- poor tourism infrastructure;
- dissatisfaction with quality of cruise product; and
- Dominica not known in the market place.

Market feedback is that Dominica should strengthen its position as one of the few comparatively undiscovered 'gems' of the Caribbean capitalising on its major appeals of *inter alia*:

- Nature environment, unspoilt wilderness – for nature lovers;
- Old world charm – the way life used to be in the Caribbean;

83 CHL Consulting (note 21 above).

- Wild, untamed simplicity;
- Peace and tranquillity – get away from it all;
- Safety and security; and
- Exclusivity and intimacy – a private hideaway – no mass tourism.[84]

Tourism, if well managed and monitored, will continue to be an important contributor to Dominica's sustainable development. Any future development strategy will therefore benefit from the inclusion of tourism as a sector to help accelerate sustainable consumption and production patterns in the development of the blue economy. Creating strong linkages between the tourism sector and the blue economy will be key to achieving this.

Against this, it must also be acknowledged that the tourism sector is vulnerable to the impacts of climate change as well as fluctuations in global economies. Thus, addressing vulnerabilities and developing resilience through coastal adaptation and multiple sources of income is important.[85]

Opportunity 1:	Create linkages between the tourism sector and marine conservation
Rationale:	Despite the damage caused by Hurricane Maria, a number of new resort style hotels are currently being developed in Dominica. These include: (i) the Kempinksi at Cabrits; (ii) the Hilton Tranquillity Beach Resort at Salisbury; (iii) the Anichi Resort & Spa at Picard Beach, Portsmouth; and (vi) the Jungle Bay Resort and Spa at Delice. Together, these facilities will add approximately 500 high end rooms to the current stock. Given that these resorts will be targeting a higher spending tourist to that which might have previously been attracted to Dominica, it is reasonable to assume that these clients will have greater spending power and will demand a higher quality of tourism product.
Opportunity:	To develop conservation partnerships aimed at protecting the marine ecosystems adjacent to these facilities (and wider if possible), in conjunction with the hotel operators themselves. Such projects could be packaged as Corporate Sustainability products for the companies and could also provide a vehicle for tourism education and awareness campaigns.
Benefits:	• Engage the tourism sector directly in conservation programmes that benefit the marine environment, the tourism industry and the people of Dominica directly. • Building environmental resilience into natural marine systems. • Improved environmental benefits for wider tourism sector (e.g. SCUBA diving). • Access to private-sector funding to support public good projects. • Basis for longer term partnership with the private sector.
Constraints:	• Availability of candidate sites in the vicinity of new development. • Political will to designate further areas for marine conservation. • Willingness of tourism operators to engage and fund such activities. • Human capacity to support such developments

84 *Ibid*.

85 World Bank and United Nations Department of Economic and Social Affairs (2017). The Potential of the Blue Economy: Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries. World Bank: Washington DC, 2017).

Opportunity 2:	Undertake a study to explore the opportunities and constraints to expanding the existing SCUBA and whale watching sub-sectors
Rationale:	From the scoping study it seems clear that there is additional capacity to support growth in both the SCUBA and whale watching sectors. The main constraints, at this time, appears to be related to access. However, without increasing tourist numbers, the number of cruise passengers alone should provide the opportunity for these sectors to capture a larger portion of the cruise market. However, in order to facilitate any growth, there is a need to better understand the carrying capacity of these coastal resources to support additional users.
Opportunity:	Support the long term sustainable growth of these sectors through the design of an effective growth strategy, based on a better understanding of the existing marine resource base, and the measures needed to protect it from adverse impacts.
Benefits:	• Define sustainable growth limits for the whale watching and SCUBA sectors thereby allowing them to grow within the natural limits of the environment that supports these sectors. • Increased revenue through tourism sector development.
Constraints:	• Funding and human capacity to undertake such a study. • Lack of scientific data to support analysis. • Lack of sector support for the initiative. • Political will to manage sector growth against environmental constraints.

Opportunity 3:	Create strong trade linkages between the fishery sector and the tourism sector
Rationale:	There are clearly linkages between fisheries and tourism, since tourists are consumers of fish and marine products. As the development of better quality accommodation progresses, there is likely to be a commensurate increase in demand for high-quality fish and marine products. The more that these can be sourced locally, the better from both the tourist operators' and the local fishing communities' perspectives. However, there are a number of severe constraints in Dominica relating to the quality of fish and the hygiene standards currently employed both by fishermen and by vendors. In order to satisfy any future market for high quality fresh fish, these constraints will need to be overcome. Failure to do so will almost certainly result in hotels sourcing fish from the neighbouring French territories or from further afield.
Opportunity:	To develop a strong internal market for fresh fish and fish products that benefits both local fisher folk and hotel operators simultaneously.
Benefits:	• Opportunity to improve fish processing standards in Dominica including the development of market standard Hazard Analysis and Critical Control Point (HACCP) systems. • Tourism and fisheries sector mutually supporting each other in terms of food security. • Increase revenue to fisherfolk through higher priced fish. • Opportunity to upscale these improvements to the national level to improve fish handling and quality.
Constraints:	• Lack of interest from either the hotel operators or the fishing communities. • Lack of existing facilities to achieve HACCP standards. • Lack of consistent supply of fish for hotel operators. • Risk of fish price disparities disadvantaging local consumers.

Opportunity 4:	Develop infrastructure to support the growing yachting community, including marine and shore-based facilities
Rationale:	As noted in section 4.1.2 Dominica is a popular stopover for cruising yachts. However, a key constraint to growth in this sector is the lack of marina and boat repair facilities, and only limited (but improving) chandlery and provisioning services. This has seriously impacted on the development of Portsmouth as a major yachting centre in the Eastern Caribbean to rival English Harbour in Antigua or Rodney Bay in St. Lucia.
Opportunity:	Develop shore-based facilities to support the yachting sector in Dominica. Initially this should focus on provisions and chandlery with the potential to develop shore/marine based facilities in the future.
Benefits:	• Attract more yachts to Dominica and increase resident time in country thereby increasing revenue. • Further diversification of the tourism product.
Constraints:	• Risks to yachting infrastructure from future storm events. • Lack of local investors willing or interested in this sector. • Lack of technical expertise to service this sector.

Opportunity 5:	Further expand the existing visitor fees payment system
Rationale:	Under the *Fisheries (Marine Reserves) Regulations, 2001* the Government has established a schedule of fees for users of the Soufriere/Scott's Head Marine Reserve. While this is an important contribution to the funding stream for the reserve, it is noted that the fees have not been revised since 2001 and no similar fees exist for other marine areas. The sustainable development of marine reserves, and related tourism sites, requires funding and, on the basis of the well accepted principle of User Pays, much of this funding should be sourced from the users.
Opportunity:	To review and comprehensively overhaul the existing user fees systems. This could form a component of a broader *Sustainable Finance Framework* for the blue economy.
Benefits:	• Increase revenue streams for blue economy initiatives. • Target visitors who are genuinely interested in marine environmental health and protection.
Constraints:	• Political will to implement. • Risk of putting visitors off of pricing is incorrect.

5.1.2 Food, Nutrition & Health

While the GDP contribution may be small, it is clear that fisheries constitute a significant pillar of Dominica's economy and a major source of livelihoods. However, as in many countries, the long-term sustainability of fisheries in Dominica is threatened by poor management practices, land-based pollution, and inadequate fisheries monitoring control and surveillance systems at both national and regional levels.

Research indicates that only those fisheries that are well managed can make a long-term contribution to the blue economy. The main factors constraining the development and management of the fisheries in Dominica include: lack of institutional and human capacity in both the public and private sectors; complexities of inshore fisheries management; post-harvest losses; poorly developed safety regulations for fishing vessels; and the poorly developed processing facilities.

Furthermore, while the impacts of climate change are being felt throughout the ocean realm, they are particularly acute for fisheries, the fish stocks they target and the marine coastal ecosystems on which they depend. Thus, well designed and targeted fisheries governance and management reforms must be seen as a key component of a transition toward a blue economy.

Opportunity 1:	Improve the health of the nearshore demersal and reef fisheries
Rationale:	As noted in section 4.3.3 above, the nearshore demersal and reef fishery has been subject to significant fishing pressure in the past. As a result, fishermen have directed greater effort towards offshore pelagic fish species. In some cases, these nearshore species (such as snapper) command premium prices. Given that many nearshore species are still caught, there is likely to be opportunities to implement fishery management measures to improve the health of these stocks. However, to achieve this there is a need to better understand this fishery resource and to design management measures that both protect the fishery and the underlying habitats that support the fishery.
Opportunity:	A key mechanism to facilitate better management of this resource would be the development and implementation of a *Demersal and Reef Fishery Management Plan*.
Benefits:	• Opportunity to carry out a detailed assessment of the state of the fishery and its potential for recovery. • Contribute to managed recover of the fishery. • If effectively implemented the management plan could lead to greater opportunities for fisherfolk to exploit nearshore resources. • Some of the demersal species are high value species therefore will improve returns to fisherfolk.
Constraints	• Lack of scientific data upon which to base the analysis - this would need to be collected as part of the project. • Lack of political will and support from the Fisheries Division. • Lack of fisherfolk buy-in. • Rik of short-term reductions in fishery needed to achieve long-term sustainability goals.

Opportunity 2:	Build resilience in the fishing fleet through better shore-based storage facilities
Rationale:	One of the key impacts of Hurricane Maria on the fishery sector was the damage to boats and engines. As a result, a large number of fishermen were (and still are) unable to fish. This not only compounded a critical shortage of food immediately after the hurricane, but has also severely impacted fishermen's livelihoods. It is noted that plans are being developed to upgrade the existing fisheries infrastructure (especially in Roseau). However, any comprehensive development plan for the fisheries sector must take into account the speed with which the sector can recover from future hurricane/storm events and the measures required to mitigate this.
Opportunity:	To build resilience into the fishery sector to allow it to recover more quickly to future storm events with lower financial losses.
Benefits:	• More resilient fishery sector which is able to return to fishing more quickly following future storm events. • Possibility to co-locate facilities for different users (e.g. fishing, DCG and yachting sector)
Constraints	• Cost of upgrading facilities. • Responsibility for ongoing maintenance of facilities. • Access to suitable land for such developments.

Opportunity 3:	Reduce post-harvest losses in the fishery sector
Rationale:	Fish is a highly perishable commodity and hence susceptible to high post-harvest losses. There is consistent evidence that these losses occur at all stages in the food/value chain (including: transport; storage; marketing and sales; and at the end consumer) and can be both quantitative and/or qualitative (i.e. economic and nutritional). Improving sanitary standards for the domestic market is likely to lead to a stronger, more viable market overtime. Minimizing post-harvest losses is therefore a key strategy to increase revenues and food security without the need to increase production. While many fishermen do utilise ice for storage, a significant proportion do not. Furthermore, storage, even on ice, in boats remains rudimentary. Handling and storage at main fish landing sites also leaves significant room for improvement. While it is acknowledged that the current lack of ice-making facilities has exacerbated this situation, there is a need for long-term strategies to address this issue. This will necessitate not only the provision of new equipment but also training and capacity-building, and financial support to improve vessel-based facilities.
Opportunity:	To both improve the quality of fish being traded and reduce the overall losses in the value chain which have both an economic and social cost.
Benefits:	• Opportunity to improve fish processing standards in Dominica including the development of market standard Hazard Analysis and Critical Control Point (HACCP) systems. • Raise confidence in the quality of the Dominica fisheries product at the local level. • Increase revenue to fisherfolk through higher priced fish. • Opportunity to upscale these improvements to the national level to improve fish handling and quality.
Constraints	• Lack of interest from the fishing communities. • Lack of existing facilities to achieve HACCP standards. • Risk of fish price disparities disadvantaging local consumers.

Opportunity 4:	Develop and strengthen the model of fishery co-management using the existing Cooperatives as a model
Rationale:	There does not appear to be a strong culture of stakeholder participation in resource-management decision-making in Dominica, particularly with regard to fisheries. A common conclusion from international experience is that bringing stakeholders together to address governance challenges is a vital step in making sustainable management possible. Communities must be empowered to make decisions locally and to take actions that meet local opportunities and problems. A key enabler for improved fisheries could be a shift towards more inclusive co-management arrangements, where this authority and the responsibility for making and enforcing marine management decision making and implementation are shared with local communities.
Opportunity:	An existing mechanism that exists in Dominica to support such a transition is the 'cooperative'. This model could be further adapted to include elements of co-management.
Benefits:	• Ability for fisherfolk to leverage support through the network of the cooperative. • Ability to develop "value chains" through the cooperative by engaging different parts of the value chain within the cooperative. (e.g. boat maintenance, cold storage and fish vendors). • Ability for fisherfolk to engage in management decisions and to therefore take a role in co-management of the fishery resources thereby giving them a vested interest in the health of the fishery.

Constraints	• Strong support from Government is required to encourage greater fisher participation and engagement in such cooperatives. • Lack of interest/support from fishing communities.

Opportunity 5:	Develop new fishery-based products to diversify fish trade
Rationale:	At present, the only products that are traded are fresh and frozen fish. There does not appear to be a culture of processing fish into products (e.g. smoking, drying or developing fish-based products). Increasing the value chain involves identifying opportunities to add value to the base product and this has not been done to any great extent in Dominica. In many developing countries, processed fish (dried, smoked and fermented) typically outweighs fresh fish by volume and number of traders. Furthermore, these types of processing typically produce little waste when compared to fillet processing. Developing actions aimed at adding value to local products would seem to be a credible component in the strategy that the fisheries sector needs to develop in order to meet current and future economic challenges.
Opportunity:	To support the development of product innovation in the fishery sector.
Benefits:	• Increase "shelf-life" of fresh fish products through processing. • Diversity the tradeable products base. • Add value to the base resource.
Constraints	• No existing processing facilities and limited local capacity in Dominica. • Limited "culture" of processing – local preference is for fresh fish. • Risk of fish price disparities disadvantaging lowest income consumers.

5.1.3 Ports & Shipping

The impacts of climate change pose serious threats to maritime transport infrastructure, services, and operations. Given that Dominica's ports are a critical infrastructure, developing measures for these to adapt to the impacts of climate and building their resilience is imperative. To benefit from the economic opportunities arising from the oceans, including trade, tourism, and fisheries, requires investment in transport infrastructure and services and transport policy measures in support of shipping. It also requires efforts to address inter-island/domestic/international shipping connectivity requirements.[86]

86 WB (note 85 above).

Opportunity 1:	Develop the existing interisland ferry service to include a domestic coastal ferry service between key locations
Rationale:	There is very limited public transport available around Dominica and, in some areas, the roads are in poor condition making access difficult or slow (for example Scott's Head). While there are inter-island ferries operating between Dominica and neighbouring islands, no domestic ferry service exists within the country. According to the Caribbean Development Bank, particularly among the OECS countries, show that ferry transport can provide reductions in passengers' costs by more than 30%.87 Additionally, ferries can offer greater connectivity between countries and provide additional connections, thereby increasing the convenience and accessibility of intra-regional tourism.
Opportunity:	As part of future planning, and in order to build a degree of redundancy into the transport network, consideration should be given to the development of a coastal ferry service that could provide regular services between key coastal communities.
Benefits:	• Diversification of domestic transport network. • Increase transport "redundancy" in case of damage to roads. • Improve speed of access to some parts of the country (e.g Scott's Head). • Integration into the cruise ship sector to expand the current cruise tourism experience. This could include linkages with the newly developed Five Star resorts. • Ability to supplement existing tourism routes to increase tourist access.
Constraints	• Lack of local investment capacity to support development. • Lack of coastal infrastructure and vulnerability of coastal infrastructure to future storm events. • Lack of proof of concept.

Opportunity 2:	Grow the registry and target "green shipping"
Rationale:	As discussed above, Dominica operates an international registry of ships. Dominica is not alone in this regard, with many other eastern Caribbean countries operating similar registries, with many of these companies targeting specific sectors of the industry of specific companies. Operating a registry has obvious benefits in terms of economic diversification and the fact that the running of the registry can be outsourced, thereby making it unaffected by lack of capacity or natural hazards at the national level. Despite this obviously competitive market, global demand for international shipping is likely to grow in future as global trade becomes more liberalised and the growing middle class consumes more. One interesting trend is the move towards greener shipping, one where ships are less polluting and consume less fuel.
Opportunity:	Focus the registry towards "green shipping", and to increase the numbers of ships registered under the Dominica flag, thereby increasing revenues. At the same time, the Government should review the current management and fees arrangements to ensure that the structure of the registry brings the maximum benefits into the national economy. Something that often does not occur.
Benefits:	• Crate a competitive advantage for the registry. • Increase revenue through the registry.
Constraints	• Lack of domestic capacity to develop the registry – have to rely on the registry being run by a third party. • Growth in the "green shipping" sector is far from certain and may take time.

87 Caribbean Development Bank (CDB) (2018). *Financing the Blue Economy: A Caribbean Development Opportunity*. (Caribbean Development Bank: Bridgetown, 2018).

Opportunity 3:	Invest in renewable energy sources to provide low carbon shore-based power for visiting ships
Rationale:	When alongside in ports ships must continue to run onboard machinery to generate power. In more modern ports, the option of connecting to a shore-based power supply exists for ships. This has the dual benefit of reducing emissions from ships in the vicinity of the port and reducing fuel consumption onboard the ship: the cost of shore power is typically lower than generating the equivalent power using fuel.
Opportunity:	Noting the need to upgrade (or even relocate) the existing Port Roseau facilities, DASPA should explore options for integrating renewable energy sources (particularly solar and wind) with its facilities to generate power for port consumption and, where excess exists, to provide shore-based power for ships.
Benefits:	• Reduce carbon footprint of the port operation thereby contributing to the overall "climate resilient" vision of the Government. • Reduce long-term operating costs through renewable energy supplies. • Reduce air pollution from ships in port. • Opportunity to increase port revenue from charges for shore-power.
Constraints	• Not clear that the economy of scale of the port makes economic case. • High CAPEX for the installation of infrastructure. • Vulnerability of power infrastructure to future storm events makes the investment risky.

5.1.4 Habitats, Marine Ecosystem Services & Coastal Protection

Opportunity 1:	Improve marine protection through expansion of the existing MPAs
Rationale:	Generally speaking, the healthier the marine ecosystem, the more resilient it is to external shocks and the better it can support those activities that are reliant on a healthy marine environment. The Government has committed to achieving the Aichi targets for protected area coverage but at this stage is a long way from achieving those targets. The expansion of the existing marine reserves to include a wider diversity of habitat types will not only provide direct benefits in terms of improvements to fish stocks but it will also help to build the resilience of those natural systems to better protect them against the inevitable impacts of climate change. They will also contribute to the natural capital which underpins the eco-tourism and SCUBA sectors.
Opportunity:	MPAs present significant opportunities for preserving the environment that underpins much of the Caribbean coastal and marine attractions. In addition to the proposed marine reserve at Salisbury, a number of other coastal sites merit further exploration as candidate MPA sites, particularly where seagrass beds, mangroves and healthy stands of coral exist.
Benefits:	• Improve marine ecosystem health and the resilience of coastal ecosystems to future impacts of climate change. • Improve the supporting functions of coastal ecosystems especially with regard to fisheries and tourism. • Contribute to achieving the Government's Achi targets.
Constraints	• Lack of political will and support from the Fisheries Division to develop further MPAs. • Opposition from tourism operators and fishing communities. • Lack of resources and capacity to fully implement new MPAs

Opportunity 2:	Explore opportunities to implement the CCI including the development of conservation Trust Funds for marine conservation
Rationale:	It is interesting to note that the Government of Dominica does not appear to have signed up to the Caribbean Challenge Initiative (CCI), which has a commitment to effectively conserve at least 20% of near-shore marine / coastal environments of participating countries by 2020. In order to progress Opportunity 1. Participating countries and territories have benefitted from institutional and financial support through the Caribbean Biodiversity Fund (CBF), an initiative funded by The Nature Conservancy (TNC), the German Government (BMZ and KfW), The World Bank Group and the Global Environment Facility. The CBF channels funds into National Conservation Trust Funds set up in each CCI country. These funds are matched by revenue raised by CCI governments via sustainable finance mechanisms, such as tourism fees.
Opportunity:	In order to establish a sustainable finance mechanism to support the blue economy and in order to assist the Government to achieve its biodiversity targets, becoming a participating member of the CCI would provide both technical and financial support.
Benefits:	• Technical assistance and capacity building to design and implement a national "network" of MPAs. • Financial support. • Assistance with the development of a more comprehensive Sustainable Finance Framework that should be a key component of any future blue economy initiative.
Constraints	• Lack of support for becoming a participating country.

Opportunity 3:	Develop a Sustainable Finance Framework
Rationale:	Considering the level of investment that will be needed to realise tangible outcomes from the blue economy, there is a need to explore new and innovative ways to finance investments in the blue economy. A blue economy approach presents an opportunity to potentially leverage additional resources for investments in ocean and coastal health and ecosystems, and utilise a wide variety of new and innovative financing models, for which both the public and private sector can partner to pool finances and share skills, expertise and approaches.[88] For example, despite the absence of dedicated funds explicitly designed to support blue economy investments, there is scope to leverage existing climate change funds to support climate change mitigation and adaptation activities in such a way that the same activities also support the development of the blue economy.[89] In a number of countries, a small charge is made on access to high-value marine biodiversity sites to contribute to continued management, surveillance and monitoring. Other important goods and services have yet to be recognised but the principles of incorporation exist through the ability to charge for use or access.
Opportunity:	To support development of the blue economy in Dominica there is a need to fully explore the range of financial mechanisms available and to develop a robust Sustainable Finance Framework that leverages these resources. This would expand existing schemes as well as devising further mechanisms to realise this potential.
Benefits:	• Sustainable funding to support blue economy initiatives such as MPAs. • Portfolio of different funding streams could be used to leverage investment from third parties (such as tourism operators)

88 CDB (note 87 above).
89 *Ibid*.

Constraints	• Lack of capacity to develop and implement a Sustainable Finance Framework – will need extensive third party support to design and identify sources of finance as well as project design and implementation support.

Opportunity 4:	Habitat mapping and marine research
Rationale:	Knowledge of the marine environment is a critical need for effective decision making. Planners and decision-makers require factual information about the geographical occurrence and abundance of ecosystems as well as information on how human actions affect these ecosystems. The marine environment is, however, far from being completely understood, leading to decision-making sometimes under considerable uncertainty. Furthermore, indigenous marine research in Dominica is poorly developed, or does not exist, due to a lack of funding and research institutions. This in turn leads to chronic gaps in the technical capacity for marine research, planning and decision making. Development of the fisheries sector, in particular, requires investments in data collection, research, knowledge and instruments that assist with planning such as undergoing vulnerability and risk assessments, particularly as it relates to climate change risks. Most solutions involve investments in building knowledge and capacity, investments in infrastructure and sustainable technology, and mainstreaming climate change Identifying and defining ongoing strategic research and capacity needs, together with appropriate funding, resources and partnerships, will therefore be essential for achieving long term economic growth from an ocean-based economy. A number of initiatives are currently underway through the UK Government's Commonwealth Marine Economies Programme (CMEP) that will start to update and improve our knowledge of Dominica's maritime space.[90] However, a more comprehensive programme of mapping and data collection is required in order to better understand the scale of the resource.
Opportunity:	The opportunity therefore exists to use the CMEP project to provide the basis for a broader programme of data collection and marine environment mapping that would underpin future planning and decision-making.
Benefits:	• Improve knowledge of the marine environment to support better planning and decision making. • Better understanding of the "value" of the marine environment.
Constraints	• Lack of a national coordination and data management function for marine data • Lack of indigenous research capacity and facilities to support a programme of data collection and monitoring.

5.1.5 The Importance of Value Chains in Growing the Blue Economy

A growing policy attention is being paid to value chains since they allow for an assessment of functions across sectors and point out where synergies and supply chain risks can occur. This is important since the core activities for each maritime function or economic activity will be surrounded by both upstream and downstream activities (the **value chain**).

90 Commonwealth Marine Economies Programme (2018). Dominica Country Plan. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachmentdata/file/758886/CommonwealthMarineEconomiesProgramme-DominicaCountryPlan.pdf

Value chains relating to the identified maritime functions in Dominica are typically short. What needs to be made clear for each activity is which aspects of the value chain are relevant to Dominica and which area not. Thus, for the maritime functions identified above, there is a need to analyse the most important value chains. The core activities for each function or maritime economic activity will be surrounded by both upstream and downstream activities (Figure 9):

- Upstream of the value chain are suppliers of equipment and resources, who may also have their suppliers.
- Downstream are processing sectors and subsequently distribution and sales.

Therefore, while the fishing sector itself may be a mature stage activity, opportunities may exist to extend the value chain with both growth stage (fish processing) and pre-development stage activities (aquaculture). This is important since large parts of the blue economy will not take place in the core sectors themselves but in the broader value chain. The extent to which the value chain can be extended will determine total value that can be realised from a single maritime function or resource.

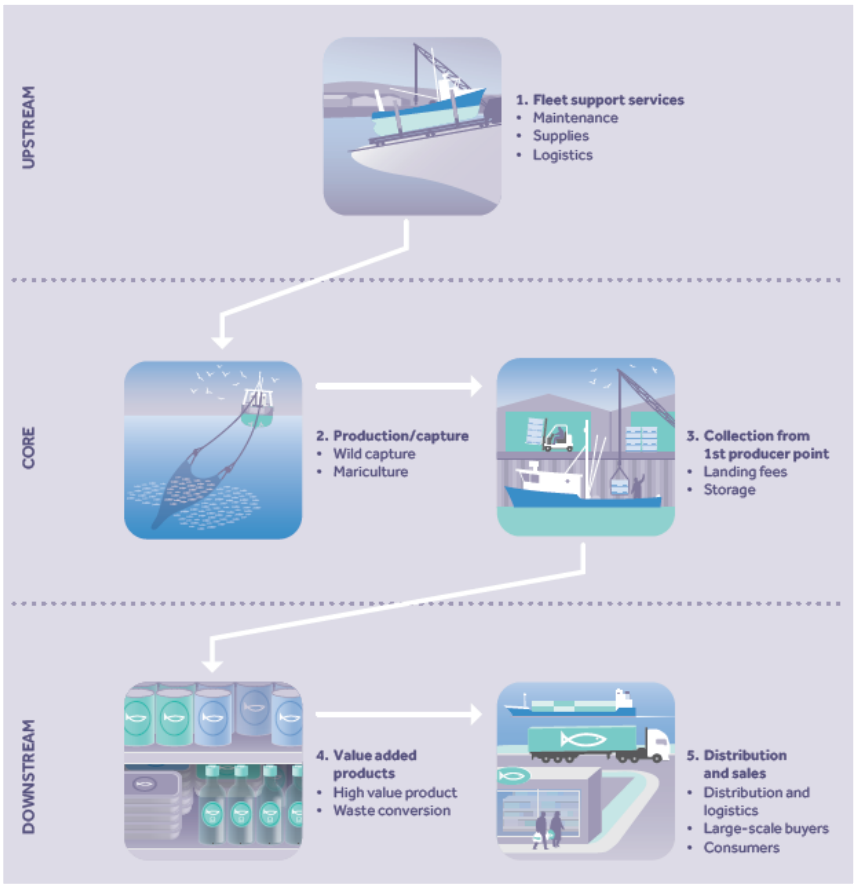

Figure 9: Fishery Value Chains. Source: Roberts & Ali (2016).[91]

5.2 Support Development of New Sectors

It is difficult to determine the potential for new economic pursuits to generate value and national economic growth. Many of the new and emerging sectors have an essential technological component

91 Roberts, J.P. and A. Ali, (2016). "The Blue Economy and Small States". *Commonwealth Blue Economy Series, No. 1*. Commonwealth Secretariat, London.

that will, in some cases, require substantial capital investment. A development approach is required that will enable innovation to expedite value creation from whatever opportunities present themselves, subject to sustainability tests. Proactive promotion by the Government is necessary because the level of investment risk is probably well beyond the domestic capital market. Foreign investment will no doubt form an important component of the realisation of new sources of value.

Dominica's potential maritime space is almost 40 times its land area and has been subject to less exploitation. In terms of future uses of the marine environment and their contribution to an emerging blue economy, aquaculture, ocean-related tourism and leisure activities and marine biotechnology are among the activities identified as having greater potential here. Renewable energy is also worth discussing, however, given the obvious land-based renewable energy resources available in Dominica (i.e. geothermal and hydro), it is not obvious that offshore renewable energy sources make economic sense in the specific case of Dominica, at least in the short term.

5.2.1 Aquaculture

Worldwide demand for fish and fishery products is expected to surge in the coming years across all continents. However, capture fisheries production is set to remain rather static, so that aquaculture has expanded rapidly to produce nearly half of all the fish people consume. To maintain the role of fish in diets, aquaculture production will have to more than double from current levels by 2050. Most of the future expansion in aquaculture production capacity will probably occur in the ocean, with some of it moving increasingly off-shore to escape the constraints of coastal waters.

Globally, aquaculture is already a multi-billion-dollar industry, but the Caribbean has yet to tap into its true potential to expand marine and fresh water aquaculture. This is because the aquaculture sector is not well developed in the region. The CRFM has identified the promotion and development of aquaculture as one of its priority programme areas, with the formulation of aquaculture development policy and legislation as key areas for attention. A recent FAO study suggests that aquaculture development could increase total fish production in the CARICOM states by 30 percent within 10 years if essential investments are made in enabling aquaculture policy and legal frameworks, supported by applied research, capacity building, and information.[92] Such sector growth could contribute to increased food production and security, improved rural income and employment, diversified farm production, and increased foreign exchange earnings and reduce the high food import bill.

As noted above, aquaculture has been successfully trailed in Dominica so the proof of concept has been established. However, at the time it failed to reach commercialisation.

Recommendations for fostering the development of an aquaculture industry within the blue economy

Listed below are a variety of strategic-level recommendations that could assist in the development of an aquaculture industry:[93]

Initial sectoral prioritisation

- The products of aquaculture are globally traded and it is unlikely that a Dominica will be able to compete on the global market on the basis of price. Therefore, aquaculture development should be based on products for the domestic/regional market or niche products that attract a higher price, such as eco-labelled products or products that can obtain added value by trading on the Eco-image of Dominica.

92 FAO (2014). The Sustainable Intensification of Caribbean Fisheries and Aquaculture. (Food and Agriculture Organization: Rome, 2014).

93 Hughes, A., J.G. Day, L. Greenhill and M.S. Stanley (2016). "Aquaculture". *Commonwealth Blue Economy Series, No. 2*. (Commonwealth Secretariat: London, 2016).

Creating a management and regulation framework based on the Ecosystem Approach to Aquaculture

- A comprehensive aquaculture policy based on the ecosystem approach to aquaculture (EAA) will allow the industry to develop within a framework that provides economic and environmental sustainability. Management, regulation and policy should be based on sound scientific principles and evidence. The EAA has to respond to three principles:
  (i) Aquaculture should be developed in the context of ecosystem functions and services (including biodiversity) with no degradation of these beyond their resilience capacity;
  (ii) Aquaculture should improve human wellbeing and equity for all relevant stakeholders; and
  (iii) Aquaculture should be developed within the context of (and integrated with) other relevant sectors.
- There are clear links between the aspirations of the blue economy and the three principles of the EAA. As the EAA framework is well developed and accepted at an international level, is recommended that, if Dominica wishes to pursue aquaculture development within a blue economy framework, the EAA should be applied as the basis for that development.

Developing in step with local capacity

- There are options for basing aquaculture development on expertise, technology and investment from outside Dominica. While this is entirely possible, it poses significant risks in terms of the economic, social and environmental sustainability of the industry. Allowing the industry to grow at a slower pace using indigenous capacity enables greater social acceptance of the enterprise and ensures that markets, infrastructure and technical expertise can all be developed within the SIDS, reducing the overall risk.

Investing in created institutional capacity and links between industry, academia and regulators

- Dominica currently has no research capacity in aquaculture. Local capacity should be addressed as a strategic issue requiring co-ordination across the blue economy and the economy as a whole, rather than within individual sectors. This capacity should be built with specific regard to making the outputs relevant to both industry and regulators, and resources should be used to ensure that there is direct access for regulators and industry to the research community.

Coherent cross-policy activity

- The blue economy framework should be used to assist in the development of clear action plans and activities should be rationalised under different policy initiatives.

Integrating planning of sectors within the blue economy

- Considering the possibilities of multi-sector development in integrated scenarios will identify overlap in actions (e.g. in relation to research or local infrastructure), address possible conflicts and develop dialogue on the comparative costs and benefits, within the context of sustainable development.

Feasibility of an aquaculture sector in Dominica

The development of an aquaculture sector in Dominica will be challenging. Previous experience has demonstrated that it is possible but requires strong support to make a success of it.

On that basis, it would be beneficial to start at the low-complexity end of the spectrum of development and to allow the aquaculture industry to grow organically (supported by government investment) and to move up the complexity spectrum as local capacity and infrastructure develop. Table 15 below illustrates a number of groups of "low-trophic level'" species that offer the potential for significant aquaculture operations in developing economies.

One example of a suitable market for Dominica would be live coral culture. The culture of live coral could provide a double benefit by assisting with the recovery of coral ecosystems, since coral

aquaculture/transplantation can improve coral cover, biodiversity, and structural heterogeneity of a degraded reef. It could also provide an interesting tourist experience. Similar initiates in other countries (e.g. Australia, Fiji, Seychelles and Belize) have demonstrated the efficacy of the approach and could provide comprehensive lessons to Dominica in the event that this option was pursued.

GROUP	MARKET	NOTES
Seaweeds	The global seaweed market is worth approximately US$6 billion annually; it is used mainly for direct human consumption or as a food ingredient.	Globally, most of the production comes from aquaculture. There are a number of species indigenous to SIDS for which both a market and cultivation techniques exist.
Sponges	Large specimens attract a premium for the bath sponge market, and take approximately 2 years to grow to size.	Sponges have a range of commercial uses, including in cosmetics, collagen and bioactive compound production, and are relatively simple to culture.
Sea cucumbers	A fishery for sea cucumbers exists globally in the tropics, but stocks have become severely depleted. Currently, China produces 10,000 tonnes per annum through aquaculture.	In many SIDS, there is an existing fishery for sea cucumbers, including *Holothuria scabra*, for which there is a well-established aquaculture industry in Asia.
Corals	The trade in live corals for aquariums has grown at approximately 9% per annum since 1990, and on average coral retails at $56 a piece in the US.	Aquaculture production is normally by fragmentation of donor colonies. In the beginning, these donor colonies are from wild coral colonies on reefs.
Aquacultured live rock	Traditionally, Fiji has been the main source of live rock for import to the US. The value of this trade is $50 million globally.	Live rock is much used in ornamental aquariums and can be easily cultivated.
Mud/mangrove crabs	The grow-out period is approximately 6 months, and the crabs are worth approximately $6/kg when full grown.	Where these animals are endemic, there is often an artisanal fishery for them. Collection and hatching of berried females, or juveniles, and their subsequent on-growing offers a sustainable alternative to the wild harvest.

Table 15: List of possible low trophic-level aquaculture species groups that may offer aquaculture potential in Dominica[94]

5.2.2 Biotechnology

The term biotechnology is widely employed and has different connotations and meanings for different individuals. A useful and all-encompassing definition is provided by the OECD:

> *The application of science and technology to living organisms, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services.*

94 Source: *Ibid.*

In 'blue biotechnology' the biological materials originate from the aquatic environment, freshwater and marine, and this has in recent years become synonymous with marine biotechnology. With the ongoing revolution in methodological development, the toolkit for developing commercially viable products and processes has expanded (Figure 10).

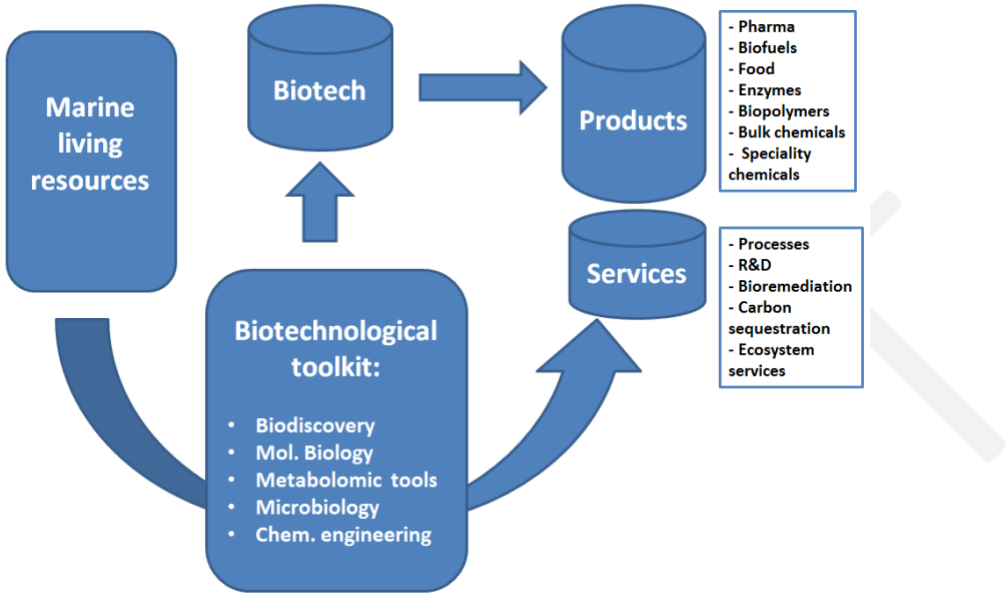

Figure 10: Blue biotech workflow: from bio-resource to wealth creation.[95]

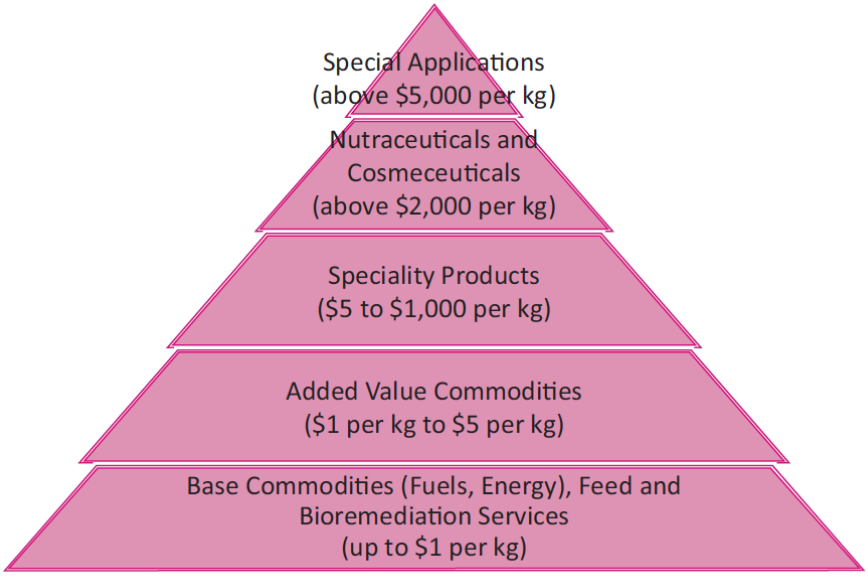

Figure 11: Value pyramid of products obtained from the marine environment. [96]

Marine biotechnology encompasses a wide range of activities and can include everything from bioprocessing of harvested materials (fish, algae, etc.) to cultivating marine microbes or developing an innovative buoy system for monitoring ocean pollution. Figure 11 shows a range of different products

95 Source: Day, J., A. Hughes, L. Greenhill and M.S. Stanley (2016). "Blue Biotechnology". *Blue Economy Report Series, No. 5*. (Commonwealth Secretariat: London, 2016).

96 Source: *Ibid*.

and services that can be generated from marine resources, categorising them on the basis of their commercial value, from top-end pharmaceutical compounds to low-value bioenergy produced from organic waste.

It is worth noting that special applications products are usually described as low volume, high value and, at the other end of the scale, base commodities are invariably high volume, low value. There is potential for individual SIDS, or SIDS collaborating closely, to produce compounds and products at certain levels in this value pyramid, but, given the costs involved in developing special applications, collaboration at an international level is likely to be required.

While the development of marine-based biotechnology is at a very early stage of development worldwide, marine biotechnology has the potential to address a raft of major global challenges:

- On the health front, there has been increasing interest in marine microbes, particularly bacteria, with studies demonstrating that they are a rich source of potential drugs.
- Marine biotechnology has also displayed widespread commercial potential in industrial products and processes, and in the life sciences industry as a novel source of enzymes and polymers.
- On the energy front, algal biofuels appear to offer promising prospects. Within the last two years billions of dollars have been injected into alga-culture or algal farming right around the world.

Marine biotechnology has also displayed widespread commercial potential in industrial products and processes, and in the life sciences industry as a novel source of enzymes and polymers. At the same time, marine bio-resources also provide a number of important ecosystem services for the planet and its inhabitants which must be maintained.

The technological journey involved in bioprospecting, from finding an organism with biotechnological potential to having a product that is marketable, can be a complex, time-consuming and expensive procedure (Figure 12).

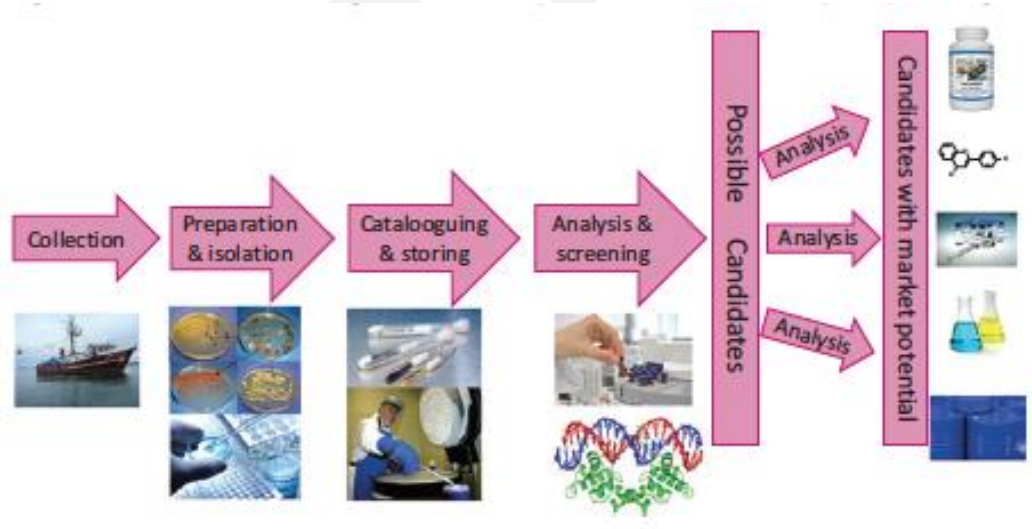

Figure 12: Technical stages of development in marine bioprospecting. [97]

In the case of bioprospecting for molecules with pharmacological activity, a minimum of 10-15 years and hundreds of millions of dollars may be required to take a product to market. However, for other, non-pharma, products the development pipeline may be much shorter, and, particularly for those products

97 Source: *Ibid*.

that can be manufactured using proven technologies and where there is a strong market demand, the period time from discovery to income generation may be as short as 2–5 years.

Recommendations for fostering the development of blue biotechnology

Listed below are a variety of strategic-level recommendations that could assist in the development of blue biotechnology: [98]

Initial sectoral prioritisation

- Focus on niche products, based on local biological resources, developed, produced and marketed worldwide. Although bioprospecting for pharmaceuticals is a possible option with the involvement of external partners, niche products, based on biological resources, developed, produced and marketed worldwide from any SIDS, provide a more realistic opportunity to generate high-value jobs and diversify the economy of the country.

Scientific exploitation

- Existing data should be systematically explored to inform and steer any future bioprospecting activity,

Biological resource management

- Ensure effective and simple implementation of the Nagoya Protocol's recommendations and establish a local biological resource facility. The establishment of a local collection facility will provide a resource that can be exploited nationally or internationally and form a foundation for future biotechnological exploitation.

Development of critical mass

- Develop a government-owned, or locally resourced, public–private independent research company as a focus for activity; build strategic alliances with national and international commercial and academic partners.

Financing

- Finance activities through public-led partnerships with the private sector and secure international support.

Coherent cross-policy activity

- Use the blue economy framework to assist in the development of clear action plans and rationalise activities under different policy initiatives.

Developing scientific research capacity

- A national study into capacity for research and current international collaboration is supported, ensuring that, in addition to technical skills, it also considers social science and entrepreneurial aspects relevant to the development of and local ownership of blue economy activity.

Developing indigenous skilled capacity

- Address local capacity as a strategic issue requiring coordination across the blue economy and the economy as a whole, rather than within individual sectors.

Feasibility of a blue biotechnology sector in Dominica

Whereas the production of some biotech products, such as bulk chemicals and pharmaceuticals, may not be practicable, because of lack of land availability, investment or infrastructure, the production of niche products such as cosmeceuticals and nutraceuticals could be commercially viable in Caribbean SIDS.

98 Adapted from Day *et al* (note 95 above).

In the case of Dominica, these could benefit from exploiting the Nature Island brand to connect to international markets. This approach has been successful in Iceland, where cosmetics (skincare products and treatments) based on Icelandic algae grown in photo-bioreactors are marketed with reference to the 'natural purity' and 'healing power' of the Blue Lagoon. Niche products, based on biological resources from an individual SIDS, developed, produced and marketed worldwide, provide a realistic opportunity to generate high-value jobs and diversify the economy of the country.

Deep marine water products

One specific case that might be worth exploring, given Dominica's surrounding topography, is the extraction of 'deep sea water'. Deep-sea water is mineral rich and of a high purity. Deep seawater-related products such as desalination bottled water, sea salt and nigari, food and beverages, cosmetics and pharmaceuticals, have experienced phenomenal success in countries such as Japan and the USA. Some countries (e.g. Mauritius) are developing such industries based on seawater extracted from depths > 1,000 m.

5.2.3 Marine renewable energy

Sustainable energy provision is fundamental to the transition to a low-carbon economy, and the basis for progressing towards sustainable development globally. SDG 7 highlights the importance of sustainable energy and industrial development, with particular reference to SIDS (SDGs 7.b and 9.a). The ocean is a rich source of potential energy resources, and with growing concern over climate change and increasing global interest in renewable energy, investment in ocean-based energy is poised to grow over the next few decades. Considering the multiple benefits of MRE, in terms of energy security, environmental protection and socio-economic benefits, it is a win-win solution in terms of sustainable development and the blue economy.

Ocean sources of renewable energy can take many forms, and the feasibility varies according to each technology as they range in development status globally:

- Wave
- Tidal (rise & fall, currents)
- Ocean currents
- Ocean Thermal Energy Conversion (OTEC)
- Salinity gradients (osmosis)
- Marine-based biomass, e.g. algae.

Given the rapid progress in the sector globally, MRE is a realistic medium- to long-term energy option for many SIDS; it would enable them to utilise locally available resource, reduce pressure for space on land and optimise the value of other marine activities within the blue economy. In addition to providing a further source of sustainable energy, MRE can supplement terrestrial renewable energy initiatives, and help in balancing the intermittency of these technologies in grid-connected energy systems.[99]

The development of marine renewable energy (MRE) in the Caribbean can support achievement of renewable energy objectives and provide energy security through greater independence from imported hydrocarbons. Regional cooperation enables strategic use of capacity, mobilisation of donor resources and development of a stronger collaborative vision to support national-level action. There has been notable progress in this regard through CARICOM, resulting in the production of a Regional Energy Policy, followed by the Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS), which aims to provide CARICOM member states with a coherent strategy for transitioning to sustainable energy.

99 Greenhill, L., J.G. Day, A. Hughes and M.S. Stanley (2016). "Marine Renewable Energy". *Commonwealth Blue Economy Series, No. 4*. (Commonwealth Secretariat: London, 2016).

However, there are also significant challenges facing the sector globally, as it is an emerging sector and demonstrated commercial success is not yet evidenced.[100] Notable challenges include, most significantly access to financial capital, institutional capacity to plan and develop renewable energy projects, local infrastructure and human capacity for engineering works. For MRE, the added cost of the risk associated with early-stage technologies means that financial support, technology transfer and capacity-building are even more important than in the case of terrestrial options. However, the current costs of energy in SIDS mean that cost-competitiveness is more easily achieved, and, through coordinated and collaborative action, the hurdles can be addressed and the renewable energy ambitions of SIDS fulfilled.

Recommendations for fostering the development of marine renewable energy

Listed below are a variety of strategic-level recommendations that could assist in the development of blue biotechnology: [101]

Clarify realistic local opportunities for MRE

- Refine understanding of opportunities through detailed resource assessment and in accordance with specific technology-developer requirements.

Ensure coherent, integrated policy and planning

- Develop integrated national action plans for renewable energy that include onshore and offshore options and options for grid and off-grid generation, as well as taking into account energy efficiency and demand.
- Demonstrate sustained, cross-policy support for stepwise progression of MRE to internal and foreign stakeholders, underpinning policy ambition with a comprehensive planning and regulatory framework.
- Integrate planning with other sectors to cost-effectively address barriers such as lack of data, skills and institutional capacity.

Use marine spatial planning (MSP) to support practical sector development

- Identify appropriate development areas, including opportunities for co-location with other sectors.
- Provide a stakeholder forum for negotiating and balancing multiple sectors and interests.
- Enable optimisation of the benefits obtained from the marine area in the blue economy, within ecological and social limits.

Build knowledge and share experience

- Connect globally, ensuring transfer of knowledge locally and influencing global forums on the specific needs of SIDS.
- Develop guidance for businesses, stakeholders, communities, prospective developers, investors, etc., on when and how to engage with the blue economy, and on opportunities in MRE.
- Develop a strategic research agenda to support continued improvement of understanding of the potential impacts of plans and projects.

Engage civil society early to use local knowledge and engender ownership

- Engender acceptance and ownership of energy projects through participation and capitalise on local knowledge in the design of innovative energy solutions.

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100 Adapted from Greenhill, L (2014). *Early briefing report on the feasibility of marine renewable energy in the Seychelles.* Briefing paper prepared for the Commonwealth Secretariat by the Scottish Association for Marine Sciences, November 2014.

101 Adapted from Greenhill *et al* (note 99 above).

Feasibility of developing marine renewable energy in Dominica

While MRE is generally considered to be a realistic medium- to long-term energy option for many SIDS, in the case of Dominica it is questionable whether MRE can be competitive against the existing options that are being pursued (particularly geothermal, hydro and solar). That is not to suggest that it should be considered in the overall portfolio of renewable energy options being considered for Dominica, but rather that it seems doubtful whether it will be cost effective against those other options.

This notwithstanding, there may be an argument for small-scale scalable MRE options for off-grid areas can address the current and future power needs of remote communities.

5.3 The Blue Economy and Resilience Building

The *National Resilience Development Strategy* defines seven development objectives that, when achieved in combination, would result in a 'climate resilient nation'. The extent to which the blue economy can contribute to these various development objectives and to climate resilience in general varies across the different objectives. However, it is clear that implementing a blue economy development approach in Dominica could contribute significantly to achieving these objectives in a mutually reinforcing way.

Table 16 below illustrates how different aspects of the blue economy could contribute to achievement of these objectives.

RESILIENCE DEVELOPMENT OBJECTIVES	TOURISM AND LEISURE	FOOD, NUTRITION AND HEALTH	PORTS AND SHIPPING	HABITATS, MARINE ECO-SYSTEM SERVICES AND COASTAL PROTECTION
Food security through climate resilience fisheries development	- Trading links between tourism and domestic fisheries can strengthen the fisheries sector, enhance the benefits to fishermen and thereby encourage greater participation in management to improve overall returns	- Sustainably managed capture fisheries ensure renewable supply of high quality protein - Opportunities to diversify the fisheries value chain (through post-harvest processing) increase food security opportunities - Development of aquaculture can relieve pressure on coastal fisheries and increase the supply of fish in the economy - Application of biotechnology can lead to development of novel food products	- Coastal fishing port facilities provide protection to fishing fleets thereby allowing a rapid return to fishing following storm events. - Co-location of fish processing and handling facilities with port facilities provides security - Co-locate Coast Guard assets with port facilities to ensure access to the water at all times of the year.	- Protection of key marine habitats (coral reefs, mangroves and seagrass) through MPAs support sustainable fisheries - Improved coastal health can improve coastal and marine tourism thereby providing opportunities for fisherfolk to diversify incomes from coastal tourism
Enhancing the resilience of ecosystems and sustainable use of natural resources	- Engage tourism operators in marine and coastal conservation projects that benefit the tourism sector as well as fisheries and the provision of wider marine ecosystem services	- Well managed fisheries are sustainable in perpetuity - Development of aquaculture can reduce pressure on wild caught stocks	- Ensure safe and clean shipping to ensure protection of coastal habitats from pollution - Spatial planning to move shipping activities away from sensitive ecosystems to avoid damage	- Application of MPAs and coastal National Parks provide protection to key habitats allowing recovery and greater resilience to climate change - Protection of key marine habitats (coral reefs, mangroves and seagrass) through MPAs support sustainable fisheries
Enhancing infrastructure resilience	- Ensure coastal developments are planned and undertaken to avoid increasing coastal risks - Co-location of coastal infrastructure with coastal tourism facilities including cost sharing agreements with tourism operators	- Develop fish landing and handling facilities to be climate resilient. This may require aggregation of existing landing sites and co-location with other maritime sectors	- "Climate smart" port facilities ensure access for imports during storm events - Co-locate renewable energy infrastructure along with port facilities - Strategic location of port infrastructure in the least exposed areas to reduce risk of damage	- Healthy coastal habitats can provide greater protection to storm events such as surge
Sustainable human settlements & communities	- Benefits from costal and marine tourism directly flow into coastal communities through employment, shared infrastructure and opportunities to run eco-tourism operations	- Sustainably managed capture fisheries provide security to coastal communities - Development of aquaculture can relief pressure on coastal fisheries and	- Opportunities to improve access and connectivity through coastal ferry services	- Improved coastal health can improve coastal and marine tourism thereby providing opportunities for fisherfolk and coastal communities to diversify incomes from coastal tourism

		increase the supply of fish in the economy		
Provision of adequate and sustainable social protection systems with the ability to respond rapidly to the impact of shocks at the individual and household levels	-	- Sustainably managed fishery should ensure food security to even the most vulnerable in the community	-	- Protection of key marine habitats (coral reefs, mangroves and seagrass) through MPAs support sustainable fisheries
Implementing a comprehensive risk management framework and pursuing the low carbon development pathway	-	- Develop contingency plans around the fisher sector to ensure the sector can return to fishing as soon as possible post-storm events	- Develop and implement compressive contingency plans to deal with marine pollution from ships and shore-based facilities	- Opportunities to explore Blue Carbon solutions through improved management of coastal habitats
Economic empowerment and innovations through sustainable climate financing.	- Explore options to improve user fee revenues from tourism sector	- Mobilise Green Climate Funds to support fishery improvement projects and possible aquaculture sector development	-	- Mobilise Green Climate Funds for habitat protection and improvement activities through blue carbon solutions

Table 16: Contribution of the blue economy to climate resilient development objectives

5.4 Summary

By embracing the blue economy, a number of opportunities are apparent, which can contribute to sustainable economic growth, ensure protection and sustainable utilisation of the ocean and its resources, and contribute to the Governments objectives for climate resilience. The realisation of these opportunities will require strategies that:

1. Further support and develop existing sectors;
2. Promote investment and innovation to support the development of new sectors; and
3. Strengthen the management and protection of Dominica's maritime waters.

Based on the scoping study undertaken as the first part of this assignment, it seems clear that the greatest opportunities for developing existing 'blue economy' sectors reside within the tourism and fisheries sectors, with further limited opportunities in the ports and shipping sector. To illustrate this, this section has identified a total of 18 separate but inter-related development opportunities across these four functions. While some of these opportunities are sector-specific, others create synergies and linkages across the different functions.

In terms of future uses of the marine environment and their contribution to an emerging blue economy, aquaculture, ocean-related tourism and leisure activities and marine biotechnology are among the activities identified as having greater potential here.

6. Implementing the Blue Economy in Dominica

Blue growth is the only long-term strategy capable of supporting sustainable growth in the marine and maritime sectors as a whole. While the individual maritime functions outlined in the previous section are an important component of this, they cannot be viewed in isolation since each is inextricably linked to the other economic activities in the marine space. Therefore, there is a need to holistically facilitate the development of the blue economy concept as a whole, with the development of a comprehensive enabling framework that facilitates and complements sector-specific frameworks.

In order to move toward a pathway of sustainable blue growth, we must recognize the interdependencies of the environmental, economic and social dimensions of sustainable development, seeking to integrate them in a more holistic manner to support the transition to a blue economy. Innovation - at all three dimensions of sustainable development, broad participation and governance for the integration of the environmental, social and economic dimensions of sustainable development are at the heart of a transition to a blue economy.

1) Environmental Innovation

The requirement for sustainability necessitates a paradigm shift in both the mind-set of those currently exploiting the oceans resources and the diversity of ways in which the marine environment is used for the benefit of mankind. At the core of the blue economy concept is the de-coupling of socioeconomic development from environmental degradation. To achieve this, the blue economy approach is founded upon the assessment and incorporation of the real value of the natural (blue) capital into all aspects of economic activity.

2) Economic Innovation

The blue economy emphasises the importance of sustainable ocean-based growth and the evolution of society and business towards 'greener' economic activity and prosperity.

A blue economy should focus on the development of core economic sectors as the basis for future growth as well as transforming patterns of economic investment that act as barriers to progress including recognising the financial value of natural blue capital.

3) Social Innovation

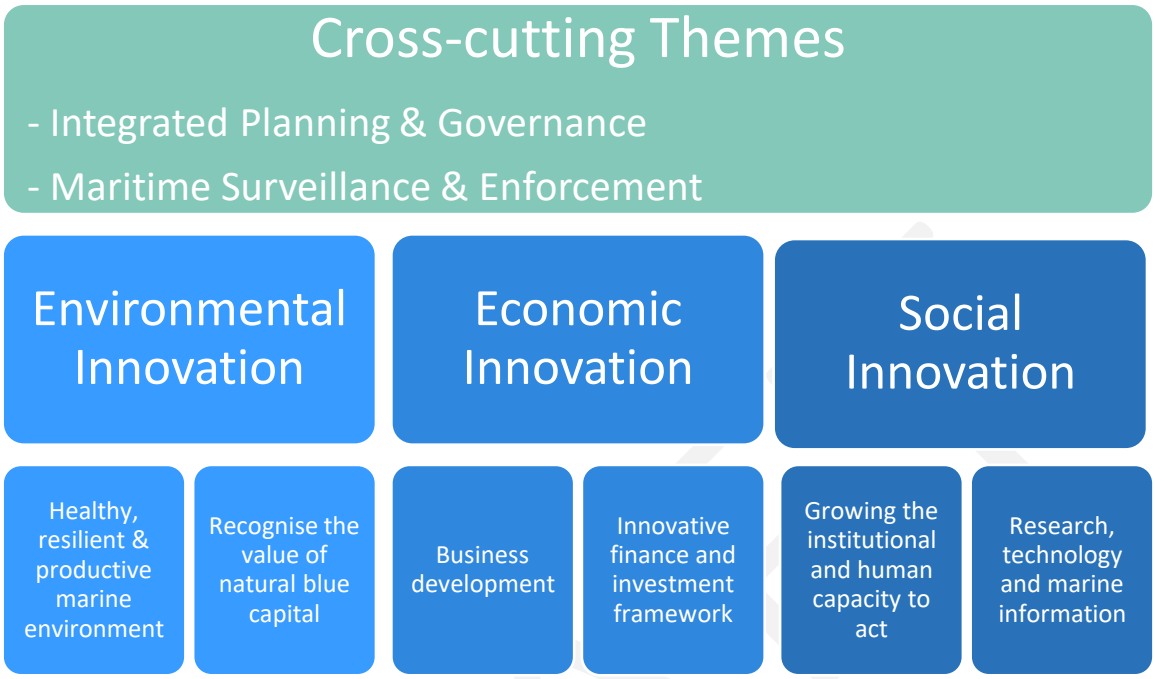
The blue economy needs to provide transition policies, allow all stakeholders to participate through meaningful employment, provide access to education and skills-development.

Identifying future skills needs and labour market supply and demand trends and adapting and developing existing education, vocational and professional training programmes to meet them will be essential if the blue economy is to become a reality in Dominica.

4) Cross-cutting, Mutually Reinforcing Themes

Governing structures and platforms are needed, which will allow new and innovative collaborations to be shaped and implemented. We must also ensure the security of the resource and the wider marine environment to ensure the long-term integrity of the ecosystem.

Building on work previously undertaken by the Commonwealth Secretariat[102] and the World Bank,[103] this analysis identifies **eight critical enablers** that must be pursued if Dominica is to integrate the blue economy into its wider development and resilience building programme. These enablers are not unique to Dominica but are similar across all countries in the Eastern Caribbean.



6.1 Cross-cutting Themes

6.1.1 Integrated Planning & Governance

Rationale

The existing management and planning arrangement for maritime space in Dominica emphasise a traditional sector-specific approach. As a generalisation, governmental attempts to mitigate or adapt to particular resource uses on a sector-by-sector basis normally prove ineffective and are unable to respond to the cumulative and synergistic impacts and pressures from human activities. These arrangements give rise to a number of institutional challenges, all of which are evident in Dominica to some extent:

- Lack of connection between the various authorities responsible for individual activities resulting in poor or absent coordination and national oversight for the management and utilisation of marine space;
- A spatial and temporal overlap of human activities and their objectives, causing potential conflicts;
- Impacts from one (or more) activities adversely affecting other users of the marine environment;
- Lack of consideration of the cumulative effects of multiple activities on the marine environment and other users;
- A lack of connection between marine activities and the resource use and onshore communities that are dependent on them;

102 Roberts and Ali (note 91 above).
103 Patil, P.G., J. Virdin, S.M. Diez, J. Roberts, A. Singh (2016). *Toward a Blue Economy: A Promise for Sustainable Growth in the Caribbean*. (World Bank: Washington DC, 2016).

- Lack of protection of biologically and ecologically sensitive marine areas.

As Dominica develops its maritime sectors further, value-based conflict between competing interests can also be expected to increase. Without a more comprehensive and integrated approach to marine planning and decision-making, which recognizes the interactions and the interdependent nature of the various uses and resources. It will be difficult to resolve such conflicts. It is therefore clear that Dominica needs to transition to a more integrated governance approach, that requires all uses, users and values to be considered.

An integrated governance framework is the unique key to achieving adequate management of the ocean and is one of the most important conditions for the successful implementation of the blue economy. Governance is therefore an overarching theme that is an essential part of the blue economy.

The components of a more effective governance system can be summarized as:

1. Policies and regulations needed to govern the use and allocation of ocean resources and space, including capacity to enforce compliance with access and use rules;
2. Administrative mechanisms required for integrated management of the ocean; and
3. Tools to achieve the implementation and coordination of integrated ocean policy frameworks (for example, CMSP and administrative capacity for monitoring and enforcement.

As a participating country in the World Bank-funded CROP project, the OECS will be providing assistance to Dominica to address a number of these needs, including:

- development of a national ocean policy framework
- development of national Blue Growth Master Plans
- development of national marine spatial planning frameworks; and
- education and awareness raising activities.

This will commence in the first quarter of 2019 and is expected to continue for up to 30 months. It is important that, in supporting the development of these activities, the government clearly articulates its goals and objectives vis-à-vis the blue economy.

Institutional arrangements

An important first step in implementing the CROP activities will be the establishment of an effective multi-sectoral coordination mechanism, within existing organisational structures. While the role of existing agencies in the administration of future maritime policy is clearly recognised, there is a strong case for a national coordination body that is focussed on all aspects of Dominica's marine space and its effective management. either formal (for example, the establishment of a Ministry of Department with functions and powers and duties for coordination) or informal (for example, an across government coordination committee with broad representation from different sectors) and incorporates local knowledge and leadership

Under the ECROP, there is an expectation that all OECS member countries will establish a National Ocean Governance Committee (NOGC) to fulfil this role. To date, no such Committee is operational in Dominica and it is recommended that this first step be initiated, if for no other reason that it will be required to coordinate the development of the national ocean policy under CROP.

The NOGC should be composed of representatives from the Ministries and agencies with competence in maritime issues. Likewise, representatives from the private sector, local NGOs and key marine user groups should participate.

For such an institutional coordinating mechanism to be effective, the following key factors are essential:

- The coordinating body would be established at a level above the Line Ministries. It must be firmly supported by the highest levels of government and would be appointed by Cabinet.
- The coordinating body would have to have a clear and legally supported mandate and sufficient resources and capacity to do its job.
- Key functions of the coordinating body would be to promote the national vision, goals and objectives for ocean governance, to strengthen inter-agency and inter-sectoral collaboration, to reduce conflict and provide a forum for conflict resolution among sectors and ocean users.

Additional administrative activities could also be undertaken if the coordinating body is mandated with an administrative and approval role such as implementing marine spatial planning, development of marine management plans, monitoring the compliance of sectoral departments' activities with the coastal policy, reviewing proposals affecting areas of strategic importance, and monitoring and evaluation of the progress of the policy implementation.

6.1.2 Maritime Surveillance & Enforcement

Rationale

Discussions with the Coast Guard and other stakeholders have clearly identified the difficulties associated with the enforcement of existing rules and regulations, particularly with regard to fisheries. Poor enforcement of existing fisheries laws as well as illegal, unregulated, and unreported (IUU) fishing by neighbouring states are key concerns. Enforcement of legislation, especially in offshore areas, assumes a knowledge of illegal activity. This is often impossible due to a lack of awareness of activities undertaken in the maritime domain.

Thus, a key element of monitoring and enforcement is the effective surveillance of Dominica's maritime space and an awareness of the activities undertaken in the maritime domain. That capability does not yet exist. To this end, there is a need for Dominica, along with many other OECS countries, to enhance their capability to identify threats to their maritime space in a timely manner by sharing and integrating intelligence, surveillance, and navigation systems into a common operating picture.

Taking a regional approach to Maritime Domain Awareness in the Caribbean Sea will reduce duplication of effort and allow limited resources to be shared and more effectively deployed.

One practical step to address this is to ***deploy the latest satellite technology to enhance maritime domain awareness*** in the region. By combining satellite technology with innovative tracking and analysis tools, OECS countries could create a system that will help governments and inter-governmental organisations across the region close the gap on illegal fishing and related criminal activity. These facilities already exist, for example within the Commonwealth, and can be shared with Caribbean countries if development partner funding can be secured at an early stage.

Such cooperation, coupled with greater coordination across governments, can help reduce costs and accelerate the transition to the integrated governance approaches needed for a blue economy.

6.2 Environmental Innovation

6.2.1 Healthy, Resilient & Productive Marine Environment

Rationale

It is clear that we cannot realise the benefits of the blue economy unless we ensure the protection of the fundamental resource base that underpins it. Preservation of Dominica's unique marine environment is therefore critical to the transition to a blue economy and must be turned into objectives that are met

through effective action by state and non-state actors, supported by an environmentally educated and aware public.

The health of coral reefs and associated biodiversity, in particular, are of critical importance from both an environmental and economic perspective due Dominica's strong reliance on the tourism and fisheries sectors. Thus, effective management of the marine environment and the maintenance and restoration of ecosystem health and integrity is fundamental to a sustainable blue economy.

In addition to developing more integrated frameworks for ocean governance, policies should, therefore, explicitly reflect the principle that the health of the oceans is inextricably linked to the sustainability of economic livelihoods for coastal communities and the economy generally.

6.2.2 Recognise the Value of Natural Blue Capital

Rationale

The concept of 'natural capital' is an extension of the economic notion of capital (resources which enable the production of more resources) to goods and services provided by the natural environment. Natural blue capital assets provide a wide range of essential goods and services that underpin the lobal economy and society, that would be extremely costly to restore or replace once lost.

For example, a sustainable fishery managed on the basis of an ecosystem approach may provide an indefinitely sustainable flow of fish, whereas over-exploitation or damage to the ecosystems that support the fishery may lead to a permanent decline in fish stocks.

Since the continuous supply of services from the available natural blue capital assets is dependent upon a healthy, functioning ocean, the structure and diversity of habitats and ecosystems are important components of natural capital. Recognising the true value of this natural blue capital helps decision-makers understand how changes in the current and future performance of natural capital assets will impact on human well-being and the economy.

6.3 Social Innovation

6.3.1 Growing the Institutional and Human Capacity to Act

Rationale

The institutional capacity gap is a common theme across all blue economy sectors and requires strong public leadership, backed up with a coherent top to bottom planning and management regime. Caribbean countries, the region as a whole and development partners supporting this process can work collectively to devise new ways of working that lever greater capacity from current systems to make change happen through for example increased regional cooperation, sharing of costs and public/private partnerships. As suggested earlier in this paper, there may be particularly strong opportunities for the DWG support to this process, in a manner which is consistent with and indeed helpful in deepening the DWG's ongoing development priorities.

Addressing three practical issues can help support the development of institutional and human capacity to act.

Firstly, through ***sharing and creating joint capacity***. Many governments, including a large number of Commonwealth Caribbean member governments have made commitments to sustainable growth and resource protection and management, not just at national and global scales, but often at the regional level. A key 'short cut' to implementing the blue economy is to identify like-minded Governments and share capacity on issues of critical concern in a creative, effective and politically appropriate manner.

Secondly, through ***increasing cooperation and coordination on ocean issues of common concern***. Increased cooperation on issues that are common across the region, coupled with greater coordination across Governments can help reduce costs and speed up the transition to more sustainable governance and management arrangements. Governments can analyse current actions and commitments and identify and implement new opportunities at regional and global scales for closer cooperative and coordinated working in making the transition to a blue economy.

Thirdly, a specific measure which could help catalyse the institutional capacity to act, which could be supported either directly or indirectly by development partners, comprises the conduct of a ***Caribbean cross-sectoral skills gap analysis for the blue economy,*** which can be followed by a strategy to address the revealed skills gaps. This initiative could be supported through partnership with all Caribbean countries, other coastal and developing country SIDS and regions, other developing countries, development partners, academic partners and others.

A pilot study, led by a Dominica-UNDP-CDB initiative, could catalyse the overall process.

6.3.2 Research, Technology & Marine Information

Rationale

Research and development and other knowledge-generating activities support sustainable economic growth and job creation through the development of new products and services; the generation of new knowledge about the marine environment; facilitation of better management and protection of marine ecosystems; and informing policy, governance, and regulation of the marine sector.

Translating new opportunities into productive sectors will require investment in research and development, building technical capacity, and creating the right environment to attract and retain outside investment as a fundamental principle of a blue economy. While indigenous marine research is not well developed in the eastern Caribbean, many overseas universities, research institutes and environment non-governmental organisations do undertake marine research in the region. Thus, a more coordinated focus between the existing research and educational facilities will be essential to support the development of new research clusters aimed at supporting and furthering key marine sectors.

Identifying and defining ongoing strategic marine research and information needs, in an inclusive and adaptive manner, together with the appropriate funding resources and mechanisms, is essential for achieving economic development through a blue economy framework.

Knowledge of the marine environment is also a critical need for effective decision making toward a blue economy. To ensure effective governance of marine space, a whole array of information and knowledge will need to be called upon. Governance requires factual information about the ecosystems being governed. It requires knowledge of geographical occurrence and abundance of ecosystems as well as information on how human actions affect these ecosystems. There is, however, generally a paucity of marine data relating to the offshore waters in Caribbean small states.

A broad range of gaps have been identified in the existing data including, but not necessarily limited to:

- Data on species and habitats, especially with respect to endemics
- Data on species diversity and distribution in the EEZ
- High resolution topographic data especially with regard to the 6” contour, which is significant from a sea level rise perspective
- Data on watersheds
- Shipping routes and information on cargoes etc – AIS reporting
- Data from recreational and artisanal fishing activity
- Areas subject to excessive coastal erosion

- Environmental quality data to assist with certification of marine and other tourism facilities
- Data on resources in the offshore waters

Although at first it appears that there is very limited marine spatial data available in Dominica, it is clear that this is not necessarily the case. However, the data that is available is not readily accessible since it is generally in paper form and has not been digitised into a GIS format. Moreover, there is a paucity of marine spatial data relating to the offshore waters. This paucity of information hampers the potential development of new fishery resources and also means that little, if any, monitoring and compliance effort is focussed on this area.

6.4 Economic Innovation

6.4.1 Business Development

Rationale

The Government has identified the need to diversify economic sectors, including with a focus on marine-based activities. Thus, the blue economy is seen as a mechanism for diversifying the economy and creating jobs. As discussed in section 6 above, the realisation of these opportunities will require strategies that:

1. Further support and develop existing sectors;
2. Further develop the backward and forward linkages in the value chains of existing sectors; and
3. Promote investment and innovation to support the development of new sectors.

In Dominica, perhaps the greatest potential for value addition and job creation lies with the development of small and medium-sized enterprises SMEs within the blue economy value chains. Finance for MSMEs will be a key aspect of this enabler. There is, therefore, a need to examine the mechanisms available to Government to encourage start-up MSMEs and to assist with capacity and technology development.

To this end, there is a need to reduce impediments for private sector investment & secure innovative and sustainable finance.

6.4.2 Innovative Finance & Investment Framework

Rationale

In order to transition to a sustainable blue economy, it is necessary to have in place *inter alia* sustainable financing mechanisms that will provide long-term and reliable funding to support blue economy activities including conservation and sustainable management initiatives for marine and coastal resources, as well as the wider environment. A range of innovative finance mechanisms exist that could be applied to a initiatives such fishery improvement projects, habitat restoration and protection projects, valorisation of a range of marine ecosystem service values and projects that link coastal and marine ecosystems to climate change adaptation.

6.5 Suggested Approach to Implement the Blue Economy

Based on a range of international experiences to date, the following four-step approach is recommended for Dominica to apply the blue economy as part of its national development framework. This integrated

approach aims to help build the systems required to apply and support the blue economy concept, and includes the following steps:[104]

Step One: Measure the status of the ocean economy and ecosystems at the national level, as well as external driving forces such as climate change

The following two tasks may be undertaken to help provide measurement sufficient for management:

- Develop an ocean account to maintain a snapshot of the output from the country's ocean economy – i.e. "gross marine product"; and
- Incorporate measures of the underlying natural capital assets into this account – i.e. a "net marine product".

An attempt has been made to provide a rough estimate of this in section 4.6 of this report. However, the level of detail in the data currently held by the Government does not permit a robust analysis or allow for a more detailed analysis due to the lack of disaggregation in the data held.

To allow for this step to be achieved, therefore, a more detailed technical analysis will be required.

Step Two: Manage the interactions between the ocean economy and ecosystems, and between sectors

Numerous obstacles stand in the way of achieving integrated planning and decision-making for Dominica's maritime space. The essential task of public agencies is to set and enforce rules for the ocean economy that limit resource extraction and pollution levels. To ensure that the design and enforcement of compliance with these rules is as integrated as the ocean ecosystems and economy, marine spatial planning (MSP) processes have developed over time. MSP processes collect and translate information on the ocean ecosystems and economy spatially, providing a more integrated basis for management decision-making. Specific tasks may include:

- Establish/strengthen the institutional framework for coordination of blue economy policy planning. In the case of Dominica, this is yet to be defined but could either be operated through the Office of the Prime Minister or through a line Ministry such as the Ministry of Agriculture, Food and Fisheries;
- Conduct marine spatial planning processes to develop an integrated ocean and coastal policy (to be completed through the CROP project); and
- Set and enforce rules for the ocean economy that allow for sustainable resource utilisation while protecting and preserving the marine environment.

Step Three: Invest in the transition to the blue economy, through clear principles and processes that encourage sustainable growth in private investment

Completing steps one and two can help attract foreign investment to Dominica as needed to support the transition to a blue economy, and ensure that those investments support the desired mix of underlying capital assets and that returns are measured in terms consistent with all three dimensions of sustainable development. In addition to steps one and two above, articulating clear and customized "ocean investment principles" will help to ensure that ocean economy investments contribute to the three dimensions of sustainable ocean use.

Step Four: Monitor progress towards agreed targets for the country's blue economy policy objective

- Model potential blue economy policy and investment scenarios
- Monitor progress towards specific targets to be developed in an integrated ocean and coastal policy

104 Adapted from the framework developed by Patil *et al* (note 103 above).

6.5.1 Measuring Success

While defining a future development strategy may be relatively easy, measuring the extent to which that strategy is achieved will require the definition of specific targets and measures to track progress towards achieving specific Goals. While it may be appropriate to set a high level, overarching target such as "double the contribution to GDP of the ocean-based economy" there is also a need to disaggregate this for key activities of the overall blue economy.

It should be noted that such targets should not be seen as the 'boundary to ambition' for the activities, but should be a realistic and achievable target. A number of indicative targets are suggested below but it should be understood that in defining the Action Plan and any subsequent Blue Economy Roadmap, consideration will need to be given to determining a set of realistic and achievable measures and targets against which to track implementation.

Target	Measure
Proportion of GDP derived from marine sectors	• % GDP
Volume seafood landed and processed	• Quantity / Value
Number of jobs supported by marine sectors	• % total jobs
Contribution of different sectors to GDP	• % GDP
Average salary for jobs in marine sectors	• EC$
Proportion of energy generated from renewable sources	• % total energy consumption
Proportion of fish in local market from mariculture	• % fish consumed
Number of yachts/cruise ships visiting	• Port call statistics
Marine data / knowledge	• % EEZ surveys • Confidence level for data
Conservation targets	• % cover of MPAs • % protection for critical habitats • Monitoring and enforcement records

6.6 Summary and Next Steps

While a number of sector specific opportunities have been identified, there is clearly a need to holistically facilitate the development of the blue economy concept as a whole, with the development of a comprehensive enabling framework that facilitates and complements sector-specific frameworks. In order to move toward a pathway of sustainable blue growth, this report presents a comprehensive enabling framework that must be pursued if Dominica is to integrate the blue economy into its wider development and resilience building programme.

This report represents the first two of three deliverables under the UNDP assignment, namely the Stocktake and the National Diagnostic Analysis. The purpose of these outputs is to provide both UNDP and the Government of Dominica with some understanding of the possible opportunities that the blue economy presents. These analyses therefore provide a snapshot of the status and current utilisation of the marine environment in Dominica as well as a broad range of opportunities that the Government may wish to consider. In this regard, this report puts forward a range of possible options for the Government's consideration.

The next stage of this assignment will involve a detailed discussion of the findings of this analysis with senior officials from both the Government of Dominica and UNDP.

At this stage, these discussions are scheduled to be held in Dominica and Barbados during the week of 14 January 2019.

Once these discussions have taken place, the consultant will finalise this analysis and prepare the initial Action Plan, taking into account the feedback received during those discussions.

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Annex A - Project Terms of Reference

First Draft Terms of Reference

Blue Economy Scoping Mission for Dominica

Duration: 30 Days

Background

Caribbean Community (CARICOM) countries continue to be highly vulnerable to shocks caused by natural disasters and now exacerbated by Climate Change. The International Monetary Fund (IMF) estimates that between 1990 and 2014, the Caribbean lost between 1.8 - 2% of Gross Domestic Product (GDP) annually as a result. Losses have exceeded 100 percent of GDP in many instances, as demonstrated in the cases of Ivan (Grenada, 2004), (Haiti, 2010); Irma (BVI, 2017), (Barbuda, 2017); Maria (Dominica, 2017).

The weather events of 2017, when two Category 5 Hurricanes unleashed unprecedented devastation across the Region, provide eloquent testimony to this "*new normal*". These events collectively resulted in significant damage and losses in the affected countries and territories. One hundred percent (100%) of the populations in Dominica, Barbuda and the British Virgin Islands were impacted. There was up to 95% damage to building stock in Dominica and Barbuda and, on average, 75-80% in the British Virgin Islands.

The Post-Disaster Needs Assessment for Dominica concluded that Hurricane Maria resulted in US$1.313B in damages and losses - an equivalent of 226% of GDP. The recovery and reconstruction needs are valued at US$1.37B. The Hurricane Irma Recovery Needs Assessment for Antigua and Barbuda indicates that total damages and losses from Irma and Maria is US$155M; equivalent of 10% of GDP and the recovery needs amount to US$222.2M.

Since the hurricanes of 2017, the ongoing recovery efforts have revealed some major challenges in the Region with the most critical being the imperative of building resilience including economic with the need to diversify and transition to innovative approaches being a priority. In this regard, several Governments in the Region have initiated discussions on optimizing the potential of the "Blue" or Ocean economy. Dominica as a leader in the Region to become the world's first climate resilient country has signaled a strong interest in the Blue Economy being an integral part of its way forward in terms of building resilience through structural transformation and innovation.

UNDP as a long-established partner of the Region and Dominica with access to global policy expertise is well positioned to support Dominica in its initial scoping of the potential of the blue economy, the development of a Blue Economy Roadmap and in the provision of implementation support. It is in this context that the consultancy is being undertaken.

An integrated 'blue economy' approach can create a new economic vision in a way that both supports economic development and maintains healthy and productive oceans and is directly relevant to the achievement of many of the targets set out in the Sustainable Development Goals (SDGs). An effective blue economy, supported by the protection and sustainable utilisation of marine ecosystem services, should map across several the SDGs including:

- Goal 2: Zero hunger through the critical role living marine resources play in food security;

- Goal 7: Affordable and clean energy through the contribution marine renewable sources play in energy security;
- Goal 8: Decent work and economic growth through the diversification and growth of marine-based economic sectors; and
- Goal 13: Climate Action through the implicit link between the oceans and climate change, and the adaptive measures countries can take to maintain ocean integrity and resilience.
- Goal 16: Strong Institutions through establishing robust national marine regulators and incorporating participatory processes in decision-making about marine management issues.

To realize such an economy, it will be important to: (i) support countries to better understand the real potential value of their ocean economy; (ii) identify ways to sustainably realize this potential value, thereby generating more value from one or more blue sectors; (iii) identify potential partners and financing windows to help advance climate resilience and develop the blue economy; and (iv) identify the steps needed to build resilience against future climactic changes. The challenge is in understanding where to start in order to change course.

Objectives and Outcomes

The overall objective of this consultancy is to undertake an assessment that can help build a detailed picture of Dominica's current blue wealth and productivity, the constraints to developing a more productive blue economy, and assess the potential for generating greater value, creating better blue jobs, and improving climate resilience.

It will provide the basis to develop a national Blue Economy Strategy, through which, a range of future development opportunities can be pursued.

The following critical activities will be undertaken:

1) Stakeholder engagement and consultation

The consultant will build the linkages between key stakeholders both at the national and regional level stakeholders including the Government of Dominica, OECS, CARICOM, regional Development Banks and regional ocean governance agencies.

2) Assessment of current Blue Economy sectors active in Dominica

Critical to achieving growth in the Blue Economy will be to ensure full inclusion of all maritime sectors, through value chains and life cycle approaches. Understanding where these opportunities lie will require a comprehensive understanding of the nature and extent of current "blue sectors" in Dominica and an identification of where opportunities for growth exist within these sectors.

3) Analysis of potential 'new' areas for blue investment with a high likelihood of success

The consultant will undertake an analysis of relevant overseas blue economy models and an identification of key lessons learned that could be applied to Dominica.

4) Analysis of existing enabling environment

In order to support growth in the identified blue growth sectors, there is a need to develop a comprehensive understanding of the existing enabling environment, including governance arrangements, infrastructure, capacity and administrative resources to support these sectors and their incubation in Dominica and, more importantly, to determine the future infrastructure and capacity needs that will be required to support growth in the identified growth areas.

5) Identification of potential partners and funding windows.

The consultant will also identify potential funding windows and development partners to support the efforts of Dominica in advancing the Blue Economy.

Deliverables

The consultant will prepare the following key deliverables:

1. A 'stocktake' document setting out the status quo in Dominica relating to marine management;
2. A 'National Diagnostic Analysis' document setting out development options based on both the stocktake and knowledge of new and emerging marine sectors that could be developed; and
3. An initial 'Action Plan' to initiate transition to a blue growth development strategy with UNDP providing policy and implementation support.

Annex B - List of Stakeholders

Name	Position	Organisation
Mr Ian King	Head of Local Country Office	UNDP
Hon Francine Baron	Minister of Foreign and CARICOM Affairs	Government of Dominica
Mrs Rosamund Edwards	Financial Secretary	Ministry of Finance
Ms Jo-Anne Commodore	Permanent Secretary	Ministry of Justice, Immigration and National Security
Mr Roland Royer	Chief Technical Officer	Ministry of Tourism and Culture
Mrs Gloria Joseph	Permanent Secretary	Ministry of Planning and Economic Development
Inspector Edwards	Acting Head	Dominica Coast Guard
Mr Steve Ferrol	Secretary to the Cabinet	Government of Dominica
Mr Colin Scaife	Chief Operating Officer	Climate Resilience Execution Agency of Dominica (CREAD)
Ms Pepukaye Bardouille	CEO	Climate Resilience Execution Agency of Dominica (CREAD)
Dr James Fletcher	CREAD Project Manager	UNDP
Commander David Robin (Via Skype to St Lucia)	Coordinator, Fisheries and Ocean Governance	OECS Commission
Mr Andrew Magliore	Former Senior Fisheries Officer	Retired
Mr Colin Piper	CEO	Discover Dominica Authority
Dr Reginald Thomas	Permanent Secretary	Ministry of Agriculture, Food and Fisheries
Mr Riviere Sebastian	Chief Fisheries Officer	Fisheries Division
Mrs Attica Jervier	Fish Vendor	(Roseau)
Mariet Canoville	Registrar of Cooperatives	
Mr Francois (Festus) Thomas	Fisherman	Soufriere Fisher's Group
Mr John Adam	Fisherman	Soufriere Fisher's Group
Mr Issac Daniel	Fisherman	Soufriere Fisher's Group
Mr Valence O' Brien	President	St. Mark Fisherfolk & Tourism Cooperative Society Ltd. (St. Marks Coop)
Festus Dalrymple	Secretary & Manager	St. Marks Coop
Mr Shaba Caesar	Fisherman	Scott's Head Fisher's Group
Mr Rollstan Johnson	Fisherman	Scott's Head Fisher's Group
Mr Samson Francis	Fisherman	Scott's Head Fisher's Group
Mr Bernard Jervier	Fisherman	Scott's Head Fisher's Group

Mr Kevin Francis	Executive Vice President	Dominica Hotel and Tourism Association
Ms Marvlyn Alexander James	President	Dominica Hotel and Tourism Association
Mr Sheldon Bruno	Director of Finance	Dominica Hotel and Tourism Association
Ms Lizra Fabien	Executive Director	Dominica Association of Industry and Commerce
Mr Daniel Perryman	President	Dominica Watersports Association
Mr Benoit Bardouille	Chief Executive Officer	Dominica Air and Seaports Authority

Annex C - Characteristics of the Blue Economy

The concept of an ocean-based, or 'Blue' economy has its origins in the 'Green Economy' concept endorsed at the United Nations Conference on Sustainable Development. At the core of the blue economy is the de-coupling of socio-economic development from environmental degradation. To achieve this, the blue economy is founded upon *inter alia* the assessment and incorporation of the real value of the natural (blue) capital into all aspects of economic activity.

The notion of the blue economy refers to those economic activities that directly or indirectly take place in the ocean and coastal areas, use outputs from the ocean, and places 'goods and services' into ocean's activities as well as the contribution those activities make to economic growth, social, cultural and environmental wellbeing.

The scope of the blue economy therefore includes:

- Activities which explore and develop ocean resources;
- Activities which use ocean and coastal space;
- Activities which protect the ocean environment;
- Activities which use ocean products as a main input; and
- Activities which provide goods and services to support ocean activities.

The blue economy concept also embodies economic and trade activities that integrate the conservation and sustainable use and management of biodiversity. In this regard, the blue economy also supports sustainable livelihoods and food security for island and coastal communities.

The outcomes to be achieved from implementation of the blue economy concept therefore include:

1. Increased investment in existing ocean-based economic sectors to realise greater value from the existing resource base;
2. Stimulate development of new economic sectors based on existing marine resources;
3. Increase the number of businesses operating and the number of people employed in the blue economy;
4. Achieve greater protection for ocean space and resources through better coordination across different sectors, application of protective measures and greater use of surveillance and enforcement tools; and
5. Generate new research, innovation and generation of knowledge about ocean space and management needs.

Characteristic of the Blue Economy

Whilst no universally agreed definition exists for the blue economy, it is possible to describe what the blue economy may look like by the prominence of certain characteristics. A review of approaches to the Green Economy highlights six strongly inter-linked characteristics that would be prominent in a blue economy:

Characteristic 1: Recognises the value of and invests in natural blue capital

The approach to biodiversity in the ocean is transformed from one seen to be based around habitats and species to one based around 'blue capital', where biodiversity and other ocean goods and services have multiple values and can act as natural solutions to wider challenges.

Achieves protection and recovery of ocean ecosystems and biodiversity

The overall quality of the marine environment is conserved or enhanced through protection, maintenance or restoration of natural and physical features, habitats, processes and biological diversity and the ecologically sustainable use of marine resources.

Recognises the true values of marine environment goods and services

Some values like the financial worth of sectors such as oil, gas, fisheries and tourism are easier to calculate, whilst indirect values from a sustainable supply of food, social values and aesthetic values are more difficult to quantify. Under a blue economy scenario the full range of marine ecosystem goods and services are recognised and quantified using expert analysis and accepted standards and approaches.

Characteristic 2: Maintains growth, fosters 'blue' business and promotes jobs in 'blue' sectors

Drives innovation – emphasises technology and innovation, cooperation and institutions

Innovation and technology - particularly in the areas of biotechnology and genetics and energy and resource use - will be critical to growing a sustainable blue economy. Under a blue economy scenario new and emerging technologies could help to drive sustainable growth, for example by enhancing resource productivity and reducing greenhouse gas emissions.

Promotes and supports small and medium sized enterprises and local communities

Small and medium sized enterprises are pivotal drivers of growth, wealth creation and employment. The role of small business in the blue economy is thus hugely important. Under a blue economy scenario innovative partnerships would develop to provide capacity-building and increased access to capital, as a means of incentivizing small and medium-sized enterprises and enabling them to take part in the blue economy.

Results in existing ocean industries 'greening' their operations to reduce environmental damage

Human activities continue to damage the marine environment through actions that may be inefficient, lacking sufficient regulatory oversight or cost effective/expedient for the operator. Under a blue economy scenario activities undertaken in the marine environment would cause minimal damage or harm to environmental, social and economic values. Furthermore, the true costs of environmental damage would be reflected in the operating costs of the business resulting in an economic incentive to reduce those costs (and the associated damage). Government has a key role to play by ensuring adoption and implementation of effective environmental controls and effective penalties for those that do not comply.

Characteristic 3: Promotes energy from low-carbon and renewable sources

Increasing energy supplies from renewable sources reduces the risks from rising and volatile prices for fossil fuels in addition to delivering mitigation benefits. Dominica, as net oil importer, is challenged by rising and volatile prices for fossil fuels. Under a blue economy scenario, marine sources of renewable energy would make a significant contribution to the overall portfolio of clean energy initiatives in Dominica.

Characteristic 4: Addresses resource scarcity and promotes enhanced resource efficiency through improved and enhanced natural resource management

Greater recognition of the risks of resource scarcity should result in efforts to conserve resources, promote the most efficient use and replace non-renewable with renewable resources wherever possible, as well as prompting decisive policy action to address the issue collectively and coherently.

Ensuring a better ecosystem approach to marine spatial planning

The existing approach of maximising economic returns through managing individual species of economic interest to the exclusion of broader ecosystem effects leads to resource degradation and invariably decline of the target species. Under a blue economy scenario critical ecosystem linkages and interdependences would be understood ensuring a sustained flow of marine goods and services. The focus would be shifted from single species management to one where single species issues are viewed within the context of values, challenges and issues of the broader ecosystems involved. This would include actions to avoid by-catch or, where this is not possible, to fully utilise by-catch and other waste streams to create value streams.

Shifting away from financial incentives that reward poor unsustainable practices

According to a report by UNEP, the present value of benefits from greening the fishing sector is estimated to be 3 to 5 times the value of the investment. The alternative business as usual scenario is continued decline and contraction of the fishery sector, resulting from increased scarcity and collapse of stocks. Under a blue economy scenario financial circumstances that act as barriers to progress would be removed, the financial value of natural blue capital would be recognised and the money released reinvested in new areas that achieve greater long-term growth and deliver multiple benefits on social, economic and environmental perspectives.

Characteristic 5: Ensures resilience from foreseeable impacts of climate change through developing adaptive capacities

A particularly important aspect of adaptation is resilience: the ability to cope with climate change and natural disasters, in particular those associated with, sea-level rise, increased temperatures and extreme weather events. Under a blue economy scenario the increasing risk of climate change would be recognised and managed through the incorporation of appropriate adaptation and resilience-building strategies into sustainable development, conservation and governance actions. Such actions would recognise the vital role coastal habitats play in the protection of coastal communities and infrastructure in coastal planning and decision making.

Characteristic 6: Grows the human capital to act

A skilled and experienced workforce that adapts to changing requirements and new opportunities is essential for developing the blue economy and attracting investment. Identifying future skills needs and adapting and developing existing education, vocational and professional training programmes to meet these needs will be critical to achieving the Vision and Goals. Raising public awareness and knowledge of the marine environment is equally important in this respect.

Builds a skilled and experienced workforce

The development of the blue economy will depend on the availability of relevant skills sets and technical capacity to support the growth of specific sectors and to drive innovation and R&D. While initially such capacity may be provided by ex-patriots, supporting the blue economy will require policies that support the transfer of knowledge at the local level and creates an investment environment that supports the growth of local enterprises. Through such initiatives, the local capacity will grow organically as demand increases.

Develops marine research capability

Indigenous marine research in Dominica is not well developed. The result is a chronic gap in the technical capacity for marine research, planning and decision making. Under a blue economy scenario, the Government and stakeholders would facilitate and support research to increase understanding of the marine environment, its natural processes and cultural marine heritage, and implement a clear marine research strategy that supports investment for new and emerging opportunities.

Facilitates stakeholder participation and cooperation

Community and stakeholder participation is a key to promoting and instituting a duty of care for the marine environment. A more inclusive form of stakeholder engagement that adopts a broader partnership approach whereby stakeholders are involved throughout the process with transparency and accountability between all parties, is required. Partnerships between government, the private sector and civil society must be built in order to ensure co-responsibility for coastal management and to empower stakeholders to participate effectively.