INTEGRATED WATER, LAND AND ECOSYSTEMS MANAGEMENT (IWEco) PROJECT

CONSULTANCY FOR DEVELOPMENT OF A PUBLIC PRIVATE PARTNERSHIP TO REDUCE MARINE POLLUTION FROM PLEASURE VESSELS (YACHTS) & TOURISM CENTRES

FINAL REPORT

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LIST OF ACRONYMS

AMEP	Assessment & Management of Environment Pollution
AAPA	American Association of Port Authorities
ACS	Association of Caribbean States
BWWTP	Beetham Wastewater Treatment Plant
CANARI	Caribbean Natural Resource Institute
CARICOM	Caribbean Community and Common Market
CARPHA	Caribbean Public Health Agency
CARSEA	Caribbean Sea Ecosystem Assessment
CHTA	Caribbean Hotel and Tourism Association
CReW	Caribbean Regional Fund for Wastewater Management
CSTZ	Caribbean Sustainable Tourist Zone
CTO	Caribbean Tourism Organisation
CWWA	Caribbean Water and Wastewater Association
EAST	Environmental Audits for Sustainable Tourism Project
EPA	Environmental Protection Agency
ESBL	Extended Spectrum Beta-Lactamases
FCCA	Florida Caribbean Cruise Association
GEF	Global Environment Facility
ICE	Institution of Civil Engineers
IDB	Inter-American Development Bank
IMO	International Maritime Organisation
IWEco	Integrated Water, Land and Ecosystems Management
IWRM	Integrated Water Resources Management
LBS	Land-based Sources of Marine Pollution
MARPOL	International Convention for the Prevention of Pollution from Ships
MBR	Membrane Bioreactor
MEA	Multilateral Environmental Agreement
MGD	Million Gallons per Day
MPA	Marine Protected Area
N	Nitrogen
NDZ	No Discharge Zones
NOAA	National Oceanic and Atmospheric Administration
OECS	Organisation of Eastern Caribbean States

SDG	Sustainable Development Goal
SIDS	Small Island Developing States
SOCAR	State of the Cartagena Convention Area Report
UN	United Nations
UNEP	United Nations Environment Programme
WASA	Water and Sewerage Authority
WCISW	Wider Caribbean Initiative for Ship-Generated Waste
WCR	Wider Caribbean Region
WTO	World Tourism Organisation
WTTC	World Travel and Tourism Council

1.0 INTRODUCTION

The archipelago that bounds the Caribbean Sea is composed of numerous islands, most of which are Small Island Developing States (SIDS), with the distinction that their seascapes significantly exceed their land areas. Caribbean SIDS are heavily dependent on their natural environments. Approximately 20 Million inhabitants in the region depend on the natural resource base for socio-economic development and well-being. The marine ecosystems of the Caribbean are of particular significance as these are a source of livelihoods, food, and income to millions of people through fisheries, tourism, coastal protection, transportation, and resilience to climate change.

The Caribbean has long been a popular vacation destination because of its year-round warm climate, the beauty of its land and seascapes, particularly its beaches. In 2017, gross revenues from marine and coastal tourism alone were estimated to total US$57 billion (World Bank Group). Over time, the rise in development has contributed to an increase in land-based sources of marine pollution and corresponding adverse impacts on marine and coastal resources, livelihoods and health. Organic and nutrient pollution, particularly from sewage, has been identified as one of the most pervasive sources of marine pollution in the region (Pollution Threatens Caribbean, n.d.).

In addition to visitors populating a growing number of hotels, the Caribbean is a major destination for cruising and yacht charter holidays. With the ongoing rapid growth of the charter industry, the discharge of sewage from boats is also fast becoming a major threat to public health and coastal ecosystems. Sewage can contain harmful bacteria, viruses and parasites, which present serious public health risks. This can harm the environment and people by contaminating seafood, causing illnesses, and creating conditions that are unsuitable for marine life. The Caribbean region is especially vulnerable to the impacts of marine pollution due to its strong dependence on natural resources in combination with its vast exposed coastlines (World Bank Group).

The International Conventional for the Prevention of Pollution from Ships (MARPOL) is recognised as the main international convention covering the prevention of pollution of the marine environment by ships from operational or accidental causes. Annex IV of MARPOL contains regulations for the prevention of pollution by sewage. However, these regulations apply to ships of 400 gross tonnage and above that are engaged in international voyages, or ships that are certified to carry more than 15 persons. Annex V of the MARPOL Convention, which regards the Wider Caribbean Region as a special area, applies to all ships including non-commercial ships like pleasure crafts and yachts. Annex V seeks to eliminate and reduce the amount of garbage being discharged into the sea from these vessels. Notably, garbage is defined such that, among other things, it includes domestic and operational waste. Nonetheless, even with arrangements in place to collect and dispose of solid wastes from ships, there are still challenges for the management of sewage.

Having recognised these challenges, the Caribbean Public Health Agency (CARPHA), in its capacity as a partner in the Integrated Water, Land and Ecosystems Management in Small Island Developing States (GEF-IWEco) Project, contracted the services of a consultant to undertake an assessment of the status and scale of the problem concerning marine pollution from pleasure vessels and tourism centres in eight of the ten IWEco participating countries. Particular focus was given to measures taken by the industry to minimise the discharge of sewage (black water pollution).

The methodology for the assessment consisted of desk research and interview with key experts and industry stakeholders. The assessment was primarily conducted between January and February 2021 during the COVID-19 Pandemic. This impacted the assignment in a number of ways, both with respect to the subject matter being assessed and the actual conduct of the assessment. Limited ability to travel

and protocols put in place to respond to the Pandemic have had significant impacts on the tourism industry. In particular, the number of tourists visiting the islands in 2020 was substantially reduced. This reduction in numbers also impacted the natural environment, including conditions in the marine environment. Data relating to 2020 was generally unavailable; therefore, the assessment includes data or information up to 2019, where possible.

A review of legislation relevant to the prevention of pollution from vessels in coastal waters was also prescribed, along with a review of the mechanisms and capacities used to enforce the relevant legislation.

It was anticipated that the information garnered from this exercise and corresponding recommendations would be used to inform the best approach for public-private sector partnerships to control, reduce and/or prevent pollution from pleasure vessels and tourism centres. This document constitutes the draft final report for the assignment. It is comprised of the interim technical report, which provides findings from the assessment of the scale of the problem; a detailed report consisting of a review of legislation, policies and guidelines relevant to the prevention of pollution from small vessels under 300 tonnes (recreational boating and yachts) as well as mechanisms and capacities used to enforce the legislation for each IWEco participating state; draft voluntary guidelines for sustainable marine tourism with specific emphasis on yachts and tourism centres; draft agenda for meeting to present findings and initiate the proposed Private Public Partnership.

2.0 GENERAL FINDINGS

A total of ten Caribbean countries are participating in The Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (**GEF-IWEco Project**), which is a multi-focal, regional project that builds upon the work of previous initiatives, to address water, land and biodiversity resource management as well as climate change in ten participating countries (IWEco Project, n.d.).

This study places emphasis on eight of the IWEco participating territories: Antigua and Barbuda, Barbados, Grenada, Jamaica, Saint Lucia, Saint Kitts and Nevis, Saint Vincent and the Grenadines and Trinidad and Tobago. These countries are highlighted in Figure 1, below.

Figure 1: Map of the Caribbean Region Showing Study Countries

Source: CTO

The following are brief descriptions of the countries of primary interest to the study.

- **Antigua and Barbuda**

The nation-state of Antigua and Barbuda comprises two main islands (Antigua and Barbuda) along with several islets and cays in close proximity to Antigua. They are home to approximately 99,000 persons, 97% of whom live on Antigua (World Factbook). Combined, they have a total land area of 443 square kilometres. Featuring a relatively flat landscape and 153 kilometres of coastline with 365 beaches, its economy is heavily dependent on tourism. In 2019 Travel and Tourism made a total contribution of USD1, 432.5 million or 42.7% of GDP (World Travel and Tourism Council, 2020). Antigua and Barbuda's tourism product is overwhelmingly coastal and it is a well-known yachting destination that stages several annual yachting and sailing events.

- **Barbados**

The nation-state of Barbados is an island of 430 square kilometres in size that sits outside the Caribbean archipelago and is entirely surrounded by the Atlantic Ocean. Its population is estimated at about 302,000 (World Factbook). Featuring a mostly flat landscape and 97 km of coastline with several attractive beaches, its economy is heavily dependent on tourism. In 2019 Travel and Tourism made a total contribution of USD1,477.9 million or 30.9% of GDP and generated a third (33.4%) of all employment in 2019 (World Travel and Tourism Council, 2020). Barbados' tourism product is primarily coastal, but the yachting component does not seem to be significant enough to justify disaggregation of its contribution.

- **Grenada**

Grenada is an island-state located near the southern end of the Caribbean archipelago. Its western coast is washed by the Caribbean Sea while its Eastern shores are impacted by the stronger waves of the Atlantic Ocean. The state of Grenada includes the smaller islands of Carriacou and Petite Martinique to the north of Grenada, along with several islets. Their combined size is 344 square kilometres and are home to a population estimated at 114,000 in 2021 (World Factbook). They feature several attractive beaches and naturally protected harbours on the 121 kilometres coastlines, most notably on the south and west coasts of Grenada. Grenada is greatly dependent on tourism which makes a total contribution to GDP of USD511.6 million or 40.5% of GDP and generating 42.9% of all employment in 2019 (World Travel and Tourism Council, 2020).

- **Jamaica**

Jamaica is an island-state that is situated within the Caribbean archipelago and is entirely surrounded by the Caribbean Sea. It is constituted by 10,991 square kilometres of mostly mountainous land with several cays and islets in the surrounding waters. Jamaica has 1,022 kilometres of coastline featuring several well-known beaches and numerous bays. Its tourism product is primarily coastal, despite having noted cultural and natural attractions in the interior. Its best-known coastal tourism centres are Montego Bay, Ocho Rios and Negril. Tourism is a major driver of the Jamaican economy making a total contribution of USD5,025.4 million or 31.1% of GDP in 2019 (World Travel and Tourism Council, 2020).

- **Saint Kitts and Nevis**

Saint Kitts and Nevis is a federation of two islands on the Caribbean archipelago that are separated by only 3 kilometres. The islands are home to about 54,000 persons (World Factbook). Their combined area is 261 square kilometres and has 135 kilometres of coastline with attractive beaches. Tourism makes a significant total contribution to the economy of USD546.2 million or 28.2% of GDP and 59.1% of all employment in 2019 (World Travel and Tourism Council, 2020).

- **Saint Lucia**

Saint Lucia is an island-state on the Caribbean archipelago with a population estimated to reach 167,000 in 2021 (World Factbook). It has a mountainous terrain and a few islets in its territorial waters. The island is 616 square kilometres in size and has 158 kilometres of coastline. Most of its tourism development is on its western coast where beaches are washed by the gentler waters of the Caribbean Sea. Tourism is the largest contributor to the Saint Lucian economy, generating a total of USD1,229.5 million or 40.7% of GDP and 78.1% of employment (World Travel and Tourism Council, 2020).

- **Saint Vincent and the Grenadines**

Saint Vincent and the Grenadines is a multi-island state on the Caribbean archipelago with a population that is expected to exceed 101,000 in 2021 (World Factbook). Its land area is 389 square kilometres and has it 84 kilometres of coastline that features numerous beaches, especially on the Caribbean coasts. This island chain offers very attractive, scenic environments for sailing, afforded by its many islets and cays, most of which are uninhabited. Tourism is a major contributor to the economy, injecting USD354.4 million or 28.6% of GDP in 2019 and generating 45.2% of total employment (World Travel and Tourism Council, 2020).

- **Trinidad and Tobago**

Trinidad and Tobago is a twin-island state located at the southern end of the Caribbean archipelago. Its location places it outside of the usual range of hurricane activity that poses a seasonal threat to Caribbean islands. Combined, the islands along with several islets are made up of 5,128 square kilometres of mostly flat land. It features 362 kilometres of coastline that features some attractive beaches, particularly on Tobago but its culture (especially the annual carnival) is also very attractive to tourists. The population of Trinidad and Tobago is estimated at 1.221 million in 2021 (World Factbook). Being a petroleum producer, tourism makes a relatively small, but significant, contribution of USD1,857.1 million or 7.8% of GDP in 2019 (World Travel and Tourism Council, 2020).

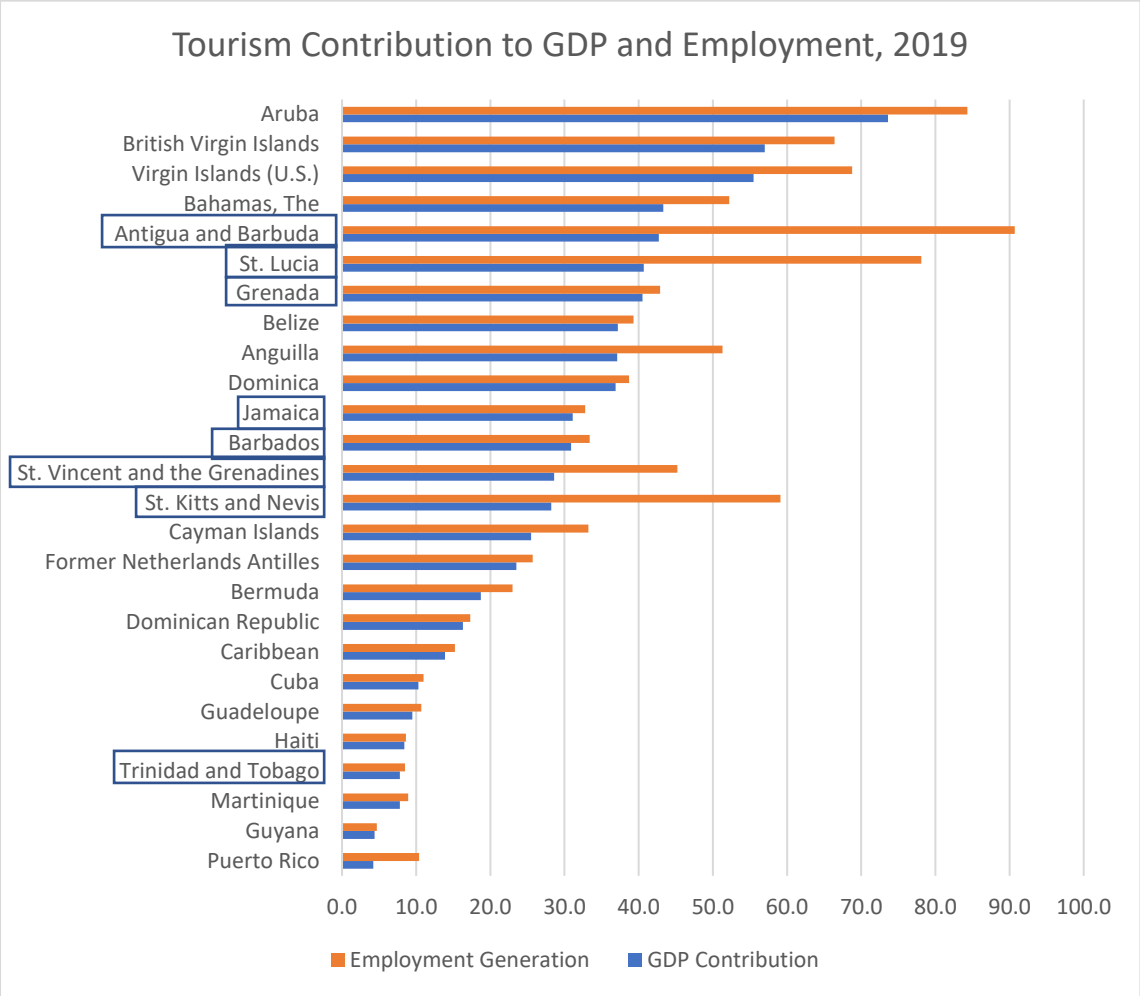
2.1 Caribbean Tourism

Caribbean tourism is presumed to have begun in Port Royal, Jamaica, where in the mid-seventeenth century, forerunners of today's hoteliers opened inns and brothels to cater to privateers and pirates (CHTA, 2012). Modern Caribbean tourism, however, began in the eighteenth century, *"when visitors attracted by the earliest attempts at destination marketing stayed in guesthouses and hotels as a consequence of their desire for the fashionable and health-giving properties of spas"* (CHTA, 2012). The first Caribbean Hotel and example of a tourism property in the region was the Bath Hotel on the island of Nevis, built in 1778 (CHTA, 2012).

The Caribbean has long had a reputation of being a real escape filled with fresh water, sun, sea and the absence of diseases. In the 1920s tourists visited the Caribbean islands for pleasurable sun-soaked vacations, a symbol of spontaneity and sensuality among the wealthy. Before the second world war began, approximately 100,000 tourists visited the region a year. By the 1970s, with improved communications and development of modern air lift and consistent flights, the Caribbean with its allure of sand, sea and sun became a destination of high demand. Tourism rose to become a leading growth sector in most economies as stagnation persisted in the traditional output and export sectors (Zappino, 2005). With the advent of trade policies, industries such as Caribbean bananas, sugar and bauxite were no longer competitively priced (CHTA, 2012).

Tourism is now a leading economic sector in the Caribbean region. The industry generates employment, foreign exchange, and overall linkages to the wider economy. In 2019 it made a total contribution of 13.9% to the Caribbean GDP and supported over 15% of all employment (WTTC, 2020). Contribution to GDP was highest for three overseas dependencies Aruba (73.6%), British Virgin Islands (57%) and US Virgin Islands (55.5%). Among independent countries, The Bahamas had a contribution of 43.3% and Antigua and Barbuda was similarly dependent (42.7%). Trinidad and Tobago (7.8%) is the only focal country for this study that had a GDP contribution below the regional average (WTTC, 2020).*Figure 2: Tourism Contribution to GDP and Employment, 2019*

> The World Tourism Organisation (WTO) defines tourism as '*a social, cultural and economic phenomenon which entails the movement of people to countries or places outside of their usual environment for personal/business or professional purposes'* (UNWTO, n.d.). The word, tourism, may also refer to the *activity of visitors* (Economic & Social Affairs, 2010).

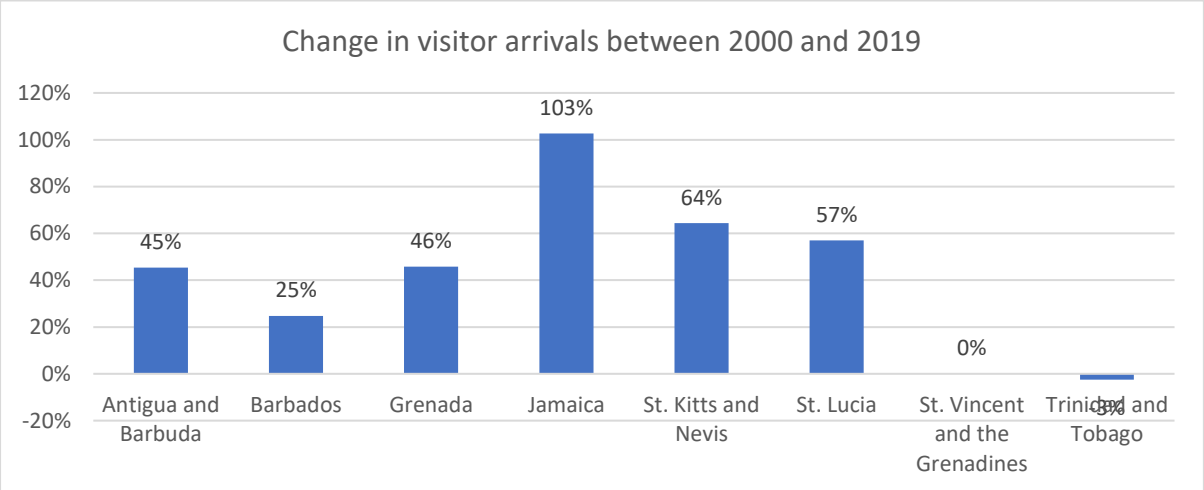


Coastal and marine tourism, in particular, represent a significant share of the region's tourism industry and is an important component of the rapidly expanding blue economy. Throughout the Caribbean, nearly all tourism development has occurred in coastal or nearshore areas, with beaches being the main attraction (Gable, 1990). A majority of the tourism facilities are located within 800 meters of the high-water mark (Zappino, 2005). Additionally, in keeping with global trends, yacht tourism, which is

directly linked to marine tourism, has become an increasingly significant asset for countries that rely on tourism as a means of development (Sevinc, Figen, & Guzel, 2018). In 2017, gross revenues from marine and coastal tourism alone were estimated at US$57 billion (Diez, et al., 2019).

While visitor arrivals over the past two decades have tended to fluctuate in most territories, there were notable increases for each of the eight islands, with the exception of Saint Vincent and the Grenadines and Trinidad & Tobago, during this period. When compared with the number of visitor arrivals in the year 2000, Trinidad & Tobago was the only country that saw a decrease in the actual number in 2019.

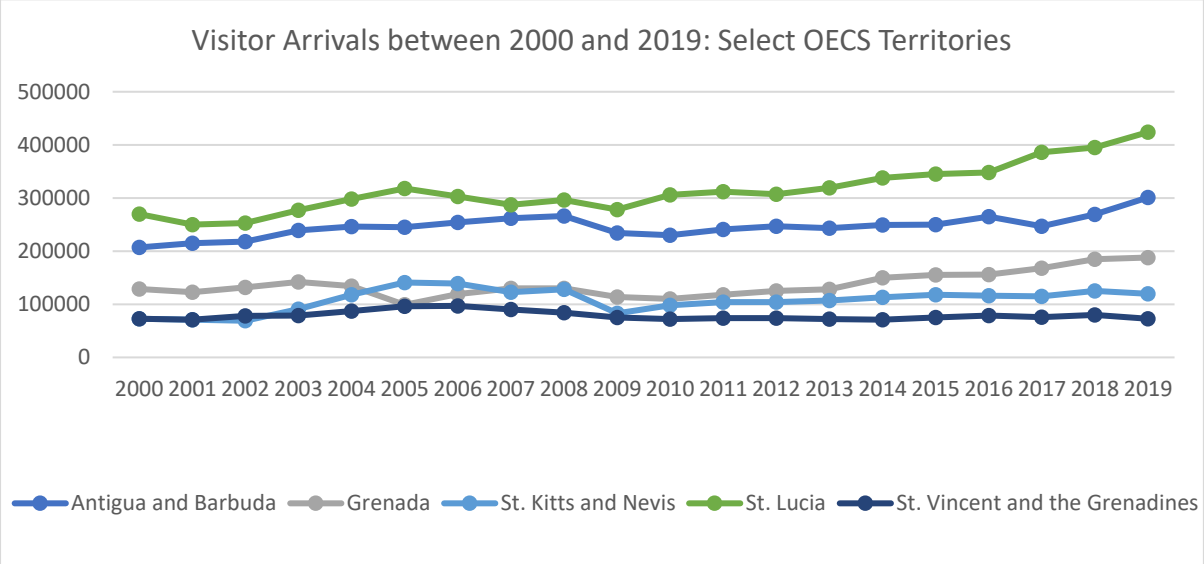
Figure 3: Change in visitor arrivals between 2000 and 2019[1]



Data Source: World Bank Data

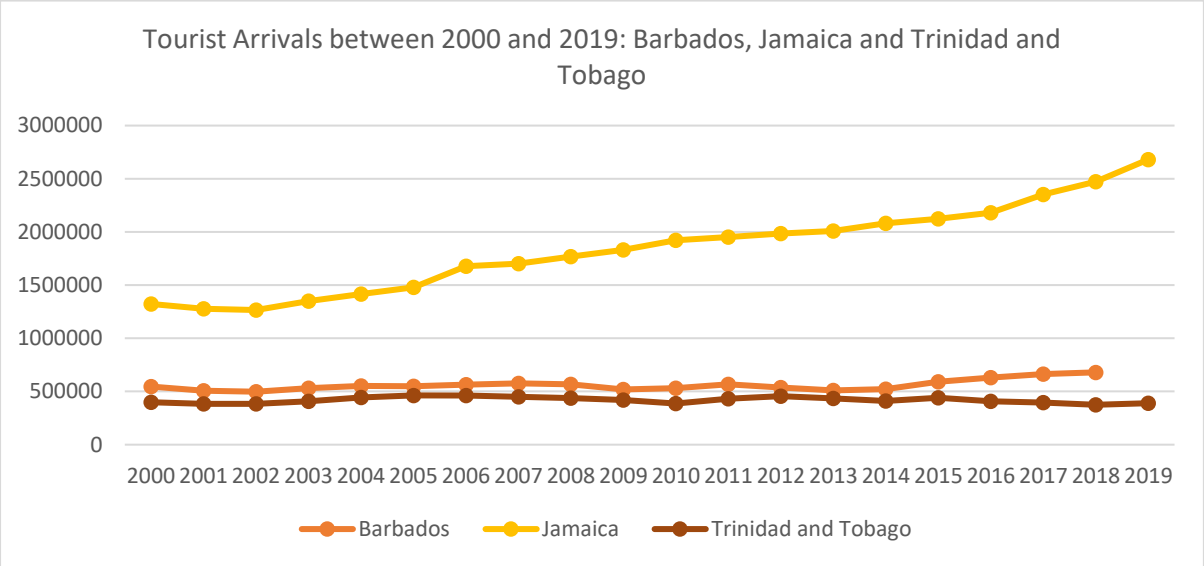
Trends in visitor arrivals for the period 2000 to 2019 are illustrated in Figures 4 and 5 below.

Figure 4: Visitor arrivals between 2000 and 2019: Select OECS territories



[1] *The graph shows the change between 2000 and 2018 for Barbados as 2019 data for that country was not available*

Figure 5: Visitor arrivals for Barbados, Jamaica and Trinidad, 2000 - 2019



The explosion of touristic centres along the coast lines of these islands became evident as each island launched campaigns to lure stronger air lift and 'bums in beds' in the late 1980s. Access to best beaches along all the coast lines of each island became a priority for tourism centres, creating and selling a unique piece of a paradise experience in each island. Today, 2021, in addition to local tourism enterprises, inclusive of home-grown exclusive boutique brands, each of these islands has facilitated the establishment of both regional and international hotel brands, which are serviced by steady air lift from around the globe.

Table 1: Estimated tourist air arrivals and room count by territory, 2019

Territory	2019	
	Tourist Air Arrivals	Room Count
Antigua & Barbuda	268,949	3,816
Barbados	681,197	6,528
Grenada	160,970	1,584
Jamaica	2,472,727	35,937
Saint Kitts	148,871	1,754
Saint Lucia	394,780	4,543
Saint Vincent	-	2,395
Trinidad & Tobago	375,485	3,863

Source: Horwath HTL, 2019

2.2 Yachting

The yachting market in the Caribbean has traditionally served a relatively small niche market (Zappino, 2005). In 2005, it was noted that there had been substantial growth in yachting in the region over the last two decades for both charter cruises and bareboating (Zappino, 2005). This, combined with more recent data, confirms the significant expansion of yachting in the region over the last thirty years. It is anticipated that there will be continued growth in the market, with the increasing popularity of marine

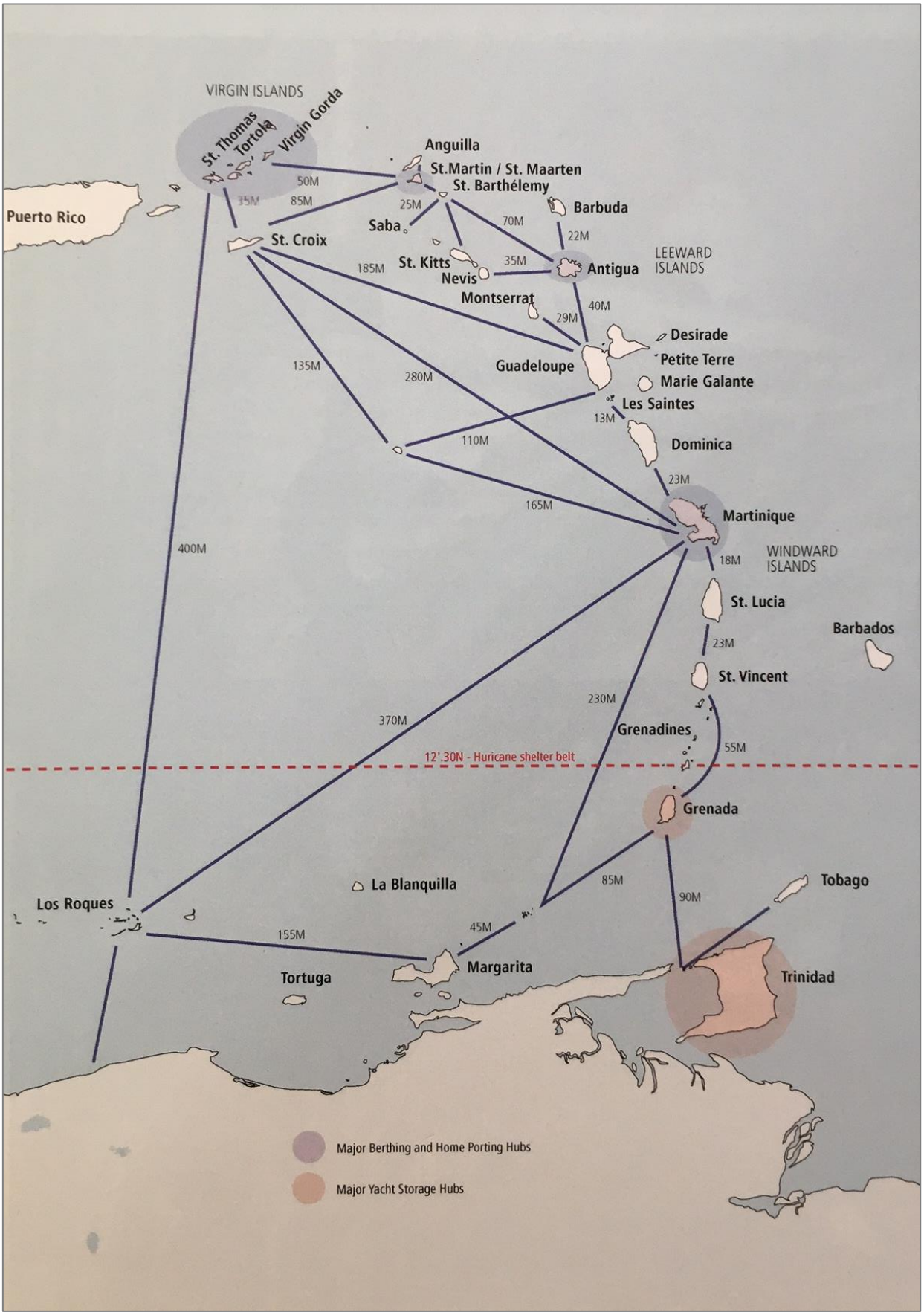
and coastal tourism along with a growing inclination towards yachting as a recreational activity, being among the primary factors driving the market (Business Wire Website, 2020).

The following are among the main types of yachts operating in the region:

- Crewed term charter boats
- Crewed day charter boats
- Term charter boats without crew (bareboats)
- Private live-aboard boats
- Private cruising boats
- Recreational power boats.

The Caribbean has the advantage of having ports of call within easy cruising distance of each other. Events are another key element of the yachting market, which help to position a destination as a yachting centre (Zappino, 2005). Several yachting and sailing events have been added to the rosters for the Caribbean territories in recent years. Antigua's Sailing Week is notably a long-standing premier event in the region, attracting up to 500 yachts during April of each year (Zappino, 2005). Other notable events include Sailing Weeks in Barbados and Grenada; the annual Bequia Easter Regatta in Saint Vincent and the Grenadines; and the Atlantic Rally for Cruisers, which culminates in Saint Lucia.

Figure 6: Major berthing centres and yachting hubs in the Eastern Caribbean



2.2.1 Growth of the Caribbean Charter Industry

The Caribbean charter industry began in the 1960s in Antigua with the introduction of the bareboat concept by Bill Stevens, the original owner of Stevens Yachts, which later transitioned into Sunsail Charters.

Bareboat Charter is an arrangement for renting a boat, with no crew or provisioning. The person who rents the boat obtains possession and full control of the vessel along with the legal and financial responsibility, including all operating expenses, such as fuel, crew and port expenses. This concept, though first introduced in Antigua, quickly spread to other islands in the northern part of the Caribbean and Saint Vincent. The type of vessel used in that period was called a Carib 38, a sailing vessel 38 feet in length. In 1970, an official charter base operation was opened in Saint Vincent with a slightly bigger version of the Carib 38, the Carib 41. In 1979, a second base was commissioned in Saint Lucia at the newly dredged Rodney Bay Lagoon in the north end of that island.

By the mid-1980s, the concept of chartered boats was no longer a novelty, with the introduction of **Skippered Charters**. Skippered Charters are yachts being rented with professional crew consisting of a skipper / captain who is responsible for the manoeuvring of that yacht. In most cases the captain is aided by one or more professional crew members. The typical Charter routes were, Antigua to Saint Martin, and Guadeloupe. Saint Lucia to Saint Vincent and the Grenadines and Grenada.

In 1989, a fiscal policy called the défiscalisation was introduced in the French departments of Martinique, Guadeloupe and Saint Martin, which would transform the charter operations within the south and northern Caribbean. The total fleet count by the end of 1980s was approximately 75 vessels on four bases in Antigua, Saint Vincent, Saint Lucia and Grenada.

Figure 7: Le Marin, Martinique

- **The Role of *Défiscalisation* (Tax Exemption)**

The *défiscalisation* (the Pons Law) is a programme which was created to promote and encourage investment in the overseas departments of France, with the objective to achieve greater economic independence for the nautical sector in the French departments.

The *défiscalisation* was based on the concept of creating investment activity by enabling a tax deduction for investment in boating related activities. The concept started in 1986 and, as a result, created strong economic growth in all the French islands in the Caribbean. This encouraged the French boat building industry and the establishment of new mordent sailing French brands of sailing vessels based in the French departments of Martinique and Guadeloupe (ECLAC, 2004).

This unique French fiscal intervention created an increase in the positioning for French built yachts within the Caribbean waters, mostly in Martinique and Guadeloupe. The following yacht brands were among those introduced to the Caribbean yacht charter fleets:

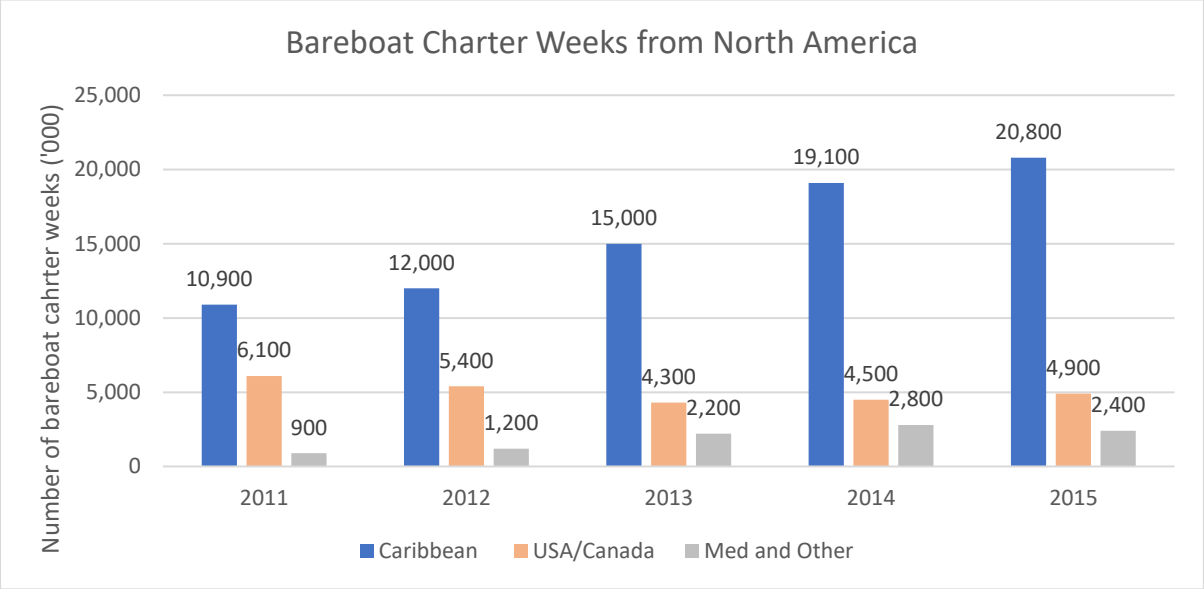
- Beneteau
- Jeanneau
- Lagoon
- Dufour
- Fountaine Pajot
- Guy Couach
- Catana Catamarans

These vessels were updated versions of the first yachts used to charter in Caribbean waters, being bigger, longer and equipped with holding tanks capable of up to 30 gallons of black water storage. The main charter base which benefitted from the French fiscal incentives in Martinique was Le Marin, which quickly evolved from a sleepy fishing village in 1986 to a mecca of yachting activity by 1998. Today, Le Marin is home to 830 berths, 100 moorings, 8 international yacht charter companies, and several private Charter companies. Le Marin at any one time will have up to 2500 yachts and attracts up to 55,000 boaters annually. Virtually all charter vessels leaving Martinique for bareboat or skippered charters sail south to Saint Lucia and Saint Vincent en-route to the Grenadines.

Figure 8: Charters en route from Martinique to the Grenadines

The Caribbean's status as a major destination for cruising and charter holidays is also reflected in its popularity among North American sailors. The Caribbean accounted for 74% of bareboat weeks from this market in 2015. There was also a significant increase of 90 per cent in the number of charter weeks to the Caribbean when compared with 2011.

Figure 9: Bareboat Charter Weeks ('000) from North America, 2011 – 2015



Source: Day, 2021

The expansion in the yachting industry has been accompanied by improvements in infrastructure and supporting services. Each island, even those with less developed yachting markets, such as Jamaica and Barbados, provides docking facilities and a range of dry dock and marine services. Table 2 provides an overview of the capacities of marinas, docks, boatyards, anchorages and moorings on the respective islands.

Table 2: Docking capacities

Territory	**Docking Capacity**		
	Marinas, Docks	Boatyards	Anchorages & Moorings
Antigua & Barbuda	455	368	481
Barbados	216	40	177
Grenada	653	970	337
Jamaica	300	106	555
Saint Kitts	64	163	404
Saint Lucia	295	90	385
Saint Vincent	224	150	640
Trinidad & Tobago	257	700	250

2.3 Coastal and Marine Environment

It follows that the coastal and marine environment are especially important for islands that are dependent on coastal tourism. The income derived from tourism is an indirect product of the ecosystem functions that make the region an attractive place to visit (CARSEA, 2007). Simultaneously,

the potentially harmful impacts that tourism can have on the physical and marine environments is for the most part well-recognised. The large numbers of visitors and massive tourism infrastructure place strains on the ecosystem which could potentially threaten its long-term capacity to sustain livelihoods (CARSEA, 2007).

Nevertheless, data on tourism and its associated impacts remains largely inadequate. Similar to observations made twenty years ago in the South Pacific (Hall, 2001), **data and information in the Caribbean are very fragmented**. **There is no systematic study of the environmental impacts of tourism in the region as a whole, and there is very little baseline data on the condition of the natural environment prior to tourism development.**

Marine pollution is one of the most notable threats to the sustainability of the marine environment. This is widespread throughout Caribbean waters and poses a serious threat to the Blue Economy. **Solid waste and wastewater are among the more prevalent sources of marine pollution** and are projected to increase with continued growth in populations, coastal cities, and tourism (Diez, et al., 2019). Improper management of coastal development can decrease seawater quality and adversely impact marine life, human health, and economic growth (Schuhmann, et al., 2019).

2.4 Wastewater

Wastewater usually has high pollutant levels from human waste and industry that may be harmful to human health and ecosystems. Cities along the coast are especially problematic sources of untreated wastewater and litter due to inadequate waste collection, disposal, and treatment facilities (Diez, et al., 2019). It is estimated that approximately 85 per cent of the wastewater that enters the sea in the Caribbean is untreated (World Bank Group).

Several small islands have insufficient or no water treatment facilities at all (World Bank Group). This has been a longstanding problem within the region. Findings from a study conducted in 1991 revealed that as many as 75 per cent of wastewater treatment plants in the Caribbean produced unacceptable effluent[2] and that in 60 per cent of cases effluent is disposed of in aquatic environments (either salt water or fresh water) (PA Consulting Group through the USAID Environmental Audits for Sustainable Tourism Project (EAST) in collaboration with OAS-USAID, 2001).

Wastewater management remains a challenge in the Caribbean and in the tourism industry, in particular. In 1996, it was estimated that 75 per cent of wastewater treatment plants operated by hotels and resorts (so-called package plants) in the Caribbean did not comply with basic effluent discharge criteria (Dixon, Hamilton, Pagiola, & Segnestam, 2001). Construction of hotels, recreation and other facilities often leads to increased sewage pollution (Sunlu U, 2003). Improper sewage management compromises nearshore water quality in many coastal regions (Schuhmann, et al., 2019).

2.4.1 Boat Sewage and Waste

Wastewater is also produced on boats. While only small amounts of pollutants are generally released by individual boats and marinas, this problem is compounded by increases in the number of boaters and marinas and can potentially result in water quality problems in rivers and coastal waters.

There are three main terms used to describe the different types of wastewater produced on a boat:

[2] *Liquid waste or sewage discharged into a river or the sea*

- *Bilge water* collects in the bilges and may be contaminated with engine oil.
- *Grey water* describes the wastewater that comes from showers, sinks and washing machines.
- *Black water* is solid or liquid waste from the toilet (head) which may contain bacteria and other contaminations.

While these may all negatively impact the quality of seawater and the marine environment in general, the primary concern is blackwater pollution. Blackwater or sewage pollution from recreational boats is an increasing problem worldwide and is of particular concern in popular tourism destinations like the Caribbean and the Mediterranean (Day, 2021). The main sources of sewage from boats are:

- Occupants defecating or urinating directly into the water body
- Toilets being flushed directly into receiving waters
- Discharges from onboard holding tanks or sewage treatment systems (Byrnes & Dunn, 2020).

Sewage from boats is especially problematic in the following conditions:

- Enclosed inland waters and/or semi-enclosed coastal waters with minimal flushing
- High conservation areas (e.g., marine parks),
- Areas continuously receiving high volumes of vessel traffic with relatively large numbers of people on board
- Areas where activities involving in-water primary human contact occurs (e.g., swimming, fishing, or diving activities) (Byrnes & Dunn, 2020).

2.4.2 Estimated Quantities of Wastewater Discharged by Boats

The quantities of wastewater (blackwater and grey water) that are potentially discharged in territorial waters by cruising boats were estimated for the respective study islands based on available yacht arrival data[3]. Assumptions were made about the duration of cruises/charters and the wastewater generated per person per day on a voyage. The formulae below were used:

Formula for blackwater generated:

No. Yacht Passengers x Duration of charter x Daily Sewage per person

Assumptions:

- Each yacht spends the 6-day voyage in the territorial waters of the country where arrival is registered.
- Based on feedback from several yacht charter operators, average duration of charter is 6 days
- Based on feedback from several yacht charter operators, average daily sewage generated per person is 1 gallon.

[3] In the absence of data, calculations for Barbados, Jamaica and Trinidad and Tobago could not be completed.

Formula for estimating the greywater generated was similar:

> No. Yacht passengers x Duration of charter x Daily greywater per person

Assumptions:

- Each yacht spends the entire 6-day voyage in the territorial waters of the country where arrival is registered
- Based on feedback from several yacht charter operators, average duration of charters is 6 days
- Based on USEPA (2011), average daily greywater generated is 45 gallons

Based on the estimates that were computed for 2019, more than one million gallons (1,059,036) of blackwater and more than forty-seven million gallons (47,656,620) of greywater were generated among the five islands in 2019. As the top sailing destinations among the focal islands for this project, the territorial waters of Saint Lucia and Saint Vincent and the Grenadines potentially received much more wastewater than their three regional peers. Together, they were recipients of over 72% of all blackwater and greywater generated among the five islands. As a less mature sailing destination Saint Kitts and Nevis accounted for only 2% of each type of wastewater.

Table 3: Estimates of Wastewater Generated by Boats in Select Territories, 2019

Country	Yacht Passengers	Duration	Blackwater Per person (gals.)	Greywater per person (gals.)	Total Blackwater (gals.)	Total Greywater (gals.)
Antigua and Barbuda	19074	6	1	45	114,444	5,149,980
Grenada	24611	6	1	45	147,666	6,644,970
St. Kitts and Nevis	4224	6	1	45	25,344	1,140,480
St. Lucia	66546	6	1	45	399,276	17,967,420
St. Vincent and the Grenadines	62051	6	1	45	372,306	16,753,770

The high season for sailing in the Caribbean runs from December to April. Three-fifths (61.7%) of all yacht arrivals among the five countries were recorded during those five months in 2019. This concentrated arrival of yachts translates to crowding on anchorages and potentially highly concentrated discharge of waste in some areas, especially Saint Lucia and the Grenadine islands. As seen below, generation of both blackwater and greywater peak during those months. In the absence of adequate infrastructure and compliance with rules for discharge zones can result in high concentrations of chemicals and biological agents that present high ecological risks.

Figure 10: Estimated Blackwater Generated by Boats in Select Territories, 2019

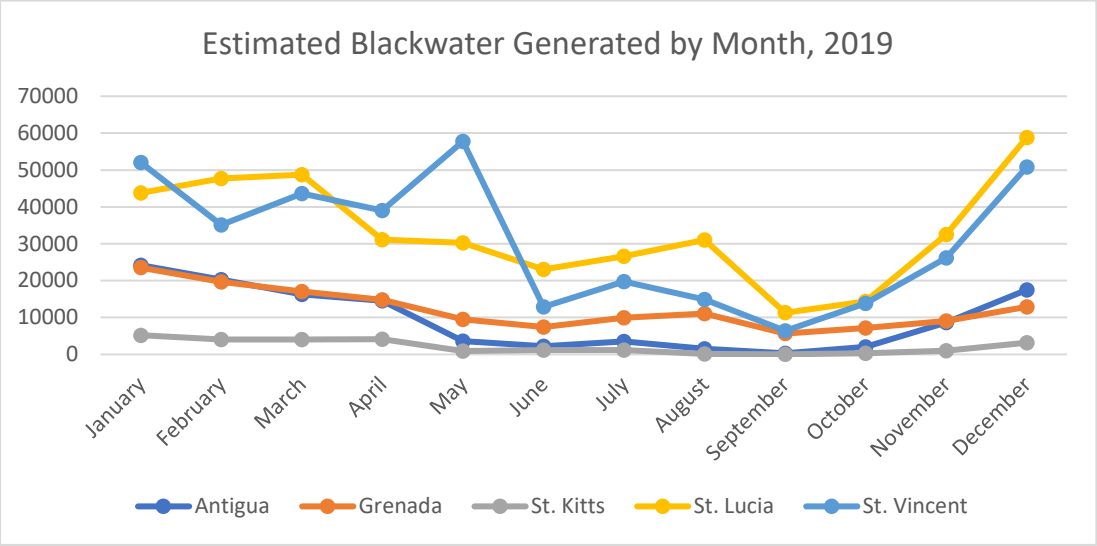
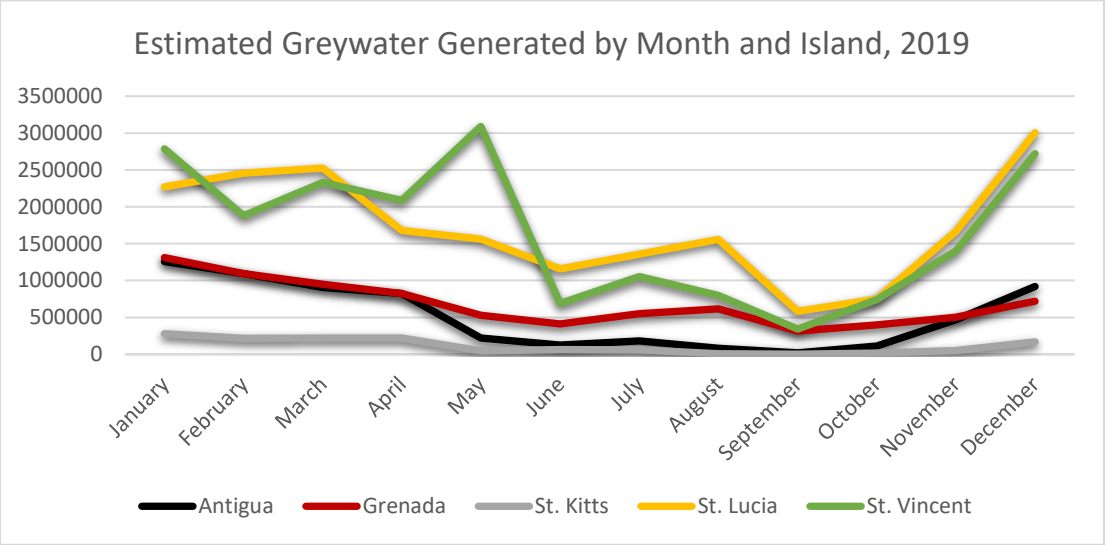


Figure 11: Estimated Blackwater Generated by Boats in Select Territories, 2019



Handling and Disposing of Blackwater on Boats

There are several ways to handle blackwater on a boat. These include:

i. **Direct Discharge** - This generally involves discharging of waste overboard while underway. It is recommended that this is done in deep water away from beaches and anchorage sites.

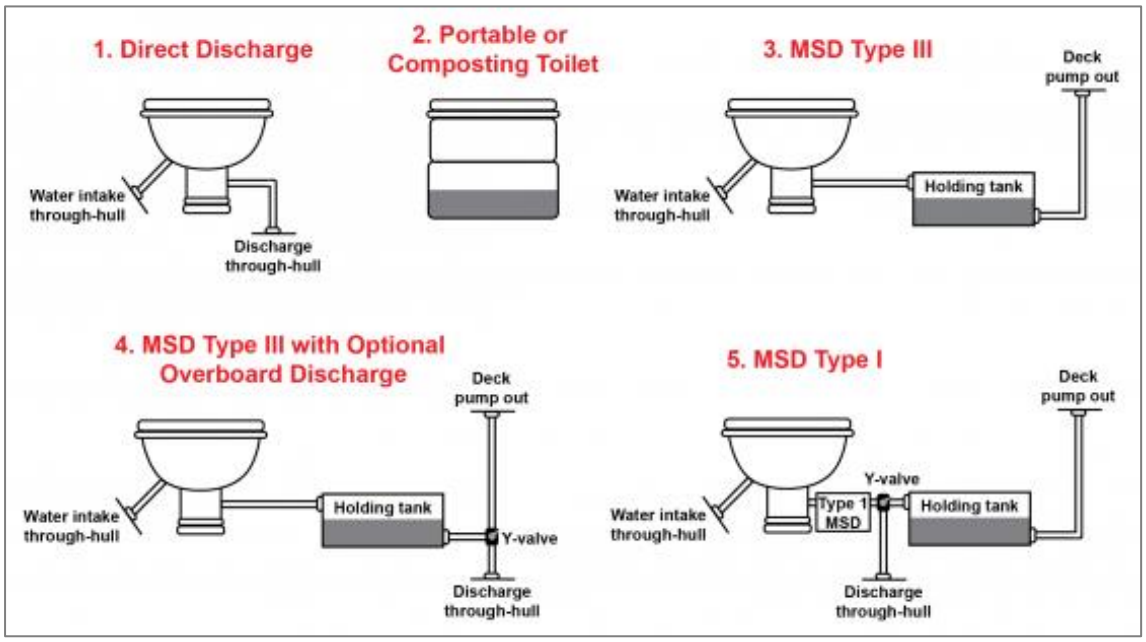
ii. **Portable or Composting Toilet** – These do not require installed water, power, or a holding tank.

iii. **MSD Type III** – For regions with adequate pumpout facilities, a holding tank connected between the head's discharge and a through-deck fitting is an option that is simple and inexpensive to install, and meets the requirements of the law.

iv. **MSD Type III with Optional Overboard Discharge**: In addition to a deck pumpout fitting, a Y-valve can be placed after the holding tank, so sewage can be pumped directly overboard. (This should be beyond the 3-mile limit.) The Y-valve must be secured to prevent accident discharge of untreated sewage.

v. **MSD Type I**: The waste is treated before entering the holding tank or being directly pumped overboard. (Oceana, n.d.)

Figure 12: Methods of handling blackwater



A common practice in the Caribbean is to use the option of direct discharge. If not safely done, this can impair water quality, negatively affect marine ecosystems and increase risks to human health (Oceana, n.d.). The volume of pollution from recreational boats may be relatively small; however, the concentration of faecal bacteria in shallow anchorages or semi-enclosed bays can reach high levels. It is estimated that a single pleasure boat over one weekend can contribute the same amount of bacterial pollution as the treated sewage from 10,000 people (Day, 2021).

2.4.3 Impacts of Wastewater on Coastal Environments

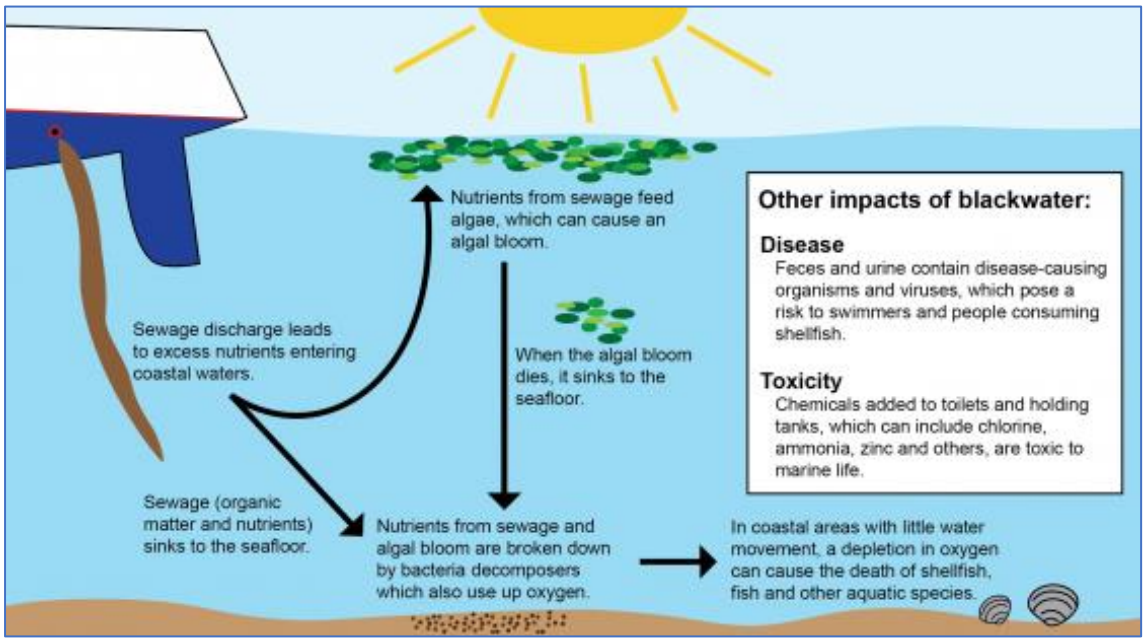
Pollution impacts from wastewater occur mainly in coastal areas and bays close to urban centres that have low levels of wastewater treatment (World Bank Group). Poorly maintained sanitary waste systems aboard boats or poorly maintained pump-out stations at marinas can significantly increase bacteria and nutrient levels in the water (Nation Ocean Service Website, n.d.).

The following are among the impacts of wastewater pollution:

- Pathogens in the water that pose hazards to the health of humans and animals.
- Damage to flora and fauna
- Damage to coral reefs due to high nutrient content which stimulates the growth of algae that cover the filter-feeding corals and hinders their ability to survive
- Changes in salinity and transparency, which can have wide-ranging impacts on coastal environments

Figure 13, below, illustrates how blackwater can impact the marine environment.

Figure 13: Impact of blackwater on aquatic environments



Source: Sailors for the Sea Website

Examples of specific microorganisms in the sewage and the infections that they cause are illustrated in Table 4.

Table 4: Examples of types of infections caused by microorganisms in sewage

Type of Microorganism	Infections Caused
Bacterial pathogens	• Campylobacter infections (e.g. Campylobacteriosis or Campylobacter food poisoning) • E. coli infections (including diarrhoeagenic E. coli, enteropathic E. coli, enterotoxigenic E. coli) • Community-acquired urinary tract infections caused by ESBL-producing E. coli or Klebsiella • Pneumoniae • E. coli O157 infections • Mycobacterium avium complex infection • Staphylococcal skin infections
Protozoan pathogens	• Cryptosporidium infections • Giardia infections
Viral pathogens	• Echovirus infection • Hepatitis A

Source: Day, 2021

Other negative impacts of sewage on the marine environment, especially as it relates to corals are outlined below. This is significant due to the importance and value of coral reefs. Goods and services provided by coral reefs include shoreline protection, livelihoods from ecotourism, fisheries production, and medicines for common diseases. These are estimated to be worth approximately US $31 billion each year (Hausheer, 2015).

Table 5: Impacts of various components of sewage on corals

Sewage Component	Characteristics and Impacts
Fresh water (primary component of sewage)	• Primary component of sewage • Can stress and kill corals (Corals' exact tolerance to fresh water is unknown, but it is documented that influxes of fresh water from storms increase reef mortality)
Endocrine disruptors	• Include natural and synthetic oestrogens, parabens, petrochemicals, and phthalates, among others • Found in many household products • Disrupt the hormone system in humans and other living things • Linked to a myriad of human health problems
Heavy metals	• These chemicals (including mercury, lead, and copper) can lead to bleaching, death and decreased reproductive success in corals • Accumulate in the skeletons of corals just like they do in people • Can increase the strength of pathogens on the coral's surface, making the coral susceptible to infection
Toxins	• Toxins will vary in different locations • Pharmaceuticals are one important class of toxins • Drugs that people take end up in sewage, including antibiotics – these are especially problematic for corals, which have a protective mucus layer that is home to a diverse community of bacteria, which may be impacted by antibiotics, making the corals more susceptible to disease
Pathogens	• In the Caribbean, researchers discovered that a bacterium associated with hospital-acquired infections in humans, *Serratia marcescens*, was causing White Pox Disease in threatened Elkhorn Corals.

2.4.4 Measures Taken to Minimise Black Water Pollution

Several measures have been put in place to help manage the potential environmental impacts of sewage discharge. In addition to general environmental guidelines, these include the development and/or implementation of the following tools:

- Laws/legislation
- Projects that include components which address the issue of sewage or blackwater discharge
- Industry codes of practice/conduct

More practical measures include:

- Wastewater treatment systems/ Wastewater reuse
- Use of holding tanks and pump out facilities.

These have been implemented to varying degrees in each of the participating territories. An overview of the more notable measures that were identified during desk research and interviews with stakeholders is presented below.

I. Laws/ Legislation

The Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region (WCR)[4], commonly referred to as the Cartagena Convention, and its three Protocols, is the most important regional legal framework concerning pollution of the marine environment. The Convention is a regional multilateral environmental agreement (MEA) for the protection and development of the WCR. It entered into force in 1986 at which time it was the only legally binding environmental treaty in the Caribbean.

The Cartagena Convention seeks to promote regional cooperation towards the protection and sustainable development of the Wider Caribbean Region, known in the context of the Convention as the Convention Area.

In 1999, the Land-Based Sources Protocol was adopted to the Cartagena Convention. This was in response to an assessment of land-based sources of pollution in the convention area, which found that domestic water was the major contributor of marine pollution in the region, and also pointed to several other large point sources of pollution to the Wider Caribbean environment (EPA, n.d.). Four of the eight countries in this study have ratified this Protocol; they are Antigua and Barbuda, Jamaica, Saint Lucia and Trinidad and Tobago.

The Protocol recognises that a significant proportion of marine pollution in the Region is estimated to originate from land-based sources and activities, placing sectors such as tourism and fishing sectors as well as its fragile coastal ecosystems at high risk (EPA, n.d.). Notably, countries that have ratified the Protocol are obligated to establish legally binding effluent limitations for domestic sewage.

All WCR countries have laws that govern environmental protection (including pollution) as well as responsibility for the water and wastewater sector (GEF CReW 2016). However, **harmonization among the different pieces of legislation, some of which are outdated, is generally lacking.** Additionally, **in most countries enforcement of existing laws is inadequate, some lack water quality and effluent standards, and water quality monitoring is generally insufficient** (UNEP, 2019).

II. Related Programmes and Projects

In recent years, key actors in the tourism industry have implemented several projects that have been centred on enhancing the sustainability of coastal and marine tourism. Several of these have directly or indirectly addressed the issue of marine pollution. One of the most significant initiatives relating to the problem at hand is the Assessment & Management of Environmental Pollution Programme (AMEP) of the UNEP Cartagena Convention Secretariat. In addition to the Project under which this assignment falls, Integrating Water, Land and Ecosystem Management in Caribbean SIDS: GEF IWEco, there are three other projects and activities aligned to the AMEP, which include components that are/were directly related to minimising blackwater pollution in the study countries. These are:

- Caribbean Regional Fund for Wastewater Management: GEF CReW
- Developing the State of Convention Area Report on Pollution (SOCAR)
- Reduction of nutrient and wastewater pollution in Costa Rica and Jamaica

[4] The Wider Caribbean Region includes 28 countries that border the Gulf of Mexico, the Straits of Florida, and the Caribbean Sea out to a distance of 200 nautical miles from shore (EPA, n.d.).

Caribbean Regional Fund for Wastewater Management (GEF-CReW)

The CReW was implemented between 2011 and 2016 with the primary objective to support the WCR in addressing the challenges that contribute to the high rates of wastewater pollution. The following were the three main areas of focus:

- Providing sustainable funding for the wastewater sector
- Supporting policy and legislative reforms, and
- Fostering regional dialogue and knowledge amongst key stakeholders in the WCR.

Another objective of the Project was to assist countries that have ratified the LBS Protocol to meet their national obligations and to encourage non-Contracting Parties to ratify the Protocol (GEF-CReW, n.d.). Six of the eight countries of interest were participating countries in the GEF-CReW Project, although only three of these have ratified the Protocol. The countries that participated are Antigua & Barbuda; Barbados; Jamaica; Saint Lucia; Saint Vincent and the Grenadines; and Trinidad & Tobago. Grenada and Saint Kitts were the exceptions.

The '*GEF-CReW+: An Integrated Approach to Water and Wastewater Management Using Innovative Solutions and Promoting Financial Mechanisms in the Wider Caribbean Region*' is being implemented following the completion of GEF-CReW. This project kicked off with its inception meeting in November 2020. It will promote wastewater as a valuable resource for reuse for agriculture, industrial and commercial purposes (UNEP, 2021).

State of the Convention Area Report (SOCAR)

The Contracting Parties to the LBS Protocol took a decision to produce the SOCAR on land-based pollution in 2010. This decision was taken with the view to:

- Assist Contracting Parties of the LBS to fulfil their reporting obligations by providing a quantitative baseline for monitoring and assessing the state of the environment with respect to the LBS pollution
- Support WCR Governments in assessing progress towards relevant goals and targets including the SDGs, particularly SDG 14.1, '*By 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution*'
- Help inform regional or country-level decisions on addressing land-based sources of pollution, including the development of a regional strategy and investment/action plan for nutrient reduction in the WCR.

All eight countries of interest to this study provided data for the SOCAR.

Other Sustainable Coastal and Marine Tourism Initiatives

The industry's efforts to minimise sewage discharge also benefit directly and indirectly from other projects and initiatives that seek to enhance the sustainability of coastal and marine tourism. An overview of key actors and their flagship projects towards sustainable coastal & marine tourism is outlined in Table 6.

Table 6: Key Tourism Actors in the WCR

Key Actors	Short description/ Areas of focus	Role on (Coastal & Marine) Tourism	Flagship Projects on (Coastal & Marine) Tourism
Public Actors			
Caribbean Tourism Organisation	Public (32 states) and private (industry) tourism alliance, focusing on employment, economic growth, destination promotion, financial tools, sustainability, blue economy	Tourism policies in the Caribbean and follow-up to the implementation; advisory services to international institutions, national governments and public / private organizations	Climate Smart and Sustainable Caribbean Tourism Industry; Sustainable Destinations Alliance for the Americas (SDAA); Caribbean Sustainable Tourism Policy Framework
Caribbean Community and Common Market (CARICOM)	Political and economic cooperation between 15 Caribbean states	Coordination of the policies of the member countries on tourism; cooperation between countries; external economic and political agreements, strategic planning	Coastal Protection for Climate Change; Adaptation in the Small Island States in the Caribbean (KfW)
Association of Caribbean States (ACS)	International cooperation between 25 Caribbean states on environment, energy, trade, shipping	Conservation and protection of Caribbean sea; the establishment of the Caribbean Sustainable Tourist Zone (CSTZ)	The Sustainable Tourism Zone of The Greater Caribbean Project; Meeting of the Special Committee on Sustainable Tourism
Organisation of Eastern Caribbean States (OECS)	International cooperation between 7 states on human rights, governance, economic harmonisation, sustainable development.	Harmonisation and coordination of tourism policies in the region. Common strategic plan.	Development programs and strategic plans.
Business Associations and Private Actors			
Florida-Caribbean Cruise Association (FCCA)	Cruise industry Association in Florida-Caribbean region	Political and economic agreements for the growth of the cruise sector in the Caribbean	FCCA/Aquila Tour Guide Excellence Program (International Certification & Training Program); Environmental Projects (Cleaning Beaches/Road; Hurricane Clean-up; Community Project)
Caribbean Hotel and Tourism Association (CHTA)	Business association of Caribbean hotels and tourism facilities	Policy interventions on tourism management Training, Marketing	CHENACT Caribbean Hotel Energy Efficiency Action Program; Caribbean Alliance for Sustainable Tourism

Key Actors	Short description/ Areas of focus	Role on (Coastal & Marine) Tourism	Flagship Projects on (Coastal & Marine) Tourism
Caribbean Shipping Association (CSA)	Caribbean shipping industry association	Economic development and regional forum of the maritime industry; Political support and lobbying	Partnership and Lobby
American Association of Port Authorities (AAPA)	American Port authority community	Political support and lobbying of port community	Partnership and Lobby
International NGOs			
Caribbean Natural Resource Institute (CANARI)	Management of natural resources, environmental governance	Facilitation and participatory approaches to natural resource governance to conserve biodiversity, enhancement of ecosystem goods and services, livelihood benefits and wellbeing of Caribbean population	Community-based tourism initiatives in the Windward Islands; Environmental Management Legal And Policy Frameworks In Grenada, Saint Lucia, St. Kitts And Nevis And Montserrat
WWF - Latin America and Caribe (LAC)	Environmental protection	Supported actions for species and priority sites finalization, MPA management; work with local communities, decision makers and people to conserve unique habitats and species	Coalition to Save Belize's Heritage
Wider Caribbean Sea Turtle Conservation Network (WIDECAST)	Conservation Caribbean Sea Turtle	Defence, monitoring and supported actions for eco-tourism in marine coastal areas in Caribbean Sea	Turtle Eco-tourism Programs (Safeguarding Sea Turtle, Network Protection of sea turtle)
IUCN Mexico Central America & Caribbean	Sustainability conservation of natural areas, the empowerment of civil society, the generation of knowledge, cooperation	Action for Sustainable tourism in Protected Areas	Biodiversity and Protected Areas Management; Regional Costal Biodiversity Project; Plastic Waste Free Islands project (Caribbean SIDS)

Source: Blue Tourism: The Transition towards Sustainable Coastal and Marine Tourism in World Marine Regions (2019)

III. Industry Codes of Practice/ Conduct

The Code of Conduct for the Prevention of Pollution from Small Ships and Anchorages in the Caribbean was developed at a Conference on Prevention of Pollution from Small Ships, held in Port of Spain, Trinidad, in 1996. It was organised by the Government of Trinidad, in co-operation with the International Maritime Organization (IMO) and the Wider Caribbean Initiative for Ship-Generated Waste (WCISW), with financial support from the United Nations Development Programme (UNDP), the Pan-American Health Organization (PAHO), France and the Netherlands.

The objective of the Conference was to highlight environmental issues arising from the drastic increase in the number of pleasure crafts visiting the islands in the 1990s and to establish uniform regional guidelines for application to the prevention of pollution from small ships, thereby fostering the sustainable development of nautical tourism (Code of Conduct for Prevention of Pollution from Anchorages and Small Ships in the Caribbean, 1997). *While the focus was on garbage, it also addresses the issue of sewage discharge.*

As international laws and guidelines often defer to local guidelines for handling of sewage for smaller craft and those carrying less than 15 passengers, this Code represents the only uniform guidelines for the WCR. It recommends that:

- Owners and operators of marinas, small ship harbours, and boat yards should *provide sewage waste reception facilities in the form of pump-out systems from a vessel's holding tank, including a facility for emptying chemical toilets and buffer tanks, usually best located adjacent to the fuelling bay at the end of a jetty or pontoon. (Section 3.3)*

With respect to users, the Code recommends the following for the discharge of sewage:

- *Never discharge toilets directly into the sea in confined/crowded anchorages or near bathing beaches as this can create a public health risk. (Minimum 300 meters from land is recommended).*
- *Do not empty sewage holding tanks within 4 miles from land or near environmentally sensitive areas in water less than 20 meters deep.*
- *Discharge only when the vessel is underway.*

There were 130 representatives from 30 countries present at the Conference where this Code was developed. Following the Conference, the draft document was circulated by the IMO to the relevant Governments for comments. It was recommended that the countries in the region take the necessary measures to implement the Code.

Seven of the eight study countries were present at this Conference. It is notable, however, that there has generally been no mention of this Code during discussion with owners of docking facilities, including marinas and boatyards, or locally based Charter companies.

IV. Water Treatment/Reuse Systems

The types of sewage treatment facilities used throughout the region include oxidation ditch, activated sludge, waste stabilization pond and primary treatment. In many cases, in the Eastern Caribbean, there is now a requirement for hotels and resorts to treat wastewater to a high standard in order to meet environmental standards for protection of the coastal areas on which they depend.

The more recently constructed plants have tended to rely more heavily on nature-based treatment because they tend to require less maintenance and suffer fewer disruptions in service, they may have more expansive space requirements. Nature-based systems utilise natural organismic action for breaking down sewage and removal of contaminants rather than on the use of chemicals. Some examples of such systems and types of biological technology used are illustrated in Table 7, below.

Table 7: Examples of Nature-based Wastewater Treatment Facilities in Operation

Territory	Location	Type of Natural Treatment
Jamaica	Florence Hall Village, Falmouth	Constructed wetland
	Negril	Facultative pond
	Montego Bay	Facultative pond
	Ocho Rios	Facultative pond
Saint Lucia	Beausejour	Oxidation Ponds
Trinidad and Tobago	Malabar Wastewater Treatment Plant	Stabilisation (aerobic and anaerobic oxidation)

Waste-water reuse systems are also commonly utilised, particularly in the hospitability sector. In addition to meeting wastewater disposal requirements, wastewater reuse has the advantages of being able to assist the resort sector in reducing the overall costs of water supply and to overcome shortages in the dry season. It was found that reuse of wastewater could meet up to 38% of total water needs (Peters, 2014).

Collection and treatment are required before wastewater can be reused. However, it is estimated that only 8% of the total wastewater generated in developing and low-income countries such as the Eastern Caribbean is treated (Peters, 2014). The need for urgent action in order to address this poor state of wastewater treatment in the wider Caribbean was one of the factors that influenced the establishment of the GEF-CReW (Peters, 2014).

An assessment of wastewater reuse practices in the Eastern Caribbean and Jamaica[5] revealed the following highlights as it relates to the islands of interest:

- **Antigua & Barbuda**
  - The motivation for wastewater reuse is driven by high prices of water and restriction of wastewater disposal
  - Treatment plants in Antigua and Barbuda produce about 4440 m^3 /d with varying quality of treated water
  - Most hotels with 50 or more rooms have on-site wastewater treatment plants and reuse wastewater for irrigation
  - One large hotel recycles 365–410 m^3 of it daily for irrigation use

- **Barbados**
  - There are three main drivers for the reuse of wastewater in Barbados: satisfying the high tourism demand, groundwater protection and the reduction of the pollution of coastal waters
  - The island is serviced by two municipal sewage treatment systems, where several package treatment plants collect about 25,000 m^3 of wastewater per day
  - The municipal plants discharge directly to the marine environment
  - Treatment plants for the hotels typically have capacities ranging from 13 m^3/d to 170 m^3/d

[5] *Key sources: Water Reuse in the Eastern Caribbean: A Case Study (2014) for Antigua and Barbuda, Grenada, Saint Kitts & Nevis, Saint Vincent & The Grenadines, and Trinidad & Tobago; Baseline Assessment on Wastewater Management (2013) for Jamaica; Discussion with industry stakeholders for Saint Lucia.*

- Overall, less than 10% of the island's generated wastewater is being collected in a way that allows it to be treated for reuse

- **Grenada**
  - Wastewater reuse practices are limited to households
  - Potential has been recognised in an integrated water resources management roadmap for the island

- **Jamaica**
  - A 1.25 MGD9 water reclamation facility was constructed by Rose Hall Utilities Limited, including 15 km of pipeline from the RIU Hotel to Iberostar Hotel, this water reclamation initiative provides water for irrigation of a golf course and gardens at several hotels
  - Wastewater is treated with a membrane bioreactor (MBR) with a capacity of 1.25 MGD. This membrane bioreactor replaces conventional clarification, aeration and filtration by combining the physical barrier characteristics of a membrane with biological treatment and produces high quality effluent at all times
  - The monthly flows of reclaimed water average approximately 9 MGD and the quality of the effluent reported by the operator meets the national standards

- **Saint Kitts & Nevis**
  - Treatment of commercial and domestic wastewater is limited, partly due to the small population and the limited industrial and commercial activities
  - Wastewater reuse for the irrigation of golf courses was introduced by the St Kitts Marriott Hotel
  - The hotel treats 272 800 m^3 of wastewater annually and utilises 87% of it for golf course irrigation

- **Saint Lucia**
  - Several hotels in Saint Lucia have implemented wastewater recycling facilities; these include Coconut Bay Beach Resort and Spa, Sandals Halcyon Beach Resort, and Sugar Beach.

- **Saint Vincent & The Grenadines**
  - Wastewater reuse in St Vincent is limited to household reuse for backyard gardening
  - In the Grenadines, it was estimated that approximately 39% of the resorts used treated wastewater

- **Trinidad & Tobago**
  - The Beetham wastewater treatment plant (BWWTP), one of the largest in the Caribbean, produces 75,700 m^3/d of high-quality effluent
  - According to the Water and Sewerage Authority (WASA), the effluent exceeds standards for many countries that use wastewater for industry and irrigation purposes
  - During the 2010 drought, Petrotrin (a national refinery) supplemented its raw water supply with 3,800 m^3/d from treated wastewater from the BWWTP
  - A project was being undertaken to transport this treated wastewater to the major industrial parks.

- An upgrade of the Malabar Sewage Treatment Plant was completed in July 2019 giving it an output capacity of 9 million gallons/day (40,000 m^3/day) of high-quality effluent (Government of the Republic of Trinidad and Tobago, n.d.).

Table 8: Wastewater disposal levels in the Eastern Caribbean

Territory	Wastewater Treatment: m^3/d	Municipal Wastewater Coverage: %	Municipal Water Reuse	Hotel and Resorts Water Reuse: %
Antigua	4810	4.2	4	
Barbuda	0	7.4	-	<10
Barbados	25003	42.7	0	≈ 4
Grenada	nil	8.0	0	<1
Saint Kitts		5.6	0	16
Nevis	NA	6.4	0	2.3
Saint Lucia	0	13.2	0	NA
Saint Vincent	213	11.6	1	>1
The Grenadines	0	0	0	≈ 50

Source: Water Reuse in the Eastern Caribbean: A Case Study (2014)

V. Holding Tanks and Pump Out Facilities

It is difficult to ascertain the proportion of craft in the region with holding tanks. Even so, interviews with stakeholders including marina operators, charter companies, boaters, and environmentalists in territories across the region confirm that, among vessels with holding tanks, there is little consistent use, or cases where they are not used at all.

As recognition of the impact of pollutants on marine life has grown with increased commercial and leisurely marine traffic, efforts have been made to tighten existing restrictions on discharge of sewage and other pollutants in sensitive waterways through international conventions. The Convention on the Protection of the Marine Environment of the Baltic Sea Area, popularly called the Helsinki Convention, has 10 signatories who are committed to protecting the Baltic Sea from all forms of pollution and covers all inland waters, in addition to the sea. It was originally signed in 1974 to take effect in 1980 and revised in 1992 to take effect in 2000. Regulation 5 of Annex IV, which makes reference to Annex IV of MARPOL covers all ships not already covered by it. Such vessels, including pleasure crafts built as of 1 January 2000 were required be fitted with toilet retention systems (holding tanks) and that ports provide reception facilities for emptying holding tanks (HELCOM, n.d.). The European Union is one of the signatories to the convention along with Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden.

Since 2006, the Recreational Craft Directive required all new vessels to have provision for a holding tank to be fitted. Furthermore, as at 1 January 2008, French law required that new vessels (whether French or foreign flagged) would be required to be fitted with a treatment system or retention tank for black water in order to have access to French maritime or river ports, moorings and anchorages. There was also stipulation that older vessels which were not equipped with treatment systems or holding tanks for black water would be required to comply with rules which prohibit discharge in ports and other designated anchorages (Dawson, 2014). This is noteworthy for the region as Martinique is a significant source market for many of the charters that traverse the Southern Eastern Caribbean.

However, for private vessels that are under 400 GT that do not carry more than 15 passengers, there is no international regulation to fit holding tanks.

For the U.S., under federal law, it is illegal to dump raw, untreated sewage into navigable U.S. waters, including coastal waters within 3 miles of shore and inland waters. A No Discharge Zone (NDZ) takes this law a step further and prohibits the discharge of both treated and untreated sewage into a designated body of water (Oceana, n.d.).

All the territories have legal requirements and/or guidelines that stipulate how sewage should safely be disposed of. There are recommended guidelines concerning the distance from shore within which the dumping of sewage is permissible, but the recommendation is not uniform and varies by territory, from 3 miles to more than 6 miles. This is a source of confusion. Furthermore, there are challenges with ensuring compliance due to lack of monitoring and enforcement. Attempts by docking facilities to implement monitoring mechanisms such as a dye system or measurement of waste in the holding tanks have not been successful in the absence of effective monitoring and enforcement.

The concept of the dye system involves placing a coloured dye into the holding tank. The dye would then be observed in the area around the vessel once the release valve is opened. Measures of this type have been implemented in other jurisdictions over several decades. As early as 1992, its implementation was reported in Avalon Harbour, California where the penalty for violations is a fine of USD500, immediate expulsion from the harbour and a one-year ban. After 200 over expulsions over 4 years, only 2 had been successfully appealed at the time of report (Taylor, 1992). Implementation of similar arrangements were reported for Newport Harbour in 2010, also in California (California: Visiting yachts to have dye placed in holding tank, 2010). In New Jersey law enforcement officers are authorised to board vessels where illegal discharge of holding tanks is suspected and insert dye tablet for verification (Police, n.d.),

With respect to the measurement of waste, the level of waste in the holding tank would be measured at the time of docking. However, boaters often find ways around this. One such way is by not discharging all of the sewage at once, but by letting out a little at a time.

Commendably, several stakeholders referred to guidelines concerning the distance that was permissible for dumping in their respective countries. There was also mention of dumping out to 'deep sea'. When probed concerning what is regarded as 'deep sea', responses from stakeholders also included distances as close as one mile from the coast, or "far enough so the waste will not come back to shore." This alludes to a lack of awareness of proper wastewater or sewage management on the part of some industry stakeholders. More blatantly, there were also several reports of known violations with yachts opting to discharge their waste within harbours or other declared no dumping zones after dark when this action could not be easily observed.

Information on the availability of pump out facilities was not readily available for most islands and information on the extent to which they are used even less so. Table 9 provides a listing of the pump out facilities that were identified during interviews with stakeholders and desk top research. It provides a reasonable indication of the extent to which pump out facilities are available across these islands.

Table 9: Availability of pump out facilities

Territory	Available Pump Out Facilities
Antigua and Barbuda[6]	▪ Antigua Slipway Marina ▪ Falmouth Harbour Marina ▪ Nelson's Dockyard Marina
Barbados	▪ Port Saint Charles Marina
Grenada	▪ Camper & Nicholson Port Louis Marina
Saint Kitts and Nevis	▪ Christophe Harbour
Saint Lucia	▪ IGY Rodney Bay Marina ▪ Marigot Bay Marina
Saint Vincent and The Grenadines	▪ Ottley Hall Marina
Trinidad and Tobago	--

2.5 Wastewater Management

Wastewater management systems and processes vary for each of the respective islands. An overview of the wastewater management efforts of the respective islands is presented below.

- **Antigua and Barbuda**

Wastewater affecting the coastal waters of the islands originate from both land- and sea-based sources and the comparative level of activity can result in land-based sources making a much larger contribution to problems. Wastewater generated on the island is predominantly disposed either to on-site sub-surface disposal systems (soak-away pits and drain fields) and/or to roadside gutters, culverts and watercourses as there is no central sewage collection and transfer treatment system in place. During heavy rainfall, this poses a significant threat to freshwater resources and the potential spreading of diseases. By contrast, the Development Control Authority (DCA) in cooperation with the Central Board of Health has consistently required the construction of mechanical type on-site wastewater treatment plants as a prerequisite to the approval of all major new tourism and commercial projects around the island. As a result, almost 75% of the hotels in the north-west tourism zone and 48% of the larger commercial buildings in the St. John's, the capital, have wastewater treatment plants. These plants are typically extended aeration, activated sludge treatment plants, operating as continuous or sequencing batch reactor (SBR) plants. They are designed to treat to secondary level effluent standards (i.e. < 30 ppm TSS) and often have no provisions for nutrient removal (Gore-Francis, 2013).

In practice, most hotels in Antigua with 50 rooms or more have their own onsite wastewater treatment plants. The waterfront Antigua Yacht Club Marina Hotel in Falmouth Harbour has a treatment plant but it is reported that the overflow of waste water from the hotel has been regularly pumped into the sea in the vicinity of the Antigua Yacht Club Marina.

[6] *The pump out services mentioned in Antigua & Barbuda are possibly provided by external service providers.*

The inadequacy of infrastructure and monitoring for compliance extends to the yachting sector. Only three of the marina facilities provide pump-out services[7] – Falmouth Harbour Marina, Nelson's Dockyard Marina and the Antigua Slipway Marina. Additionally, there is a truck operator who provides service as needed at suitable locations. Despite that, only one of three charter boat services contacted report using any pump-out services. All boats operated by the three companies have holding tanks and report compliance with the required distance from shore for discharging waste.

- **Barbados**

Being a relatively flat island with low rainfall, Barbados relies heavily on its aquifer as a water source and has therefore invested heavily in treatment of sewage from land sources. The Barbados Water Authority operates two treatment plants and hotels have mini facilities for their properties. There have been recent reports (2017 and 2018) of untreated sewage running through the streets of Hastings, Christchurch and Lake Folly and Fontebelle, St. Michael due to malfunctioning sewage plants. More recently, though, improvements have been reported after funding for repairs through an additional charge on the bills of the Barbados Water Authority.

Vessels are required to empty their tanks at least 3 miles from shore. The marina at Port Saint Charles extends pump-out services to boats on demand from which sewage is channelled into the treatment facility that serves the adjoining resort.

- **Grenada**

Wastewater in Grenada is processed via a combination of septic tanks, soak-away pits and sewage treatment facilities. Our review found concerns about marine pollution from both land-based and marine sources. Most frequently-cited was the inadequacy of treatment from the islands two wastewater treatment plants which were designed to pump effluent into the sea after merely removing solids (primary treatment). A technical review of the Grand Anse sewer project prior to construction urged its implementation on the basis that it would successfully reduce human contact with waste that was responsible for the spread of cholera and other infections with little concern expressed for impact on marine life (Hogrewe & Singleton, 1992). Other concerns raised were about disposal of sewage and solid waste from cargo and fishing vessels in the harbour at St. Georges and potential threats to mangroves and aquatic life from boats moored to mangrove plants and on anchor.

Only two marinas, both on Grenada, offer pump-out services. Camper & Nicholson Port Louis Marina has a fixed installation and Grenada Marine Boatyard provides a mobile service using a truck. Little concern has been raised about sewage from yachts but that is probably not due to the absence of violations because there does not seem to be systematic monitoring of conduct in the marinas or in the coastal waters.

- **Jamaica**

Jamaica has faced several challenges with land-based wastewater management with much of the complaints focused on inadequate or non-functional sewage treatment facilities that were often beyond their useful lives, poorly designed or overloaded. However, efforts have been made to address the problem and its major coastal tourism centres (Montego Bay, Ocho Rios and Negril) are now served by recently constructed sewage systems (GEF-CReW, n.d.). It is not known how prevalent connections to those systems are in their respective service areas, but large-volume sewage generators such as hotels would benefit from the greater feasibility of connection to the central

[7] *The pump out services mentioned in Antigua & Barbuda are possibly provided by external service providers.*

system rather than to use alternatives. Despite these investments there does not seem to be a system of routine monitoring by a regulator to ensure compliance with standards.

As noted, in Jamaica yachting and sailing is a miniscule part of the tourism product and consequently its contribution to coastal water contamination is probably negligible. Nevertheless, the sector could grow, given Jamaica's strengths in other sub-sectors and the potential for more significant contribution to marine pollution exists in the absence of a monitoring regime for the vessels currently in operation as day charters and party boats.

- **Saint Kitts and Nevis**

There is very little public investment in wastewater treatment infrastructure. Wastewater generated on the twin islands is predominantly disposed either to on-site sub-surface disposal systems (soak-away pits and drain fields) and/or to roadside gutters, culverts and watercourses as there is no central sewage collection and transfer treatment system in place. This means that there is high likelihood of contaminants from land-based sources entering the marine environment. The larger hotel developments have their own water treatment plants but not much is known about their operational adequacy or compliance with standards.

Handling of wastewater from yachts is mixed. Only Christophe Harbour provides pump-out services for yachts. It has its own treatment plant and treated sewage is trucked away from the site but neither the rate of usage of the facility nor the adequacy of treatment is known. Boats are required to empty their tanks offshore or use pump-out facilities but there is not much indication of structured monitoring for compliance, especially at anchorages.

2.6 Summary: Scale of the Problem

The assessment shows clear evidence of continuous growth in the Caribbean's tourism industry. Most of the eight islands that were evaluated have shown substantial growth to varying degrees. Notably, Jamaica has seen a doubling in the number of overall tourist arrivals in the past 20 years, whereas countries such as St. Lucia, St. Kitts and Nevis have seen increases of more than 50 per cent. St. Vincent and the Grenadines and Trinidad and Tobago were the only islands that showed no clear visible growth during this period. This, however, has not taken away from the significance of their respective tourism industries with tourism being a major contributor to the economies of each of these islands, and having shown steady increases in its contribution to the islands' GDPs in recent years.

Tourism, in the foreseeable future, will continue to drive most of these islands' economies, even in a post-Covid environment. Present data shows that as the number of air arrivals and yacht passengers continue to remain as is, or increase, consistent strain will remain on the islands' ability to manage, monitor and reduce pollution from pleasure vessels and tourism centres. An overwhelmingly large proportion of the sewage that enters the sea is untreated. Furthermore, several of these islands have been found to have inadequate or no water treatment facilities. Most of the treatment plants in the region, including those operated by hotels and resorts, have been found to produce unacceptable effluent, most of which is disposed of in marine environments. Construction of tourist centres along the coastline further contributes to increased sewage pollution. It is cause for concern as marine pollution from these sources negatively impacts nearshore water quality and ecosystems in the coastal regions, thereby compromising human health, and the sustainability of the tourism sector. This is a clear and present danger.

All eight countries have applicable laws that govern environmental pollution, including the assignment of responsibility for the water and wastewater sectors. The primary challenge, however, is that

enforcement is mostly lacking. This is compounded by the inadequacy of the existing laws, which generally do not outline standards for water quality and water quality monitoring. Regulations and policy guidelines also present some amount of confusion based on understanding. **An example of this is guidelines concerning direct disposal of blackwater at sea, which sees varying interpretations of how far from the shore the waste should be disposed of. Added to this is that the guidelines vary from island to island, therefore exacerbating this issue.**

Interviews with industry stakeholders point to acute and chronic pollution in specific bays and coastal sites. However, while many studies have been completed by regional and international agencies, the scientific information is often dated, and there is evidence of little or no coordination with the follow-up actions based on findings. There are also challenges with respect to obtaining water test certificates for some areas, possibly because of the potential fallout that these findings may have on the tourism product of these islands. While water quality tests are being done, the results are not always shared, even with agencies responsible for monitoring of that resource in some instances. Only a few islands have systems in place for continuous monitoring. Instead, the process on most islands tends to be more reactive, with tests being done sporadically or when there is an issue. A key contributing factor is the unavailability of resources to support ongoing monitoring functions.

Recognition of the problem has resulted in projects such as this, which seek to increase awareness and implement initiatives geared at minimising the impact of black water pollution. At the national and regional levels, often with support from international development partners and the private sector, there has been the development of guidelines, codes of conduct, and legally binding treaties that are geared towards alleviating the problem. There is also considerable effort among the private sector to undertake initiatives such as reuse of wastewater, which results in additional benefits such as a reduction in the cost of water. Despite this, the review shows a disjointed approach to the management and monitoring of pollution, with lack of ownership of this problem. Based on the findings, it is evident that the region must work towards a collective solution for this growing issue. It is strongly recommended that a more collaborative approach should be utilised. Ideally, this would involve the development of clear and uniform standards for guidelines, monitoring and enforcement.

3.0 REVIEW OF LEGISLATION

Annex IV of the International Convention for the Prevention of Pollution from Ships (MARPOL) contains regulations regarding the discharge of sewage into the sea from ships. This assignment, however, focuses on vessels under 300 tonnes, that are therefore not subject to the MARPOL.

Arguably, the volume of wastewater generated by a single pleasure boat or small craft is miniscule when compared to the vastness of the oceans but the number of such vessels traversing the ecologically sensitive waters of the Caribbean Sea annually (especially during winter) has elevated the significance of their impact on the marine environment, necessitating consideration being given to applying equivalent standards to those achieved by Annex IV of MARPOL, taking account of the complexity of the category. The category is complex because it covers vessels ranging from jet skis to mega-yachts and all of which could be in be in use commercially and for personal pleasure.

This review of existing environmental legislation in eight Caribbean countries examines each piece of legislation with focus its applicability to the vessel category of interest either as ships operating anywhere or operating within geographically delineated zones, such as marine parks, marine protected areas or in ports.

3.1 ANTIGUA AND BARBUDA

Among countries in this review, Antigua has gone the farthest in its attempt to regulate the class of vessels of interest, though it ultimately falls short on the issue of sewage pollution from them. The Merchant Shipping Act 2006 with its companion regulations is its most expansive legislation for the maritime sector but it also has a Code of Practice for Large Commercial Yachts and the Small Craft Control Act 2015 with a companion regulation. For all of them the Antigua and Barbuda Department of Marine Services and Merchant Shipping handles registration. For general environmental protection, the Environmental Protection and Management Act mandates the Department of Environment to take responsibility for driving policy and action

3.1.1 THE SMALL CRAFT CONTROL ACT, 2015

The Small Craft Control Act, 2015 is applicable to vessels of less than 24 metres in length. Without regard for whether it is propelled or, if so, its method of propulsion. Only vessels of the applicable size already registered under the Fisheries Act are exempt. Section 4 declares the Antigua and Barbuda Department of Marine Services and Merchant Shipping (ADOMS) as the legal authority for small crafts and bars operation of unlicensed vessels. The regulations issued in 2017 under the Act details standards of registration and safe operations for vessels in three size categories: crafts up to 5 metres in length; vessels over 5 metres and up to 13.7 metres long, and; vessels over 13.7 metres and up to 24 metres in length. Neither the Act nor the regulations address pollution from applicable vessels but its attempt to confront the challenges of regulation of small crafts suggests measures related to pollution will likely need to take sub-categories by size or other type into consideration.

3.1.2 ANTIGUA AND BARBUDA LARGE YACHT CODE 2014

The Antigua and Barbuda Large Yacht Code 2014 (hereinafter referred to as “the Code”) is based upon the Large Commercial Yacht Code and its successor, that were developed jointly by the United Kingdom, its relevant overseas territories and international industry representatives. It should be

noted that the Code is not legislation and merely provides guidance on procedure relating to large yachts.

The Code specifically applies to vessels of less than 3000 gross tons (GT) in commercial use for sport or pleasure and which are 24 metres in load line length and over or, if built before 21 July 1968, 150 gross tons and over according to the tonnage measurement regulations applying at that date, and which do not carry cargo and do not carry more than 12 passengers.

It is noted that prevention of marine pollution is dealt with briefly under Clause 25 of the Code and states that vessels should comply with all the requirements of the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as "MARPOL") to the extent that the Annexes of same apply. For vessels under 400 GT, it is the owner's responsibility to comply with local administration/port state requirements and for dealing with oily bilge water retention and so on. Annex 5 of MARPOL which deals with garbage, is applicable to all vessels covered by the Code.

3.1.3 ENVIRONMENTAL PROTECTION AND MANAGEMENT ACT, No. 10 of 2019

The Environmental Protection and Management Act (hereinafter referred to as "the Act") provides for sustainable environmental protection and management of natural resources, to allocate administrative responsibility for the management of environmental matters; to give effect to Antigua and Barbuda's treaty obligations with respect to the environment and to provide the framework financial mechanism to satisfy the requirements of the Act and for other related matters.

One of the objects of the Act is to provide preventive and remedial measures for the control and mitigation of all forms of environmental degradation or pollution including the management of hazardous substances and wastes for the purposes of protecting human health and maintaining the quality of the environment.

Under the Act "pollution" is defined as the introduction, either directly or indirectly, of substances or energy into the environment, which results in deleterious effects such as harm to living resources and marine life, hazards to human health, hindrance to marine activities including fishing and other legitimate uses of the sea, impairment of quality for use of water, air or soil, reduction of amenities or the creation of a nuisance and includes the release or deposit of any pollutant or waste onto land or into the air or water.

"Pollutant" under the Act includes any industrial, municipal or agricultural waste and the deposit or discharged, whether intentionally or otherwise, of other such substances which causes pollution of the environment, including but not limited to greenhouse gases, dredged soil, solid or liquid waste, incinerator residue, sewage, garbage, sewage sludge, chemical waste, hazardous waste, biological material, radioactive minerals, heat, wrecked or discarded equipment, oil and oil residue, rock, sand and other such substances which causes pollution of the environment.

Part V of the Act deals with pollution control. Section 26 provides for pollution control permits and states that no person shall deposit or release a pollutant on or into land, water or the air, except in accordance with a pollution control permit issued by the Department of Environment (hereinafter referred to as "the Department"). The permit issued under this section is subject to such conditions as the Department may determine.

Under the Act, the Minister responsible for environment must ensure that Antigua and Barbuda—

(a) collaborates with other Member States of the Organisation of Eastern Caribbean States and the Caribbean Community to develop and strengthen sub-regional and regional negotiating mechanisms for multilateral environmental agreements;

(b) cooperates with other Member States of the Organisation of Eastern Caribbean States and the Caribbean Community to enable, as far as practicable a common political position in the negotiation and implementation of multilateral environmental agreements;

(c) integrates international principles on climate change and development into the negotiation and implementation of multilateral environmental agreements; No. 10 of 2019 75 *Environmental Protection and Management Act, 2019;* and

(d) establishes appropriate mechanisms to facilitate the exchange of information relating to the negotiation and implementation of, and compliance with multilateral environmental agreements.

Though not explicitly stated, nothing in the Act precludes the Department of Environment from asserting authority over pollution into territorial waters of Antigua and Barbuda from any source, including vessels at sea and such assertion could provide impetus to ADOMS to expeditiously address safe disposal of wastewater from vessels.

3.2 BARBADOS

Three pieces of legislation are applicable to pollution from untreated wastewater in the marine and terrestrial environments. The Coastal Zone Management Act bears an implicit limitation to near-coast areas but can do much to regulate the conduct of boat operators at anchorages. The Marine Pollution Control Act has wider applicability to the marine environment and the Shipping Act has overall applicability to vessels in Barbadian waters and has strong enforcement capabilities where violations are detected but it only implicitly addresses sewage pollution from ships by enforcement of MARPOL and does not extend similar requirements to small ships.

3.2.1 COASTAL ZONE MANAGEMENT ACT CHAPTER 394

The Coastal Zone Management Act (hereinafter referred to as “the Act”) provides for the more effective management of the coastal resources of Barbados, for the conservation and enhancement of those resources. The Act repeals the Marine Areas (Preservation and Enhancement Act) 1985.

Part III of the Act deals with the preservation and enhancement of marine areas and does not make provision for marine pollution. Section 29 of the Act merely states that any person who fouls any part of the beach or foreshore by the deposit of offal, garbage or other waste, or in any other manner whatsoever, is guilty of an offence.

3.2.2 MARINE POLLUTION CONTROL ACT CHAPTER 392A

The Marine Pollution Control Act (hereinafter referred to as “the Act”) purports to prevent, reduce and control pollution of the marine environment of Barbados from whatever source.

Section 3 of the Act prohibits a person from releasing or causing to be released any pollutant into the environment which is in violation of any applicable standards, conditions or requirements specified under the Act or regulations. The Minister may prescribe a list of pollutants and their prohibited concentration levels. Under the Act "environment" means the land, water and airspace of Barbados and its territorial waters.

Section 16 of the Act deals with penalties and states that any person who commits an offence under section 3 of the Act is liable on the first conviction for that offence on indictment, to a fine of $200,000.00 or to imprisonment for 5 years, or to both; or on summary conviction, to a fine of $100,000.00 or to imprisonment for 2 years, or to both. Any person who commits an offence under section 3 of the Act is liable on the second or any subsequent conviction for that offence on indictment to a fine of $400,000.00 or to imprisonment for 7 years, or to both; or on summary conviction, to a fine of $200,000.00 or to imprisonment for 2 years, or to both. For any other offence committed under the Act, a person is liable on summary conviction to a fine of $5,000.00 or to imprisonment for a period of 2 years or to both.

The Head of the Environmental Engineering Division is charged with the responsibility of ensuring compliance under the Act. He is she is assisted by public officers as are designated by the Minister to be marine pollution control inspectors.

3.2.3 THE SHIPPING ACT, 1994

The Shipping Act 1994 of Barbados was developed with intent to regulate maritime activity in the country's exclusive economic zone and of Barbados flagged vessels wherever they are located. Section 3 lists its objectives and they seem to emphasise regulation and development of commercial shipping but includes one on the safety of diving operations and one addressing marine pollution:

> *to prevent or mitigate the effect of shipping activity on the marine environment in the Exclusive Economic Zone of Barbados*

Despite the stated objective, there is no provision in the Shipping Act addressing marine pollution.

At the time of drafting, 14 international conventions were listed in section 312 but the MARPOL was not among them. However, room is left for any other international convention or regulations prescribed by the Minister. Section 313 gives precedent by default to provisions of international conventions where conflict arises with provisions of the Act but that can be overridden by directions from the Minister. Under section 314, violations of conventions can be punished by suspension of certificates of registry.

The Act also seeks to regulate small commercial vessels which are defined as a vessel that is less than 150 gross tons, is registered in Barbados and operates within its exclusive economic zone. Under section 15 subsection (1), should be registered in a small vessels register but should not include vessels under one ton unless used commercially. Despite the clear registration requirements for small vessels including "pleasure yachts" (under section 8), failure to explicitly address pollution from vessels retains the gap in treatment left by MARPOL.

3.3 GRENADA

Grenada seems to be lacking enacted legislation on environmental protection, being limited to only the National Parks and Protected Areas Act which does not seem to have been created primarily for that purpose. The Shipping Act, 1994 is the only legislation governing maritime activity that is particularly relevant to this review.

3.3.1 ENVIRONMENTAL MANAGEMENT ACT

The Environmental Management Act (hereinafter referred to as "the Act") does not appear to be in force. Nevertheless, upon review, it does not specifically deal with the prevention of marine pollution.

The Environmental Management Agency (hereinafter referred to as "the Agency") established under the Act is charged with the responsibly or reviewing the Act and conducting an assessment to evaluate the effectiveness of the Act in achieving the government's sustainable development policy objectives and whether there is an improvement in resource management practices. One of the functions of the Agency include taking appropriate actions for the prevention and control of pollution and conservation of the environment.

Part V of the Act deals with pollution control however focuses on marine pollution to the extent that the Agency must investigate activities to determine the level of water pollution. Consequently, it is noted that the Act is deficient in providing for the prevention of marine pollution from ships, or at all, and is further not compliant with the provisions of MARPOL.

3.1.1 THE MERCHANT SHIPPING ACT, 2006

Despite its title, the Merchant Shipping does not seem to be exclusively limited in its applicability to commercial vessels and their operations. Firstly, It adopts a definition for ships that includes 'every description of vessel used in navigable and not powered by oars'. Secondly, section 13 mandates division of the register into and international ships register, a register for mega-yachts (pleasure vessels longer than 24 metres) and a local register.

Beyond that, section 7 permits the responsible minister to make regulations for implementing the provisions of the Act and any international conventions to which Antigua and Barbuda is a Party. Section 8 goes further in listing 8 conventions that are applicable, including MARPOL. Regarding MARPOL, section 173 states that the provisions of the convention, including its annexes and protocols have the force of Law in Antigua and Barbuda. Violations are detected and verified through inspections and penalties include fines and detention of vessels. Under this act regulations were issued for small commercial vessels in 2008 but those did not address wastewater disposal.

3.3.2 NATIONAL PARKS AND PROTECTED AREAS ACT, 1991

Passed in 1991, the National Parks and Protected Areas Act seems to be focused on terrestrial zones, with no mention being made of the coastal zones but its language is general enough to be interpreted as being applicable to them. Section 7 establishes the National Parks Authority that serves as an agent of the responsible minister of government in administering the Act while the National Parks Advisory Council is tasked with responsibility for maintenance of the land comprising the national parks system. Section 5 empowers the Minister to declare any government land as a protected area for the purposes of preserving its natural beauty, creating a recreational area, commemorating an historic event, or preserving a place that is a historic landmark or of cultural or scientific interest. Subsection (2) of section 13 permits the Minister to make regulations for implementing the act in any relevant area of it operations. Park attendants and police officers have enforcement responsibilities in national parks and may interrogate and search persons suspected of committing offences and may also execute searches and make arrests (section 16). Violations under the act are punishable with both fines and imprisonment (Section 17).

3.3.3 THE SHIPPING ACT, 1994

The Shipping Act, 1994 was created to govern the maritime sector Its definition of ships does not limit its applicability to large vessels. Ships are define as 'every description of vessel used in navigation' (section 2) and vessel as 'every description of water craft used and capable of being used as a means of transportation on water and includes non-displacement craft' (section 2). Grenada government ships in non-commercial use and any in use by the Royal Grenada Police Force are exempt from its jurisdiction.

The Minister and Director of Maritime Affairs are charged with responsibility for implementing the provisions of the Act. Section 18 demands that the Registrar of Ships keeps at least three register books: for merchant ships, fishing vessels and ships under construction. The Registrar of Ships and Director of Maritime Affairs issue relevant certificates for relevant purposes subject to inspections and surveys of the vessels to guarantee compliance with international conventions, local laws and standards for safe operations. Section 457 empowers the Minister to make regulations to carry out the Act and section 463 gives precedence to the provisions of international conventions by default where there is conflict with those in the Act. Violations of international conventions can be met with suspension of registration under section 464. This means that the provisions of MARPOL and its annexes are enforceable in Grenada, though not explicitly stated, but there is nothing in this Act extends similar obligations as those in Annex IV of MARPOL to small vessels. This could be remedied either through issuance of regulations by the Minister, amendments to the Act or enactment of new legislation targeting the complicated class of vessels that are the focus of concern.

3.4 JAMAICA

Jamaica has legislation that addresses marine pollution from both land-based and maritime sources but not all of it is explicitly stated and the provisions of the MARPOL convention have not yet been codified. This omission was noted by Jamaica's Minister of Transport and Mining, Hon., Robert Montaque who promised parliament that legislation to incorporate the MARPOL convention would be brought up for passage during the 2020-21 financial year (Angus, 2020). There is no evidence that goal was achieved. Therefore, there is a requirement for the development of the necessary policy papers and legislative framework to ensure Jamaica's compliance with MARPOL as well as impose measures for the environmentally safe discharge of waste from small pleasure crafts that are not covered by MARPOL

3.4.1 NATIONAL RESOURCES CONSERVATION AUTHORITY ACT, 1991

Pollution affecting the maritime environment falls under the responsibility of two main agencies – The Natural Resources Conservation Agency (NRCA) and the Jamaica Maritime Agency. The Natural Resources Conservation Agency (NRCA) acts as Jamaica's lead environmental protection agency and imposes a licensing and monitoring regime on sewage system operators and industrial waste generators via the Natural Resources Conservation (Wastewater and Sludge) Regulations 2013 through which it limits pollution from land-based sources. Jamaican laws often empower agencies and ministers of government to issue regulations that specify rules employed in exercise of their regulatory powers. Those regulations can be approved by parliament without necessitating amendments to the legislation under which they are issued. The NRCA's role in regulating maritime activity seems to be limited to its empowerment to define and manage marine parks that is Resources (Marine Parks) Regulations 1992 it prohibits the discharge or deposition of waste or other polluting substance that is injurious to plant or animal life in a marine park and imposes a fine or imprisonment for violations.

Though its full description covers all types of waste, it does not specify sewage waste. Park rangers are its enforcement agents.

3.4.2 SHIPPING ACT, 1999

The Shipping Act 1999 was created with the intent of it providing comprehensive regulation of the maritime sector. That intent begins with the broad definition of "vessels" in Section 2 that seeks to encompass any craft on or in the sea irrespective of size, whether or not propelled and mode of propulsion. Its authority is extended to all vessels or ships (defines as equivalent terms) operating in Jamaican territorial waters or flying the Jamaican flag anywhere in the world with the exception of vessels operated by the Jamaican and foreign governments and their military bodies. The Act created the Jamaica Maritime Authority and tasked it to execute development and regulation of maritime sector under the direction of the responsible minister of government. Its functions, listed in Section 8, includes "inspect ships for the purposes of maritime safety and prevention of marine pollution". Notably, sewage or other types of wastewater are not explicitly mentioned but that function can be interpreted to cover it. Though allowed under the act, no regulations have been issued to cover this function.

Further, the Act anticipates adoption of international treaties by stating in Section 459 that, by default, its provisions are to be superseded by such treaties where conflicts arise with provisions in such treaties. Adoption of such treaties is addressed in Section 457 which provides for their adoption via issuance of regulations rather, rather than via amendments of the Act. It states:

> *For the purpose of giving effect to any international agreement or other international treaty instrument relating to shipping or the prevention of pollution of the marine environment, to which Jamaica is a party, the Minister may- (a) by order make such amendment to any provision of (b) make such regulations, the Act; or as appear to him to be necessary and any order or such regulations, as the case may be, shall be subject to affirmative resolution.*

This means that the easiest and most logical pathway for regulation of wastewater disposal from small pleasure boats is via the Shipping Act which already executes its oversight of vessels through inspections and the issuance of certificates.

3.5 SAINT KITTS & NEVIS

Environmental Protection in Saint Kitts and Nevis is led by the Department of Environment which was created via the **National Conservation and Environment Protection Act, 1987**. Its functions (section 4) includes making and implementing policies, programmes and projects; regulation and monitoring of environmental protection. Section 7 gives it power to designate protected areas on land and in marine areas. Section 20 allows it to appoint wildlife and parks officers to administer those designated spaces as well as to engage assistance from other government personnel, community groups and NGOs, among others, to achieve it goals. Sections 34 to 36 bar any pollution of coastal zones, allow for the designation of selected coastal areas as protected areas and punishes violations with fines of up to ten thousand dollars and/or imprisonment of up to one year, in addition to possible seizure of any equipment used in committing the offence.

The Shipping Act and ancillary legislation exercise control over vessels in its territorial waters and those bearing its flag globally.

3.5.1 SHIPPING (MARINE POLLUTION PREVENTION) BILL, 2015

The Shipping (Marine Pollution Prevention) Bill, (hereinafter referred to as "the Bill) intends to prevent the deliberate, negligent or accidental release of harmful substances from ships, and to prevent, reduce and where practicable eliminate pollution, for the protection and preservation of the marine environment and the conservation of the natural resources therein.

Under clause 12 of the Bill the Director of Maritime appointed pursuant to section 411 of the Merchant Shipping Act of St. Kitts (hereinafter referred to as "the Director") must endeavour as far as is practicable, directly or through the International Maritime Organization (IMO), to observe, measure, evaluate and analyse by recognised scientific methods the risks or effects of pollution of the marine environment, and in particular keep under surveillance the effects of maritime activities that are permitted in the island or in which St. Kitts engages, so as to determine whether such activities are likely to pollute the marine environment. The Director must prepare reports of the results obtained and provide such reports of results to the IMO at appropriate intervals.

Part III of the Bill deals with the prevention of pollution by dumping wastes at sea. Part IV deals specifically with the prevention of pollution from ships and applies to all St. Kitts ships all ships operating under the authority of a MARPOL member state within St. Kitts waters and any other ships voluntarily entering the port of offshore terminal of St. Kitts to which the provisions of MARPOL apply.

Clause 27 of the Bill provides for a general duty to comply with MARPOL. The Bill therefore seeks to ratify the provisions of MARPOL and deem these provisions law of St. Kitts, once the Bill is in force. Clause 27 also makes provision for a penalty fine not exceeding $1,350,000.00 for non-compliance in relation to a requirement of MARPOL relating to control of discharge of oil, prevention of oil pollution from ships operating in a special area or discharging of noxious liquid substances. In relation to any other requirement of MARPOL attracts a penalty for non-compliance of fine not exceeding $675,000.00.

Part V of the Bill provides for oil pollution preparedness, response and cooperation. Under Part XII of the Bill, enforcement, legal proceedings and cooperation are dealt with. The Director, or a person authorised by the Director for the purpose, may board, inspect and survey any ship to which the Bill affords jurisdiction, enter port facilities in St. Kitts, demand the production of documents, records and other evidence, and take testimony of witnesses under oath, for the purpose of conducting inspections and surveys and for undertaking other activities authorised or required under the Bill.

The Director is also empowered to take the necessary actions for violation of provisions under the Bill such as, denying the entry of a ship to any St. Kitts port of offshore terminal, if the Director has reason to believe that the ship proposing to enter a St. Kitts port or offshore terminal is not in compliance with the requirements of the Bill or any other law of St. Kitts relating to seaworthiness of ships, and thereby threatens damage to the marine environment. The Director may also, in instances provided for under the Bill, institute proceedings for the detention of a ship which does not comply with the provisions of the Bill.

The Minister responsible for maritime affairs is responsible for the administration and implementation of the Bill and is empowered to make regulations for the administration thereof.

The Bill, once it comes into force, will provide a sound means of regulating the prevention of marine pollution, thereby preserving and protecting marine life but it does not extend similar regulations to small ships and pleasure vessels not currently included in Annex IV of MARPOL. An amendment or issuance of regulations under the Shipping could be used to extend similar requirements to small ships and pleasure vessels, taking into consideration issues raised by their sizes and use.

3.6 SAINT LUCIA

Saint Lucia has not created an authoritative environmental protection agency in the way that some other countries have, neither does it have legislation that explicitly unites and coordinates its environmental protection efforts. That is not to say that much effort is not underway to protect both marine and terrestrial environments. Shipping is, however clearly and comprehensively addressed by the Shipping Act, its companion legislation and regulations. Further, the Saint Lucia Air and Sea Ports Authority (SLASPA) houses the Division of Maritime Affairs that serves as the registrar and regulator for the maritime sector.

3.6.1 THE SHIPPING ACT, CAP. 13.27

The Shipping Act applies to every type of vessel used in navigation, excepting for Saint Lucian Government ships used non-commercially and those used by the Saint Lucian Defence Force. Ships are required to be registered under the act with the registrar appointed under the Division of Maritime Affairs. Section 491 empowered the responsible minister of government to issue regulations for giving effect to international conventions on maritime affairs, among other purposes. Section 494 gives precedence to provisions of international conventions over those of the act by default, where conflicts arise. Violation of international conventions can be punishable by suspension of certificate of registry until a defect is rectified.

Interestingly, the Seaports Regulation issued under the SLASPA Act requires that any person who allows the use of a small craft for hire is required to register with the General Manager of SLASPA and such vessels are subject to inspections for the issuance of a certificate of its suitability and fitness for the intended purpose. Failure to comply with its standards can result in fines as well as suspension or cancellation of licenses.

3.6.2 SHIPPING (MARINE POLLUTION) ACT 2020

The Shipping (Marine Pollution) Act, (hereinafter referred to as “the Act”) purports to prevent the deliberate, negligent or accidental release of oil and other harmful substances from ships, for the protection and preservation of the marine environment and the conservation of the natural resources therein, and to regulate maritime activities.

The Act highlights that Saint Lucia is a party to the following International Conventions, namely, the United Nations Convention on the Law of the Sea, 1982, the International Convention Relating to Intervention on the High Sea in Cases of Oil Pollution Casualties, 1969, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1996, the International Convention on the Prevention of Pollution from Ships, 1973, together with its Protocol of 1978 (MARPOL), the International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990, the International Convention on Civil Liability for Oil Pollution Damage, 1992, the International Convention on the Establishment of an International Fund for the Compensation for Oil Pollution Damage 1992, and the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996. The Bill, once passed, will give effect to the foregoing Conventions.

The Act is administered by the Minister assigned with the responsibility of shipping (hereinafter referred to as “the Minister”). The Minister is responsible for the administration and implementation of the Bill and may delegate his or her duties or powers to anyone authorised under the Bill to perform any function under the Act. The Minister is empowered to prescribe regulations to the Bill. Importantly

also, the Director of Maritime Affairs (hereinafter referred to as “the Director) or any other person lawfully acting under the instruction or on behalf of the Director plays an instrumental role in the administration of the Act. The Director is under an obligation to observe and evaluate the risks or effects of pollution of the marine environment; and keep under surveillance the effects of any activities which it permits or in which it engages in order to determine whether these activities are likely to pollute the marine environment.

Chapter 2 of the Act makes provision for the prevention of pollution by oil. “Oil” is defined under the Act as, petroleum in any form including crude oil, fuel oil, sludge, oil refuse and refined products and includes the substances listed in the Fifth Schedule to the Act. This Chapter controls the discharge of oil generally and also in special areas identified under the Act. Clause 71 of the Act specifically prohibits discharge into the sea, containing chemicals or other substances in quantities or concentrations which are hazardous to the marine environment or chemicals or other substances introduced for the purpose of circumventing the conditions of discharge specified in the Chapter.

Clause 83 under Chapter 2 of the Act provides for offences and states that where any ship, or the owner or master thereof, fails to comply with the requirements of this Chapter or the Schedules related thereto or any Regulations made, the owner and the master of the ship is each guilty of an offence and liable on summary conviction to a fine not exceeding EC$250,000.00. It shall be a defence for a person charged to show that he took all reasonable precautions and exercised all due diligence to avoid the commission of the offence.

The Director is empowered under this Chapter, to ensure the compliance with the provisions under this Chapter.

Chapter 3 of the Act deals with prevention of pollution by noxious liquid substances in bulk. Again, the Director is empowered under the Bill to ensure compliance of the provisions thereunder. This Chapter purports to control the discharge of noxious substances into the sea. These substances are identified under the 8th Schedule to the Act and categorised under clause 90 of the Bill.

Clause 126 under Chapter 3 of the Act makes provision for penalties and provides that where any ship, or the owner or master thereof, fails to comply with any requirement of this Chapter or the Schedule related thereto or any Regulations made, the owner and the master of the ship is each guilty of an offence, and liable on summary conviction to a fine not exceeding EC$250,000.00. It is however a defence for a person charged to show that he took all reasonable precautions and exercised all due diligence to avoid the commission of the offence.

Chapter 4 of the Act deals with prevention of pollution by harmful substances carried by sea in packaged form. “Harmful substances" is defined at substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code and includes empty packaging which have been used previously for the carriage of harmful substances unless adequate precautions have been taken to ensure that they contain no residue that is harmful to the marine environment. The Chapter provides for the manner in which the substances are to be stored on the ships and also the quantity which can be carried. The Director is responsible for ensuring compliance and doing the necessary monitoring and checks.

Clause 138 under Chapter 4 of the Act provides for penalties and states that where an owner, master or agent of a ship that accepts goods for carriage by sea in a way that contravenes the Chapter, he is she is guilty of an offence and is liable on summary conviction to a fine of EC$125,000.00. There are other penalties for failure to comply with the prohibition of dumping of harmful substances into the sea which attracts a fine of EC$25,000.00 and costs which may be incurred in connection with the

recovery of such substances. Further, the Act provides that any person who fails to take the measures prescribed by the Minister in relation to the regulations of the washing of leakages overboard based on the physical, chemical and biological properties of harmful substances is guilty of an offence and is liable on summary conviction to a fine of EC$12,500.00, unless he can show that compliance with such measures would have impaired the safety of the ship and persons on board. It remains a defence for a person charged with an offence to show that he took all reasonable precautions and exercised all due diligence to avoid the commission of the offence.

Chapter 5 of the Bill addresses prevention of pollution by sewage. Under the Bill "sewage" is defined as-

drainage and other wastes from any form of toilets, urinals, and WC scuppers;

drainage from medical premises (dispensary, sick bay, etc.) via wash basins, wash tubs and scuppers located in such premises;

drainage from spaces containing living animals;

other waste waters when mixed with the drainages defined above.

This Chapter deals with sewage reception facilities and standard discharge connections and the inspection of these sewage reception facilities. It also deals with the control of discharge of sewage into the sea and prohibits same unless it has, inter alia, been comminute and disinfected using a system approved by the Director a distance of more than 4 nautical miles from the nearest land; or the ship has in operation an approved sewage treatment plant which has been certified by the Director.

Clause 153 under Chapter 5 of the Act makes provision for penalties and state that where any ship, or the owner or master thereof, fails to comply with any requirement of this Chapter, or any Schedule related thereto or any Regulations made, the owner and the master of the ship is each guilty of an offence and liable on summary conviction to a fine not exceeding EC$25,000.00.

Chapter 6 of the Act deals with prevention of pollution by garbage. Under this Chapter "garbage" means all kinds of victual, domestic and operational waste excluding fresh fish and part thereof, generated during the normal operation of the ship and liable to be disposed of continuously or periodically but does not include substances which are defined or listed in other Chapters; and small quantities of food wastes for the specific purpose of fish feeding in connection with fishing or tourist operations.

This Chapter provides for the disposal of garbage on fixed and floating platforms and disposal of garbage within special areas designated under the Bill. It also provides for garbage reception facilities and inspection thereof, and the requirement for garbage management plans to be carried on ships over 400 gross tonnage which are certificated to carry at least fifteen people.

Clause 172 under Chapter 6 of the Act deals with penalties and states that where any ship, or the owner or master thereof, fails to comply with any requirement of this Chapter, the owner and the master of the ship is each guilty of an offence and liable on summary conviction to a fine not exceeding EC$250,000.00.

The Act is accompanied by Marine Pollution Regulations which explicitly specify the standards for disposal of sewage from ships and effectively extends MARPOL requirements for handling sewage to some smaller vessels. It uses issuance of the Sewage Pollution Prevention Certificate (SPPC) as an enforcement tool but limits the applicability of the rules to vessels of mass greater than 200 gross

tonnage or carrying more than 10 passengers, if smaller. This means that even vessels certified to operate only within the exclusive economic zone that fit those specifications will now require SPPCs. However, that still excludes a substantial number of pleasure vessels (less than 200 gross tonnage) which is a significant part of the complicated category that is exempted from MARPOL Annex IV.

3.7 SAINT VINCENT & THE GRENADINES

Environment protection in Saint Vincent and the Grenadines is addressed via the Environment Protection Bill 2009 and The Marine Parks Act 1997. The Environmental Protection Act is executed by the Department of Environment while the Marine Parks Board has responsibility of action over areas under its watch. Marine parks are significant because they include some of the popular anchorages for pleasure vessels. At the same time, the Shipping Act 2004 and Shipping (Marine Pollution Prevention) Act give direct authority over vessels and should be used as the main vehicles for regulating wastewater discharges from small ships and pleasure vessels, despite their current limitations.

3.7.1 ENVIRONMENTAL MANAGEMENT BILL 2009

The purpose of the Environmental Management Bill, 2009 (hereinafter referred to as "the Bill") is to, inter alia, allocate and coordinate the administrative responsibilities for environmental management within St. Vincent and to prevent and mitigate against pollution of the environment, for the purposes of protecting human health and maintaining the quality of the environment.

In an effort to administer the Bill and the Regulations made thereunder, the Bill provides for the establishment of a department under the Ministry responsible for Environment, known as the Department of Environment (hereinafter referred to as "the Department"). The Department will be headed by a public officer, known as the Director of Environment, appointed by the Public Service Commission. Some of the duties of the Department are to assess the status of natural resources and of pollution, environmental degradation and other adverse impacts on the environment; to prevent and control pollution where there is no existing legal provision for such control by coordinating all activities relating to the discharge of wastes into the environment; and to undertake investigations and inspections to ensure compliance with the Bill or the regulations made thereunder.

While Part III of the Bill deals with pollution control, it does not make provision for the prevention of pollution from ships. In Particular, the Bill does not make reference to MARPOL or any of the obligations under same. Consequently, the Bill is deficient in so far as it relates to St. Vincent's obligations under MARPOL.

3.7.2 SHIPPING (MARINE POLLUTION PREVENTION) ACT 2019

In 2015, Saint Vincent presented a Shipping (Marine Pollution Prevention) Act. This Act was passed in 2019, making Saint Vincent and the Grenadines the only island, of the eight studied, furthest along, having passed the MARPOL Bill through its Parliament. Notwithstanding that progress, though the Act imposes a duty to comply with the provisions of MARPOL and imposes fines for contravention, it does not extend similar compliance requirements to small commercial and pleasure vessels that are not included in Annex IV. That is so despite such vessels being given distinct treatment in the main Shipping Act 2004. Under section 2 of the Shipping Act 2004 the designation of "owner" is extended to the charterer of a vessel so that yachts chartered for personal pleasure purposes are treated as pleasure vessels under law, rather than as commercial vessels. Further the Act treats issues related to

bareboat charters extensively and requires that separate register books be kept for small ships, pleasure vessels and submersible craft (section 13). The responsible minister may, however, make regulations that could provide the extended rules for sewage disposal to small ships and pleasure vessels. It is noteworthy that same legislative template was used as for the similar legislation in Saint Lucia, producing practically identical bills but Saint Lucia's was accompanied by regulations that added specificity and extended the MARPOL requirements to some smaller vessels.

3.7.3 MARINE PARKS ACT, 1997

The Marine Parks Act, 1997 is also a noteworthy piece of legislation regarding protection of the marine environment. It defines a marine park as:

> *a marine area including the sub-marine area thereof within the territorial waters of Saint Vincent*
>
> *and the Grenadines and any adjoining land or swamp area which forms within the area a single ecological entity or complemental ecological unit*

Section 6 of the Act bars several types of activities including fishing and causing pollution of the air or sea through negligence or acts of omission. Violations are punishable by fines of up to five thousand dollars and or imprisonment of up to one year. Park rangers act as enforcement agents.

3.8 TRINIDAD AND TOBAGO

Trinidad and Tobago's approach to addressing environmental pollution is similar to that adopted by Jamaica in its creation of an authoritative agency as the lead environmental protector with a broad mandate that is explicitly stated, despite the necessity to be instructed by the responsible minister of government. Likewise, shipping activities are governed under the Shipping Act which seems to largely ignore the need for distinct treatment of small vessels, especially pleasure vessels.

3.8.1 ENVIRONMENTAL MANAGEMENT ACT CHAPTER 35.05

The Environmental Management Act established the Environmental Management Authority and in section 2, it adopts a definition of "environment" that clearly includes the marine environment:

> *"environment" means all land, area beneath the land surface, atmosphere, climate, surface, surface water, groundwater, sea, marine and coastal areas, seabed, wetlands and natural resources within the jurisdiction of Trinidad and Tobago, and "environmental" shall have the corresponding meaning*

As listed in section 16 of the Act, its functions include: development and implementation of policies and programmes; coordination of environmental functions; public education; development and establishment of national environmental standards, and; monitoring compliance with standards. Specificity can be added to the execution of some of those functions by the responsible minister issuing rules that are subject to negative resolution in parliament. Further, the Environmental Management Authority is empowered to impose its power by requiring and issuing permits for operations and projects that are potentially impactful on the environment. It also exercised control over operations that handle waste by maintaining a registry of such operations and granting them licences that allow for the imposition of standards, monitoring measures and reporting requirements (section 57).

Additionally, section 41 empowers the Authority to shield areas requiring extreme protection from human activities by declaring them as Environmentally Sensitive Areas for which it may set special rules. It is noteworthy that the Marine Areas (Preservation and Enhancement) Act of 1970 already provided protection for sensitive marine areas, such as the Bucco Reefs off Tobago, but its restrictions seemed to be limited to physical disruption of marine life.

3.8.2 THE SHIPPING ACT

The Shipping Act gives the Director of Maritime Services authority over ships operating in Trinidad and Tobago's exclusive economic zone and ships flying its flag worldwide. The definition of ships used in the Shipping Act includes every type of vessel used in navigation, excluding only those propelled by oars. It requires the registration of all vessels with qualified ownership, even those belonging to the government. Its, register is required to be divided into books for merchant ships, fishing vessels and ships under construction. Though the act is silent on wastewater discharge from vessels, it is open to adoption and enforcement of international maritime conventions in section 409 and gives presence to them by default where provisions conflict with those in the act (section 410). Contravention of conventions can be punished with suspension of a ships Certificate of Registry. Further, the Minister make regulations for enforcement of conventions. This means that the MARPOL Convention is enforceable but that there is no extension of similar requirements for small vessels but that could be remedied through either an amendment to the Act or issuance of regulations, or both.

3.9 ENFORCEMENT

It is noteworthy that all the islands highlighted in this report rely heavily on land-based tourism, cruise and yachting. Some like Antigua, Grenada, Saint Lucia and Saint Vincent have very active yachting products and attract thousands of yachts yearly. However, despite having heavy yachting traffic, these islands have not promulgated a Marine Pollution Bill to lower the risks of marine pollution from yachts, and ships transiting through their coastal waters, and ports.

Regulations regarding the discharging of sewage are gradually increasing; however, at present there is no international convention which requires private pleasure craft, such as yachts, to fit a holding tank, with the application of the latest wording of MARPOL chapter IV. This chapter IV only applies to vessels which exceed 400 GT or carries more than 15 passengers. International conventions are not the only regulations that apply to small pleasure craft vessels within these islands. Once a yacht, or pleasure craft is cruising within the coastal, and territorial waters of the said mentioned islands, that vessel is now under the jurisdiction of that island state. In the context of holding tanks, this means that these islands can require visiting vessels and national vessels plying for hire, to fit holding tanks in line with the respective islands' national policy on the treatment of sewage. However, this is seldom done for visiting yachts. All the islands in the study operate ports of entry and have strong shipping legislation, this can be the front line in enforcement as these pieces of legislation empowers the Port Authorities to monitor discharges into national waters, and administer fines.

The Saint Lucia Port Authority, by way of the Shipping Act :" Refuse not to be deposited in a Port (1) ropes, wires, dunnage, mats, wood, dirt, ballast, ashes, stone, offal or rubbish of any sort what so ever shall not be thrown or allowed to fall drift into the water at a port. Any ship from which such articles or refuse have been allowed to fall shall make good all loss, damage and expenses which the Authority or any other person may sustain or incur in consequence thereof. (2) Oil or any other similar substances of any description shall not be discharged into or allowed to escape into the water at a port."

In general, the discharge of sewage from visiting and local pleasure crafts plying the coastal areas of all eight islands is primarily a major problem, especially in semi-enclosed coastal bays where flushing is negligible. However there appear to be a lack of will to have the conventions which have been signed promulgated into National Law. Presently only Saint Vincent and the Grenadines has done so. In a nutshell, there is a lack of sensitization on this issue of Marine pollution, and policy makers in all eight islands have not invested states funds in pursuing national legislation, nor enforcing whatever weak national policies that presently exists.

Feedback from stake holders from four islands, with vibrant yachting sectors, confirmed gaps in enforcement and monitoring of sewage pollution from yachts and other pleasure crafts. Written responses confirmed there is limited testing by departments of government, that are charged with that responsibility. A common thread in the responses was also the lack of resources allocated for patrols on the water and installation of personnel at key anchorage points with high usage from yachts. In all these four islands there is a lack of adherence to the national policy of no discharge of sewage, and marinas do not ensure yacht charter companies who are using the marina facilities use the sewage pump out facilities that are on site. Some marina operators confirmed that while some yachters use the pump out facilities on site, land based touristic centres discharged untreated sewage into coastal waters, in plain sight of the general public. A strong reference was continuously made to the high amounts of raw sewage discharged by touristic centres into coastal waters, when compared to visiting yachts.

- ***Antigua and Barbuda***

Despite the vitality of the pleasure sailing sub-sector in Antigua and Barbuda and the resultant importance of the sustenance of healthy marine environments, monitoring and enforcement of compliance with laws and regulations seem to be inadequate for confident assertions about compliance. While some water quality testing is done by an arm of the Department of Environment, the results are not shared with either environment watchers or the general public and it is not clear whether this is done routinely or primarily in response to reported events. Further, regulatory agencies do not have vessels of their own and must rely on the coast guard for close viewing of activities at sea. That not being a priority function of the coast guard means that it is infrequently afforded.

Yacht rental companies also seem to lack the capacity or interest in monitoring actual discharge of wastewater into the marine environment. Neither of the two large yacht rental companies on island make use of pump-out facilities. Boats are usually returned with empty holding tanks and it is assumed that the regulated minimal distance from shore for discharging waste is obeyed.

- ***Grenada***

Responses were obtained from operators of three marinas, including one dry dock facility, and the industry association along with some yacht rental businesses. They mostly argued that the problems resulting in the release of untreated wastewater into the coastal waters of Grenada primarily stem from inadequate land-based infrastructure and that the overwhelming majority of marine pollution originate from land-based sources. Chiefly, the sewage infrastructure on island is inadequate in that only the two major population centres – St Georges and Grand Anse – are served by wastewater collection systems. Further both systems merely release untreated sewage into the sea. This inadequacy of resources is pointed to as the main factor affecting the availability of pump-out facilities as some argue that such facilities add no value if the sewage is not treated before release into the environment. The scarcity of pump-out facilities is said to result in yachters primarily releasing wastewater into the sea but there is variation the level of confidence that there is adherence to the

distance requirement from sure for release of waste. One suggested that there is virtually no compliance, another suggested about 50% compliance while another believes that they are mostly adhered to. Despite this, several yacht rental business report usage of pump-out facilities, including one of the larger operators that has a private facility.

They also report inadequate (mostly non-existent) monitoring and enforcement efforts by regulators though they suggest that operators are well aware of the relevant regulations. The repeated finger-pointing at infrastructural inadequacy by operators suggests that attempts to craft solutions that are not built on top of addressing infrastructural deficiencies are likely to face low levels of buy-in from operators who believe that the impact of the pleasure craft sub-sector is miniscule when compared to marine pollution from land-based sources.

Environmental watchers were able to identify areas of concern with marine pollution around Grenada but also pointed the finger at land-based sources as the primary points of origin such as the sewage collection systems and some hotels. Concern was expressed, though about the practices of some boats on anchor in the south and berthed at the Careenage which seem to dispose of both solid and human waste into the sea. Meanwhile regulators are said to be lacking personnel for effective monitoring in both numbers and quality. Further, they questioned whether the much talked-about collaboration among the Grenada Ports Authority, Environmental Health Department and the Grenada Solid Waste Management Authority for enforcement and monitoring of adherence to regulations under the MARPOL was in fact being effectively implemented. Note was made that the impetus for creation of most environmental policies originated externally, suggesting that local buy-in might be limited.

- ***Saint Lucia***

Feedback was obtained from the two marina operators in Saint Lucia and the Saint Lucia Air and Sea Ports Authority (SLASPA). From their perspective, marina operators report strong usage of pump-out facilities, relative to their size. One operator suggests that strict enforcement by marina operators can be impactful. It was suggested that the layout of some facilities that adjoin hotel amenities such as restaurants place greater emphasis on compliance for berthed vessels. The other larger facility perceives much lower overall compliance but suggests that level of compliance varies with national origin of vessel operators. It was suggested that operators from more developed countries external to the Caribbean were more compliant than locals and other operators from within the region.

Both marina operators and the regulator agree that there is substantial deficit in enforcement of regulations. The regulator suggests that the absence of dedicated personnel and vessels is a great contributor. Currently, any monitoring activity of vessels in the territorial waters is left to the marine police who primarily act reactively, in response to complaints and is often supplemental to their pursuit of narcotics trafficking violations. It was also suggested that police officers might be inadequately knowledgeable about the relevant laws and regulations and would need sensitization training. Despite those deficiencies in monitoring it is reported that Wasco conducts periodic water quality tests in the Marigot Bay through a contractor and that the Fisheries Department has recently started some routine water quality testing in Soufriere, suggesting recognition of the need for such programmes on the part of regulators.

One potentially useful suggestion acknowledges the possibility of a leadership role in regulation enforcement for industry operators who see protection of the marine environment as vital to the success of the sector. The formation of a committee tasked with assuming this role was suggested. It would include representatives of key stakeholder groups such as marina operators, government regulators and yacht rental companies. [Note: Could operators be encouraged to report violations

through this committee for quick response from regulators? Could sanctions also be developed for implementation by private-sector operators in addition to those prescribed by law.

It seems that, in Saint Lucia, interest in effective monitoring is beginning to sprout and a programme taking advantage of this interest among all stakeholder groups that includes sensitization aimed at culture change among local-based operators and involving environmentally-aware stakeholders serving as watchful eyes for regulators could be a successful early initiative while regulators search for the resources that they lack.

- ***Saint Vincent and the Grenadines***

Feedback from a regulator and an environmental NGO in Saint Vincent and the Grenadines revealed that problems persist despite the existence of regulations defining national parks as No-Discharge Zones and the allowance for discharge of wastewater beyond a five-mile limit from land. Yachters in the Tobago Cays Marine Park, which average about 75 per day during the high season, are monitored by park rangers during the days but are left unsupervised at night. It is assumed that assumed that at least some release wastewater on anchorages at night. Moreover, boats entering the territory are not subject to inspection of the functionality or existence of holding tanks. There is neither monitoring of activity outside of the marine parks nor water quality testing in any of the coastal waters.

Saint Vincent and the Grenadines is lacking infrastructure for the safe conversion and disposal of wastewater from yachts, but its marine parks have personnel who believe that their efforts are positively effective during daylight hours. A system that increases visibility of violations during both night and daylight hours and probably enlists environmentally conscious boat operators could be effective.

3.10 SUMMARY: LEGISLATIVE REVIEW

The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. MARPOL includes 6 Annexes which address the prevention of pollution by noxious liquid substances in bulk; prevention of pollution by harmful substances carried by sea in packaged forms; prevention of pollution by sewage from ships; prevention of pollution by garbage from ships and prevention of air pollution from ships.

Notably, although the countries outlined above are all signatories to MARPOL, Saint Lucia is the only island with a draft Bill namely, the Shipping (Marine Pollution) Bill, which is significantly consistent with the obligations under MARPOL.

St. Kitts' Shipping (Marine Pollution Prevention) Bill, 2015 in many respects is similar to that of Saint Lucia's Shipping (Marine Pollution) Bill, and once passed, may provide a sound means of regulating the prevention of marine pollution from ships. Admittedly, the foregoing review has not considered which is the preferred draft Bill, and perhaps this can be assessed and determined once there is a better appreciation of the policy papers for the respective islands.

St. Vincent & the Grenadines, Jamaica, Trinidad and Tobago, Grenada, Antigua, and Barbados, though having legislation in place purporting to deal with pollution, and draft Bills intended to regulate pollution and preserve the environment, these draft Bills and legislation do so inadequately, and therefore do not meet the requirements or obligations under MARPOL.

In light of the foregoing analysis, there is an urgent requirement for the ratification of the provisions of MARPOL by the respective islands into their local law. Ideally, a uniformed piece of legislation ought

to be drafted, considered, and passed as law in the abovementioned islands, which are signatories to MARPOL.

The foregoing recommendation is further bolstered by the fact that MARPOL is supported by other conventions, such as the Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region, known as the Cartagena Convention. The Cartagena Convention is a regional legal agreement for the protection of the Caribbean Sea and not surprisingly, the above-mentioned islands are also signatories to same. Remarkably though, none of the above-mentioned islands have referenced the Cartagena Convention in their legislation or draft bills.

It is noted that the Cartagena Convention covers several aspects of marine pollution for which the contracting parties must adopt specific measures. These measures include the prevention, reduction and control of pollution from ships; pollution caused by dumping; pollution from sea-bed activities; airborne pollution; pollution from land-based sources and activities. Countries who are contracting parties to the Cartagena Convention are also required to protect and preserve rare or fragile ecosystems and habitats of depleted, threatened or endangered species; and develop technical and other guidelines for the planning and environmental impact assessments of important development projects.

It would therefore be prudent to also consider the obligations and requirements of the Cartagena Convention and ensure that provision is made within the uniformed draft Bill, to be presented to the islands for consideration.

4.0 RECOMMENDATIONS

The following recommendations are being proposed following the assessment of the scale of the problem concerning marine pollution from pleasure vessels and tourism centres and a review of applicable legislation in the eight (8) study countries. It is anticipated that realisation of these recommendations would bolster the implementation of proposed guidelines to sustainable marine tourism.

1. Each island should implement a carrying capacity study of marinas, boatyards and anchorage areas for the servicing of yachts. These studies will give clear indication of the numbers of yachts and the infrastructure needed to manage sewage from these yachts.

2. Each island should contemplate the introduction of duty-free concessions and any other concessions for the importation of mobile and stationary sewage pump out facilities for the servicing of all yachts in marinas, boatyards and approved anchorage areas along the coastlines.

3. Islands with robust yachting products must make mandatory the use of sewage pump out facilities at all ports of entry, marinas, boatyards and approved anchorage areas.

4. Islands consider the introduction, in the customs declaration forms of the size of holding tanks of vessels clearing in and out of the state.

5. Islands must implement policy which seals holding tanks of yachts once on dry dock for long term storage in boatyards (long term to mean any period past 7 days.)

6. Islands should consider the inclusion of water testing as a prerequisite for licensing of operations for the following:
    - Touristic centres along the coast lines
    - Marinas
    - Boatyards
    - Anchorage areas
    - Touristic Beaches.
7. Governments of the identified islands must identify an arm or agency of government which WILL be responsible for ensuring there is good water quality within all coastlal areas, and there will be consistent water quality monitoring for bodies of water in marinas, beaches off operating hotels and anchorage areas.

8. CARPHA and Governments work with marinas, boatyards and touristic commercial centres to implement No Discharge Zones, to ensure pleasure craft and tourism operations do not discharge pollutants in key identified areas.

9. CARPHA considers an alliance with a company to introduce new cutting-edge technology to monitor and track discharges from holding tanks by charter companies and other yachts in the Caribbean region. The Blue Valve system is one such innovative concept. It is a simple solution for the prevention of pollution from boats in coastal waters. (www.bluevalvesystem.com.)

10. CARPHA introduces a safe water quality program with marinas, boatyards and touristic commercial centres within the eight islands. CARPHA work with Governments to ensure legislation is passed based on the MARPOL Convention.

4.1 Voluntary Guidelines to Sustainable Marine Tourism

The following are voluntary guidelines which the eight islands should explore implementing at marinas, boatyards, anchorage areas and touristic commercial centres. These guidelines can be a first step, as islands explore developing detailed policies, legislation and enforcement to manage yachts, recreational boating and coastal tourism centres as it relates to the issue of sewage and marine pollution:

- Marketing materials can be sent out to ALL yacht charter bases detailing: the island's policy on the discharge of black and grey water, and the locations where these discharges are prohibited.
- The islands of Saint Lucia, Saint Vincent and the Grenadines can issue information translated to French for the Charter operations based in Martinique giving details of: Location of sewage pump out facilities, and locations of no discharge zones.
- Marinas and Boat yards must ensure they provide or facilitate access to reception facilities, such as pump out sewage stations, for the removal of black and grey water from yachts using their facilities.
- Signs should be erected to direct patrons to and identify shore side facilities. Disposal of plastics and other forms of garbage by yachts must be prohibited every-where in the Caribbean sea.
- Marinas and boatyards must ensure they provide facilities to dispose of hazardous waste, oil and other such materials removed from yachts.
- Marinas and Boatyards can encourage the owners of vessels in the facilities to use on shore facilities in place of the toilets on board their yachts.
- Marinas and boat yards must display signage throughout the facilities outlining: DOs and DONTs while using the facilities specific to the discharge of black and grey water, and garbage disposal.
- Anchorage areas, and safe bays must provide mobile pump out facilities for yachts using such areas.
- Yachts plying the coastal waters of the islands must show respect for these protected natural areas by not discharging black and grey water into the sea, and having on board garbage management plans.
- Yacht owners, and charters plying the coastal waters must be encouraged to check periodically the holding tanks on these vessels, and ensure these tanks are do not leak, and are cleaned out at Marinas and Boat yards at least every two months.
- Marinas and Boatyards must be encouraged to implement effect in house management systems to ensure best water quality. A cleaner marina and boatyard will attract more customers.
- Marinas, Boat yards and Touristic Commercial centres MUST have in house sewage, fuel and oil spills prevention and emergency containment plans.
- All drains from maintenance areas at Marinas, Boatyards and Tourist Commercial centres must lead to a sump, holding tank or pump out facility, from which the waters can later be extracted for treatment and /or disposal by approved methods. Direct drainage into the marine environment must be prohibited.
- Touristic commercial centres must be connected to islands central sewage treatment plants.
- Touristic commercial centres should ensure the management of garbage takes into account re cycling and other global best practices. Such centres should be encouraged to implement inhouse management systems which address best water quality controls and efficient garbage systems.
- Black and grey water should be treated in house at Touristic commercial centres and must not at any time be discharged into the coastal waters.

5.0 AGENDA FOR STAKEHOLDER MEETING

In keeping with the terms of the assignment, CARPHA and IWEco partners will convene a meeting of the key stakeholders who were consulted during the study (see Appendix A). The meeting will facilitate the presentation and discussion of the results of the studies. Possible technological solutions will also be presented, discussed, and recommendations developed. Following this, the participants will be invited to join a Public-Private Partnership with the aim of preventing future pollution from vessels.

A draft agenda for the proposed stakeholder meeting is presented below.

Proposed Agenda

- Welcome and opening remarks by CARPHA
- Introduction of participants
- Overview of consultancy by CARPHA
    - Break
- Presentation of key findings by Consultant
- Open floor discussion: Feedback and contributions from Participants
- Review of proposed guidelines – Consultant
- Open floor discussion: Feedback and comments from participants
- Review of recommendations – Consultant
- Open floor discussion: Feedback and comments from participants
    - Break
- Summary of discussions – CARPHA
- Discussion on the way forward: Private Public Partnership
- Wrap up by CARPHA
- Next steps and closing remarks

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APPENDIX A: LIST OF STAKEHOLDERS BY COUNTRY

Organisation	Type of Entity	Country
Bailey's Boatyard	Charter Company	Antigua
Catamaran Marina	Docking Facility	Antigua
Dream Yacht Charter Antigua & Barbuda	Charter Company	Antigua
Excellence / Mystic Catamaran	Charter Company	Antigua
Falmouth Harbour Marina	Docking Facility	Antigua
Gadaboat	Charter Company	Antigua
National Solid Waste Management Authority	Government Agency	Antigua
Sammy's Boatyard & Marina	Charter Company	Antigua
Sewage Department - Bridgetown/South Coast Sewage Plant	Government Agency	Antigua
Shell Beach Marina	Docking Facility	Antigua
Sunsail / The Moorings Yacht Charters	Charter Company	Antigua
Waste Management Solutions (Listed at Quality Trucking	Private Sector	Antigua
Bolador Tours	Charter Company	Barbados
Cat & The Fiddle Luxury Catamaran	Charter Company	Barbados
Camper & Nicholson Port Louis Marina (C&N PLM)	Docking Facility	Grenada
Chris Doyle Publishing/ Cruising Guides	Yachting Publication	Grenada
First Impressions Ltd (Yacht Charters)	Charter Company	Grenada
Footloose Yacht Charters and Day Sails	Charter Company	Grenada
Friends Of The Earth Grenada	Non-Government Organisation	Grenada
Grenada Green Group (G3)	Non-Government Organisation	Grenada
Grenada Tourism Authority	Government Agency	Grenada
Horizon Yacht Charters	Charter Company	Grenada
Island Dreams Yacht Services/ Super Yacht Services Guide	Charter Company	Grenada
Le Phare Bleu Marina	Charter Company	Grenada
Marine and Yachting Association of Grenada	Business Support Organisation	Grenada
Spice Island Marine Services	Docking Facility	Grenada
True Blue Bay Resort	Docking Facility	Grenada
Loose Cannon Tours	Charter Company	Jamaica
Montego Bay Yacht Club	Docking Facility	Jamaica
The Environmental Awareness Group	Non-Government Organisation	Jamaica
IGY Rodney Bay Marina	Docking Facility	Saint Lucia
Island Water World	Marine Supplies	Saint Lucia
Marigot Bay Resort and Marina	Docking Facility	Saint Lucia
Ministry of Health	Government Ministry	Saint Lucia
Ministry of Health	Government Ministry	Saint Lucia
Saint Lucia Air and Seaport Authority	Government Agency	Saint Lucia
Soufriere Development Foundation (SDF)	Non-Government Organisation	Saint Lucia
Central Water and Sewerage Authority (CWSA, Saint Vincent)	Government Agency	St Vincent

Organisation	Type of Entity	Country
The Trinidad and Tobago Solid Waste Management Company Limited (SWMCOL)	Government Agency	Trinidad
Trinidad and Tobago Sailing Association (TTSA) Boatyard	Business Support Organisation	Trinidad
Yacht Services Association of Trinidad and Tobago (YSATT)	Business Support Organisation	Trinidad

APPENDIX B: Legislation Relevant to the Prevention of Marine Pollution in Participating Territories

Region

- Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region
- Protocol Concerning Pollution from Land-Based Sources and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region
- Caribbean Water and Wastewater Association (Incorporation) Act, 1991
- Code of Conduct for the Prevention of Pollution from Small Ships in Marinas and Anchorages in the Caribbean Region

Territory	Legislation/Codes, etc.
Antigua	• Antigua and Barbuda Code of Practice for Large Commercial Yachts, 2014 (Antigua and Barbuda Large Yacht Code 2014) • Environmental Protection and Management Act, 2019 • National Marine Pollution Contingency Plan, 2016 • The Merchant Shipping Act, 2006 • The Small Craft Control Act, 2015
Barbados	• Coastal Zone Management Act, 1998 • Marine Areas (Preservation and Enhancement) Act, 1985 • Marine Pollution Control Act, 2000 • Water Authority Act, 1980
Grenada	• Environmental Management Act, 2005 • National Parks and Protected areas Act, 1991 • The Shipping Act, 1994
Jamaica	• Jamaica's Maritime Legal Regime • The Natural Resources (National Parks) Regulations, 1993 • The National Resources Conservation authority Act, 1991 • National Water Commission Act • The Parish Councils Building Act • The Public Health (Tourist Establishments) Regulation, 2000 • The Shipping Act, 1999 • Water Resources Act, 1996
Saint Kitts	• National Conservation and Environmental Protection Act, 1997 • Shipping (Marine Pollution Prevention) Bill, 2016 • Solid Waste Management Act, 2009
Saint Lucia	• Safety Code of Practice for Small Yachts • Shipping (Marine Pollution) Act, 2020 • Waste Management Act, 2004 • Water and Sewerage Act, 2008
Saint Vincent	• Environmental Management Act, 2009 • Marine Parks Act, 1997 • Shipping (Marine Pollution Prevention) Act, 2019

Trinidad and Tobago	• Environmental Management Act, 2000 *(Water Pollution Rules)* • Marine Areas (Preservation and Enhancement) Act

APPENDIX C: Country Information on the Growth of the Tourism and Charter Industries

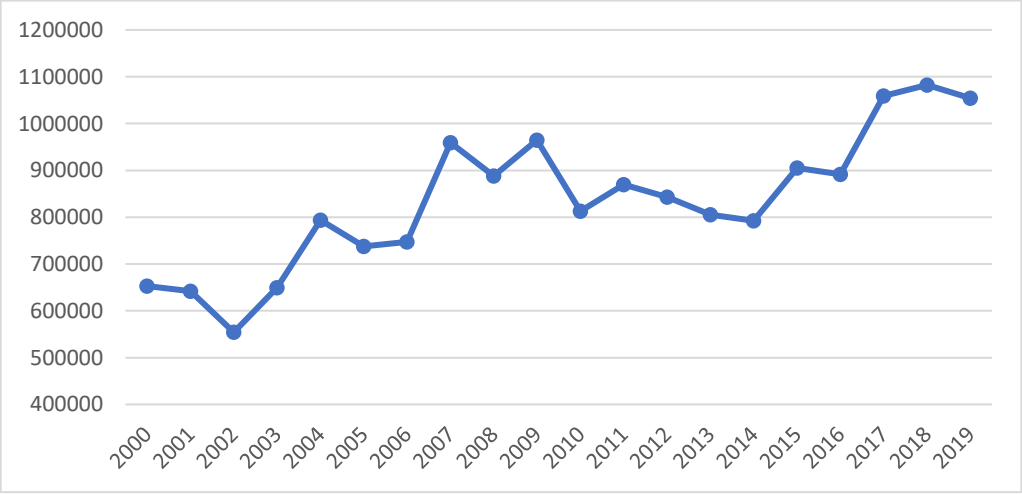
1.0 ANTIGUA AND BARBUDA

The nation-state of Antigua and Barbuda comprises two main islands (Antigua and Barbuda) along with several islets and cays in close proximity to Antigua. They are home to approximately 99,000 persons, 97% of whom live on Antigua (World Factbook). Combined, they have a total land area of 443 square kilometres. Featuring a relatively flat landscape and 153 kilometres of coastline with 365 beaches, its economy is heavily dependent on tourism. In 2019 Travel and Tourism made a total contribution of USD1, 432.5 million or 42.7% of GDP (World Travel and Tourism Council, 2020). Antigua and Barbuda's tourism product is overwhelmingly coastal and it is a well-known yachting destination that stages several annual yachting and sailing events.

1.1 Tourism Growth

Like much of the Caribbean, Antigua and Barbuda's tourism success has fluctuated with economic conditions in the main source markets of Western Europe and North America. Starting at about 65,000 arrivals in 2000, they rose to 97,000 in 2009 but declined from 2010 to 2014 due to the Great Recession. Thereafter, they rose to surpass the 2009 level in 2017 and achieved a new peak of 1.082 million in 2018. Figure 9 shows that the overall trend in tourist arrivals for Antigua and Barbuda over the period was upward, despite numerous fluctuations. The mean number of total tourist arrivals jumped from about 616,000 (for 2000 – 2002) to over 1,065,000 (for 2017 – 2019) – an increase of approximately 73%. Depending on the composition of visitor totals, such a pace of growth can greatly challenge the capacity of infrastructure and institutional arrangements.

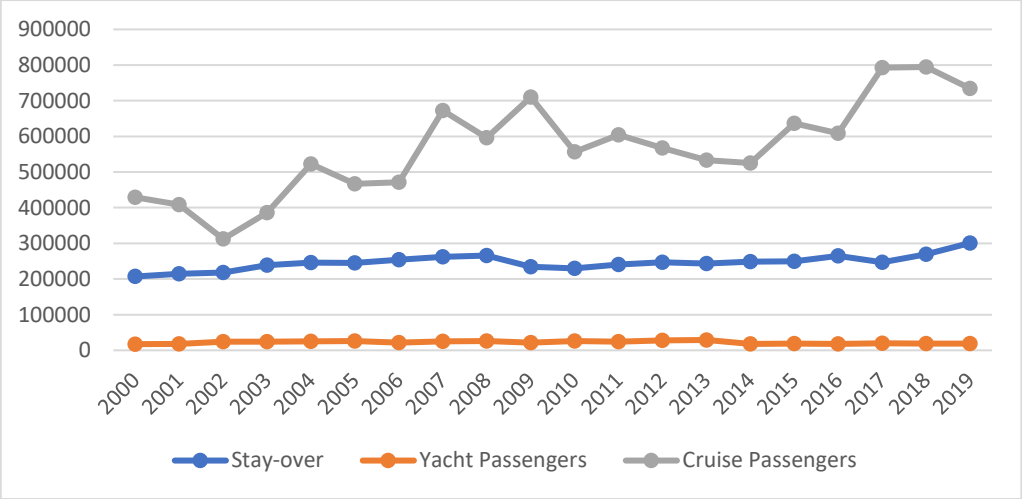
Figure C- 1: Annual Total Visitor Arrivals for Antigua and Barbuda, 2000 - 2019



- **Composition of Tourist Arrivals**

Total arrivals are composed of stay-over visitors, yacht passengers and cruise ship passengers. Figure 10 shows a few noteworthy patterns when arrivals for the three categories are compared. Firstly, Antigua and Barbuda's total tourist arrivals is dominated by cruise ship passengers, followed by stay-over visitors and yacht passengers. The proportion of total visitors arriving by cruise ships ranged between 56% in 2002 and 75% in 2017, falling below 60% only in 2002 and 2003. The mean over the 20-year period was 67%. Secondly, stay-over visitor arrivals have generally trended upward despite a decline in the wake of the Great Recession. Starting at the period-minimum of 207,000 persons, it grew to 266,000 in 2008 followed by two years of decline. Thereafter it grew almost every year to peak at 301,000 in 2019. Overall, that represents an increase of 45% over 20 years and the spike of 22% between 2017 and 2019 was particularly noteworthy. Thirdly, yacht passenger arrivals have shown little variation in recent years. After showing a clear upward trend from the minimum of 17,000 in 2000 to the peak of 29,000 in 2013, they have declined to rest in a narrow band between 17,500 and 19,000 since.

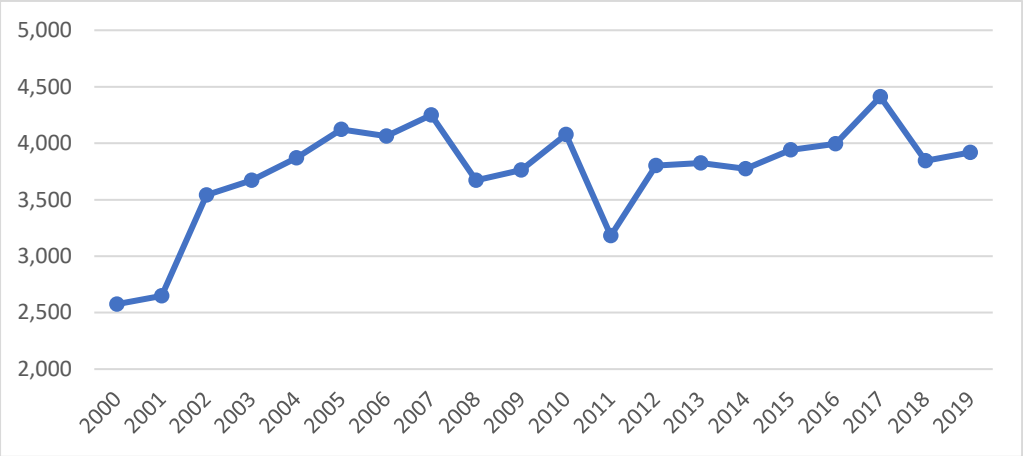
Figure C- 2: Annual Visitor Arrivals by Mode of Transport for Antigua and Barbuda, 2000 - 2019



Data sources: World Bank and Eastern Caribbean Central Bank

Yacht calls over the same period present a slight but notably different pattern of progress from that for yacht passenger counts. Though there is a similarly steep ascent at the start of the period, followed by a brief period of recession-induced decline, the relative stability that followed was closer to the previous peak. Yacht calls have fluctuated in a narrow band between 3,800 and 4,000, excepting for a new peak of 4,400 in 2017.

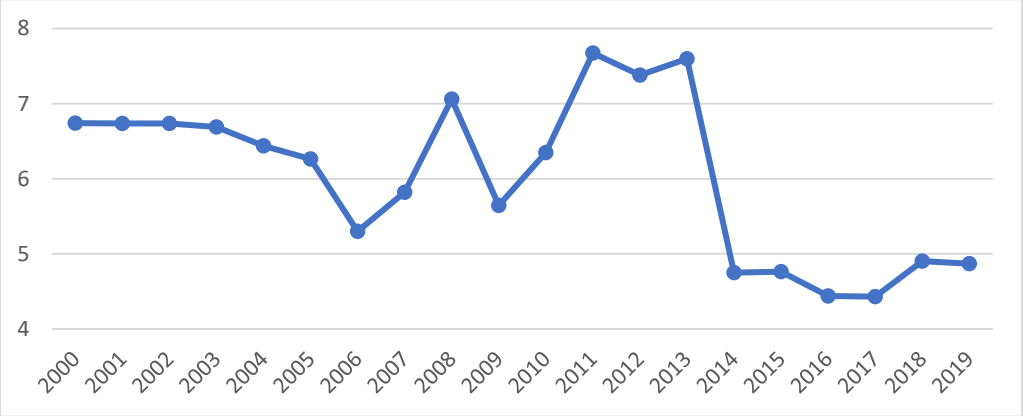
Figure C- 3: Annual Yacht Calls for Antigua and Barbuda, 2000 - 2019



Data source: Eastern Caribbean Central Bank

The average number of passengers per yacht call was calculated for each year. Figure 17 shows that after initial stability around 7 passengers per yacht, there was a period of fluctuating averages between 2006 and 2013 that included peak values at about 8 passengers per yacht in 2013. The period since 2014 has seen stability at about 5 passengers per yacht.

Figure C- 4: Annual Average Passengers per Yacht Call for Antigua and Barbuda, 2000 - 2019



Though the data examined so far presents a picture of a relatively stable yachting sub-sector that has recently stabilised below peak levels of patronage, there are other indicators of increased activity.

1.2 Yachting and Sailing in Antigua and Barbuda

Antigua and Barbuda distinguishes itself as the prime destination for yacht racing in the Caribbean. The season kicks of each year, early in December, with the Antigua Charter Yacht Meeting which is a showcase of boats available for charter. Sailing in Antigua is kept vibrant by hosting events frequently, some of which are open to regional and international participation. ECLAC (2004) identified two events of this type – Antigua Sailing Week and the Antigua Classic Yacht Regatta. Since then, six others have been added – the RORC Caribbean 600 Regatta, Jolly Harbour Annual Regatta, the Jolly Harbour Valentines Regatta, the Antigua to Bermuda Race, the Antigua 360 RTI Race and the Superyacht Challenge Antigua.

- **Antigua Sailing Week**

The Antigua Sailing Week is the largest yachting event is Antigua. It is a multi-race event that is open to boats in multiple categories. It is staged annually in late April and has been on the calendar since

1967. As a world-renowned premier sailing event, it attracts more than 100 boats each year, ranging in length from 24 feet to more than 100 feet.

- **Antigua Classic Yacht Regatta**

The Antigua Classic Yacht Regatta was born in 1987 out of the Antigua Sailing Week. It is scheduled annually a week before the older event. As the name suggests, participation is restricted to classic yachts.

- **RORC Caribbean 600 Regatta**

The RORC Caribbean 600 Regatta is organised by the Royal Ocean Racing Club (RORC) and is held in late February annually. It covers a course of 600 nautical miles that passes by 11 islands. The 12th staging in 2020 featured 73 teams of 700 sailors from 37 countries.

- **Jolly Harbour Annual Regatta**

Organised by the Jolly Harbour Yacht Club, the Jolly Harbour Annual Regatta sails in the middle of November.

- **Jolly Harbour Valentines Regatta**

Also organised by the Jolly Harbour Yacht Club, the Valentines Regatta is staged over three days in the middle of February.

- **Antigua to Bermuda Race**

Organised by the Royal Bermuda Yacht Club in association with Antigua Sailing Week, the Antigua to Bermuda Race takes place following the Antigua Sailing Week, in the first week of May. The open-ocean race over 935 nautical miles was inaugurated in 2017 and attracted 20 participants 21 boats in 2019.

- **Antigua 360 RTI Race**

Inaugurated in 2016, the Antigua 360 RTI Race is organised by the SuperYacht Challenge Committee. It is a one-day event circumnavigating the island of Antigua over 52 miles. Participation is restricted to entrants in the RORC 600 and serves as a warm-up for the larger event as it takes place three days prior.

- **Superyacht Challenge Antigua**

The 10th staging of the Superyacht Challenge Antigua took place in March 2020, though it is usually held in January. The event is restricted to yachts longer than 80 feet and usually limits the number of entrants. There were 19 boats in 2020.

Docking Capacity

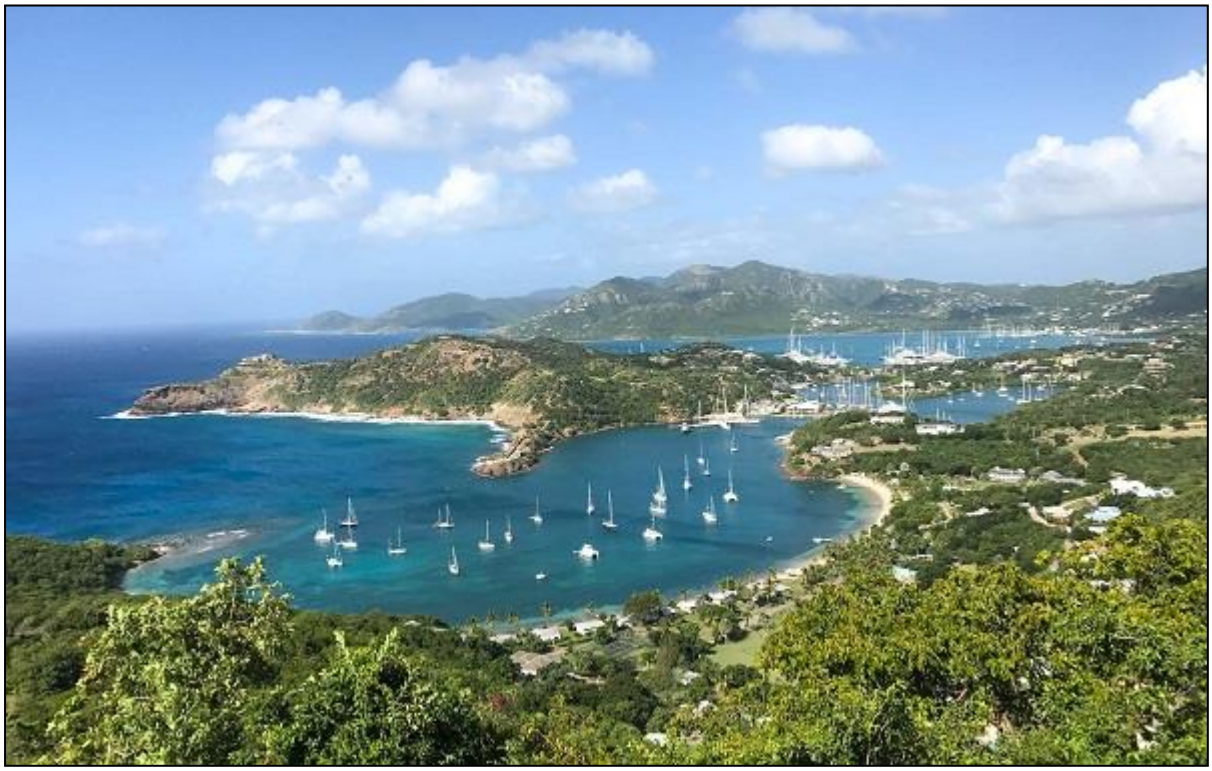
- **Marina Capacity**

There was a modest increase in Marina Capacity in Antigua since 2004. Additional accommodation has been made for about 50 more boats. All marinas have made small increases in their capacities of, at most, 20 boats. Sammy's Boat Yard and Marina is the only new marina facility, providing spaces for 20 more conventional-sized boats.

- **Mooring and Anchorage Capacity**

The shape of Antigua, with numerous inlets and coves provides numerous suitable places for anchorage. Mooring and anchorage are provided at 30 locations in Antigua and 7 in Barbuda with combined capacity estimated at 480 boats. The number of locations in Antigua is up from the 24 identified by ECLAC (2004). The greatest accommodations are at Falmouth Harbour (121 boats), Dickenson Bay (80 boats) and English Harbour (62 boats).

Figure C- 5: English Harbour, Antigua



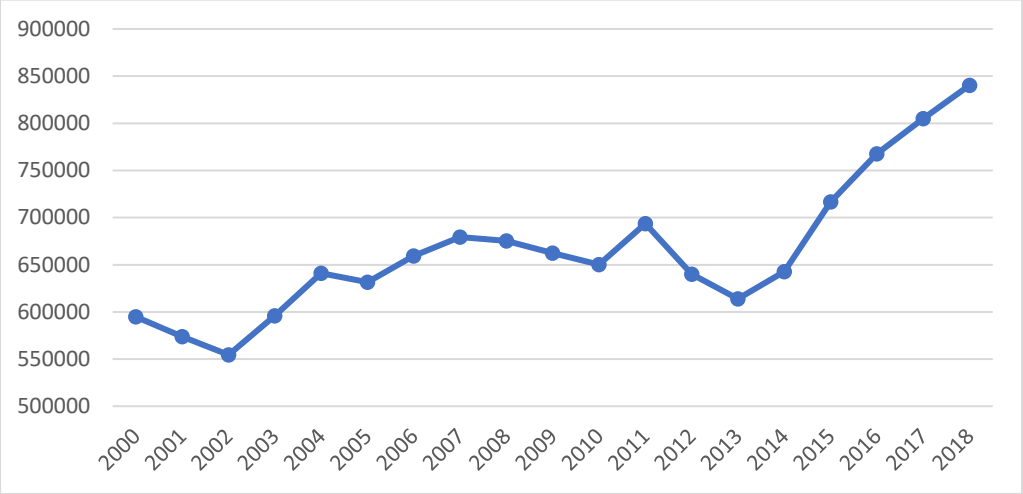
2.0 Barbados

The nation-state of Barbados is an island of 430 square kilometres in size that sits outside the Caribbean archipelago and is entirely surrounded by the Atlantic Ocean. Its population is estimated at about 302,000 (World Factbook). Featuring a mostly flat landscape and 97 km of coastline with several attractive beaches, its economy is heavily dependent on tourism. In 2019 Travel and Tourism made a total contribution of USD1,477.9 million or 30.9% of GDP and generated a third (33.4%) of all employment in 2019 (World Travel and Tourism Council, 2020). Barbados' tourism product is primarily coastal, but the yachting component does not seem to be significant enough to justify disaggregation of its contribution.

2.1 Tourism Growth

Despite fluctuations produced by economic conditions in source markets, total visitor arrivals for Barbados between 2000 and 2018 trended upward, most markedly since 2014. After fluctuating in a range of 600,000 to 700,000 arrivals between 2004 and 2013, they shot up over the succeeding years to exceed 800,000 in 2017 and went even higher in 2018. This recent rapid growth of 37% over five years could place strains on the capacities of infrastructure and institutional arrangements that might need more time to adjust, depending on the composition of tourist arrivals.

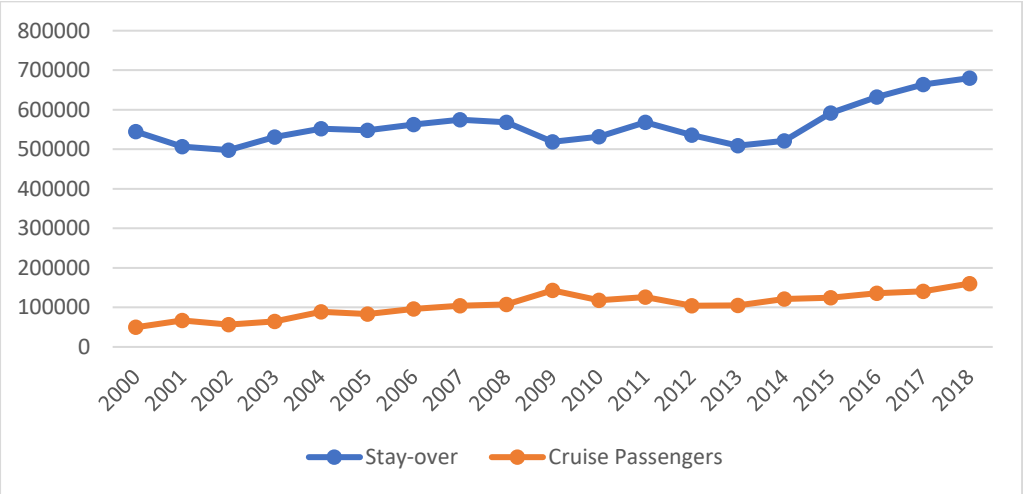
Figure C- 6: Annual Total Visitor Arrivals for Barbados, 2000 - 2018



- **Composition of Tourist Arrivals**

Barbados' tourism statistics are only disaggregated into stay-over arrivals and cruise ship passengers. Of the two, stay-over tourists are dominant, accounting for between 78% and 86% of arrivals. Consequently, Figure 20 confirms that the trend in total arrivals more closely resembles that for stay-over arrivals. Stay-over arrivals undulated between 500,000 and 600,000 arrivals until they exceeded that limit in 2016 and continued to rise toward 700,000 in 2018. In contrast, cruise ship passenger arrivals have mostly been on a steady climb since 2000, with only small fluctuations.

Figure C- 7: Annual Visitor Arrivals by Mode of Transport for Barbados, 2000 - 2018



Data sources: World Bank and Central Bank of Barbados

2.2 Yachting and Sailing in Barbados

The yachting and sailing sub-sector does not enjoy much prominence in Barbados. It has only one yachting event on the international calendar. That event, the Barbados Sailing Week, has been staged annually since 1936 by the Barbados Cruising Club. It includes multiple races along the coast and around the island. Likewise, investment in yachting infrastructure seems to have been primarily limited to the needs of locally-based vessels.

Docking Capacity

- **Marina Capacity**

Barbados is disadvantaged by its relative lack of natural harbours and protected anchorages. Added to that, there does not seem to have been much historical investment in infrastructure for the yachting and sailing sub-sector. There are 4 marinas in Barbados – Port Ferdinand, The Carenage, The Shallow Draft Marina and Port Charles (a multi-use facility). The combined capacity is 216 vessels, including 6 mega-yachts/superyachts. Port Ferdinand and Port Charles are the main marinas but most of their slips are allocated for private use, leaving only 10 (combined) for visiting vessels. There are planned developments at Carlisle Bay Speightstown.

- **Mooring and Anchorage Capacity**

Barbados' mooring and anchorage capacity stands at 177 vessels. Mooring capacity is low – only 9 vessels can be moored across 6 locations. There is much greater anchorage capacity, totalling 168 across 8 locations. Carlisle Bay and Port Saint Charles are the main locations with capacities for 100 and 40 boats, respectively.

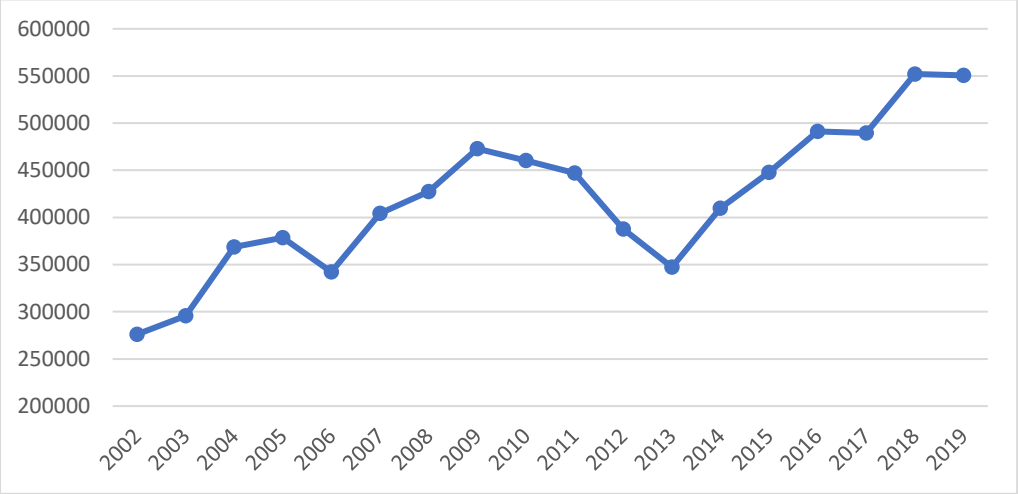
3.0 GRENADA

Grenada is an island-state located near the southern end of the Caribbean archipelago. As a result of being on the archipelago, its western coast is washed by the Caribbean Sea while its Eastern shores are impacted by the stronger waves of the Atlantic Ocean. The state of Grenada includes the smaller islands of Carriacou and Petite Martinique to the north of Grenada, along with several islets. Their combined size is 344 square kilometres and are home to a population estimated at 114,000 in 2021 (World Factbook). They feature several attractive beaches and naturally protected harbours on the 121 kilometres coastlines, most notably on the south and west coasts of Grenada. Grenada is greatly dependent on tourism which makes a total contribution to GDP of USD511.6 million or 40.5% of GDP and generating 42.9% of all employment in 2019 (World Travel and Tourism Council, 2020).

3.1 Tourism Growth

Total tourist arrivals in Grenada almost doubled (92% increase) between 2002 and 2019 but there has been much variation from year to year. Of note, Figure 21 shows that arrivals dipped between 2011 and 2013, likely due to the continued impact of the Great Recession but rebounded steeply afterward. The lowest number of arrivals was recorded at the beginning of the period and the highest at the end, underscoring the growth trend. Failure to develop institutional arrangements and infrastructure rapidly enough to meet this pace of growth in demand could result in additional stresses and strains on the environment in ways that are dependent on the composition of visitor arrivals.

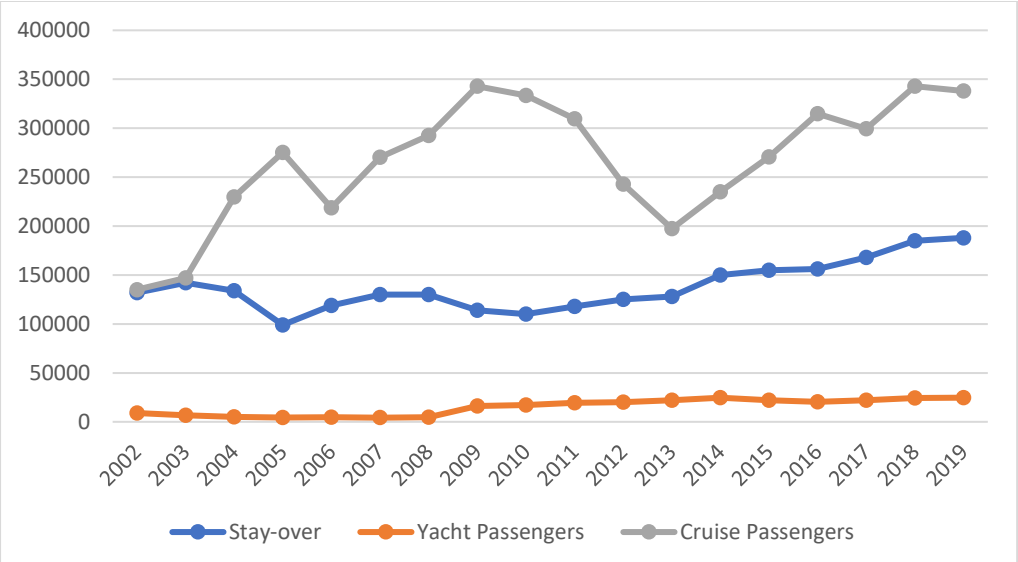
Figure C- 8: Annual Total Arrivals for Grenada, 2000 - 2019



- **Composition of Tourist Arrivals**

Tourist arrivals are composed of stay-over visitors, cruise passengers and yacht passengers. Figure 22 shows that cruise passengers became the largest category of arrivals in 2003 and have continued to be, despite dramatic fluctuations. Cruise passenger arrivals constituted more than one-half of total arrivals in all excepting for two years – 2003 and 2004. They have also been on a general upward trajectory. It also reveals that most of the undulation in total arrivals is caused by variation in cruise passenger arrivals because very little of that variation is visible on the other curves. Contrastingly, stay-over arrivals maintained a steadier growth path despite declines early in the period and from the effects of the Great Recession. The overall increase in stay-over visitors between 2002 and 2018 was 42% or 56,000 persons. Yacht passenger arrivals almost trebled over the period. After generally declining between 2002 and 2007, they almost quadrupled in 2008 and proceeded on a generally slow rise until 2014, followed by relative stagnation.

Figure C- 9: Annual Visitor Arrivals by Mode of Transport for Grenada, 2000 – 2019



Data sources: World Bank and Eastern Caribbean Central Bank

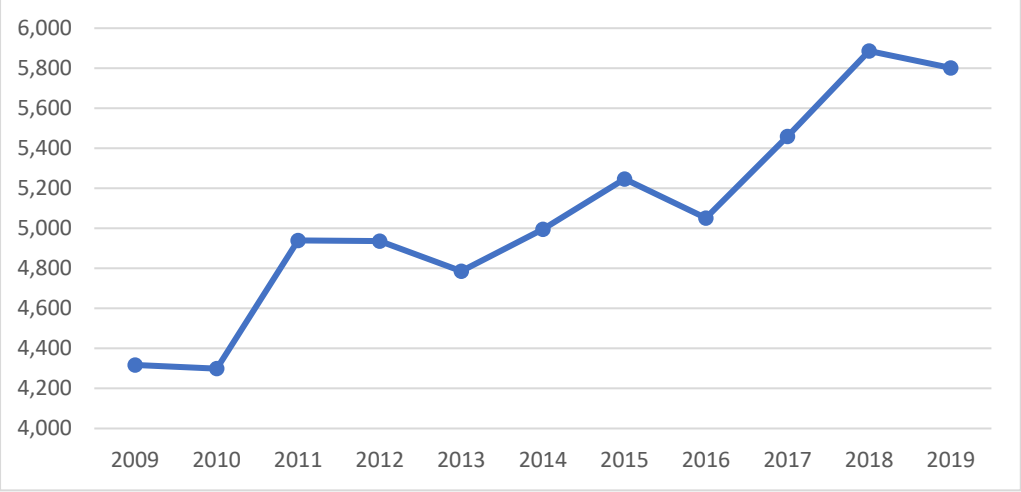
3.2 Yachting and Sailing in Grenada

Taking advantage of its geographic location, that brings reduced risk of hurricane impact, close proximity to the Grenadines chain of islands and its several naturally protected harbours, Grenada has positioned itself as an ideal location for both sailing and boat storage. The result has been strong investment in the capacities of its boatyards and marinas. Storage capacity of boatyards (970) exceeds the number of berths (653) by 49%. That was achieved through expansion of the three boatyards identified in ECLAC (2004) and addition of two others, producing and increase of 159% in dry storage capacity in less than 20 years. The islands have had a long tradition of local boat building (especially on Carriacou) and local racing and has elevated that with the inception, in 2013, of the Grenada Sailing Week as its sole locally-organised event on the international sailing calendar. Grenada also serves, since 2014, as the destination for the RORC Transatlantic race that starts in the Canary Islands and typically attracts fewer than 20 competing vessels.

- **Yacht Calls**

Data on the annual number of yacht calls were only available as of 2009. Over the eleven-year period up to 2019, they have fluctuated, but with a clear growth trend. After varying around 5,000 calls between 2011 and 2016, calls were elevated to just under 6,000 for the final two years. The approximately 5,800 yacht calls in 2019 was 34% higher than the count for 2009.

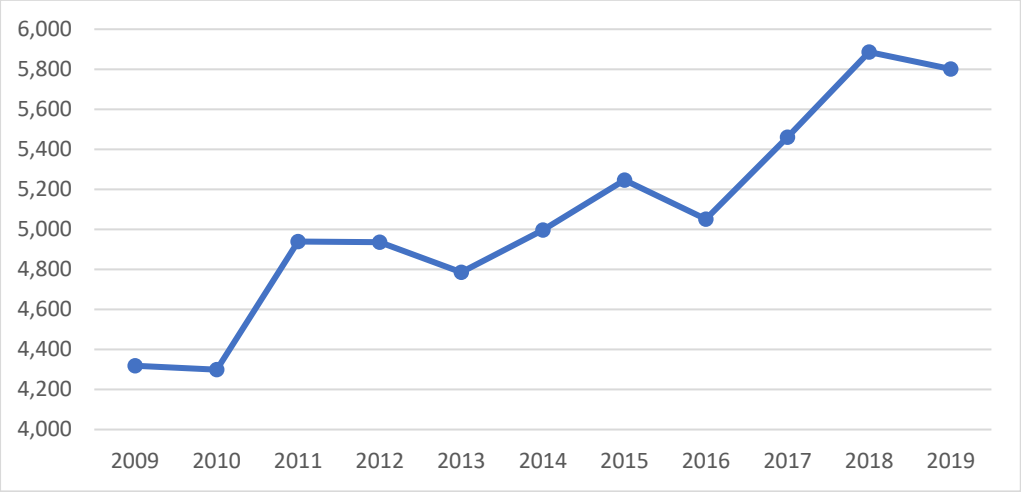
Figure C- 10: Yacht Calls for Grenada, 2000 – 2019



Data source: Eastern Caribbean Central Bank

The average number of passengers per yacht call was calculated for each year. Figure 24 shows that, about 4 passengers have arrived per yacht for most of the period. The exceptions were recorded for 2013 and 2014 when the averages jumped close to 5 passengers per vessel.

Figure C- 11: Annual Average Yacht Passengers per Call for Grenada, 2009 - 2019



Docking Capacity

- **Marina Capacity**

There has been rapid expansion of Grenada's yachting infrastructure. Total berthing capacity has trebled to 653 from 206 identified in ECLAC (2004). The largest capacity is at Camper & Nicholson Port Louis Marina (C&N PLM) located in Saint Georges that accommodates 227 vessels. Le Phare Bleu Marina and Secret Harbour Marina are the next largest with capacities of 60 and 53, respectively.

- **Mooring and Anchorage Capacity**

Moorings are relatively scarce, totalling only 27 and located at the Whisper Cove and Prickly Bay marinas. As expected, anchorages are more abundant with total estimated capacities for 310 boats. Five of the locations are in Saint Georges, Grenada – Prickly Bay, Woburn Bay, Grand Mal, Mount Pandy and Mount Harman Bay. Two others are on Carriacou – Tyrell Bay and Hillsborough Bay.

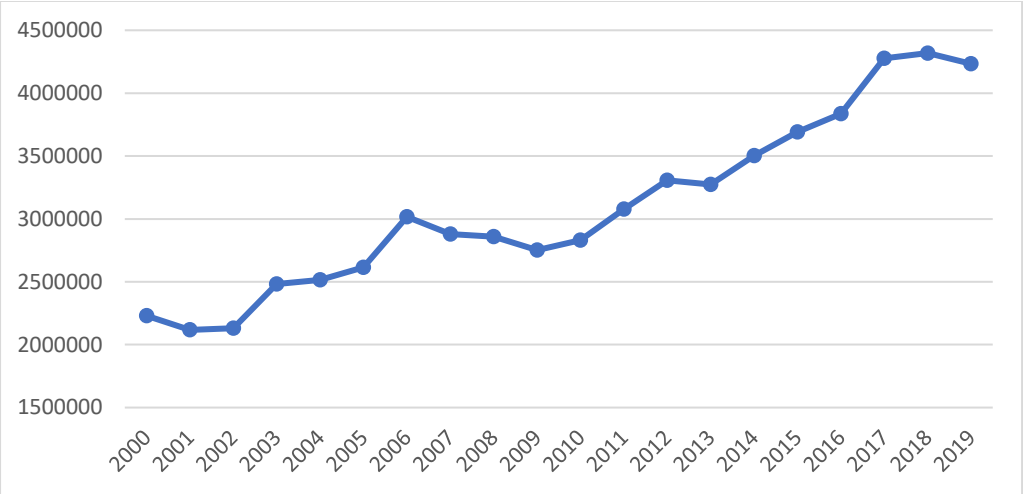
4.0 JAMAICA

Jamaica is an island-state that is situated within the Caribbean archipelago and is entirely surrounded by the Caribbean Sea. It is constituted by 10,991 square kilometres of mostly mountainous land with several cays and islets in the surrounding waters. Jamaica has 1,022 kilometres of coastline featuring several well-known beaches and numerous bays. Its tourism product is primarily coastal, despite having noted cultural and natural attractions in the interior. Its best-known coastal tourism centres are Montego Bay, Ocho Rios and Negril. Tourism is a major driver of the Jamaican economy making a total contribution of USD5,025.4 million or 31.1% of GDP in 2019 (World Travel and Tourism Council, 2020).

5.1 Tourism Growth

Tourist arrivals into Jamaica have grown by 90% between 2000 and 2019. There have been consistent increases year-over-year excepting for brief impact of recessions in 2001 and 2008 to 2009 and the unexplained decline in 2019. This sustained period of growth could present challenges to the capacities of infrastructure, institutional arrangements and the environment, depending on the composition of visitor arrivals.

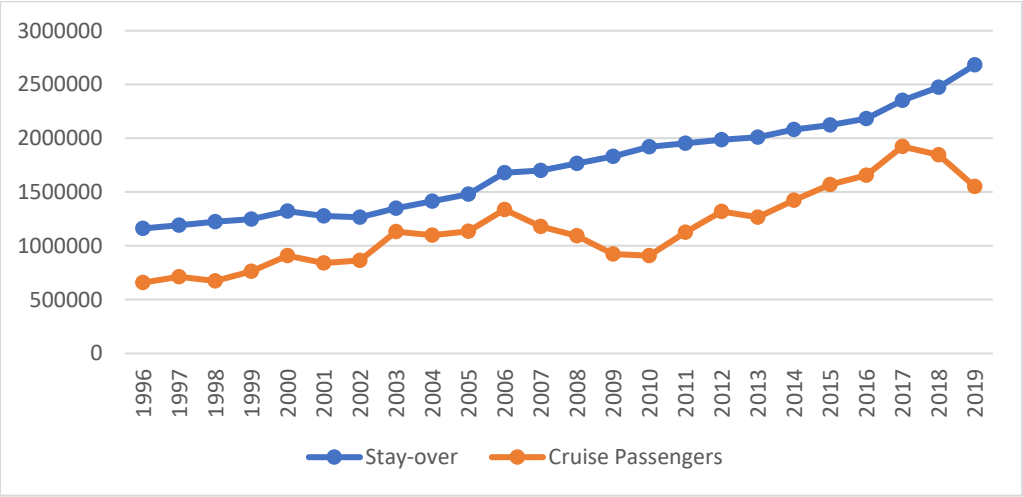
Figure C- 12: Annual Total Visitor Arrivals for Jamaica, 2000 - 2019



- **Composition of Tourist Arrivals**

Jamaica categorises tourist arrivals as either stay-over or cruise ship passengers. Stay-over visitors was the larger category for all years between 2000 and 2019, accounting for between 54% and 68% of total arrivals each year. The average proportion over the twenty-year period was 60%. The number of stay-over visitors more than doubled, jumping by 103%. Notably, declines were recorded in only three years and growth in stay-over arrivals was not impacted by the Great Recession of 2008 -2009. While cruise ship passenger arrivals also grew strongly (71%), there was much more variation in its path. There were significant declines around the Great Recession and at the end of the period (2018 to 2019).

Figure C- 13: Annual Visitor Arrivals by Mode of Transport for Jamaica, 2000 - 2019



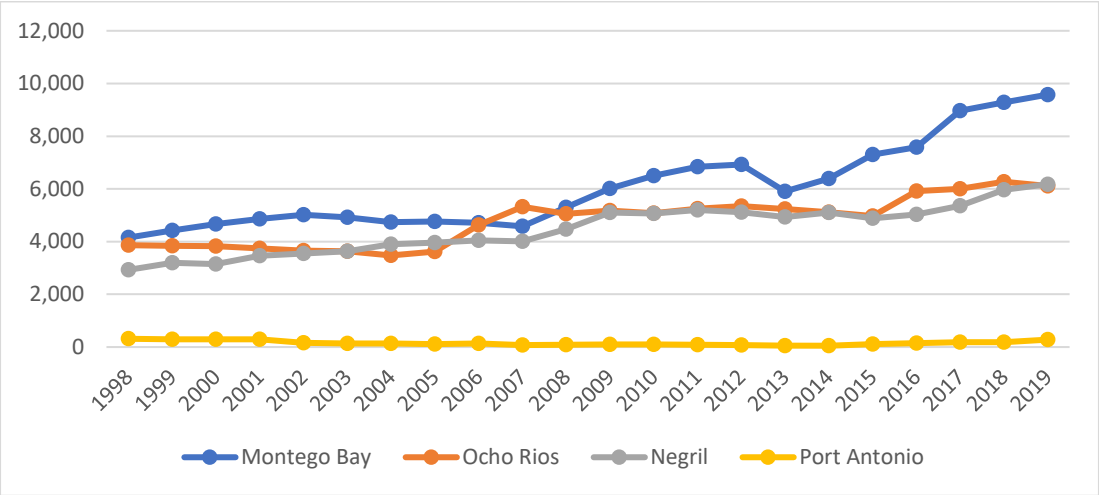
Data Sources: World Bank and Jamaica Tourist Board

- **Tourism Centres**

Three coastal centres dominate Jamaican tourism – Montego Bay and Ocho Rios on the north coast and Negril on the west coast. Port Antonio on the north-eastern coast makes a smaller but significant contribution. There is tourism on a much smaller scale on the south coast, but it is not treated as significant enough to warrant its own category in the reported data. Together, the four coastal tourism

centres account for 91% of hotel rooms and up to 95% of room nights sold. Both the number of rooms and room nights sold have become increasingly concentrated in those coastal centres as the number of stay-over visitors has grown.

Figure C- 14: Room Capacity in Jamaican Coastal Tourism Centres, 1998 - 2019



Data Source: Jamaica Tourist Board

Room capacities have mostly kept pace with increased visitor arrivals. Rooms in all of Jamaica increased by 76% over the period. Capacities for Montego Bay more than doubled (105%) and Negril doubled (96%). Meanwhile Ocho Rios' room numbers grew strongly (60%) but that for Port Antonio slipped by 6%. Increase in room nights sold was even more robust at 93% overall. Montego Bay (125%) and Negril (103%) exceeded that while Ocho Rios grew by 80% and Port Antonio suffered a decline of 36%.

5.2 Yachting and Sailing

Yachting and sailing in Jamaica is a very small component of the tourism sector. The infrastructure has developed primarily for the needs of local boat owners and a few commercial pleasure boat operators and tour services for cruise passengers. Port Antonio offers the only exception, where infrastructure was developed primarily in service to visitors.

Docking Capacity

- **Marina Capacity**

Jamaica has 7 marina facilities at varying levels of development but only one – The Errol Flynn Marina in Port Antonio – explicitly serves visiting boats. The total berthing capacity is for 300 vessels, including 8 slips for mega-yachts/superyachts. The largest facilities are the Royal Jamaica Yacht Club (121 slips), Ocho Rios Boat Marina (48 slips), Errol Flynn Marina (43 slips) and the Montego Bay Yacht Club (41 slips).

- **Mooring and Anchorage Capacity**

Jamaica has 44 locations suitable for anchorages with estimated total capacity of 555 boats but only one – Port Antonio – has fixed moorings. The vast majority of these locations are under-developed, lacking facilities such as dinghy docks and several have known security risks. Most are used by local fisherfolk and use by yachters can raise competitive concerns among them.

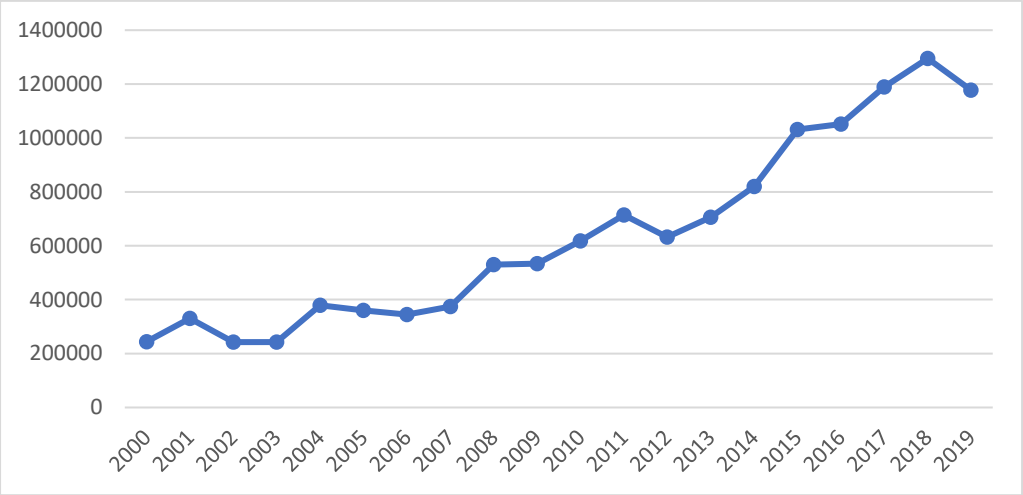
5.0 SAINT KITTS AND NEVIS

Saint Kitts and Nevis is a federation of two islands on the Caribbean archipelago that are separated by only 3 kilometres. The islands are home to about 54,000 persons (World Factbook). Their combined area is 261 square kilometres and has 135 kilometres of coastline with attractive beaches. Tourism makes a significant total contribution to the economy of USD546.2 million or 28.2% of GDP and 59.1% of all employment in 2019 (World Travel and Tourism Council, 2020).

6.1 Tourism Growth

Total visitor arrivals in Saint Kitts and Nevis for 2019 was almost five times what it was in 2000. This increase of 378% was the combined result of growth in all but 5 out of the 20 years under review. It was marked by steep periods of growth between 2007 and 2011 and again between 2013 and 2018, with the latter being more pronounced. This pace of growth is likely to have placed strains on infrastructure and institutional arrangements with possible implications for the natural environment, depending on the composition of visitor arrivals.

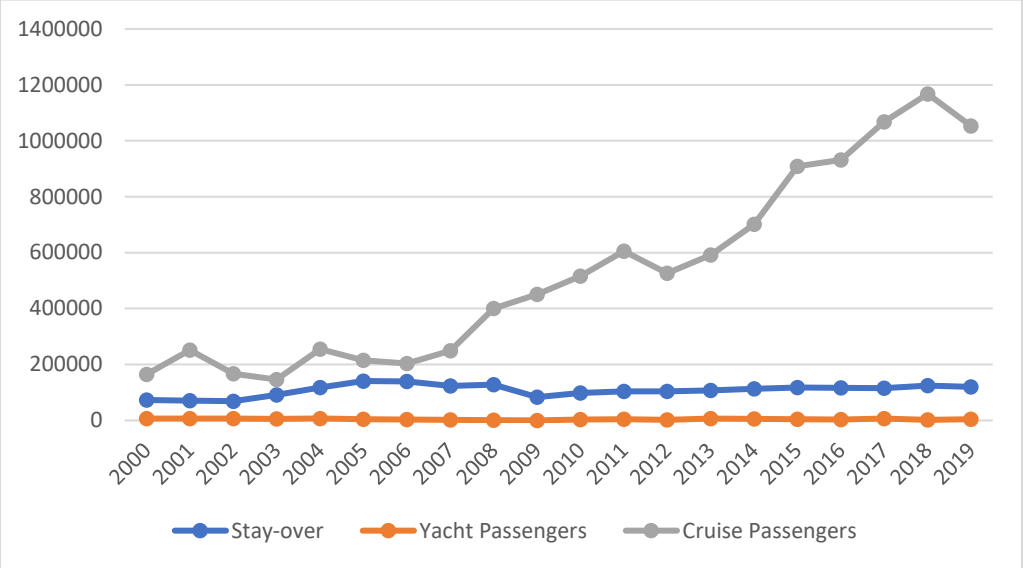
Figure C- 15: Annual Total Visitor Arrivals for Saint Kitts and Nevis, 2000 - 2019



- **Composition of Tourist Arrivals**

Reported tourist arrivals for Saint Kitts and Nevis are composed of stay-over visitors, cruise passengers and yacht passengers. Cruise passenger arrivals is, overwhelmingly, the largest portion, accounting for more than three-quarters (77%) of all visitors over the entire period. That share has generally increased, despite dipping to a low of 58% in 2006 and has remained at just under 90% since 2015. In contrast, annual stay-over visitor counts have been mostly stable over the period. The lowest level of 69,000 was recorded in 2006 and the high point of 141,000 was recorded in 2005 but it has only fluctuated between 100,000 and 125,000 since 2010. Yacht passenger arrivals have fluctuated greatly over the period, but with a declining trend. In fact, the 4,200 arrivals in 2019 was 33% lower than that recorded for 2000. The highest value was 7,072 in 2004 and least of just 209 persons arrived by yacht in 2009, in the wake of a global recession. There has been no multi-year period of increase in yacht passenger arrivals.

Figure C- 16: Annual Visitor Arrivals by Mode of Transport for Saint Kitts and Nevis, 2000 - 2019



Data source: World Bank and Eastern Caribbean Central Bank

6.2 Yachting and Sailing

Docking Capacity

- **Marina Capacity**

Yachting and Sailing is a small sub-sector of travel and tourism in Saint Kitts and Nevis, in terms of head counts, and it does not seem to have benefitted from much investment in infrastructure. There are only 2 marinas in Saint Kitts (Port Zante Marina at Basseterre, and Christophe Harbour) and none on Nevis. Their combined capacity is only 64 yachts, including 24 mega-yachts. Considering that much of those slips are taken by local vessels, there are far fewer total slips available for visiting yachts. For example, only 10 of the 40 berths at the Port Zante Marina are available for visitors. There are proposed developments at both existing locations and redevelopment at Marina Tecla, which was recently severely impacted by a hurricane.

- **Anchorage and Mooring Capacity**

Mooring infrastructure has been allowed to deteriorate over the years resulting in moorings on Nevis falling from 100 to 40, spread across four (4) locations. Otherwise, there are 13 locations suitable for anchorage, five of which are on Nevis. Pinney's Beach on Nevis and Basseterre on Saint Kitts stand out for having the largest capacities of 80 and 50 vessels, respectively. The combined anchorage and mooring capacities of all locations is 364 vessels.

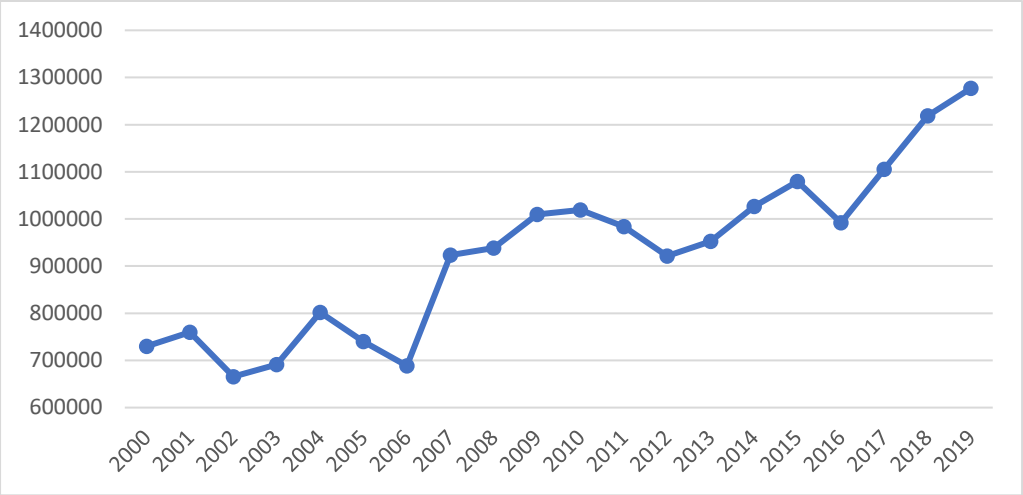
6.0 SAINT LUCIA

Saint Lucia is an island-state on the Caribbean archipelago with a population estimated to reach 167,000 in 2021 (World Factbook). It has a mountainous terrain and a few islets in its territorial waters. The island is 616 square kilometres in size and has 158 kilometres of coastline. Most of its tourism development is on its western coast where beaches are washed by the gentler waters of the Caribbean Sea. Tourism is the largest contributor to the Saint Lucian economy, generating a total of USD1,229.5 million or 40.7% of GDP and 78.1% of employment (World Travel and Tourism Council, 2020).

7.1 Tourism Growth

Total tourist arrivals have grown strongly between 2000 and 2019, increasing by 73%. Figure 30 shows three distinct periods of change: the first, between 2000 and 2006 when counts mostly fluctuated between 650,000 and 800,000; the second, between 2007 and 2016 when it again fluctuated but between 900,000 and 1,090,000; the third, between 2017 and 2019 when arrivals increased steeply to exceed 1,200,000. This stepped pattern of growth is likely to have allowed time for adjustments to institutional arrangements and infrastructure but that is dependent on the composition of visitor arrivals and whether planners anticipated further increase during the periods of fluctuation.

Figure C- 17: Annual Total Visitor Arrivals for Saint Lucia, 2000 - 2019

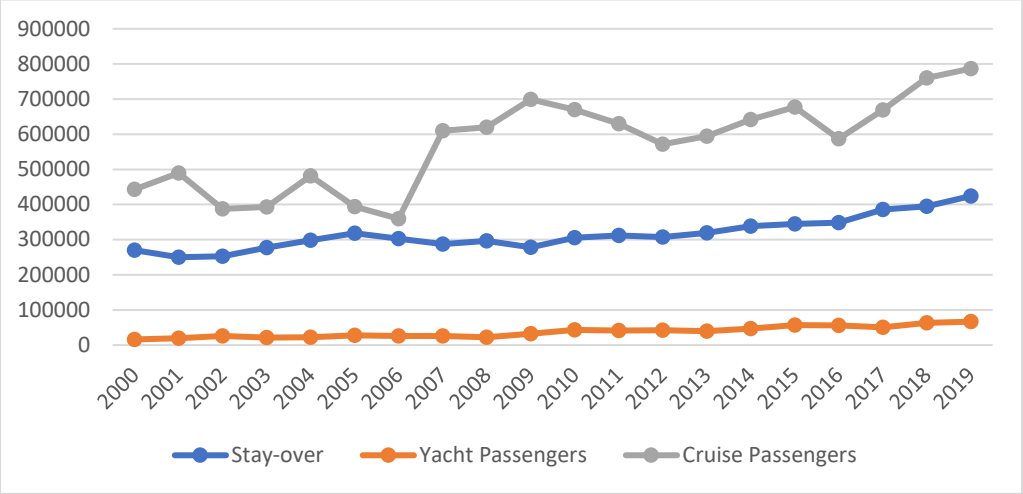


- **Composition of Tourist Arrivals**

Saint Lucia reports tourist arrivals disaggregated into three categories: stay-over visitors, yacht passengers and cruise ship passengers. Most of the fluctuations in visitor arrivals was due to variations in cruise passenger arrivals. Comparison of the curves reveals that the stepped pattern of increase described above is not distinctly observable on the curves for any category other than cruise passengers. Overall, cruise passenger arrivals grew by three-quarters (77%) over the period, having recorded a high of about 787,000 in 2019 and low of approximately 360,000 in 2006. Stay-over visitor arrivals also recorded strong growth, having increased by 57% over the period. Apart from declines around economic recession that impacted source markets in 2001 and 2008-2009, Saint Lucia's stay-over arrivals have trended upward, indicating that it is an increasingly popular destination. Yacht passenger arrivals has shown the strongest growth – 314%. They have jumped from about 16,000 in 2000 to under 67,000 in 2019. Note should be made of 2008 to 2010 over which yacht passenger arrivals shot up by 20,000. Saint Lucia clearly has increasing appeal to all categories of tourists, especially to yachters.

Cruise ship passengers constitute the largest portion of total visitor arrivals, averaging 61% over the entire period. This proportion varied much up to 2010 but settled into relative stability around 60% thereafter.

Figure C- 18: Annual Visitor Arrivals for Saint Lucia by Mode of Transport, 2000 – 2019

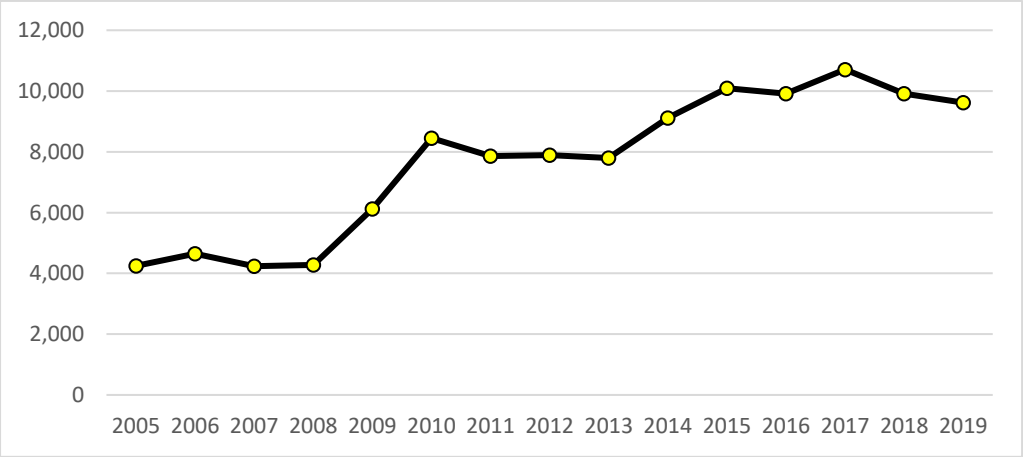


Data source: World Bank and Eastern Caribbean Central Bank

- **Yacht Calls**

Data on yacht calls to Saint Lucia were only available as of 2005. The annual number of calls followed a clear growth trend but in a stepped patten. Between 2005 and 2008, a little over 4,000 calls were recorded for each year. They jumped over the next two years and stabilised around 8,000 calls for each year between 2010 and 2013. Another jump, to 10,000 annual calls, occurred over the next two years, where they seem to have found stability since 2015.

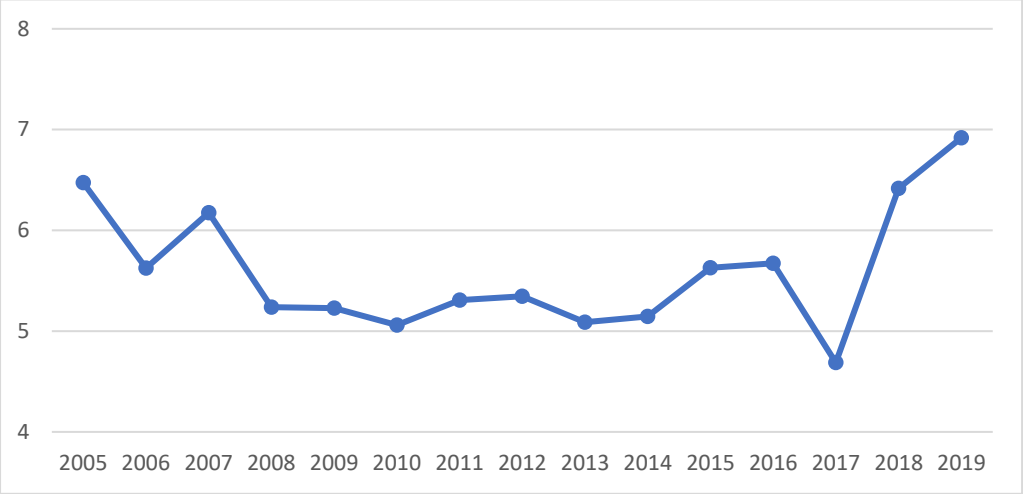
Figure C- 19: Annual Yacht Calls for Saint Lucia, 2000 - 2019



Data source: Eastern Caribbean Central Bank

The average number of passengers per yacht call was calculated for each year and plotted in Figure 33. Starting at about 5 passengers per call between 2005 and 2007, it fell to about 5 and remained there until 2014. There after it has fluctuated, ending on an incline toward 7 passengers per yacht. Changes in this average are possibly reflective of variations in the sizes of vessels but we were not able to verify that with the appropriate data.

Figure C- 20: Annual Yacht Passengers per Call, 2000 - 2019



7.2 Yachting and Sailing

The data presented above shows strong growth in Saint Lucia's yachting sub-sector. It seems to have been achieved by leveraging its attractiveness as a destination, the quality of its main facilities and the exposure afforded by being the main destination for an annual transatlantic race, the Atlantic Rally for Cruisers (ARC) that is staged from November to December. Saint Lucia has been welcoming more than 200 yachts annually at the end of their 2,700 nm race for more than 20 years. Despite that success, the island holds no other place on the international sailing calendar.

Docking Capacity

- **Marina Capacity**

There has been modest change in the capacities of the two main marinas. The IGY Rodney Bay Marina was reported as having 232 slips in ECLAC (2004) but now has 253, including 32 for mega-yachts. It is the operational base for seven charter operations that supply a total of 86 yachts. Development at Marigot Bay has been more significant. It now has 42 berths, up from 29. Importantly, a greater proportion of berths are now available to visitors because the charter company that once dominated the space no longer operates from there and has not been replaced. The other facility, at Ganters Bay, continues to serve local, day-charter operators almost exclusively.

- **Mooring and Anchorage Capacity**

There has been little change in the availability of fixed mooring in Saint Lucia's Bays. Though ECLAC (2004) did not quantify the mooring and anchorages, there are currently 85 moorings in Saint Lucia: 25 and the Rodney Bay Marina, 20 at the Marigot Bay Marina and 40 at the Soufriere Marine Management Area.

Anchorage capacity is unknown because there are numerous bays around the island, especially in the vicinity of the fishing villages. However, the most popular anchorage area on island is at Rodney Bay, outside of the marina, which has an estimated capacity of 300 vessels.

Figure C- 21: Entertainment Event at Pigeon Point, Saint Lucia

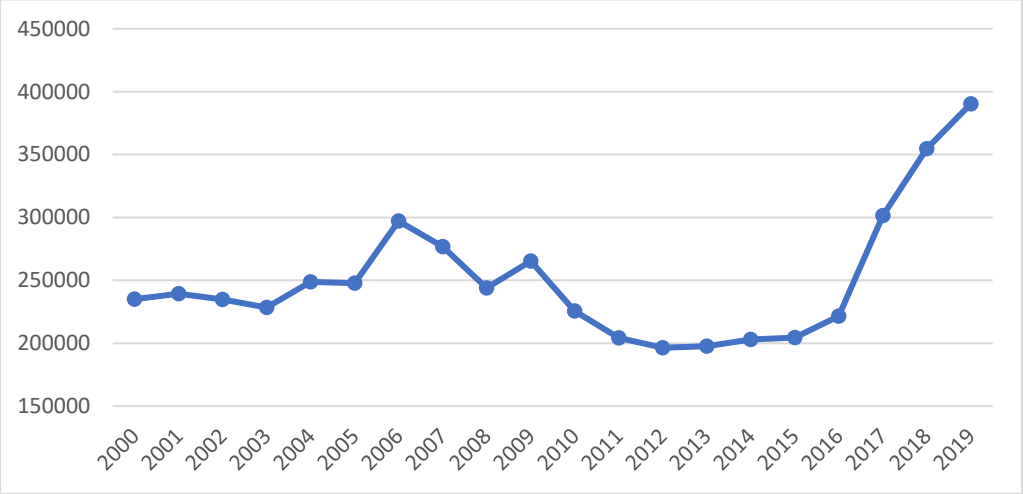
7.0 SAINT VINCENT AND THE GRENADINES

Saint Vincent and the Grenadines is a multi-island state on the Caribbean archipelago with a population that is expected to exceed 101,000 in 2021 (World Factbook). Its land area is 389 square kilometres and has it 84 kilometres of coastline that features numerous beaches, especially on the Caribbean coasts. This island chain offers very attractive, scenic environments for sailing, afforded by its many islets and cays, most of which are uninhabited. Tourism is a major contributor to the economy, injecting USD354.4 million or 28.6% of GDP in 2019 and generating 45.2% of total employment (World Travel and Tourism Council, 2020).

7.1 Tourism Growth

Though total tourist arrivals in Saint Vincent and the Grenadines were 53% higher in 2019 than they were in 2000, that statistic does not accurately characterise movement over the 20-year period. Arrivals remained stable at about 250,000 persons per year until 2009, then declined to find stability around 200,000 visitors between 2011 and 2015. Thereafter, they shot up to just under 400,000 in 2019. The low level of arrivals suggests that Saint Vincent and the Grenadines is among the least mature tourism destinations in the region. Notably, though, the rapid rise that almost doubled visitor arrivals over 4 years could greatly strain institutional arrangements, infrastructure and the natural environment, depending on the composition of arrivals.

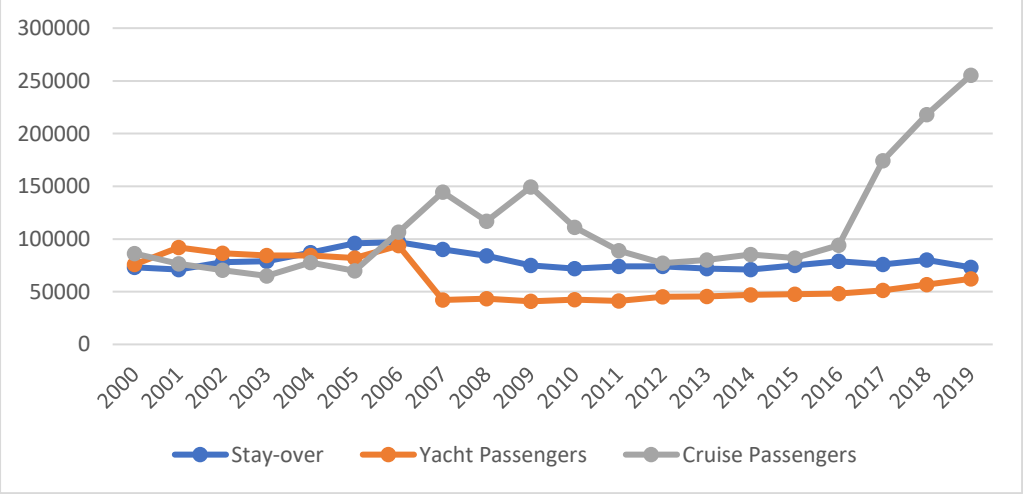
Figure C- 22: Annual Total Tourist Arrivals for Saint Vincent and the Grenadines, 2000 - 2019



- **Composition of Tourist Arrivals**

Passenger arrivals on all components excepting for cruise ship passengers have mostly changed slowly over the years with differing trends at the end of the period. Tourist Arrivals to Saint Vincent and the Grenadines are categorised as stay-over, cruise ship passengers and yacht passengers. Cruise ship passenger arrivals have been similar in number to stay-over visitors in all excepting for seven years, divided into two periods – 2017 to 2010 and 2017 to 2019. The latter period is the main contributor to the spike in total visitor arrivals as curves for the other categories either remained flat or rose only modestly. Stay-over visitor arrivals reached their peak of 97,000 in 2007 but have remained between 70,000 and 80,000 since 2009 and ended at the level reported for 2000. Yacht passenger arrivals rivalled stay-over visitors up to 2006 but fell dramatically in 2007 and have yet to return to previous levels despite continual increases for each subsequent year. It is not known how accurately these statistics reflect the numbers of yachters in the territorial waters given that it is easy to bypass immigration entry points in a chain of islands that does not have posts on every island and where there is little policing of the waters. Additionally, sailors who begin their journeys in the territory would not have been counted in this category.

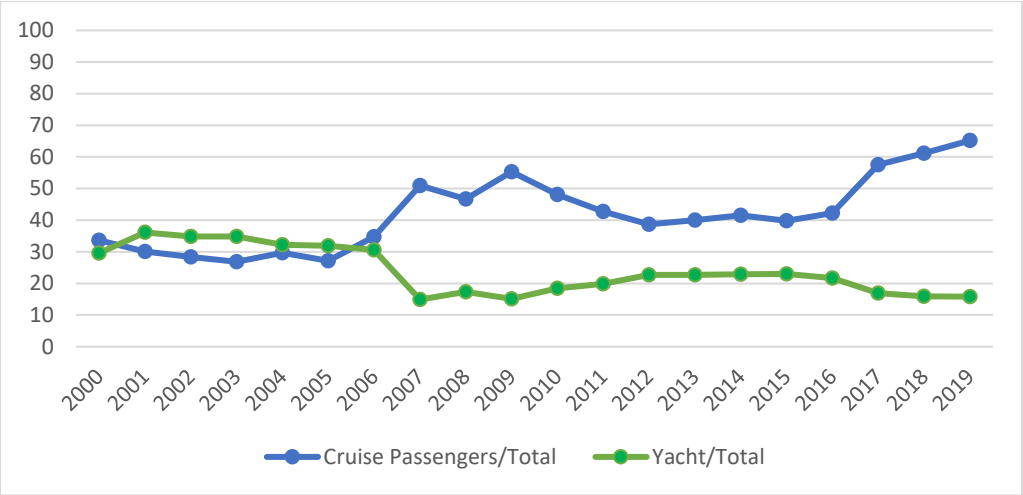
Figure C- 23: Composition of Annual Tourist Arrivals for Saint Vincent and the Grenadines, 2000 - 2019



Data source: World and Eastern Caribbean Central Bank

The composition of tourist arrivals was further examined by computing percentages of cruise ship and yacht passengers of total annual arrivals and are both plotted in Figure 37, below. Yacht passenger arrivals made a greater contribution to the total between 2001 and 2005 but the diverged sharply between 2007 and 2011 as cruise ship arrivals jumped while yacht arrivals declined. There was further sharp divergence after 2017 as cruise passenger arrivals spiked enough to greatly outpace the rise in yacht passenger arrivals.

Figure C- 24: Cruise Ship Passengers and Yacht Passengers as Percentages of Total Visitor Arrivals



7.2 Yachting and Sailing

The island chain of Saint Vincent and the Grenadines is among the best-known sailing destinations in the Caribbean. Its numerous scenic islands and cays with beautiful beaches draw relatively large numbers of yachters to its shores. It relies primarily on that natural attractiveness, having only one sailing event on the international calendar, the ARC+, for which it is an alternate end-point to Saint Lucia.

Docking Capacity

- **Marina Capacity**

Despite its attractiveness as a yachting destination, the supporting infrastructure in Saint Vincent and the Grenadines is relatively underdeveloped. There are 8 marina facilities spread across 4 islands – Saint Vincent, Bequia, Union Island and Canouan. Their combined capacity is 224 vessels, including 38 for mega-yachts/superyachts. The locations with the largest capacities are the Sandy Lane Yacht Club & Residences on Canouan (120 slips) and the Ottley Hall Marina on Saint Vincent (40 slips).

- **Mooring and Anchorage Capacity**

It is estimated that the Saint Vincent and the Grenadines chain of islands has a capacity for 640 yachts on moorings or at anchor. Approximately 80 officially regulated and managed fixed moorings can be found in the Tobago Cays Marine Park and at Britannia Bay on Mustique. Additionally, a large (unspecified) number of private, unregulated moorings are also available for use by visiting yachts on St Vincent, Bequia, Canouan, Mayreau and Union Island. The largest capacity is at Admiralty Bay/Port Elizabeth on Bequia (200 vessels) and the Tobago Cays Marine Park (70 vessels).

Figure C- 25: Anchorage in the Grenadines

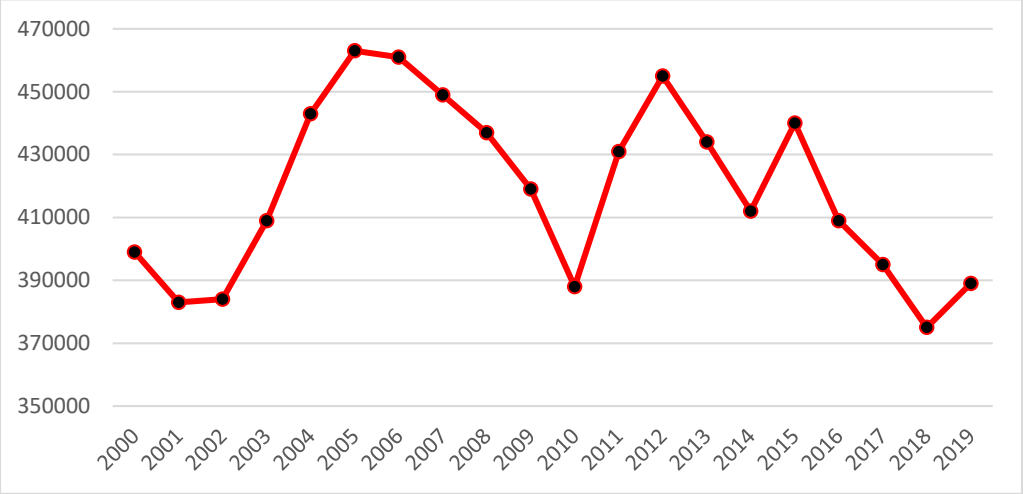
8.0 TRINIDAD AND TOBAGO

Trinidad and Tobago is a twin-island state located at the southern end of the Caribbean archipelago. Its location places it outside of the usual range of hurricane activity that poses a seasonal threat to Caribbean islands. Combined, the islands along with several islets are made up of 5,128 square kilometres of mostly flat land. It features 362 kilometres of coastline that features some attractive beaches, particularly on Tobago but its culture (especially the annual carnival) is also very attractive to tourists. The population of Trinidad and Tobago is estimated at 1.221 million in 2021 (World Factbook). Being a petroleum producer, tourism makes a relatively small, but significant, contribution of USD1,857.1 million or 7.8% of GDP in 2019 (World Travel and Tourism Council, 2020).

8.1 Tourism Growth

Stay-over visitor arrivals in Trinidad and Tobago have not grown over the past 20 years. It is one of the less mature tourism destinations in the Caribbean, receiving, at most, only 463,000 stay-over visitors in any year since 2000. That peak was reached in 2005 and subsequent high points have reached similar, but lower levels. Data on other components of visitor arrival has been difficult to obtain and it is notable that the Revised Draft National Tourism Policy, 2020 presents only stay-over visitor arrivals while making reference to fast growth of cruise ship passenger arrivals without presenting any data.

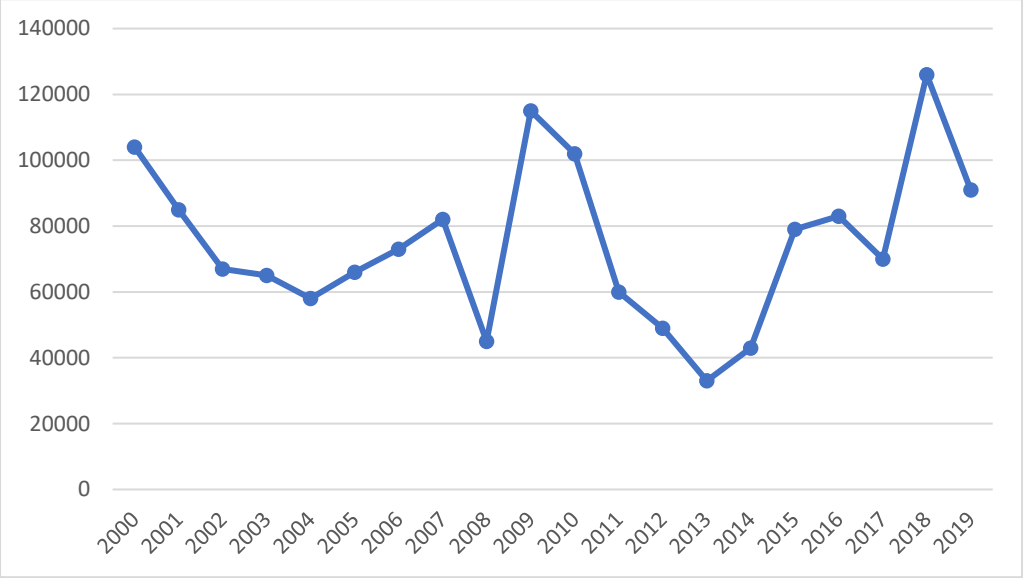
Figure C- 26: Annual Stay-over Visitors for Trinidad and Tobago, 2000 - 2019



Data source: World Bank

Cruise ship passenger arrivals were obtained from the World Tourism Organisation (via the United Nations data repository, data.un.org) for 2000 to 2019. An erratic patten of arrivals with a peak value of about 126,000 in 2018 and a floor of under 40,000 in 2013 is observable in Figure 40, below. Arrivals seem to decline sharply in the wake of recessions in origin markets. This also seems to be reflective of its relative immaturity as a destination. Though there has been strong growth between 2013 and 2018, the peak reached was only marginally above that reached in 2009 and the sharp decline in 2019 questions the sustainability of that trend.

Figure C- 27: Cruise Ship Passenger Arrivals for Trinidad and Tobago, 2000 - 2019



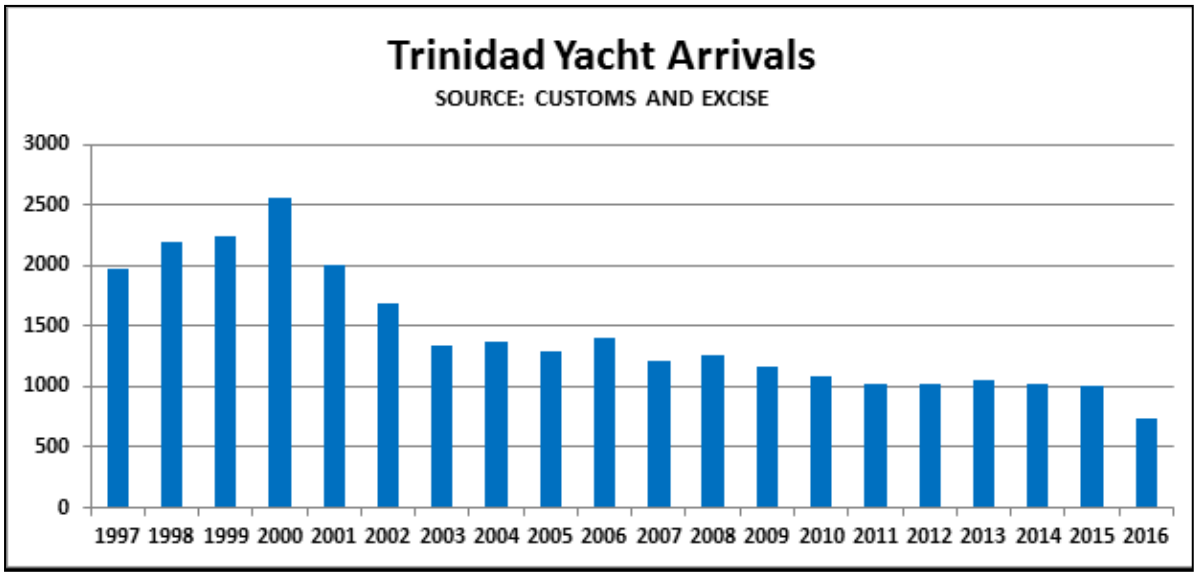
Data source:data.un.org

8.2 Yachting and Sailing

Trinidad and Tobago stands out as one of the most industrialised islands in the region. It ventured into the petroleum and other industries, taking advantage of its natural resources of oil, natural gas and asphalt. Its entry into the international yachting industry was focused on provision of maintenance services and a safe haven, leveraging its strength in industrial services and location on the fringe of the Atlantic Tropical Cyclone Zone. Vessels are stored and undergo repairs in its relative safety during

the Atlantic Hurricane Season which runs from June to November. ECLAC (2004) showed the growth in arrival of yachts in the 1990s in response to investments made in the industry.

Figure C- 28: Annual Yacht Arrivals for Trinidad, 2000 - 2019



Source: Customs and Excise Division, Government of Trinidad and Tobago

Yacht arrivals continued to rise toward their peak in 2000 but have continued on a slow downward trajectory since, despite efforts to boost Trinidad and Tobago's tourism product. In spite of the similarity of Tobago's natural environment to those of other islands in the region, it has been noted that entry to its main port, Scarborough, is difficult for sailors due to wind and sea current direction and there have been complaints about excessive paperwork required at ports, including having to file entry at both islands separately. The decline could be due to competition from improved storage and maintenance services in other locations, such as Grenada which also has lower tropical cyclone risks than much of the Caribbean.

There is little expectation of significant reversal of the declining trend. The Revised Draft National Tourism Policy, 2020 makes no mention of the yachting sub-sector, making public-sector investment and encouragement unlikely in the near term.

Docking Capacity

- **Marinas, Mooring and Anchorages**

Trinidad and Tobago boasts several, mostly small marinas located in the north-west of Trinidad and on Tobago. Chaguaramas Bay is the yacht servicing hub of Trinidad and most marinas are located between there, its nearby off-shore islets and Port of Spain. Eight have been identified in that area along with one at Scarborough on Tobago. The capacity of marinas in Trinidad and Tobago has not yet been determined.

There are numerous locations on both islands that are suitable for anchorage and some are used more heavily than others. The greatest concentration of locations is in the north-west of Trinidad between the Chaguaramas area and the Gulf of Paria (including Port of Spain) but there are several in other locations. There are also 9 identified anchorages around Tobago where the best-known are at Scarborough, Bucco Bay and Store Bay, which has served as the starting point for sailing events.