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GUIDELINES FOR CLASSIFICATION OF WATERS ACCORDING TO THE LBS PROTOCOL

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FINAL INTEGRATED REPORT

**DEVELOP GUIDELINES FOR CLASSIFICATION OF WATERS ACCORDING TO
THE LBS PROTOCOL**

SMALL SCALE FUNDING AGREEMENT

SUBMITTED BY THE INSTITUTE OF MARINE AFFAIRS

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EXECUTIVE SUMMARY

The Cartagena Convention is the solitary legally binding agreement to protect the Caribbean Sea. Under this Convention, The Protocol concerning Land Based Sources of Pollution and Activities (LBS Protocol) was established to address these sources of pollution entering into coastal waters. Annexes within the Protocol are key to its implementation and strategically guide the contracting parties to develop the required framework to positively impact coastal water quality.

The Regional Activity Centres (RACs), IMA and CIMAB, are designated to provide technical assistance to contracting parties in the implementation of the convention and particularly the LBS Protocol. The establishment of guidelines for water classification are expected to form a sound foundation for implementation in the Caribbean. The IMA (English Speaking) and CIMAB (Spanish Speaking) evaluated the existing water classification structures of coastal and marine waters in twenty countries across the Caribbean, Central and Latin America. The countries were assessed via a questionnaire and desk study, where existing legislative instruments were reviewed as key indicators with respect to Protocol alignment.

The implementation of the LBS Protocol centres on the water classification principle identified in Annex III which designate Class I and Class II based on the use of the specific water body and the need for protection of sensitive ecosystems (Corals reefs, mangroves, seagrass). A snapshot of the region demonstrates that water classification – and the LBS Protocol in general – are at different levels of progress, highlighting the challenges of the process. Although there are similarities to how countries perform their Water Classification, the differences that occur underscore the need for uniformity. The importance of existing wastewater regulations comprising of well-defined permissible limits also becomes exceedingly important.

Lessons are also taken from other parts of the world. Countries in different regions such as The Philippines, South Africa, Paraguay and Europe provide examples of well-established water classification systems and supporting legislative framework. The possibility for enhancing the current systems under the LBS Protocol exists through understanding the rudiments used in designing, employing and maintaining water classification systems used by others.

After review, guidelines were offered to assist with implementation of the protocol. The development and subsequent application of water classification mechanisms should eventually harmonise the status of contracting parties and simplify the process for new signatories. Recommendations were made for Legislation, Effluent limitations, Classification Criteria and Monitoring and Rehabilitation. These are considered crucial areas for enhancement of the water classification process regionally and could be potential solutions for the existing challenges of protecting the Caribbean Sea.

1. INTRODUCTION

The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, now commonly known as the Cartagena Convention, is the only legally binding agreement which seeks to protect the Caribbean Sea through regional cooperation. In 1999, the Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) was adopted to the Cartagena Convention. Anchored in the Articles of the LBS Protocol are the guidelines for contracting parties may use to develop the necessary strategic and technical frameworks to achieve the long-term goals of pollution prevention and water quality monitoring and prevention in the Wider Caribbean Region (WCR).

The main objective of this technical report is to integrate sub-regional studies in both the English and Spanish-speaking countries of the Wider Caribbean Region (Figure 1) on the classification of coastal-marine waters as receiving bodies of wastewater, in order to propose regional guidelines. The results obtained in this report are intended to be utilised in further developing the existing guidelines to effectively classify bodies of water throughout the countries in the WCR under the LBS Protocol.



Figure 1 - Map of the Wider Caribbean Region

There were a total of twenty (20) countries assessed regionally. The countries included in this study were Antigua and Barbuda, The Bahamas, Barbados, Belize, Grenada, Guyana, Jamaica,

Saint Lucia, Trinidad and Tobago, United States of America, Colombia, Costa Rica, Cuba, Guatemala, Honduras, Mexico, Nicaragua, Dominican Republic, Panama and Venezuela.

1.1 METHODOLOGY

Questionnaire

A questionnaire (Annex I) was designed by the LBS Regional Activity Centres (RACs), the Institute of Marine Affairs in Trinidad and Tobago (RAC IMA) and the Centre of Engineering and Environmental Management of Coasts and Bays in Cuba (RAC CIMAB) and circulated to the LBS focal points of all the aforementioned countries. The aim was to gain insight into the legislative instruments and/or existing processes of each country in the classification of coastal water bodies. A total of 7 countries (Barbados, Belize, Guyana, Honduras, Jamaica, Trinidad and Tobago and the United States of America) responded to the questionnaire. These responses were reviewed and incorporated into the respective sub-regional report.

Desktop Review

A thorough desktop study was completed to gather any existing information on each country for water classification, especially in instances where there was no response to the circulated questionnaire. In such a case, the main data sources were legal instruments from each country related to the subject (standards, resolutions, laws, decrees), obtained online. To further supplement the understanding of water classification systems, a review of existing systems in countries of other regions was also conducted.

Outcome

The results obtained in each sub-regional study were collated, organized and then integrated for presentation under a single regional report. This work should provide additional clarity to build and further develop guidelines in the identification of water bodies and their subsequent classification to ultimately better protect marine and coastline ecosystems.

The importance of this study is that the National Environmental Authorities of each country will be provided with methodological tools to facilitate the classification of coastal and marine waters in line with the LBS Protocol. Therefore, further facilitating the fulfilment of their duties as contracting parties to this Protocol.

This activity was financially supported through a Small Scale Funding Agreement with the United Nations Environment Programme (UNEP) and the Swedish International Development Agency (SIDA).

2. CLASSIFICATION OF COASTAL AND MARINE WATERS

2.1 IMPORTANCE OF THE COASTAL ZONE

The coastal zone is essential to marine life and supports a large part of the world's living marine resources. Within its wetlands, lagoons, seagrass beds, coral reefs and shallow bays are nursery or feeding areas for most coastal and many oceanic species. This zone has the highest biological diversity of any part of the sea (FAO, 1992). Within the wider Caribbean, coral reefs, mangroves and seagrass beds can be found across an area of 5.9 million km². (UNEP-CEP, 2020)

2.2 WATER CLASSIFICATION

In general, the most common aspect to take into account for the classification of water bodies is based on their uses such as drinking water supply, bathing and recreation, support of aquatic life and agricultural. In addition, the presence of effluent discharges that could affect the coastal zone must also be considered, along with their capacity for dilution and dispersion, the sensitivity of the receiving waters, the eutrophication level, existing special environmental protection characteristics, among other criteria (Metcalf & Eddy, 2014).

However, this classification may be subject to errors depending on different incident factors, therefore a more detailed classification of water bodies is required, for which methodical and laborious work to know the conditions of water quality and their (current and potential) uses must be carried out.

The classification by water quality and uses considers that those water bodies which are in better condition and have more sensitive uses must be protected to a greater degree, while those whose quality is already degraded and therefore are not suitable for most uses are classified in the worst category and are subject to less protection (AECID, 2021).

2.3 WATER CLASSIFICATION ACCORDING TO THE LBS PROTOCOL

According to Annex III of the Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) to the Cartagena Convention, the classification of coastal marine waters is focused on two classes: Class I and Class II, which are generally defined to encompass all regions of significance within the Convention area. Class I and Class II differ mainly in the sensitivity to the impacts of domestic wastewater. Class I waters are recognised as the most vulnerable and are particularly sensitive to the discharges of domestic wastewater, because it can negatively affect sensitive ecosystems and human health. However, Class II waters are identified as less sensitive in comparison.

Class I waters are defined as waters containing:

- I. Coral reefs, seagrass beds, or mangroves;
- II. Critical breeding, nursery or forage areas for aquatic and terrestrial life;
- III. Areas that provide habitat for species protected under the Protocol Concerning Specially Protected Areas and Wildlife to the Convention (the SPAW Protocol);
- IV. Protected areas listed in the SPAW Protocol; and
- V. Waters used for recreation

Class II waters are defined as waters in the Convention area, other than Class I waters, that due to oceanographic, hydrologic, climatic or other factors are less sensitive to the impacts of domestic wastewater and where humans or living resources that are likely to be adversely affected by the discharges are not exposed to such discharges.

3. CLASSIFICATION OF COASTAL AND MARINE WATERS IN THE WCR

An assessment of the countries was conducted to identify the status of classification of their respective coastal and marine areas. The analysis of the legal framework and regulations for the designation of water bodies revealed that classification is mainly based on their uses. Where possible, the analysis includes the classification relationship - whether it exists or not - with the standards or criteria for wastewater discharges to coastal water bodies.

The findings should not be considered an exhaustive or critical assessment of the environmental legal and regulatory frameworks of each country included in this study. However, the objective considers how close the regulatory frameworks of these countries are to the LBS Protocol in terms of coastal marine zones classifications and provides recommendations on guidelines for this purpose at the regional level.

3.1 WATER CLASSIFICATION IN THE WCR

3.1.1 ANTIGUA AND BARBUDA

Antigua and Barbuda is a twin island state located approximately 402km southeast of Puerto Rico with a combined land area of 440km² and population of just over 96,000. The coastline of Antigua is indented with numerous islands, creeks, inlets, associated sand bars and wetlands. A large portion of the surrounding coasts are protected by fringing reefs. The coastline of Barbuda holds less variation to its sister isle but has extensive reef systems especially off the east coast. The Codrington Lagoon is bordered by mangroves and sand ridges. This area is of significant importance to the fisheries and wildlife of Barbuda.

The Environment Protection and Management Act (EPMA, 2015) included water classification, however, the Act was revised in 2019 to modify the scope of the National Environmental Policy. The Act encompasses the management of pollution and environmental remediation as stated in Section 3 (1)(b):

“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”

Further to this, within Schedule VII - Water Quality Management Criteria and Guidelines of the EPMA 2019 includes water classification criteria for coastal, fresh and ground waters. Each of these categories are then subdivided into three water classes. Coastal waters are categorised into classes AA, A and B in accordance with the respective uses to be protected.

Class AA Waters

- (i) the uses to be protected in this class of water are oceanographic research, the support and propagation of shellfish and other marine life, conservation of coral reefs and wilderness areas, compatible recreation and other aesthetic enjoyment;
- (ii) it is the objective that this class of waters remain as near to their natural state as possible with an absolute minimum of pollution from any source;
- (iii) to the extent possible, the wilderness character of such areas shall be protected;

- (iv) no point source discharge will be permitted in these waters, nor will destruction of reefs, aquatic habitats or other resources be permitted;
- (v) the classification of any water areas as Class AA shall not preclude other uses of such waters compatible with these objectives and in conformance with the standards applicable to them;

Class A Waters

- (i) the uses to be protected in this class of waters are recreational (including swimming, bathing, and other water contact sports), aesthetic enjoyment, and the support and propagation of aquatic life;
- (ii) it is the objective that this class of waters be used for recreational purposes and aesthetic enjoyment shall not be limited in any way;
- (iii) Class A waters shall be kept clean of any trash, solid materials or oil, and shall not act as receiving waters for any effluent which has not received the highest degree of treatment or control practicable under existing technological and economic conditions and shall be compatible with the standards established for this class;

Class B Waters

- (i) waters within such areas are to be used for ports, small boat harbours, industrial activities, mining, commercial and industrial shipping, compatible recreation, the support and propagation of aquatic life, and aesthetic enjoyment;
- (ii) it is the objective for this class of water that discharge of any pollutant be controlled to the maximum extent possible and that sewage and industrial effluent receive the highest degree of treatment practicable under existing technological and economic conditions, and shall be compatible with the standards established for this class;
- (iii) the Class B designation should apply only to a limited area next to commercial or industrial facilities, and the rest of the water area in such bay or harbour shall be Class A unless given some other specific designation.

As previously mentioned, the above classifications are mainly based upon the uses of the particular coastal area/water body and also indicate which class may or may not act as receiving waters for possible effluent discharge. The water quality guidelines provided within Schedule VII are composed of both basic standards that are applicable across all designated water categories (coastal, fresh, groundwater and respective classes within) and specific water quality standards that include assigned criteria per classification. These specific standards can be considered as a protective measure to maintain the classes designated to act as receiving waters (Class A & B). It is important to note that some of the criteria coincides with the indicator parameters included within the LBS protocol.

3.1.2 THE BAHAMAS

The Bahamas archipelago comprises of thirteen major islands and seven hundred smaller islands and two hundred cays that altogether have a total land area of 13,934 km². The islands

span a distance of over 1400 km from the eastern coast of Florida to the northern coast of Cuba. Though approximately 30 islands are inhabited, the coastal areas are of major importance to the population and economic activity (National Environmental Policy, 2005). The windward side of the islands have notable patch reefs on the interior banks as well as an extensive network of fringing coral reefs and sea grass beds. Collectively the Bahamian shallow seas provide the largest body of coral reefs and other marine organisms in the Atlantic and Caribbean regions (National Assessment Report, 2004).

While The Bahamas ratified the LBS Protocol in 2010, there is not yet an established water classification system. However, there are two significant legislative instruments which work towards water classification and further integration of the LBS Protocol. Firstly, the Ministry of Environment Act 2019 serves to establish its namesake with the functions of management, protection and conservation of all land, water, air and living resources of the Bahamas and to determine the process by which environmental policies are developed and implemented. Under this Act the Ministry consolidated the responsibility of existing government agencies such as environmental health services, national geographic information services, public park and beaches forestry, Environmental Impact Assessments and Multilateral Environmental Agreements.

Secondly, the Environmental Planning and Protection Act (EPPA) 2019 focuses on policy development and implementation for environmental management and conservation. The Act seeks to establish the Framework of the National Environment Policy which comprises of several measures including a National Beach and Coastal Management Policy and National Coral Reef Conservation Plan. The Department of Environmental Planning and Protection (DEPP) established under this Act is tasked with the coordination and implementation of international conventions, treaties and protocols relating to the environment, as well as, providing oversight and approval for water management agencies.

Other conservation plans are to include surface waters, ground waters and wetlands. Under this framework, the EPPA also cited the need for the establishment of a National water quality management policy. Though no draft of this policy was observed during this study, it would be expected to include water quality standards with criteria pertaining to all bodies of water within the Bahamas. Also, it can be assumed that water classification criteria would be developed parallel to respective permissible limits for receiving waters of domestic and/or industrial effluent discharge. In addition, with the various conservation efforts to be incorporated, a holistic approach should be assumed to designate waters of sensitive coastal areas to be free of any effluent discharge. There is an opportunity for the DEPP and other respective statutory agencies of the Bahamas to collaborate in order to establish a regime of water and wastewater management, to effectively preserve human health and coastal ecosystems moving forward.

It is important to mention that the EPPA also makes provisions for the protection of environmentally sensitive land areas, under which the term “land” may include “surface land, the seabed and other land covered by water and all subsoils found therein, or any combination or part thereof”. The Minister responsible for the environment possesses the power to designate an environmentally sensitive area to provide protection under the Act.

This ministerial order requires a comprehensive description of the area to be designated, respective reasons for such and the specific limitations of uses and activities within the selected area. Similarly, the Act allows for the designation of closed areas that are ordered for “the survival of any biological resource, genetic material, ecosystem or endangered species located in such area.” Closed areas may or may not occur within the environmentally sensitive areas as mentioned above. This may be employed as a means to rehabilitate bodies of water that have been degraded through effluent discharge, environmental incidents or otherwise. In addition to the above, the order for the designation of a closed area must include the specific limitations on use of or activities within such area or with regard to such biological resource, genetic material, ecosystem or endangered species which are required to adequately protect the identified environmental concerns.

3.1.3 BARBADOS

Barbados is the most eastward island in the Caribbean and sits as an outlier of the archipelagic chain. The island has a total land area of approximately 432km² (UNEP, 2010). The eastern coast is exposed to the Atlantic Ocean and these stronger, rougher waters see less coral reefs as opposed to the calmer waters of the west coast. As a result, beaches, extensive coastal wetlands, seagrass beds and offshore reefs are located between the western and southern coastline (State of the Environment Report, 2000).

Barbados ratified the LBS Protocol in 2019. While there is not yet a designated water classification system similar to that of the LBS protocol, several existing fragments of legislation provide a measure of regulations in this regard. The Marine Pollution Control Act 1998 (MPCA) aims to manage marine water quality to stem the deleterious effects on fisheries and marine ecosystems from anthropogenic sources such as land-based sources, sea-bed activities, and dumping.

In order to effectively manage pollution of coastal areas, the MPCA calls for the development and implementation of a programme to prevent, reduce and control pollution from the aforementioned sources. After identification and registration of each pollutant, a list of these pollutants and their prohibited concentration levels (maximum permissible limits) would be devised.

Though not explicitly stated, part of the MPCA may be considered relative to the concept of water classification in Barbados. Within section 7 of the Act “Power to Require Reduction in level of Pollution”, where if the existence of a prohibited concentration level of a pollutant is found, restriction or cessation of the pollutant are required until it is once again within the designated level. These instances can be on land or land covered by water, which can be seen as akin to coastal areas. Further to this, it can be proposed that this legislation be used in concert with development of water classification criteria to protect sensitive coastal areas and ecosystems that are found to be at risk due to receiving effluent discharge. However, according to the Environmental Protection Department (EPD), it is understood that Barbados is currently in the process of drafting Marine Pollution (Discharge) Control Regulations, to support existing legislation in the establishment of permissible levels for effluent discharge. The Coastal Zone Management Act, 1998 (CZMA) aims to provide effective management, preservation and enhancement of the coastal resources of Barbados.

Within the CZMA includes the development of a coastal zone management plan which would include classification of the coastal zone correlating to the use, such as mangroves, protected areas, recreation etc. It is important to note that use of the coastal zone requires a Physical Development Plan which aims to ensure best practices are followed. This is a necessity under the Planning and Development (Amended) Act 2020.

The coastal zone management plan should also include standards for water quality in coastal and marine areas to effect the maintenance, rehabilitation and enhancement of coastal and marine habitats. It would be a fair assumption that these standards would be in line with Discharge control regulations being developed under the MPCA. The CZMA also makes provisions for preservation and enhancement of marine areas through regulations for Beach Protection and Coral Reef protection. Under the CZMA an Integrated Coastal Zone Plan was drafted with the National Policy Framework to implement plans through legislation over a 10-year period (2020 - 2030). The Cartagena Convention (LBS Protocol) is to be used as a guideline for policy development, among other international conventions.

3.1.4 BELIZE

Belize is located in Central America and has a land area of 22,963 km², including approximately 1,000 small islands or cays. Though bordered by Mexico and Guatemala, both Spanish speaking countries, the native language of Belize is English (UNEP, 2011). The country has an estimated population of 404,900, highlighting its generally low population density. Approximately 7% of land is used for agriculture in comparison to the 60% that remains forested. Belize is home to one of the largest barrier reefs globally and has approximately 765 km² of mangrove forest.

The Environmental Protection Act 1995 established the Department of Environment as the agency mandated to execute the regulations made within. Among its functions is the prevention and control of pollution by the coordination of activities leading the waste discharge into the environment, conditioned licensing and registration of wastes, discharges and emissions. Effluent Limitation Regulations also accompanied the Act, which established Schedules as a guideline to specifically control discharges of sewage and industrial effluents into inland waters or the marine environment. The Effluent Limitation Regulations were subsequently amended in 2009 to include the water classification guidelines as specified within the LBS Protocol. Also, the Government of Belize is currently developing a National Wastewater Management Policy regarding water classification as it relates to discharge of wastewater.

The Coastal Zone Management Act 1998 of Belize establishes and defines the functions of the Coastal Zone Management Authority an autonomous statutory body that advises the Government of Belize on all matters regarding development and utilization of coastal resources. Under this body, the Coastal Zone Management Plan (CZMP) was developed to include guidelines for coastal development, land or water use in the coastal zone, establishment of marine protected areas, recreation and tourism, environmental monitoring and policy strengthening, inter alia. Further to this, the CZMP is to include proposals for the reservation of water (or land) in the coastal zone for particular uses or the prohibition of certain activities in particular areas of the coastal zone. This complements the legislation of

the Effluent Limitation Regulations and any of Belize's future work towards water classification.

3.1.5 GRENADA

The country consists of a tri-island state namely Grenada, Carriacou and Petit Martinique with a total land area of 340 km². Grenada, the largest and most populated island, has a coast that is characterised by coral reefs, sea grass beds, mangrove swamps and wetlands. The marine environment suffers degradation from sewage and domestic wastewater. In St. George's Grenada only crude separation of waste is performed as a means of treatment by the sewerage facilities before discharge via an outfall. Coastal water quality is also impacted by the use of pesticides, agrochemicals and agricultural activities along rivers and watersheds (UNEP, 2010).

The National Water and Sewerage Authority (NAWASA) Act established the National Water and Sewerage Authority and its mandate. NAWASA's responsibility includes management of the water supply to the population, as well as the construction and/or connection to the sewer systems to both households and industries of Grenada. Within the NAWASA Regulations, there is the prohibition of discharge sewage or industrial waste to a natural outlet or the ocean but no further classification is stated regarding coastal waters.

Grenada's Integrated Coastal Zone Management Act 2019, defines the coastal zone as an area possessing coastal resources, where these resources include beaches, wetlands, coral reefs, seagrass beds and other shoreline ecosystems. The ICZM Act outlines the establishment of a Coastal Zone Management Plan which requires the development of water quality standards specific to the coastal zone that would result in better maintenance, assist with rehabilitation and enhancement of coastal and marine habitats. The Act also calls for the establishment of Marine Protected Areas. In addition, the Minister responsible for the environment can designate an area of the coastal zone to be restricted, for the purpose of natural preservation, protection, rehabilitation, scientific study or public recreation.

It is important to note that prior to the ICZM Act, the existing ICZM Policy (2015) made reference to the implementation of Grenada's ratified Multilateral Environmental Agreements as a strategy to fulfil transboundary obligations and attain policy objectives as part of achieving the overarching goal of coastal management. The policy also aimed to prevent, reduce, or mitigate the discharge of pollutants into nearshore areas, that are derived from human activities (agriculture, housing development) within the coastal zone. The policy states the need for establishment of domestic and industrial wastewater effluent standards for discharge into the coastal zone and the enforcement of these standards to achieve and maintain coastal water quality to international standards. While the above may not yet be included in the current iteration of the ICZM Act, addition to the existing legislation would assist water classification and efforts to minimize harmful effects of land-based sources of pollution.

Further to the aforementioned, there are other statutes that serve to establish protected areas and some of which, directly or otherwise, include coastal areas and sensitive marine ecosystems, by extension lending itself to water classification. The Fisheries Act, Fisheries

(Marine Protection Areas) Regulations and Physical Planning and Development Control Act enables the head of the relevant authority to protect, conserve and rehabilitate areas that are considered at risk or of natural and cultural importance.

In addition, the National Water Policy 2020 highlights the need for action as the coastal waters of Grenada have been compromised by human activity and land-based pollution. As part of its strategic focus, implementation of the Cartagena Convention's LBS Protocol (Annex III) is to be used as one of the guiding principles to develop legislation, policies and regulations for protection of coastal water resources.

3.1.6 GUYANA

Guyana lies within the northerly region of the South American continent holding an expansive land area of 215,000 km², bordered by Venezuela, Brazil and Suriname. Guyana forms part of the North Brazil Shelf Large Marine Ecosystem with coastal areas characterised by wetlands, mangroves and offshore corals (State of Environment Guyana 2016). The highest population of Guyana resides in the coastal areas. The capital Georgetown is central to infrastructure development as well as industrial activity. However, inadequate sewerage facilitates results in the discharge of domestic wastewater and untreated sewage into rivers. Various industries are located in the Demerara river basin that discharge untreated wastewater into drainage systems that ultimately traverse into rivers (UNEP, 2010). As a result, the water quality of rivers and coastal waters are severely impacted by these as well as runoff from agricultural use of pesticides and mining activities.

At present, there is not yet classification of receiving waters (Class I and Class II) as required under Annex III of the LBS Protocol. Currently, the Guyana Environmental Protection Agency (EPA) is the statutory body established under Guyana's Environmental Protection Act working to execute its mandate under the Environmental Protection Regulations for the establishment of effluent parameter limits that may be discharged into coastal or inland waters. However, currently the Regulations do not possess established limits for domestic wastewater discharge. With respect to industrial discharge limits, the Guyana National Bureau of Standards collaborated with the EPA to develop interim guidelines for industrial wastewater discharge, specifying parameter limits for a range of industries. However, a key limitation of these guidelines is that they presently do not apply to mining and forestry operations, agricultural infiltration, seepage and run-off as these activities are deemed primary contributors to pollution (Phillip, 2013).

In addition to the Guyana EPA, the Environmental Protection Act of Guyana (1996), amendments to the Act also established Regulations for Water Quality and a host of others. The Water Quality Regulations (2000) include the prohibition of effluent discharge to inland or coastal waters from an industry, commercial, agriculture, institutions or sewage related facility. In addition, sewage discharge from vessels, in transit or otherwise, to inland or coastal waters are also prohibited. However, the EPA has the authority to allow for discharge into Guyana's waters through licensed authorisation. An important exception listed is housing or commercial development (or both) that are less than 30 units. In the absence of adequate enforcement of the Act and Regulations, it may be difficult to account for unplanned

settlements totalling greater numbers than the prescribed limit occurring along rivers or watercourses in less urban or rural areas that are not within the legislation.

Guyana does not yet have an established Coastal Zone Management legislation. However, the presence of sensitive ecosystems such as mangroves, coastal wetlands and coral reefs underscores the need for this important legal framework to enable preservation. The Protected Areas Act 2011 established the Protected Areas Commission (PAC) which has the ability to designate areas, coastal or otherwise, as National Protected Areas (NPA). As such, an NPA is applicable to the land or seascape and any activities within are to be permitted by the managing authority (PAC) to protect and maintain the natural ecosystems. This legal fragment can be seen as the closest thing to Marine Protection Area legislation. Its presence can enable the classification of Class I waters in Guyana.

3.1.7 JAMAICA

Jamaica is the third largest island of the Caribbean, possessing a land area of 10,990 km². The island is made up of coastal lowlands, a limestone plateau and the Blue Mountains. Coral reefs, seagrass beds and mangroves are part of Jamaica's marine and coastal ecosystem. These are impacted by improperly treated sewage discharged into coastal waters, industrial effluents discharged into rivers and agricultural runoff from agrochemicals (National Report, 2001).

The National Environment and Planning Agency (NEPA) operates as the lead government agency with the mandate for environmental protection, natural resource management, land use and spatial planning in Jamaica. The establishment of NEPA was principally to execute the mandate of the Natural Resources Conservation Authority (NRCA) along with two other statutory bodies, the Town and Country Planning Authority and the Land Development and Utilisation Commission.

The Natural Resources Conservation Authority (NRCA) is a statutory body established through the Natural Resources Conservation Authority Act (1991) with primary responsibility for environmental management and conservation. Forming part of the subsidiary legislation of this Act, is the Natural Resources Conservation (Wastewater and Sludge) Regulations, 2013 which includes water classification as defined within the LBS Protocol for Class I and Class II waters. Part II, Section 4 (1) of the Regulations enables the NCRA to declare waters as Class I or Class II after consultation with the Water Resource Authority, another statutory agency. Section 4 (2) states the necessary steps to be taken to attain or maintain Class I designation by the NCRA. However, neither the NCRA Act nor the Regulations include any further categories of water bodies under Class I or Class II.

Importantly, the NCRA Act makes provisions for the designation of marine parks/protected areas. Under Section 5 (1) (b) and (c) of the NCRA Act, the minister responsible for the environment has the authority to designate any area of land or water of aesthetic, educational, historical or scientific interest as a protected area or any area of land under tidal water or any area of water as a marine park, upon recommendation from the NCRA. In addition to this capacity, the NCRA can implement zoning for specified purposes and require

licensing for the occurrence of activities related to trade or business to occur within national and marine parks, protected areas and public facilities.

Furthermore, under the Fisheries Act (2018), Section 17 (1), the minister with responsibility has the authority to designate any area of Jamaica's territorial waters as a fish sanctuary to ensure the protection of important aquatic species and resilience of the marine ecosystem. In light of the aforementioned designations, these areas can be considered as Class I waters due to their significance as protected areas.

3.1.8 SAINT LUCIA

Saint Lucia forms part of an archipelago of islands located in the Eastern Caribbean and is about 616 km² in area. The island has multiple ridges, with the highest peak at 850 feet above sea level. There are nearshore reefs, fringing mangroves and seagrass beds around Saint Lucia's coastline. Coral reef and mangrove ecosystems are more prevalent on the western coast of the island due to the calmer waters of the Caribbean Sea compared to that of the eastern coastline which is open to the rougher Atlantic Ocean. In addition to readily accessible beaches, the majority of the island's hotels are located on the western coast (Environmental Profile, 2005).

Existing regulatory instruments provide support to the LBS Protocol such as the Public Health (Water Quality Control) Regulations (1978), which prohibits the discharge of sewage, industrial and trade waste into a water course, streams, rivers and seas. However, no classification of waters as outlined under Annex III of the protocol was observed in St Lucian legislation.

The National Conservation Authority (NCA) was established to ensure preservation and management of public recreation areas (beaches) and protected areas. The National Conservation Authority Act 1999, facilitates the protection of land and waters through ministerial order. Section 3, (1) of the Act states the above for the purpose of (a) preserving or enhancing the natural beauty of the area, its flora or fauna (b) creating a recreation area or national park (c) creating a marine park. The NCA Act also supports management of the coastal zone as part of the Authority's functions in Section 7 (1) (g) (ii) to advise the minister on the control of the construction in any protected area or beach and 7 (1) (i) to advise the minister on an area to be declared as a protected area under section 3.

The Saint Lucia Bureau of Standards developed Guidelines for Recreational Water Quality (SLNS 83: 2010) in 2009, which was later revised (SLNS 83: 2016) in 2016. These guidelines serve as a national standard with established levels of water quality and safety for recreational activities in riverine and coastal areas. It defines recreational water as a coastal, riverine or estuarine natural water body, publicly or privately controlled, where its source and immediate environments are used for leisure purposes.

The LBS Protocol was given key consideration in the St. Lucia Bureau's establishment of the Guidelines as it remains consistent with Annex III of the Protocol which also classifies waters used for recreation as Class I waters. The guidelines for recreational water quality focus on the protection of human health especially during recreational activities from exposure to domestic wastewater, untreated discharge or other pollutants. While no additional

designation or classification was made within the guidelines, it is important to note that even though they are applied to classified water bodies, it should not mean that the water quality of waters that are without such classification should be allowed to deteriorate.

3.1.9 TRINIDAD AND TOBAGO

The twin island state of Trinidad and Tobago (T&T) has a total land area of 5,130 km² and is situated at the southeastern end of the Caribbean archipelago. Trinidad features three mountainous ranges in the northern, central and southern parts of the island with swamps and mangroves on both eastern and western coasts. The landscape of Tobago has a mountainous ridge located centrally on the island and mangroves and offshore coral reefs at its southwestern end.

The Environmental Management Authority (EMA) is the statutory agency responsible for T&T's policy development and implementation, pollution prevention, control and monitoring and environmental conservation, inter alia. The EMA was established in 1995 under the Environmental Management Act, which was amended in 2000. The Act prohibits the release of any water pollutants into the environment, however it does not explicitly reference or contain the LBS Protocol's water classification guidelines and does not outline a classification of its own. Conversely, the Act is supported by subsidiary legislation in the form of the Water Pollution Rules (WPR) established in 2001 and recently amended in 2019. The WPR includes further and more defined limitations with respect to the release of pollutants into waters designated for human consumption where the treatment is limited to disinfection i.e. use of chemicals or technique for removal of microorganisms. Schedule II of the WPR establishes effluent discharge limits similar to those outlined within Annex III of the Protocol. Importantly, it divides T&T's receiving waters into categories which are relevant to the purpose of this report:

Environmentally Sensitive Areas and/or Groundwater - The designation of a defined portion of the environment requiring special protection / The water below the earth's surface, usually in porous rock formations

Inland Surface Waters - Water from rivers, creeks, tidal waters, estuaries, swamps, streams, lakes and impounded reservoirs that flows over or rests upon the land surface of Trinidad and Tobago and in dry conditions includes the area over which such waters flowed or rested

Coastal Nearshore Waters - The area of the marine environment which extends no more than three nautical miles from the high water mark

Marine Offshore Waters - That area of the marine environment seaward of the coastal nearshore.

The Environmentally Sensitive Areas and/or Groundwater category is consistent with Class I waters under Annex III of the Protocol, while the remaining categories can be seen as subdivisions of Class II waters.

Further to this, Schedule III of the WPR establishes Ambient Water Quality Standards for both fresh and marine waters. These standards make reference to recreational waters which are defined in the Act as any public or private water body whether coastal, riverine or estuarine.

Though not included as an explicit designation, it can be considered as a subset of the established classes.

Trinidad and Tobago has recently approved its first Integrated Coastal Zone Management (ICZM) Policy and Action Plan (GoRTT, 2024). Central to the ICZM Policy Framework is the need for an integrated approach to enhance functional integrity of coastal resources via inclusive planning. Key objectives are improved pollution control and waste management to minimize adverse effects on human health and coastal ecosystems; maintaining coastal and marine ecosystem health through the identification and protection of sensitive environments and habitats in the coastal zone; and rehabilitation of degraded coastal ecosystems accompanied by ensuring effective management of marine protected areas.

Noteworthy, is the Environmentally Sensitive Areas (ESA) Rules that serve as subsidiary legislation of the EM Act and provide guidance with respect to the designation of an area as an ESA. In particular, Schedule II outlines the guidelines for classification as a sensitive area relating to coastal areas in Section 3B (e) Protected Landscape/Seascape: an area, that may contain coast and sea requiring protection for conservation and recreation, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity.

3.1.10 UNITED STATES OF AMERICA

Within the United States of America, the south-eastern state of Florida neighbours the Caribbean Sea and along with the U.S. territories of Puerto Rico and the U.S. Virgin Islands, form and belong to part of the Wider Caribbean Region. Off the southern coast of Florida lie coral reefs spanning over 560 km² and mangroves forests estimated near 2,500 km². In addition, six different species of seagrass beds exist throughout the coastal areas of the state. Commercial and recreational activities, land based pollution and coastal development of Florida's densely populated coastline are major contributors to the decline of the coastal and marine habitat (Florida Department of Environmental Protection).

The US Environmental Protection Agency (EPA) is the statutory body responsible for ensuring the Federal government mandate is executed to prevent threats against water quality and other environmental challenges, as well as developing and enforcing regulations. The Clean Water Act (CWA) regulates discharges of pollutants in US waters. Under the CWA, the EPA developed national water quality standards for surface water and implemented wastewater standards for industrial discharge. The Act also prohibits discharge of any pollutant into navigable waters which are defined to include ocean and coastal waters. Importantly, classification based on the CWA requires waters to be "swimmable and fishable" and if not so, they are designated as impaired. The legislation works towards the goals of the LBS Protocol to effectively regulate wastewater discharge into coastal waters for the protection of human health and marine ecosystems. Other legal instruments relative to the above are the Safe Drinking Water Act which establishes minimum standards required for public water systems supplying tap water designated for consumption sourced from above or below ground; the Marine Protection, Research and Sanctuaries Act (Ocean Dumping Act), which prohibits dumping of material into the ocean that will degrade or endanger human health, welfare, or the marine environment.

Under the CWA the Water Quality Standards (WQS) Regulations (40 CFR Part 131) establish the benchmark goals required for all water bodies in the US. The WQS designate the uses of US waters and sets the required standards or criteria to protect them i.e. the water classification is based upon designated use and standards intended to be protective of each use are then applied. As such, the WQS provide for the main uses which are Protection and Propagation of Fish, Shellfish and Wildlife, Recreation in and on the water ("fishable/swimmable"). There are additional uses that consider State waters for Public Water Supply, Agriculture and Industry, Navigation and other uses that states may adopt where necessary. Subsequently, states may adopt certain designations applicable to their water bodies and then establish water classification through the adopted uses.

For example, as a part of Florida's surface water quality standards (62-302), waters are classified according to water quality criteria which is arranged in order of the degree of protection, from most (Class I) to least (Class V) stringent. However, Class I, II, and III surface waters share water quality criteria established to protect fish consumption, recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife.

Class I - Potable Water Supplies

Class II - Shellfish Propagation or Harvesting

Class III - Fish Consumption; Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife

Class III-Limited - Fish Consumption; Recreation or Limited Recreation; and/or Propagation and Maintenance of a Limited Population of Fish and Wildlife

Class IV - Agricultural Water Supplies

Class V - Navigation, Utility and Industrial Use

The coastal zone management act of the US aims toward the use of management programs to achieve environmentally compatible development in the coastal zone where these programs provide protection of wetlands, coral reefs and other habitats within the coastal zone. In addition, the act establishes protected areas of the coast via the National Estuarine Research Reserve System, which ensures coastal states perform research of the ecosystem, provide long term resources enabling a stable environment and comply with any stipulated regulations.

In the Commonwealth of Puerto Rico, an unincorporated territory of the United States, there are five water classification categories that are typically recognized as a part of Puerto Rico's water classification system. Coastal waters primarily fall under the SA, SB, and SE classes, which are described in more detail below:

Class SA: These are coastal or estuarine waters of exceptional quality or high ecological or recreational value whose existing conditions shall not be altered, except by natural phenomena, as defined under Puerto Rico Water Quality Standards Regulation (PRWQSR), to preserve its natural characteristics. Class SA includes bioluminescent lagoons and bays such as La Parguera and Monsio José in the municipality of Lajas, Laguna Joyudas in the

Municipality of Cabo Rojo, Laguna Grande in the Municipality of Fajardo, Bahía Puerto Mosquito in the Municipality of Vieques, and any other coastal or estuarine waters of exceptional quality or high ecological or recreational value which may be designated by the pertinent agency and adopted by the Department through Resolution, requiring this classification for protection of the waters. With the exception of lagoons, Rule 1303.2 (A) (2) of the PRWQSR will also apply to the waters 500 meters (0.31 miles) offshore of the physical and geographical limits of the water bodies under this classification.

Class SB: These are coastal and estuarine waters intended for use in primary and secondary contact recreation, and for propagation and maintenance of desirable species, including threatened or endangered species. Class SB includes coastal and estuarine waters not classified as Class SA under Rules 1302.1 (A) of the PRWQSR. Class SB also includes lagoons not classified under any other class. This classification will apply from the zone subject to the ebb and flow of tides (mean sea level) up to a maximum of 10.35 miles (16,656.71 meters) offshore.

Class SE: These are surface waters and wetlands of exceptional ecological value, whose existing conditions shall not be altered in order to preserve its natural characteristics. Class SE includes Laguna Tortuguero, Laguna Cartagena and any other surface water body of exceptional quality or high ecological or recreational value which may be designated by the pertinent agency and adopted by the Department, through Resolution requiring this classification for protection of the waters and wetlands of exceptional ecological value, whose existing conditions shall not be altered in order to preserve its natural characteristics.

Finally, the U.S. Virgin Islands, which are a group of Caribbean islands and a territory of the United States, classifies its waters as either inland, or marine and coastal. For more information, refer to the U.S. Virgin Islands Water Quality Standards Regulations in effect for Clean Water Act (CWA) purposes for this territory. For the purposes of this report, marine and coastal waters fall under three categories whose designated uses are described in further detail below:

Class A: Designated uses include the maintenance and propagation of desirable species of wildlife and aquatic life (including any threatened or endangered species), primary contact recreation, and for use as potable water sources for those waters being used currently or that could be used in the future as potable water sources. Preservation of the water's unique characteristics that make it a water of exceptional recreational, environmental, or ecological significance (e.g., Natural Barrier Reef at Buck Island, St. Croix and the Under Water Trail at Trunk Bay, St. John). No new or increased dischargers shall be permitted.

Class B: Designated uses include maintenance and propagation of desirable species of wildlife and aquatic life (including any threatened or endangered species), primacy contact recreation, and for use as potable water sources for those waters being used currently or that could be used in the future as potable water sources.

Class C: Designated uses include Maintenance and propagation of desirable species of wildlife and aquatic life (including any threatened or endangered species), primary contact recreation, industrial water supplies, shipping, navigation and for use as potable water sources for those waters being used currently or that could be used in the future as potable water sources.

3.1.11 COLOMBIA

According to Lastra and Vergara (2019), in Colombia national public policies in reference to marine, coastal and oceanic areas are relatively recent.

In Decree 1076 entitled "Unique Regulatory Decree of the Environment and Sustainable Development Sector" of the year 2015, subsection 2 (Water Resources Regulations) of Chapter 3 (Water Resources and Discharges Regulations) declares in Article 2.2.3.3.1.4 that the Competent Environmental Authority must carry out the water resources classification (subdivided as coastal and oceanic waters according to Article 2.2.3.3.1.3). It must also establish the purpose in a generic approach according to the different uses that this Decree deals with and the utilization possibilities.

Article 2.2.3.3.2.1 of Decree 1076 (2015) defines the uses for surface or coastal waters (waters within marine influence, defined in Article 2.2.3.3.1.3) and groundwater, as the following:

1. Human and domestic consumption.
2. Preservation of flora and fauna.
3. Agricultural.
4. Livestock.
5. Recreational.
6. Industry.
7. Aesthetic.
8. Fishing, Mariculture and Aquaculture.
9. Navigation and Water Transportation.

In subsequent articles (from 2.2.3.3.2.2 to 2.2.3.3.2.10), the specific activities for each use are described, which, as mentioned above, are defined for surface or coastal waters as well as for groundwater. In the aforementioned Decree, there are no definitions for the oceanic waters uses.

Article 2.2.3.2.20.1 of this decree, classifies water bodies with respect to discharges into two classes:

Class I - Water bodies that do not allow discharges.

Class II - Water bodies that admit discharges with some treatment.

The article defines the waters that belong to Class I as the following:

1. The headwaters of water sources.
2. Groundwater.
3. Water bodies of coastal water areas used for recreation.
4. A sector upstream for drinking water, in extension that will be determined by the competent Environmental Authority jointly with the Ministry of Health and Social Protection.
5. Those declared by the competent Environmental Authority as specially protected in accordance with the provisions of Articles 70 and 137 of Decree-Law 2811 of 1974.

Other water bodies not included in Class I belong to Class II.

Taking the above into account, it is assumed that Class I water bodies classify water intended for human and domestic consumption and recreational use, in addition to marine protected areas. And in Class II all the remaining uses included in Article 2.2.3.3.2.1.

Decree 50 issued in 2018, partially modifies Decree 1076 of 2015. Article 2, modifies some definitions of Article 2.2.3.3.1.3 of Decree 1076 and reorganizes the waters in only two types:

- Inland waters: Water bodies found on the mainland up to the highest average tide line and are located in the emerged lands, either in the form of surface water or groundwater.
- Marine waters: Those contained in the exclusive economic zone, territorial sea, internal waters, including the ones up to the highest average tide line.

Decree 50 (2018) also modifies to a certain extent Article 2.2.3.3.1.4. (Water Resources Regulations) mentioned above from Decree 1076 (2015), however maintains or reiterates that the competent Environmental Authority is responsible for the water resources regulations and to establish the classification and possible water uses.

The modifications described above related to classification by water-type significantly simplify the application of the decree. Decree 50 (2018) does not make any changes in relation to the uses (Article 2.2.3.3.2.1), because it is understood that it applies to the two types of water defined in Article 2 of the Decree: that is, continental and marine waters.

On the other hand, Resolution 0883 (2018): "*Whereby the parameters and maximum permissible limit values are established in point discharges to marine waters bodies and also issues other requirements*" defines the maximum permissible values limits for the discharge of domestic and non-domestic wastewater to marine water bodies according to the origin or activity type.

The Resolution 0883 (2018) does not determine a distinction between the discharge limits according to the uses defined in Decree 1076 (2015). But, this last decree, as explained, defines the waters as receiving discharges in Class I and Class II (Article 2.2.3.2.20.1) and establishes that discharges are not allowed in Class I waters. Therefore, it is then assumed that the discharge limits established in Resolution 883 (2018) refer only to discharges in Class II.

3.1.12 COSTA RICA

In Costa Rica, coastal-marine ecosystems are governed by a wide variety of laws, among which is the Organic Law of the Environment No. 7554 of 1995, which is one of the oldest but is still in force. Eleven versions of this law exists. On September 24, 2021 the latest version (11) was issued and it includes chapters directly or indirectly linked to wastewater management and the environmental quality of coastal areas.

In Chapter VIII (Article 39) of this Law entitled "Marine, Coastal and Wetland Resources" a definition of everything that is understood as marine and coastal resources is proposed, which of course includes coastal marine areas in their various forms:

Article 39 – “Definition of marine and coastal resources are understood as the seawaters, beaches, coastline, bays, coastal lagoons, mangroves, coral reefs, seagrass meadows, estuaries, scenic beauties and natural resources, living or non, contained in the waters of the territorial and patrimonial sea, the contiguous zone, the exclusive economic zone, the continental shelf and its insular basin”

The Organic Law of the Environment No. 7554 explicitly defines what coastal marine resources mean. However, it does not establish any criteria for the classification of coastal marine areas as wastewater receiving bodies.

On the other hand, the country has regulations regarding wastewater discharges that govern different aspects related to this type of matrix:

- Regulations for the Discharge and Reuse of Wastewater (Decree No. 33601-MINAE-S of the year 2007), that establishes the maximum permissible limits of different environmental quality indicators which wastewater must be discharged into a receiving body.
- The Regulation for the Approval and Operation of Wastewater Treatment Systems (Decree No. 31545 of the year 2005) and,
- The Regulation of the Environmental Canon for Discharges (Decree No. 34431 of the year 2008).

The Wastewater Discharge and Reuse Regulation declares coastal marine waters as wastewater receiving bodies, however, a water classification according to their use and sensitivity level is not established. For its part, the Regulation for the Approval and Operation of Wastewater Treatment Systems refers to coastal marine water bodies as wastewater receptors; however, it does not establish a classification for them either.

Finally, the Regulation of the Environmental Canon for Discharges establishes a standard for the use of water resources to discharge polluting substances defines a water body or receiving body as any spring, river, creek, permanent or non-permanent stream, lake, lagoon, marsh, natural or artificial reservoir, artificial or non-artificial canal, estuary, mangroves, turf, swamp, fresh, brackish or salt water, where sewage is discharged. Therefore, this regulation establishes the classification of the receiving body according to the type but not according to the use. On the other hand, it defines differences in the canon according to the residual water:

of the ordinary type (generated by the domestic activities) and the special type (different from those of the ordinary type).

3.1.13 CUBA

The Republic of Cuba recognizes the importance of water resources at present and for this reason, the Land Water Law (Law No. 124 of 2017) was recently enacted to regulate the integrated and sustainable water management. However, as the name indicates, it has jurisdiction only for land waters (those found within or above the earth's crust).

In the case of the protection and management of coastal ecosystems, Decree Law No. 212 of the year 2000, "Management of the Coastal Zone", defines the components that integrate the coastal zone as well as their types and limits.

Article 12 of Chapter III (Uses of Coastal Zones) of Decree Law 212 explicitly states, "The usage of the coastal zone will be free, public and granted for common uses in accordance with its nature. This corresponded with walking, residing, bathing, fishing, sailing, beaching and other similar activities that do not require works and any type of facilities in accordance with this Decree-Law and other legislation on the matter. The areas intended for or of interest to defense, security and internal order, port facilities, protected areas are an exception, with strict management categories, productive and scientific facilities, and maritime signals. In other words, the possible uses of the coastal zones appear in a broad approach but without specifying by types or subdivisions according to aforementioned uses.

For its part, in Cuba, there are two standards to regulate wastewater discharges, Cuban Standard 27 of 2012, (Dumping of wastewater into land waters and sewerage - Specifications) and Cuban Standard 521 of 2007 (Dumping of wastewater to the coastal zone and marine waters — Specifications). In both standards, the receiving bodies are classified according to their use.

In the specific case of the coastal marine environment (which is the main interest of this study), NC 521:2007 establishes that receiving bodies are classified according to their use as follows:

- **Class A:** Marine areas of ecological conservation zones, or protected areas.
- **Class B:** Marine areas dedicated to recreational activities as bathing in which people come into direct contact with the water. Marine areas with the existence of coral reefs.
- **Class C:** Marine areas where fishing takes place.
- **Class D:** Marine areas whose waters are for industrial use such as power generation.
- **Class E:** Marine areas in bays where maritime-port activity takes place.
- **Class F:** Marine areas for navigation and other uses.

This standard reveals that the classification was carried out according to the use of the receiving body, but taking into account the economic, social and natural values of the considered areas.

As follows, NC 521:2012 establishes the maximum permissible limits (MPL) of basic parameters and indicators for wastewater discharges to the coastal zone and marine receiving bodies for each class according to the previous classification.

3.1.14 DOMINICAN REPUBLIC

Law 64-00 on the Environment and Natural Resources (2000) is the superior legal instrument that regulates in the Dominican Republic the sustainable use of natural resources in the country, including water.

Regarding water resources, there is a draft water law (in the process of approval) that is applicable to all waters throughout the territory of the Dominican Republic, including surface, underground or marine. In Chapter VI (Of Common Uses) of the abovementioned bill, it is established that:

Article 146 - Common uses are:

- a) Those designed to satisfy personal and family needs, such as drinking and human hygiene, and irrigation of plants, if the extraction is carried out without fixed works or mechanical means;
- b) Water and bathe cattle in transit;
- c) Breeding of fish in natural channels;
- d) Fishing or sports navigation or other uses that have a recreational nature, in the places authorized in this regard, within the limits indicated by the regulations.

In other words, it defines in a general way the common uses of water but does not differentiate or classify water according to those defined uses. On the other hand, a preliminary draft of the Sectorial Law on Coastal and Marine Resources is also being discussed and submitted to the Senate of the Republic whose objective is to serve as an instrument for the conservation and sustainable use of marine and coastal natural resources. This Bill recognizes the Dominican State as responsible for the sustainable use of coastal marine water bodies but does not define a classification for them.

In the Dominican Republic, the standard that establishes the characteristics of liquid waste or wastewater discharges to surface water bodies, sanitary sewers, and coastal waters is NA-CDAS-2012 "Environmental Standard on control of discharges to surface waters, sanitary sewers, and coastal waters" 2012.

This standard defines the maximum permissible values of a group of quality indicators for municipal (domestic) wastewater discharges in coastal waters without distinction of the uses or classification of said receiving body. For wastewater of industrial origin, the standard establishes maximum permissible limits according to the type of industry, equally without distinction of the classification of coastal zones. However, it clarifies that for wastewater discharges of any origin, exhaustive studies of its discharges in coastal waters are required and these must comply with maximum permitted limits that are defined according to the types or classification of coastal waters.

The classification of coastal areas referred to in the NA-CDAS-2012 standard is outlined explicitly in the NA-CACS-2012 "Environmental Standard for the quality of surface and coastal waters," also from 2012.

In this last standard, coastal waters are outlined or classified into four (4) classes:

- **Class D2:** Coastal and estuarine waters preserved in natural conditions due to their exceptional quality or great ecological value, such as coral reef areas. The uses of these areas include demonstrations or scientific research, aesthetic activities, landscaping, and the management and conservation that do not modify the environment.
- **Class E:** Waters designated for the conservation of natural resources such as mangroves and breeding and feeding areas for marine organisms and areas for marine aquaculture. In addition, waters intended for water sports and others that involve direct contact such as swimming, diving, water skiing and others.
- **Class F:** Coastal waters intended for water sports that do not involve direct contact.
- **Class G:** Coastal waters used for industrial, port and shipping activities.

The NA-CACS-2012 standard also describes in article 9 that it is the Ministry of Environment and Natural Resources that will prepare the initial classification map of water bodies at the national level.

3.1.15 GUATEMALA

Guatemala has a great challenge in terms of water and sanitation. The coastal-marine ecosystems of Guatemala have few specific regulations for their management, however there is the "Policy for the Integral Management of Coastal Marine Zones" approved through Government Agreement No. 328-2009. This policy constitutes a first step to support the socioeconomic progress of coastal populations, as well as the sustainable development and conservation of coastal-marine resources.

In the Caribbean Coastline of Guatemala, there is still no departmental legislation or local ordinances specifically aimed at Integrated Coastal Management (ICM), beyond those aimed at beach maintenance, solid waste and urban waters management (Caviedes, Arenas and Barragan, 2021).

Guatemala has two Government Agreements that establish the criteria and requirements for the discharge and reuse of wastewater:

- Government Agreement 236-2006: Regulation of the Discharges and Reuse of Wastewater and Sludge Disposal. Modified in 2019 by Government Agreement 254 in which its Article 24 is reformed, as a result of successive modifications and extensions of the established terms, establishing new compliance dates as appropriate for the years 2024, 2028 and 2032.
- Government Agreement 12-2011: Regulation of Wastewater Discharges in the Lake Atitlan Basin.

In the "Regulation of the Discharges and Reuse of Wastewater and the Sludge Disposal", the receiving bodies are not classified according to their use, but only by their characterization (natural reservoir, lake, lagoon, river, stream, spring, wetland, estuary, mangrove, swamp, coastal water and groundwater).

The "Regulation of Wastewater Discharges in the Lake Atitlan Basin" considers a progressive reduction of the maximum permissible limits of wastewater discharges to receiving bodies of the Lake Atitlan Basin, either directly or indirectly. This Agreement is for the rescue, protection and prevention of the water system from pollution. This is a meritorious initiative to protect the largest water body of Guatemala. However, it does not classify the receiving bodies of this Basin according to use.

3.1.16 HONDURAS

The Environmental General Law of Honduras (Agreement No. 104-93, 1994) is a framework law that establishes the guiding principles on all environmental legislation and natural resources.

Article 31 of Chapter I (continental and marine waters) of Title III establishes the following water categories that will be subject to special protection and control:

- a) Those aimed for the water supply to populations or widespread human consumption
- b) Those proposed for irrigation or food production
- c) Those that constitute nurseries or natural hatcheries of species of aquatic fauna and flora
- d) Those found in protected areas and,
- e) Any other source of prominent importance

The previous categorization has implicit uses, although not mentioned as such.

In Chapter I of Title III, Article 32 proscribes all types of polluting waste, whether solid, liquid or gaseous disposal into the continental and marine waters. The State exercises jurisdiction over these waters that can be susceptible to pollution and ultimately affect human health or aquatic life, water quality or distress the ecological balance in general.

However, the General Water Law, in force since 2009 by Decree No. 181-2009, establishes the principles and regulations applicable to the proper management of water resources for the protection, conservation, valuation and use of water resources. Although this law, is applicable to continental, insular, surface, subterranean, marine and other waters over which the state of Honduras exercises sovereignty, above all, the focus is on the continental water as the most important resource for the country and also on the wastewater management. Only Article 39 refers to the conservation of marine and coastal resources and establishes the relevance to carry out plans, strategies and policies related to the protection of marine and coastal ecosystems. However, it does not establish or manage a classification criterion for coastal marine waters.

Recently in May 2021, the National Regulation for the Discharge and Reuse of Wastewater (Executive Agreement No. 003, 2020) was approved, with the main objective of prevention, control and reduction of pollution generated by wastewater discharges to receiving bodies, to ensure the protection of human health and the environment. This regulation shows a

classification of wastewater emissions based on the source and composition, and in Article 49 establishes a classification for natural water bodies according to their uses, which includes:

- a) Supply to settlements
- b) Conservation of aquatic and coastal flora and fauna
- c) Agricultural and livestock use
- d) Landscape uses
- e) Use in aquaculture
- f) Industrial uses
- g) Recreational uses
- h) Non-drinkable urban uses

Although this regulation states that this classification is, in a general sense, for natural water bodies, in the specific description of the uses it is evident that some of the classifications are applicable to coastal - marine water bodies.

On the other hand, the reference regulation establishes that the limits for wastewater discharges is defined by the "Competent Authority" based on the receiving body, the needs and objectives of the treatment, the basic environmental conditions and the risks to human health (Article 54). This authority has a period of no more than 10 years after the regulation is in effect to define the quantitative standards that will limit wastewater inputs to the receiving bodies, based on the best available practical technology and/or the water quality of the receiving bodies (Article 55).

The regulation also establishes in Article 61 that as long as the "Competent Authority" has not defined the standards indicated for all the discharges that occur directly to any receiving body, or indirectly through a sanitary sewer system, then the standards indicated in Decree 058 of April 9, 1996 (Technical Standards for Wastewater Discharges to Receiving Bodies and Sanitary Sewers) regulate the different discharges with some expressly defined modifications that are not objects of interest in this analysis.

Therefore, it can be affirmed that there is currently no relationship or correspondence between the use of coastal - marine areas (defined by a recent regulation, year 2020) and the wastewater discharge standards (from 1996), which must be defined in the coming years, but, meanwhile, the regulation in force can be considered outdated.

Presently, a proposal for a "Natural Water Quality Standard for Marine-Coastal Zones" is being reviewed and in the approval process, which has the objective of: "classifying, protecting, preserving, conserving and restoring the quality of marine-coastal areas and resources by establishing quality standards through the different physical, chemical, microbiological and biological parameters, in order to guarantee the health of the people and the environment."

This proposal or draft standard defines in its Chapter III Section 1: The Classification of water bodies as follows:

A. Category 1: Transitional surface waters in conservation - Coastal lagoons.

Understanding those coastal lagoon waters to be preserved for having special natural conditions, for their exceptional quality or great ecological value.

B. Category 2: Groundwater – Coastal and island aquifers.

Understanding the groundwater reservoirs located in coastal and insular areas.

C. Category 3: Marine - coastal waters

1) Subcategory 3.1: Coastal waters with special natural conditions.

Estuarine, reef and other areas with ecosystems dedicated to conservation due to their high ecological value. Its geographical physical delimitation will extend to its zone of ecological influence established in the declarations of national and international importance, also stipulated in the management plans and in accordance with any legal instrument in relation to those areas. The other areas that are considered of high ecological value and that their marine protected zone is not established under any legal instrument will be taken 500 meters from the coastline from its lowest tide zone towards the sea.

2) Subcategory 3.2: Coastal waters dedicated to conservation and multiple uses.

Coastal waters intended for the conservation of natural resources such as wetlands, reproduction, repopulation, shelter and nutrition areas for marine organisms and waters for marine aquaculture, including molluscs, shrimp, fish and commercial fishing found in conservation areas. Waters also dedicated to aquatic and tourist-recreational sports with direct and indirect contact.

3) Subcategory 3.3: Coastal waters dedicated to port, industrial and commercial activities.

Coastal waters intended for port activity, shipping, industrial and commercial activities that could occur in coastal areas.

With the objective of evaluating the water quality, the norm proposes maximum admissible limits of a group of environmental indicators to be met, according to the previous classification.

3.1.17 MEXICO

The National Policy of Seas and Coasts (PNMC) of Mexico, which was approved in the Parliamentary Gazette on December 20, 2018 (Gazette LXIV/1PPR-73/88785), establishes three main objectives aimed at improving the situation of the coastal-marine areas of Mexico. Objective 3 focuses on guaranteeing the environmental quality of coastal-marine areas and proposes the following:

"Ensure that the structure and function of coastal-marine ecosystems do not undergo irreversible modifications and, where appropriate, the resilience recovery and maintain, induce or increase the goods, the services and landscape quality"

Among the strategies cited in the PNMC to achieve compliance with Objective 3, Strategy 3.1.1 stands out, which states:

"Prepare the "National Coastal Inventory", based on a Geographic Information System, in which the coastal natural resources are spatially located, described and catalogued or classified, with their main uses (social and economic variables) and resources (environmental variables) of the coastal zone, on a scale useful for both regional and local management".

It may be assumed, that this categorization of coastal natural resources includes the classification of the coastal zone. A direct result would be the recognition of the importance of carrying out such a classification.

In the design of the PNMC, the aforementioned Strategy (3.3.1) has its associated strategic aim (to have the national coastal inventory in process) with a submission date of 2018.

Such Strategy (3.3.1) has as an associated objective: to have in process the elaboration of the national coastal inventory, which had compliance date for the year 2018

Also, in January 1997 the Ministry of the Environment and Natural Resources (SEMARNAT) published the Official Mexican Standard NOM-001-SEMARNAT-1996, which established the maximum permissible limits of pollutants in wastewater discharges to national waters and assets. This document presented a wastewater classification for the receiving bodies, which included coastal waters, and in turn defined this classification in the following three classes:

- **Class A: Fishing, navigation and other uses.**
- **Class B: Recreation**
- **Class C: Estuaries**

The aforementioned Official Mexican Standard NOM-001SEMARNAT-1996 is replaced by Official Mexican Standard NOM-001SEMARNAT-2021 published by SEMARNAT in March 2022. However, this legal instrument was not planned to enter into force until March 11, 2023.

Among the modifications carried out by the Official Mexican Standard NOM-001SEMARNAT-2021 are changes in the classification of the receiving bodies of wastewater discharges and the allowable pollutants limits are reinforced in wastewater emissions.

Within the classification of receiving bodies established in the new standard NOM-001SEMARNAT-2021, the "Mexican marine areas" are considered as a classification category; however, a detailed classification or differentiation is not defined. The new disposal standard defines the "Mexican marine zones" as *"the waters of the territorial seas, inland marine waters, the contiguous zone, the exclusive economic zone, to the extent and terms established by the Federal Law of the Sea; as well as the lagoons and estuaries that input permanently or intermittently with the sea"*.

In accordance with the above, the referred standard establishes the same permissible limits of pollutants in wastewater discharges towards all marine and coastal areas, regardless of the use or the capacity of the marine and coastal environment to receive these discharges.

3.1.18 NICARAGUA

In Nicaragua, the General Water Law (Law 620, 2007), governs the international legal framework of all water resources in the country: surface, underground, residual and marine.

The country has a legal instrument for the classification of water bodies (Nicaraguan Mandatory Technical Standard, NTON 05007-98), which establishes the parameters to determine the required quality levels of water bodies (lakes, lagoons, artificial lakes, springs, rivers, groundwater, estuaries and seas), according to the uses proposed for them.

In order to determine the capacity and conditions for the use of water resources, tolerable levels and discharge quality for each water body, six categories were established in this standard to classify the receiving bodies:

Type 1 - Water intended for domestic and industrial use that requires drinking water, if it is part of a product, by-product intended for human consumption, or that meets it. Waters of this type are subdivided into two categories:

- Category 1-A Water that can be conditioned, from a sanitary point of view, just with additions of disinfectants; and
- Category 1-B Water that can be conditioned through conventional treatment coagulation, flocculation, sedimentation, filtration and/or chlorination treatments.

Type 2 - Water destined for agricultural uses. These are broken down into two categories:

- Category 2-A Water for irrigation of vegetables intended for human consumption
- Category 2-B Water intended for irrigation of any other type of crop and livestock use.

Type 3 - Marine waters or coastal environments intended for the breeding and exploitation of molluscs for human consumption.

Type 4 - Waters intended for spas, water sports, sport, commercial and subsistence fishing. Waters of this type are disaggregate into two categories:

- Category 4-A Waters for full human contact;
- Category 4-B Waters for partial human contact.

Type 5 - Water intended for industrial uses that do not require drinking water.

Type 6 - Waters intended for navigation and power generation.

According to the classification established in the NTON 05007-98 (2000), Type 3 is the one that refers specifically to marine waters or coastal environments destined for the breeding and exploitation of molluscs for human consumption. However, it is recognized that Types 4, 5 and 6, according to the proposed uses, can also be associated with coastal marine waters to some extent or another.

Meanwhile, in 2017 a regulation that controls discharge was issued in Nicaragua, Decree No. 21-2017: "Regulation in which the provisions for the discharge of wastewater are established" that revokes Decree No. 33-1995, the previous discharge regulation. Decree No. 21-2017 establishes the requirements regarding the regulation of the wastewater discharge from domestic, industrial, commercial, agro-industrial activities and services to receiving bodies and sanitary sewage, by establishing limits or maximum permissible discharge ranges.

In this regulation, the receiving body is defined as *"a natural stream or water deposit, reservoirs, riverbeds, marine areas or public domain assets, where wastewater is discharged, as well as the land where wastewater is infiltrated or injected"*. Although the Decree does not establish the discharge limits or ranges according to the receiving body, it makes reference to the origin or source of the wastewater. Article 5 establishes that the discharges may not introduce into the receiving body effluents that modify and alter the characteristics of water quality for the different uses which are considered.

In light of this, it is inferred that the limits or ranges defined in the discharge regulations (Decree No. 21-2017) must be precise enough to not modify the required quality levels of the water bodies according to their use (NTON 05007-98) but that relationship between both legal instruments is not explicitly defined.

3.1.19 PANAMA

In 2007, the National Environmental Authority (ANAM) issued the preliminary draft: "By which the environmental quality standards for natural waters are stated". As of the finalisation of this assessment, the standards (Preliminary Draft Decree, 2007) have not been approved. They are based on the Resolution Administrative Decree No. AG-0069-2002 of February 25, 2002, which orders the preparation of proposals for marine and coastal water quality standards. This document establishes a classification of marine and coastal water bodies as follows:

Class 1–M: Waters intended for:

- a) The protection and conservation of aquatic communities
- b) Recreation by direct contact according to the specific regulations
- c) Development of aquaculture and fishing activities

Class 2–M: Waters intended for:

- a) Protection of aquatic communities
- b) Recreation of medium risk according to the specific regulations
- c) Recreational fishing

Class 3–M: Waters intended for:

- a) Navigation
- b) Landscape harmony

The draft also establishes the expected uses for Classes 2-M and 3-M which can be carried out in water bodies classified as Class 1-M. Similarly, the uses established in Class 3-M might be fulfilled in Class 2-M water bodies.

Additionally, the standard draft also establishes that certain coastal-marine water bodies are classified as a special class or recovery class. For the first case, Article 10 states the following: *"ANAM may designate special class water bodies for reasons of ecological protection, or to protect water sources, both for continental water bodies and marine and coastal water bodies. These water bodies must comply at least with the standards provided for Classes 1-C or 1-M depending on the type of water body."*

For the classification of recovery class water bodies, Articles 35 and 36 establish the following:

"Article 35. In the event that recurrent action take place in the same water body or that there is a systematic non-compliance in a water body with the standards in which is classified, ANAM together with the competent Institutions that comprise the Inter-Institutional Environment System (SIA), may establish any of the following actions:

- a. Modify the water body classification to a lower class*
- b. Classify the water body e.g. in recovery*
- c. Establish the water body in the class in which it is classified, defining an action plan to comply with the standards.*

Article 36. When a water body is classified as in recovery, ANAM in conjunction with the Ministry of Health (MINSA), the Panama Maritime Authority (AMP) (in the case of marine or coastal water bodies), the Panama Canal Authority (ACP) (in the case of water bodies inside the Panama Canal basin), must prepare a Decontamination Program according to the requirements of Article 37:

Article 37. The Decontamination Programs must define water quality objectives that will correspond to the standards of the class in which the water body was classified or, in the absence of, those of Class 3-C or 3-M, as appropriate. The water body must comply with the quality objectives in at least two consecutive samplings so that this water body is again categorised in one of the planned classes and ceases to integrate the classification as in recovery."

In summary, Panama has a robust marine zone classification system, but it is pending of approval.

Additionally, Panama has different regulations that establish the maximum permissible limits of environmental quality indicators for discharge into receiving bodies:

- DGNTI-COPANIT Technical Regulation 39 – 2000: "Water. Discharged from liquid effluents directly to wastewater collection systems" (2000).
- Technical Regulation DGNTI-COPANIT 35 - 2019: "Environment and health protection. Safety. Water quality. Discharge of liquid effluents to bodies and masses of continental and marine water" (2019).
- Standard for effluent discharge and verification methodology (2610-esm-111-2019).

Technical Regulation DGNTI-COPANIT 35 - 2019, which is the one that applies to bodies and masses of marine water, does not establish differentiation in the permissible limits of effluents according to the type or uses of the different receiving water bodies. In fact, the similar limits for continental and marine waters are managed. This regulation defines "Marine Waters" as those included in the territorial sea up to the waters established by law.

Regarding the Standard for effluent discharge and verification methodology (2610-esm-111-2019), it is explained that the application field is aimed toward the emission entities of the Panama Canal Authority (ACP) to discharge liquid effluents as follows:

- Directly or indirectly to continental or maritime water bodies, being surface or underground, natural or artificial, in areas owned by the ACP.
- Directly to sewer systems.
- Sailing equipment of the ACP.

In the same way, this standard does not differentiate the maximum permissible limits for effluents according to the types or uses of water bodies, which generally classifies them as a *"course, volume or mass of continental or maritime waters, whether they are surface or underground, natural or artificial"*.

3.1.20 VENEZUELA

In 1995 in Venezuela, Decree No 883 "Rules for the Classification and Quality Control of Water Bodies and Liquid Discharges or Effluents" was issued and a new version was approved in 2005.

This decree reports the rules to follow for the Classification and Quality Control of Water Bodies and Discharges or Liquid Effluents. It also provides that the National Executive by Decree will establish the classification corresponding to each water body or sector, for which it must establish an information management system. Likewise, an order of priorities may be established for the classification of bodies of water, according to the intensity of the degree of intervention or degradation of their waters. The general provisions established in this decree will govern water bodies that have not been classified. The Ministry of the Environment and renewable Natural Resources may design specific water quality control and management master plans for each hydrographic basin in the national territory, in order to improve the quality of a certain water body or sections of these.

This document in its Chapter II: "On the classification of waters", establishes seven categories to classify bodies of water according to uses:

Type 1: Water intended for domestic and industrial use that requires drinking water, always if it forms part of a product or sub product intended for human consumption or that comes into contact with it.

Type 2: Water intended for agricultural uses.

Type 3: Marine waters or coastal environments intended for the breeding and exploitation of molluscs consumed raw.

Type 4: Waters used for beaches, water sports, sport, commercial and subsistence fishing.

Type 5: Water intended for industrial uses that do not require drinking water.

Type 6: Waters used for navigation and power generation.

Type 7: Water intended for the transport, dispersion and breakdown of pollutants without causing interference with the adjacent environment.

Note that Type 3 refers specifically to marine waters, however, Types 4, 5, 6 and 7 could also be linked to marine waters according to the established uses.

Subsequently, in the year 2001, Decree No 1.468 of the Law of Coastal Zones issued and published in the Official Gazette of the Republic of Venezuela N° 37.349, which provides a regulatory framework for the organization and management of the coastal zone. This document describes the guidelines and directives for the integrated management of coastal zones. These guidelines and directives present premises to carry out the classification of coastal-marine zones, when they are used as receiving bodies. In fact, the guidelines themselves list some of the uses of the coastal-marine zones: recreational activities, tourist use, historical and archaeological resources, landscape and protected areas, among others. However, the decree does not establish a proper classification of them.

For its part, the Water and Air Quality Law (2015) is a Venezuelan regulation that refers to discharges into the coastal-marine environment. In chapter II: Liquid Discharges, Second Section: Discharges to the Coastal – Marine Environment; in Articles 74, 75, 76 and 77 certain conditions and regulations are declared for the discharge of wastewater from ships and ports to the coastal-marine zone. However, the document does not issue any criteria for their classification.

More recently, in 2021, the Attorney General's Office – as an instrument that promotes the sustainable development of the coasts – issued a Strategy for the Planning and Integrated Management of Coastal Zones, currently in a review process. This governing document serves as the basis for the developing planning processes of the country's coastal and marine areas (Official Gazette of the Bolivarian Republic of Venezuela No. 42182 dated 08/03/2021).

Also in 2021, the Permanent Administration and Services Commission presented to the National Assembly of the Legislative Authority of Venezuela, the Organic Water Law Project, which constitutes a new legal instrument that brings together the dispersed provisions in the Laws that governed the country and allows the organicity and sovereign control of the different water uses. In Chapter V: "Of the Waters Uses for National Life and its Controls", Article 29: Forms of control and management of water bodies, states that for the control and management of water bodies, the first action to carry out is precisely the water bodies classification or at several water sectors, taking into account the quality as well as the current and potential uses. In the same Chapter, Article 30: Of the uses of water, seawater is recognised within the category of uses of non-conventional sources (Organic Water Law, 2021).

Considering what is stated in this legal document, the intention and the need to carry out the classification of the different water bodies, including marine areas, are perceived as the main requirements to perform the control and management of the water bodies, an aspect established in the articles of the aforementioned Law.

Table 1 - Water Classifications in the WCR and their alignments with Classes I and II of the LBS Protocol

COUNTRY	LEGISLATION	CLASSIFICATION	
		CLASS I	CLASS II
Colombia	Decree 1076 (2015)	According to uses: Type: 2, 5, 7 and 8 Regarding discharges: Class I	According to the uses: Type 6 and 9 Regarding discharges: Class II
Cuba	NC 521 (2007)	Class A, B and C	Classes D, E and F
Dominican Republic	NA-CACS (2012)	Class D2 and E	Class F and G
Honduras	Executive Agreement 003 (2020)	Types B, E and G	Type C, D, F and H
Nicaragua	NTON 05007 -98 (2000)	Type 3 and 4	Type 5 and 6
Panama	Draft Decree (2007)	Class 1M, 2M	Class 3 M
Venezuela	Decree 883 (2005)	Types 3 and 4	Types 5, 6 and 7
Antigua & Barbuda	Schedule VII, Environmental Protection and Management Act (2019)	Coastal Waters - Class AA (propagation marine life, natural state, no discharge), Class A (recreation, highest level treatment)	Class B (ports, industrial, maximum discharge control)
Belize	Effluent Limitation Regulations 2009 Amendment	Class I	Class II
Jamaica	Natural Resources Conservation (Wastewater and Sludge) Regulations, 2013	Class I	Class II
Saint Lucia	SLNS 2016 Guidelines for Recreational Water Quality	Recreational Waters	
Trinidad & Tobago	Water Pollution Rules (2019), Environmental Management Act, 2000	Environmentally Sensitive Areas, Inland Surface Waters, Coastal Nearshore	Marine Offshore
USA – Florida	Clean Water Act - Water Quality Standards	Class I (potable) , Class II (shellfish propagation), Class III (recreation), Class III-limited (fish consumption)	Class IV (Agri water supplies), Class V (Navigation, Industrial use)
Puerto Rico (US Territory)	Puerto Rico Water Quality Standards Regulation (PRWQSR)	Class SA, Class SB, Class SE	
US Virgin Islands (US Territory)	US Virgin Islands Water Quality Standards Regulations	Class A, Class B	Class C

3.2 ANALYSIS OF WATER CLASSIFICATION IN THE WCR

This study has shown that water classification and by extension, the LBS Protocol, are at various stages of implementation across these countries. An obvious reason accounting for this variance would be that the countries have completed ratification at different times and each face different challenges throughout the process. In general, classification is mainly done by use of a water body, but it was also noted that in some cases classifications are made by a waters body's functioning as a wastewater recipient. This review of both English and Spanish speaking countries has revealed other key points regarding water classification that may guide the overall process in the WCR.

It is important to note that, while there may exist some form of categorisation of the waters in the coastal and marine areas among the 20 countries, very few of them exactly reflect water classification as it was outlined in the LBS protocol. Six English speaking countries (Table 1) and seven Spanish speaking countries (Table 1) currently categorise waters in coastal nearshore and marine areas. This accounts for 65% of all countries in this study. However, only Belize and Jamaica (20%) have included the water classification of Annex III within their existing legislation that exemplifies the classification of their waters into Class I and Class II. Importantly, Saint Lucia has the designation of "Class I" as part of a National Standard for recreational waters. Nevertheless, all 13 countries presented in Table 1 have classification systems that are generally compatible or aligned with Classes I and II of the LBS Protocol.

It was observed that five English speaking countries (Antigua & Barbuda, Belize, Jamaica, Saint Lucia and USA) make water classification based on the use of the particular water body, while just one other country (Trinidad & Tobago) categorised waters based on their functioning as a wastewater recipient. All of the aforementioned countries have existing legislation framework for the regulation of wastewater discharges which also include maximum permissible limits of water quality indicators for environmental protection. It is important to note that Barbados is currently in the process of approving similar discharge regulations.

Within the Spanish speaking nations, seven countries (Colombia, Cuba, Honduras, Nicaragua, Panama, Dominican Republic and Venezuela) have legislation and/or regulatory instruments (or are in the preparation process) for classification of coastal areas according to their use (Table 1). In addition, all ten of these countries have standards or regulations that define maximum permissible limits of water/environmental quality indicators. However, it was observed that some are outdated, as half of these countries (50%) have regulations that are more than 10 years old.

However, in four of the countries (Nicaragua, Cuba, Colombia and Dominican Republic) the standards for effluent discharge into coastal marine areas differentiate the maximum permissible limits of the water/environmental quality indicators according to the respective classifications of water bodies as wastewater receptors. In addition, Antigua & Barbuda and the USA both have classification systems that are similar to the aforementioned, where maximum permissible limits are defined for each classification of nearshore and coastal waters.

Overall, it is observed that more progress is required towards achieving the objective of water classification in the region. For instance, within the English speaking countries, four territories (The Bahamas, Barbados, Grenada and Guyana) have not yet officially established a water classification system. However, this is compounded by an absence of discharge regulations, but it is understood that this work may be in progress. Conversely, it was observed that three Spanish speaking countries are also without established water classification but as previously mentioned, water quality regulations are in place. Even though the remaining Spanish speaking countries may not have adopted the general classification of the LBS Protocol (Class I and Class II), they have established systems that are well defined on the basis of the classification method (by use or wastewater recipient). As a result, the development of legislative framework and respective effluent discharge standards can be considered key elements in the process of establishing a water classification system for any country, after which, discharge standards should be applied towards each classification group to ensure protection of the water bodies.

4. EXPERIENCES FROM OTHER REGIONS

4.1 THE PHILIPPINES

The Republic of the Philippines is an island state off the Southern coast of Asia that lies in the western Pacific Ocean. The country consists of over 7,000 islands and has a coastline of 33,900km with an extensive coral reef system that covers 25,060 km². In 1974 the first marine sanctuary was established in the Philippines, since then a network of marine parks, reserves and MPAs have been established (Post, 2015).

The Philippine Clean Water Act (PCWA) of 2004 (Republic Act 9725) aims toward economic growth in a manner that is consistent with the protection, preservation and revival of the quality of fresh, brackish and marine waters via a sustainable development framework. Within the Environmental Management Bureau, the Department of Environment and Natural Resources (DENR) functions as the lead agency responsible for implementation and enforcement of the Act. The focal point of the PCWA is its focus on water quality management i.e. a primary application towards the reduction and control of pollution from land based sources and the enforcement of water quality standards and regulations. The Act also provided for the Classification/Reclassification of the nation's waters based on a variety of key factors including existing water quality and the most beneficial existing (and future) use of said water bodies.

Previously, the DENR enacted a water classification system in 1990 through administrative order (DENR Administrative Order no. 34) where all waters – freshwaters, coastal and marine waters – were classified by beneficial usages. This system was later revised and updated to the Water Quality Guidelines and General Effluent Standards in 2016 (DENR Administrative Order 2016-08). These guidelines classify fresh, marine and groundwater based on the intended beneficial use in Table 2 and 3 below.

Table 2 - Water Body Usage and Classification of Freshwater in The Philippines

Classification	Intended Beneficial Use
CLASS AA	Public Water Supply Class I – Intended primarily for waters having watersheds, which are uninhabited and/or otherwise declared as protected areas, and which require only approved disinfection to meet the latest PNSDW
CLASS A	Public Water Supply Class II – Intended as sources of water supply requiring conventional treatment (coagulation, sedimentation, filtration and disinfection) to meet the latest PNSDW
CLASS B	Recreational Water Class I – Intended for primary contact recreation (bathing, swimming, etc.)
CLASS C	1. Fishery Water for the propagation and growth of fish and other aquatic resources 2. Recreational Water Class II – For boating, fishing or similar activities 3. For agriculture, irrigation and livestock watering
CLASS D	Navigable waters

Table 3 - Water Body Usage and Classification of Marine Waters in The Philippines

Classification	Intended Beneficial Use
CLASS SA	1. Protected Waters – Waters designated as national or local marine parks, reserves, sanctuaries and other areas established by law (Presidential Proclamation 1801 and other existing laws), and/or declared as such by appropriate government agency, LGUs, etc.
	2. Fishery Water Class I – Suitable for shellfish harvesting for direct human consumption
CLASS SB	1. Fishery Water Class II – Waters suitable for commercial propagation of shellfish and intended as spawning areas for milkfish and similar species 2. Tourist Zones – For ecotourism and recreational activities 3. Recreational Water Class I – Intended for primary contact recreation (bathing, swimming, skin diving, etc.)
CLASS SC	1. Fishery Water Class III – For the propagation and growth of fish and other aquatic resources and intended for commercial and sustenance fishing 2. Recreational Water Class II – For boating, fishing or similar activities 3. Marshy and/or mangrove areas declared as fish and wildlife sanctuaries
CLASS SD	Navigable waters

These water quality guidelines are continually used to categorise waters according to their quality, area, purpose and vulnerability to pollution. Importantly, they assist programs for water quality management across all regions of the country and provide the standards (General Effluent Standards) to protect aquatic life and human health regarding their use of specific water bodies.

4.2 SOUTH AFRICA

South Africa lies at the southernmost point of the African continent and has a land area of 1.2 million km² with a coastline stretching over 3,000 km. The coast is uniquely surrounded by two oceans, with the southern Atlantic Ocean in the west and the Indian Ocean in the east. South Africa has a large number of Conservation and Protected Areas to safeguard its wetlands and coral reefs. The National Water Act of South Africa (1998) identifies sustainability and equity as the fundamental guiding principles for management and control of its water resources. Subsequent amendments to this Act laid Regulations for the establishment of a water resource classification system in 2010 to ensure ecological sustainability with consideration of all needs, social and economic of significant water resources (National Water Act Regulations, 2010).

The classification of waters is primarily based upon the designated use of the resource. As such, the procedure is outlined whereby the class must describe the extent of use of a water resource, the reserve, the resource quality objectives and the quantification of the allocation portion of a water resource for use. The national waters must fall into one of the three distinguished categories:

Class I - Waters that are minimally used and the configuration of ecological categories of the water resources within a catchment result in an overall water resource condition that is minimally altered from its pre-development condition.

Class II - Waters that are moderately used and the configuration of ecological categories of the water resources within a catchment result in an overall water resource condition that is moderately altered from its pre-development condition.

Class III - Waters that are heavily used and the configuration of ecological categories for the water resources within a catchment result in an overall water resource condition that is significantly altered from its pre-development condition.

It is important to note that key steps in the determination of the classes above include the assessment of the current state of the water body and the ecological and socio-economic value connections to that water state. Water quality requirements to best suit ecological needs as well as additional changes for ecosystem good and services are reviewed to devise the most ecologically sustainable conditions. Furthermore, integrated water resource management and stakeholder needs are considered before finalization and implementation of the classification. This classification process highlights the need to be holistic, environmentally advantageous and most of all, highly sustainable once implemented.

4.3 PARAGUAY

Concerning the Latin American standards that establish a classification of receiving bodies, there is the Original Standard of Paraguay (Resolution No. 222/02), which establishes a classification of water bodies with different levels of emission in each class based on the intended uses and requires differentiated discharge limits in each case. The defined classes are the following:

Class 1: Waters planned:

- a) For domestic supplies after simplified treatments
- b) For the protection of aquatic communities
- c) For primary contact recreations (swimming, water skiing)
- d) The irrigation of vegetables and fruits that grow in soils and eaten fresh, without removing the skin.
- e) The natural and/or intensive breeding (aquaculture) of species intended for human nutrition.

Class 2: Waters planned:

- a) For domestic supplies after simplified treatments
- b) For the protection of aquatic communities
- c) For primary contact recreations (swimming, water skiing)
- d) The irrigation of vegetables and fruits that grow in soils and eaten fresh, without removing the skin.
- e) The natural and/or intensive breeding (aquaculture) of species intended for human nutrition.

Class 3: Waters planned:

- a) In domestic supply, after special treatment
- b) For tree irrigation, garden and fodder.
- c) For recreation of secondary contact.

Class 4: Waters planned:

- a) For navigation
- b) For landscape harmony
- c) For less demanding uses

The classification established in the aforementioned standard is intended for receiving water bodies in a broader view because Paraguay is a landlocked country and as such, classification refers only to inner or continental waters.

4.4 EUROPE

In Europe, a classification exists of surface water bodies as: rivers, lakes, coastal lagoons, transition and highly modified water masses. It is verified that complex and laborious studies have been required at the national level, which have taken several years to carry out and which have been reviewed at the basin level to take into account specific singularities of each one (AECID and Del Río, 2021).

Based on previous experience, perhaps, the best time to carry out or review these classifications is when the basin plans are prepared. In addition, the updating of the issued classifications must be taken into account, according to the changes of use of the receiving body or other needs.

Regarding coastal areas, Directive 91/271/CEE (1991) on the treatment of urban wastewater is the fundamental standard in Europe to regulate discharges from populations. This document establishes some differentiated conditions such as: population size, limited parameters and/or limit level established for discharges that end up in less sensitive coastal zones, normal coastal zones, transition zones, continental zones, sensitive zones (for eutrophication or other requirement), areas affected by high nitrate content, among others. In accordance with the provisions of this Directive, the incorporation of some classification criteria for receiving bodies could be applicable in other coastal areas.

5. PROPOSED GUIDELINES FOR WATER CLASSIFICATION

After analysis of the existing classification systems of countries in Wider Caribbean Region and the relative disparities, the following guidelines are put forth to serve as a tentative outline to aid implementation of the protocol. The development of water classification mechanisms may ultimately harmonise the status of contracting parties. The following are proposals for general guidelines in order to classify coastal-marine water bodies as wastewater receptors, with a focus on the LBS Protocol. These can be considered as a set of good practices recommended for this purpose and could be applied as needed in each of the countries of the Wider Caribbean Region.

5.1 LEGISLATION

- Development of new and/or updating existing policy framework supporting environmental legislation and capacity building within contracting parties to ensure protection of the marine environment.
- Once a country has ratified the Cartagena Convention, it is recommended that the obligations within the LBS Protocol, and Annex III in particular, should be incorporated into the environmental protection/environment management legislation of the contracting party if the obligations are not already addressed through a country's existing legislation. Annex III of the LBS Protocol can help to assist with the development of a regional baseline for water classification.
- Establishment of Regulations consisting of water quality standards related to water classification, particularly where coastal and marine areas may act as wastewater receptors. However, these Regulations must be preceded by rigorous scientific studies on the current environmental water quality and on the hydrodynamic characteristics of these areas (dilution factors, currents, bathymetric and waves).

5.2 EFFLUENT LIMITATIONS

- The establishment of Effluent Limitation Regulations for contracting parties that are consistent with or even stricter than those of the LBS Protocol, to supplement the environmental legislation of contracting parties and ensure consistency in the determination of water quality for coastal areas.
- Inclusion of discharge (maximum permissible) limits for environmental/water quality indicators in established Effluent Regulations according to the classifications of the receiving water bodies.
- For countries with discharge limits, potential revision/update of the standards or criteria for discharges. The reviews carried out in this study, regarding the existence of national discharge criteria or standards for countries of the WCR, showed that in certain cases the standards of some countries are more than 10 years old.
- It is recognised that maximum permissible limits of discharges should be established for each indicator of environmental quality, as well as for each possible class of

receiving bodies. In the same manner, it is also possible to determine discharge limits for each type (origin) of wastewater to be released.

- It is recommended that the application of existing or developed standards for discharges per water classification be applied in a manner that is simple and effective, as an increase in complexity can lead to implementation becoming impractical and/or unsustainable.
- For countries where required infrastructure may be limited, discharge limits may be applied progressively over time, in a manner that can take into account the required capacities to comply with these regulations.

5.3 CRITERIA FOR CLASSIFICATION OF WATER BODIES

- Establishment of the classification criteria may be considered as a variety of criteria are in practice and it would be ideal to superimpose the classifications based on the existing compatible criteria. This would provide information that is comprehensive and facilitate the coastal and marine water classification in the region.
- The classification criteria must always have the perspective of conservation and/or minimizing the environmental impact of discharges. It is essential for criteria to define the differentiation of discharge limits, including the environmental perspective, and the ecosystem approach. In other words, placing human beings, with their diversity and cultural integration, as an integral organism of the systems and associated natural resources.
- Classification should be done in consideration of existing factors such as current state of coastal zone and corresponding watershed i.e. domestic/industrial runoff, other current and potential sources of pollution and ongoing human activities.
- If the classification will be made where the water body functions as a wastewater recipient, then the water quality of that class must be maintained in accordance with the existing effluent/wastewater discharge standards. If the current water quality of that water body is unsatisfactory, then remediation efforts should be made to restore the required level for that class. In the case where a country's wastewater discharge standards do not include criteria for a particular water classification, those standards and/or corresponding regulations should be revised to include same to clearly identify the required water quality.
- If a water body may be designated for two (or more) uses, it must be done in such a manner that the classification associated with the highest water quality is maintained, so as not to be deteriorated by any additional or future use.
- Where there is the existence of MPAs or the need for that designation to protect a sensitive ecosystem/coastal area within a contracting party, these areas should be

included into the strictest classification to aid in the protection of that coastal resource.

- The criteria for water classification systems should be reviewed, and updated if necessary, within a given time period (for example every 5-10 years) due to changes that may occur within a country over time such as new infrastructure, new water treatment facilities, introduction of new technologies, etc. At the very least, there should be a specific process that ensures the existing water classification remains relevant and adequate.

5.4 MONITORING AND REHABILITATION

- For the development of any water classification system, whether by use or as a receiving body of wastewater, a corresponding monitoring programme should be implemented to ensure preservation of all designated classes. It is also important to note that the potential deterioration of a class should be monitored and mitigated, against whether caused by human activity, climate change or any other additional factors.
- One must avoid classifying an ecosystem as "irrecoverable" and therefore "sentencing it for life" as a wastewater recipient. In other words, the concept should be avoided that if it is already degraded, then it does not matter to contaminate it further.
- A recovery program should be developed for waters that may currently be deemed as "irrecoverable" – water bodies that are longstanding wastewater recipients or continually exposed to large volumes of pollutants – enabling rehabilitation of water bodies to progressively become fit for purpose.

6. FINAL CONSIDERATIONS

This study on the classification system of water bodies, particularly in coastal and marine areas, and the corresponding discharge regulations has made it possible to assess the status of both matters across English and Spanish speaking countries of the WCR.

The review and assessment of the respective associated legal instruments has confirmed that although there are advances in certain countries, there are others that are behind in the formulation and/or implementation of statutes regarding wastewater discharge and effluent limitations. In addition, some require significant revisions of these statutes to achieve alignment with the LBS Protocol. Subsequently, the existing challenges and potential solutions have been also discussed. However, the process should not be considered formulaic as each country may have different challenges and unique circumstances to overcome.

This work has also revealed the need to develop and/or improve the relationship between the classification of the coastal areas and the discharge (maximum permissible) limits established based on environmental indicators in the Effluent Regulations. A significant observation in the countries where standards or criteria have been established for the classification of coastal and marine areas, is that these categorisations are generally compatible or aligned with the LBS Protocol.

The proposed guidelines for the classification of coastal and marine areas are not aimed to recommend fixed rules for what each country should do, but are intended to improve efforts to ultimately realise that objective. The time frame required to effectively implement a water classification system is a critical characteristic of this process and should be evaluated by each country that is without it. It is essential that a holistic approach is taken for such an objective so it may be completed in stages or on a phased basis.

Recognition of the need to protect the value of the ecosystems within these coastal and marine areas by all stakeholders and taking the necessary action should ultimately lead to the success of water classification in the region and by extension, implementation of the LBS Protocol.

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ANNEX I

ACTIVITY 1 QUESTIONNAIRE

SECTION A: GENERAL INFORMATION

Country:

Full name of the reporting institution:

Name(s) and position(s) of the reporting officer(s):

Email address:

Postal address:

Telephone (Office; mobile):

Website:

Survey submission date (DD/MM/YYYY):

Autorizad signature:

SECTION B: CLASSIFICATION OF WATER BODIES AND COASTAL AREAS

1. Does your country have a system or criteria for classifying **coastal marine waters**?

Yes ☐

No ☐

In preparation ☐

I don't know ☐

(a) If Yes, is the classification linked to the use of coastal marine waters as recipients of domestic wastewater?

Yes ☐

No ☐

I don't know ☐

(b) If "Yes" is the classification in any way related to the classification established by the Land-Based Sources of Marine Pollution Protocol (LBS Protocol) in Class I and II for the waters within the Cartagena Convention area (Wider Caribbean Region)?

Yes ☐

No ☐

I don't know ☐

Please send relevant websites or bibliographic references where information/documents for your country can be accessed.

Name of the document or institution responsible	Website or bibliographic reference where the document/institution can be accessed

2. Does your country have any national policies, laws, or plans for water classification related to the discharge of wastewater?

Policies Yes ☐ No ☐ In Preparation ☐ Unsure ☐
 Laws Yes ☐ No ☐ In Preparation ☐ Unsure ☐
 Plans Yes ☐ No ☐ In Preparation ☐ Unsure ☐

- (a) If "Yes" or "In preparation" please provide brief details.

- (b) Are these documents available for sharing? Yes ☐ No ☐

- (c) Please provide a website or URL reference or bibliographic reference to link the response to the appropriate information/document that is maintained by your country. Extend table where necessary

Name of the document	Website/URL Reference/Bibliographic Reference

3. Does your country have a coastal zone classification system or criteria?

Yes ☐ No ☐ In preparation ☐ I don't know ☐

- (a) If "Yes" is the classification linked to the use of the coastal zone (mangroves, seagrass, marine protected areas, fishing, recreation etc.)?

Yes ☐ No ☐ I don't know ☐

- (b) Please send relevant websites or bibliographic references where information/documents for your country can be accessed.

Name of the document or institution responsible	Website or bibliographic reference where the document/institution can be accessed

4. Can you please share any information with respect to implementation/ challenges / successes/ lessons learnt on classifying water bodies in your country.

Please include written responses below. Use as many lines as needed.
