

GOVERNANCE IN THE CARIBBEAN SEA IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT

Asha Singh

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Contact Information

Asha Singh, PhD

Email: ashasing@yahoo.ca

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Abstract

Asha Singh

Governance in the Caribbean Sea: Implications for Sustainable Development

In the Caribbean Sea, 36 States (Independent and Overseas Territories of France, Netherlands, UK and USA) have jurisdiction over its marine space, of which many of them have claimed by legislative decree the full extent of 200 NM afforded under UNCLOS or by way of customary international law. Although, not all the States have delimited their boundaries at present, when these claims are asserted, the entire Caribbean Sea will be under the jurisdiction of one nation or another with no claims of high seas. The sea's resources provide many goods and services which are contributing significantly to human-wellbeing.

However, the vital services, which human communities derive from the Caribbean Sea ecosystems are being placed in jeopardy, often by the very activities and industries whose long-term future depends on the continued provision of those services. This has implications for sustainable development. Therefore, there is a need to respond in the form of improved governance and progressive action especially as more evidence is pointing to the need for a management regime, which considers the sea as an ecosystem unit.

An examination of the governance structure for pollution and sustainable use and management of both living and non-living resources shows a caveat of initiatives at the international, regional, sub-regional and national levels such as conventions, UNGA resolution and other agreements, which are all superimposing their form of governance on the Sea, often done with little synergies. A number of shortcoming and challenges was identified and among those, are low ratification of various multilateral agreements, poor implementation and inadequate stipulations in conventions to effectively respond to issue such as pollution. Therefore, the current paradigm of governance needs revisiting if the region is to take stewardship of the sea with all the rights and responsibilities it implies. Among the suggested recommendations is the need for an integrated strategy for the sea.

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Thank you is not enough to the say to my family and friends for the 'always' unwavering and countless support.

List of Acronyms

CARICOM	Caribbean Community Secretariat
CEHI	Caribbean Environmental Health Institute
CIDA	Canadian International Development Agency
DFID	United Kingdom Department for International Development
GPA	Global Plan of Action for the Protection of the Marine Environment from Land Based Sources of Pollution
IWCAM	Integrated Watershed and Coastal Zone Management
OECS	Organisation of Eastern Caribbean States
PAHO	Pan American Health Organisation
SIDS	Small Island Developing States
UNCLOS	United Nations Convention on Law of the Seas
UNEP	United Nations Environmental Programme

Ocean Governance of the Caribbean Sea Implication for Sustainable Development

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Part One: Introduction to the Study Area

1.1 Introduction

From the seventeenth century onward, the oceans were separated into ‘territorial waters’ - a narrow band of the sea where Coastal States possessed rights similar to those they exercised over their land territory, and the ‘high seas’. These two formed a vast area in which all States enjoyed the freedom to use the waters and associated natural resources as they saw fit (the doctrine of *res nullius*).¹

This freedom seemed compatible with the assumption that the world’s oceans have infinite resources, which could withstand any demands placed upon them at any given time by humans. However, by late 1950s, it became evident that the oceans’ natural resources were in limited supplies and that the long subjection of ‘freedom of-the-seas doctrine’ was taking a toll on the marine environment. Coastal fish stocks depletion compounded by the threats of pollution associated with both marine and land based activities placed vital productive areas in jeopardy. Today these problems are still present, but compounded by new and emerging threats such as the climate change phenomenon. In addition, the livelihoods of communities, national economies and the biodiversity of ecosystems of the oceans were threatened.

At the same time, the world’s maritime powers were competing to maintain a presence across the globe both on the surface waters as well as under the sea. Coastal nations viewed this development as a threat to their security, economy and sovereignty and felt obligated to secure these interests. At a global level, the international community responded to these concerns through the formulation of the United Nations Convention on Law of the Sea (hereafter referred to as UNCLOS²) which, after a series of lengthy negotiations entered into force in 1994. This agreement afforded Contracting States the right not only exploit the natural resources for human well-being but also to be

¹ Juda, L. (1996). International Law and Ocean Use Management London Routledge. 345 pp.

² UNCLOS is now regarded also as a codification of customary international law.

responsible for the protection and preservation of the marine environment, which should be done by forging cooperation.³

In the Caribbean Sea, 36 States⁴ have jurisdiction over its marine space, of which many of them have claimed⁵ by legislative decree the full extent of 200NM⁶ afforded under UNCLOS or by way of customary international law. Although, not all the States have delimited their boundaries at present, when these claims are asserted, the entire Caribbean Sea will be under the jurisdiction of one nation or another with no claims of high seas. In addition, with the claims of 200NM, many of the States will have a larger marine than land area. For example, Barbados will likely have approximately 10 times more marine area than terrestrial.

The environmental problems and challenges similar to those experienced at the global level were evident also in the Caribbean Sea, and over the last three decades, as a response, UNCLOS and many other instruments and interventions (programmes, guidelines, projects etc.) have collectively evolved into a governance mechanism, with the overarching aim of finding a compromise between sustainable environmental management and economic development. In this paper, ocean governance in the Caribbean Sea will be examined in an effort to determine its effectiveness in curbing the degradation of this sea and provide recommendations for improvement. In the following sections, the geo and bio-physical characteristics of the Caribbean Sea will be discussed along with benefits which are derived from the various uses of the Sea.

³ Refer to Section 2.3 for more discussion and footnotes 75-80 for various UNCLOS provisions relevant to these aspects.

⁴ These States are **Independent Mainland Countries**: Belize, Colombia, Costa Rica, Guatemala, Honduras, Mexico, Nicaragua, Panama, Venezuela; **Independent Island States**: Antigua & Barbuda, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, St Kitts & Nevis, St Vincent & Grenadines, St. Lucia, Trinidad and Tobago. **Overseas Territories (OTs) Islands**: United States Virgin Islands (USVI), Puerto Rico (USA); Aruba, Bonaire, Curaçao, St. Eustatius, St. Marteen (The Netherlands); Guadeloupe, Martinique, St Martin, Saint Barthélemy (France); Anguilla, British Virgin Islands (BVI), Cayman Island, Montserrat (United Kingdom).

⁵ All the countries in the Caribbean Sea claimed 200NM either under UNCLOS or customary international law (such as Venezuela) except for The Netherland Antilles.

⁶ Given the large number of States in the Caribbean Sea, it is unlikely all will have 200NM when all the boundaries are agreed upon.

1.2 Geo-physical Characteristics

1.2.1 Geographic Location

The Caribbean Sea is located between 9-22°N and 89-60°W and is the second largest sea in the world.⁷ It is semi-enclosed by nine South and Central American countries (commonly referred to as Latin America) and an archipelago of twenty-five island States of which some are independent States and others are overseas territories of either France, Netherlands, United Kingdom (UK) and United States of America (USA). A few other islands governed by Netherlands are scattered within the sea. Collectively, the study area (hereon referred to as ‘the Caribbean Sea’) comprises a total of thirty-six States⁸ and the Caribbean Sea as shown in Figure 1.

⁷ Richards, W. J. and J. A. Bohnsack (1990). The Caribbean Sea: A Large Marine Ecosystem.in Large Marine Ecosystem: Patterns, Processes and Yields. K. Sherman, L. M. Alexander and B. D. Gold. Washington, American Association for the Advancement of Science: 44-53.

⁸ Refer to Footnote 4 for list of States in the study area.

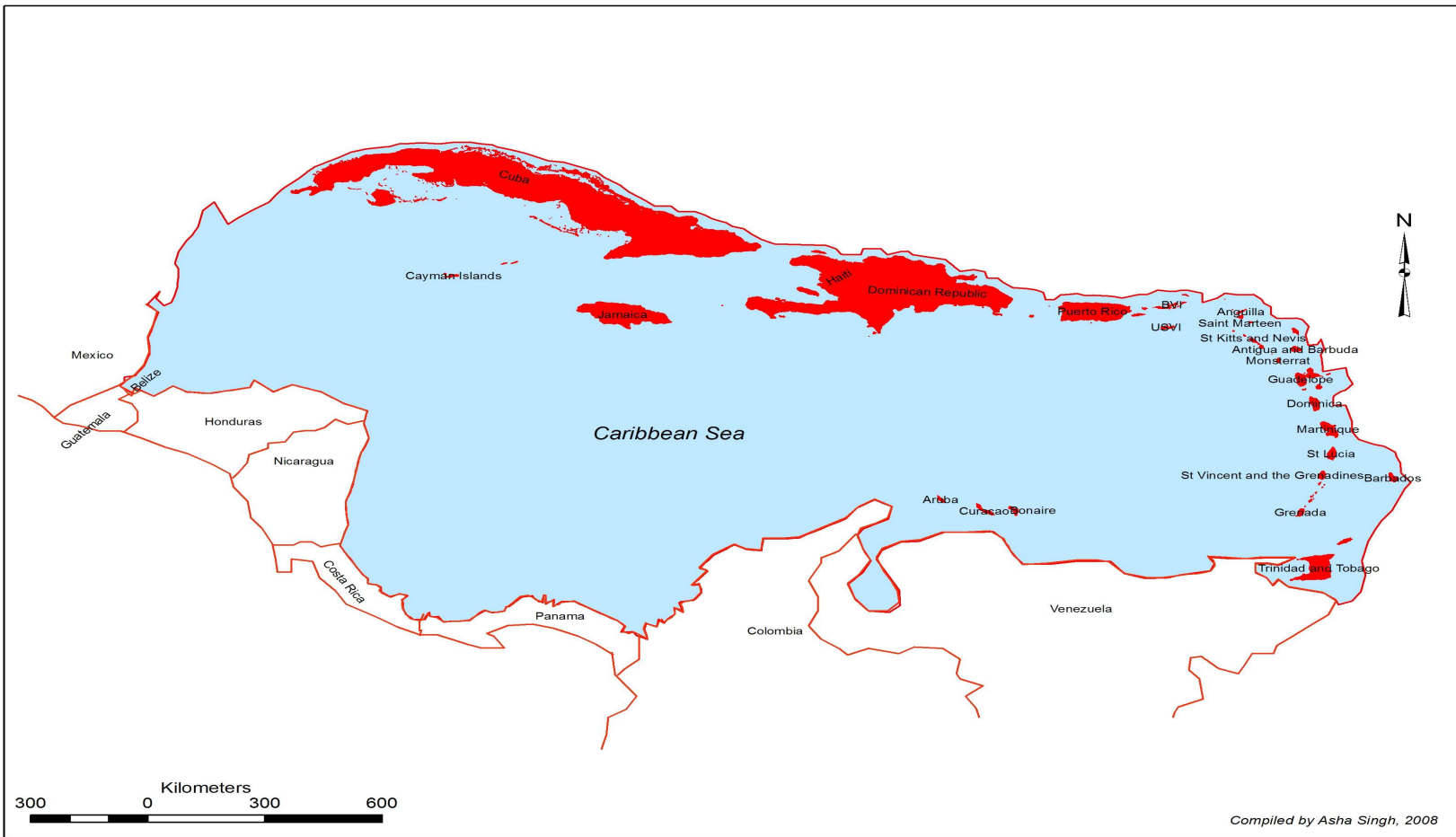


Figure 1: Map of the Study Area

Source: Derived and Compiled by the author, 2008. Spatial data was derived using information from Encarta Maps "Caribbean Sea" <http://www.encarta.msn.com>

1.2.2 Bathymetry

This Caribbean Sea covers an area of 2,515, 900 sq km and has many basins/troughs, which were formed in the Cenozoic era.⁹ The Cayman trough is one of the many basins and is the deepest vertical depression in the sea. There are also many passages and straits of which the Anegada passage, serves as one of the principal shipping lanes in the Caribbean Sea. The others are the Mona, Martinique, Guadeloupe and Windward passages.

1.2.3 Current Movement in the Caribbean Sea

Water masses in the Caribbean Sea originate in both the North Atlantic and South Atlantic Ocean.¹⁰ The surface current flows, as documented by drifting buoys, indicate a relatively slow current speed (0.2 ms^{-1}) in the easterly Grenada Basin¹¹, and a moderate to relatively stable current speeds of 0.5 ms^{-1} in the Central basins, which includes the Venezuelan Basin.¹² Study conducted in the vicinity of Puerto Rico, showed that the surface water (in the upper 50m of the water column) has salinity values of less than 35.5 psu and a potential temperature of 28°C .¹³ These studies seem to suggest that the water column is relatively stable¹⁴ with little mixing, thereby influencing the nutrient capacity of the Caribbean Sea.

⁹ Bachman, R. (2001) *The Caribbean Plate and the Question of its Formation*. Institute of Geology, University of Mining and Technology 17.

¹⁰ Wilson, W. D. and W. E. Johns (1997). Velocity Structure and Transport in the Windward Islands Passages. *Deep Sea Research* **44**: 487-520; Gyory, J., A. J. Marianno and E. H. Ryan. (2002). "The Caribbean Current." <http://oceancurrents.rsmas.miami.edu>; Johns, W. E., T. L. Townsend, D. M. Fratantoni and W. D. Wilson (2002). On the Atlantic inflow to the Caribbean Sea. *Deep Sea Research Part I: Oceanographic Research Papers* **49**(2): 211-243.

¹¹ Kinder, T. H. (1983). Shallow Currents in the Caribbean Sea and Gulf of Mexico as observed with satellite-tracked drifters. *Bulletin of Marine Science* **33**(2): 239-246; Kinder, T. H., G. W. Heburn and A. W. Green (1985). Some aspects of the Caribbean Circulation. *Marine Geology* **68**(1-4): 25-52; Molinari, R. L., W. D. Wilson and K. Leaman (1985). Volume and Heat Transports of the Florida Current: April 1982 through 1983. *Science* **227**(4684): 295-297.

¹² Kinder, T. H., G. W. Heburn and A. W. Green (1985). Some aspects of the Caribbean Circulation. *Marine Geology* **68**(1-4): 25-52.

¹³ Hernandez-Guerra, A. and T. M. Joyce (2000). Water Masses circulation in the Surface Layers of the Caribbean at 66°W . *Geophysical Research Letters* **27**: 3497-3500.

¹⁴ Similar findings were presented by Richards, W. J. and J. A. Bohnsack (1990). The Caribbean Sea: A Large Marine Ecosystem. in Large Marine Ecosystem: Patterns, Processes and Yields. K. Sherman, L. M. Alexander and B. D. Gold. Washington, American Association for the Advancement of Science: 44-53; Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES. Plymouth PhD: 391.pp. in

1.3 Bio-Physical Characteristics and the Importance to Human Wellbeing

The highly stratified nature of the water in the Caribbean Sea makes it one of the lesser productive seas in the world. This Sea is highly stratified in the upper 1,200m, weakly stratified between 1,200-2,000m and almost uniform below 2,000m.¹⁵ It is relatively nutrient deficient (nitrates and phosphates) except for isolated areas of upwelling¹⁶ which are mainly coastal upwellings occurring on the northern coast of South America.¹⁷ The National Ocean and Atmospheric Agency (NOAA) in 1995 using SeaWifs global index, calculated the productivity index of the Caribbean Sea to be less than 150 g C/m²-yr, thereby falling into the 111 Class - low productivity.¹⁸ The generally low productivity of the sea is primarily caused by the short supply of nitrogen (N) and phosphorous (P) arising as a result of limited amounts of inorganic nutrients in the water, in addition to poor mixing. This low level of productivity leads to long food chains of which many species are highly vulnerable to over-exploitation.

Despite this generally low productivity, there are many ecosystems and species sharing a high degree of connectivity, thereby classifying the Sea as a large marine ecosystem (LME).¹⁹ The continental shelf of the islands and mainland countries support most of the Caribbean Sea's major productive ecosystems in the form of coral reefs²⁰, sea grass

which it stated that "the surface water of the Sea is thermally stable and stratified with little seasonal variation in the surface water temperature, which has a range from 25.5°C in winter to 28°C in the summer."

¹⁵ Gordon, A. L. (1967). *Circulation of the Caribbean Sea*. *Journal of Geophysical Research* **72**: 6207-6223. Gyory, J., A. J. Marianno and E. H. Ryan. (2002). "The Caribbean Current." <http://oceancurrents.rsmas.miami.edu>.

¹⁶ NOAA. (2003, 2003). "LME 12: The Caribbean Sea." 2004, <http://na.nefsc.noaa.gov/lme/text>.

¹⁷ Richards, W. J. and J. A. Bohnsack (1990). The Caribbean Sea: A Large Marine Ecosystem. in *Large Marine Ecosystem: Patterns, Processes and Yields*. K. Sherman, L. M. Alexander and B. D. Gold. Washington, American Association for the Advancement of Science: 44-53.

¹⁸ NOAA. (2002). "SeaWifs Global Primary Productivity Estimates." 2004.

¹⁹ LMEs worldwide are considered as expansive ocean areas with each having distinct bathymetry, hydrography and biological productivity whose plant and animal populations are inextricably linked to one another in the food chain. Currently there are 64 identified LMEs, one of which is the Caribbean Sea. Refer to NOAA. (2007). "Large Marine Ecosystems: A Breakthrough Concept for Ecosystem Management ", <Http://www.noaa.org>.

²⁰ Coral reefs found throughout the Sea are limited in size and vary in abundance on a geographic basis. There are more than one thousand species of corals including many species of hard and soft corals. The stock of soft gorgonian corals is more abundant in the Caribbean Sea than any other parts of the world, with fringing reefs being the most common. The Caribbean has the highest number of regionally endemic genera

beds²¹ and mangroves forests²², which in turn support many species of marine life thereby supporting vibrant fishery sectors in all the States. The importance of the ecosystem services provided by way of fisheries to the people of the region range in significance between States but overall provide over 500,000 jobs in the fisheries sector and an estimated 2 billion dollars in revenue to the economies.²³ Fisheries²⁴ also account for over 7% of the total protein intake in the region. The coral reefs, seagrass beds and mangroves also provide valuable services, which are linked to tourism especially in SIDS economies. Such that, 19 of the 27 States ranked tourism as contributing the highest GDP of all economic sectors.²⁵ In addition to these ecosystem services, the Caribbean Sea has contributed significantly in other sectors such as shipping²⁶, extraction of non-living resources and cruise tourism.²⁷

in the world with a total of 9 endemic coral genera see Groombridge, B. and M. D. Jenkins, Eds. (1996). The Diversity of the Seas: A Regional Approach. WCMC Biodiversity Series # 4. Cambridge, World Conservation Press.190.

²¹ The Seagrass beds are found in many coastal areas of the islands and also in the coastal areas of mainland countries. They vary in abundance and species diversity. The most common species are the *Thalassia testudinum* -Turtle Grass, *Syringodium filiforme* - Manatee Grass and *Halodule wrightii*- Shoal Grass. There are two endemic species of Seagrass in the Caribbean, these are *Halophila emgelmannii* and *Halophila johnsonii*. *Ibid;Duarte, C. M. (1999). Seagrass Ecology at the turn of the Millennium: Challenges for the New Century. Aquatic Botany 65(1-4): 7-20;CARICOMP. (2002). "Coastal and Marine Productivity Database." 2002, <http://www.ccdc.org.jm/caricomp.html>.*

²² The mangal system in the Caribbean Sea though comparatively small on an international scale, play a vital role in coastal stability. Mangrove abundance ranges from a few scattered scrub patches to a more diverse riverine or fringing mangal system. The mangroves of Latin America and the Caribbean are amongst the most productive ecosystems globally. However, these forests are not homogenous, thus impacting the goods and services provided from locale to locale.

²³ CAESEA (2007). Caribbean Sea Ecosystem Assessment. A sub- global component of the Millenium Ecosystem Assessment. *Caribbean Marine Studies, Special Edition* 104;CARSEA (2007). Caribbean Sea Ecosystem Assessment. A sub- global component of the Millenium Ecosystem Assessment. *Caribbean Marine Studies, Special Edition* 104.

²⁴ Refer to Section 2.4.2.2 for An overview of the fisheries pressures and governance mechanism

²⁵ Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES Plymouth PhD: 391.pp.

²⁶ Refer to Section 2.4.1.1 for an in-depth overview of the pressures associated with shipping and governance mechanism

²⁷ Refer to Section 2.4.1.1 for information of waste generated by cruise industry

1.4 Uses of the Caribbean Sea and the Economic Importance

1.4.1 Shipping in the Caribbean Sea

The Caribbean Sea is ranked as one of the principal waterways in the world, harbouring in excess of 80,000 ship calls per year²⁸, and it is classified as having one of the most intensive maritime traffic in the world.²⁹ There is a huge inter and intra regional and international shipping in this sea, moving various products from ports and refineries. In total, there are two hundred ports found within or bordering the Caribbean Sea.³⁰ In addition, the refineries are scattered in South American countries and on islands such as Puerto Rico and the USVI. The refineries throughout the Caribbean supply refined products to countries within the region, the Gulf of Mexico and beyond. Refined products from outside the region are shipped into the Caribbean or through the Caribbean Sea (via the Panama Canal) to other destinations. Not only are other products such as crude oil and its refined products shipped from Africa, the Middle East, Argentina and Alaska into the Caribbean³¹ but also oil and its derivatives are also shipped from Venezuela, Trinidad and Columbia to the USA and other parts of the region. Large storage terminals in St. Lucia, Aruba and St. Eustatius are used as trans-shipment ports for crude oil, thereby contributing to the traffic intensity of the Sea.

The Panama Canal also plays a significant role regarding shipping in the sea and this is expected to increase further with the scheduled expansion of the canal. At its completion in 2014, it is expected that the transit volume will double its present capacity along with a two-fold increase in the present ship size that uses the canal. In addition, this expansion will open a new possibility of using the canal for the transport of liquefied natural gas (LNG), in addition to the higher volume of petroleum and other products. Petroleum shipments represented about 15 percent of total canal traffic in 2006, of which about 60

²⁸ ACS. (2002). "Caribbean Sea." 2002, <http://www.acs-aec.org/tourism>.

²⁹ UNEP (2005) *Natural and Man Made Disasters Threaten Stability of Small islands*. UNEP 16 <http://hq.unep.org/Documents.Multilingual/Default.asp?DocumentID=421&ArticleID=4696&l=en>.

³⁰ Statistics modified from Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES Plymouth PhD: 391.pp.

³¹ Dillion, M. (1995) *Report on Vessel Movement in the Wider Caribbean*. Prepared for IMO 10.

percent went from the Caribbean Sea to Pacific Ocean.³² This expansion of the Panama Canal will add to the intensity of shipping in the Caribbean Sea thereby increasing the environmental threats associated with this activity to the Sea's fragile ecosystems.

Apart from commercial shipping, the Caribbean Sea plays a significant role in cruise ship tourism. The region is regarded as the most visited destination in the world, commanding over 60 % of the world's cruise market.³³ In total, there are over seventy cruise ships from approximately twenty-four cruise companies that operate in the Caribbean Sea.³⁴

Maritime trade also plays a major role in the Caribbean Sea and studies have shown that the economies of the region's fastest growing economic aggregates are linked to maritime trade.³⁵ The maritime container trade has registered the greatest expansion worldwide of which Latin America and the Caribbean has shown remarkable increases.

Collectively, the shipping network suggests a complex pattern of traffic throughout the Caribbean Sea, which includes oil tankers, chemical tankers, yachts, cruise ships, ferries and large fishing vessels.

1.4.2 Oil and Gas Extraction

Apart from the uses identified above, the Caribbean Sea also holds significant deposits of minerals in a number of jurisdictions.³⁶ Trinidad, the largest oil producer in the Caribbean SIDS, has significant gas deposit in the Caribbean Sea which is currently being exploited. Similarly, Cuba is currently expanding its offshore production and areas of the Caribbean Sea hold promising oil prospects.³⁷ Colombia is one of the major oil producers in the

³² Energy Information Administration (2008) *International Energy Annual-Database*
Energy Information Administration
http://www.eia.doe.gov/emeu/iea/Notes%20for%20Table%203_6.html.

³³ Ocean Conservancy (2002) *Cruise Control: a report on how cruise ships affect the marine environment*.
The Ocean Conservancy 68.

³⁴ Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " *SEOES*. Plymouth PhD: 391.pp.

³⁵ Sanchez, J. and M. Ulloa (2007). *The Seaborne Container Trade in Latin America and the Caribbean 2006*. *FAL Bulletin*

³⁶ The Exclusive Economic Zone with a maximum claim of 200 NM give rights to coastal States to exploit, explore, conserve and manage all the living resources and also the non living too. Coastal States have rights to the seabed, subsoil and super adjacent waters. UNCLOS Articles 55-75

³⁷ Anonymous (2008). *Caribbean has overlooked hydrocarbon potential on North America*. *Oil and Gas Journal* **101**(42): 10-15.

region and in its jurisdiction in the Caribbean Sea, preliminary surveys have identified significantly large oil and gas deposits.³⁸ In May 2004, Petrobras from Brazil teamed up with Exxon Mobil Corp (XOM) and Colombia's State-owned company Ecopetrol to explore Tayrona, an area of more than 4.4 million hectares off Colombia's northern coast in the Caribbean waters. Colombia has not ratified UNCLOS, but is currently delimiting its boundaries with neighbouring jurisdictions. Venezuela, a non party to UNCLOS, is one of the largest oil producers in the western hemisphere, and in 2006, ranked as the world's sixth largest net oil exporter.³⁹ Although, most of Venezuela's oil reserves are in the south of the country there is natural gas in the Plataforma Deltana in close proximity to Trinidad and Tobago in the Caribbean Sea. Apart from these established oil producing countries, a few other countries in the region have commenced exploration for oil. In 2007, Nicaragua conducted a licensing round for offshore blocks in the Caribbean and the Pacific basins. Similarly, current geological and seismic data from Jamaica's EEZ have suggested the potential for commercial quantities of oil and gas in the Walton Basin and Pedro Bank areas in the Caribbean Sea.⁴⁰ Explorations are currently being conducted by a number of companies, which began in early 2008.⁴¹ Also, Belize embarked on conducting surveys offshore in 2006.

Given these developments, oil related activities would likely intensify because of the prospect of large, unexplored oil deposits. However, the regulation of the oil and gas sector is done largely by the respective jurisdictions and although not many studies have been conducted on their impacts, it is known from other areas in the world, that these activities have environmental implications, if not regulated effectively. At present, there is no common policy for the region.

³⁸ *ibid.*

³⁹ Energy Information Administration (2008) *International Energy Annual-Database*
Energy Information Administration
http://www.eia.doe.gov/emeu/iea/Notes%20for%20Table%203_6.html.

⁴⁰ Petroleum Corporation of Jamaica. (2008). "Oil and Gas Exploration Activities " 2008,
<http://www.pcj.com>.

⁴¹ *ibid.*

The attributes of the Caribbean Sea, such as, poor nutrient and low productivity, which increases its vulnerability to abnormal anthropogenic pressures, the presence of important habitats which provide ecosystem services⁴² for human well-being both regionally and internationally, the various activities and uses of major economic significance, which has potential for conflicts among the States⁴³, the reliance of a large number of States on coastal based tourism which utilises the services provided by the mangrove, seagrass beds and coral reefs habitats have all contributed to making the Caribbean Sea an important area. It is evident that these vital services, which human communities derive from the Caribbean Sea ecosystems, are being placed in jeopardy, often by the very activities and industries whose long-term future depends on the continued provision of those services. These activities exemplified above are exerting pressures⁴⁴ and accelerating the decline of the environmental quality of the Caribbean Sea⁴⁵ which has implications for governance. Therefore, sustained economic development requires a shift from little or no regard for the Caribbean Sea as an ecosystem to one of recognition of the inter-relationships and inter-dependence between industry and the environment. These inter-linkages are graphically represented in Figure 2.

⁴² Ecosystem services are goods and services people obtain from the ecosystem by either direct or indirect uses. Armenteras, D., A. Singh, M. Bynoe, M. Morales, S. Singh-Renton, J. Cortés, R. López, R. Martínez, N. Rodríguez, R. Guillermo, M. Vides and C. Windt (to be published). Links between environmental changes and human well-being in Latin America and Caribbean. in GEO LAC: State of the Environment Report. E. Provencio, United Nations Environmental Programme: 50.

⁴³ An example of such conflict was between Barbados and Trinidad and Tobago which was taken to the Permanent Court of Arbitration. Refer to case Barbados vs Republic of Trinidad and Tobago accessed at www.Pca-cpa.org on 10 October, 2008

⁴⁴ Refer to Section 2.4 for more information on the pressures on the sea from pollution and activities related to the use and management of both living and non-living resources.

⁴⁵ UNEP (1994) *Regional Overview of Land Based Sources of Pollution in the Wider Caribbean Region*. CEP-UNEP 43; GESAMP (2001) *Protecting the Oceans from Land based Activities: Land-based sources and activities affecting the quality and uses of the marine, coastal and associated freshwater environment*. GESAMP 162. Armenteras, D., A. Singh, M. Bynoe, M. Morales, S. Singh-Renton, J. Cortés, R. López, R. Martínez, N. Rodríguez, R. Guillermo, M. Vides and C. Windt Links between environmental changes and human well-being in Latin America and Caribbean. in GEO LAC: State of the Environment Report. E. Provencio, United Nations Environmental Programme: 50.

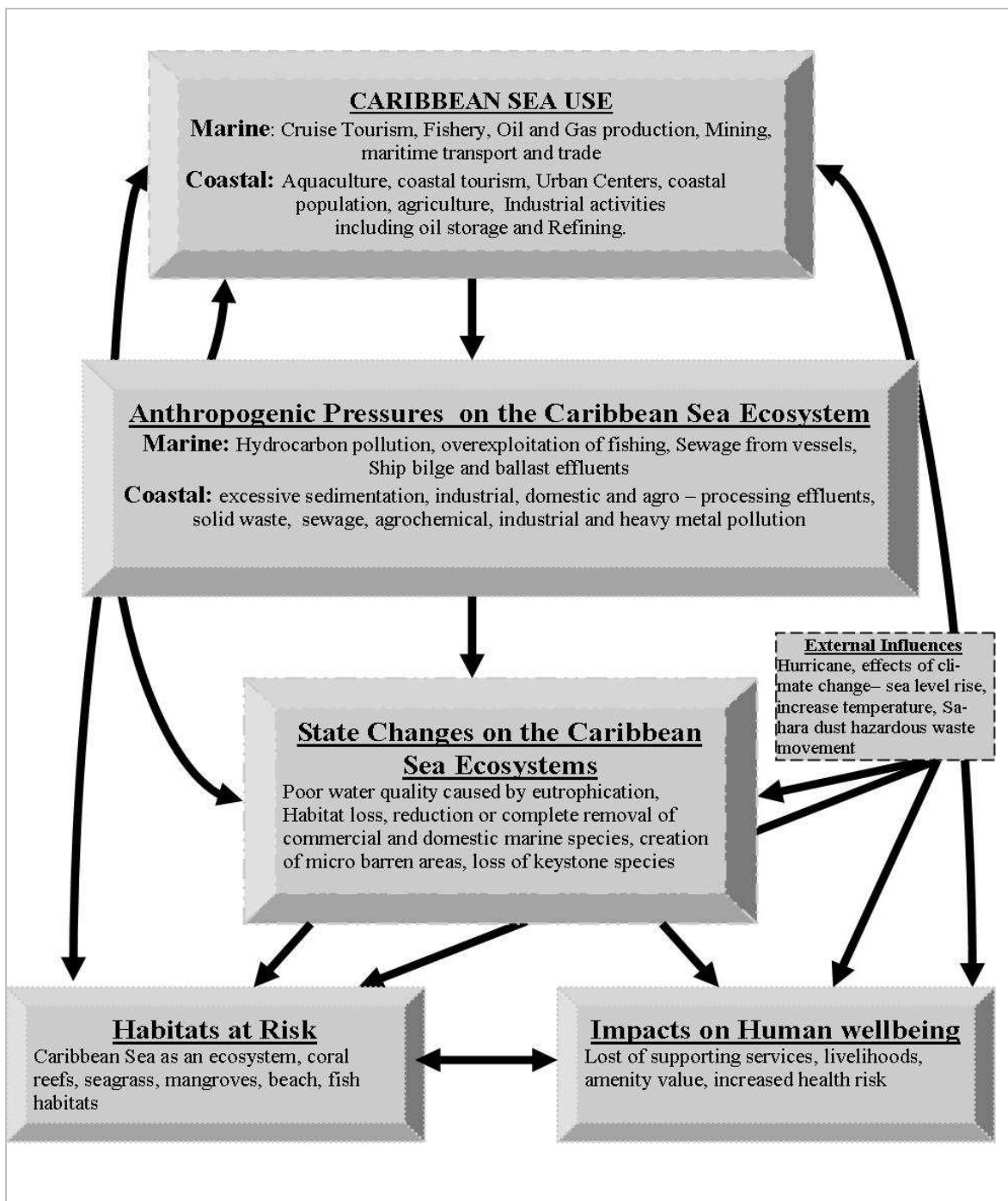


Figure 2: A Causal-Link Approach for illustrating the inter-linkages between Humans and the Caribbean Sea. Source: Source: Compiled by the author using referenced sources⁴⁶

⁴⁶ Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " *SEOES*. Plymouth PhD: 391.pp.
 Kremer, H. H., W. Salomons and C. J. Crossland (2004) *Human Dimension of Land-Based fluxes to the Coastal Zone: LOICZ Approach*. EUROCAT 13.

1.5 Recognition of the Problem

The degradation of the Caribbean Sea is linked to inadequate and ineffective waste management of all forms (land and marine based) and the over-exploitation of both living and non-living resources.⁴⁷ These three areas have implications for sustainable management of the Sea and must therefore be addressed. In addition, there is a disconnect between the way the region manages its terrestrial and marine resources.

However, within the last two decades, a few countries in Latin America and the Caribbean have started closing the gap between their policies for land and maritime resources. This is particularly true of countries whose economies are closely linked to environmental quality in the coastal zone. Recent inventories highlight the considerable scope of management efforts in the region, within countries and the upsurge of regional initiatives responding to these issues and causes.⁴⁸

Among the responses are many programme implementations targeting various sectors or particular issues, the establishment of regional institutions, initiatives and legal agreements including Multilateral Agreements (MAs). However, the degradation of the Caribbean Sea continues and many have pointed to the sea being in crisis.⁴⁹ Therefore, there is a need to promote a paradigm of ocean governance, which can respond more effectively to the issues that are affecting the Sea. In this regard, governance and its role in the Caribbean Sea will be discussed in the following section.

⁴⁷ GESAMP (2001) *Protecting the Oceans from Land based Activities: Land-based sources and activities affecting the quality and uses of the marine, coastal and associated freshwater environment*. GESAMP 162;GESAMP (2001) *A Sea of Troubles*. United Nations Environment Programme 2001.

⁴⁸ Lemay, M. H. (1998) *Coastal and Marine Resources Management in Latin America and the Caribbean*. World Bank 62; Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES. Plymouth PhD: 391.pp;Singh, A. and L. D. Mee (2008). Examination of Policies and MEAs Commitment by SIDS for sustainable management of the Caribbean Sea Marine Policy 32(3): 274-282.

⁴⁹ Armenteras, D., A. Singh, M. Bynoe, M. Morales, S. Singh-Renton, J. Cortés, R. López , R. Martínez , N. Rodríguez , R. Guillermo, M. Vides and C. Windt Links between environmental changes and human well-being in Latin America and Caribbean.in GEO LAC: State of the Environment Report. E. Provencio, United Nations Environmental Programme: 50; Singh, A. and L. D. Mee (2008). Examination of Policies and MEAs Commitment by SIDS for sustainable management of the Caribbean Sea Marine Policy 32(3): 274-282.

Part Two: Governance of the Caribbean Sea

2.1 Introduction

For many people who have lived, worked or spent time in the Caribbean and in particular those who happened to view the Caribbean Sea from above, often described it as “the water wilderness” or “a vast commons.” It is neither. Civilization has left its mark for centuries in the itineraries of ships, the use and misuse of its resources, the records of trade and exploration, and the interactions of nations particularly those that hold jurisdiction over it, but also many others outside the region. Today, the challenge of governance faces the Caribbean Sea with all the complexity and contradiction faced on land in the many Latin America and Caribbean nations.

As evident in the previous section, the need to respond is defined and many calls for improved governance and progressive action are sanctioned for the Caribbean Sea. In this section, governance and in particular, ocean governance will be explored in an effort to add to the current understanding and to examine the current structure of governance in the Caribbean Sea. In addition, the governance structure as it relates to sustainable development will be examined.

2.2 A Review of Governance and its role in Marine Management

The academic literature on governance is eclectic and relatively disjointed, but evidently, governance has various roots in many fields of study and application. This includes institutional, economic, international relations, organisational studies and a range of economic analysis. Governance in its traditional use and dictionary entry is defined as a synonym for government and at times, it is used in this context to convey just that.⁵⁰ This has been argued as being simplistic and does not accurately represent the extent of governance and some instances, governance as meaning government has being completely ignored. By denying governance its simplest definition, then it begs the question of what is governance, and what it encompasses.

⁵⁰ These authors used Governance in place of Government. Osborne, D. and T. Gaebler (1992). Reinventing Government Reading Addison -Wesley. 200 pp.

2.2.1 The meaning of Governance

In the growing work on governance, it is evident that there is a redirection of its use and currently governance has a broader application. This broader application has resulted in many different meanings depending on the context and usage, many of which are somewhat removed from the original intention or meaning.⁵¹ A review of the literature concludes that the term governance is used in a variety of ways and disciplines and has a variety of meanings, which include:

“A change in the meaning of government, referring to a new process of governing, or a changed condition of ordered rule or the new method by which society is governed.”⁵²

“The exercise of economic, political and administrative authority to manage affairs...its comprises of mechanisms, processes and institutions through which stakeholders articulate their interests, exercise their rights, meet obligations and mediate differences.”⁵³

“is the whole of public as well as private interactions taken to solve problems and create opportunities, and includes the formulation and application of principles guiding those interactions and care for institutions that enable them.”⁵⁴

“the structures and processes by which societies share power, shapes individuals and collective actions.”⁵⁵

“Establishes the framework for management”⁵⁶

“constituted by institutions, formal and informal agreements and behaviours, how resources are used, how problems and changes are assessed, the actions permitted or prohibited and the regulation and sanctions applied as the

⁵¹ Adams, T. (1996). Governance of fisheries and aquaculture in the Pacific Islands region Review Paper for the 3rd Dialogue on the ACP-EU Research Initiative Belize, South Pacific Commission: 16.

⁵² Rhodes, R. (1996). The New Governance: governing without Government. *Political Studies* **44**: 652-657.

⁵³ UNDP (1998) *Sharing Knowledge for Good Governance* UNDP 11., cited on page 1.

⁵⁴ Kooiman, J. and M. Bavinck (2005). Governance: A new perspective for fisheries.in Fish for Life: Interactive governance for fisheries. J. Kooiman, S. Jentoft, R. Pullin and M. Bavinck. Amsterdam, Amsterdam University Press: 400.

⁵⁵ Young, O. (2000). Rights, Rules and Resources in World Affairs.in Global Governance. O. Young. London, MIT Press: 1-22.

⁵⁶ Scanlon, J. and F. Burhenne-Guilmin (2004) *International Environmental Governance: An International Regime for Protected Areas*. IUCN 81.

means by which society defines goals and priorities and advances cooperation; be it globally, regionally, nationally or locally. The arrangements are expressed through legal and policy frameworks, strategies and action plans and monitoring performance.”⁵⁷

“the development of governing styles in which boundaries between the sectors are blurred or in an effort to develop a more effective synergy.”⁵⁸

In all attempts to define governance, no single definition is agreed and as evident with the examples provided above, the iterations are numerous. What has emerged however is that governance is multi-dimensional and its definition are based on other aspects, such as the situation to which it is applied.⁵⁹

Apart from its wide and varied definitions, some have argued governance and its theoretical contribution. As Professor Stoker pointed out, “the contribution of the governance perspective to theory is not at the level of casual analysis, nor does it offer a new normative theory, rather the value of the governance perspective is that it provides a framework for understanding the process of governing.”⁶⁰ As a follow up, Judge and colleagues give credence to governance as a conceptual framework, rather than a theory and pointed out that “governance as a framework provides a language and a frame of reference through which reality can be examined and lead theorist to ask questions that might not otherwise occur. The result if successful, is fresh insights that theoretical or other perspective might not have yielded. This conceptual framework of governance can constitute a paradigm shift”.⁶¹

⁵⁷ *ibid*

⁵⁸ *ibid*

⁵⁹ These authors gave notion to governance complexity “Governance is multi-dimensional and is not easily defined” ;Rothwell, D. and D. VanderZwaag (2008). *The Sea Change Towards Principled Ocean Governance in Towards Principled Ocean Governance: Australian and Canadian Approaches and Challenges*. London, Routledge Press: 179.

⁶⁰ Stoker, G. (1998) *Governance as theory: five propositions*. UNESCO 20.

⁶¹ Judge, D., G. Stoker and H. Wolman, Eds. (1995). *Urban Politics and Theory: An Introduction!*. Theories of Urban Politics London Sage 1-13.

Given the many usages of governance, it therefore seems plausible to acknowledge that governance is a concept, which points to a structure or an order resulting from the interaction of the various components or mechanisms to achieve greater efficiency. In addition, it is evident that governance is also being used to capture a shift in the sectoral thinking to one of holistic, linking components and extorting the inter-relationship and linkages. Therefore, perhaps the best way to convey its understanding is to give 'governance' an object. For example, *governance of a company* is the way in which it is administered.⁶² *Fisheries governance* is the way in which the fishery is managed by whoever is managing it.⁶³ This 'object' concept has led to the use of governance in many aspects of management and over the last decade, governance has evolved into areas of resource management as a vehicle to respond to resource degradation and with the aim of achieving sustainable development.⁶⁴ Such notion was highly agreed by the international community and in a compelling manner governance has taken a place in issues regarding environment and development. Within the resource management area, governance had also emerged in ocean affairs⁶⁵ and now the notion of ocean governance is being sanctioned at the international, regional and national levels as the way of dealing with the global ocean crisis.⁶⁶

⁶² Sinclair, J. (1995). Collins Cobuild Dictionary J. Sinclair. London, HarperCollins

⁶³ Adams, T. (1996). Governance of fisheries and aquaculture in the Pacific Islands region Review Paper for the 3rd Dialogue on the ACP-EU Research Initiative Belize, South Pacific Commission: 16.

⁶⁴ The Johannesburg Plan of Implementation viewed governance as the vehicle for achieving sustainable development. It also noted that governance at all levels is essential for sustainable development. UNCED (1994) *Plan of Implementation of the World Summit on Sustainable Development*. UNEP 62.

⁶⁵ The late Dr. Elizabeth Mann Borgese was a strong advocate for sustainable use of the ocean and has been the pioneer of promoting governance of the oceans. She is probably the first to coin the phrase 'ocean governance'.

⁶⁶ Armenteras, D., A. Singh, M. Bynoe, M. Morales, S. Singh-Renton, J. Cortés, R. López, R. Martínez, N. Rodríguez, R. Guillermo, M. Vides and C. Windt Links between environmental changes and human well-being in Latin America and Caribbean. in GEO LAC: State of the Environment Report. E. Provencio, United Nations Environmental Programme: 50. GESAMP (2001) *Protecting the Oceans from Land based Activities: Land-based sources and activities affecting the quality and uses of the marine, coastal and associated freshwater environment*. GESAMP 162; Millennium Ecosystem Assessment (2006) *Millennium Ecosystem Assessment*. UNEP 600 <http://www.millenniumassessment.org/en/subglobal.caribbean.aspx>.

2.2.2 Ocean Governance and its Interpretation

A search on the literature has not revealed a common definition of ocean governance and like governance, it is rather loosely defined. Professor Anderson refers to ocean governance as complex and multidisciplinary approach to the management of coastal and marine resources. Further stating that an element of participatory decision making, evolving attitudes and changing behaviours must also form part of governance.⁶⁷ Anderson's explanation of ocean governance also demonstrates the complex process but no mention was made of the elements of ocean governance. Other studies have attempted to defined ocean governance. For example, Dr. Carayannis defined ocean governance as: "[...] a participatory multi task approach to policy making, which mobilises all public and private, national and international resources for such development".⁶⁸ Dr. Carayannis further defined 'proper ocean governance' as "the implementation of policies and programmes worldwide and an action plan that result in the development of sustainable resources and favourable environmental conditions worldwide."⁶⁹ Further stating that 'since ocean governance makes use of knowledge, skills and energy of all social and scientific groups concerned with the future of the planet earth and its people, proper education and training in ocean related science becomes necessary'.⁷⁰ Dr. Carayannis' definition of ocean governance seems very broad and falls short of the basic elements of policy making. In addition, his attempt at making a distinction between ocean governance and proper ocean governance seem to suggest that ocean governance varies depending on its success (which can leave room for subjectivity). In other instances, some authors have captured ocean governance in a philosophical manner by teasing apart 'Ocean' and 'Governance'. For example, Dr. Bailet viewed ocean governance as 'Ocean' which implies the holistic nature of the ocean and recognises that problems are closely interrelated and therefore must be treated as a

⁶⁷ Anderson, C. (2006). Ocean Governance Theory- the practical realities. Proceedings, Pacem in Maribus XXX1, Townsville, Australia, International Ocean Institute 191-193.

⁶⁸ Pararas-Carayanisis, G. (2008). "Ocean Governance and Sustainability –Present Trends and Future Challenges " Retrieved 6th November 2008, <http://www.drgeorgepc.com/oceangovernance.html>.

⁶⁹ ibid

⁷⁰ ibid

whole AND ‘governance’ which implies the inclusive nature of decision making and implementation.⁷¹

These examples cited above have demonstrated the nuances of what governance is and particularly what ocean governance really means. These definitions have all attempted to cover ocean governance in its broadest sense. These definitions also suggest that ocean governance is ‘everything’ that is influencing the way in which the oceans are used and managed. This maybe true, but what seems to be missing or oversimplified from the definitions in the various literatures cited in this study is the importance of the foundation of ocean governance which necessitates the various other components. This seemingly oversimplification can lead to many misunderstandings of ocean governance. Therefore, in view of this lacuna, the author will tease apart the critical components of ocean governance in an effort to build on the information available in the literature and to formulate a definition of ocean governance.

2.2.3 Teasing Apart Ocean Governance

Based on the current understanding, ocean governance can be seen as composing of many components, of which some may precede others, but collectively they share a high degree of inter-linkage. In this regard, the components are as follows:

1. First and foremost, governance lies in a legal core in which the fundamental basis of ocean governance is to be given the ‘right and space to govern the ocean and its resources.’⁷² Therefore, some form of measures must be in place to codify these rights, which can be granted by way of a legal instrument (UNCLOS), and/or it can be under customary international law.⁷³ These legal instruments form the core of any ocean governance mechanism. If this is absent, then there will be no impetus or reason to govern.
2. Secondly, in exercising the right to govern a particular space also means that there is an obligation to protect the resources found in that space. Therefore,

⁷¹ Baillet, F. "Ocean Governance:Towards an Ocean Circle." Retrieved 20 August 2008, http://www.un.org/depts/los/convention_20years/presentation-ocean_governance_frbailet.pdf

⁷² Govern is defined in the Webster Dictionary as ‘exercise authority over’; Anonymous (2007). Mariam-Webster, Mariam-Webster

⁷³ Cicin –Sain and Knecht advocated a ‘legal regime’ approach to ocean governance. Refer to Cicin-Sain, B. and R. W. Knecht (2000) *The Future of U.S Ocean Policy: choices for the new century*. University of Delaware 16.

there must be interventions, which will assist in executing the rights and meeting the obligations (responsibility). These interventions can be in the form of programmes, policies and guidelines among others.

3. In order for the legal instruments and interventions to be effective, there must be institutions (implementing mechanisms), which are used to execute and facilitate the various mandates prescribed.
4. The above three components can only be executed by taking into consideration the multitude of stakeholders and the social, economic and cultural aspects of society.

These components then form the foundation for ocean governance (shown in Figure 3). Therefore, in descriptive terms, ocean governance is “the ability to govern the ocean as prescribed in forms of legal instruments and/or customary international law and supplemented by policy, programme and institutional interventions at the international, regional and national levels, all done in a holistic manner with effective synergies among the various entities, taking into consideration the social, cultural and economic factors.”

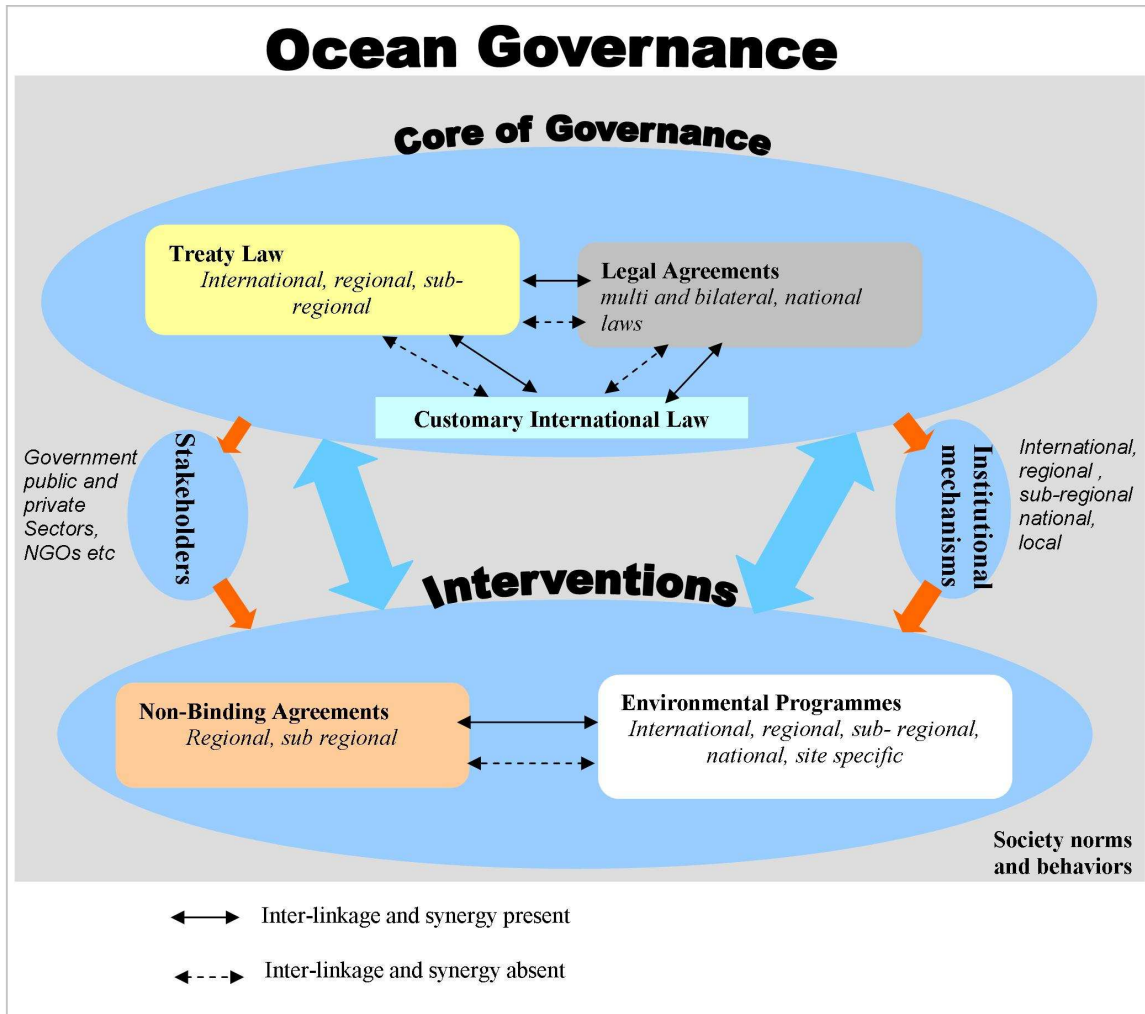


Figure 3: A Conceptual Framework of Ocean Governance. The core of governance shows the various legal agreements, which provide the legal basis/right to govern and the Interventions show the various instruments which support the core. Both core of governance and interventions are effected by a large number of implementing mechanisms facilitated by various institutions and stakeholders. These take into account society norms and behaviours.

Source: Created by the author, 2008

Ocean governance is advocated throughout the world, occurring within national, regional or international boundaries as a way of resolving tension and to seek coherence between economic and environmental interests. It is particularly important in semi-enclosed and enclosed seas where resources are shared and economic interests are significant. Hence, the governance structure becomes critical in ensuring these are done harmoniously. Some governance mechanisms can either promote sustainable development or be ineffective. In this regard, the current governance mechanism for the Caribbean Sea will be examined in the following section in an attempt to decipher its effectiveness with regard to sustainable development.

2.3 An Examination of the Current Ocean Governance Mechanism in the Caribbean Sea

Upon examination, the Caribbean Sea governance (shown in Figure 3) seems to be shaped by a collection of MEAs, political agreements, non-binding agreements, programmes, projects and national laws, which exists at various levels. Certain policies relating to the sea are determined at the international level while others are done at the regional and sub-regional levels. This governance mechanism is being supported by a multitude of stakeholders and a number of implementing agencies.⁷⁴ The implementation of these may involve all the jurisdictions that exercise ownership in the Sea or done in core groups.

As illustrated in the Figure 3, ocean governance for the Caribbean Sea is driven by UNCLOS. This agreement, which is international in scope, provides an essential framework for governance. As the framework, UNCLOS provides three major aspects which have shaped the way the Caribbean Sea is governed. These are:

⁷⁴ Stakeholder participation and the implementing agencies play a significant role in governance. However, this paper focuses on the governance from the legal, diplomatic and political perspective. Wherever, it is deemed important, reference to institutional mechanism and stakeholders will be incorporated into the analysis.

1. It provides the rights to Coastal States of the Caribbean Sea by granting jurisdiction up to a maximum of 200 NM (EEZ) where possible.⁷⁵ The EEZ give rights to the Coastal States in the Caribbean Sea to exploit, explore, conserve and manage all the living resources and the non-living too. In addition, UNCLOS give rights to the seabed, subsoil and super adjacent waters.⁷⁶ However, Coastal States have limited rights with regard to establishing islands and artificial islands.⁷⁷

2. It elaborates many responsibilities, which includes pollution⁷⁸ prevention and the sustainable use and management of both living and non-living marine resources.⁷⁹

3. Given the nature of the living resources of this semi-enclosed sea, which are often shared, UNCLOS articulates the need for cooperation.⁸⁰

⁷⁵ This 200 NM includes the territorial sea and the Contiguous zones. **The Territorial Sea**

All the Countries in this region claimed territorial water of 12 NM (Art.2) except for Dominican Republic which claimed 6 NM. Under UNCLOS, the right of ‘innocent passage’ applies to all vessels in the territorial sea including naval and merchant ships. **Contagious Zone** In this zone, coastal states can claim an additional 12 NM (Art 33 (1) and coastal states can exercise control in terms of pollution prevention and immigration regulation and also have rights to exploit the resources. Fifteen countries in the region made claim to this zone. **Straits and Passages** Geographically, there are 9 straits⁷⁵ (Table 3) in the Caribbean Sea and UNCLOS gives rights of passage for the purpose of continuous and expeditious transit through the passage (Art.38). States bordering the straits and passages may put into effect international standards and regulations to deal with environmental pollution, fishing and sanitary laws. UNCLOS, Article, 36.

⁷⁶ UNCLOS, Articles 55-75

⁷⁷ UNCLOS, Articles 56 (1) (b) and 60 and Parts X11 and X111

⁷⁸ UNCLOS defines pollution of the marine environment and dumping as the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which result, or is likely to result, in such deleterious effects as harm to living resources and marine life. Other definitions included are hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.

⁷⁹ Refer to Section 2.4 for analysis on pollution, sustainable use and management of both living and non-living resources.

⁸⁰ UNCLOS, Article 123 states that:

States bordering an enclosed or semi-enclosed sea **should** cooperate with each other in the exercise of their rights and in the performance of their duties under this Convention. To this end they **shall** endeavour, directly or through an appropriate regional organization:

- (a) to coordinate the management, conservation, exploration and exploitation of the living resources of the sea;
- (b) to coordinate the implementation of their rights and duties with respect to the protection and preservation of the marine environment;
- (c) to coordinate their scientific research policies and undertake where appropriate joint programmes of scientific research in the area;
- (d) to invite, as appropriate, other interested States or international organizations to cooperate with them in the furtherance of the provisions of this article.

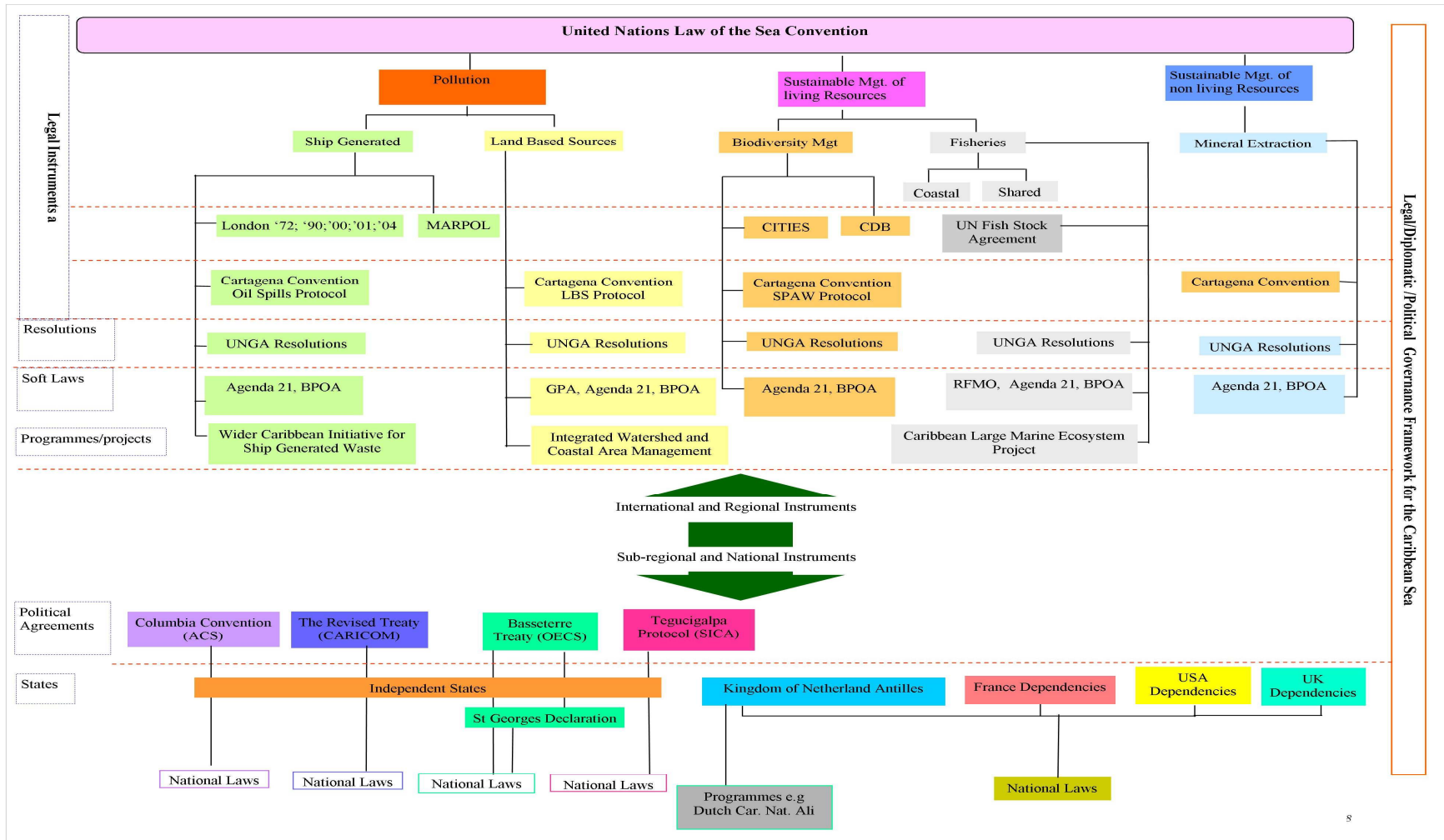


Figure 3: The legal, political and diplomatic governance mechanism in the Caribbean Sea with respect to three core sustainable development issues. The institutions and stakeholders, which are an integral part of governance, are not represented in this diagram.

Source: Created by the author, 2008.

In the Caribbean, UNCLOS has the highest ratification rate than any other international environmental agreements (refer to Table 1).

Convention	Status	States	Signed	Ratified or Acceded	# of Non Party members
United Nations Convention on Law of the Sea (UNCLOS)	Adoption: 1982 Entry into force: 1994	Independent States (total of 21)	2 ⁺	18	1 [*]
		OTs (total of 16)		8 ⁺⁺	7 [^]

Table 1: The Status of UNCLOS in the Caribbean Sea . Refer to footnote 4 for the list of States in the Independent States and OTs categories. Source: Compiled by the author using referenced sources⁸¹

* Venezuela is not a Party to UNCLOS but became party to the 1958 Convention on the Territorial Sea and the Contiguous Zone

+ Colombia and Dominican Republic signed but yet to ratify

^ THE Netherlands ratified UNCLOS, but for its Kingdom in Europe, hence not applicable to its OTs in the Caribbean Sea

The USA is not party to UNCLOS, but has signed the Vienna Convention on Law of the Treaty (referred to article 18 and 29), hence the Conventions it ratify are also applicable to its OTs.

++ UK acceded/ the Convention on behalf of its OTs in the Caribbean Sea.

++ France ratified the Convention on behalf of its OTs in the Caribbean Sea.

Other Legal Instruments is another component in the Caribbean Sea governance. Despite, UNCLOS sanctions many obligations; it does not set out any rules, regulations and guidelines on how States can execute these obligations. Rather, it articulates the need to adhere to international agreed standards. To augment UNCLOS especially with regard to the obligations for environmental protection, a number of legal international and regional instruments focusing on specific areas have been negotiated or those existing prior to UNCLOS were renegotiated or use in the same form to augment UNCLOS. These mechanisms fall under the jurisdiction of various international organisations and regional organisations, which have specific mandates such as MARPOL.

Soft Laws are used to further compliment UNCLOS and the other legal instruments present in the Caribbean Sea, a caveat of international declarations, policy guidance documents and programmes of actions, which set forth principles, guidelines and

⁸¹ UNDOALOS. (2008). "UNCLOS Database: List of Ratifications " 2008, <http://www.doalos.org>.

recommendations, were sanctioned in support of these agreements, for example Agenda 21. In addition, a number of Caribbean wide projects dealing with specific issues were initiated to further augment these agreements.

Resolutions are another component of Caribbean Sea governance. In the late 1990s, a significant development emerged in the Caribbean Sea, which is the UNGA sanctioned resolutions (hereon refer to as the resolution)⁸² for sustainable management of the Caribbean Sea.⁸³ This resolution which is an initiative of the Association of Caribbean States (ACS) is an attempt at seeking recognition of the ‘specialness’ of the Caribbean Sea in addition, to augmenting UNCLOS, especially in protection of the sea.

Political/Diplomatic Agreements: At the regional level and sub-regional levels, there are also a number of politically initiated agreements, which have bearings on the protection and use of the Caribbean Sea.⁸⁴ These agreements in turn influence sub-regional agreements and national laws⁸⁵ of its members.

Collectively, these various components form the current governance mechanisms in the Caribbean Sea. Given the region’s attempt at using the resources in the context of integrated sustainable management, this current governance mechanism will be examined further to determine its effectiveness in this regard. Three thematic areas will be used which are pollution, sustainable use and management of both living resources and non-living resources. Such examination is important because these instruments may be either complimentary of each other, or in some cases conflicting or simply inadequate to respond to these core environmental issues, thereby having implication for sustainable management of the Caribbean Sea.

⁸² Refer to Section 2.4.2.2 for information on the nature of the resolutions

⁸³ Refer to Part 3 for an analysis of the effectiveness of this initiative

⁸⁴ Refer to Section 2.4.1.1.2 for more information on these Agreements.

⁸⁵ In this paper, the national laws of the 36 States will not be discussed. However, their implications and significance for ocean governance where necessary will be examined.

2.4 Caribbean Sea Governance and its application in Sustainable Management

2.4.1 Pollution

Pollution affecting the Caribbean Sea is both marine (specifically ship-generated waste) and from land based sources. The magnitude of pollution varies from locale to locale, and is influenced by the scale of activities of the particular place. The information provided in the various overviews throughout this section is a generalised view of the situation in the Caribbean Sea, however, where available site specific examples will be cited.

2.4.1.1 Ship Generated Pollution

2.4.1.1.1 Overview of Pressures

Ship generated waste is one of the major contributors of pollution in the Caribbean Sea, emanating mainly from operational ballasting activities of ships, accidental oil spills and tank washing, solid waste and sewage. Oil pollution is significant and UNEP noted that, it prevails throughout the Caribbean Sea and is regarded as one of the most significant threats to marine life.⁸⁶ Heavy traffic movement of petroleum and its derivatives from the region's refineries, container shipping and shipment through the Panama Canal are most likely exacerbating the pollution problem.⁸⁷ UNEP in 1994 estimated that in excess of 50% of the pollution is caused by ballasting and emptying of bilges in the Caribbean region.⁸⁸ Similarly, in 1997, it was estimated that in excess of seven million barrels of oil were discharged annually into the marine environment from operational ballast activities and tank washing.⁸⁹ In the current scenario, it is likely that this number will be higher because of the growing shipping network and traffic caused in part by increase demands for products by emerging economies, globalization and trade liberalization. This is likely to further increase as a result of the expansion of the Panama Canal. The high level of

⁸⁶ UNEP (1994) *Regional Overview of Land Based Sources of Pollution in the Wider Caribbean Region*. CEP-UNEP 43.

⁸⁷ Refer to Section 1.4 for information on shipping in the Caribbean Sea

⁸⁸ UNEP (1994) *Regional Overview of Land Based Sources of Pollution in the Wider Caribbean Region*. CEP-UNEP 43.

⁸⁹ Botello, A. V., S. Villanueva and G. Diaz (1997). Petroleum Pollution in the Gulf of Mexico and the Caribbean Sea. *Rev. Environ. Contam. Toxicol.* **153**: 91-118.

discharge is also compounded by the lack of waste reception facilities for oil products in the region's ports. Scattered in the Caribbean Sea, are two hundred ports of which sixty-two (28%) handles oil and oil products, however, only twenty-two (35%) have oil/slop or ballast reception facilities.⁹⁰ In the Caribbean Sea, inadequate reception facilities can promote oil pollution especially in the absence of surveillance thereby compromising the integrity of the marine environment. Although oil pollution is controlled under MARPOL, ballasting is viewed as operational discharge and therefore does not fall under the stipulations under its annexes.

Oil spills also pose a huge risk to the Caribbean Sea. Since 1960 there have been in excess of seven incidences of oil spills which discharged between 7, 000 – 83,400 barrels of oil into the sea⁹¹ with most of the spills occurring in the vicinity of Puerto Rico and the USVI.⁹² Small spills have also been reported, and data available for the Caribbean SIDS, shows that between 1960-1995, twenty-eight vessel spilled in excess of 240 barrels (>10,000 gallons) in the sea with Cuba and Dominican Republic recording the highest. Ship collision also contributes to hydrocarbon pollution. In 2001, two ships collided in the vicinity of the Colombian port of Cartagena and at least 20 tonnes of oil was spilled into the Caribbean Sea.⁹³ Field monitoring data indicated that oil can be found throughout the Caribbean Sea, of which high levels of Dispersed/Dissolved Petroleum Hydrocarbons (DDPH) were recorded at various cruise stations in the South Eastern part of the Caribbean Sea⁹⁴, and in other areas of the sea.⁹⁵ In addition, reports of the presence of floating tar has also been documented for some areas of the sea.⁹⁶

⁹⁰ Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES. Plymouth PhD: 391.pp.

⁹¹ *ibid.*

⁹² *ibid.*

⁹³ BBC World Service (2001). Second Oil Spill in Latin America. BBC .

⁹⁴ Persad, D. and W. Rajkumar (1995). A Synoptic view of the level of Dispersed/Dissolved Petroleum Hydrocarbons (DDPH) and heavy metals in the South Eastern Caribbean Sea. *Marine Pollution Bulletin* **30**(7): 487-489;Fernandez, A., A. Singh and R. Jaffe (2007). A literature review on trace metals and organic compounds of anthropogenic origin in the Wider Caribbean Region *Marine Pollution Bulletin* **54**: 1681-1691.

⁹⁵ Harvey, G. R. (1987). A Personal Overview of Oil in the Marine Environment. *Journal of Caribbean Science* **23**(1): 5-10.

⁹⁶ Richardson, Q. B. R., J. A. C. Laasen and E. M. G. Ujsbertha (1987). Tar Pollution Monitoring in Curaçao. *Caribbean Journal Science* **23**(1): 145-152.

Another form of waste is solid waste and the cruise industry plays a significant role in this regard. The most visited destination in the world⁹⁷ “the Caribbean” also means the highest amount of waste generation in the cruise industry and according to the International Maritime Organisation (IMO), each tourist generates about 3.5 kilos of waste per day. In 2000, the Caribbean had 21,510,142 beddays⁹⁸ and generated in excess of 75 metric tons of waste.⁹⁹ In comparison, the Mediterranean had 6,277,064 beddays and generated close to 22 metric tons for the corresponding year.¹⁰⁰ This data suggest that the Caribbean cruise industry produced close to four times more waste than the Mediterranean. If the waste generated by the cruise industry is not disposed properly, there can be far reaching consequences to marine life such as diseases, and physical damage.¹⁰¹

Sewage and grey water are other forms of ship generated waste and although container shipping and other forms of commercial ships do contribute to this problem, the cruise industry is significant because of its cargo. According to Ocean Conservancy, a typical cruise ship plying the Caribbean Sea has a 3,000 capacity, which is capable of producing 30,000 gallons of sewage and 255,000 gallons of grey water per day.¹⁰² How much of sewage, grey water and solid waste ends up in the marine system of the Caribbean Sea is generally unknown, except for a few cases of prosecution¹⁰³, as there is no major policing in the Caribbean Sea for the cruise industry.¹⁰⁴

⁹⁷ Refer to Section 1.4 for additional information on the cruise industry in the Caribbean Sea.

⁹⁸ It is a common measurement used in the cruise industry. Beddays are calculated by multiplying the number of beds occupied on a ship by the number of days; Ocean Conservancy (2002) *Cruise Control: a report on how cruise ships affect the marine environment*. The Ocean Conservancy 68..

⁹⁹ *ibid.*

¹⁰⁰ *ibid.*

¹⁰¹ In response, the Caribbean Sea has being granted special area status under the MARPOL Convention Annex V which was entered into force in 1994, but has yet to be implemented. Refer to IMO. (2002). "Special Area." 2004, <http://www.imo.org/home.asp>.

¹⁰² Ocean Conservancy (2002) *Cruise Control: a report on how cruise ships affect the marine environment*. The Ocean Conservancy 68.

¹⁰³ GESAMP (2001) *A Sea of Troubles*. United Nations Environment Programme 2001.pg 14. This report notes that about one third of the wasted dumped by cruise ships in the Caribbean is done deliberately. In the recent past, Norwegian Cruise Lines, Carnival Corp. and Royal Caribbean Cruises all have faced fines ranging from \$1 million to \$27 million for illegal pollution of the marine environment. Further these companies have engaged in production of fraudulent documents to cover up their wrong-doing. In November, 2002 Norwegian was given the smallest fine of \$1 million because of its efforts to report, cooperate and change its operating procedures. Adams, M. (2002). *US Keeps Wary Eye on Cruise Ships for*

The consequences of ship-generated pollution cannot be overstated because it pose a serious threat to the sea's water quality, ecosystems, habitats and even single species. This in turn, affects the long-term viability of the Caribbean Sea to provide the valuable goods and services to humankind.

2.4.1.1.2 The Current Governance Structure in the for Ship Generated Pollution Management in the Caribbean Sea

Governance regarding ship-generated waste is sanctioned at the international and regional levels via conventions, treaties and programmes, which in some instances are translated to the sub-regional and national levels, enshrined in laws, regulations and programmes. Over the last few decades, a number of legal instruments and programmes have responded, including UNCLOS. Many of these international agreements have influenced the governance, as evidenced by the number of States in the region that have signed, ratified or acceded to them as shown in Table 1. The applicable provisions in each initiative regarding ship-generated waste are discussed below.

More Pollution. Miami USA Today. Miami, www.usatoday.com/travel/news/2002/2002-11-08-cruise-dumping.htm.

¹⁰⁴ The surveillance in the Caribbean Sea is weak, because of limited financial and technical capabilities. For more information on surveillance in the Caribbean Sea. See Mitchell, C. (2007). "Countering Maritime Terrorism in the Caribbean Sea and the Atlantic Ocean: Implications of Possible Maritime Terrorism in the Caribbean " *U.S Army Command and General Staff Collage MSc.*: 76.pp.

Convention	Status	State	Signed	Ratified or Acceded					# of non party members
Ship Generated									
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters (1972) and 1996 Protocol	Adoption: 1972, 1996 Entry into force: 1974;2006	Independent States (total of 21)		14					7
		OTs (total of 16)		5					11
Convention for the Prevention of Pollution from Ships (MARPOL 73/78)	Adoption: 1978 Entry into Force: 1983 along with Annex 1 and 11. Annex VI: 2005	Independent States (total of 21)		1& 11	111	1V	V	VI	
		OTs (total of 16)		18	15	14	18	6	
International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990	Adoption: November 1990 Entry into force: May 1995	Independent States (total of 21)		10					11
		OTs (total of 16)		2					14
Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS Protocol)	Adoption: March 2000 Entry into force: June 2007	Independent States (total of 21)		2					19
		OTs (total of 16)		0					16
International Convention on the Control of Harmful Anti-fouling Systems on Ships	Adoption: October 2001 Entry into force: pending	Independent States (total of 21)		3					18
		OTs (total of 16)		0					16
International Convention for the Control and Management of ship Ballast water and Sediments	Adoption: February 2004 Entry into force: pending	Independent States (total of 21)		3					18
		OTs (total of 16)		0					16
Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena)	Adoption: March 1983 Entry into force: October 1986	Independent States (total of 21)	2	18					1
		OTs (total of 16)		16					
A Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region	Adoption: 1983 Entry into force: October 1986	Independent States (total of 21)	1	19					1
		OTs (total of 16)		16					0
Land Based Sources of Pollution									
A Protocol for Land Based Sources of pollution in the Wider Caribbean (LBS Protocol)	Adoption: October, 1999 Entry into force: pending	Independent States (total of 21)	3	2					16
		OTs (total of 16)	8	4					4

Table 2: The Status of the various ship related Conventions. Refer to footnote 4 for the list of States in the Overseas Territories (OTs) and Independent States categories.

Sources: Compiled by the author using referenced sources¹⁰⁵

¹⁰⁵ UNEP/CEP. (2004). "An Overview of the Cartagena Convention." Retrieved 01-11-05 2005, <http://www.cep.unep.org/who/ctf.php>; IMO. (2008). "Marine Environment Conventions." Retrieved 07 July 2005, <http://www.imo.org/home.asp>.

UNCLOS: This convention has within its provisions, laws governing pollution which are enforceable by the coastal States from vessels.¹⁰⁶ As such, ships using transit passages must comply with generally acceptable standards and regulations for the prevention, reduction and control of pollution from ships.¹⁰⁷ *UNCLOS* also states that coastal States¹⁰⁸ may adopt internationally acceptable laws to prevent pollution from ships in areas under their sovereignty¹⁰⁹, which includes territorial waters and the EEZ. In terms of pollution management and surveillance, coastal States may require a vessel in transit, to provide information on its identity, port of registry and its last and next port of call, if there is evidence that it has been responsible for pollution in that state's territorial waters or EEZ.¹¹⁰ If the vessel refuses to provide the requested information, the coastal State has the right to inspect the vessel and, if there is evidence to substantiate the claim, the vessel may be detained and proceedings initiated against it.¹¹¹

Convention on the Prevention of Marine Pollution by Dumping of Waste and other Matter (London Convention 1972): This convention contributes to the control and prevention of marine pollution by prohibiting the dumping¹¹² of certain hazardous materials.¹¹³ Among the requirements, contracting Parties undertake to designate an authority to deal with records, permits¹¹⁴ and monitor the condition of the sea.¹¹⁵ Other articles are designed to promote regional co-operation with respect to *inter alia* the disposal and treatment of waste and monitoring among others.¹¹⁶ As part of the provision

¹⁰⁶ *UNCLOS*, Article 36

¹⁰⁷ *UNCLOS*, Article 38

¹⁰⁸ The term 'Coastal States' used for *UNCLOS* in this study refers to the Countries in the Caribbean Sea that are party to said agreement. Refer to Table 1 for the number of Contracting Parties

¹⁰⁹ *UNCLOS*, Article 211 (5)

¹¹⁰ *UNCLOS*, Article 220

¹¹¹ *ibid*

¹¹² London Convention, Article 111 defines dumping as *inter alia* "[...] any deliberate disposal at sea of wastes or other matter from vessels [...] at sea, however, operational discharges are not classified as dumping and are permitted."

¹¹³ London Convention, Article 1V classifies waste under three Annexes. Depending on the annex, the waste are either prohibited, requiring a prior special permit or requiring a general permit.

¹¹⁴ London Convention, Article VI

¹¹⁵ London Convention, Article V111

¹¹⁶ London Convention, Article 1X

of this convention, certain types of waste are permissible for dumping, subject to the granting of either a special permit or a general permit.¹¹⁷

1996 Protocol: This protocol is part of the 1972 Convention. The 72 convention permits dumping to be carried out provided certain conditions are met. The severity of these conditions varies according to the danger to the environment presented by the materials themselves, and those which are not permitted are enumerated in a "black list". However, in 1996, the London Protocol was agreed to further modernize the London Convention with plans to replace it in due course. Under this protocol all dumping is prohibited except for waste on the so-called "reverse list".¹¹⁸

Convention on Oil Pollution from Ships 73/78 (MARPOL): This convention is very significant in dealing with ship-generated waste. Its objective of "desiring to achieve the complete elimination of intentional pollution of the marine environment by oil and other harmful substances"¹¹⁹, acknowledges the importance of the marine environment for human survival and the negative impacts of oil on the environment. It also attempts at instituting measures aimed at minimising accidental discharges¹²⁰ of such substances.¹²¹ A caveat of restrictions is found in the various annexes¹²² in which limits and conditions for dumping were outlined.¹²³ The general aim of MARPOL is to prevent¹²⁴ and

¹¹⁷ The London Convention Annexes list wastes which cannot be dumped and others for which a special dumping permit is required. The criteria governing the issuing of these permits are in the Annex 111 which deals with the nature of the waste material, the characteristics of the dumping site and method of disposal.

¹¹⁸ 1996 Protocol, Article 1 lists dredge materials, sewage sludge, fish waste, vessel platforms, inorganic and organic material, bulky items and Carbon dioxide streams. However, operational discharges are not classified as dumping and therefore permitted.

¹¹⁹ MARPOL defines harmful substances as including anything that harms marine life or damage to amenities

¹²⁰ MARPOL defines discharge "any release howsoever caused [...] and includes any escape, disposal, spilling, leaking pumping, emitting or emptying."

¹²¹ MARPOL, Preamble

¹²² MARPOL Annex I: Regulations for the Prevention of Pollution by Oil, MARPOL Annex II: Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk MARPOL Annex III: Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form – stipulates requirements for labelling, packing, documentation, storage and preventing pollution of harmful substances; MARPOL Annex IV : Prevention of Pollution by Sewage from Ships- Annex V: Prevention of Pollution by Garbage from Ships- prohibits disposal of plastics and severely restricts discharges of other garbage into coastal waters of 'special area; MARPOL Annex VI: Prevention of Air –sets limits on sulphur dioxide and nitrogen oxides emission form ships.

¹²³ Ibid

¹²⁴ There is an exception within this convention. MARPOL, Article 3 (b) (i) for dumping under the Dumping Convention and (ii) sea bed mineral resources exploitation

minimize pollution from ships – from both accidental pollution and routine operations. This convention works on the basis of certifying ships in terms of safety and pollution compliance. Under the various annexes, MARPOL stipulates that any discharge of waste must be done at a minimum distance from any land mass. The stipulations are as follows¹²⁵:

1. MARPOL, Annex 1 (Oil): The maximum quantity of oil permitted to be discharged on a ballast voyage of new oil tankers was reduced from 1/15,000 of the cargo capacity to 1/30,000 of the amount of cargo carried. These criteria applied equally both to persistent (black) and non-persistent (white) oils, the rate at which oil may be discharged must not exceed 60 litres per mile travelled by the ship. No discharge of any oil whatsoever must be made from the cargo spaces of a tanker within 50 miles (43 NM) of the nearest land;
2. MARPOL, Annex 11 (Noxious liquid Substances): Some 250 substances were evaluated and included in the list appended to the Convention. The discharge of their residues is allowed only to reception facilities until certain concentrations and conditions (which vary with the category of substances) are complied with. In any case, no discharge of residues containing noxious substances is permitted within 12 miles of the nearest land. Restrictions that are more stringent are applied to special area such as the Baltic and Black Seas;
3. MARPOL, Annex V1 (Sewage): The discharge of sewage into the sea will be prohibited, except when the ship has in operation an approved sewage treatment plant. comminuted and disinfected sewage using an approved system can be discharged at a distance of more than 3 nautical miles from the nearest land. Sewage which is not comminuted or disinfected can be discharged at a distance of more than 12 nautical miles from the nearest land.

The International Convention on Oil Pollution Preparedness, Response and Co-operation – OPRC (London 1990): This Convention prescribes certain regulations for oil pollution prevention.¹²⁶ It stipulates that ships must carry an oil pollution emergency plan¹²⁷ and operators of offshore units under the jurisdiction of contracting parties are required to have oil pollution emergency.¹²⁸ In addition, these plans and arrangements must be in co-ordination with national systems in order to enable prompt and effective

¹²⁵ MARPOL Convention

¹²⁶ OPRC, Article 1

¹²⁷ OPRC, Article 2

¹²⁸ OPRC, Article 3 (2)

response to oil pollution incidents.¹²⁹ Contracting Parties should forge international cooperation at all levels in combating major incidents or threats of marine pollution.¹³⁰ In forging such cooperation, cognizance must be taken of the special needs of some countries including developing and SIDS.¹³¹ A further provision is that ships are required to report incidents of pollution to coastal authorities and the convention details the actions that should be taken in this regard.¹³²

Protocol on the Preparedness, Response and Cooperation to Pollution Incidents by Hazardous and Noxious Substances (London 2000): This protocol follows the principles of OPRC, 1990. It aims to provide a global framework for international co-operation in combating major incidents or threats of marine pollution, specifically dealing with hazardous and noxious substances.¹³³ Parties to the Hazardous and Noxious Substances (HNS) Protocol are required to establish measures for dealing with pollution incidents, either nationally or in co-operation with other countries.¹³⁴ Ships are required to carry a shipboard pollution emergency plan to deal specifically with incidents involving HNS.

The HNS Protocol¹³⁵ ensures that ships carrying hazardous and noxious liquid substances are covered by preparedness and response regimes similar to those already in existence for oil incidents.¹³⁶

International Convention on the Control of Harmful Antifouling Systems on Ships (London 2001): Given the increased understanding of the impacts of harmful

¹²⁹ OPRC, Article 3 (3)

¹³⁰ OPRC, Article 7

¹³¹ OPRC, Preamble

¹³² OPRC, Article 4 (a) (i)

¹³³ For the purposes of the HNS Protocol, a Hazardous and Noxious Substance is defined as any substance other than oil which, if introduced into the marine environment is likely to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea. Article 2

¹³⁴ OPRC/HNS, Article 3

¹³⁵ It should be noted that the definition of an HNS as defined by the OPRC-HNS Protocol 2000 differs widely from the definition of an HNS under the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances (HNS) by sea, otherwise known as the HNS Convention. See the relevant conventions for the various definitions.

¹³⁶ OPRC/HNS Convention, Article 5

organotins¹³⁷, it is pertinent for such a convention to be initiated. This convention prohibits and/or restricts the use on ships¹³⁸ of anti-fouling paints, which contain harmful organotins.¹³⁹ This convention moved away from the norm to include ships flying flags of Contracting Parties, as well as ships not entitled to fly their flag but which operate under their authority and all ships that enter a port, shipyard or offshore terminal of a Party.¹⁴⁰

The Annex to the Convention stipulated that all ships should not apply or re-apply organotins compounds, which act as biocides in anti-fouling systems. Further, ships¹⁴¹ shall either:

1. not bear such compounds on their hulls or external parts or surfaces;
2. bear a coating that forms a barrier to such compounds leaching from the underlying non-compliant anti-fouling systems.

In addition, Contracting Parties are given the right to take, individually or jointly with other Parties, more stringent measures with respect to the prevention, reduction or elimination of the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments, consistent with international law.¹⁴² Parties should ensure that ballast water management practices do not

¹³⁷ The harmful environmental effects of organotin compounds were recognized by the International Maritime Organisation (IMO) in 1989. In 1990, IMO's Marine Environment Protection Committee (MEPC) adopted a resolution which recommended that Governments adopt measures to eliminate the use of anti-fouling paint containing Tributyltin (TBT). The resolution called for a global prohibition by 1 January 2008. IMO. (2008). "Marine Environment Conventions." Retrieved 07 July 2005, <http://www.imo.org/home.asp>.

¹³⁸ Contracting Parties are required to prohibit and/or restrict the use of harmful anti-fouling systems on ships of 400 gross tonnage and above that engaged in international voyages (excluding fixed or Floating Platforms (FPs), Floating Storage Units (FSUs) and Floating Production Storage and Offtake units (FPSOs) will be required to undergo an initial survey before the ship is put into service or before the International Anti-fouling System Certificate is issued for the first time; and a survey when the anti-fouling systems are changed or replaced. Ships of 24 metres or more in length but less than 400 gross tonnage engaged in international voyages (excluding fixed or floating platforms, FSUs and FPSOs) will have to carry a Declaration on Anti-fouling Systems signed by the owner or authorized agent. The Declaration will have to be accompanied by appropriate documentation such as a paint receipt or contractor invoice. Anti-fouling systems to be prohibited or controlled will be listed in (Annex 1) to the Convention, which will be updated as and when necessary. Ibid.

¹³⁹ Antifouling Convention, Article 2

¹⁴⁰ Antifouling Convention, Article 3

¹⁴¹ This applies to all ships (including fixed and floating platforms, (FSUs), and (FPSOs); Antifouling Convention Article 7

¹⁴² Ibid

cause greater harm than they prevent to their environment, human health, property or resources, or those of other States.¹⁴³

Safeguard measures are also taken within this convention to deal with the negative impacts of ballast water. In this regard, ships must have a ballast water management plan and Ballast Water Record Book.¹⁴⁴ The regulations also include Port State inspection powers.¹⁴⁵ Discharging of ballast water is permissible only under prescribed rule as stated “except where expressly provided otherwise, the discharge of ballast water shall only be conducted through ballast water management, in accordance with the provisions of the Annex.”¹⁴⁶

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean (Cartagena Convention): At the regional level the Cartagena Convention¹⁴⁷ and one of its accompanying protocols¹⁴⁸ – Protocol Concerning Co-operation and Development in Combating Oil Spills in the Wider Caribbean Region (the Oil Spills Protocol) was developed to respond to *inter-alia*, ship-generated waste. The Cartagena Convention and its accompanying protocols are not stand-alone agreements, or designed to replete existing agreements. Partly, it is designed to supplement other international agreements. This convention requires parties to adopt measures aimed at preventing,

¹⁴³ Ballast Water Convention, Article 4

¹⁴⁴ Ballast Water Convention, B-2: The ballast water book is to record when ballast water is taken on board; circulated or treated for ballast water management purposes; and discharged into the sea. It should also record when Ballast Water is discharged to a reception facility and accidental or other exceptional discharges of ballast water.

¹⁴⁵ Ballast Water Convention, Article 9 states that ships may be inspected by Port State Control Officers who can verify that the ship has a valid certificate; inspect the Ballast Water Record Book; and/or sample the ballast water. If there are concerns, then a detailed inspection may be carried out and "the Party carrying out the inspection shall take such steps as will ensure that the ship shall not discharge Ballast Water until it can do so without presenting a threat of harm to the environment, human health, property or resources."

¹⁴⁶ Ballast Water Convention, Regulation A-2: General Applicability.

¹⁴⁷ The Cartagena Convention and its accompanying Protocols are applicable to the marine environment of the Gulf of Mexico, the Caribbean Sea and the areas of the Atlantic Ocean adjacent thereto, south of 30 degrees North latitude and within 200 nautical miles of the Atlantic coasts of the States. See Cartagena Convention, Article 2.

¹⁴⁸ The Cartagena Convention has three Protocols (Oil Spills, Land based Sources of Pollution and Specially Protected Area and Wildlife). These protocols will discussed in the relevant sections below.

reducing and controlling pollution from ships and those caused by dumping, among others.¹⁴⁹

Oil Spills Protocol: The objective of the oil spills protocol is to strengthen national and regional preparedness and response capacity of the nations and territories of the region.¹⁵⁰ It stipulates that Contracting Parties take remedial and preventative measures (within their capabilities) for the protection of the marine and coastal environment of the Wider Caribbean Region, particularly the coastal areas of the islands of the region, from oil spill incidents.¹⁵¹ The need for cooperation and mutual assistance is highly emphasised in this protocol, especially in the areas of emergency oil spills response and prevention.¹⁵²

Apart from the international conventions discussed above, there are also a number of regional and sub-regional conventions taken at the political level among States in the Caribbean region, which articulates various mandates regarding ship generated forms of pollution in the Caribbean Sea. These are discussed below.

Colombia Convention: In addition to establishing the Association of Caribbean States (ACS)¹⁵³, this convention also explicitly recognizes the centrality of the Caribbean Sea for the association's membership and commits the ACS to preserve the environmental integrity of the sea¹⁵⁴, while at the same time developing and exploiting the resources.¹⁵⁵ The convention also mandated the formation of five special committees, which includes one for the Caribbean Sea called "Protection and Conservation of the Environment and

¹⁴⁹ Cartagena Convention, Article 5 inter alia "[...] take all appropriate measures to prevent, reduce and control pollution of the Convention area caused by discharges from ships, and for this purpose, to ensure the effective implementation of the applicable international rules and standards [...]."

¹⁵⁰ Oil Spills Protocol, Preamble

¹⁵¹ The Oil Spills Protocol, Article 2

¹⁵² *ibid*

¹⁵³ The members of ACS are two types: **Members** Antigua and Barbuda, Bahamas, Barbados, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, el Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, St Kitts and Nevis; St Vincent and the Grenadines, Trinidad and Tobago, Venezuela. **Associate Members** Aruba, Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Montserrat, Puerto Rico, Turks and Caicos Islands, United States Virgin Islands, The French Republic in respect of: Guadeloupe, Guyane, Martinique; The Kingdom of the Netherlands for Netherlands Antilles.

¹⁵⁴ Colombia Convention, Section 2 Article 1 (a and b).

¹⁵⁵ Colombia Convention, Section 2 Article 2 (b)

the Caribbean Sea”.¹⁵⁶ One of the initiatives of the ACS, which falls under the Caribbean Sea mandate, is the pursuance of the Caribbean Sea Special Status at the United Nations General Assembly (UNGA).¹⁵⁷

The Revised Treaty: This treaty establishes the Caribbean Community (CARICOM) and accompanying mandates for informing policy decisions within the jurisdictions of its members¹⁵⁸. In the Revised Treaty, the need for management of the Caribbean Sea to avoid environmental impacts is recognized in a number of areas including its transport policy¹⁵⁹. In addition, the treaty sets forth the mandate of seeking international recognition of the Caribbean Sea as a special area.¹⁶⁰

Tegucigalpa Protocol: This protocol is part of the Charter of La Organizacion De Estados Centroamericanos (ODECA).¹⁶¹ It articulates within its provisions the obligation to protect the natural environment in the area¹⁶² but does not qualify whether this obligation applies to the terrestrial, marine, or both. In 2007, ODECA¹⁶³ signed an agreement with CARICOM seeking cooperation and providing greater environmental protection of the Caribbean Sea in addition to coordinating positions on resources management within the management framework of the ACS for the Caribbean Sea.¹⁶⁴

¹⁵⁶ Colombia Convention, Article V111 (3b); See also Elbow, G. (1995) *Regional Cooperation in the Caribbean: The Association of Caribbean States*. Indiana University 13-22. pg 13

¹⁵⁷ Refer to Sections 2.4.4, 3.1 and 3.2 for an analysis of this initiative and proposed recommendations.

¹⁵⁸ The members of CARICOM are Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat Saint Lucia St. Kitts and Nevis St. Vincent and the Grenadines Suriname Trinidad and Tobago: Associate Members Anguilla, Bermuda, Turks and Caicos Islands.

¹⁵⁹ Revised Treaty, Article 135 (1d)

¹⁶⁰ Revised Treaty, Article 141 states “[...] international recognition for the Caribbean Sea as a special area requiring protection from potentially harmful effects of the transit of nuclear and other hazardous wastes, dumping, oil pollution [...] through the conduct of ships.”

¹⁶¹ The members of ODECA are Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama.

¹⁶² Tegucigalpa Protocol, Article 3 (a)

¹⁶³ La Organizacion De Estados Centroamericanos (ODECA) is referred to as SICA in its English translation. Often SICA is used in place ODECA in many agreements.

¹⁶⁴ CARICOM/SICA Agreement was signed in May 2007 in which a joint declaration press release was issued.

Basseterre Treaty: The Treaty of Basseterre establishing the Organisation of Eastern Caribbean States (OECS) ¹⁶⁵ gave primacy to cooperation in the international relations of its member States.¹⁶⁶ One of its major objectives is “to assist the Member States in the realization of their obligations and responsibilities to the international community with due regard to the role of international law as a standard of conduct in their relationships.”¹⁶⁷ Under the OECS, the St George’s Declaration of Principles of Environmental Sustainability was adopted to augment the legal international environmental instruments within the OECS and to give credence to the treaty. One of the core principles in the Declaration is the recognition of the need for sustainable management by preventing air, water and land pollution stating *inter alia*, “Measures will be taken to prevent, reduce and control waste generation and disposal, as well as pollution of land, rivers, sea and the air.”¹⁶⁸

In addition to these instruments, there are also a number of non-binding initiatives, which contain programmes of action including responses to pollution from ship-generated wastes. These serve to augment the legal agreements, which are further translated into policy, programme and project implementation in the Caribbean Sea.

¹⁶⁵ The members of the OECS are Antigua and Barbuda, Dominica, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia and St. Vincent and the Grenadines: Associate Members are Anguilla and the British Virgin Islands.

¹⁶⁶ This is done with due regard to The Revised Treaty and the United Nations Charter. The Basseterre Treaty, Article 3.1 states that: the major purpose of the organization shall be, *inter alia* “to promote co-operation among the Member States and at the regional and international levels having due regard to the Treaty establishing the Caribbean Community and the Charter of the United Nations”

¹⁶⁷ Basseterre Treaty, Article 3.2

¹⁶⁸ OECS NRMU. (2008). "The St George’s Declaration of Principles of Environmental Sustainability in the OECS; Principle # 10 " Retrieved 8th November, 2008, <http://www.oecs.org>

Agenda 21: An outcome of the UNCED Process¹⁶⁹, Agenda 21¹⁷⁰ recognizes the importance of preventing, reducing and controlling sea based activities, which are affecting the marine environment and presented a number of measures for States to consider.¹⁷¹ These include supporting the ratification and implementation of shipping conventions and protocols¹⁷², cooperation in the monitoring and assessment of marine pollution from ships especially illegal discharges¹⁷³, enforcement of MARPOL provisions¹⁷⁴ and take into consideration appropriate measures for ballast water discharge and transportation of hazardous and noxious substances.¹⁷⁵ Port States are also tasked with establishing port reception facilities and similar facilities in harbours and marinas¹⁷⁶ and to formulate response mechanisms for oil spills.¹⁷⁷

Barbados Programme of Actions (BPOA): The BPOA¹⁷⁸ also recognizes the need to address pollution and had indentified as part of national action and policy measures, the development of standards and regulatory measures for all forms of waste and stated the need to “Develop and implement appropriate regulatory measures, including emission discharge and pollution standards, for the reduction, prevention, control and monitoring of pollution from all sources; for the safe and efficient management of toxic, hazardous and solid wastes, including sewage, herbicides, pesticides and industrial and hospital effluent; and for the proper management of disposal sites.”¹⁷⁹ In addition, the BPOA

¹⁶⁹ The UNCED Process is popularly referred to as the Earth Summit which held in Rio. As an outcome of UNCED, five major instruments were agreed; these are The Rio Declaration, Agenda 21, Framework Convention on Climate Change, Framework Convention on Biological Diversity and a Statement of Principles on Forests.

¹⁷⁰ In 1992, at the United Nations Conference on Environment and Development, the world community adopted Agenda 21. Agenda 21 reflects a global consensus and political commitment at the highest level on development and environment cooperation. The cooperation of all States is a prerequisite for the fulfilment of the objectives of Agenda 21. Such cooperation must also respond to the special circumstances and particular vulnerabilities of countries through adequate and specific approaches: Agenda 21 Preamble

¹⁷¹ Agenda 21; Chapter 17, paragraph 30- 43

¹⁷² Agenda 21, 17:30 (A) and 17:33

¹⁷³ Agenda 21, 17:30 (A)

¹⁷⁴ *ibid*

¹⁷⁵ *ibid*

¹⁷⁶ Agenda 21, 17: 30 (D)

¹⁷⁷ Agenda 21, 17:34

¹⁷⁸ BPOA was initiated through the General Assembly Resolution 47/189, which called for a global conference on the sustainable development of small island developing states. This conference was held in 1992 and BPOA was adopted in 1994. BPOA presents a basis for action in 14 areas.

¹⁷⁹ BPOA, Article 111 (A) (ii)

outlined, as part of its action plan for waste management, that States ratify and implement all the necessary treaties and conventions.¹⁸⁰

In addition to these programmes, there was also a major project called the ‘Wider Caribbean Initiative for Ship Generated Waste (WCISW)’ which was initiated in 1994 and ended in 1998. Twenty-two countries from the Wider Caribbean Region participated in this project.¹⁸¹ The objective of the project was to provide a regional strategy for the ratification of the MARPOL Convention. Specifically, it aimed at providing the Government in the region with information on the legal, technical and institutional measures and to provide support for the implementation of a regional strategy. However, at the end of the project in 1998, many of the objectives were not achieved especially the regional strategy.

Collectively, these mechanisms form the existing governance structure for the management of ship-generated waste.¹⁸²

2.4.1.2 Land Based Sources of Pollution

2.4.1.2.1 Overview of Pressures

Land based sources of pollution in the Caribbean Sea are from a number of sources and from many countries. The forms of waste include hydrocarbon pollution and effluent discharges of many forms, which are discussed below.

Siltation of nearshore areas is a major problem facing the region and fuelling this problem are a number of activities. Deforestation along riverbanks as well as poorly

¹⁸⁰ BPOA, Article 111 (A) (iii) stipulates that treaties to be ratified include the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal and the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention of 1972), as well as relevant regional conventions.

¹⁸¹ The Countries involved in this project were Antigua and Barbuda, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Suriname, Venezuela and Trinidad and Tobago. Note that the OTs of France, The Netherlands, United Kingdom and USA were not part of this project.

¹⁸² An analysis of the governance mechanism for ship-generated waste is presented in Part 3 of this report.

managed and/or unplanned construction/development in coastal areas are common occurrences in many countries in the region, and although more stringent measures are in place in many parts of the region the problem still persists. This is more pronounced in some countries than in others for example, sediments from intense vegetation cover removal and poor agronomic practices in many parts of Haiti have resulted in large deposits directly into the marine environment or via river systems.¹⁸³ This increased deposition of materials into the nearby marine areas has resulted in the smothering of nearby ecosystems such as coral reefs and seagrass beds. In areas where the mangroves have been removed, the seagrass and coral reefs are at increased risk. Other activities such as quarry operations in countries such as Grenada and Jamaica have contributed to major disturbances in the habitats.¹⁸⁴

Effluents including those from domestic sewage, industrial and agro processing water and urban drainage, are also discharged into the marine environment.¹⁸⁵ These discharges pose a major threat to the ecosystems in the region as a form of pollution. Among these effluents, sewage discharges caused by the lack of adequate sewage treatment facilities¹⁸⁶ is a major concern given the growing population in general and the rising rural – urban migration patterns, which exist in many countries in the region. Where these facilities are absent, inadequate or non-functional, the collected effluents are discharged directly into the sea untreated, as is the case of the Castries Sewerage Plant in St. Lucia or in other cases, only primary treatment is carried out prior to the discharge as it occurs in Dominica. All the countries that border the Sea have identified sewage pollution as a

¹⁸³ Ministère de l'Environnement (2001) *Haiti National Report*. Ministère De L'Environnement, Uinte de mise oeuvre du plan d'action pour l'environnement (UMO-PAE) 75.

¹⁸⁴ Department of Economic Affairs (2001) *Grenada National Report on Integrating Management of Watersheds and Coastal Areas*. Prepared for IWCAM 60; NRCA (2001) *Jamaica National Report on Integrating the Management of Watersheds and Coastal Areas*. Prepared for IWCAM 61.

¹⁸⁵ UNEP (1994) *Regional Overview of Land Based Sources of Pollution in the Wider Caribbean Region*. CEP-UNEP 43; UNEP (1997) *Coastal Tourism in the Wider Caribbean Region: Impacts and Best Management Practices*. Prepared by Lloyd Gardner 130; GESAMP (2001) *Protecting the Oceans from Land based Activities: Land-based sources and activities affecting the quality and uses of the marine, coastal and associated freshwater environment*. GESAMP 162; UNEP (2004). *Caribbean Islands, GIWA Regional Assessment*. in. A. Villasol, B. J., M. Fortnam and P. Blime. Kalmar, Sweden, University of Kalmar: 190. GESAMP (2001) *A Sea of Troubles*. United Nations Environment Programme 2001.

¹⁸⁶ Vlugman, A. (1992) *Assessment of Recreational Status of Waste Water Treatment Plants in the Caribbean*. CEHI/PAHO 98; PAHO (1998) *Health in the Americas*. Pan American Health Organisation 40-46; Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES. Plymouth PhD: 391.pp.

contributing factor to coastal degradation. One example is in Guadeloupe, where an inventory of its facilities showed that from a total of twenty public sewerage treatment plants, only nine apply minimum treatment, the others are either inadequate or ineffective.¹⁸⁷ A similar situation regarding the management of sewage exists in other islands and in settlements in mainland Latin America, as many settlement centres are not connected to a sewerage system.¹⁸⁸ For example, a study done in Curaçao in 1998 revealed that only 38% of the households in that State are connected to the sewerage system.¹⁸⁹ This low percentage of connection is due to the lack of mandatory compliance. The issue of sewage disposal and sewerage treatment is recognized by Government in the region as critical and as a result, more emphasis is being placed on building treatment plants. Currently however, the available capacity is still inadequate to deal with the waste generated¹⁹⁰ and to date the degradation of coastal water quality remains a major concern in the region.

Effluents emanating from industries are also a major source of land based pollution and are regarded as a significant issue in the more industrialised countries such as Venezuela, Columbia, Trinidad and to a lesser extent, islands such as Martinique. In addition to the relatively high volume of industrial waste, in many countries, existing industries do not conduct adequate effluent treatment prior to the discharge thereby compromising water quality in the marine environment.¹⁹¹ This inevitably contributes to the inherent disruption of the marine ecosystems found in the region.

¹⁸⁷ IFRECOR. (2000). "Introduction Guadeloupe." Retrieved 03/02/2003 2003, http://www.ecologie.gouv.fr/article.php3?id_article=794.

¹⁸⁸ Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES. Plymouth PhD: 391.pp. In this study an inventory was conducted of the existing sewage system in the SIDS and it was found that no countries did tertiary treatment of sewage and in almost all the SIDS in 2005, only a small fraction of the total population was connected to a treatment facility.

¹⁸⁹ Gast, G. J. (1998) *Nutrient Pollution in Coral Reef Waters, with data from Curaçao water*. Reef Care Contribution 10.

¹⁹⁰ Refer to the following source for inventory on the number of treatment plants: UNEP (1998) *Appropriate Technology for Sewage Pollution Control in the Wider Caribbean Region*. 98 <http://www.cep.unep.org/pubs/Techreports/tr40en/index.html>.

¹⁹¹ UNEP (1989) *Regional Overview of Environmental Problems and Priorities Affecting the Coastal and Marine Resources of the Wider Caribbean*. 50;GESAMP (2001) *Protecting the Oceans from Land based Activities: Land-based sources and activities affecting the quality and uses of the marine, coastal and associated freshwater environment*. GESAMP 162.

Fertilizer, pesticides and insecticides used in the agricultural sector, are also causing marine pollution in the region. In St. Lucia, pesticide runoffs into streams were identified as the cause for fish kills in inland waterway in 2000.¹⁹² In addition to these known effects, agrochemicals can cause eutrophic conditions, and are identified as having negative impacts on the coastal areas of the Caribbean and are noted as a serious risk to the integrity of the marine environment.¹⁹³ For example, such impacts on the marine environment were evident in the Kingston Harbour¹⁹⁴ and Montego Bay in Jamaica¹⁹⁵ and also in Point Lisas in Trinidad.¹⁹⁶

Another form of agro-industrial pollution is acidic waste derived from sugar cane refining and alcohol distillation, which is conducted primarily in Barbados, Cuba, Guadeloupe, Trinidad and some Central American countries such as Belize. In Guadeloupe for example, 'vinasse' generated from the distilleries is discharged directly into open channels or rivers which flow into the sea, without any form of treatment.¹⁹⁷ It is estimated that the quantities of organic pollution entering the marine environment during the manufacturing period, are equivalent to the 20 t/day domestic/oxidizable waste generated by the total population (177,000) of Guadeloupe.¹⁹⁸

¹⁹² Bushnell, D., A. James, J. Polius, M. Andrew, C. A. Cox, F. Jaria, M. Louise Felix, S. Scott, C. Corbin, C. d'Auvergne, J. Medard, P. Regis, R. Eudovique, P. Norville and S. King (2001) *St Lucia National Report on Integrating Watershed Management and Coastal Areas*. 115.

¹⁹³ UNEP (1994) *Regional Overview of Land Based Sources of Pollution in the Wider Caribbean Region*. CEP-UNEP 43.

¹⁹⁴ Mansingh, A. and A. Wilson (1995). Insecticides contamination of Jamaican Environment 111: Baseline Studies of Insecticidal Pollution of Kingston Harbour. *Marine Pollution Bulletin* **30**: 640-645; Fernandez, A., A. Singh and R. Jaffe (2007). A literature review on trace metals and organic compounds of anthropogenic origin in the Wider Caribbean Region *Marine Pollution Bulletin* **54**: 1681-1691.

¹⁹⁵ Mansingh, A. and A. Wilson (1995). Insecticides contamination of Jamaican Environment 111: Baseline Studies of Insecticidal Pollution of Kingston Harbour. *Marine Pollution Bulletin* **30**: 640-645. Jaffé, Gardinali et. al. Jaffé, R., P. Gardinali, Y. Cai, A. Sudburry, A. Fernandez and H. Bernward (2002). Organic compounds and trace metals of anthropogenic origin in sediments from Montego Bay, Jamaica: Assessment of sources and distribution pathways *Environmental Pollution* **123**: 291 – 299.

¹⁹⁶ Institute of Marine Affairs. (2005, 01/21/2005). "Investigation into Fish Kills at Point Lisas." Retrieved 03/04/2005 2005, <http://www.ima.gov.tt/news.htm>.

¹⁹⁷ IFRECOR. (2000). "Introduction Guadeloupe." Retrieved 03/02/2003 2003, http://www.ecologie.gouv.fr/article.php3?id_article=794.

¹⁹⁸ DRIRE (ed.) (1994) *Impacts de l'industrie sur l'environnement*. Rapport Ministère de l'environnement, DRIRE 40.

Overall, the region's bays and estuaries are among the most productive systems in the world¹⁹⁹, but they are also the receiving water for large amounts of these effluents. These effluents tend to settle in the bays or are diluted or dispersed with the seawater by the flushing effects of water currents. However, there are cases where this natural process is exceeded by the large concentration of these contaminants, giving rise to environmental problems. Rising effluent discharges compromise the marine productivity as well as create a human health hazard. The outbreak of shellfish disease in Mexico and other Latin American countries is an indicator of the cost of coastal pollution.

Solid waste, which includes poorly degradable synthetic materials such as plastic (PET) bottles, poses a major problem for the region in general.²⁰⁰ Poor disposal practices and lack of recycling facilities within the region are some of the contributing factors. This problem is evident in many of the Caribbean SIDS and Latin American Countries after periods of heavy rainfall as debris can be observed clogging river mouths and nearshore areas.²⁰¹ Although the waste generated varies by country, the amount and method of disposal are of concern. For example, in 1992, Trinidad generated approximately 500 tons of municipal waste.²⁰² Another example is in St. Lucia where according to the World Bank; tourists generate twice the amount of waste per day as residents, but in total contribute only 5% of the total waste because of the short length of stay.²⁰³ Although this may not be overwhelming on the global scale, in countries with small landmasses, limited resource capital and competing demands for land, this can become a serious environmental issue especially where dumping into the marine environment is not regulated stringently. Collection of marine debris provides an indication of the magnitude of this problem in the Caribbean SIDS coastal areas. A study conducted in 2005

¹⁹⁹ Lemay, M. H. (1998) *Coastal and Marine Resources Management in Latin America and the Caribbean*. World Bank 62.,

²⁰⁰ Singh, A. (2005) *National Programmes of Action in the Caribbean: A Compilation of Lesson Learnt*. Prepared for UNEP/CEP 27.

²⁰¹ Henneman, B. (1988) *Persistent Marine Debris in the North Sea, Northwest Atlantic Ocean, Wider Caribbean Region and the West Coast of Baja California*. Center of Environmental Education 23; Department of Economic Affairs (2001) *Grenada National Report on Integrating Management of Watersheds and Coastal Areas*. Prepared for IWCAM 60..

²⁰² IMO (1995) *Global Waste Survey*. International Maritime Organisation 294.

²⁰³ Dixon, J., K. Hamilton, S. Pagiola and L. Segnestan (2001) *Tourism and the Environment in the Caribbean: An Economic Outlook*. World Bank 66.

compared marine debris collected in various Caribbean SIDS and found that the amount of debris collected varied among the Caribbean island States. For example, Jamaica recorded the highest collection per unit area and Barbados the lowest.²⁰⁴ Another study found that plastic was the most common type of marine debris present on the coastal area in St. Lucia, accounting for over 59.3 % of total waste collected between 1992 and 1993.²⁰⁵ These studies highlight the problem of solid waste management including marine debris in the region and demonstrate the potential hazards on marine life such as migrating turtles. Therefore, priority should be given to effective waste management in order to minimize its impact on the marine environment, vulnerable biodiversity and economic activities such as tourism.

Heavy metals of various types are also a form of pollution in the region and the major sources are from sewage input, mineral extraction, hydrocarbon extraction and transportation.²⁰⁶ There is evidence to suggest that heavy metals are present in the food chain in bivalves in Cuba²⁰⁷ and Venezuela²⁰⁸, fish in Colombia²⁰⁹ and in sea urchin also in Cuba.²¹⁰ Studies conducted in other areas of the Caribbean Sea showed that there are high levels of mercury and other contaminants in marine fish and coral reefs in many areas.²¹¹ In addition to bioaccumulation the ambient water quality is also been

²⁰⁴ Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES Plymouth PhD: 391.pp.

²⁰⁵ Corbin, C. J. and J. G. Singh (1993). Marine debris contamination of beaches in St. Lucia and Dominica. *Marine Pollution Bulletin* 26(6): 325-328.

²⁰⁶ Fernandez, A., A. Singh and R. Jaffe (2007). A literature review on trace metals and organic compounds of anthropogenic origin in the Wider Caribbean Region *Marine Pollution Bulletin* 54: 1681-1691.

²⁰⁷ Gonzalez, H. and M. Ramirez (1995). The effect of nickel mining and metallurgical activities on the distribution of heavy metals in Levisa Bay, Cuba. *Journal of Geochemical Exploration* 52: 183-192

²⁰⁸ Jaffé, R., I. Leal, J. Alvarado, P. Gardinali and J. Sericano (1998). Baseline Study on the Levels of Organic Pollutants and Heavy Metals in Bivalves from the Morrocoy National Park, Venezuela *Marine Pollution Bulletin* 36: 925-929; Alfonso, J. A., J. A. Azocar, J. J. LaBrecque, Z. Benzo, E. Marcano, C. V. Gomez and M. Quintal (2005). Temporal and spatial variation of trace metals in clams *Tivela mactroidea* along the Venezuelan coast. *Marine Pollution Bulletin* 50: 1713-1744.

²⁰⁹ Alonso, D., P. Pineda, J. Olivero, H. Bonzalez and N. Campos (2000). Mercury levels in muscle of two fish species and sediments from the Cartagena Bay and the Ciénaga Grande de Santa Marta, Colombia. *Environmental Pollution* 109: 157-163.

²¹⁰ Gonzalez, H., M. Pomares, M. Ramirez and I. Torres (1999). Heavy Metals in Organisms and Sediments from the discharge zone of the submarine sewage outfall of Havana City, Cuba *Marine Pollution Bulletin* 11: 1048-1051.

²¹¹ Shrestha, K. P. and E. Morales (1987). Seasonal variation of iron, copper and zinc in *Penaeus brasiliensis* from two areas of the Caribbean Sea. *The Science of The Total Environment* 65: 175-180; Shrestha, K. P., R. Noguera, J. Chopite and P. Sosa (1988). Mercury Content of some Marine Fish from the Southern Caribbean Sea. *The Science of The Total Environment* 73(3): 181-187; Guzman, H. M.

compromised in many areas by these contaminants. For example, heavy metals were found in the vicinity of Kingston Harbour in the water column and suspended sediments.²¹² Furthermore, in the surrounding waters of Guadeloupe, abnormal concentrations of some heavy metals were found in sediments, marine organisms and within the water column.²¹³ These heavy metals included lead (Pb), cadmium (Cd), vanadium (V), copper (Cu), zinc (Zn) and tin (Sn) were traced to the sources.²¹⁴ The lead originates from urban and industrial waste, cadmium and vanadium from sump oil and copper, tin and zinc are mostly from anti-fouling marine paints.²¹⁵ An in-depth review of trace metal and organic compound in this region have revealed that the occurrences of these heavy metals compounds are mainly from anthropogenic sources and prevail throughout the region.²¹⁶

Hydrocarbon pollution from land based activities is also affecting the Caribbean Sea. Incidence such as seepage and spills of oil storage facilities and oil refineries in the region are shown to contribute to marine pollution and habitat degradation. In 1999, a valve used to transport oil to a tanker from a storage facility in Puerto Rico was left open and as a result, over 112,000 gallons of oil was spilled into a nearby mangrove habitat.²¹⁷

and C. E. Jimenez (1992). Contamination of coral reefs by heavy metals along the Caribbean coast of Central America (Costa Rica and Panama). *Marine Pollution Bulletin* **24**(11): 554-561.

²¹² Mansingh, A. and A. Wilson (1995). Insecticides contamination of Jamaican Environment 111: Baseline Studies of Insecticidal Pollution of Kingston Harbour. *Marine Pollution Bulletin* **30**: 640-645; Knight, C., J. Kaiser, G. C. Lalor, H. Robotham and J. V. Witter (1997). Heavy Metals in Surface Water and Stream Sediments in Jamaica. *Environment, Geochemistry and Health* **19**: 60-63.

²¹³ Lamour, K. and L. Burgaud (1993) *Étude de la pollution de la rivière salée*. Rapport DDE Cellule du littoral et de l'environnement, 16; DDE (1995) *Impact de la décharge publique de Grand Camp sur la pollution de la Rivière Salée*, Rapport DDE Cellule du littoral et de l'environnement 22; DDE (1995) *Qualité des eaux littorales du Petit Cul-de-Sac Marin*. Rapport DDE Cellule du littoral et de l'environnement, 46; De Lapeyre, B. M. (1995) *Concentrations de certains métaux lourds dans les eaux et les sédiments de la marina du Bas du Fort*. Rapport DDE Cellule du littoral et de l'environnement 18; Doris, J. (1996) *Étude de la qualité des eaux du Petit Cul-de-Sac Marin à proximité de la zone industrielle de Jarry (Baie-Mahault / Guadeloupe)*. Rapport DDE Cellule du littoral et de l'environnement, 38.

²¹⁴ Bernard, D. (1994). "Contribution à l'étude des perturbations chimiques en zone marine à mangrove et sous pression anthropique. Exemples des lagons de la Guadeloupe." *Claude Bernard*: 185 pp.

²¹⁵ IFRECOR. (2000). "Introduction Guadeloupe." Retrieved 03/02/2003 2003, http://www.ecologie.gouv.fr/article.php3?id_article=794.

²¹⁶ Fernandez, A., A. Singh and R. Jaffe (2007). A literature review on trace metals and organic compounds of anthropogenic origin in the Wider Caribbean Region *Marine Pollution Bulletin* **54**: 1681-1691.

²¹⁷ Data taken from Office of Response and Restoration (2008) *Oil Spills Case Studies: Summaries of Significant US and International Spills*. NOAA/ Hazardous Materials Response and Assessment Division 80.

In 1992, the oil refinery in St. Eustatius suffered a damaged pipe, which spilled between 200-400 barrels of oil into the Caribbean Sea.²¹⁸ In addition, to affecting the water quality of the Caribbean Sea, studies have indicated that ecosystems and habitats affected by oil pollution may never recover to pre spill level. For example, in 1986, Refinera Panama in Panama suffered a rupture at its facility and over 55,000 gallons of oil was spilled into the Caribbean Sea in areas where coral reef and mangroves are present. Over 15 years of monitoring by the Smithsonian Institute, it was found that the reefs have not recovered.²¹⁹ Studies like this reinforce the fragile nature of these ecosystems and add knowledge on resilience of ecosystems. In addition, it further demonstrates that disturbances of any magnitude will likely have a long term or even permanent effect.

The increased understanding of the impacts of these land based activities have prompted many response effort in the form of international, regional, sub-regional and national initiatives. These are discussed below and graphically represented in Figure 3.

2.4.1.2.2 The Current Governance Structure for Land Based Pollution Management in the Caribbean Sea

UNCLOS: The issue of pollution is articulated in this agreement and within its provisions, it sets forth the general obligations of States to protect and preserve the marine environment.²²⁰ *UNCLOS* also articulates that measures be taken by Contracting Parties to “prevent, reduce and control pollution of the marine environment and minimise to the fullest extent possible the release of toxic, harmful or noxious substances.”²²¹ This convention also links the general obligation of States to protect and preserve the marine environment with “substantive international rules and national legislation.”²²²

²¹⁸ *ibid*

²¹⁹ Garrity, S. D., S. C. Levings and K. A. Burns (1994). The Galeta Oil Spill. I. Long-term Effects on the Physical Structure of the Mangrove Fringe. *Estuarine, Coastal and Shelf Science* **38**(4): 327-348.

²²⁰ *UNCLOS*, Article 192

²²¹ *UNCLOS*, Article 194 (3) (a)

²²² *UNCLOS*, Article 207 and 213

Cartagena Convention: In its provisions stated that Contracting Parties should take all appropriate measures to prevent, reduce and control pollution of the Wider Caribbean including the Caribbean Sea.²²³ The precautions for prevention and control should be particularly for those caused by coastal disposal or by discharges emanating from rivers, estuaries, coastal establishments, outfall structures, or any other sources on Contracting Parties territories.²²⁴

Land Based Sources of Pollution Protocol (LBS Protocol) of the Cartagena Convention: The Protocol which is applicable to all countries, with jurisdiction in the Caribbean Sea sets forth guidelines and a legal framework for regional co-operation in controlling land based pollution into the Caribbean Sea.²²⁵ As part of the stipulation, it requires all contracting parties to respond appropriately to prevent, reduce and control pollution²²⁶ of the marine environment.²²⁷ Emission discharge standards are prescribed for sewage in this protocol under Annex 111. As a stipulation of the protocol, the ratifying States will be given 10 years from the date of ratification to put measures in place in order to adhere to emission guidelines set forth within. The operative Annexes describe the work that each Contracting Party must comply with, as well as to give direction to the development of regional actions.²²⁸

In addition to these instruments, there are also regional and sub-regional agreements, that have identified issues of sustainable management for the Caribbean Sea, which inferred

²²³ Cartagena Convention, Article 7

²²⁴ *ibid*

²²⁵ LBS Protocol, Preamble

²²⁶ Pollution as defined by the Cartagena Convention, Article 1 "means the introduction by humans, directly or indirectly, of substances or energy into the Convention area, which results or is likely to result in such deleterious effects as harm to living resources and marine ecosystems, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities;

²²⁷ The LBS Protocol, Article 111.

²²⁸ LBS Protocol, Annex I establishes a list of land-based sources and activities and their associated contaminants of greatest concern to the marine environment of the Wider Caribbean Annex II outlines and establishes the process for developing regional standards and practices for the prevention, reduction, and control of the sources and activities identified in Annex I. Annex III establishes specific regional effluent limitations for domestic sewage and Annex IV requires each Contracting Party to develop plans, programmes and other measures for the prevention, reduction and control of agricultural non-point sources, respectively.

to include responding to land based sources of pollution. These include the Colombia Convention, The Revised Treaty, Basseterre Treaty and Tegucigalpa Protocol.²²⁹

Global Programme of Action (GPA): In 1995, the UNEP initiated a Global Plan of Action for the Protection of the Marine Environment from Land Based Sources of pollution. The GPA is translated into National Programmes of Actions (NPAs) aimed at the protection of the marine environment from land based sources. In countries where similar plans exist, policy makers are encouraged to adjust these plans to include pollution management. Whilst the GPA/NPA and the LBS Protocol represent two policy tools, they are complementary and can be used to support the mainstreaming of environmental management issues into national and regional development frameworks.²³⁰

Agenda 21: It highlights the need to curb land based sources of pollution. It recognises that action must be taken to minimize the impact of land-based sources of pollution in an effort to protect the marine environment.²³¹ In order to address land-based sources of pollution, it requested that States take appropriate actions at the necessary levels (national, sub regional and regional) to respond to the issues of land based pollution taking into account the Montreal Guidelines for the protection of the marine environment from land based sources of pollution.²³²

BPOA: It has also echoed the call for affirmative action regarding land based pollution. It articulates that action be taken to develop standards to regulate the pollutants entering the environment.²³³ It also calls for the ratification by States the relevant international environmental instruments to curb pollution.²³⁴

²²⁹ Refer to Section 2.4.1.1.2 for these applications.

²³⁰ Singh, A. (2005) *National Programmes of Action in the Caribbean: A Compilation of Lesson Learnt*. Prepared for UNEP/CEP 27.

²³¹ Agenda 21, Article 17 -19.

²³² The Montreal Guidelines are a number of guidelines to assist Government to develop agreements and legislation for the protection of the marine environment from pollution. Its elements and principles are guided by the existing international agreements such as UNCLOS (See document : Decision 13/18/11 of the governing council of UNEP 24 May 1985.

²³³ BPOA, Section 111 A (i)and (ii)

²³⁴ BPOA, Section 111 A (iii)

Integrated Watershed and Coastal Areas Management Project (IWCAM): At the project level, NOAA, UNEP and a selected number of States²³⁵ in the Caribbean have jointly undertaken the Integrated Watershed and Coastal Area Management (IWCAM) project to respond to issues of terrestrial and marine degradation in the region. The objective of the project is to strengthen the capacity of the participating SIDS to implement an integrated approach to the management of watersheds and coastal areas. This project, which is currently being implemented, is expected that the knowledge and capacity building gained, will enhance the capacity of the countries to plan and manage their aquatic resources and ecosystems on a sustainable basis.²³⁶

These various instruments collectively form the governance mechanisms for the management of land based sources of pollution in the Caribbean Sea.²³⁷

2.4.2 Sustainable Use and Management of Living Resources

As illustrated in Figure 3, living resources are of two major categories. This section focuses on biodiversity management as it relates to coral reefs, seagrass and mangroves. The fisheries will be dealt with separately in the subsequent sections.

²³⁵ Countries participating in the IWCAM project are Antigua and Barbuda, Barbados, Cuba, Dominican Republic, Dominica, Grenada, Haiti, Jamaica, St Kitts, St Lucia, St Vincent and the Grenadines and Trinidad and Tobago)

²³⁶ NOAA (2002) *Caribbean SIDS IWCAM Project Brief*. NOAA, 29.

²³⁷ Refer to Part 3 for analysis of these instruments.

2.4.2.1 Biodiversity Management

2.4.2.1.1 Overview of Pressures

Coral Reefs provide many direct and indirect ecosystem services. They are a source of fish and other seafoods for many of the inhabitants of the region. The reefs also provide biochemical compounds that are being used in treatments of diseases, serves as a protective barrier to the adjacent coastal areas and are of high aesthetic value.²³⁸ Indirectly, the coral reefs provide nursery grounds for an immense number of species (some of direct commercial importance), including habitats for larvae, juveniles and adults. Coral reefs also perform synthesis functions such as the uptake of carbon dioxide, liberating of oxygen and regenerating nutrients.²³⁹ Ecologically, these are essential for life in the sea, their economic value is significant, and socially and culturally, they are invaluable to local communities.

Seagrass is being an important contributor to the ocean's global primary production, and as an ecosystem, provides many ecosystem services alongside coral reefs. Sea grass beds support a substantial secondary production of economically important taxa like fish and crustaceans.²⁴⁰

²³⁸ Birkeland, C. (1997). Introduction' in Life and Death of Coral Reefs.in. C. Birkeland., Chapman & Hall, New York;Jackson, J. B. C., M. X. Kirby, W. H. Berger, K. A. Bjorndal, L. W. Botsford, B. J. Bourque, R. H. Bradbury, R. Cooke, J. Erlandson, J. A. Estes, T. P. Hughes, S. Kidwell, C. B. Lange, H. S. Lenihan, J. M. Pandolfi, C. H. Peterson, R. S. Steneck, M. J. Tegner and R. R. Warner (2001). Historical Overfishing and the recent collapse of Coastal ecosystems. *Science* **293**(5530): 629-637;Hoegh-Guldberg, O., P. J. Mumby, A. J. Hooten, R. S. Steneck, P. Greenfield, E. Gomez, Harvell, C. D., , P. F. Sale, A. J. Edwards, K. Caldeira, N. Knowlton, C. M. Eakin, R. Iglesias-Prieto, N. Muthinga, R. H. Bradbury and A. H. Dubi, M. E; (2007). Coral reefs under rapid climate change and ocean acidification. *Science* **vol. 318**(no. 5857): 1737–1742;Knowlton, N. and J. B. C. Jackson ((2008).). Shifting baselines, local impacts, and global change on coral reefs. *PLoS Biol.* **6**(2)(e54.).

²³⁹ Birkeland, C. (1997). Introduction' in Life and Death of Coral Reefs.in. C. Birkeland., Chapman & Hall, New York. Mumby P.J., Hastings A. and H. J. Edwards (2007). Thresholds and the resilience of Caribbean coral reefs. *Nature* **401**(1): 98-101;Hughes, T. P., M. J. Rodrigues, D. R. Bellwood, D. Ceccarelli, O. Hoegh-Guldberg, L. McCook, N. Moltschaniwskyj, M. S. Pratchett, R. S. Steneck and B. Willis (2007). Phase shifts, herbivory, and the resilience of coral reefs to climate change. *Current Biology* **17**(4): 360–365.

²⁴⁰ Erftemeijer, P. L. A. and J. J. Middleburg (1993). Sediment-nutrient interactions in tropical seagrass beds: a comparison between a terregious and a carbonate sedimentary environment in South Sulawesi (Indonesia). *Marine Ecology Progress Series* **102**: 187-198.

Mangroves provide a variety of services in the Caribbean Sea, it plays a key role in cycling of nutrients, provides habitation for many juvenile species of fish of which many, in the mature stages are of great commercial importance, which in turn serves as a source of protein for a huge number of the region's inhabitants. Mangroves also trap sediments, thereby in many instances, decrease the rate of sedimentation into the marine environment caused by poor land use planning.

Over the last few decades, the good and services provided by these habitats are being threatened by the increased exploitation and degradation. The degradation of coral reefs, seagrass and mangroves are mainly from natural phenomena, such as the effects of climate change and anthropogenic activities. The man made pressures are from activities such as tourism, industrial activities and coastal development which are continuing at an accelerated pace in many parts of the region. In many instances, these activities are not well planned and as such the operations can have severe environmental consequences. These has resulted in red tides, sedimentation, pollution, and human encroachment, which are all identified as the main causes of ecosystem degradation in the region.²⁴¹ Other activities such as overfishing have resulted in the over exploitation of many living marine species, thereby causing reef collapse. Overall, the unsustainable use and management of the biodiversity can lead to lost of genetic resources and also compromise the ability of the ecosystems to perform their functions. The loss of biodiversity or damage to these ecosystems are troubling for the region, given the immense reliance on

²⁴¹ Wolanski, E., R. Richmond, L. McCook and H. Sweatman (2003). Mud, marine snow and coral reefs. *Amer. Scient* **91**: 44–51; Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES Plymouth PhD: 391.pp; Kleypas, J. A., R. A. Feely, V. J. Fabry, C. Langdon, C. L. Sabine and L. L. Robbins (2006) Impacts of Ocean Acidification on Coral Reefs and Other Marine Calcifiers. A Guide for Future Research. NSF, NOAA, USGS; Hoegh-Guldberg, O., P. J. Mumby, A. J. Hooten, R. S. Steneck, P. Greenfield, E. Gomez, Harvell, C. D., , P. F. Sale, A. J. Edwards, K. Caldeira, N. Knowlton, C. M. Eakin, R. Iglesias-Prieto, N. Muthinga, R. H. Bradbury and A. H. Dubi, M. E; (2007). Coral reefs under rapid climate change and ocean acidification. *Science* **vol. 318**(no. 5857): 1737–1742; Hughes, T. P., M. J. Rodrigues, D. R. Bellwood, D. Ceccarelli, O. Hoegh-Guldberg, L. McCook, N. Moltschaniwskyj, M. S. Pratchett, R. S. Steneck and B. Willis (2007). Phase shifts, herbivory, and the resilience of coral reefs to climate change. *Current Biology* **17**(4): 360–365; Pandolfi, J. M., R. H. Bradbury, E. Sala, T. P. Hughes, K. A. Bjorndal, R. G. Cooke, D. McArdle, L. McClenachan, M. J. H. Newman, G. Paredes, R. R. Warner and J. J. B. C.; (2003). Global trajectories of the long-term decline of coral reef ecosystems. *Science* **301**: 955–958; Hoegh-Guldberg, O., P. J. Mumby, A. J. Hooten, R. S. Steneck, P. Greenfield, E. Gomez, C. D. Harvell, P. F. Sale, A. J. Edwards, K. Caldeira, N. Knowlton, C. M. Eakin, R. Iglesias-Prieto, N. Muthinga, R. H. Bradbury, A. Dubi and M. E. Hatzioios (2007). Coral reefs under rapid climate change and ocean acidification. *Science* **318**(5857): 1737–1742.

these for ecosystems goods and services for human well-being. In addition, there are many unique species found in the Caribbean Sea ²⁴² which are of global significance, hence these impacts can lead to extinction. Already natural phenomena such as effects of climate change and hurricanes are compromising the resilience of these ecosystems hence, added pressures from anthropogenic activities can further compromise the health of the ecosystems and thereby their ability to perform the services.

In response to these issues, a number of mechanisms were initiated to curb biodiversity loss and to afford added protection to the marine ecosystems not only in the Caribbean Sea but in many parts of the world where these exist. These are discussed below and the membership to these instruments is shown in Table 3.

2.4.2.1.2 The Current Governance Structure for Biodiversity Management in the Caribbean Sea

UNCLOS: This convention provides coastal States with the right to exploit the resources within the EEZs and territorial waters. However, this must be conducted within certain guidelines, enshrined within *UNCLOS*' provisions aimed at avoiding over-exploitation of stocks.²⁴³ This convention also sets forth general obligations which should be adhered to in order to maintain habitat integrity and protect fragile ecosystems and habitats.²⁴⁴ In doing so, States are obligated to take measures to protect and preserve rare or fragile ecosystems as well as habitats of depleted, threatened or endangered species and other forms of marine life.²⁴⁵ If the area to be protected forms part of the EEZ, then *UNCLOS* stipulates that special international arrangements must be made to prevent pollution in this zone.²⁴⁶ Overall, in protecting the living resources of the marine environment, States are required to take action²⁴⁷ to prevent pollution from any source, by using the best

²⁴² Refer to Footnote 20-22 for the endemic species of the Caribbean

²⁴³ *UNCLOS*, Article 61-63

²⁴⁴ *UNCLOS*, Article 192

²⁴⁵ *UNCLOS*, Article 194 (5)

²⁴⁶ *UNCLOS*, Article 211 (6)

²⁴⁷ The measures taken, must encompass all sources of pollution of the marine environment including:

1. e of toxic chemicals and harmful substances fro land based sources either via air or dumping;
2. pollution from vessels;
3. pollution from installation devices.

Convention	Status	States	Signed	Ratified or Acceded	No. of Non -Party Members
Biodiversity Management					
The Convention on international Trade in Endangered Speices of Wild flora and Fauna (CITIES) and its amendments (Bonn and Botswana)	Adoption: June 1979; April 83 Entry into force: April 1987; still to enter into force	Independent States (total of 21)		18	3
		OTs (total of 16)		16*	
Convention on Biological Diversity	Adoption: January, 1992 Entry into force: December 1993	Independent States (total of 21)		20	
		OTs (total of 16)		14	2
Specially Protected Area and Wildlife of the Wider Caribbean under the Cartagena Convention	Adoption: January 1990 Entry into force: pending	Independent States (total of 21)	3	2	16
		OTs (total of 16)	8	4	4
Fisheries Management					
The United Nations Fish Stocks Agreement	Adoption: August 1995 Entry into force: November 2001	Independent States (total of 21)		5	16
		OTs (total of 16)		4	12

Table 3: The Status of the various Conventions related to Living Resources Use and Management. Refer to footnote 4 for the list of States in the Overseas Territories (OTs) and Independent States categories.

Source: Compiled by the author from referenced sources²⁴⁸

²⁴⁸ CDB Secretariat. (2008). "The Convention on Biological Diversity Around the World." Retrieved 10 October 2008, <http://www.biodiv.org/world/map.aspx>; CITES. (2008). "National Contacts and Contracting Parties." Retrieved 12/11/2005 2005, http://www.cites.org/common/directy/e_directy.html; UNDOALOS. (2008). "UNCLOS Database: List of Ratifications " 2008, <http://www.doalos.org>; UNEP/CEP. (2008). "An Overview of the Cartagena Convention." Retrieved 1 November 2008, <http://www.cep.unep.org/who/ctf.php>.

practical means. UNCLOS also stipulates that these measures must take into account and should not be less effective than generally accepted international rules and standards.²⁴⁹

Convention on the international Trade in Endangered Species of Wild Flora and fauna (CITES): This convention is one of the oldest agreements which attempts to protect species by regulating the international trade of certain specimens of wild animals and plants.²⁵⁰ This was done as a means of ensuring that trade does not threaten species survival or make them prone to over-exploitation. Since its inception, two amendments to the original text of the Convention were made, called the Bonn and Botswana Amendments respectively.

CITES presently accords varying degrees of protection to more than 30,000 species of animals and plants worldwide.²⁵¹ These species are categorized in the Appendices as most endangered, threatened species and species, which neither endangered nor threatened but require cooperation to avoid exploitation.²⁵² CITES stipulates that Contracting Parties must regulate the trading by the use of export permits, which must be issued by credible agencies (Scientific and Management Authorities) within the States.²⁵³ In the Caribbean Sea, the number of species are protected under CITES.²⁵⁴

Conventional on Biological Diversity: The main aims within the relevant provisions of this Convention, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.²⁵⁵ The convention stipulates that all provisions in the Convention apply only to the contracting parties area of jurisdiction²⁵⁶ (in this case will be a

²⁴⁹ UNCLOS, Articles 207 (1), 208 (3), 209 (2), 210(6) and 211 (2)

²⁵⁰ Refer to CITES, Article 11 and Appendices 1-111 for all species, which are restricted for trading.

²⁵¹ Statistic cited from CITES. (2005). "National Contacts and Contracting Parties." Retrieved 12/11/2005 2005, http://www.cites.org/common/directy/e_directy.html.

²⁵² CITIES, Articles 3, 4 and 5

²⁵³ *ibid*

²⁵⁴ The following species found in the Caribbean Sea are regulated by CITES:

Queen Conch - *Strombus gigas* - Appendix 2

Manatee - *Trichechus manantus* - Appendix 1

Sea Turtles - *Caretta caretta*, *Chelonia mydas*, *Eretmochelys imbricata* – Appendix 1

Crocodile - *Crocodylus acutus* – Appendix 2

²⁵⁵ CBD, Article 1

²⁵⁶ CBD, Article 4

maximum of 200 NM for States in the LAC Region). As a measure for sustainable use and conservation of the resources, it requires that the Contracting Party develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity²⁵⁷ or adapt for this purpose, existing strategies, plans or programmes which reflect, *inter alia*, the measures set out in this Convention.²⁵⁸ The Convention also articulates measures for sustainable use of biodiversity, which includes *inter alia* integrating conservation and sustainable use of biological resources into national decision-making and adopting measures relating to the use of biological resources to avoid or minimize adverse impacts on biodiversity.²⁵⁹ In an effort to conserve biodiversity, *in-situ* conservation methods are stipulated which, include establishing a system of protected areas or areas where special measures are taken to conserve biological diversity. In addition, States are required to protect important ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings.²⁶⁰

Cartagena Convention: This stipulates that Contracting Parties take all appropriate measures either individually or jointly, to protect and preserve rare or fragile ecosystems, as well as the habitat of depleted, threatened or endangered species in the Wider Caribbean.²⁶¹ Also in its provisions, Contracting Parties are required to establish protected areas and share among members, information regarding management of such areas.²⁶²

The Protocol Concerning Specially Protected Area and Wildlife (SPAW Protocol): This is part of the Cartagena Convention. SPAW protocol is a sub-regional mechanism aimed at responding to biodiversity loss within the Wider Caribbean Area. The objective of the Protocol is to protect rare and fragile ecosystems and habitats, and protect the endangered

²⁵⁷ CBD, Article 2 defines Biological Diversity as the variability among living organisms from all sources including *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

²⁵⁸ CBD, Article 6

²⁵⁹ CBD, Article 10

²⁶⁰ CBD, Article 9

²⁶¹ Cartagena Convention, Article 10

²⁶² Ibid

and threatened species residing within these areas.²⁶³ The SPAW protocol in its provision has stipulated the conservation of species through the establishment of Marine Protected Areas (MPAs) and buffer zones that are contiguous to international boundaries.²⁶⁴

In addition to these instruments, there are also regional and sub-regional agreements that have identified issues of sustainable management for the Caribbean Sea, which inferred to include biodiversity management also. These include the Columbia Convention, Basseterre Treaty and Tegucigalpa Protocol.²⁶⁵

The Revised Treaty: This treaty articulates within its provisions the need to protect biodiversity. In this regard, it encourages the establishment of protected aquatic habitats.²⁶⁶

Agenda 21: It recognises the need for the improvement in the mechanisms used for conservation and sustainable use of biological resources.²⁶⁷ In order to achieve such, States should develop national strategies for sustainable use and conservation of the resources.²⁶⁸ Agenda 21 also calls for the ratification of CBD²⁶⁹ and for States to take actions such as *in-situ* conservation methods by designating protected areas.²⁷⁰

BPOA: It also recognises the need for SIDS to respond to the threats posed to their biological resources and has echoed the call for the implementation of biodiversity strategies.²⁷¹ In addition, it calls for the ratification of CITES, CBD and other related conventions²⁷² and the designation of protected areas.²⁷³

²⁶³ SPAW Protocol, Article 3

²⁶⁴ SPAW Protocol, Articles 5, 6, 7 and 9

²⁶⁵ Refer to Section 2.4.1.1.2 for these applications

²⁶⁶ The Revised Treaty, Article 60

²⁶⁷ Agenda 21, Chapter 15

²⁶⁸ *ibid*

²⁶⁹ *ibid*

²⁷⁰ *ibid*

²⁷¹ BPOA, Section X1

²⁷² *ibid*

²⁷³ *ibid*

Collectively, these mechanisms form the governance structure for biodiversity management of the Caribbean Sea.²⁷⁴

2.4.2.2 Fisheries Use and Management

2.4.2.2.1 Overview of Pressures

In the Caribbean Sea, there are two types of fisheries:

1. Fisheries stocks found in the fringing habitats of the coral reefs, seagrass and mangroves of the islands and coastal areas of mainland countries;
2. The pelagic fisheries stocks which are linked at a Caribbean wide level²⁷⁵

Fishery in the Caribbean Sea include offshore pelagic, reef fishes, lobsters, conch, shrimps, continental shelf demersal fishes, migratory species, deep slope and bank fishes and coastal pelagic groups of which their habitats are found in the sea as outlined in Section 1.3. Many of these species along with various migratory species such as swordfish are targeted in the region. Of lesser economic importance are marine mammals such as sea turtles and whales.²⁷⁶

Most of the Caribbean SIDS have limited demersal fisheries resources due to the limited shelf area.²⁷⁷ In contrast, the mainland countries such as Venezuela have a significant fishery sector, of which a large amount is derived from its extensive EEZ in the

²⁷⁴ Refer to Part 3 for analysis of the governance in biodiversity management.

²⁷⁵ Richards, W. J. and J. A. Bohnsack (1990). The Caribbean Sea: A Large Marine Ecosystem.in Large Marine Ecosystem: Patterns, Processes and Yields. K. Sherman, L. M. Alexander and B. D. Gold. Washington, American Association for the Advancement of Science: 44-53.

²⁷⁶ Chakalall, B., R. Mahon and P. Mc Conney (1998). Current Issues in Fisheries Governance in Caribbean Community (CARICOM). *Marine Policy* **22**(1): 29-44..

²⁷⁷ Benbow, C. H. and J. Burnett-Herkes (1980). Island Nation Management of Extended Jurisdiction. Gulf and Caribbean Fisheries, Miami, Florida, Gulf and Caribbean Fisheries Institute. 57-62;NOAA. (2003, 2003). "LME 12: The Caribbean Sea." 2004, <http://na.nefsc.noaa.gov/lme/text>.

Caribbean Sea.²⁷⁸ However, over the years fisheries production have changed significantly especially in the 1980s and onwards. By late 1990s, there was a marked decline in all the major taxonomical groups of targeted species²⁷⁹ and many studies have concluded that the Caribbean fisheries including the Caribbean Sea stocks are in crisis.²⁸⁰ In many instances, specific references were made to the overexploitation of single species such as Nassau groupers *Epinephelus striatus*²⁸¹, conch and lobster²⁸² or species or type of fisheries under severe stress such as White Sea Urchins (*Diadema Spp.*) and various species of reef fishes.²⁸³

One of the most widely expressed concerns about intensive fishing is that it can lead to imbalances in the ecosystem functions, which can have ramifications on the overall community structure.²⁸⁴ Fishery removal can induce indirect or direct trophic interactions causing trophic cascading, which is evident in the Caribbean Sea.²⁸⁵ In Jamaica, a strong

²⁷⁸ CARSEA (2007). Caribbean Sea Ecosystem Assessment (CARSEA). A sub-global component of the Millennium Ecosystem Assessment (MA). Caribbean Marine Studies. 168. It is estimated that Venezuela derived in excess of 1.000.000 USD annually from fisheries in the Caribbean Sea

²⁷⁹ NOAA. (2003, 2003). "LME 12: The Caribbean Sea." 2004, <http://na.nefsc.noaa.gov/lme/text;CAESEA> (2007). Caribbean Sea Ecosystem Assessment. A sub-global component of the Millennium Ecosystem Assessment *Caribbean Marine Studies, Special Edition* 104.;

²⁸⁰ Chakalall, B., R. Mahon and P. Mc Conney (1998). Current Issues in Fisheries Governance in Caribbean Community (CARICOM). *Marine Policy* **22**(1): 29-44; CARSEA (2007). Caribbean Sea Ecosystem Assessment (CARSEA). A sub-global component of the Millennium Ecosystem Assessment (MA). Caribbean Marine Studies. 168.

²⁸¹ Callum, R. (2002). Deep Impact: rising toll of fishing in the deep sea. *Trends in Ecology and Evolution* **17**(5): 242-245.

²⁸² Sturm, M. G. (1991). The living resources of the Caribbean Sea and Adjacent areas. *Caribbean Marine Studies* **2**(1-2): 18-44.

²⁸³ Nicholson, W. and L. Hartsuiker (1983) *The State of the Fishery Resources of the Pedro Bank and South Jamaican Shelf.* FAO Fisheries Report; UNEP (1989) *Regional Overview of Environmental Problems and Priorities Affecting the Coastal and Marine Resources of the Wider Caribbean.* 50; Aronson, R. B. and W. F. Precht (2001). White Band Disease and the changing face of Caribbean Coral Reef. *Hydrobiologia* **460**(1-3): 25-38.

²⁸⁴ Jennings, S. and M. J. Kaiser (1998). The Effects of Fishing on the Marine Ecosystem. *Advances in Marine Biology* **34**: 201-352; Pinnegar, J. K., N. V. C. Polunin, P. Francour, F. Badalamenti, R. Chemello, M. L. Vivien-Harmelin, M. Milazzo, R. Zabala, G. D'anna and C. Papitone (2000). Trophic Cascades in Benthic Marine Ecosystem: Lessons for Fisheries and Protected area Management. *Environmental Conservation* **27**(2): 179-200..

²⁸⁵ Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES. Plymouth PhD: 391.pp. illustrated diagrammatically, how trophic cascading is occurring on the reefs on the Caribbean Sea.

correlation was observed of trophic cascading from overfishing in Discovery Bay, which led to increase macro-algae community and decline fringing coral reef.²⁸⁶

Overall, the region's fisheries are under pressure, therefore meaningful responses are vital to maintain a sustainable fisheries sector. The fisheries resources are vulnerable, because stock abundance, is highly dependent on habitat integrity and spawning aggregations, which can be easily lost from overfishing pressure and other anthropogenic activities, that affect their habitats.

In response, a number of instruments are influencing the governance of fisheries in the Caribbean Sea. These are shown in Table 3 and are discussed below.

2.4.2.2.2 The Current Governance Structure for Fisheries Management in the Caribbean Sea

UNCLOS: The provision of the EEZ²⁸⁷ was the most significant provision in relation to the governance of the marine fisheries resources. This provision offers coastal States sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources including living.²⁸⁸ Contracting Parties are also tasked with pursuing sustainable exploitation and as such, are given the right to set a total allowable catch (TAC) on the basis of the best scientific evidence available to the contracting Parties.²⁸⁹

United Nations Straddling and Highly Migratory Fish Stock Agreement (UN Fish Stock Agreement). Given that species in the Caribbean Sea are shared within the EEZs, the

²⁸⁶ Lapointe, B., M. Littler and D. Littler (1997). Macroalgal Overgrowth of Fringing Coral Reefs at Discovery Bay, Jamaica: Bottom -up versus top-down control. Proceedings of the 8th coral Reef Symposium. 927-932.

²⁸⁷ UNCLOS, Articles 55-75

²⁸⁸ UNCLOS, Article 56

²⁸⁹ UNCLOS, Article 61

Straddling Stock Agreement is not applicable in full²⁹⁰ to the Caribbean Sea, because of the absence of high seas upon the complete delimitation of boundaries.²⁹¹ However, many of the principles, concepts and tools for management articulated in this agreement²⁹² apply to any forms of fisheries and as such, influence the governance of fisheries in the Caribbean Sea. Testimony to this understanding is the ratification of this agreement by some jurisdictions in the Caribbean Sea e.g Belize shown in Table 3.

In addition to these instruments, there are also regional and sub-regional agreements which have identified issues of sustainable management for the Caribbean Sea which inferred to also include fisheries management. These include the Columbia Convention, Basseterre Treaty and Tegucigalpa Protocol.²⁹³

The Revised Treaty: This treaty has stipulated the promotion, sustainable management and conservation of the fisheries resources²⁹⁴ in and among its members.²⁹⁵ It also mandated the establishment of a regime for effective management, conservation and utilisation of the living resources of the EEZ of its member States.²⁹⁶

Agenda 21: It highlights the need for actions to address the sustainable use and conservation of living marine resources under national jurisdictions.²⁹⁷ It also advocated the conservation of critical altered habitats²⁹⁸ and the integration of sectoral programmes on sustainable development of fisheries.²⁹⁹

BPOA: It recognises the impacts of unsustainable fishing practices and articulates the need to develop and/or strengthen national capabilities for the sustainable harvesting and

²⁹⁰ The Straddling Stock Agreement, Article 3 stated *inter alia* “[...] the agreement applies to the conservation and management of straddling fish stocks and highly migratory fish stocks beyond areas under national jurisdiction”

²⁹¹ Refer to Section 1.1 for more information.

²⁹² The Straddling Stock Agreement, Articles 6 and 7 in particular.

²⁹³ Refer to Section on 2.4.1.1.2 for more information.

²⁹⁴ The Revised Treaty, Article 60 defines fisheries resources to include all the fishable resources, natural and cultured in the inland and internal waters, territorial seas and the EEZ of the member States

²⁹⁵ The Revised Treaty, Article 60

²⁹⁶ *ibid*

²⁹⁷ Agenda 21, Chapter 17, paragraph 17.1 (d)

²⁹⁸ *ibid*

²⁹⁹ *ibid*

processing of fishery resources.³⁰⁰ It also calls for States to ratify and/or adhere to regional and international conventions concerning the protection of coastal and marine resources and combat unsustainable fishing and related practices.³⁰¹

FAO Fisheries Code of Conduct: Another form of response to fisheries was by FAO. In 1995, FAO attempted to address declining stock worldwide by providing guidelines for effective fisheries management. This was done through the Code of Conduct for Responsible Fisheries.³⁰² This code of conduct advocates the management of fish stock through regional management arrangements.³⁰³ It also includes specifications for the management of stocks at regional levels, which may involve multi jurisdictions.³⁰⁴ It stipulates that there must be cooperation and negotiation among the States on scientific research³⁰⁵, the establishment of Total Allowable Catch (TACs) and enforcement measures.³⁰⁶

In addition to these initiatives, there are two activities which have implications for fisheries governance. These are initiatives by CARICOM and Global Environment Facilities (GEF) and its partners. These are discussed below.

CARICOM Fisheries Initiative: In 2007, CARICOM began the formulation of the common fisheries policy and regime for its members. This is being done under the aegis of CARICOM Fishery Mechanism (CRFM)³⁰⁷, in fulfilment of the relevant provisions in UNCLOS³⁰⁸ and those within the Revised Treaty.³⁰⁹

³⁰⁰ BPOA, Section 1V

³⁰¹ *ibid*

³⁰² FAO (1995) *Code of Conduct for Responsible Fisheries*. FAO 41.

³⁰³ FAO Code of Conduct, Section 7

³⁰⁴ *ibid*

³⁰⁵ FAO Code of Conduct, Section 8

³⁰⁶ *ibid*

³⁰⁷ In 1991, CARICOM established CRFM to provide expertise in fishery management for its members. It is currently a functioning body with full membership of the CARICOM member countries.

³⁰⁸ The Revised Treaty, Article 60 (2) (b) (ii)

³⁰⁹ The Revised Treaty, Article 60 (4)

Caribbean Large Marine Ecosystem Project (CLME): This project which is scheduled to be implemented in late 2008 aims to provide a governance mechanism for the management of the shared marine resources in the Caribbean Sea and adjacent regions.³¹⁰ It proposes to build on and compliment existing projects and initiatives that emphasize technical and institutional aspects of sustainable living marine resource use. All the countries in the Caribbean Sea are involved except the OTs of the United Kingdom, France, Netherlands and USA.

Collectively, the agreements and instruments for both biodiversity and fisheries management form the governance mechanism for the use and management of living resources in the Caribbean Sea.

2.4.3 Sustainable Use and Management of the Non Living Resources

2.4.3.1 Overview of Pressures

The mineral resources of Caribbean Sea, mainly in the form of hydrocarbon deposits have contributed significantly to the economies of a number of countries within the region³¹¹ in addition, to fulfilling the energy demands of many countries.

Data regarding the impacts of the oil and gas sector on the marine environment of the Caribbean Sea is understudied. However, there are evidence to suggest that oil pollution is prevalent in the region of which oil and gas extraction has being identified as a source.³¹² In addition, floating tar and oil slicks were observed in coastal areas and beaches in the region³¹³, which has been linked to the industry.³¹⁴

³¹⁰ Caribbean Large Marine Ecosystem Project. (2008). "Caribbean Large Marine Ecosystem Project." Retrieved November, 10 2008, <http://www.cavehill.uwi.edu>.

³¹¹ Refer to Section 1.4.2 for additional information on the oil producing Countries in the Caribbean Sea.

³¹² UNEP (1994) *Regional Overview of Land Based Sources of Pollution in the Wider Caribbean Region*. CEP-UNEP 43.

³¹³ Wade, B. A. (1987). *Results of the CARIPOL Petroleum Monitoring Project of the Wider Caribbean*. *Marine Pollution Bulletin* **18**(10): 540-548;Buth, L. and J. Ras (1992) *Inventory of the Land Based Sources of Marine Pollution*. The Council for Sea Research and Sea Activities 26.

³¹⁴ Refer to Sections 2.4.1.1.1 and 2.4.1.2.1 for impacts of oil pollution.

2.4.3.2 The Current Governance Structure for Non-Living Resources in the Caribbean Sea

UNCLOS: The provision with respect to EEZs³¹⁵ provides for the exploitation of non-living resources in the Caribbean Sea. This provision offers coastal States sovereign rights for the purpose of exploring and exploiting, conserving and managing the non-living resources (seabed and subsoil).³¹⁶ It also stipulates that the rights afforded to Coastal States should be exercised in accordance with Part IV of UNCLOS.³¹⁷ Part IV deals with the continental shelf beyond the 200NM jurisdiction, hence not applicable to the Caribbean Sea when all the claims are asserted by the many jurisdictions.

Cartagena Convention: It recognises the need to manage activities regarding extraction of resources found on the seabed. It articulates that States party to the convention must take all appropriate measures to prevent, reduce and control pollution resulting directly or indirectly from exploration and exploitation of the sea-bed and its subsoil.³¹⁸

In addition to the various governance mechanisms discussed for pollution and the sustainable use and management of both living and non-living resources of the Caribbean Sea, there is also the UNGA Resolutions, which is being pursued by the Caribbean leaders. This resolution is aimed at promoting sustainable management of the Caribbean Sea and although this is a non-binding obligation, it is highly recognised in the region and strongly pursued at the international level. Such is the recognition that a legally constituted Caribbean Sea Commission (CSC) was formed and amongst its responsibilities is the pursuance of this agenda. Given the value placed on this resolution, its cross cutting nature on issues discussed above and its role in the governance of the Caribbean Sea, the resolution will be discussed in the following sections by examining its role and effectiveness in sustainable management of the Caribbean Sea.

³¹⁵ UNCLOS, Articles 55-75

³¹⁶ UNCLOS, Article 56

³¹⁷ UNCLOS, Article 56 (2)

³¹⁸ Cartagena Convention, Article 8

2.4.4 UNGA Resolution as a vehicle for Sustainable Management

2.4.4.1 Overview of the Resolution

Given the fragile nature of the ecosystems, the high dependence on these services and the threats from shipping and related activities, the Caribbean Sea is viewed as a special sea. On this basis, coupled with the provisions in UNCLOS³¹⁹ and the Revised Treaty³²⁰, in 1997 at the CARICOM initiated Caribbean Ministerial Meeting on the Implementation of the Programme of Action for the Sustainable Development of SIDS, the decision was taken to seek international support for the Caribbean Sea as a special area in the context of sustainable development.

Considering that not only the Caribbean SIDS shares the Caribbean Sea, it was agreed that the support, involvement and consent of the Latin American countries that exercised jurisdictions in the Caribbean Sea were vital. In 1997, the ACS was given the mandate to pursue this agenda³²¹ instead of CARICOM. As a way forward, the region under the aegis of the ACS decided to seek the special area status for the Sea via the UNGA. In 1999, the UNGA passed a resolution on the Caribbean Sea, and to date there has been four more resolutions, all dealing with sustainable management. From the ACS' perspective, the overarching aim is to seek a constituted legal instrument that would address the major uses and impacts on the Caribbean Sea.³²² Given these developments since 1999, it will be necessary to examine the resolutions, the region's responses to the obligations set forth in each of these in an effort to determine the effectiveness of such a mechanism within the Caribbean Sea governance structure.

³¹⁹ Refer to footnote 80 for UNCLOS' provisions regarding cooperation in semi enclosed seas.

³²⁰ Refer to footnote 160 for the provisions of special recognition.

³²¹ UNECLAC (2003) *Developments in relation to the proposal for securing the international recognition of the Caribbean Sea as a special area in the context of sustainable development*. United Nations Economic Cooperation for Latin America and the Caribbean 52.

³²² Girvan, N. (2002). "The Caribbean Sea is Special." 2005, <http://www.acs-aec.org/column/index43.htm>.

2.4.2.2 The Nature of Resolutions

Resolution commonly called UN resolution is a formal text adopted and issued by a United Nations (UN) body. In practice most resolutions are issued by either the General Assembly or the Security Council. The resolutions regarding the Caribbean Sea were issued by the former.

Experts consider most General Assembly resolutions to be non-binding. The basis of this assumption is in reference to Chapter 4 (captioned General Assembly) Articles 10 and 14 of the UN Charter which refers to General Assembly resolutions as "recommendations". However, there are some exceptions to this, such as some General Assembly resolutions dealing with matters internal to the United Nations, such as budgets are clearly binding on their addressees. The 'recommendatory' nature of General Assembly resolutions has repeatedly been stressed by the International Court of Justice (ICJ).³²³

In contrast, resolutions passed by the Security Council are binding. As such, Chapter 5 (captioned Security Council) Article 25 of the Charter articulates that UN member States are bound to carry out "decisions of the Security Council in accordance with the present Charter". Resolutions made under Chapter 7 (captioned action with respect to threats to the peace, breaches of the peace, and acts of aggression) are considered binding, but resolutions under Chapter 6 (captioned Settlements and Disputes) have no enforcement mechanisms and are generally considered to have no binding force under international law.³²⁴ However, there are instances where the ICJ asserted that all resolutions made

³²³ Sergei, A. V. (1995). International Economic Organizations in the International Legal Process. Martinus Nijhoff Publishers: 95. See also the ICJ report; International Court of Justice (1971) *Legal Consequences for States of the continued presence of South Africa in Namibia (South West Africa) notwithstanding Security Council Resolution 276 (1970)* International Court of Justice 150.

³²⁴ Non binding force under international law can be found in the following opinions:

1. "Additionally it may be noted that the Security Council cannot adopt binding decisions under Chapter VI of the Charter." De Hoogh, A. Obligations Erga Omnes and International Crimes. 199: 371.
2. "Council recommendations under Chapter VI are generally accepted as not being legally binding." Magliveras, K. D. Exclusion from Participation in International Organisations. Martinus Nijhoff Publishers 1999: 113.
3. "Under Chapter VI, the Security Council may only make recommendations but not binding decisions on United Nations members". Wallace-Bruce, N. L. (1998). The Settlement of International Disputes. Martinus Nijhoff Publishers: 47-48.

under chapter 6 and 7 are legally binding.³²⁵ However, this has been contested by scholars who argue that Chapter 6 cannot be binding.³²⁶

In general, UNGA resolutions are soft laws which reflect a concern of the international community to a particular issue and serve to build awareness of that said issue of the resolution. In practice, a number of resolutions taken by the General Assembly on a specific issue over a period of time usually yield a number of different outcomes. Such that:

1. These progressive resolutions can lead to a legally binding instrument such as a Multilateral Agreement (MA) which can be either international, regional or sub-regional in scope;
2. It can serve as the basis for programme, policy, and project interventions;
3. Resolution can become interpreted as customary international law. For example, UNGA Resolution 46/215 on the 'Large Scale pelagic drift-net fishing and its impact on the living marine resources of the worlds ocean and seas',³²⁷ has propelled a awareness of the negative impacts of such activity on fish stock globally. This resolution, is now being regarded as customary

4. "First, it may issue non-binding resolutions under Chapter VI of the Charter expressing its opinion on the abuses and their resolution." Mertus, Julie. *The United Nations And Human Rights (2005). A Guide For A New Era*. London Routledge Press. 120 pp.

5. "There are two limitations on the Security Council when it is acting under Chapter VI. Firstly, recommendations of the Council under Chapter VI are not binding on states." Werksman, J. (1996). *Greening International Institutions*, Earthscan. 14 pp.

6. "One final point must be noted in connection with Chapter VI, and that is that the powers of the Security Council are to make "recommendations." These are not binding on the states to whom they are addressed, for Article 25 relates only to "decisions." Sands, P., P. Klein and B. D.; (2001). *Bowett's Law of International Institutions*, Sweet & Maxwell. 46 pp.

³²⁵ Refer to case *Legal Consequences for States of the Continued Presence of South Africa in Namibia (South West Africa) notwithstanding Security Council Resolution 276 (1970)*, Advisory Opinion of 21 June 1971 at paragraphs 87-116, especially 113: "It has been contended that Article 25 of the Charter applies only to enforcement measures adopted under Chapter VII of the Charter. It is not possible to find in the Charter any support for this view. Article 25 is not confined to decisions in regard to enforcement action but applies to "the decisions of the Security Council" adopted in accordance with the Charter. Moreover, that Article is placed, not in Chapter VII, but immediately after Article 24 in that part of the Charter which deals with the functions and powers of the Security Council. If Article 25 had reference solely to decisions of the Security Council concerning enforcement action under Articles 41 and 42 of the Charter, that is to say, if it were only such decisions which had binding effect, then Article 25 would be superfluous, since this effect is secured by Articles 48 and 49 of the Charter." International Court of Justice (1971) *Legal Consequences for States of the continued presence of South Africa in Namibia (South West Africa) notwithstanding Security Council Resolution 276 (1970)* International Court of Justice 150.

³²⁶ See Article on this counter claim: De Wet, E. (2004). *The Chapter VII Powers of the United Nations Security Council*.in, Hart Publishing: 39-40.

³²⁷ UNGA (1999). UNGA Resolution 46/215, 79th plenary meeting, UNGA

international law and are implemented by States as a mechanism for sustainable fisheries.³²⁸

2.4.4.4 The Merits for Sustainable Management of the Caribbean Sea

The resolutions³²⁹ have the basis on the use and importance of the Caribbean Sea to which the UNGA recognized its importance to present and future generations such that:

1. It is important to the heritage of the people of the region;
2. The reliance on the sea for the continuing economic well-being and the sustenance of people living in the area;
3. Its geo-political complexities of a large number of States, countries and territories;
4. The ecosystems and unique biodiversity which are ecologically fragile and economically vulnerable;
5. The heavy reliance of most States, countries and territories on their coastal areas and the marine environment in general to achieve their sustainable development goals and economic needs.

2.4.4.4 The Resolutions, Obligations and Implementation

Resolutions regarding the sustainable management of the Caribbean Sea were passed by the UNGA in 1999 (Resolution 54/225)³³⁰, 2000 (Resolution 55/203)³³¹, 2002 (Resolution 57/261)³³², 2004 (Resolution 59/230)³³³ and 2006 (Resolution 61/197).³³⁴ In each resolution, a number of measures were set forth for the region to accomplish. In addition, a number of measures were also stipulated for the international community to

³²⁸ Personal conversation with Mr. Andre Tahindro, Senior Law Officer/Ocean Affairs Officer, Office of Legal Affairs, United Nations, New York, USA.

³²⁹ The preambulatory clauses of the Caribbean Sea Resolutions 54/225, 55/203, 57/261, 59/230 and 61/197

³³⁰ UNGA (1999). 54/225: Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 3.

³³¹ UNGA (2000). 55/203: Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 4.

³³² UNGA (2002). 57/261: Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 5.

³³³ UNGA (2004). 59/230: Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 6.

³³⁴ UNGA (2006). 61/197: Towards the sustainable development of the Caribbean Sea for the present and future generation. U. N. G. Assembly: 3.

undertake, especially in areas of financial assistance and technical expertise, however, for this assessment, these will not be reviewed. A review of the other measures for each resolution shows the inclusion of some broad policy areas such as the future development of the integrated approach, to more definite obligations such as the need for the region to meet its obligations for the various multilateral agreements. The latter as measures of responding to pollution, biodiversity loss and the effects of climate change. These measures are summarised in Table 4.

In each resolution, ACS reported on the progress in the form of activities undertaken at regional and national levels at predetermined sittings. Table 4 details the large cohort of responses and it shows that actions are being taken in the region. For example, projects were undertaken to address integrated coastal zone management, upgrading contingency plans for port States, addressing oil pollution and information and training for oil spill response among others. In 2007, a work plan was formulated by the ACS in association with UNECLAC aimed at fulfilling the obligations of the resolutions.

Measures regarding each Resolution that should be undertaken by the Caribbean ³³⁵	Initiatives to fulfil the obligations of the Resolution as reported by UNGA Secretary General	
Res: 54/225 Promoting an Integrated approach to the Caribbean Sea in the context of Sustainable Development³³⁶		
<p>..Further development of the integrated management approach to the Caribbean Sea area in the context of sustainable development.</p>	<p><i>Regional</i></p> <ol style="list-style-type: none"> 1.human resource strengthening and capacity building as part of UNDP Capacity 21; 2.proposed judicial symposium for topics of environmental law targeting magistrates; 3.proposed project for a number of SIDS aimed at integrating freshwater and marine resources, as part of UNEP-CEP; 4.adoption of the LBS Protocol within the Cartagena convention; 5.proposal for a regional information and training centre for oil spill response and contingency planning, 6.proposal to have a regional network to monitor the resources which will lead to periodic assessment of the Caribbean environment; 7.CARICOM's initiatives such as Caribbean Fisheries Resources Assessment and Management Programme and Adaptation to climate Change; 8.Code for the safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High level radioactive wastes on board ships (INF code), an annex to the SOLAS convention becomes mandatory; <p><i>National</i></p> <ol style="list-style-type: none"> 9.Colombia launched a national programme for sustainable and integrated development and management of its coastal zone; <p>Overall, most efforts for this resolution have been at developing a common methodology for environmental assessment and reporting.</p>	
<p>...take action, as appropriate, to address land-based sources of marine pollution;</p>		
<p>...give priority to improving the emergency response capabilities and to increasing their participation in existing mechanisms so as to allow for a timely, effective and coordinated response to natural disasters, and for the containment of environmental damage in the Caribbean Sea area in the event of an accident or incident relating to maritime transport;</p>		

³³⁵ The Association of Caribbean States (ACS) has the mandate to report to the UNGA on the measures stipulated in the resolution for the Caribbean region

³³⁶ UNGA (1999). 54/225:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 3;UNGA (2001) *Secretary General Report on 54/225:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development*. 13.

Measures regarding each Resolution that should be undertaken by the Caribbean ³³⁵	Initiatives to fulfil the obligations of the Resolution as reported by UNGA Secretary General
Res:55/203 Promoting an integrated Management Approach to the Caribbean Sea area in the Context of Sustainable Development³³⁷	
<p>...all States to become contracting parties to relevant international agreements to promote the protection of the marine environment of the Caribbean Sea from pollution and degradation from ships;</p>	<p><i>Regional</i> 10. IMO providing technical expertise for capacity building for port states, flag states and up-grading of contingency plans; 11. Continuation of project on integrated coastal areas management for some countries for some islands as in 3</p>
<p>...Calls upon Member States to improve as a matter of priority their emergency response capabilities and the containment of environmental damage, particularly in the Caribbean Sea, in the event of natural disasters or of an accident or incident relating to maritime navigation;</p>	<p>12. Marine and Coastal assessment report in progress 13. Wider Caribbean initiative for ship generated waste 14. A project for reduction of pesticide runoff to the Caribbean 15. workshop to facilitate early ratification on the Rotterdam and Stockholm conventions;</p>
<p>...all relevant States to take the necessary steps to bring into force, and to support the implementation of, the Protocol Concerning Pollution from Land-based Sources and Activities, in order to protect the marine environment of the Caribbean Sea from land-based pollution and degradation;</p>	<p>16. Establishment of a regional activity centre for the region as in 5 17. workshop held by Barbados to identify all aspects of integrated management approach; 18. Project on waste water amelioration and sustainable tourism;</p>
	<p><i>National</i> 19. Project in Belize on land use; 20. Sustainability project on Negril in Jamaica to promote ecotourism 21. Formulation of an strategic action plan for sustainable management for an area in basin shared by Nicaragua and Costa Rica; Overall, ongoing and new projects have being directed at institutional and technical capacity building and countries have increased their activities.</p>

³³⁷ UNGA (2000). 55/203:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 4;UNGA (2002) *Secretary General Report on 55/203:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development*. 13.

Measures regarding each Resolution that should be undertaken by the Caribbean ³³⁵	Initiatives to fulfil the obligations of the Resolution as reported by UNGA Secretary General
Res: 57/261 Promoting an Integrated Management Approach to the Caribbean Sea Area in the context of Sustainable Development³³⁸	
<p>... calls upon States to continue to prioritize action on marine pollution from land-based sources as part of their national sustainable development strategies and programmes, in an integrated and inclusive manner, and also calls upon them to advance the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, and the Montreal Declaration on the Protection of the Marine Environment from Land-based Activities</p>	<p><u>Regional</u> 22. A number of reports was produced to support the resolutions; 23. 14 countries created national biodiversity strategies as part of CDB convention; 24. 14 countries created national communication for UNFCC; 25. 6 countries created national implementation plans for Stockholm Convention as a follow up to 18;</p>
<p>...all relevant States to take the necessary steps to bring into force, and to support the implementation of, the Protocol Concerning Pollution from Land-based Sources and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, in order to protect the marine environment of the Caribbean Sea from land-based pollution and degradation;</p>	<p>26. Implementation of project on integrated coastal areas management for some countries for some islands as in 3 and 11; 27. formulation of a governance project for the sustainable management of the shared living resources; 28. IOC (UNESCO) promoted an integrated coastal management cooperation project in Latin America and the Caribbean;</p>
<p>...calls upon all States to become contracting parties to relevant international agreements to promote the protection of the marine environment of the Caribbean Sea from pollution and degradation from ships;</p>	<p>29. Climate Change scenario for a few countries as support to subset of 7 30. Continuation of project on integrated coastal areas management for some countries for some islands as in 3 and 11</p>
<p>...calls upon States, taking into consideration the Convention on Biological Diversity, to develop national, regional and international programmes for halting the loss of marine biodiversity in the Caribbean Sea, in particular fragile ecosystems, such as coral reefs;</p>	<p><u>National</u> 31. Colombia implementing projects integrated coastal zone management specifically the development of indicators and development of methodologies for utilization of living marine resources; 32. Mexico has developed a strategy for protecting the fragile ecosystems in ITS Caribbean jurisdiction</p>
<p>...calls upon Member States to improve as a matter of priority their emergency response capabilities and the containment of environmental damage, particularly in the Caribbean Sea, in the event of natural disasters or of an accident or incident relating to maritime navigation;</p>	<p>Overall a number of activities are being carried out, along with capacity building.</p>

³³⁸ UNGA (2002). 57/261:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 5; UNGA (2004) *Secretary General Report on 57/261:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development*. 13.

Measures regarding each Resolution that should be undertaken by the Caribbean ³³⁵	Initiatives to fulfil the obligations of the Resolution as reported by UNGA Secretary General
Res:59/230 Promoting an integrated Management approach to the Caribbean Sea area in the context of Sustainable Development³³⁹	
<p>...States to become contracting parties to relevant international agreements to enhance maritime safety and promote the protection of the marine environment of the Caribbean Sea from pollution, damage and degradation from ships and ship-generated waste;</p>	<p><u>Regional</u> 33. continued formulation of project of governance of living marine resources as in 27; 34. Project continuation of integrated coastal zone management in Latin America and the Caribbean as in 28; 35. Capacity building for contaminated Bays in the form of two workshops on management of nutrients and sludge 36. A study on the yachting industry in 9 countries</p>
<p>....States to continue to prioritize action on marine pollution from land-based sources as part of their national sustainable development strategies and programmes, in an integrated and inclusive manner, and also calls upon them to advance the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, and the Montreal Declaration on the Protection of the Marine Environment from Land-based Activities</p>	<p>40. An ecosystem assessment of fisheries and tourism was conducted as part of the Millennium Project; 41. IMO and ITU organised an capacity building workshop on Global Maritime Distress and Safety System (GMDSS); 42. FAO spearheading a project aimed at capacity building on Responsible Fishing for SIDS. This includes fisheries conservation and management in the EEZs;</p>
<p>....consideration the Convention on Biological Diversity, to develop national, regional and international programmes for halting the loss of marine biodiversity in the Caribbean Sea, in particular fragile ecosystems, such as coral reefs</p>	<p>43. a proposal by CARICOM for a common fisheries policy;</p>
<p>.....States to improve as a matter of priority their emergency response capabilities and the containment of environmental damage, particularly in the Caribbean Sea, in the event of natural disasters or of an accident or incident relating to maritime navigation;</p>	<p><u>National</u> 44. Barbados initiated a number of country projects in disaster preparedness, coastal zone management including shoreline stabilization; 45. Mexico conducting routine inspection of ships that transport hazardous waste.</p>
<p>.....States to take the necessary steps to bring into force, and to support the implementation of, the Protocol Concerning Pollution from Land-based Sources and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region in order to protect the marine environment of the Caribbean Sea from land-based pollution and degradation;</p>	

³³⁹ UNGA (2004). 59/230:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 6;UNGA (2006) *Secretary General Report on 59/230:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development*. 15.

Measures regarding each Resolution that should be undertaken by the Caribbean ³³⁵	Initiatives to fulfil the obligations of the Resolution as reported by UNGA Secretary General
Res: 61/197 Towards the sustainable Management of the Caribbean Sea for Present and Future Generation³⁴⁰	
<p>...States to become contracting parties to relevant international agreements to enhance maritime safety and promote the protection of the marine environment of the Caribbean Sea from pollution, damage and degradation from ships and ship-generated waste;</p>	<p>46. The formulation of the Caribbean Sea Commission (CSC) 47. The Caribbean Sea Commission through ECLAC has devised a work programme, which addresses dimensions such as policy, legal, scientific, capacity building, dialogue among stakeholders and safety</p>
<p>.... States to continue to prioritize action on marine pollution from land-based sources as part of their national sustainable development strategies and programmes, in an integrated and inclusive manner, and also calls upon them to advance the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, and the Montreal Declaration on the Protection of the Marine Environment from Land-based Activities;</p>	
<p>.... consideration the Convention on Biological Diversity, to develop national, regional and international programmes for halting the loss of marine biodiversity in the Caribbean Sea, in particular fragile ecosystems, such as coral reefs;</p>	
<p>...calls upon Member States to improve as a matter of priority their emergency response capabilities and the containment of environmental damage, particularly in the Caribbean Sea, in the event of natural disasters or of an accident or incident relating to maritime navigation;</p>	

Table 4: A Summary of the UNGA Resolutions for the Caribbean Sea and the Activities undertaken by the region in fulfilling the Obligations set forth within each resolution. The obligations in the resolutions are in general similar to many of the actions and recommendations in agenda 21 and BPOA

Source: Compiled by author from referenced sources ³³⁶⁻³⁴⁰

³⁴⁰ UNGA (2006). 61/197: Towards the sustainable development of the Caribbean Sea for the present and future generation. U. N. G. Assembly: 3.; At the time of the writing this report, the report to the Secretary General regarding the implementation of Resolution 61/197 was not made public.

In response, this raft of instruments and interventions which exist for the Caribbean Sea, demonstrates a genuine concern by the various international, regional and national bodies for the need to find a such compromise between environment and development. However, the Caribbean Sea continues to degrade. In the following section, an evaluation of the governance mechanism will be discussed.

**Part 3: Discussion of the Governance Mechanism
in the Caribbean Sea and Implications for
Sustainable Management**

3.1 Introduction

The evaluation of the governance mechanisms, shows that actions are being taken at all levels and it is evident from the stipulation and guidelines provided in these agreements that they are all attempting to promote a balance between economic development and environmental management. From the analysis, a number of observations were evident regarding the governance structure in the Caribbean Sea. These are broadly classified as shortcomings and challenges.

3.1.2 Shortcomings

Sectoral: Many of the agreements seemed sectoral in nature, of which they are all superimposing their own form of governance, without much regard for synergies with the other instruments. For example, MARPOL is more biased to shipping nations, of which coastal States do not have much enforcement powers. On the other hand, UNCLOS provides rights for coastal States to prevent pollution in the EEZ, yet under MARPOL, various types of treated waste could be discharged at much as 12 NM from a land mass. This creates conflict of interest between coastal States and Flag States especially regarding the management of critical habitats. This ‘fuzzy area between these two instruments’ can have implications for sustainable management of the Caribbean Sea.

Repetition among Instruments: The analysis shows that in some instances many of the stipulations in the agreements are similar in scope and at times seem very repetitive. For example, the call for the designation of protected areas is enshrined in the CBD, Cartagena Convention, SPAW Protocol, BPOA and Agenda 21. This could be ‘very overloading’ for many countries in the region given the limited financial and technical capacities, therefore leaving many of these inadequately implemented at best or not implemented. In addition, each of these instruments have a reporting agency and requires a focal point, again placing more strains on limited capacities given the overlapping nature of many of the Government in the region. This repetitive nature could be a reason for poor implementation. In addition, this repetitiveness of the various mechanisms also

demonstrates the sectoral nature of many of the UN Agencies which are also operating with little synergy among them.

Generalisation of some Agreements: Some agreements are very generalised on certain issues and therefore opened to various interpretations while others are very specific. For example, the Cartagena Convention and MARPOL. The Cartagena Convention in its provision³⁴¹ on ship generated marine pollution articulated “ taking all appropriate measures to prevent, reduce and control pollution of the Convention area caused by discharges from ships and, for this purpose, to ensure the effective implementation to the applicable international rules and standards established by the competent international organization.” This can be interpreted in a number of ways to mean that either members must ensure compliance with international agreements for ship generated pollution; or members have an obligation to create agreements concerning ship generated waste which confirms with international law; or reaffirming that members have an obligation to comply with obligations placed on them under international law.³⁴²

In contrast, MARPOL 73/78 includes in its provisions a series of specific regulations on the size of ships and also the stipulations regarding the type, area of dumping and amount of waste which are permitted. In this regard, it may be easier to measure the success or failure of MARPOL as opposed to Cartagena. Although, it maybe an unfair comparison given that Cartagena is more a framework convention, nonetheless, they both have high levels of ratification in the region. This general vs specific nature of these instruments has implication for sustainable management as it may allow for manoeuvres.

Ratification: One measure of success of legal instruments is the number of ratification. When translated to the region, a number of observations can be made such as the general rate of ratification of the relevant agreements on average is low. In agreements where stipulations are made to minimize aspects such as pollution from land based activities, the rate of ratification is meagre e.g the LBS Protocol. In contrast, for agreements where

³⁴¹ Cartagena Article 5

³⁴² For more on this interpretation, See Sheehy, B. (2004). Does International Marine Environment Law work? An examination of Cartagena Convention for the Wider Caribbean Region. *Georgetown International Environmental Law Review* 12(3): 441-472.

the obligations are not many, the ratification rate is higher, for example the Oil Spills Protocol of the Cartagena Convention. In some cases, countries are signatory to the protocols but the time lag between signature, ratification and implementation are long, as in the case of the LBS Protocol.

For many treaties, there seem to be a significant disparity between independent Countries and the overseas territories (OTs) of France, Netherlands, U.K and USA. The highest rates of ratification are within the independent States while it is significantly low for OTs. In some instances, many of the “parent” countries although being party to many of the conventions, their OTs in the Caribbean Sea are not. For example, The Netherlands ratified UNCLOS for the Kingdom of Europe which does not include Bonaire, Curaçao, St. Maarten, St. Eustatius, Aruba and Saba.³⁴³ Similarly, France ratified MARPOL but not for OTs³⁴⁴ in the Caribbean Sea. Given that collectively, OTs use the resources and contribute to the impacts of the Caribbean and make up over 48% of all the States in the region, this disregard for treaties obligation may negatively affect any measure for governing the Caribbean Sea as a unit. However, it is pertinent to note, that these OTs have varying legal competence depending on the laws of the parent countries, which may or may not provide other avenues for resource management. These will require further research.

Overall, poor ratification and non-memberships create a significant disparity for the successful outcome of these instruments. This seems to suggest that the commitment to sustainable environmental management is absent.

³⁴³ Netherlands on behalf of The OTs in the Caribbean Sea, have recognized 200 NM as customary international law and have entered into agreements to delimit its boundaries. The islands in the Caribbean Sea under the umbrella of Netherland Antilles are semi autonomous in many regards, except those of foreign affairs and defense, which is controlled solely by The Kingdom of Netherlands in Europe. Information Source: Netherlands Mission to the UN.

³⁴⁴ Guadeloupe and Martinique are regarded as provinces of France. Saint Martin and Saint Batholomy are viewed as territories of France hence, the laws governing these are different. Information Source: French Mission to the UN. 10 December 2008.

Inadequacies in the Conventions: Some of the conventions seem rather inadequate in dealing with the environmental issues facing the Caribbean Sea. For example, MARPOL is one of the most widely ratified pollution related convention and one of the oldest in the region. However, when the stipulations for discharges are analysed in GIS (as shown in Figure 5) it seems rather inadequate in protecting fragile ecosystems, leaving a large area where discharges are ‘permissible’. This restriction is inadequate in avoiding pollution in nearshore areas as the pattern of ocean currents can easily and quickly move onto nearshore areas or to marine habitats. This somewhat ‘inadequacy’ of MARPOL is further compounded by the inadequate port reception facilities for all forms of waste in the Caribbean Sea, poor surveillance and a high intensity cruise industry. Examples exist where cruise ships have dumped waste into the sea³⁴⁵, despite the enforcement of MARPOL. In addition, the emerging container trade and the expansion of the Panama Canal will likely witness more pollution in the Caribbean Sea, of which the provision in MARPOL would not assist. Again, this will have implication for the governance mechanism in the Caribbean Sea.

³⁴⁵ Refer to footnote 103 on prosecution of cruise ships for dumping

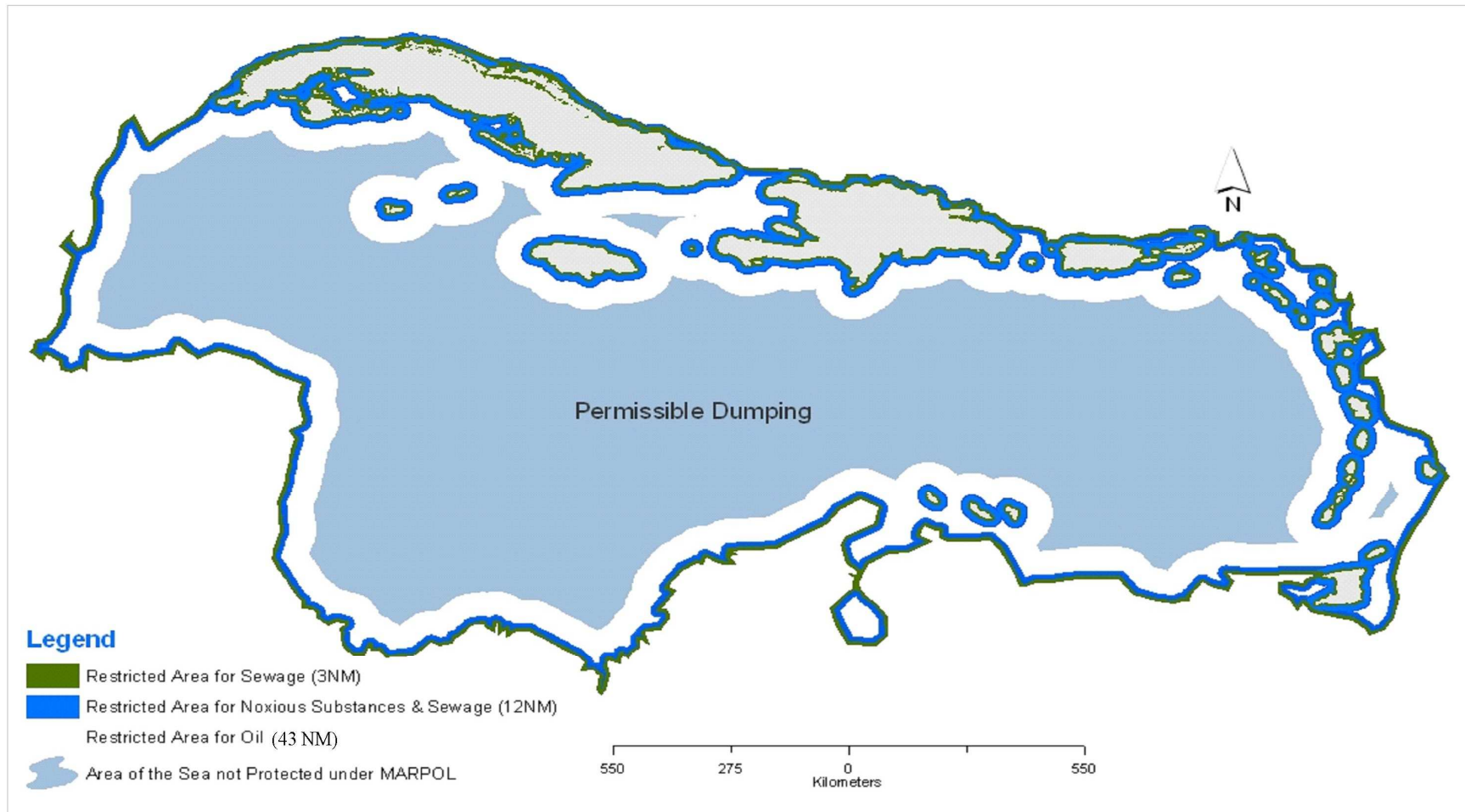


Figure 5: A Map showing the area of the Caribbean Sea protected under the stipulations of Annexes 1, 11, IV . The map highlights the inadequacies of these stipulations in seas which require an ecosystem management type approach such as the Caribbean Sea

Source: Modified by the author, from referenced source³⁴⁶

³⁴⁶ Singh, A. and L. D. Mee (2008). Examination of Policies and MEAs Commitment by SIDS for sustainable management of the Caribbean Sea *Marine Policy* 32(3): 274-282.

Non-Binding Agreements and their poor influence: Apart from the legal agreements, the non-binding agreements such as Agenda 21 and BPOA have all attempted to give further credibility to the various legal instruments. These agreements provide useful guidelines and action plans which can assist in curbing marine degradation. For example, BPOA is very applicable to the Caribbean region given the large number of SIDS. However since its inception in 1994, it has undergone 2 major follow-up ‘reviews’ (shown in Table 5) of which both concluded that it remains largely unimplemented at a regional level. In 2005, at a meeting for the BPOA +10 in Mauritius, Jamaica’s Minister of Land and Environment, Dean Peart conceded that,

"We are nowhere near where we are supposed to be in term
of the implementation of the BPOA"³⁴⁷

Table 5 :A Summary of the BPOA and follow up on progress

Framework	Agreement	Comments
2002 World Summit on Sustainable Development (WSSD) Johannesburg Meeting	At the WSSD a recommendation was made that "a full and comprehensive review of the implementation of the Barbados Programme of Action for the Sustainable Development of Small Island Developing States should take place in 2004" ³⁴⁸	The review sought a renewed political commitment by all countries to the Programme of Action. It also focused on practical and pragmatic actions for further implementation, including mobilisation of resources and assistance for SIDS ³⁴⁹
2005 Mauritius Declaration	The BPOA was reaffirmed as the blue print providing framework for sustainable development in the SIDS. It was agreed that these vulnerabilities will continue to escalate unless immediate steps are taken ³⁵⁰ . Also the challenges of small islands, their problems of integration into the global economy, and the need to support the programmes were reiterated	The Mauritius Strategy ³⁵¹ , which represents proactive measures to further implement the Barbados Plan of Action (BPOA), and the Mauritius Declaration ³⁵² , aimed at reinforcing commitment at the political level were adopted.

Source: Compiled by the author from referenced sources ³⁴⁷⁻³⁵²

³⁴⁷ Davidson, T. (2005). *Mauritius Declaration highlights problems of integration in Global Economy*. Jamaica Observer. Kingston, <http://www.sidsnet.org/latestarc/other-newswire/msg00065.html>.

³⁴⁸ Commonwealth Secretariat (2004) *The Barbados Programme of Action on Sustainable Development of Small Island Developing States*. Commonwealth Secretariat Small States 9 <http://www.commonwealthsmallstates.org/Default.aspx?page=217>.

³⁴⁹ Ibid.

³⁵⁰ UNEP (2005) *Mauritius Declaration - adoption of the final outcome of the International Meeting*. UNEP 3.

³⁵¹ UNEP (2005) *Draft Mauritius Strategy for Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States*. UNEP 30.

³⁵² *ibid.*

Arguably, the initiative such as the BPOA is a well-intentioned effort to deal with many of the environmental problems including those faced in the Caribbean Sea. However, it lacks the necessary power needed for its successful implementation. Its non-binding principles allow for manoeuvres and the reviews highlight its meagre achievements after 14 years from its conception.

Overemphasising the UNGA Resolutions: The region must be commended for taking sustainable management of the Caribbean Sea to a global audience via the UNGA Resolutions. Such action seems to demonstrate that the region is both concerned with the declining environmental quality and cognizant of the consequences of inaction. The region has acted with a high degree of unison, testimony by fact that this initiative has seen the largest number (although not all) of the States being involved via the Caribbean Sea Commission (CSC) to pursue such an initiative at a global level.

However, an evaluation of the achievements has highlighted major shortcomings in terms of meeting the obligations as summarised in Table 6. The review of the achievements indicates that the region has many areas where the required measures of the resolution were not fulfilled based on the reports submitted on each resolution, most projects seem to still be *ad-hoc* in geographical scope within defined political entities. In addition, it is evident that marine projects and industries are still managed individually or in small core groups and a coordinated strategy for the sea is still lacking.

Evaluation of achievements as reported for each Resolution	Comments
Res: 54/225 Promoting an Integrated approach to the Caribbean Sea in the context of Sustainable Development	
<p>1. Capacity building in a number of areas which would assist in providing the expertise needed to assist in this resolution;</p> <p>2. Adoption of the LBS protocol- if and when entered into force and ratified and implemented in the region by all the countries, it will be an important development in minimizing the pressure from land based sources of pollution;</p> <p>3. The mandatory compliance of the annex to the SOLAS Convention will help to minimize the risk posed by hazardous waste movement in the Caribbean Sea.</p>	<p>1. although the proposed project for SIDS and the individual efforts by other countries in responding to coastal zone and other issues, is an excellent idea in minimizing the impacts, managing the sea will require all the countries to be involved in such initiative or similar and within a strategy;</p>
Res:55/203 Promoting an integrated Management Approach to the Caribbean Sea area in the Context of Sustainable Development	
<p>4. Capacity building especially in port related issues will increase the awareness and expertise of the role of port in minimizing pollution thereby helping to achieve sustainable management;</p> <p>5. The reports will provide updated scientific assessment of the state of the sea and will be useful to inform the actions taken with regard to management;</p> <p>6. Wider Caribbean project on ship generated waste (phase 1) which started in 1994 and ended in 1998. The objective is to clean up the Caribbean Sea. No further information is available on this initiative.</p>	<p>2. same as in 1</p>
Res: 57/261 Promoting an Integrated Management Approach to the Caribbean Sea Area in the context of Sustainable Development	
<p>7. same as in 1</p> <p>8. The creation of the national strategies for CDB, and Stockholm conventions will assist the countries in cataloging their biodiversity and pollution issues and ways in which the impacts could be minimized;</p> <p>9. Proactive response to climate change</p> <p>10. Initiative on the management of shared resources</p> <p>11. Capacity building and cooperation in coastal management;</p>	<p>3.the implementation of the integrated coastal areas management are within specific sites within the countries akin to demonstration sites;</p> <p>4. Same as 1</p>

Evaluation of achievements as reported for each Resolution	Comments
Res:59/230 Promoting an integrated Management approach to the Caribbean Sea area in the context of Sustainable Development	
12. same as 5 13. the governance project on living marine resources will certainly assist in dealing with the over exploitation of the fisheries as the scope includes the Caribbean sea; 14. The study on yachting will provide an insight into its impact on the Caribbean Sea and inform the strategy for sustainable management;	5. the initiatives on fisheries by CARICOM should build on the many initiatives in the pass and also compliment the project on governance of living marine resources;
Res: 61/197 Towards the sustainable Management of the Caribbean Sea for Present and Future Generation	
15. The formulation of the Caribbean Sea Commission (CSC) 16. The Caribbean Sea Commission through ECLAC has devised a work programme, which addresses dimensions such as policy, legal, scientific, capacity building, dialogue among stakeholders and safety	No report is available on its list of accomplishments. However, a review of the work programme has shown that there is no clear strategy on sustainable management of the sea;

Table 6: An Evaluation of the success achieved in meeting the obligations of the UNGA Resolutions. The information shows that work is being done in the region, which are used in fulfilment of the resolutions, however, these projects need to be done in such a manner that will assist in responding in totality to the environmental challenges of the Sea.

Source: Compiled by the author, 2008.

Although, this is a well intentioned initiative, beyond the cooperation agreement and resolutions on paper, the manner in which the region responds to environmental degradation in the past seems to still be the same at present – sectoral, core group of countries with similar political alignment and lack of integration of all States. These are hindrance to achieving any form of sustainable resource management of the Sea. The CSC programme of work seems similar to that of a sub-regional organisation, which will make it difficult to achieve holistic management of the sea. In addition, the concept of special area which is presently being pursued under this resolution seems legally flawed in its present format and continuity seems to be absent from the work of the CSC. The resolutions (non-binding) principles, may likely allow for continued manoeuvres similar to other initiatives such as the BPOA. In view of these observations, seeking another resolution³⁵³ in the region’s current manner of operation will be another agreement while in the meantime the marine environment continues to degrade. In practical terms, there is a tremendous gap between rhetoric and reality which needs to be narrowed.

3.1.3 Challenges

Implementation: Almost all the agreements have advocated the need for cooperation, more evident in UNCLOS.³⁵⁴ However, in the region it has been a challenge for States to concur on regional agreements, despite the growing understanding of the need to manage the sea as an ecosystem. Programmes that augment many of the legal instruments are done along traditional political alignments and conducted in core groups of countries, For example, the region-wide initiative such as the IWCAM is aiming to conduct holistic management of the watershed and coastal area but has so far aligned itself to the CARICOM member States. In addition, this project is site specific in these countries, therefore, at its best, IWCAM is a demonstration project which contributes meagrely to the overall goal of sustainable management. This lack of integration of all the countries

³⁵³ The ACS is scheduled to report to the UNGA in 2008. It is expected that ACS will seek a further resolution to build on the previous ones.

³⁵⁴ UNCLOS, Article 123 emphasizes the need for cooperation by bordering States in exercising the rights and responsibilities with regard to the protection and preservation of the marine environment.

in this region is evident in many other areas as well, such as ship generated waste and fisheries among others.

This lack of integration is also very evident for the OTs of France, the USA, the United Kingdom and the Netherlands. At best, many of these States are observing members to many of the regional and sub-regional bodies, hence their integration into the governance of the Caribbean Sea may be less effective, than those with full membership. This can have implications for the overall management of the sea.

In terms of implementation of multilateral agreements, many of the instruments are poorly implemented in the region. For example, biodiversity management falls under CBD, Agenda 21, BPOA, Cartagena Convention and SPAW Protocol of which all articulated the designation of protected areas to curb biodiversity loss. Many countries have ratified these conventions and incorporate the non-binding agreements into national strategies, also many of them legislated the establishment of MPAs in fulfilment of these obligations. Such response has resulted in the legal designation of 99 MPAs³⁵⁵, varying in sizes and found in almost all the jurisdictions in the Caribbean Sea. However, despite these designations, only a small percentage is operating with any satisfactory management plans. A study investigating the management of MPAs³⁵⁶ have concluded that there are a total of 45 MPAs in the Caribbean Sea with active management. Among them, four are ranked as having high level management³⁵⁷ in place and 19 are ranked as having low level or no management, thereby, leaving over 54 MPAs with no forms of management whatsoever.

³⁵⁵ Data modified from Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES, Plymouth PhD: 391.pp; Singh, A. and L. D. Mee (2008). Examination of Policies and MEAs Commitment by SIDS for sustainable management of the Caribbean Sea *Marine Policy* **32**(3): 274-282.

³⁵⁶ Geoghegan, T., A. H. Smith and K. Thacker (2001) *Characterisation of Caribbean Marine Protected Area: An Analysis of Ecological Organisational and Socio Economic Factors*. Caribbean Natural Resources Institute 140.

³⁵⁷ According to the Geoghegan (2001) High level management is where objective, management plan or operations plan is in place. Adequate human and other resources are available to address all stated objectives with actions and programmes. There is a high level of awareness of and adherence to management rule. Low management activities are in place, but objective are unstated or not addressed, resources are insufficient, management rules are not widely adhered to, and management may not be evident to visitors .

In some States, MPAs have been effective in arresting the decline of certain species, for example in St. Lucia³⁵⁸, while in other cases the MPAs were ineffective, for example in Curaçao.³⁵⁹ Having these designated biodiversity sanctuaries in the absence of effective management systems do not assist the cause and neither do they serve their intended aim of these many legal instruments. These inadequacies in implementation will certainly influence effective governance of the Sea.

Poor Commitment in the Region: The Caribbean Sea is designated a special area for garbage under Annex V of MARPOL since 1993. However, this is yet to be implemented because the Caribbean region has not fulfilled its requirement on the number of reception facilities for this designation to be effective. In this regard, the convention has responded to the problem of garbage, however, implementation is at best inefficient. Thirteen years onward, the region cannot collectively meet this requirement and although this designation is important in many regards, the region has not appointed an agency to pursue this.

Poor Cooperation: In some areas of resource management, cooperation is very important. The nature of the fish stock in the region require such initiative of which both UNCLOS and the Fish Stock Agreement have broadly but vehemently sanctioned. However, many of the current management regimes reflect a fishery which is managed within nations' EEZs and in many instances, the stock biology and movements are not well considered. In some instances, sub-regional organisations are devising common fisheries policies for the Caribbean Sea with just the involvement of a small fraction of nations in the Caribbean Sea. This inability to incorporate all jurisdictions in such an initiative will make this ineffective in dealing with the fisheries issues in the region.

³⁵⁸ Roberts, C. M. and N. V. C. Polunin (1991). Are Marine Resources Effective in Management of Reef Fisheries. *Reviews in Fish Biology* **1**: 65-91; Polunin, N. V. C. and C. M. Roberts (1993). Greater Biomass and Value of Target of Coral Reef Fishes in Two Small Caribbean Reserves. *Marine Ecology Series* **100**: 167-176.

³⁵⁹ Bruckner, A. W. and R. J. Bruckner (2003). Condition of Coral Reefs off less developed coastlines of Curaçao. in Status of Coral Reefs in the western Atlantic: Results of initial Surveys. *Atlantic and Gulf Rapid Reef Assessment (AGRRA) Program.* J. C. Lang, Atoll Research Bulletin 496.: 394-402.

The region may overcome this barrier to cooperation with the proposed implementation of the Caribbean Large Marine Ecosystem (CLME) Project as in concept it seems to foster a more common approach to fisheries management and is also attempting to promote synergies among the various fisheries agencies. However, the OTs of the region are not involved. The effective incorporation of these OTs will truly reflect a fisheries governance mechanism at the Caribbean Sea level.

Overall cooperation in all areas regarding the Caribbean Sea is constrained by cultural differences, varying developmental status and priorities, lack of common conservation goals, economic factors, linguistic barriers and various political alignments and external influences.

Asserting Rights: In the Caribbean Sea, there are few boundary agreements between the States, however, there are still a large number of territories that are yet to fully delimit boundaries. There are also a number of outstanding boundary disputes, with many emerging ones.³⁶⁰ The absence of defined boundaries seem to be a contributing factor to ineffective governance in the region, in that if States do not know the extent of their boundaries then they will be unable to ascertain how much and what they are governing. So how can they govern? How can the CARICOM Common Fisheries Policy work when its members have only settled seven claims out of a possible total of the forty-eight?

External Influences: Over the last two decades, The Netherlands, France and The United Kingdom have increasingly moved to unify its position under the common umbrella body of the European Union (EU)³⁶¹ which effectively resulted in many of the OTs of these three countries as non-members of the EU.³⁶² In some instances, upon ratification of some agreements, the competencies in some areas are passed onto the EU. This may

³⁶⁰ For a more in-depth study on boundary delimitation refer to Anonamous (1999) *Delimitation of Maritime Boundaries within CARICOM* CARICOM.

³⁶¹ Refer to Art. 47 of the Rome Treaty for members of the EU.

³⁶² For example, the Netherland Antilles although part of the Kingdom of Netherlands are not members of EU.

have implication for OTs in the Caribbean and their participation in the region, especially upon the passing of the impending Lisbon Treaty.³⁶³

Emerging Challenges: Initiatives such as the drive to end poverty as enshrined in the Millennium Development Goals³⁶⁴ can foster an increased use of already limited or over exploited stocks, as Government in the region are required to meet these goals. These, if not cautious can be counter-productive, hence the challenge for the region is to balance managing the sea and meeting the goals of other initiatives such as MDGs , all done in a manner that would not further compromise the resources and ecosystem integrity of the Caribbean Sea.

Overall, the analyses presented, highlight some of the barriers, which are contributing to ineffective governance and management of the resources and the Caribbean Sea as a unit. Apart from these, it is evident that there are governance mechanisms for the Caribbean Sea, which create challenges and opportunities for sustainable management as a regional sea. Although well intentioned, it is evident many of these agreements have some major shortcomings and when these are all superimposed on the Caribbean Sea, they provide some emerging clues as to their contribution to ineffective governance. Based on the analysis, the effective management of the Caribbean Sea is still lacking and there are some areas which require some urgent interventions. The focus of the following section will be to provide recommendations for a more effective governance mechanism.

³⁶³ The Treaty of Lisbon is designed to streamline the workings of the EU with amendments to the Maastricht Treaty and the Rome Treaty.

³⁶⁴ In 2001, eight international goals were agreed by 189 UN member States aimed at improving the life of the people across the world. These include reducing extreme poverty, reducing child mortality rates, and fighting diseases among others. Government are tasked with achieving these by 2015.

3.2 Recommendations

Based on the findings, it may be useful to consider the following recommendations:

- a. *A Common Strategy*: There are merits in such an approach, as the resources are shared and so are the problems. Therefore, good conservation measures in one country can reap benefits for another country as in the case of shared marine species. In addition, fulfilling the obligations for all the conventions (MARPOL, Cartagena, UNCLOS) and agreements (Agenda 21, BPOA, Johannesburg 2006) require preparing strategies and programs and to report on them regularly. In a region of mostly developing countries where resources and expertise are scarce, a regional approach to the Caribbean Sea will reap benefits in meeting these obligations and achieving sustainable management while simultaneously reducing the financial burden by the duplication of projects. In specific regards the following components for this strategy should include:

Policies: Policy makers in the region need to overcome the *ad-hoc* approach to governance through cooperation, restructuring and the use of common policies. The major economic and environmental activities require an integrated regional approach to management. These include tourism and pollution among others. In view of this need, the following policies should be devised for all the nations sharing the Caribbean Sea:

1. *A common waste policy* should be initiated to ensure that waste generated by the countries is dealt with in a manner that prevents it from reaching the marine environment. This is necessary in order to reduce ecosystem

damage and impede water quality degradation. This common policy must inform at country level the policy of which the latter will take into consideration its own geographical and socio cultural attributes. This policy must address waste such as industrial, sewage and other household waste, solid waste, other forms of effluents discussed in Section 2.4.1.2.2. In regards to sewage, all the countries must address the issue of untreated and/or inadequate treatment of sewage.

2. *A common agricultural policy* should be incorporated into each State's policy plans. This policy should be implemented at a local level with a regional objective of preventing or minimizing agricultural waste from entering the sea. This should also promote sound agronomic practices, which will contribute to minimizing excessive siltation and promote judicious use of pesticides, fertilizers and other harmful chemicals.
3. A common policy to address pollution from ships, involving stringent measures and restrictions for ballast water and bilges. This is vital because of the threat posed on the marine environment from invasive species (marine pests) and pollution. These should be done with increased research, monitoring and awareness. A ballast water programme for the Caribbean Sea, similar to those that exist for other regions such as Asia/Pacific and Eastern Europe may be a worthwhile consideration.³⁶⁵
4. *A land use policy* for each country should be devised, or revamped where they might already exist, to effectively manage land based issues which affect the marine environment. Land capability should be adhered so as to minimise issues such as erosion in coastal areas prone to such.
5. *A common fisheries policy*, which considers the sea as a ecosystem of which all States are stakeholders. Where needed fisheries policies for specific species should also be considered. Synergy should be promoted in cases where there are sub-regional fisheries policies already in existence. Maybe the work of CLME could be expanded to include such in its mandate.
6. *A common policy for surveillance and monitoring controls* would be useful given that many of the States have large areas to monitor, thereby placing a strain on limited resources. Collectively, the region can work

³⁶⁵ Global Ballast Water Management Programme. (2005). "The Glo Ballast Programme." Retrieved 10/12/2005 2005, http://globallast.imo.org/index.asp?page=gef_interw_project.htm&menu=true.

together in this regard especially in areas of fisheries surveillance and pollution monitoring. However, in devising such policy, the issues of sovereignty must be given due consideration

Standards, Monitoring Programmes and Data Collection: The increasingly high coastal development means that water quality and discharge standards should be a priority. Based on the current knowledge, common monitoring schemes and indicators should be devised and use by all the countries. Each country should have a regime for water quality monitoring applicable to its own situation, but should be informed by the regional water quality programme.

Data collection and monitoring should be an important priority, as this is the only way to further the understanding of the marine environment, while simultaneously being able to identify trends and environmental changes. Indicators should be developed to gauge the state of the environment, specifically regarding pollution indicators. There should be a repository for data storage which should be made readily available to any country and other relevant stakeholders.

Research: Integrated management is an ongoing process, and resources should be prioritised to fulfil the research needs in various aspects (such as scientific, economic and socio cultural) for ongoing management. Below are a few examples of required research:

1. Economic valuation of the services provided by the Sea, this includes regulating, socio-cultural and supporting services;
2. Ecological and environmental indicators for measuring 'resilience' ;
3. Threshold quantification (carrying capacity) of the sea's core ecosystem functions;
4. Cost-Benefit analysis of cruise ship tourism in the sea;
5. Pollution risk assessment and sensitivity mapping for the sea;

6. Identify ways in which the region can capture economic rents for ecosystem goods and services from the Caribbean Sea.

Public Awareness: This proposed strategy must have an element of ongoing public awareness campaigns and dialogues in order to succeed and to increase environmental awareness. These awareness programmes should be designed for both State and regional levels. Media agencies and educational institutions can be used to promote environmental awareness in the region. In addition, it is vital to recognise that community and stakeholders' dialogue and participation are paramount to sustainable management.

Adaptive Management: New information regarding the Caribbean Sea's function and biodiversity should be continuously incorporated into this proposed management strategy and subsequent plans, programmes and projects. Importantly, decision makers must acknowledge that managing the sea should be adaptive, with policy making being an iterative process. They must acknowledge that there are uncertainties rather than static answers, which should be reflected in the policies.

Overall, this strategy must be adopted by all the States either within a defined legal agreement or an agreement which would foster a strong commitment to making the management of the Caribbean Sea a priority. In addition, the policies contained within the strategy, although made at the sea/regional level can then be implemented through a tier approach formulated the form of programmes and projects using the model illustrated in Figure 6.

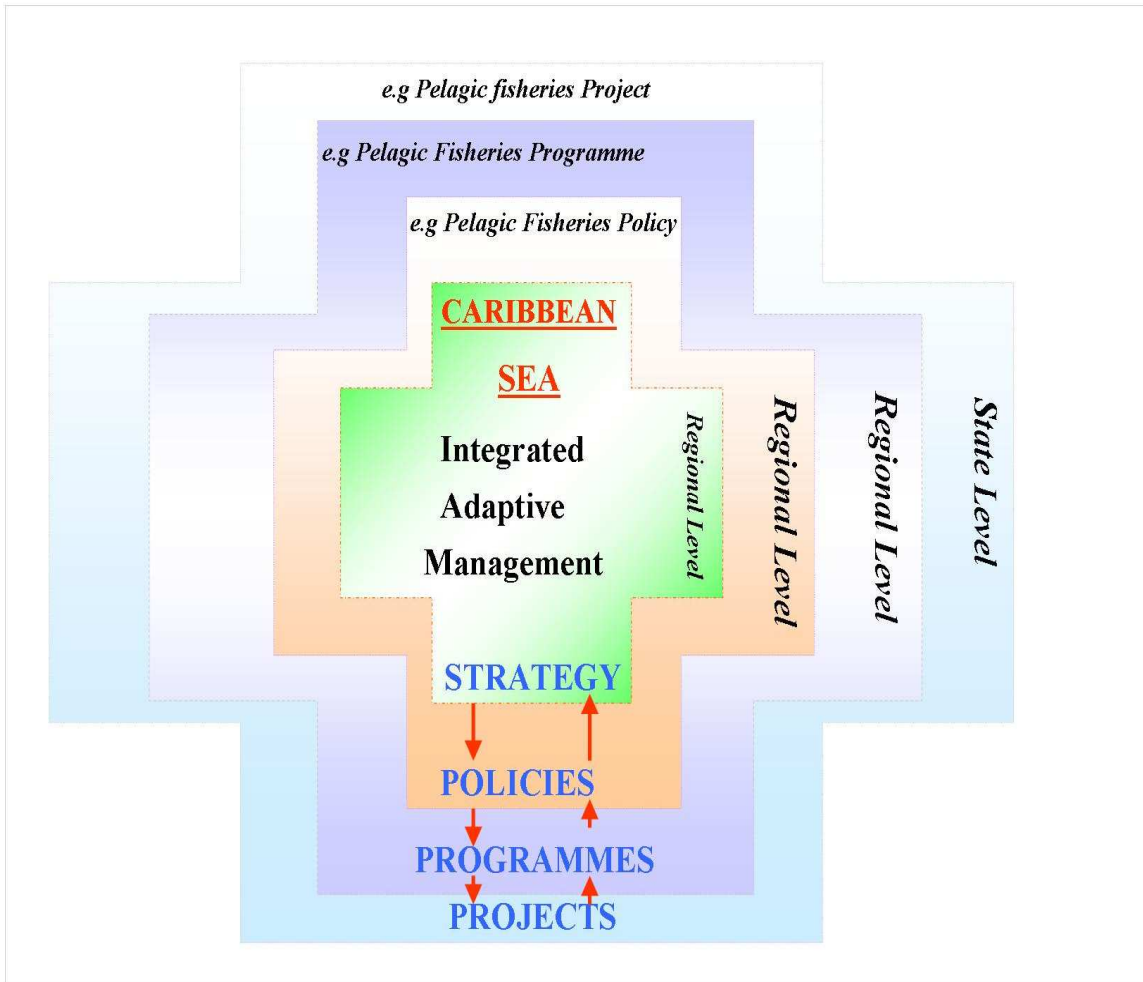


Figure 6: Example of the Proposed Tier Approach to achieving integrated management. It shows that any policies, programmes or projects must be informed by the Integrated Adaptive Management Strategy, with effective synergies. For example, pelagic fisheries is part of the strategy in dealing with fisheries management. A pelagic fisheries policy is devised at a regional level and implemented via a regional programme and implemented by national projects. Source : Modified by the author from the referenced source³⁶⁶

³⁶⁶ Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES. Plymouth PhD: 391.pp.

In addition to a strategy, the following are also recommended:

2. *Obligations:* Conventions, which are related to marine and land based pollution and activities, should be ratified and implemented by all countries that have jurisdiction in the Caribbean Sea, especially those conventions listed in Tables 1, 2 and 3. Despite the identified shortcomings in these instruments, they do provide a common base upon which the region can build sound regimes especially with regard to sustainable governance.

3. *Institutional:* Agreed cooperation and common policies require efficient and integrated institutional mechanisms. This must involve all the countries and efforts must be made to overcome language and cultural barriers. The Caribbean region is a multi-lingual area, therefore, a four-tiered approach with top-down, bottom-up and horizontal information flow will be useful and may be worthwhile considering (these organisations already exist in the region). In terms of collaboration, there must also be horizontal flow of information and cooperation, as language and political alignment (the many sub-regional blocks) must be seamless in order to deal with the management of the Caribbean Sea. A proposed model shown in Figure 7 may help in dealing with some of the current problems.

Currently, the CSC holds potential as a lead agency and can play a vital role in bridging the many programmes and initiatives. However, the success of the CSC will depend on its ability to incorporate and build on the existing initiatives such as those by CARICOM, UNEP/CEP, in addition to adhering to a clear and committed long-term strategy.

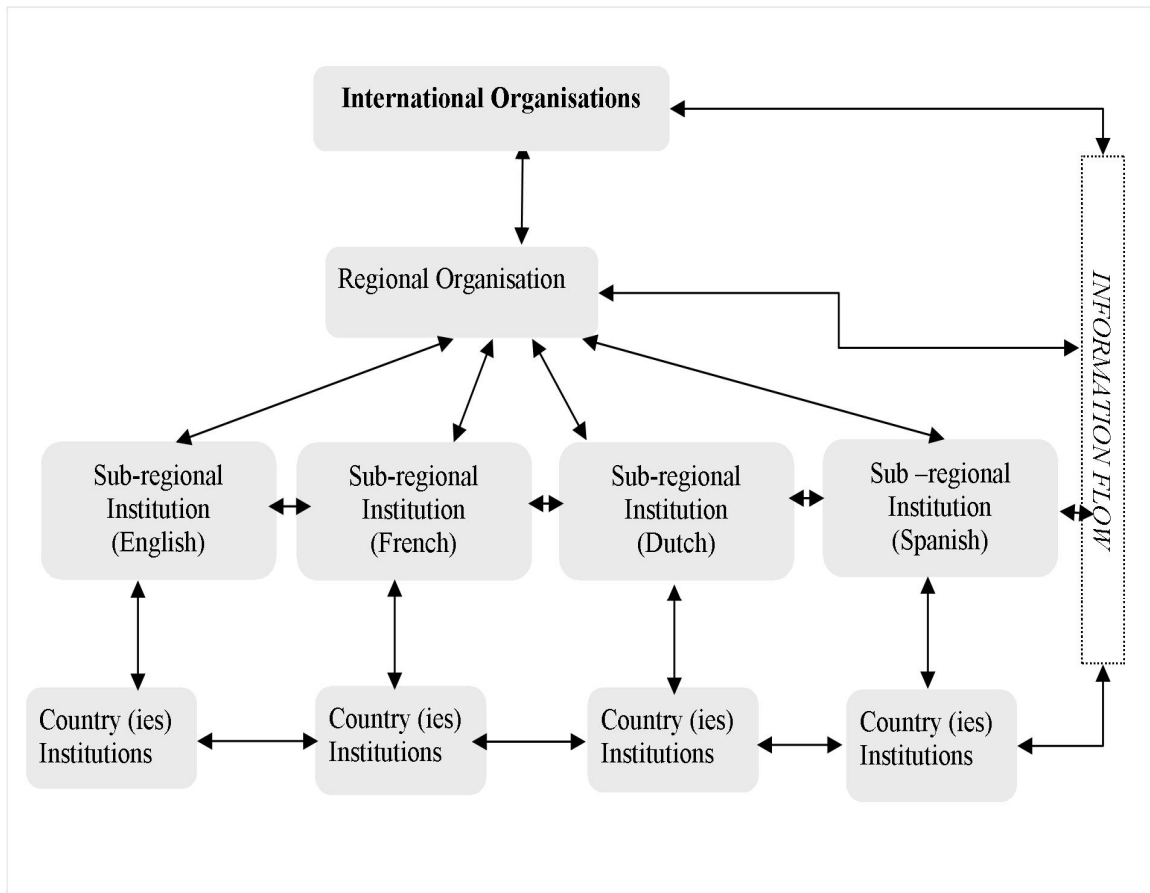


Figure 7: Proposed Institutional Structure for Integrated Management of the Sea. For example, information regarding all the devised policies programmes and projects implementation are reported to a sub- regional institution (e.g CARICOM) which is then fed to the regional organisation. This will allow better negotiation with international organisations. Countries must also develop cooperation and allow for flow of information.

Source: Taken from referenced source³⁶⁷

4. Overcoming Governance Complexities: The complexity of the Caribbean Sea cannot be overstated and is evident in the multiple inter-linkages in marine governance (as shown in Figure 8), overlapping, disjointed programmes and political alliances in addition to the other barriers identified above. The success cannot be achieved by one country or a group of countries responding and others not, or projects which target only specific geographic areas or some countries. Similarly, its success hinges on clear

³⁶⁷ Ibid.pp.

tangible indicators, which reflect mitigation and response to the causes of the pressures, all done in a synergistic manner within a sustainable development context.

5. Defining the Role of the Caribbean Sea Commission: The role of the Caribbean Sea Commission can be one of promoting synergies, expanding the many programmes in the region and to make existing and new programmes regional (Caribbean Sea wide) in scope. It should act in policy advising and as a scientific and technical clearinghouse; a element which is missing in the region. A model such as the one proposed in Figure 8 may assist in making management of the Caribbean Sea seamless.

Overcoming financial burdens: Adequate financing is one of the major hurdles facing the region, and no doubt this is contributing significantly to poor implementation of programmes.³⁶⁸ Therefore, the region needs to overcome this barrier and make financing for the Caribbean Sea mandatory, in an effort of mainstreaming management. Maybe, the region may want to consider a Caribbean Sea Fund dedicated to providing resources for research and management of which both the former and latter informed by the strategy. The advantage of having such a mechanism is that more available finances will empower the region to undertake long-term projects which are required to effectively manage the marine environment. This can also be used to meet the stipulations of funding agencies like the GEF in accessing more grants for projects.

³⁶⁸ Currently and in the past, most of the projects and programmes are funded by donor agencies such as UK DFID, USAID, which are usually short termed with many preconditions, which are politically sanctioned. The result is that very often some countries are excluded although contributing to many of the problem in greater magnitude. For more on this refer to Singh, A. and L. D. Mee (2008). Examination of Policies and MEAs Commitment by SIDS for sustainable management of the Caribbean Sea Marine Policy 32(3): 274-282.

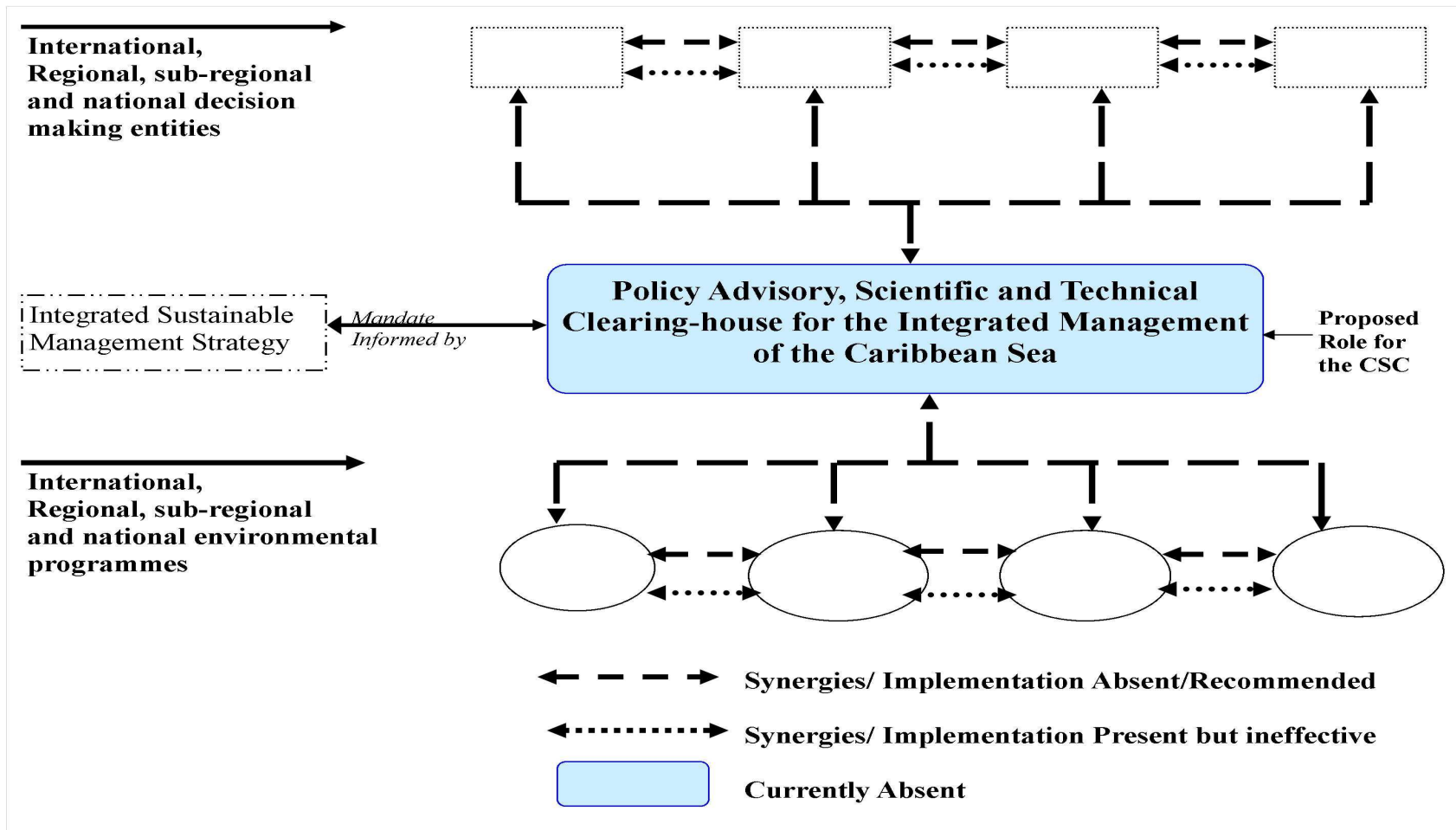


Figure 8: An Illustration of the complexity of Governance in the Caribbean Sea and an approach to overcoming the challenges. The diagram shows that various governance mechanisms are operating with/without synergy among them, which is further exacerbated by the absence of a core body to bridge the many mechanisms. The Caribbean Sea Commission can play a central role in this regard.

Source: compiled by the author, 2007, modified, 2008.

5. *Devising Strategic Economic Modalities:* Given the fact that there will be no high seas upon the complete delimitation of boundaries by all States, then the Caribbean Sea stakeholders should seek to develop the Sea as an economic entity. In the current mode of operations, the region has not effectively internalised its externalities in terms of economic benefits. For example, is the region benefitting fully from the cruise industry? Given that anywhere in the Caribbean Sea, the cruise ship is within a State's EEZ, then why is it that only an uneconomical amount of revenue goes to the States via a head tax³⁶⁹ only if the cruise ship docks into port?

6. *Boundary Delimitation::* Although Contracting Parties in the Caribbean Sea have made claims to the Caribbean Sea, in the absence of agreed boundaries, States cannot fully utilise the resources, carry out its responsibilities or seek legal recourse at the International Court of Arbitration in the event of aggression and/or violation of rights and obligations (under UNCLOS) by other States. These can all contribute to ineffective ocean governance. Therefore, efforts should be made to address boundary delimitation in the region.

³⁶⁹ See Appendix for debate on head tax from cruise ships.

3.6 Conclusion

The information provided in this study regarding the Sea's natural characteristics, the uses derived and the concomitant environmental pressures suggest an imbalance in the manner it is managed. It is evident that the sea is under severe stress from anthropogenic activities and the current governance mechanism in place and its current operation are unable to curb marine degradation. Therefore, it is vital that consideration be given regarding the fragile nature of the ecosystems and a compromise balance between maintaining environmental integrity and pursuing human development must be the foremost objective.

This paper also discusses the governance framework for the Caribbean Sea and highlights the constraints and barriers, which are hindering effective management. In addition, it offers recommendations for improvement. Among the conclusions drawn, is an urgent need for a collective effort by all the jurisdictions to respond and mitigate many of the negative impacts on the sea. The countries and the Caribbean Sea share a high level of inter-dependency and therefore it requires a shift from contingency and reactive management to necessity management.

The prognosis for sustainable management is daunting, but the region will benefit if it grasps this opportunity to structure the exploitation of the sea for economic well-being in such a way that it balances with sustaining the resources of this unique ecosystem. This must be done in ways the region has been unable to do with its land resources, after all, nations party to UNCLOS have a legal obligation to protect and preserve the marine environment³⁷⁰ of which failing to comply constitutes a breach under international law.³⁷¹

In summary, the region is still to reflect in any public policy the real value and significance of this unique semi enclosed sea. Therefore, the region must take stewardship of the sea, with all the rights, privileges and responsibilities that implies.

³⁷⁰ Refer to footnote 76

³⁷¹ UNCLOS, Article 235 (1)

List of References

- ACS. (2002). "Caribbean Sea." 2002, <http://www.acs-aec.org/tourism>.
- Adams, M. (2002). *US Keeps Wary Eye on Cruise Ships for More Pollution*. Miami USA Today. Miami, www.usatoday.com/travel/news/2002/2002-11-08-cruise-dumping.htm.
- Adams, T. (1996). *Governance of fisheries and aquaculture in the Pacific Islands region Review Paper for the 3rd Dialogue on the ACP-EU Research Initiative* Belize, South Pacific Commission: 16.
- Alfonso, J. A., J. A. Azocar, J. J. LaBrecque, Z. Benzo, E. Marcano, C. V. Gomez and M. Quintal (2005). *Temporal and spatial variation of trace metals in clams Tivela mactroidea along the Venezuelan coast*. *Marine Pollution Bulletin* **50**: 1713-1744.
- Alonso, D., P. Pineda, J. Olivero, H. Bonzalez and N. Campos (2000). *Mercury levels in muscle of two fish species and sediments from the Cartagena Bay and the Ciénaga Grande de Santa Marta, Colombia*. *Environmental Pollution* **109**: 157-163.
- Anderson, C. (2006). *Ocean Governance Theory- the practical realities*. Proceedings, Pacem in Maribus XXXI, Townsville, Australia, International Ocean Institute 191-193.
- Anonymous (1999) *Delimitation of Maritime Boundaries within CARICOM* CARICOM.
- Anonymous (2007). *Mariam-Webster*, Mariam-Webster
- Anonymous (2008). *Caribbean has overlooked hydrocarbon potential on North America*. *Oil and Gas Journal* **101**(42): 10-15.
- Armenteras, D., A. Singh, M. Bynoe, M. Morales, S. Singh-Renton, J. Cortés, R. López, R. Martínez, N. Rodríguez, R. Guillermo, M. Vides and C. Windt Links between environmental changes and human well-being in Latin America and Caribbean.in *GEO LAC: State of the Environment Report*. E. Provencio, United Nations Environmental Programme: 50.
- Armenteras, D., A. Singh, M. Bynoe, M. Morales, S. Singh-Renton, J. Cortés, R. López, R. Martínez, N. Rodríguez, R. Guillermo, M. Vides and C. Windt (to be published). Links between environmental changes and human well-being in Latin America and Caribbean.in *GEO LAC: State of the Environment Report*. E. Provencio, United Nations Environmental Programme: 50.
- Aronson, R. B. and W. F. Precht (2001). *White Band Disease and the changing face of Caribbean Coral Reef*. *Hydrobiologia* **460**(1-3): 25-38.
- Bachman, R. (2001) *The Caribbean Plate and the Question of its Formation*. Institute of Geology, University of Mining and Technology 17.

Baillet, F. "Ocean Governance: Towards an Ocean Circle." Retrieved 20 August 2008, http://www.un.org/depts/los/convention_20years/presentation-ocean_governance_frbailet.pdf

BBC World Service (2001). Second Oil Spill in Latin America. BBC

Benbow, C. H. and J. Burnett-Herkes (1980). Island Nation Management of Extended Jurisdiction. Gulf and Caribbean Fisheries, Miami, Florida, Gulf and Caribbean Fisheries Institute. 57-62.

Bernard, D. (1994). "Contribution à l'étude des perturbations chimiques en zone marine à mangrove et sous pression anthropique. Exemples des lagons de la Guadeloupe." Claude Bernard: 185.pp.

Birkeland, C. (1997). Introduction' in Life and Death of Coral Reefs.in. C. Birkeland., Chapman & Hall, New York.

Botello, A. V., S. Villanueva and G. Diaz (1997). Petroleum Pollution in the Gulf of Mexico and the Caribbean Sea. *Rev. Environ. Contam. Toxicol.* **153**: 91-118.

Bruckner, A. W. and R. J. Bruckner (2003). Condition of Coral Reefs off less developed coastlines of Curaçao.in Status of Coral Reefs in the western Atlantic: Results of initial Surveys, Atlantic and Gulf Rapid Reef Assessment (AGRRA) Program. J. C. Lang, Atoll Research Bulletin 496.: 394-402.

Bushnell, D., A. James, J. Polius, M. Andrew, C. A. Cox, F. Jaria, M. Louise Felix, S. Scott, C. Corbin, C. d'Auvergne, J. Medard, P. Regis, R. Eudovique, P. Norville and S. King (2001) *St Lucia National Report on Integrating Watershed Management and Coastal Areas*. 115.

Buth, L. and J. Ras (1992) *Inventory of the Land Based Sources of Marine Pollution*. The Council for Sea Research and Sea Activities 26.

CAESEA (2007). Caribbean Sea Ecosystem Assessment. A sub- global component of the Millenium Ecosystem Assessment *Caribbean Marine Studies, Special Edition* 104.

Callum, R. (2002). Deep Impact: rising toll of fishing in the deep sea. *Trends in Ecology and Evolution* **17**(5): 242-245.

Caribbean Large Marine Ecosystem Project. (2008). "Caribbean Large Marine Ecosystem Project." Retrieved November, 10 2008, <http://www.cavehill.uwi.edu>.

CARICOMP. (2002). "Coastal and Marine Productivity Database." 2002, <http://www.ccdc.org.jm/caricomp.html>.

CARSEA (2007). Caribbean Sea Ecosystem Assessment (CARSEA). A sub-global component of the Millennium Ecosystem Assessment (MA). Caribbean Marine Studies. 168.

CARSEA (2007). Caribbean Sea Ecosystem Assessment. A sub- global component of the Millenium Ecosystem Assessment *Caribbean Marine Studies, Special Edition* 104.

CDB Secretariat. (2008). "The Convention on Biological Diversity Around the World." Retrieved 10 October 2008, <http://www.biodiv.org/world/map.aspx>.

Chakalall, B., R. Mahon and P. Mc Conney (1998). Current Issues in Fisheries Governance in Caribbean Community (CARICOM). *Marine Policy* **22**(1): 29-44.

Cicin-Sain, B. and R. W. Knecht (2000) *The Future of U.S Ocean Policy: choices for the new century*. University of Delaware 16.

CITES. (2005). "National Contacts and Contracting Parties." Retrieved 12/11/2005 2005, http://www.cites.org/common/directy/e_directy.html.

CITES. (2008). "National Contacts and Contracting Parties." Retrieved 12/11/2005 2005, http://www.cites.org/common/directy/e_directy.html.

Commonwealth Secretariat (2004) *The Barbados Programme of Action on Sustainable Development of Small Island Developing States*. Commonwealth Secretariat Small States 9 <http://www.commonwealthsmallstates.org/Default.aspx?page=217>.

Corbin, C. J. and J. G. Singh (1993). Marine debris contamination of beaches in St. Lucia and Dominica. *Marine Pollution Bulletin* **26**(6): 325-328.

Davidson, T. (2005). *Maritius Declaration highlights problems of integration in Global Economy*. *Jamaica Observer*. Kingston, <http://www.sidsnet.org/latestarc/other-newswire/msg00065.html>.

DDE (1995) *Impact de la décharge publique de Grand Camp sur la pollution de la Rivière Salée.*, Rapport DDE Cellule du littoral et de l'environnement 22.

DDE (1995) *Qualité des eaux littorales du Petit Cul-de-Sac Marin*. Rapport DDE Cellule du littoral et de l'environnement, 46.

De Hoogh, A. Obligations Erga Omnes and International Crimes. **199**: 371.

De Lapeyre, B. M. (1995) *Concentrations de certains métaux lourds dans les eaux et les sédiments de la marina du Bas du Fort*. Rapport DDE Cellule du littoral et de l'environnement 18.

De Wet, E. (2004). *The Chapter VII Powers of the United Nations Security Council*.in, Hart Publishing: 39-40.

Department of Economic Affairs (2001) *Grenada National Report on Integrating Management of Watersheds and Coastal Areas*. Prepared for IWCAM 60.

- Dillion, M. (1995) *Report on Vessel Movement in the Wider Caribbean*. Prepared for IMO 10.
- Dixon, J., K. Hamilton, S. Pagiola and L. Segnestan (2001) *Tourism and the Environment in the Caribbean: An Economic Outlook*. World Bank 66.
- Doris, J. (1996) *Étude de la qualité des eaux du Petit Cul-de-Sac Marin à proximité de la zone industrielle de Jarry (Baie-Mahault / Guadeloupe)*. Rapport DDE Cellule du littoral et de l'environnement, 38.
- DRIRE (ed.) (1994) *Impacts de l'industrie sur l'environnement*. Rapport Ministère de l'environnement, DRIRE 40.
- Duarte, C. M. (1999). Seagrass Ecology at the turn of the Millennium: Challenges for the New Century. *Aquatic Botany* **65**(1-4): 7-20.
- Elbow, G. (1995) *Regional Cooperation in the Caribbean: The Association of Caribbean States*. Indiana University 13-22.
- Encarta. (2004). "Caribbean Sea." <http://www.encarta.msn.com>.
- Energy Information Administration (2008) *International Energy Annual-Database*
Energy Information Administration
http://www.eia.doe.gov/emeu/iea/Notes%20for%20Table%203_6.html.
- Ertfemeijer, P. L. A. and J. J. Middleburg (1993). Sediment-nutrient interactions in tropical seagrass beds: a comparison between a terrigenous and a carbonate sedimentary environment in South Sulawesi (Indonesia). *Marine Ecology Progress Series* **102**: 187-198.
- FAO (1995) *Code of Conduct for Responsible Fisheries*. FAO 41.
- Fernandez, A., A. Singh and R. Jaffe (2007). A literature review on trace metals and organic compounds of anthropogenic origin in the Wider Caribbean Region *Marine Pollution Bulletin* **54**: 1681-1691.
- Garrity, S. D., S. C. Levings and K. A. Burns (1994). The Galeta Oil Spill. I. Long-term Effects on the Physical Structure of the Mangrove Fringe. *Estuarine, Coastal and Shelf Science* **38**(4): 327-348.
- Gast, G. J. (1998) *Nutrient Pollution in Coral Reef Waters, with data from Curaçao water*. Reef Care Contribution 10.
- Geoghegan, T., A. H. Smith and K. Thacker (2001) *Characterisation of Caribbean Marine Protected Area: An Analysis of Ecological Organisational and Socio Economic Factors*. Caribbean Natural Resources Institute 140.

GESAMP (2001) *Protecting the Oceans from Land based Activities: Land-based sources and activities affecting the quality and uses of the marine, coastal and associated freshwater environment*. GESAMP 162.

GESAMP (2001) *A Sea of Troubles*. United Nations Environment Programme 2001.

Girvan, N. (2002). "The Caribbean Sea is Special." 2005, <http://www.acs-aec.org/column/index43.htm>.

Global Ballast Water Management Programme. (2005). "The Glo Ballast Programme." Retrieved 10/12/2005 2005, http://globallast.imo.org/index.asp?page=gef_interw_project.htm&menu=true.

Gonzalez, H., M. Pomares, M. Ramirez and I. Torres (1999). Heavy Metals in Organisms and Sediments from the discharge zone of the submarine sewage outfall of Havana City, Cuba *Marine Pollution Bulletin* **11**: 1048-1051.

Gonzalez, H. and M. Ramirez (1995). The effect of nickel mining and metallurgical activities on the distribution of heavy metals in Levisa Bay, Cuba. *Journal of Geochemical Exploration* **52**: 183-192

Gordon, A. L. (1967). Circulation of the Caribbean Sea. *Journal of Geophysical Research* **72**: 6207-6223.

Groombridge, B. and M. D. Jenkins, Eds. (1996). The Diversity of the Seas: A Regional Approach. WCMC Biodiversity Series # 4. Cambridge, World Conservation Press.190.

Guzman, H. M. and C. E. Jimenez (1992). Contamination of coral reefs by heavy metals along the Caribbean coast of Central America (Costa Rica and Panama). *Marine Pollution Bulletin* **24**(11): 554-561.

Gyory, J., A. J. Marianno and E. H. Ryan. (2002). "The Caribbean Current." <http://oceancurrents.rsmas.miami.edu>.

Harvey, G. R. (1987). A Personal Overview of Oil in the Marine Environment. *Journal of Caribbean Science* **23**(1): 5-10.

Henneman, B. (1988) *Persistent Marine Debris in the North Sea, Northwest Atlantic Ocean, Wider Caribbean Region and the West Coast of Baja California*. Center of Environmental Education 23.

Hernandez-Guerra, A. and T. M. Joyce (2000). Water Masses circulation in the Surface Layers of the Caribbean at 66° W. *Geophysical Research Letters* **27**: 3497-3500.

Hoegh-Guldberg, O., P. J. Mumby, A. J. Hooten, R. S. Steneck, P. Greenfield, E. Gomez, C. D. Harvell, P. F. Sale, A. J. Edwards, K. Caldeira, N. Knowlton, C. M. Eakin, R. Iglesias-Prieto, N. Muthinga, R. H. Bradbury, A. Dubi and M. E. Hatzioolos (2007). Coral

reefs under rapid climate change and ocean acidification. *Science* **318**(5857): 1737–1742.

Hoegh-Guldberg, O., P. J. Mumby, A. J. Hooten, R. S. Steneck, P. Greenfield, E. Gomez, Harvell, C. D., , P. F. Sale, A. J. Edwards, K. Caldeira, N. Knowlton, C. M. Eakin, R. Iglesias-Prieto, N. Muthinga, R. H. Bradbury and A. H. Dubi, M. E; (2007). Coral reefs under rapid climate change and ocean acidification. *Science* **vol. 318**(no. 5857): 1737–1742.

Hughes, T. P., M. J. Rodrigues, D. R. Bellwood, D. Ceccarelli, O. Hoegh-Guldberg, L. McCook, N. Molschaniwskyj, M. S. Pratchett, R. S. Steneck and B. Willis (2007). Phase shifts, herbivory, and the resilience of coral reefs to climate change. *Current Biology* **17**(4): 360–365.

Hughes, T. P., M. J. Rodrigues, D. R. Bellwood, D. Ceccarelli, O. Hoegh-Guldberg, L. McCook, N. Molschaniwskyj, M. S. Pratchett, R. S. Steneck and B. Willis (2007). Phase shifts, herbivory, and the resilience of coral reefs to climate change. *Current Biology* **17**(4): 360–365.

IFRECOR. (2000). "Introduction Guadeloupe." Retrieved 03/02/2003 2003, http://www.ecologie.gouv.fr/article.php3?id_article=794.

IMO (1995) *Global Waste Survey*. International Maritime Organisation 294.

IMO. (2002). "Special Area." 2004, <http://www.imo.org/home.asp>.

IMO. (2008). "Marine Environment Conventions." Retrieved 07 July 2005, <http://www.imo.org/home.asp>.

Institute of Marine Affairs. (2005, 01/21/2005). "Investigation into Fish Kills at Point Lisas." Retrieved 03/04/2005 2005, <http://www.ima.gov.tt/news.htm>.

International Court of Justice (1971) *Legal Consequences for States of the continued presence of South Africa in Namibia (South West Africa) notwithstanding Security Council Resolution 276 (1970)* International Court of Justice 150.

Jackson, J. B. C., M. X. Kirby, W. H. Berger, K. A. Bjorndal, L. W. Botsford, B. J. Bourque, R. H. Bradbury, R. Cooke, J. Erlandson, J. A. Estes, T. P. Hughes, S. Kidwell, C. B. Lange, H. S. Lenihan, J. M. Pandolfi, C. H. Peterson, R. S. Steneck, M. J. Tegner and R. R. Warner (2001). Historical Overfishing and the recent collapse of Coastal ecosystems. *Science* **293**(5530): 629-637.

Jaffé, R., P. Gardinali, Y. Cai, A. Sudburry, A. Fernandez and H. Bernward (2002). Organic compounds and trace metals of anthropogenic origin in sediments from Montego Bay, Jamaica; Assessment of sources and distribution pathways *Environmental Pollution* **123**: 291 – 299.

Jaffé, R., I. Leal, J. Alvarado, P. Gardinali and J. Sericano (1998). Baseline Study on the Levels of Organic Pollutants and Heavy Metals in Bivalves from the Morrocoy National Park, Venezuela *Marine Pollution Bulletin* **36**: 925-929.

Jennings, S. and M. J. Kaiser (1998). The Effects of Fishing on the Marine Ecosystem. *Advances in Marine Biology* **34**: 201-352.

Johns, W. E., T. L. Townsend, D. M. Fratantoni and W. D. Wilson (2002). On the Atlantic inflow to the Caribbean Sea. *Deep Sea Research Part I: Oceanographic Research Papers* **49**(2): 211-243.

Juda, L. (1996). International Law and Ocean Use Management London Routledge. 345 pp.

Judge, D., G. Stoker and H. Wolman, Eds. (1995). Urban Politics and Theory: An Introduction. Theories of Urban Politics London Sage 1-13.

Kinder, T. H. (1983). Shallow Currents in the Caribbean Sea and Gulf of Mexico as observed with satellite-tracked drifters. *Bulletin of Marine Science* **33**(2): 239-246.

Kinder, T. H., G. W. Heburn and A. W. Green (1985). Some aspects of the Caribbean Circulation. *Marine Geology* **68**(1-4): 25-52.

Kleypas, J. A., R. A. Feely, V. J. Fabry, C. Langdon, C. L. Sabine and L. L. Robbins (2006) Impacts of Ocean Acidification on Coral Reefs and Other Marine Calcifiers. A Guide for Future Research. NSF, NOAA, USGS.

Knight, C., J. Kaiser, G. C. Lalor, H. Robotham and J. V. Witter (1997). Heavy Metals in Surface Water and Stream Sediments in Jamaica. *Environment, Geochemistry and Health* **19**: 60-63.

Knowlton, N. and J. B. C. Jackson (2008). Shifting baselines, local impacts, and global change on coral reefs. *PLoS Biol.* **6**(2)(e54).

Kooiman, J. and M. Bavinck (2005). Governance: A new perspective for fisheries.in *Fish for Life: Interactive governance for fisheries*. J. Kooiman, S. Jentoft, R. Pullin and M. Bavinck. Amsterdam, Amsterdam University Press: 400.

Kremer, H. H., W. Salomons and C. J. Crossland (2004) Human Dimension of Land-Based fluxes to the Coastal Zone: LOICZ Approach. EUROCAT 13.

Lamour, K. and L. Burgaud (1993) Étude de la pollution de la rivière salée. Rapport DDE Cellule du littoral et de l'environnement, 16.

Lapointe, B., M. Littler and D. Littler (1997). Macroalgal Overgrowth of Fringing Coral Reefs at Discovery Bay, Jamaica: Bottom -up versus top-down control. Proceedings of the 8th coral Reef Symposium. 927-932.

Lemay, M. H. (1998) *Coastal and Marine Resources Management in Latin America and the Caribbean*. World Bank 62.

Magliveras, K. D. Exclusion from Participation in International Organisations,. *Martinus Nijhoff Publishers* **1999**: 113.

Mansingh, A. and A. Wilson (1995). Insecticides contamination of Jamaican Environment 111: Baseline Studies of Insecticidal Pollution of Kingston Harbour. *Marine Pollution Bulletin* **30**: 640-645.

Mansingh, A. and A. Wilson (1995). Insecticides contamination of Jamaican Environment 111: Baseline Studies of Insecticidal Pollution of Kingston Harbour. *Marine Pollution Bulletin* **30**: 640-645.

Millennium Ecosystem Assessment (2006) *Millennium Ecosystem Assessment*. UNEP 600 <http://www.millenniumassessment.org/en/subglobal.caribbean.aspx>.

Ministère de l'Environnement (2001) *Haiti National Report*. Ministère De L'Environnement, Uinte de mise oeuvre du plan d'action pour l'environnement (UMO-PAE) 75.

Mitchell, C. (2007). "Countering Maritime Terrorism in the Caribbean Sea and the Atlantic Ocean: Implications of Possible Maritime Terrorism in the Caribbean " U.S Army Command and General Staff Collage MSc.: 76.pp.

Molinari, R. L., W. D. Wilson and K. Leaman (1985). Volume and Heat Transports of the Florida Current: April 1982 through 1983. *Science* **227**(4684): 295-297.

Mumby P.J., Hastings A. and H. J. Edwards (2007). Thresholds and the resilience of Caribbean coral reefs. *Nature* **401**(1): 98-101.

Nicholson, W. and L. Hartsuiker (1983) *The State of the Fishery Resources of the Pedro Bank and South Jamaican Shelf*. FAO Fisheries Report.

NOAA (2002) *Caribbean SIDS IWCAM Project Brief*. NOAA, 29.

NOAA. (2002). "SeaWifs Global Primary Productivity Estimates." 2004

NOAA. (2003, 2003). "LME 12: The Caribbean Sea." 2004, <http://na.nefsc.noaa.gov/lme/text>.

NOAA. (2007). "Large Marine Ecosystems: A Breakthrough Concept for Ecosystem Management ", [Http://www.noaa.org](http://www.noaa.org).

NRCA (2001) *Jamaica National Report on Integrating the Management of Watersheds and Coastal Areas*. Prepared for IWCAM 61.

- Ocean Conservancy (2002) *Cruise Control: a report on how cruise ships affect the marine environment*. The Ocean Conservancy 68.
- OECS NRMU. (2008). "The St George's Declaration of Principles of Environmental Sustainability in the OECS; Principle # 10 " Retrieved 8th November, 2008, <http://www.oecs.org>
- Office of Response and Restoration (2008) *Oil Spills Case Studies: Summaries of Significant US and International Spills*. NOAA/ Hazardous Materials Response and Assessment Division 80.
- Osborne, D. and T. Gaebler (1992). Reinventing Government Reading Addison -Wesley. 200 pp.
- PAHO (1998) *Health in the Americas*. Pan American Health Organisation 40-46.
- Pandolfi, J. M., R. H. Bradbury, E. Sala, T. P. Hughes, K. A. Bjorndal, R. G. Cooke, D. McArdle, L. McClenachan, M. J. H. Newman, G. Paredes, R. R. Warner and J. J. B. C.; (2003). Global trajectories of the long-term decline of coral reef ecosystems. *Science* **301**: 955–958.
- Pararas-Carayanisis, G. (2008). "Ocean Governance and Sustainability –Present Trends and Future Challenges " Retrieved 6th November 2008, <http://www.drgeorgepc.com/oceangoverance.html>.
- Persad, D. and W. Rajkumar (1995). A Synoptic view of the level of Dispersed/Dissolved Petroleum Hydrocarbons (DDPH) and heavy metals in the South Eastern Caribbean Sea. *Marine Pollution Bulletin* **30**(7): 487-489.
- Petroleum Corporation of Jamaica. (2008). "Oil and Gas Exploration Activities " 2008, <http://www.pcj.com>.
- Pinnegar, J. K., N. V. C. Polunin, P. Francour, F. Badalamenti, R. Chemello, M. L. Vivien-Harmelin, M. Milazzo, R. Zabala, G. D'anna and C. Papitone (2000). Trophic Cascades in Benthic Marine Ecosystem: Lessons for Fisheries and Protected area Managment. *Environmental Conservation* **27**(2): 179-200.
- Polunin, N. V. C. and C. M. Roberts (1993). Greater Biomass and Value of Target of Coral Reef Fishes in Two Small Caribbean Reserves. *Marine Ecology Series* **100**: 167-176.
- Rhodes, R. (1996). The New Governance: governing without Government. *Political Studies* **44**: 652-657.
- Richards, W. J. and J. A. Bohnsack (1990). The Caribbean Sea: A Large Marine Ecosystem.in Large Marine Ecosystem: Patterns, Processes and Yields. K. Sherman, L. M. Alexander and B. D. Gold. Washington, American Association for the Advancement of Science: 44-53.

- Richardson, Q. B. R., J. A. C. Laasen and E. M. G. Ujsbertha (1987). Tar Pollution Monitoring in Curaçao. *Caribbean Journal Science* **23**(1): 145-152.
- Roberts, C. M. and N. V. C. Polunin (1991). Are Marine Resources Effective in Management of Reef Fisheries. *Reviews in Fish Biology* **1**: 65-91.
- Rothwell, D. and D. VanderZwaag (2008). The Sea Change Towards Principled Ocean Governance in Towards Principled Ocean Governance: Australian and Canadian Approaches and Challenges. London, Routledge Press: 179.
- Sanchez, J. and M. Ulloa (2007). The Seaborne Container Trade in Latin America and the Caribbean 2006. FAL Bulletin
- Sands, P., P. Klein and B. D.; (2001). Bowett's Law of International Institutions, Sweet & Maxwell. 46 pp.
- Scanlon, J. and F. Burhenne-Guilmin (2004) *International Environmental Governance: An International Regime for Protected Areas*. IUCN 81.
- Sergei, A. V. (1995). International Economic Organizations in the International Legal Process. *Martinus Nijhoff Publishers*: 95.
- Sheehy, B. (2004). Does International Marine Environment Law work? An examination of Cartagena Convention for the Wider Caribbean Region. *Georgetown International Environmental Law Review* **12**(3): 441-472.
- Shrestha, K. P. and E. Morales (1987). Seasonal variation of iron, copper and zinc in Penaeus brasiliensis from two areas of the Caribbean Sea. *The Science of The Total Environment* **65**: 175-180.
- Shrestha, K. P., R. Noguera, J. Chopite and P. Sosa (1988). Mercury Content of some Marine Fish from the Southern Caribbean Sea. *The Science of The Total Environment* **73**(3): 181-187.
- Sinclair, J. (1995). Collins Cobuild Dictionary J. Sinclair. London, HarperCollins
- Singh, A. (2005) *National Programmes of Action in the Caribbean: A Compilation of Lesson Learnt*. Prepared for UNEP/CEP 27.
- Singh, A. (2005). "SIDS, Sustainability and the Caribbean Sea " SEOES Plymouth PhD: 391.pp.
- Singh, A. and L. D. Mee (2008). Examination of Policies and MEAs Commitment by SIDS for sustainable management of the Caribbean Sea *Marine Policy* **32**(3): 274-282.
- Stoker, G. (1998) *Governance as theory: five propositions*. UNESCO 20.

Sturm, M. G. (1991). The living resources of the Caribbean Sea and Adjacent areas. *Caribbean Marine Studies* 2(1-2): 18-44.

The United Nations And Human Rights (2005). A Guide For A New Era. London Routledge Press. 120 pp.

UNCED (1994) *Plan of Implementation of the World summit on Sustainable Development*. UNEP 62.

UNDOALOS. (2008). "UNCLOS Database: List of Ratifications " 2008, <http://www.doalos.org>.

UNDP (1998) *Sharing Knowledge for Good Governance* UNDP 11.

UNECLAC (2003) *Developments in relation to the proposal for securing the international recognition of the Caribbean Sea as a special area in the context of sustainable development*. United Nations Economic Cooperation for Latin America and the Caribbean 52.

UNEP (1989) *Regional Overview of Environmental Problems and Priorities Affecting the Coastal and Marine Resources of the Wider Caribbean*. 50.

UNEP (1994) *Regional Overview of Land Based Sources of Pollution in the Wider Caribbean Region*. CEP-UNEP 43.

UNEP (1997) *Coastal Tourism in the Wider Caribbean Region: Impacts and Best Management Practices*. Prepared by Lloyd Gardner 130.

UNEP (1998) *Appropriate Technology for Sewage Pollution Control in the Wider Caribbean Region*. 98 <http://www.cep.unep.org/pubs/Techreports/tr40en/index.html>.

UNEP (2004). Caribbean Islands, GIWA Regional Assessment.in. A. Villasol, B. J., M. Fortnam and P. Blime. Kalmar, Sweden, University of Kalmar: 190.

UNEP (2005) *Draft Mauritius Strategy for Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States*. UNEP 30.

UNEP (2005) *Mauritius Declaration - adoption of the final outcome of the International Meeting*. UNEP 3.

UNEP (2005) *Natural and Man Made Disasters Threaten Stability of Small islands*.

UNEP 16

<http://hq.unep.org/Documents.Multilingual/Default.asp?DocumentID=421&ArticleID=4696&l=en>.

UNEP/CEP. (2004). "An Overview of the Cartagena Convention." Retrieved 01-11-05 2005, <http://www.cep.unep.org/who/ctf.php>.

- UNEP/CEP. (2008). "An Overview of the Cartagena Convention." Retrieved 1 November 2008, <http://www.cep.unep.org/who/ctf.php>.
- UNGA (1999). 54/225:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 3.
- UNGA (1999). UNGA Resolution 46/215, 79th plenary meeting, UNGA
- UNGA (2000). 55/203:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 4.
- UNGA (2001) *Secretary General Report on 54/225:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development*. 13.
- UNGA (2002). 57/261:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 5.
- UNGA (2002) *Secretary General Report on 55/203:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development*. 13.
- UNGA (2004). 59/230:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development. U. N. G. Assembly: 6.
- UNGA (2004) *Secretary General Report on 57/261:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development*. 13.
- UNGA (2006). 61/197:Towards the sustainable development of the Caribbean Sea for the present and future generation. U. N. G. Assembly: 3.
- UNGA (2006) *Secretary General Report on 59/230:Promoting an integrated management approach to the Caribbean Sea area in the context of sustainable development*. 15.
- Vlugman, A. (1992) *Assessment of Recreational Status of Waste Water Treatment Plants in the Caribbean*. CEHI/PAHO 98.
- Wade, B. A. (1987). Results of the CARIPOL Petroleum Monitoring Project of the Wider Caribbean. *Marine Pollution Bulletin* **18**(10): 540-548.
- Wallace-Bruce, N. L. (1998). The Settlement of International Disputes. *Martinus Nijhoff Publishers*: 47-48.
- Werksman, J. (1996). Greening International Institutions, Earthscan. 14 pp.
- Wilson, W. D. and W. E. Johns (1997). Velocity Structure and Transport in the Windward Islands Passages. *Deep Sea Research* **44**: 487-520.
- Wolanski, E., R. Richmond, L. McCook and H. Sweatman (2003). Mud, marine snow and coral reefs. *Amer. Scient* **91**: 44-51.

Young, O. (2000). Rights, Rules and Resources in World Affairs.in Global Governance.
O. Young. London, MIT Press: 1-22.

Appendix
Head Tax from Cruise Passengers -debate

St. Maarten denies CTO conference boycott

Thursday, October 16, 2003

PHILIPSBURG, St. Maarten: St. Maarten's Economic Affairs and Tourism Commissioner, Mr. Theo Heyliger, has denied boycotting the 26th Annual Caribbean Tourism Organization (CTO) conference in St. Thomas. "Going or not going to that conference had nothing to do with boycotting. It is not that I didn't want to go. I would have loved to go," he told the Daily Herald today. He denied that St. Maarten wasn't represented at the CTO conference because of the proposal of a US\$20 head tax. But the tourism official acknowledged that the levy is clearly not in the best interest of St. Maarten.

The levy being championed by the Caribbean Tourism Organisation as part of efforts to create a sustainable fund to market the Caribbean in global tourism. The proposal has its roots in the private sector and is under consideration by several regional governments. Should St. Maarten decide to implement a US\$20 levy or "head tax" for cruise visitors, it could spell economic disaster for the island and its cruise product, said Mr. Heyliger.

Antigua has already rejected the proposal while Dominica is expected to soon follow with a similar announcement. Antigua has built a second pier that can hold four ships, St. Kitts has a pier for two ships and St. Thomas has signed a five-year contract with the Florida-Caribbean Cruise Association (FCCA) agreeing not to raise the head tax in return for a guarantee of an annual growth of 10 per cent. "We have to realize that we are getting more and more competition in the region, competition that is against and will not implement any cruise levy," Mr. Heyliger told the Herald.

"If we lose 60 to 70 per cent, and they pick it up, who are we helping? It means less business for the taxis, for Philipsburg, everybody on this island. It took a lot of effort and time to grow this cruise market into what it is today. Don't take it for granted."

Taken from Caribbean Net News from the Caribbean as of Friday July 29, 2005

<http://www.caribbeannetnews.com/2003/10/16/boycott.htm>

Tourism conference in St. Thomas concludes with no consensus on head tax

Sunday, October 19, 2003

CHARLOTTE AMALIE, U.S. Virgin Islands: St. Vincent & the Grenadines, Mr. Prime Minister Ralph Gonsalves, yesterday stopped short of saying he approved of the US\$20 cruise ship levy instead telling industry officials at the close of the travel conference that the cruise industry should be required to help pay for services ranging from police to garbage collection in different countries. "They are reluctant to provide a fair and reasonable contribution," AP last night quoted Mr. Gonsalves as saying. "We have to engage the cruise ship companies to do somewhat better."The proposed tax has drawn fire from cruise officials who say it would reduce demand for the industry by increasing ticket prices. Members who support the proposed tax hope it will generate more than US\$60 million (EC\$160 million) in annual revenue that could be reinvested into the region's tourism industry.

Much of the conference focused on the cruise industry, which accounted for 9 percent of the Caribbean's US\$20 billion (EC\$53 billion) in revenue last year. The proposed levy comes at a time when island governments will need to invest more in their infrastructure to keep ships coming.

Taken from Caribbean Net News Friday July 29, 2005
<http://www.caribbeannetnews.com/2003/10/19/cto.htm>