

# **Caribbean Planning for adaptation to Global Climate Change (CPACC)**

## **An Assessment of the Adequacy of the Legal Framework to Cope**

**with the**

## **Potential Effects of Sea Level Rise in Guyana**

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*December, 2000*

**Technical Report 5C/CPACC-00-12-1**

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Published by Caribbean Community Climate Change Centre, Belmopan, Belize

Digital Edition (November 2013)

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Visit our website at <http://www.caribbeanclimate.bz>

ISBN-978-976-8236-73-9 (pdf)

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## **1.0 INTRODUCTION & PROJECT DESCRIPTION**

The Caribbean Planning for Adaptation to global Climate Change (CPACC) is a regional project involving twelve participating Caribbean states. The project is funded by the Global Environment Facility (GEF) and is executed by the Organisation of American States (OAS). The primary objective of the CPACC Project is to support Caribbean countries in preparing to cope with the potential effects of global climate change.

The project is aimed at assisting national governments to:

- (i) strengthen regional capacity for monitoring and analysing climate and sea level dynamics and trends, seeking to determine the immediate and potential impacts of global climate change;
- (ii) identify areas particularly vulnerable to the adverse effects of climate change and sea level rise (SLR);
- (iii) develop an integrated management and planning framework for cost effective response and adaptation to the impacts of global climate change and coastal marine areas,
- (iv) enhance regional and national capabilities for preparing for the advent of global climate change through institutional strengthening and human resource development; and
- (v) identify and assist in the development of policy options that may help in the implementation of a long-term program of adaptation to global climate change in vulnerable coastal areas.

The CPACC project commenced in 1998 and has a duration of four years. It consists of a series of four regional and national components distributed among the participating countries. Component six relates to Coastal Vulnerability and Risk Assessment. Three countries (Barbados, Grenada and Guyana) have agreed to participate under this component in development of vulnerability and risk assessments of these coastal areas. This component is required to review coastal vulnerability assessment models and the adaptation of the Intergovernmental Panel on Climate Change (IPCC) common methodology in these three countries.

This report has been prepared under Component six in relation to Guyana and constitutes a review and analysis of relevant existing environmental, land use and building legislation. It assesses the adequacy of the legislation to cope with the potential effects of sea level rise in Guyana. Specifically, the scope of this report is to:

- (i) locate, identify and describe all existing environmental, land use and building legislation

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and regulations in Guyana;

- (ii) assess the current legislation, to determine the existing provisions, if any, which would be applicable to the coastal zone and the regulation for management activities therein;
- (iii) assess the adequacy of the regulations and the provisions for their implementation i.e. coping with the potential effects of sea level rise under each of the scenarios being used by the project; and
- (iv) propose revisions to the regulations aimed at minimising or eliminating the adverse impact of sea level rise noting the impacts of the findings in item (iii).

### **1.1 Description of Selected Site- Guyana**

Guyana is located in northeastern South America, between latitudes 1° and 6° and longitude 57° and 61°. It is bounded by the Atlantic Ocean in the north, Venezuela in the west, Brazil in the south and south west and Suriname in the east.

Topographically, the country can be divided into five regions: the coastal plain, the sandy rolling lands, the lowland region, the tropical savannas and the mountainous region. The width of the coastal plain varies from 16km to 64km and extends for about 400km. It is 0.5 to 1 meter below mean high water. It is composed of sedimentary clays that support a thriving agricultural industry from times of earliest settlement in the sixteenth century. As a result, over 90% of the population lives today on the coastal plain.

The capital, Georgetown, in which lies the administrative seat of Government was established near the mouth of the eastern bank of the Demerara River and the settlement of people on the coast continued eastwards and westwards with the establishment of townships.

Numerous drainage channels, irrigation canals sluice gates and sea defense works characterize the coastal zone of Guyana. The entire coastline is below mean high water level and is being drained by gravity at low tide. The drainage system is natural and is dependent on the main rivers which extend beyond the coastline. Any accelerated rise in sea level would have increasing negative economic and environmental consequences on the Guyanese coast. Approximately 35% of the sea defense are manmade while the remainder is natural. Most of the sea defense being constructed in the 1950's is old and in dire need of maintenance. With the present sea defense infrastructure, Guyana is already highly vulnerable to flooding. Any further sea level rise will only compound the situation since a major portion of the population will have to be devastated, the entire system of freshwater supply for agricultural, drinking and other purposes would be affected and there will be disruption of other major economic activities.

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## **1.2 Resources/activities vulnerable to sea level rise – Direct Impacts**

### *Water resources*

Water supply for domestic, industrial and commercial purposes are abstracted from about 170 wells drilled mainly from two aquifers known as the “A” and “B” sands. The water is distributed through a network of pipes estimated at about 3000 miles, laid in villages along the coastal plain. Inundation of the country’s coastal plain with seawater will cause infiltration of saline water into pipelines, which are at times under negative pressure, and in the freshwater wells resulting in contamination of the aquifers. Major investments are planned to upgrade the existing water supply system on the coastal plain as well as the installation of a new water supply scheme. These investments will be affected by any major flooding of the coast, since the country’s water supply lines are below ground level and the well raise only 0.4 meters above ground level.

The majority of the population is concentrated in a narrow strip along the Atlantic coast. Their main supply of water is the wells located in close proximity to the coastline and therefore the risk of salinization of these coastal wells is highly likely with any sea level rise.

### *Drainage*

The drainage system is natural and depends on the main rivers, which extend beyond the coast. The major rivers include Essequibo, Demerara and Berbice. Smaller rivers such as Mahaica, Mahaicony, Abary and Canjie are also part of the drainage network. All these rivers are within tidal influences of the Atlantic Ocean and this effect is noticeable for some distance upstream. The density of the seawater is higher than freshwater and as a consequence this allows intrusion of saline water upstream of these rivers. Saline intrusion will impact most severely the rivers. This is because the density of seawater is higher than river water and therefore this will allow intrusion of saline water higher upstream of rivers. Furthermore, the conservancies are likely to be affected by a sea level rise as well. The economy of the country which is quite dependent upon agriculture will be severely affected in the wake of a rise of sea level.

### *Mangroves*

Mangrove forests are found at the interface between the terrestrial and marine ecosystems. They are also found in estuarine wetlands and in tidal reaches of riverine areas. Mangrove ecosystems are an important coastal resource having a variety of functions and uses.

In addition to their economic use, mangroves play an important role in coastal protection and sea defense. Mangroves also provide a habitat for a number of different species of phytoplankton, shrimp, crab and manatee as well as birds.

While mangroves are likely to play an important role in reducing the impacts of sea-level rise by protecting the coast, these ecosystems may themselves be seriously affected by sea level rise. It

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is felt that sea level rise could have an adverse effect on mangrove which play an important role as a filter and nursery for fish.

Marine animals are also of economic importance to man. Without mangrove and other coastal fringe ecosystems, neither the habitat nor adequate food to support these ecosystems will be available and these populations will decline.

#### *Agriculture*

Agriculture is the dominant economic activity on the Guyanese coastal plain. The belt has favorable soil and climate for lowland crops such as sugarcane and rice. Agriculture is a major source of employment, economic growth and foreign exchange in Guyana. The economic contribution of this sector to the national economy is vital and hence the need for sustaining its vitality cannot be overemphasized. Almost all of the agriculture products important to the national economic are harvested along the coast.

The impacts of global climate change should not be taken lightly in so far as agriculture is concerned. Inundation and salinization associated with sea-level rise could possibly devastate this activity along the coast.

A direct impact of rising sea levels will be the threat of saline intrusion into cultivation fields. Drainage during the raining seasons may require additional and more intensive pumping facilities. The intrusion of salt water into the water conservancies needs to be examined since there are the prime source of irrigation water. Those pockets of agricultural areas found within the coastal belt will be adversely affected by salinization, flooding and erosion. Salinization will also affect the quality of the water used for irrigation purposes and this could ultimately affect the security of locally produced food.

If weather systems become more intense, then the effect of flooding conditions must be addressed. More frequent El Nino/La Nina events can subject the coast to cycles of drought/flood which can have serious effects on the soil and therefore, on food production. Cattle and other livestock may not be spared because of the severity of the conditions associated with these rainfall extremes. Apart from the effect on rice and sugar, scarcity of cash crops will be a problem and an economic hindrance.

Preliminary analysis have shown from Georgetown's temperature that there will be an increase of 0.2°C to 0.5°C. Since agriculture is the mainstay of Guyana's economy, it is of concern that increased soil temperature may affect production. The impact of rising sea temperatures on marine life needs to be explored.

#### *Fisheries*

After agriculture, fisheries is the second most important economic activity along the coast. About 6.5 million tones of fish were exported in 1998 comprising about 6% of the nation's GDP.

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Vulnerable resources to sea level rise include the fish resource itself, wharves/landing sites, co-operative buildings, fishers and mangroves. More severe and frequent flooding will cause the potential destruction of landing sites and cooperative buildings that are situated along the coast. Freshwater aquaculture will be impacted from salt water intrusion. In addition to freshwater species, brackish species will also be impacted by flooding and erosion caused by sea-level rise. Pond banks will be eroded away and cultured fish will escape. Aquaculture will not longer be a financial viable operation if the introduction of predators cannot be controlled.

#### *Housing and human settlements*

Guyana has an average population of 750,000 people, 90% of which reside on the coastal plain. The population is concentrated in certain locations influenced by the availability of land for housing and other utility services. Major highways and secondary roads are also concentrated on this narrow coastal strip. Georgetown is served by a conventional mains sewerage system consisting of 24 sewerage basins each draining to one dedicated pumping station. In the rest of Georgetown and the coast, sewerage is discharged into septic tanks or pit latrines.

Sea-level rise will cause permanent inundation of the entire coastline if no measures are taken. Houses will be severely damaged by more frequent flooding. In addition, households could suffer from water borne diseases due to water contamination. It would also seriously affect communications, medical facilities, and transportation infrastructure which are the basis for human survival.

Sea-level rise may lead to increased erosion which would cause damage to the foundation upon which houses are built. Salt water intrusion will have similar effects on human settlements as described above. In particular, saltwater intrusion affects plant soil and lumber tends to rot faster.

#### *Tourism*

Tourist attractions on the coast of Guyana include Georgetown the capital city and the shore types/beaches. Other major tourist attractions including the tropical rain forest, major water falls and rivers are concentrated in the hinterland regions which could be deemed less vulnerable to a sea level rise.

Georgetown, the capital city and chief port, is situated on the right bank of the Demerara River. Most of the city's historical buildings are wooden structures, reflecting the unique 18<sup>th</sup> and 19<sup>th</sup> century architecture and are major tourist attractions. Further, the major administrative facilities, hotels and shopping centers are located in Georgetown making this city the "heart" and "brain" of the country.

Sea-level rise would lead to loss of national landmarks, administrative buildings, communications and transportation networks and other social services in Georgetown. These are



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the facilities upon which the tourism industry depends. Sea-level rise would also cause increased erosion, inundation and saltwater intrusion threatening beaches.

### **1.3 Other global warming effects – Indirect Impacts**

#### *Other Climatic factors*

Guyana's coast is primarily affected by weather systems which originate in the Atlantic Ocean. The Inter tropical Convergence Zone (ITCZ) is mainly responsible for the seasons which includes: the first dry season (late January to early April); the first wet season (also called the primary wet season, from April to July); second dry season (July through November) and secondary wet season (November and December). In addition to the ITCZ, there are other weather systems that affect Guyana: tropical waves, upper level troughs and southern hemisphere troughs.

There are two main climatic seasons. These have been very reliable so that agricultural and socio-economic events are planned on the expectations of a wet or dry season in particular months. However, climatic events in the Pacific Ocean have had dramatic effects on the predictability of the climate.

The 1982-83 El Nino produced a mild reduction in coastal rainfall while the 1997-98 event produced severe droughts on the Guyanese coast and a national emergency had be declared. In general, El Nino event causes wet seasons to become less intense, with no rains in the 97-98 event and dry seasons become drier. As a consequence, rivers draining into the coastal plain became dry in late 1997.

It has also been forecasted that due to global warming more intense storms may be seen over the Guyanese territory, causing larger rainfall amounts in shorter periods of time, especially from the ITCZ clusters and tropical waves. Flood management will have to become much more efficient to deal with this problem. Rising sea level, coupled with water accumulation due to rainfall and river water, especially in the wet seasons, can lead to overtopping and breaches of sea and river defenses.

#### *Financial Services*

One possible indirect impact associated with sea level rise is the increase in insurance premiums. The cost of erecting coastal defence works and other engineering infrastructure is also likely to increase.

#### *Human Health*

There is likely to be increased health threats caused by flooding, burst water and sewerage mains. The associated impacts may include increased incidences of vector-borne and water-borne diseases such as malaria and dengue.

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### ***Human Settlement***

All the major urban centres (Speightstown, Holetown, Bridgetown, Oistins Town) fall within the coastal belt. SLR induced impacts such as flooding and erosion are predicted to negatively impact upon the various land uses (commercial, industrial, recreational, etc) sited within the urban centres. Flooding is expected to have a significant impact in particular on the residential and commercial land uses since a significant amount residential and commercial land uses since a significant amount residences and businesses are sited within the 1 in 50 and 1 in 100 year flood zones

### ***Water Supply***

In addition to the direct impacts that SLR is predicted to have on the quality of the ground water resources it is also anticipated that there will be indirect impacts on the water supply. For example disruptions of the water supply may occur where water mains are located within areas affected by coastal erosion. Similarly, it is expected that SLR induced coastal erosion will affect sewerage mains.

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## **2.0 Location, Identification and Description of the Laws**

**Specific Objective:** *To locate, identify and describe all existing environmental, land use and building legislation in Guyana.*

This part of the Report identifies and describes the existing environmental, land use and building legislation in Guyana as at December 2000. Under the environmental classification the laws are grouped according to the institutional agency and environmental problem the law seeks to control. The groupings here are, air pollution, water pollution, noise pollution, waste management and natural resource conservation;

This approach was adopted as a comprehensive and easy reference to the existing legal framework which facilitates the identification of the several institutions that discharge environmental responsibilities and makes clear the specific nature of the responsibility that is to be discharged and the remedies that are available within that framework.

In detailing the provisions of any Act, only those provisions pertaining to the particular classification is used, except where the whole Act is relevant then this is stated.

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## STATUTES

### **A. Constitutional Law**

#### **Constitution of the Cooperative Republic of Guyana, 1980**

Guyana has a written Constitution which is the supreme law of the land. It is the most fundamental source of law and the articles contained therein contain the basis upon which all other laws acquire their validity. The Constitution contains two express provisions that refer to the responsibilities of the State and citizens regarding the environment and the management of natural resources.

#### **Chapter 2, Article 25**

“Every citizen has a duty to participate in activities designed to improve the environment and protect the health of the nation.

#### **Chapter 3, Article 26**

“ In the interest of present and future generations, the State will protect and make rational use of its land, mineral and water resources, as well as its flora and fauna, and will take all appropriate measures to conserve and improve the environment”

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## *Environmental, Land Use & Building Legislation*

### State Lands Act Ch. 62:01

*Amendment 11/1971, 1/1972, 4/1972, 9/1977, 20/1989.*

This Act provides for the proper regulation of State lands, rivers and creeks. Indirect provision is made for environmental protection by the inclusion of covenants for “good husbandry” in the standard form State Land Leases used in land settlement schemes.

This Act provides for all matters pertaining to the administration of State lands including rivers and creeks. It contains provisions regarding the disposal of State lands and establishes the exclusive right of the State over any minerals contained therein. The Commissioner of State Lands may grant leases, exclusive licences or permissions to occupy these lands. In certain cases disposal may be by public competition at auction. The procedure required by law, and contained in the Regulations include provisions regarding leases for agricultural purposes and may be special or ordinary.

The Act provides that State lands shall not be leased without prior consultation with the forestry administration. Section 22 (1) makes it an offence for anyone to cause any impediment to the free use or navigation in any river or creek. The fine for such an offence is G\$500.

Special and ordinary leases are subject to certain restrictions. The lessee may not transfer, mortgage or sublet and is required to keep the boundary lines clear. The Commissioner or his agent may exercise a right of inspection of the lands. All improvements, buildings and erections which are on the land belong to the State at the expiry of the lease.

### Acquisition of Lands for Public Purposes Act Ch. 62:05

*Amendment 1/1972, 35/1975, 2/1980, 23/1990*

Generally this piece of legislation establishes the procedures for compulsory acquisition of land for public purposes by the State.

### Amerindian Lands Commission Act Ch. 59:03

*Modified 1966 (By Guyana Independence Order 1966 No. 575) (Sec. 17)*

This Act provides for the establishment of a Commission to determine the areas of Guyana within which Amerindian tribes or communities were originally settled and to make recommendations respecting the nature of these areas. This Act reserves 1.4 million hectares of land in 65 locations for Amerindian tribes of Guyana.

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Amerindian Act Ch. 29:01

*Amendment 6/1976, 9/1977, 16/1978, 24/1990, 43/1991*

The administration of Amerindian lands is controlled by Tribal Councils and Captains. Subject to the approval of the Minister of Amerindian Affairs the Tribal Councils can make rules to prohibit the poisoning of any river or stream, felling of timber, prevention of grass/bush fires or soil erosion or to develop agriculture.

The Act at Section 7 extends an immunity from prosecution to persons killing protected birds for food within ten miles of the nearest plantation. The Act also exempts all Amerindians from liability for the commission of offences under the Act.

Mahaica-Mahaicony-Abary Agricultural Development Authority Act No. 27 of 1977

*Amendment 6/1981, 3/1985*

The Authority is empowered to (a) prepare plans for, approve and undertake responsibility for construction of drainage and irrigation systems and related works necessary for agricultural development of the Mahaica-Mahaicony-Abary area, (c) to prepare and approve all plans and schemes relating to land use, including the location of new canals and new roads, (d) to act as the principal agency or coordinator for the implementation of approved drainage and irrigation schemes including construction, engineering surveys, operation and maintenance schemes and related matters, (f) to manage, operate and maintain all drainage and irrigation systems and all access roads within the area, (k) to exercise with respect to the area and evaluation, statistical and reporting function taking place as a result of the drainage, irrigation and related works in the area, and (m) to prepare, approve and implement any plans for resettlement of any residents.

In relation to the area, the functions conferred on the Central Authority under the Town & Country Planning Act, the Central Board of Health under the Public Health Act, the Guyana Water Authority under the Guyana Water Authority Act, the Sea Defence Board under the Sea Defence Act and the Drainage & Irrigation Board under the Drainage and Irrigation Act, shall be exercisable by the MMA Authority.

Municipal & District Councils Act Ch. 28:01

*Amendment 7/1971, 1/1972, 3/1972, 4/1972, 13/1972, 13/1973, 25/1973, 17/1974, 36/1979, 12/1980, 80/1980, 3/1982, 23/1983, 11/1986, 17/1988, 10/1990, 19/1990, 16/1992*

Section 265 empowers the Councils to establish drainage and irrigation areas not covered by the *Drainage and Irrigation Act*. Section 266 a council in any council drainage area shall cause all works to be so kept as not to be injurious to health and be properly cleansed and drained and at section 267 may serve on an owner notice to repair on maintain work.

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Guyana Water Authority Act Ch. 55:01

*Amendment 27/1974, 73/1972, 44/1991, 33/1993, 15/1977*

Under section 26 the Authority is empowered to control and regulate the collection, production, treatment, storage, transmission, distribution and use of water. Section 26 (i) empowers the Authority with the approval of the Minister to make regulations for (h) the proper use and conservation of water.

Guyana Water & Sewerage Commissioners Act No. 30:01 (not recorded in Consolidated Index)

Section 32 empowers the Water Commissioners appointed under this Act, to make regulations, *inter alia*, to conserve water and to prevent fouling of any reservoir, canal or trench under their charge. The Commissioners are empowered at section 35 to publish by notice in the Gazette and a daily newspaper prohibit sewage of any kind that would be injurious to the sewer to be introduced into any sewer.

East Demerara Water Conservancy Act Ch. 55:03

*Amendment 25/1973, 7/1980*

Section 16 establishes the Board as the agency responsible for the control, management and regulation of the conservancy. The Board shall take measures to the satisfaction of the Minister to provide relief for any surplus waters of the Conservancy and shall make proper provision for the navigation of and traffic on such of the waterways of the Conservancy that may be open to public navigation and traffic.

Section 53 provides that (a) every person who commits any nuisance in any of the waters of the Conservancy, (b) causes or permits in any of the waters or foul fluid to flow into any of the water of the Conservancy or (c) throws any earth, dirt, stones, broken bottles, oil, filth or causes any substance likely to contaminate the waters of the conservancy shall be liable to a fine of \$75.00. Section 54 establishes a penalty for any person who opens or shuts the koker of any plantation or suffer any water from the Conservancy to be taken into the trenches or to escape through the drainage without permission being previously obtained. A fine of \$750.00 is imposed for this offence.

Boerasirie Creek Act Ch. 50:05

*Amendment 44/1976, 16/1981, 58/1981*

The Commissioners under this Act, have powers to (c) construct and maintain all such weirs, sluices, locks, kokers, dams, canals, waterways, or other works, both in the Boerasirie and otherwise, as may be convenient for the conservation and distribution of the waters of the Boerasirie (d) regulate the supply and distribution of water from the Boerasirie and the means of taking and receiving same.

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The Act at section 21 makes it an offence for any person to wilfully damage any dam, trench, koker or sluice and a penalty is assessable by the Commissioners.

Hobaboe Creek (Diversion) Act Ch. 50:06

This Act authorises the Demerara Company to dig, construct, maintain, and use a canal leading from the Hobaboe Creek into the Demerara river.

Town & Country Planning Act Ch. 20:01

*Amendment 25/1973*

This Act provides machinery for physical development planning and land use development control and also provides for interim control of development in declared planning areas.

Housing Act Ch. 36:20

*Amendment 1/1972, 4/1972, 25/1973, 35/1975*

The development planning and control powers created by the Town & Country Planning Act are vested in the Central Housing & Planning Authority.

Local Democratic Organs Act No. 12 of 1980

*Amendment 80/1980, 6/1981, 14/1985, 12/1980, 8/1980, 9/1980, 30/1990, 2/1980, 69/1980, 51/1990, 37/1989, 21/1990, 9/1991, 10/1991, 10, 20, 32/1992, 47/1990, 6/1981*

The Act establishes the duties of these organs to include responsibility to –

- (a) maintain and protect public property; and
- (b) protect and improve the physical environment.

They may also acquire land compulsorily for local government purposes.

Sea Defences Act Ch. 64:01

*Amendment 15/1975, 7/1988, 30/1992*

Section 28 (1) empowers the Minister, subject to negative resolution of the National Assembly, to regulate the construction of coastal structures in Guyana.



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**Sea Defence Act Chapter 64:02**

*Amendment 11/1971, 9/1972, 25/1973, 19/1975, 7/1988, 30/1992, 48/1971, 10 and 11/1974, 62/1977*

This Act provides for the appointment of a Sea Defence Board to maintain, manage and construct new sea defences. This enactment expands upon the provisions of the Sea Defences Act by including responsibilities to construct and can be distinguished from the Sea Defences Act. Forseeably, several provisions overlap with those of the Sea Defences Act, which establishes similar responsibilities, in the Hydraulics Officer, with regard to existing sea defences on estates. It should be noted that the Hydraulics Officer is also a member of the Board. The Act vests all sea defences located in a district<sup>1</sup>, in the State.

The Board performs the following functions: -

- (a) Maintenance, Management and Construction of Sea Defences: The Board is required to adopt certain procedure including the preparation of a plan, for the construction of new sea defences. A proprietor or local authority may object to the proposed plan. Where sea defence apparatus is commonly used in relation to drainage for an estate, village or council area, the responsibility for maintaining such apparatus is that of the proprietor or local authority.
- (b) Emergency Works: The Board, as directed by the Minister, undertakes action to mitigate damage that may result from inundation.

The Act prescribes certain activities to be offences. These include causing obstructions to the sea, removing earth, shell etc. without the consent of the Board, obstructing officers of the Board in the discharge of their lawful duties and trespass of cattle. The Board, with the approval of the Minister may make regulations for carrying out the objects of the Act.

**Drainage and Irrigation Act Chapter 64:03**

*Amendment 1/1972, 17/1974, 3/1975, 15/1976, 28/1977, 9/1978, 3/1981, 22/1983*

Under the Drainage and Irrigation Act, the National Drainage and Irrigation Board (NDIB) is assigned the sole control and management of all drainage and irrigation works<sup>2</sup> save and except for the Mahaica-Mahaicony-Abary area.<sup>3</sup>

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<sup>1</sup> means any sea defence set out in the Schedule and includes the Essequibo Coast & Pomeroon, Islands of Wakenaam and Leguan, West Coast Demerara, East Coast Demerara, Mahaica Abary, West Coast, Berbice and East and Corentyne Coast, Berbice [Sea Defences (Amendment) Act No. 30 of 1992]

<sup>2</sup> These works refer to any reservoir, trench, drain, culvert, sluice, koker, koker runs or training walls of outfall channels, aqueduct, weir, dam, lock, syphon stop off, paal off, fence, gate, barrier, bridge, road, watch-house or building used for housing sluice operations, rangers and pumping station attendants, which has been used for the purpose of drainage or irrigation and includes any machinery, pumping station or power station used in connection therewith. Lands twelve feet of works also vests in Board (section 20 of Act).

<sup>3</sup>Section 18(1) Mahaica-Mahaicony-Abary Agricultural Development Authority Act No. 27 of 1977

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In the exercise of its principal function the NDIB discharges the following duties: -

- (a) Declaration of Drainage and Irrigation Areas: The procedural requirements followed in order to declare a drainage and irrigation area is prescribed in the Act.<sup>4</sup> The Minister initiates the steps and may by Order, direct the Board to consider and make recommendations in that regard. In making the assessment the Board prepares plans, specifications and estimates including a recommendation regarding the proportion of the capital works which should be borne by the proprietors of the estate. The Minister prescribes, by Order, the proportion to be borne by the proprietors if the area is subsequently declared
- (b) Acquisition/Maintenance of Works: Certain work within a drainage and irrigation area though not constructed or maintained by the Board, but which it requires for the purposes of drainage and irrigation may be vested in and become the property of the Board. The Board is required to follow certain prescribed procedure in order to achieve this. Otherwise, the Board may maintain other work, though not acquiring it. Proprietors and/or relevant local authorities may object to the action to be taken.
- (c) Divestiture and Ceasure: The Board may divest work and land, which it no longer requires for the purposes of drainage and irrigation. Such action is required to be undertaken in accordance with certain procedure. The Commissioner of State Lands and the Registrar of Deeds are to make annotations accordingly. The work or lands then becomes vested in the Commissioner of State Lands.
- (d) Compensation: The Board is required to pay compensation to a claimant whose lands became vested in the Board by virtue of its being declared a drainage and irrigation area or due to the construction of new works in that area.<sup>5</sup> The amount of compensation will either be the estimated value of the land acquired from or the amount of the actual loss or damage.

The Board may make by-laws, inter alia, to regulate the distribution or restrict the use of water, the drainage of any area, the manner in which water may be discharged into any drainage or drainage trench, prevent the pollution of water, compel owners or occupiers to repair and maintain any works and to prescribe the fees to be paid for any service.

The Board may sell, or grant leases of lands vested in it. It also can direct proprietors of adjoining estates to adequately maintain the estates. The Board can take the necessary action and recover the costs of the repairs where the proprietor fails to comply.

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<sup>4</sup> Part III sections 11-18.

<sup>5</sup> Part III or Part IV of the Act

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Public Health Ordinance Ch. 145 (1953 Laws)

*Amendment 2/1976, 13/1980, 2/1989, 31/1991*

The Act at section 14 provides for the delegation of authority for the implementation and enforcement of its provisions regulating environmental health conditions to local health authorities. These areas may be summarised as follows:-

Section 76 - inspection of districts, section 77 - the abatement of nuisances, section 95 - offensive trades, section 105 - sanitary control, section 113 - the removal of refuse, section 125 - sanitary control of water pollution.

The local authority may, and shall if directed by the Medical Board of Health, make bylaws for regulating or preventing the keeping of live or dead animals where the keeping of them is or is likely to be a nuisance or injurious to health or any accommodation or deposit which is a nuisance or injurious to health. Any factory or workplace not so ventilated as to render harmless any gases vapours etc constitutes a nuisance.

The nuisance provisions of this Act contained in section 76 - 118 are applicable to this area. The Public Health Board may make regulations for the time for removal of faeces or offensive matter or liquid, the use of dust bins, lavatories, baths.

Factories Act Ch. 95:02

*Amendment 20/1983, 19/1990, 97/1977*

Subject to negative resolution of the National Assembly, the Minister may make regulations at section 26 for prohibiting, limiting or controlling the use of any material or process.

Mining Act Cap. 65:01/ No 20 of 1989 & Regulations made thereunder

*Amendment 32/1976, 74/1977, 1/1972, 9/1979, 1,9and 16/1984, 9/1986, 1/1984, 9/1986, 3/1992, 7/1994, 50/1991, 15/1991, 58/1991*

The Act empowers the Minister to make regulations for the carrying on of all operations relating to prospecting and mining; the conservation and prevention of waste of minerals; health safety and welfare standards; the cutting and use of timber from State lands for purposes connected with mining; and other matters.

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A mining licence is required in order to mine any mineral and is issued at the discretion of the Commissioner of Geology and Mines and consultation with the relevant Minister. Section 92 sets out the various licences that are available. Section 52 sets out the grounds upon which the licence may be revoked.

Licencees may only dispose of, stack or dump any mineral waste product resulting from mining in an approved manner.

The Act provides for a system of mineral agreements and licences for the regulation of prospecting, mining and quarrying activities. Licencees must put forward work proposals and show technical competence, and no mining licence can be issued unless the relevant authority is satisfied that the proposals of the applicant are cost efficient and make optimal use of the mineral resource.

Licences are granted subject to conditions, including conditions with respect to the processing of minerals.

#### Petroleum (Exploration & Production) Act No. 3 of 1986

*Amendment 4/1992, 31/1986, 19/1988, 56 and 64 of 1991, 82/1989, 26/1989, 47 and 54/1991*

The Act empowers the Minister to make regulations in regard of all prospecting and production operations, the conservation and prevention of the waste of petroleum or other natural resources; the control of the flow and the prevention of the escape of petroleum, water, gases, other than petroleum or other noxious or deleterious matter; the prevention of the escape of drilling fluid or any other matter, and safety and welfare standards.

Section 7 (f) empowers the Minister to make regulations for the prevention of pollution to the atmosphere. The regulations further provide that any "spills" whatsoever must be handled in an environmentally acceptable manner. For breach of these regulations a fine of G\$25,000.00 and/or imprisonment for three years are attached.

The regulations require that exploration/exploitation of petroleum be done in a safe manner. Any spills whatsoever must be handled in an environmentally acceptable manner. The Act makes provision for petroleum prospecting and production licences and for the making of regulations with respect to all prospecting and production operations, the conservation and prevention of the waste of petroleum or other natural resources, the control of the flow and the prevention of the escape of petroleum, water, gases other than petroleum or other noxious or

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deleterious matter, the prevention of the escape of drilling fluid or any other matter. Regulations made under the Act provide the legal regime for the exploitation of hydro-carbons. Any breach of the regulations attracts a fine of G\$25,000.00 or imprisonment for three years.

#### Forests Act Ch. 67:01

*Amendment 4/1972, 9/1977, 2/1979, 4/1982, 24/1990, 10/1991, 7/1990*

This is the principal statute governing the forests of Guyana. The Act establishes a legal regime for the utilisation of Guyana's forest resources. The Act empowers the Minister to make regulations governing the harvesting of forest produce, the operation of sawmills, to restrict the exploitation of certain species and to set girth limits and maximum stump heights for logging operations, and other matters. The Act provides that the Minister may declare any area of State land to be a State Forest.

Concessions in the nature of contracts and permits are made under this Act.

Sections 15-17 seeks to prevent damage to forests by fire and imposes an obligation on the general public to assist in extinguishing fires. Sections 18-34 makes the unlawful possession of forest produce an offence. Regulations 16-18 made under the Act establish the guidelines for tree felling and include stipulations on size of the stump and using parts of the tree for charcoal .

A scheme of forest offences enforceable by forest officers, police constables, Justices of the peace and District Commissioners is also created under the Act. These officials have powers of search and arrest, as well as to hold enquiries and receive record evidence.

The Act provides for the monitoring of the resource, the revocation of licences and the granting of licences subject to certain conditions.

#### Guyana Forestry Commission Act No. 2 of 1979

*Amendment 14/1981, 4/1982, 39/1989*

The Act establishes the *Guyana Forestry Commission* as the regulatory Authority for Guyana's forestry sector and is therefore responsible for the implementation and enforcement of the *Forests Act*.

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Export of Timber Act (citation not recorded in Consolidated Index)

Both the Forests Act and this Act were enacted to regulate the exportation of timber. The provisions require the approval of the Forestry Commission for export of forest produce and establish procedure for approving/rejecting logs. The composition and duties of the Timber Board are also provided.

Guyana Geology & Mines Commission Act No. 9 of 1979

*Amendment 20/1989, 31/1897*

The Act empowers the Commission to make regulations for mining and quarrying operations. The Commission is responsible for the implementation and enforcement of the *Mining Act*

The Act establishes the Commission and empowers the Commission, with the approval of the Minister, to make regulations for the carrying into effect the purposes of the Act. The functions of the Commission, at section 4, to not include provisions for the conservation of resources.

Guyana National Energy Authority Act (not reported in Consolidated Index)

The Guyana Natural Resources Agency (GNRA) was established by Presidential Order No. 37 of 1986, made under this Act. By Order No. 39 of 1989 the GNRA was empowered to exercise supervisory jurisdiction over the following statutory authorities:

Guyana Forestry Commission (GFC); Guyana Geology & Mines Commission (GGMC); Guyana Gold Board (GGB); and Guyana National Energy Authority (GNEA). The Executive Chairman of GNRA is empowered to give directions to the Chief Executive Officers of the statutory authorities under the jurisdiction of the GNRA

Wild Birds Protection Act Ch. 71:07 (not reported in Consolidated Index)

The Minister is empowered to make regulations regarding the wildlife trade and the hunting and capture of wild birds. He may grant licences. For the capture, killing, export of protected wild birds and designate the open or close season for hunting wild birds.

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The Act Section 6 prohibits at the wounding, killing, sale, or export of listed species of birds, restricts the exploitation of other listed species to an open season and provides for the humane treatment of caged birds.

#### Species Protection Regulations, 1999

The *Protection of Species Regulations* for the implementation and enforcement of the CITES Convention have recently been enacted. These regulations are made under the authority of the *EP Act*. Together, the Act and regulations will control the import, export, transport and sale of certain wild animals and plants and their parts and derivatives.

The overall purpose of the Regulations is to protect wild species, especially those at risk from over-exploitation caused by poaching and illegal trade, and to safeguard Guyana's own wildlife and ecosystems from the introduction of harmful wild species.

#### Importation of Bees Act Ch. 71:06

The Minister is empowered to make regulations for the purpose of regulating the importation of bees and bee-keepers' stock. This Act regulates the importation of bees and beekeepers stock and prohibits at section 4, the importation of any bees or beekeepers stock. These may be destroyed upon satisfaction that the offence has been committed.

#### Plant Protection Act Ch 68:03

##### *Amendment 107/1978*

This Act provides for the prevention, eradication and control of diseases and pests affecting plants.

The Minister may make regulations to prohibit, control or restrict the transportation of any diseased plant; prohibit, control or restrict the cultivation or harvesting of plants; quarantine affected areas; direct plants to be disinfected, treated or destroyed.

Guyana is a party to the 1951 International Plant Protection Convention. Certain provisions of this Convention are enacted in this statute.

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**Fisheries Act Ch. 71:08 (Aquatic Wildlife Control Regulations)**

*Amendment 10/1977, 80/1980, 5/1993, 5/1993*

The Minister is empowered to make regulations on various ranging from setting a fish season, minimum weight of individual fish that could be caught, the prohibition of pollutants in Guyana's waters by fishing and other vessels and for aquatic wildlife.

This Act regulates the utilisation of the fisheries resources of Guyana. In an attempt to control overexploitation, the Act contains provisions for the control of fishermen, fishing boats and the exportation of fish.

The Aquatic Wildlife Control Regulations are made under the Fisheries Act. They prohibit the killing or capture of manatees, arapaimas, caymans, water dogs and turtles. The penalty for breach of these regulations is G\$250.00 or the alternative of imprisonment for six months.

Subsidiary regulations enacted under this Act with the specific objective of securing the proper management of the resource such as the size of nets. Regulations may also be made to protect endangered species and ecologically sensitive areas, and to prevent life-threatening forms of water pollution

**Whaling Industry (Regulation) Act 1934**

This Regulation prohibits the killing of immature whales and females with calves and the unlicensed taking of whales.

**Animal Diseases Act Ch. 71:02**

*Amendment 46/1977*

The Act controls the spread of infectious diseases among animals. The Minister at section 36 make regulations in respect of (a) the export and movement of animals from Guyana (b) prescribing the seizure, disposal and detention of any animal (h) as to the introduction and manufacture of toxin, vaccines, serum for the treatment of animals.

The Minister may make regulations at sector 36 (a) to regulate the export and movement of animals from Guyana (b) prohibiting or regulating the movement of animals or persons into, in, or out of an infected area.



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The Minister may make regulations at section 36 (i) for the sending of diseased animals or excreta on any vessel, canal river (c ) the seizure and disposal of diseased animals.

Transport & Harbours Act Ch. 49:04

*Amendment 10/1990, 11/1983, 11/1986*

The Minister is empowered to make regulations for the sanitary conditions of harbours. Section 43 prohibits the unauthorised discharge of drainage channels or canals into harbours

Maritime Boundaries Act No. 10 of 1977

*Amendment 2/1989, 10/1977, 19/1991, 8/1992, 10/1989*

This Act provides for the legal regime in respect of Guyana's territorial Sea, continental shelf, Exclusive Economic Zone and Fisheries Zone and the making of regulations governing the living resources of these marine and submarine areas, and the control of marine pollution.

The Minister may make regulations governing the living resources of the marine and submarine areas of Guyana and the control of marine pollution.

Section 16 (d) provides for the control of marine pollution. Section 17 creates an offence for any person to explore or exploit any resources of the exclusive economic zone or carry out any search or excavation or conduct any research without first obtaining a letter of authority or licence granted by the Minister.

The President may be order, at section 18, make provisions for the protection for any area of the exclusive economic zone declared to be a designated area and the protection of marine environment.

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National Trust Act Ch. 20:03

*Amendment 83/1975*

Section 29 empowers the National Trust Board to make regulations for the better carrying out of the purposes of the Act. It should be noted that though the Act remains on the statute books appointments to the Trust have not been made and the Act has not been used.

Kaiteur National Park Act Ch 20:02

This Act constitutes an area of land a National Park and provides for the control of the said part. The Minister, at section 5, may make regulations for carrying into effect the objects and purpose of the Act.

The Act provides for the control of and preservation of the natural scenery, fauna and flora of the Kaiteur National Park. Certain activities are prohibited by section 4 (1) and include the entry, chase, catch, kill or otherwise disturb any animal or cut, pluck any of the flora or disturb any soil by mining or other operations within the park except in accordance with the regulations.

A permit is required for entry into the park.

National Parks Commission Act No. 23 of 1977

Under section 2 the Minister may make regulations for the control and management of public gardens, grounds and government agricultural stations.

Public Gardens & Agricultural Shows Act Ch. 68:05

This piece of legislation enables the Minister to make regulations for the control of public gardens and grounds and government agricultural stations, and for the holding of agricultural shows.

Environmental Protection Act No. 11 of 1996 & Regulations made thereunder

There are a number of areas in which the Environmental Protection Act empowers the Minister to make regulations. These are summarised as follows:- Section 16 – establishing the criteria and thresholds to determine which projects may have significant effects in the environment; Section

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35 (3) – the procedure to be followed in connection with the taking of, and dealing with, samples of the air, water on land in, on or in the vicinity of premises; Section 36 (2) – prescribing other information to be included in the register and prescribing fees; Section 68 (1) – (a) standards and codes of practice with respect to the protection and rehabilitation of the environment and the conservation of natural resources; (b) the quantity, condition or concentration of the substances that may be released into the environment; (c) the restriction or prohibiting of ozone depleting substances; (d) the protection of particular species of prescribed flora and fauna; (e) the reduction of litter and the discharge of waste; (h) classifying contaminants and sources of contaminants including the designation of certain contaminants as hazardous; (i) requiring the filing of terms of returns concerning any matter regulated by or under the Environmental Protection Act; (j) protecting the coastal and marine resources; (k) ambient air quality standards, an air pollution monitoring system and index, the manufacture, use and emission of air contaminants;

Section 13 (1) requires a developer to comply with any directions of the Environmental Protection Agency where compliance with such directions are necessary for the implementation of any obligations of Guyana under any treaty or international law relating to environmental protection.

Although water pollution is not specifically mentioned, the provisions in relation to “pollution” generally are thought to embrace it. The Act contains the following provisions:- Section 19 makes an offence for any person (a) to undertake any activity that causes pollution unless reasonable measures to minimise any adverse effect; (b) discharge any contaminant into the environment in any amount, concentration or level in excess of that prescribed by the regulations. Any person found guilty of this offence may be fined not less than three thousand dollars nor more than seven hundred and fifty thousand dollars and imprisonment for one year.

Under Section 20 (1) the Agency may require the owner or operator of any sewage treatment plant, industrial waste treatment facility or any other facility for controlling pollution a notice containing information which includes a pollution prevention plan for the facility. Failure to comply with the requirements of the notice constitutes an offence.

According to Section 27 the Agency may serve a prohibition notice where it appears that an activity poses a risk of serious pollution (including water pollution) of the environment or any damage to public health.

Section 5 establishes the function of the Authority to, inter alia include, the receiving, treatment and disposal of sewage and to advise the Minister on matters relating to the collection, treatment, and disposal of sewage, and to make agreements with respect to same

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Section 4 of the Act sets out the general functions of the EPA which may be interpreted to include waste management. The provisions of Part V and VI of the Act that pertain to the prevention and control of pollution and investigations, prosecutions and civil proceedings apply.

A regulatory regime for air, noise, water and hazardous waste has been established under the Act.

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### 3.0 Assessment of Applicability of Existing Laws to Manage the Coastal Zone & Related Activities

Specific Objective: *To assess the legislation to determine the existing provisions, if any, which would be applicable to the coastal zone and the regulation for management of activities therein.*

#### 3.1 Assessment of Existing Laws

Although there are in excess of thirty (30) pieces of environmental, land use and building legislation only a limited number of Acts are relevant to the type of impacts that will result from sea level rise in Guyana. They are set out below.

Sea Defence Act

Ch. 64:01

Section 3 empowers the Board with the responsibility to maintain and manage sea defences and to build new sea defences.

Sea Defences Act

Ch. 64:02

Section 28 (1) empowers the Minister, subject to negative resolution of the National Assembly to regulate the construction of coastal structures in Guyana.

Section 20 makes it an offence to remove any earth, sand, shell, clay, gravel, seaweed or Vegetation without the consent of the. If any cattle trespasses on any sea defence the Custodian of the cattle is liable to a fine of \$G100.00.

Transport & Harbours Act

Ch. 49:04

Section 43 prohibits the unauthorised discharge of drainage channels or canals into harbours.

The Minister is empowered to make regulations for the sanitary conditions of harbours.

Drainage & Irrigation  
Areas Act Ch. 64:03 & By  
Laws

The Board is assigned the sole control and management of all drainage and irrigation works. Certain works within such area may be vested in the Board. By laws made under the Drainage & Irrigation

Maritime Boundaries Act  
No 10 of 1977

Act to prohibit the pollution of reservoirs, regulate the distribution or restrict the use of water the drainage of any area and compel owners to repair and maintain work.

This Act provides for the legal regime in respect of Guyana's territorial Sea, continental shelf, Exclusive Economic Zone and Fisheries Zone and the making of regulations governing the living resources of these marine and submarine areas, and the control of marine pollution.

Section 16 (d) provides for the control of marine pollution.

State Lands Act  
Ch. 62:01

This Act provides for the proper regulation of State lands, rivers and creeks. Indirect provision is made for environmental protection by the inclusion of covenants for "good Husbandry" in the standard form State Land Leases used in land settlement schemes.

Municipal & District  
Councils Act Ch. 28:01

Section 265 empowers the Councils to establish drainage and irrigation areas not covered by *Drainage and Irrigation Act*. Section 266 a council in any council drainage area cause all works to be so kept as not to be injurious to health and be properly cleansed and drained and at section 267 may serve on an owner notice to repair on maintain work.

Section 285 makes it an offence for any person to a the in any stream, reservoir maintained for the supply of water, or throws rubbish, filth so as to contaminate water under the management of the council.

Town & Country Planning  
Act Ch. 20:01

Establishes provisions for the orderly and progressive development of land, cities, towns and other areas and seeks to "preserve and improve the amenities" of these areas. The Act legislates for the adoption of

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developmental schemes by local authorities and the Central Housing and Planning Authorities. Public participation is provided for as part of the planning approval process but the requirement for Environmental impact assessments for development is absent. The power to grant planning permission may be delegated by this provision and the Municipal & District Councils have developed buildings by-laws for Georgetown and New Amsterdam.

The Act also requires that development permission be obtained for declared planning areas of Regions 2,3,4,5,6,7 and 10. The Act also provides for the preparation of development schemes for cities, towns and other areas. This has only been done in 1950, for Greater Georgetown. The Act contains provisions prohibiting, regulating, and controlling the deposit or disposal of waste materials and refuse, sewage and the pollution of rivers, streams and ponds.

The development planning and control powers created by the Town & Country Planning Act are vested in the Central Housing & Planning Authority.

Public Health Ordinance  
Ch. 145

Permission is required under this act for the subdivision of land and the construction of buildings. The powers regarding the implementation and enforcement of environmental health conditions may be delegated to Local Health authorities (incorporated under the Municipal & District Councils Act).

Section 77 (1) provides that any cistern vat or well Used for supply of water for domestic water that Renders the water liable to contamination is deemed to be a nuisance. The Board at section 124 may make regulations for the control of sanitary systems for the purpose of receiving, conducting, storing, disinfecting or disposal of sewage.

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Housing Act Ch. 36:20

The Central Housing & Planning Authority (CHPA) is established under this Act whereby the CHPA is vested with responsibilities that include slum clearance and low-income housing. The development planning and contract powers created by the Town: country planning Act are vested in the CHPA.

Amerindians Act  
amended by Act  
Ch. 29:01 No 6 of 1976

The administration of Amerindian lands is controlled by Tribal Councils and Captains. Subject to the approval of the Minister of Amerindian Affairs and Tribal councils can make rules to prohibit the poisoning of any river stream, felling of timber, prevention of grass/bush fires or soil degradation.

Guyana Water Authority  
Act Ch. 55:01

Section 226 empowers the Authority to make Regulations relating to the quality or quantity of water in the drainage and irrigation systems.

Section 26 (1) empowers the Authority to make Regulations for (h) the prevention of contamination or pollution of water.

Under section 26 the Authority is empowered to control and regulate the collection, production, treatment, storage, transmission, distribution and use of water.

The Authority's responsibilities for the supply of

Water and sewerage services are delegated to the Regional Democratic Councils in accordance with the delegation of Function Order 1991.

Housing Act  
Chp 36:20

The Central Housing & Planning Authority (CHPA) is established under this Act whereby the CHPA is vested with responsibilities that include slum clearance and low-income housing. The development planning and contract powers created by the *Town & Country Planning Act* are vested in the CHPA.



Guyana Water's Sewerage  
Commissioners Act No  
30:01

Section 32 empowers the Water Commissioners appointed under this Act, to make regulations, *inter alia*, to conserve water and to prevent fouling of any reservoir, canal or trench under their Charge. The Commissioners are empowered at section 35 to publish by notice in the Gazette and a daily newspapers prohibit sewage of any kind that would be injurious to the sewer to be introduced in any sewer.

East Demerara Water  
Conservancy Act  
Ch. 55:03

The water of the Conservancy, (b) causes or permits in any of the waters or foul fluid to flow into any of the water of the Conservancy or (c) throws any earth, dirt, stones, broken bottles, oil, filth or causes any substances likely to contaminate the waters of the conservancy shall be liable to a fine of \$75.00

Fisheries Act & Aquatic  
Wildlife Control  
regulations  
Ch. 71:08

Both these pieces of legislation are presently in advanced stages of revision. The existing provisions provide for the making of regulation to prevent life - threatening forms of pollution, the control of fishermen, fishing boats and the exportation of fish. Regulations may also be made to protect endangered species and ecologically sensitive areas, hereby providing an opportunity for some legislative measure of protection to be afforded mangroves.

The Aquatic Control regulations also being amended prohibits the killing or captive of manatee, arapaimas, caymans, waterdogs and turtles.

The penalty for breach of these regulations is G\$250.00 or the alternative of imprisonment for six months.

Whaling Industry  
(Regulation) Act  
1934

The killing of immature whales and females with calves and the unlicensed taking of whales is prohibited.

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**Plant Protection Act**

Ch. 68:03

This Act provides for the prevention, eradication and control of diseases and pests affecting plants. The Act at section 7 provides for mechanisms for dealing with the threat of diseases.

**Amerindian Lands**

**Commission Act**

Ch. 59:03

This Act provides for the establishment of a Commission to determine the areas of Guyana within which Amerindian tribes or communities were originally settled and to make recommendations respecting the nature of these areas.

This Act reserves 1.4 million hectares of land in 65 locations for Amerindian tribes of Guyana.

**Forests Act**

Ch. 62:01

This is the principal statute governing the forests of Guyana. Sections 15-17 seek to prevent damage to forests by fire and imposes an obligation on the general public to assist in extinguishing fires.

Sections 18-34 make the unlawful possession of forest produce an offence.

A scheme of forest offences enforceable by forest officers, police constables, Justices of the peace and District Commissioners is also created under the Act. These officials have powers of search and arrest, as well as to hold enquiries and receive record evidence.

Regulations 16-18 made under the Act establish the guidelines for tree felling and include stipulations on size of the stump and using parts of the tree for charcoal.

**Export of Timber Act**

Ch. 67:02 & Guyana

Both these Acts were enacted to regulate the exportation of timber. The provisions require the approval of the Forestry Commission for export of

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Timber Board

forest produce and establish procedure for approving/rejecting logs. The composition and duties of the Timber Board are also provided.

State Lands Act  
Ch. 62:01

The Act provides for the monitoring of the resource, the revocation of licences and the granting of licences subject to certain conditions.

The Act provides that State lands shall not be leased without prior consultation with the forestry administration. Section 22 (1) makes it an offence for anyone to cause any impediment to the free use or navigation in any river or creek. The fine for such an offence is G\$500.

Petroleum (Exploration &  
Production) Act  
No. 3 of 1986

Section 70 (f) empowers the Minister to make regulations for the prevention of pollution to the atmosphere. He may also prescribe the form, contents and conditions with respect to an application for the grant or renewal of licence.

Petroleum (Exploration &  
Production) Act

The regulations require that exploration/exploitation of petroleum be done in a safe manner. Any spills whatsoever must be handled in an environmentally acceptable manner. The Act makes provision for petroleum prospecting and production licences and for the making of regulations with respect to all prospecting and production operations, the conservation and prevention of the waste of petroleum or other natural resources, the control of the flow and the prevention of the escape of petroleum, water, gases other than petroleum or other noxious or deleterious matter, the prevention of the escape of drilling fluid or any other matter. Regulations made under the Act provide the legal regime for the exploitation of hydrocarbons. Any breach of the regulations attracts a fine of G\$25,000.00 or imprisonment for three years.

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Guyana Geology & Mines  
Commission No. 9 of 1979

The Act establishes the Commission and empowers the commission, with the approval of the Minister, to make regulations for the carrying into effect the purposes of the Act. The functions of the Commission, at section 4, do not include provisions for the conservation of resources.

Guyana National Energy  
Authority Act

Section 17 creates an offence for any person to explore or exploit any resources of the exclusive economic zone.

Mining Act  
No 20 of 1989

The Act provides for a system of mineral agreements and licences for the regulation of prospecting, mining and quarrying activities. Licencees must put forward work proposals and show technical competence, and no mining licence can be issued unless the relevant authority is satisfied that the proposals of the applicant are cost efficient and make optimal use of the mineral resource.

Licences are granted subject to conditions, including conditions with respect to the processing of minerals.

Section 7 (f) empowers the Minister to make regulations for the prevention of pollution to the atmosphere. The regulations further provide that any "spills" whatsoever must be handled in an environmentally acceptable manner. For breach of these regulations a fine of G\$25,000.00 and/or imprisonment for three years are attached.

Licencees may only dispose of, stack or dump any mineral waste product resulting from mining in an approved manner.

Kaituma National Park  
Act No 23 of 1973

The Act provides for the control of and preservation of the natural scenery, fauna and flora of the Kaituma National park. Certain activities are prohibited by section 4 (1) and include the entry, chase, catch, kill or

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otherwise disturb any animal or cut, pluck any of the flora or disturb any soil by mining or the operations within the park except in accordance with the regulations.

A permit is required for entry into the park.

Mahaicony-Abary  
Agricultural Development  
Act No. 27

The main function of the Authority is to promote the development of agriculture in the MMA area.

Environmental Protection  
Act  
No 11 of 1996

Section 13 (1) requires a developer to comply with any directions of the Environmental Protection Agency where compliance with such directions are necessary for the implementation of nay obligations of Guyana under any treaty or international law relating to environmental protection.

#### 4.0 Assessment of Adequacy of Laws to Cope the Potential Effects of Sea Level Rise

**Specific Objective:** *To assess the adequacy of the current legislation and regulations to cope with sea level rise under each of the scenarios, which have been suggested for Guyana.*

The vulnerability of Guyana to flooding renders the prudent land use and the proper development and maintenance of drainage and irrigation schemes as important to various types of economic activity as to the protection of the public health. A review of the sea level rise scenarios that are suggested for Guyana of 0.2m, 0.5m and 0.9m. project certain specific results<sup>6</sup>. Part I of this report identified the likely impacts that will result and are summarised in the Table below. Three direct impacts have been identified (i) inundation; (ii) salinization, and (iii) erosion. Part I also anticipated that a number of indirect impacts will occur which will affect the socio-economic sectors.

TABLE

BIOPHYSICAL IMPACTS OF SEA LEVEL RISE	SOCIO-ECONOMIC IMPACTS				
	AGRICULTURE	HUMAN SETTLEMENTS	TOURISM	WATER RESOURCES	FISHERIES
INUNDATION	Major impact. Inundation will devastate agriculture a dominant economic activity on the coast.	Major impact. 90 % of housing and pop. Is concentrated in this region, and hence will be severely affected by inundation.	Major impact. Loss of national landmarks, admin. buildings, transportation and communication lines.  Loss of beaches will also result	Medium impact. Inundation will lead to infiltration of saline water into pipelines and contamination of aquifers. This is an imp. Source of drinking water	Inundation will cause destruction of landing sites and cooperative buildings.  Damage will be caused to nursery areas located in mangrove swamps and fishing grounds will be shifted.
SALINIZATION	Major impact since most plants would be unable to survive under such unfavourable soil	Medium impact. Materials used for building houses will rot at an accelerated rate	Medium impact. Impact on coastal ecosystems.	Major impact. Salinization is likely to occur further upstream of rivers.	Medium impact Salinization is likely to affect freshwater aquaculture

<sup>6</sup> Guyana Human Development Report

	conditions.				
EROSION	Major impact	Medium impact. Foundation upon which houses are built can become weak due to rise in water levels.	Impact on coastal ecosystems Beach loss	Minor impact since pipelines are covered about 1m below groundlevel.	Minor impact.

#### *Analysis of Screening Assessment Matrix*

*The above screening assessment matrix reveals that a sea level rise is likely to have significant impacts on Guyana's coastal assets. The biophysical impacts as well as the socio economic effects are inextricably linked and influence each other. As such ranking the likely impacts on the different sectors is quite challenging. Nevertheless, an attempt is made at ranking these based on the nation's priorities.*

1. Agriculture – dominant economic activity on the coast, it is one of the pillars of the Guyanese economy.
2. Human settlement and infrastructure – 90% of the population, administrative, transportation and communication facilities are concentrated on the narrow coastal strip.
3. Fisheries – contributes quite substantially to the Guyanese economy and also local consumption.
4. Tourism - supports the nation's economy
5. Water Resources

While the results vary in severity somewhat, they all will engage the application of the same statutes. As such the following assessment is relevant to all three scenarios. The discussion below assesses the adequacy and effectiveness of existing laws to cope with the impacts of sea level rise. The discussion identifies the inadequacy in the existing law and recommends the legal responses that are required to address the particular impact.

#### **Land Use Planning Laws**

Land use planning plays a significantly important role in managing the impacts of sea level rise and the conservation of natural resources. Since the purpose for which land is developed or the use to which land is put may have adverse effects on the environment, regulation of these activities can and do have significant implications for sustainable development and in preventing or minimising the impacts of sea level rise in Guyana. The *Town & Country Planning Act*<sup>7</sup> provides machinery for physical development planning and landuse development control. Under the Act development schemes may be prepared for cities, towns and other areas.

Such schemes may provide for preservation of areas of natural beauty, forests, trees and plants and for the regulation of waste disposal. The Act provides for public participation in the planning process before any scheme is approved. The significance of this Act exists more in

<sup>7</sup> Ch. 20:01

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relation to its inadequacy rather than to its usefulness. Generally, its limited provisions are not enforced due to the inadequacy of enforcement personnel and the prescribed penalty. The inadequacy of the existing institutional arrangements established under the Act.

Except for Georgetown and New Amsterdam, where there are elaborate building by-laws, made under the *Municipal and District Councils Act*<sup>8</sup>, no zoning by-laws or building codes exist, and applications are determined on their own merits. Under the *Public Health Ordinance* and by-laws, permission for the subdivision of land and the construction of buildings. Notably absent is a requirement for environmental impact assessments to be carried out for proposed developments.

Part IV of the *EP Act* addresses this omission. By virtue of this enactment provisions have been introduced that require the conduct of environmental impact assessments for projects identified in the Fourth Schedule to the Act or for any other project which may significantly affect the environment. This assessment is done with a view to the need to protect and improve human health and living conditions and the need to preserve the stability of ecosystems as well as the diversity of species. The Act makes no specific reference to the consideration of potential impacts related to sea level rise (inundation, salinization and coastal erosion) and is deficient in this regard.

The *State Lands Act* and *Acquisition of Land for Public Purposes Act* by establishing provisions relating to the acquisition of lands and conditions governing leases, contain useful provisions that make it possible for State and other lands to be brought within any management plan for preventing or mitigating the impacts associated with climate change and sea level rise. At the institutional level however proper coordinating arrangements need to be established among the agencies that administer these Acts.

The need for the rationalisation and modernisation of existing legislation in this area cannot be over-emphasised. There is also a need to coordinate the concurrent jurisdictions of the *Public Health, Municipal & District Councils, Town & Country and Environmental Protection Acts* to ensure efficient implementation and enforcement of the legislation taking the impacts of sea level rise into account.

The linkage of the manufacturing process to the causes of global warming and ultimately sea level rise is now universally accepted. Under the *EP Act* a regulatory regime has been established for pollution control and if effectively enforced, will potentially have the effect of providing subsidiary means of preventing/mitigating the impacts of sea level rise. Other legislation of potential relevance in this regard includes the dated *Motor Vehicle and Road Traffic, Factories and Public Health Acts* which establish authority to control air emissions.

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<sup>8</sup> supra



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## 4.1 Drainage, Irrigation and Sea Defences Laws

### Drainage and Irrigation

The coast, which is at a level of 0.5m to 1.0 below sea level at high tide, is protected from the intrusion of saline water by mangroves, dikes, sluices and concrete walls, known collectively as sea defences. With extensive drainage, irrigation and flood control network, the sea defences serve to make the coast habitable and cultivable. Without this hydraulic system, cultivation and settlement would have to be located much farther inland.

Many pieces of legislation govern the management and operation of drainage and irrigation management in Guyana, but together they do not establish a consistent body of regulations. Instead, the result is a set of complex regulations that hinder the smooth operation of the drainage and irrigation system. Owing to the lack of adequate maintenance of the system, environmental problems have resulted.

Enacted on January 1, 1941, the *Drainage & Irrigation Act* established a Board with powers to:

- (a) ascertain the suitability of land as drainage and irrigation areas;
- (b) regulate construction and the establishment of certain works in these areas; and
- (c) make regulations with respect to these areas.

The Act empowers the Minister to designate drainage and irrigation areas in the context of consultations with the Board (section 18). The Act also provides for the modification of the designated areas and the proprietors of lands adjacent to designated areas. The institutional arrangements regarding responsibility for drainage and irrigation are also complex. There are eight different agencies with a role to play in Guyana's drainage and irrigation system.

The protection of the settlements on the north coast against flooding cannot be guaranteed by this aging statute<sup>9</sup>. Admittedly, the Board has enacted by-laws to prevent pollution of the reservoir. Other relevant by-laws include the *Drainage & Irrigation Ascertainment, Determination and Suitability for Drainage Order; Drainage & Irrigation (Construction) Orders; and the Drainage & Irrigation Area Declaration Orders*. The Board functions in a limited manner resulting in low levels of monitoring and inspection of areas and inadequate assessments of potential for flooding.

The institutional framework is characterised by a lack of clear policy objectives, inadequate supervision and coordination, multiple overlapping jurisdiction, significant variations among regions in organisation and effectiveness and imprecise roles of the various agencies. In particular there is a lack of coordination between the management of sea defences and the

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<sup>9</sup> A draft Drainage & Irrigation Act has been prepared under the Inter-American Development Bank/Netherlands Engineering Project.

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management of drainage and irrigation systems. This is vital because most times the two systems utilise the same drainage and irrigation systems. Further, responsibility for operation and maintenance of the Boerasarie Conservancy and the East Demerara Water Conservancy is established under separate Acts.

The *Transport & Harbours Act, 1932* established a Transport and Harbours Department for the purpose of managing Government vessels and of controlling and regulating the control of the harbours of Guyana. The removal of soil from any harbour without permission is an offence and the tools and equipment used to commit the crime are subject to seizure. But the Act does not contain provisions that address any flooding, erosion or inundation that may result from the commission of such a crime. The Act also provides that no drainage, channels, or canals may be made to discharge into a harbour, nor any alterations be made to such facilities already discharging, without permission.

The mining industry in Guyana presents certain challenges to the prevention of flooding, depending on the type of mining and where the activity is conducted. Petroleum mining is often productive of water and air pollution, but the *Petroleum (Exploration & Production) Act, 1986* and regulations made thereunder do not consider this impact as a consideration in the grant of licences. Bauxite mining destroys the environment in Guyana where excavation down to 100 feet below the surface is required causing frequent subsidence and erosion of fertile agricultural lands. Gold prospecting and gold mining cause several environmental problems relating to sea level rise that include the diversion of river courses, the damaging of river banks and surrounding vegetation and the destruction of animal forms in these areas. The new “dredging” machine has exacerbated the causes of soil erosion. This notwithstanding, there is no express statutory provision that addresses these concerns. Environmental clauses which are attached to the mining agreements require the operator to use reasonable efforts to negative the impact of its operations on forest land quality, wildlife and human settlements.

It is apparent that the legislative framework for drainage and irrigation is not viable or comprehensive to address the likely impacts of sea level rise in Guyana. The legislative regime for drainage and irrigation must be revised to include provisions that anticipate these impacts, for water conservation, efficient use and distribution of water, the monitoring of environmental impacts of drainage and irrigation works and participation of all stakeholders in the operation and maintenance of the system.

#### 4.2 Sea Defences Laws

Sea defences are a fundamental element in the protection of the environment, protecting the coastal lands and other critical areas from flooding. The frequent flooding of the coastal plain has occurred mainly because of, inter alia, a lack of maintenance of sea defences and sustainable management of mangroves.

The widespread lack of awareness of the value of mangroves for sustaining marine fisheries and preventing flooding and erosion of sea defences, has presented a major constraint to the

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conservation efforts in this sector. The *Sea Defences Act*<sup>10</sup> prohibits the removal of earth, shells, from any lands along the foreshore within half mile of the mean high water mark but does not make express reference to this important ecosystem. Solutions for managing mangroves in a sustainable way needs to be developed and implemented with the participation of the local communities who exploit the mangroves for firewood. The legislative regime for the conservation of natural resources should therefore include provisions that prioritise the areas along the coast that require protection, prohibit the exploitation of mangroves, and provide for a management programme that includes the replanting and protection of mangroves.

#### 4.3 Integrated Coastal Zone Management

Ninety percent of the estimated population of 751,000 resides in the coastal zone of Guyana and except for forestry, all agricultural products come from the coastal area. Most of the industry is found along the remaining coast. Other major economic activities outside the coast consist mainly of large and small scale mining, mostly on major rivers.

The shorezone, which serves as the natural line of defence against coastal erosion, is subject to erosion from floating mud shoals, exacerbated by destruction of mangroves and by removal of sand for construction on shore. The system of water conservancies and drainage and irrigation works in the coastal plain, cause periodic fresh water flooding.

The vulnerability of its coastal zone to sea level rise and climate change therefore makes proper management of the coastal zone increasingly important for Guyana.

The legislative regime presents a fragmented regulatory framework in which the coastal zone is managed in a piecemeal fashion in response to specific problems:-

Sea defence , soil erosion and destruction of mangroves- *Sea Defence & Sea Defences Act, Guyana Forestry Commission, Forests Acts;*

Land use control- *Town & Country Planning, Municipal & District Councils, Public Health, State Lands and Housing Acts;*

Drainage and irrigation - *Drainage & Irrigation Act, East Demerara Water Conservancy Acts;*

Sand-mining, soil erosion - *Mining Act, Guyana Geology & Mines, Petroleum (Exploration and Production) Acts;*

Waste disposal- *Public Health, Georgetown Water & Sewerage Commissioners Acts.*

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<sup>10</sup> Ch. 64:02

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General legislation providing for the coordinated management of the coastal zone among relevant institutions, monitoring and regulation, availability of baseline data and participation by local communities and coastal zone issues is not in place.

Even though the coastal zone supports the majority of the population and the main economic activities, there is no formal coastal zone management plan or strategy for the multiple uses to which these resources may be put. In 1991, recognising that improved coastal zone management depends on an integrated approach, a subcommittee on coastal zone management, represented by representatives from the major agencies dealing with coastal zone was established. Coastal communities have not been incorporated into this process.

General environmental regulation relevant to coastal areas is provided for in the *EP Act*. The *EP Act* vests the Agency with express statutory responsibility for co-ordinating an integrated coastal zone management programme. The *EP Act* also vests the Agency with responsibility at section 4;

- to co-ordinate the environmental management activities of all persons, organisations and agencies;
- to coordinate and maintain a programme for the conservation of biological diversity and its sustainable use;
- to coordinate the establishment and maintenance of a national parks and protected areas system and a wildlife protection management programme and;
- to advise the Minister on matters of general policy relating to the protection, conservation and care of the environment and the impact of development.

The requirement for the conduct of environmental impact assessments is linked to the nature of the activities that are to be conducted and is therefore not based upon the geographical location of the project. This strategy makes it a mandatory requirement, at section 11 of the EPA Act that an environmental permit be obtained from the Agency for any project, which may significantly affect the environment, or any project identified in the Fourth Schedule. Development projects in coastal areas are caught within this requirement. This activity-based management strategy for coastal zone management will however be required to be harmonised with proposed national parks and protected areas legislation for Guyana.

In relation to the regulation of contaminants, which cause climate change, the EPA is in the process of formulating standards and codes of practice for the improvement and maintenance of the quality of the environment and limits on the release of contaminants.

Although the preparation of exclusive legislation to govern this area has not been initiated, integrated coastal zone management occupies a high priority in Guyana. On the question whether the legislative framework for coastal zone management will produce an independent stand-alone regulation, the approach has been to strengthen and update existing legislation to ensure that it is

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complementary and taken together presents a coherent approach to integrated coastal zone management in Guyana. The general environmental regulation relevant to the coastal zone present in the *EP Act* will be maintained. The EPA in this regard will function to coordinate all activities that have an impact on the coastal zone and where necessary require the amendment of sector-specific legislation to deal satisfactorily with the issues, consistent with its legislative policy. To this extent the legislative regime of coastal zone management in Guyana will be fully integrated within the overall environmental management framework established in the *EP Act*.

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## **5.0 Proposed Revisions Aimed at Minimising/Eliminating Adverse Impacts & Recommendations for a Revised Legal Framework**

**Specific Objective:** *To propose revisions to the current legislation or new legislation aimed at minimizing or eliminating the adverse impacts of sea level rise, noting the outputs of (4) above for Guyana.*

The assessment of the existing environmental land use and building laws contained in Part III of this study indicate that while generally, statutory powers are established in existing legislation to respond to the potential or likely effects of sea level rise, there are some gaps and weaknesses that need to be addressed in order to make them useful to the impacts of sea level rise (inundation, salinization and coastal erosion).

The legislative framework is generally too outdated to offer any significant influence. This is reflected vividly in the inadequacy of fines and penalties legislation, the lack of coordination among agencies, inadequate institutional arrangements, the absence of modern day principles such as the precautionary principle and reliance upon alternative enforcement and compliance methods. More importantly, the legislative process has not kept pace by passing the required implementing legislation. And in the isolated circumstances where regulations were made, they have become rigid and inflexible and their application to the issues presented by sea level rise and climate change is generally inadequate. The major gaps and weaknesses are identified as follows:

### **Gaps and weaknesses**

- absence of guidelines and standards to prevent inundation as it pertains to development activities including mining, forestry and agriculture;
- absence of emergency preparedness plan and a legal and institutional framework for disaster management;
- planning legislation needs to be strengthened to include the establishment of building codes and design and construction standards. At the institutional level the relationship with other relevant agencies such as Housing, District & Municipal Councils and Public Health needs to be strengthened to promote the enforcement effort and avoid duplication of effort;
- drainage and irrigation and legislation pertaining to navigation and the protection of water resources should be strengthened to include provisions that have the potential to cause pollution, salinization and flooding;
- Harmonisation of legislation to avoid overlap and duplication of the functions is lacking throughout the legislative instruments that impact on climate change.

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### **5.1 Establishing an Adequate Legal Framework for Sea level Rise**

The assessment of the legislation in the light of these impacts identified the need to strengthen the legislative framework to address the impacts of sea level rise in Guyana. The following is proposed in this regard:

- (a) The development of an appropriate national policy, strategy, management plan and programmes for addressing the impacts of climate change in Guyana. An adequate institutional arrangement among relevant agencies and authorities should be established. This approach is recommended since duties in relation to inundation, erosion and salinization are divided among civil service-based institutions and statutorily independent authorities and a legislative response could prove to difficult to implement. Such a comprehensive policy will ensure that consistent approaches are adopted with regard to such issues as location of critical services, types of development, application of planning regimes to the land-water interface, including areas seaward of the high-water mark standards and conditions that are permissible, taking into account the impacts of sea level rise.
- (b) Because the impacts of climate change are cross-sectoral in nature, the preparation of comprehensive climate change legislation might not be the obvious priority for Guyana. Given Guyana's early stage of development of integrated coastal zone management policy and its difficulty in implementing extensive legislation which is already in place, a comprehensive review of the relevant legislation to fill the existing gaps for effective monitoring, implementation and enforcement is recommended. Priority should be given to the *Town & Country Planning Act*, *Environmental Protection Act*, *State Lands Act*, *Housing, Drainage and Irrigation Act*, *Sea Defences Act* and *Sea Defence Act* as the principal legislative instruments to provide adequate preventative responses to sea level rise. Provision should therefore be established for regulating marine and sand mining, the execution of coastal protection works, the establishment of a regime of port management, establishment of a regime for the protection of special areas including wetlands and mangrove protection and with particular reference to administration of lands, the establishment of procedures and safeguards for effects of the legislation on private property interests in the coastal areas.
- (c) The adoption of policy on climate change should be considered in a broad national developmental context. Established inter alia, to coordinate the environmental management activities of all persons, organisations and agencies in Guyana, the EPA should be the institution to convene activities for the preparation of the national climate change policy and legislative review.
- (d) Conservation-oriented legislation should also be reviewed to ensure consistency with the national climate change policy. Provisions should therefore be made for

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- (e) Enforcement of national legislation is generally weak in Guyana. In addition the existing fines and penalties are extremely low and do not serve as a deterrent to the commission of offences. Any legislative review should establish adequate fines and penalties.
  - (f) Guyana is yet to prepare legislation to address natural disasters. The Caribbean Disaster Response Act provides the regional context in which Caribbean countries should respond to these disasters. Guyana therefore needs to prepare national disaster management legislation.
  - (g) Limited zoning by-laws or building codes exist in Guyana and generally building applications are determined on their own merits. Construction and design standards should be developed.
  - (h) The existing EP Act should be amended to expressly include provision for the consideration of inundation, salinization and erosion impacts as among the considerations that should be taken into account in the preparation of EIA's for projects.
  - (i) Public awareness programmes should be developed to educate the public and private sector particularly with regard to its role in preventing or mitigating the impacts of climate change e.g. land-clearing, erosion, emissions as a means to promoting compliance with the legislative regime for climate change.
  - (j) Efforts should be taken to ensure that the banking and insurance industry take account of the effects of climate change in the delivery of their services.



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