



Watersheds Policy for Jamaica



2024



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Message by

**DR. THE MOST HONOURABLE
ANDREW HOLNESS, ON, PC, MP**

In this regard, every Jamaican is encouraged to play his/her part in facilitating the requisite paradigm shift in how we treat the environment, on which lives and livelihoods depend. Small positive actions by many can have a domino effect and result in significant outcomes.

One of the primary functions of watersheds is to provide an area for the filtration, catchment and storage of the island's water resources. Hence, the sustainable management and resilience of these areas are particularly important in responding to the impacts of climate change.

Indeed, watersheds may be deemed as the natural reservoirs for our water resources. Therefore, it is important that we protect these areas from all sources of pollution, including air pollution, discharge of inadequately treated or untreated effluent, chemical pollution (pesticide and fertilizer run off from agricultural areas) and improper disposal of solid wastes, ecosystem degradation, including deforestation and habitat destruction due to human activities (including open burning), as well as inappropriate construction and development practices.

The Watersheds Policy for Jamaica will provide the policy prescriptions necessary to inform the amendment of the Watersheds Protection Act (WPA), 1963. Indeed, the Policy seeks to, *inter alia*, identify and institute the governance arrangements and institutional framework necessary to allow for the sustainable management of the island's watersheds. Additionally, the Policy recommends the establishment of a sustainable finance mechanism

The health and productivity of the island's watersheds are critical to the economic growth and development and environmental sustainability of the country based on the myriad of ecosystem functions and services that they provide. Hence, it is imperative that the island's twenty-six (26) watershed management units are effectively restored and rehabilitated, particularly those that are severely degraded.

According to the 2017 State of the Environment Report, more than a third of the total watershed areas in Jamaica were classified as either degraded (22%) or severely degraded (14%). The importance of these watersheds to the quality of life we experience cannot be overly emphasized.

It is estimated that the Hope-Yallahs River Watershed is the source of water for approximately 40% of the Kingston Metropolitan Area. The restoration of these areas will require an integrated and coordinated approach involving various stakeholders, including the public and private sectors, civil society and importantly the general public working collaboratively to achieve a common objective – the preservation of the island's watersheds.

to support watershed management as well as the promotion and facilitation of sustainable land management practices.

Once the Policy is approved, the Ministry of Economic Growth and Job Creation will be tasked with amending the WPA to align it with the Policy prescriptions. The Watersheds Policy will support and complement existing policies and strategies, including the National Water Sector Policy and Implementation Plan, the Forest Policy, the Climate Change Policy Framework for Jamaica and the Emissions Policy Framework as well as the relevant pieces of legislation, namely the Natural Resources Conservation Authority Act, the Water Resources Act, Forest Act, Public Health Act, Pesticides Act and the Mining Act.

Additionally, it is also important to promote tools and arrangements such as payments for ecosystem services (also referred to as payments for environmental services) where individuals within the watershed areas are 'incentivized' or 'compensated' to conserve and maintain the ecological integrity within these areas.

I would like to thank the Environment and Risk Management Branch of the Ministry of Economic Growth and Job Creation for their coordination in the development of this draft Policy. I would also like to encourage all stakeholders to become actively engaged in the finalization of this Policy and its effective implementation.

Dr. the Most Honourable Andrew Holness, ON, PC, MP
Prime Minister and Minister of Economic Growth and
Job Creation



ACRONYMS

AGC	Attorney-General's Chambers	MEGJC	Ministry of Economic Growth and Job Creation
BPOA	Barbados Programme of Action for the Sustainable Development of Small Island Developing States	MEYI	Ministry with responsibility for Education, Youth and Information
CBD	Convention on Biological Diversity	MFPS	Ministry with responsibility for Finance and Public Service
CBO	Community-based Organisation	MGD	Mines and Geology Division
CCAM	Caribbean Coastal Area Management Foundation	MHW	Ministry with responsibility for Health and Wellness
CCD	Climate Change Division	MIC	Ministry with responsibility for Industry and Commerce
CDB	Caribbean Development Bank	MLGCD	Ministry with responsibility for Local Government and Community Development
CLME	Caribbean Large Marine Ecosystems (Project)	MLSS	Ministry with responsibility for Labour and Social Security
EFJ	Environmental Foundation of Jamaica	MM	Ministry with responsibility for Mining
ERMB	Environment and Risk Management Branch	MPP	Ministry with responsibility for Physical Planning
FAO	Food and Agriculture Organization	MRE	Ministry with responsibility for the Environment
FD	Forestry Department	MRL	Ministry with responsibility for Land
GEF	Global Environment Facility	MRW	Ministry with responsibility for Water
GIS	Geographic Information System	MT	Ministry with responsibility for Tourism
GIS-DSS	Geographic Information System - Decision Support System	NCTFJ	National Conservation Trust Fund of Jamaica
GOJ	Government of Jamaica	NEPA	National Environment and Planning Agency
IDB	Inter-American Development Bank	NGO	Non-Governmental Organisation
IWCAM	Integrating Watershed and Coastal Area Management	NIC	National Irrigation Commission
IWRM	Integrated Water Resources Management	NIWMC	National Integrated Watershed Management Council
IWRMC	Integrated Water Resources Management Council	NIWMP	National Integrated Watershed Management Programme
JAS	Jamaica Agricultural Society	NLA	National Land Agency
JIS	Jamaica Information Service	NRCA	Natural Resources Conservation Authority
JB	Jamaica Bauxite Institute	NSDMB	National Spatial Data Management Branch
JCF	Jamaica Constabulary Force	NWC	National Water Commission
JSIF	Jamaica Social Investment Fund	OCP	Office of the Chief Parliamentary Counsel
LFMCs	Local Forest Management Committees	ODPEM	Office of Disaster Preparedness and Emergency Management
LIWRMC	Local Integrated Water Resources Management Committee		
LRD	Legal Reform Department		
MAF	Ministry with responsibility for Agriculture and Fisheries		
MCs	Municipal Corporations		
MDA	Ministries, Departments and Agencies		

OUR	Office Of Utilities Regulation	UNCED	United Nations Conference on Environment and Development
PASMP	Protected Areas System Master Plan	UNDP	United Nations Development Programme
PES	Payments for Ecosystem Services	UNEP	United Nations Environment Programme
PIOJ	Planning Institute of Jamaica	UNFCCC	United Nations Framework Convention on Climate Change
PSOJ	Private Sector Organisation of Jamaica	USAID	United States Agency for International Development
RADA	Rural Agricultural Development Authority	WAMM	Watershed Area Management Mechanism
SBAJ	Small Business Association of Jamaica	WMCs	Watershed Management Committees
SIDS	Small Island Developing States	WMU	Watershed Management Unit
SDC	Social Development Commission	WPA	Watersheds Protection Act
SPAW	Specially Protected Areas and Wildlife	WRA	Water Resources Authority
STATIN	Statistical Institute of Jamaica		
SWB	Sustainable Watersheds Branch		
TCPA	Town and Country Planning Authority		
TPDCo	Tourism Product Development Company		



EXECUTIVE SUMMARY

The term ‘watershed’ is defined as the land area in which rain falls and from which water drains into a stream or river (National Oceanic and Atmospheric Administration, 2022). This area covers not only the mountains and hill slopes but also includes the forests, farms, industries and housing developments. Jamaica is divided into 10 hydrologic basins and 26 watershed management units (WMUs) each usually identified by the name of the major river, which runs through it.

While the protection of watersheds and adjoining areas as well as the promotion of the conservation of water resources were assigned to the Watershed Commission¹ with the enactment of the Watersheds Protection Act (WPA), 1963, the range of issues to be addressed is wide and involves several Ministries, Departments and Agencies. Since the enactment of the WPA, there have been changes in the institutional, policy and legislative frameworks related to management of the island’s watersheds. Additionally, new technologies have become available, several projects and programmes implemented and new global commitments made. It is within this context that this Policy seeks to address the governance and management arrangements for effective watershed management.

The Government of Jamaica’s policy prescription as articulated in the Watersheds Policy seeks to respond to the degradation of the island’s watersheds, challenges in the management of these areas, the need for greater coordination and partnership, at all levels, outdated laws and policies, as well as threats posed by global environmental issues such as climate change.

According to the State of the Environment Report 2017, with respect to the status of the country’s watersheds, “...all 26 WMUs have been assessed as degraded to some extent... More than a third of the total watershed areas in Jamaica were classified as either degraded (22%) or severely degraded

(14%); these are generally located on the eastern side of the island. The most severely degraded WMUs included Rio Minho, Wagwater, Hope River and Yallahs”.

This Policy outlines the goals, objectives and principles that should guide decision-making by public sector agencies that have mandates concerning watershed management and includes provisions related to the engagement of communities and other stakeholders in watershed protection. The Policy takes into account commitments made by Jamaica under various global agreements related to environmental protection and sustainable development as well as the goals and objectives of related national plans and policies.

The **Vision** of the Watersheds Policy for Jamaica is aligned with Vision 2030 Jamaica – National Development Plan, which is:

“Jamaica has healthy and optimally functional watersheds that provide sustained ecosystem services for the benefit of all in society.”

The **Goals** of the Policy are:

1. Strengthening of the legislative and institutional frameworks governing Jamaica’s watersheds to support effective and efficient management
2. Enhancement of capacities (human, technical, technological and financial) at all levels to allow for integrated watershed management
3. Increased access to data and information to facilitate informed decision-making at all levels
4. Increase awareness among Jamaicans regarding the importance of watersheds and encourage active participation in their conservation
5. To promote appropriate land use and sustainable land management

¹The Watersheds Commission is the Natural Resources Conservation Authority as per section 42 of the Natural Resources Conservation Authority Act.



The Government will, to the extent possible, provide the requisite support to the responsible entities to enable them to effectively manage and protect critical areas within the island's WMUs. In this regard, partnerships will be forged at all levels—national and local—and include community-based and non-governmental organisations, academia, the private sector and multilateral agencies – to address common interests and concerns with respect to watershed management.

The Policy includes eleven **guiding principles**:

- I. Transparency and accountability
- II. Precautionary approach
- III. Participation and collaboration
- IV. Conflict resolution
- V. Environmental economic tools and technology
- VI. Protection and sustainable use of water resources
- VII. Evidence-based approach
- VIII. Polluter Pays Principle
- IX. Access to information, justice in environmental matters and participation in the decision-making process (Principle 10 of Rio Declaration)
- X. Sustainability
- XI. Inter- and Intra-generational equity

The five **objectives** of the Policy are:

1. Rationalization of legislative and institutional frameworks governing watershed and water resources management;
2. Enhance national capacities for effective watershed management;
3. Increase access to appropriate information and data for effective watershed management;
4. Increase public education, awareness and engagement to foster positive attitudes towards watershed protection and conservation; and
5. Support integrated land-use initiatives to conserve and preserve critical watershed areas

The monitoring and evaluation of this Policy will be carried out by the Ministry with responsibility for the environment. Additionally, actions included in the Policy Implementation Plan will be included in the Medium-Term Socio-Economic Policy Framework (MTF) of Vision 2030 as well as the corporate and operational plans of the relevant agencies. All issues related to watershed management will be addressed by the Natural Resources Conservation Authority (NRCA) with the support of the National Integrated Watershed Management Council (NIWMC). Also, Reports on the State of the Environment will continue to include information on the state of Jamaica's watersheds.

1. INTRODUCTION

The main purpose of this Policy is to address the institutional, policy and legislative frameworks for more effective management of Jamaica's critical watershed areas, taking into account all relevant policies and legislation as well as Agenda 2030 for Sustainable Development.

Definitions

The Watersheds Protection Act, (1963), the principal law governing the island's management of watersheds, does not include a definition of the term 'watershed'. It is therefore imperative that this Policy defines key terms, including 'watershed' and

'watershed management unit', which are as outlined below:

- a. Watershed: **"Area having a common outlet for its surface runoff"** (World Meteorological Organization & United Nations Educational, Scientific and Cultural Organization, 2012).
- b. Watershed Management Unit: **"A defined land area from the ridge of a mountain to the coast within which a group of sub-hydrological basins drain into a major water body."**



Figure 1: Watershed diagram

Adapted from the National Oceanic and Atmospheric Administration, 2022

The watershed is the land area in which rain falls and from which water drains into a common outlet/common body of water such as a stream or river (Figure 1). This area covers not only the mountains and hill slopes but also includes the forests as well as the farms, industries and housing developments on them.

Generally, watersheds provide many functions including a wide range of ecosystem services and goods, such as provision for freshwater, timber, food, fibre, soil formation, water and air filtration, nutrient cycling, carbon storage and medicinal plants. Watersheds typically feature high terrestrial bio-diversity, ground and surface water catchment and high mineral content. As a result of drainage and surface water flow, watersheds are linked to mountains/high elevations making the two systems interrelated. Watersheds and mountains are often fragile ecosystems that are susceptible to erosion, landslides and other natural hazards, which make them a priority area for strengthening resilience to climate change (Food and Agriculture Organization, 2017).

Productive and healthy watersheds can also provide opportunities for recreation, ecotourism and sustainable livelihoods. It should be noted that in countries like Colombia and Costa Rica, payments for ecosystem services (PES) programmes compensate or incentivize landowners as encouragement for the conservation of land, enabling others to benefit from the ecosystem services provided. In this regard, sustainable land management and best management practices in watersheds must be observed.

Integrated Watershed Management Approaches

Land and water resources management activities have been undertaken in Jamaica since the late 1800s when recommendations were made to establish forest reserves in the Blue Mountains and in certain limestone formations for soil conservation, the retention of timber trees and protection of the hillsides from clearing (Hooper, 1886, as cited in Forestry Department, 2017). Documented reports from the 1900s continued to

highlight the need for forest cover to improve water retention in catchments to ensure reliable potable/domestic water and reduce soil erosion (National Environment and Planning Agency, 2013).

In the 1900s, the Government of Jamaica took steps to strengthen the legislative and institutional frameworks for watershed management. The Government undertook the following agriculture and land-use initiatives in collaboration with key stakeholders:

- establishment of Land Authorities;
- enactment of the Watersheds Protection Act of 1963;
- implementation of the Farm Development Scheme;
- Integrated Rural Development Project 1978-1983; and
- Hillside Agriculture Development Project of 1987-1997.

In the 1980s, the emphasis gradually shifted to an integrated approach, which combined soil conservation and rural development, including improvement in livelihood opportunities. Following the United Nations Conference on Environment and Development (UNCED) (Rio de Janeiro, Brazil, 1992), watershed conservation programmes focused on the improvement of the rural environment and living standards, alleviation of poverty and public participation, as well as the protection of tropical forest and other natural resources.

Several projects in the 2000s employed the ridge-to-reef approach, which is a holistic method considering the interconnectivity between coastal and marine areas ('reef') and their uplands ('ridge'). One such project was the 'Ridge to Reef Watershed Project'. This was a five-year initiative between the Government of Jamaica's National Environment and Planning Agency (NEPA) and the United States Agency for International Development (USAID). The 'Integrating Watershed and Coastal Areas Management (IWCAM)' Project, funded by the Global Environmental Facility (GEF) and implemented by NEPA, was another project during this period which also utilized the 'ridge-to-reef' approach.

As per the National Water Sector Policy and Implementation Plan, 2019, a key goal of water resources management decisions is the protection of watersheds at all points — from ridges and headwaters to the coastal waters that they feed. Jamaica's National Ecological Gap Report (2009) (NEGAR) noted that research on marine, freshwater and terrestrial ecosystem connectivity in protected areas should be a priority for the effective conservation of 'ridge to reef' areas. The NEGAR also considers how ecological connectivity could be incorporated into conservation strategies such as zoning and restoration.

Another approved method for watershed management is the ecosystem-based approach, which views watershed management as the management of a complex ecosystem. It regards all its components — air, land, water, wildlife and humans — as interrelated.

Appendix II provides a brief overview of the various strategies that have been employed in watershed management in Jamaica.

2. BACKGROUND

2.1 Physical Setting

The island of Jamaica consists primarily of mountainous regions with over 60 per cent of the island having altitudes greater than 230 metres above sea level. It is often described as having a mountainous backbone attributed to the central ridge that transverses the length of the island. In the east, the crest of the ridge exceeds 2,100 metres above sea level for at least 16 kilometres, with the highest summit in the Blue Mountains. Limestone soils cover about 65 per cent of the watersheds, with the remainder being soils derived from weathered igneous and metamorphic rocks. Alluvial soils are mostly along the coastal plains and interior valleys. Figure 2 shows the distribution of soil types across the island.

The watershed includes all the land from the mountains to the sea. Lands in the upper parts of

the watersheds are characterised by steep slopes, the majority of which are greater than 20 degrees. The Blue Mountains Range — the island's highest and most extensive mountain form — is composed of igneous and metamorphic rocks and is dissected by a network of steep-sided ravines. This land formation gives rise to surface drainage by an extensive network of streams and rivers. In the limestone areas drainage by rivers is significantly less dominant.

Under section 5 of the Watersheds Protection Act (WPA), the Minister by order, upon the recommendation of the Natural Resources Conservation Authority² (NRCA), declared thirty-three (33) watershed areas from 1964 to 1983 with the majority being between 1982 and 1983 (Appendix III).

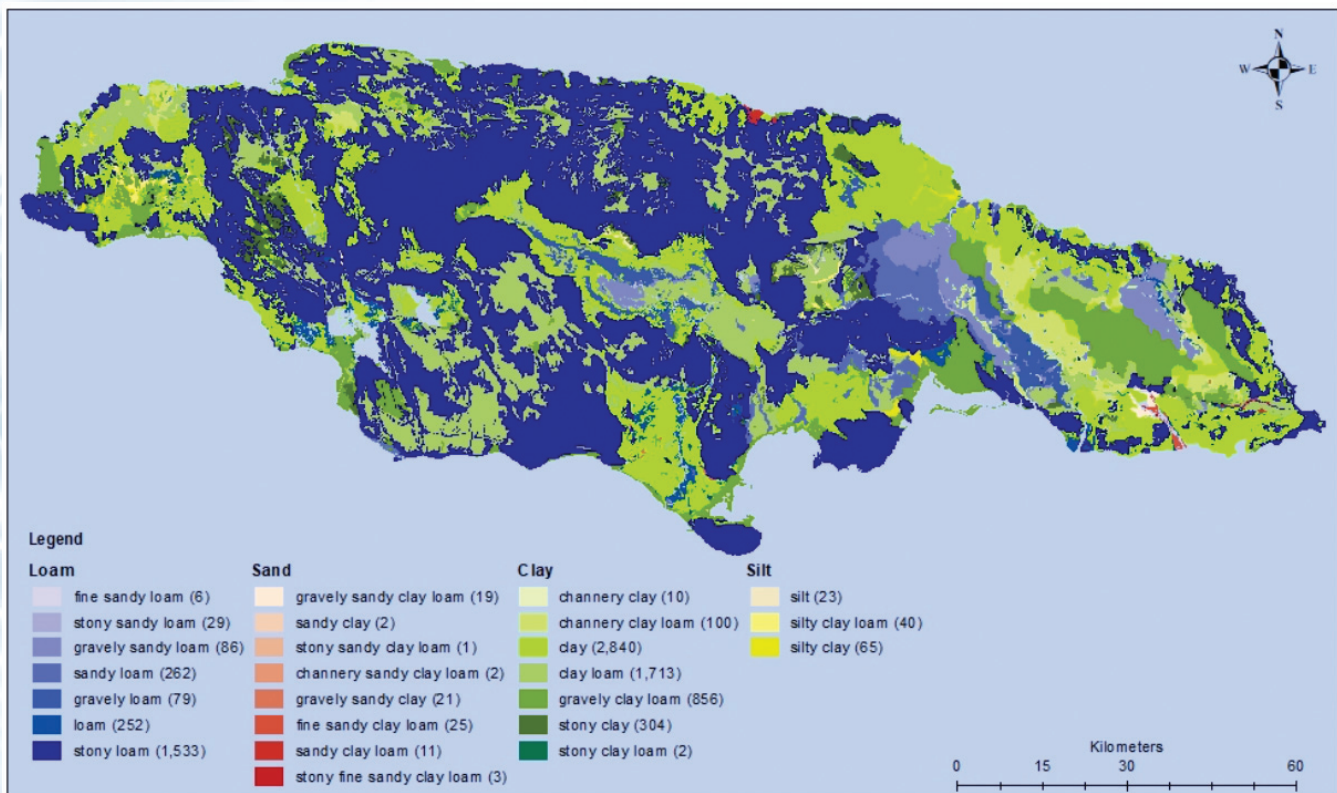


Figure 2: Soil Map of Jamaica - Sources: NEPA (Design) and Rural Physical Planning Division [RPPD] (Data), 2020

² On or after July 5, 1991, any reference to the Watershed Commission in any enactment or regulations was construed as a reference to the Natural Resources Conservation Authority (section 42 of the NRCA Act).

In 1995, for management purposes, the Underground Water Authority (later replaced by the Water Resources Authority [WRA]) and the NRCA, in collaboration with other agencies³, divided the island into 26 watershed management units (WMUs) each usually identified by the name of the major river, which runs through it. The WMUs are composites of watersheds within the 10 hydrological basins. Figure 3 illustrates the subdivision of the island into the WMUs, while the list of the areas, their approximate sizes and related hydrological basins are presented in Appendix IV.

Each watershed has three physical and management subdivisions. These are **the upper watershed**, which

begins at mountain tops and is characterised by steep slopes often over 20 degrees; the **middle watershed**, which separates the upper and lower areas; and **the lower watershed**, which consists of gently undulating foothills and flatlands ending on the coast. The upper and middle watersheds (lands 305 metres or 1000 feet and above) occupy almost three-quarters of the island and approximately 40 per cent of Jamaica's population is located therein, including the majority of small farmers, and a significant portion of Jamaica's non-traditional crops. Urban centres are mainly established in coastal areas, particularly on the southern side of the island, where there are more extensive, better-developed plains.

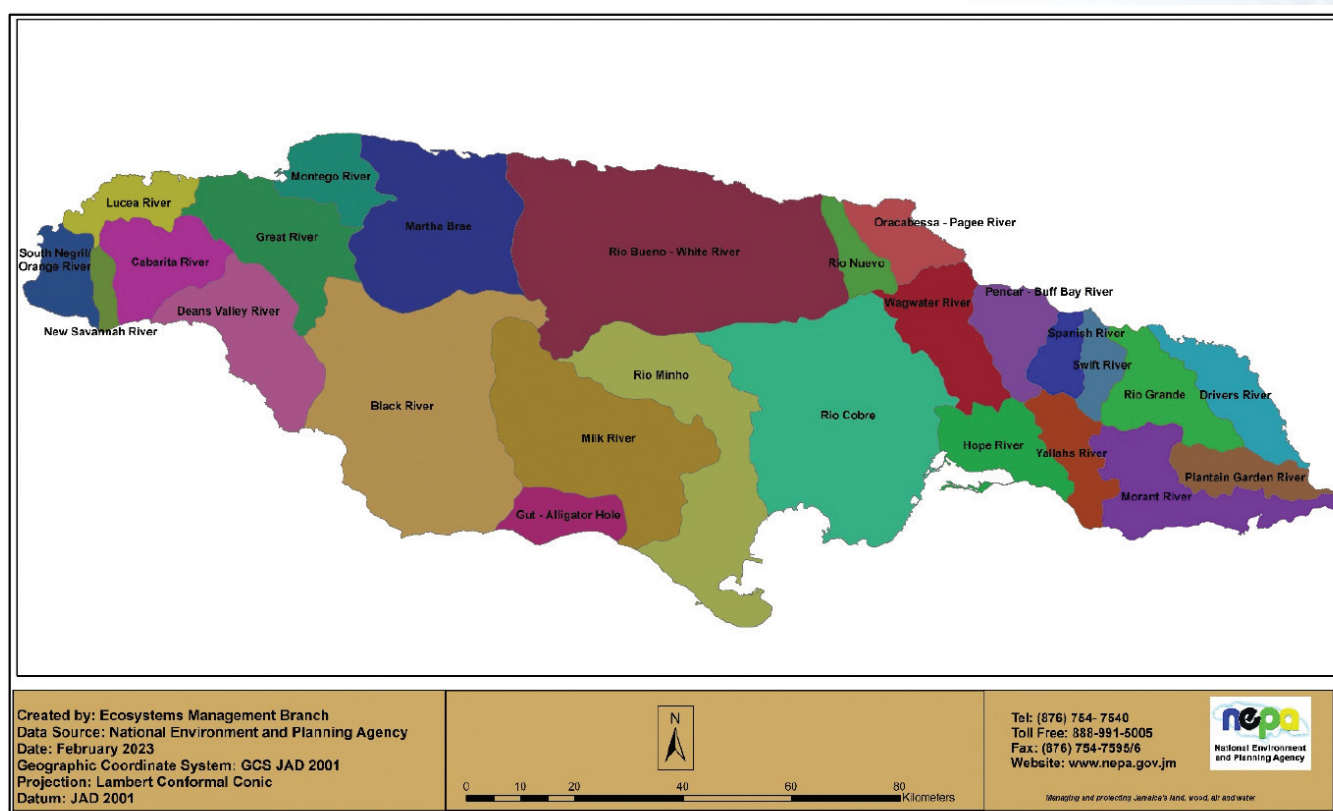


Figure 3: Map of Jamaica illustrating the 26 watershed management units - Source: NEPA, 2023

³The collaborating agencies included the National Water Commission, National Irrigation Commission, Meteorological Service of Jamaica, Rural Physical Planning Division, Caribbean Agricultural Research & Development Institute and the Planning Institute of Jamaica - State of the Environment Report 2013 (National Environment and Planning Agency, 2015).

Many upland watersheds — due to their location — are of utmost importance for providing water for urban, industrial, and agricultural development. Also, they are the sites for many other resources such as forestry, energy, recreation, mineral, and domestic and export crops, as well as the homes of small-scale farmers.

Healthy forests play a crucial role in maintaining the overall well-being of watersheds, which are vital components of ecosystems responsible for water supply, regulation and purification. Some key aspects of the link between forest health and watershed health are:

- **Water Regulation:** Forests act as natural sponges, absorbing and storing rainwater. They regulate the flow of water by releasing it gradually, preventing rapid runoff and reducing the risk of floods. This regulated flow helps sustain streamflow in watersheds.
- **Water Quality:** Healthy forests contribute to better water quality. The root systems and forest floor filter pollutants and sediments, ensuring that water entering streams and rivers from the forested areas is cleaner and more suitable for various uses.
- **Groundwater Recharge:** Forested areas facilitate groundwater recharge by allowing rainwater to infiltrate the soil. This process helps maintain the water table and contributes to a sustained supply of groundwater within watersheds.
- **Climate Regulation:** Forests play a role in climate regulation by absorbing carbon dioxide and releasing oxygen. Stable climate conditions, influenced by healthy forests, contribute to the overall resilience of watersheds.
- **Sustainable Resource Management:** Forests provide timber and non-timber forest products. Sustainable management of these resources in healthy forests ensures that watersheds can contribute to benefit from these services without compromising long-term health.

The health of forests and watersheds is intrinsically linked, with each influencing the well-being and functioning of the other. Conservation and sustainable management of forests are essential for maintaining the health and resilience of

watersheds, contributing to overall ecosystem sustainability.

2.2 Situational Analysis

2.2.1 Activities affecting Watersheds

The lowland areas are associated with many of the same environmental problems observed in the ridge area, notably erosion and poorly managed and excessive application of agricultural chemicals to cash crops such as sugar cane, papayas, bananas, and coconut plantations. Larger population centres and industries characterise these areas. The human settlements in the lowland areas are the major contributors to environmental degradation in many of the watersheds, primarily because of inadequate solid waste disposal practices and lack of sewage infrastructure or treatment.

In urban watershed areas, there has been an increase in impervious surfaces. Water quality can be impacted by harmful pollutants in urban stormwater runoff which are channelled into gullies, rivers and other waterways. Surface water runoff, which may contain contaminants and sediments, is less likely to be intercepted before reaching surface waters. Further, hydrological functions, especially stream flows and channels, are substantially altered. Urban sprawl into areas zoned for agriculture can cause decreasing availability of agricultural land (Edwards, 2003).

Soil erosion, land slippage and slope failure are widespread in the non-limestone watersheds as a result of the steep slopes, and thin or erosive soils, compounded with heavy and high-intensity rains in the upper watershed areas. Other particular features of Jamaica that necessitate due diligence in the protection of watersheds include the country's location within an area of earthquake susceptibility and hurricane tracks (Edwards, 2003). Anthropogenic activities exacerbate the pre-existing vulnerabilities, including cultivating without soil conservation, indiscriminate forest removal, improper construction and maintenance of roads, uncontrolled grazing, and unregulated and illegal quarrying and mining.

All the above factors result in heavy siltation to surface waters such as rivers, reservoirs, irrigation

canals, water intakes, as well as harbours. Surface runoff is significantly increased from the excavation of slopes, diminished vegetation cover, compacting of soils, and other activities that reduce water intake to the soils. During heavy rains and hurricanes, floods become more frequent and severe. Contrastingly, in dry seasons, water shortage becomes a severe problem.

NEPA's monitoring of watersheds has shown that improper solid waste disposal is also negatively impacting the condition of watersheds (NEPA, 2019). The solid waste problem has health, environmental, and aesthetic dimensions. Unplanned development exacerbates garbage accumulation. Further, many urban areas outside the major cities lack managed sanitary landfills. These unmanaged disposal sites are a nuisance, harbour rodents, and result in noxious odours. They may also result in the leaching of various pollutants into rivers, streams, and coastal bays. The ubiquitous litter, burning trash piles, and unmanaged dumps detract from the scenic beauty of the countryside.

The problem of water pollution has also drastically increased in recent decades due to agricultural expansion and intensification, the use of more agricultural chemicals, agro-industry, and resettlement programmes in the watersheds. Pollution not only degrades water quality for domestic and industrial use, but also affects coastal resources including beaches, seagrass and coral reefs, and has direct and indirect negative impacts on the tourism industry.

2.2.2 Status of Watersheds

In 1999, a National Watershed and Monitoring Programme for Jamaica was developed by Computer Assisted Development Inc. (CADI) for the Government of Jamaica. The 26 WMUs were classified into four groups of management priorities, mainly according to their physical conditions and management needs (Figure 4).

A process for the identification of priority watersheds was employed using the following steps:

- **Limestone vs Non-Limestone Areas**

In step 1, WMUs dominated with limestone,

using a 60% area in the upper watershed as a cut-off line, were not considered high priority areas. These are areas dominated by karst topography, especially in white limestone regions. Little can be done in such areas to influence hydrology regimes, including water quantity, quality, erosion and sediments (CADI, 1999). Lucea River, Montego River, Martha Brae, Rio Bueno, Deans Valley River, Black River, Gut-Alligator Hole, Milk River and Drivers River were dominated by limestone; therefore, they were not considered as high priority areas and were placed in Group 4. Hence, the remaining WMUs were considered at step 2 below for further priority ranking.

- **With and without downstream interests**

The second step was to differentiate WMUs with downstream interests and those without. Downstream interests include cities, tourist attractions, reservoirs or dams. WMUs with downstream interests were considered for further priority ranking and those without downstream interests (such as Rio Nuevo, Spanish River, Plantain Garden River and New Savannah River) were placed into Group 3.

- **Watershed stability classification**

A stability evaluation was done for upper watersheds, using factors such as permanent vegetative cover, erosion hazards, landslide risk, rainfall intensity, stream density and road density. Each factor was given a value of "1" or "0" according to its condition. WMUs that had a score above 4 were more critical. South Negril/Orange River, Great River and Cabarita River were relatively stable; hence they were assigned to Group 3. However, the remaining WMUs were assigned to either Group 1 or 2. WMUs that had a score from 4-5 were assigned to Group 2 (second priority) and those with a score of 6 were assigned to Group 1 (first priority) (Figure 4).

The WMUs of the highest priority for intervention were Hope River, Yallahs River, Wagwater River and Rio Minho (CADI, 1999).

Watershed Management Unit Classification

Final Rankings by WMU



Figure 4: Classification of watershed management units (WMUs) - Source: NEPA, 1999

In 2010, the Ecosystems Management Branch of the NEPA assessed 17 of the 26 WMUs, using four parameters namely: stream density, road density, downstream interest and population density. The results showed that several of the watersheds had deteriorated compared with the ranking done in 1999, except for Swift River, New Savannah River and Drivers River WMUs. These units are in the same category as they were in 1999, while improvements were noted in the Oracabessa-Pagee River and Rio Nuevo watersheds (Ecosystems Management Branch, 2010).

The 2010 findings resulted in five key recommendations; one of which is that "...the Agency needs to engage in aggressive on the ground watershed initiatives to watershed users and so create the paradigm which is needed in our Jamaican Watersheds." The other recommendations addressed watershed assessment and classification; database management; and the regulation of land use within watersheds, including

the incorporation of zoning plans specific to watershed areas into development orders.

According to the State of the Environment Report, 2017 regarding the status of the island's watersheds, "all 26 WMUs have been assessed as degraded to some extent by the Global Environment Facility-Integrating Watershed and Coastal Area Management project... In terms of the relative proportion of land area, just over half (52%) of the total watershed area was classified as 'Least Degraded'. These included nine of the 26 WMUs, including the two largest WMUs (Rio Bueno-White River and the Black River). Another seven WMUs (accounting for 12% of the total watershed area of Jamaica) were classified as "Less Degraded," including the Great River and the Cabarita River. More than a third of the total watershed areas in Jamaica were classified as either degraded (22%) or severely degraded (14%); these are generally located on the eastern side of the island. The most severely degraded WMUs included Rio Minho,

Wagwater, Hope River and Yallahs” (National Environment and Planning Agency, 2019).

One important observation that is being addressed by NEPA is the inclusion of water quality within watersheds as a parameter to support the watershed classification process. It started in 2021 and should last for a period of seven years. In this regard, the Agency has commenced routine water quality monitoring in the following watershed areas: Black River, Rio Cobre, Montego River, White River, Negril Orange River and Rio Minho. This National Water Quality Monitoring Programme will be expanded over time to include other watershed areas.

It should be noted that the existing watershed boundaries (Figure 4) are currently being redefined. This redefinition is informed by updated analyses from the WRA as well as ongoing discussions on the subject between that Agency and the MEGJC, NEPA, the Forestry Department, and other key stakeholders. This activity aligns with new data and research from the WRA indicating the need for boundary updates. This redefinition of the boundaries of the watersheds is significant in that it will ensure that watershed conservation and the generated flow of ecosystem services benefit the targeted WMU as a whole.

2.2.3 Threats to Jamaica’s Watersheds

In 2013, the Forestry Department conducted a land use cover assessment of the pressures and threats that Jamaica’s forests face. The key activities identified and their impacts are as follows:

- The encroachment by farmers and informal settlers into forested areas, especially in the upper watersheds and riparian forests (along riverbanks), seeking to carry out small farming;
- Illegal logging for lumber — especially for highly prized hardwoods such as Jamaican Mahogany and Blue Mahoe — but also for trees to make stakes for yam (yam sticks), scaffolding, fence poles and posts, or wood for charcoal kilns. These activities contribute to reduced quality of the country’s forests;

- Infrastructural development to link major conurbations in Jamaica — in particular, the development of Highway 2000 and new toll roads — which facilitate greater access to forested areas for agriculture expansion and growth;
- Forest removal to facilitate the extraction of minerals. When this removal occurs in areas of native limestone forest, the impact on biodiversity and the quantity and quality of groundwater can be significant. Furthermore, following mine closure, in line with provisions under the Mining Regulations, 1947 amended 2006, sites are to be restored “to the level of agricultural or pastoral productivity or of utilisation for afforestation purposes or such other uses as may be approved by the Commissioner or the Town and County Planning Authority”; and
- Climate variability and change are leading to longer dry periods, which make forests more vulnerable to fires, droughts, and more intense hurricanes which — when coupled with deforestation, especially in the most critical watersheds — have increased human vulnerability to disasters and the loss of natural barriers to the spread of disease and the reproduction of pollinators.

It is of note that an updated land use change assessment was undertaken by the Forestry Department in February 2021 which confirmed many of the drivers of land use identified in the 2013 assessment.

NEPA conducted 20 stakeholder consultations over the 2013/14 financial year⁴ (National Environment and Planning Agency, 2015), and the top six issues impacting watersheds were identified as:

- improper disposal of solid waste;
- flooding;
- poor farming practices including the improper use of agricultural chemicals;
- soil erosion and landslides;
- clearing of wetlands; and
- blockage of drains and sinkholes.

⁴This is the last evaluation of multiple WMUs. Since then, NEPA has taken a more targeted approach at watershed management doing more in-depth studies such as rapid ecological assessments in a few WMUs per financial year.

Other issues identified were charcoal burning, poisoning of fish in rivers and poor quarrying practices. In a similar assessment conducted in the 2011/12 financial year, similar problems affecting the majority of the island's watersheds were identified by NEPA. In the 2011/12 financial year assessment, the additional issues identified included deforestation and indiscriminate land clearance. Several of the factors contributing to these activities included socio-economic concerns such as people's need to earn and support themselves financially, have a place to live and have access to essential social services. Another critical finding was the disinclination towards proactive enforcement of environmental and planning legislation, opting instead for reactive approaches (Ecosystems Management Branch, 2012).

Urban watersheds are not without challenges, although they slightly differ from rural sections. The issues in urban watersheds include:

- rapid population growth;
- finite land resources;
- vulnerability to natural disasters;
- soil erosion;
- chemical contamination;
- lack of land tenure;
- infrastructural development;
- informal settlements;
- deforestation;
- forest conversion;
- large developments linked to tourism in commercial and residential areas;
- poor access to and availability of freshwater resources;



- inadequate solid waste disposal; and
- groundwater pollution—from sewage, suspended solids, agricultural chemicals and runoff.

2.2.4 Impact of Climate Change on Watersheds

The modelling of climate projections shows that temperatures in the Caribbean region are increasing, which could result in changes in the frequency and intensity of extreme weather events, more significant climate variability (Ministry of Water, Land, Environment and Climate Change, 2013) and rising sea levels. As noted in the Third National Communication of Jamaica to the United Nations Framework Convention on Climate Change, 2018, these changes will adversely affect Jamaica's critical sectors including agriculture, fisheries, tourism, human health and energy.

Several floods and hurricanes have had a significant impact on Jamaica. In 1996 and 1998, Portland experienced floods which had an associated rehabilitation cost of approximately JA\$261.5 million and JA\$832.3 million, respectively. For Hurricane Ivan (2004), the total cost of repairs was estimated at over JA\$36 billion with the damage to environmental assets — excluding any loss of ecological services — accounting for more than ten per cent (Economic Commission for Latin America and the Caribbean, 2004). The island experienced the effects of Hurricane Dean in 2007 with resulting damage of over JA\$23 billion; however, as there was a lack of information on environmental assets before its passing, it was unrealistic to assess the impacts of this system quantitatively. Damage to the coastal and inland ecosystems was described to be a result of “storm surge, and defoliation;

destruction of wildlife habitats; landslides and vegetation damage” (Planning Institute of Jamaica, 2007).

The Climate Change Policy Framework for Jamaica, 2023, lists the following potential impacts of climate change on water resources:

- contamination of groundwater resources due to the intrusion of seawater into coastal aquifers as sea level rises;
- higher levels of sedimentation in reservoirs and dams and sediment transport to coastal areas as soil erosion increases with higher incidences of more intense rainfall and hurricane events;
- adverse shifts in climatic conditions for agricultural cultivation due to changes in temperature;
- increasing degradation and destruction of watersheds caused by the displacement of traditional activities/livelihoods such as farming;
- shortage of water during periods of prolonged droughts; and
- damage to infrastructure (roads, bridges, electricity generation and transmission systems, seaports, airports, pipelines and dams) caused by extreme and slow onset events.

The Economic Commission for Latin America and the Caribbean (ECLAC) conducted an overview of the economics of climate change in Latin America and the Caribbean (ECLAC, 2014). The integrated management of watersheds and coastal areas as well as the protection of coastal wetlands and education on ecosystem services were amongst the adaptation measures proposed to combat the impact of climate change on agriculture, coastal areas and the water sector.

3. CURRENT LEGISLATION, POLICIES AND INSTITUTIONAL ARRANGEMENTS

Jamaica is guided by the Charter of Fundamental Rights and Freedoms. The Charter is the legal framework that outlines and protects the fundamental rights and freedoms of individuals. It establishes the foundation for the protection of these rights, ensuring that they are respected and upheld within the legal and judicial systems of Jamaica. Section 13(3)(l) of the Charter guarantees all Jamaicans the right to enjoy a healthy and productive environment free from the threat of injury or damage from environmental abuse and degradation of the ecological heritage.

3.1 Existing Legislative Framework

The following legislations primarily govern watershed management in Jamaica: the Watersheds Protection Act (WPA) (1963), the Natural Resources Conservation Authority Act (NRCA Act) (1991), the Forest Act (1996), Water Resources Act (1995), and Rural Agricultural Development Authority Act (RADA Act) (1990). As per section 42 of the NRCA Act, any reference to the Watersheds Commission in any enactment or regulations or any instrument in writing issued pursuant to a statutory power and having effect on or after July 5, 1991, shall be construed as a reference to the NRCA. Section 22 of the WPA empowers the Commission⁵, subject to the Minister's approval, to "...from time to time appoint committees to be known as Watersheds Protection Committees to whom work may be committed by the Authority." These Committees have all the functions of the Authority in the watershed within which it is assigned, except for the powers of making regulations, entering into an assisted

improvement agreement (without the Authority's authorization) and the acquisition and disposal of property as outlined in section 23 of the WPA.

The objective of the **Watersheds Protection Act**, 1963, is to protect water resources by effectively controlling land use and regulating specific activities that are likely to harm water resources. Under section 5 of the WPA, Ministerial Orders for the declaration of thirty-three (33) Watershed Areas were issued over the period 1964 – 1983. The Watersheds Protection Commission was also appointed for a period. The WPA is outdated and has no provisions regarding participatory approaches, public education or the involvement of local communities in watershed management. Several key definitions are not included in the Act, including the term 'watershed'. Additionally, no regulations have been promulgated per the WPA, which limits the effectiveness of implementing the Act. Notably, however, the WPA included novel concepts on the protection of watersheds such as the Assisted Improvement Agreement⁶ and provisional schemes⁷ partnership between the government and the private sector.

The **Natural Resources Conservation Authority Act**, 1991, establishes the provisions for the effective management of the physical environment of Jamaica to ensure the conservation, protection and proper use of its natural resources and promotes public awareness of the ecological systems of Jamaica and their importance to the social and economic life of the island. In performing its functions, the Authority may develop, implement and monitor plans and programmes relating to the

⁵ Natural Resources Conservation Authority is deemed as Watersheds Commission

⁶According to section 10 (1) of the WPA: "Subject to subsections (2) and (3), the Authority may enter into an agreement with the owner of any construction parcel and with any other interested person for the carrying out of improvement works in relation to such construction parcel (in this Act referred to as an assisted improvement agreement). The WPA defines the Authority as the NRCA.

⁷Section 12 of the WPA: "...after the preparation of any provisional scheme, the authority shall cause to be published in not less than three issues of the Gazette, and at intervals not less than seven or more than ten days in three issues of the daily newspaper printed for sale and published in Jamaica."

management of the environment and the conservation and protection of natural resources (section 4).

Under the Natural Resources Conservation (Permits and Licences) (Amendment) Regulations, 2015, environmental permits are required for the following:

- River basin development and improvement projects;
- Irrigation and water management projects including improvements;
- Land reclamation and drainage projects; and
- Watershed development and soil conservation projects, including river training such as works in river channelling and water resources transferal amongst river basins, check dams and retaining walls.

The Natural Resources Conservation Authority (Environmental Protection Measures) Order, 2016, outlines measures to address the threat of wildfires, which are associated with dry conditions, to biodiversity, ecosystems and watersheds. The Order specifies that annually, from February to October, special environmental protection measures are to be applied, along with any requirements for land use, in ten watershed areas (as declared under section 5 of the WPA), namely:

- i. Black River
- ii. Yallahs Valley
- iii. Bull Savannah
- iv. Rio Minho Extension
- v. Wag Water
- vi. Fresh River
- vii. Rio Minho
- viii. Hermitage
- ix. Hope River
- x. Rio Cobre

The Forest Act, 1996, provides for the Forestry Department to, *inter alia*, protect and preserve Forest Reserves and Forest Management Areas. The Forest Act includes among the functions of the Forestry Department, the “protection and preservation of watersheds in forest reserves, protected areas and forest management areas”

(section 4 [n]). This mandate is further articulated in the Forest Policy for Jamaica, 2017. Proposals for the amendment and updating of the Forest Act are included in the Forest Policy, 2017, and the National Forest Management and Conservation Plan 2016–2026. However, given the volume of amendments proposed for the Forest Act, a policy decision was made that the Act should be repealed and replaced instead of amended. In this regard, Cabinet by Decision No. 5/24, dated February 12, 2024, approved the repeal and replacement of the Forest Act.

The Water Resources Act, 1995, established the Water Resources Authority (WRA) to regulate, allocate, conserve and manage the water resources of Jamaica. The Act also enables the WRA to perform such other functions relating to the management, conservation and use of water resources as may be assigned to it by or under this Act or any other enactment. The Authority may obtain, compile, store and disseminate data concerning the water resources of Jamaica and prepare a Master Plan for the proper management of such resources. Section 14 of the Act provides for the appointment of a Water Resources Advisory Committee to inform the Minister of (i) general policy matters related to the management, development, conservation and use of water resources, and (ii) the Master Plan and Water Quality Control Plans, among other things.

The **Climate Change Policy Framework for Jamaica**, 2023, supports the objectives outlined in Vision 2030 Jamaica - National Development Plan. The Policy Framework particularly focuses on supporting the implementation of Goal 4 ‘Jamaica has a healthy natural environment’. Additionally, it contributes to achieving National Outcomes 13 and 14, which involve the sustainable management of environmental and natural resources and hazard risk reduction and adaptation to climate change, respectively. The Framework recognises the potential impact of climate change on water resources and the economic sectors that depend on water. Water plays a crucial role as a vital input for various sectors, encompassing agriculture, energy, mining and quarrying, manufacturing, tourism,

housing, sanitation and health services. The Framework highlights initiatives such as rainwater harvesting for water conservation.

The **Rural Agricultural Development Authority Act**, 1990, provides for the Authority to “encourage and, so far as may be practicable, having regard to the financial and other resources and to the statutory powers of the Authority, to secure the proper economic and efficient utilisation of land in the rural areas” (section 4 [1] [b]). A provision of ‘improvement work’ is included in section 9 (1) of the WPA and section 14 (1) of the RADA Act. The main difference is that the RADA Act stops short of a reference to the conservation of water resources.

The **Town and Country Planning Act**, 1957, addresses the orderly development of land primarily through development orders which are the primary means of control of land use in Jamaica. Section 5 (1) provides that “the Authority may after consultation with any local authority concerned prepare so many or such provisional development orders as the Authority may consider necessary in relation to any land, in any urban or rural area, whether there are or are not buildings thereon, with the general object of controlling the development of the land comprised in the area to which the respective order applies, and with a view to securing proper sanitary conditions and conveniences and the coordination of roads and public services, protecting and extending the amenities, and conserving and developing the resources, of such area.” Several of the more recently promulgated development orders contain sectoral policies that speak to watershed protection; particularly the recent ones such as Hanover.

Other legislation relevant to watershed management include:

- Country Fires Act, 1942;
- Wild Life Protection Act, 1945;
- Mining Act, 1947;
- Floodwater Control Act, 1958;
- Land Development and Utilization Act, 1966;
- River Rafting Act, 1970;
- Quarries Control Act, 1983;
- Public Health Act, 1985;

- National Solid Waste Management Act, 2001;
- The Pesticides Act, 1987;
- National Water Commission Act, 1963; and
- Disaster Risk Management Act, 2015.

Proposed Legislative Amendments

There are proposals for the amendment of laws or the promulgation of new legislation relevant to watershed management. Both the Forest Policy for Jamaica (2017) and the National Forest Management and Conservation Plan refer to proposed amendments to the Forest Act, 1996, and the Forest Regulations, 2001. The proposed amendments to the Forest Act included expansion of the regulatory function of the Forestry Department as it relates to forest management and protection including, *inter alia*, regulation of certain activities in privately owned forests, stricter controls on activities allowed in forest reserves, and strengthening the capacities of Local Forest Management Committees to co-manage forested areas.

The National Water Sector Policy and Implementation Plan, 2019, addresses the need for amendment of the Water Resources Act — including the institutional arrangements for integrated water resources management— and the Floodwater Control Act. Section 14 of the Mining Act of 1947 provides for the acquisition of lands, that are wholly or in part covered by an active mining lease, for public purposes. The National Minerals Policy (2017-2030) refers to proposals to modernise the Mining Act of 1947, incorporating best practices for environmental management.

The Public Health Act (1985), the Country Fires Act (1942) and the National Solid Waste Management Act (2001) require in-depth review and updating given the institutional and policy developments since their enactment.

In 2005, preliminary drafting instructions were prepared for the development of the National Environment and Planning Act to marry environmental and planning laws such as the Wild Life Protection Act (1945), the Watersheds Protection Act (1963), the Town and Country

Planning Act (1957) and the Land Development and Utilization Act (1966). The preliminary instructions include a new structure for environmental management. This proposal is still under review. It should be noted that work has commenced on the amendment of the Wild Life Protection Act (1963).

The Watersheds Protection Act (WPA) will be amended to take into account the related proposals outlined in the Watersheds Policy. The proposals include, *inter alia*, definition of key terms, amendment of sections 22 and 23 of the WPA to delete all references to Watersheds Protection Committees (WPCs) which will be replaced instead by the establishment of Watersheds Management Committees (with specified functions; not expansive as that outlined for WPCs) and the appointment of the National Integrated Watershed Management Council (NIWMC) with its constitution and procedure specified in a new Schedule of Act.

The omnibus Protected Areas legislation will be promulgated once the new Protected Areas Policy is finalized. In the 2023/24 Financial Year, Protected Areas Regulations were promulgated under the NRCA Act.

3.2 Existing Policy Framework

Several policies, plans and guidelines developed by the Government are of relevance to watershed management as they affect many types of activities which take place in watershed areas. Several national policies related to natural resources management have been approved since 2015 or are in the process of being revised or updated.

Vision 2030 Jamaica — National Development Plan 2009–2030 has four national goals: Goal 1: Jamaicans are empowered to achieve their fullest potential; Goal 2: The Jamaican society is secure, cohesive and just; Goal 3: Jamaica's economy is prosperous and; Goal 4: Jamaica has a healthy natural environment. Goal 4, which considers the environment and, is most applicable under this policy has three National Outcomes: Outcome 13 (Sustainable Management and Use of Environmental and Natural Resources), Outcome 14 (Hazard Risk Reduction and Adaptation to Climate Change), and Outcome 15 (Sustainable Urban and Rural

Development). Goal 4 recognises that healthy, productive and protective environments, social systems and economies are the basis of development, sustainability and human welfare.

While substantial progress in environmental management has been made, a myriad of challenges still exists including:

- watershed degradation;
- loss of biodiversity;
- net loss of forest cover;
- deteriorating air and water quality;
- poor management of solid, liquid and hazardous wastes; and
- increasing incidence of fires.

The central policies and plans relevant to watershed management include:

- **The National Land Policy (1997):** The objectives of this policy are to ensure sustainable, productive and equitable development, use and management of the country's natural resources. Revisions made to the policy in 2017 address watershed protection, noting among the issues the lack of a coordinated approach to the management of watersheds, forests, protected areas, coastal areas and waste, including hazardous waste.
- **Policy for Jamaica's System of Protected Areas (1997):** This policy defines a protected area as an area of water or land that is managed for the protection and maintenance of its ecological systems, biodiversity and specific natural, cultural or aesthetic resources. The policy includes the category of 'protected watershed.'

A draft Overarching Policy for Jamaica's Protected Areas System was prepared in 2019 under the project 'Strengthening the Operational and Financial Sustainability of the National Protected Areas System', funded by the Global Environment Facility. The draft took into account, *inter alia*, the existing policy and legislative gaps in the protected areas system and the tenets of the 2013–2017 Protected

Areas System Master Plan (PASMP). It is anticipated that this new Policy, which will replace the 1997 Protected Areas Policy for Jamaica, will be finalized in the 2024/25 Financial Year.

■ **Protected Areas System Master Plan [PASMP]**

2013–2017: The matter of inter-agency coordination is central to the PASMP. The Plan is based on the Protected Areas Programme of Work of the Convention on Biological Diversity. One of the main principles of the PASMP is to “Protect habitats, ecosystems, species and genetic resources and cultural and natural heritage”. This includes restoration and protection of watersheds, rivers, wetlands, forests, coral reefs, and other critical ecosystems so that essential resources, such as water, soil, and related ecosystem services are available for the sustainable development of the country.

- **Forest Policy for Jamaica (2017):** The goals of the Forest Policy are (i) Improved Governance Arrangements in Relation to the Management of the Island’s Forests; (ii) Increased Forest Ecological System Conservation and Protection; and (iii) Incorporation of Socio-Economic Considerations into Forest Conservation and Preservation. The Forestry Department’s supporting role to the executing agencies, NEPA and WRA, is set out in the policy, including its responsibility to protect and preserve Forest Reserves and Forest Management Areas in the upper watersheds around water sources. It noted that transparency, public participation, education and awareness and the involvement of communities and the private sector are essential aspects of forest management.

- **National Forest Management and Conservation Plan (NFMCP) 2016–2026:** The National Forest Management and Conservation Plan updates the five-year Strategic Forest Management Plan for the period 2010–2015. The goal of the NFMCP is to “Sustainably manage and utilise Jamaica’s forest resources to enhance social and economic development and contribute to building the country’s climate resilience.” Among

the issues noted in the plan is that there is insufficient institutional capacity in the Forestry Department, its partners and forest communities to support the efficient and effective implementation of the NFMCP. Coordination and harmonization among stakeholders are identified as a cross-cutting issue.

■ **National Strategy and Action Plan on Biological Diversity in Jamaica 2016–2021 (2016):**

The Strategy outlines plans and programmes for the sustainable use of Jamaica’s biodiversity and notes that the protection and conservation of forests and watershed areas are critical to species diversity and the preservation of ecosystems and habitats. The NBSAP will be updated to take into account the Kunming-Montreal Global Biodiversity Framework which was adopted by the 15th Conference of the Parties to the Convention on Biological Diversity in December 2022. This updated NBSAP will include, *inter alia*, new national biodiversity targets.

■ **National Water Sector Policy and Implementation Plan, 2019:**

The Policy provides an update to the 2004 Water Sector Policy Strategies and Action Plan and outlines the current situation in the water and wastewater sector and the principles, objectives and policy directions for the management of the country’s water resources in keeping with *Vision 2030 Jamaica—National Development Plan*. The Policy recognizes the critical role that water resources play in the realization of the National Vision “Jamaica, the place of choice to live, work, raise families and do business,” and will therefore seek to manage the resources in a sustainable and integrated way to facilitate the population having universal access to potable water and adequate sanitation by 2030.

The National Water Sector Policy and Implementation Plan focuses on the Integrated Water Resources Management (IWRM) approach and the mainstreaming of climate adaptation initiatives and participatory processes in the sector. The goal of the policy is to ensure that Jamaica’s water resources are

effectively managed to provide for our nation's social, economic, and environmental well-being, now and in the future. The vision, goals and objectives of the National Water Sector Policy and Implementation Plan are consistent with those in the Watersheds Policy for Jamaica.

- **Local Sustainable Development Plans:** Several local authorities have prepared Local Sustainable Development Plans. The purpose of the Local Sustainable Development Plans is to guide the orderly growth and development of parishes while identifying and integrating projects and activities that will facilitate long-term growth.
- **National Minerals Policy (2017–2030):** Goal 3 of the policy recognises that land use should consider watershed, forest and ecological protection. It considers coordination between economic development and environmental conservation to achieve the sustainability of both sectors. According to the policy, a strategy related to environmental stewardship is to “ensure effective rehabilitation of mined-out and other disturbed lands”. In order to improve environmental stewardship in the mining sector, best environmental management practices should be adhered to, including the disposal of waste materials that are generated by the sector.
- **Jamaica's Comprehensive Disaster Risk Management Policy and Strategy (2020–2040) (Green Paper):** Over time, the deterioration of ecosystems, including forests, wetlands, watersheds, and coral reefs, has played a role in amplifying the consequences of natural disasters in Jamaica. These natural systems, essential for their protective functions, are now compromised. Anticipated trends, such as accelerated urbanization, escalating environmental degradation, and the effects of climate change, are expected to perpetuate the impacts of natural hazards, further intensifying disaster risk and undermining resilience. The objective of this Disaster Risk Management Policy is to

strengthen Jamaica's social and economic resilience by the year 2040, effectively mitigating the adverse impacts of national disasters stemming from natural hazards, climate change, man-made disasters, and biological hazards.

Other relevant policies pertaining to watershed management and conservation include the Housing⁸, Transport, Land Use, and Agricultural Land Utilization Policies.

A recurring theme among the policies and actions related to the supply of water is the evaluation of watersheds and identification of practices and activities that contribute to degradation; the establishment of corrective guidelines and monitoring strategies to mitigate degradation; and the promotion of public involvement and participation in the decision-making process.

3.3 Institutional Framework

The institutional framework for watershed management in Jamaica comprises a mix of management structures based on regulatory, technical, advisory and extension functions. Currently, management functions are undertaken by government agencies established by statute, ad hoc coordinating committees, non-governmental organisations (NGOs) and external funding agencies.

3.3.1 Natural Resources Conservation Authority (NRCA)/National Environment and Planning Agency (NEPA)

The NRCA has the responsibility to manage, conserve and protect the natural resources of Jamaica. Overall responsibility for local watershed management is conferred on the Authority, which by section 42 of the NRCA Act, 1991 is the NRCA. As per section 4 of the WPA, the duty of the Authority in the promotion of the conservation of water resources is to “...institute such measures and to recommend to the Minister for the implementation of such programmes as it considers necessary for the protection of those areas which constitute or adjoin the watersheds of the Island”.

⁸The National Housing Policy for Jamaica was finalized in 2023.

With the establishment of NEPA in 2001 (a merger of the staff of the NRCA, the Town Planning Department and the Land Development and Utilization Commission), the Sustainable Watersheds Branch (SWB) came into being which replaced the Watersheds Protection Management Unit of NRCA. The focus of the SWB was on monitoring and coordinating activities within watersheds, providing general oversight and promoting public awareness of watershed issues. The SWB was then merged with the Biodiversity and Coastal Zone Management branches of NEPA to form the Ecosystems Management Branch (EMB). Although the NEPA no longer carries out physical works, the Agency advises the National Works Agency on watershed-related works, primarily restoration, as the need arises.

3.3.2 Forestry Department

The Forestry Department has responsibility for, *inter alia*, the protection and preservation of watersheds in areas declared as forest reserves, protected areas or forest management areas. The National Forest Conservation and Management Plan (2016–2022) sets out in detail the Department's plans to manage forests⁹.

In some forest reserves in upper watershed areas, forest management plans are developed by the Local Forest Management Committees (LFMCs) established under section 12 of the Forest Act. Pursuant to section 12 (3) of the Forest Act, the Conservator shall, from time to time, make available to any forest management committee technical advice and assistance as may be necessary to assist the committee in its functions. Eighteen LFMCs have been established to date.

3.3.3 Water Resources Authority (WRA)

The role of the Water Resources Authority established under the Water Resources Act, 1995, includes the management of water resources, allocation of water and control of the quality of water resources. Additionally, section 14(1) of the Act established the Water Resources Advisory Committee (WRAC) has as its functions the provision of advice to the Minister on: (i) matters of

general policy relating to the management, development and conservation of the island's water resources, (ii) the Master Plan and Water Quality Control Plans and any amendments thereto, and (iii) and such other matters related to water resources that the Minister may refer to it. The Chief Executive Officer of the WRA serves as the Secretary of the WRAC (Second Schedule of the Water Resources Authority Act).

In terms of inter-agency responsibility for water quality, there is a Memorandum of Understanding among WRA, NRCA/NEPA, the Office of Disaster Preparedness and Emergency and the Ministry of Health and Wellness. This Agreement was signed in 2020 for an effective period of five years, with the option of extending for a further three years. It represents the shared acceptance of the responsibility of these agencies for water quality management, amongst other things.

3.3.4 The National Integrated Watershed Management Council

The National Integrated Watershed Management Programme (NIWMP), 1999, included a recommendation for the establishment of the National Integrated Watershed Management Council (NIWMC). In 2000, the Cabinet approved the appointment of a multi-disciplinary and multi-sectoral Council whose role was to improve cohesion, planning, fundraising, resource allocation, coordination, monitoring and evaluation and implementation of watershed programmes and projects. The Council was to be the critical link with donor and lender agencies that are active in watershed management in Jamaica and provide policy advice to Cabinet.

The Council was to report to Cabinet and the Minister responsible for the environment portfolio on the implementation of the NIWMP Framework.

Included in the responsibility of the NIWMC are:

- ensuring consensus for acceptance by all major stakeholders, of future/projects and development proposals;

⁹The Forestry Department has prepared a National Mangrove and Swamp Management Plan which will address issues related to the island's mangrove forests.

- ensuring that planning is based on an integrated approach and incorporates the input of the local stakeholders;
- identifying funding in support of the programmes;
- liaising with NEPA in monitoring the effectiveness of the NIWMP; and
- preparing and submitting progress reports to the Houses of Parliament.

NIWMC's achievements included the implementation of the Better Environments for Social Transformation (BEST) Community Competition and Programme; an annual national competition and programme aimed at the sustainable development of communities and Jamaica (BEST Community Competition and Programme, 2008). It encouraged community self-help activities in a variety of areas. It also sought to establish partnerships between communities and those who have technical, professional, spiritual, educational and financial capabilities. The priority areas included the built environment; natural environment; socio-economic; hazard mitigation and disaster preparedness; education; health; waste management and heritage and culture.

However, the NIWMC has not functioned over several years due to varying reasons, including capacity constraints. After an assessment of the previous weaknesses of the Council, this Policy has recommended that the Council be re-established with its constitution and procedure included as one of the proposed amendments of the WPA.

3.3.5 The Integrated Water Resources Management Council (IWRMC)

Under the National Water Sector Policy and Implementation Plan 2019, the Integrated Water Resources Management Council (IWRMC) was established with an expanded role replacing the National Integrated Watershed Management Council. Similar to the NIWMC, the IWRMC is a multi-disciplinary and multi-sectoral body led by the Ministry with portfolio responsibility for water and reporting to the Cabinet. It involves key stakeholders in the land, water and water-related sectors.

The responsibilities assigned to the IWRMC include:

- making recommendations to the Minister responsible for water for all IWRM-related matters;
- overseeing the preparation of a comprehensive IWRM framework;
- coordinating the implementation of water management plans/programmes at the macro and micro levels. This will eliminate the overlapping of responsibilities of Ministries, Departments and Agencies, which often results in conflicting objectives;
- reviewing, monitoring and evaluating the implementation of the IWRM framework;
- identifying financial and technical support for projects and programmes;
- making recommendations for amendments to existing laws and/or the need for new laws;
- periodically reviewing development plans within the context of the IWRM framework;
- liaising with agencies to obtain relevant data to guide decision-making;
- recommending incentives for private sector investment for improving water resources in Jamaica;
- developing criteria and procedures for the establishment of Local Integrated Water Resources Management Committees (LIWRMC) and the integration of existing groups;
- reviewing and monitoring the institutional capacities and strengthening of the LIWRMC and governance mechanisms; and
- preparing and submitting progress reports through the Ministry with portfolio responsibility for water to the Cabinet.

3.3.6 Watershed Area Management Mechanism (WAMM)

The Watershed Area Management Mechanism (WAMM) was developed under the GEF/UNEP/UNDP/GOJ project "Integrating Watershed and Coastal Area Management in Caribbean Small Island Developing States" (2006–2011). The development and subsequent implementation of the WAMM was one of the outputs of Jamaica's component under the regional project. The WAMM provides a framework



for collaboration between public bodies to achieve an integrated approach to watershed management and to focus on attitudinal and behavioural changes of community members individually and collectively. It also provides a means of replication of watershed initiatives as experiences are recorded and shared.

The WAMM has 10 main components which are:

- I. Engagement of the Community
- II. Formalisation of Governance Approach
- III. Reconnaissance of Resources
- IV. Capacity Building through Training
- V. Establishing Indicators for Assessment and Evaluation
- VI. Environmental Monitoring, Mitigation and Evaluation
- VII. Capacity Building to Access External Funding
- VIII. Developing Sustainable Livelihoods
- IX. Capturing Lessons Learnt
- X. Broadcasting the Experience

The WAMM was implemented as a pilot in the Driver's River watershed management unit by the project between 2009–2010. Since its development, various components of the WAMM have been implemented in selected communities in 14 WMUs. Due to limited financial and human resources, the full implementation of all WAMM components within the 26 WMUs was constrained.

The Medium Term Socio-Economic Policy Framework (2015–2018) specified that the WAMM was to be further refined based on a review. This review was finalized under the Government of Jamaica/Inter-American Development Bank/Global Environment Facility Integrated Management of the Yallahs and Hope River Watershed Area Project (2014–2020) in 2020. The recommendations arising out of the review have informed the policy prescriptions included in this Policy on the WAMM.

3.4 Regional and Global Commitments

Jamaica has commitments under several environmental treaties and has developed related Action Plans for implementation accordingly. An overview of the main treaties which are relevant to the protection of biodiversity and watershed management is provided in Appendix V and outlined below:

- The Convention on Biological Diversity (CBD), 1992;
- The United Nations Framework Convention on Climate Change (UNFCCC), 1994;
- The United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa (UNCCD), 1994;
- The Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1971 (Ramsar Convention);
- The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, 1983 (Cartagena Convention);
- The United Nations Forest Instrument, 2015 — formally known as the Non-Legally Binding Instrument on All Types of Forests (NLBI);
- The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, 1995;
- Regional agreement on access to information, public participation and justice in environmental matters in Latin America and the Caribbean, 2018 (based on Principle 10 of the Rio Declaration on Environment and Development);
- The Convention Concerning the Protection of World Cultural and Natural Heritage, 1972 (the UNESCO World Heritage Convention); and
- International Plant Protection Convention, 1951.

While the international agreements/treaties do not speak specifically to watershed management, the country's obligations to these agreements focus on the conservation and sustainable use of the resources of the terrestrial and marine environment.

Appendix VI highlights the key global agreements that are focused on sustainable development.

With Agenda 21, the 1992 United Nations Conference on Environment and Development (UNCED) established sustainable development as a shared global priority and identified integrated approaches to the management of natural resources as a means to achieve it (UNCED, 1992).

The 2030 Agenda for Sustainable Development, 2016–2030, comprises 17 global goals, 169 targets and 230 indicators. Several of the goals are relevant to watershed management, specifically:

- **Goal 2: Zero Hunger**
End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
- **Goal 5: Gender Equality**
Achieve gender equality and empower all women and girls.
- **Goal 6: Clean Water and Sanitation**
Ensure availability and sustainable management of water and sanitation for all.
- **Goal 13: Climate Action**
Take urgent action to combat climate change and its impacts.
- **Goal 14: Life Below Water**
Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
- **Goal 15: Life on Land**
Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

The Watersheds Policy is consistent with Jamaica's international obligations concerning the protection of biodiversity and watershed management and Jamaica's commitment to achieving the Sustainable Development Goals. Indeed, the Road Map for SDG Implementation, 2017¹⁰, was developed to assist Jamaica in achieving the Agenda 2030 and the

¹⁰The Road Map is the product of a collaboration between the national focal points — the Planning Institute of Jamaica (PIOJ), Ministry of Foreign Affairs and Foreign Trade (MFAFT) and the Statistical Institute of Jamaica (STATIN) — and the United Nations Development Programme (UNDP).

SDGs. It covers the alignment of the SDGs with Vision 2030, the implementation of which is monitored by the Planning Institute of Jamaica (PIOJ), and other national priorities, financing, accelerators to galvanise progress towards national development objectives, data requirements, institutional coordination and advocacy (Government of Jamaica, 2017). Jamaica has reported on its progress in meeting the SDGs through the submission of Voluntary National Reviews to the United Nations (in 2018 and 2022).

The Government of Jamaica has committed to maintaining a 'no-net-loss' policy for its forests. This is embodied in the country's efforts towards the United Nations Framework Convention on Climate Change (UNFCCC) to reduce emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+). This commitment will also contribute to progress on the Sustainable Development Goals.

3.5 National Projects/Programmes on Watershed Management

There have been several national projects and programmes focused on watershed management from 2006 to 2020; Appendix VII provides an overview of these projects. Several projects are highlighted below:

- GEF/UNEP Integrating Watershed and Coastal Areas Management [GEF/UNEP IWCAM] (2006–2011) — Watershed Area Management Mechanism (WAMM);
- IDB/GEF Integrated Management of the Yallahs and Hope Watershed Management Areas Project (2014–2020) — Conservation Plan for the Yallahs and Hope River WMUs and the Geographic Information System Decision Support System (GIS-DSS);
- USAID Jamaica Rural Economy & Ecosystems Adapting to Climate Change [Ja REEACH] Reforestation Initiative (2010–2018) — Disaster and Climate Risk Management Plans;
- USAID Jamaica Rural Economy and Ecosystems Adapting to Climate Change II [Ja REEACH II] (2014–2018);
- The Water Project Jamaica;
- Jamaica National Group (JN)/IDB/Pilot Program for Climate Resilience; and
- The Nature Conservancy (TNC) Water Fund.

3.6 Summary of Gaps and Challenges

The legislative and institutional frameworks for watershed management require urgent attention as do human resources and technical capacity, at all levels.

Effective integrated management is challenging to put into effect. Since the management of watersheds is interdisciplinary and multi-sectoral, no single organisation can do the job thoroughly and efficiently. Strengthened institutions and commitment, as well as a willingness to collaborate in the pooling of resources, are essential. Therefore, coordination amongst Ministries, Departments and Agencies (MDAs) becomes necessary. Efforts should be made to promote mutual interests among agencies, specify the details of coordination and responsibilities, locate resources, and set up proper mechanisms for working together to obtain effective stakeholder coordination (Sheng, Challenges and Strategies of Integrated Watershed Management in Developing Countries, 1994). In other words, coordination needs to be pursued with specific details and objectives among related agencies, not merely as a general agreement. An ambitious watershed project or programme which coordinates too many agencies and integrates too many activities will seldom succeed. Both the items of work and the institutions should be carefully selected.

The main areas for which issues and concerns have been identified for watershed management include legislative, policy and institutional framework; human resources and technical capacity; finances; public awareness and governance; and land use (Table 1).

Table 1: Summary of Key Issues and Concerns regarding Watershed Management

Legislative, Policy and Institutional Framework	Human Resources and Technical Capacity	Finances	Public Awareness and Governance	Land Use
<ul style="list-style-type: none"> Outdated laws – (e.g., the WPA, 1963) Overlap in responsibilities in watershed management in some areas Need for updated fines and penalties under relevant pieces of legislation including the WPA, 1963; NRCA Act, 1991; and Country Fires Act, 1942 Absence of appropriate legal framework for incentives to encourage wider stakeholder participation in watershed management Inadequate monitoring and enforcement of laws that protect the watersheds and the environment, generally Absence of a national policy on rivers 	<ul style="list-style-type: none"> Insufficient number of personnel working in watershed management within MDAs Challenges in the retention of staff previously trained in watershed management Limited extension services The need to utilise updated equipment and technologies Up-to-date comprehensive and centralised data management system needed Improved access to and sharing of data/information required among stakeholders 	<ul style="list-style-type: none"> Absence of a flexible and long-term strategy for funding watershed management No effective scheme of incentives to promote sustainable land management Inadequate funding to support training programmes and the acquisition of technologies A number of watershed management interventions have been projectized which is not deemed to be a sustainable approach 	<ul style="list-style-type: none"> Inadequate general knowledge of the value of watersheds Need for greater general appreciation of the value of forests and green spaces (particularly within urban centres) Need for greater stakeholder participation in governance Improved access required for information in real-time and/or within a timely manner 	<ul style="list-style-type: none"> Land use capability recommendations not being implemented Security of tenure issues remains unresolved, especially regarding ‘family lands’ Planned developments which have been identified as being non-compliant with terms and conditions of permissions/permits/licences issued by regulatory authorities Unplanned development Lack of secure tenure

4. POLICY

4.1 Vision

The vision of the Watersheds Policy for Jamaica, in alignment with Vision 2030 Jamaica — National Development Plan, is:

“Jamaica has healthy and optimally functional watersheds that provide sustained ecosystem services for the benefit of all in society.”

4.2 Goals

The **Goals** of the Policy are:

1. Strengthening of the legislative and institutional frameworks governing Jamaica's watersheds to support effective and efficient management;
2. Enhancement of capacities (human, technical, technological and financial) at all levels to allow for integrated watershed management;
3. Increased access to data and information to facilitate informed decision-making at all levels;
4. Increase awareness among Jamaicans regarding the importance of watersheds and encourage active participation in their conservation; and
5. To promote appropriate land use and sustainable land management.

4.3 Policy Statement

The Government of Jamaica will provide the enabling framework to support the effective management and protection of critical areas within the island's watershed management units, including through partnerships at the national and local levels with community-based and non-government organisations, academia, the private sector and multilateral agencies.

4.4 Guiding Principles

- I. Transparency and accountability:** There is a commitment to open and transparent decision-making processes, accountable governance and provision of opportunities to encourage and facilitate the participation of all citizens in the implementation of programmes aimed at addressing watershed management issues.
- II. Precautionary approach:** Ensure that the precautionary approach (Principle 15 of the Rio Declaration 1992) is applied as widely as possible to avoid or minimise environmental degradation and loss of biodiversity.
- III. Participation and collaboration:** Local involvement and community engagement in watershed management are essential, and planned interventions and implementation will include non-governmental organisations (NGOs), community-based organisations (CBOs), youth and gender matters. Close collaboration and coordination among government agencies and between public and private entities are essential for success.
- IV. Conflict resolution:** Where possible, compromise and complementary approaches are employed in resolving conflicts of interest that may arise in resource uses.
- V. Environmental economic tools and technology:** Adequate investment in financial capital for resource management tools and technology for the benefit of the communities concerned, upstream and downstream, and for all sectors.
- VI. Protection and sustainable use of water resources:** Conservation work carried out in a watershed requires maintenance and must be considered an integral part of the watershed programme.
- VII. Evidence-based approach:** The best scientific information — social and technical — is integrated with local knowledge to form an interdisciplinary body of knowledge by the decision-makers.
- VIII. Polluter Pays Principle:** An environmental policy principle that requires that the cost associated with pollution be borne by those who cause it - Principle 16 of the Rio Declaration (United Nations, 1992).
- IX. Principle 10 of the Rio Principles:** This Principle focuses on ensuring that every person has access to information, can participate in the decision-making processes and has access to justice in environmental matters with the aim of safeguarding the right to a healthy and

sustainable environment for present and future generations.¹¹

- X. Sustainability:** The effective management of watersheds will provide many functions for present and future generations including a wide range of ecosystem services and goods, such as freshwater, timber, food, fibre and medicinal plants.
- XI. Inter- and Intragenerational equity:** Ensuring fairness and justice among individuals within the current generation and across generations by distributing watershed benefits equitably.

4.5 Objectives

The objectives of the Watersheds Policy for Jamaica are:

1. Rationalization of legislative and institutional frameworks governing watershed and water resources management
2. Enhance national capacities for effective watershed management
3. Increase access to appropriate information and data for effective watershed management
4. Increase public education, awareness and engagement to foster positive attitudes towards watershed protection and conservation
5. Support integrated land-use initiatives to conserve and preserve critical watershed areas

The Policy directives are derived from the implementation strategies and necessary activities needed to attain the stated objectives. The strategies and activities are examined in the text below.

Objective 1: Rationalization of legislative and institutional frameworks governing watershed and water resources management

Implementation Strategy & Key Actions:

Strengthen the legislative and institutional frameworks governing watershed management

- i. Review and streamline the provisions of the Watersheds Protection Act to address gaps and

weaknesses as well as ensure complementarity and synergies with key pieces of legislation including the NRCA Act, RADA Act, the WRA Act, the Fisheries Act and the Forest Act.

- The amendment of the Watersheds Protection Act, 1963, will include: (a) definition of key terms including watershed and watershed management unit, (b) streamlining of terminologies (e.g. 'watershed' vis-a-vis 'watershed area') (c) declaration of watershed management units and zones of protection including their boundary descriptions, (d) provisions for compliance schemes, (e) the appointment of the National Integrated Watershed Management Council and Watershed Management Committees and their respective designated functions, (f) preparation of management and zoning plans for WMUs, and (g) increase in fines and related custodial sentences (Table 1).
- The WMUs will be reviewed and, as necessary and appropriate refined, and further developed to include: (a) a possible increase in number, (b) defined boundaries, and (c) spatial maps.
- ii. Review legislation related to point source pollution (e.g., fishing utilizing chemicals, livestock facilities, and improper disposal of solid wastes), as well as non-point source pollution, in the context of watershed protection and make recommendations for amendments as required.
- iii. Re-establishment of the National Integrated Watershed Management Council to provide technical and scientific oversight in the management of the island's watersheds. The NRCA/NEPA will, from time to time, appoint Watershed Management Committees to support the Authority in the management of priority WMUs.
- iv. Identify and establish synergies between the National Integrated Watershed Management Council and the Integrated Water Resources Management Council in the execution of projects and programmes related to the management of the island's watersheds and water resources.

¹¹United Nations. 2017. Principle 10 of the Rio Declaration on Environment and Development.

<https://observatoriop10.cepal.org/en/infographic/principle-10-rio-declaration-environment-and-development>

Objective 2: Enhance national capacities for effective watershed management

Implementation Strategies & Key Actions:

Increase capacities at the national and community levels for effective watershed management

- i. The Watershed Area Management Mechanism (WAMM) will be established as a code of practice for watershed management. Capacities at the national and community levels will be strengthened to facilitate the successful implementation of the WAMM.
- ii. A national training programme will be developed and implemented to improve capacities to support watershed management in the following areas: soil conservation, soil fertility, hydrology, agricultural engineering, forest management, land husbandry and Geographic Information Systems (GIS).
- iii. Further enhance curricula at the tertiary level to allow for increased specialization in technical areas to support watershed management.
- iv. Training of community groups to collect and analyse data and information related to watershed management.
- v. NEPA in collaboration with the Social Development Commission (SDC) and Jamaica Social Investment Fund (JSIF) will build the capacity of community groups within the WMUs to enable access to financing to support sustainable livelihood activities.
- vi. Sustainable livelihood opportunities will be identified and promoted, particularly targeting vulnerable groups such as the poor and the youth, within watershed areas.
- vii. Develop the capacities of vulnerable groups such as persons with disabilities, women, youth and the elderly to facilitate their participation in watershed planning and management.
- viii. Strengthen monitoring and enforcement capabilities of the relevant regulatory agencies to discourage illegal activities in watersheds, including encroachment, squatting and deforestation.
- ix. Empowerment of women and girls through capacity-building initiatives will be pursued to facilitate effective participation in watershed management.
- x. Watershed management projects/programmes

implemented will be reviewed. Documented lessons learnt and best practices are then considered for application in future projects and programmes — for example, in terms of cost-effectiveness of major conservation interventions or agricultural practices, or water supply and alternative livelihoods projects from small grants to communities for replication and upscaling.

Increase the use of information technology in watershed management

- i. NEPA will implement the Integrated Watershed Management GIS-Based Decision Support System to monitor and assess watersheds and to inform decision-making.
- ii. All agencies involved in watershed management will utilize modern/innovative technologies to monitor, facilitate analyses and assist in the management of the WMUs.
 - The use of drones for the monitoring of watershed health indicators will be explored and implemented in accordance with regulatory requirements.
 - Tools such as remote sensing, geospatial technologies, mobile and web-based applications, modelling, and related software, as appropriate, will be used to monitor/manage watersheds.

Rehabilitation and management of watershed management units

- i. NEPA, in consultation with the relevant Ministries, Departments and Agencies, will revise the WMU classification system developed in 1999.
- ii. Develop and implement projects and programmes, at the national and community levels, geared towards soil quality and conservation, improved water quality, maintenance of the health of key water catchment areas (rivers, streams and other water bodies) and forests as well as sustainable agricultural practices.
- iii. Provide treated wastewater at a reduced cost to sectors that are heavy users of water such as agriculture, industry, tourism and recreational (playgrounds, golf courses, parks and sporting venues).

- iv. Issuance of Performance Bonds for large-scale developments/investments which may by the nature of their operations have an adverse impact on the health of watersheds. These Bonds may be redeemed to facilitate restoration of affected watershed areas.
 - v. Ecosystem-based approaches will continue to be implemented to rehabilitate and manage WMUs.
 - vi. Nature-based solutions will be utilized as one approach to mitigate issues related to climate change impacts within watersheds.
 - vii. In recognition of the critical socio-economic role that healthy watersheds play in national sustainable development, the Government will utilise the linkages and resources of Government (including the Forestry Department, NRCA/NEPA and the WRA), community-based organisations and non-governmental entities to monitor watersheds, identify the intervention needs in WMUs and employ the relevant strategies.
 - viii. The use of green infrastructure in watershed management will be actively explored and where practical and feasible, implemented to increase percolation and retention of water.
 - ix. Abandoned wells and boreholes will be appropriately managed and decommissioned to prevent them from becoming vectors for groundwater contamination.
- v. Allocation of a percentage of revenue from mining operations, manufacturing and any other industrial/commercial activities that may adversely affect watersheds to support the restoration of degraded/denuded lands.
 - vi. Increase the eco-efficiency of the operations within the tourism sector, particularly hotels and resorts, by promoting certification to globally recognized environmental schemes/programmes.
 - vii. New and additional sources of financing are to be identified and pursued by public, philanthropic, and private actors, with emphasis on private and blended finance, as appropriate.
 - viii. Annual subvention from the Consolidated Fund to the relevant key public sector agencies (NRCA/NEPA, WRA and Forestry Department) to support the development and implementation of sustainable watershed management programmes.
 - Where practical, joint exercises and initiatives will be encouraged among the agencies involved in watershed management and innovative solutions/approaches to challenges will be identified and executed.

Establish sustainable funding mechanisms for watershed management activities

- i. Implementation of the Payments for Ecosystems Services (PES) scheme as a tool in the provision of funding for forests and watershed management.
- ii. NEPA/NRCA, Tourism Product Development Company (TPDCo), Mines and Geology Division and municipal corporations will contribute to watershed management from administrative fees associated with permits and licenses issued by these entities.
- iii. The NWC and NIC will allocate a percentage of utility bills and irrigation fees, respectively, to support conservation and rehabilitation activities in critical watershed areas.
- iv. Water conservation incentives are included as an element of the NWC's rate structure (higher

Explore and implement additional funding options

Other than the financial resources from the Government, the following are some additional funding options for watershed management:

- i. Allocation of a percentage of the costs associated with major infrastructure projects taking place in upper watershed areas (such as projects related to highways, reservoirs, dams and housing) for watershed protection purposes, including slope stabilization via the inclusion of a new provision under the NRCA Act.
- ii. Support of the capitalization of the Forest Conservation Fund which could be used for watershed rehabilitation.
- iii. Exploration and support of creative financing mechanisms through NGOs and CBOs, for example, the Water Fund.

- iv. Submission of applications for grants to the National Conservation Trust Fund of Jamaica¹² for watershed management projects/programmes within protected areas.
- v. Development of proposals for programmes to address land-use planning, climate-smart agriculture, ecosystem-based adaptation, watershed and coastal area rehabilitation, as well as green infrastructure under multilateral environment and climate-related funds.
- vi. Exploration of supplementary funding channels including opportunities in climate financing, such as carbon trading to support watershed and water resources management.
- vii. Application of stumpage rates by the Forestry Department, a percentage of the fees generated will be utilised for reforestation initiatives.
- viii. Allocation of a percentage of user fees for protected areas to aid in watershed management.
- ix. A percentage of fees charged for bioprospecting whether for research and/or commercialization will be used for sustainable watershed management.
- ii. All relevant agencies and institutions will provide data and information for the maintenance of the Integrated Watershed Management Geographic Information System Decision Support System (GIS-DSS).
- iii. The research agenda with respect to watersheds will be determined by the National Integrated Watershed Management Council.
- iv. Joint research initiatives will be undertaken with institutions to the greatest extent possible. Given the resource constraints, research activities will focus on applied research. The research will include determining erosion rates; identifying the most appropriate erosion control measures; sustainable agricultural practices and technologies, particularly for small farmers, which will ensure livelihoods and provide ecological benefits for watersheds; and development of appropriate treatment processes for urban stormwater runoff.
- v. Conduct hydrological assessments, particularly in critical watersheds, to inform decision-making by relevant regulatory authorities with respect to major infrastructure developments as well as mining. These assessments will involve the maintenance of data collection instruments to ensure accuracy and up-to-date information. The availability of accurate and current data is pivotal for monitoring progress towards goals and facilitating evidence-based decision-making in the management of our watersheds, thereby enhancing their overall health.
- vi. NEPA and other government entities will publish relevant data and information on watersheds including water quality. This will provide stakeholders with accessible, up-to-date information; fostering informed decision-making and promoting environmental stewardship.
- vii. The Government will continue to utilise and expand the hydro-meteorological network.

The Government will continue to assess, identify and implement economic incentive schemes (e.g. water funds, debt-for-nature and debt-for-climate swaps, and blue and green bonds) to support the conservation and management of the island's watersheds, with priority given to those which are deemed to be critically degraded.

Objective 3: Increase access to appropriate information and data for effective watershed management

Implementation Strategy & Key Actions:

Strengthen the capacity to conduct research and exchange information

- i. Establishment of a readily accessible and centralized database including accurate and updated information and data (including socio-economic, geography, hydrology, geology, land-use/land-use changes, climate and environment) on the state of the island's watersheds.

Objective 4: Increase public education, awareness and engagement to foster positive attitudes towards watershed protection and conservation

Increased public education and awareness initiatives will foster positive changes in attitudes

¹² The National Conservation Trust Fund of Jamaica provides grants for projects related to climate change and protected areas.

regarding watershed conservation while promoting public participation in the planning of watershed management interventions.

Implementation Strategy & Key Actions:

Increase public education and awareness by actively engaging stakeholders and fostering community participation

- i. NEPA will develop material, strategies and techniques to facilitate increased public awareness and education, including the use of social media, with respect to watershed management. The material developed will target key stakeholders including the private sector (farmers and land developers) and community groups.
- ii. Sensitization of the political directorate to facilitate informed decision-making with respect to watershed management.
- iii. Proactive engagement of communities, particularly those persons who live and work in priority WMUs as well as the youth, in the decision-making process will be promoted.
- iv. A participatory approach will be used to encourage sustainable community action and facilitate the inclusion of traditional and cultural knowledge in identifying and resolving problems within watershed areas, using the WAMM model, as appropriate. The involvement of community leaders in group activities will be encouraged to engender dynamism and continuity in initiatives related to watershed management.
- v. Community participation in the planning and implementation of sustainable watershed management programmes and interventions will be supported, taking into account the importance of their involvement for successful watershed management.
- vi. Initiatives to encourage the involvement of the private sector in the protection of forests and watersheds will be supported, for example, the Private Planting Programme and Adopt-a-Hillside Programme of the Forestry Department.
- vii. Gender considerations will be mainstreamed in national policies, plans, projects and programmes related to integrated watershed

- management to facilitate greater gender balance, particularly the involvement of women.
- viii. Opportunities for persons with disabilities to actively participate in national and community engagement activities will be created.
- ix. Sensitization of law enforcement officials, including the judiciary, to the importance of enforcing environmental laws generally, and specifically those affecting watershed management.
- x. Sustain and expand activities that emphasize the importance of watershed management to raise awareness among students at the primary, secondary and tertiary levels.

Objective 5: Support integrated land-use initiatives to conserve and preserve critical watershed areas

Implementation Strategy & Key Actions:

Promote sustainable land management within watersheds

- i. Integration of sustainable land management (SLM)¹³ practices through programmes involving government entities, the private sector and other key stakeholders.
- ii. The Ministry with responsibility for land will update the 1997 National Land Policy.
- iii. The Commissioner of Lands will continue to address issues relating to land tenure via Systematic Land Registration as well as access to Crown lands to prevent/reduce land fragmentation and adverse land use practices/ changes within critical watersheds.
- iv. NEPA will ensure that during the preparation of new or revised development orders, core areas for watershed protection and conservation are included.
- v. NEPA will recommend to the municipal corporations the inclusion of watershed protection strategies in parish development plans and local sustainable development plans.
- vi. The NEPA/ Town and Country Planning Authority (TCPA) and the municipal corporations will take into consideration areas within the watershed to be protected by Tree Preservation Orders under the Town and Country Planning Act.

¹³ "The United Nations defines SLM as the use of land resources, including soils, water, animals and plants, for the production of goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions" (Food and Agricultural Organisation, n.d.)

- vii. NEPA shall, in collaboration with the Climate Change Division and other relevant stakeholders, promote land-use practices which facilitate adaptation to climate change.
- viii. The Forestry Department, NEPA and other relevant entities will continue afforestation and reforestation activities. This will enhance watershed health by restoring vegetation cover and improving soil stability which will mitigate erosion, enhance water retention, and promote biodiversity, thus contributing to the overall resilience and sustainability of watersheds.
- ix. Degraded lands within critical watershed areas will be identified and restored to allow them to provide ecosystem services such as carbon sequestration and climate regulation.
- x. The Ministry with responsibility for agriculture will develop and implement strategies to improve soil quality and conservation.
- xi. Areas within watersheds will be spatially planned to ensure land-use and land-use changes do not pose a threat to the health of ecosystems contained therein.

5 . POLICY IMPLEMENTATION

Inter-agency coordination of watershed management initiatives will be managed by the Ministry with responsibility for the environment (MRE). Also, as necessary and appropriate, coordination between the relevant public sector agencies will be governed by Memoranda of Understanding to allow for more effective actions, taking into account, the finite funding, and human and technical resources within any one agency.

The NRCA has the legal responsibility for watershed and natural resource management as per the WPA and the NRCA Act, respectively. NEPA has led the development and implementation of several programmes and projects related to watersheds and will continue to monitor the state of critical areas in watershed management units.

The National Integrated Watershed Management Council (NIWMC) will be re-established as a multi-disciplinary and multisectoral entity. The Council will be the principal technical and scientific advisory body that will provide oversight for watershed management activities at the national level. It will provide data and information on the status of watersheds to the NRCA. The Council will support the NRCA and the relevant MDAs in decision-making with respect to watersheds. NEPA will be the Secretariat of the Council. Watershed management issues under the Integrated Water Resources Management Council will be relegated to the NIWMC to allow for greater focus and coordinated action with respect to watershed management; given the current status of the island's watersheds. Both Councils will closely collaborate to ensure the health and sustainability of the island's water resources.

The NIWMC and Watershed Management Committees (WMCs) will be established under the WPA. The NIWMC's membership will be appointed by the Minister with responsibility for the environment. It will comprise representatives from the MRE, Ministries with responsibility for water, agriculture, tourism, local government and community development, National Environment and Planning Agency, Forestry Department, Rural Agricultural

Development Authority, Water Resources Authority, National Water Commission, National Irrigation Commission, Planning Institute of Jamaica, Scientific Research Council, Social Development Commission, civil society, the private sector (including farmers' groups e.g., Jamaica Agricultural Society), community-based organisations, NGOs and academia.

The MRE will, in consultation with the NRCA/NEPA and other key stakeholders, identify and address gaps in the legal and institutional frameworks related to watersheds. Additionally, this Ministry will monitor and evaluate the implementation of the Watersheds Policy over a five-year period.

The NRCA/NEPA will establish WMCs at the local level, based on the status of the WMUs across the island. The data and information provided to the NRCA by the Council will be used to determine the WMUs that require WMCs. WMCs will assist NEPA/NRCA in developing and implementing projects and programmes to address watershed management issues within their locale. Individual Terms of Reference will be prepared for WMCs which will guide their operations.

The budget to support the operations of the NIWMC, WMUs and the NRCA/NEPA will be cast based on the programme of activities to be implemented in keeping with the GOJ's medium-term approach to budgeting.

The cost associated with the operation of the WMCs will be included in the recurrent budget of the Ministry with portfolio responsibility for the environment.

The relevant MDAs including NEPA, directly involved in watershed management will continue to undertake watershed management activities utilizing funds from their allocated budgets to support the implementation of the Policy. Projects and programmes relating to watershed management will be submitted by relevant MDAs to the Ministry with responsibility for finance to provide funding through the Consolidated Fund.

5.1 Policy Implementation Plan

The steps to actualise the Policy objectives are outlined in Table 2.

Table 2: Strategic Activities Required to Attain the Policy Objectives¹⁴

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
GOAL 1: STRENGTHENING OF THE LEGISLATIVE AND INSTITUTIONAL FRAMEWORKS GOVERNING JAMAICA'S WATERSHEDS TO SUPPORT EFFECTIVE AND EFFICIENT MANAGEMENT						
1. Rationalization of legislative and institutional frameworks governing watershed and water resources management	Strengthen the legislative and institutional frameworks governing watershed management	Review and streamline the provisions of the WPA	WPA amended Drafting instructions prepared and submitted to the OCPC WMU maps, boundary descriptions, management plans and zoning plans prepared	1-3	Lead: MRE Support: NEPA, FD, WRA, RADA, OCPC, AGC, LRD, MLGCD	Legal Consultant (\$7 million) and Staff Time

¹⁴ Based on all activities for year 1, the indicative estimated budget is 45.7 million Jamaican Dollars. This does not include an assessment of the staff costs.

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
			WMU boundaries gazetted to the requisite standard			
		Review legislation related to point and non-point pollution sources	Legislation reviewed and recommendations provided for amendments	1-2	Lead: MRE Support: NEPA	Staff Time
		Establishment of the National Integrated Watershed Management Council	Council established	Year 1	Lead: MRE Support: NRCA/NEPA, FD, WRA	Staff Time
GOAL 2: ENHANCEMENT OF CAPACITIES (HUMAN, TECHNICAL, TECHNOLOGICAL AND FINANCIAL) AT ALL LEVELS TO ALLOW FOR INTEGRATED WATERSHED MANAGEMENT						
2. Enhance national capacities for effective watershed management	Increase capacities at the national and community levels for effective watershed management	Establish the WAMM as a code of practice for watershed management	At least 1 consultation held with relevant stakeholders prior to the WAMM implementation WAMM implemented	1–5	Lead: NEPA Support: FD, WRA	\$35 million annually

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Develop and implement national capacity-building programmes	<p>National capacity building strategy developed and implemented</p> <p>Number of workshops/training sessions held (nationally and at the community level)</p> <p>Number of persons trained in the various disciplines (gender-disaggregated data)</p> <p>Accessibility features incorporated into training, training materials and activities to ensure inclusivity for persons with disabilities and the elderly</p>	1-5	<p>Lead: NEPA, FD, RADA, WRA</p> <p>Support: MRE, MRW, MEYI, tertiary training institutions, Jamaica Council for Persons with Disabilities</p>	Staff Time and \$35 M (minimum of \$7M per annum)

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Enhance curricula at the tertiary level to allow for increased specialization in technical areas to support watershed management	Number of specialized courses developed and/or enhanced Number of internships and practical training opportunities	2-5	Lead: MEYI, academic institutions Support: NEPA, FD, WRA	Staff Time
		Increase the capacity of community-based and vulnerable groups particularly the poor, persons with disabilities, women, elderly and youth, within the WMUs to pursue sustainable livelihood activities	Number of alternative income-generating activities Level of financing secured for sustainable livelihood activities Number of sustainable livelihood activities identified and promoted, with a specific focus on vulnerable groups	1-5	Lead: NEPA, SDC, FD, WRA, RADA, JSIF Support: MRE, MEYI, MLSS, MLGCD, PIOJ, LFMCs, Jamaica Council for Persons with Disabilities	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Strengthen monitoring and enforcement capabilities of the relevant regulatory agencies to reduce the number of illegal activities in watersheds, including encroachment, squatting and deforestation	<p>Incidences of illegal activities reduced (rate of reduction/ percentage reduction)</p> <p>Number of persons engaged as enforcement officers increased</p> <p>Number of joint enforcement activities undertaken / partnerships established to facilitate greater collaboration between watershed management entities and law enforcement authorities</p>	1-5	<p>Lead: NEPA, FD, WRA, JCF</p> <p>Support: Protected Area Managers, NGOs, LFMCS, CBOs</p>	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Empowerment of women and girls through capacity-building initiatives will be pursued to facilitate effective participation in watershed management	Number of women and girls who have participated in capacity-building initiatives related to watershed management	1-5	Lead: FD, NEPA, WRA Support: Ministry responsible for gender	Staff Time
	Increase the use of information technology in watershed management	Implement the Integrated Watershed Management GIS-DSS to monitor and assess watersheds and to inform decision-making	GIS-DSS implemented MOU signed by relevant entities	2	Lead: NEPA Support: FD, WRA, Meteorological Service of Jamaica	\$6 million and Staff Time
		Utilize modern/innovative technologies to monitor, facilitate analyses and assist in the management of the WMUs	Procurement of, training in and utilisation of drones to assist in monitoring watershed health indicators Utilisation of tools such as remote sensing, geospatial technologies and	1-5	Lead: NEPA, NSDMB, WRA	\$12 million and Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
			modelling to monitor/manage watersheds			
	Rehabilitation and management of watershed management units	Revise the WMU classification system that was developed in 1999	WMU classification system revised	1-2	Lead: NEPA, WRA Support: FD	Consultant (\$5 million)
		Develop and implement projects and programmes at the national and community levels geared towards soil quality and conservation, improved water quality, maintenance of the health of key water catchment areas (rivers, streams and other water bodies) and forests as well as sustainable agricultural practices	Soil and water quality improved Forest coverage increased and quality improved Sustainable agricultural practices used by farmers	1-5	Lead: NEPA, FD, WRA, MAF Support: PIOJ, NGOs, CBOs	Staff Time
		Provide treated wastewater at a reduced cost to sectors	Sector-specific consultations held	2-4	Lead: MRE, MRW, MAF,	Staff Time and Consultant (\$5 million)

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		that are heavy users of water such as agriculture, industry, tourism and recreation	Development of the National Policy on the Reuse of Treated Water Development of a fee structure for the use of wastewater		MFPS, NWC, OUR Support: NEPA, RADA, NIC, WRA, FD, TPDCo	
		Issue Performance Bonds for large-scale developments/ investments which may by the nature of their operations have an adverse impact on the health of watersheds	Assessments (soil quality, water quality, species population, etc.) conducted for critical watersheds to inform the value of Performance Bonds Number of performance bonds issued Funds redeemed for watershed restoration	3	Lead: NEPA, FD	Staff Time
		Continue to implement ecosystem-based approaches to support the rehabilitation and	Number of Ecosystem-based projects/initiatives implemented	1-5	Lead: NEPA, FD, WRA	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		management of WMUs				
		Utilize nature-based solutions as an approach to mitigate issues related to climate change impacts within watersheds	Nature-based solutions integrated into watershed management	1–5	Lead: MRE, NEPA, FD Support: CCD	Staff Time
		Explore the use of green infrastructure in watershed management	Number of green infrastructure projects initiated and implemented within watersheds annually	1-5	Lead: FD, NEPA/NRCA Support: WRA	Staff Time
		Manage abandoned wells and boreholes	Number of abandoned wells and boreholes properly sealed and/or restored	3-4	Lead: WRA	Staff Time
	Establish sustainable financing mechanisms for watershed	Pilot and implement the Payments for Ecosystems Service (PES) scheme	Consultations on the PES held with stakeholders particularly upstream and downstream users	1–5	Lead: MFPS, NEPA, FD, WRA Support: MRE, MLGCD,	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
	management activities		and relevant public sector agencies PES piloted Cabinet approval received for the implementation of the PES Enactment of legislation governing the PES PES implemented		MCs, Community Development Committees, SDC, Parish Development Committees, LFMCs	
		NEPA/NRCA, Tourism Product Development Company (TPDCo), Mines and Geology Division and municipal corporations will contribute to watershed management from administrative fees associated with permits and licenses issued by these entities	Level of financial contribution/ support provided by these entities for watershed management	1-5	Lead: NEPA/NRCA TPDCo, MGD, MCs Support: MRE, MT, MM	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		NWC and NIC will allocate a percentage of utility bills and irrigation fees, respectively, to support conservation and rehabilitation activities in critical watershed areas	<p>Consultations held with NWC, NIC and OUR</p> <p>Cabinet approval for utilisation of a percentage of service fees from NWC and NIC for sustainable watershed management</p> <p>Percentage of utility bills and irrigation fees allocated</p>	1-5	<p>Lead: NWC, NIC, OUR</p> <p>Support: MRE, MT, MAF</p>	Staff Time
		Allocate a percentage of revenue from mining operations, manufacturing and any other activities that may adversely affect watersheds to support the restoration of degraded/denuded lands	Percentage of revenue generated from industrial activities allocated annually for watershed management	1-5	<p>Lead: MFPS, MM, MIC</p> <p>Support: JBI, MGD</p>	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Annual subvention from the Consolidated Fund to the relevant key public sector agencies (NRCA/NEPA, WRA and Forestry Department) for sustainable watershed management	Amount allocated from the Consolidated Fund for sustainable watershed management	1-5	Lead: MRE, MFPS, MRW Support: NEPA, WRA, FD	Staff Time
	Explore and implement additional funding options	Allocate a percentage of the costs associated with major infrastructure projects taking place in upper watershed areas (such as projects related to highways, reservoirs, dams and housing) for watershed protection purposes	Percentage of funds allocated for watershed protection purposes	1-5	Lead: MFPS, Ministry responsible for infrastructure/works	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Access financing from various sources for watershed management projects/initiatives: 1. local sources (e.g., Forest Conservation Fund and National Conservation Trust Fund of Jamaica) and 2. international sources (e.g., GEF, Green Climate Fund and Adaptation Fund)	Projects/ initiatives developed and submitted to local and international funding sources	1-5	Lead: MRE (ERMB and CCD), FD, NEPA Support: MFPS, PIOJ, EFJ, NCTFJ	Staff Time
		Allocate a percentage of fees generated from stumpage rates for reforestation initiatives	Percentage of fees allocated annually for reforestation initiatives	1-5	Lead: FD Support: MFPS, AGC, LRD, OCPC	Staff Time
		Allocate a percentage of user fees for protected areas to aid in watershed management	Percentage of fees allocated annually	1-5	Lead: NEPA/NRCA, FD Support: MFPS, AGC, LRD, OCPC	Staff time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Develop and implement a bioprospecting fee structure, for research and/or commercialization, in watersheds	System implemented regulating access and benefit sharing Revenue generated from bioprospecting fees	3-5	Lead: MRE Support: MFPS, AGC, CPC, NEPA/NRCA, FD	Staff Time
GOAL 3: INCREASED ACCESS TO DATA AND INFORMATION TO FACILITATE INFORMED DECISION-MAKING AT ALL LEVELS						
3. Increase access to appropriate information and data for effective watershed management	Strengthen the capacity to conduct research and exchange information	Establish a readily accessible and centralized database including accurate and updated information and data on the state of the island's watersheds	Watersheds database further streamlined and populated Biomonitoring component of the National Water Quality Monitoring Programme implemented into the database Watershed Improvement Tracking System	1-5	Lead: NEPA, WRA, FD Support: MHW, ODPEM, STATIN, academia	\$16 million

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
			established and utilised by key stakeholders			
			Data and information on watersheds published at least once annually			
		Provide data and information for the maintenance of the GIS-DSS	GIS-DSS populated with data and periodically updated	1-5	Lead: NEPA Support: FD, WRA, Meteorological Service of Jamaica, NSDMB	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Develop and implement the national research agenda and undertake joint research initiatives, as necessary and appropriate, for watershed management	National research agenda developed and implemented Number of joint research initiatives undertaken	2-5	Lead: NEPA, WRA, FD, NIWMC Support: RADA, academia	Staff Time and \$12 million
		Conduct hydrological assessments particularly in critical watersheds, to inform decision-making by relevant regulatory authorities with respect to major infrastructure developments as well as mining	Hydrological assessments conducted, as needed Hydro-meteorological network is maintained and utilised	1-5	Lead: NEPA, WRA, FD, Meteorological Service of Jamaica Support: PIOJ	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
GOAL 4: INCREASE AWARENESS AMONG JAMAICANS REGARDING THE IMPORTANCE OF WATERSHEDS AND ENCOURAGE ACTIVE PARTICIPATION IN THEIR CONSERVATION						
4. Increase public education, awareness and engagement to foster positive attitudes towards watershed protection and conservation	Increase public education and awareness by actively engaging stakeholders and fostering community participation	Develop and implement material, strategies and techniques for public awareness and education	<p>Communication plan developed and implemented</p> <p>Public education and awareness raising material developed and targeted sessions held annually for key stakeholders including the farmers, land developers and community members</p> <p>Knowledge, Attitudes, Practices and Beliefs (KAPB) survey conducted</p>	1–5	<p>Lead: NEPA</p> <p>Support: NIWMC, MEYI</p>	\$50 million (\$10 million annually)

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Sensitize the political directorate to facilitate informed decision-making with respect to watershed management	Sensitization sessions held Number of political leaders participating in sensitization sessions	2 & 5	Lead: NEPA, WRA, FD	Staff Time
		Proactive engagement of communities, utilising a participatory approach, particularly those persons who live and work in priority WMUs as well as the youth, in decision-making processes	Number of community members/ community groups that participate in decision-making processes related to watershed management Number of community-led initiatives implemented Traditional and cultural knowledge are integrated into decision-making processes	1-5	Lead: NEPA, WRA, FD Support: MLGCD, MEYI, MAF, CBOs, LFMCS, SDC, JIS	Staff Time and \$15 million per annum

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Support community participation in the planning and implementation of sustainable watershed management programmes and interventions	Establishment of community groups dedicated to watershed management Number of projects implemented by the community members Number of community members actively involved in the planning and implementation of watershed management initiatives/programmes/ projects	1-5	Lead: NEPA, WRA, SDC, FD Support: MLGCD, CBOs, LFMCs, SDC	Staff Time
		Support initiatives to encourage the involvement of the private sector in the protection of forests and watersheds	Number of private sector initiatives supported for the protection of forests and watersheds, annually	1-5	Lead: FD, NEPA, WRA Support: PSOJ, Jamaica Chamber of Commerce, SBAJ, JAS	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Mainstream gender considerations in national policies, plans, projects and programmes related to integrated watershed management to facilitate greater gender balance, particularly the involvement of women	Gender considerations integrated into policies, plans, projects and programmes	1-5	Lead: Ministry responsible for gender	Staff Time
		Create opportunities for persons with disabilities to actively participate in national and community engagement activities	Number of activities implemented to actively involve persons with disabilities	1-5	Lead: FD, NEPA, WRA Support: PIOJ, Jamaica Council for Persons with Disabilities	Staff Time
		Sensitize law enforcement officials, including the judiciary, to the importance of enforcing environmental laws generally, and specifically those	Number of sensitization sessions held and target audience sensitized	3	Lead: NEPA, FD, WRA Support: JCF	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		affecting watershed management				
		Sustain and expand activities that emphasize the importance of watershed management to raise awareness among students at the primary, secondary and tertiary levels	<p>Number of schools and students participating in the public education programme</p> <p>Feedback gathered from students about the impact of awareness activities on their understanding and appreciation of watershed management concepts</p>	1–5	<p>Lead: MEYI, NEPA, FD, WRA</p> <p>Support: MRE</p>	\$2 million per annum
GOAL 5: TO PROMOTE APPROPRIATE LAND USE AND SUSTAINABLE LAND MANAGEMENT						
5. Support integrated land-use initiatives to conserve and	Promote sustainable land management within watersheds	Integration of SLM practices through programmes involving government entities,	Number of hectares with improved SLM	1–5	Lead: NEPA, FD, RADA, NLA	\$30 million and Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
preserve critical watershed areas		the private sector and other key stakeholders	Number of programmes that integrate sustainable land management practices Number of stakeholders participating in programmes		Support: MAF, WRA, private sector organisations	
		Update the 1997 National Land Policy and the land-use/land-change assessment	Consultations held with relevant stakeholders to finalize policy and assessment Policy updated Assessment conducted	1-5	Lead: Ministry responsible for land, FD Support: NEPA	Staff Time
		Continue to address issues related to land tenure via Systematic Land Registration as well as access to Crown lands to	Number of land titles issued in critical watershed management areas	1-5	Lead: Commissioner of Lands Support: Ministry	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		prevent/reduce land fragmentation and adverse land use practices/changes within critical watersheds	Reduction in land fragmentation within critical watersheds		responsible for land	
		Inclusion of core areas for watershed protection and conservation in new or revised development orders	Number of development orders that include core areas	1–5	Lead: NEPA Support: MPP, MLGCD, MCs	Staff Time
		Inclusion of watershed protection strategies in parish development plans and local sustainable development plans	Number of strategies developed and incorporated in collaboration with MCs	2–5	Lead: MLGCD, NEPA, MCs	Staff Time
		Recommendations prepared on the designation of Tree Preservation Orders at the parish level	Recommended areas declared in a timely manner	3–5	Lead: NEPA/TCPA, MCs	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Promote land-use practices which facilitate adaptation to climate change	Guidelines outlining land-use practices that facilitate adaptation to climate change are developed and disseminated Number of training sessions conducted to educate stakeholders on climate-adaptive land-use practices	2–3	Lead: NEPA, CCD, FD Support: MRE	Staff Time
		Afforest/reforest watersheds	Number of afforestation and reforestation activities executed Percentage increase in forest cover within watersheds	1–5	Lead: FD, NEPA	Staff Time

Objective	Strategy	Key Activities	Indicators	Timeline (Year)	Responsible Entities	Indicative Cost (\$J)
		Identify and restore degraded lands within critical watershed areas to allow them to provide ecosystem services such as carbon sequestration and climate regulation	Number of degraded sites within critical watershed areas identified and restored	1–5	Lead: FD, NEPA, WRA Support: CCD, MRE, JBI, MGD	Staff Time
		Develop and implement strategies to improve soil quality and conservation	Soil conservation practices implemented	1–5	Lead: MAF Support: FD, NEPA, RADA, academia	Staff Time
		Areas within watersheds spatially planned to ensure land-use and land-use change activities do not pose a threat to the health of ecosystems	Areas within watersheds spatially planned	1–5	Lead: NEPA, NSDMB, FD, WRA Support: MRE	Staff Time

5.2 Institutional Arrangement

The institutional framework for the implementation of the Policy is highlighted in Figure 5.

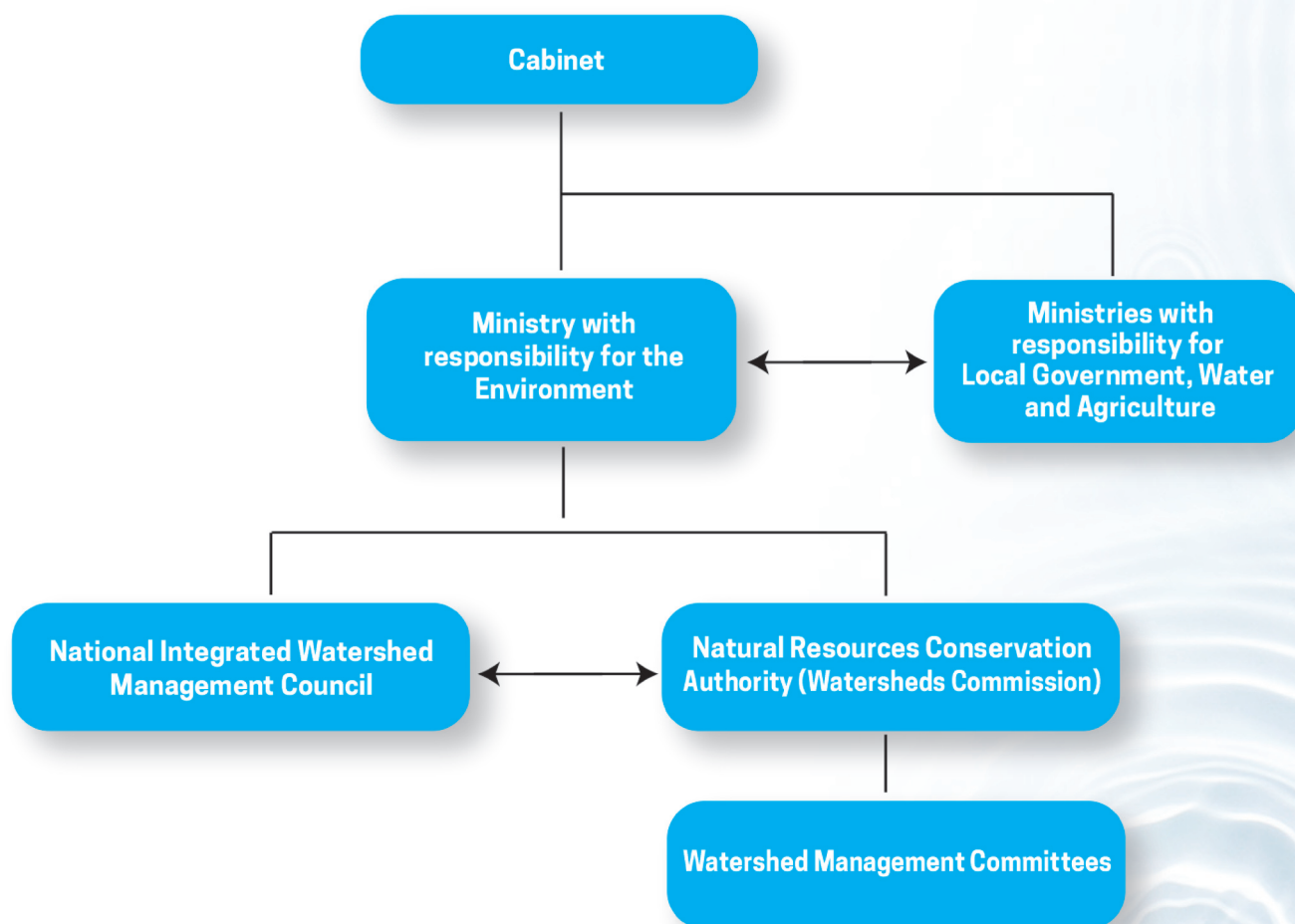


Figure 5: Institutional arrangement for watershed management

6. MONITORING AND EVALUATION FRAMEWORK

The monitoring and evaluation of this policy will be carried out by the Ministry with responsibility for the environment biannually. The reports will be submitted to the secretariat of the Medium Term Socio-Economic Policy Framework of Vision 2030 Jamaica. NEPA will also monitor progress towards the targets of the Sustainable Development Goals relating to watershed management. The report will be submitted annually to the Minister with responsibility for the environment.

Reports on the State of the Environment will continue to include information on the state of the watershed management units. NEPA's annual reports submitted to the Ministry shall include a chapter on the state of watersheds and the implementation of the Policy.

Relevant government ministries, departments and agencies (MDAs) will report on commitments to biodiversity-related agreements with regard to watershed management to the NRCA and the National Integrated Watershed Management Council.

The GIS-DSS, developed under the Inter-American Development Bank/Global Environment Facility Integrated Management of the Yallahs and Hope River Watershed Management Areas Project, functions to monitor and assess watersheds, and to inform decisions on proposed activities in the watersheds. It is expected to be the primary management tool used to monitor and evaluate the implementation of this Policy. Component 6 of the WAMM covers the monitoring, mitigation and evaluation of the status and trends of social and natural resources within watersheds. Data collected through the implementation of the WAMM would complement the population and use of the GIS-DSS. The proposed framework for monitoring and evaluation is outlined in Table 3.



Table 3: Monitoring and Evaluation Framework

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
Objective 1: Rationalization of legislative and institutional frameworks governing watershed and water resources management					
Outcome 1.1: Legislative and institutional frameworks for watershed management strengthened Output 1.1.1: Boundary descriptions and plans for WMUs prepared	Review and streamline the provisions of the WPA	Maps, boundary descriptions, management plans and zoning plans prepared	Maps, boundary descriptions, management plans and zoning plans prepared by year 2	Gazetted Boundary Descriptions, Management Plans, Zoning Plans, Technical Reports, Amended WPA	GOJ is committed to the amendment of the Watersheds Protection Act. Watersheds Protection Act will be amended to include legislation for zoning plans.
		Drafting instructions prepared and submitted	Drafting instructions submitted by year 2		
		WPA amended	WPA amended by year 3		
Output 1.1.2: Amended Watersheds Protection Act Output 1.1.3: Legislative provisions relating to pollution sources reviewed and recommendations provided	Review legislation related to point and non-point pollution sources	Legislative provisions relating to pollution sources reviewed	Legislative provisions reviewed and recommendations provided by year 2	Documentation provided	
Output 1.1.4: NWIMC established	Establishment of the National Integrated Watershed Management Council (NIWMC)	Council established	Council established in year 1	ToR, Annual Reports, Meeting Reports	Scope of work complementary to, but does not overlap with, those of the Integrated Water Resources Management Council (IWRMC).

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
Objective 2: Enhance national capacities for effective watershed management					
Outcome 2.1: Capacities enhanced at all levels to allow for integrated watershed management	Establish the WAMM as a code of practice for watershed management	At least 1 consultation held WAMM implemented	WAMM implemented throughout the 5 years	Reports, Surveys	GOJ has adequate fiscal space and will provide funding for watershed management.
Output 2.1.1: Code of practice established for watershed management	Develop and implement national capacity-building programmes	National capacity building strategy developed and implemented	Programmes developed and implemented by Year 3	Workshop/Training Reports	GOJ has adequate fiscal space and will provide funding for watershed management.
Output 2.1.2: National programmes developed and implemented		Number of workshops/training sessions held Number of persons trained in the various disciplines Accessibility features incorporated into training	At least 2 national workshops/training sessions held by Year 5		Programmes cover training in watershed management skills such as soil conservation, soil fertility, hydrology, GIS and modelling.
Output 2.1.3: Curricula enhanced at the tertiary level					
Output 2.1.4: Increased capacity of communities for watershed management		Number of women and girls who have participated in capacity-building initiatives related to watershed management	Women and girls have participated in capacity-building initiatives throughout the 5 years	Registration/Participation Records, Reports, Meeting Minutes	
Output 2.1.5:					

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
Increased use of information technology in watershed management Output 2.1.6: Funding mechanisms established for watershed management activities	Enhance curricula at the tertiary level to allow for increased specialization in technical areas to support watershed management	Number of specialized courses developed and/or enhanced	Relevant courses developed and/or enhanced by year 5	Curricula, Reports	There will be collaboration and partnerships between academic institutions, environmental experts, and watershed management professionals to inform the curriculum enhancements.
Output 2.1.7: Revised WMU classification system Output 2.1.8: Development of the National Policy on the Reuse of Treated Water and related fee structure	Increase the capacity of community-based and vulnerable groups to pursue sustainable livelihood activities	Number of alternative income-generating activities Level of financing secured for sustainable livelihood activities Number of sustainable livelihood activities identified and promoted, with a specific focus on vulnerable groups	Increase the number of alternative income-generating activities by Year 5	Livelihood Project Reports, Reports, Surveys	There is active engagement and participation from community members in the capacity-building programmes, ensuring their willingness to learn and apply sustainable practices.

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
	Strengthen monitoring and enforcement capabilities of the relevant regulatory agencies	<p>Incidences of illegal activities reduced</p> <p>Number of persons engaged as enforcement officers increased</p> <p>Number of joint enforcement activities undertaken / partnerships established</p>	<p>Annual reduction in the number of illegal activities in watersheds</p> <p>Number of enforcement officers increased by year 5</p> <p>At least 2 joint enforcement activities undertaken / partnerships established by year 5</p>	Reports	
	Implement the Integrated Watershed Management GIS-DSS	GIS-DSS implemented	<p>MOU signed by Year 2</p> <p>GIS-DSS implemented by year 2</p>	MOU, Technical Reports	
	Utilize modern/innovative technologies to monitor watersheds	Procurement of, training in and utilisation of drones	<p>Procurement of and training in the utilisation of drones completed by year 3</p> <p>At least 50% of WMUs are</p>	Procurement Reports, Training Manual, Training Reports, Technical Reports	<p>Drone and associated software procured.</p> <p>Stakeholder capacities are enhanced through training.</p>

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
			monitored by drones by year 5		
	Revise the WMU classification system	WMU classification system revised	System revised by year 2	Consultation Report, WMU Classification System	Data requirements for adequate classification are met.
	Provide treated wastewater at a reduced cost to sectors that are heavy users of water such as agriculture, industry, tourism, and recreation	Development of the National Policy on the Reuse of Treated Water Development of a fee structure for the use of wastewater	Policy developed by year 4 Fee structure developed by year 4	Consultation Reports, Policy, Fee Structure	Cabinet approves the development of a policy for the reuse of treated water.
	Issue Performance Bonds for large-scale developments/ investments	Number of Performance Bonds issued	TBD	Documentation of Bond Issuance, Regulatory Authority Reports	
	Pilot and implement the PES scheme	PES piloted and implemented	PES piloted by year 3 PES implemented by year 5	Consultation Reports, Technical Reports	Cabinet approval received for the pilot and implementation of the PES.

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
	NEPA/NRCA, TPDCo, Mines and Geology Division and municipal corporations contribute to watershed management	Level of financial contribution/support provided by these entities for watershed management	Contribution/support provided annually by relevant entities	Reports, Finance Plans, Budget Reports	
	NWC and NIC will allocate a percentage of utility bills and irrigation fees, respectively	<p>Consultations held with NWC, NIC and OUR</p> <p>Cabinet approval received for the utilisation of a percentage of service fees from NWC and NIC</p> <p>Percentage of utility bills and irrigation fees allocated</p>	<p>Consultations held in year 1</p> <p>Percentage of utility bills and irrigation fees allocated annually</p>	Consultation Report, Reports	Cabinet approval is received for the utilisation of a percentage of service fees from NWC and NIC for sustainable watershed management.
	Funds will be allocated from stumpage rates, user fees for protected areas, bioprospecting fees, industrial activities, and major infrastructure projects for watershed management	Percentage of funds allocated	Funds allocated annually for watershed management	Reports	Funds will be provided by relevant entities.

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
	Access financing from various sources for watershed management projects/initiatives: 1. local sources and 2. international sources	Projects/ initiatives developed and submitted to local and international funding sources	Financing accessed by year 4 for projects/ initiatives	ToR, Budget Plans, Technical Reports	
Objective 3: Increase access to appropriate information and data for effective watershed management					
Outcome 3.1: Data requirements for watershed management are met Output 3.1.1: Watershed information database implemented Output 3.1.2: Watersheds data and information published Output 3.1.3: Research agenda developed and implemented	Establishment of a readily accessible and centralized database	Watersheds database further streamlined and populated Biomonitoring component of the National Water Quality Monitoring Programme implemented into the Database Watershed Improvement Tracking System established and utilised by key stakeholders Data and information on watersheds	Database with data and information on all WMUs by year 5 Stakeholders trained in the use of the database by year 3 Data and information on watersheds published annually	Training Reports, Technical Reports, Publications with watersheds data and information, Tracking System	Data generated are cleaned and incorporated into the database in a timely manner. Database developed has sufficient information with which to build out a tracking mechanism.

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
Output 3.1.4: Hydrological assessments conducted		published at least once annually			
	Implementation of the Integrated Watershed Management GIS-DSS	GIS-DSS populated with data and periodically updated	MOUs signed by year 2 At least 3 MDAs using and contributing to the GIS-DSS by Year 4	MOUs, Data Sharing Protocols, Technical Reports	Contributions to include, <i>inter alia</i> , hosting costs and data needs.
	Develop and implement the national research agenda and undertake joint research initiatives	National research agenda developed and implemented Number of joint research initiatives undertaken	National research agenda developed and implemented by Year 2 At least 2 research initiatives undertaken by year 4	Research Agenda, Meeting Reports, Research Progress Reports	
	Conduct hydrological assessments, particularly in critical watersheds	Hydrological assessments conducted, as needed Hydro-meteorological network is maintained and utilised	At least 2 hydrological assessments conducted annually	Reports, Publications	

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
Objective 4: Increase public education, awareness, and engagement to foster positive attitudes towards watershed protection and conservation					
Outcome 4.1: Increased awareness of watershed management requirements Output 4.1.1: Public education and awareness programmes developed Output 4.1.2: Increased participation in watershed management	Develop and implement material, strategies and techniques for public awareness and education	Communication plan developed and implemented Public education and awareness raising material developed and targeted sessions held annually for key stakeholders including the farmers, land developers and community members Knowledge, Attitudes, Practices and Beliefs (KAPB) survey conducted	Communication plans implemented by Year 2 At least 1 education and awareness raising session held annually for the general public At least 10 percent improvement over baseline by Year 5 2 KAPB Reports; one of which is conducted in Year 5	Communication Plans, Reports, Attendance Records, Post Outreach Surveys, KAPB Reports	Plans to include actions for integration between partners and MDAs. Strategies informed by baseline KAPB reports. Baseline calculated as an average between the findings under IWEco and Yallahs Hope Projects. Sampling framework and survey instruments comparable to those used in baseline documents.

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
	Sensitize the political directorate to facilitate informed decision-making with respect to watershed management	Sensitization sessions held Number of political leaders participating in sensitization sessions	At least 2 sessions held by Year 5	Reports, Registration Records	
	Proactive engagement of communities, utilising a participatory approach, particularly those persons who live and work in priority WMUs as well as the youth, in decision-making processes	Number of community members/community groups that participate in decision-making processes related to watershed management	Community members/ groups participate in decision-making processes throughout the 5-year period	Reports	
	Support community participation in the planning and implementation of sustainable watershed management programmes and interventions	Establishment of community groups dedicated to watershed management Number of projects implemented by community members	Establishment of community groups throughout the 5-year period Projects implemented by Year 5	Project Documents, Records	

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
	Support initiatives to encourage the involvement of the private sector in the protection of forests and watersheds	Number of private sector initiatives supported for the protection of forests and watersheds, annually	At least 1 initiative supported by Year 3	Reports, Meeting Minutes	
	Mainstream gender considerations throughout national policies, plans, projects and programmes related to integrated watershed management	Gender considerations integrated into policies, plans, projects and programmes	National policies, plans, projects and programmes incorporate gender considerations throughout the 5 years	Project Documentation, Policy Document, Reports	
	Support initiatives to encourage the involvement of the private sector in the protection of forests and watersheds	Number of private sector initiatives supported for the protection of forests and watersheds	At least 1 initiative supported	Reports, Meeting Minutes	
	Create opportunities for persons with disabilities to actively participate in national and community engagement activities	Number of activities implemented to actively involve persons with disabilities	At least 2 initiatives are implemented by Year 5 which involve persons with disabilities	Attendance Records, Reports	

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
	Sensitize law enforcement officials, including the judiciary, to the importance of enforcing environmental laws generally, and specifically those affecting watershed management	Number of sensitization sessions held, and target audience sensitized	At least 1 sensitization session conducted by Year 3	Attendance Records, Meeting Reports	
	Sustain and expand activities that emphasize the importance of watershed management to raise awareness among students at the primary, secondary and tertiary levels	<p>Number of schools and students participating in the public education programme</p> <p>Feedback gathered from students about the impact of awareness activities on their understanding and appreciation of watershed management concepts</p>	Increase in the awareness levels of students regarding the importance of watershed management by Year 3	Attendance Records, Reports	

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
Objective 5: Support integrated land-use initiatives to conserve and preserve critical watershed areas					
Outcome 5.1: Critical watershed areas are conserved and preserved Output 5.1.1: Sustainable land-use practices integrated by land-users	Integration of SLM practices through programmes involving government entities, the private sector, and other key stakeholders	Number of hectares with improved SLM Number of programmes that integrate SLM practices	Increase in the number of hectares with improved SLM by Year 5 At least 2 programmes exist that integrate SLM practices by Year 5	Technical Reports	Intervention areas are assessed with a view to obtain data on the baseline condition prior to the implementation of programmes.
Output 5.1.2: National Land Policy updated	Update the 1997 National Land Policy and conduct land-use/ land-change assessment	Policy updated Assessment conducted	Policy updated by Year 5 Assessment conducted by Year 5	Consultation Reports, Policy Document, Assessment Report	
Output 5.1.3: Landscape changes assessed Output 5.1.4: Core watershed areas for protection included in development orders	Continue to address issues related to land tenure via Systematic Land Registration as well as access to Crown lands to prevent/reduce land fragmentation and adverse land use practices/changes within critical watersheds	Number of land titles issued in critical watershed management areas Reduction in land fragmentation within critical watersheds	Land titles distributed in critical watershed areas by Year 5 Land fragmentation reduced by Year 5	Land Titles, Records	Programmes maintained to support access and tenure.

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
Output 5.1.5: Watershed protection strategies included in parish development plans and local sustainable development plans					
	Inclusion of core areas for watershed protection and conservation in new or revised development orders	Number of development orders with core watershed areas delineated	Development orders updated/drafted throughout the 5-year period	Development Orders	Updates are made to emerging development orders
Output 5.1.6: Tree Preservation Orders issued	Inclusion of watershed protection strategies in parish development plans and local sustainable development plans	Number of strategies developed and incorporated in collaboration with MCs	Strategies developed throughout the 5-year period	Parish Development Plans, Local Sustainable Development Plans	
Output 5.1.7: Afforestation/reforestation of watershed areas	Recommendations prepared on the designation of Tree Preservation Orders at the parish level	Recommended areas declared in a timely manner	TBD	Report	
	Promote land-use practices which facilitate adaptation to climate change	Guidelines outlining land-use practices that facilitate adaptation to climate change are developed and disseminated	Adaptation strategies developed and disseminated by Year 2 Training sessions conducted by Year 3	Guideline Document, Training Reports	

Expected Result	Activities	Proposed Indicators	Targets	Means of Verification	Key Assumptions
		Number of training sessions conducted to educate stakeholders on climate-adaptive land-use practices			
	Afforest/reforest watersheds	<p>Number of afforestation and reforestation activities executed.</p> <p>Percentage increase in forest cover within watersheds</p>	Increase in the number of trees/tree cover in watersheds by Year 5	Field Surveys, Remote Sensing and Satellite Imagery Data/Reports, Technical Reports	

7. RISK MATRIX

The potential risks associated with the implementation of the Policy — though not exhaustive — are highlighted in Table 4.

Table 4: Potential Risks Associated with the Development and Implementation of the Policy

Risks	Impact	Probability	Risk Score	Risk Response
The Policy is not promulgated in a timely manner	There are challenges in watershed management with a history of not developing the relevant legislation and policy for this mandate.	Medium	Medium	The policy development and implementation responsibilities will be inclusive, overarching and comprehensive. This will enhance the Policy's attainment of the SMART goals. ¹⁵
Efficient and effective multi-agency execution	Unavailability of technical staff due to competing assignments. Delays in getting input/approval at the management level. Problems in the sequencing of joint activities.	Medium	Medium	Enhanced monitoring through regular meetings of the respective technical working groups and steering committee. Plus, the timely execution of evaluation exercises.
Inadequate financing for the implementation of the Policy	Policy implementation may not be adequate and effective management of the watersheds may be negatively impacted	High	High	Identify additional funds to support policy implementation

¹⁵ Specific, Measurable, Achievable, Realistic, and Timely

8. GLOSSARY

Aquifer: “Any geological formation containing or conducting groundwater, especially one that supplies the water for wells, springs etc.” (Queensland Curtis Limited, 2009).

Catchment area: “The area of land draining into a stream or a watercourse at a given location” (Hydrology, n.d.); also called drainage area or drainage basin or watershed.

Drainage basin: “An area of land drained by a river and its tributaries” (Rutledge, et al., 2011). It includes water found in the water table and surface run-off. There is an imaginary line separating the drainage basin called a watershed. Usually, this is a ridge of highland.

Drainage divide: Watershed or water parting is the line that separates neighbouring drainage basins. “Ridges and hills that separate two watersheds are called the drainage divide” ((United States Geographical Survey, n.d.).

Ecosystem: “A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit” (Convention on Biological Diversity Secretariat, 2010).

Ecosystem approach: “A strategy for the integrated management of land, water, and living resources that promotes their conservation and sustainable use in an equitable way. It is based on the application of appropriate scientific methodologies focused on levels of biological organisation, encompassing the essential structures, processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystems” (Convention on Biological Diversity Secretariat, 2010).

Ecosystem Services: “The benefits people obtain from ecosystems. These include provisioning services such as food, water, timber, and fiber;

regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling” (Millennium Ecosystem Assessment, 2005).

Gender: “The social attributes and opportunities associated with being male and female and the relationships between women and men and girls and boys, as well as the relations between women and those between men” (United Nations, n.d.).

Gender equality: “The equal rights, responsibilities and opportunities of women and men and girls and boys” (United Nations, n.d.).

Hydrological basin: “A geographical area drained by a particular surface water and/or groundwater system. The basin boundaries are demarcated so that there is generally no flow from one basin to another” (MASHAV; UNDP, 1990).

Integrated Land-Use: “Integrated land use aims to sustainably manage multiple land uses across landscapes, considering both the natural and human systems that depend on them. In doing so, this approach can give rise to programs which recognize the interrelatedness between different sectors” (World Bank Group, 2022).

Integrated Water Resources Management: “The coordinated development and management of water, land and related resources to maximize economic and social welfare without compromising the sustainability of ecosystems and the environment” (Global Water Partnership, 2014).

Integrated Watershed Management Programme: The purpose is to identify priority land and water-related issues in the watershed, determine projects or policies targeted to address the issues, and identify how land and water management programming will be cooperatively carried out throughout the watershed.

Land Authorities: Established in the 1950s, under the Land Authorities Act to rehabilitate land, check soil erosion and improve farming.

Payments for Ecosystems Services: “PES is used to describe schemes in which the beneficiaries, or users, of ecosystem services provide payment to the stewards, or providers, of ecosystem services. In practice, PES often involves a series of payments to land or other natural resource managers in return for a guaranteed flow of ecosystem services (or, more commonly, for management actions likely to enhance their provision) over and above what would otherwise be provided in the absence of payment” (UK Department for Environment, 2013).

Ridge-to-Reef-Approach: A holistic method that considers the interconnectivity between coastal and marine areas (‘reef’) and their uplands (‘ridge’).

Slow onset events: This refers to the risks and impacts associated with increasing temperatures; desertification; loss of biodiversity; land and forest degradation; glacial retreat and related impacts; ocean acidification; sea level rise; and salinization (United Nations Framework Convention on Climate Change, n.d.).

Sub-Hydrological basin: “A discrete subunit of a larger hydrological basin, the water resources of which can be assessed, developed and managed in a near independent manner from the rest of the basin. Discharge can take place from one sub-hydrological basin to another within the same hydrological basin, via a surface channel or groundwater flow path” (MASHAV; UNDP, 1990).

Urban watershed: Watershed area in a town or city.

Water resources: (a) Water which is contained in (i) any spring, river, stream or other watercourses, whether natural or artificial, including any estuary thereof; and (ii) any lake or pond, whether natural or artificial, sustained by underground water or by a spring, river, or stream; (b) underground water (Water Resources Act, 1995).

Watershed: “Area having a common outlet for its surface runoff” (World Meteorological Organization & United Nations Educational, Scientific and Cultural Organization 2012).

Watershed Management: This is resource management with the watershed as the basic organizing unit and consists of applying known skills to land use to minimize or repair degradation and safeguard the use of the land beyond its present use. It is the process of organizing and guiding the use of land, water, and other natural resources in a watershed to provide the appropriate goods and services while mitigating the impact on the soil and watershed resources. It involves socio-economic, human-institutional, and biophysical inter-relationships among soil, water, and land use and the connection between upland and downstream areas (Wang, Mang, Cai, & Innes, 2016).

Watershed Management Unit: A defined land area from the ridge of a mountain to the coast within which a group of sub-hydrological basins drain into a major water body.

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10. APPENDICES

Appendix I: Policies and Plans Relevant to Watershed Management

POLICY/PLAN	GOAL/PRINCIPLE	STATUS
National Integrated Watershed Management Programme Framework, 2000	To promote the integrated protection, conservation and development of land and water resources in the watersheds, for their sustainable use, and for the benefit of the nation	The National Integrated Watershed Management Council is not functional. A progress report on the NIWMP for the period 2001-2006 was prepared by NEPA. The Programmatic Framework may need to be reviewed and updated in light of changes—institutional, policy and legislative—and new developments in watershed management.
National Water Sector Policy and Implementation Plan, 2019	To ensure that Jamaica's water resources are effectively managed so as to provide for our nation's social, economic, and environmental well-being, now and in the future	The policy was updated in 2019. One of the guiding principles of the policy is Integrated Water Resources Management.
National Biodiversity Strategy and Action Plan (NBSAP), 2016	Goal 1 — Conserve biodiversity An integrated management approach will be required to conserve Jamaica's biodiversity	This plan updated the 1998 NBSAP.
Protected Areas System Master Plan – 2013-2017	<ul style="list-style-type: none"> • Protect habitats, ecosystems, species and genetic resources and cultural and natural heritage - Restore and protect watersheds, rivers, wetlands, coral reefs and other important ecosystems. 	The Protected Areas Committee was appointed. Review of plan to be carried out.
National Forest Management and Conservation Plan 2016-2026	Sustainably manage and utilise Jamaica's forest resources to enhance social and economic development and contribute to building the country's climate resilience	Cabinet approved the National Forest Management and Conservation Plan 2016-2026 and its tabling in the Houses of Parliament in 2018. The development of watershed restoration plans, a joint activity being done by the Forestry Department and NEPA, is one of the

POLICY/PLAN	GOAL/PRINCIPLE	STATUS
		main activities in the plan that seeks to support water management and the wide range of products and ecosystem services including the prevention of soil erosion and landslides that forests provide.
Policy for the National System of Protected Areas System, 1997	<ul style="list-style-type: none"> • Expand and diversify Jamaica's natural resource-based economy • Protect the supply and quality of basic natural resources that support most economic activities including water, air and the productive land base 	<p>An Overarching Policy for the Protected Areas System has been drafted to update the 1997 Policy and provide an enabling framework for the coordinated management of protected areas.</p> <p>This policy is being updated.</p>
Forest Policy for Jamaica, 2017	Vision – By 2062, Jamaica's forests and its biodiversity are sufficiently restored and sustainably managed, so once again the island can adequately be described as “the land of wood and water”, capable of meeting the social, economic and ecological needs of current and future generations	The policy replaced the Forest Policy 1996.
Climate Change Policy Framework for Jamaica, 2023	<ul style="list-style-type: none"> • Strengthening of Jamaica's adaptive capacity and resilience to reduce its vulnerability to climate change; • Pursuit of low carbon development and enhancement of access to and mobilization of climate finance; and • Promotion of public education and awareness raising, research and technology transfer towards ambitious climate action. 	This framework replaced the 2015 Climate Change Policy Framework.
Agricultural Land Use Policy, 2015 (draft)	The policy addresses subdivision of prime agricultural lands for non-farm uses, and the denudation of land in the upper watersheds due to improper farming methods.	The draft is being reviewed.

POLICY/PLAN	GOAL/PRINCIPLE	STATUS
National Ocean and Coastal Zone Management Policy (NOCZM), 2000	<ul style="list-style-type: none"> • Promotion of sustainable development • Conservation of ocean and coastal resources and ecosystems • Baseline data collection and research • Utilizing the role of science and traditional ecological knowledge for integrated coastal area management • Providing the conditions of governance required for effective integrated coastal area management 	The draft update of the NOCZM Policy – the draft Coastal Resources Policy, prepared in 2015 – is being reviewed.
Food and Nutrition Security Policy, 2013	Addresses water and forest and fishery resources, recognizing that forests, watersheds, wetlands and marine resources constitute a substantive resource for food and nutrition security to be safeguarded, through the establishment of protected areas	This policy was approved by Cabinet on May 1, 2013.
The National Minerals Policy, 2017-2030	Goal 3 - To improve occupational health and safety, community relations and environmental stewardship throughout the sector	This policy was approved by Cabinet as a White Paper in July 2019 and tabled in the Houses of Parliament in March 2020. The policy is currently being implemented.
The National Squatter Management Policy and Implementation Plan (draft)	Goal D - Sustainable use of land resources by curtailment of squatting and the restoration of degraded lands to facilitate the restoration of watershed management units adversely impacted by squatting	The draft policy is being reviewed.

Appendix II: Approaches to the Management of Land and Water Resources

1. Ecosystem Approach/Ecosystem-based Approach

A strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way. It recognizes that humans with their cultural diversity are an integral component of many ecosystems. The ecosystem approach views watershed management as the management of a complex ecosystem and regards all its components — air, land, water, fish, wildlife and humans —as interrelated.

2. Integrated Coastal Area Management (also known as Integrated Coastal Zone Management (ICZM) or Integrated Coastal Management (ICM)

A process in which coordinated strategies are developed and implemented for the protection of coastal areas and resources, to achieve the conservation and sustainable use of these resources.

3. Integrated Water Resources Management (IWRM)

The coordinated development and management of water, land and related resources in order to maximize economic and social welfare without compromising the sustainability of ecosystems and the environment.

4. Integrated Watershed management

Integrated planning for land and water which takes into account both ground and surface water flow, recognizing and planning for the interaction of water, plants, animals, and human land use found within the physical boundaries of a watershed” (Red Deer River Watershed Alliance, 2015).

5. Ridge-to-reef approach

Integrated coastal zone management (ICZM) and watershed protection.

6. Sustainable Land Management

The management of land without damaging the ecological processes or reducing biological diversity. It requires land use practices that ensure that land, water and vegetation adequately support land-based production systems for current and future generations (Food and Agricultural Organisation, n.d.).

7. Watershed Management

Watershed management is any human action aimed at ensuring the sustainable use of watershed resources. Unlike sectoral development approaches, watershed management involves examining the interactions among various natural processes and land uses and managing land, water and the wider ecosystem of the watershed in an integrated way.

8. Water Resources Management (WRM)

The process of planning, developing, and managing water resources, in terms of both water quantity and quality, across all water uses. WRM includes the institutions, infrastructure, incentives, and information systems that support and guide water management. WRM seeks to ensure that there is sufficient water of adequate quality for drinking water and sanitation services, food production, energy generation, inland water transport, and water-based recreation, as well as sustaining healthy water-dependent ecosystems. Water resource management also entails managing water-related risks, including floods, drought, and contamination (The World Bank, 2017).

Appendix III: Declared Watershed Areas

The following Watershed Areas have been declared under Orders issued by the Minister pursuant to section 5 of the WPA (1963). The approximate area in hectares is also represented.

Watershed Area	Approximate Size (hectares)
Great River	40,549.50
Montego River	23,876.45
Martha Brae	65,559.07
Rio Nuevo	11,735.88
Oracabessa	14,609.15
Wag Water	25,090.51
Buff Bay River	45,324.79
Rio Grande	26,709.25
Plantain Garden	18,615.54
Morant River	19,020.23
White River	4,856.23
Yallahs Valley	17,806.17
Hope River	7,689.03
Rio Cobre	6,394.03
Rio Minho	174,014.83
Black River	153,052.11
Cabarita River	62,726.27
New Savannah River	7,041.53
Liguanea	11,735.88
Salt Island Creek	26,304.57
Coleburns Gully	17,927.57
Fresh River	9,024.49
Bull Savannah	26,709.25
Northwest Coast	40,063.88
Reading	4,937.16
St. Ann	126,100.05
Moneague	39,740.13
Water Valley	6,879.66
Fosters Cave	2,428.11
Northeast Coast	27,235.34
Port Morant	10,521.83
Yallahs Town	3,237.49
Cane River	7,365.28

Appendix IV: Watershed Management Units and Hydrologic Basins

Hydrological Basin	Watershed Management Unit	Parish(es)	Approximate Size (Km ²)
Great River	Great River	St. James, Hanover and Westmoreland	435.21
	Montego River	St. James and Trelawny	205.66
	Lucea River	Hanover	2,674
Blue Mountain North	Rio Nuevo	St. Mary	109.46
	Oracabessa/Pagee River	St. Mary	168.79
	Wagwater River	St. Mary, St. Andrew and St. Catherine	318.65
	Pencar/Buf Bay River	St. Mary and Portland	203.21
	Rio Grande	Portland and St. Thomas	280.99
	Drivers River	Portland and St. Thomas	237.21
	Swift River	Portland	107.63
	Spanish River	Portland	109.71
Blue Mountain South	Plantain Garden River	Portland and St. Thomas	180.04
	Morant River	St. Thomas	385.26
	Yallahs River	St. Thomas and St. Andrew	188.73
Cabarita River	Cabarita River	Westmoreland and Hanover	169.62
	New Savannah River	Westmoreland and Hanover	54.13
	South Negril/Orange River	Westmoreland and Hanover	159.87
	Deans Valley River	Westmoreland and St. Elizabeth	426.77
Rio Minho	Guts River/Alligator Hole	Manchester, St. Elizabeth and Clarendon	165.27
	Milk River	Clarendon and Manchester	855.57
	Rio Minho	Clarendon and St. Catherine	799.32
Martha Brae River	Martha Brae	Trelawny, St. Elizabeth and St. James	734.85
Dry Harbour Mountain	Rio Bueno/White River	St. Ann, Manchester, Trelawny, St. Catherine and Clarendon	1567.95
Kingston	Hope River	St. Andrew and St. Thomas	252.54
Rio Cobre	Rio Cobre	St. Catherine, St. Andrew, Clarendon, and St. Ann	1260.54
Black River	Black River	St. Elizabeth, Westmoreland, Manchester, St. James, Trelawny and Westmoreland	1316.09

Source: NEPA, 2021

Appendix V: Global and Regional Commitments Relevant to the Management of Watersheds

Treaty/Status of Accession/Plans	Provisions relevant to watershed management
<p>Convention on Biological Diversity, 1992</p> <p>Date of Accession: 5 April 1995</p> <p>Action Plans:</p> <ul style="list-style-type: none"> • National Strategy and Action Plan on Biological Diversity for Jamaica, 2016-2021 • National Strategy and Action Plan on Biological Diversity for Jamaica, 2003 • Protected Areas System Master Plan, 2013-2017 	<p>Objectives: the conservation of biological diversity; the sustainable use of its components; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.</p> <p>National Biodiversity Strategies and Action Plans (NBSAPS) are the main instruments for implementing the Convention. Among the Programmes of Work developed under the Convention is the Programme on Protected Areas.</p> <p>Parties to the Convention adopted an updated Strategic Plan for Biodiversity, including the Aichi Biodiversity Targets, for the 2011-2020 period. Of relevance to water resources is:</p> <p><i>Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services</i></p> <p><i>Target 14:</i> By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.</p> <p>Preparation for the post-2020 Biodiversity Framework started in 2017.</p>
<p>UN Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, 1994</p> <p>Date of Accession: 12 November 1997</p> <p>Action Plan: National Action Plan, 2002</p>	<p>Objective: “To combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification...”</p> <p>The Convention focuses on improving land productivity, rehabilitation of land, conservation and sustainable management of land and water resources. Such action should also prevent the long-term consequences of desertification, including mass migration, species loss, climate change and the need for emergency assistance to populations in crisis.</p> <p>National action programmes are required to identify the causes of desertification and practical measures necessary to combat it and mitigate the effects of drought.</p>

Treaty/Status of Accession/Plans	Provisions relevant to watershed management
	<p>The 2018-2030 Strategic Framework will contribute to (i) achieving the objectives of the Convention and the 2030 Agenda for Sustainable Development; (ii) improving the living conditions of affected populations; and (iii) enhance ecosystems services.</p> <p>In keeping with a global commitment to strive to achieve a land-degradation neutral (LDN) world in the context of sustainable development, the UNCCD has developed a programme on LDN. The UNCCD defines land degradation neutrality (LDN) as “a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems” (United Nations Convention to Combat Desertification, 2017).</p> <p>Jamaica has been participating in the Land Degradation Neutrality Target Setting Programme aimed at supporting countries in establishing national voluntary targets for LDN and identifying transformative projects to achieve these targets.</p>
<p>Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1971 (Ramsar Convention)</p> <p>Date of Accession: 7 October 1997</p> <p>National Report: National Report on the Implementation of the Ramsar Convention on Wetlands, 2015</p>	<p>The mission of the Ramsar Convention is the conservation and wise use of all wetlands, as a contribution towards achieving sustainable development throughout the world.</p> <p>Wetlands are defined as: “areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres” (RAMSAR, 1994).</p> <p>Wise use of wetlands means: “the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development” (The RAMSAR Convention Secretariat, 2014). Jamaica has designated four wetlands of international importance covering 37,847 hectares (Black River Lower Morass, St. Elizabeth; Portland Bight Wetlands and Cays, Clarendon; Mason</p>

Treaty/Status of Accession/Plans	Provisions relevant to watershed management
	River Protected Area, Clarendon; Palisadoes/Port Royal, Kingston).
<p>Protocol Concerning Specially Protected Areas and Wildlife in the Wider Caribbean Region (2000) to the Cartagena Convention for the Protection and Development of the Marine Environment</p> <p>Date of simple signature: 18 January 1990</p> <p>Jamaica is a signatory, not yet a Party, to the Protocol.</p>	<p>Obligations: Each Party shall take the necessary measures to protect, preserve and manage in a sustainable way (a) areas that require protection to safeguard their special value; and (b) threatened or endangered species of flora and fauna.</p> <p>Among the measures is the regulation or prohibition of any activity involving modification of the profile of the soil that could affect watersheds, denudation and other forms of degradation of watersheds, or the exploration or exploitation of the subsoil of the land part of a marine protected area (UNEP–Caribbean Environment Programme, 1990).</p>
<p>Protocol Concerning Pollution from Land-based Sources and Activities to the Cartagena Convention for Protection and Development of the Marine Environment</p> <p>Date of Accession to the Protocol: 5 November 2015</p>	<p>Objective: Protection of the marine environment of the Caribbean Sea from land-based point and non-point sources of marine pollution by outlining the types of control and management responses required for addressing land-based issues such as regional effluent limitations for domestic wastewater (sewage) and requiring specific plans to address agricultural non-point sources of pollution.</p> <p>Jamaica’s priority areas of action were identified as:</p> <ul style="list-style-type: none"> • Sewage treatment and disposal • Agricultural practices (soil conservation, pesticides and fertilizer usage) • Collection and disposal of solid waste <p>The 2017–2018 Work Programme of the Caribbean Environment Programme includes:</p> <ul style="list-style-type: none"> • Further development of the Caribbean Platform for Nutrients Management; • Applying innovation to reduce nutrient pollution from wastewater and agricultural discharges in waterways, coastal and marine environments of the Caribbean Sea - Jamaica and Costa Rica;

Treaty/Status of Accession/Plans	Provisions relevant to watershed management
	<ul style="list-style-type: none"> • Development of regional investment plans for pollution and nutrients reduction (UNDP/GEF CLME+); and • Development/implementation of an Ecosystem-Based Adaptation (EBA) sub-project for the Caribbean and North Brazil Shelf (UNDP/GEF CLME+).
<p>The UN Environment Programme Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA)</p> <p>Adopted in 1995</p>	<p>This Programme calls for the application of integrated approaches in coastal areas and river basins, such as the “ridge-to-reef concept” (United Nations Environment Programme/GPA, 2012). The Convention on Biological Diversity (CBD) adopted the ecosystem approach as its primary framework of action: “a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way” (Convention on Biological Diversity Secretariat, 2010). The Aichi biodiversity targets include measures to safeguard both terrestrial and inland waters and coastal and marine areas. Further, the goal to achieve ‘a land-degradation neutral world in the context of sustainable development’ was approved in 2012. In 2015, commitments were also reached to address climate change and its impacts on ecosystems and livelihoods (United Nations Framework Convention on Climate Change [UNFCCC], 2015).</p>
<p>Two agreements of significance for small island developing states are:</p> <ul style="list-style-type: none"> • The United Nations Programme of Action for the Sustainable Development of Small Island Developing States popularly referred to as the Barbados Program of Action (BPOA) held in June 1994 in response to UNCED and Agenda 21; and 	<p>“The BPOA highlights the special challenges and constraints that cause major setbacks to the socio-economic development of SIDS, some of which had already been addressed in Agenda 21, including small size and geographic isolation that prevent economies of scale. In addition, the BPOA underlines the excessive dependence of SIDS on international trade; high population density, which increases the pressure on already limited resources; overuse of resources and premature depletion; relatively small watersheds and threatened supplies of fresh water; costly public administration and infrastructure; and limited institutional capacities and domestic markets” (United Nations, n.d.).</p>

Treaty/Status of Accession/Plans	Provisions relevant to watershed management
<ul style="list-style-type: none"> • The Small Island Developing States Accelerated Modalities of Action (SAMOA) Pathway, which resulted from the Third International Conference on SIDS held in Samoa in September 2014. 	<p>The SAMOA Pathway recognises “that small island developing States face numerous challenges with respect to freshwater resources, including pollution, the overexploitation of surface, ground and coastal waters, saline intrusion, drought and water scarcity, soil erosion, water and wastewater treatment and the lack of access to sanitation and hygiene. Furthermore, changes in rainfall patterns related to climate change have regionally varying and potentially significant impacts on water supply” (United Nations, n.d.).</p>
<p>Sendai Framework for Disaster Risk Reduction 2015 - 2030</p>	<p>In 2015, the Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted at the Third United Nations World Conference in Sendai, Japan. Subsequent to its adoption, Jamaica has been resolute in advancing a contemporary, functional, and adaptable disaster management and mitigation infrastructure. This initiative reflects the nation's commitment as a signatory to the Framework.</p> <p>The Framework encompasses four priority actions:</p> <ol style="list-style-type: none"> 1. Understanding disaster risk; 2. Strengthening disaster risk governance to manage disaster risk; 3. Investing in disaster reduction for resilience and; 4. Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction. <p>To achieve this, it is crucial to:</p> <ul style="list-style-type: none"> • “To promote the mainstreaming of disaster risk assessment, mapping and management into rural development planning and management of, <i>inter alia</i>, mountains, rivers, coastal flood plain areas, drylands, wetlands and all other areas prone to droughts and flooding, including through the identification of areas that are safe for human settlement, and at the same time preserving ecosystem functions that help to reduce risks; • Promote transboundary cooperation to enable policy and planning for the implementation of ecosystem-based approaches with regard to shared

Treaty/Status of Accession/Plans	Provisions relevant to watershed management
	resources, such as within river basins and along coastlines, to build resilience and reduce disaster risk, including epidemic and displacement risk;”

Appendix VI: Main Global Agreements Focused on Sustainable Development

UN Conferences on Sustainable Development and Reviews	Global Conferences on the Sustainable Development of Small Island Developing States
<p>United Nations Conference on Environment and Development, Rio de Janeiro, June 1992</p> <p>Outcome:</p> <ul style="list-style-type: none"> ○ Agenda 21 ○ Rio Declaration on Environment and Development (proclaims 27 principles) <p>The Rio Conventions:</p> <ul style="list-style-type: none"> • UN Framework Convention on Climate Change • Convention on Biological Diversity • UN Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, 1994 • New York Declaration on Forests, 2014 	<p>International Conference on the Sustainable Development of Small Island Developing States (SIDS), Barbados, 1994</p> <p>Outcome: Programme of Action for the Sustainable Development of Small Island Developing States (BPOA)</p> <p>The BPOA set out 14 priority goals for SIDS.</p>
<p>World Summit on Sustainable Development, Johannesburg, June 2002</p> <p>Outcome: Johannesburg Plan of Implementation</p> <p>Frameworks for Action: Water and Sanitation, Energy, Health, Agricultural Productivity, Biodiversity and Ecosystem Management (WEHAB)</p>	<p>International Meeting to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States, Port Louis, Mauritius, January 2005</p> <p>Outcome: Mauritius Strategy for the Further Implementation of the BPOA (MSI) (BPOA+10)</p> <p>The MSI set out actions and strategies in 19 priority areas, building on the original 14 thematic areas of the BPOA including health, knowledge management and culture, considering the requirements of the Millennium Development Goals.</p>

UN Conferences on Sustainable Development and Reviews	Global Conferences on the Sustainable Development of Small Island Developing States
<p>United Nations Conference on Sustainable Development (Rio+20), June 2012 Outcome: The Future We Want The Conference launched the development of the Sustainable Development Goals which would build on the Millennium Development Goals 2000-2015 and gave guidelines on green economy policies as well as institutional framework for sustainable development.</p>	<p>The Third International Conference on Small Island Developing States, Apia, Samoa, September 2014 Outcome: Small Island Developing States Accelerated Modalities of Action (SAMOA) Pathway—in which countries recognized the need to support and invest in these nations so they can achieve sustainable development.</p>
<p>United Nations Sustainable Development Summit, New York, September 2015 Outcome:</p> <ul style="list-style-type: none"> ○ Transforming our world: the 2030 Agenda for Sustainable Development ○ Sustainable Development Goals <p>The aims of the post-2015 development agenda include - Between 2016 and 2030, end poverty and hunger everywhere, protect human rights and promote gender equality, ensure the lasting protection of the planet and its natural resources.</p>	

Appendix VII: Consolidated List of Watershed Management Projects (Direct and Indirect) 2006–2020

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
Biodiversity Restoration in Portland Bight Protected Area through Community Engagement	GEF Small Grants programme	CCAM	To protect communities, infrastructure, livelihoods and biodiversity in the Portland Ridge area through restoration and protection of the damaged, high biodiversity dry limestone forests in the area.	<ul style="list-style-type: none"> - Development of best techniques and approaches for forest restoration - Reduction of fire risks through the development and implementation of a fire management plan, provision of resources and awareness programme - Increase in public awareness and support for forest conservation and compliance with laws through outreach and interpretation in the community and at the exhibition at the Portland Bight Discovery Centre (PBDC). 	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
Climate Change Adaptation and Risk Reduction Technology and Strategies to Improve Community Resilience (CARTS) Project	GAC – Administered by the CDB	Westmoreland Municipal Corporation	To improve community resilience, safety and preparedness in the context of disaster risks; and enhance public awareness of disaster risks and appropriate responses. It also seeks to improve the effectiveness of community-wide disaster planning committees and first responders and to improve community resilience to climate change impacts via improving ecosystem-based services while building the capacity of two communities to sustainably utilize local natural resources to generate earnings.	The project aims to improve knowledge of climate risks, disaster risk reduction and climate change adaptation of Savanna-la-Mar's population by 80 per cent; reduce the vulnerability of Savanna-la-Mar's population to flood hazards by 25 per cent; and enhance capacity to manage flood risk and reduce flood damage in the communities by 30 per cent.	Ongoing
Disaster Vulnerability Reduction Project	World Bank	Jamaica Social Investment Fund	To enhance Jamaica's resilience to disaster and climate risk, through improvement in the collection and generation of risk information, its analysis and use in monitoring systems and decision-making, retrofitting and/or construction of key	Component 1: Technical Assistance for Improved Disaster and Climate Resilience (US\$3.815M); Component 2: Risk Reduction (US\$23.61M); Component 3: Contingent Emergency Response; Component 4: Project Administration (US\$2.5M)	Ongoing

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
			infrastructure assets, and strengthening institutional capacities for climate and disaster risk management.		
Enhancing the legislative framework in Jamaica while fostering community and private sectors' engagement to reduce plastic marine litter from land activities/Plastic Waste Minimization Project	UNEP	MEGJC	To enhance the capacity and legislative framework of Jamaica to reduce and manage plastic marine litter from land-based activities in an integrated and environmentally sound manner and demonstrate the potential of plastic waste prevention and sound management while catalysing action for the reduction of plastic marine litter generated by land-based activities.	<ul style="list-style-type: none"> - Completion of a Regulatory Impact Assessment and National Strategy and Action Plan for integrated waste management for Jamaica - Development of a national policy and strategy on plastics 	Completed
Essex Valley Agricultural Development Project (UK-CIF)	UK Department for International Development (DFID) – Administered by CDB	NIC	To enhance production and productivity of farmers in Essex Valley in a socially inclusive gender equitable and climate sensitive manner.	Component 1: Improved Irrigation Systems; Component 2: Enhanced Agricultural Production, Marketing Facilities and Systems; Component 3: Energy Efficiency/Renewable Energy; Component 4: Technical	Ongoing

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
				Assistance; Component 5: Land; Component 6: Project Management, Financial Audits and Baseline Survey	
GOJ/ Adaptation Fund Programme	Adaptation Fund (which was established under the Kyoto Protocol of the UN Framework Convention on Climate Change)	PIOJ	The programme is aimed at protecting livelihoods, food security and safeguarding our natural resources, particularly in rural and coastal communities which are vulnerable to the adverse impacts of climate change. The GOJ/AFP involves support from the Ministry of Tourism and Entertainment in collaboration with the Office of Disaster Preparedness and Emergency Management (ODPEM), and the National Environment and Planning Agency (NEPA).	The programme (i) strengthens coastal resilience (ii) improves land and water management for the agricultural sector and (iii) builds institutional and local capacity for climate change adaptation and disaster risk reduction.	Ongoing

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
Improved Forest Management for Jamaica	European Union	Forestry Department	The specific objectives of the programme are to: 1. Reverse forest degradation, deforestation and the loss of forest biodiversity, through conservation and sustainable forest management, as well as strengthening the legislative, policy and institutional framework of the sector. 2. Enhance economic, social and environmental benefits of forests through the sustainable utilisation of forest resources.	1.1 Strengthened governance, policy and legislative framework to ensure sustainable development of the forest sector. 1.2 Improved participatory planning to protect, conserve and manage Jamaica's forests. 2.1 Strengthened institutional capacity for improved availability of data and capacity for monitoring and knowledge management. 2.2 Improved availability of spatial data for sustainable forest management practices, promoting investments, and assessing vulnerabilities and risks in the forest sector. 2.3 Forest communities, the general public as well as targeted groups of professionals have increased knowledge/capacity.	Ongoing
Integrated Management of the Yallahs-Hope Watershed	GEF - Administered by the IDB	NEPA	To improve the conservation and management of biodiversity and the provision of ecosystem	Component 1: Institutional Strengthening and Capacity Building for Integrating Biodiversity into Watershed	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
Management Area			services on the Yallahs and Hope River Watershed Management units (WMUs).	Management (US\$1,453,497); Component 2: Creating Economic and Financial Incentives to Support Biodiversity (US\$2,151,403); Component 3: Implementing Sustainability Livelihoods, Agriculture and Forestry in Watershed Communities (US\$8,166,261).	
Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (IWEco)	GEF	Ecosystem Division/Latin America and the Caribbean Office/Caribbean Environment Programme (CEP)/ Caribbean Regional Coordinating Unit (CAR/RCU) /UNEP/ UNDP	To contribute to the preservation of Caribbean ecosystems that are of sustainable financing for the implementation of environmentally sound and cost-effective wastewater management measures.	The project applies a “Ridge to Reef” approach integrating watershed and coastal areas management in small islands to address the multiple challenges of sustainable water, land (including forests) and biodiversity management and conservation within the spatial framework of the watershed unit. The project will support policy, institutional and legislative reforms, will contribute to the implementation of effective appropriate	Ongoing

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
				technologies to accelerate contribution to global targets on access to safe and reliable water supplies and improved sanitation, and will help to improve ecosystem functioning in the Caribbean.	
Pilot Programme for Climate Resilience (PPCR) - Adaptation Program and Financing Mechanism for the PPCR Jamaica	Climate Investment Fund - Administered by the IDB	MEGJC	To create innovative climate financing mechanisms to support the implementation of climate resilience within micro, small and medium enterprises (MSMEs), NGOs and CBOs for tourism and agro-businesses across Jamaica, through access to a line of credit to MSMEs from an approved financial institution, as well as the establishment of a special climate change adaptation fund available to NGOs, CBOs and select public sector entities.	Component 1: Mainstreaming Climate Change Adaptation Measures (Grant -\$5.1 M, Counterpart -\$986,997.00). This includes vulnerability assessments conducted for 15 communities in the Upper Rio Minho Watershed; and Climate Change Adaptation and Disaster Risk Reduction (CCA/DDR) plans developed. Component 2: Creation of Financial Mechanisms (Counterpart -\$789,597) and Component 3: Knowledge Management (Grant - \$200,000.00).	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
PPCR-Improving Climate Data and Information Management Project	Climate Investment Fund- Administered by the World Bank	PIOJ	To improve the quality and use of climate related data and information for effective planning and action at local and national levels.	Component 1: Updating of the data collection, processing and forecasting system of the Hydromet Services Component 2: Developing climate change scenarios and vulnerability assessments and strengthening the Web Portal Climate and Risk Information Platform and Clearinghouse Component 3: Climate change education, awareness and behaviour change	Completed
Southern Plains Agricultural Development Project (UK-CIF)	DFID – Administered by the CDB	Ministry with responsibility for agriculture and fisheries through National Irrigation Commission	The project will support, among others, the expansion and improvement of the irrigation and farm access road network of identified areas, strengthening commercial market linkages for small-scale farmers, installation of flood control systems; construction of packing houses and Global G.A.P structures in the rural communities of Parnassus in Clarendon and Amity Hall in St. Catherine.	Provide irrigation infrastructure on two (2) parcels of government land earmarked for leasing to small, medium and large-scale farmers, including women and youth	Ongoing

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
Strengthening Community Resilience to Ensure Sustainable Management of our Natural Resources through Social Inclusion	GEF Small Grants Programme	UNDP	To address issues related to climate change, improper land use such as poor farming practices and cutting of trees in forests, which lead to land degradation and flooding thus severely impacting the watersheds. Also, issues of social inclusion, 'youth-at-risk' and the elderly.	1. Implement climate change mitigation strategies and corrective measures to halt land degradation through Climate-Smart Agro-Ecology technologies 2. Implement Sustainable Environment and Natural Resources management practices, including Sustainable Forest Management through Social Inclusion.	Ongoing
Trash Free Waters Programme	UNEP	UNEP	To reduce and prevent land-based trash from entering our watersheds, coastal waters, and the marine environment	Enhancement of the Whitehouse and Bluefields Solid Waste Reduction Pilot Project (2018 -2019) - to protect two Marine Protected Areas (in the communities of Bluefields and Whitehouse) from solid waste pollution and also facilitated a participatory approach to effectively manage solid waste across the region.	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
Accelerating the Uptake of Climate Smart Agriculture in African, Caribbean and Pacific (ACP) Countries	European Union	Technical Centre for Agricultural and Rural Co-operation, the Climate Change Division in the Ministry of Economic Growth and Job Creation, and the Rural Agricultural Development Authority (RADA)	To improve agricultural productivity, adaptation and income of smallholder farmers in selected ACP countries through the promotion of widespread adoption of climate-smart agriculture (CSA) practices that are most aligned with national policy priorities. More specifically: To promote the resilience of smallholder farmers in ACP countries To improve agricultural productivity and adaptive capacity to climate uncertainties for smallholder farmers through accelerated field uptake of smart-agricultural practices using ICT tools.	<ul style="list-style-type: none"> • Increased farm productivity and food security for smallholder farmers under changing climatic conditions. • Improved adaptive capacity to climate uncertainties for smallholder farmers. • Engagement of key actors in the policy process that supports upscaling and investment opportunities for CSA. 	Completed
Assessing the Kingston Hydrologic Basin	International Atomic Energy Agency (IAEA)	NWC	To determine the availability of adequate water resources in the Kingston Hydrological Basin (KHB) for enhanced and sustainable water supply. The specific objective is to strengthen the technical capacity of the NWC to	Strengthening of the water management institutional capacity, provision of specialized equipment and training in enhanced water quality management, use of state-of-the-art nuclear technologies to assess the	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
			make informed decisions relating to sustainable planning, management and use of water resources.	state of the Kingston Hydrologic Basin and facilitate and inform the development of strategic and mitigating plans for protecting the water supply sources in the basin and the maintenance of water and wastewater systems.	
Climate Change Adaptation and Disaster Risk Reduction in Jamaica	GOJ/ European Union / UNEP	Planning Institute of Jamaica (PIOJ), National Environment and Planning Agency (NEPA), Forestry Department, Ministry of Water, Land, Environment and Climate Change, United Nations Environment Programme (UNEP)	To assist Jamaica with its adaptation to climate change and to contribute to sustainable development by increasing the resilience of vulnerable areas and reducing the risks that are associated with natural hazards	<p>Rehabilitate and improve management of selected watersheds to reduce downstream run-off and associated pollution and health risks.</p> <p>Restore and protect coastal ecosystems to enhance natural buffers and increase resilience.</p> <p>Integrate climate change mitigation and adaptation into relevant national policies and plans, enhance institutional capacity and facilitate awareness building amongst Jamaica's population to better adapt to climate change.</p>	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
Community Disaster Risk Reduction Program (Co-financed with UK and IDB) - Regional	GAC	CDB	To support community resilience in the face of natural disasters by undertaking demonstration projects that help determine which prevention or mitigation measures are most effective. In order to produce tangible risk reduction results in pilot communities to be disseminated across the region, these demonstration projects take lessons learned from other disaster risk reduction projects and test innovative ideas to improve or expand on them.	The project is implementing demonstration projects in fifteen to seventeen communities across the Caribbean, with a focus on high-risk, low-income communities.	Completed
Community-based Landslide Risk Reduction Project	Japan Trust Fund	Office of Disaster Preparedness and Emergency Management	To reduce the risk of natural disasters in vulnerable communities in Jamaica and to provide an evidence-based toolkit for vulnerability reduction throughout the Caribbean.	1. Developing a toolkit or operations manual of MoSSaiC Methodology and its application 2. Training on MoSSaiC Methodologies for Community-based Landslide Risk Reduction 3. Identification and Implementation of Community-based Landslide Risk Reduction Measures in Four Communities	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
Evaluating Ground Water Recharge in the Upper Rio Cobre Basin	International Atomic Energy Agency (IAEA)	Scientific Research Council	To develop a map of the rate of recharge and potential contamination between upper and lower Rio Cobre.	The development of a database of new and existing information pertaining to the recharging of water in the Rio Cobre, inclusive of groundwater levels, spring and river discharges, isotopes, and chemistry and meteorological parameters. In addition, it will provide training for technical staff in the application of isotope in hydrology; development of a mathematical model of groundwater recharge and flow to the Rio Cobre hydro-geological system; and procurement of current meters, groundwater probes with rainwater collectors, and multi-parameter sonde for wells.	Completed
Flood Risk Management along the Highway 2000 Corridor	IDB	National Road Operating and Constructing Company (NROCC)	The objective of the programme is to reduce the impacts of floods in the communities surrounding the Kingston to Clarendon sections of Highway 2000 (Phase 1A and 1B). The programme seeks to provide	The operation covers four areas: (i) evaluate the flood risk in the communities in the Kingston to Four Paths sections of the Highway 2000 corridor; (ii) identify priorities for specific mitigation actions that can be	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
			these municipalities with the capacity to better prepare for flood risk, considering climate change, with special emphasis on reducing the disruption to lives and livelihoods due to these events and protection of critical infrastructure such as Highway 2000.	taken to reduce flood risks; (iii) finance the technical design studies of these measures; and (iv) increase awareness of the affected communities regarding flood risk reduction.	
Hurricane Dean Rehabilitation Works	CDB	National Works Agency	Construction of sea defences to protect the Palisadoes tombolo which links Norman Manley International Airport (NMIA) with the mainland via the Norman Manley Highway.	Construction of stone revetments, groynes, and replenishment of protective dunes Repairs to main roads, including rehabilitation of pavement, drainage works, river training and sea defences	Completed
Improving Climate Resilience for Sustainable Management of Natural Resources and Disaster Risk Reduction in Mocho	GEF Small Grants Programme	UNDP	The water catchment area at the Lennon High School will be repaired to increase efficiency in operations at the institution; by providing sufficient access to safe drinking water; increased access to water for sanitation and waste disposal and reduction in the pollution of water resources harming	Project results and additional information can be found at https://sgp.undp.org/spacial-itemid-projects-landing-page/spacial-itemid-project-search-results/spacial-itemid-project-detailpage.html?view=projectdetail&id=22805	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
			<p>biodiversity. This activity will reduce the problem of water scarcity by providing a sustainable solution through water harvesting techniques. A 40,000 gal water tank will be constructed to support existing system, which should result in increased water storage to support the essential social services to the community. A 10X10 cold storage unit will be built to reduce post-harvest loss. The installation of this unit should reduce the school's food bill and increase productivity level by providing storage for extra crops. The school's animal husbandry department which consists of seven (7) chicken houses, a piggery area and an abattoir will be the biggest benefactor with the construction of a 750 gal tank bio-digester to include training in maintenance of the unit.</p>		

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
Integrated Management of the Yallahs-Hope Watershed Management Area (PPG)	IDB	IDB	The objective is to prepare a full project proposal to be financed with GEF, including project component designs, a results framework with a detailed timeline, indicators and targets, budget, procurement plan and plan of action. The preparation will also help identify the institutional arrangements needed for the project implementation and linkage with other initiatives to secure co-financing as requested by the GEF (donor).	The output of the PPG: the preparation of a project proposal including a results framework with a detailed timeline, indicators and targets. The proposal will show the project's contribution to the GEF Focal Areas and national sustainable development objectives and detail the expected global environmental and national benefits. To achieve this, the PPG phase will collect baseline data on key areas of the national response, elaborate the business-as-usual scenario and quantify the incremental activities described in general terms in the PIF. This will ensure that the project components are defined more precisely.	Completed
Integrating Watershed and Coastal Area Management in Small Island Developing	GEF	UNDP and UNEP	To strengthen the commitment and capacity of the participating countries to implement an integrated approach to the management	1. Watershed characterisation and compilation of baseline data for the watershed management unit 2. Community training	Completed

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States (IWCAM) REGIONAL (US\$13.99 Million)			of watersheds and coastal areas	3. Establishment of formal management mechanism 4. Mitigation of watershed threats using environmentally sound techniques and provision of alternative livelihood opportunities. Some of the project results and additional information can be found at https://wedocs.unep.org/bitstream/handle/20.500.11822/9251/-Integrated%20Watershed%20and%20Coastal%20Areas%20Management%20(IWCA%20M)%20Atlas-2012GEF%20IWCAM%20Atlas-%202012.pdf?sequence=3&amp%3BisAllowed=	
Jamaica Rural Economy and Ecosystems Adapting to Climate Change II (JAREEACH II)	USAID	ACDI/VOCA	Objective 1 – Improve the adaptive actions of Jamaican partners and institutions to promote livelihoods and natural systems that are resilient to climate change and its impacts Objective 2 – Strengthen local and national institutions	1 - Systems and Strategies to Protect Lives and Livelihoods Adopted 2 - Institutional Strengthening, Capacity Building and Coordination for Climate Change Adaptation and Resilience Building	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
			needed to support the processes of adaptation and sustainability	3 - Systems and Strategies to Protect Targeted Ecosystems Adopted	
Japan-Caribbean Climate Change Partnership Project (JCCCP) REGIONAL	Government of Japan	UNDP	To support countries across the Caribbean in advancing the process of low-emission risk-resilient development by improving energy security and integrating medium to long-term planning for adaption to climate change	The assistance was aimed at improving energy security and integrating medium and long-term planning for adaptation to climate change.	Completed
Optimizing Irrigation Water Management to Improve Crop Output and Water Quality Control	International Atomic Energy Agency (IAEA)	NIC	To improve soil, water and crop management practices. Increase productivity of selected crops like onion and sweet potatoes as well as the efficient use of water and fertilizers	To increase the irrigation water quality in the Rio Cobre basin by utilizing water and fertilizer in an efficient manner. The project also seeks to increase the productivity of onions and sweet potatoes productivity by training personnel in isotopic techniques	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
Securing a reliable water supply system in the community of Jacob's Ladder while improving the members' adaptive capacity to climate change impacts	GEF Small Grants Programme	UNDP	To construct new on-site water catchment/storage facilities, establish a completed refurbish the system for extracting water from near-by wells and expand the agro-forestry system to include drought-resistance species.	Project results and additional information can be found at https://sgp.undp.org/m/index.php?option=com_sgpprojects&view=projectdetail&id=23685&Itemid=272	Completed
Upgraded Flood Early Warning System for the Rio Cobre Watershed	European Union	WRA	To upgrade the Flood Early Warning System for the Rio Cobre Watershed	1. Increasing the number of monitoring stations, enhancing the real-time monitoring of water levels and intensity at rainfall stations 2. Cost-effective mechanisms for relaying real-time data and transferring information to key stakeholders.	Completed
Water Harvesting and Enhancing Sustainable Livelihoods	GEF Small Grants Programme	Jamaica Bauxite Institute, WINDALCO, US Peace Corps, Walkers Wood Farmers Group	To enhance the livelihoods of farmers of the Ewarton Watershed and Farmers Cooperative Society	1. Construct 2 rainwater harvesting ponds and install a solar powered water pumping system 2. Construct a 100' by 20' greenhouse to increase crop production and provide	Completed

Name of Project	Funding Agency	Implementing Agency	Objective	Components	Project Status
				<p>training in greenhouse technology</p> <p>3. Build community awareness of climate change and mitigation strategies</p> <p>4. Crop and fish production.</p> <p>Project Results and additional information can be found at</p> <p>https://sgp.undp.org/spacial-itemid-projects-landing-page/spacial-itemid-project-search-results/spacial-itemid-project-detailpage.html?view=projectdetail&id=20072</p>	

