

Financed by



Co-implemented by



Co-executed by



OAS | More rights  
for more people

In partnership with



**GEF CRew+ Project**  
**“An integrated approach to wastewater management in the Wider  
Caribbean Region using innovative solutions and sustainable  
financing mechanisms”**

**Review of Wastewater Policy and Legal Framework  
in St. Kitts and Nevis**

**Situational Analysis**

**Final Report**

**March 2025**



**Project Details**

Consultancy Assignment	Review of Wastewater Policy and Legal Framework in St. Kitts and Nevis
Consultant	Dr. Halla Sahely
Country	St. Kitts and Nevis
Implementing Entity	UNEP CAR/RCU
National Executing Agency	Ministry of Environment, Climate Action and Constituency Empowerment, Department of Environment
Deliverable 1	Situational Analysis
Submission Date	Draft 1: November 2024 Draft 2: March 13, 2025 Final: March 31, 2025

**Acknowledgments**

Special thanks go to officers of the EHD from St. Kitts (CEHO, Mr. Alex Riley, and EHO Oren Martin) and Nevis (Principal EHO Mr. Merville Morton and EHO Mr. Kevin Maynard) for facilitating field visits and for their extensive collaboration and contributions to this analysis.



OAS More rights for more people



## Table of Contents

List of Tables .....	4
1.0 Introduction .....	5
1.1 Literature Review .....	5
2.0 Current Infrastructure and Technology .....	8
2.1 Overview of Existing Wastewater Collection, Treatment and Disposal Systems .....	8
2.2 Efficiency and Capacity of Wastewater Treatment Facilities .....	8
2.3 Technologies Used in Wastewater Treatment and Their Effectiveness .....	8
2.4 Maintenance and Operational Challenges .....	9
3.0 Legislative and Policy Framework .....	13
3.1 National Laws, Regulations, and Standards for Wastewater Management .....	13
3.2 Compliance with Regional and International Environmental Agreements .....	14
3.3 Governance Structure .....	14
3.4 Gaps in Policy, Legislation and Institutional Frameworks .....	15
3.5 Recommendations to Address the Gaps .....	15
4.0 Environmental and Health Impacts .....	17
5.0 Economic Aspects .....	19
5.1 Cost Analysis of Existing Practices and Needed Investments .....	19
5.2 Financing of Wastewater Management Systems .....	19
6.0 Societal and Cultural Attitudes .....	20
7.0 Technological and Innovative Solutions .....	21
8.0 Recommendations .....	22
9.0 Conclusions .....	24
10.0 References .....	26
11.0 Photos .....	27

Financed by



Co-implemented by



Co-executed by



In partnership with



## List of Tables

Table 1: Types of Wastewater Treatment Systems in St. Kitts and Nevis .....	10
Table 2: Governance Structure at the EHD in St. Kitts and Nevis .....	15
Table 3: Summary of Gaps and Proposed Actions and Resource Needs .....	22

## 1.0 Introduction

The situational analysis on wastewater management for St. Kitts and Nevis, will offer a detailed examination of the country's current practices, infrastructure, and challenges, as well as proposed improvements for sustainable and resilient wastewater management. The document is structured as follows:

1. **Introduction** - Outlines the context and importance of wastewater management in St. Kitts and Nevis, referencing public health and environmental risks.
2. **Current Infrastructure and Technology** - Reviews existing systems, their efficiency, technological application, and maintenance challenges.
3. **Legislative and Policy Framework** - Discusses relevant laws, governance, and compliance with international standards.
4. **Environmental and Health Impacts** - Examines the adverse effects of current practices on ecosystems and public health.
5. **Economic Aspects** - Analyzes the costs associated with current and improved wastewater systems, exploring financing options.
6. **Societal and Cultural Attitudes** - Considers public perceptions and engagement in wastewater management.
7. **Technological and Innovative Solutions** - Identifies potential new technologies suitable for the local context.
8. **Recommendations** - Provides actionable strategies for improvements.
9. **Conclusions** - Summarizes the findings, highlighting the critical need for regulatory, infrastructural, and financial enhancements.

### 1.1 Literature Review

Wastewater management in St. Kitts and Nevis encompasses multiple challenges across public health, environmental sustainability, regulatory gaps, and climate adaptation needs. An in-depth review of various reports provides a clearer understanding of the complex issues and strategic recommendations for wastewater management in the Federation.

#### Public Health and Environmental Risks

Wastewater pollution poses significant health and environmental threats in St. Kitts and Nevis. Residential and agricultural wastewater flows into natural drainage channels (*ghauts*) which carry contaminants such as agricultural runoff, livestock waste, and graywater. This untreated wastewater reaches coastal and marine ecosystems, impacting coral reefs, increasing sedimentation, and affecting biodiversity critical to tourism and fisheries (Simmons and Associates, 2024). The *Vulnerability and Adaptation Assessment Chapter of the Third National Communications to the UNFCCC* (2021) highlights that erosion and sediment accumulation exacerbate these impacts, especially in areas like Basseterre Bay, where rising pollution levels pose both ecological and public health risks due to the contamination of freshwater sources.

## Infrastructure and Regulatory Gaps

Many reports indicate a pressing need for wastewater infrastructure improvements and updated regulatory frameworks. Much of the populace are served by septic tank and soakaway systems which are often not properly designed, constructed or maintained. As such, these systems can increase contamination risks, especially during heavy rains, which cause overflow and potential groundwater contamination (GOSKN, 2018; HR Wallingford Ltd., 2021). Regulatory gaps are also evident, as wastewater disposal from industrial and agricultural sources lacks proper oversight due to a lack of specific effluent regulations. Recommendations call for revisions to the *Public Health Act* and the establishment of wastewater discharge effluent standards to limit pollutants from various sectors (Ocean Earth Technologies, 2009; PAHO, 2024).

## Adaptation Strategies and Resilience Building

The reviewed reports emphasize Integrated Water Resources Management (IWRM) as a central strategy to manage wastewater pollution, promote resilience, and mitigate water scarcity. IWRM encourages collaboration across sectors to safeguard water quality through initiatives such as rainwater harvesting, gray water recycling, and wastewater recycling for non-potable uses, particularly in the tourism industry. This approach is critical for balancing water demand as tourism and other sectors expand (GOSKN, 2018; HR Wallingford Ltd., 2021). Additionally, the *Water Sector Adaptation Plan* (2021) identifies targeted goals to improve watershed protection, which includes better management of ghauts and waterways to prevent runoff and sedimentation.

## Climate-Resilient Infrastructure Development

Wastewater management strategies also prioritize infrastructure that is resilient to climate impacts, as St. Kitts and Nevis are highly susceptible to extreme weather, including hurricanes and heavy rainfall events. The *Saint Christopher National Physical Development Plan: Vision 2040* (2023) advocates for infrastructure improvements in rapidly urbanizing areas to manage population growth impacts on water resources. The "ridge-to-reef" approach is recommended, emphasizing upstream interventions in wastewater management to protect downstream marine ecosystems. This integrated approach helps reduce risks associated with flooding and erosion by maintaining functional wastewater systems during and after severe weather events, contributing to both public safety and environmental protection (Government of St. Kitts and Nevis, 2023).

## Data Gaps and International Support Needs

The need for comprehensive data collection and monitoring of wastewater effluents is repeatedly emphasized, particularly in the *Revised Nationally Determined Contribution (NDC)* (2021). Limited data hinder the ability to track and enforce pollution controls. International

funding and technical assistance are also called for to help develop climate-resilient wastewater infrastructure, monitor water quality more rigorously, and close critical data gaps that impact effective water resource management (Government of St. Kitts and Nevis, 2021).

### Sector-Specific Impacts and Recommendations

- **Tourism Sector:** The expanding tourism industry adds pressure on water resources and wastewater treatment requirements. The adaptation strategies call for a focus on water recycling for non-potable uses within tourism facilities and support for hotels that already use desalination, thereby alleviating public water system demands (HR Wallingford Ltd., 2021).
- **Healthcare Sector:** Recent upgrades at the JNF hospital in St. Kitts underscore the need for improved healthcare wastewater management, as hospitals generate unique waste that poses additional risks if not treated adequately. Enhanced wastewater treatment in healthcare settings is recommended to minimize public health risks associated with untreated effluents (PAHO, 2024).
- **Agriculture:** The reports also highlight agricultural runoff as a key contributor to water pollution. Recommendations suggest establishing guidelines for managing livestock waste and agrochemical runoff to protect water sources from nutrient pollution and sedimentation, which harm both freshwater and marine ecosystems (Simmons and Associates, 2024; Ocean Earth Technologies, 2009).

This review of key reports reveal that wastewater management in St. Kitts and Nevis is closely tied to public health, environmental protection, and climate resilience. Key recommendations include updating wastewater regulations, improving monitoring systems, establishing climate-resilient infrastructure, and advancing IWRM practices. These steps will support the islands' efforts to protect ecosystems, ensure public health, and strengthen their resilience to climate impacts.

## 2.0 Current Infrastructure and Technology

### 2.1 Overview of Existing Wastewater Collection, Treatment and Disposal Systems

St. Kitts and Nevis utilizes a combination of decentralized wastewater collection systems. Urban areas typically rely on septic tanks / soakaway systems and small-scale package wastewater treatment plants, while more rural areas rely on septic tanks and to a much lesser degree, pit latrines (only 2% reported in the last census). Centralized collection systems do not exist due to the island's topography, dispersed population, historical colonial era infrastructure development patterns and overall high capital costs.

Tourism facilities and large commercial establishments often operate their own treatment systems as small septic system are no longer practicable given the large flow rates of wastewater generated. Table 1 lists various sectors / buildings and the types of treatment systems installed in St. Kitts and Nevis along with observations noted during field visits undertaken in April and May 2024.

### 2.2 Efficiency and Capacity of Wastewater Treatment Facilities

The existing wastewater treatment facilities are generally **limited in capacity** and are designed primarily to serve specific locations like hotels, government facilities, and some residential areas. Due to a lack of robust infrastructure, many wastewater systems on the islands struggle with efficiency. There are challenges in achieving high treatment levels, resulting in concerns regarding effluent quality and environmental impact. This is especially true with package treatment plants which do not receive adequate maintenance. The systems are often not sized to handle peak loads, particularly in areas with a high influx of tourists, causing periodic overflows and underservicing during peak seasons.

### 2.3 Technologies Used in Wastewater Treatment and Their Effectiveness

**Septic Tanks:** Septic tanks are the most used technology across both islands, especially in residential areas. They provide primary treatment but are limited in effectiveness for reducing nutrients.

**Package Treatment Plants:** Some resorts and larger commercial facilities use package treatment plants that provide secondary treatment. These systems are more effective at reducing contaminants but require regular maintenance to operate effectively.

**Constructed Wetlands and Natural Treatment Methods such as aerated and non-aerated lagoons:** To a very limited extent, natural treatment systems, such as constructed wetlands, have

been explored for their low energy requirements and effectiveness in treating wastewater sustainably.

## 2.4 Maintenance and Operational Challenges

Due to limited resources and technical expertise, regular maintenance is a challenge. Septic systems, for example, often face issues related to inappropriate sizing during the design phase, poor construction and infrequent desludging and poor upkeep. Most of the populace have a “out of sight, out of mind” mentality as it relates to these systems. Actions are only taken if the system has failed. Culex mosquito breeding was noted as a major problem in Nevis due to improper design and construction of septic systems especially lack of screens on vents to prevent mosquito breeding. On both islands, EHD officers report greywater from homes being discharged onto the street instead of the septic tank especially in older housing subdivisions. In Charlestown, grey water is allowed to flow down out into the street into the drains but outside of Charlestown area: most older residents contain their grey water on their property (in most cases the grey water would flow where there are vegetation such as sugar cane, bananas, citrus or dasheen trees) or it would flow into a ghaut if the property has one. Residential homes, built after 2000, must have a soak away system along with septic tanks. In areas where the water table is high, holding tanks are recommended.

The operational efficiency of treatment systems is often hindered by insufficient funding, a shortage of trained personnel, and limited spare parts availability (for more sophisticated package systems).

Meeting environmental standards is an ongoing challenge, particularly given the lack of a structured legal enabling environment (outdated legislation, absence of policy and action plans, weak institutional capacity) and limited enforcement capacity. There are efforts to improve the management of wastewater to protect marine environments, but these efforts are constrained by these weaknesses.

**Table 1: Types of Wastewater Treatment Systems in St. Kitts and Nevis**

Sector / Wastewater type	Wastewater treatment system type	Observations
<b>St. Kitts</b>		
Abattoir	Septic / soakaway / leach field	Operational with minimal issues
Major hotels Marriott (with effluent from homes in Frigate Bay and Royal St. Kitts hotel)	Activated sludge plant with tertiary treatment in an aerated lagoon. Used for irrigation or discharged into ocean through a series of ponds on the golf course.	Effluent is tested by the private contractor that operates the plants but not shared with EHD unless requested. Plans underway to begin to test the effluent more regularly for BOD, phosphates and nitrates. Inspection of the plant showed growth of algae in aeration chambers and other signs of insufficient maintenance [Photo 1]
Ramada / Koi / Kittitian Hill / Sugar Bay Club / Timothy Hill	Septic / soakaway	No additional details given. No site visit.
Park Hyatt	Package treatment plant	
Yachts	All vessels are required to have their own holding tanks. No pump out service available except at Christophe Harbor.	
Airplanes	Holding tank at RLB airport for aircraft waste is treated with white lime and after some retention time (not specified), it is treated in a package activated sludge plant located near to the front of the airport with effluent directed to a leach field.	Operational with recent maintenance and upgrades to the system. No sampling of effluent done by EHD. Leachfield appeared to have areas with standing water [Photo 2]
Septage	Cess pool at the landfill	Under the control of the SWMC. No testing done. More than one cess pool located at the landfill.
Funeral homes	Septic tank / soakaway	No complaints.
Animal waste	Some farmers have concrete pads which are washed periodically. Typically, the waste is directed into a nearby ghaut / waterway.	No regular sampling or enforcement by EHD or Agriculture.
Mechanics	Waste oil directed to landfill or into drains / ghauts	EHD has limited enforcement capacity but will do so when alerted.
Power plant	Oil water separator at the power plant	No complaints, EHD not sure about the activities at the power plant and the oily waste generated.
Brewery	Treatment plant (but no details available as to the exact type)	Not regularly monitored by EHD.



Ross University	Tertiary Treatment plant	
Windsor University / UHMS	Unclear what type of system they have	
Restaurants on the strip (Frigate Bay Beach)	Waste from toilets is directed to a holding tank and periodically pumped by the Frigate Bay Corporation.	This can be problematic during high tide.
JNF Hospital	Recently refurbished activated sludge plant	Pre-treatment chamber appeared to be clogged and not regularly cleaned [Photo 3] and growth of algae in the aeration chambers [Photo 4]
<b>Nevis</b>		
Abattoir	Formerly serviced by a lagoon which is no longer functional. Discharge into adjacent ghaut.	Once the abattoir boiler plant is established, DPPE indicated that a constructed wetland will be implemented.
Major hotels Four Seasons	Activated sludge plant with reuse of effluent for irrigation.  Most other hotels have septic tanks and soakaway system except where the water table is high and package plants or holding tanks are required.	No external sampling of effluent done by EHD. Complaints from time to time would trigger corrective actions by the hotel. Smaller hotels are served by septic tank / soakaway or package treatment plants
Yachts and airplanes	No offloading of waste in Nevis	
Septage	Cess pool at the landfill	
Funeral homes	Septic / soakaway	No complaints
Animal waste	No systematic collection or treatment of waste. Discharged into ghauts / land	
Malcolm Guishard Park and nearby restaurants on Pinneys Beach	Outfitted with a new package treatment plant (2 at the park in total. No details as to the exact design / configuration). [Photo 5]	In the recent past, the restaurants directed waste into holding tanks which were pumped weekly or biweekly as needed. Intermittent overflows were directed to adjacent wetland which discharged into ocean. [Photo 6]
Power plant	No oil water separator	In the past, oily water discharged into street drain, but this has been rectified in recent times.
Mechanics / car wash	Mechanics must collect of waste oils in a secure container and ensure safe disposal at the local landfill.	
Alexandria Hospital	Older activated sludge treatment plant including Grinder pump Holding tank	During site visit, the grinder pump was not functional, there were no bar screens, and no chlorination [Photos 7 and 8]

Financed by



Co-implemented by



Co-executed by



In partnership with



	<p>Aeration tank          Clarification tank          Chlorine contact chamber          Effluent to nearby leach field</p>	
--	--	--

### 3.0 Legislative and Policy Framework

This section highlights the main gaps related to the policy, legislative and institutional framework in St. Kitts and Nevis.

#### 3.1 Relevant National Laws, Regulations, and Standards for Wastewater Management

The relevant laws, regulations and standards for wastewater management in St. Kitts and Nevis are listed below:

- **National Conservation and Environment Protection Act (NCEPA):** NCEPA includes provisions to prevent pollution in natural water systems. It classifies ghauts as areas of special concern, requiring permits for activities that may disturb these sensitive zones.
- **Public Health Act:** The act addresses water contamination concerns and empowers the Ministry of Health to oversee wastewater disposal, ensuring it does not pose public health risks.
- **Waterworks and Watercourses Ordinance (WWO):** This ordinance regulates activities around watercourses, making it an offense to pollute water sources with waste from households or industries. It emphasizes the protection of surface water resources, though it lacks specific provisions for groundwater.
- **Solid Waste Management Act (SWMA) and Solid Waste Management Ordinance (Nevis):** This act mandates licenses for waste disposal facilities, aiming to prevent water pollution by controlling waste disposal practices near water sources.
- **Development Control and Planning Act (DCPA) and Nevis Physical Planning and Development Control Ordinance:** The DCPA grants authority to regulate land use to protect environmental areas. It includes provisions for requiring environmental impact assessments (EIAs) for developments that could affect water resources, such as through wastewater disposal or effluent discharge.
- **Fisheries Aquaculture and Marine Resources Act (FAMRA), 2016** of St. Kitts and Nevis provides a regulatory framework for the conservation, management, and sustainable use of marine resources. It prohibits the introduction of toxic or hazardous substances into fisheries waters, holding offenders liable for fines and requiring them to compensate for environmental damage, including habitat restoration. It also allows the Minister to designate Marine Management Areas, including no-take zones and conservation areas, where strict regulations prevent pollution and other activities that could harm marine biodiversity.

### 3.2 Compliance with Regional and International Environmental Agreements

St. Kitts and Nevis actively engages with international and regional frameworks, including the United Nations Environment Program, Caribbean Environment Programme (CEP), which is the secretariat for the Cartagena Convention, to align its environmental protection policies with regional standards especially with its recent signing of the LBS protocol. St. Kitts and Nevis is also signatory to the International Convention for the Prevention of Pollution from ships (MARPOL), which aims to prevent pollution of the marine environment by ships due to operational discharges and accidental spills. These frameworks support efforts in pollution prevention and resource conservation across Caribbean nations.

The country is also a participant in global environmental agreements, like the Paris Agreement and the 2030 Agenda for Sustainable Development, which underscore the importance of sustainable practices in managing water resources.

### 3.3 Governance Structure

The governance structure and roles of the various players in this sector are listed below:

- **Environmental Health Department [both on St. Kitts and Nevis]:** This department, under the Ministry of Health, monitors water quality standards and regulates wastewater discharge to ensure compliance with public health requirements. It is the main agency charged with wastewater management.
- **Department of Physical Planning St. Kitts and Department of Physical Planning and Environment (DPPE) Nevis:** Established under the DCPA, DPP and DPPE handle land use planning, and the issuance of development permits, particularly concerning projects impacting water resources.
- **Department of Environment:** Established under NCEPA, DOE handles environmental conservation, protected areas and biodiversity and biosafety.
- **Water Services Department (WSD) and Nevis Water Department (NWD):** The WSD is the primary agency responsible for water supply and quality. It oversees water resources management in St. Kitts and Nevis but lacks comprehensive authority due to outdated legislative frameworks that limit its regulatory powers.
- **Public Works Department (PWD) and National Emergency Management Agency (NEMA):** These entities collaborate on flood control and stormwater management, contributing to watershed protection and erosion prevention efforts. The NIA has its own PWD as well as NDMD which is the local arm of NEMA in Nevis.
- **Department of Marine Resources (DMR):** The primary agency responsible for marine resources as outlined under FAMRA.
- **Non-Governmental Organizations (NGOs):** NGOs, such as the St. Christopher National Trust, CYEN (Caribbean Youth Environment Network) SKN, Nevis Historical and Conservation Society (NHCS) and others locally and the Caribbean Water and Wastewater Association (CWWA) regionally, contribute to policy



development, awareness campaigns, and the implementation of best practices in water and wastewater management.

### 3.4 Gaps in Policy, Legislation and Institutional Frameworks

The current framework for wastewater management in St. Kitts and Nevis reveals several critical gaps. Firstly, there is no comprehensive Wastewater National Policy, Strategy, or Action Plan, nor formal mechanisms for managing wastewater effluent discharge and setting effluent standards. There is no framework to issue wastewater discharge permits, whether for release into ambient waters or for reuse as irrigation water. Additionally, the Public Health Act is outdated, necessitating substantial revisions to empower the Environmental Health Department (EHD) as the primary enforcement entity within the Ministry of Health for water quality and wastewater effluent oversight. Moreover, the National Conservation and Environmental Protection Act (NCEPA) requires updates to strengthen pollution control provisions and clarify enforcement roles for the Department of Environment (DOE) and EHD. Additionally, some gaps were identified as to the role of EHD in reviewing and approving plans and designs of wastewater treatment plants, while EHD sits on the DCPB in St. Kitts, in Nevis, their role is not as clearly defined and they act only in an advisory capacity.

Table 2 outlines the current staffing and resources at the EHD in St. Kitts and Nevis. An institutional analysis highlights additional gaps, including insufficient staffing within the EHD to support adequate monitoring and enforcement, and the need for extensive training for all inspectors. Given that the EHD is intended to serve as an enforcement body rather than a service provider, the Government of St. Kitts and Nevis (GOSKN) should consider creating a dedicated utility for wastewater services, particularly as the demand for sophisticated wastewater systems grows with national development.

**Table 2: Governance Structure at the EHD in St. Kitts and Nevis**

Island	Vehicles	Workforce
St. Kitts	4	32 Environmental Health Officers 14 Vector Control Officers Chief Environmental Health Officer (reports to CMO)
Nevis	3	6 Environmental Health Officers 5 Vector Control Officers Principal Environmental Health Officer (reports to PS Health NIA)

### 3.5 Recommendations to Address the Gaps

To address these gaps, several recommendations are proposed. Firstly, NCEPA and the Public Health Act should be enhanced with regulations that establish clear effluent standards for wastewater discharge, forming a robust framework for effective enforcement. This framework should include a permitting process for large-scale wastewater discharges, whether into ambient waters or for irrigation use, with specific standards for treated wastewater intended for irrigation. Facility owners should be responsible for demonstrating the suitability of effluent

through regular testing, with reports submitted to the EHD. Additionally, deterrent measures, such as fines, should be strengthened to promote regulatory compliance. The framework should empower EHD, DOE, DPP or DPPE officers to conduct inspections, collect samples, and issue stop orders when necessary.

Furthermore, strengthening the enforcement capacity of the DPP and DPPE in overseeing the design and construction of onsite wastewater treatment systems is essential. This effort includes planned updates to the national building code, expected to be completed by the end of 2024, to align with best practices in design and construction. The EHD should have access to design plans for all housing projects, including government developments, to ensure compliance with wastewater management standards.

To support effective enforcement, EHD, DOE, DPP and DPPE officers should receive certification and authorization to inspect development sites, particularly during the construction and commissioning of wastewater treatment plants. Comprehensive training for inspectors is crucial, and partnerships with law enforcement should be established to ensure the safety of inspectors during their duties.

## 4.0 Environmental and Health Impacts

The assessment by Ambient Environmental Consulting (2021) of water quality monitoring practices in St. Kitts and Nevis provided a comprehensive review of existing systems, identifying several key areas for improvement:

1. Water Quality Monitoring Scope and Practices:
  - The primary focus on potable water monitoring includes monthly sampling from distribution points and treatment facilities. Coastal and recreational water monitoring is limited and lacks routine, with sporadic checks for indicators such as biological oxygen demand (BOD), nitrates, and microbial contaminants like fecal coliforms and Enterococci.
  - Wastewater monitoring is mostly absent due to infrastructure limitations. There are package treatment plants for specific locations, such as major hotels and Ross University, but no overarching regulatory framework mandates consistent wastewater testing across facilities.
2. Institutional Roles and Resources:
  - The Water Services Department and Environmental Health Department are primarily responsible for water quality assessments but face challenges due to outdated equipment, limited staff, and inadequate laboratory resources. Sampling protocols and data recording are manual and prone to transcription errors, with reliance on Excel for data management.
3. Infrastructure Needs:
  - The departments require upgrades, including modern multi-parameter testing equipment, laboratory space expansion, and secure facilities for data management. Some laboratory equipment, such as pH meters and turbidity meters, are outdated or malfunctioning, impacting data quality and reliability.
  - A recommendation was made for implementing the IDEXX Colilert system to improve microbiological testing accuracy and to consider the Enterolert method for coastal water Enterococci monitoring.
4. Recommendations:
  - Establish a structured water quality monitoring framework with quarterly testing of source waters for contaminants like nitrates and coliforms.
  - Implement data management improvements, possibly through Microsoft data management tools, to streamline reporting and minimize errors.
  - Consider engaging community volunteers or educational institutions in monitoring programs, especially for remote and recreational water sites, to enhance capacity without extensive resource demand.

Ambient's assessment underscores the need for enhanced regulatory support, modernized laboratory capabilities, and sustainable monitoring practices to safeguard water quality in St. Kitts and Nevis.



The current wastewater management practices have direct implications for public health, particularly in areas where septic systems may contaminate groundwater sources. Although drinking water monitoring is conducted, gaps in wastewater treatment mean that microbial contamination from domestic sewage is a persistent risk, potentially contributing to waterborne illnesses. Monitoring of microbial indicators in recreational waters is limited, but existing data suggest that Enterococci levels may sometimes exceed safe thresholds, posing a risk for diseases associated with fecal contamination, especially for beachgoers.

Further, the Department of Environmental Health lacks adequate resources and infrastructure to routinely test for contaminants beyond basic microbial indicators, limiting the ability to identify and address health risks from emerging pollutants or complex pathogens. The need for improved monitoring capacity and emergency response plans is highlighted, as episodic pollution events can escalate health risks for both residents and visitors if not addressed swiftly.

The MOH has an established coordination and data sharing mechanism spearheaded by the Epidemiology Survey Group (ESG), a committee made up of all the key stakeholders across all the health units. Based on weekly reporting from the office of the epidemiologist, the ESG decides on priority actions to respond to disease surveillance data and makes recommendations to the CMO. Although quite strong in relation to vector-borne diseases, there is a lack of reporting / data from private doctors / clinics related to waterborne diseases. As such, this mechanism could be strengthened to facilitate easier and wider data collection and sharing and in-depth mapping to enhance decision-making. To shift to a more proactive management pathway, the development of early warning systems and use of GIS for data mapping will be critical. These systems need to be formalized and expanded to include water-related illnesses, and other diseases which could become more prevalent as the climate changes (PAHO 2024).

In summary, the existing wastewater management practices in St. Kitts and Nevis have notable environmental and health implications due to inadequate treatment, limited regulatory enforcement, and periodic contamination risks. Strengthening monitoring protocols, investing in wastewater infrastructure, and implementing robust health protection measures are crucial to mitigate these impacts effectively.

## 5.0 Economic Aspects

### 5.1 Cost Analysis of Existing Practices and Needed Investments

Current decentralized practices, while affordable, impose long-term costs due to inefficiencies and frequent maintenance requirements. Septic systems and package plants incur periodic costs for desludging, maintenance, that are often overlooked thus impacting both public health and the environment. These costs are generally borne by the homeowner and not always part of household budgets.

By contrast, investment in centralized infrastructure could lead to long-term savings through economies of scale and improved efficiencies especially as population densities increase. An analysis of other decentralized solutions such as constructed wetlands is also worthwhile and should be conducted on a case-by-case basis. That being said, a comprehensive cost-benefit analysis should be undertaken to assess initial capital needs against future economic benefits, factoring in health cost savings, improved tourism appeal from enhanced water quality, and reduced environmental degradation of various solutions.

### 5.2 Financing of Wastewater Management Systems

Wastewater management in St. Kitts and Nevis faces economic challenges, primarily due to limited financial resources. Funding comes mainly from the private sector and government budgets yet falls short of meeting the needs for robust infrastructure and regular maintenance. Establishing a utility service dedicated to wastewater management could improve financial stability by creating consistent revenue streams through user fees or taxation mechanisms. Alternative financing options, such as environmental levies on tourism or grants from international environmental funds, could support sustainability and help meet rising costs due to growing populations and increased tourism demand.

Tourism, a cornerstone of the economy in St. Kitts and Nevis, is vulnerable to wastewater mismanagement. Pollution from ineffective wastewater treatment can degrade marine and coastal environments, deterring visitors and potentially leading to revenue loss. Improved wastewater infrastructure could enhance the appeal of beaches and resorts, offering a cleaner environment and increasing tourism-related revenues. Furthermore, agricultural sectors could benefit from treated wastewater reuse, decreasing reliance on freshwater resources and promoting sustainability.

## 6.0 Societal and Cultural Attitudes

In St. Kitts and Nevis, public understanding of wastewater’s environmental and health impacts remains limited. Many residents may not be aware of the consequences of improper maintenance or disposal using septic tanks. There is limited formal engagement of local communities in wastewater management initiatives. Encouraging communities to participate in wastewater system maintenance and management can improve system longevity and environmental outcomes. Community-based monitoring initiatives and training programs for residents on basic maintenance could enhance engagement and reduce system failures. Education campaigns emphasizing personal responsibility for maintaining septic systems and the broader environmental impact of wastewater are essential to foster community engagement.

Finally, cultural norms play a significant role in shaping attitudes towards water reuse. Traditionally, wastewater is seen as waste rather than a resource, leading to resistance against reuse practices. Increasing awareness about safe, treated wastewater reuse, particularly in non-potable contexts like irrigation, could shift cultural attitudes. Highlighting case studies from similar island settings where treated wastewater is effectively used can help normalize conservation practices.

## 7.0 Technological and Innovative Solutions

The lack of a centralized system presents an opportunity to adopt innovative, decentralized technologies suited for small islands. Technologies such as anaerobic digestion, constructed wetlands and improved septic systems could provide more effective treatment with lower energy needs and be implemented in a decentralized way. Integrating digital tools, such as sensors for remote monitoring, can improve system oversight and maintenance efficiency in areas with limited technical expertise.

St. Kitts and Nevis could benefit from treating and reusing wastewater for agricultural or landscaping purposes, especially in areas with high tourism and freshwater demand. This approach not only conserves freshwater resources but also supports sustainability initiatives in agriculture and hospitality. Although this is already happening at the St. Kitts Marriott and Four Seasons Resort, it is important that these be properly monitored. Other pilot projects in controlled settings, can demonstrate the feasibility and benefits of water reuse to the broader community.

Finally, public-private partnerships could be instrumental in addressing financial and technical gaps. Partnerships with tourism stakeholders, who have a vested interest in maintaining a clean environment, can ensure resources and expertise are shared to enhance wastewater management. Additionally, partnerships can create funding models where private businesses invest in infrastructure and receive incentives, such as tax credits, to offset initial costs.



## 8.0 Recommendations

Table 3 summarizes the gaps and proposed actions and resources needs outlined in the document.

**Table 3: Summary of Gaps and Proposed Actions and Resource Needs**

Category	Identified Gaps	Action Points	Resource Needs
<b>Policy and Legislative Gaps</b>	Lack of comprehensive National Wastewater Policy, Strategy, and Action Plan	Develop a formal wastewater policy with guidelines on effluent standards and discharge permits	Legislative support, trained personnel for drafting policy, legal enforcement mechanisms
	Outdated Public Health Act and National Conservation and Environmental Protection Act	Update laws to strengthen the enforcement capacity of EHD and DOE	Legal expertise, funding for legislative updates, training for enforcement officers
<b>Institutional and Governance Gaps</b>	Insufficient staffing in enforcement bodies and lack of coordination among agencies	Increase staffing, especially environmental health officers; establish inter-agency coordination protocols	Budget for hiring, training programs, inter-departmental communication systems
	No dedicated utility for wastewater services, limiting organized management	Create a dedicated utility for wastewater management to streamline operations	Organizational planning, budget support, potential public-private partnerships
<b>Monitoring and Data Gaps</b>	Limited routine monitoring of wastewater quality; no centralized environmental data database	Establish regular testing protocols and a centralized data management system	Modern lab equipment, data management software, trained staff for ongoing monitoring
	Insufficient data on contaminants beyond basic microbial indicators, affecting response to public health risks	Implement regular testing for additional contaminants, especially in recreational waters and effluents	Updated lab resources, capacity for advanced testing, funding for public health initiatives
<b>Infrastructure Gaps</b>	Over-reliance on septic tanks and limited use of advanced treatment methods	Invest in decentralized treatment solutions like constructed wetlands or anaerobic digestion	Investment funding, technological partnerships, skilled maintenance personnel
	Lack of resilient infrastructure to withstand climate impacts	Integrate climate resilience into wastewater infrastructure planning	Climate-adapted design expertise, materials for resilient infrastructure, international funding
<b>Societal and Cultural Gaps</b>	Limited public awareness and engagement in wastewater management	Launch public education campaigns to promote responsible management and community involvement	Communications staff, outreach materials, partnerships with educational institutions



Category	Identified Gaps	Action Points	Resource Needs
<b>Financial Gaps</b>	Insufficient funding for wastewater management and maintenance activities	Explore alternative financing options like environmental levies or international grants	Financial planning expertise, government incentives, engagement with international environmental funds

## 9.0 Conclusions

The situational analysis for wastewater management in St. Kitts and Nevis underscores significant challenges across infrastructure, regulation, environmental health, economic considerations, societal engagement, and technological adaptation. Current wastewater infrastructure is largely inadequate, with a heavy reliance on decentralized systems, such as septic tanks, that often lack regular maintenance. Additionally, the analysis points out that the current wastewater systems are insufficient to handle the demands of a growing population and tourism industry, underscoring the need for substantial upgrades and improved management practices.

Regulatory and policy frameworks in St. Kitts and Nevis are equally underdeveloped. Key laws, including the Public Health Act and the National Conservation and Environment Protection Act, are outdated and insufficient to empower enforcement bodies or set clear wastewater discharge standards. Without a comprehensive wastewater policy or action plan, structured oversight and enforcement of wastewater management remain limited. This regulatory shortfall complicates efforts to protect water quality, especially in sensitive coastal and marine areas where pollution from untreated domestic and agricultural wastewater threatens ecosystems and public health alike.

Economic constraints present further challenges. A comprehensive cost-benefit analysis of all innovative wastewater management solutions should be undertaken to assess initial capital needs against future economic benefits, factoring in health cost savings, improved tourism appeal from enhanced water quality, and reduced environmental degradation. This shift toward more effective wastewater management whether centralized or decentralized could support not only environmental goals but also create economic benefits by enhancing water quality and promoting a healthier ecosystem for tourism and local communities.

Public awareness and engagement in wastewater management are limited, with many residents unaware of the impacts of inadequate wastewater practices on health and the environment. The analysis emphasizes the importance of educating communities and fostering a culture of shared responsibility to reduce system strain. By encouraging community involvement in wastewater system maintenance and responsible water usage, the government can help build a more proactive approach to wastewater management that extends beyond government oversight alone.

Finally, the analysis notes that decentralized technological solutions suited to the island's unique environment—such as constructed wetlands, anaerobic digesters, and enhanced septic systems—could provide more effective and sustainable wastewater treatment. Public-private partnerships, particularly with tourism stakeholders, could support the adoption of innovative wastewater technologies while alleviating financial burdens through shared resources and incentives. In summary, addressing the findings of this analysis will require an integrated approach that prioritizes infrastructure investment, regulatory reform, public engagement, and

Financed by



Co-implemented by



Co-executed by



In partnership with



sustainable financing to protect the natural resources and public health of St. Kitts and Nevis, while fostering a resilient future for its economy and environment.



## 10.0 References

Ambient Environmental Consulting Inc. 2021. *Water Quality Monitoring Practices Assessment Report for the GEF-IWEco National Sub-Project in St. Kitts and Nevis: Upgrading Water Quality Monitoring Protocols in St. Kitts and Nevis*. Prepared for the Global Environment Facility Integrating Water, Land, and Ecosystems Management in Caribbean Small Island Developing States (GEF-IWEco) Project, December 15, 2021

Burrowes, R., Debortoli, N., Clarke, J., Litt, A., Eyzaguirre, J., & Campbell, D. 2021. *Vulnerability & Adaptation Assessment for St. Kitts and Nevis, Third National Communication to the UNFCCC*. Government of St. Kitts and Nevis, July 28, 2021.

David Simmons and Associates Limited. 2024. *Draft Integrated Climate Vulnerability and Adaptation Assessment for the Agriculture, Health and Tourism Sectors in Saint Kitts and Nevis*. Caribbean Community Climate Change Centre, Belize.

Government of St. Kitts and Nevis. 2023. *Saint Christopher National Physical Development Plan Update: Vision 2040 – Towards a Sustainable Island State*. Developed by the Department of Physical Planning with support from the Global Environment Facility (GEF) and the International Union for Conservation of Nature (IUCN), August 2023.

Government of St. Kitts and Nevis. 2021. *Revised Nationally Determined Contribution of St. Kitts and Nevis*. Communicated to the UNFCCC, October 2021.

Government of St. Kitts and Nevis. 2018. *St. Kitts and Nevis National Climate Change Adaptation Strategy (2018-2030)*. Organisation of Eastern Caribbean States (OECS) Global Climate Change Alliance (GCCA) Project on Climate Change Adaptation and Sustainable Land Management, funded by the European Union (EU).

HR Wallingford Ltd. 2021. *St. Kitts and Nevis – Water Sector Adaptation Plan*. Caribbean Community Climate Change Centre (CCCCC), August 2021.

Ocean Earth Technologies Consortium. 2009. *Review of Current Policy and Legislative Framework for Water Resources Management in St. Kitts*. Prepared for the St. Kitts Water Department, Government of St. Kitts and Nevis, September 2009.

Pan American Health Organization. 2024. *Technical and Institutional Capacity Gaps, and Resource Needs, to Enhance Health Issues in National Priorities, Plans, and Strategies for Climate Resilient Health Systems: St. Kitts and Nevis*. Pan American Health Organization/World Health Organization, July 2024.



## 11.0 Photos



Photo 1: Algae growth in aeration chamber of Royal Utilities treatment plant



Photo 2: Stagnant water observed at leachfield of the RLB Airport treatment plant



Photo 3: Clogged pre-treatment chamber, JNF Hospital wastewater treatment plant



Photo 4: Algae growth in the aeration chamber, JNF wastewater treatment plant



Photo 5: Treatment plant installed at Malcolm Guishard Park



Photo 6: Evidence of overflow from wastewater holding tanks from restaurant area on Pinney's Beach adjacent to Malcolm Guishard Park



Photo 7: Clogged pre-treatment section of the plant at Alexandria Hospital



Photo 8: Aeration chamber of the plant at Alexandria Hospital