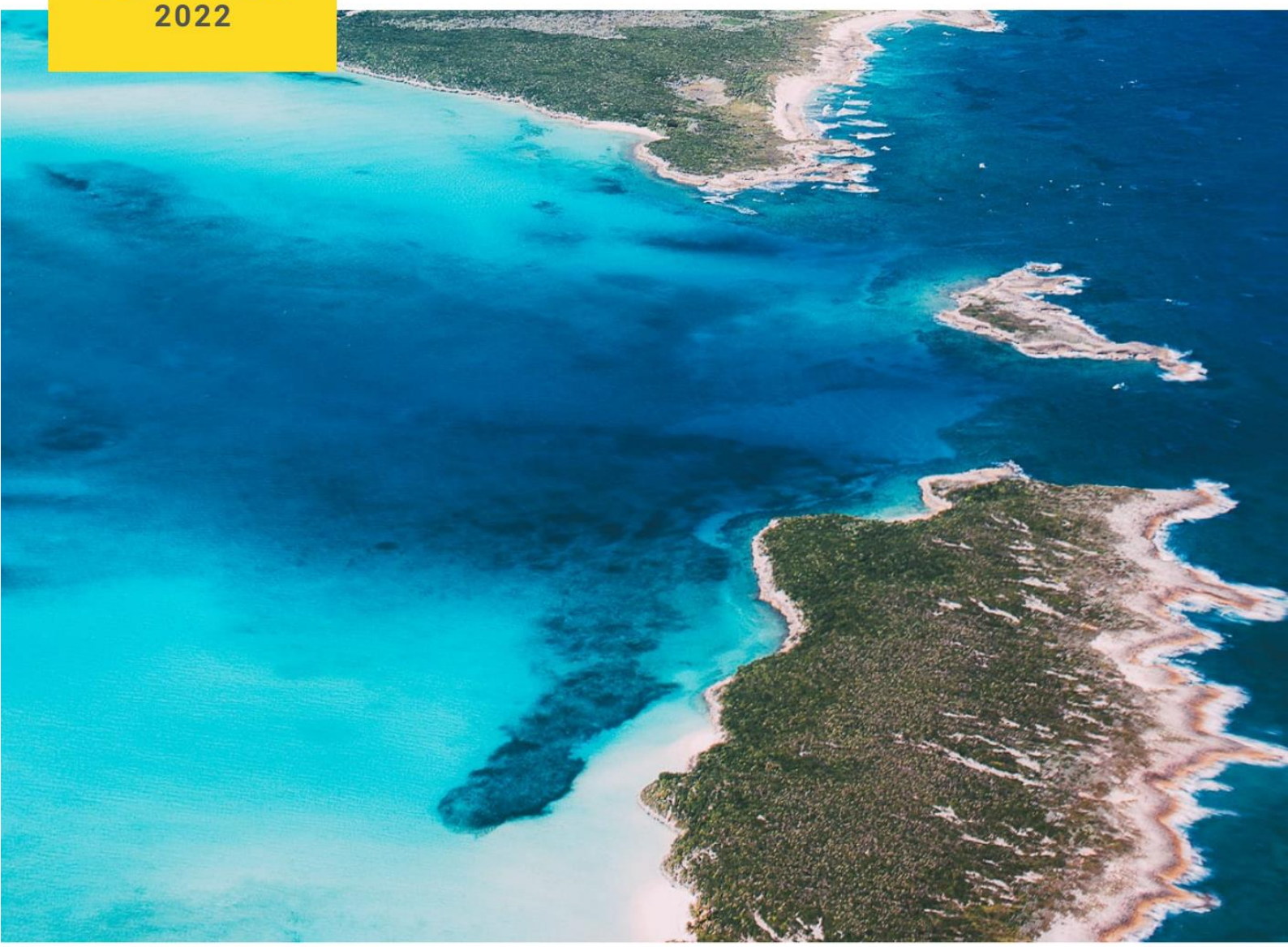
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THE BAHAMAS

MINAMATA INITIAL ASSESSMENT REPORT



Development of Minamata Initial Assessment in The Bahamas

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BCRC CARIBBEAN
Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean

DEPARTMENT OF ENVIRONMENTAL PLANNING & PROTECTION

MINAMATA INITIAL ASSESSMENT REPORT- THE BAHAMAS

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The Department of Environmental Planning and Protection (DEPP), Ministry of the Environment and Natural Resources

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ABOUT THIS DOCUMENT

The Minamata Initial Assessment Report-The Bahamas was developed under the project, "Development of Minamata Initial Assessment in The Bahamas".

The project is an enabling activity for the implementation of the Minamata Convention on Mercury. Funding was received from the Global Environment Facility (GEF) with the United Nations Environment Programme (UNEP) acting as the Implementing Agency and the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC-Caribbean) as well as the Department of Environmental Planning and Protection (DEPP) of the Ministry of the Environment and Natural Resources, acting as the Co-executing Agencies.

The development of the Report and technical backstopping was guided by the BCRC-Caribbean. The report consists of an inventory of mercury releases primarily based on 2020 data. Data collection was conducted by a National Project Coordinator, Ms. Eustacia Jennings, hired by the BCRC-Caribbean, and assessments and recommendations for the effective implementation of the Minamata Convention were provided.

This inventory was performed in accordance with UN Environment's "Toolkit for identification and quantification of mercury releases", Inventory Level 2 (version November 2019).

The report also includes an assessment of the Policy, Legislative and Institutional Framework in relation to the implementation of the Minamata Convention on Mercury, which was developed by the legal consultant, Gonsalves-Sabola Chambers. Additional assessments and recommendations are outlined in chapters relating to populations at risk, education and awareness-raising strategies, and priorities for action to ensure the effective implementation of the Minamata Convention on Mercury.

For data collection and verification, a voluntary National Working Group consisting of national stakeholders from relevant sectors was formed.

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List of Abbreviations

ACHS	Advisory Council for Health and Safety
BAHSFA	Bahamas Agricultural Health and Food Safety Authority
BASFSAA	Bahamas Agricultural Health and Food Safety Authority Act, 2016
BAT	Best Available Techniques
BBS	Bahamas Bureau of Standards
BCCEC	Bahamas Chamber of Commerce and Employers Confederation
BCED	Bahamas Customs and Excise Department
BCRC-Caribbean	Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean
BDA	Bahamas Dental Association
BDC	Bahamas Dental Council
BEP	Best Environmental Practices
BPA	Bahamas Pharmacy Association
BPC	Bahamas Pharmacy Council
BPL	Bahamas Power and Lighting Company Limited
BRI	Biodiversity Research Institute
BUFHMA	Bahamas United Funeral Homes and Morticians Association
CARICOM	Caribbean Community
CARPHA	Caribbean Public Health Agency
CBD	United Nations Convention on Biological Diversity
CCFLs	Cold Cathode Fluorescent Lamps
CDB	Caribbean Development Bank
CDEMA	Caribbean Disaster Emergency Management Agency
CDM	Comprehensive Disaster Management
CFLs	Compact Fluorescent Lamps
CH_3Hg	Methylmercury
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
CMA	Customs Management Act, 2011
CMO	Chief Medical Officer
COP	Conference of the Parties
CROSQ	CARICOM Regional Organization for Standards and Quality
CSOs	Civil Society Organisations
DEHS	Department of Environmental Health Services
DEPP	Department of Environmental Planning and Protection
DFS	Director of Food Safety
DLA	Director of Legal Affairs
DOA	Department of Agriculture
DOH	Department of Health
EAF	Environmental Administration Fund
EC	European Commission
EEFLs	External Electrode Fluorescent Lamps
EHB	Environmental Health Board
EHSA	Environmental Health Services Act, Chapter 232
EHS(CDW)R	Environmental Health Services (Collection and Disposal of Waste) Regulations, 2004
EIA	Environmental Impact Assessment
EPPA	Environmental Planning and Protection Act, 2019
ESM	Environmentally Sound Management
ESP	Electrostatic Precipitator
ETF	Environmental Trust Fund
FAO	Food and Agriculture Organization
FDA	U.S. Food and Drug Administration

F(SPI)R	Food (Seafood Processing and Inspection) Regulations, 2002
FSQA	Food Safety and Quality Act, 2016
g	Gram
GBPA	Grand Bahama Port Authority Limited
GBPC	Grand Bahama Power Company
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information Systems
GLC	Great Lakes Commission
GSA	Geological Society of America
HDI	Human Development Index
Hg	Mercury
$HgCl_2$	Mercury Chloride
HgO	Mercury Oxide
HgS	Mercury Sulphide
$HgSO_4$	Mercury Sulphate
HPMV	High-Pressure Mercury Vapour
HSA	Health Services Act, Chapter 231
HS Code	Harmonised System Codes
HSWA	Health and Safety at Work Act, Chapter 321C
HCGB(DWHIA)A	Hawksbill Creek, Grand Bahama (Deep Water Harbour and Industrial Area) Act, Chapter 261
lbs	Pounds
ICM	Integrated Chemicals Management
ILO	International Labour Organisation
IL2	Inventory Level 2
IQ	Intelligence Quotient
ISLANDS	Implementing Sustainable Low and Non-Chemical Development in Small Island Developing States
ISM	Interim Storage of Mercury
Kg	Kilogram
Kg Hg/y	kilograms per year
LCD	Liquid Crystal Display
LEDs	Light-Emitting Diodes
LFLs	Linear Fluorescent Lamps
LPG	Liquid Petroleum Gas
M&E	Monitoring and Evaluation
MAPs	Mercury-Added Products
MCMM	Minamata Convention on Mercury Management
MEA	Ministry of Environment Act, 2019
MEAs	Multilateral Environmental Agreements
mg	milligrams
MIA	Minamata Initial Assessment
mm	Millimetres
MOA	Ministry of Agriculture, Marine Resources and Family Island Affairs
MOENR	Ministry of the Environment and Natural Resources
MOH	Ministry of Health and Wellness
MOL	Ministry of Labour
MOW	Ministry of Works
MW	Megawatts
NCCC	National Chemicals Coordinating Committee
NEPF	National Environmental Policy Framework

NGOs	Non-Governmental Organisation
NIP	National Implementation Plan
NPEP	New Providence Ecology Park
NREL	National Renewable Energy Laboratory
NWG	National Working Group
OAG	Office of the Attorney General
OECS	Organisation of Eastern Caribbean States
PPE	Personal Protective Equipment
POPs	Persistent Organic Pollutants
ppm	Parts Per Million
RBPF	Royal Bahamas Police Force
RoHS	Restriction of Hazardous Substances
SAICM	Strategic Approach to International Chemicals Management
SDG	Sustainable Development Goals
SIDS	Small Island Developing State(s)
sq. km	Square Kilometres
t	Tonne
THg	Total Mercury
UN	United Nations
UN ECOSCO	The United Nations Economic and Social Council
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
UPOPs	Unintentional Persistent Organic Pollutants
US	United States
US EPA	United States Environmental Protection Agency
WEEE	Waste Electrical and Electronic Equipment
WHO	World Health Organisation
WSC	Water and Sewerage Corporation
WSCA	Water and Sewerage Corporation Act, Chapter 196
WTO	World Trade Organization
ww	Wet Weight

Foreword

The Department of Environmental Planning and Protection (DEPP) in collaboration with the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC-Caribbean) and the United Nations Environment Programme (UNEP), seeks to implement the Minamata Convention on Mercury in The Bahamas.

The Minamata Convention on Mercury is a global treaty that aims to protect human health and the environment from the harmful effects of the toxic chemical mercury. The Convention came into effect in August 2017 and the Government of The Bahamas became a Party to the Minamata Convention in February 2020. While The Bahamas is not a country which participates in the manufacture of mercury, it is a country which is impacted by mercury through the major sources of landfills and /or waste incineration facilities. The Bahamas looks forward to the implementation measures of the Convention to reduce the emissions and releases of mercury from products and processes, phase-out the use of mercury-added products and provide environmentally-sound management of the storage and disposal of mercury waste. The development of the MIA Bahamas Project, has provided an opportunity to undertake a national mercury inventory, assess the national regulatory framework to provide recommendations for the implementation of the objectives of the Convention, develop strategies for the identification of potentially mercury contaminated sites, and identify effective public-awareness and communication strategies to deliver the gathered information in a concise and clear manner.

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Executive Summary

The Minamata Convention on Mercury, which came into effect in 2017, is a multilateral environmental agreement (MEA) that aims to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.

To assess the priorities for the implementation of the Minamata Convention's obligations, the Government of The Bahamas participated in the Global Environment Facility (GEF) funded project, "Development of Minamata Initial Assessment in The Bahamas" (MIA Project). The MIA Project aims to facilitate the implementation of the Minamata Convention on Mercury using scientific and technical knowledge in participating countries. The MIA Project outputs within the project country were overseen by a National Working Group (NWG) comprising of representatives from relevant ministries and institutional bodies.

Under the MIA Project, a national inventory of the major sources of mercury releases and emissions was conducted using the "Toolkit for Identification and Quantification of Mercury Releases" (Toolkit), made available by the Chemicals Branch of the United Nations Environment Programme. This project utilised the Level 2 Toolkit as it provided a more comprehensive assessment of mercury releases. It should be noted that in the Toolkit, the term "releases" is used to cover mercury emissions to air as well as releases to water, land, and other output pathways. The methodology is based on a life cycle approach where mercury releases from a particular human activity are viewed as the consecutive distribution of an original mercury input to various media (air, water, land, etc.) during various stages of the life cycle of the product or process in question. Using previous research and databases available globally, the Toolkit provides set calculation templates to estimate national mercury releases for a country. The estimations provided by the Toolkit have various uncertainties and complexities involved.

For The Bahamas, the inventory primarily used 2020 data obtained through research, interviews and stakeholder questionnaires. However, for some sub-categories, data from the year 2020 was not available and data from previous years, extrapolations based on available data, or default calculations were used to develop estimates. Default calculations were based on the Toolkit assumptions and may have resulted in over- or under-estimations of the actual mercury input. Data gaps were also noted for some sub-categories where no estimations could be made such as informal burning of waste. The completed inventory Toolkit spreadsheet and a listing of national project stakeholders are included as Annexes to this document. It is noted that due to the limited available data for certain categories and the assumptions made, the

estimations of mercury releases for The Bahamas using this inventory should not be considered as definitive but rather as a guide for the identification of priorities and further assessments.

Results of The Inventory of Mercury Releases

Based on the data available, approximately 262.6 kilograms (Kg) of mercury (Hg) were determined to have been released in The Bahamas in 2020. The data used to develop the inventory of mercury releases was collected from national stakeholders by Ms. Eustacia Jennings, the National Project Coordinator.

The estimated mercury releases by source and by output through various release pathways identified are illustrated in Figures 1 and 2. The most significant source of mercury releases was found to be Waste Deposition/Landfilling and Wastewater Treatment. This category accounted for 53.33% of estimated national mercury releases, of which the largest releases were from the source category, Wastewater Treatment (181.0 Kg of mercury per year (Kg Hg/y)) with minor releases from Landfilling (2.42 Kg Hg/y).

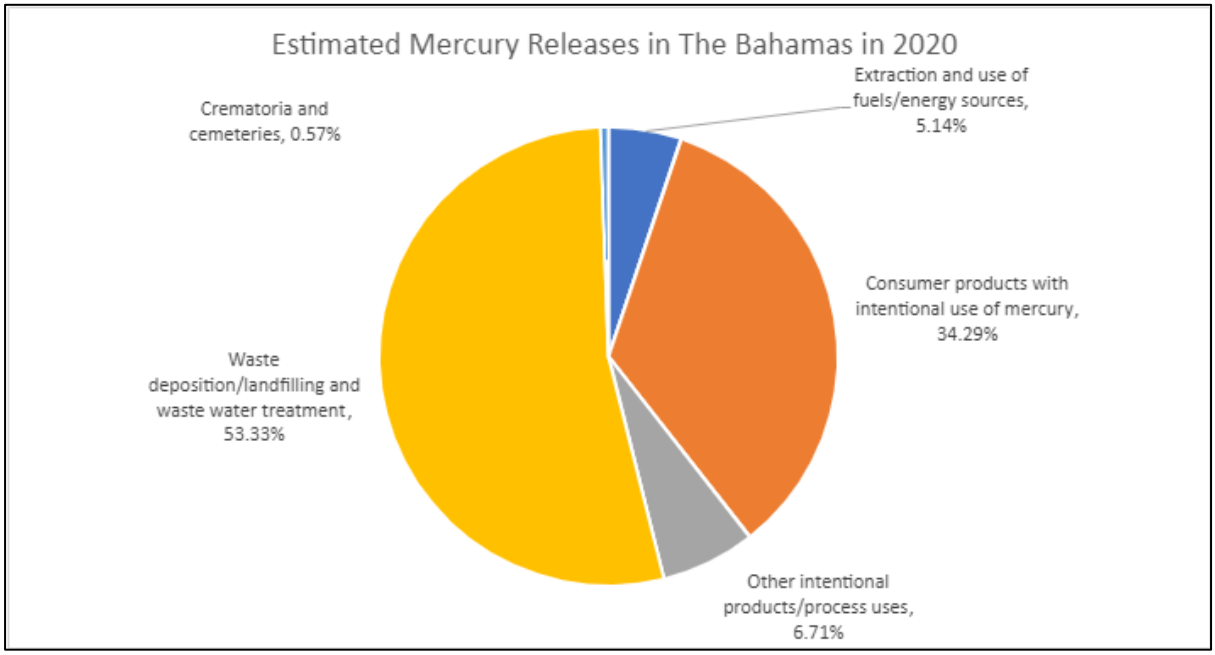


Figure 1: Estimations of total releases from the major sources of mercury identified in the mercury inventory conducted using primarily 2020 data for The Bahamas

Of this total, the majority was estimated to be released to the water output pathway with other significant releases to general waste and sector specific treatment/disposal, and minor releases to air.

The second largest estimated source of mercury releases was found to be from the category: Consumer Products with intentional use of mercury. This category accounted for 34.29% of the estimated national mercury releases

due to the use and disposal of mercury containing electrical switches and relays, polyurethane with mercury catalysts, batteries, and lighting devices, which accounted for inputs of approximately 41.70 Kg, 8.94 Kg, 8.86 Kg, and 0.26 Kg of mercury per year (Kg Hg/y) respectively, resulting in a total of 59.8 Kg Hg/y.

The third highest source of mercury releases was from the category: Other Intentional Products/Process Uses, which referred to sources such as Dental Amalgam Fillings (5.76 Kg Hg/y), Laboratory Chemicals and Equipment (3.93 Kg Hg/y), and Manometers and Gauges (2.00 Kg Hg/y).

Other releases were estimated from the categories, Extraction and Use of Fuels/Energy Sources (referring to the combustion and use for transport and other uses of mineral oils) with the largest releases attributed to the use of mineral oils for transportation. Minor releases were also estimated from Crematoria and Cemeteries.

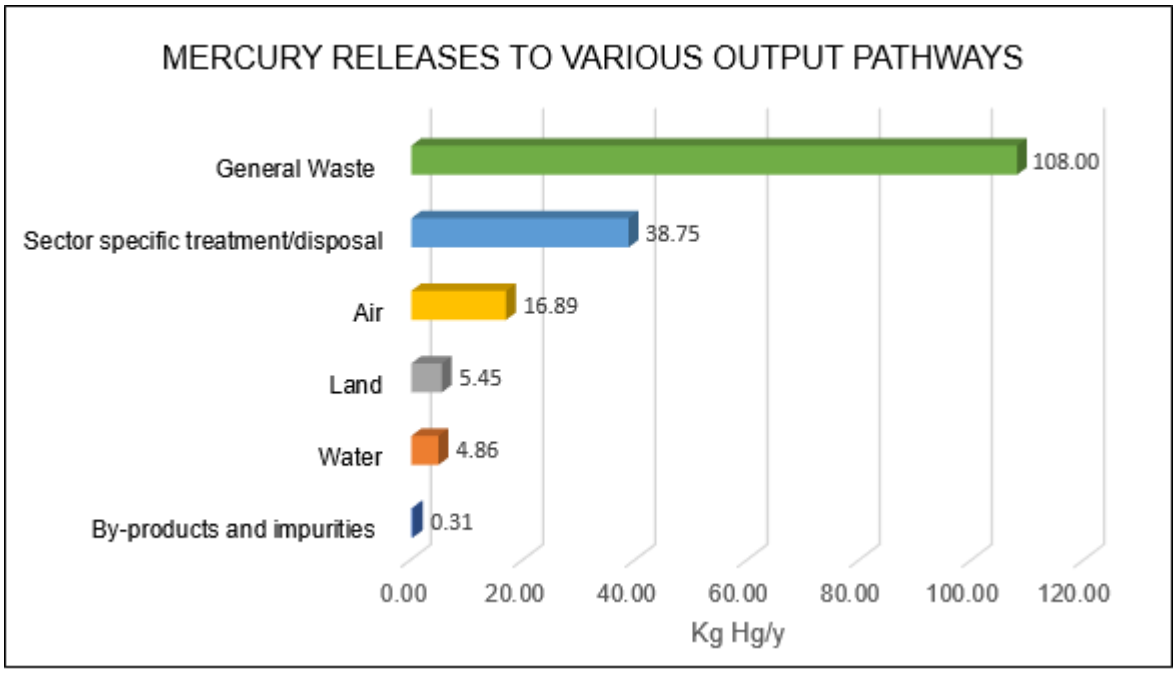


Figure 2: Estimations of releases to each output pathway from the major sources of mercury identified in the mercury inventory conducted using 2020 data for The Bahamas

Major Findings of the Policy, Regulatory and Institutional Framework Assessment

An assessment of the policy, regulatory and institutional framework related to the mercury management was conducted under the MIA Project by legal consultant, Gonsalves-Sabola Chambers.

The Bahamas has shown some policy, legislative and institutional capacity to manage chemicals nationally however

a general observation of this study is that these frameworks and practices do not adequately fulfil what is required to attain compliance with the Convention.

The Bahamas has established general policies for the environment, human health and safety and hazardous wastes, and policies as it relates to the compliance to Multilateral Environmental Agreements (MEAs). These policies provide background and act as a framework for chemicals management as it relates to mercury. However, a chemicals management policy is needed, with detailed strategies that address the risks of mercury, through the identification of the main goals of The Bahamas in its chemical management framework and the process to achieve it.

The Ministry of the Environment Act 2019 serves as the overarching Act, which allowed the establishment of the Ministry that is responsible for the environment, now called the Ministry of the Environment and Natural Resources (MOENR). This Act establishes a framework for implementing international environmental agreements, and appropriate disbursement of funds. The other instruments of importance are the Environmental Health Services Act, Chapter 232, which deals with environmental pollution, the Environmental Health Services (Collection and Disposal of Waste) Regulations, 2004, which deals with the disposal of domestic and commercial waste, the Customs Management Act, 2011, which involves the imports and exports to The Bahamas, and the Standards Act, Chapter 338A, which focuses on the regulations regarding packaging, labelling, description and advertising.

The implementation of the Minamata Convention also aligns with other MEAs. Attention to the environmentally safe handling and disposal of mercury wastes creates linkages for policymaking and management with similar efforts of the Basel, Rotterdam and Stockholm Conventions, and the Cartagena Protocol.

In addition to the legal framework, the Minamata Convention obliges Parties to establish appropriate institutional arrangements for fulfilling its obligations. The relevant organisations under which the various policies and legislation fall work separately, resulting in fragmented and dispersed efforts. Reliance must be placed on the structures of government with a collaborative approach to bolster its impact. A single entity, that is all encompassing, for the management of the matters at it relates to mercury, and chemicals and waste management on a whole, can facilitate the streamlining of information, to assist in achieving a collective approach, where all key agencies which are charged with the task of regulating chemicals and waste, fall under the remit of one entity.

The following recommendations are proposed for the Government of The Bahamas:

- The preparation of a mercury policy by the Department of Environmental Planning and Protection (DEPP), in collaboration

with the National Working Group (NWG) and the National Chemicals Coordinating Committee (NCCC), where the specific aims, as it relates to the Minamata Convention, are detailed, along with the measures for compliance
- Amendments to the Customs Management Act by the Office of the Attorney General (OAG) to account for prohibitions on and restrictions to the import and export of mercury
- Development of procedures for the environmentally sound storage and disposal of mercury, mercury-added products and mercury compounds
- Testing and monitoring of seafood
- Identification of point source categories
- Determination of stocks of mercury or mercury compounds in excess of 50 metric tons
- Development of a national plan and inventory for the control of releases
- Undertake public awareness and public education campaigns on the impacts of mercury on human health and the environment

Strategies for Identification of Contaminated Sites and Assessment of Risks to Human Health

The development of a strategy to identify sites contaminated by mercury used the work completed by the Biodiversity Research Institute (BRI) under the GEF 9991 Project (MIA Belize) as a guide. Under the MIA Belize Project, BRI (2019) found that "mercury sensitivity patterns were strongly driven by the combination of the spatial distribution of wetlands and potentially contaminated sites."

For this MIA Project, Geographic Information System (GIS) datasets of potential point sources of mercury and ecosystems that might be sensitive to mercury inputs were obtained and used to create maps. Between 2021 and early 2022, the GIS datasets were obtained from the Bahamas National GIS Centre, the GIS Services Department of the Water and Sewage Corporation (WSC) and The Nature Conservancy. The maps that were created highlight the locations of certain ecosystems, particularly wetlands, with the locations of potentially mercury contaminated sites, including disposal sites and wastewater treatment plants, as well as towns and other points of interest.

Using the maps developed under this MIA Project, The Bahamas can identify areas where potentially contaminated sites and wetlands are in close proximity to towns or other settlements and carry out tests for the presence of mercury. These tests are recommended as understanding the levels of mercury in such areas will help in the development of activities to reduce the risk mercury can cause on human and environmental health.

Additionally, it is recommended that in the future, the presence and location of additional potential sources of mercury are identified and verified by relevant authorities in The Bahamas. The location of these sources can be added to the maps created and further areas

where mercury testing should be done can be identified.

Exposure to elemental mercury and mercury compounds can pose a higher risk to certain populations that are more sensitive to their effects or have an increased frequency of exposure. These groups include pregnant women and women of childbearing age, foetuses, newborns and young children, individuals with health-related preconditions, and individuals who consistently use mercury added products (MAPs). Also at risk are people living in areas that are more susceptible to environmental contamination by mercury and workers exposed to mercury on a regular basis including dental and medical professionals and assistants, waste handlers, environmental officers, firemen and first responders, laboratory workers and other industrial workers.

Populations with a regular diet of contaminated high trophic level aquatic organisms are also at risk of mercury exposure. The Government of The Bahamas is encouraged to monitor quantities of mercury in fish and seafood to understand their citizens' level of exposure and develop appropriate advisories and guidance on healthy dietary practices throughout the country.

Awareness-raising Strategies for Mercury Management

Under the MIA project, stakeholders from the relevant government sectors such as health, customs, the environment, and the private sector, have been made aware of the focus for sound mercury management throughout the duration of the project, through the frequent NWG meetings. In addition to the National Minamata Initial Assessment Report and discussions, a communications strategy was developed, with the update of communications materials. These materials also include technical briefing documents, which will provide information to all key stakeholders and government officials. The documents provide the results of the different components of the project and will assist in high-level stakeholder engagements or in drafting relevant cabinet briefing notes to promote the enforcement and implementation of the Minamata Convention.

Based on the materials produced, the developed communications strategy for mercury awareness for The Bahamas includes the use of social media campaigns, Public Service Announcements via radio, partnering with local public figures, and the development of a content calendar for the roll-out of communications products by DEPP.

Priority Areas for Consideration in the Implementation of the Minamata Convention

Recommendations for consideration in the implementation of the Minamata Convention may include:

- Maintenance of a National Coordination Committee to oversee the implementation of Minamata Convention in coordination with other chemicals and waste management initiatives.

- Phase-Out or Phase-Down of Mercury-Added Products
- Strengthening of the national or regional capacity to test and monitor mercury in human health and the environment.
- Environmentally Sound Management of Mercury Wastes
- Integration of gender into mercury abatement projects.

INTRODUCTION

Mercury in the Environment

Mercury (Hg) is a highly toxic heavy metal which occurs naturally in the Earth's crust. It is commonly found as a reddish-brown compound called cinnabar (mercury sulphide (HgS)) and can be released into the environment via natural processes or anthropogenic releases. Once released and mobilised into the environment, mercury cannot be destroyed and will cycle between air, water, and land.

Some of the natural processes that release mercury into the environment include volcanic eruptions, weathering of mercury-containing rock materials, forest fires, and hydrothermal vents in the ocean (Figure 3).

Human activities have significantly contributed to major increases in mercury levels in the environment. These activities include mining, combustion, production of metal from ores, the intentional use of mercury in products and processes and the remobilisation of previous mercury releases. Anthropogenic sources can account for 30% of the mercury emissions in the atmosphere, while 60% comes from re-emissions of mercury already in the environment, mostly because of previous human activity, and the remaining 10% of the emissions is from natural sources. (UNEP, 2019d).

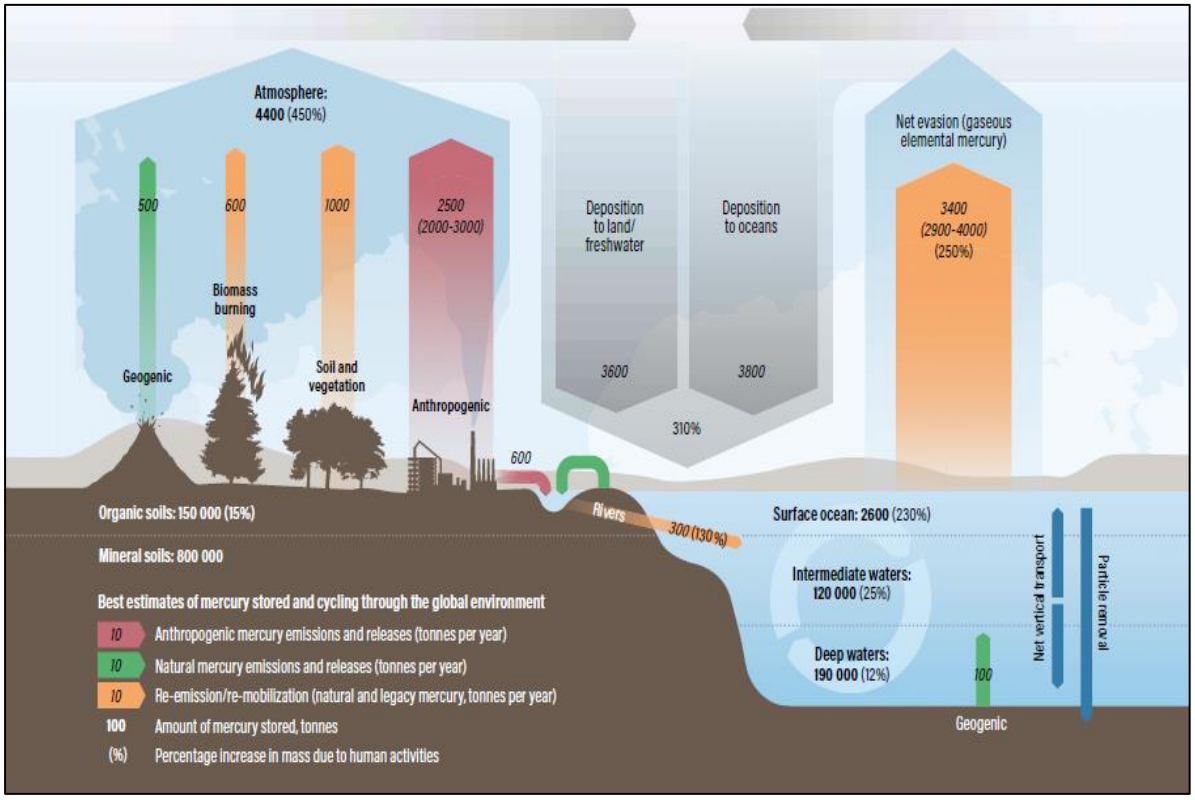


Figure 3: The Global Mercury Budget as it relates to the Mercury Cycle (Values in tonnes of mercury) (UNEP, 2019d)

Mercury possesses unique properties; for example: it has a high density, is liquid at room temperature and can combine with most metals to form alloys called amalgams. With a change in temperature, liquid elemental mercury expands and contracts very precisely, yet, with a change in atmospheric pressure, maintains its volume. These unique properties have made mercury very useful in devices designed to measure temperature or pressure, and it is included as a component of many products and processes.

The World Health Organization (WHO) has listed mercury as one of the top ten chemicals of major health concern (WHO, 2017). In its liquid, inorganic form, mercury poses less of a risk but when deposited into water bodies, it can be converted into its more toxic methylated form through the action of bacteria. This highly toxic organic form of mercury can bioaccumulate and biomagnify up the food chain and can result in different concentrations of mercury in food resources that can affect humans and wildlife.

Inorganic mercury can enter the human body through inhalation or direct contact with the skin, while organic methylmercury (CH_3Hg) can enter through ingestion of contaminated aquatic species. Exposure to mercury is detrimental to human health as it can damage the central nervous system and affect numerous organs, resulting in neurological and behavioural disorders. Symptoms include tremors, insomnia, memory loss, neuromuscular effects, headaches, and cognitive and motor dysfunction (UNEP, 2019a). More severe effects are typically seen in foetuses and young children due to their vulnerable developing systems.

According to the updated Global Mercury Assessment which assessed 2015 global mercury inventory emissions, it was noted that artisanal and small-scale gold mining contributed the most to mercury emissions (approximately 38% of total) as large amounts of elemental mercury are often used in the process. Other key sources included coal combustion, non-ferrous metal production and cement production. Emissions from the disposal of mercury-added products (MAPs), such as thermometers and compact fluorescent lightbulbs accounted for 7% of global emissions. For Central America and the Caribbean region, an estimated 45.8 tonnes of mercury per year were estimated to be emitted accounting for 2.1% of global emissions (UNEP, 2019d). Although the releases of mercury through anthropogenic activity in the Caribbean region are expected to be relatively small, mercury released by other countries around the globe has the ability for long-range transport in the atmosphere and a global approach to mercury management is needed to adequately address its impacts.

Minamata Convention on Mercury

To address the negative impacts posed by the release of mercury, a global treaty called the Minamata Convention on Mercury was developed. The objective of this Convention is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.

The text of the Minamata Convention was adopted on October 10, 2013, and the Convention entered into force on August 16, 2017. The Convention regulates, *inter alia*, mercury supply, sources, and trade; MAPs and processes; interim storage and disposal of mercury, its compounds and mercury waste; and the emissions and releases of mercury.

In the Caribbean region, the countries that are Party to the Minamata Convention as of April 2022 are:

- Antigua and Barbuda,
- The Bahamas,
- Cuba,
- Dominican Republic,
- Guyana,
- Jamaica,
- Saint Kitts and Nevis,
- Saint Lucia, and
- Suriname.

Project Background

Through Article 13 of the Minamata Convention, a financial mechanism was identified to support countries with implementation of the Convention. This included support from the Global Environment Facility Trust Fund for the development of a Minamata Initial Assessment (MIA) which is an enabling activity to determine the national mercury inventory in a country and what is needed to implement the Convention.

The Minamata Initial Assessment for The Bahamas is facilitated through the project entitled the “Development of Minamata Initial Assessment in The Bahamas” (MIA Project) which is funded by the Global Environment Facility (GEF), implemented by United Nations Environment Programme (UNEP) and co-executed by the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC-Caribbean) and the Department of Environmental Planning and Protection (DEPP).

The MIA Project aims to facilitate the implementation of the Minamata Convention on Mercury using scientific and technical knowledge in conducting an inventory of mercury releases (and emissions[1]). The development of an inventory of mercury releases will inform countries of their national mercury sources and subsequently assist in identifying actions to increase their capacity in mercury management.

The inventory was conducted with the use of the "Toolkit for Identification and Quantification of Mercury Releases" (Toolkit), made available by the Chemicals Branch of UNEP. The Toolkit is designed to produce a simple and standardised methodology and database to inform the national mercury inventory. It outlines a UNEP-recommended procedure to facilitate the development of consistent and comparable source inventories. The steps involved include:

1. The identification of the main mercury source categories present in the country;

[1] Under the Minamata Convention, the term “releases” is typically related to mercury released to land and water while the term “emissions” refers to mercury released to air. Under the UNEP Toolkit, “releases” is used to describe mercury released to all media, including air. For this report, the term “mercury releases” will be used predominantly as described under the UN Environment Toolkit.

2. The refining of the identified mercury source categories into further sub-categories in order to determine the individual activities that potentially release mercury, and gathering of qualitative information on the activities;
3. The development of a quantitative inventory; the Inventory Level 2 version of the Toolkit was utilised in this MIA Project as it provided a more comprehensive look at the releases of mercury. Estimations are calculated via equations and procedures specific to the source types identified; and
4. The compilation of the standardised mercury inventory and identification of data gaps which will build on the country's knowledge base on mercury.

It is important to note that in calculating estimations of mercury releases using the Toolkit, there may be various uncertainties and complexities involved. As such, for each mercury source sub-category present, there will be an estimate of releases to all mediums where data is sufficient and an indication of the likely magnitude if full data is unavailable. Major data gaps will also be identified. These considerations will assist in the interpretation of results and prioritisation of future actions.

Other aspects of the MIA Project included an assessment of the legislation, policies, and institutional capacity available to implement the Convention; identification of possible mercury contaminated sites and hotspots; and capacity building, technical assistance, and awareness-raising activities in relation to mercury management. Further details on the project outputs are detailed in Table 1.

For the development of project activities, consultants were hired. The BCRC-Caribbean functioned as the technical experts for the mercury inventory development and the overall MIA Report drafting. Additionally, a National Project Coordinator, Ms. Eustacia Jennings, was hired for the in-country data collection and stakeholder engagement and legal experts, Gonsalves-Sabola Chambers (GSC) were also recruited. Ms. Jennings was later re-engaged as a Project Assistant to provide on-the-ground support with the project's completion. Several local consultants were also engaged for the development, update and subsequent dissemination of the communications materials and dissemination.

To acquire information and develop a comprehensive national mercury management strategy for mercury releases, a national working group of key stakeholders, which included professionals from the waste management, energy, health, and environmental sectors, was formed (Annex 1).

Table 1: Outline of Project Components and Expected Outputs as Stated in The MIA Project Document

Project Component	Project Output
Global technical support and capacity building for MIAs development	1.1 Technical assistance provided to the participating country to develop the MIA while building sustainable foundations for their future implementation of the Minamata Convention
Development and validation of the Minamata Initial Assessments	2.1 Identified and strengthened Project Steering Committee and National Coordination Mechanisms dealing with mercury management that will guide the project implementation
	2.2 National institutional and regulatory frameworks and national capacities on mercury management assessed
	2.3 National inventories of mercury sources and releases developed using the UNEP Mercury Toolkit Level II and strategies for the identification of mercury contaminated sites developed
	2.4 Challenges, needs and opportunities to implement the Minamata Convention assessed and recommendations to ratify and implement the Minamata Convention developed
	2.5 MIA validated by national stakeholders
Monitoring and Evaluation	3.1 Status of project implementation and probity of use of funds accessed on a regular basis and communicated to the GEF
	3.2 Independent terminal evaluation developed and made publicly available

Chapter 1: National Background Information

1.1 Geography and Population

The Commonwealth of The Bahamas is an archipelago of islands in the western Atlantic Ocean, with latitudes between 21° and 27° N and longitudes between 72° and 79° W. It extends some 50 mi (80 km) east of Florida to about 50 mi (80 km) northeast of Cuba (Figure 4). The total area of The Bahamas is approximately 124,000 mi^2 (321,159 km^2) with a total land area of 5,382 mi^2 (13,939 km^2). The archipelago is low-lying and surrounded by coral reefs and extensive sand flats. The highest point in the country is Mount Alvernia, on Cat Island, at 207 ft (63 m) above mean sea level. The highest point on New Providence Island, the most populous island, is only 125 ft (38 m) above mean sea level. Much of the land area is only a few feet above mean sea level (The Bahamas Second National Communication to the UNFCCC, 2014). As a result, The Bahamas is a Small Island Developing State (SIDS).

In 2020, the population of The Bahamas was 393,248 (World Bank, 2021). There are an estimated 700 islands and cays of which about 25 of the larger islands are inhabited. Nearly 70% of the population resides on New Providence Island, one of the smaller islands, where the capital city of Nassau is located. Freeport in Grand Bahama Island is the second major population centre, with just under 9% of total population. The rest of the population is spread over the other islands which are collectively referred to as the “Family Islands” (The Bahamas Second National Communication to the UNFCCC, 2014).

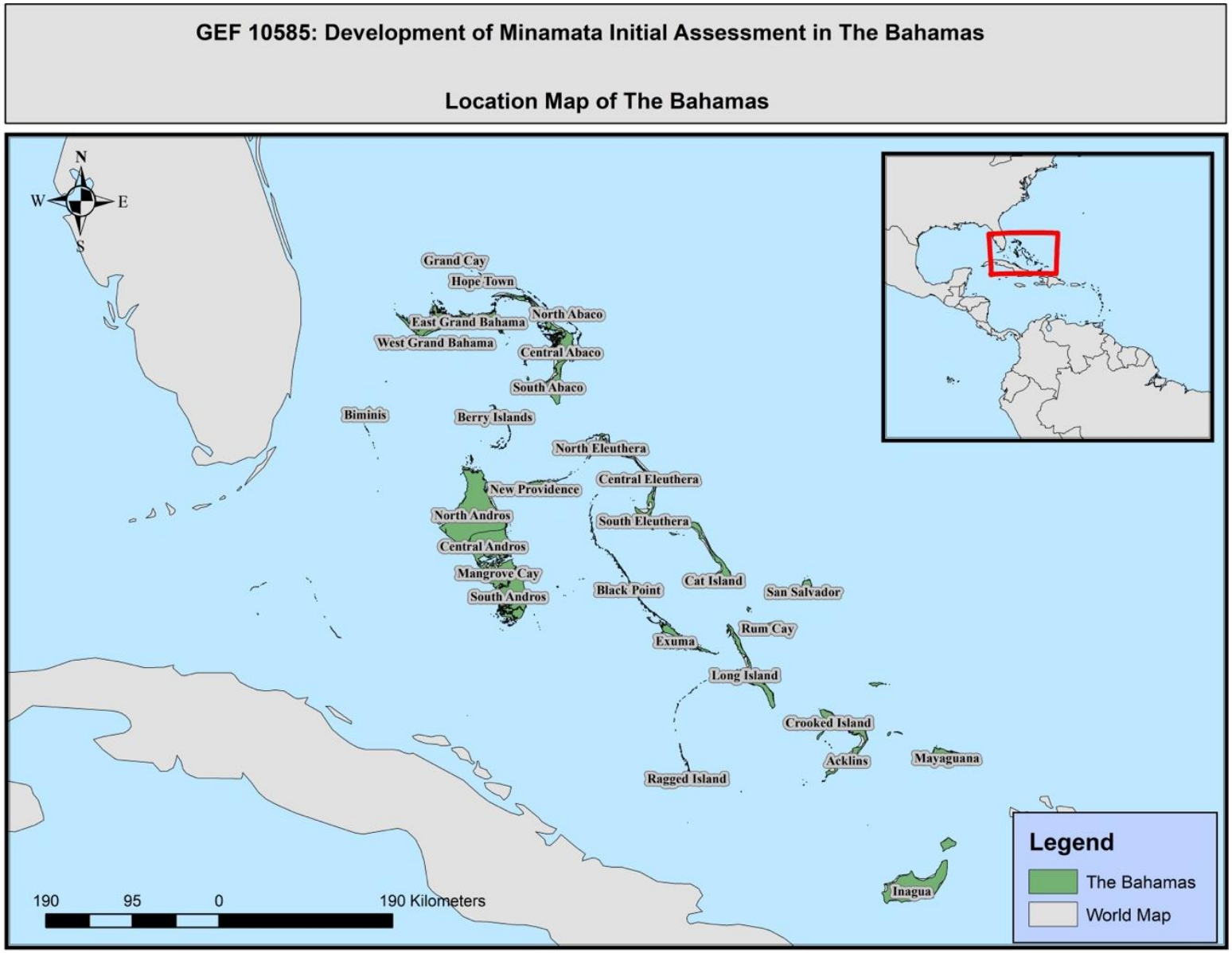


Figure 4: Location Map of The Bahamas (BCRC-Caribbean, 2021)

1.2 Political, Economic and Legal Profile

The Bahamas gained independence from the United Kingdom on 10 July 1973 and is now considered a small island state within the Commonwealth of Nations (formerly the British Empire).

The Head of State (Queen of the United Kingdom) is represented by the Governor-General. The Government is led by the Prime Minister, the Attorney-General and at least seven other Cabinet Ministers and Ministers of State responsible for running their government ministries. The Legislature is a two-chamber system based on the Westminster model, with a House of Assembly and a Senate. There are currently 24 constituencies in Nassau and 15 in the Family Islands totalling 39 House seats and 16 Senate seats (The Bahamas Second National Communication to the UNFCCC, 2014).

Tourism is the main industry of The Bahamas contributing over 50% of the Gross Domestic Product (GDP). Approximately 50% of the Bahamian population is either directly or indirectly employed by the tourism industry. Tourism relies heavily on a clean, healthy, and beautiful environment, particularly the marine environment as well as beautiful beaches. With ecotourism projected to increase, preservation of the environment is essential to the economy. The Bahamas received 7.249 million foreign air and sea arrivals in 2019 and 6.622 million in 2018. Of these foreign air and sea arrivals (including cruise) in 2019, The Bahamas received 1.66 million air arrivals and 5.69 million sea arrivals (Tourism Today, 2020). The Bahamas' ship registry is among one of the largest in the world (The BMA, 2021).

The financial services sector is the second largest contributor to the GDP. Financial services account for about 20% of the GDP contributing to the economy in salaries, fees and other local overheads. This sector includes offshore banking and asset management, which make gains through foreign exchange.

Manufacturing contributes about 4% of the GDP. Industry is mostly located in and around Freeport on Grand Bahama Island, which was originally designed to attract industrial growth. Activities in the past have included the manufacture of cement using the readily available limestone but now primarily include the production of cement products. Previous oil refining facilities have now become oil storage facilities. There are currently pharmaceutical companies, a major container transhipment terminal, oil storage facilities and a ship dry-dock, and repair facility located in Freeport Harbour. Light manufacturing companies in New Providence produce goods such as, mattresses, bleach, paper and plastic products. Other companies throughout the islands serve the international and domestic markets with alcohol, purified water, soft drinks, ice cream, jams, jellies and sauces and bakery products.

Agriculture is a small sector contributing between one and two percent of the GDP. It should be noted

that some 90% of the food consumed by the population and visitors is imported, mainly from the United States of America. Agriculture is often focused on a small number of native and introduced fruit species. About 19,760 acres (8,000 ha) of land are presently used for agriculture, with large-scale mechanised crop production carried out mainly on the islands of Abaco, Andros, and Grand Bahama. Small-scale agriculture is practiced in the other islands, often using traditional methods of crop production. Export crops include citrus, avocadoes, and pumpkins. There are several large poultry farms on New Providence, Grand Bahama, and Abaco. Sheep and goats are found mainly on the drier Family Islands. Intensive pig farming is found mainly in Abaco, Grand Bahama, and New Providence.

The Exclusive Economic Zone (EEZ) of The Bahamas includes some highly productive fishing grounds, including sea grass beds, coral reefs, and deep ocean. Spiny lobster, conch and Nassau grouper are the major species fished. Commercial fishing generates about US$70 million a year, and exports of spiny lobster alone contribute just over 2% of GDP (FAO, 2021). Grouper, conch, and other fisheries are included in exports. The Department of Fisheries along with Bahamas Agricultural Health and Food Safety Authority (BAHFSA) are responsible for ensuring compliance of export fisheries. Fishery regulations include size limits and closed seasons for spiny lobster, conch, grouper, and stone crabs. The Government has designated five “no take” marine reserves, such as The Exuma Cays Land and Sea Park, which has been a “no take” zone since 1986 and has demonstrated the effectiveness of such zones. Long-line fishing is forbidden. Poaching continues to be a problem. Due to the variety of fish species found in Bahamian waters, sports fishing is popular and attracts a number of boats each year. Through game and sport fishing the following species are often fished, amberjack, bonefish, dolphin, blue marlin (the national fish), white marlin, sailfish, swordfish, tuna, and wahoo. Fishing for bonefish, known as bonefishing, is becoming an increasingly popular sport in many of the Family Islands.

The Ministry of Health and Wellness holds responsibilities in human physical and mental health and manages two major hospitals and numerous public clinics. Waste management is often carried out through an area designated (officially or unofficially) as a dumpsite. The Environmental Health Services Act of 1987 provides regulations, penalties, and provisions for remediation of pollution emission into the environment. The primary source of energy for electricity generation, transportation and domestic use is the combustion of imported fossil fuels. Gasoline and diesel oil are used for transportation while liquefied petroleum gas (LPG) is used for cooking. Brewing, distillation, and furniture production represent the growing industries in New Providence while chemical and pharmaceutical manufacture is currently present in Grand Bahama. Mining of rock and limestone sand are restricted by the regulations established in the

Conservation and Protection of the Physical Landscape of The Bahamas Act of 1997.

1.3 Environmental Overview

The islands are the exposed portions of banks, formed from limestone created from the skeletal remains of marine and plant life. Around the islands, notably on the windward sides, are fringing coral reefs; the total area of reef is estimated at about 780 mi^2 (about 2,000 km^2). The landscape is one of rolling ridges with flat rock lands and extensive wetlands. The natural vegetation is Caribbean pine forest in the four northern islands (Grand Bahama, Abaco, North Andros and New Providence), broadleaf hardwood coppice woodland in the central and south-eastern islands (South Andros, Eleuthera, Cat Island, the Exumas, Ragged Islands, Long Island, Rum Cay, and San Salvador) and shrub land in the drier southern islands (Crooked Island, Acklins Island, Mayaguana, Inagua) (Moore and Gape, 2008). There are no rivers, but several islands are deeply penetrated by tidal creeks. The structure of the archipelago consists of several submerged plateaus, such as the Great Bahama Bank and the Little Bahama Bank, separated by deep oceanic troughs.

The Bahamas is separated from the temperate North American continent by the warm, northerly flowing, Gulf Stream. The climate is sub-tropical, with two distinct seasons: a hot wet summer season from May to October, and a warm but drier winter season from November to April. Rainfall is locally variable, but there is a gradient from about 60 in. (1500 mm) per annum in the northern islands, to about 30 in. (750 mm) in the south-eastern island of Inagua. The southern islands are rainfall deficient and droughty, and this is reflected in the natural vegetation. Most of the rainfall occurs during the hurricane season, from June to November. Heavy rain during this season often causes flooding, and storm surges and hurricane-force winds can cause extensive damage to property and to the landscape (National Policy for Adaption to Climate Change, 2005).

The Department of Environmental Planning and Protection (DEPP) was established the DEPP Act of 2019 and currently sits within the Ministry of the Environment and Natural Resources. The mandate of DEPP is to provide for the prevention or control of pollution, the regulation of activities and the administration, conservation, and sustainable use of the environment and for connected purposes. The Department also manages research permit applications for scientific investigations involving or affecting natural resources within The Bahamas. In addition, the Department is responsible for the development and implementation of policies, programmes and plans for the effective management and conservation of the physical environment within The Bahamas (DEPP, 2021).

Table 2 lists the multilateral environmental agreements (MEAs) to which The Bahamas is a signatory. DEPP serves as the national focal point for the Basel, Stockholm, and

Minamata Conventions. The Ministry of Foreign Affairs and the Public Service often forwards to DEPP correspondence concerning these MEAs.

Table 2: Multilateral environmental agreements to which The Bahamas is a Party

Multilateral Environmental Agreement	Ratification Date
Basel Convention on the Control of Transboundary Movement of Hazardous Wastes	12/08/1992
Cartagena Protocol on Biosafety to the Convention on Biological Diversity	24/05/2000
Convention on Biological Diversity	12/06/1999
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	20/03/1979
Minamata Convention on Mercury	12/02/2020
Montreal Protocol on Substances that Deplete the Ozone Layer	4/05/1993
Ramsar Convention on Wetlands of International Importance	7/06/1997
Stockholm Convention on Persistent Organic Pollutants (POPs)	20/03/2002
United Nations Agreement for the Implementation of the Provisions of UNCLOS Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks	16/01/1997
United Nations Convention to Combat Desertification and Land Degradation	10/11/2000
United Nations Framework Convention on Climate Change (UNFCCC), and its Kyoto Protocol	29/04/1994
Vienna Convention for the Protection of the Ozone Layer	1/04/1993

Chapter 2: Mercury Inventory and Identification of Emissions and Releases

2.1 Summary of Mercury Releases, Stockpiles, and Supply and Trade

2.1.1 Mercury Release Source Types Present

Mercury released into the environment can come from a variety of sources. For the Toolkit, focus was placed on anthropogenic sources of mercury. In The Bahamas, the presence of these sources was identified through consultations with national stakeholders from the public and private sector (Table 3). Stakeholders were engaged through questionnaires, email correspondence, interviews and project workshops. The categories identified as absent and possibly but not positively identified will not be discussed further in the report.

Table 3: Identification of mercury release sources in The Bahamas; sources present (Y), absent (N), and possible but not positively identified (?)

Toolkit Category #	Source category	Source presence (Y/N/?)
5.1	**Extraction and use of fuels/energy sources**	
5.1.1	Coal combustion in large power plants	**N**
5.1.2	Other coal combustion	**N**
5.1.3	Extraction, refining and use of mineral oil	**Y**
5.1.4	Extraction, refining and use of natural gas	**Y**
5.1.5	Extraction and use of other fossil fuels	**N**
5.1.6	Biomass fired power and heat production	**N**
5.1.7	Geothermal power production	**N**
5.2	**Primary (virgin) metal production**	
5.2.1	Primary extraction and processing of mercury	**N**
5.2.2	Gold and silver extraction with the mercury-amalgamation process	**N**
5.2.3	Zinc extraction and initial processing	**N**
5.2.4	Copper extraction and initial processing	**N**
5.2.5	Lead extraction and initial processing	**N**
5.2.6	Gold extraction and initial processing by other processes than mercury amalgamation	**N**
5.2.7	Aluminium extraction and initial processing	**N**
5.2.8	Extraction and processing of other non-ferrous metals	**N**
5.2.9	Primary ferrous metal production	**N**
5.3	**Production of other minerals and materials with mercury impurities**	
5.3.1	Cement production	**N**
5.3.2	Pulp and paper production	**N**
5.3.3	Lime production and light weight aggregate kilns	**N**

Toolkit Category #	Source category	Source presence (Y/N/?)
5.3.4	Other minerals and materials	**N**
5.4	**Intentional use of mercury as an auxiliary material in industrial processes**	
5.4.1	Chlor-alkali production with mercury-technology	**N**
5.4.2	VCM (vinyl-chloride-monomer) production with mercury-dichloride ($HgCl_2$) as catalyst	**N**
5.4.3	Acetaldehyde production with mercury-sulphate ($HgSO_4$) as catalyst	**N**
5.4.4	Other production of chemicals and polymers with mercury compounds as catalysts	**N**
5.5	**Consumer products with intentional use of mercury**	
5.5.1	Thermometers with mercury	**N**
5.5.2	Electrical and electronic switches, contacts and relays with mercury	**Y**
5.5.3	Light sources with mercury	**Y**
5.5.4	Batteries containing mercury	**Y**
5.5.5	Polyurethane with mercury catalysts	**Y**
5.5.6	Biocides and pesticides	**N**
5.5.7	Paints	**N**
5.5.8	Pharmaceuticals for human and veterinary uses	**?**
5.5.9	Cosmetics and related products	**Y**
5.6	**Other intentional products/process uses**	
5.6.1	Dental mercury-amalgam fillings	**Y**
5.6.2	Manometers and gauges	**Y**
5.6.3	Laboratory chemicals and equipment	**Y**
5.6.4	Mercury metal use in religious rituals and folklore medicine	**N**
5.6.5	Miscellaneous product uses, mercury metal uses and other sources	**N**
5.7	**Production of recycled metals**	
5.7.1	Production of recycled mercury ("secondary production)	**N**
5.7.2	Production of recycled ferrous metals (iron and steel)	**N**
5.7.3	Production of other recycled metals	**N**
5.8	**Waste incineration**	
5.8.1	Incineration of municipal/ general waste	**N**
5.8.2	Incineration of hazardous waste	**N**
5.8.3	Incineration of medical waste	**Y**
5.8.4	Sewage sludge incineration	**N**
5.8.5	Informal waste burning	**Y**
5.9	**Waste deposition/landfilling and wastewater treatment**	
5.9.1	Controlled landfills/deposits	**Y**

Toolkit Category #	Source category	Source presence (Y/N/?)
5.9.2	Diffuse deposition under some control	**N**
5.9.3	Informal local deposition of industrial production waste	**N**
5.9.4	Informal dumping of general waste	**Y**
5.9.5	Wastewater system/treatment	**Y**
5.10	**Cremation and cemeteries**	
5.10.1	Crematoria	**Y**
5.10.2	Cemeteries	**Y**

2.1.2 Summary of Estimated Mercury Inputs to Society

Mercury inputs to society should be understood here as the mercury made available for potential releases through economic activity in The Bahamas. This includes mercury intentionally used in products such as thermometers, blood pressure gauges and fluorescent light bulbs as well as mercury that can become available through the disposal of these products. It also includes mercury mobilized via extraction and use of raw materials which contains mercury in trace concentrations.

Mercury inputs to The Bahamas for the source categories identified as being present in Table 3 are shown below in Table 4.

Table 4: Summary of mercury inputs to The Bahamas based on Toolkit

Source category	Estimated Hg Input (Kg Hg/y)
Extraction and use of fuels/energy sources	
Mineral Oil- Extraction, refining and use	**8.96**
Natural Gas- Extraction, refining and use	**0.0000031**
Consumer products with intentional use of mercury	
Electrical and electronic switches, contacts and relays with mercury	**41.70**
Light sources with mercury	**0.26**
Batteries containing mercury	**8.86**
Polyurethane with mercury catalysts	**8.94**
Cosmetics and related products with mercury	**No data available**
Other intentional products/process uses	
Dental mercury-amalgam fillings	**5.76**
Manometers and gauges	**2.00**
Laboratory chemicals and equipment	**3.93**
Waste incineration	
Incineration of medical waste	**No data available**

Source category	Estimated Hg Input (Kg Hg/y)
Informal waste burning	**No data available**
Waste deposition/landfilling and wastewater treatment	
Controlled landfills/deposits	**2.42**
Informal dumping of general waste	**No data available**
Wastewater system/treatment	**181.00**
Cremation and cemeteries	
Crematoria/Cremation	**0.12**
Cemeteries	**0.87**
Total	**262.6**

The sum of mercury inputs to The Bahamas for 2020 was determined to be approximately 262.6 Kg Hg. This input was calculated using national data collected through stakeholder engagement and default input factors present in the Toolkit. The total input includes only 10% of the calculated mercury input from waste incineration sources, waste deposition and informal dumping to avoid double counting of mercury inputs from waste and products. These 10% represent approximately the mercury input to waste from materials which were not quantified individually in Inventory Level 1 of this Toolkit.

Mercury in waste and wastewater produced in The Bahamas originates in products and materials in which mercury was intentionally used. Imported wastes may represent original mercury inputs to a country, however, this is not relevant as The Bahamas does not import wastes from other countries. Waste deposition to controlled landfills and wastewater may, however, represent substantial flows of mercury through society.

The following source sub-categories (waste sub-categories not included) made the largest contributions to mercury inputs to The Bahamas:

- Electrical switches and relays (41.7 Kg Hg/y);
- Mineral Oil- Extraction, refining and use (8.96 Kg Hg/y);
- Polyurethane with mercury catalysts (8.94 Kg Hg/y); and
- Batteries (8.86 Kg Hg/y).

Overall, the largest source of mercury input to The Bahamas is from wastewater system/treatment with 181.0 Kg Hg released per year.

Consumer products with intentional use of mercury, was the second largest source of mercury input to The Bahamas with 59.8 Kg Hg released per year.

2.1.3 Summary of Mercury Releases

Key mercury releases are to air (the atmosphere), water (marine and freshwater bodies, including via wastewater systems), land, general waste, and sector specific waste treatment/disposal. An additional

output pathway is "by-products and impurities" which designates mercury flows back into the market in by-products and products where mercury does not play an intentional role. Table 5 describes these output pathways.

Table 5: Descriptions of the types of output pathways for mercury releases

Calculation Result Type	Description ***(NOTE: Not all examples provided are relevant to The Bahamas but are included for general reference)***
Estimated Hg input, Kg Hg/y	The standard estimate of the amount of mercury entering this source category with input materials, for example calculated mercury amount in coal used annually in the country for combustion in large power plants.
Air	Mercury emissions to the atmosphere from point sources and diffuse sources from which mercury may be spread locally or over long distances with air masses, for example, from: • Point sources such as coal fired power plants, metal smelter, waste incineration; • Diffuse sources such as small-scale gold mining, informal burning of waste with fluorescent lamps, batteries, thermometers.
Water	Mercury releases to aquatic environments and to wastewater systems; point sources and diffuse sources from which mercury will be spread to marine environments (oceans), and freshwaters (rivers, lakes, etc.), for example, releases from: • Wet flue gas cleaning systems on coal fired power plants; • Industry, households, etc. to aquatic environments; • Surface run-off and leachate from mercury contaminated soil and waste dumps.
Land	Mercury releases to the terrestrial environment: General soil and groundwater. For example, releases from: • Solid residues from flue gas cleaning on coal fired power plants used for gravel road construction; • Uncollected waste products dumped or buried informally; • Local un-confined releases from industry such as on-site hazardous waste storage/burial; • Spreading of sewage sludge with mercury content on agricultural land (sludge used as fertilizer); • Application on land, seeds or seedlings of pesticides with mercury compounds.

Calculation Result Type	Description *(NOTE: Not all examples provided are relevant to The Bahamas but are included for general reference)*
By-products and impurities	By-products that contain mercury, which are sent back into the market and cannot be directly allocated to environmental releases, for example: • Gypsum wallboard produced from solid residues from flue gas cleaning on coal fired power plants; • Sulphuric acid produced from desulphurization of flue gas (flue gas cleaning) in non-ferrous metal plants with mercury trace concentrations; • Chlorine and sodium hydroxide produced with mercury-based chlor-alkali technology; with mercury trace concentrations; • Metal mercury or calomel as by-product from non-ferrous metal mining (high mercury concentrations).
General waste	General waste: Also called municipal waste in some countries. Typically, household and institution waste where the waste undergoes a general treatment, such as incineration, landfilling or informal dumping. The mercury sources to waste are consumer products with intentional mercury content (batteries, thermometers, fluorescent tubes, etc.) as well as high volume waste like printed paper, plastic, etc., with small trace concentrations of mercury.
Sector specific waste treatment /disposal	Waste from industry and consumers which is collected and treated in separate systems, and in some cases recycled; for example: • Confined deposition of solid residues from flue gas cleaning on coal fired power plants on dedicated sites; • Hazardous industrial waste with high mercury content, which is deposited in dedicated, safe sites; • Hazardous consumer waste with mercury content, mainly separately collected and safely treated batteries, thermometers, mercury switches, lost teeth with amalgam fillings, etc.; • Confined deposition of tailings and high-volume rock/waste from extraction of non-ferrous metals.

Table 6 summarises mercury releases to the various output pathways in The Bahamas based on Toolkit calculations using mainly 2020 data[2] and default values where data was not available. Details on how the release values were obtained are included in the respective subsections of this report. Source categories that were not identified as being present in The Bahamas are not included in the table.

[2] The source category of Extraction and use of fuels/energy sources was the only category for which 2019 data was used. This was due to the impact of the COVID-19 pandemic on the use of fuels and energy sources, especially for use in transportation.

Table 6: Summary of mercury releases in The Bahamas for 2020

Source category	Calculated mercury output, kilograms per year (Kg Hg/y)					
	Air	Water	Land	By-pro-ducts and impurities	General waste	Sector specific treatment/ disposal
Extraction and use of fuels/energy sources						
Mineral oils - extraction, refining and use	8.96	0.00	0.00	0.00	0.00	0.00
Natural gas - extraction, refining and use	0.0000031	0.0	0.0	0.0	0.0	0.0
Consumer products with intentional use of mercury						
Electrical switches and relays with mercury	4.17	0.00	4.17	-	33.36	0.00
Light sources with mercury	0.01	0.00	0.00	-	0.25	0.00
Batteries with mercury	0.00	0.00	0.00	-	8.86	0.00
Polyurethane with mercury catalysts	0.89	0.45	0.00	-	7.60	0.00
Cosmetics and related products	No data available for input in Toolkit					
Other intentional product/process use						
Dental mercury-amalgam fillings	0.13	2.49	0.41	0.31	1.21	1.21
Manometers and gauges with mercury	0.20	0.60	0.00	0.00	1.20	0.00
Laboratory chemicals with mercury	0.00	1.30	0.00	0.00	1.30	1.34
Waste incineration*3						
Incineration of medical waste	No data available for input in Toolkit					
Informal waste burning	No data available for input in Toolkit					
Waste deposition/landfilling and wastewater treatment						
Controlled landfills/deposits*3	2.40	0.02	0.00	0.00	0.00	0.00
Informal dumping of general waste*1*3	No data available for input in Toolkit					
Wastewater system/treatment*2	0.00	90.50	0.00	0.00	54.30	36.20
Crematoria and cemeteries						
Crematoria/cremation	0.12	0.00	0.00	-	0.00	0.00
Cemeteries	0.00	0.00	0.87	-	0.00	0.00
SUM OF QUANTIFIED INPUTS AND RELEASES *1*2*3*4	**16.9**	**4.9**	**5.5**	**0.3**	**108.0**	**38.7**

Notes: *1: The estimated quantities include mercury in products which has also been accounted for under each product category. To avoid double counting, the release to land from informal dumping of general waste has been subtracted automatically in the TOTALS.

*2: The estimated release to water include mercury amounts which have also been accounted for under each source category. To avoid double counting release to water from wastewater system/treatment have been subtracted automatically in the TOTALS.

*3: To avoid double counting of mercury inputs from waste and products in the input TOTAL, only 10% of the mercury input to waste incineration sources, waste deposition and informal dumping is included in the total for mercury inputs. These 10% represent approximately the mercury input to waste from materials which were not quantified individually in Inventory Level 1 of this Toolkit.

*4 To avoid double counting of mercury in products produced domestically and sold on the domestic market (including oil and gas), only the part of mercury inputs released from production are included in the input TOTAL.

The output pathway with the highest quantity of mercury releases to The Bahamas in 2020 was general waste. A total of 108.0 Kg Hg/y was released primarily due to the following sub-categories:

- Wastewater system/treatment (54.3 Kg Hg/y)
- Electrical switches and relays with mercury (33.4 Kg Hg/y)
- Polyurethane with mercury catalysts (7.6 Kg Hg/y); and
- Batteries (8.9 Kg Hg/y).

2.1.4 Summary of Mercury Stockpiles, Supply and Trade

The Minamata Convention on Mercury outlines the obligations of Parties in terms of managing mercury supply sources and trade in Article 3. The provisions of the article refer to restrictions for the Party's territory regarding:

- Primary mercury mining;
- Individual stocks of mercury or mercury compounds exceeding 50 metric tons;
- Sources of mercury supply generating stocks exceeding 10 metric tons per year; and
- The import and export of mercury under circumstances described within the article.

If any such stockpiles are identified, Article 10 of the Convention regarding environmentally sound interim storage of mercury, other than waste mercury, would also apply.

There are no industries in The Bahamas, which generate or use mercury as described by the Convention. Therefore, there are no such stockpiles in the country and no supply and trade in this regard. Mercury entering the country largely comes from imported products.

2.2 Data and Inventory on Extraction and Use of Fuels/Energy Sources

2.2.1 Extraction and Use of Mineral Oils and Natural Gas

Mineral oils or petroleum oils are combusted to provide heat and power and for transportation. Mineral oils also have other uses such as the synthesis of chemicals, lubricants, polymers and black pigments. Small amounts of mercury are contained within petroleum oils as impurities. These can be emitted into the atmosphere through extraction,

refining and use (UNEP, 2019a). In refineries, crude oil can be separated via distillation into various fractions such as gasoline/petrol, kerosene, jet fuel, liquefied petroleum gas and other distillates.

Natural Gas which is combusted to produce electricity and heat also contains small amounts of natural mercury impurities which are released during extraction, refining and combustion.

In The Bahamas, mineral oils and natural gas are used in for power generation (National Renewable Energy Laboratory (NREL), 2015). The Bahamas Power and Lighting Company Limited (BPL), a subsidiary of the Bahamas Electricity Corporation, produces 85% of the electricity generated in the country. BPL serves customers on New Providence Island and many of Family Islands including, Eleuthera, Exuma, and Long Island. The Grand Bahama Power Company (GBPC) provides electricity to Grand Bahama Island and serves over 19,000 customers.

No information on the use of fuels in the transport sector was obtained during the development of this report.

Data Collection and Assessment

For the development of the inventory of mercury releases for the fuel sector, import data was received from The Bahamas Customs Department. Power generation companies and fuel distributors were contacted for further data collection and verification; however, responses were limited.

Upon assessment of fuel import data received from The Bahamas Customs Department, a marked decrease in fuel imports for 2020 was noted due to the onset of the COVID-19 pandemic which reduced the need for fuels due to the enforcement of travel restrictions and country-lockdowns. Through consultation with the NWG, it was determined that for the fuels sector, 2019 data would be used for the inventory to provide a more comparable dataset for average fuel use in typical years.

A summary of the import data used for input into the Toolkit from the use of mineral oils in the transportation sector is provided in the following table.

Table 7: Values Estimated of Mineral Oils Used in the Transportation Sector

HS Code	Product	Quantity Imported in 2019 (Barrels)	Quantity (tonnes) (calculated using Unit Conversion tab of Toolkit)	Total (tonnes)
27101210	Jet Fuel	13,004,654.62	165,875.6	**3,560,253**
27101220	Aviation Gasoline	17,375,570.00	195,231.1	
27101230	Leaded	518.87	6.1	
27101240	Unleaded	271,601,335.34	3,199,073.4	
27101920	Kerosene type jet fuel	5,262.38	67.1	

For power generation, the main power and lighting company in The Bahamas indicated the use of automotive diesel oil and heavy fuel oil for their operations. For the inventory, it was assumed that import data for diesel oil and bunker C fuel oil represented the amount of fuel used for power generation throughout The Bahamas. From data provided by The Bahamas Customs Department, it was also noted natural gas, in both liquified and gaseous forms, are imported to The Bahamas. NREL (2015) noted that 26.5% of the energy generated in The Bahamas was produced using natural gas. However, during the development of this inventory, no information on the use of natural gas by power generation companies was obtained.

It should also be noted, BPL and Shell are aiming to develop and build a Liquefied Natural gas (LNG) terminal and a new power plant on New Providence Island. This venture will involve a LNG terminal, which will receive, store and re-gasify the LNG, and a power plant that will generate electricity, which will be sold to BPL for transmission and distribution (Hector, n.d.). If this venture is finalised, it would signify the increase in the import, use of natural gas, and subsequent releases of mercury in The Bahamas. Therefore, future inventories should confirm how natural gas is used and incorporate the quantities used.

A summary of the import data used for input into the Toolkit from the use of mineral oils in the power generation sector (other oil combustion facilities) is provided in Table 8.

According to the data from Customs, in 2019, 25,950 pounds (lbs) of natural gas (25,850 lbs of liquified natural gas, and 100 lbs of natural gas in a gaseous state) were imported.

Table 8: Values Estimated of Mineral Oils Used in the "Other Oil Combustion Facilities" Sector

HS Code	Product	Quantity Imported in 2019 (Barrels)	Quantity (tonnes) (calculated using Unit Conversion tab of Toolkit)	Total (tonnes)
27101910	Diesel Oil	68,620,136.03	9,198,41	**919,864**
27101930	Bunker C fuel oil	1,721.01	23.7	

Table 9 summarises the mercury inputs and releases to The Bahamas from the use of mineral oils. The input factors and output distribution factors used to estimate mercury releases were obtained from the Toolkit.

The mercury inputs from the use of natural gas was calculated as 0.0000031 Kg Hg/y. Due to this small input value, inputs of natural gas were deemed insignificant and not discussed.

Table 9: Analysis of mercury inputs and outputs from the use of mineral oils

Use of Mineral Oils	Unit	Use of Mineral Oils-Transportation	Use of Mineral Oils-Other Oil Combustion Facilities
Activity rate	Oil, t/y	3,560,253	919,864
Input factor for phase	mg Hg/t oil	2.00	2.00
Calculated input to phase	**Kg Hg/y**	**7.12**	**1.84**
Output distribution factors for phase:			
- Air	N/A	1.00	1.00
- Water	N/A	-	-
- Land	N/A	-	-
- Products	N/A	-	-
- General waste treatment	N/A	-	-
- Sector-specific waste treatment	N/A	-	-
Calculated outputs/releases to:			
- Air	Kg Hg/y	7.12	1.84
- Water	Kg Hg/y	-	-
- Land	Kg Hg/y	-	-
- Products	Kg Hg/y	-	-
- General waste treatment	Kg Hg/y	-	-
- Sector specific waste treatment	Kg Hg/y	-	-

Specific mercury content data was not available for any of the fuel sources obtained for the inventory. The recommended input factor provided in the Toolkit was used for calculations.

With regards to the "Other Oil Combustion Facilities" sector, the power and lighting company noted there are no mercury air emission monitoring systems in place. As such, in the Toolkit, the output scenario used was the 'Oil Combustion Facility with no emissions controls.

2.3 Data and Inventory on Consumer Products with Intentional Use of Mercury

Several products make use of mercury's properties to support their functions. The major product groups in which mercury is added intentionally are fluorescent light bulbs, some batteries, older types of electrical switches and relays, and some manometers and pressure gauges.

Releases take place during production, depending on how closed the manufacturing systems are, and on the handling and workplace procedures in the individual production units; during use, when products are broken or damaged; during disposal of the products after use (directly to soil through landfills and informal dumping sites, to the air via waste incineration and informal burning, and to water through wastewater treatment, landfill leachate and runoff) according to the types and efficiency of waste collection and handling procedures implemented (UNEP, 2019a).

Under Article 4 of the Minamata Convention on Mercury, Parties must phase out the manufacture, import and export of certain mercury-added products listed under Annex A of the Convention by the year 2020.

In The Bahamas, no production of products containing mercury occurs. However, items are imported, used and disposed of locally.

It should be noted that during initial National Working Group meetings, the use and disposal of mercury-added thermometers was listed as being present, however upon assessment of Customs data and verification with select retailers/medical institutions, no stocks were found. As such, this category was revised to being absent or negligible and will not be discussed further in this report.

2.3.1 Use and Disposal of Electrical Switches and Relays

Mercury is used in some electrical switches and relays found in various electronic equipment due to its high density, conductivity and sensitivity to temperature. The elemental mercury within electrical switches and relays expands or contracts in order to open or close a valve. It can also be used to make electrical connections within switches during their operation (UNEP, 2019a).

The most common use of elemental mercury is in tilt switches or "silent" switches which are used in numerous products including silent electric wall switches, electric switches for thermostats used in residential and commercial heating, antilock braking systems and active ride-control systems in vehicles and convenience lights (such as those used in car trunks when opened). Another type of switch

is the “float” switch which is used in pumps to activate or deactivate equipment (UNEP, 2019a).

Relays, electrically controlled switches, are used in high current lighting and heating (displacement relays), small circuit controls for low voltage electronic devices primarily used in test, calibration, and measurement equipment (wetted read relays). Although mercury relays may be widely used, their total mercury consumption has been relatively small compared to the mercury switches (UNEP, 2019a).

Globally, mercury-free switches and relays have become more popular over the past twenty (20) years, but the status and extent of substitution varies between countries (UNEP, 2019a). Further, due to the long service life of mercury switches and relays (ranging from 10-50 years, primarily based on the life span of the equipment in which the switch or relay is contained), mercury from these items is expected to be present in wastes for many years despite the use of alternative products.

Mercury contained in electrical switches and relays does not pose a risk to human health and the environment when the items are intact as a tight seal prevents the release of mercury. However, mercury becomes a hazard when the products are damaged and the seal is broken thus allowing elemental mercury to be emitted into the atmosphere as vapours, or into waterways or the land.

In The Bahamas, electrical switches and relays may be present as components of the range of electronic equipment mentioned above. Although imported switches and relays may not contain mercury due to the increased global popularity of mercury free options, mercury containing items may be included in older equipment and homes. With regard to disposal, the products containing switches and relays are disposed of in general waste.

Data Collection and Assessment

Specific data on the number of electrical switches and relays in use and disposed of in The Bahamas and their mercury content was not available as these items are included as components of a large range of equipment and are typically not quantified. Therefore, default Toolkit calculations were used to estimate mercury input to society and output from this category. The calculations developed under the Toolkit utilised the number of inhabitants and the percent electrification rate from 2000 to give a more accurate estimation of the historical consumption and infer the 2020 disposal rates based on the estimated 20-year lifespan of these products. These values for 2000 were 298,045 residents and 100% electrification rate (World Bank, 2021).

According to the Toolkit estimations, approximately 41.7 Kg Hg/y is input to The Bahamas from the use and disposal of electrical switches and relays. There is no separate collection of these items and waste handling is controlled. As such, it was estimated that 4.17 Kg Hg/y is released each to air and to the land each, while the majority of the estimated mercury (33.4 Kg Hg/y) is released to general waste. The summary of estimated releases of

mercury in electrical switches and relays is shown in Table 10.

Table 10: Analysis of mercury inputs and outputs from the use and disposal of electrical switches and relays with mercury

Electrical Switches and Relays with Mercury	Unit	Use and Disposal
Activity rate	inhabitants	298,045
	% of population with access to electricity	100
Input factor for phase	g Hg/(y*inhabitant)	0.14
Calculated input to phase	**Kg Hg/y**	**41.7**
Output distribution factors for phase:		
- Air	N/A	0.1
- Water	-	-
- Land	N/A	0.1
- Products	-	-
- General waste treatment	N/A	0.8
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	Kg Hg/y	4.17
- Water	-	-
- Land	Kg Hg/y	4.17
- Products	-	-
- General waste treatment	Kg Hg/y	33.4
- Sector specific waste treatment	-	-

2.3.2 Use and Disposal of Light Sources

Small amounts of mercury are used in various discharge lamps including linear fluorescent tubes (LFLs), compact fluorescent lamps (CFLs), mercury vapour lamps, high-pressure sodium lamps and metal halide lamps. CFLs and LFLs are typically used for general lighting in residences and buildings, while high-pressure sodium lamps and metal halide lamps can be used in streetlights and lights utilized in stadiums. The amount of mercury contained in these light sources vary and depend on the type of bulb.

Mercury is not considered a threat to the environment when it is contained within the glass tube of the bulbs. When the bulbs and lamps are broken, however, vapour-phase elemental mercury, liquid mercury and mercury absorbed onto phosphor powder which coats the inside surface of the tube can be released into the environment. Small amounts of mercury could also be released from pieces of the glass and other components of the lamps that are contaminated with the mercury (UNEP, 2019a).

Lighting products containing mercury are not produced in The Bahamas, however, they are imported. It should also be noted globally, there has been a shift towards the use of mercury-free Light-Emitting Diodes (LEDs) (Clean Lighting Coalition, n.d.). Not only have LEDs become more widely available, but they have also become more

affordable, making them a solution to replace mercury lighting, which can pose threats to human and environmental health, especially when improperly disposed.

Data Collection and Assessment

Customs data from 2015-2020 was obtained for analysis. For the inventory Toolkit, data from 2020 was used to estimate mercury releases. For data entry, the respective assumptions provided in Table 11 were made for Customs Data as confirmation on the number of imports that were mercury-containing over the years could not be obtained.

Table 11: Assumptions made in Data used for Input in Toolkit to Estimate Mercury Releases for Lighting Products

Toolkit Source Category for Lighting Products	2020 Customs Data Used	Assumptions made
Fluorescent Tubes (double ended)	No items were imported under HS Code 8539 3110 (Discharge Lamps, fluorescent, hot cathode with double ended cap)	This HS Code referred to mercury containing fluorescent tubes (double ended).
Compact Fluorescent Lamp (CFL single end)	68,334 items imported under HS Code 8539 3910 (Low energy consumption lamps)	All items imported under HS Code were mercury containing CFLs (single ended)
High pressure mercury vapour lamps	231 items imported under HS Code 8539 3200 (mercury or sodium vapour lamps; metal halide lamps)	As the HS Code covered three (3) types of bulbs, it was assumed that equal proportions of each bulb in this category were imported (77 items each).
High pressure sodium lamps		
Metal Halide Lamps		
UV Light for Tanning	4,620 items imported under HS Code 8539 4900 (UV or IR lamps excluding arc lamps)	All items imported under HS Code were mercury containing UV lights used for tanning

Default Toolkit calculations were used to estimate mercury input to society and output from this category and estimated releases are outline in Table 12 below. Estimated releases from all light sources was 0.26 Kg Hg/y for the year 2020 with most releases being to general waste treatment (0.25 Kg Hg/y) as in The Bahamas, there is not typically any separate waste collection for spent light bulbs.

Table 12: Analysis of mercury inputs and outputs from the use and disposal of light sources with mercury

Light Sources with Mercury	Unit	Use and Disposal					
		Fluorescent Tubes	Compact Fluorescent Lamps	High-Pressure Mercury Vapour	High-Pressure Sodium Lamps	Metal Halide Lamps	UV Light for Tanning
Activity rate	Items/y	0	68,334	77	77	77	4,620
Input factor for phase	mg Hg/item	8	2.7	40	20	25	15
Calculated input to phase	**Kg Hg/y**	**0.00**	**0.185**	**0.003**	**0.002**	**0.002**	**0.069**
Total Calculated Input to phase (No separate collection; waste handling controlled)	Kg Hg/y	**0.26**					
Output distribution factors for phase:							
- Air	N/A	0.05					
- Water	-	-					
- Land	-	-					
- Products	-	-					
- General waste treatment	N/A	0.95					
- Sector specific waste treatment	-	-					
Calculated outputs/releases to:							
- Air	Kg Hg/y	0.01					
- Water	-	-					
- Land	-	-					
- Products	-	-					
- General waste treatment	Kg Hg/y	0.25					
- Sector specific waste treatment	-	-					

2.3.3 Use and Disposal of Batteries

Batteries are among the largest product uses of mercury (UNEP, 2019a). Primary, non-rechargeable batteries which contain mercury include mercury oxide batteries, some cylindrical alkaline batteries, and some button cell batteries (alkaline, zinc/air, silver oxide) which are used to provide power in small portable electronics such as calculators and wrist watches. High concentrations of mercury (30-32% w/w) have been used in the positive electrode in button cells, larger cylindrical and other shaped mercury oxide batteries used in hospitals, military facilities, and commercial appliances (Zero Mercury Working Group, n.d.). About 0.25 mg of mercury are added to the zinc-air, alkaline and silver-oxide batteries to prevent the

formation of internal gases (Zero Mercury Working Group, n.d.).

The use of mercury in batteries does not pose a threat to human health or the environment once the batteries are intact. Mercury only becomes a hazard when the batteries are broken allowing elemental mercury to be released into the atmosphere as vapours, and into land and general waste. Due to the risks associated with the exposure of mercury from batteries, some countries have prohibited the marketing of mercury oxide batteries and other batteries with mercury for purposes other than specified exemptions such as military uses (UNEP, 2019a).

In The Bahamas, batteries are imported for use in various equipment and applications. There is no separate collection of batteries for disposal.

Data Collection and Assessment

Customs data from 2015-2020 was obtained and for the purpose of the inventory Toolkit, data from 2020 was used to estimate mercury releases from the sector.

Customs data provided information on the number of batteries imported per year, however for the inventory, data for batteries were input in tonnes (t) per year using the unit conversion factors available in the Toolkit as shown in Table 13.

Table 13: Calculated Activity Rates Used in the Toolkit for Batteries

Toolkit Source Categories for Batteries	Items Imported in 2020 according to Customs Data (items/y)	Conversion Factor (Kg/item)	Calculated Activity Rate Used in Toolkit (t/y)
Mercury Oxide/Mercury-Zinc Batteries	1,881	0.0012	0.002
Zinc-air Button Cells	1,580	0.0012	0.002
Alkaline Button Cells	124,364	0.0012	0.149
Silver Oxide Button Cells	4,135	0.0012	0.005
Alkaline, other than button*1	For the inventory calculations, it was assumed that of the total items imported, 25% were AA battery cells; 25% were AAA battery cells; 25% were C battery cells and; 25% were D battery cells, resulting in 124,364 items each	0.023 (AA battery cell)	2.860
		0.011 (AAA battery cell)	1.368
		0.066 (C battery cell)	8.208
		0.139 (D battery cell)	17.287

*1 Total Calculated Activity Rate for the category, “Alkaline, other than button” was estimated to be 4.711 t/y.

It was assumed that all batteries were mercury-containing. According to Toolkit estimations as shown in Table 14, as there is no separate collection of batteries for disposal, but waste handling is controlled, 8.86 Kg Hg/y were released to general waste treatment.

Table 14: Analysis of mercury inputs and outputs from the use and disposal of batteries with mercury

Batteries with Mercury	Unit	Use and Disposal				
		Mercury oxide	Zinc-air button cells	Alkaline button cells	Silver oxide button cells	Alkaline, other than button cell shapes
Activity rate	t/y	0.002	0.002	0.149	0.005	29.7
Input factor for phase	Kg Hg/t	320	12	5	4	0.25
Calculated input to phase	**Kg Hg/y**	**0.64**	**0.02**	**0.75**	**0.02**	**7.43**
Total Calculated Input to phase (no separate collection; waste handling controlled)	Kg Hg/y	**8.86**				
Output distribution factors for phase:						
- Air	N/A	-				
- Water	-	-				
- Land	-	-				
- Products	-	-				
- General waste treatment	N/A	1				
- Sector specific waste treatment	-	-				
Calculated outputs/releases to:						
- Air	Kg Hg/y	-				
- Water	-	-				
- Land	-	-				
- Products	-	-				
- General waste treatment	Kg Hg/y	8.86				
- Sector specific waste treatment	-	-				

2.3.4 Use and Disposal Polyurethane with mercury catalysts

Polyurethane is used in the manufacture of products including high resilience foam seating, high performance adhesives, surface coating and sealants, synthetic fibres, and durable wheels for products, such as shopping carts, escalators, and elevators. The production of polyurethane materials may involve the use of organic mercury compounds as catalysts to harden or cure the polyurethane materials. The catalyst may become embedded in the structure of the compound and remain in the final product where it may be released to the environment during use or disposal (UNEP, 2019a).

Data Collection and Assessment

Specific data on the use and disposal of polyurethane in The Bahamas could not be obtained due to the many possible uses of polyurethane in other products and equipment that cover a wide range including rollers, flooring,

gaskets, encapsulation of electronic components, shoe soles, shock absorption and repair of industrial installations.

It was also noted that in most countries neither data on the actual consumption figures nor historical data are available, and as such it is necessary to base the estimates on general information on the global use of mercury for this application.

For the purpose of the inventory, default Toolkit calculations were used to estimate mercury input to society and output from this category. The calculations utilised the number of inhabitants and the percent electrification rate from 2000. These values were 298,045 residents and 100% electrification rate (World Bank, 2021).

According to the Toolkit estimations, approximately 8.94 Kg Hg/y is input to The Bahamas from the use and disposal of polyurethane with mercury catalysts. There is no separate collection of these items and waste handling is controlled. As such, it was estimated that the majority of releases (7.60 Kg Hg/y) are released to general waste while minor releases to air and water occur. The summary of estimated releases of mercury in polyurethane with mercury catalysts is shown in Table 15.

Table 15: Analysis of mercury inputs and outputs from the use and disposal of polyurethane with mercury catalysts

Polyurethane with mercury catalysts	Unit	Use and Disposal
Activity rate	inhabitants	298,045
	% of population with access to electricity	100
Input factor for phase	g Hg/(y*inhabitant)	0.03
Calculated input to phase	**Kg Hg/y**	**8.94**
Output distribution factors for phase:		
- Air	N/A	0.10
- Water	N/A	0.05
- Land	-	-
- Products	-	-
- General waste treatment	N/A	0.85
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	Kg Hg/y	0.89
- Water	Kg Hg/y	0.45
- Land		-
- Products	-	-
- General waste treatment	Kg Hg/y	7.60
- Sector specific waste treatment	-	-

2.3.5 Use and Disposal of Cosmetics and Related Products

Mercury is used in the production of some skin-lightening creams and soaps, and as a preservative in some eye make-up products including mascara (UNEP, 2019a). Inorganic mercury in skin lightening products inhibits the formation of melanin, thereby lightening the user's complexion (WHO, 2011). The mercury in these products can accumulate within the body where it can cause damage to the nervous system and have adverse effects on the kidney and other organs (UNEP, 2019a).

When the products containing mercury are washed off, they can be released into wastewater systems and waterways. Mercury can then bioaccumulate in aquatic species which may be consumed by humans. When containers are discarded, small amounts of creams may remain and be a source of mercury release to the environment through general waste. In this regard, the manufacture, import and export of skin lightening products with mercury content greater than **1 ppm** are to be phased out by Parties to the Minamata Convention on Mercury by 2020. Furthermore, some skin-lightening creams may contain other harmful melanin suppressors instead of mercury, such as hydroquinone.

The use of skin lightening creams has been found to be prevalent around the globe especially in African and Asian countries and Afro-diaspora regions like the Caribbean, where the trend of skin lightening has become prominent in beauty fads, culture, and music (Hamann, et al., 2014; Copan et al., 2015).

Skin lightening creams and soaps are not produced in The Bahamas; however, products are imported from other countries for use locally, and some may contain mercury. While some skin-lightening products may be safe to use, many products on the global and local markets are unlabelled, mislabelled, counterfeit or labelled in a foreign language. Additionally, some products may list mercury-containing compounds by ambiguous names such as calomel or cinnabaris. The production of many of these creams is informal and thus, concentrations of ingredients may vary between batches of the same product.

Therefore, the risk of using any of these products is increased as consumers are not always able to identify mercury as a component (Zero Mercury Working Group, n.d.).

Data Collection and Assessment

In recent years, numerous assessments on the presence and quantities of mercury in various skin-lightening creams have been conducted.

To determine the potential presence of mercury-containing skin lightening products currently on the market in The Bahamas, the National Project Coordinator conducted a rapid fact-finding exercise in mid-2021 to determine whether any of the listed mercury-added skin-lightening creams that have been noted to be commonly found in the Caribbean were present at retail stores. The list was based on data

made available in Ricketts, et al (2020) and a summary of those found to be sold locally is provided in Table 16. It was also observed that many home-based products were being sold which were noted to be repackaged from products bought in bulk or from mixed ingredients from various sources.

The amount of skin lightening creams and soaps containing mercury which were imported into The Bahamas could not be determined for the inventory. Additionally, the data needed for the activity rate (amount of creams/soaps sold, t/y) was not available; therefore, estimates of mercury inputs and releases to the various pathways could not be calculated. As such, the estimated mercury inputs and releases from this source could not be quantified.

Due to the potential risk of mercury exposure from the use and disposal of skin-lightening creams containing mercury, it can be recommended that a ban be placed on the importation of these products once they are identified as containing mercury exceeding 1 part per million (ppm). A new technical regulation would also need to be implemented and the sensitisation of The Bahamas Customs Department to improve surveillance. This, however, may not stop the illegal importation of this product. Thus, measures would need to be put in place to ensure the overall cooperativeness of the general public (*discussed further later chapters*).

Table 16: List of Known Mercury-containing Skin-Lightening Creams Found to be Present in The Bahamas based on a Rapid Assessment

Skin-lightening cream brands found to be present in The Bahamas based on rapid assessment	Hg Concentration (ppm) based on Ricketts et al (2020)
Nadinola	422 – 465
Maxi Light	1.12
Haloderm Cream	2.17
Radiant Skin Lightening pills	0.05
Caro White Intensive Care	0.12
Neoplus Soap Fort	0.15
Metasol Medicated Cream	0.19
Bio Claire Cream	0.72

2.4 Data and Inventory on Other Intentional Product/Process Use

2.4.1 Dental mercury-amalgam Fillings

Dental amalgam is used to fill cavities caused by tooth decay. It consists of a mixture of metals including liquid elemental mercury (which makes up approximately 50% of the amalgam by weight), silver, copper and tin (U.S. FDA, 2017). Due to its chemical properties, mercury can bind readily to the other metals in order to form the amalgam.

Amalgam can be delivered to dentists as pure mercury and a powder mix of

the other metals which must be separately weighed out in the right proportions and mixed in an agitator at the clinic; or as a small capsule containing the required proportions of mercury and other metals that need only be mixed before application to the cavity. In general, mercury amalgam fillings can last between 10-20 years.

Mercury releases from dental amalgam fillings occur to the air, water, and waste during the production of amalgam at factories; when amalgam is being prepared, placed, shaped or repaired at clinics; through natural wearing away in a person's mouth; during disposal of the amalgam after it is removed; and when a person with amalgam is buried or cremated after death (UNEP, 2019).

Data Collection and Assessment

In The Bahamas, it has been noted that the use of mercury-amalgam fillings is very minimal country-wide as composite fillings have become more commonly used. According to the President of The Bahamas Dental Association (BDA), with the evolution of dental materials, dentists have switched to using the composite fillings, which are tooth-coloured and more aesthetically pleasing. The President noted that no decision or proclamation was made by the BDA about discontinuing the use of mercury-dental amalgam and that in some cases, dentists still use mercury-dental amalgam as it is the most suitable option. Based on the responses received from some members of the BDA, waste generated is either disposed of through general disposal or through biohazard waste. As dentists do not typically record the number of dental amalgam fillings conducted in their practices, for the inventory, default calculations derived from the Toolkit were used to obtain an estimate of mercury input to society. These calculations utilised the number of dentists per 1,000 inhabitants (estimated to be 0.0709 for The Bahamas according to the Toolkit) as well as the number of inhabitants.

Population data from 2020 was used to calculate the mercury input from the preparation of dental amalgam fillings at dental clinics in The Bahamas. Mercury input and releases occurring from the use of amalgam fillings in 2020 were expected to have been from amalgam placed 10 years prior in 2010 since mercury amalgam can last between 10-20 years before needing to be replaced. Mercury input from the disposal of dental amalgam in 2020 was calculated using the country's population from 20 years prior, 2000, due to the life expectancy of the fillings. Population data was sourced from available World Bank Database (2021).

According to the Toolkit, about 6.7 Kg Hg/y, 6.1 Kg Hg/y and 5.1 Kg Hg/y were input to society from dental amalgam prepared, placed and disposed in 2020, 2010 and 2000, respectively. Releases of mercury from dental amalgam fillings occur gradually over time and would not all be accounted for in the preparation year. Therefore, the overall input of mercury to society from the preparation, placement, use and disposal of dental amalgam in 2020 was calculated to be approximately 5.76 Kg Hg/y once double-counting assumptions were

accounted for. The summary of estimated inputs and releases of mercury from dental amalgam is provided in Table 17.

Due to the phasing out of mercury amalgam, estimated releases from this sector are expected to be reduced in further years.

Table 17: Analysis of mercury inputs and outputs from the preparation, use and disposal of dental amalgam in 2020

Dental Mercury-Amalgam Fillings	Unit	Preparation	Use	Disposal
Activity rate	inhabitants	393,248 (2020)	354,936 (2010)	298,045 (2000)
Input factor for phase	g Hg/(y*inh)	0.2	0.2	0.2
Calculated input to phase	**Kg Hg/y**	**6.7**	**6.1**	**5.1**
Output distribution factors for phase:				
- Air	N/A	0.02	-	-
- Water	N/A	0.14	0.02	0.28
- Land	N/A	-	-	0.08
- Products	N/A	-	-	0.06
- General waste treatment	N/A	0.12	-	0.08
- Sector specific waste treatment	N/A	0.12	-	0.08
Calculated outputs/releases to:				
- Air	Kg Hg/y	0.13	-	-
- Water	Kg Hg/y	0.94	0.12	1.43
- Land	Kg Hg/y	-	-	0.41
- Products	Kg Hg/y	-	-	0.31
- General waste treatment	Kg Hg/y	0.80	-	0.41
- Sector specific waste treatment	Kg Hg/y	0.80	-	0.41

2.4.2 Use and Disposal of Manometer and Gauges

Mercury is used in some manometers, gauges, pressure valves and other measuring devices (UNEP, 2019a). Its historical use in these products is due to its non-evaporating quality under normal conditions and its high and stable density (National Programme on Technology Enhanced Learning (NPTEL), n.d.). Globally, mercury containing equipment are being substituted by mercury-free alternatives.

Data Collection and Assessment

Specific data on the number of medical blood pressure gauges imported and used in The Bahamas was not able to be quantified for entry in the inventory. It has been noted that mercury-free medical blood pressure gauges have become more common throughout The Bahamas and as such the estimated releases from this product are expected to be low. In order to determine mercury releases from other manometers used in industry and equipment, default calculations for mercury input from the use and disposal of other manometers were used 2020 population data

(393,248) and electricity rates (100%) were used (World Bank, 2021).

The total input from the use and disposal of other manometers (not including medical devices) in 2020 was estimated to be 2.0 Kg Hg/y. According to the default output distribution factors derived from the Toolkit, 1.20 Kg of mercury per year is released into the general waste, while 0.20 and 0.60 Kg of mercury per year are released to the air and water, respectively, from the use and disposal of manometers and gauges since no separate collection occurs with controlled waste handling.

A summary of estimated mercury releases from manometers and gauges is shown in Table 18.

Table 18: Analysis of mercury inputs and outputs from the use and disposal of manometers and gauges with mercury

Manometers and Gauges with Mercury	Unit	Use and Disposal of Other Manometers
Activity rate	inhabitants	393,248
Input factor for phase	Percent of population with access to electricity	100
	g Hg/y*inhabitant	0.005
Calculated input to phase	**Kg Hg/y**	**2.0**
Output distribution factors for phase:		
- Air	N/A	0.1
- Water	N/A	0.3
- Land	-	-
- Products	-	-
- General waste treatment	N/A	0.6
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	Kg Hg/y	0.20
- Water	Kg Hg/y	0.60
- Land	-	-
- Products	-	-
- General waste treatment	Kg Hg/y	1.20
- Sector specific waste treatment	-	-

2.4.3 Use and Disposal of Laboratory Chemicals

Mercury is used in laboratories as components of instruments and equipment, reagents, preservatives and catalysts (UNEP, 2019a). Some laboratory chemicals which contain mercury include mercury oxide (HgO), mercury chloride (HgCl2), mercury sulphate (HgSO4), and others which may be used in different experiments or for the preparation of other chemicals.

Globally, the total mercury content in many of the chemicals used in laboratories is low. Further, some mercury- added instruments and some methods using mercury have been substituted by mercury-free alternatives due to increasing availabilities of

alternatives and awareness of the related risks (COWI and Concord East/West, 2008).

Mercury and mercury containing products used in various laboratories and schools in The Bahamas may be imported. The mercury within the chemicals and equipment in laboratories can be released to various pathways during their life-cycle. Mercury vapours can be released from chemicals during use and when stockpiled or disposed improperly at the landfills and into waterways.

Data Collection and Assessment

Data on the volumes and numbers of laboratory chemicals and equipment imported for The Bahamas could not be verified at the time of the inventory due to the difficulties in differentiating mercury-containing from mercury-free products based on the HS Codes provided. Due to the type of laboratory equipment that typically contain mercury, it was assumed that the presence in The Bahamas would be negligible. Default calculations made available in the Toolkit were used to estimate releases of laboratory chemicals based on global references available.

The 2020 population data and electrification rate were used as the activity rate in these default calculations. The default input factors of 0.01 and of mercury per year per inhabitant were used to estimate the mercury input to society from laboratory chemicals. Default output factors from the Toolkit were used to estimate mercury releases.

The mercury input to The Bahamas from the use and disposal of laboratory chemicals was determined to be approximately 3.93 Kg Hg/y in total. A summary of mercury inputs and releases to each category is provided in Table 19.

Further assessments to assist in the accurate quantification of the mercury-containing chemicals and equipment used in The Bahamas is necessary to accurately approximate the amount of mercury being released into the environment from this source.

The implementation of a proper management system for the use and disposal of chemicals and equipment containing mercury within schools and laboratories in the nation is needed to aid in data collection.

Table 19: Analysis of mercury inputs and outputs from the use and disposal of laboratory chemicals with mercury

Laboratory Chemicals with Mercury	Unit	Use and Disposal of Laboratory Chemicals
Activity rate	inhabitants	393,248
Electrification Rate	% of population with access to electricity (2020)	100
Input factor for phase	g Hg/y*inhabitant	0.01
Calculated input to phase	**Kg Hg/y**	**3.93**

Laboratory Chemicals with Mercury	Unit	Use and Disposal of Laboratory Chemicals
Output distribution factors for phase:		
- Air	-	-
- Water	N/A	0.33
- Land	-	-
- Products	-	-
- General waste treatment	N/A	0.33
- Sector specific waste treatment	N/A	0.34
Calculated outputs/releases to:		
- Air	-	-
- Water	Kg Hg/y	1.30
- Land	-	-
- Products	-	-
- General waste treatment	Kg Hg/y	1.30
- Sector specific waste treatment	Kg Hg/y	1.34

2.5 Data and Inventory on Waste Incineration

2.5.1 Incineration of Medical Waste

Medical waste is any waste generated from medical activities taking place at hospitals, healthcare facilities, dental clinics, etc. Waste generated from these activities usually include human secretions, pharmaceuticals, packaging materials and various tools used in medical treatment. Incineration is usually used to destroy different toxins, pathogens and viruses contained within the waste (UNEP, 2019a).

The concentration of mercury within incinerated waste is dependent on the amount of mercury contained in products and equipment included in the incinerated waste. These may include medical thermometers, blood pressure gauges, dental amalgam fillings and chemicals containing mercury.

Data Collection and Assessment

In The Bahamas, the incineration of medical waste was noted to occur at one (1) hospital located on Grand Bahama Island. Data on the quantities of incinerated medical waste was not provided, and as such, could not be included in the inventory.

During the data collection process, it was also found that on New Providence Island, Bahamas Waste Limited autoclaves medical waste. The company confirmed they do not incinerate medical waste and only autoclaves medical waste produced on the island of New Providence.

2.5.2 Open Waste Burning on Landfills and Informally

Informal waste burning is defined as waste incineration undertaken in informal conditions such as in barrels, containers, or on bare land without flue gas controls and the diffuse spreading of incineration residues on land (UNEP, 2019a). If mercury is present in the

waste, part of it will be released to air, while the remainder in the incineration residues (including unburned and semi-degraded waste) have potential for additional releases to air, land, groundwater and surface waters. This waste disposal method may pose an immediate risk for the local community in which it takes place, because air emissions that may contain mercury and several other potent pollutants which are not controlled, and the residues may cause contamination of the local groundwater (UNEP, 2019).

Data Collection and Assessment

In The Bahamas, open burning of waste has been noted to occur in disposal sites however the frequency of this activity and the amount of garbage burnt is difficult to quantify. As a result, data from the open burning of general waste was not included in this assessment and further research should be conducted to quantify releases more accurately from this sector.

2.6 Data and Inventory on Waste Deposition/Landfilling and Wastewater Treatment

2.6.1 Controlled Landfills/Deposits

A sanitary landfill is an area for waste deposition which is specially designed to prevent releases and emissions of waste components to the environment. Some design attributes may include linings made up of impermeable materials such as clay or leachate ponds to isolate liquid components from the environment. A non-sanitary landfill may refer to an area for waste collection that is controlled but does not have proper engineering designs such as linings and leachate ponds. Wastes deposited in landfills that do not have efficient built-in measures to prevent releases can lead to the contamination of surrounding areas with hazardous waste components including mercury (UNEP, 2019a).

The mercury content in the municipal waste may be due to discarded MAPs such as batteries and fluorescent lighting products (UNEP, 2019a). When the MAPs are damaged or broken, mercury contained within the item can be released into the air by evaporation. Small amounts of mercury can also be released into waterways.

In the Bahamas, there are nine (9) official disposal sites, of which three (3) are sanitary landfills (New Providence Ecology Park, Grand Bahama and Great Abaco); five (5) are non-sanitary landfills (Bimini, Exuma, San Salvador, Andros and Eleuthera); and one (1) is considered a dump site (Grand Cay) (Rodrigo, 2016).

The Department of Environmental Health Services is responsible for the management of the disposal sites, except for the Pine Ridge Sanitary Landfill which is partly owned by the Grand Bahama Port Authority and a national company, Sanitation Services Company Limited.

The New Providence Ecology Park which covers 0.38 square kilometres of waste disposal area, serves most of the population in The Bahamas and was recently remediated to operate in accordance with international standards for solid waste management.

The expected lifespan of the landfill is till 2053. A hazardous waste facility exists at the New Providence Ecology Park, but currently hazardous waste is only temporarily stored until it is collected by a certified company for proper disposal. The hazardous waste facility is currently under repair in order to function effectively as a secure and carefully managed packaging, storage and shipping waystation for hazardous materials from public and private institutions. Repairs were completed in 2021.

Pine Ridge Landfill is a class D landfill that accepts numerous types of waste, except hazardous waste. If hazardous waste is detected in collection, it is typically diverted.

It was noted that the Great Abaco Sanitary Landfill has been non-functional since being impacted by Hurricane Dorian in 2019. Large quantities of unsorted debris were deposited due to the hurricane and the Government of The Bahamas is currently considering developing a waste-to-energy plant to treat with industrial wastes and used tyres at the site (REAL, 2021).

The Bahamas is a major cruise ship destination and is also a global hub for oil transhipment and dry cargo shipping. As such, Ship-Generated Waste (SGW) which includes all kinds of food, domestic and operational waste, all plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship need to be disposed of. SGW collection and disposal in-country is typically facilitated by ship agents who coordinate with local authorities. In Nassau, the Prince Georges Wharf cruise ship terminal is the only port that accepts SGW and in Freeport, SGW is collected for disposal through the Grand Bahama Port Authority's Sanitation Department.

Data Collection and Assessment

Data from New Providence Ecology Park was obtained through questionnaire responses obtained while data from the Pine Ridge Landfill was obtained from previous reports developed (REAL, 2021). Due to the current state of the Great Abaco Sanitary Landfill as mentioned, data was not obtained for entry into the Toolkit. As noted in a previous assessment by REAL (2021), many of the disposal sites in The Bahamas have challenges in their operation and need expansions and upgrades. Data on the amount of waste collected at sites is lacking due to the limited capacity for monitoring. In order to estimate the amount of waste generated at the remaining disposal sites, calculations were made using average waste generated per capita estimations obtained from the UNEP's Small Island Developing States Waste Management Outlook (2015) and population data extrapolations. A summary of the data used is provided in Table 20.

Table 20: Summary of Data Estimated for Waste Generation across The Bahamas

Disposal Site	Estimated 2020 Population Data	Waste Generated per Capita (tonnes/year) (UNEP, 2015)	Estimated Waste Deposited in 2020 (tonnes)
New Providence Ecology Park	-	-	239,147
Grand Bahama (Pine Ridge Landfill)	-	-	350
Great Abaco (no data obtained due to site being impacted by hurricane damage)	-	-	-
Bimini	108,143[3]	0.003	324
Exuma			
San Salvador			
Andros			
Eleuthera			
Grand Cay			
Total			**239,821**

This total value was input in the inventory (as seen in Table 21) to calculate an estimated 240 Kg Hg/y being input due to this sector. When calculations were adjusted to account for double-counting of mercury inputs due to other categories, it was determined that total releases to the environment were 2.40 Kg Hg/y (to air) and 0.02 Kg Hg/y (to water).

Table 21: Analysis of mercury inputs and outputs from controlled landfills/ deposits

Controlled Landfills/ Deposits	Unit	Controlled Landfills
Activity rate	Waste landfilled, t/y	239,821
Input factor for phase	g Hg/t waste	1
Calculated input to phase	**Kg Hg/y**	**240**
Output distribution factors for phase:		
- Air	N/A	0.01
- Water	N/A	0.0001
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	Kg Hg/y	2.40
-Water	Kg Hg/y	0.02
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-

[3] Population data estimated through deductions made for 2010 population data of Nassau and Grand Bahama available from Bahamas Department of Statistics Report, "PRELIMINARY POPULATION AND HOUSING COUNT BY ISLAND AND SUPERVISORY DISTRICT, ALL BAHAMAS: CENSUS 2010". Extrapolations of 2010 data were made to estimate 2020 population data.

2.6.2 Informal Dumping of General Waste

This relates to disposal of general waste in the absence of safeguards preventing the release of pollutants into the environment (UNEP, 2019a). Residential, green and construction waste represent the major waste types dumped. Illegal, informal dumping has been noted to occur in The Bahamas. However, the amount of general waste informally dumped was unable to be quantified at the time of the inventory and it is unknown whether this practice presents a potential mercury danger to groundwater or the local community. Further assessments on the locations and quantification of informal dumping of waste should be conducted.

2.6.3 Wastewater System/Treatment

Mercury in wastewater originates from the two main source groups:

- Intentionally used mercury in products and processes such as dental amalgams, broken thermometers and other devices, and industrial discharges; and
- Atmospheric mercury, originating from both natural and anthropogenic sources that is washed out by precipitation which makes its way into soil, surface and groundwater.

Wastewater systems are an intermediate mercury release pathway, where the mercury will either be released into the waterways after the treatment of wastewater or distributed through sludge as fertiliser on land or as waste deposited at a landfill (UNEP, 2019a).

Wastewater treatment processes can include different stages - primary (involves mechanical filtration of debris, sand and sludge); secondary (involves clarification and disinfection through processes involving chlorine or ultraviolet light) and tertiary (involving nutrient removal).

Wastewater in The Bahamas is mainly managed by the state-owned Water and Sewerage Corporation (WSC) which operates in New Providence and the Family Islands for the provision of water, wastewater collection, and wastewater treatment (International Bank for Reconstruction and Development / The World Bank, 2020). According to a 2020 report, WSC provides wastewater services to 12,503 customers across The Bahamas. Based on 2009 data, it was found that sanitation facilities in use in The Bahamas were mainly septic tanks (81% of population) while only 13% were centralized sewerage systems and the remaining 5% were pit latrines (PAHO, 2012).

Data Collection and Assessment

Data on wastewater treated was provided by the WSC. In 2020, the WSC reported treating 25 MGD (million gallons per day) of wastewater. This value was converted to m^3/d [94,635.295 m^3/d] and then the wastewater treated for 2020 was calculated as 34,541,882.7 m^3.

The calculated input of mercury was estimated based on the assumption that the total volume of wastewater had

mechanical and biological (activated sludge) treatment with no land application of sludge as seen in Table 22. Estimated input was calculated to be 181 Kg Hg/y with releases being to water (90.5 Kg Hg/y); general waste (54.3 Kg Hg/y) and; sector-specific waste treatment (36.2 Kg Hg/y).

Table 22: Analysis of mercury inputs and outputs from Wastewater system/treatment

Wastewater System/Treatment	Unit	Wastewater System/Treatment
Activity rate	Wastewater, m^3/y	34,541,882.7
Input factor for phase	mg Hg/ m^3 wastewater	5.25
Calculated input to phase (mechanical and biological (activated sludge) treatment; no land application of sludge)	**Kg Hg/y**	**181**
Output distribution factors for phase:		
- Air	-	-
- Water	N/A	0.5
- Land	-	-
- Products	-	-
- General waste treatment	N/A	0.3
- Sector specific waste treatment	N/A	0.2
Calculated outputs/releases to:		
- Air	-	-
-Water	Kg Hg/y	90.5
- Land	Kg Hg/y	-
- Products	-	-
- General waste treatment	Kg Hg/y	54.3
- Sector specific waste treatment	Kg Hg/y	36.2

In this inventory, default input factors were used for the estimation of mercury releases from wastewater system/treatment. The default factors were based on literature data of mercury contents in wastewater, and the only data available were from developed countries. The following test of the results was performed to qualify the results for this source.

The test made for wastewater compares the calculated inputs to wastewater system/treatment with the sum of outputs to water from intentional mercury uses in products plus processes, using data from the Inventory Level 2 (IL2) spreadsheet.

In the IL2 spreadsheet, the test was done as follows in the tab labelled "Level 2-Summary":

E72 > 2*(G24 + ∑ (G37 to G56)).

The result of the above calculation using the inventory results are shown below:

181 > 2*(0+4.83) = 181 > 9.66

The calculation made indicate that the default input factors for wastewater system/treatment may over-estimate the mercury releases from this sub-

category. More detailed investigations may be needed on this issue.

2.7 Data and Inventory on Crematoria and Cemeteries

Mercury can accumulate in humans through the use of dental amalgam, exposure to mercury contained in products and intentionally used in processes, and consumption of mercury contaminated aquatic species. This mercury may be released after death when a corpse is cremated or buried.

2.7.1 Crematoria/Cremation

Data Collection and Assessment

Cremation is a method used for a smaller percent of the population in The Bahamas. The Department of Environmental Health and Planning provides regulatory oversight for the operation of crematories in The Bahamas. It was noted in The Bahamas, open burning or pyre cremations are illegal.

Throughout The Bahamas, there are a total of seven (7) crematoria, with four (4) being located on the island of New Providence, where nearly 70 % of the Bahamian population resides, resulting in approximately 90 % of all cremations nationwide occurring here.

According to the President of The Bahamas United Funeral Homes and Morticians Association, of the total deaths that occur on the island of New Providence, approximately 10-15 % (median: 12.5%) of the bodies are cremated and all 7 crematoria in The Bahamas are equipped with modernised filtration systems.

Records of the number of cremations that occurred in 2020 were not available and as such, it was assumed that 12.5% of the registered deaths in The Bahamas as provided by the Registrar General's Department resulted in cremation.

As shown in Table 23, the estimated mercury releases were solely to the air at 0.12 Kg Hg/y.

Table 23: Analysis of mercury inputs and outputs from crematoria/cremation

Crematoria/Cremation	Unit	Crematoria/Cremation
Activity rate	Corpses cremated/y	364
Input factor for phase	g Hg/corpse	4
Adjustment for dental personnel density as dental amalgam is the major contributor to mercury in the human body	Dentist per 1000 inhabitants, country	0.0709
Calculated input to phase	**Kg Hg/y**	**0.12**
Output distribution factors for phase:		
- Air	N/A	1
- Water	-	-
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-

Calculated outputs/releases to:		
- Air	Kg Hg/y	0.12
-Water	-	-
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-

2.7.2 Cemeteries

During decomposition, mercury in human corpses can be released into the soil in cemeteries. Mercury in corpses were typically estimated to be due to dental amalgam releases.

Data Collection and Assessment

Data for the inventory was obtained from the Registrar General's Department that provided 2020 statistical data on the number of registered deaths. Based on the estimated percentage of cremations, it was estimated that the remaining 87.5% (2,551 deaths) were buried in the year 2020. Estimated releases are shown in Table 24 with a total of 0.87 Kg Hg/y being released to land.

Table 24: Analysis of mercury inputs and outputs from cemeteries

Cemeteries	Unit	Cemeteries
Activity rate	Corpses buried/y	2,551
Input factor for phase	g Hg/corpse	4
Adjustment for dental personnel density as dental amalgam is the major contributor to mercury in the human body	Dentist per 1000 inhabitants, country	0.0709
Calculated input to phase	**Kg Hg/y**	**0.87**
Output distribution factors for phase:		
- Air	-	-
- Water	-	-
- Land	N/A	1
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	-	-
-Water	-	-
- Land	Kg Hg/y	0.87
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-

2.10 Stocks of Mercury and/or Mercury Compounds and Storage Conditions

As per Article 3, Part 1 of the Minamata Convention on Mercury, “mercury” and “mercury containing compounds” refer to mixtures of mercury with other substances, mercury (I) chloride, mercury (II) oxide, mercury (II) sulphate, mercury (II) nitrate, cinnabar and mercury sulphide.

Article 3, Part 5a states that each Party shall endeavour to identify individual stocks of mercury or mercury compounds (not including MAPs) over 50 metric tonnes. If any such stocks are identified, Article 10 of the Convention regarding environmentally sound interim storage of mercury, other than waste mercury, would also apply.

The Bahamas does not currently have any notable stocks of mercury and/or mercury compounds as no significant activities occur that would require such stocks.

2.11 Supply and Trade of Mercury and Mercury Containing Compounds Including Sources, Recycling Activities and Quantities

Article 3 of the Minamata Convention also lists provisions for Parties to regulate the supply, export and disposal of mercury and mercury containing compounds. Part 5a states that each Party shall endeavour to identify sources of mercury supply generating stocks exceeding 10 metric tonnes per year, that are located within its territory.

Based on the inventory, it was determined that no significant sources, trade, or recycling of mercury and/or mercury compounds are present in The Bahamas, and therefore, the interim storage provisions outlined in Article 10 of the Minamata Convention are not currently applicable to The Bahamas.

2.12 Identified Hot Spots of Mercury Contamination (Contaminated Sites)

Article 12 of the Minamata Convention on Mercury states that Parties should “develop appropriate strategies for identifying and assessing sites contaminated by mercury or mercury compounds”. Risk reduction activities should be conducted using environmentally sound measures and should incorporate an assessment of the risks to human and environmental health from present mercury or mercury compounds.

Hot spots of mercury contamination exist as the direct result of the use and release of mercury in processes leading to on-site deposition, as well as the inadequate disposal of mercury-contaminated materials. Previous deposits of mercury may still have the potential to release significant amounts of mercury and pose a risk to human health and the environment. Potential hot spots may include reservoirs where mercury containing materials have been stored, dumped or accumulated over many years, such landfills or dumpsites. As discussed in section 2.6.1, The Bahamas has a total of nine (9) official disposal sites.

For the GEF 9991 Project (MIA Belize), the Biodiversity Research Institute

(BRI) completed watershed hot spot mapping to identify areas which may be sensitive to mercury contamination (BRI, 2019). Through their work, BRI found that “mercury sensitivity patterns were strongly driven by the combination of the spatial distribution of wetlands and potentially contaminated sites.” To develop an appropriate strategy to identify sites potentially contaminated with mercury under this MIA Project, BRI (2019) was reviewed and used as a guide.

The strategy developed involved visually highlighting the locations of certain ecosystems, particularly wetlands, with the locations of potentially mercury contaminated sites, including disposal sites and wastewater treatment plants, and towns and other points of interest. Wetland ecosystems are or particular interest as they can have high rates of methylation (conversion of inorganic mercury to organic mercury, methylmercury) and thus be areas where high levels of mercury can be found (BRI, 2019).

For this strategy, the following Geographic Information System (GIS) datasets were necessary:

1. Hydrology
2. Soil type
3. Slope (may be obtained from a digital elevation model)
4. Location of towns, cities, villages, roads, landfills, wastewater facilities
5. Wetlands/mangroves.

Some of the datasets were obtained from the Bahamas National GIS Centre, the GIS Services Department of the WSC and The Nature Conservancy between 2021 and early 2022.

With the use of QGIS, maps highlighting the locations of potentially mercury contaminated sites, ecosystems and towns were developed. In Figure 5, the nine (9) official disposal sites in The Bahamas are identified along with areas of vegetation, swash/swamp, and mangroves and wetlands.

Based on the datasets collected, maps of New Providence and Andros Islands with greater details were also developed. These maps are presented in Figures 6 and 7 respectively.

In Figure 6, the landfill at the New Providence Ecology Park, sewer treatment plants, disposal wells, different ecosystems and towns are highlighted. In Figure 7, a cemetery, a landfill, solid waste dumps and different ecosystems are highlighted. As discussed in section 2.7.2, as human corpses decompose in cemeteries, the mercury in the corpses can be released into the soil, where it accumulates or is released and accumulated in the soil.

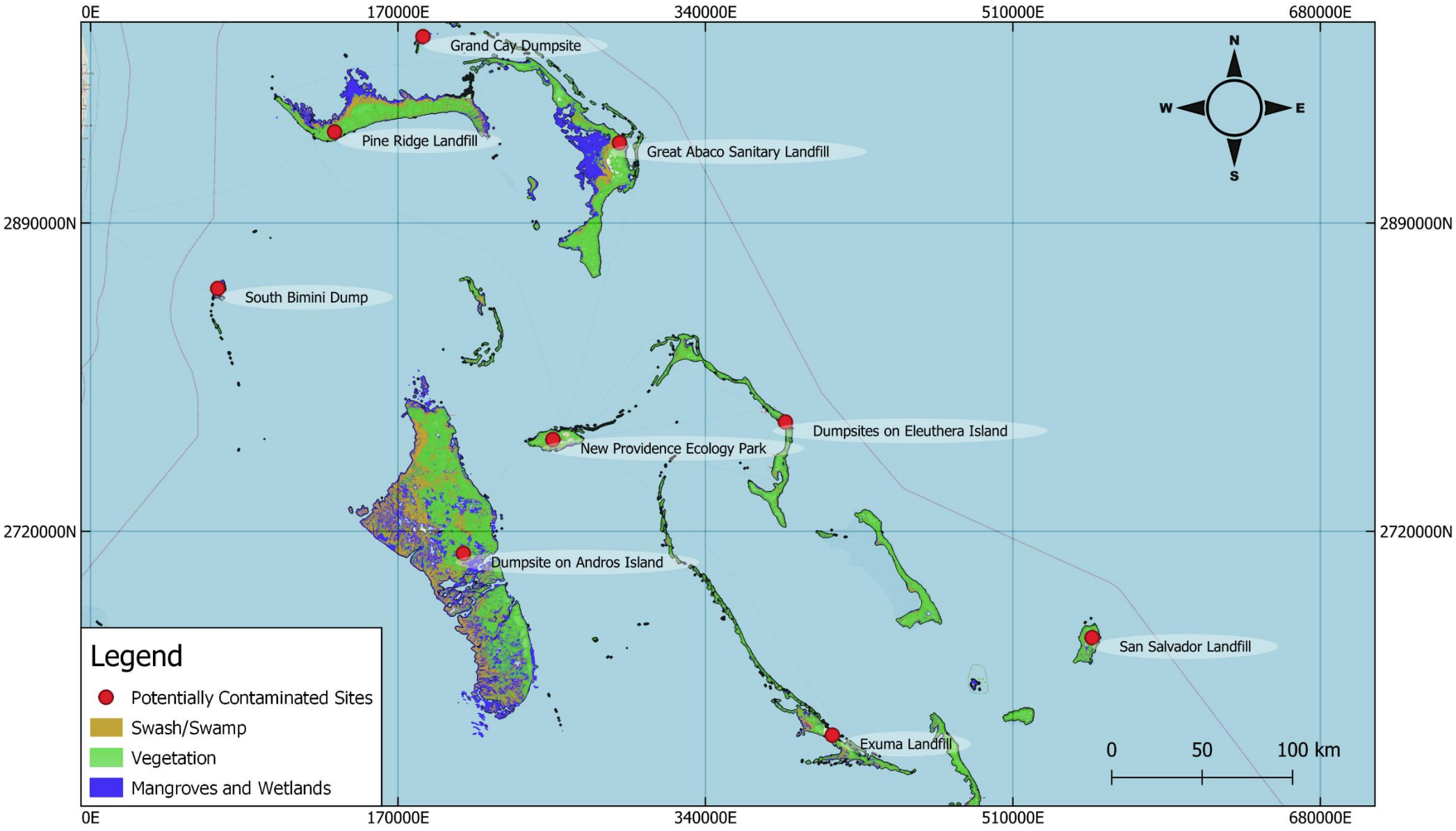


Figure 5: Map of Potential mercury contaminated sites in The Bahamas (BCRC-Caribbean, 2022)

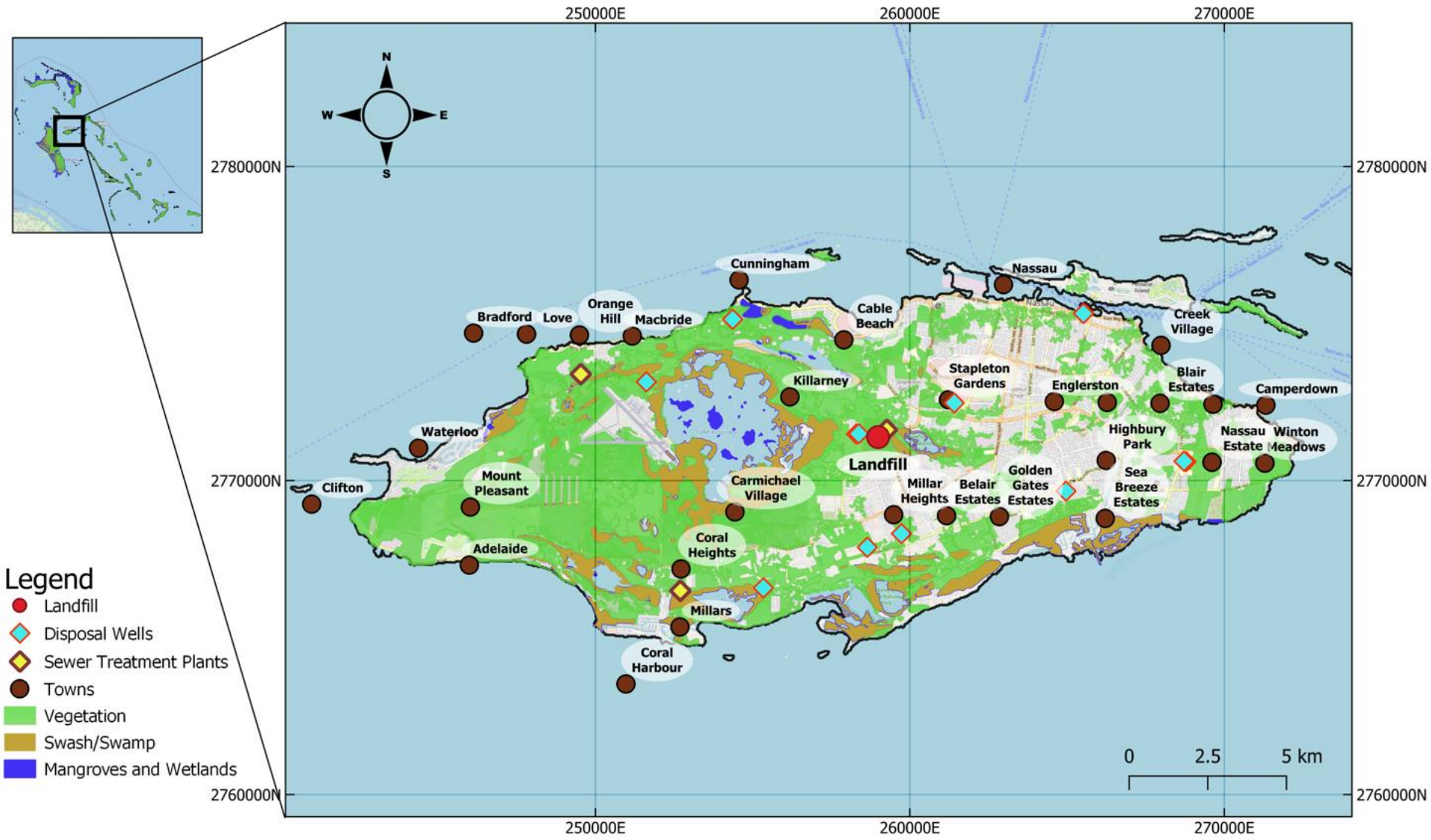


Figure 6: Map of New Providence Island highlighting the location of potentially mercury contaminated sites, ecosystems and towns (BCRC-Caribbean, 2022)

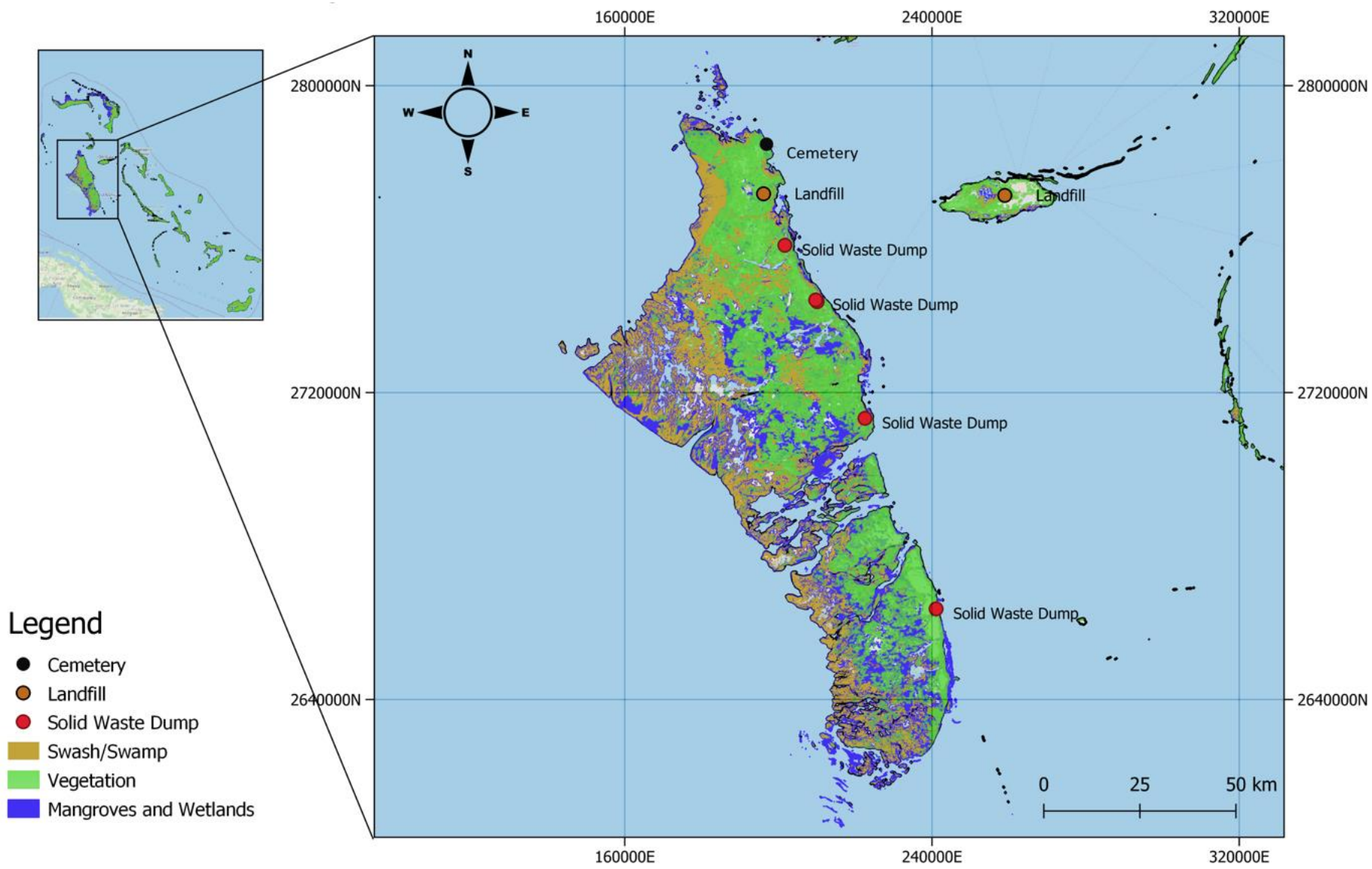


Figure 7: Map of Andros Island highlighting the location of potentially mercury contaminated sites and ecosystems (BCRC-Caribbean, 2022)

Based on BRI (2019), areas with potentially contaminated sites and wetlands were found to have greater mercury sensitivity. As such, it is recommended that in areas of The Bahamas where potentially contaminated sites, such as disposal sites, sewer treatment plants, cemeteries and wetlands are in close proximity to towns or other settlements, tests for the presence of mercury are undertaken. Understanding the levels of mercury in such areas will help in the development of activities to reduce the risk mercury can cause on human and environmental health.

It will be important for the Government of The Bahamas to conduct further studies to better understand and refine these preliminary findings.

In the future, the presence and location of additional potential sources of mercury should also be identified and verified by relevant authorities in The Bahamas. The location of these sources can be added to the maps created and further areas where mercury testing should be done can be identified.

2.13 Impact of Mercury on Human Health and the Environment

Mercury is a highly toxic element which persists in the environment in various forms.

The organic form of mercury, methylmercury, is its most dangerous form as it binds to human and animal tissue and can cause physiological, neurological and behavioral harm to humans. The process of methylation, whereby mercury is converted to methylmercury, varies widely across various landscapes and within waterscapes. Areas that are particularly sensitive to mercury deposition generally represent aquatic ecosystems or have an aquatic connection within the food web. Methylmercury tends to bio-magnify in food webs and bioaccumulate over time in organisms which are then consumed by humans. Fish from the sea or freshwater systems can be a major source of methylmercury, and it has been determined that generally, predatory species that are long-lived and grow larger can contain higher levels of methylmercury, though it may vary from species to species (BRI, 2018).

Elemental mercury can also enter the body through direct contact with mercury and its compounds, and the inhalation of vapours released from damaged MAPs or processes in which mercury is intentionally used. Exposure can affect the central and peripheral nervous systems and cause tremors, emotional lability, and insomnia (WHO, 2003). The inhalation of mercury can also affect the lungs and the digestive and immune systems which may be fatal.

The effects of mercury on health and the environment are causes for concern, and plans should be put in place to alleviate these effects. Further investigation is needed to assess the quantities of mercury being released into the environment in order to fully understand what should be done to eliminate this toxic metal and reduce its impacts.

Chapter 3 Policy, Regulatory and Institutional Framework Assessment

To determine the legislative and institutional framework that would benefit the implementation of the Minamata Convention on Mercury in The Bahamas, an assessment was undertaken. The information provided in this chapter results from an assessment of multiple pieces of legislation that are relevant to the management of wastes and chemicals in the country and discusses the strengths, weaknesses and gaps of these legislations and policies within the context of mercury management. The following section summarises the results obtained for The Bahamas.

Table 25 outlines the relevant articles of the Minamata Convention for The Bahamas.

The domestic legislative procedure for incorporating the obligations of a multilateral instrument into national legislation in The Bahamas falls under the purview of the Minister responsible for the Environment, which includes the negotiation of Multilateral Environmental Agreements (MEAs), and the implementation of and compliance to MEAs, as established in Section 4 (2) of the Environmental Planning and Protection Act, 2019. Under this Act, the Minister responsible for the Environment has the authority to establish the appropriate mechanisms to facilitate information exchange as it regards to MEAs in The Bahamas.

Table 25: Relevant Articles of the Convention on Mercury Management for National Consideration

Main Article	Relevant Article	Brief Description of Article	Relevance to The Bahamas
3 Mercury Supply Sources and Trade	3(5)(a)	Obligation on parties to identify stocks of mercury and mercury compounds exceeding 50 metric tons and sources generating mercury exceeding 10 metric tons per year.	While this is a primary obligation of the Convention, since there is no weighing or other quantification of mercury being performed at present, or identification of mercury separate and distinct from other hazardous wastes, there is no mechanism or process available for The Bahamas to comply. Since mercury and mercury compounds are not imported as they are not required for any activities in The Bahamas, it is doubtful that such stocks exist.
	3(6)	Prohibit the export of mercury to a Party except with written consent and for a use permitted by the Convention or for interim storage as set out in Article 10, or to a non-Party under the same conditions where measures exist to ensure the protection of human health and the environment under Articles 10 and 11.	While this prohibition cannot be ignored, it is of limited relevance to The Bahamas, as mercury is not produced in The Bahamas, with the result that export of mercury is unlikely. However, if consideration is given to incorporating provisions of the Convention in legislation, this requirement is relevant.
4 Mercury-added Products	4(1)	Prohibit the manufacture, import or export of mercury-added products listed in Part I of Annex A after the specified phase-out dates (2020) unless an exclusion is specified, or an exemption is registered under Article 6.	This prohibition is relevant and must be incorporated in legislation. The phase-out dates having passed, the prohibition should take effect immediately.
	4(2)	Implement different measures or strategies to reduce mercury in any product listed in Part I of Annex A for which a de minimis value is not yet obtained.	The products mentioned in Part 1 of Annex A are not manufactured in The Bahamas. So, the responsibility to reduce the amount of mercury contained in the products listed in Part 1 of Annex A will not fall to The Bahamas.
	4(5)	Prohibit the manufacture of assembled products using mercury-added products not permitted to be imported, exported or manufactured under Article 4.	This prohibition is relevant and must be incorporated in legislation.
	4(7)	The Bahamas may submit a proposal to the Secretariat for listing a mercury-added product in Annex A.	This provision is minimally relevant. This is an entitlement, notwithstanding that The Bahamas may not have cause to take advantage of this provision.
5 Manufacturing Processes in which Mercury or	5(2)	Prohibit the use of mercury or mercury compounds in manufacturing processes listed in Part I of Annex B after the phase-out date	This is not relevant to The Bahamas as there is no chlor-alkali production or acetaldehyde production in which mercury or mercury compounds are used as a catalyst or at all. So, the time limits for discontinuation (2025 and 2018 respectively) are not

Main Article	Relevant Article	Brief Description of Article	Relevance to The Bahamas
Mercury Compounds are Used		specified in Part II unless exempted under Article 6.	relevant. However, this may still have to be incorporated in legislation in terms of the general prohibitions with respect to the use of mercury and mercury compounds.
	5(3)	To restrict the use of mercury and mercury compounds in processes in Part II of Annex B.	The Bahamas has no vinyl chloride monomer, sodium or potassium methylate or ethylate production or production of polyurethane using mercury containing catalysts, which are the processes referred to in Part II of Annex B, and so there is no relevance to The Bahamas in this regard.
	5(5)	Where a facility uses mercury or mercury compounds in its manufacturing process, to take measures to address mercury emissions and releases from those premises and identify such facilities within 3 years of the entry into force of the Convention and their estimated annual amount of mercury used.	No such facilities have been identified, and as such, this provision is of no relevance to The Bahamas.
	5(6)	Prohibit the use of mercury in facilities that did not exist prior to entry into force of the Convention for it, for manufacturing processes listed in Annex B.	This prohibition is relevant and must be incorporated in legislation.
	5(7)	Discourage development of new manufacturing facilities, not in existence before entry into force of the Convention for it, using mercury or mercury compounds, unless significant health and environmental benefits exist and there are no feasible mercury-free alternatives.	This provision is relevant and is suggested for incorporation in policy.
	5(8)	Share information about new mercury-free alternatives and measures to reduce or eliminate the use of mercury, emissions, and releases from the manufacturing process.	This provision is relevant in that it is expected that The Bahamas will benefit from this information-sharing.

Main Article	Relevant Article	Brief Description of Article	Relevance to The Bahamas
	5(9)	The Bahamas may submit a proposal to amend Annex B to list a manufacturing process.	There are no manufacturing facilities as are mentioned in Annex B; so, it is not anticipated that The Bahamas is likely to seek to amend Annex B in the future.
8 Emissions	8(3)	Take measures to control emissions and make a national plan.	Since the emissions referenced under this Article refer to emissions from point source categories in Annex D only, and no such point source categories exist in The Bahamas, this obligation is not relevant to The Bahamas.
	8(4)	Reduce emissions from new sources by use of best available techniques and best environmental practices within 5 years of entry into force of the Convention in The Bahamas.	This provision is not relevant, since new sources refer to modification of the sources listed in Annex D and thus do not relate to The Bahamas. Consequently, the provisions in Article 8 of the Convention with respect to mercury emissions to the air are not relevant to The Bahamas and should not be a primary focus.
9 Releases	9(3)	Within 3 years of entry into force of the Convention for The Bahamas, identify relevant point source categories of releases.	This provision is very relevant and should be provided for in legislation since this Article refers to releases to land and water from sources not otherwise mentioned in any other article of the Convention. This would therefore refer to waste disposal of hazardous material containing mercury, which may affect the land and in turn the water. This is a continuing obligation.
	9(4)	Take measures to control releases.	Although a national plan appears to be discretionary because of the use of the word “may” in the provision, it is recommended that the preparation of a national plan, setting out the expected targets, goals, and outcomes will add structure to the implementation of the Convention. This plan must be submitted to the Conference of the Parties within 4 years of the entry into force of the Convention for The Bahamas. This is a relevant obligation which is a focus of the implementation of the Convention in The Bahamas.
	9(6)	Establish and maintain an inventory of releases from relevant sources within 5 years of the date of entry into force of the Convention in The Bahamas.	This provision is very relevant and should be incorporated in legislation.
10 Environmentally Sound Interim Storage of	10(4)	Cooperate with relevant organisations to enhance capacity-building for the environmentally sound storage of mercury and mercury compounds.	This provision is minimally relevant as no storage of mercury has been identified, given that it is not used in manufacture in The Bahamas.

Main Article	Relevant Article	Brief Description of Article	Relevance to The Bahamas
Mercury, Other Than Waste Mercury			
11 Mercury Wastes	11(3)(a)	Manage mercury waste in an environmentally sound manner in accordance with the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal (the Basel Convention) and requirements of the Conference of the Parties.	This provision is relevant to The Bahamas in terms of the management of the disposal of mercury wastes at the New Providence Ecology Park (NPEP), the landfill.
	11(3)(b)	Only recover, recycle, reclaim or reuse mercury or mercury wastes for permitted uses under the Convention or for environmentally sound disposal.	This provision is relevant to The Bahamas in terms of the management of the disposal of mercury wastes at the NPEP.
	11(3)(c)	Prohibit the transportation of mercury wastes across international boundaries except for environmentally sound disposal.	This provision is minimally relevant to The Bahamas as the incidence of mercury wastes being transported across international boundaries other than for environmentally sound disposal has not been identified. However, the prohibition ought to be contained in legislation as it is an important obligation.
	11(5)	Cooperate with Parties and relevant intergovernmental bodies to develop and maintain global, regional, and national capacity for management of mercury wastes in an environmentally sound manner.	This provision is relevant as The Bahamas needs assistance in terms of building capacity to comply with the obligations of the Convention.
13 Financial Resources and Mechanism	13	Provide, within its capabilities, through domestic funding, national budgets and bilateral and multilateral funding, resources in respect of national activities to implement the Convention.	This provision is relevant as resources are always an important component of complying with the obligations of international conventions such as the Convention. The Bahamas must make domestic budgetary allocations to assist in the implementation of the Convention. The mechanism of the Global Environmental Facility Trust described under Article 13(6) may also be used to access resources to implement the Convention.

Main Article	Relevant Article	Brief Description of Article	Relevance to The Bahamas
14 Capacity-building, Technical Assistance and Technology Transfer	14(1)	Cooperate to provide, within its capabilities, timely and appropriate capacity-building and technical assistance to least developed countries and small island developing states and Parties with economies in transition to assist them in implementing their obligations under the Convention.	This provision is minimally relevant. The Bahamas, being a small island developing state, can hope to benefit from the assistance of developed countries with experience in implementing the Convention.
16 Health Aspects	16(1)	Promote the development and implementation of strategies and programmes to identify and protect populations at risk, especially vulnerable populations, and may adopt science-based health guidelines relating to exposure to mercury, setting targets for mercury exposure reduction and engaging in public education with participation from health sectors. Promote the development of science-based educational and preventative programmes on occupational exposure to mercury and mercury compounds. Promote health care services for prevention, treatment and care of populations affected by exposure to mercury. Establish and strengthen health professional capacities for prevention, diagnosis, treatment, and monitoring of health risks related to exposure to mercury.	This provision is of medium relevance given that mercury is not used in manufacturing processes in The Bahamas and there are limited areas in which the risk of exposure is likely, being in the disposal of lightbulbs and hazardous wastes, in dental use, in crematoria and in certain cosmetics. Training in the relevant sectors is required. The promotion of health care services for diagnosis, treatment and care of vulnerable populations is useful but not urgent as there are no reports in The Bahamas of persons suffering health effects from exposure to mercury.
17 Information Exchange	17(1)	Facilitate the exchange of scientific, technical, and legal information concerning mercury and mercury compounds, information on reduction or elimination of production, use, trade, emissions, releases, viable alternatives, health and environmental risks, economic and social costs, epidemiological and health impacts, mercury-added products, manufacturing processes using mercury, and activities that emit or release mercury.	This provision is of minimal relevance in that The Bahamas can expect to be on the receiving end of this obligation; however, the exchange of information is an important requirement of the Convention that ought not to be overlooked albeit that mercury production or use may be minimal.

Main Article	Relevant Article	Brief Description of Article	Relevance to The Bahamas
18 Public Information, Awareness and Education	18(1)	Promote and facilitate the provision of information to the public on health and environmental effects of mercury, alternatives to mercury and mercury compounds, the topics mentioned in Article 17(1), results of research, development and monitoring activities under Article 19, activities to meet the obligations of the Convention and education, training and public awareness related to the effects of exposure to mercury.	This provision is relevant and relates to the obligations under Article 17(1).
	18(2)	Use existing mechanisms or consider developing mechanisms like pollutant release and transfer registers, for collection and dissemination of information on estimates of annual quantities of mercury emitted, released, or disposed of through human activity.	This provision is relevant to The Bahamas for the purpose of collecting data to be shared with the public and the Conference of the Parties about the quantities of mercury emitted, released, and disposed of locally.
19 Research, Development and Monitoring	19(1)	Cooperate to develop inventories of use, consumption, anthropogenic emissions of mercury and mercury compounds to air, water and land, levels of mercury in vulnerable populations and the environment and in biotic media such as fish, marine mammals, sea turtles and birds and collaborate in collection and exchange of appropriate samples, assess the impact of mercury and mercury compounds on human health and the social, cultural and economic impacts especially to vulnerable populations, develop harmonised methodologies for these activities, develop and improve information on the environmental cycle, the transport and fate of mercury in the ecosystem, distinguishing between natural and anthropogenic releases and remobilization of mercury from historic deposition, information on commerce and trade in mercury, mercury	This provision is relevant and comprises some of the main obligations of the Convention.

Main Article	Relevant Article	Brief Description of Article	Relevance to The Bahamas
		compounds and mercury-added products and information on the technical and economic availability of mercury free products and processes and on best available techniques and best environmental practices to reduce and monitor emissions and releases of mercury and mercury compounds.	
20 Implementation Plans	20(1)	Develop and execute an implementation plan, considering domestic circumstances, and transmit the plan to the Secretariat.	This provision is relevant, as this will point the way to the implementation of the Convention.
	20(2)	Review and update the implementation plan, taking into account its domestic circumstances and referring to guidance from the Conference of the Parties and other relevant guidance and consult national stakeholders in updating the implementation plan, and if necessary, coordinating on regional plans to facilitate implementation of the Convention.	This provision is relevant as the implementation plan carries with it a continuing obligation to review and update it.
21 Reporting	21(1)	Report to the Conference of the Parties on measures to implement the Convention, their effectiveness, and challenges.	This provision is relevant as it will allow for the assessment of the success of implementation of the Convention in The Bahamas.
	21(2)	Report on matters in Articles 3,5,7 and 9.	This provision is relevant as these are reporting obligations under the Convention.
Annex A Mercury-added Products	Annex A	List of items to be prohibited or phased out.	This list of mercury-added products provides a useful checklist of the items that it is sought to phase out or prohibit and so is relevant.
Annex B Manufacturing Processes in Which Mercury or Mercury Compounds are Used	Annex B	List of manufacturing processes in which mercury or mercury compounds are used.	This is not relevant to The Bahamas.
Annex C	Annex C	Artisanal and small-scale gold mining.	This is not relevant to The Bahamas.

Main Article	Relevant Article	Brief Description of Article	Relevance to The Bahamas
Artisanal and Small-scale Gold Mining			
Annex D List of Point Sources of Emissions of Mercury and Mercury Compounds to the Atmosphere	Annex D	Lists point source categories of emissions of mercury and mercury compounds to the atmosphere.	Due to The Bahamas not having the point source categories listed, emissions to the air are not a factor about which The Bahamas must be concerned in the implementation of the Convention.

3.1 Assessment of Policies and Legislation

3.1.1 Existing Policies

Since the enactment of the **Environmental Planning and Protection Act, 2019 (EPPA)** which mandates the preparation of a **National Environmental Policy Framework (NEPF)** no such policy framework has been created. Although no mercury policy exists, some decision-making ought to have occurred prior to any decision to ratify the Convention. The enactment of environmental legislation is an indication of the Government's policy with respect to the environment. Policy, therefore, can be deduced from these enactments and the ratification of international conventions.

There is a **National Environmental Policy 2005** which is very general in its terms and does not address mercury at all.

3.1.2 Existing Legislation

Legislation exists some of which is suitable for amendment to incorporate the provisions necessary to give effect to the Convention.

The **Ministry of the Environment Act, 2019 (MEA)** served to establish the Ministry of the Environment, which is now the Ministry of the Environment and Natural Resources (MOENR), under the general direction and control of the Minister who is constituted thereby a corporation sole. This Act does not require amendment because it establishes a framework for implementing international environmental conventions and multi-lateral agreements and provides an avenue through which Parliament can appropriate funds for these purposes.

The EPPA already contains provisions that allow for some of the obligations of the Convention to be administered, but under the general heading of hazardous wastes, and not specifically in terms of mercury. Minimal amendment ought to suffice.

The Environmental Health Services Act, Chapter 232 (EHSA) likewise makes provision for regulating environmental pollution while the **Environmental Health Services (Collection and Disposal of Waste) Regulations, 2004 (EHS(CDW)R)** contains significant provisions relating to disposal of domestic and commercial waste. These provide appropriate avenues for expansion to include any relevant obligation under the Convention.

The Customs Management Act, 2011 (CMA) regulates imports and exports in The Bahamas. Thus, any requirement to control the import or export of mercury must be effected through the vehicle of this Act.

No legislation exists concerning prohibitions against the manufacture of mercury-added products. Other legislation, such as the **Standards Act, Chapter 338A** may be used to provide additional support for the obligations of the Convention, if considered necessary. Under the Standards Act, Chapter 338A the Minister may make regulations with respect to the packaging, labelling, description, and advertising of any commodity for which a standard specification has been declared.

Table 26 set out hereunder identifies the existing legislation relevant to mercury management in The Bahamas.

Table 26: Summary of Existing Legislation Relevant to Mercury Management in The Bahamas

Provision of the Convention	Relevant Legislation and Regulation	Policy and Legislative Gap Analysis (if present)	Proposed Legal Reform Action (if needed)
4	CMA	No legislation exists with respect to the import or export of mercury or mercury-added products, the latter of which cover a wide range of disparate items coming under differing HS codes. However, this is the legislation under which it is appropriate for provision to be made for the relevant prohibitions.	There must be a legislative statement with respect to the prohibition and/or restriction of the import of mercury, mercury-added products and mercury compounds, and the proper placement for such prohibitions and restrictions is the CMA.
9, 10, 11, 12, 17, 18, 20, 21	EPPA	There is a policy with respect to the treatment of hazardous wastes that is demonstrated by the existence of provisions with respect to the treatment of environmental pollutants in the EPPA, although mercury has not been specifically identified. A policy decision had to precede the drafting of this legislation. This Act calls for an NEPF, setting out an analysis of the environmental issues of national significance, The Bahamas' obligations under the environmental agreements to which the country is a party and the mechanisms to implement their requirements. To date, the NEPF is non-existent, or at least incomplete, with no indication given as to the possible date of completion.	The Convention must be specifically referred to in the EPPA, consistent with mention being made of other international treaties with respect to the environment. Even without being mentioned, this Act does regulate mercury under the broad category of environmental pollutants. The NEPF mandated by the Act would include a position with respect to mercury. However, it is suggested that since the NEPF is expected to be a comprehensive document covering other aspects of environmental issues, a mercury policy can be isolated in the interest of implementing the Convention soonest. Otherwise, the schedules for implementing the Convention may well overtake the preparation of the NEPF.

Provision of the Convention	Relevant Legislation and Regulation	Policy and Legislative Gap Analysis (if present)	Proposed Legal Reform Action (if needed)
		The preparation of a national plan is an option under the Convention and does not exist in a written policy or legislation as the Convention is now being sought to be implemented. However, the ratification of the Convention can be regarded as an indication that the obligations of the Convention are included in the Government's policy.	While the requirement for a national plan need not be put into legislation, measures for the control of releases should be legislated insofar as these measures consist of release limit values to control or reduce releases, or any other action which requires or mandates persons to take or refrain from taking certain action. The EPPA is an appropriate vehicle for the enactment of these obligations.
		Measures for interim storage of mercury.	Any measures decided upon for interim storage of mercury with which persons are required to comply must be given legislative backing. However, this may be of minimal relevance since there is currently no interim storage of mercury.
		Management of mercury wastes.	This provision is very relevant being a focus of the Convention. Depending on the measures adopted for managing mercury waste, this may either be contained in legislation or policy.
		Develop strategies for identifying and assessing contaminated sites.	This obligation may be more suitable to being addressed by policy than by legislation.
		Facilitate the exchange of information between Parties.	This is the responsibility of the focal point, the Director in DEPP.
		Promote public education on the health effects of mercury and mercury compounds, alternatives to mercury and develop mechanisms for the collection and dissemination of information concerning annual quantities of mercury and mercury compounds released or disposed of through human activities.	This requirement is suitable for policy, although certain aspects may be strengthened through legislative provisions at the discretion of the legislative drafter.

Provision of the Convention	Relevant Legislation and Regulation	Policy and Legislative Gap Analysis (if present)	Proposed Legal Reform Action (if needed)
4, 5, 9, 10, 11, 12, 16	EHSA EHS(CDW)R	There is no reference to mercury in either the Act or the Regulations.	The responsibilities of the Department of Environmental Health Services (DEHS) include investigating and resolving issues of environmental protection, gathering, collating, and disseminating of information, providing training, monitoring and preparing reports and plans, providing advice, keeping abreast of technology and updating legislation, standards and procedures and a wide range of activities under which some of the requirements of the Convention may be subsumed. Amendment is suggested to make direct reference to mercury and the obligations that the Convention imposes. The EHS(CDW)R made under the EHSA contains provisions for the disposal of domestic, commercial, industrial, and medical waste.
		There is no policy with respect to testing of the land or water for mercury contamination.	Consideration should be given to whether this is an appropriate place for making provision for hazardous waste in general and mercury waste in particular. The Bahamas ought to seek the assistance of the Secretariat in accessing available information to determine what measures may need to be taken with respect to testing of land and water.
1, 16, 18	Health and Safety at Work Act, Chapter 321C (HSWA)	The Act provides adequately for a safe working environment. The gap lies in the employees not being fully aware of the dangers of mercury in their working environment.	Educational programmes should be devised to educate employees on the dangers of mercury and on where the potential dangers for exposure may lie.
4	Standards Act	No provision is made for the regulation of mercury content in cosmetics.	The Bahamas Bureau of Standards (BBS) ought to consider whether a standard should be declared with respect to mercury content in cosmetics. This may not be necessary if the Bahamas Customs and Excise Department (BCED) can effectively

Provision of the Convention	Relevant Legislation and Regulation	Policy and Legislative Gap Analysis (if present)	Proposed Legal Reform Action (if needed)
			regulate the importation of mercury-added products.
1, 9, 16	Dental Act	The Dental Act permits the use of dental amalgam containing mercury. There are no provisions with respect to the disposal of amalgam waste.	The Act should be amended to restrict the use of dental amalgam to situations where it is medically necessary. Consideration must be given to amending the Act to provide for the disposal of amalgam waste.
1, 9, 16	Pharmacy Act	Under the Pharmacy Act mercury compounds such as mercuric chloride, mercuric iodide and mercuric sulphocyanide may be dispensed although being categorised as poison. Pharmacies offer for sale medical equipment, medical preparations and cosmetics containing mercury	Consideration must be given to whether the Second Schedule to the Act should be amended to delete these poisons. Consideration should be given by the BPC to whether any standards ought to be imposed with respect to these items.

3.2 Assessment of Institutional Capacity

3.2.1 Key Institutions

The institutions described below are set out in order of their priority and duties as regards the implementation and enforcement of the obligations under the Minamata Convention.

Ministry of the Environment and Natural Resources (MOENR)

The Ministry of the Environment and Natural Resources (MOENR) is the ministry under which DEPP and DEHS fall. The Permanent Secretary is given the responsibility for all matters related to the administration of the ministry. The Ministry is given a mandate to protect and conserve the environment in general, including land, water and air, to determine and enforce policies, set standards for collecting and retrieving data, to deduce and advise the Minister on effective means of public participation in the formulation of environmental policy, to advise on pollution control, to communicate with international organisations with respect to any international conventions and coordinate with the Ministry of Foreign Affairs on the implementation of such conventions. In particular, the MEA brings the responsibility for environmental health under its mantle and the body responsible for administering multilateral environmental agreements. It establishes the Environmental Administration Fund (EAF) which is to be used to restore and enhance the environment in The Bahamas and implement an incentive measure to reduce environmental pollution, among other things. Money in the EAF may be designated for a specific purpose. The MEA also establishes the Environmental Trust Fund (ETF) to be under the control of a Board of Trustees constituted under section 11 of the MEA, which shall collect, allocate and use monies appropriated by Parliament or provided by another source. Importantly, this money is to be used to fulfil obligations of any multi-lateral environmental agreement. Apart from having the overall responsibility for the implementation of international environmental agreements this ministry also has the very important capacity of securing funds for the implementation of the Convention.

Department of Environmental Planning and Protection (DEPP)

DEPP has been identified as the primary department authorised and expected to develop, provide, and disseminate policies for the prevention and control of pollution, for sustainable use of the environment, to enforce compliance with the EPPA and related purposes. One of its primary obligations is to make recommendations for laws, guidelines, regulations, and codes of practice, and provide a legal framework to achieve this objective. This cannot be achieved in a vacuum, as reliance must be placed on the structures provided by the Government for the drafting of legislation, which is the Office of the Attorney General (OAG) that has the responsibility of drafting and shepherding new legislation

through the legislative process until it is enacted by Parliament.

Further, DEPP, whose Director is named as the focal point of the Convention, has by legislation, been given the responsibility of facilitating compliance with international agreements which The Bahamas has ratified. It is for this reason that the main agency through which the obligations of communicating with the Secretariat or the Conference of the Parties are to be achieved.

In terms of education, DEPP is charged with establishing a mechanism to ensure effective public participation in decision-making, the formulation of environmental policy and to promote environmental awareness and education.

DEPP is required to establish an accredited and standardised laboratory for water, air, and soil testing under the EPPA. Although there appear to be facilities available for conducting certain types of laboratory tests, in the context of the Convention, testing of the air is not relevant since The Bahamas does not have the point source categories listed in Annex D. However, it is noted that some testing is done for differing microbiological agents. It must be determined whether the existing laboratory facilities have the capacity to provide the testing for mercury that the Convention requires. It is noted that information relating to releases to water and soil is not generally available as testing is only carried out when a complaint is made.

Although the preparation of a mercury policy, separate and apart from the NEPF expected to be prepared by DEPP is recommended, it is noted that this mercury policy should be a part of the NEPF mandated by the EPPA.

Under the EPPA, prescribed standards are expected to be enacted in regulations controlling the release of pollution into the water or land with sanctions in place for breaches. Pollution control permits may be issued by the Director. The making of regulations for prescribed limits is outstanding.

Ascertainment of the extent of pollution to the land and water already has legislative backing under the EPPA, but this investigation has not yet been carried out.

Legal sanctions exist for breach of the provisions for protection of the environment from various types of pollution, including mercury (although it is not named), with the important addition, that a person in breach may be made to bear the cost of restoration of the environment and damage to persons adversely affected.

The EPPA gives the Director significant power to enforce environmental measures which would assist in implementing the Convention, such as issuing pollution control permits, investigating premises to ascertain the extent of water or air pollution, and establishing an environmental registry.

Department of Environmental Health Services (DEHS)

The Environmental Health Services Act provides for conservation and maintenance of the environment in the

interest of health and proper sanitation. The main thrust of this legislation is for the protection of human health. The Minister responsible for the environment is charged with the regulation and monitoring of the environment and control of pollution from any source (which would include mercury).

The Director of Environmental Health Services, who is the principal technical advisor to the Minister, is required to maintain constant consultations with the Ministry of Health and Wellness and other departments concerned with the environment. This fulfils the requirement of the Convention for intra-governmental collaboration and exchange of information.

DEHS is charged in legislation with investigating and implementing measures for the disposal of wastes, gathering, collating, and publishing of material relevant to the foregoing, training persons, carrying out necessary surveys, monitoring and investigations, maintaining necessary laboratory facilities, providing advice to MOH and other government agencies and updating legislation, standards, and procedures in connection with environmental health.

The EHSA provides for offences in relation to emissions and discharges of pollutants into the environment. Provision is made for the issuance of a Certificate of Approval as a mechanism to control the emission or release of pollutants and the treatment and disposal of solid waste must be carried out in accordance with this Act.

Regulations are authorised to be made for the control of hazardous wastes and for the control of pollution on land or in water. So, the EHSA is a significant tool in The Bahamas' arsenal against environmental pollution, which includes releases of mercury to land and water (emissions to air not being significant in the context of The Bahamas).

Bahamas Customs and Excise Department (BCED)

Although it is not anticipated that major amendments need to be made to the CMA, the amendments recommended, mainly being prohibitions and/or restrictions against import or export of mercury, mercury compounds and MAPs, are expected to have far-reaching effect in the implementation of the Convention. This is because ports of entry are the main thresholds for entry into The Bahamas of any of a range of imports whose use the Convention seeks to curb.

The CMA and the BCED may be the most important factors in the implementation and enforcement of the Convention.

Ministry of Health and Wellness (MOH) and Other Related Parties under Health

The Ministry of Health and Wellness (MOH), the Minister, the Department of Health (DOH) and medical officers of health, which includes the Chief Medical Officer (CMO), constitute the structure in place for addressing the medical aspects of implementing the Convention. Additionally, the Minister

has a role to play in the making regulations concerning cemeteries, cremation and burials at sea which indirectly relate to the issue of the disposal of silver fillings contained in corpses. While the health aspects of the use and disposal of mercury and mercury products are important, there is no indication of damage to health by exposure to mercury, whether by persons living in proximity to the landfill, or from waste collection, food, or any other source. However, vulnerable populations, such as persons involved in the use of dental amalgam, waste collectors, pregnant mothers and children must always be kept in mind and provision must be made proactively to prevent the damaging effects of exposure to mercury, including in foods. It is noted that while the Food (Seafood Processing and Inspection) Regulations, 2002 (F(SPI)R) set limits for mercury in seafood, it is uncertain to what extent this provision is monitored or enforced.

Dental amalgam is a well-documented source of anthropogenic releases of mercury. The Bahamas Dental Association (BDA) is the representative body to be approached to convey the requirements of the Convention to its membership and indications are that the National Coordinator has already conducted an educational seminar with the membership of this body. The Bahamas Dental Council (BDC) has a mandate to advise the Minister with respect to the practice of dentistry and the training of dental auxiliaries and so forms part of the institutional capacity responsible for the implementation of the Convention with respect to the use of dental amalgam. There does not seem to be a widespread awareness that waste from dental amalgam may be harmful to the environment as there is some incidence of such waste being simply washed down the sink to go into general wastewater. Over the years there has been a decrease in the use of dental amalgam, but the data provided by the BCED shows a rise in importations in relation to the last year for which data was available.

There are no existing regulations for the construction or location of crematoria. The effects of cremation and scattering of ashes at sea are not measured or documented. As regards potential releases from burials, this is not regarded as likely to be significant as burial is done in sealed receptacles, whether coffins, caskets, or urns. There is no regulation for scattering of ashes. Under the Health Services Act, Chapter 231 (HSA) the Minister may make regulations appointing places for the burial of persons who have died from any infectious disease and providing for and regulating the interment, burning or burial at sea of such corpses to prevent any injury or danger to health. The Health Rules provide that burial at sea shall not be within 10 miles of the coast. There appears to be a gap in the provisions relating to burial at sea and cremation in that the regulations that exist only speak to burial at sea or cremation of infected bodies.

The Bahamas Pharmacy Association (BPA) and the Bahamas Pharmacy Council (BPC) constituted under the Pharmacy Act, Chapter 227 are likewise the vehicles through which

training can be disseminated to pharmacists, pharmacy interns, pharmacy technicians, veterinarians, medical practitioners, and pharmacy owners with respect to knowledge, standards of knowledge and skill in the dispensing and use of medications, medical equipment and cosmetics containing mercury.

Bahamas Chamber of Commerce and Employers' Confederation (BCCEC)

The Bahamas Chamber of Commerce and Employers' Confederation (BCCEC) is representative of manufacturers and entrepreneurs which constitute the main importers of mercury-added products. Although it is useful for importation trends to be influenced by their knowledge on the subject, their relevance is expected to come second to the BCED which regulates the importation and therefore the use of mercury, mercury compounds and mercury-added products in The Bahamas. In terms of manufacturing, mercury does not currently factor into the manufacturing processes in The Bahamas, but the knowledge gleaned by the BCCEC in this exercise and their education of their membership is useful to future endeavours of its members and their compliance with the requirements of the Convention.

New Providence Ecology Park (NPEP)

NPEP plays a significant role in the carrying out of the Convention's mandate to dispose of mercury waste in an environmentally sound manner. They are the sole institution undertaking that responsibility in New Providence. Some shortcomings have been observed as for example the failure to separate mercury waste. This in turn results in a deficiency in the quantification of mercury waste that is stored on site or is to be disposed of.

Office of the Attorney General (OAG)

Prohibitions and restrictions must be effected by legislation and OAG oversees the drafting of legislation. So, although DEPP and DEHS have stated obligations in terms of ensuring that legislation keeps abreast of the environmental requirements, OAG is the implementing agency.

Grand Bahama Port Authority Limited (GBPA)

Special arrangements apply to the Grand Bahama Port Authority Limited (GBPA) in Freeport, Grand Bahama under the Hawksbill Creek Grand Bahama (Deep Water Harbour and Industrial Area) Act, Chapter 261 (HCGB(DWHIA)A), which gives responsibility for the management of the port area to the GBPA for the dredging and construction of a deep-water harbour and the establishment of factories and industrial undertakings for the economic benefit of The Bahamas in providing employment and encouraging economic development. In consideration of the development set out in the agreement authorised by this Act, the GBPA assumed significant

control over the area specified in the agreement and was given wide powers under the agreement and in bylaws of the company in terms of conservation and environmental protection. More regulation is proposed in draft bylaws which ought to be finalised for full legal effect.

National Chemicals Coordinating Committee (NCCC)

The Bahamas, as a party to the Stockholm Convention on Persistent Organic Pollutants (the Stockholm Convention), has undertaken to ban the importation and use of the 12 Persistent Organic Pollutants (POPs) into The Bahamas.

As a member signatory of the Stockholm Convention, The Bahamas is required to identify all products and services that contain or use the 12 POPs with a view to banning them. The National Chemicals Coordinating Committee (NCCC) comprising various stakeholders including representatives from the DEPP, DEHS, the University of The Bahamas, the Department of Agriculture (DOA), Bahamas Power and Light, the MOH, the Ministry of Finance (BCED) and GBPA, was established in April 2019 to oversee the implementation of the Stockholm Convention in The Bahamas.

A National Implementation Plan for the Stockholm Convention in The Bahamas (NIP), detailing how The Bahamas will ban and/or phase out use of these POPs, which include chemicals, and how existing stocks will be managed, has been drafted. Most of the work has been done in locating some of these chemicals in stockpile or storage. Due to the similarities in the remit and composition of the NCCC and the National Working Group of the Minamata Convention (NWG) this presents an ideal synergy for the implementation of the Stockholm Convention and the Convention. Under the Convention, advantage is expected to be taken of any existing structures to assist in its implementation. While mercury is not included in the 12 POPs, a similar process is required in terms of the banning and phasing out of mercury.

Chemicals and Wastes

The regime for chemicals in The Bahamas is much the same as it is for mercury. The EPPA deals with the management of hazardous pollutants in general. However, there is not a specific listing of chemicals to which the Act refers. Hazardous waste is defined in the Act as “any waste that exhibits characteristic properties of ignitability, corrosivity, reactivity or toxicity or such other characteristic properties that may be listed in any other enactment”, which includes most chemicals.

The NEPF required to be prepared by DEPP under the EPPA and referred to in section 15(3)(c), must contain a National Persistent Organic Pollutants and Toxic Chemicals Management Policy as set out in the Stockholm Convention and its related Protocols. However, although the EPPA specifically speaks to toxic chemicals and the NIP has been made and work

has been done by the NCCC towards implementation of the NIP, the NEPF is incomplete.

The EPPA provides that no person shall release or cause to be released any air pollutant or water pollutant into the environment which is in violation of any applicable standards, conditions or permit requirements under the EPPA or any regulations made thereunder. The EPPA provides for pollution permits to be issued by the Director of DEPP, mandates the Director to investigate the environment, and ascertain the extent of water, air, and noise pollution and the significant sources of pollutants which by their release causes or contributes to such pollution, and to characterise or describe such pollution. The Director is also required to establish in an Environmental Registry, data on the sources of water, air, and noise pollution, particularly data that identifies the quantity, conditions, or concentrations relevant to the identification of each pollutant.

All the other obligations such as research and monitoring, issuing of permits and carrying out investigations provided by the EPPA for that department and its Director that are relevant to mercury, also apply to hazardous chemicals.

In so far as The Bahamas seeks to implement the Stockholm Convention, the BCED is impacted as the first frontier which must be crossed for these chemicals to enter The Bahamas. Therefore, the BCED is also an important stakeholder in the prohibitions against the importation of POPs, subject to the stated capacities of other stakeholders in implementing that convention.

Ambient water quality criteria for chemical pollutants in surface waters of the port area as contained in Schedule 1 to the proposed Grand Bahama Pollution and Waste Bye-Laws reflects the standards for a significant number of the POPs that may be contained in standing water.

The draft Freeport (Environmental Management and Protection) Bye-laws contain very generalised environmental provisions without specifying any pollutant or specific chemical that is prohibited and draft Freeport (Water Preservation) Bye-laws are also not geared to providing directly for chemical waste.

Therefore, some structures are proposed for chemical management in the port area, but the extent to which there is capacity for properly monitoring this has not been established.

The F(SPI)R provides for chemical limits in seafood for a limited number of chemicals. In as much as it also provides limits for mercury and taking into consideration the recommendation that this testing continue or resume, the same recommendation is made concerning testing for chemicals. In the implementation process for the Stockholm Convention, it will be determined to what extent the laboratory facilities and manpower to conduct such testing exists. Consideration will also have to be given to whether the rather limited list of chemicals tested for ought to be expanded.

The Pharmacy Act provides for dispensing poisons and lists substances so categorised. As such, this legislation is an avenue for regulating the offering of hazardous chemicals for sale. The Standards Act, BAHFSA and WSCA are all avenues through which legislation may be enacted for the regulation of chemicals in food and water, subject to the recommendations of the NIP.

Hospitals, clinics, laboratories, NPEP and other waste disposal facilities and contractors are all relevant stakeholders in the implementation of any regulation concerning capacities for chemical management and disposal, while MOL has an interest in ensuring that workplaces are kept free of toxic chemicals in overseeing employers' obligations to provide a safe place of work. The issue of provision of PPEs for persons engaged in these undertakings must be noted.

The same agencies engaged in monitoring mercury waste have a responsibility for monitoring hazardous chemical waste. The BCED, GBPA, DEPP and NPEP are identified as having significant roles in this exercise.

The NIP has identified the stakeholders and provided recommendations concerning management, monitoring and capacities for the elimination of POPs and treatment of toxic chemicals from the environment.

Having assessed the institutional capacity, the key institutions are documented in Table 27 together with the national needs, the gaps that have been revealed and their priority.

Table 27: Identification of National Needs and Gaps and Key Institutions for Implementation of Mercury

IDENTIFICATION OF NATIONAL NEEDS AND GAPS	KEY INSTITUTIONS FOR IMPLEMENTATION	DEGREE OF RELEVANCE
Make provision for prohibitions and restrictions on the import and export of mercury and mercury compounds, considering the timelines stated in the Convention for phasing out mercury-added products. The GBPA may wish to adopt additional measures in its byelaws to incorporate any of the obligations of The Bahamas under the Convention which would have effect for the area over which the GBPA has jurisdiction.	OAG, BCED and GBPA	High
Make provision for prohibition of the manufacture of assembled products using mercury-added products.	OAG and DEPP	High
Establish an inventory of use, consumption and anthropogenic releases to land and water of mercury and mercury compounds.	DEPP	High
Cooperate in several areas including with intra-governmental bodies to develop and maintain capacity for management of mercury wastes, and to develop strategies for identifying, prioritizing, managing and remediating contaminated sites.	DEPP, DEHS, MOH, BDA, BDC and Bahamas United Funeral Homes and Morticians Association (BUFHMA)	High
Report to the Secretariat.	DEPP	High
Report to the Conference of the Parties.	DEPP	High
Make an implementation plan.	DEPP	High
Assess the impact of mercury and mercury compounds on human health and on trade in mercury and mercury-free products and processes, using harmonised methodologies for the same.	MOH, DEPP and DEHS	High
Sharing of information with Parties and the public.	MOH, DEPP and DEHS	High
Identify “relevant sources”[4] of releases to land and water.	DEPP	High
Make provision for recovery, recycling, reclamation, re-use and the environmentally sound disposal of mercury and mercury compounds.	DEPP, DEHS, and OAG	Medium
Disseminate information on the life cycle, transport, transformation, and fate of mercury in ecosystems and distinguish between anthropogenic and natural emission.	DEPP and DEHS	Medium
Provide for environmentally sound storage of mercury.	DEHS and OAG	Low
Provide, through policy, for settlement of disputes with respect to the interpretation of the Convention through peaceful means in accordance with the dispute resolution provisions of the Convention.	DEPP	Low

[4] Defined at Article 9(2)(b).

Table 28 below identifies the various sectors in which mercury added products are managed and the stakeholders relevant to each sector.

Table 28: Life-cycle Management of Mercury and Mercury Added Products in The Bahamas

Life-cycle Regulators	Stakeholders
Managing Importation	BCED, GBPA, medical institutions and personnel, dentists, suppliers of medical equipment.
Managing Placement in the Market	Entrepreneurs, individuals, and suppliers of medical equipment.
Production **Commercial Sale and Distribution** **Own Use**	N/A Entrepreneurs, BCCEC, individuals and suppliers of medical equipment. Individuals
Managing Transport and Distribution	Entrepreneurs/importers, medical institutions, dentists, individuals
Managing use	DEPP, DEHS, individuals, medical institutions and personnel, dentists
Managing Disposal	DEPP and DEHS, medical institutions and personnel, dentists, crematoria, cemeteries, waste collectors, NPEP

3.2.2 Institutional Challenges and Priorities

No major challenges are expected to be associated with the prohibition or restriction of the importation and export of mercury. The legislation must simply be enacted. However, for mercury to be prohibited or restricted, there must be training of Customs Officers and some provision must be put in place in terms of physical amenities to accommodate any products that the BCED may seize in the event of a breach of the law. Whether it will be necessary to provide Customs Officers with personal protective equipment (PPE) is a consideration.

The GBPA has draft byelaws which contain general provisions for environmental protection including monitoring of pollutants and specific provisions detailing the amount of mercury permitted in surface waters of the port area.

A policy must be established with respect to the treatment of products which may contain more than the permissible amount of mercury such as cosmetics, with a view to enabling Customs Officers to identify them and take appropriate action.

Mercury waste management is part of the general obligation to dispose of waste in an environmentally sound manner. The challenges, if any, may arise in the DEHS's and GBPA's ability to monitor levels of pollution and the availability of appropriate laboratory facilities for testing specifically for mercury.

The identification of contaminated sites may call for expert advice and collaboration, but, apart from cost considerations, is not anticipated to be a major problem since the sources of mercury pollution and releases may be relatively small and confined to certain areas such as landfills.

Education about the dangers of exposure to mercury has commenced by dissemination of information and training in small groups and sectors. The relevant departments, hospitals and health professionals would benefit from ongoing training being offered and there are no challenges anticipated with these measures. The sharing of information to the public about the use and disposal of lightbulbs, batteries, skin-lightening cosmetics, and other mercury-added products should continue and be augmented.

A challenge is anticipated in obtaining timely amendments to the CMA before the relevant phase-out dates. While other legislative measures are expected to be taken, the amendments to the CMA are regarded as of foremost importance.

Table 29 provides in greater detail information concerning institutional capacity for mercury management in The Bahamas. It gives an indication, by sector, of the technical infrastructure, financing arrangements and the legislative provisions for research and data management with respect to the previously mentioned institutions.

Table 29: Summary of Situational Analysis of the Current Institutional Capacity for Mercury Management in The Bahamas

Sector	Relevant Institutions	Regulations	Administrative Structure	Technical Infrastructure	Finance	Research and Data Management
Import/ export	BCED and GBPA	None existing concerning mercury and mercury added products	BCED and GBPA	Existing customs procedures	Government budgetary allocations and GBPA	Records are required to be kept and data easily retrievable for BCED.
Environmental Protection and Management	DEPP	EPPA contains general prohibition against pollution by hazardous material which includes mercury.	DEPP is configured to be able to administer the requirements of the EPPA and the Convention.	DEPP has access to a laboratory but testing for mercury has not commenced.	Budgetary allocations are made for this Department but may need to be augmented with the assistance of GEF, or another donor agency.	Section 28(1) of the EPPA requires the Director to maintain in an environmental registry data on water and air pollution. The Director shall also establish and maintain records with respect to sampling, monitoring, environmental audit activities and pollution control equipment. Draft byelaws of the GBPA provide for monitoring and data collection of environmental information, conducting research, creating an inventory of data, formulating guidelines and codes of practice and reporting on the state of the environment.
	Port Authority	Draft byelaws of the GBPA contain references to environmental protection,	The capacity of the GBPA to administer the draft byelaws with respect to	The availability of the technical infrastructure to administer the draft byelaws	GBPA/ Government	

Sector	Relevant Institutions	Regulations	Administrative Structure	Technical Infrastructure	Finance	Research and Data Management
		conservation, and pollution. Limits are proposed for various pollutants to surface waters in the port area, including mercury. Draft byelaws exist to establish mercury limits in ambient water quality of the surface waters of the Port Area.	environmental measures has not been determined.	has not been established. Existing draft byelaws require formalisation.		
	MOENR	MEA	MOENR, Board of Trustees of the ETF	Departments of MOENR being DEPP and DEHS	ETF established under the MEA, budgetary allocations and donor agencies.	MOENR through DEPP and DEHS
	DEHS	EHSA EHS(CDW)R	DEHS, especially the Director	Director and officers of DEHS and EHB	Budgetary allocations and ETF	DEHS
Health	DOH, especially CMO, BDC, BDA, BPC, and BPA	No prohibition exists to prohibit the use of mercury. The Hospital Rules made pursuant to the HSA list a price for amalgam fillings. The Dental Act refers to amalgam	Structures exist under which prohibitions can be administered and monitored. The BCED is responsible for advising the	Issues of procurement and education are expected to be dealt with by the MOH, BCED and BDA.	It is expected that budgetary allocations ought to be able to finance the replacement of existing mercury-added devices and equipment in Government medical and dental	Provision exists under the EHSA and the Pharmacy Act.

Sector	Relevant Institutions	Regulations	Administrative Structure	Technical Infrastructure	Finance	Research and Data Management
		in the context of the work of a dental hygienist. The Pharmacy Act provides for regulation of the sale of poison under which mercury can be categorised.	Minister on the practice of dentistry, dental services in general, the performance of dental services by and the establishment of suitable training programmes for dental auxiliaries. The BDA may arrange training for its membership. BPC, the Registrar appointed by the Minister under the Pharmacy Act, the Minister responsible for Medical and Health Services, pharmacists, and owners of pharmacies.	The Registrar appointed by the Minister under the Pharmacy Act, BPC, pharmacists, and pharmacies.	facilities. Private medical and dental practitioners will be required to fund these replacements themselves. Budgetary allocations for BPC and Registrar and private funding for pharmacy owners.	
Education	MOENR, MOH, DEPP, DEHS, BDA, BCED, BPC, BPA and NPEP	MEA, EPPA, EHSA, the Medical Act, the Dental Act, the Pharmacy Act and HSA	The MOENR, MOH, DEPP, DEHS, BDA, BCED, BPC and BPA all have a mandate to	Present infrastructure is considered sufficient for the purposes of educating	Budgetary allocations of government departments, BDA, BCED, BPC, BPA and NPEP.	Legislative provision exists for investigations, research and data collection by MOENR, DEPP and DEHS

Sector	Relevant Institutions	Regulations	Administrative Structure	Technical Infrastructure	Finance	Research and Data Management
			provide education.	stakeholders and members of the public. Attention should be paid to the communication strategy.		
Hazardous waste disposal	MOENR, MOH, DEPP, DEHS, BDA, BCED, Minister responsible for Medical and Health Services and NPEP	EHSA, EHS(CDW)R, EPPA, the Pharmacy Act	Procedures are partially in place for private collection and disposal of hazardous waste but not specifically for mercury.	Hazardous waste collection and disposal measures are currently in place at NPEP. Some dentists report inappropriate means of disposal of dental amalgam. No procedures exist for the separation of waste containing mercury other than lightbulbs to a limited extent.	The operations of NPEP are privately funded. DEHS pays for the collection of waste in New Providence and Local Government pays for the collection of waste in the family islands.	DEPP and DEHS are charged in their legislation with collecting data and conducting research.
Food and Water	DEHS and Bahamas Agricultural Health and Food Safety Authority (BAHFSA)	Bahamas Agricultural Health and Food Safety Authority Act, 2016 (BAHFSAA), FSQA, F(SPI)R	BBS, BAHFSA, Director of Food Safety (DFS) and authorised officers under the FSQA	BBS, BAHFSA	Budgetary allocations.	BAHFSA and DEHS are charged with collecting, collating, analysing and disseminating data with respect to food and drinks management.

Sector	Relevant Institutions	Regulations	Administrative Structure	Technical Infrastructure	Finance	Research and Data Management
Standards	BBS and DEHS	The Standards Act and ESHA	BBS, Director of Standards and Minister of the Environment	BBS and DEHS	Budgetary allocations.	BBS is required to promote research in furtherance of declaring standards. DEHS is charged under the EHSA to carry out research and collect data.
Safety at Work	Ministry of Labour (MOL), DEHS and GBPA.	EHSA and HSWA	Minister responsible for Labour, Advisory Council for Health and Safety (ACHS) and employers' health and safety committees established pursuant to section 22 of the HSWA.	Inspectors designated under section 10 of the HSWA. Director and officers of DEHS.	Budgetary allocations. Private funding by employers. GBPA.	None identified.

3.3 Policy, Legislation and Education

3.3.1 Policy

The formulation of a policy requires first and foremost a statement of the problem or issue. This can be stated as the need to implement the Convention in The Bahamas, consequent upon its ratification by The Bahamas.

Policy is the statement from which legislative drafting instructions are derived. From the policy, legislative drafting instructions are formulated, and where for one reason or another it is not practicable or desirable to convert any aspect of the policy into legislation, the policy itself may be administered notwithstanding that there may be no legislative backing.

The meetings with stakeholders have revealed that there is no written policy with respect to the treatment of mercury specifically or under any other classification as for example, hazardous chemicals. However, it is evident that the Government of The Bahamas has taken a position on these matters by virtue of its ratification of the Convention, which is likely to be contained in a Cabinet Conclusion, and by virtue of the relatively recent enactment of the EPPA. The EPPA incorporates other environmental conventions some of which duplicate obligations of the Convention.

It has been noted that the EPPA makes provision for an NEPF to be formulated by DEPP, which is the focal point for the implementation of the Convention. This NEPF is not limited to the treatment of mercury, but also encompasses treatment of other hazardous materials. There is still no indication of when the NEPF will be completed. The Government's Legislative Drafters have not participated in this process although an invitation was extended to them. It may well be that it is an inefficient use of resources to assign a drafter to this task at such an early stage.

Investigating whether policy exists is not limited to DEPP. Policy in that department should relate to and address releases of mercury and treatment of waste, especially hazardous waste. There are other Ministries and departments that have a part to play in the overall treatment of mercury and mercury-added products such as MOH, as regards medicine and medical devices, with respect to dentistry in terms of the use and disposal of amalgam fillings, and as regards public health issues such as use and disposal of mercury added products, with DEHS overseeing issues in relation to burials and cremations. Likewise, the MOL shares responsibility with DEHS for occupational health and safety, while BCED has an overarching role in supervising all imports and exports, which encompass mercury and mercury-added products.

3.3.2 Legislation

Legislation is the means by which new obligations acquire the force of law and are enforceable nationally. These obligations may be incorporated into the law by one free-standing piece of legislation or by incorporating amendments into existing laws in

different pieces of legislation, as has been done quite effectively in Canada.

Legislation is usually preceded by a policy which sets out the status quo, the problem that the legislation is intended to resolve, how it is intended to be resolved, and how this is done, whether by a new Act or by amending existing legislation.

Since the objective of this exercise concerns The Bahamas' intention to implement the Convention, there must be legislative action taken to ensure the efficacy of the obligations of the Convention in The Bahamas.

3.3.3 EPPA

The EPPA is a significant piece of legislation in the quest to implement the Convention. This Act already contains provisions for environmental protection in general and treatment of hazardous waste, both of which are essential in dealing with mercury.

Since the protection of the environment is one of the main areas of focus of the Convention, the fact that there are already provisions in legislation designed to achieve that end is a clear signal that insofar as the EPPA puts regimes in place regarding hazardous waste, emissions into the air and releases into the soil and water, this Act is an umbrella under which rules and prohibitions concerning the use, emission and release of mercury is already addressed, albeit not by name. Given this position, while it may be desirable, it is not strictly necessary to amend this Act to incorporate a reference to mercury.

Section 15 of the EPPA requires an NEPF to be prepared upon the coming into effect of this Act. The contents of that NEPF are substantial and appear not to have been completed yet despite the Act being in force for some time already. The NEPF requires that the obligations of the major international conventions to which The Bahamas is a party be reflected in the NEPF. The Vienna, Montreal and Stockholm Conventions are mentioned. As presently configured, the Act does not contain any reference to the Convention. Therefore, consistent with this Act setting out the various conventions to be implemented, section 15(3) of this Act must be amended to reflect that the NEPF must include the obligations of the Convention and so this Convention should be named under this section.

The Questionnaire returned by DEPP, the department that administers this Act, shows that there are no limits set for emissions of mercury to air or wastewater. The EPPA prohibits the discharge of any hazardous substance including chemicals into any water or any segment of the environment except in accordance with prescribed regulations. Further, the Director may issue a pollution control permit to authorise the release or emission into land, water, or air of any contaminant in quantities in excess of the prescribed standard. No regulations exist to this effect. This is another indication that the NEPF is incomplete, and that DEPP still has some way to go in achieving their

mandate to establish standards with respect to protection of the environment, including bodies of water, air, and soil. While the NEPF can be expected to refer to the requirements of the Convention, it appears that in the interest of the early implementation of the Convention, a mercury policy should be constructed independent of the NEPF so that it can be put into effect soonest without having to await the considerable content expected to be incorporated into the NEPF. Between this proposed mercury policy and the amendments that are suggested in this report, these will satisfy the requirement of section 3 of the Act insofar as it mandates the provision of a legal framework for the protection, enhancement, and conservation of the environment and for the sustainable management, use, development, and enjoyment of the environment by the people of The Bahamas and facilitates the implementation of the obligations under the Convention.

The time frames for the phase out of mercury from the date of ratification of the Convention by The Bahamas vary among categories of items. Given that the countdown from ratification of the Convention has already started, it is proposed that the actual target set should be for the total elimination of mercury in The Bahamas, with various exceptions, which will represent the delay for phase out. It may well be that by the time the legislation is ready, the phase out dates may already have passed.

Feedback from the water sector has not shown much attention being paid to mercury. However, although the manufacturing sector does not contribute to mercury emissions, and the NPEP waste management managers indicate that there is no incineration at least at the facility they manage, the potential accumulated effect of mercury entering waterways from the use and disposal of products and dental amalgam from the dental sector is still important to note as it contributes to the total mercury wastes.

3.3.4 CMA

No explicit prohibition exists concerning the importation or exportation of mercury; so, the simple solution to the implementation of the Convention in terms of the CMA is to amend that Act to include these prohibitions, and, to provide a system which can regulate and monitor the quantities of mercury imported.

A perusal of the CMA, the response of the BCED to the questionnaire and a further interview with personnel of the BCED indicates that there is no separate HS Code for products containing mercury. So, the importation of mercury-added products is uncertain to quantify and, without a monitoring mechanism, may prove difficult to assess or even estimate.

The proposed prohibition of the importation of mercury, mercury-added products and mercury compounds raises another concern, which is whether the Customs entry points, including the GBPA, have the capacity

to store such hazardous material prior to disposal. Indications from the BCED are that there is no capacity for the proper storage of hazardous waste at the points of entry. This issue is flagged merely as a reminder of this consequential issue that will arise to be managed appropriately.

3.3.5 Education

Education has commenced. BDA and Bahamas Chamber of Commerce and Employers' Confederation (BCCEC) have admitted being aware of the dangers of mercury. There are other avenues for awareness to be spread. The associations and councils that represent and license the various stakeholders are appropriate entities through which the message can be disseminated, as their mandate includes training. Government ministries and departments such as MOH, Ministry of the Environment and Natural Resources, Ministry of Agriculture, Marine Resources and Family Island Affairs (MOA), MOL, DEPP and DEHS all have a part to play.

Public awareness can be achieved in various ways through a variety of media. Song can be an effective medium. Schools can be involved, and the implementing ministries and departments may create competitions aimed at educating school children and their wider family circle on the dangers of mercury, of the use of mercury, the products to avoid, safe alternatives to mercury-added products, and best environmental practices with respect to mercury.

DEPP and DEHS have a mandate to educate, do research and train. The ways are numerous. A comprehensive educational strategy is required. These organisations can use the communications products developed through this MIA Project and previous MIAs in the region to develop a tailored education strategy for the Bahamian public. Further details on said communications products are included in Chapter 5 of this report.

Table 30 identifies the institutional challenges to the implementation of the Convention and the recommendations for their resolution within the institutional frameworks.

Table 30: Proposed Institutional Framework for Addressing Institutional Challenges for the Implementation of the Convention

Area	Proposed Aim	Core Institutional Challenge	Governance and Accountability	Designated National Agencies	Implementation Measures
Policy	DEPP as the implementing agency should: (a) create a statement of the issue at hand, which is the implementation of the Convention; (b) indicate the measures proposed for addressing the implementation of the Convention; (c) state which measures are intended for legislative attention and which measures will be confined to policy; and (d) obtain Cabinet approval of the policy. The approved policy will constitute the legislative drafting instructions. DEPP must collaborate with BCED and DEHS in this endeavour.	Absence of a practice of preparing written policies within departments. The NEPF made under the EPPA in which the issue of mercury is expected to be addressed requires significant work as it is required to cover all the areas policed by DEPP. This is likely to delay the creation of a policy on mercury.	DEPP and MOENR	DEPP	DEPP to prepare a mercury policy then to obtain Cabinet's approval of the policy.
Legislation, Standards and Byelaws	To create obligations, prohibitions, and restrictions commensurate with the obligations of The Bahamas under the Convention.	Timely enactment of legislation consistent with differing periods for compliance with obligations.	OAG/Director of Legal Affairs (DLA)	OAG/ DLA, DEPP, DEHS, BBS and GBPA	DEPP to construct a mercury policy and obtain Cabinet's approval of the Policy and legislative drafting instructions. OAG/DLA to draft the requisite amendments to existing legislation (CMA, EPPA, and EHSA).

Area	Proposed Aim	Core Institutional Challenge	Governance and Accountability	Designated National Agencies	Implementation Measures
					To obtain Cabinet's approval of the Bill(s) and to lay in Parliament with a view to passage of the Bill(s). To Gazette, upon which the measures will become law. BBS to declare standards, if appropriate. Minister of the Environment to make regulations and take any other action as considered appropriate. GBPA to formalise byelaws.
Education	To inform stakeholders and the public of the dangers of mercury, sensitise them to the various mercury-added products and educate them about proper disposal.	The implementation of a widespread communication strategy.	DEPP, DEHS, NPEP, BDA, BPA and MOH	DEPP, DEHS, BPC and MOH	Workshops and public service announcements disseminated through print, audio, visual and social media. Competitions and presentations in schools.

ANALYSIS

Having met with various stakeholders (summaries of stakeholder consultations completed for the legislative and institutional framework assessment are included in Annex 3), received responses to questionnaires, perused existing legislation in The Bahamas and analysed the Convention in terms of its relevance to The Bahamas, the process of implementing the Convention in The Bahamas has been narrowed. This is largely due to there not being primary mercury mining in The Bahamas, no artisanal gold mining, no point source categories as are mentioned in Annex D (thus removing concerns about emissions to the air). This leaves the major concerns being imports, manufacturing, and releases to land and water. The use of mercury-added products arises in different contexts and may call for differing treatment.

The exercise conducted has revealed that the sectors most likely to have to deal with mercury and mercury compounds are the medical and dental sectors by virtue of medical equipment on the one hand and dental amalgam on the other hand. An offshoot of the issue concerning dental amalgam is the sector responsible for burials and cremations insofar as bodies for burial or cremation may contain what is commonly known as silver fillings.

A variety of stakeholders were consulted via questionnaires and teleconferences. In terms of responses from stakeholders, the responses have been, in some cases, less than ideal in that the percentage of responses vis-a-vis the specific category of stakeholders was possibly not representative of the interests and responses of the entire category, as for example the manufacturers, the funeral directors and the dentists**.** An informal survey conducted at large pharmacies and smaller business places in New Providence revealed a large selection of skin-lightening products. This bears some investigation in terms of their mercury content. There is no regulation on the importation or sale of these products.

RECOMMENDATIONS

Table 31 below summarises the recommendations for the implementation of the obligations of the Convention for The Bahamas, categorises the recommendations according to priority and provides a timeframe within which the recommendations must be implemented.

Table 31: Recommendations for The Bahamas for the implementation of the obligations of the Minamata Convention

RECOMMENDATIONS	PRIORITY
A mercury policy must be prepared by DEPP in collaboration with the NWG and the NCCC in which the aims of the Convention are spelled out. In this policy, the provisions of the Convention relevant to The Bahamas must be identified and the proposed measures for complying with the Convention set out.	High
Amendments should be made to the CMA by the OAG to provide for prohibitions on the import and the restrictions on the export of mercury, with attention being paid to the time limits for so doing, if applicable, and with respect to the items containing mercury listed in Annex A to the Convention.	High
BCED in collaboration with DEPP should establish procedures for the storage and disposal of mercury, mercury-added products and mercury compounds retained by BCED. Customs officers must be provided with PPEs suitable to ensure their safe handling of such products.	High
MOH and BDA must promote the use of best environmental practices in dental facilities to reduce the release of mercury and mercury compounds to water and land.	High
Testing and monitoring of seafood for export and domestic use should be resumed for the purpose of enforcing adherence to the F(SPI)R. The authorised officer of DEHS or DOA appointed for the purpose of the F(SPI)R by the Minister of the Environment.	High
By February 2023, DEPP must identify relevant point source categories, if any.	High
DEPP must determine whether there are any stocks of mercury or mercury compounds in excess of 50 metric tons, and if so, identify these stocks and any source generating over 10 metric tons per year.	High
DEPP must prepare a national plan setting out the measures to be taken to control releases, the expected targets, and outcomes. The Bahamas has four years after ratification of the Convention in which to submit this national plan to the Conference of the Parties. Over one year has already elapsed; so, this obligation must be pursued speedily.	High
The requirement to prepare an inventory of releases within five years of the entry into force of the Convention for The Bahamas (by February 2025) would depend on whether the Bahamas is assessed as having any “relevant sources”, i.e., “any significant anthropogenic point sources of release as is determined by a Party, that is not addressed in other provisions of the Convention”. This process has commenced through the Minamata Initial Assessment Project and DEPP will have the responsibility for continuing to monitor and update the inventory.	High
Provisions must be made in the national budget for the allocation of funds by Parliament to assist in compliance with the Convention. The Bahamas must seek to explore all measures for obtaining financing. Every stakeholder	High

RECOMMENDATIONS	PRIORITY
ministry/department must make the appropriate budgetary representations to secure Parliamentary approval for their respective budgets to carry out their assigned tasks. This is also one of the ETF's mandates.	
DEPP and DEHS must assess their abilities to gather data and monitor premises and activities, to prepare inventories of use, consumption, and releases, working in accordance with scheduled agendas rather than only carrying out investigations when complaints are made.	High
DEPP must prepare an implementation plan and the Focal point must submit it to the Secretariat, review and update it on a regular basis, and report on the prohibitions, the making of the national plan, the success of the measures for phasing out, and the challenges.	High
DEPP and DEHS must take stock of the products highlighted for phasing out, as well as other products in use, and carry out timely surveys and investigations of mercury-added products to assist in the compilation of data, as the sharing of information in various departments and with the public and, the exchange of information with other Parties and the Secretariat are important aspects of the Convention. Monitoring is an area in which a deficiency is observed, and steps must be taken by these departments to strengthen capacity.	High
GBPA must finalise their draft Byelaws and amend them further to make them compliant with the Convention, extending the provisions concerning mercury releases to the land and water beyond the surface water of the Port Area.	High
BCED should implement the use of written declarations requiring importers to declare the mercury content of relevant imports. This should be given legislative support in the form of regulations drafted by OAG. Customs officers should be outfitted with mercury detectors to enable them to identify mercury content in imports.	Medium
It should be noted that the Convention provides protocols for the reduction in the use of dental amalgam with a view to its replacement by mercury-free alternatives. These protocols include restricting the use of dental amalgam to its encapsulated form. National objectives aimed at the prevention of dental caries and health promotion should be established in schools and through public service announcements. Professional dental organisations, such as BDA, should provide education to its membership on alternative, mercury-free dental restoration.	Medium
Amendments should be made by the OAG to the EPPA to provide for a prohibition against the manufacture of products utilizing mercury or mercury compounds, for interim storage of mercury in accordance with guidelines adopted by the Conference of the Parties, for environmentally sound management and disposal of mercury, to formalise in legislation the naming of the Director as the focal point, and for specific reference to be made to the Convention in the EPPA in a similar manner to how other international conventions are identified.	Medium
Prohibition of recycling, reclaiming or reuse of mercury, and prohibition against transportation across international boundaries must also be enacted. The OAG is responsible for drafting the legislation.	Medium

RECOMMENDATIONS	PRIORITY
It should be noted that by referring to mercury in the proposed amendment of the EPPA mention will have to be made of other hazardous chemicals, for consistency. The OAG is responsible for amending the legislation.	Medium
Further investigation and testing must be carried out with respect to skin-lightening soaps, creams, and cosmetics to determine their mercury content, if any, and if so, whether it is within acceptable levels, or whether particular brands should be prohibited. This equally falls within the responsibility of DEPP, DEHS and the Director of BBS.	Medium
MOH should establish protocols for pharmacists and owners of pharmacies to reduce or eliminate existing stock of skin-lightening products containing mercury.	Medium
The Director in BBS should declare a standard with respect to the packaging, labelling, description and advertising of items which contain mercury or mercury compounds, and the Minister should make regulations for the packaging, labelling, description or advertising of such products.	Medium
All stakeholders must put in place the best available techniques and the best environmental practices to control releases from relevant sources. This calls for a response in line with The Bahamas' abilities, taking into account economic and technical considerations and the cost and benefit to The Bahamas.	Medium
The requirement for cooperation with other Parties may be difficult to enforce across jurisdictions and so this requirement is more suitable for policy. If any contaminated sites are found in The Bahamas, assistance of the Conference of the Parties must be sought to access the guidance for their management. The Focal point will liaise with the Conference of the Parties and Parties.	Medium
Requirements in terms of promoting educational programmes, promoting appropriate health care, setting targets, and protecting at-risk populations are all requirements which are not narrowly defined and so are not suitable for legislation, but ought to be put into policy, with collaboration between MOENR and MOH. These educational programmes should be made available to different categories of persons and include school children. The obligations that the Convention requires a Party to encourage or discourage are suitable for policy within the respective implementing departments as opposed to legislation, as the imprecision of such obligations is difficult to convert into meaningful legislative language.	Medium
DEPP must create and execute a comprehensive public awareness campaign involving the stakeholders such as DEHS, MOH, BDA, BDC, BPA, BPC, BCCEC, BCED, GBPA, NPEP, and BUFHMA.	Medium
Legislation to control the disposal of ashes should be enacted. This legislation may be achieved within the context of an updated burials and cremation Act which addresses the entire sector.	Medium
Legislation to control the use and disposal of dental amalgam should be enacted.	Medium

All of the provisions of the Convention are important. Some are less relevant to The Bahamas, and for this reason have been accorded a lesser priority. It must be noted that none of the recommendations have been categorised as a low priority.

The timeframes for meeting the proposed recommendations depend primarily on the times dictated by the Convention for their implementation, some being immediate, others 3, 4 and 5 years from the date of ratification of the Convention. The OAG/DLA are responsible for preparing legislation for enactment by the Parliament of The Bahamas. The timeframes in which the legislative obligations can be achieved depends on the relative priorities of the OAG/DLA and the instructing ministries. Since the date for initial restriction on the import of certain items has already passed, amendment of the CMA should be addressed immediately. It is to be expected however that OAG/DLA must still do some of their own background research in order to fulfil this task. The necessary amendment should be able to be achieved within 6 months.

With respect to the NEPF, DEPP has not provided information in terms of how advanced this task may be or if it has commenced. For this reason, the preparation of a stand-alone mercury policy is recommended. Having ratified the Convention, it must be assumed that the relevant approvals have already been obtained from the relevant ministries and Cabinet. Therefore, a mercury policy ought to be able to be completed within 3-6 months.

The Convention allows four (4) years for the preparation of a national plan. A little over two (2) years have already passed. However, this report provides a good structure upon which to build a national implementation plan and it is considered that this can be completed within six (6) months.

Since the inventories of mercury releases and emissions must be updated regularly it is now time to strengthen the mechanisms that support the collection of this data such as addressing the separation and measurement of mercury waste at the NPEP and other waste disposal facilities.

Education and training of stakeholders is a continuing process which has already commenced and can proceed incrementally. The timeframe would be dictated by the extent of the campaign. BBS should start the process of collecting samples of skin-lightening cosmetics, soaps and creams for testing. This should commence immediately subject to the availability of adequate testing facilities, their other priorities, and the pandemic. Regulations for labelling ought to be able to be prepared within 6 months.

EPPA requires amendment either to the substantive Act or by enacting regulations relating to recycling, reclaiming and reuse of mercury.

Chapter 4: Identification of Populations at Risk and Gender Dimensions

4.1 Preliminary Review of Potential Populations at Risk and Potential Health Risks

Mercury has the ability to travel long distances in the atmosphere, persist in the environment, accumulate in ecosystems and significantly adversely affect human health and the environment and as such, has caused major concerns worldwide. Exposure to mercury can be chronic through long term contact or acute over a brief period of time at high dosage (World Health Organization, 2017). Extensive exposure disrupts the central nervous system which causes tremor, insomnia, and memory impairments. Whereas acute exposure aligns with symptoms such as nausea, abdominal pain, bloody diarrhea, kidney damage or even death (Shirkhanloo et al., 2014).

Although mercury is dangerous to all humans, there are groups that are more sensitive to the health effects and factors that determine the severity of the effects. These factors include:

- Form of mercury (methylmercury is more toxic to humans);
- Amount of mercury;
- Age of person exposed;
- Duration of exposure;
- Route of exposure; and
- Dietary patterns of fish consumption (UNEP/WHO, 2008).

Women of childbearing age; pregnant women; fetuses; newborns; and young children (less than 12 years of age) are included in the groups that are more sensitive to the effects. Fetuses and children are at highest risk when exposed to mercury because their nervous systems are still developing. Studies have shown that the concentration of mercury within a fetus is higher than that of the mother due to active transport of the mercury through the placenta (UNEP/WHO, 2008). Newborns and young children (under the age of 5) are susceptible to the effects of mercury as their nervous systems and organs are still developing (“Growth and Development of Children”, n.d.).

Populations or groups with continuous exposure to high levels of mercury are also more susceptible to the health impacts from mercury. These groups typically include persons with diets featuring significant amounts of fish, especially in fishing coastal communities, and those exposed through occupational roles, such as engaging in waste management activities (directly interacting with waste), healthcare workers, dental personnel and certain industrial workers such as those in cement production facilities or any processes that may use mercury directly in the process such as chlor-alkali facilities (not applicable to The Bahamas). A preliminary risk assessment of populations at risk is shown in Table 32. Persons who fall within more than one

of the categories identified should be assessed as a higher risk.

Table 32: Preliminary risk assessment of populations at risk due to sensitivity to mercury (UNEP/WHO, 2008)

Population	Description	Risk Level
Pregnant women and fetuses	Methylmercury concentrations in fetuses' blood are 1.5 to 2 times higher than his/her mother. This high rate is due to the "active transport of methylmercury to the fetus through the placenta". Fetuses are especially at risk to high mercury levels as their developing nervous systems are very sensitive. Women of childbearing age who are planning to have a child should also be warned of this risk.	High
Nursing women and infant children	Mercury levels within nursing women's blood stream can be transferred to infants via breast feeding. Risks are high due to the child's developing central nervous system.	High
Persons with certain illnesses	Persons with diseases of the liver, heart, kidney, nerves/nervous system and lungs, as well as those who suffer from undernutrition (especially lack of zinc, glutathione, antioxidants, or selenium) and malnutrition are vulnerable to unsafe levels of mercury as their bodies are ill-equipped to protect itself against it.	High to Moderate
Older children and adolescents	Research has shown that although the risk levels are lower, children up to the age of 17 are more at risk to harmful mercury effects when compared to adults. Again, this is due to the fact that the human central nervous system develops from birth to adolescence.	Moderate to Low

Article 16 of the Minamata Convention encourages Parties to develop strategies and programmes to identify these sensitive groups and populations at risk to adopt science-based health guidelines and targets to reduce the negative health impacts of mercury exposure, and to increase the capacity of health-care systems to be able to better monitor, prevent and treat affected populations.

4.1.1 Mercury exposure to humans through seafood

The consumption of fish provides numerous health benefits, such as the provision of important nutrients like Omega-3 for healthy growth and development. However, with the presence of mercury in different waterbody hotspots, methylmercury can be formed and can biomagnify and bioaccumulate in aquatic food webs, potentially contaminating an important food source for the population. Predatory fish and large fish species with longer lifespans tend to contain elevated levels of mercury and therefore extensive consumption of these species can increase the mercury levels and affect human health.

There are many studies on the impact of methylmercury toxicity to the neurological, cardiovascular, and immune systems within humans. For example, neurological impacts are often measured and become evident

through lowered IQ levels (Spadaro and Rabl, 2008) and through various neuropsychological tests (Grandjean et al., 1998). Cardiovascular and immunological impacts are often related to chronic exposure to mercury (Sweet and Zelikoff, 2001; Downer et al., 2017). The relative impacts from methylmercury's toxic effects can vary across human populations as some groups are more sensitive to the impacts of exposure. Methylmercury is known to affect neurological development in children and is also linked to cardiovascular disease in adults (Clarkson et al., 2003; Valera et al., 2011; Grandjean et al., 2012).

Since fish and other seafood are regularly eaten by populations in The Bahamas, groups in this country have a higher risk of exposure to mercury through the frequent consumption of aquatic species with bioaccumulated mercury. Health based organisations such as the WHO, the United States Environmental Protection Agency (U.S. EPA) and the European Commission (EC) have examined fish mercury concentrations to identify the types of fish that are likely to have higher mercury content, and to develop consumption guidelines which indicate the number of seafood meals that could be eaten to stay within recommended doses.

Table 33 shows guidelines for the safe consumption of seafood containing mercury that were created based on the U.S. EPA reference dose of $1x10^{4}$ mg of Hg/kg of body weight/day, a body weight of 132 pounds (60 kg) for an adult female person, and a fish meal size of about 6 ounces (170 grams). These guidelines are for muscle tissues in fish as >95% of Hg in the methyl form, and therefore this consumption guidance cannot be directly used with the shellfish total mercury data.

Table 33: U.S. EPA guidance for seafood consumption based on mercury concentrations

Mercury in Seafood (ppm, ww)	Consumption Guidance
≤ 0.05	Unrestricted
0.05 - 0.11	2 meals per week
0.11 - 0.22	1 meal per week
0.22 - 0.95	1 meal per month
> 0.95	No consumption

For further reference, the WHO and the EC general guidance level for fish mercury concentrations is 0.5 ppm with an "exemption" for larger, predatory fish species of up to 1.0 ppm, which is similar to the U.S. EPA "no consumption" level.

There have been a few scientific studies on the monitoring of mercury in fish in The Bahamas however, more frequent studies need to be done to ensure accurate exposure estimates over time, and to inform advisories on healthy dietary practices throughout the country. The Bahamas can consider testing fish species, such as cero mackerel, barracuda, amberjack, blue marlin, yellowfin tuna and wahoo, which tended to have higher levels of mercury when sampled and tested in rapid fish sampling and assessments completed in other Caribbean countries.

4.1.2 Occupational and environmental exposure to mercury

Individuals are often unaware of the possible exposure to mercury and mercury compounds in their everyday, occupational or environmental surroundings. The International Labour Organisation (ILO) reports that 22 percent of workplace fatalities and work-related diseases worldwide are due to improper handling of chemicals and other hazardous substances (Global Employment Trends, 2004). Population groups that have an increased frequency of exposure are at greater risk to the effects of mercury. Table 34 provides an assessment of the populations who are exposed to higher levels of mercury and their risk level.

Table 34: Preliminary risk assessment of populations at risk due to high/higher mercury exposure

Population	Description	Risk Level
Fishing communities	Persons who frequently consume fish, especially larger predator species, are more at risk to mercury contamination. The level of risk can vary and is dependent on how much fish is consumed, the type of fish consumed and the fish's level of mercury contamination. Recommended mercury consumption guidelines are set by GLC of the Great lakes Fish Advisory Workgroup and WHO and should be consulted by consumers.	High to Moderate
Pescatarians/ frequent fish consumers	Pescatarians, people who do not eat any meat other than fish, or persons who consume fish frequently, are also at high to moderate risk of experiencing adverse mercury health effects due to the frequent consumption of potentially mercury-contaminated aquatic species.	High to Moderate
Persons who work in the waste sector formally or informally	MAPs enter the landfill and dump sites through general and medical waste streams. Mercury exposure from this occupation can occur if broken bulbs and other damaged MAPs are included in wastes being handled. Training on environmentally sound management of MAPs, upkeep of the machinery and the use of proper safety equipment will reduce the risk of workers being exposed to harmful levels of mercury from the disposal of MAPs. However, without these measures, a moderate risk level stands.	Moderate
Persons who regularly use cosmetics which contain mercury, particularly skin-lightening creams with mercury	Some cosmetic products are known to contain low to high amounts of inorganic mercury or organic mercury. Mercury in its inorganic form is used for its skin bleaching properties in products such as skin lightening and anti-aging creams. Mercury is known to "inhibit the formation of melanin, the pigment that gives human skin a dark colour" (BRI, 2018). Such use of mercury is often illegal; and where industries are unregulated, dangerous levels of mercury may be used in the creams. Constant exposure to mercury in cosmetic products can lead to mercury poisoning. The level of risk is identified to be moderate as cosmetic products which contain mercury have been found to be present in The Bahamas based on factfinding conducted during data collection activities by the NPC.	Moderate

Population	Description	Risk Level
Medical and laboratory workers	Some medical and laboratory equipment such as blood pressure gauges and thermometers contain mercury. Exposure to mercury may occur during breakage and subsequent disposal of mercury containing equipment. The risk of exposure in this manner has been determined to be moderate as breakage may not be a common occurrence. Public awareness on the hazards of mercury exposure and proper disposal procedures are not prevalent in The Bahamas.	Moderate to Low
Persons with dental amalgam	Dental amalgam, used to fill tooth cavities, is made of a combination of mercury, silver, tin and copper. According to UNEP and WHO (2008), persons with dental amalgam fillings have been found to have higher levels of mercury in their bodies when compared to those who do not have dental amalgam fillings. This is due to the inhalation of and/ or ingestion of elemental mercury releases from the fillings. Therefore, the associated risk is considered to be moderate to low.	Moderate to Low
Dental practitioners	Dental practitioners who utilise dental amalgam are exposed to low levels of mercury via inhalation of elemental mercury from the amalgam during mixing and installation. Consultation with the Ministry of Health reveal that the use of dental amalgam has been mostly phased out in The Bahamas.	Low

Training on the risks of mercury exposure and personal protective equipment should be required by all workers in the fields highlighted in Table 35. Best environmental practices (BEP) and best available techniques (BAT) should be identified and promoted to ensure that professionals in The Bahamas use environmentally sound clean-up methods when handling broken mercury containing items. Source separation of mercury wastes should also be promoted to reduce the quantities of this waste stream entering the landfills and to decrease the risk of exposure by waste handlers. Awareness raising on the potential presence of mercury in waste products should be conducted for relevant stakeholders.

People living downstream/downwind to, or within areas which are sensitive to mercury contamination are also at an increased risk to the adverse health effects caused by mercury exposure. These higher risk areas are typically around hot spots and point sources of uncontrolled mercury release such as the informal dumpsites throughout the country (referring to any location where waste is disposed of in an uncontrolled or unmonitored manner). Measures should be put in place for the control of mercury releases at these sites to prevent emissions to the environment and decrease the risk to nearby residents. Potential testing of persons who may have been exposed to mercury should also be considered.

4.2 Assessment of Potential Gender Dimensions related to the management of mercury

Gender equality is an integral part of the implementation of the Minamata Convention as it is important to represent equality of the experience and realities of all members of society.

The United Nations Economic and Social Council (UN ECOSCO) has defined 'gender mainstreaming' as "a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of the policies and programmes in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated" (UNDP, 2007). It is recommended that gender mainstreaming considerations be incorporated into national activities for the implementation of the Minamata Convention in The Bahamas and for activities related to achieving the United Nations Sustainable Development Goals.

The Bahamas is a Party to several gender-related global agreements including the Beijing Platform for Action, which acknowledge that women and girls are disproportionately affected by climate change and environmental issues and demonstrates the need for women to be involved at all levels of decision-making and for a focus to be placed on the needs and conditions of rural women in the Family Islands of The Bahamas (Wallace, A. 2021). In Chapter 6 of this report, an outline of action for the integration of gender into mercury abatement projects is provided.

Gender difference in occupational roles, household roles and cultural practices can affect the level of mercury exposure to men and women and furthermore, toxic chemicals can affect men and women differently due to their varying biological factors. Chemicals can also affect men and women at different stages of their life and women especially tend to have time periods during which they are more vulnerable to the exposure to chemicals and consequently this exposure can result in serious consequences for their babies. Chemicals transferred during fetal development can cause lifelong harm.

4.2.1 Occupational Exposure

In SIDS, it is common to have certain occupational roles and tasks that may be more oriented towards men and vice versa and depending on these occupational roles and social circumstance, there are gender differences towards greater risk of exposure to toxic chemicals, including mercury.

In The Bahamas, women comprise 47.9% of the work force (World Bank Data Group, 2020). Based on the inventory of mercury releases detailed in Chapter 2 of this report, occupational exposure of mercury in The Bahamas may be mainly from the waste management sector. While there are no specific gender disaggregated data available on the waste sector, it has been observed that mainly men are employed in the waste handling and management sector while typically, the small businesses engaged in recycling and waste management are women-owned. Additionally, women are typically responsible for household management which involves the disposal of mercury-added products and other chemicals/waste (Wallace, A. 2021).

While dental amalgam preparation and use is minimal in The Bahamas as detailed in Section 2.4.1, it should still be noted that the potential risk of exposure to mercury from dental amalgam preparation or removal would be higher in females as over 94% of dental hygienists and dental technicians registered in The Bahamas are female (Bahamas Dental Council, 2020).

It is recommended that mercury monitoring should be conducted in order to further assess the patterns of exposure and difference in the effect of mercury exposure for men and women. Gathered information should inform a national strategy for reducing the risk of occupational exposure to mercury.

The concerns and experiences of each gender should be specifically considered when developing a risk management strategy as each gender is affected in different capacities due to varying environments. Developed policies and programmes should be designed, implemented, monitored, and evaluated based on the primary vulnerable group at risk for each field, and in such a way as to equally benefit both men and women or affected group (as noted in Chapter 6).

4.2.2 Cosmetic Exposure and Gender Differences

As noted in Section 2.3.5, mercury is sometimes used in skin care products and cosmetics found on the market in The Bahamas. For the purpose of skin-lightening and anti-aging soaps and creams, mercury salts are added to inhibit the formation of melanin, the pigment that gives human skin, hair and eyes their colour, and as a result lead to a lighter skin tone. Trace amounts of mercury are also legally added to some cosmetics, like mascara, for its properties as a preservative in preventing the growth of microorganisms (BRI, 2018).

It is assumed that if members of the population are indeed engaged in the use of these products, exposure would primarily be to women as global studies have indicated that women are more likely to use these products than men (Pierre-Louis, 2017). Some research has shown that the use of skin lightening creams by women with children have led to greater risks of mercury transfer to their children. Copan, et al., (2015) detailed a case in which a 20-month-old child was diagnosed with mercury poisoning which was attributed to the use of a skin lightening cream (found to contain 38,000 ppm Hg) by the child's mother. The child may have been exposed through skin-to-skin contact, breastfeeding, or potentially direct interaction with the cream.

Under the Minamata Convention, Parties have to end the import, export and manufacture of cosmetics with potentially harmful concentrations of mercury (above 1 ppm – parts per million) by 2020.

In the Bahamas, the Customs Management Act and Standards Act handles the regulation of imports and exports and the regulation of labelling respectively, however, there are no current provision existing for mercury in cosmetics (Gonsalves-Sabola Chambers, 2021). Consumers of these

skin-lightening products are therefore at risk to mercury exposure without even having the knowledge that harmful chemicals are components of the product. It is important to raise awareness regionally on the potential health risks associated with these mercury-containing products.

Chapter 5: Awareness/Understanding of the Workers and Public; and Existing Training and Educating Opportunities of Target Groups and Professionals

The level of awareness on the risks of mercury among identified stakeholders and target populations in The Bahamas vary based on the information made available to them. Measures should be put in place to educate these groups on the hazards of mercury exposure, the possible action to mitigate risks and to reduce mercury releases overall.

Article 18 of the Minamata Convention on Mercury states that:

1. *Each Party shall, within its capabilities, promote and facilitate:*
    a) *Provision to the public of available information on:*
    i. *The health and environmental effects of mercury and mercury compounds;*
    ii. *Alternatives to mercury and mercury compounds;*
    iii. *The topics identified in paragraph 1 of Article 17;*
    iv. *The results of its research, development and monitoring activities under Article 19; and*
    v. *Activities to meet its obligations under this Convention;*

    b) *Education, training and public awareness related to the effects of exposure to mercury and mercury compounds on human health and the environment in collaboration with relevant intergovernmental and non-governmental organizations and vulnerable populations, as appropriate.*

2. *Each Party shall use existing mechanisms or give consideration to the development of mechanisms, such as pollutant release and transfer registers where applicable, for the collection and dissemination of information on estimates of its annual quantities of mercury and mercury compounds that are emitted, released or disposed of through human activities.*

The development of a communications strategy to raise awareness on the issues of mercury is also a component under the MIA project. Stakeholders from the relevant government sectors have been made aware of the areas of focus for sound mercury management throughout the project through working group meetings.

Additionally, awareness raising materials were developed and adapted with consideration for mercury issues that are most relevant to the Bahamian context. The materials included:

1. A series of brief animated videos and promotional digital flyers on the following topics *(developed in coordination under previous GEF 9865 and GEF 9991 MIA Projects and updated for this MIA Project):*

    a. The Mercury Cycle
    b. Background on the Issue of Mercury globally and regionally

c. Mercury in Skin-lightening Creams and its Potential Health Effects
d. Mercury in your Diet
e. Mercury in the home (Figure 8)



Figure 8: Still image of animated video developed on mercury in household products

Through the GEF 9865 and GEF 9991 MIA Projects, the character of Captain Minamata was developed. Captain Minamata is the defender and protector of the Caribbean region against mercury and helps protects people from mercury exposure to safeguard their health and the health of the environment.

Through flyers, posters and videos, Captain Minamata helps disseminate information on mercury in a fun and interesting way. In these communications products, Captain Minamata is joined by characters, such as Grandpa Keith, Gary, and Adita from the 'Stop the POPs' Campaign, developed under the GEF 5558 Project, 'Development and Implementation of a Sustainable Management Mechanism for POPs in the Caribbean'. By incorporating characters from the 'Stop the POPs' Campaign in communications products with new characters, such as Captain Minamata, linkages have been created for an overall chemicals management and awareness campaign for the Caribbean.

2. Four (4) infographics *(developed under previous GEF 9455 MIA project and made available)* on the following topics:
    a. Mercury in Household Products (Figure 9)
    b. Mercury in Industrial and Medical Devices
    c. Mercury in Cosmetics
    d. Mercury and Health



Figure 9: Excerpt of Mercury in Household Products Infographic Developed

3. National MIA Summary brochure developed by the BCRC-Caribbean based on the results of the MIA project

4. Technical briefing documents on:
    a. Lessons Learnt and Good Practices Report
    b. Draft National Legal Briefing Note

5. Radio adverts on:

a. Managing mercury in The Bahamas
b. Skin lightening creams.

6. Live-action videos titled:
    a. Managing Mercury in The Bahamas: Mr. Jones, Jamaal and Candice at School
    b. Managing Mercury in The Bahamas: Dr. Marlon and Mr. Bain at the Doctor's Office
    c. Managing Mercury in The Bahamas: Stanley and Peter at Work

Based on the materials produced, a communication strategy for mercury awareness was developed for The Bahamas.

Examples of communication channels included:

1. **Social Media Platforms**: Using the different social media platforms for the DEPP and other national stakeholders, as well as the BCRC-Caribbean can allow the messages to reach a wide audience as well as provide the platform to share the products with many other agencies and organisations. Many environmental NGOs and local entertainers can be engaged to share the material on their social platforms as well. Using appropriate hashtags, the messages can be spread across the nation with little effort. The animated videos developed will be launched on the BCRC-Caribbean's and DEPP's social media platforms in 2022.
2. **Public Service Announcements via Television and Radio Platforms:** Engaging popular news channels and radio stations is another media form to ensure visibility of the videos and radio adverts produced.
3. **Environmental Campaigns and Events:** Many countries have nation-wide awareness events or campaigns to increase public education on current environmental concerns. Joining efforts and resources can add value to these environmental events and increase the general knowledge base of the population. Many campaigning events reach a large variety of target groups.
4. **Partnering with NGOs, Youth Groups or Other Project Initiatives:** Many environmental NGOs, youth groups, Rotary Clubs and community groups already have a following or an audience to engage when spreading a message. These awareness-raising products, along with the supporting document and a brief training done by the National Supervisor, key NWG members and/or BCRC-Caribbean, can be shared among interested groups to assist with carrying the message further with joint efforts.
5. **Engaging Local Health Institutions and Store Owners:** Contacting local stores that sell certain MAPs, such as skin-lightening creams or CFL bulbs, can allow for the messages to be understood from the seller's perspective. The flyers or infographics provided can be put in

the stores to potentially influence the consumer's behaviour at the direct source. Similarly, with community health institutes, flyers can be placed in the waiting room to engage specific target groups such as pregnant women or women of child-bearing age. Some health institutes have television screens or monitors in the waiting room which can also show the animated videos.

6. **Engaging Students at Primary and Secondary Level:** Through coordination with the Ministry of Education, there are multiple approaches that can be taken to engage students to raise awareness on these mercury issues. One approach can include engaging schools with the provision of an educational package, including a brief training or instruction set for the teachers. This will allow for the information to be incorporated into their lesson plans, curriculum or as a school assembly programme. Another approach can be to host a student workshop where specific classes or students from different schools can attend. These workshops can include presentations, theatre-style video viewing, a drama skit on the topic (Figure 10) and an interactive question-and-answer engagement session.



Figure 10: Trinidad and Tobago Drama Youth Group performing a mercury awareness skit under the GEF 9455 MIA Project previously executed

7. **Engaging Policy Makers:** In addition to the National Minamata Initial Assessment Report, the communications package includes technical briefing documents which will provide information to all key stakeholders and government officials. These documents provide the results of the different components of the project. These materials will assist in high-level stakeholder engagements or in drafting relevant cabinet briefing notes to promote the ratification and implementation of the Minamata Convention.

The communication strategy can be tailored to meet the priorities of The Bahamas, given the available resources, collaborations, and network in the country.

Table 35 summarises considerations for dissemination of the materials developed based on particular target audiences.

Table 35: Target Audience Considerations for Dissemination of Communication Material

Audience	Key Message	Channel
General Public / Households	• **Diet:** All products listed • **Health:** Animated Video with associated material and Infographics • **Consumer Products:** All products listed • **Mercury situation in the Caribbean:** Animated Videos with associated materials and live-action video.	Social Media Television Radio Community Meetings Posters & Flyers Training of community health professionals and NGOs for further dissemination
Students	• **Diet:** All products listed • **Health:** All products listed • **Consumer Products:** All products listed • **Mercury situation in the Caribbean:** Animated Videos with associated materials and live-action video.	Social Media Posters Student Engagement Workshops Training of teachers and incorporating into lessons plans
Pregnant Women and Women of Child-bearing age (18-44)	• **Diet:** All products listed • **Health:** Animated Video with associated material, Infographics and Flyer • **Consumer products:** Infographics • **Mercury situation in the Caribbean:** Animated Videos with associated materials and live-action video.	Social Media Posters in Health Centres or Doctor/Dentist offices Television Radio Training of health professionals and NGOs/Women's Groups for further dissemination
Private Sector, Importers and Retailers	• **Consumer products:** All products listed	Stakeholder Meetings Television
Government Agencies / Policy Makers	*Although all products can be used, the more technical products are listed here. • **Diet:** Fish Card and Flyer • **Health:** Infographic Flyer and Report • **Consumer Products:** Infographic	Television Briefing Meetings Government Awareness Events Training of customs and health officials

Chapter 6: Implementation Plan and Priorities for Action

The Bahamas became a Party to the Minamata Convention in 2020. Chapter 3 of this report provided an outline of the legislative recommendations for consideration in the implementation of the Minamata Convention. This Chapter highlights some of the practical considerations, based on the findings of the inventory, that may be taken by the Government of The Bahamas to assist in the implementation of the Minamata Convention.

Article 20 of the Text of the Minamata Convention on Mercury states that, "each Party may, following an initial assessment, develop and execute an implementation plan, taking into account its domestic circumstances, for meeting the obligations under this Convention" (UNEP, 2019b). Recommended priorities for action that can provide a basis to the development of an implementation plan are outlined this chapter. The development of an implementation plan is the responsibility of the respective Government and is optional. Coordination for the development of a *Guidance on national implementation plan development* is available through the Global Mercury Partnership and official Minamata Convention on Mercury website.

Financial assistance for the implementation of national priority actions is available for Parties to the Minamata Convention as per Article 13 which establishes a mechanism for the provision of financial resources through the Global Environment Facility Trust Fund and a Specific International Programme to support capacity building and technical assistance. Article 14 further lists provisions for capacity building, technical assistance, and technology transfer to developing country Parties and countries with economies in transition through regional, sub-regional, national, multilateral, and bilateral arrangements and partnerships.

In addition to the priorities discussed below, increasing education, and raising awareness about mercury and its impacts on human health and the environment is imperative. As such, the communications strategy and products developed for this MIA Project and discussed in Chapter 5 can assist the relevant ministries and institutions with increasing the knowledge of the Bahamian public on mercury.

Priority 1: Maintenance of a National Coordination Committee to Oversee Minamata Convention Implementation in Coordination with other chemicals and waste management initiatives.

In order to determine the needs for implementation of the Minamata Convention, consultation with various stakeholders is required. Stakeholder participation through consultation with the National Working Group and Focal Point for the project is critical to arriving at recommended actions that are suitable to The Bahamas. The information contained in this study was obtained through consultations with stakeholders involved or having an

interest in the management of chemicals (provided in Annex 1). Their input was beneficial in clearly identifying what was essential, for example, for the preferred institutional arrangements, the legislative reform measures, amendments to the policy framework and the timeframe within which the activity will be completed as compliance measures for the implementation of the Minamata Convention.

By participating in the MIA project, The Bahamas has an opportunity to strengthen its governance capacity for the implementation of the Minamata Convention. The country is a Party to other chemicals-related MEAs – Basel, and Stockholm Conventions, Montreal Protocol and Cartagena Protocol- and participates in the Strategic Approach to International Chemicals Management (SAICM) programme. The Bahamas may expand the opportunity presented by the MIA to establish a broad-based chemicals management framework that incorporates these other chemical-related MEAs within its policy, law, and institutional arrangements to establish an overall comprehensive chemicals management framework.

Each organisational format has strengths and limitations. The choice is between having several laws or a single law involving multi-sectors for chemicals management. However, for a small nation with limited resources and professional capacity, a multisector approach with clear responsibilities for leadership and coordination may be more suitable.

Mercury management also takes place in a broader context of the global sustainable development agenda, linked to the UN Sustainable Development Goals for good health and well-being, clean water and sanitation, affordable and clean energy, responsible consumption and production, sustainability of life below water, gender equality, and climate actions. Adequate arrangements to overcome these challenges and transforming them into opportunities will ultimately lead to informed and knowledge-based actions on the implementation of the Minamata Convention and help The Bahamas to successfully meet its obligations under the Minamata Convention.

The matrix of the requirements of the Minamata Convention as they relate to The Bahamas' governance arrangements established was presented in Chapter 3 of this report.

Priority 2: Phase-Out or Phase-Down of Mercury-Added Products

Based on the results of the inventory, one of the largest sources of mercury to The Bahamas are from the use and disposal of MAPs and other intentional products and processes.

To facilitate the phase-out or phase-down of MAPs regulated under the Minamata Convention, the Government of The Bahamas should establish standards or regulations that restrict the import of MAPs for which there are available mercury-free alternatives. Maximum allowable mercury content should be set and enforced for products that have no available mercury-free

alternatives and standards for ensuring transparent product labelling should be developed. The development of new standards and selection of suitable mercury-free alternatives should be based on research and collaboration with national stakeholders to ensure the effectiveness of measures put in place.

National import regulations for MAPs should be strengthened to facilitate the enforcement of established standards. The Bahamas is a member of the World Customs Organisation, and the country uses the 6-8 digit Harmonized System (HS) codes overseen by the World Customs Organization. However, HS Codes for certain MAPs are not specifically identified. National sub-codes to distinguish between MAPs and non-mercury containing products may be created at the discretion of national authorities or collaboration on regional initiatives for the development of specific codes can be done (Global Mercury Partnership, 2018).

Added digits should be specifically defined as an indicator of the presence of mercury in the imported item. For example, the Environment Directorate of Uruguay established a Working Group to create tariff codes for mercury-added medical devices resulting in the addition of sub-codes to differentiate between liquid clinical thermometers with and without mercury (UNEP, 2019c).

- 9025.11 Liquid thermometers
- 9025.11.10 Clinical thermometers
- 9025.11.10.10 Clinical thermometers containing mercury
- 9025.11.10.90 Other clinical thermometers

Officers from the Customs and Excise Department should be trained in the identification of the designated codes and recording of mercury-added imports to support the implementation of policies and legislation related to mercury. Under the GEF Programme, Implementing Sustainable Low and Non-Chemical Development in SIDS (ISLANDS) of which The Bahamas is a participant, parties to the Minamata Convention on Mercury will conduct activities to build capacity among Customs and Enforcement Officers.

There is global support for the development of an international approach for implementing mercury-specific HS codes through the UN Global Mercury Products Partnership, and for the promotion of mercury-free consumer products which are already widespread on the market.

Other general recommendations for the phase-out or phase-down of MAPs including the promotion of alternative mercury-free products and preventing the import and use of certain MAPs are highlighted in Table 37.

Overall, the use of mercury, mercury-added products and mercury compounds must be eradicated or limited. Although a written mercury policy has not been identified, there are clear signs that the necessity to phase out the use of mercury, mercury-added products and mercury compounds is understood and there is the political will

to achieve this. Already, there is a reduction in the use of mercury thermometers as shown from Customs import data and the responses to the questionnaires shared with hospitals and those involved in the distribution of medical equipment.

While a reduction in the use of skin lighting products containing mercury may have been influenced by another underlying motivation, and the phasing out of mercury lighting is being done to improve energy-efficiency, the overall result is a reduction in the use of mercury. To a certain extent the use of materials such as porcelain in dental fillings may have aesthetics at its root; yet the outcome is a reduction in the use of dental amalgam. The information provided by BDA indicate a steady decline in the use of dental amalgam, however, as noted in section 2.4.1, is noted that in some cases dental amalgam is the most suitable option.

A significant challenge to implementing the recommendations provided in Table 36 is the existence of an unfounded perception that some mercury-free alternatives do not perform as precisely and accurately as their mercury-containing counterparts. Therefore, although there is a general push to promote the use of mercury-free and mercury-reduced alternatives in The Bahamas, there is still a need to increase public awareness on the hazards of mercury and the benefits of using mercury-free alternatives and their efficiency rates to encourage a higher substitution rate.

Table 36: General recommendations for phasing out or phasing down MAPs listed in Annex A of the Minamata Convention on Mercury

MAP	Recommended Action for Phase-Out/Phase-Down
Switches and Relays	• Promote the use of Hg-free alternatives which are already widespread on the market. For example, electronic mercury-free alternatives are proven effective and widely available, and many manufacturers now produce mercury-free switches and relays because of restrictions in the EU's RoHS Directive. Mercury-free alternatives include hybrid tilt switches and electronic thermostats.[5] • Take measures to prevent use as components in larger products like pumps, appliances, ovens, and circuit boards. • Ensure that allowable high accuracy capacitance and loss measurement bridges and high frequency radio frequency switches and relays in monitoring and control instruments maintain a maximum mercury content of 20 mg per bridge, switch, or relay.

[5] Some of the recognized existing guidance documents are available at the following links (Kamande, 2017):
- Report on the major mercury-containing products and processes, their substitutes and experience in switching to mercury-free products and processes, UN Environment OEWG2: http://www.mercuryconvention.org/Portals/11/documents/meetings/oewg2/English/2_7.pdf
- Mercury-added Product Fact Sheets, Northeast Waste Management Officials Association: http://www.newmoa.org/prevention/mercury/imerc/FactSheets/
- Developing National Strategies to Phase Mercury Out of Thermometers and Sphygmomanometers Including in the Context of the Minamata Convention on Mercury, WHO: http://www.who.int/ipcs/assessment/public_health/WHOGuidanceReportonMercury2015.pdf

MAP	Recommended Action for Phase-Out/Phase-Down
	• Set up waste electrical and electronic equipment (WEEE) dismantling plants to remove switches and relays from non-hazardous waste streams.
Batteries	• Promote the use of Hg-free alternatives, such as cylinder (alkaline rechargeable) batteries which are already common on the market • Prevent the import and use of mercury containing batteries in devices used for medical, industrial or military applications and electronics. • Ensure that allowable mercury-containing button zinc silver oxide and button zinc air batteries used maintain acceptable limit of <2% Hg content. This limit is typically in accordance with the batteries on the global market currently. • Put measures in place, e.g., WEEE dismantling plants, to remove batteries from non-hazardous waste streams.
Lighting Devices (CFLs, LFLs, HPMV, CCFLs, EEFLs)[6]	• Promote the use of LEDs and other Hg-free lamp alternatives for general purpose lighting and LCD backlighting (The amount of Hg needed per lamp has decreased over the years due to technology/production improvements, including better dosing; therefore, meeting this requirement globally is becoming easier. The People's Republic of China which manufactures many of these products for worldwide export is Party to the Minamata Convention and have implemented plans to meet the obligations for manufacture in accordance with the Convention's obligations [Kamande, 2017]). • Set and enforce low maximum mercury content limits for lamps imported and used. • Restrict the use of HPMV and enforce the use of available alternatives. • Purchase bulb-eaters to facilitate recycling or environmentally sound disposal of end-of-life fluorescent tubes. • Set up and train WEEE dismantling facilities to separate CCFLs and EEFLs from non-hazardous waste streams.
Non-Electronic Measuring Devices (Barometers, Hygrometers, Sphygmomanometers, Thermometers etc.)	• Promote the use of cost-effective Hg-free alternatives. Digital and aneroid Hg-free alternatives to these products are already popular on the global market. Guidance documents on phasing out these products have been developed by the World Health Organization and Health Care Without Harm who began a global campaign to shift the production of mercury-added medical devices to Hg-free alternatives by 2017. • Ensure there are customs codes to identify mercury-containing and mercury-free products entering the country to track the phase out process. • Enforce on-site separation of these devices from non-hazardous waste streams and waste incineration streams.

[6] CFLs, LFLs and high-pressure mercury vapour lamps (HPMV) are used for general lighting purposes; Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) are used in electronic displays.

MAP	Recommended Action for Phase-Out/Phase-Down
Cosmetics (Skin Lightening Products)	• Establish measures to regulate the import and local manufacture of skin lightening products. • Compile a local inventory of mercury containing cosmetics to better inform governments and public. • Develop and enforce proper and transparent labelling standards. • Promote the use of cost-effective Hg-free alternatives. • Ban the manufacture, import and export of mercury-added cosmetics. • Conduct public awareness campaigns.
Dental Amalgam	• Encourage the use of cost-effective and clinically effective mercury-free dental restoration options to phase-out the use of Hg-added dental amalgam, for example, through Bahamas Dental Association. • Provide training and education opportunities for professional dentists and students in dental school on mercury-free dental restoration options and best practices[7] to prevent release of mercury into the environment.

Priority 3: Strengthening of the national or regional capacity to test and monitor mercury in human health and the environment

Overall, in the Caribbean, there is a need for greater resources and capacity to monitor mercury in the environment. Periodic monitoring and evaluations are needed to ensure that potential mercury sources are identified, and that control methods are effectively reducing the mercury releases and emissions in the environment.

Under the 2019 second round of the Specific International Programme, Antigua and Barbuda was awarded funding for "Facilitating capacity-building with technical assistance and technology transfer for managing mercury in the Caribbean" in which a Caribbean Region Mercury Monitoring Network will be set up. The Network will ensure the strengthening of national laboratory capacity and assess mercury in air deposition, fish, birds, humans, and cosmetics. In the future, The Bahamas could join the Network and benefit from the resources it offers. Additionally, considerations can be made to build local capacity for training and testing.

Priority 4: Environmentally Sound Management of Mercury Wastes

Many household consumer products and medical waste products that contain mercury or mercury compounds end up at the national

[7] To prevent the release of mercury into water supplies during the removal of existing mercury-containing dental amalgams, dentists should be strongly encouraged to purchase brands of dental chairs that are fitted with amalgam separators which trap excess amalgam. Amalgam captured by the filters should be captured during periodic cleaning efforts, and the mercury-containing waste should be transported to a facility for recycling. Temporarily stored dental amalgam should utilize the underwater storage method outlined on page 13 of the UNDP/GEF Global Healthcare Waste Project: "Guidance on the cleanup, temporary or intermediate storage, and transport of mercury waste from healthcare facilities" document (Emmanuel, 2010).

landfills mixed in with municipal waste. Even after the importation of MAPs is phased out, it is expected that the generation of wastes containing mercury will continue due to the extensive lifespan of some MAPs. Proper waste management methods are therefore essential for the protection of The Bahamas' health and environment from releases of mercury.

While some of the mercury used in products can be collected and recycled, The Bahamas faces issues which reduce the feasibility of such measures. These issues include a lack of enforced requirements for manufacturers (imported from) to list all the components of their products, which leaves users and disposers unaware of the need for special disposal; inefficient collection, waste separation, and disposal systems; a lack of access to storage and recycling facilities; and little public awareness on the hazards of MAPs and their proper disposal. Further, the small amount of mercury that may become available for national recovery may not be enough to develop an economically viable system.

Information that may contribute to the development of mercury waste thresholds was submitted to the second meeting of the COP to the Minamata Convention (UNEP, 2018). This information included national data presented by experts such as:

- Mercury compounds in use;
- MAPs in use;
- Data on mercury content in waste contaminated with mercury or mercury compounds;
- Existing mercury thresholds in national legislation; and
- Proposed threshold values for mercury concentrations.

The suggested threshold values could be used to inform the development of standards for the environmentally sound disposal of mercury wastes, and to establish guidelines for reducing health risks caused by emissions and releases of mercury from the mismanagement of mercury-containing wastes. At COP 4, discussions on the thresholds for mercury waste were held. Further work on the establishment of thresholds is to be completed before COP 5 schedule for late 2023.

Development of proper separation methods for the disposal of MAPs at the household consumer level and in landfill management procedures is necessary for sound management of mercury releases in The Bahamas. The Government should ensure that the public has access to environmentally sound facilities/locations that could aid in the disposal process, as well as information and guidelines on disposing MAPs. Source separation of wastes containing mercury should be encouraged, and a nation-wide collection system should be established to reduce the landfilling of mercury wastes. Training of waste management personnel, as well as educating the general public on the identification of MAPs are necessary to ensure the effectiveness of implemented measures. Furthermore, the Environmental Planning and Protection Act, 2019 should be updated to ensure that the prohibition of recycling, reclaiming or reuse of mercury and transportation across international

boundaries are in line with the requirements of the Basel Convention.

Under the GEF Programme, ISLANDS of which The Bahamas is a participant, sound management of chemicals and waste will be addressed through strengthening the capacity of sub-national, national, and regional institutions and strengthening the enabling policy and regulatory framework in project countries. Mercury management will be largely addressed under this Programme planned for 2021-2026 for Parties to the Convention. Some of the proposed activities under the GEF ISLANDS Programme include:

- The development of legislative and institutional framework for the environmentally sound management of mercury containing products, and development of national strategies for adoption and implementation;
- training of the customs/border control and trade officers, environmental inspectors, and officers responsible for the sound management of chemicals;
- establishment of standards and building of capacity to control/limit and prevent the import of mercury added products; the promotion of Sustainable Procurement to reduce the manufacture/import of products containing hazardous chemicals and;
- harmonisation of BAT/BEP for the management of existing hazardous waste management strategies and initiatives.

Priority 5: Integration of gender into mercury abatement projects

Under a rapid analysis conducted by Gender Consultant, Ms. Candice Ramessar, under a related MIA Project (GEF 9865), the importance of including sensitivity guidelines for engendering projects addressing mercury pollution was highlighted. Table 37 provides suggested guidelines that can be considered in the development and implementation of mercury and overall chemicals management initiatives.

Table 37: Integrating Gender into Mercury Abatement Projects

INTEGRATING GENDER INTO MERCURY ABATEMENT PROJECTS			
Planning Stage	**Design Stage** Gender considerations should be implemented in the design framework and organisation of the project	**Implementation Stage**	**Monitoring and Evaluation (M&E) Stage**
Identify key gender issues and considerations related to chemicals and waste management (through literature review and general research). **Determine** how gender inequalities affect exposure to mercury pollution (through literature review and interview with experts from the scientific and gender fields. **Identify** structural and other societal factors for men and women (but particularly women) exposure and vulnerability to mercury pollution (this can be done through a literature review of gender documents of the country and region including Country Gender Assessments and Poverty Assessments as well as reports on Social Protection and Human Rights). **Acknowledge** and note women's and fetuses' vulnerability to chemical pollution	**Allocate** resources for the conduct of a gender analysis (In the early stages of the project preparatory phase assign a budget line item for the carrying out of gender analysis. Some donors such as the GEF provide a grant for the preparation of projects. The gender analysis should be done by someone who is experienced in the field of gender or other social sciences field with experience in gender studies or practice. **Procure** gender expert to conduct gender analysis. **Conduct** gender analysis of chemical pollution and gender in the area of focus. (For national and regional projects, the gender analysis can focus on the gender issues at the national and regional levels. However, if the project will work in local communities and those communities are known then the gender analysis should also focus on the local/community levels. Gender Analysis typically asks the questions. **Refine** gender issues and considerations identified in the planning stage. **Incorporate** gender in the project results framework by developing sensitive/responsive programme objectives.	**National** gender awareness and sensitization at inception workshops to demonstrate the projects commitment to gender equality and mainstreaming. **Adopt** a gender mainstreaming strategy in the project policies. **Build** the capacity of the programme's team and partners to conduct gender analysis and mainstream gender. **Implement** gender action plan, including ensuring the allocation of specific and sufficient resources (financial, human, time) to enable the achievement of programme objectives. **Implement** activities in a culturally sensitive manner. **Conduct** activities that leverage other gender interventions in the country (including the National Gender Agencies and Women representative organizations) or region and use them to build	**Adopt** an M&E process and methodology to capture the gender dimension of the programme. **Define** quantitative and qualitative gender-sensitive indicators to measure projects impact on men and women have contributed to addressing the issues and achieving the expected outcomes, and to what extent the programme has equitably addressed both women's and men's needs. **Develop** culturally sensitive and gender-specific data collection tools and methodologies. **Conduct** culturally sensitive and gender-specific data collection exercises including single-gender activities and activities respectful of women and men's schedules and social and reproductive roles.

INTEGRATING GENDER INTO MERCURY ABATEMENT PROJECTS			
Planning Stage	**Design Stage** Gender considerations should be implemented in the design framework and organisation of the project	**Implementation Stage**	**Monitoring and Evaluation (M&E) Stage**
and exposure (Collation of notes from the literature review and interviews).	**Define** goal, objectives outcomes, outputs, and activities that will contribute to addressing both women's and men's needs. **Develop** criteria for participation in project activities that will ensure gender balance in participation. **Ensure** social inclusivity by the design of activities to reach all sectors of society, especially vulnerable populations. **Ensure** that programmes and activities reflect socio-ethnocultural sensitivity. **Embed** in the project design the socio-ethnocultural and gender sensitivity especially in awareness, communications, monitoring, and evaluation programme activities and these activities promote gender equality and the empowerment of women and men. **Develop** a gender action plan with a budget based on the proportionality of the project. **Allocate** resources for the gender action plan implementation including human resources. **Identify** clear responsibilities for the gender action plan or gender sensitivity activities including the allocation of specific personnel.	political commitment and community support. **Highlight** women vulnerability in mercury pollution and their potential as powerful advocates in raising awareness of the issue. **Advocate** for gender mainstreaming as essential in addressing the issue of chemical pollution in the countries and regions.	

References

Bahamas Dental Council. 2020. Official Gazette- Bahamas Dental Council. [online] Available at: https://static1.squarespace.com/static/602ebcd3f2335f5b956abd42/t/60301415951ab900f28964e9/1613763605474/Gazette+20.pdf.

The Bahamas Department of Statistics. 2015. *Population Projections 2010-2040.* [online] Available at: https://www.bahamas.gov.bs/wps/wcm/connect/22f9b2b0-68fa-4a26-8bd8-474952e42dc2/Population+Projection+Report+2010-2040.pdf?MOD=AJPERES.

The Bahamas Maritime Authority (The BMA). 2021. *About us*. Available at: https://www.bahamasmaritime.com/the-bma/about-us/.

The Bahamas Second National Communication to the UNFCCC. 2014. [online] Available at: https://depp.gov.bs/wp-content/uploads/2021/06/The_Bahamas_-_Second_National_Communication_to_the_UNFCCC.pdf.

Biodiversity Research Institute (BRI). 2018. *Mercury Exposure through Skin Lightening Products – Antigua and Barbuda.*, 2018. Portland, ME, USA.

Biodiversity Research Institute (BRI). 2019. *Watershed Hotspot Mapping in Belize.*, 2019. Portland, ME, USA.

Burdescu, R., van den Berg, C., Janson, N., and Alvarado, O. 2020. *A Benchmark for the Performance of State-Owned Water Utilities in the Caribbean*. Development Knowledge and Learning. Washington, DC: World Bank. [online] Available at: https://openknowledge.worldbank.org/handle/10986/33251.

Clarkson, T.W., Magos, L., Myers, G.J. 2003. The Toxicology of Mercury—Current Exposures and Clinical Manifestations. *The New England J. Medicine*. 349:1731–1737.

Clean Lighting Coalition. n.d. *Benefits*. [online] Available at: https://cleanlightingcoalition.org/benefits/.

Codex Alimentarius. 2009. *Codex General Standard for Contaminants and Toxins in Food and Feed (Codex Stan 193-1995)*. United Nations Food and Agriculture Organization, 44 pp. [online] Available at: http://www.fao.org/fileadmin/user_upload/livestockgov/documents/1_CXS_193e.pdf.

Copan, L., Fowles, J., Barreau, T., McGee, N. 2015. Mercury toxicity and contamination of households from the use of skin creams adulterated with mercurous chloride (Calomel). *International journal of environmental research and public health*. 12(9):10943-54.

COWI. 2002. *ACAP and Danish EPA Reduction of Atmospheric Mercury Emissions from Arctic countries questionnaire on emissions and related topics*.

COWI and Concord East/West. 2008. *Options for reducing mercury use in products and applications, and the fate of mercury already circulating in society*. COWI and Concord East/West for the European Commission, DG Environment. Available January 2014 at http://ec.europa.eu/environment/chemicals/mercury/pdf/study_report2008.pdf.

Department of Environmental Planning and Protection. 2021. Available at: https://www.depp.gov.bs/.

Department of Environmental Planning and Protection. 2021. Available at: https://www.best.gov.bs/international-conventions/.

Department of Statistics. 2017. *Census of Population and Housing*. [online] Available at: https://www.bahamas.gov.bs/wps/wcm/connect/a6761484-9fa0-421d-a745-34c706049a88/Microsoft+Word+-+2010+CENSUS+FIRST+RELEASE+REPORT.pdf?MOD=AJPERES

Downer, M.K., Martínez-González, M.A., Gea, A., Stampfer, M., Warnberg, J., Ruiz-Canela, M., Salas-Salvadó, J., Corella, D., Ros, E., Fitó, M. and Estruch, R. 2017. Mercury Exposure and Risk of Cardiovascular Disease: A Nested Case-Control Study in the PREDIMED (PREvention with MEDiterranean Diet) Study. *BMC Cardiovascular Disorders Journal*. 17(1):9.

Food and Agriculture Organization of the United Nations (FAO). 2022. *Fishery and Aquaculture Country Profiles. Bahamas. Country Profile Fact Sheets*. Fisheries and Aquaculture Division [online] Available at: https://www.fao.org/fishery/en/facp/bhs?lang=en.

Global Employment Trends 2004, International Labour Office. [online] Available at: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_elm/---trends/documents/publication/wcms_114353.pdf.

Global Mercury Partnership. 2018. "Custom Code Harmonization for Mercury-Added Products".

Gonsalves-Sabola Chambers. 2021. Analysis and Recommendations Report under the GEF 10585 Project: Development of Minamata Initial Assessment in The Bahamas.

Grandjean, P., Pichery, C., Bellanger, M., and Budtz-Jorgensen, E. 2012. Calculation of Mercury's Effects on Neurodevelopment. *Environmental Health Perspectives*. 120:a452–a452.

Grandjean, P., Weihe, P., White, R., and Debes, F. 1998. Cognitive Performance of Children Prenatally Exposed to "Safe" Levels of Methylmercury. *Environmental Research*. 77. 165-72. 10.1006/enrs.1997.3804.

Growth and Development of Children. n.d. [online] Available at: http://samples.jbpub.com/9781449630584/84409_ch03_6058.pdf.

Hector, M. n.d. Shell and Bahamas Power & Light (BPL) to provide cleaner electricity to New Providence. [online] Available at: https://www.shell.com/about-us/contact-us/bahamas/shell-and-bahamas-power-light-bpl-to-provide-cleaner-electricity.html.

Kamande, R., 2017. *Replacing Mercury-added Products with Convention Compliant Products*. [PowerPoint Presentation] Zero Mercury Working Group. Nairobi, Kenya.

Moore, P. & Gape, L. 2008. BAHAMAS. In: Wege, D. C. and Anadon-Irizarry, V. (eds.). *Important Bird Areas in the Caribbean: Key Sites for Conservation*. BirdLife International. Available at: http://datazone.birdlife.org/info/ibascarib.

NEWMOA 2010. *Mercury Use in Lighting*. [online] Available at: http://www.newmoa.org/prevention/mercury/imerc/factsheets/lighting.cfm.

NPTEL. n.d. *Measurements in Fluid Mechanics*. [online] Available at: https://nptel.ac.in/courses/101103004/module7/lec1/4.html.

The National Climate Change Committee & The Bahamas Environment, Science and Technology Commission Nassau, The Bahamas. 2005. *National Policy for Adaption to Climate Change.* [online] Available at: http://www.depp.gov.bs/Documents/ClimateChangePolicy.pdf.

National Renewable Energy Laboratory (NREL). 2015. *Energy Snapshot – Bahamas*. [online] Available at: https://www.nrel.gov/docs/fy15osti/62691.pdf.

PAHO (Pan American Health Organization). 2012. *Health in the Americas: Regional Outlook and Country Profiles*. Washington, DC: PAHO. [online] Available at: https://www3.paho.org/salud-en-las-americas-2012/index.php?option=com_docman&view=download&category_slug=health-americas-2012-edition-42&alias=68-health-americas-2012-edition-regional-outlook-country-profiles-8&Itemid=231&lang=en.

Pierre-Louis, K. 2017. *Beauty Standards Are Literally Toxic for Women of Color*. Popular Science: Health. [online] Available at: https://www.popsci.com/personal-care-products-are-especially-toxic-for-women-color/.

Ramessar, C. 2019. *Gender Assessment of MIA Project and Mercury Management in the Caribbean Countries of Antigua & Barbuda, Dominica, Grenada, and Saint Vincent & the Grenadines*. 2019. BCRC-Caribbean.

Rapid Environmental Assessment (2003) Limited (REAL). 2021. *Framework For The Control And Management Of Chemicals And Wastes In The Bahamas* under the GEF 10472 Project: Implementing Sustainable Low And Non-Chemical Development In Small Island Developing States (ISLANDS) (Project Preparation Grant Phase).

Ricketts, P., Knight, C., Gordon, A., Boischio, A., & Voutchkov, M. 2020. Mercury Exposure Associated with Use of Skin Lightening Products in Jamaica. *Journal of health & pollution*, *10*(26), 200601. https://doi.org/10.5696/2156-9614-10.26.200601.

Riquelme, R., Méndez, P., and Smith, I. 2016. *Solid Waste Management in the Caribbean: Proceedings from the Caribbean Solid Waste Conference*. [online] Available at: https://publications.iadb.org/publications/english/document/Solid-Waste-Management-in-the-Caribbean-Proceedings-from-the-Caribbean-Solid-Waste-Conference.pdf.

Rivas, M., Suarez-Aleman, A., and Serebrisky, T. 2019. *Inter-American Development Bank (IDB) Stylized Urban Transportation Facts in Latin America and the Caribbean*. [online] Available at: https://publications.iadb.org/en/stylized-urban-transportation-facts-latin-america-and-caribbean.

Shirkhanloo, H., Golbabaei, F., Hassani, H., Eftekhar, F., and Kian MJ. Occupational exposure to mercury: air exposure assessment and biological monitoring based on dispersive ionic liquid-liq-uid microextraction. *Iran J Public Health*. 2014;6:793–799. [online] Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4475598/.

Spadaro, J., and Rabl, A. 2008. Global Health Impacts and Costs Due to Mercury Emissions. *Risk Analysis*. Vol. 28, No. 3, 2008.

Sweet, L., and Zelikoff, J. 2001. The Toxicology and Immunotoxicology of Mercury: A Comparative Review in Fish and Humans. *Journal of Toxicology and Environmental Health-B*. 4:161-205.

Tourism Today. 2020. *Frequently requested Tourism Statistics Report 2019. [online] Available at:* https://www.tourismtoday.com/sites/default/files/frequently_requested_statistics_brochure_2019_latest_1.pdf.

U.S. Food and Drug Administration. 2017. *About Dental Amalgam Fillings*. [online] Available at: https://www.fda.gov/medicaldevices/productsandmedicalprocedures/dentalproducts/dentalamalgam/ucm171094.htm#1.

UNEP and WHO. 2008. *Guidance for Identifying Populations at Risk from Mercury Exposure*. [online] 2008. UNEP DTIE Chemicals Branch and WHO Department of Food Safety, Zoonoses and Foodborne Diseases, Geneva, Switzerland. [online] Available at: https://www.who.int/foodsafety/publications/risk-mercury-exposure/en/.

United Nations Environment Programme (UNEP). 2015. *Global Waste Management Outlook*. Available at: https://wedocs.unep.org/20.500.11822/9672.

United Nations Environment Programme (UNEP). 2017. *Caribbean Waste Management Conference: SIDS Approaches to Waste Management And The Circular Economy Kingston, Jamaica July 4-6, 2017*. [online] Available at: http://www.sustainablesids.org/wp-content/uploads/2018/06/Waste-Management-Conference-2017-Summary.pdf.

UNEP. 2018. *Information submitted by nominated experts that may contribute to the development of mercury waste thresholds. UNEP/MC/COP.2/INF/10*. Conference of the Parties to the Minamata Convention on Mercury Second Meeting. Geneva. 19-23 November 2018.

UNEP. 2019a. *Toolkit for Identification and Quantification of Mercury Releases, Reference Report and Guideline for Inventory Level 2*. Version 1.5. November 2019. UNEP Chemicals Branch, Geneva, Switzerland.

UNEP. 2019b. *Minamata Convention on Mercury*. [online] Available at: http://www.mercuryconvention.org/Convention/tabid/3426/Default.aspx.

UNEP. 2019c. *Draft report on possible mechanisms for consideration by the third meeting of the Conference of the Parties to identify and distinguish non-mercury-added and mercury-added products listed in annex A to the Minamata Convention on Mercury based on the Harmonized Tariff System*. 2019. Secretariat of the Minamata Convention and the Global Mercury Partnership.

UNEP. 2019d. *Global Mercury Assessment 2018*. UN Environment Programme, Chemicals and Health Branch Geneva, Switzerland.

United Nations Development Programme (UNDP). 2007. *Chemicals Management: The Why and How of Mainstreaming Gender*. [online] Available at: http://www.undp.org/content/undp/en/home/librarypage/environment-energy/chemicals_management/chemicals-management-the-why-and-how-of-mainstreaming-gender.html.

United Nations Development Programme. 2019. *2019 Human Development Index Ranking*. [online] Available at: http://hdr.undp.org/en/content/2019-human-development-index-ranking.

Valera, B., Dewailly, E., and Poirier, P. 2011. Impact of Mercury Exposure on Blood Pressure and Cardiac Autonomic Activity among Cree Adults (James Bay, Quebec, Canada). *Environ. Res*. 111: 1265–70.

Wallace, Alice. 2021. *Gender Analysis Report for The Bahamas* under GEF 10472 Implementing Sustainable Low and Non-chemical Development in Small Island Developing States (ISLANDS) Programme.

World Bank Group, 2021. *Population, total – The Bahamas*. [online] Available at: https://data.worldbank.org/indicator/SP.POP.TOTL?locations=BS.

World Bank Data Group. 2020. *GNI per capita, Atlas method (current US$) - Bahamas, The*. [online] Available at: https://data.worldbank.org/indicator/NY.GNP.PCAP.CD?locations=BS.

World Health Organisation (WHO), 2003. *Exposure to Mercury: A Major Public Health Concern*, s.l.: World Health Organisation (WHO).

World Health Organisation. 2017. *Mercury and health*. [online] Available at: http://www.who.int/mediacentre/factsheets/fs361/en/.

Zero Mercury Working Group (ZMWG). n.d. *FACT SHEET: Mercury in Skin Lightening Cosmetics*. [online] Available at: http://www.mercurypolicy.org/wp-content/uploads/2010/06/skincreamhgfactsheet_may31_final.pdf.

Annex 1: Stakeholder Engagement Process

The following table gives the institutions, organisations and ministries that were instrumental in the development of the MIA Report.

NATIONAL WORKING GROUP MEMBERS		
Names	**Position**	**Agency**
Dr. Rhianna Neely-Murphy	Director	Department of Environmental Planning and Protection, Ministry of the Environment and Natural Resources
Mrs. Gammell Deal	Senior Environmental Officer	Department of Environmental Planning and Protection, Ministry of the Environment and Natural Resources
Mrs. Launa Williams	Public Analyst	Department of Environmental Health Services, Ministry of the Environment and Natural Resources
Mrs. Lisa Taylor	Senior Laboratory Technician	Public Analyst Lab, Department of Environmental Health Services, Ministry of the Environment and Natural Resources
Mr. Demeris Armbrister	Assistant Superintendent of Police	Fire Department, Royal Bahamas Police Force
Mrs. Antoinette Lindor-Musgrove	Inspector	Scientific Support Services Laboratory, Royal Bahamas Police Force
Mr. Hosea Lewis	Senior Customs/Revenue Officer	Bahamas Customs Department
Mr. Rico Cargill	Senior Environmental Officer	Grand Bahama Port Authority
Mrs. Rochelle McKinney	Environmental Project Manager	Bahamas Power and Light
Mrs. Brendalee Adderley	Senior Statistician	Bahamas National Statistical Institute
Dr. Bentley Higgs	Project Engineer	Sperling Hansen Associates New Providence Ecological Park
Ms. Deborah Deal	Chairperson of the Energy and Environment Committee	Bahamas Chamber of Commerce
Dr. Shamika Strachan	Bahamas Dental Association	President
Ms. Eustacia Jennings	National Project Coordinator/Project Assistant	
Mrs. Sharmon Frazier-Williams	Nursing Officer II, IHR Coordinator	Ministry of Health and Wellness

Annex 2: UNEP TOOLKIT Calculation Spreadsheet

The UNEP Toolkit Calculation Spreadsheet is available for download at the following link:

FINAL.Hg.Tlkit.BAHAMAS.09.2022.xls

Should any issues occur in accessing the link provided, please contact info@bcrc-caribbean.org.

Annex 3: Stakeholder Consultations

The following are summaries of the stakeholder consultations completed for the legislative and institutional framework assessment completed by Gonsalves-Sabola Chambers.

DEHS

DEHS was represented by Ms. Melody McKenzie, its director and Ms. Launa Williams, Chair of the NCCC. They confirmed that there was no written policy either with respect to hazardous chemicals, or more particularly with respect to mercury. It was indicated that the responsibility for hazardous chemicals had been turned over to DEPP.

DEHS still offers guidance with respect to how to dispose of hazardous waste, where to dispose of it and recommends specific persons or companies to handle the disposal.

It was further indicated that most of the hazardous material is sent to NPEP. There is not much material to dispose of since the material sent to NPEP usually consists of small amounts given that when imported as a component of other products, the amount may be minimal, is often used, and so there is not much left to dispose of. The requirement for mercury to be weighed for totals to be compliant with the requirements of the Convention is expected to be easily achieved since the NPEP has the capacity to weigh materials, and they are fully equipped with the requisite personal protective equipment to assure the safety of staff conducting these exercises. It must be noted, however, that the information provided by NPEP was that amounts are estimated as distinct from being weighed.

Although DEHS has always been aware of the dangers of mercury, there was no tallying of amounts of mercury at disposal or other facilities, and it was not necessary before to isolate mercury as a hazardous waste.

No investigations have been carried out by DEHS with respect to dentists, cemeteries, landfills, or potable water with respect to mercury content, although testing was conducted on drinking water for microbiological content.

Testing has been conducted around crematoria for microbiological content, but DEHS has no capacity to test the air. However, this is insignificant in the context of the Convention as emissions from crematoria do not fall within the categories listed in Annex D to the Convention and so are not the type of emissions about which the Convention is concerned.

The existing hazardous waste facility at the landfill was constructed and operated by DEHS. It was a state-of-the-art project designed to receive and house hazardous materials. Indications are that there is ongoing work at NPEP in terms of storing and disposal of hazardous waste and DEHS is reported to have monitoring systems in

place. It is also noted that DEHS does not usually liaise with private contractors in terms of disposal of hazardous waste, since the vendors of the hazardous materials are usually able to give guidance on the disposal of wastes resulting from the products they sell. DEHS constantly reviews the contracts with private contractors to keep current with the recommended methods of handling hazardous waste, so that the obligations of these contractors to deal with and dispose of these wastes can be kept up to date.

The issue of burials at sea is regulated in that an application must be made to the Chief Medical Officer (CMO) for a body to be buried at sea; it was pointed out however, that there is neither a policy nor any regulation for the scattering of ashes at sea and this would be difficult to police. This is an area where DEHS would welcome legislation for added guidance.
DEHS does not conduct scheduled investigations. Most of their investigation is based on receiving complaints, or reports or queries from BCED**,** although it was indicated that the department does retain some responsibility to pro-actively conduct investigations where there is an obvious or apparent situation of concern**.**

While DEHS admits to some collaboration with the MOH, since investigations and monitoring are based largely on complaints, this is an area which may not be adequately monitored since it appears that if no complaints are made, monitoring may not be conducted.

DEHS has confirmed that any danger of mercury use in pesticides and chemicals used on the land is expected to be minimal, as these chemicals are chosen based on safety and ability to do the least harm. Also, the sources from which The Bahamas imports these substances do not use mercury in their products. So, it is considered that danger from pesticides is minimal, if not non-existent.

DEHS is responsible for the environment in all the islands of The Bahamas, although the method of collection of data and monitoring is different in the islands other than New Providence, the island housing the capital. In the other islands, local government departments are responsible for data collection and conveying this information to DEHS. Local government agencies have not participated in this exercise, as they were not flagged initially as being stakeholders.

Environmental health in the workplace in terms of the presence of hazardous waste including mercury, comes under the jurisdiction of DEHS, but again investigation is based on complaints received. Therefore, it may be safe to conclude that in the absence of complaints, monitoring is not conducted regularly. It may also be observed that the likelihood of mercury contamination in the workplace is generally low unless there is documented incidence of exposure as for example in dental clinics, pharmacies and in waste disposal facilities.

There is a system of approvals necessary for any concern commencing operations in The Bahamas whereby they must apply to DEHS for a certificate. Therefore, there is a proper structure that would facilitate any monitoring that may be necessary. Offences are provided for under the Act to reenforce the obligations under the Act.

DEPP

Consultation with the then Director of Environmental Planning and Protection Mrs. Rochelle Newbold revealed that The Bahamas does not import mercury. However, mercury-added products are imported largely from the United States of America. For products such as vaccines[8], where there is no alternative, the Convention allows usage.

There is also no identified place for storage of mercury in The Bahamas. All hazardous material is sent to NPEP which deals with residential and commercial wastes and is operated under private management. However, DEPP retains the responsibility for providing a transhipment certificate to send such waste abroad for disposal. It was noted that NPEP has not applied for such a certificate, which may be an indicator that the amounts collected are not significant, or on the other hand, that there is an accumulation of hazardous waste at the landfill. In the Family Islands, DEHS assumes responsibility for collection of hazardous wastes.

Several attempts have been made to separate wastes, but these efforts have been largely specific, such as plastics, oil, and aluminium cans. There is no culture of recycling in The Bahamas, although it has been advocated, but it will require a significant public education programme to sensitise the public. DEHS expressed a wish to see legislation aimed at mandating the separation of different types of waste, while admitting that the process would be fraught with challenges such as separate pickups or locations identified for drop-offs.

NEPF is appropriate umbrella under which to state a mercury policy. DEPP had no objection to the suggestion of a separate mercury policy.

With respect to the preparation of a national plan, it was observed that up to the present time, there has been a fragmented approach to the management of hazardous chemicals. The Bahamas seeks to prepare a comprehensive National Chemical Plan, but mercury has not yet been added to this effort.

In terms of air quality issues, it was indicated that investigations are carried out based on complaints of which there have been none in recent times.

Health related issues were not flagged as being of particular concern.

[8] No specific vaccine was identified.

BCED

BCED is an important starting point for implementation of the Convention given that Articles 3 and 4 of the Convention prohibit the import and export of mercury, except under certain conditions. With BCED controlling all imports and exports in The Bahamas, this department is an important stakeholder in the implementation of the Convention since all imports and exports have to be processed through that department. This brings into focus the very real issues of how mercury is detected in mercury-added products and how the department will police this requirement.

BCED has made the very helpful suggestion that a requirement for disclosure by the manufacturer/importer of the contents of products/certain products can be established with a view to eradicating the importation of mercury-added products, as it would not be a workable solution to create an HS code for a variety of different products on the basis that they all contain mercury.

However, given the specific list of products that contain mercury identified in the Convention, this department will be able to identify some of the prohibited items and make the necessary interventions. This leads to another related issue, which is the question of storage and disposal of the prohibited items that may be confiscated. The training of officers with respect to the handling of these products and the need for protective covering required for persons who must interact with these materials must also be addressed.

Although it is recognised that mercury-added products may be used in a wide range of differing situations, it is safe to conclude that BCED has a major role in the phasing out of the use of mercury.

Other Consultations

Although DEPP, DEHS, BCED, and in Freeport, the GBPA, are the major stakeholders in the implementation of the Convention, many other stakeholders were consulted and contributed to the information provided for this report. These stakeholders are listed at Schedule A.

Of note is the fact that use of lightbulbs containing mercury has already been curbed, but not fully eradicated, for reasons other than in furtherance of the implementation of the Convention. This should provide an excellent platform from which the implementing agencies can launch their educational campaigns leading to the complete eradication of mercury lighting.

With respect to the use of dental amalgam, the BDA has indicated that most of its members no longer use dental amalgam although they do remove silver fillings. Yet, it continues to be imported with imports increasing between 2019 and 2020. It is

referred to in legislation relating to fees for hospital services, which is an indication that apart from no prohibition existing, its use is permitted by the health authorities. This provision in the legislation ought to be amended to delete this reference as a first step towards ensuring compliance with the Convention. The BDA must be encouraged to increase their training to dentists about the need to phase out the use of dental amalgam and the MOH must also play a role to ensure that its use is phased out in government clinics and hospitals.

Apart from the response by BDA, only three dentists provided answers to the questionnaires. One of these responses suggests a lack of awareness of proper disposal techniques for dental amalgam, as one dentist admitted to allowing residue of amalgam to go down the sink into general wastewater and disposing of dental amalgam in general garbage. Two responses indicated that dental amalgam waste was disposed of in biohazard waste. However, the very few responses are not a representative sample of dentists in The Bahamas and so it is not known whether other dentists who did not respond carry out the same practices. Both MOH and BDA have a responsibility to ensure training of their employees and members so that proper environmental standards are maintained.

A related issue concerns burials and cremations, due to some bodies having silver fillings. However, as “relevant sources” of mercury releases are defined as significant anthropogenic point source releases not otherwise dealt with by the Convention, it must be determined whether releases through burials and cremations or even from dental use, can be classified as significant. Releases from these sources can only be estimated.

Burial at sea is not adequately regulated and may be difficult to monitor, but legislation setting limits for disposal of ashes, whether at sea or otherwise, bolstered by the creation of criminal offences ought to provide the necessary incentive to comply. MOH ought to be able to determine the number of persons buried at sea since the permission of the CMO must first be sought. Monitoring and data collection must be done with a view to keeping records up to date.

Indications from the water sector are that no testing for mercury is conducted. It is to be noted that water comes under the classification of food in the EHSA; so, it falls under the purview of DEHS and BBS to decide whether there are any concerns about water.

The GBPA is at liberty to establish byelaws for the regulation of any sector of their activities. Draft byelaws aimed at conservation of the environment, protection of health and safety and for testing mercury limits to ambient water show a promising level of awareness of the issues at hand. DEPP or any other relevant agency should encourage the GBPA to finalise the byelaws and formalise the monitoring activities that must take place.

MOA is considered a relevant stakeholder as releases to the land arise for consideration in implementing the Convention. However, no releases to land were identified. It is recommended that MOA implement strategies for monitoring the land for any mercury releases. While such releases are not expected to be significant, this will contribute to ensuring that the surrounding waters from which The Bahamas harvests seafood remains free from mercury released from the land.

The possibility of mercury being contained in ammunition and explosives was investigated. MOW indicated that certain types of non-el blasting caps used in construction contain mercury, but that these explosives are no longer used and were set aside for destruction. No data was available on the construction sector in terms of explosives used in demolition. MOW also indicated that stocks of explosives were maintained and the RBPF (Anti-terrorism Unit) maintained logs of quantities of explosives that are not publicly available. The RBPF were not aware of mercury being contained in ammunition.

Emissions were discussed and information was received that crematoria were fitted with filters. However, for reasons already explained, emissions are not an area of focus for The Bahamas. The BCCEC indicated that their members did not use mercury in manufacturing processes. The processes employed by NPEP did not yield emissions of the type prohibited.