



The State of Mercury in Grenada



The Minamata Convention on Mercury is the first global agreement specifically designed to address contamination from a heavy metal. Opened for signature on October 10, 2013 and entered into force on August 16, 2017, the Convention seeks to address issues related to the use and release of mercury in trade and in industrial processes. The Convention also addresses major sources of atmospheric emissions and releases of mercury into the environment, as well as long-term storage and disposal of mercury and mercury compounds.

Under the Convention, individual countries are charged with protecting human health and the environment from the risks of mercury exposure, which involves systematically controlling mercury emissions and releases, including phasing out the use of mercury in certain products and processes.

In order to assist with preparations for the ratification and implementation of the Convention, the government of Grenada conducted a Minamata Initial Assessment (MIA).

The primary activities of the MIA included:

- A review of institutional and capacity needs for implementation of the Convention;
- An assessment of national regulations, policies, and legislation to assist with preparations for compliance with the obligations of the Convention; and
- An identification of the primary sources of mercury emissions and releases as part of a detailed National Mercury Profile.

The MIA was conducted with financial assistance from the Global Environment Facility and was implemented in collaboration with UN Environment and the Basel Convention Regional Centre for the Caribbean (BCRC-Caribbean). This brochure summarizes the primary mercury sources and risks identified through the MIA project in Grenada.



Findings from the Minamata Initial Assessment

What are the Sources of Mercury?

The origin of mercury (Hg) can be natural (e.g., volcanoes) or anthropogenic (human-caused releases). The major sources of mercury in Grenada based on the mercury inventory conducted for the MIA, include the following:

- Use and disposal of mercury-added products such as thermometers, compact fluorescent lamps, and batteries (17 kg Hg/yr)
- Dental amalgam fillings (4 kg Hg/yr)
- Waste management, including waste incineration and landfilling (3 kg Hg/yr)



As a result of the MIA process, the approximate magnitude and source distribution of these anthropogenic releases into the air, water, and land are now quantified for Grenada. Based on the MIA findings, the total calculated mercury input to society in Grenada is 27 kg/year.

How are People Exposed to Mercury?

Elemental mercury, which is found in some manufactured products, is not necessarily toxic to humans. Exceptions may include dental amalgam and cosmetics, but these products are still under scientific investigation, so their potential harm is not yet fully characterized.

Methylmercury, the organic form of mercury, biomagnifies in food webs and bioaccumulates over time in organisms that may be frequently consumed. Once ingested, this neurotoxin can cause physiological harm and behavioral disorders in humans. Mercury exposure is particularly concerning for children and women of childbearing age as it can damage the nervous system, kidneys, and cardiovascular system. Developing organ systems, such as the fetal nervous system, are the most sensitive to the toxic effects of mercury, although nearly all organs are vulnerable.

Fish from the sea or freshwater systems can be a major source of methylmercury exposure to humans. In general, fish species that are small, short-lived, and forage low in the food web contain less methylmercury, while predatory species that are long-lived and grow larger can contain higher levels of methylmercury.

Published and recently measured (in 2018) mercury concentrations (equivalent to 95% methylmercury) from tissues in fish from Grenada indicate regular exceedance of thresholds used by American and/or International entities. For example:

0.22 parts per million (ppm), wet weight (ww) by the Great Lakes Consortium for the U.S. and Canada;

0.30 ppm, ww by the U.S. Environmental Protection Agency;

0.50 ppm, ww by the European Commission and World Health Organization which includes an exemption for large predatory fish species of 1.0 ppm, ww).

See the list of healthier and riskier seafood choices below (all listed fish were measured for muscle mercury concentrations in 2018 based on selection of species from six fish markets in Grenada (n=85 fish and 2 shellfish):

Seafood with lower mercury levels (<0.22 ppm, ww; healthier choices):

- Bigeye scad, butterfish, carvalli, lionfish, mahi mahi, red snapper, spiny lobster

Seafood with higher mercury levels (>0.22 ppm, ww; riskier choices):

- Atlantic blue marlin, barracuda, blackfin tuna, bonito, kingfish, sailfish (ocean gar), shark species, swordfish, yellowfin tuna

Red Snapper



How Does Mercury Affect Ecological Health?

Studies have shown that high mercury concentrations in fish can have negative impacts on fish growth, behavior, and reproduction. Consequently, fish-eating wildlife are shown to have decreased reproductive success when methylmercury concentrations in fish are high. As a neurotoxin, methylmercury can also have negative effects on behavior such as foraging or nest protection.

The process of methylation, the conversion of elemental mercury to organic methylmercury, varies widely on the landscape and within the waterscape. Areas that are particularly sensitive to mercury deposition—where methylation rates are highest and biomagnification in the food web is greatest, and where animals experience significant reproductive harm—are called biological mercury hotspots. These areas generally represent aquatic ecosystems or have an aquatic connection within the food web.

Aquatic ecosystems, either marine (e.g., coral reefs) or freshwater (e.g., rivers), are often prime areas for high methylation rates. Fish and wildlife predators that live in rivers and lakes, or that forage in a food web associated with these habitats (e.g., mangroves), often contain elevated mercury levels. The combination of high methylation rates and longer-lived animals higher in the food web creates the greatest risk of adverse effects.

Habitats at Greatest Risk:

- Rivers, mangroves, and coral reefs

Wildlife at Greatest Risk:

- Brown Pelican, Flycatchers, Frigatebirds, Herons, Kingfishers, Osprey, Rails, Terns, Tropicbirds



Brown Pelican



Rivers



Coral Reefs



Mangroves

What is the State of Mercury in Grenada?

The Minamata Convention addresses the management of mercury and the risks this toxin poses to human health and the environment. Provisions in the Convention assist countries in developing strategies to reduce mercury contamination.

Findings from the Minamata Initial Assessment in Grenada indicate that the input of mercury into local ecosystems may be elevated in some areas, but with effort by the government, key stakeholders, and the general public, those inputs can be further identified and reduced.

Lifecycle management of mercury-added products also presents a challenge for Grenada. The adoption of national legislation that limits and restricts the importation of such products will be an important first step towards the successful implementation of the Minamata Convention, which will help to reduce overall mercury releases on the islands.

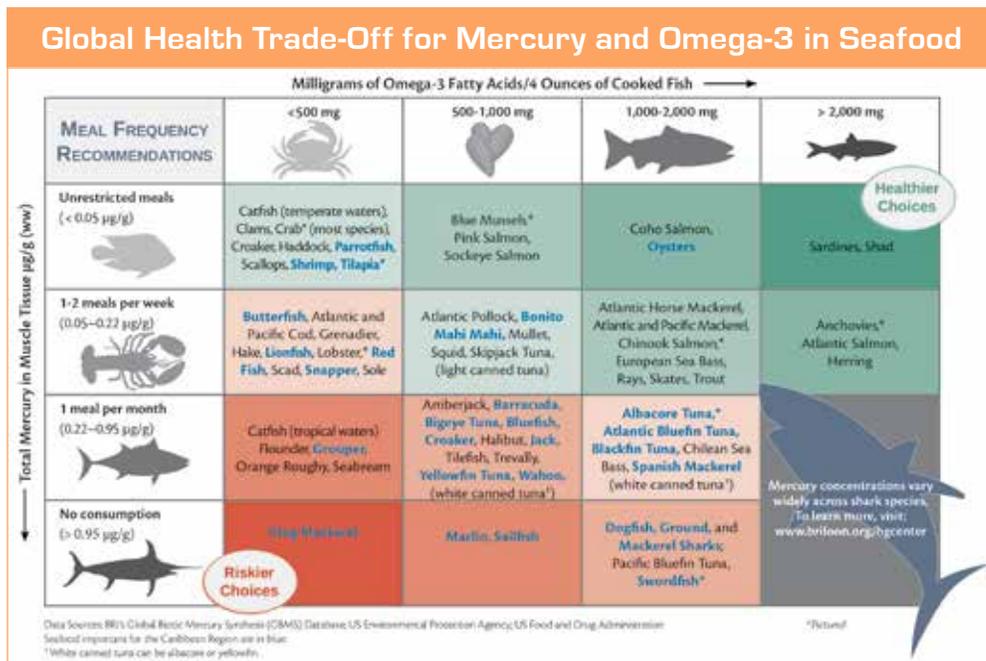
As with many Small Island Developing States, regional atmospheric mercury loads may be impacting local marine fisheries. However, with greater collaboration and cooperation across the region, the potential risks associated with mercury in the environment can be reduced.

STEPS CONSUMERS CAN TAKE TO PROTECT AGAINST MERCURY CONTAMINATION

- Choose healthier dietary fish options (those with lower mercury levels).
- Purchase no- or low-mercury product replacements when possible (See Useful Links on back page for more information).
- Support legislation that helps reduce the impacts of mercury on the environment.

Recommendations from the Grenada Mercury Team

- Ratify the Minamata Convention on Mercury.
- Create legislation that can help facilitate a framework to comply with the Minamata Convention.
- Promote mercury-free alternative consumer products and medical equipment (which are already widespread on the market):
 - Replace compact and linear fluorescent lights with Light Emitting Diodes (LED) bulbs;
 - Choose brands of batteries that do not contain mercury;
 - Check the ingredients in skin lightening creams and lotions to avoid products that contain mercury;
 - Replace outdated medical/measuring devices containing mercury with digital alternatives; and
 - Generate greater awareness and education through existing outreach programs; oversee the development and distribution of information on mercury to the public, including importers of manufactured products.
- Develop proper separation methods for the disposal of mercury-added products both at the household consumer level and in the landfill management procedures.
- Improve public access to environmentally sound facilities/locations that could aid in the disposal of mercury-added products.
- Improve management of mercury releases from industrial processes through the implementation of best available techniques/best environmental practices to ensure maximum control and reduction of mercury emissions and releases. The efficiencies of these measures should be continuously monitored and evaluated. It is also recommended that the locations for development of future industries/processes/disposal sites should be considered with respect to environmentally sensitive areas.
- Participate in global mercury database and monitoring programs involving global and regional sampling efforts organized by UN agencies, BCRC-Caribbean, and Biodiversity Research Institute (BRI), including:
 - Hair samples for people (BCRC-Caribbean–BRI–IPEN project in 2018);
 - Muscle samples for fish (BCRC-Caribbean–Swiss Government–BRI project in 2018);
 - Blood, feather, and egg samples for birds;
 - Sampling of cosmetic skin lightening creams (BCRC-Caribbean–BRI project in 2018); and
 - Air sampling with passive devices (BCRC-Caribbean–BRI–Environment Canada project in 2018-2019).



MIA Stakeholders

- Ministry of Tourism, Civil Aviation, Climate Resilience and the Environment
- Ministry of Agriculture, Lands, and Forestry
- Ministry of Health
 - Environmental Health
 - Chief Medical Officer
 - Central Medical Stores
 - Senior Planning officer
 - Director of Hospital–Laboratory Services
 - Chief Community Health Nurse
- Ministry of Foreign Affairs
- Ministry of Legal Affairs
- Ministry of Social Affairs
- All Private and Public Laboratories
- Grenada Electricity Services Limited
- Funeral Agencies
- Meteorological Office
- Airport Authority
- National water and Sewage Authority
- Grenada Solid Waste Management Authority
- Fisheries Distributor Companies
- St. George's University
- T.A. Marryshow Community College
- Civil Society
- Head of Sustainable Development Committee
- Automotive Divisions
- Medical Association
- Dental Association
- Customs
- Sol Petroleum
- Rubis Gas
- Petro- Caribe
- Grenada Bureau of Standards
- Mercury Supplier (bulbs, relays, switches)

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For More Information:

Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC-Caribbean)
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Basel Convention Regional Centre – Caribbean

The BCRC-Caribbean serves the Contracting Parties to the Basel, Rotterdam, Stockholm and Minamata Conventions within the Caribbean region and any other country consenting to be served by the Centre.

BCRC–Caribbean: www.bcrc-caribbean.org

Other Links

Biodiversity Research Institute: www.brifoon.org

Minamata Convention: www.mercuryconvention.org