The State of Mercury in

Antigua and Barbuda

The Minamata Convention on Mercury is a 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 treaty 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 Minamata 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 Antigua and Barbuda 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.

This brochure summarizes the primary mercury sources and risks identified through the MIA project in Antigua and Barbuda.

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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 Antigua and Barbuda 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: 15 kg Hg/yr
- Dental amalgam fillings: 4 kg Hg/yr
- Crematoria and cemeteries: < 1 kg Hg/yr
- Waste management, including waste incineration and landfilling: 17 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 Antigua and Barbuda. Based on the MIA findings, the total calculated mercury input to society in Antigua and Barbuda is 28 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.

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 mercury concentrations from tissues in fish and marine mammals in the Caribbean region indicate regular exceedance of various thresholds used by American and International entities (e.g., 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, based on the analyses of total Hg of seafood sampled from fish markets in St. John's, below:

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

- Butterfish, Caribbean spiny lobster, cockle, lionfish, mahi-mahi, Nile tilapia, red snapper

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

- Barracuda, blacktip shark, blue marlin, yellowfin tuna

Red Snapper

How Does Mercury Affect Ecological Health?

Studies have shown that high methylmercury concentrations in fish can have negative impacts on 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 affects 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.

Generally, aquatic ecosystems, either marine (e.g., beaches) 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:

- Wetlands, mangroves, aquatic habitats near contaminated sites

Wildlife at Greatest Risk:

Brown Pelican

- Brown Pelican, Magnificent Frigatebird, Masked and Red-footed Booby, White-tailed Tropicbird, Black-capped Petrel, Audobon's Shearwater, Bridled Tern, Sooty Tern

Wetlands

Mangroves

Aquatic Habitats

What Is the Status of Mercury in Antigua and Barbuda?

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 Antigua and Barbuda 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 Antigua and Barbuda. The adoption of national legislation limiting and restricting the import of such products is an important first step in 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 Antigua and Barbuda Mercury Team

- Create legislation that can help facilitate a framework to comply with the Minamata Convention.
- Reduce the import of and use of products that contain mercury by selecting no-or low-mercury product replacements:
  - Replace 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; and
  - Replace outdated medical/measuring devices containing mercury with digital alternatives.
- Properly store waste products with mercury and avoid using landfills by creating proper storage facilities for hazardous wastes.
- Improve public access to environmentally sound facilities/locations that could aid in the disposal process, as well as provide information and guidelines on disposing of mercury-added products.
- Implement, monitor, and evaluate best available techniques and environmental practices to maximize reduction of mercury emissions and releases from industrial processes. Locations for development of future sites should be considered with respect to environmentally sensitive areas.
- Participate in global mercury database and monitoring programs involving sampling efforts organized by UN agencies, including:
  - Hair samples for people;
  - Muscle samples for fish;
  - Blood, feather, and egg samples for birds;
  - Sampling of cosmetic skin lightening creams; and
  - Air sampling with passive devices.

Global Health Trade-off for Mercury and Omega-3 in Seafood

Blue highlights - seafood important for the Caribbean region. Blue underline - seafood that has been sampled in Antigua and Barbuda.

Milligrams of Omega-3 Fatty Acids/4 Ounces of Cooked Fish →

Total Mercury in Muscle Tissue µg/g (ww) ⟵

Meal Frequency Recommendations	<500 mg	500-1,000 mg	1,000-2,000 mg	> 2,000 mg
Unrestricted meals (< 0.05 µg/g)	Catfish (temperate waters), Clams, Crab* (most species), Croaker, Haddock, Parrotfish, Scallops, Shrimp, Tilapia,* Cockle	Blue Mussels,* Pink Salmon, Sockeye Salmon	Coho Salmon, Oysters	Sardines, Shad
1-2 meals per week (0.05–0.22 µg/g)	Butterfish, Atlantic and Pacific Cod, Grenadier, Hake, Lionfish, Lobster,* Red Fish, Scad, Snapper, Sole	Atlantic Pollock, Bonito Mahi Mahi, Mullet, Squid, Skipjack Tuna, (light canned tuna)	Atlantic Horse Mackerel, Atlantic and Pacific Mackerel, Chinook Salmon,* European Sea Bass, Rays, Skates, Trout	Anchovies,* Atlantic Salmon, Herring
1 meal per month (0.22–0.95 µg/g)	Catfish (tropical waters) Flounder, Grouper, Orange Roughy, Seabream	Amberjack, Barracuda, Bigeye Tuna, Bluefish, Croaker, Halibut, Jack, Tilefish, Trevally, Yellowfin Tuna, Wahoo, (white canned tuna[1])	Albacore Tuna,* Atlantic Bluefin Tuna, Blackfin Tuna, Chilean Sea Bass, Spanish Mackerel, (white canned tuna1)	Mercury concentrations vary widely across shark species. To learn more, visit: www.briloon.org/hgcenter
No consumption (> 0.95 µg/g)	King Mackerel	Marlin, Sailfish	Dogfish, Ground, and Mackerel Sharks; Pacific Bluefin Tuna, Swordfish*	

Healthier Choices

Riskier Choices

Data Sources: BRI's Global Biotic Mercury Synthesis (GBMS) Database; U.S. Environmental Protection Agency; U.S. Food and Drug Administration *Pictured

[1] White canned tuna can be albacore or yellowfin.

Hg trade-off card available in printed format or at www.briloon.org/hgpubs

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For More Information:

Basel Convention Regional Center for Training and Technology Transfer for the Caribbean (BCRC-Caribbean)
info@bcrc-caribbean.org

BRI's Mercury Work in Antigua and Barbuda

Biodiversity Research Institute (BRI) collaborates with its partners in Saint Vincent and the Grenadines to help identify and estimate major mercury sources in the region. An international advisor on mercury, BRI serves as co-lead of the UN Environment's Mercury Air Transport and Fate Research partnership area. BRI also serves as International Technical Expert with the United Nations Development Programme (UNDP) and UN Environment, and an Executing Agency for the United Nations Industrial Development Organization (UNIDO).

Basel Convention Regional Centre–Caribbean

The primary mechanism for assisting in the implementation of the Basel Convention and its obligations is a series of Basel Convention Regional Centres for Training and Technology Transfer (BCRC). The BCRC-Caribbean serves the Contracting Parties to the Basel, Rotterdam, Stockholm and Minamata Conventions within the Caribbean region and any other country in the region consenting to be served by the Centre.

Useful Links

BCRC-Caribbean: **www.bcrc-caribbean.org**
Minamata Convention: **www.mercuryconvention.org**
World Health Organization: **www.who.int**
BRI publications on mercury: **www.briloon.org/hgpubs**

National Executing Agency:

- Department of Analytical Services

MIA Stakeholders:

- Ministry of Agriculture, Fisheries and Barbuda Affairs Headquarters
- Barbuda Council
- Ministry of Education Science and Technology
- Ministry of Health, Wellness and Environment Headquarters
- Zero Waste AB
- Ministry of Justice and Legal Affairs
- Ministry of Foreign Affairs, International Trade and Immigration
- GEF/SGP
- Environmental Awareness Group
- Mount St. John's Medical Centre
- Central Board of Health
- BWC Enterprise
- Antigua and Barbuda Dental Association
- West Indies Oil Company Ltd
- Department of Analytical Services
- MET Office
- National Solid Waste Management Authority
- Antigua and Barbuda Bureau of Standards
- Antigua and Barbuda Customs and Excise Division
- Barbuda Landfill
- Fisheries Division
- Environment Division
- Pesticides and Toxic Chemicals
- Ministry of Investment and Trade
- Ministry of Legal Affairs
- Prices and Consumer Affairs