



Project for
**Promoting
Minamata
Convention
on Mercury**



by making the most of Japan's
knowledge and experiences

Customs Training to Enhance Monitoring of Trade of Mercury and Mercury Compounds

Presentations at the workshop in Palau on 17 July 2025

National Training on Strengthening Country-Level Inter-Agency Coordination on Trade of Mercury

WORKSHOP OVERVIEW

Koror, PALAU
Thursday 17 JULY 2025

Background and Objectives:

- Effective mercury trade enforcement requires tailored national strategies that align with each country's regulatory and operational context. This in-country training focuses on practical, hands-on exercises to enhance coordination among customs officers, environmental regulators, and law enforcement authorities. Strengthening inter-agency collaboration is essential for detecting, monitoring, and preventing illicit mercury trade, which remains a persistent challenge across the Asian and Pacific Region.
- This initiative aims to equip national enforcement agencies with the technical skills and enforcement tools necessary to combat mercury smuggling. By integrating regional collaboration with country-specific training, the program fosters a comprehensive enforcement network, enhancing national and cross-border cooperation to improve compliance with the Minamata Convention and other trade regulations. Ultimately, this approach will bolster national enforcement capacity and contribute to regional efforts to eliminate mercury trade.

Objectives

1. Build country-specific enforcement capacity through hands-on training.
2. Improve coordination between national agencies to close enforcement gaps.
3. Train officers in forensic detection and risk assessment for mercury shipments.
4. Initiate a national action plan for mercury trade control.

Expected Outcomes

1. Strengthened inter-agency coordination for mercury trade enforcement.
2. Improved capacity of national authorities to detect and prevent mercury trade.
3. Standardized procedures for customs and law enforcement authorities.
4. Initiation of country-specific action plans and policy recommendations.
5. Gather up to date information on mercury trade data and national challenges.

Schedule of Overall Activities

Online Webinars:

3 webinars (1.5 hours each)

Between May – July/August 2025

1. Overview on the issues posed by mercury, mercury trade and the relevant obligations under the Minamata Convention – *held 26 May 2025*
1. Review of Regulatory Framework for Managing Mercury Trade – 29 July 2025
1. Lessons Learnt from In-Country Training Workshops – 7 August 2025

Schedule of Today's Key Activities:

Thursday 17 July 2025 (UTC+9 Time zone)		
8:30 – 9:00	Registration – housekeeping announcements.	Bishal Bhari, Asian Institute of Technology (AIT)
9:00 – 9:20	Opening remarks	Thomas Verbaere, United Nations Environment Programme (UNEP) Mr. Michael Blesam, Environmental Quality Protection Board (EQPB) Bishal Bhari, AIT
9:20 – 9:40	Introduction of Participants, Group Photo and Short Break	All
9:40 – 10:00	- Objectives, expected outcomes, and schedule of the training. - Introduction of BRI	Ashley Bastiansz and Cassie Gilham, BRI
10:00 – 10:20	Status of Mercury in Palau based on the Minamata Initial Assessment and Overview of Minamata Convention Obligations Regarding Trade and Waste Management	Ashley Bastiansz, BRI
10:20 – 10:35	Implementation of the Minamata Convention in Palau	Mr. Michael Blesam (EQPB)
10:35 – 10:50	Existing National Customs Capacity for Identifying/Confiscating and Exporting Hazardous Substances	Representative from the Bureau of Customs and Border Protection (BCBP)
10:50 – 11:05	Existing National Management (Handling, Storage and Disposal) of Hazardous Waste	Ms. Jessica Emesiochel, Division of Solid Waste Management (DSWM)
11:05 – 11:25	Mercury Mass Flow in Palau	Kyaw Nyunt Maung, UNEP- <i>virtual</i>
11:25 – 12:15	Mercury Impacts on the Environment, the Importance of Mercury Biomonitoring in Palau and the Pacific Region – Discussion and Practical Hair Sampling Exercise	Cassie Gilham and Ashley Bastiansz, BRI
12:15 – 12:30	Tools to Enhance Mercury Trade Management: Identifying Mercury-added Products	Ashley Bastiansz, BRI

12:30–13:30	<i>Lunch</i>	
13:30 – 14:35	Practical Exercise: Developing a National Action Plan for Phasing out Mercury-Added Products and Management of Mercury Waste	Facilitator: Ashley Bastiansz, BRI All participants Note-takers: Cassie Gilham, BRI and AIT
14:35 – 14:55	Mercury Impacts on the Environment, the Importance of Mercury Biomonitoring in Palau and the Pacific Region – Discussion and Practical Hair Sampling Exercise	Cassie Gilham and Ashley Bastiansz, BRI
14:55 – 15:10	Short Break	
15:10 – 15:15	Sharing of experiences and knowledge gained from equipment use and workshops attended	Mr. Darwin Florencio, EQPB
15:15 – 15:45	Atmospheric Survey and Analysis (Manual Active Sampling Method)	AIT
15:45 – 16:00	Cross-Agency Collaboration in Mercury Trade Enforcement	Ashley Bastiansz, BRI
16:00 – 16:20	Wrap up of Discussions and Closing Remarks	BRI and all participants.



Biodiversity Research Institute

A nonprofit ecological research group

headquartered in Portland, Maine

MISSION STATEMENT

BRI's mission is to assess emerging threats to wildlife ecosystems through collaborative research, and to use scientific findings to advance environmental awareness and inform decision makers.



BRI AT A GLANCE

68

SCIENTISTS ON
OUR TEAM

17

RESEARCH
PROGRAMS

4

RESEARCH
LABORATORIES

44

COUNTRIES WITH
ONGOING BRI
PROJECTS



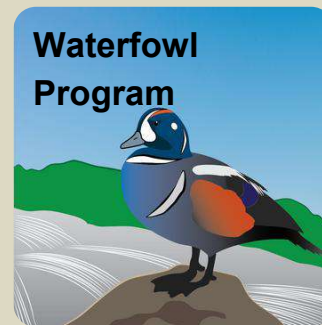
RESEARCH CENTERS

BRI's research capabilities have grown in response to pressing ecological issues, from the ability to study the natural history of loons to the development of new technologies that enable researchers to predict risks due to climate change and human development.



RESEARCH PROGRAMS

Through our [research programs](#), we work to better understand ecological health through the lens of wildlife. With 17 different programs, we work across the globe, from the Arctic to the Tropics.



RESEARCH LABS



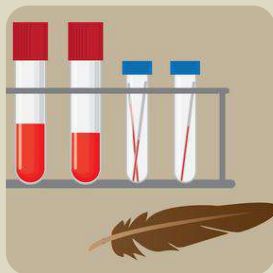
WILDLIFE REMOTE ACOUSTICS & IMAGERY LAB (WRAIL)

Our team of biologists has expertise in using remotely deployed devices to survey for waterfowl, marine, wading, and shorebirds, as well as bats and marine mammals, from the deployment and retrieval of devices, to the processing, analysis and reporting of data.



QUANTITATIVE WILDLIFE ECOLOGY & RESEARCH LAB (QWERL)

BRI's Quantitative Wildlife Ecology Research Lab (QWERL) aims to answer important ecological questions with sophisticated analytical methods such as data integration, species distribution models, and movement modeling.



TOXICOLOGY LAB

In BRI's Toxicology Lab, our technicians analyze tissue samples for total mercury using a Nippon MA-3000.

LAB CAPABILITIES

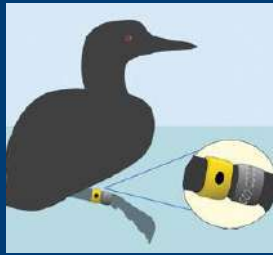
In addition to our own laboratory capabilities, BRI has established relationships with distinguished labs around the country for specialty work, including PFAS, stable isotopes, and metals.

RESEARCH CAPABILITIES



CAPTURE & SAMPLING

BRI researchers are well versed in the humane capture, handling, and release of a broad range of species including (but not limited to): an extensive array of birds; bats including species recently listed as endangered; and furbearing mammals such as otter, mink, muskrat, and beaver.



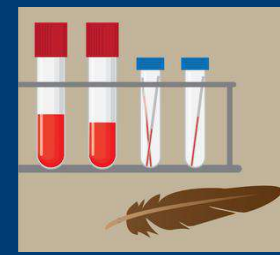
MOVEMENT & TRACKING

Using a variety of technologies, BRI tracks birds and mammals across all our programs, from capture and the application of transmitters through collection and analysis of data to obtain valuable information about animal movements and habitat usage.



SURVEYING & MONITORING

BRI researchers use a variety of survey and monitoring techniques- from traditional population counts to innovative high-tech remote sensing systems such as drones- to survey and monitor wildlife in a variety of ecosystems.



CONTAMINANTS MONITORING

BRI is a national leader in collecting, analyzing, and publishing data on the fate and transport of mercury in ecosystems. Other investigations include historical or legacy contaminants such as polychlorinated biphenyls (PCBs), perfluorocarbons (PFCs), and lead.

BRI TEAM

OUR STAFF

300+

SCIENTIFIC
PUBLICATIONS

FIELD BIOLOGISTS

Our wildlife research and field biologists team work around the world conducting research, from bird banding, tissue collections, and biodiversity surveys in Africa.

QUANTITATIVE TEAM

Our quantitative team consists of ecological data analysts, skilled in geospatial analysis, data management, and ecological modeling.

COMMUNICATIONS TEAM

Our communications team shares our science through social media posts, science communications pieces, and public relations programming.

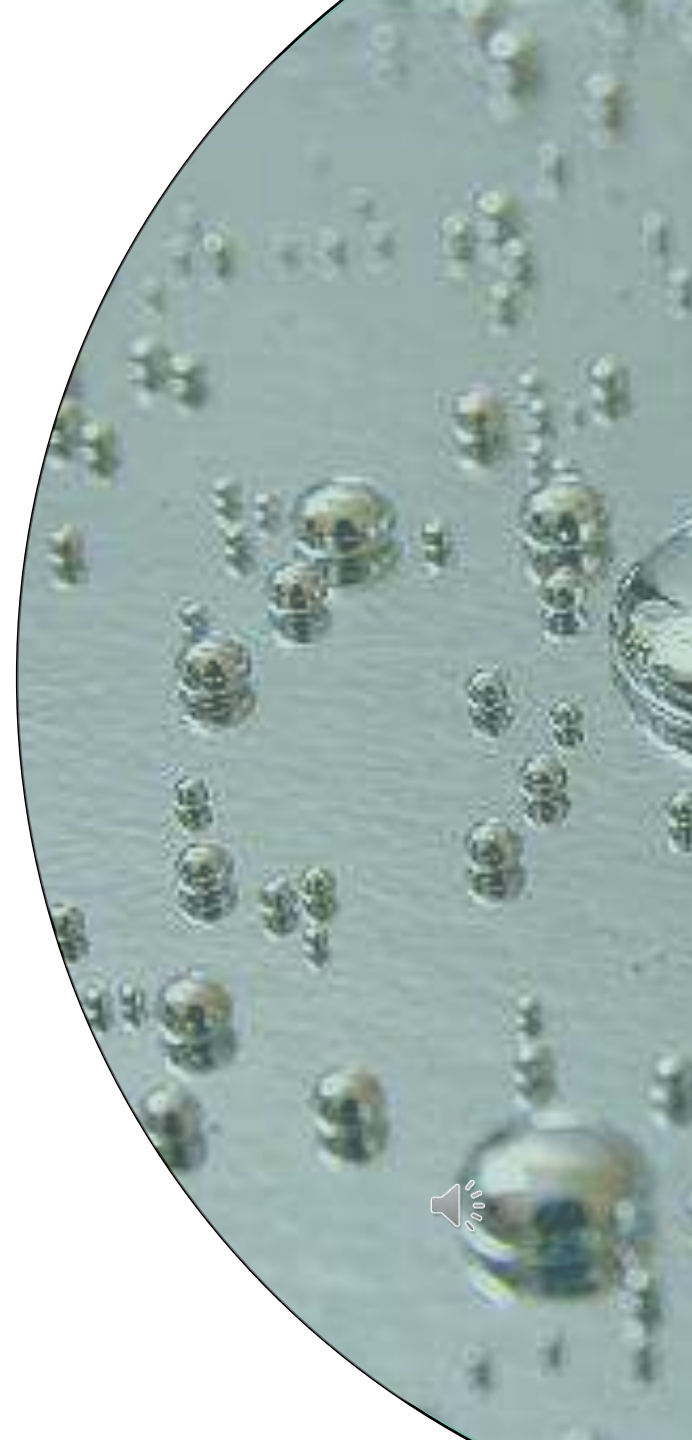
Thank you!



BIODIVERSITY RESEARCH INSTITUTE
innovative wildlife science

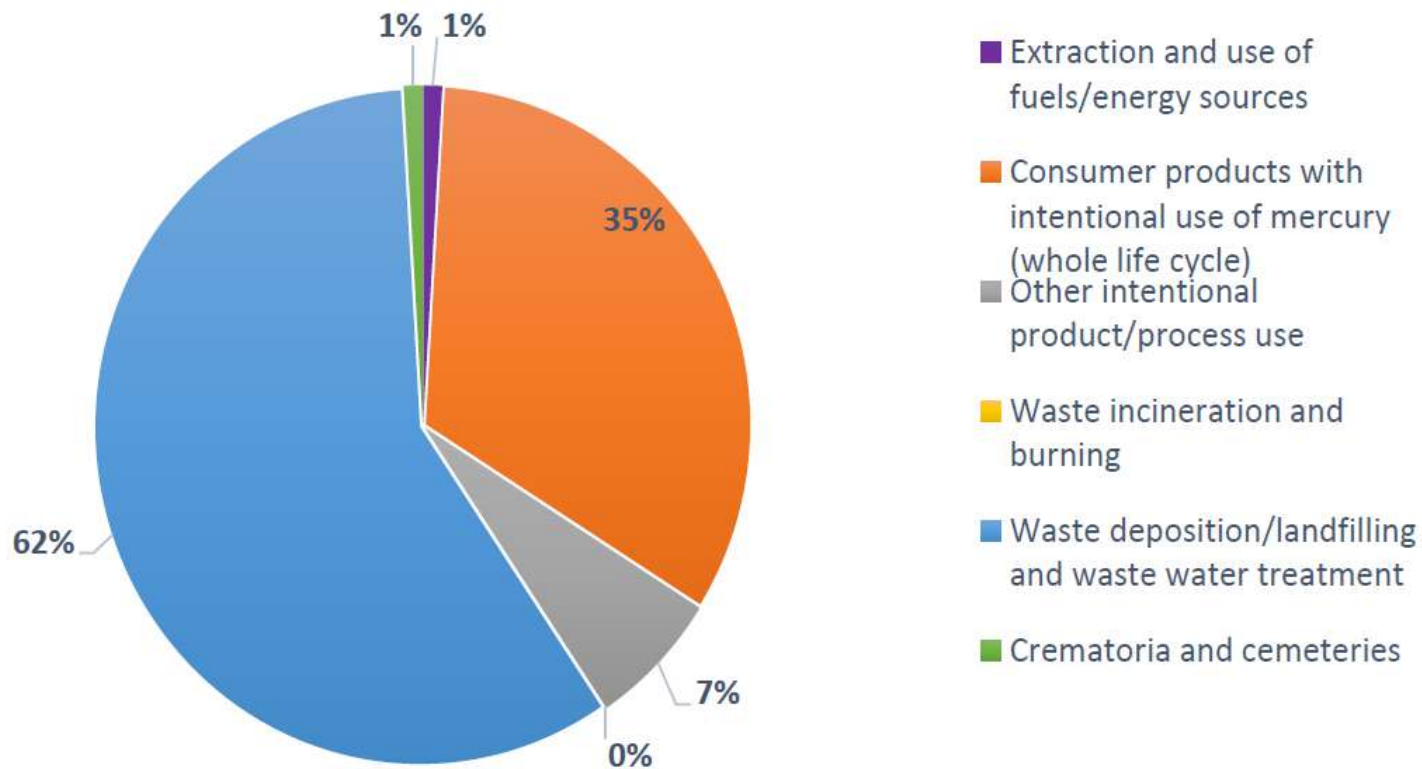
The Status of Mercury in Palau (based on the Minamata Initial Assessment)

Ashley Bastiansz, International Environmental Specialist, BRI
National Training on Strengthening Country-Level Inter-Agency
Coordination on Trade of Mercury
Koror, PALAU
17 July 2025



Sources of Mercury Releases in Palau

SOURCES OF ESTIMATED MERCURY RELEASES IN THE
REPUBLIC OF PALAU



Based on the MIA Inventory conducted in 2024, ~ 8 Kg of mercury per year were released in Palau.

Main sources estimated were due to releases from the use and disposal (to landfills, wastewater treatment etc.) of such as electrical switches and relays and lighting devices.

Implementation Measures and Stakeholder Coordination

- Palau's main source of mercury is from **imported products**.

Policy Recommendations – prohibit the import of:

- Mercury and mercury compounds
- Mercury-added products listed in Annex A (Part 1)
- Bulk mercury used for **dental amalgam** listed in Annex A (Part 2)
- Align national regulations with **Minamata Convention obligations**

Key Stakeholders and Roles:

- **Customs Division & Private sector Retailers collaboration to:**
 - Strengthen enforcement of mercury import bans and ensure effective implementation of prohibitions on mercury-added products.
 - Promote safe, mercury-free alternatives
- **Ministry of Health & Human Services:**
 - Implement and meet obligations of phase-down of dental amalgam use
 - Phase out mercury-containing medical devices
- **Coordination Needs:**
 - Cross-sector collaboration essential for effective implementation
 - Raise awareness and build support among importers, health professionals, and the public

Challenges, Solutions & Institutional Framework

- **Challenges in implementation include:**

- Limited human resource and technical capacity to carry out continuous activities related to mercury management.
- Difficulty maintaining long-term mercury management programs

- **Proposed solutions:**

- Important to recognize the linkages between mercury issues and issues related to other hazardous or potentially harmful chemicals
- Harmonize chemical management approaches across agencies

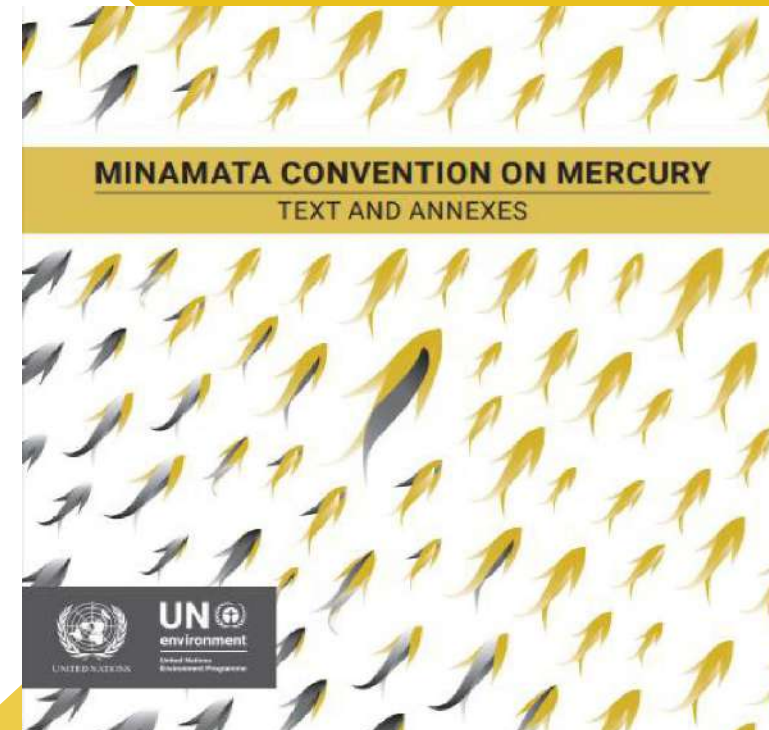
- **Governance recommendations:**

- It is recommended that a Mercury Management Coordination group be formally established with the EQPB acting as the Chair.
- This working group can be linked to other environmental committees that may have been or will be established to:
 - Ensure coordination, avoid duplication of work, and streamline actions

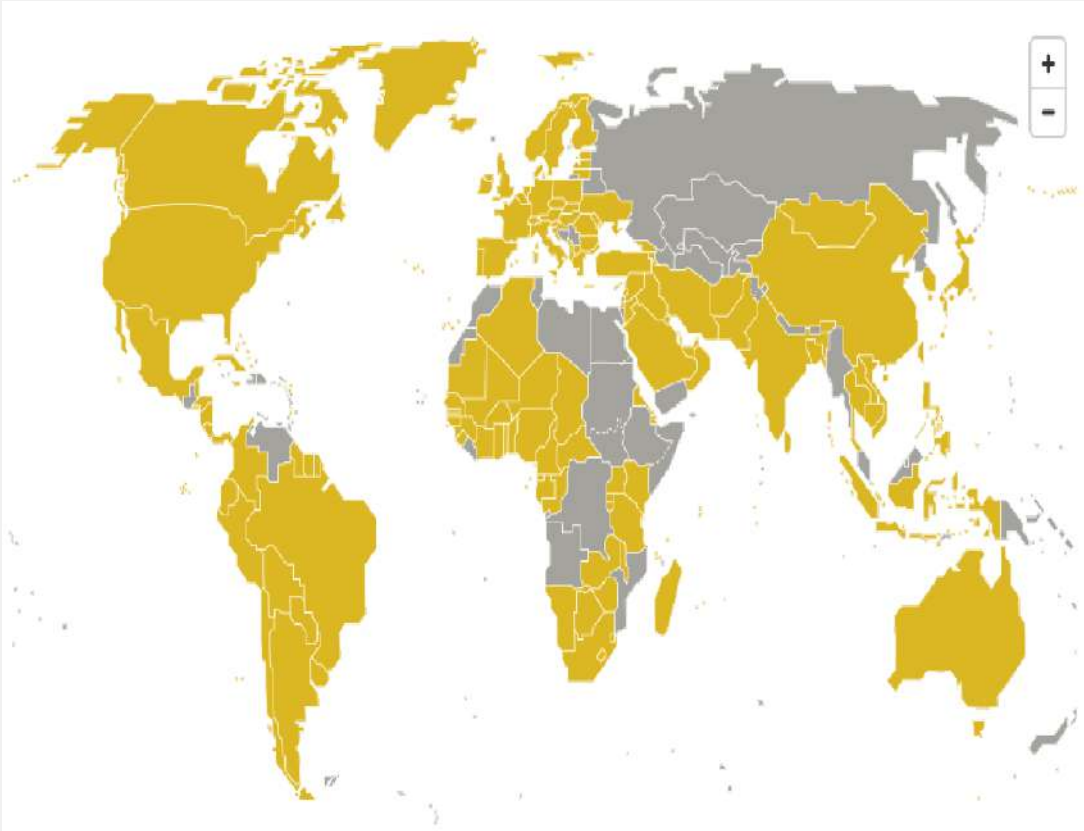
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Koror, PAL

Overview of Minamata Convention Obligations Regarding Trade and Waste Management



Minamata Convention on Mercury



AIM: to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds

Adopted in October 2013, entered into force
in August 2017

152 Parties, as of June 2025

Article 3: Mercury supply sources and trade

Requires Parties to take measures to control trade of mercury with other Parties as well as with non-Parties and reinforces demand reduction control measures (Articles 4–7)

This article covers:

- Elemental mercury,
- Mixtures of mercury with other substances, including alloys of mercury, with a mercury concentration of at least 95 per cent by weight,
- “Mercury compounds” meaning mercury (I) chloride (known also as calomel), mercury (II) oxide, mercury (II) sulphate, mercury (II) nitrate, cinnabar and mercury sulphide.

Article 3:

Mercury supply sources and trade

Main Provisions:

- Not allow the EXPORT of mercury unless the importing country provides **written consent**, the mercury is for an **allowed use or environmentally sound storage**, and all other conditions of Article 3.6 are met.
- Not allow the IMPORT of mercury without government **consent**, ensuring both the mercury **source and proposed use** are allowed under the Convention (and applicable domestic law).
- Restrict the export and use of mercury from **primary mercury mining**, so that it is not available for use in artisanal and small-scale gold mining (ASGM).

Article 3:

Mercury supply sources and trade

General Notifications:

- Allows for Parties to issue consent either on an import-by-import basis or through a general notification of consent provided to the Secretariat.
- A general notification of consent may include terms and conditions and may be revoked at any time by that Party or non-Party.

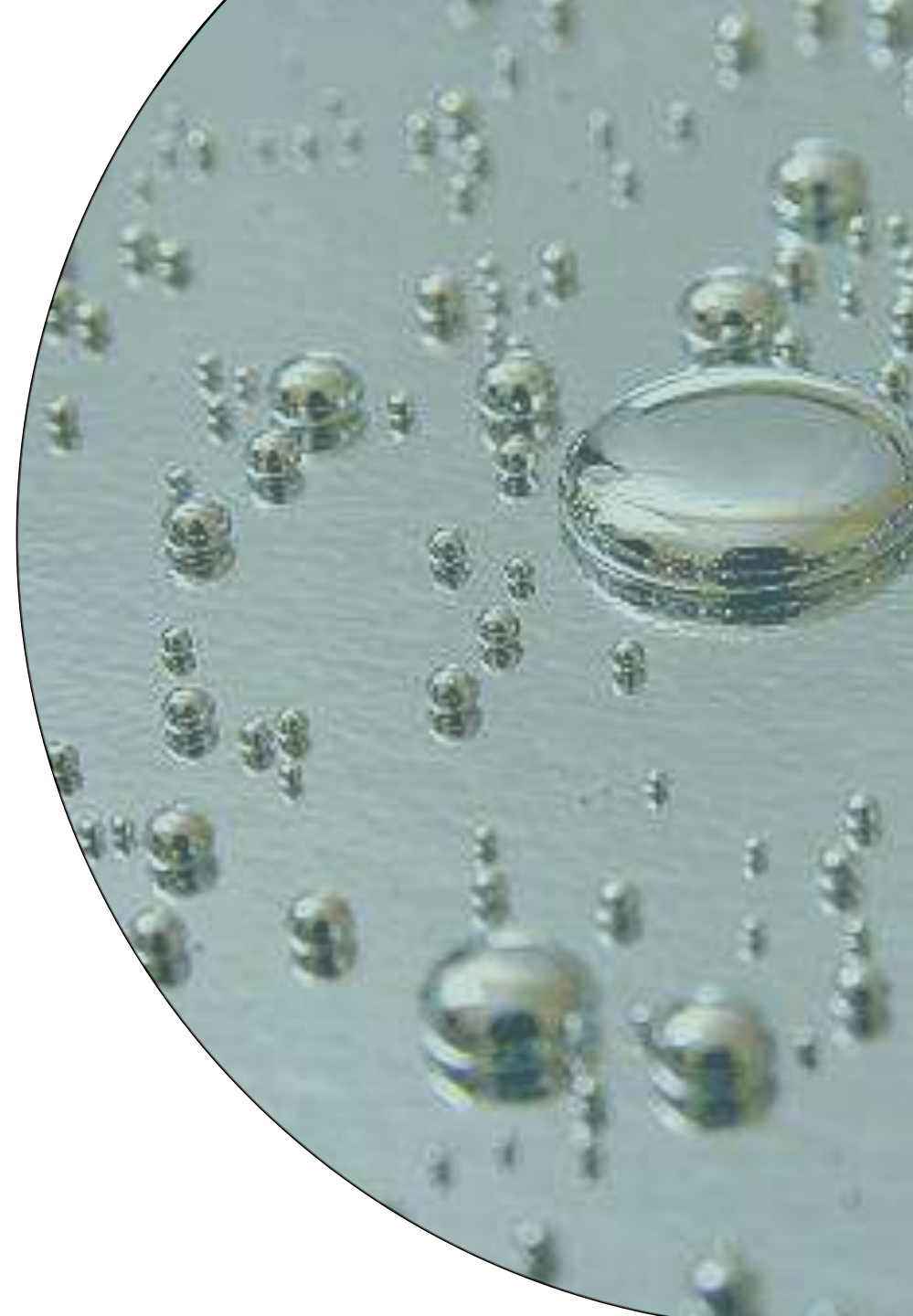
Minamata Convention Secretariat

The Minamata Secretariat makes public the forms and guidance and keeps a public register of general notification of consent on its website.

<https://minamataconvention.org/en/documents/forms-related-article-3-mercury-trade>

<https://minamataconvention.org/en/documents/guidance-completing-forms-required-under-article-3-related-trade-mercury>

Handling and Disposal of Mercury Waste



What are Mercury Wastes?

Under Article 11 of the Minamata Convention, “mercury wastes” refer to substances or objects:

- **Consisting** of mercury or its compounds (e.g. waste mercury catalysts from industrial processes),
- **Containing** mercury or its compounds (e.g. end-of-life mercury added products) *or*
- **Contaminated** by mercury or its compounds (e.g. smelting residue and tailings from primary metal production)

This definition **excludes** overburden, waste rock and tailings from mining, except from primary mercury mining, unless they contain mercury or mercury compounds above thresholds defined by the Conference of the Parties.

Obligations for Management of Mercury Wastes

Under **Article 11** of the Minamata Convention, each Party shall take appropriate measures so that mercury waste is:

- Managed in an environmentally sound manner, taking into account the guidelines developed under the Basel Convention and in accordance with requirements that the Conference of the Parties...
- Only recovered, recycled, reclaimed or directly re-used for a use allowed to a Party under this Convention or for environmentally sound disposal...

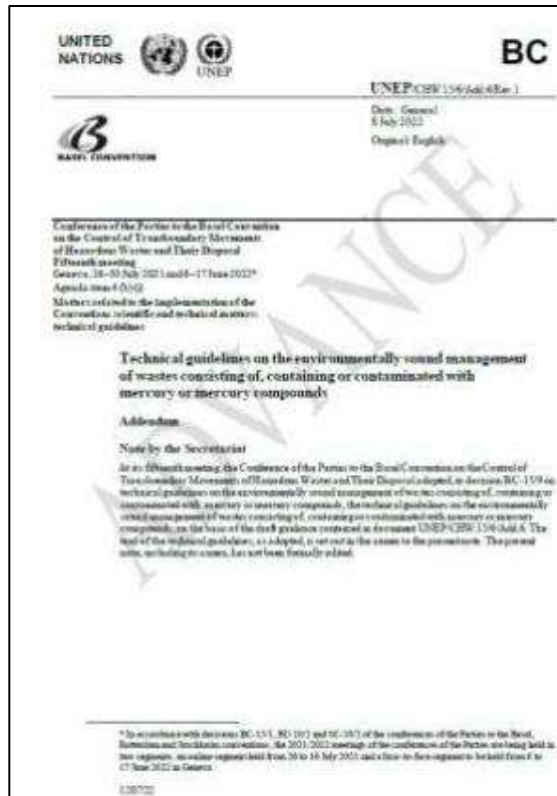
Obligations for Management of Mercury Wastes

For Parties to the Basel Convention, not transported across international boundaries except for the purpose of environmentally sound disposal in conformity with this Article and with that Convention.

In circumstances where the Basel Convention does not apply to transport across international boundaries, a Party shall allow such transport only after taking into account relevant international rules, standards, and guidelines.

Guidelines for Mercury Waste Management

The technical guidelines from the Basel Convention on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds provide guidance on how to prevent, minimize, handle, store and dispose of mercury wastes.



Identification of Mercury Wastes

Identify category (consisting, containing, contaminated by) of mercury waste and understand the potential hazardous characteristics and risks of mercury waste to determine best approach to handling.

Handling of Mercury Wastes

Ensure that waste is handled in a secure manner to prevent evaporation/spillage.

Ensure proper awareness amongst waste handlers and that they wear appropriate personal protective equipment to handle, separate, package, label, transport and store waste.

Storage of Mercury Wastes

Key considerations for storage include:

- Siting
- Design
- Floor
- Equipment
- Structure and interior furnishings
- Forklift
- Temperature
- Signage

Treatment and Disposal of Mercury Wastes

- **Treat** mercury wastes so that they meet the acceptance criteria of disposal facilities.
- **Minimize** mercury emissions/releases from treatment processes of mercury wastes
- **Dispose** of treated wastes in specially engineered landfills and permanent storage

THANK YOU

CONTACT:

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International Environmental Specialist
(Ashley.bastiansz@briwildlife.org)

WEBSITE: www.briwildlife.org



MERCURY: IMPACTS ON THE ENVIRONMENT & THE IMPORTANCE OF BIOMONITORING

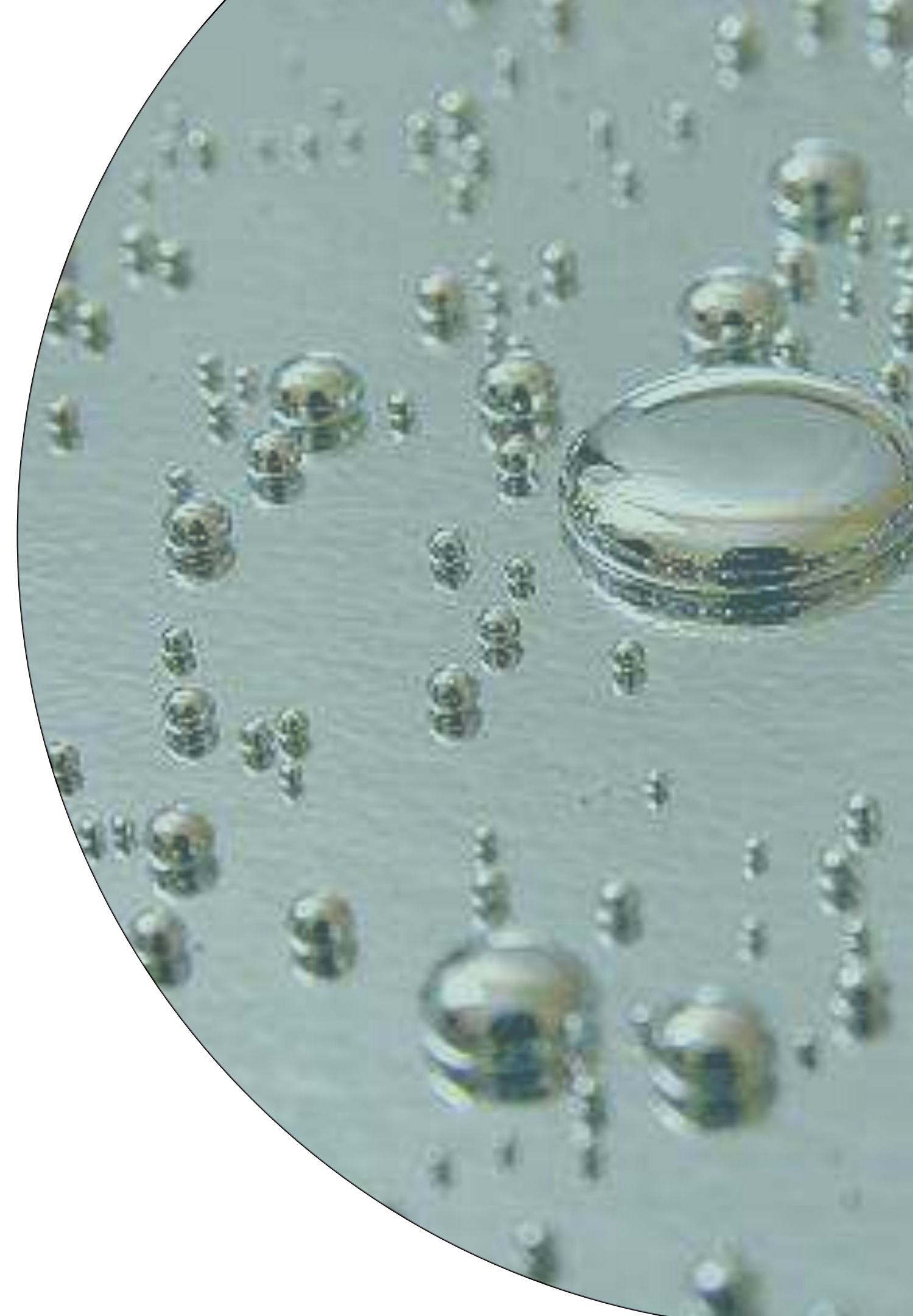
Presenter, Cassie Gilham, BRI

National Training on Strengthening Country-level

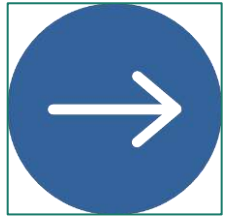
Inter-Agency Coordination on Trade of Mercury

Thursday, 17 July 2025,

Koror, Palau

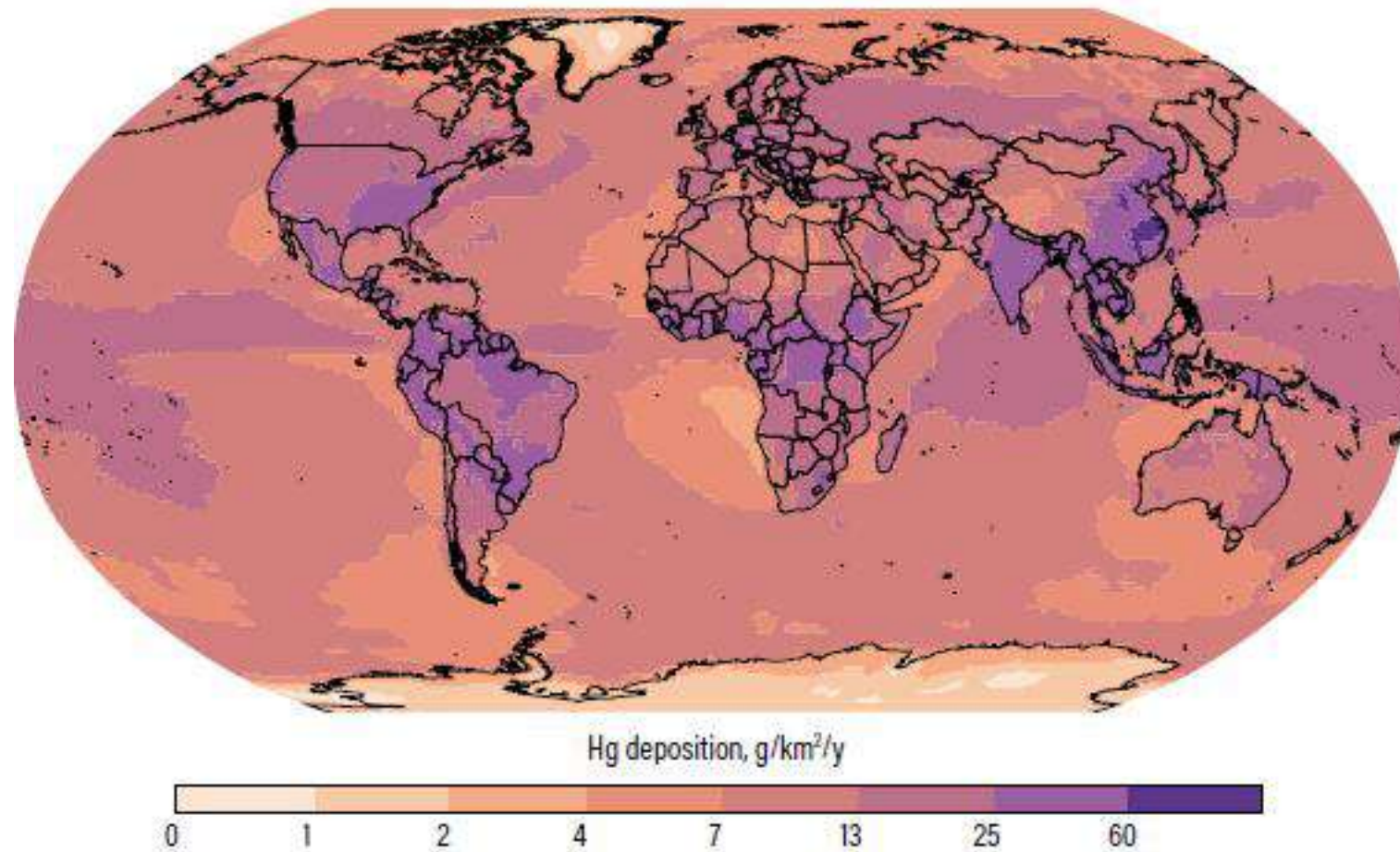


Overview

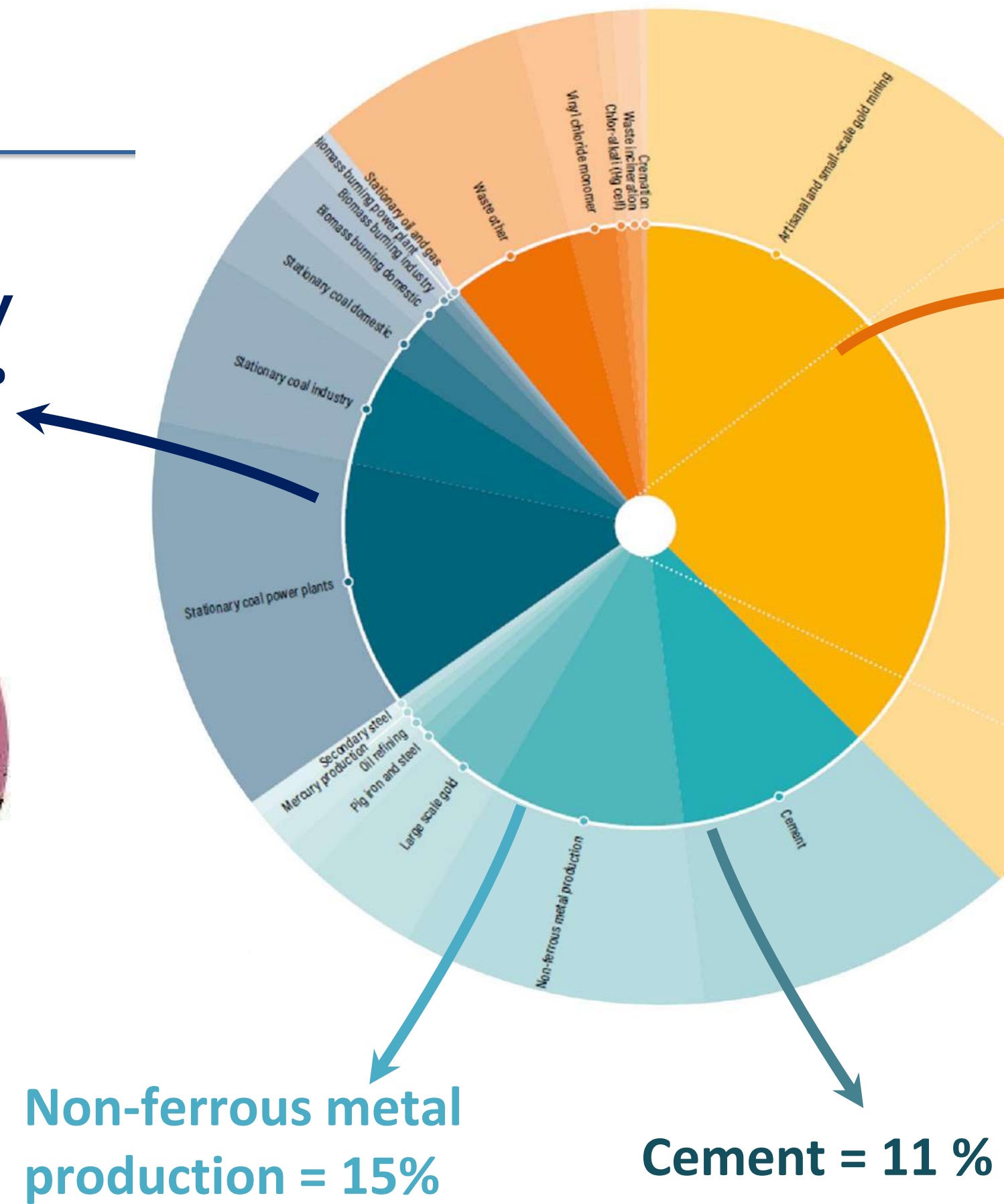


- What are some sources of mercury?
- Why is mercury an issue in the environment?
- Why is mercury biomonitoring important in the Pacific region?
- Why is hair sampling a strong method for mercury biomonitoring in humans?

Global Sources



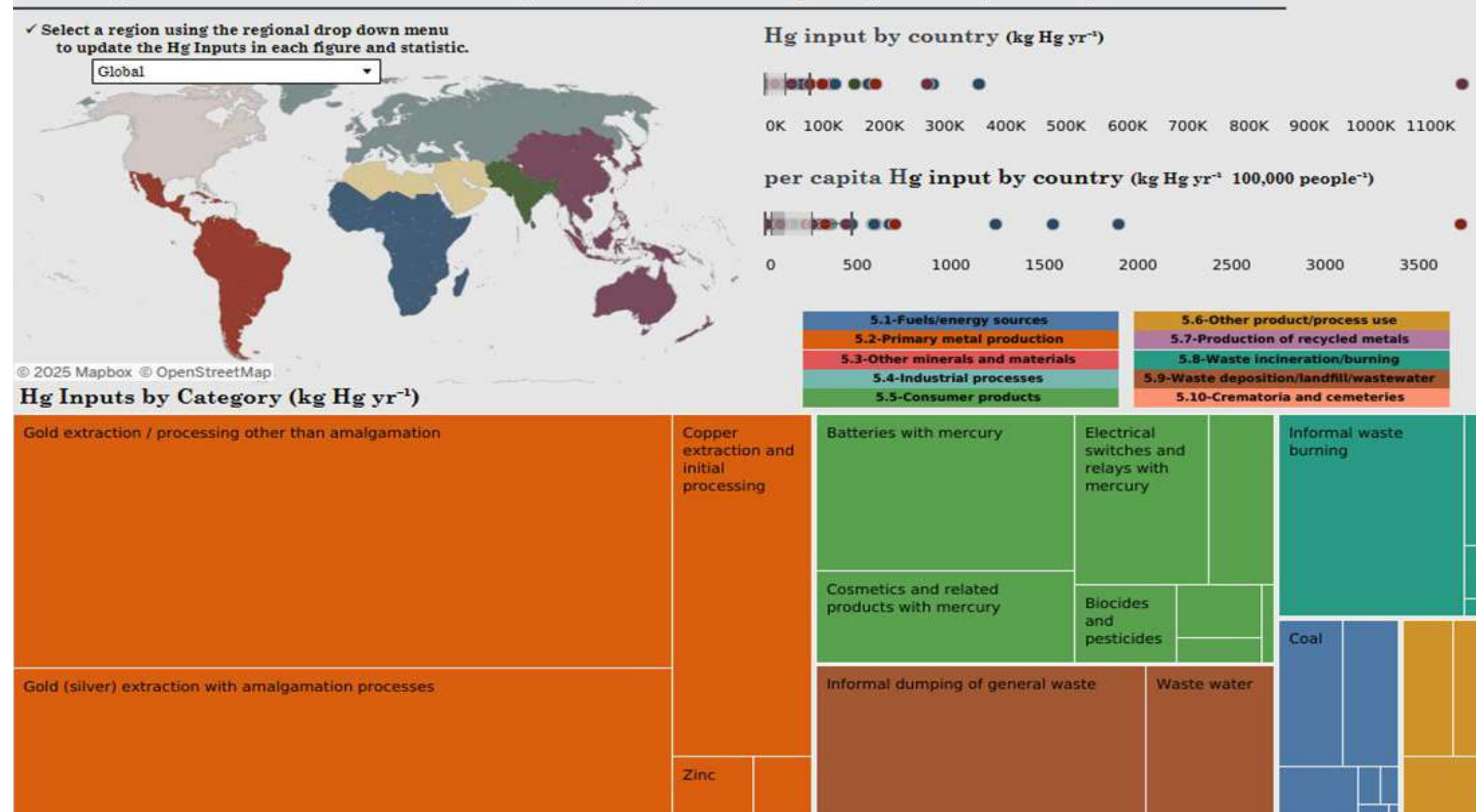
**Stationary
Coal = 21%**



Global Sources - MIAs

Minamata Initial Assessments Mercury Inventories

Summary of results from UNEP's *Toolkit for identification and quantification of mercury releases*



Estimated Sources of Mercury Releases
Based on UNEP's Toolkit for identification and quantification of mercury releases for **78 countries assessed as of 2022***.

Major Sources:

- Primary Metal Production
- Consumer products with intentional use of mercury
- Waste deposition/landfilling and wastewater treatment

Mercury-Added Products (MAPs)

Approximately 30% of the global demand for mercury is due to its use in products.

Due to its properties as a good electricity conductor, its high density and high surface tension, mercury has historically been used in many products such as **certain**:

- Lighting devices (e.g.) CFLs, LFLs and High-pressure mercury vapour lamps
- Batteries
- Electrical Switches and Relays
- Non-electrical measuring devices
- Dental amalgam fillings
- Pesticides, biocides and topical antiseptics
- Cosmetics such as mercury skin lightening products.

Many of these products are being phased out with manufacturing countries phasing out mercury use under the Minamata Convention and other countries agreeing not to import/export them, the long-lasting impacts of mercury releases due to disposal still poses a risk to be addressed.



Sources: BCRC-Caribbean, 2019

Common Uses for Mercury Compounds

Common Purposes	Mercury Compounds
Manufacture of Certain Mercury-Added Products such as Batteries etc.	Mercury (I) Chloride, Mercury (II) Oxide, Mercury (II) Sulfate, Mercury (II) Chloride...
As a preservative, disinfectant or in the production of antiseptics (e.g. mercurochrome)	Thimerosal, mercury (II) amidochloride, phenylmercury (II) acetate, mercury (II) chloride...
Manufacture of Pharmaceuticals	Mercury (II) chloride, mercury (II) iodide, mercury (II) thiocyanate...
As a lab reagent	Mercury (II) nitrate, mercury (II) sulfate, mercury (II) chloride...
Synthesis of other mercury compounds or recovery of elemental mercury	Mercury (I) chloride, mercury (II) nitrate, mercury (II) acetate...
As catalysts in industrial process	Mercury (I) chloride, phenylmercury (II) acetate...
In gold and silver extraction	Mercury (II) sulfate
Manufacture of skin lightening products	Mercury (I) chloride, mercury (II) oxide, mercury (II) sulfate, mercury (II) chloride
Miscellaneous (fireworks, thermoelectric applications, nuclear particle equipment, photo fixative...)	Many other mercury compounds

Example: Mercury-added Skin Lightening Products (Hg SLPs)

Mercury Compounds Used for Manufacture of Mercury-added Skin Lightening Products:

- Mercury(I) chloride
- Mercury(II) oxide
- Mercury(II) amidochloride (ammoniated mercury) –*most popular Hg compound reported in Hg SLPs.*

NOTE: *There are very few Hg SLPs on the market that explicitly list mercury/mercury compounds as ingredients (despite having them in very high concentrations).*



Mercury Exposure from Mercury-added Products

MERCURY EXPOSURE FROM SKIN LIGHTENING PRODUCTS

Skin
Both **men and women** use skin lightening products.
Product is absorbed and mercury travels into the bloodstream and reaches the **kidney and liver**.
Non-users can be exposed through skin-to-skin contact with users, or through contact with clothes or bedding that was handled by the users.

Inhalation
Mercury in SLP can volatilize and mercury vapors can be detected in the ambient air of the home.
Inhaled mercury passes through brain and placenta barriers posing a **risk for pregnant women and developing fetuses**.

Ingestion
Exposure to mercury can occur through food prepared by the SLP users.

Environmental pathway
Release of mercury through wastewater discharge can further contaminate the surrounding environment.

UN environment programme



Breakage, leakage or improper disposal of mercury-added products



Breakage and spillage of mercury devices at your workplace (laboratories/hospitals/dental offices/artisanal small scale gold mining)

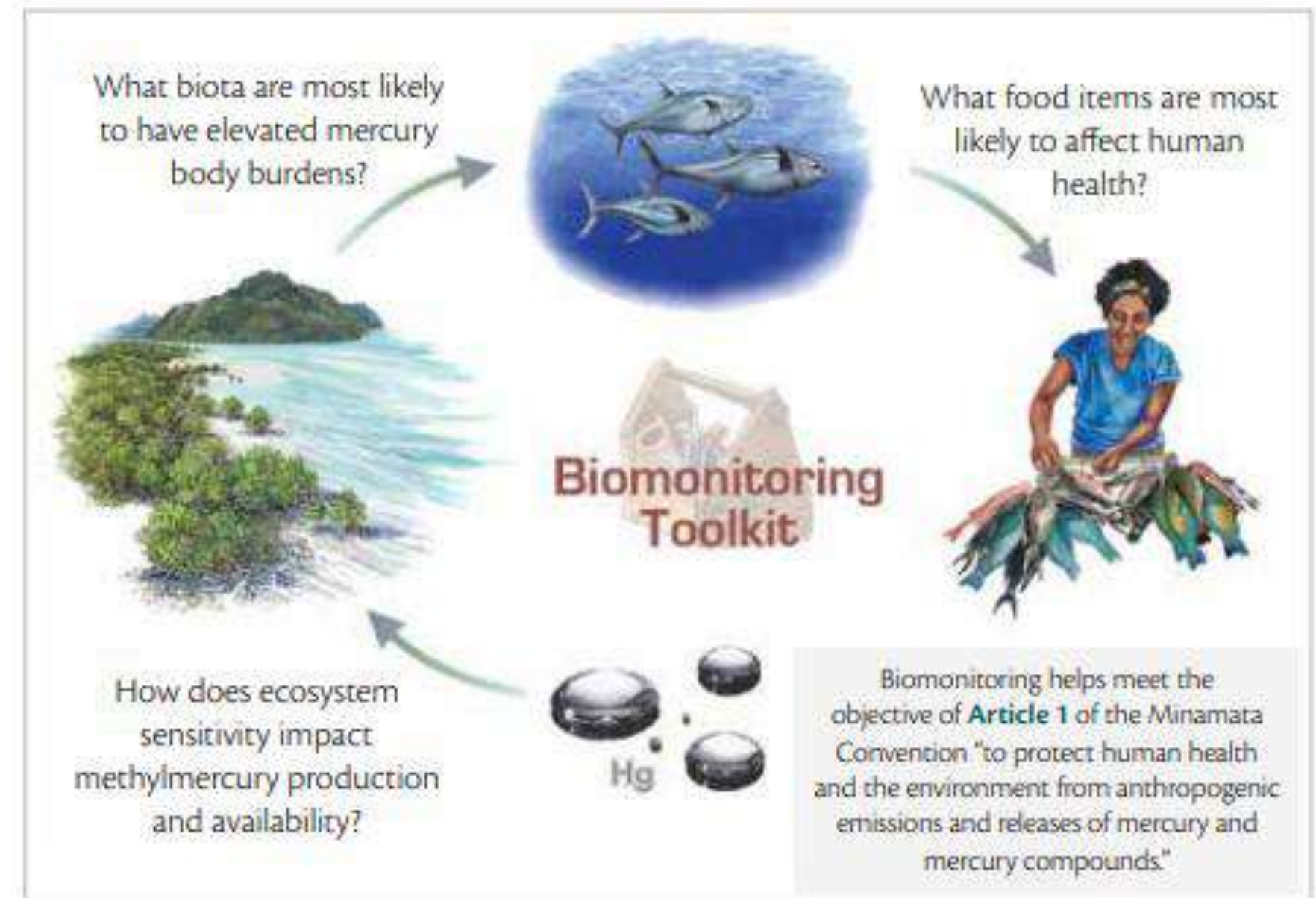
Sources: UNEP, 2024 and BCRC-Caribbean, 2019

When they are broken, mercury emissions and releases can be released into the air, land and water



How does mercury impact ecological and human health

Depending on a suite of environmental conditions, when mercury is emitted or released into air, land, or water, it may be converted to methylmercury, a bioaccumulative neurotoxin.



Sources: BRI, 2019

Biomonitoring for Mercury

Standardized Sampling ensures consistency across space and time so data will be comparable and scientifically sound

Soil and Sea
Field Sampling

Fish Field Sampling

Bird Field Sampling Methods

Collection of Tissues
for Mercury Analysis
2024

Bat Field Sampling Methods

Human Hair
Field Sampling Methods

Collection of Tissues
for Mercury Analysis

Collection of Tissues
for Mercury Analysis
2024

Collection of Samples
for Mercury Analysis



Palau National Training
July 17, 2025

Human Biomarkers: Identifying Biological Hg Hotspots

Typical sampling:

1. Hair
2. Blood
3. Urine

Purpose:

1. Human health assessment
 - Dietary exposure
 - Occupational exposure
 - Other direct exposure (e.g., SLPs)
2. Identify biological Hg hotspots

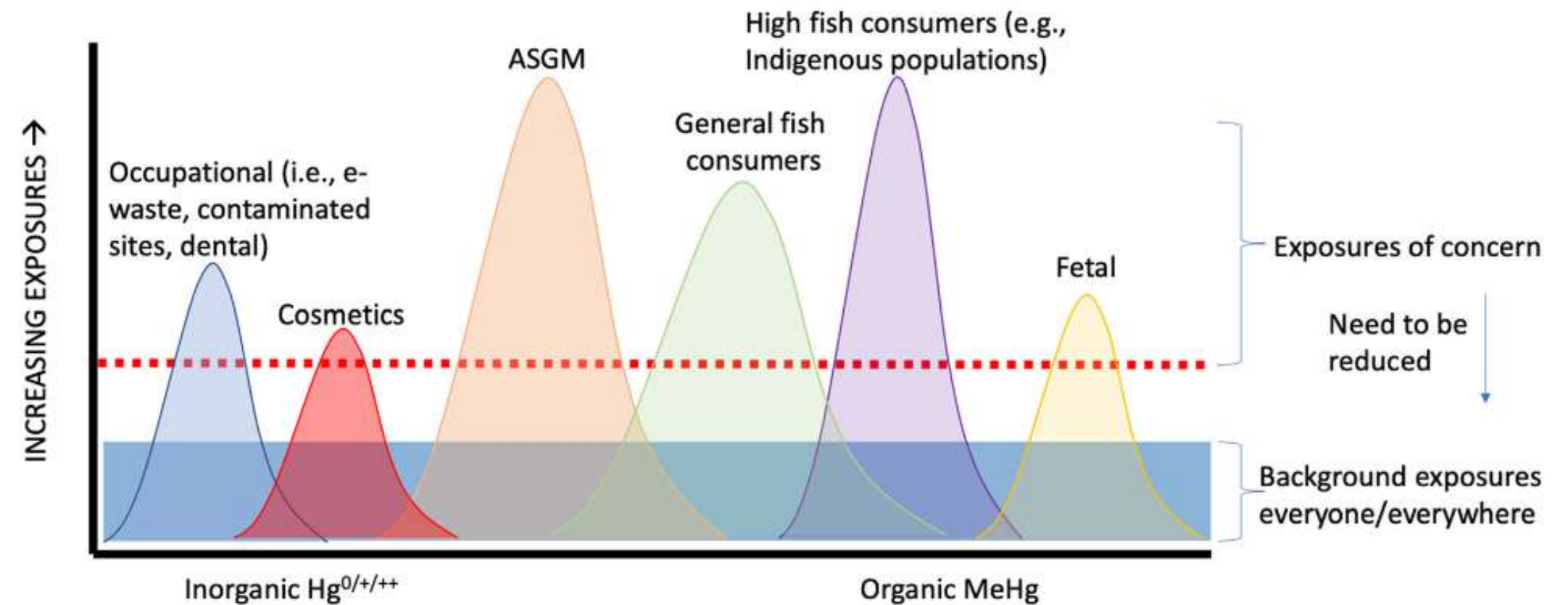


Fig. 1 Population groups with relatively high exposures to mercury and its compounds

Basu N, Bastiansz A, Dórea JG, Fujimura M, Horvat M, Shroff E, Weihe P, Zastenskaya I (2023) Our evolved understanding of the human health risks of mercury. *Ambio*, 52(5), pp.877-896.

Fish – Effect Levels

Fish Hg concentrations and meal frequency ingestion for people, based on U.S. guidelines¹

Guideline or Criterion by Agency	Mercury in Fish (µg/g, ww) ³	Fish Consumption Guideline
U.S. Environmental Protection Agency (USEPA)	≤0.15	Best choices; 2-3 meals per week
–	≤0.23	Good choices; 2 meals per week
U.S. Food and Drug Administration (FDA)	≤0.46	Good choices; 1 meal per week
fish advice ²	>0.46	Choices to avoid; 0 meals per week

Other guidelines are the European Union (EU) and World Health Organization human health guidelines, which are both higher than those identified by the USEPA and FDA

¹Mercury concentrations are number of fish meals that could be consumed to stay within the USEPA health-based reference dose for MeHg adopted in 2001

²U.S. FDA (2022); <https://www.fda.gov/food/environmental-contaminants-food/technical-information-development-fdaepa-advice-about-eating-fish-those-who-might-become-or-are>

Making Informed Decisions

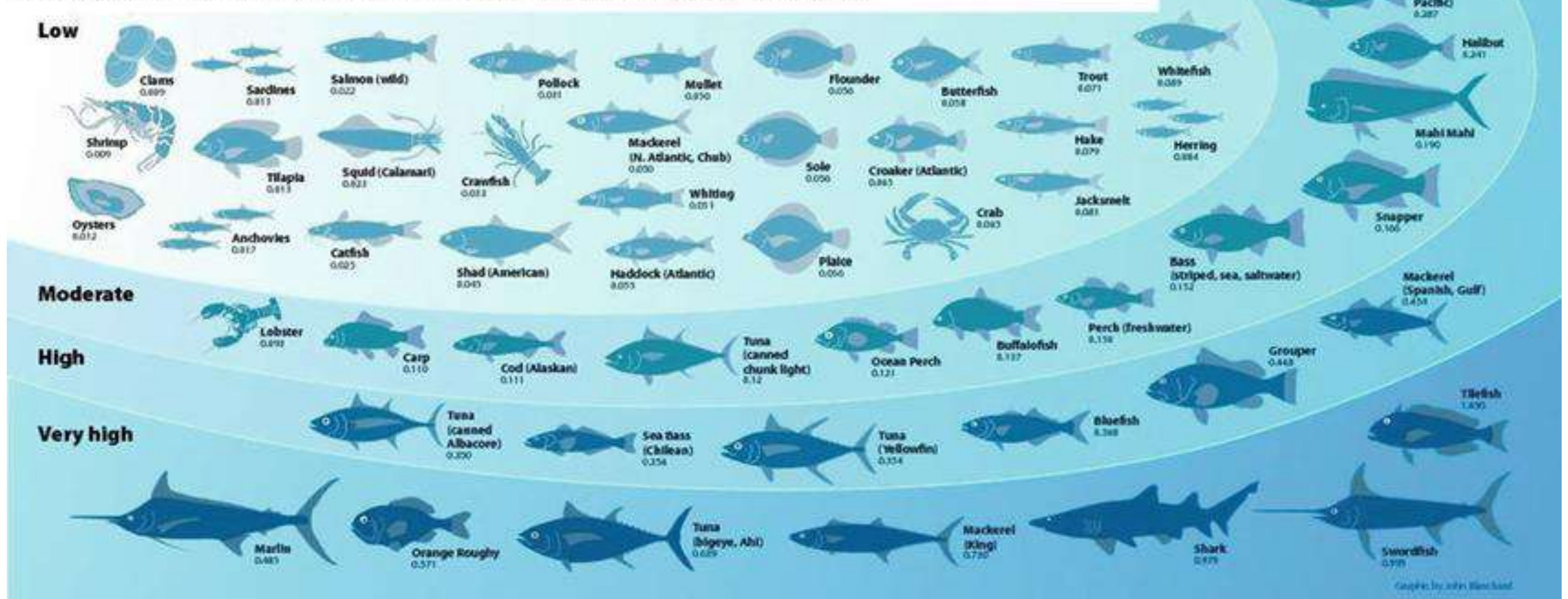
Fish from the sea or freshwater can be a major source of methylmercury accumulation in humans through consumption.

However, fish are an important source of protein and nutrients such as Omega-3



Species Variations in Mercury Content (ppm)

Source: Blue Ocean Institute (2012) (Data Sources: USFDA and USEPA, 2010. Graphic by John Blanchard)



Human Biomarkers: Hg Effect Levels

Effect levels

1 ppm: US EPA (1997)

0.58 ppm: other studies have put forward lower levels (Grandjean and Budtz-Jorgensen 2007).

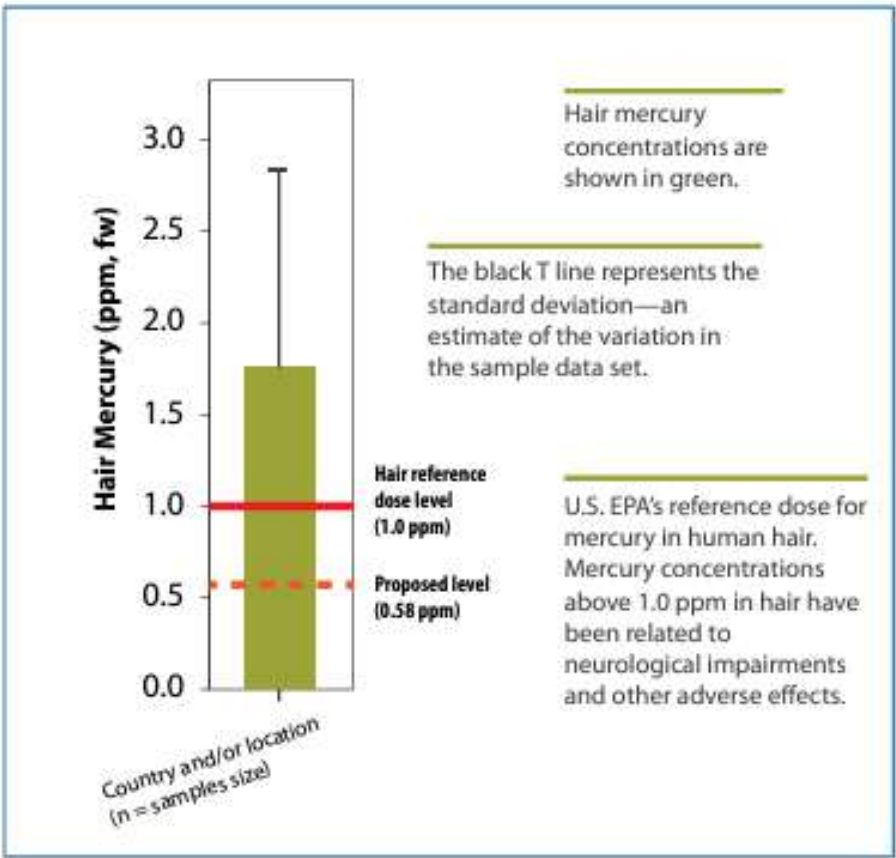
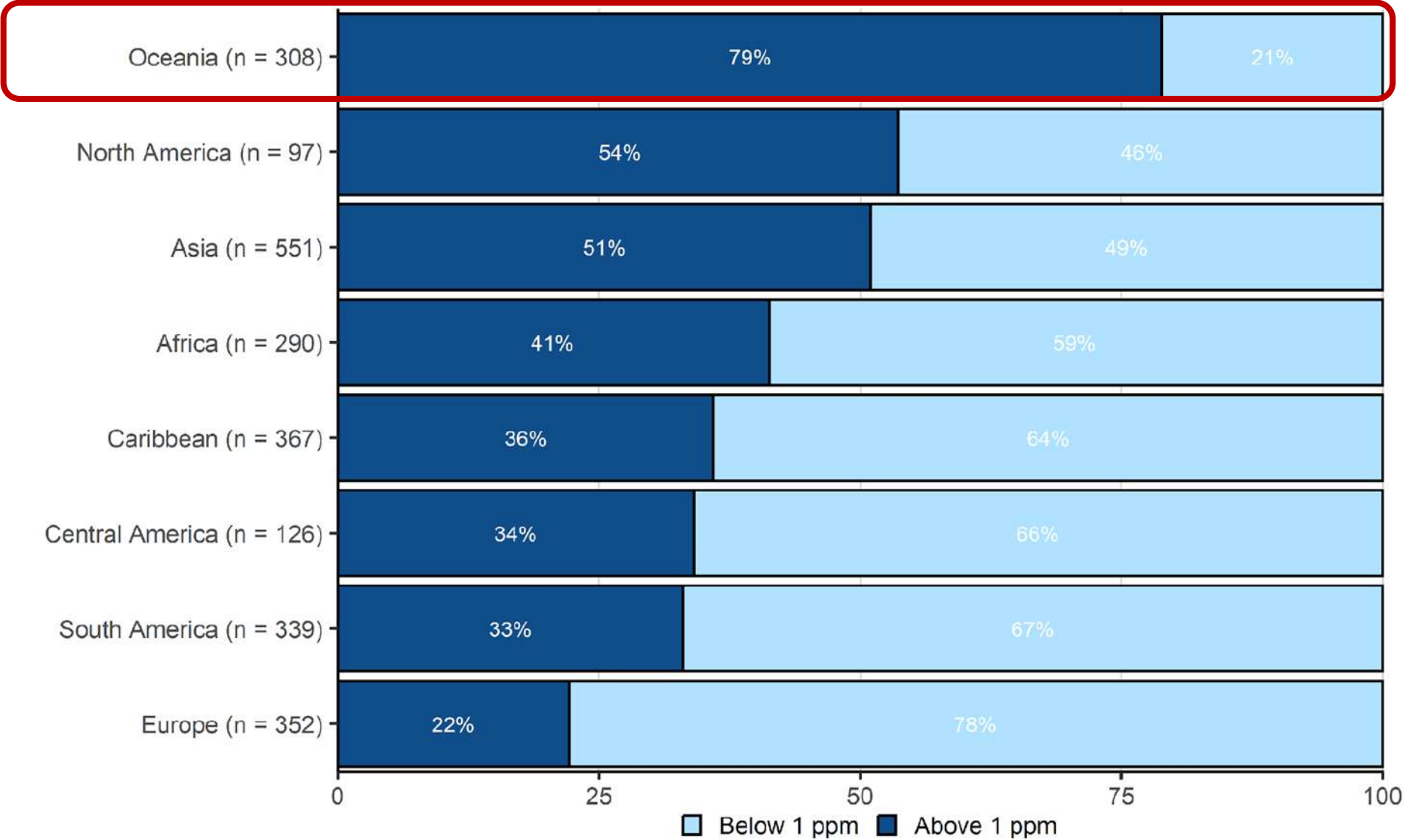


Figure 2. Interpretation of the mercury hair concentration chart.

(Bell et al. 2021)

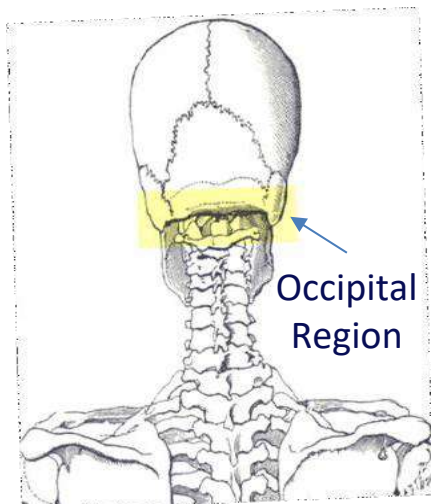
Preliminary results from a large-scale hair analysis study (BRI)



Human Biomarkers: Hair Sampling

Methods:

- Ensure consent forms have been signed
- Ensure questionnaire is complete
- Clip small piece of hair from occipital region
- Clip as close to scalp as possible for recent exposure (growth is approx. 1 cm/ month)



**Total Mercury (THg)
Analysis is conducted at the
Biodiversity Research
Institute in Portland, Maine**

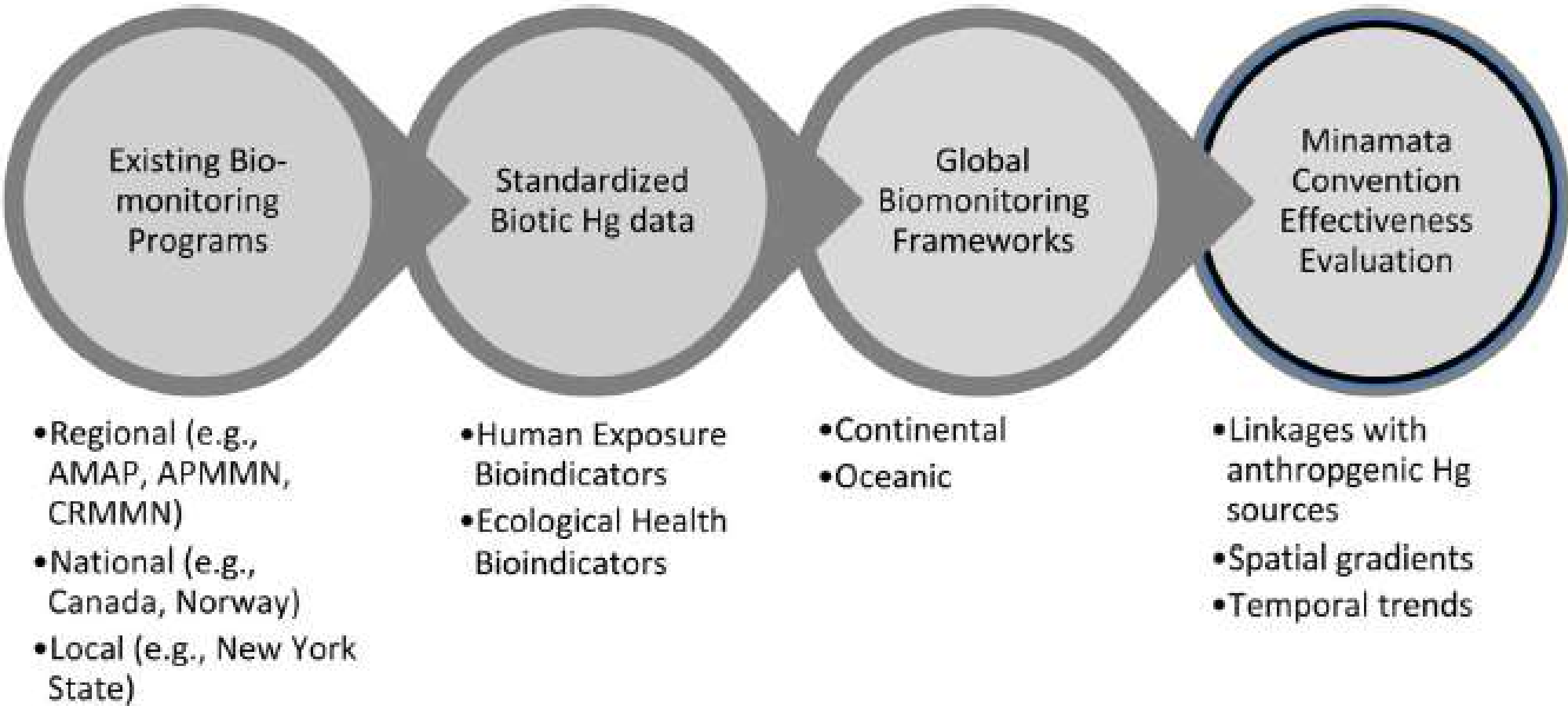
Using the Nippon MA-3000
Direct Mercury Analyzer

- Method: Thermal Decomposition followed by Gold Amalgamation and Atomic Absorption Spectroscopy (AAS)



Local biomonitoring efforts can be used to support larger scale, global biomonitoring and inform global policy objectives!

Fig. 21 Conceptual diagram of the relationships and process for integrating existing data from biomonitoring programs (e.g., Arctic Monitoring and Assessment Program [AMAP], Asia Pacific Mercury Monitoring Network [APMMN], and the Caribbean Region Mercury Monitoring Network [CRMMN]) to design appropriate biomonitoring frameworks to inform global policy objectives of the Minamata Convention



Data Source: Evers DC, Ackerman JT, Åkerblom S, Bally D, Basu N, Bishop K, Bodin N, Braaten HFV, Burton MEH, Bustamante P, et al. (2024) Global mercury concentrations in biota: Their use as a basis for a global biomonitoring framework. *Ecotoxicology*, pp.1-72.

THANK YOU



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For more information on mercury supply, sources and trade, download the draft Minamata Secretariat Report at:

https://minamataconvention.org/sites/default/files/documents/other/Global%20Mercury%20Compounds_Draft_FOR_COMMENTS.docx

Palau National Training
July 17, 2025

National Training on Strengthening Country-Level Inter-Agency Coordination on Trade of Mercury

Tools to Enhance Mercury Trade Management: Identifying Mercury-added Products



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Background

- Mercury is a highly toxic heavy metal that affects neurological, renal, and developmental systems, posing serious risks to vulnerable groups such as children and pregnant women
- Risk assessment is essential for identifying and quantifying mercury exposure, supporting regulatory monitoring, and managing risks in mining, industrial, and environmental settings.
- Risk assessment for mercury relies on analytical detection techniques are essential for protecting health, guiding policy, and supporting global efforts like the Minamata Convention.

Applicability of Risk assessment methods in Mercury Trade Management

Risk assessment methods can be used to check and assess various mercury shipments, including:

- Elemental mercury
- Mercury compounds
- Mercury-containing waste
- Mercury-added products

For the purposes of this presentation, **mercury-added skin lightening products** will be used as a **case study**.

- This product category represents an **emerging issue** and is **more difficult to identify** than elemental mercury.
- However, the **underlying principles and assessment methods** apply similarly across all mercury forms and product types.

Article 4 – Minamata Convention

- Requires Parties to ban the manufacture, import, and export of specified mercury-added products (e.g., **batteries, switches, lamps, cosmetics, measuring devices**) by set phase-out dates
- Aims to reduce global supply and demand for mercury in products, protecting health and the environment.



Mercury added Skin Lightening Products (SLPs)



- **Mercury compounds** are sometimes added to skin lightening products to inhibit melanin production and lighten skin tone.
- Commonly found in **creams, soaps, and lotions**, especially in unregulated or imported products.
- **Highly toxic:** mercury can be absorbed through the skin, causing kidney damage, neurological issues, and developmental harm.
- They not only pose serious health risks not only to users, but also to family members and the environment through contaminated surfaces and waste.
- Many products **exceed legal mercury limits** (often above 1 ppm or now **0 ppm** in updated standards), violating international safety regulations.
- Banned or restricted under **Article 4 of the Minamata Convention on Mercury** and by health authorities in many countries.



Identifying Mercury in Skin Lightening Products: A case study

Importance of testing skin lightening products and cosmetics for mercury

- **Lack of Ingredient Transparency:** Mercury is often not listed on product labels or have ingredients written in different languages, making it difficult for consumers, regulators, and health authorities to identify hazardous products based on packaging alone.
- **Limited Testing Capacity at Borders:** Many customs agencies lack the equipment, expertise, or resources to routinely test cosmetic products for mercury, allowing dangerous items to enter markets undetected.

Instruments commonly used for testing:

- X-Ray Fluorescence (**XRF**)
- Direct Mercury Analyzer (**DMA**)
- Inductively Coupled Plasma Mass Spectrometry (**ICP-MS**)
- Inductively Coupled Plasma Optical Emission Spectrometry (**ICP-OES**)
- Cold Vapor Atomic Absorption Spectroscopy (**CVAAS**)
- Cold Vapor Atomic Fluorescence Spectroscopy (**CVAFS**)
- Atomic Absorption Spectroscopy (**AAS**)
- Commercially available testing kits

Handheld X-Ray Fluorescence (XRF)

Advantages

- I. Portability:** Highly portable, allowing for on-site, real-time analysis without the need to send samples to a laboratory and cost-effective
- II. Non-Destructive:** sample remains intact after testing
- III. Rapid Results:** Real-time results
- IV. Versatility:** These devices can detect elements other than mercury
- V. Instrument** is not damaged by extreme high mercury concentrations



Disadvantages

- I. Detection Limit:** These devices have a higher detection limit than other instruments available (e.g., Direct Mercury Analyzers)
- II. Heterogeneity of samples:** Accuracy of results are inconsistent with error rates increasing with increasing water content of samples
- III. Calibration curves:** For more accurate results beyond use as a screening tool, an external calibration curve should be used

Desktop X-Ray Fluorescence (XRF)

Advantages

- I. **Higher accuracy and precision:** Generally, offers more stable readings due to controlled testing environment.
- I. **Lower detection limits:** Better suited for detecting trace elements, including low concentrations of mercury.
- I. **Greater analytical power:** Often includes advanced software, vacuum/purge systems, and better X-ray sources.
- I. **Less operator-dependent:** Reduced variability from user handling.



Disadvantages

- I. **Lack of portability:** Requires a lab setting, limiting field applications.
- I. **More expensive:** Higher initial cost and maintenance.
- I. **Slower throughput in some cases:** Especially for batch testing or varied sample sizes.
- I. **Bulky and space-intensive:** Requires dedicated lab space.

Direct Mercury Analyzer (DMA)



Advantages

I. Limit of detection: Detection at very low concentrations (sub-ppb)

II. Ease of use: no digestion step resulting in potential errors in sample preparation and resulting in acid waste

III. Versatility: detect mercury in a wide range of matrices

IV. Speed: Analysis time per sample is about 4-7 minutes

V. Automation: Varying degrees of automation

Disadvantages

I. Destructive: Analysis combusts samples (small amount is used)

II. Cost: Instruments are expensive to both purchase and maintain

III. Sample mass: Small sample analyzed – disadvantageous in non-homogeneous and low concentration samples

IV. Size and mobility: Larger footprint and not as portable as an XRF

V. Very high concentrations in some SLPs can damage sensitive instruments necessitating high-cost repairs or dilution steps

Other analyzers

1. Atomic Absorption Spectroscopy (AAS)

Type: Quantitative analytical technique for metal detection

Pros:

- Established method for mercury detection
- Reasonably accurate and reliable for certain sample types

Cons:

- Limited sensitivity compared to more advanced techniques
- May not be suitable for ultra-trace level detection

2. Cold Vapor Atomic Absorption Spectrometry (CVAAS)

Type: Specialized version of AAS for mercury

Pros:

- Highly specific to mercury
- Often used due to its enhanced sensitivity for mercury

Cons:

- Requires careful sample preparation
- May not be ideal for complex matrices without modification
- Reagents are essential — mercury must be reduced to elemental form using chemical reducing agents
- Dilution is not always needed but may be used depending on sample concentration.

3. Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Type: Highly sensitive technique for trace metal analysis

Pros:

- Very low limits of detection
- High precision and accuracy
- Applicable to a wide range of sample types

Cons:

- Expensive instrumentation and maintenance
- Requires technical expertise and thorough QA/QC procedures
- Dilution needed to bring concentrations within the instrument's detection range
- Reagents needed for sample digestion

Other analyzers

4. Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES)

Type: Multi-element detection method

Pros:

- Moderate detection limits
- Suitable for multi-element analysis
- Good balance between cost and performance

Cons:

- Expensive equipment and to maintain
- Less sensitive than ICP-MS
- Can struggle with speciation and very low mercury concentrations

5. Cold Vapor Atomic Fluorescence Spectroscopy (CVAFS)

Type: Specialized version of AAS for mercury

Pros:

- Ultra-high sensitivity, one of the most sensitive techniques available
- Highly specific for mercury with minimal interference
- Some systems are portable for field use

Cons:

- Only for mercury detection
- Expensive equipment and to maintain
- Sensitive to trace contamination
- Requires reagents and proper disposal

6. Commercially Available Screening Kits

Type: Rapid test kits for field or consumer use

Pros:

- Inexpensive and easy to use
- Useful for preliminary screening

Cons:

- High detection limits
- Often provide qualitative or semi-quantitative results
- Not suitable for accurate quantification or low concentration detection

Sampling for
Mercury
using an XRF
Analyzer

Thank you!

Questions?



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For more information on the project, visit:
<https://www.unep.org/mercuryfreecosmetics>

[#mercuryfreecosmetics](https://twitter.com/mercuryfreecosmetics)



Practical Exercise: Developing a National Action Plan for Phasing out Mercury-Added Products and Management of Mercury Waste

The Minamata Convention on Mercury marks a significant global achievement in the effort to reduce the harmful effects of mercury on health and the environment. Under Article 4 of the Convention, Parties are not allowed to manufacture, import or export a prescribed list of mercury-added products after 2020.

Mercury-added Products	Date after which the manufacture, import or export of the product shall not be allowed (Phase-out date)
Batteries, except for button zinc silver oxide batteries with a mercury content < 2%, button zinc air batteries with a mercury content < 2%	2020
Switches and relays, except very high accuracy capacitance and loss measurement bridges and high frequency radio frequency switches and relays in monitoring and control instruments with a maximum mercury content of 20 mg per bridge, switch or relay	2020
Compact fluorescent lamps (CFLs) for general lighting purposes that are ≤ 30watts with a mercury content exceeding 5 mg per lamp burner	2020
Linear fluorescent lamps (LFLs) for general lighting purposes: (a) Triband phosphor < 60 watts with a mercury content exceeding 5 mg per lamp; (b) Halophosphate phosphor ≤ 40 watts with a mercury content exceeding 10 mg per lamp	2020
High pressure mercury vapour lamps (HPMV) for general lighting purposes	2020
Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for electronic displays: (a) short length (≤ 500 mm) with mercury content exceeding 3.5mg per lamp (b) medium length (> 500 mm and ≤ 1 500 mm) with mercury content exceeding 5 mg per lamp (c) long length (> 1 500 mm) with mercury content exceeding 13 mg per lamp	2020
Cosmetics (with mercury content above 1ppm), including skin lightening soaps and creams, and not including eye area cosmetics where mercury is used as a preservative and no effective and safe substitute preservatives are available ^{1/}	2020
Pesticides, biocides and topical antiseptics	2020
The following non-electronic measuring devices except non-electronic measuring devices installed in large-scale equipment or those used for high precision measurement, where no suitable mercury-free alternative is available: (a) barometers; (b) hygrometers; (c) manometers; (d) thermometers; (e) sphygmomanometers.	2020

The covered list of products is provided in Annex A (Part 1): Products subject to Article 4, para 1

^{1/} The intention is not to cover cosmetics, soaps or creams with trace contaminants of mercury.

Annex A (Part 2): Products subject to Article 4, para 3

Mercury-added products	Provisions
Dental amalgam	Measures to be taken by a Party to phase down the use of dental amalgam shall take into account the Party's domestic circumstances and relevant international guidance and shall include two or more of the measures from the following list: (i) Setting national objectives aiming at dental caries prevention and health promotion, thereby minimizing the need for dental restoration; (ii) Setting national objectives aiming at minimizing its use; (iii) Promoting the use of cost-effective and clinically effective mercury-free alternatives for dental restoration; (iv) Promoting research and development of quality mercury-free materials for dental restoration; (v) Encouraging representative professional organizations and dental schools to educate and train dental professionals and students on the use of mercury-free dental restoration alternatives and on promoting best management practices; (vi) Discouraging insurance policies, and programmes that favour dental amalgam use over mercury-free dental restoration; (vii) Encouraging insurance policies and programmes that favour the use of quality alternatives to dental amalgam for dental restoration; (viii) Restricting the use of dental amalgam to its encapsulated form; (ix) Promoting the use of best environmental practices in dental facilities to reduce releases of mercury and mercury compounds to water and land.

In addition, Parties must discourage the manufacture and sales of new types of mercury-added products. Countries may wish to consider the following checklist when planning activities to meet Article 4 Convention obligations:

STEP 1. Development and implementation of a stakeholder engagement strategy

- Identify relevant ministries and stakeholders, and form a structure to facilitate project input and coordination, such as a Products Advisory Committee (PAC)
- Determine roles, responsibilities, timeline, etc. for moving forward between the ministries with jurisdiction over relevant Article 4 obligations (i.e., Ministries of Environment, Health, Trade, etc.)
- Hold PAC inception meeting, identify significant implementation issues and data needs, set project goals, specify the sequence and timing of project milestones, and establish mechanisms for conducting outreach and obtaining input as project progresses
- Secure financial, technical and informational cooperation as needed from relevant agencies/organizations and stakeholders
- Facilitate stakeholder review and input on significant project work products

1.A Describe steps to engage stakeholders in your country.

1B. Identify/list gaps/challenges in relation to engaging stakeholders.

Step 2. National Situation assessment

For each section you need to:

1. Assess the national situation

Note: Start from the MIA, other documents, projects you may have developed in relation to MAPs since the MIA. You don't need to repeat what is in the MIA, but if this is still valid, you can refer to the MIA, summarise the present situation and focus on (2)

2. Identify/List the gaps /challenges in relation to the national situation.

Note: Identify the gaps/challenges for each area e.g. Institutional framework, legal gaps in the legislation , etc. List/number the challenges, because then in step 3 – you will need to identify a solution/action/measure for EACH of the challenges identified above.

Examples of elements to look at and consider:

- Obtain available data on manufacture and trade, as needed (see resources)
- Assess availability of mercury-free or Convention compliant products/devices by 2020 (see resources)
- Assess existing institutional capacity to support mercury-added product phase-out activities, in areas such as information reporting and data platforms, product testing and compliance evaluation, trade monitoring, training of relevant officials, and enforcement
- Conduct legal gaps analysis for addressing mercury-added products (see resources)
- Create information platform as needed to implement the strategy and meet Convention reporting obligations
- Identify laboratory testing needs for strategy implementation and secure financial/technical assistance as needed
- Training of personnel (e.g. Customs)
- Identify target populations for strategy implementation and improve hazard and risk communication initiatives
- Improve occupational health and safety standards and practices for handling mercury
- Foster data gathering, management and information sharing on mercury-free products
- Establish methods for determining mercury levels in products, calibration, validation, etc.
- Promote reduction in illegal transboundary trade in mercury-added products

Institutional Framework Assessment

1. Assess the national situation

2. Identify the gaps /challenges in relation to the national situation. List/number the challenges.

Legislative Assessment

1. Assess the national situation

2. Identify the gaps /challenges in relation to the national situation. List/number the challenges.

Infrastructural Assessment

1. Assess the national situation

2. Identify the gaps /challenges in relation to the national situation. List/number the challenges.

Data on MAPs and their mercury free alternatives

1. Assess the national situation

2. Identify the gaps /challenges in relation to the national situation. List/number the challenges.

Capacity Building Assessment

1. Assess the national situation

2. Identify the gaps /challenges in relation to the national situation. List/number the challenges.

Public Awareness and knowledge sharing assessment.

1. Assess the national situation

2. Identify the gaps /challenges in relation to the national situation. List/number the challenges.

Step 3. Proposed Actions to each challenge identified above

Identify the actions necessary to address the challenges identified above.

E.g.:

- Definition of roles and responsibilities of relevant ministries in the implementation of Article 4 obligations
- Development of new legal authorities as needed, reflecting the alignment of implementation responsibilities for each of the relevant ministries
- Identification of priorities for filling institutional gaps and capacity needs, and sources of potential technical and financial support available to fill the gaps
- Identification of target populations for hazard and risk communication initiatives related to priority products of concern in the country
- Improvement of occupational health and safety standards and practices for handling mercury, as needed

Step 4. Draft National Action Plan

List the actions described above under (3). Table shows an overview of the elements comprising the National Action Plan of COUNTRY, for the phasing out of mercury-added products (MAPs).

	Actions	Lead Agency	Resources Necessary	Time frame short/medium/long
A. Institutional				
1.				
2.				
3.				
B. Legislative				
1.				
2.				
3.				
C. Infrastructure				
1.				
2.				
3.				
D. Data				
1.				
2.				
3.				
E. Capacity Building				
1.				
2.				
3.				
F. Public Awareness				
1.				

2.				
3.				

Resources

UNEP Global Mercury Partnership – Mercury Reduction in Products

<http://www.unep.org/chemicalsandwaste/global-mercury-partnership/mercury-reduction-products>

"Toolkit for identification and quantification of mercury releases"

<http://www.unep.org/chemicalsandwaste/what-we-do/technology-and-metals/mercury/toolkit-identification-and-quantification-mercury-releases>

ZMWG – Minamata Convention on Mercury, Ratification and Implementation Manual (June 2016)

http://www.zeromercury.org/phocadownload/Developments_at_UNEP_level/minamata-convention-on-mercurymanual.pdf

NRDC – Guide to Checklist of Minamata Convention on Mercury obligations which may require new legal authority

<https://www.nrdc.org/sites/default/files/guide-checklist-minamata-obligations.pdf>

NEWMOA- Mercury added product factsheets

<http://www.newmoa.org/prevention/mercury/imerc/factsheets/>

Revised Discussion Document, Mercury Education and Reduction Model Act, Prepared by the Northeast Waste Management Officials' Association (USA)

http://www.newmoa.org/prevention/mercury/final_model_legislation.htm

UNEP Mercury in Products and Waste & Healthcare Settings and Dentistry Modules, (MPP)

http://www.unep.org/chemicalsandwaste/Portals/9/Mercury/AwarenessPack/English/UNEP_Mod1_UK_Web.pdf

2015 Step-by-step Guidance on Phasing Out Mercury Thermometers and Sphygmomanometers, WHO.

http://www.who.int/ipcs/assessment/public_health/WHOGuidanceReportonMercury2015.pdf?ua=1

Replacement of Mercury Thermometers and Sphygmomanometers in Health Care

http://www.who.int/water_sanitation_health/publications/2011/mercury_thermometers/en/

Mauritius National Action Plan on Mercury (2015-2020), Ministry of the Environment and Sustainable Development, February 2014, supported by SAICM, UNEP and UNDP,

<http://africainstitute.info/download/mauritius-national-action-plan-on-mercury/>

Restrictions on products containing mercury, EC,

http://ec.europa.eu/environment/chemicals/mercury/restriction_en.htm

National Action Plan on Mercury and Mercury-containing Wastes Management (Philippines),

http://www.unep.org/hazardoussubstances/Portals/9/Mercury/Waste%20management/Annex%205_PHL_National%20Action%20Plan%20on%20Mercury%20&%20Mercury-Contai.pdf

This practical exercise was adapted from a checklist developed in 2017 by the European Environmental Bureau/Zero Mercury Working Group (EEB/ZMWG) product project team (MPP, NRDC, EEB, gW, SRADev, PANEM) in the framework of the project “**Contributing to the preparation/implementation of the Minamata Convention on Mercury, with a focus on developing strategies for phasing out mercury-added products and on reducing mercury use in Artisanal and Small Scale Gold Mining through development of National Action Plans, in four African countries**”, funded by the European Commission via the Food and Agriculture Organisation, under the ‘Capacity Building related to Multilateral Environmental Agreements (MEAs) in Africa, Caribbean and Pacific countries’ Phase 2 (ACP/MEAs Phase 2). It has been revised by EEB/ZMWG in 2023, in the framework of the third phase of the programme, ACP MEAs 3 and under the project “**Contributing to the implementation/enforcement of the Minamata Convention on mercury, with a focus on developing strategies for phasing out mercury-added products and on reducing mercury use in Artisanal and Small-Scale Gold Mining**”.

Thank you for your participation!





Cross-Agency Collaboration in Mercury Trade Enforcement

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17 July 2025
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The Problem of Mercury Trade

- Despite the obligations of the Minamata Convention, illicit trade in mercury continues due to high demand in sectors including artisanal and small-scale gold mining (ASGM).
- Tackling this trade requires a multi-sectoral, cross-agency enforcement approach involving customs, environmental, health, trade, and law enforcement bodies.
- Smuggling of mercury occurs via land, sea, and air, often concealed or mislabeled.
- Illicit trade leads to:
 - environmental degradation
 - undermines legal frameworks; and
 - increases human exposure to mercury vapors and contaminated water.
- The global scale of the problem requires international collaboration and robust national coordination



Why Cross-Agency Collaboration is Essential

Customs administrations play a critical role in ensuring compliance with both international and national regulations, preventing illegal trade, and facilitating legitimate commerce.

- Mercury enforcement touches on customs, environmental protection, public health, trade, and policing.
- Effective collaboration improves detection of illegal shipments, strengthens prosecution, and enhances public safety.
- Joint strategies ensure better use of resources and consistent implementation of regulations.

Key Challenges in Enforcing Mercury Trade Regulations:

- Limited technical capacity and tools to identify mercury and its compounds
- Poor inter-agency coordination and intelligence sharing
- Fragmented data systems and unclear institutional roles
- Weak case development and prosecution due to lack of collaborative enforcement

Roles and Responsibilities of Key Enforcement Stakeholders

Customs Agencies:

- Conduct inspections and enforce import/export regulations
- Apply commodity classification systems and risk-based profiling
- Detect, seize, and detain illegal or undeclared mercury, mercury-added products, and mercury waste
- Report findings and coordinate actions with relevant national and international agencies

Environmental Authorities:

- Regulate hazardous substances, oversee compliance, and investigate pollution incidents.
- Lead enforcement of environmental laws and mercury-related regulations
- Issue licenses and permits for mercury use, trade, and handling
- Detect and address mislabeling, diversion, or illegal disposal of hazardous mercury waste
- Provide technical support for the safe storage, treatment, or disposal of seized mercury

Law Enforcement:

- Conduct investigations, raids, and ensure legal accountability
- Support arrests and prosecution of offenders
- Uncover and dismantle organized criminal networks
- Identify links between mercury trafficking and related crimes (e.g., illegal mining, smuggling)

Roles and Responsibilities of Key Enforcement Stakeholders

Health Authorities:

- Identify unlicensed mercury use and illegal trade channels
- Provide technical expertise on mercury exposure and health risks
- Monitor public health impacts of mercury
- Support implementation and enforcement of health-related regulations
- Assess risks to human health and promote safer alternatives.

Judiciary and Prosecutors:

- Apply environmental law and impose penalties.
- Build and prosecute legal cases using multi-agency evidence
- Apply environmental laws and ensure due process
- Impose penalties, fines, and custodial sentences
- Enforce sanctions to deter illegal mercury trade and use

Trade Ministries:

- Manage product bans, trade controls, and import/export permitting for mercury-related goods
- Coordinate with enforcement agencies to ensure compliance with international trade regulations

International Partners:

- Support national capacity building through training, funding, and technical assistance
- Facilitate intelligence sharing and cross-border cooperation on mercury trade enforcement



Enhancing Inter-Agency and Cross-Border Information Sharing

- **Designated Communication Channels & Secure Platforms:** Establish secure inter-agency communication portals for real-time information exchange
- **Standardized Templates and Shared Databases:** Use predefined forms (e.g., seizure reports, risk alerts) and develop shared databases for flagged traders, shipment routes, and permits
- **Regular Coordination Mechanisms:** Schedule consistent meetings, briefings, and joint situation reporting to align efforts and build risk profiles
- **Real-Time Alerts and Intelligence Sharing:** Share immediate notifications on suspicious shipments or activities
- **Data Protection and Confidentiality:** Ensure protocols safeguard sensitive information with clear privacy provisions
- **Appointed Focal Points:** Assign dedicated contacts in each agency to streamline communications



Need for Standard Operating Procedures (SOPs)

- **Strategic Tool for Planning & Inspection:** Well-developed and regularly updated SOPs support risk analysis and effective shipment inspections.
- **Centralized & Adaptable Guidance:** SOPs provide a reliable, centralized reference that evolves with changing needs and aligns with international standards.

Key Elements of Domestic SOPs:

- Procedures consistent with the Minamata Convention and national laws
- Clear definition of roles and responsibilities for Customs and stakeholders
- Detailed processes for managing imports, exports, transit, and trade involving mercury, mercury-added products, and waste



Essential Elements of SOPs

- **Regulatory Framework:** Reference to national laws and alignment with the Minamata Convention
- **Control Procedures:** Step-by-step processes for inspecting and managing mercury and mercury-added product shipments
- **Shipment Identification:** Methods for detecting, verifying, and classifying relevant goods
- **Risk Management & Enforcement:** Guidelines for profiling, targeting, and conducting enforcement actions
- **Health & Safety Measures:** Protocols to protect officers and prevent contamination
- **Illegal Traffic & Sanctions:** Procedures for addressing violations and applying penalties
- **Training Provisions:** Regular capacity building for frontline officers and stakeholders
- **Inter-Agency Cooperation:** Coordination with competent authorities and relevant stakeholders

Joint Capacity Building and Training

- Conduct cross-agency training on mercury detection, handling, and documentation.
- Train customs and law enforcement on identification and safe seizure protocols.
- Hold workshops on interpreting the Minamata Convention and national regulations.
- Build labs and forensic capacity to analyze mercury samples.
- Involve international experts to share global best practices.

Monitoring, Compliance, and Enforcement

- **Palau MIA:**
 - Recommended that a mercury management coordination be formally established with the **EQPB** acting as the Chair.
 - This working group can be linked to other environmental committees that may have been or will be established to avoid duplication of work.
- Conduct joint inspections at high-risk points (ports, markets, ASGM sites).
- Set up integrated compliance teams for consistent enforcement.
- Create feedback loops to assess what's working and adjust enforcement strategies.
- Use GPS and chain-of-custody documentation to trace mercury movement.
- Prosecute violations consistently to serve as a deterrent.



Barriers to Effective Collaboration

- Institutional fragmentation and lack of shared mandates.
- Budget constraints and unequal resource distribution among agencies.
- Resistance to sharing sensitive information.
- Limited political will or understanding of mercury issues.
- Low public awareness and pressure from illegal market actors.

Recommendations for Strengthening Collaboration

- Establish a permanent inter-agency task force with legal authority and budget.
- Create national enforcement plans for mercury trade with clear roles.
- Provide dedicated funding for joint operations and technology upgrades.
- Engage civil society, academia, and the private sector in awareness and compliance.
- Strengthen regional and international cooperation frameworks.

Standard Operating Procedures for controls of waste shipments (2024) – World Customs Organization (WCO)



THANK YOU!

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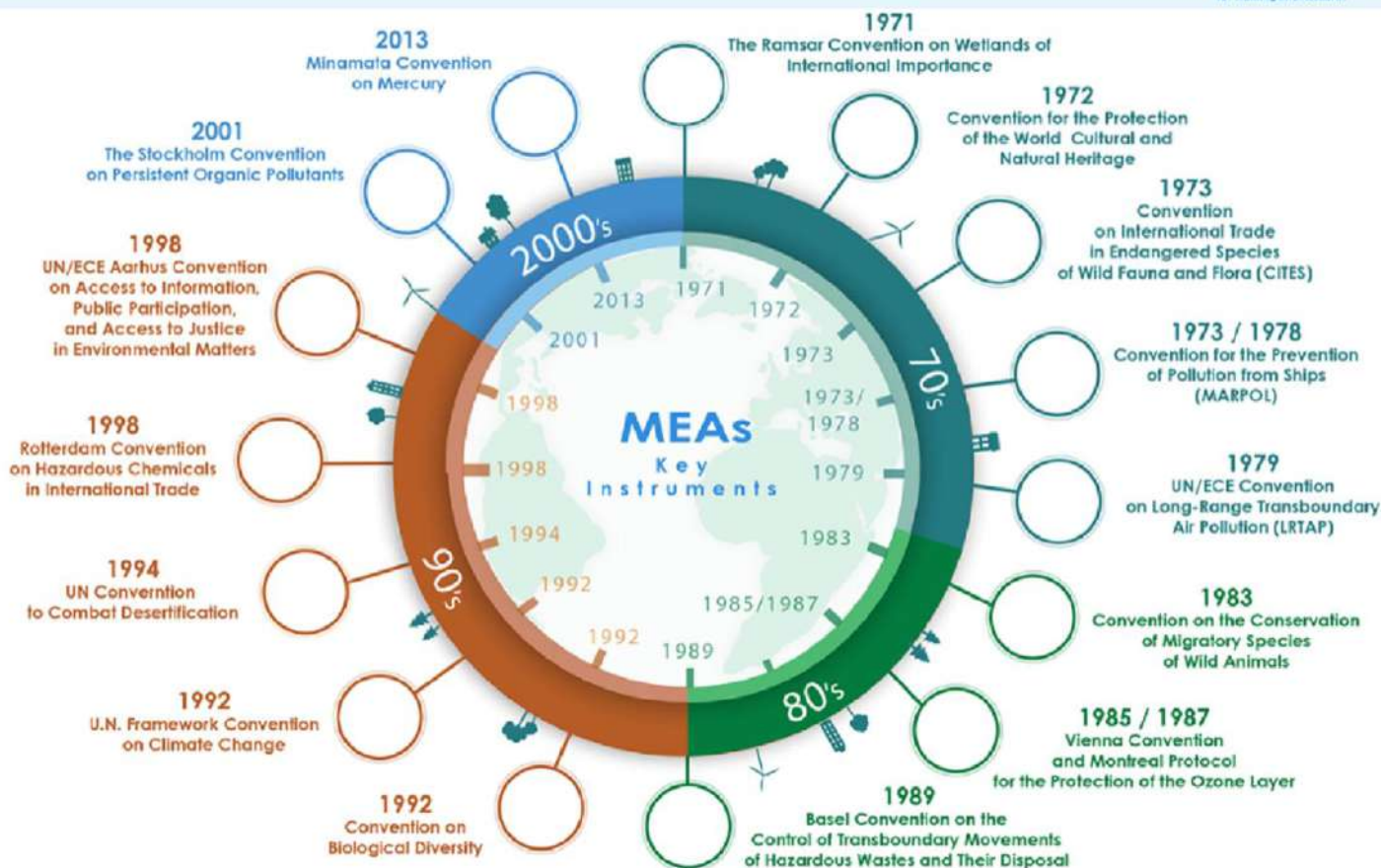
**World Customs
Organization**

Understanding the role of Customs and the available resources for enhancing implementation of the Minamata Convention on Mercury/other environmental agreements

National Training on Strengthening Country-Level Inter-Agency Coordination on Trade of Mercury

17 July 2025, Palau

Multilateral Environmental Agreements (MEAs)



<https://www.informea.org/en>

Multilateral Environmental Agreements (MEAs)



Common types of trade-related measures used in MEAs include:

- Trade Restrictions or Bans
- Prior Informed Consent (PIC)
- Labelling and Packaging Requirements
- Phase-out or Phase-down Schedules
- Permitting and Licensing Systems
- Environmental Impact Assessments (EIA)
- Monitoring and Reporting Obligations
- Financial Mechanisms.

Trade provisions of the Minamata Convention – Role of Customs



- **Article 3** (Mercury supply sources and trade) provides for the need prior informed consent for mercury trade. Parties shall not allow the export of mercury to a party without its written consent, and only for the purpose of a use allowed under the Convention (or interim storage).
- **Article 4** (Mercury-added products) requires parties not to allow the manufacture, import or export of mercury-added products after the phase out date. (Articles 4, 5 and 6, Annexes A and B)
- **Article 7** (Artisanal and small-scale gold mining) requires parties with ASGM to develop and implement national action plans, which includes strategies for managing trade and preventing the diversion of mercury to use in ASGM.
- **Article 11 (Mercury waste)** requires parties to the Basel Convention to take measures so that mercury waste be not transported across international boundaries except for the purpose of environmentally sound disposal. (Articles 10, 11 and 12)

Article 3: Trade



The key features of Article 3 relate to:

- the export and import of elemental mercury
- stocks of mercury and certain mercury compounds
- the prohibition of trading of mercury taken out of use in chlor-alkali production using mercury cells.
- Export of mercury from a [Party to the Convention](#) (member country) is only allowed:
 - to import countries which have given their prior consent
 - only for purposes/fates which are allowed under the Convention.

Article 3 : Trade



Customs need evidence of the prior consent from the importing country:

- General consent: Minamata Convention's Secretariat's publishes register of general prior consents from Parties:
<https://www.mercuryconvention.org/en/parties/notifications>.
- Consent to the specific shipment: A specific consent form shall follow the shipment. In cases of doubt, contact directly the official authorities in charge in the importing country.
- If the importing country is a non-Party to the Convention, the consent must additionally include certification that the importing country "has measures in place to ensure the protection of human health and the environment and to ensure its compliance with Articles 10 (storage) and 11 (waste) of the Convention".

Article 3: Trade



- FORM A: Form for the provision of written consent by a Party to the import of mercury.
- FORM B: Form for the provision of written consent by a non-Party to the import of mercury.
- FORM C: Form for non-Party certification of the source of mercury to be exported to a Party.
- FORM D: Form for general notification of consent to Import Mercury.
- Forms are available at the Minamata Convention website: [Forms related to Article 3 on Mercury trade](#).
- Guidance for the use of the forms can be seen here: [Guidance on completing the forms required under article 3 related to trade in mercury](#).

Article 4: Mercury-Added Products



- Certain mercury-added products must not be manufactured, imported, or exported after a certain phase-out date (Annex A).
- There are certain exemptions.
- For some products not subject to phase-out, parties must take steps to reduce mercury use. (Annex B).

Article 10: Interim storage

- Article 10 of the Minamata Convention on interim storage of mercury (not waste) states that mercury and its compounds should be stored in an environmentally sound manner, to avoid releases.

Article 11: Waste



- Article 11 regulates mercury waste, and references the Basel Convention on the transboundary movement of hazardous waste and their Disposal (Also for countries that are not Basel Parties but are Minamata Parties)
- In the Minamata Convention mercury wastes mean substances or objects:
 - a) Consisting of mercury or mercury compounds;
 - b) Containing mercury or mercury compounds; or
 - c) Contaminated with mercury or mercury compounds.
- Types of wastes in categories a) and b) and a concentration threshold for category c) exist, see https://minamataconvention.org/sites/default/files/documents/forms_and_guidance_document/Mercury_Waste_Thresholds.pdf

Article 11: Waste



- Article 11 further states that mercury and mercury compound wastes must be managed in an environmentally sound manner
- For Parties to the Minamata and Basel Conventions, mercury wastes shall not be transported across international boundaries unless for the purpose of environmentally safe disposal.
- Prior informed consent principles
 - Definition of illegal trafficking of waste
 - Without notification to all States concerned;
 - Without the consent of all States concerned;
 - With consent obtained through falsification, misrepresentation or fraud;
 - When there is a material discrepancy between documents and wastes;
 - When the movement results in deliberate disposal of the wastes in contravention of the Convention (e.g. dumping).
- [Basel convention guideline on mercury waste treatment](#)

Article 11: Waste

Basel Convention waste codes with reference to mercury*



Entries with direct reference to mercury	
Y29	Wastes having as constituents: <i>Mercury; mercury compounds</i>
A1010	Metal wastes and waste consisting of alloys of any of the following: ... - <i>Mercury</i> ... but excluding such wastes specifically listed on list B.
A1030	Wastes having as constituents or contaminants any of the following: ... - <i>Mercury; mercury compounds</i> ...
A1180	Waste electrical and electronic assemblies or scrap ² containing components such as accumulators and other batteries included on list A, <i>mercury-switches</i> , glass from cathode-ray tubes and other activated glass and PCB-capacitors, or contaminated with Annex I constituents (e.g., cadmium, <i>mercury</i> , lead, polychlorinated biphenyl) to an extent that they possess any of the characteristics contained in Annex III (note the related entry on list B B1110) ³

*As per Annexes I and VIII to the Basel Convention

<https://www.basel.int/Implementation/MercuryWastes/Overview/tabid/3890/Default.aspx>

Article 11: Waste

Other Basel Convention waste codes relevant to mercury (not exhaustive)*

Other entries related to wastes which may contain or be contaminated with mercury	
A1170	Unsorted waste batteries excluding mixtures of only list B batteries. Waste batteries not specified on list B containing Annex I constituents to an extent to render them hazardous
A2030	Waste catalysts but excluding such wastes specified on list B
A2060	Coal-fired power plant fly-ash containing Annex I substances in concentrations sufficient to exhibit Annex III characteristics (note the related entry on list B B2050)
A3170	Wastes arising from the production of aliphatic halogenated hydrocarbons (such as chloromethane, dichloro-ethane, vinyl chloride, vinylidene chloride, allyl chloride and epichlorhydrin)
A4010	Wastes from the production, preparation and use of pharmaceutical products but excluding such wastes specified on list B
A4020	Clinical and related wastes; that is wastes arising from medical, nursing, dental, veterinary, or similar practices, and wastes generated in hospitals or other facilities during the investigation or treatment of patients, or research projects
A4030	Wastes from the production, formulation and use of biocides and phytopharmaceuticals, including waste pesticides and herbicides which are off-specification, outdated, or unfit for their originally intended use
A4080	Wastes of an explosive nature (but excluding such wastes specified on list B)
A4160	Spent activated carbon not included on list B (note the related entry on list B B2060)

*As per Annexes I and VIII to the Basel Convention

Other international regulation related to mercury trade and shipments _ Rotterdam Convention



- The following mercury compounds are covered by the PIC procedure (in Annex III to the Convention):
 - “Mercury compounds, including inorganic mercury compounds, alkyl mercury compounds and alkyloxyalkyl and aryl mercury compounds.”
 - These compounds are listed under the category “Pesticides”, but they actually have a broader application.
- For enforcement purposes Annex III in <http://www.pic.int/TheConvention/Overview/TextoftheConvention/tabid/1048/language/en-US/Default.aspx>

Identification



- HS codes that are specific to materials, products and wastes with mercury. For example:
 - HS 2805.40 – Mercury
 - HS 2852.00 – Compounds, inorganic/organic, of mercury, excluding amalgam
 - HS 8539.31 – Lamps; discharge, (..), fluorescent, hot cathode
- In addition, there are other HS codes that are also relevant to mercury, meaning that the codes include materials, products and wastes with mercury, along with other non-mercury commodities and wastes. When checking for mercury trade, these are as important as the mercury-specific codes.
- There are also regional or national codes beyond 6 digits.
- Misclassification, by mistake, or deliberate.

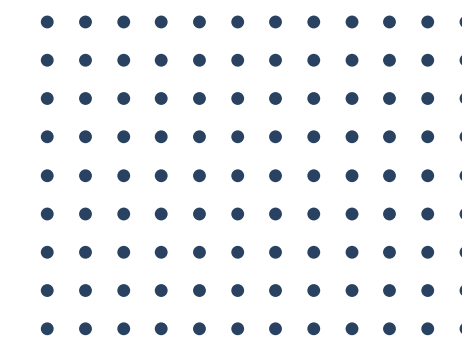
Identification



- For an overview of types of materials, products and wastes with mercury, including pictures of examples of the relevant materials, products and wastes, examples of HS codes and Basel Convention waste codes relevant to mercury, as well as a description of key characteristics, STRiKE report [“Onsite detection of mercury”](#):
- The [Minamata Convention recommendations](#) for voluntary HS codes development for mercury-added products listed in Annex A to the Convention as of 2020.

THANK YOU!

Anna KOBYLECKA
TECHNICAL OFFICER
POLICY AND STANDARDS DIRECTORATE
WORLD CUSTOMS ORGANIZATION
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IMPLEMENTATION OF THE MINAMATA CONVENTION



PRIORITY



- Protecting the Environment
- Protecting Public health
- Protecting and sustaining fishing and farming livelihoods

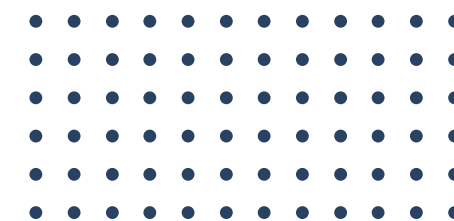
By preventing contamination of air, water, land and marine ecosystems.



INITIATIVES



- Strengthening tracking and oversight
- Safeguarding worker health and safety
- Ensuring safe storage, transport and disposal
- Preventing contamination
- Expanding monitoring



TIMELINE

2019

Special Project to develop the Palau Chemical Baseline Report and National Policy

2023

Resurrection of the MIA

2024

- MIA Report - Published
- Palau National Chemical Baseline Report, Final Draft
- Policy for Sound Chemical Management in Palau, Final Draft

2025

Pending endorsement of the Chemical Baseline Report and the Policy for Sound Chemical Management in Palau

NOW

- Opportunities for Expansion

ACTION PLAN



- Regulatory Enhancements
- Tracking Systems
- Establishment of Proper Disposal Facilities

REGULATORY ENHANCEMENTS



01

Review existing and relevant environmental regulations



03

Develop new or amend existing regulations



02

National Chemical Baseline Report to inform



04

Legal reviews pending

TRACKING SYSTEMS



AWARENESS

Prevent injury to human health and environment



INVENTORY

Develop an on-going inventory of imported mercury added products



PHASE DOWN/OUT

Mercury added devices
Dental amalgams



MONITORING

Develop a reporting process of all mercury added products that are imported and disposed

DISPOSAL FACILITY

Strengthen partnership with Bureau of Public Works



SAFE STORAGE

Identify and design facility



SAFE HANDLING

Develop safety awareness



PROPER DISPOSAL

Develop environmentally safe standards

CURRENTLY



CAPACITY CONSTRAINTS

- LABORATORY
- TECHNICAL EXPERTISE
- FINANCIAL



POTENTIAL

LAB EXPANSION

Technical Assistance

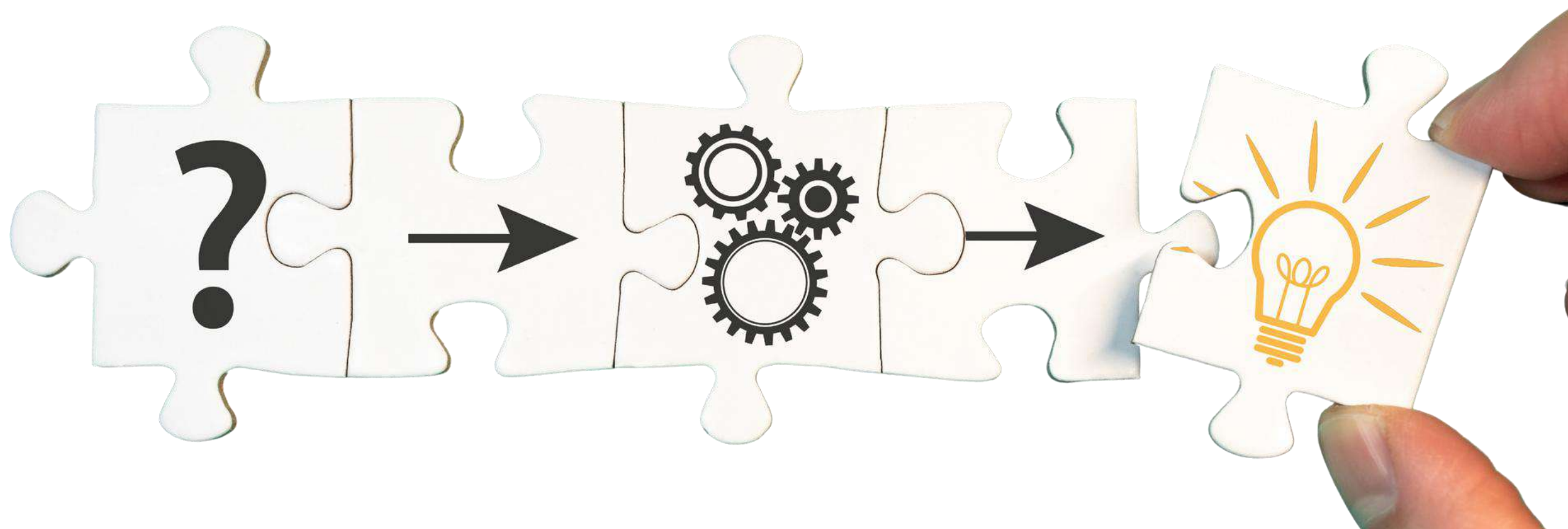
- Testing capacity
- Training and Development
- Strengthening infrastructure
- Data collection and analysis (across all media)

INTEGRATION

- Roll out monitoring/reporting imports of mercury added products (Part of a larger monitoring project - Chemical Import Data)
- 

PATH FORWARD

- Capacity building for environmental monitoring
- Resource mobilization to establish compliant disposal infrastructure
- Technical support in designing and operationalizing tracking systems
- Strengthen inter-agency coordination and stakeholder engagement



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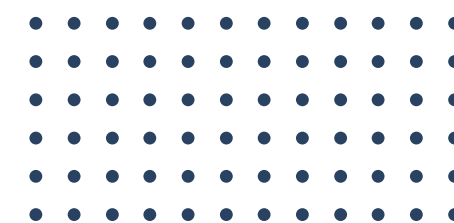


Address

EQPB @ BPW Building

P.O. Box 8086

Koror, PW 96940



EQPB, 2025



Sulang





GLOBAL
MERCURY
PARTNERSHIP



Project for
Promoting
Minamata
Convention
on Mercury



by making the most of Japan's
knowledge and experiences

National Training on Strengthening Country-Level Inter-Agency Coordination on Trade of Mercury



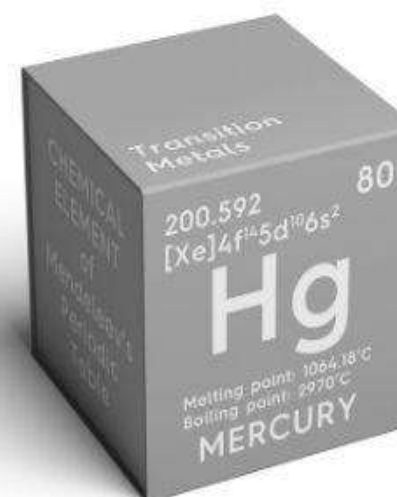
17 JULY 2025



8:30 AM - 5:00 PM



KOROR, PALAU





HOUSEKEEPING ANNOUNCEMENTS



LANGUAGE

This training program will be conducted in English



INTERNET

Please contact us if you need internet connection.

Username:

Password:

AGENDA



Please Scan the QR code for Training Agenda





RECORDING

This training program is being recorded for administrative purpose



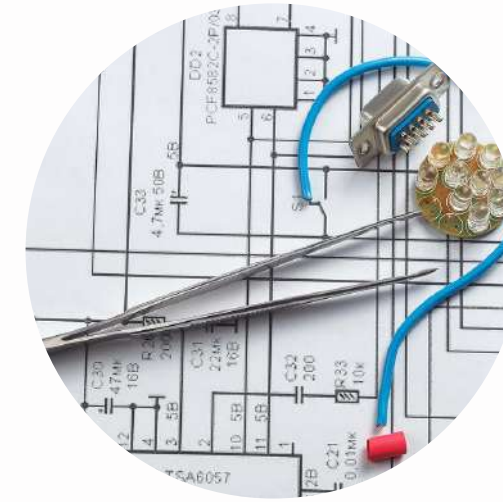
PHOTOS

Apart from dedicated time for group photo, photo will be taken during the session for reporting and documentation purpose.



QUESTION/DISCUSSION/SHARING

Please do not hesitate to ask questions and share your experience. We encourage you to actively participate



ANY ISSUES

If you have any issues please let us know



LUNCHBREAK

Lunch will be served at
12:30 - 13:30
Please return back on time



HEALTH BREAKS

There will be some health breaks
during the training. Refreshment
will be served outside this room.
Please return back on time



**Switch your phones
to silent mode or
vibrate to avoid
disruptions**



Ethical Participation

- Engage respectfully and professionally with all participants and presenters.
- Avoid offensive language or disrespectful comments.
- Acknowledge and respect the diverse perspectives and experiences of all participants.





**Group Photo
(After Opening
Remark)**

Participant

Self Introduction



WORK

ATMOSPHERIC SURVEY AND ANALYSIS (MANUAL ACTIVE SAMPLING METHOD)



SAMPLE COLLECTION



OUTLINES OF ATMOSPHERIC MERCURY SURVEY

Type of Atmospheric Mercury Survey

Categorized by the method of sample (air) collection

Automated active sampling

Manual active sampling

Passive sampling



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Outlines of
Atmospheric
Mercury Survey

Outline of Manual Active Sampling Method (Gold Amalgamation Trap)

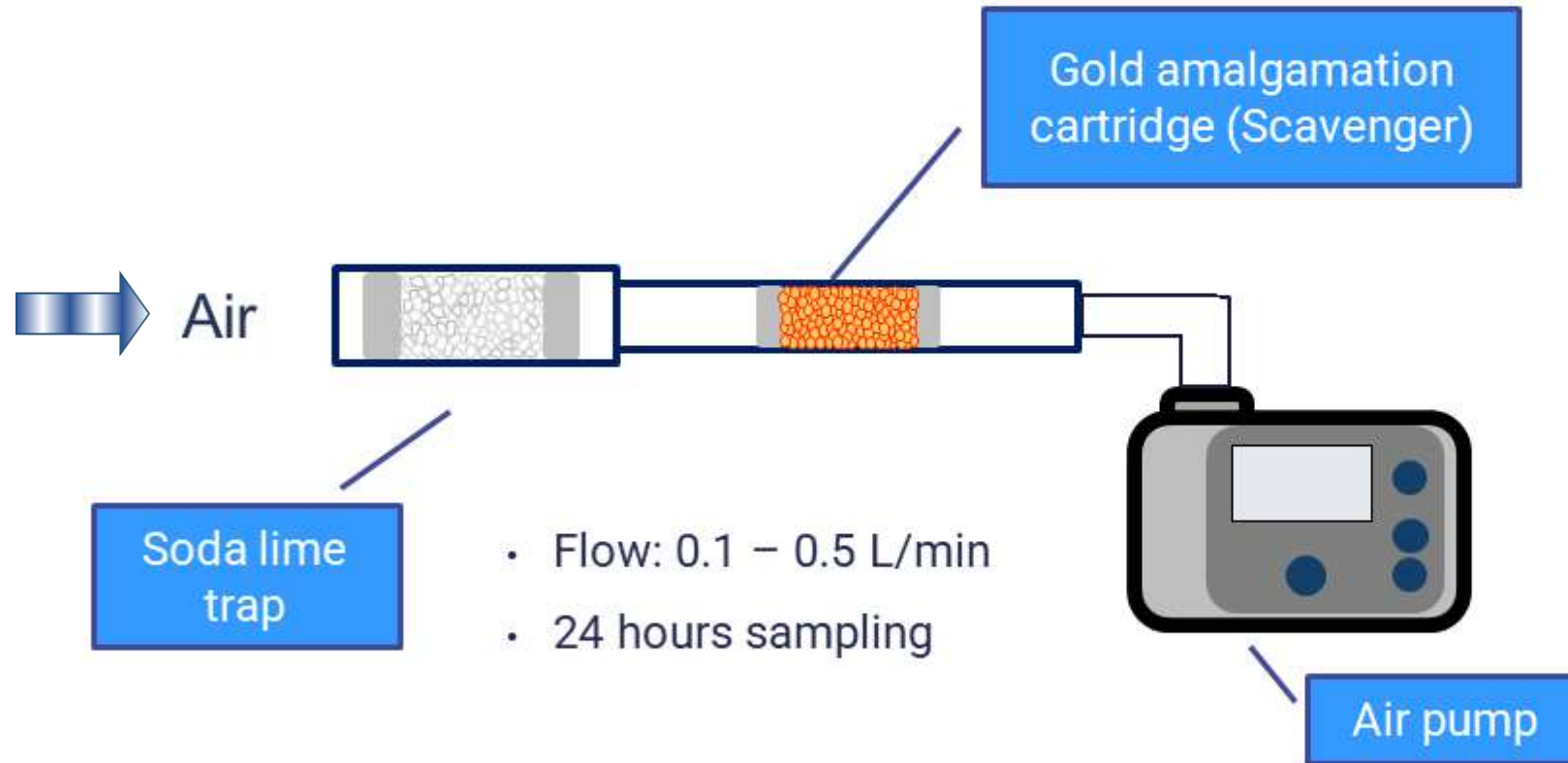


Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Outlines of
Atmospheric
Mercury Survey

Gold Amalgamation Trap Method



- ☐ Collected cartridge is easy to carry and store
- ☐ Reusable



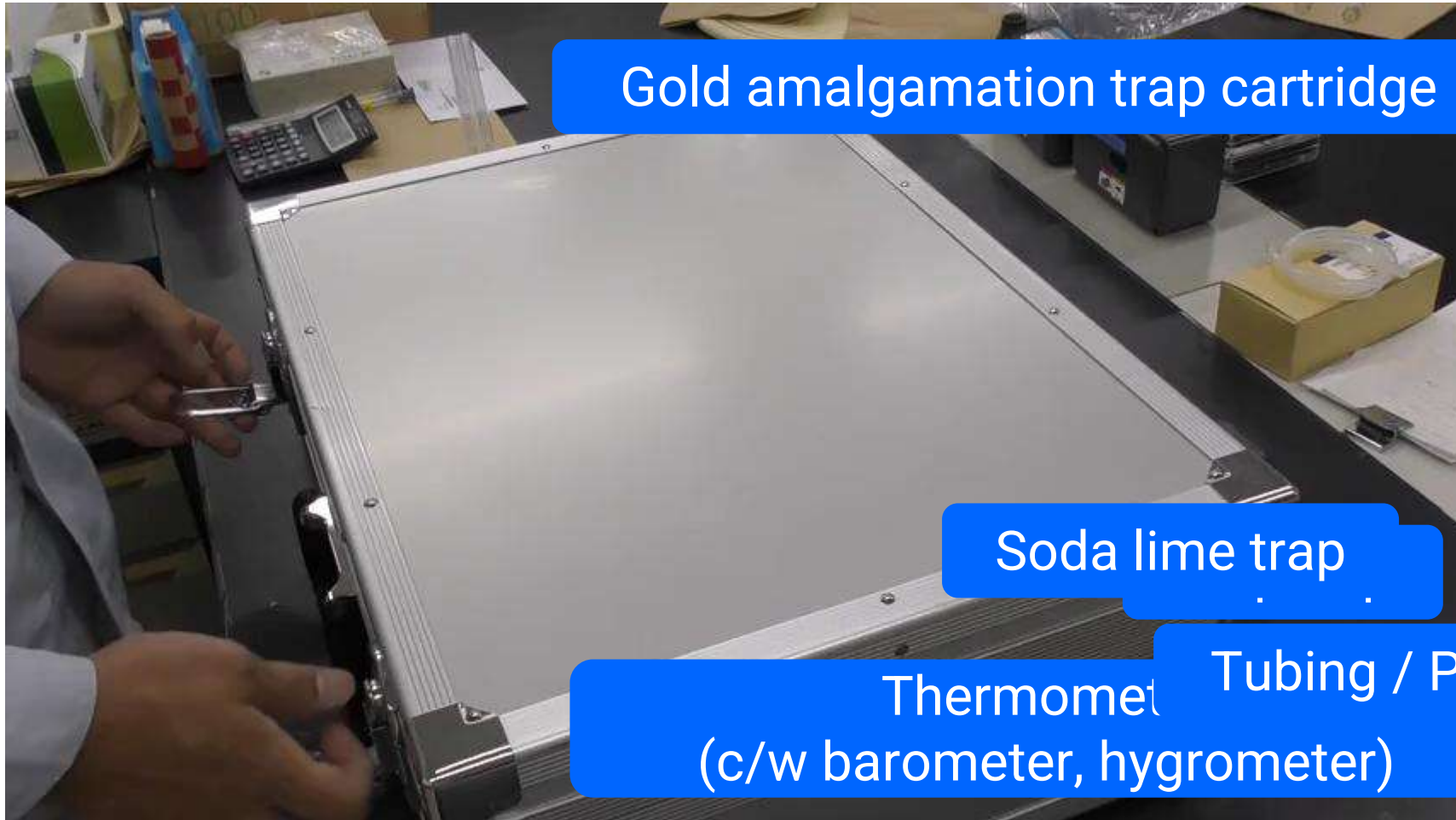
Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Outlines of
Atmospheric
Mercury Survey

SAMPLING EQUIPMENT AND ITS PREPARATION

Sampling Equipment

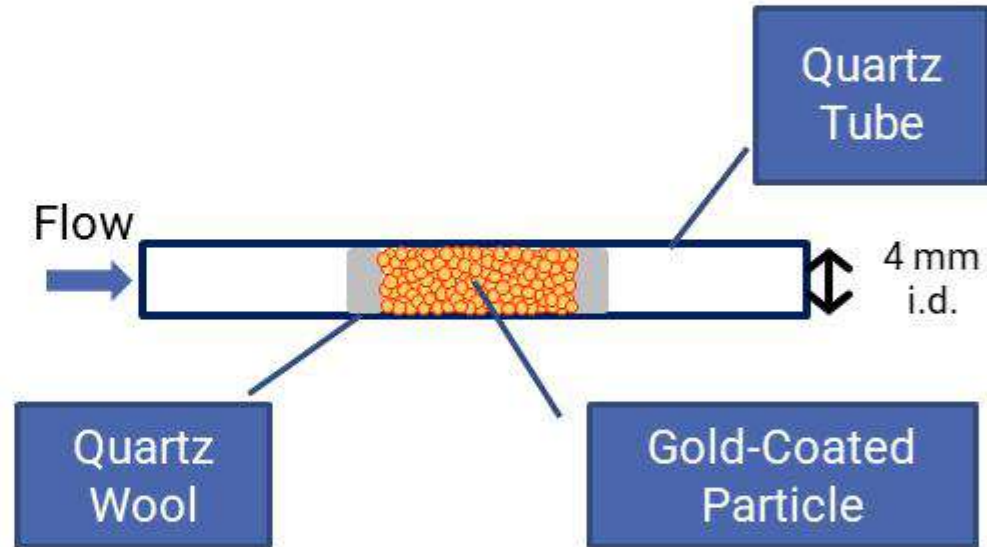
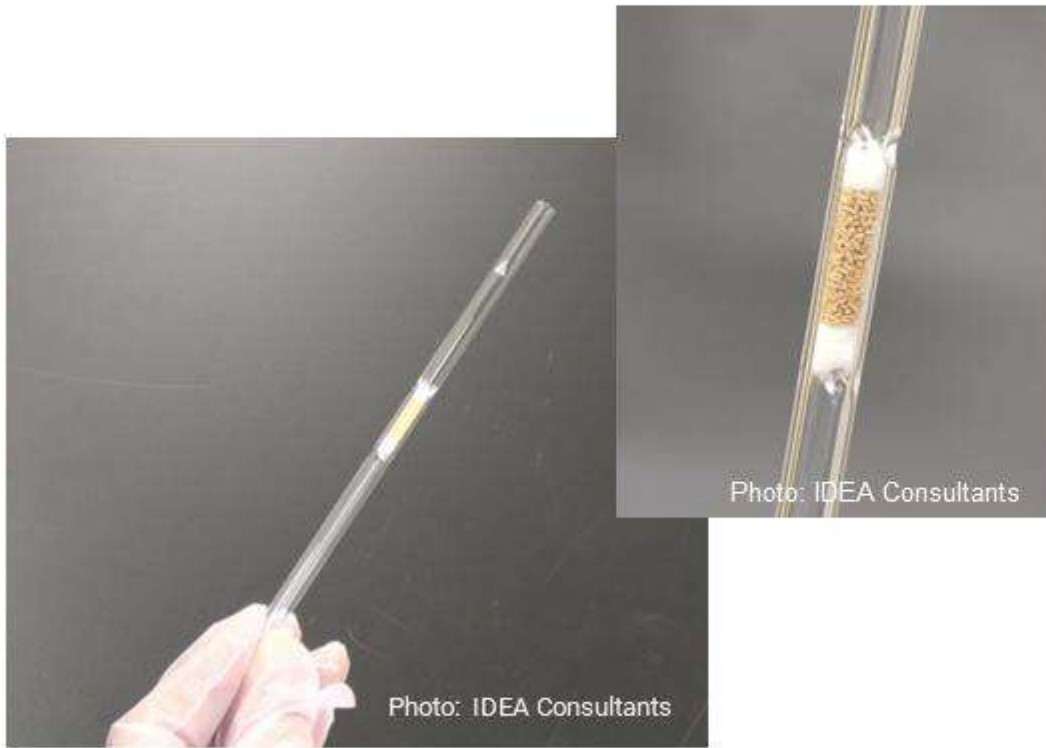


Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Sampling
Equipment and
its
Preparation

Gold Amalgamation Trap



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Sampling
Equipment and
its
Preparation

Gold Trap Cartridge Preparation



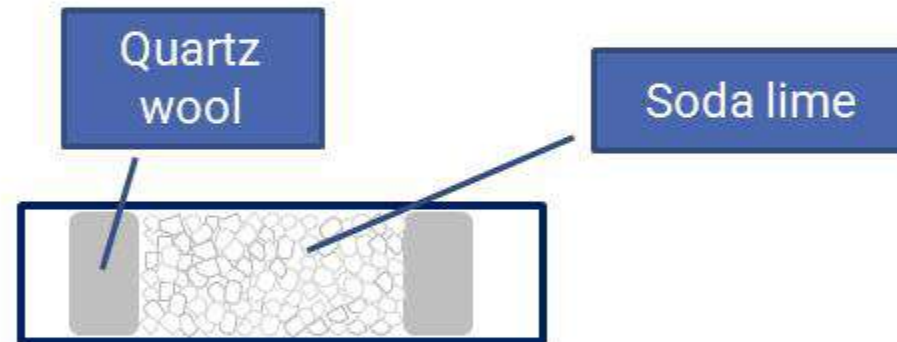
- ☐ Clean the cartridge by heating.
(It is convenient to measure by instrument.)
- ☐ Cleaned cartridge should be stored in sealed container.
- ☐ Periodical “Field Blank” test should be operated.

Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Sampling
Equipment and
its
Preparation

Soda lime Trap



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Sampling
Equipment and
its
Preparation

Soda lime Trap Preparation



New soda lime should be used for
each sample collection



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Sampling
Equipment and
its
Preparation

Air Pump



Photo: IDEA Consultants

- ☐ Flow: $\sim 0.5\text{L} / \text{min}$
- ☐ Flow integrator is also necessary.
(There are pumps which combine flow controller / integrator.)
- ☐ To convert the concentration into standard condition, Information of temperature and air pressure is also needed.



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Sampling
Equipment and
its
Preparation

Tubes



- ☐ Silicon rubber or other sort of plastic.
- ☐ No need to be made of glass/fluoropolymer.
- ☐ On sample collection, it should be confirmed that tubes are **clean** and **no leakage**.

Thermometer, Barometer etc.



Photo: IDEA Consultants

- ☐ Weather information is important (necessary) to assess the sampling situation.
- ☐ If there are weather monitoring station near the sampling site, that data can be used.



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Sampling
Equipment and
its
Preparation

ATMOSPHERIC SAMPLE COLLECTION

Sampling Location

- ☐ No mercury emission facility near the site
- ☐ No special (local) air flow pattern



Photo: IDEA Consultants



Preparation of sampling point



- ☐ If the ground is bare soil, or with a lot of dust, covering with a sheet is desirable.
- ☐ A shelter to protect the pump from rain and direct sunlight, is necessary (a small tent is sufficient. Or a container with a fan for heat removal may be used.)



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Atmospheric
Sample
Collection

Stand and Pipe for Gold Cartridge



- ☐ Gold cartridge should be set at 1.5m or more from the ground.
- ☐ Pipe to protect cartridge from the rain, dust, etc.



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Atmospheric
Sample
Collection

Tubing, Connection of Pump

❑ Check operation of the pump



Setting-up Gold Cartridge



- ☐ Wear groves
- ☐ Open the Field blank case
- ☐ Take the sample cartridge, check the direction, connect the soda lime trap
- ☐ Connect the cartridge and the tube
- ☐ Tilt the sampling pipe
- ☐ Cover the end of pipe with aluminum foil



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Atmospheric
Sample
Collection

Check Connection



- ☐ Correct cartridge direction?
- ☐ No damage on the tube?
- ☐ No air leak?



Start sampling



- ☐ Start the pump
- ☐ Check the flow condition
- ☐ After starting the pump, close the container of field blanks



Recording

☐ Write the note at the sampling point



Photo: IDEA Consultants

Field Note

Researcher	Keisuke Uchida							
Location	IDEA Consultants, Inc. Institute of Environmental Ecology St. 1							
Condition of Sampling start up	M/D/Y	10 / 11 / 2021	Weather	Cloudy	Temp. (°C)	18.5	Atmosphere (hpa)	1014.9
Condition of sampling end	M/D/Y	10 / 12 / 2021	Weather	Sunny	Air temp. (°C)	21.2	Atmosphere (hpa)	1012.5

Target: Mercury

Sampling No. or Name	ST. 1	ST. 1 Duplicate							
Pump No.	303	304							
Column No.	6	7							
Sodalime No.	1	2							
Column position info. (if necessary)	—								
No.	Date & Time	flow rate (L)	flow rate (L)	Instantaneous flow rate	Total Vol. (L)	Instantaneous flow rate	Total Vol. (L)	Instantaneous flow rate	Total Vol. (L)
0	(optional: default)	0.5	0.5						
1	10/11 11:20	0.5	0	0.5	0				
2	12:20	0.5	60.1	0.5	60.1				
3	16:20	0.5	150.1	0.5	150.2				
4	10/12 9:20	0.5	660.2	0.5	660.3				
5									
6									
7									
8									
9									
10	11:20	—	720.0	—	720.1				
Total sampling Vol. (L)		720.0	720.1						
Column No. of Travel Blank	Special instruction:								
8, 9, 10									

Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Atmospheric
Sample
Collection

Site Inspection during Sampling

- ❑ For early detection of any error of the survey, revisit and inspect the survey site during the sampling

Field Note

Researcher	Keisuke Uchida							
Location	IDEA Consultants, Inc. Institute of Environmental Ecology ST-1							
Condition of Sampling start up	M/D/Y	10/11/2021	Weather	Cloudy	Air temp. (°C)	18.5	Atmosphere (hpa)	1014.9
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Target: Mercury

Sampling No. or Name	ST-1	ST-1 Duplicate				
Pump No.	303	304				
Column No.	6	7				
Sodalime No.	1	2				
Column position info. (if necessary)	—	—				

No.	Date & Time	Atmospheric flow rate (L)	Total Vol. (L)	Atmospheric flow rate (L)	Total Vol. (L)	Atmospheric flow rate (L)	Total Vol. (L)	Atmospheric flow rate (L)	Total Vol. (L)	Atmospheric flow rate (L)	Total Vol. (L)	Atmospheric flow rate (L)	Total Vol. (L)
0	(preliminary - default)	0.5	—	0.5	—								
1	10/11 11:20	0.5	0	0.5	0								
2	12:20	0.5	60.1	0.5	60.1								
3	16:20	0.5	150.1	0.5	150.2								
4	10/12 9:20	0.5	660.2	0.5	660.3								
5													
6													
7													
8													
9													
10	11:20	—	720.0	—	720.1								
Total sampling Vol. (L)		720.0		720.1									
Column No. of Travel Blank		Special instruction:											
8, 9, 10													

Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Atmospheric
Sample
Collection

End of Sampling, Cartridge Collection



After sampling time
(24 hours)

- ☐ Turn off the pump
- ☐ Record sampling volume
- ☐ Open the field blank case
- ☐ Take collected cartridge and put it in the case
- ☐ Close the field blank case

Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Atmospheric
Sample
Collection

Duplicate Sampling



- ☐ To confirm the stability (precision) of the survey, 1 pair of duplicate sampling on 10 samplings is recommended.
- ☐ Deploy 2 (or more) cartridges side by side.

Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Atmospheric
Sample
Collection

ATMOSPHERIC SURVEYS IN SPECIAL SITUATION

Needs of Atmospheric Mercury Survey / Monitoring

- ❑ Atmospheric mercury survey / monitoring is also required other than general environment.
- ❑ For example:
 - In / near the **mercury using or emitting facility**.
 - **Work environment** using mercury.
 - **Waste dumping site**.
 - **Accidental situation** (e.g., mercury is spilled out).

In such situation, there may be especially high concentration of mercury.



Photo: MOEJ

Application of Manual Active Sampling Method

Owing to its **mobility**, manual active sampling is applicable (and useful) for the survey / monitoring of special situation / sites.



Photo: IDEA Consultants

- ☐ Easy to carry sampling equipment
- ☐ Quick to set-up
- ☐ Require small space

However, following should be noted:

- High mercury concentration
- Interfering substances



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Atmospheric
Surveys in
Special Situation

High Concentration of Mercury (1/2)

- ❑ In some cases, such as work environment using mercury or accidental spill-out field, atmospheric mercury concentration may be **especially higher than general environment** (it is sometimes thousands of times higher).
- ❑ Mercury amount of these samples sometimes **exceeds the range of calibration curve**, or measurement range of the instrument.



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Atmospheric
Surveys in
Special Situation

High Concentration of Mercury (2/2)

- ❑ Check the **upper limit of measurement** of the instrument
- ❑ If a very high concentration is expected:
 - **Reduce the sample flow rate** (minimum: 0.1 L/min).
 - Make **sampling time shorter**.
 - (On measurement) analyse **higher concentration of standard**.
- ❑ If the level of mercury concentration is unpredictable, it is effective to **collect multiple samples with different sampling volumes**.

Keep in mind collected atmospheric mercury sample cannot be “diluted” on measurement.



Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Atmospheric
Surveys in
Special Situation

Interfering Substances for Mercury Measurement

❑ Restricting the capture of mercury, and causing damage the gold cartridge

- Aerosol

❑ Interfering the CVAAS measurement

- Halogenate gas

- Nitrogen Oxide (NO_x)

- Sulphur Oxide (SO_x)

- Organic compound gas

- (High moisture)

- (Ozone)



High amount of aerosol causes damage to gold cartridge and decreases its recovery rate of mercury.



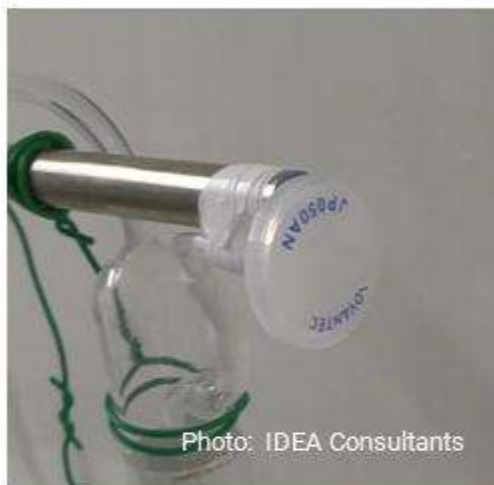
Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

Atmospheric
Surveys in
Special Situation

Countermeasure for Interfering Substances

❑ Particle filter



❑ Gas scrubber (in front of the soda lime trap)



❑ Larger soda-lime trap



If electricity is available, heating the gold cartridge (around 100-150 °C) is effective.

Atmospheric
Survey and
Analysis (Manual
Active Sampling
Method)

Sample
Collection

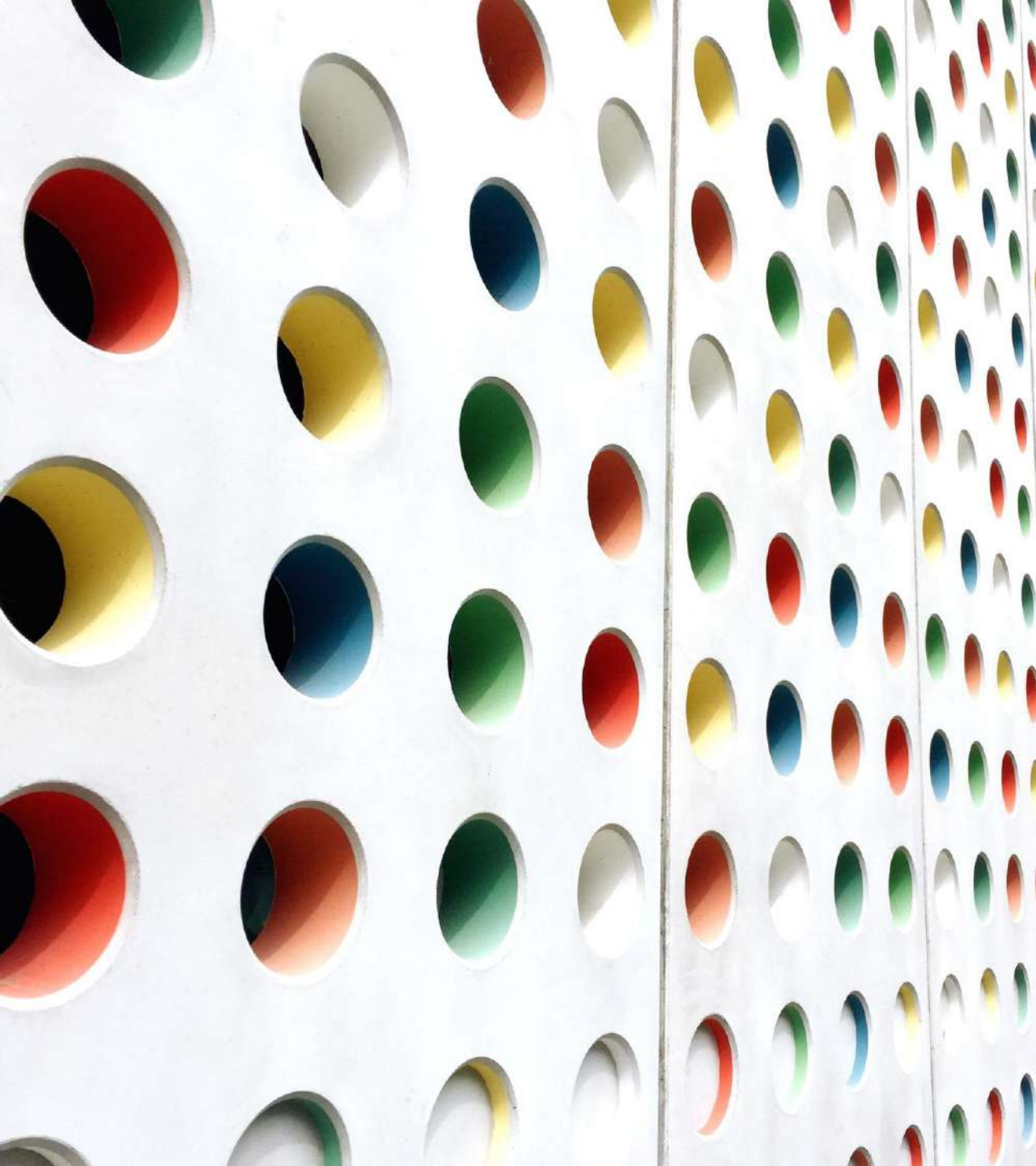
Atmospheric
Surveys in
Special Situation



MEASUREMENT, DATA PROCESSING AND QA/QC



- ❑ Measurement of gold amalgamation cartridge
- ❑ CVAAS measurement
- ❑ Data processing and QA/QC
- ❑ Maintenance and calibration



National Solid Waste Management

JESSICA EMESIOCHEL

Hazardous Waste



HANDLE



STORAGE



DISPOSE

Hazardous Waste Accepted at the Landfill



Medical Waste

- Buried or incinerated based on MOH decision



Hazardous Waste Accepted at the Landfill

💡 Mercury-Containing Materials (e.g., Fluorescent Lights)

- Crushed and mixed with general waste



Hazardous Waste Accepted at the Landfill

Used Cooking Oil

- Mixed with general waste while KSG program is under trial



Hazardous Waste Accepted at the Landfill



Batteries

- **Vehicle Batteries:** Sent off-island via EQPB program
- **Other Batteries:** Stored



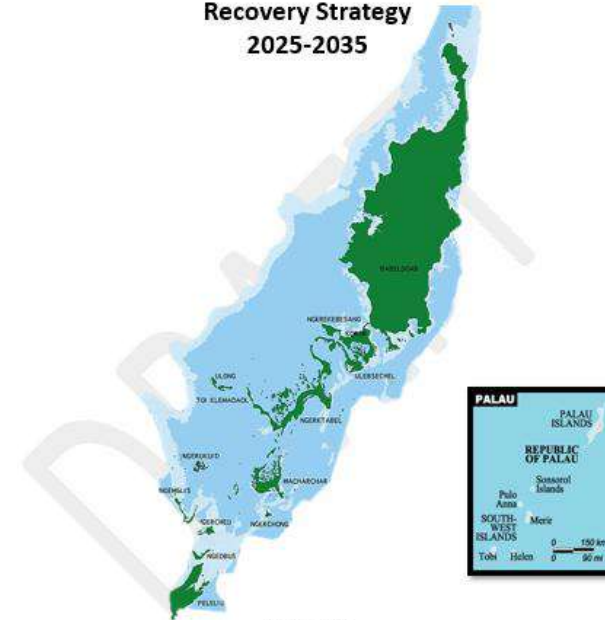
Hazardous Waste Accepted at the Landfill

End-of-Life Vehicles

- Oils contained per EQPB rules; sent to PPUC power plant



Future Plans



January 2025