

2019

**Development of Minamata Initial Assessment in the
Caribbean – Belize
National Project Initiation/Inception Workshop Report**



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Development of Minamata Initial Assessment in the Caribbean – Belize:

National Project Initiation/Inception Workshop Report

SUBMITTED TO:

Basel Convention Regional Centre - Caribbean

SUBMITTED BY:

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Biodiversity Research Institute (BRI) is a 501(c)3 non-profit organization located in Portland, Maine, United States of America. Founded in 1998, BRI is dedicated toward supporting global health through collaborative ecological research, assessment of ecosystem health, improving environmental awareness, and informing science-based decision making.

Summary

The Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC-Caribbean), in collaboration with the United Nations Environment (UN Environment) and the government of Belize through the Department of Environment under the Ministry of Agriculture, Fisheries, Forestry, the Environment and Sustainable Development, are part of a regional Minamata Initial Assessment (MIA) project. The MIA project has the goal of assisting the participating country with the process of ratifying and implementing the Minamata Convention on Mercury. The MIA activities will help to strengthen national capacity and identify the primary sectors responsible for mercury emissions and releases in each of these countries.

This report covers the MIA activities related to Belize conducted from 22 through 25 January 2019 for the project: Development of Minamata Initial Assessment in the Caribbean – Belize. The National Project Initiation Workshop Report is covered within this document.

The National Project Initiation/Inception Workshop for the MIA project was conducted on 23 January 2019. During the workshop, BCRC-Caribbean (Tahlia Ali Shah and Stefan Ghany) provided presentations on the overall goals of the MIA project. In addition, the Belize National Project Coordinator (NPC – Marco Manzanilla) provided an overview of the MIA process and linkages with the different Ministries and stakeholders, and the Legal Consultant (Judy Daniel of Environmental Advisors Inc.) provided a description of the national regulatory framework needed for ratification. BRI (Project Lead: David Evers) presented three different presentations on context about mercury, next steps for mercury projects, and communications (on behalf of BRI Communications Expert, Molly Taylor). The workshop concluded with closing remarks given by Tahlia Ali Shah and a Question and Answer session.

For the period of 24 and 25 January, site visits were conducted to potential sources of mercury in Belize, including a crematorium, the Mile 24 landfill, and a medical incinerator. In the interest of developing new mercury data from various matrices, a visit was conducted to one of the fish markets in Belize City (where an early fish sampling design was suggested), air samplers were placed at two sites (at the Mile 24 Landfill and a remote site at the Tropical Education Center) with a third site proposed (at the medical incinerator facility) and sampling was conducted at the Tropical Education Center in coordinator with staff from Runaway Creek Nature Reserve to sample birds for their mercury concentrations.

National Project Initiation Workshop and Inception Report

Day One (22 January 2019) was used as a coordination meeting with the BCRC staff.

Day Two (23 January 2019) served as the Inception and Inventory Workshop for the MIA project (Agenda attached as Appendix 1). During the workshop, opening remarks were made by Mr. Edgar Ek, Deputy Chief Environmental Officer of the Department of Environment, Ministry of Agriculture, Fisheries, Forestry, the Environment and Sustainable Development. Representatives from BCRC-Caribbean (Tahlia Ali Shah, Project Execution Officer, and Stefan Ghany, Associate Professional) provided presentations on the overall goals of the MIA project as well as specific obligations related to the Minamata Convention on Mercury. In addition, the Belize National Project Coordinator (NPC – Marco Manzanilla) and the Legal Consultant (Judy Daniel of Environmental Advisors Inc.) provided informative presentations on preliminary assessments and the related legislative and institutional capacity. BRI (David Evers) presented three times (see Appendix III):

1. “Mercury and the Minamata Convention”
2. “Contaminated Site identification, hotspot mapping, and Mercury monitoring Activities: global linkages for Belize”
3. “Cosmetics and Communications” (on behalf of BRI Communications Expert, Molly Taylor, who was unable to attend because of an illness).

The first presentation provided background information about mercury sources, how it is methylated in the environment, and the relationship of the mercury inventory and environmental sampling with meeting the needs and obligations of the Minamata Convention. For the second presentation the major topics that were discussed included: a) fish sampling purposes and strategies, b) a discussion of contaminated sites and hotspot mapping, c) an overview of air and bird mercury monitoring, d) and a discussion of human hair sampling to monitor mercury exposure. Linkages with collecting such mercury data and future interests by the Minamata Convention and some of its committees, such as the Effectiveness Evaluation ad hoc Group were made. The third presentation covered background information about mercury in skin-lightening creams and ways to communicate findings from the project among Ministries, the general public and media.

Day Three (24 January 2019) was used for visits of a crematorium, incinerator and recycling center, fish market, and the largest landfill in Belize. These visits were made to better understand the locations of potential Hg contamination, to begin formulating priorities for the Hg inventory, to determine priority locations for air Hg monitoring, and to better develop a sampling design for fish samples that are of concern to human health and the environment.

Day Four (25 January 2019) was used for a site visit to Runaway Creek Nature Reserve / Tropical Education Center and for discussing the potential sampling of birds for mercury analysis. Some

feather samples were collected by BRI in collaboration with the Tropical Education Center personnel.

1. Objective of Meeting and Key Outcomes

The objectives of the four day visit to Belize were to: (1) meet with the Lead Department for Belize (Department of Environment under the Ministry of Agriculture, Fisheries, Forestry, the Environment and Sustainable Development) and conduct a country-specific Inception Workshop for the Minamata Initial Assessment, (2) view existing potentially contaminated sites to assist in the development of mercury hotspot mapping, (3) generate a fish sampling design, and (4) discuss other relevant sampling interests (e.g., air, birds and cosmetics). Key national stakeholders attended the workshop (Appendix II); following the workshop a National Working Group will be formed to oversee the national project activities.

Key outcomes of these objectives are:

1. A line of communication between BRI and the NPC (Marco Manzanilla) and legal consultant (Judy Daniel) was established. The Department of Environment and national stakeholders are now engaged. Stakeholders have been notified of the activities, a timeline and general workplan for collecting data and generating a MIA report;
2. Existing potentially contaminated sites have been visited and a plan for hotspot mapping has commenced;
3. The process for developing a fish sampling design has commenced but requires further consultation with Marco Manzanilla and key staff within the Department of Environment and fisheries personnel;
4. Air mercury sampling stations using passive air samplers (PAS) have been established (two stations now have PASs – the landfill and the remote site at the Tropical Education Center); the third station will be at the incinerator site where PASs will be placed by Marco Manzanilla once we receive approval);

For the following three sampling efforts, BRI and BCRC will work closely with relevant Ministries to determine if, when and how these sampling efforts will happen.

5. The bird mercury sampling location will be at Runaway Creek Nature Reserve / Tropical Education Center and will be operated by Birds Without Borders in association with BRI. This partnership builds from collaborative efforts over the past 10 years. Sampling for blood and feathers began while on site and will continue over the next few months;
6. Human exposure sampling for mercury (using hair samples) will be conducted on several communities with around 10-15 samples taken per community. The selection

of communities will be the decision of the Public Health Department and will happen after an IRB is in place for Belize.

7. Cosmetic sampling will occur within Belize City and will include 10 skin-lightening cream samples that do not originate in the U.S. or Europe, with a preference from Jamaica, Dominican Republic, Bangladesh, or Africa.

2. Site Visits Summary

Visits on 24 January, 2019 were facilitated by Marco Manzanilla (the NPC) and included:

- a. Coye's Funeral Home and Crematorium, 5 ½ Miles, Old Belize Road, Belize City – Mr Coye Jr. facilitated the site visit and demonstrated the new furnace that has been in use for three (3) years. (manufactured in the United States). Mercury from the dental amalgams of people is likely released through the vents of the furnace (although this should be confirmed based on further discussions). Based on discussions with Mr. Coye, Jr. most individuals cremated are of East Asian descent and the number is recorded. This may assist in providing more insight into the amount of mercury released from this sector and can be noted in the NMP.
- b. Waste Incinerator- Belize Waste Control Limited is located at 2 ½ Mile George Price Highway, Belize City. The waste incinerator is a new system and is mainly used to incinerate medical waste and confidential paperwork. There is interest and a possibility of establishing Passive Air Samplers at this station.
- c. The Belize Regional Landfill is located at Mile 24 George Price Highway, Belize District- met with landfill manager. This landfill is a new system, is well engineered, has long-term capacity (e.g., decades), and likely has little impact on the neighboring ecosystem through emissions or releases of Hg from the waste.

3. Fish Sampling Meeting Summary

Visits were conducted to the main fish market in Belize City-Conch Shell Bay Fish Market. A general fish sampling design was generated from the information gathered at the fish market and includes tentatively ten (10) individual samples from barracuda, snapper and kingfish (as discussed on site). A protocol with sampling supplies will be provided to the NPC by BRI and samples will be analyzed at the BRI lab using a Direct Mercury Analyzer (Figure 1). Further sampling designs are needed for freshwater fish and the current sampling plan is for ten (10) bay snook from four (4) rivers: Macal, Mopan, Belize and New. Coordination and approvals from the DOE and relevant fisheries personnel will be led by Marco Manzanilla. The results of any fish analysis conducted under the project will not be made public without the express permission of the DOE and key stakeholders.

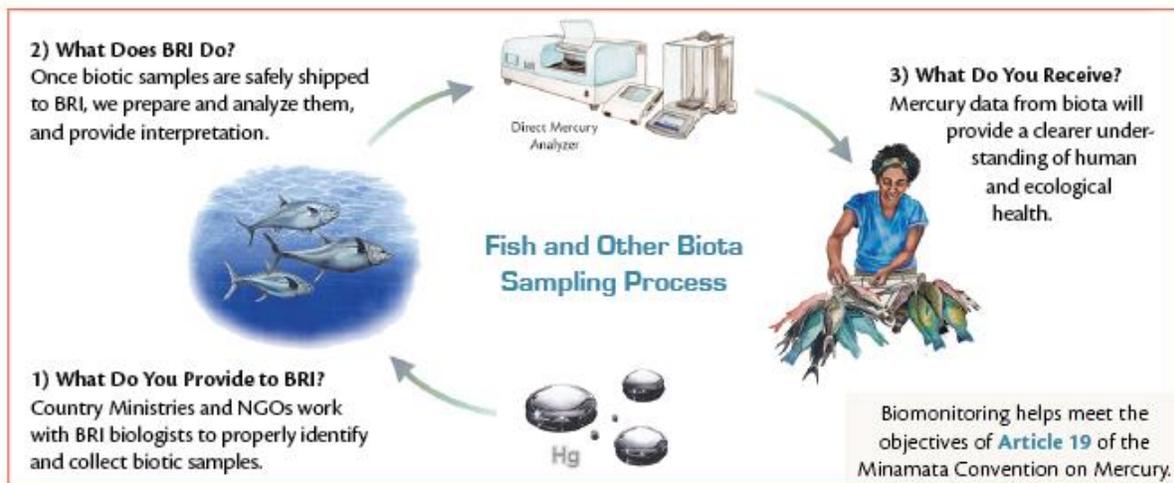


Figure 1. Steps for fish sampling, analyses and interpretation.

4. Air Mercury Sampling Summary

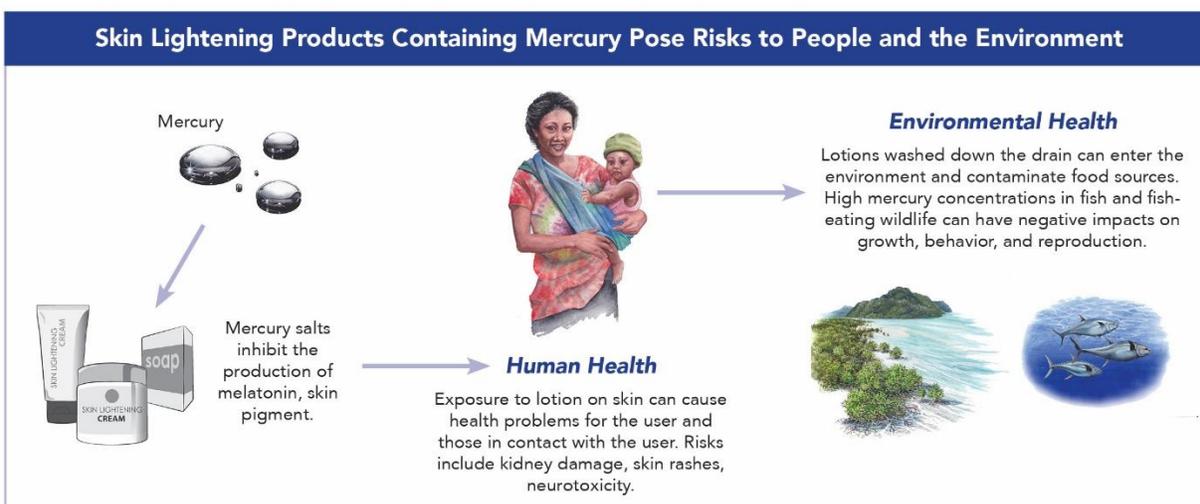
BRI is collaborating with Environment Canada to include the Caribbean Region in their efforts to measure and model air Hg deposition in the Western Hemisphere using Passive Air Samplers (PAS) (Figure 2). PASs provide an opportunity to improve the spatial range and resolution of gaseous mercury (Hg) measurements. This sampler design uses a sulfur-impregnated activated carbon sorbent, a Radiello diffusive barrier, and a protective shield for outdoor deployments. PASs were placed at two sites and include 4 PAS at each (Hg sample, a duplicate, Hg isotopes, and a blank). PASs are generally placed approximately 10 feet above ground on a pole. The two sites include the Belize landfill (at the headquarters building) and at the Tropical Education Center (on the building where the Runaway Creek Nature Reserve staff stay). A third site will have PAS placed at it, once approval is made (at the medical incinerator facility). The samplers will be removed, sealed and shipped after either 3, 6 or 12 months, which depends on a design strategy that still needs to be determined with the lab at Harvard University. All mercury data will be shared among the government of Belize, BRI, and Harvard University.



5. Figure 2. Passive air sampler. **Cosmetic Sampling Summary**

Mercury and its compounds are toxic to all living systems. Mercury is often used in skin lightening and other cosmetics. These products are widely available in less developed countries where they can be easily transported and sold illegally. Mercury in cosmetics is used in the form of mercurous chloride and can be hidden in the ingredient list as calomel or omitted completely. This compound readily decomposes into metallic mercury and highly toxic mercuric chloride on exposure to sunlight. Many countries are not required to list the ingredients contained within cosmetic products.

Mercury is one of the ingredients used in skin lightening or anti-aging soaps and creams because mercury salts inhibit the formation of melanin, the pigment that gives human skin a dark colour (Figure 3). Skin lightening products are used throughout the world among dark-skinned populations (for many cultural reasons, including but not limited to, improving social status), but they are also marketed as treatments to remove age spots and freckles.



The Minamata Convention on Mercury requires that cosmetics with mercury content above 1 ppm, including skin lightening soaps and creams, be banned after 2020 (including manufacture, import or export).

Figure 3. Cosmetic potential impacts to human health and the environment.

Article 4 of the Minamata Convention on Mercury addresses mercury in cosmetics, among other products, and requires parties to cease production, import and export of such products with concentrations exceeding 1 ppm by 2020. While the use and importance of skin-lightening creams and other cosmetics that may be of interest for meeting the obligations of the Minamata Convention, there is interest to measure mercury in 10 cosmetics to be sampled from stores in Belize City and elsewhere. Cosmetics are likely clean from the U.S. and European countries, so there is an interest to measure cosmetics that are made outside of these countries. Cosmetics with

mercury concentrations above 1 ppm from the Caribbean are known from Jamaica and Dominican Republic. The NPC will work closely with BRI on the selection of cosmetics for testing in Belize.

6. Bird Sampling Summary

Article 19 of the Minamata Convention on Mercury allows for the monitoring of mercury in biota using birds. Birds are good bioindicators of methylmercury that is available through dietary uptake in aquatic and terrestrial ecosystems. In Belize, there is great interest in bird conservation as well as for ecotourism purposes, so understanding the health of bird populations and identifying biological mercury hotspots in ecosystems where fish are not as available is useful. The Runaway Creek Nature Reserve (RCNR), in partnership with the Tropical Education Center, has been collecting mercury concentrations in bird blood and feathers with BRI for many years. Blood Hg concentrations provides information on methylmercury uptake in the diet over the past week, while feather Hg concentrations provide more of a longer-term view. RCNR staff have agreed to continue sampling and a demonstration of the capture and sampling of birds happened on 25 January (with Marco Manzanilla attending). With Ministry approval, the plan is to engage RCNR staff over the next few months to have them capture and sample birds (with assistance by Marco Manzanilla).

7. Conclusions

The four-day trip was successful in meeting the main objectives. The key stakeholders, ministries and NPC are all engaged and appear to be attentive to the needs of the MIA and the add-on sampling components.

8. Recommendations

It is recommended that regular connections with the NPC and key stakeholders are made to maintain the momentum of the project from the workshop and site visits. It is anticipated that the Hg inventory will proceed now and take 4 months.

9. Action Items

BRI will work with the NPC and key stakeholders in the next quarter to generate (1) an inventory of Hg data, (2) hotspot maps using contaminated sites and key GIS landscape layers, (3) fish and bird Hg concentrations and a report interpreting those data, (4) develop the IRB needs for human Hg exposure sampling using hair and (5) cosmetic sampling, Hg analyses and an interpretation report. The timing, location and collaborators for the mercury monitoring efforts are summarized in Table 1. BRI will continue to have an open dialogue with the NPA to check on the toolkit data input. BRI will provide quarterly reports to BCRC as identified in the Belize Workplan.

Table 1. Mercury monitoring and other efforts summary for Belize – approaches identified to date.

Matrix / Action	Location (known or proposed) and number of samples	Actions to date or next steps	Key coordinator(s)	Comments
NPC Engagement	Country wide	Training and monitoring of Hg toolkit development	Marco Manzanilla working with stakeholders and BRI (if there are questions)	Status reports should be submitted to BCRC
Hotspot Mapping	Country wide	Require GIS habitat layers and contaminated site locations	Marco Manzanilla working with the DOE	The model used for other countries will be used here. Need GIS layers from DOE
Air	1.Tropical Education Center (remote site) 2.Landfill at Mile- 24 3.Medical incinerator	Passive air samplers are in place and will be on site for 3 months (or more – need to determine this)	Harvard University (analytical lab) and University of Toronto (lead collaborator)	The time stamp is still being determined as of discussions on 31 January 2019
Fish	Marine (3 target species, including barracuda, snapper and kingfish) and Freshwater (4 rivers)	Need to work with DOE to develop sampling strategy	DOE and Marco Manzanilla	The fish sampling design should be determined through a conference call
Birds	2 sites at Runaway Creek Nature Reserve (RCNR)	Need 100 samples of key bird species	Runaway Creek Nature Reserve (RCNR)/Birds Without Borders	Approved by RCNR and should happen between February-April 2019.
Human Exposure	7 communities of 10 samples each is proposed	Need to apply for hair sampling through the Ethics Committee, suing Evers IRB	Belize Public Health	A follow up call is needed with Public Health
Cosmetics	Belize City (10 samples)	Need to identify 10 skin-lightening creams that do not originate from U.S. or the EU	Belize Public Health	Should happen in Feb or Mar

Appendix I. Agenda for inception meeting and inventory workshop for the Belize MIA.



Minamata Initial Assessment in the Caribbean- Belize

National Project Inception Workshop

DATE: January 23rd, 2019

**LOCATION: Best Western Plus Belize Biltmore Plaza,
3 Miles Northern Highway, Belize City**

PROVISIONAL AGENDA		
9:30 AM	REGISTRATION	
10:00 AM	Opening Remarks	<p>Edgar Ek- Deputy Chief Environmental Officer, DOE</p> <p>Jewel Batchasingh – Director (Ag.), BCRC-Caribbean <i>[via Skype]</i></p> <p>Giovanna Moire- Programme Officer, UN Environment <i>[via Skype]</i></p>
10:30 AM	Introduction of Participants <i>Group Photo</i>	
10:50 AM	<i>Coffee Break</i>	
11:00 AM	Background to the Minamata Convention on Mercury	Tahlia Ali Shah - Project Execution Officer, BCRC-Caribbean
11:20 AM	Overview of the Minamata Initial Assessment Project	Stefan Ghany - Research Assistant, BCRC-Caribbean
11:45 AM	Overview of the Legal and Institutional Capacity Component	Judy Daniel – Environmental Advisors Inc. - Legal Consultant
12:30 PM	<i>Lunch</i>	
1:30 PM	National Potential Sources of Mercury, Key Stakeholders, and Strategies for Outreach and Awareness-Raising	Marco Manzanilla - National Project Coordinator
2:00 PM	Overview of UNEP’s Mercury Inventory Toolkit and Mercury Sources	David Evers - BRI

2:30 PM	Group Exercise to Identify Existing Sources and Data Collection Methods	Participants
3:20 PM	<i>Coffee Break</i>	
3:30 PM	Contaminated Site identification, hotspot mapping, and Mercury monitoring Activities	David Evers- BRI
4:00 PM	Communication Best Practices and Reporting Guidelines	Molly Taylor - Communications Director, BRI
4:20 PM	Closing Remarks	DOE BCRC-Caribbean
4:30 PM	END	

Appendix II. Attendees of the MIA workshop in Belize on 23 January 2019.

N o.	GENDER_1	FIRST NAME	LAST NAME	MINISTRY/ ORGANIZATION	POSITION	GEN DER	CONTACT NUMBR	EMAIL
1	Mr.	Dieudonne	Sah	Loma Luz Hospital	RN	M	622-5433	sahtiemula@hotmail.com
2	Mr.	Marvin	Camal	Loma Luz Hospital	Medical Director	M	631-0021	m.e.camal@hotmail.com
3	Mr.	Jorge	Franco	Department of the Environment	Environmental Officer	M	610-4389	francoia@gobmail.gov.bz
4	Ms.	Karen	Link	University of Belize	FST Lecturer	F	600-1861	klink@ub.edu.bz
5	Mr.	Thippi	Thiagarajan	University of Belize	Professor of Biology	M	605-1146	tthiagarajan@ub.edu.bz
6	Ms.	Judy	Daniel	Legal Consultant		F	678-230-4674	judidani14@aol.com
7	Mr.	David	Evers	Biodiversity Research Institute	Scientist	M	207-653-7378	david.evers@briloon.org
8	Mr.	Isani	Chan	Department of the Environment	Consultant	M	635-4904	isanichan@gmail.com
9	Mr.	Leonides	Sosa	Department of the Environment	Environmental Officer	M	822-2819	sosalb@gobmail.gov.bz
10	Ms.	Shanee	Gillet	Department of the Environment	Environmental Technician	F	828-4855	outreach@environment.gov.bz
11	Mr.	Noel	Castellanos	Belize Water Services Limited	Lab Analyst II	M	602-6854	ncastellanos@bwsli.com.bz
12	Mr.	Edgar	Ek	Department of the Environment	Deputy Chief Environmental Officer	M	828-4842	deputy@environment.gov.bz
13	Mr.	Stefan	Ghany	BCRC-Caribbean	Associate Professional	M		stefan.ghany@bccr-caribbean.org
14	Ms.	Tahlia	Ali Shah	BCRC-Caribbean	Project Execution Officer	F		tahlia.alishah@bccr-caribbean.org
15	Ms.	Analissa	Rasheed	BCRC-Caribbean	Project Execution Officer	F		analissa.rasheed@bccr-caribbean.org
16	Mr.	Marco	Manzailla	Department of the Environment	National Project Coordinator-Inventory	M	608-2978	projects@environment.gov.bz
17	Mr.	John	Bodden	Ministry of Health	Principal Public Health Inspector	M	614-4549	jbodden@health.gov.bz
18	Ms.	Elizabeth	Harvey	Belize Natural Energy	Lab Manager	F	607-8814	eharvey@bne.bz
19	Mr.	Albert	Roches	Belize Natural Energy	Environmental Officer	M	650-5754	aroches@bne.bz
20	Mr.	Aldo	Cansino	Department of the Environment	Environmental Officer	M	828-4845	eiainit@environment.gov.bz
21	Mr.	Wilbert	Estrada	B&B Beverages	Water-Waste/Water Supervisor	M	620-5403	westrada@bowen.bz
22	Ms.	Dalila	Ical	Love News	Reporter	F	607-4605	lovetelevison@gmail.com
23	Ms.	Jem	Smith	Guardian Newspaper	Reporter	F	614-8152	jemsandi659@gmail.com
24	Mr.	Jesus	Yam	Labour Department	Senior Labour Officer	M	610-6487	jesus.yam@labour.gov.bz
25	Mr.	Aldo	Manzanero	Ministry of Investment, Trade and Commerce	Revenue Coordinator	M	622-8323	aldomanzanero@gamil.com
26	Mr.	Lorin	Frazer	Customs and Excise Department	Customs Clerk I	M	604-2059	excise@customs.gov.bz
	Mr.	Lorin	Frazer	Customs and Excise Department	Customs Clerk I	M	604-2059	lorin.frazer@yahoo.com
27	Mr.	Anthony	Mai	Department of the Environment	Environmental Officer	M	615-4377	enforcement@environment.gov.bz
28	Ms.	Lumen	Cayetano	Solid Waste Management Authority	Acting Director/ Senior Technician	F	601-6202	seniortech@solidwaste.gov.bz
29	Ms.	Candy	Gonzalez	Belize Institute of Environmental Law & Policy	President of Board of Directors	F	635-8796	candybz@gmail.com
30	Ms.	Vivian	Belisle Ramnarace	Fisheries Department	Fisheries Officer	F	224-4552	vivian.ramnarace@fisheries.gov.bz
31	Ms.	Jessie	Young	Belize River Watershed Task Forcer	Member	F	629-7890	baboonsanctuary@hotmail.com

Appendix III. PowerPoint presentations given by David Evers for the Belize Minamata Initial Assessment workshop. Because of their digital size, all presentations are available separately.

1. "Mercury and the Minamata Convention". Full presentation available in a separate file because of file size.
2. "Contaminated Site identification, hotspot mapping, and Mercury monitoring Activities: global linkages for Belize". Full presentation available in a separate file because of file size.
3. "Cosmetics and Communications". Full presentation available in a separate file because of file size.