

Laguna de las Mareas (Las Mareas Bay):

What We Found After Evaluating Risks to People's Health

Guayama, Puerto Rico
October 2025

The U.S. Environmental Protection Agency, the EPA, has developed a Human Health Risk Assessment (HHRA) to better understand community concerns regarding coal, coal ash, and possible chemical exposure in Las Mareas Bay, Guayama, Puerto Rico.

EPA representatives engaged with community residents to learn about common recreational activities in Las Mareas Bay and identify what type of fish are usually caught for eating. Based on these conversations, EPA collected samples of surface water, sand, sediment, and fish in Las Mareas Bay and two other reference sites to determine presence of potentially harmful substances. Although various chemicals were identified, thalium was the only one found at levels above the regional screening levels in the bay for children less than 2 years old.

Key Terms

- A **human health risk assessment, or HHRA**, is the process used to estimate the likelihood of people experiencing adverse health effects from chemicals in contaminated environments, either now or in the future.
- **Background locations**, Tropical Beach in Salinas and Playa Arenas in Naguabo, are reference sites used to compare with samples from Las Mareas Bay in Salinas.
- **Regional screening levels (RSLs)** are comparison values created using standard formulas that include exposure assumptions and EPA toxicity data.
- An **exposure assessment** is the analysis used to identify who might come into contact with the chemicals and how, considering behaviors like eating.



FIGURE 1 LAS MAREAS BAY AERIAL IMAGE

Recent Community Engagement

On August 14, 2025, from 2:30 PM to 5:00 PM, the EPA hosted an in-person community update meeting at the Interamerican University of Puerto Rico in Guayama to share the preliminary results of this study with stakeholders. During this meeting, the EPA addressed preliminary questions from the community and committed to distributing the final report of the study in fall 2025.



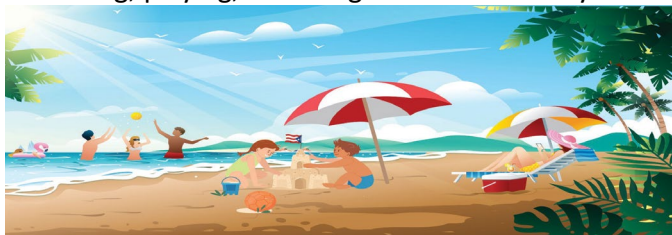
FIGURE 2 - LOCATION OF THE AREA OF STUDY AND BACKGROUND BEACH AREAS

Collecting Samples to Understand Health Risks

The EPA collected samples of surface water, sand, sediments, and fish from Las Mareas Bay, taking into account residents' activities and their contact with these environmental media. Similar samples were also collected from two background locations, Tropical Beach and Playa Arenas, for comparison, as these sites are outside the industrial area near Las Mareas Bay. The sampling areas are shown in the lower left corner of the map in Figure 2. This comparison helps identify unusual contamination levels potentially linked to local industry.

The agency measured 34 chemicals, including metals like arsenic, lead, and mercury, as well as organic chemicals like naphthalene, to better understand possible health risks. The chemicals analyzed were selected because these chemicals are associated with coal combustion residuals and other industrial operations in the area.

The researchers evaluated if these chemicals could negatively impact people's health of people by assessing exposure during recreational activities like swimming, playing, or fishing in Las Mareas Bay.



A Step-by-Step Risk Assessment Process

EPA followed a structured, science-based approach to assess human health risks, using HHRA guidelines. This process helps understand if chemicals and their concentrations found in the during sampling might pose a risk to human health. The HHRA involved:

- Identifying chemicals were present in water, sand, sediment, and fish.
- Measuring how much of each chemical was found.
- Determining how people might be exposed.
- Estimating how often and how long people could be exposed.
- Combining exposure and toxicity information to calculate potential risks, including cancer risks and other health effects.

For the exposure assessment, EPA focused on everyday activities in Las Mareas Bay area, such as swimming, playing on the beach, and eating fish caught in the bay. People can encounter contamination by:

- Touching water, sand, or sediment.
- Accidentally swallowing small amounts of water while swimming.
- Ingesting small amounts of sand or sediment while playing, especially young children.
- Eating fish caught in the bay.

EPA used common activity patterns to estimate how much contamination people might experience as shown in Figure 3.

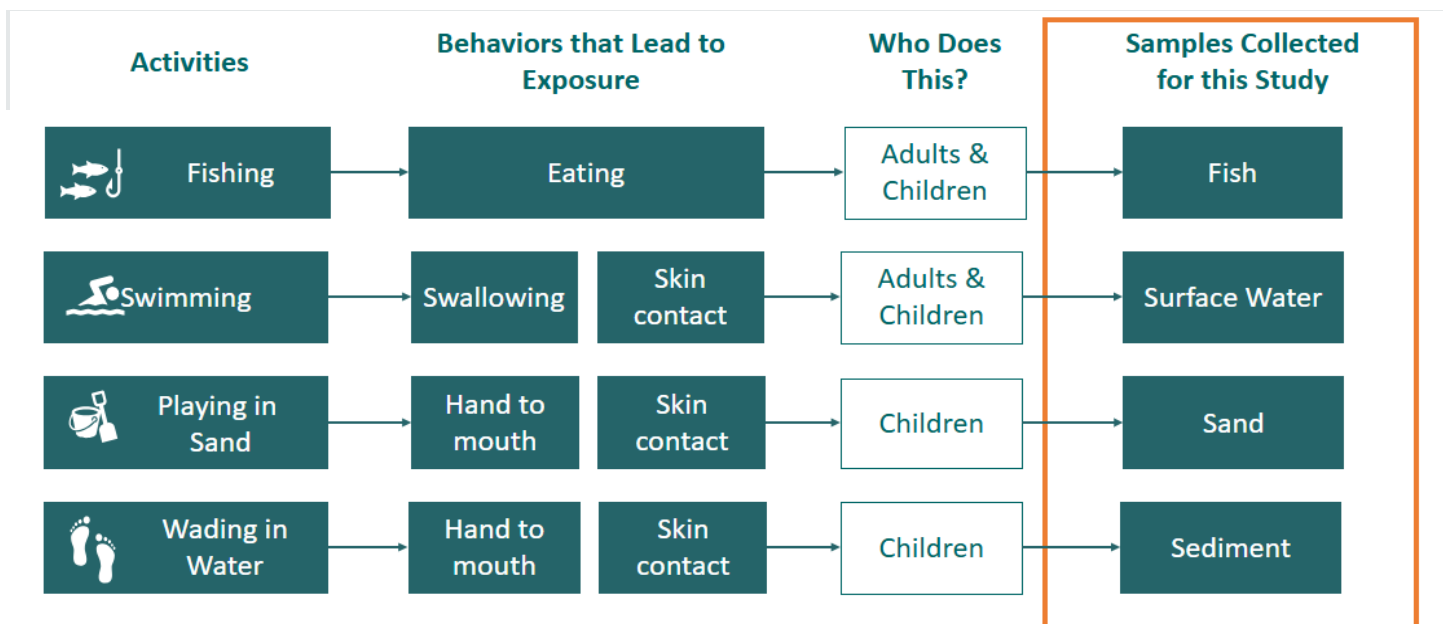


FIGURE 3 TYPES OF SAMPLES COLLECTED

Evaluating How People Might Be Exposed

In the exposure assessment, the EPA considered the following activities and behaviors:

Visiting the beach: Adults and kids go to the beach about 2 to 5 times a month.

Swimming: Adults typically swim for about 10 minutes and might accidentally swallow around a teaspoon of water. Children swim for 30 to 60 minutes and may swallow approximately 1 to 3 tablespoons of water.

Playing in the sand or sediment: Kids play in sand or wade in sediment for 30 to 60 minutes and might accidentally swallow small amounts.

Eating local fish: Adults eat about 14 ounces of fish caught from the bay each month, which is about 3 servings the size of your palm. Kids eat about 2.5 to 7 ounces a month, depending on age (about 1 serving the size of their palm).

These estimates help the EPA understand if there might be a health concern for people in the area.

For questions or more information, please reach out to: Claudia Gutierrez (Gutierrez.Claudia@epa.gov).

Summary of Results

EPA's assessment found that swimming in Las Mareas Bay poses no potential risk for adults or children, as data did not exceed the safety criteria. Similarly, none of the sand and sediment samples were above safety levels for playing in the sand and wading activities.

Regarding fish consumption, the data was generally safe, but thallium and lead levels slightly exceeded the criteria for children under 2 years old. The thallium finding was based on a single fish sample, and due to limited data for children under 2, the EPA used consumption habits of slightly older children, making these results uncertain and likely overestimated. Lead exposure was assessed using a model that estimated blood lead levels, which might slightly exceed CDC reference values for very young children consuming local fish.

Overall, the only notable risk was thallium in fish, but this is uncertain and likely an overestimate. These metals were not a concern for older children or adults.