**Research Project Title:** DNA metabarcoding dataset for study of microbial community response to human and environmental factors in the San Juan Bay Estuary (SJBE), Puerto Rico, USA

**Project Overview:**

Problem:

The San Juan Bay Estuary (SJBE) is an estuarine system that runs through major portions of San Juan and is considered a main source of water sports recreation. The high rate of urbanization, on-going since the 1950’s, has contributed to an increase in microbial fecal loadings across the system. Thus, increasing human health risk due to the potential presence of waterborne pathogens.

Objectives:

* In this study, we aim to use microbial water quality indicators to identify zones of higher impact and factors that influence the presence of pathogens and indicators across an estuarine system impacted by an urban development gradient.
* Establish relationship to EPA recommended indicators and MST markers and identify whether established indicators can be used as a surrogate for the presence of the selected waterborne pathogens.

Research Approach:

Monthly water sampleshave been collected since June 2021 from 16 locations, membrane filtered, and sent frozen in dry ice to the U.S EPA laboratory in Durham, NC for DNA analysis. Molecular analysis included quantitative polymerase chain reaction assays targeting fecal bacterial markers, and 16S amplicon sequencing. Enumeration of fecal indicator bacteria (FIB) and measurement of physicochemical parameters were included during sample collection. Additional details about location description, sample collection and companion microbial and chemical analyses can be found in Oczkowski et al., 2025 (submitted).

Scope and Significance:

* Understanding the fate and transport of emergent waterborne pathogens and potential exposure to recreators in estuarine environments impacted by urban development.
* This effort will allow us to identify a set of molecular indicators useful to assess microbial water quality across an urban gradient and contribute to improve ecosystem health indices in coastal areas impacted by urban development.
* Relationship to MST markers will be used to classify polluted sites and/or hot spots based on human waste levels and the presence of pathogens and the influence of non-point pollution sources in coastal tropical environments.

References:

Autumn Oczkowski1, Ivelisse Cappielo-Cosme2, Morgan Schwartz1, Noemí Soto Nieves3, Marirosa Molina4,Eileen Villafane5, Evelyn Huertas6, David Katz1, Alana Hanson1 . 2025.Water column biogeochemistry in a tropical urban estuary. *Submitted to Coastal and Estuarine Pollution Bulletin.*