Assessment of Chemical Contaminants in Sediments from the Salt River Bay National Historical Park and Ecological Preserve, St. Croix, USVI

Background

Over the past few years, a number of environmental monitoring projects have been undertaken inside Salt River Bay St. Croix, USVI. These projects include a previous collection of targeted sediments for chemical contaminants, and a limited collection of water quality samples. Ongoing work includes fish tracking and trapping work. Upcoming work in Salt River Bay includes the collection of fish for contaminant body burdens, and the tracking and collection of conch, also for chemical contaminant body burdens. Data gaps related to ongoing studies of chemical contaminants and toxicity of sediments have been identified. Through the careful leveraging of these projects, funds repurposed from the USVI Department of Planning and Natural Resources (DPNR) will be used to address the identified data gaps.

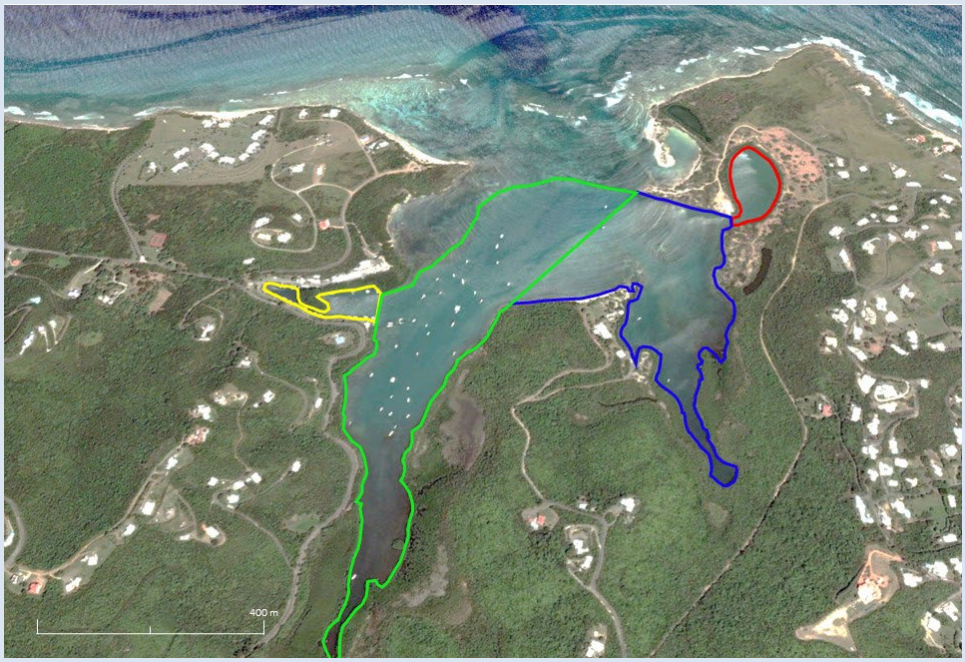

Figure 1. Strata developed for sampling sediments in the SARI.

The Project

In partnership with DPNR and the National Park Service, scientists from NOAA's National Centers for Coastal Ocean Science (NCCOS) will conduct a baseline assessment of chemical contaminants, building upon work already completed in Salt River Bay. The project will result in the quantification of the magnitude and spatial extent of chemical contaminants within the bay through the collection of surficial sediment samples, a sediment core to describe contaminant changes over time, an assessment of sediment toxicity using one or more assays, and an analysis of the benthic infaunal community in the estuarine portion of Salt River Bay.

Based on a review of the physical characteristics of the bay, we will subdivide the bay into four strata including: Mangrove Lagoon, Sugar Bay, Triton Bay, and Marina. Sample collection within each stratum will follow the stratified random sampling routinely used by the NOAA's National Status and Trends (NS&T) Program. The magnitude of pollution will be put into regional and ecological contexts by comparing the results in Salt River Bay to NS&T data for other locations in the region and from around the nation. Additionally, a series of NOAA sediment quality guidelines will be used to assess the likely risk to benthic and infaunal organisms. This work would be accomplished through a one-time sediment sampling effort, likely during the rainy season, as previous sediment studies have not characterized this timeframe.

Field Work

The collection of sediments is scheduled to occur in late summer of 2018. All sampling will occur within the strata identified in Figure 1. The sediment samples will be collected aboard an NPS vessel using a PONAR sediment grab, along with a sediment corer. Sediment samples will be placed on ice in the field, and then later frozen until shipment.

Figure 2. View of Salt River Bay showing a few of the many boats moored in the area.

At the end of the field mission, the sediment samples will be shipped via FedEx to a NOAA analytical contract laboratory (TDI-Brooks, International) in College Station, Texas, and subsequently analyzed by TDI-Brooks, and by a NOAA analytical laboratory in Charleston, South Carolina. The samples will be analyzed for over 150 chemical contaminants, including polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, butyltins (e.g., tributyltin or TBT), and heavy metals. Because of the long-term monitoring and assessments that have been conducted by the NS&T Program for 30 years, we will be able to compare results from Salt River Bay with results from other NS&T studies throughout the coastal US. Results from the sediment analysis will be compared with NS&T median and 85th percentile values, and with available sediment quality guidelines (e.g., ERL and ERM), to help further assess environmental risks.

Outcomes

The results from this project will provide a better understanding of the chemical contaminants present, along with their concentrations and toxicity in sediments, particularly in those areas that may be receiving inputs of land-based sources of pollution. The results from this study, in conjunction with the other chemical contaminants work completed or ongoing (e.g., sediments and conch), will provide a robust baseline assessment of chemical contaminant issues that may be present in Salt River Bay. The information generated will also be important to help gauge the level of contamination in different parts of the study area, to assess if activities in some of these areas (e.g., the marina area), are associated with increased levels of contamination and toxicity. Finally, the project will provide local resource managers with information needed to make informed decisions regarding the health of the system, and management activities that may be required to preserve or restore this valuable natural resource.

For additional information or questions on the project, please contact:

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