



Identification and Delineation of Land-Based Mercury Sources Impacting Fisheries in the Southern Central Coastal Region of Saipan Lagoon



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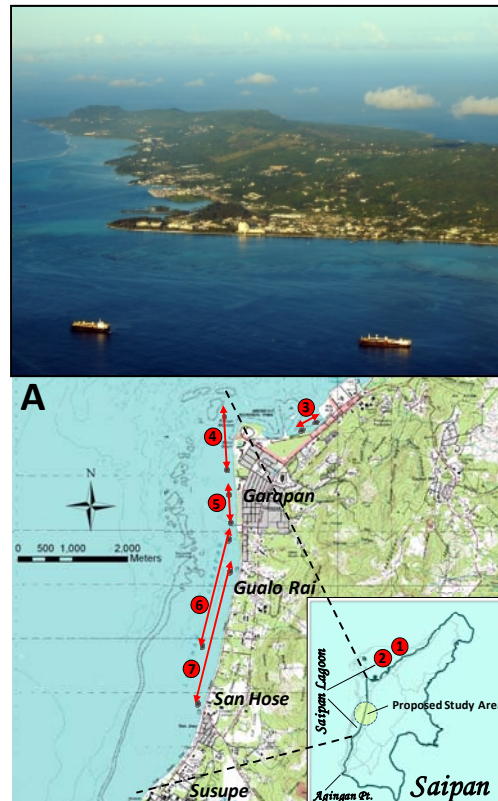
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The southern half of Saipan Lagoon is heavily impacted by urban runoff that primarily flows from roads (paved and unpaved) and properties (residential and commercial) within 0.5 km of the coast. Frequent mercury detections have previously been reported in discharges from several stormdrains in this part of the lagoon (Environet Inc. 2007). Such findings are unusual because mercury is rarely detected in runoff outside of industrialized areas (USEPA 1983). The highest level recorded was 150 ng/L, which again is remarkable given that detectable levels in runoff seldom exceed 0.01 ng/L (Morace 2012). Denton *et al.* (2014) noted unusual mercury distribution patterns in sediments from the lagoon's southern waters and concluded that inputs washed into the ocean from land-based sources were superimposed upon a scattering of mercury contamination emanating from within the lagoon itself. They attributed their findings to the extensive use of mercury in artillery shells and other explosive devices manufactured during WWII, and to the heavy shelling of Japanese defenses positioned along the shoreline of the lagoon prior to the US invasion in 1944. Continuing mercury releases from corroding munitions left behind after the war most likely account for the Environet findings noted above.

The aftermath of these cataclysmic wartime events on fisheries in the lagoon is currently unknown although an earlier study revealed elevated mercury concentrations in a popular table fish (*Lethrinus atkinsoni*) from a 3-km stretch of coastline just north of the invasion beaches (Denton *et al.* 2010). Levels encountered here were higher than in the same species and a close relative (*L. harak*) from waters further north in the lagoon.

The study proposed here seeks funding to revisit the 3-km coastal strip from whence the earlier contaminated fish were captured and identify the

primary source or sources of mercury impacting them. The primary objectives of the study are to: a) determine mercury concentrations in surface deposits from stormwater drainage pathways servicing the Gualo Rai area; b) back-track along obviously enriched pathways to pinpoint sources of contamination within the watershed; c) delineate the extent of contamination in the lagoonal target area (via sediment analysis) and evaluate the impact on popular table fish with bioindicator potential; and d) weigh the fish data against established USEPA benchmarks to determine potential health risks and advisable maximum monthly consumption rates.



a) Aerial view of Saipan Lagoon.
b) Map of the site locations of the study.