



Influence of Stormwater and Wastewater Discharges on the Distribution and Abundance of Heavy Metals in Sediments from Saipan Lagoon



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Principal Investigators:

John A. Starmer and Gary R.W. Denton

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Saipan is the second most densely populated island in Micronesia and experiences many of the environmental pollution problems seen in the larger industrialized nations of the world. Solid and hazardous waste disposal, illegal dumping, urban runoff, unregulated waste discharges from various commercial premises, and the disposal of primary treated sewage effluent directly into the ocean, rank among the most critical environmental problems seen on the island today. A large lagoon on the western side of the island serves as a sink for many of the more recalcitrant pollutants mobilized into the ocean from land-based sources during major storm events. Locally referred to as Saipan Lagoon, this body of water is geographically divided into three separate lagoonal entities all of which are impacted to some degree by the activities of man. The largest and most northerly of these is Tanapag Lagoon which extends along some of the most industrialized coastline on island.

An ongoing pollution monitoring and assessment program for Tanapag Lagoon was established by WERI in 1997 and we now have a reasonable understanding of the abundance and distribution of the contaminants of primary concern in these waters (i.e., heavy metals and PCBs). In 2008 the study was extended into the two lagoonal entities further south. The smaller and most southerly of these two water bodies is Chalan Kanoa Lagoon which borders mostly rural and residential areas and receives relatively little in the way of stormwater runoff. It does, however, receive effluent from a sewage treatment plant and is, therefore, of special interest from an environmental monitoring standpoint. Immediately to the north of

Chalan Kanoa Lagoon is Garapan Lagoon, a relatively long narrow stretch of water that borders both residential and commercial premises between the villages of Susupe and Garapan. Relatively high levels of mercury were recently discovered in fish taken from the northern end of this lagoon and were attributed, at least in part, to storm drain discharges from two land-based sources identified in the Garapan area. Heavy metal contributions into Garapan Lagoon from the many other storm drains that discharge along much of its length are currently being evaluated in sediments and nearshore biota. The impact of these discharges on ecosystems further off shore remains to be evaluated.

This project will address this deficiency by conducting an evaluation of heavy metals in surface sediments within Garapan Lagoon and Chalan Kanoa Lagoon along strategically positioned transect lines extending from the coast to the outer reef margin. Such a program is fundamental to understanding the dynamics of pollutant transport processes operating within these two lagoonal entities and is an essential first step towards protecting and preserving the vital fisheries resources therein. The overall objectives of the proposed study are to establish a reliable database for surface sediments within the southern half of Saipan Lagoon with which future findings may be compared and evaluated; delineate impacted offshore areas within the study area for later biological monitoring and assessment purposes, and determine the current degree of contamination by reference to levels reported for clean and polluted environments in tropical regions from elsewhere in the world, including Guam..