



Heavy Metals in Biotic Components from Saipan Lagoon with Emphasis on Nearshore Areas Impacted by Stormwater and Wastewater Discharges



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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 that borders 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). Comparable data for the two lagoonal entities further south is, however, lacking. 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 contributions from two land-based sources identified in the Garapan area. Sediment deposition patterns around these storm drains suggest that fisheries further south may also be impacted. Heavy metal contributions into Garapan Lagoon from the many other storm drains that discharge along much of its length are currently unknown.

Extending the baseline survey for Tanapag Lagoon into the southern half of Saipan Lagoon therefore seems a logical extension of WERI's ongoing pollution monitoring and assessment program for Saipan's coastal waters. To this end, the project described herein proposes to determine heavy metals in dominant ecological representatives inhabiting the shallow, nearshore waters of Garapan Lagoon and Chalan Kanoa Lagoon with emphasis given to those groups with proven bioindicator capability and/or food potential for local residents (e.g., algae, seagrass and bivalve mollusks). The objectives of the study are to establish a reliable database with which future findings may be compared and evaluated; identify 'hotspots' and delineate areas of contaminant enrichment within the study area, and assess the degree of contamination in the southern half of Saipan Lagoon by reference to levels reported for clean and polluted environments in tropical regions from elsewhere in the world, including Guam. Potential health risks (if any) associated with the long-term consumption of edible resources surveyed will also be evaluated.