

Polychlorinated Biphenyls (PCBs) and Organochlorine Insecticides in Biotic Components of Tanapag Lagoon, Saipan



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Tanapag Lagoon borders the western shore of central Saipan. It harbors a rich diversity of marine life and supports a variety of commercial and recreational activities. Over the last quarter century, Tanapag Lagoon has become heavily impacted by the activities of man. Primary sources of anthropogenic disturbance in these waters include a power station and commercial port, two small boat marinas, a sewer outfall, several garment factories, auto and boat repair shops, wood shops, government vehicle maintenance yards, a commercial laundry, and an acetylene gas producer. There are also a number of old military dumps and disposal sites in the area as well as a 50-year-old municipal dump that served as the island's only solid waste disposal site until its closure a little over two years ago. Several streams and storm drains discharge into the lagoon during the rainy season and provide a mode of transport into the ocean for any land-based contaminants from these and other facilities. Overflows from sewer lines are also commonplace at this time of the year and the whole area is inundated by storm water runoff during periods of prolonged wet weather.

Until recently, the availability of information concerning the distribution and abundance of major contaminant groups in this area was extremely limited. The turning point came in 1998 when WERI scientists conducted a detailed assessment of heavy metals, PCBs and PAHs in surface sediments from the southern half of the lagoon and identified areas of enrichment around the port, the small boat marinas, and the dump. Subsequently, dominant ecological representatives (algae, seagrass, seacucumbers, bivalve mollusks and fish) were collected for chemical analysis from strategic locations within the lagoon in order to determine the impact of these perturbations on resident biota. All samples have since been analyzed for heavy metals and archived specimens await analysis for other contaminant groups of concern. This

project will screen the archived collection for PCBs and organochlorine insecticides (e.g. DDT and related compounds). These ubiquitous contaminants are of interest because of their persistence, high bioaccumulation capacity and endocrine disruptive influence. Virtually nothing is known of their distribution and abundance in biota from Tanapag Lagoon despite PCB 'hotspots' being previously identified inland. The study will therefore add significantly to the existing contaminant database required for future trend monitoring purposes in the lagoon. Moreover, it will provide valuable information on levels of a potentially harmful group of organic chemicals in key indicator organisms and identify potential health risks (if any) associated with the unrestricted consumption of edible species. Overall, the program will provide the necessary foundations for the future assessment and regulation of pollution problems in the area. Such information is vital for the overall protection and sustainable development of aquatic resources in Saipan's coastal waters.

The analytical work will be carried out at the Water and Environmental Research Institute (WERI), Water Quality Laboratory, at the University of Guam, where adequate support facilities, infrastructure, essential chemicals and items of equipment (including GC-MS plus accelerated solvent extraction and solvent reduction systems) necessary for the study are present. All analyses will be conducted on freeze-dried samples to compensate for water losses incurred during storage of the achieved collection. Previously determined wet to dry weight ratios will be reported with the data along with extractible lipid weights (%).