



Mercury Contamination in Garapan Lagoon, Saipan: An Evaluation of Potential Drainage Pathways and Impact on Fisheries Resources



Funded by:
US Geological Survey, Water Institute Program

Principal Investigators:

Brian G. Bearden, Michael S. Trianni,
Gary R.W. Denton, H. Rick Wood

Funding: \$39,725

Garapan Lagoon is one of three lagoons that border the western shoreline of Saipan. All three lagoons harbor a rich diversity of marine life and support a variety of commercial and recreational activities. However, over the years, increased urban growth and commercial developments along the adjacent coastline have resulted in a loss of environmental quality in these waters. This is especially true in the southern half of Tanapag Lagoon where a commercial port (Saipan Harbor), power station, municipal dump, two small boat marinas, a sewer outfall, several garment factories, auto and boat repair shops and government vehicle maintenance yards have all taken their toll. Several streams and storm drains empty into the lagoons during the rainy season and provide a mode of transport into the ocean for any land-based contaminants. 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 sediments from the southern half of Tanapag Lagoon and identified areas of contaminant enrichment around the port, the small boat marinas and the dump. Subsequently, dominant ecological representatives, including a number of popular table fish, were collected for chemical analysis from these waters. Surprisingly, mercury levels in the majority of specimens taken from

the Micro Beach area, at the northern end of Garapan lagoon, were significantly higher than those found elsewhere in the study area. Moreover, close to 60% of the total catch from this site (~50 fish) had levels sufficiently high enough to warrant restricted consumption. This compares with about 15% from an outer lagoon control site. The source and extent of the mercury contamination in the Micro Beach area is currently unknown and is the primary focus of this proposal. Past military activities are strongly suspected to be linked with the contamination and will be assessed by analyzing sediments from storm drains and drainage basins in the Garapan area where the majority of military personnel were stationed towards the end of WWII. Surface sediments from within the lagoon will also be examined to delineate the area of mercury enrichment. The full impact on the biotic resource of the area will be assessed using squirrel fish, *Myripristis violacea*, and snapper, *Lethrinus harak* as bioindicators. Both species of fish show a high propensity for mercury and are favored by local fisherman. Samples will be collected for analysis on a monthly basis to determine if there are critical times during the year when fish consumption from this area should be more restrictive.

The study has relevance from an ecological and public health standpoint and should command the interest of those involved with environmental protection, water quality management and the sustainable development of fisheries resources in the area. It will also provide the basis for determining whether remediation strategies are necessary.