

tongue-like intrusion towards north. The salinity distribution can be attributed to the combined effects of bathymetry, a larger fetch area, greater wind stress, inequality in evaporation and the tidal influx of high saline water. The surface-bottom differences are more pronounced in the shallow areas. The lagoon is well oxygenated, however, extreme values are observed in the northern sector where thick vegetation and poor mixing takes place. pH values varied from 7.6 to 10.2 for the entire lake and the northern sector values varied from 8.32 to 10.2. Nutrients such as nitrate, phosphate and silicate values are found to be highest in the northern sector whereas the lowest values are recorded in the southern sector. Chlorophyll-a values varied from 0.17 to 18.88 mg/m³ in the lagoon during the entire period of observation. It is observed that saline conditions primarily regulate the fisheries of the lake. Fish landing data reveals that there was a sharp decline in the fish production in the lake from 1988 to 2000. However, fish, shrimp and crab production suddenly jumped to the order of 2.5, 6 and 10 times respectively in the 2000–2001 period after the dredging of a new mouth resulted in considerable increase in

salinity (32 psu). The catch of the major prawn *Penaeus indicus* has increased dramatically. The rivers bring huge sediments (turbidity). IRS data sets for different time periods reveal that the vegetation spread occurs at the rate of 25 km²/year. A Chloro-alkali factory that uses mercury is in production a little further away from the lake. Besides that, the lake is surrounded by paddy fields that are major sources for different fertilizers that enter the lake environment. However, the pollution components of the lake are still not properly studied.

Past events in the lake are the best examples of interaction between natural process, human impact, socio-economic conditions of traditional fishing folk and government policies in coastal habitats. A recent observation indicates that the lake is over exploited and lacking proper regulation in relation to resources management. Hence, it is suggested that the involvement and education of the local community and the state Government can play a key role in shaping the future of this pristine environment.

Ngaremeduu Conservation Area GIS Project Palau

Alma Ridep-Morris

Bureau of Natural Resources and Development,
Ministry of Resources and Development, P.O. Box 117, Koror, Palau 96940
E-mail: almarm@palaunet.com

GOAL: To utilize the GIS application to enhance understandings of impacts of the development and other activities on water quality in the Ngaremeduu Conservation Area, and to better equip managers to make wise decisions.

The Ngaremeduu Conservation Area encompasses approximately 29,400 acres of land, mangroves, estuary and reef areas. In order to understand the environmental impacts of the various developments and activities in or near the Conservation Area, water quality monitoring is carried out in rivers, streams, mouths of estuaries, and water bodies in or near the Ngaremeduu Conservation Area.

Currently, with the development of the 53 miles Compact Road around Babeldaob, there is the potential for environ-

mental impacts that may be caused by increased development once the Compact Road is completed. The purpose of the project is to provide managers with adequate decision-making tools that will assist them to manage their resources sustainably. Water quality samples will enable the managers to see the impacts occurring during times of increased sedimentation or nutrient runoffs caused by developments around the Ngaremeduu Conservation Area.

The project will provide managers, landowners and decision makers with adequate decision making tools using the GIS application. The agencies or organizations involved in the water quality monitoring include EQPB, Ministry of Resources and Development and the state governments.

Mangroves of Samoa and Science Education

Matamua Asipa Pati

The Faculty of Science, Pusa Meli 5768, Apia, The National University of Samoa, Samoa
E-mail: asipap@yahoo.com

Traditionally, mangroves have been a part of the country's environment and providing goods and services to the Samoans. The goods include firewood, timbers, fishing poles, dyes, and medicines. With services, the mangroves have been playing a role in protecting the islands against strong wave and wind actions. The trees also trap a significant proportion

of sediments from flowing towards the sea and thus sparing the marine environment from unavoidable damages. As far as the nutrients cycles are concerned, mangroves have been involved in carbon sequestration, contributing to the islands' fertile soils. In addition the role of the mangrove ecosystem in providing niches for various organisms have been instrumen-