COASTAL LAGOONS ALONG THE COAST OF EGYPT WITH EMPHASIS ON BARDAWIL LAGOON

M. Hany S. ELWANY* [1], Ahmed KHAFAGY[2],
Abdel HAMID EL-LKANY[3], Alfy FANOS[2]

[1] Scripps Institution of Oceanography, La Jolla, CA 92093, USA
[2] Institute for Coastal Research, Alexandria, Egypt
[3] Faculty of Engineering, Alexandria University, Alexandria, Egypt

Egypt have a coast on the Mediterranean sea about 450 km long. 50% to 60% of the coast of Egypt is a low lying barrier beaches backed by large water lakes. There are one lake and 4 lagoons along the coast of Egypt. These are Lake Maryut and Idku, Burullus, Manzala and Bardawil Lagoons (Figure 1). All the lagoons are shallow with mean water depth about 2 m. Lake Maryut is not connected to the sea, however the other lagoons have channels to the Mediterranean sea (inlets) and when these inlets are open there are considerable circulation between open sea and these lagoons. The object of this paper is to give descriptions of these lagoons, their habitat value and to discuss their general hydrological characteristics.

The habitat value and productivity of shallow water lagoons are largely controlled by the circulations with the open ocean and within them. Often these circulations are determined by episodic tidal exchange with the open ocean. Typically shallow lagoons are closed to the ocean by the natural extension of beach berms across their inlet as a result of littoral sand transport along the neighbouring beaches. Occasionally these berms are broached by either high tides or excessive fresh water runoff. During periods of inlet closures, these lagoons progressively evaporate and become increasingly hypersaline.

Of special interest among these lagoons is the Bardawil lagoon. There is often vertical and lateral stratification in the Bardawil lagoon during this evaporative cycle with average rate of 2 m/year the salinities varies from 40 ppt to 90 ppt (Figure 2).

The Bardawil lagoon is 84 km length along the sea cost, 22 km maximum width and 1.75 to 2.6 m average depth. Its surface area is about 600 km at mean sea water level. This lagoon differs from the Nile Delta Lagoons in that it is of tectonic origin and not a deltatic lagoon. The only source of water into Bardawil Lagoon is the Mediterranean Sea through 3 inlets.

Measurements of water salinities, level and velocities were taken in the lagoon in 1972, 1973 and 1986 (BEN-TUVIA, 1984; CRI, 1988) in order to search for a method to keep the inlets open to the daily tidal flushing. The results of these measurements were utilized in this study along with a numerical model which use winds and tides time series as an input in order to attempt to explain the observed salinity structure of the lagoon.

Figure 1. Coast of Egypt. Notice the three inlets of the Bardawil Lagoon.

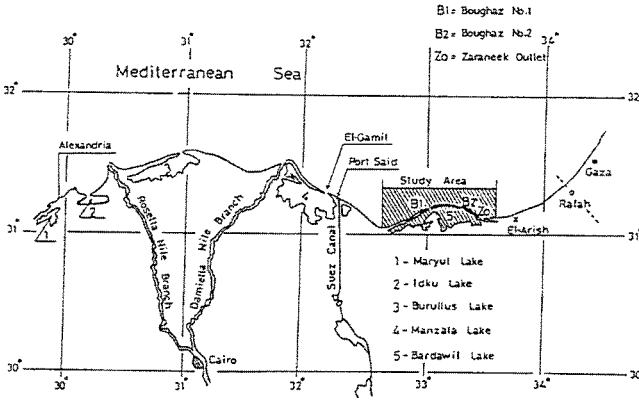
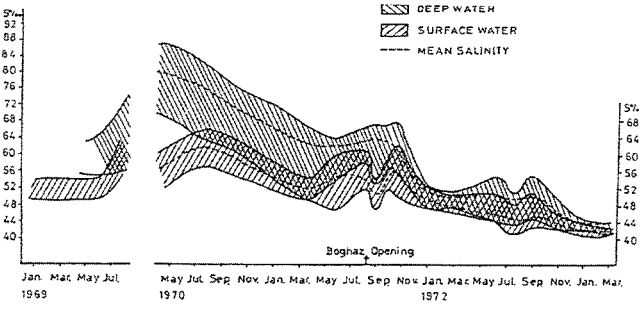


Figure 2. Time-series plot of salinity at Bardawil lagoon about 10 km east of B1.



REFERENCES

BEN-TUVIA, A., 1984. Some aspects of the management of Bardawil Lagoon. FAO, General Fisheries Council for the Med., *Studies and Reviews* 61(2) : 529 - 540.

COASTAL RESEARCH INSTITUTE AT ALEXANDRIA, 1988. Project of development Bardawil Lagoon fish resources, Final Report submitted to Academy of Scientific Research Cairo, Egypt.