

## Part IV: Coastal Processes and Sediment Transport



Rubjerg Knude (Cliff at Lønstrup)



Tombolo Formation, Liseleje, Zealand

## THE MORPHOLOGICAL CHANGES ALONG THE NORTHERN COAST OF THE NILE DELTA

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### Abstract

*Major beach erosion has been occurring along the Nile Delta shoreline. The erosion is primarily caused by diminished sediment transport in the River Nile due to construction of the Aswan high dam.*

*Egyption and foreign experts have evaluated various shore protection methods since 1983.*

*A summary of alternative shore protection methods, including offshore breakwaters, beach sand replenishment, groins, inlet training jetties, etc. is presented.*

### Introduction

The objective of this study was to investigate a variety of coastal erosion problems occurring along the Nile Delta Shoreline.

The erosion started after constructing the first dam at Aswan, the development of other dams and barrages, and the increased diversion of river water for irrigation purposes.

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After completion of the Aswan high dam in 1966, erosion along the Delta coastline accelerated considerably, resulting in the loss of several beaches and blockage of estuaries and navigation channels by sediment, as well as flooding of coastal villages.

### Nile Delta Coastal Erosion Problems

Due to the resulting economic losses and the great importance of this national problem, the Egyptian Government conducted several studies since 1960 through several Egyptian and international consultants.

The areas in which erosion problems are critical along the Nile Delta Coast between Port Said City east and Alexandria City west are:

- 1) Alexandria Beach,
- 2) Baltim Beach,
- 3) Burullos,
- 4) Elgamil Strip,
- 5) Ras-Elbar Beach, and
- 6) Rosetta Promontory.

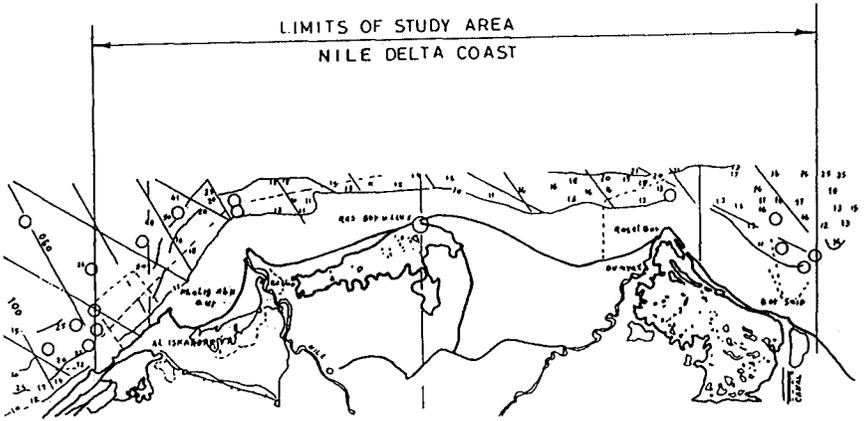
### Field Data For The Egyptian Northern Delta Coastline

Most recent data were collected by the Egyptian Academy for Scientific Research and Technology, Suez Canal Research Center, The United Nations Development Program (UNDP), Coastal Research Institute and the Egyptian Shore Protection Authority.

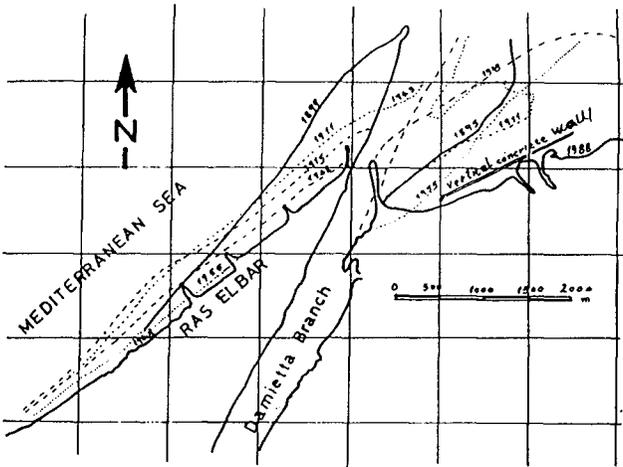
Several shoreline changes from 1895 to 1988 at the Rosetta and Damietta promontories were recorded. Shoreline survey studies were based on data available from two aerial photographs taken in 1955 and 1983. The old shoreline was obtained from topographic maps, admiralty charts, satellite photographs and the Egyptian Survey Department maps.

### Shore Protection Plans

In order to develop a shore protection plan, the Egyptian Government awarded a contract for the protection of the Rosetta area to a French consulting firm in 1983. In 1985 the Egyptian Government awarded a contract to an American consulting firm to prepare a General Master Plan for the protection of the Nile Delta Coast. In 1987 the Bilateral Panel for the Nile Delta Coastal Zone Management appointed a Dutch consulting firm to investigate the feasibility of protecting the Ras-Elbar area. Table 1 indicates several shore protection alternatives.



a) Shore protection study area



b) Shoreline retreat at Ras-Elbar

Figure 1. The shore protection study area and shoreline retreat at Ras-Elbar

Table 1. Conceptual Shore Protection Alternatives

Location	Alternative
1. Alexandria Eastern	a) Detached offshore breakwater b) interior breakwater
2. Alexandria Area Beaches	a) Offshore breakwaters and beach restoration at Chatby and Ibrahimiya beaches b) Groin field and beach restoration
3. Abou Quir (Mohamed Ali Seawall)	a) Monitoring of rehabilitated and old section. b) Add 2 tons modified cubes at damaged areas.
4. Lake Idku Inlet	Only monitoring is recommended
5. Rosetta Promontory	a) Dolosse seawall and breakwater 4.7 km revetment and breakwater section. b) Other alternatives discussed in SOGREA (1984)
6. Burullos	a) Inlet training jetty b) Maintenance dredging as required c) Seawall (monitoring only)
7. Baltim Resort Area	a) Groin field and sand nourishment b) Offshore breakwater and sand nourishment c) Construction setback guidelines

(from Tetra Tech Report)

### Conclusions

The study concluded that:

- a. Planning for the whole region is more realistic and will create an interactive plan for the whole coast.
- b. Further studies are recommended to cover all problem areas along the Nile Delta coast.
- c. It is strongly recommended to develop and to improve the record-keeping procedures in a standard uniform format.
- d. Evaluating the existing shore protection measures by analyzing the field data and comparing it with the calculated data.

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