

# **Coastal Erosion Issues in Sierra Leone : Adaptation, planning and implementation relating To the Sierra Leone coastal zone**

**By**

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# INTRODUCTION and BACKGROUND

## *The Coastal Zone*

The coastal zone of Sierra Leone extends some 460km from Kiragba in the north, to Sulima in the south occupying an area of around some 155km<sup>2</sup>. Sierra Leone has about 190 km of sheltered coast. The sheltered coast is dominated by extensive mangrove systems (230 km) and mud flats.

Only about 150 km of the coastline is significantly developed and this includes Freetown (the capital).

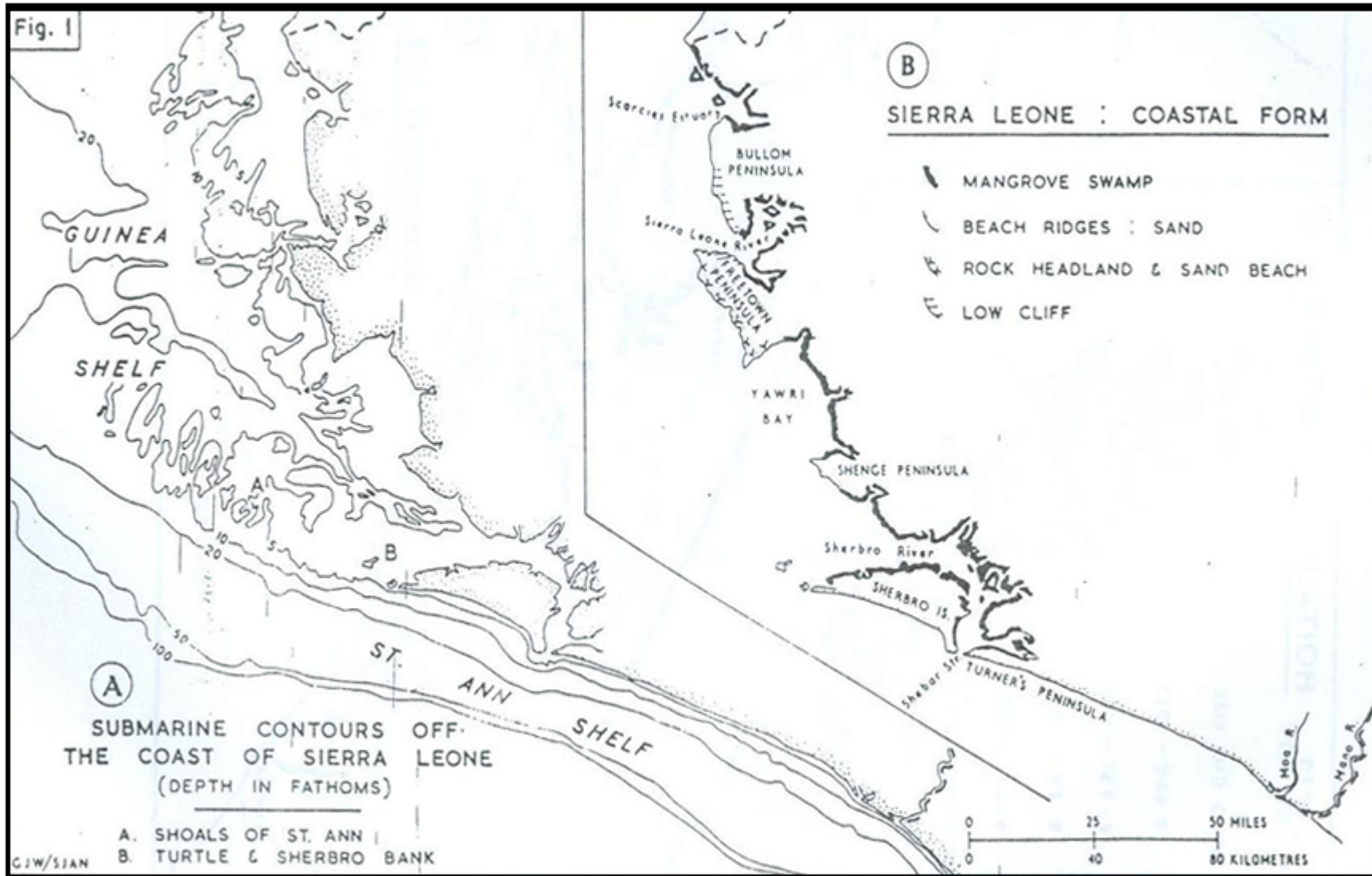


# Geology and Geomorphology of Study Area

## *The Coastal Zone*

- + Low Cliffs (5-20m high) of poorly consolidated clays, sands, and gravels of Eocene to upper Pleistocene age
- + Sand beach ridges
- + Mangrove swamps and mudflats associated with estuaries and sheltered embayment.
- + Pocket beaches alternating with rocky headlands in the Freetown peninsula.

Fig. 1



C. J. W. / S. J. A. N.

# MARINE CLIMATE

The erosion situation requires knowledge about the wave conditions during the highest possible tide as this condition will produce maximum wave attack on the shore. On the shore of Freetown waves are from the sea generated by the local monsoon especially during the squally period of May-June and August, September and the swell generated by storms during the dry season in the southern part of the North Atlantic. (R. G. Johnson, published dissertation, 1998). The swells reaching the coast have periods varying between 8 to 20 seconds with an average of 12 to 13 seconds. Wave height in deep waters average 0.25 – 1m. However, heights of 2 to 3 metres or more occur with directions from between south and southwest especially during stormy months (August – October).

Tides in the area are of the semi-diurnal type with an appreciable daily inequality (0.04 to 0.34 metres). The average range is about one meter. Currents are driven by the South –West monsoon and generally flows from north-west to south-east. The area east of Aberdeen falls under the influence of the strong tidal currents in the Sierra Leone river estuary. Local variations in the strengths and even temporary reversal of the current near the coast are caused by corresponding variations in wind force and direction.

# Impacts of Climate change on the Coastal Zone

As shown in Table \_2 it is projected that about 26.4 km<sup>2</sup> of land in the coastal zone of Sierra Leone will be inundated as a result of 1 metre sea level rise.

**Table: Land at risk from a 1-m rise of sea-level**

<b>Coastal segment</b>	<b>Land at Risk</b>
Northern coast	9.6
Central coast	1.0
Southern coast	15.8
Total	26.4

# Extent of coastal erosion along the Sierra Leone Coastline

Coastal erosion has been and is still posing a serious problem for coastal managers in Sierra Leone. This phenomenon which is very evident along the Sierra Leone coastline has attained rates of some 4-6 metres per year at some locations. e.g. Konakridee, Lumley, Lakka, Hamilton etc.

Coastal erosion has resulted in loss of private and public property along the northern sector of the coastline as well as posing threat to beaches, settlements and other shoreline facilities such as hotels, clubs, resorts along the coastline of the Freetown Peninsula.

Along the southern portion of the Sierra Leone coastline, coastal erosion seems to be naturally induced although visual observation revealed alarming intensity with houses and other facilities now in the sea.

On the other hand along the beaches of the Freetown Peninsula, the erosion of the sandy beaches is accelerated by sand extraction activities for construction and building purposes.

# Lessons learned and best practices identified impacts of Climate change on the Coastal Zone

Efforts made in the past to halt shoreline retreat along certain portions of the Freetown Peninsula, however is proving unsuccessful. Gabion revetments were erected along a stretch of the Lumley beach area but could not greatly minimize the retreat of the beach.

It is however suggested that the impacts of shoreline erosion can be minimized if appropriate passive and active approaches are adopted. Active structures can be constructed probably offshore or material dumped offshore.

Such structures should be capable of (a) dissipating of the energy of the waves and (b) reduce both longshore and cross-shore sediment exchanges along the profile of the beach.

Passive measures which are mostly adopted by least developed countries include, setback, controlled abandonment, do nothing and where funds are available, shoreline protection.



# Measures taken for the protection of the Coastal Zone

There is no overall legal framework for the protection of the coastal and marine environment although there are sectoral frameworks.

The coastal resources therefore fall under the jurisdiction of more than one institution. Some measures have been taken over the past few years to protect the coastal and marine environment. These steps were geared towards the maintenance of sustained fishery development and coastal marine environmental quality for other socio-economic uses. The measures include restrictions on beach sand extraction, banning of environmentally unfriendly fishing methods, mangrove reforestation programmes, establishment of reserves and restrictions on beach face constructions.

# PROPOSED ADAPTATION PROJECTS IN THE COASTAL ZONE

The most important issues to be addressed in the management of the coastal zone in Sierra Leone are presented below as well as recommendations for addressing these issues. The issues involve

1. Establish of Coastal Management Board/Studies on coastal erosion in Sierra Leone
2. Delineation of flood and erosion hazard area
3. Further work to improve on the quality of topographic data for the coastal
4. Monitoring of the Coast
5. Establishment of a national sea-level observing system in Sierra Leone
6. Develop sand and gravel mining management plan
7. Education; and
8. Research

**Thanks for your kind attention**