CHAPTER 3
THE STUDY SITES

The present investigation was carried out in two closely situated estuarine biotopes on the south-west coast of India, namely the Poonthura estuary and the Adimalathura estuary lying in the Thiruvananthapuram district of Kerala state. Details of the different study sites are indicated below.

SITE 1. THE POONTHURA ESTUARY (Fig. 1)

The lower reaches of the Karamana river, known as the Poonthura Kayal, lying between 8° 25' - 8° 30' North latitudes and 76° 55' - 77° 00' East longitudes is in the Thiruvallam Panchayat of Thiruvananthapuram district. The Karamana river originates at an elevation of about 1650m above the mean sea level from the western ghat mountains and has a catchment area of 703 square km. From its source, the river flows about 65 kms in a more or less south-western direction and flows into the Poonthura Kayal before it joins the Lakshadweep sea. The Karaman river splits up into two branches near the Thiruvallam bridge and flows down enclosing an island called the Edayar and joins the sea at Panathura. The tidal reaches of this river is designated as the Poonthura estuary. Accordingly, the total length of the estuary is 4.35 km. Over the last few years, the lower reaches of the estuary has been found to be exposed to city sewage flowing out from a sewage farm located at Muttathara on the banks of the Parvathy - Puthanar water way which joins the estuary at Moonnattumukku. Thus, the whole ecosystem is face to face with an enormous load of pollutants emanating from a fastly growing city.
The estuary remains open to the Lakshadweep sea during periods of heavy flood water discharge from the Karamana river during rainy seasons and it remains closed when the flow becomes sluggish. When the estuary is open, the marine influence can be felt several kilometers interior to the river. The Parvathy - Puthanar canal connects the estuary with the Veli lake on the north and the Kovalam canal provides a water way to the Kovalam beach resort on the south.

Five stations were fixed for regular observations.

**Station I KARIMBUVILA.** (Photograph 1)

It is located on the Karamana river proper, about 1 km upstream the Thiruvallam bridge. The river has an average depth of 3.5 meters at this station. The water in this station was generally unpolluted and always flowing.

**Station II MOONNATTUMUKKU** (Photograph 2)

It is about 1.5 km downstream from station 1 on the estuary. The Parvathy - Puthanar canal joins the estuary at this point. This is the first point on the estuary where the sewage reaches the estuary after flowing through the Parvathy-Puthanar canal for about 2.5 km.

**Station III EDAYAR** (Photograph 3)

This station is located on the western arm of the estuary about 1.5 km away from station II. The Edayar island on the eastern side is bordered with patches of mangrove plants followed by extensive gardens of coconut palms. On the west lies the Poonthura fishing village.
Station IV PANATHURA (Photograph 4)

Station IV is located in the estuary at Panathura. The sand bar separating the estuary from the sea at this point is removed during periods of heavy flood water flow and it is reformed by the waves and the currents in the sea when the flow ceases with the retreat of the monsoon rains.

Station V POONTHURA (Photograph 5)

It is a station located outside the estuary mouth at Panathura in the open coast. The coast is a typical sandy shore.

SITE 2 ADIMALATHURA ESTUARY (Fig. 2)

The Adimalathura estuary is situated in the Kottukal Panchayat of Thiruvananthapuram district lying between 8° 20' - 8° 22' North latitudes and 77° 01' - 77° 03' East longitudes. It is one of the small estuaries in Kerala. The Balaramapuram stream joins the estuary at a place called Chappathu. The estuary opens to the Lakshadweep sea at Adimalathura. It is very shallow and the maximum depth is not exceeding 3 metres. The Adimalathura fishermen village, one of the most densely populated fishermen pockets in Kerala is located on the western bank of the estuary. Domestic sewage is the principal source of pollution. Retting of coconut husk also contributes to the degradation of the estuary. This estuary has a mouth which gets closed because of heavy deposition of silt and sand and the local people remove the sand so deposited almost every week, to prevent flooding of the nearby areas. When it is open, the sea water influence can be seen throughout the estuary and the stream that joins it.

Four contrasting locations were selected for regular monitoring.
Station VI CHAPPATHU (Photograph 6)

This station is located on the Balaramapuram stream at chappathu junction on the Vizhinjam- Poovar road. This station is about 2.5 km away from the estuary mouth. It is a shallow area and the maximum water depth is not exceeding 1.5 m.

Station VII ADIMALATHURA BRIDGE (Photograph 7)

This station is located near the Adimalathura bridge. An apparently impacted zone with pollution from sewage and retting of coconut husk and is bordered with thick vegetation on either side of the estuary. It is mainly a public utility zone.

Station VIII POZHIKKARA (Photograph 8)

This station is located inside the estuary at its mouth. It is the widest part of the estuary and is characterised by sandy bottom. Wave action is very high. The estuary mouth gets closed due to sand deposits quite often and the local people have to remove it almost every week to keep the area free from flash flooding. The depth of this station do not exceed 3 metres.

Station IX ADIMALATHURA (Photograph 9)

This is the open coast outside the estuary. The shore is sandy in nature and it is typically marine.
Fig. 1. Map of the poonthura estuary

Sampling stations
I Karimbuvila
II Moonnattumukku
III Edayar
IV Panathura
V Poonthura

Fig-1. Map of the poonthura estuary
Sampling stations:

VI Chappathu
VII Adimalathura bridge
VIII Pozhikkara
IX Adimalathura

Retting yard
Sewage disposing area

Fig.2. Map of the Adimalathura estuary
Photograph 1. Station 1 KARIMBUVILA

Photograph 2. Station II MOONNATTUMUKKU
Photograph 7. Station VII ADIMALATHURA BRIDGE

Photograph 8. Station VIII POZHIKKARA