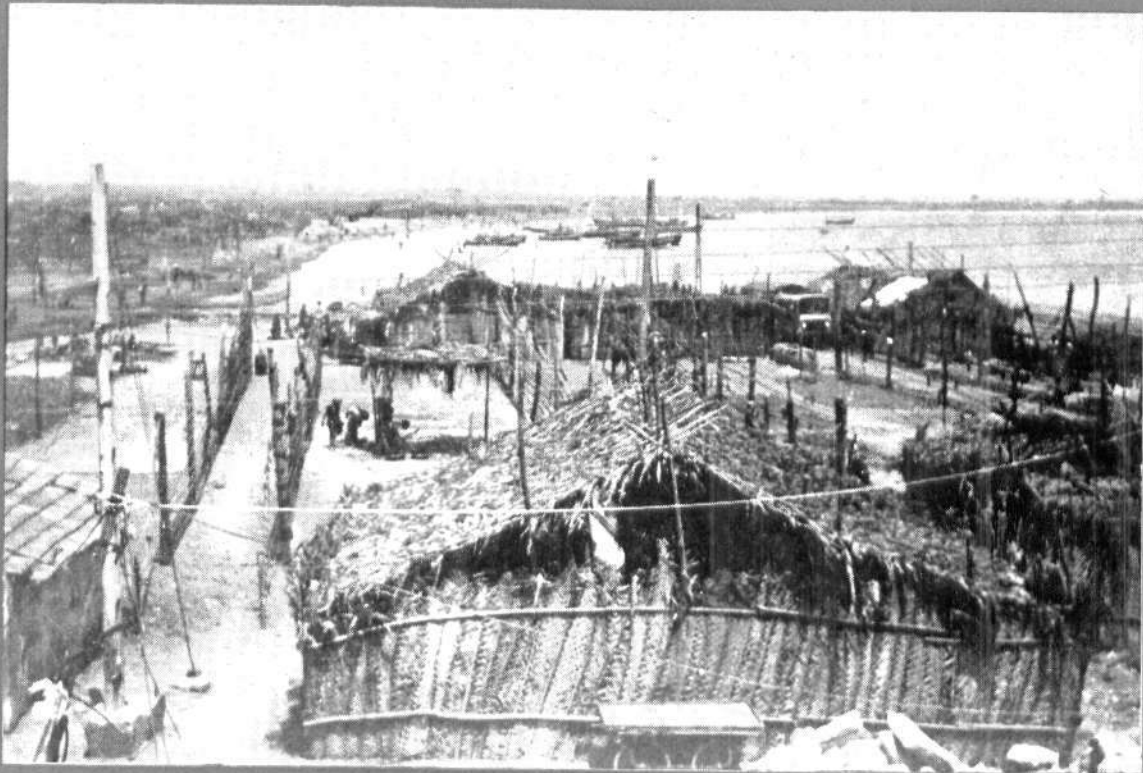




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WATER POLLUTION AND FISH MORTALITY IN ENNORE ESTUARY, MADRAS*

Mass mortality of fishes and aquatic organisms occur in Ennore estuary (13°14'N 80°20'E) from time to time due to water pollution. One such instance was observed from 5-9-1983 to 8-10-1983. Dead fishes were found floating and spread out for about 2 km distance in the region between Ennore Thermal Power Station and Ennore Railway Bridge (Fig. 1). The fish kill was particularly extensive on 30-9-1983. A brief account of this incident with analysis of relevant parameters to find out probable causes is given here.

Pollution problems are encountered in Ennore estuary as it receives industrial effluents and domestic sewage mostly in untreated condition. These affect water quality and living organisms. Major industries like Kothari Chemicals, Alkali Chemicals, Madras Refineries, Madras Fertilizers, Petrochemical industries, many other private industries and Government installation such as Ennore Thermal Power Station are located around Ennore estuary. It has been estimated that about 4,49,000 litres/day of industrial effluents carrying heavy metals are let out into this estuary by

these industrial establishments. Another source of pollution that poses danger to fishes and other aquatic life is the flow of domestic sewage, and about 4 million litres/day are discharged into this estuary (Tamil Nadu Water Supply and Sewerage Board, Report 1980).

Eventhough the bar mouth of this estuary is kept open throughout the year by dredging operations by Ennore Thermal Power Station for maintaining free flow of sea water into this estuary, a large number of fish, prawn and other organisms die every year in this estuary due to water contamination. The physico-chemical characteristics of the water such as temperature, salinity, dissolved oxygen, pH and water transparency were examined besides heavy metal concentrations and their consequent impact on the mortality of fishes in the vicinity of industrial and sewage waste discharge points. Representative samples of dead fishes were collected from various stations of the estuary such as Ennore Thermal Power Station, Buckingham Canal discharge point, railway bridge, travellers bungalow and bar mouth of the estuary. The percentage intensity of dead fishes was high (70%) at the Buckingham canal discharge point.

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The dead fishes collected, with their size range are as follows (Fig. 2): *Liza macrolepis* (85-265 mm), *Liza cunnesius* (65-100 mm), *Liza tade* (60-85 mm), *Rhynchorhamphus marginatus* (80-95 mm), *Etrophus suratensis* (50-70 mm), *Tilapia mossambica* (95-105 mm), *Leiognathus fasciatus* (55-90 mm), *Tetrodon immaculatus* (40-50 mm), *Triacanthus brevirostris* (65-70 mm), *Tachysurus jella* (40-45 mm), *Tachysurus dussumieri* (40-50 mm), *Platycephalus serratus* (110-205 mm), *Platycephalus biomaculatus* (110-190 mm), *Ambassis commersoni* (60-75 mm), *Anguilla bicolor* (700-900 mm) and *Scylla serrata* (50-60 mm).

31 to 62 cm. Further, the distribution and concentration of various heavy metals of the water in Buckingham Canal discharge point where the percentage intensity

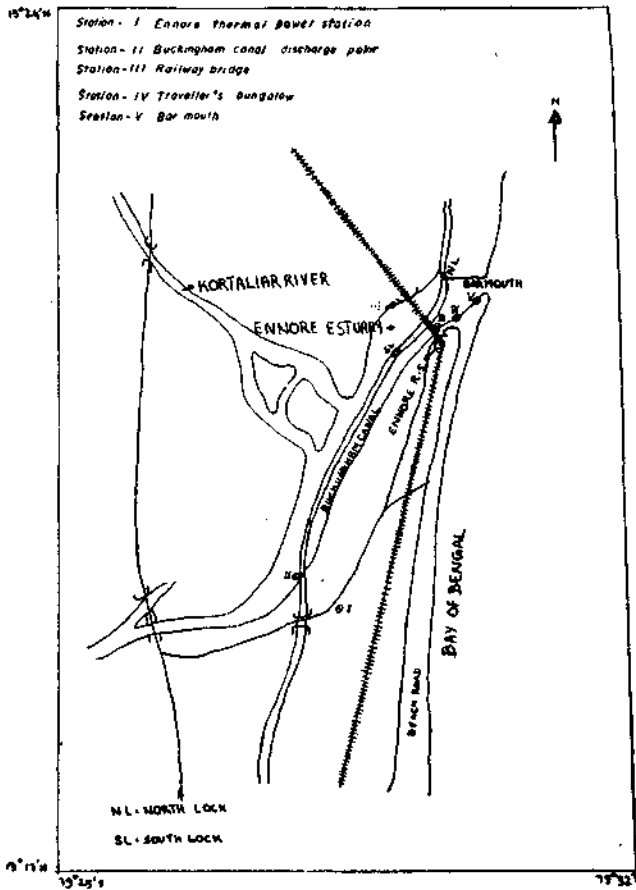


Fig. 1. Map showing location of sampling stations in Ennore estuary, Madras.

The analysis of various samples showed that temperature of water ranged from 30.0 to 33.6°C, salinity between 24.30 and 37.63‰ and dissolved oxygen content from 4.28 to 5.44 ml/l. The pH ranged from 7.67 to 8.11. The secchi-disc depth used as a measure of transparency of the water ranged from



Fig. 2. Fish mortality in Ennore estuary, Madras.

of fish mortality was high (70%) were analysed. They are ranked as follows: $Mg > Na > K > Al > Pb > Fe > Cd > Zn > Sb$ (51.2, 20.0, 9.8, 7.8, 0.9, 0.3, 0.2, 0.04 and 0.01 ppm respectively). The concentrations of heavy metals like Mg, Al, Pb, Zn and Cd were found to be higher when compared to natural concentrations in sea water. The possibility of the presence of increased levels of these heavy metals in the water can be surmised, as many industries release effluents, and Buckingham Canal discharges domestic sewage wastes. The mass mortality of fishes occurred whenever the vents were opened to release the water from the Buckingham canal into the estuary. This is usually done during monsoon period to relieve the pressure on the bunds of Buckingham canal. As a result, the organic debris and some heavy metals in the water at the bottom would be churned up; an activity that usually takes place, which is indicative of excessive pollution. Thus based on the present investigation, it may be stated that the presence of some metallic elements, with their synergistic effects would have poisoned the water resulting in the mass mortality of fishes and prawns and dislocation of the most bottom fauna from their habitat in this estuary. The role played by the low oxygenated water brought by the process of churning in the Buckingham canal during monsoon season cannot be overlooked.

