CHAPTER 8

NO IMPACT ZONE STUDIES

8.1 INTRODUCTION

8.2 Activity Impact analyses

Impact of various developments on Pulicat Lake have been analysed by identifying different existing activities. The activities are both natural and man-made. Different activity zones in Pulicat Lake were demarcated and displayed in the Fig.8.1. All the figures were prepared in the Arc view GIS platform with different thematic layers. The outcome of the results is discussed below.

8.2.1 AQUAFARMS

Aquafarms are active after 1990 after changing the agricultural practices in the channel part of the study area. Aquafarms are active in the southern side of the Pulicat Lake. All along the backwater channel, which connects Pulicat Lake and the Ennore Creek, the aquafarms are active. The intake water and outlet point are from the channel. Both semi-intensive and intensive farms are in operation. All the active farms are on the western side of the channel, south of Pazhaverkadu town (Pulicat town) and present up to the western side of the Kattupalli village. The active farms are demarcated in the imagery and shown in the Figure8.2. Nutrient concentration in the water samples collected from the outlet and intake points of the aquafarms. Nitrite concentration ranges from 0.023 to 0.031 with an average of 0.031 ppm, which is almost similar to that of the lake water (0.025ppm). Phosphate concentration ranges from 0.2 to 0.24 with an average of 0.222 ppm. The average phosphate concentration of the lake is 0.237 ppm. Hence the nutrient concentration in the waters near the farms are not changed due to aquaculture activity. But, if the activity continues in the present rate and farms are added in this zone, then the water quality will be affected by the excessive nutrient load and eutrophication along the channel .

8.2.2 AGRICULTURE

In the study region of Pulicat Lake intense agricultural activity is seen in the western side of the Pulicat Lake due to availability of water through small irrigation tanks. Paddy is the major crop cultivated in this region. The two islands (Irakkam and Venadu) in the central part of the lake have agricultural activity along the fringing regions fed by small pool like freshwater tanks/ponds. Developmental activities and the population growth have led to changes in agricultural land to settlements near Ponneri, which is present west of Pulicat Lake. During the monsoon period, freshwater inputs are more through the rivers Kalangi and Araniar. Input of more freshwater leads to rise in water level of the lake region, which makes flooding in the fringes of the island region causing flooding in the paddy fields (Fig. 8.3). Nitrite concentration in the water samples collected from the lake near the agricultural activity zones ranges from 0.18 to 0.27 ppm with an average of 0.23 and phosphate concentration ranges from 0.16 to 0.22 with an average of 0.19 ppm. The results from the water quality in the activity influencing zones reflect that the present level of agricultural activity is not contributing any nutrient load to the lake water and hence the impact due to this activity is within the acceptable limit.

8.2.3 SHELL MINING

The Pulicat Lake recorded the recent sea level fluctuations of Late Pleistocene - Holocene. Due to the lowering of sea level, the spit had been developed and the lagoon had been formed. Since the middle part of the present lacustrine ecosystem has once experienced the near shore environment rich accumulation of pelecypod shell are seen at a depth of around 40 cm to more than a meter. This shell accumulation is on an average 60 cm thick in the central part of the lagoon near the islands of Irakkam and Venadu and along the eastern sand dunes near Arangam (old) on Sriharikota Island. Rich accumulation of shells of Cerithidae sp, Melangina sp, Ostrea sp, Mytilus sp, Longimactra sp in the central part of the present lake supports the shell mining activity in this region (Fig. 8.4). These mined shells are mainly used in lime industries and for

mixing in poultry feeds. Around fifteen villages in the surrounding regions of Sunnambukulam are actively engaged in shell mining activity. Recently Andhra Pradesh Department of Forests and Wild Life have imposed restrictions on these activities as it disturbs the birds sanctuary. Earlier Department of Geology and Mining of Tamil Nadu has given license for this mining activity in Tamil Nadu region but now all the licences were cancelled and the issue is now in court of law. Our study showed that there is no threat to the bird population and ecology of the lake due to the shell mining. The only impact observed is the increase in turbidity level in water column during the mining time (i.e from 10.00 am to 3.00 pm of a day). Suspended sediment concentration in the shell mining region ranges from 81 to 92 mg/l which is within the limits of the SSC concentration (85 mg/l) of the entire lake.

8.2.4 ENNORE PORT

North Chennai Thermal Power Station (NCTPS) and Ennore satellite port located south of Kattupalli village are new introductory major activities that caused major land use changes in the study region. Including the SHAR these developmental activities occupies around 15 sq. km. Ennore satellite port is constructed to import coal for the North Chennai Thermal Power Station and to reduce traffic congestion in Chennai Port. The Ennore port was commissioned in 2001 and the approach channel of the port is facing south (Fig. 8.5). The northern breakwater is constructed in such a way that the impact on the northern coast erosion will be reduced considerably. According to the survey conducted by earlier researchers, the erosion will be minimum due to the presence of Ennore and Pulicat shoals. The south breakwater construction leads to closing of the Ennore creek mouth. Since the intake point of NCTPS and Ennore Thermal Power Station is from creek system the mouth being artificially kept open by repeated dredging by the Tamil Nadu Electricity Board. In the present scenario Pulicat Lake will not be affected by the erosion due to the north breakwater. The configuration of the coastline, presence of shoals in the northern side, artificial beach nourishment for 2 sq km in northern side of the port, all these will delay the process of northern side erosion due to the breakwater construction. The grain size analyses of the sediments collected from the

near by regions of the port showed medium to coarse sand sediments in the northern side of the northern breakwaters south of Kattupalli village. The south side sediments are recycled from the dredged materials of Ennore creek and they are fine sand sized particles. The beach profile survey conducted during different seasons on both side of the port show the accreting coast in the southern side and almost constant coast in the northern side of the port. After the construction of the port, the cyclonic storms during the recent past of two years are minimum and hence the impact of cyclones on coastal erosion in the Pulicat adjoining villages like Koraikuppam, Sattankuppam and Vairankuppam are minimum. The remedial coastal protection measures to control the erosion and accretion problems will be taken up after stabilization of the coastline i.e after two years.

8.2.5 NORTH CHENNAI THERMAL POWER STATION (NCTPS)

Coolant water for the Thermal Power Plant is taken from the Ennore creek on the southern side (Fig. 8.5). The hot water coming out of the Thermal Plant is discharged on the western side of the thermal plant on the Buckingham Canal, which joins in the Kortalaiyar creek system at a distance of 200 meters north of the discharge point. The discharged coolant water has water temperature up to 42°C, which is 8 to 10°C more than the ambient level. The impact of rise in temperature level is seen for 500 meters on both the sides from the discharge point in the creek system. The observed water temperature in the creek system within the 500 meters zone is around 36 - 37°C with a difference of 5°C to the normal system.

8.2.6 BAR MOUTH DYNAMISM

The bar mouth of Pulicat Lake is located on the northeastern side of Pulicat town. This is the only active opening between the lake and the Bay of Bengal to exchange water through tidal fluctuations. In the recent years this tidal inlet is being closed frequently and it has developed great pressure on the inland fishermen. Reasons for the closure of bar mouth is due to insufficient freshwater flow in the in-flowing rivers such as Kalangi, Araniar, etc. and due to accretion taking place in the coastal region near bar mouth.

8.2.7 BIODIVERSITY

Biodiversity of the Pulicat Lake ecosystem is very rich in all respects. This lake has been declared as Ramsar Site in order to protect the existing biodiversity of the lake. The Government of Andhra Pradesh has declared it as a Bird Sanctuary and banned the shell mining activity in and around the lake. From the study no threat has been identified against the degradation of biodiversity due to any of the activity.

8.2.7 ISLAND REGIONS

The two major islands situated within the lake such as Venadu and Irakkam are connected by the main land through ferry services operated by the village administration. In addition, for Venadu Island a limited jeep service is available by road to Sullurpet. In both the islands agriculture is a main activity and they are cultivating paddy crops. Rainwater stored in irrigation tanks is used for the agricultural purposes. Drinking water quality is also good in islands. Fishing and shell mining are other activities noticed in the islands.

8.2.8 COASTAL REGION

Certain impacts have been identified on the coastal region of the study area due to construction of port. Coastal erosion is noticed north of Kattupallikuppam fishermen village, located northern side of the Ennore Port. Similarly coastal accretion is noticed on both sides of Ennore Creek and near bar mouth region of Pulicat Lake. These developments have altered the shoreline configuration. Width of sand bar between the lake and the sea near Koraikuppam village is about 100 m only and the particular location is in danger because a severe storm will cause breach and the entire village will be affected.

8.3 No Impact Zones

From the studies undertaken, it is clearly seen that no adverse impacts are noticed due to various activities with in the Pulicat Lake in the present scenario. If the proposed developmental projects are undertaken in the Kattupalli region, definitely it will affect the lake ecosystem. Also, if the number of aquaculture farms increase in the region, the water quality of the lake will definitely be affected.

Fig. 8.1 Activities Zone in Pulicat Lake

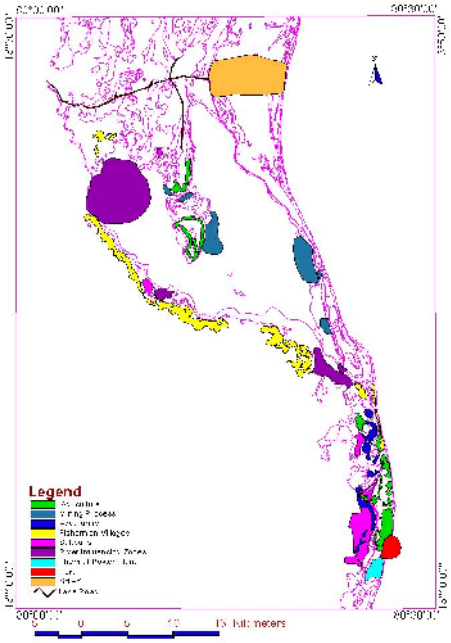

Fig. 8.3 Phosphate concentration in lake and Agricultural activity

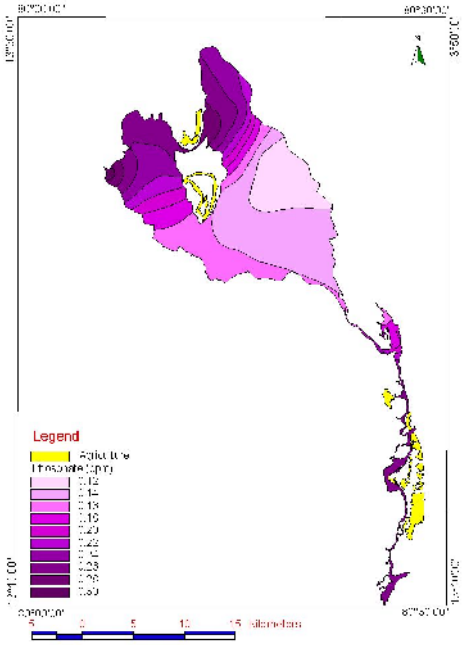

Fig. 8.4 Suspended Sediment concentration and Shell mining activity

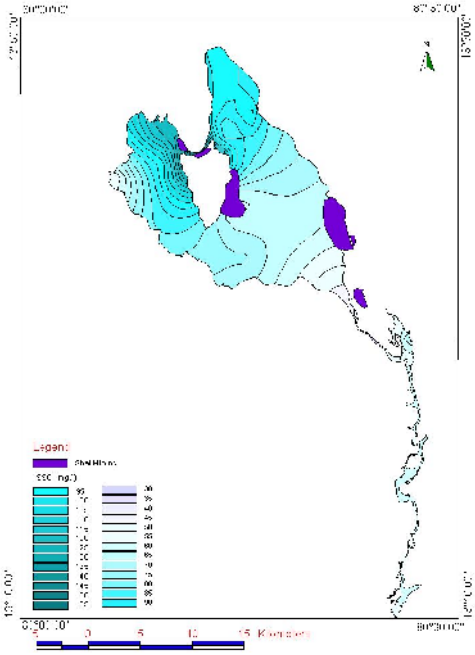

Fig. 8.2 Nitrate concentration in Lake and Aquafarm activity

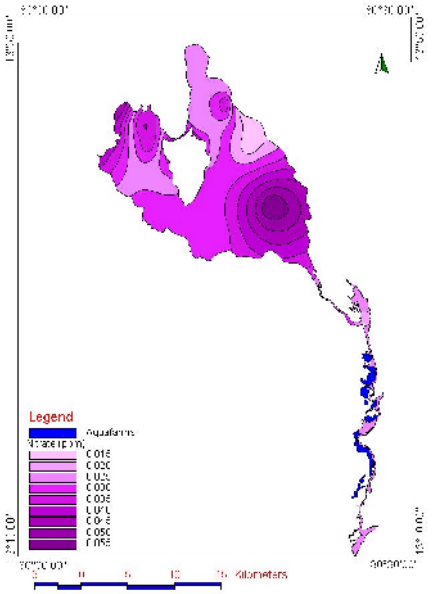
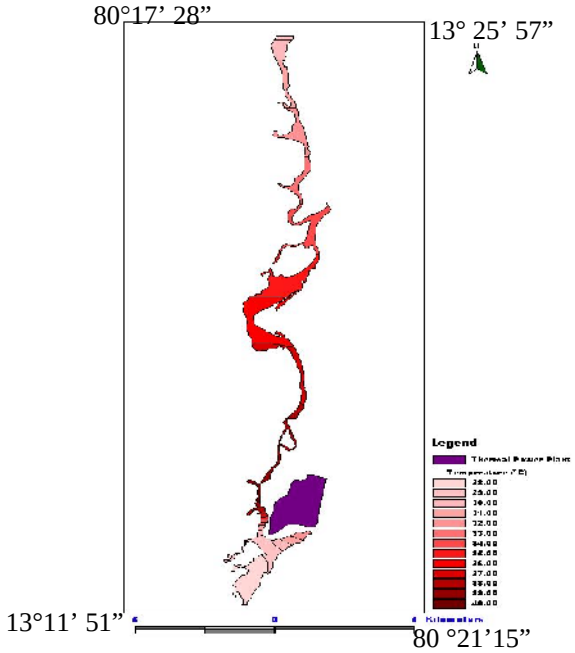
Fig. 8.5 Thermal Power plant influence on water temperature