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Observation of fish mortality in the mudflat of Siruthalaikadu Creek, Palk Bay, Southeast Coast of India

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ABSTRACT: The study discusses the massive mortality of fishes from the mudflats of Point Calimere Wildlife Sanctuary Wetland in India during July 2023, and examined the possible causes of this phenomenon. The physicochemical properties of water indicated that there was an evidence of reduction in water level, reduced dissolved oxygen (DO), low salinity, and acidic pH. The DO concentration varied from 0.3 to 1.2 mg/l, pH fluctuated between 5.5 and 6.4 and temperature ranged between 24.2 and 31°C. As a result it was found that abrupt fluctuations in temperature and salinity lead to low DO, which caused mass mortality of fishes.

Key words: Mass mortality, Mudflats, Point Calimere Wildlife and Bird Sanctuary, Water quality

Point Calimere Wildlife and Bird Sanctuary (PCWBS) is a Ramsar Site of South-eastern Coast (10°.19'N, 79°.38'E) of India, spanning an area of approximately 38,500 acres. It is well-known for its permanent and migratory bird species (Mohan *et al.*, 2020). This area has salt marshes, mangrove forests, backwaters, mudflats, grasslands, and tropical dry evergreen forest. The Siruthalaikadu creek, a choked form of lagoon located inside the PCWBS Ramsar site has grown with time and is now connected to the sea through an extremely narrow and deep mouth. This stream and refuge serve as a breeding or nursery ground for a variety of commercially important fish species as well as prawns and crabs (James *et al.*, 2023). The mudflats of Siruthalaikadu creek are a key interface between marine and terrestrial ecosystems and together with salt marshes are among the most significant and widespread coastal wetlands. These mudflats are the product of hydrodynamic activities occurring in the Cauvery Delta, where riverside sediments settle between spits and bars which offer shelter from wave action and the longshore currents. Tidal waters cross the steep berm and reach the mudflats on occasion. The firm interested in large-scale salt manufacturing in the region or for mariculture built a few barrages/

dykes in the mudflats. Sachithanandam *et al.* (2017), Saleem Raja *et al.* (2019), Thiruselvam (2022) were reported mass mortality of fishes from various parts of Tamil Nadu. PCMWS is the first Ramsar site of Tamil Nadu and many fishermen and farmers rely on the coastal wetlands for their living (Miththapala, 2013). Hence, Present study was carried out to document and to investigate the mass mortality of fishes from the mudflats of Siruthalaikadu creek, Palk bay, Southeast Coast of India.

MATERIALS AND METHODS

Information on mass mortality of fishes from the mudflats of Siruthalaikadu creek through local fisherman prompted us to make the visit to the spot. The fish samples were quickly gathered from the creek's mudflat sections, where the fishes were drifting in huge numbers owing to wind blow, and brought to the laboratory. The total amount of fish species and their mean length were recorded. Fish species were identified and formalin-preserved. On the location, water quality data such as temperature, salinity, dissolved oxygen (DO), and pH were recorded using Eutech Instruments Cyber scan series 600 water proof portable meter.

RESULTS AND DISCUSSION

Field observations revealed signs of fish mortalities in the mudflat. Due to tidal water outflow or increased temperature, half of the mudflat evaporated. The temperature of the water, salinity and DO ranged from 24.2 to 31°C, 12.5 to 26.45 ppt, and 0.3 to 1.2 mg/l, respectively. The pH varied between 5.5 and 6.4. Sachithanandam *et al.* (2017) reported the mortality of fishes from Ennore estuary and analysed the probable reasons associated with its physiochemical parameters presumed that increased levels of heavy metals due to industrial effluent discharges lead to mass mortality of fishes. No such industries are working around the mudflats of Siruthalaikadu creek, hence we ruled out the chances of pollution due to industrial effluent discharges.

Number and average size of fishes in centimeters (cm) collected from the mudflat region is furnished in Table 1. Milkfish *Chanos chanos* dominated in the number of fishes followed by Tilapia *Oreochromis mosambicus* and small-scaled terapon *Therapon puta*. The majority of the fishes was medium to small in size and was juveniles.

The preliminary survey was carried out at Siruthalaikadu creek to understand the origin of the issue. Based on the observations, the following information was acquired and reasons were compiled: During the monsoon and post-monsoon seasons, the water in the mudflat is as salty as sea water and hypersaline (>40 ppt) during the summer months. During high tide, seawater reaches the mudflat and provides life to aquatic species. The

water was so warm on 8th July 2023, leading to reduced DO, and the quick shift in temperature due to unexpected rain on 8th and 9th July 2023 lead to fluctuations in the salinity of the water. Similar incidents were used to happen primarily during summer days. According to Rahman *et al.* (2018), the low DO leads to mass fish mortality is caused by the mixing of thermally stratified water and creek turnover. Based on the results of a spot examination of water quality and a survey of local residents, we presumed that a low level of DO and a fast shift in salinity were the major causes of mass fish mortality. However, further studies are required to arrive at a more definitive conclusion.

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Table 1: Number and average size of fishes taken from the mudflat region

Sl. No	Reported fish species	Reported Numbers	Average size in cm
1.	<i>Chanos chanos</i>	135	12.5
2.	<i>Oreochromis mosambicus</i>	112	5.2
3.	<i>Therapon puta</i>	88	4.1
4.	<i>Mugil cephalus</i>	57	6
5.	<i>Eleutheronema tetradactylum</i>	44	5.5
6.	<i>Strongylura strongylura</i>	23	7.3
7.	<i>Pomadasys kaakan</i>	18	5

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