



# **STUDIES ON ESTUARINE AND MARINE BENTHIC DIATOMS FROM NAGAPATTINAM, SOUTH EAST COAST OF INDIA**

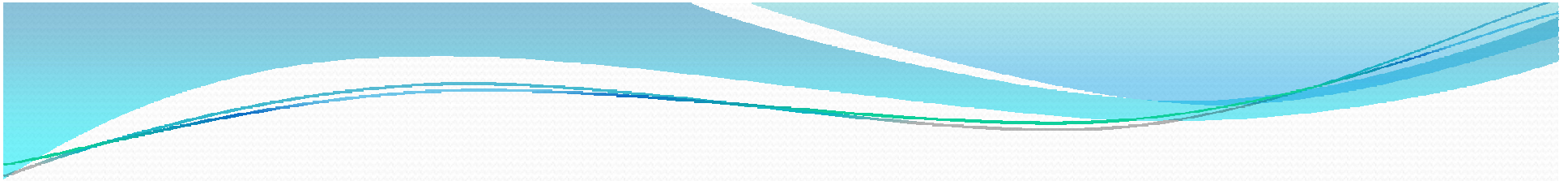
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# INTRODUCTION

- The benthic microalgae especially diatoms play vital role in establishing food chain relationships between different organisms in this ecosystem.
- Those diatoms occur abundantly, fix significant fraction of the organic carbon to support
- Diatom a major flora component of benthos are represented by a large number of species which occur in widely divergent habitats ranging from arctic sea to desert soil.

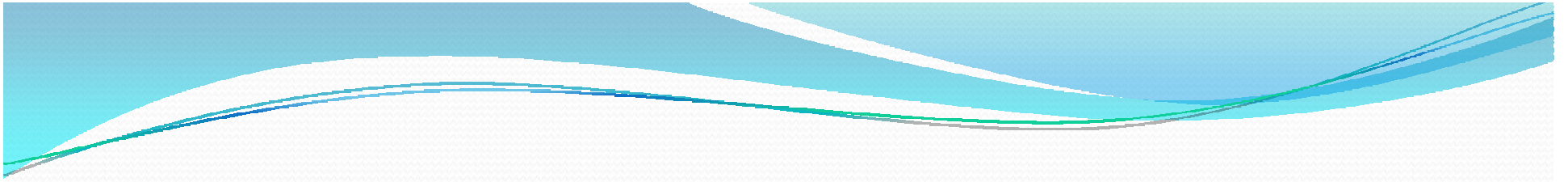


- **The estuarine benthic flats are often inhabited by rich diatom communities**
- **Estuary areas are subjected to strongly changing salinities due to the varying degree of mixing of sea water and freshwater, moreover, benthic algae living in the intertidal zone are exposed to rain and desiccation at low tide**
- **Benthic diatom is an important for community ecology to identify major patterns of community structure and to characterize and predict changes in those patterns in relation to environmental gradients.**

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- In shallow aquatic ecosystems with large intertidal regions , benthic microalgae are often important contributions to primary production.**
  - The production of benthic microalgae often exceeds that of phytoplankton and macroalgae in shallow aquatic ecosystems.**
  - Hence the present work an attempt has been made to study the estuarine and marine benthic diatoms from Nagapattinam, Southeast Coast of India.**

# PHYSIOGRAPHY OF THE STUDY AREA

- The sites selected for the present investigation are located in the Nagapattinam district in Tamilnadu state, India.
- The study areas situated on the South east coast of India in the delta region of the river Cauvery .
- The main branches of Cauvery Grand Anicut are the Kodamurutti, Arasalar, Virasolanar, Vikramanar and Kaduvaiyaru River. Nagapattinam enters into coastal region, having a total run of 34 km. Kaduvaiyaru river opens into the bay of Bengal on the east forming the estuary.

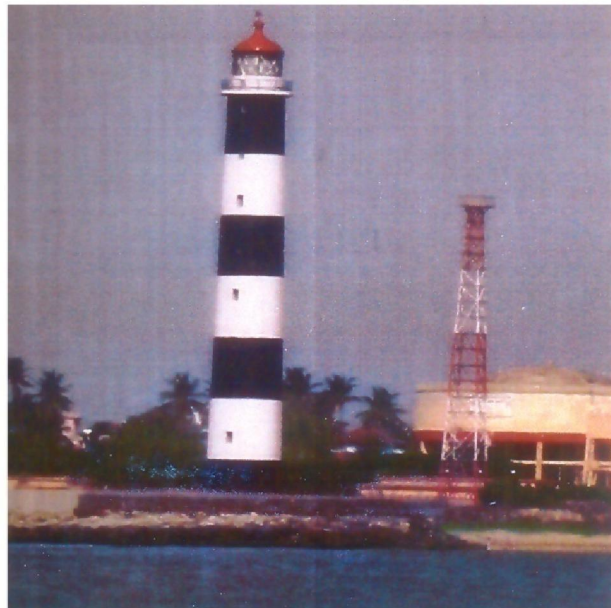


- **The river is narrow during summer season and wide during raining season due to heavy inflow of freshwater from the Mettur dam in the Cauvery river**
- **The mouth of the estuary is always open to the sea, and never gets closed completely even during summer months.**

Fig.I. Physiography of the study area



Station I - Estuary

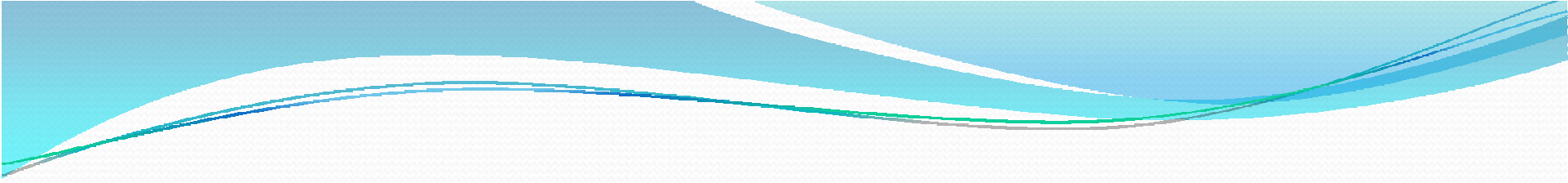


Station II - Marine

# MATERIALS AND METHODS

- Collection of sample by Amspoker and McIntrie (1979)
- Dissolved oxygen concentration was measured using the modified Winkler's method as described by Strickland and Parsons (1972),
- Salinity was estimated by using Hand Refractometer model ATACO, Japan.



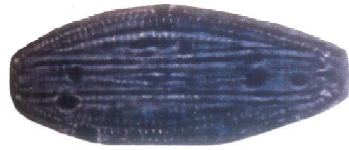
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- The water sample were also analysed for concentration of dissolved reactive silicate, inorganic phosphate and nitrate following the procedures described by Strickland and Parsons (1972).
  - The diatom taxa were identified using different classical working Boyer (1926-27), Hustedt (1927-66), Cupp (1943), Cleve-Euler (1951-55), Hendey (1964), Dsikacharry (1986, 1988).

1.	<i>Amphora coffeaeformis</i> var. <i>acutusclia</i> (Hutz) Hustedt.
2.	<i>Biddulphia aurita</i> (Lyngbya) Bneb & Godey.
3.	<i>Biddulphia rhombus</i> (Her) Wm. Sm.
4.	<i>Biddulphia Mobiliensis</i> (Bailey) Grun.
5.	<i>Biddulphia sinensis</i> gnew.
6.	<i>Bacteriastrum furcatum</i> shadb.
7.	<i>Bacteriastrum hyalinum</i> var <i>princes</i> (Castar)
8.	<i>Bacteriastrum delicatum</i> CI
9.	<i>Bacteriastrum cosmosum</i> (Pavill)
10.	<i>Coscinodiscus gigas</i> Ehneb
11.	<i>Coscinodiscus janicii</i> AS. Var. <i>arafuensis</i> Grun.
12.	<i>Coscinodiscus granii</i> Gough
13.	<i>Coscinodiscus asteromphalus</i> (Ehrenb)
14.	<i>Coscinodiscus oculus-iridis</i> (Her)
15.	<i>Chaetoceros lorenceana</i> Grun.

16.	<i>Compylodiscus biostatus</i> W. Smith
17.	<i>Coscinodiscus</i> sp.
18.	<i>Coscinodiscus</i> sp.
19.	<i>Coscinodiscus</i> sp.
20.	<i>Diplonosis carbro</i> Her
21.	<i>Hemialus membraceus</i> C1
22.	<i>Nitzschia kerguelensis</i> (O.meara) Hasle
23.	<i>Nitzschia flexa</i> Schumann
24.	<i>Navicula algida</i> Grun
25.	<i>Navicula granulate</i> Bailey
26.	<i>Navicula marina</i> Ralfs in Pritchard
27.	<i>Navicula Arabia</i> Grun
28.	<i>Navicula directa</i> (Castar.) De Toni
29.	<i>Nitzschia bilobata</i> Hantz
30.	<i>Nitzschia</i> sp.

31.	<i>Pluerosigma javanicum</i> Grun in CI Grun
32.	<i>Pinnularia reana</i> (Castar.) De Toni
33.	<i>Plagiogamma</i> sp.
34.	<i>Rhizosolenia setigera</i> Brightwell
35.	<i>Rhizosolenia alata</i> Brightwell forma indica (Peragallo) Ostenfeld
36.	<i>Synedra tabulate</i> (Ag) Kittz
37.	<i>Thalassiothrix longissima</i> cleve and Grunow
38.	<i>Thalassiothrix frauenfeldii</i> Grunow
39.	<i>Thalassiothrix leaniata</i> Jouse (Van Heurck)
40.	<i>Thalassionema nitzschioides</i> Grun.
41.	<i>Thalassiothrix eccentrica</i> (Ehrenb)(
42.	<i>Thalassiosira nanolineata</i> (Mann) Fry & Well et Hasle
43.	<i>Thalassiosira</i> sp.

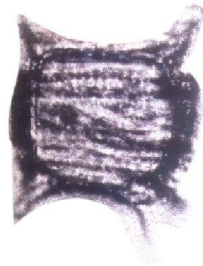
Plate - 1



1. *Amphora coffeaeformis* var. *acutuscila* (Hutz) Husted



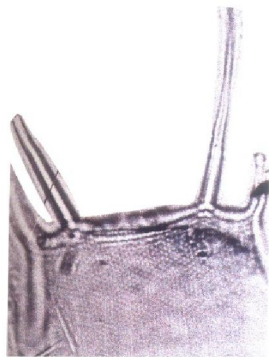
2. *Biddulphia aurita* (Lyngbya) Bneb & Godey



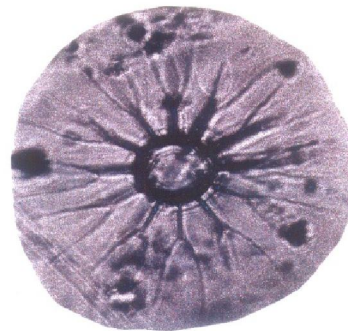
3. *Biddulphia rhombus* (Her) Wm. Sm.



4. *Biddulphia mobiliensis* (Bailey) Grun.

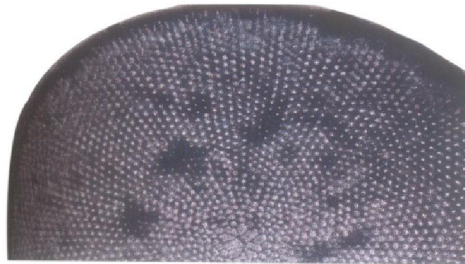


5. *Biddulphia sinensis* Gnew.



6. *Bacteriastrum furcatum* shadb.

Plate - 4



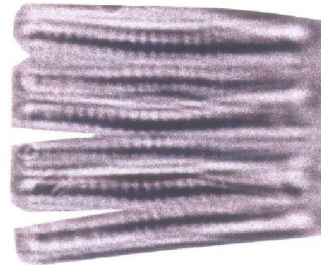
19. *Coscinodiscus* sp.



20. *Diplonosis carbro* Her



21. *Hemialus membraceus* Cl



22. *Nitzschia Kerguelensis* (O. mears) Hasle



23. *Nitzshia flexa* Schumann

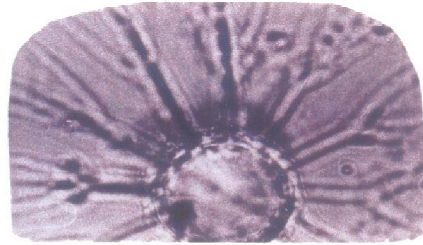


24. *Navicula algida* Grun

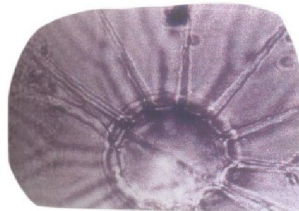
Plate - 2



7. *Bacteriastrum hyalinum* var *princeps* (Caster)



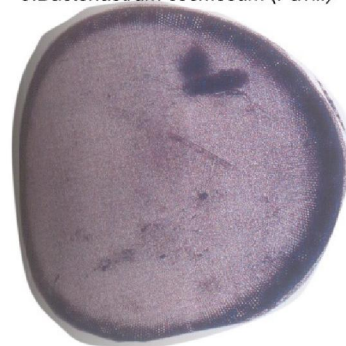
8. *Bacteriastrum delicatum* C1



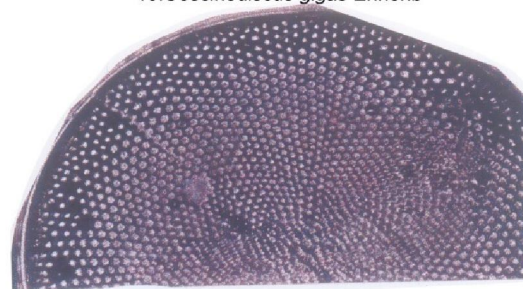
9. *Bacteriastrum cosmosum* (Pavill)



10. *Coscinodiscus gigas* Ehnenb



11. *Coscinodiscus janiclii* A.S. var. *arafuensis* Grun.

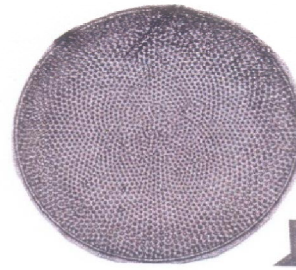


12. *Coscinodiscus granii* Gough

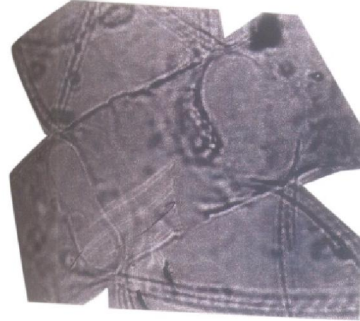
Plate - 3



13. *Coscinodiscus asteromphalus* (Ehrenb)



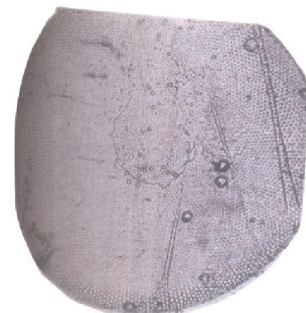
14. *Coscinodiscus oculus-iridis* (Her)



15. *Chaetoceros lorenceana* Grun



16. *Compylodiscus bicostatus* W.Smith



17. *Coscinodiscus* sp.



18. *Coscinodiscus* sp.



Plate - 5



25. *Navicula graunlata* Bailey



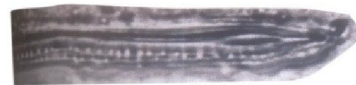
26. *Navicula marina* Ralfs in Pritchard



27. *Navicula arabica* Grun



28. *Navicula directa* (Castar.) De Toni



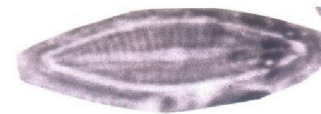
29. *Nitzschia bilobata* Hantz



30. *Nitzschia* sp.



31. *Pluerosigma javanicum* Grun in ClGrun



32. *Pinnularia reana* (Castar.) De Toni

Plate - 6



33. *Plagiogamma* sp.



34. *Rhizosolenia setigera* Brightwell



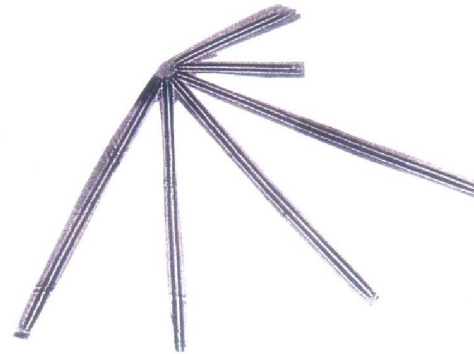
34. *Rhizosolenia alata* Brightwell (Peragallo)  
Ostenfeld



36. *Synedra tabulata* (Ag) Kutz

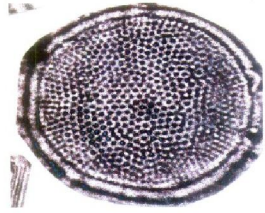


37. *Thalassiothrix longissima* Cleve (Grunow)

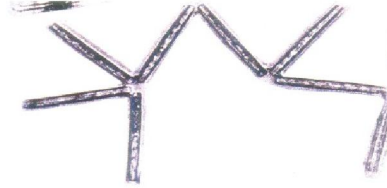


38. *Thalassiothrix frauenfeldii* Grunow

Plate - 7



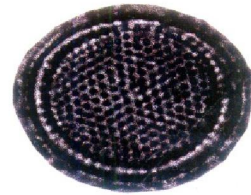
39. *Thalassiothrix leaniata* Jouse  
( Van Heurck )



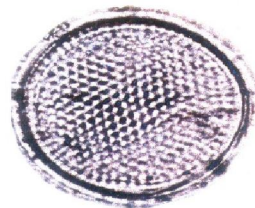
40. *Thalassionema nitzschioides*  
Grun.



41. *Thalassiothrix eccentrica*  
(Ehrenb)



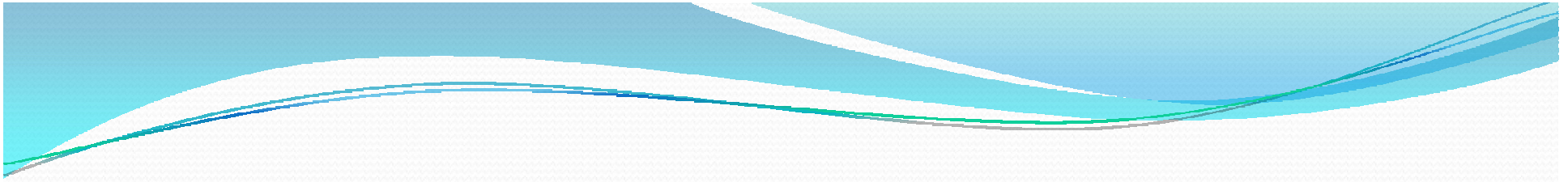
42. *Thalassiosira nanolineata* (Mann)  
Fry & Well et Hasle




43. *Thalassiosira* sp.

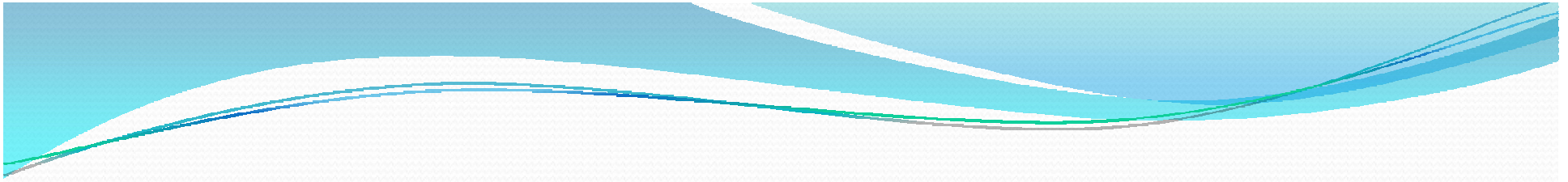
# Summary and Conclusion

- The Present study on the estuarine and marine benthic diatoms from Nagapattinam, South east Coast of India was carried out for a period of one year from September 2006 to August 2007.
- For the study, two stations were selected, Station I is located in the Kaduvaiyaru estuary and Station II located in the Nagapattinam coast.
- Study concentrated attention on the systematics of benthic diatoms and the influence of meteorological and physico-chemical factors on their seasonal distribution.

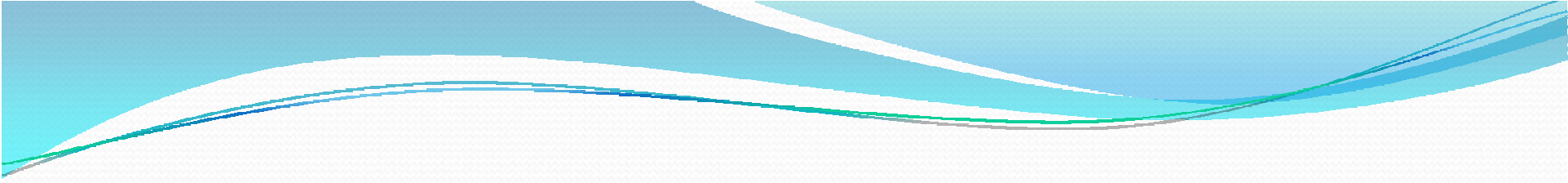


- During the study period, a total of 43 species of benthic diatoms were recorded from both stations. The most common genera were *Amphora*, *Biddulphia*, *Chatoceros*, *Coscinodiscus*, *Navicula*, *Nizschia*, *Rhizosolenia* and *Thalassiothrix*.
- The benthic diatom population density at both stations was high during postmonsoon and summer season when fairly high temperature were recorded.

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- Hydrogen ion concentration of the study area showed alkaline nature of the water.
  - The alkaline nature was due to the close proximative of the study area to the adjacent channels which influence the pH during summer with regard to the salinity and dissolved oxygen high during postmonsoon season as their was a large influence of freshwater into the study areas which lowering the salinity and enhanced the dissolved oxygen content.



- Nutrients such as reactive silicate, dissolved nitrate, total phosphorous and also soil nutrients such as organic matter, total nitrogen, C:N ratio, sodium and chloride showed higher concentration during premonsoon and monsoon due to land runoff caused by monsoon floods.
- Lower concentration of this nutrients were recorded during summer associated with high production of benthic diatoms.

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- Benthic diatoms forms the primary producer in all aquatic ecosystems on the water bodies.
  - If any disorders in this ecosystem it will affect the entire food chain pattern. The study conducted now and the data collected is inadequate to draw final conclusion.
  - The study area to be conducted for more than two years will form the basis for comparison in future to identify the changing status of this environments and effective management.



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THANK YOU