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Coastal Regulation

in Tamil Nadu



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Coastal Regulation in Tamil Nadu

Tamil Nadu is the southern most state in India, flanked by Andhra Pradesh, Karnataka on the north / North West; Indian Ocean on the south; Kerala on the west and Bay of Bengal on the east. The coastline of Tamil Nadu has a length of about 1076kms, constitutes about a 15% of the total coastal length of India and stretches along Bay of Bengal, Arabian Sea and Indian Ocean. Ports, fishing harbors and a variety of coastal industries like nuclear thermal power plants, refineries, fertilizer, marine chemicals are situated on the coast. Chennai is an important coastal and mega metropolitan city of India having a major port and many coastal industries. The coastal region is a place of hectic human activity owing to urbanization and industrialization resulting in human interference of rapid development. In recent years, the coastal ecosystems are highly disturbed and very much threatened, encountering problems like pollution, siltation, erosion, flooding, salt water intrusion, storm surges etc.

In order to protect coastal environment and to regulate development activities in the coastal areas, Government of India has issued a Coastal Regulation Zone Notification in 1991 under Environment Protection Act. As per this Notification, in coastal areas a) the land area between Low Tide Line (LTL) and High Tide Line (HTL) b) 500 meters land area on the landward side from High Tide Line, c) 100 meters on both sides of tidal influenced water bodies have been declared as Coastal Regulation Zone (CRZ). Ministry of Environment and Forest (MoEF), Government of India declares the coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters which are influenced by tidal action (in the landward side) upto 500 metres from HTL and the land between the LTL and the HTL as Coastal Regulation Zone (CRZ); and imposes with effect from the date of this Notification, the following restrictions on the setting up and expansion of industries, operations or processes, etc. in the said CRZ.

Table 1. Coastal Statistics of Tamil Nadu

Name	Area	Name	Area
Coastal length	1076 km	Marine parks and Sanctuaries	10,500
Number of coastal villages	591	Coastal shelter belts	7549 (ha)
Coastal population	6,98,268	Major ports	3
Exclusive Economic Zone (EEZ)	0.19million sq.km	Minor ports	24
Coastal shelf	41412 km ²	Fishing harbour	3
Ecological Sensitive Areas (in Km ²)		Fish landing centres	13
Mangroves	33.14		
Coral reefs	63.22		
Lagoons	252.04		
Sand dunes	1437.6		
Mudflats	148.8		



Source: Institute for Ocean Management, 2009

(I) Coastal Area Classification and Development Regulations

For regulating development activities, the coastal stretches with in 500 metres of High Tide Line on the landward side are classified into four categories, namely

i. CRZ-I : Areas that are ecologically sensitive and important, such as national parks / marine parks, sanctuaries, reserve forests, wildlife habitats, mangroves, corals / coral reefs, areas close to breeding and spawning grounds of fish and other marine life, areas of outstanding natural beauty / historically / heritage areas, areas rich in genetic diversity, areas likely to be inundated due to rise in sea level consequent upon global warming and such other areas as may be declared by the Central Government or the concerned authorities at the State / Union Territory level from time to time. The CRZ I area falls between LTL and HTL.

ii. CRZ-II: The areas that have already been developed upto or close to the shoreline. For this purpose, "developed area" is referred to as that area within the municipal limits or in other legally designated urban areas which is already substantially built up and which has been provided with drainage and approach roads and other infrastructural facilities, such as water supply and sewerage mains.

iii. CRZ-III: Areas that are relatively undisturbed and those which do not belong to either Category-I or II. These will include coastal zone in the rural areas (developed and undeveloped) and also areas within Municipal limits or in other legally designated urban areas which are not substantially built up.

iv. CRZ-IV: Coastal stretches in the Andaman & Nicobar, Lakshadweep and small islands, except those designated as CRZ-I, CRZ-II or CRZ-III.



(II) Coastal Management Zone (CMZ) Notification

The Ministry of Environment and Forests has brought out a draft Coastal Management Zone Notification 2008. This notification is based on the concept of setback line. The setback line means "a line demarcated along the coast, based on its vulnerability to sea-level rise, flooding and shore line changes" as per Guidelines in the CMZ notification. The Ministry setup the Prof. M.S. Swaminathan Committee in 2004 to review the CRZ and the report was submitted to MoEF in February 2005. The committee feels that the current practice of fixing CRZ based on HTL is not the best practice and is less scientific. The committee has recommended seven parameters for mapping the vulnerability line and guidelines has been issued. The parameters are elevation, geology, geomorphology, sea level trends, horizontal shoreline displacement, tidal ranges and wave heights. These are based on the best practices adopted in countries such as the United States, Canada, United Kingdom, etc. The Committee has recommended the reclassification of the coastal zone into four Zones i. e.:

i. Coastal Management Zone-I : consists of areas designated as Ecologically Sensitive Areas such as Mangroves, Coral reefs, Sand Dunes, Inland tide/water bodies such as estuaries, lakes, lagoons, creeks & straits, Mudflats, Marine parks and sanctuaries, Coastal forests & wildlife, Coastal fresh water lakes, Salt Marshes, Turtle nesting grounds, Horse shoe crabs habitats, Seagrass beds, Sea weed beds, Nesting grounds of migratory birds.

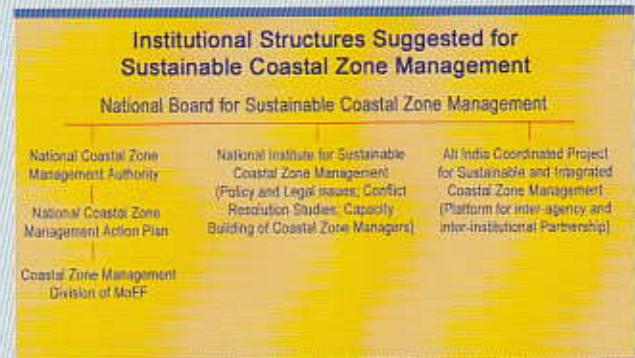
ii. Coastal Management Zone-II - consists of areas identified as Areas of Particular Concern such as economically important areas, high population areas and culturally /strategically important areas. The administrative boundaries of these areas would be boundaries of CMZ-II.

iii. Coastal Management Zone-III - consists of all other open areas including the coastal seas but excluding those areas classified as CMZ-I, CMZ-II and CMZ -IV.

iv. Coastal Management Zone-IV - consists of Islands of The Andaman and Nicobar and Lakshadweep.

The Committee has suggested Integrated Coastal Zone Management Approach for managing the coastal areas. After taking into account the recent Tsunami, the Committee has

laid emphasis on demarcation of vulnerability line all along the coastal areas and has suggested developmental activities to be regulated on the seaward side of the vulnerability line. Since the coastal management is a multi-disciplinary subject, the Committee has suggested a National Sustainable Coastal Zone Management Institute along with organisational structure to address issues relating to policy, law, conflict resolution and to creating public awareness. The Committee has laid special emphasis on developing bio shields all along the coastal areas by intensive plantation of mangroves, casuarina, etc.



Report on ICZM Plan from Pulicat lake upto Palar River

The overall objective of an integrated management programme like ICZM, is to provide the best long-term and sustainable use of coastal natural resources and perpetual maintenance of the most beneficial natural environment. It is a process of governance and consists of the legal and institutional framework necessary to ensure that development and management are integrated with environmental goals and are made with the participation of those affected. The management issues are based on scientific knowledge derived from several scientific investigations on coastal habitats as well as coastal and oceanic processes. It has proven to be an effective general framework for dealing with conflicts arising from interactions of the various uses of coastal areas. The IOM, Anna University has prepared this report for 4 sectors in Chennai and identified coastal erosion and accretion, degradation of water quality in rivers, beaches and coastal waters, of multi-sectoral organizations in the sustainable utilization of coastal resources and management (ICZMP Report, 2006).

III. Initiatives by the Department of Environment under the World Bank Assistance

1. Demarcation of High Tide Line (HTL)

Under the Emergency Tsunami Reconstruction Project (ETRP) the demarcation of HTL (1:5,000 scales) along the coast of Tamil Nadu was awarded to Institute of

Remote Sensing (IRS) Anna University. The IRS, Anna University has submitted the final maps which includes information on Low tide Line (LTL) and HTL (100 mts, 200 mts and 500 mts from HTL). These maps have been verified in the coastal areas of Tamil Nadu using Global Positioning System (GPS) by the officials of the Department of Environment. After the completion of the project, these maps will be available to the public.

2. Erection of Stone Pillars on High Tide Line reference points

In order to facilitate the coastal community, planners, stakeholder and revenue officials HTL stone pillars have been erected in Tiruvallur, Chennai and Kancheepuram districts. The erection of stone pillars for the remaining districts is under progress.

3. Preparation of Integrated Coastal Zone Management Plan (ICZMP) and Coastal Vulnerability Maps of Tamil Nadu and preparation of Training Modules

The coast of Tamil Nadu is replete with several economic activities like industry, tourism and fisheries. To minimize the conflicts of interest between various competing activities, an appropriate management plan rationally integrating the activities of all the stakeholders is essential. In order to achieve economic prosperity without sacrificing ecological security, Integrated Coastal Zone Management Plan is being prepared for the coastline of Tamil Nadu. The setback lines in the coastal areas will also be drawn based on the vulnerability of the coast to natural and man made hazards. For the purpose of assessing the vulnerability of the coast, seven parameters are taken into account viz., elevation, geology, geomorphology, sea level trends, horizontal shore line displacement (erosion / accretion), tidal ranges and wave heights. The Integrated Coastal Zone Management Plan and Coastal Vulnerability Maps are being prepared by DHI (India) Water & Environment.

Pollution Hotspots along the Coast of Tamil Nadu

The coastal areas of Tamil Nadu are assuming greater importance owing to increasing human population, urbanization and accelerated industrial activities. There are about 12,000 industries in Tamil Nadu out of these 5,500 industries are located in coastal districts and 2,500 are situated near the coasts. The major congregation of industries along Chennai coast where 1500 industries are located. The group wise distribution of industries along the Chennai coast are as follows: Electricity, Gas and water (35%); Rubber, Plastic, Petroleum and coal products (9.5%); Machine tools (9.3%); Paper and paper products (5.5%); metal products (5.1%) and others (26.3%) (GoTN, 1995). Major coastal activities responsible for coastal/ marine pollution in Tamil

Nadu are discharge and disposal of treated (1.8mld) / untreated sewage and industrial wastes; discharge of industrial coolant waters, harbour activities such as dredging, cargo handling, dumping of ship wastes, spilling of cargoes such as chemicals and metal ores, oil transport, fishing activities such as mechanized fishing vessels movements, draining of waste oil, painting of fishing vessels, scrapping of metal lining of fishing vessels, dumping of wastes and trash fishes, oil exploration and oil refining activities, recreation and tourism activities, salt production etc.

Table 2. Pollution hotspots along the coast of Tamil Nadu

S.No.	District	Nature of Pollution
1	Thiruvallur	Thermal, domestic sewage, industrial, chemical
2	Chennai	Harbour, domestic sewage, industrial, chemical
3	Kancheepuram	Thermal, domestic sewage, industrial, chemical, textile, tannery and tourism
4	Villupuram	Domestic sewage, industrial, chemical, aquaculture waste
5	Cuddalore	Domestic sewage, industrial, chemical, aquaculture waste, harbour
6	Nagapattinam	Domestic sewage, aquaculture waste, tourism
7	Thiruvarur	Aquaculture waste, muthupet swamps
8	Thanjavur	Domestic sewage, sethubava chatram
9	Pudukottai	Domestic sewage, oil & fish, industrial, aquaculture waste
10	Ramnad	Domestic sewage, fishing harbour, aquaculture waste
11	Tuticorin	Thermal, domestic sewage, industrial, chemical, salt, tourism, aquaculture waste
12	Thirunelveli	Domestic sewage, industrial, nuclear
13	Kanyakumari	Domestic sewage, fishing waste, tourism

Table 3. Accretional areas along Tamil nadu coast

S.no.	Site	Length(m)	Rate(m/yr)
1	Cuddalore (N)	1538	8.00
2	Point Calimere	966	3.40
3	Cuddalore (S)	483	2.98

4	Marina Beach	2968	1.70
5	Ennore	3265	1.30
6	Foreshore estate	2300	1.09
7	Ammappattinam	3600	0.72
8	Manakudi	3650	0.57
9	Thiruchendur	1325	0.33
10	Kilakarai	2900	0.29
11	Mahabalipuram	5450	0.25
12	Muttom	3000	0.17
13	Rameswaram	3295	0.06

Source: Database on Coastal Information of T.N, 2008

Table 4. Erosional site along Tamil Nadu

S.no.	Site	Length(m)	Rate (m/yr)
1	Royapuram	5380	6.60
2	Pulicat	710	3.20
3	Tranquebar	760	1.80
4	Kanathur	700	1.74
5	Kanniyakumari	240	1.40
6	Elliot Beach	2090	1.28
7	Kolachal	1750	1.20
8	Manapadu	1600	1.10
9	Pallam	2600	0.93
10	Uvari	2600	0.86
11	Midalam	2500	0.84
12	Kovalam	3150	0.81
13	Poompuhar	1905	0.65
14	Manavalakurichi	3500	0.60
15	Erumanthurai	5400	0.56
16	Mandapam	2194	0.25
17	Pudhucherry	1190	0.15
18	Nagapattinam	4270	0.11

Source: Database on Coastal Information of T.N, 2008

In Tamil Nadu the coastal erosion accrued in Ennore, Mahabalipuram, Rameswaram and Kanniyakumari. Both erosion and accretion are taking place in Gulf of Mannar and Rameswaram. A coastline behavioral study carried out by the Institute of Hydraulics and Hydrology, Poondi, revealed that the low lying area like Nagapattinam has been identified as potential areas for inundation due to sea level rise. Accretion or erosion sites along Tamil Nadu coast are alarming in nature with respect to land, lives and properties. The natural littoral transport processes along the coastal region leads to changes in the shoreline during the past 25 years. A large number of man made developments towards seaward alter the coastal dynamics. The maximum accretion occurred in the coastal areas of Mahabalipuram (5450m), Manakudi (3650m), Ammapattinam (3600), Rameswaram (3295 m), Marina beach (2968m) and Ennore (3265m). Also the maximum erosion occurred in Royapuram (5380m), Kovalam (3150m), Uvari & Pallam (2600m) and Midalam (2500m).



Fig.1. Erosion /Accretion along Chennai coast

VI. Ecologically Important areas in Tamil Nadu

Table 5. Ecologically Important Coastal Areas

District	Identified Area	Ecological Sensitive for	Location	Area (km ²)
Thiruvallur	Pulicat Lake	Lagoon	13°26'-13°43'N 80°03'-80°18'E	252.04
Cuddalore		Mangroves	11°24'-11°27'N 79°46'-79°48'E	10.61
Nagapattinam	Vedaranyam Muthupettai	Mangroves	10°15'-10°35'N 79°20'-79°55'E	24.53
Ramnad	Gulf of Mannar	Coral reefs	8°45'-9°25'N 78°5'-79°3'E	63.22

(i) Pulicat Lake

The Pulicat Lake is extending over the Ponneri and Gummidipundi taluk of Thiruvallur district in Tamilnadu and Sulurpet and Tada Mandals of Nellore district in Andhra Pradesh and covers an area of about 461 km². The average depth of the lake is about 1.5m and the minimum and maximum depth varies between 0.5 to 6.0m respectively. The total water spread area of the Pulicat Lake in 1700 AD is around 481km², but the present area is only 281km². It shows that the lake area is shrinking by 200km² in 300 years. Pulicut lagoon is the feeding ground for local and long distance migrant bird species. Long distance migrants like the Pelican, flamingo, painted stork, spoon-billed stork, snake bird and sand piper and variety of bird species feed on aquatic flora and fauna. Besides several species of crustaceans, brachiopods, edible and non-edible fishes, and mollusks are present in Pulicut lake, providing food for secondary and tertiary consumers of the food chain, namely migrant birds. About 50,000 fisher men are depending on Pulicut Lake (Current Science, 2008).



(ii) PITCHAVARAM

Pichavaram is known for its unique mangrove ecosystem. Pichavaram is located in the northernmost part of the Cauvery delta, in the Vellar-Coleroon estuarine complex and has many islands separated by intricate water-ways. Covering an area of over 400 hectares, it is traversed by a large number of channels and creeks which connect the Coleroon estuary in the South and Vellar estuary in the north.

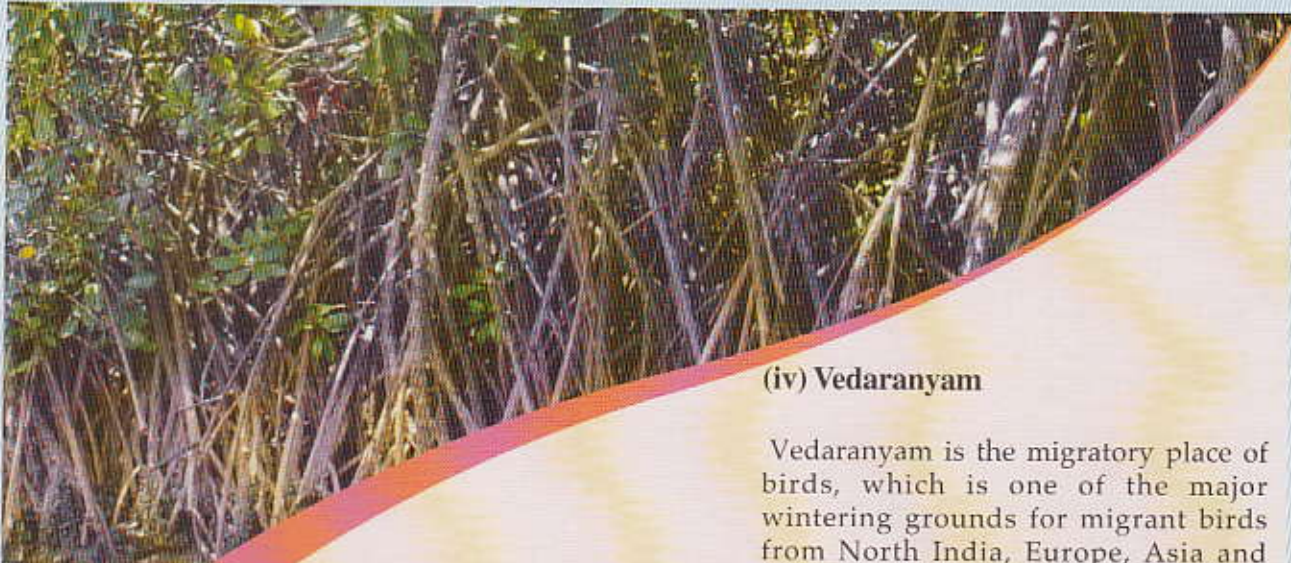
The Pichavaram mangrove wetland consists of 3 Reserve Forests - Killai, Pichavaram and Pichavaram Extension area. The biological diversity of Pichavaram is extensive and rich. The mangroves are distributed in varying degrees of abundance, supporting an abundant growth of oysters, important crustaceans, several varieties of fish and specie of marine turtle, the Olive Ridley. Pichavaram is also an important habitat for a variety of resident and migratory waterfowls and other birds, with over 200 species having being recorded from here. These Mangrove systems play home to the common otter, jackals, water snakes, water dogs and foxes as well. The wetlands are rich in fishery resources, including a variety of species of fish, oysters and green mussels and over 26 species of finfish, 7 species of prawns and 4 species of crabs.



(iii) Gulf of Mannar Biosphere Reserve

The Gulf of Mannar Biosphere Reserve covers an area of 1,050,000 hectares on the south-east coast of India across from Sri Lanka. It is one of the world's richest regions from a marine biodiversity perspective. The biosphere reserve comprises 21 islands with estuaries, beaches, forests of the near shore environment, including a marine component with algal communities, sea grasses, coral reefs, salt marshes and mangroves. Among the Gulf's 3,600 plant and animal species are the globally endangered sea cow (Dugong dugon) and six mangrove species endemic to peninsular India (UNESCO website). In September 1986 the Gulf of Mannar Marine National Park was declared, which includes all the 21 islands. In addition to this, in 1989 the GoM was also declared as "Marine Biosphere Reserve" covering an area of 10,500 sq.km from Rameswaram to Kanyakumari.



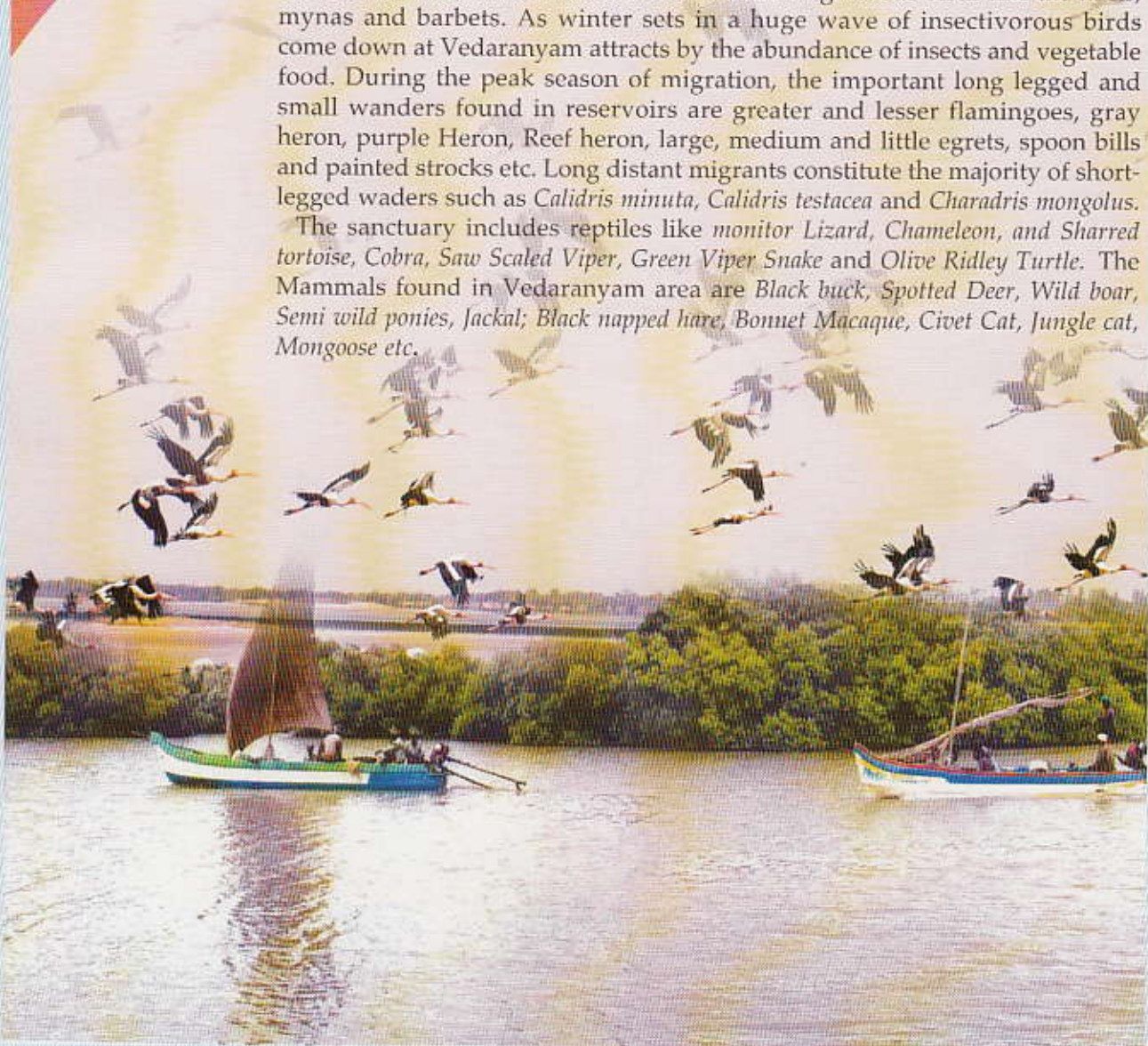


(iv) Vedaranyam

Vedaranyam is the migratory place of birds, which is one of the major wintering grounds for migrant birds from North India, Europe, Asia and

Africa. These swamps host around 240 species of birds both migratory and resident. Among this 48% is aquatic and the rest is terrestrial. The migrants include *Garganey*, *teals*, *Shovellers*, *Whistling teals*, *Caspian terns*, *Godwits*, *Golden plovers*, *Great stone plover*, *Sand pipers*, *Little stints*, *Red Shanks*, *Green Shanks*, *Ringed Plovers*, *Reef Heron*, *Whimbrels* and *red necked Phalacrocorax*. During spring the trees and shrubs with wild berries attract frugivorous birds like the koels, mynas and barbets. As winter sets in a huge wave of insectivorous birds come down at Vedaranyam attracts by the abundance of insects and vegetable food. During the peak season of migration, the important long legged and small wanders found in reservoirs are greater and lesser flamingoes, gray heron, purple Heron, Reef heron, large, medium and little egrets, spoon bills and painted strocks etc. Long distant migrants constitute the majority of short-legged waders such as *Calidris minuta*, *Calidris testacea* and *Charadris mongolus*.

The sanctuary includes reptiles like *monitor Lizard*, *Chameleon*, and *Sharred tortoise*, *Cobra*, *Saw Scaled Viper*, *Green Viper Snake* and *Olive Ridley Turtle*. The Mammals found in Vedaranyam area are *Black buck*, *Spotted Deer*, *Wild boar*, *Semi wild ponies*, *Jackal*; *Black napped hare*, *Bonnet Macaque*, *Civet Cat*, *Jungle cat*, *Mongoose* etc.



World Wetlands Day 2009

The 2nd February each year marks the date of the signing of the Convention on Wetlands, in the Iranian city of Ramsar. The international theme for World Wetlands Day 2009 is "Upstream-Downstream: Wetlands connect us all". This is in recognition of how interconnected we all are within river basins and the impact that activities upstream have on the lower parts of a river catchment. Sustainable river basin management is extremely important to maintain the functions and ecosystems services of a wetland. World Wetlands Day 2009 aims to raise awareness on how we can all support healthy rivers and assess how our actions affect those downstream (Source: www.ramsar.org).

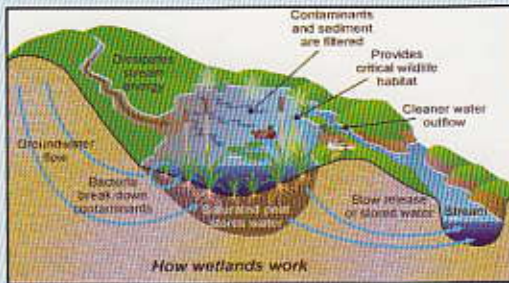


Fig .2 Wetland



Fig .3 Pulicat Wetland

Wetlands have numerous functions:

- wetlands provide habitat for plants and animals such as amphibians, fish, reptiles, mammals and birds.
- wetlands help control flood waters by acting like a giant sponge, absorbing water during heavy rainfall then slowly releasing it back into the ecosystem.
- Wetlands can assist in erosion control as they are often located between water bodies and high ground. The roots of the vegetation help to protect soil from high impact events such as wave action or heavy rainfall events.
- wetlands are important culturally and for recreational activities. wetlands enhance water quality as they act like giant kidneys, purifying and processing nutrients, suspended materials and other pollutants.

World Water Day 2009

An international day to celebrate freshwater was recommended at the 1992 United Nations Conference on Environment and Development (UNCED). The United Nations General Assembly responded by designating 22 March 1993 as the first World Water Day. The theme for World Water Day 2009 is "Shared Water - Shared Opportunities". Special focus will be placed on transboundary waters. Nurturing the opportunities for cooperation in transboundary water management can help build mutual respect, understanding and trust among countries and promote peace, security and sustainable economic growth (Source: www.unwater.org).

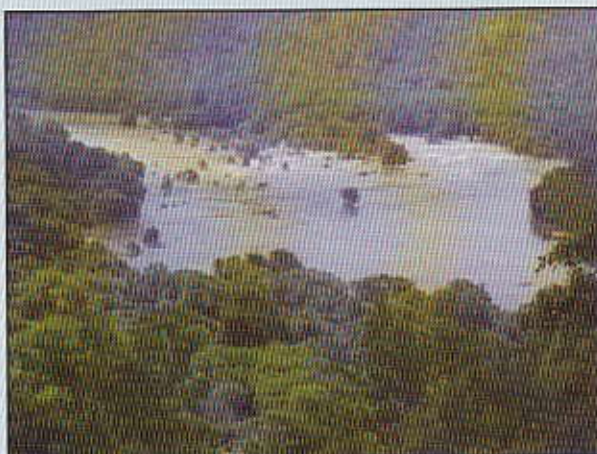


Fig.4 River Cauvery



Events

1. National Land Resource Conservation week



The Tamil Nadu State Land Use Board (SLUB) and the Department of Environment have jointly organized an awareness campaign on "Scientific management of Natural Resources" on 19th November, 2008, at Guindy National Park, Chennai. Dr. M. Naganathan, Vice Chairman, State Planning Commission & Chairman SLUB, inaugurated an exhibition on "Global Warming" and released the ENVIS News letter on "Co₂ Kick the Carbon Habit". During the Presidential address he has highlighted the impact of thermal/coal based energy and its consequences, Dr. R. Annamalai, Director, DoE elaborated the concepts of sustainable developments and said that sustainable development can be obtained only by practicing sustainable agriculture, sustainable forests management, & conserving biodiversity. Around 150 NGC and Eco club school students from various City schools participated along with the teachers and NGC coordinators.

2. Seminar on Urban Environment

A one day seminar on Urban Environment-Protection and promotion was organized by Community Helpline, Chennai on 24th September, 2008. During the technical session of the seminar Dr. C. Thomson Jacob, SPO, Envis Centre made a

presentation on "Environmental Information System" and screened a film on "Point Calimere" produced by Shekar Dattatri. Around 260 school teachers from over 250 schools attended the seminar.

3. Directory of Environmental Resource Persons in Tamil Nadu

The Directory on Environmental Resource Persons of Tamil Nadu was released on November 20th, 2008 during the celebration of

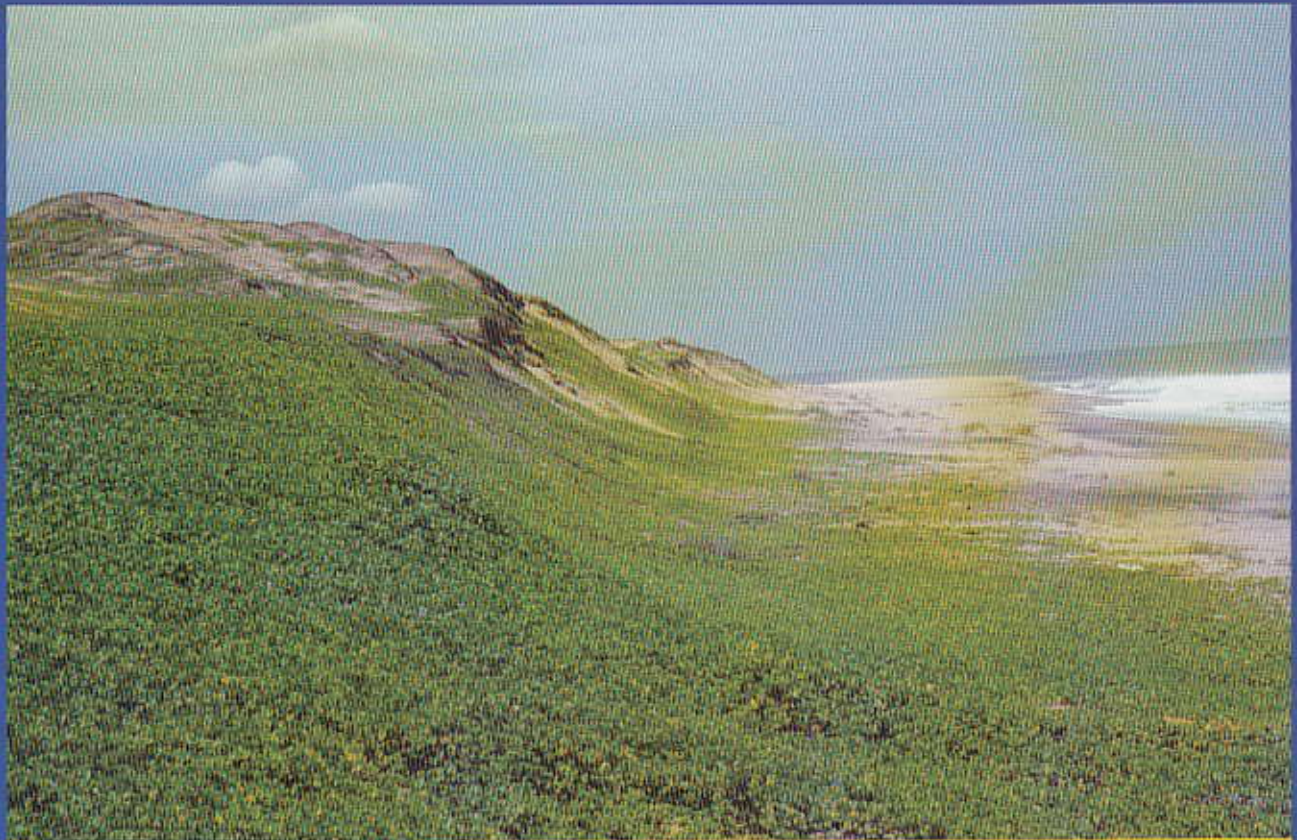


Dr. Salim Ali's birthday (bird's day), 2008. This directory covers around 130 experts in the field of Environment and it was jointly prepared by ENVIS Centre, DoE, GoTN and WWF, India. The directory was released by Dr. Vincent, Member secretary, TN State Council for Science and Technology and the first copy of the directory was received by the Hon'ble Minister Thiru Thangam Thennarasu, Minister for School Education, GoTN.

4. Seminar on Tamil Nadu's Climate Change Challenge:

A seminar on Tamil Nadu Climate Change Challenge was organized on 19-20 December, 2008 by Loyola College, Chennai and International Centre for Journalist, Washinton, DC for the journalist in Tamil Nadu. Dr. C. Thomson Jacob, SPO, ENVIS Centre made a presentation on the "Impact of climate change in India" also highlighted the environmental issues in the Pallikaranai Marsh. After the seminar a field trip was organized to see the Pallikaranai Reserve Forest.





Sand dunes act as a natural barrier against Tsunami, cyclones etc., commonly found in Nagapattinam, Tirunelveli and Kanyakumari districts. Dunes have a variety of creepers, grasses and woody species. On the east coast of India, *Ipomea pes-caprae* is a widely distributed creeper, *Spinifex* is the most common grass, and *Pandus* is a common woody species.

Coastal Web Links

Centre for Advance Study in Marine Biology	casmbenvis.nic.in
Coastal Aquaculture Authority	www.caa.gov.in
National Institute of Ocean Technology	www.niot.res.in
Institute of Ocean Management	www.annauniv.edu/ceg/iom/home.htm
National Institute of Oceanography	www.nio.org

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