

*Ecosystem Health
Report Card; a tool
for monitoring the
health of a coastal
ecosystem.*



A.K.PATTNAIK, Ph.D.
Chief Executive , CDA &
Project Director ,ICZM,
Project,Odisha



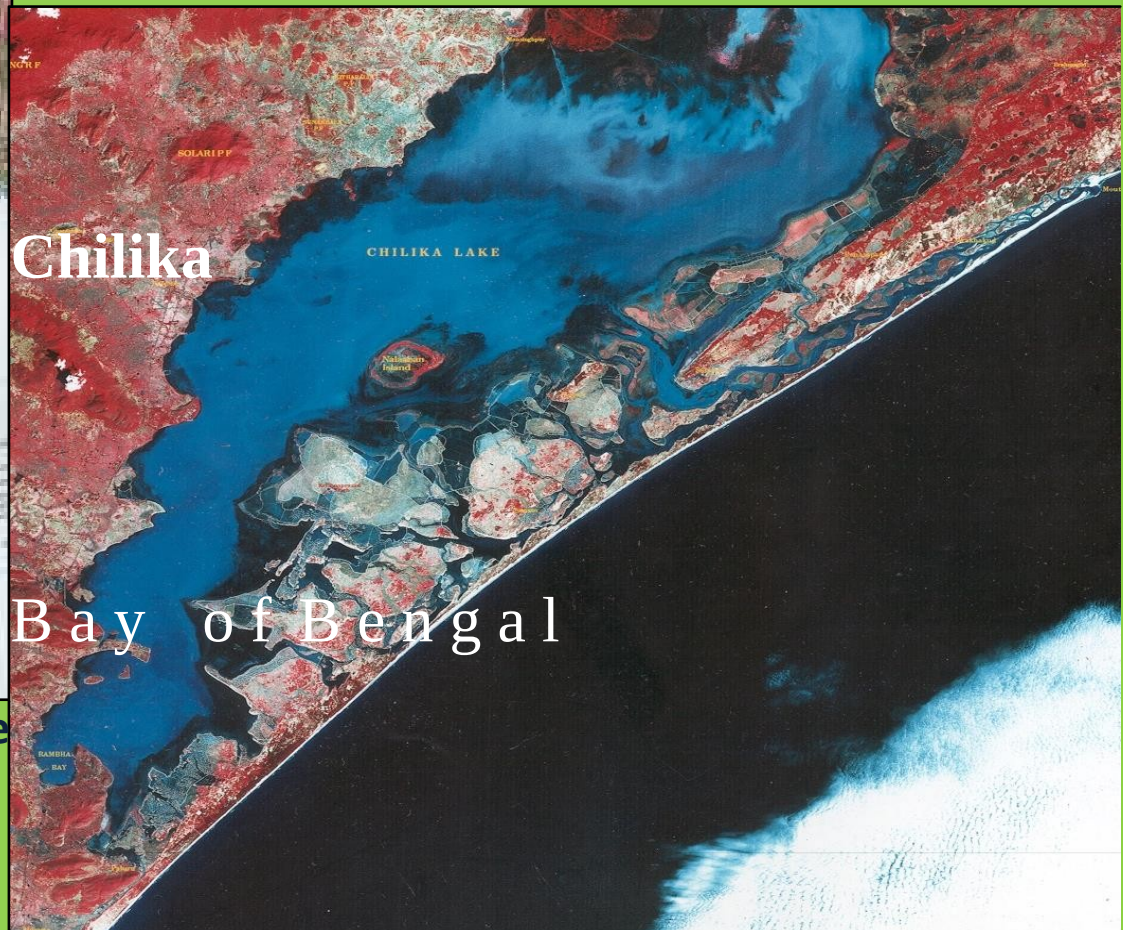
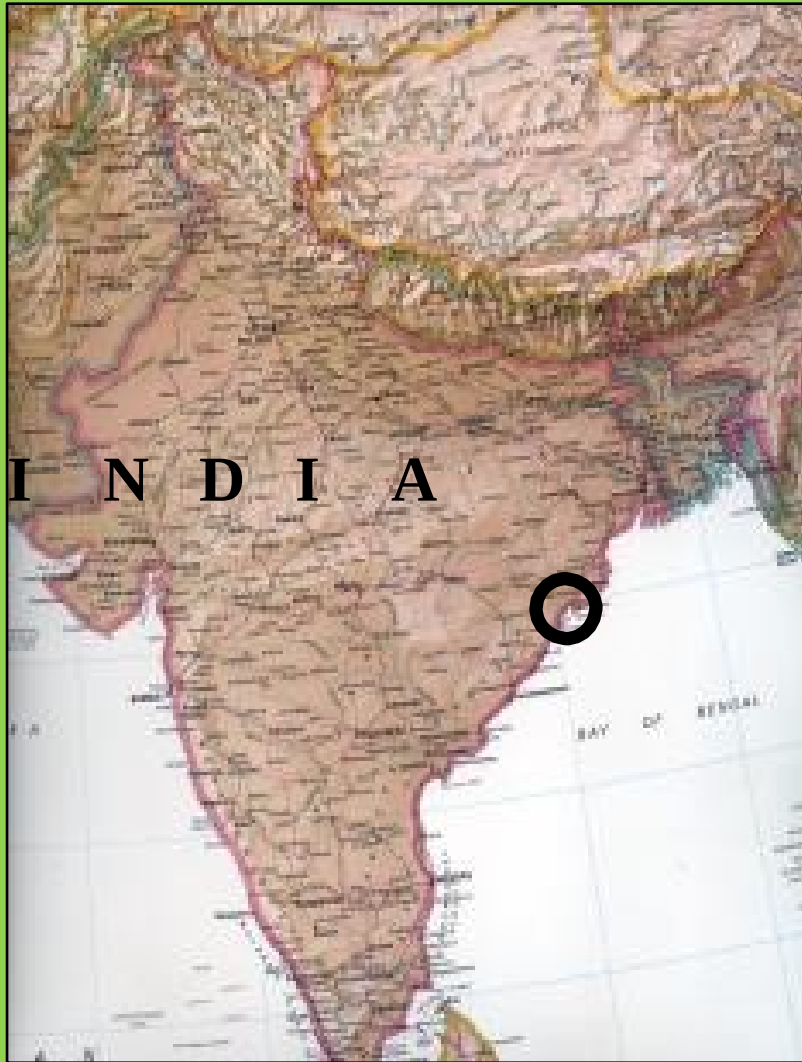
Chilika

Coastal wetland system

Average waterspread: 1065 sq km

Direct basin: 4406 sq kms

Average depth- 1 mts



Chilika



Hotspot of biodiversity

211 bird species; largest Irrawady Dolphin
population; 217 fish species

Exceeds 1% biogeographical population in case of
30 migratory species .



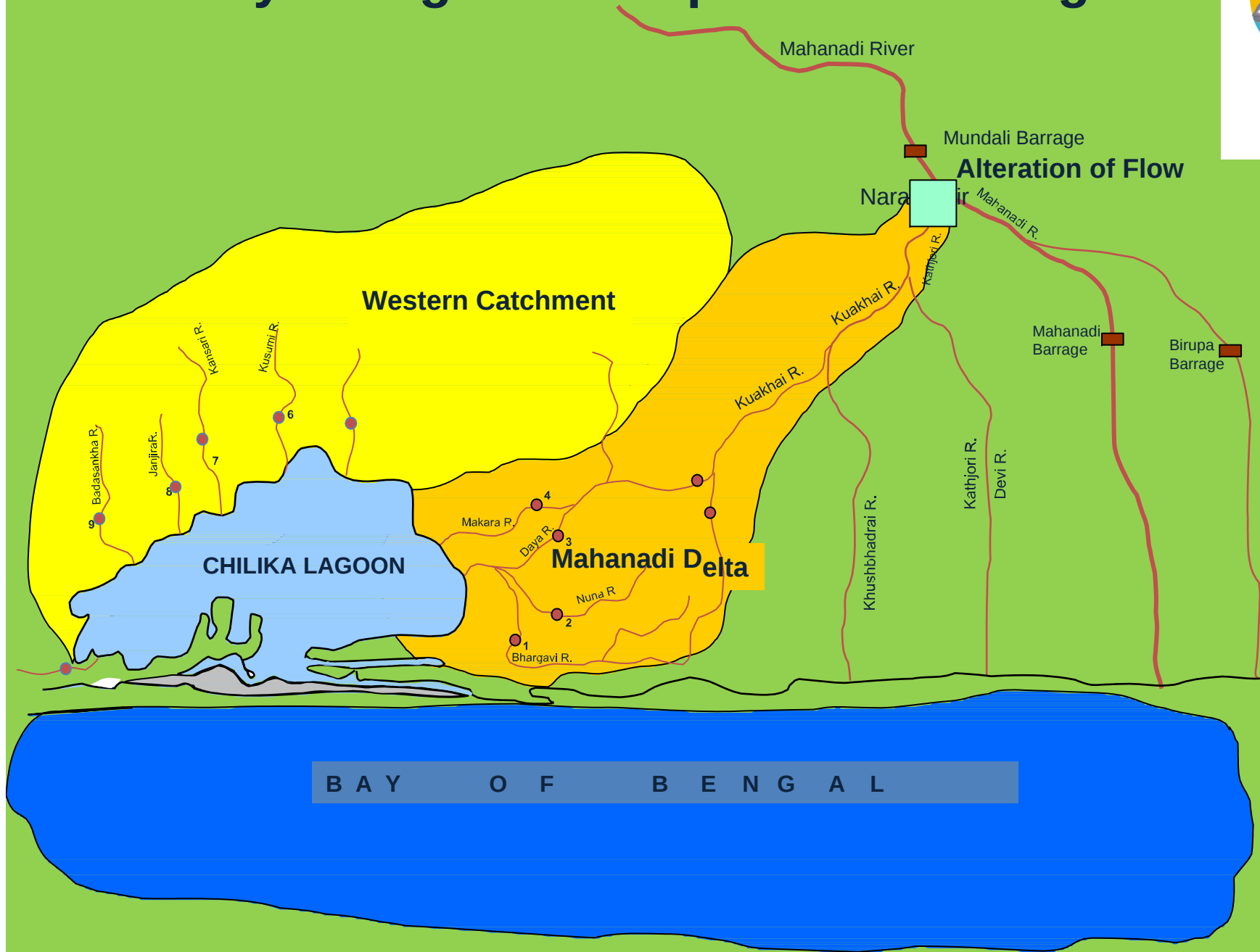
Chilika



Livelihood base of 0.2 million fishers



Hydrological set-up of Chilika Lagoon



Objectives

- The purpose of the SSFA was to support co-operation between UNEP and the CDA to strengthen the GPNM in addressing coastal nutrient over-enrichment effectively through the development of 'nutrient health reporting card' s approach to demonstrate the effects of nutrient over-enrichment on water quality and the livelihoods of local population and use as a mangagement tool .

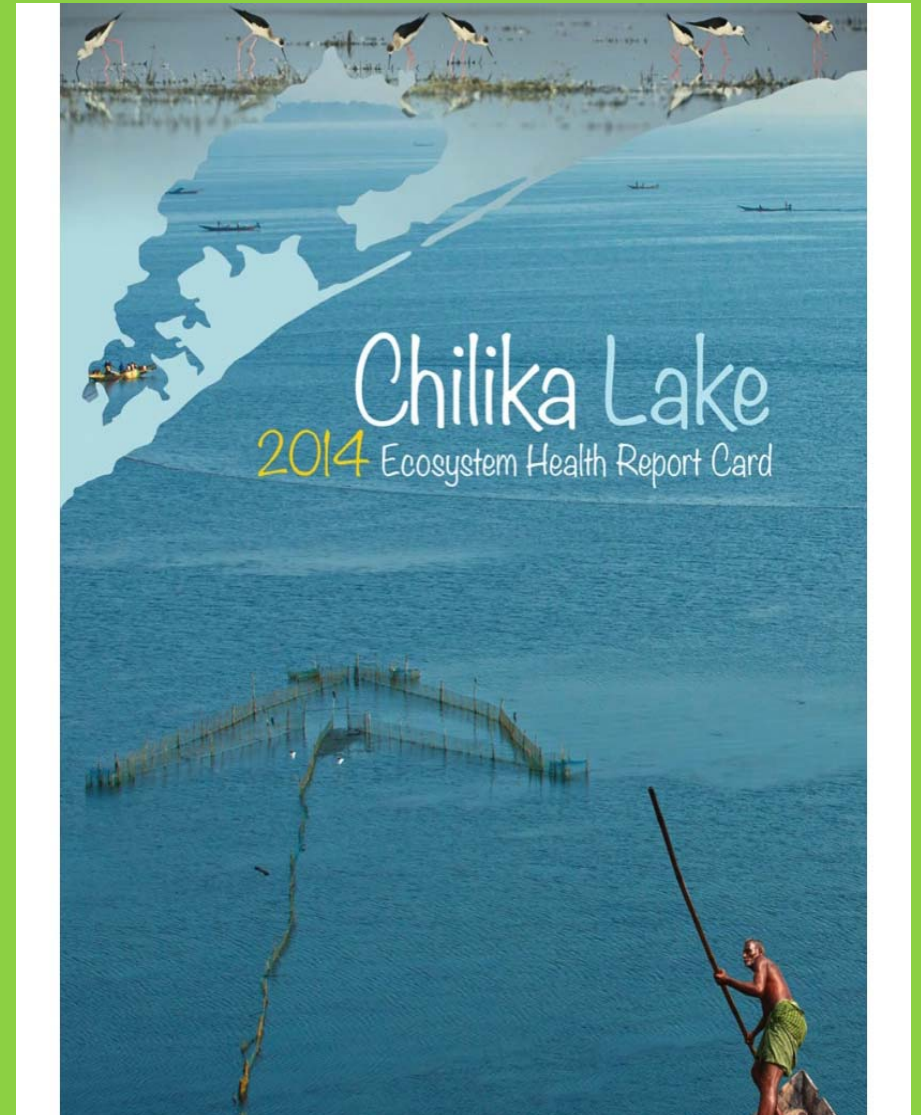


Goals

- Develop an **integrated ecosystem health assessment** for the Chilika Lake and its tributaries using the identified reporting indicators.
- Create a **ranking valuation scheme** to compare ecosystem health assessments both geographically and over time (annual assessments).
- Effectively **communicate the integrated ecosystem health assessments** with spatially explicit maps and rigorous scientific analyses to all stakeholders (i.e., the policy makers, managers, resource users and the larger community members whose actions impact the health of the Chilika Lake).

Ecosystem Health Report Card

- Environmental report cards are transformative assessment and communication products that compare environmental data to scientific or management thresholds and are delivered to a wide audience on a regular basis.
- To facilitate science to become policy relevant .

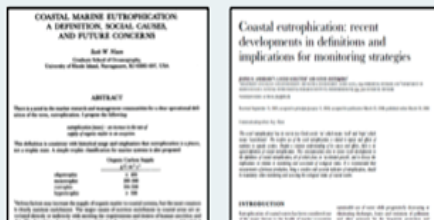


Core Objectives

- Define the basic indicators and their values to ascertain the health of the lake for the report card .
- Understand the role of river-catchment and freshwater nutrient input and associated nutrient fluxes to Chilika Lake
- Determine the transport of nutrient from the major/ minor rivers into the lake
- Assess the biogeochemical coupling of nutrient inputs with other physical components of the Chilika Lake system
- Analyse and carry out modelling of existing data in support of bridging data gaps in the report card.

Effective communication to catch the imagination of wide audience

Scientific writing



- Providing scientific context (references)
- Text > graphics
- Authorship exclusive
- Focus on results & interpretation



Science communication



- Providing societal context (examples)
- Text $\approx$ graphics
- Authorship inclusive
- Focus on conclusions & recommendations



Methodology

- Understanding the environmental characteristics
- Identify key parameters, pressure & values .
- Making of graphic presentation with the knowledge of Ecosystem environment and activities in and around the Lake.
- Deciding indicators based on Values and Pressures
- Fixing of thresholds based on professional judgment from long term data set
- GRADINGS: By comparison of the observed present data with threshold values
- Presentation can be seasonal, Annual, sectoral depending on the spatio-temporal variability of environmental parameters.

Methodology: Thresholds

Category	Indicator	Desired condition
Water Quality	Water clarity	≤ 30 NTU
	Dissolved oxygen	≥ 5 mg/L or 60% sat.
	Total chlorophyll	≤ 5 μ g/L
Fisheries	Total catch	% deviation above or below maximum sustainable yield (11,500 t/yr)
	Commercial species diversity	Ratio of species landed:desired (45 sp. desired)
	Size	Proportion of species landed above a sustainable size limit. <i>M. cephalus</i> : 219 - 461 mm; <i>P. monodon</i> : 116 - 197 mm; <i>S. serrata</i> : 87 mm
Biodiversity	Bird count and richness	Ratio to maximum bird count and diversity recorded since 2003
	Dolphin abundance	Ratio to maximum dolphin count recorded since 2001
	Benthic infauna diversity	Simpson's Index of Diversity (1-D)
	Phytoplankton diversity	Simpson's Index of Diversity (1-D)

Chilika Health Report Card (HRC) is used as a management tool for sustained monitoring of the lake ecosystem .

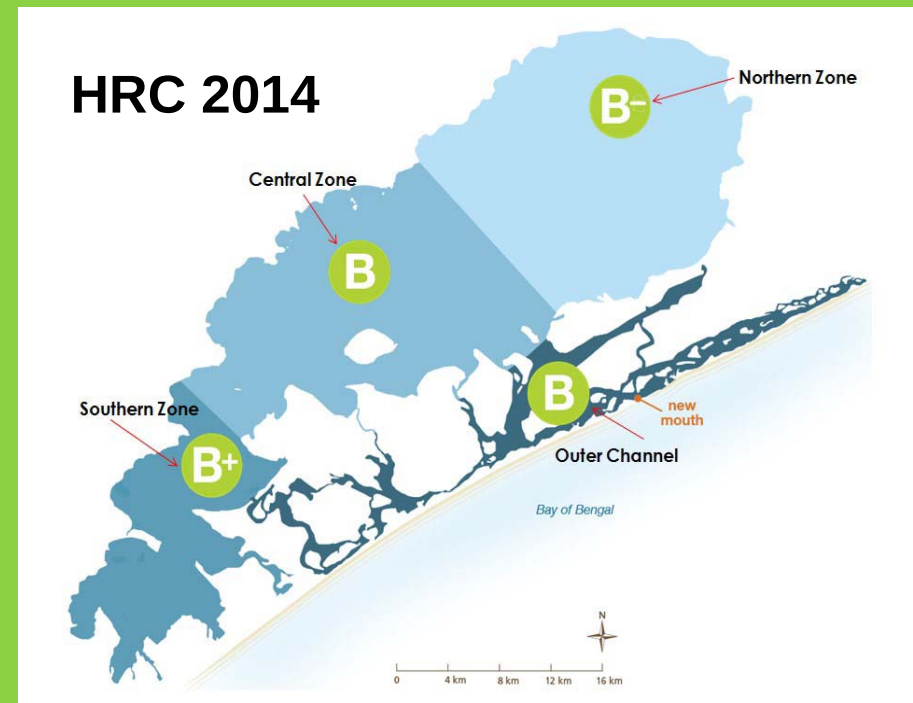
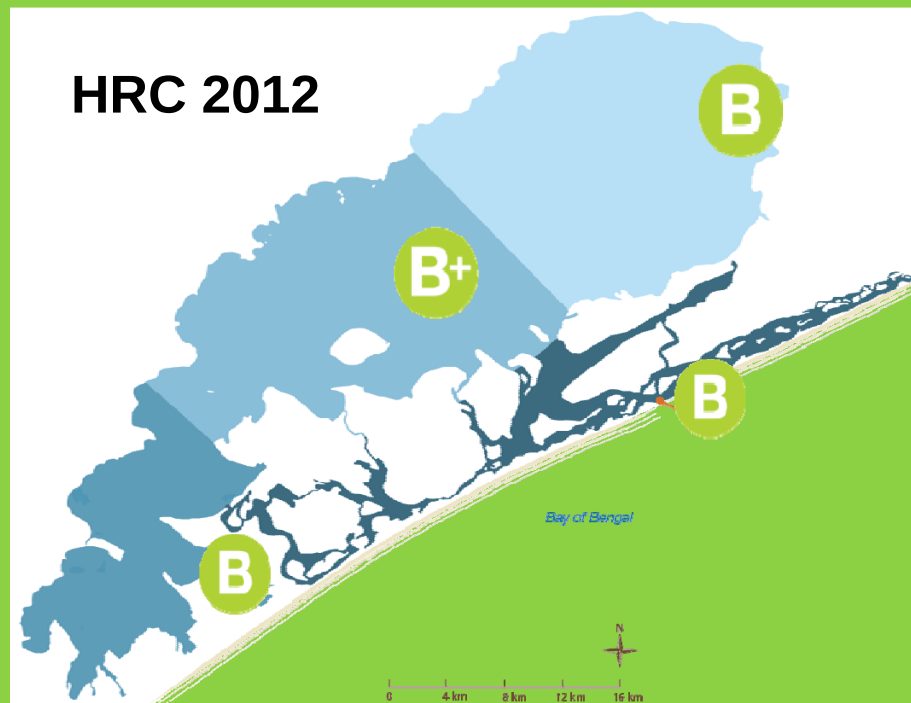
Quantitative health rankings of 4 sectors on an biannual basis

Biological, physical, and chemical data (**water quality index, biotic index**) from monitoring stations was compared with threshold values to assess Chilika health

Score was assigned to calculate health report card grades (A to F)

Grades

- A** 100-80%
- B** 80-60%
- C** 60-40%
- D** 40-20%
- F** 20-0%



Outcomes

- Overall, Chilika Lake scored “B” for ecosystem health based on performance of fisheries, and biodiversity indices.
- The Lake as a whole displayed excellent (**A**) dissolved oxygen concentrations, water clarity, total fishery catch and size, and benthic infauna diversity.
- The Lake failed, however, for chlorophyll concentrations (**F**), based on desired conditions.
- The 2014 Chilika Lake Report Card provides a different perspective of lake health compared to the 2012 report card, as this follows an extreme climatic event i.e. the severe tropical cyclonic storm , *Phailin*.
- It severely impacted the biodiversity and ecosystem.
- Interestingly the lake recovered from the impact of *Phailin* within two years as captured in HRC .
- This demonstrates the resilience of the lake ecosystem.

Way forward

- During preparation of the 2012 health report card, it was identified that a few parameters such as chlorophyll-a , total nitrogen, total phosphorous could be better indicators of ecological health.
- As a first step in this endeavor, chlorophyll-a has been assessed in this report card.
- Total Nitrogen and total Phosphorous would be better indicator (could not be used as time series data was not available) it would be used for next report card.
- Based on the intensive study of the benthic community of the lake “Indicator species” are identified which could be used in the next HRC once the validation is completed .



Thank you for your kind attentio