

Chilika Lake

2014 Ecosystem Health Report Card



Introduction

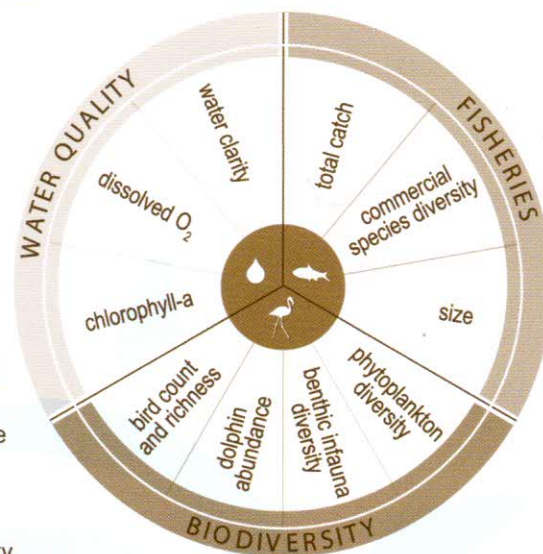
An ecosystem health report card emerged as an effective tool for tracking and reporting the ecological health of Chilika Lake. The report card has successfully communicated the complex volume of data and information gathered through the Lake monitoring program into a simple communicable format which was understandable and appreciated by a wide audience including local communities, policy makers, and the stakeholders.

The first in the series of Ecosystem Health Report Cards for Chilika Lake was developed in 2012, with an aim to enhance the understanding and management of the Lake. It was initiated through a collaborative project on "Global foundations for reducing nutrient enrichment and oxygen depletion from land based pollution, in support of Global Nutrient Cycle" with funding support from United Nations Environment Programme (UNEP/GEF) by Chilika Development Authority (CDA), National Centre for sustainable Coastal Management (NCSCM) and in partnership with the Integration and Application Network from the University of Maryland Center for Environmental Science. The first "Chilika Ecosystem Health Report Card" was published bilingually (English and local language) based on wide multilevel consultation. The report card not only provided information about the status of the health of Chilika Lake, but also generated awareness about pressures which are affecting the ecological values and services of the Lake.

Chilika Lake maintains an unique salinity gradient due to monsoonal freshwater inflow and seawater exchange through the mouth, supporting an amazing biodiversity of life. The Lake is subjected to constant pressures from both natural processes and human activities. The major threats to the Lake's ecological integrity are over fishing, pollution, unregulated tourism, and sedimentation. This has necessitated continuous monitoring of ecological health of Chilika Lake for sustainable management of biodiversity and ecosystem services. In order to report monitoring results, the report card based assessment has proved an effective tool for sustainable management of Chilika Lake. The current report card is the second in series and is useful for comparing the changes in Lake health over multiple years and progress towards Chilika Lake management goals.

Measures of ecosystem health

Ecosystem health of Chilika Lake was assessed, by taking into consideration 10 indicators organized into three broad indices: (i) Water quality (ii) Fisheries and (iii) Biodiversity. Together, these indicators represent the ecosystem features of Chilika Lake that are valued (e.g. fishing, tourism, and biodiversity) and the threats (over fishing, aquaculture, pollution, and sedimentation) to these values.



WATER QUALITY

Water clarity is a measure of light that penetrates through the water column. It plays an important role in determining the distribution and abundance of macrophytes, seagrasses, and phytoplankton. Dissolved oxygen is a very crucial parameter for the vitality of any aquatic life. The amount of dissolved oxygen needed for aquatic organisms varies from species to species. Chlorophyll-a, is a measure of phytoplankton (microalgae) biomass and is a good indicator of the health of an ecosystem (Smith et al., 1999). Elevated phytoplankton level can reduce water clarity and decomposing phytoplankton can reduce dissolved oxygen levels.

FISHERIES

Total catch of fish, prawns, and crabs was recorded monthly at 27 landing stations around the Lake. This monitoring allows Lake managers to monitor annual yield in comparison to a calculated theoretical maximum sustainable yield for the Chilika Lake (CIFRI-ICAR, 2005).

Commercial species diversity is the number of species landed each year that are commercially important for the livelihood of fishermen. The body length of landed Bagada or tiger prawns (*Penaeus monodon*), Khainga or mullet (*Mugil cephalus*) and Chilika Crabs (*Scylla serrata*) should be above (or between) a prescribed length to ensure sustainability of the species.

BIODIVERSITY

Bird count and richness: Count of the number of birds and bird species utilizing the Lake for feeding, resting, and breeding. Chilika Lake is the largest wintering ground for migratory waterfowl found anywhere on the Indian sub-continent. Bird are good indicator of the aquatic ecosystem.

Dolphin abundance: Count of the endangered Irrawaddy dolphins (top of the food chain of the Lake) surveyed annually in the Lake.

Macro-benthic faunal diversity: Simpson's Index of Diversity (D) is used to assess the condition of this community. Macro-benthic fauna are organisms living in or on the bottom areas (sub-stratum) of the Lake (e.g. gastropods, bivalves, polychaetes, isopods, amphipods etc.) and are a key food source for many species, particularly fishes.

Phytoplankton diversity (microalgae): Simpson's Index of Diversity (D) is used to assess the condition of microscopic algal community through analysis of the number of species present and the abundance of each species. Phytoplankton is an important component of the Lake's food web.



