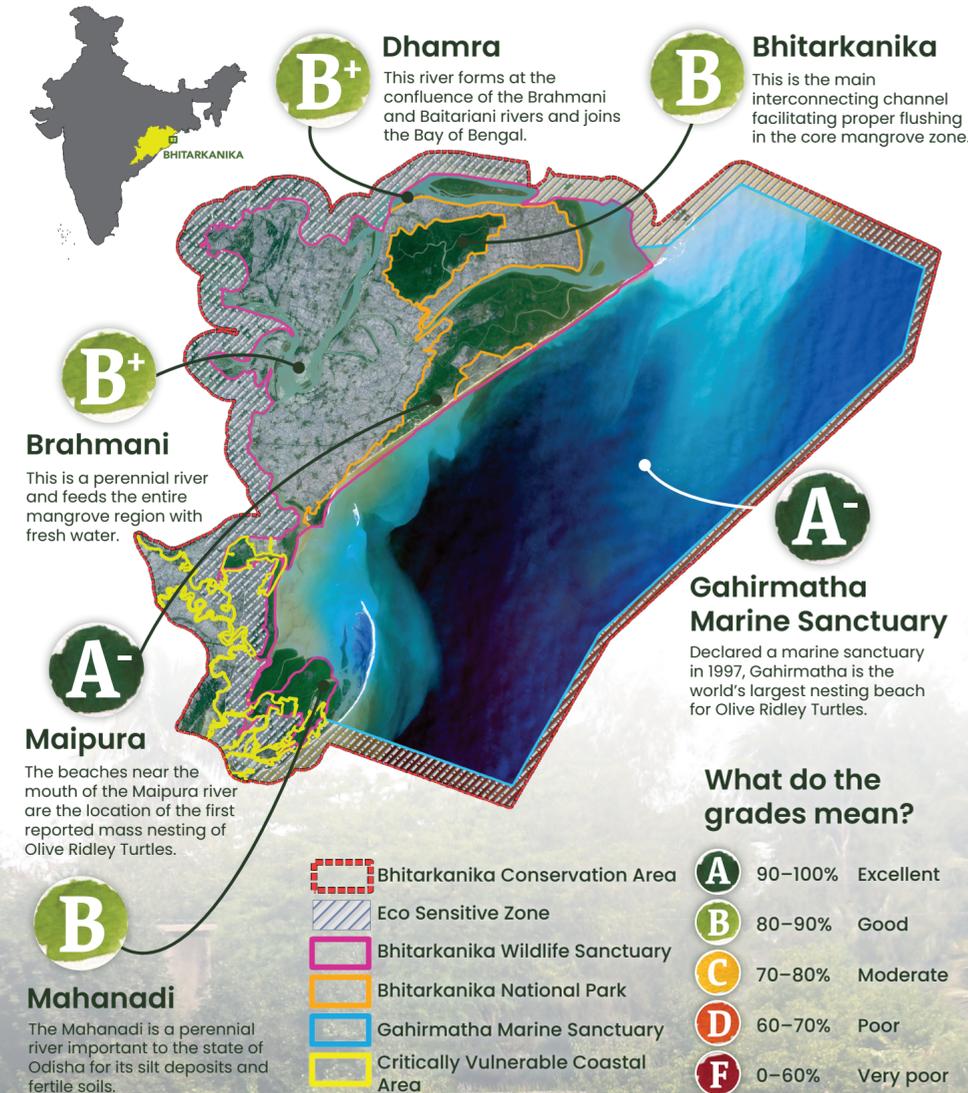


Bhitarkanika ecosystem health is "Good" **B+**

Bhitarkanika Report Card captures current conditions within the conservation area, including the Eco Sensitive Zone, Bhitarkanika Wildlife Sanctuary, Bhitarkanika National Park, Critically Vulnerable Coastal Area and the Gahirmatha Marine Sanctuary. Based on data availability and natural geographic divisions, the report card presents results, where possible, in six regions: (1) Bhitarkanika, (2) Maipura, (3) Dhamra, (4) Brahmani, (5) Mahanadi and (6) Gahirmatha Marine Sanctuary. **Overall, Bhitarkanika is in good condition.** Indicator scores were "excellent" in Maipura and Gahirmatha and "good" in Bhitarkanika, Dhamra, Brahmani and Mahanadi.



Managing for the future

A Conservation Management Plan (CMP) provides tools for achieving integrated conservation management of coastal and marine areas to implement and regulate legal policies and to establish objectives for the management of natural resources. The CMP for Bhitarkanika encompasses existing management plans of the protected area and integrates the outcome studies to create an ecosystem based conservation management plan. The State Government has enacted legal policies and has implemented interventions to conserve and manage natural resources of the Bhitarkanika Conservation Area.



Fishing boats lining a Bhitarkanika Conservation Area tributary.

Acknowledgments

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Bhitarkanika is an ecologically diverse region

Bhitarkanika Conservation Area ("Bhitarkanika") is home to India's second largest mangrove forest. Situated in the deltaic region, between a complex network of rivers and estuaries to the west and the Bay of Bengal to the east. Bhitarkanika, is home to globally important habitat, flora and fauna. Notable wildlife that inhabit the region include olive ridley sea turtles, water monitor lizards, 290 species of birds, fishing cats and India's largest population of saltwater crocodiles.

Bhitarkanika Conservation Area (BCA) encompasses 2717 km² and includes a National Park, Wildlife Sanctuary, Eco Sensitive Zone, Critically Vulnerable Coastal Area (CVCA) and Gahirmatha Marine Sanctuary. The diversity of mangroves in BCA is extremely rich which includes 32 true mangrove species. The vast mangrove forests of Bhitarkanika provide nursery habitat for fishes, cyclone protection for coastal communities and the recycling of nutrients to the wetland soils.

Protecting this fragile ecosystem

Bhitarkanika is increasingly threatened by various pressures, including the encroachment of aquaculture farms, agriculture and pollution, coastal erosion, climate change, human-animal conflict and dependence of the community on the region's natural resources.

Although the current protection and efforts for the conservation and restoration of Bhitarkanika are adequate, a comprehensive ecosystem-based approach is necessary to strengthen existing management practices. This report card was developed to address such concerns.



Developing a report card for Bhitarkanika

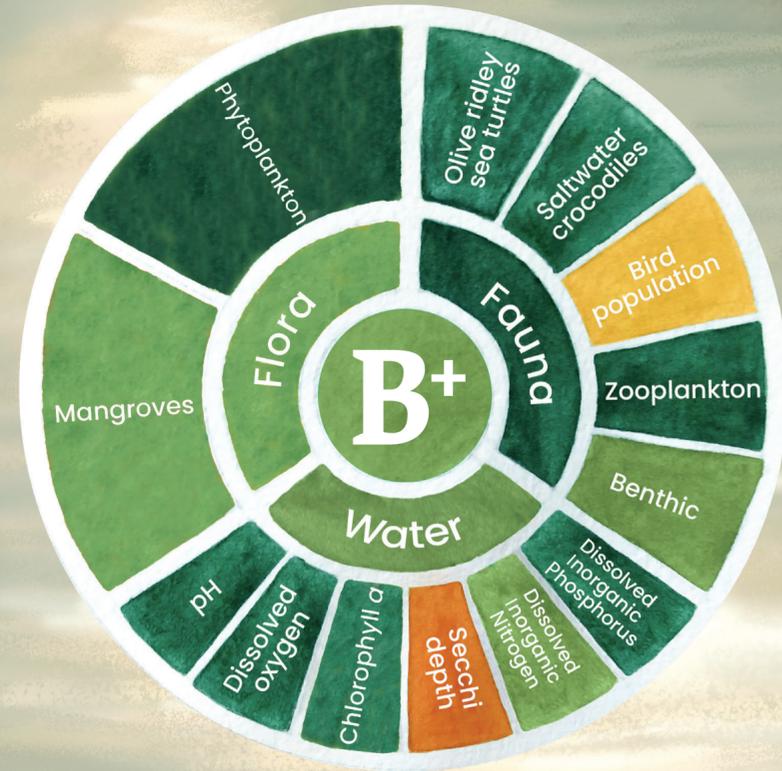
Report cards communicate complex scientific information in an easily understood format and provide a regional assessment of the ecosystem, highlighting where health is improving and where further management action is required. The National Centre for Sustainable Coastal Management (NCSCM), Ministry of Environment, Forest and Climate Change (MoEF&CC), jointly with the Odisha Forestry Sector Development Project (OFSDP-II) and the University of Maryland Center for Environmental Science, brought together over 40 local and regional experts and stakeholders in February 2019. Together the group chose ecosystem health indicators, thresholds and a reporting framework for Bhitarkanika Conservation Area.



Stakeholders during the February 2019 report card workshop. Credit: Mr. Bijay Kumar Das.

Bhitarkanika supports an abundance of life

Overall, the Bhitarkanika Conservation Area scored a **B+** (88%) based on ecological and water quality indicators. Olive Ridley Turtles and saltwater crocodiles are the healthiest indicators (scored 100%) witnessing a steady population increase over the last few years. The poorest performing indicator was water quality (secchi depth 62%), indicating surrounding land use activities are influencing Bhitarkanika.



C

Bird population

Bhitarkanika mangroves, home to approximately 290 species of avifauna, serves as a foraging ground for migratory birds and local resident species. Overall, bird colonies scored 75%. While mid-winter bird diversity showed a steady decrease over time, colonial nesting bird population are increasing.



B-

Mangroves

Mangroves are referred as the "lungs of the planet" and Bhitarkanika is one of the most pristine and diverse mangrove ecosystems in India. Mangrove health was assessed by measuring the greenness and density of mangrove foliage based on Normalized Difference Vegetation Index (NDVI) and Leaf Area Index (LAI), which resulted in a score of 83% for Bhitarkanika following the grade > 80% - Excellent; 60 - 80% - Good; 40 - 60% - Moderate; 20 - 40% - Poor and < 20% - Very Poor.



Social and economic indicators

Creating a holistic view of ecosystem health for Bhitarkanika requires assessing the social and economic health of the region. Due to lack of data and/or thresholds for comparison, this report card does not include scores for socio-economic indicators. Future report cards will be expanded to include such indicators for Bhitarkanika.

B+

Water quality

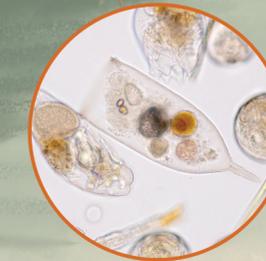
Water quality (physical, chemical and biological) underlies the health condition of the rivers and coastal waters of Bhitarkanika. Despite good to excellent conditions for most water quality indicators, low water clarity was observed in Bhitarkanika, which is a classic feature of all mangrove ecosystems. Large runoff from the perennial rivers result in highly turbid conditions throughout the year within the Bhitarkanika mangrove ecosystem.



A-

Zooplankton

Zooplankton, being a key element of the aquatic food chain, are important for trophic energy transfer. In Bhitarkanika, Zooplankton scored 92% based on Simpson's Diversity Index, meaning they are highly diverse and healthy in this region.



Threats to Bhitarkanika

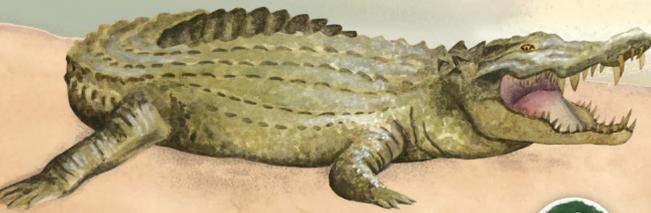
Bhitarkanika, like many remaining natural environments, is subject to external pressures including increased population, growing tourism, shrimp farming, illegal fishing and climate change.

Bhitarkanika attracts thousands of tourists and school children each year which brings economic benefits to communities in the region. Along with tourism comes an increase in footfall, boat use and waste. Managing Bhitarkanika means finding a balance between protecting the environment and allowing visitors to experience and enjoy this unique ecosystem.



Destruction of mangroves for prawn aquaculture and associated use of chemicals are the growing problem within and around Bhitarkanika leading to irreversible damage to the ecosystem.

Increase in coastal erosion and flooding, due to increased storm activity associated with climate change, is resulting in loss of mangrove habitat and salinization of soils affecting agricultural production.



A+

Saltwater crocodiles

Bhitarkanika is home to the largest population of saltwater crocodiles (*Crocodylus porosus*) in India. Commonly called "salties" or estuarine crocodiles. They scored 100%, due to their increasing abundance in the region compared to their historic average.



Fisheries

Fishing in the Bhitarkanika National Park is not permitted (permitted in Wildlife Sanctuary and CVCA), although in marine area it is managed by the Forest Department to balance the ecosystem and to sustain local livelihoods.

Olive Ridley sea turtles

Gahirmatha Marine Sanctuary is the world's largest rookery for the endangered Olive Ridley Sea Turtles (*Lepidochelys olivacea*). They scored 100% with their average abundance during the last three years being better than their historic abundance.

A+



A-

Phytoplankton

A very diverse Phytoplankton population is observed in Bhitarkanika, which creates the base of the aquatic food web. Based on Simpson's Diversity Index, phytoplankton in Bhitarkanika scored 90%, Excellent.

B+

Benthic fauna

Benthic faunal communities, a primary source of food for fish, reptiles and amphibians, also help to filter water and recycle nutrients in the water column. Benthic fauna scored 86%, indicating these communities are in excellent condition in Bhitarkanika.

