

BIOLUMINESCENT BACKWATERS - ENVIRONMENT

NEWS: Kochi's glowing blue backwaters mesmerize tourists, but this stunning bioluminescence signals ecological concerns driven by nutrient overload and plankton blooms.

WHAT'S IN THE NEWS?

Annual Natural Phenomenon in Kochi

- Every year, between **March and May**, the backwaters of Kochi exhibit a spectacular **blue glow** when the water is physically disturbed.
- This **bioluminescent display** turns the otherwise calm backwaters into a glowing spectacle visible especially during nighttime.

Local Name and Cultural Popularity

- Locally, this **natural phenomenon** is referred to as "**kavaru**" in the Malayalam language.
- It gained **widespread public attention** and emotional connection after being visually depicted in the popular **2019 Malayalam film *Kumbalangi Nights***, which showcased the phenomenon in a poetic and captivating manner.



Scientific Basis of Bioluminescence

- Bioluminescence refers to the **emission of visible light by certain marine microorganisms** when agitated or disturbed.
- In the waters of Kerala, the **primary organism responsible** is *Noctiluca scintillans*, commonly known as “**sea sparkle**.”
- This light emission results from a **biochemical reaction** involving specialized light-producing structures within the organism.

Environmental Concerns Behind the Beauty

- Though visually enchanting, the bioluminescent blooms are **ecological indicators of eutrophication** — a harmful condition caused by excessive nutrient enrichment in water bodies.
- These plankton blooms can lead to **oxygen depletion**, negatively affecting fish and other aquatic life.

Key Causes of Bioluminescence in Kochi

- **Eutrophication:** The main cause is the **influx of nitrates and phosphates** from **industrial waste and agricultural fertilizers**, which accelerates plankton growth.
- **Changing Climate:** Increased **sea surface temperatures** and **shifts in rainfall patterns** create favorable conditions for the bloom of bioluminescent organisms.
- **Salinity and Turbidity:** A **salinity range of 30–35 parts per thousand** and specific turbidity levels support the thriving of *Noctiluca scintillans*.

Occurrence in Other Indian Coastal Areas

- Similar bioluminescent events have been documented at:
 - **Thiruvananthapuram Beach, Chennai**
 - **Juhu Beach, Mumbai**
 - **Bangaram Island, Lakshadweep**

- These instances indicate that **bioluminescent blooms are not isolated to Kochi**, raising **broader concerns about marine health and nutrient pollution** along India's coasts.

Solutions and Preventive Measures

a. Monitoring and Research

- Organizations like **UNESCO's IOC-HAB Programme** and **INCOIS Algal Bloom Information System** conduct continuous monitoring and provide data on **Harmful Algal Blooms (HABs)**.

b. Sustainable Waste Management

- Implementing stricter controls on **industrial waste discharge** and improving **agricultural runoff management** can help reduce the nutrient load entering coastal waters.

c. Restoration of Natural Barriers

- Conservation and replanting of **mangroves, seagrasses, and wetlands** can **naturally filter nutrients**, stabilize shorelines, and support healthier marine ecosystems.

d. Advanced Prediction Systems

- Use of **remote sensing technologies, satellite data, and biotic algorithm models** enables scientists to **predict bloom occurrences**, allowing for early intervention.

e. Community Awareness Programs

- **Citizen science initiatives** and local education campaigns help engage coastal communities in **monitoring, reporting, and protecting** their marine environment.

Source: <https://www.downtoearth.org.in/environment/behind-the-beauty-of-kochis-bioluminescent-backwaters-lies-a-looming-crisis>