

[ECOLOGICAL FLUX]

Marine heatwaves since October last year leading to widespread bleaching of corals in Lakshadweep Sea

Jayashree Nandi

letters@hindustantimes.com

NEW DELHI: Marine heatwaves starting October 2023 have resulted in widespread coral bleaching in the Lakshadweep Sea, ICAR-Central Marine Fisheries Research Institute (CMFRI), said in a statement on Monday, with some experts putting the damage at around 75% of the corals around the eponymous archipelago.

How bad is it?

According to the Indian National Center for Ocean Information Services, a marine heatwave event of moderate category with area of spreading 98.56% has been observed on May 3 over the Lakshadweep coast. And one of moderate to extreme category with area of spreading 100% has been observed on May 3 over the South Tamil Nadu coast. There was bleaching in Gulf of Mannar also, according to CMFRI.

"Marine heatwaves are rare

extreme weather events that involve prolonged periods of abnormally high ocean temperatures. These temperatures often exceed the 90th percentile of typical regional ocean temperatures based on historical data. In Lakshadweep, the Degree Heating Week (DHW) indicator, which measures accumulated heat stress, has surged above 4°C-weeks. According to the National Oceanic and Atmospheric Adminis-

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Bleached Porites corals in the Kavaratti lagoon.

HT PHOTO

LAKSHADWEEP SEA

tration (NOAA), this level of DHW poses a substantial risk of coral bleaching, threatening the region's diverse marine ecosystems," CMFRI said in a statement.

According to the Pacific Island Ocean Observing System, Degree Heating Week (DHW) shows how much heat stress has accumulated in an area over the past 12 weeks (three months) by adding up any temperature exceeding the bleaching threshold during that time period. When DHW reaches 4°C-weeks, significant coral bleaching is likely, especially in more sensitive species. When DHW is 8°C-weeks or higher, widespread bleaching and mortality from thermal stress may occur.

"Such heat stress levels signify a severe threat to coral health, leading to extensive bleaching where corals lose the symbiotic algae (zooxanthellae), compromising their survival by depriving them of essential nutrients. If the DHW continues to rise, reaching beyond 12°C-weeks, it could precipitate an unprecedented biodiversity crisis due to multispecies mortality," said KR Sreenath, senior scientist at CMFRI.

The CMFRI team has been observing this severe bleaching from around mid April.

"We have a survey team in Lakshadweep that identified that a very large area (around 934 sqkm) has been impacted. The Lakshadweep atolls are built on corals. If these corals are destroyed it will impact the livelihoods of fishermen because these corals support fish. If corals are impacted, the growth and size of the island will also be affected because the island is made of coral sand or particles," added Sreenath.

The Lakshadweep Sea has recorded around three coral bleaching events — 1998, 2010 and 2018. "Following the 1997-98 event around 65% of the corals globally that were bleached recuperated. There were two other bleaching events but the current bleaching event seems to be more severe than the earlier two... these corals have started expelling the symbiotic algae. They appear white because only their skeleton is visible. If the SSTs reduce considerably very soon, some of these corals may be able to recuperate. Because their tissue is disintegrating, its an opportu-

nity for other species to occupy the space, sea weeds can occupy this area," added Sreenath.

As El Nino gradually loosens its grip, such bleaching events are being globally including the bleaching in the Great Barrier Reef and Gulf of Mannar. "We were expecting this to happen in India. The lower latitudes have been more impacted in the past 2-3 months," he explained.

"This is expected. With increasing ocean temperatures marine biodiversity is likely to be seriously affected. Immediate impact could be on coral reefs. Other impacts expected are mortality of marine species. Unfortunately, we know these adverse impacts qualitatively. No authentic quantitative impacts are estimated," said M Ravindra, former secretary, ministry of earth sciences.

"While the Indian Ocean warmed at a rate of 1.2°C per century during 1950-2020, climate models we assessed, predict accelerated warming, at a rate of 1.7°C-3.8°C per century during 2020-2100. Though the warming is basin-wide, maximum warming is in the north-western Indian Ocean including the Arabian Sea. The rapid warming in the Indian Ocean is not limited to the surface. The heat content of the Indian Ocean, from surface to 2000 meters deep, is currently increasing at the rate of 4.5 zetta-joules per decade," said Romy Mathew Koll, climate scientist at Indian Institute of Tropical Meteorology.

"The future increase in heat content is comparable to adding the energy equivalent of one Hiroshima atomic bomb detonation every second, all day, every day, for a decade... Marine heatwaves, periods of extremely high temperatures in the ocean, are expected to increase from 20 days per year to 220-250 days per year. This will push the tropical Indian Ocean into a near-permanent heatwave state, our study has found," he added.

Koll also said that the projected changes in pH may be detrimental to the marine ecosystem since many marine organisms — particularly corals and organisms that depend on calcification to build and maintain their shells — are sensitive to the change in ocean acidity.

"The primary cause of these marine heatwaves are excessive heat atmospheric transfer coupled with shifts in ocean currents, leading to unusually high

water temperatures. Since October 27, 2023, the Lakshadweep Sea, spanning from 80.0 to 12.0 N latitude and 71.0 to 75.0 E longitude, has been experiencing these conditions, with temperatures consistently registering rises greater than 1°C above the norm," said Shelton Padua, senior scientist at CMFRI.

HT reported on November 2 last year that ocean and land temperatures continued their record-breaking spree in October. Sea surface and land temperatures have been at record highs for seven and five months respectively, data maintained by University of Maine's Climate Reanalyzer shows.

The latest data on Climate Reanalyzer also shows daily sea surface temperatures have been far higher this year since January, than temperatures ever recorded.