

Coral Reefs of South Asia

Regional summary

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SUMMARY

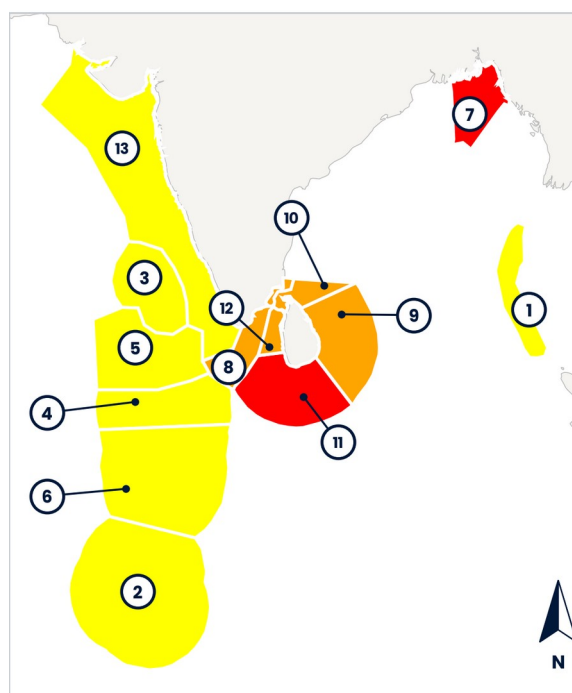
Shallow coral reefs of South Asia host diverse coral and reef fish communities across oceanic atolls, fringing reefs and mainland systems. These ecoregions span strong environmental gradients due to monsoon circulation, water clarity and freshwater discharge. They face interacting threats from marine heatwaves, mass bleaching, overfishing, coastal development, sedimentation and land-based pollution. The IUCN Red List of Ecosystems assessment evaluated all 13 South Asian ecoregions Critically Endangered (CR) under future climate scenarios. Based on the past 50 years of observed change, risk across the region is driven mostly by restricted geographic distribution (Criterion B), heat stress (Criterion C1), and decline of hard coral cover and fish indicators (Criterion D). The Northern Bay of Bengal – Bangladesh and Sri Lanka South are assessed as Critically Endangered (CR) due to highly restricted extent of occurrence combined with ongoing threats.

REGIONAL DESCRIPTION

Coral reefs of South Asia extend across India, Bangladesh, Sri Lanka, the Maldives and the Chagos Archipelago, covering an estimated 8,282.6 km² or around 4% of the global coral reef extent. The region encompasses 13 ecoregions delineated using the Marine Ecoregions of the World and regional expert input, corresponding to Level 4 of the IUCN Global Ecosystem Typology. The region includes true framework-building accreting reefs (Type A) across oceanic atolls like the Maldives, Lakshadweep, and Chagos. Marginal or fringing reefs (Type B) are found on island and continental shelves in the Gulf of Mannar, Palk Bay, Sri Lanka, Andaman and Nicobar, Gulf of Kachchh, and Saint Martin's Island in Bangladesh. Deep coral reefs and subtidal rocky reefs (Type C) are excluded.

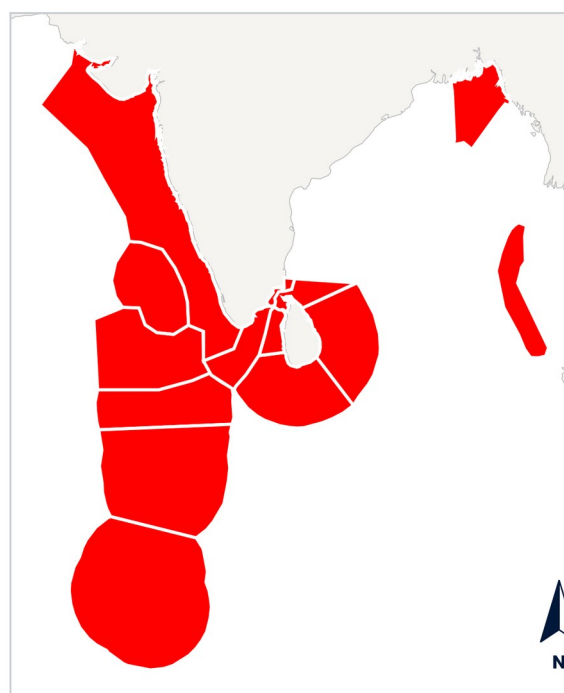
Observed change

Based on the past 50 years of observed change
Criteria A1, B, C1 and D1



Overall risk

Observed change plus future climate projections
Adds projected heat stress (C2, IPCC SSP2-4.5)



- | | | | |
|-------------------------------|---------------------------------------|--------------------------|-------------------------|
| CO Collapsed | CR Critically Endangered | EN Endangered | VU Vulnerable |
| NT Near Threatened | LC Least Concern | DD Data Deficient | NE Not Evaluated |
| ① Andaman and Nicobar Islands | ⑥ Maldives-South | ⑪ Sri Lanka South | |
| ② Chagos | ⑦ Northern Bay of Bengal – Bangladesh | ⑫ Sri Lanka West | |
| ③ Lakshadweep Island | ⑧ South Coast of India | ⑬ West Coast of India | |
| ④ Maldives-Central | ⑨ Sri Lanka East | | |
| ⑤ Maldives-North | ⑩ Sri Lanka North | | |

Figure 1. Risk categories of the 13 coral reef ecoregions of South Asia. Left: observed change, based on the past 50 years of observed change (criteria A1, B, C1 and D). Right: overall risk (official RLE category), based on observed change plus projected heat stress from ocean warming over the next 50 years (IPCC SSP2-4.5; criterion C2). Numbers identify the ecoregions listed below the maps and in Table 1.

BIOTIC COMPONENTS

South Asia represents a major transition zone between the high-diversity Coral Triangle to the east and Arabian Sea systems to the west. Coral species richness varies across ecoregions, from around 300 hard coral species in Chagos to 183 in Sri Lanka, about 133 in Lakshadweep, and 72 around Saint Martin's Island in Bangladesh. Hard coral communities are dominated by key framework-building genera including *Acropora*, *Porites*, *Montipora*, *Pocillopora*, *Favia/Favites*, Merulinids, *Goniastrea*, *Pavona* and *Platygyra*. Crustose coralline algae consolidate substrates and provide settlement cues for coral larvae. Associated reef fish include key functional groups such as herbivorous parrotfishes and surgeonfishes, which control macroalgal growth, alongside predatory groupers and reef-associated sharks.

ABIOTIC ENVIRONMENT

South Asian coral reefs occur in warm waters shallower than 30 m depth. Environmental settings cover strong gradients associated with the Indian Ocean monsoon, continental runoff, and oceanic isolation. Oceanic atolls, like the Maldives, Lakshadweep and Chagos, experience clear, saline, nutrient-poor waters with low terrestrial sediment input. In contrast, continental-shelf and island-shelf reefs on the mainland of India, Sri Lanka and Bangladesh are strongly influenced by river discharge, suspended sediments, monsoon-driven turbidity, and seasonal ocean circulation. Water temperatures vary seasonally with changing monsoon winds, ocean surface mixing, cool-water upwelling and tidal movement.

MAIN THREATS

Thermal stress and mass coral bleaching due to climate change represent the most immediate widespread threat, causing major regional declines in live hard coral cover, notably during the 1998 and 2016 El Niño-Southern Oscillation events. Ocean acidification reduces calcification by corals, while sea-level rise threatens low-lying atoll islands. Persistent local human pressures compound climate disturbances. Overfishing and destructive fishing deplete herbivores and predators, while coastal development, dredging, land reclamation, and harbour construction impact nearshore habitats. Runoff from land delivers sediment, nutrients, sewage, industrial effluents, debris and microplastic pollution into the ocean. Biological stressors include outbreaks of the coral eating crown-of-thorns starfish (*Acanthaster*) and coral diseases.

ASSESSMENT RESULTS

The IUCN Red List of Ecosystems assessment classified all 13 South Asian coral reef ecoregions as Critically Endangered (CR), triggered by projected marine heatwaves and mass bleaching (Criterion C2). Based on the past 50 years of observed change, all 13 ecoregions are threatened: two, Northern Bay of Bengal – Bangladesh and Sri Lanka South, are Critically Endangered (CR), four are Endangered (EN) and seven are Vulnerable (VU). This is driven primarily by restricted geographic distribution (Criterion B), heat stress (Criterion C1), and the decline of hard coral cover and fish communities (Criterion D).

Reduction in distribution (Criterion A): Only one ecoregion, Northern Bay of Bengal – Bangladesh, is classified as Vulnerable (VU) due to the proportion of monitoring sites where hard coral cover has fallen below thresholds for accretion. Four ecoregions are Data Deficient (DD) due to a lack of recent monitoring data.

Restricted distribution (Criterion B): Northern Bay of Bengal – Bangladesh and Sri Lanka South are Critically Endangered (CR) due to an extremely restricted extent of occurrence combined with ongoing threats. Much of the rest of the region is also threatened by restricted distributions, with four ecoregions assessed as Endangered (EN) and six as Vulnerable (VU).

Environmental degradation (Criterion C): Based on historical heat stress (C1), Northern Bay of Bengal – Bangladesh is Critically Endangered (CR) and 11 ecoregions are Vulnerable. Based on future climate projections (C2, IPCC SSP2-4.5), all 13 ecoregions are Critically Endangered (CR) due to projected ocean warming and mass bleaching.

Biotic disruption (Criterion D): Four ecoregions are threatened due to declines in hard coral cover and grouper biomass. Sri Lanka West is classified as Endangered (EN), while Chagos, Maldives-Central, and South Coast of India are Vulnerable (VU). Five ecoregions are Data Deficient (DD) due to a lack of monitoring data.

Table 1. Risk category of each coral reef ecoregion of South Asia under each criterion, observed change and overall risk. Numbers match Figure 1.

Ecoregion	A1	B1	B2	C1	C2	D1	Observed change	Overall risk
1 Andaman and Nicobar Islands	LC	LC	LC	VU	CR	NT	VU	CR
2 Chagos	LC	VU	LC	VU	CR	VU	VU	CR
3 Lakshadweep Island	LC	NT	VU	VU	CR	NT	VU	CR
4 Maldives-Central	LC	VU	LC	VU	CR	VU	VU	CR
5 Maldives-North	DD	VU	LC	VU	CR	DD	VU	CR
6 Maldives-South	LC	VU	LC	VU	CR	NT	VU	CR
7 Northern Bay of Bengal – Bangladesh	VU	CR	EN	CR	CR	DD	CR	CR
8 South Coast of India	LC	EN	VU	VU	CR	VU	EN	CR
9 Sri Lanka East	LC	EN	VU	LC	CR	LC	EN	CR
10 Sri Lanka North	DD	EN	EN	VU	CR	DD	EN	CR
11 Sri Lanka South	DD	CR	EN	VU	CR	DD	CR	CR
12 Sri Lanka West	NT	EN	EN	VU	CR	EN	EN	CR
13 West Coast of India	DD	LC	VU	VU	CR	DD	VU	CR

Overall risk: the official RLE category; risk of collapse based on observed change plus projected heat stress from ocean warming over the next 50 years (IPCC SSP2-4.5; criterion C2). Observed change: risk of collapse based on the past 50 years of observed change (criteria A1, B, C1 and D). Categories: CO: Collapsed; CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near Threatened; LC: Least Concern; DD: Data Deficient; NE: Not Evaluated.