



Coral Reefs of Western Indian Ocean

Regional summary

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SUMMARY

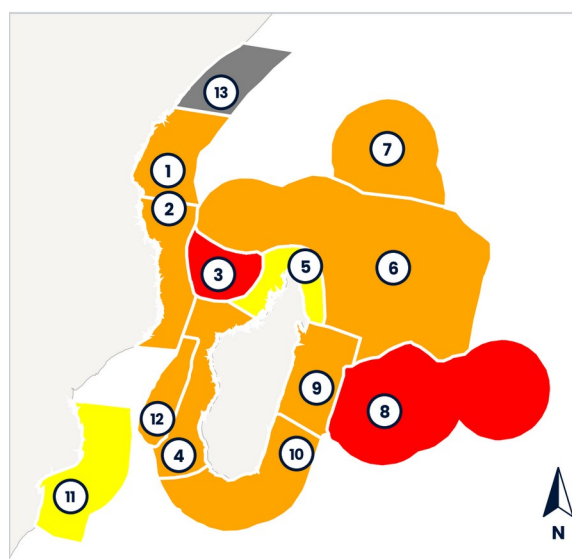
The coral reefs of the Western Indian Ocean coral reefs extend along the East African mainland coast and across the islands of the Southwest Indian Ocean. These ecosystems host high biodiversity, supporting up to 400 hard coral species and 2,400 reef fish species. They face escalating pressures from climate-driven marine heatwaves, tropical cyclones, land-based pollution, sediment runoff, overfishing and destructive fishing practices. The IUCN Red List of Ecosystems assessment evaluated 12 of the region's coral reef ecoregions as threatened. The Northern Monsoon Current (Somalia) is Data Deficient (DD) due to data gaps. Based on the past 50 years of observed change, two ecoregions, the Mascarene Islands and Comoros Archipelago, are already Critically Endangered (CR), eight are Endangered (EN), and two are Vulnerable (VU), driven primarily by heat stress (Criterion C1) and biotic disruption (Criterion D1). Under future climate scenarios (Criterion C2), all 12 ecoregions with sufficient data are Critically Endangered (CR) due to projected annual marine heatwaves.

REGIONAL DESCRIPTION

Coral reefs of the Western Indian Ocean extend from southern Somalia along the East African coast to northern South Africa, and across the islands of the Southwest Indian Ocean. The region contains approximately 8,000 km² of coral reefs, representing around 4.3% of the photic coral reef area assessed globally in the Red List of Ecosystems (5.85% of global coral reef extent according to GCRMN 2025). For this assessment, coral reefs were grouped into 13 ecoregions based on the Marine Ecoregions of the World, with boundaries refined using specific regional and global coral reef classifications. These ecoregions capture important variation in reef biodiversity, biogeography and environmental conditions, and correspond to Level 4 of the IUCN Global Ecosystem Typology.

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)



Figure 1. Risk categories of the 13 coral reef ecoregions of the Western Indian Ocean. 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

Coral reefs of the Western Indian Ocean support high biodiversity, with approximately 350–400 species of reef-building hard corals and around 2,400 reef fish species. Coral diversity peaks in the northern Mozambique Channel, where local assemblages can support 250–300 coral species. Mainland East African reefs tend to support more stress-tolerant massive corals, including Poritidae, Faviidae and Pocilloporidae. Oceanic islands, such as Seychelles, Comoros and northern Madagascar, support a greater abundance of fast-growing branching Acroporidae. Other important biotic components include crustose coralline algae, which consolidate reef frameworks and facilitate coral recruitment, as well as turf algae, macroalgae and soft corals. Herbivorous parrotfishes and surgeonfishes control algal growth, while predatory fishes such as groupers help regulate reef food webs.

ABIOTIC ENVIRONMENT

Western Indian Ocean coral reefs occur across a broad range of environmental conditions shaped by temperature, nutrients, salinity, sedimentation and water clarity. Accreting reefs dominate the northern and central Western Indian Ocean, where warm (22–30°C), relatively clear and nutrient-poor waters favour reef growth and structural complexity. Towards the southern limits, cooler waters associated with the Mozambique Channel and Agulhas Current constrain reef growth and favour more marginal reef communities. Along mainland East Africa and Madagascar, terrestrial runoff and sediment inputs reduce water clarity and generally restrict reefs to shallower waters, while reefs around some remote oceanic islands extend to depths of around 60 m.

MAIN THREATS

Climate change is the most severe and widespread threat to coral reefs of the Western Indian Ocean. Marine heatwaves have caused region-wide mass bleaching and coral mortality, including major events in 1998, 2016 and 2024. Repeated thermal stress reduces coral diversity, structural complexity and the

capacity of reefs to recover. Tropical cyclones can cause additional acute damage to coral reefs. Major local pressures include land-based pollution and sediment runoff, which cause nutrient enrichment and reduce water quality and coral recruitment. Overfishing of herbivorous and predatory fishes disrupts key ecological functions and recovery processes, while destructive fishing, particularly dynamite fishing, causes direct physical damage. Coral disease and outbreaks of crown-of-thorns starfish can further amplify coral loss.

ASSESSMENT RESULTS

The IUCN Red List of Ecosystems assessment classified all 12 Western Indian Ocean coral reef ecoregions with sufficient data as Critically Endangered (CR), triggered by projected heat stress (Criterion C2). The Northern Monsoon Current ecoregion (Somalia) is Data Deficient (DD) due to insufficient data. Based on the past 50 years of observed change, two ecoregions, the Mascarene Islands and Comoros Archipelago, are already Critically Endangered (CR), while a further eight are Endangered (EN) and two Vulnerable (VU). This is driven primarily by heat stress (Criterion C1) and biotic disruption (Criterion D1).

Reduction in distribution (Criterion A): The Comoros Archipelago, West Madagascar and Seychelles Inner are Vulnerable (VU), based on the proportion of monitored reef sites where hard coral cover has fallen below the critical threshold over the past 50 years. The Northern Monsoon Current and South Madagascar ecoregions are Data Deficient (DD).

Restricted distribution (Criterion B): The Central Mozambique Channel ecoregion is Endangered (EN), and four other ecoregions are Vulnerable (VU), due to restricted geographic distributions combined with ongoing threats such as coral bleaching.

Abiotic degradation (Criterion C): Based on historical heat stress (C1), all 12 evaluated ecoregions are threatened. Mascarene Islands is Critically Endangered (CR), four ecoregions are Endangered (EN) and seven are Vulnerable (VU). Based on future climate projections (C2, IPCC SSP2-4.5), all 12 evaluated ecoregions are Critically Endangered (CR) due to projected thermal stress.

Biotic disruption (Criterion D): Nine of the 13 ecoregions are threatened, with Comoros Archipelago classified as Critically Endangered (CR), four ecoregions as Endangered (EN), and four as Vulnerable (VU). Risk reflects disruption across key biotic components, including hard coral cover, coral-algae balance, and biomass of herbivorous parrotfish and predatory groupers. South Madagascar and Northern Monsoon Current are Data Deficient (DD).

Table 1. Risk category of each coral reef ecoregion of the Western Indian Ocean under each criterion, observed change and overall risk. Numbers match Figure 1.

Ecoregion	A1	B1	B2	C1	C2	D1	Observed change	Overall risk
1 Kenya – North Tanzania	LC	LC	LC	VU	CR	EN	EN	CR
2 South Tanzania – North Mozambique	LC	LC	LC	VU	CR	EN	EN	CR
3 Comoros Archipelago	VU	NT	LC	VU	CR	CR	CR	CR
4 West Madagascar	VU	LC	LC	VU	CR	EN	EN	CR
5 North Madagascar	LC	LC	LC	VU	CR	NT	VU	CR
6 Seychelles Outer	LC	LC	LC	EN	CR	VU	EN	CR
7 Seychelles Inner	VU	LC	LC	VU	CR	EN	EN	CR
8 Mascarene Islands	LC	LC	VU	CR	CR	VU	CR	CR
9 East Madagascar	LC	VU	LC	EN	CR	LC	EN	CR
10 South Madagascar	DD	LC	VU	EN	CR	DD	EN	CR
11 Delagoa	LC	LC	VU	VU	CR	VU	VU	CR
12 Central Mozambique Channel	LC	VU	EN	EN	CR	VU	EN	CR
13 Northern Monsoon Current	DD	DD	DD	DD	DD	DD	DD	DD

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.