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Current biodiversity and biogeography trends of reef-building corals in Qatar

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ABSTRACT

Coral reefs represent one of the most biologically and socio-economically important natural assets in the Arabian region, particularly in Qatar. Stress through increasing sea temperatures and salinities, growing development, and other pressures, has resulted in shifts in reef communities across the region in recent years. Branching corals have disappeared from most reef systems while previously thriving inshore reefs are being reduced to rubble with little signs of life remaining. We here conduct a thorough re-assessment of coral reefs around Qatar, focusing on coral cover and biodiversity using photoquadrat surveys, and we investigate potential environmental drivers of coral communities in the region. Results show higher coral cover on offshore reefs than on inshore reefs. Additionally, among previously documented inshore corals reefs, several have lost their coral cover and have shifted to non-coral ecosystems composed of rubble, turf algae, and oysters. Coral diversity is higher on offshore reefs than inshore reefs, with previously reported species now absent on inshore reefs. Environmental factors such as salinity and sea surface temperatures could play an important role in driving current patterns of coral biodiversity and biogeography and in predicting their shift as a function of future regional climate scenarios. We expect inshore reefs to be generally more fragile and susceptible to stress due the higher variability in environmental conditions. These same inshore reefs are also the most exposed to human interactions and coastal development. To ensure the future of coral reefs in the region and to sustain their ecosystem services, coral reefs in Qatar will need to be effectively regulated (i.e. through the development and implementation of an ecosystem-based management plan). In addition, recovery of impacted reefs could be assisted through the creation of a network of marine protected areas (MPAs), allowing for natural replenishment of coral communities through connectivity. In the meantime, local reefs are likely to continue their decline in coral cover and diversity, particularly the inshore environments.

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