



Chagos reefs are recovering rapidly from the 1998 mortality event and now support diverse fish assemblages

The impact of climate change on coral reef fish assemblages

Our warming climate is causing reef corals to bleach (expel their symbiotic algae) and die at alarming rates. In 1998, 16% of the world's reefs were lost through a warm water event. The Indian Ocean was one of the worst impacted regions, with some reefs suffering huge mortality, and Chagos was no exception¹. With such events expected to get worse in the future, considerable attention is now focussed on the possible secondary impacts on fish.

Studies of the short-term (1–3 years) impacts of coral loss on fish indicate that species reliant on live coral (for food, shelter or as a place to settle), may decline, and fish that feed on algae may show some increases, but in general the impacts are small². However, in the longer-term (5–10 years) the physical structure of the reef may begin to collapse and much greater impacts can occur. For example, the number of species may decline, as may the abundance of fish particularly those with small body sizes³. Furthermore, the juveniles of larger bodied species may decline when their refuge from predators (the reef structure) erodes, which will ultimately mean larger fish, which are important for fisheries may also decline⁴.

A large-scale research study has been underway in the Indian Ocean for the past three years where researchers have repeated coral reefs and fish surveys at sites in seven Indian Ocean countries where data had been collected in the mid 90s. The Chagos was one of these locations, with fish counts being repeated by members of the Chagos 2006 expedition at sites surveyed by the 1996 expedition. All these data from across the Indian Ocean have been analysed to assess the regional impacts of the 1998 bleaching, caused by the warm water event, on coral reefs and fish. The impacts are large in some locations, such as the inner Seychelles, but vary across the region and some places show little impact. Chagos is one location indicating little change in coral and fish, which is of particular interest as this suggests rapid recovery of Chagos reefs (pictured), which were heavily affected in 1998. The study concludes that such variability needs to be built into management plans to combat climate change effects on coral reefs.

¹ Sheppard CRC 1999. Coral decline and weather patterns over 20 years in the Chagos Archipelago, central Indian Ocean. *Ambio* **28**: 472-478.

² Spalding MD, Jarvis GE 2002. The impact of the 1998 coral mortality on reef fish communities in the Seychelles. *Marine Pollution Bulletin* **44**: 309-321.

³ Graham NAJ, Wilson SK, Jennings S, Polunin NVC, Bijoux JP, Robinson J 2006. Dynamic fragility of oceanic coral reef ecosystems. *PNAS* **103**:8425-8429.

⁴ Graham NAJ, Wilson SK, Jennings S, Polunin NVC, Robinson J, Bijoux JP, Daw TM 2007. Lag effects in the impacts of mass coral bleaching on coral reef fish, fisheries, and ecosystems. *Conservation Biology* **21**: 1291-1300.

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