



## Coral reef resilience to climate change in the Commonwealth of the Northern Marianas Islands

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*Steven McKagan, one of a team of researchers and managers, assessing reef resilience in CNMI, is shown here assessing fish communities in the Coral Gardens near the island of Rota. Photo courtesy J. Maynard.*

Coral reefs are sensitive to changes in the marine environment, including alterations to water chemistry, temperature, wave exposure, and pollution. To protect coral reefs, resource managers must determine which reefs are most resilient to natural and human-made changes in the ocean. Scientists and managers working on this project sought to assess the resilience, or capacity to resist or recover from disturbance, of fringing reefs in the Commonwealth of the Northern Mariana Islands (CNMI).

To inform local management efforts, scientists collaborated with managers from CNMI agencies to survey 78 sites on the islands of Rota, Aguijan, Tinian, and Saipan and evaluate indicators of resilience (such as numbers of juvenile corals and herbivorous fish). The project team then interpreted their results to identify targets for different types of management actions including land-based pollution reduction, fishery regulation, reef restoration, monitoring of reef bleaching, stewardship for tourism, and conservation.

Over 70% of the sites met at least one of the action criteria and over 40% of the sites met the criteria for more than one management action. The most common suggested management actions varied by island.

Relatively less developed

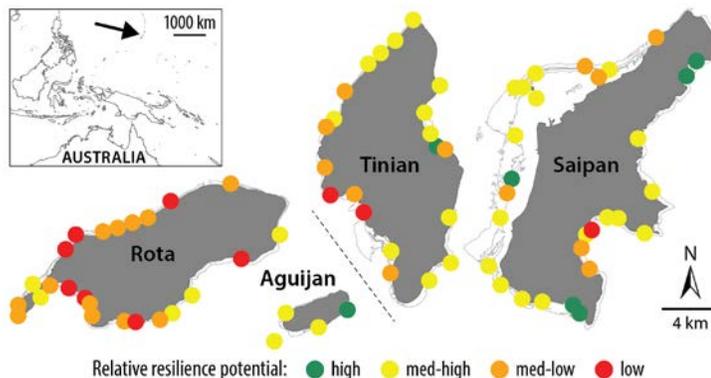
islands, such as Rota, would benefit more from conservation and monitoring. Saipan, a more developed island with a greater

human population, would benefit more from fisheries management and pollution control, and more sites on this island met criteria for multiple targets. Fisheries regulation and enforcement was the most common recommendation, followed by coral reef restoration and monitoring.

This project represents globally relevant progress using resilience assessments to inform, and even drive, management decision-making. Identifying potential targets for management action enables managers to consider these results during planning and management decision-making processes. The scientist-manager collaborations formed during this project have already facilitated use of the results by local managers for the coming years, identified gaps in scientific research that need to be addressed, and assisted in development of education and outreach materials to raise awareness of climate change and reef resilience among community members and reef stakeholders.

## Quick Summary

- Coral reefs are affected by diverse environmental factors, but individual reefs vary in their resilience, or capacity to recover from disturbance.
- We evaluated 78 sites on multiple islands in the Commonwealth of the Northern Mariana Islands to assess their resilience and determined which could benefit from management actions such as fisheries regulation, pollution reduction, or reef restoration and monitoring.
- Our results will allow more effective resource management targeted to the needs of specific areas as well as assisting with community education and outreach.



*Inter-island resilience assessment results for the Northern Mariana Islands in the west Pacific. Image courtesy J. Maynard.*



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