



Ministry of Marine Resources  
TU'ANGA O TE PAE MOANA  
COOK ISLANDS

# MITIARO MARINE SURVEY

January 2023



## ABOUT MITIARO

Mitiaro is a *makatea* island in the Ngaputoru group of the southern Cook Islands. It has a shallow, fringing coral reef with a total reef circumference of 19 km. During low tides, Mitiaro's reef flats become shallow or exposed to air. This allows invertebrates to be easily harvested by the local community.

The last *ra'ui* (Kovea-Oponi area) was closed to harvest after May, 2018 and opened in 2020. No *ra'ui* were in place at the time of survey.

## SURVEY METHODS

- January 9th to 16th, 2023
- Invertebrates, fish, and substrates were surveyed at 10 sites (see map)
- Within each site, surveys were performed within the reef on the reef flat and reef crest, and outside the reef on the fore reef slope at 10 m depth
- Invertebrates and substrate were surveyed in all habitats
- Fish were only surveyed on the forereef
- Previous survey in May 2018 used the same methods, with substrate surveys added to reef flat and reef crest in 2023
- Ten 0.25 m<sup>2</sup> quadrats were used to assess substrate cover in lagoon habitats



## SUBSTRATE

- Southern sites - lowest hard coral cover on fore reef (9% and 10%)
- Highest hard coral cover on fore reef at Patiare (70%)
- Algal cover on fore reefs decreased since 2018
- Reef crest was predominately crustose coralline algae and coral pavement
- Reef crest hard coral cover was highest at Tepari (18%)

**Mitiaro had the highest recorded hard coral cover in the southern group (40%)**



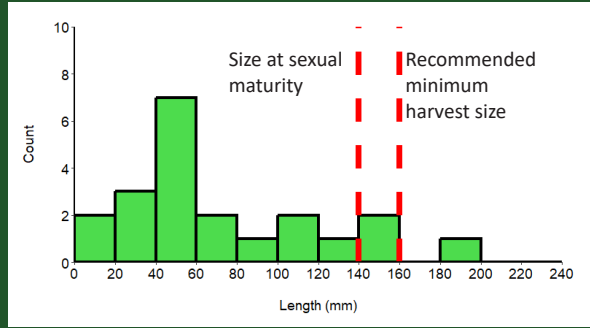
*Astreopora* (sp.) was the dominant coral genus on forereef slopes



## INVERTEBRATES

### *Pa'ua* (*Tridacna* spp.)

- Only three sexually mature *pa'ua* recorded
- Densities at all sites were below four *pa'ua* per 100 m<sup>2</sup>
- **Densities were too low for successful reproduction**



### *Arii* (*Turbo* spp.)

- Low densities observed at all sites
- Average size - 39 mm base diameter, max length

### *Ungakoa* (*Dendropoma* sp.)

- **Densities declined substantially since 2018**
- Few were observed in 2023
- *Ungakoa* were observed at six sites in patchy distributions

### *Vana* (*Echinothrix diadema*)

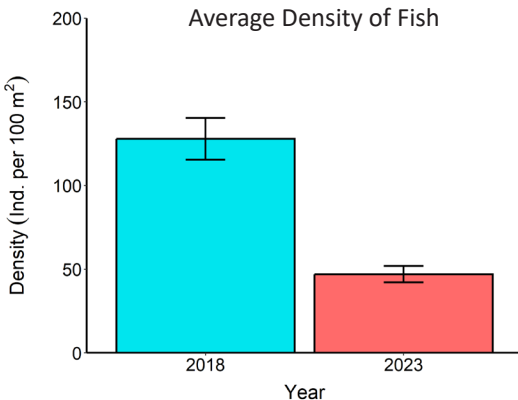
- High densities in 2013
- Mass die-off in 2016 left low densities of urchins \*
- **Populations had not recovered since die-off**

\* Rongo, T.\*, Kora, J., McDonald, G., Phillips, A., Smith, A. 2017. Rarotonga fore reef community survey 2016. Government of the Cook Islands. 41 pp.



## FISH

- 75 different species observed
- Highest number of fish observed at Tiara, lowest at Oponi
- The most common groups recorded were damsels, anthias, wrasses, and surgeonfish
- **Fish densities declined substantially since 2018**



### *Katoti* (*Chromis acares/vanderbilti*)

- Most commonly observed fish in 2018 and 2023



## ADDITIONAL OBSERVATIONS

A notable amount of rubbish was observed on beaches and on land. The beach rubbish was mainly composed of plastic bottles and polystyrene foam that had washed up from overseas. Land-based rubbish was composed of plastic bottles, lolly wrappers, aluminium cans, and glass bottles.

This rubbish can damage marine life. Plastics can break down and enter the food chain, becoming harmful to animals and humans.



*Pa'ua*



*Ungakoa*



*Vana*



*Ariri*



MMR surveys Kovea reef flat

## ACKNOWLEDGEMENTS

The Ministry of Marine Resources would like to extend a gracious *meitaki ranuinui* to Mayor Makara Murare, EO Anna Roi, the Mitiaro Island Government, and the Aronga Mana for their support and assistance during our expedition. We would also like to recognize MMR Secretary Pamela Maru and Director of Inshore and Aquaculture Koroo Raumea for their continued support. Our field team included: Fisheries Officers Ngarourou Tou, Kirby Morejohn, Phoebe Argyle, Michael Parrish, Charlee McLean, Adrian Teiotu, and National Environment Service Officer, Eva Patai. This pamphlet was prepared by Michael Parrish, Phoebe Argyle, Charlee McLean, and Kirby Morejohn.

© Pictures from K. Morejohn, P. Argyle, L. Ainley (Ministry of Marine Resources), and E. Patai (National Environment Services)

## MANAGEMENT RECOMMENDATIONS & OPTIONS

The following recommendations are advised to improve Mitiaro's fisheries management. These recommendations are based on survey data and observations and are consistent with regional guidelines.

### Overall

- Prohibit or develop rules for the sale and export of reef fish and invertebrate species
- Create a permanent, no-take marine reserve from the northern harbour wall, north to Taungaroa, and extending from shore to the drop-off
- Create and enforce *ra'ui*
- Organize periodic rubbish cleanups on beaches and land

### Invertebrates

- 🐚 Create 160 mm minimum size limit for *pa'ua*
- 🐚 Prohibit *pa'ua* harvest beyond the reef
- 🐚 Create 30 mm minimum size limit for *ariri* (measured across shell opening)

### Fish

- 🐟 Prohibit spearfishing at night for sleeping fish
- 🐟 Prohibit or develop rules for net fishing
- 🐟 Prohibit *maratea* harvesting

Gillnet entangled around coral





**Please contact us for more information**  
Inshore Fisheries and Aquaculture Division



**Ature school in harbour**

**Ministry of Marine Resources**

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