# ATIU & TAKUTEA

## NEARSHORE MARINE ASSESSMENT

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Ministry *of* Marine Resources
GOVERNMENT OF THE COOK ISLANDS

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# ATIU & TAKUTEA

# NEARSHORE MARINE ASSESSMENT

Prepared for the Atiu Island Council and Community

*James Kora, Dr. Lara Ainley and Kirby Morejohn*

Ministry of Marine Resources

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This book is an abbreviated form of the 2018, Atiu and Takutea Nearshore Invertebrate and Finfish Assessment

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# INTRODUCTION

***Atiu***

Atiu has a fringing coral reef with a circumference of 22 km in total. This reef encompasses the entire island with the widest reef flat area located on the southern side and *makatea* cliffs on the north-eastern side. The southern side has a limited lagoon area, with many intertidal pools that connect to narrow passages running through the reef crest. There are two designated *rā'ui* on Atiu located within the Vai Piake and Te Vai areas, located on the western and southern sides of the island (Figure 1).

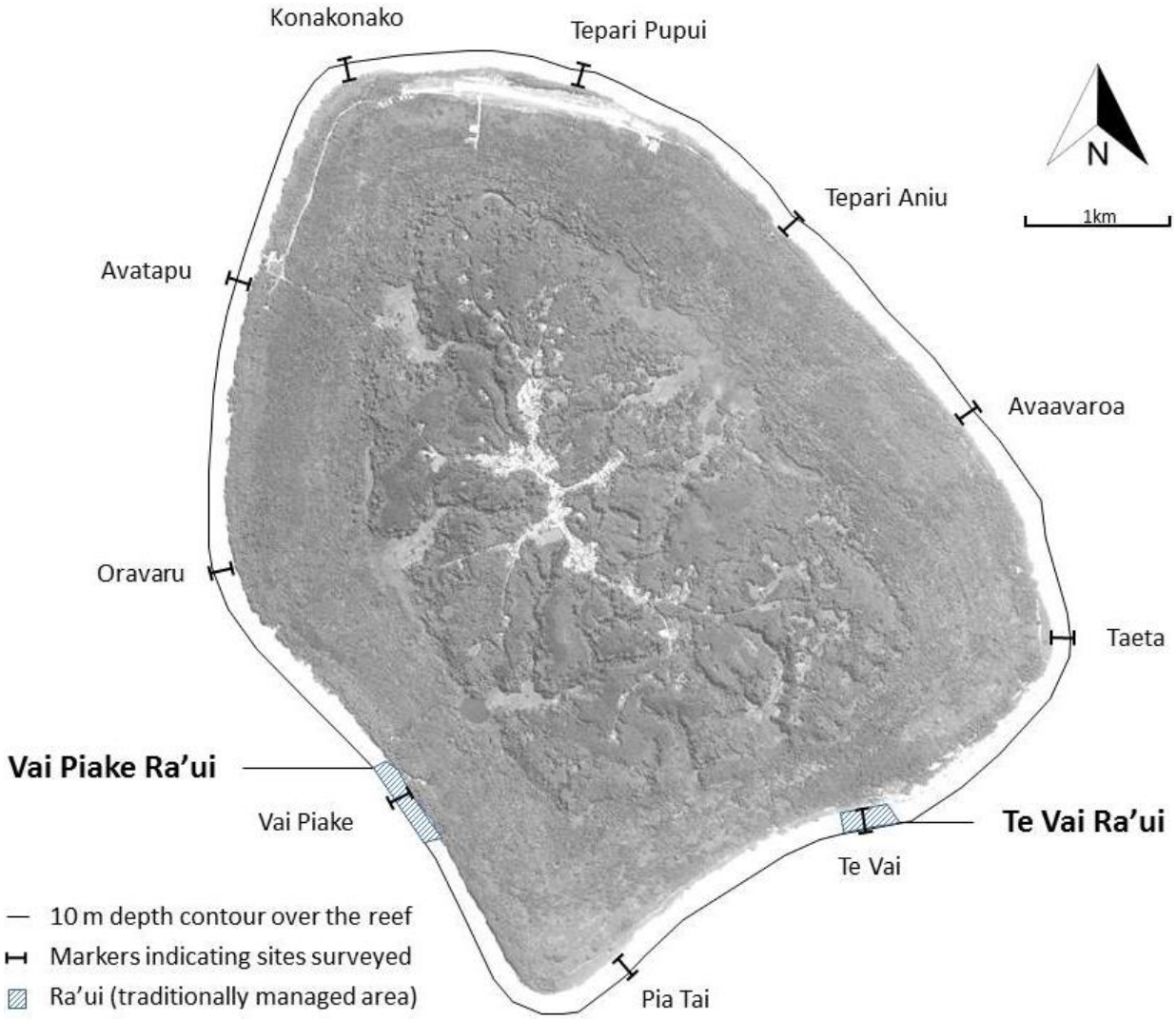



Figure. 1. Atiu survey sites and traditionally managed areas. Map source: Google DigitalGlobe.

***Takutea***

Takutea lies approximately 23 km northwest of Atiu and is governed by the Takutea Trustees and Atiu Island council. It is also surrounded by a fringing coral reef, but is classified as a sand cay. Takutea is much smaller than Atiu and has a total reef circumference of 6 km. Shallow reef flats comprise the northern, western and southern sides of the island while a short reef flat occurs on the northeastern side. A steep fore reef is also found on the north-eastern side where strong wave action often occurs due to the close proximity of the reefs edge to the shore. Accessing Takutea is naturally difficult due to shallow reef flats with no natural passages and strong wave action.

In 2007, the Atiu traditional leaders and Takutea trustees entered into an agreement with a non-charitable organisation to establish a wildlife sanctuary on Takutea. The agreement facilitated the establishment of a 297 acre sanctuary, covering the entire island and surrounding nearshore waters for a period of 20 years. The people of Atiu regard the sanctuary as a form of *rã'ui* and are responsible for governing the uninhabited sand cay as no other marine resource legislation exists.

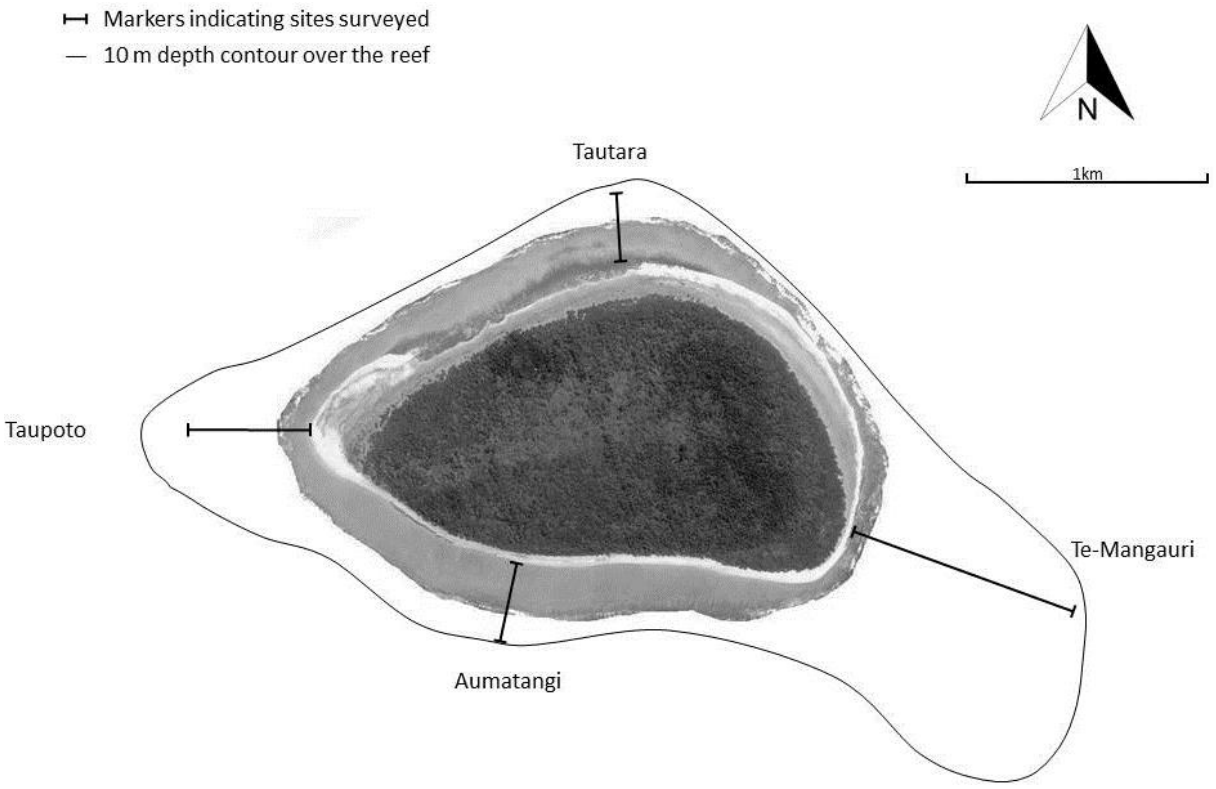
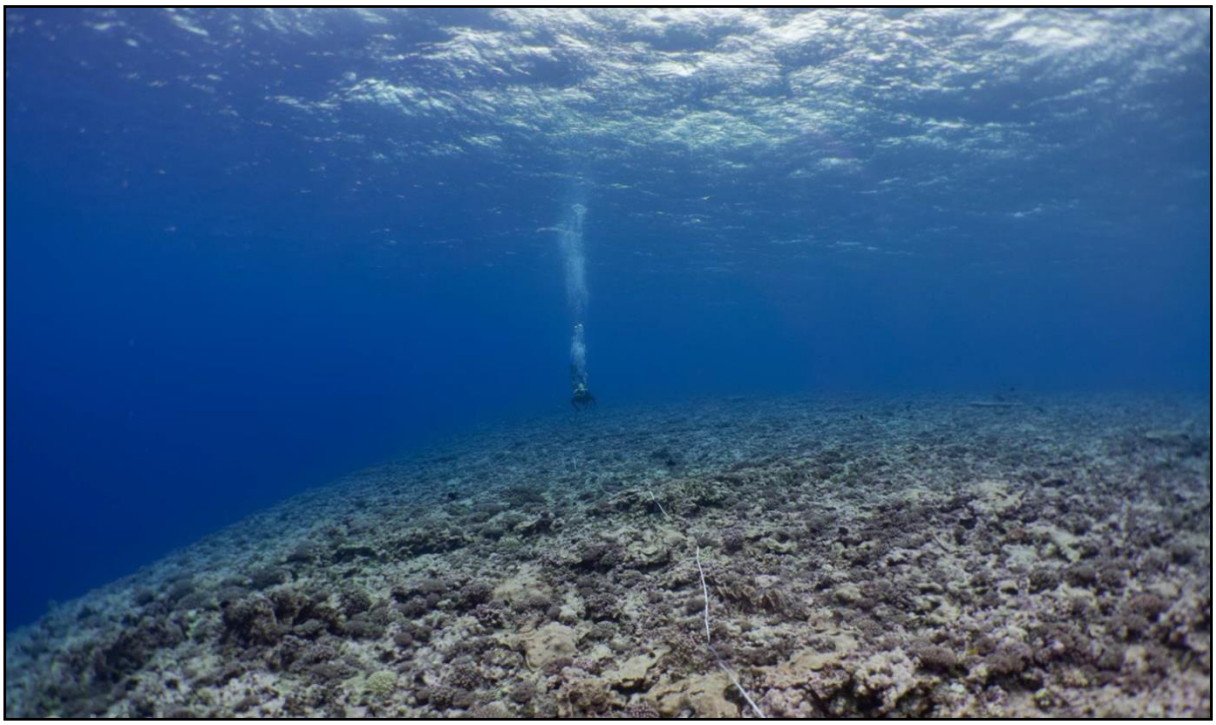



Figure. 2. Takutea survey sites. Map source: Google DigitalGlobe.

## METHODOLOGY

The survey in Atiu took place from the 21st to 30th of May 2018 at ten field sites around the island. The survey in Takutea took place on the 24th and 25th of May of 2018 at four sites around the island. Survey sites were selected to include any existing *rā'ui* and nearby control areas (unregulated areas open to harvest). Finfish, invertebrates and substrate data were collected at each field site on both islands using SCUBA transects in 10 m of water on the fore reef slope. Invertebrate data were collected on the reef flat using snorkel and walk sampling transects.

Data collection of all species included identification to the lowest possible taxonomic classification (taxa), counts, and measurements when applicable. For finfish, fork length measurements (mm) were visually estimated. For invertebrates, length measurements were recorded (mm) for the first ten individuals of commonly harvested species or species of interest.



MMR staff swimming along 50 m transect in 10 metres of water. ©MMR

# RESULTS

***Invertebrates***

A total of 2,645 individual invertebrates were observed across 86 transects in Atiu, representing 31 different taxa. The most frequently observed invertebrate was the *ungakoa* (*Dendropoma* spp.), where a total of 902 individuals were recorded across all transects. The *rori toto* (*Holothuria atra*) and the Red Urchin (*Parasalenia gratiosa*) were also frequently observed with 739 and 250 individuals recorded across all transects, respectively. The average density of reef flat invertebrates was greatest at the southern field site Pia Tai (223 ind./100 $m^2$). The average species richness was also greatest at Pia Tai (6 taxa/40 $m^2$), and significantly greater than species richness at all other sites except Te-Vai *rā'ui* and Taeta. No invertebrates were recorded at the northern field site Tepari Pupui.

A total of 1,049 individuals were observed across 36 transects in Takutea, representing 17 different taxa. The most frequently observed species was the *paua kura* (*Chama pacifica*) where a total of 352 individuals were recorded across all transects. The *paua* (*Tridacna* spp.) and *ungakoa* were also frequently observed with total individuals of 298 and 169, respectively. The average density of inner reef invertebrates was greatest at Aumatangi (122 ind./100 $m^2$), on the southern side of Takutea. The average species richness was also greatest at Aumatangi and Tautara (3 taxa/40 $m^2$ and 3 taxa/40 $m^2$), respectively.

A large *paua* (*Tridacna squamosa*) in 10 metres of water at Taeta. ©MMR

***Paua***

Average *paua* density on the reef flat in Atiu was greatest at the western field site Oravaru (3 ind./100 $m^2$, Fig. 3). *Paua* were not recorded at the five northern-most field sites Avaavaroa, Avatapu, Konakonako, Tepari Aniu and Tepari Pupui; and the *rā'ui* field site Vai Piake. The average density of *paua* in Takutea was greatest at Aumatangi (87 ind./100 $m^2$) and was significantly greater than all other sites (Figure 3).

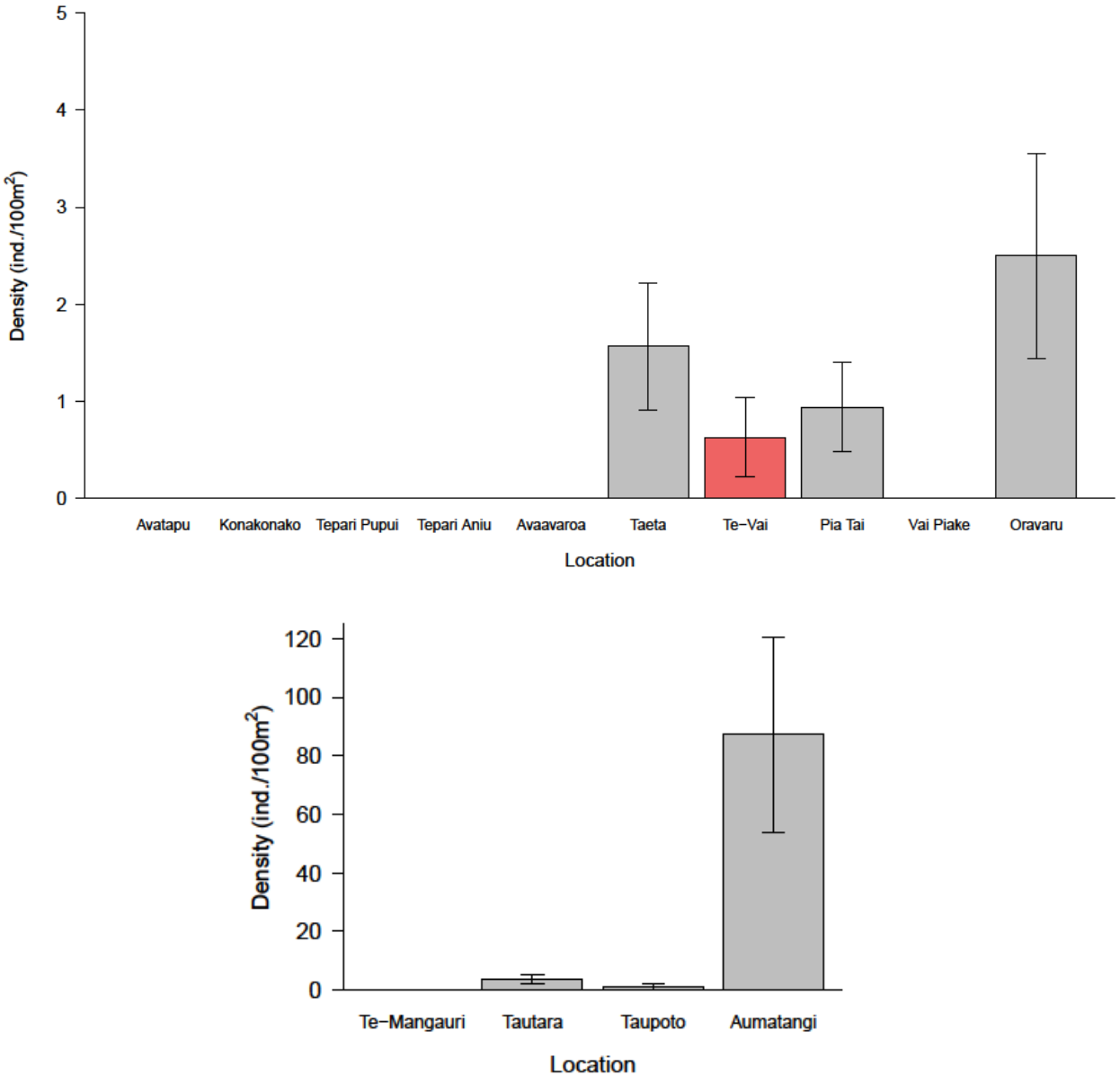



Figure 3. ***Top***: *Paua* densities on the inner reef in control sites (grey) and *rā'ui* sites (red) in Atiu. ***Bottom***: *Paua* densities on the inner reef in Takutea.

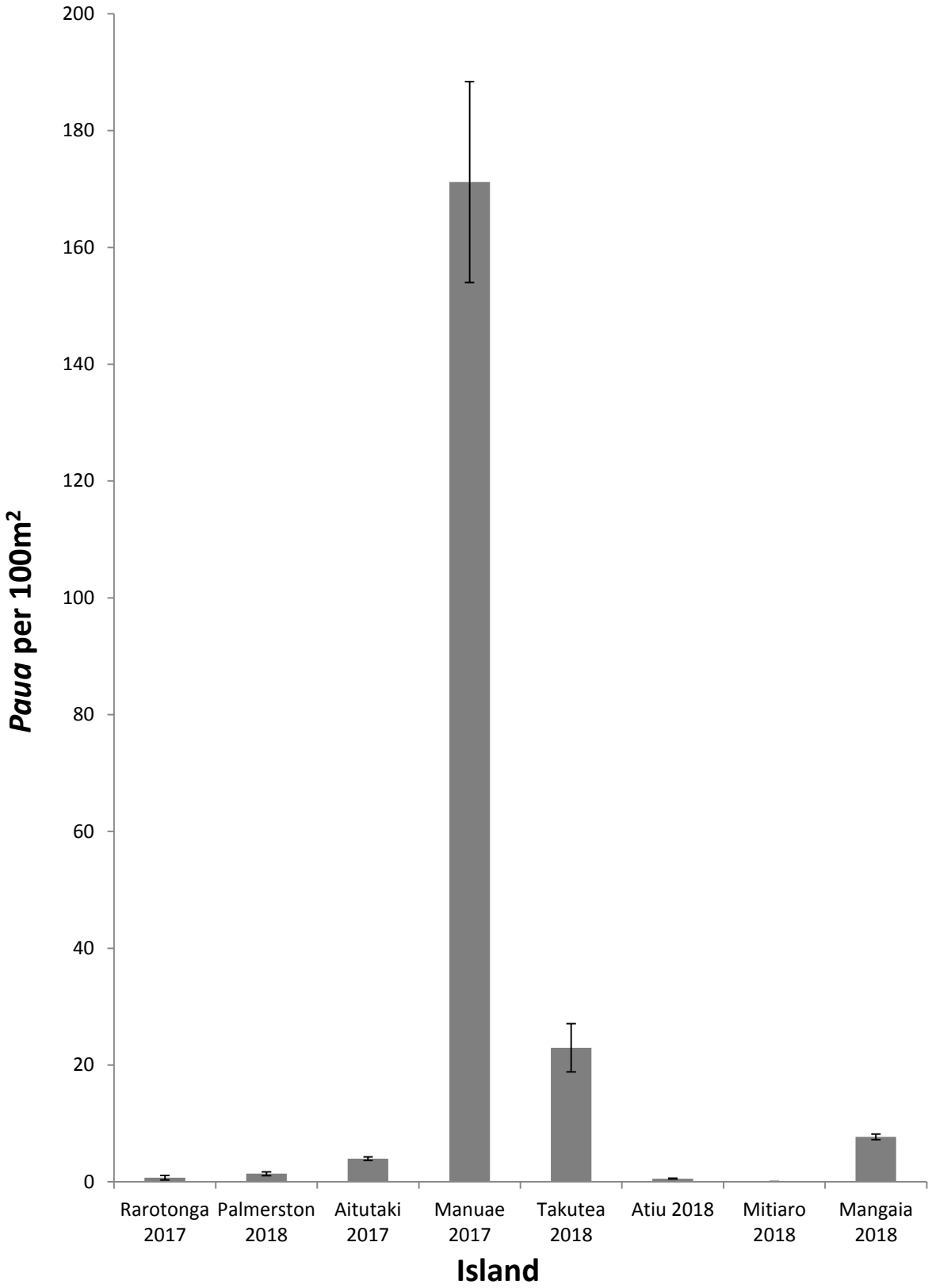



Figure. 4. *Paua* densities from recent surveys of Southern Group islands.

***Finfish***

A total of 3,768 finfish were observed across ten transects representing a total of 83 taxa. The most frequently observed species was the Midget Chromis (*Chromis acares*) where a total of 1,097 individuals were recorded across all transects. The *maito* (*Ctenochaetus striatus*) and Olive Anthias (*Pseudanthias olivaceus*) were also frequently observed with total individuals of 728 and 445, respectively. Finfish density over the reef was greatest at Tepari Aniu (304 ind./100 $m^2$) and least at Avatapu (109 ind./100 $m^2$).

A total of 1025 fish observed across 4 transects representing a total of 54 taxa. The most frequently observed species was the Tahitian Damselfish (*Pomachromis fuscidorsalis*) where a total of 160 individuals were recorded across all transects. The Midget Chromis (*Chromis acares*) and Olive Anthias (*Pseudanthias olivaceus*) were also frequently observed with a total of a 150 individuals of each species recorded across all transects. Finfish density over the reef was greatest at Aumatangi with (175 ind./100$m^2$) and least at Taupoto with (83 ind./100 $m^2$).

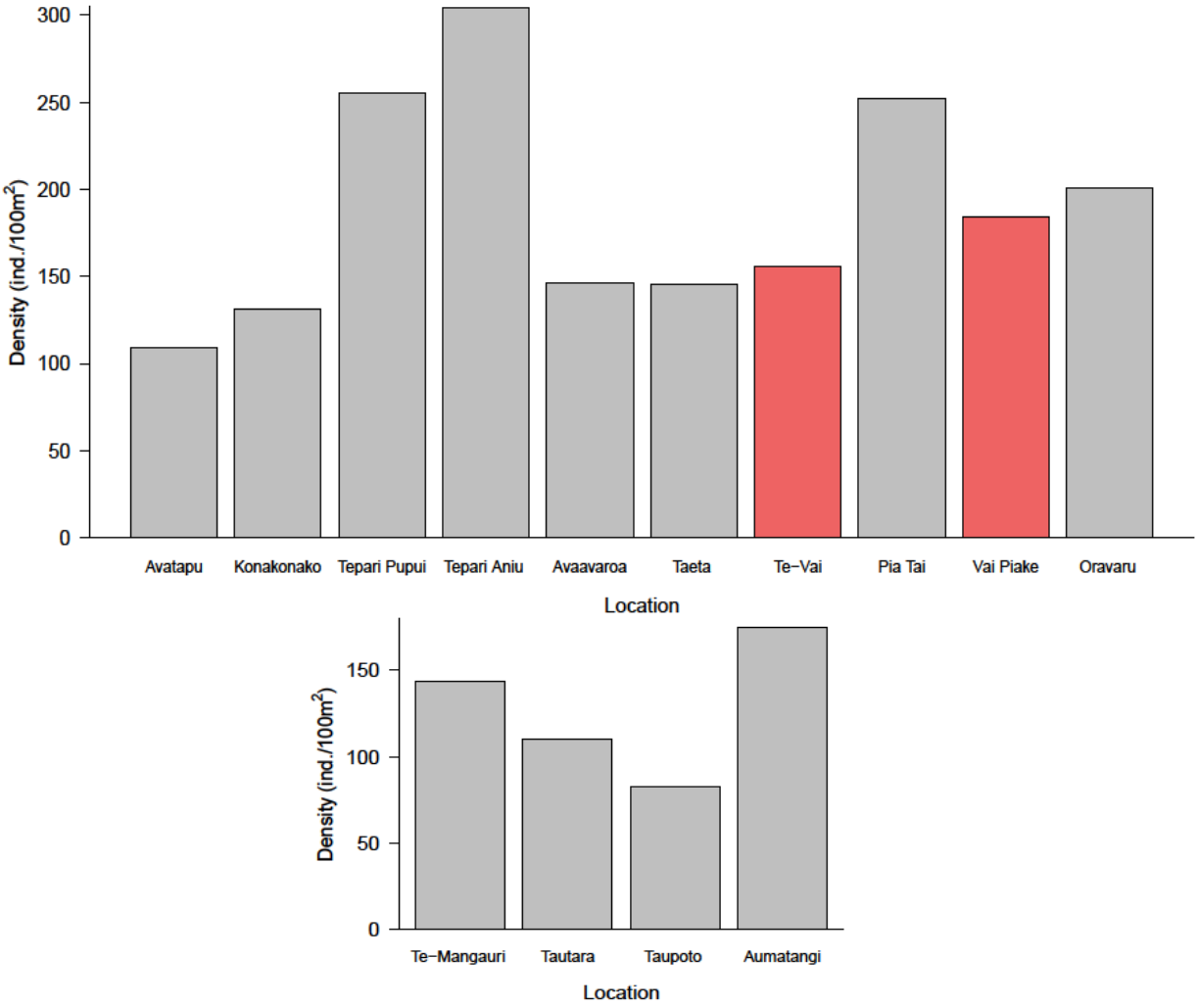



Figure 5**.** ***Top***: Finfish density over the reef in control (grey) and *rā'ui* (red) sites in Atiu. ***Bottom***: Finfish density over the reef in Takutea.

***Coral and Substrate***

The average live coral cover for Atiu was 19%. Hard substrate accounted for the highest percentage cover over the reef with an overall average of (39%). Hard coral cover was greatest at Avatapu (21%) and least at Tepari Pupui (15%). The average live coral cover for Takutea was 7%. Hard substrate accounted for the most percentage cover over the reef with an overall average of (47%). Average hard coral cover was greatest at Tautara (10%) and lowest at Taupoto (1%).

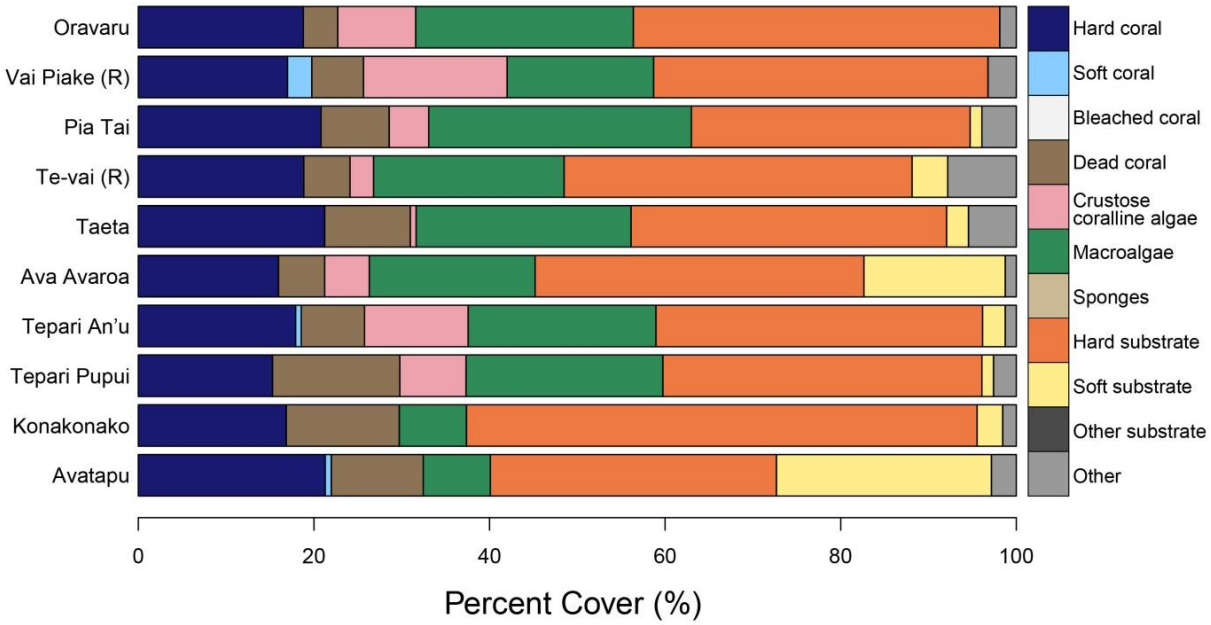



Figure 6. Atiu substrate type and percentage cover from over the reef in control and *rā'ui* (R) sites.

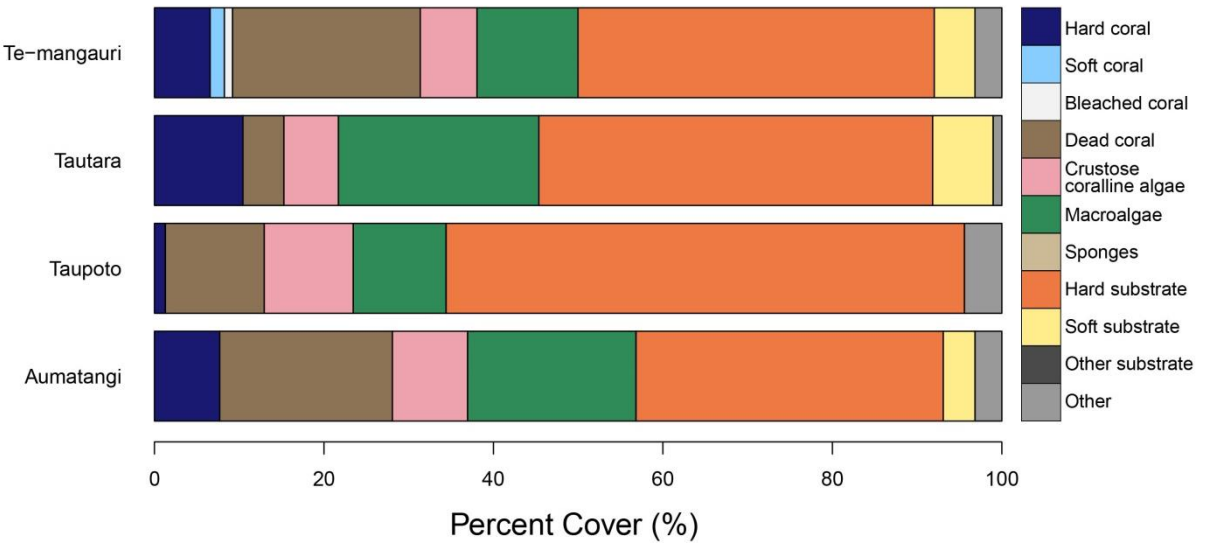



Figure 7. Takutea substrate type and percentage cover from over the reef.

# MANAGEMENT OPTIONS

Based on these results and the current state of scientific knowledge, outlined below are management options that should have long term positive benefits for subsistence fishers, ecosystem resilience and biodiversity conservation in Atiu and Takutea. These options may be accepted or modified to suit the needs of fishermen, communities and managers.

**Atiu**

- Limit invertebrate harvest sales, only permitting harvests for subsistence fishers by the Atiu community.
- Establish a marine reserve for *paua* on the reef near the already established terrestrial Mokoero Nui reserve. *Paua* species are highly susceptible to overharvest and careful management is imperative to their survival.
- To regulate *paua* harvests, we recommend:
    - Impose conservative minimum size limit
    - Impose conservative daily bag limit
    - Never harvest *paua* from over the reef.

**Takutea**

- Limit invertebrate harvest sales, only permitting harvests for subsistence fishers by the Atiu community.
- Establish a permanent marine reserve for *paua* at Aumatangi. This area may serve as a source population for species recruitment to Takutea and Atiu.
- To regulate *paua* harvests, we recommend:
    - Impose conservative minimum size limit
    - Impose conservative daily bag limit
    - Never harvest *paua* from over the reef
- For plastic debris that may impact seabirds, turtles and other marine life, we recommend that during each visit to Takutea, boats remove as much rubbish as reasonably possible.

## ACKNOWLEDGEMENTS

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