

REPORT

CORAL REEF BIODIVERSITY COMMUNITY-BASED ASSESSMENT AND CONSERVATION PLANNING IN THE MARSHALL ISLANDS: BASELINE SURVEYS, CAPACITY BUILDING AND NATURAL PROTECTION AND MANAGEMENT OF CORAL REEFS OF THE ATOLL OF RONGELAP.

Silvia Pinca, Maria Beger, Editors

Authors:

Silvia Pinca – Ecological Section, Management Recommendations

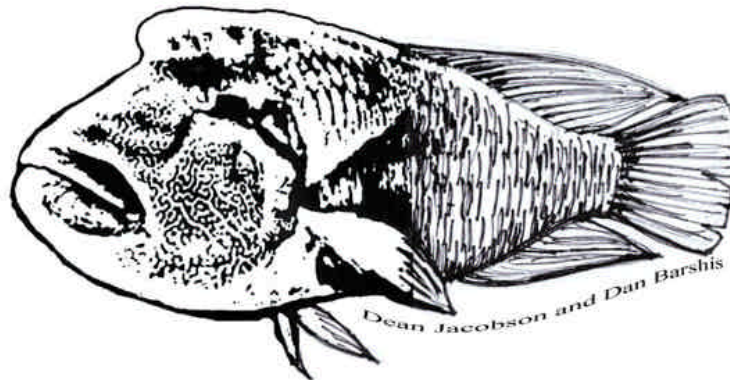
Maria Beger – Fish Diversity, Management Recommendations

Eric Peterson – Management Recommendations

Zoe Richards – Coral Diversity

Emma Reeves – Management Recommendations

Bikini-Rongelap



NRAS
survey team
2002

5. Site Descriptions

The following tables and figures summarize the description of habitat and species richness for each of the site samples in Rongelap.



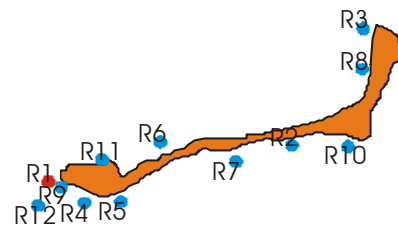
R1: Jaboan on SW tip of Rongelap Island

Coordinates: N 11° 09.20707' E 166° 50.18976'

Conservation value: very high

Fish species: 176

Coral species: 51



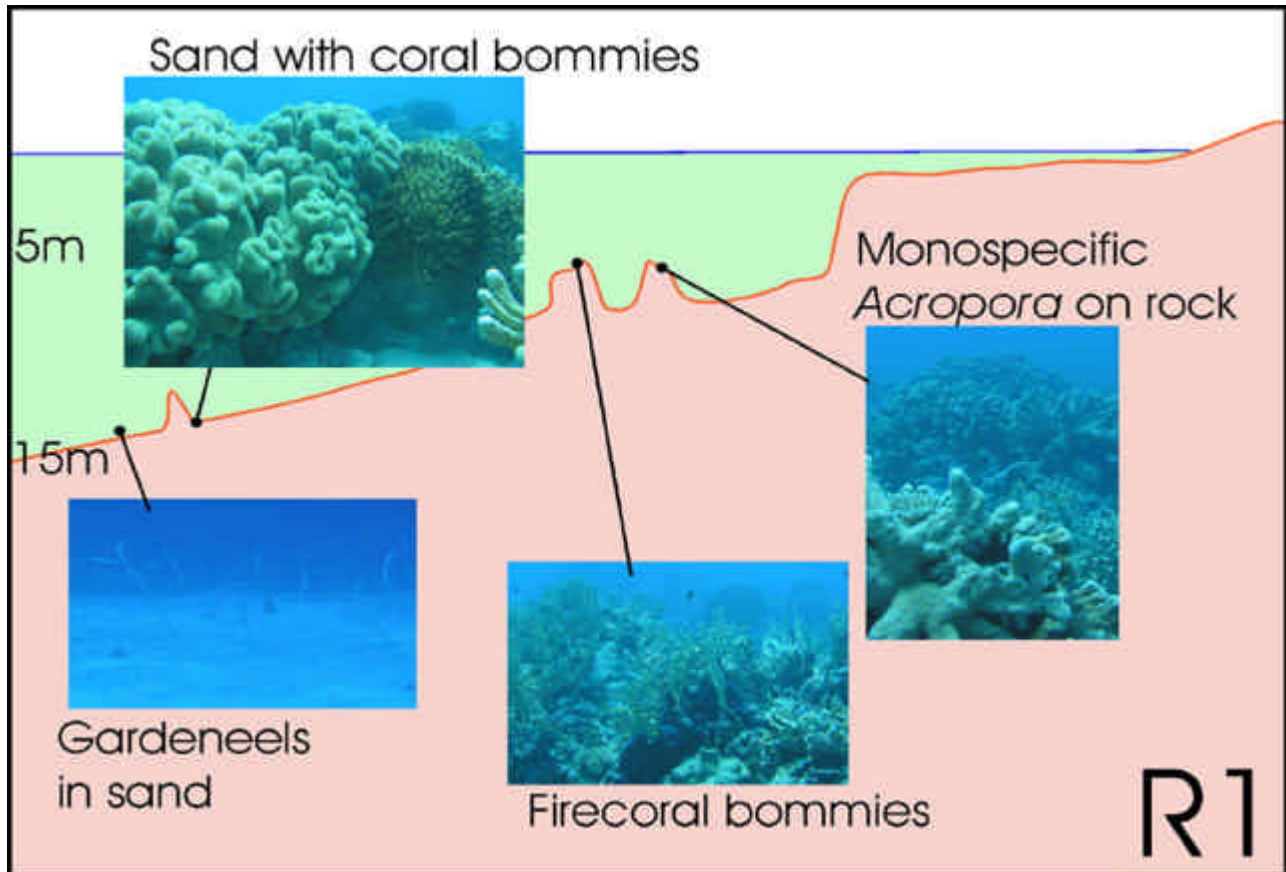
Visually estimated coral cover: 70%	Measured coral cover:	Fish biomass: 4.46 kg (6.11) (2,500m ³ of water sampled)	Shallow	1.95 kg	
	Shallow		61%	Medium	0 kg
	Medium		2%	Deep	11.4 kg
	Deep		2%		

Habitats:	- biological	- topographical
	Mixed corals	Slope (> 25°)
7 biological	Monospecific corals on rocky substrate	Steep wall w/ slope (> 60°)
9 topographical	Sand with coral bommies	High energy reef crest / top
	Sand	Flat reef

Description: Beach dive from Jaboan Point, where we saw several habitats on repetitive dives. This description is an account of many dives, but the transects and profile only represent one area (sandy flat to grooves and bommies). A more detailed description of Jaboan point is in the text of the Results section.

The site was rich with corals and fish. Abundant plankton and salps caused a low visibility. In the shallow area were complicated bommies creating caves and tunnels. Towards the western side there was a coral garden approaching 100% cover, which contained *Acropora palifera*, *Pocillopora spp* and *Montipora spp*. Large schools of parrotfish and humpback snappers (*Lutjanus gibbus*) and unicorn-fish (*Naso vlamingii* and *N. annulatus*). At 15m there were small coral bommies on a sandy flat that was home to expansive colonies of garden eels. In the south, we encountered a steep wall which slopes sideways towards the sand flat, interrupted by large patch reefs. We observed a tiger shark, saw several gra reef sharks, a nurse shark and eagle rays. Turtles constitute one of the tiger shark's favorite prey, and a half-eaten turtle was found on the reef flat. Large sea fans grew on the wall and soft corals (*Dendronephthya spp*) in small caves. Sometimes there was *Halimeda* seaweed hanging from the overhang. Channels occasionally led inshore into enclosed sandy patches surrounded by steep coral formations. Schools of unicorn-fish, blue-fin trevallies (*Caranx melampygus*), rainbow runners (*Elagatis bipinnulata*), and dog-tooth tunas hung around the wall.

Profile:



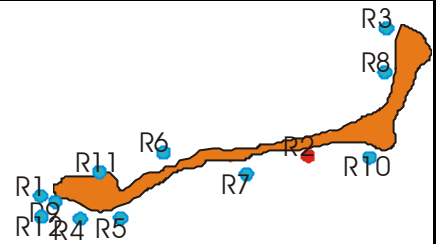
R2:

Coordinates: N 11° 09.39472' E 166° 53.14641'

Conservation value: average

Fish species: 132

Coral species: 53

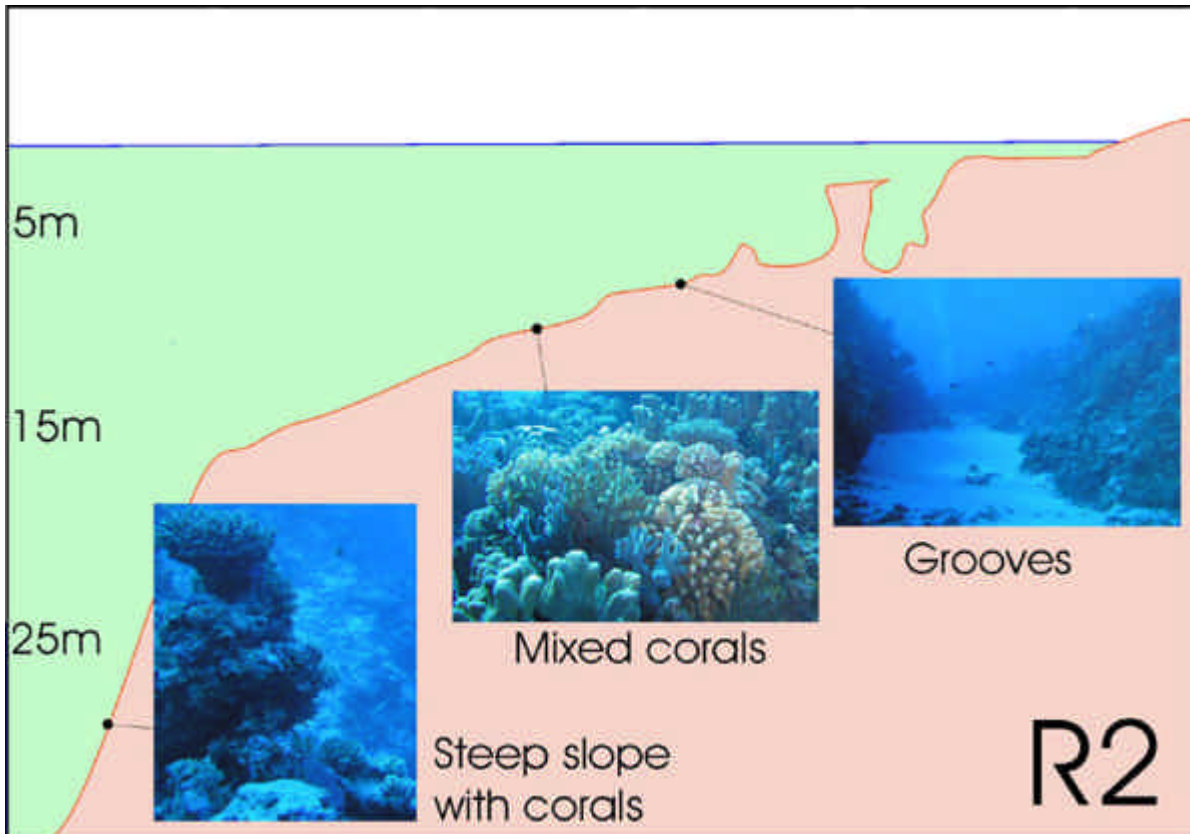


Visually estimated coral cover: 70 %	Measured coral cover:		Fish biomass:	
	Shallow	27%	Shallow	7.72 kg
	Medium	36%	Medium	3.29 kg
	Deep	41%	Deep	5.71 kg
			5.57 kg (2.22) (2,500 m ³ of water sampled)	

Habitats: 4 biological 7 topographical	- biological	- topographical
	Mixed corals	Bommies
	Bedrock w/ sparse corals	Slope (> 45°)
	Mixed coral on bommies and sand	Steep wall w/ slope (> 60°)
	Monospecific corals on rocky substrate	Flat reef

Description: Beach dive off far end of airport. A short entry because the reef flat has been filled in with the contaminated soil scraped from the living compound area, in support for the landing strip. Jumped off the edge crushed by waves at incoming tide, into deeper water. At 8-10 m the habitat was dominated by bedrock and deep sandy grooves. *Acropora palifera* and *cuneata*, *Heliopora coerulea* and *Tubipora musica* were the dominant coral forms, together with massive *Porites*. The gentle slope with grooves went to about 13m, where it abruptly turned into a steep wall sloping down into the blue. At the wall, there were many anthiases, surgeonfish *Acanthurus thompsoni* and the Multicolour Angelfish (*Centropyge multicolor*). Corals were a little less dense than nearer the surface, where the slope was less steep. Rich in life for both coral and fish. One eagle ray, one white tip shark and one gray reef shark. Two Napoleon wrasses, one small, one medium size. A few seaweeds, *Halimeda spp.* and coralline algae.

Profile:



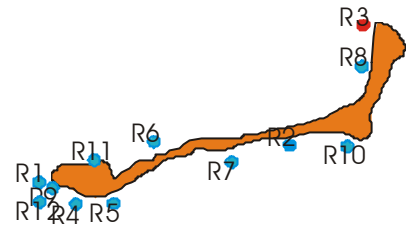
R3:

Coordinates: N 11° 10.74334' E 166° 53.74411'

Conservation value: very high

Fish species: 144

Coral species: 38

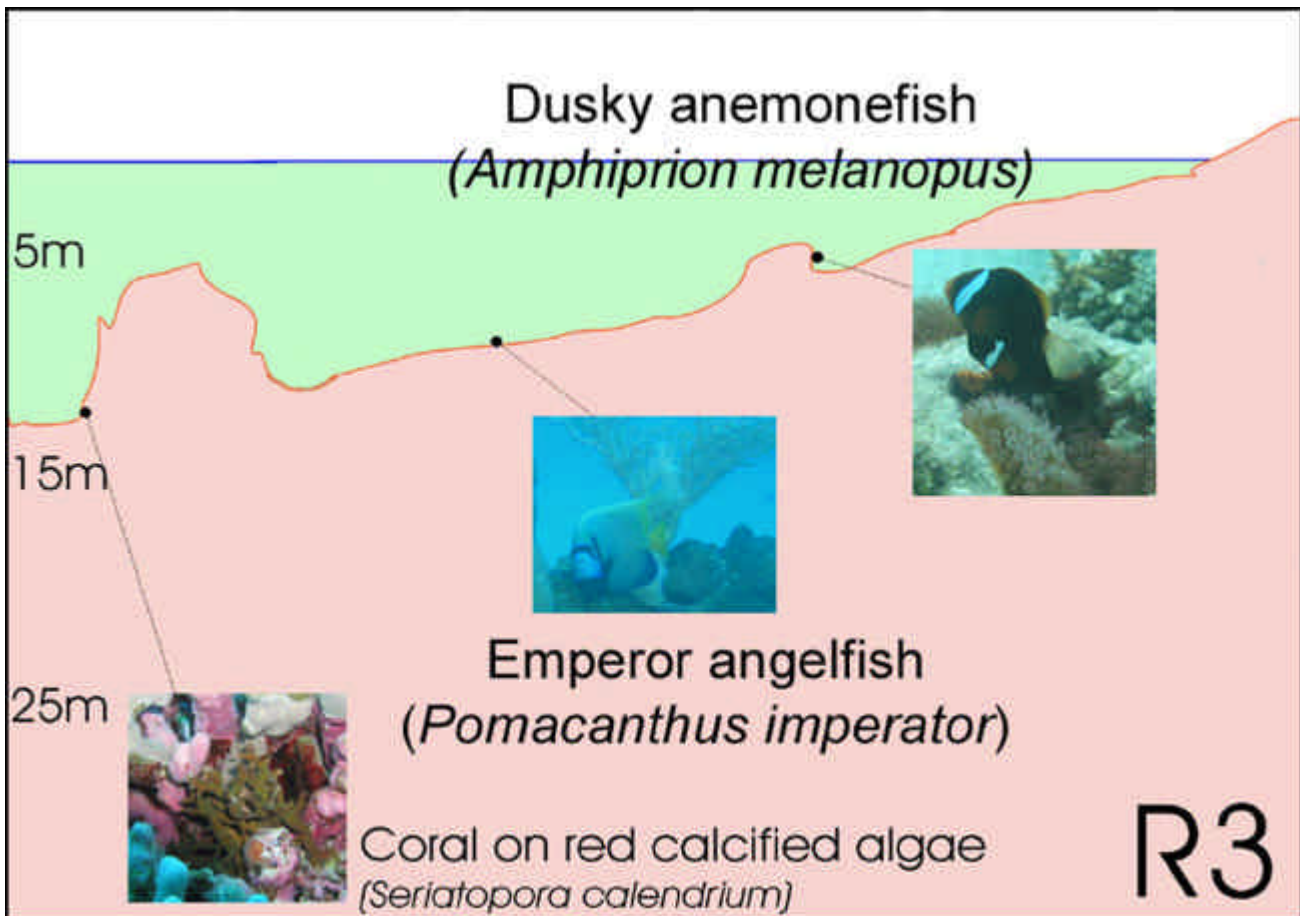


Visually estimated coral cover: 10 %	Measured coral cover:		Fish biomass:		
	Shallow	12%	Shallow	3.98 kg	
	Medium	7%	Medium	3.01 kg	
	Deep	50%	Deep	1.75 kg	
			2.91 kg (1.12) (2,500 m³ of water sampled)		

Habitats:	- biological	- topographical
	Sand	Flat reef
6 biological	Mixed coral on bommies and sand	Bommies
3 topographical	Sand with algae	Monolith
	Monospecific corals on sandy substrate	

Description: Truck dive off northern side of Rongelap. Very gentle slope. Sandy substrate and some coral bommies with *Porites cylindrica* and *Favia spp.* and *Favites spp.*, branching *Acropora* (e.g. *A. muricatum*), bottlebrush *Acropora* and *Seriatopora hystrix*. On sand, lots of *Halimeda*. Lots of damsels and chromis. Giant clams. Many *Holoturia edulis*.

Profile:



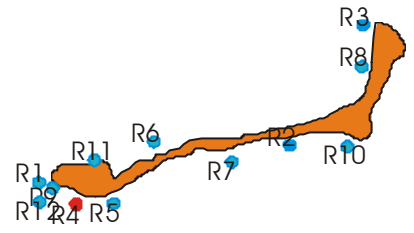
R4:

Coordinates: N 11° 09.10086' E 166° 50.32076'

Conservation value: high

Fish species: 149

Coral species: 58

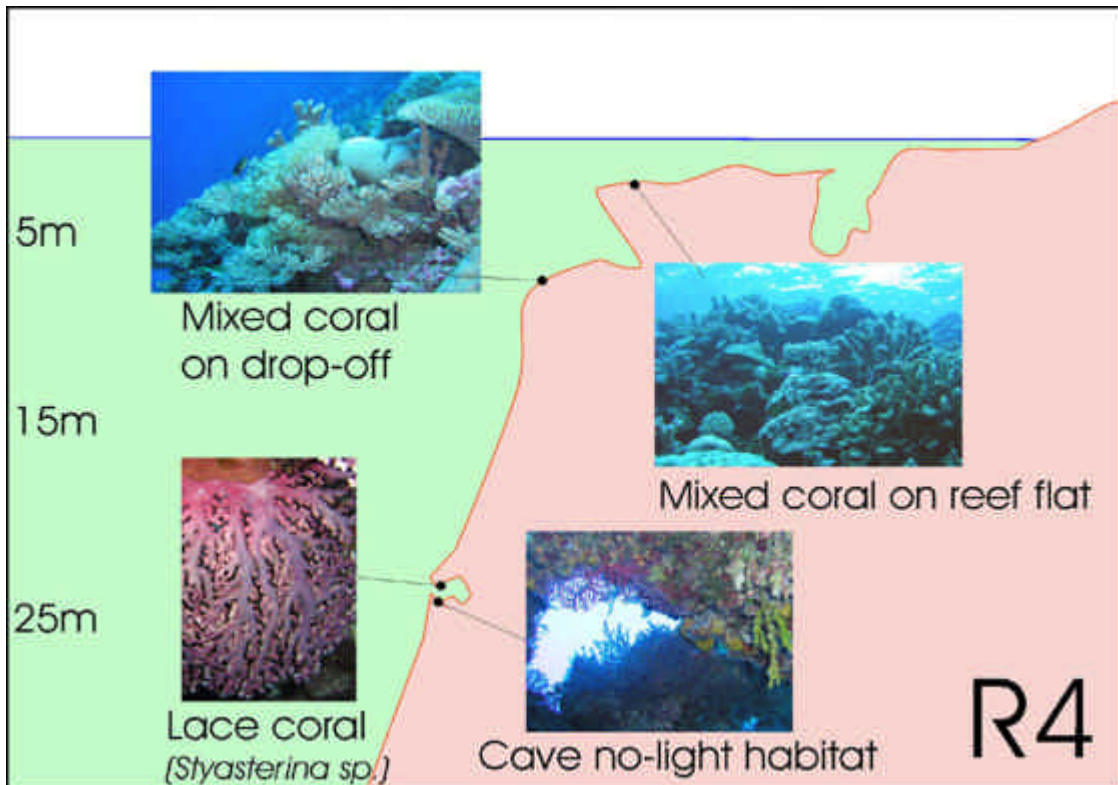


Visually estimated coral cover: 90 %	Measured coral cover:		Fish biomass:		
	Shallow	76%	4.9 kg (3.96) (2,500 m ³ of water sampled)	Shallow	9.44 kg
	Medium	42%		Medium	2.16 kg
Deep	34%	Deep		3.09 kg	

Habitats: 7 biological 5 topographical	- biological	- topographical
	Mixed corals	Steep wall fragmented
	Monospecific corals on rocky substrate	High energy reef crest / top
	Macroalgae w/ sparse coral no light habitat	Cave Slope (> 45°)

Description: Dive at the south end of Rongelap Island, off the wall on the ocean side, near the tip of the island. Departure from sandy beach, across an intertidal bedrock flat that ends in gullies and channels. After a quick jump over the reef edge, there was a deep gully which we followed down until it took us out to the steep slope / wall at 10 m. Extremely clear water. Steep wall with very diverse corals, many massive *Porites spp*, *Heliopora coerulea*, *Favia* and other mussels. High diversity of fish and many of large sizes. In the slope, small caves with the ornamental wrasse *Pseudocheilinus ocellatus* in it, and bushes of branching soft coral hanging in the water column. Going shallower, the good coral cover on the fragmented wall became even better, with about 95% or more of live coral coverage. The shallow ridge was covered by diverse abundant corals, like in a picture book. One gray reef at 25 m, one large Napoleon wrasse. Abundant (ca. 40%) of *Halimeda spp.* and fan seaweeds, some coralline algae, *Caulerpa racemosa* and *C. racemosa peltata*.

Profile:



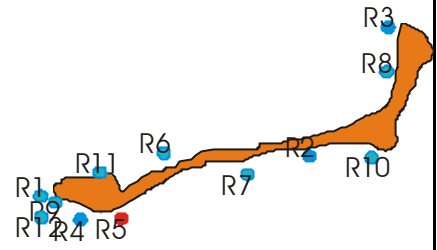
R5:

Coordinates: N 11° 08.93800' E 166° 50.58275'

Conservation value: average

Fish species: 124

Coral species: 61

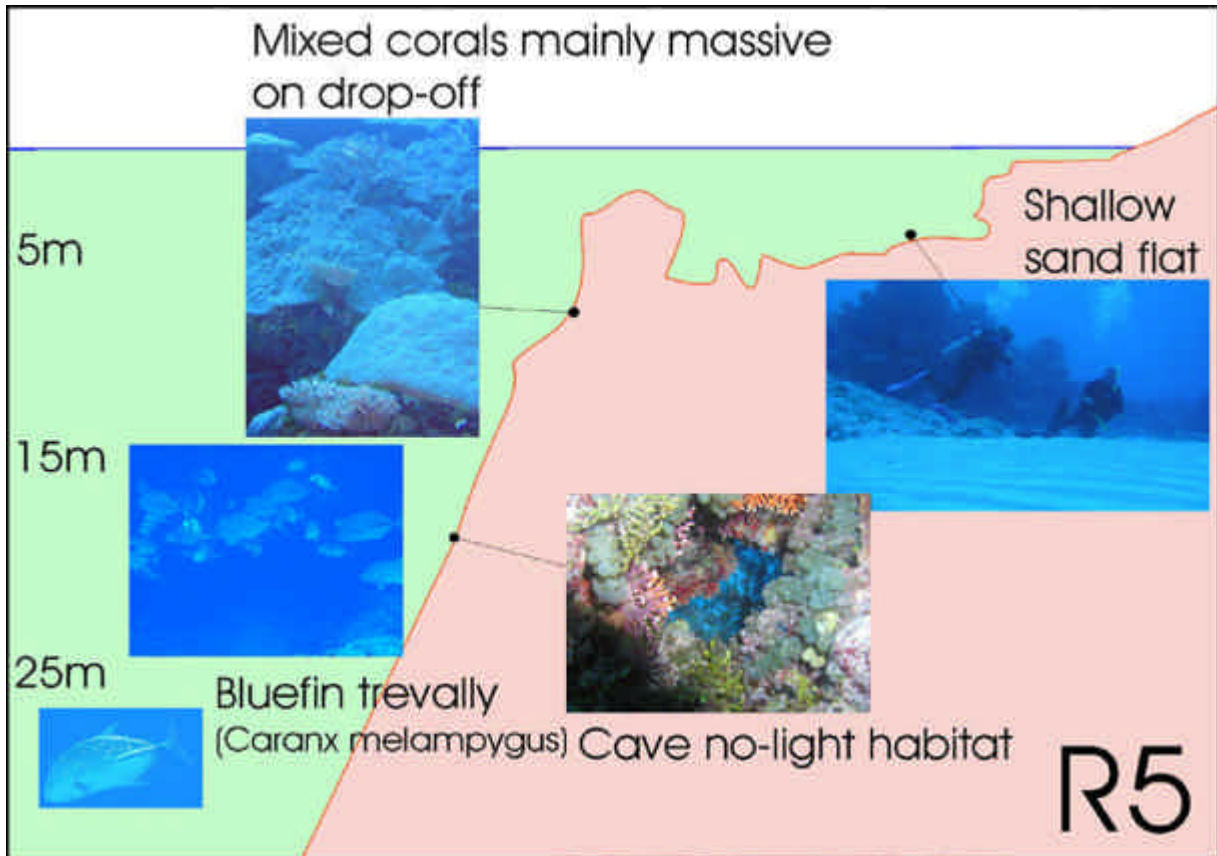


Visually estimated coral cover: 80 %	Measured coral cover:		Fish biomass	
	Shallow	44%	Shallow	1.98 kg
	Medium	47%	Medium	4.7 kg
	Deep	54%	Deep	8.02 kg
			4.9 kg (3.02) (2,500 m ³ of water sampled)	

Habitats: 6 biological 8 topographical	- biological	- topographical
	Mixed corals	Steep wall fragmented
	Macroalgae w/ sparse coral	High energy reef crest / top
	no light habitat	Grooves
	Monospecific corals on rocky substrate	Deep crevasse/ hole

Description: Truck dive off ocean side, side of the southern part of Rongelap- Rongelap Island, next to site R4. Entrance on deep gullies of bedrock and then on a bed of sand and a slope with bommies and a large mound (patch reef) reaching for the surface near the drop off. The wall was deep and steep. Abundant massive corals (*Porites*) and *Acropora palifera-cuneata* at shallow depths. A few fish on trail, mainly small damsels. Large school of rainbow runners, large school of blue-fin trevallies (*Caranx melampigus*), 2 green turtles (one very large male), one deep grey reef shark. 40% coverage of seaweeds, mainly *Halimeda* and *Caulerpa racemosa peltata*, and deeper (20m) *Microdyction*. On shallow water (shallower than 10m) pink coralline algae. Good visibility, 40+, blue water.

Profile:



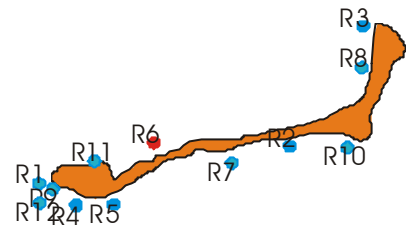
R6:

Coordinates: N 11° 09.46714' E 166° 52.00121'

Conservation value: very high

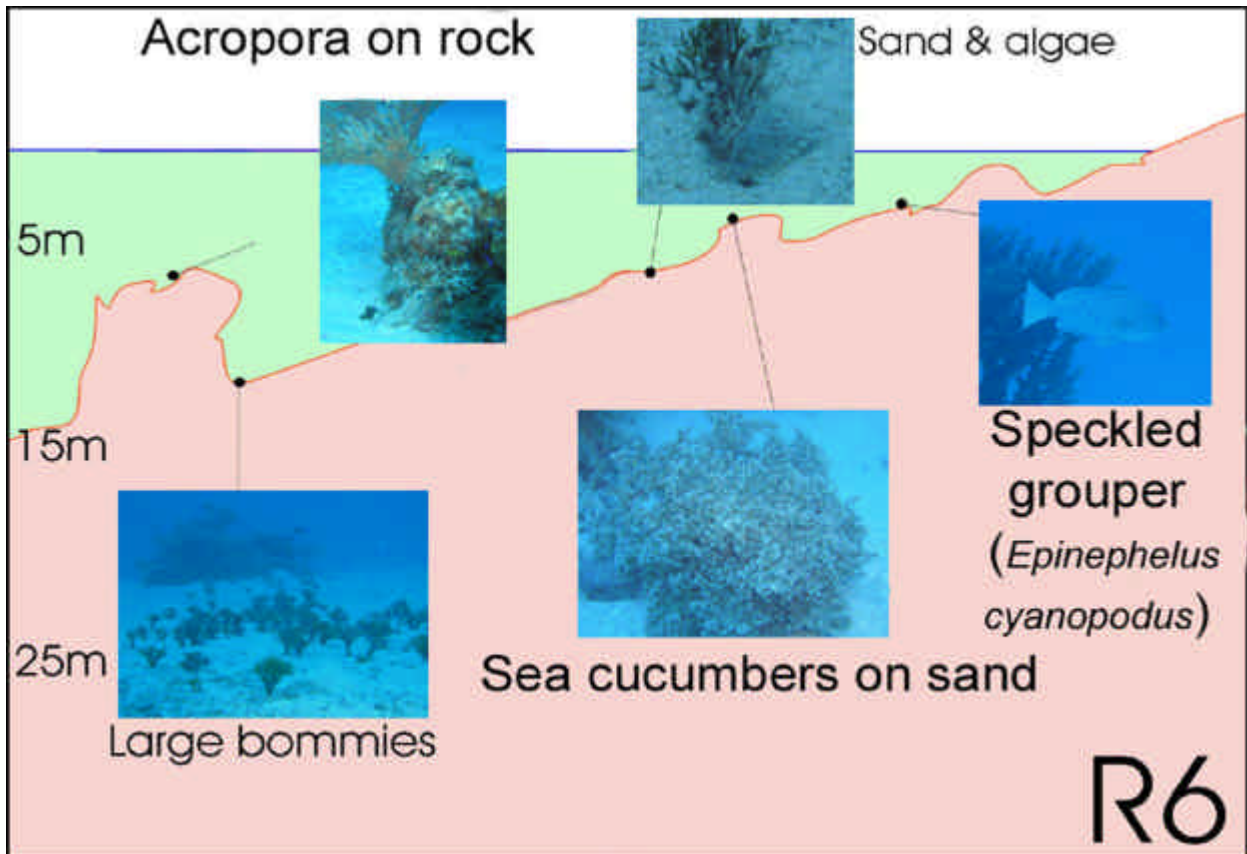
Fish species: 178

Coral species: 42



Visually estimated coral cover: 15 % 70% on bommie	Measured coral cover: Shallow 4% Medium 6% Deep 3%	Fish biomass: 3.8 kg (2.84) (2500m ³ of water sampled)	Shallow 0.79 kg Medium no data Deep 5.81 kg
Habitats: 8 biological 6 topographical	- biological Mixed coral on bommies and sand Sand <i>Acropora</i> tables on rock Mixed corals	- topographical Bommies Slope (> 25°) Patch reef Patch reef	
Description: Lagoon side off old house in Jaboan, half way between camp and Southern tip. Gently sloping sandy flat with coral bommies, with large schools of Parrotfish and Surgeonfish schooling around at 5m. Deeper, the bommies were fewer, and at 12 to 17m there were larger bommies/ patch reefs, that were highly diverse. Huge schools of Pacific long-nose Parrotfish (<i>Hipposcarus longiceps</i>) and Dash and Dot Goatfish (<i>Parupeneus barbarinus</i>). Many groupers such as Speckled Grouper (<i>Epinephelus cyanopodus</i>) and High-fin Grouper (<i>E. maculatus</i>). One large ray. <i>Halimeda</i> spp. growing on sand and <i>Caulerpa serrulata</i> and <i>C. racemosa</i> . Very good spot, highest diversity so far.			

Profile:



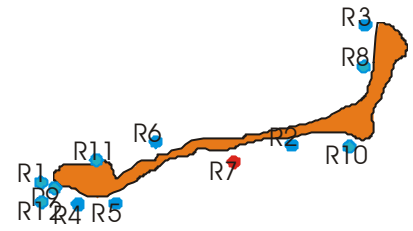
R7:

Coordinates: N 11° 09.43624' E 166° 52.92400'

Conservation value: average

Fish species: 130

Coral species: 67

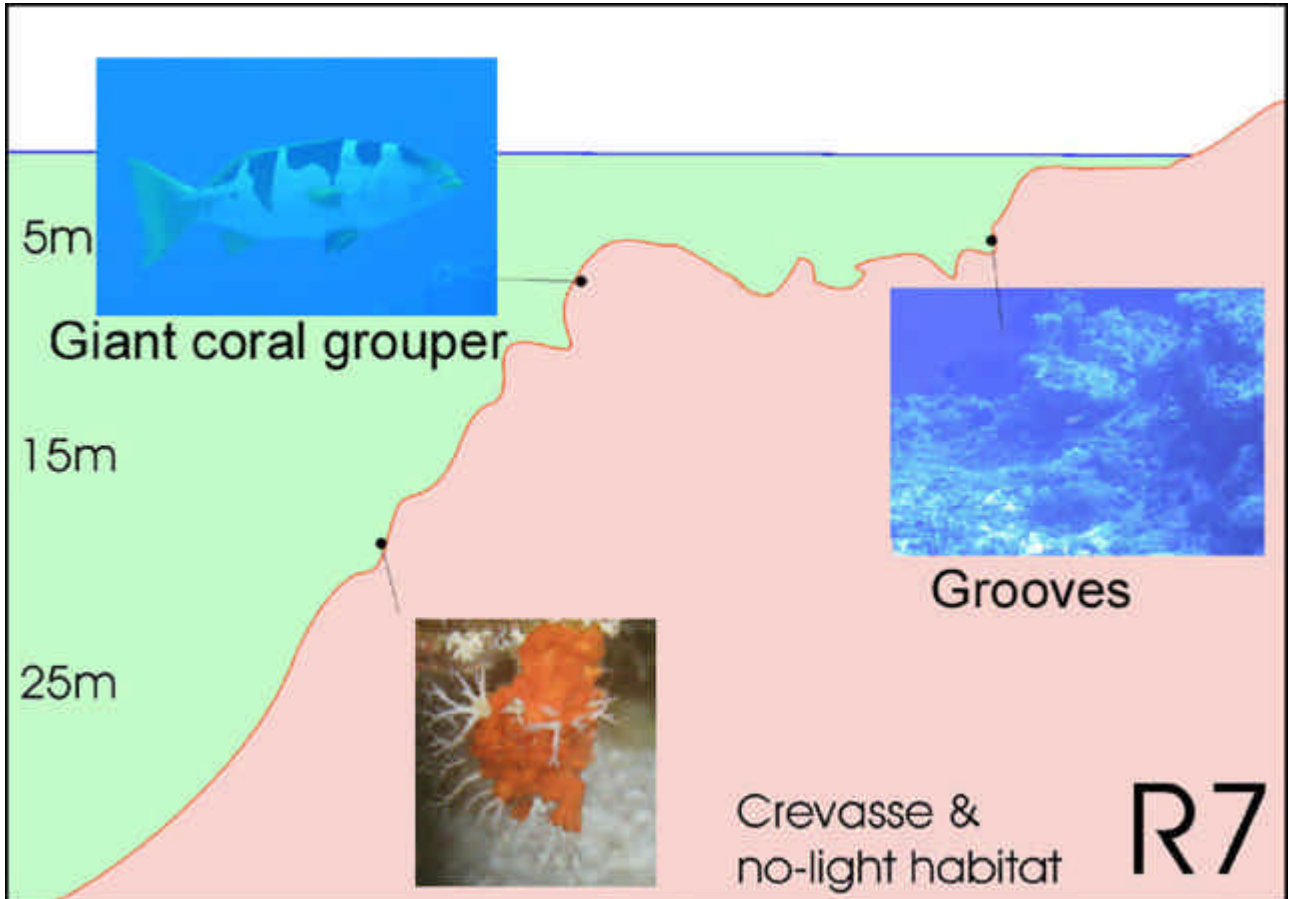


Visually estimated coral cover: 70 %	Measured coral cover:		Fish biomass:		
	Shallow	34%	8.19 kg (3.02) (2500m³ of water sampled)	Shallow	7.7 kg
	Medium	47%		Medium	11.4 kg
Deep	35%	Deep		5.44 kg	

Habitats: 6 biological 9 topographical	- biological	- topographical
	Macroalgae w/ sparse coral	Steep wall w/ slope (> 60°)
	Mixed corals	High energy reef crest / top
	no light habitat	Deep crevasse/ hole
	Sand	Grooves

Description: Dive on ocean side at the end of the runaway. Entrance on bedrock, smooth surface, no problem, at in-coming tide. Long swim to 10 m depth, where substrate was mainly live coral in deep gullies, ups and downs. Abundant *Acropora palifera*, blue coral and organ-pipe coral dominated the coral community. The drop off was not as steep as at other places, perhaps 60 degrees. Fish were diverse and abundant, including large giant coral groupers (*Plectropomus laevis*), black and white snappers (*Macolor niger*) and emperors. We also recorded one gray reef shark, one large white tip shark, and one napoleon wrasse. Much *Halimeda spp.*, blue-green encrusting sheets. Coverage of 30-35% of total seaweed at 10 m. Good visibility.

Profile:



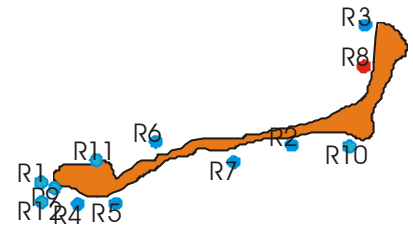
R8:

Coordinates: N 11° 10.43048' E 166° 53.75506'

Conservation value: average

Fish species: 84

Coral species: 31

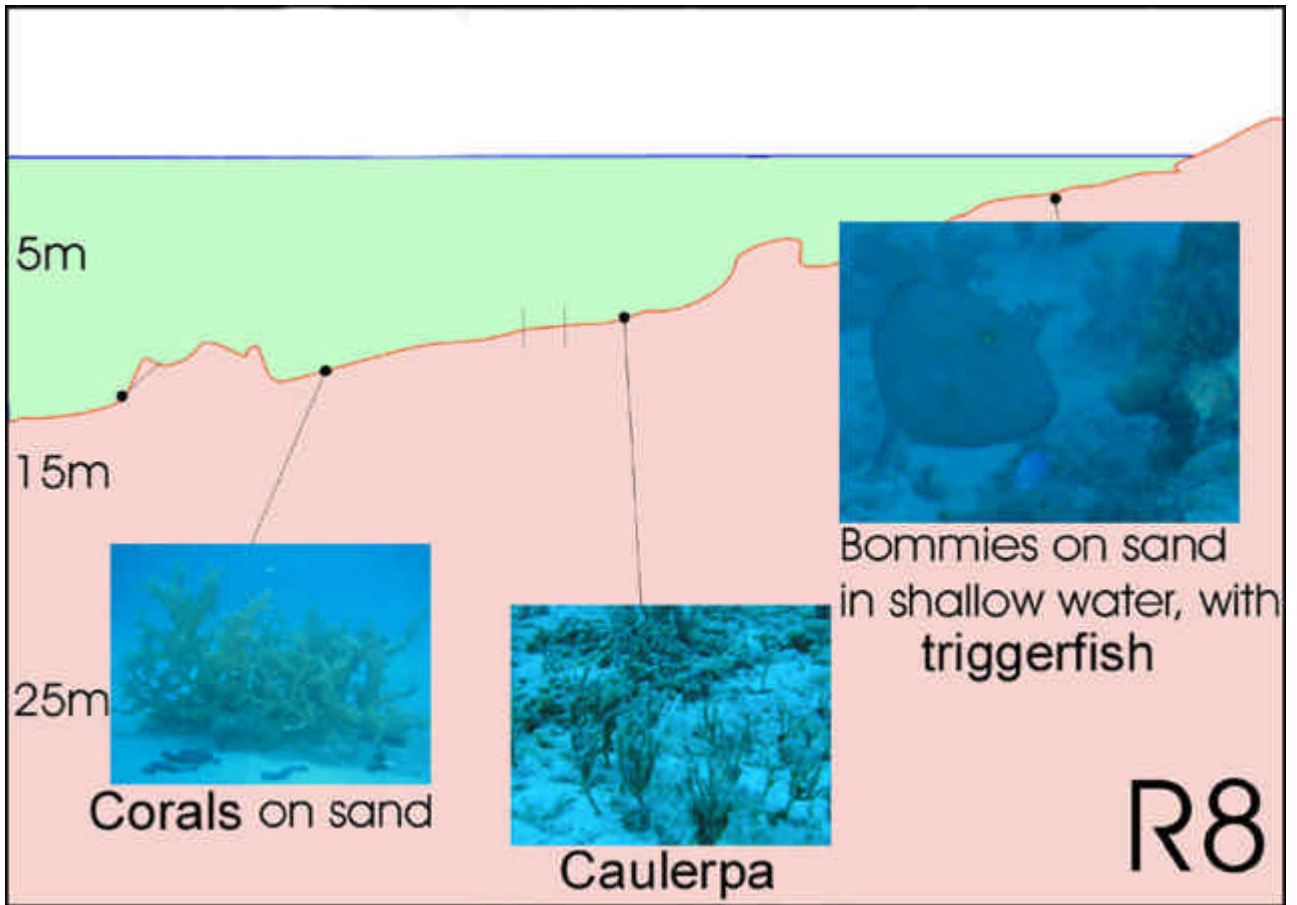


Visually estimated coral cover: 10 % 50% on bommy	Measured coral cover:		Fish biomass: 4.76 kg (2.31) (2500m ³ of water sampled)	Shallow 2.42 kg
	Shallow 19%	Medium 26%		Medium 7.04 kg
	Deep 9%			Deep 4.83 kg

Habitats: 5 biological 3 topographical	- biological Sand Mixed coral on bommies and sand <i>Acropora</i> tables on rock Macroalgae	- topographical Slope (> 25°) Sheltered reef crest / top Bommies
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Description: Late afternoon dive on sand, on NW point of island, by an old house. The substratum was mostly sand and a few coral bommies with the corals *Porites nigrescens* and *Acropora florida*. Some patches were covered by *Halimeda* spp. and some by *Caulerpa serrulata*. Lots of small damselfish and many cardinal fish were associated with the bommies. One large stingray was seen.

Profile:



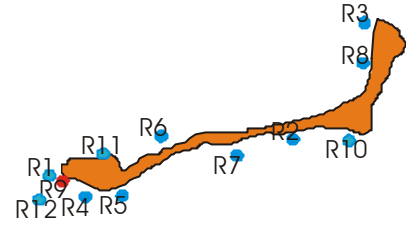
R9:

Coordinates: N 11° 09.12210' E 166° 50.25059'

Conservation value: average

Fish species: 120

Coral species: 65

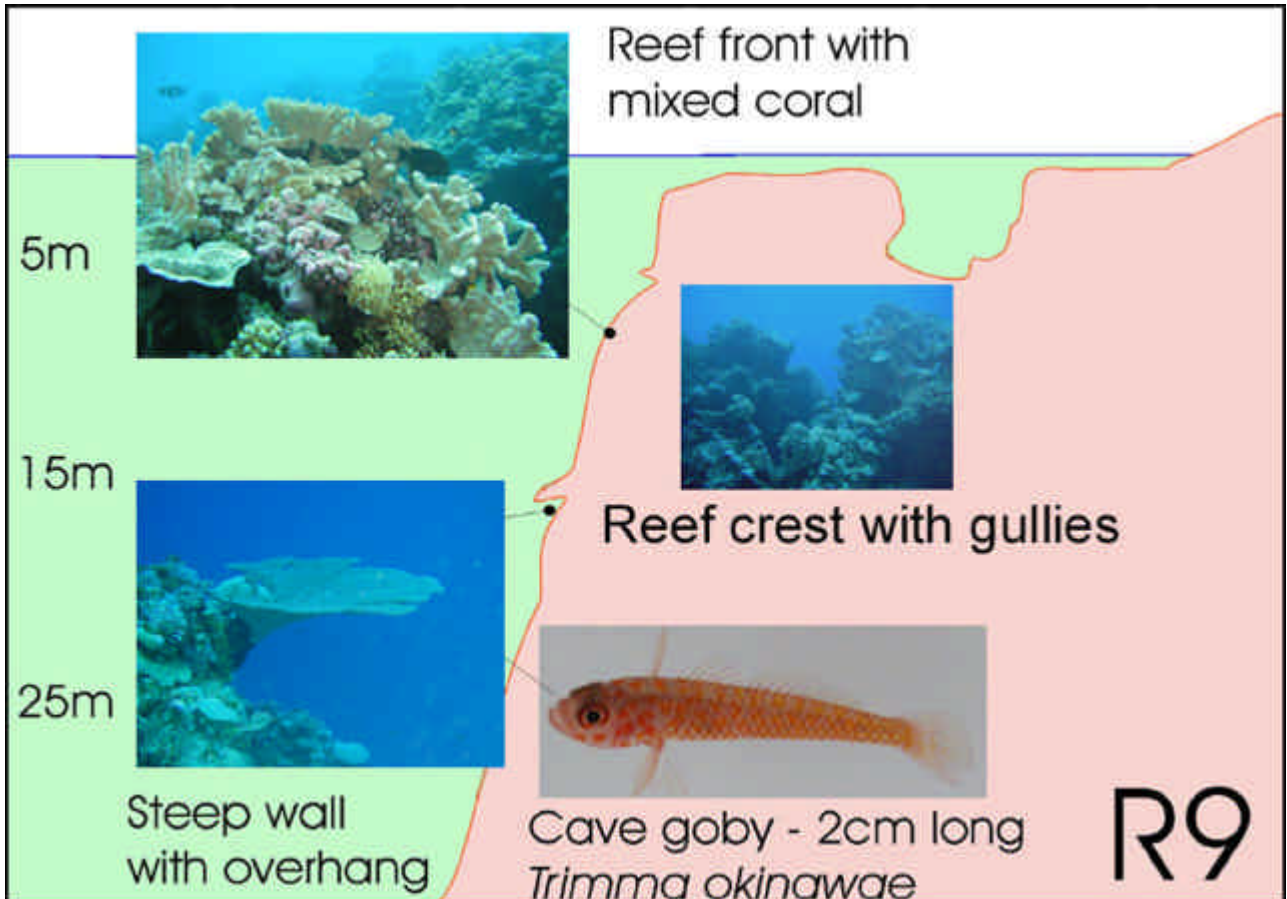


Visually estimated coral cover: 95 %	Measured coral cover:		Fish biomass:	
	Shallow	63%	Shallow	41.9 kg
	Medium	68%	Medium	5.63 kg
	Deep	59%	Deep	41.9 kg
			17.4 kg (21.2) (2500m³ of water sampled)	

Habitats:	- biological	- topographical
	Mixed corals	Steep wall fragmented
	3 biological Macroalgae w/ sparse coral	High energy reef crest / top
	4 topographical Sand with algae	Cave Groves

Description: Dive off the South wall, between R1 and R4. Nice wall, with access through shallow bedrock and channels surrounded by big bommies of large blue coral colonies, *Acropora palifera*, and pink coralline dam. The wall was vertical with small caves supporting good coral coverage. Algal coverage was up to 40%, with dominant *Halimeda spp.* and *Caulerpa racemosa*. Only few fish were seen on the steep wall. However on the fore reef there were many small fishes such as damselfishes, snappers and very large groupers. One turtle.

Profile:



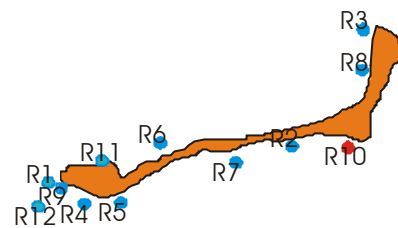
R10:

Coordinates: N 11° 09.30557' E 166° 53.40841'

Conservation value: high

Fish species: 142

Coral species: 64

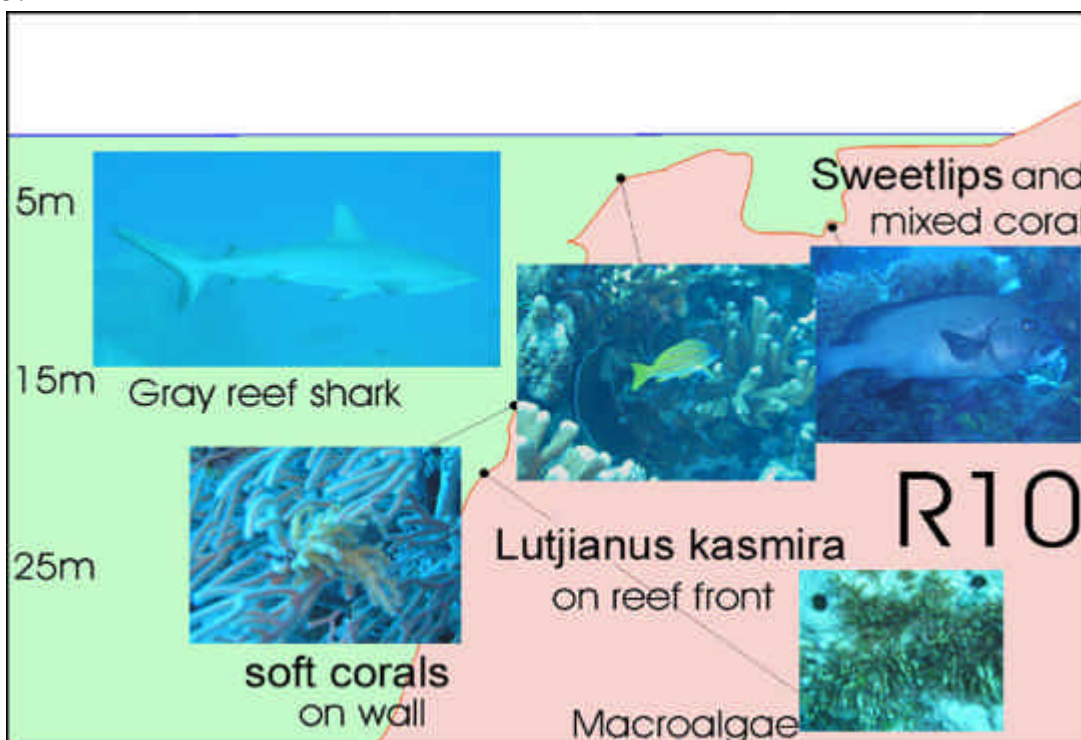


Visually estimated coral cover: 70 %	Measured coral cover:		Fish biomass:	
	Shallow	55%	Shallow	14.0 kg
	Medium	0%	Medium	21.9 kg
	Deep	43%	Deep	9.91 kg

Habitats:	- biological	- topographical
	Mixed corals	Steep wall fragmented
6 biological	no light habitat	Steep wall w/ slope (> 60°)
8 topographical	Macroalgae w/ sparse coral	High energy reef crest / top
	Soft coral	Deep crevasse/ hole

Description: Opposite the airport terminal on ocean side. Parked on airstrip, walked down short “road” to the beach. There was a deep basin behind some wall breaking the waves, ideal for jumping in safely. The basin had intermittent surge channels connecting to the edge of the wall. One of these crevasses channels led through to the reef wall. The wall dropped steeply continuing well below 60 m, as seen from 30 m. At depth there were large cave structures, but were rather bare of fish. We recorded a high coral coverage of ca. 75%. With decreasing depth the coral cover increased to about 95% on the shallow fore reef. The substrate also supported small seaweeds (*Caulerpa spp.* and *Halimeda spp.*) and many hydrozoans. Sand covered the bottom of the canyons, otherwise the substratum consisted mainly of corals and bedrock, with large tabulate *Acropora spp.* colonies and black corals. Schools of Scarids and Acanthurids played in the surge, mainly *Scarus altipinnis*, *Chlorurus frontalis*, *Acanthurus nigricans* and *A. guttatus*. We also saw 6 Napoleon wrasses and big groupers (brown-marbled grouper, *Epinephelus fuscoguttatus*, and giant coral-groupers, *Plectropomus laevis*). A school of blue-fin trevallies (*Caranx melampyngus*), two large black jacks (*Caranx lugubris*), one big stingray, one turtle, and one gray reef shark were sighted.

Profile:



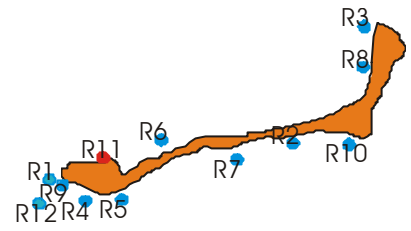
R11:

Coordinates: N 11° 09.23958' E 166° 50.62749'

Conservation value: average

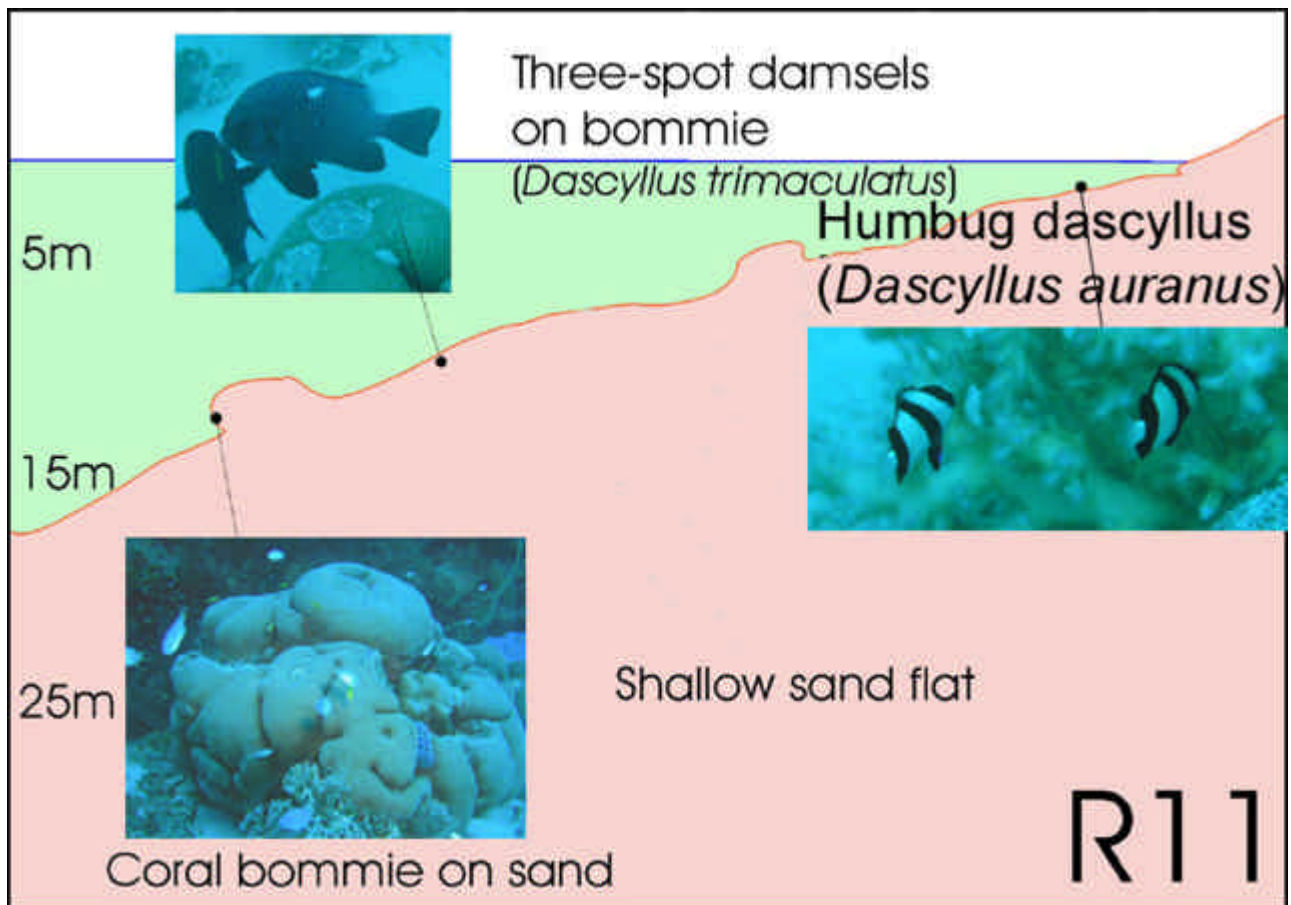
Fish species: 81

Coral species: 33



Visually estimated coral cover: 5 % 50% on bommie	Measured coral cover:		Fish biomass	
	Shallow 4% Medium 39% Deep 13%	Shallow 3.35 kg Medium 0.04 kg Deep 10.6 kg	4.65 kg (5.38) (2500m ³ of water sampled)	
Habitats: 4 biological 3 topographical	- biological Sand Mixed coral on bommies and sand Sand with algae Macroalgae	- topographical Slope (> 25°) Sheltered reef crest / top Bommies		
Description: Lagoon side between 2 nd house and Jaboan, about 0.5 miles away from Jaboan point. Occasional small bommies on a lot of sand eventually sloping steeply down to 25-30m. Steep slope entirely composed of rubble. One Crown-of-Thorns starfish with around 200 small fish in it.				

Profile:



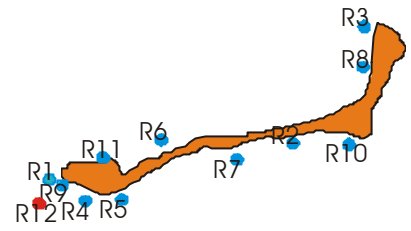
R12:

Coordinates: N 11° 09.16394' E 166° 50.21003'

Conservation value: high

Fish species: 142

Coral species: 68

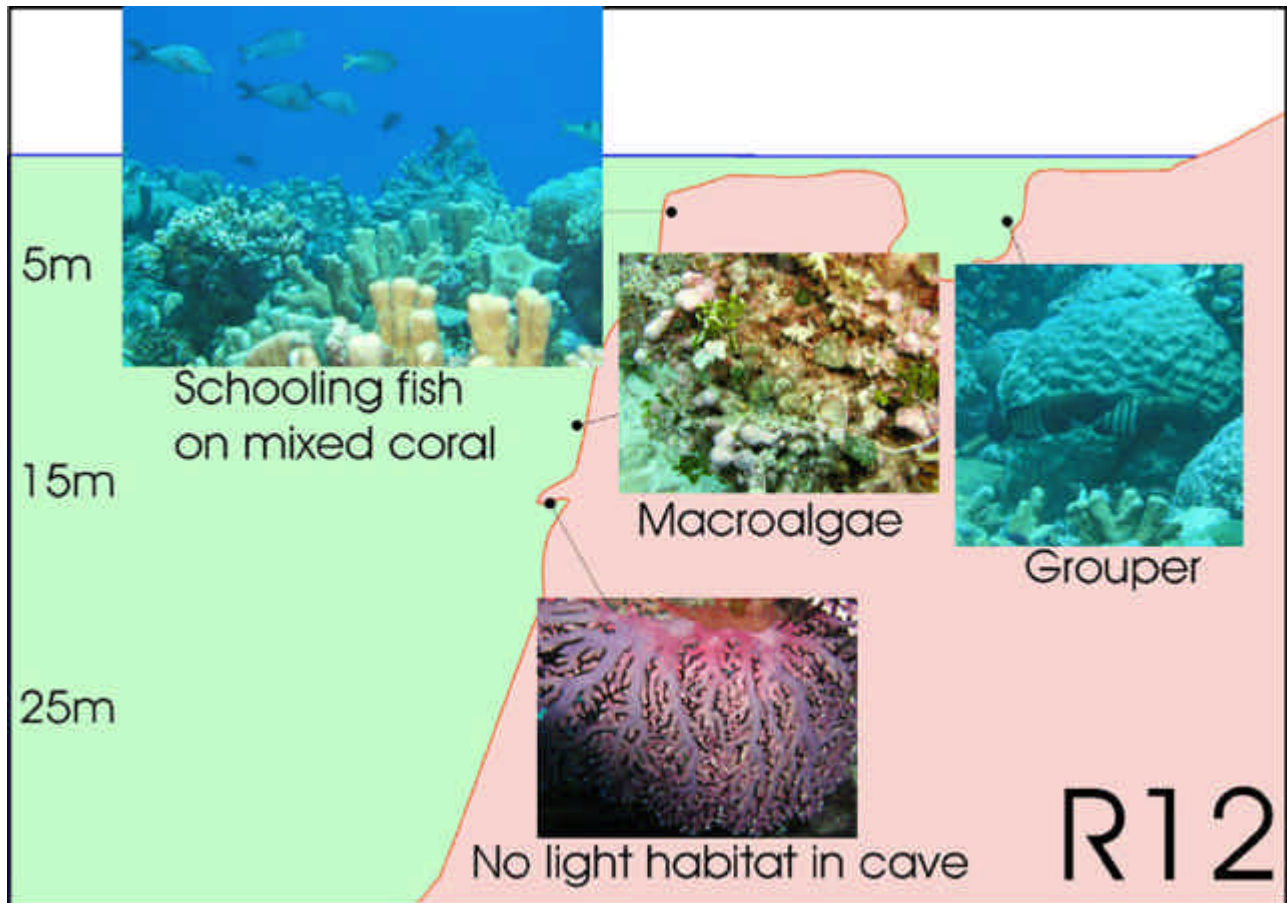


Visually estimated coral cover: 95 %	Measured coral cover:		Fish biomass:	
	Shallow	57%	Shallow	9.95 kg
	Medium	69%	Medium	4.42 kg
	Deep	67%	Deep	3.7 kg
			6.02 kg (3.42) (2500m³ of water sampled)	

Habitats:	- biological	- topographical
	Mixed corals	Steep wall fragmented
3 biological	Macroalgae w/ sparse coral	High energy reef crest / top
4 topographical	Sand with algae	Cave
		Grooves

Description: Survey dive on west tip wall off Jaboan Point. Transects at 20, 17 and 10m on the vertical wall. School of blue-fin trevallies (*Caranx melampygus*), dog-tooth tuna, small school of large snub-nose pompanos (*Trachinotus blochii*).

Profile:



R13:

Coordinates: N 11° 11.49714' E 166° 43.42705'

Oceanside off Eniroruuri Island

Conservation value: high

Fish species: 147

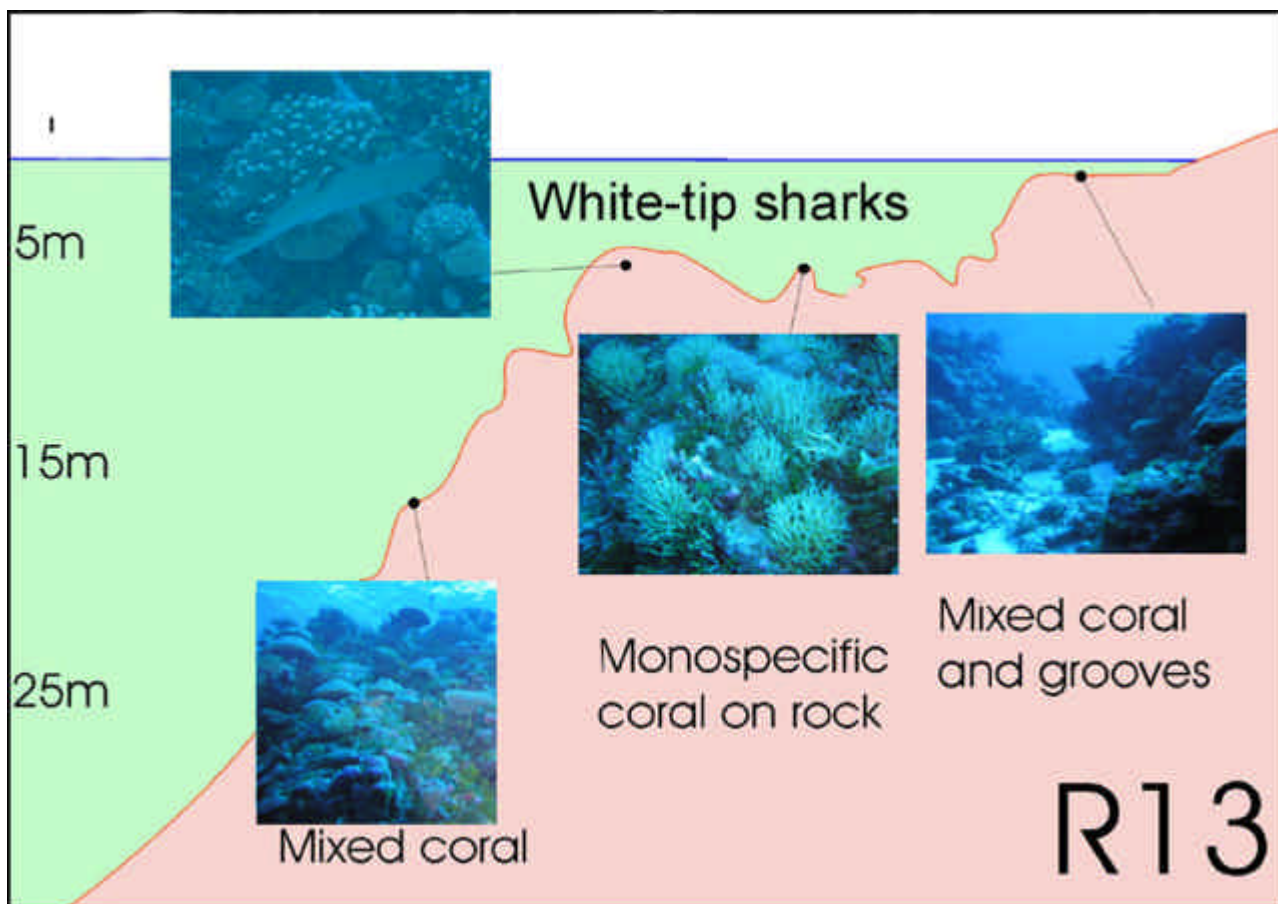
Coral species: 77

Visually estimated coral cover: 70 %	Measured coral cover:		Fish biomass:		
	Shallow	60%	46.4 kg (59.03) (2500m ³ of water sampled)	Shallow	10.9 kg
	Medium	45%		Medium	13.7 kg
Deep	62%	Deep		114.57 kg	

Habitats: 7 biological 9 topographical	- biological	- topographical
	Mixed corals	Slope (>45°)
	Sand	High energy reef crest / top
	Macroalgae w/ sparse coral	Grooves
	Rubble with encrusted life	Steep wall w/ slope (>60°)

Description: Dive on the south ocean side, at the end of the island of Eniroruuri. Nice drop-off starting at 20 m, not a real wall but a steep slope. Small sand patches on shallow water (<10), with nice coral bommies and surge channels, or grooves. The valleys of the grooves have sandy bottoms and the outcrops were covered with rich mixed coral assemblages. Very shallow, there was a bare rock with bommies, and huge quantities of the endemic damselfish *Pomachromis exilis*. One grey reef sharks and lots of large black and white snappers (*Macolor niger*) and two-spot snappers (*Lutjanus bohar*).

Profile:



R14:

Coordinates: N 11° 10.09542' E 166° 46.79730'

**Arubaru (Southern Island)
on eastern tip outside the
pass.**

Conservation value: high

Fish species: 145

Coral species: 61

Visually estimated coral cover: 70 %	Measured coral cover:		Fish biomass: 12.9 kg (2.32) (2500m³ of water sampled)	Shallow	30%	Shallow	15.4 kg
	Medium	28%		Medium	12.4 kg		
	Deep	32%		Deep	10.9 kg		

Habitats: 6 biological 6 topographical	- biological	- topographical
	Macroalgae w/ sparse coral	Slope (> 25°)
	Macroalgae	Slope (> 45°)
	Mixed corals	High energy reef crest / top
	Rubble with encrusted life	Flat reef

Description: Second dive of day, by the pass, island facing the ocean side. Murky water for tide coming in. Gentle sandy gentle slope with bommies going down gradually with grooves, with coarse sand at bottom of the valleys between the outcrops. The cover was at least 50% algae and only sparse corals for most of the 20 to 7 m depth portion of the reef. Shallower, there was a lot of rubble, and near the beach a rock ledge. High presence of seaweeds as well, somewhere up to 60%. *Caulerpa serrulata*, *Halimeda spp.*, *Caulerpa racemosa*, *Microdyction spp.* and blue green algae were the dominant types. Big schools of large black and white snappers, several grey reef sharks, one turtle.

Profile:

