REPORT – APPENDICES

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.

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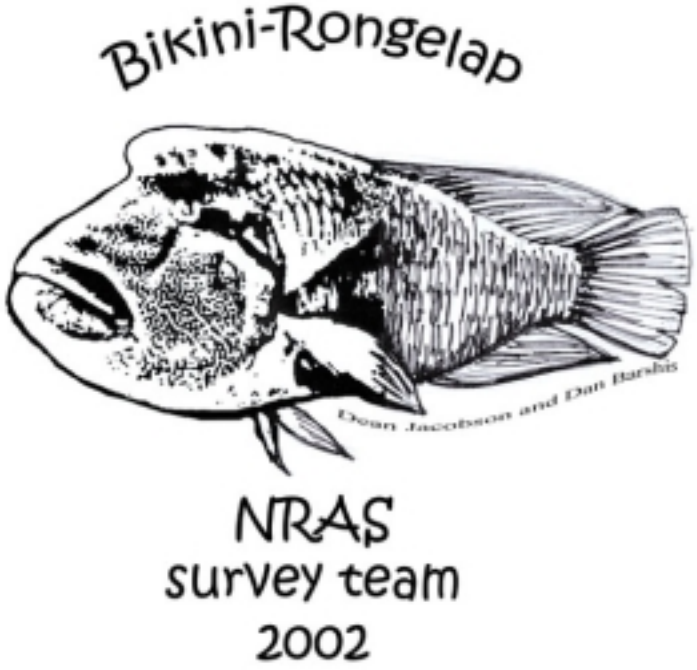

Appendix 1

SUBSTRATUM, CORAL LIFE FORMS, CORAL TARGET SPECIES.

On the LIT two different information are acquired: 1) substratum types and 2) coral life form and species/genera.
Substratum

The habitat type is linked to species ID as some species can only be found on a certain substratum (e.g. sea pen on sand and mud). Reef health is often indicated by the presence of dead coral or rubble, which will be found to support different species types.

Bedrock	Rock, or coral rock, coral features (e.g. corallites) or life forms can not be distinguished, on dense or medium dense coral cover this is the most likely substratum.
Dead coral	Recently dead hard coral, newly dead still white) or longer dead. Former corallites and / or coral life form are still visible and distinguishable.
Rubble	Loose small to medium coral rock, mainly stemming from branching or submassive coral, normally substratum for red coralline algae. Not much grows on rubble, due to its loose status. Often accumulates below walls. Sometimes indicates recent damage, e.g. due to destructive fishing or bleaching.
Sand	Sand – grains can be seen.
Mud	Mud, if disturbed the water becomes cloudy, grains cannot be distinguished.

CORAL LIFE FORMS

LIFE FORMS	SYMBOL	EXAMPLES		
Stony corals				
Acropora				
Acropora branching	A-B	*A.formosa, A.teres*	S	
Acropora encrusting	A-E/Sm	*A.-Isopora cuneata, A.-Isopora palifera*	S	
Acropora digitate	A-D	*A. digitifera, A. humilis*	S	
Acropora tabulate	A-T	*A. hyacinthus, A. irregularis*	S	
Acropora bottlebrush	A-Bb	*A. subglabra*	S	
Non Acropora				
Branching	N-Br	*Seriatopora hystrix*	S	
Encrusting	N-E	*Astreopora listeri*	S	
Massive	N-M	*Favia speciosa*	S	
Submassive	N-Sm	*Alveopora, Goniopora, Leptoria phygia*	S	
Foliose	N-F	*Montipora foliosa, Pachyserius speciosa*	S	
Mushroom	Mu	*Cycloseris*	S	
Tube coral	Tub	*Tubastrea*	S	
Blue coral	Bl	*Heliopora*	O	8
Organ pipe	Op	*Tubipora*	O	8
Fire coral	Fire	*Millepora*	H	
Lace coral	Lc	*Distichopora*	H	
Fine Lace coral	FLc	*Stylaster*	H	
Soft exacorals				
Anemone	An		A	6
bottle-cap	Bc	*Zoanthus, Palythoa*	Z	6
mushroom anemone	MA	*Discosoma*	C	6
Soft octocoral (Alcyonacea)				
Leather coral	SLe	*Sarcophyton*	O-S	8
Stiff Leather coral	Sle	*Lobophytum*	O-S	8
Soft finger coral	Sfn	*Sinularia*	O-S	8
Soft Christmas tree coral	SCt	*Dendronephtya*	O-S	8
Soft Cauliflower coral	SCf	*Lemnalia, Paralemnalia*	O-S	8
Soft Flower	SFl	*Clavularia*	O-S	8
Pulsing flower	SPf	*Xenia*	O-S	8
Fan coral	SFan	*Subergorgia*	O-S	8
Bamboo coral	SBc	*Melithaea*	O-S	8
Whip coral	SWc	*Ctenocella, Junceella*	O-S	8

8 = octocorals, 6 = exacorals, A= Actiniaria, O = Octocorals, O-S = Octocorals soft, Z = Zoanthidea, C = corallimorphs, S = Scleractinia

CORAL TARGET GENERA/SPECIES

TARGET GENERA		
Scleractinia genera	**code**	***example***
Cricket-bat coral	Cb	*A. palifera*
Bottlebrush *Acropora*	Bb	*A. subglabra/echinata/speciosa*
Angular crater coral	Ac	*Leptastrea*
Broccoli coral	Bc	*Pocillopora damicornis*
Cabbage coral	Cb	*Turbinaria*
Crater coral sharing	Cs	*Favites*
Crater coral with valleys	Cv	*Favia*
Cup mushroom	Cup	*Halomitra spp.*
Cylindrical brain coral	Cbr	*Scaphophyllia cylindrica*
Daisy corals	Ds	*Alveopora/Goniopora*
Donut coral	Dt	*Lobophyllia*
Elephant coral	El	*Pachyseris speciosa*
Fine brain coral	Fbr	*Goniastrea*
Finger coral	Fn	*Stylophora pistillata*
Flat spiny cup coral	Fsc	*Acanthastrea echinata*
Furry mushroom coral	Fmu	*Polyphillia talpina*
Gingerroot coral	Gr	*P. cylindrica*
Large brain coral	Lbr	*Oulophyllia*
Large Broccoli coral	LBc	*Pocillopora Eydouxi, meandrina*
Lobe coral	Lob	*Porites lobata, P.australiensis, P.lutea*
Long mushroom	Lmu	*Ctenactis echinata, H. limax*
Majuro coral	Mj	*P. rus*
Medium Broccoli coral	MBc	*Pocillopora verrucosa*
Mushrooms	Mu	*Fungia, Cycloseris*
Sand paper coral	Sdp	*Montipora*
Sandy coral	Snd	*Psammocora*
Sausage brain coral	SBr	*Symphyllia*
Small brain coral	Sbr	*Leptoria*
Spaghetti coral	Sp	*Euphyllia*
Star coral	St	*Pavona*
Thorn coral	Th	*Seriatopora hystrix*
Volcano coral	Vo	*Astreopora*

Appendix 2

TARGET FISHES

Family	Name (Engl)	*Species*	Common
Charcharinidae		*Carcharinus melanopterus* *Triaenodon obesus* *C. amblyrhynchos* *C. albimarginatus*	Black-tip shark White-tip shark Gray-reef shark Silver-tip shark
Myliobatidae		*Aetobatis narinari*	Spotted eagle ray
Muraenidae	Morays	*Gymnothorax javanicus*	Giant morey eel
Synodontidae	Lizardfish		
Mugilidae	Mullets		
Holocentridae	Squirrelfish		
	Soldierfish		
Scorpaenidae	Scorpionfish	*Pterois spp.*	lionfish
Serranidae	Groupers	*Anyperodon leucogrammicus* *Cephalopholis argus* *C. miniata* *C. urodeta* *Epinephelus fuscoguttatus* *E. merra* *Plectropomus laevis* *Variola louti* *Pseudanthias sp.*	Slender grouper Peacock grouper Coral hind Flagtail grouper Brown-marble g. Honeycomb g. Giant coral g. Lyretail g. Anthias
Cirrithidae	Hawkfish	*Paracirrhites arcatus*	Arc-eye hawk
Apogonidae	Cardinalfish		
Carangidae	Trevallies Jacks	*Caranx sexfasciatus* *C. ignobilis* *C. lugubris* *C. melampygus* *Carangoides orthogramus* *Elegatis bipinnulata*	Big-eye trevally Giant trevally Black jack Bluefin trevally Yellow-spotted t Rainbow runner
Lutjanidae	Snappers	*Aprion virescens* *Lutjanus. bohar* *L. gibbus* *L.kasmira* *Macolor macularis*	Green jobfish Twinspot s. Humpback s. Blue-lined s. Black & white s.
Caesionidae	Fusiliers		
Haemulidae	Sweetlips	*Plectorhinchus lineatus* *P. picus*	Lined sweetlips Spotted sweetlips
Lethrninidae	Emperors	*Lethrinus olivaceus* *Monotaxis grandoculis*	Longface e. Big-eye emperor
Mullidae	Goatfish	*Parupeneus barberinus* *P. pleurostigma* *Mulloidichthys vanicolensis*	Dash and dot g. Sidespot goat Yellowfin goatf.
Chaetodontidae	Butterflyfish	*Chaetodon auriga* *C. reticulatus* *C. lunulatus* *C. punctatofascaitus* *C. vagabundus* *Forcipiger flavissimus* *Hemitaurichthys polylepis* *Heniocus chrysostomus*	Threadfin buttrf. Reticulated buttrf Redfin/oval buttf Spot-banded b. Vagabond buttrf Forcepsfish Pyramid buttrf. Pennant banner
Pomacanthidae	Angelfish	*Centropyge bicolor* *C. flavissima* *C. loricula* *Pygoplites diacanthus*	Bicolor angelfish Lemonpeel an. Flame angelfish Regal angelfish

		Pomacanthus imperator	Emperor a.
Kyphosidae	Rudderfish		
Pomacentridae	Damselfish	*Amphripion spp.* *Plectroglyphidodon dickii* *Chromis spp.* *Dascyllus auranus* *D. reticulates* *Adudefduf* *Pomacentrus coelestis*	Anemonefish Three banded an. Chromis Humbug dascyl. Reticulated Dam. Sergeants Neon damsel
Labridae	Wrasses	*Gomphosus varius* *Hemigymnus melapterus* *Labroides sp* *Epibulus insidiator* *Cheilinus undulates* *C. fasciatus* *Corys aigula* *Halichoeres trimaculatus* *Cirrhilabrus balteatus*	Bird wrasse Blackeye thicklip Cleaners Slingjaw wrasse Napoleon wrasse Red breasted-wr. Clown coris Threespot wrasse Girdled wrasse
Scaridae	Parrotfish	*Bolbometapon muricatum* *Chloruus microrinhos* *Cetoscarus bicolor* *Hipposcarus longiceps*	bumphead parrot Pacific steephead Bicolor parrot Pacific longnose
Blenniidae	Blennis		
Gobiidae	Gobies		
Microdesmidae	Dartfish		
Siganidae	Rabbitfish	*Siganus puellus* *S. argenteus*	Masked rabbitfsh Forktail rabbit
Zanclidae	Moorish idol	*Zanclus cornutus*	
Acanturidae	Surgeonfish	*Acanthurus olivaceus* *A. nigricans* *A. achilles* *A. blochii* *A. triostegus* *A. lineatus* *Ctenochaetus striatus* *Naso lituratus* *Naso vlamingii* *Zebrasoma scopas*	Orangeband s. Whitecheeck Achille's tang Ringtail s. Convict s. Bluebanded s Striped br.letooth Orange spine u. Bignose u. Sailfin tang
Sphyraenidae	Barracudas		
Scombridae	Tunas Makerels		
Balistidae	Triggerfish	*Balistapus undulates* *Balistoides viridescens* *B . melichthys vidua* *Rhinecanthus aculeatus* *Sufflamen bursa*	Orange-stripe tri. Titan triggerfish Pinktail tri. Picassofish Scythe trigger
Monacanthidae	Filefish		
Ostraciidae	Trunkfish	*Ostracion spp.*	Boxfish-trunkf
Tetraodontidae	Pufferfish Tobies		
Diodontidae	Porcupinefish		

Appendix 3

TARGET INVERTEBRATES

	Latin name
SPONGES	
Branching	
elephant ear	
Lumpy	
CRUSTACEANS	
Lobster	
MOLLUSCS	
Cowrie	
Oyster	
Pearl oyster	
small giant calm	*T. maxima*
real giant clam	*Tridacna gigas*
fluted giant clam	*T. squamosa*
smooth clam	*T. derasa*
horse's hoof giant clam	*Hippopus hippopus*
Cuttlefish	
Squid	
Octopus	
ECHINODERMS	
Long-spined black sea urchins	*Diadema spp.*
Pencil urchin	
black sea cucumber	
spiky sea cucumber	*Telenota ananas*
giant sea cucumber	*Telenota anas*
Crown-of-thorns starfish	*Achantaster plancii*
Cushion star	
skinny star	*Linckia*
chocolate chip star	

Appendix 4

TARGET ALGAE SPECIES AND GENERA

Microdyction spp.
Halimeda spp.
Udotea spp.
Avrainvillea spp.
Dictyosphaeria cavernosa
Dictyosphaeria versluysii
Ventricaria ventricosa
Valonia aegagrophila
Caulerpa serrulata
Caulerpa racemosara
Codium spp.
Neomeris spp.
Jania spp.
Galaxaura spp.
Lithophyllum spp.
Peyssonnelia spp.
Schizothrix spp.
Phormidium spp.
Hydrocoleum coccineum

Appendix 5

PRESENCE AND ABUNDANCE OF CORAL REEF FISHES AT RONGELAP ATOLL, BY MARIA BEGER.

Family	Genus	species	All	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
Ginglymostomatidae	*Nebrius*	*ferrugineus*	x	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Carcharhinidae	*Carcharhinus*	*albimarginatus*	x	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Carcharhinus	*amblyrhynchos*	x	2	0	0	0	1	0	1	0	2	1	0	1	2	3
	Carcharhinus	*melanopterus*	x	0	1	0	2	0	0	0	0	0	0	0	0	0	0
	Galeocerdo	*cuvrier*	x	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Triaenodon	*obesus*	x	0	2	0	0	0	1	0	0	0	0	0	0	1	0
Mylobatidae	*Aetobatus*	*narinari*	x	2	1	0	0	1	0	0	0	0	0	0	0	0	0
Muraenidae	*Echidna*	*polyzona*	x	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Gymnothorax	*flavimarginatus*	x	0	0	0	0	0	0	0	0	0	0	2	0	0	0
	Gymnothorax	*meleagris*	x	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Congridae	*Heteroconger*	*haaser*	x	5	0	0	0	0	0	0	0	0	0	3	0	0	0
	Gorgasia	*spA*	x	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Synodontidae	*Synodus*	*dermatogenys*	x	0	0	0	0	0	2	0	0	0	0	0	0	0	0
	Synodus	*variegatus*	x	2	0	0	0	0	1	1	0	1	0	0	1	0	1
Holocentridae	*Myripristis*	*berndti*	x	1	1	1	1	0	3	1	2	1	0	0	0	1	1
	Neoniphon	*argenteus*	x	0	0	2	0	0	2	0	2	0	0	0	0	0	0
	Neoniphon	*opercularis*	x	0	0	3	0	0	2	0	0	1	0	0	0	0	0
	Neoniphon	*sammara*	x	0	0	3	1	0	2	0	0	1	0	0	0	0	0
	Sargocentron	*spiniferum*	x	2	0	2	0	3	3	2	1	0	1	1	1	0	0
	Sargocentron	*cfrubrum*	x	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aulostomidae	*Aulostomus*	*chinensis*	x	2	0	1	0	0	0	0	0	0	1	0	0	0	0
Fistularidae	*Fistularia*	*commersonii*	x	2	0	0	0	0	0	1	0	0	0	0	1	1	0
Syngnathidae	*Corythoichthys*	*intestinalis*	x	0	0	0	0	0	2	0	0	0	0	0	0	0	0
	Corythoichthys	*schultzi*	x	0	0	2	0	0	0	0	0	0	0	0	0	0	0
	Corythoichthys	*sp*	x	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Caracanthidae	*Caracanthus*	*maculatus*	x	0	1	0	1	0	0	0	0	0	0	0	0	1	2
	Caracanthus	*unipinna*	x	0	0	0	2	2	0	0	0	0	0	0	0	0	1
Serranidae	*Anyperodon*	*leucogrammicus*	x	2	1	2	1	1	1	1	1	2	1	0	0	2	1
	Cephalopholis	*argus*	x	1	0	0	0	0	0	0	0	0	1	0	1	0	1
	Cephalopholis	*leopardus*	x	0	0	2	1	0	2	1	2	1	1	0	0	0	0
	Cephalopholis	*miniata*	x	0	0	0	0	0	2	0	1	0	0	2	0	0	0
	Cephalopholis	*spiloparaea*	x	0	0	1	0	0	1	0	0	1	1	1	0	1	0
	Cephalopholis	*urodeta*	x	1	1	3	0	0	1	1	2	1	1	2	1	1	2
	Epinephelus	*corallicola*	x	0	0	2	0	0	2	0	0	0	0	0	0	0	0
	Epinephelus	*cyanopodus*	x	0	0	1	0	0	2	0	1	0	0	0	0	0	0
	Epinephelus	*fasciatus*	x	0	0	0	0	0	1	1	0	0	0	0	0	0	0
	Epinephelus	*fuscoguttatus*	x	0	0	0	0	1	0	0	0	0	0	0	0	1	1
	Epinephelus	*hexagonatus*	x	0	0	0	0	0	0	0	0	0	1	0	0	0	0

	Epinephelus	*maculatus*	**x**	0	0	4	0	0	3	0	2	0	0	1	0	0	0
	Epinephelus	*merra*	**x**	0	0	2	0	0	2	0	2	1	0	2	0	0	0
	Epinephelus	*polyphekadion*	**x**	1	0	1	0	0	0	2	0	0	0	0	0	0	0
	Epinephelus	*spilotoceps*	**x**	0	1	0	0	0	0	1	0	0	0	0	0	2	0
	Gracila	*albimarginata*	**x**	1	1	0	0	0	0	1	0	1	1	0	1	3	0
	Plectropomus	*aerolatus*	**x**	1	2	2	2	2	2	1	1	2	2	0	1	2	1
	Plectropomus	*laevis*	**x**	2	2	1	1	1	2	2	0	2	3	0	3	1	2
	Plectropomus	*oligacanthus*	**x**	2	0	0	1	0	0	1	0	2	0	0	0	0	2
	Variola	*louti*	**x**	2	0	1	1	1	2	2	1	0	0	1	1	1	3
	Belonoperca	*chabanaudi*	**x**	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Pseudanthias	*pascalus*	**x**	4	3	0	4	2	0	2	0	3	4	0	3	3	3
Pseudochromidae	*Pseudochromis*	*bitaeniatus*	**x**	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Pseudochromis	*marshallensis*	**x**	0	0	2	0	0	1	0	1	2	0	0	1	0	0
Kuhlidae	*Kuhlia*	*mugil*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apogonidae	*Apogon*	*apogonoides_cf*	**x**	0	0	0	0	0	2	0	0	0	0	0	0	0	0
	Apogon	*exostigma*	**x**	0	0	3	0	0	3	0	0	0	0	3	0	0	0
	Apogon	*fragilis*	**x**	0	0	4	0	0	0	0	4	0	0	0	0	0	0
	Apogon	*luteus*	**x**	0	0	3	0	0	3	0	3	0	0	3	0	0	0
	Apogon	*savayensis_cf*	**x**	0	0	0	0	0	2	0	0	0	0	0	0	0	0
	Apogon	*taeniophorus*	**x**	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Apogon	*Y stripe sm*	**x**	0	0	2	0	0	0	0	0	0	0	1	0	0	0
	Archamia	*fucata*	**x**	0	0	4	0	0	4	0	0	0	0	1	0	0	0
	Cheilodipterus	*macrodon*	**x**	0	0	3	1	0	2	0	0	0	0	0	1	0	0
	Cheilodipterus	*quinquelineatus*	**x**	0	0	3	1	1	4	0	3	0	2	3	0	0	0
	Rhabdamia	*gracilis*	**x**	0	0	0	0	0	3	0	4	0	0	3	0	0	0
Malacanthidae	*Hoplolatilus*	*starcki*	**x**	3	0	0	0	0	0	0	0	0	2	0	0	0	0
	Malacanthus	*brevirostris*	**x**	2	1	0	0	0	0	0	0	0	0	0	1	1	0
	Malacanthus	*latovittatus*	**x**	1	0	1	0	1	0	0	0	0	0	0	0	0	2
Echeneidae	*Echeneis*	*naucrates*	**x**	1	0	1	1	0	0	0	1	0	0	0	0	0	0
Carangidae	*Carangoides*	*ferdau*	**x**	0	0	0	0	0	1	0	1	0	0	1	0	0	0
	Caranx	*ignobilis*	**x**	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Caranx	*lugubris*	**x**	0	0	0	0	0	2	0	0	0	0	0	0	0	0
	Caranx	*melampygus*	**x**	3	1	1	3	3	1	3	1	3	1	2	4	1	0
	Decapturus	*macarellus*	**x**	0	3	0	0	0	0	0	0	0	0	0	0	0	0
	Elegatis	*bispinnulata*	**x**	0	3	0	0	3	0	0	0	0	3	0	0	4	0
	Trachinotus	*blochii*	**x**	0	0	0	1	0	0	0	0	0	0	0	3	0	0
Lutjanidae	*Aphareus*	*furca*	**x**	1	1	1	2	0	2	1	0	1	0	0	2	2	1
	Aprion	*virescens*	**x**	2	0	0	1	3	1	3	0	1	0	1	3	1	1
	Lutjanus	*bohar*	**x**	3	3	2	2	2	3	2	0	2	2	1	2	3	3
	Lutjanus	*fulvus*	**x**	1	0	0	0	0	0	0	1	0	2	0	2	0	0
	Lutjanus	*gibbus*	**x**	2	2	4	3	1	1	3	0	2	2	0	1	2	2
	Lutjanus	*kasmira*	**x**	2	0	2	2	0	2	0	1	0	0	0	0	0	3
	Lutjanus	*monostigma*	**x**	2	1	2	3	1	0	0	0	0	3	0	1	0	0
	Macolor	*niger*	**x**	2	3	2	2	2	1	3	0	2	2	0	2	3	3

Caesionidae	*Caesio*	*teres*	**x**	0	0	0	3	0	2	0	0	0	0	0	0	0	0
	Pterocaesio	*marri*	**x**	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Pterocaesio	*tile*	**x**	3	2	0	2	2	1	3	0	3	3	0	3	3	0
	Pterocaesio	*trilineata*	**x**	0	0	0	0	0	5	0	0	0	0	0	0	0	0
Haemulidae	*Plectorhinchus*	*picus*	**x**	0	0	0	0	0	0	1	0	0	1	0	0	0	0
Nemipteridae	*Pentapodus*	*caninus*	**x**	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Lethrinidae	*Gnathodentex*	*aurolineatus*	**x**	0	0	2	2	0	2	3	2	0	0	0	1	0	0
	Gymnocranius	*spA*	**x**	0	0	2	0	0	0	0	0	0	0	1	0	0	0
	Lethrinus	*erythracanthus*	**x**	2	2	0	2	2	0	1	0	2	1	0	1	2	2
	Lethrinus	*obsoletus*	**x**	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Lethrinus	*olivaceus*	**x**	2	0	1	0	1	1	0	0	2	1	0	1	1	0
	Lethrinus	*xanthochilus*	**x**	0	0	0	0	0	0	0	0	0	1	0	0	1	0
	Monotaxis	*grandoculis*	**x**	4	3	2	4	2	3	2	2	2	1	1	3	1	3
Mullidae	*Mulloidichthys*	*flavolineatus*	**x**	0	1	2	0	0	3	0	3	0	0	0	0	0	0
	Mulloidichthys	*vanicolensis*	**x**	0	0	0	0	0	2	0	1	0	0	0	0	0	0
	Parupeneus	*barberinoides*	**x**	0	0	2	0	0	0	0	0	0	0	0	0	0	0
	Parupeneus	*barberinus*	**x**	0	0	3	0	1	4	0	1	0	0	1	0	0	0
	Parupeneus	*bifasciatus*	**x**	1	0	0	2	0	0	1	0	1	2	0	0	0	0
	Parupeneus	*cyclostomus*	**x**	1	1	0	1	0	2	0	0	0	1	0	0	1	2
	Parupeneus	*multifasciatus*	**x**	2	3	0	2	3	1	3	0	1	3	0	3	2	2
	Parupeneus	*pleurostigma*	**x**	0	0	0	0	1	2	0	0	0	0	0	0	0	3
Pempheridae	*Pempheris*	*oualensis*	**x**	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Kyphosidae	*Kyphosus*	*sp.*	**x**	0	1	2	0	0	1	0	0	2	1	0	0	0	0
Chaetodontidae	*Chaetodon*	*auriga*	**x**	1	1	2	1	0	3	0	3	0	1	2	2	0	0
	Chaetodon	*benetti*	**x**	0	0	0	1	1	0	0	0	0	0	0	0	2	0
	Chaetodon	*citrinellus*	**x**	2	1	2	2	0	2	1	1	0	0	1	1	1	2
	Chaetodon	*ephippium*	**x**	2	2	1	1	1	2	1	2	0	1	1	1	2	1
	Chaetodon	*lineolatus*	**x**	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Chaetodon	*lunula*	**x**	1	1	1	0	0	2	0	0	0	0	2	0	0	0
	Chaetodon	*lunulatus/ tritus*	**x**	3	2	2	2	2	2	2	0	2	2	0	3	2	3
	Chaetodon	*melannotus*	**x**	0	2	0	0	0	0	2	0	0	2	0	0	0	0
	Chaetodon	*mertensi*	**x**	1	0	0	0	1	2	2	0	0	0	0	0	0	2
	Chaetodon	*ornatissimus*	**x**	0	1	0	1	0	0	0	0	0	0	0	1	0	0
	Chaetodon	*punctatofasciatus*	**x**	3	2	1	3	3	2	2	0	1	2	0	3	2	3
	Chaetodon	*quadrimaculatus*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Chaetodon	*reticulatus*	**x**	2	2	1	3	2	2	1	1	2	2	0	1	2	2
	Chaetodon	*semeion*	**x**	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	Chaetodon	*trifascialis*	**x**	2	0	2	1	1	2	0	2	1	2	1	1	1	1
	Chaetodon	*ulietensis*	**x**	2	1	0	1	1	1	2	0	0	0	0	1	2	2
	Chaetodon	*unimaculatus*	**x**	2	0	0	0	0	0	0	0	1	1	0	1	1	2
	Chaetodon	*vagabundus*	**x**	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Forcipiger	*flavissimus*	**x**	1	2	0	2	1	3	2	0	1	2	0	2	2	2
	Hemitaurichthys	*polylepsis*	**x**	0	0	0	0	2	0	0	0	0	1	0	0	0	3
	Heniochus	*accuminatus*	**x**	2	0	0	0	0	1	0	0	0	0	0	0	0	0

	Heniochus	*chrysostomus*	**x**	2	0	0	0	2	2	1	0	2	0	0	1	1	0
	Heniochus	*monoceros*	**x**	2	0	0	0	0	2	0	0	0	0	0	0	0	0
	Heniochus	*varius*	**x**	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pomacanthidae	*Centropyge*	*bicolor*	**x**	0	0	0	0	0	2	0	0	0	0	0	1	0	0
	Centropyge	*bispinosus*	**x**	2	2	1	3	2	2	2	0	2	0	0	2	3	3
	Centropyge	*flavissimus*	**x**	2	1	2	2	2	2	1	2	1	2	2	2	3	2
	Centropyge	*heraldi*	**x**	2	2	0	0	0	2	1	0	0	1	0	0	0	3
	Centropyge	*loriculus*	**x**	0	2	0	3	2	0	1	0	2	1	0	3	1	1
	Centropyge	*multicolor*	**x**	2	3	0	2	0	0	0	0	1	1	0	1	0	0
	Centropyge	*multifasciatus*	**x**	1	0	0	1	0	0	0	0	1	0	0	1	0	0
	Centropyge	*vrolikii*	**x**	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Pomacanthus	*imperator*	**x**	2	0	0	0	0	1	2	0	0	0	0	0	0	1
	Pygoplites	*diacanthus*	**x**	2	2	0	2	1	2	2	0	1	1	0	1	2	2
Pomacentridae	*Abudefduf*	*septemfasciatus*	**x**	0	0	3	0	0	0	0	0	0	0	0	0	0	0
	Abudefduf	*sordidus*	**x**	0	0	2	0	0	1	0	0	0	0	1	0	0	0
	Abudefduf	*vaigiensis*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Amblyglyphidodon	*aureus*	**x**	3	0	0	2	0	0	0	0	2	1	0	2	2	0
	Amblyglyphidodon	*curacao*	**x**	0	0	3	0	0	3	0	1	0	0	0	0	0	0
	Amblyglyphidodon	*leucogaster*	**x**	0	0	0	2	0	2	0	0	0	0	0	0	0	0
	Amphiprion	*melanopus*	**x**	0	0	3	0	0	0	0	0	0	0	0	0	0	0
	Amphiprion	*perideraion*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Amphiprion	*tricinctus*	**x**	0	2	2	0	0	0	0	0	2	0	0	2	0	0
	Chromis	*acares*	**x**	0	1	0	3	2	0	0	0	3	3	0	0	3	0
	Chromis	*agilis*	**x**	4	3	2	4	3	2	3	0	3	4	0	4	5	3
	Chromis	*alpha*	**x**	1	1	0	2	0	0	1	0	0	3	0	0	2	2
	Chromis	*amboinensis*	**x**	4	3	0	4	3	1	2	0	4	4	0	4	3	3
	Chromis	*atripectoralis*	**x**	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Chromis	*lepidolepsis*	**x**	2	0	0	0	0	0	0	0	0	0	2	0	0	0
	Chromis	*margaritifer*	**x**	3	2	1	2	0	2	0	2	2	2	1	1	3	3
	Chromis	*ternatensis*	**x**	2	0	0	2	0	2	0	0	0	0	0	2	3	2
	Chromis	*vanderbilti*	**x**	0	0	0	0	0	0	0	0	0	2	0	0	0	0
	Chromis	*viridis*	**x**	3	0	3	0	0	3	0	2	0	0	3	2	0	0
	Chromis	*xanthura*	**x**	2	0	0	2	3	0	1	0	0	0	0	0	1	2
	Chrysiptera	*biocellata*	**x**	0	2	2	0	0	2	3	2	0	0	0	0	0	0
	Chrysiptera	*glauca*	**x**	3	0	2	2	0	2	0	0	0	0	0	0	0	0
	Chrysiptera	*leucopoma*	**x**	2	0	1	3	0	2	1	0	0	0	0	2	0	1
	Chrysiptera	*trayceyi*	**x**	2	0	1	2	2	1	1	0	2	0	0	0	3	2
	Dascyllus	*aruanus*	**x**	0	0	3	0	0	2	0	3	0	0	3	0	0	0
	Dascyllus	*reticulatus*	**x**	2	2	0	0	1	3	2	0	0	2	3	0	2	3
	Dascyllus	*trimaculatus*	**x**	1	0	1	0	0	2	0	0	0	0	0	0	0	0
	Plectroglyphidodon	*dickii*	**x**	3	2	0	3	2	1	3	0	2	2	0	3	1	2
	Plectroglyphidodon	*johnstonianus*	**x**	3	2	0	3	3	1	3	1	3	3	0	4	3	2
	Plectroglyphidodon	*lacrymatus*	**x**	2	3	0	2	2	0	2	0	3	2	0	2	2	2
	Plectroglyphidodon	*phoenixensis*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	2

	Pomacentrus	*amboinensis*	**x**	3	0	0	2	0	2	0	0	2	1	1	2	3	3
	Pomacentrus	*brachialis*	**x**	1	0	1	0	0	2	0	0	0	0	0	0	0	0
	Pomacentrus	*coelestris*	**x**	3	0	2	0	0	2	0	0	0	0	2	0	3	0
	Pomacentrus	*pavo*	**x**	3	0	4	0	0	4	0	2	0	0	3	0	0	0
	Pomacentrus	*vaiuli*	**x**	3	3	1	2	3	2	3	1	4	2	0	3	3	3
	Pomachromis	*exilis*	**x**	0	0	1	0	0	0	0	0	0	0	1	0	4	3
	Stegastes	*fasciolatus*	**x**	0	2	0	0	1	2	3	0	2	2	1	3	2	3
	Stegastes	*nigricans*	**x**	0	0	3	0	0	0	0	2	0	0	0	0	0	0
	Stegastes	*lividus*	**x**	0	0	3	0	0	2	0	3	0	0	0	0	0	0
Cirrhitidae	*Paracirrhitus*	*hemistictus*	**x**	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	Cirrhitus	*pinnulatus*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Paracirrhites	*arcatus*	**x**	2	2	0	2	2	0	3	1	2	1	3	2	2	2
	Paracirrhites	*forsteri*	**x**	1	0	0	0	0	1	0	0	0	0	0	0	1	0
Sphyranidae	*Sphyraena*	*barracuda*	**x**	1	0	0	1	0	0	0	0	0	0	0	0	0	0
	Sphyraena	*helleri*	**x**	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Labridae	*Anampses*	*caeruleopunctatus*	**x**	1	1	0	0	1	0	1	0	0	2	0	0	0	0
	Anampses	*melanurus*	**x**	0	2	0	0	0	0	0	0	0	2	0	0	0	0
	Anampses	*twistii*	**x**	1	2	0	2	2	0	2	0	1	1	0	3	3	0
	Bodianus	*anthioides*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bodianus	*axillaris*	**x**	0	0	0	0	0	0	1	0	0	0	0	0	1	0
	Cheilinus	*chlourosus*	**x**	0	2	1	1	0	0	1	0	0	3	0	0	1	1
	Cheilinus	*digrammus*	**x**	2	0	2	1	0	0	2	0	1	0	0	0	0	1
	Cheilinus	*fasciatus*	**x**	1	0	0	2	2	1	1	0	1	0	0	2	2	2
	Cheilinus	*orientalis*	**x**	1	0	0	0	0	2	1	0	1	1	0	1	0	1
	Cheilinus	*oxycephalis*	**x**	0	2	0	1	2	1	0	0	2	0	0	0	3	1
	Cheilinus	*trilobatus*	**x**	0	0	1	1	1	1	0	0	0	0	2	1	0	0
	Cheilinus	*undulatus*	**x**	1	1	0	1	0	0	1	0	0	0	0	0	0	0
	Cheilinus	*unifasciatus*	**x**	2	2	0	1	2	0	0	0	0	1	0	1	3	3
	Cirrhilabrus	*balteatus*	**x**	2	0	0	2	2	0	2	0	0	2	0	0	2	2
	Cirrhilabrus	*katharinae*	**x**	2	2	2	2	0	1	2	0	3	2	0	1	3	3
	Cirrhilabrus	*luteovittatus*	**x**	2	0	0	0	0	3	2	0	2	0	0	3	0	0
	Cirrhilabrus	*rhomboidalis*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Coris	*aygula*	**x**	1	3	1	0	1	2	0	0	0	1	0	2	2	2
	Coris	*batuensis*	**x**	0	0	1	0	0	3	0	1	0	0	1	1	0	0
	Coris	*gaimard*	**x**	1	2	1	1	0	0	0	0	0	1	0	0	0	1
	Epibulus	*insidiator*	**x**	3	1	0	2	2	1	2	2	0	1	0	2	3	2
	Gomphosus	*varius*	**x**	3	2	2	2	2	3	2	2	0	2	0	2	2	2
	Halichoeres	*biocellatus*	**x**	3	3	0	2	2	1	2	0	0	2	0	3	3	4
	Halichoeres	*chrysus*	**x**	2	0	0	0	0	2	0	0	0	0	3	0	0	0
	Halichoeres	*hortulanus*	**x**	2	2	1	2	2	2	2	1	2	2	0	2	3	3
	Halichoeres	*margaritaceus*	**x**	1	2	2	2	3	1	3	0	0	1	1	3	2	2
	Halichoeres	*marginatus*	**x**	1	1	0	2	2	1	0	0	0	1	0	2	1	0
	Halichoeres	*melanurus*	**x**	0	0	0	1	0	1	0	1	0	0	2	0	0	0
	Halichoeres	*melasmapomus*	**x**	2	0	0	0	0	0	0	0	1	0	0	0	0	0

	Halichoeres	*trimaculatus*	**x**	2	2	3	2	1	3	0	3	2	0	2	3	2	0
	Hemigymnus	*fasciatus*	**x**	0	1	0	1	1	1	2	0	0	1	0	2	0	3
	Hemigymnus	*melapterus*	**x**	1	1	1	0	0	0	0	1	0	1	0	1	1	0
	Labrichthys	*unilineatus*	**x**	0	0	1	0	0	0	0	1	0	0	0	2	0	1
	Labroides	*bicolor*	**x**	2	1	1	1	1	1	2	0	2	0	0	2	2	2
	Labroides	*dimidiatus*	**x**	2	2	2	3	2	2	2	2	3	2	2	3	2	3
	Labroides	*pectoralis*	**x**	2	0	2	2	1	0	2	0	2	1	0	1	2	0
	Labropsis	*micronesia*	**x**	1	1	1	2	1	1	1	0	1	1	0	1	1	2
	Labropsis	*xanthonota*	**x**	0	0	0	0	0	0	0	0	0	1	0	0	2	0
	Macropharyngodon	*meleagris*	**x**	3	2	1	2	1	0	1	0	2	3	0	3	2	3
	Macropharyngodon	*negrosensis*	**x**	0	0	0	0	1	0	0	0	0	1	0	0	0	0
	Novaculichtys	*taenirourus*	**x**	1	1	1	0	0	1	0	0	0	0	2	2	0	2
	Pseudocheilinus	*evanides*	**x**	1	2	1	3	2	0	1	0	2	2	0	3	2	2
	Pseudocheilinus	*hexataenia*	**x**	2	2	2	3	1	1	3	2	3	2	0	3	3	2
	Pseudocheilinus	*tetrataenia*	**x**	2	1	0	3	2	0	1	0	3	1	0	2	2	1
	Pseudocheilinus	*ocellaris*	**x**	2	0	0	2	2	0	1	0	1	0	0	0	2	0
	Pseudocoris	*aurantiofasciata*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Pseudocoris	*yamashiroi*	**x**	3	0	0	0	0	0	0	0	0	2	0	0	2	0
	Pseudodax	*moluccans*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Pteragogus	*cryptus*	**x**	0	0	2	0	0	1	0	0	1	0	0	0	0	0
	Stethojulis	*bandanensis*	**x**	1	2	0	2	1	1	0	1	1	3	0	2	1	2
	Thalassoma	*amblycephalum*	**x**	2	0	1	2	0	2	1	0	0	0	2	2	3	1
	Thalassoma	*hardwicke*	**x**	1	0	1	1	0	0	0	2	0	0	0	1	0	0
	Thalassoma	*lunare*	**x**	0	0	0	0	0	2	0	0	0	0	2	0	0	0
	Thalassoma	*lutescens*	**x**	3	3	0	3	2	2	2	0	2	2	0	2	3	3
	Thalassoma	*pupureum*	**x**	1	3	2	3	3	3	3	0	2	3	2	2	2	4
	Thalassoma	*quinquevittatum*	**x**	1	2	0	1	2	0	2	0	2	3	0	1	2	2
	Thalassoma	*trilobatum*	**x**	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Scaridae	*Calotomus*	*spinidens*	**x**	0	0	0	0	0	0	0	0	2	0	0	0	0	1
	Cetoscarus	*bicolor*	**x**	2	2	1	3	2	1	2	0	2	2	0	2	2	2
	Chlorurus	*pyrrhurus*	**x**	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Hipposcarus	*longiceps*	**x**	1	3	3	3	2	4	0	1	1	2	2	2	1	2
	Scarus	*altipinnis*	**x**	2	1	0	1	1	4	1	0	2	3	0	2	0	0
	Scarus	*forsteni*	**x**	3	2	0	2	2	0	3	0	0	2	0	1	2	2
	Scarus	*frenatus*	**x**	1	2	0	1	1	0	1	0	0	2	0	2	0	1
	Scarus	*frontalis*	**x**	0	0	0	0	0	0	0	0	0	2	0	0	0	0
	Scarus	*ghobban*	**x**	2	0	0	0	0	1	0	0	0	1	0	0	0	0
	Scarus	*globiceps*	**x**	1	2	0	0	0	0	0	0	0	2	0	0	0	0
	Scarus	*microrhinos*	**x**	2	2	2	3	2	3	1	0	3	2	2	3	3	3
	Scarus	*niger*	**x**	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Scarus	*oviceps*	**x**	0	1	2	0	0	0	0	1	0	2	0	1	1	1
	Scarus	*rubroviolacens*	**x**	0	0	0	0	0	0	0	0	0	1	0	0	2	0
	Scarus	*schlegeli*	**x**	3	3	0	3	2	2	3	0	2	3	0	2	2	3
	Scarus	*sordidus*	**x**	3	3	2	3	1	2	3	2	3	3	0	3	3	3

Pinguipedidae	*Parapercis*	*clathrata*	**x**	0	2	0	0	1	2	1	0	1	0	1	1	1	0
	Parapercis	*xanthozona*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tripterygiidae	*Helcogramma*	*striata*	**x**	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Aspidontus	*dussimieri*	**x**	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Blenniidae	*Blennieella*	*chrysospilos*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ecsenius	*opsifrontalis*	**x**	0	0	2	1	0	3	0	1	2	0	3	0	0	0
	Exallias	*brevis*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plagiotremus	*laudandus*	**x**	2	2	0	3	1	2	1	0	3	1	0	2	4	2
	Plagiotremus	*rhinorhynchus*	**x**	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	Plagiotremus	*tapeinosoma*	**x**	0	1	1	1	1	2	1	1	1	2	1	0	2	1
Gobiidae	*Amblyeletoris*	*guttata*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Amblyeletoris	*steinitzi*	**x**	0	0	0	0	0	1	0	1	0	0	2	0	0	0
	Amblygobius	*phalaena*	**x**	0	0	2	0	0	3	0	1	0	0	2	0	0	0
	Amblygobius	*rainfordi*	**x**	0	1	1	0	0	1	0	0	0	0	0	0	0	0
	Asterropteryx	*semipunctatus*	**x**	0	0	0	0	0	0	0	2	0	0	0	0	0	0
	Bryaninops	*yongei*	**x**	0	0	0	0	0	3	0	0	0	0	3	0	0	0
	Coryphopterus	*signipinnis*	**x**	0	0	2	2	0	0	0	0	0	0	1	0	0	0
	Cryptocentrus	*strigilliceps*	**x**	0	0	2	0	0	0	0	0	0	0	0	0	0	0
	Ctenogobiops	*sp2*	**x**	0	0	2	0	0	3	0	1	0	0	0	0	0	0
	Ctenogobiops	*tangaroai*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	Ctenogobiops	*sp1*	**x**	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Eviota	*guttata*	**x**	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Eviota	*melasma*	**x**	0	0	1	2	0	2	0	0	0	0	0	0	0	1
	Eviota	*prasites*	**x**	0	0	2	0	0	0	0	0	0	0	0	0	0	0
	Eviota	*sebreei*	**x**	0	0	0	1	0	3	0	0	1	0	2	2	0	0
	Eviota	*cometae*	**x**	0	0	2	1	0	1	0	0	1	0	1	1	0	0
	Gnatholepsis	*cauerensis*	**x**	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Gobidon	*citrinus*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Gobidon	*okinawae*	**x**	0	0	3	0	0	0	0	2	0	0	0	0	0	0
	Istigobius	*decoratus*	**x**	0	0	1	0	1	0	0	1	0	0	2	0	0	0
	Lotilia	*graciliosa*	**x**	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Paragobidon	*echinocephalus*	**x**	0	0	1	1	0	0	1	1	0	0	0	0	1	0
	Paragobidon	*xanthosoma*	**x**	0	0	0	1	0	0	2	3	3	0	2	1	2	0
	Pleurosicya	*micheli*	**x**	0	0	0	0	0	0	0	0	1	0	0	0	2	0
	Trimma	*caesiura*	**x**	0	0	2	0	1	0	0	0	0	0	0	0	0	0
	Trimma	*naudei*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trimma	*tevegae*	**x**	2	0	0	3	2	0	0	0	3	3	0	2	0	0
	Trimma	*benjamini*	**x**	0	2	0	1	0	1	0	0	0	0	0	0	0	0
	Valenciennea	*puellaris*	**x**	0	0	1	0	0	2	0	1	0	0	0	0	0	0
	Valenciennea	*sexguttata*	**x**	0	0	0	0	0	1	0	1	0	0	0	0	0	0
	Valenciennea	*strigata*	**x**	0	1	0	0	0	0	0	0	0	2	0	0	0	0
Microdesmidae	*Nemateleotris*	*helfrichi*	**x**	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Nemateleotris	*magnifica*	**x**	1	0	0	0	0	0	1	0	0	0	0	0	1	2
	Ptereleotris	*evides*	**x**	3	2	0	1	2	1	3	0	2	1	0	2	3	3

	Ptereleotris	*heteroptera*	**x**	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ptereleotris	*microlepsis*	**x**	1	0	2	0	0	4	0	1	0	0	1	0	0	0
	Ptereleotris	*zebra*	**x**	2	0	0	0	0	1	1	0	0	0	0	0	3	0
Acanthuridae	*Acanthurus*	*achilles*	**x**	0	2	0	0	1	0	1	0	1	2	0	0	2	2
	Acanthurus	*blochii*	**x**	0	0	0	0	0	3	0	0	0	0	0	0	0	0
	Acanthurus	*guttatus*	**x**	0	2	0	3	1	0	0	0	1	2	0	3	0	1
	Acanthurus	*lineatus*	**x**	0	2	0	0	0	0	1	0	0	2	0	2	0	2
	Acanthurus	*nigricans*	**x**	3	3	0	2	2	0	3	0	2	3	0	2	3	2
	Acanthurus	*nigricauda*	**x**	0	0	2	0	0	4	0	1	1	1	4	3	2	0
	Acanthurus	*nigrofuscus*	**x**	3	0	0	0	0	2	0	0	0	0	2	0	3	2
	Acanthurus	*nigroris*	**x**	2	3	1	3	2	3	3	0	0	4	0	3	0	2
	Acanthurus	*olivaceus*	**x**	3	0	0	0	1	3	2	0	0	0	2	2	3	2
	Acanthurus	*pyroferus*	**x**	2	2	0	3	3	0	3	0	2	3	0	3	3	3
	Acanthurus	*thompsoni*	**x**	3	3	0	2	3	0	2	0	3	3	0	3	2	3
	Acanthurus	*triostegus*	**x**	0	0	2	2	0	0	3	2	0	1	3	1	0	1
	Acanthurus	*xanthopterus*	**x**	0	0	3	0	0	1	0	0	0	0	0	0	0	0
	Ctenochaetus	*binotatus*	**x**	0	0	0	0	0	0	2	0	0	0	0	0	0	0
	Ctenochaetus	*hawaiiensis*	**x**	0	0	0	1	0	2	2	0	0	2	2	0	3	2
	Ctenochaetus	*striatus*	**x**	2	3	1	3	2	2	0	0	2	3	3	4	3	2
	Ctenochaetus	*strigosus*	**x**	3	2	1	0	2	0	0	0	2	2	0	2	3	3
	Naso	*annulatus*	**x**	2	0	0	0	0	0	0	0	1	0	0	1	2	2
	Naso	*brevirostris*	**x**	0	0	0	0	0	2	0	0	0	0	0	0	4	1
	Naso	*caesius*	**x**	4	2	0	2	1	0	0	0	3	0	0	2	4	2
	Naso	*lituratus*	**x**	2	3	1	1	1	2	1	1	2	1	0	2	2	2
	Naso	*unicornis*	**x**	1	0	1	0	2	0	1	0	2	0	0	0	1	0
	Naso	*vlamingii*	**x**	2	1	0	0	2	1	2	0	3	1	0	1	0	1
	Zebrasoma	*flavescens*	**x**	2	0	0	1	1	2	0	0	0	0	0	0	2	1
	Zebrasoma	*scopas*	**x**	2	0	2	2	2	2	1	0	2	2	0	2	2	3
	Zebrasoma	*veliferum*	**x**	2	2	0	2	2	2	2	0	2	1	0	2	2	1
Zanclidae	*Zanclus*	*cornutus*	**x**	2	3	2	2	0	2	1	2	2	2	1	2	2	3
Siganidae	*Siganus*	*argenteus*	**x**	3	0	2	3	3	2	2	0	0	2	0	2	3	2
	Siganus	*puellus*	**x**	0	0	2	0	0	0	0	0	0	0	0	0	0	0
	Siganus	*punctatus*	**x**	2	2	2	2	0	2	0	0	0	0	0	0	0	2
	Siganus	*spinus*	**x**	0	0	0	0	0	0	0	2	0	0	0	0	0	1
Scombridae	*Grammatorcynus*	*bilineatus*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gymnosarda	*unicolor*	**x**	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	Rastrelliger	*kanagurta*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	5	0
Bothidae	*Arnoglossus*	*intermedius*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Balistidae	*Balistapus*	*undulatus*	**x**	2	1	1	2	2	1	1	0	2	1	1	2	3	2
	Balistoides	*viridescens*	**x**	1	1	0	0	0	1	0	1	0	1	0	0	1	2
	Melichthys	*vidua*	**x**	2	2	0	0	0	0	2	0	0	0	0	0	3	2
	Melichthys	*niger*	**x**	0	0	0	0	0	0	0	0	0	0	0	2	0	1
	Pseudobalistes	*flavimarginatus*	**x**	0	0	3	0	0	2	0	1	0	0	0	0	0	0
	Pseudobalistes	*fuscus*	**x**	0	0	2	0	0	2	0	1	0	0	1	0	0	0

	Rhinecanthus	*aculeatus*	**x**	0	0	1	0	0	2	0	1	0	0	2	0	0	0
	Rhinecanthus	*rectangulus*	**x**	1	0	0	1	0	0	2	0	0	0	0	1	0	0
	Sufflamen	*bursa*	**x**	1	2	0	1	2	0	1	0	1	1	0	0	2	2
	Sufflamen	*chrysopterus*	**x**	2	0	0	0	1	3	1	0	1	0	1	2	1	1
Monacanthidae	*Amanses*	*scopas*	**x**	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Cantherhines	*perdalis*	**x**	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Oxymonacanthus	*longirostris*	**x**	2	0	0	2	2	0	1	0	1	0	0	1	1	0
	Paraluteres	*prionurus*	**x**	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pervagor	*alternans*	**x**	0	2	0	1	0	0	0	0	0	1	0	0	2	3
Ostraciidae	*Ostracion*	*cubicus*	**x**	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Ostracion	*meleagris*	**x**	1	1	0	0	0	0	0	0	0	0	0	0	1	0
Tetraodontidae	*Arothron*	*caeruleopunctatus*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Arothron	*meleagris*	**x**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Arothron	*nigropunctatus*	**x**	1	0	1	1	0	0	0	0	1	0	0	0	1	0
	Arothron	*stellatus*	**x**	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Canthigaster	*Solandr*	**x**	2	1	0	1	1	0	0	0	1	0	0	0	0	0
	Canthigaster	*valentini*	**x**	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Chilomycterus	*reticulatus*	**x**	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Diodontidae	*Diodon*	*hystrix*	**x**	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		Total	**361**	179	132	144	148	124	179	130	83	120	136	80	142	147	145

Appendix 6

Coral presence and abundance at Rongelap atoll, by Z. Richards

Genus	Species	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
Acropora	*acuminata*	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	cerealis	0	1	0	0	1	1	2	0	0	1	2	1	0	1
	grandis	0	0	1	0	0	2	0	0	0	0	1	0	0	0
	muricata	1	0	2	2	0	3	0	0	0	1	0	0	0	0
	solitaryensis	0	0	0	0	0	0	0	0	0	1	1	0	0	0
	granulosa	0	0	0	2	2	3	0	2	0	0	2	0	0	0
	loripes	1	0	0	0	0	0	0	0	0	0	1	0	1	1
	gemmifera	1	2	0	1	2	0	1	0	0	0	0	0	2	2
	robusta	2	0	0	1	2	0	1	0	2	1	0	2	0	2
	cytherea	1	3	3	2	0	2	2	3	2	2	2	2	2	2
	monticulosa	2	0	0	0	0	0	1	0	0	1	0	0	1	2
	humilis	1	0	0	0	0	0	1	0	0	1	0	1	2	1
	austera	0	0	0	0	2	0	0	0	0	0	0	1	0	1
	nana	0	0	0	0	0	0	1	0	1	1	0	2	2	1
	speciosa	0	0	0	0	0	0	0	0	0	0	1	1	0	0
	elseyi	0	0	0	0	0	2	0	0	0	0	1	2	0	0
	digitifera	1	0	1	0	0	0	1	0	1	0	0	1	0	0
	florida	0	0	1	1	0	3	0	3	0	0	2	0	0	0
	nasuta	2	3	2	2	2	2	2	2	2	2	0	2	3	2
	subulata	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	intermedia	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	secale	0	0	0	0	1	0	0	0	0	2	0	0	0	0
	valida	2	2	1	1	2	1	0	0	2	0	0	1	1	2
	millepora	1	1	0	1	1	0	0	0	1	2	1	0	0	1
	hyacinthus	1	2	2	1	0	0	1	2	1	1	0	2	0	0
	sarmentosa	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	vaughani	1	0	0	0	0	1	0	0	0	0	0	0	0	0
	unidentified	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	striata	1	0	1	1	1	1	0	1	2	2	0	0	1	0
	verweyi	0	0	1	0	0	0	0	0	0	0	0	0	1	0
	loisettae	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	unidentifiedsp1	0	0	0	2	0	0	0	0	0	0	0	0	0	0
	lutkeni	0	0	0	1	1	0	1	0	0	0	0	1	1	1
	tenuis	0	0	0	0	0	0	1	0	0	1	0	0	0	0
	elseyi	0	0	0	0	0	0	1	0	1	1	0	0	0	0
	selago	0	0	0	0	0	0	0	0	0	2	0	0	0	0
	unidentifiedsp2	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	aculeus	0	0	0	0	0	0	0	0	0	1	1	0	0	0
	unidentifiedsp3	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	unidentifiedsp4	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	unidentifiedsp5	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	horrida	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Isopora cuneata	1	0	0	0	0	0	3	0	2	2	0	1	0	2
	Isopora palifera	4	4	1	3	3	3	0	2	3	3	0	4	3	3
Montipora	*crassituberculata*	0	0	0	0	0	1	1	0	0	0	0	0	0	0
	tuberculosa	3	3	0	2	2	0	1	0	1	2	0	2	1	1
	aequituberculosa	2	0	0	0	0	0	0	0	1	1	0	0	0	1
	monasteriata	0	1	1	0	0	0	0	0	0	0	0	0	0	0
	foliosa	0	1	0	0	0	0	0	0	1	0	1	0	0	0
	verrucosa	1	3	1	0	1	2	2	1	2	1	0	2	1	1
	danae	0	0	0	0	0	0	0	2	0	1	0	1	2	0
	nodosa	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	informis	2	1	0	0	0	0	2	0	1	0	2	3	0	0
	foveolata	1	2	0	0	2	2	1	1	0	1	0	0	0	0
	caliculata	0	0	0	0	0	0	1	0	1	1	0	0	0	0
	venosa	0	1	1	2	2	0	0	0	0	0	0	0	0	0
	efflorescens	2	1	0	2	2	1	2	0	2	0	1	0	0	0
	mollis	1	0	0	0	0	2	1	0	2	0	0	0	2	1
	peltiformis	0	0	1	1	0	0	1	0	0	2	0	2	2	2
	capitata	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	unidentifiedsp6	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	incrassata	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	unidentifiedsp7	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	unidentifiedsp8	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	unidentifiedsp9	0	0	0	0	0	0	0	0	1	0	0	0	1	0
	myriophthalma	2	2	3	2	3	2	1	0	2	2	2	0	1	1
	gracilis	0	1	0	0	1	0	0	1	0	1	0	1	1	0
Seriatopora	*hystrix*	0	2	1	3	2	1	2	2	3	2	2	2	3	2
	caliendrum	0	0	1	0	1	0	0	0	0	0	0	0	0	0
	dentritica	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Pocillopora	*eydoxyi*	0	0	0	1	1	0	1	0	1	2	0	2	2	2
	verruosa	3	0	3	3	2	3	0	2	2	3	3	2	3	2
	damicornis	1	0	2	1	2	3	1	2	1	2	3	2	0	0
	meandrina	0	1	0	0	0	0	0	0	0	0	0	0	1	1
	woodjonesi	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Stylophora	*pistillata*	2	3	2	3	2	0	2	2	2	1	0	2	2	2
Fungia	*scutaria*	0	1	0	0	2	0	0	0	0	1	0	2	2	1
	danai	0	1	0	0	0	0	1	0	1	0	0	0	1	0
	repanda	1	0	0	0	0	0	1	0	0	0	0	0	1	1
	concinna	0	0	1	0	0	0	0	0	0	1	0	1	0	1
	scruposa	0	1	0	0	0	0	1	2	1	0	0	0	0	0
	horrida	0	0	0	0	0	0	0	0	0	0	0	0	2	0
	paumotensis	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Herpolitha	*weberi*	0	0	0	0	1	2	2	0	1	0	0	0	1	0
	limax	0	1	0	1	0	0	0	0	1	1	0	2	2	1
Halomitra	*pileus*	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Cycloseris	*vaughani*	0	0	0	1	0	0	1	0	0	0	0	0	0	0

	tenuis	0	1	0	0	2	0	1	0	1	0	0	1	2	0
Ctenactis	*crassa*	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Favities	*pentagona*	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	abdita	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	halicora	0	0	0	1	0	0	1	2	0	0	1	1	0	1
	chinensis	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	complanata	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	flexuosa	0	0	0	0	1	0	0	0	0	0	0	1	0	0
	unidentifiedsp10	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Favia	*matthaii*	0	0	0	0	0	0	0	1	1	1	0	1	1	0
	pallida	0	2	0	0	0	0	1	0	1	0	0	0	0	0
	rotumana	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	stelligera	2	0	0	0	0	0	1	0	1	2	0	1	2	1
	speciosa	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	rotundata	1	0	0	2	0	0	0	0	2	2	0	0	1	1
	unidentifiedsp11	1	1	0	1	1	0	0	1	0	0	0	0	1	0
Montastrea	*curta*	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	salebrosa	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Plesiastrea	*versipora*	2	1	2	0	1	0	0	0	0	1	0	0	1	0
Cyphastrea	*microphthalma*	1	0	0	2	1	0	2	2	2	1	0	1	1	1
	serialia	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Platygyra	*sinensis*	0	0	0	0	1	0	0	0	1	2	0	2	1	1
	ryukyuensis	1	0	1	0	0	1	1	0	1	2	0	2	0	0
	pini	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Goniastrea	*edwardsi*	2	2	1	2	1	0	0	0	1	0	1	1	1	1
	favulus	0	0	0	0	2	1	2	2	0	1	1	2	2	2
Leptastrea	*transversa*	0	2	1	2	1	0	1	0	2	2	0	0	1	1
	pruinosa	1	0	0	0	0	0	1	0	3	0	0	0	1	0
Goniopora	*columna*	0	0	0	0	0	0	0	0	0	0	2	1	0	0
	marionensis	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Porites	*lobata*	2	0	0	2	0	0	0	0	0	0	0	0	1	1
	lutea	2	3	3	3	4	3	3	3	3	3	3	3	3	2
	cylindricata	2	0	0	3	0	2	1	2	0	0	2	3	2	1
	rus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	vaughani	0	2	2	1	0	0	0	0	0	0	0	0	0	0
	horizontalata	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	lichen	0	0	0	2	1	0	0	0	0	0	0	0	0	0
Lobophyllia	*hemprichii*	0	1	0	0	1	1	1	1	2	2	1	2	1	1
	corymbosa	2	2	0	2	2	1	0	0	1	1	0	1	0	1
	pachysepta	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Symphyllia	*recta*	0	0	1	0	0	0	0	0	0	0	0	0	1	1
	valencinessi	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Acanthastrea	*hemprichii*	0	0	0	1	2	0	0	0	2	0	0	2	1	0
	brevis	1	1	1	1	0	0	0	0	1	1	0	0	0	0
	echinata	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Scolymia	*vitiensis*	0	0	0	0	1	1	0	0	0	0	0	0	0	0

Leptoseris	*myceteroides*	0	1	0	1	1	0	1	0	2	1	0	1	2	1
Pavona	*maldiviensis*	1	0	0	0	0	0	0	0	0	0	0	2	0	0
	duerdeni	1	2	0	1	0	0	1	0	2	2	0	2	1	1
	varians	2	2	1	0	2	1	2	0	2	0	1	1	1	2
	clavus	0	0	0	2	1	0	1	2	2	0	0	1	2	1
Gardinoseris	*planulata*	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Galaxea	*horrescens*	0	0	0	0	0	2	0	2	0	0	2	0	0	0
Psammocora	*haimeana*	0	2	0	0	1	1	2	0	2	2	0	2	2	2
	profundacella	1	0	0	0	0	1	0	0	2	1	0	1	1	0
	vaughani	0	0	0	0	1	0	2	2	0	0	1	0	0	0
	explanulata	0	0	0	0	0	0	0	0	1	1	0	0	0	0
	superficialis	0	0	0	0	0	0	0	0	0	2	0	0	0	0
	nietzraszi	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Coscinarea	*columna*	0	0	0	0	0	1	0	0	1	1	0	1	1	0
	monile	1	1	0	0	2	0	0	0	0	2	0	0	0	0
Pseudosideras trea	*tayami*	0	0	0	3	2	1	2	0	3	2	0	1	1	1
Stylocoeniella	*guentheri*	1	1	1	2	2	2	1	2	2	0	2	0	2	1
	armata	1	0	0	0	0	0	0	0	0	0	1	0	1	0
Turbinarea	*retiformis*	1	1	0	1	1	0	1	0	0	0	0	0	1	1
	stellulata	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	microconos	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	pilosa	1	1	0	0	0	0	1	0	0	1	0	1	1	1
	rigida	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Hydnophora	*exesa*	0	0	0	1	0	0	1	0	0	0	0	0	1	0
Echinopora	*lamellosa*	0	0	0	2	2	0	2	0	3	0	0	2	1	1
Merulina	*ampliata*	0	0	0	1	1	0	0	0	0	0	0	1	0	0
Scapophyllia	*cylindrica*	0	0	1	2	2	0	1	1	2	1	0	2	2	1
Plerogyra	*sinuosa*	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Euphyllia	*glabrescens*	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Echinophyllia	*aspera*	0	2	0	0	1	0	0	0	1	0	1	1	1	0
Ouphyllia	*crispa*	0	1	0	0	0	0	1	0	2	1	0	1	1	1
Podobacia	*motuporensis*	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Heliopora	*coerulea*	0	2	1	2	1	0	2	0	2	1	0	1	1	0
Tubipora	*musica*	0	3	0	3	2	0	4	0	2	2	1	1	2	0
	OrderStylasterina Distichopora	0	1	0	1	0	0	1	0	1	2	0	2	2	1
	OrderStylasterina Stylaster	0	1	0	2	2	0	1	0	2	2	0	2	1	2
	OrderMillepora Millepora	2	2	1	0	0	1	2	0	1	1	0	2	1	0
	OrderMillepora unidentifiedsp12	0	0	0	0	0	0	0	0	0	1	0	0	0	0

Appendix 7

CHECKLIST OF CORAL SPECIES AT RONGELAP ATOLL, BY ZOE RICHARDS.

Genus	Species	NRAS, 2002	Wells, 1956
Acropora	*acuminata*	*	
	cerealis	*	
	grandis	*	
	muricata	*	*
	granulosa	*	
	loripes	*	
	gemmifera	*	
	robusta	*	
	cytherea	*	
	monticulosa	*	
	humilis	*	
	austera	*	
	nana	*	
	speciosa	*	
	elseyi	*	
	digitifera	*	
	florida	*	
	nasuta	*	
	subulata	*	
	intermedia	*	
	secale	*	
	valida	*	*
	millepora	*	
	hyacinthus	*	*
	sarmentosa	*	
	vaughani	*	*
	striata	*	
	verweyi	*	
	loisettae	*	
	lutkeni	*	
	tenuis	*	
	elseyi	*	
	selago	*	
	aculeus	*	
	solitaryensis	*	
	horrida	*	*
	unidentified sp.1	*	
	unidentified sp. 2	*	
	unidentified sp. 3	*	
	unidentified sp. 4	*	
	unidentified sp. 5	*	
	danai		*
	squarrosa		*
	longicyathus		*
	teres distans		

Isopora	*cuneata*	*	
	palifera	*	*
Montipora	*crassituberculata*	*	
	tuberculosa	*	
	aequituberculosa	*	
	monasteriata	*	
	foliosa	*	
	verrucosa	*	
	danae	*	
	nodosa	*	
	informis	*	
	foveolata	*	*
	caliculata	*	*
	venosa	*	
	efflorescens	*	
	mollis	*	
	peltiformis	*	
	capitata	*	
	unidentified sp. 6	*	
	incrassata	*	
	unidentified sp.7	*	
	unidentified sp. 8	*	
	unidentified sp. 9	*	
	socialis		*
Astreopora	*myriophthalma*	*	
	gracilis	*	
Anacropora	*forbesi*		*
Seriatopora	*hystrix*	*	
	caliendrum	*	
	dentritica	*	
Pocillopora	*eydoxyi*	*	
	verruosa	*	*
	damicornis	*	
	meandrina	*	
	woodjonesi	*	
	elegans		*
Stylophora	*pistillata*	*	
Fungia	*scutaria*	*	*
	danai	*	
	repanda	*	
	concinna	*	
	scruposa	*	
	horrida	*	
	paumotensis	*	
fungities	*dentata*		*
fungities	*haimei*		*
fungities	*incisa*		*
Herpolitha	*weberi*	*	
	limax	*	*
Halomitra	*pileus*	*	
Cycloseris	*vaughani*	*	

	tenuis	*	
Ctenactis	*crassa*	*	
Concinna	*serrulata*		*
Favities	*pentagona*	*	
	abdita	*	
	halicora	*	
	chinensis	*	
	complanata	*	
	flexuosa	*	
	unidentified sp.10	*	
Favia	*matthaii*	*	
	pallida	*	
	rotumana	*	
	stelligera	*	
	speciosa	*	
	rotundata	*	
	unidentified sp. 11 11	*	
Montastrea	*curta*	*	
	salebrosa	*	
Plesiastrea	*versipora*	*	
Cyphastrea	*microphthalma*	*	
	serialia	*	
Platygyra	*sinensis*	*	
	ryukyuensis	*	
	pini	*	
	rustica		*
Goniastrea	*edwardsi*	*	
	favulus	*	
Leptastrea	*transversa*	*	
	pruinosa	*	
Goniopora	*columna*	*	
Alveopora	*marionensis*	*	
	allingi		*
Porites	*lobata*	*	
	lutea	*	*
	cylindricata	*	
	vaughani	*	
	horizontalata	*	*
	lichen	*	
	austrialiensis		*
	superfusa		*
Lobophyllia	*hemprichii*	*	
	corymbosa	*	
	pachysepta	*	
Symphyllia	*recta*	*	
	valencinessi	*	
	nobilis		*
Acanthastrea	*hemprichii*	*	
	brevis	*	
	echinata	*	
Scolymia	*vitiensis*	*	

Leptoseris	*myceteroides*	*	
Pavona	*maldiviensis*	*	
	duerdeni	*	
	varians	*	*
	clavus	*	
Gardinoseris	*planulata*	*	
Galaxea	*horrescens*	*	
Psammocora	*haimeana*	*	
	profundacella	*	
	vaughani	*	
	explanulata	*	
	superficialis	*	
	nietzraszi	*	
Coscinaraea	*columna*	*	
	monile	*	
Pseudosiderastrea	*tayami*	*	
Stylocoeniella	*guentheri*	*	
	armata	*	
Turbinaria	*retiformis*	*	
	stellulata	*	
Hydnophora	*microconos*	*	*
	pilosa	*	
	rigida	*	
	exesa	*	
Echinopora	*lamellosa*	*	
Merulina	*ampliata*	*	
Scapophyllia	*cylindrica*	*	
Plerogyra	*sinuosa*	*	
Euphyllia	*glabrescens*	*	
Echiniphyllia	*aspera*	*	*
Ouphyllia	*crispa*	*	
Podobacia	*motuporensis*	*	
Order Helioporacea	*Heliopora coerulea*	*	*
Order Alcyonacea	*Tubipora musica*	*	
Order Stylasterina	*Distichopora*	*	*
	Stylaster	*	
Order Millepora	*Millepora*	*	*

Appendix 8

SPECIAL FEATURES OF CORAL SPECIES AT RONGELAP ATOLL, BY ZOE RICHARDS.

Family	Genus	Species	Special Features
Acroporidae	*Acropora*	*acuminata*	site restricted - R14: South Pass Wall
		gemmifera	minor range extension
		monticulosa	minor range extension
		nana	major range extension
		speciosa	major range extension
		digitifera	minor range extension
		subulata	site restricted - R6: Lagoon
		intermedia	minor range extension/site restricted - R8: Lagoon
		secale	minor range extension
		sarmentosa	minor range extension
		vaughani	minor range extension
		loisettae	major range extension/site restricted - R3: Wall
		elseyi	minor range extension
		selago	site restricted - R10: Wall
		solitaryensis	minor range extension
		horrida	minor range extension/site restricted: R12: Wall
		unid. sp.1	site restricted - R2: Wall
		unid. sp. 2	site restricted - R4: Wall
		unid. sp. 3	site restricted - R10: Wall
		unid. sp. 4	site restricted - R11: Lagoon
		unid. sp. 5	site restricted - R14: South Pass Wall
		palifera	minor range extension
		nodosa	site restricted - R7: Wall
		capitata	site restricted - R12: Wall
		unid. sp. 6	site restricted - R2: Wall
		unid. sp.7	site-restricted - R6: Lagoon
Pocillopora	*Seriatopora*	*dentritica*	major range extension / site-restricted - R12: Wall
Fungidae	*Fungia*	*horrida*	site-restricted - R13: South Wall
		paumotensis	site-restricted - R10: Wall
	Herpolitha	*pileus*	site-restricted - R7: Wall
	Cycloseris	*crassa*	site-restricted - R12: Wall
		pentagona	site-restricted - R9: Wall
	Ctenactis	*abdita*	site-restricted - R1: Jaboan Pass
Faviidae	*Favites*	*chinensis*	site-restricted - R4: Wall
		complanata	site-restricted - R4: Wall
		flexuosa	site-restricted - R5: Wall
		unid. sp.10	site-restricted - R13: South Wall
	Favia	*rotumana*	site-restricted - R6: Lagoon
		speciosa	site-restricted - R13: South Wall
	Montastrea	*curta*	site-restricted - R3: Wall
		salebrosa	major range extension
	Plesiastrea	*serialia*	site-restricted - R4: Wall
Poritidae	*Goniopora*	*marionensis*	site-restricted - R1: Jaboan Pass
	Porites	*horizontalata*	site-restricted - R9: Wall

Mussidae	*Lobophyllia*	*pachysepta*	site-restricted - R4: Wall
		valencinessi	site-restricted - R12: Wall
	Acanthastrea	*brevis*	major range extension
		echinata	site-restricted - R1: Jaboan Pass
Siderastreidae	*Psammocora*	*superficialis*	site-restricted - R10: Wall
	Coscinaraea	*monile*	major range extension
Dendrophllidae	*Turbinaria*	*stellulata*	site-restricted - R4: Wall
Merulinidae	*Hydnophora*	*microconos*	site-restricted - R2: Wall
		rigida	site-restricted - R3: Wall
Euphyllidae	*Euphyllia*	*glabrescens*	site-restricted - R1: Jaboan Pass
	Podobacia	*motuporensis*	site-restricted - R9: Wall
unid. sp.12			site-restricted - R9: Wall

Appendix 9

HABITAT CATEGORIES

Surveyor:		
Location:	Transect/ Survey No:	Date:
Water temp:	Horizontal visibility:	
Type of Main Survey:		
Comments:		

* Any area larger than 5 m across is recorded as a separate habitat, cave habitats are recorded as any overhanging structure with at least 2 m depth, length or height.

DEPTH:

- [ ] 0-2 m
- [ ] 2-6 m
- [ ] 6-15 m
- [ ] 15-25 m
- [ ] 25-45
- [ ] Below 45

BIOLOGICAL DESCRIPTION:

- [ ] Sand with seagrass
- [ ] Sand
- [ ] Sand and mud
- [ ] Sand with coral
- [ ] Dense seagrass cover
- [ ] Monospecific corals on sandy substrate
- [ ] Monospecific corals on rocky substrate
- [ ] Sparse coral on rock w/ algae (>50% coral)
- [ ] Sparse coral, algae w/ recently dead coral (>5% dead)
- [ ] Mixed corals
- [ ] Mixed corals mainly massive
- [ ] Mixed coral mainly encrusting
- [ ] Mixed coral on bommies and sand
- [ ] Soft coral
- [ ] Soft coral forests
- [ ] Macroalgae w/ sparse coral (>50% algae)
- [ ] Macroalgae
- [ ] Filamentous algae and turf
- [ ] Bluegreen algae
- [ ] Rubble with encrusted life
- [ ] Bedrock w/ sparse corals
- [ ] Bedrock w/ sparse SC
- [ ] Black Coral shelter trees (> 2m)
- [ ] No light habitat

TOPOGRAPHICAL DESCRIPTION:

- [ ] Cave
- [ ]
- [ ] Overhanging steep wall
- [ ] Steep wall fragmented
- [ ] Steep wall w/ slope (>60^{o})
- [ ] Slope (>45^{o})
- [ ] Slope (>25^{o})
- [ ] Deep ridge (>14 m depth)
- [ ] High energy reef crest / top
- [ ] Sheltered reef crest / top
- [ ] Flat reef crest
- [ ] Lagoon / reef flat
- [ ] Flat reef
- [ ] Groves
- [ ] Bommies
- [ ] Monolith
- [ ] Deep crevasse / hole

Appendix 10

PARTICIPANTS

NAME	AFFILIATION AND LEVEL OF EDUCATION	NATIONALITY	PREVIOUS EXPERIENCE IN UW RESOURCE ASSESSMENTS	DUTIES
PROJECT LEADERS				
Silvia Pinca, Project Leader	CMI, PhD	Italian	Previous experience in coral reef assessments; Coral Cay Conservation, Philippines (4 months, 150 dives	Organization design, fund raising, transects; algae expert
Maria Beger, Project Co-Leader	University of Queensland, PhD student	German	Several expeditions in the Philippines, PNG, Australia for coral reef assessments. (hundreds of survey dives). Speciality: fish.	Methods design; Fish experts: Fish biodiversity & assessment
PARTICIPANTS WITH PREVIOUS EXPERIENCE IN UNDERWATER ASSESSMENTS				
Dan Barshis	University of Hawaii, PhD student	American	CMI, 3 months, 40 survey dives Gastropod biodiversity	Transects, physical, permanent transects
Benjiamin Dominici		British	Coral Cay Conservation, 4 months, 80 assessment dives	Transects, physical, permanent transects
Sacha Jellinek, MsC	University of Tasmania, Honors	Australian	4 yrs experience in coral reef ecology and Assessments. Coral Cay Conservation, Science Officer, 3 months, 60 assessment dives, GBR	Transects, physical, permanent transects
Craig Musburger	University of Hawaii, PhD student	American	Research at UH on fish aggregations	Fish expert: fish biodiversity; permanent transects
Emma Reeves	University of Borthmouth, Master of Science in Coastal Management	British	Coral Cay Conservation, Science Officer, 3 months, 120 assessment dives; Likiep assessment expedition 2001	Transects, physical, permanent transects
Zoe Richards	Museum of Tropical Queensland, AU	Australian	Collaboration as coral expert at the Museum; speciality: *Acropora* corals ID	Coral expert: coral biodiversity
LOCAL TRAINEES				

Melba White	CMI AA graduate, with speciality in Marine Science, Candidate student at Florida International University	Marshallese	Bikini surveys 2002; total dives for surveys 30	
VOLUNTEERS				
Ingolf Kuhrt		German	trainee	physical
Anna McMurray		American	trainee	physical, invertebrates, corals
Eric Peterson	Adjunct Senior Research Fellow, Centre for Marine Studies, University of Queensland, Brisbane, Australia	Australian	Trainee	physical, invertebrates, corals
PHOTOGRAPHER				
Robert Fournier		American	200 dives for coral reef surveys in Belize, Fiji, Raratonga; research dives for shark studies; director for whale shark film in Australia; photographic expedition in Thailand	photographer

Silvia Pinca

Date of Birth: February 24, 1967
Citizenship: Italian

EDUCATION

1994 PhD Marine Environmental Sciences, University of Genoa, Italy.
1990 MSc in Natural Sciences, University of Genoa, Italy. Best mention.

Specialization courses

2002 Coastal Management Workshop, College of the Marshall Islands and University of Rhode Island
2002 Community-Based Fisheries Training, Secretariat of the Pacific Community
2001 Environmentally Sustainable Development in the Rep. of the Marshall Islands Workshop
1995 Numerical Analysis in Marine Ecology, University of Paris VI.
1991 Numerical Analysis of data and signals in Marine Ecology, University of Paris VI.
1989 Oceanology Course, University of Trieste.

WORK EXPERIENCE

Research positions held

Present coral reef research: *coral reef management and conservation. Grant writing and fund raising, project design, capacity building, field work, data collection, data analysis, report writing.*

2002 World Heritage Site selection in Ailininae atoll, RMI. Participation to surveys with University of Hawaii and US Fish and Wildlife and Service. Underwater assessments of marine resources and biodiversity. Seaweed biodiversity.

2002 Bikini atoll coral reef resources assessments. Principal investigator.

2002 Resource assessment and conservation in the Marshall Islands. "NRAS 2002: Natural resources assessments surveys in the atolls of Bikini and Mili". Principal investigator

2001 Resource assessment in the Marshall Islands: "Marine Resources Assessment: Likiep Atoll 2001". Principal investigator.

Previous ecology academic research

1999-2000 Research assistant at Department of Ecology and Evolution, University of Chicago.

1995-1997 Research assistant at the Marine Biology Research Division, Scripps Institution of Oceanography, University of California San Diego.

1996 Research assistant at Station Zoologique, University Pierre et Marie Curie, Paris VI.

Other professional experiences

***College-level teaching*:**

2001-ongoing Marine Science Instructor and Marine Science Program Coordinator, College of the Marshall Islands.

Teaching work: Courses: Introduction to Marine Biology, Tropical Reef Ecosystems of the Pacific, Ocean Management, Oceanography. Training for underwater coral reef assessments.

2001-ongoing MSc Mentor: External Supervisor for Anir Lal's Master degree thesis of, University of the South Pacific (benthic algae)

2002 MSc Mentor: Supervision of Coastal Zone Management Master Degree graduate student Emma Reeves from Bournemouth University, UK (conservation study in RMI)

2001 Honors Mentor: Supervisor to undergraduate Honors in Zoology student from UK: Lucy Horton from Edinburgh University, UK (fish assessments in RMI and sociological analysis at the College of the MI)

1997 Marine Biology Lecturer at a Biological Oceanography summer course at the University of Southern California, LA.

Extension work and outreach:

2001-ongoing Translate coastal management and conservation material into vernacular, targeting different groups in the community of the Marshall Islands: grade school students, government officials, women groups.

2002 Collaboration on environment conservation with other conservation practitioners at national (Environmental Protection Authority,- RMI-EPA, Marshall Islands Marine Resources Authority - MIMRA) and international (Rhode Island University, US Fishery and Wildlife Service,) level.

2002 Facilitation of the formation of a local NGO in the Marshall Islands: Nature Conservation Communities of the MI, to involve more people college students, government officials and citizens - into marine management and conservation issues, related to local traditions and needs.

2000 Science Officer: science coordinator, instructor and surveyor for Coral Reefs Conservation project, The Philippines.

1999 & 1995 Environmental education coordinator in coral reefs ecosystems, Maldive islands.

SCHOLARSHIPS

2002 US National Fishery and Wildlife Foundation Grant for coral reef conservation

2002 US Department of the Interior, Insular Affairs grant 2002 Marine Resources Pacific Consortium grant

2002 Marshall Islands Marine Resources Authority grant for education and capacity building

2002 Marshall Energy Company grant

2002 Rufford small grant, Whitley Conservation Society

1995-1997 Two years scholarship from the University of Genoa for Specialization abroad1996 Scholarship from European Union for the "Advanced Study Course in Marine Science and Technology".

1992 Scholarship form the European Community for Science Activity Abroad

1991-1994 Scholarship from the University of Genoa for the Research Doctorate (Ph.D.)

OCEANOGRAPHIC MISSIONS

1997 Oceanographic cruise J-GOFS in the Ross Sea, Antarctica
1996 Oceanographic cruises in the Pacific Ocean, project HOTS: Hawai'i
1988-89 Oceanographic cruises for the University of Genova

AFFILIATIONS AND CERTIFICATES

2000 Member of Royal Geographical Society
2000 Scuba dive certification Dive Master PADI
1997 Member of Nature Conservancy: project, Rescue the Reef
1989 Underwater photographer certification

PUBLICATIONS

2000 Pinca S. "Spatial organization of plankton size composition in an eddy-jet system, obtained through contiguity-constrained analysis", *Deep-Sea Research* I, 47, 973-996

1997 Pinca S., Dallot S. "Zooplankton community structure in the Western Mediterranean sea related to mesoscale hydrodynamics", *Hydrobiologia*, 356, 127-142.

1995 Pinca S., Dallot S. "Meso- and macrozooplankton composition patterns related to hydrodynamic structures in the Ligurian Sea (Trophos 2 experiment, April-June 1986), *Marine Ecology Progress Series*,126, 49-65..0

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1996 Pinca S., Zhu Y., Zhou M., Huntely M.: "Small-scale zooplankton distribution in the California Current System related to the hydrodynamic features", EOS Transactions, American Geophysical Union, 76, 3 suppl.

1994 Pinca S. " Distribution et structure de la communaute zooplanctonique superficielle de Trophos II", Traveaux de l'Observatoire Oceanologique de Villefranche-sur-Mer.

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1994 Di Natale, A., Mangano A., Maurizi A., Montaldo L., Navarra E., Pinca S., Schimmenti G., Torchia G., Valastro M.: "A review of drifnet catches by the Italian fleet: species, composition, observers data and distribution along the net". Third GFCM-ICCAT Expert Consultation on Stocks of Large Pelagic Fishes in the Mediterranean, Fuengirola (Spain), September 1994.

1993 Di Natale, A., Mangano A., Maurizi A., Montaldo L., Navarra E., Pinca S., Schimmenti G., Torchia G., Valastro M.: "Swordfish (*Xiphias gladius*, L.) drifnet fishery in the Western Italian Seas: 1990-1991 report". Second GFCM-ICCAT Expert Consultation on Stocks of Large Pelagic Fishes in the Mediterranean, Crete, September 1992, 18 pp.

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1992 Di Natale, A., Mangano A., Maurizi A., Montaldo L., Navarra E., Pinca S., Schimmenti G., Torchia G., Valastro M.: “Swordfish (*Xiphias gladius*, L.) long-line fishery in the Western Italian seas and in the Sicily Channel: 1991 report”, ICCAT, SCRS, Coll. Vol. Sci. Pap, 11 pp.

1991 Orsi Relini L., Pinca S.: ”Reproductvie patterns of *Pasiphaea sivado* in the Ligurian Sea”, Rapport de la Communaute Internationale de la Mer Mediterranee, 32, 1.

REPORTS

2001 Pinca, S. “Marine Resources Assessment: Likiep Atoll 2001, final report”, MIMRA, Republic of the Marshall Islands.

1993 Pinca, S. “Description of the distribution and structure of the surface zooplankton community in the region of the Liguro-provencal front”, PhD thesis, University of Genova, 156 + 65 pp.

1992 DiNatale A., Labanchi L., Mangano A., Maurizi A., Montaldo L., Montebello O., Navarra E., Pederzoli A., Pinca S., Placenti V., Schimmenti G., Sieni E., Torchia G., Valastro M. "Pelagic drifting tools used for the fishing of the adult swordfish (*Xiphias gladius*, L.): compared evaluation of functionality, capture capability, global impact and economy of systems and re-conversion", Reserved report to the Minister of the Navy.

1990 Pinca S.: Biological observations on pelagic decapods of the genus *Pasiphaea* in the Ligurian Sea”, MSc Thesis, University of Genova.

Maria Beger

Interests

Marine Protected Areas: selection, implementation and management
Biodiversity on reefs, specifically fish
Monitoring of coral reefs

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Education

1993- '94 Heriot Watt University, Edinburgh, UK
MSc Marine Resource Development and Protection

1994- '96 Technische Universität Dresden, Germany
1990- '93 Dipl.- Ing.:Wasserwirtschaft, Fachrichtung Grundwasserbewirtschaftung

Sept 2002- present University of Queensland, Australia
enrolled as PhD candidate, Supervisor Professor Hugh Possingham.

Marine Work Experience

Oct 2002 The Nature Conservancy, PNG, Eastern Kimbe Bay — Fish Expert Consultant
Biodiversity survey for reef fishes as part of TNC's rapid ecological assessment programme.

Nov 01- Sep 2002 Marshall Islands Marine Conservation Expedition — Co-Leader
Co-prepared and organised a reef survey expedition with the aim to train local students, collect reef biodiversity and health status data and contribute to global databases.

Oct 2000 – Nov 2001 James Cook University, Australia — Visiting Researcher
Coral reef research answering the following questions: How efficiently does a biodiversity approach work to select tropical Marine Protected Areas (MPA's)? Does reef size matter to fish diversity?

Ongoing since 2000 Danjugan Island Marine Reserve & Sanctuary Monitoring, Philippines
Designed and implemented an annual monitoring and training programme on behalf of the Philippine Reef and Rainforest Conservation Foundation Inc. http://www.whitley-award.org/rsg/beger.html

Sept 2000 Department of Fisheries Malaysia, — Scientific Team Leader
Led a team of five experts engaged in a rapid assessment of coral reef biodiversity, habitat and health in MPA's on the Malaysian peninsula. Responsible for fish biodiversity assessment.

Jun 98 – Aug 2000 Coral Cay Conservation Ltd., UK — Indo Pacific Marine Scientist
Responsible for managing the coral reef assessment programme of Coral Cay Conservation Ltd., whose paying volunteers survey natural resources in countries within the Indo-Pacific region.

Voluntary Marine Work Experience

Apr 2000 Eritrea's Coastal, Marine and Island Biodiversity Project, Eritrean Ministry of Fisheries/ UNDP — Voluntary Trainer, Eritrea

Jul97- Apr 98 Coral Cay Conservation Ltd. — Science Officer, Philippines and Indonesia

Professional Affiliations

Marine Conservation Society, UK; Reef Conservation UK; International Society for Reef Studies (ISRS); ReefCheck Europe (Founding member); Royal Geographical Society, UK, (Fellow).

Publications and Presentations

Journals

Beger, M., Jones, G. and P.L. Munday. In press. Selecting sites for coral reef protected areas: a comparison of biodiversity approaches for corals and fish. Biological Conservation.

Beger, M., T.P. Dacles, A.R. Harborne, G.L. Ledesma, A.W.M. Page, and P.S. Raines. In prep. Addressing the problems of establishing and managing marine protected areas: a case study in the Philippines. To be submitted to Environmental Conservation.

Beger, M., Jones, G. in prep. Marine biogeography theory: Does reef size matter to biodiversity?

Reports and Project Descriptions

Beger, M., J-L. Solandt, and T.P. Dacles. 2001. Coral Reef Bleaching at Danjugan Island, Negros Occidental, Philippines. A two year monitoring programme. Danjugan Island Survey Summary Report 2 to the Philippines Reef and Rainforest Conservation Foundation Inc.

Solandt, J-L, M. Beger and A.R. Harborne. 2001. Reef fish populations around Danjugan Island, Negros Occidental, Philippines. Danjugan Island Survey Summary Report 3 to the Philippines Reef and Rainforest Conservation Foundation Inc.

Harborne, A.R., D. Fenner, A.R. Barnes, M. Beger, S.P. Harding, and T. Roxburgh. 2000. Status report on the coral reefs of the east coast of Peninsula Malaysia. 50 pp. Report to Department of Fisheries, Malaysia. Kuala Lumpur.

Beger, M. and G.L. Ledesma. 2000. Taytay Bay Conservation Project — Project Proposal. Project summary document submitted to Palawan Council of Sustainable Development, Palawan, Philippines. 80 pp. Coral Cay Conservation Ltd. London.

Beger, M. and A.R. Harborne. 2000. Southern Negros Coastal Development Programme — Municipality of Sipalay. Internal report. 100 pp. Coral Cay Conservation Ltd. London.

Beger, M., J.A. Ellis, and A.R. Harborne. 2000. Taytay Bay Conservation Project, Phase 1 — Cagdanao Island. Internal report. 70 pp. Coral Cay Conservation Ltd. London.

Beger, M. 1999. Marine Science Staff Manual — Philippines. Internal working manual. 500 pp. Coral Cay Conservation Ltd. London.

Conference Presentations

Beger, M., T.P. Dacles, A.R. Harborne, G.L. Ledesma, A.W.M. Page, and P.S. Raines. 2000. Danjugan Island: A unique integrated approach to establish a community-based Marine Protected Area in the Philippines. Presented at 9th International Coral Reef Symposium, Bali, 2000.

Teleki, K.A., A.R., Harborne, H. Hall, M. Beger, and E.M. Wood. 2000. Reef Conservation UK: Carrying the philosophy of International Year Of The Reef into the future. Poster at 9th International Coral Reef Symposium, Bali, 2000.

Ledesma, G.L., M. Beger, G. Goby, A.R. Harborne, and P.S. Raines. 1999. The Philippine Reef and Rainforest Project: An integrated approach to establishing marine protected areas. Proceedings: The Symposium on Marine Biodiversity in the Visayas and Mindanao, 1998, Ilo Ilo, Philippines.

Appendix 11

GRANTS

RALGOV (RONGELAP LOCAL GOVERNMENT)

US DEPARTMENT OF INTERIOR

MIMRA (MARSHALL ISLANDS MARINE RESOURCES AUTHORITY) FUND

WHITLEY AWARD – RUFFORD SMALL GRANT

REEFCHECK

MEC (MARSHALL ISLANDS ENERGY COMPANY)

MAREPAC (MARINE RESOURCES PACIFIC CONSORTIUM)

IN - KINDS

OUTRIGGER HOTEL

CMI, COLLEGE OF THE MARSHALL ISLAND

Contributions:

- Use of facilities and library for training
- Use of digital camera and underwater housing
- Use of laptop computer and projector
- Use of photocopy machine

Appendix 12

SCHEDULE OF FIELD ACTIVITIES

date	name of site	consecutive dive number	location	activity	# divers	transportation
2/8/2002	R1	1	Jaboan lagoon side	3 transects + corals&fish biodiversity	13	truck
2/8/2002	R2	2	ocean wall, S side	3 transects + corals&fish biodiversity	13	truck
3/8/2002	R3	3	lagoon, N-W	3 transects + corals&fish biodiversity	13	truck
4/8/2002	R4	4	ocean wall, S side	3 transects + corals&fish biodiversity	11	truck
5/8/2002	R5	5	ocean wall, S side	3 transects + corals&fish biodiversity	11	truck
6/8/2002	R6	6	lagoon, west	3 transects + corals&fish biodiversity	11	truck
6/8/2002	R7	7	ocean wall, off runway	3 transects + corals&fish biodiversity	11	truck
7/8/2002	ReefCheck	8	Jaboan, lagoon side	ReefCheck	11	truck
7/8/2002	Perm.trans.	9	Jaboan, lagoon side	permanent transect	11	truck
7/8/2002	R8	10	lagoon side, N tip	3 transects + corals&fish biodiversity	11	truck
8/8/2002	R9	11	ocean wall, Jaboan	3 transects + corals&fish biodiversity	11	truck
8/9/2002	R10	12	S wall, E end of runway	3 transects + corals&fish biodiversity	10	truck
8/9/2002	R11	13	lagoon E of Jaboan	3 transects + corals&fish biodiversity	10	truck
8/10/2002	descriptive	14	descriptive dive off Jaboan	dives off wall	11	truck
8/10/2002	R12	15	wall at Jaboan	3 transects + corals&fish biodiversity	11	truck
8/11/2002	R10Ph1	16	S wall, E end of runway	topographical description + biodiversity	11	truck
8/12/2002	R1Ph1	17	Jaboan wall	topographical description + biodiversity	11	truck
8/12/2002	R1Ph2	18	Jaboan wall	topographical description + biodiversity	9	truck

8/15/2002	R13	19	Enirouuri wall	3 transects + corals&fish biodiversity	9	boat
8/15/2002	R14	20	Arubaru, E channel side	3 transects + corals&fish biodiversity	9	boat
8/17/2002	PT2	21	airport terminal, ocean side	permanent transect	9	walk
8/17/2002	PT1	22	Jaboan	mapped permanent transect	9	truck

Appendix 13

REEF CHECK RESULTS

Jaboan Point:

Site name	**Shark Alley Jabwan, Rongelap Atoll**			
Date	8/7/2002			
Time of day that work started	10am			
Time of day that work ended	11am			
Longitude of transect start point				
Latitude of transect start point				
From chart or by GPS? (If GPS, indicate units)	chart_____	GPS 11deg 9' 12" N, 166 deg 50' 11"		
Orientation of transect	N-S___	NE-SW__X_	E-W___	
Distance from shore	100 m			
Distance from nearest river	Atoll			
River mouth width	<10m__	11-50m__	51-100m__	101-500m__
Weather	sunny_X__	cloudy_____	raining_____	
Air temperature	34 degrees C			
Water temperature at surface	27 degrees C			
Water temperature at 3 m	27 degrees C			
Water temperature at 10 m	27 degrees C			
Distance to nearest population centre	5 km			
Approximate population size	100 people			
Horizontal visibility in water	25 m			
Why was this site selected?	Good site, easily accessable			
Is this site -	sheltered_____	exposed_X____		
Any major coral damaging storms in past years?	yes_____	no_____	unknown_X____	
How do you rate this site overall in terms of anthropogenic impact?	none_X___	low____	moderate____	heavy____
What types of impacts do you believe occur?				
Dynamite fishing	none_X___	low____	moderate____	heavy____
Poison fishing	none_X___	low____	moderate____	heavy____
Aquarium fish collection	none_X___	low____	moderate____	heavy____
Harvest of invertebrates for food	none_X___	low____	moderate____	heavy____
Harvest of invertebrates for curio sales	none_X___	low____	moderate____	heavy____
Tourist diving	none_X___	low____	moderate____	heavy____
Sewage pollution	none_X___	low____	moderate____	heavy____
Industrial pollution	none_X___	low____	moderate____	heavy____
Other forms of fishing? (Specify)	none_X___	low____	moderate____	heavy____
Other impacts? (Specify)	none_X___	low____	moderate____	heavy____

Is there any form of protection (statutory or other) at this site?	yes_____ no_X____
If yes, what type of protection?	
Other comments	
Submitted by (enter TL/TS and your name)	S Pinca

Fish "deep"

Site Name:	**Shark Alley Jaboan, Rongelap Atoll**		
Depth:	9m	Team Leader:	Dr Silvia Pinca
Date:	8/7/2002	Time:	10.00-11

Indo-Pacific Belt Transect : Fish

Data recorded by:	Craig Musburger	Maria Beger

	0-20m	25-45m	50-70m	75-100m	Total	Mean	Standard deviation
Butterfly fish	2	5	8	7	22	8.8	2.65
Sweetlips (Haemulidae)	0	0	0	0	0	0	0.00
Snapper (Lutjanidae)	8	1	15	17	41	16.4	7.27
Barramundi Cod (*Cromileptes*)	0	0	0	0	0	0	0.00
Grouper >30cm (Give sizes in comments)	0	2	2	3	7	2.8	1.26
Humphead wrasse	0	0	0	1	1	0.4	0.50
Steephead parrot	0	0	1	0	1	0.4	0.50
Other Parrotfish (>20cm)	17	3	3	4	27	10.8	6.85
Moray eel	0	0	0	1	1	0.4	0.50

Indo-Pacific Belt Transect : Invertebrates

Data recorded by:	Eric Peterson	Dan Barshis

	0-20m	25-45m	50-70m	75-100m	Total	Mean	Standard deviation
Banded coral shrimp (*Stenopus hispidus*)	0	0	0	0	0	0	0.00
Diadema urchins	2	0	0	0	2	0.8	1.00
Pencil urchin (*Heterocentrotus mammilatus*)	0	0	0	0	0	0	0.00
Sea cucumber (edible only)	0	3	0	0	3	1.2	1.50
Crown-of-thorns star (*Acanthaster*)	0	0	0	0	0	0	0.00
Giant clam (*Tridacna*)	1	0	0	1	2	0.8	0.58
Triton shell (*Charonia tritonis*)	0	0	0	0	0	0	0.00
Lobster	0	0	0	0	0	0	0.00
For each segment, rate the following as: None=0, Low=1, Medium=2, High=3							
Coral damage : Anchor	0	0	0	0	0	0	0.00
Coral damage:Dynamite	0	0	0	0	0	0	0.00
Coral damage : Other	0	0	0	0	0	0	0.00
Trash : Fish nets	0	0	0	0	0	0	0.00
Trash : Other	0	0	0	0	0	0	0.00

Comments:			1 gray reef shark, 1 nurse shark, 1 tiger shark
Grouper sizes (cm)	35 & 30cm	30 & 60cm	30, 30 & 15cm
Bleaching (% of coral population)			
Bleach (% of colony)			
Suspected disease (type/%):			
Rare animals sighted (type/#):			
Other:			

Corals "deep"

Site name: **Shark Alley Jaboan, Rongelap Atoll**

Depth: 9m

Date: 8/7/2002

Team Leader: Silvia Pinca

Data recorded by: Eric Peterson, Dan Barshis

Time: 10

Substrate Code

HC hard coral
SC soft coral
RKC recently killed coral
FS fleshy seaweed
SP sponge
RC rock
RB rubble
SD sand
SI silt/clay
OT other

(For first segment, if start point is 0 m, last point is 19.5 m)

SEGMENT 1		**SEGMENT 2**		**SEGMENT 3**		**SEGMENT 4**	
0 - 19.5 m		**25 - 44.5 m**		**50 - 69.5 m**		**75 - 94.5 m**	
1 RC	21 SD	41 RC	61 RC	81 SD	101 HC	121 HC	141 SC
2 SD	22 RB	42 HC	62 HC	82 SD	102 FS	122 SD	142 SC
3 SD	23 RC	43 RB	63 RB	83 SD	103 RB	123 HC	143 DC
4 RC	24 SD	44 FS	64 HC	84 RB	104 RB	124 RB	144 RC
5 SD	25 RC	45 HC	65 RC	85 RB	105 RB	125 SD	145 RC
6 RC	26 SD	46 SC	66 HC	86 RB	106 HC	126 HC	146 RKC
7 SC	27 RB	47 HC	67 HC	87 RB	107 HC	127 HC	147 SD
8 RC	28 RB	48 RB	68 HC	88 SD	108 SC	128 HC	148 HC
9 SD	29 HC	49 HC	69 SD	89 HC	109 SD	129 DC	149 HC
10 SD	30 RC	50 RC	70 FS	90 RB	110 SD	130 HC	150 HC
11 HC	31 SC	51 RB	71 HC	91 RB	111 FS	131 HC	151 HC
12 HC	32 HC	52 RC	72 RC	92 RB	112 RB	132 SD	152 RC
13 RC	33 RB	53 RC	73 HC	93 HC	113 RC	133 HC	153 SD
14 SD	34 HC	54 RC	74 RB	94 HC	114 SD	134 RKC	154 FS
15 SD	35 RC	55 HC	75 RB	95 RC	115 RC	135 HC	155 HC
16 SD	36 RC	56 RC	76 RB	96 HC	116 RB	136 HC	156 HC
17 HC	37 SD	57 SD	77 RB	97 HC	117 HC	137 HC	157 HC
18 HC	38 RC	58 SD	78 RB	98 SC	118 RC	138 HC	158 HC
19 HC	39 RB	59 SD	79 SD	99 RB	119 RB	139 HC	159 HC

20 SD	40 HC	60 RB	80 RC	100 RB	120 HC	140 RC	160 SC		

DO NOT TYPE DATA BELOW THIS LINE

Total S1	**Total S2**	**Total S3**	**Total S4**	**Grand total**		**Mean**	**SD**	
HC	9 HC	9 HC	12 HC	12 HC	42	HC	10.5 HC	4.93
SC	2 SC	2 SC	1 SC	1 SC	6	SC	1.5 SC	0.837
RKC	0 RKC	0 RKC	0 RKC	0 RKC	0	RKC	0 RKC	0
FS	0 FS	1 FS	2 FS	1 FS	4	FS	1 FS	0.837
SP	0 SP	0 SP	0 SP	0 SP	0	SP	0 SP	0
RC	11 RC	12 RC	10 RC	5 RC	38	RC	9.5 RC	5.03
RB	5 RB	9 RB	10 RB	15 RB	39	RB	9.75 RB	5.63
SD	13 SD	7 SD	5 SD	6 SD	31	SD	7.75 SD	4.658
SI	0 SI	0 SI	0 SI	0 SI	0	SI	0 SI	0
OT	0 OT	0 OT	0 OT	0 OT	0	OT	0 OT	0
#	40 #	40 #	40 #	40	160			

Comments:

Fish "shallow"

Site Name:	**Shark Alley Jaboan, Rongelap Atoll**		
Depth:	5-7m	Team Leader:	Dr Silvia Pinca
Date:	8/7/2002	Time:	10.00-11

Indo-Pacific Belt Transect : Fish

Data recorded by:	Sacha Jellineck	Emma Reeves

	0-20m	**25-45m**	**50-70m**	**75-100m**	**Total**	**Mean**	**Standard deviation**
Butterfly fish	7	7	9	11	34	8.5	1.914854
Sweetlips (Haemulidae)	0	0	0	1	1	0.25	0.5
Snapper (Lutjanidae)	2	2	4	1	9	2.25	1.258306
Barramundi Cod (*Cromileptes*)	0	0	0	0	0	0	0
Grouper >30cm (Give sizes in comments)	1	3	1	0	5	1.25	1.258306
Humphead wrasse	0	0	0	0	0	0	0
Steephead parrot	0	0	0	0	0	0	0
Other Parrotfish (>20cm)	9	2	1	5	17	4.25	3.593976
Moray eel	0	0	0	0	0	0	0

Indo-Pacific Belt Transect : Invertebrates

Data recorded by:	Anna McMurray	Zoe Richards

	0-20m	**25-45m**	**50-70m**	**75-100m**	**Total**	**Mean**	
Banded coral shrimp (*Stenopus hispidus*)	0	0	0	0	0	0	0

Diadema urchins	2	5	8	3	18	4.5	2.645751
Pencil urchin (*Heterocentrotus mammilatus*)	0	0	0	0	0	0	0
Sea cucumber (edible only)	0	0	0	0	0	0	0
Crown-of-thorns star (*Acanthaster*)	0	0	0	0	0	0	0
Giant clam (*Tridacna*)	0	1	1	0	2	0.5	0.57735
Triton shell (*Charonia tritonis*)	0	0	0	0	0	0	0
Lobster	0	0	0	0	0	0	0
For each segment, rate the following as: None=0, Low=1, Medium=2, High=3							
Coral damage : Anchor	0	0	0	0	0	0	0
Coral damage:Dynamite	0	0	0	0	0	0	0
Coral damage : Other	1	0	1	0	2	0.5	0.57735
Trash : Fish nets	0	0	0	0	0	0	0
Trash : Other	0	0	0	0	0	0	0

Comments:	Good condition	
Grouper sizes (cm)	60+cm	30cm Lyretail
Bleaching (% of coral population)		
Bleach (% of colony)		
Suspected disease (type/%):		
Rare animals sighted (type/#):		
Other:		

Corals "shallow"

Site name: **Shark Alley Jaboan, Rongelap Atoll**

Depth: 5-7m Date: 8/7/2002

Team Leader: Silvia Pinca Data recorded by: Anna McMurray, Zoe Richards

Time: 10

Substrate Code

HC hard coral **SC** soft coral **RKC** recently killed coral
FS fleshy seaweed **SP** sponge **RC** rock
RB rubble **SD** sand **SI** silt/clay
OT other

(For first segment, if start point is 0 m, last point is 19.5 m)

SEGMENT 1			**SEGMENT 2**			**SEGMENT 3**			**SEGMENT 4**		
0 - 19.5 m			**25 - 44.5 m**			**50 - 69.5 m**			**75 - 94.5 m**		
1 HC	21 RC		41 RC	61 FS		81 RKC	101 SD		121 HC	141 HC	
2 RC	22 FS		42 FS	62 FS		82 SD	102 SD		122 HC	142 RC	
3 FS	23 HC		43 HC	63 FS		83 SD	103 RC		123 RB	143 RC	
4 HC	24 HC		44 HC	64 RC		84 SD	104 SD		124 RB	144 RC	
5 RC	25 HC		45 FS	65 FS		85 FS	105 RC		125 SD	145 RC	

6 RB	26 HC	46 RC	66 HC	86 HC	106 SD	126 RC	146 RB
7 HC	27 HC	47 HC	67 FS	87 FS	107 HC	127 SD	147 RB
8 HC	28 RC	48 HC	68 RC	88 FS	108 HC	128 HC	148 RB
9 RC	29 RC	49 RB	69 HC	89 RC	109 RB	129 RC	149 HC
10 RC	30 RC	50 RB	70 HC	90 RB	110 HC	130 RC	150 RC
11 RC	31 HC	51 FS	71 FS	91 HC	111 RB	131 HC	151 HC
12 RC	32 HC	52 FS	72 RC	92 RC	112 SD	132 RB	152 HC
13 HC	33 HC	53 RC	73 FS	93 RC	113 SD	133 RB	153 RC
14 RC	34 RC	54 RC	74 HC	94 FS	114 RB	134 FS	154 HC
15 RC	35 HC	55 HC	75 FS	95 SD	115 SD	135 HC	155 HC
16 HC	36 HC	56 RKC	76 HC	96 HC	116 SD	136 HC	156 HC
17 HC	37 HC	57 HC	77 RC	97 RC	117 RC	137 HC	157 RC
18 HC	38 RC	58 RC	78 RC	98 SD	118 HC	138 HC	158 HC
19 FS	39 RC	59 HC	79 RB	99 SD	119 FS	139 HC	159 HC
20 RC	40 RB	60 FS	80 RB	100 SD	120 HC	140 HC	160 HC

DO NOT TYPE DATA BELOW THIS LINE

Total S1	**Total S2**	**Total S3**	**Total S4**	**Grand total**		**Mean**	**SD**	
HC	19 HC	18 HC	12 HC	8 HC	57	HC	14.25 HC	5.188
SC	0 SC	0 SC	0 SC	0 SC	0	SC	0 SC	0
RKC	0 RKC	1 RKC	1 RKC	1 RKC	3	RKC	0.75 RKC	0.5
FS	3 FS	6 FS	13 FS	12 FS	34	FS	8.5 FS	4.796
SP	0 SP	0 SP	0 SP	0 SP	0	SP	0 SP	0
RC	16 RC	12 RC	10 RC	9 RC	47	RC	11.75 RC	3.096
RB	2 RB	3 RB	4 RB	3 RB	12	RB	3 RB	0.816
SD	0 SD	0 SD	0 SD	7 SD	7	SD	1.75 SD	3.5
SI	0 SI	0 SI	0 SI	0 SI	0	SI	0 SI	0
OT	0 OT	0 OT	0 OT	0 OT	0	OT	0 OT	0
#	40 #	40 #	40 #	40	160			

Comments: