INT2019-04 Identification and storage of cold-water coral bycatch specimens

1 July 2020 – 31 December 2020

Milestone 4. Six monthly progress update

Prepared for: Conservation Services Programme, Department of Conservation
Attention: Shannon Weaver
Report date: November 2020
Prepared by: Diana Macpherson, Di Tracey, Sadie Mills (NIWA)
Project: DOC20303 - INT2019-04

For any information regarding this report please contact:
Di Tracey
Scientist
Deepsea Ecology and Fisheries Group
+64-4-386 866
di.tracey@niwa.co.nz
National Institute of Water & Atmospheric Research Ltd
Private Bag 14901
Kilbirnie
Wellington 6241

*Cover image: At-sea digital image of Paragorgia (*Paragorgiidae*; bubblegum coral) collected from TRIP6135 by trawl [Observer, FNZ].*

Report reference:
Macpherson, D., Tracey, D., Mills, S. (2021). INT2019-04 Identification and storage of cold-water coral bycatch specimens 1 July 2020 – 31 December 2020. Milestone 4. Six monthly progress update prepared by NIWA for the Conservation Services Programme, Department of Conservation. DOC20303 - INT2019-04. 18 p.

Executive summary

Many protected coral species occur as bycatch in commercial fisheries around New Zealand. The Conservation Services Programme (CSP) of the Department of Conservation (DOC) recognise that Government Fisheries Observers on commercial fishing vessels are not always able to identify this bycatch at sea with high precision (especially to species level), with the confirmation of species requiring identification from a coral taxonomist in many cases. An understanding of deepsea coral bycatch is required to help determine how vulnerable protected corals might be to various anthropogenic impacts such as fishing, and thus help manage and conserve populations.

This project (INT201904) facilitates, through the examination of returned coral specimens and specimen images, the taxon and the provenance of corals bycaught in New Zealand fisheries. This progress report summarises the sample and image identifications of all observed coral bycatch that were returned during the period 1 July 2020 to 31 December 2020, including a count of the sub-samples collected for genetic analysis, and an update on the progress of other objectives such as the preparation of an updated and revised coral guide training resource.

A total of 17 specimen samples were collected and returned for identification during the reporting period. Sub-samples from each live specimen (n=10) were taken for future genetic studies. A total of 28 specimens were identified from 38 digital images during the reporting period; 27 of these were protected coral taxa, and all images were georeferenced. Specimen and image data are presented by Fisheries Management Areas (FMA), fishing method, and targeted fishery. Highest protected coral specimen counts came from the Chatham Rise (FMA4 South-East). Most samples were taken by bottom trawl targeting deepsea species orange roughy. Bottom longline vessels targeting ling also bycaught protected corals (two trips during this reporting period).

Considerable input has taken place during this reporting period to assist with the production of a revised and updated Coral Identification Guide for use at-sea by Observers. The Guide is well advanced with additional editing and revisions in train, and a description of compiling this training resource is provided here.

1 Background

The specific objectives for this project are:

1. To determine, through examination of returned protected cold-water coral specimens and images, the taxon, and where possible the provenance of cold-water corals killed in New Zealand fisheries (for returned dead specimens).
2. To collect sub-samples of all protected cold-water coral specimens for genetic analysis in future.
3. To assist with observer training and the development/improvement of observer training resources.

There are several milestones for this project, here we report on Milestone 4. Six monthly progress update with a "Summary of coral specimens identified by samples and images, bycaught during the period 1 July 2020 – 31 December 2020." We also summarise progress made on the development and improvement of observer training resources, specifically on the revised and updated Coral Identification Guide.

2 Objective 1

Determine, through examination of returned protected cold-water coral specimens and images, the taxon, and where possible the provenance of cold-water corals killed in New Zealand fisheries (for returned dead specimens).

2.1 Identification of returned protected coral specimens

During the reporting period 1 July 2020 to 31 December 2020, NIWA received, processed, and identified 17 observer collected protected coral specimens in 15 sample lots. Four of the physical specimens returned to NIWA were collected by bottom longline targeting ling, and 13 by bottom trawl, with 12 specimens from fisheries targeting orange roughy, three specimens from fisheries targeting ling and one specimen from a fishery targeting smooth oreo. As part of Objective 2, sub-samples from each live specimen were taken for future genetic studies (n=10).

Experts identifying samples collected during this reporting period were:
Di Tracey and Marcelo Kitahara - Scleractinia (stony corals)
Di Tracey - Alcyonacea (formerly Gorgonacea, gorgonian octocorals)
Rob Stewart and Dennis Opresko - Antipatharia (black corals)
Peter Marriott - Stylasteridae (hydrocorals)

A summary of protected coral bycatch specimens collected between 1 July 2020 to 31 December 2020 and identified by experts are provided in the NIWA Invertebrate Collection (NIC) *Specify* Database *niwainvert* extract (Appendix A(a)) and presented in Table 1.

Table 1. Summary of protected coral species with a count of number of specimens collected by Observers from each Fisheries Management Area (FMA) and target fishery between 1 July–31 December 2020. Refer to Figure 2 for FMA location. ORH = orange roughy, SSO = smooth oreo, LIN = ling.

				FMA (target fishery)				
Order	Family	Genus	Species	CHA (LIN)	SOU (LIN)	SOE (ORH)	SOE (SSO)	Total no. of specimens
Alcyonacea	Keratoisididae					1		1
		Acanella				1		1
		Keratoisis				1		1
	Paragorgiidae	*Paragorgia*	*arborea*				1	1
Anthoathecata	Stylasteridae	*Conopora*	*verrucosa*		1			1
Antipatharia			indet.			1		1
	Leiopathidae	*Leiopathes*				2		2
	Schizopathidae	*Bathypathes*				2		2
	Stylopathidae		Indet.			1		1
		Tylopathes				1		1
Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*			1		1
	Dendrophylliidae	*Eguchipsammia*	*japonica*	3				3
		Enallopsammia	*rostrata*			1		1
Total no. of specimens				3	1	12	1	17

Two research trawl survey collected coral specimens were returned for identification from the TAN2014 Subantarctic Trawl Survey inside this reporting period (December 2020). The two specimens were:

- a confirmed identification of the solitary bowl coral *Stephanocyathus platypus* (STP) from the Southland (SOU) FMA,
- a changed identification from Primnoidae (PRI) onboard to the golden whip-like coral *Radicipes* (RAD) from the Subantarctic (SUB) FMA (Figure 1).

A summary of the research trawl survey specimens is provided in Appendix A (b).

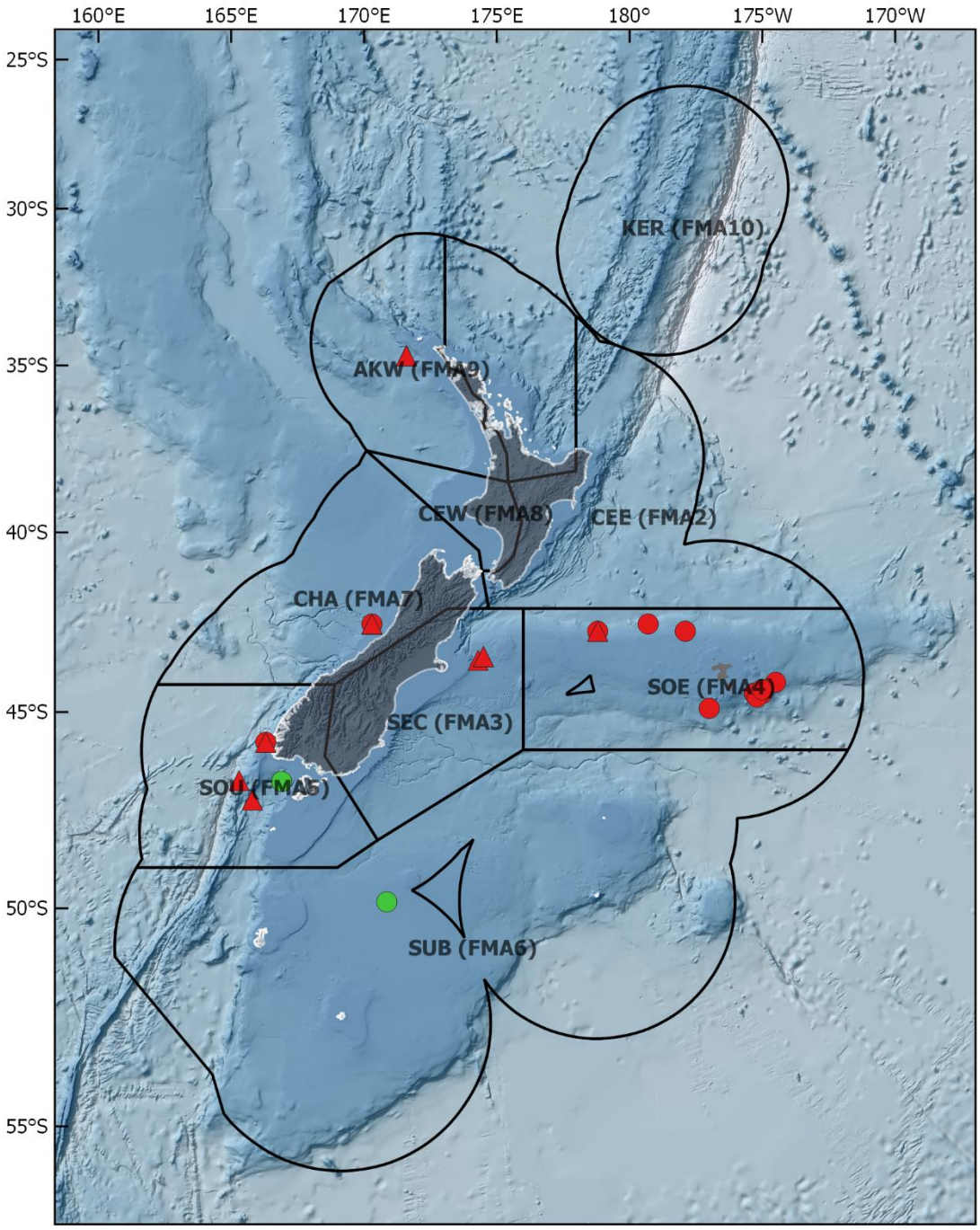

Figure 1. Observer collected bycatch coral specimens (red circles), specimens from images (red triangles), and research trawl survey specimens (green circles) collected 1 July–31 December 2020.

2.2 Processing and identification of specimens from images

During the reporting period 1 July 2020 to 31 December 2020, NIWA received 140 digital images and 38 of these were processed. The remaining 102 were not processed because they were of non-protected coral taxa (n=33); or they were of coral taxa but could not be matched to a tow number (n=65), or they were already processed for last reporting period (Jan – June 2020) (n=4). Efforts to match georeferenced data with the images that had missing tow numbers (i.e., no label and / or label missing the actual tow number), will be carried out where possible, by the next reporting period covering the full year 1 July 2020-30 June 2021.

In total, 28 specimens were identified from 38 images (noting that at times there were multiple images of the same specimen). Of the 28 identified specimens, 27 were protected coral taxa, all of which were georeferenced. The remaining specimen was determined a geological sample, specifically a bio-eroded rock pavement, possibly carbonate crust, with various coral and non-coral taxa attached and growing on it. All processed images were photographed within New Zealand's Exclusive Economic Zone (EEZ).

Of the 38 processed images, 24 contained a label providing a tow number. Tow numbers for the remainder of the images were able to be determined by cross checking the TRIP number and the taxa with specimen records already entered in the *Specify* database *niwainvert* - as some specimens that had been photographed were returned to NIWA by the Observer and the specimen samples had a label indicating the tow number.

The highest number of photographed specimens were from the Chatham Rise area (FMA4 South-East) (Table 2). The highest number of tows with coral bycatch were recorded from bottom trawls targeting orange roughy (Table 3).

Table 2. Summary of specimens by Fisheries Management Area (FMA).

Area	Description	Total no. of specimens
AKE	Auckland East (FMA1)	4
CHA	Challenger (FMA7)	3
SEC	South-East Coast (FMA3)	4
SOE	South East (FMA4)	12
SOU	Southland (FMA5)	5
Total		28

Table 3. Count of tows and specimens by fishing method and target fishery. TWL = Trawl, BLL = Bottom longline.

Target Fishery (common name)	FNZ code	Fishing Method	Count of Tows	Total no. of specimens
Black oreo	BOE	TWL	2	3
Hoki	HOK	TWL	2	4
Ling	LIN	BLL	2	4
Orange roughy	ORH	TWL	10	15
Smooth oreo	SSO	TWL	2	2
Total			18	28

The most photographed protected coral taxa were from the octocoral families Keratoisididae (bamboo corals; n=5 specimens) and Paragorgiidae (bubblegum coral; n=4 specimens), followed by Caryophylliidae and Flabellidae (stony cup corals; n=5 specimens) and Schizopathidae (black coral *Bathypathes*; n=3 specimens). A diverse range of Antipatharia (black corals) were noted, along with a specimen each of Coralliidae (precious coral), Stylasteridae (hydrocoral *Conopora verrucosa*) and stony branching cup coral *Eguchipsammia japonica* (Table 4 and Figure 2).

Table 4. Count of specimens identified of each species.

Phylum	Class	Order	Family	Genus	Species	Total no. of specimens
Cnidaria	Anthozoa	Alcyonacea	Coralliidae	*Hemicorallium*		1
			Keratoisididae	*Acanella*		2
				Keratoisis		2
				Isidella		1
			Paragorgiidae	*Paragorgia*		4
			Primniodae	*Thouarella*		1
Cnidaria	Anthozoa	Antipatharia	Leiopathidae	*Leiopathes*		1
			Myriopathidae	*Antipathella*	*fiordensis*	1
			Schizopathidae	*Bathypathes*		3
			Stylopathidae		indet.	1
Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Caryophyllia*		1
				Goniocorella	*dumosa*	1
				Solenosmilia	*variabilis*	2
			Dendrophylliidae	*Eguchipsammia*	*japonica*	1
			Flabellidae	*Flabellum*		1
				Truncatoflabellum	*angiostomum*	3
Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	*Conopora*	*verrucosa*	1
Rock						1
Total no. of specimens						28

Figure 2. Specimen images. a: stony branching cup coral *Eguchipsammia japonica* (physical specimen received, NIWA 146471) growing on a bio-eroded rock pavement, possibly carbonate crust; b: a specimen of *Acanella* bamboo coral; c: large broken specimen of bubblegum coral *Paragorgia* inside a fish bin and adjacent to another fish bin; d: mostly dead matrix of *Solenosmilia variabilis* inside a fish bin (physical specimen received, NIWA 146482); e: a large specimen of black coral *Bathypathes* (physical specimen received, NIWA 146537); f: a specimen of precious coral *Hemicorallium* [Observer, FNZ].

2.3 COD database uploads

Expert identifications of physical specimens will be uploaded into the Centralised Observer Database (COD) and reported on in the Draft Final Report. It is expected that expert identifications of specimens from images will also be loaded into COD table t_coral_images, after discussions with FNZ and NIWA COD database managers have taken place.

3 Objective 3

Assist with observer training and the development/improvement of observer training resources.

A key activity during this reporting period has been to assist with the development and improvement of observer training resources. The focus has been on the production of a revised and updated Coral Identification Guide for use at-sea by Observers. Additionally, initial discussions around the production of a coral identification training video for Observers took place. No assistance has been required for observer training during this reporting period however documents such as 'Instructions to observers when carrying out at-sea protected coral data collection' have been passed on to CSP.

Revised Coral Identification Guide

The Coral Identification Guide (Tracey et al. 2014) plays an important role in aiding Observers at-sea data collection, helping them to correctly identify coral bycatch, and with the data and samples that they collect, can help inform the effects of commercial fishing on protected coral species.

The format of the revised and updated guide will be presented as an A5 document, matching other CSP produced Protected Species Identification Guides.

Tasks during this reporting period to support the production of the guide have included:

- meetings with the Client and their designers
- revising the content of the guide, e.g., where global taxonomists have revised the description of certain corals
- liaising with global coral experts
- the provision of specimen images and figures
- revising descriptions of some coral three-letter MPI codes
- obtaining new three-letter MPI codes via Fisheries New Zealand and NIWA research database managers

Effort has focused on producing additional descriptive text and updates (e.g., incorporating recent taxonomic descriptions and revisions for bamboo corals and black corals, as well as providing fuller descriptions for octocorals from the families Plexauridae, Anthothelidae and Acanthorgorgiidae). Additional figures (e.g., a coral reproduction schematic), and specimen images were provided to accompany the updated and additional text.

New 3-letter MPI species codes

Guide production is well advanced with additional editing underway. New three-letter species codes have now been loaded into relevant databases (Table 5). An additional new code is proposed, and updated descriptions for current codes for clarity and to reflect updated taxonomy, are shown in Table 6.

Table 5. New codes loaded into various species code databases at NIWA and FNZ.

code	com_name	sci_name	family_sci
ACC	Acanthogorgiid coral	*Acanthogorgia* spp.	Acanthogorgiidae
ACD	Acanthogorgiid coral	Acanthogorgiidae	Acanthogorgiidae
ANA	Acanthogorgiid coral	*Anthogorgia* spp.	Acanthogorgiidae
ANB	Anthothelid coral	*Anthothela* spp.	Anthothelidae
AND	Anthothelid coral	Anthothelidae	Anthothelidae
ASD	Plexaurid sea fan	*Astrogorgia* spp.	Plexauridae
CMB	Ambrosia cup coral	*Caryophyllia* (*Caryophyllia*) *ambrosia*	Caryophylliidae
CLA	Clumping cup coral	*Cladopsammia* spp.	Dendrophylliidae
CRT	Feathery hydroid	*Cryptolaria* spp.	Zygophylacidae
DSY	Bottlebrush coral	*Dasystenella* spp.	Primnoidae
DDB	Stony branching coral	*Dendrophyllia* spp.	Dendrophylliidae
EJA	Stony branching coral	*Eguchipsammia japonica*	Dendrophylliidae
FAP	Apertum cup coral	*Flabellum* (*Ulocyathus*) *apertum*	Flabellidae
ICI	Anthothelid coral	*Iciligorgia* spp.	Anthothelidae
ISP	Bamboo coral	*Isidella* spp.	Isididae
MEF	Branching sea fan coral	*Metafannyella* spp.	Primnoidae
MRI	Plexaurid sea fan	*Muriceides* spp.	Plexauridae
PRF	Plexaurid sea fan	*Paracis* spp.	Plexauridae
PRG	Plexaurid sea fan	*Paramuricea* spp.	Plexauridae
PLD	Primnoid sea fan	*Parastenella* spp.	Primnoidae
PLO	Plexaurid sea fan	*Placogorgia* spp.	Plexauridae
SRO	Black coral	*Saropathes* spp.	Schizopathidae
SWI	Plexaurid sea fan	*Swiftia* spp.	Plexauridae
TOK	Branching bushy coral	*Tokoprymno* spp.	Primnoidae
TYL	Black coral	*Tylopathes* spp.	Stylopathidae
VCT	Deep-sea purple gorgonian	*Victorgorgia* spp.	Victorgorgiidae
VIC	Deep-sea purple gorgonian	Victorgorgiidae	Victorgorgiidae
VIL	Plexaurid sea fan	*Villogorgia* spp.	Plexauridae

Table 6. Proposed new code for bamboo coral *Jasonisis*, and updated descriptions for current codes for clarity and to reflect updated taxonomy.

code	com_name	sci_name	family_sci	notes	action
JAS	*Jasonisis*	*Jasonisis*	Keratoisididae	Genus level code	add
ACN	Bushy bamboo coral	*Acanella* spp.	Keratoisididae	Previously in family Isididae, changed Nov 2021	update
ISP	Bamboo coral	*Isidella* spp.	Keratoisididae	Previously in family Isididae, changed Nov 2021	update
BOO	Bamboo coral	*Keratoisis* spp.	Keratoisididae	Previously in family Isididae, changed Nov 2021	update
LLE	Bamboo coral	*Lepidisis* spp.	Keratoisididae	Previously in family Isididae, changed Nov 2021	update
PAN	Bamboo bottlebrush coral	*Primnoisis antarctica*	Mopseidae	Previously in family Isididae, changed Nov 2021	update
MIN	Worm-commensal bamboo coral	*Minuisis* spp.	Mopseidae	Previously in family Isididae, changed Nov 2021	update
ISI	Bamboo corals			Over-arching code to use to describe coral with bamboo-like skeleton (includes Families Keratoisididae and Mopseidae)	update
GOC	Gorgonian octocoral	Gorgonian octocorals in Order Alcyonacea			update
ERR	Red hydrocorals				update
CSB	Corals (true), sponges and bryozoans	Porifera (Phylum), Bryozoa (Phylum), Gorgonian octocorals Order Alcyonacea, Scleractinia (Order), Antipatharia (Order), Stylasteridae (Family)			update
COR	Stylasterids (hydrocorals)				update
COU	True coral (unidentified)	Gorgonian octocorals in Order Alcyonacea, Scleractinia (Order), Antipatharia (Order), Stylasteridae (Family)			update

Preparation of Identification sheets – NIWA Fisheries Centre

Funding from the Ministry of Business, Innovation and Employment (MBIE) Strategic Science Investment Fund (SSIF) via NIWA's National Fisheries Centre 2021/22 budget, has supported revisions to the content of the guide. With this complementary funding, 16 new or revised identification sheets have been produced for protected corals, or taxa that can be easily confused with corals, with a focus on shallower water species. These sheets are formatted to match those in the black coral identification guide (Opresko et al. 2014) (Figure 3) and the deepsea invertebrate guide (Tracey et al. 2011) and will be made available as .pdf files to Observers.

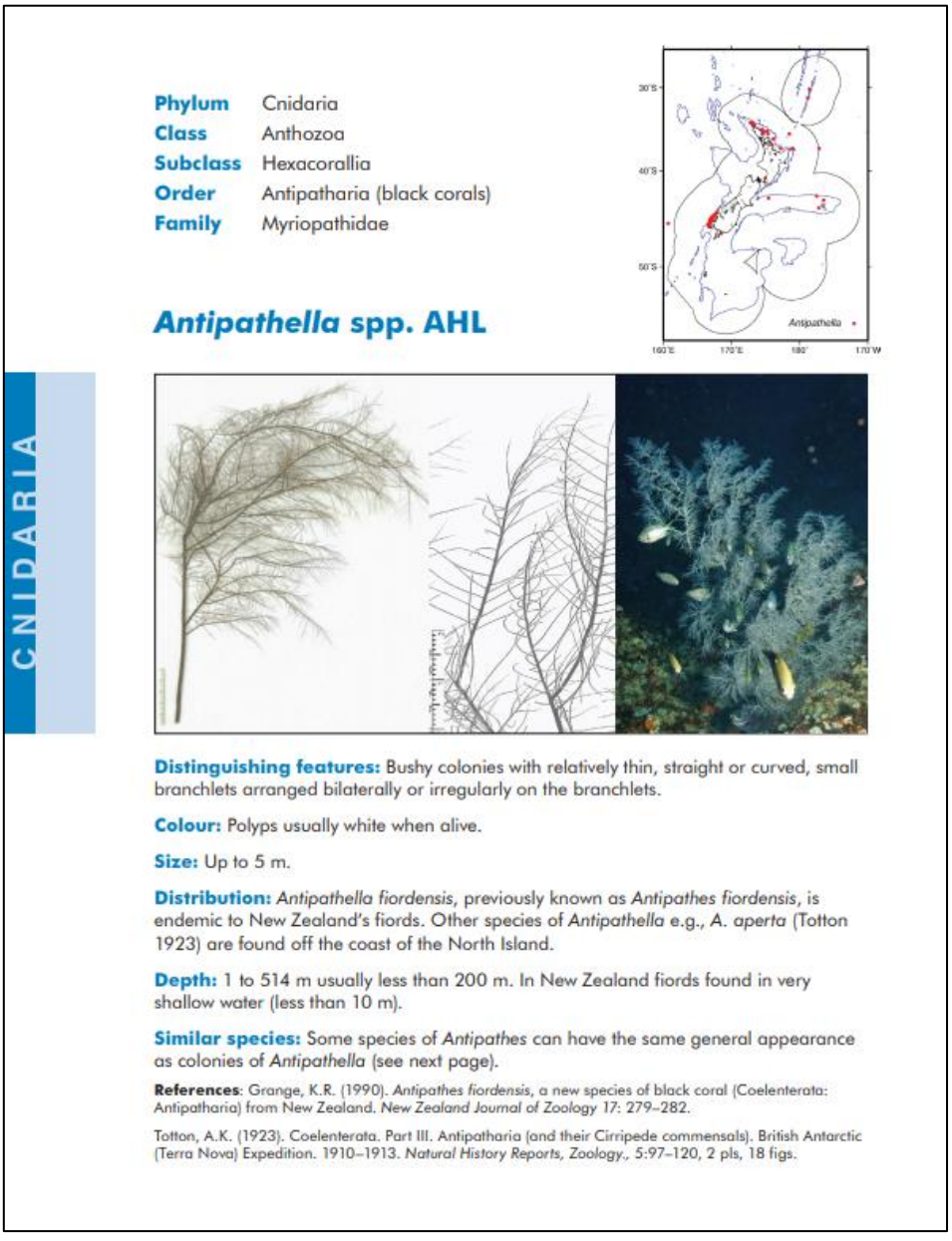

Figure 3. Identification sheet for *Antipathella* spp. from the black coral identification guide.

4 Acknowledgements

Our thanks to the FNZ observers for their on-going efforts at sea and to the various coral experts who provided identifications for this reporting period. These include Di Tracey, Rob Stewart, Peter Marriott (NIWA), Marcelo Kitahara (Universidade de São Paulo, Brazil), and Dennis Opresko (Smithsonian Institution, USA). We acknowledge Dean Stotter for processing the Observer samples and the NIC team (NIWA) for providing curatorial support for the specimens. Finally, our thanks to Jade Maggs (NIWA) for COD data extracts; Merryn Jones (MPI) and Jade Maggs (NIWA) for generating and updating the three-letter MPI codes for several taxa; Scott Nodder and Alan Orpin (NIWA) for their identification of the geological sample to which various invertebrates including protected corals were attached. Finally, we thank Shannon Weaver (CSP) for helpful comments on an earlier version of this report.

5 References

Opresko, D.; Tracey, D.; Mackay, E. (2014). Antipatharia (black corals) for the New Zealand region. A field guide of commonly sampled New Zealand black corals including illustrations highlighting technical terms and black coral morphology. New Zealand Aquatic Environment and Biodiversity Report No. 131. 20 p.

Tracey, D.; Anderson, O.; Naylor, J. (Comps.) (2011). A guide to common deepsea invertebrates in New Zealand waters. New Zealand Aquatic Environment and Biodiversity Report No. 86. 317 p.

Tracey, D.; Mackay, E.; Gordon, D.; Cairns, S.; Alderslade, P.; Sanchez, J.; Williams, G. (2014). Coral Identification Guide – 2nd version. Department of Conservation Report, Wellington. 16 p

Appendices

Appendix A (a): Summary output from NIWA Invertebrate Collection (NIC) *Specify* Database *niwainvert* updated with revised identifications of 17 bycatch specimens (in 15 sample lots) collected by observers between 1 July 2020 to 31 December 2020

This publicly accessible website can be used to search the target species, initial and expert ID species codes: https://marlin.niwa.co.nz/species_codes/ and FMA codes: https://marlin.niwa.co.nz/area_codes/. The fishing method codes are as follows: TWL = Trawling, includes bottom trawl and midwater trawl; BLL = Bottom LongLine.

NIWA Cat. No.	TRIP	Tow	OSD No.	Initial ID code	Phylum	Class	Order	Family	Genus	Species	Expert ID	Date	Latitude1	Longitude1	Depth 1	FMA	Gear	Target species	Count
146424	6030	43	5221	LLE	Cnidaria	Anthozoa	Alcyonacea	Keratoisididae			ISI	31/07/2020	-42.6	-179.3	1052	SOE	TWL	ORH	1
146425	6030	21	5222	CHR	Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	*Acanella*		ACN	24/07/2020	-42.8	178.8	1075	SOE	TWL	ORH	1
146461	6135	129	5277	ACN	Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	*Keratoisis*		BOO	27/11/2020	-44.4	-175	880	SOE	TWL	ORH	1
146463	6135	151	5279	PAB	Cnidaria	Anthozoa	Alcyonacea	Paragorgiidae	*Paragorgia*	*arborea*	PAB	30/11/2020	-44.9	-177	1124	SOE	TWL	SSO	1
146466	6135	86	5282	BTP	Cnidaria	Anthozoa	Antipatharia			indet.	COB	21/11/2020	-42.8	-177.9	830	SOE	TWL	ORH	1
146479	6135	22	5297	COB	Cnidaria	Anthozoa	Antipatharia	Leiopathidae	*Leiopathes*		LEI	03/11/2020	-44.5	-175.3	675	SOE	TWL	ORH	1
146481	6135	69	5300		Cnidaria	Anthozoa	Antipatharia	Leiopathidae	*Leiopathes*		LEI	10/11/2020	-44.5	-175.3	672	SOE	TWL	ORH	1
146537	6135	22	5380	COB	Cnidaria	Anthozoa	Antipatharia	Schizopathidae	*Bathypathes*		BTP	03/11/2020	-44.5	-175.3	675	SOE	TWL	ORH	1
146536	6135	51	5379	LEI	Cnidaria	Anthozoa	Antipatharia	Schizopathidae	*Bathypathes*		BTP	06/11/2020	-44.5	-175	880	SOE	TWL	ORH	1
146468	6135	101	5285	COB	Cnidaria	Anthozoa	Antipatharia	Stylopathidae		Indet.	COB	24/11/2020	-44.2	-174.5	850	SOE	TWL	ORH	1
146462	6135	129	5278	TPT	Cnidaria	Anthozoa	Antipatharia	Stylopathidae	*Tylopathes*		TYL	27/11/2020	-44.4	-175	880	SOE	TWL	ORH	1
146482	6135	23	5301	SIA	Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*	SVA	03/11/2020	-44.6	-175.2	990	SOE	TWL	ORH	1
146471	6159	3	5288	SIA	Cnidaria	Anthozoa	Scleractinia	Dendrophylliidae	*Eguchipsammia*	*japonica*	EJA	15/12/2020	-42.6	170.3	254	CHA	BLL	LIN	3
146465	6135	129	5281	SIA	Cnidaria	Anthozoa	Scleractinia	Dendrophylliidae	*Enallopsammia*	*rostrata*	ERO	27/11/2020	-44.4	-175	880	SOE	TWL	ORH	1
132000	6057	42	5231	COR	Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	*Conopora*	*verrucosa*	COO	24/08/2020	-45.8	166.3	322	SOU	BLL	LIN	1

Appendix A (b): Summary output from NIWA Invertebrate Collection (NIC) Specify Database *niwainvert* updated with revised identifications of 2 bycatch specimens (in 2 sample lots) collected on fisheries research trawl surveys between 1 July 2020 to 31 December 2020.

This publicly accessible website can be used to search the target species, initial and expert ID species codes: https://marlin.niwa.co.nz/species_codes/ and FMA codes: https://marlin.niwa.co.nz/area_codes/ . The fishing method codes are as follows: TWL = Trawling, includes bottom trawl and midwater trawl.

NIWA Cat. No.	TRIP	Tow	Lot	Initial ID code	Phylum	Class	Order	Family	Genus	Species	Expert ID	Date	Latitude1	Longitude1	Depth 1	FMA	Gear	Count
157348	TAN2014	17	I49	PRI	Cnidaria	Anthozoa	Alcyonacea	Chysogorgiidae	*Radicipes*		RAD	01/12/2020	-49.8431667	170.8596667	517	SUB	TWL	1
157343	TAN2014	75	I181	STP	Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Stephanocyathus*	*platypus*	STP	20/12/2020	-46.8218333	166.898	919	SOU	TWL	1

Appendix B: Spreadsheet summary of digital images processed, and identified for the reporting period 1 July 2020 to 31 December 2020

This publicly accessible website can be used to search the target species, initial and expert ID species codes: https://marlin.niwa.co.nz/species_codes/ and FMA codes: https://marlin.niwa.co.nz/area_codes/. The fishing method codes are as follows: TWL = Trawling, includes bottom trawl and midwater trawl; BLL = Bottom LongLine; BT = Bottom Trawl (single).

trip_number	station_number	fishing_method	target_species	event_start_date	start_obs_fma	trunc_start_latitude	trunc_start_longitude	start_seabed_depth	Phylum	Class	Order	Family	Genus	Species	NIWA Cat. No.	OSD No.	Initial OBS ID Code	Specimen count	Expert ID Code
6030	21	TWL	ORH	24/07/2020	SOE	-42.8	178.8	1075	Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	*Acanella*		146425	5222	CHR	1	ACN
6030	21	TWL	ORH	24/07/2020	SOE	-42.8	178.8	1075	Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	*Acanella*		146425	5222	CHR	0	ACN
6057	42	BLL	LIN	23/08/2020	SOU	-45.8	166.3	322	Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	*Conopora*	*verrucosa*	132000	5231	COR	1	COO
6057	42	BLL	LIN	23/08/2020	SOU	-45.8	166.3	322	Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	*Conopora*	*verrucosa*	132000	5231	COR	0	COO
6112	54	BT	ORH	22/10/2020	AKW	-34.7	171.6		Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	*Isidella*				BOO	1	ISP
6112	54	BT	ORH	22/10/2020	AKW	-34.7	171.6		Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	*Keratoisis*				GOC	1	BOO
6112	54	BT	ORH	22/10/2020	AKW	-34.7	171.6		Cnidaria	Anthozoa	Antipatharia	Myriopathidae	*Antipathella*	*fiordensis*			GOC	1	AHL
6112	54	BT	ORH	22/10/2020	AKW	-34.7	171.6		Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	*Keratoisis*				GOC	1	BOO
6122	6	TWL	HOK	19/10/2020	SEC	-43.6	174.3	554	Cnidaria	Anthozoa	Scleractinia	Flabellidae	*Flabellum*				COF	1	COF
6135	22	TWL	ORH	3/11/2020	SOE	-44.5	184.6	675	Cnidaria	Anthozoa	Antipatharia	Leiopathidae	*Leiopathes*		146479	5297	COB	1	LEI
6135	22	TWL	ORH	3/11/2020	SOE	-44.5	184.6	675	Cnidaria	Anthozoa	Antipatharia	Schizopathidae	*Bathypathes*		146537	5380	COB	1	BTP
6135	23	TWL	ORH	3/11/2020	SOE	-44.6	184.7	990	Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*	146482	5301	SIA	1	SVA
6135	23	TWL	ORH	3/11/2020	SOE	-44.6	184.7	990	Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*	146482	5301	SIA	0	SVA
6135	23	TWL	ORH	3/11/2020	SOE	-44.6	184.7	990	Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*	146482	5301	SIA	0	SVA
6135	23	TWL	ORH	3/11/2020	SOE	-44.6	184.7	990	Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*	146482	5301	SIA	0	SVA
6135	23	TWL	ORH	3/11/2020	SOE	-44.6	184.7	990	Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*	146482	5301	SIA	0	SVA
6135	42	TWL	ORH	5/11/2020	SOE	-44.2	185.5	830	Cnidaria	Anthozoa	Alcyonacea	Primnoidae	*Thouarella*				GOC	1	THO
6135	51	TWL	ORH	6/11/2020	SOE	-44.4	185	880	Cnidaria	Anthozoa	Antipatharia	Schizopathidae	*Bathypathes*		146536	5379	LEI	1	BTP
6135	101	TWL	ORH	24/11/2020	SOE	-44.2	185.4	850	Cnidaria	Anthozoa	Antipatharia	Stylopathidae		indet.	146468	5285	COB	1	COB
6135	129	TWL	ORH	27/11/2020	SOE	-44.4	185	880	Cnidaria	Anthozoa	Alcyonacea	Keratoisididae	*Acanella*		146461	5277	ACN	1	ACN
6135	151	TWL	SSO	30/11/2020	SOE	-44.8	182.9	1124	Cnidaria	Anthozoa	Alcyonacea	Paragorgiidae	*Paragorgia*		146463	5279	PAB	1	PAB
6151	58	TWL	ORH	26/11/2020	SOE	-42.6	182.6	1458	Cnidaria	Anthozoa	Alcyonacea	Paragorgiidae	*Paragorgia*				PAB	1	PAB

trip_number	station_number	fishing_method	target_species	event_start_date	start_obs_fma	trunc_start_latitude	trunc_start_longitude	start_seabed_depth	Phylum	Class	Order	Family	Genus	Species	NIWA Cat. No.	OSD No.	Initial OBS ID Code	Specimen count	Expert ID Code
6151	58	TWL	ORH	26/11/2020	SOE	-42.6	182.6	1458	Cnidaria	Anthozoa	Alcyonacea	Paragorgiidae	*Paragorgia*				PAB	1	PAB
6151	89	TWL	ORH	1/12/2020	SOE	-44.6	184.5	1435	Cnidaria	Anthozoa	Antipatharia	Schizopathidae	*Bathypathes*				COB	1	BTP
6155	5	TWL	HOK	12/11/2020	SEC	-43.5	174.5	538	Cnidaria	Anthozoa	Scleractinia	Flabellidae	*Truncatoflabellum*	*angiostomum*				3	CUP
6155	5	TWL	HOK	12/11/2020	SEC	-43.5	174.5	538	Cnidaria	Anthozoa	Scleractinia	Flabellidae	*Truncatoflabellum*	*angiostomum*				0	CUP
6155	5	TWL	HOK	12/11/2020	SEC	-43.5	174.5	538	Cnidaria	Anthozoa	Scleractinia	Flabellidae	*Truncatoflabellum*	*angiostomum*				0	CUP
6159	3	BLL	LIN	14/12/2020	CHA	-42.6	170.3	254	Rock									1	ROK
6159	3	BLL	LIN	14/12/2020	CHA	-42.6	170.3	254	Cnidaria	Anthozoa	Scleractinia	Dendrophylliidae	*Eguchipsammia*	*japonica*	146471	5288		0	EJA
6159	3	BLL	LIN	14/12/2020	CHA	-42.6	170.3	254	Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Caryophyllia*					1	CAY
6159	3	BLL	LIN	14/12/2020	CHA	-42.6	170.3	254	Cnidaria	Anthozoa	Scleractinia	Dendrophylliidae	*Eguchipsammia*	*japonica*	146471	5288		1	EJA
6182	23	TWL	SSO	1/01/2021	SOU	-46.8	165.3		Cnidaria	Anthozoa	Alcyonacea	Coralliidae	*Hemicorallium*				CLL	1	CLL
6182	37	TWL	BOE	3/01/2021	SOU	-47.3	165.8		Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*			GDU	1	GDU
6182	37	TWL	BOE	3/01/2021	SOU	-47.3	165.8		Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*			GDU	0	GDU
6182	45	TWL	BOE	4/01/2021	SOU	-47.3	165.8		Cnidaria	Anthozoa	Alcyonacea	Paragorgiidae	*Paragorgia*				PAB	1	PAB
6182	45	TWL	BOE	4/01/2021	SOU	-47.3	165.8		Cnidaria	Anthozoa	Alcyonacea	Paragorgiidae	*Paragorgia*				PAB	0	PAB
6182	45	TWL	BOE	4/01/2021	SOU	-47.3	165.8		Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*			GDU	1	SVA
6182	45	TWL	BOE	4/01/2021	SOU	-47.3	165.8		Cnidaria	Anthozoa	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*			GDU	0	SVA