INT2023-07 Expert identification of protected corals: Mopseidae, *Anthothela*, *Victorgorgia* and kin

Prepared for Conservation Services Programme Department of Conservation

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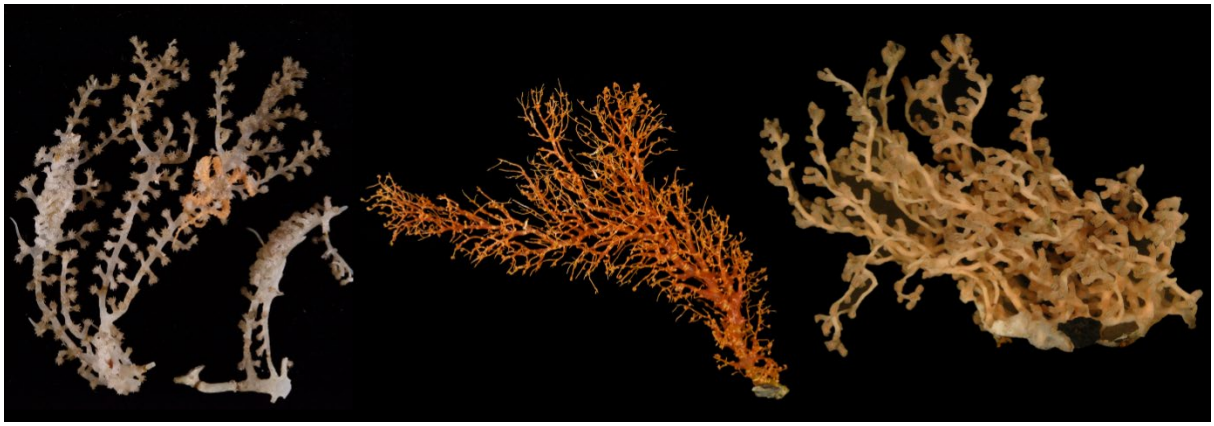

Climate, Freshwater & Ocean Science

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Executive summary

Protected corals provide ecosystem services in the deep sea, but knowledge gaps remain in the distribution and diversity of some gorgonian coral families, which impedes our understanding of the impacts on them from commercial fishing and other human impacts in the New Zealand marine environment.

The work described here, commissioned by the Conservation Services Programme (CSP) of the Department of Conservation, acts on a recommendation of the POP2022-04 'Deep diving into decades of uncatalogued corals' CSP project (Mills et al. 2023), by bringing an international taxonomic expert to New Zealand to confirm and revise identification of protected coral specimens in the NIWA Invertebrate Collection.

Dr Kirrily Moore (KM) from the Tasmanian Museum and Art Gallery, is a taxonomic expert in deep-sea coral species in the gorgonian octocoral families Mopseidae and Victorgorgiidae, plus genera previously contained in family Anthothelidae: *Anthothela*, *Icilogorgia* and *Solenocaulon* (genera now reassigned to families Alcyoniidae and Melithaeidae). During her visit (24 June–5 July 2024) KM identified 240 sample jars (295 colonies) and taught the higher-level identification of these gorgonian groups at a workshop held at the NIWA Wellington campus on 4 July 2024.

Amongst the samples identified were ten described species, six new genera and 15 new species, collected from within the New Zealand Exclusive Economic Zone. There is still work to be done to verify some of the identifications with genetic analyses, and eventual taxonomic descriptions of the identified new genera and species is required. The identifications completed for this project add to and improve our knowledge of the protected coral fauna in the New Zealand region and the wider region within Australian, International and Antarctic waters that connect to our zone.

We recommend that two new family level MPI species codes are created for the families Keratoisididae and Mopseidae, and that the taxonomic name and descriptive notes are updated for the code AND, which currently represents the anthothelid corals. We also recommend that additional protected coral taxonomic experts are invited to New Zealand in future to continue to identify and describe under-studied octocoral groups where we have a lack of understanding of the genus and species level diversity.

1 Introduction

Protected corals provide ecosystem services in the deep sea and constitute frequent components of trawl bycatch (e.g., see Connell et al. 2024). A recently completed New Zealand marine biodiversity inventory highlighted major gains in our knowledge of coral species diversity in the region due to expert attention on certain groups (e.g. the Primnoidae family, Cairns 2021), but also discussed gaps in others (e.g., bamboo coral families Keratoisididae and Mopseidae) (Macpherson et al. 2023). Our incomplete knowledge of coral diversity and their distribution impedes our understanding of the impacts on them from commercial fishing and other human impacts, and therefore also our ability to provide protection to them.

This project for the Conservation Services Programme (CSP) of the Department of Conservation (DOC) extends and adds value to the outputs of the POP2022-04 'Deep diving into decades of uncatalogued corals' CSP project (Mills et al. 2023), by bringing an international taxonomic expert to New Zealand to confirm and revise identification of protected coral specimens in the NIWA Invertebrate Collection (NIC) in Wellington. Work done in the POP2022-04 project facilitated the registration and identification of 652 protected coral samples (1682 specimens) collected from the New Zealand Exclusive Economic Zone (EEZ). These records were updated in the NIC database, *niwainvert*, which holds a total of 9596 samples (22 247 specimens) of protected corals from observer, fishery trawl survey, and biodiversity survey sources. At the end of this effort, a total of 800 coral samples held in the NIC remained unidentified beyond family level and require further expert attention to determine genus and species level diversity, especially among gorgonian corals of the orders Scleralcyonacea and Malacalcyonacea. Mills et al. (2023) recommended that international expert identifications would assist with these taxonomically challenging protected coral taxon groups that are still poorly known in New Zealand and contain many undescribed taxa.

Dr Kirrily Moore (KM) from the Tasmanian Museum and Art Gallery (TMAG) is a taxonomic expert in protected deep-sea coral species in the gorgonian octocoral families Mopseidae and Victorgorgiidae, plus genera previously contained in family Anthothelidae: *Anthothela*, *Icilogorgia* and *Solenocaulon,* which are now split between families Alcyoniidae and Melithaeidae respectively. The CSP and NIWA invited KM to visit the NIC from 24 June–5 July 2024 to identify protected coral specimens in these groups to putative species level, and to teach the higher-level identification of these groups at a workshop held at NIWA on 4 July 2024.

1.1 Project Objective

To determine the distribution and taxonomic composition to the lowest level possible of protected coral samples currently identified by parataxonomists and held by the NIC.

1.2 Project rationale

Knowledge of the full range of coral species diversity in the New Zealand region is incomplete, which impedes our understanding of the impacts of commercial fishing on coral diversity. This project uses expert identification of coral samples and summaries of their geographic locations to produce identifications and distributional maps at the lowest taxonomic level (mostly to species) for select coral groups. The project builds on POP2022-04 that prioritised identifications by parataxonomists to Family level.

2 Methods

2.1 Identifications

Lists of specimens were prepared that required further identification in the groups of KM's expertise: Mopseidae, 'Anthothelidae' (genera now relegated to Alcyoniidae and Melithaeidae) and Victorgorgiidae from the New Zealand EEZ. These spreadsheets were extracted from the NIC database, *niwainvert* (Table 2-1).

Table 2-1: Protected coral samples in the families Mopseidae, 'Anthothelidae' (now Alcyoniidae) and Victorgorgiidae that required identification or additional expert confirmation from the New Zealand EEZ.

Family	Taxon	No. of samples
Alcyoniidae	*Anthothela*	37
Alcyoniidae	'Anthothelidae'	20
Victorgorgiidae	*Victorgorgia*	3
Mopseidae	Various family and genus level specimens	243

To make the most of the visiting expert's time, this project included bycaught coral specimens collected by Fisheries Observers (usually identified under CSP project INT2019-04 'Identification storage, and genetics of cold-water coral bycatch specimens') in addition to samples from fisheries and biodiversity research voyages.

KM's visit encompassed time in the collection laboratory to identify specimens to the lowest level possible using morphological technique and teaching a half-day workshop.

Morphological identification methods used to identity specimens included the microscopic examination of sclerite shape, size and distribution in the polyp tentacles, the polyp body, the coenenchyme and medulla, and examination of gross colony morphology (colony growth form and polyp distribution). Photographs of colonies, polyps and sclerites were taken using a Dino-eye microscope camera to provide an archive of reference imagery of New Zealand species in these groups.

Important references used:

- Alderslade, P. (1998). Revisionary systematics in the gorgonian family Isididae, with descriptions of numerous new taxa (Coelenterata: Octocorallia). Records of the Western Australian Museum. Supplement No. 55: 1-360. https://museum.wa.gov.au/research/records-supplements/records/revisionary-systematics-gorgonian-family-isididae-descriptions-
- Grant, R. B. (1976). The marine fauna of New Zealand: Isididae (Octocorallia: Gorgonacea) from New Zealand and the Antarctic. New Zealand Oceanographic Institute Memoir 66: 1-56. Link to NBM 66
- Moore, K.M., Alderslade, P., Miller, K.J. (2017). A taxonomic revision of *Anthothela* (Octocorallia: Scleraxonia: Anthothelidae) and related genera, with the addition of new taxa, using morphological and molecular data. *Zootaxa.* 4304(1): 1. https://doi.org/10.11646/zootaxa.4304.1.1

2.2 Workshop

The half day workshop was targeted towards sea-going researchers, marine invertebrate collection managers, students, and resource managers and was designed to help them learn how to recognise these groups at a suitable taxonomic level while at sea, in the laboratory, or from seafloor or specimen imagery, and to distinguish them from other protected gorgonian octocorals and non-protected soft corals. Physical specimens were provided at the workshop for attendees to handle and compare features that can be seen with the naked eye. Dissecting microscopes were available to look at some of the smaller details of colonies, and a binocular microscope was provided to examine sclerite preparations on slides for the commonly encountered species. It is noted that microscopic examination is not typically not feasible for seagoing staff in the field, but these tools enabled the highlighting of character differences required for genus or species level identification in the laboratory.

3 Results

3.1 Identifications

KM completed identifications for a total of 240 sample jars (containing 295 colonies) comprising 188 samples from the New Zealand EEZ; 26 samples from the Southern Ocean, Antarctica; 18 samples from international waters and 8 samples from the Australian EEZ (Appendix A). Some non-New Zealand EEZ samples were identified as these are required for comparative purposes and to determine the distributional limits of related EEZ taxa.

Table 3-1 lists the taxon groups identified by KM from the New Zealand EEZ. From the New Zealand EEZ samples, a total of 44 taxon groups were identified in 11 families. Ten described species were identified, plus six new genera and 15 new species. KM reconfirmed some of the identifications from earlier visits to the NIC that she and Dr. Phil Alderslade completed and was able to keep the numbering of new genera and species consistent with historical records aligning with the species list published in Macpherson et al. (2023).

Table 3-1: Taxonomic breakdown and total number of sample jars and colonies of protected gorgonian octocorals identified by Dr. Kirrily Moore from the New Zealand Exclusive Economic Zone. Note that a single jar may contain more than one specimen (colony).

Order	Family	Taxon name (identification by Dr K. Moore)	No. of sample jars	No. of colonies
Malacalcyonacea	Acanthogorgiidae	Acanthogorgiidae	2	3
	Alcyoniidae	Alcyoniidae	1	1
		Alcyoniidae n. gen A n. sp. A	1	1
		Alcyoniidae n. gen A n. sp. B	1	1
		Alcyoniidae n. gen B n. sp. A	1	1
		Anthothela n. sp. 1	2	2
		Anthothela n. sp. 4	1	4
		Anthothela n. sp. 5	2	2
		Anthothela vickersi	13	15
		Anthothela?	1	1
		Lateothela n. sp. 1	1	1
		Lateothela?	1	1
	"Isididae"	"Isididae"	1	1
		"Isididae" n. gen.?	1	1
	Keroeididae	*Keroeides*?	1	1
	Melithaeidae	*Iciligorgia*	14	17
		Iciligorgia sp. 1	6	8
		Solenocaulon?	2	2
	Paramuriceidae	*Bebryce*?	1	1
	Rosgorgiidae	*Rosgorgia*	34	37

Order	Family	Taxon name (identification by Dr K. Moore)	No. of sample jars	No. of colonies
	Victorgorgiidae	*Trachythela*?	2	2
		Victorgorgia eminens	1	1
Scleralcyonacea	Keratoisididae	Keratoisididae	4	5
	Mopseidae	*Chathamisis bayeri*	35	57
		Chathamisis bayeri?	1	1
		Chathamisis n. sp. 1	1	2
		Circinisis circinata	3	6
		Echinisis eltanin	3	3
		Lissopholidisis nuttingi	2	2
		Minuisis n. sp. 1	1	1
		Mopseidae cf. *Caribisis* n. sp. 1	1	1
		Mopseidae indet.	16	16
		Mopseidae n. gen. A n. sp. 1 (PA)	4	4
		Mopseidae n. gen. B n. sp. 1 (PA)	1	4
		Mopseidae n. gen. bumpy (KM)	8	16
		Primnoisis	2	3
		Primnoisis (*Delicatisis*) *niwa*?	1	1
		Primnoisis (*Primnoisis*) *chatham*	7	7
		Primnoisis cf. n. sp. 1	1	1
		Primnoisis?	1	1
		Sclerisis macquariana	3	3
		Sclerisis n. sp. 1	1	3
		Sclerisis?	1	1
	Primnoidae	Primnoidae	1	1
Grand Total			188	243

As reported in Mills et al. (2023), coral samples and specimens held in the NIC can be grouped into three collecting group categories 'fisheries trawl survey', 'observer' and 'biodiversity'. The three collection groups represent the source of the samples– i.e. 'Observer' group were collected by scientific observers as bycaught corals from commercial fishing activities, the 'Fisheries trawl survey' group samples were bycaught corals collected from bottom trawl fisheries research surveys conducted by NIWA, 'Biodiversity' group samples were collected on either NIWA, New Zealand Oceanographic Institute (NZOI) or international voyages for the purposes of biodiversity, geology or other (non-fisheries) research using a range of sampling gear targeted to the survey and bottom type (for example, scuba diving, Agassiz trawls, grabs, bottom trawls, epibenthic sleds etc.) (Table 3-2).

Table 3-2: Total count of protected gorgonian coral samples examined that originated from the New Zealand Exclusive Economic Zone, by survey type.

Survey type	No. of sample jars
Biodiversity	135
Fisheries trawl survey	9
Observer collected	44
Grand Total	188

Maps showing the locations that specimens were sampled from within the New Zealand region (EEZ plus those sampled in high seas areas adjacent to the EEZ) are provided (Fig. 3-1). The maps show where these samples overlap with Fisheries Management Areas and the Benthic Protected Areas (BPAs) established in 2007 to protect the benthic diversity of offshore areas in the New Zealand EEZ (indicated as hashed boxes).

Maps have been provided with a 'trawl footprint' layer indicating the bottom-contacting trawl effort by commercial trawlers within the New Zealand EEZ and Territorial Sea in waters open to trawling down to 1600 m in depth for all fish stocks from 1989–90 (1990) to 2020–21 (2021) fishing years (MacGibbon and Mules, 2023) to allow comparison of the different survey types/ methods of collection of protected corals (Figs. 3-1, 3-2). Most of the biodiversity survey samples were collected from within the trawl footprint, highlighting the lack of our knowledge of protected Mopseidae, Victorgorgiidae and 'Anthothelidae' in areas where fishing does not occur, and within protected areas.

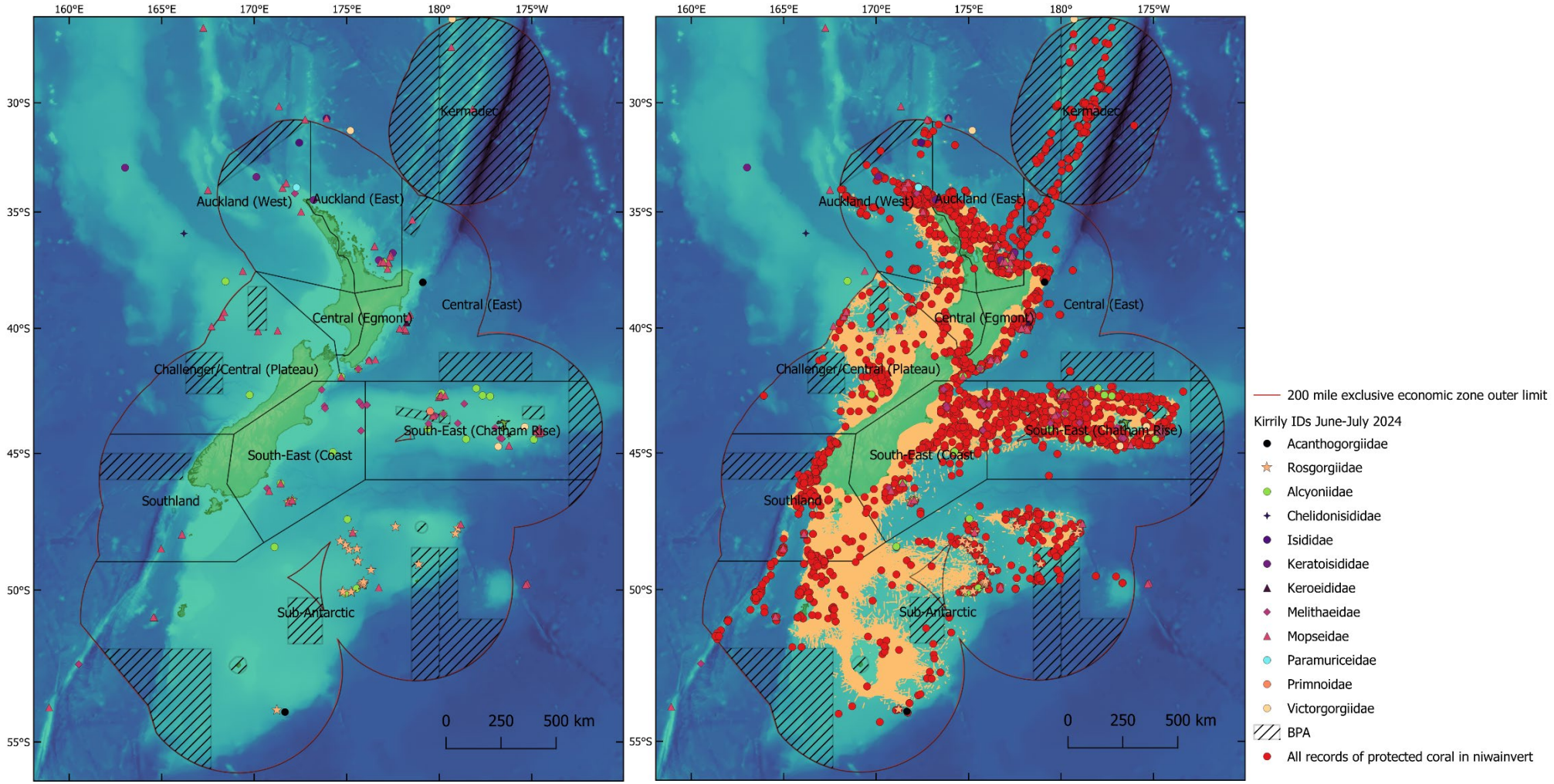


Figure 3-1: Left: Map of identifications provided by Dr Kirrily Moore for specimens collected in the wider New Zealand region (both inside the New Zealand Exclusive Economic Zone (EEZ) and those from high seas locations adjacent to the EEZ). Right: Map of all protected coral samples collected from within the New Zealand EEZ and registered in the NIWA Invertebrate Collection overlaid on the commercial trawl footprint for all fish stocks from 1989-90 to 2020-21 (MacGibbon and Mules 2023) overlaid with the identifications provided by Dr Kirrily Moore. Orange markings = trawl footprint.

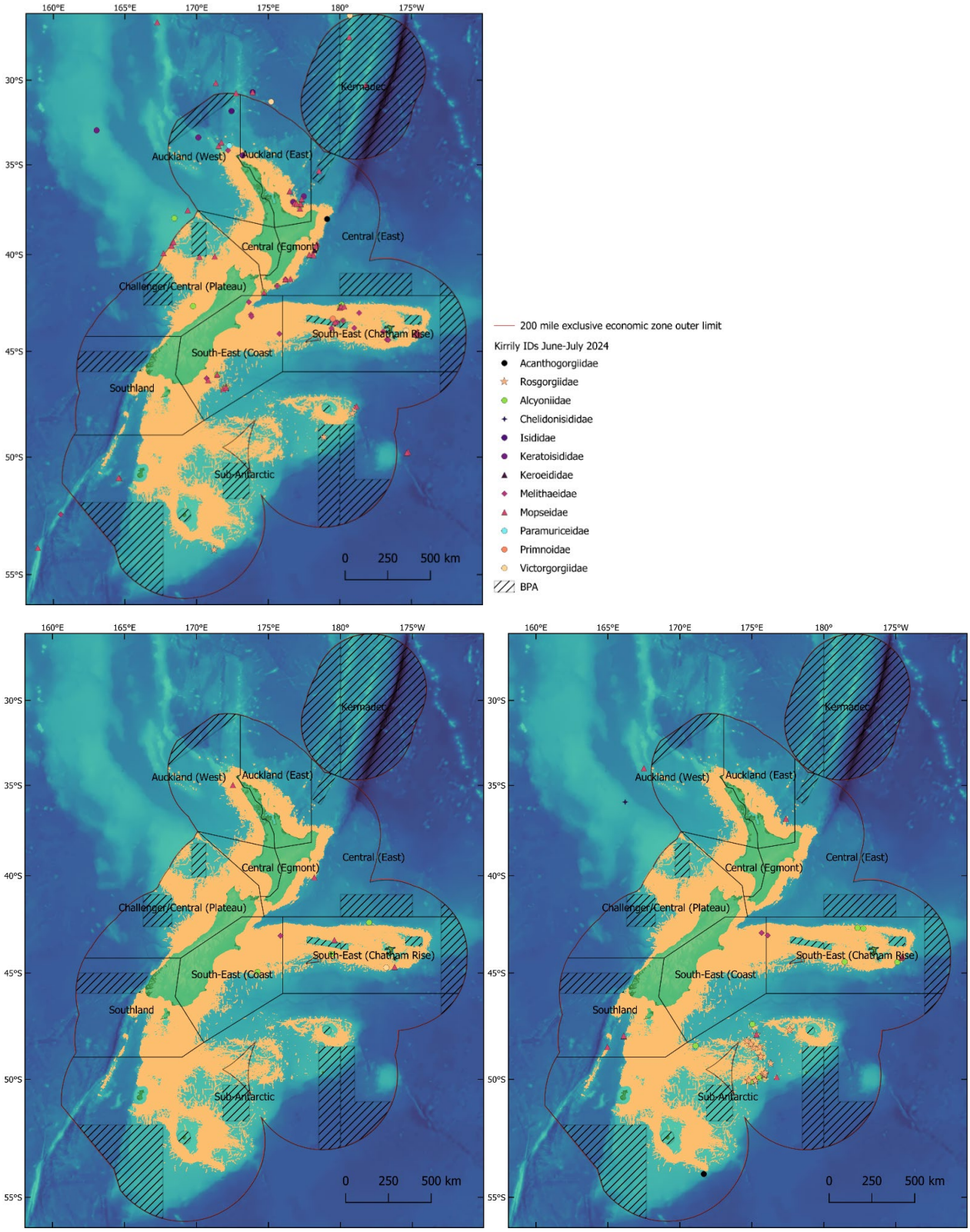


Figure 3-2: Maps of identifications provided by Dr Kirrily Moore for specimens collected in the wider New Zealand region on three survey types overlaid on the commercial trawl footprint for all fish stocks from 1989-90 to 2020-21 (MacGibbon and Mules 2023). Top left: protected coral samples collected on biodiversity surveys; bottom left: protected coral samples collected on fisheries research trawl surveys; bottom right: protected coral samples collected on commercial fishing vessels by observers.

The identified specimens contained the following taxonomic highlights:

- *Rosgorgia* (Fig. 3-3) – specimens of this genus were previously identified as Subergorgiidae n. gen., Keroididae n. gen., Plexauridae and *Iciligorgia* sp. in *niwainvert*. Further examination of sclerites and a review of the literature has shown that these specimens align most closely with the genus *Rosgorgia*, which is originally described from Antarctica. All specimens in the collection come from the Subantarctic Plateau from 778–1192 m and have commensal ophiuroids entwined in their branches, *Astroniwa nukurangi* McKnight, 2000. Genetic analyses will confirm the placement of these specimens and specimens originally identified as 'Plexauridae' have been included in a separate CSP project focusing on genetic diversity of the Paramuriceidae (INT2023-05). Previously only one specimen in the collection was identified as *Rosgorgia* by Dr Phil Alderslade in 2017, which was the first record of this genus and family Rosgorgiidae in New Zealand waters. A total of 34 samples (37 specimens) have now been identified as *Rosgorgia* reconfirming the presence of this group in New Zealand waters and likely representing new species. Specimens were collected by observers and also by researchers on the recent TAN2402 Ocean Census survey to the Bounty Trough (Mills et al. 2024).

Figure 3-3: A colony of *Rosgorgia* (NIWA 180694) with a commensal ophiuroid, *Astroniwa nukurangi*.
Credit: Ocean Census Bounty Trough Expedition, Alicia Maurice, NIWA.

- *Victorgorgia alba* (Nutting, 1908) – a single specimen of this species, originally described from the Hawaiian Islands, was identified from a sample collected at NZOI station P946, on Colville Ridge in 1980. This specimen (NIWA 112104) was collected from international waters but is the southern-most record of this species and the first record for the extended New Zealand region. Other than the type specimen, this is the only confirmed specimen of this species anywhere in the world (Fig. 3-4).

Figure 3-4: A single colony of *Victorgorgia alba* (Nutting, 1908) NIWA 112104 collected from New Zealand Oceanographic Institute station P946 at 660 m on Colville Ridge. Photo: Kirrily Moore, TMAG.

- *Chelidonisis* sp. – A single specimen in family Chelidonisididae was identified from an observer-collected specimen (NIWA 66301) and represents a new family record for the wider New Zealand region (collected 809–978 m on Lord Howe Rise in international waters outside EEZ). An image of this species is provided in Appendix B.

- cf. *Caribisis* n. sp. 1 – Two specimens of Mopseidae were identified that resemble the genus *Caribisis*, which was originally described from the Caribbean. The NIWA specimens likely represent a new species. One specimen was collected from 509 m deep in Norfolk Basin (international waters) on a NZOI biodiversity survey in 1983 (NIWA 162673), and the other from 797 m deep by ROV on Kiwi Seamount, Three Kings Ridge on a R/V *Sonne* biodiversity survey in 2017 (NIWA 127002). This would be a significant range extension and a new genus record for New Zealand if it proves to be *Caribisis,* and if not, it is probably an undescribed genus within the Mopseidae.

- *Lateothela* n. sp. 1 – One specimen from NZ waters was identified from genus *Lateothela*, which has only one species and has previously only been recorded in the northern hemisphere. This specimen was collected on a biodiversity survey (TAN1206) in 2012 from 938 m on Matatara Knoll in the Bay of Plenty. There was also an additional specimen from 977 m in subantarctic New Zealand EEZ collected by an observer, which was provisionally identified to be from this genus. These specimens

almost certainly represent a significant extension to the range of the genus and are probably a new species.

- "Isididae" - two specimens were identified that have a noded axis, but do not currently fit with the family characters of either Mopseidae, Keratoisididae or Isididae. These likely represent a new genus and species but require further study to assign confidently to a family. One of the specimens was collected at 797 m deep by ROV on Kiwi Seamount, Three Kings Ridge on a R/V *Sonne* biodiversity survey in 2017 (NIWA 127012) just outside the EEZ, while the second specimen was collected at 790 m deep on an NZOI survey in 1988 from three Kings Ridge, just inside the EEZ (NIWA 28304).

3.2 Workshop

A half day identification workshop for "Bamboo coral, 'anthothelid' corals and kin" was held at NIWA Wellington and was attended by 24 participants from a range of institutions (Table 3-3). The attendees included sea-going researchers, collection managers, video and image analysts, PhD students, scientists and resource managers tasked with the identification of coral specimens or images containing corals.

Table 3-3: Workshop attendees, institution and position. * indicates an on-line attendee.

Name	Institution	Position
Lyndsey Holland	DOC	Marine Science Advisor, DOC host
Megan Melidonis	GWRC	Senior Coastal Scientist
Elizabeth Malama	MPI	Private Secretary to the Under Secretary for Oceans and Fisheries
Alina Wieczorek	NIWA	Fisheries Scientist
Amelia Connell	NIWA	Marine Biology Technician
Caroline Chin	NIWA	Marine Biology Technician
Darren Stevens*	NIWA	Fisheries Scientist
Dean Stotter	NIWA	Marine Biology Technician
Diana Macpherson	NIWA	Collection Manager, Marine Biology Technician
Jaret Bilewitch	NIWA	Molecular Biologist, NIWA co-host
Jeff Forman	NIWA	Fisheries Technician
Jennifer Beaumont	NIWA	Marine Ecologist
Kate Neill	NIWA	Marine Biologist
Mark Fenwick*	NIWA	Marine Ecologist
Megan Carter	NIWA	Marine Ecology Technician
Niki Davey	NIWA	Marine Ecologist
Peter Marriott	NIWA	Principal Technician - Marine Biology
Sadie Mills	NIWA	Collection Manager, Principal Technician - Marine Biology, NIWA co-host
Tessa Thomson	NIWA	Te Kūwaha intern
Gustav Kessel	RSNZ	soft coral taxonomist
Belinda Glasby	Te Papa	Collection Manager
Kirrily Moore	TMAG	Taxonomist, Workshop Lead
Amber Kirk	VUW	PhD student
Miriam Pierotti	VUW	PhD student

The workshop was an in-person format, with short talks including slides with specimen images to introduce each of the taxonomic groups and provide tips for identification. The talks were followed by a hands-on session for each taxonomic group to allow time for workshop participants to examine physical specimens. The workshop closed with a catered lunch. Two participants viewed the workshop talks on-line due to illness and other time commitments.

A PDF file of the workshop slides was shared with workshop participants and is provided in Appendix B.

Figure 3-5: Bamboo coral, 'anthothelid' corals and kin workshop attendees. A list of attendees is provided in Table 3-3.

4 Conclusions and recommendations

The 240 identifications completed for this project add to and improve our knowledge of the protected coral fauna in the NZ region and the wider region within Australian, International and Antarctic waters that connect to our zone. Within the NZ EEZ ten described species were identified, along with six new genera and 15 new species. There is still work to be done to verify some of the identifications with genetic analyses, and eventual taxonomic descriptions of the identified new species are required.

We recommend that additional protected coral experts are invited to identify and describe taxonomic collections in NZ in future. There remain several groups of octocoral gorgonians, for example the paramuriceid/plexaurid-like sea fans, that are not well defined geographically or morphologically. The results of this project highlight the huge benefit that can be gained from a short visit from an expert in understanding genus and species level diversity and distribution. Additional funding supporting the description and publication of new taxa as well as identification of under-studied groups is also crucial.

A group of New Zealand researchers and students have now been trained in the higher-level identification of bamboo coral groups and “Anthothelidae” corals and kin. This will improve the identification of specimens and imagery collected at sea and back on land in collections, especially improving the distinction between bamboo coral families Keratoisididae and Mopseidae and helping to distinguish victorgorgiids and ‘anthothelids’ from other sea fan families.

New knowledge gained from the workshop highlights the need to create or update MPI three letter species codes for some of the gorgonian octocoral families to recognise the taxonomic changes in these groups (Appendix B, McFadden et al. (2022)). We recommend these changes include: two new codes for the bamboo coral families Keratoisididae and Mopseidae, which can be distinguished from one another by the relative size of the colony and the presence of obvious ‘spiky’ polyps in Keratoisididae when polyps are present; and updating the scientific name and notes for the existing code ‘AND’ which represents the anthothelid corals (previously family Anthothelidae) – this name is now no longer taxonomically correct.

5 Acknowledgements

We thank Lyndsey Holland of CSP DOC for providing funding for the workshop, project planning guidance and for supporting KM's visit under project INT2023-07 (NIWA project DOC24309).

We also thank RDM (MPI) for permission to reproduce the trawl footprint layer.

Thank you to the NIC team Diana Macpherson, Amelia Connell, Dean Stotter and Te Kūwaha intern Tessa Thomson for assistance with visitor support, workshop set-up and for registration of identified samples.

Thank you to Owen Anderson for the review of this report, Jess Moffatt for formatting and Judy Sutherland for final sign-off.

6 References

Cairns, S.D. (2021) The Marine Fauna of New Zealand. Primnoid octocorals (Anthozoa, Alcyonacea). Part 3. *Thouarella*, and additional records of other primnoid species. *NIWA Biodiversity Memoir* 133: 67 pp.

Connell, A., Macpherson, D., Mills, S., Bilewitch, J., Wood, C. (2024) *INT2022-03 Identification, storage and genetics of cold-water coral bycatch specimens (1 July 2022–30 June 2023). Milestone 2.* Final Annual Report. Prepared for Conservation Services Programme, Department of Conservation *NIWA Client Report* 2024096WN. 64p.

López-González, P.J., Gili, J.-M. (2001) *Rosgorgia inexspectata*, new genus and species of Subergorgiidae (Cnidaria, Octocorallia) from off the Antarctic Peninsula. *Polar Biology*. 24(2): 122-126. https://doi.org/10.1007/s003000000176

MacGibbon, D.J., Mules, R. (2023) Extent and intensity of bottom contact by commercial trawling and shellfish dredging in New Zealand waters, 1990-2021. *New Zealand Aquatic Environment and Biodiversity Report* 316: 174 p. https://www.mpi.govt.nz/dmsdocument/57907/direct

Macpherson, D., Tracey, D., Bilewitch, J., Opresko, D., Bo, M., Kitahara, M.V., Cairns, S., Sinniger, F., Kessel, G., Alderslade, P., Rodríguez, E., Neill, K., Miranda, L.S., Schuchert, P., Gordon, D.P. (2023) Chapter 6. Kingdom Animalia, phylum Cnidaria (corals, medusae, anemones, hydroids, staurozoans, & myxozoans). Pp. 132–155 *in*: Kelly, M., Mills, S., Terezow, M., Sim-Smith, C., Nelson, W. (Eds) The Marine Biota of Aotearoa New Zealand. Updating our marine biodiversity inventory. *NIWA Biodiversity Memoir* 136: 494 pp. https://docs.niwa.co.nz/library/public/NIWAbm136-ch06.zip

McFadden, C.S., Van Ofwegen, L.P., Quattrini, A.M. (2022) Revisionary systematics of Octocorallia (Cnidaria: Anthozoa) guided by phylogenomics. *Bulletin of the Society of Systematic Biologists* 1(3). https://doi.org/10.18061/bssb.v1i3.8735

Mills, S., Connell, A., Bilewitch, J., Stewart, R., Marriott, P., Tracey, D. (2023) *POP2022-04 Deep diving into decades of uncatalogued corals. Milestone 4.* Final Report. Prepared for Conservation Services Programme, Department of Conservation *NIWA Client Report* 2023211WN. 64 p.

Mills, S., Rogers, A., Moore D., Schnabel K., Leduc, D., Bolstad, K., Chin, C., Connell, A., Curtis, T., Downey, R., George, S., Gordon, J., Gress, E., Hall, J., Linley, T., Maurice, A., McIntyre, S., Miller, A., Orpin, A., Parsons-King, R., Stewart, A., Walton, K. (2024) *Ocean Census Bounty Trough: voyage report of the TAN2402 survey in February 2024*. *NIWA Client Report* 2024098WN. 113 pp. https://niwa.co.nz/sites/default/files/2024-05/TAN2402%20Voyage%20report_final_v1.1.pdf

Appendix A Updated protected coral identifications

Identifications of NIWA Invertebrate Collection protected gorgonian octocoral samples determined by Dr Kirrily Moore, Tasmanian Museum and Art Gallery.

Table A-1: Samples collected from within the New Zealand Exclusive Economic Zone.

NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
173311	Malacalcyonacea	Acanthogorgiidae	Acanthogorgiidae	E745	28/03/1967	-38.0667	179.1083	1441		2
162842	Malacalcyonacea	Acanthogorgiidae	Acanthogorgiidae	TRIP1227/52	14/05/1999	-54.1	171.7	1315		1
65586	Malacalcyonacea	Alcyoniidae	Alcyoniidae	TRIP2832/75	05/05/2009	-47.5	175	1061	1123	1
64134	Malacalcyonacea	Alcyoniidae	Alcyoniidae n. gen A n. sp. A	TAN1004/120	26/04/2010	-41.9853	174.6988	730	685	1
62915	Malacalcyonacea	Alcyoniidae	Alcyoniidae n. gen A n. sp. B	TRIP2714/80	12/11/2008	-44.5	-178.6	785	880	1
163742	Malacalcyonacea	Alcyoniidae	Alcyoniidae n. gen B n. sp. A	Q13	15/03/1978	-43.4600	-179.7817	415		1
162829	Malacalcyonacea	Alcyoniidae	*Anthothela* n. sp. 1	E731	25/03/1967	-37.3917	177.2000	602		1
86551	Malacalcyonacea	Alcyoniidae	*Anthothela* n. sp. 1	TAN1004/2	15/04/2010	-41.6712	175.6250	640	635	1
78460	Malacalcyonacea	Alcyoniidae	*Anthothela* n. sp. 4	TAN1116/57	09/11/2011	-44.9538	174.2480	967	968	4
62980	Malacalcyonacea	Alcyoniidae	*Anthothela* n. sp. 5	TRIP2253/23	30/05/2006	-42.7	-177.7	1166	1092	1
75817	Malacalcyonacea	Alcyoniidae	*Anthothela* n. sp. 5	TRIP3028/101	05/01/2010	-49.9	175.5	870	1009	1
162883	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TAN0104/48	16/04/2001	-42.7862	-179.9853	993	900	2
53296	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TAN0905/48	18/06/2009	-42.6443	-179.8813	1052	1080	1
126883	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TAN1801/25	11/01/2018	-42.4541	-178.0030	865	893	1
180181	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TAN2402/19	11/02/2024	-46.1405	171.4297	1221	1200	1
180541	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TAN2402/40	13/02/2024	-46.8408	171.8630	1379	1152	1
180672	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TAN2402/50	14/02/2024	-46.7708	172.0515	1049	1086	1

NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
162886	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TAN9812/94	27/10/1998	-44.0597	179.3667	673		1
62979	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TRIP2101/143	16/05/2005	-42.8	-177.3	918	1040	2
47785	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TRIP2699/17	02/10/2008	-44.5	-174.9	1008	1087	1
70727	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TRIP2832/30	27/04/2009	-48.5	171.1	977	1037	1
75795	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TRIP2920/96	28/09/2009	-50.1	174.9	1005	1020	1
162825	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	X486	04/07/1994	-42.7770	-179.9138	910		1
162828	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	X486	04/07/1994	-42.7770	-179.9138	910		1
92224	Malacalcyonacea	Alcyoniidae	*Anthothela*?	E777	16/10/1967	-42.7167	169.7500	731		1
83336	Malacalcyonacea	Alcyoniidae	*Lateothela* n. sp. 1	TAN1206/166	30/04/2012	-37.1837	176.9837	928	928	1
70718	Malacalcyonacea	Alcyoniidae	*Lateothela*?	TRIP2832/30	27/04/2009	-48.5	171.1	977	1037	1
28304	Malacalcyonacea	"Isididae"	"Isididae"	U582	05/02/1988	-31.8617	172.4333	790		1
127012	Malacalcyonacea	"Isididae"	"Isididae" n. gen.?	SO254/02ROV01_BIOBOX1	30/01/2017	-30.7331	173.9100	770.1		1
163745	Malacalcyonacea	Keroeididae	*Keroeides*?	T109	24/04/1981	-39.7633	178.2350	288		1
163684	Malacalcyonacea	Melithaeidae	*Iciligorgia*	A910	13/09/1963	-43.0667	-178.6500	549		1
91091	Malacalcyonacea	Melithaeidae	*Iciligorgia*	D90	17/05/1963	-43.8333	-179.0000	399		1
162820	Malacalcyonacea	Melithaeidae	*Iciligorgia*	E842	16/03/1968	-33.9000	172.2833	224		1
149758	Malacalcyonacea	Melithaeidae	*Iciligorgia*	G697	21/01/1970	-46.3250	170.7000	528		1
162843	Malacalcyonacea	Melithaeidae	*Iciligorgia*	I721	26/03/1979	-44.1233	175.7700	540		1
162865	Malacalcyonacea	Melithaeidae	*Iciligorgia*	J59	20/05/1970	-43.8500	179.4167	309		1
92216	Malacalcyonacea	Melithaeidae	*Iciligorgia*	KAH0109/22	30/10/2001	-43.1370	175.8372	441		1
93575	Malacalcyonacea	Melithaeidae	*Iciligorgia*	N868	18/12/1976	-43.5500	179.8000	395		1
163743	Malacalcyonacea	Melithaeidae	*Iciligorgia*	Q13	15/03/1978	-43.4600	-179.7817	415		1

NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
162839	Malacalcyonacea	Melithaeidae	*Iciligorgia*	Q38	24/03/1978	-44.4133	-176.7267	345		1
63016	Malacalcyonacea	Melithaeidae	*Iciligorgia*	TAN1004/2	15/04/2010	-41.6712	175.6250	640	635	4
140314	Malacalcyonacea	Melithaeidae	*Iciligorgia*	TAN1903/106	21/06/2019	-43.3677	179.4513	396	396	1
16446	Malacalcyonacea	Melithaeidae	*Iciligorgia*	U246	10/12/1982	-42.5083	173.6433	660		1
149943	Malacalcyonacea	Melithaeidae	*Iciligorgia*	Z9752	02/04/1999	-34.1722	172.1968	190		1
162859	Malacalcyonacea	Melithaeidae	*Iciligorgia* sp. 1	Q39	24/03/1978	-44.4333	-176.6167	255		1
92251	Malacalcyonacea	Melithaeidae	*Iciligorgia* sp. 1	S194	01/11/1979	-43.1567	173.7917	1190		1
53891	Malacalcyonacea	Melithaeidae	*Iciligorgia* sp. 1	TAN0905/106	26/06/2009	-44.1750	-174.5530	704	769	1
63673	Malacalcyonacea	Melithaeidae	*Iciligorgia* sp. 1	TAN1004/66	21/04/2010	-41.3193	176.1973	495	495	3
88665	Malacalcyonacea	Melithaeidae	*Iciligorgia* sp. 1	TRIP3914/112	30/11/2013	-43	175.7	530	714	1
160391	Malacalcyonacea	Melithaeidae	*Iciligorgia* sp. 1	TRIP6774/10	06/04/2023	-43.1	176.1	399	405	1
173310	Malacalcyonacea	Melithaeidae	*Solenocaulon*?	E159	19/10/1964	-44.0083	-176.9833	165		1
162995	Malacalcyonacea	Melithaeidae	*Solenocaulon*?	S192	31/10/1979	-43.2500	173.8283	130		1
163692	Malacalcyonacea	Paramuriceidae	*Bebryce*?	E842	16/03/1968	-33.9000	172.2833	224		1
92227	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	I666	13/03/1979	-47.7917	-178.9917	1165		1
93579	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	I693	18/03/1979	-49.0933	178.8833	778		1
163749	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	S46	21/09/1978	-53.9967	171.2200	1075		1
93577	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	T23	11/03/1981	-47.9950	-179.1300	830		1
180513	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TAN2402/39	13/02/2024	-46.8375	171.8580	1246	1146	1
180539	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TAN2402/40	13/02/2024	-46.8408	171.8630	1379	1152	1
180551	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TAN2402/40	13/02/2024	-46.8408	171.8630	1379	1152	3
180650	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TAN2402/50	14/02/2024	-46.7708	172.0515	1049	1086	1

NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
180658	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TAN2402/50	14/02/2024	-46.7708	172.0515	1049	1086	1
180694	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TAN2402/51	15/02/2024	-46.7770	172.0483	1161	1136	1
180703	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TAN2402/51	15/02/2024	-46.7770	172.0483	1161	1136	1
162870	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP1153/136	29/09/1998	-49	175.6	910		1
67834	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2324/21	14/11/2006	-49.3	176.3	1192	1300	1
47779	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2494/34	05/09/2007	-48.3	174.7	1048	1147	1
42417	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2571/225	31/03/2008	-49.8	175.8	1038	1111	1
41850	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2571/74	04/03/2008	-48	175.3	1021	1163	1
42552	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2614/124	28/04/2008	-47.7	177.6	950	950	1
42514	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2614/127	29/04/2008	-48.5	175.6	920	995	1
46371	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2614/37	12/04/2008	-49.8	175.9	1049	1160	1
42551	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2614/38	12/04/2008	-49.8	175.9	1010	1165	1
47778	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2614/39	12/04/2008	-49.8	175.9	870	1005	2
47780	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2614/48	13/04/2008	-50.1	175.2	1020	1110	1
42617	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2614/65	16/04/2008	-50.1	174.8	910	1030	1
42490	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2653/107	27/07/2008	-49.8	175.9	991	1004	1
42492	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2653/111	27/07/2008	-49.8	175.8	1041	1084	1
42496	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2653/40	16/07/2008	-50.1	174.8	880	977	1
42500	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2653/43	17/07/2008	-50.1	175.3	1024	1115	1
65924	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2718/17	12/11/2008	-48.4	174.9	911	1054	1
75853	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2718/18	12/11/2008	-48.6	175.1	794	805	1
65923	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2718/23	13/11/2008	-49	175.6	869	880	1

NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
65920	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2718/32	14/11/2008	-49.8	175.9	966	1064	1
66113	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2718/70	19/11/2008	-50.1	175.2	865	1074	1
66310	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP2920/82	27/09/2009	-49.8	175.8	1021	1072	1
75713	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	TRIP3328/131	06/06/2011	-49.7	175.9	870		1
173312	Malacalcyonacea	Victorgorgiidae	*Trachythela*?	AEX0101/80	01/11/2001	-44.7353	-176.8137	753		1
112453	Malacalcyonacea	Victorgorgiidae	*Trachythela*?	C617	30/04/1961	-43.9733	-175.3817	302		1
126025	Malacalcyonacea	Victorgorgiidae	*Victorgorgia eminens*	SO254/08ROV02_BIOBOX15	31/01/2017	-31.3008	175.1981	1280.7		1
56173	Scleralcyonacea	Keratoisididae	Keratoisididae	TAN0906/134	13/07/2009	-34.4650	173.2115	141	140	2
82032	Scleralcyonacea	Keratoisididae	Keratoisididae	TAN1206/7	15/04/2012	-37.1120	176.7342	1012	1047	1
82787	Scleralcyonacea	Keratoisididae	Keratoisididae	TAN1206/86	23/04/2012	-36.8028	177.4813	1445	1484	1
95989	Scleralcyonacea	Keratoisididae	Keratoisididae	TAN1312/D50-d63	13/11/2013	-33.4238	170.1162	680	547	1
104210	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	KAH9907/1	01/06/1999	-40.0215	178.0692	797	804	1
162675	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	R435	15/06/1990	-39.4300	178.4220	985	1190	1
15632	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0413/54	11/11/2004	-37.2370	177.2773	1126	1134	1
15715	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0413/56	11/11/2004	-37.2290	177.2483	770	744	1
15631	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0413/66	11/11/2004	-37.4820	177.2073	270	230	2
25360	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0604/108	06/06/2006	-43.5328	179.6280	375	381	5
25362	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0604/110	07/06/2006	-43.5308	179.6292	378	390	1
25860	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0604/110	07/06/2006	-43.5308	179.6292	378	390	1
26880	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0616/18	05/11/2006	-39.5412	178.3318	775	810	1
27625	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0701/14	31/12/2006	-43.3577	179.5828	409	423	1
53726	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0905/101	26/06/2009	-44.1270	-174.5695	645	779	3

NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
53874	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0905/106	26/06/2009	-44.1750	-174.5530	704	769	2
53933	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0905/110	27/06/2009	-44.1270	-174.5698	650	800	3
54007	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0905/112	27/06/2009	-44.1428	-174.7248	760	821	3
54117	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0905/114	27/06/2009	-44.1498	-174.7682	830	900	10
54162	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0905/116	27/06/2009	-44.1750	-174.5522	716	745	1
54314	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0905/120	28/06/2009	-44.0277	-174.5913	796	882	1
53524	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0905/95	25/06/2009	-44.1360	-174.7212	613	735	1
53580	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0905/97	26/06/2009	-44.1473	-174.6900	440	600	2
53639	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0905/98	26/06/2009	-44.1470	-174.6978	720	780	1
76768	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN1003/24	22/03/2010	-40.0905	178.1892	744		1
64133	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN1004/120	26/04/2010	-41.9853	174.6988	730	685	1
63644	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN1004/66	21/04/2010	-41.3193	176.1973	495	495	1
63653	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN1004/66	21/04/2010	-41.3193	176.1973	495	495	1
180179	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN2402/19	11/02/2024	-46.1405	171.4297	1221	1200	1
180254	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN2402/19	11/02/2024	-46.1405	171.4297	1221	1200	1
180427	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN2402/32	12/02/2024	-46.4262	170.8085	1035	1060	1
180516	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN2402/39	13/02/2024	-46.8375	171.8580	1246	1146	1
180651	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN2402/50	14/02/2024	-46.7708	172.0515	1049	1086	1
180652	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN2402/50	14/02/2024	-46.7708	172.0515	1049	1086	1
180656	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN2402/50	14/02/2024	-46.7708	172.0515	1049	1086	1
180689	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN2402/51	15/02/2024	-46.7770	172.0483	1161	1136	1
163275	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TRIP1124/66	15/08/1998	-36.9	177.4	765	787	1

NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
104239	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TRIP1643/18	24/04/2002	-44.2	-174.6	985	1060	1
66255	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TRIP2832/170	24/05/2009	-49.9	176.7	896	942	1
104181	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*?	SO17/446	21/05/1981	-43.5373	179.6780	401		1
15633	Scleralcyonacea	Mopseidae	*Chathamisis* n. sp. 1	TAN0413/35	09/11/2004	-36.9595	177.3320	1396	1462	2
127501	Scleralcyonacea	Mopseidae	*Circinisis circinata*	E849	17/03/1968	-33.9167	171.5333	216		1
139486	Scleralcyonacea	Mopseidae	*Circinisis circinata*	KAH1806/125	23/11/2018	-34.9872	172.5325	162	163	1
118646	Scleralcyonacea	Mopseidae	*Circinisis circinata*	TAN1612/71	29/10/2016	-30.2835	-178.1970	1431	1426	4
149768	Scleralcyonacea	Mopseidae	*Echinisis eltanin*	TRIP1171/113	11/12/1998	-48.5	165	937		1
90453	Scleralcyonacea	Mopseidae	*Echinisis eltanin*	TRIP1171/12	25/11/1998	-48	166.1	935		1
90454	Scleralcyonacea	Mopseidae	*Echinisis eltanin*	TRIP1171/30	28/11/1998	-48	166.1	937		1
172850	Scleralcyonacea	Mopseidae	*Lissopholidisis nuttingi*	D221	26/09/1964	-40.1000	171.2667	688		1
34801	Scleralcyonacea	Mopseidae	*Lissopholidisis nuttingi*	TAN0707/75	02/06/2007	-39.5307	168.2543	657	660	1
163271	Scleralcyonacea	Mopseidae	*Minuisis* n. sp. 1	KAH9907/52	05/06/1999	-36.5198	176.4923	975		1
127002	Scleralcyonacea	Mopseidae	Mopseidae cf. *Caribisis* n. sp. 1	SO254/02ROV01_BIOBOX7	30/01/2017	-30.7331	173.9087	767.6		1
24651	Scleralcyonacea	Mopseidae	Mopseidae indet.	GEO0702/14	25/07/2007	-35.3493	178.5415	1244		1
173307	Scleralcyonacea	Mopseidae	Mopseidae indet.	H947	15/08/1975	-43.3600	179.5058	394		1
90449	Scleralcyonacea	Mopseidae	Mopseidae indet.	KAH9907/53	05/06/1999	-36.5045	176.5075	990	1100	1
25358	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0604/104	04/06/2006	-42.7162	-179.9057	1005	1070	1
25679	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0604/9	28/05/2006	-42.7627	-179.9252	1019	1081	1
26856	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0616/18	05/11/2006	-39.5412	178.3318	775	810	1
26868	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0616/45	07/11/2006	-40.0128	177.8597	1127	1160	1
26868	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0616/45	07/11/2006	-40.0128	177.8597	1127	1160	1

NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
28753	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0707/106	05/06/2007	-40.1270	170.2052	803	804	1
34800	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0707/77	02/07/2007	-39.3290	168.3820	590	592	1
53475	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0905/70	22/06/2009	-42.7365	-179.6905	840	1037	1
53669	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0905/99	26/06/2009	-44.1397	-174.7197	641	758	1
104375	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN1503/67	04/04/2015	-42.7982	179.9875	936	1031	1
180256	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN2402/19	11/02/2024	-46.1405	171.4297	1221	1200	1
44621	Scleralcyonacea	Mopseidae	Mopseidae indet.	TRIP2520/129	25/11/2007	-44.2	-174.5	775	1064	1
163690	Scleralcyonacea	Mopseidae	Mopseidae indet.	V480	07/06/1994	-41.2925	176.5502	725		1
32015	Scleralcyonacea	Mopseidae	Mopseidae n. gen. A n. sp. 1 (PA)	SO191-3/240	07/03/2007	-40.0377	178.1605	743	743	1
83083	Scleralcyonacea	Mopseidae	Mopseidae n. gen. A n. sp. 1 (PA)	TAN1206/130	27/04/2012	-37.2267	176.9907	953	966	1
91077	Scleralcyonacea	Mopseidae	Mopseidae n. gen. A n. sp. 1 (PA)	TAN1312/D7-d81	15/11/2013	-33.7035	171.7290	932	837	1
90451	Scleralcyonacea	Mopseidae	Mopseidae n. gen. A n. sp. 1 (PA)	X139	27/11/1989	-37.2200	176.8283	685		1
83368	Scleralcyonacea	Mopseidae	Mopseidae n. gen. B n. sp. 1 (PA)	TAN1206/168	30/04/2012	-37.1870	176.9783	948	930	4
53727	Scleralcyonacea	Mopseidae	Mopseidae n. gen. bumpy (KM)	TAN0905/101	26/06/2009	-44.1270	-174.5695	645	779	3
53877	Scleralcyonacea	Mopseidae	Mopseidae n. gen. bumpy (KM)	TAN0905/106	26/06/2009	-44.1750	-174.5530	704	769	1
53936	Scleralcyonacea	Mopseidae	Mopseidae n. gen. bumpy (KM)	TAN0905/110	27/06/2009	-44.1270	-174.5698	650	800	1
53525	Scleralcyonacea	Mopseidae	Mopseidae n. gen. bumpy (KM)	TAN0905/95	25/06/2009	-44.1360	-174.7212	613	735	1
53670	Scleralcyonacea	Mopseidae	Mopseidae n. gen. bumpy (KM)	TAN0905/99	26/06/2009	-44.1397	-174.7197	641	758	1
102448	Scleralcyonacea	Mopseidae	Mopseidae n. gen. bumpy (KM)	TAN1503/103	09/04/2015	-44.1828	-174.4478	1099	1254	5
102674	Scleralcyonacea	Mopseidae	Mopseidae n. gen. bumpy (KM)	TAN1503/117	11/05/2014	-44.1278	-174.5715	740	961	3
102548	Scleralcyonacea	Mopseidae	Mopseidae n. gen. bumpy (KM)	TAN1503/119	11/04/2015	-44.1998	-174.5378	846	1034	1
125339	Scleralcyonacea	Mopseidae	*Primnoisis*	TAN0104/391	21/04/2001	-42.7892	179.9957	1044	884	2

NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
25354	Scleralcyonacea	Mopseidae	*Primnoisis*	TAN0604/97	04/06/2006	-42.7913	-179.9880	882	1000	1
173316	Scleralcyonacea	Mopseidae	*Primnoisis* (*Delicatisis*) *niwa*?	TAN0604/118	07/06/2006	-42.7975	179.9877	925	1054	1
90442	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *chatham*	TAN0104/393	21/04/2001	-42.7955	179.9872	1009	928	1
25372	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *chatham*	TAN0604/118	07/06/2006	-42.7975	179.9877	925	1054	1
25346	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *chatham*	TAN0604/27	30/05/2006	-42.7607	-179.9713	757	1095	1
25355	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *chatham*	TAN0604/99	04/06/2006	-42.7898	-179.9872	890	1160	1
181662	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *chatham*	TAN2402/88	23/02/2024	-47.6531	-178.8433	1427	1425	1
163223	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *chatham*	TAN9812/64	19/10/1998	-44.7017	-176.2325	1046		1
149767	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *chatham*	TRIP1171/24	27/11/1998	-48	166.1	940	1180	1
181066	Scleralcyonacea	Mopseidae	*Primnoisis* cf. n. sp. 1	TAN2402/88	23/02/2024	-47.6531	-178.8433	1427	1425	1
25371	Scleralcyonacea	Mopseidae	*Primnoisis*?	TAN0604/118	07/06/2006	-42.7975	179.9877	925	1054	1
28311	Scleralcyonacea	Mopseidae	*Sclerisis macquariana*	TAN0306/4	14/04/2003	-50.9385	164.5527	1053	998	1
41544	Scleralcyonacea	Mopseidae	*Sclerisis macquariana*	TAN0306/6	14/04/2003	-50.9427	164.6092	1140	1105	1
104376	Scleralcyonacea	Mopseidae	*Sclerisis macquariana*	TAN1503/101	09/04/2015	-44.1782	-174.5075	1005	1165	1
65641	Scleralcyonacea	Mopseidae	*Sclerisis* n. sp. 1	TRIP2718/267	14/12/2008	-48	175.3	646	1166	3
112428	Scleralcyonacea	Mopseidae	*Sclerisis*?	P944	31/05/1980	-27.3467	-179.3483	673		1
173308	Scleralcyonacea	Primnoidae	Primnoidae	H947	15/08/1975	-43.3600	179.5058	394		1

Table A-2: Samples collected from within the Australian Exclusive Economic Zone.

NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
16126	Malacalcyonacea	Alcyoniidae	*Anthothela* n. sp. 4	U223	09/10/1982	-32.9800	152.6933	1150		1
91207	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	SS0197/62	30/01/1997	-44.3300	147.2700	1200	1300	1
163683	Malacalcyonacea	Melithaeidae	*Iciligorgia*	D17	23/04/1963	-52.5167	160.5167	124		1
163517	Malacalcyonacea	Melithaeidae	*Iciligorgia* sp. 1	D18	22/04/1963	-52.5167	160.5167	128		1
173302	Malacalcyonacea	Victorgorgiidae	*Trachythela* n. sp. 1	U223	09/10/1982	-32.9800	152.6933	1150		1
163235	Scleralcyonacea	Mopseidae	Mopseidae indet.	C734	25/11/1961	-53.9167	158.9167	360		1
104290	Scleralcyonacea	Mopseidae	Mopseidae indet.	G3	27/09/1966	-26.4167	167.2500	710		1
163239	Scleralcyonacea	Mopseidae	Mopseidae n. gen. A n. sp. 1 (PA)	S568	13/08/1983	-30.1667	171.3367	900	650	1

Table A-3: Samples collected from Antarctic waters.

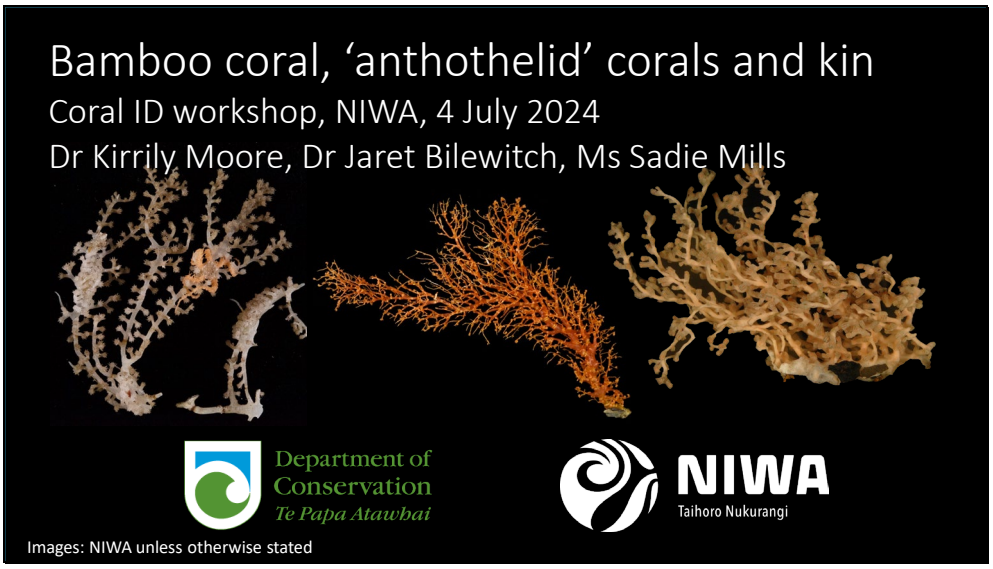
NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
81719	Scleralcyonacea	Mopseidae	*Chathamisis* n. sp. 1	TRIP2993/136	04/02/2010	-72	176	1207	1412	1
65178	Scleralcyonacea	Mopseidae	*Chathamisis* n. sp. 1	TRIP2995/20	24/12/2009	-71	176	1450	1438	1
173314	Scleralcyonacea	Mopseidae	*Echinisis spicata*	E209B	02/02/1965	-66.6917	162.8833	163		1
163278	Scleralcyonacea	Mopseidae	Mopseidae indet.	A527	07/02/1960	-74.1667	-178.2833	352	331	1
14498	Scleralcyonacea	Mopseidae	Mopseidae indet.	E199	29/01/1965	-67.5800	164.8833	278		1
149974	Scleralcyonacea	Mopseidae	Mopseidae indet.	E199	29/01/1965	-67.5800	164.8833	278		1
29867	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0602/442	10/03/2006	-66.7562	163.0602	140	150	1
29868	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0602/442	10/03/2006	-66.7562	163.0602	140	150	1

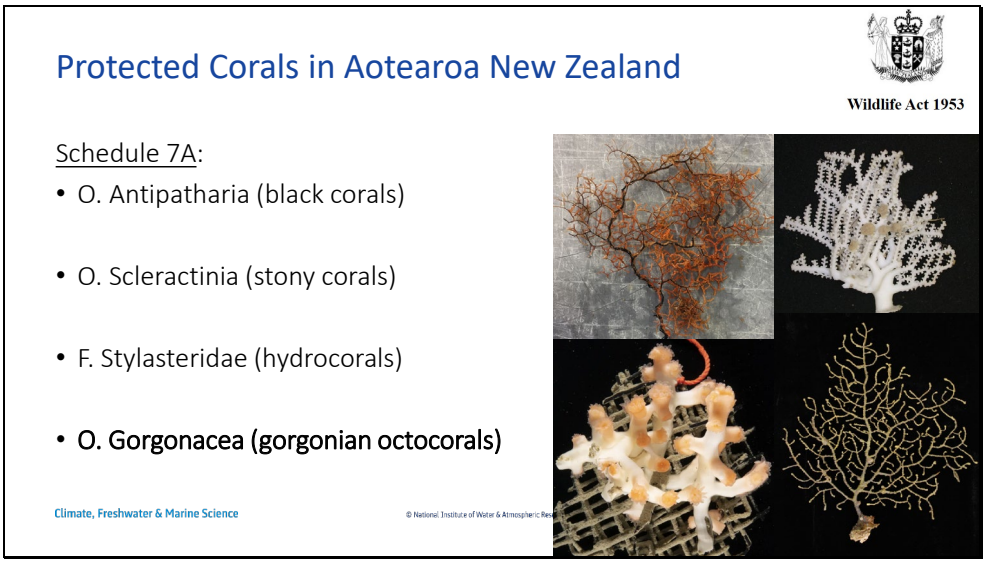
NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
29869	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0602/442	10/03/2006	-66.7562	163.0602	140	150	1
35569	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0802/17	09/02/2008	-73.1245	174.3205	321		1
147098	Scleralcyonacea	Mopseidae	Mopseidae indet.	TRIP2729/59	18/01/2009	-71	171	1120	1021	1
81725	Scleralcyonacea	Mopseidae	Mopseidae indet.	TRIP2993/60	05/01/2010	-71	-177	883	905	1
28361	Scleralcyonacea	Mopseidae	*Notisis* cf. *fragilis*	TAN0602/442	10/03/2006	-66.7562	163.0602	140	150	1
163277	Scleralcyonacea	Mopseidae	*Primnoisis* (*Delicatisis*) *delicatula*?	O139	27/12/1976	-78.0667	167.3833	67		1
41833	Scleralcyonacea	Mopseidae	*Primnoisis* (*Delicatisis*) *delicatula*?	TRIP1431	30/01/2001	-71	-177	1100		1
128461	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*)	E189	20/01/1965	-72.0200	170.9583	307		1
128466	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *fragilis*	E209B	02/02/1965	-66.6917	162.8833	163		1
173313	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *fragilis*	E209B	02/02/1965	-66.6917	162.8833	163		1
163276	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *fragilis*	E220B	09/02/1965	-66.4700	162.7583	371		1
163236	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *fragilis*	TAN0102/K0808	01/03/2001	-66.6328	163.0418	183		1
103281	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *fragilis*	TAN0402/34	10/02/2004	-71.7685	171.1012	235	235	1
41835	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *fragilis*	TRIP1431/24	02/02/2001	-71	-177	1088	1058	1
172836	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *fragilis*?	E175	14/01/1965	-75.9333	168.0000	512		1
97944	Scleralcyonacea	Mopseidae	*Primnoisis* n. sp. 2 (long)	E209B	02/02/1965	-66.6917	162.8833	163		1
173315	Scleralcyonacea	Mopseidae	*Primnoisis* n. sp. 2 (long)	E209B	02/02/1965	-66.6917	162.8833	163		1
173309	Scleralcyonacea	Primnoidae	Primnoidae	E209B	02/02/1965	-66.6917	162.8833	163		1

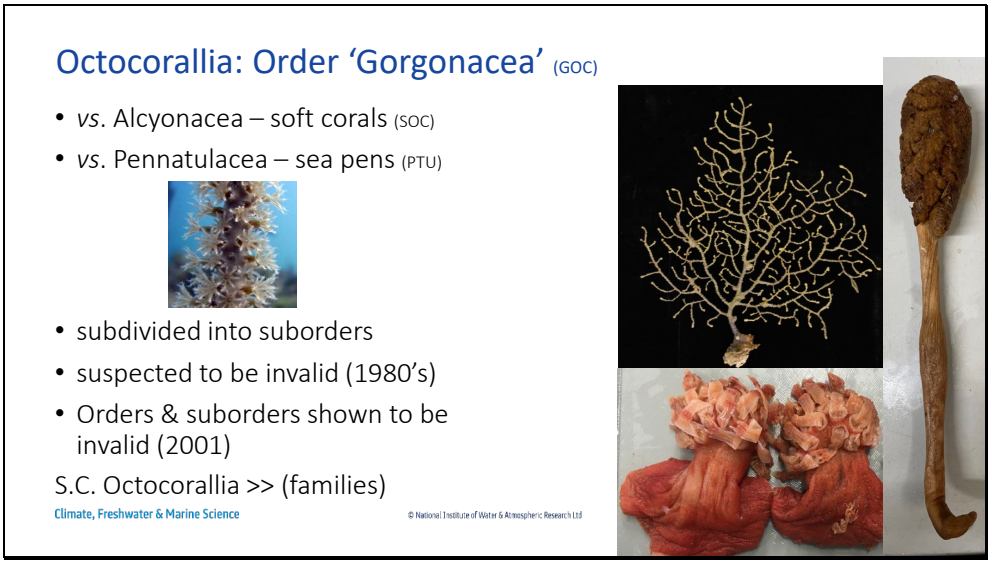
Table A-4: Samples collected from international waters (outside of Antarctica).

NIWA Cat. No.	Order	Family	Full taxon	Station ID	Date	Latitude1	Longitude1	Depth 1	Depth 2	Count
28681	Malacalcyonacea	Alcyoniidae	*Anthothela* n. sp. 1	TAN0707/34	29/05/2007	-38.0238	168.4470	570	575	1
94290	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TAN1402/66	16/02/2014	-37.7073	-169.0150	1244	1370	1
11317	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TRIP1137/6	08/08/1998	-47.5	148.9	1024		1
149760	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	TRIP1153/11	02/09/1998	-47.7	147.4	954		1
91171	Malacalcyonacea	Victorgorgiidae	*Victorgorgia*	TRIP1153/11	02/09/1998	-47.7	147.4	954		1
112104	Malacalcyonacea	Victorgorgiidae	*Victorgorgia alba*	P946	01/06/1980	-25.9850	-179.3017	660		1
66301	Scleralcyonacea	Chelidonisididae	*Chelidonisis*	TRIP2894/91	14/07/2009	-36	166.2	809	978	1
163251	Scleralcyonacea	Keratoisididae	Keratoisididae	Q83	07/06/1978	-33.0033	163.0200	816		1
41545	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	TAN0307/79	02/05/2003	-49.8105	-175.3216	908	887	1
162677	Scleralcyonacea	Mopseidae	*Chathamisis* n. sp. 1	TAN0307/79	02/05/2003	-49.8105	-175.3216	908	887	1
34799	Scleralcyonacea	Mopseidae	*Lissopholidisis nuttingi*	TAN0707/12	28/05/2007	-37.5845	169.3820	1070	1090	1
66244	Scleralcyonacea	Mopseidae	*Minuisis granti*	TRIP2886/3	21/06/2009	-34	167.5	767	1044	1
162673	Scleralcyonacea	Mopseidae	Mopseidae cf. *Caribisis* n. sp. 1	S571	15/08/1983	-30.7883	172.7533	509		1
41549	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0307/79	02/05/2003	-49.8105	-175.3216	908	887	1
104234	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0307/83	02/05/2003	-49.7683	-175.2425	1278	1261	1
28711	Scleralcyonacea	Mopseidae	Mopseidae indet.	TAN0707/67	01/06/2007	-39.9262	167.6933	1139	1144	1
66251	Scleralcyonacea	Mopseidae	*Primnoisis* (*Primnoisis*) *fragilis*	TRIP2938/6	25/09/2009	-53.5	140	1274	998	1
104167	Scleralcyonacea	Mopseidae	*Sclerisis macquariana*	TAN0307/79	02/05/2003	-49.8105	-175.3216	908	887	1

Appendix B Workshop slides



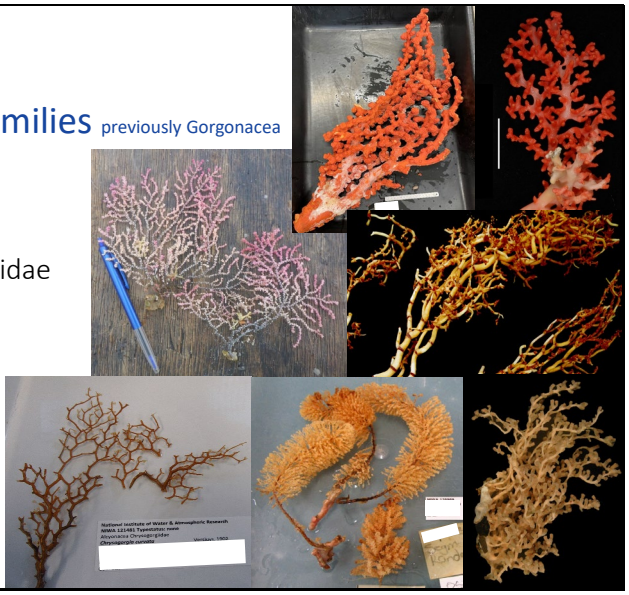




Wildlife Act 1953

Protected gorgonian families previously Gorgonacea

- Paragorgiidae (bubblegum corals)
- Coralliidae (precious corals)
- Plexauridae & Acanthogorgiidae (sea fans)
- Isididae (bamboo corals)
- Chrysogorgiidae (golden corals)
- Primnoidae
- Anthothelidae



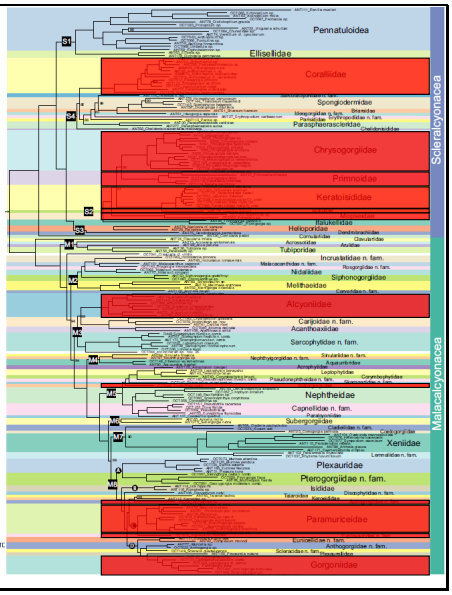
Climate, Freshwater & Marine Science

Revisionary systematics of Octocorallia (Cnidaria: Anthozoa) guided by phylogenomics

Catherine S. McFadden[1], Leen P. van Ofwegen[2]‡, and Andrea M. Quattrini[1, 3]

2022: *Bulletin of the Society of Systematic Biologists* 1(3)

- phylogenomic-based revision
- 55/63 recognised families
- 8 protected families -> 12 families



Climate, Freshwater & Marine Science

Protected gorgonian families (GOC)

Wildlife Act 1953

- Paragorgiidae (bubblegum corals) → Coralliidae (bubblegum & precious corals)
- Coralliidae (precious corals) → Coralliidae (bubblegum & precious corals)
- Plexauridae & Acanthogorgiidae (sea fans) → Paramuriceidae (+Astrogorgiidae, Euplexauridae, Gorgoniidae)
- Isididae (bamboo corals) → Keratoisididae (big bamboo corals)
- Isididae (bamboo corals) → Mopseidae (little bamboo corals)
- Chrysogorgiidae (golden corals) → Chrysogorgiidae (golden corals)
- Primnoidae → Primnoidae
- Anthothelidae → Alcyoniidae (soft corals + *Anthothela*)
- Anthothelidae → Victorgorgiidae (*Victorgorgia*)
- Anthothelidae → Melithaeidae (*Iciligorgia*)

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9

Protected gorgonian families (GOC)

Wildlife Act 1953

- Assemblage of unrelated families
- Families mixing SOC & GOC
- C. Octocorallia >> (families)

Coralliidae (bubblegum & precious corals & SOC)

Paramuriceidae (+Astrogorgiidae, Euplexauridae, Gorgoniidae)

Keratoisididae (big bamboo corals)

Mopseidae (little bamboo corals)

Chrysogorgiidae (golden corals)

Primnoidae

Alcyoniidae (SOC + *Anthothela*)

Victorgorgiidae (*Victorgorgia*)

Melithaeidae (*Iciligorgia*)

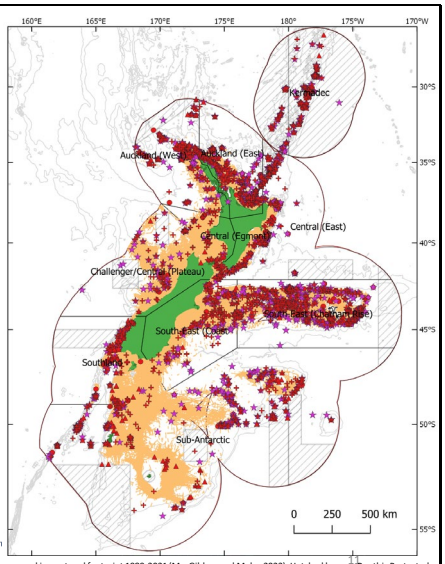
NIWA Taihoro Nukurangi

10

Workshop background

- DOC Conservation Services Programme project: POP2022-04 Deep diving into decades of uncatalogued corals (Mills et al. 2023)
- 652 protected coral samples (1682 specimens) collected from NZ EEZ registered, ID'd and updated in NIWA Invertebrate Collection *niwainvert* database
- 9596 samples (22,247 specimens) of protected coral now recorded in *niwainvert* from observer, fishery trawl survey and biodiversity trip sources.
- 800 samples are not yet identified beyond family level and could benefit from further expert attention
- Recommendation that international experts are invited to further identify challenging protected coral taxon groups that are still poorly known and contain many undescribed taxa.

Climate, Freshwater & Marine Science



Orange markings = trawl footprint 1989-2021 (MacGibbon and Mules 2023); Hatched boxes = Benthic Protected Areas. Symbols: stars = gorgonian corals, pluses = stony corals, circles = black corals, triangles = hydrocorals

I acknowledge that TMAG is on the Country of the *muwinina* and *mumirimina* people, who did not survive British colonisation, and I pay my respects to the Tasmanian Aboriginal community. I honour the Aboriginal Elders past and present, and value the history, culture and strength of the Tasmanian Aboriginal Community.

I live on the island lutruwita/Tasmania, in the area of nipaluna/Hobart on the foothills of kunanyi/Mount Wellington

Class: Octocorallia

- Common name - octocorals or soft corals or gorgonians
- Colonial corals without hard skeletons
- Polyps each have eight tentacles
- Can be branching, encrusting, bunched, bulky, fine, brittle, soft

- Found in all oceans, shallow to abyssal
- Fundamental part of complex marine habitats - seamounts, coral reefs, canyons

CSIRO

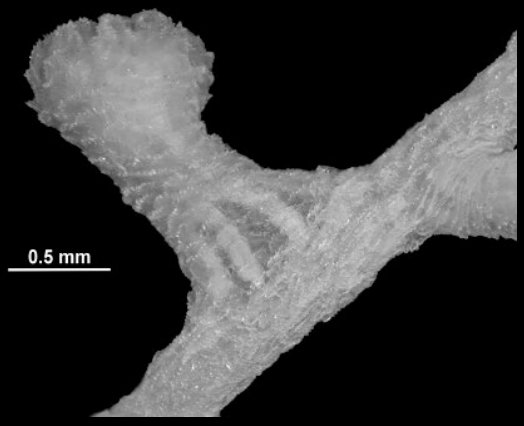
Sometimes you get lots!

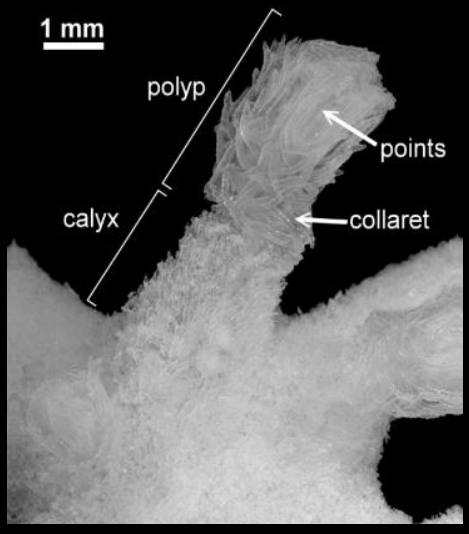
Where to start with Octocorals?

- Axis structure and colour (if any)
- Branching (if any)
- Polyp arrangement, shape, feel
- Colour

Karen Gowlett-Holmes (CSIRO)

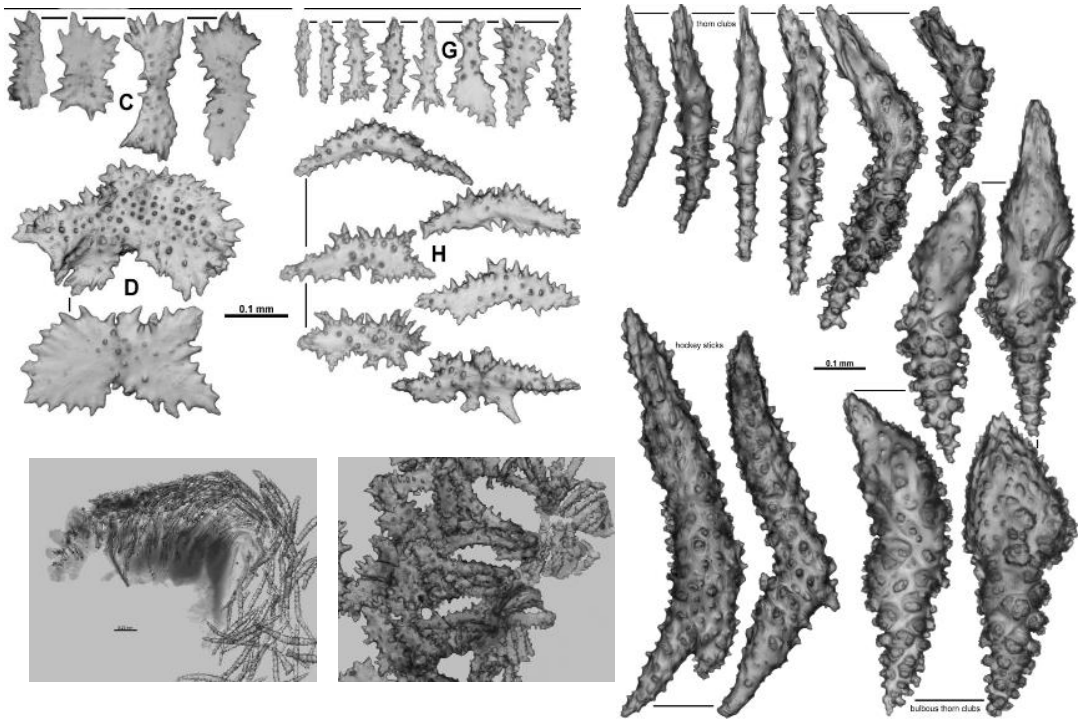
Karen Gowlett-Holmes (CSIRO)



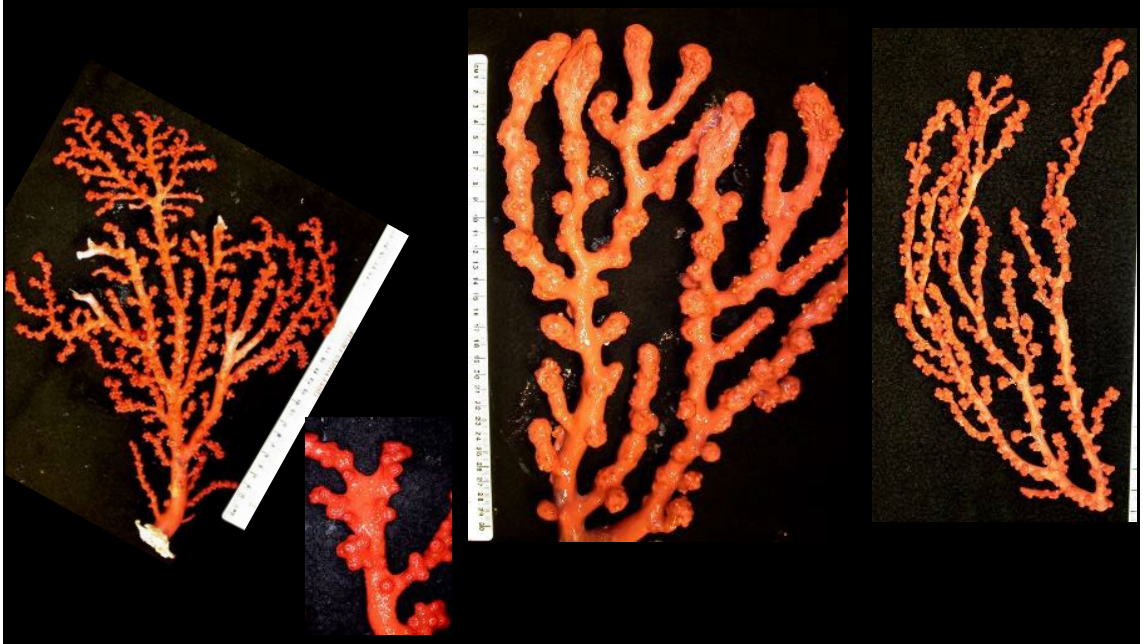


- Can retract – partly or fully
- Can be fused with others
- Can be grouped or singular
- Can be on additional structures
- Can have many to no sclerites

Sclerites – form and arrangement



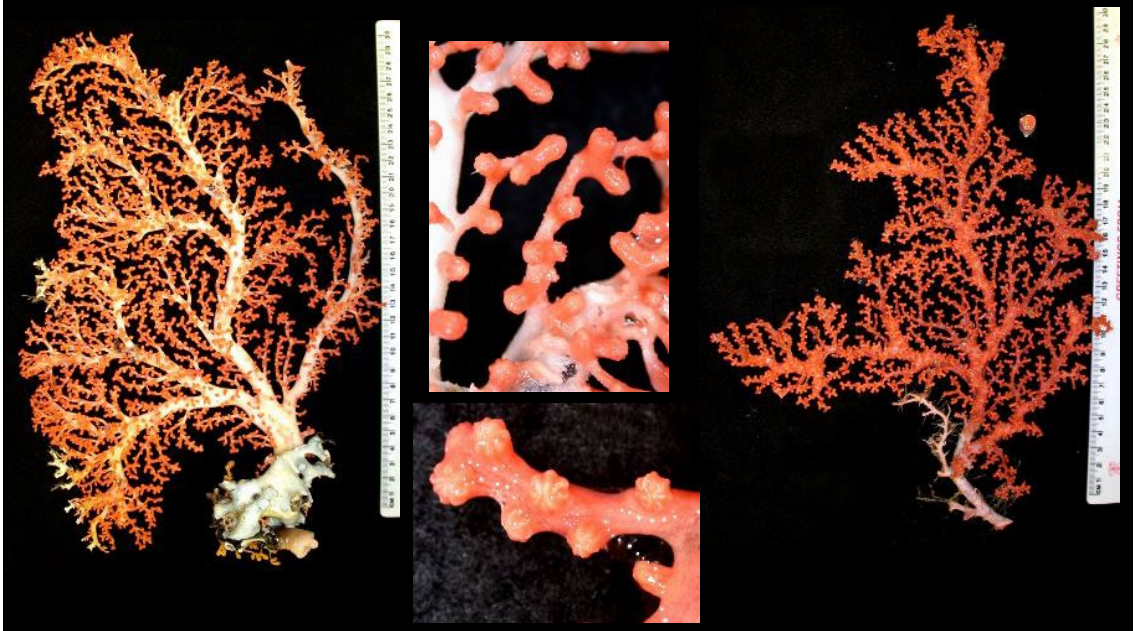
"Easy" ones



Red-pink, spongy, lumpy branches, (often) big = *Paragorgia* (PAB)

Karen Gowlett-Holmes (CSIRO)

Other “easy” ones



Red-pink/white, very hard axis branches = Corallidae (CLL)

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Other “easy” ones

Red, fleshy mushroom shaped = *Anthomastus*

Karen Gowlett-Holmes (CSIRO)

Other “easy” ones

Purple/variations of purple = Victorgorgiidae (VIC)

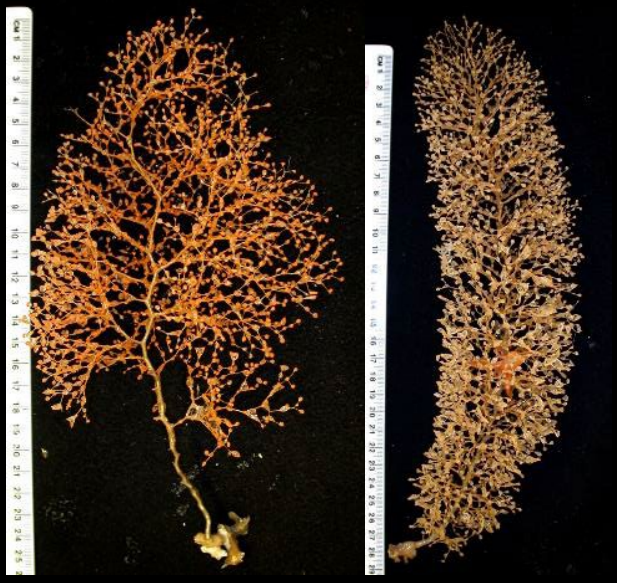
Karen Gowlett-Holmes (CSIRO)

Slightly “less hard” ones

With soft “foot” for mud = sea pen

Karen Gowlett-Holmes (CSIRO)

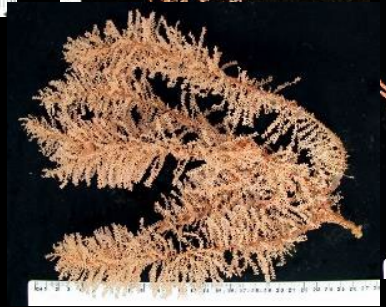
Getting harder now…



Gold axis, tiny polyps, bushy = Chrysogorgiidae

Karen Gowlett-Holmes (CSIRO)

Getting harder now…



Brown axis, crispy polyps = Primnoidae

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Still harder…

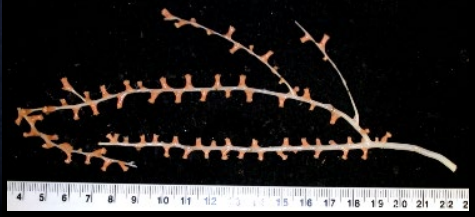
= Ellisellidae?

= Acanthogorgiidae?

= Plexauridae?

= ~~Anthothelidae?~~ Alcyoniidae

Sort-of still easy…..



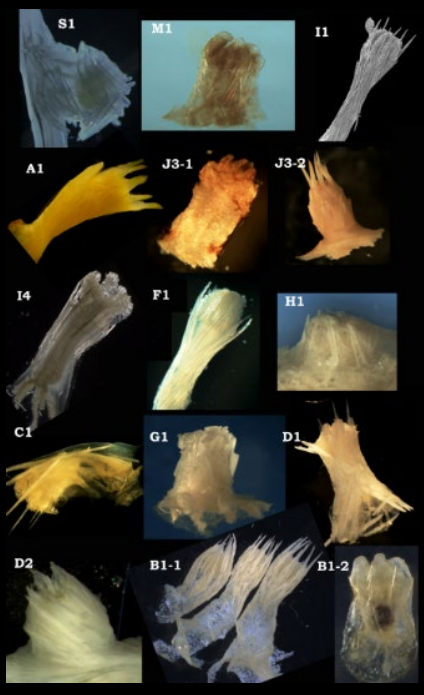
Bamboo corals are still bamboo corals (ISI)

Karen Gowlett-Holmes (CSIRO)

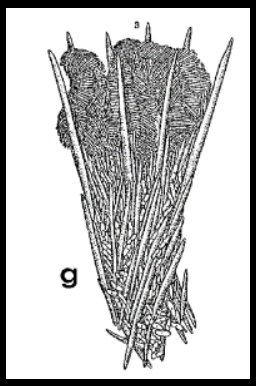
Bamboo axis, large, often big spikey polyps = Keratoisididae

Karen Gowlett-Holmes (CSIRO)

Bamboo axis, large, often big spikey polyps = Keratoisididae



Watling et al 2022



Bayer & Stefani 1987

ID guide suggests genera (like Keratoisis, Acanella) BUT…

TABLE 4. Summary of morphological characters associated with each molecular subclade or indel type.

Clade	Typical Genus	Axis	Branching Pattern	Colony Form	Polyp Sclerites	Pharynx Sclerites	Polyp Contraction	Polyp Shape	Tentacle contraction	Sclerites Projecting Beyond Bases of Folded Tentacles	Coenenchyme Thickness	Coenenchyme Sclerites	Polyp Distribution on Axis
S1	*Cladarisis*	solid	at nodes or immediately distal to node	whip-like to delicate open structure of long branches	rods, curved rods	thorny rods	polyp shortens	short & wide, or tall and thin	into the oral area	no	thin	none?	sparse, mostly on one side
M1	*Orstomisis*	solid	at nodes	multi-planar flabellate	rods	thorny rods	polyp shortens	short & wide	tentacles over mouth but below verrucal margin	no	thin	none	opposite or alternate
I1	*Lepidisis*	hollow, thin	none, or nodal	whip-like to planar fans	intertentacular needles, long needles, scales rare	thorny rods	polyp does not shorten	tall and thin	tentacles over mouth,	yes, mostly	thin	rods or needles	all sides, usually widely spaced
A1	*Acanella*	solid	nodal, whorls	densely branched bush to flabellate	needles, rods, some intertentacular	thorny stars, short rodlets	polyp does not shorten	tall, subovate	tentacles over mouth	yes	thin	rods	opposite or alternate
J3	*Jasonisis*	hollow, sometimes thick or solid	nodal and/or internodal	planar densely branched fans to delicate brambles to whip-like	flat rods, rods, scales, needles	thorny rods	polyp does not shorten	tall	tentacles over mouth	occasionally	thin or thick, cnidae	flat rods	opposite to all sides

.....continued on the next page

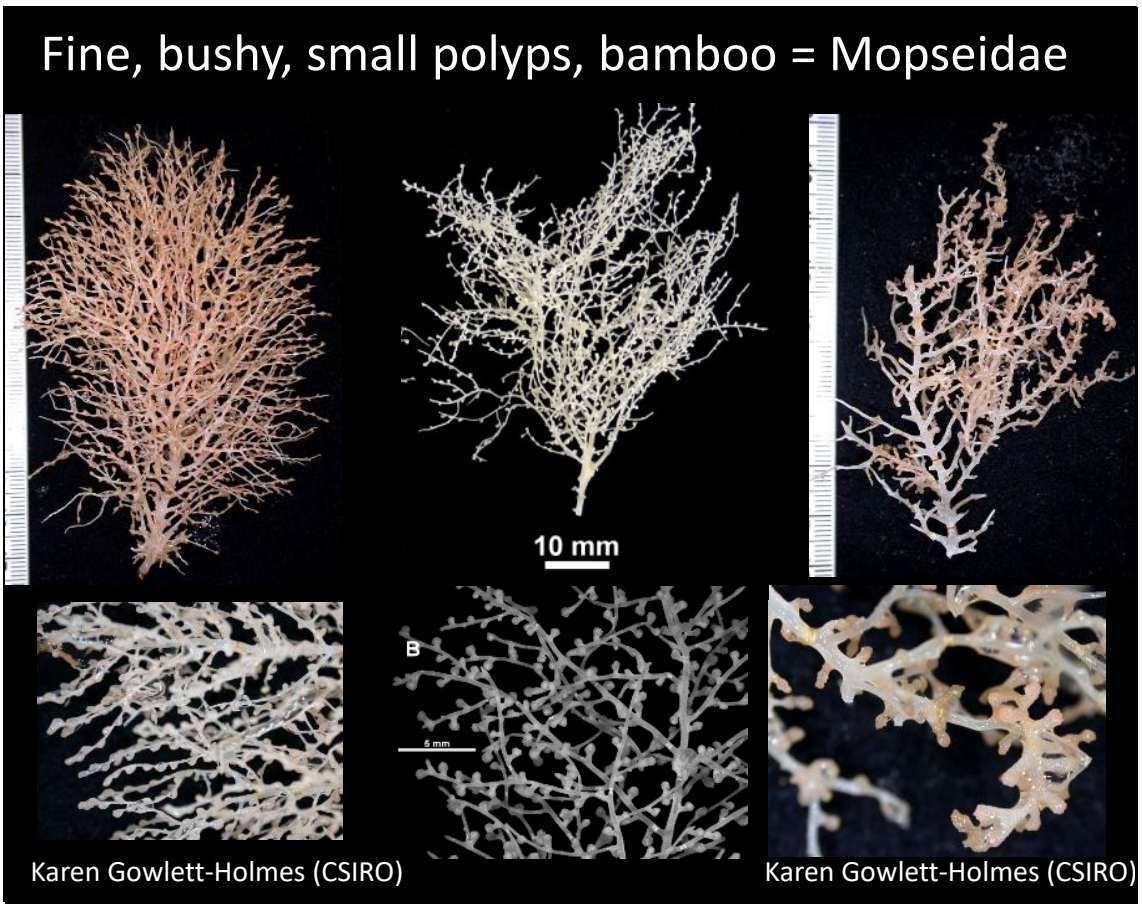
TABLE 4. (Continued)

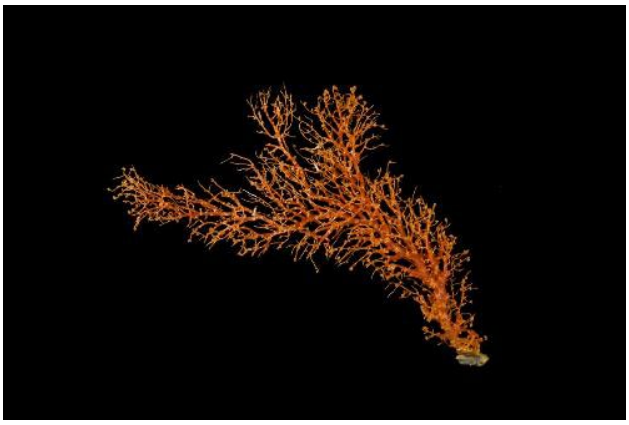
Clade	Typical Genus	Axis	Branching Pattern	Colony Form	Polyp Sclerites	Pharynx Sclerites	Polyp Contraction	Polyp Shape	Tentacle contraction	Sclerites Projecting Beyond Bases of Folded Tentacles	Coenenchyme Thickness	Coenenchyme Sclerites	Polyp Distribution on Axis
I4	Not yet described	hollow, thin, thick at base	nodal, pseudodichotomous	developmental series from whip to trident to candelabra	needles, no scales, no sclerites bottom half of polyp	thorny rods	polyp shortens	tall	tentacles over mouth,	yes	thick	rods, occasionally none	opposite or alternate
C1	Not yet described	hollow, thick, long internodes	none	whip-like (with possible distal coiling on largest colonies)	needles, no scales	elongate rods, few teeth	polyp bends adaxially, long needles on abaxial side	tall	tentacles over mouth,	yes	thick	rods or needles	opposite, alternate, or all around
G1	*Bathygorgia*	hollow, solid	none	stiff unbent rod	blunt rods	flat smooth or wavy rods	polyp does not shorten	medium height, wide	tentacles over mouth	no	thin	rods	mostly on one side
F1	Not yet described	solid	none or rarely nodal or internodal	whip-like to sparsely branching from base	needles, rods, flat rods in tentacle pinnules	elongate thorny rods	polyp does not shorten	tall, cylindrical	tentacles over mouth	yes	thin	needles	all sides, widely spaced
H1	*Keratoisis magnifica*	solid	internodal	planar flabellate	needles	elongate thorny rods	polyp shortens	medium height, wide	tentacles into oral area	very slightly	moderately thick	absent	all sides, closely spaced

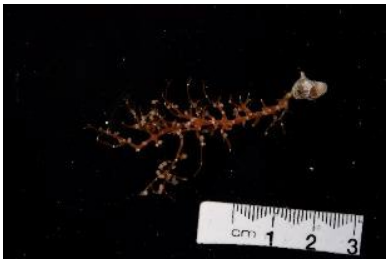
.....continued on the next page

TABLE 4. (Continued)

Clade	Typical Genus	Axis	Branching Pattern	Colony Form	Polyp Sclerites	Pharynx Sclerites	Polyp Contraction	Polyp Shape	Tentacle contraction	Sclerites Projecting Beyond Bases of Folded Tentacles	Coenenchyme Thickness	Coenenchyme Sclerites	Polyp Distribution on Axis
B1	Not yet described	hollow, thick	none or internodal	whip-like to planar flabellate	rods with needles, and scales, or no scales if thick mesoglea	short and wide or elongate toothed rods	polyp shortens slightly, tentacles bend over mouth	tall, cylindrical	tentacles over mouth	yes	thick	scales or needles and scales	dense, all around
D1	Not yet described	hollow, thick	none, or internodal	whip-like to densely branched planar	needles, few sclerites in bottom part of polyp	unknown	polyp does not shorten	tall, robust	tentacles over mouth or into oral area	yes	thin or thick	needles, rods, and flat rods	polyps on one or two sides, most commonly
D2	*Keratoisis*, *Ekmonisis*	hollow, thick	none or internodal	whip-like to flabellate to open bushy	needles and rods, both upper and lower parts of polyp	short and wide or elongate toothed rods	polyp does not shorten	a little taller than wide, robust	tentacles over mouth or into oral area	yes but sometimes not interten-tacular	thin or thick	needles	polyps all around

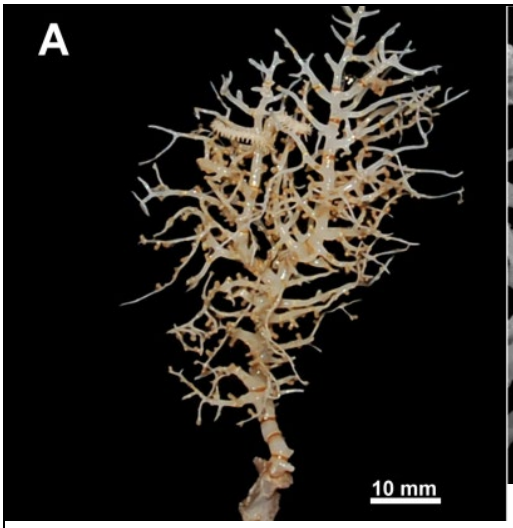


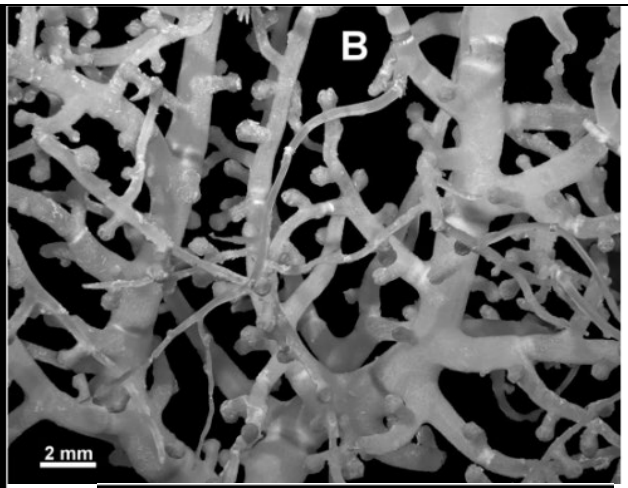


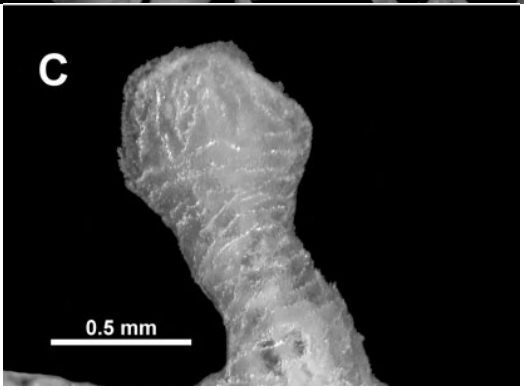


Chathamisis bayeri

- same orange/red colour even after preservation
- always bushy
- has whitish/cream polyps





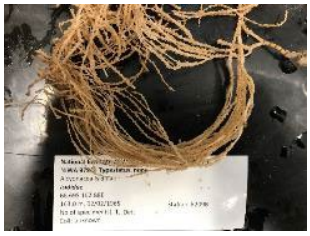


Primnoisis chatham

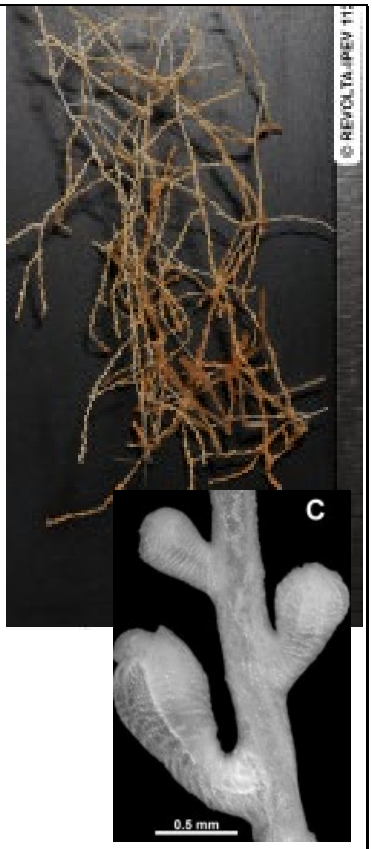
- code is PAN (not actually *Primnoisis antarctica)*
- always bottlebrush
- quite tough

Primnoisis gracilis

Primnoisis niwa



Primnoisis new species



Primnoisis delicatula

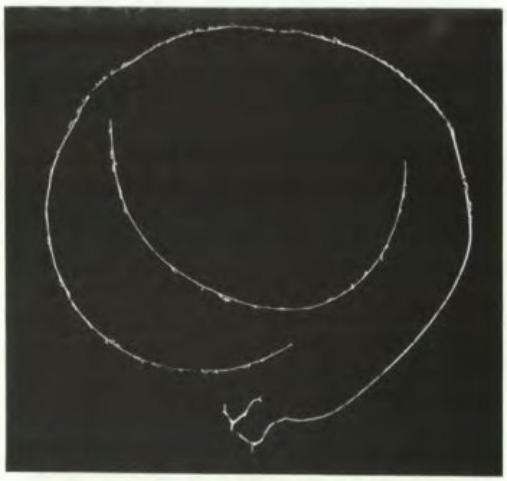
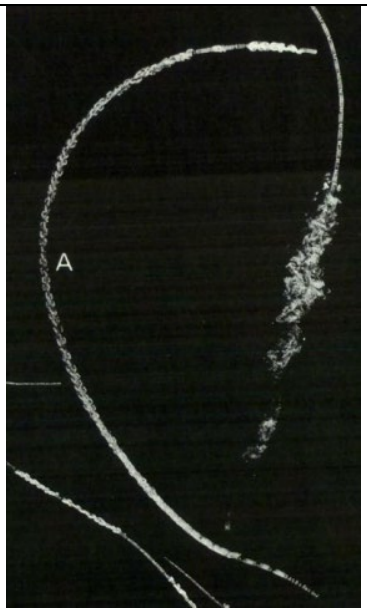
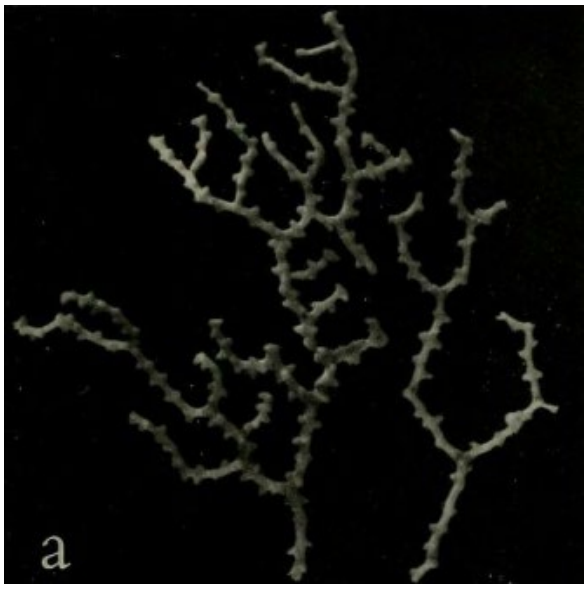


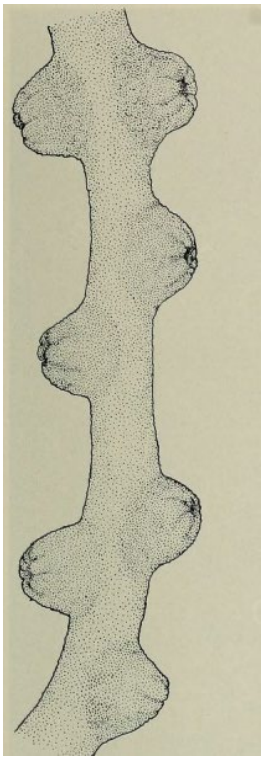
Figure 191 *Lissopholidisis nuttingi* (Grant, 1976), holotype, natural size.

Lissopholidisis – unbranched, extremely fine, <u>bamboo axis</u>



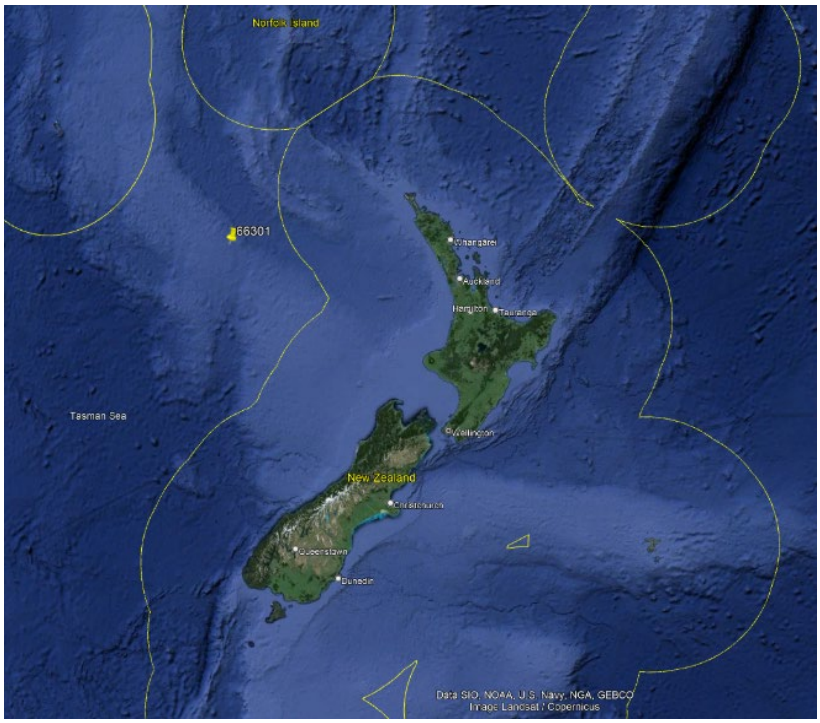
Circinisis – unbranched, thicker with many polyps, <u>bamboo axis</u>

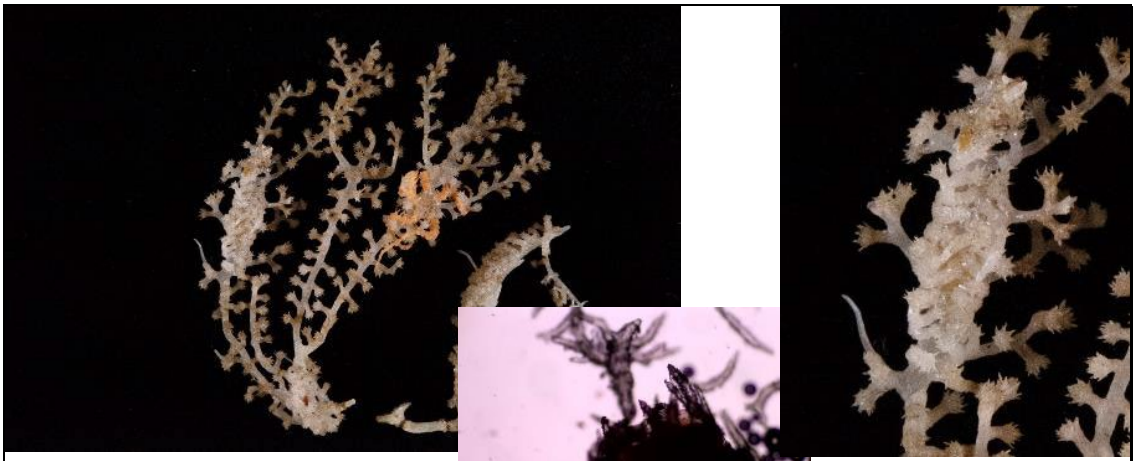




Chelidonisis – red! planar branching (flat), very low polyps, <u>bamboo axis</u>

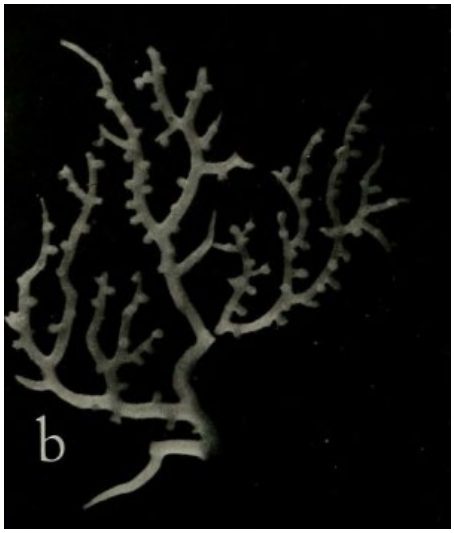
Chelidonisidae – new family for NZ



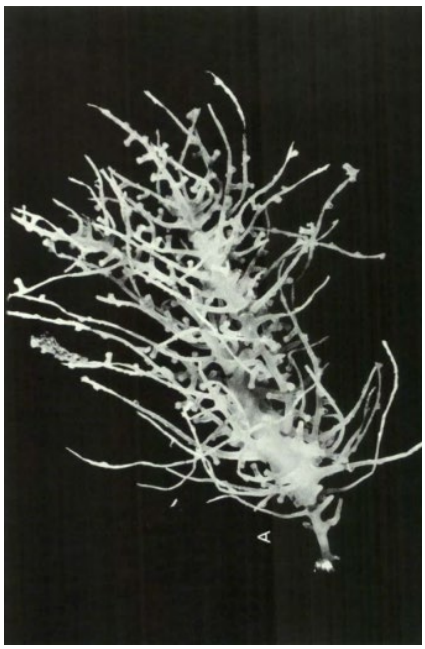


Sclerisis macquariana

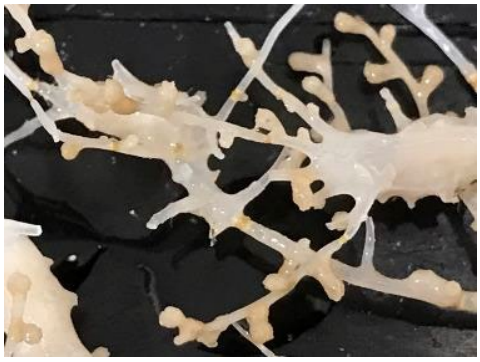
- always has an odd bit where a worm has lived
- always spikey
- has whitish/cream polyps



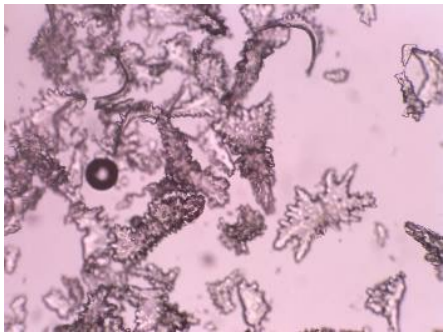
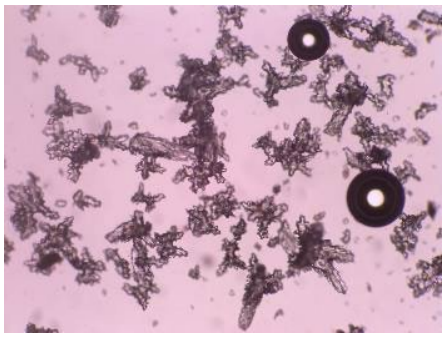
Echinisis – bushy or flat, spikey (doesn't have the worm home like *Sclerisis*) but difficult



Minuisis – code MIN but impossible to tell apart from others



Mopseidae new genus A new species 1

Mopseidae new genus B new species 1

~~Anthothelidae~~

Victorgorgiidae

Victorgorgia sp.

Victorgorgia nyahae

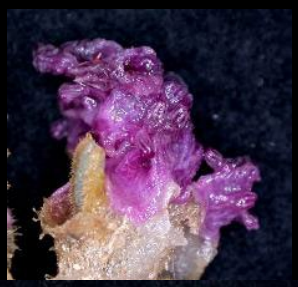
Victorgorgia eminens

Purple or variations of purple = Victorgorgiidae (VIC)

Karen Gowlett-Holmes (CSIRO)

Victorgorgia eminens

Victorgorgiidae



Trachythela nsp1

Trachythela nsp2

Trachythela sp.

Victorgorgia alba

Victorgorgia alba (Nutting, 1908)

- only the original type specimen
- hasn't been collected since (1902)
- from deep water off Hawaii
- this specimen from northern waters 25°S, 179°W from 1980 (purple?)

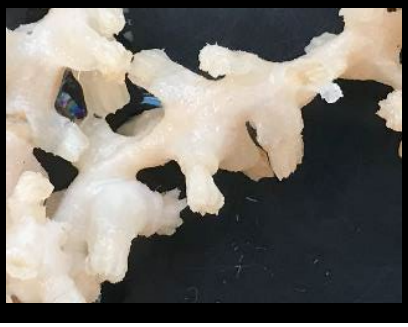
~~Anthothelidae~~ Alcyoniidae (Subfamily "Anthothelinae")

Anthothela and *Lateothela*

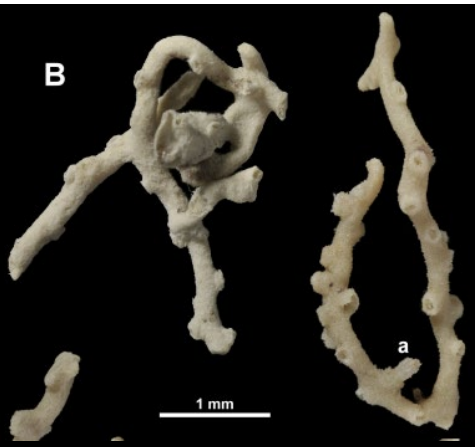
- firm but not hard, "snap-able"
- big polyps, all over
- usually pale creamy pink
- can be tangled and with joined branches
- can grow over things or encrust as well

Anthothela vickersi

Anthothela vickersi



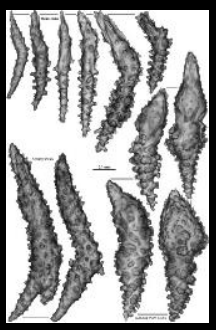
Anthothela aldersladei



Anthothela tropicalis

Anthothela nsp.

Lateothela sp.



Melithaeidae

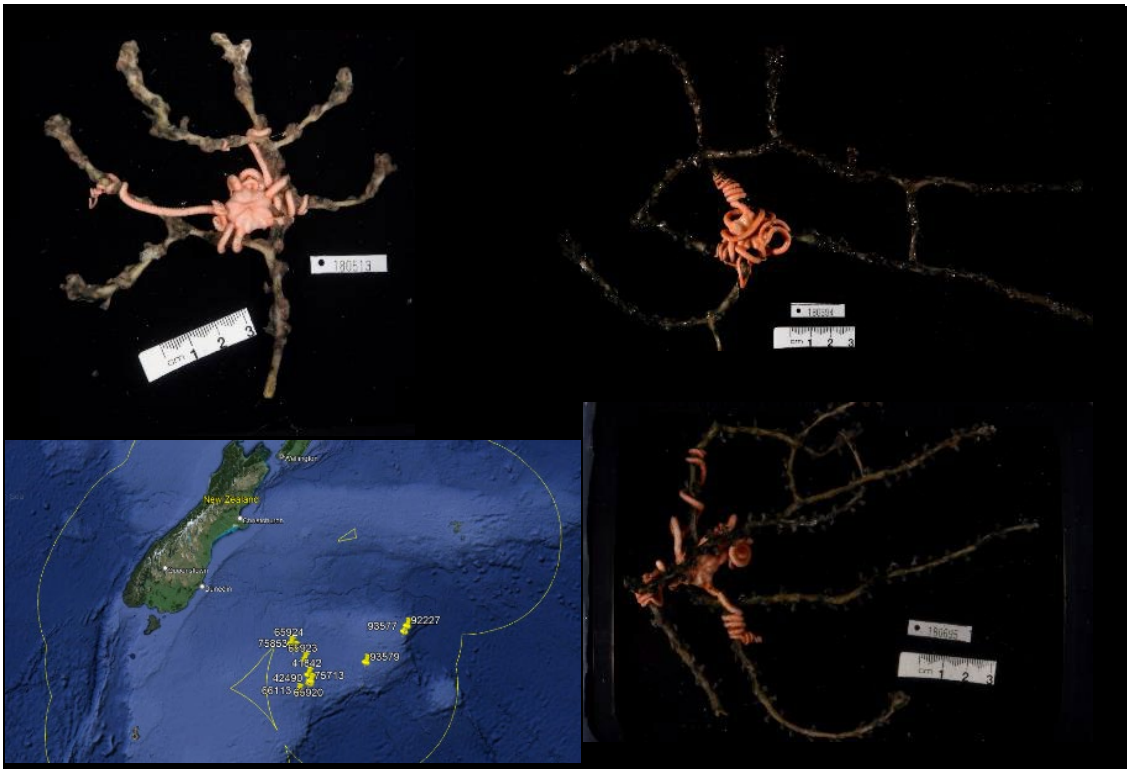
Iciligorgia and *Solenocaulon*

- firm but not hard, “snap-able”
- polyps mostly along sides of skinny axis
- can have channel along axis
- colour? (brown?)
- tends to have fist-like branch tips

~~Subergorgiidae~~ Rosgorgiidae

Undescribed species in genus *Rosgorgia*

- firm but not hard, “snap-able”
- big black/dark polyps, all over
- black/dark grey?
- big, sparse branching
- always seems to have a particular brittle star attached



- restricted distribution (as does the brittle star)