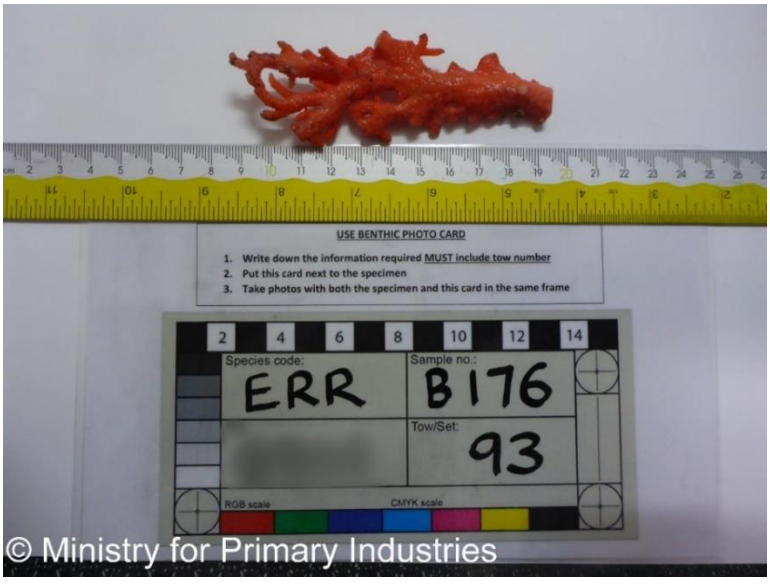
INT2022-03 Identification, storage and genetics of cold-water coral bycatch specimens

Milestone 6. Final Annual Report

Prepared for Conservation Services Programme, Department of Conservation

June 2025



Climate, Freshwater & Ocean Science

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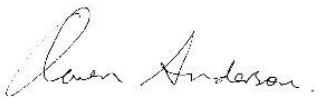	Reviewed by:	Owen Anderson
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Cover image: A perfect example of an at sea digital image of protected hydrocoral *Errina* sp., using a filled in photo card, scale and good lighting. Caught by bottom trawl targeting arrow squid (SQU) in Southland (SOU; FMA 5) on the 10th of February 2024 [Observer, FNZ].

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Executive summary

Protected coral species frequently occur as bycatch in commercial fisheries around New Zealand, and it is important for their protection that there is a good understanding of the species that are caught. 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. Over time, NIWA has received coral bycatch samples and images collected by Observers and has been contracted to provide expert identifications and present the results in reports.

This report, covering the second year of a three-year contract, summarises the sample and image identifications of all observed coral bycatch collected under the project during the period 1 July 2023 to 30 June 2024. A total of 39 physical specimens (in 23 samples) were collected by Observers and returned for identification during the reporting period. Ten subsamples from live-caught specimens were taken for future genetic studies. Not all specimens had sufficient live tissue for subsampling. Additionally, there were 92 historical physical specimens (86 historical samples) collected by Observers prior to 1 July 2023, for which revised higher-level identifications were made during the reporting period. Identifications for a further 46 research trawl-collected specimens in 32 samples are also reported here.

There were 765 specimens identified from 308 digital images and two digital video files that were processed during the reporting period; 706 were identified by experts as protected coral taxa. The remaining 59 specimens from images were of other, non-coral, taxa. The location of capture of all specimens from images was able to be determined (i.e. all files were able to be georeferenced) and 755 specimens were confirmed to be from within the New Zealand Exclusive Economic Zone (EEZ) (10 specimens were from Challenger Plateau, beyond the EEZ (CET)).

Corrected identifications (where the Observer identification is revised by an expert), have been made where necessary in the COD database, with both the original and amended identifications retained. All raw data are provided in the Appendices of this report and as separate excel files.

Data summaries of protected coral bycatch occurring in New Zealand region fisheries are presented by Fisheries Management Areas (FMA), fishing method, and target fishery. The greatest number of protected coral specimen counts from images came from SOE South East (Chatham Rise) (FMA 4) followed by SEC South East Coast (FMA 3) and AKW Auckland West (FMA 9) regions. Most were taken by bottom trawl operations targeting scampi, orange roughy, hoki and oreo. Similarly, most protected corals identified from physical specimens came from SOE South East (Chatham Rise) (FMA 4) bottom trawling, targeting scampi, although physical samples this year came from a wider range of areas and targeting a wider range of species than in previous years examined.

While no formal analyses of accuracy have been carried out during this reporting period, between Observer and NIWA expert identifications, brief non-statistical summaries of accuracy are provided to help inform Observers.

We have continued to update and provide input into coral-relevant resources for Observers during this reporting period as stated in the project contract, by means of in-person refresher training, and through the improvement of Observer reference material, including revisions to the updated Coral

Identification Guide and the updates to the document “Instructions to observers when carrying out at-sea protected coral data collection”.

An additional objective of this project was to assess the utility of genetic or genomic methods of identifying and discriminating both known and undescribed protected corals. In this second year it was agreed with CSP that effort should focus on characterisation of genetic diversity and connectivity of gorgonian coral populations of the genus *Anthothela*, as an extension of taxonomic research into this group conducted by an overseas visiting expert Dr. Kirrily Moore, as part of CSP project INT2023-07. A selection of 37 individuals included bycaught and research specimens from across the EEZ, as well as representatives from international and Australian territories. Specimens were subjected to genome skimming – an economical method of obtaining DNA sequences from across the genome that works well with degraded and archival tissues. Skimming produced an average of 4.1 billion base-pairs of DNA sequence data per sample for markers that enable comparisons and combinations with past genetic and genomic approaches that have been used in CSP projects to document protected species relationships. The analysis of skimming data uncovered misidentified specimens, recovered biogeographic relationships, and identified a putative new species record of *Anthothela*.

1 Background

Deep-sea protected coral samples taken as bycatch in commercial fishery operations are collected by government Observers on commercial fishing vessels. Under the New Zealand Wildlife Act (1953) protected corals are deemed to be protected whether they are dead or alive. Protected coral and other invertebrate bycatch are routinely photographed by Observers as part of their at sea reporting. This research project "Identification and storage of cold-water coral bycatch specimens" was initiated in 2016 (INT2015-03 – DOC16307), continued in 2020 (INT2019-04 – DOC20303) and 2022 (INT2022-03 – DOC23303) contracts NIWA to determine, through the examination of returned coral specimens and specimen images, the taxon, provenance (i.e. the location of capture) and, for the current project, the genetics of corals bycaught in New Zealand fisheries. All such corals are identified by experts to the lowest feasible taxonomic level, counted, and the information reported in the relevant databases. Since 2016, this information, along with associated fishing data including fishing method, fishery area, and target species, have been presented in reports. All raw data have also been provided to CSP in spreadsheet form.

Data from this research helps to better characterise interactions between protected corals and commercial fishing activities (Tracey et al. 2011; Clark et al. 2019). It provides vital baseline information that can help to better inform research underpinning marine protection planning including habitat suitability modelling (e.g., Anderson et al. 2014; Rowden et al. 2017; Georgian et al. 2019), coral risk assessments (Clark et al. 2014; Clark et al. (submitted)), benthic impact assessments (Rowden et al. 2024), and management of benthic marine protected species. It also helps to pave the way forward towards a more comprehensive mitigation framework to be implemented to protect cold-water corals in New Zealand waters.

The research has a similar focus to earlier CSP Projects INT2015-03 – DOC16307 and INT2019-04 – DOC0303 (Identification and storage of cold-water coral bycatch specimens) and to Fisheries New Zealand (FNZ) Projects DAE201804 and BEN202103 (Identification of benthic invertebrate samples from research trawls and observer trips) (Schnabel et al. 2024), all of which provide identification and enumeration of benthic invertebrate bycatch in New Zealand waters. The overall purpose of these research efforts is to continually improve information on the nature of coral and benthic bycatch reported and collected through the Observer Services Programme and thus continually provide higher-quality data and resources for downstream usage.

For this three-year contract (INT2022-03 – DOC23303 Identification, storage and genetics of cold-water coral bycatch specimens) for CSP, NIWA provides:

- the identification of coral specimens, database updates, and specimen storage,
- the identification and georeferenced labelling of images and the digital storage there-of, database updates,
- the sub-sampling of protected coral tissue samples for future genetic studies (see Bilewitch 2022; Bilewitch 2024; Bilewitch & Tracey 2020a, 2020b),
- input into training and resources for government Fisheries Observers, and
- genetic analysis on archival and recent tissue samples.

The contract provides for up to 200 protected coral samples (physical specimens) and 200 specimen images to be identified per annum. As few physical specimens were provided by Observers this year,

a backlog of historical coral samples collected by Observers were identified, with priority given to recent Observer collected samples from within EEZ, for the current year and historical, followed by research trawl survey samples, then high-sea samples.

This project does not report on coral specimens by images photographed from the high-seas.

Throughout the report we refer to specimens and samples, for clarity we provide the following explanation of these terms:

- Physical specimens – individual animals or colonies returned physically to the NIWA Invertebrate Collection.
- Specimens from images – individual animals/colonies photographed in a digital image.
- Samples – a bag, pail or jar of one or more individual physical specimens/colonies collected from one unique station.

2 Objectives

This project forms part of the Conservation Services Programme (CSP) and is part of a long-term series of analyses that began in 2016. The purpose of this research is to continually improve information on the nature of coral bycatch reported and collected through the Fisheries Observer Programme.

The specific objectives for this project (INT2022-03 - DOC23303) are:

Specific Objectives

1. To confirm or update identifications of coral bycatch reported by Fisheries Observers to the lowest taxonomic level (i.e., to assign codes to coral specimens at the species level wherever possible, or to genus or family level if not possible).
2. To record all identified coral specimens and their metadata (including haplotype/genetic data) and ensure storage of the physical specimens in an appropriate taxonomic collection.
3. To update relevant government coral identification and observer databases.
4. To determine whether genetic taxonomic assessment of coral ID is an efficient means to determine or improve image-based or morphological coral ID, and to use genetic data to better understand coral bycatch.
5. To update and provide input into coral-relevant resources for Fisheries Observers, including reference material and material for observer training.

This is a 3-year project, comprising biannual reporting of 6 monthly progress reports (November each year), and annual reports (May each year). Reporting to date includes Connell et al. (2023, 2024) and Macpherson et al. (2024). Here we report on Milestone 6: *Final Annual Report detailing methods and results for each specific objective for all corals identified from physical samples and images assessed for the period 1 July 2023 - 30 June 2024*.

3 Methods

3.1 Objective 1

To confirm or update identifications of coral bycatch reported by Fisheries Observers to the lowest taxonomic level (i.e., to assign codes to coral specimens at the species level wherever possible, or to genus or family level if not possible).

There are two key activities for specific objective 1:

3.1.1 Identification of returned physical specimens

Some of the deep-sea coral bycatch that could not be identified by Observers at sea were retained (whole specimens or subsamples of the specimens) and delivered frozen to NIWA for identification. Specifically, samples were photographed and or collected opportunistically from commercial fishing activity when either Observers were uncertain of their identification of the coral specimen, the specimen was caught outside the expected depth range or distribution, or when the specimen was considered rare or unusual. A similar method was followed to process bycatch of invertebrates (excluding protected corals) collected by Observers under a Fisheries New Zealand (FNZ) project in previous years (BEN202103) (Schnabel et al., 2024).

The corals were thawed, sorted into main groups and initially identified to coarse taxonomic level (mostly to order and family level), then returned to frozen storage, fixed in ethanol, or dried where appropriate. The tasks of fixing and preserving samples, providing containment (jar or pail storage), documenting samples (station numbering, labelling) and high level sorting (dividing samples into major or minor taxonomic groups in the laboratory), were all carried out under the FNZ Data Custodianship Services project DAT2016-01P. Sample data were entered into the web-interfaced NIWA Observer Samples Database (OSD) (version 2.4.1; 2024).

High-seas samples were not differentiated from within-EEZ samples at the time of arrival at NIWA for processing. Trip data are provided in sacks of frozen material but no information on general location is given at this stage. Once the frozen sacks have thawed it is most efficient to process all of their contents rather than separating and refreezing high-seas samples. As such, high-seas samples are partially processed within this project. The high-seas samples are a very useful contribution to habitat suitability modelling exercises in the high-seas (e.g., see Georgian et al. 2019).

Data from OSD were uploaded into the NIWA Invertebrate Collection (NIC) Specify database niwainvert where the specimens are curated for long-term storage and formal taxonomic identification.

Experts then identified all corals to species level wherever possible and when this was not possible, to genus or family level, and assigned the most appropriate Ministry for Primary Industries (MPI) three-letter code (noting that coral codes have not yet been allocated for all coral taxa recognised by experts). Specimen handling followed NIWA procedures for identifying specimens housed in the NIC. NIWA currently manages specimens according to the “Guidelines for the care of natural history collections” (Committee on Common Philosophies and Objectives, 2010). NIWA has its own collection policy document: “NIWA Marine Invertebrate Collection Policy and Procedures”, which also guided the process. Specimens retained in the NIC are held in stewardship for DOC.

Expert identification of the samples was carried out and entered into niwainvert. See Table 3-1 for the list of experts that carried out identifications. Note that some specimens that were identified as

corals by Observers, but were not corals were identified by experts in other groups. For example, a possible crayfish antenna was identified by an Observer as a whip coral and a crustacean expert confirmed that it was possibly a crayfish antenna.

Table 3-1: Taxonomic experts, their affiliation and their speciality.

Expert	Affiliation	Taxon Group
Amelia Connell	NIWA	Scleractinia (in training with Di Tracey)
Dennis Opresko	Smithsonian Institution	Antipatharia (black corals)
Di Tracey	NIWA	Scleractinia, gorgonian octocorals
Erika Gress	James Cook University	Antipatharia (black corals)
Jaret Bilewitch	NIWA	Gorgonian octocorals
Kirrily Moore	Tasmanian Museum & Art Gallery	Gorgonian octocorals
Michelle Taylor	University of Essex	Primnoidae
Peter Marriott	NIWA	Stylasteridae (hydrocorals)
Rob Stewart	Independent	Antipatharia (black corals)
Diana Macpherson	NIWA	Hydrozoa (hydroids), Antipatharia (with guidance from Dennis Opresko) and other non-coral taxa
Kate Neill	NIWA	Pennatuloidea (seapens)
Kareen Schnabel	NIWA	Crustacea (crayfish)
Michelle Kelly	NIWA	Porifera (sponges)
Sadie Mills	NIWA	Brisingida (armless sea star)

3.1.2 Processing and identification of specimens from images

Observers are asked to follow instructions for the collection and reporting of protected coral specimens and data, as outlined in the revised Coral Identification Guide (Tracey et al. 2023) and the "Instructions to observers when carrying out at-sea protected coral data collection" document (Macpherson et al. 2025), which should be used in conjunction with the most recent MPI Fisheries Observer Manual and Observer Briefing Notes. Specifically, these instructions emphasise that all coral bycatch are sorted into species groups, recorded, labelled, photographed and subsampled. Images are to be captured in a well-lit area using a plain grey background if possible, including a reference size scale, and a specimen label and/or photo card filled in with at least the trip and tow/set number, species code, and sample number so that the specimen can be matched to a record in the Centralised Observer Database (COD) later.

The digital images and metadata collected by Observers for this reporting period were obtained from the FNZ Observer Programme by a CSP Team programme coordinator and transferred to NIWA, in September 2024 (195 digital image and video files), with a further set delivered in December 2024 and a final set in January 2025 (156 digital image and video files). The files were reviewed and decisions made whether to process further. Metadata cannot be embedded to video files so if there was an image alongside the video of the same specimen, then the image was chosen to process and the video used to compliment the image for identification purposes only. Some specimen images were collected from extra territorial (ET) areas beyond New Zealand's EEZ and were therefore not processed and identified. Furthermore, some images were of non-coral taxa (sea pens and sponges)

which the Observer correctly identified onboard (i.e. the Observer did not confuse these with a protected coral taxa), so no further processing under this project was needed.

Identifications of the specimens and their associates shown in the images, such as another coral attached to the specimen, were carried out by coral and non-coral experts (Table 3-1). Since images are identified in a separately timed process to the identification of physical specimens, all images are identified by experts regardless of whether a physical specimen associated with an image was returned or not.

3.1.3 Georeferencing and matching to benthic records in COD

To georeference the images, the trip and tow number needs to be accurately determined so that the location of capture can be retrieved from COD. Digital files were delivered to NIWA already organised into trip numbered folders. Tow numbers and any other details such and the MPI sample number and the initial Observer ID (MPI three-letter species code) were able to be determined to a reasonable degree of accuracy using a variety of methods. In many cases these data were fully or partially provided in the specimen labels or photo cards showing in the image. Sometimes this information was recorded on the label incorrectly by the Observer at the time of taking the photo and was later corrected in the MPI Benthic Materials Forms and COD, therefore an extract of updated data from COD (provided by DOC CSP at the time of image delivery) was used by the Collections Curation team to suggest a match for the specimen to a benthic record using the available data, which was then passed on to the NIWA Fisheries Data Services (FDS) to check.

FDS then work through a set of scenarios and categories using a combination of the trip and tow number, the MPI sample number, the initial Observer ID (three-letter species code), NIWA catalog number (if a physical specimen matched the specimen in the image), and image filename, depending on which of these data are available. If some data are missing, then a broader search of benthic records within a trip can be done to find the best possible match using the data available. FDS through a systematic approach double checked the suggested match and with consultation with the Collections Curation team who finalised the matches. FDS then added the expert ID to the matched records and provided a full extract of all COD fishing data in a spreadsheet, including:

- target_species
- fishing_method and fishing_method_desc
- gear_code and gear_desc
- event_start_date and event_start_time
- event_end_date and event_end_time
- trunc_start_latitude and trunc_start_longitude
- trunc_end_latitude and trunc_end_longitude
- start_obs_fma and end_obs_fma
- start_seabed_depth and end_seabed_depth
- img_initial_species_code (the Observer initial ID as shown in the image label)
- ben_initial_species_code (the Observer initial ID as entered into COD)

- img_mpi_sample_number (the MPI sample number as shown in the image label)
- ben_mpi_sample_number (the MPI sample number as entered into COD)

Sometimes the Observer writes a different initial ID and/or MPI sample number on the specimen label or photo card from what they later enter into the Benthic Materials Forms (which is loaded into COD after completion of the trip). The Observer might decide to change their ID as the trip progresses and they become more familiar with the fauna in the fishing area. The MPI sample number can be different due to Observer error, and it is generally decided that COD contains the correct data, but all data are retained for clarity. The fact that the Observer IDs are very often different between these two sources of data is the reason for the matching process being fairly complex.

However, in recent years, the field "fnz_image_filename" has been added to the Observer Benthic Materials Forms and in the benthic table in COD and can therefore be used to match images directly to COD benthic records, although sometimes these are recorded incorrectly by the Observer (or other MPI staff) or not recorded at all.

There are two main tables in COD which are used for this project - the "benthic" (y_benthic) table and the "general catch" (x_fishing_event_catch) table (Sanders & Fisher 2023, section 3.18). Originally the benthic table contained all benthic invertebrate species. However, since approximately 2022, generally only strictly sessile, benthic species are entered into the benthic table. All records entered into the benthic table are also entered into the general catch table (also known as the "report table"), which contains all catch records (not just those of benthic species), but the benthic table does not hold general catch table records. Both need to be interrogated in case a coral record has been added to the general catch table and not the benthic one, so that the best possible match is made. This can be useful, for example, in case a specimen is identified as a species not included in the benthic table by the Observer, so in order to update its identification with the expert ID it needs to be found in the general catch table, not the benthic one.

Note that the coral bycatch records are verified by FDS upon loading into COD to check that the species ID and end type (e.g. discarded, retained) are valid for benthic catch, that the weight is in the expected range, and that the image filename has been supplied if an image was taken. If any fields do not pass verification then MPI is consulted and they provide corrections to the data. Further details with regards to specific weight thresholds of protected coral taxa are described by Anderson et al. (submitted).

This methodology has been modified from previous years and now the emphasis is put on selecting the correct benthic record from COD, rather than using the image date time stamp to select the best possible tow number (as described in Connell et al. 2024). This has proven to be more reliable and time efficient than methods used in previous years.

3.1.4 Embedding metadata to the files

Using the ACDSee Photo Studio Professional 2021 (version 14.0) software to manage the metadata information, data for each image was either added manually into the relevant field or assigned from a drop down 'picklist'. The following metadata were embedded into each image file (metadata cannot be embedded to video files):

- expert ID in the form of taxonomic name (species, genus or family level),

- trip and tow number,
- initial Observer ID and expert ID in the form of three-letter MPI code,
- specimen count,
- specimen comments,
- the NIWA Invertebrate Collection catalogue number (where applicable), and
- image rating (where the best rating is 1 (very good quality) and the worst is 5 (very poor quality)).

An image rating classification was developed specifically for this research programme as there is no universal standard (International Press Telecommunications Council 2024). Image ratings help indicate the quality and usefulness of an image and, as part of the workflow, enable the images to be sorted and filtered at a later point in time. Table 3-2 shows the image rating classification used and outlines the factors taken into consideration when assigning a rating to an image.

Table 3-2: The classification system used to assign a rating to an image.

Image rating	Classification
1	Very good quality. The specimen is in focus and the whole specimen has been photographed. Good lighting and background. The image includes a label with complete data. There may also be a scale present. The specimen weight may also be shown in the image.
2	Good quality. All the specimen, or part of the specimen is in focus. The lighting and background are sufficient. The image includes a label with some or complete data. May include more than one coral specimen. There may also be a scale present. The specimen weight may also be shown in the image.
3	Average quality. All the specimen, or part of the specimen is in focus. The image may include a label with some data, and a specimen weight may be shown. Insufficient lighting and background. May include more than one coral specimen.
4	Bad quality. All the specimen, or part of the specimen may be in focus, or in focus enough to be able to determine what it is. There is no label in the image. It is not photographed against a good background with a scale and good lighting, and/or photographed at an unhelpful angle. The image is of an aggregated group of corals and other specimens, so it is not clear what the subject of the image is. The image is of a non-coral.
5	Very bad quality. The specimen, or part of the specimen is out of focus and is not able to be identified to a sufficient taxonomic level as a result. There is no label in the image. It is not photographed against a good background with a scale and good lighting, and/or photographed at an unhelpful angle. The image is of an aggregated group of corals and other specimens, so it is not clear what the subject of the image is. The image is of a non-coral.

Finally, all metadata for the images, including the trip and tow number, COD fishing data (the start and end coordinates, date, depth and FMA of the tow, fishing method, target species) and the Observer initial ID, the expert ID in the form of MPI code, taxon name and its full hierarchy (phylum, class, order, superfamily, family, genus, species), the MPI sample numbers, NIWA catalog number, image filenames and specimen count were assembled manually in a spreadsheet (a summary of

which is presented in Appendix C, and the full data file is submitted alongside this report named "Appendix C Final report Milestone 6.xlsx").

3.2 Objective 2

To record all identified coral specimens and their metadata (including haplotype/genetic data) and ensure storage of the physical specimens in an appropriate taxonomic collection.

Tissue subsamples were taken from all live-collected protected coral samples provided to NIWA by Observers. The subsamples were stored with their corresponding NIC registration label in standard vials in 99% high grade absolute ethanol. The subsamples are currently stored in the NIC wet collection along with the parent samples.

3.3 Objective 3

To update relevant government coral identification and observer databases.

Expert identifications and relevant data (particularly trip, tow, and sample numbers, and initial Observer ID) of all physical specimens and specimens from images collected/photographed by Observers for this reporting period were provided to the NIWA FDS for loading and table updates. NIWA manages the COD database for FNZ and it is regularly updated with revised identifications when corals are returned from sea. In this process the generic three-letter MPI codes initially used by Observers to record unidentified corals are updated with the expert identification code. For example, SIA (Scleractinia) to COF (*Flabellum* spp. cup coral). Notes are also added with the expert identification, NIWA catalog number, and date added to COD. For specimens from images, the MPI image file name and NIWA image file name are also added. Note that the benthic table contains more information fields than the general catch table. The benthic table stores the three-letter MPI code for the observer ID as well as the expert ID, whereas the general catch table only stores one code, so the three-letter MPI code for the observer ID is overwritten by that of the expert ID.

Physical sample information of expert-identified coral specimens collected by fisheries research trawl surveys for this reporting period were extracted from Specify database niwainvert and provided to the NIWA trawl database manager for loading and table updates. The matching process is based on trip number, tow number, and species.

These updates made to COD and trawl allow for the potential interactions between individual coral taxa and fishing gear to be better quantified and therefore help to identify factors that may have contributed to coral mortality.

3.4 Objective 4

To determine whether genetic taxonomic assessment of coral ID is an efficient means to determine or improve image-based or morphological coral ID, and to use genetic data to better understand coral bycatch.

Following consultation with the Conservation Services Programme it was agreed that, for the 2024-2025 period of the contract, effort within this objective should focus on using genomic approaches to better understand the identity, diversity and connectivity of protected corals belonging to the genus *Anthothela* (Figure 3-1). Specimens of the family 'Anthothelidae' (now formally part of the family Alcyoniidae: McFadden et al. 2022) contained within the NIC were recently subject to morphological study and expert identification by Dr. Kirrily Moore (Tasmanian Museum and Art Gallery, Australia),

under DOC-CSP project INT2023-07. This material has not been previously subjected to genetic analysis and only two genera (*Anthothela* and *Lateothela*) and one species (*A. vickersi*) have been documented within the New Zealand EEZ, although several other undescribed species were recognised by KM (Mills et al. 2024). *Anthothela* has a widespread and common distribution within the EEZ, it is a regular component of bottom-contact fisheries bycatch, and the 50 specimens within the NIC (plus two *Lateothela* specimens) presented a manageable sample size for genetic study. It was thus selected for genetic characterization using Ultra-Conserved Elements (UCEs; Quattrini et al. 2017), to examine cryptic diversity and species composition, as well as to test whether population-level information could be obtained, to inform assessments of genetic connectivity.

Figure 3-1: A specimen of the protected gorgonian *Anthothela* housed within the NIC. This colony was collected on NIWA research voyage TAN1004 and was included as a non-bycatch reference specimen.

The DNA-sequencing of UCEs was tested in project BCBC2020-26 for the Primnoidae (Bilewitch 2022) then implemented for the Acanthogorgiidae in INT2023-05 (Bilewitch 2024); in both instances it was effective at resolving ancestral relationships and discovering new cryptic species, genera and families. A new approach to sequencing UCEs for *Anthothela* was used here, termed genome skimming. This method uses low-coverage whole genome shotgun sequencing to obtain UCE loci, instead of previous methods using target bait enrichment (Quattrini et al. 2024). Genome skimming offers cost savings compared to target bait enrichment, it generates more data, and it carries the added benefit of also generating mitochondrial genome and nuclear ribosomal sequences, which represent traditional barcode markers (Trevisan et al. 2019). The generation of barcode sequences allows for comparison to much larger historical datasets available in genetic repositories (e.g., NCBI GenBank), which have been produced using older, targeted sequencing methods.

3.4.1 Specimen selection and processing

The NIC Specify database niwainvert was queried for catalogued specimens of *Anthothela*, *Lateothela*, or 'Anthothelidae'. From these, 37 specimens were selected that represented all bycatch specimens, two outgroups (*Lateothela*), and a broad selection of collection localities from across the EEZ and beyond (Tasmanian and Louisville Seamount Chain).

Approximately 2 mm^2 of tissue was subsampled from each specimen using sterilized forceps. Tissues were dried to remove residual ethanol and were then extracted using a DNeasy Blood & Tissue kit (Qiagen). DNA extractions followed the manufacturer's recommended protocol except that incubations in proteinase K were conducted overnight and two volumes of 40µl of AE buffer were used for a final elution. Genomic DNA extracts were quantified using Quant-iT PicoGreen dsDNA (Invitrogen) and were shipped on ice to Livestock Improvement Corporation (Hamilton, NZ) for library construction. Initial library balancing was tested on an iSeq (Illumina) followed by paired-end 150bp sequencing on two lanes of a NovaSeq (Illumina).

3.4.2 Bioinformatics and data analysis

UCE sequence data was processed using the *phyluce* bioinformatic package (Faircloth 2016). Sequencing reads were cleaned and trimmed of adapters using the *illumiprocessor* module then assembled using SPAdes v.3.15.3 (Bankevich et al. 2012). The resulting contigs were matched to the *octocoral-v2* baitset of Erickson et al. (2020) and extracted according to UCE loci. UCE-specific sequence assemblies were concatenated and aligned using *MAFFT* (Katoh et al. 2013) and were trimmed using the *phyluce_align_seqcap_align* module in *phyluce*. Two alignments were produced: one including all UCE loci that had data from at least 75% of the 15 ingroup samples (>11) and one that had data from at least 90% (>13) of ingroup samples. Bayesian phylogenetic analysis of each alignment was performed using ExaBayes (Aberer et al. 2014), with $1x10^6$ generations sampled every 1000 generations and 5% of samples discarded as burn-in. Alignments were partitioned according to UCE loci and the resulting output was examined for evidence of chain convergence using Tracer (Rambaut et al. 2018).

The ability of the genome skimming data to generate whole mitochondrial genomes ('mitogenomes') for *Anthothela* was explored by running *MitoFinder* v1.4.2 (Allio et al. 2020) on the assembled contigs, using available whole mitochondrial sequences for the Alcyoniidae obtained from NCBI GenBank as annotation references. The resulting output was examined for annotations of 14 protein-coding genes, two ribosomal RNA genes and tRNA-Met, indicating a whole mitogenome was recovered.

3.5 Objective 5

To update and provide input into coral-relevant resources for Fisheries Observers, including reference material and material for observer training.

Consultation with the Conservation Services Programme throughout the year directs the work to be completed to meet this objective. NIWA input into the improvement of Observer reference material and training resources such as the revised Coral Identification Guide (Tracey et al. 2023), and the "Instructions to observers when carrying out at-sea protected coral data collection" (Macpherson et al. 2025) is ongoing as CSP time and funding allows. Input into Observer refresher training occurs as MPI funding and Observer availability allows.

4 Results

4.1 Objective 1: To confirm or update identifications of coral bycatch reported by Fisheries Observers to the lowest taxonomic level

4.1.1 Identification of returned physical specimens

During the reporting period 1 July 2023 to 30 June 2024, NIWA received and processed 39 Observer-collected protected coral specimens from 23 sample lots, and 92 historical (i.e., collected prior to the current reporting year) specimens (in 86 samples), identified since delivery of the final annual report in the previous coral bycatch project (Connell et al. 2024).

A summary of these 131 specimens (109 samples) identified by experts are provided in extracts from the NIWA Invertebrate Collection (NIC) Specify Database niwainvert (Appendix A (a–b)).

Additionally, identifications are reported for 46 research trawl-collected protected coral specimens (in 32 samples), collected between 1994 and 2022. Data for these samples are included in Appendix A(c).

Several identifications of historically collected protected coral taxa were provided by international experts visiting NIWA with funding from other projects. For example, Dr Erika Gress and Dr Michelle Taylor were invited experts participating in an Ocean Census identification workshop funded by the Nippon Foundation and Nekton (Mills et al. 2024; Neil & Mills 2024), and Dr Kirrily Moore was an invited expert on the DOC funded project INT2023-07 to identify a historical backlog of protected coral specimens (Mills et al. 2024).

While formal 'analyses of accuracy' have not been carried out between the Observer and NIWA expert identifications, such as those presented in Parker et al. (2009), a non-statistical summary of the accuracy of Observer ID is presented for this period and will be useful for on-going Observer training exercises. For the current reporting year Observers correctly identified 13 of the 23 samples, with three samples correctly identified to species level (*Goniocorella dumosa* - GDU and *Desmophyllum dianthus* - DDI), four to genus level (*Flabellum* spp. - COF) and five to order level (Antipatharia - COB and Malacalcyonacea and Scleralcyonacea - GOC). This indicates a 56% accuracy of Observer code use overall for the physical samples, regardless of the taxonomic level of the ID (see colour coding in Appendix A(a)).

This is very similar to the previous reporting year (55% accuracy of code use, see Connell et al. 2024).

Ten of the samples were incorrectly identified by Observers, however most of the identifications were within the correct coral family, but an incorrect species assignment (e.g., *Desmophyllum dianthus* – DDI, should have been coded as CUP). Two samples identified as corals by Observers were not (true) corals: one sample was a parazoanthid misidentified as an unknown coral, and another was a hydroid, *Cryptolaria* sp. misidentified as a black coral (COB).

4.1.2 Identification of specimens from images

During the reporting period 1 July 2023 to 30 June 2024, NIWA received 332 digital images and 19 digital video files. All images and videos were reviewed; 17 of the videos and 24 of the images were not processed for identification, for reasons explained in the Methods section 3.1.2. A summary of the digital files received are presented in Appendix C.

Of the 308 images and two videos processed there were a total of 261 images and two videos taken of protected coral taxa and 47 images taken of non-coral or non-protected coral taxa. All processed image and video files were able to be georeferenced.

In total, approximately 765 specimens were identified from the 308 images and two videos that were processed. A total of 755 specimens were from within the New Zealand EEZ (10 specimens were from Challenger Plateau, beyond the EEZ (CET)). The number of specimens differs from the number of images because sometimes there are multiple images of the same specimen and sometimes multiple specimens in one image. Of the 765 specimens, 706 were protected coral taxa. The remaining 59 specimens were determined to be non-protected taxa including sponges, hydroids, sea pens, soft corals, zoantharians, brisingid (armless star) discs, a possible crayfish antenna, bryozoans, polychaete tube clumps and a discarded longline filament encrusted with coralline algae, bryozoan and sponges (Table 4-1).

Table 4-1: Expert identifications of specimens from images by number of specimens and the count of distinct tows they were caught in.

Phylum	Class	Order	Family (or Superfamily)	Genus	Species	Protected species	No. of specimens	Count of tows
Annelida	Polychaeta					N	7	3
Arthropoda	Crustacea					N	1	1
Bryozoa						N	2	1
	Stenolaemata	Cyclostomatida	Cerioporidae	*Tetrocycloecia*	*neozelanica*	N	1	1
Cnidaria	Hexacorallia	Antipatharia				Y	2	2
			Leiopathidae	*Leiopathes*		Y	3	3
					secunda	Y	1	1
			Schizopathidae	*Lillipathes*		Y	1	1
				Parantipathes		Y	3	3
		Scleractinia				Y	1	1
			Caryophylliidae			Y	117	7
				Caryophyllia		Y	4	4
				Desmophyllum	*dianthus*	Y	33	5
				Goniocorella	*dumosa*	Y	83	12
				Solenosmilia	*variabilis*	Y	115	13
			Dendrophylliidae	*Eguchipsammia*	*japonica*	Y	7	1

Phylum	Class	Order	Family (or Superfamily)	Genus	Species	Protected species	No. of specimens	Count of tows
				Enallopsammia	*rostrata*	Y	3	3
			Flabellidae	*Flabellum*		Y	2	2
					knoxi	Y	173	20
			Madreporidae	*Madrepora*	*oculata*	Y	10	1
			Rhizangiidae	*Culicia*	*rubeola*	Y	2	1
			Stephanocyathidae	*Stephanocyathus*	*platypus*	Y	7	3
		Zoantharia				N	1	1
			Parazoanthidae			N	1	1
	Hydrozoa					N	10	3
		Anthoathecata	Solanderiidae	*Solanderia*?		N	1	1
			Stylasteridae			Y	2	2
				Conopora	*verrucosa*	Y	1	1
				Errina		Y	1	1
		Leptothecata	Symplectoscyphidae	*Symplectoscyphus*?		N	1	1
			Zygophylacidae	*Cryptolaria*		N	2	2
			Plumularioidea			N	4	2
	Hydrozoa?					N	1	1
	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*		Y	1	1
			Victorgorgiidae	*Trachythela*		Y	1	1
		Scleralcyonacea	Acanthogorgiidae			Y	2	2
				Acanthogorgia		Y	3	3
				Acanthogorgia?		Y	1	1
			Chrysogorgiidae	*Chrysogorgia*		Y	1	1
			Coralliidae	*Anthomastus*?		N	1	1
				Paragorgia		Y	22	3
			Keratoisididae			Y	2	1
				Acanella		Y	1	1
				Isidella		Y	3	3
				Keratoisis		Y	45	6
			Primnoidae	*Callogorgia*		Y	1	1
				Fanellia?		Y	20	1
				Metafannyella	*chathamensis*	Y	3	3
				Parastenella		Y	1	1
				Primnoa	*notialis*	Y	9	3

Phylum	Class	Order	Family (or Superfamily)	Genus	Species	Protected species	No. of specimens	Count of tows
				Thouarella		Y	12	9
				Thouarella (Euthouarella)	*hilgendorfi*	Y	1	1
				Tokoprymno		Y	6	2
			Pennatuloidea; Balticinidae	*Balticina*?		N	1	1
			Protoptilidae	*Distichoptilum*	*gracile*	N	1	1
Echinodermata	Asteroidea	Brisingida				N	2	1
Porifera						N	1	1
	Demospongiae	Tetractinellida	Geodiidae	*Geodia*	*chathamensis*	N	1	1
	Hexactinellida					N	20	1
Total							765	121

For the protected coral species, a diverse range of gorgonian octocorals (sea fans) and Scleractinia (stony corals) were present (Table 4-1; Figure 4-1; also see Figure 2-2 in Macpherson et al. 2024). The most caught and photographed species were stony corals *Flabellum knoxi* (173 specimens caught in 20 distinct tows), followed by Caryophyllidae (117 specimens from 7 tows), *Solenosmilia variabilis* (115 specimens from 13 tows), *Goniocorella dumosa* (83 specimens from 12 tows) and *Desmophyllum dianthus* (33 specimens from 5 tows). Large numbers of octocorals were also noted, such as bamboo coral *Keratoisis* (45 specimens from 6 tows), bubblegum coral *Paragorgia* (22 specimens from 3 tows), and primnoid coral possibly of the genus *Fanellia* (20 specimens from 1 tow).

Figure 4-1: A selection of representative protected coral specimen images. a) branching stony coral *Goniocorella dumosa*; b) black coral *Leiopathes secunda*; c) branching stony coral *Eguchipsammia japonica*; d) sea fan *Acanthogorgia*; e) stony cup coral *Flabellum*; f) stony coral *Culicia rubeola*; g) sea fan *Tokoprymno*; h) branching stony coral *Solenosmilia variabilis*. [Observer, FNZ].

Similarly to the physical specimens no formal ‘analyses of accuracy’ have been carried out between the Observer and the expert identifications, such as those presented in Parker et al. (2009), but a non-statistical summary of the accuracy of Observer ID is presented for this period. Initial Observer three-letter identification codes were sourced from the best matched benthic record in COD, using a combination of the trip and tow number, the MPI sample number, the initial Observer ID (three-letter species code), NIWA catalog number (if a physical specimen matched the specimen in the image), and image filename to decide the best match, rather than relying on the label showing in the image or the Observer Benthic Materials Forms as in previous years, as the codes can change from the time they are written on the label to when they are entered into COD (as described in Methods section 3.1.3). During this reporting period Observers assigned coral identification codes for 300 out of the 308 images and two videos that were processed and identified by experts. Observers correctly assigned genus or species codes to 73 images (23.5%). In addition to the correct genus/species level identifications, 175 (56.5%) images were correct to the level of family and/or order, meaning that either a higher-level coral code was given by the Observer and the expert identified to a lower taxonomic level, or an incorrect coral code was recorded by the Observer at species/genus level but that identification was correct to the level of family and/or order. Thirty images (9.7%) given coral codes were identified by experts as not corals, i.e. the Observer identified the specimen as a stony coral but the expert identified it as a sponge or worm tube building clump. Other examples include mistakenly confusing a black coral and/or gorgonian coral with a hydroid, a stylasterid with a bryozoan, and in one case the discs of brisingid armless sea stars were mistaken as cup corals. In another case, a possible antenna from a crustacean was thought to be a whip coral (Figure 4-2).

Figure 4-2: A selection of non-coral specimen images originally identified as protected coral taxa by the Observer. a) bryozoan (identified as a stylasterid *Calyptopora reticulata* CRE); b) bryozoan *Tetrocycloecia neozelanica* (identified as coral unidentified COU); c) hydroid (identified as gorgonian GOC); d) discs of brisingid armless sea star (identified as stony cup coral *Stephanocyathus platypus* STP); e) hydroid *Cryptolaria* (identified as black coral COB); f) plumularid hydroids (identified as unidentifiable UNF); g) crayfish antenna? (identified as black whip coral *Cirrhipathes* CIR); h) polychaete tubes (identified as coral unidentified COU). [Observer, FNZ].

4.2 Objective 2: To record all identified coral specimens and their metadata (including haplotype/genetic data) and ensure storage of the physical specimens in an appropriate taxonomic collection

All specimens are registered and stored in the NIWA Invertebrate Collection (NIC) in Wellington and all associated specimen metadata is registered in the NIC Specify database, niwainvert.

During this reporting period, tissue subsamples were taken from 10 specimens from all live-caught Observer collected protected coral samples. Not all specimens returned had sufficient live tissue for subsampling. Accumulated protected coral tissue subsamples retained for future genetic studies now number 174, and CSP funded projects using these samples for molecular studies have been carried out or are underway (e.g., see Bilewitch & Tracey 2020a, 2020b; Bilewitch 2022; Bilewitch 2024).

4.3 Objective 3: To update relevant government coral identification and observer databases

4.3.1 Summary of physical specimen data loading processes into COD

The revised identifications from the niwainvert database were provided for uploading into COD. The COD extract summary is provided in Appendix B.

As described in Methods section 3.1.3, there are two main tables in COD which are used for this project - the “benthic” (y_benthic) table and the “general catch” (x_fishing_event_catch) table. Records entered into the benthic table are also entered into the general catch table, which contains all catch records (not just those of benthic species), but the benthic table does not hold general catch information. Records (i.e. rows) from both need to be interrogated in case a coral record has been added to the general catch table and not the benthic one, so that the best possible match is made.

Of the 109 rows of Observer-collected physical specimen data (23 current year, 86 historical) provided for uploading into COD:

- 44 rows/samples were matched and updated against the benthic table.
- 65 rows/samples could not be matched and so were inserted as new catch records for the tow in the benthic table.
  - Of these, 64 rows were created in the benthic table,
  - 1 row was created in the general catch table.

Historical samples are more likely not to match and this was the case for a large portion of the historical samples included in this year’s identifications.

4.3.2 Data summaries and locality plots for physical specimen identifications

Data summaries for the physical specimens identified from Observer collected protected coral samples in the current reporting year (1 July 2023–30 June 2024) and historical samples are provided below. These include a count by Fisheries Management Area (FMA) (Table 4-2) and a count of tows and specimens by fishing method and target fishery (Table 4-3). Also see Figure 4-3 that illustrates the geographic spread of physical sample coral bycatch in the region.

Some physical samples were collected from ET areas, including one historical sample from the far east from the southeast Louisville Seamount Chain (LOUR) and six historical samples from the far west from the Tasmanian Ridge (TMAR). Furthermore, three of the current reporting year samples, and two of the historical samples were from ET areas to the northwest from the Challenger Plateau (CET), and two historical samples each from the Lord Howe Rise (HOWE) and Wanganella Bank (WANB) (Table 4-2, Figure 4-3).

Table 4-2: Summary of protected coral samples/specimens by Fisheries Management Area (FMA) or from high-seas regions (ET), for Observer collected protected coral.

(a) Collected during the current reporting year (1 July 2023-30 June 2024)

FMA	Description	Count of samples	No. of specimens
SOE	South East (Chatham Rise) (FMA 4)	11	12
SEC	South East (Coast) (FMA 3)	4	19
CET	Challenger Plateau, beyond the EEZ (ET)	3	3
AKE	Auckland East (FMA 1)	1	1
CEE	Central East (FMA 2)	1	1
SOI	Southern Offshore Islands – Auckland & Campbell Is. (FMA 6A)	1	1
SOU	Southland (FMA 5)	1	1
SUB	Subantarctic incl. Bounty Is and Pukaki Rise (FMA 6)	1	1
Total of all areas		23	39

(b) Historical samples identified in this reporting period

FMA	Description	Count of samples	No. of specimens
SUB	Subantarctic incl. Bounty Is and Pukaki Rise (FMA 6)	34	37
SOE	South-East (Chatham Rise) (FMA 4)	13	15
AKE	Auckland East (FMA 1)	10	10
SOU	Southland (FMA 5)	8	8
TMAR	Tasmanian Ridge (ET)	6	7
SEC	South-East (Coast) (FMA 3)	4	4
CET	Challenger Plateau, beyond the EEZ (ET)	2	2
HOWE	Lord Howe Rise (ET)	2	2
KER	Kermadec (FMA 10)	2	2
WANB	Wanganella Bank (ET)	2	2
AKW	Auckland West (FMA 9)	1	1
CEE	Central East (FMA 2)	1	1
LOUR	Louisville Ridge (ET)	1	1
Total all areas		86	92

Table 4-3: Count of tows and samples/ specimens by fishing method and target fishery for physical specimens.

(a) Samples collected in the current reporting year (1 July 2023–30 June 2024). BT = Bottom Trawl, BLL = Bottom Longline.

Target Fishery (common name)	FNZ Code	Fishing Method	Count of tows	Count of samples	No. of specimens
Scampi	SCI	BT	10	11	12
Bluenose	BNS	BLL	3	3	3
Silver Warehou	SWA	BT	2	2	17
Hoki	HOK	BT	2	2	2
Arrow squid	SQU	BT	2	2	2
Oreos	OEO	BT	1	1	1
Orange roughy	ORH	BT	1	1	1
Snapper	SNA	BLL	1	1	1
Total			22	23	39

(b) Historical samples identified in this reporting period. BT = Bottom Trawl, BLL = Bottom Longline, MW = Midwater Trawl.

Target Fishery (common name)	FNZ Code	Fishing Method	Count of tows	Count of samples	No. of specimens
Orange roughy	ORH	BT	29	36	39
Oreos	OEO	BT	16	17	17
Black oreo	BOE	BT	11	11	11
Smooth oreo	SSO	BT	9	10	13
Hoki	HOK	BT	2	3	3
Barracouta	BAR	MW	2	2	2
Tarakihi	TAR	BT	2	2	2
Alfonsino	BYS	BT	1	1	1
Patagonian toothfish	PTO	BLL	1	1	1
Scampi	SCI	BT	1	1	1
Spiky oreo	SOR	BT	1	1	1
Arrow squid	SQU	BT	1	1	1
Total			76	86	92

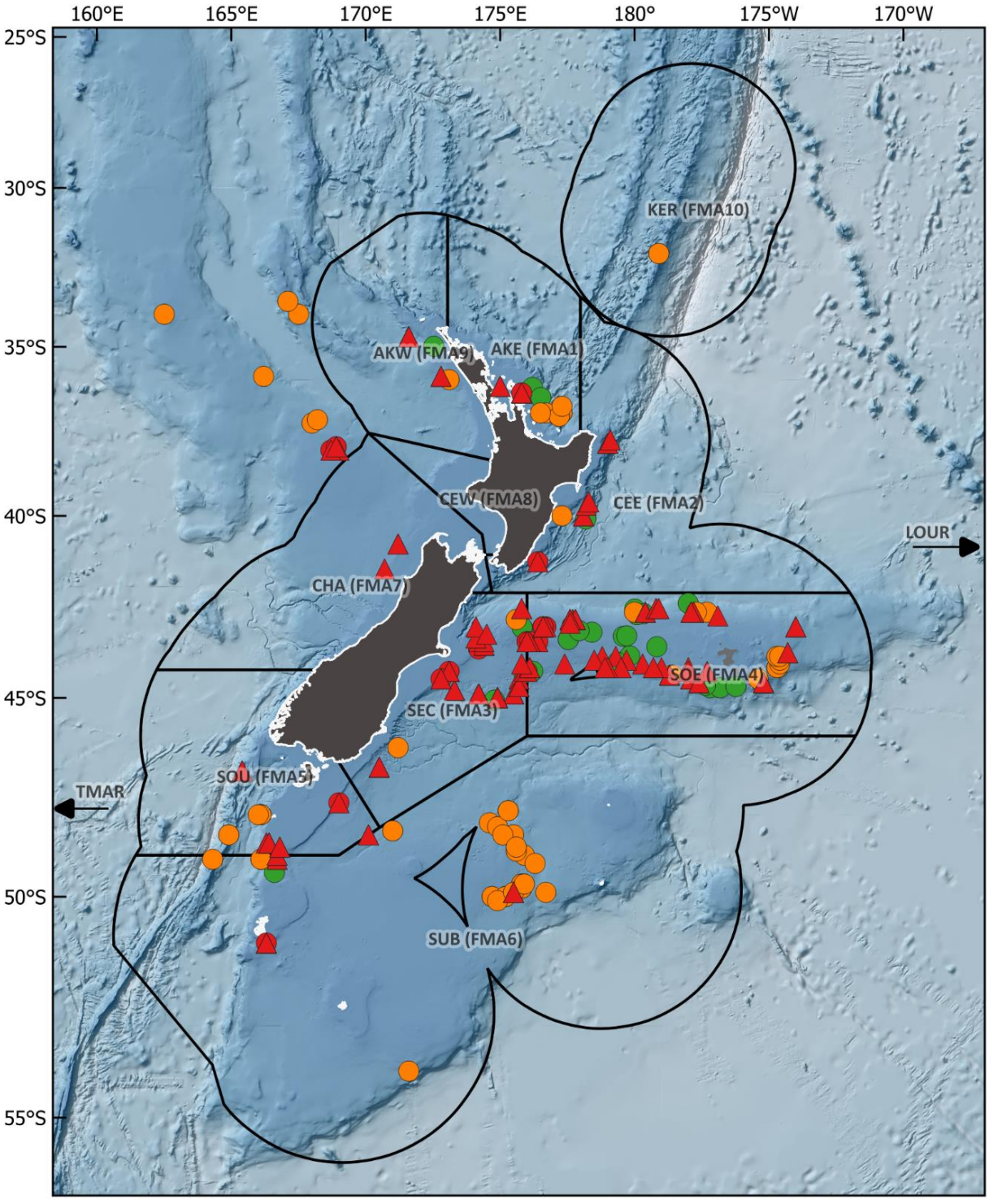

Figure 4-3: Location of identified protected coral samples within Fisheries Management Areas (FMAs). Red circles: current year physical samples; orange circles: historical physical samples; green circles: research trawl survey physical samples; red triangles: current year images. Some historical physical samples were collected from the ET area beyond New Zealand's EEZ and outside of this map range, to the far east from the southeast Louisville Seamount Chain (LOUR) and the far west from the Tasmanian Ridge (TMAR) (black arrows). Furthermore, some historical and current year physical specimens/images were identified from ET areas within the map area beyond the EEZ to the northwest, from the Challenger Plateau (CET), Lord Howe Rise (HOWE) and Wanganella Bank (WANB).

4.3.3 Summary of specimens from images data loading processes into COD

The revised identifications of the specimens from images for this reporting period were provided for uploading into COD.

In total, 320 digital files were provided which consists of 308 images and two videos, and 10 duplicate images (due to some images showing more than one protected coral taxa, these were duplicated so that the expert identification of each taxa could be uploaded/updated). Of the 320 files:

- 54 images matched on niwa_catalogue_number indicating that the specimen in the image matches a physical specimen in the NIC (23 benthic table rows; 23 specimens).
- 306 images were matched to benthic rows (149 benthic table rows/items).
- 14 images were inserted to the benthic table (10 benthic rows).

A total of 159 benthic table rows (benthic items) were updated or inserted/created. Additionally, approximately 200 images also matched on fnz_image_filename (the original filename before they were processed at NIWA), proving that this is a useful field to help with matching benthic records. All images were matched to benthic table (i.e. no images were matched only the general catch table).

4.3.4 Data summaries and locality plots for specimens from images identifications

Data summaries for the protected coral specimens identified from images in the current reporting year (1 July 2023–30 June 2024) are provided below. These include a count by FMA (Table 4-4) and a count of tows and protected coral specimens by fishing method and target fishery (Table 4-5). Also presented is a summary of the number tows with more than one different species of protected coral specimens (Table 4-6) and the number of tows that a protected coral species is caught across (Table 4-7). Also see Figure 4-3 that illustrates the geographic spread of protected coral bycatch from digital images in the region.

These data summaries only report on the number of specimens counted from digital images, and no reporting is done on unphotographed protected coral bycatch that is recorded by Observers in the benthic or general catch tables.

Table 4-4: Protected coral specimens from images by Fisheries Management Area (FMA), ordered by specimen count.

FMA	Description	No. of specimens
SOE	South East (Chatham Rise) (FMA 4)	306
SEC	South East Coast (FMA 3)	181
AKW	Auckland West (FMA 9)	109
CEE	Central East (FMA 2)	57
SUB	Subantarctic (FMA 6)	24
CET	Challenger Plateau, beyond the EEZ (ET)	10
SOU	Southland (FMA 5)	7
SOI	Southern Offshore Islands - Auckland & Campbell Is. (FMA 6A)	5
AKE	Auckland East (FMA 1)	4
CHA	Challenger (Central Plateau) (FMA 7)	3
	Total	706

Table 4-5: Count of tows by fishing method and target fishery for protected coral specimens from images. BT = Bottom Trawl, BLL = Bottom Longline.

Target fishery (common name)	Code	Fishing method code	Count of tows	No. of specimens
Scampi	SCI	BT	19	195
Orange roughy	ORH	BT	26	183
Hoki	HOK	BT	18	154
Smooth oreo	SSO	BT	14	81
Oreos	OEO	BT	2	21
Alfonsino & long-finned beryx	BYX	BT	2	21
Arrow squid	SQU	BT	5	7
Silver warehou	SWA	BT	2	17
Bluenose	BNS	BLL	4	10
Ling	LIN	BT	6	6
Snapper	SNA	BLL	1	3
Black oreo	BOE	BT	4	4
Hake	HAK	BT	2	3
Trevally	TRE	BT	1	1
		Total	106	706

Table 4-6: Count of tows by number of coral taxa photographed.

Number of different coral taxa	Number of tows
1 taxon of coral was photographed	89
2 taxa of coral were photographed	12
3 taxa of coral were photographed	3
4 taxa of coral were photographed	1
5 taxa of coral were photographed	1

Table 4-7: Count of tows in which a coral taxon was caught.

Coral taxon	Code	Number of tows caught in
Flabellum knoxi	COF	20
Solenosmilia variabilis	SVA	13
Goniocorella dumosa	GDU	12
Thouarella	THO	9
Caryophylliidae	SIA	7
Keratoisis	BOO	6
Desmophyllum dianthus	DDI	5
Acanthogorgia, Caryophyllia	ACC, CAY	4
Enallopsammia rostrata, Isidella, Leiopathes, Metafannyella chathamensis, Paragorgia, Parantipathes, Primnoa notialis, Stephanocyathus platypus	ERO, ISP, LEI, MEF, PAB, PTP, PMN, STP	3
Acanthogorgiidae, Antipatharia indet., *Flabellum,* Stylasteridae indet., *Tokoprymno*	ACD, COB, COF, COR, TOK	2
Acanella, Acanthogorgia?, *Callogorgia, Chrysogorgia, Conopora verrucosa, Culicia rubeola, Eguchipsammia japonica, Errina, Fanellia*?, *Keratoisididae, Leiopathes secunda, Lillipathes, Madrepora oculata, Parastenella,* Scleractinia indet.*, Thouarella (Euthouarella) hilgendorfi, Trachythela*?	ACN, ACC, CLG, CHR, COO, CUR, EJA, ERR, PRI, ISI, LSE, LIL, MOC, PLD, SIA, THO, VIC	1

The FMAs with the highest number of photographed protected coral bycatch specimens were the SOE South-East (Chatham Rise) (FMA 4) and SEC South-East Coast (FMA 3) regions, with AKW Auckland West (FMA 9) the next highest. The bottom trawl operations with the highest number of photographed protected coral specimens were those targeting scampi, orange roughy, hoki and oreo, and these were mostly stony corals *Flabellum knoxi* (COF), *Solenosmilia variabilis* (SVA) and *Goniocorella dumosa* (GDU).

4.4 Objective 4: Determine whether genetic taxonomic assessment of coral ID is an efficient means to determine or improve image-based or morphological coral ID, and to use genetic data to better understand coral bycatch

The NIC currently holds 50 specimens of *Anthothela* plus two specimens of the related genus *Lateothela*. Of these, 14 *Anthothela* specimens and one *Lateothela* specimen originated from Observer collections of fishery bycatch. All bycatch specimens were sampled for further processing, except two that were unable to be located (NIWA 11330 & 62915). An additional 24 specimens (23 *Anthothela* plus the second specimen of *Lateothela*) obtained from NIWA voyages (trawl surveys and research expeditions) were included. In total, 37 specimens were sampled, and all were successfully sequenced using genome skimming (Figure 4-4).

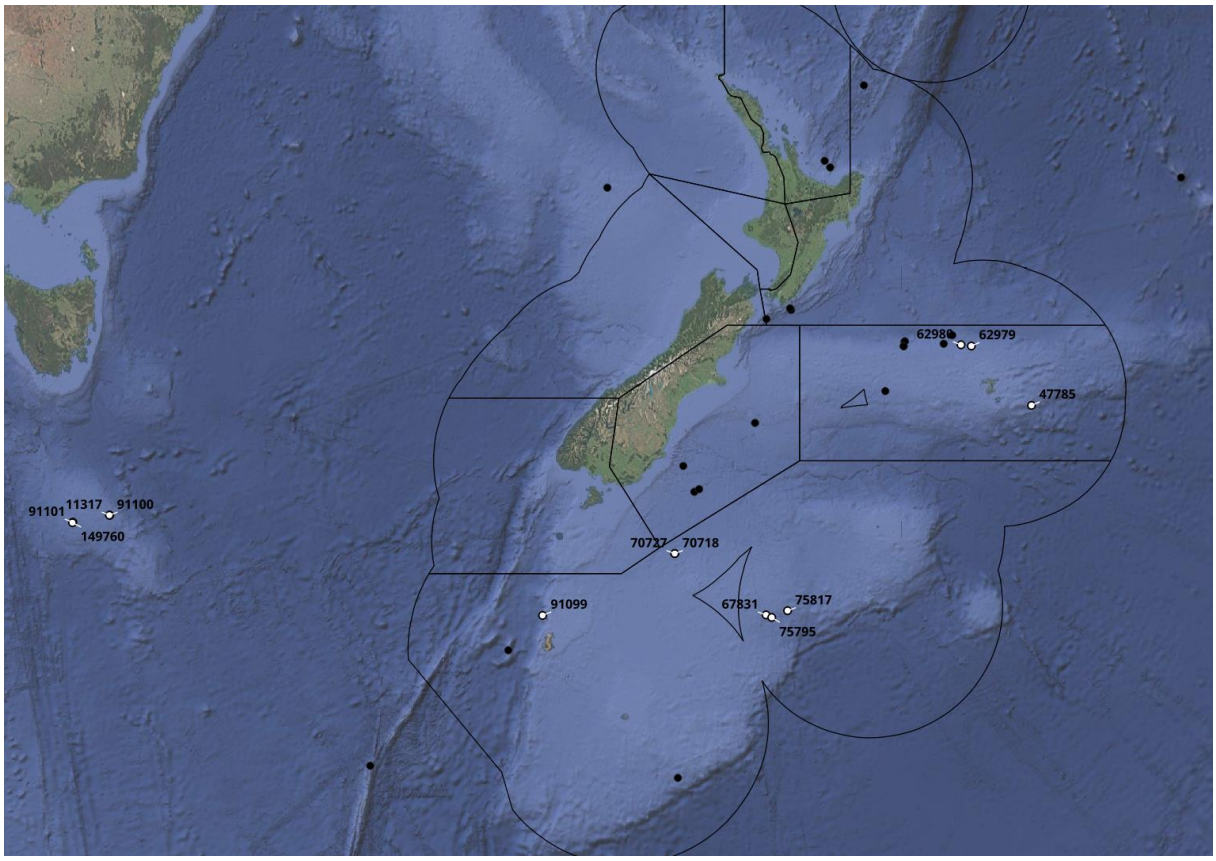

Figure 4-4: Map showing the capture location of 37 NIC specimens DNA-sequenced using genome skimming. White circles denote specimens obtained from fisheries bycatch, black circles denote specimens obtained from other collection events, lines delineate FMA boundaries (within-EEZ) and international zones (international waters and Australian territorial seas). For clarity, NIC catalogue numbers are only labelled for bycatch specimens.

Genome skimming produced an average of 31 million reads per sample (range: 5.1-53.7x10^6), resulting in an average of 4.1 billion basepairs of DNA sequence per sample (range: 0.4-7.6x10^9) (Appendix D).

Assembled contigs recovered all 17 mitochondrial genes for 36 of the 37 sequenced specimens. Of these, 28 specimens had full length sequences for all mitochondrial genes recovered, as whole mitogenome sequences of approximately 19,800 bp in length. Eight specimens had sequences for all 17 genes but one or more of these were incomplete, preventing a full mitogenome reconstruction. Specimen 162829 – the specimen that produced the least DNA sequencing data overall (see Appendix D) – failed to produce any sequences that could be mapped to any mitochondrial gene.

An average of 2016 UCE loci were recovered from the assembled sequences, with five samples producing less than 1000 contigs each (*Anthothela*: 162829, 47785, 62979, 62980; *Lateothela*: 70718). Final datasets of aligned UCE loci included 352,163 bp for 312 UCE loci among at least 85% of included samples and 2,255,684 bp for 2133 UCE loci among at least 70% of included samples. Initial phylogenetic results of these alignments are presented in Figure 4-5. Sample 64134 is suspected to be a misidentified specimen of *Trachythela* – a member of the Victorgorgiidae that superficially resembles some *Anthothela* and *Lateothela*. This sample was used to outgroup root the remaining sequenced samples. Of the two included *Lateothela* specimens, only one (83336) formed a sister clade to *Anthothela* specimens, with *Lateothela* 70718 nested among them. 70718 is an unbranched,

encrusting specimen that may represent a small, undeveloped *Anthothela* colony rather than *Lateothela*, although closer morphological investigation is required. Specimen 70718 also produced few UCE loci (104) and thus its phylogenetic position may be influenced by missing data. The remaining specimens were divided amongst the *Anthothela* ingroup into two basal lineages – one containing four specimens (indicated in red in Fig. 4-5) that were widely distributed from the Chatham Rise, Challenger Plateau and Bay of Plenty seamounts, and a second clade containing the majority of *Anthothela* specimens that were distributed from the Tasmanian seamounts, across New Zealand (from the Hjort Trench to the Kermadec Arc), to the Louisville Seamount Chain. We surmise that the four members of the former clade (in red) represent a species of *Anthothela* distinct to the latter, larger clade and may represent either a new species or a new record for a species of *Anthothela* described from abroad. The relationships among specimens of the larger clade, which includes all bycatch specimens, show little evolutionary structuring and genetic diversity is likely to be intra-specific, and thus better analysed in a population genomic framework capable of incorporating interbreeding and admixture into estimates of population structure. However, we note that all bycatch specimens from the Tasmanian seamounts represented a distinct lineage within this clade (in blue, Fig. 4-5) that may represent a third distinct species or a genetically distinct population.

In summary, genomic characterisation of a commonly bycaught coral uncovered misidentified specimens and a potential new species in New Zealand. All bycatch specimens of *Anthothela* that were characterised from within NZ territorial waters belong to a single species, while a second, possibly new species is represented among NZ specimens collected by other means, with a potential third species occurring overseas on Tasmanian seamounts.

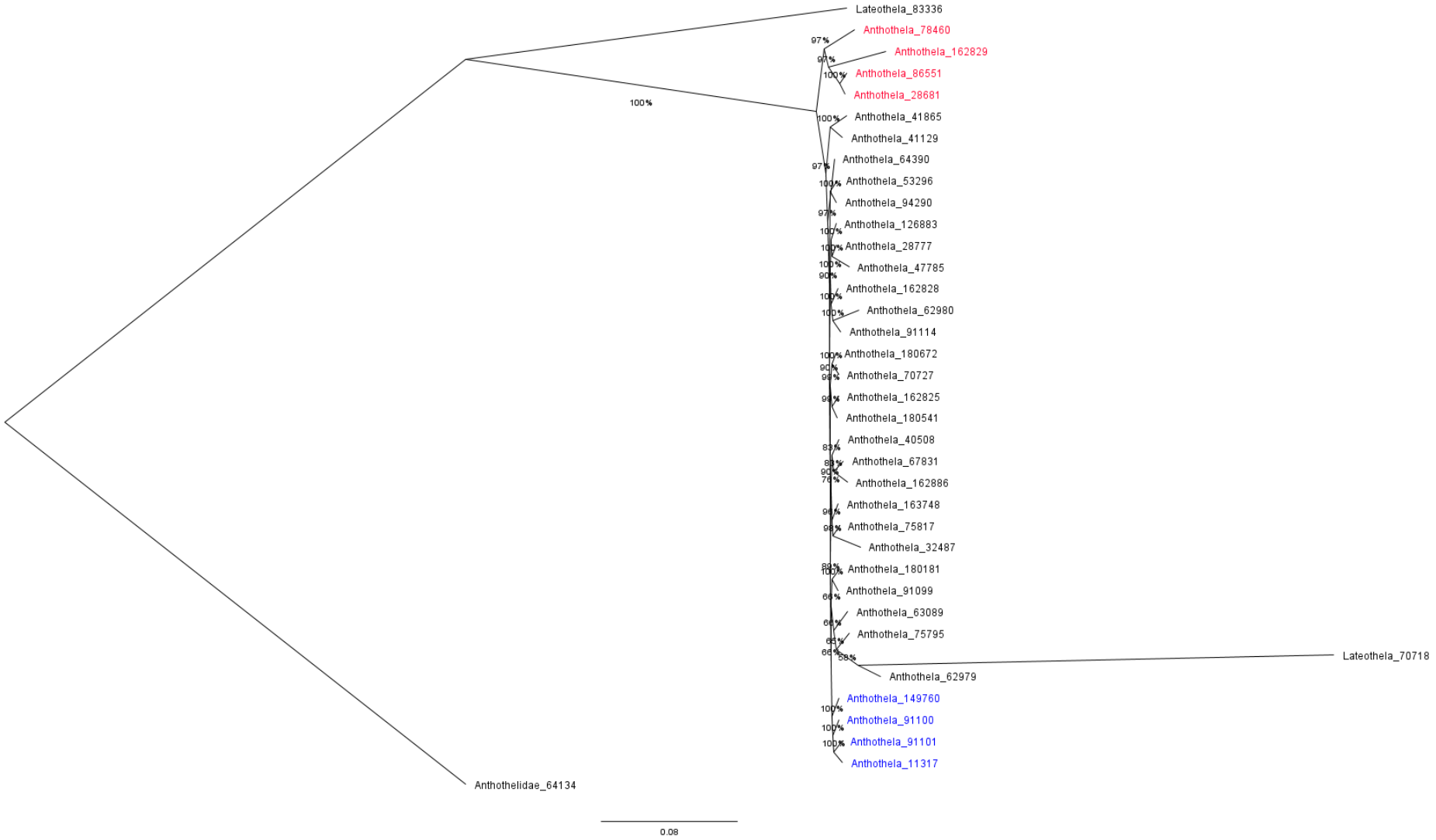

Figure 4-5: Bayesian phylogenetic results for UCE dataset containing at least 70% of included samples at each locus. Node labels indicate posterior probability support values. Coloured samples are discussed in text: red specimens represent a putative 2nd species of *Anthothela*; blue specimens represent samples from Tasmanian seamounts. Note that outgroup 64134 likely represents a misidentified specimen of *Trachythela* (Victorgorgiidae).

4.5 Objective 5: Update and provide input into coral-relevant resources for Fisheries Observers, including reference material and material for observer training

Updates have been made to the 2016 document "Instructions to observers when carrying out at-sea protected coral data collection" (Macpherson et al. 2025) to reflect NIWA staff changes and the revised Coral Identification Guide (Tracey et al. 2023). A copy has been provided to CSP for approval and was also included in Appendix C in Macpherson et al. (2024). Once approved it should be forwarded to the Observer Services Unit of the FNZ Observer Programme for dissemination to the Observers.

A meeting with DOC CSP and NIWA was held on the 6th of March 2025 to discuss updates to the revised Coral Identification Guide. Most importantly NIWA provided guidance around recent taxonomic revisions which needed to be corrected in the hierarchy shown in the guide. Also, some minor corrections, layout adjustments and changes to some specimen images were advised.

On the 8th of April 2025, NIWA hosted 11 MPI Observers and one office staff member for refresher training on how to identify protected coral species at sea within the NZ EEZ. NIWA staff first discussed with the Observers the importance of accurate labelling and data recording, emphasising the recording of the weight of coral bycatch and appropriate use of the MPI three-letter codes. Specifically, the use of the coral rubble codes (code CBB, code CBD if dead) was discouraged as taxa specific codes are preferred, for example SIA (Scleractinia) or CBR (stony branching corals). Emphasis was also placed on the collection of representative coral subsamples along with photographs for expert identification.

An overview of the procedure used for the collection coral data, photographing, and subsampling was outlined, and the Observers were referred to the Coral Identification Guide for detailed instructions. NIWA coral experts then explained how to recognise the protected coral groups including Scleractinia, Antipatharia, gorgonian octocoral families Keratoisididae, Mopseidae, Corallidae, Primnoidae, Plexauridae, Victorgorgiidae, Acanthogorgiidae and Chrysogorgiidae, and hydrocoral family Stylasteridae. Advice was also given about how to tell apart the most common species within these groups using specimens from the NIWA Invertebrate Collection to demonstrate their characteristic features (Figure 4-6). Representative specimens were on display of all the protected coral genera that are mentioned in the guide, with their MPI three-letter codes. Specimens of non-coral taxa that are most often confused as protected coral species were also displayed and pointed out to the participants, these included polychaete tube building worms from the family Serpulidae, a variety of different forms of bryozoans including *Tetrocycloecia neozelanica*, sponges *Dendrilla rosea* and ostrich egg sponge *Geodia vestigifera*, and hydroids *Cryptolaria*, *Nemertesia* and *Symplectoscyphus*.

To finish the training, some recently collected coral samples which have yet to be identified by an expert were examined alongside the Observers who collected them as a real time identification exercise. This was valued by the Observers and was an excellent opportunity for them to learn if they were correct with their identification on board.

Figure 4-6: Specimens from the NIWA Invertebrate Collection laid out for Observers to examine at the refresher training, alongside ID guides and other reference material.

5 Summary and Conclusions

This is the second year of a three-year project for the identification, storage and genetics of protected coral bycatch and continues the work of several multi-year time-series of fisheries bycatch projects. Not only do these accumulated coral records contribute to filling knowledge gaps around spatial distribution of species, but they help describe the overall composition of observed bycatch and provide data that can be used to improve both predictive habitat suitability models and risk assessments, as well as expand knowledge of the region's biodiversity.

The objective for this reporting period to detail all bycaught physical samples and digital images returned by fisheries Observers was met. The methods used to achieve this have been consistent and standardised over several years, although a slightly new method was tried this year with regards to the order of extracting the required data from COD for the specimens from images. The required database updates for both physical specimens and specimens from images have been made.

Both the physical specimens and specimens from images are highly valuable and continue to augment datasets used to highlight interactions between fishing and protected corals, for example in the modelling of species distributions and community classifications. Recognising the importance of these data for enhancing basic understanding of coral distribution and given recent elucidation of unexplored cryptic diversity in some coral groups, we encourage Observers to return a specimen or subsample of it whenever they are able to, regardless of how confident they are in their identification. Emphasis has been given through the in-person refresher training to retain a subsample of every species of coral bycatch in order to increase physical sample collection for expert identification and genetic subsampling.

Overall, the accuracy of the Observer identification is good and for some groups can usually be correctly carried out to family and sometimes genus or species level. While the sample sizes used in the general accuracy summaries are small, it is nevertheless clear certain taxa continue to be confused. A few Observers have provided their email address on specimen labels seeking direct feedback from experts on the identification of specimens (which has been given). This highlights an encouraging interest in improving their identification skills.

A total of 177 physical specimens (including research trawl and Observer collected), and 765 specimens from digital images and videos were identified or verified to the lowest taxon level possible by experts. All the processed images and videos were able to be georeferenced. There were 261 digital images and two videos taken of protected coral taxa and 47 digital images taken of non-coral or non-protected coral taxa.

Data summaries of protected coral bycatch occurring in New Zealand region fisheries were presented by FMA, fishing method, and target fishery. The greatest number of protected coral specimen counts from both the physical specimens and specimens from images from this reporting period came from SOE South East (Chatham Rise) (FMA 4) and SEC South East (Coast) (FMA 3). Most were taken by bottom trawl operations targeting scampi, orange roughy, hoki and oreo. The most caught and photographed coral species were stony corals *Flabellum knoxi* followed by Caryophyllidae, *Solenosmilia variabilis* and *Goniocorella dumosa*. Large numbers of octocorals were also noted, such as bamboo coral *Keratoisis*, bubblegum coral *Paragorgia* and primnoid coral possibly of the genus *Fanellia*.

Similar to previous projects, the number of Observer specimens photographed was high for this reporting period, however physical samples returned for identification from within the EEZ were low (39 physical specimens in 23 samples), albeit a slightly higher number than the previous two years.

Genetic analysis, via genome skimming was successful for all 37 specimens, including older specimens collected in 1967 and 1978 (NIWA 162829 & 163748 respectively) and a specimen originally fixed in formalin prior to ethanol preservation (NIWA 47785). DNA sequencing via skimming recovered more data than the target-bait enrichment method used previously (Bilewitch 2024), was cheaper, and could be wholly conducted within New Zealand. In addition, it recovered whole mitogenomes from most specimens, providing valuable marker data for reference in future barcoding studies. The efficacy of genome skimming as a tool for population genomics requires further testing but the genetic variability seen amongst specimens of *Anthothela* indicate it is likely to be useful for spatial assessments of genetic connectivity and (potentially) genetic hotspots. However, as a tool for improving the identification of bycatch, genome skimming was able to unambiguously distinguish morphologically similar and highly cryptic species (including regional variants), and diagnose specimens misidentified through visual means (images and morphology). As seen in previous CSP reports (Bilewitch et al. 2024, Connell et al. 2024), modern phylogenomic applications are thus essential for accurately and precisely determining the extent of commercial fishing effects on protected species diversity.

6 Recommendations

Hands-on and in-person training for new observers or refresher training for experienced observers is proving to be the most effective method of taxonomic knowledge transfer and it is recommended that this type of training is continued. It provides an excellent opportunity to demonstrate to Observers the easily confused non-coral taxa and emphasise the return of subsamples of each species of coral bycaught in the fishing area. In particular, highlighting the differences between the cup coral taxa in family Caryophyllidae would be worthwhile exercise for future training, as there was some confusion between *Desmophyllum dianthus* and other cup corals in the same family in this reporting period.

No formal 'analyses of accuracy' have been carried out between the Observer and the expert identifications but a non-statistical summary of the accuracy of Observer ID for this report indicates that the accuracy of Observer code use is hovering around 50%, noting that physical sample sizes are small and some identifications are accurate at least to some level. All physical samples of corals and images of corals taken and retained by Observers are identified through this project and its predecessors and their expert IDs are entered into COD. Prior to this project and CSP projects INT2015-03 and INT2019-04, corals were included for several years under FNZ projects to identify benthic invertebrate bycatch (also see Background section 1). Expert IDs of physical specimens have been entered into COD since at least 2006 (Tracey & Consalvey 2006, Tracey & Sanders 2010). Expert IDs from images from the current and previous two reporting years (July 2021 – June 2022, July 2022 – June 2023, July 2023 – June 2024) have been entered into COD, but not earlier as COD matching and updating processes did not yet exist, and the backlog since 2017 requires further funding to complete. It is recommended to end users of COD data to be cautious of using protected coral identifications that do not have an expert ID, as the identification of samples that were not retained or photographed are not verified by experts. Furthermore, it is recommended that the "Instructions to observers when carrying out at-sea protected coral data collection" document is finalised and forwarded to the Observer Services Unit of the FNZ Observer Programme for dissemination to the Observers, along with updated copies of the revised Coral Identification Guide.

The application of DNA barcoding (Bilewitch & Tracey 2020a) and phylogenomic approaches (Bilewitch 2022, Bilewitch 2024, Connell et al. 2024, this report) has significantly improved and expanded our understanding of coral diversity and the breadth of protected species impacted by commercial fishing operations in New Zealand. The continued application of such methods (DNA barcoding for routine screening, skimming for detailed analysis) is recommended for ongoing bycatch characterisation and documentation, particularly for protected families that have not recently been subject to such analyses in New Zealand, such as the bubblegum corals (*Paragorgia* spp.) and smaller bamboo corals (Mopseidae).

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8 References

Aberer, A.J., Kobert, K., Stamatakis, A. (2014) ExaBayes: Massively Parallel Bayesian Tree Inference for the Whole-Genome Era. *Molecular Biology and Evolution,* 31(10): 2553-2556. 10.1093/molbev/msu236

Allio, R., Schomaker-Bastos, A., Romiguier, J., Prosdocimi, F., Nabholz, B., Delsuc, F. (2020) MitoFinder: Efficient automated large-scale extraction of mitogenomic data in target enrichment phylogenomics. *Molecular Ecology Resources*, 20(4): 892-905. 10.1111/1755-0998.13160

Anderson, O., Tracey, D., Bostock, H., Williams, M., Clark, M. (2014) Refined habitat suitability modelling for protected coral species in the New Zealand EEZ. *NIWA Client Report* WLG2014-69, prepared for Department of Conservation. http://www.doc.govt.nz/Documents/conservation/marine-and-coastal/marine-conservation-services/reports/models-predicting-future-distributions-corals-nz-niwa-dec-2015.pdf

Anderson, O., Carswell, S., Connell, A. (submitted) Understanding coral bycatch. Assessing large catches. Report prepared for Project INT2023-10, Conservation Services Programme, Department of Conservation. *NIWA Client Report* 2025053WN: 53 p.

Bankevich, A., Nurk, S., Antipov, D., Gurevich, A.A., Dvorkin, M., Kulikov, A.S., Lesin, V.M., Nikolenko, S.I., Pham, S., Prjibelski, A.D., Pyshkin, A.V., Sirotkin, A.V., Vyahhi, N., Tesler, G., Alekseyev, M.A., Pevzner, P.A. (2012) SPAdes: a new genome assembly algorithm and its applications to single-cell sequencing. *Journal of Computational Biology,* 19(5):455-77. 10.1089/cmb.2012.0021.

Bilewitch, J.P., Tracey, D. (2020a) Coral biodiversity in deep-water fisheries bycatch. Final Report prepared by NIWA for the Conservation Services Programme, Department of Conservation. DOC19304-INT201905. *NIWA Client Report* 2020223WN: 36 p.

Bilewitch, J.P., Tracey, D. (2020b) Protected coral connectivity in New Zealand. Final Report prepared by NIWA for the Conservation Services Programme, Department of Conservation. DOC19306-POP201806. *NIWA Client Report* 2020222WN: 32 p.

Bilewitch, J.P. (2022) Octocoral bycatch diversity on the Chatham Rise. DOC21302. *NIWA Client Report* 2022138WN: 23 p.

Bilewitch, J. (2024) High-resolution estimation of species diversity for a protected coral family commonly occurring as trawl bycatch. INT2023-05 final report prepared by NIWA for Department of Conservation. *NIWA Client Report* 2024188WN. 31 p. https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/reports/202324-annual-plan/int2023-05-high-resolution-estimation-of-species-diversity-for-a-protected-coral-family-commonly-occurring-as-trawl-bycatch-final-report.pdf

Clark, M., Tracey, D., Anderson, O., Parker, S. (2014) Pilot ecological risk assessment for protected corals. Prepared for New Zealand Department of Conservation, Wellington. *NIWA Client Report* WLG2014-70. 32 p. http://www.doc.govt.nz/Documents/conservation/marine-and-coastal/marine-

conservation-services/reports/pilot-ecological-risk-assessment-for-protected-corals-final-report.pdf

Clark, M.R., Bowden, D.A., Rowden, A.A., Stewart, R. (2019) Little evidence of benthic community resilience to bottom trawling on seamounts after 15 years. *Frontiers in Marine Science*, 6: 63 p.

Clark, M., Finucci, B., Anderson, O., Tracey, D., Kaikkonen, L., Stephenson, F. (submitted) INT2022-04 Risk Assessment for Protected Corals. Final Report Prepared for Conservation Services Programme, Department of Conservation.

Committee on Common Philosophies and Objectives (2010) *Guidelines for the Care of Natural History Collections*. Society for the Preservation of Natural History Collections. Webpage url: http://cool.conservation-us.org/byorg/spnhc/spnhc1.html last accessed 26 March 2025.

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 3. Final Annual Report. Prepared for Conservation Services Programme, Department of Conservation. *NIWA Client Report* 2024096WN. 64p.

Connell, A., Mills, S., Bilewitch, J., Macpherson, D. (2023) INT2022-03 Identification and storage of cold-water coral bycatch specimens 1 July 2022 – 31 December 2022. Milestone 1. Six monthly progress update prepared by NIWA for the Conservation Services Programme, Department of Conservation. DOC23303 – INT2022-03. *NIWA Client Report* 2023325WN 26 p.

Erickson, K.L., Pentico, A., Quattrini, A.M., McFadden, C.S. (2020) New approaches to species delimitation and population structure of anthozoans: two case studies of octocorals using ultraconserved elements and exons. Molecular Ecology Resources, 21: 78-92. 10.1111/1755-0998.13241

Faircloth, B.C. (2016) PHYLUCE is a software package for the analysis of conserved genomic loci. *Bioinformatics,* 32:786-788. doi:10.1093/bioinformatics/btv646.

Georgian, S., Anderson, O., Rowden, A. (2019) Ensemble habitat suitability modelling of vulnerable marine ecosystem indicator taxa to inform deep-sea fisheries management in the South Pacific Ocean. *Fisheries Research*, 211: 256–274.

International Press Telecommunications Council (2024, December 11) *IPTC Photo Metadata User Guide*. Retrieved from iptc.org: https://www.iptc.org/std/photometadata/documentation/userguide/

Katoh, K., Standley, D.M. (2013) MAFFT multiple sequence alignment software version 7: improvements in performance and usability. *Molecular Biology & Evolution*, 30(4): 772-780. 10.1093/molbev/mst010

Macpherson, D., Connell, A., Bilewitch, B., Wood, R. C. (2024) INT2022-03 Identification, storage and genetics of cold-water coral bycatch specimens. Milestone 4. Six monthly progress update. Prepared by NIWA for the Conservation Services Programme, Department of Conservation. DOC23303-INT2022-03. *NIWA Client Report* 2024354WN.

Macpherson, D., Mills, S., Connell, A. (2025) Instructions to observers when carrying out at-sea protected coral data collection. Project INT2022-03. 8p.

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). 10.18061/bssb.v1i3.8735

Mills, S., Bilewitch, J., Moore, K. (2024) INT2023-07 Expert identifications of protected corals: Mopseidae, Anthothela, Victorgorgia and kin. Prepared for Conservation Services Programme, Department of Conservation. *NIWA Client Report* 2024234WN. 56 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. NIWA Client report

Neill, K., Mills, S. (2024) Interim report on the workshop following on from the TAN2402 Ocean Census voyage to the Bounty Trough. *NIWA Client Report* 2024315WN. 22 pp.

Parker, S.J., Mormede, S., Tracey, D., Carter, M. (2009) Evaluation of VME taxa monitoring by scientific observers from New Zealand in the Ross Sea Antarctic toothfish longline fishery during the 2008-09 season. Document WG-TASO 09/08. CCAMLR, Hobart, Australia: 13 p.

Rowden, A.A.; Anderson, O.F.; Neubauer, P.; Hamill, J.; Bowden, D.A.; Tremblay-Boyer, L.; Charsley, A.; MacGibbon, D. (2024) Spatially explicit benthic impact assessments for bottom trawling in New Zealand. *New Zealand Aquatic Environment and Biodiversity Report No. 329*. 118 p.

Rowden, A., Anderson, O.F., Georgian, S.E., Bowden, D.A., Clark, M.R., Pallentin, A., Miller, A. (2017) High-resolution Habitat Suitability Models for the Conservation and Management of Vulnerable Marine Ecosystems on the Louisville Seamount Chain, South Pacific Ocean. *Frontiers in Marine Science,* 4*:* 1–19.

Quattrini, A.M., Faircloth, B.C., Dueñas, L.F., Bridge, T.C.L., Brugler, M.R., Calixto-Botía, I.F., DeLeo, D.M., Forêt, S., Herrera, S., Lee, S.M.Y., Miller, D.J., Prada, C., Rádis-Baptista, G., Ramírez-Portilla, C., Sánchez, J.A., Rodríguez, E., McFadden, C.S. (2017) Universal target-enrichment baits for anthozoan (Cnidaria) phylogenomics: New approaches to long-standing problems. *Molecular Ecology Resources,* 2017: 1-15. 10.1111/1755-0998.12736

Quattrini, A.M., McCartin, L.J., Easton, E.E., Horowitz, J., Wirshing, H.H., Bowers, H., Mitchell, K., Gonzalez-Garcia, M.D.P., Sei, M., McFadden, C.S., Herrera, S. (2024) Skimming genomes for systematics and DNA barcodes of corals. *Ecology & Evolution,* 14(5): e11254. 10.1002/ece3.11254

Rambaut, A., Drummond, A.J., Xie, D., Baele, G., Suchard, M.A. (2018) Posterior Summarization in Bayesian Phylogenetics Using Tracer 1.7. *Systematic Biology,* 67(5): 901-904. 10.1093/sysbio/syy032

Sanders, B.M., Fisher, D.O. (2023) Database documentation for the Ministry for Primary Industries Centralised Observer Database (cod). *NIWA Fisheries Data Management Database Documentation Series*. Revised Nov 2023. 693 p. https://marlin.niwa.co.nz/files/dataHoldings/scientificResearchDbs/cod.pdf

Schnabel, K.E., Mills, V.S., Connell, A., Macpherson, D., Mitchell, M., Kelly, M., Peart, R.A., Hayward, L., Clinchard, S., Wood, C.R., Yeoman, J. (2024) Identification of benthic invertebrate samples from research trawls and observer trips 2021–24. *New Zealand Aquatic Environment and Biodiversity Report No*. XX. 65p.

Tracey, D., Baird, S.J., Sanders, B.M., Smith, M.H. (2011b) Distribution of protected corals in relation to fishing effort and assessment of accuracy of observer identification. *NIWA Client Report* WLG2011-33 prepared for Department of Conservation, Wellington: 74 p.

Tracey, D., Consalvey, M. (2006) Archived benthic bycatch final research report submitted to the Ministry of Fisheries for Research Project IPA200604, Objective 1. 26p. (Unpublished report held by the Ministry of Fisheries Wellington).

Tracey, D., Macpherson, D., Stewart, R., Bilewitch, J., Marriot, P., Cairns, S., Opresko, D., Alderslade, P., Sinniger, F., Kitahara, M. (2023) Coral Identification Guide - 3rd version. Department of Conservation Report. Wellington. 34 p. https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-conservation-services/resources/resources-for-fishers/csp-fishers-guide-to-protected-coral-2024.pdf

Tracey, D., Sanders, B. (2010) Updated coral identifications and subsequent loading into COD. Supplementary report prepared for Marine Conservation Services, Department of Conservation. 4 p.

Trevisan, B., Alcantara, D.M.C., Machado, D.J., Marques, F.P.L., Lahr, D.J.G. (2019) Genome skimming is a low-cost and robust strategy to assemble complete mitochondrial genomes from ethanol preserved specimens in biodiversity studies. *PeerJ*, 7: e7543. 10.7717/peerj.7543

Wildlife Act (1953) https://www.legislation.govt.nz/act/public/1953/0031/latest/whole.html

Appendix A Summary output from NIWA Invertebrate Collection (NIC) Specify Database niwainvert

This publicly accessible website can be used to search the initial and expert ID species codes: https://marlin.niwa.co.nz/species_codes/ and FMA codes: https://marlin.niwa.co.nz/area_codes/. Please note that the trip number has been removed from this table for reporting, but a complete dataset is available on request from CSP.

(a) Revised identifications of 39 bycatch specimens (in 23 sample lots) returned by observers between 1 July 2023 to 30 June 2024. Green highlighted cells indicate the level of matching where three-letter identification codes were correctly used, yellow highlighted cells indicate the level at which the identification is valid where incorrect identification codes were used.

NIWA Cat Num	Tow	OSD Num	MPI Sample Num	Initial ID Code	Expert ID code	Class	Order	Family	Full Taxon	Count	Date	Latitude1	Longitude1	Depth1	Depth2
172860	4	6610	2	LEI	COB	Hexacorallia	Antipatharia		Antipatharia	1	May-24	-36.4	175.8	100	104
171385	122	6588		COB	LSE	Hexacorallia	Antipatharia	Leiopathidae	*Leiopathes secunda*	1	Mar-24	-41.3	176.4	1080	
163469	6	6459	B2	DDI	CUP	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	2	Oct-23	-43.6	176.4	395	
163472	20	6462	B6	DDI	CUP	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	1	Oct-23	-43.6	176.1	360	
171379	3	6582	1	DDI	CUP	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	1	Feb-24	-43.1	176.6	322	
171380	8	6583	2	DDI	CUP	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	1	Feb-24	-43.1	176.7	328	
171381	12	6584	3	DDI	CUP	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	1	Mar-24	-43.1	176.7	340	
171384	23	6587	5	DDI	CUP	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	1	Mar-24	-43.1	176.7	318	
171382	19	6585	4	DDI	DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	1	Mar-24	-43.1	176.7	334	
163468	5	6458	B1	GDU	GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1	Oct-23	-43.6	176.0	350	
163471	14	6461	B4	GDU	GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1	Oct-23	-43.6	176.1	360	
171383	23	6586	6	GDU	SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	1	Mar-24	-43.1	176.7	318	
171372	70	6576	B27	COF	COF	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	1	Feb-24	-44.4	176.0	190	175
163473	57	6466		COF	COF	Hexacorallia	Scleractinia	Flabellidae	*Flabellum knoxi*	6	Jan-24	-44.4	173.2	340	
163474	59	6467		COF	COF	Hexacorallia	Scleractinia	Flabellidae	*Flabellum knoxi*	11	Jan-24	-44.6	172.8	330	

NIWA Cat Num	Tow	OSD Num	MPI Sample Num	Initial ID Code	Expert ID code	Class	Order	Family	Full Taxon	Count	Date	Latitude1	Longitude1	Depth1	Depth2
171378	36	6581		CUP	COF	Hexacorallia	Scleractinia	Flabellidae	*Flabellum knoxi*	1	Jan-24	-47.7	169.1	618	513
172858	81	6606	14	COU	ZAH	Hexacorallia	Zoantharia	Parazoanthidae	Parazoanthidae	1	Jan-24	-49.7	175.7	995	1044
173096	5	6681	11	COB	CRT	Hydrozoa	Leptothecata	Lafoeidae	*Cryptolaria*	1	Jun-24	-47.1	169.5	178	205
163476	23	6471		GOC	ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*	1	Jan-24	-38.1	168.9	591	460
171377	7	6565		GOC	ACD	Octocorallia	Malacalcyonacea	Acanthogorgiidae	Acanthogorgiidae	1	Oct-23	-43.7	174.2	489	496
163477	8	6472	2	GOC	BOO	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*	1	Jan-24	-38.0	168.9	480	521
163475	21	6470		GOC	THO	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella (Euthouarella) hilgendorfi*	1	Jan-24	-38.1	168.7	558	
173092	30	6676		GOC	TOK	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*	1	Jun-24	-51.1	166.3	450	389

(b) Revised identifications of 92 historical bycatch specimens (in 86 sample lots) returned by observers, identified between 13 March 2024 and 18 February 2025.

NIWA Cat Num	Tow	OSD Num	MPI Sample Num	Initial ID Code	Expert ID code	Class	Order	Family	Full Taxon	Count	Date	Latitude1	Longitude1	Depth1	Depth2
47913	123	76			LSE	Hexacorallia	Antipatharia	Leiopathidae	*Leiopathes secunda*	1	Nov-08	-44.5	-175.3	661	873
24194	24				TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes*	1	Apr-99	-37.4	168.0	661	
16224	129				TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1	Jun-99	-49.1	166.1	643	500
16225	129				TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1	Jun-99	-49.1	166.1	643	500
47877	87				TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1	Dec-07	-44.1	-174.6	835	1133
49470	190	150			TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1	Jan-09	-43.9	-174.5	748	936
49477	187	147			TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1	Jan-09	-43.9	-174.7	614	807
46849	86				CAY	Hexacorallia	Scleractinia	Caryophylliidae	*Caryophyllia*	2	May-02	-44.2	-174.6	1070	1081
3904	9				DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	1	Feb-99	-47.4	148.8	1100	
89157	24				GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1	Nov-99	-40.1	177.3	420	
171946	46				GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1	Aug-97	-37.1	177.3	788	961
15490	47				SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	1	Jun-03	-40.8	-165.3	900	960
89134	49				SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	1	Dec-98	-49.1	164.3	948	
96089	43				SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	1	Oct-01	-42.8	-180.0	885	1067
96090	39				SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	1	Aug-97	-37.0	176.7	976	
103351	2				SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	2	Sep-98	-47.3	148.4	953	
104312	86				MOC	Hexacorallia	Scleractinia	Oculinidae	*Madrepora oculata*	1	May-02	-44.2	-174.6	1070	1081
160377	80	6361	147		HDF	Hydrozoa	Leptothecata	Aglaopheniidae	Aglaopheniidae	1	Mar-23	-44.2	175.8	141	141
160338	28	6298	11	DEN	CRT	Hydrozoa	Leptothecata	Lafoeidae	*Cryptolaria*	1	Dec-22	-48.6	166.4	171	164
160368	19	6352		DEN	CRT	Hydrozoa	Leptothecata	Lafoeidae	*Cryptolaria prima*	1	Feb-23	-46.0	170.8	118	110

NIWA Cat Num	Tow	OSD Num	MPI Sample Num	Initial ID Code	Expert ID code	Class	Order	Family	Full Taxon	Count	Date	Latitude1	Longitude1	Depth1	Depth2
14422	12				ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*	1	Apr-98	-32.2	-179.1	128	
14429	32				ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*	1	Nov-98	-48.0	166.1	1079	
14518	38				ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*	1	Nov-98	-48.6	165.0	1061	
112284	15				ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*	1	Sep-98	-32.2	-179.1	122	307
163536	153				ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	Acanthogorgia	2	Oct-98	-50.1	175.2	1003	
162842	52				ACD	Octocorallia	Malacalcyonacea	Acanthogorgiidae	Acanthogorgiidae?	1	May-99	-54.1	171.7	1315	
62915	80		48		AND	Octocorallia	Malacalcyonacea	Alcyoniidae	Alcyoniidae (Anthothelidae) n. gen. A n. sp. B	1	Nov-08	-44.5	-178.6	785	880
62980	23				ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela* n. sp. 5	1	May-06	-42.7	-177.7	1166	1092
75817	101	2073			ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela* n. sp. 5	1	Jan-10	-49.9	175.5	870	1009
62979	143				ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	2	May-05	-42.8	-177.3	918	1040
70727	30		14		ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	1	Apr-09	-48.5	171.1	977	1037
75795	96	2025			ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	1	Sep-09	-50.1	174.9	1005	1020
149760	11				ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	1	Sep-98	-47.7	147.4	954	
70718	30				AND	Octocorallia	Malacalcyonacea	Alcyoniidae	*Lateothela*?	1	Apr-09	-48.5	171.1	977	1037
88665	112	2730			ICI	Octocorallia	Malacalcyonacea	Melithaeidae	*Iciligorgia* sp. 1	1	Nov-13	-43.0	175.7	530	714
163510	65				PRG	Octocorallia	Malacalcyonacea	Paramuriceidae	*Paramuricea*?	1	Aug-98	-37.1	177.3	614	648
41850	74	19			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Mar-08	-48.0	175.3	1021	1163
42417	225	77			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Mar-08	-49.8	175.8	1038	1111
42490	107	155			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Jul-08	-49.8	175.9	991	1004
42496	40	76			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Jul-08	-50.1	174.8	880	977
42500	43	82			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Jul-08	-50.1	175.3	1024	1115
42514	127	139	139		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Apr-08	-48.5	175.6	920	995
42551	38		B21		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Apr-08	-49.8	175.9	1010	1165

NIWA Cat Num	Tow	OSD Num	MPI Sample Num	Initial ID Code	Expert ID code	Class	Order	Family	Full Taxon	Count	Date	Latitude1	Longitude1	Depth1	Depth2
42617	65	64	B64		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Apr-08	-50.1	174.8	910	1030
46371	37		19		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Apr-08	-49.8	175.9	1049	1160
47779	34				GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Sep-07	-48.3	174.7	1048	1147
47780	48				GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Apr-08	-50.1	175.2	1020	1110
65920	32	1073			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Nov-08	-49.8	175.9	966	1064
65923	23	1076			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Nov-08	-49.0	175.6	869	880
65924	17	1077			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Nov-08	-48.4	174.9	911	1054
66113	70	914			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Nov-08	-50.1	175.2	865	1074
66310	82	370	18		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Sep-09	-49.8	175.8	1021	1072
67834	21				GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Nov-06	-49.3	176.3	1192	1300
75713	131	1851			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Jun-11	-49.7	175.9	870	
75853	18	2118			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Nov-08	-48.6	175.1	794	805
162870	136				GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1	Sep-98	-49.0	175.6	910	
91171	11				VCT	Octocorallia	Malacalcyonacea	Victorgorgiidae	*Victorgorgia*	1	Sep-98	-47.7	147.4	954	
66301	91	80			GOC	Octocorallia	Scleralcyonacea	Chelidonisididae	*Chelidonisis*	1	Jul-09	-36.0	166.2	809	978
149762	12				CHR	Octocorallia	Scleralcyonacea	Chrysogorgiidae	*Chrysogorgia*	1	Mar-00	-37.0	176.5	949	949
111958	39				GOC	Octocorallia	Scleralcyonacea	Isidoidae	*Isidoides*	1	Aug-97	-37.0	176.7	976	
163093	65				GOC	Octocorallia	Scleralcyonacea	Isidoidae	*Isidoides*	1	Aug-98	-37.1	177.3	614	648
44624	52				ISP	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*	1	Oct-07	-46.4	171.3	1098	1317
163255	29				ISP	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*?	1	Feb-02	-37.3	168.2	1074	
112213	39				JAS	Octocorallia	Scleralcyonacea	Keratoisididae	*Jasonisis*	1	Aug-97	-37.0	176.7	976	
101770	45				BOO	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*	1	Sep-98	-34.1	162.6	694	
163256	18				BOO	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*	1	Aug-02	-36.0	173.2	799	819
163544	24				BOO	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*	1	Nov-98	-48.0	166.1	940	1180

NIWA Cat Num	Tow	OSD Num	MPI Sample Num	Initial ID Code	Expert ID code	Class	Order	Family	Full Taxon	Count	Date	Latitude1	Longitude1	Depth1	Depth2
163687	6				BOO	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis magnifica*	1	Aug-98	-47.5	148.9	1024	
66255	170	801			ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	1	May-09	-49.9	176.7	896	942
104239	18				ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	1	Apr-02	-44.2	-174.6	985	1060
163275	66				ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	1	Aug-98	-36.9	177.4	765	787
90453	12				ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Echinisis eltanin*	1	Nov-98	-48.0	166.1	935	
90454	30				ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Echinisis eltanin*	1	Nov-98	-48.0	166.1	937	
149768	113				ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Echinisis eltanin*	1	Dec-98	-48.5	165.0	937	
66244	3	129			MIN	Octocorallia	Scleralcyonacea	Mopseidae	*Minuisis granti*	1	Jun-09	-34.0	167.5	767	1044
44621	129				ISI	Octocorallia	Scleralcyonacea	Mopseidae	Mopseidae indet.	1	Nov-07	-44.2	-174.5	775	1064
149767	24				ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Primnoisis (Primnoisis) chatham*	1	Nov-98	-48.0	166.1	940	1180
65641	267	1031	271		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Sclerisis* n. sp. 1	3	Dec-08	-48.0	175.3	646	1166
112212	39				CTP	Octocorallia	Scleralcyonacea	Primnoidae	*Calyptrophora* cf. *inornata*	1	Aug-97	-37.0	176.7	976	
66111	292	912			DSY	Octocorallia	Scleralcyonacea	Primnoidae	*Dasystenella*	1	Dec-08	-48.9	175.6	899	917
66112	65	913			DSY	Octocorallia	Scleralcyonacea	Primnoidae	*Dasystenella*	1	Nov-08	-50.1	175.3	781	1084
127586	6				PLD	Octocorallia	Scleralcyonacea	Primnoidae	*Parastenella*	1	Aug-98	-47.5	148.9	1024	
66280	17	30			THO	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella (Euthouarella)* cf. *hilgendorfi*	1	Jul-09	-33.7	167.1	633	836
112214	38				THO	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella (Euthouarella)* cf. *hilgendorfi*	1	Jul-98	-37.0	176.7	972	1207
42609	215	219			THO	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella (Thouarella) brevispinosa*	1	May-08	-48.0	175.3	1050	1120
66313	105	392			THO	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella* n. sp. 1	1	Dec-09	-44.5	-178.8	977	963

(c) Revised identifications of 46 research trawl survey collected specimens (in 32 sample lots) returned by fisheries staff between 1994 and 2022 identified during the current reporting year.

NIWA Cat Num	Voyage	Tow	Initial ID Code	Expert species code	Class	Order	Family	Taxon	Count	Date	Latitude1	Longitude1	Depth 1	Depth 2
19848	TAN9406	254		TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1	04/07/1994	-42.74	-179.67	817	817
24193	SMT9801	3		TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1	16/06/1998	-36.54	176.52	906	
104317	AEX9901	20		CAY	Hexacorallia	Scleractinia	Caryophylliidae	*Caryophyllia*	1	26/06/1999	-42.77	-179.91	940	
171910	TAN9701	101		CAY	Hexacorallia	Scleractinia	Caryophylliidae	*Caryophyllia profunda*	1	22/01/1997	-43.44	177.54	325	298
89097	AEX9901	6		DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	1	23/06/1999	-42.61	-179.99	1173	
35262	TAN0012	42		DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	8	6/12/2000	-49.42	166.60	550	522
35261	TAN0101	68		DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	3	10/01/2001	-43.89	179.82	409	408
173606	TAN1001	25	CAY	DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	2	6/01/2010	-43.64	-179.17	407	408
147901	TAN2001	87	DDI	DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	1	23/01/2020	-44.29	176.21	341	387
47058	TAN0001	127		DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	1	20/01/2000	-43.34	179.71	465	
47037	TAN0101	99		DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	1	17/01/2001	-44.35	175.88	285	
47052	AEX0101	80		DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	1	1/11/2001	-44.74	-176.81	753	
25587	KAH0108	21		DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	5	4/09/2001	-43.12	175.82	467	
35260	TAN0101	82		GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1	13/01/2001	-43.07	177.68	322	319
173713	TAN9701	101		GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1	22/01/1997	-43.44	177.54	325	298
99646	TAN9701	105		GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1	22/01/1997	-43.25	178.41	372	386
92786	Z10012 (KAH0001)			GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1	17/02/2000	-36.23	176.20	340	340

NIWA Cat Num	Voyage	Tow	Initial ID Code	Expert species code	Class	Order	Family	Taxon	Count	Date	Latitude1	Longitude1	Depth 1	Depth 2
104319	TAN9901	56		GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1	14/01/1999	-43.20	177.93	317	
89015	X483 (TAN9406)			SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	1	4/07/1994	-42.76	-179.91	890	
88409	TAN9713	45		ERO	Hexacorallia	Scleractinia	Dendrophylliidae	*Enallopsammia rostrata*	1	8/12/1997	-45.06	174.78	1007	1017
88343	TAN9406	254		ERO	Hexacorallia	Scleractinia	Dendrophylliidae	*Enallopsammia rostrata*	1	4/07/1994	-42.74	-179.67	817	817
89248	AEX0101	80		MOC	Hexacorallia	Scleractinia	Oculinidae	*Madrepora oculata*	1	1/11/2001	-44.74	-177.18	753	
126883	TAN1801	25	SOC	ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	1	11/01/2018	-42.45	-178.00	865	893
162886	TAN9812	94		ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	1	27/10/1998	-44.06	179.37	673	
92216	KAH0109	22		ICI	Octocorallia	Malacalcyonacea	Melithaeidae	*Iciligorgia*	1	30/10/2001	-43.14	175.84	441	
173312	AEX0101	80		VIC	Octocorallia	Malacalcyonacea	Victorgorgiidae	*Trachythela*?	1	1/11/2001	-44.74	-176.81	753	
161320	TAN2215	31	PRI	FQU	Octocorallia	Scleralcyonacea	Funiculinidae	*Funiculina quadrangularis*	1	03/12/2022	-49.77	170.57	537	536
14377	TAN9812	41		CAN	Octocorallia	Scleralcyonacea	Keratoisididae	*Acanella*	1	11/10/1998	-44.67	-177.36	998	
27625	TAN0701	14		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	1	31/12/2006	-43.36	179.58	409	423
76768	TAN1003	24		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	1	22/03/2010	-40.09	178.19	744	
139486	KAH1806	125	PMN	ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Circinisis circinata*	1	23/11/2018	-34.99	172.53	162	163
163223	TAN9812	64		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Primnoisis (Primnoisis) chatham*	1	19/10/1998	-44.70	-176.23	1046	

Appendix B Summary of physical specimen data loaded into COD.

This publicly accessible website can be used to search target species and expert 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: BLL = Bottom longlining, BT = Bottom Trawl, MW = Midwater trawl.

(a) Summary of data loaded into COD including historical and current year protected coral samples returned by Observers between 1 July 2023 to 30 June 2024. Please note that the trip number and target fishery data have been removed from this table for reporting, but a complete dataset is available on request from CSP.

niwa_cat_number	station_number	gear_code	event_start_date	start_obs_fma	trunc_start_latitude	trunc_start_longitude	start_seabed_depth	end_seabed_depth	initial_species_code	expert_species_code	class_name	order_name	family_name	taxon	sample_count
47913	123	BT	Nov-08	SOE	-44.5	-175.4	912	868		LSE	Hexacorallia	Antipatharia	Leiopathidae	*Leiopathes secunda*	1
171385	122	BT	Mar-24	CEE	-41.3	176.4	1080		COB	LSE	Hexacorallia	Antipatharia	Leiopathidae	*Leiopathes secunda*	1
24194	24	BT	Apr-99	CET	-37.3	168	661	968		TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes*	1
16224	129	BT	Jun-99	SUB	-49.1	166.1	643	500		TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1
16225	129	BT	Jun-99	SUB	-49.1	166.1	643	500		TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1
47877	87	BT	Dec-07	SOE	-44	-174.6	1158	1136		TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1
49477	187	BT	Jan-09	SOE	-43.9	-174.7	846	874		TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1
49470	190	BT	Jan-09	SOE	-43.9	-174.6	1097	1023		TDP	Hexacorallia	Antipatharia	Stylopathidae	*Triadopathes trilix*	1
172860	4	BLL	May-24	AKE	-36.4	175.8	100	104	LEI	COB	Hexacorallia	Antipatharia		Antipatharia indet.	1
46849	86	BT	May-02	SOE	-44.2	-174.7	1070	1081		SIA	Hexacorallia	Scleractinia	Caryophylliidae	*Caryophyllia*	2
163469	6	BT	Oct-23	SOE	-43.5	176.4	395		DDI	SIA	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	2
163472	20	BT	Oct-23	SOE	-43.5	176.1	360	405	DDI	SIA	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	1
171379	3	BT	Feb-24	SOE	-43.1	176.6	322	329	DDI	SIA	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	1
171380	8	BT	Feb-24	SOE	-43.1	176.6	328	334	DDI	SIA	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	1
171381	12	BT	Mar-24	SOE	-43.1	176.6	340	331	DDI	SIA	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	1
171384	23	BT	Mar-24	SOE	-43.1	176.6	318	324	DDI	SIA	Hexacorallia	Scleractinia	Caryophylliidae	Caryophylliidae	1
3904	9	BT	Feb-99	TMAR	-47.3	148.7	1100	1110		DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	1
171382	19	BT	Mar-24	SOE	-43.1	176.7	334	349	DDI	DDI	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum dianthus*	1

niwa_cat_number	station_number	gear_code	event_start_date	start_obs_fma	trunc_start_latitude	trunc_start_longitude	start_seabed_depth	end_seabed_depth	initial_species_code	expert_species_code	class_name	order_name	family_name	taxon	sample_count
171946	46	BT	Aug-97	AKE	-37.1	177.2	788	961		GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1
89157	24	BT	Nov-99	CEE	-40	177.3	420	420		GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1
163468	5	BT	Oct-23	SOE	-43.5	176	350		GDU	GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1
163471	14	BT	Oct-23	SOE	-43.5	176	360		GDU	GDU	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella dumosa*	1
96090	39	BT	Jul-97	AKE	-37	177.3	915	977		SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	1
103351	2	BT	Sep-98	TMAR	-47.3	148.3	923	929		SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	2
89134	49	BT	Dec-98	SUB	-49.1	164.3	948	1126		SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	1
96089	43	BT	Oct-01	SOE	-42.7	180.0	885	1067		SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	1
15490	47	BT	Jun-03	LOUR	-40.7	194.7	900	960		SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	1
171383	23	BT	Mar-24	SOE	-43.1	176.6	318	324	GDU	SVA	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia variabilis*	1
171372	70	BT	Feb-24	SOE	-44.3	176	190	175	COF	COF	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	1
163473	57	BT	Jan-24	SEC	-44.3	173.1	340		COF	COF	Hexacorallia	Scleractinia	Flabellidae	*Flabellum knoxi*	6
163474	59	BT	Jan-24	SEC	-44.5	172.8	330		COF	COF	Hexacorallia	Scleractinia	Flabellidae	*Flabellum knoxi*	11
171378	36	BT	Jan-24	SOU	-47.7	169	618	513	CUP	COF	Hexacorallia	Scleractinia	Flabellidae	*Flabellum knoxi*	1
104312	86	BT	May-02	SOE	-44.2	-174.7	1070	1081		MOC	Hexacorallia	Scleractinia	Oculinidae	*Madrepora oculata*	1
172858	81	BT	Jan-24	SUB	-49.7	175.7	995	1044	COU	ZAH	Hexacorallia	Zoantharia	Parazoanthidae	Parazoanthidae	1
160377	80	BT	Mar-23	SEC	-44.2	175.8	141	141	HDF	HDF	Hydrozoa	Leptothecata	Aglaopheniidae	Aglaopheniidae	1
160338	28	MW	Dec-22	SOU	-48.6	166.4	171	164	DEN	CRT	Hydrozoa	Leptothecata	Lafoeidae	*Cryptolaria*	1
173096	5	BT	Jun-24	SEC	-47.1	169.4	178	205	COB	CRT	Hydrozoa	Leptothecata	Lafoeidae	*Cryptolaria*	1
160368	19	MW	Feb-23	SEC	-46	170.8	118	110	DEN	CRT	Hydrozoa	Leptothecata	Lafoeidae	*Cryptolaria prima*	1
14422	12	BT	Apr-98	KER	-32.1	-179.1	128	260		ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*	1
112284	15	BT	Apr-98	KER	-32.1	-179.1	122	307		ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*	1
163536	153	BT	Oct-98	SUB	-50	175.2	1003	1021		ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*	2
14429	32	BT	Nov-98	SOU	-48	166	936	1149		ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*	1
14518	38	BT	Nov-98	SOU	-48.5	164.9	1061	1248		ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*	1

niwa_cat_number	station_number	gear_code	event_start_date	start_obs_fma	trunc_start_latitude	trunc_start_longitude	start_seabed_depth	end_seabed_depth	initial_species_code	expert_species_code	class_name	order_name	family_name	taxon	sample_count
163476	23	BLL	Jan-24	CET	-38	168.9	591	460	GOC	ACC	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*	1
162842	52	BLL	May-99	SUB	-54	171.6	1315	1315		ACD	Octocorallia	Malacalcyonacea	Acanthogorgiidae	Acanthogorgiidae	1
171377	7	BT	Oct-23	SEC	-43.7	174.2	493	500	GOC	ACD	Octocorallia	Malacalcyonacea	Acanthogorgiidae	Acanthogorgiidae	1
62980	23	BT	May-06	SOE	-42.7	-177.7	1166	1092		ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela*	1
75817	101	BT	Jan-10	SUB	-49.9	175.5	870	1055		ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela*	1
149760	11	BT	Sep-98	TMAR	-47.6	147.4	954	956		ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	1
62979	143	BT	Jun-05	SOE	-42.7	-177.3	918	1040		ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	2
70727	30	BT	Apr-09	SUB	-48.4	171	1000	994		ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	1
75795	96	BT	Sep-09	SUB	-50.1	174.9				ANB	Octocorallia	Malacalcyonacea	Alcyoniidae	*Anthothela vickersi*	1
70718	30	BT	Apr-09	SUB	-48.4	171	1000	994		ALY	Octocorallia	Malacalcyonacea	Alcyoniidae	*Lateothela*	1
62915	80	BT	Nov-08	SOE	-44.4	-178.6	785	880		AND	Octocorallia	Malacalcyonacea	Anthothelidae	Alcyoniidae (Anthothelidae)	1
88665	112	BT	Nov-13	SEC	-42.9	175.6	530	714		ICI	Octocorallia	Malacalcyonacea	Melithaeidae	*Iciligorgia*	1
163510	65	BT	Aug-98	AKE	-37.1	177.2	614	648		PRG	Octocorallia	Malacalcyonacea	Paramuriceidae	*Paramuricea*	1
162870	136	BT	Sep-98	SUB	-49	175.9	910	1099		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
67834	21	BT	Nov-06	SUB	-49.2	176.3	1192	1300		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
47779	34	BT	Sep-07	SUB	-48.2	174.6	1130	1114		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
41850	74	BT	Mar-08	SUB	-47.9	175.3	1204	1203		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
42417	225	BT	Mar-08	SUB	-49.8	175.8	1059	1163		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
46371	37	BT	Apr-08	SUB	-49.8	175.8				GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
42551	38	BT	Apr-08	SUB	-49.8	175.8				GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
47780	48	BT	Apr-08	SUB	-50	175.2				GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
42617	65	BT	Apr-08	SUB	-50	174.7				GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
42514	127	BT	Apr-08	SUB	-48.5	175.5		955		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
42496	40	BT	Jul-08	SUB	-50	174.7		893		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
42500	43	BT	Jul-08	SUB	-50	175.2	1131	1193		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1

niwa_cat_number	station_number	gear_code	event_start_date	start_obs_fma	trunc_start_latitude	trunc_start_longitude	start_seabed_depth	end_seabed_depth	initial_species_code	expert_species_code	class_name	order_name	family_name	taxon	sample_count
42490	107	BT	Jul-08	SUB	-49.7	175.8	1260	1264		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
65924	17	BT	Nov-08	SUB	-48.3	174.9		1015		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
75853	18	BT	Nov-08	SUB	-48.5	175.1	810	817		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
65923	23	BT	Nov-08	SUB	-48.9	175.6	876	880		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
65920	32	BT	Nov-08	SUB	-49.7	175.8	966	1050		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
66113	70	BT	Nov-08	SUB	-50	175.2	1034	1136		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
66310	82	BT	Sep-09	SUB	-49.8	175.8		1119		GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
75713	131	BT	Jun-11	SUB	-49.7	175.9	870			GOC	Octocorallia	Malacalcyonacea	Rosgorgiidae	*Rosgorgia*	1
91171	11	BT	Sep-98	TMAR	-47.6	147.4	954	956		VCT	Octocorallia	Malacalcyonacea	Victorgorgiidae	*Victorgorgia*	1
66301	91	BT	Jul-09	HOWE	-35.9	166.2	1137	1278		GOC	Octocorallia	Scleralcyonacea	Chelidonisididae	*Chelidonisis*	1
149762	12	BT	Mar-00	AKE	-37	176.5	711	949		CHR	Octocorallia	Scleralcyonacea	Chrysogorgiidae	*Chrysogorgia*	1
111958	39	BT	Jul-97	AKE	-37	177.3	915	977		GOC	Octocorallia	Scleralcyonacea	Isidoidae	*Isidoides*	1
163093	65	BT	Aug-98	AKE	-37.1	177.2	614	648		GOC	Octocorallia	Scleralcyonacea	Isidoidae	*Isidoides*	1
163255	29	BT	Feb-02	CET	-37.2	168.2	1074	1262		ISP	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*	1
44624	52	BT	Oct-07	SEC	-46.3	171.2	1077	1362		ISP	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*	1
112213	39	BT	Jul-97	AKE	-37	177.3	915	977		JAS	Octocorallia	Scleralcyonacea	Keratoisididae	*Jasonisis*	1
101770	45	BT	Sep-98	HOWE	-34	162.5	518	694		BOO	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*	1
163544	24	BT	Nov-98	SOU	-48	166.1	930	1130		BOO	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*	1
163256	18	BT	Aug-02	AKW	-36	173.1	799	819		BOO	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*	1
163477	8	BLL	Jan-24	CET	-38	168.9	480	521	GOC	BOO	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*	1
163687	6	BT	Aug-98	TMAR	-47.4	148.9	1024	1095		BOO	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis magnifica*	1
163275	66	BT	Aug-98	AKE	-36.8	177.3	765	787		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	1
104239	18	BT	Apr-02	SOE	-44.2	-174.7	985	1060		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	1
66255	170	BT	May-09	SUB	-49.9	176.7	1443	1385		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Chathamisis bayeri*	1
90453	12	BT	Nov-98	SOU	-48	166.1	935	1043		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Echinisis eltanin*	1

niwa_cat_number	station_number	gear_code	event_start_date	start_obs_fma	trunc_start_latitude	trunc_start_longitude	start_seabed_depth	end_seabed_depth	initial_species_code	expert_species_code	class_name	order_name	family_name	taxon	sample_count
90454	30	BT	Nov-98	SOU	-48	166.1	937	1064		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Echinisis eltanin*	1
149768	113	BT	Dec-98	SOU	-48.5	164.9	1079	1205		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Echinisis eltanin*	1
66244	3	BT	Jun-09	WANB	-34	167.5	980	1094		MIN	Octocorallia	Scleralcyonacea	Mopseidae	*Minuisis granti*	1
44621	129	BT	Nov-07	SOE	-44.1	-174.6	1162	1097		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Mopseidae*	1
149767	24	BT	Nov-98	SOU	-48	166.1	930	1130		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Primnoisis (Primnoisis) chatham*	1
65641	267	BT	Dec-08	SUB	-47.9	175.3	1164	1141		ISI	Octocorallia	Scleralcyonacea	Mopseidae	*Sclerisis*	3
112212	39	BT	Jul-97	AKE	-37	177.3	915	977		CTP	Octocorallia	Scleralcyonacea	Primnoidae	*Calyptrophora inornata*	1
66112	65	BT	Nov-08	SUB	-50	175.2	1046	1184		DSY	Octocorallia	Scleralcyonacea	Primnoidae	*Dasystenella*	1
66111	292	BT	Dec-08	SUB	-48.8	175.6	1010	919		DSY	Octocorallia	Scleralcyonacea	Primnoidae	*Dasystenella*	1
127586	6	BT	Aug-98	TMAR	-47.4	148.9	1024	1095		PLD	Octocorallia	Scleralcyonacea	Primnoidae	*Parastenella*	1
66313	105	BT	Dec-09	SOE	-44.4	-178.8		984		THO	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*	1
112214	38	BT	Jul-98	AKE	-37	176.7	972	1207		THO	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella (Euthouarella) hilgendorfi*	1
66280	17	BT	Jul-09	WANB	-33.6	167.1	746	883		THO	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella (Euthouarella) hilgendorfi*	1
163475	21	BLL	Jan-24	CET	-38.1	168.7	558		GOC	THO	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella (Euthouarella) hilgendorfi*	1
42609	215	BT	May-08	SUB	-47.9	175.3		1175		THO	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella (Thouarella) brevispinosa*	1
173092	30	BT	Jun-24	SOI	-51.1	166.3	450	389	GOC	TOK	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*	1

(b) The number of expertly identified protected coral physical specimens returned by Observers summarised by species, target fishery and gear type for the reporting period 1 July 2023 to 30 June 2024. The fishing method codes are as follows: BLL = Bottom longlining, BT = Bottom Trawl, MW = Midwater trawl.

Target species code	Target species common name	Gear code	Expert ID Taxon	Expert ID Code	Total
BAR	Barracouta	MW	*Cryptolaria*	CRT	1
			Cryptolaria prima	CRT	1
				Barracouta Total	**2**
BNS	Bluenose	BLL	*Acanthogorgia*	ACC	1
			Keratoisis	BOO	1
			Thouarella (Euthouarella) hilgendorfi	THO	1
				Bluenose Total	**3**
BOE	Black oreo	BT	*Anthothela*	ANB	1
			Anthothela vickersi	ANB	1
			Dasystenella	DSY	2
			Rosgorgia	GOC	7
				Black oreo Total	**11**
BYS	Alfonsino & long-finned beryx	BT	*Keratoisis*	BOO	1
				Alfonsino & long-finned beryx Total	**1**
HOK	Hoki	BT	Acanthogorgiidae	ACD	1
			Flabellum knoxi	COF	1
			Iciligorgia	ICI	1
			Triadopathes trilix	TDP	2
				Hoki Total	**5**
OEO	Oreos	BT	*Acanthogorgia*	ACC	2
			Echinisis eltanin	ISI	3
			Keratoisis	BOO	1
			Parazoanthidae	ZAH	1
			Primnoisis (Primnoisis) chatham	ISI	1
			Rosgorgia	GOC	7
			Solenosmilia variabilis	SVA	1
			Thouarella	THO	1

Target species code	Target species common name	Gear code	Expert ID Taxon	Expert ID Code	Total
			Thouarella (Thouarella) brevispinosa	THO	1
				Oreos Total	**18**
ORH	Orange roughy	BT	*Alcyoniidae* (Anthothelidae)	AND	1
			Anthothela	ANB	1
			Anthothela vickersi	ANB	3
			Calyptrophora inornata	CTP	1
			Caryophyllia	SIA	2
			Chathamisis bayeri	ISI	2
			Chrysogorgia	CHR	1
			Desmophyllum dianthus	DDI	1
			Goniocorella dumosa	GDU	1
			Isidella	ISP	1
			Isidoides	GOC	2
			Jasonisis	JAS	1
			Keratoisis	BOO	1
			Keratoisis magnifica	BOO	1
			Leiopathes secunda	LSE	2
			Madrepora oculata	MOC	1
			Minuisis granti	MIN	1
			Mopseidae	ISI	1
			Paramuricea	PRG	1
			Parastenella	PLD	1
			Rosgorgia	GOC	2
			Solenosmilia variabilis	SVA	5
			Thouarella (Euthouarella) hilgendorfi	THO	2
			Triadopathes	TDP	1
			Triadopathes trilix	TDP	3
			Victorgorgia	VCT	1
				Orange roughy Total	**40**
PTO	Patagonian toothfish	BLL	Acanthogorgiidae	ACD	1

Target species code	Target species common name	Gear code	Expert ID Taxon	Expert ID Code	Total
				Patagonian toothfish Total	**1**
SCI	Scampi	BT	Caryophylliidae	SIA	7
			Desmophyllum dianthus	DDI	1
			Goniocorella dumosa	GDU	3
			Solenosmilia variabilis	SVA	1
			Tokoprymno	TOK	1
				Scampi Total	**13**
SNA	Snapper	BLL	Antipatharia indet.	COB	1
				Snapper Total	**1**
SOR	Spiky oreo	BT	*Chelidonisis*	GOC	1
				Spiky oreo Total	**1**
SQU	Arrow squid	BT	Aglaopheniidae	HDF	1
			Cryptolaria	CRT	1
			Flabellum	COF	1
				Arrow squid Total	**3**
SSO	Smooth oreo	BT	*Acanthogorgia*	ACC	2
			Anthothela vickersi	ANB	1
			Chathamisis bayeri	ISI	1
			Isidella	ISP	1
			Lateothela	ALY	1
			Rosgorgia	GOC	4
			Sclerisis	ISI	3
				Smooth oreo Total	**13**
SWA	Silver warehou	BT	*Flabellum knoxi*	COF	17
				Silver warehou Total	**17**
TAR	Trevally	BT	*Acanthogorgia*	ACC	2
				Trevally Total	**2**
				Grand Total	**131**

Appendix C Summary of digital images processed and identified

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: BLL = Bottom LongLine; BT = Bottom Trawl; MW = Midwater Trawl.

(a) Summary of images identified by experts for the reporting period 1 July 2023 to 30 June 2024. Please note that the trip number and target fishery data have been removed from this table for reporting, but a complete dataset is available on request from CSP.

Station number	Fishing method	Event start date	Start obs FMA	Start latitude	Start longitude	Start seabed depth	End seabed depth	Phylum	Class	Order	Superfamily; Family	Genus	Species	NIWA Cat. No.	Specimen count	Initial OBS ID Code	Expert ID Code
30	BT	Jun-24	SOI	-51.1	166.3	450	389	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*		173092	5	GOC	TOK
30	BT	Jun-24	SOI	-51.1	166.3	450	389	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*		173092	0	GOC	TOK
30	BT	Jun-24	SOI	-51.1	166.3	450	389	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*		173092	0	GOC	TOK
30	BT	Jun-24	SOI	-51.1	166.3	450	389	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*		173092	0	GOC	TOK
30	BT	Jun-24	SOI	-51.1	166.3	450	389	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*		173092	0	GOC	TOK
30	BT	Jun-24	SOI	-51.1	166.3	450	389	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*		173092	0	GOC	TOK
30	BT	Jun-24	SOI	-51.1	166.3	450	389	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*		173092	0	GOC	TOK
30	BT	Jun-24	SOI	-51.1	166.3	450	389	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*		173092	0	GOC	TOK
8	BT	Jul-23	SEC	-43.6	174.4	547	525	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		0	COF	COF
8	BT	Jul-23	SEC	-43.6	174.4	547	525	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		8	COF	COF
57	BT	Aug-23	CHA	-41.5	170.7	384	363	Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae				1	GOC	ACD
23	BT	Jul-23	CHA	-40.8	171.2	373	405	Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*			1	COU	ACC
25	BT	Jul-23	CHA	-40.8	171.2	358	362	Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*			1	COU	ACC
12	BT	Aug-23	AKW	-34.7	171.6	916	916	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		10	CBR	SVA
12	BT	Aug-23	AKW	-34.7	171.6	916	916	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		10	CBR	SVA
12	BT	Aug-23	AKW	-34.7	171.6	916	916	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		1	CBR	SVA
12	BT	Aug-23	AKW	-34.7	171.6	916	916	Cnidaria	Hexacorallia	Scleractinia	Dendrophylliidae	*Enallopsammia*	*rostrata*		1	SIA	ERO

Station number	Fishing method	Event start date	Start obs FMA	Start latitude	Start longitude	Start seabed depth	End seabed depth	Phylum	Class	Order	Superfamily; Family	Genus	Species	NIWA Cat. No.	Specimen count	Initial OBS ID Code	Expert ID Code
12	BT	Aug-23	AKW	-34.7	171.6	916	916	Cnidaria	Hexacorallia	Scleractinia	Dendrophylliidae	*Enallopsammia*	*rostrata*		0	SIA	ERO
12	BT	Aug-23	AKW	-34.7	171.6	916	916	Cnidaria	Hexacorallia	Scleractinia	Dendrophylliidae	*Enallopsammia*	*rostrata*		0	SIA	ERO
17	BT	Aug-23	AKW	-34.7	171.6	973	973	Cnidaria	Octocorallia	Scleralcyonacea	Chrysogorgiidae	*Chrysogorgia*			1	CHR	CHR
17	BT	Aug-23	AKW	-34.7	171.6	973	973	Cnidaria	Octocorallia	Scleralcyonacea	Chrysogorgiidae	*Chrysogorgia*			0	CHR	CHR
17	BT	Aug-23	AKW	-34.7	171.6	973	973	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*			1	LLE	ISP
17	BT	Aug-23	AKW	-34.7	171.6	973	973	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*			0	LLE	ISP
17	BT	Aug-23	AKW	-34.7	171.6	973	973	Porifera	Hexactinellida						20	ONG	GLS
25	BT	Aug-23	AKW	-35.9	172.8	890	885	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae				2	LLE	ISI
25	BT	Aug-23	AKW	-35.9	172.8	890	885	Cnidaria	Hexacorallia	Scleractinia	Stephanocyathidae	*Stephanocyathus*	*platypus*		2	CUP	STP
29	BT	Sep-23	SEC	-44.5	175.7	604		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		1	CBR	SVA
35	BT	Sep-23	SEC	-43.5	174.2	519	540	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		1	SIA	COF
14	BT	Sep-23	SOU	-48.7	166.4	505	493	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			1	THO	THO
14	BT	Sep-23	SOU	-48.7	166.4	505	493	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	THO	THO
14	BT	Sep-23	SOU	-48.7	166.4	505	493	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	THO	THO
14	BT	Sep-23	SOU	-48.7	166.4	505	493	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	THO	THO
14	BT	Sep-23	SOU	-48.7	166.4	505	493	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	THO	THO
14	BT	Sep-23	SOU	-48.7	166.4	505	493	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	THO	THO
24	BT	Sep-23	SOU	-48.7	166.4	500	588	Cnidaria	Hydrozoa	Leptothecata	Symplectoscyphidae	*Symplectoscyphus*?			1	HDF	HDF
5	BT	Oct-23	SOE	-43.5	176.0	350		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*	163468	1	GDU	GDU
6	BT	Oct-23	SOE	-43.5	176.4	395		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae			163469	5	DDI	SIA
6	BT	Oct-23	SOE	-43.5	176.4	395		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae			163469	0	DDI	SIA
14	BT	Oct-23	SOE	-43.5	176.0	360		Porifera	Demospongiae	Tetractinellida	Geodiidae	*Geodia*	*chathamensis*	163470	1	CBR	DSO
14	BT	Oct-23	SOE	-43.5	176.0	360		Porifera	Demospongiae	Tetractinellida	Geodiidae	*Geodia*	*chathamensis*	163470	0	CBR	DSO
14	BT	Oct-23	SOE	-43.5	176.0	360		Porifera	Demospongiae	Tetractinellida	Geodiidae	*Geodia*	*chathamensis*	163470	0	CBR	DSO

Station number	Fishing method	Event start date	Start obs FMA	Start latitude	Start longitude	Start seabed depth	End seabed depth	Phylum	Class	Order	Superfamily; Family	Genus	Species	NIWA Cat. No.	Specimen count	Initial OBS ID Code	Expert ID Code
14	BT	Oct-23	SOE	-43.5	176.0	360		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*	163471	2	GDU	GDU
14	BT	Oct-23	SOE	-43.5	176.0	360		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*	163471	0	GDU	GDU
16	BT	Oct-23	SOE	-43.5	176.1	360	400	Cnidaria	Hexacorallia	Antipatharia	Leiopathidae	*Leiopathes*			1	COB	LEI
16	BT	Oct-23	SOE	-43.5	176.1	360	400	Cnidaria	Hexacorallia	Antipatharia	Leiopathidae	*Leiopathes*			0	COB	LEI
20	BT	Oct-23	SOE	-43.5	176.1	360	405	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae			163472	6	DDI	SIA
20	BT	Oct-23	SOE	-43.5	176.1	360	405	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae			163472	0	DDI	SIA
24	BT	Oct-23	SOE	-43.5	176.0	360		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum*	*dianthus*		6	DDI	DDI
24	BT	Oct-23	SOE	-43.5	176.0	360		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum*	*dianthus*		0	DDI	DDI
5	BT	Nov-23	SOE	-42.9	177.6	325	322	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		1	SIA	GDU
6	BT	Nov-23	SOE	-42.9	177.7	320	360	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Caryophyllia*			1	SIA	CAY
6	BT	Nov-23	SOE	-42.9	177.7	320	360	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		1	SIA	GDU
7	BT	Nov-23	SOE	-42.9	177.6	325	323	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae				1	SIA	SIA
11	BT	Nov-23	SOE	-42.9	177.8	320	324	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		5	SIA	GDU
11	BT	Nov-23	SOE	-42.9	177.8	320	324	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			3	THO	THO
11	BT	Nov-23	SOE	-42.9	177.8	320	324	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		0	SIA	GDU
11	BT	Nov-23	SOE	-42.9	177.8	320	324	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	THO	THO
11	BT	Nov-23	SOE	-42.9	177.8	320	324	Annelida	Polychaeta						2	SIA	POL
14	BT	Nov-23	SOE	-42.9	177.5	320	324	Porifera							1	SIA	ONG
17	BT	Nov-23	SOE	-42.9	176.8	404	373	Cnidaria	Hydrozoa	Anthoathecata	Solanderiidae	*Solanderia*?			1	MIN	HDF
40	BT	Dec-23	SOE	-42.9	177.6	320	318	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Caryophyllia*			1	SIA	CAY
40	BT	Dec-23	SOE	-42.9	177.6	320	318	Cnidaria	Hydrozoa						1	MIN	HDF
67	BT	Dec-23	SOE	-42.9	177.6	325	324	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum*	*dianthus*		2		DDI
67	BT	Dec-23	SOE	-42.9	177.6	325	324	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		20	SIA	GDU
67	BT	Dec-23	SOE	-42.9	177.6	325	324	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		3	SIA	GDU

Station number	Fishing method	Event start date	Start obs FMA	Start latitude	Start longitude	Start seabed depth	End seabed depth	Phylum	Class	Order	Superfamily; Family	Genus	Species	NIWA Cat. No.	Specimen count	Initial OBS ID Code	Expert ID Code
67	BT	Dec-23	SOE	-42.9	177.6	325	324	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			1	THO	THO
89	BT	Dec-23	SOE	-43	177.6	330	326	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		1	SIA	GDU
4	BT	Nov-23	SEC	-46.8	170.5	988	1022	Cnidaria	Hexacorallia	Scleractinia	Dendrophylliidae	*Enallopsammia*	*rostrata*		1	SIA	ERO
4	BT	Nov-23	SEC	-46.8	170.5	988	1022	Cnidaria	Hexacorallia	Scleractinia	Dendrophylliidae	*Enallopsammia*	*rostrata*		0	SIA	ERO
4	BT	Nov-23	SEC	-46.8	170.5	988	1022	Cnidaria	Hexacorallia	Scleractinia	Dendrophylliidae	*Enallopsammia*	*rostrata*		0	SIA	ERO
25	BT	Nov-23	SOE	-44.5	-177.9	988		Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*?			1	GOC	ACC
25	BT	Nov-23	SOE	-44.5	-177.9	988		Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*?			0	GOC	ACC
25	BT	Nov-23	SOE	-44.5	-177.9	988		Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*?			0	GOC	ACC
25	BT	Nov-23	SOE	-44.5	-177.9	988		Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*?			0	GOC	ACC
25	BT	Nov-23	SOE	-44.5	-177.9	988		Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*?			0	GOC	ACC
25	BT	Nov-23	SOE	-44.5	-177.9	988		Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*?			0	GOC	ACC
25	BT	Nov-23	SOE	-44.5	-177.9	988		Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*?			0	GOC	ACC
25	BT	Nov-23	SOE	-44.5	-177.9	988		Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*?			0	GOC	ACC
25	BT	Nov-23	SOE	-44.5	-177.9	988		Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*?			0	GOC	ACC
42	BT	Nov-23	SOE	-43.1	-174.0		1167	Cnidaria	Hexacorallia	Scleractinia	Stephanocyathidae	*Stephanocyathus*	*platypus*		0	STP	STP
42	BT	Nov-23	SOE	-43.1	-174.0		1167	Cnidaria	Hexacorallia	Scleractinia	Stephanocyathidae	*Stephanocyathus*	*platypus*		0	STP	STP
42	BT	Nov-23	SOE	-43.1	-174.0		1167	Cnidaria	Hexacorallia	Scleractinia	Stephanocyathidae	*Stephanocyathus*	*platypus*		0	STP	STP
42	BT	Nov-23	SOE	-43.1	-174.0		1167	Cnidaria	Hexacorallia	Scleractinia	Stephanocyathidae	*Stephanocyathus*	*platypus*		3	STP	STP
54	BT	Nov-23	SOE	-44.6	-175.2	1394	1381	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	GDU	SVA
54	BT	Nov-23	SOE	-44.6	-175.2	1394	1381	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		1	GDU	SVA
54	BT	Nov-23	SOE	-44.6	-175.2	1394	1381	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	GDU	SVA
54	BT	Nov-23	SOE	-44.6	-175.2	1394	1381	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	GDU	SVA
54	BT	Nov-23	SOE	-44.6	-175.2	1394	1381	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	GDU	SVA
54	BT	Nov-23	SOE	-44.6	-175.2	1394	1381	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	GDU	SVA

Station number	Fishing method	Event start date	Start obs FMA	Start latitude	Start longitude	Start seabed depth	End seabed depth	Phylum	Class	Order	Superfamily; Family	Genus	Species	NIWA Cat. No.	Specimen count	Initial OBS ID Code	Expert ID Code
54	BT	Nov-23	SOE	-44.6	-175.2	1394	1381	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	GDU	SVA
54	BT	Nov-23	SOE	-44.6	-175.2	1394	1381	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	GDU	SVA
54	BT	Nov-23	SOE	-44.6	-175.2	1394	1381	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	GDU	SVA
65	BT	Dec-23	SOE	-44.4	-178.7			Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		1	SIA	SVA
65	BT	Dec-23	SOE	-44.4	-178.7			Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	SIA	SVA
65	BT	Dec-23	SOE	-44.4	-178.7			Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	SIA	SVA
65	BT	Dec-23	SOE	-44.4	-178.7			Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	SIA	SVA
71	BT	Dec-23	SOE	-42.7	-179.6		1134	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*			1	ISI	ISP
71	BT	Dec-23	SOE	-42.7	-179.6		1134	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*			0	ISI	ISP
71	BT	Dec-23	SOE	-42.7	-179.6		1134	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*			0	ISI	ISP
71	BT	Dec-23	SOE	-42.7	-179.6		1134	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*			0	ISI	ISP
71	BT	Dec-23	SOE	-42.7	-179.6		1134	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*			0	ISI	ISP
71	BT	Dec-23	SOE	-42.7	-179.6		1134	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*			0	ISI	ISP
71	BT	Dec-23	SOE	-42.7	-179.6		1134	Cnidaria	Hexacorallia	Scleractinia	Stephanocyathidae	*Stephanocyathus*	*platypus*		2	SIA	STP
71	BT	Dec-23	SOE	-42.7	-179.6		1134	Cnidaria	Hexacorallia	Scleractinia	Stephanocyathidae	*Stephanocyathus*	*platypus*		0	SIA	STP
71	BT	Dec-23	SOE	-42.7	-179.6		1134	Cnidaria	Octocorallia	Scleralcyonacea	Pennatuloidea; Balticinidae	*Balticina*?			1	PTU	PTU
71	BT	Dec-23	SOE	-42.7	-179.6		1134	Cnidaria	Octocorallia	Scleralcyonacea	Pennatuloidea; Balticinidae	*Balticina*?			0	PTU	PTU
71	BT	Dec-23	SOE	-42.7	-179.6		1134	Cnidaria	Octocorallia	Scleralcyonacea	Pennatuloidea; Balticinidae	*Balticina*?			0	PTU	PTU
72	BT	Dec-23	SOE	-42.6	-179.2		1158	Cnidaria	Hydrozoa?						1	GOC	HDF
72	BT	Dec-23	SOE	-42.6	-179.2		1158	Cnidaria	Hydrozoa?						0	GOC	HDF
72	BT	Dec-23	SOE	-42.6	-179.2		1158	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*			1	ISI	ISP
72	BT	Dec-23	SOE	-42.6	-179.2		1158	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Isidella*			0	ISI	ISP

Station number	Fishing method	Event start date	Start obs FMA	Start latitude	Start longitude	Start seabed depth	End seabed depth	Phylum	Class	Order	Superfamily; Family	Genus	Species	NIWA Cat. No.	Specimen count	Initial OBS ID Code	Expert ID Code
73	BT	Dec-23	SOE	-42.7	-177.8	1201	1208	Cnidaria	Hexacorallia	Antipatharia	Schizopathidae	*Parantipathes*			1	COB	PTP
73	BT	Dec-23	SOE	-42.7	-177.8	1201	1208	Cnidaria	Hexacorallia	Antipatharia	Schizopathidae	*Parantipathes*			0	COB	PTP
73	BT	Dec-23	SOE	-42.7	-177.8	1201	1208	Cnidaria	Hexacorallia	Antipatharia	Schizopathidae	*Parantipathes*			0	COB	PTP
78	BT	Dec-23	SOE	-42.8	-176.9	848		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		3	SIA	GDU
97	BT	Dec-23	SOE	-44.6	-175.2			Cnidaria	Hexacorallia	Scleractinia					1	SIA	SIA
97	BT	Dec-23	SOE	-44.6	-175.2			Cnidaria	Hexacorallia	Scleractinia					0	SIA	SIA
97	BT	Dec-23	SOE	-44.6	-175.2			Cnidaria	Hexacorallia	Scleractinia					0	SIA	SIA
97	BT	Dec-23	SOE	-44.6	-175.2			Cnidaria	Hexacorallia	Scleractinia					0	SIA	SIA
97	BT	Dec-23	SOE	-44.6	-175.2			Cnidaria	Hexacorallia	Scleractinia					0	SIA	SIA
101	BT	Dec-23	SOE	-44.6	-177.6		1318	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			1	PRI	THO
101	BT	Dec-23	SOE	-44.6	-177.6		1318	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	PRI	THO
111	BT	Dec-23	SEC	-44.9	-179.1	1135	1173	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		5	PMN	PMN
111	BT	Dec-23	SEC	-44.9	-179.1	1135	1173	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PMN	PMN
111	BT	Dec-23	SEC	-44.9	-174.3	1135	1173	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PMN	PMN
111	BT	Dec-23	SEC	-44.9	-174.3	1135	1173	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PMN	PMN
111	BT	Dec-23	SEC	-44.9	-175.2	1135	1173	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PMN	PMN
111	BT	Dec-23	SEC	-44.9	-177.6	1135	1173	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PMN	PMN
111	BT	Dec-23	SEC	-44.9	-177.6	1135	1173	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PMN	PMN
111	BT	Dec-23	SEC	-44.9	-177.6	1135	1173	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PMN	PMN
111	BT	Dec-23	SEC	-44.9	-179.7	1135	1173	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PMN	PMN
111	BT	Dec-23	SEC	-44.9	-179.0	1135	1173	Cnidaria	Octocorallia	Malacalcyonacea	Victorgorgiidae	*Trachythela*			1	COU	VIC
111	BT	Dec-23	SEC	-44.9	-178.0	1135	1173	Cnidaria	Octocorallia	Malacalcyonacea	Victorgorgiidae	*Trachythela*			0	COU	VIC
111	BT	Dec-23	SEC	-44.9	-177.3	1135	1173	Cnidaria	Octocorallia	Malacalcyonacea	Victorgorgiidae	*Trachythela*			0	COU	VIC
111	BT	Dec-23	SEC	-44.9	-178.0	1135	1173	Cnidaria	Octocorallia	Malacalcyonacea	Victorgorgiidae	*Trachythela*			0	COU	VIC

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111	BT	Dec-23	SEC	-44.9	-179.3	1135	1173	Cnidaria	Octocorallia	Malacalcyonacea	Victorgorgiidae	*Trachythela*			0	COU	VIC
111	BT	Dec-23	SEC	-44.9	-177.9	1135	1173	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PMN	PMN
111	BT	Dec-23	SEC	-44.9	-177.9	1135	1173	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PMN	PMN
133	BT	Dec-23	SEC	-44.9	174.2	993		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		1	SIA	SVA
133	BT	Dec-23	SEC	-44.9	174.2	993		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Caryophyllia*			1	SIA	CAY
146	BT	Dec-23	SEC	-45	174.9	1108	1122	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		2	PRI	PMN
146	BT	Dec-23	SEC	-45	174.9	1108	1122	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PRI	PMN
146	BT	Dec-23	SEC	-45	174.9	1108	1122	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PRI	PMN
146	BT	Dec-23	SEC	-45	174.9	1108	1122	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PRI	PMN
146	BT	Dec-23	SEC	-45	174.9	1108	1122	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PRI	PMN
146	BT	Dec-23	SEC	-45	174.9	1108	1122	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PRI	PMN
146	BT	Dec-23	SEC	-45	174.9	1108	1122	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PRI	PMN
146	BT	Dec-23	SEC	-45	174.9	1108	1122	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PRI	PMN
146	BT	Dec-23	SEC	-45	174.9	1108	1122	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PRI	PMN
153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Caryophyllia*			1	SIA	CAY
153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Hexacorallia	Scleractinia	Dendrophylliidae	*Enallopsammia*	*rostrata*		1	SIA	ERO
153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		3	SIA	SVA
153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Caryophyllia*			0	SIA	CAY
153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Caryophyllia*			0	SIA	CAY
153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	SIA	SVA
153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum*	*dianthus*		1	SIA	DDI
153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum*	*dianthus*		0	SIA	DDI
153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			1	THO	THO
153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	THO	THO

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153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	THO	THO
153	BT	Dec-23	SEC	-44.9	174.2	969	1056	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		20	SIA	SVA
162	BT	Dec-23	SEC	-44.7	175.7	1069	1054	Cnidaria	Octocorallia	Scleralcyonacea	Coralliidae	*Paragorgia*			0	PAB	PAB
162	BT	Dec-23	SEC	-44.7	175.7	1069	1054	Cnidaria	Octocorallia	Scleralcyonacea	Coralliidae	*Paragorgia*			0	PAB	PAB
162	BT	Dec-23	SEC	-44.7	175.7	1069	1054	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		0	PMN	PMN
162	BT	Dec-23	SEC	-44.7	175.7	1069	1054	Cnidaria	Octocorallia	Scleralcyonacea	Coralliidae	*Paragorgia*			20	PAB	PAB
162	BT	Dec-23	SEC	-44.7	175.7	1069	1054	Cnidaria	Octocorallia	Scleralcyonacea	Coralliidae	*Paragorgia*			0	PAB	PAB
162	BT	Dec-23	SEC	-44.7	175.7	1069	1054	Cnidaria	Hydrozoa						0	HDF	HDF
162	BT	Dec-23	SEC	-44.7	175.7	1069	1054	Cnidaria	Hydrozoa						0	HDF	HDF
162	BT	Dec-23	SEC	-44.7	175.7	1069	1054	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Primnoa*	*notialis*		2	PMN	PMN
162	BT	Dec-23	SEC	-44.7	175.7	1069	1054	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum*	*dianthus*		1	SIA	DDI
162	BT	Dec-23	SEC	-44.7	175.7	1069	1054	Cnidaria	Hexacorallia	Scleractinia	Madreporidae	*Madrepora*	*oculata*		10	SIA	MOC
162	BT	Dec-23	SEC	-44.7	175.7	1069	1054	Cnidaria	Hydrozoa						8	HDF	HDF
171	BT	Dec-23	SOE	-42.7	179.6	1176		Cnidaria	Octocorallia	Scleralcyonacea	Pennatuloidea; Protoptilidae	*Distichoptilum*	*gracile*		1	DGR	DGR
180	BT	Dec-23	SOE	-42.6	-179.1		1175	Cnidaria	Hexacorallia	Antipatharia	Schizopathidae	*Parantipathes*			1	COB	PTP
180	BT	Dec-23	SOE	-42.6	-179.1		1175	Cnidaria	Hexacorallia	Antipatharia	Schizopathidae	*Parantipathes*			0	COB	PTP
190	BT	Dec-23	SOE	-43.8	-174.3		1088	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			1	THO	THO
190	BT	Dec-23	SOE	-43.8	-174.3		1088	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	THO	THO
199	BT	Dec-23	SOE	-44.6	-175.2			Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		20	SIA	SVA
213	BT	Jan-24	SEC	-42.6	175.8	1179	1174	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Callogorgia*			1	PMN	CLG
213	BT	Jan-24	SEC	-42.6	175.8	1179	1174	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Callogorgia*			0	PMN	CLG
213	BT	Jan-24	SEC	-42.6	175.8	1179	1174	Cnidaria	Octocorallia	Scleralcyonacea	Coralliidae	*Anthomastus*?			1	STP	ARO
213	BT	Jan-24	SEC	-42.6	175.8	1179	1174	Cnidaria	Octocorallia	Scleralcyonacea	Coralliidae	*Anthomastus*?			0	STP	ARO

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9	BT	Nov-23	SOU	-48.7	166.3	630	649	Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae				0	GOC	ACD
9	BT	Nov-23	SOU	-48.7	166.3	630	649	Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae				1	GOC	ACD
15	BT	Nov-23	SUB	-49.1	166.7	625	611	Cnidaria	Octocorallia	Scleralcyonacea	Acanthogorgiidae	*Acanthogorgia*			1	PLE	ACC
25	BT	Dec-23	SUB	-49	166.7	470	534	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	COB	THO
25	BT	Dec-23	SUB	-49	166.7	470	534	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			2	COB	THO
26	BT	Dec-23	SOU	-48.7	166.4	545		Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			1	COB	THO
6	BT	Dec-23	SEC	-44.8	173.3	1016	1093	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*			1	ISI	BOO
10	BT	Dec-23	SEC	-44.9	174.2	988	1102	Cnidaria	Hexacorallia	Antipatharia	Leiopathidae	*Leiopathes*			1	LEI	LEI
10	BT	Dec-23	SEC	-44.9	174.2	988	1102	Cnidaria	Hexacorallia	Antipatharia	Leiopathidae	*Leiopathes*			0	LEI	LEI
10	BT	Dec-23	SEC	-44.9	174.2	988	1102	Cnidaria	Octocorallia	Scleralcyonacea	Coralliidae	*Paragorgia*			0	PAB	PAB
10	BT	Dec-23	SEC	-44.9	174.2	988	1102	Cnidaria	Octocorallia	Scleralcyonacea	Coralliidae	*Paragorgia*			1	PAB	PAB
10	BT	Dec-23	SEC	-44.9	174.2	988	1102	Cnidaria	Octocorallia	Scleralcyonacea	Coralliidae	*Paragorgia*			0	PAB	PAB
10	BT	Dec-23	SEC	-44.9	174.2	988	1102	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*			1	THO	TOK
10	BT	Dec-23	SEC	-44.9	174.2	988	1102	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*			0	THO	TOK
10	BT	Dec-23	SEC	-44.9	174.2	988	1102	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Tokoprymno*			0	THO	TOK
15	BT	Dec-23	SEC	-44.8	173.1	1004		Echinodermata	Asteroidea	Brisingida					2	STP	BRG
16	BT	Dec-23	SEC	-44.8	173.3	1016	1099	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*			1	ISI	BOO
16	BT	Dec-23	SEC	-44.8	173.3	1016	1099	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*			0	ISI	BOO
34	BT	Dec-23	SOU	-46.9	165.4	952		Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	*Conopora*	*verrucosa*		1	CRE	COO
34	BT	Dec-23	SOU	-46.9	165.4	952		Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	*Conopora*	*verrucosa*		0	CRE	COO
34	BT	Dec-23	SOU	-46.9	165.4	952		Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	*Conopora*	*verrucosa*		0	CRE	COO
57	BT	Dec-23	SOE	-44.6	-177.6	1080	1233	Cnidaria	Hexacorallia	Antipatharia	Schizopathidae	*Parantipathes*			1	GOC	PTP
57	BT	Dec-23	SOE	-44.6	-177.6	1080	1233	Cnidaria	Hexacorallia	Antipatharia	Schizopathidae	*Parantipathes*			0	GOC	PTP
57	BT	Dec-23	SOE	-44.6	-177.6	1080	1233	Cnidaria	Hexacorallia	Antipatharia	Schizopathidae	*Parantipathes*			0	GOC	PTP

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49	BT	Dec-23	SEC	-43.3	174.2	574	573	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		9	COF	COF
54	BT	Dec-23	SEC	-43.5	174.4	544	524	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		55	COF	COF
81	BT	Dec-23	SOE	-44.1	-179.7	509	534	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		1	COF	COF
82	BT	Dec-23	SOE	-44.2	-179.0	532	612	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		3	COF	COF
85	BT	Dec-23	SOE	-44.2	-178.0	574	556	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		5	COF	COF
89	BT	Dec-23	SOE	-44.3	-177.3	558	604	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		25	COF	COF
91	BT	Dec-23	SOE	-44.3	-178.0	618	545	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		3	COF	COF
97	BT	Dec-23	SOE	-44.2	-179.3	540	515	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		2	COF	COF
99	BT	Dec-23	SOE	-44	179.7	502	539	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		18	COF	COF
100	BT	Dec-23	SOE	-43.9	179.3	554	531	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		10	COF	COF
152	BT	Jan-24	SOE	-43.9	178.8	518	560	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		2	COF	COF
21	BT	Feb-24	CEE	-40	178.1	1010		Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae				1	COR	COR
21	BT	Feb-24	CEE	-40	178.1	1010		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		5	SIA	GDU
21	BT	Feb-24	CEE	-40	178.1	1010		Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Parastenella*			1	PRI	PLD
21	BT	Feb-24	CEE	-40	178.1	1010		Cnidaria	Hexacorallia	Zoantharia					1	SOC	ZAH
34	BT	Feb-24	SOE	-44.2	179.5	977		Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae				1	COU	COR
48	BT	Feb-24	SOE	-44	178.5	820		Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Metafannyella*	*chathamensis*		1	PRI	MEF
51	BT	Feb-24	SOE	-44.2	179.0	945		Cnidaria	Octocorallia	Scleralcyonacea	Coralliidae	*Paragorgia*			1	PAB	PAB
64	BT	Feb-24	SOE	-44.2	178.9	1080		Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Metafannyella*	*chathamensis*		1	GOC	MEF
78	BT	Mar-24	SOE	-44.1	177.4	944		Cnidaria	Hexacorallia	Antipatharia					1	GOC	COB
80	BT	Mar-24	CEE	-37.9	179.0	935		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		2	SIA	SVA
98	BT	Mar-24	CEE	-37.9	179.0	950		Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*			2	ISI	BOO
98	BT	Mar-24	CEE	-37.9	179.0	950		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		20	SIA	GDU
105	BT	Mar-24	CEE	-37.8	179.1	977		Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		1	SIA	GDU

Station number	Fishing method	Event start date	Start obs FMA	Start latitude	Start longitude	Start seabed depth	End seabed depth	Phylum	Class	Order	Superfamily; Family	Genus	Species	NIWA Cat. No.	Specimen count	Initial OBS ID Code	Expert ID Code
122	BT	Mar-24	CEE	-41.3	176.4	1080		Cnidaria	Hexacorallia	Antipatharia	Leiopathidae	*Leiopathes*	*secunda*	171385	1	COB	LSE
122	BT	Mar-24	CEE	-41.3	176.4	1080		Cnidaria	Hexacorallia	Antipatharia	Leiopathidae	*Leiopathes*	*secunda*	171385	0	COB	LSE
135	BT	Mar-24	CEE	-37.8	179.1			Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		3	SIA	SVA
6	BT	Dec-23	CEE	-39.7	178.2	410	485	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Fanellia*?			20	GOC	PRI
12	BT	Dec-23	CEE	-39.6	178.3			Cnidaria	Hexacorallia	Antipatharia	Schizopathidae	*Lillipathes*			1	COB	LIL
93	BT	Feb-24	SOU	-48.8	166.8	190	148	Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	*Errina*			1	ERR	ERR
93	BT	Feb-24	SOU	-48.8	166.8	190	148	Cnidaria	Hydrozoa	Anthoathecata	Stylasteridae	*Errina*			0	ERR	ERR
57	BT	Jan-24	SEC	-44.3	173.1	340		Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*	163473	6	COF	COF
57	BT	Jan-24	SEC	-44.3	173.1	340		Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*	163473	0	COF	COF
57	BT	Jan-24	SEC	-44.3	173.1	340		Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*	163473	0	COF	COF
57	BT	Jan-24	SEC	-44.3	173.1	340		Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*	163473	0	COF	COF
59	BT	Jan-24	SEC	-44.5	172.8	330		Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*	163474	11	COF	COF
59	BT	Jan-24	SEC	-44.5	172.8	330		Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*	163474	0	COF	COF
36	BT	Jan-24	SOU	-47.7	169.0	618	513	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*	171378	1	CUP	COF
36	BT	Jan-24	SOU	-47.7	169.0	618	513	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*	171378	1	CUP	COF
8	BLL	Jan-24	CET	-38	168.9	480	521	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*		163477	1	GOC	BOO
8	BLL	Jan-24	CET	-38	168.9	480	521	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*		163477	0	GOC	BOO
9	BLL	Jan-24	CET	-38.1	169.0	523	582	Cnidaria	Hexacorallia	Scleractinia	Dendrophylliidae	*Eguchipsammia*	*japonica*		7	SIA	EJA
9	BLL	Jan-24	CET	-38.1	169.0	523	582	Cnidaria	Hexacorallia	Scleractinia	Dendrophylliidae	*Eguchipsammia*	*japonica*		0	SIA	EJA
21	BLL	Jan-24	CET	-38.1	168.7	558		Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella (Euthouarella)*	*hilgendorfi*	163475	1	GOC	THO
23	BLL	Jan-24	CET	-38	168.9	591	460	Cnidaria	Octocorallia	Malacalcyonacea	Acanthogorgiidae	*Acanthogorgia*		163476	1	GOC	ACC
29	BT	Jan-24	SUB	-48.5	170.1	948	971	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Acanella*			0	BOO	ACN
29	BT	Jan-24	SUB	-48.5	170.1	948	971	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Acanella*			1	BOO	ACN

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29	BT	Jan-24	SUB	-48.5	170.1	948	971	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Acanella*			0	BOO	ACN
81	BT	Jan-24	SUB	-49.7	175.7	995	1044	Cnidaria	Hexacorallia	Zoantharia	Parazoanthidae			172858	0	COU	ZAH
81	BT	Jan-24	SUB	-49.7	175.7	995	1044	Cnidaria	Hexacorallia	Zoantharia	Parazoanthidae			172858	0	COU	ZAH
81	BT	Jan-24	SUB	-49.7	175.7	995	1044	Cnidaria	Hexacorallia	Zoantharia	Parazoanthidae			172858	1	COU	ZAH
104	BT	Jan-24	SUB	-49.9	175.5	985	1084	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		20	COU	SVA
104	BT	Jan-24	SUB	-49.9	175.5	985	1084	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	COU	SVA
104	BT	Jan-24	SUB	-49.9	175.5	985	1084	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	COU	SVA
104	BT	Jan-24	SUB	-49.9	175.5	985	1084	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	COU	SVA
104	BT	Jan-24	SUB	-49.9	175.5	985	1084	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	COU	SVA
104	BT	Jan-24	SUB	-49.9	175.5	985	1084	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	COU	SVA
104	BT	Jan-24	SUB	-49.9	175.5	985	1084	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	COU	SVA
136	BT	Feb-24	SOU	-47.6	166.8	173	176	Arthropoda	Crustacea						1	CIR	CRU
136	BT	Feb-24	SOU	-47.6	166.8	173	176	Arthropoda	Crustacea						0	CIR	CRU
136	BT	Feb-24	SOU	-47.6	166.8	173	176	Arthropoda	Crustacea						0	CIR	CRU
3	BT	Feb-24	SOE	-43.1	176.6	322	329	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae			171379	50	DDI	SIA
3	BT	Feb-24	SOE	-43.1	176.6	322	329	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae			171379	0	DDI	SIA
8	BT	Feb-24	SOE	-43.1	176.6	328	334	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae			171380	7	DDI	SIA
8	BT	Feb-24	SOE	-43.1	176.6	328	334	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae			171380	0	DDI	SIA
12	BT	Mar-24	SOE	-43.1	176.6	340	331	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae			171381	26	DDI	SIA
12	BT	Mar-24	SOE	-43.1	176.6	340	331	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae			171381	0	DDI	SIA
19	BT	Mar-24	SOE	-43.1	176.7	334	349	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Desmophyllum*	*dianthus*	171382	23	DDI	DDI
23	BT	Mar-24	SOE	-43.1	176.6	318	324	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae			171384	22	DDI	SIA
23	BT	Mar-24	SOE	-43.1	176.6	318	324	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*	171383	1	GDU	SVA
100	BT	Feb-24	SEC	-44.3	175.9	168	163	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Metafannyella*	*chathamensis*		1	THO	MEF

Station number	Fishing method	Event start date	Start obs FMA	Start latitude	Start longitude	Start seabed depth	End seabed depth	Phylum	Class	Order	Superfamily; Family	Genus	Species	NIWA Cat. No.	Specimen count	Initial OBS ID Code	Expert ID Code
100	BT	Feb-24	SEC	-44.3	175.9	168	163	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Metafannyella*	*chathamensis*		0	THO	MEF
70	BT	Feb-24	SOE	-44.3	176.0	190	175	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*		171372	1	COF	COF
3	BT	Feb-24	AKE	-36.2	175.0		46	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*			1	COF	COF
3	BT	Feb-24	AKE	-36.2	175.0		46	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*			0	COF	COF
17	BT	Feb-24	SEC	-44.2	175.8	150	177	Cnidaria	Hydrozoa	Leptothecata	Plumularioidea				2	UNI	HDF
17	BT	Feb-24	SEC	-44.2	175.8	150	177	Cnidaria	Hydrozoa	Leptothecata	Plumularioidea				0	UNI	HDF
17	BT	Feb-24	SEC	-44.2	175.8	150	177	Cnidaria	Hydrozoa	Leptothecata	Plumularioidea				0	UNI	HDF
23	BT	Feb-24	SOE	-44.2	176.1	140	133	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			1	LPT	THO
23	BT	Feb-24	SOE	-44.2	176.1	140	133	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	LPT	THO
23	BT	Feb-24	SOE	-44.2	176.1	140	133	Cnidaria	Octocorallia	Scleralcyonacea	Primnoidae	*Thouarella*			0	LPT	THO
2	BT	Mar-24	SOE	-44	176.0	139	137	Annelida	Polychaeta						2	COU	POL
6	BT	Mar-24	SOE	-44	176.0	139	145	Annelida	Polychaeta						2	COU	POL
6	BT	Mar-24	SOE	-44	176.0	139	145	Annelida	Polychaeta						1	COU	POL
32	MW	Mar-24	SEC	-43.7	173.7	89	139	Cnidaria	Hydrozoa	Leptothecata	Zygophylacidae	*Cryptolaria*			1	COB	CRT
6	BT	Apr-24	SOU	-47.6	168.9	140		Cnidaria	Hydrozoa	Leptothecata	Plumularioidea				2	COB	HDF
6	BT	Apr-24	SOU	-47.6	168.9	140		Cnidaria	Hydrozoa						1	GOC	HDF
6	BT	Apr-24	SOU	-47.6	168.9	140		Cnidaria	Hydrozoa						0	GOC	HDF
6	BT	Apr-24	SOU	-47.6	168.9	140		Cnidaria	Hydrozoa						0	GOC	HDF
21	BT	Apr-24	SOU	-48.4	167.9	145	250	Bryozoa	Stenolaemata	Cyclostomatida	Cerioporidae	*Tetrocycloecia*	*neozelanica*		1	COU	TNE
2	BT	Apr-24	SEC	-43.4	174.1			Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		4	COF	COF
121	BT	Jun-24	SOE	-42.7	-177.9	850	938	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		1	GDU	SVA
121	BT	Jun-24	SOE	-42.7	-177.9	850	938	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		0	GDU	SVA
44	BT	May-24	SEC	-44.1	175.8	272	199	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		3	COF	COF
50	BT	May-24	SEC	-43.1	174.1	652	585	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		1	COF	COF

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53	BT	May-24	SEC	-43.3	174.5	518	543	Cnidaria	Hexacorallia	Scleractinia	Flabellidae	*Flabellum*	*knoxi*		4	COF	COF
4	BLL	May-24	AKE	-36.4	175.8	100	104	Cnidaria	Hexacorallia	Antipatharia				172860	1	LEI	COB
4	BLL	May-24	AKE	-36.4	175.8	100	104	Cnidaria	Hexacorallia	Antipatharia				172860	0	LEI	COB
4	BLL	May-24	AKE	-36.4	175.8	100	104	Cnidaria	Hexacorallia	Antipatharia				172860	0	LEI	COB
4	BLL	May-24	AKE	-36.4	175.8	100	104	Cnidaria	Hexacorallia	Antipatharia				172860	0	LEI	COB
4	BLL	May-24	AKE	-36.4	175.8	100	104	Cnidaria	Hexacorallia	Antipatharia				172860	0	LEI	COB
4	BLL	May-24	AKE	-36.4	175.8	100	104	Cnidaria	Hexacorallia	Scleractinia	Rhizangiidae	*Culicia*	*rubeola*		1		CUR
4	BLL	May-24	AKE	-36.4	175.8	100	104	Cnidaria	Hexacorallia	Scleractinia	Rhizangiidae	*Culicia*	*rubeola*		1		CUR
7	BLL	May-24	AKE	-36.9	176.1	68	69	Bryozoa							1	CRE	COZ
7	BLL	May-24	AKE	-36.9	176.1	68	69	Bryozoa							0	CRE	COZ
7	BLL	May-24	AKE	-36.9	176.1	68	69	Bryozoa							1	COR	COZ
5	BT	Jun-24	SEC	-47.1	169.4	178	205	Cnidaria	Hydrozoa	Leptothecata	Zygophylacidae	*Cryptolaria*		173096	1	COB	CRT
5	BT	Jun-24	SEC	-47.1	169.4	178	205	Cnidaria	Hydrozoa	Leptothecata	Zygophylacidae	*Cryptolaria*		173096	0	COB	CRT
5	BT	Jun-24	SEC	-47.1	169.4	178	205	Cnidaria	Hydrozoa	Leptothecata	Zygophylacidae	*Cryptolaria*		173096	0	COB	CRT
5	BT	Jun-24	SEC	-47.1	169.4	178	205	Cnidaria	Hydrozoa	Leptothecata	Zygophylacidae	*Cryptolaria*		173096	0	COB	CRT
5	BT	Jun-24	AKW	-34.7	171.6	969	998	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Goniocorella*	*dumosa*		20	SIA	GDU
5	BT	Jun-24	AKW	-34.7	171.6	969	998	Cnidaria	Hexacorallia	Scleractinia	Caryophylliidae	*Solenosmilia*	*variabilis*		20	SIA	SVA
7	BT	Jun-24	AKW	-34.7	171.6	993	1018	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*			20	ISI	BOO
26	BT	Jun-24	AKW	-34.7	171.6	1014		Cnidaria	Hexacorallia	Antipatharia	Leiopathidae	*Leiopathes*			1	COB	LEI
36	BT	Jun-24	AKW	-34.7	171.6	1023	1071	Cnidaria	Octocorallia	Scleralcyonacea	Keratoisididae	*Keratoisis*			20	ISI	BOO

(b) The number of expertly identified protected coral specimens from images photographed by Observers summarised by species, target fishery and gear type for the reporting period 1 July 2023 to 30 June 2024. The fishing method codes are as follows: BLL = Bottom LongLine; BT = Bottom Trawl.

Target species code	Target species common name	Gear code	Expert ID Taxon	Expert ID Code	Total
BNS	Bluenose	BLL	*Acanthogorgia*	ACC	1
			Eguchipsammia japonica	EJA	7
			Keratoisis	BOO	1
			Thouarella (Euthouarella) hilgendorfi	THO	1
				Bluenose Total	**10**
BOE	Black oreo	BT	*Enallopsammia rostrata*	ERO	1
			Metafannyella chathamensis	MEF	1
			Paragorgia	PAB	1
			Solenosmilia variabilis	SVA	1
				Black oreo Total	**4**
BYX	Alfonsino & long-finned beryx	BT	*Fanellia*?	PRI	20
			Lillipathes	LIL	1
				Alfonsino & long-finned beryx Total	**21**
HAK	Hake	BT	*Acanthogorgia*	ACC	1
			Thouarella	THO	2
				Hake Total	**3**
HOK	Hoki	BT	*Flabellum knoxi*	COF	153
			Solenosmilia variabilis	SVA	1
				Hoki Total	**154**
LIN	Ling	BT	*Acanthogorgia*	ACC	2
			Acanthogorgiidae	ACD	2
			Thouarella	THO	2
				Ling Total	**6**
OEO	Oreos	BT	*Acanella*	ACN	1
			Solenosmilia variabilis	SVA	20
				Oreo Total	**21**

Target species code	Target species common name	Gear code	Expert ID Taxon	Expert ID Code	Total
ORH	Orange roughy	BT	*Callogorgia*	CLG	1
			Chrysogorgia	CHR	1
			Conopora verrucosa	COO	1
			Enallopsammia rostrata	ERO	1
			Goniocorella dumosa	GDU	49
			Isidella	ISP	3
			Keratoisididae	ISI	2
			Keratoisis	BOO	42
			Leiopathes	LEI	1
			Leiopathes secunda	LSE	1
			Parantipathes	PTP	2
			Parastenella	PLD	1
			Scleractinia	SIA	1
			Solenosmilia variabilis	SVA	68
			Stephanocyathus platypus	STP	7
			Stylasteridae indet.	COR	1
			Thouarella	THO	1
				Orange roughy Total	**183**
SCI	Scampi	BT	*Caryophyllia*	CAY	2
			Caryophylliidae	SIA	117
			Desmophyllum dianthus	DDI	31
			Goniocorella dumosa	GDU	34
			Leiopathes	LEI	1
			Solenosmilia variabilis	SVA	1
			Thouarella	THO	4
			Tokoprymno	TOK	5
				Scampi Total	**195**
SNA	Snapper	BLL	Antipatharia indet.	COB	1
			Culicia rubeola	CUR	2
				Snapper Total	**3**
SQU	Arrow squid	BT	*Errina*	ERR	1

Target species code	Target species common name	Gear code	Expert ID Taxon	Expert ID Code	Total
			Flabellum	COF	1
			Flabellum knoxi	COF	3
			Metafannyella chathamensis	MEF	1
			Thouarella	THO	1
				Arrow squid Total	**7**
SSO	Smooth oreo	BT	*Acanthogorgia*?	ACC	1
			Antipatharia indet.	COB	1
			Caryophyllia	CAY	2
			Desmophyllum dianthus	DDI	2
			Enallopsammia rostrata	ERO	1
			Keratoisis	BOO	2
			Leiopathes	LEI	1
			Madrepora oculata	MOC	10
			Metafannyella chathamensis	MEF	1
			Paragorgia	PAB	21
			Parantipathes	PTP	1
			Primnoa notialis	PMN	9
			Solenosmilia variabilis	SVA	24
			Stylasteridae indet.	COR	1
			Thouarella	THO	2
			Tokoprymno	TOK	1
			Trachythela?	VIC	1
				Smooth oreo Total	**81**
SWA	Silver warehou	BT	*Flabellum knoxi*	COF	17
				Silver warehou Total	**17**
TRE	Trevally	BT	*Flabellum*	COF	1
				Trevally Total	**1**
				Grand Total	**706**

Appendix D Genome skimming data, UCE matching, and mitogenome recovery

For each specimen, initial raw DNA sequencing results are shown for genome skimming, including the number of reads, total bp produced, the average of average read lengths from each of two NovaSeq lanes plus one iSeq run (three sequencing events), the average of standard errors of read lengths, the minimum and maximum read length produced (in bp), and the average of median read lengths from each sequencing event. For assembled raw sequences, the 'Matching to UCE loci' columns indicate the number of contigs matched to UCE loci, the summed length of all UCE loci, statistics on UCE locus length (mean, confidence interval, minimum, maximum, median), and the number of contigs matched to UCE loci that exceed 1000 bp in length. The number of mitochondrial genes (out of 17 total) recovered from assembled reads is given as '# mt Genes', where '*' indicates the presence of one or more incomplete gene sequences.

	DNA Sequencing Output							Matching to UCE loci								mtDNA
Specimen	Reads	Sum Read Lengths	Mean of Mean Read Lengths	Mean of SE of Read Length	Min Read Length	Max Read Length	Mean of Median Read Length	Contigs	Total bp	Mean Length	95 CI Length	Min Length	Max Length	Median Length	Contigs >1kb	# mt Genes
Anthothela_11317	27071916	3,765,438,263	137	0.0303	40	151	151	2391	2563832	1072	16	207	6753	853	971	17
Anthothela_126883	53567593	7,566,160,726	140	0.0214	40	151	151	2426	5887036	2427	38	225	16367	1872	1916	17
Anthothela_149760	34521136	4,843,914,479	139	0.0259	40	151	151	2460	3475125	1413	20	216	8159	1152	1433	17
Anthothela_162825	31708634	4,302,957,030	133	0.0304	40	151	151	2463	3628465	1473	22	214	8717	1160	1432	17
Anthothela_162828	38445105	5,026,987,736	128	0.0297	40	151	150	2478	3615521	1459	20	208	7851	1176	1463	17*
Anthothela_162829	5129347	397,098,732	76	0.0890	40	151	67	30	9692	323	79	208	2598	244	1	0
Anthothela_162886	21615439	2,572,786,039	116	0.0392	40	151	134	1745	891376	511	7	207	3658	435	88	17
Anthothela_163748	35388551	4,733,328,900	131	0.0304	40	151	150	2465	3703424	1502	22	208	10396	1187	1496	17
Anthothela_180181	32245577	4,270,415,535	130	0.0319	40	151	150	2462	3219323	1308	18	212	9723	1066	1334	17*
Anthothela_180541	40655559	5,681,802,760	138	0.0260	40	151	151	2452	4907167	2001	31	204	13872	1570.5	1786	17*
Anthothela_180672	52332423	7,308,975,522	138	0.0221	40	151	151	2411	5966871	2475	40	207	21943	1967	1924	17
Anthothela_28681	31608632	4,452,206,920	139	0.0288	40	151	151	2409	3971512	1649	24	197	8836	1320	1563	17
Anthothela_28777	37245156	5,249,615,768	139	0.0246	40	151	151	2445	4620755	1890	31	182	13543	1453	1683	17
Anthothela_32487	39102741	5,281,278,331	132	0.0290	40	151	150	1818	1202432	661	65	60	116795	509.5	191	17
Anthothela_40508	37852333	4,692,604,892	121	0.0464	40	151	144	2412	2875355	1192	16	202	7486	974	1166	17
Anthothela_41129	17553106	1,948,588,041	108	0.0693	40	151	114	1407	663495	472	9	207	6169	385	59	17*

Specimen	DNA Sequencing Output							Matching to UCE loci								mtDNA
	Reads	Sum Read Lengths	Mean of Mean Read Lengths	Mean of SE of Read Length	Min Read Length	Max Read Length	Mean of Median Read Length	Contigs	Total bp	Mean Length	95 CI Length	Min Length	Max Length	Median Length	Contigs >1kb	# mt Genes
Anthothela_41865	15587727	1,904,638,527	120	0.0477	40	151	142	1642	849796	518	8	151	6380	435	104	17*
Anthothela_47785	12693471	1,249,961,382	96	0.0701	40	151	90	749	257491	344	5	87	1235	298	1	17
Anthothela_53296	29012319	3,919,309,481	133	0.0344	40	151	151	2434	3248266	1335	19	141	8046	1078	1318	17
Anthothela_62979	15897787	1,878,762,193	115	0.0463	40	151	135	183	84468	462	159	70	28678	253	3	17
Anthothela_62980	22253324	2,206,344,428	97	0.0603	40	151	90	778	281533	362	7	207	2251	304	11	17
Anthothela_63089	18351441	2,209,212,235	117	0.0428	40	151	138	1837	1003586	546	7	69	2580	468	149	17
Anthothela_64390	38642635	5,399,879,266	138	0.0265	40	151	151	2447	4715834	1927	29	214	21837	1541	1746	17
Anthothela_67831	24699536	2,500,202,729	99	0.0550	40	151	94	1582	784515	496	9	90	6707	412	78	17
Anthothela_70727	35705510	4,643,093,781	127	0.0334	40	151	149	2426	2793064	1151	16	207	7491	952	1142	17
Anthothela_75795	21503981	2,609,525,488	118	0.0417	40	151	140	1752	999871	571	9	56	7233	476.5	170	17
Anthothela_75817	31947079	4,168,233,556	128	0.0335	40	151	150	2427	3052827	1258	18	207	6779	1008	1222	17
Anthothela_78460	35312369	4,757,786,983	132	0.0317	40	151	150	2436	3558266	1461	20	57	7273	1223	1465	17
Anthothela_86551	28727751	3,899,731,697	133	0.0353	40	151	151	2432	2830434	1164	16	207	6827	955.5	1159	17
Anthothela_91099	40985855	5,721,260,445	138	0.0252	40	151	151	2456	4640523	1889	28	213	10151	1511	1728	17
Anthothela_91100	42171924	5,823,678,649	136	0.0254	40	151	151	2464	4928236	2000	32	208	16394	1555.5	1760	17
Anthothela_91101	41692264	5,473,056,265	128	0.0294	40	151	150	2471	3599055	1457	23	145	10646	1121	1376	17
Anthothela_91114	41805107	5,531,189,134	130	0.0291	40	151	150	2328	2273916	977	14	138	6788	805	859	17*
Anthothela_94290	33109791	4,635,576,578	138	0.0274	40	151	151	2445	4133624	1691	25	202	10279	1356	1599	17
Anthothelidae_64134	35105304	4,815,046,378	135	0.0279	40	151	151	2468	4540499	1840	30	207	16422	1410.5	1634	17
Lateothela_70718	30026152	3,224,293,721	104	0.0555	40	151	106	104	65203	627	303	64	31751	246	5	17*
Lateothela_83336	27798289	3,885,818,813	138	0.0295	40	151	151	2442	3333919	1365	20	211	10557	1081.5	1321	17*