

**FORM 3****Voyage Report: TAN2201 Chatham Rise trawl survey**

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**Date:** 28 February 2022

**Research Provider:** National Institute of Water and Atmospheric Research Limited

**Project Code:** MID2018/01

**Project Title:** Estimation of hoki and middle depth fish abundance using trawl surveys

**Principal Investigator:** Jennifer Devine

**Vessel:** R.V. *Tangaroa*

**Area:** Chatham Rise

**Voyage Start Date:** 4 January 2022

**Voyage End Date:** 3 February 2022

**Voyage Leader:** Darren Stevens

**Shift Leaders:** 0300 – 1500 Dan MacGibbon 1500 – 0300 Darren Stevens

**Voyage staff:** Caroline Chin (Biosecurity) Brit Finucci (Chemical Officer)  
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**OVERALL OBJECTIVE**

To continue the time series of relative abundance indices for hoki, hake, ling, and other middle depth and deepwater fish species caught on the Chatham Rise.

**SPECIFIC OBJECTIVES**

1. To continue the time series of relative abundance indices of recruited hoki (eastern stock) and other middle depth and deepwater species on the Chatham Rise in January 2020 and 2022 using trawl surveys and to determine year class strengths of juvenile hoki (1, 2 and 3 year olds), with target CV of 20 % for the number of two year olds.
2. To collect data for determining the population age, size structure, and reproductive biology of hoki, hake, and ling on the Chatham Rise.
3. To collect data to underpin the development of assessment and monitoring capabilities for biodiversity and ecosystems.
4. To collect and preserve specimens of unidentified organisms taken during the trawl survey and identify them later ashore.
5. To sample deeper strata for deepwater species using a random trawl survey design.

**BACKGROUND**

This survey was the 27th survey in the Chatham Rise time series using RV *Tangaroa*. Surveys were carried out annually from 1992–2014, and biennially since. The primary objective of the survey was to measure the abundance of both juvenile and adult hoki on the Chatham Rise. This is the most comprehensive time series of species abundance at water depths of 200 to 800 m in New Zealand's 200-mile Exclusive Economic Zone (O'Driscoll et al. 2011b).

Chatham Rise surveys provide relative biomass estimates of adult and juvenile hoki. Hoki is New Zealand's largest finfish fishery, with an annual catch limit of 110 000 t from 1 October 2021. Although managed as a single stock, hoki is assessed as two stocks in the New Zealand region, western and eastern. The hypothesis is that juveniles from both stocks mix on the Chatham Rise and recruit to their respective stocks as they approach sexual maturity. The Chatham Rise is also the principal residence area for the hoki that spawn in Cook Strait and off the east coast South Island in winter (eastern stock). Annual catches of hoki on the Chatham Rise peaked at over 75 000 t in 1997–98 and 1998–99. The catch from the Chatham Rise in 2019–20 was 32 900 t, making this the second largest hoki fishery in the EEZ (behind the west coast South Island), and contributing about 31% of the total New Zealand hoki catch (Fisheries New Zealand 2021).

To manage the fishery and minimise potential risks, it is important to have some predictive ability concerning recruitment into the fishery. Extensive sampling throughout the EEZ has shown that the Chatham Rise is the main nursery ground for juvenile hoki. Abundance estimation of two year old hoki provides the best index of potential recruitment to the adult fisheries, while the index of one year old hoki is also informative. The survey data from both juvenile and adult abundance are used directly in the stock assessment to estimate recruitment parameters, determine current stock size, and inform projections of future stock status. The continuation of the time series of trawl surveys on the Chatham Rise is a high priority to provide information required to update the assessment of hoki, hake, ling, and other middle depth species and to provide abundance information for a wide range of bycatch species.

Other commercial middle depth species (particularly hake and ling) and a wide range of non-commercial fish and invertebrates are also monitored by this survey. A review of the time series estimated biomass for 142 species or groups, with 49 of these species considered relatively well estimated (coefficient of variation (CV) less than 40%) (O'Driscoll et al. 2011b). For most of these species, the trawl survey is the only fisheries-independent estimate of abundance on the Chatham Rise. The survey time-series fulfils an important "ecosystem monitoring" role (e.g., Tuck et al. 2009), as well as providing inputs into single-species stock assessment.

In January 2010, the survey was extended to sample deeper strata (800 to 1300 m) to the north and east of the Chatham Rise. In January 2016, the survey duration was increased by 6 days to also include deeper strata to the south and west of the Chatham Rise. The 2022 survey again covered 800–1300 m depths around the whole Chatham Rise, providing fishery independent abundance indices for a range of common deepwater bycatch species in the orange roughy and oreo fisheries.

Acoustic data were recorded continuously (during trawls and while steaming between stations) on all trawl surveys on the Chatham Rise since 1995, except for 2004. Data from previous surveys were analysed to describe mark types, to provide estimates of the ratio of acoustic vulnerability to trawl catchability for hoki and other species, and to estimate abundance of mesopelagic fish (e.g., O'Driscoll et al. 2011a). Acoustic data also provide qualitative information on the amount of backscatter that is not available to the bottom trawl, i.e. either off the bottom, or over areas of foul ground. Other work carried out concurrently with the trawl survey included sampling and preservation of unidentified organisms caught in the trawl and collection of oceanographic (CTD) data.

## RESULTS

### *Trawl survey*

All survey objectives were completed. Weather conditions during the voyage were generally good although on occasions, the wind reached 30 to 40 knots (Figure 1). About 4 hours were lost due to a strong southerly front on the 27 January.

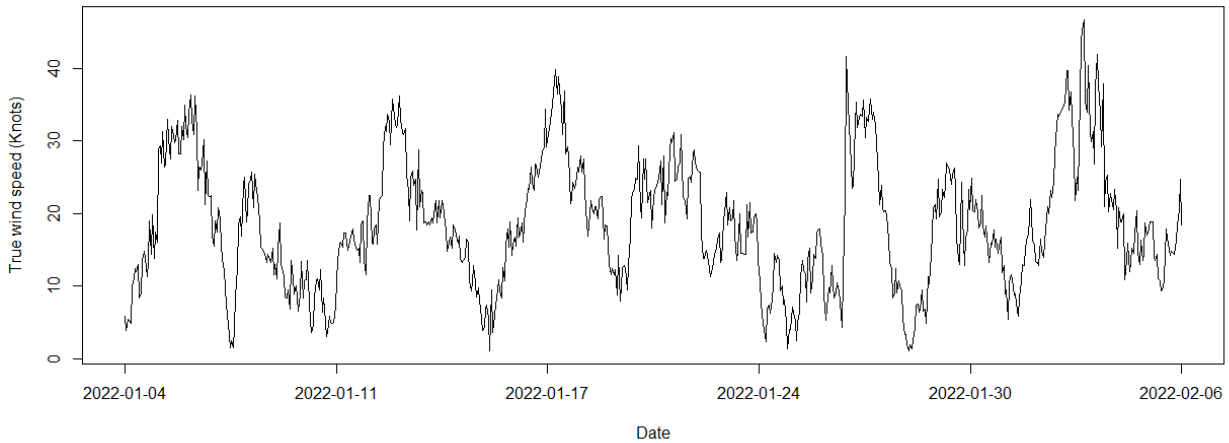
A total of 130 successful trawl survey tows were completed in 34 strata (Figure 2, Table 1). This included all 82 planned phase 1 tows, 6 phase 2 tows in core 200–800 m strata, and 42 of 43 planned deep tows. Due to logistical issues arising from a 18 t catch of black oreo, one station in stratum 27 was not able to be completed. Five further tows were considered unsuitable for estimating abundance and were substituted: tow 1 and tow 8 were rejected due to unsatisfactory gear performance; the generator stopped working while on tow 39 and the tow exceeded the maximum allowable distance (3.85 n.miles); tow 57 was outside of the stratum boundary; and tow 103 came fast.

The 6 phase 2 tows were carried out at the end of phase 1 to improve the CV for 1+ hoki (three tows in stratum 19) and 2+ hoki (three tows in stratum 20). Individual station details from all tows, including the catch of hoki, hake, and ling are listed in Appendix 1. The phase 2 tows reduced the CV for 1+ hoki in core strata from 38.9% to 33.7%, 2+ hoki in core strata from 20.4% to 17.3%, and total hoki in core strata from 11.1% to 10.1%.

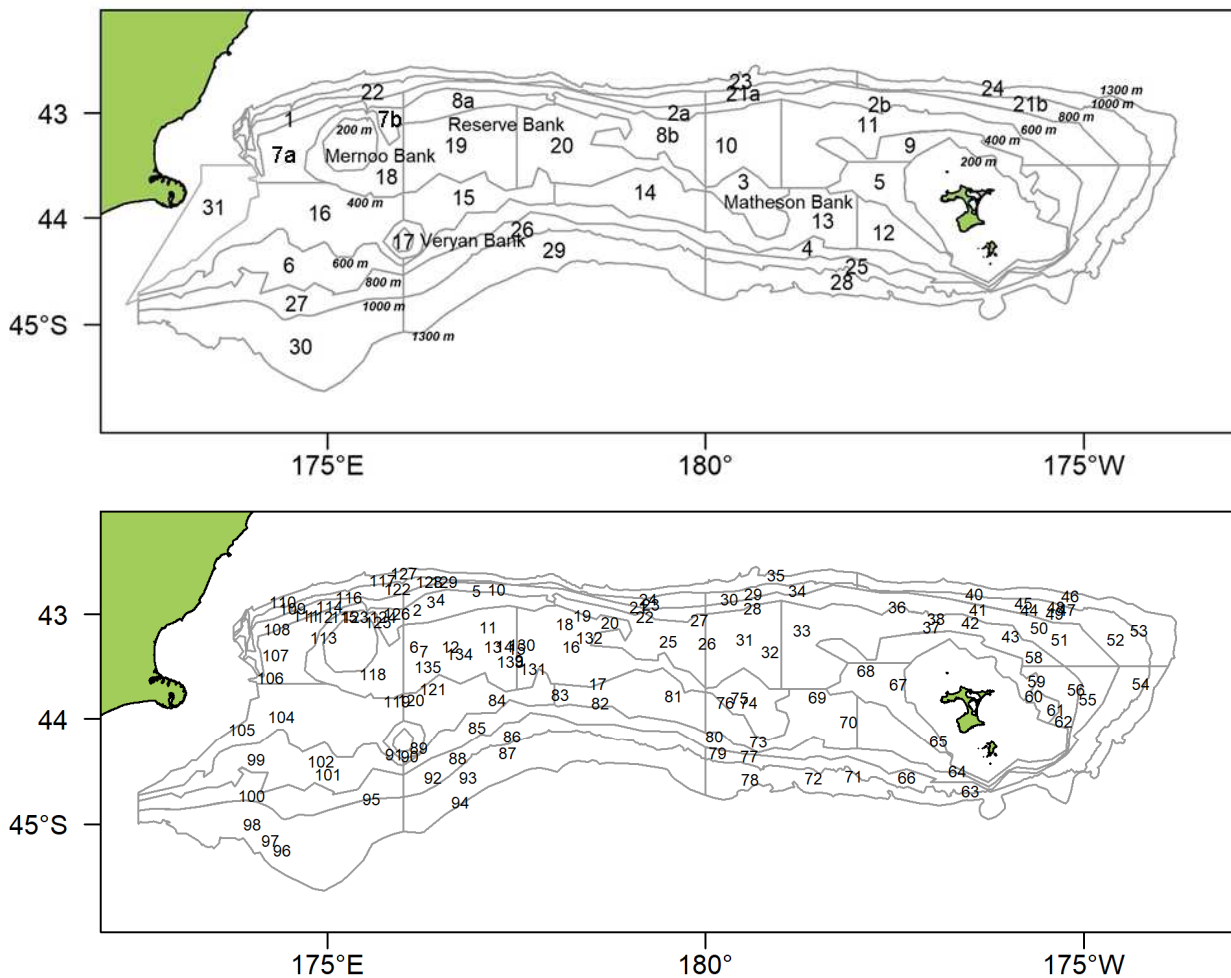
Preliminary biomass estimates and CVs for core (200–800 m) and all (200–1300 m) strata are given in Table 2. The CV for 2+ hoki (17.3%) was well below the MPI target of 20%. The CV's for total hoki (10.1%) and ling (10.7%) were below 15%, while the CV for hake (20.4%) was close to 20%.

The preliminary estimate of total hoki abundance in core strata was up (by 8.8%) from that of the most recent survey in 2020. The abundance estimate for 1+ (2020 year-class) was one of the lower estimates for the Chatham Rise time-series, while the estimate for 2+ (2019 year-class) hoki was above average for the time series. The abundance of older hoki (ages 3 and older) in core strata increased by 8.3% from 2020.

The preliminary abundance estimate for ling was down by 3.8% from the most recent survey in 2020. The estimate for hake increased by 59.2% from the 2020 survey (Table 2). Abundance estimates for most other species were higher than in 2020, in particular black oreo and silver warehou, which were mainly due to single large catches (18 t and 9.9 t respectively, Table 2).



**Figure 1:** Mean hourly wind speed during the voyage. Wind data from the *Tangaroa* automatic weather station and is corrected for vessel speed.



**Figure 2:** Trawl survey area stratum boundaries (upper panel) and positions of valid biomass stations (lower panel). Station details are given in Appendix 1.

**Table 1: Stratum depth boundaries, areas, and numbers of planned and completed stations for the 2022 Chatham Rise survey. Trawl station locations are shown in Figure 2, with station details in Appendix 1.**

Stratum number	Depth range (m)	Location	Area (km <sup>2</sup> )	Phase 1 allocation	Completed stations		
					Phase 1	Phase 2	Total
1	600–800	NW Chatham Rise	2 439	3	3		3
2a	600–800	NW Chatham Rise	3 253	3	3		3
2b	600–800	NE Chatham Rise	8 503	4	4		4
3	200–400	Matheson Bank	3 499	3	3		3
4	600–800	SE Chatham Rise	11 315	3	3		3
5	200–400	SE Chatham Rise	4 078	3	3		3
6	600–800	SW Chatham Rise	8 266	3	3		3
7a	400–600	NW Chatham Rise	4 364	3	3		5
7b	400–600	NW Chatham Rise	869	3	3		3
8a	400–600	NW Chatham Rise	3 286	3	3		3
8b	400–600	NW Chatham Rise	5 722	3	3		3
9	200–400	NE Chatham Rise	5 136	3	3		3
10	400–600	NE Chatham Rise	6 321	4	4		4
11	400–600	NE Chatham Rise	11 748	6	6		6
12	400–600	SE Chatham Rise	6 578	3	3		3
13	400–600	SE Chatham Rise	6 681	3	3		3
14	400–600	SW Chatham Rise	5 928	3	3		3
15	400–600	SW Chatham Rise	5 842	3	3		3
16	400–600	SW Chatham Rise	11 522	3	3		3
17	200–400	Veryan Bank	865	3	3		3
18	200–400	Mernoo Bank	4 687	4	4		4
19	200–400	Reserve Bank	9 012	7	7	3	10
20	200–400	Reserve Bank	9 584	6	6	3	9
Core (200–800 m)			139 498	82	82	6	88
21a	800–1000	NE Chatham Rise	1 249	3	3		3
21b	800–1000	NE Chatham Rise	5 819	6	6		6
22	800–1000	NW Chatham Rise	7 357	7	7		7
23	1000–1300	NW Chatham Rise	7 014	4	4		4
24	1000–1300	NE Chatham Rise	5 672	3	3		3
25	800–1000	SE Chatham Rise	5 596	5	5		5
26	800–1000	SW Chatham Rise	5 158	3	3		3
27	800–1000	SW Chatham Rise	7 185	3	2		2
28	1000–1300	SE Chatham Rise	9 494	3	3		3
29	1000–1300	SW Chatham Rise	10 965	3	3		3
30	1000–1300	SW Chatham Rise	10 960	3	3		3
Deep (800–1300 m)			76 469	43	42		42
Total (200–1300 m)			215 967	125	124	6	130

**Table 2: Provisional abundance estimates (tonnes) with coefficient of variation (CV, in parentheses) of 25 common species for valid trawl tows in core (200–800 m) and all (200–1300 m) strata in 2022. Abundance estimates for all strata are compared to estimates from the previous survey in 2020 (from Stevens et al. 2021). Note: Sea perch are now separated into two species: *Helicolenus barathri* (HBA) and *H. percoides* (HPC).**

Common name	Code	2022 core	2022 all	2020 core	2020 all
Hoki	HOK	97 419 (10.1)	102 865 (10.3)	89 557 (14.4)	94 308 (14.1)
1+ hoki		8 420 (33.7)	8 420 (33.7)	28 342 (34.2)	28 342 (34.2)
2+ hoki		36 036 (17.3)	36 036 (17.3)	12 319 (17.4)	12 319 (17.4)
3++ hoki		52 963 (9.0)	58 409 (10.7)	48 897 (14.7)	53 647 (14.6)
Hake	HAK	1 651 (20.4)	1 801 (19.0)	1 037 (20.1)	1 126 (18.7)
Ling	LIN	7 293 (10.7)	7 347 (10.6)	7 577 (7.9)	7 617 (7.9)
Dark ghost shark	GSH	8 995 (17.9)	8 995 (17.9)	8 101 (19.6)	8 101 (19.6)
Pale ghost shark	GSP	5 144 (11.5)	5 754 (10.5)	1 476 (22.0)	1 652 (19.9)
Lookdown dory	LDO	6 354 (11.0)	6 431 (10.9)	6 352 (9.1)	6 358 (9.1)
Bigeye sea perch	HBA	5 498 (15.4)	5 530 (15.3)	3 954 (10.5)	3 959 (10.5)
Sea perch	HPC	173 (58.4)	173 (58.4)	501 (47.0)	501 (47.0)
Spiny dogfish	SPD	7 740 (10.9)	7 740 (10.9)	7 238 (10.8)	7 238 (10.8)
Silver warehou	SWA	49 888 (53.5)	49 899 (53.5)	9 659 (52.8)	9 667 (52.7)
White warehou	WWA	2 403 (31.6)	2 403 (31.6)	1 683 (48.6)	1 683 (48.6)
Giant stargazer	GIZ	2 423 (31.3)	2 423 (31.3)	2 797 (18.4)	2 797 (18.4)
Ribaldo	RIB	532 (15.8)	645 (14.2)	220 (22.2)	287 (17.9)
Black oreo	BOE	5 093 (37.4)	153 533 (93.8)	16 475 (23.6)	25 033 (29.2)
Smooth oreo	SSO	423 (71.3)	25 768 (40.9)	618 (58.8)	26 255 (48.8)
Spiky oreo	SOR	10 726 (45.0)	11 065 (43.6)	1 542 (40.3)	1 699 (36.6)
Shovelnosed dogfish	SND	5 961 (16.9)	11 576 (18.2)	4 465 (18.2)	6 281 (14.8)
Longnose velvet dogfish	CYP	118 (48.1)	1 977 (23.2)	207 (40.1)	1 892 (19.9)
Baxter's dogfish	ETB	619 (29.6)	4 952 (53.5)	378 (25.9)	1 263 (17.6)
Big-scaled brown slickhead	SBI	0	4 079 (20.8)	0	2 508 (21.8)
Small-scaled brown slickhead	SSM	0	9 683 (34.3)	0	4 949 (33.9)
Basketwork eel	BEE	1 (100)	2 754 (5.8)	1 (100)	2 103 (16.1)
Four-rayed rattail	CSU	3 (60.8)	2 060 (29.3)	10 (91.9)	1 457 (46.9)
Bollons's rattail	CBO	8 958 (12.0)	8 973 (12.0)	7 641 (9.6)	7 654 (9.6)
Javelinfish	JAV	11 318 (14.9)	11 793 (14.4)	7 087 (18.1)	7 214 (17.8)
Orange roughy	ORH	5 (69.7)	1 967 (22.1)	13 (59.8)	3 087 (31.1)

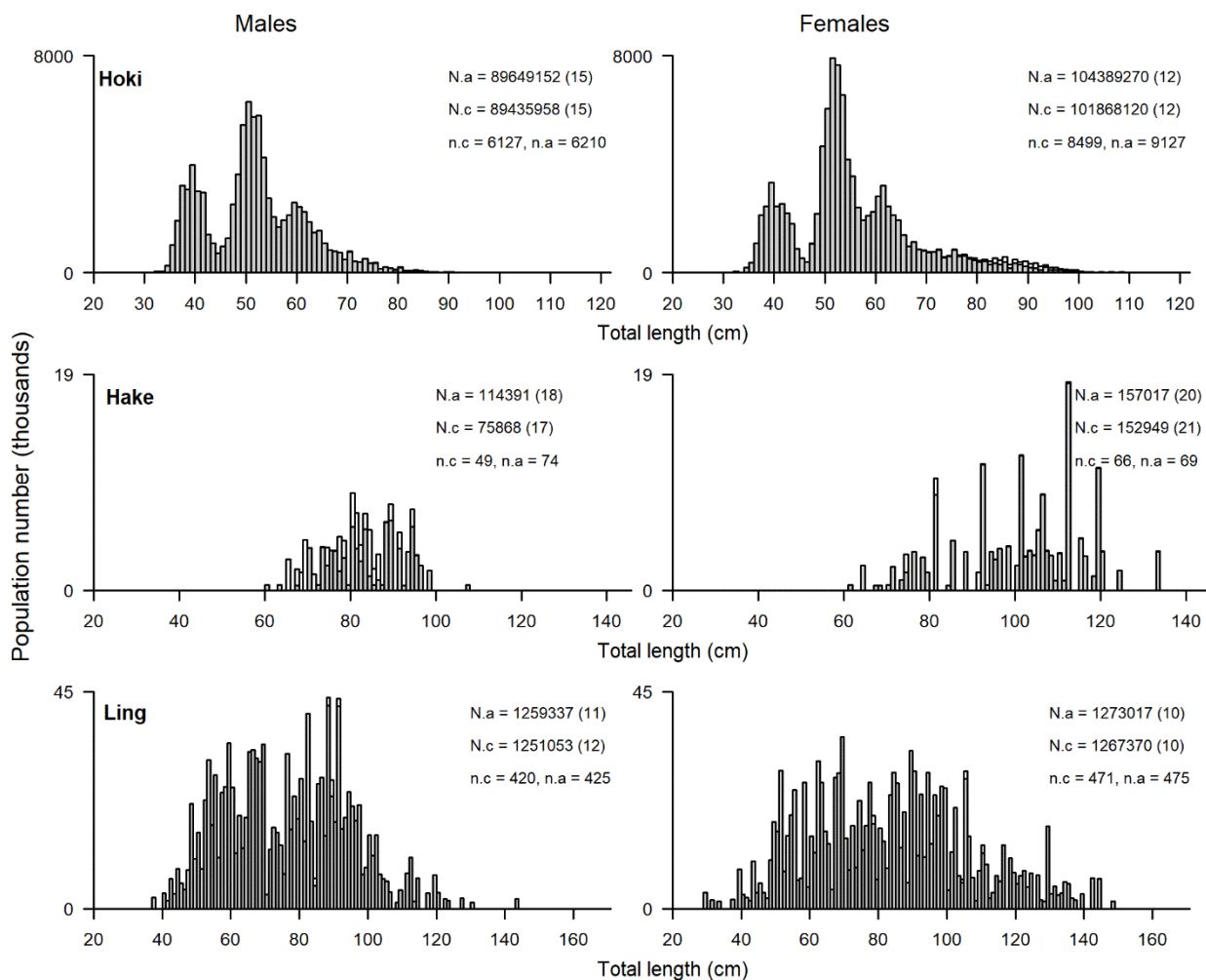
Trawl data were entered in real time using the electronic data capture system onboard the *Tangaroa* and were error-checked at sea. All species were weighed using motion-compensated scales on every successful trawl station. A total catch of 161.6 t was recorded from all trawl stations. From the 356 species or species groups caught during the trawl survey, 174 were teleosts, 29 elasmobranchs, 7 holocephalans, 19 squids or octopuses, 39 echinoderms, and 33 were crustaceans, the remainder comprised assorted benthic and pelagic animals. Of the total catch from all trawl survey tows, hoki accounted for 26.9%, black oreo 13.0%, silver warehou 12.9%, smooth oreo 5.4%, ling 1.8%, and hake 0.5% (Appendix 2).

#### Biological data

A random sample of all quota, commercially important, and selected non-commercial species were measured from all stations. A total of 78 976 fish, squid, and scampi of 133 different species were measured from all tows (Appendix 2). Of these, 26 359 fish were also individually weighed (Appendix 2). Additional data on fish condition (liver and gutted weight) were recorded from 1800 hoki. On this survey for the first time we also staged 380 arrow squid (*Nototodarus sloanii*) using a new five-stage gonad maturity scale. Pairs of otoliths were removed from 1765 hoki, 722 ling, 146 hake, 423 orange roughy, 364 smooth oreo, 287 black oreo, 253 silver warehou, 176 ribaldo, 68 slender jack mackerel (*T. murphyi*), 21 greenback jack mackerel (*Trachurus declivis*), 33 barracouta, and 2 gemfish.

Population scaled length frequency data for hoki, hake, and ling are shown in Figure 3. The hoki scaled length frequency shows a mode at 33–45 cm representing the 1+ (2020) year class, a relatively strong mode at about 46–56 cm representing the 2+ (2019) year class, and a mode at about 57–65 cm representing the 3+ (2018) year-class. There was a broad distribution of female hake between 60 and 120 cm, while most male hake were 60–100 cm. The ling scaled length frequencies show a broad size distribution, with females, again, being slightly larger (Figure 3).

A total of 244 sample lots were inventoried and preserved. These included 55 lots of unusual or unidentified organisms retained for identification ashore (30 invertebrates to be identified under Ministry for Primary Industries contract BEN2021-03 and 25 fish specimens).



**Figure 3:** Provisional population scaled length frequency distributions for hoki, hake, and ling from the 2022 Chatham Rise trawl survey (all successful tows, including deep strata). N.a, estimated number of male fish (left panel) and female fish (right panel) from all (200–1300 m) strata; N.c, estimated number of male fish (left panel) and female fish (right panel) from core (200–800 m) strata; CV (in parentheses), coefficient of variation; n.c, number of fish measured from core strata; n.a, number of fish measured from all strata. White bars show fish from all strata. Black bars show fish from core strata.

*Acoustic and related data*

Over 2TB of acoustic data were collected with the multi-frequency (18, 38, 70, 120, and 200 kHz) hull-mounted EK60 systems on each trawl station and while steaming between stations. Weather and sea conditions during the survey were generally good, meaning acoustic data quality was high.

Sea temperature and conductivity (salinity) were measured using the Seabird CTD mounted on the trawl headline for all 135 bottom tows (including both valid and non-valid biomass tows). Surface temperatures ranged from 14.4° to 20.4° C (mean 16.8° C) and bottom temperatures ranged from 3.0° to 13.6° C (mean 7.7° C). Bathymetric data were collected by the Data Acquisition System (DAS) throughout the voyage.

## TIMETABLE

4 January	Loading and mobilisation of scientific equipment.
5 January	Tangaroa departed Wellington at 14:00 NZDT and proceeded to the survey area. Safety drills and training were carried out prior to departure.
6 January	Arrived in Chatham Rise survey area and began trawling in stratum 2A at 0656 NZDT.
6 Jan – 1 Feb	Trawl survey continues. 130 bottom trawls successfully completed including 82 core phase 1 tows, 6 core phase 2 tows, and 42 deep tows. About 4 hours lost due to a strong southerly front.
1 February	Trawl survey completed. Depart survey area at 1645 NZDT. Transit to Wellington and clean-up.
3 February	Arrive in Wellington at 08:00. De-mobilisation and unloading.

## PROCESSING OR DISPOSAL OF CATCH

All catch (see Appendix 2) was taken as specified in our Special Permit 665. We did our best to balance research survey requirements and processing and focussed our processing capacity on higher value fish (large hoki, hake, ling, and silver warehou) to get maximal return. The total weight of processed (head and gut, and some trunked ling and hake) fish landed was 16 253.7 kg, which was mainly silver warehou (5212 kg), hoki (3437 kg), smooth oreo (1850 kg), black oreo (1662 kg), and ling (1548 kg). All discarding was carried out (and reported as required) under the conditions of our Special Permit.

Sample collection followed the MPI biosecurity requirements for samples collected outside 12 n. miles. NIWA biosecurity permit number 2021078206 was used for the collection of non-viable (frozen) marine biological samples. All material were returned to MPI Biosecurity approved transitional facilities at NIWA.

## ACKNOWLEDGMENTS

Thanks to the officers and crew of the RV *Tangaroa* and to the scientific staff for making this a successful voyage. Thanks also to the Blake Ambassadors Georgia Third and Tim Currie for their enthusiasm and hard work. This report was reviewed by Jennifer Devine and made possible by Fisheries New Zealand funding under project MID2018-01.

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Darren Stevens and Sira Ballara  
28 February 2022

## APPENDIX 1: STATION DETAILS

\* indicates tow was not considered suitable for abundance estimation

Station	Date	Start time (NZST)	Stratum	Start latitude (° S)	Start longitude (° )	E or W	Max. depth (m)	Distance towed (n. mile)	Catch hoki (kg)	Catch ling (kg)	Catch hake (kg)
1 *	6/01/2022	556	002A	42 48.77	176 07.14	E	664	2.88	74.7	5.7	27.2
2	6/01/2022	907	008A	42 57.03	176 11.14	E	537	3.01	328.1	0.0	14.4
3	6/01/2022	1208	008A	42 52.73	176 22.19	E	527	2.92	384.1	0.0	85.4
4	6/01/2022	1428	008A	42 51.02	176 30.30	E	508	3.00	256.1	18.2	37.5
5	6/01/2022	1808	002A	42 46.17	176 58.05	E	657	3.05	137.5	12.2	54.4
6	7/01/2022	536	0019	43 18.86	176 09.19	E	371	3.01	1 503.9	0.0	43.1
7	7/01/2022	807	0019	43 21.17	176 16.84	E	313	3.07	2 394.0	0.0	0.0
8 *	7/01/2022	1323	0019	43 31.47	177 05.95	E	270	2.83	0.0	0.0	0.0
9	7/01/2022	1758	0020	43 26.39	177 32.43	E	313	3.02	532.2	0.0	33.0
10	8/01/2022	544	002A	42 45.67	177 14.57	E	737	3.01	39.8	2.6	25.1
11	8/01/2022	1105	0019	43 07.29	177 07.54	E	290	2.99	648.0	0.0	0.0
12	8/01/2022	1338	0019	43 18.70	176 37.77	E	274	3.02	104.4	0.0	0.0
13	8/01/2022	1756	0019	43 18.78	177 11.39	E	228	3.07	0.0	0.0	0.0
14	9/01/2022	535	0019	43 18.05	177 20.41	E	241	3.01	0.0	0.0	0.0
15	9/01/2022	732	0019	43 20.06	177 29.84	E	268	3.01	1.9	0.0	0.0
16	9/01/2022	1232	0020	43 18.61	178 12.91	E	330	2.09	326.7	0.0	0.0
17	9/01/2022	1808	0020	43 39.77	178 34.26	E	396	3.03	1 994.5	4.1	106.1
18	10/01/2022	545	0020	43 05.68	178 08.70	E	369	3.02	399.0	0.0	21.9
19	10/01/2022	757	0020	43 00.70	178 22.45	E	363	3.01	3 924.1	3.5	61.4
20	10/01/2022	1044	0020	43 04.53	178 44.22	E	395	3.01	709.4	0.0	63.5
21	10/01/2022	1337	002A	42 55.96	179 06.56	E	728	3.02	194.7	14.2	21.1
22	10/01/2022	1621	008B	43 01.50	179 11.81	E	512	2.99	308.0	0.0	31.8
23	10/01/2022	2000	0022	42 53.99	179 16.74	E	821	3.01	21.6	0.0	0.0
24	10/01/2022	2219	0022	42 51.26	179 14.13	E	976	3.02	11.5	0.0	0.0
25	11/01/2022	520	008B	43 15.55	179 30.74	E	437	3.02	253.0	16.1	78.1
26	11/01/2022	831	0010	43 16.85	179 58.60	W	496	3.01	1 129.3	3.7	52.3
27	11/01/2022	1228	008B	43 02.92	179 55.05	E	564	3.02	264.4	26.4	11.1
28	11/01/2022	1644	0010	42 56.55	179 22.69	W	577	3.03	282.9	22.3	26.1
29	11/01/2022	1941	021A	42 47.84	179 22.35	W	864	3.01	92.7	4.4	0.0
30	11/01/2022	2224	021A	42 50.81	179 41.65	W	843	3.04	54.3	1.3	0.0
31	12/01/2022	522	0010	43 14.66	179 29.06	W	514	3.05	196.3	3.6	13.9
32	12/01/2022	807	0010	43 21.64	179 08.86	W	461	3.01	536.8	16.7	15.2
33	12/01/2022	1150	0011	43 08.81	178 43.79	W	504	3.00	365.6	9.8	0.0
34	12/01/2022	1640	021A	42 46.00	178 47.19	W	838	3.01	70.7	0.0	5.9
35	12/01/2022	1953	0023	42 36.98	179 04.44	W	1271	3.01	0.0	0.0	0.0
36	13/01/2022	523	002B	42 55.87	177 28.01	W	629	3.00	325.9	7.4	14.7
37	13/01/2022	912	0011	43 07.06	177 00.56	W	522	3.02	245.8	0.0	6.9
38	13/01/2022	1141	0011	43 02.35	176 56.70	W	550	3.03	342.6	8.3	0.0
39 *	13/01/2022	1442	002B	42 57.77	176 47.62	W	625	3.85	0.0	22.3	0.0
40	13/01/2022	2049	0024	42 48.30	176 27.09	W	1031	3.03	1.9	0.0	0.0
41	14/01/2022	518	002B	42 57.25	176 23.98	W	720	3.01	181.6	9.6	17.1
42	14/01/2022	830	0011	43 04.53	176 30.15	W	541	3.01	379.2	24.9	27.7
43	14/01/2022	1217	0011	43 12.59	175 58.42	W	593	3.04	319.3	47.0	26.2
44	14/01/2022	1630	021B	42 57.09	175 43.20	W	837	3.08	49.0	0.0	0.0
45	14/01/2022	2009	021B	42 53.12	175 48.23	W	933	3.00	14.0	41.2	0.0
46	15/01/2022	0	0024	42 49.18	175 10.92	W	1234	3.01	0.0	0.0	0.0
47	15/01/2022	432	021B	42 56.71	175 13.43	W	979	3.04	1.7	7.2	0.0
48	15/01/2022	706	021B	42 55.67	175 22.20	W	954	3.01	26.2	0.0	0.0
49	15/01/2022	929	021B	42 59.22	175 23.29	W	868	3.00	27.0	0.0	0.0
50	15/01/2022	1301	002B	43 07.87	175 35.31	W	705	3.02	182.7	8.6	14.0
51	15/01/2022	1632	002B	43 14.26	175 19.49	W	694	3.01	158.0	32.0	49.7
52	15/01/2022	2152	021B	43 14.21	174 35.08	W	868	3.01	15.4	0.0	0.0
53	16/01/2022	40	0024	43 09.18	174 16.50	W	1042	3.00	3.1	0.0	0.0
54	16/01/2022	536	0025	43 39.73	174 15.04	W	935	3.01	17.0	0.0	0.0
55	16/01/2022	956	0004	43 48.83	174 56.87	W	673	3.01	140.4	9.6	21.4
56	16/01/2022	1230	0012	43 43.38	175 05.74	W	588	3.01	298.3	49.4	39.0
57 *	16/01/2022	1608	0004	43 29.19	175 15.00	W	640	3.04	113.9	0.0	27.2
58	17/01/2022	512	0011	43 24.46	175 39.64	W	498	3.03	94.3	0.0	6.1
59	17/01/2022	750	0009	43 38.38	175 37.93	W	347	3.05	463.4	0.0	12.7
60	17/01/2022	947	0009	43 46.82	175 39.51	W	316	3.01	0.0	0.0	3.3



Station	Date	Start time (NZST)	Stratum	Start latitude (° ' S)	Start longitude (° ' )	E or W	Max. depth (m)	Distance towed (n. mile)	Catch hoki (kg)	Catch ling (kg)	Catch hake (kg)
61	17/01/2022	1240	0009	43 54.35	175 22.43	W	252	2.21	0.0	0.0	0.0
62	17/01/2022	1501	0012	44 01.21	175 16.19	W	499	3.03	186.0	0.0	4.9
63	18/01/2022	148	0025	44 41.64	176 29.74	W	938	2.28	38.1	0.0	0.0
64	18/01/2022	739	0012	44 29.96	176 40.13	W	573	3.02	291.6	6.5	94.2
65	18/01/2022	1227	0005	44 12.46	176 55.26	W	241	2.56	0.0	0.0	0.0
66	18/01/2022	1935	0025	44 33.35	177 20.15	W	816	3.02	172.7	13.4	10.9
67	19/01/2022	512	0005	43 40.36	177 26.96	W	318	2.10	132.4	0.0	14.4
68	19/01/2022	829	0005	43 32.51	177 53.05	W	370	2.07	280.1	0.0	13.1
69	19/01/2022	1237	0013	43 47.58	178 31.42	W	457	3.01	1 135.7	54.0	68.4
70	19/01/2022	1652	0013	44 01.80	178 06.74	W	466	3.02	456.4	3.4	82.1
71	19/01/2022	2203	0028	44 33.08	178 02.52	W	1044	2.14	0.0	0.0	0.0
72	20/01/2022	151	0028	44 33.92	178 34.00	W	1146	3.04	2.1	0.0	0.0
73	20/01/2022	709	0013	44 13.00	179 17.79	W	466	2.74	1 213.1	0.0	115.3
74	20/01/2022	1047	0003	43 50.60	179 26.07	W	304	2.75	162.6	0.0	0.0
75	20/01/2022	1356	0003	43 47.93	179 33.12	W	332	2.09	128.3	0.0	0.0
76	20/01/2022	1655	0003	43 50.25	179 44.18	W	388	2.23	480.3	0.0	21
77	20/01/2022	2222	0025	44 21.89	179 25.45	W	861	2.99	20.7	0.0	3.1
78	21/01/2022	154	0028	44 35.10	179 24.83	W	1218	3.00	0.0	0.0	0.0
79	21/01/2022	649	0025	44 20.09	179 50.18	W	866	3.04	4.3	0.0	6.6
80	21/01/2022	943	0004	44 10.34	179 53.07	W	636	3.01	66.4	0.0	32.4
81	21/01/2022	1443	0014	43 46.78	179 34.59	E	461	3.01	960.5	18.8	91.6
82	22/01/2022	522	0014	43 51.26	178 36.39	E	496	2.43	430.7	0.0	22.4
83	22/01/2022	908	0014	43 45.94	178 04.55	E	486	3.01	1 338.7	0.0	76.0
84	22/01/2022	1430	0015	43 49.26	177 15.10	E	510	3.03	670.7	8.3	40.5
85	22/01/2022	1812	0004	44 05.05	176 58.51	E	656	2.99	96.7	0.0	25.8
86	22/01/2022	2156	0026	44 10.28	177 26.14	E	946	3.01	15.8	5.4	0.0
87	23/01/2022	122	0029	44 19.92	177 22.80	E	1160	3.03	0.0	0.0	0.0
88	23/01/2022	622	0026	44 23.04	176 42.94	E	906	3.05	9.4	0.0	0.0
89	23/01/2022	1148	0017	44 17.02	176 12.40	E	358	2.84	0.0	0.0	0.0
90	23/01/2022	1446	0017	44 21.88	176 05.63	E	341	3.01	0.0	0.0	0.0
91	23/01/2022	1747	0017	44 20.58	175 53.01	E	286	2.47	1.6	0.0	0.0
92	24/01/2022	17	0026	44 33.41	176 23.87	E	976	3.01	4.1	0.0	0.0
93	24/01/2022	421	0029	44 33.60	176 51.69	E	1101	3.05	0.0	0.0	0.0
94	24/01/2022	844	0029	44 47.27	176 45.76	E	1296	3.01	0.0	0.0	0.0
95	24/01/2022	1816	0027	44 45.83	175 34.70	E	961	2.23	2.4	0.0	0.0
96	25/01/2022	140	0030	45 14.43	174 24.10	E	1173	3.03	0.0	0.0	0.0
97	25/01/2022	410	0030	45 09.18	174 15.05	E	1188	3.05	0.0	0.0	0.0
98	25/01/2022	707	0030	45 00.29	174 00.52	E	1201	3.01	0.0	0.0	0.0
99	25/01/2022	1301	0006	44 23.49	174 03.42	E	708	2.93	133.8	0.0	6.1
100	25/01/2022	1805	0027	44 43.99	174 00.10	E	846	2.12	505.5	0.0	0.0
101	26/01/2022	555	0006	44 31.77	175 00.40	E	731	3.07	85.4	0.0	22.9
102	26/01/2022	759	0006	44 24.49	174 55.07	E	651	3.00	156.7	5.4	60.1
103 *	26/01/2022	1200	0016	44 02.74	174 27.47	E	575	0.74	0.0	0.0	0.0
104	26/01/2022	1332	0016	43 59.07	174 23.59	E	571	3.04	335.3	0.0	16.5
105	26/01/2022	1821	0016	44 05.74	173 52.22	E	501	3.06	299.3	0.0	24
106	27/01/2022	556	007A	43 36.69	174 14.77	E	542	3.05	1 661.2	0.0	48.8
107	27/01/2022	836	007A	43 23.58	174 19.42	E	584	3.04	1 097.6	5.1	82.6
108	27/01/2022	1115	0001	43 08.41	174 19.95	E	628	3.03	296.4	7.2	23.6
109	27/01/2022	1951	0022	42 56.59	174 32.43	E	931	3.01	10.1	10.3	0.0
110	27/01/2022	2318	0023	42 52.87	174 24.64	E	1180	3.01	0.0	0.0	0.0
111	28/01/2022	607	0001	43 00.37	174 43.05	E	726	3.01	102.5	0.0	8.2
112	28/01/2022	911	007A	43 01.25	174 53.80	E	546	3.03	918	42.4	72.5
113	28/01/2022	1229	0018	43 13.27	174 57.06	E	231	3.01	15	6.8	0.0
114	28/01/2022	1535	0001	42 55.23	175 01.63	E	651	3.03	511.7	29.9	36.9
115	28/01/2022	1807	0018	43 01.50	175 13.50	E	344	3.10	669.9	0.0	22.4
116	28/01/2022	2055	0022	42 49.64	175 16.91	E	821	3.05	101.8	6.6	3.6
117	29/01/2022	22	0023	42 39.99	175 44.02	E	1144	3.01	5.0	0.0	0.0
118	29/01/2022	811	0018	43 33.96	175 35.85	E	270	3.02	439.7	0.0	0.0
119	29/01/2022	1144	0016	43 50.00	175 55.21	E	467	2.37	817.2	17.2	60.8
120	29/01/2022	1422	0015	43 49.15	176 06.84	E	477	2.60	1 793.1	2.9	57.9

Station	Date	Start time (NZST)	Stratum	Start latitude (° ' S)	Start longitude (° ' )	E or W	Max. depth (m)	Distance towed (n. mile)	Catch hoki (kg)	Catch ling (kg)	Catch hake (kg)
121	29/01/2022	1720	0015	43 42.66	176 23.75	E	425	2.19	636.9	0.0	159.1
122	30/01/2022	155	0022	42 44.90	175 55.98	E	840	3.01	180.5	9.0	0.0
123	30/01/2022	712	0018	43 01.35	175 22.07	E	355	3.01	991.0	0.0	69.5
124	30/01/2022	947	007B	43 01.06	175 44.36	E	508	3.01	371.7	52.7	45.7
125	30/01/2022	1211	007B	43 04.18	175 39.91	E	467	3.01	905.5	69.1	110.3
126	30/01/2022	1500	007B	42 59.28	175 55.04	E	536	3.00	338.6	54.9	21.2
127	30/01/2022	1953	0023	42 36.23	176 00.66	E	1209	3.02	0.0	2.1	0.0
128	30/01/2022	2252	0022	42 40.91	176 20.74	E	892	3.00	12.5	0.0	7.3
129	31/01/2022	110	0022	42 40.84	176 32.21	E	934	2.71	2.3	0.0	0.0
130	31/01/2022	906	0020	43 17.53	177 34.40	E	274	2.32	0.0	0.0	0.0
131	31/01/2022	1234	0020	43 31.12	177 43.05	E	373	2.01	264.1	0.0	14.0
132	31/01/2022	1702	0020	43 13.42	178 27.41	E	392	3.06	496.7	8.2	53.8
133	1/02/2022	545	0019	43 27.29	177 25.48	E	268	3.07	0.0	0.0	0.0
134	1/02/2022	920	0019	43 22.69	176 44.71	E	263	3.03	0.0	0.0	0.0
135	1/02/2022	1420	0019	43 30.30	176 19.78	E	369	3.00	0.0	0.0	0.0

## APPENDIX 2: BIOLOGICAL SAMPLE COLLECTION

Species	Scientific name	Common name	Catch weight (kg)	Number measured	Number weighed
AAM	<i>Apristurus ampliceps</i>	Roundfin catshark	29.6	18	18
ABR	<i>Alepisaurus brevirostris</i>	Shortsnouted lancetfish	1.6	-	-
ACA	<i>Acanthephyra</i> spp.	Subantarctic ruby prawn	3.7	-	-
ACS	Actinostolidae	Smooth deepsea anemones	42.3	-	-
AEX	<i>Apristurus exsanguis</i>	New Zealand catshark	40.9	37	37
AFO	<i>Aristaeomorpha foliacea</i>	Royal red prawn	0.3	-	-
AGI	<i>Argyropelecus gigas</i>	Giant hatchetfish	0.8	-	-
AGK	<i>Apristurus garricki</i>	Garrick's catshark	0.8	3	3
AML	<i>Apristurus melanoasper</i>	Fleshynose catshark	5.3	4	4
ANI	<i>Austropenaeus nitidus</i>	<i>Austropenaeus nitidus</i>	0.1	-	-
ANT	Anthozoa	Anemones	1.9	-	-
ANZ	<i>Ecionemia novaezelandiae</i>	Knobbly sandpaper sponge	31.4	-	-
API	<i>Alertichthys blacki</i>	Alert pigfish	0.1	-	-
APN	<i>Apristurus pinguis</i>	Bulldog catshark	0.2	1	1
ARI	<i>Aristeus</i> spp.	<i>Aristeus</i> species	0.1	-	-
ARO	<i>Anthomastus (Bathyalcyon) robustus</i>	<i>Anthomastus (Bathyalcyon) robustus</i>	0.3	-	-
ASC	Ascidacea	Sea squirt	3.8	-	-
ASG	<i>Acesta saginata</i>	Lesser giant file shell	0.1	-	-
ASI	<i>Apristurus cf. sinensis</i>	Freckled catshark	10.2	7	7
ASR		Asteroid (starfish)	0.2	-	-
BAM	<i>Bathyploetes</i> spp.	<i>Bathyploetes</i> spp.	0.2	-	-
BAN	<i>Borostomias antarcticus</i>	Southern snaggletooth	0.5	-	-
BAR	<i>Thyrsites atun</i>	Barracouta	703.1	213	67
BBE	<i>Centriscoops humerosus</i>	Banded bellowsfish	812.2	2 137	141
BCA	<i>Magnisudis prionosa</i>	Barracudina	4.3	4	4
BCR	<i>Brotulotaenia crassa</i>	Blue cusk eel	0.5	-	-
BEE	<i>Diastobranchus capensis</i>	Basketwork eel	786.7	827	437
BEN	<i>Benthodesmus</i> spp.	Scabbardfish	0.3	1	1
BER	<i>Typhlonarke</i> spp.	Numbfish	0.5	-	-
BES	<i>Benthopecten</i> spp.	Benthopecten spp.	0.1	-	-
BJA	<i>Mesovagus antipodum</i>	Black javelinfish	31.0	61	60
BMO	<i>Borostomias mononema</i>	<i>Borostomias mononema</i>	0.1	-	-
BNS	<i>Hyperoglyphe antarctica</i>	Bluenose	74.3	6	6
BOC	<i>Bolocera</i> spp.	Deepsea anemone	1.7	-	-
BOE	<i>Allocyttus niger</i>	Black oreo	20 968.7	1 631	300
BOO	<i>Keratoisis</i> spp.	Bamboo coral	0.3	-	-
BPA	<i>Bathylagichthys parini</i>	Parin's deepsea smelt	0.2	-	-
BPD	Brachiopoda	Lamp shells	0.4	-	-
BRG	Brisingida (Order)	Armless stars	9.0	-	-
BRL	<i>Brochiraja leviveneta</i>	Blue skate	0.2	-	-
BSH	<i>Dalatias licha</i>	Seal shark	145.6	57	57
BSL	<i>Xenodermichthys copei</i>	Black slickhead	285.2	798	201
BTA	<i>Brochiraja asperula</i>	Smooth deepsea skate	9.4	5	5
BTD	<i>Benthodytes</i> sp.	<i>Benthodytes</i> sp.	72.0	-	-
BTS	<i>Brochiraja spinifera</i>	Prickly deepsea skate	8.9	6	6
BYD	<i>Beryx decadactylus</i>	Longfinned beryx	2.2	1	1
BYS	<i>Beryx splendens</i>	Alfonsino	197.0	343	196
CAM	<i>Campylonotus rathbunae</i>	Sabre prawn	0.5	-	-
CAR	<i>Cephaloscyllium isabellum</i>	Carpet shark	7.6	3	3
CAS	<i>Coelorinchus aspercephalus</i>	Oblique banded rattail	356.3	1 824	557
CBA	<i>Coryphaenoides dossenus</i>	Humpback rattail (slender rattail)	29.6	13	13
CBE	<i>Notopogon lilliei</i>	Crested bellowsfish	1.9	11	-
CBI	<i>Coelorinchus biclinozonalis</i>	Two saddle rattail	348.5	515	219
CBO	<i>Coelorinchus bollonsi</i>	Bollon's rattail	3 274.4	3 578	1 137
CBS	<i>Poromitra atlantica</i>	Common bigscale fish	0.3	-	-
CCX	<i>Coelorinchus parvifasciatus</i>	Small banded rattail	6.3	102	57
CDO	<i>Capromimus abbreviatus</i>	Capro dory	8.5	95	-
CDX	<i>Coelorinchus maurofasciatus</i>	Dark banded rattail	1.8	10	10
CDY	<i>Cosmasterias dyscrita</i>	Cosmasterias dyscrita	0.3	-	-
CEX	<i>Coelorinchus celaenostomus</i>	Black lip rattail	0.9	-	-
CFA	<i>Coelorinchus fasciatus</i>	Banded rattail	84.1	798	337
CFU	<i>Corallistes fulvodesmus</i>	Smooth white cup sponge	1.9	-	-
CFX	<i>Coelorinchus supernasutus</i>	Supanose rattail	0.1	-	-
CHA	<i>Chauliodus sloani</i>	Viper fish	2.1	-	-
CHI	<i>Chimaera</i> spp.	<i>Chimaera</i> spp.	0.1	-	-
CHP	<i>Chimaera carophila</i>	Chimaera, brown	52.6	21	21

Species	Scientific name	Common name	Catch weight (kg)	Number measured	Number weighed
CHQ	Cranchiidae	Cranchiid squid	0.1	-	-
CHY	<i>Coelorinchus trachycarus</i>	Roughhead rattail	20.0	82	81
CIC	<i>Crella incrustans</i>	Orange frond sponge	1.4	-	-
CIN	<i>Coelorinchus innotabilis</i>	Notable rattail	49.5	651	377
CJA	<i>Crossaster multispinus</i>	Sun star	2.5	-	-
CKA	<i>Coelorinchus kaiyomaru</i>	Kaiyomaru rattail	8.6	96	89
CLL	<i>Corallium</i> spp.	Precious coral	0.1	-	-
CLM	Corallimorphidae	Coral-like anemones	1.1	-	-
CMA	<i>Coelorinchus matamua</i>	Mahia rattail	107.2	163	162
CMU	<i>Coryphaenoides murrayi</i>	Abyssal rattail	11.9	23	23
CMX	<i>Coryphaenoides mcmillani</i>	McMillan's rattail	1.2	-	-
COF	<i>Flabellum</i> spp.	Flabellum coral	1.3	-	-
COL	<i>Coelorinchus oliverianus</i>	Oliver's rattail	637.9	2 489	793
CON	<i>Conger</i> spp.	Conger eel	0.4	-	-
COT	<i>Cottunculus nudus</i>	Bonyskull toadfish	0.7	-	-
CPA	<i>Ceramaster patagonicus</i>	Pentagon star	0.1	-	-
CSE	<i>Coryphaenoides serrulatus</i>	Serrulate rattail	95.2	447	393
CSQ	<i>Centrophorus squamosus</i>	Leafscale gulper shark	495.7	69	69
CSU	<i>Coryphaenoides subserrulatus</i>	Four-rayed rattail	1 001.0	2 664	603
CTH	<i>Coelorinchus acanthiger</i>	Roughhead rattail	0.6	5	5
CTR	<i>Coryphaenoides striaturus</i>	Abyssal rattail	0.4	2	2
CUB	<i>Cubiceps</i> spp.	Cubehead	2.3	7	7
CUC	<i>Paraulopus nigripinnis</i>	Cucumber fish	0.4	-	-
CVI	<i>Pycnoplax victoriensis</i>	Two-spined crab	0.3	-	-
CYO	<i>Centroscymnus owstoni</i>	Smooth skin dogfish	232.5	62	62
CYP	<i>Centroscymnus crepidater</i>	Longnose velvet dogfish	1 218.0	881	537
DAP	<i>Dagnaudus petterdi</i>	Antlered crab	1.9	-	-
DCO	<i>Notophycis marginata</i>	Dwarf cod	0.3	-	-
DCS	<i>Bythaelurus dawsoni</i>	Dawson's catshark	0.3	1	1
DDA	<i>Diaphus danae</i>	Dana lanternfish	0.7	-	-
DEA	<i>Trachipterus trachipterus</i>	Dealfish	1.7	-	-
DHO	<i>Dermechinus horridus</i>	Sea urchin	34.1	-	-
DIP	<i>Diplophos</i> spp.	Twin light dragonfishes	0.1	-	-
DIR	<i>Diacanthurus rubricatus</i>	Pagurid	1.1	-	-
DIS	<i>Diretmus argenteus</i>	Discfish	0.2	-	-
DMG	<i>Dipsacaster magnificus</i>	<i>Dipsacaster magnificus</i>	21.8	-	-
DPP	<i>Diplopteraster</i> sp.	<i>Diplopteraster</i> sp.	0.4	-	-
DSK	<i>Amblyraja hyperborea</i>	Deepwater spiny skate (Arctic skate)	21.4	1	1
DSS	<i>Bathylagus</i> spp.	Deepsea smelt	0.1	-	-
ECN		Echinoid (sea urchin)	0.1	-	-
ECR	<i>Echiodon cryomargarites</i>	Messmate fish	1.0	38	-
ECT	Echinothuriidae	Echinothuriidae (family)	1.6	-	-
EEX	<i>Enypniastes eximia</i>	<i>Enypniastes eximia</i>	4.2	-	-
EGC		Egg case	0.1	-	-
EPD	<i>Epigonus denticulatus</i>	White cardinalfish	0.6	-	-
EPL	<i>Epigonus lenimen</i>	Bigeye cardinalfish	22.4	139	40
EPM	<i>Epigonus machaera</i>	Thin tongue cardinalfish	39.5	341	157
EPO	<i>Melanostigma gelatinosum</i>	Limp eel pout	0.6	-	-
EPT	<i>Epigonus telescopus</i>	Deepsea cardinalfish	150.1	369	205
EPZ	<i>Epizoanthus</i> spp.	<i>Epizoanthus</i> spp.	1.2	-	-
ERA	<i>Torpedo fairchildi</i>	Electric ray	7.1	2	2
ERB	<i>Epigonus robustus</i>	Robust cardinalfish	1.3	-	-
ERE	<i>Euplectella regalis</i>	Basket-weave horn sponge	0.4	-	-
ETB	<i>Etmopterus baxteri</i>	Baxter's lantern dogfish	964.2	702	439
ETL	<i>Etmopterus lucifer</i>	Lucifer dogfish	61.3	365	324
EZE	<i>Enteroctopus zealandicus</i>	Yellow octopus	16.3	-	-
FAN	<i>Pterycombus petersii</i>	Fanfish	1.8	-	-
FHD	<i>Hoplichthys haswelli</i>	Deepsea flathead	29.0	14	14
FMA	<i>Fusitriton magellanicus</i>	Fusitriton magellanicus	4.5	-	-
FQU	<i>Funiculina quadrangularis</i>	Rope-like sea pen	0.5	-	-
FRO	<i>Lepidopus caudatus</i>	Frostfish	66.4	34	34
GAI	<i>Galiteuthis</i> spp.	<i>Galiteuthis</i> spp.	0.1	-	-
GAO	<i>Gadomus aoteanus</i>	Filamentous rattail	0.4	2	2
GAS	Gastropoda	Gastropods	0.2	-	-
GDU	<i>Goniocorella dumosa</i>	Bushy hard coral	14.9	-	-
GGC	<i>Guttigadus globiceps</i>	Codling	0.1	-	-
GIZ	<i>Kathetostoma giganteum</i>	Giant stargazer	1 175.3	425	287
GOR	<i>Gorgonocephalus</i> spp.	<i>Gorgonocephalus</i> spp.	3.7	-	-
GPA	<i>Goniocidaris parasol</i>	Sea urchin	0.7	-	-
GRC	<i>Tripterophycis gilchristi</i>	Grenadier cod	0.3	-	-

Species	Scientific name	Common name	Catch weight (kg)	Number measured	Number weighed
GRM	<i>Gracilechinus multidentatus</i>	Sea urchin	38.8	-	-
GSH	<i>Hydrolagus novaezealandiae</i>	Dark ghost shark	5 318.1	2 788	704
GSP	<i>Hydrolagus bemisi</i>	Pale ghost shark	2 097.6	1 208	839
GSQ	<i>Architeuthis</i> spp.	Giant squid	48.4	-	-
GTA	<i>Graneledone taniwha</i>	Deepwater octopus	12.2	-	-
GUR	<i>Chelidonichthys kumu</i>	Red gurnard	2.5	2	2
GVO	<i>Provocator mirabilis</i>	Golden volute	0.7	-	-
GYB	<i>Gymnoscopelus bolini</i>	Bolin's lanternfish	0.7	-	-
GYP	<i>Gymnoscopelus piabilis</i>	Southern blacktip lanternfish	0.2	-	-
HAA	<i>Histioteuthis atlantica</i>	Violet squid	0.8	-	-
HAK	<i>Merluccius australis</i>	Hake	871.9	147	147
HAL	<i>Halosauropsis macrochir</i>	Abyssal halosaur	0.3	-	-
HAP	<i>Polyprion oxygeneios</i>	Hapuku	273.1	39	39
HAS	<i>Halargyreus</i> sp.	Australasian slender cod	619.3	1 350	524
HBA	<i>Helicolenus barathri</i>	Bigeye sea perch	2 796.4	3 418	1 166
HCO	<i>Bassanago hirsutus</i>	Hairy conger	98.9	90	85
HDR	Hydrozoa	Hydroid	0.4	-	-
HEC	<i>Henricia compacta</i>	<i>Henricia compacta</i>	0.3	-	-
HJC	<i>Halargyreus johnsonii</i>	Johnson's cod	80.4	126	84
HJO	<i>Halargyreus</i> spp.	Johnson's cod	5.8	6	6
HMT	Hormathiidae	Deepsea anemone	16.3	-	-
HOK	<i>Macruronus novaezealandiae</i>	Hoki	43 397.3	15 541	1 854
HOL	<i>Holtbyrnia</i> sp.	Tubeshoulder	0.2	-	-
HPC	<i>Helicolenus percoides</i>	Sea perch	97.5	250	78
HPE	<i>Halosaurus pectoralis</i>	Common halosaur	1.2	2	2
HSI	<i>Haliporoides sibogae</i>	Jackknife prawn	0.2	-	-
HTR	<i>Hippasteria phrygiana</i>	Trojan starfish	6.9	-	-
HYA	<i>Hyalascus</i> sp.	Floppy tubular sponge	1 595.5	-	-
HYB	<i>Hydrolagus homonycteris</i>	Black ghost shark	5.3	2	2
HYC	<i>Hymenaster carnosus</i>	Hymenaster carnosus	0.2	-	-
IAT	<i>Idiacanthus atlanticus</i>	Common black dragonfish	0.5	-	-
ISI	Isididae	Bamboo corals	0.1	-	-
JAV	<i>Lepidorhynchus denticulatus</i>	Javelinfish	4 957.3	6 598	1 525
JFI		Jellyfish	26.3	-	-
JMD	<i>Trachurus declivis</i>	Jack mackerel	20.2	22	21
JMM	<i>Trachurus murphyi</i>	Slender mackerel	190.6	143	69
LAC	<i>Nannobranchium achirus</i>	Cripplefin lanternfish	0.4	-	-
LAG	<i>Laetmogone</i> spp.	<i>Laetmogone</i> spp.	6.6	-	-
LAN	Myctophidae	Lantern fish	0.2	-	-
LAO	<i>Lithodes aotearoa</i>	New Zealand king crab	2.1	-	-
LAU	<i>Lampanyctus australis</i>	Austral lanternfish	0.9	-	-
LBI	<i>Lissodendoryx bifacialis</i>	Lissodendoryx bifacialis	0.5	-	-
LCH	<i>Harriotta raleighana</i>	Long-nosed chimaera	656.5	490	408
LDO	<i>Cyttus traversi</i>	Lookdown dory	2 376.3	2 859	1 296
LHE	<i>Lampanyctodes hectoris</i>	Hector's lanternfish	0.2	-	-
LHO	<i>Lipkius holthuisi</i>	Omega prawn	7.3	-	-
LIN	<i>Genypterus blacodes</i>	Ling	2 845.0	909	767
LIP	<i>Liponema</i> spp.	Deepsea anemone	1.0	-	-
LIT	<i>Lampanyctus intricarius</i>	Intricate lanternfish	1.6	-	-
LLE	<i>Lepidisis</i> spp.	Bamboo coral	0.1	-	-
LMD	<i>Lampanyctus macdonaldi</i>	MacDonald's lanternfish	0.2	-	-
LNV	<i>Lithosoma novaezealandiae</i>	Rock star	0.4	-	-
LPA	<i>Lampanyctus</i> spp.	<i>Lampanyctus</i> spp.	0.5	-	-
LPI	<i>Lepidion inosimae</i>	Giant lepidion	13.3	2	2
LRO	<i>Lithodes robertsoni</i>	Robertson's king crab	1.0	-	-
LSO	<i>Pelotretis flavilatus</i>	Lemon sole	18.5	37	37
MAN	<i>Neoachirosetta milfordi</i>	Finless flounder	17.3	8	8
MAU	<i>Malacosteus australis</i>	Southern loosejaw	1.0	-	-
MCA	<i>Macrourus carinatus</i>	Ridge scaled rattail	344.7	548	325
MCC	<i>Malluvium calcareum</i>	Cap limpet	0.1	-	-
MEB	<i>Melanolagus bericoides</i>	Bigscale blacksmelt	1.5	-	-
MEL	<i>Melanonus gracilis</i>	Smalltooth pelagic cod	0.2	-	-
MIQ	<i>Moroteuthopsis ingens</i>	Warty squid	501.0	-	-
MMA	<i>Macroparalepis macrugeneion</i>	<i>Macroparalepis macrugeneion</i>	0.1	-	-
MRQ	<i>Onykia robsoni</i>	Warty squid	27.7	-	-
MSL	<i>Mediaster sladeni</i>	Starfish	5.8	-	-
MVE	<i>Metelectrona ventralis</i>	Flaccid lanternfish	0.1	-	-
MVI	<i>Melanostigma vitiazi</i>	Limp eel pout	0.1	-	-
NAT		Natant decapod	0.1	-	-
NAU	<i>Notostomus auriculatus</i>	<i>Notostomus auriculatus</i>	0.1	-	-

Species	Scientific name	Common name	Catch weight (kg)	Number measured	Number weighed
NCA	<i>Nectocarcinus antarcticus</i>	Hairy red swimming crab	0.1	-	-
NCU	<i>Nemichthys curvirostris</i>	Black spot snipe eel	0.1	-	-
NEB	<i>Neolithodes brodiei</i>	Brodie's king crab	10.4	-	-
NEC	<i>Nematocarcinus</i> spp.	Spider prawns	0.2	-	-
NEI	<i>Neognathophausia ingens</i>	Giant red mysid	0.3	-	-
NMP	<i>Nemadactylus macropterus</i>	Tarakihi	170.9	140	52
NNA	<i>Nezumia namatahi</i>	Squashedface rattail	0.9	4	4
NOC	<i>Notacanthus chemnitzii</i>	Giant spineback	4.6	7	7
NOS	<i>Nototodarus sloanii</i>	Arrow squid	562.4	812	408
NPU	<i>Kuronezumia leonis</i>	Starnose black rat	0.9	3	3
NSD	<i>Squalus griffini</i>	Northern spiny dogfish	23.1	12	12
NUD	<i>Nudibranchia</i>	Nudibranchs	0.2	-	-
OCP		Octopod	1.0	-	-
ODT	<i>Odontaster</i> spp.	Pentagonal tooth-star	0.1	-	-
OME	<i>Octopus mernoo</i>	Octopus mernoo	0.3	-	-
OMI	<i>Opostomias micripnus</i>	Giant black dragonfish	2.7	-	-
OMO	<i>Omosudis lowei</i>	Hammerjaw	0.1	-	-
OMU	<i>Odontomacrus murrayi</i>	Largefang rattail	0.5	-	-
ONG	<i>Porifera</i>	Sponges	8.0	-	-
OPE	<i>Lepidoperca aurantia</i>	Orange perch	575.9	418	151
OPH		Ophiuroid (brittle star)	0.6	-	-
OPI	<i>Opisthoteuthis</i> spp.	Umbrella octopus	2.4	-	-
OPO	<i>Octopoteuthis</i> spp.	<i>Octopoteuthis</i> spp.	1.6	-	-
OPP	<i>Oplophorus</i> spp.	<i>Oplophorus</i> spp.	0.6	-	-
ORH	<i>Hoplostethus atlanticus</i>	Orange roughy	1 148.1	1 108	472
OVM	<i>Ovalipes mollerii</i>	Swimming crab	1.5	-	-
PAG	<i>Paguroidea</i>	Pagurid	0.3	-	-
PAL	<i>Paralepididae</i>	Barracudinas	0.3	-	-
PAM	<i>Pannychia moseleyi</i>	<i>Pannychia moseleyi</i>	0.3	-	-
PAO	<i>Pillsburiaster aoteanus</i>	<i>Pillsburiaster aoteanus</i>	2.4	-	-
PAT	<i>Patiriella</i> spp.	<i>Patiriella</i> spp.	0.1	-	-
PBA	<i>Pasiphaea barnardi</i>	<i>Pasiphaea barnardi</i>	0.7	-	-
PCH	<i>Penion chathamensis</i>	<i>Penion chathamensis</i>	0.1	-	-
PCO	<i>Auchenoceros punctatus</i>	Ahuru	0.1	-	-
PDG	<i>Oxynotus brunienis</i>	Prickly dogfish	22.3	12	12
PDS	<i>Paradiplospinus gracilis</i>	False frostfish	0.8	-	-
PER	<i>Perspersia kopua</i>	Common tubeshoulder	0.6	-	-
PHA	<i>Phaeophyta</i>	Brown seaweed	1.6	-	-
PHM	<i>Phormosoma</i> spp.	<i>Phormosoma</i> spp.	0.1	-	-
PHO	<i>Phosichthys argenteus</i>	Lighthouse fish	7.1	-	-
PIG	<i>Congiopodus leucopaecilus</i>	Pigfish	4.8	16	16
PKN	<i>Plutonaster knoxi</i>	Abyssal star	15.5	-	-
PLS	<i>Proscymnodon plunketi</i>	Plunket's shark	76.5	11	11
PLY	<i>Polycheles</i> spp.	Polychelidae	0.9	-	-
PMO	<i>Pseudostichopus mollis</i>	<i>Pseudostichopus mollis</i>	31.6	-	-
PNE	<i>Proserpinaster neozelanicus</i>	<i>Proserpinaster neozelanicus</i>	4.3	-	-
POL	<i>Polychaeta</i>	Polychaete	0.2	-	-
PPE	<i>Periphylla periphylla</i>	Helmet jellyfish	0.2	-	-
PRA		Prawn	0.1	-	-
PRU	<i>Pseudechinaster rubens</i>	<i>Pseudechinaster rubens</i>	3.4	-	-
PSI	<i>Psilaster acuminatus</i>	Geometric star	6.6	-	-
PSK	<i>Bathyraja shuntovi</i>	Longnosed deepsea skate	41.4	12	12
PSY	<i>Psychrolutes microporos</i>	Psychrolutes	12.9	-	-
PTA	<i>Pasiphaea</i> aff. <i>tarda</i>	Deepwater prawn	4.7	-	-
PTU	<i>Pennatulacea</i>	Sea pens	1.3	-	-
PYC	<i>Pycnogonida</i>	Sea spiders	0.2	-	-
PYR	<i>Pyrosoma atlanticum</i>	<i>Pyrosoma atlanticum</i>	12.7	-	-
PZE	<i>Paralomis zealandica</i>	Prickly king crab	0.2	-	-
QSC	<i>Zygochlamys delicatula</i>	Queen scallop	0.1	-	-
RAD	<i>Radicipes</i> spp.	Whip-like golden coral	0.7	-	-
RBT	<i>Emmelichthys nitidus</i>	Redbait	6.8	13	13
RBY	<i>Plagiogeneion rubiginosum</i>	Rubyfish	1.0	6	6
RCH	<i>Rhinochimaera pacifica</i>	Widenosed chimaera	311.8	110	92
RCO	<i>Pseudophycis bachus</i>	Red cod	153.4	239	216
RHY	<i>Paratrachichthys trailli</i>	Common roughy	76.6	255	92
RIB	<i>Mora moro</i>	Ribaldo	321.1	220	220
ROK		Rocks stones	50.2	-	-
ROS	<i>Rosenblattia robusta</i>	Rotund cardinalfish	0.4	-	-
RSK	<i>Zearaja nasuta</i>	Rough skate	2.7	1	1
RSO	<i>Rexea solandri</i>	Gemfish	12.4	5	5
RUD	<i>Centrolophus niger</i>	Rudderfish	76.9	15	15

Species	Scientific name	Common name	Catch weight (kg)	Number measured	Number weighed
SAL		Salps	0.1	-	-
SAU	<i>Scomberesox saurus</i>	Saury	0.1	-	-
SBB	<i>Stomias boa</i>	Scaly dragonfish	0.2	-	-
SBI	<i>Alepocephalus australis</i>	Bigscaled brown slickhead	1 126.1	1 442	340
SBK	<i>Notacanthus sexspinis</i>	Spineback	344.7	780	320
SBP	<i>Symbolophorus boops</i>	Bogue lanternfish	0.2	-	-
SBR	<i>Pseudophycis barbata</i>	Southern bastard cod	2.2	1	1
SBW	<i>Micromesistius australis</i>	Southern blue whiting	1.9	4	4
SCG	<i>Lepidotrigla brachyoptera</i>	Scaly gurnard	14.6	28	-
SCH	<i>Galeorhinus galeus</i>	School shark	398.5	27	27
SCI	<i>Metanephrops challengerii</i>	Scampi	11.6	107	107
SCO	<i>Bassanago bulbiceps</i>	Swollenhead conger	216.0	184	161
SDE	<i>Cryptoparas couesii</i>	Seadevil	2.5	-	-
SDM	<i>Sympagurus dimorphus</i>	Pagurid	1.0	-	-
SDO	<i>Cyttus novaezealandiae</i>	Silver dory	24.2	156	54
SEO		Seaweed	4.9	-	-
SEP	<i>Sergia potens</i>	<i>Sergia potens</i>	0.2	-	-
SIA	Scleractinia	Stony corals	0.1	-	-
SLT	<i>Stelletta</i> spp.	Orange fat finger sponge	3.2	-	-
SMC	<i>Lepidion microcephalus</i>	Small-headed cod	16.1	38	37
SMK	<i>Teratomaia richardsoni</i>	Spiny masking crab	0.9	-	-
SMO	<i>Sclerasterias mollis</i>	Cross-fish	3.7	-	-
SND	<i>Deania calcea</i>	Shovelnose dogfish	7 736.8	1 920	715
SNO	<i>Sio nordenskjoeldii</i>	Black bigscale fish	0.1	-	-
SOR	<i>Neocyttus rhomboidalis</i>	Spiky oreo	4 446.8	1 991	626
SOT	<i>Solaster torulatus</i>	Solaster torulatus	0.7	-	-
SPD	<i>Squalus acanthias</i>	Spiny dogfish	3 127.2	1 936	897
SPL	<i>Scopelosaurus</i> spp.	Waryfishes	0.3	-	-
SPN		Sea pen	0.6	-	-
SPP	<i>Callanthias</i> spp.	Splendid perches	0.1	-	-
SPT	<i>Spatangus multispinus</i>	Heart urchin	3.1	-	-
SPU	<i>Sternoptyx pseudodiaphana</i>	False oblique hatchetfish	0.1	-	-
SQX		Squid	0.2	-	-
SRB	<i>Brama australis</i>	Southern Ray's bream	93.9	64	64
SRH	<i>Hoplostethus mediterraneus</i>	Silver roughy	29.0	305	171
SSA	<i>Serrivomer samoensis</i>	Common sawtooth eel	0.4	-	-
SSI	<i>Argentina elongata</i>	Silverside	16.2	145	105
SSK	<i>Dipturus innominatus</i>	Smooth skate	464.1	35	30
SSM	<i>Alepocephalus antipodianus</i>	Smallscaled brown slickhead	3 182.0	1 187	374
SSO	<i>Pseudocyttus maculatus</i>	Smooth oreo	8 789.2	1 636	364
SSQ	<i>Sepioloidea</i> spp.	Bobtail squid	0.2	-	-
STO	<i>Stomias</i> spp.	Stomiatidae	0.2	-	-
STP	<i>Stephanocyathus platypus</i>	Solitary bowl coral	0.6	-	-
SUA	<i>Suberites affinis</i>	Fleshy club sponge	0.4	-	-
SUM	<i>Schedophilus maculatus</i>	Pelagic butterfish	0.1	-	-
SWA	<i>Seriola punctata</i>	Silver warehou	20 861.7	2 482	606
TAM	Echinothuriidae & Phormosomatidae	Tam O shanter urchin	44.1	-	-
TDQ	<i>Taningia danae</i>	Dana octopus squid	1.8	-	-
TFA	<i>Trichopeltarion fantasticum</i>	Friiled crab	1.4	-	-
THO	<i>Thouarella</i> spp.	Bottlebrush coral	0.1	-	-
TLD	<i>Tetilla leptoderma</i>	Furry oval sponge	2.2	-	-
TMI	<i>Trigonolampa miriceps</i>	Starburst dragonfish	0.4	-	-
TOD	<i>Neophrynichthys latus</i>	Dark toadfish	0.6	-	-
TOP	<i>Ambophthalmos angustus</i>	Pale toadfish	39.3	-	-
TPE	<i>Teuthowenia pellucida</i>	Teuthowenia pellucida	0.8	-	-
TRS	<i>Trachyscorpia eschmeyerii</i>	Cape scorpionfish	15.9	8	8
TRX	<i>Trachonurus gagates</i>	Velvet rattail	0.1	-	-
TSQ	<i>Todarodes filippovae</i>	Todarodes filippovae	95.6	2	2
TTL	<i>Tetilla australe</i>	Bristle ball sponge	0.1	-	-
TUB	<i>Tubbia tasmanica</i>	Tasmanian ruffe	2.8	2	2
VCO	<i>Antimora rostrata</i>	Violet cod	70.8	186	123
VIT	<i>Vitjazmaia latidactyla</i>	Deep sea spider crab	0.3	-	-
VNI	<i>Lucigadus nigromaculatus</i>	Blackspot rattail	3.0	20	20
VSQ	<i>Histioteuthis</i> spp.	Violet squid	2.0	-	-
WHR	<i>Trachyrincus longirostris</i>	Unicorn rattail	1.3	-	-
WHX	<i>Trachyrincus aphyodes</i>	White rattail	859.0	454	426
WIT	<i>Arnoglossus scapha</i>	Witch	7.3	10	10
WOD	Wood	Wood	37.8	-	-
WOE	<i>Alloctytus verrucosus</i>	Warty oreo	34.8	48	48
WWA	<i>Seriola caerulea</i>	White warehou	1 183.1	569	292

<b>Species</b>	<b>Scientific name</b>	<b>Common name</b>	<b>Catch weight (kg)</b>	<b>Number measured</b>	<b>Number weighed</b>
YBO	<i>Pentaceros decacanthus</i>	Yellow boarfish	0.2	-	-
YCO	<i>Parapercis gilliesi</i>	Yellow cod	1.1	1	-
ZOR	<i>Zoroaster</i> spp.	Rat-tail star	13.3	-	-
ZSP		Siphonophore	0.3	-	-
ZVA	<i>Thetys vagina</i>	<i>Thetys vagina</i>	3.7	-	-