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Catch-at-age estimates for hake and ling from commercial fisheries in 2024–25 and a 2026 survey

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PLAIN LANGUAGE SUMMARY

This report provides catch-at-age estimates for hake (*Merluccius australis*) and ling (*Genypterus blacodes*) from commercial fisheries during the 2024–25 fishing year and a research trawl survey in January 2026, to update ongoing time series.

These estimates are based on biological data and otoliths (ear bones used for ageing fish) sampled by observers and survey staff. The sampled ages are extrapolated via broader fishery or survey information (length frequencies scaled to total catch or survey biomass) to form representative estimates of catch-at-age.

Catch-at-age estimates of exploited stocks are important for stock assessment and management because they provide information on the selectivity of fishing gear, magnitude of a given year class, and productivity (i.e. growth rate, age at reproduction, and natural mortality).

EXECUTIVE SUMMARY

Barnes, T.C. [1]; Spong, K. [1]; Sutton, C. [1]; Davey, N. [1]; Carter, M.[1] (2026). Catch-at-age estimates for hake and ling from commercial fisheries in 2024–25 and a 2026 survey.

***New Zealand Fisheries Assessment Report 2026/45.* 33 p.**

This report provides catch-at-age for hake (*Merluccius australis*) in HAK 1 and 7 and ling (*Genypterus blacodes*) in LIN 3&4, 5&6, and 7 from commercial fisheries during the 2024–25 fishing year. Catch-at-age from discrete fisheries (within quota management areas) were estimated for both species using biological data and otoliths sampled at sea by observers, and also from a bottom trawl research survey on the Chatham Rise in January 2026 (TAN2601). The target mean weighted coefficient of variation (mwCV) for estimated catch-at-age for each dataset was 30% across all age classes, for both species and all fisheries.

For hake commercial trawl fisheries, the target mwCV was achieved for the Sub-Antarctic (HAK 1) and west coast South Island (WCSI) (HAK 7). The target mwCV was not achieved for hake captured during the Chatham Rise trawl survey. For ling commercial trawl fisheries, the target mwCV was achieved for the Chatham Rise (LIN 3&4) and Sub-Antarctic (LIN 5&6) fisheries but not for the WCSI (LIN 7). For ling longline fisheries, the target mwCV was not achieved for the Sub-Antarctic (LIN 5&6). Only 70 otoliths were available for the Chatham Rise (LIN 3&4) ling longline fishery and hence were not aged as this is below the required sample size. The target mwCV for ling was achieved from the Chatham Rise (LIN 3&4) trawl survey.

Estimated ages ranged from 4 to 26 years (median 8) for Sub-Antarctic hake (HAK 1), 1 to 21 years (median 6) for WCSI hake (HAK 7), and 3 to 27 years (median 7) for hake from the 2026 Chatham Rise trawl survey. For ling, ages ranged from 3 to 34 years (median 10) in the Chatham Rise trawl fishery (LIN 3&4), 5 to 26 years (median 10) in the Sub-Antarctic trawl fishery (LIN 5&6), 4 to 25 years (median 11) in the WCSI trawl fishery (LIN 7), 7 to 39 years (median 17) in the Sub-Antarctic longline fishery (LIN 5&6), and 2 to 26 years (median 9) in the 2026 Chatham Rise trawl survey.

Where target mwCVs were not achieved, the precision could not be improved via more ageing (i.e., increasing the sample size) because all available otoliths were aged. To further increase the precision of the catch-at-age time series for the assessment of these two species, more targeted observer coverage and survey effort would be required.

1. INTRODUCTION

Catch-at-age estimates are derived from commercial fisheries (herein fisheries) and fishery independent bottom trawl research surveys (herein surveys) within the New Zealand Exclusive Economic Zone (EEZ) for certain species. Such estimates are important for the stock assessment process as they provide data on the year class strength of recruited cohorts, stock productivity, and selectivity ogives. This report provides the catch-at-age estimates for the 2024–25 fishing year for hake (*Merluccius australis*) for fisheries within quota management areas (QMAs) HAK 1 and 7 and ling (*Genypterus blacodes*) QMAs LIN 3&4, 5&6, and 7 as derived from fishery catch sampling and surveys. The target mean weighted coefficient of variation (mwCV) for each catch-at-age analysis was 30% (mwCV across all age classes) for both species and their respective discrete fisheries. Sampling of biological data and otoliths to develop the fishery catch-at-age estimates is often stratified spatiotemporally and by target species. Also, the actual catch-at-age estimates are themselves sometimes stratified spatiotemporally. Descriptions of strata and extrapolative methods are provided in this report. This report also provides, and briefly discusses, time series of catch-at-age estimates for the target species (by fisheries) but only for those that were relevant to work pertaining to the 2024–25 fishing year and 2026 survey.

This report fulfils the reporting requirements for hake and ling in Objective 1 in year two of project MID2024-01 "Routine age determination of middle depth and deepwater species from commercial fisheries and resource surveys" (milestone 18) funded by Fisheries New Zealand. The overall objective was:

1. To determine catch-at-age for commercial catches and resource surveys of specified middle depth and deepwater fish stocks.

2. METHODS

2.1 Hake trawl fisheries description

Hake within the NZ EEZ are managed as three geographically separate QMAs: the Challenger Plateau and west coast South Island (HAK 7); the eastern Chatham Rise (HAK 4); and the remainder of the EEZ (HAK 1) which includes waters around the North Island, east coast of the South Island, and Sub-Antarctic but excludes the Kermadec area (Figure 1). Catch-at-age estimation is not done for HAK 10 as it is not a major fishery. For easy reference, and consistency with previous years, all major fisheries are described below, regardless of whether catch-at-age estimates were generated for 2024–25. Sufficient data means at least 500 fish were measured unless stated otherwise.

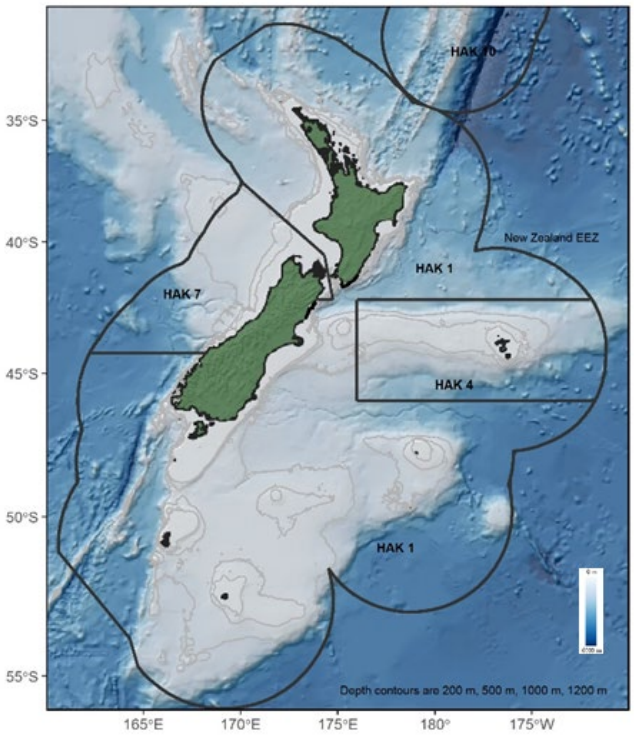


Figure 1: Hake QMAs within the 200 n. mile EEZ. Grey lines indicate depth contours for 200 m, 500 m, 1000 m, and 1200 m.

2.1.1 Chatham Rise (HAK 4)

For the Chatham Rise catch-at-age estimates were previously developed for four separate fisheries (e.g., Horn & Sutton 2009) as shown in Figure 2, and defined as follows:

1. West shallow (west of 178.1° E and bottom depth equal to or less than 530 m)
2. West deep (west of 178.1° E and bottom depth greater than 530 m)
3. East excluding Area 404 (east of 178.1° E, excluding Statistical Area 404)
4. Statistical Area 404 (178° W to 179.5° W, 42° S to 43.75° S).

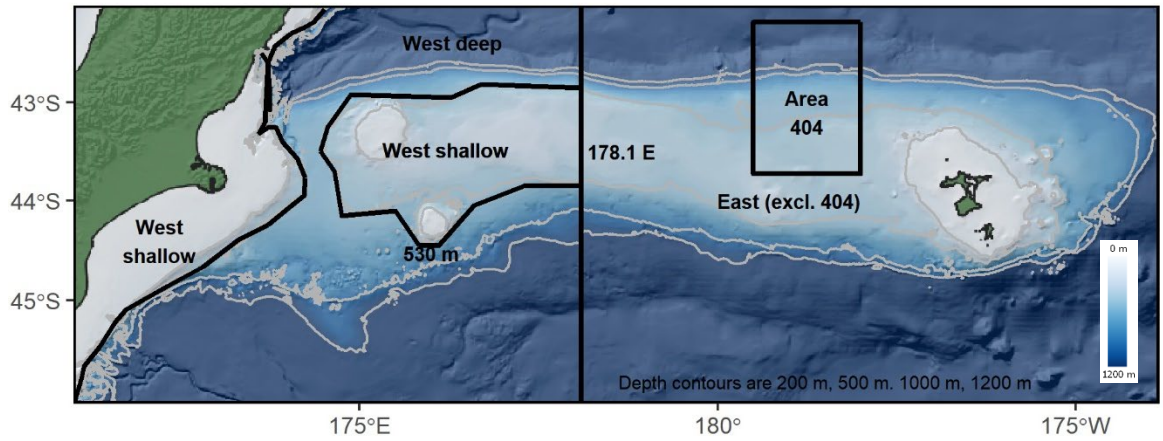


Figure 2: Sampling and catch-at-age strata defined for the Chatham Rise hake fishery. The west stratum boundary defined by depth (530 m) is shown only approximately. Grey lines indicate depth contours for 200 m, 500 m, 1000 m, and 1200 m.

A later assessment of the Chatham Rise hake stock (Horn & Francis 2010) concluded that splitting the estimates into two fisheries at longitude 178.1° E. (i.e., west and east), rather than four was statistically robust. Therefore, two series have been developed (for each year with sufficient data). Sufficient data for this fishery is at least 400 or 300 length measurements (west and east fisheries respectively). The raw data were still stratified, i.e. each Chatham Rise catch-at-age fishery comprised two strata for sampling purposes. In years when there were sufficient raw data and contract requirements to estimate catch-at-age for both fisheries, the same (combined) age-length key (ALK) was used for east and west, because Horn & Dunn (2007) showed that mean age-at-length did not differ (between fisheries). Catch-at-age is estimated from sampling between 1 October and 30 April.

This fishery was not included in catch-at-age work this project year.

2.1.2 Sub-Antarctic (HAK 1)

For the Sub-Antarctic a catch-at-age was estimated using a single ALK and the four raw data sampling strata shown in Figure 3 (determined by Horn 2008a) and defined as follows:

1. Puysegur Bank (east of 165° E to 168° E, south of 46° S to 48° S)
2. Snares-Pukaki (east of 165° E to 175° E, south of 46° S to 50.25° S, but excluding the Puysegur Bank stratum and the area north of 48° S and east of 171.6° E)
3. Auckland Island (east of 165° E to 169° E, south of 50.25° S to 54° S)
4. Campbell Island (east of 169° E to 174° E, south of 50.25° S to 54° S).

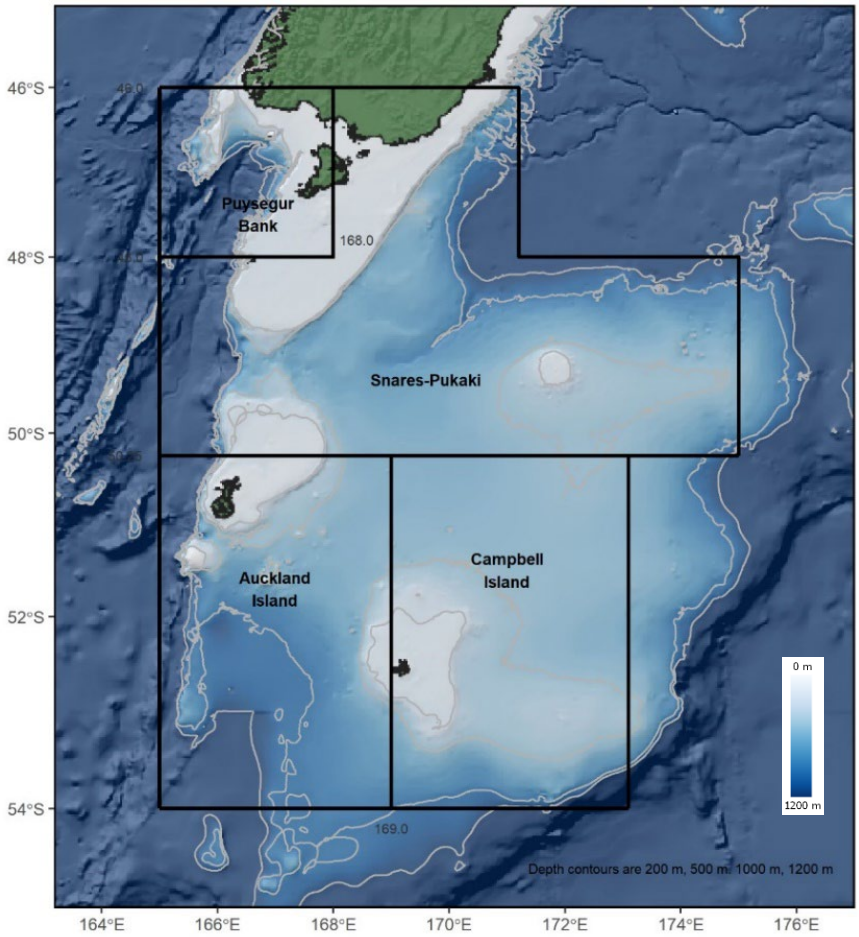


Figure 3: Sampling strata defined for the Sub-Antarctic hake fishery. Grey lines indicate depth contours for 200 m, 500 m, 1000 m, and 1200 m.

Catch-at-age was estimated from sampling between 1 September and 30 April which is the peak catch period historically (Devine 2008). Sufficient data were available to estimate catch-at-age for HAK 1 in 2024–25.

2.1.3 West coast South Island (HAK 7)

For the WCSI, catch-at-age was estimated using a single ALK and the three raw data sampling strata following Horn & Sutton (2008) and shown in Figure 4 and defined as follows:

1. Deep (bottom depth equal to or greater than 629 m).
2. North shallow (bottom depth less than 629 m and north of 42.55° S)
3. South shallow (bottom depth less than 629 m and south of 42.55° S).

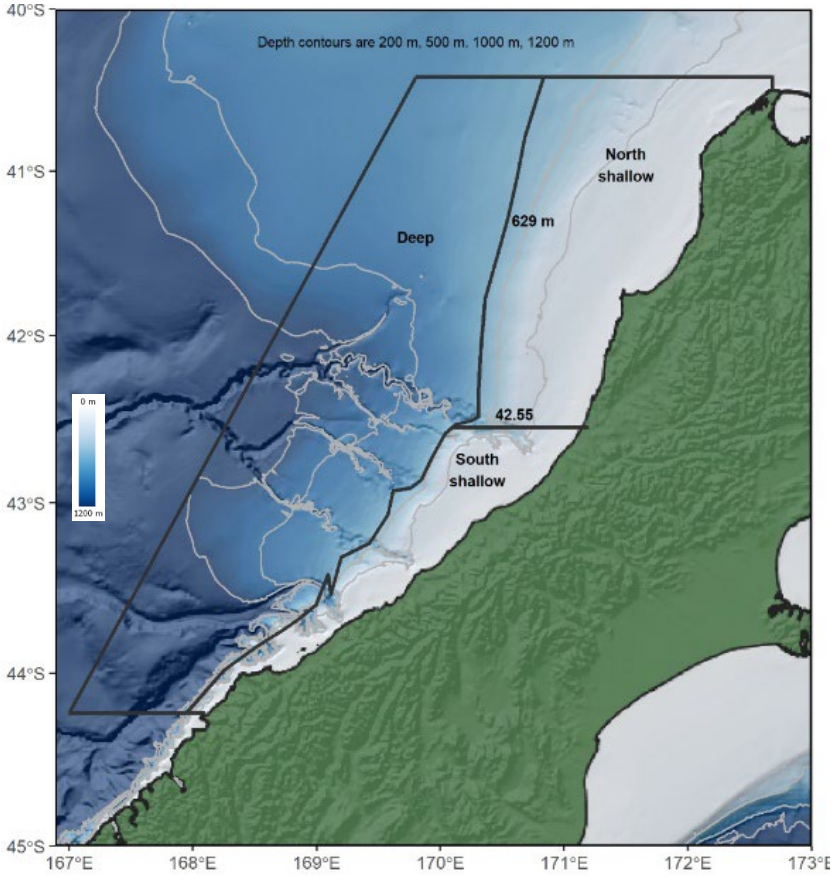


Figure 4: Sampling strata defined for the west coast South Island hake fishery. Grey lines indicate depth contours for 200 m, 500 m, 1000 m, and 1200 m.

Catch-at-age was estimated from sampling between 1 May and 30 September. Sufficient data were available to estimate catch-at-age for HAK 7 in 2024–25.

2.2 Ling trawl fisheries description

Ling are managed as eight administrative QMAs (Figure 5), although five of these (LIN 3, 4, 5, 6, and 7) currently produce about 95% of the catch. There are at least four major ling biological stocks in New Zealand waters (Horn 2005) and these are defined as: Chatham Rise (LIN 3 and LIN 4); the Sub-Antarctic incorporating Campbell Plateau, Stewart-Snares shelf and and Bounty Plateau (LIN 5, and LIN 6 & 6 B); west coast South Island (LIN 7 west of Cape Farewell); and Cook Strait (those parts of LIN 2 and LIN 7 between latitudes 41° S and 42° S and longitudes 174° E and 175.4° E, equating approximately to Statistical Areas 016 and 017) (Table 1). These stocks are referred to as LIN 3&4, LIN 5, 6&6 B, LIN 7 WC, and LIN 7 CK fisheries, respectively. Note LIN 6 B was once considered a separate stock (Horn 2005) but more recent research has shown no differentiation with the surrounding sub-Antarctic ling (Mormede et al. 2024).

Again, all major fisheries are described below, regardless of whether catch-at-age estimates were generated for 2024–25. Most ling temporal strata for catch-at-age estimation from trawl fisheries were changed in 2024. The new strata are described below, for details on strata used in 2023 (and earlier) refer to Ballara et al. (2024). Sufficient data means at least 700 fish were measured unless stated otherwise.

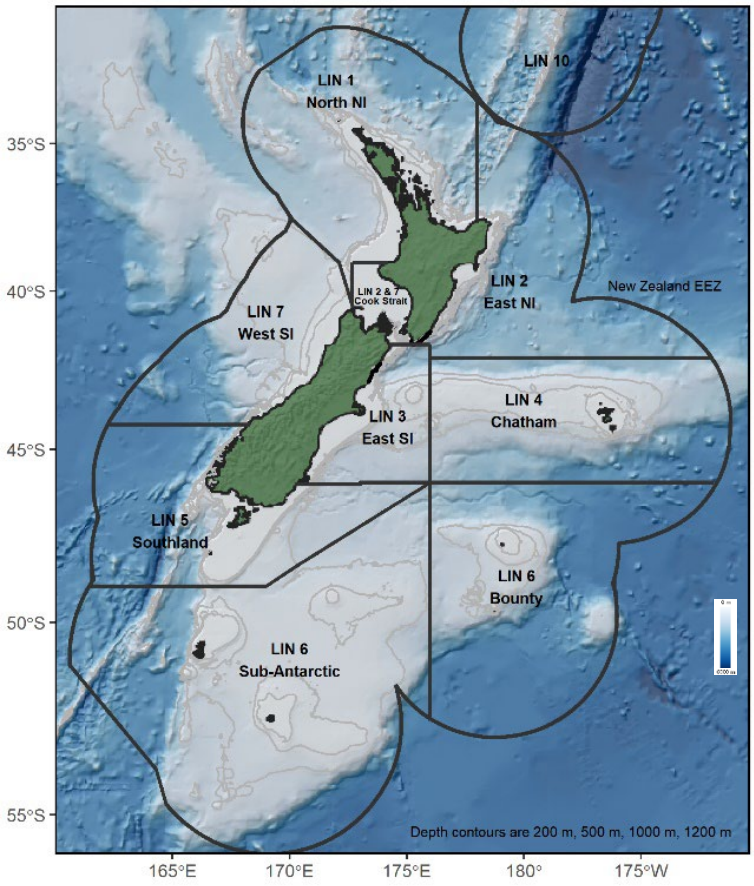


Figure 5: Ling QMAs. Grey lines indicate depth contours for 200 m, 500 m, 1000 m, and 1200 m.

Table 1: Definitions of geographical areas used in the ling catch-at-age estimates, based on statistical areas, and the administrative ling stocks they approximate.

Area	Statistical Areas	Approximate ling stock
Northern North Island	041–048, 001–010, 101–110, 801	LIN 1
East North Island	011–015, 201–206	LIN 2
East South Island	018–024, 301	LIN 3
Chatham	049–052, 401–412	LIN 4
Southland	025–031, 302, 303, 501–504	LIN 5
Sub-Antarctic	601–625	LIN 6& 6 B
WCSI	032–036, 701–706	Part of LIN 7 (LIN 7 WC)
Cook Strait	016, 017, 037–040	Parts of LIN 2&7 (LIN 7 CK)

2.2.1 Chatham Rise (LIN 3&4)

For the Chatham Rise, raw data sampling was stratified (spatiotemporally and/or by target species) following Horn & Sutton (2008) and shown in Figure 6 and defined as follows:

1. Coast (west of 174° E and the target not scampi *Metanephrops challengeri*)
2. Scampi (all trawl tows [tows] targeting scampi)
3. North Rise (north of 43.55° S, east of 174° E and the target not scampi)
4. South Rise (south of 43.55° S, east of 174° E and the target not scampi).

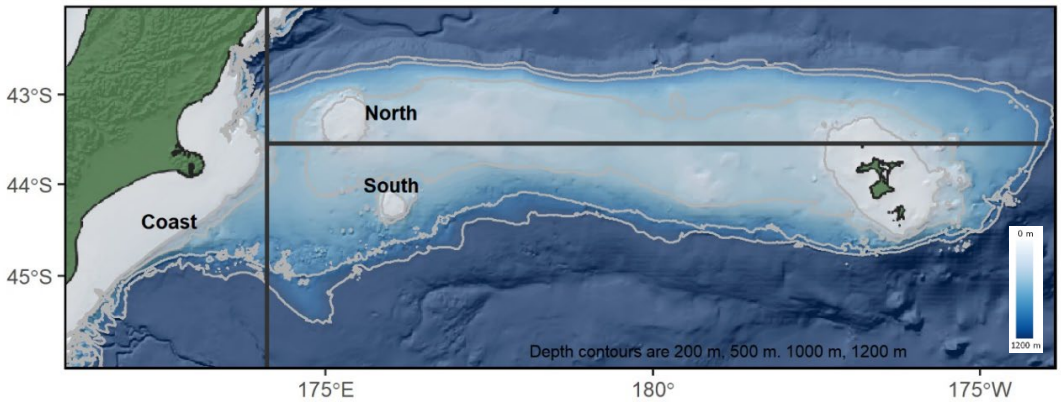


Figure 6: Sampling strata defined for the Chatham Rise LIN 3&4 fishery (excludes target scampi stratum). Grey lines indicate depth contours for 200 m, 500 m, 1000 m, and 1200 m.

Scampi target tows were sampled as a separate stratum because the gear used usually catches ling of a smaller average size than that used to target finfish. Catch-at-age was estimated from sampling between 1 November and 31 May. Sufficient data were available to estimate catch-at-age for LIN 3&4 in 2024–25.

2.2.2 Sub-Antarctic (LIN 5&6)

For the Sub-Antarctic, raw data sampling was stratified (spatiotemporally, including depth and/ or target species) following Horn & Sutton (2008) and shown in Figure 7 and defined as follows:

1. Scampi (all tows targeting scampi)
2. Shallow (bottom depth less than or equal to 450 m and the target not scampi)
3. Deep (bottom depth greater than 450 m and the target not scampi).

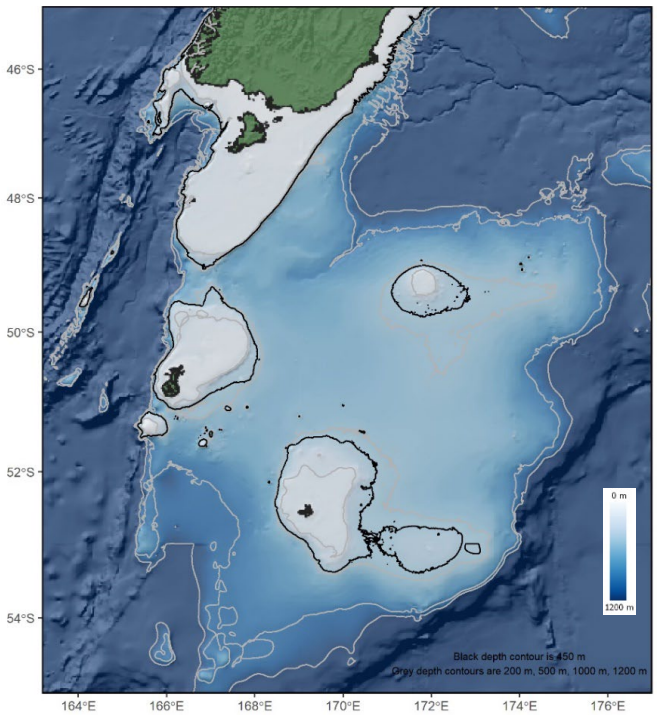


Figure 7: Sub-Antarctic ling sampling strata, defined by the 450 m contour (black contour line), for data where scampi is not the target. Grey lines indicate depth contours for 200 m, 500 m, 1000 m, and 1200 m.

Catch-at-age was estimated from sampling between 1 September to 31 December. Sufficient data were available to estimate catch-at-age for LIN 5&6 in 2024–25.

2.2.3 West coast South Island (LIN 7)

For the WCSI, raw data sampling was stratified (spatiotemporally, including depth) following Horn & Sutton (2008) and Horn (2008b) and shown in Figure 8 and defined as follows:

1. Deep (bottom depth equal to or greater than 498 m)
2. North shallow (bottom depth less than 498 m and north of 42.42° S)
3. South shallow (bottom depth less than 498 m and south of 42.42° S).

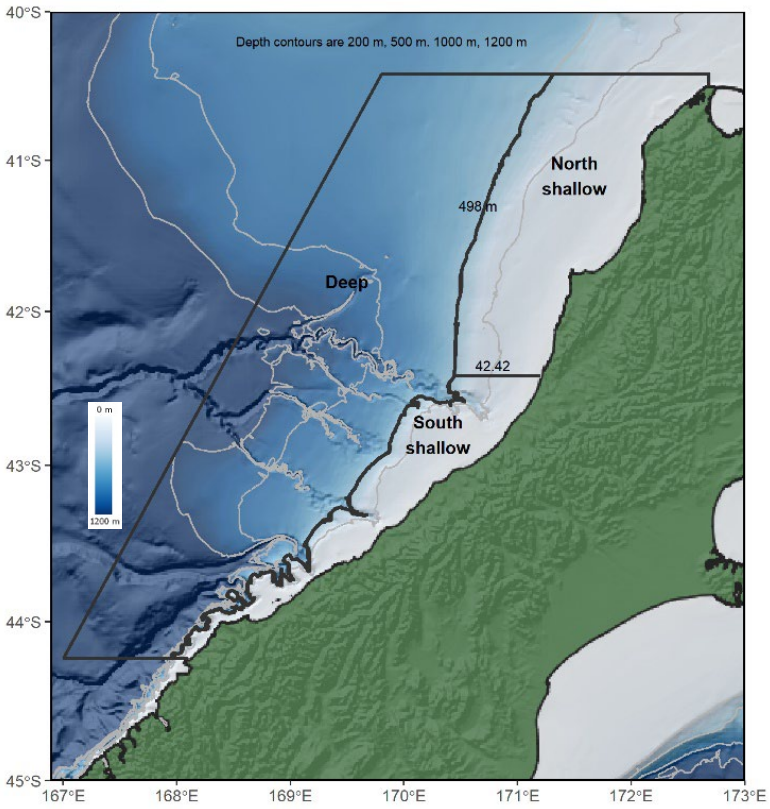


Figure 8: WCSI ling sampling strata. Grey lines indicate depth contours for 200 m, 500 m, 1000 m, and 1200 m.

Catch-at-age was estimated from sampling between 1 August and 30 September. Sufficient data were available to estimate catch-at-age for LIN 7 in 2024–25.

2.2.4 Cook Strait (LIN 2&7 CK)

For the Cook Strait, raw data sampling was from a single area stratum which is those parts of QMAs 2, 7, and 8 between 41° and 42° S and 174° and 175.4° E (see Figure 5), equating approximately to Statistical Areas 016 and 017, and a temporal stratum of 1 June to 30 September with an update of this period possible in the future. Catch-at-age estimation for Cook Strait was not part of project work for this reporting period.

2.3 Ling longline fisheries description

The raw data sampling and/or catch-at-age estimation were traditionally done for bottom longline (longline) fisheries according to established strata (most recently reported in Ballara et al. (2024)). As for the ling trawl fisheries, most temporal strata were changed prior to 2024 along with the geographical

strata in the Sub-Antarctic (see Ballara et al. (2024) for old strata definitions). Sufficient data means that at least 500 fish were measured unless stated otherwise.

2.3.1 Chatham Rise (LIN 3&4)

For Chatham Rise a single spatiotemporal stratum (i.e., QMAs 3 and 4 between 42° and 46° S and 1 July to 31 November) was used. Catch-at-age estimation for the Chatham Rise (LIN 3&4) longline fishery is a year behind due to boats still being at sea during the critical time for otolith selection (spring at the start of any fishing year). As only 70 otoliths were available at the time of selection catch-at-age could not be estimated for this fishery in this reporting period (i.e. 2023–24 fishing year as year behind).

2.3.2 Sub-Antarctic (LIN 5&6)

The Sub-Antarctic raw data is now sampled and catch-at-age estimated as a single fishery (see Ballara & Barnes 2024). The sampling strata comprise QMAs 5 and 6, excluding Statistical Area 030, between 1 March to 30 June. Sufficient data were available to estimate catch-at-age for LIN 5&6 in 2024–25.

2.3.3 West coast South Island (LIN 7)

Raw data from the WCSI are sampled and catch-at-age estimated using a single stratum between 1 January and 31 October. Lack of raw data (otoliths) from the 2002–03, 2005–06, and 2006–07 longline fishing resulted in ALKs developed using age data from the WCSI trawl fisheries from those years. This relied on the assumption that both fleets were fishing the same population. The 2005–06 and 2006–07 raw data were sampled under the Seafood New Zealand ling longline logbook programme (Langley 2001). Catch-at-age estimation for the WCSI ling longline fishery was not part of project work for this reporting period.

2.3.4 Cook Strait (LIN 2&7 CK)

Cook Strait raw data are sampled and catch-at-age estimated using a single stratum (i.e., those parts of QMAs 2, 7, and 8 between 41° and 42° S and 174° and 175.4° E, equating approximately to Statistical Areas 016 and 017 and 1 June to 30 September). The Cook Strait ALK in 2001 (Langley 2001) used all otoliths sampled from the longline fishery (n = 57), supplemented by otoliths sampled from the trawl fishery in the same area and year. Catch-at-age estimation for Cook Strait was not part of project work for this reporting period.

2.4 Ling potting fisheries description

The pot fishery is relatively new, has increased rapidly, and in 2024–25 accounted for roughly one third of ling catch (Holmes et al. 2025). Catch-at-age estimation for ling potting fisheries was not part of project work for this reporting period. In recent times commercial fishing with this method is becoming increasingly common and this may be affecting the sample size available for ageing from traditional ling fisheries. As such, Fisheries New Zealand is considering pot-based age frequencies in future (pers. comm. Dr Gretchen Skea).

2.5 Hake and ling trawl surveys

For ease of reference and consistency with previous reports, all surveys that form an ongoing hake and ling catch-at-age series are described below regardless of occurrence in the period relevant to this report.

2.5.1 Chatham Rise

The Chatham Rise survey began in early 1989, with surveys in most years until 2014, when surveys became biennial. The most recent Chatham Rise survey was in January 2026 and age distributions for hake and ling are included in this report. Prior to 2010, survey catch-at-age estimates were extrapolated from the numbers of hake and ling available to the trawl between 200 and 800 m (core strata). Since

2010, additional deeper strata (800–1300 m) have been surveyed, but few ling are caught deeper than 800 m.

2.5.2 Sub-Antarctic

A survey of the Sub-Antarctic was completed most recently in 2024 (TAN2413 in November–December) and results were published in Barnes et al. (2026). This survey series began in the early 1990s, was annual during the 2000s, and became biennial from 2012. The main survey series has been typically in summer, although some surveys were in autumn and spring. Survey catch-at-age estimates were extrapolated from the numbers of hake and ling available to the trawl for depths of 300–800 m, an 800–1000 m stratum at Puysegur, and, in some years, other 800–1000 m strata off the Campbell Plateau (as above, few ling are caught deeper than 800 m). To ensure comparability, samples from the core 300–800 m strata plus the deep Puysegur stratum only were used to estimate catch-at-age.

2.5.3 West coast South Island

A survey of the WCSI was also completed most recently in 2024 (TAN2407 in July–August) and results were published in Barnes et.al. (2026). Hake survey catch-at-age estimates were produced for the 'core' (depths 200–650 m) and 'all' (200–800 m) strata whereas ling survey catch-at-age estimates were from the core area only.

2.6 Catch at-age estimation

The catch-at-age estimation for each fishery and survey were derived in the same manner as previous years (e.g. Ballara & Barnes 2024) by application of sex-specific ALKs. All hake and ling sampled have their total length (reported here in centimetres) and sex recorded with a sample or sub sample (i.e. for fishery sampling) also having their otoliths extracted. For each ALK, otoliths were selected from each 1-cm length class roughly in proportion to their occurrence in the scaled length frequency samples, with the constraint that the number of otoliths in each length class (where available) was at least one. Commercial tows and longline shots (herein shots) have the constraint that ≥5 hake or ling need to be sampled for length (by observers) for that tow or shot to be included in the length frequency and otolith subsample analyses but where fewer than the contracted target number of otoliths were achieved by observer sampling then the ≥5 rule does not apply (to provide all available otoliths to the ALK). This rule does not apply to surveys, for example if only 3 hake or ling were caught in a biomass survey tow then these fish would still be available for ageing.

Otoliths were prepared and read using the validated ageing technique for hake (Horn 1997) and ling (Horn 1993, Horn 2021). Length-at-age boxplots were used as a quality control tool to identify potential outliers, defined as observations occurring outside the boxplot whiskers. The plots were also used to assess whether observed length-at-age relationships were consistent with expected growth patterns. Potential outliers were reviewed individually and retained unless they were considered biologically implausible or indicative of a transcription, preparation, or otolith reading error. Catch-at-age was estimated by constructing ALKs separately for each sex and applying them to the scaled length frequency data derived from each fishery or survey using 'catchatage' software developed specifically for this task by Earth Sciences New Zealand (formerly NIWA) (Bull & Dunn 2012).

Fishery catch-at-age estimates were derived by scaling the sample age frequency estimates to the total catch from each fishery in the time period sampled. Ages 40 years and greater were pooled into a single plus group. For fisheries with multiple sampling strata (but a single fishery catch-at-age), length frequency data from each stratum were first scaled to the total catch from that stratum, and then the scaled length frequencies from all strata were summed, and the resulting ALK was applied to the entire scaled length frequency. Trawl survey catch-at-age estimates were scaled to total estimated relative biomass available in the survey area.

In some previous years, surveys occurred around the middle of the periods sampled for fishery catch-at-age estimates (e.g., the January Chatham Rise survey occurred in the middle of the October to April hake fishery and the October to May ling trawl fishery). This meant that fishery catch-at-age could be estimated using ALKs developed for the relevant survey. It was sometimes necessary, however, to age some additional fish from the fisheries to develop length-sex combinations that were inadequately sampled by the survey.

The target mwCV for hake catch-at-age from trawl surveys is often not achieved. To maximise the chances of achieving the target, all hake from the tows used to estimate survey biomass were sampled for otoliths. Any hake caught in survey tows not used for biomass calculations (i.e., foul, midwater, or night tows) were also sampled for otoliths. These extra fish were aged and incorporated into the ALK. Consequently, in the summaries shown below, the number of aged hake from the surveys was often greater than the number of measured fish (i.e., more hake aged than the number of fish used to generate the length frequencies). Only length frequencies from biomass tows were used.

2.7 Hake ageing design

For hake, ageing of the following samples was proposed for the 2024–25 fishing year (but to be sampled during the specific months listed below), with the target number of otoliths to be aged given in square brackets:

HAK 1
- Sub-Antarctic trawl fishery (September 2024–May 2025) [500]

HAK 4
- Chatham Rise trawl survey (January 2026) [500]

HAK 7
- WCSI trawl fishery (May–September 2025) [600]

2.8 Ling ageing design

For ling, ageing of the following samples was proposed for the 2024–25 fishing year (but to be sampled during the specific months listed below), with the target number of aged otoliths in square brackets:

LIN 3&4
- Chatham Rise trawl fishery (November 2024–May 2025) [500]
- Chatham Rise bottom longline fishery (July–November 2024) [500]
- Chatham Rise trawl survey (January 2026) [500]

LIN 5&6
- Sub-Antarctic trawl fishery (September–December 2024) [500]
- Sub-Antarctic bottom longline fishery (March–June 2025) [500]

LIN 7
- WCSI trawl fishery (August–September 2025) [500]

3. RESULTS

3.1 Hake trawl fishery catch-at-age

3.1.1 Sub-Antarctic (HAK 1)

In 2024–25, a complete sample (i.e. 500 otoliths) were available from the fishery. A total of 505 otoliths were selected and 502 provided age estimates (i.e. after vateritic or deformed otoliths were removed). The derived mwCV was 18.6% which is well below the agreed target. Table 2 provides the data used since 1989–90 to produce the catch-at-age estimates and mwCVs. Details of the estimated catch-at-age distribution are given in Table 3 with graphical representation of distributions in Appendix A.

Table 2: Numbers of measured and aged hake by fishing year, sex, tows sampled, and the estimated mean weighted CV (%) for the Sub-Antarctic (HAK 1) trawl fishery. –: no data.

	Males		Females			
Fishing year	Measured	Aged	Measured	Aged	Tows	mwCV
1989–90	269	47	548	71	74	42.0
1990–91	175	–	588	–	64	–
1991–92	557	215	1 363	409	151	24.9
1992–93	833	183	1 218	518	171	27.6
1993–94	512	87	609	173	119	47.8
1994–95	167	–	597	–	92	–
1995–96	289	65	435	110	75	50.0
1996–97	84	–	219	–	54	–
1997–98	390	82	1 018	193	154	37.7
1998–99	463	174	1 077	322	199	27.4
1999–00	3 007	259	2 526	421	307	22.5
2000–01	527	388	1 648	698	216	29.6
2001–02	921	333	2 026	874	320	23.4
2002–03	271	258	908	739	197	40.4
2003–04	1 309	350	969	518	165	24.7
2004–05	179	185	424	305	82	40.1
2005–06	1 906	218	1 094	506	153	23.2
2006–07	547	224	666	351	73	38.5
2007–08	891	325	592	682	89	23.2
2008–09	1 221	311	893	498	109	23.9
2009–10	1 879	418	1 029	611	91	18.2
2010–11	3 738	296	1 212	282	117	20.2
2011–12	4 098	581	1 597	605	109	15.0
2012–13	2 555	412	1 306	666	100	19.5
2013–14	4 027	316	1 443	146	90	19.4
2014–15	2 907	256	800	210	94	22.9
2015–16	2 125	217	931	166	64	26.4
2016–17	2 409	203	777	143	67	23.2
2017–18	2 067	215	1 090	175	75	22.4
2018–19	759	105	389	240	25	34.8
2019–20	784	122	388	140	45	28.1
2020–21	2 005	166	469	57	40	29.2
2021–22	2 699	164	1 292	344	83	24.6
2022–23	1 680	256	980	241	73	22.1
2023–24	1 623	209	893	108	40	24.8
2024–25	1 932	281	1 151	221	53	18.6

Table 3: Hake calculated numbers-at-age by sex and the estimated CV (proportion) for the Sub-Antarctic (HAK 1) trawl fishery catch, September 2024 to May 2025. Age is in years. –: no data.

Age	Male	CV	Female	CV	Age	Male	CV	Female	CV
3	-	-	-	-	15	18 685	0.936	192 791	0.313
4	24 578	0.731	5 362	0.633	16	56 935	0.499	83 941	0.434
5	84 655	0.569	18 656	0.524	17	51 679	0.606	105 606	0.456
6	712 621	0.217	30 465	0.533	18	14 802	1.058	73 825	0.513
7	1 737 493	0.109	241 602	0.251	19	41 297	0.686	40 790	0.739
8	1 286 849	0.129	465 123	0.196	20	19 953	1.014	-	-
9	800 083	0.173	452 767	0.224	21	-	-	27 775	0.816
10	200 048	0.358	374 596	0.220	22	-	-	42 165	0.766
11	165 612	0.390	304 601	0.253	23	-	-	12 836	1.129
12	117 568	0.395	312 157	0.251	24	-	-	-	-
13	82 791	0.454	131 300	0.396	25	-	-	-	-
14	72 760	0.490	230 488	0.311	26	-	-	9 252	0.992

3.1.2 West coast South Island (HAK 7)

In 2024–25, 1171 otoliths were available from the fishery and 602 selected (subsampled) for ageing. Only one otolith was unable to be aged and was removed leaving 601 ages available for catch-at-age estimation. The derived mwCV was 14.9%. Table 4 provides the data used since 1990 to produce the catch-at-age estimates and the mwCVs. Details of the estimated catch-at-age distribution are given in Table 5 with graphical representation of distributions in Appendix A.

Table 4: Numbers of measured and aged hake by fishing year, sex, tows sampled, and the estimated mean weighted CV (%) for the WCSI (HAK 7) trawl fishery.

	Males		Females			
Fishing year	Measured	Aged	Measured	Aged	Tows	mwCV
1989–90	578	210	567	261	57	23.1
1990–91	2 288	286	1 653	358	146	18.4
1991–92	2 592	196	1 193	261	121	22.5
1992–93	2 129	188	979	163	93	29.1
1993–94	1 598	151	1 643	272	174	32.5
1994–95	2 528	271	2 769	342	152	29.2
1995–96	2 862	287	1 753	326	193	28.9
1996–97	3 286	262	1 720	198	234	21.3
1997–98	2 339	257	1 497	253	237	21.4
1998–99	4 186	270	3 744	240	307	18.3
1999–00	2 705	258	2 330	269	285	18.9
2000–01	1 529	176	1 723	280	192	23.9
2001–02	2 281	93	2 434	385	380	33.8
2002–03	1 917	227	2 063	234	296	20.0
2003–04	2 702	303	2 181	193	353	16.5
2004–05	2 305	238	2 324	280	217	23.8
2005–06	5 502	276	4 231	298	395	16.3
2006–07	3 385	248	3 258	257	132	16.7
2007–08	4 682	321	2 416	266	147	17.7
2008–09	5 773	301	3 610	301	178	18.8
2009–10	2 454	130	1 877	134	76	25.4
2010–11	2 489	260	2 489	353	104	16.8
2011–12	2 535	357	2 061	381	140	14.4
2012–13	12 352	325	8 417	443	493	14.3
2013–14	8 128	320	7 242	384	360	13.1
2014–15	12 334	329	10 173	363	498	13.6
2015–16	5 304	461	4 589	449	240	13.2
2016–17	9 019	363	6 572	382	362	13.3
2017–18	4 242	419	4 758	434	392	13.6
2018–19	1 027	185	2 144	450	88	19.7
2019–20	3 481	209	3 734	413	197	21.6
2020–21	1 571	206	2 067	422	120	36.9
2021–22	1 416	193	1 887	351	134	22.5
2022–23	5 440	279	4 220	322	230	14.3
2023–24	949	280	2 466	322	149	19.0
2024–25	1 303	185	2 767	394	162	14.9

Table 5: Hake calculated numbers-at-age by sex and the estimated CV (proportion) for the WCSI (HAK 7) trawl fishery catch, May to September 2025. Age is in years. –: no data.

Age	Male	CV	Female	CV	Age	Male	CV	Female	CV
1	-	-	32 303	1.146	12	-	-	256 583	0.47
2	1 209 831	0.365	688 645	0.329	13	105 367	1.056	209 579	0.505
3	220 740	0.715	138 882	0.651	14	217 046	0.639	388 680	0.357
4	1 124 097	0.291	142 094	0.498	15	185 049	1.022	269 184	0.421
5	7 886 015	0.110	2 517 166	0.182	16	-	-	76 186	0.692
6	5 337 406	0.122	6 971 881	0.099	17	-	-	166 101	0.569
7	1 137 645	0.312	4 877 641	0.108	18	-	-	178 901	0.576
8	391 541	0.506	2 094 437	0.167	19	-	-	90 840	1.033
9	229 046	0.719	1 101 399	0.216	20	-	-	15 278	1.139
10	105 367	1.060	724 922	0.264	21	25 615	1.334	42 529	1.113
11	210 143	0.795	395 756	0.35					

3.2 Trawl survey catch-at-age for hake

3.2.1 Chatham Rise (HAK 4)

From the 2026 survey, 158 otoliths were available and all were aged with 154 passing after reading quality control. The sample was below the target of 500 otoliths, resulting in an mwCV of 57%, well above the desired maximum of 30% Table 6 summarises the data used each year to produce the catch-at-age estimates and the mwCVs. Details of the estimated catch-at-age distribution for hake caught in the survey are given in Table 7 with graphical representation of distributions in Appendix A.

Table 6: Numbers of measured and aged hake by survey, year, sex, tows sampled, and the estimated mean weighted CV (%) for the Chatham Rise (HAK 4) core trawl surveys. Number of aged fish exceeds the number measured in some years, because hake caught outside the core trawl survey area were also aged. –: no data.

	Males		Females			
Source	Measured	Aged	Measured	Aged	Tows	Mean CV
AEX8903	220	154	212	179	63	39.5
TAN9106	322	233	305	230	122	30.0
TAN9212	243	200	275	225	121	32.7
TAN9401	293	181	355	217	123	33.1
TAN9501	201	170	229	191	87	38.7
TAN9601	149	113	200	165	56	36.4
TAN9701	149	145	159	149	77	36.1
TAN9801	137	135	142	139	55	39.0
TAN9901	94	103	142	157	62	44.1
TAN0001	177	177	178	177	72	35.9
TAN0101	104	112	148	150	66	37.3
TAN0201	104	177	121	172	61	36.4
TAN0301	33	34	69	71	46	61.4
TAN0401	94	82	110	105	53	49.4
TAN0501	115	134	107	113	55	45.3
TAN0601	109	123	126	138	56	33.8
TAN0701	133	158	136	142	61	32.6
TAN0801	55	65	87	99	60	38.0
TAN0901	259	238	201	191	70	32.5
TAN1001	122	142	97	107	56	39.7
TAN1101	49	74	63	65	45	44.5
TAN1201	48	78	83	98	54	49.5
TAN1301	51	73	109	112	47	48.4
TAN1401	38	88	65	91	46	55.4
TAN1601	67	115	91	106	46	40.8
TAN1801	111	143	107	115	34	49.4
TAN2001	31	56	56	57	37	56.2
TAN2202	49	74	66	72	39	60.8
TAN2401	296	142	215	164	36	47.0
TAN2601	64	98	50	56	27	57.1

Table 7: Hake calculated numbers-at-age by sex and the estimated CV (proportion) for the core trawl survey of the Chatham Rise (HAK 4) in January 2026 (TAN2601). Age in years. –: no data.

Age	Male	CV	Female	CV	Age	Male	CV	Female	CV
1	-	-	-	-	15	1 949	1.448	11 598	0.735
2	-	-	-	-	16	-	-	-	-
3	16 221	0.859	10 397	1.229	17	-	-	4 633	1.096
4	26 651	0.420	13 965	0.596	18	716	1.668	3 857	1.052
5	54 924	0.354	25 218	0.586	19	-	-	491	2.076
6	33 265	0.365	14 251	0.655	20	5 211	1.377	590	1.652
7	27 668	0.436	8 188	0.995	21	-	-	-	-
8	29 227	0.413	7 222	0.815	22	-	-	-	-
9	24 676	0.536	8 564	0.837	23	-	-	-	-
10	4 163	1.052	5 705	0.975	24	-	-	-	-
11	4 405	0.962	13 798	0.679	25	-	-	-	-
12	1 061	1.423	7 457	0.829	26	-	-	-	-
13	2 357	1.088	462	1.835	27	2 191	1.42	-	-
14	11 767	0.707	14 189	0.755	28	-	-	-	-

3.3 Ling trawl fishery catch-at-age

3.3.1 Chatham Rise (LIN 3&4)

In 2024–25, more than the contracted 500 otoliths were available from the fishery and thus 520 were selected and 519 aged (one otolith was unable to be aged). The derived mwCV was 23.6%. Table 8 provides the data used since 1991–92 to produce the catch-at-age estimates and the mwCVs. Details of the estimated catch-at-age distribution are given in Table 9 with graphical representation of distributions in Appendix B.

Table 8: Numbers of measured and aged ling by fishing year, sex, tows sampled and estimated mean weighted CV (%) for the Chatham Rise (LIN 3&4) trawl fishery.

	Males		Females			
Fishing year	Measured	Aged	Measured	Aged	Tows	mwCV
1991–92	2 151	252	2 653	281	143	27.0
1993–94	1 127	302	768	302	126	32.9
1994–95	359	236	302	201	59	45.1
1995–96	453	306	399	284	87	30.0
1996–97	162	317	240	242	31	41.1
1997–98	3 463	348	3 117	280	497	18.7
1998–99	3 306	336	2 469	318	312	20.0
1999–00	887	322	1 013	326	161	24.8
2000–01	1 000	312	988	341	188	21.0
2001–02	642	294	708	334	129	23.8
2002–03	694	317	764	347	114	24.3
2003–04	356	303	600	302	99	30.1
2004–05	869	310	666	326	194	27.9
2005–06	251	328	291	330	54	34.5
2006–07	699	310	687	330	135	22.9
2007–08	2 755	317	2 070	325	276	20.9
2008–09	1 034	323	1 120	298	141	32.4
2009–10	526	318	571	309	87	28.9
2010–11	492	308	521	293	74	27.3
2011–12	739	257	767	297	82	26.4
2012–13	981	278	1 083	315	130	24.1
2013–14	1 385	314	1 674	258	164	29.7
2014–15	330	102	499	176	47	33.4
2015–16	371	287	423	292	47	32.8
2016–17	853	220	719	171	76	28.9
2017–18	745	357	773	343	75	24.9
2018–19	724	186	831	221	82	26.6
2019–20	732	160	823	239	78	29.2
2020–21	1 584	253	990	202	88	32.3
2021–22	630	179	1 018	314	91	25.5
2022–23	550	142	630	189	68	34.5
2023–24	554	156	767	246	79	30.8
2024–25	1 157	251	1 192	268	121	23.6

Table 9: Ling calculated numbers-at-age by sex and the estimated CV (proportion) for the Chatham Rise (LIN 3&4) trawl fishery during November 2024 to May 2025. Age in years. –: no data.

Age	Male	CV	Female	CV	Age	Male	CV	Female	CV
1	-	-	-	-	18	1 458	0.544	969	0.771
2	-	-	-	-	19	832	0.838	465	0.973
3	10 209	0.359	8 533	0.354	20	435	1.165	2 651	0.462
4	7 129	0.344	8 874	0.293	21	1 275	0.729	1 708	0.616
5	13 769	0.233	13 333	0.281	22	478	0.912	-	-
6	9 491	0.295	9 810	0.281	23	1 049	0.718	-	-
7	10 470	0.25	11 057	0.271	24	-	-	-	-
8	12 474	0.231	11 129	0.265	25	901	0.637	925	0.858
9	9 101	0.307	13 806	0.234	26	-	-	-	-
10	9 071	0.257	10 566	0.232	27	723	0.823	-	-
11	7 457	0.324	8 925	0.254	28	76	1.476	612	0.884
12	7 764	0.271	6 372	0.291	29	-	-	-	-
13	7 652	0.255	11 007	0.228	30	469	0.884	-	-
14	4 145	0.38	6 417	0.311	31	-	-	-	-
15	2 916	0.401	7 320	0.297	32	536	1.087	-	-
16	2 984	0.415	3 912	0.443	33	-	-	-	-
17	1 900	0.525	3 133	0.452	34	131	1.258	-	-

3.3.2 Sub-Antarctic (LIN 5&6)

In 2024–25, a complete sample (i.e. 500 otoliths) was available from the fishery, 520 otoliths were selected and 496 aged. The mwCV was 17.9%. Table 10 provides the data used since 1991–92 to produce the catch-at-age estimates and mwCVs. Details of the estimated catch-at-age distribution are given in Table 11 with graphical representation of distributions in Appendix B.

Table 10: Numbers of measured and aged ling by fishing year, sex, tows sampled, and the estimated mean weighted CV (%) for the Sub-Antarctic (LIN 5&6) trawl fishery.

	Males		Females			
Source	Measured	Aged	Measured	Aged	Tows	mwCV
1991–92	1 466	437	1 652	667	141	22.0
1992–93	1 337	235	1 615	363	164	28.3
1993–94	686	256	1 059	357	129	29.2
1995–96	881	366	779	297	83	24.5
1997–98	1 408	274	1 717	302	218	29.0
2000–01	2 192	247	1 947	351	267	28.1
2001–02	1 887	264	2 579	327	424	24.8
2002–03	1 164	434	1 828	625	263	20.9
2003–04	853	246	1 397	337	202	22.9
2004–05	2 324	254	2 415	339	218	21.5
2005–06	2 739	288	2 618	305	252	20.4
2006–07	1 644	225	1 446	382	191	24.3
2007–08	4 104	229	3 258	353	183	23.3
2008–09	2 877	245	3 803	324	184	19.4
2009–10	2 899	226	3 266	336	121	21.7
2010–11	2 212	236	2 630	279	215	21.4
2011–12	2 826	260	2 398	316	131	21.9
2012–13	4 565	286	5 542	317	275	21.6
2013–14	2 236	232	2 716	311	147	20.3
2014–15	3 920	264	3 274	363	229	19.2
2015–16	5 419	307	3 637	306	198	18.0
2016–17	4 207	344	3 190	404	218	16.7
2017–18	6 509	316	7 639	358	325	17.3
2018–19	7 002	365	6 555	425	329	16.2
2019–20	5 292	233	6 681	306	243	18.7
2020–21	2 998	224	3 747	283	112	20.6
2021–22	6 182	236	5 819	268	232	20.1
2022–23	9 947	234	11 469	266	352	20.5
2023–24	5 873	235	5 178	266	166	19.7
2024–25	8 708	260	7 799	236	246	17.9

Table 11: Ling calculated numbers-at-age by sex and the estimated CV (proportion) for the Sub-Antarctic (LIN 5&6) trawl fishery, September to December 2025. Age in years. –: no data.

Age	Male	CV	Female	CV	Age	Male	CV	Female	CV
5	1 558	0.803	639	0.670	18	21 121	0.431	3 727	0.897
6	34 342	0.323	10 423	0.497	19	6 368	0.703	9 693	0.510
7	70 651	0.202	49 373	0.236	20	10 489	0.569	3 769	1.100
8	153 608	0.139	86 318	0.195	21	10 580	0.655	-	-
9	160 034	0.142	109 674	0.161	22	10 504	0.513	3 921	0.631
10	104 411	0.180	78 041	0.208	23	3 396	1.002	3 205	1.135
11	74 883	0.212	70 818	0.221	24	-	-	-	-
12	49 633	0.270	68 522	0.237	25	7 945	0.674	5 363	0.540
13	50 077	0.239	45 104	0.281	26	495	1.302	-	-
14	29 925	0.338	39 116	0.288	27	-	-	-	-
15	16 575	0.466	53 333	0.229	28	-	-	-	-
16	32 107	0.325	37 755	0.246	29	-	-	-	-
17	30 359	0.333	25 635	0.35	30	-	-	-	-

3.3.3 West coast South Island (LIN 7)

In 2024–25, an incomplete sample (i.e. fewer than 500 otoliths) was available from the fishery, meaning only 375 otoliths were aged. The mwCV was 30.6%. Table 12 provides the data used since 1990–91 to produce the catch-at-age estimates and mwCVs. Details of the estimated catch-at-age distribution are given in Table 13 with graphical representation of distributions in Appendix B.

Table 12: Numbers of measured and aged ling by fishing year, sex, tows sampled, and the estimated mean weighted CV (%) for the WCSI (LIN 7) trawl fishery.

	Males		Females			
Year	Measured	Aged	Measured	Aged	Tows	mwCV
1990–91	563	176	440	220	65	34.8
1993–94	873	172	1 096	221	141	27.9
1994–95	1 051	238	794	268	111	24.3
1995–96	485	247	448	201	83	28.0
1996–97	1 532	442	901	399	173	19.5
1997–98	1 063	349	700	279	155	23.6
1998–99	1 862	285	1 126	263	221	23.7
1999–00	829	269	783	264	168	26.8
2000–01	1 106	256	924	307	178	29.6
2001–02	1 401	283	1 405	321	332	21.4
2002–03	1 157	293	1 290	302	286	23.3
2003–04	1 003	243	1 540	352	334	21.4
2004–05	908	282	899	355	184	24.9
2005–06	763	276	844	361	154	29.0
2006–07	228	148	258	158	65	38.7
2007–08	805	209	824	251	98	24.1
2011–12	686	321	576	345	83	31.8
2012–13	1 270	283	1 302	376	153	23.9
2013–14	619	183	692	202	95	31.6
2014–15	3 684	292	3 822	363	417	21.2
2015–16	2 220	336	2 374	367	267	20.1
2016–17	1 722	296	1 862	319	195	23.6
2017–18	2 029	363	2 059	390	231	22.5
2018–19	1 323	319	1 371	352	137	21.1
2019–20	1 209	244	1 307	279	133	24.3
2020–21	607	346	440	312	53	31.7
2021–22	948	146	886	99	68	32.1
2022–23	1 284	227	1 492	272	92	31.1
2023–24[1]	1 140	284	865	217	52	27.8
2024–25	835	184	821	191	68	30.6

[1]Otoliths to build the ALK were sourced from the relevant commercial trawl fishery and the survey.

Table 13: Ling calculated numbers-at-age by sex and the estimated CV (proportion) for the WCSI (LIN 7) trawl fishery, August to September 2025. Age in years. –: no data.

Age	Male	CV	Female	CV	Age	Male	CV	Female	CV
3	-	-	-	-	16	432	0.679	1 090	0.569
4	302	1.155	-	-	17	1 521	0.770	1 919	0.463
5	863	0.621	1 931	0.812	18	782	0.971	1 518	0.606
6	3 038	0.412	719	0.815	19	1 150	0.581	971	0.661
7	2 213	0.433	3 275	0.735	20	351	0.878	271	0.847
8	3 848	0.364	5 179	0.42	21	346	0.911	345	0.988
9	6 815	0.309	5 972	0.298	22	-	-	536	0.682
10	5 002	0.279	3 154	0.435	23	58	1.598	287	1.123
11	4 707	0.339	4 417	0.335	24	-	-	-	-
12	5 632	0.300	6 159	0.291	25	-	-	42	1.313
13	3 037	0.373	4 599	0.301	26	-	-	-	-
14	1 687	0.544	2 899	0.437	27	-	-	-	-
15	3 133	0.373	3 665	0.426	28	-	-	-	-

3.4 Ling longline fishery catch-at-age

3.4.1 Chatham Rise (LIN 3&4)

Catch-at-age estimation for the Chatham Rise (LIN 3&4) longline fishery is a year behind due to boats still being at sea during the critical time for otolith selection (spring at the start of any fishing year). When otolith processing was scheduled, only 70 otoliths were available from the 2023–24 Chatham Rise longline fishery. This sample was considered too small and unrepresentative, so ageing was not undertaken.

3.4.2 Sub-Antarctic (LIN 5&6)

In 2024–25, an incomplete sample (i.e. fewer than 500 otoliths) was available from the fishery, meaning that only 352 otoliths were aged after removing 36 broken or deformed otoliths. The mwCV was 32.5%. Table 14 provides the data used since 1997–98 to produce the catch-at-age estimates and mwCVs for this fishery. Details of the estimated catch-at-age distribution are given in Table 15 with graphical representation of distributions in Appendix B.

Table 14: Numbers of measured and aged ling by fishing year, sex, trips and shots sampled, and the estimated mean weighted CV (%) for the Sub-Antarctic (LIN 5&6) (previously called non-spawning) longline fishery.

	Males		Females				
Fishing year	Measured	Aged	Measured	Aged	Trips	Shots	mwCV
1997–98	608	73	2 763	395	1	34	23.1
1998–99	3 316	214	7 535	428	2	136	18.3
2000–01	674	103	2 040	235	2	58	25.3
2002–03	304	128	611	273	2	43	29.3
2004–05	413	114	716	307	2	113	25.9
2008–09	165	61	454	196	1	49	28.0
2009–10	151	78	424	214	1	49	29.0
2010–11	180	60	823	267	1	64	27.3
2011–12	316	109	979	320	2	91	23.7
2013–14	156	57	782	258	2	59	29.8
2017–18	383	136	1 256	531	1	82	21.2
2019–20	606	73	441	138	2	67	40.1
2021–22	609	45	1 560	202	3	73	33.2
2022–23	426	125	1 277	376	3	117	23.8
2023–24	367	114	640	251	2	46	33.7
2024–25	591	134	1 012	228	2	75	32.5

Table 15: Ling calculated numbers-at-age by sex and the estimated CV (proportion) for the Sub-Antarctic (LIN 5&6) longline fishery, March and June 2025. Age is in years. –: no data.

Age	Male	CV	Female	CV	Age	Male	CV	Female	CV
4	-	-	-	-	22	451	0.680	585	0.53
5	-	-	-	-	23	-	-	306	0.822
6	-	-	-	-	24	313	0.792	183	1.082
7	212	1.077	950	0.915	25	457	0.661	401	0.642
8	841	0.56	-	-	26	355	0.694	337	0.642
9	-	-	2 236	0.484	27	787	0.727	975	0.392
10	-	-	303	1.146	28	1 462	0.392	771	0.424
11	188	1.229	960	0.527	29	907	0.453	1 512	0.349
12	493	0.674	237	0.825	30	178	0.874	501	0.574
13	1 501	0.503	2 828	0.337	31	880	0.49	581	0.464
14	191	0.912	3 558	0.242	32	1 157	0.421	80	1.280
15	624	0.792	4 892	0.224	33	439	0.678	389	0.606
16	1 973	0.331	4 595	0.204	34	792	0.400	316	0.715
17	1 826	0.312	4 358	0.215	35	172	0.808	359	0.763
18	1 223	0.378	1 261	0.382	36	401	0.654	-	-
19	663	0.622	1 904	0.306	37	238	1.006	-	-
20	565	0.622	612	0.617	38	120	1.076	115	1.163
21	403	0.792	215	0.796	39	-	-	225	0.854

3.5 Trawl survey catch-at-age for ling

3.5.1 Chatham Rise (LIN 3&4)

From the 2026 survey, a complete sample (500 otoliths) was available with 483 (from 510 selected) being aged after removal of otoliths that could not be aged or did not pass quality control checks. The mwCV was 25.8%. Table 16 summarises the data used each year to produce the catch-at-age estimates and the mwCVs. Details of the estimated catch-at-age distribution for ling caught in the survey are given in Table 17 with graphical representation of distributions in Appendix B.

Table 16: Numbers of measured and aged ling by survey, year, sex, tows sampled and the estimated mean weighted CV (%) for the core Chatham Rise summer trawl surveys.

	Males		Females			
Survey	Measured	Aged	Measured	Aged	Tows	Mean CV
AEX8903	743	303	613	296	130	26.0
TAN9106	1 208	252	1 189	281	174	22.4
TAN9212	1 229	286	1 108	313	177	21.7
TAN9401	1 541	302	1 349	302	157	21.5
TAN9501	583	236	578	201	114	28.1
TAN9601	556	306	509	284	79	27.7
TAN9701	837	317	601	242	98	24.3
TAN9801	665	348	492	280	88	24.5
TAN9901	1 071	336	848	318	111	23.8
TAN0001	1 080	322	969	326	113	22.0
TAN0101	1 145	312	1 084	341	108	20.5
TAN0201	1 053	294	1 170	334	102	19.7
TAN0301	813	317	808	347	98	20.6
TAN0401	865	303	752	302	101	20.2
TAN0501	845	310	801	326	98	22.5
TAN0601	1 007	328	880	330	90	21.0
TAN0701	733	310	732	330	94	21.0
TAN0801	610	317	623	325	92	22.3
TAN0901	946	338	880	312	103	24.3
TAN1001	608	322	882	339	70	25.0
TAN1101	523	334	508	313	80	30.6
TAN1201	656	273	697	313	93	23.0
TAN1301	646	287	652	324	83	24.9
TAN1401	515	322	482	275	82	26.4
TAN1601	860	317	863	325	86	21.8
TAN1801	568	296	576	291	73	26.3
TAN2001	470	311	552	338	74	25.2
TAN2202	420	290	471	331	66	26.4
TAN2401	488	283	489	322	75	27.9
TAN2601	466	242	506	241	76	25.8

Table 17: Ling calculated numbers-at-age by sex, and the estimated CV (proportion), for the trawl survey of the core Chatham Rise in January 2026 (TAN2601). Age in years. –: no data.

Age	Male	CV	Female	CV	Age	Male	CV	Female	CV
2	-	-	11 806	2.432	19	76 493	0.458	29 067	0.598
3	18 069	1.348	10 347	1.453	20	32 219	0.702	36 595	0.736
4	68 271	0.562	106 977	0.414	21	8 104	1.081	2 995	1.507
5	220 534	0.257	147 460	0.334	22	22 143	0.917	9 811	1.124
6	348 019	0.248	317 136	0.220	23	27 827	0.811	2 911	1.598
7	253 039	0.268	289 839	0.219	24	14 696	1.158	18 805	0.950
8	196 989	0.305	341 320	0.204	25	-	-	7 529	1.252
9	237 291	0.264	263 101	0.235	26	9 810	1.268	-	-
10	207 540	0.291	159 774	0.338	27	-	-	-	-
11	82 241	0.446	108 532	0.381	28	-	-	-	-
12	78 502	0.418	176 323	0.319	29	-	-	-	-
13	174 690	0.306	66 783	0.433	30	-	-	-	
14	91 142	0.452	103 192	0.322	31	-	-	-	-
15	106 853	0.381	109 712	0.385	32	-	-	-	-
16	52 905	0.520	58 404	0.553	33	-	-	-	-
17	93 116	0.426	64 493	0.503	34	-	-	-	-
18	62 792	0.557	35 519	0.582	35	-	-	-	-

5. DISCUSSION

5.1 Hake

Sufficient raw data (e.g. biologicals and otoliths) were available, and therefore catch-at-age was estimated, for the 2024–25 Sub-Antarctic (HAK 1) trawl fishery. This continues a 27-year time series for HAK 1. The number aged was slightly greater than the target number of otoliths, and the mwCV achieved the 30% target. Most hake caught were 6 to 15 years old with the males more abundant. There were few fish older than 15 years, although the female estimate has a relatively long right-hand tail to 25 years old. Year class progressions are evident in this series, particularly for males. Figure A1 shows the progression of hake aged 9 in 1989–90 to age 13 in 1993–94; aged 6 in 1997–98 to age 12 in 2003–04; and aged 5 in 2008–09 to age 11 years in 2014–15. In 2024–25 there were no obvious progressions for fish older than 10 years old but there was a new dominant year class for males aged 6 and females aged 6–7 years of age (Figure A1). Contemporary age classes greater than 10 years are less dominant than those from the early 1990s (both sexes, Figure A1).

Sufficient raw data were available to produce catch-at-age estimations for the WCSI (HAK 7) trawl fishery in 2024–25. The derived mwCV was below the target. The time series is complete for all years since 1990. In 2024–25, most hake caught were aged 5 to 8 years, with right tails in the estimates for both sexes extending out to about age 20. There were few hake caught less than age 5. Year class progression is unclear after the year 1999–00 especially into older classes (greater than 10 years old, Figure A2). Since 1999–00, hake older than age 10 appeared to be less abundant in the catch than in most previous years. The catch in most years since 2010–11 has been dominated by males aged 5 to 7 and females aged 6 to 8 years.

The target mwCVs for hake from the Chatham Rise trawl survey series (HAK 4) was not achieved in the 2026 survey or any of the other surveys since 1991 due to low numbers of hake being caught. Hake of both sexes enter the survey at the same age (3 years) but there were a few older males than females (i.e. some at 27 years old). The strong year class progression of 2-year-olds in 2004 to 8 years olds in 2010 is the only readily recognisable progression in the survey series (both sexes, Figure A3).

5.2 Ling

Ling catch-at-age observer sampling from the Chatham Rise trawl fishery (LIN 3&4) in 2024–25 was sufficient to meet the target mwCV of 30%. Age distributions were similar between sexes, but males were slightly older (i.e., some males over 30 years). Both sexes had some very young fish in the catch at age (i.e., a few 1 year olds) which is unusual (Figure B1). Catch-at-age estimates for the last 31 years for this fishery show that the dominant age classes tend to be from ages 5 to 15. Fish appear to recruit to the fishery at ages 3 and 4 and again the distribution tends to have a long right-hand tail. Year class progression is evident in both sexes (Figure B1), for example, ling aged 5 in 1993–94, 1999–00, 2004–05, 2011–12, and 2013–14.

Chatham Rise trawl surveys have been biennial since 2014, with the most recent in January 2026. Sufficient ling were sampled to achieve the target mwCV. Historically, the sex proportions are very similar in this survey's catches and older fish are rare (25 years and older). Year class progression is again evident with particularly strong progressions tracked from age 4 in 2000 and 2004 to age 10. Since 2012, the year class progression doesn't appear as strong, but this could be because of the biennial sampling (Figure B2).

Sufficient ling were sampled by observers from the Sub-Antarctic (LIN 5&6) trawl fishery in 2024–25 for catch-at-age estimation with the target mwCV achieved. The numbers of ling caught was biased slightly towards males in 2024–25. This time series began in 1991–92 and is available for all years since 2000–01. The 2024–25 estimates show fish beginning to recruit at age 5 and the main age classes are from 7 to 17 for both sexes. The distribution has a long right tail to approximately age 25. The presence of fish aged 6 and under is slightly reduced in the last four years. Strong year class progression is

occasionally evident, for example, age 4 fish entering the fishery in 1997–98 can be tracked to age 12 in 2005–06 (Figure B3).

The ling catch in the 2024–25 sub-Antarctic (LIN 5&6) longline fishery was biased towards females. The catch-at-age series began in 1997–98 and is available sporadically. The 2024–25 estimate shows a return to the bimodal 2019–20 ages which included a cohort of 20–25-year-olds (both sexes). The 2024–25 estimate has a range of ages from 7 to the early-mid-30s (males and females, respectively). Old ling (30 years and over) have only been present in the estimates in the last five years sampled. Strong year classes often appear, but spasmodic sampling means that progression is hard to ascertain (Figure B4).

Sufficient ling were sampled by observers from the 2024–25 WCSI (LIN 7) trawl fishery for catch-at-age estimation but the mwCV did not quite achieve the target (31%). The numbers of male and female ling caught were relatively even. Estimates have been produced since 1993–94 except for three years. The estimates appear unimodal in recent years. Since 2018–19 there has been a trend of very young fish (5 years and under) not appearing in the estimate. Year class progression can be most easily seen for females. For example, females entering the fishery aged 5 in 1993–94 can be easily tracked to age 18 in 2006–07 (Figure B5).

No catch-at-age estimates are available from the emerging pot fishery.

6. FULFILMENT OF BROADER OUTCOMES

As required under Government Procurement rules[1], Fisheries New Zealand considered broader outcomes (secondary benefits such as environmental, social, economic or cultural benefits) that would be generated by this project.

As part of this project, the team has continued to build capacity and capability in fisheries science and fish ageing. By using a broader team approach, we promoted a more diverse use of staff; and importantly shared expertise and grew institutional knowledge of New Zealand fisheries and ageing amongst these staff. This will reduce the risk of such knowledge being lost in the future and potentially benefit a wide range of future fisheries research projects. Earth Sciences New Zealand staff working on this project were a combination of senior and mid-career scientists, more than half of whom were women.

The broader outcomes specific to this project involved building capacity, collaborations, capability, and diversity in the research sector. The project fostered collaboration between Earth Sciences New Zealand, the fishing industry, and other New Zealand research providers. The catch-at-age process successfully provided opportunities for fishing industry stakeholders to contribute their unique observations and knowledge to the research process.

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[1] https://www.procurement.govt.nz/procurement/principles-charter-and-rules/government-procurement-rules/planning-your-procurement/broader-outcomes/

8. REFERENCES

Ballara, S.L.; Barnes, T.C. (2024). Catch-at-age from commercial fisheries and trawl surveys for hake (*Merluccius australis*) and ling (*Genypterus blacodes*) in 2021–22. *New Zealand Fisheries Assessment Report 2024/14*. 87 p.

Ballara, S.L.; Barnes, T.C.; Hart, A.; Sutton, C.; Ó Maolagáin, C.; Spong, K (2024). Catch-at-age from commercial fisheries for hake (*Merluccius australis*) and ling (*Genypterus blacodes*) in 2022–23 and a trawl survey in 2024. *New Zealand Fisheries Assessment Report 2024/74.* 87 p.

Barnes, T.C.; Ballara, S.L.; Spong, K; Sutton, C.; Davey, N.; Carter, M. (2026). Catch-at-age estimates for hake (HAK 1&7) and ling (LIN 3–7) from commercial fisheries in 2023–24 and trawl surveys in 2024. *New Zealand Fisheries Assessment Report 2026/06.* 41 p.

Bull, B.; Dunn, A. (2012). catchatage: NIWA catch-at-age package. R package version 2.01. http://www.niwa.co.nz

Devine, J. (2008). Descriptive analysis of the commercial catch and effort data for New Zealand hake (*Merluccius australis*) for the 1989–90 to 2004–05 fishing years. *New Zealand Fisheries Assessment Report 2008/60*. 73 p.

Holmes, S.J.; Dunn, M.R.; Ballara, S. (2025). Descriptive analysis of ling (*Genypterus blacodes*) on Chatham Rise (LIN 3&4) up to 2024–25 and inputs for the 2025 stock assessment. *New Zealand Fisheries Assessment Report 2025/47.* 57 p.

Horn, P.L. (1993). Growth, age structure, and productivity of ling, *Genypterus blacodes* (Ophidiidae), in New Zealand waters. *New Zealand Journal of Marine and Freshwater Research 27*: 385–397.

Horn, P.L. (1997). An ageing methodology, growth parameters, and estimates of mortality for hake (*Merluccius australis*) from around the South Island, New Zealand. *Marine and Freshwater Research 48*: 201–209.

Horn, P.L. (2005). A review of the stock structure of ling (*Genypterus blacodes*) in New Zealand waters. *New Zealand Fisheries Assessment Report 2005/59*. 41 p.

Horn, P.L. (2008a). Stock assessment of hake (*Merluccius australis*) in the Sub-Antarctic for the 2007–08 fishing year. *New Zealand Fisheries Assessment Report 2008/49*. 66 p.

Horn, P.L. (2008b). Stock assessment of ling (*Genypterus blacodes*) on the Chatham Rise, Campbell Plateau, and in Cook Strait for the 2007–08 fishing year. *New Zealand Fisheries Assessment Report 2008/24*. 76 p.

Horn, P.L. (2021). Age determination protocol for ling (*Genypterus blacode*). *New Zealand Fisheries Assessment Report 2021/31*. 19 p.

Horn, P.L.; Dunn, A. (2007). Stock assessment of hake (*Merluccius australis*) on the Chatham Rise for the 2006–07 fishing year. *New Zealand Fisheries Assessment Report 2007/44.* 62 p.

Horn, P.L.; Francis, R.I.C.C. (2010). Stock assessment of hake (*Merluccius australis*) on the Chatham Rise for the 2009–10 fishing year. *New Zealand Fisheries Assessment Report 2010/14.* 66 p.

Horn, P.L.; Sutton, C.P. (2008). Catch-at-age for hake (*Merluccius australis*) and ling (*Genypterus blacodes*) in the 2006–07 fishing year and from trawl surveys in summer 2007–08, with a summary of all available data sets. *New Zealand Fisheries Assessment Report 2008/60.* 54 p.

Horn, P.L.; Sutton, C.P. (2009). Catch-at-age for hake (*Merluccius australis*) and ling (*Genypterus blacodes*) in the 2007–08 fishing year and from trawl surveys in summer 2008–09, with a summary of all available data sets. *New Zealand Fisheries Assessment Report 2009/41.* 53 p.

Langley, A.D. (2001). Summary of biological data collected by the ling longline logbook programme, 1994–95 to 1999–2000. *New Zealand Fisheries Assessment Report 2001/71*. 37 p.

Mormede, S.; Dunn, A.; Webber, D.N. (2024). Stock hypotheses for ling in the Sub-Antarctic (LIN 5&6 and LIN 6B). *New Zealand Fisheries Assessment Report 2024/83.* 13 p.

9. APPENDICES

Appendix A: Summaries of the proportions-at-age series for hake catches

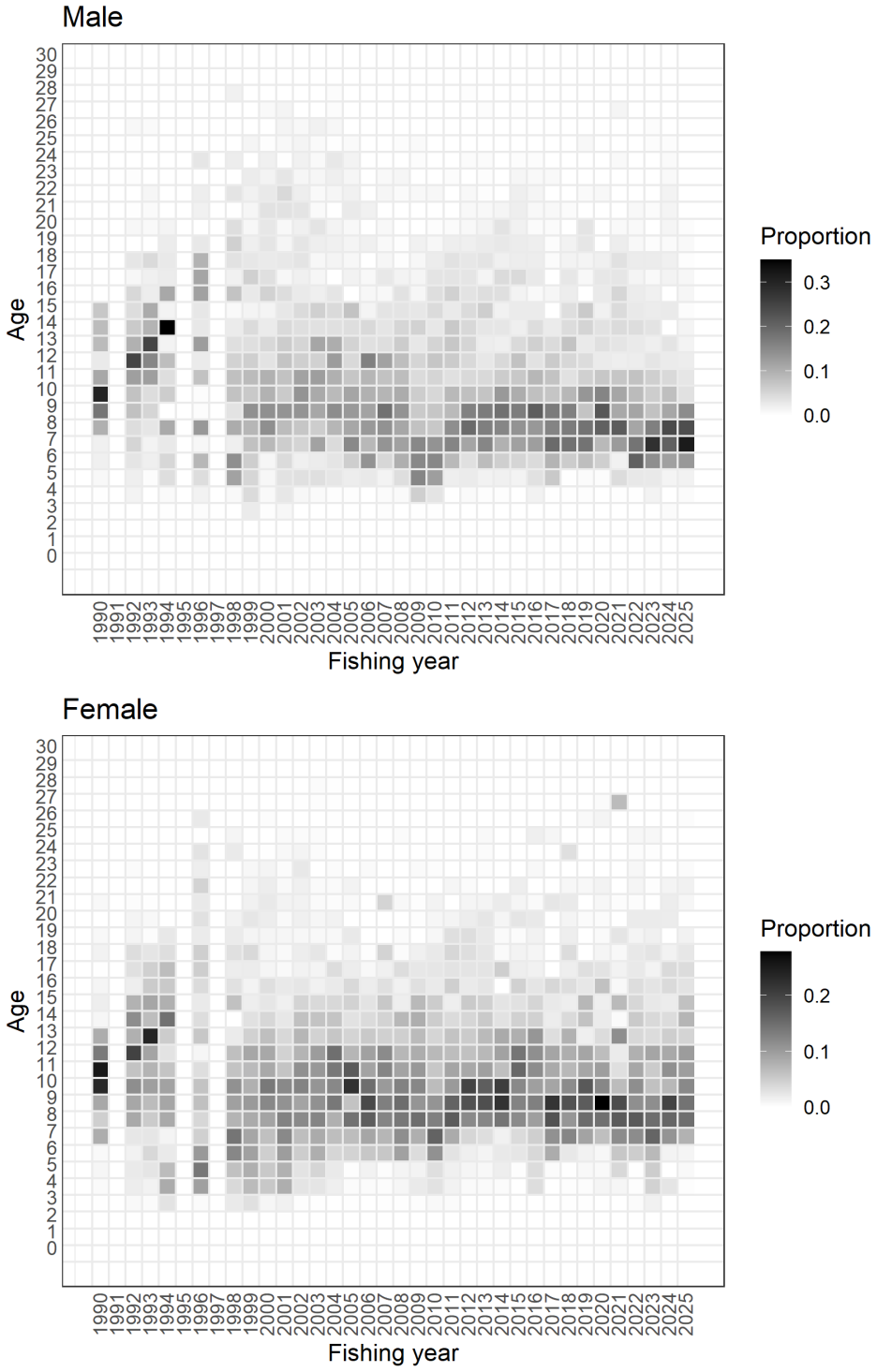


Figure A1: Age frequency distributions of hake from commercial catch-at-age data in the Sub-Antarctic trawl fishery (HAK 1), 1989–90 to 2024–25 (where sufficient data are available).

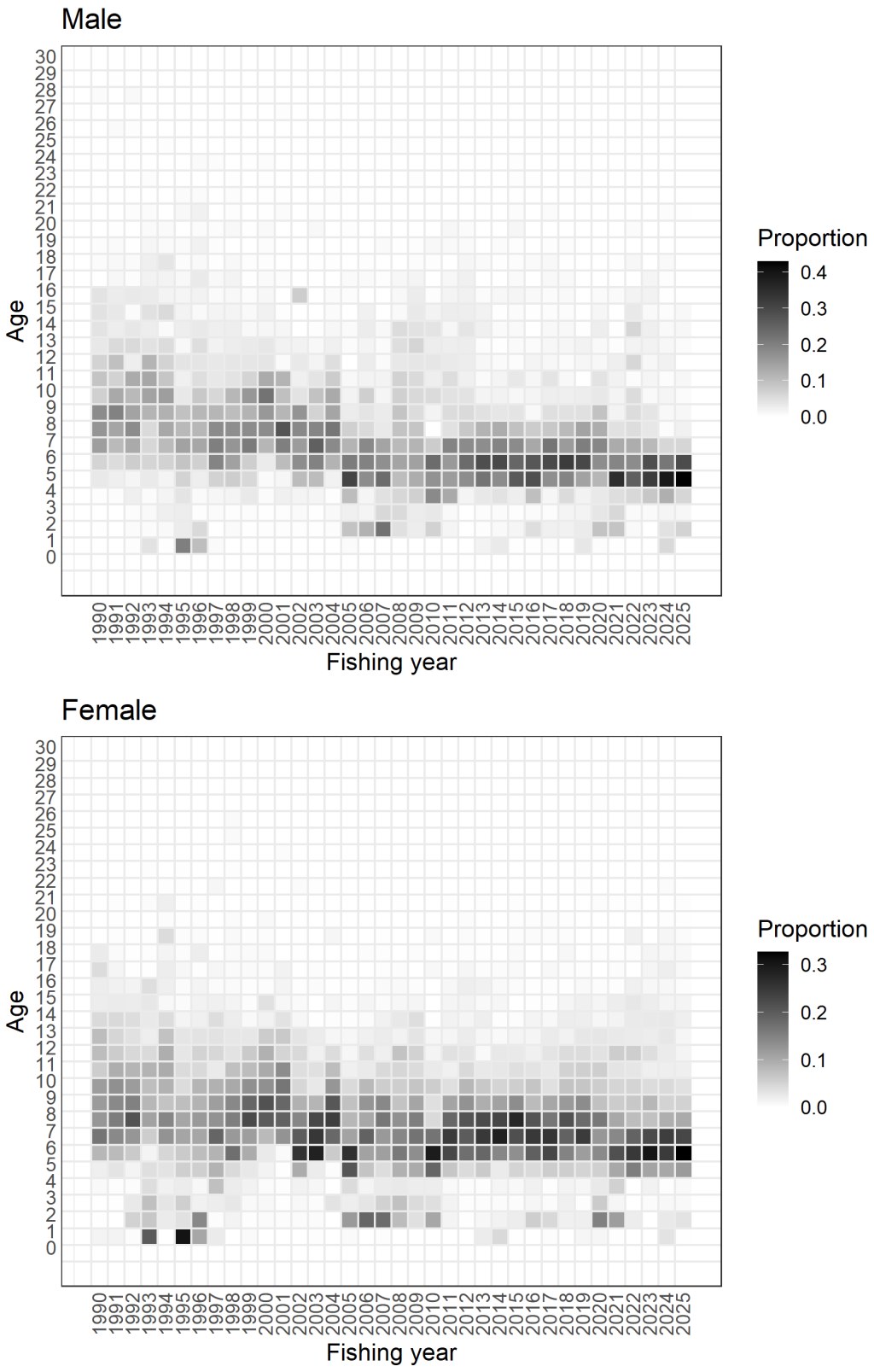


Figure A2: Age frequency distributions of hake from commercial catch-at-age data in the WCSI trawl fishery (HAK 7), 1989–90 to 2024–25 (where sufficient data are available).

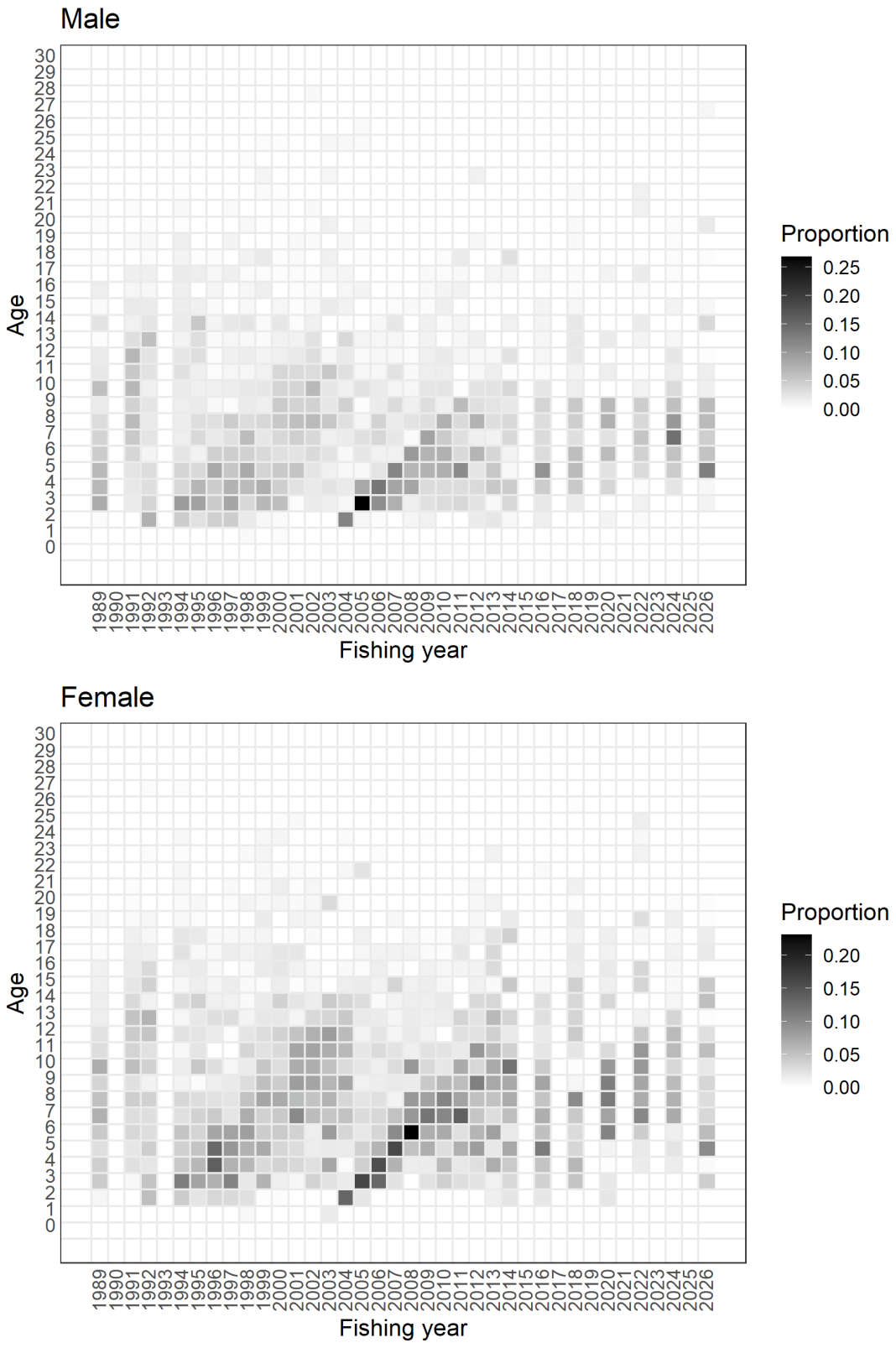


Figure A3: Age frequency distributions of hake from summer trawl surveys of the Chatham Rise (HAK 4), 1989 to 2026.

Appendix B: Summaries of the proportions-at-age series for ling catches

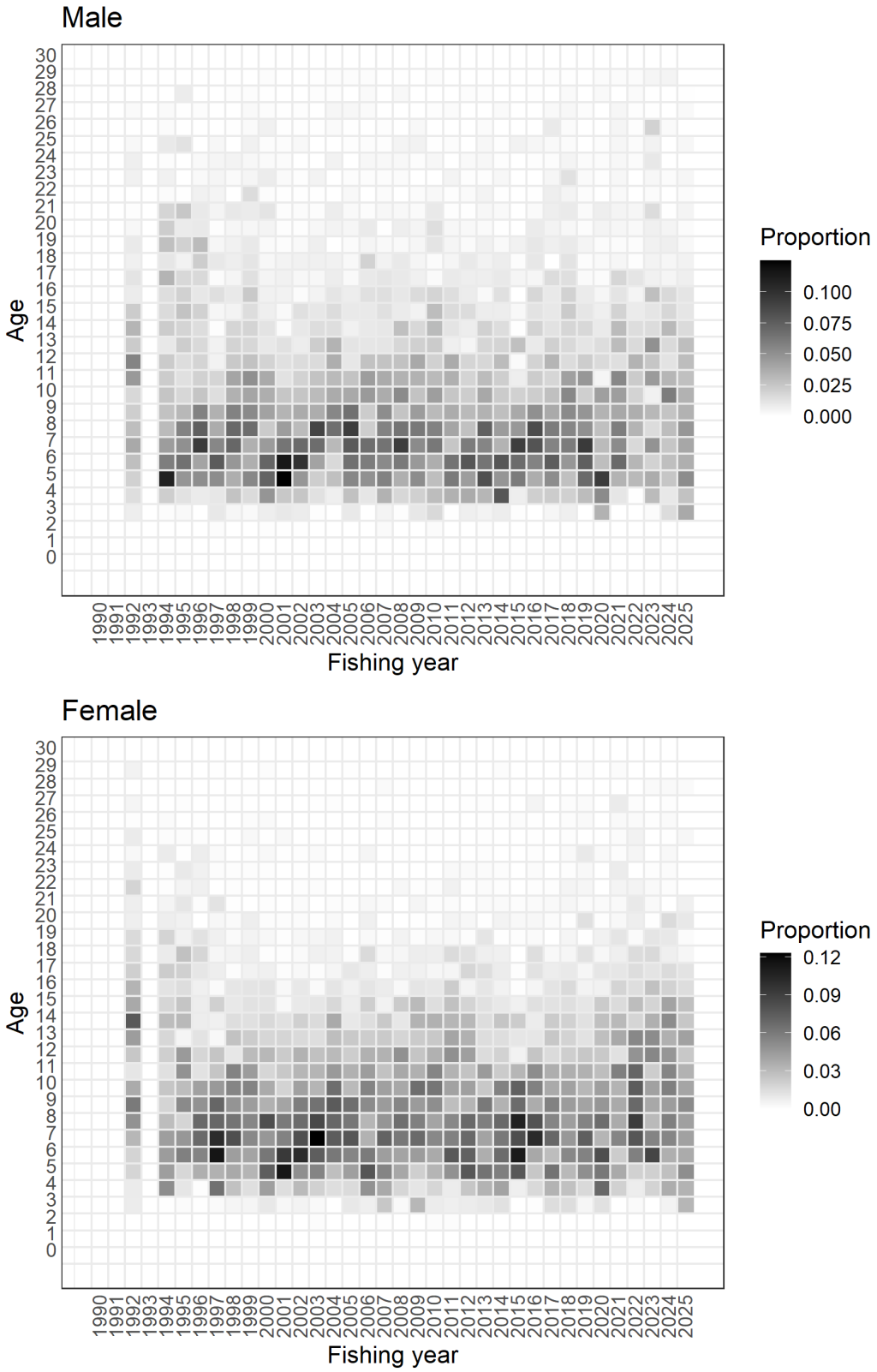


Figure B1: Age frequency distributions of ling from commercial catch-at-age data in the Chatham Rise trawl fishery (LIN 3&4), 1991–92 to 2024–25 (where sufficient data are available).

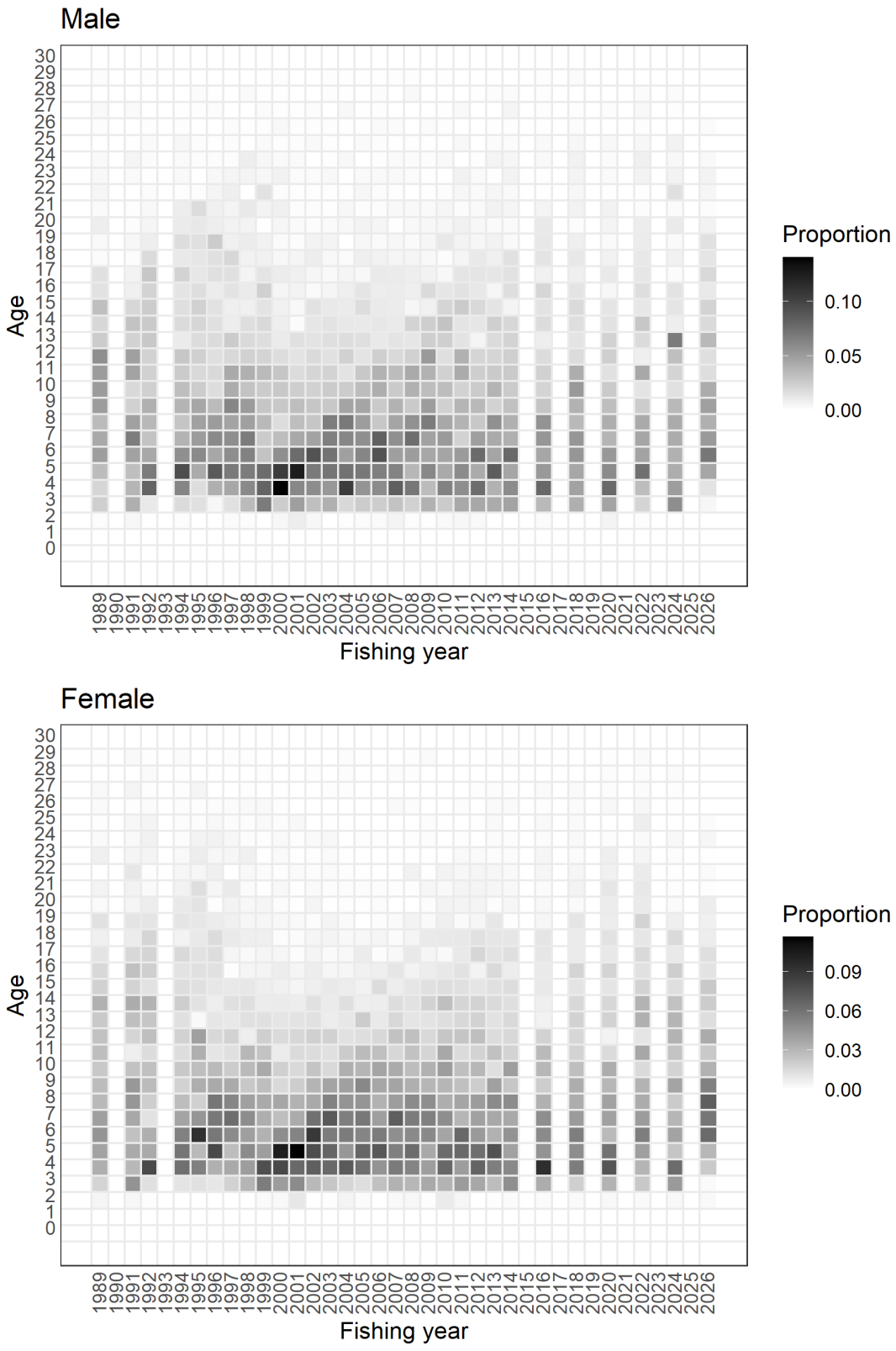


Figure B2: Age frequency distributions of ling from catch-at-age data from the Chatham Rise trawl survey (LIN 3&4), 1989 to 2026 (where sufficient data are available) sampled by the Scientific Observer Programme.

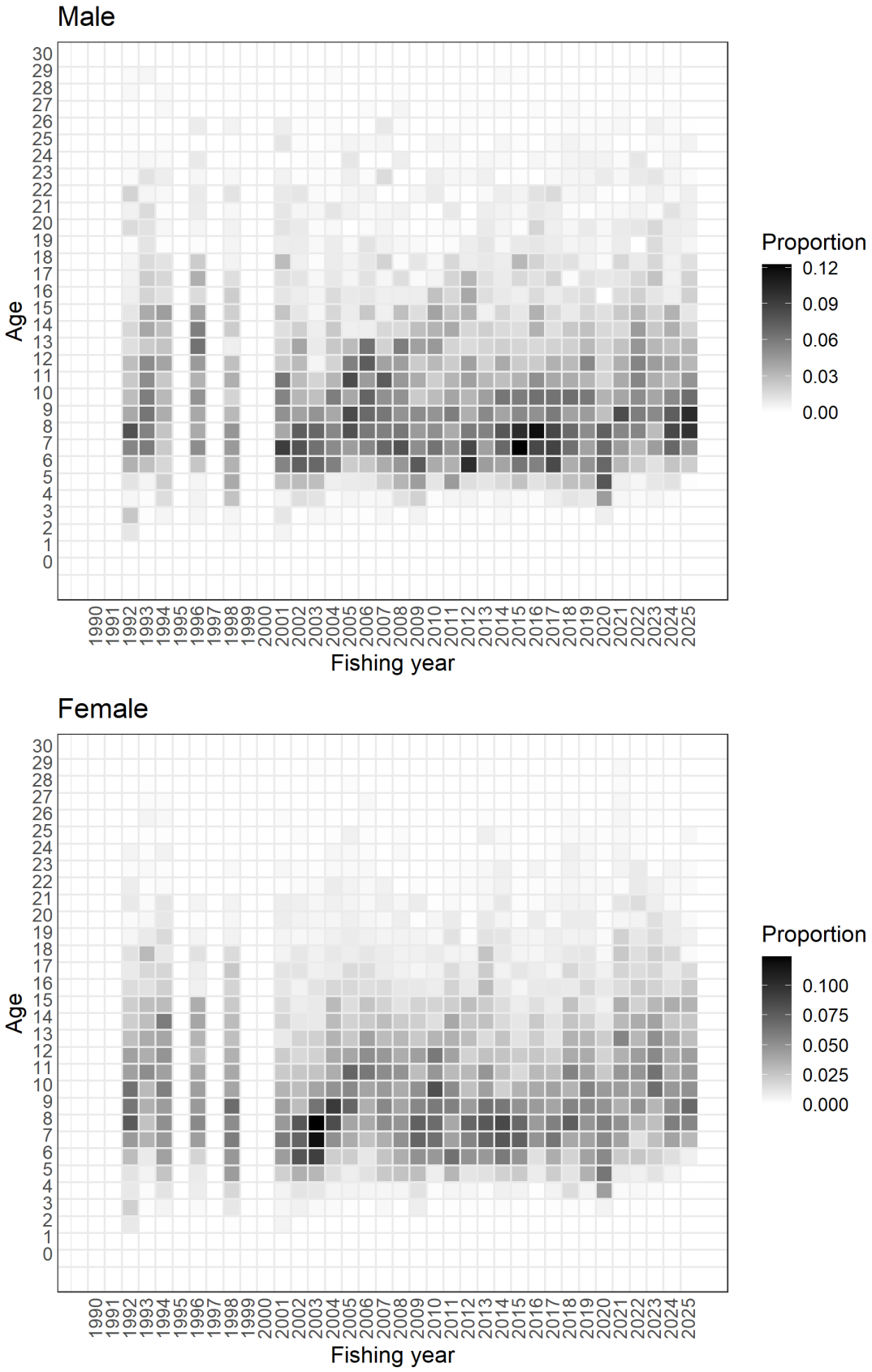


Figure B3: Age frequency distributions of ling from commercial catch-at-age data in the Sub-Antarctic trawl fishery (LIN 5&6), 1991–92 to 2024–25 (where sufficient data are available).

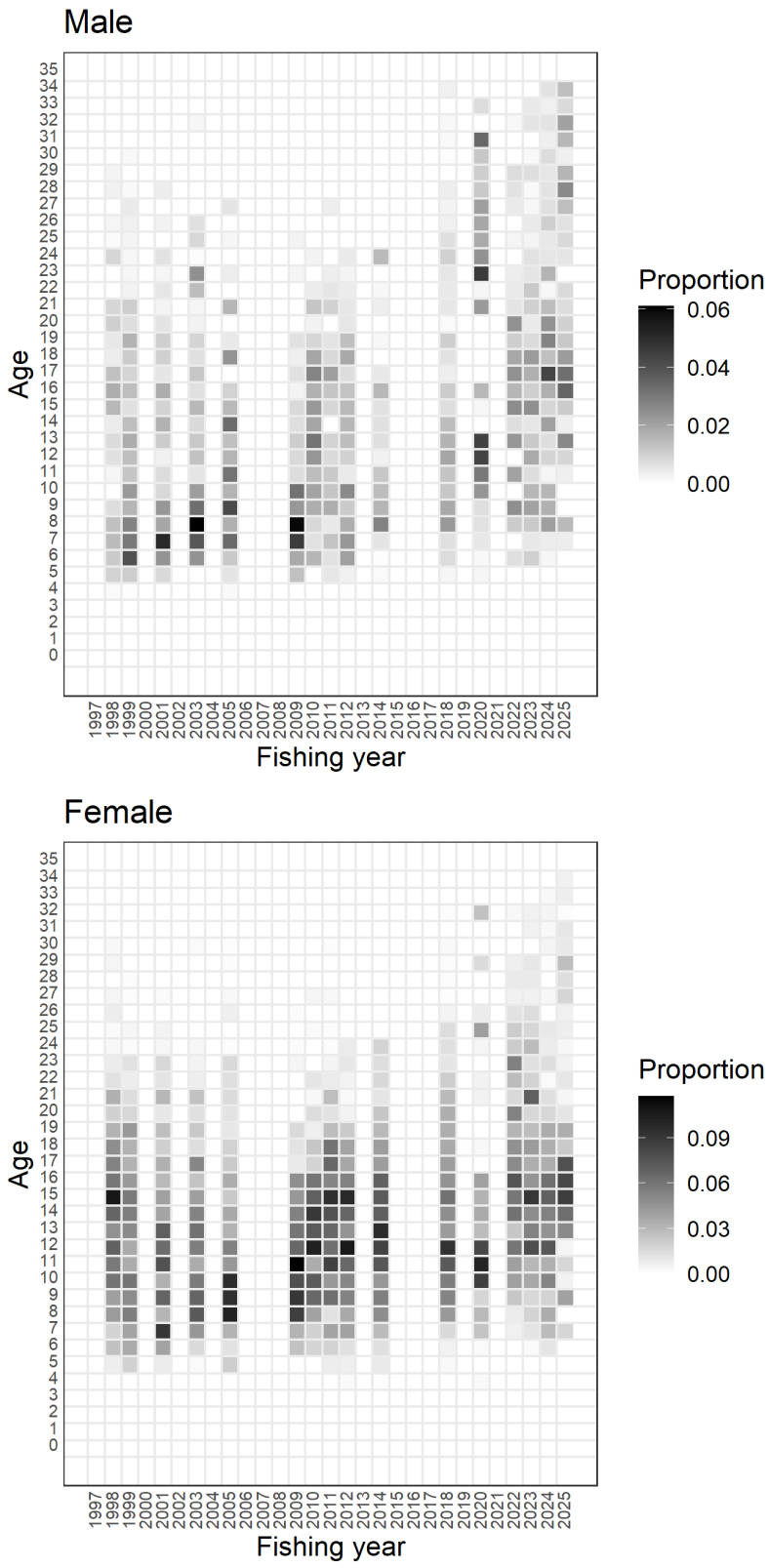


Figure B4: Age frequency distributions of ling from commercial catch-at-age data in the Sub-Antarctic (non-spawning season or new strata) ling longline fishery (LIN 5&6), 1997–98 to 2024–25 (where sufficient data are available).

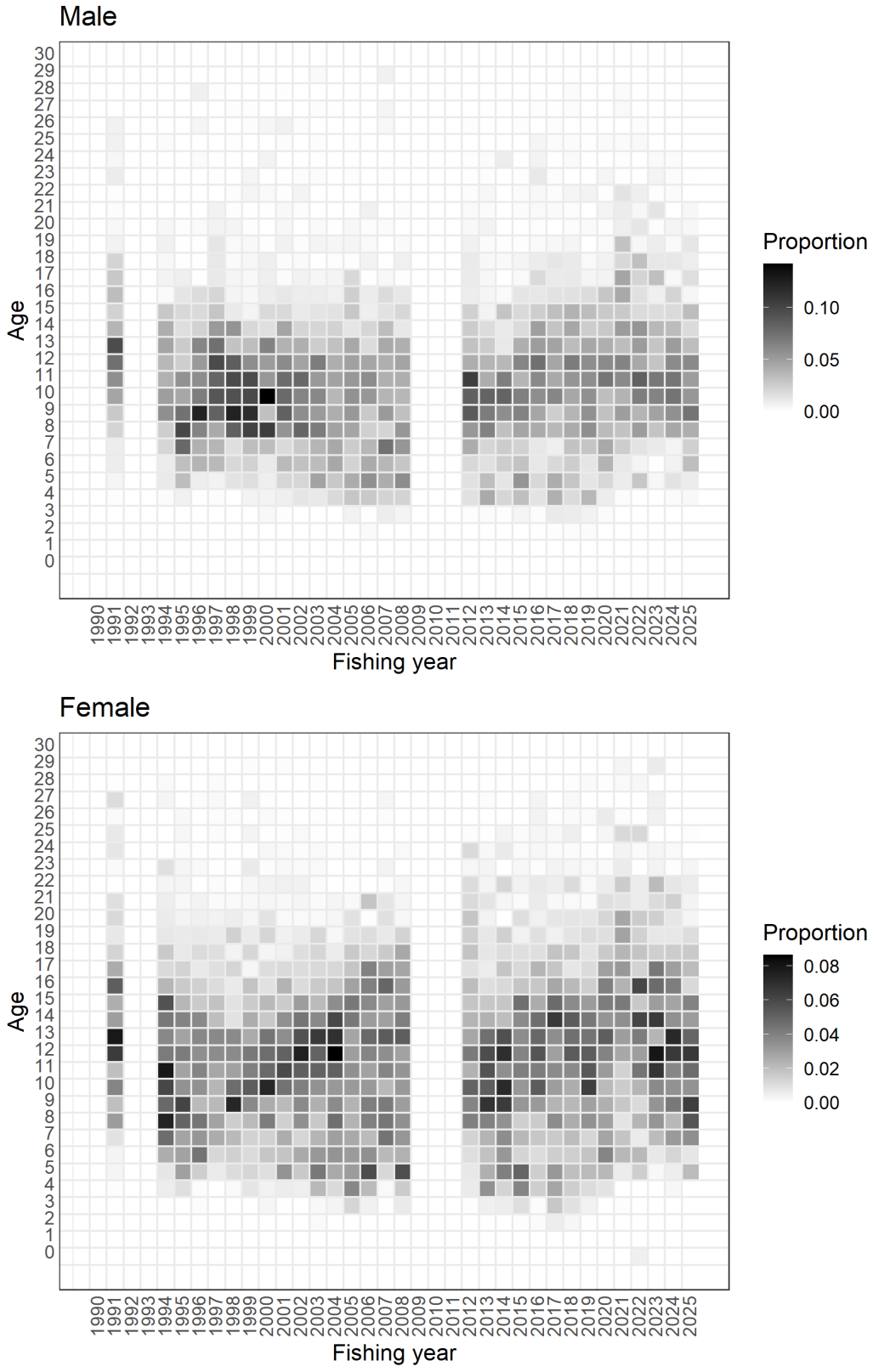


Figure B5: Age frequency distributions of ling from commercial catch-at-age data in the WCSI trawl fishery (LIN 7), 1990–91 to 2024–25 (where sufficient data are available).