Fisheries New Zealand
Tini a Tangaroa

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

New Zealand Fisheries Assessment Report 2026/21

S.L. Ballara,
R.L. O'Driscoll

ISSN 1179-5352 (online)
ISBN 978-1-997337-41-6 (online)

July 2026

Te Kāwanatanga o Aotearoa
New Zealand Government

Disclaimer

Requests for further copies should be directed to:

Fisheries Science Editor
Fisheries New Zealand
Ministry for Primary Industries
PO Box 2526
Wellington 6140
NEW ZEALAND

Email: Fisheries-Science.Editor@mpi.govt.nz
Telephone: 0800 00 83 33

This publication is also available on the Ministry for Primary Industries websites at:
http://www.mpi.govt.nz/news-and-resources/publications
http://fs.fish.govt.nz go to Document library/Research reports

Please cite this report as:

Ballara, S.L.; O'Driscoll, R.L. (2026). Catch-at-age estimates for hoki from commercial fisheries in 2024–25 and a trawl survey in 2026. *New Zealand Fisheries Assessment Report 2026/21.* 72 p.

TABLE OF CONTENTS

PLAIN LANGUAGE SUMMARY

This report updates ongoing time series with catch-at-age data for hoki (*Macruronus novaezelandiae*) from commercial fisheries caught in the 2024–25 fishing year and a research trawl survey in January 2026. Catch-at-age estimates are based on biological data and otoliths (ear bones used for ageing fish) sampled by observers and survey staff. The sampled length frequencies are scaled to total catch or survey biomass to form representative estimates of catch-at-age.

The overall hoki catch in the 2024–25 fishing year was higher than the catch in 2023–24. Catch increased on Chatham Rise, in Cook Strait, and off the west coast South Island, but decreased off the east coast South Island and in the Sub-Antarctic. Most of the catch in 2024–25 was of hoki 45–90 cm in length from the 2007–23 year-classes. The most recent (2020–2023) year-classes appear to be lower than average in the commercial fishery. However, the abundance estimate for the 2024 year-class at age 1+ in the January 2026 Chatham Rise survey was the highest estimate in the time-series.

EXECUTIVE SUMMARY

Ballara, S.L.[1]; O'Driscoll, R.L.[1] (2026). Catch-at-age estimates for hoki from commercial fisheries in 2024–25 and a trawl survey in 2026. ***New Zealand Fisheries Assessment Report 2026/21.*** **72 p.**

This report summarises catches by area and presents the length and age structure of hoki (*Macruronus novaezelandiae*) caught commercially during the 2024–25 (2025) fishing year. Catch-at-length and catch-at-age data from spawning and non-spawning fisheries are compared with those from previous years. Biomass indices from a research trawl survey on hoki in January 2026 is also briefly described. Data in this report will be incorporated in the model for the hoki stock assessment in 2027; there was no hoki stock assessment in 2026.

The overall reported catch in 2024–25 of 109 714 t was 2659 t higher than that in 2023–24, and only 286 t lower than the TACC of 110 000 t. Relative to 2023–24, catches in 2024–25 increased in the Chatham Rise, Cook Strait, and west coast South Island (WCSI), and decreased in east coast South Island (ECSI) and Sub-Antarctic. The Chatham Rise fishery caught 40 120 t in 2024–25, an increase of 1684 t, and was the largest New Zealand hoki fishery, contributing to about 37% of the total catch. The WCSI was the second largest fishery, with catches increasing from by 1179 t from 2024 to 33 653 t in 2025. The catch from the Cook Strait spawning fishery increased by 743 t to 12 688 t in 2025. The catch from the ECSI spawning fishery area in 2025 was 14 523 t, a decrease of 988 t from that in 2024, but is still the third largest hoki fishery, and larger than Cook Strait. The catch from the Sub-Antarctic fishery decreased slightly to 7614 t in 2024–25. Catch from Puysegur increased to 522 t in 2024–25 and the catch from the east coast North Island decreased slightly to 593 t.

The WCSI, Chatham Rise, and Sub-Antarctic regions were split into sub-fisheries, with estimation of length and age frequencies by fishery. Cook Strait and ECSI were each treated as a single spawning fishery. Length and age data was updated using the length-weight relationships accepted in the 2025 Deepwater Working Group for all years and fisheries. Most of the catch in 2024–25 was of fish 45–90 cm length from the 2007–23 year-classes. The 2015 and 2014 year-classes were important in the sub-Antarctic sub-fisheries for females, and in spawning areas. The 2019 and 2018 year-class appeared strong in all sub-fisheries, although were less abundant on the Chatham Rise. The 2020–23 year-classes were widespread but appear weaker than average. The 2024 year-class was present at age 1 in the Cook Strait, ECSI, WC.north, and SA.snares sub-fisheries.

One new fishery-independent estimate of hoki abundance was available. The Chatham Rise trawl survey core biomass in January 2026 was 2% higher than the equivalent estimate in 2024. The abundance estimate for 1+ (2024 year-class) was the highest estimate for the Chatham Rise time-series, while the estimate for 2+ hoki (2023 year-class) was one of the lowest. The abundance of older hoki (ages 3 and older) in core strata decreased by 41.9% from 2024 survey.

[1] Earth Sciences New Zealand (ESNZ).

1. INTRODUCTION

This report summarises catch-at-age estimates from commercial fisheries sampling carried out during the 2024–25 (2025) fishing year, along with results from a research trawl survey of the Chatham Rise in January 2026. This data will provide inputs to the 2027 stock assessment of hoki (*Macruronus novaezelandiae*); there was no hoki stock assessment in 2026.

1.1 Project objectives

This report fulfils the final reporting requirement for objectives in Fisheries New Zealand research projects HOK2023-02, and MID2024-01.

MID2024-01: Routine age determination of middle depth and deepwater species from commercial fisheries and resource surveys
Objective 1: To determine catch-at-age for commercial catches and resource surveys of specified middle depth and deepwater fish stocks.

HOK2023-02: Land-based sampling of hoki
Objective 1: To collect biological samples from commercial landings of hoki from Cook Strait and on the west coast of the South Island during winter 2024. Note: Otoliths were read and catch-at-age determined under MID2024-01.

1.2 Description of the hoki fishery

Since the 1980s, the main fishery for hoki has operated from late June to late August off the WCSI, where hoki aggregate to spawn (Figure 1). The spawning aggregations begin to concentrate at depths of 300–700 m around the Hokitika Canyon from late June and further north off Westport later in the season. Fishing in these areas continues into September in some years. In 1988, another fishery developed on large spawning aggregations of hoki in Cook Strait. The spawning season in Cook Strait runs from late June to mid-September, peaking in July and August.

Catches of spawning hoki are taken from other grounds off the ECSI, and late in the spawning season at Puysegur Bank. There are also anecdotal reports of spawning hoki being caught near the Snares Islands, Chatham Islands, and several locations off the ECNI. Catches from Puysegur are currently low, but catches from the ECSI have increased since 2019 and are now higher than those from Cook Strait.

Outside the spawning season, when hoki disperse to their feeding grounds, substantial fisheries have developed since the early 1990s on the Chatham Rise and in the Sub-Antarctic. These fisheries usually operate at depths of 300–800 m. The Chatham Rise fishery generally has similar catches over all months except in July–September, when catches are lower due to the fishery moving to the spawning grounds. In the Sub-Antarctic, catches have typically peaked in April–June. Out-of-season catches are also taken from Cook Strait and ECNI, but these are small compared with spawning season catches.

From 1986 to 1990, surimi vessels dominated the catches and took about 60% of the annual WCSI catch. However, since 1991, the surimi component of catches has decreased and processing to head and gut or to fillet product has increased, as has 'fresher' catch for shore processing. The hoki fishery now operates throughout the year, producing high quality fillet product from both spawning and non-spawning fisheries. No surimi has been produced from hoki since 2002. Since 1998, twin-trawl rigs have operated in some hoki fisheries, and trawls made of spectra twine (a high strength twine with reduced diameter resulting in reduced drag and improved fuel efficiencies) were introduced from 2007–08 and are now commonly used throughout the fishery.

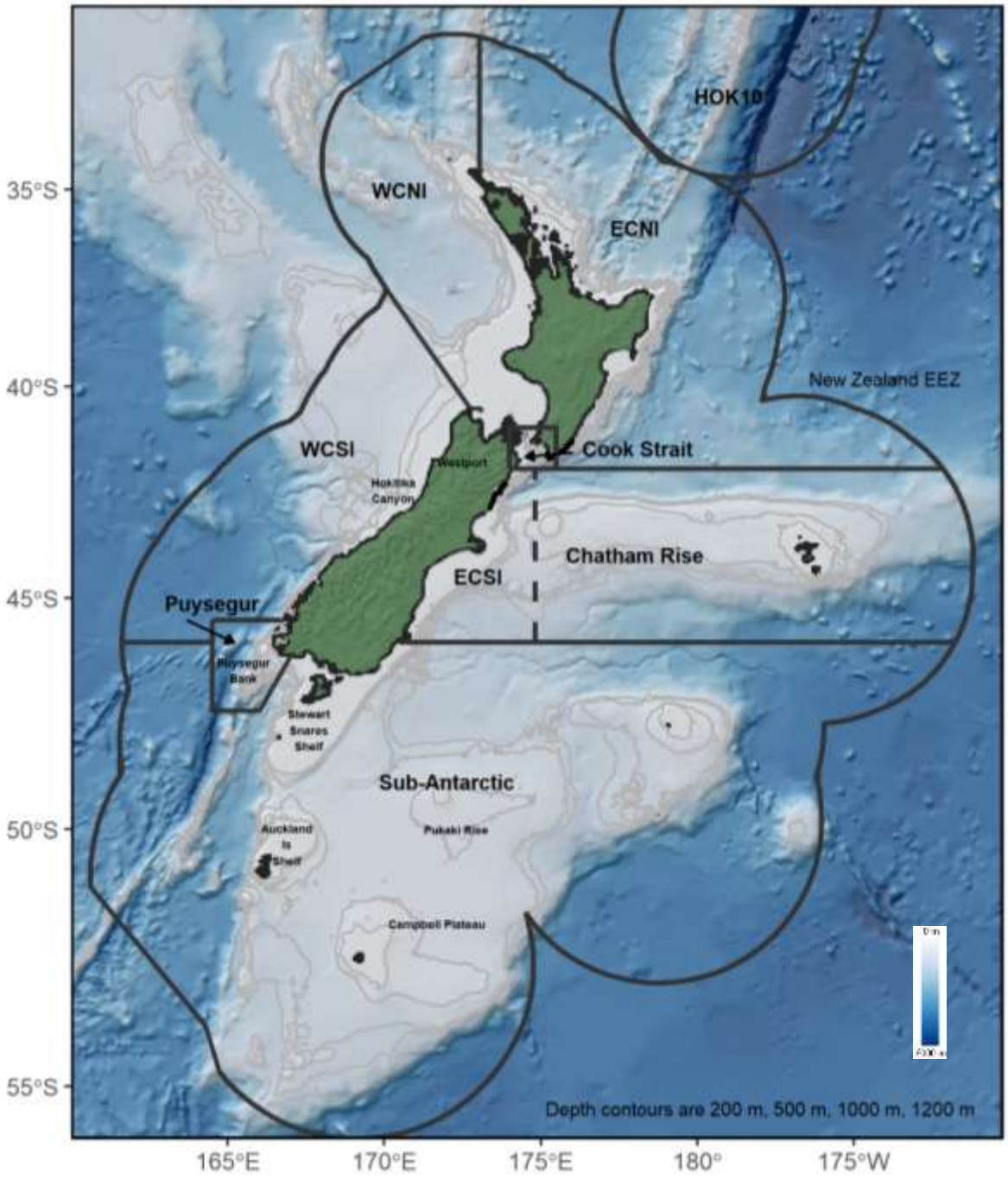


Figure 1: Hoki areas. Note that the ECSI area is for data from July–September only; from October to June ECSI data are included as part of the Chatham Rise area.

Between 2012–13 and 2017, Precision Seafood Harvest (PSH) technology was tested in the hoki fishery. This included a prototype trawl system called a Modular Harvest System (MHS) that aimed to target specific species and fish size, as well as enabling fish to be landed in much better condition than traditional trawls. Approval to use MHS gear in the hoki, hake (*Merluccius australis)*, and ling (*Genypterus blacodes)* fisheries was granted in 2018. During the 2017–18 fishing year, seven vessels used the gear to target hoki and caught 9595 t (7% of the total hoki catch). The MHS catch increased to 17 127 t (14% of the total catch) in 2018–19 but has subsequently decreased due to a change in preference of product from fillet to block and unavailability of materials for MHS (now called FlowMo) codends (Charles Heaphy, Sealord, pers. comm.). In 2023–24 and 2024–25, less than 0.03% of the total hoki catch was taken with MHS.

The fishing industry introduced a Code of Practice (COP) for hoki target trawling in 2001 with the aim to protect small fish (less than 60 cm). The main components of this COP were to restrict fishing in waters shallower than 450 m; a rule requiring vessels to 'move on' if there are more than 10% small hoki in the catch; and seasonal and area closures in spawning fisheries. The COP was superseded by Operational Procedures for Hoki Fisheries, introduced by the fishing industry from 1 October 2009. The Operational Procedures aim to manage and monitor fishing effort within four industry hoki management areas, where there are thought to be high abundances of juvenile hoki (Narrows Basin of Cook Strait, Canterbury Banks, Mernoo Bank, and Puysegur). These areas are closed to trawlers over 28 m targeting hoki, with increased monitoring when targeting species other than hoki. There is also a general recommendation that vessels move from areas where catches of juvenile hoki (now defined as less than 55 cm total length) comprise more than 20% of the hoki catch by number.

From 2018–19 to 2021–22, there was agreement from industry to close certain fishing grounds to target fishing for hoki to allow spawning to occur undisturbed at peak times (Operational Procedures version 18). Seasonal spawning closures were:

- WCSI inside the 25 nautical mile (n. mile) line: between 0000 h 18 July and 2400 h 24 July.
- WCSI outside the 25 n. mile closure, shallower than 800 m, between Kahurangi Point in the north and the boundary between Fishery Management Areas 5 and 7 in the south: between 0000 h 25 July and 2400 h 31 July.
- Cook Strait: Entire fishery between 0000 h 1 August and 2400 h 7 August.
- Pegasus: between 0000 h 1 September and 2400 h 7 September.

From 2022–23 to 2024–25 there were no seasonal spawning area closures.

The TACC for HOK 1 has been 110 000 t since 1 October 2021, with an agreed catch split arrangement of 65 000 t from eastern stock areas and 45 000 t from western stock areas. This TACC applied to all areas of the EEZ (except the Kermadec FMA which had a TACC of 10 t). The ACE available to fishers has varied due to voluntary shelving agreements and carry forward (Fisheries New Zealand 2025).

2. METHODS

2.1 Catch and effort information

Catch and effort, daily processed, and landed data were extracted from the Fisheries New Zealand Enterprise Data Warehouse (EDW) as extract '17022_update_16396A' on 5 November 2025 and consisted of all fishing and landing events associated with a set of fishing trips that reported a positive catch or landing of hoki, hake, or ling from fishing years 1989–90 to 2024–25. This included all fishing recorded on: Trawl Catch Effort and Processing Returns (TCEPRs); Trawl Catch Effort Returns (TCERs); Catch Effort and Landing Returns (CELRs); Lining Catch Effort Returns (LCER); Lining Trip Catch Effort Returns (LTCER); Netting Catch Effort Landing Returns (NCELR); digital monitoring of trawl commercial fishing (ERS-trawl); other digital monitoring commercial fishing (ERS-Lining, ERS-Netting, ERS-Other Lining, ERS-Potting, ERS-Seining, and ERS-Tuna Lining); and high seas versions of these forms. Catch and effort data for hoki from the Fisheries New Zealand observer sampling programme (administered by ESNZ in the *cod* database) were also extracted, on 22 December 2025. Data were analysed by fishing year (1 October to 30 September), referred to by the year-ending, for example, 1990 for the 1989–90 fishing year.

As part of Digital Monitoring of Commercial Fishing, the ERS (Electronic Reporting System) has been rolled out to replace legacy catch-and-effort paper-based reporting. On 1 October 2017, trawl vessels over 28 m started supplying fishing and related event data such as catch, effort, and landing data via the new ERS, and these data are now available from the EDW database. Because the ERS

started in 2017–18, there were still a few trawl vessels over 28 m that reported on the legacy TCEPR form type; however, from 2018–19 most data were reported on the ERS.

TCEPR and TCER forms record tow-by-tow data with the estimated catch (by weight) of the top five species (TCEPRs) or the top eight species (TCERs) in each individual tow. The ERS-trawl form reports the top five QMS species and top three non-QMS species (although fishers are able to report more species on this form) and consequently should produce data closely comparable with that from the TCEPR and TCER paper forms for deepwater vessels. CELR forms record estimated daily catches for the top five species, which are further stratified by statistical area, method of capture, and target species. Green-weight data associated with landing events are reported on the bottom part of the CELR forms, or on Catch Landing Return (CLR) forms for fishing reported on TCEPRs and TCERs. Information on total harvest levels are provided via the Quota Management Report/Monthly Harvest Return (QMR/MHR) system, but only at the resolution of Quota Management Area.

Data were checked for errors, using simple checking and imputation algorithms developed in the statistical software package 'R' (R Core Team 2025), and similar to those used by Ballara et al. (2025). Individual tows were investigated, and errors were corrected using median imputation for start/finish latitude or longitude, fishing method, target species, tow speed, net depth, bottom depth, wingspread, duration, and headline height for each fishing day for a vessel. Range checks were defined for the remaining attributes to identify outliers in the data. The outliers were checked and corrected, if possible, with median imputation on larger ranges of data such as vessel, target species, and fishing method for a year or month, or the record was removed from the data set. Statistical areas were calculated from positions where these were available. Transposition of some data was carried out (e.g., bottom depth and depth of net).

Fishery stratification

Following the review of Langley (2020), the WCSI, Chatham Rise, and Sub-Antarctic regions were split into sub-fisheries (Table 1, Figure 2), with estimation of catch and length and age frequencies produced for each sub-fishery.

The WCSI (WC) region was split into three fisheries spatially: WC.north (north of 42.5° S); WC.inside (south of 42.5° S inside the 25-n. mile line); and WC.south (south of 42.5° S outside the 25-n. mile line) (Figure 2) as fish size is smaller in the north, and substantially larger fish are caught inside the 25 nautical mile line. The WC.north sub-fishery has been the largest WCSI fishery in most years, with most of the recent declines in catch occurring in this fishery.

The Sub-Antarctic (SA) region was structured spatially as: SA.auck (Auckland Islands); SA.snares (the Stewart-Snares shelf north of 49° S); and SA.suba (the remaining Sub-Antarctic area) (Figure 2), based on fish size. The smallest hoki are on the Stewart-Snares shelf, medium-sized fish are around the Auckland Islands, and most of the catch in the rest of the Sub-Antarctic comprises large females. The SA.snares sub-fishery is the largest Sub-Antarctic fishery in most years.

The Chatham Rise (CR) region was structured using depth, with depth greater than or equal to 475 m defined as CR.deep, and shallower than 475 m as CR.shallow (Figure 2), as larger fish are predominantly found in deeper water (Langley 2020). The CR.deep sub-fishery makes up most of the Chatham Rise catch in each year.

In the 2023 stock assessment, Cook Strait (CS) and ECSI ('ECSI original' in Figure 3), catches from spawning months (June–September) made up the Cook Strait spawning fishery for stock assessment, with catches from these areas outside spawning months included in the Chatham Rise fisheries (CS.nonspawn and ES.nonspawn). For the 2024 and 2025 stock assessments the ECSI spawning region was redefined to a larger area (Figure 3) because it was found that the 'ECSI original' area for months June to September (Figure 3) missed running ripe fish east and south of this area (McGregor & Langley 2025, McGregor-Tiatia & Langley 2026a). June catches were also excluded from the extended ECSI spawning region as most observed female fish are immature, resting or

ripening in June. In this report, Cook Strait catches from June-September made up the CS_spawn fishery and catches from the extended ECSI area in July to September make up the ES_spawn fishery, with catches from these areas outside the spawning months included in the Chatham Rise sub-fisheries.

Table 1: Hoki region, sub-fishery descriptions, and stock assessment areas.

Region	Sub-fishery	Description	Stock assessment area
WCSI	WC.north	Oct–Sep, location based, see Figure 1	fishery_WC_north
	WC.south	Oct–Sep, location based, see Figure 1	fishery_WC_south
	WC.inside	Oct–Sep, location based, see Figure 1	fishery_WC_inside
Cook Strait	CS.spawn	Jun–Sep	fishery_CS_spwn
	CS.nonspawn	Oct–May, bottom depth <475 m or no depth	fishery_CR_shallow
	CS.nonspawn	Oct–May, bottom depth ≥475 m	fishery_CR_deep
Chatham Rise	CR.shallow	Chatham Rise Oct-Sep, bottom depth <475 m, see Figure 1	fishery_CR.shallow
	CR.deep	Chatham Rise Oct-Sep, bottom depth ≥475 m, see Figure 1	fishery_CR.deep
ECSI	ES.spawn	Jul–Sep	fishery_ES_spwn
	ES.shallow	Oct–Jun, bottom depth <475 m	fishery_CR_shallow
	ES.deep	Oct–Jun, bottom depth ≥475 m	fishery_CR.deep
Sub-Antarctic	SA.snares	Oct–Sep, location based, see Figure 1	fishery_SA_snares
	SA.auck	Oct–Sep, location based, see Figure 1	fishery_SA_auck
	SA.suba	Oct–Sep, location based, see Figure 1	fishery_SA_suba
Puysegur	PU.spawn	Jun–Sep	fishery_WC_north
	PU.nonspawn	Oct–May	fishery_SA_snares
ECNI	EN.shallow	Oct–Sep, bottom depth <475 m	fishery_CR_shallow
	EN.deep	Oct–Sep, bottom depth ≥475 m	fishery_CR_deep
WCNI	WCNI	fishery_WC_north	fishery_WC_north
NA	NA	Oct–Sep	fishery_CR_deep

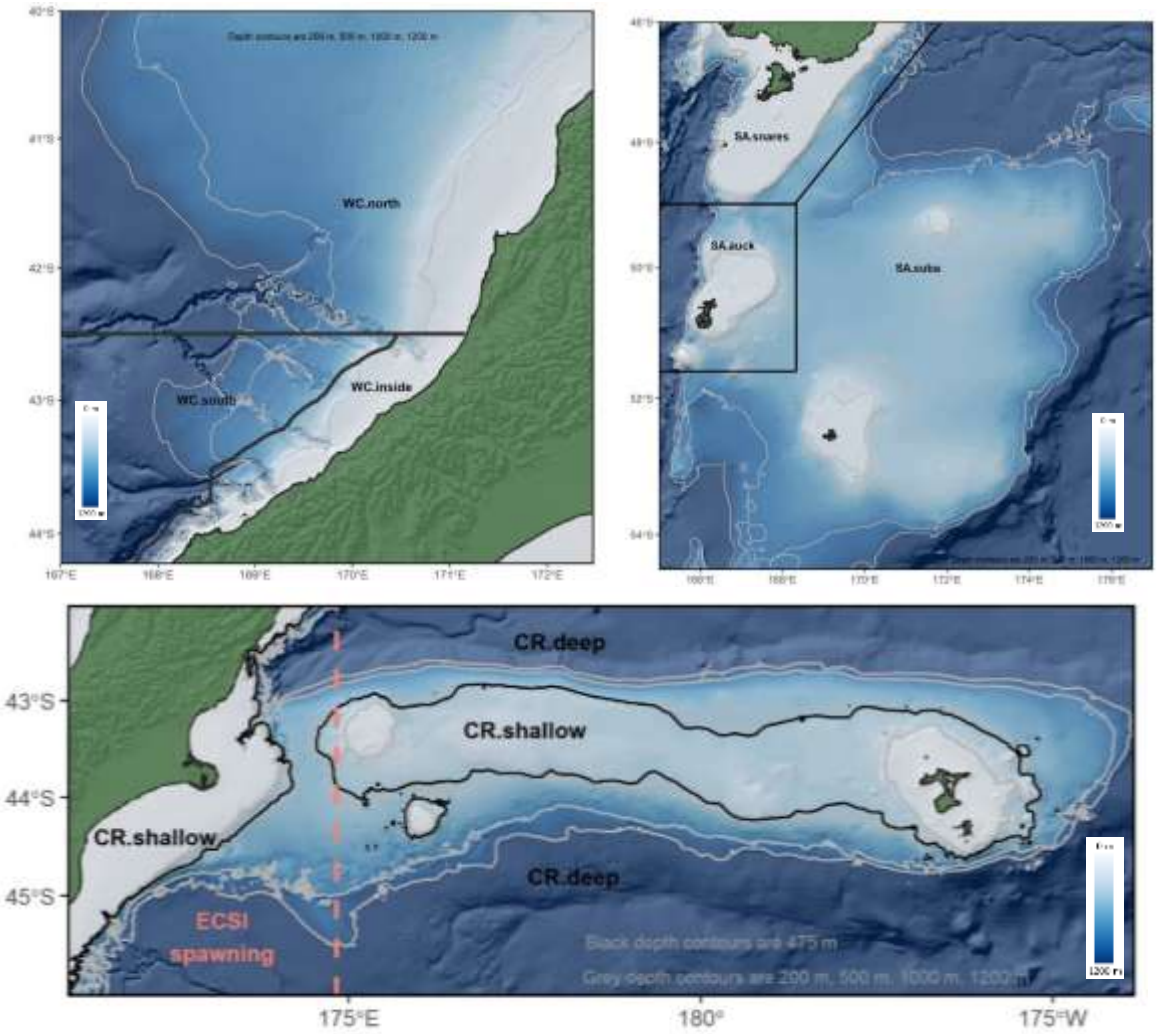


Figure 2: Hoki WCSI, Sub-Antarctic and Chatham Rise fisheries. Note data from the ECSI area are separated in July–September only; from October to June ECSI data are included as part of the Chatham Rise area.

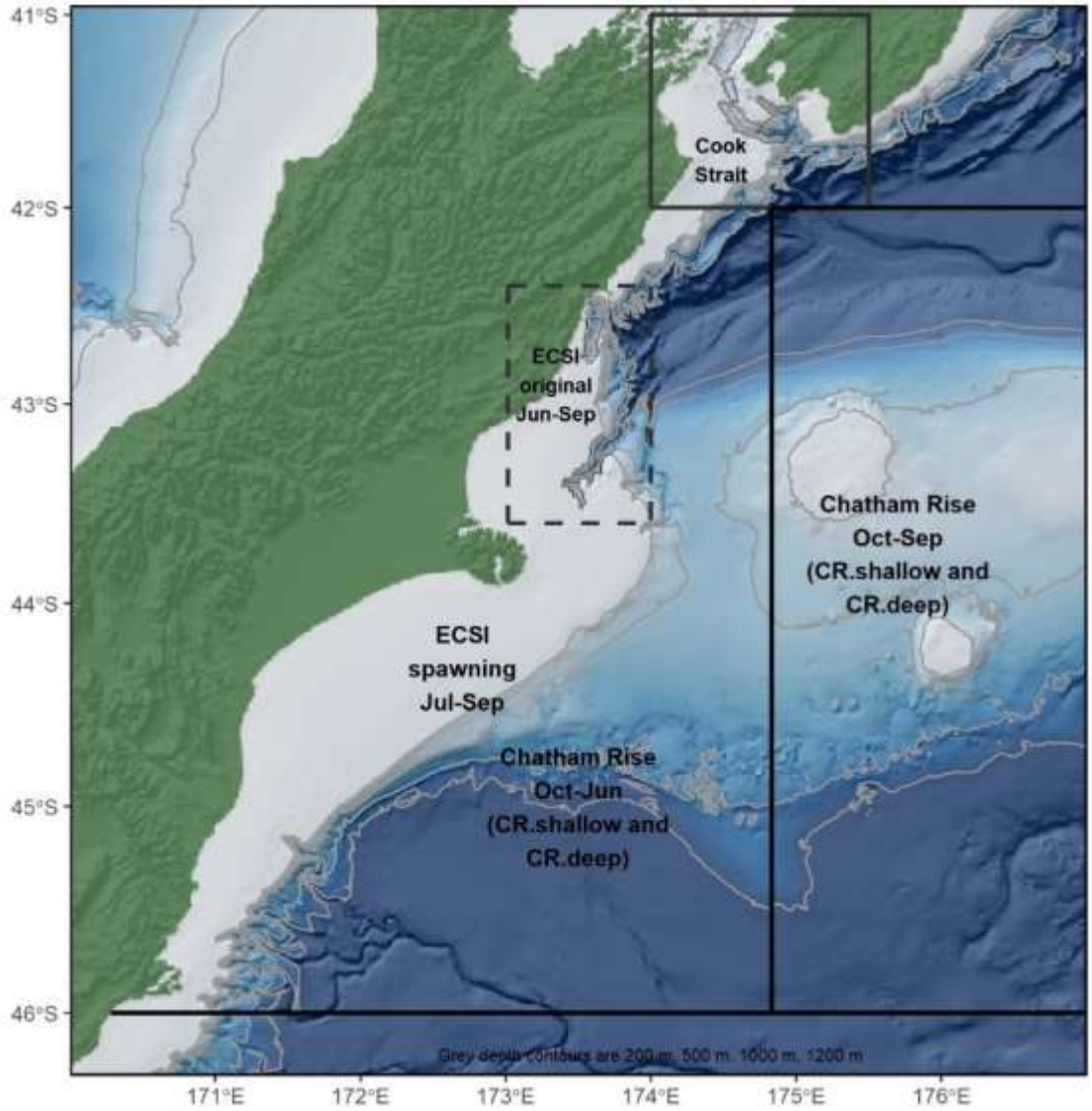


Figure 3: Hoki ECSI fishery. The dashed line shows ECSI area prior to the 2024 stock assessment. The area to the west of longitude 174º48' and between latitudes 42º and 46º shows the extended ECSI area used in the 2024 and 2025 stock assessments. Note data from the ECSI area are for July–September only; from October to June ECSI data are included as part of Chatham Rise CR.shallow and CR.deep fisheries.

In the 2023 stock assessment, Puysegur (PU) was defined as its own spawning fishery for catches from June–September; catches from Puysegur outside these spawning months were included in the SA.snares sub-fishery. For the 2024 and 2025 stock assessments, the Puysegur catches from June to September (PU.spawn) were included in the WC.north sub-fishery; catches from Puysegur outside these spawning months (PU.nonspawn) were included in the SA.snares sub-fishery (McGregor & Langley 2025, McGregor-Tiatia & Langley 2026a).

2.2 Size and age composition of commercial catches

Data to estimate length frequency distributions in 2024–25 were available from the at-sea Observer Programme (OP) (Table 2) and from land-based sampling of landed hoki from Cook Strait and WCSI (inside the 25-n. mile line) carried out for Fisheries New Zealand research project HOK2023-02. Hoki were measured by OP observers from 1662 target hoki tows, of which 503 came from the WCSI, 115 from Cook Strait, 196 from the ECSI (July–September), 608 from the Chatham Rise, 225 from the Sub-Antarctic, 1 from ECNI, and 14 from Puysegur. In Cook Strait and WCSI, 20 and 21 land-based samples, respectively, were collected by Earth Sciences New Zealand (ESNZ). Also, in ECSI and WCSI, 10 and 16 land-based samples, respectively, were collected by Fisheries New Zealand observers. Table 3 describes the timing of 2024–25 sampling in the main areas.

Otoliths were also collected by ESNZ staff during the 2025 hoki Cook Strait and ECSI acoustic survey on FV *Rakaia* (SRK2501) and some were aged to construct the age-length keys (Table 3). Length frequencies from the survey were not used for commercial catch-at-age as these came from mark identification trawls, some of which were outside of the area that is commercially fished.

Table 2: Target hoki observer coverage in 2024–25 by sub-fishery, for combined trawl methods for target hoki tows. The number of tows in this table are an initial summary and may not reflect the number of tows in later tables and figures where data were removed for different reasons (e.g., land-based samples that included observed tows, only data from land-based samples were included; assumed positional errors for observer tows for vessels ≥ 46 m inside the 25-n. mile line; etc).

	Number of vessels			Number of tows			Catch (t)		
Sub-fishery	All	Observed	Percent	All	Observed	Percent	All	Observed	Percent
SA.auck	12	7	58.3	309	41	13.3	1 980	318	16.0
SA.snares	15	11	73.3	264	69	26.1	1 560	561	35.9
SA.suba	11	8	72.7	358	115	32.1	3 051	1 169	38.3
CR.shallow	15	10	66.7	823	71	8.6	6 527	629	9.6
CR.deep	17	13	76.5	4 088	537	13.1	33 265	5 517	16.6
ECSI	18	8	44.4	942	196	20.8	14 486	3 617	25.0
ECNI	10	1	10.0	169	1	0.6	224	4	1.8
CS.nonspawn	2	1	50.0	214	6	2.8	1 473	59	4.0
CS.spawn	8	2	25.0	423	109	25.8	11 212	3 703	33.0
WC.north	15	10	66.7	691	243	35.2	8 609	3 896	45.3
WC.south	15	10	66.7	1 168	257	22.0	14 937	5 200	34.8
WC.inside	8	2	25.0	965	3	0.3	9 667	35	0.4
PU.spawn	5	-	-	43	-	-	376	-	-
PU.nonspawn	1	-	-	2	-	-	2	-	-
Other	-	3	-	-	14	-	-	287	-
All areas combined	42	20	47.6	10 459	1 662	15.9	107 369	24 995	23.3

Table 3: 2024–25 hoki target length frequency samples and aged otoliths by observer trips and the land-based sampling programme, and monthly timing. Length frequency samples include those selected at the time of extract in Dec 2025 (see Section 2.1) with errors, missing data, or outside the sample period (e.g., non–spawning season in a spawning area) removed so may not match numbers in Table 2. – , no data.

(a) WCSI observer (OP) and ESNZ land-based samples. Three observer programme length frequency samples were excluded (large vessels inside the 25-n.mile line, which may have position errors). Observer Programme land-based samples were not used in catch-at-age calculations.

		Number of length frequencies					Number of aged otoliths				
Data source	Sub-fishery	Jun	Jul	Aug	Sep	Total	Jun	Jul	Aug	Sep	Total
OP	WC.north	-	131	111	1	243	-	285	144	-	429
OP	WC.south	1	95	148	13	257	2	83	43	-	128
OP	WC.inside	-	-	-	-	-	-	-	-	-	-
OP	WC.total	1	226	259	14	500	2	368	187	-	557
ESNZ land-based	WC.inside	2	9	9	1	21	23	80	83	13	199

(b) Cook Strait observer (OP) and ESNZ land-based samples. 20 observed tows that overlapped with ESNZ land-based samples were excluded. SRK2501, 2025 hoki acoustic survey where length frequencies and otoliths were collected by ESNZ staff, although length frequencies were not used for commercial catch-at-age.

		Number of Length frequencies					Number of aged otoliths				
Data source	Description	Jun	Jul	Aug	Sep	Total	Jun	Jul	Aug	Sep	Total
OP	Vessel length < 40m	-	4	11	-	15	-	17	40	-	57
OP	Vessel length ≥ 40m	2	42	30	-	74	5	178	133	-	316
OP	Total	2	46	41	-	89	5	195	173	-	373
ESNZ land-based	Vessel length < 40m	-	2	-	6	8	-	30	-	87	117
ESNZ land-based	Vessel length ≥ 40m	-	5	5	2	12	-	60	77	24	161
ESNZ land-based	Total	-	7	5	8	20	-	90	77	111	278
SRK2501	Acoustic survey	-	3	6	-	9	-	21	51	-	72

(c) ECSI observer (OP), observer land-based (OP land-based) and acoustic survey sampling (SRK2501) data. OP land-based: observers collected land-based length frequencies and otoliths, although otoliths were not used for catchatage, as unavailable at time of otolith select (in brackets). SRK2501, 2025 hoki acoustic survey where length frequencies and otoliths were collected by ESNZ staff, although length frequencies were not used for commercial catch-at-age (in brackets).

		Number of Length frequencies				Number of aged otoliths			
Data source	Description	Jul	Aug	Sep	Total	Jul	Aug	Sep	Total
OP	Vessel length < 40m	-	-	-	-	-	-	-	-
OP	Vessel length ≥ 40m	71	57	68	196	203	124	189	516
OP	Total	71	57	68	196	203	124	189	516
OP land-based	Vessel length < 40m	-	10	-	10	-	(406)	-	(406)
SRK2501	Total	-	(6)	(3)	(9)	-	48	37	85

(d) Chatham Rise observer (OP) data. Chatham Rise includes ECSI non–spawning data.

Data	Sub-fishery	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Length frequency	CR.deep	4	39	104	94	90	125	61	6	8	3	-	2	536
	CR.shallow	3	9	19	10	7	11	6	5	-	-	-	-	70
	Total	7	48	123	104	97	136	67	11	8	3	-	2	606
Aged otoliths	CR.deep	6	52	112	130	160	183	70	-	11	3	-	4	731
	CR.shallow	30	40	81	97	61	112	20	-	-	-	-	-	441
	Total	36	92	193	227	221	295	90	-	11	3	-	4	1 172

Table 3 continued:

(e) Sub-Antarctic observer (OP) data.

Data	Sub-fishery	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Length frequency	SA.auck	-	1	2	4	7	9	-	3	-	13	-	2	41
	SA.snares	-	16	5	11	17	8	-	2	3	1	3	2	68
	SA.suba	12	28	7	4	9	28	-	4	6	4	10	3	115
	Total	12	45	14	19	33	45	-	9	9	18	13	7	224
Aged otoliths	SA.auck	-	-	20	39	56	86	-	30	-	112	-	5	348
	SA.snares	-	99	24	71	119	40	-	15	18	6	16	-	408
	SA.suba	59	105	21	19	33	114	-	16	19	11	25	6	428
	Total	59	204	65	129	208	240	-	61	37	129	41	11	1 184

2.2.1 Spawning fisheries catch-at-age methods

Length frequency distributions were estimated for each area as the weighted (by catch weight) average of individual length samples. Length frequency data were post-stratified by sub-fishery. Catch-at-age from spawning fisheries was estimated using age-length keys derived from otolith ageing (see Table 3). A subsample of 756 target hoki otoliths from WCSI (557 from OP samples and 199 from land-based samples), 723 otoliths from Cook Strait (373 from OP samples, 278 from land-based samples, and 72 from SRK2501), and 601 otoliths from ECSI (516 from OP samples and 85 from SRK2501) were selected, prepared, and read using the validated technique of Horn & Sullivan (1996) as modified by Cordue et al. (2000) and described by Horn & Sutton (2017). The sub-sample was derived by randomly selecting a set number of otoliths from each of a series of 1-cm length/sex bins covering the bulk of the catch and then systematically selecting additional otoliths to ensure that the tails of the length distribution were represented. The chosen sample sizes approximated those necessary to produce mean weighted CVs of less than 20% across all age classes, in each of the spawning fisheries.

WCSI catch-at-age datasets per year were calculated in a consistent way (where data were available) for the three WCSI sub-fisheries: WC.north, WC.inside, and WC.south (Table 4). Each sub-fishery in each year was stratified by time (Table 5) for the 2025 season stratification with adjacent strata combined if there were few length samples available. For all datasets, data from May to September were used with week 1 starting at 1 May. Three observer tows for vessels ≥ 46 m inside the 25-n. mile line were not included as these records were assumed to have positional errors. Data were also excluded from land-based length frequency distributions where vessels sorted their catch at sea. Where land-based samples included observed tows, only data from land-based samples were included. Land-based samples where area was defined as ‘WCSI’ (anywhere off the WCSI) rather than ‘WC25’ (inside the 25-n. mile line) were also excluded.

Table 4: Number of target hoki length frequencies by WCSI sub-fisheries for 1990–2025. Year defined as May–Sep. See Figure 2 for WCSI sub-fishery definitions. – indicates no samples.

	Number of observed samples			Number of land–based samples
Year	WC.north	WC.south	WC.inside	WC.inside
1990	242	255	–	–
1991	389	204	–	–
1992	223	147	2	–
1993	246	54	–	–
1994	546	58	–	–
1995	200	140	10	–
1996	263	211	4	–
1997	287	89	–	–
1998	301	174	5	–
1999	331	172	–	–
2000	359	199	1	10
2001	352	173	58	55
2002	380	200	5	70
2003	417	120	–	25
2004	304	228	35	24
2005	154	331	–	21
2006	127	188	–	11
2007	257	58	–	10
2008	177	42	–	7
2009	210	50	8	10
2010	245	18	–	11
2011	179	75	–	–
2012	314	72	24	–
2013	595	293	17	–
2014	510	224	42	–
2015	532	206	57	10
2016	373	161	44	14
2017	376	84	94	12
2018	477	280	109	10
2019	248	244	97	20
2020	390	227	96	20
2021	270	240	96	21
2022	323	261	117	21
2023	268	375	75	22
2024	223	332	124	20
2025	243	257	–	21

Table 5: Stratification for the 2025 WCSI sub-fisheries for target hoki length samples showing number of samples, number of males and females measured, and observed and commercial catches (t) by year. n, number of observed length frequencies, N, number of land-based samples.

WC.inside

Stratum	Stratum label	Observer/land-based catch	Commercial catch	N	n	No. males	No. females
1	1–10	146.4	1 175.6	4	-	284	546
2	11–12	104.1	2 063.4	4	-	261	561
3	13–14	152.8	2 333.1	5	-	640	390
4	15–16	147.0	2 172.1	4	-	243	586
5	17–22	171.5	1 994.3	4	-	233	609
Total	1–22	721.9	9 738.5	21	-	1 661	2 692

WC.north

Stratum	Week number	Observer catch	Commercial catch	n	No. males	No. females
1	1	197.2	512.5	24	907	1 262
2	2	142.0	387.6	26	841	1 668
3	3	213.6	1 048.4	14	485	955
4	4	832.9	1 587.4	57	1 507	4 053
5	5	1 395.1	2 710.0	62	1 577	4 431
6	6	349.3	925.2	23	459	1 716
7	7	423.1	1 190.5	16	402	1 218
8	8	342.9	599.7	21	502	1 610
Total	1-22	3 896.1	8 961.3	243	6 680	16 913

WC.south

Stratum	Stratum label	Observer catch	Commercial catch	n	No. males	No. females
1	1-10	83.0	1 702.3	11	368	613
2	11	277.6	1 179.5	30	1 097	2 099
3	12	268.1	849.8	21	844	1 598
4	13	608.3	1 697.0	28	977	1 856
5	14	697.7	2 235.0	28	870	1 888
6	15	880.3	2 796.9	41	897	2 984
7	16	790.2	1 780.8	35	920	2 698
8	17	861.2	1 652.0	29	808	2 144
9	18-22	733.9	1 057.5	34	982	2 440
Total	1-22	5 200.4	14 950.7	257	7 763	18 320

* Definition of week numbers and week dates

Week	Dates	Week	Dates	Week	Dates
1	1–7 May	9	26 Jun–2 Jul	17	21–27 Aug
2	8–14 May	10	3–9 Jul	18	28 Aug–3 Sep
3	15–21 May	11	10–16 Jul	19	4–10 Sep
4	22–28 May	12	17–23 Jul	20	11–17 Sep
5	29 May–4 Jun	13	24–30 Jul	21	18–24 Sep
6	5–11 Jun	14	31 Jul–6 Aug	22	25–30 Sep
7	12–18 Jun	15	7–13 Aug		
8	19–25 Jun	16	14–20 Aug		

For Cook Strait, catch-at-age length distributions by year were stratified by time and vessel size (Table 6). For all datasets, data from June to September were used, and each year was stratified by vessel size as vessel lengths < 40 m and ≥ 40 m, and time as June–July and August–September (see Table 7 for 2025 season stratification). As for the WCSI, land-based data where vessels sorted their catch at sea were excluded and, where land-based samples included observed tows, only data from land-based samples were included.

Table 6: Number of Cook Strait target hoki land-based and observed length frequencies by stratum. Strata for each year are two-month blocks for each vessel size. Year defined as Jun–Sep. – indicates no data.

(a) Cook Strait vessels < 40 m. * Length and age data not calculated.

	Catches (t)		Land-based samples		Observer tows	
Season	Jun-Jul	Aug-Sep	Jun-Jul	Aug-Sep	Jun-Jul	Aug-Sep
1988*	-	-	1	8	-	1
1989*	-	-	4	9	-	-
1990	5 396.3	6 671.0	4	4	-	1
1991	12 033.0	13 600.5	9	8	-	-
1992	9 901.2	11 891.4	15	16	-	-
1993	9 264.6	10 050.7	28	30	-	-
1994	8 602.0	18 910.7	12	25	2	1
1995	9 489.2	15 893.0	11	11	-	-
1996	14 634.7	24 753.9	9	10	-	4
1997	13 301.5	18 854.6	13	19	-	-
1998	10 313.4	18 903.5	13	20	22	51
1999	7 380.8	15 201.3	10	19	17	53
2000	8 482.6	18 628.0	12	18	10	33
2001	7 958.6	14 943.8	11	23	2	75
2002	3 950.8	7 615.5	10	25	15	23
2003	7 370.0	12 208.9	8	17	6	23
2004	5 950.6	15 890.3	9	14	29	36
2005	2 761.6	7 218.8	6	17	7	23
2006*	2 274.1	5 394.7	7	16	-	31
2007	2 187.3	4 402.7	8	18	-	23
2008	1 670.7	5 163.1	9	22	-	42
2009	1 839.0	4 569.6	9	22	5	20
2010	2 547.2	3 904.1	5	12	6	42
2011*	2 166.5	4 355.1	-	-	-	45
2012	1 276.8	4 050.7	-	-	13	47
2013*	1 963.3	3 074.2	-	-	-	29
2014	2 697.1	4 107.8	8	11	6	-
2015	2 371.8	4 072.6	11	11	-	9
2016	2 796.5	4 144.3	7	10	4	22
2017	2 607.5	3 281.2	9	11	8	29
2018	2 660.9	4 054.4	10	9	34	38
2019	4 157.5	3 520.0	11	9	24	48
2020	2 367.7	1 129.0	12	8	20	6
2021	1 252.4	811.2	14	6	-	5
2022	910.4	747.0	13	7	1	29
2023	465.3	727.4	10	10	-	10
2024	354.6	434.8	6	6	-	-
2025	157.3	719.0	2	6	4	11

Table 6: (continued)

(b) Cook Strait vessels ≥ 40m. * Length and age data not calculated.

	Catches (t)		Land-based samples		Observer tows	
Season	Jun-Jul	Aug-Sep	Jun-Jul	Aug-Sep	Jun-Jul	Aug-Sep
1988*	-	-	-	1	-	-
1989*	-	-	1	2	-	-
1990	750.9	1 857.0	3	2	-	-
1991	1 121.4	2 405.1	1	1	-	-
1992	1 596.6	1 119.5	1	1	-	-
1993	382.9	2 022.6	-	4	2	-
1994	2 945.4	5 140.2	2	7	10	-
1995	3 801.5	5 734.0	12	13	-	-
1996	7 900.6	11 990.0	11	12	4	9
1997	8 298.2	15 379.1	8	8	-	-
1998	6 125.0	9 665.3	10	8	15	37
1999	5 425.0	11 601.1	7	8	-	53
2000	3 365.4	8 807.2	7	11	-	10
2001	3 107.4	6 410.4	5	9	3	31
2002	3 092.5	6 960.7	5	10	9	-
2003	6 609.1	8 150.8	8	15	-	4
2004	6 092.3	10 884.3	13	11	9	-
2005	4 882.5	8 169.2	12	15	-	14
2006*	4 890.7	7 276.7	-	-	7	-
2007	5 092.2	6 113.9	-	-	15	10
2008	3 696.4	5 056.3	-	-	29	27
2009	3 101.3	5 326.2	1	-	62	6
2010	3 411.5	5 834.7	2	3	67	19
2011*	3 434.5	1 690.3	-	-	-	21
2012*	1 191.8	6 356.1	-	-	15	-
2013*	3 830.9	6 397.3	-	-	2	6
2014	2 605.3	5 185.5	2	7	54	32
2015	3 233.1	6 484.1	6	5	8	12
2016	2 605.7	5 885.4	3	8	9	-
2017	2 204.7	4 645.6	4	5	2	33
2018	5 671.1	5 673.1	4	8	9	1
2019	6 298.9	4 995.2	6	6	-	-
2020	5 686.7	5 917.7	6	6	7	15
2021	5 103.7	3 876.5	8	4	46	-
2022	3 499.5	3 178.2	7	5	44	15
2023	4 569.7	6 251.7	7	7	51	34
2024	4 205.3	5 709.7	8	6	25	9
2025	4 819.0	5 517.4	5	7	44	30

Table 7: Stratification for the 2025 Cook Strait CS.spawn sub-fishery for target hoki length samples showing number of samples, number of males and female measured, and observed and commercial catches (t) by year. Strata are two-month blocks for each vessel size class. n, number of observed length frequencies, N, number of land-based samples.

Stratum	Stratum label	Observer/land-based catch	Commercial catch	N	n	No. males	No. females
1	Vessel length < 40m Jun-Jul	82.9	157.3	2	4	325	488
2	Vessel length < 40m Aug-Sep	328.7	719.0	6	11	1 072	1 324
3	Vessel length ≥ 40m Jun-Jul	2 560.1	4 819.0	5	44	2 618	2 427
4	Vessel length ≥ 40m Aug-Sep	2 459.1	5 517.4	7	30	1 247	3 248
Total	Jun-Sep	5 430.8	11 212.7	20	89	5 262	7 487

For ECSI, catch-at-age distributions by year were calculated for years where there were at least 10 target hoki length frequencies collected during July to September and there were at least 100 otoliths in that year (Table 8). These were treated as two strata based on vessel size where there were observed length frequencies for vessel lengths < 40 m and ≥ 40 m, and data was scaled to the July to September catch in that year. Catch-at-age was calculated for 2003, 2004, 2006, 2008, 2019, and 2022–2025 using the ECSI age-length key for that year applied to that year's data.

Table 8: ECSI commercial catches (t), number of target hoki observer (Observer) and Observer Programme collected land-based length frequencies (OP Land-based) by vessel length for each year (July–September) used in the length frequency distributions. *, as there was only 1 tow for vessels < 40 m in 2023, one overall stratum was calculated with 55 tows.

			Catch (t)	OP Land-based		Observer tows
Year	Vessels < 40m	Vessels ≥ 40m	Total	Vessels < 40m	Vessels < 40m	Vessels ≥ 40m
2003	1 569.5	8 263.5	9 833.0	-	1*	54
2004	953.9	6 925.6	7 879.5	-	9	119
2006	82.2	2 073.7	2 155.9	-	-	51
2008	98.9	5 214.0	5 312.9	-	-	39
2019	342.6	10 282.0	10 624.6	-	-	111
2022	1 148.9	8 545.1	9 694.0	-	5	90
2023	1 261.7	9 646.5	10 908.2	-	5	204
2024	1 379.2	14 131.7	15 510.9	-	-	263
2025	1 717.0	12 806.4	14 523.4	10	-	196

For Puysegur, catch-at-age distributions by year were calculated for years where there were at least 10 target hoki length frequencies collected during August and September of that year (Table 9). These were treated as one stratum and scaled to the June to September catch in that year. The WCSI age-length key for that year was applied to that year. Catch-at-age was calculated for 1990–1992, 1994–1997, 2000–2005, and 2025. Puysegur catch-at-age was not used in the hoki modelling in 2024 or 2025.

Table 9: Puysegur catches (t) and observer number of target hoki length frequencies for years where there are at least 10 length frequencies. – indicates no data.

				Catches (t)		Number of length frequencies				
Year	Jun	Jul	Aug	Sep	Total	Jun	Jul	Aug	Sep	Total
1990	15.4	0.7	7 117.8	115.1	7 249.0	-	-	17	-	17
1991	847.2	1 211.4	1 844.5	946.4	4 849.5	-	23	8	5	36
1992	1 346.8	2 296.4	869.3	243.7	4 756.2	10	63	11	-	84
1994	81.9	55.7	111.0	2 100.2	2 348.8	-	-	-	22	22
1995	66.7	-	176.7	551.6	795.0	-	-	-	11	11
1996	140.8	452.4	120.3	1 500.4	2 213.9	-	-	-	30	30
1997	181.2	350.0	484.7	4 525.9	5 541.8	-	-	-	15	15
2000	275.8	224.8	113.8	1 854.2	2 468.6	5	-	-	16	21
2001	496.6	113.3	1 000.0	4 142.5	5 752.4	2	-	-	30	32
2002	305.9	74.5	1 662.6	2 771.5	4 814.5	-	-	3	26	29
2003	254.0	21.2	4 450.9	862.2	5 588.3	-	-	14	1	15
2004	51.1	24.7	627.9	20.6	724.3	-	2	16	-	18
2005	23.3	208.6	4 052.3	1 162.2	5 446.4	-	-	35	3	38
2025	0.6	56.4	305.3	115.0	477.3	-	-	11	3	14

Previously the length-weight relationship of Francis (2003) was used for all spawning fisheries (WCSI, Cook Strait, and ECSI) (Table 10). Length and age data updated using the length-weight relationships from McGregor-Tiatia & Langley (2026b) were used for all years (Table 10). The western stock length-weight relationship was applied to Puysegur, and the non-spawning

relationship was applied to ECNI. Age-length keys were constructed for each spawning area and applied to the total length frequency distribution to produce an age frequency distribution for the catch of each sex separately. For the spawning fisheries, catch-at-age estimates were determined using ESNZ's catch-at-length and -age analysis software tool 'CALA' (catch-at-length and -age, Francis & Bian 2011). This software has been updated to incorporate data from otolith zone measurements using the consistency scoring method of Francis (2001) in the age-length key. For 1990–2000 age-length-key data there were no otolith ring measurements so average radii were applied as 2.23, 3.17, and 3.57 units for ages 1 to 3, respectively (Peter Horn, NIWA, pers. comm). The same age-length key was used for each sub-fishery within a year.

Table 10: Length-to-weight parameters a and b (weight= a(length)^b) estimated from the previous analysis (Francis 2003) and updated by McGregor-Tiatia & Langley (2026b). Weight is in grams; length is total length (cm).

Description	Area	Sex	*a*	*b*
Previous				
Francis (2003)	All	All	0.00479	2.89
Updated				
Non-spawning	Chatham Rise and Sub-Antarctic	All	0.00417	2.92
Spawning Western stock	WCSI	Female	0.00500	2.89
Spawning Western stock	WCSI	Male	0.00526	2.87
Spawning Eastern stock	Cook Strait and ECSI	Female	0.00394	2.95
Spawning Eastern stock	Cook Strait and ECSI	Male	0.00448	2.92

Catch-at-age was not calculated for the 1987–1989 seasons (WCSI) or 1988–1989 seasons (Cook Strait) because no commercial data were available in these years.

2.2.2 Non-spawning fisheries direct ageing methods

Catch-at-age in Chatham Rise and Sub-Antarctic sub-fisheries was estimated by sampling directly for age. This continued the approach used since 1998–99 for the Chatham Rise (Francis 2002) and since 2000–01 for the Sub-Antarctic (Ballara et al. 2003). Sampling directly for age is necessary because a single age-length key is not appropriate in non-spawning fisheries. The sub-fisheries are spread over much of the year and there will be substantial fish growth. This means that for any given length the proportions-at-age will change throughout the fishery. To sample directly for age, observer coverage must be sufficient to provide a random sample of otoliths from the fishery. Francis (2002) suggested that even a sample size of 1200 otoliths may not be sufficient to achieve a target CV of 0.20 in some years.

Criteria for otolith selection involves choosing about 1200 otoliths for each area, with more otoliths from larger catches and fewer from smaller catches, but most importantly covering all tows with catches greater than 1 t. If there are enough otoliths, otolith selection involves choosing 600 otoliths from each of CR.shallow and CR.deep and 400 otoliths from each of SA.auck, SA.snares and SA.suba. Otoliths categorised by observers as 'non random' are not used when there are sufficient 'random' otoliths. The proportion of catch by fishing method from the current year is also used to apportion otoliths between methods where possible.

In the 2024–25 Chatham Rise non-spawning season, at the time of otolith select (12 November 2025), 5840 otoliths were collected from 591 tows from target hoki tows. Of these, 4370 'random' otoliths for catches greater than 1 t and within defined sub-fisheries were collected. As there were only 452 otoliths for CR.shallow, all of these otoliths were selected.

For CR.deep, 'random' otoliths were selected (at random) for age estimation as given below.

1. All otoliths from tows that caught less than 1 t of hoki were rejected.

2. For tows that caught 1–6 t of hoki, 1 otolith from each tow.
3. For tows that caught more than 6 t of hoki, 2 otoliths from each tow.

This selected 758 otoliths for CR.deep all from bottom trawls, with the proportion of CR.deep bottom trawl catch over 89%. There were no otoliths from midwater trawls (9.5% of the CR.deep catch) available at time of otolith selection.

In the 2024–25 Sub-Antarctic non-spawning season, at the time of otolith select (12 November 2025), 2094 target hoki otoliths from catches greater than 1 t, not unsexed, and within defined sub-fisheries were collected from 211 tows. These tows included otoliths categorised by observers as 'non random' which was necessary as otherwise there would not have been enough otoliths to do the select. Hence 368, 597, and 1129 otoliths from SA.auck, SA.snares, and SA.suba respectively were identified as from catches greater than 1 t, not unsexed, and within defined sub-fisheries. All 368 SA.auck of these target hoki otoliths were selected.

For SA.snares, otoliths were selected at random for age estimation as given below.
1. All otoliths from tows that caught less than 1 t of hoki were rejected.
2. For tows that caught 1–9 t of hoki, 6 otoliths from each tow.
3. For tows that caught 9–15 t of hoki, 8 otoliths from each tow.
4. For tows that caught more than 15 t of hoki, 9 otoliths from each tow.

For SA.suba, otoliths were selected at random for age estimation as given below.
1. All otoliths from tows that caught less than 1 t of hoki were rejected.
2. For tows that caught 1–11 t of hoki, 3 otoliths from each tow.
3. For tows that caught 11–15 t of hoki, 5 otoliths from each tow.
4. For tows that caught more than 15 t of hoki, 6 otoliths from each tow.

This selected 425 and 443 otoliths from SA.snares and SA.suba respectively. Therefore, a total of 1189 Sub-Antarctic otoliths were prepared and read after swaps for missing or mislabelled otoliths. After ageing the otoliths, 5 were rejected, with final total available for ageing at 1184, with 348, 408, and 428 from the SA.auck, SA.snares, and SA.suba sub-fisheries respectively. All otoliths were from bottom trawls (noting that greater than 99% of the commercial catch was from bottom tows).

The method to estimate catch-at-age for the Chatham Rise and Sub-Antarctic followed that of Francis (2002) as modified by Smith (2005). Catch-at-age for two Chatham Rise sub-fisheries (CR.shallow and CR.deep) and three Sub-Antarctic sub-fisheries (SA.snares, SA.auck, SA.suba) were estimated using the same stratification across all years, instead of annual stratification calculated using tree-based methods. There was no stratification within each sub-fishery and year. Data from October to September were used for the Chatham Rise and Sub-Antarctic non-spawning fisheries (Tables 11 and 12) for all years.

Age frequencies were only calculated (and used for the hoki assessment) where at least 100 otoliths were available in a sub-fishery and year for the sub-Antarctic. All years were used for Chatham Rise sub-fisheries. The estimated age frequencies by sex for the observed tows were obtained by scaling the otolith ages and sexes up by the estimated numbers of hoki of each sex caught in the tow and averaging over all tows. Finally, the number of fish caught was estimated from ERS-trawl data and catch-at-age frequencies were calculated as the weighted average, for each stratum, of the estimated age frequencies by sex. Only tows that caught at least 1 t of hoki were used. Numbers of fish were estimated from catch weights using the updated length-weight relationship of McGregor-Tiatia & Langley (2026b) (see Table 10).

Estimates of catch-at-age before 1999–2000 in the Sub-Antarctic and up to 1997–98 on the Chatham Rise were based on an optimised length frequency model (OLF) described in detail by Hicks et al. (2002).

Table 11: Data used for estimation of length frequencies and for direct ageing in Chatham Rise fisheries. Commercial catch is for all target species, and length frequency and otolith data are target hoki only. See Figure 1 for sub-fishery definitions.

Chatham Rise CR.shallow sub-fishery. Year defined as October–September. No age data in 2020.

Fishing	Number of tows			Mean length	Number of aged otoliths		
year	Commercial	Sampled by observers	Sampled by observers for otoliths	(cm)	Male	Female	Total
2001	3 537	60	51	64.16	65	98	163
2002	2 509	41	36	63.66	53	63	116
2003	3 167	32	29	67.79	39	55	94
2004	2 289	24	23	59.01	43	53	96
2005	2 088	32	31	62.23	85	87	172
2006	2 684	55	54	63.85	109	93	202
2007	2 669	11	11	63.36	35	23	58
2008	2 792	6	6	60.87	7	7	14
2009	2 087	4	3	69.00	13	10	23
2010	2 145	35	35	60.80	71	73	144
2011	2 315	40	32	61.22	57	69	126
2012	2 211	16	8	68.04	15	19	34
2013	2 448	58	56	67.57	52	57	109
2014	2 309	42	38	64.19	37	51	88
2015	2 119	55	48	67.71	113	144	257
2016	2 199	38	35	69.91	69	68	137
2017	1 909	19	19	61.15	39	61	100
2018	2 243	21	19	62.34	40	49	89
2019	2 226	18	16	64.86	27	29	56
2021	3 321	30	21	65.41	95	109	204
2022	2 926	14	10	63.59	39	41	80
2023	2 902	38	36	62.74	142	220	362
2024	2 971	38	37	62.13	158	199	357
2025	3 016	70	44	64.66	193	248	441

Chatham Rise CR.deep sub-fishery. Year defined as October–September.

Fishing	Number of tows			Mean length	Number of aged otoliths		
year	Commercial	Sampled by observers	Sampled by observers for otoliths	(cm)	Male	Female	Total
2001	8 877	444	395	71.28	380	835	1 215
2002	7 752	281	266	72.45	258	567	825
2003	7 983	152	141	69.68	132	317	449
2004	6 596	87	83	68.37	120	223	343
2005	5 223	230	189	66.04	406	572	978
2006	4 512	240	223	68.35	302	456	758
2007	5 172	231	218	67.08	465	650	1 115
2008	4 510	303	291	67.46	427	623	1 050
2009	4 545	139	134	65.44	432	573	1 005
2010	4 678	263	260	67.09	438	549	987
2011	3 943	286	213	66.74	440	481	921
2012	4 143	293	200	71.21	372	626	998
2013	4 010	525	484	70.61	391	601	992
2014	4 101	531	502	70.74	382	677	1 059
2015	4 476	219	182	68.30	362	502	864
2016	4 232	238	222	71.21	369	582	951
2017	4 390	227	217	66.61	427	553	980
2018	4 326	227	185	66.23	377	558	935
2019	4 088	234	225	69.20	376	465	841
2020	3 773	353	304	69.42	408	850	1 258
2021	4 288	835	640	68.82	388	571	959
2022	4 281	549	458	68.29	436	578	1 014
2023	4 327	483	436	65.89	264	395	659
2024	4 774	647	571	66.18	305	472	777
2025	4 548	535	418	67.63	249	482	731

Table 12: Data used for estimation of length frequencies and for direct ageing in Sub-Antarctic fisheries. Commercial catch is for all target species, and length frequency and otolith data are target hoki only. Year defined as October–September. See Figure 1 for sub-fishery definitions.

Sub-Antarctic SA.auck sub-fishery. 2002 and 2005 age data not used in stock assessment

Fishing		Number of tows		Mean length	Number of aged otoliths		
year	Commercial	Sampled by observers	Sampled by observers for otoliths	(cm)	Male	Female	Total
2001	3 020	53	45	80.13	61	69	130
2003	2 357	89	84	87.01	82	177	259
2004	1 716	59	55	86.87	52	116	168
2006	851	15	15	73.89	82	67	149
2007	1 151	14	12	83.01	38	106	144
2008	1 358	87	58	76.21	218	237	455
2009	1 106	26	24	75.07	67	71	138
2011	943	51	49	77.00	149	175	324
2012	893	31	17	81.38	42	109	151
2013	1 077	82	80	79.97	130	177	307
2014	1 179	69	62	76.27	132	165	297
2015	1 120	21	13	84.72	39	74	113
2016	865	49	48	84.10	135	339	474
2017	864	32	14	79.93	40	98	138
2018	1 727	136	107	71.05	110	201	311
2019	1 614	28	26	74.96	49	77	126
2020	1 441	47	40	78.55	146	193	339
2021	1 556	141	111	76.23	176	240	416
2022	1 890	46	35	70.22	156	182	338
2023	2 302	71	37	72.67	140	208	348
2024	1 448	37	33	77.41	151	161	312
2025	1 887	41	37	78.54	152	196	348

Sub-Antarctic SA.snares sub-fishery. 2002–2005 age data not used in stock assessment

Fishing		Number of tows		Mean length	Number of aged otoliths		
year	Commercial	Sampled by observers	Sampled by observers for otoliths	(cm)	Male	Female	Total
2001	2 604	105	83	76.04	116	123	239
2006	1 294	38	37	69.53	170	191	361
2007	1 614	63	62	74.51	265	330	595
2008	1 091	59	57	77.62	250	247	497
2009	1 355	81	81	72.41	313	307	620
2010	1 596	55	49	69.27	173	236	409
2011	1 419	92	82	68.99	357	295	652
2012	1 455	67	59	70.71	276	268	544
2013	1 391	172	151	73.17	307	251	558
2014	1 370	74	58	65.44	123	116	239
2015	1 485	72	57	70.71	184	226	410
2016	726	38	36	72.83	118	194	312
2017	1 134	22	18	69.59	70	82	152
2018	1 042	145	107	64.08	196	158	354
2019	932	63	61	66.14	168	181	349
2020	848	103	83	67.27	274	380	654
2021	933	120	78	69.13	170	233	403
2022	686	86	55	68.77	181	239	420
2023	649	49	32	69.33	156	151	307
2024	605	44	40	71.45	200	184	384
2025	783	68	61	73.72	167	241	408

Sub-Antarctic SA.suba sub-fishery. 2004–2008, 2011, 2013–2015, and 2017 age data not used in stock assessment

Fishing		Number of tows		Mean length	Number of aged otoliths		
year	Commercial	Sampled by observers	Sampled by observers for otoliths	(cm)	Male	Female	Total
2001	1 774	120	112	88.51	75	255	330
2002	3 371	192	161	90.20	92	411	503
2003	2 074	37	36	89.92	28	85	113
2009	455	40	38	90.98	48	203	251
2010	419	56	55	89.67	92	337	429
2012	392	14	13	89.25	18	84	102
2016	243	13	13	89.81	31	88	119
2018	917	152	141	87.91	100	386	486
2019	421	35	33	85.19	38	152	190
2020	267	35	28	87.03	42	181	223
2021	304	47	34	89.12	81	263	344
2022	394	71	69	88.18	105	334	439
2023	737	155	125	83.64	138	356	494
2024	440	102	100	84.78	146	350	496
2025	396	114	112	84.65	110	313	423

3. RESULTS

3.1 Catch and effort information

The total annual catches of hoki within the EEZ from 1969 to 2024–25 are given in Tables 13 and 14. The hoki fishery was developed by Japanese and Soviet vessels in the early 1970s (Table 13). Catches peaked at nearly 100 000 t in 1977 but dropped to less than 20 000 t in 1978 when the EEZ was declared and quota limits were introduced (Table 13, Figure 4). From 1979 on, the hoki catch increased to about 50 000 t until an increase in the TACC from 1986 to 1990 saw the fishery expand to a catch in 1987–88 of about 255 000 t (Tables 13 and 14).

Reported annual catches ranged between 175 000 and 255 000 t from 1986–87 to 1996–97 and peaked again at 269 000 t in 1997–98, when the TACC was over-caught by 19 000 t (Table 14). Catches subsequently declined, tracking the TACC as it was reduced to address poor stock status, reaching a low of 89 000 t in 2008–09, then increasing again up to 161 500 t in 2014–15 following increases in the TACC as stock status improved (Table 14). The TACC was reduced to 150 000 t in 2015–16 and catches in the next four years were below this level (Table 14). The fishing industry voluntarily shelved 20 000 t of western ACE in 2018–19, leading to an effective lowering of the catch limit in that year to 130 000 t within an overall TACC of 150 000 t, and a western catch limit in that year to 70 000 t. The TACC was reduced to 115 000 t in 2019–20 and to 110 000 t from 1 October 2021.

Table 13: Reported trawl catches (t) by fleet from 1969 to 1987–88, 1969–1983 by calendar year, 1983–84 to 1987–88 by fishing year (Oct-Sept). Source - FSU data.

				New Zealand		
Year	USSR	Japan	South	Domestic	Chartered	Total
1969	–	95	–	–	–	95
1970	–	414	–	–	–	414
1971	–	411	–	–	–	411
1972	7 300	1 636	–	–	–	8 936
1973	3 900	4 758	–	–	–	8 658
1974	13 700	2 160	–	125	–	15 985
1975	36 300	4 748	–	62	–	41 110
1976	41 800	24 830	–	142	–	66 772
1977	33 500	54 168	9 865	217	–	97 750
1978*	2 028†	1 296	4 580	678	–	8 581
1979	4 007	8 550	1 178	2 395	7 970	24 100
1980	2 516	6 554	–	2 658	16 042	27 770
1981	2 718	9 141	2	5 284	15 657	32 802
1982	2 251	7 591	–	6 982	15 192	32 018
1983	3 853	7 748	137	7 706	20 697	40 141
1983–84	4 520	7 897	93	9 229	28 668	50 407
1984–85	1 547	6 807	35	7 213	28 068	43 670
1985–86	4 056	6 413	499	8 280	80 375	99 623
1986–87	1 845	4 107	6	8 091	153 222	167 271
1987–88	2 412	4 159	10	7 078	216 680	230 339

* Catches for foreign licensed and New Zealand chartered vessels from 1978 to 1984 are based on estimated catches from vessel logbooks. Few data are available for the first 3 months of 1978 because these vessels did not begin completing these logbooks until 1 April 1978.

† Soviet hoki catches are taken from the estimated catch records and differ from official MAF statistics. Estimated catches are used because of the large amount of hoki converted to meal and not recorded as processed fish.

Table 14: Reported catch (t) from QMS, estimated catch (t) and TACC (t), for HOK 1 from 1986–87 to present. Reported catches are from the QMR and MHR systems. Estimated catches include TCEPR and CELR data (from 1989–90), LCER data (from 2003–04), NCELR data (from 2006–07), TCER and LTCER data (from 2007–08), 'ERS – Trawl' data (from 2017–18), and 'ERS – Netting', 'ERS-lining', 'ERS - Other Lining', 'ERS – Potting', 'ERS – Seining', and 'ERS - Tuna Lining' data (from 2018–19).

	Estimated	Reported catch (MHR)		
Year	catch	Exclude HOK ET	Include HOK ET	TACC
1986–87	158 000	–	175 000	250 000
1987–88	216 200	–	255 000	250 000
1988–89	208 500	–	210 000	250 000
1989–90	203 535	208 851	208 851	251 884
1990–91	207 620	212 720	212 720	201 897
1991–92	205 575	212 167	212 167	201 897
1992–93	185 704	191 994	191 994	202 155
1993–94	182 997	192 384	192 385	202 155
1994–95	171 850	176 787	176 788	220 350
1995–96	197 818	209 639	209 639	240 000
1996–97	232 917	246 754	246 756	250 000
1997–98	259 478	269 232	269 239	250 000
1998–99	237 899	244 527	244 528	250 000
1999–00	243 400	242 420	242 423	250 000
2000–01	230 625	229 858	229 862	250 000
2001–02	200 055	195 492	195 506	200 000
2002–03	182 563	184 659	184 668	200 000
2003–04	133 765	135 784	135 786	180 000
2004–05	102 885	104 364	106 189	100 000
2005–06	101 984	104 385	105 965	100 000
2006–07	97 790	101 009	102 861	100 000
2007–08	87 815	89 318	91 045	90 000
2008–09	87 598	88 805	89 475	90 000
2009–10	105 105	107 209	107 209	110 000
2010–11	115 782	118 805	118 805	120 000
2011–12	126 184	130 108	130 108	130 000
2012–13	127 968	131 576	132 619	130 000
2013–14	143 705	146 344	146 344	150 000
2014–15	156 663	161 528	161 528	160 000
2015–16	136 087	136 719	136 722	150 000
2016–17	138 325	141 567	141 570	150 000
2017–18	131 533	135 419	135 420	150 000
2018–19[2]	116 672	122 460	122 460	150 000
2019–20	102 599	107 737	107 737	115 000
2020–21[2]	97 513	100 819	100 819	115 000
2021–22[2]	90 174	91 664	91 664	110 000
2022–23[2]	102 582	105 556	105 556	110 000
2023–24	103 981	107 054	107 054	110 000
2024–25	105 137	109 714	113 447	110 000
2025–26	–	–	–	110 000

1. Discrepancies between QMS data and estimated catches from 1986 to 1990 arose from incorrect surimi conversion factors. The estimated catch in those years was corrected from conversion factors measured each year by Ministry observers on the WCSI fishery. Since 1990 the current conversion factor of 5.8 was used, and the total catch reported to the QMS is considered to be more representative of the true level of catch. From 2000–01 MHR catches were shown including and excluding HOK ET catches (catches outside the EEZ).
2. In 2018–19 20 000 t of western ACE was voluntarily shelved by the fishing industry so the effective TACC was 130 000 t. In 2020–21, 20 000 t of ACE (equally split between west and east) was voluntarily shelved by the fishing industry so the effective TACC was 95 000 t (excluding carry-forward catch). In 2021–22 and 2022–23, 10 000 t of eastern ACE was voluntarily shelved by the fishing industry so the effective TACC was 100 000 t. In 2023–24 and 2024–25, there was no shelving of ACE, so the effective TACC remained at 110 000 t (plus any uncaught ACE carried forward), with the western catch limit 45 000 t and the eastern catch limit 65 000 t.

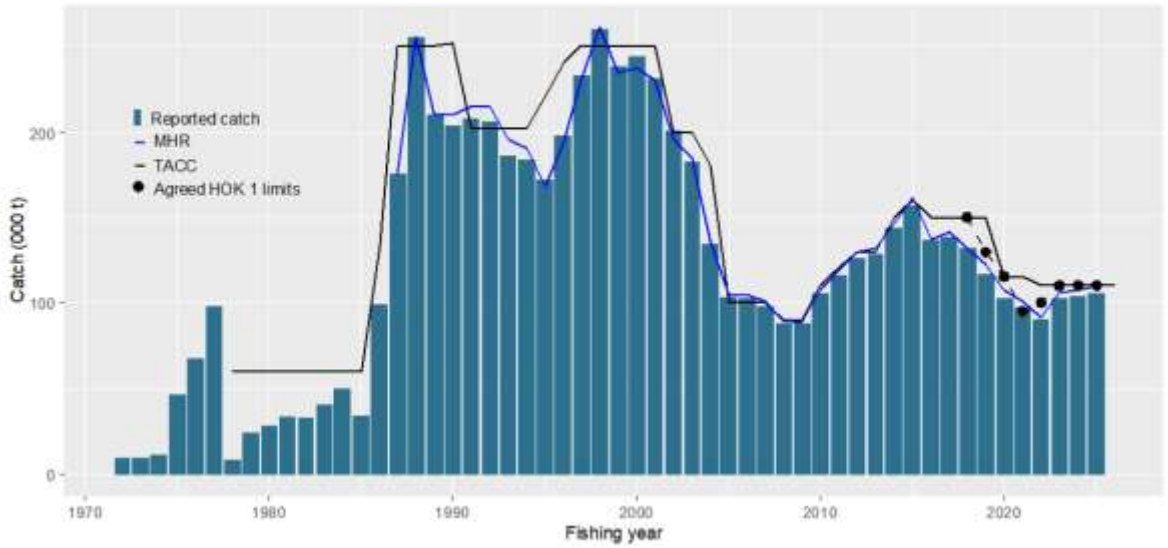


Figure 4: Total New Zealand hoki catch (thousands of tonnes) estimated from reported landings for calendar years 1972 to 1983 and fishing years 1983–84 (1984) to 2024–25 (2025) and TACC to 2025–26. Agreed catch limits are shown from 2017–18.

Catches by area and fishery from 1989–90 are given in Tables 15 and 16 and Figures 5 and 6. The pattern of fishing has changed markedly since the years before 1989–90 when over 90% of the total catch was taken in the WCSI spawning fishery (Figure 5). This has been due to a combination of TACC changes and redistribution of fishing effort. The WCSI region accounted for 31% of the total hoki catch in 2024–25 and was the second largest hoki fishery in New Zealand behind the Chatham Rise (Table 15). The WC.north sub-fishery has been the largest WCSI sub-fishery in most years, with most of the recent declines occurring in this sub-fishery (Table 16, Figure 6). Cook Strait catches peaked at 67 000 t in 1995–96, were relatively stable in the range 15 000 t to 25 000 t from 2004–05 to 2019–20, but have decreased to between 10 000 and 14 000 t in the last five years (Table 16, Figure 6). At the same time catches from the ECSI spawning fishery doubled from around 5000 t in 2011–12 to 2017–18 to around 10 000 t from 2018–19 to 2022–23, increasing further to over 14 000 t in 2023–24 and 2024–25 (Table 15, Figure 6). The Chatham Rise was the largest hoki fishery from 2022–23 to 2024–25 contributing about 35–37% of the total catch. The CR.deep sub-fishery made up most of the Chatham Rise catch in each year (Table 16, Figure 6). Catches from the Sub-Antarctic peaked at over 30 000 t from 1999–2000 to 2001–02 but have been variable since, ranging between about 6000 t and 20 000 t over the past 22 years (Table 15, Figure 6). The SA.snares sub-fishery was the largest Sub-Antarctic sub-fishery in most years (Table 16, Figure 6). Catches from other areas are at relatively low levels (Table 15).

From 1999–2000 to 2001–02, there was a redistribution in catch from eastern stock regions (Chatham Rise, ECSI, ECNI, and Cook Strait) to western stock regions (WCSI, Puysegur, and Sub-Antarctic). This was initially due to industry initiatives to reduce the catch of small fish in the area of the Mernoo Bank on the Chatham Rise, but from 1 October 2001, became part of an informal agreement with the Minister of Fisheries that 65% of the catch should be taken from the western fisheries to reduce pressure on the eastern stock. This arrangement ended following the 2003 hoki assessment in 2002–03, which indicated that the eastern hoki stock was less depleted than the western stock, and effort was shifted back into eastern regions, particularly Cook Strait. Since 2004–05 there has been a series of agreements, including limiting catch below the TACC and voluntary catch splits between western and eastern fishing grounds. The split between eastern and western catches has been close to the agreed catches in most years. From 2022–23 to 2024–25, eastern and western

catches (including carry-forward catch) were below agreed catch limits for both eastern and western stock areas.

Table 15: Estimated total catch (t) (scaled to reported QMR or MHR) of hoki by region 1989–90 to 2024–25. Other is catch with no location information. – No catches.

Fishing	Spawning fisheries				Non-spawning fisheries					Total
year	WCSI	Puysegur	Cook Strait	ECSI	Sub-Antarctic	Chatham Rise	ECNI	WCNI	Other	catch
1989–90	160 436	7 404	14 741	1 079	11 747	12 368	901	113	64	208 851
1990–91	129 243	4 876	29 243	2 580	16 764	28 905	937	158	14	212 720
1991–92	101 531	4 848	24 872	2 540	30 695	46 503	1 063	49	66	212 167
1992–93	96 601	2 206	22 240	1 061	24 862	43 436	1 399	35	154	191 994
1993–94	115 883	2 385	37 321	1 573	11 636	21 637	1 760	21	169	192 384
1994–95	80 379	1 101	40 452	3 214	13 413	35 798	2 272	58	101	176 787
1995–96	72 907	2 418	67 638	3 745	13 089	46 177	2 795	568	300	209 639
1996–97	91 388	5 871	65 077	5 053	21 785	52 383	4 592	90	514	246 754
1997–98	106 299	2 150	51 857	4 621	25 140	74 052	4 722	83	306	269 232
1998–99	94 537	2 891	45 244	3 258	23 774	72 326	2 314	62	120	244 527
2099–00	102 717	2 880	43 203	4 091	33 770	54 271	1 387	98	3	242 420
2000–01	102 235	6 798	36 297	4 799	30 076	47 459	2 035	147	13	229 858
2001–02	92 720	5 322	23 976	5 526	30 175	36 596	1 147	39	-	195 501
2002–03	73 862	5 948	36 712	9 833	20 199	36 638	929	532	7	184 660
2003–04	45 112	1 158	41 034	7 879	11 635	27 910	880	126	48	135 784
2004–05	33 111	5 548	24 833	4 837	6 244	29 080	522	37	152	104 364
2005–06	38 989	1 437	21 803	2 156	6 732	32 567	686	8	9	104 385
2006–07	33 328	408	20 113	2 973	7 661	35 846	667	8	6	101 009
2007–08	20 931	308	18 470	5 313	8 708	34 930	640	17	1	89 318
2008–09	20 548	233	17 535	3 480	9 807	36 585	588	25	3	88 805
2009–10	36 349	272	17 880	1 999	12 275	37 808	618	7	-	107 209
2010–11	48 373	1 176	14 937	2 157	12 655	37 915	1 588	2	3	118 805
2011–12	54 532	1 308	15 859	4 424	15 743	37 353	858	31	-	130 108
2012–13	56 219	955	19 396	5 477	14 098	34 371	1 051	9	-	131 576
2013–14	69 400	778	18 400	3 627	19 927	32 875	1 326	9	1	146 344
2014–15	78 705	1 875	20 100	4 250	16 378	39 444	766	11	-	161 528
2015–16	68 877	1 056	18 378	5 311	6 639	35 529	888	20	21	136 719
2016–17	65 837	1 211	16 111	5 442	13 178	38 955	827	6	-	141 567
2017–18	55 534	1 133	21 473	4 948	15 431	35 755	1 141	4	1	135 419
2018–19	46 463	1 268	20 348	10 625	9 061	33 513	1 177	4	1	122 460
2019–20	43 922	349	16 907	9 738	8 038	27 931	844	6	-	107 737
2020–21	35 142	448	12 524	9 665	9 136	33 150	746	7	-	100 819
2021–22	31 599	566	10 151	9 694	8 340	30 685	623	6	-	91 664
2022–23	30 317	160	13 711	10 908	12 890	36 916	650	2	-	105 556
2023–24	32 474	227	11 945	15 511	7 754	38 436	706	-	-	107 054
2024–25	33 653	522	12 688	14 523	7 614	40 120	593	2	-	109 715

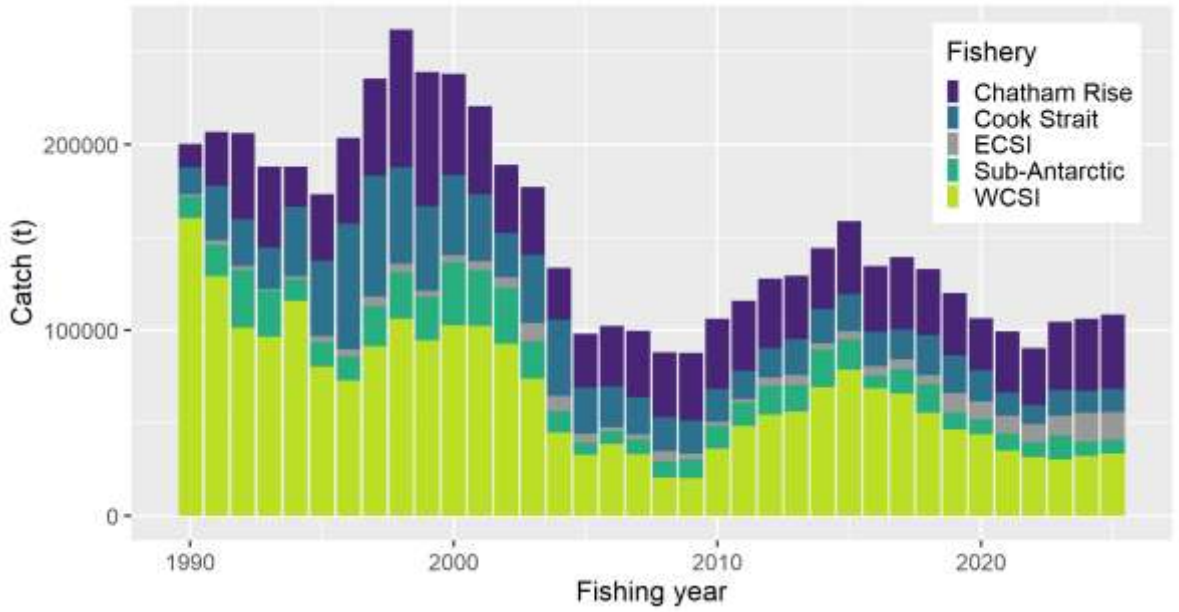


Figure 5: Estimated total catch (t) of hoki by fishing region from 1988–89 (1989) to 2024–25 (2025).

Table 16: Estimated total catch (t) scaled to total reported catch of hoki by region and sub-fishery, 1989–90 to 2024–25. There may be instances where sub-fishery catches do not add up to fishery total catches in Table 15 due to catch with no location or depth information.

Fishing	WCSI fisheries			Cook Strait fisheries		Chatham Rise fisheries		Sub-Antarctic fisheries		
year	WC north	WC inside	WC south	CS nonspawn	CS spawn	CR shallow	CR deep	SA auck	SA snares	SA suba
1989–90	78 955	1 765	79 716	65	14 675	3 169	9 199	660	9 491	1 596
1990–91	72 351	1 180	55 711	83	29 160	4 183	24 722	1 748	8 217	6 798
1991–92	64 421	754	36 355	364	24 509	10 943	35 560	2 496	16 948	11 252
1992–93	83 763	1 039	11 799	519	21 721	8 558	34 878	3 635	13 734	7 492
1993–94	95 942	1 647	18 293	1 719	35 602	4 669	16 967	865	8 525	2 246
1994–95	54 155	2 384	23 840	5 534	34 918	4 599	31 199	2 089	6 948	4 375
1995–96	42 756	4 244	25 907	8 358	59 279	9 411	36 766	1 666	9 044	2 379
1996–97	62 155	7 991	21 242	9 194	55 883	9 034	43 349	6 573	11 139	4 074
1997–98	71 329	7 769	27 202	6 850	45 007	16 499	57 553	9 149	9 728	6 263
1998–99	50 492	7 218	36 827	5 636	39 608	20 243	52 084	7 983	10 580	5 211
1999–00	64 628	14 136	23 952	3 919	39 283	15 074	39 196	13 985	13 409	6 377
2000–01	43 404	21 574	37 257	3 877	32 420	11 989	35 470	11 391	11 645	7 039
2001–02	45 597	21 825	25 298	2 357	21 620	7 135	29 462	9 018	6 949	14 209
2002–03	37 982	16 479	19 401	2 373	34 339	10 212	26 426	7 921	3 126	9 152
2003–04	14 334	18 784	11 995	2 217	38 817	5 704	22 206	4 778	2 170	4 687
2004–05	15 758	7 893	9 459	1 801	23 032	4 434	24 646	2 654	2 191	1 399
2005–06	17 783	5 220	15 985	1 966	19 836	9 171	23 396	1 232	4 616	883
2006–07	23 678	3 109	6 541	2 316	17 796	3 932	31 913	1 780	5 231	651
2007–08	16 935	914	3 082	2 884	15 586	3 867	31 063	2 801	4 382	1 525
2008–09	16 692	1 151	2 705	2 698	14 836	4 692	31 892	2 201	6 281	1 326
2009–10	31 060	2 933	2 357	2 183	15 697	4 743	33 066	2 527	8 198	1 550
2010–11	35 453	7 509	5 411	3 290	11 646	6 201	31 714	3 272	7 726	1 657
2011–12	35 554	8 487	10 492	2 983	12 875	4 482	32 871	2 973	10 781	1 988
2012–13	35 180	6 858	14 181	4 130	15 266	4 268	30 102	4 257	7 323	2 518
2013–14	44 026	10 355	15 019	3 805	14 596	2 780	30 095	5 784	7 028	7 115
2014–15	49 839	13 388	15 477	3 938	16 162	3 700	35 744	4 575	8 790	3 013
2015–16	37 372	16 171	15 333	2 946	15 432	6 380	29 149	2 406	2 589	1 644
2016–17	32 367	16 764	16 706	3 372	12 739	5 026	33 929	2 494	5 762	4 923
2017–18	18 401	17 087	20 045	3 413	18 059	5 297	30 458	3 693	4 730	7 008
2018–19	14 339	14 990	17 134	1 377	18 972	4 325	29 188	2 440	4 126	2 494
2019–20	17 945	13 728	12 250	1 806	15 101	2 823	25 108	3 013	3 814	1 211
2020–21	12 176	9 985	12 981	1 481	11 044	2 434	30 716	4 104	3 493	1 539
2021–22	10 168	9 748	11 682	1 816	8 335	2 644	28 041	3 052	2 663	2 625
2022–23	7 730	10 321	12 267	1 697	12 014	3 231	33 685	5 065	2 540	5 285
2023–24	6 930	10 091	15 454	1 241	10 704	4 717	33 719	2 496	1 512	3 747
2024–25	8 961	9 740	14 951	1 475	11 213	6 796	33 324	2 444	2 086	3 084

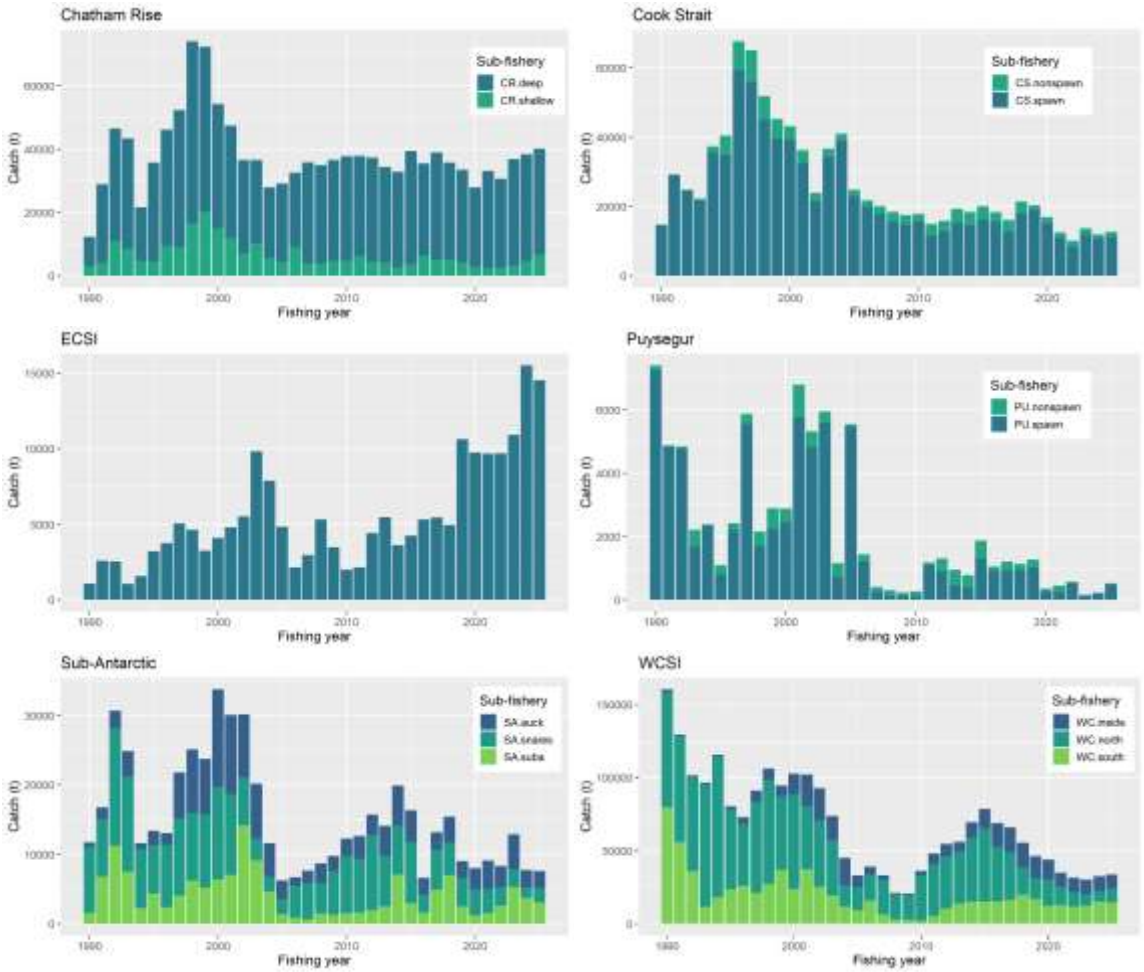


Figure 6: Estimated total catch (t) of hoki fishing by region and sub-fishery from 1989–90 (1990) to 2024–25 (2025).

2024–25 catch

Estimated catches of 105 137 t were scaled up to the total monthly harvest return (MHR) catch of 109 714 t. The overall reported catch of 109 714 t was 2659 t higher than the reported catch in 2023–24, and only 286 t lower than the TACC of 110 000 t. Relative to 2023–24, catches in 2024–25 increased in the Chatham Rise, Cook Strait, and WCSI, and decreased in ECSI and Sub-Antarctic (Figure 5, Table 15), with a high proportion of the hoki catch in 2024–25 taken during the spawning season from June to September (Figure 7). Overall, about 41 789 t of the total catch in 2024–25 was taken from western stock areas, with 67 924 t from the eastern stock areas.

The WCSI was the second largest fishery in 2024–25, ranking below the Chatham Rise for the third time since 2009–10, with catches increasing by 1179 t to 33 653 t in 2025 (2024–25) (Table 15) Catches from inside the 25-n. mile line made up 29% of the total WCSI catch in 2025, a decrease in proportion from 31% in 2024, and 10% lower than the peak of 41% of the catch taken from inside-the-line in 2004. Catches from the WC.north (8961 t) sub-fishery were higher than those in 2024, whereas catches from the WC.inside (9740 t) and WC.south (14 951 t) were lower than those in 2024 (Table 16, Figure 4). Peak catches on the WCSI spawning grounds were in July and August (Figure 7).

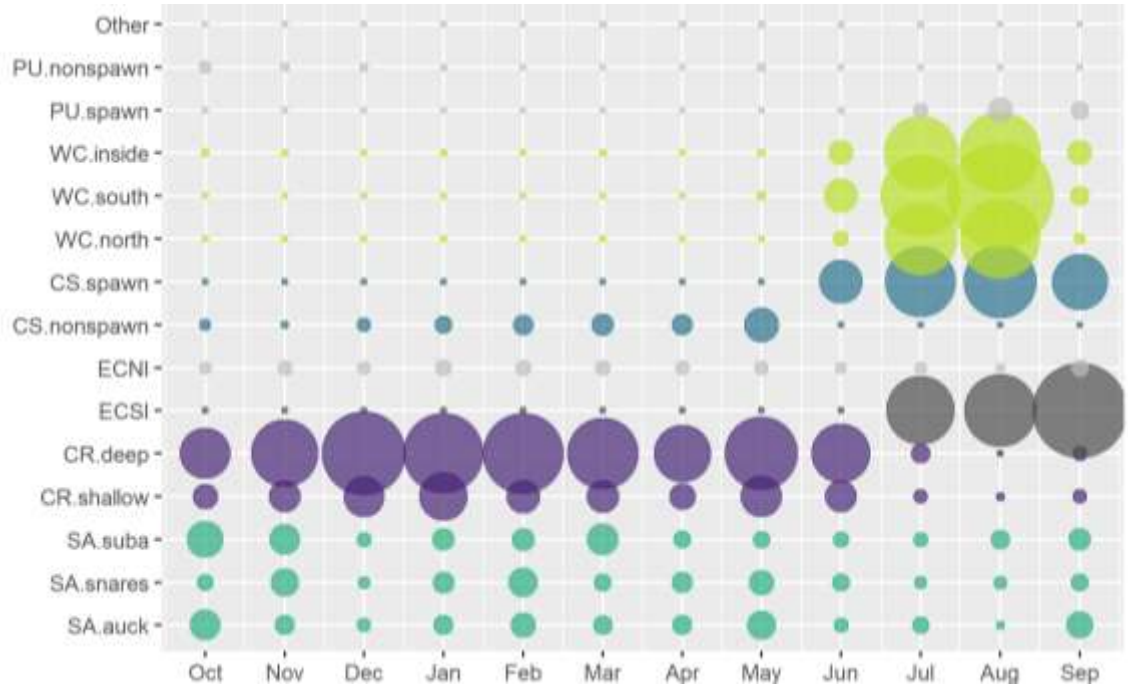


Figure 7: Hoki catch by month and region or sub-fishery for the 2024–25 fishing year (maximum circle size is 20 000 t). See Table 1 and Figure 2 for definitions of sub-fisheries.

The catch from Cook Strait in 2025 (2024–25) was 12 688 t, an increase of 743 t from that in 2024 (Table 15, Figure 6). Peak catches were from mid-July to mid-September, with about 1200 t caught outside the spawning season (Table 16, Figure 7).

The catch from the ECSI spawning fishery in 2025 (2024–25) was 14 523 t, a decrease of 988 t from that in 2024 (Table 15, Figure 6). This made it the third largest hoki fishery in 2024–25. Catches were taken from July to September, with a peak in early September (Figure 7).

The Chatham Rise fishery caught 40 120 t in 2024–25, an increase of 1684 t from 2023–24 and was the largest New Zealand hoki fishery (by nearly 6500 t) in 2024–25 (Table 15, Figure 6). The Chatham Rise fishery occurs mainly during October to June (Figure 7). The CR.deep sub-fishery accounted for 83% of the Chatham Rise catch in 2024–25 (Table 16).

The catch from the Sub-Antarctic was similar to that in 2023–24, with 7614 t taken in 2024–25 (Table 15). Sub-fishery catches in SA.auck and SA.suba decreased slightly in 2024–25 with 41% of the catch taken in SA.suba (3084 t), 32% from SA.auck (2444 t), and 27% from SA.snares (2086 t) (Table 16, Figure 6). The 2024–25 Sub-Antarctic catch was taken throughout the year, but with relatively little catch in July and August 2025 (Figure 7).

Catches from Puysegur increased, and ECNI decreased slightly, in 2024–25 from those in 2023–24, to 522 t and 593 t respectively (Table 15). Fishing in Puysegur was mainly limited to July to September, while small catches were taken throughout the year from the ECNI, although catches were smaller during July–September (Figure 7). Very little catch was taken from the WCNI.

3.2 Size and age composition of commercial catches

3.2.1 Spawning fisheries

West coast South Island

The OP data used to estimate WCSI catch-at-age were representative of the overall spatial, depth, and temporal distribution of the catch in the 2025 season (Figures 8 and 9). By fishery, the number of observer tows sampled was low (less than 100) in some years for WC.south, and low for WC.inside in the 1999, 2008, 2011–2014, and 2025 seasons (Table 4).

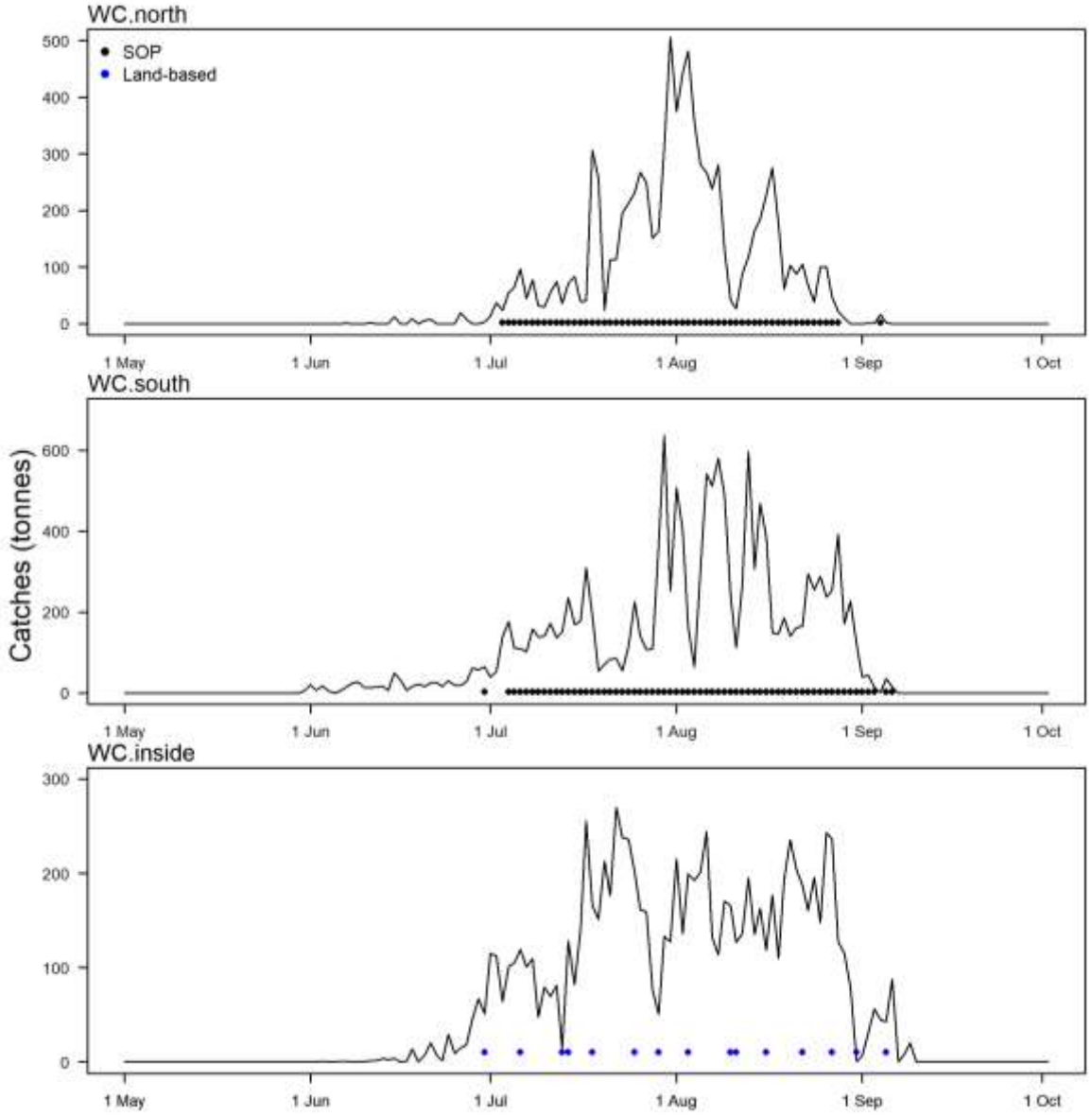
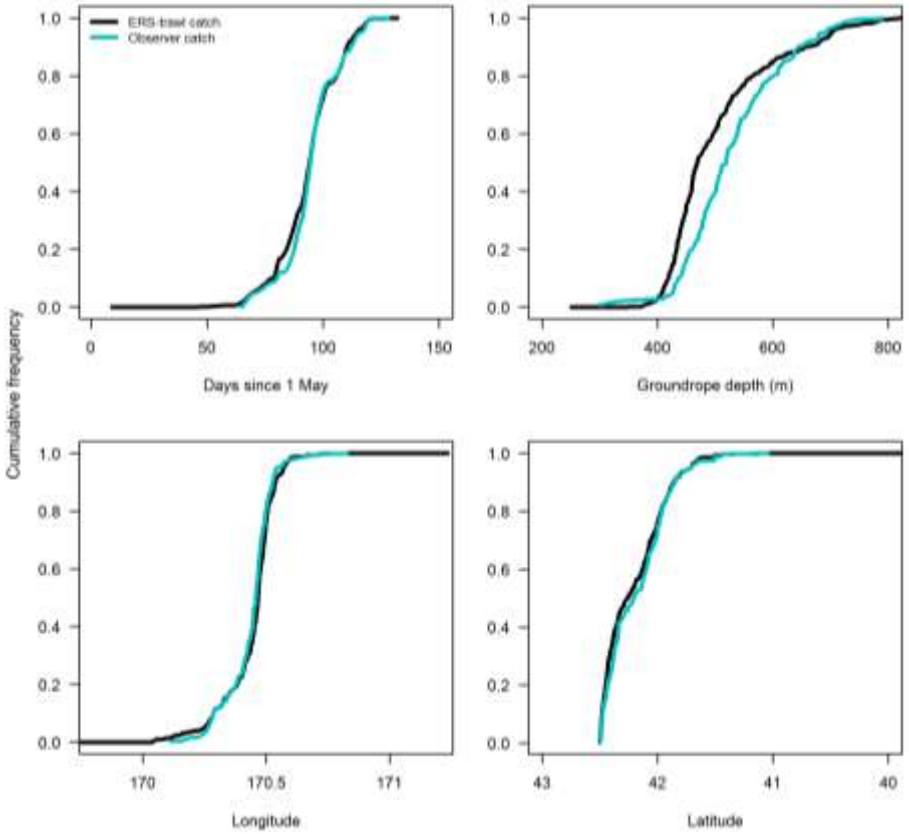


Figure 8: Daily catch for vessels from WCSI fisheries during the 2025 spawning season, showing timing of Observer Programme samples (black dots) and land-based samples (blue dots).

WC.north



WC.south

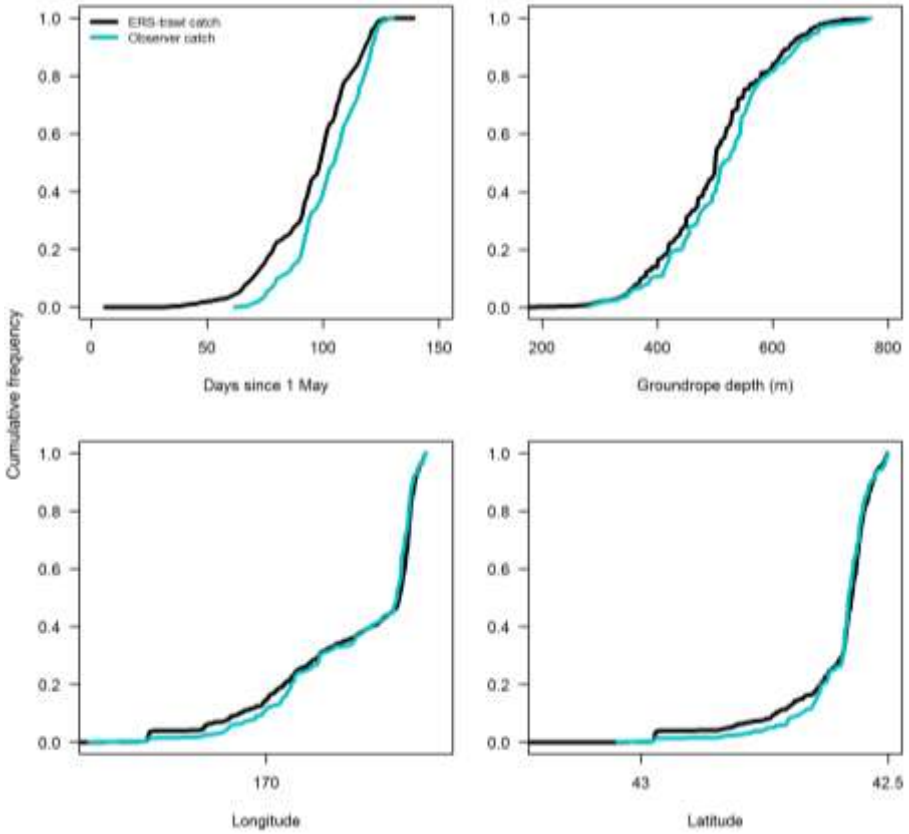


Figure 9: Comparison of WCSI 2025 Observer Programme catch coverage outside the 25-n. mile line (WC.north and WC.south) with ERS-trawl catches by day of year, depth, latitude, and longitude. If sampling is representative of the fishery, then the blue lines (observed catches) should overlay the black lines (ERS-trawl catch).

The WCSI catch in 2025 was dominated by fish from 70 to 110 cm total length (TL) from the 2011 to 2020 year-classes (ages 5–14), with few small fish (30–70 cm) from the 2023–2021 year-class caught at age 2–4 (Figures 10, A1–A6). The modal age was age 7 (2018 YC) for males and females for all three sub-fisheries, except for WC.north males where age 6 (2019 YC) was the mode.

The WC.north length distribution of both female and male hoki was made up of one large mode; the WC.north fish were centred at 85 cm for the females and 80 cm for the males with the peak comprising of fish from the 2017–2020 year-classes (ages 5–8). Fish from WC.south showed similar modes to WC.north, although the female peak had a pronounced bulge to the right representing ages 9–11 (YC 2015–2013). WC.north and WC.south also had a few fish less than 70 cm at ages 2–4 (2023–2021). WC.inside had a peak centred at 85 cm of fish from the 2013–2015 year-classes (ages 9–11), with some older females representing ages 9–11 (YC 2015–2013), and few fish younger than 5 years. Fishing inside the 25-n. mile line catches a higher proportion of larger fish (greater than 80 cm) than fisheries outside the line (Ballara et al. 2025) which was seen again in 2025; the land-based sampling data from the WC.inside sub-fishery had very few fish less than 80 cm, but fish smaller than 80 cm were caught in the WC.north and WC.south sub-fisheries (Figure 10). The WC.north fishery had the highest proportion of small fish, especially males.

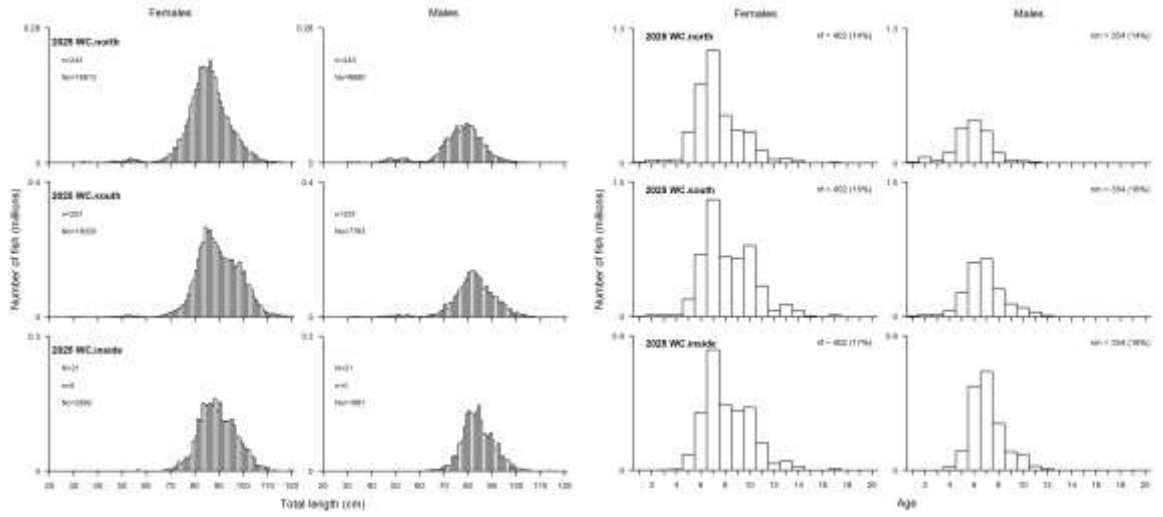


Figure 10: Comparisons of WCSI WC.north, WC.south, and WC.inside sub-fishery female and male length and age frequency distributions for the 2025 season.

Cook Strait

In 2025, the OP data used to estimate catch-at-age were poorly representative of the overall distribution of the catch (Figure 11, see Tables 6–7) and catch by vessels < 40 m and vessels ≥ 40 m. However, land-based samples were well spread throughout the spawning season (Figure 11).

A broad size range of hoki was caught in 2025, with most fish from 60 to 110 cm total length (TL) from the 2020 to 2013 year-classes (ages 5–12) (Figures 12, A7 and A8). Length frequency distributions by stratum showed that the size distribution of the catch was broadly similar between vessel classes and through the season (Figure 12), although there were more large fish in June–July.

The catch-at-age data for the Cook Strait overall fishery in 2006 and 2011–2013 were not used in the 2025 hoki stock assessment model as they were not considered representative of the commercial catch due to low observer coverage (Fisheries New Zealand 2025).

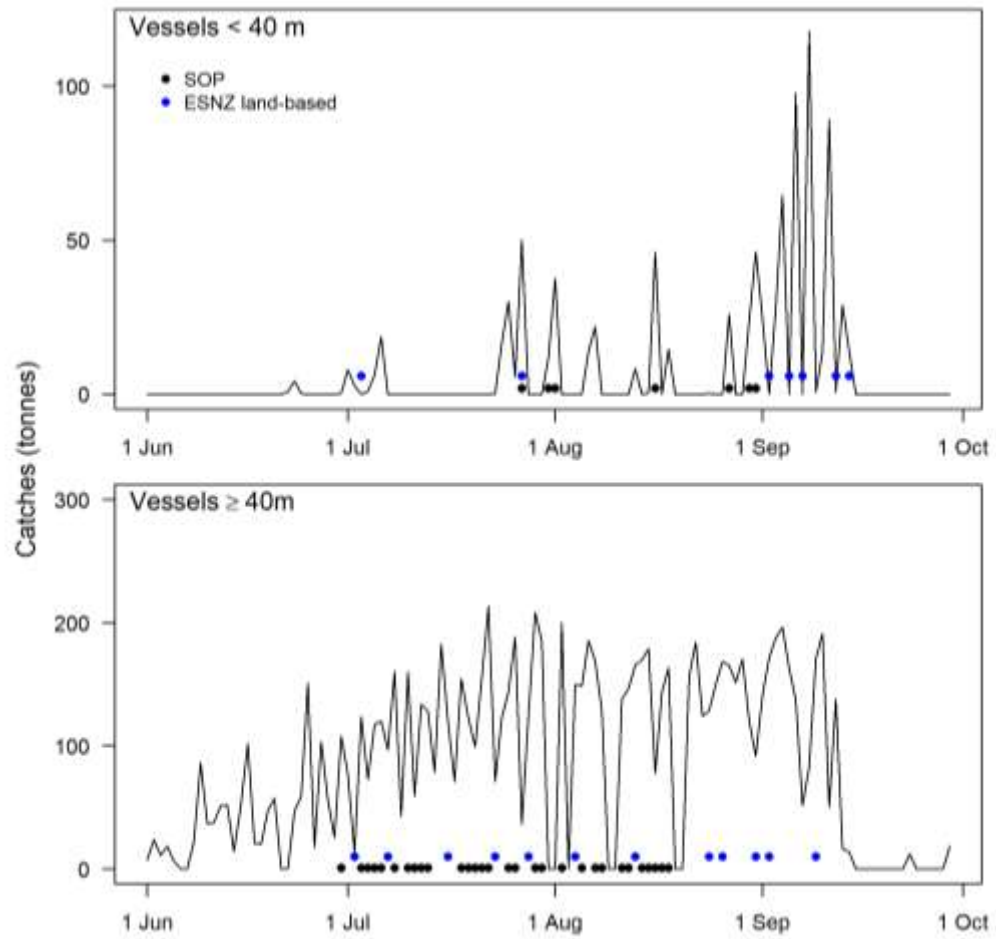


Figure 11: Cook Strait 2025 catch by day for vessels less than 40 m and 40 m or longer during the spawning season, showing timing of Observer Programme samples (black dots), and land-based samples (blue dots).

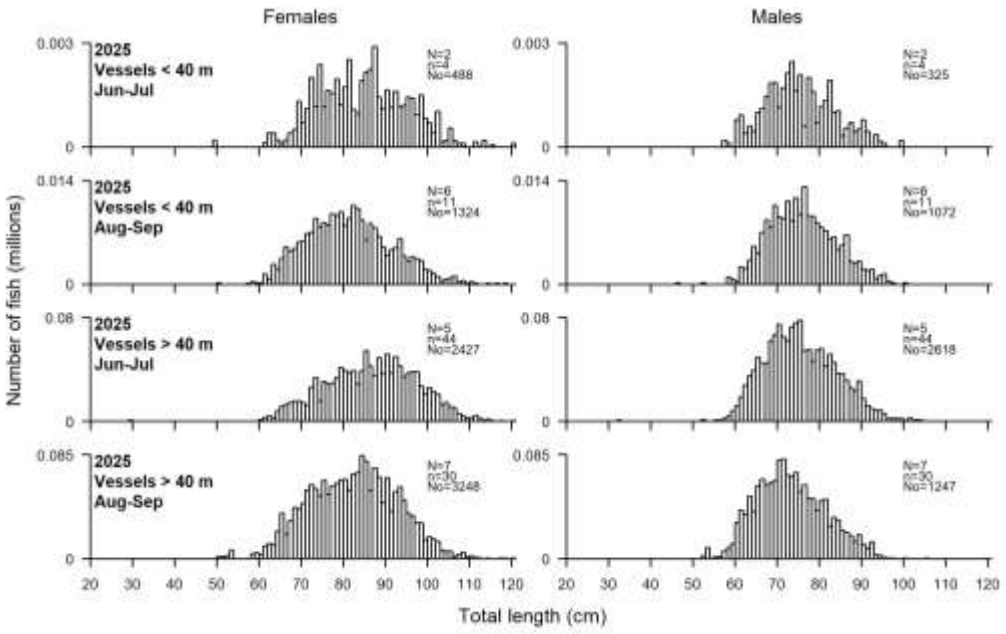


Figure 12: Comparison of Cook Strait spawning sub-fishery length frequency distributions by strata in 2025. N: number of land-based length frequencies, n: number of observed length frequencies; No: number of fish measured.

East coast South Island

In 2025, the OP data used to estimate catch-at-age were reasonably representative of the overall distribution of the catch for vessels greater than 46 m, although there was no coverage of vessels 40–46 m (Figure 13, see Table 8). There was also some coverage by Fisheries New Zealand observers taking land-based samples in August from vessels < 40 m.

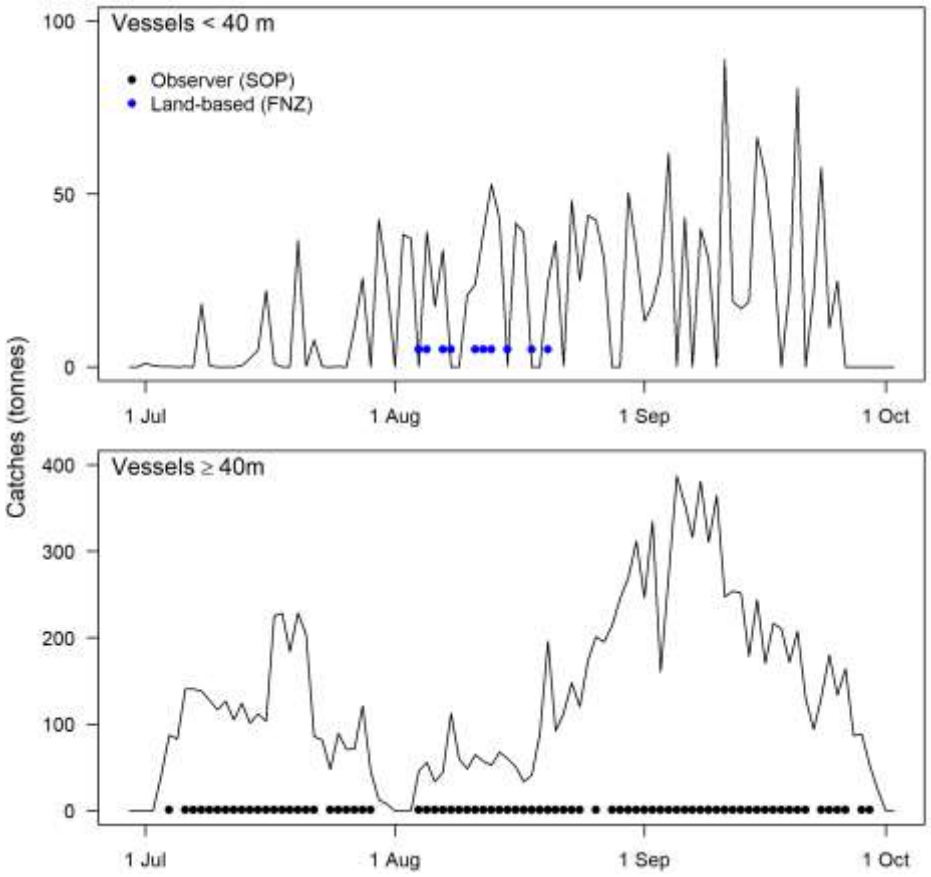


Figure 13: ECSI 2025 catch by day for vessels less than 40 m and 40 m or longer during the spawning season, showing timing of Observer Programme samples (black dots), and land-based samples (blue dots).

A broad size range of hoki from 50 to 110 cm was caught in the ECSI in 2025, with the main modes at ages 3–9 (2022 to 2016 year-classes) (Figures 14, A9 and A10). Small vessels on the ECSI caught larger hoki (Figure 14). A higher proportion of smaller, younger fish were taken in ECSI than in from Cook Strait. Fish from the ECSI were more similar in size to those observed in the Chatham Rise fisheries, although there were more larger fish on the ECSI.

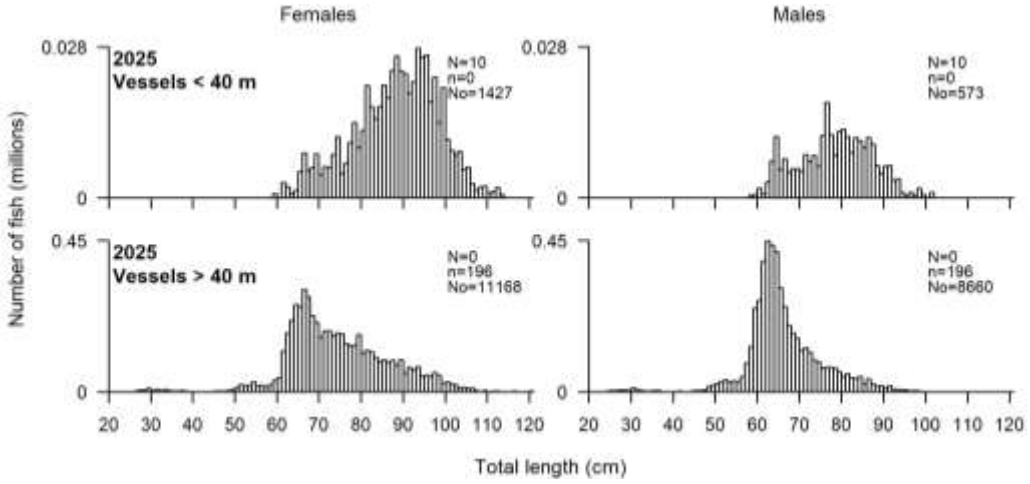


Figure 14: Comparison of ECSI spawning sub-fishery length frequency distributions by strata in 2025. N: number of Observer Programme land-based length frequencies, n: number of observed length frequencies; No: number of fish measured.

Puysegur

In 2025, 14 target hoki OP samples were collected during the spawning season (Table 9). A broad size range of hoki from 45 to 110 cm was caught in the Puysegur in 2025, with the main modes at ages 5–10 (2020 to 2015 year-classes) (Figures A11–A12). In some years the larger fish showed a similar size distribution to the fish in the sub-fisheries SA.auck and SA.suba, and WC.inside, with smaller fish showing a similar distribution to SA.snares fish.

3.2.2 Non-spawning fisheries

Chatham Rise

The OP data used to estimate CR.deep catch-at-age were generally representative of the overall temporal spatial, and depth distribution of the catch in 2024–25 (Figures 15 and 16). CR.deep had good observer coverage, except in Oct, May–Jun and for deeper tows greater than 600 m. Representation of OP data was lower for CR.shallow especially: in May–June 2025; for Statistical Areas 018–023, and for vessels less than 46 m (Table 11, Figures 15 and 16).

The length frequency distributions in the CR.shallow and CR.deep sub-fisheries had a large mode for female hoki at 45–90 cm, and for male hoki at 45–80 cm corresponding to fish from the 2021 to 2019 year-classes (Figures 17, A13–A16). The 2022 (age 2+) year-class at about 50 cm, made up a low proportion of the catch. There were more smaller fish in CR.shallow than CR.deep (Figures 17, A13–A16).

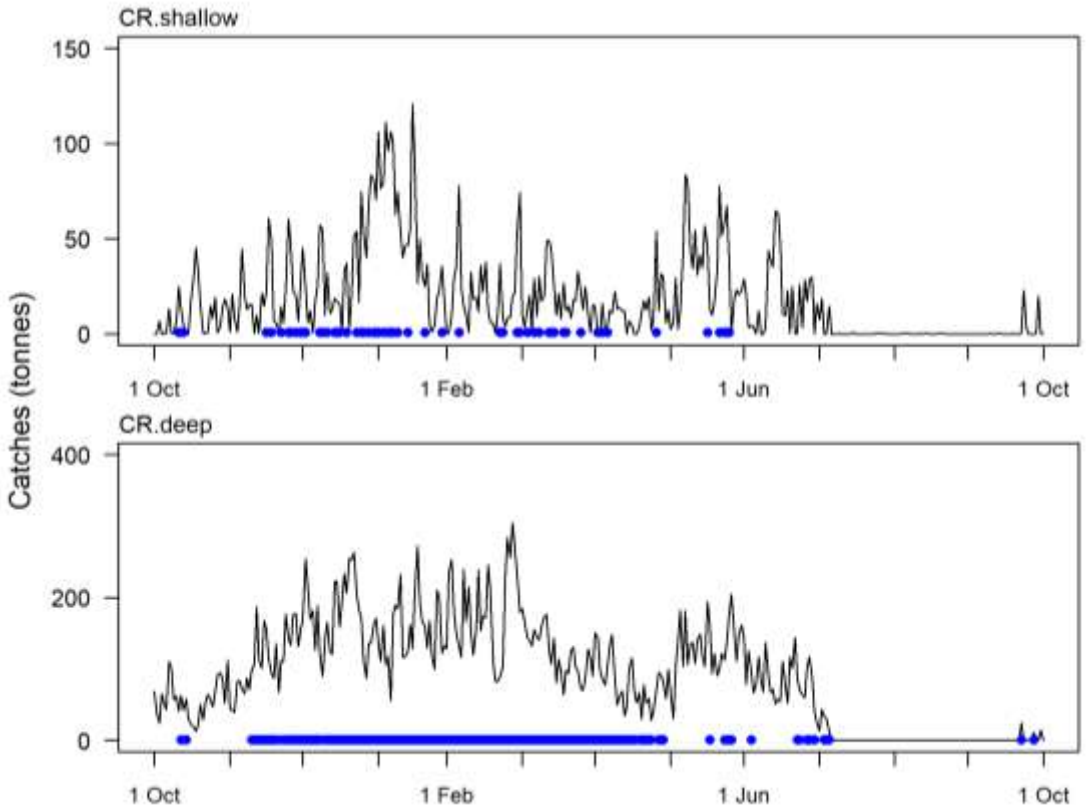
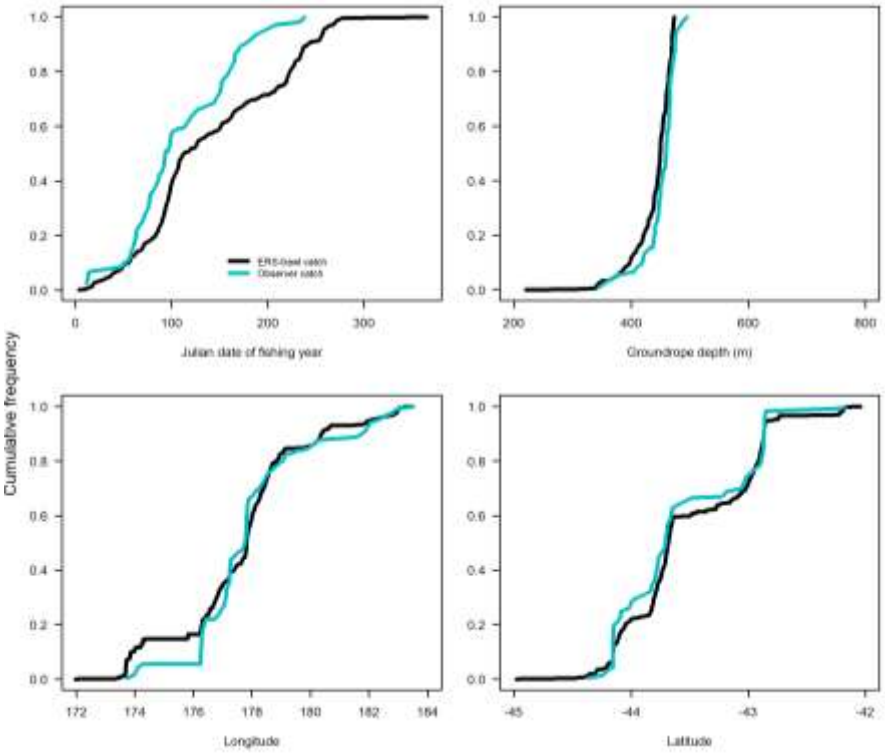


Figure 15: Chatham Rise 2024–25 catch by day for fisheries CR.shallow and CR.deep during the spawning season, showing timing of Observer Programme samples (blue dots).

Chatham Rise CR.shallow sub-fishery



Chatham rise CR.deep sub-fishery

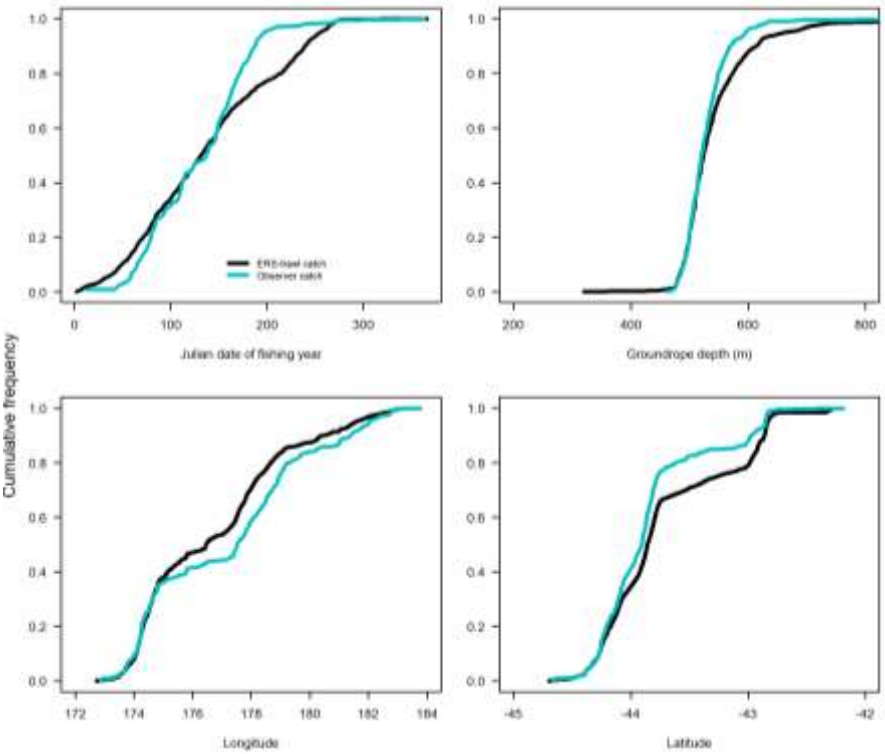


Figure 16: Comparison of Chatham Rise 2024–25 Observer Programme catch coverage with ERS-trawl catches by day of year, depth, latitude, and longitude. If sampling is representative of the fishery, then the blue lines (observed catches) should overlay the black lines (ERS-trawl catch).

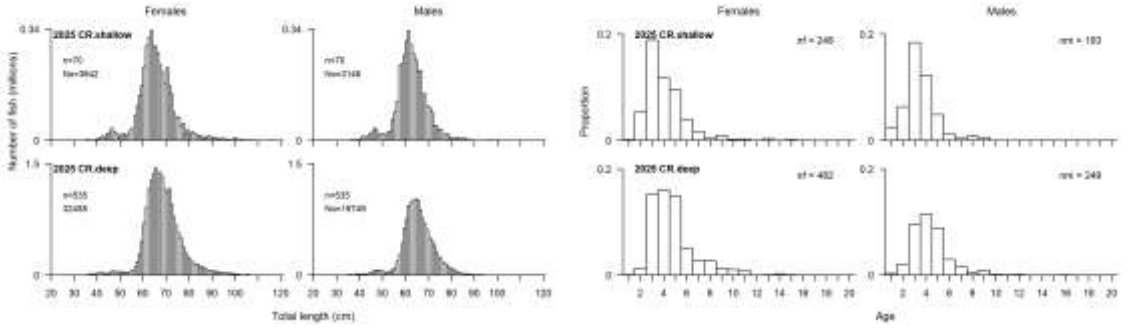


Figure 17: Comparisons of Chatham Rise CR.shallow and and CR.deep sub-fishery female and male length and age frequency distributions for the 2024–25 fishing year. n: number of observed length frequencies; No: number of fish measured; nf: number of female fish aged; nm: number of male fish aged.

Sub-Antarctic

The OP data used to estimate catch-at-age for the target hoki Sub-Antarctic sub-fisheries were not representative of the overall temporal distribution of the catch in 2024–25 mainly due to patchy coverage in each sub-fishery (Figures 18 and 19). Representation of OP data was low in October 2024, and April, May, and September 2025, in Statistical Area 028, and for depths less than 400 m for SA.snares; October 2024, April 2025, and September 2025, and for vessels < 60 m (Foreign owned vessels) for SA.auck; and April and September for SA.suba (Table 12, Figures 18 and 19). Twin-trawl tows were not represented in any fishery (not shown).

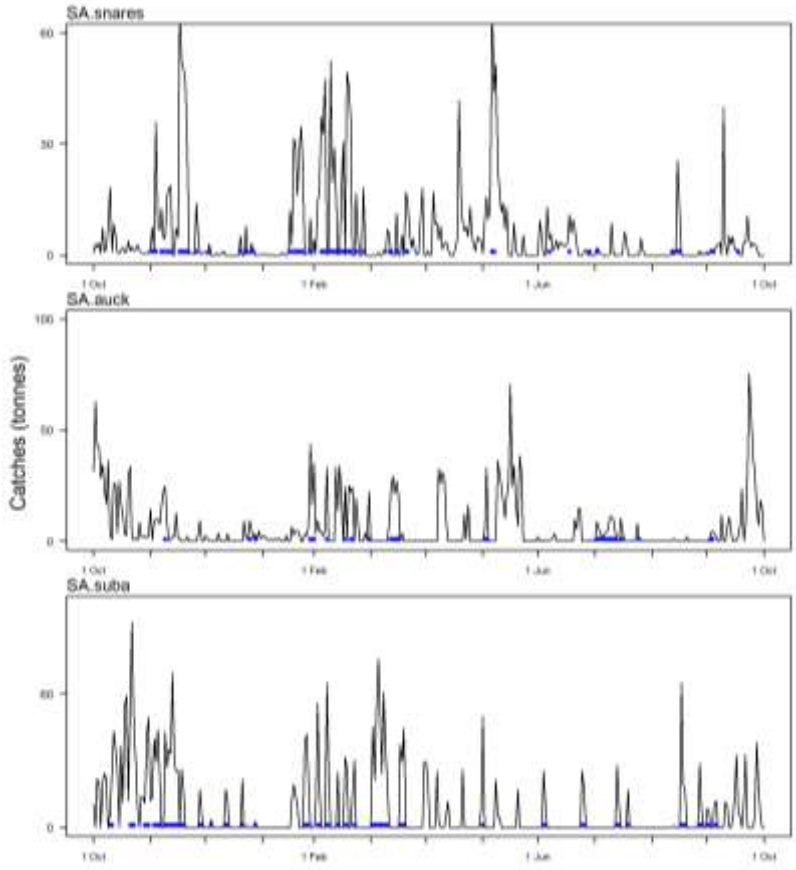
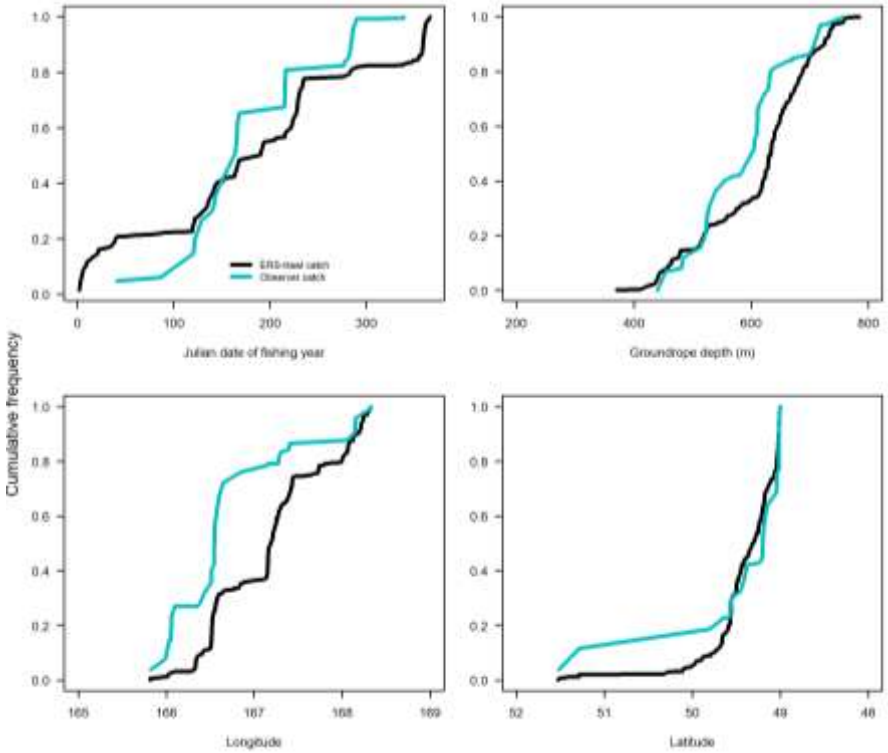


Figure 18: Sub-Antarctic 2024–25 catch by day for fisheries CR.shallow SA.snares, SA.auck and SA.suba during the spawning season, showing timing of Observer Programme samples (blue dots).

Sub-Antarctic SA.auck fishery



Sub-Antarctic SA.snares fishery

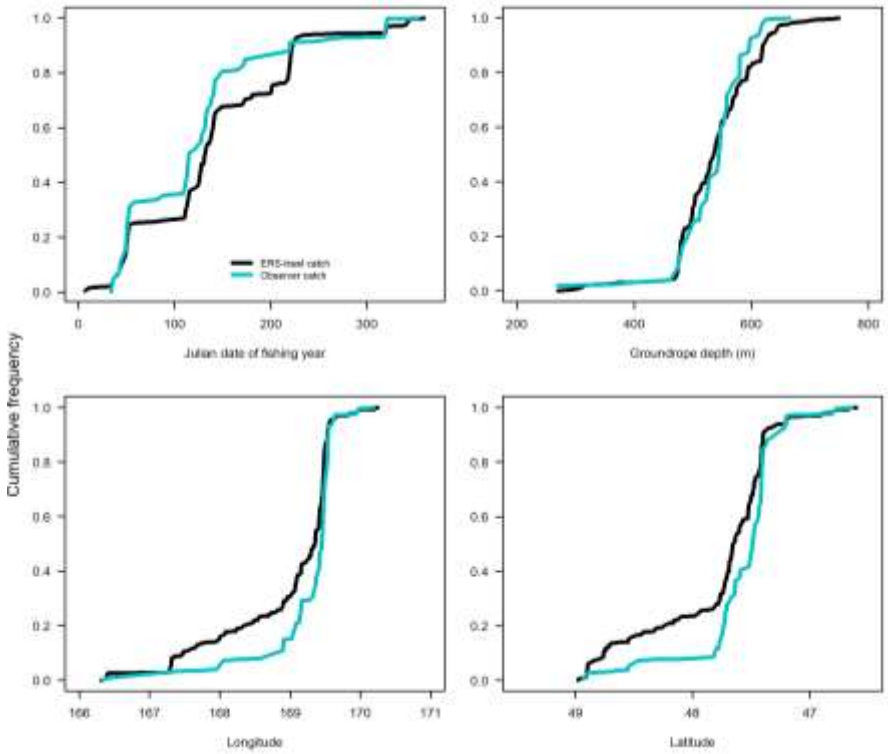


Figure 19: Comparison of Sub-Antarctic 2024–25 Observer Programme catch coverage with 'ERS-trawl' catches by day of year, depth, latitude, and longitude. If sampling is representative of the fishery, then the blue lines (observed catches) should overlay the black lines (ERS-trawl catch).

Sub-Antarctic Suba fishery

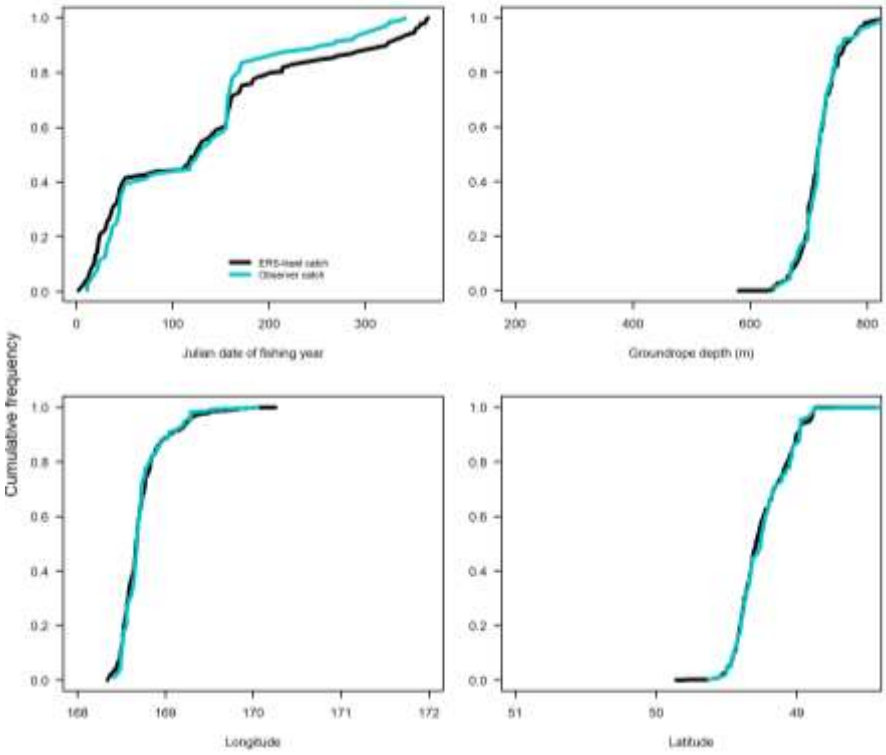


Figure 19: continued.

The length frequency from the 2024–25 SA.snares sub-fishery was bimodal with a large mode centred on 50 cm, corresponding to fish from ages 1 and 2 (2023 and 2022 YC), and the right hand mode from fish ages 4–10 (2021–2014 YC), and a modal age of 6 (2018 YC) (Figures 20, A17–A22). The 2024–25 SA.auck and SA.suba sub-fisheries both had one mode corresponding to ages 4–10 (2020–2014 YC), although most fish were ages 4–9 in SA.auck and aged greater than 6 in SA.suba (Figures 20, A17–A22). SA.snares had proportionally less older fish than SA.auck especially for females over 70 cm (Figures 20, A17–A22).

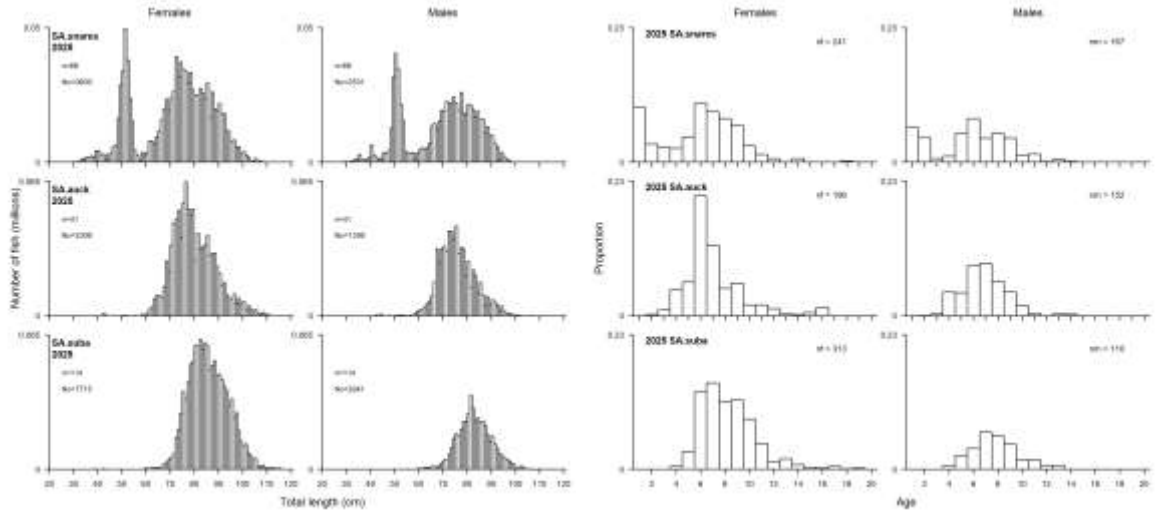
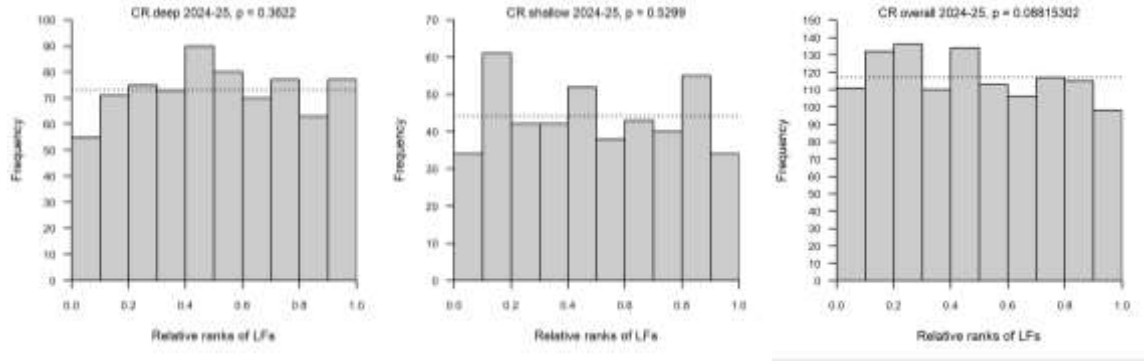


Figure 20: Comparisons of Sub-Antarctic SA.snares, SA.auck and SA.suba sub-fishery female and male length and age frequency distributions for the 2024–25 fishing year. n: number of observed length frequencies; No: number of fish measured; nf: number of female fish aged; nm: number of male fish aged.

Test for bias in collection of otoiths for estimation of catch-at-age in non-spawning fisheries

Observers collect otoliths from 10 fish out of the 50–150 sampled per tow for length measurement (and three otoliths per tow in the spawning fisheries) and in some years there is evidence for preferential selection of larger fish (e.g., Ballara & O'Driscoll 2018). In 2024–25, a rank sum test showed that otolith selection from the Chatham Rise and Sub-Antarctic regions appeared unbiased (Figure 21).

Chatham Rise



Sub-Antarctic

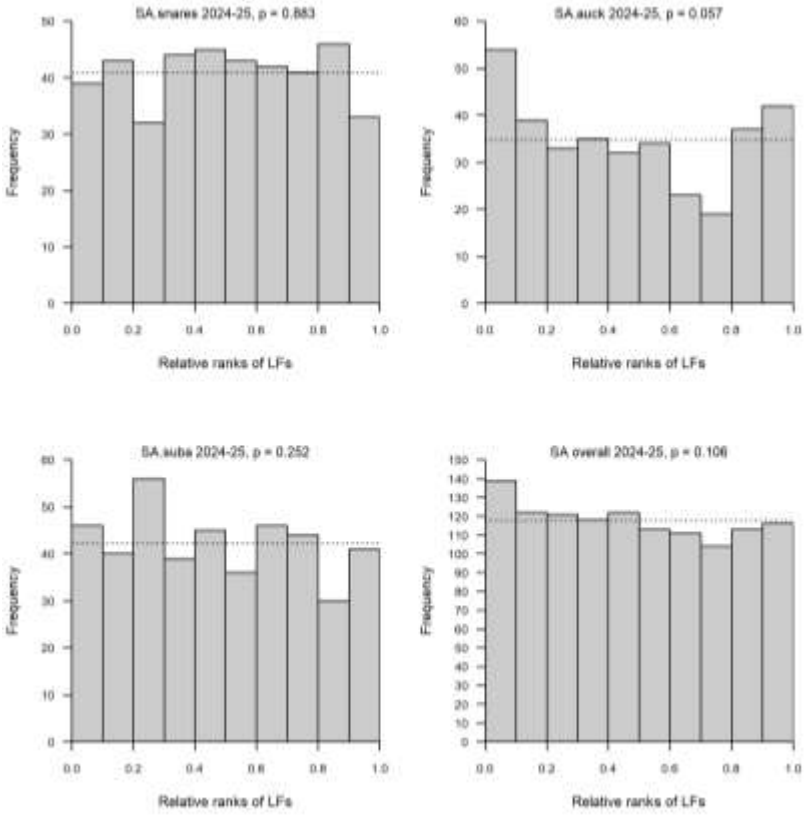


Figure 21: Histograms of ranks of the lengths that yielded 2024–25 Chatham Rise and Sub-Antarctic otoliths relative to the lengths of hoki measured for each tow. If sampling was random then the expected counts are given by the dotted line. The p-value was calculated using the rank sum test.

3.2.3 Comparison of size and age composition between fisheries

Length and age distributions from the main sub-fisheries in 2024–25 are compared in Figures 22 and 23 respectively. The catch in all areas was mainly fish of 45–90 cm length. The 2015 and 2014 year-classes were important at ages 9–10 in the sub-Antarctic sub-fisheries for females, and at ages 10–11 in spawning areas. The 2016 and 2017 year-classes appeared low in all the main sub-fisheries (ages 8+ and 7+ in non-spawning areas, and ages 9 and 8 in spawning areas). The 2019 and 2018 year-classes (age 5+ and 6+ on non-spawning areas, and ages 6 and 7 in spawning areas) appeared in all sub-fisheries, although they became less abundant in Chatham Rise sub-fisheries in 2024–25. The 2021 year-class appears widespread although lower than average. The 2022 year-class was seen at age 3 in ECSI, WC.north, and at age 2 in Chatham Rise fisheries and SA.snares, and appears widespread but lower than average. Catches of the 2023 year-class at age 3 in the spawning areas and non-spawning areas at age 2 also appear lower than average, although this year-class was seen in reasonable numbers in SA.snares. The 2024 year-class was present in the catch at age 1 in the Cook Strait, ECSI, WC.north, spawning areas and at age 0+ in non-spawning SA.snares sub-fisheries.

Smaller hoki dominated length frequencies in both Chatham Rise sub-fisheries, WC.north, ECSI, and SA.snares fisheries. Chatham Rise fish were smaller and younger than ECSI fish, and ECSI fish were smaller and younger than Cook Strait fish. Larger female fish were more dominant in Cook Strait, WC.north, WC.south, WC.inside, ECSI, and SA.suba sub-fisheries. There were few male hoki over 90 cm in any area, except for WC.south, WC.inside and SA.suba.

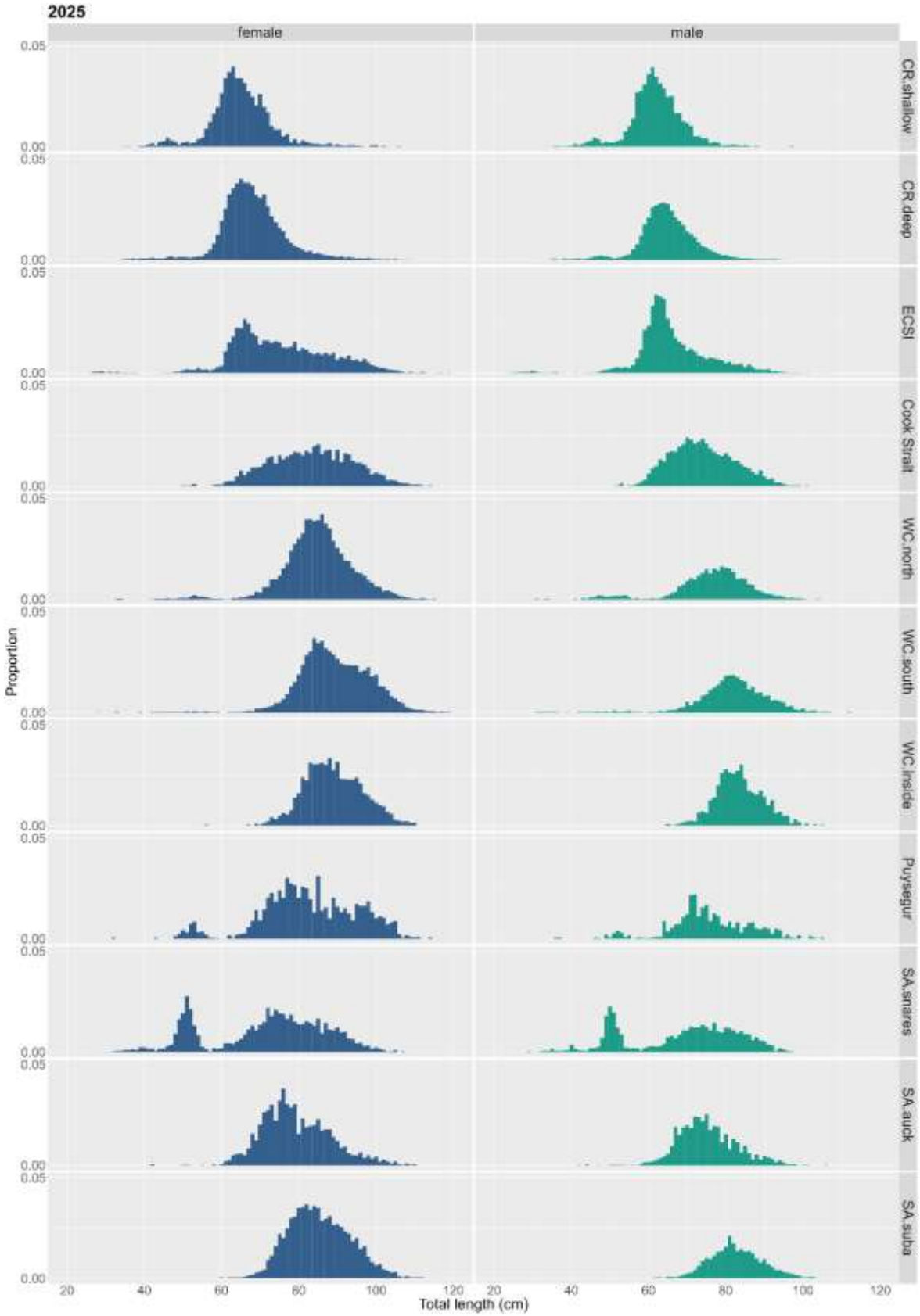


Figure 22: Length frequency distributions of female and male hoki taken in commercial catches from different sub-fisheries during the 2024–25 fishing year.

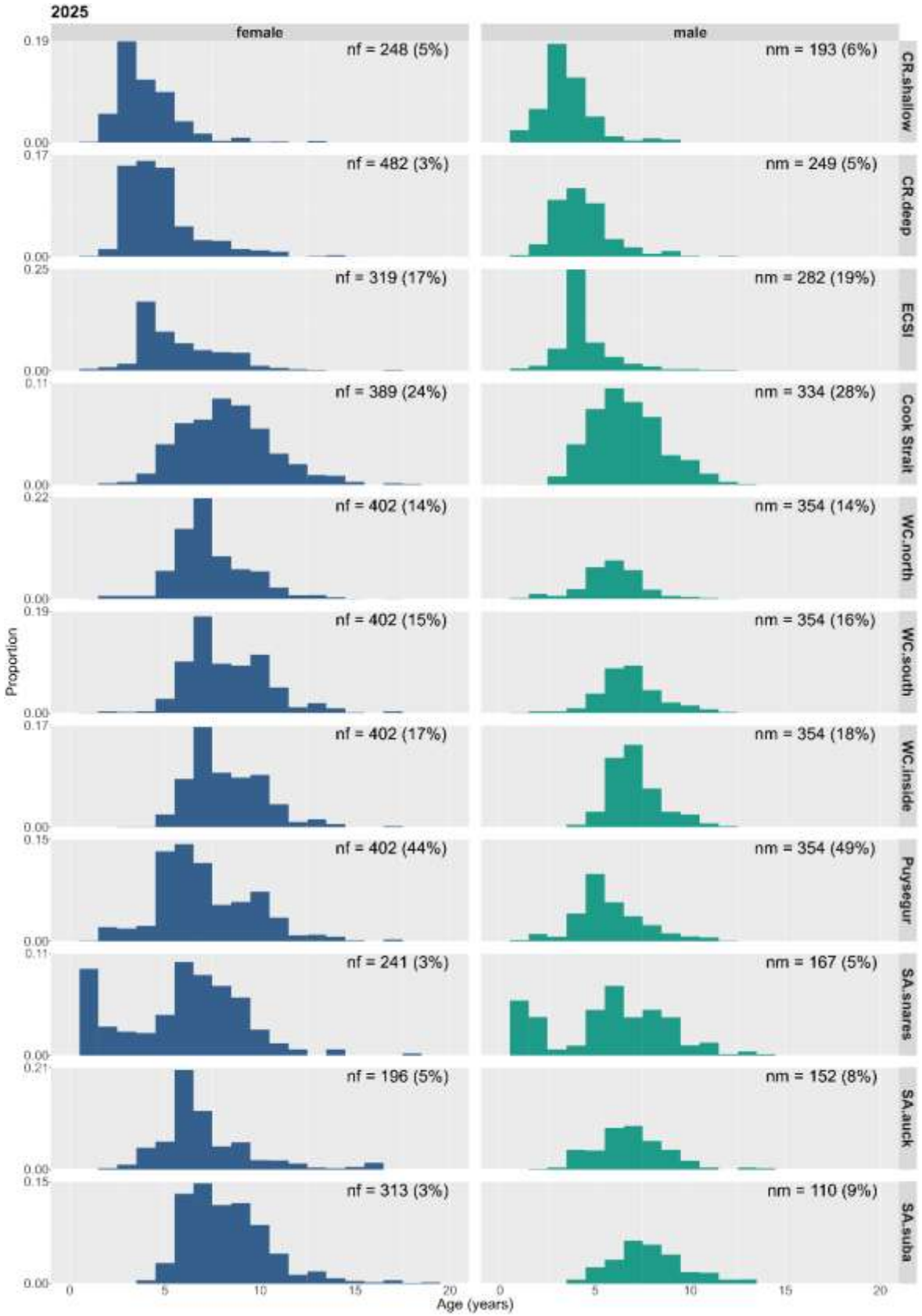


Figure 23: Length frequency distributions of female and male hoki taken in commercial catches from different sub-fisheries during the 2024–25 fishing year. nf: number of female fish aged (CV in brackets); nm: number of male fish aged (CV in brackets).

3.3 Hoki research

3.3.1 Chatham Rise trawl survey

Chatham Rise

The survey in January 2026 was the 29th survey in the Chatham Rise time series using RV *Tangaroa*. Surveys were carried out annually from 1992 to 2014, and biennially since 2016. The primary objective of the surveys is to measure the abundance of both juvenile and adult hoki on the Chatham Rise. A total of 130 successful trawl survey tows were completed in 34 strata in 2026, included all 85 planned phase 1 tows and 42 of 45 planned deep tows. No phase two stations were conducted.

The Chatham Rise trawl survey core biomass in January 2026 was 2% higher than that in 2024 (Table 17). The abundance estimate for 1+ (2024 year-class) was the highest estimate for the Chatham Rise time-series, while the estimate for 2+ (2023 year-class) hoki was one of the lowest. The abundance of older hoki (ages 3 and older) in core strata decreased by 41.9% from 2024.

The hoki scaled length frequency is dominated by a strong mode at 35–48 cm representing the 1+ (2024) year class, a weak mode at about 48–56 cm representing the 2+ (2023) year class, and a mode at about 56–65 cm representing the 3+ (2022) year-class (Figures A23–A24). There were few male hoki larger than 80 cm and few females larger than 100 cm.

Table 17: Chatham Rise trawl series relative biomass estimates (t) and coefficient of variation (% in parentheses) for hoki for the core strata (200–800 m) from the surveys of the summer Chatham Rise trawl surveys. 1+, 2+, and 3++ hoki based on length cutoffs for hoki aged 1 year, 2 years and 3 plus years and older respectively.

Survey	1+ hoki			2+ hoki			3 ++ hoki		Total hoki	
	1+ year	t	CV	2+ year	t	CV	t	CV	t	CV
1992	1990	3.0	(27.8)	1989	23.9	(13.1)	94.7	(7.8)	121.6	(7.7)
1993	1991	32.9	(33.4)	1990	8.8	(18.2)	144.6	(9.0)	186.2	(10.2)
1994	1992	14.7	(20.2)	1991	44.8	(18.4)	87.2	(9.4)	146.7	(9.8)
1995	1993	6.6	(12.9)	1992	42.8	(11.4)	71.8	(8.3)	121.2	(7.4)
1996	1994	27.5	(24.4)	1993	15.0	(13.3)	110.3	(10.3)	152.8	(9.7)
1997	1995	3.2	(40.3)	1994	61.4	(12.0)	93.4	(8.2)	158.0	(8.4)
1998	1996	4.4	(33.3)	1995	15.3	(19.4)	65.8	(10.8)	85.5	(11.0)
1999	1997	25.5	(30.6)	1996	13.8	(19.0)	70.1	(10.2)	109.3	(11.6)
2000	1998	14.4	(32.4)	1997	28.2	(20.7)	29.1	(9.2)	71.7	(12.4)
2001	1999	0.4	(72.9)	1998	26.3	(17.1)	33.7	(8.8)	60.3	(9.7)
2002	2000	22.5	(26.1)	1999	1.2	(21.2)	50.6	(12.6)	74.4	(11.4)
2003	2001	4.9	(46.0)	2000	27.3	(15.1)	20.3	(9.3)	52.5	(11.6)
2004	2002	14.4	(32.5)	2001	5.5	(20.4)	32.8	(12.9)	52.7	(12.6)
2005	2003	17.5	(23.4)	2002	45.8	(16.3)	21.2	(11.4)	84.6	(11.5)
2006	2004	25.9	(21.5)	2003	33.6	(18.8)	39.7	(10.3)	99.2	(10.6)
2007	2005	9.1	(27.5)	2004	32.8	(13.1)	28.8	(8.9)	70.7	(8.5)
2008	2006	15.7	(31.6)	2005	23.8	(15.5)	37.4	(7.8)	76.9	(11.4)
2009	2007	25.2	(28.8)	2006	65.2	(17.2)	53.7	(7.8)	144.1	(10.6)
2010	2008	19.4	(30.6)	2007	28.7	(15.4)	49.4	(16.3)	97.5	(14.6)
2011	2009	27.0	(36.8)	2008	26.3	(14.1)	40.6	(7.8)	93.9	(14.0)
2012	2010	2.6	(30.1)	2009	29.1	(16.6)	55.9	(8.0)	87.5	(9.8)
2013	2011	50.9	(24.5)	2010	1.0	(43.6)	72.1	(12.8)	124.1	(15.3)
2014	2012	5.7	(36.6)	2011	43.3	(14.2)	53.0	(10.9)	101.9	(9.8)
2016	2014	47.6	(27.6)	2013	12.9	(18.6)	54.0	(12.8)	114.5	(14.2)
2018	2016	30.5	(38.8)	2015	51.3	(19.1)	40.3	(14.8)	122.1	(16.0)
2020	2018	28.3	(34.2)	2017	12.3	(17.4)	48.9	(14.7)	89.6	(14.4)
2022	2020	8.4	(33.7)	2019	36.0	(17.3)	53.0	(9.0)	97.4	(10.1)
2024	2022	2.8	(33.1)	2021	31.1	(21.9)	62.6	(13.4)	96.4	(13.4)
2026	2024	60.2	(46.0)	2023	7.6	(10.7)	31.0	(10.8)	98.8	(29.2)

4. DISCUSSION

The reported hoki catch of 109 714 t was 2659 t higher than the reported catch in 2023–24, and 286 t lower than the TACC of 110 000 t. Relative to 2023–24, catches in 2024–25 increased in the Chatham Rise, Cook Strait, and WCSI, and decreased in ECSI and Sub-Antarctic. The Chatham Rise fishery was the largest New Zealand hoki fishery (by nearly 6500 t) in 2024–25. About 41 789 t of the total catch in 2024–25 was taken from western stock areas, with 67 924 t from the eastern stock areas.

The WCSI, Chatham Rise, and Sub-Antarctic fisheries were split into sub-fisheries, with estimation of length and age frequencies by sub-fishery. The ECSI fishery was redefined in 2024 to encompass a larger area, with catches from July–September making up the spawning fishery and catches from this area outside these months included in the Chatham Rise fisheries. Cook Strait catches from June-September made up the Cook Strait spawning fishery, and catches from outside the spawning months were included in the Chatham Rise fisheries. Consistent stratification was used instead of annual stratification in each fishery.

Length and age data was updated using the length-weight relationships accepted in the 2025 Deepwater Working Group (McGregor-Tiatia & Langley, 2026b) for all years and areas. The western stock length-weight relationship was applied to Puysegur, and the non-spawning relationship was applied to ECNI.

Length and age frequency distributions from the commercial fishery showed that most of the catch in 2024–25 was of fish 45–90 cm length. The 2015 and 2014 year-classes were important at ages 9–10 in the sub-Antarctic sub-fisheries for females, and at ages 10–11 in spawning areas. The 2019 and 2018 year-class (age 5+ and 6+ on non-spawning areas, and ages 6 and 7 in spawning areas) appeared in all sub-fisheries, although became less abundant in Chatham Rise sub-fisheries in 2024–25. The 2020–2023 year-classes appear to be widespread but weaker than average. The 2024 year-class was present in the catch at age 1 in the Cook Strait, ECSI, WC.north, spawning areas and at age 0+ in non-spawning SA.snares sub-fisheries. Smaller hoki dominated length frequencies in both Chatham Rise sub-fisheries, WC.north, ECSI, and SA.snares fisheries. Larger female fish were more dominant in Cook Strait, WC.north, WC.south, WC.inside, ECSI, and and SA.suba sub-fisheries. There were few male hoki over 90 cm in any area.

One new fishery-independent estimate of hoki abundance was available. The core biomass from the Chatham Rise trawl survey in January 2026 was 2% higher than that in 2024. The abundance estimate for 1+ (2024 year-class) was the highest estimate in the time-series, while the estimate for 2+ hoki was one of the lowest. The abundance of older hoki (ages 3 and older) in core strata decreased by 41.9% from the 2024 survey.

5. FUTURE RESEARCH CONSIDERATIONS

Land-based sampling in Cook Strait, ECSI, and WCSI inside the line is important for the stock assessment, given the low observer coverage in these areas in some years, and especially as cameras have replaced observers on smaller vessels. It is desirable for land-based sampling to be spread across the season and not overlap with observed tows.

It is desirable to improve observer coverage for the Sub-Antarctic target hoki sub-fisheries over the season. The sub-Antarctic fishery definitions could be reviewed, with the potential to combine the SA.snares and SA.auck sub-fisheries.

Timely loading of observer and land-based data and inventory of otoliths is required for otolith selection in October and subsequent ageing and analysis.

6. FULFILMENT OF BROADER OUTCOMES

As required under Government Procurement rules[2], Fisheries New Zealand considered broader outcomes (secondary benefits such as environmental, social, economic or cultural benefits) that would be generated by this project. This research aimed to ensure the long-term sustainability of hoki stocks, for the good of the wider community (including stakeholders and the public) and the marine ecosystems that hoki inhabit.

As part of this project, the team has continued to build capacity and capability in fisheries science and stock assessment, by using both experienced researchers from ESNZ and independent consultants. This provides an exceptional level of expertise, befitting assessment of New Zealand's largest and most valuable finfish stock. 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 stock assessments 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. ESNZ staff working on this project were a combination of senior and mid-career scientists, more than half of whom were women.

The associated working group process further fostered collaboration between ESNZ, the fishing industry, and other New Zealand research providers. Catch-at-age projects provide opportunities for fishing industry stakeholders to contribute their data and knowledge to the research process.

7. ACKNOWLEDGEMENTS

This work was funded by Fisheries New Zealand Research Projects HOK2023-02, and MID2024-01. Thank you to Gretchen Skea (Fisheries New Zealand) for guiding and reviewing these projects and to the Fisheries New Zealand Deepwater Working Group for useful suggestions and contributions. Thanks to the many scientific and industry staff who contributed to the collection of data used in this report. Thanks to Colin Sutton, Jason Hamill, Pame Olmedo Rojas, Niki Davey, Megan Carter, Louis Olsen, Paul Lambert, Angela Lambert Andrew Miller, Diarmuid Toman and Altan Ní Mhurchú (ESNZ) for collection of shed sampling data. Thanks to Keren Spong, Caoimhghin Ó Maolagáin, Colin Sutton, Niki Davey, Caroline Chin, Jason Hamill, Megan Carter and Tom Barnes (ESNZ) for processing and reading the otoliths. Thanks to Richard Bian for further developing CALA. Thanks to Lydia Hayward, Caroline Wood, Shaun Carswell and Jeremy Yeoman for loading observer/ research data. Thanks to Darren Stevens (ESNZ) and Marianne Vignaux (Fisheries New Zealand) for reviewing and editing this report.

8. REFERENCES

Ballara, S.L.; McGregor-Tiatia, V.; Wieczorek, A.M.; O'Driscoll, R.L. (2025). Catches, size, and age structure of the 2023–24 hoki fishery and a summary of input data used for the 2025 stock assessment. *New Zealand Fisheries Assessment Report 2025/42.* 187 p.

Ballara, S.L.; O'Driscoll, R.L. (2018). Catches, size, and age structure of the 2016–17 hoki fishery, and a summary of input data used for the 2018 stock assessment. *New Zealand Fisheries Assessment Report 2018/38*. 125 p.

Ballara, S.L.; O'Driscoll, R.L.; Phillips, N.L.; Livingston, M.E.; Smith, M.H.; Kim, S.W. (2003). Catches, size, and age structure of the 2001–02 hoki fishery, and a summary of input data used for the 2003 stock assessment. *New Zealand Fisheries Assessment Report 2003/42*. 77 p.

Cordue, P.L.; Ballara, S.L.; Horn P.L. (2000). Hoki ageing: recommendation of which data to

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

routinely record for hoki otoliths. Final Research Report for Ministry of Fisheries Research Project MOF1999/01. (Unpublished report held by Fisheries New Zealand, Wellington.)

Fisheries New Zealand (2025). Fisheries Assessment Plenary, May 2025: stock assessments and stock status. Compiled by the Fisheries Science Team, Fisheries New Zealand, Wellington, New Zealand. 1955 p.

Francis, R.I.C.C. (2001). Improving the consistency of hoki age estimation. *New Zealand Fisheries Assessment Report 2001/12*. 18 p.

Francis, R.I.C.C. (2002). Estimating catch at age in the Chatham Rise hoki fishery. *New Zealand Fisheries Assessment Report 2002/9*. 22 p.

Francis, R.I.C.C. (2003). Analyses supporting the 2002 stock assessment of hoki. *New Zealand Fisheries Assessment Report 2003/5*. 34 p.

Francis, R.I.C.C; Bian, R. (2011). Catch-at-length and -age User Manual, National Institute of Water & Atmospheric Research Ltd. Unpublished report. 83 p.

Hicks, A.C.; Cordue, P.L.; Bull, B. (2002). Estimating proportion at age and sex in the commercial catch of hoki (*Macruronus novaezelandiae*) using length frequency data. *New Zealand Fisheries Assessment Report 2002/43*. 51 p.

Horn, P.L.; Sullivan, K.J. (1996). Validated ageing methodology using otoliths, and growth parameters for hoki (*Macruronus novaezelandiae*) in New Zealand waters. *New Zealand Journal of Marine and Freshwater Research 30*: 161–174.

Horn, P.L.; Sutton, C.P. (2017). Age determination protocol for hoki (*Macruronus novaezelandiae*). *New Zealand Fisheries Assessment Report 2017/13*. 22 p.

Langley, A.D. (2020). Review of the 2019 hoki stock assessment. *New Zealand Fisheries Assessment Report 2020/28*. 56 p.

McGregor, V.L.; Langley, A.D. (2025). Assessment of hoki (*Macruronus novaezelandiae*) in 2024. *New Zealand Fisheries Assessment Report 2025/14*. 266 p.

McGregor-Tiatia, V.L.; Langley, A.D. (2026a). Assessment of hoki (*Macruronus novaezelandiae*) in 2025. *New Zealand Fisheries Assessment Report 2026/04*. 241 p.

McGregor-Tiatia, V.L.; Langley, A.D. (2026b). Estimation of biological parameters to support the hoki (*Macruronus novaezelandiae*) stock assessment. *New Zealand Fisheries Assessment Report* XX. xx p.

R Core Team (2025). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna. http://www.R-project.org.

Smith, M.H. (2005). Direct estimation of year-class frequencies for the non-spawning hoki fisheries with estimates of the coefficients of variation. *New Zealand Fisheries Assessment Report 2005/14*. 26 p.

APPENDIX A: Length and age frequencies

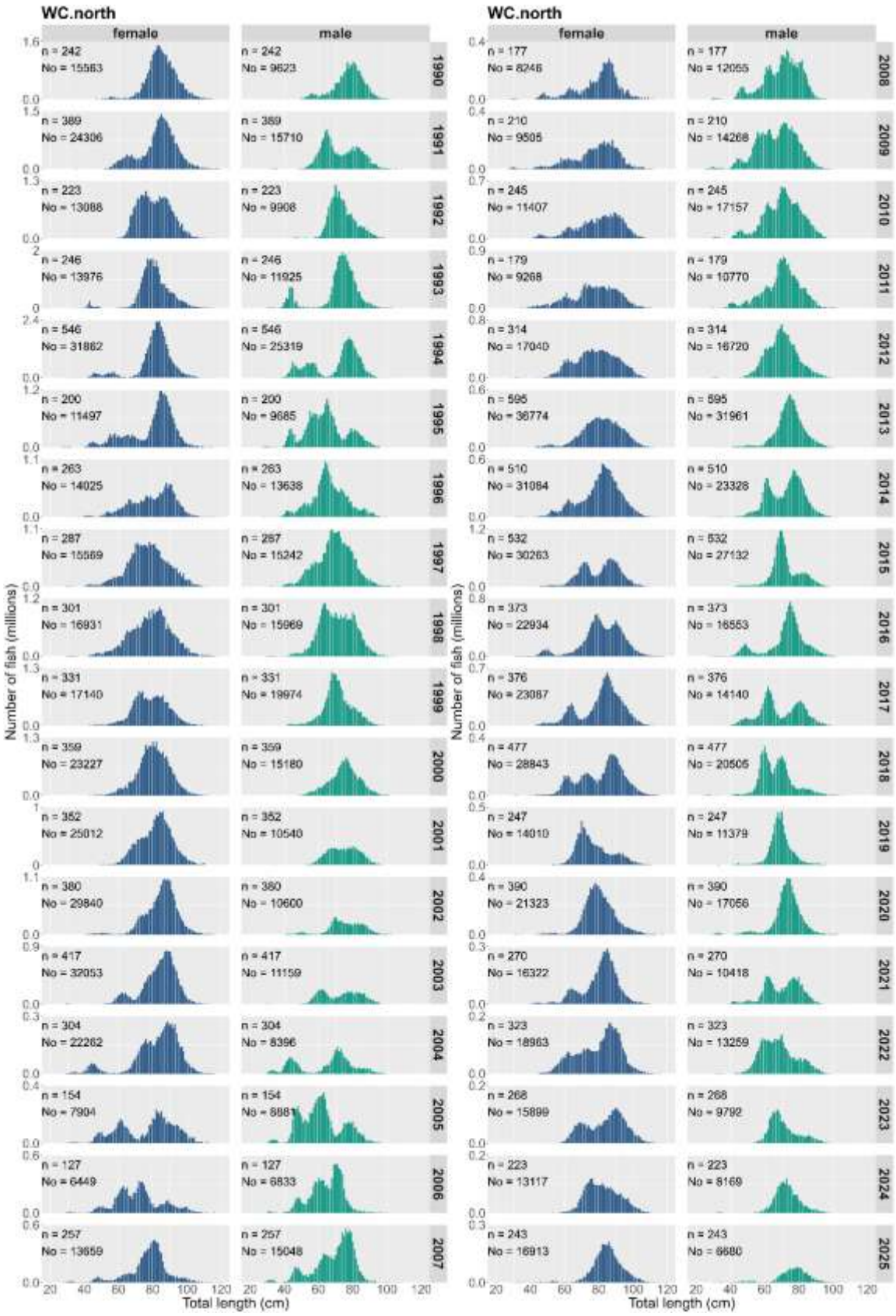


Figure A1: Comparison of number of fish by length for WCSI WC.north spawning sub-fishery by year for 1990–2025. n: number of observed length frequencies; No: number of fish measured.

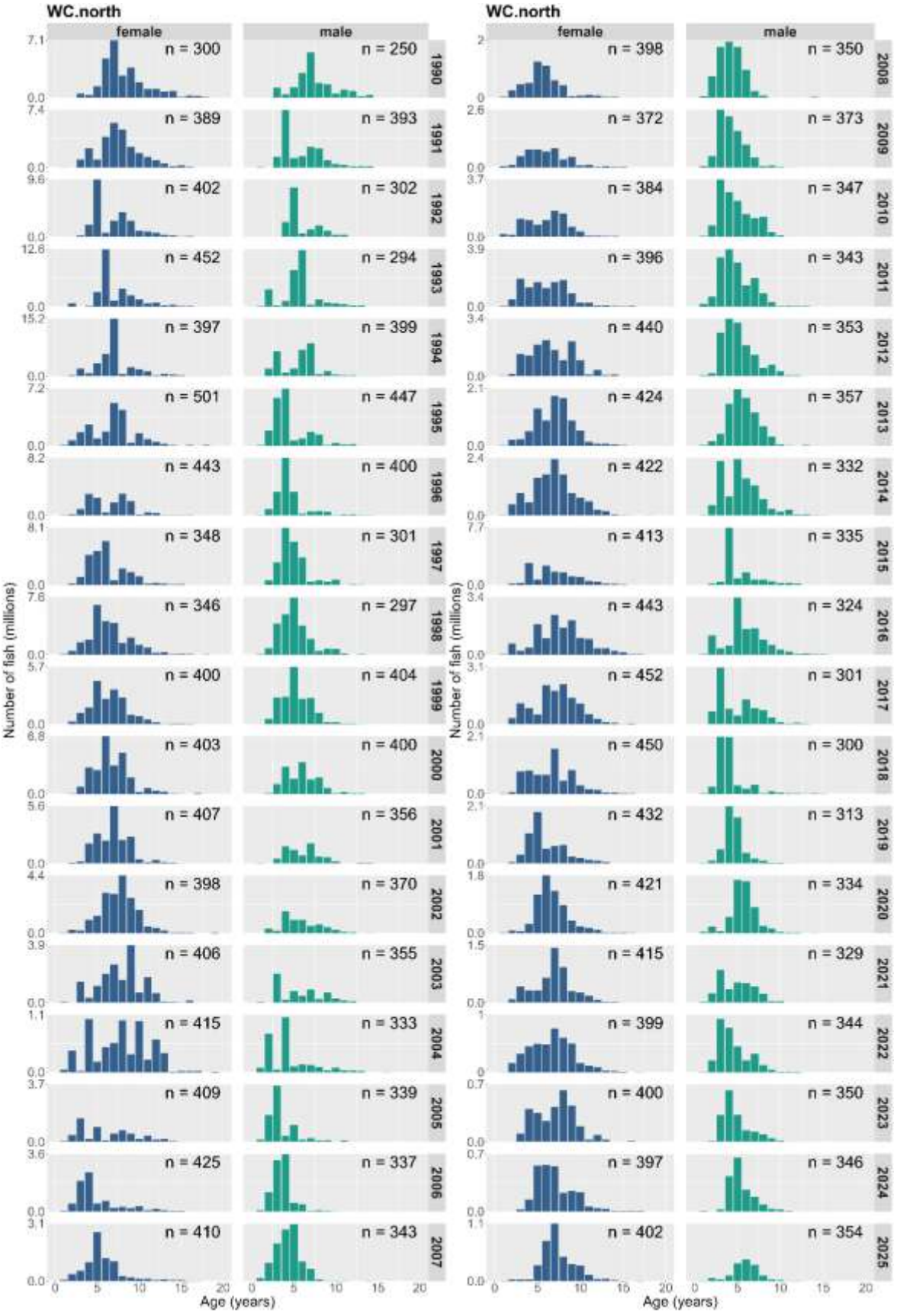


Figure A2: Comparison of number of fish by age for WCSI WC.north spawning sub-fishery by year for 1990– 2005, 2007–2010, 2014–2025. n: number of fish aged.

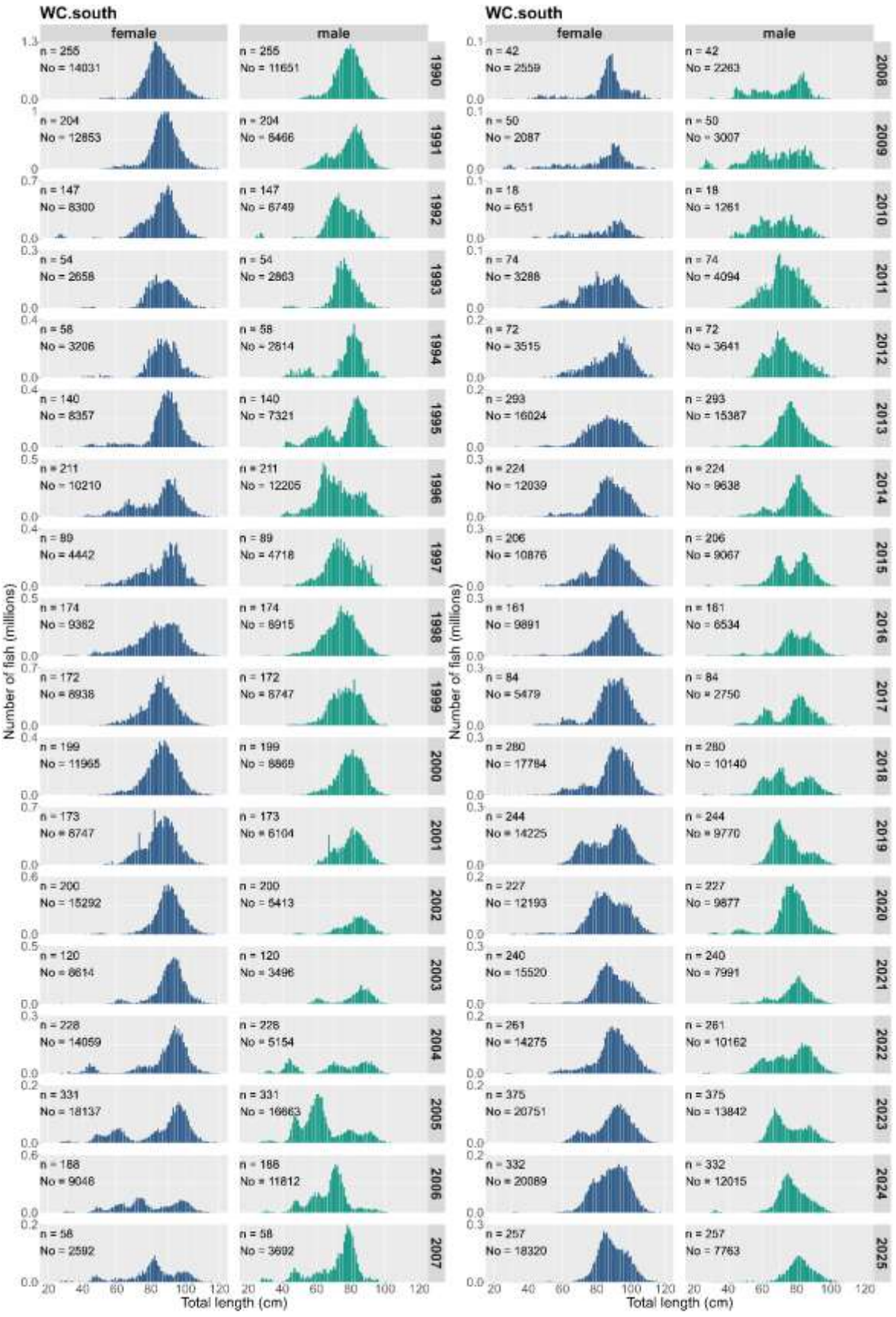


Figure A3: Comparison of number of fish by length for WCSI WC.south spawning sub-fishery by year for 1990–2025. n: number of observed length frequencies; No: number of fish measured.

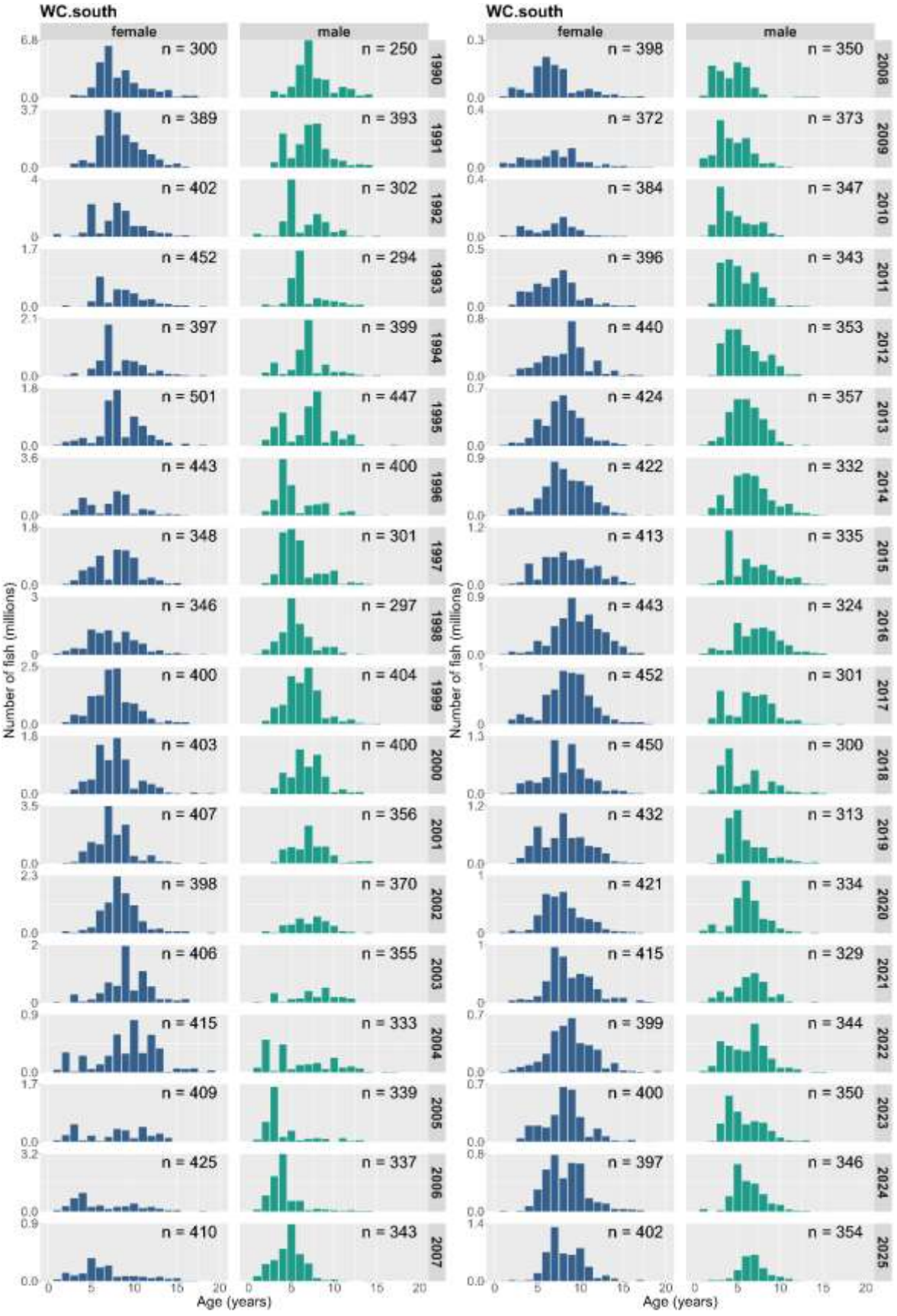


Figure A4: Comparison of number of fish by age for WCSI WC.south spawning sub-fishery by year for 1990–2025. n: number of fish aged.

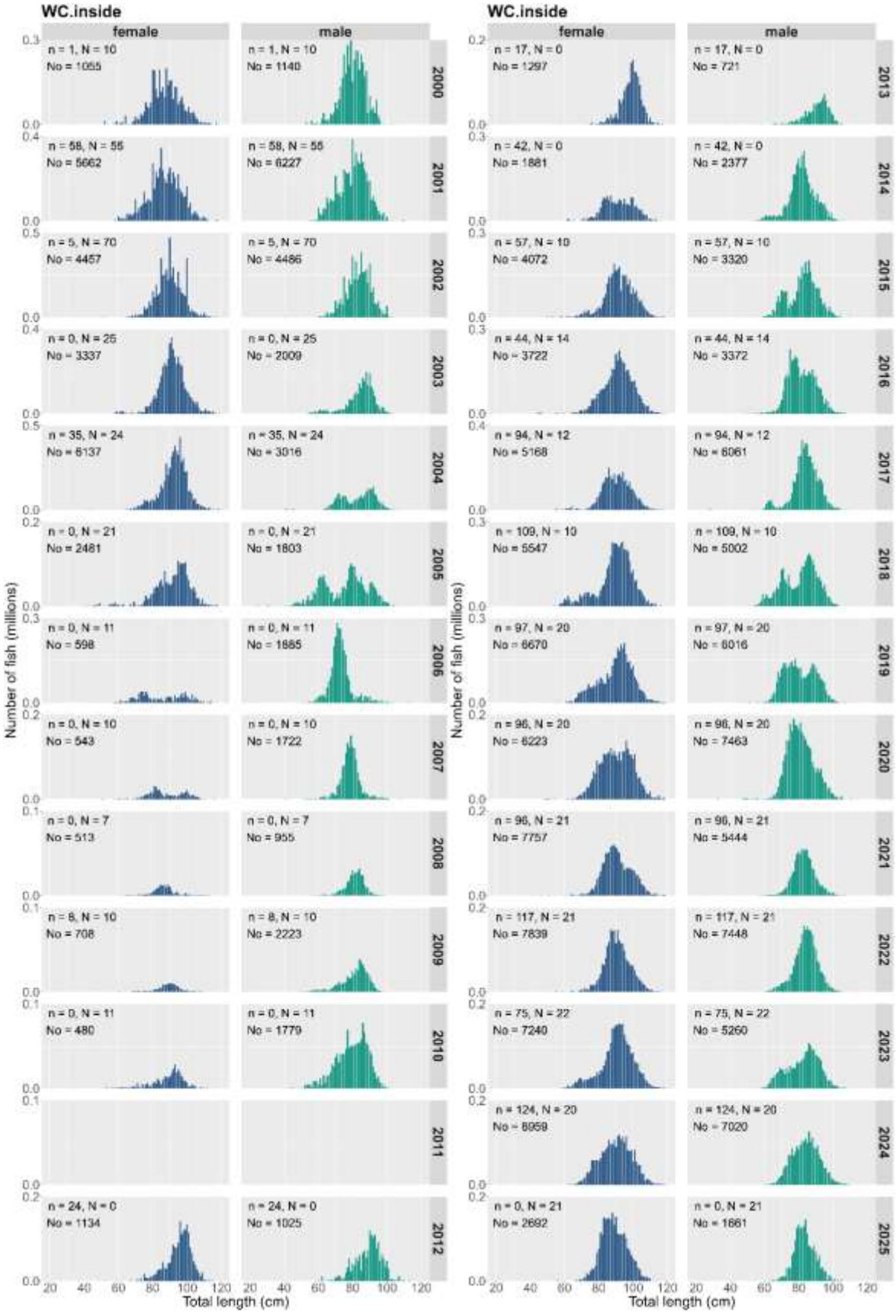


Figure A5: Comparison of number of fish by length for WCSI WC.inside spawning sub-fishery by year for 2000–2010, 2012–2025. N: number of land-based length frequencies, n: number of observed length frequencies; No: number of fish measured.

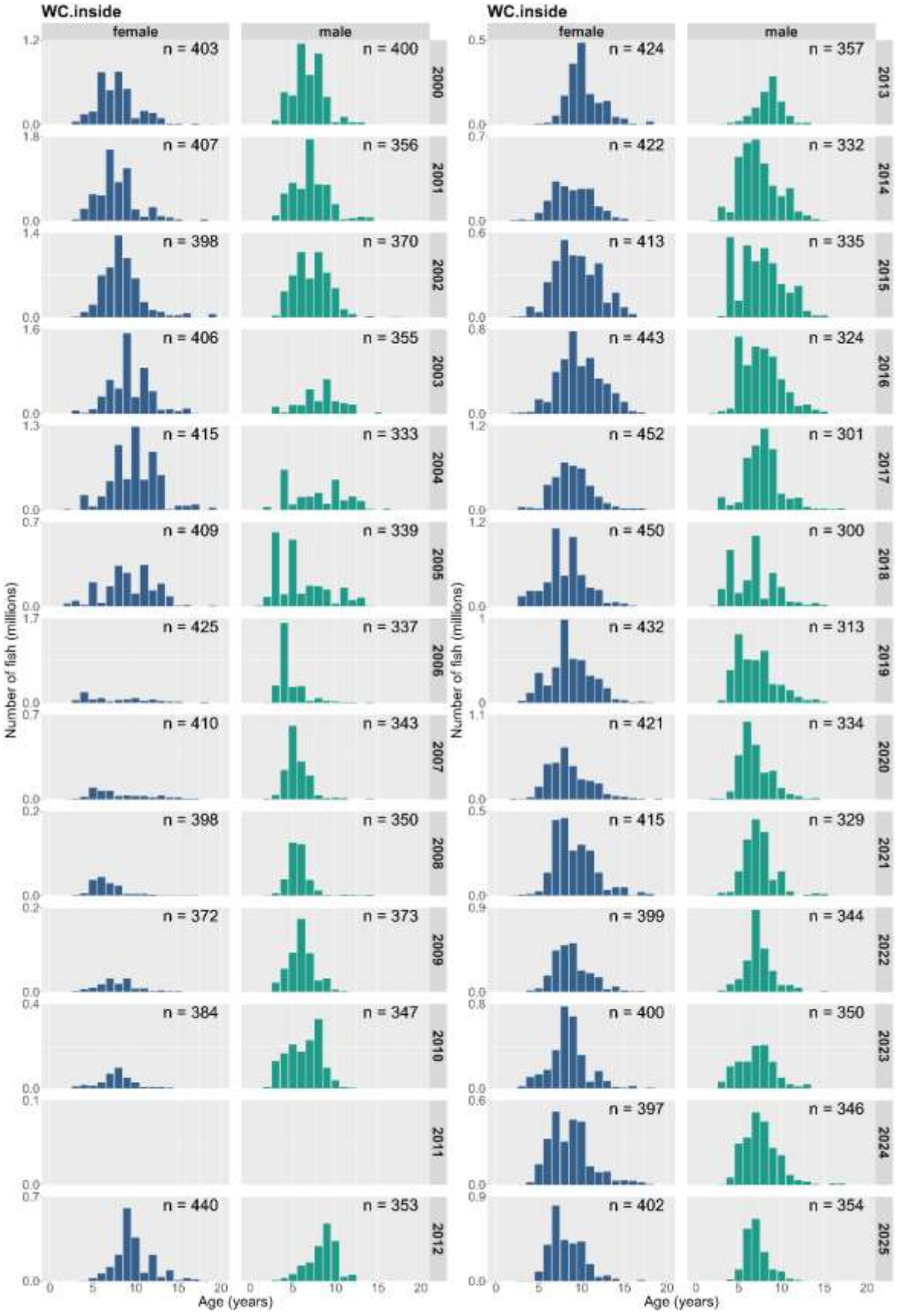


Figure A6: Comparison of number of fish by age for WCSI WC.inside spawning sub-fishery by year for 2000–2010, 2012–2025. n: number of fish aged.

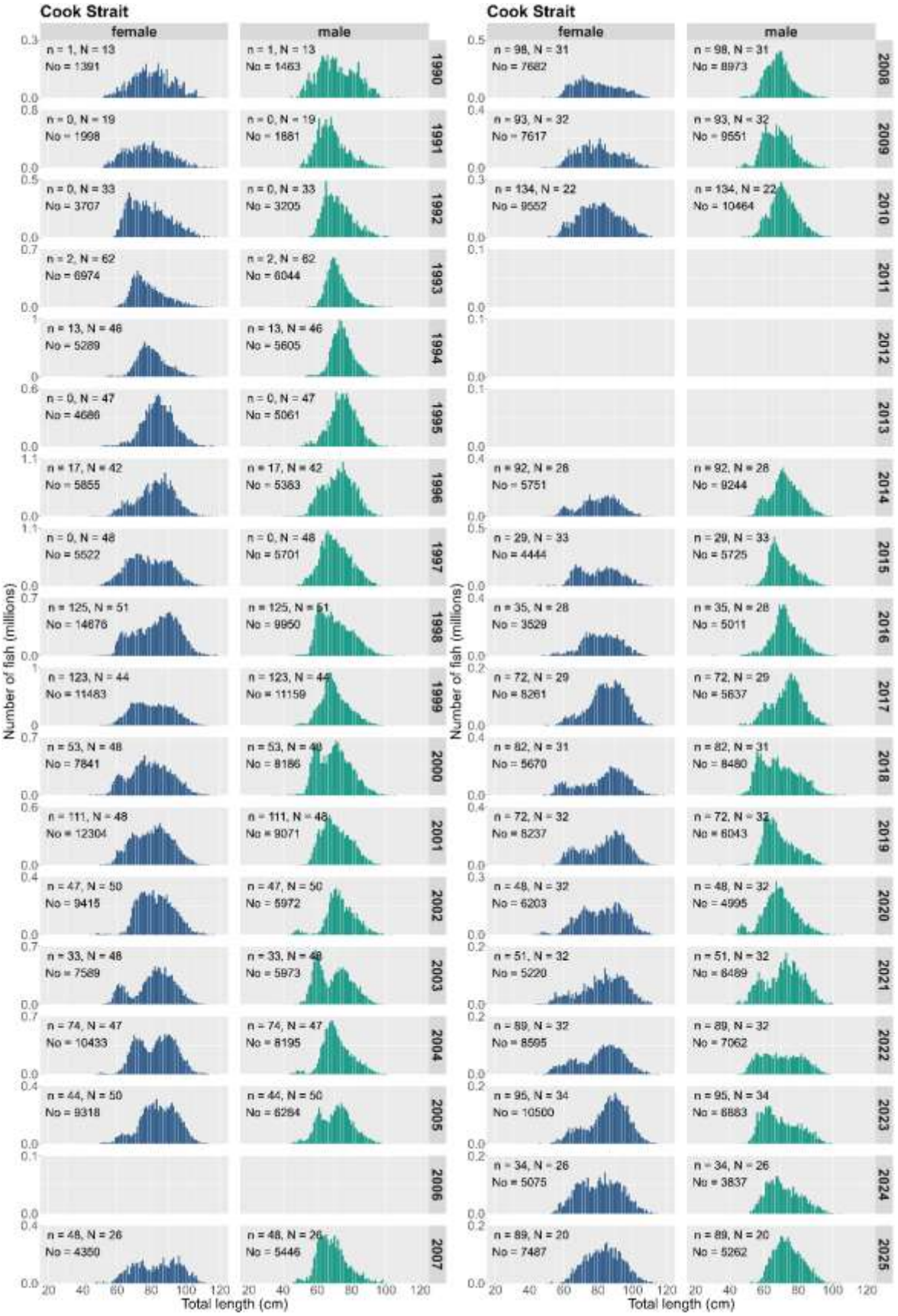


Figure A7: Comparison of number of fish by length for Cook Strait spawning sub-fishery by year for 1990– 2005, 2007–2010, 2014–2025. N: number of land-based length frequencies, n: number of observed length frequencies; No: number of fish measured.

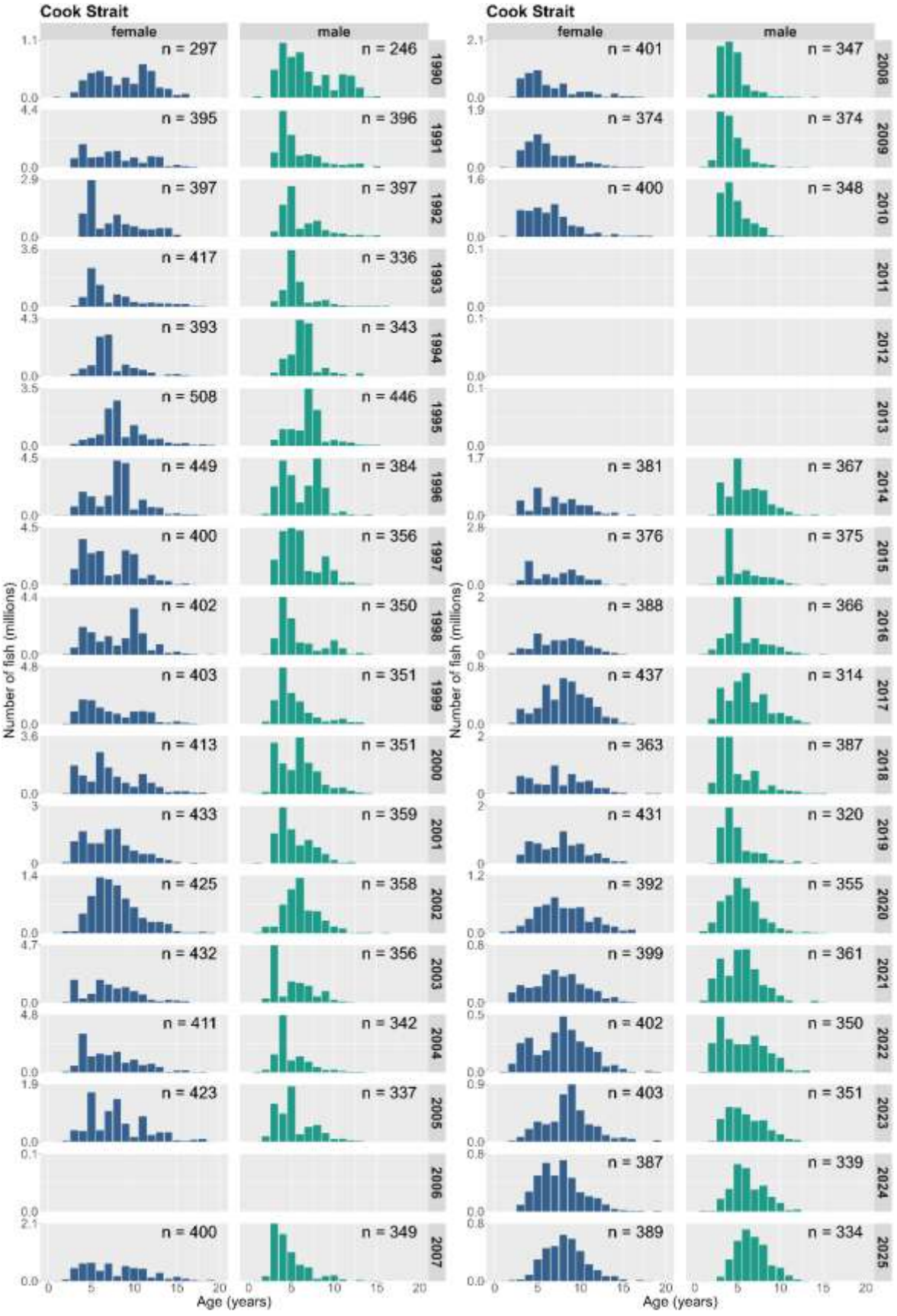


Figure A8: Comparison of number of fish by age for Cook Strait spawning sub-fishery by year for 1990–2005, 2007–2010, 2014–2025. n: number of fish aged.

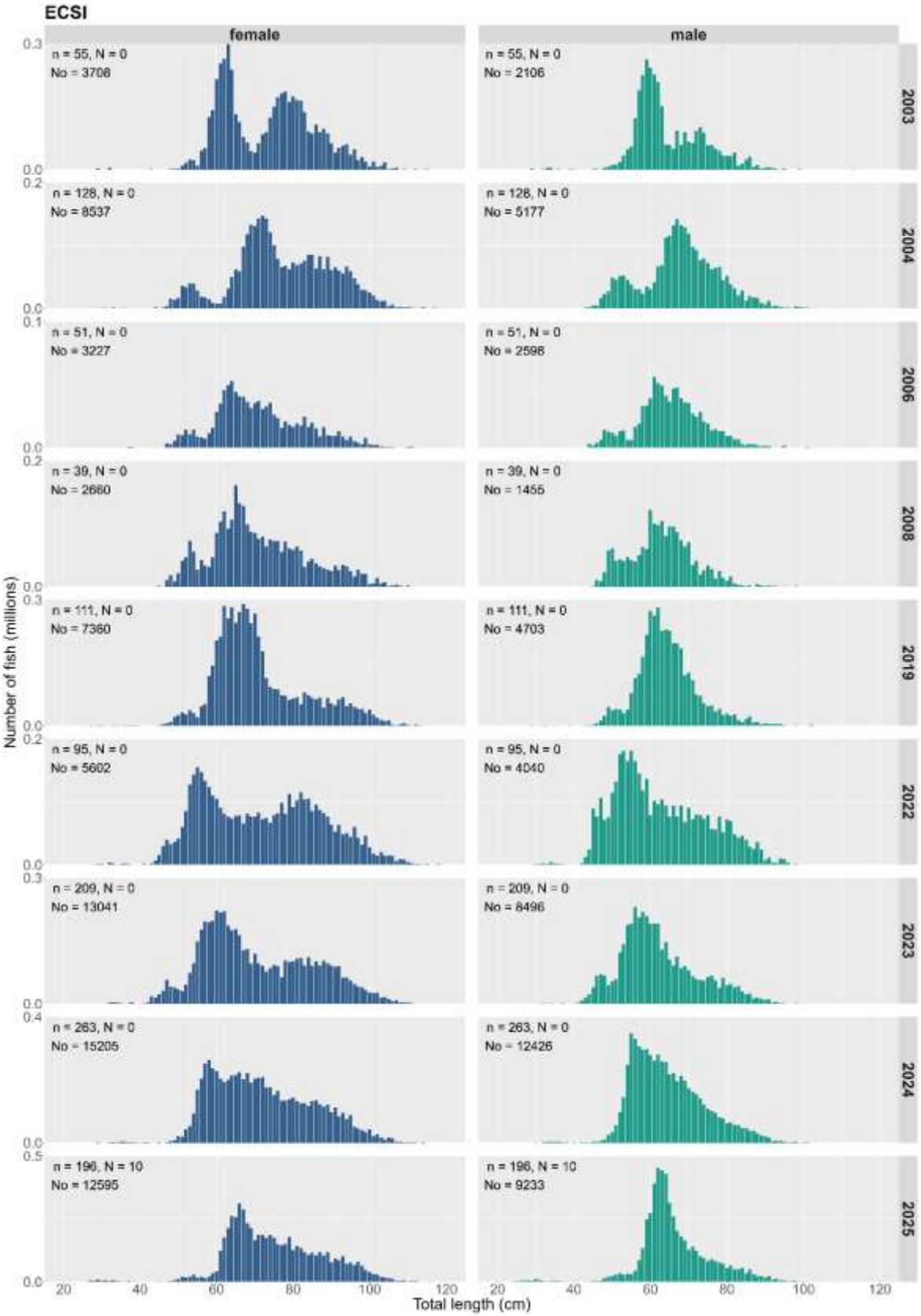


Figure A9: Comparison of number of fish by length for ECSI July to September spawning sub-fishery by year for 2003–2004, 2006, 2008, 2019, 2022–2025 sampled by the Scientific Observer Programme, although 2025 also sampled by Observers on land. N: number of OP land-based length frequencies, n: number of observed length frequencies; No: number of fish measured.

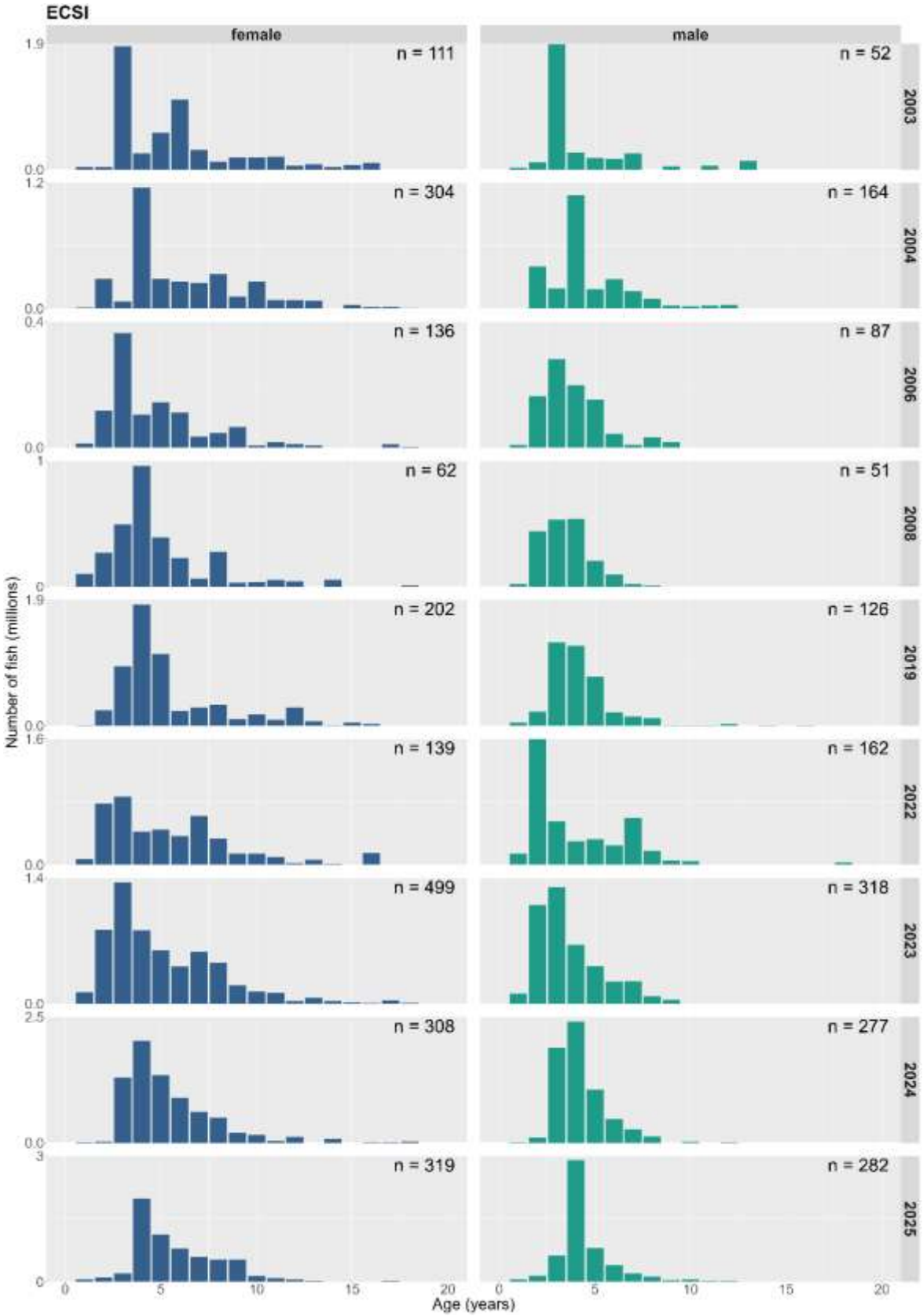


Figure A10: Comparison of number of fish by age for ECSI July to September spawning sub-fishery by year for 2003–2004, 2006, 2008, 2019, 2022–2025. n: number of fish aged.

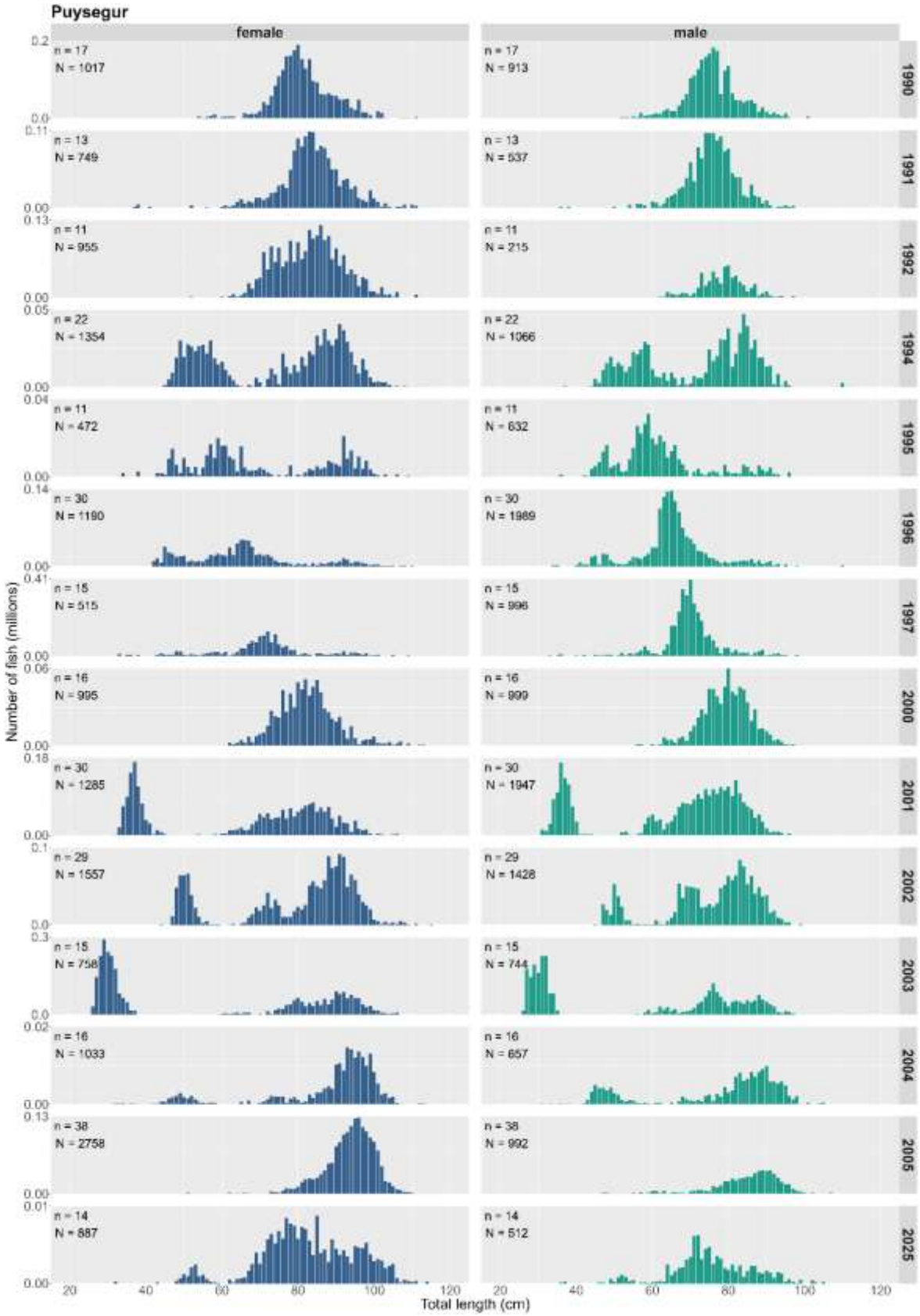


Figure A11: Comparison of number of fish by length for Puysegur spawning fishery by year for 1990–1992, 1994–1997, 2000–2005 and 2025 sampled by the Scientific Observer Programme. n: number of observed length frequencies; N: number of fish measured.

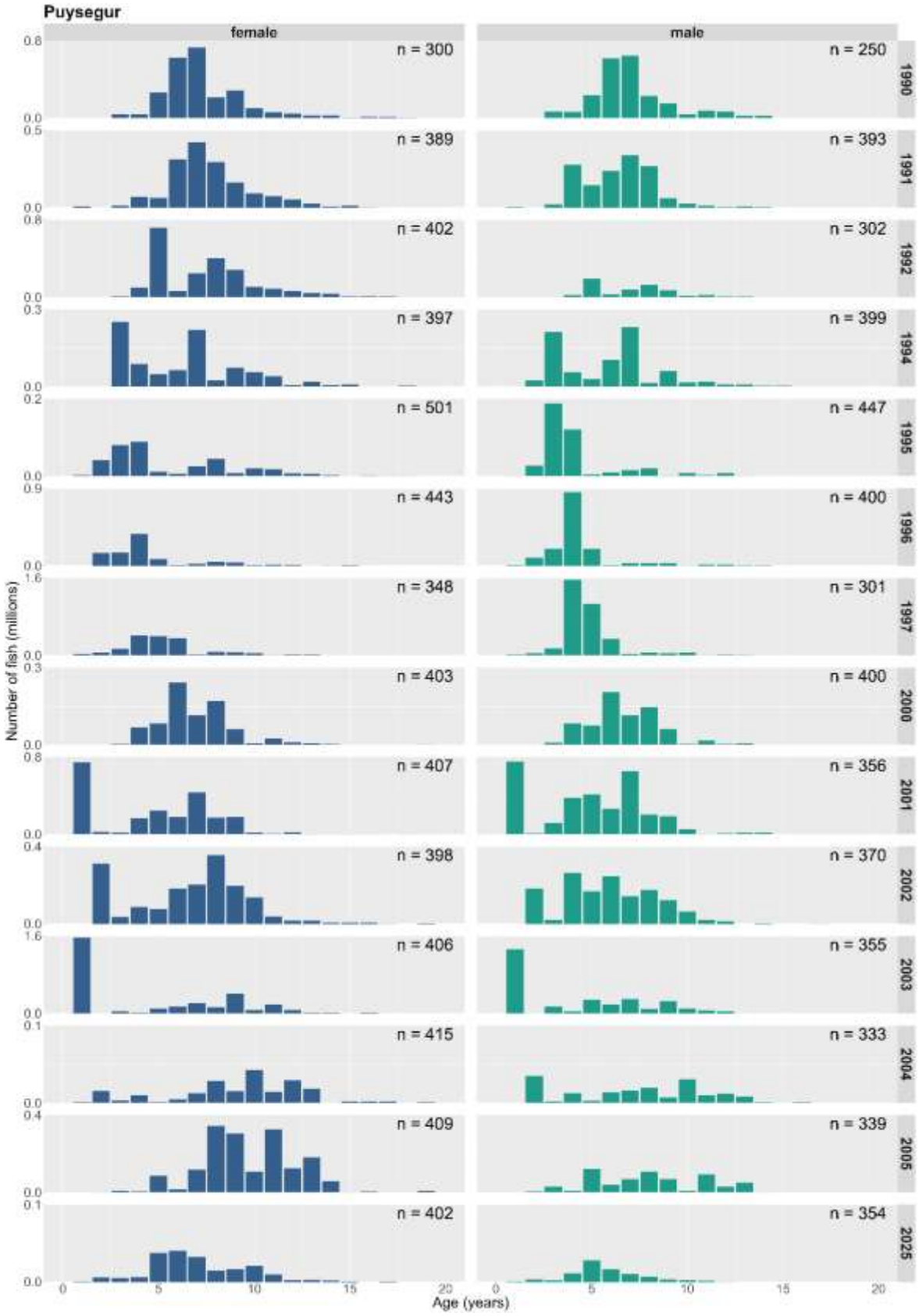


Figure A12: Comparison of number of fish by age for the Puysegur spawning sub-fishery by year for 1990–1992, 1994–1997, 2000–2005 and 2025. n: number of fish aged.

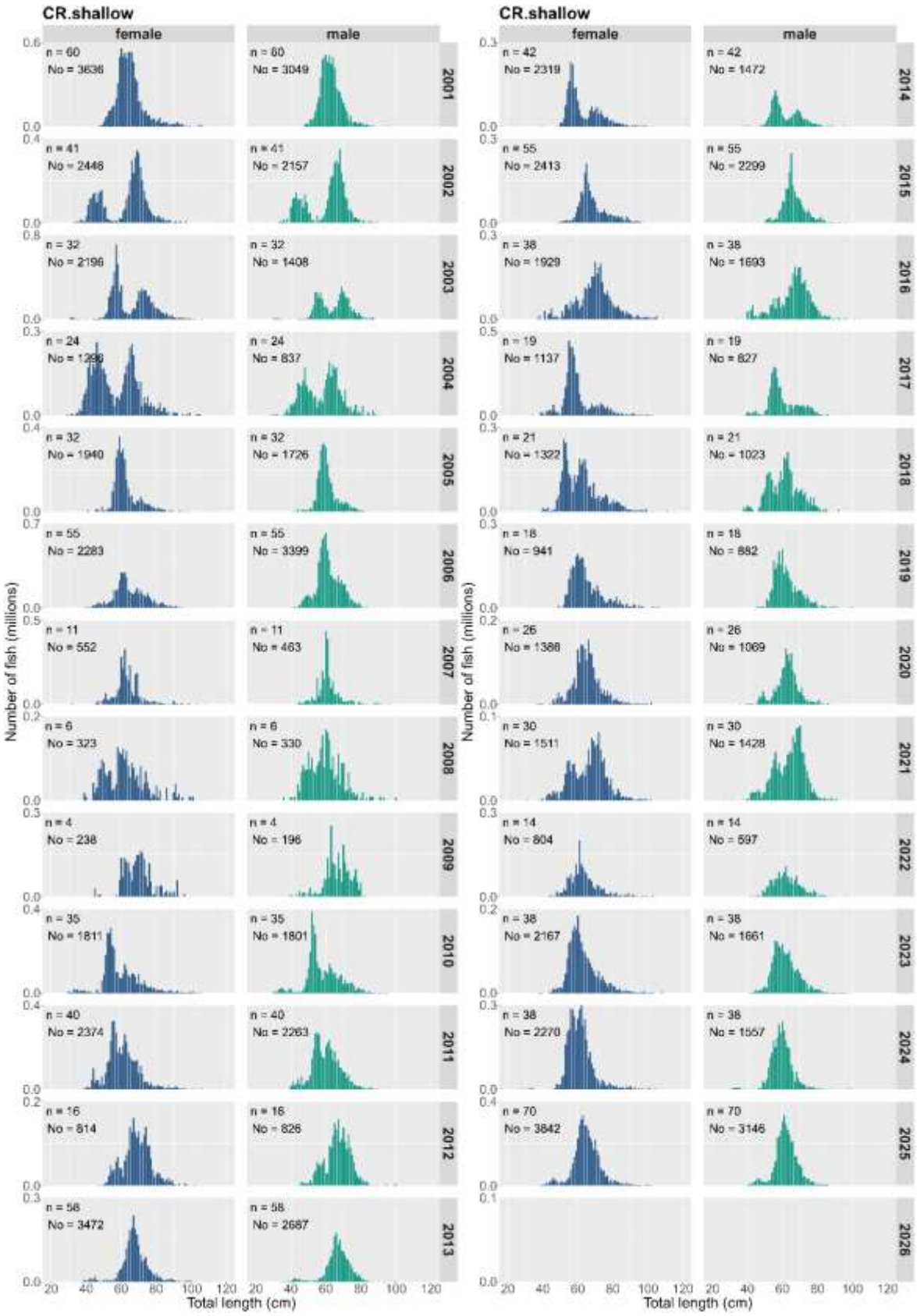


Figure A13: Comparison of number of fish by length for Chatham Rise CR.shallow non spawning sub-fishery by year for 2001–2025 sampled by the Scientific Observer Programme. n, number of tows sampled; no., number of fish sampled. n: number of observed length frequencies; No: number of fish measured.

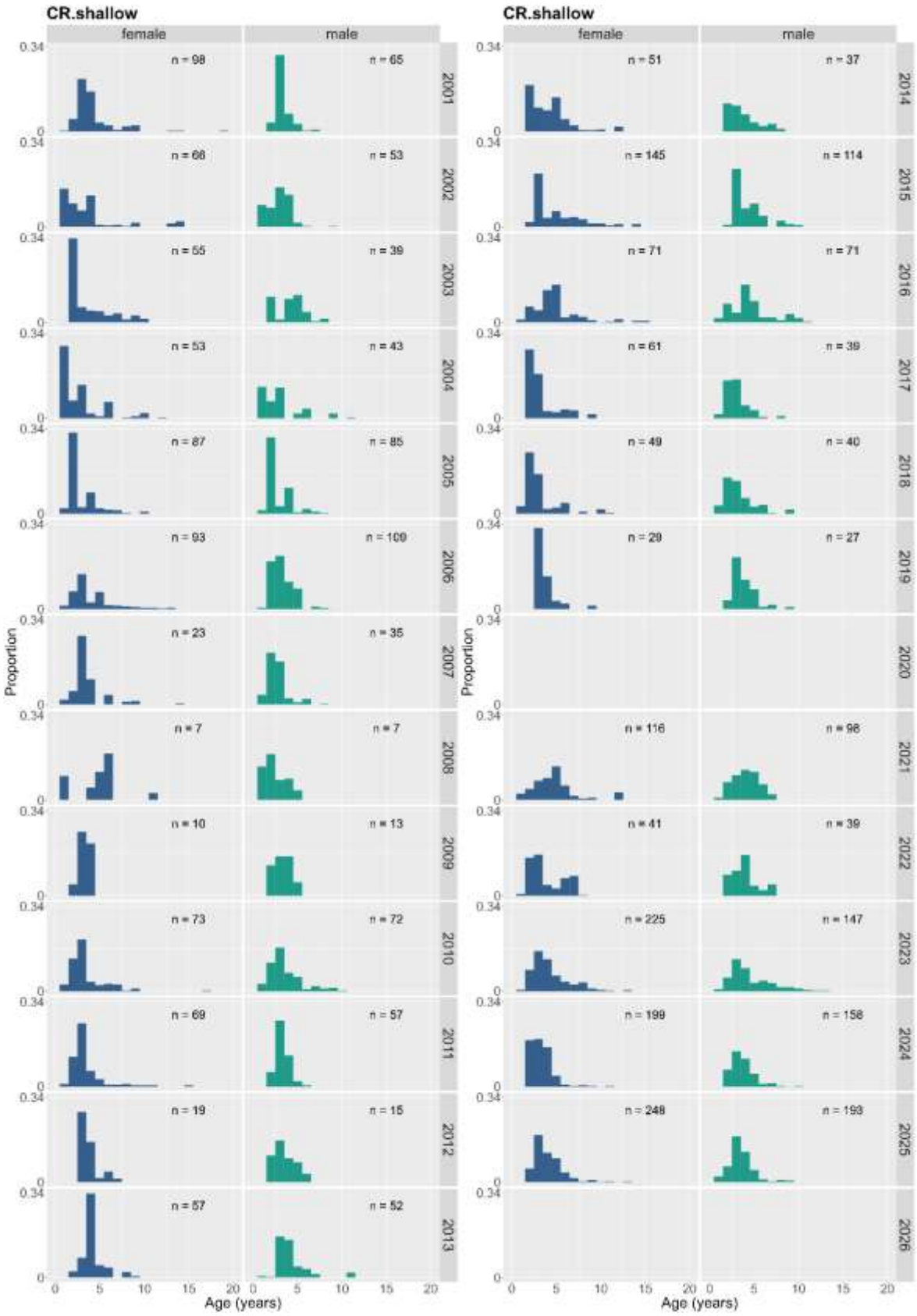


Figure A14: Comparison of proportion of fish by age for Chatham Rise CR.shallow non spawning sub-fishery by year for 2001–2025. n: number of fish aged. No age frequency for 2020.

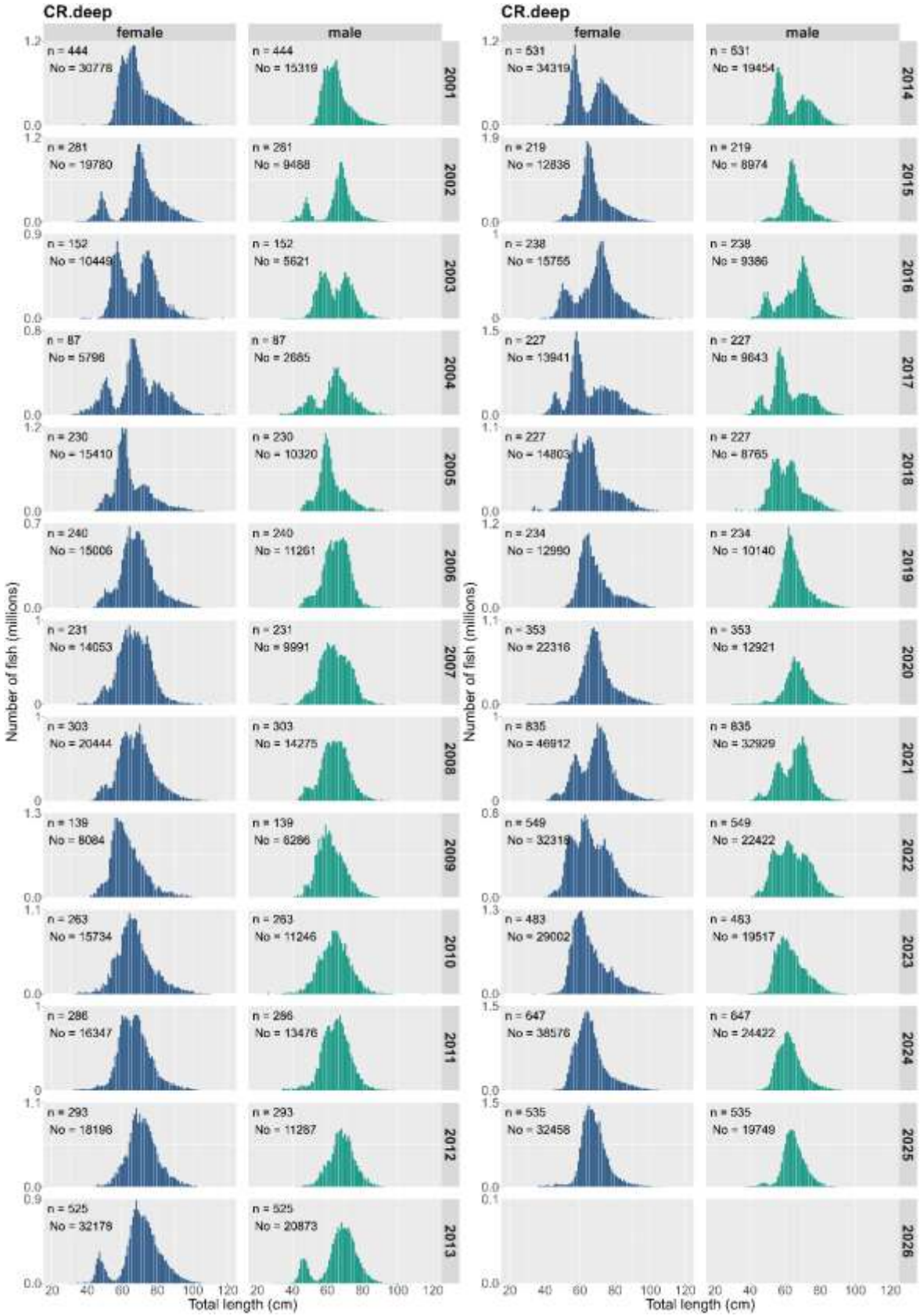


Figure A15: Comparison of number of fish by length for Chatham Rise CR.deep non spawning sub-fishery by year for 2001–2025 sampled by the Scientific Observer Programme. n, number of tows sampled; no., number of fish sampled. n: number of observed length frequencies; No: number of fish measured.

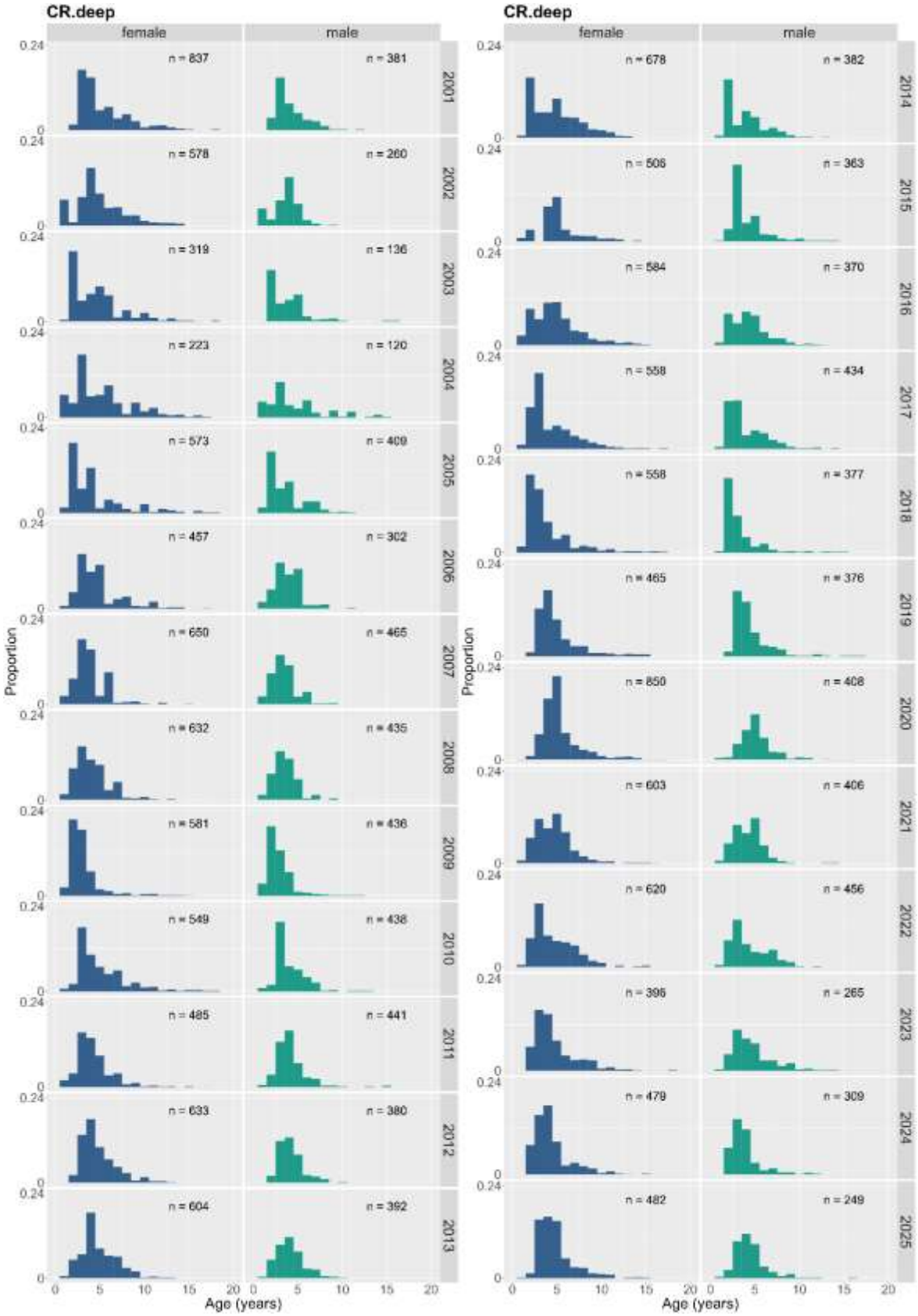


Figure A16: Comparison of proportion of fish by age for Chatham Rise CR.deep non spawning sub-fishery by year for 2001–2025. n: number of fish aged.

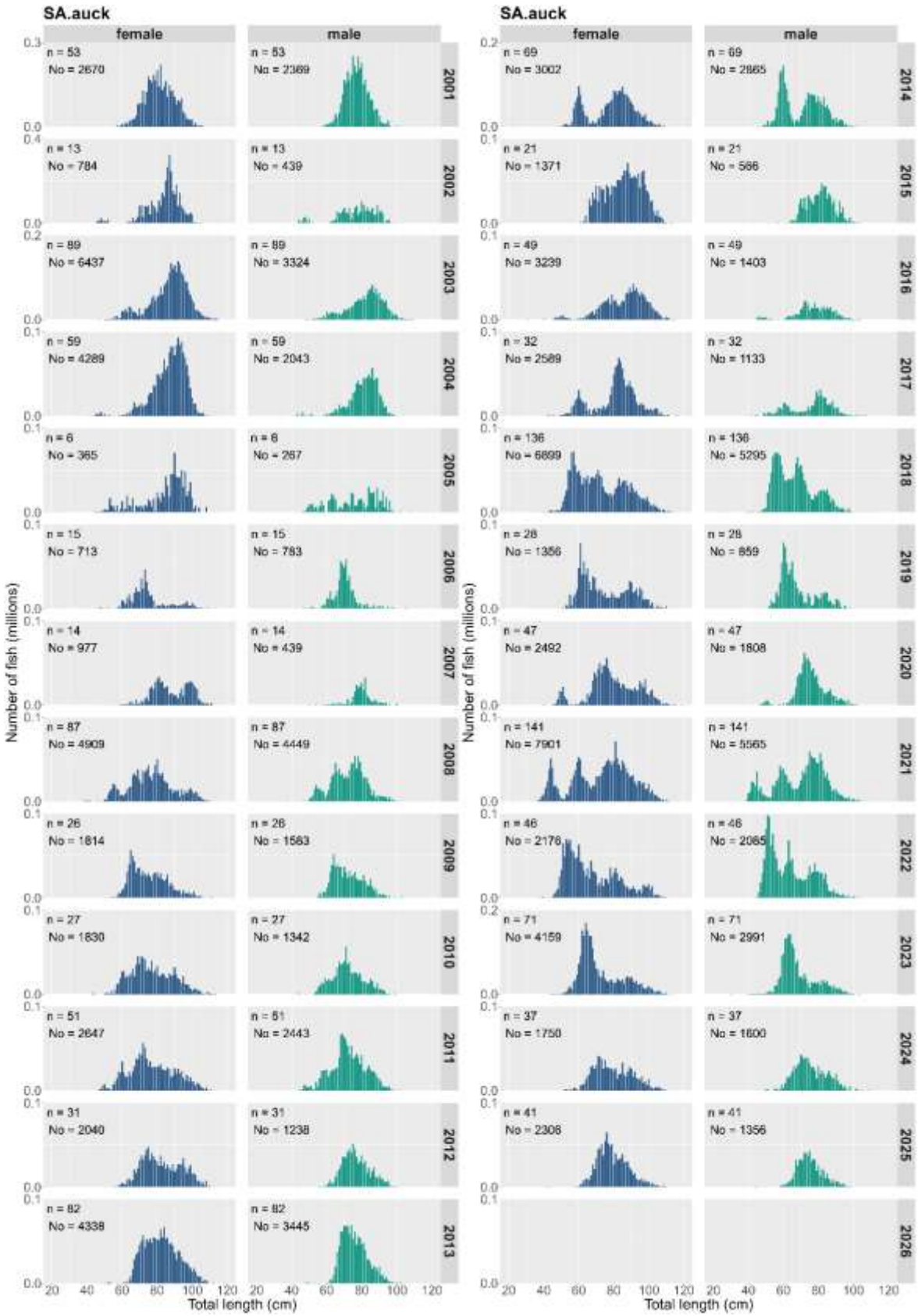


Figure A17: Comparison of number of fish by length for Sub-Antarctic SA.auck non spawning sub-fishery by year for 2001–2025 sampled by the Scientific Observer Programme. n: number of observed length frequencies; No: number of fish measured.

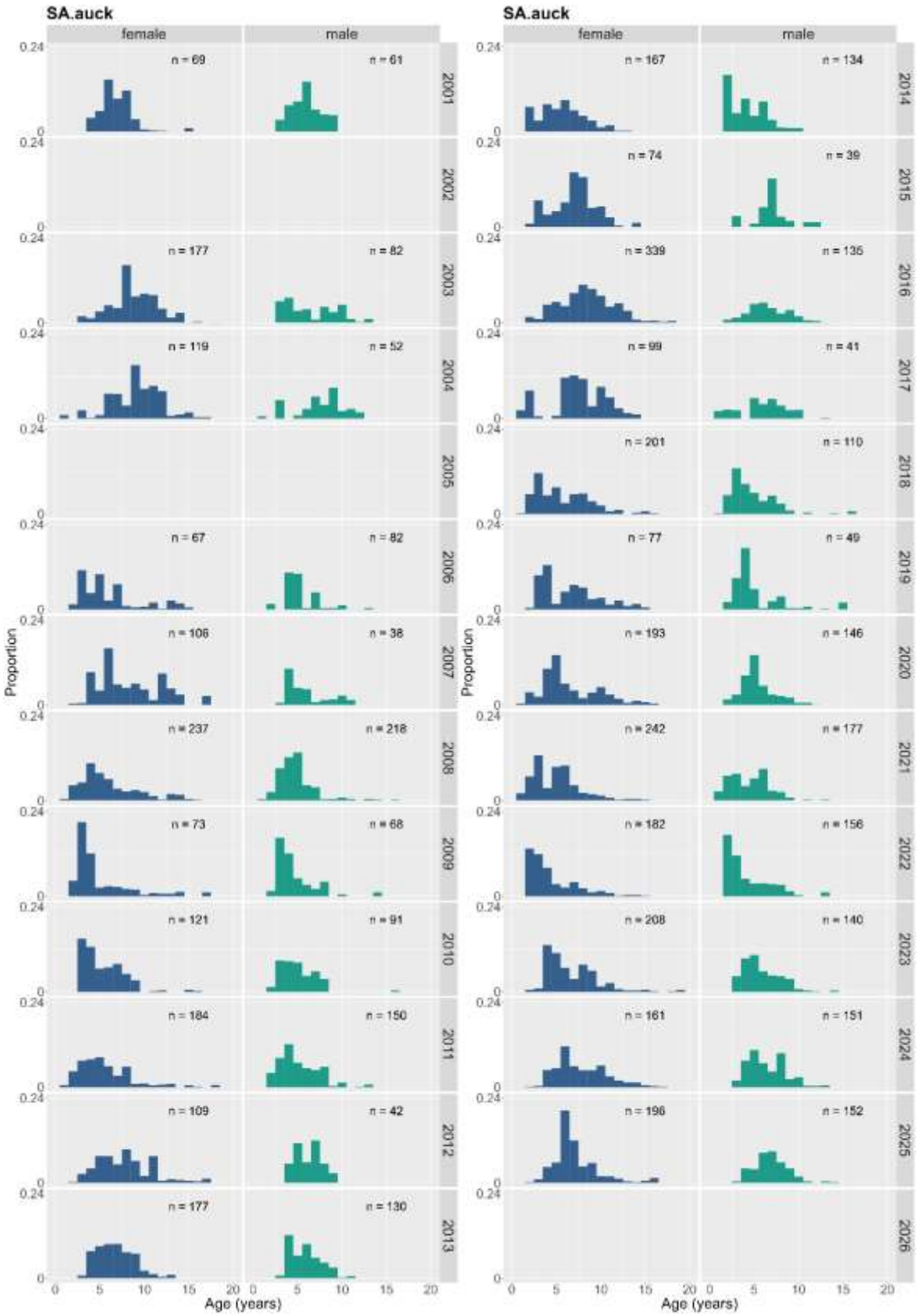


Figure A18: Comparison of proportion of fish by age for Sub-Antarctic SA.auck non spawning sub-fishery by year for 2001–2025. Ages calculated where there were at least 100 otoliths. n: number of fish aged.

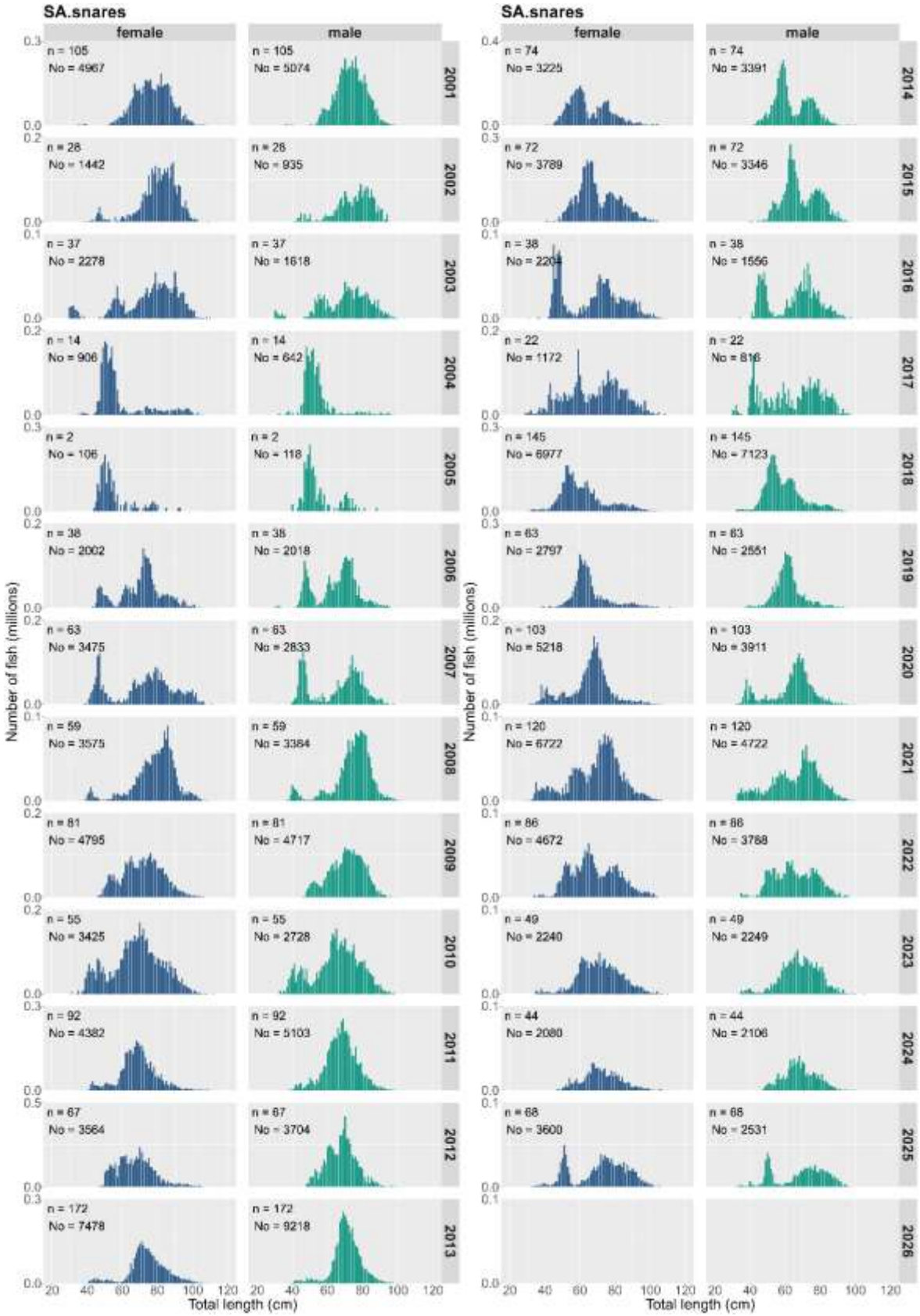


Figure A19: Comparison of number of fish by length for Sub-Antarctic SA.snares non spawning sub-fishery by year for 2001–2025 sampled by the Scientific Observer Programme. n: number of observed length frequencies; No: number of fish measured.

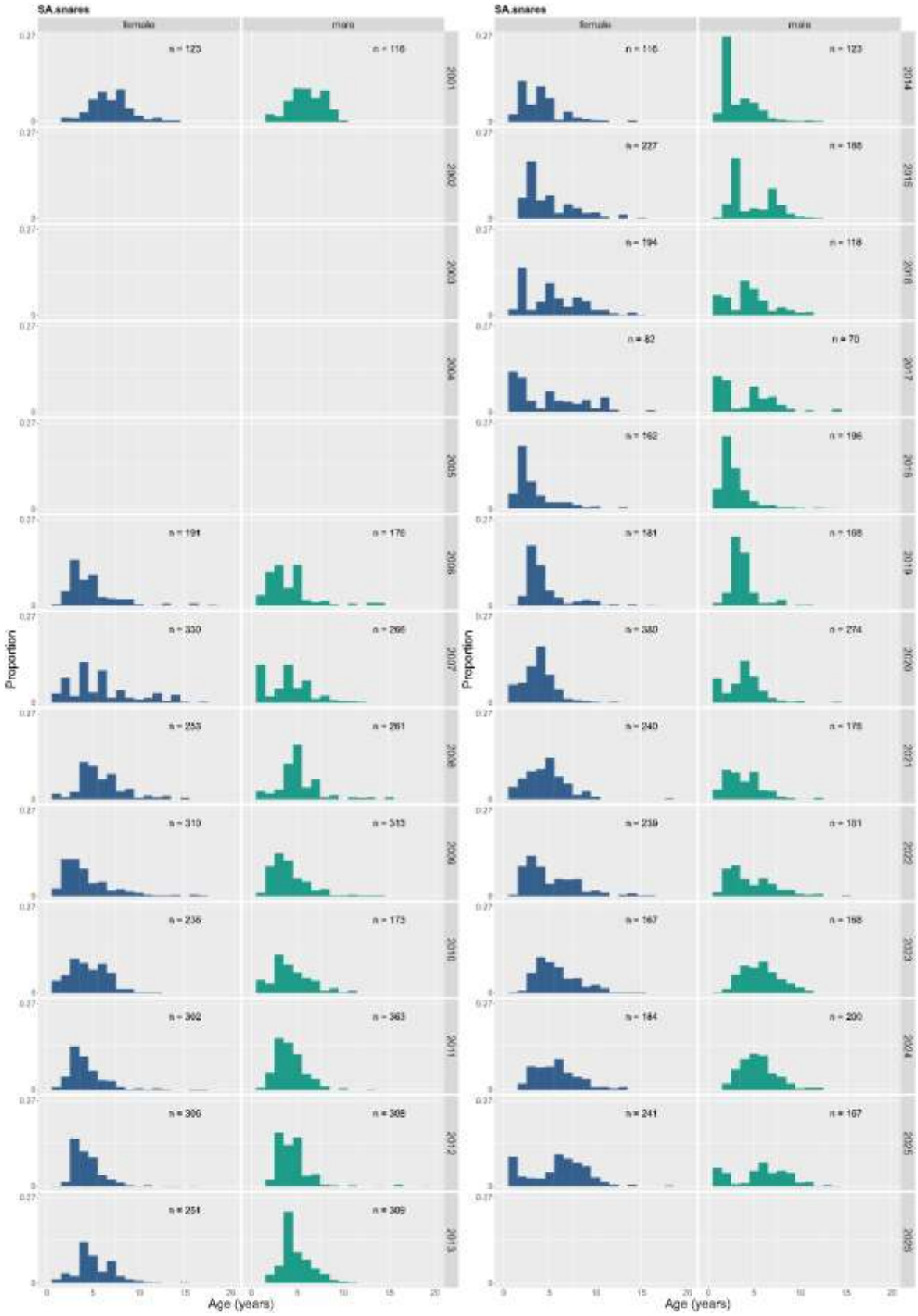


Figure A20: Comparison of proportion of fish by age for Sub-Antarctic SA.snares non spawning sub-fishery by year for 2001–2025. Ages calculated where there were at least 100 otoliths. n: number of fish aged.

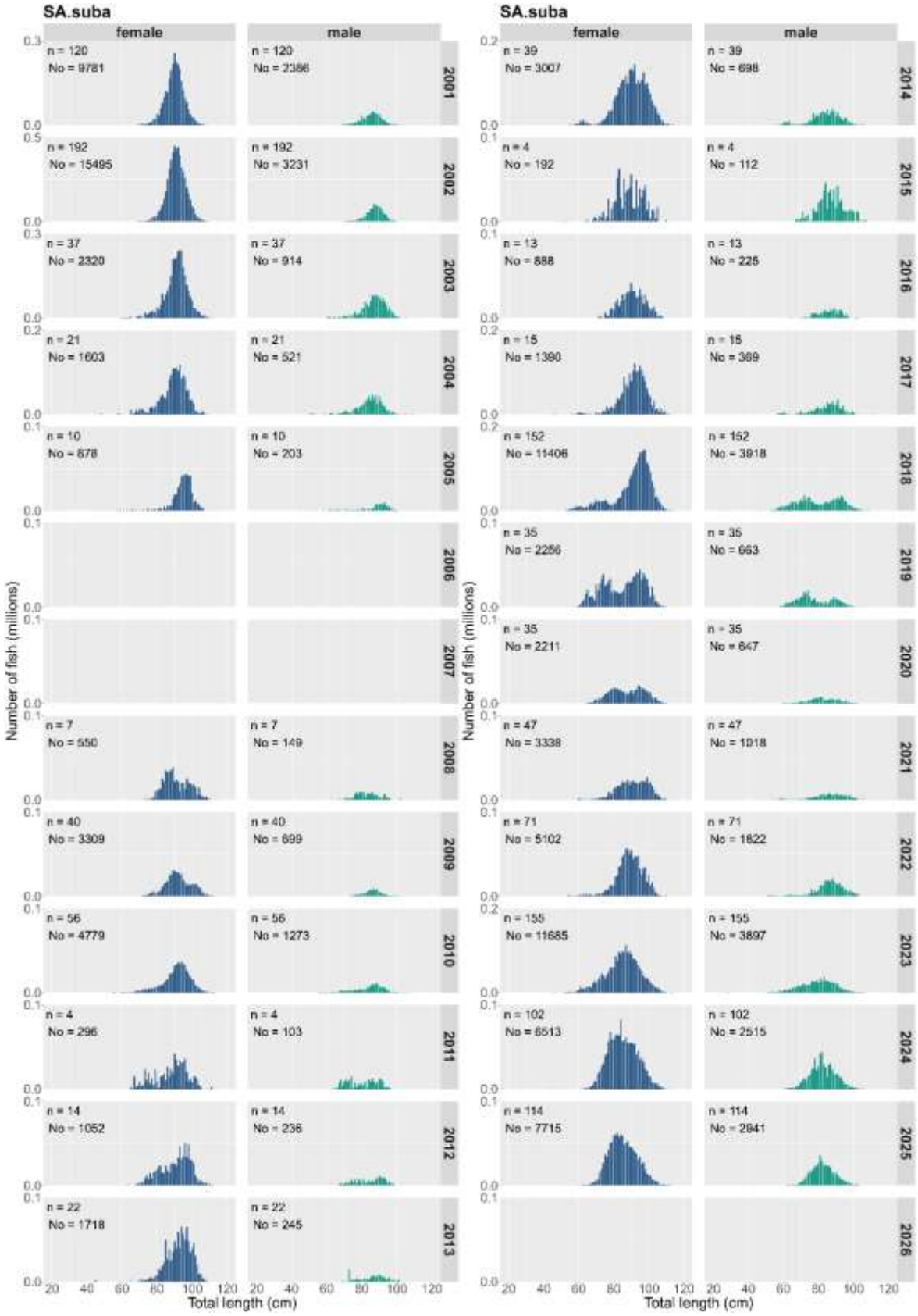


Figure A21: Comparison of number of fish by length for Sub-Antarctic SA.suba non spawning sub-fishery by year for 2001–2025 sampled by the Scientific Observer Programme. No observer data in 2006 or 2007. n: number of observed length frequencies; No: number of fish measured.

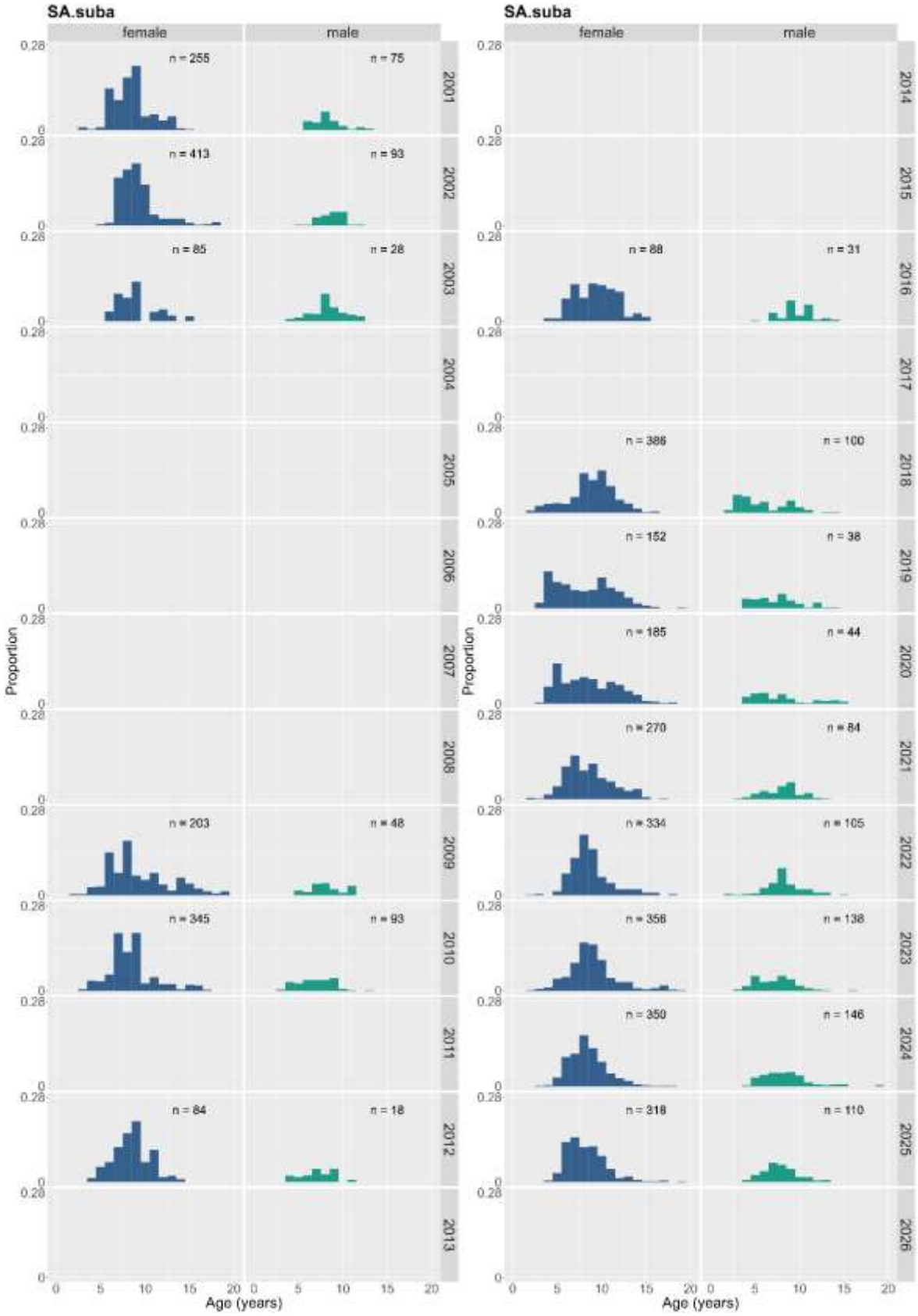


Figure A22: Comparison of proportion of fish by age for Sub-Antarctic SA.suba non spawning sub-fishery by year for 2001–2025. Ages calculated where there were at least 100 otoliths. n: number of fish aged.

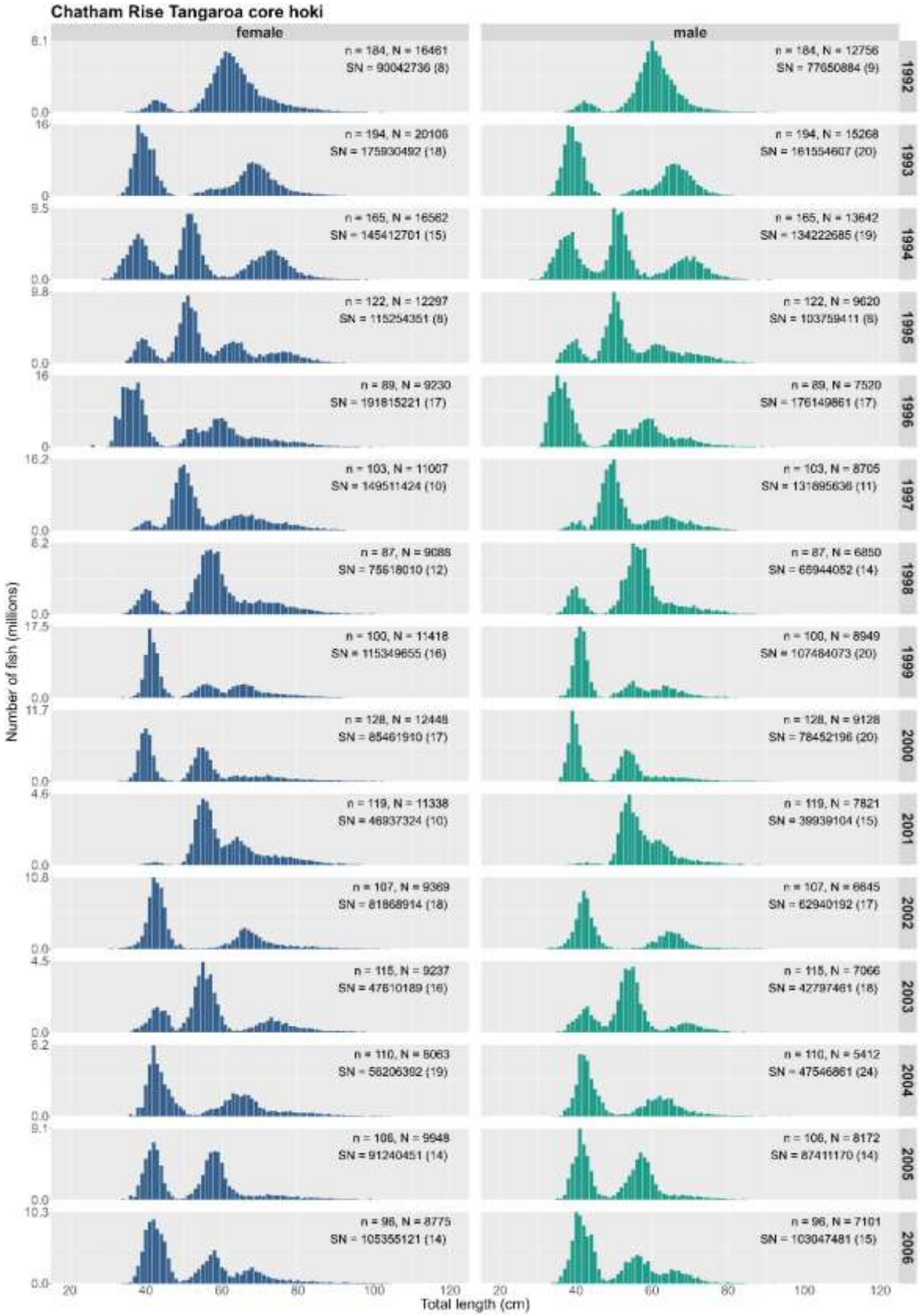


Figure A23: Estimated length frequency distributions of the female and male hoki population from *Tangaroa* trawl surveys of the Chatham Rise from 1992 to 2026 for core strata. n, number of length frequencies; N, number of hoki measured; SN, estimated population number of hoki; CV (in parentheses), coefficient of variation.

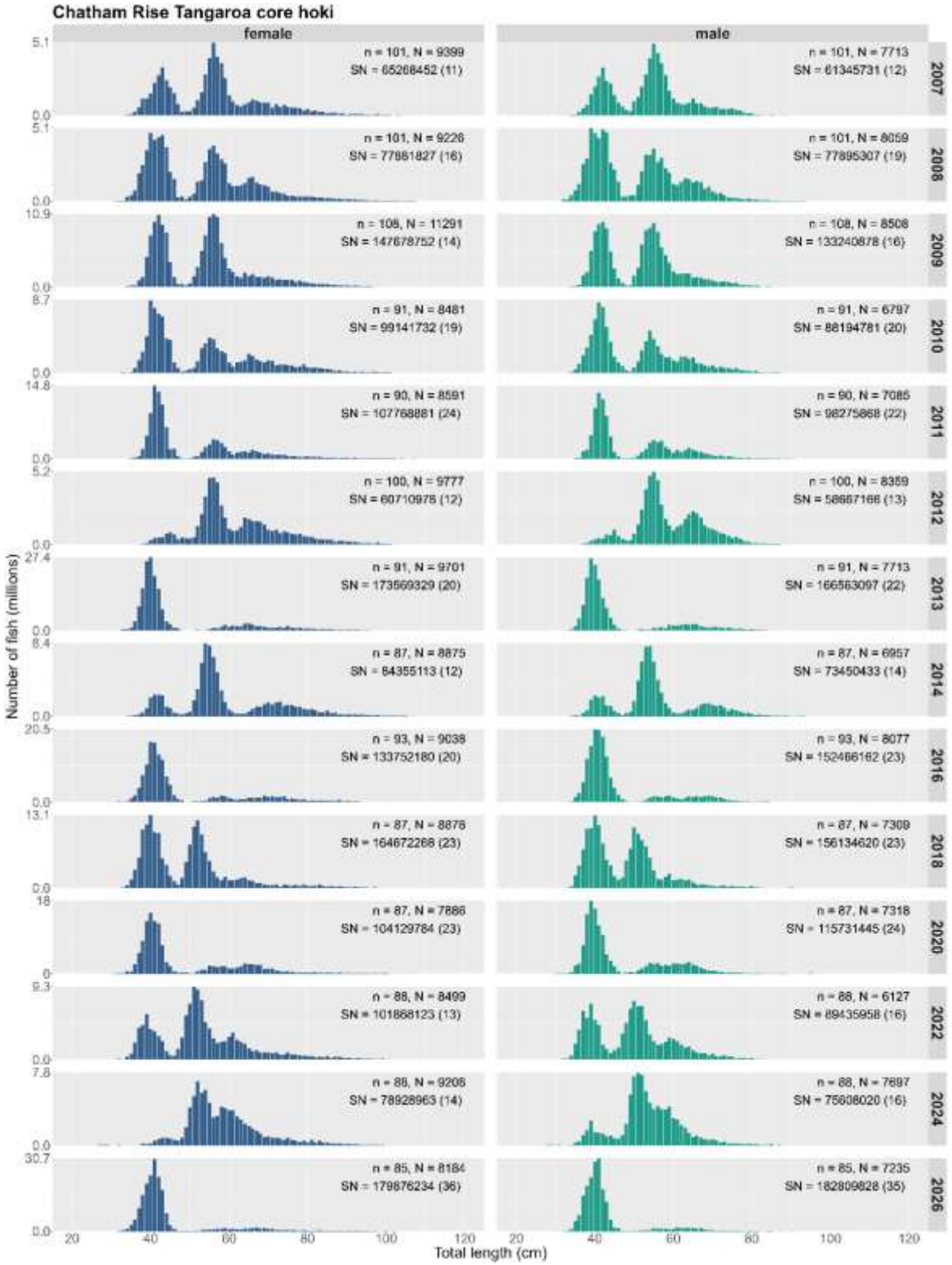


Figure A23:(continued)

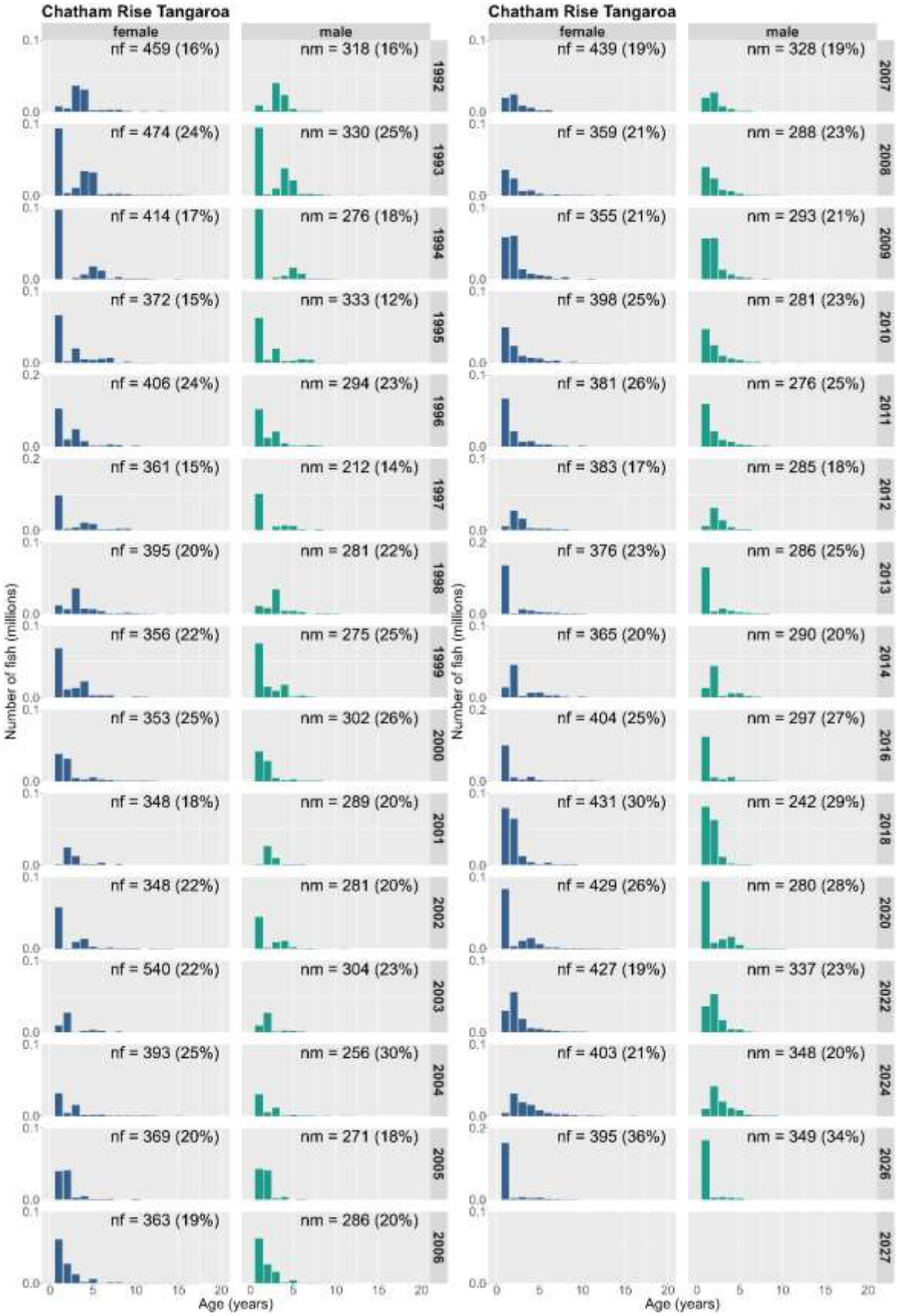


Figure A24: Scaled age frequency distributions for hoki from Chatham Rise *Tangaroa* trawl surveys from 1992 to 2026.