



## Catch-at-age for southern blue whiting (*Micromesistius australis*, SBW) in SBW 6I and SBW 6B during the 2024–25 fishing year

New Zealand Fisheries Assessment Report 2025/44

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## **PLAIN LANGUAGE SUMMARY**

This report documents the size and age information collected for southern blue whiting (SBW) in the 2024–25 fishing year from the Campbell Rise and Bounty Platform. These data add to the time series produced for the previous fishing years. For Campbell Rise, a previously strong year class corresponding to fish born in 2015 has weakened, with catch now dominated by young fish born in 2020 and 2021. For Bounty Platform two strong year classes continued to be observed, corresponding to fish born in 2012 and 2018.

## EXECUTIVE SUMMARY

**Datta, S.<sup>1</sup>; Stevens, D.<sup>1</sup>; Sutton, C.<sup>1</sup>; Barnes, T.<sup>1</sup>; Spong, K.<sup>1</sup> (2025). Catch-at-age for southern blue whiting (*Micromesistius australis*, SBW) in SBW 6I and SBW 6B during the 2024–25 fishing year.**

*New Zealand Fisheries Assessment Report 2025/44. 23 p.*

This report documents the age and length frequency data collected for southern blue whiting (*Micromesistius australis*, SBW) in the 2024–25 fishing year from Campbell Rise (SBW 6I) and Bounty Platform (SBW 6B), and variation in catch by year. These data add to the time series produced for the previous fishing years using the same methods. For Campbell Rise, a previously strong year class corresponding to SBW born in 2015 has weakened, but a year class corresponding to SBW born in 2020 was observed for the second year. The 2021 year-class also appears strong. For Bounty Platform two strong year classes continued to be observed, corresponding to SBW born in 2012 and 2018.

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## 1. INTRODUCTION

Southern blue whiting (*Micromesistius australis*; SBW) around New Zealand are almost entirely restricted to sub-Antarctic waters. They are dispersed throughout the Campbell Plateau (SBW 6I) and Bounty Platform (SBW 6B) for much of the year, but during August and September they aggregate to spawn near the Campbell Islands, on Pukaki Rise, on Bounty Platform, and near the Auckland Islands within depths of 250–600 m (figure 1; Large et al. 2021). Fish in the spawning fishery usually range between 35 and 50 cm fork length (FL), although occasionally smaller size classes of males (29–32 cm FL) are observed in the catch.

Commercial fishing has concentrated on the Campbell Island Rise and, to a lesser extent, the Bounty Platform. The Pukaki Rise and Auckland Islands have seen important fisheries in the past but have recently had much lower annual catches than the Campbell Island Rise and Bounty Platform fisheries (Fisheries New Zealand 2024).

This report follows on from the previous fishing year (Datta et al. 2024) and first provides a basic characterisation of the fishery catches over time and location. We then describe the age data available for a stock assessment, from ageing performed on southern blue whiting sampled from both Campbell Rise and Bounty Platform, combined with data extracts from the Fisheries New Zealand observer database (November 2024).

This report is part of Objective 1 of the reporting requirements for Fisheries New Zealand Project MID2024-01: *Routine age determination of middle depth and deepwater species from commercial fisheries and resource surveys*, specifically to determine catch-at-age for SBW 6B and SBW 6I for the 2024–25 fishing year (1 April 2024 to 31 March 2025).

## 2. METHODS

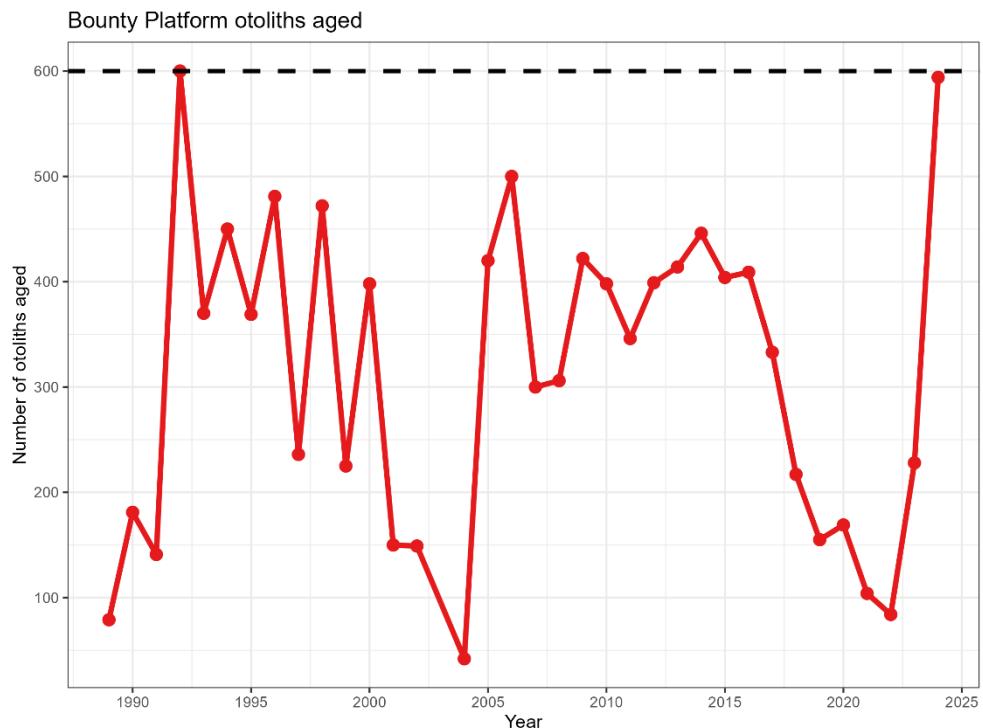
The new data described here adds to the series produced for the previous fishing years using the same methods (see Datta et al. 2024). We aged southern blue whiting sampled off fishing vessels from fishing vessels from Campbell Rise and Bounty Platform, and extracted data on length composition and spatial distribution of catch from the Fisheries New Zealand observer database. We investigated the annual variation in landings, spatial distribution of catch (catches were assigned to locations based on the starting point of the trawl tow), spawning data, timing of catch, length and age frequencies, and calculated catch-at-age and mean-weighted coefficient of variation (CV) for the age frequency of males, females, and overall (weighted by length frequency using an age-length key).

For both Campbell Rise and Bounty Platform, otoliths from each 1 cm length class were selected by sex for a target of 600 otoliths per fishery. Numbers of otoliths were distributed between the two sexes proportional to the number of otoliths available. Preparation of the otoliths employed the bake and embed method, and reading of the otoliths was done by a single reader once with quality assurance (QA) via a reference set during the ageing process. A CV of 1.67% was achieved when ageing the reference set. The otolith reading was done following an established methodology (Hanchet & Uozumi 1996). It is noted that a change in reader occurred for the 2024–25 otolith reading for the first time in recent years.

The total number of otoliths available and aged were as follows:

- Campbell Islands: 2208 otoliths available (n = 605 otoliths aged).
- Bounty Platform: 1415 otoliths available (n = 601 otoliths aged).

Due to the increased sampling of otoliths from Bounty Platform in 2024–25, the target of 600 otoliths was reached for the first time since 1992 (Figure 1).



**Figure 1:** Number of otoliths aged from Bounty Platform over the period 1989–90 to 2024–25 inclusive. Target of 600 shown by dashed horizontal black line.

We determined catch-at-age for both Campbell Rise and Bounty Platform using an age-length key via the R package ‘catch-at-age’. The process produced scaled length and age length frequencies (by sex and overall, by area), as well as mean lengths by age (by sex and overall) and mean weighted CVs. The target mean weighted CV was 20% for both areas.

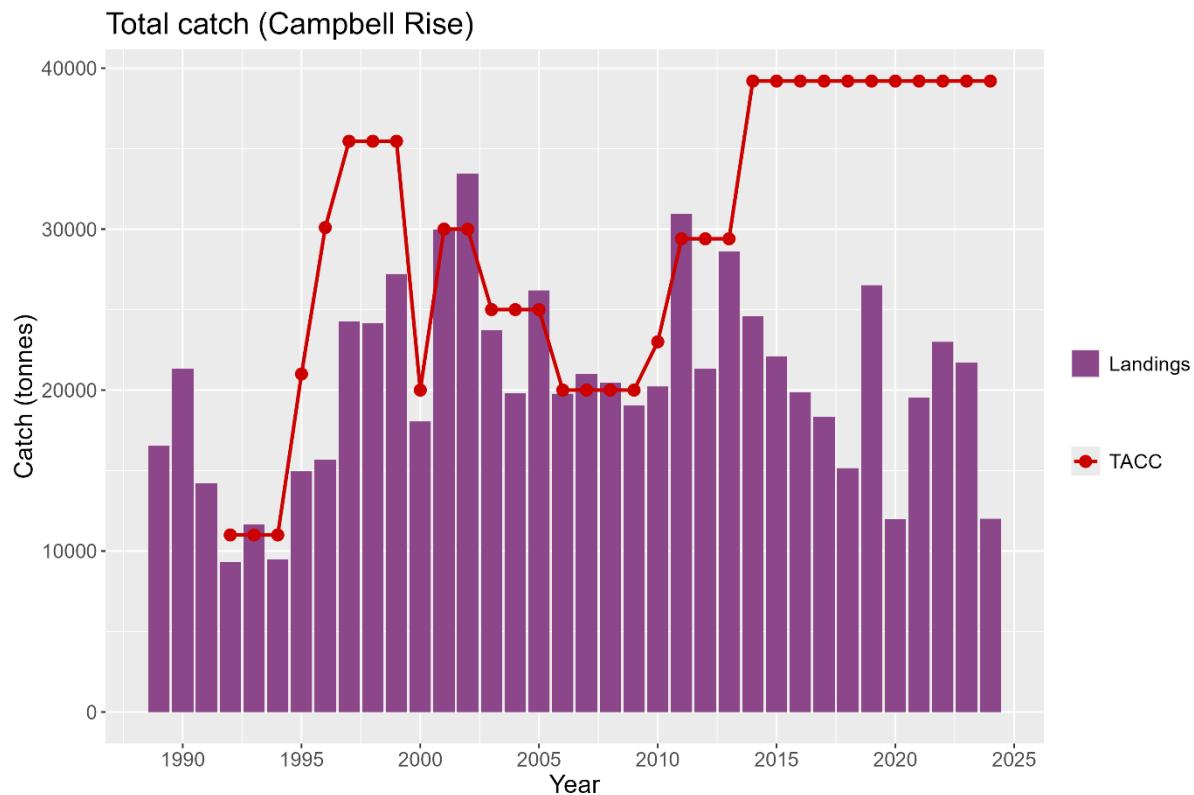
### 3. RESULTS

In all the following results, year refers to the calendar year in which most fishing occurs, which for southern blue whiting is the first year of the split fishing year, defined for this species as 1 April – 31 March (i.e., 2024 in this report refers to 1 April 2024 – 31 March 2025).

#### 3.1 Catch by year

For Campbell Rise, the recent catches increased from 11 520 t in 2020–21 to over 20 000 t in 2022–23 and 2023–24, but there was a significant decrease to 11 996 t in 2024–25 (Figure 2, Table 1). The total allowable commercial catch (TACC) for Campbell Rise has been 39 200 t since 2014–15.

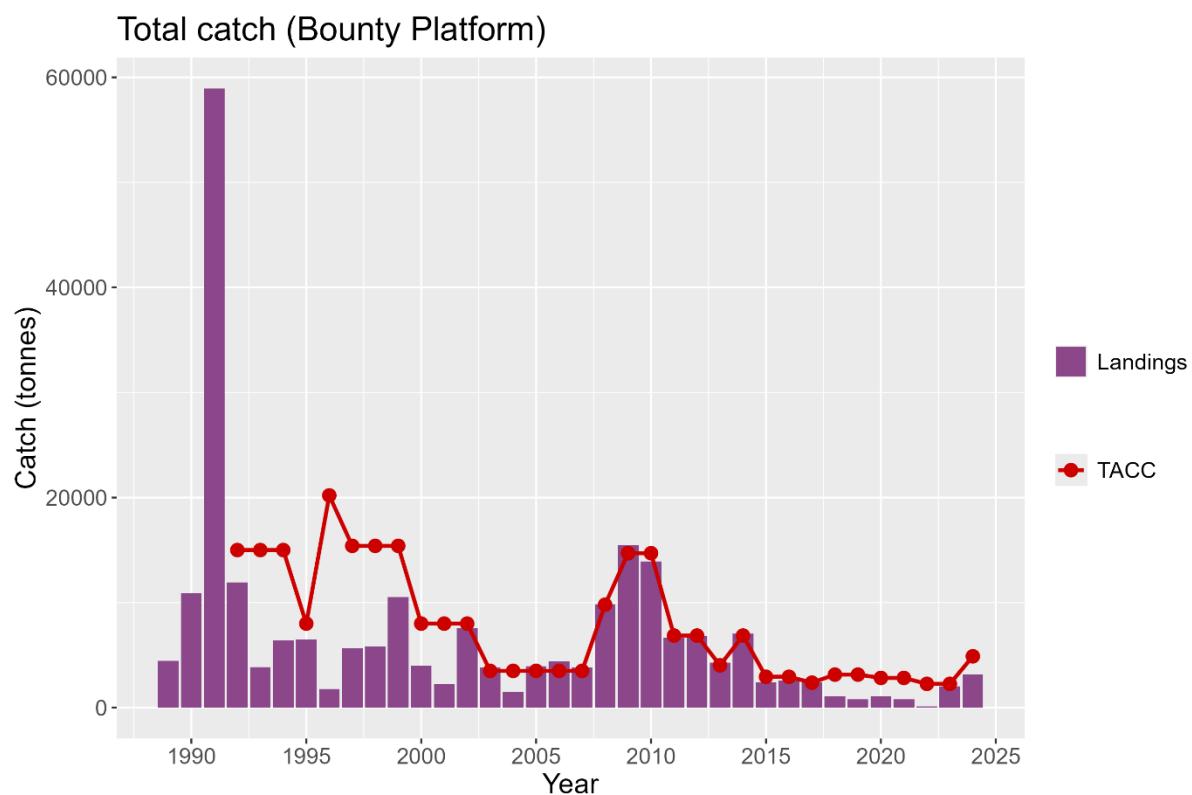
Catches on the Bounty Platform have declined from 15 000 t in 2009–10 to only 120 t in 2022–23 (the lowest on record), and then have increased to 1985 t in 2023–24, and further to 3170 t in 2024–25 (Figure 3, Table 2). The TACC was 2264 t in 2022–23 and 2023–24, before increasing to 4888 t in 2024–25.



**Figure 2:** Catch (tonnes) of southern blue whiting on Campbell Rise, over the fishing years 1989–90 to 2024–25 inclusive (labelled by year beginning, i.e., 2024–25 fishing year labelled 2024), in purple, with the TACC overlaid in red.

**Table 1:** Catch in tonnes (t) of southern blue whiting on Campbell Rise by fishing year.

| Year    | Catch (t) | Year    | Catch (t) | Year    | Catch (t) |
|---------|-----------|---------|-----------|---------|-----------|
| 1989–90 | 2 341     | 2001–02 | 24 409    | 2013–14 | 25 595    |
| 1990–91 | 16 556    | 2002–03 | 29 140    | 2014–15 | 22 548    |
| 1991–92 | 21 918    | 2003–04 | 22 672    | 2015–16 | 20 089    |
| 1992–93 | 13 670    | 2004–05 | 19 508    | 2016–17 | 17 449    |
| 1993–94 | 8 810     | 2005–06 | 25 197    | 2017–18 | 16 172    |
| 1994–95 | 11 404    | 2006–07 | 18 905    | 2018–19 | 13 882    |
| 1995–96 | 10 031    | 2007–08 | 20 423    | 2019–20 | 24 275    |
| 1996–97 | 16 744    | 2008–09 | 19 719    | 2020–21 | 11 520    |
| 1997–98 | 19 142    | 2009–10 | 18 300    | 2021–22 | 17 293    |
| 1998–99 | 24 136    | 2010–11 | 19 415    | 2022–23 | 21 300    |
| 1999–00 | 27 208    | 2011–12 | 29 204    | 2023–24 | 20 873    |
| 2000–01 | 14 444    | 2012–13 | 20 155    | 2024–25 | 11 996    |



**Figure 3:** Catch (tonnes) of southern blue whiting on Bounty Platform, over the fishing years 1990–91 to 2024–25 inclusive (labelled by year beginning, i.e., 2024–25 fishing year labelled 2024), in purple, with the TACC overlaid in red.

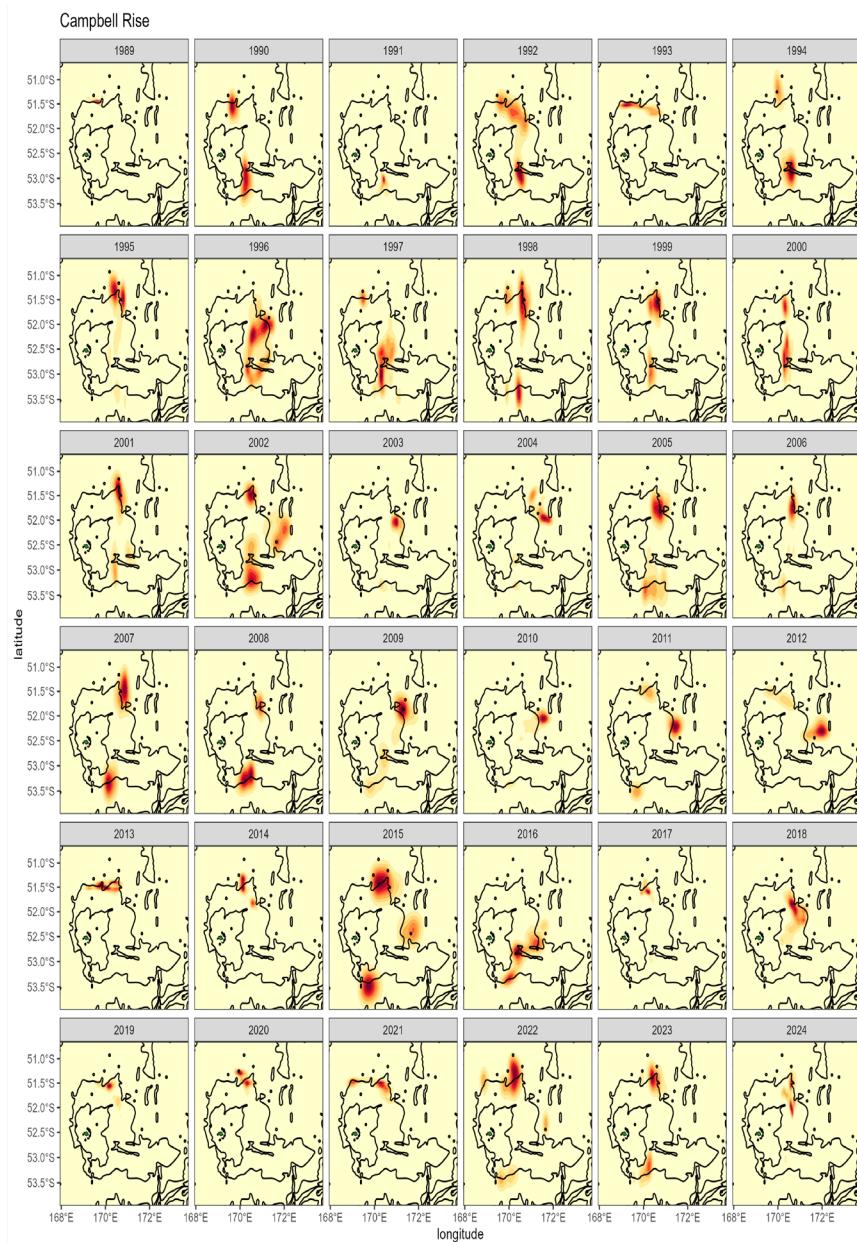
**Table 2:** Catch in tonnes (t) of southern blue whiting on Bounty Platform by fishing year.

| Year    | Catch  | Year    | Catch  | Year    | Catch |
|---------|--------|---------|--------|---------|-------|
| 1990–91 | 4 438  | 2002–03 | 6 208  | 2014–15 | 8 069 |
| 1991–92 | 11 184 | 2003–04 | 3 609  | 2015–16 | 2 278 |
| 1992–93 | 58 694 | 2004–05 | 1 478  | 2016–17 | 2 457 |
| 1993–94 | 11 787 | 2005–06 | 3 769  | 2017–18 | 2 188 |
| 1994–95 | 3 877  | 2006–07 | 4 257  | 2018–19 | 987   |
| 1995–96 | 6 472  | 2007–08 | 3 603  | 2019–20 | 699   |
| 1996–97 | 5 121  | 2008–09 | 9 583  | 2020–21 | 1 023 |
| 1997–98 | 2 043  | 2009–10 | 14 956 | 2021–22 | 707   |
| 1998–99 | 5 792  | 2010–11 | 13 783 | 2022–23 | 120   |
| 1999–00 | 10 531 | 2011–12 | 6 468  | 2023–24 | 1 985 |
| 2000–01 | 3 852  | 2012–13 | 6 856  | 2024–25 | 3 170 |
| 2001–02 | 1 554  | 2013–14 | 3 860  |         |       |

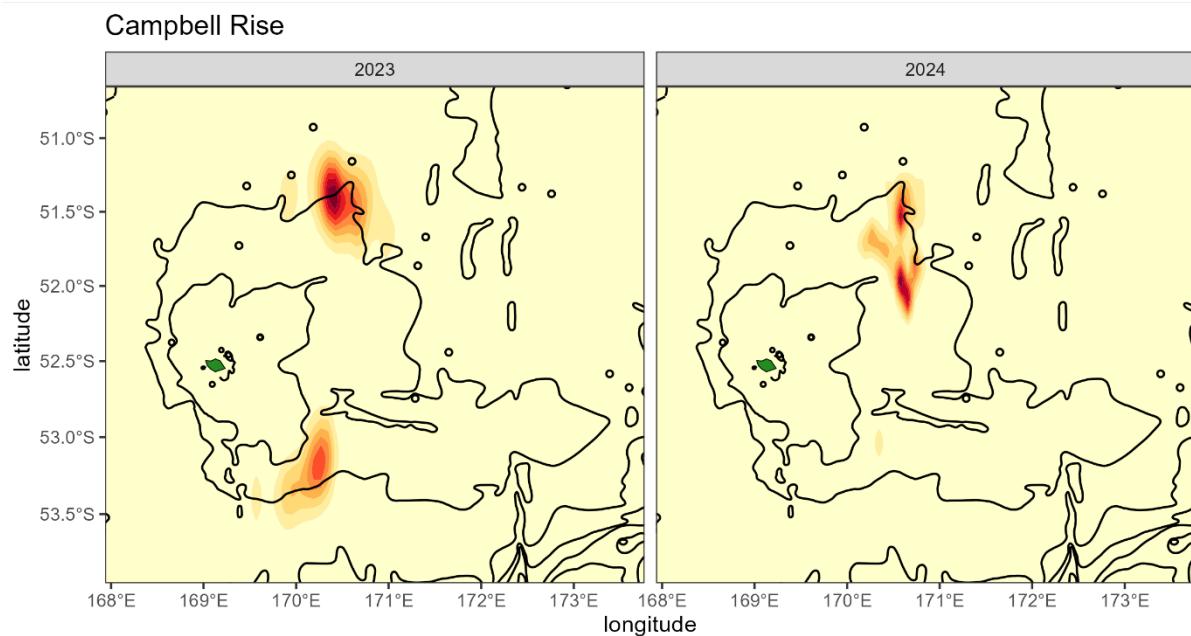
### 3.2 Spatial catch distribution

The catch has been scattered across Campbell Rise, often with concentrations in the north, south and/or east areas (Figure 4). In 2023, catch was split between the north and south areas, but was concentrated in only the north area in 2024 (Figure 5).

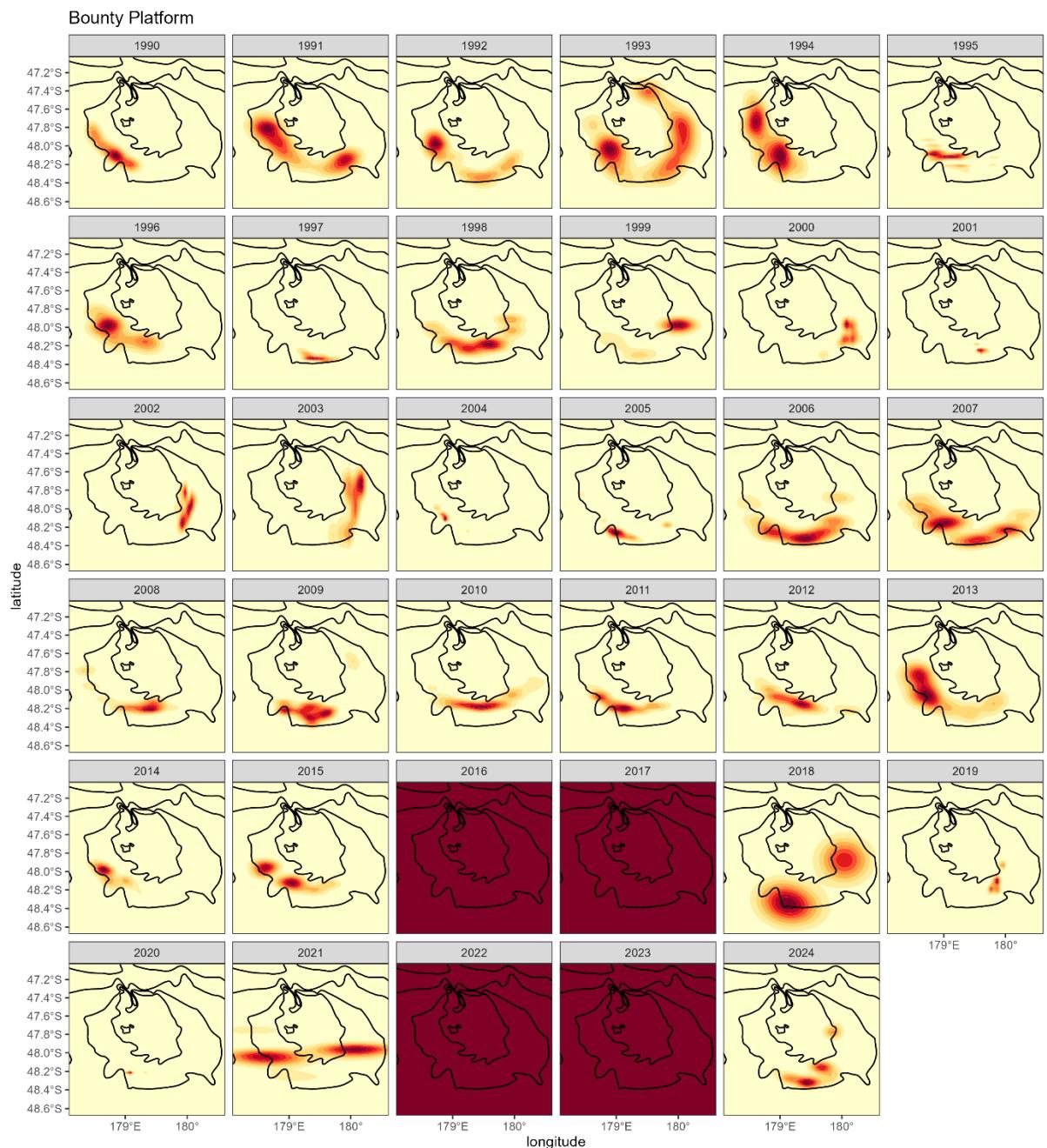
For Bounty Plateau, catch distribution maps cannot be shown for all years because of Fisheries New Zealand data confidentiality requirements (Figure 6). The spatial distribution of catch on Bounty Platform has generally been around the south side of the area and has shrunk in recent years (Figure 6). In 2024, the catch was concentrated within three patches in the south and east (Figure 7).



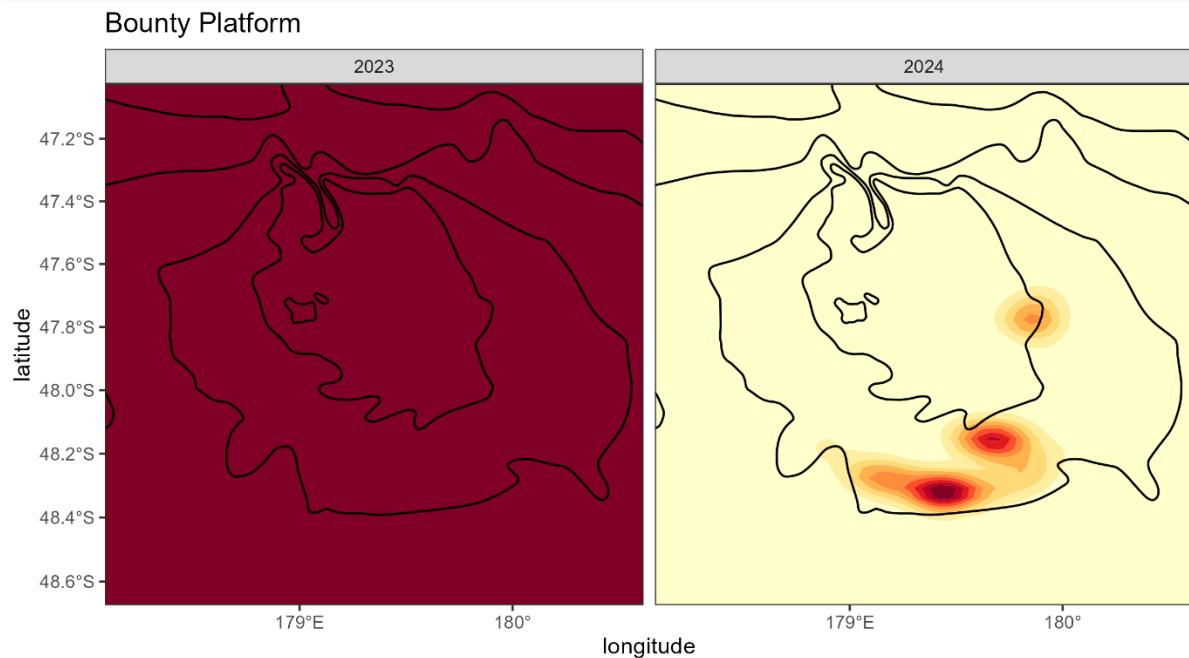
**Figure 4: Spatial catch distribution of southern blue whiting on Campbell Rise (coordinates show the location of the start of each tow), over the fishing years 1989–90 to 2024–25 inclusive (labelled by year beginning). Darker red shades indicate higher catches.**



**Figure 5:** Spatial catch distribution of southern blue whiting on Campbell Rise in fishing years 2023–24 and 2024–25 (labelled by year beginning). Darker red shades indicate higher catches.



**Figure 6:** Spatial catch distribution of southern blue whiting on Bounty Platform (coordinates show the location of the start of each tow), over the fishing years 1990–91 to 2024–25 inclusive (labelled by year beginning). Darker red shades indicate higher catches. Data not plotted for fishing years 2016, 2017, 2022 and 2023 due to data confidentiality requirements.

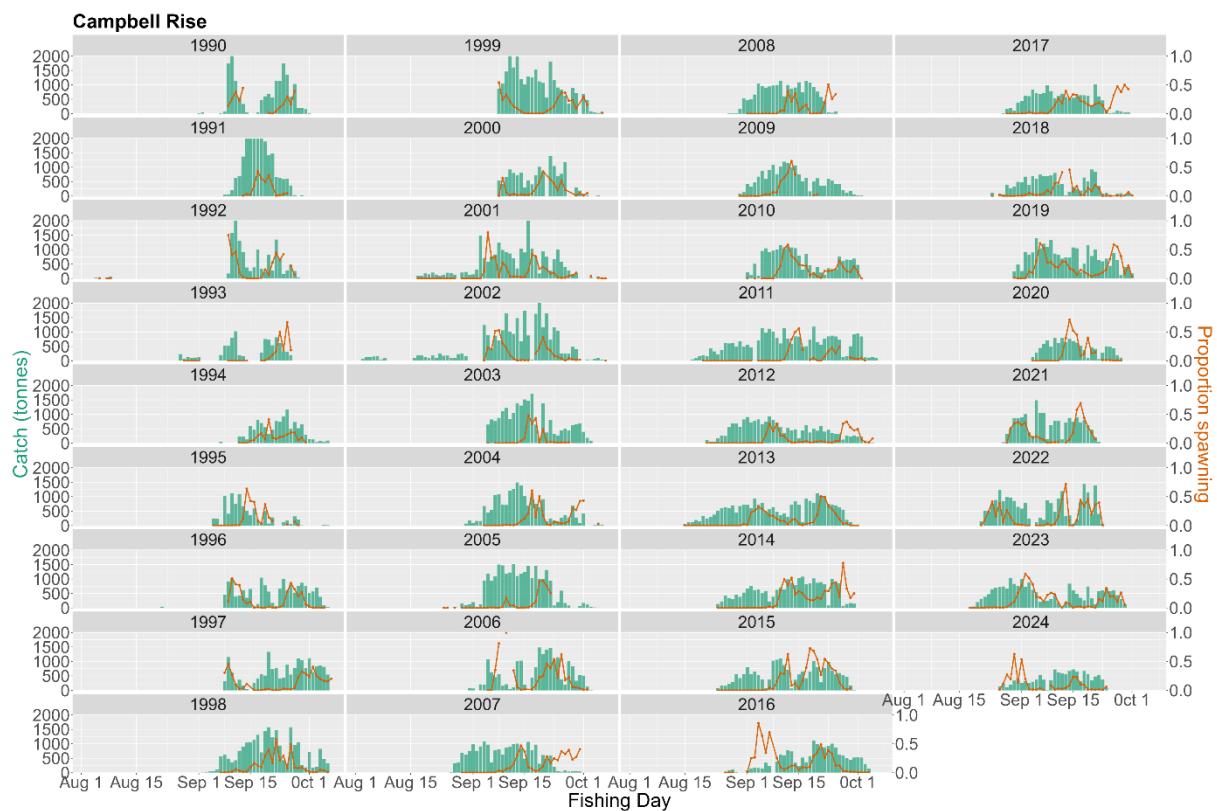


**Figure 7:** Spatial catch distribution of southern blue whiting on Bounty Platform in fishing years 2023–24 and 2024–25 (labelled by year beginning). Darker red shades indicate higher catches. Data not plotted for fishing year 2023 due to data confidentiality requirements.

### 3.3 Timing of catch

The catch on Campbell Rise has generally been during September (Figure 8), although some seasons have started in mid-August (e.g., 2011, 2023). There has not been a clear pattern in the timing of spawning, as evidenced by the lack of consistency or trend between years in the proportion of females spawning through the catch period (Figure 8 orange lines).

The timing of catch for Bounty Platform has become sporadic as catches have decreased (Figure 9). Between 2011 and 2017, there was a trend for the timing of spawning to become later, shifting from mid to late August. In 2018 to 2022 catch took place over only a few days or weeks, but the available data for 2024 suggested southern blue whiting may have reverted to spawning earlier in August (Figure 9).



**Figure 8:** The timing of catch on Campbell Rise over each fishing year, labelled by year beginning (green bars), along with the proportion of running ripe females (orange lines).



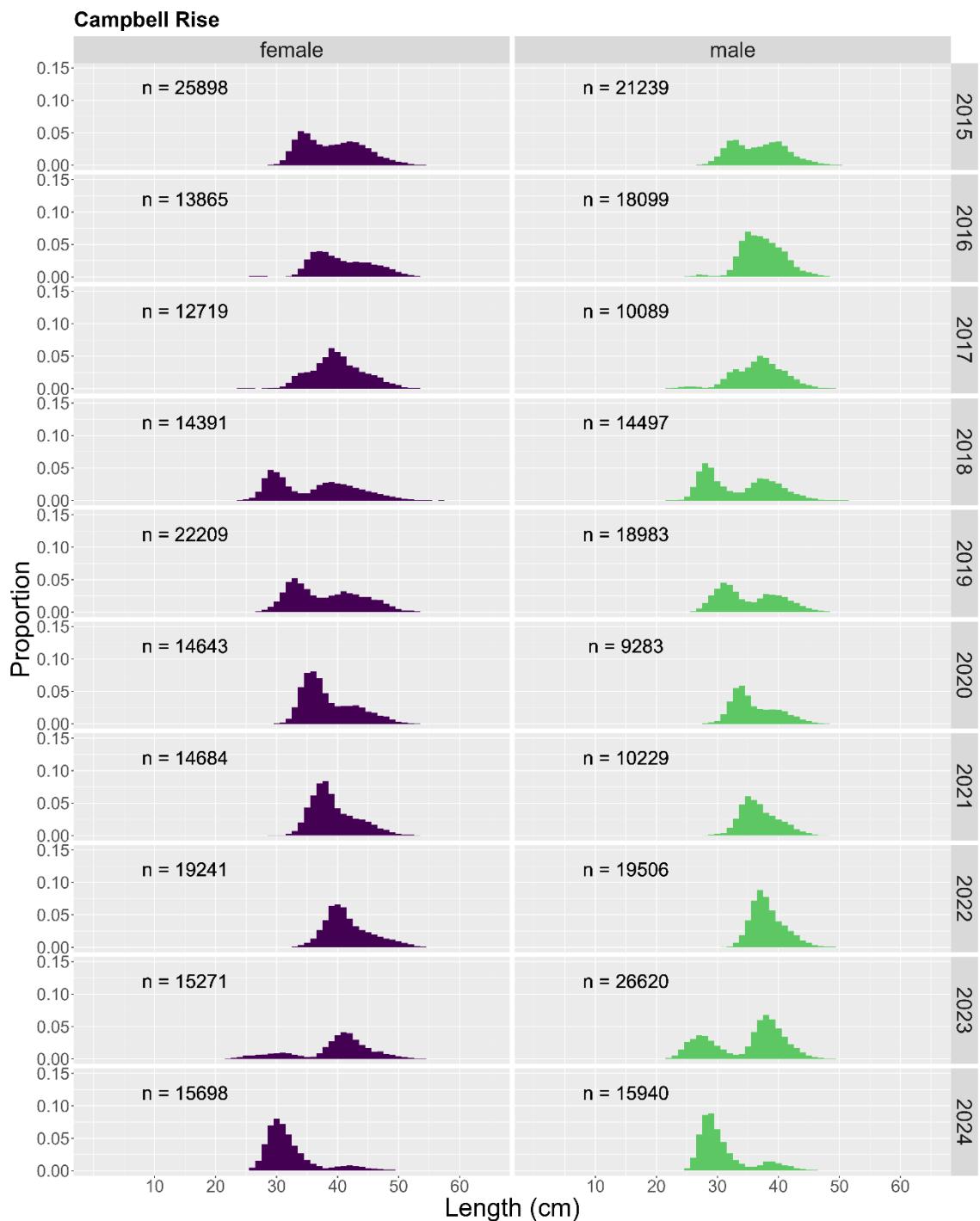
**Figure 9:** The timing of catch on Bounty Platform over each fishing year, labelled by year beginning (green bars), along with the proportion of running ripe females (orange lines). The catch for 1992–93 has been capped at 2000 t so that other years are more easily visible; the maximum observed value in that year was 4019 t.

### 3.4 Length and age frequencies

Length and age frequencies for Campbell Rise over the last ten years show a clear progression of cohorts through the years (Figure 10 and Figure 11). On Bounty Platform, cohort progression is also visible, despite the lower sample sizes particularly for age frequencies (Figure 12 and Figure 13).

For Campbell Rise, the two strongest cohorts in 2024 were from the 2020–21 year-classes at ages 3 and 4. The 2021 cohort was the dominant age class for males in 2024, but we do not expect this cohort to be fully recruited at age 3, especially for females. The 2020 cohort at age 4 was apparent for both females and males but was more important for females. The stronger year-class from 2015, has mostly disappeared in 2024 (Figure 14). On Bounty Platform the previously strong year classes from 2002 and 2007 are not obvious in 2024, while cohorts from 2012 and 2018 persist (Figure 15).

Historical length frequencies for both areas are given in Appendix 1 (Figure A1 and Figure A2). Historical age frequencies for both areas are given in Appendix 2 (Figure A3 and Figure A4).



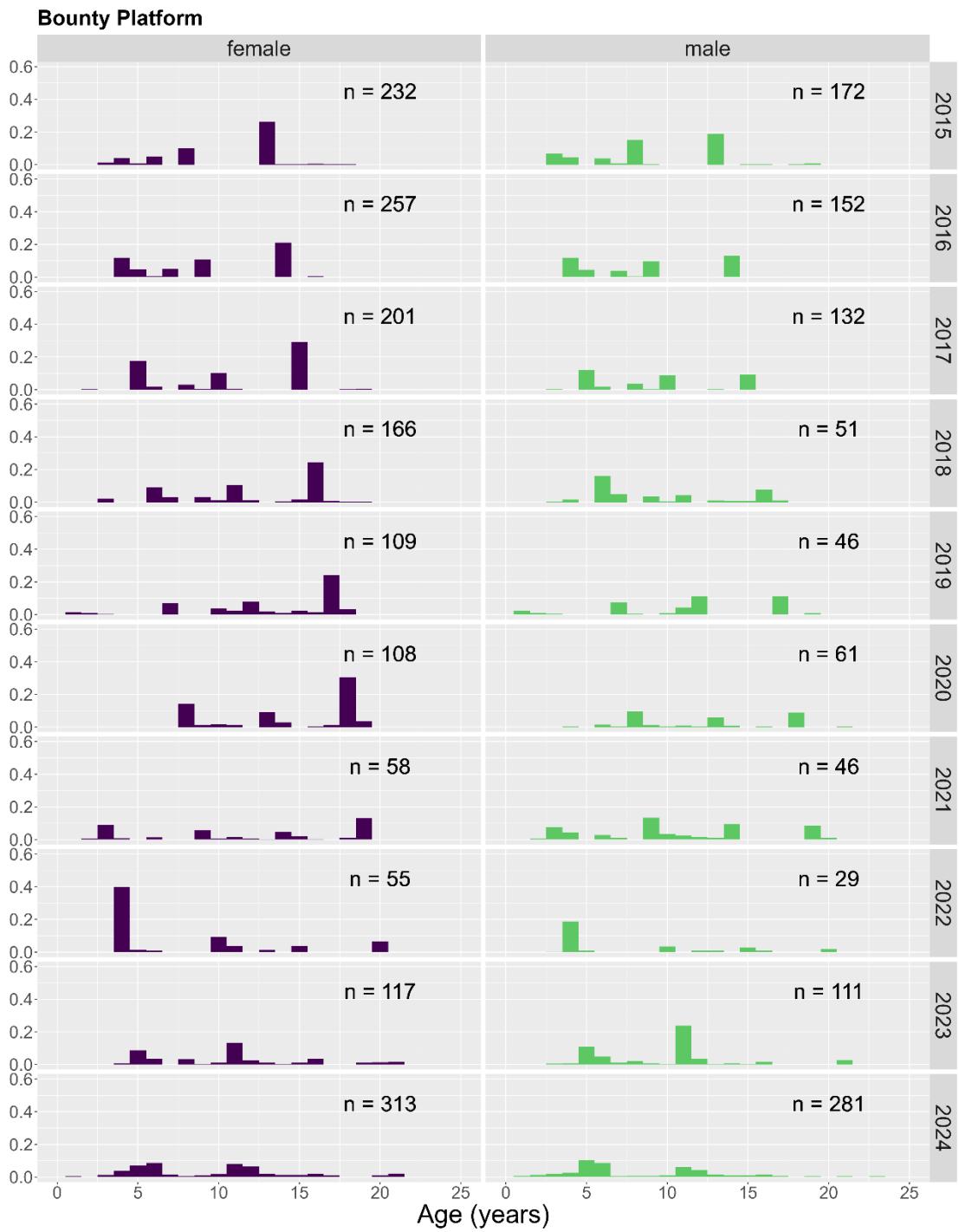
**Figure 10:** Length frequency distributions for southern blue whiting caught on Campbell Rise over the fishing years 2015–16 to 2024–25, labelled by year beginning (top to bottom) and for females (left column) and males (right column). The number of fish measured  $n$  is shown in the top left corner of each plot.



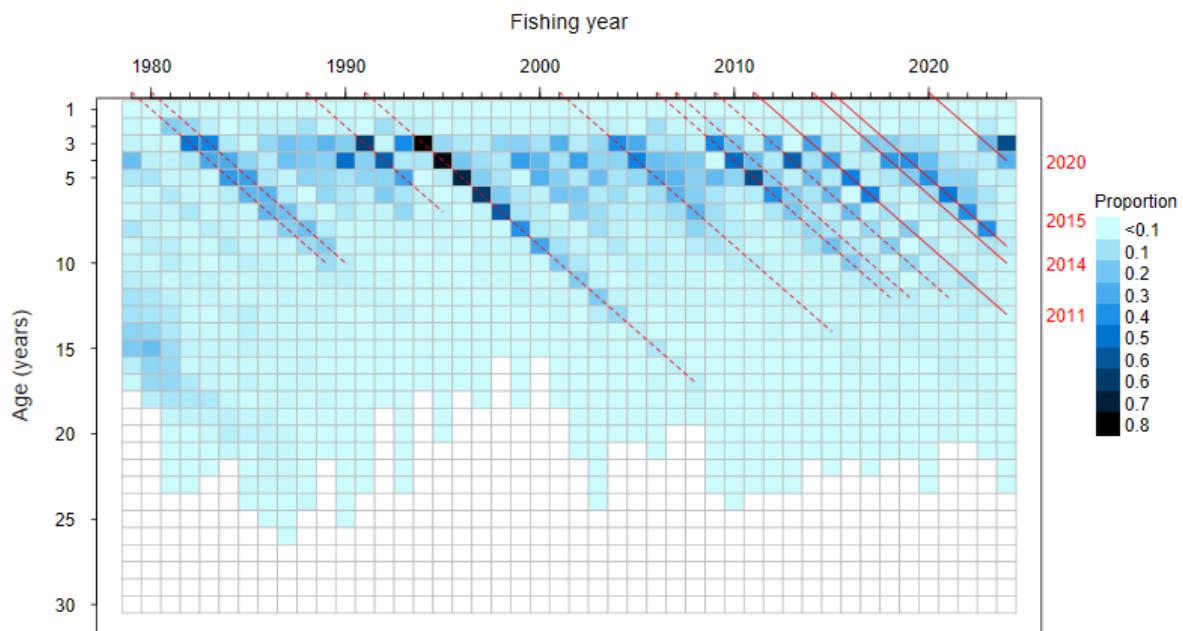
**Figure 11:** Age frequencies for southern blue whiting caught on Campbell Rise over the fishing years 2015–16 to 2024–25, labelled by year beginning (top to bottom) and for females (left column) and males (right column). The number of fish aged  $n$  is shown in the top right corner of each plot.



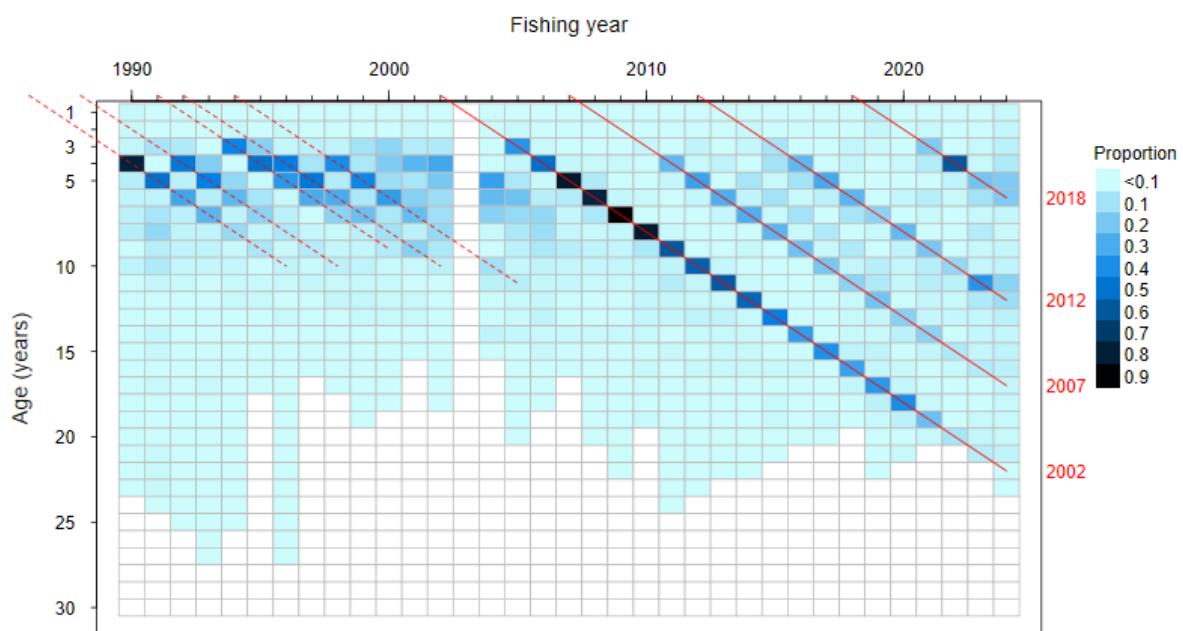
**Figure 12:** Length frequencies for southern blue whiting caught on Bounty Platform over the fishing years 2015–16 to 2024–25, labelled by year beginning (top to bottom) and for females (left column) and males (right column). The number of fish measured  $n$  is shown in the top left corner of each plot.



**Figure 13:** Age frequencies for southern blue whiting caught on Bounty Platform over the fishing years 2015–16 to 2024–25, labelled by year beginning (top to bottom) and for females (left column) and males (right column). The number of fish aged  $n$  is shown in the top right corner of each plot.



**Figure 14:** Scaled age frequencies for Campbell Rise since 1979–80 (scaled using length frequencies and an age-length key), labelled by year beginning. Higher proportions are indicated by darker shades of blue. Cohorts from 2011, 2014, 2015 and 2020 are highlighted by solid red lines; older cohorts are shown by dashed red lines.



**Figure 15:** Scaled age frequencies for Bounty Platform since 1990–91 (scaled using length frequencies and an age-length key), labelled by year beginning. Higher proportions are indicated by darker shades of blue. Cohorts from 2002, 2007, 2012 and 2018 are highlighted by solid red lines; older cohorts are shown by dashed red lines.

The mean-weighted CVs for the catch-at-age are shown for Campbell Rise and Bounty Platform in Table 3 and Table 4 respectively.

**Table 3: Mean-weighted CVs for the catch at age for Campbell Rise for fishing years from 2017–18 to 2024–25.**

| Year    | CV (males) | CV (females) | CV (total) |
|---------|------------|--------------|------------|
| 2017–18 | 17.7       | 16.6         | 12.4       |
| 2018–19 | 18.1       | 18.7         | 13.8       |
| 2019–20 | 22.0       | 18.2         | 14.0       |
| 2020–21 | 19.7       | 16.7         | 13.1       |
| 2021–22 | 20.5       | 18.3         | 13.7       |
| 2022–23 | 19.6       | 17.5         | 13.3       |
| 2023–24 | 19.5       | 21.1         | 14.6       |
| 2024–25 | 10.8       | 12.6         | 8.6        |

**Table 4: Mean-weighted CVs for the catch-at-age for Bounty Platform for fishing years from 2017–18 to 2024–25.**

| Year    | CV (males) | CV (females) | CV (total) |
|---------|------------|--------------|------------|
| 2017–18 | 20.3       | 16.3         | 13.5       |
| 2018–19 | 47.1       | 29.7         | 29.0       |
| 2019–20 | 55.8       | 38.2         | 34.4       |
| 2020–21 | 42.3       | 26.7         | 23.9       |
| 2021–22 | 68.5       | 70.4         | 58.6       |
| 2022–23 | 43.9       | 27.3         | 25.3       |
| 2023–24 | 34.8       | 40.8         | 27.0       |
| 2024–25 | 24.0       | 23.3         | 17.2       |

For the Campbell Rise, otolith sample sizes have been 500–600 per year (see Figure 11; with many more collected) with mean-weighted CVs in the range 12–15% from 2017 to 2023. In 2024, the mean-weighted CV was 8.6% (Table 3).

The number of otoliths collected on Bounty Platform have been generally low since 2015 (see Figure 13); in 2021, 2022 and 2023 the numbers collected were 104, 84, and 228 respectively, with all of them being aged. In 2024, due to increased sampling, 594 otoliths were aged, leading to a lower mean-weighted CV of 17.2% (Table 4). The previous time a mean-weighted CV below the target of 20% was achieved for Bounty Platform was in 2017.

#### 4. DISCUSSION

This report updates the length and age frequencies presented by Datta et al. (2024).

Catches from the Campbell Rise in 2024 were lower than those in 2022 and 2023. The catch from the Bounty Platform in 2024 was the highest since 2014. The spatial distribution of catch on the Campbell Rise has varied: catches were concentrated in both the north and south areas in 2022 and 2023; whereas the majority of catch was taken in the north area in 2024. Bounty Platform has seen the catch area generally reduce over the years.

The catch timing and proportion of spawning individuals has varied between years and areas. For Campbell Rise catch generally occurred from late August to late September across all years. There was no consistent date for peak spawning (running ripe) females, with the peak(s) occurring at any time between the start and end of September. Between 2011 and 2017 the peak of spawning for Bounty Platform shifted from mid- to late-August. From 2018 to 2022, catch took place over only a few days or weeks and so spawning data were harder to analyse. Southern blue whiting on the Bounty Platform

may potentially now have reverted to spawning earlier in August (see figures 4 and 5 in Wieczorek et al. 2024).

The length and age frequencies for both areas showed progression of cohorts, with strong recent year classes from the Campbell Rise in 2020 and potentially 2021, and for Bounty Platform in 2012 and 2018.

The mean-weighted CVs for catch-at-age were the lowest seen in recent years for both Campbell Rise (8.6%) and Bounty Platform (17.2%). Increased sampling for Bounty Platform in 2024 contributed towards the lower CV, and a change in reader could also have shifted the CVs. There are clear signals in the data which allow cohort tracking in both areas, which implies that the change in reader has not affected results significantly, and the new reader achieved a low CV on the reference set of otoliths (1.67%). Some older cohorts, present in 2023, were no longer obvious in 2024 such as the 2015 year-class on Campbell Rise and the 2007 year-class on Bounty Platform.

Suggestions from the Deepwater Working Group on presentation of the results shown here centred around assessing the representativeness of sampling. Potential ways of checking the representativeness included: (i) the T vessel characteristic (e.g. effect of vessel type, size and gear); (ii) analysing cumulative catch and sampling through time; and (iii) analysing otoliths by spatial aggregation. These will be considered for future analyses.

## 5. POTENTIAL RESEARCH

In order to achieve the target CV of 20%, at least 600 otoliths should continue to be sampled from the Bounty Platform as were sampled in 2024.

## 6. FULFILMENT OF BROADER OUTCOMES

As required under Government Procurement rules<sup>2</sup>, Fisheries New Zealand considered broader outcomes (secondary benefits such as environmental, social, economic, or cultural benefits) that would be generated by this project.

As part of this project, the team has continued to build capacity and capability in fisheries science and stock assessment. By using a broader team approach, we promoted a more diverse use of staff; and importantly shared expertise and grown 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. Earth Sciences New Zealand staff working on this project were a combination of senior and mid-career scientists, almost half of whom were women.

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

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<sup>2</sup> <https://www.procurement.govt.nz/procurement/principles-charter-and-rules/government-procurement-rules/planning-your-procurement/broader-outcomes/>

## 7. ACKNOWLEDGEMENTS

The authors thank Steven Holmes and Matt Dunn at Earth Sciences New Zealand for reviewing an earlier draft of this FAR. We also thank the Fisheries New Zealand Project Scientist Gretchen Skea for guiding the project and reviewing the document, and the Fisheries New Zealand Deepwater Working Group for useful suggestions and contributions. This work was completed under Objective 1 of Fisheries New Zealand project MID2024-01.

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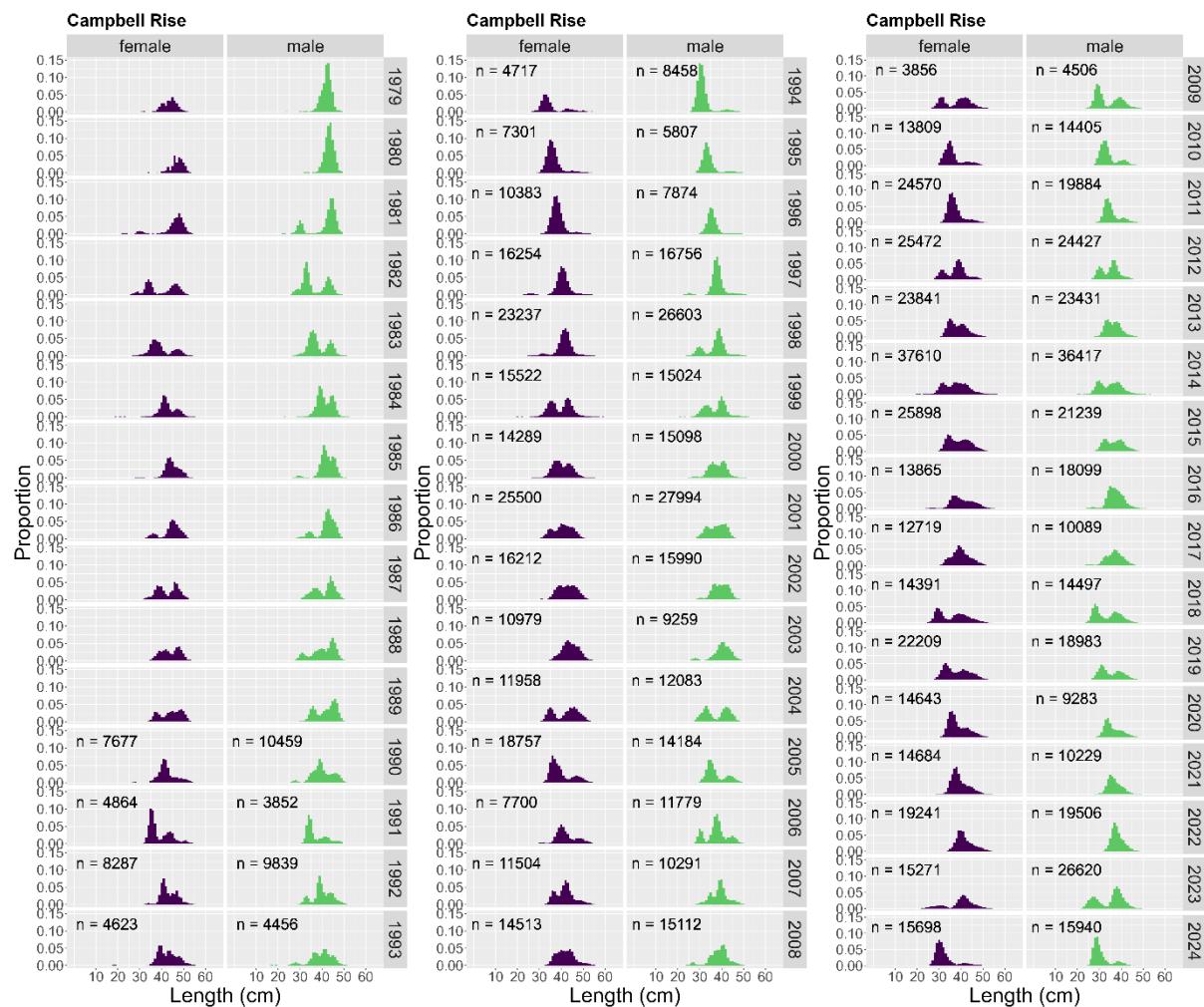
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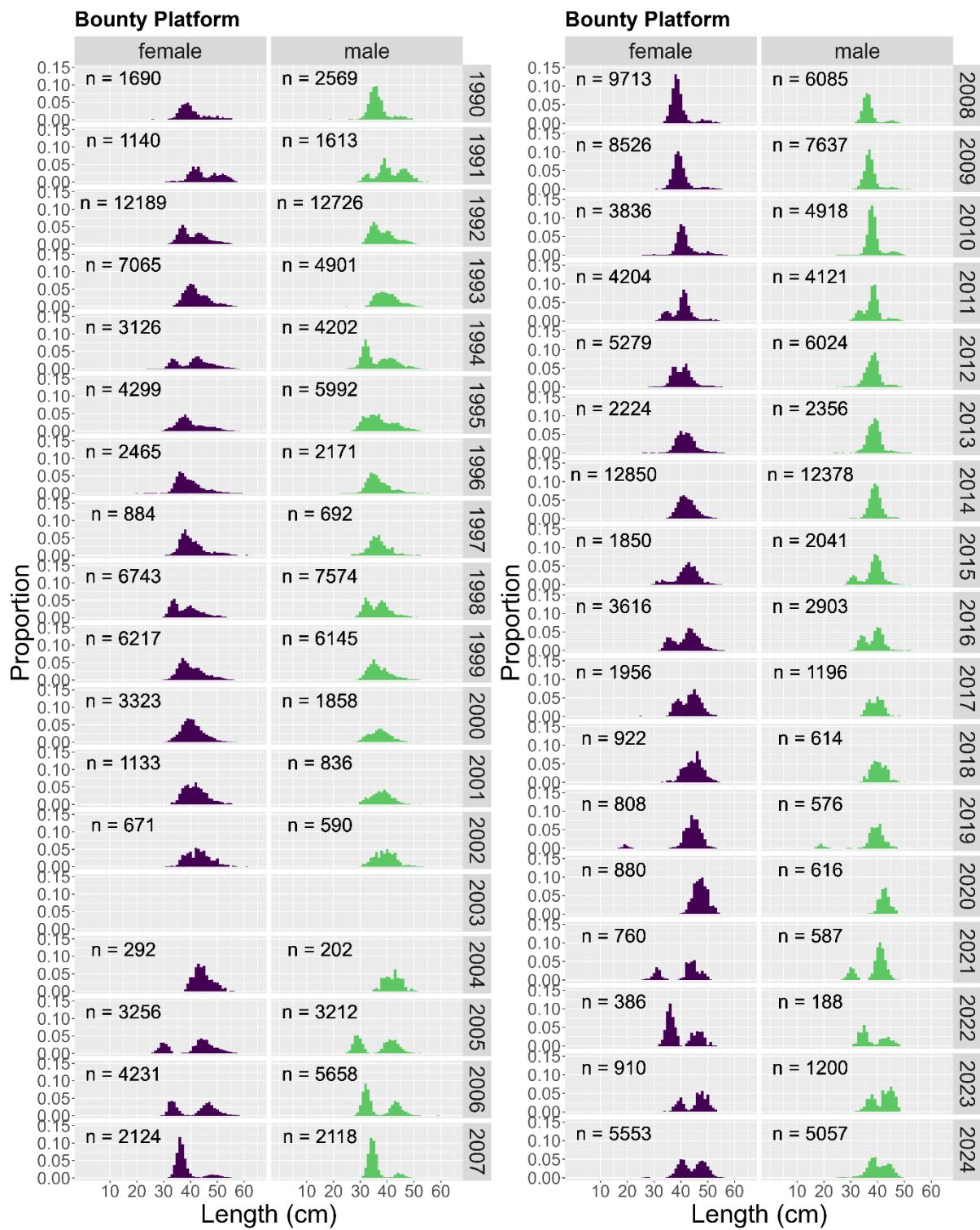
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## APPENDIX 1 – HISTORICAL LENGTH FREQUENCIES

Length frequencies back to 1979 for Campbell Rise (the start of the data for that area) are shown in Figure A1. The corresponding length frequencies for Bounty Platform back to 1990 (the start of the data for that area) are shown in Figure A2.



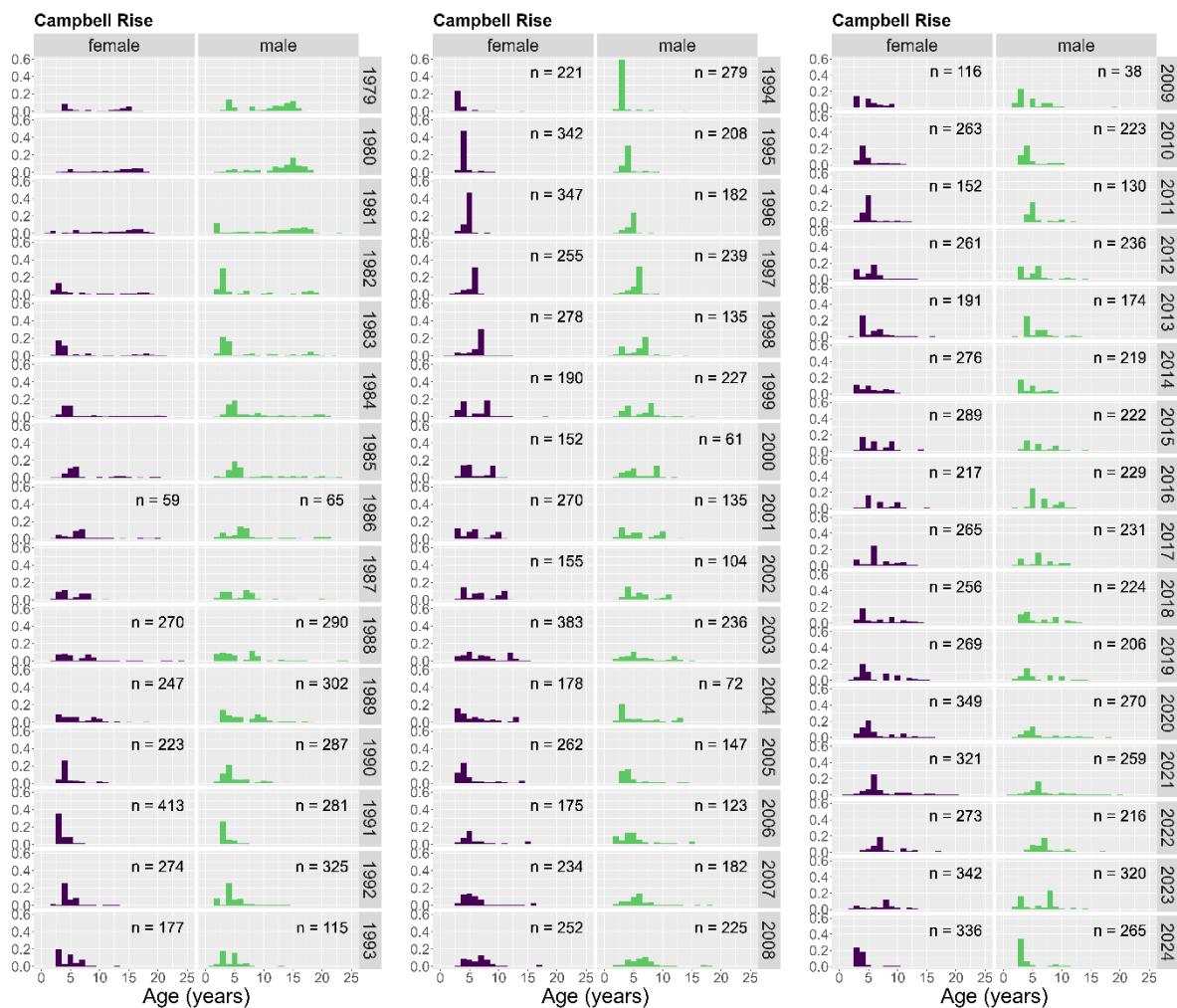
**Figure A1: Length frequencies for southern blue whiting samples caught on Campbell Rise over the fishing years 1979–80 to 2024–25, labelled by year beginning (top to bottom, then left to right) and for females (left column) and males (right column). Sample numbers given in top left corner of each year/sex combination. Note sample numbers were not available prior to 1990.**



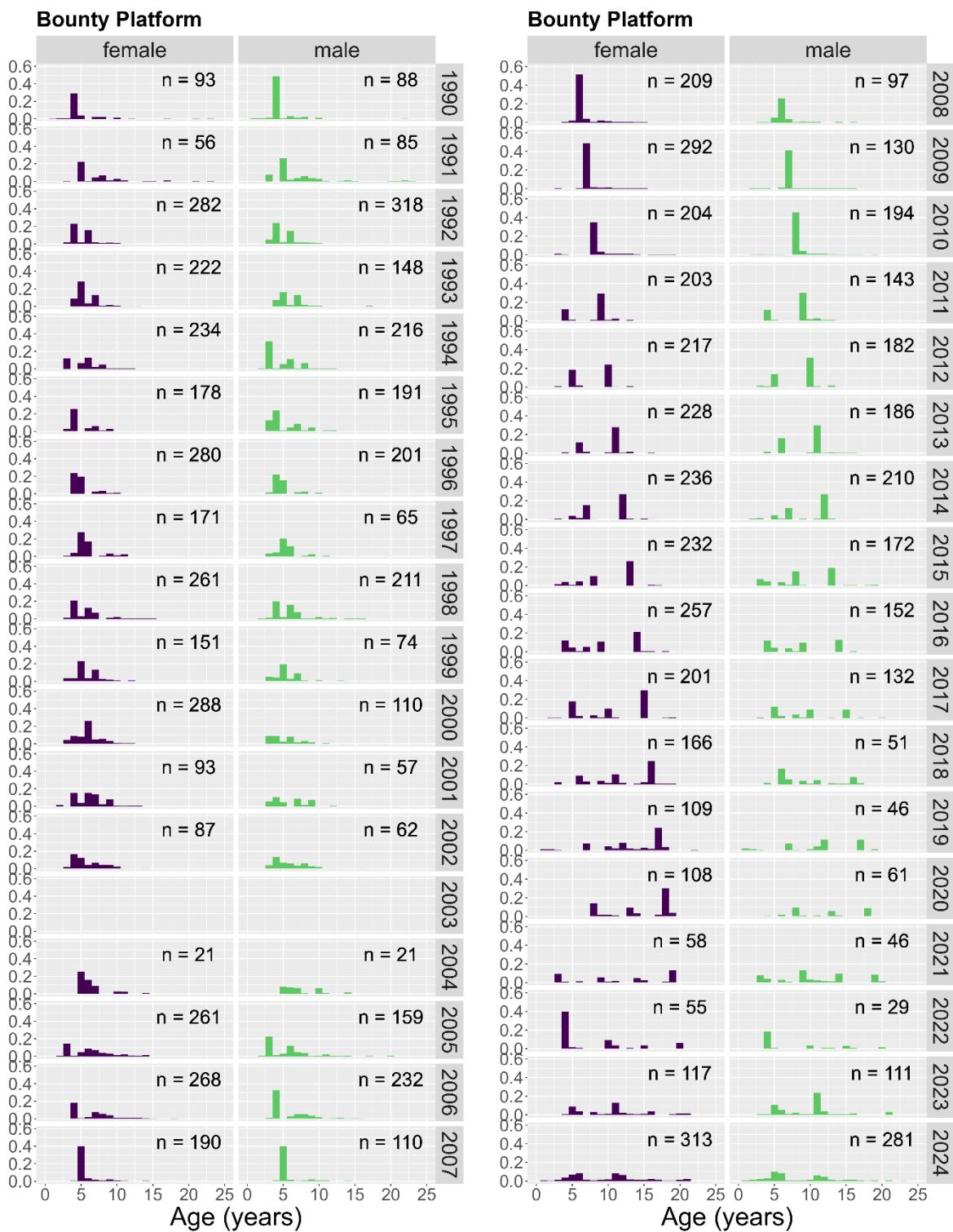
**Figure A2: Length frequencies for southern blue whiting samples caught on Bounty Platform over the fishing years 1990–91 to 2024–25, labelled by year beginning (top to bottom, left and then right) and for females (left column) and males (right column). Sample numbers given in top left corner of each year/sex combination. Note no sampling took place in 2003–04.**

## APPENDIX 2 – HISTORICAL AGE FREQUENCIES

Age frequencies back to 1979 for Campbell Rise (the start of the data for that area) are shown in Figure A3. The corresponding age frequencies for Bounty Platform back to 1990 (the start of the data for that area) are shown in Figure A4.



**Figure A3:** Age frequencies for southern blue whiting samples caught on Campbell Rise over the fishing years 1979–80 to 2024–25, labelled by year beginning (top to bottom, then left to right) and for females (left column) and males (right column). Sample numbers given in top right corner of each year/sex combination. Note that sample numbers were not available prior to 1986 and in 1987.



**Figure A4:** Age frequencies for southern blue whiting samples caught on Bounty Platform over the fishing years 1990–91 to 2024–25, labelled by year beginning (top to bottom, left and then right) and for females (left column) and males (right column). Sample numbers given in top right corner of each year/sex combination. Note no sampling took place in 2003–04.