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# Results from Bottom Trawl Survey on Flemish Cap of June-July 2023

by

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## Abstract

A stratified random bottom trawl survey on Flemish Cap was carried out from 6 July to 2 August 2023. Following the same procedures as in previous years, the area surveyed extends up to depths of 800 fathoms (1460 meters) and 181 fishing stations were planned. The survey was carried out by the R/V *Vizconde de Eza* with the usual survey gear (*Lofoten*). A total of 181 valid hauls were made, 120 up to 730 meters depth and 61 up to 1460 meters. Survey results are presented, including abundance indices of the main commercial species and age distributions for cod, redfish, American plaice, Greenland halibut, roughhead grenadier, squid and shrimp. The general indexes for this year are estimated taken into account the traditional swept area (strata 1-19, up to depths of 730 m.) and the total area surveyed (strata 1-34, up to depths of 1460 m.).

## Introduction

The survey on Flemish Cap was carried out on board R/V *Vizconde de Eza* in 2023. A total of 181 valid bottom trawls were made up to a depth of 1460 m. (800 fathoms) (Figure 1). The survey covered all strata of the bank adequately with the exception of the strata corresponding with the Beothuk knoll (35-39 strata) in the Southwest of the bank and the strata 26 and 27 in the Southeast. In Figure 1 we can observe the closed areas for Vulnerable Marine Ecosystems. Although the closed areas are tried to be avoided during the survey, sometimes this is impossible due to the lack of trawled zones. A synoptic sheet of the survey with vessel and gear characteristics is shown in Table 1. This was the 36th survey of the series initiated by the EU in 1988. All years, the survey has had a stratified random design following NAFO specifications (Doubleday, 1981). Dates, vessel, number of valid tows (including the number of valid tows until 700 m. in brackets since 2002) and dates of the survey each year were:

| Year | Vessel | Valid tows | Dates | Year | Vessel | Valid tows | Dates |
|---|---|---|---|---|---|---|---|
| **1988** | Cornide de Saavedra | 115 | 08/07 – 22/07 | **2005** | Vizconde de Eza | 176 (117) | 01/07 – 21/08 |
| **1989** | Cyros | 116 | 12/07 – 01/08 | **2006** | Vizconde de Eza | 179 (115) | 01/07 – 26/07 |
| **1990** | Ignat Pavlyuchenkov | 113 | 18/07 – 06/08 | **2007** | Vizconde de Eza | 174 (117) | 23/06 – 19/07 |
| **1991** | Cornide de Saavedra | 117 | 24/06 – 11/07 | **2008** | Vizconde de Eza | 179 (111) | 23/06 – 19/07 |
| **1992** | Cornide de Saavedra | 117 | 29/06 – 18/07 | **2009** | Vizconde de Eza | 178 (119) | 23/06 – 20/07 |
| **1993** | Cornide de Saavedra | 101 | 23/06 – 08/07 | **2010** | Vizconde de Eza | 153 (97) | 22/06 – 21/07 |
| **1994** | Cornide de Saavedra | 116 | 06/07 – 23/07 | **2011** | Vizconde de Eza | 128 (79) | 29/06 – 09/08 |
| **1995** | Cornide de Saavedra | 121 | 02/07 – 19/07 | **2012** | Vizconde de Eza | 174(118) | 26/06 – 24/07 |
| **1996** | Cornide de Saavedra | 117 | 28/06 – 14/07 | **2013** | Vizconde de Eza | 181(120) | 26/06 – 23/07 |
| **1997** | Cornide de Saavedra | 117 | 16/07 – 01/08 | **2014** | Vizconde de Eza | 181(120) | 25/06 – 23/07 |
| **1998** | Cornide de Saavedra | 119 | 17/07 – 02/08 | **2015** | Vizconde de Eza | 181(120) | 23/06 – 22/07 |
| **1999** | Cornide de Saavedra | 117 | 02/07 – 20/07 | **2016** | Vizconde de Eza | 181(120) | 23/06 – 22/07 |
| **2000** | Cornide de Saavedra | 120 | 10/07 – 28/07 | **2017** | Vizconde de Eza | 181(120) | 16/06 – 15/07 |
| **2001** | Cornide de Saavedra | 120 | 03/07 – 20/07 | **2018** | Vizconde de Eza | 181(120) | 26/06 – 24/07 |
| **2002** | Cornide de Saavedra | 120 | 30/06 – 17/07 | **2019** | Vizconde de Eza | 180(120) | 01/07 – 27/07 |
| **2003** | Vizconde de Eza | 177 (114) | 02/06 – 02/07 | **2020** | Vizconde de Eza | 181(120) | 30/06 – 29/07 |
| | Cornide de Saavedra | 50** | 07/06 – 17/06 | **2021** | Vizconde de Eza | 181(120) | 12/07 – 09/08 |
| **2004** | Vizconde de Eza | 177 (124) | 25/06 – 02/08 | **2022** | Vizconde de Eza | 182(121) | 06/07 – 18/08 |
| | Cornide de Saavedra | 61** | 23/07 – 02/08 | **2023** | Vizconde de Eza | 181(121) | 06/07 – 02/08 |

( ) valid tows carried out in depths lesser than 400 fathoms ** calibration tows

## Material and Methods

As last years, the R/V *Vizconde de Eza* carried out the survey following the same procedures as in previous years, the same bottom trawl net *Lofoten*, with a cod-end mesh size of 35 mm, as well as all other details of its use (Vazquez *et al.*, 2014).

## Results

Biomass of the main species during the survey estimated by swept area method (tons) are:

| | Survey | Cod | American plaice | Redfish | Greenland halibut | Roughhead grenadier | Squid | Shrimp |
|---|---|---|---|---|---|---|---|---|
| 120-730 m | 1988 | 40839 | 16046 | 188331 | 6926 | 2009 | 6 | 5615 |
| | 1989 | 114050 | 14047 | 162535 | 4472 | 871 | 9 | 2252 |
| | 1990 | 59362 | 11983 | 126757 | 5799 | 852 | 2107 | 3405 |
| | 1991 | 40248 | 10087 | 76955 | 8169 | 1335 | 1483 | 11352 |
| | 1992 | 26719 | 8656 | 130209 | 8728 | 1577 | 83 | 24508 |
| | 1993 | 60963 | 7861 | 72608 | 6529 | 3021 | 1 | 11673 |
| | 1994 | 26463 | 8227 | 162525 | 8037 | 1975 | 269 | 3879 |
| | 1995 | 9695 | 6785 | 87644 | 10875 | 1558 | 1 | 7276 |
| | 1996 | 9013 | 4098 | 119662 | 11594 | 1362 | 113 | 10461 |
| | 1997 | 9966 | 3026 | 165816 | 16098 | 1197 | 81 | 7449 |
| | 1998 | 4986 | 3437 | 70832 | 24229 | 1691 | 92 | 39367 |
| | 1999 | 2854 | 2585 | 98651 | 21207 | 1250 | 22 | 24692 |
| | 2000 | 3062 | 1606 | 177990 | 16959 | 1047 | 3 | 19003 |
| | 2001 | 2695 | 2404 | 77345 | 13872 | 2079 | 10 | 27204 |
| | 2002 | 2496 | 2049 | 121312 | 12100 | 1211 | 8 | 36510 |
| | 2003 | 1593 | 2286 | 93816 | 6214 | 2348 | 222 | 21087 |
| | 2004 | 4071 | 3525 | 250605 | 12292 | 3597 | 470 | 20182 |
| | 2005 | 5242 | 2760 | 451215 | 11698 | 2387 | 79 | 30675 |
| | 2006 | 12505 | 1691 | 766922 | 11708 | 3933 | 3541 | 16235 |
| | 2007 | 23886 | 1053 | 464628 | 13040 | 1367 | 411 | 17046 |
| | 2008 | 43675 | 1766 | 566126 | 11997 | 2961 | 5137 | 11092 |
| | 2009 | 75228 | 1442 | 358479 | 7777 | 782 | 1688 | 2797 |
| | 2010 | 69295 | 2446 | 212211 | 6657 | 1402 | 43 | 4894 |
| | 2011 | 106151 | 4084 | 197031 | 6765 | 888 | 89 | 1621 |
| | 2012 | 113227 | 4491 | 305946 | 4291 | 612 | 38 | 1041 |
| | 2013 | 72289 | 3698 | 219737 | 2799 | 807 | | 844 |
| | 2014 | 159939 | 3800 | 179925 | 5168 | 399 | 3 | 900 |
| | 2015 | 114807 | 3821 | 158001 | 6577 | 478 | | 1551 |
| | 2016 | 80583 | 4325 | 171199 | 6139 | 373 | 3 | 2478 |
| | 2017 | 89414 | 7475 | 163262 | 7632 | 616 | 2350 | 2884 |
| | 2018 | 75795 | 6109 | 100483 | 5578 | 625 | 49 | 4394 |
| | 2019 | 42460 | 7654 | 143297 | 5496 | 590 | 363 | 9273 |
| | 2020 | 67442 | 7752 | 227261 | 6649 | 624 | 142 | 6734 |
| | 2021 | 51501 | 9372 | 148914 | 5872 | 699 | 329 | 2101 |
| | 2022 | 62206 | 6654 | 201837 | 4226 | 546 | 4 | 862 |
| | 2023 | 100474 | 9893 | 226474 | 6873 | 958 | 2 | 912 |
| 120-1460 m | 2004 | 4071 | 3525 | 250638 | 28676 | 17184 | 479 | 20195 |
| | 2005 | 5242 | 2760 | 453086 | 20460 | 14253 | 83 | 31186 |
| | 2006 | 12505 | 1691 | 766952 | 23475 | 12109 | 3551 | 15250 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2007 | 23886 | 1053 | 464660 | 30731 | 7807 | 411 | 17120 |
| 2008 | 43675 | 1766 | 566647 | 39614 | 12139 | 5144 | 11141 |
| 2009 | 75228 | 1442 | 358521 | 36047 | 7304 | 1694 | 2792 |
| 2010 | 69295 | 2446 | 212282 | 27096 | 9091 | 43 | 4896 |
| 2011 | 106151 | 4084 | 196574 | 32309 | 8997 | 90 | 1733 |
| 2012 | 113227 | 4491 | 305974 | 23505 | 5476 | 41 | 1063 |
| 2013 | 72289 | 3698 | 219767 | 23391 | 4298 | | 855 |
| 2014 | 159939 | 3800 | 179956 | 29288 | 4111 | 3 | 901 |
| 2015 | 114807 | 3821 | 158055 | 58180 | 3702 | | 1551 |
| 2016 | 80583 | 4325 | 171219 | 34642 | 3836 | 4 | 2479 |
| 2017 | 89414 | 7475 | 163273 | 52237 | 5141 | 2366 | 2897 |
| 2018 | 75795 | 6109 | 100512 | 36482 | 4375 | 52 | 4404 |
| 2019 | 42460 | 7654 | 143390 | 20673 | 6500 | 365 | 9325 |
| 2020 | 67442 | 7752 | 227332 | 16194 | 4037 | 142 | 6869 |
| 2021 | 51501 | 9372 | 148929 | 19969 | 3964 | 351 | 2246 |
| 2022 | 62206 | 6654 | 201850 | 16527 | 3720 | 4 | 902 |
| 2023 | 100474 | 9893 | 226518 | 33629 | 5332 | 2 | 935 |

Values for surveys before 2003, when R/V *Cornide de Saavedra* was used, are transformed to their equivalences for R/V *Vizconde de Eza* following the accepted calibration among the two vessels (González Troncoso and Casas, 2005). From 2004 onwards, abundances are calculated for 19 shallowest strata covering the bank up to 730 m. deep, as it was done in previous years, and for 32 strata up to 1460 m. deep.

The biomass indices for the most important species or groups up to 730 m. are presented in Table 2, and even they belong to different species, having into account the pelagic vs. demersal character, and the transformation to the new scale only was carried out for the main species, a global index is presented for each year, which minimum occurred in 2001. The composition of the species in 2023 is similar to that found in the beginning of the series: cod at high levels, shrimp residual, redfish fluctuating around 150-300 kt. and grenadiers and Greenland halibut (<730m) at low levels. Greenland halibut biomass index (<1400m) increased in 2017 next to historic maximums, decreasing until 2022, with an increase in the last year. Everything seems to point to a return to the situation found at the beginning of the EU survey series, and prior to the changes induced by the collapse of cod in the late 90´s. American plaice biomass has increased since 2014 and it seems to show signs of recovery, being the 2023 value the highest of the series since 1991.

Due to administrative problems in the Spanish administration, the ALKs and maturity ogives for cod and the three species of *Sebastes* (S. *norvegicus*, *S. mentella* and *S. fasciatus*) could not be processed in 2023. Moreover, the ALKs for American plaice has not been produced since 2019 due to lack of time.

**Cod**

Mean catch per haul and biomass by strata with standard errors for 2023 are presented in Table 3. These indices are compared with results of previous surveys in Table 5. Total biomass calculated by the swept area method and compared with Russian survey results are:

| Year | EU (1) | Russia: (2) | (3) | Year | EU (1) | Russia: (2) | (3) | |
|---|---|---|---|---|---|---|---|---|
| **1983** | | 23,070 | | **2004** | 4,071 | | - | |
| **1984** | | 31,210 | | **2005** | 5,242 | | | |
| **1985** | | 28,070 | | **2006** | 12,505 | | | |
| **1986** | | 26,060 | | **2007** | 23,866 | | | |
| **1987** | | 10,150 | 21,600 | **2008** | 43,675 | | | |
| **1988** | 40,839 | 7,720 | 34,200 | **2009** | 75,228 | | | |
| **1989** | 114,050 | 36,520 | 78,300 | **2010** | 69,295 | | | |
| **1990** | 59,362 | 3,920 | 15,200 | **2011** | 106,151 | | | |
| **1991** | 40,248 | 6,740 | 8,200 | **2012** | 113,227 | | | |
| **1992** | 26,719 | 2,490 | 2,400 | **2013** | 72,289 | | | |
| **1993** | 60,963 | 8,990 | 9,700 | **2014** | 159,939 | | | |
| **1994** | 26,463 | - | - | **2015** | 114,807 | | | |
| **1995** | 9,695 | 8,260 | - | **2016** | 80,583 | | | |
| **1996** | 9,013 | 730 | - | **2017** | 89,414 | | | |
| **1997** | 9,966 | - | - | **2018** | 75,795 | | | |
| **1998** | 4,986 | - | - | **2019** | 42,460 | | | |
| **1999** | 2,854 | - | - | **2020** | 67,442 | | | |
| **2000** | 3,062 | - | - | **2021** | 51,501 | | | |
| **2001** | 2,695 | 784 | - | **2022** | 62,206 | | | |
| **2002** | 2,496 | 694 | - | **2023** | 100,474 | | | tons |
| **2003** | 1,593 | | | | | | | |

**1)** Biomass estimated from bottom trawl survey. **2)** Biomass estimated from bottom trawl survey (Kiseleva and Vaskov 1994; Kiseleva 1996, 1997; Vaskov and Igashov, 2003). **3)** Biomass estimated of bottom trawlable plus pelagic biomass (Borovkov *et al.* 1993; Kiseleva and Vaskov 1994).

Table 4 shows the length distribution of this stock. As explained below, it was not possible to get the age-length key for this stock in the 2023 survey. For that, Tables 6 and 7, that show the age-length key and the abundance at age by stratum respectively, have not been updated.

Distribution of survey catches in the last four surveys is presented in Figure 2. Evolution of biomass and abundance are illustrated in Figure 3. The abundance at age along the series is presented in Table 8 and Figure 4.

The 1992 to 2003 year-classes failed almost completely. The abundances of 2004-2008 years classes were higher than in previous 12 years. The abundance of the 2010 year-class was the highest of the series, and the 2009 and 2011 ones were also high. The 2012-2018 year-classes failed according to current results at age 1 and the 2019-2021 years classes seems to be better than in recent years but it remains still at low level (Figure 4). In 2022, the recruitment shows a new decrease.

After the historic maximum in biomass in 2014, the biomass decreased to a low in 2019, in the level of the 2008 one, increasing since then. The abundance had a peak in 2011 due to the very high recruitment, and since then decreased, indicating an increase in older ages and a fail in recruitment, but increasing in 2023.

**American plaice**

Mean catch per haul and biomass by strata with standard errors for 2023 are presented in Table 9. Survey biomass, as calculated by the swept area method, is compared with results of previous surveys in Table 11. This biomass is compared with Russian survey results in the following table:

| Year | EU | Russia (1) | Year | EU | Russia (1) | Year | EU | Russia (1) |
|---|---|---|---|---|---|---|---|---|
| **1983** | | 8,900 | **1997** | 3,026 | | **2011** | 4,084 | |
| **1984** | | 7,500 | **1998** | 3,437 | | **2012** | 4,491 | |
| **1985** | | 7,800 | **1999** | 2,585 | | **2013** | 3,698 | |
| **1986** | | 20,200 | **2000** | 1,606 | | **2014** | 3,800 | |
| **1987** | | 9,300 | **2001** | 2,404 | | **2015** | 3,821 | |
| **1988** | 16,046 | 6,500 | **2002** | 2,049 | | **2016** | 4,325 | |
| **1989** | 14,047 | 5,000 | **2003** | 2,286 | 548 | **2017** | 7,475 | |
| **1990** | 11,983 | 1,200 | **2004** | 3,525 | 1,398 | **2018** | 6,109 | |
| **1991** | 10,087 | 14,400 | **2005** | 2,760 | | **2019** | 7,654 | |
| **1992** | 8,656 | 1,200 | **2006** | 1,691 | | **2020** | 7,752 | |
| **1993** | 7,861 | 2,700 | **2007** | 1,053 | | **2021** | 9,372 | |
| **1994** | 8,227 | | **2008** | 1,766 | | **2022** | 6,654 | |
| **1995** | 6,785 | | **2009** | 1,442 | | **2023** | 9,893 | ton |
| **1996** | 4,098 | ton | **2010** | 2,446 | ton | | | |

**1)** Rikhter *et al.* 1991; Borovkov *et al.* 1992, 1993, 1994; Vaskov and Igashov, 2003.

Table 10 shows the length distribution and Tables 12 and 13 the age-length key and the abundances at age by stratum respectively (no updated since 2019). Figure 5 shows the distribution of the survey catches in the last four surveys. The abundance at age along the series is shown in Table 14 (no updated since 2019). Also, the evolution of survey biomass and abundance along the series is presented in Figure 6. Figure 7 shows the age distribution over the years (no updated since 2019).

Fish aged 6 or more roughly correspond with fishable biomass. Results indicate two periods for recruitment, and a change from an upper abundance level to a lower one. The 1991 year-class was the first weak cohort. The 2006 year-class is the more abundant since 1991, but its abundance is only intermediate. Recruitment for later year-classes seems to be weaker; too weak for a quick recovery of the stock. Figure 7 illustrates the lack of recruitment that occurred for many years, and how most recent year-classes are weaker than those at the beginning of the series. We have to wait to see what happened since 2020. The biomass and abundance were more or less stable from 2011 to 2016, showing an upward trend since 2017 reaching in 2023 the maximum values since 1991.

The ALKs for American plaice since 2020 are not available yet due to lack of time, so the indices by age are presented only until year 2019. The length distribution doesn´t indicate a change with regards to previous years.

**Redfish**

All redfish catches were classified by species. The group name *juvenile* contains those individuals of small size for which routine classification was not possible. The 15 cm maximum length is a good reference for this group, but it has been never used as a criterion. The skill required to identify the species increased over time, so the group *juvenile* is not an uniform defined group, but it is maintained for practical reasons.

Mean catch per standard haul and biomass by strata with the standard errors are presented in Tables 15, 19, 23 and 27 for *Sebastes norvegicus*, *S. mentella*, *S. fasciatus* and the *juvenile* group, respectively. The following table shows the total biomass (tons) by year in the traditional strata (<730 m.).

| Year | *Sebastes norvegicus* | *Sebastes spp.* | | | Total |
|---|---|---|---|---|---|
| | | *mentella* | *fasciatus* | *juvenile* | |
| **1988** | 18,229 | | 170,102 | | 188,331 |
| **1989** | 27,312 | | 135,223 | | 162,535 |
| **1990** | 16,751 | 86,695 | | 23,311 | 126,757 |
| **1991** | 4,864 | 59,552 | 6,755 | 5,784 | 76,955 |
| **1992** | 4,909 | 85,408 | 6,314 | 33,578 | 130,209 |
| **1993** | 4,789 | 21,235 | 5,175 | 41,409 | 72,608 |
| **1994** | 39,516 | 42,495 | 9,303 | 71,211 | 162,525 |
| **1995** | 10,754 | 70,567 | 5,986 | 337 | 87,644 |
| **1996** | 13,431 | 92,647 | 13,112 | 472 | 119,662 |
| **1997** | 77,125 | 66,710 | 20,780 | 1,201 | 165,816 |
| **1998** | 7,640 | 53,946 | 7,656 | 1,590 | 70,832 |
| **1999** | 11,215 | 77,610 | 9,460 | 366 | 98,651 |
| **2000** | 53,388 | 106,283 | 15,364 | 2,955 | 177,990 |
| **2001** | 10,244 | 45,931 | 13,715 | 7,455 | 77,345 |
| **2002** | 11,651 | 48,760 | 27,556 | 33,345 | 121,312 |
| **2003** | 40,110 | 28,785 | 15,031 | 9,890 | 93,816 |
| **2004** | 85,383 | 45,999 | 76,164 | 43,059 | 250,605 |
| **2005** | 147,688 | 105,110 | 123,326 | 75,762 | 451,215 |
| **2006** | 298,290 | 105,849 | 319,387 | 43,396 | 766,922 |
| **2007** | 88,071 | 51,191 | 261,790 | 63,576 | 464,628 |
| **2008** | 240,777 | 42,570 | 202,288 | 80,491 | 566,126 |
| **2009** | 72,211 | 111,787 | 171,676 | 2,804 | 358,479 |
| **2010** | 47,377 | 62,684 | 97,067 | 5,083 | 212,211 |
| **2011** | 29,056 | 103,678 | 59,753 | 4,543 | 197,030 |
| **2012** | 55,410 | 166,693 | 82,539 | 1,304 | 305,946 |
| **2013** | 32,016 | 102,500 | 84,801 | 420 | 219,737 |
| **2014** | 37,171 | 96,158 | 46,174 | 422 | 179,925 |
| **2015** | 30,672 | 45,668 | 80,494 | 1,167 | 158,001 |
| **2016** | 35,069 | 79,143 | 55,394 | 1,593 | 171,199 |
| **2017** | 23,371 | 92,136 | 47,521 | 234 | 163,262 |
| **2018** | 10,771 | 57,403 | 30,407 | 1,931 | 100,512 |
| **2019** | 22,588 | 49,464 | 43,222 | 28,023 | 143,297 |
| **2020** | 70,138 | 95,372 | 58,304 | 3,508 | 227,261 |
| **2021** | 15,723 | 78,212 | 51,733 | 3,246 | 148,914 |
| **2022** | 27,286 | 93,914 | 73,761 | 6,876 | 201,837 |
| **2023** | 36,931 | 109,533 | 72,944 | 7,066 | 226,474 |

Due to the administrative problems explained above, it was not possible to get the age-length key for these stocks in the 2023 survey. For that, Tables 16 and 18, 20 and 22, 24 and 26, showing the age length key and the abundance at age by stratum for the three species of redfish respectively, were not updated for 2023. Tables 17, 21, 25 and 28 show the length frequency of *Sebastes norvegicus*, *S. mentella*, *S. fasciatus* and the *juvenile* group, respectively. Catches per haul distributions in the 2023 survey and biomass of the three species and juveniles are presented in the Figure 8 and 9 respectively.

**Greenland halibut**

Mean catch per standard haul and the estimated biomass by strata with their standard errors in the 2023 survey are presented in Table 29. These indices are compared with results of previous surveys in Table 30. The following table summarises the total biomass in tons by year in depths <730 m. (1988-2023) and in depths up to 1460 m. (2004-2023).

| Year | EU < 730 m. | Year | EU < 730 m. | EU < 1460 m. |
|---|---|---|---|---|
| **1988** | 6,926 | **2004** | 12,292 | 28,343 |
| **1989** | 4,472 | **2005** | 11,698 | 21.515 |
| **1990** | 5,799 | **2006** | 11,706 | 24.357 |
| **1991** | 8,169 | **2007** | 13,040 | 31,723 |
| **1992** | 8,728 | **2008** | 11,995 | 39,614 |
| **1993** | 6,529 | **2009** | 7,775 | 36,047 |
| **1994** | 8,037 | **2010** | 6,299 | 26,739 |
| **1995** | 10,875 | **2011** | 6,713 | 32,257 |
| **1996** | 11,594 | **2012** | 4,291 | 23,505 |
| **1997** | 16,098 | **2013** | 2,799 | 23,391 |
| **1998** | 24,229 | **2014** | 5,168 | 29,288 |
| **1999** | 21,207 | **2015** | 6,577 | 58,180 |
| **2000** | 16,959 | **2016** | 6,139 | 34,642 |
| **2001** | 13,872 | **2017** | 7,632 | 52,237 |
| **2002** | 12,100 | **2018** | 5,578 | 36,482 |
| **2003** | 6,214 | **2019** | 5,496 | 20,673 |
| | | **2020** | 6,649 | 16,194 |
| | | **2021** | 5,872 | 19,969 |
| | | **2022** | 4,226 | 16,527 |
| | | **2023** | 6,873 | 33,629 |

Age-length keys and length frequency are presented in Tables 31 and 32 respectively. Frequency at age by stratum for 2023 is presented in Table 33. Catch per haul distribution for the last four surveys is presented in Figure 10. Figure 11 shows the estimated biomass with their standard error and numbers by year. The abundance at age along the series is shown in Table 34. Figure 12 shows the age distribution by year in the EU Flemish Cap surveys. The 2017 biomass and abundance indices until 1430 m. are the second highest of the series, after the 2015 values. The 2020 and 2022 biomasses to 1400 m. are the lowest in the historical series, since 2004. The 2023 biomass showed a pronounced increase. The 2017 age 1 numbers were the highest since 2004, but no good recruitments can be seen since then.

**Roughhead grenadier** (*Macrourus berglax*)

Mean catch per standard haul and estimated biomass by strata with their standard errors for 2023 are presented in Table 35. These indices are compared with results of previous surveys in Table 36. The following table summarises the total biomass in tons by year:

| Year | EU < 730 m. | Year | EU < 730 m. | EU < 1460 m. |
|---|---|---|---|---|
| **1988** | 2,009 | **2004** | 3,597 | 17,185 |
| **1989** | 871 | **2005** | 2,387 | 12,560 |
| **1990** | 852 | **2006** | 3,933 | 11,336 |
| **1991** | 1,335 | **2007** | 1,367 | 7,271 |
| **1992** | 1,577 | **2008** | 2,961 | 12,138 |
| **1993** | 3,021 | **2009** | 781 | 7,303 |
| **1994** | 1,975 | **2010** | 1,403 | 9,092 |
| **1995** | 1,558 | **2011** | 729 | 8,800 |
| **1996** | 1,362 | **2012** | 612 | 5,477 |
| **1997** | 1,197 | **2013** | 807 | 4,298 |
| **1998** | 1,691 | **2014** | 399 | 4,111 |
| **1999** | 1,250 | **2015** | 478 | 3,702 |
| **2000** | 1,047 | **2016** | 373 | 3,836 |
| **2001** | 2,079 | **2017** | 616 | 5,141 |
| **2002** | 1,211 | **2018** | 625 | 4,375 |
| **2003** | 2,348 | **2019** | 590 | 6,500 |
| | | **2020** | 624 | 4,037 |
| | | **2021** | 699 | 3,964 |
| | | **2022** | 546 | 3,720 |
| | | **2023** | 958 | 5332 |

Age-length keys and length frequency and are presented in Tables 37 and 38. Frequency at age by strata is presented in Table 39. Catch per haul distribution in the last four surveys is presented in Figure 13. Figure 14 shows the estimated biomass with their standard error and numbers by year. The abundance at age along the series is shown in Table 40 and Figure 15. Biomass and abundance have been stable in the last years at low levels.

**Squid**

Some indices of the squid (*Illex illecebrosus*) are presented. Total biomass and abundance are presented in Table 41. The biomass is presented by stratum and year. The 1988-2002 indices were transformed for the R/V *Cornide de Saavedra* to the R/V *Vizconde de Eza* level (González-Troncoso, 2016). Catch per haul distribution for the last four surveys is presented in Figure 16. The indices could be seen in Figure 17. No all the years squid is present in the survey, and the indices show a high variability.

**Shrimp**

Total biomass and mean catch per town, as well as those indices for females, are presented in Table 42 and Figure 19 by year. Abundance at age by year is presented in Table 43 and Figure 20. Catch per haul distribution for the last four surveys is presented in Figure 18. All indices are up to 700 meters. The biomass and abundance estimated in 2023 EU survey were mainly represented by female; young specimens (mainly males around 25% in number) remain well below average. The 2023 female biomass values are between the lowest estimated in the historical survey series, confirming the downward trend started in 2020. More detailed results are presented in Casas and Manuel, 2023.

**Biodiversity**

Figure 21 shows the biodiversity of the survey. The percentage of catch of the species analyzed in this work, together with each functional group (other Fish, other Crustacea, other Mollusca, human rests and others), are presented. At the beginning of the series, other Fishes as well as Atlantic cod were the most caught taxa, but since 1994 the catch is dominated by the three redfish species, followed since 2008 for the Atlantic cod due to the recovery of this stock. The importance of the shrimp varies depending on the year, being a good part of the catches between 1998 and 2003.

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**Table 1**. Technical data of the 2023 survey.

| Procedure | Specification |
|---|---|
| Vessel | R/V *Vizconde de Eza* |
| GT | 1 400 t |
| Power | 1 800 HP |
| Mean trawling speed | 3.0 -3.5 knots |
| Trawling time | 30 minutes effective time |
| Fishing gear | type *Lofoten* |
| footrope / handrope | 31.20 / 17.70 m. |
| footgear | 27 steel bobbins of 35 cm |
| vertical opening | 3.0 m. (MARPORT) |
| warps | 100 meters, 45 mm, 200 Kg/100m |
| trawl doors | polyvalent, 850 Kg |
| wire length | 2 × depth echo sounder (m.) + 250. |
| mesh size in cod-end | 35 mm |
| Type of survey | Stratified sampling |
| Station selection procedure | Random |
| Criterion to change position of a selected tow | - Unsuitable bottom for trawling according to ecosonder register.<br>- Information on gear damage from previous surveys. |
| Criterion to reject data from tow | - tears in cod-end<br>- severe tears in the gear<br>- less than 20 minutes tow<br>- bad behaviour of the gear |
| Daily period for fishing | 6.30 to 18:30 hours |
| Species for sampling | All fish, cephalopods, shrimp and invertebrates |
| Species for age determination | Cod, American plaice, redfish (*Sebastes sp.*), Greenland halibut and roughhead grenadier (*Macrourus berglax*). |

**Table 2**. Biomass (t.) for the most important species or groups of species in 1988-2023 surveys in depths lesser than 730 m.

| Species | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rajidae | 4495 | 1938 | 2823 | 4061 | 3780 | 6241 | 3506 | 2268 | 2051 | 1842 | 1978 | 1608 | 1150 | 2236 | 1544 | 4608 | 6241 | 4238 |
| *Synaphobranchus sp.* | 217 | 88 | 40 | 80 | 72 | 105 | 8 | 16 | 0 | 8 | 40 | 0 | 0 | 24 | 8 | 24 | 88 | 72 |
| *Urophycis sp.* | 643 | 169 | 169 | 257 | 72 | 169 | 217 | 80 | 80 | 32 | 225 | 249 | 169 | 394 | 129 | 547 | 667 | 740 |
| *Antimora sp.* | 394 | 306 | 281 | 563 | 724 | 820 | 796 | 193 | 185 | 233 | 491 | 290 | 265 | 667 | 346 | 306 | 1158 | 1110 |
| Macrouridae | 3088 | 1456 | 1222 | 2252 | 2589 | 6498 | 3233 | 2606 | 2340 | 2292 | 2831 | 2332 | 1809 | 3080 | 2043 | 3691 | 4914 | 3353 |
| *Notacanthus sp.* | 499 | 410 | 64 | 474 | 450 | 740 | 458 | 346 | 177 | 290 | 169 | 64 | 97 | 105 | 64 | 24 | 145 | 64 |
| *Illex sp.* | 8 | 8 | 1649 | 1158 | 64 | 0 | 209 | 0 | 88 | 64 | 72 | 16 | 0 | 8 | 8 | 225 | 474 | 80 |
| Anarhichadidae | 7994 | 7487 | 8122 | 10101 | 9095 | 14355 | 15642 | 19220 | 20563 | 14033 | 10985 | 5581 | 4471 | 5863 | 5227 | 5983 | 10591 | 9570 |
| Witch flounder | 909 | 338 | 418 | 772 | 820 | 1045 | 788 | 708 | 507 | 322 | 241 | 378 | 410 | 458 | 209 | 844 | 1568 | 1777 |
| Greenland halibut | 6924 | 4471 | 5798 | 8171 | 8725 | 6530 | 8034 | 10873 | 11596 | 16100 | 24230 | 21207 | 16960 | 13872 | 12103 | 6216 | 12288 | 11701 |
| Zoarcidae | 563 | 1142 | 1206 | 1978 | 1359 | 3474 | 1874 | 2179 | 1705 | 1729 | 2059 | 893 | 780 | 1246 | 812 | 2067 | 3683 | 3080 |
| Cod | 40837 | 114050 | 59365 | 40250 | 26715 | 60966 | 26466 | 9699 | 9015 | 9964 | 4986 | 2855 | 3064 | 2694 | 2493 | 1592 | 4069 | 5243 |
| American plaice | 16044 | 14049 | 11982 | 10085 | 8653 | 7865 | 8227 | 6787 | 4101 | 3024 | 3434 | 2581 | 1608 | 2405 | 2051 | 2284 | 3522 | 2758 |
| Redfish | 188333 | 162535 | 126757 | 76953 | 130206 | 72610 | 162527 | 87641 | 119664 | 165816 | 70833 | 98650 | 177991 | 77347 | 121312 | 93817 | 250602 | 453041 |
| Shrimp* | 5742 | 2300 | 3490 | 11661 | 25155 | 12087 | 3981 | 7503 | 10905 | 7704 | 41971 | 25734 | 19719 | 28316 | 40177 | 21512 | 20129 | 30672 |
| Total | 277325 | 310956 | 224530 | 169483 | 218909 | 193504 | 236440 | 150512 | 183669 | 224039 | 165655 | 163058 | 230087 | 140162 | 189459 | 149394 | 322866 | 529181 |

| Species | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rajidae | 3506 | 2179 | 6289 | 2244 | 3471 | 2188 | 1658 | 743 | 680 | 836 | 1073 | 1365 | 775 | 1592 | 1650 | 1339 | 866 | 607 |
| *Synaphobranchus sp.* | 32 | 64 | 40 | 24 | 14 | 2 | 20 | 40 | 14 | 9 | 23 | 10 | 25 | 19 | 11 | 12 | 7 | 9 |
| *Urophycis sp.* | 611 | 249 | 547 | 217 | 685 | 682 | 380 | 332 | 258 | 145 | 113 | 107 | 130 | 199 | 305 | 663 | 433 | 476 |
| *Antimora sp.* | 474 | 587 | 893 | 499 | 670 | 342 | 727 | 655 | 649 | 630 | 748 | 520 | 442 | 455 | 370 | 243 | 136 | 175 |
| Macrouridae | 5026 | 2364 | 3957 | 1166 | 1926 | 561 | 1190 | 1253 | 980 | 843 | 655 | 848 | 855 | 1065 | 1227 | 1384 | 1438 | 1628 |
| *Notacanthus sp.* | 145 | 64 | 88 | 32 | 21 | 12 | 69 | 68 | 40 | 17 | 69 | 55 | 109 | 91 | 83 | 83 | 91 | 95 |
| *Illex sp.* | 3546 | 410 | 5139 | 1737 | 43 | 89 | 0 | 0 | 0 | 0 | 3 | 2350 | 49 | 363 | 142 | 329 | 4 | 2 |
| Anarhichadidae | 9272 | 8195 | 9867 | 4600 | 4256 | 3739 | 5073 | 3893 | 4775 | 5402 | 5371 | 6182 | 6333 | 8802 | 9121 | 4635 | 4238 | 3224 |
| Witch flounder | 893 | 595 | 2220 | 764 | 1836 | 1458 | 2283 | 940 | 1810 | 2163 | 2126 | 3134 | 2465 | 3380 | 4291 | 3223 | 1819 | 3142 |
| Greenland halibut | 11709 | 13044 | 11999 | 7777 | 6299 | 6481 | 4291 | 2884 | 5168 | 6577 | 6139 | 7633 | 5578 | 5277 | 6649 | 5872 | 4226 | 6873 |
| Zoarcidae | 1801 | 354 | 458 | 56 | 75 | 20 | 1 | 6 | 0 | 1 | 5 | 1 | 0 | 30 | 58 | 61 | 46 | 34 |
| Cod | 12505 | 23884 | 43676 | 75232 | 69295 | 106151 | 113227 | 71903 | 159939 | 114807 | 80583 | 89414 | 75621 | 42460 | 67442 | 51501 | 62206 | 100474 |
| American plaice | 1689 | 1053 | 1769 | 1440 | 2446 | 4084 | 4491 | 3632 | 3800 | 3821 | 4325 | 7475 | 6105 | 7654 | 7752 | 9372 | 6654 | 9893 |
| Redfish | 766924 | 464621 | 566649 | 358476 | 212212 | 196493 | 305947 | 219729 | 179925 | 158001 | 171198 | 163262 | 100484 | 143297 | 227261 | 148915 | 201837 | 226473 |
| Shrimp* | 16237 | 17049 | 11066 | 2799 | 4889 | 1593 | 1055 | 844 | 900 | 1551 | 2478 | 2885 | 4395 | 9273 | 6734 | 2101 | 862 | 912 |
| Total | 845252 | 534714 | 664655 | 457062 | 317805 | 320886 | 448661 | 319157 | 365459 | 300443 | 283269 | 325190 | 212421 | 236417 | 343032 | 246150 | 293835 | 362285 |

* Values affected by mesh size cod-end: 40 mm in 1994, 25 mm in 1998 and 30 mm in 1999.

**Table 3**. Cod (*Gadus morhua*) mean catch per standard haul and the estimated biomass by strata and its standard error in the 2023 survey.

| | area | tow | catch (kg) | | Biomass (t.) | |
|---|---|---|---|---|---|---|
| stratum | sq. miles | number | mean | s. e. | value | s.e. |
| 1 | 342 | 4 | 765.07 | 617.59 | 19936 | 16093 |
| 2 | 838 | 10 | 142.19 | 87.29 | 9078 | 5573 |
| 3 | 628 | 7 | 387.17 | 163.52 | 18525 | 7824 |
| 4 | 348 | 4 | 185.12 | 55.11 | 4908 | 1461 |
| 5 | 703 | 8 | 75.58 | 13.72 | 4048 | 734 |
| 6 | 496 | 6 | 133.35 | 42.12 | 5039 | 1592 |
| 7 | 822 | 9 | 240.85 | 65.66 | 15084 | 4112 |
| 8 | 646 | 7 | 71.24 | 21.47 | 3507 | 1057 |
| 9 | 314 | 3 | 15.72 | 6.56 | 376 | 157 |
| 10 | 951 | 11 | 54.46 | 11.66 | 3946 | 844 |
| 11 | 806 | 9 | 94.13 | 18.13 | 5781 | 1113 |
| 12 | 670 | 8 | 29.51 | 9.87 | 1506 | 504 |
| 13 | 249 | 3 | 12.79 | 3.69 | 243 | 70 |
| 14 | 602 | 7 | 133.51 | 108.31 | 6124 | 4967 |
| 15 | 666 | 9 | 30.03 | 7.60 | 1523 | 385 |
| 16 | 634 | 7 | 4.71 | 4.45 | 228 | 215 |
| 17 | 216 | 2 | 0.00 | 0.00 | | |
| 18 | 210 | 2 | 0.00 | 0.00 | | |
| 19 | 414 | 5 | 19.71 | 12.88 | 622 | 406 |
| Total < 730 m. | 10555 | 120 | 124.93 | 24.92 | 100474 | 20044 |
| Total < 1460 m. | 16070 | 181 | 82.06 | 16.36 | 100474 | 20044 |

**Table 4**. Cod (*Gadus morhua*) length distribution ('000) in the 2023 survey.

| length | number | length | number | length | number | length | number |
|---|---|---|---|---|---|---|---|
| 9-11 | 10 | 45-47 | 6110 | 81-83 | 390 | 117-119 | |
| 12-14 | 30 | 48-50 | 5240 | 84-86 | 310 | 120-122 | 10 |
| 15-17 | 100 | 51-53 | 6460 | 87-89 | 190 | 123-125 | |
| 18-20 | 10 | 54-56 | 7570 | 90-92 | 100 | 126-128 | 10 |
| 21-23 | 220 | 57-59 | 6470 | 93-95 | 90 | | |
| 24-26 | 2590 | 60-62 | 3740 | 96-98 | 70 | | |
| 27-29 | 3090 | 63-65 | 2030 | 99- 101 | 70 | | |
| 30-32 | 11570 | 66-68 | 1170 | 102- 104 | 10 | | |
| 33-35 | 21200 | 69-71 | 850 | 105- 107 | 30 | | |
| 36-38 | 14180 | 72-74 | 740 | 108-110 | 10 | | |
| 39-41 | 7640 | 75-77 | 610 | 111-113 | 30 | | |
| 42-44 | 6730 | 78-80 | 530 | 114-116 | | total | 110210 |

**Table 5**. Cod (*Gadus morhua*) biomass (t.) by strata in 1988-2023 surveys.

| strata | year | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| 1 | 1345 | 649 | 767 | 5585 | 76 | 516 | 2165 | 1563 | 1006 | 243 | 125 | 99 | 250 | 86 | 477 | 173 | 1996 | 1091 |
| 2 | 10150 | 10323 | 2065 | 5486 | 5150 | 9044 | 8186 | 3040 | 3991 | 2049 | 1899 | 1502 | 740 | 491 | 736 | 102 | 1668 | 1888 |
| 3 | 4471 | 10276 | 2391 | 2459 | 8473 | 8435 | 6092 | 1146 | 1054 | 1132 | 703 | 145 | 360 | 230 | 451 | 90 | 9 | 1791 |
| 4 | 3130 | 4843 | 2446 | 2900 | 3443 | 14171 | 1885 | 746 | 1068 | 857 | 140 | 25 | 443 | 488 | 66 | 136 | 168 | 152 |
| 5 | 2130 | 10702 | 8447 | 10651 | 4570 | 6824 | 924 | 1274 | 936 | 1149 | 976 | 256 | 425 | 260 | 146 | 303 | 19 | 30 |
| 6 | 3230 | 6789 | 3286 | 1531 | 952 | 4220 | 1412 | 1310 | 620 | 1074 | 613 | 375 | 511 | 749 | 525 | 24 | 155 | 206 |
| 7 | 2224 | 16025 | 4385 | 2538 | 945 | 6153 | 857 | 122 | 55 | 1067 | 78 | 52 | 5 | 12 | 24 | 107 | 18 | |
| 8 | 8931 | 16434 | 15973 | 5107 | 2349 | 7964 | 3615 | 349 | 93 | 1610 | 77 | 23 | 74 | 123 | 37 | 111 | 5 | |
| 9 | 184 | 5261 | 6340 | 188 | 143 | 998 | 239 | 9 | 103 | 174 | | 20 | 41 | | 14 | 376 | | |
| 10 | 1338 | 4898 | 4193 | 1558 | 327 | 936 | 506 | 58 | 46 | 301 | 199 | 102 | 107 | 81 | 2 | 24 | | 28 |
| 11 | 2505 | 13219 | 3859 | 1787 | 224 | 1678 | 582 | 78 | 41 | 310 | 176 | 255 | 106 | 175 | 18 | 58 | 33 | 56 |
| 12 | 335 | 2469 | 1587 | 126 | | 24 | | | | | | | | | | 71 | | |
| 13 | 9 | 2534 | 734 | 93 | | | | | | | | | | | | | | |
| 14 | 107 | 1121 | 545 | 131 | 67 | | | | | | | | | | | | | |
| 15 | 748 | 8436 | 2344 | 108 | | | | | | | | | | | | 18 | | |
| 16 | | 66 | | | | | | | | | | | | | | | | |
| 17 | | 5 | | | | | | | | | | | | | | | | |
| 18 | 2 | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | |
| total | 40839 | 114050 | 59362 | 40248 | 26719 | 60963 | 26463 | 9695 | 9013 | 9966 | 4986 | 2854 | 3062 | 2695 | 2496 | 1593 | 4071 | 5242 |
| s.e. | 5784 | 12205 | 8225 | 6704 | 5837 | 17397 | 7367 | 2070 | 1459 | 1725 | 646 | 451 | 593 | 380 | 398 | 273 | 780 | 813 |

s.e.: standard error

| strata | year | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| 1 | 2433 | 4420 | 4224 | 2253 | 11815 | 4694 | 1567 | 1931 | 4688 | 11089 | 3195 | 5589 | 15884 | 11385 | 959 | 3943 | 1765 | 19936 |
| 2 | 4145 | 1775 | 5346 | 6627 | 23368 | 22989 | 13861 | 10230 | 27320 | 1896 | 8348 | 18068 | 15592 | 3691 | 7608 | 8928 | 4116 | 9078 |
| 3 | 1948 | 11466 | 4129 | 7630 | 4512 | 16922 | 17743 | 12291 | 22585 | 5572 | 21702 | 10439 | 8556 | 5364 | 3002 | 3389 | 5032 | 18525 |
| 4 | 466 | 1132 | 771 | 5190 | 1716 | 10114 | 2903 | 7106 | 3081 | 2046 | 11268 | 5305 | 2466 | 2389 | 971 | 1429 | 6492 | 4908 |
| 5 | 644 | 548 | 1129 | 6947 | 3600 | 10947 | 11639 | 5528 | 5090 | 2051 | 3499 | 11273 | 4189 | 5000 | 3639 | 1817 | 3177 | 4048 |
| 6 | 1224 | 3214 | 12487 | 10734 | 2303 | 9510 | 9991 | 3849 | 11494 | 7413 | 2298 | 8027 | 8814 | 4312 | 2145 | 5119 | 5250 | 5039 |
| 7 | 473 | 140 | 4692 | 12659 | 4667 | 2586 | 6824 | 5872 | 37607 | 5914 | 7099 | 8053 | 4630 | 2292 | 38851 | 5045 | 11907 | 15084 |
| 8 | 347 | 475 | 3471 | 2814 | 4204 | 10921 | 7739 | 4641 | 9335 | 5732 | 5284 | 2708 | 2260 | 1342 | 2265 | 5658 | 2035 | 3507 |
| 9 | 64 | 151 | 81 | 503 | 2048 | 1997 | 5963 | 970 | 9040 | 256 | 9058 | 2334 | 2670 | 653 | 1086 | 530 | 1168 | 376 |
| 10 | 304 | 246 | 2625 | 5071 | 4275 | 5247 | 16988 | 5153 | 6655 | 9852 | 1676 | 3217 | 1005 | 1780 | 981 | 3690 | 3808 | 3946 |
| 11 | 381 | 272 | 3699 | 4336 | 4458 | 4557 | 5701 | 4205 | 9585 | 1490 | 2457 | 7350 | 1929 | 1778 | 1747 | 6821 | 7749 | 5781 |
| 12 | | | 42 | 339 | 588 | 1135 | 2538 | 1323 | 927 | 747 | 974 | 1974 | 1475 | 1334 | 2319 | 1529 | 857 | 1506 |
| 13 | | | 15 | 135 | 124 | 419 | 875 | 940 | 529 | 311 | 846 | 213 | 513 | 120 | 17 | 1382 | 2179 | 243 |
| 14 | 76 | | 160 | 9795 | 1056 | 3186 | 3663 | 6094 | 8331 | 3093 | 1092 | 1297 | 3355 | 175 | 220 | 772 | 2947 | 6124 |
| 15 | | 47 | 805 | 195 | 475 | 926 | 5133 | 1961 | 3532 | 532 | 1787 | 3567 | 2375 | 815 | 1630 | 1229 | 3615 | 1523 |
| 16 | | | | | | | | 82 | 142 | 93 | | | | | | 17 | 30 | 228 |
| 17 | | | | | | | | | | | | | 80 | | | | 73 | |
| 18 | | | | | | | 100 | | | | | | | | | | | |
| 19 | | | | | 88 | | | 113 | | 17 | | | | 32 | | 204 | 6 | 622 |
| total | 12505 | 23886 | 43675 | 75228 | 69295 | 106151 | 113227 | 72289 | 159939 | 114807 | 80583 | 89414 | 75795 | 42460 | 67442 | 51501 | 62206 | 100474 |
| s.e. | 980 | 4526 | 5507 | 8109 | 16269 | 11805 | 12293 | 8904 | 25425 | 19966 | 14715 | 11056 | 16599 | 6846 | 13801 | 6639 | 10396 | 20044 |

s.e.: standard error

**Table 6.** Cod (*Gadus morhua*) age-length key in 2023. NOT AVAILABLE

**Table 7.** Cod (*Gadus morhua*) frequency ('000) at age and stratum in the 2023 survey. NOT AVAILABLE

| | Strata | | | | | | | | | | | | | | | | | | | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 19 | total | Weight (g) | Length (cm) |
| 1 | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | |
| 16+ | | | | | | | | | | | | | | | | | | | | | |
| Sets | | | | | | | | | | | | | | | | | | | | | |
| n | | | | | | | | | | | | | | | | | | | | | |

**Table 8.** Cod (*Gadus morhua*) abundance ('000) at age in 1988-2023 surveys. 2023 NOT AVAILABLE

| age | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1** | 4868 | 19604 | 2303 | 129032 | 71533 | 4075 | 3017 | 1425 | 36 | 37 | 23 | 5 | 178 | 473 | 0 | 684 | 14 | 8069 |
| **2** | 79905 | 10800 | 12348 | 26220 | 41923 | 138357 | 4130 | 11901 | 3121 | 150 | 83 | 84 | 16 | 1990 | 1330 | 54 | 3380 | 16 |
| **3** | 49496 | 91303 | 5121 | 16903 | 5578 | 31096 | 27756 | 1338 | 6659 | 3478 | 95 | 116 | 327 | 13 | 641 | 628 | 25 | 1118 |
| **4** | 13448 | 54613 | 16952 | 2125 | 2385 | 1099 | 5097 | 3892 | 892 | 4803 | 1256 | 117 | 198 | 122 | 29 | 134 | 600 | 78 |
| **5** | 1457 | 20424 | 15834 | 6757 | 385 | 1317 | 130 | 928 | 2407 | 391 | 1572 | 717 | 96 | 79 | 70 | 22 | 168 | 709 |
| **6** | 211 | 1336 | 4492 | 1731 | 1398 | 173 | 67 | 33 | 192 | 952 | 78 | 444 | 446 | 15 | 33 | 42 | 5 | 136 |
| **7** | 225 | 143 | 340 | 299 | 244 | 489 | 7 | 23 | 8 | 21 | 146 | 19 | 172 | 142 | 26 | 7 | 10 | |
| **8** | 72 | 126 | 146 | 68 | 14 | 87 | 111 | 0 | 5 | 0 | 0 | 5 | 11 | 99 | 96 | 8 | 3 | 17 |
| **9** | 0 | 6 | 77 | 32 | 0 | 0 | 0 | 21 | 0 | 0 | 6 | 0 | 17 | 6 | 30 | 39 | 5 | 16 |
| **10** | 0 | 7 | 25 | 4 | 0 | 0 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 24 | 15 | 8 |
| **11** | 0 | 0 | 0 | 10 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 5 | 0 | 0 | 0 |
| **12** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 |
| **13** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **14** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **16** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **17** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **18** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **19** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | 149683 | 198363 | 57637 | 183181 | 123468 | 176693 | 40319 | 19567 | 13320 | 9837 | 3259 | 1507 | 1470 | 2951 | 2261 | 1642 | 4226 | 10166 |

| age | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | |
| **1** | 19709 | 3917 | 6096 | 5139 | 66370 | 347674 | 103494 | 5525 | 7282 | 1141 | 56 | 2010 | 366 | 11900 | 7137 | 19195 | 3787 | |
| **2** | 3886 | 11620 | 16671 | 7479 | 27689 | 142999 | 128087 | 67521 | 2372 | 12952 | 4485 | 314 | 4303 | 1740 | 4733 | 8871 | 17222 | |
| **3** | 62 | 5022 | 12433 | 16150 | 8654 | 16993 | 10942 | 32339 | 48564 | 7250 | 14356 | 6516 | 271 | 5210 | 25203 | 9272 | 14010 | |
| **4** | 1481 | 21 | 4530 | 14310 | 7633 | 6309 | 11721 | 4776 | 43168 | 25614 | 2230 | 16645 | 6114 | 310 | 13495 | 19074 | 19231 | |
| **5** | 85 | 1138 | 72 | 4154 | 4911 | 7739 | 4967 | 4185 | 17861 | 14107 | 14540 | 3267 | 13117 | 3310 | 5678 | 3913 | 6971 | |
| **6** | 592 | 58 | 946 | 26 | 1780 | 3089 | 4781 | 2782 | 6842 | 21854 | 12375 | 15842 | 3370 | 5700 | 4109 | 960 | 2485 | |
| **7** | 115 | 425 | 56 | 1091 | 8 | 1191 | 1630 | 1807 | 3447 | 3434 | 4814 | 8519 | 7074 | 400 | 3336 | 1061 | 507 | |
| **8** | 7 | 74 | 231 | 0 | 442 | 0 | 832 | 963 | 1931 | 1426 | 1157 | 2765 | 3948 | 1460 | 687 | 1035 | 1253 | |
| **9** | 0 | 13 | 76 | 335 | 46 | 215 | 24 | 278 | 1551 | 762 | 522 | 789 | 1030 | 1960 | 631 | 289 | 485 | |
| **10** | 7 | 20 | 0 | 0 | 251 | 0 | 93 | 40 | 600 | 366 | 303 | 345 | 272 | 830 | 938 | 558 | 205 | |
| **11** | 14 | 0 | 14 | 0 | 26 | 89 | 30 | 29 | 79 | 194 | 145 | 137 | 182 | 130 | 566 | 636 | 377 | |
| **12** | 0 | 0 | 0 | 14 | 0 | 0 | 101 | 32 | 54 | 14 | 28 | 53 | 63 | 30 | 126 | 195 | 506 | |
| **13** | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 8 | 21 | 20 | 27 | 13 | 10 | 54 | 31 | 125 | |
| **14** | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 21 | 0 | 6 | 0 | 10 | 14 | 37 | 32 | |
| **15** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | | 0 | 29 | 0 | 7 | |
| **16** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 6 | 0 | 0 | 7 | 0 | |
| **17** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | |
| **18** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | |
| **19** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | |
| **Total** | 25965 | 22308 | 41124 | 48697 | 117810 | 526300 | 266720 | 120280 | 133760 | 89164 | 55032 | 57241 | 40139 | 33002 | 66744 | 65149 | 67204 | |

**Table 9.** American plaice (*Hippoglossoides platessoides*) mean catch per haul and the estimated biomass by stratum, and their standard error, in the 2023 survey.

| | area | tow | catch (kg) | | Biomass (t.) | |
|---|---|---|---|---|---|---|
| stratum | sq. miles | number | mean | s. e. | value | s.e. |
| 1 | 342 | 4 | 23.47 | 13.32 | 612 | 347 |
| 2 | 838 | 10 | 35.61 | 6.53 | 2274 | 416 |
| 3 | 628 | 7 | 27.62 | 8.05 | 1322 | 385 |
| 4 | 348 | 4 | 34.90 | 11.01 | 925 | 292 |
| 5 | 703 | 8 | 13.77 | 3.68 | 737 | 197 |
| 6 | 496 | 6 | 22.23 | 4.76 | 840 | 180 |
| 7 | 822 | 9 | 6.95 | 1.66 | 435 | 104 |
| 8 | 646 | 7 | 11.66 | 3.10 | 573 | 152 |
| 9 | 314 | 3 | 1.09 | 1.09 | 26 | 26 |
| 10 | 951 | 11 | 6.07 | 1.16 | 440 | 83 |
| 11 | 806 | 9 | 27.37 | 8.66 | 1681 | 532 |
| 12 | 670 | 8 | 0.37 | 0.30 | 18 | 15 |
| 13 | 249 | 3 | | | | |
| 14 | 602 | 7 | | | | |
| 15 | 666 | 8 | 0.18 | 0.18 | 9 | 9 |
| 16 | 634 | 7 | | | | |
| 17 | 216 | 2 | | | | |
| 18 | 210 | 2 | | | | |
| 19 | 414 | 5 | | | | |
| Total < 730 m. | 10555 | 120 | 12.30 | 1.19 | 9893 | 961 |
| Total < 1460 m. | 16070 | 181 | 8.09 | 0.79 | 9893 | 961 |

**Table 10**. American plaice (*Hippoglossoides platessoides*) length frequency ('000) in the 2023 survey.

| length | male | female | length | male | female | length | male | female |
|---|---|---|---|---|---|---|---|---|
| 12-13 | | 14 | 32-33 | 99 | 29 | 52-53 | 20 | 712 |
| 14-15 | | | 34-35 | 111 | 52 | 54-55 | | 654 |
| 16-17 | 7 | | 36-37 | 134 | 80 | 56-57 | 7 | 491 |
| 18-19 | | | 38-39 | 355 | 78 | 58-59 | | 215 |
| 20-21 | 7 | | 40-41 | 381 | 96 | 60-61 | | 73 |
| 22-23 | 29 | 7 | 42-43 | 610 | 136 | 62-63 | | 7 |
| 24-25 | 30 | 7 | 44-45 | 1061 | 246 | 64-65 | | 23 |
| 26-27 | 58 | 65 | 46-47 | 785 | 350 | 66-67 | | 8 |
| 28-29 | 94 | 36 | 48-49 | 226 | 630 | | | |
| 30-31 | 51 | 64 | 50-51 | 70 | 608 | total | 4135 | 4681 |

**Table 11.** American plaice (*Hippoglossoides platessoides*) survey biomass (t) by strata in 1988-2023.

| | year | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| stratum | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
| 1 | 1306 | 1000 | 505 | 1078 | 709 | 1079 | 661 | 2230 | 1462 | 381 | 156 | 372 | 345 | 1043 | 141 | 1292 | 1507 |
| 2 | 2845 | 3602 | 1375 | 2663 | 1714 | 1267 | 1199 | 1335 | 943 | 740 | 1587 | 1810 | 976 | 835 | 1262 | 713 | 768 |
| 3 | 1367 | 1118 | 1668 | 1247 | 631 | 444 | 325 | 252 | 168 | 495 | 284 | 97 | 21 | 93 | 75 | 17 | 427 |
| 4 | 2199 | 461 | 817 | 320 | 557 | 572 | 853 | 489 | 268 | 203 | 343 | 53 | 100 | 85 | | 128 | 395 |
| 5 | 2599 | 3093 | 1830 | 1407 | 837 | 1291 | 1230 | 549 | 500 | 619 | 744 | 73 | 56 | 112 | 189 | 82 | 72 |
| 6 | 479 | 1130 | 954 | 501 | 601 | 305 | 808 | 123 | 32 | 13 | 35 | 40 | 25 | 37 | 63 | 29 | 26 |
| 7 | 1174 | 531 | 837 | 389 | 639 | 319 | 316 | 249 | 72 | 83 | 47 | 19 | 15 | 28 | 52 | 30 | 84 |
| 8 | 417 | 164 | 263 | 251 | 727 | 487 | 171 | 132 | 56 | 123 | 165 | 3 | | 45 | 43 | 14 | 55 |
| 9 | 103 | 163 | 343 | | 373 | 205 | 20 | 500 | 55 | 36 | | | | | 1 | 9 | 77 |
| 10 | 2323 | 1491 | 2000 | 1308 | 1406 | 1459 | 2236 | 708 | 415 | 287 | 36 | 72 | 45 | 95 | 36 | 54 | 45 |
| 11 | 1186 | 1168 | 1316 | 401 | 372 | 292 | 303 | 109 | 68 | 32 | 29 | 37 | 23 | 27 | 59 | 29 | 69 |
| 12 | 9 | 19 | 45 | 17 | 11 | 15 | 33 | 12 | 32 | 7 | | | | 4 | | 11 | |
| 13 | 3 | | 20 | | | | | 3 | | | | | | | | | |
| 14 | 8 | 8 | 7 | 389 | 29 | | 24 | 15 | 4 | | 4 | 9 | | | | | |
| 15 | 23 | 99 | 3 | 97 | 37 | 109 | 40 | 68 | 23 | 7 | 7 | | | | | 6 | |
| 16 | 5 | | | 4 | 9 | 12 | 5 | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | |
| 19 | | | | 15 | 4 | 5 | 3 | 11 | | | | | | | | | |
| total | 16046 | 14047 | 11983 | 10087 | 8656 | 7861 | 8227 | 6785 | 4098 | 3026 | 3437 | 2585 | 1606 | 2404 | 2049 | 2286 | 3525 |
| s.e. | 1845 | 2048 | 1276 | 1180 | 954 | 1040 | 1373 | 1083 | 912 | 708 | 751 | 869 | 332 | 429 | 729 | 748 | 740 |

| | year | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| stratum | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| 1 | 1038 | 714 | 284 | 144 | 548 | 716 | 693 | 462 | 329 | 181 | 410 | 219 | 1014 | 764 | 945 | 1360 | 1583 | 411 | 612 |
| 2 | 796 | 354 | 209 | 513 | 370 | 1084 | 1141 | 1272 | 1202 | 1872 | 1248 | 1307 | 4379 | 1807 | 831 | 1793 | 3603 | 2096 | 2274 |
| 3 | 101 | 74 | 101 | 147 | 74 | 103 | 364 | 468 | 266 | 223 | 462 | 488 | 410 | 534 | 1042 | 436 | 982 | 914 | 1322 |
| 4 | 359 | 109 | 153 | 440 | 36 | 91 | 1201 | 749 | 671 | 258 | 376 | 178 | 342 | 285 | 801 | 571 | 596 | 467 | 925 |
| 5 | 45 | 63 | 81 | 88 | 72 | 200 | 190 | 716 | 267 | 328 | 443 | 592 | 277 | 421 | 1602 | 1107 | 447 | 467 | 737 |
| 6 | 71 | 61 | 99 | 37 | 57 | 34 | 160 | 185 | 341 | 187 | 309 | 282 | 314 | 751 | 805 | 680 | 534 | 755 | 840 |
| 7 | 31 | 37 | 20 | 47 | 32 | 28 | 160 | 156 | 166 | 208 | 117 | 253 | 215 | 389 | 289 | 495 | 419 | 255 | 435 |
| 8 | 175 | 163 | 58 | 128 | 47 | 49 | 65 | 187 | 156 | 249 | 220 | 346 | 114 | 241 | 206 | 119 | 293 | 192 | 573 |
| 9 | 18 | | | | 77 | | | 30 | 25 | 0 | 2 | 12 | 2 | | 121 | 35 | | 17 | 26 |
| 10 | 87 | 97 | 24 | 163 | 54 | 115 | 35 | 123 | 153 | 105 | 86 | 325 | 190 | 403 | 336 | 482 | 230 | 282 | 440 |
| 11 | 35 | 19 | 22 | 50 | 64 | 26 | 33 | 121 | 121 | 185 | 124 | 308 | 188 | 397 | 559 | 462 | 667 | 751 | 1681 |
| 12 | | | | | 11 | | | 11 | 0 | | | | 10 | 16 | 18 | 128 | 7 | 9 | 18 |
| 13 | | | | | | | | | | | | 2 | | | 20 | | 4 | 25 | |
| 14 | | | | | | | 32 | | | | 3 | 3 | 16 | 39 | 28 | 13 | | | |
| 15 | 4 | | 3 | 7 | 1 | | 10 | 13 | | | 22 | 10 | 4 | 51 | 52 | 72 | 6 | 13 | 9 |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | 12 | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| total | 2760 | 1691 | 1053 | 1766 | 1442 | 2446 | 4084 | 4491 | 3698 | 3800 | 3821 | 4325 | 7475 | 6109 | 7654 | 7752 | 9372 | 6654 | 9893 |
| s.e. | 684 | 342 | 159 | 300 | 327 | 526 | 780 | 534 | 439 | 671 | 556 | 481 | 1547 | 558 | 852 | 987 | 1382 | 999 | 961 |

**Table 12a**. American plaice (*Hippoglossoides platessoides*) age-length key in 2020.
NOT YET AVAILABLE

**MALE**

**FEMALE**

**Table 12b**. American plaice (*Hippoglossoides platessoides*) age-length key in 2021.
NOT YET AVAILABLE

**MALE**

**FEMALE**

**Table 12c**. American plaice (*Hippoglossoides platessoides*) age-length key in 2022.
NOT YET AVAILABLE

**MALE**

**FEMALE**

**Table 12d**. American plaice (*Hippoglossoides platessoides*) age-length key in 2023.
NOT YET AVAILABLE

**MALE**

**FEMALE**

**Table 13a**. American plaice (*Hippoglossoides platessoides*) frequency at age in the 2020 survey.
NOT YET AVAILABLE

**Table 13b**. American plaice (*Hippoglossoides platessoides*) frequency at age in the 2021 survey.
NOT YET AVAILABLE

**Table 13c**. American plaice (*Hippoglossoides platessoides*) frequency at age in the 2022 survey.
NOT YET AVAILABLE

**Table 13d**. American plaice (*Hippoglossoides platessoides*) frequency at age in the 2023 survey.
NOT YET AVAILABLE

**Table 14.** American plaice (*Hippoglossoides platessoides*) abundance ('000) at age in 1988-2023 surveys. 2020-2023 NOT YET AVAILABLE.

| age | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 0 | 40 | 8 | 40 | 0 | 0 | 0 | 0 | 8 | 8 | 0 | 8 | 16 | 0 | 0 | 8 | 0 |
| **2** | 402 | 563 | 426 | 354 | 852 | 8 | 40 | 32 | 32 | 16 | 24 | 0 | 24 | 40 | 0 | 8 | 113 |
| **3** | 1882 | 8364 | 917 | 1206 | 796 | 1544 | 48 | 113 | 121 | 113 | 32 | 24 | 8 | 48 | 32 | 32 | 281 |
| **4** | 1311 | 1874 | 8372 | 2171 | 1070 | 1086 | 2131 | 740 | 257 | 24 | 48 | 64 | 80 | 56 | 64 | 97 | 72 |
| **5** | 4230 | 4367 | 1126 | 5348 | 1938 | 780 | 1037 | 2131 | 587 | 121 | 72 | 80 | 105 | 105 | 16 | 80 | 80 |
| **6** | 6385 | 4359 | 3370 | 2445 | 4769 | 418 | 877 | 1367 | 1665 | 418 | 265 | 80 | 153 | 56 | 88 | 56 | 105 |
| **7** | 5010 | 4142 | 2340 | 2686 | 1279 | 4134 | 973 | 1375 | 893 | 1206 | 619 | 241 | 121 | 113 | 64 | 48 | 105 |
| **8** | 5460 | 2429 | 2228 | 2067 | 1504 | 450 | 3426 | 909 | 547 | 273 | 901 | 474 | 153 | 265 | 129 | 137 | 129 |
| **9** | 1753 | 804 | 1351 | 852 | 828 | 780 | 322 | 1536 | 402 | 410 | 523 | 507 | 394 | 434 | 161 | 290 | 249 |
| **10** | 458 | 346 | 627 | 298 | 378 | 370 | 651 | 161 | 627 | 290 | 354 | 257 | 426 | 579 | 193 | 233 | 314 |
| **11** | 97 | 40 | 113 | 8 | 177 | 257 | 225 | 177 | 145 | 491 | 298 | 338 | 225 | 483 | 298 | 426 | 281 |
| **12** | 161 | 16 | 16 | 56 | 97 | 306 | 225 | 145 | 80 | 129 | 290 | 209 | 185 | 418 | 225 | 483 | 595 |
| **13** | 129 | 0 | 32 | 0 | 16 | 362 | 249 | 145 | 80 | 24 | 88 | 121 | 72 | 193 | 249 | 281 | 426 |
| **14** | 48 | 0 | 16 | 0 | 0 | 1070 | 523 | 290 | 105 | 97 | 113 | 121 | 56 | 161 | 145 | 265 | 402 |
| **15** | 56 | 0 | 0 | 0 | 0 | 32 | 491 | 217 | 72 | 48 | 56 | 56 | 48 | 113 | 129 | 145 | 330 |
| **16+** | 40 | 0 | 0 | 0 | 0 | 40 | 8 | 32 | 24 | 113 | 105 | 97 | 56 | 97 | 185 | 161 | 523 |
| **total** | 27415 | 27351 | 20949 | 17523 | 13711 | 11637 | 11226 | 9377 | 5645 | 3772 | 3804 | 2670 | 2131 | 3169 | 1970 | 2766 | 4013 |
| N6+ | 19598 | 12135 | 10093 | 8412 | 9047 | 8219 | 7970 | 6353 | 4640 | 3498 | 3611 | 2501 | 1890 | 2911 | 1866 | 2525 | 3458 |
| **Biomass** | 16043 | 14044 | 11983 | 10088 | 8657 | 7861 | 8228 | 6785 | 4097 | 3024 | 3436 | 2587 | 1606 | 2404 | 2048 | 2286 | 3525 |

| age | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 0 | 7 | 207 | 51 | 26 | 10 | | 7 | 27 | 8 | 20 | 70 | | | 30 | | | | |
| **2** | 32 | 28 | 7 | 1492 | 293 | 341 | 394 | 60 | 198 | 344 | 578 | 178 | 847 | 211 | 137 | | | | |
| **3** | 113 | 37 | 13 | 69 | 1107 | 608 | 601 | 447 | 76 | 219 | 695 | 1176 | 442 | 980 | 458 | | | | |
| **4** | 290 | 106 | 35 | | 147 | 2000 | 1384 | 629 | 311 | 144 | 599 | 1275 | 923 | 717 | 918 | | | | |
| **5** | 105 | 133 | 106 | 32 | 29 | 301 | 2467 | 980 | 718 | 135 | 101 | 936 | 1397 | 899 | 719 | | | | |
| **6** | 105 | 139 | 119 | 127 | 22 | 187 | 454 | 2833 | 866 | 510 | 109 | 263 | 891 | 1136 | 1032 | | | | |
| **7** | 129 | 72 | 49 | 120 | 80 | 72 | 94 | 447 | 1596 | 816 | 328 | 239 | 282 | 652 | 911 | | | | |
| **8** | 105 | 57 | 49 | 108 | 57 | 139 | 49 | 84 | 138 | 1569 | 609 | 405 | 549 | 300 | 794 | | | | |
| **9** | 225 | 123 | 35 | 104 | 94 | 122 | 90 | 111 | 64 | 190 | 1320 | 515 | 883 | 288 | 318 | | | | |
| **10** | 201 | 163 | 47 | 111 | 90 | 70 | 176 | 143 | 94 | 65 | 140 | 1083 | 1528 | 467 | 240 | | | | |
| **11** | 225 | 200 | 76 | 63 | 132 | 56 | 144 | 125 | 109 | 55 | 49 | 77 | 1623 | 617 | 488 | | | | |
| **12** | 249 | 193 | 122 | 47 | 121 | 176 | 55 | 115 | 108 | 62 | 33 | 49 | 209 | 519 | 652 | | | | |
| **13** | 354 | 192 | 143 | 118 | 63 | 125 | 107 | 45 | 55 | 46 | 41 | 21 | 68 | 66 | 504 | | | | |
| **14** | 394 | 213 | 82 | 110 | 104 | 114 | 148 | 133 | 61 | 64 | 47 | 27 | 71 | 60 | 307 | | | | |
| **15** | 257 | 201 | 75 | 150 | 121 | 134 | 82 | 130 | 54 | 50 | 55 | 34 | 86 | 46 | 75 | | | | |
| **16+** | 547 | 323 | 236 | 561 | 353 | 497 | 672 | 323 | 195 | 201 | 228 | 175 | 329 | 228 | 212 | | | | |
| **total** | 3329 | 2188 | 1401 | 3262 | 2838 | 4952 | 6917 | 6614 | 4670 | 4477 | 4950 | 6523 | 10129 | 7186 | 7795 | 7250 | 8812 | 5785 | 8816 |
| N6+ | 2791 | 1877 | 1033 | 1619 | 1237 | 1692 | 2072 | 4489 | 3340 | 3628 | 2959 | 2888 | 6519 | 4379 | 5533 | | | | |
| **Biomass** | 2760 | 1691 | 1053 | 1766 | 1442 | 2446 | 4084 | 4491 | 3698 | 3800 | 3821 | 4325 | 7475 | 6109 | 7654 | 7752 | 9372 | 6654 | 9893 |

**Table 15.** Redfish (*Sebastes norvegicus*) mean catch per haul and the estimated biomass by stratum, and their standard error, in the 2023 survey.

| | area | tow | catch (kg) | | Biomass (t.) | |
|---|---|---|---|---|---|---|
| stratum | sq. miles | number | mean | s. e. | value | s.e. |
| 1 | 342 | 4 | 0.47 | 0.26 | 12 | 7 |
| 2 | 838 | 10 | 9.84 | 9.80 | 628 | 625 |
| 3 | 628 | 7 | 31.33 | 18.87 | 1499 | 903 |
| 4 | 348 | 4 | 28.42 | 27.30 | 753 | 724 |
| 5 | 703 | 8 | 17.57 | 10.45 | 941 | 559 |
| 6 | 496 | 6 | 8.96 | 3.13 | 339 | 118 |
| 7 | 822 | 9 | 83.21 | 28.14 | 5211 | 1763 |
| 8 | 646 | 7 | 32.11 | 11.76 | 1580 | 579 |
| 9 | 314 | 2 | 57.70 | 52.06 | 1381 | 1245 |
| 10 | 951 | 11 | 159.76 | 65.63 | 11576 | 4755 |
| 11 | 806 | 9 | 192.27 | 95.36 | 11808 | 5856 |
| 12 | 670 | 8 | 0.07 | 0.07 | 3 | 3 |
| 13 | 249 | 3 | | | | |
| 14 | 602 | 8 | 13.84 | 6.67 | 635 | 306 |
| 15 | 666 | 8 | 11.13 | 5.81 | 565 | 295 |
| 16 | 634 | 7 | | | | |
| 17 | 216 | 2 | | | | |
| 18 | 210 | 2 | | | | |
| 19 | 414 | 5 | | | | |
| 20 | 525 | 6 | | | | |
| 21 | 517 | 6 | | | | |
| 22 | 533 | 6 | | | | |
| 23 | 284 | 3 | | | | |
| 24 | 253 | 3 | 0.53 | 0.53 | 10 | 10 |
| 25 | 226 | 3 | | | | |
| 28 | 530 | 6 | | | | |
| 29 | 488 | 6 | | | | |
| 30 | 1134 | 11 | | | | |
| 31 | 203 | 2 | | | | |
| 32 | 238 | 2 | | | | |
| 33 | 98 | 2 | | | | |
| 34 | 486 | 5 | | | | |
| Total < 1460 m. | 16070 | 181 | 30.17 | 6.55 | 36941 | 8008 |
| Total < 730 m. | 10555 | 120 | 45.92 | 9.96 | 36931 | 8008 |

**Table 16.** Redfish (*Sebastes norvegicus*): age-length key in the 2023 survey. NOT AVAILABLE

**Male**

**Table 16 (cont.)** Redfish (*Sebastes norvegicus*): age-length key in the 2023 survey. NOT AVAILABLE

**Female**

**Table 17.** Redfish (*Sebastes norvegicus*) length frequency ('000) in the 2023 survey.

| length | male | female | length | male | female | length | male | female |
|---|---|---|---|---|---|---|---|---|
| 16 | 794 | 278 | 32 | 569 | 479 | 48 | 23 | 823 |
| 17 | 497 | 299 | 33 | 706 | 354 | 49 | | 891 |
| 18 | 480 | 201 | 34 | 876 | 485 | 50 | | 661 |
| 19 | 350 | 142 | 35 | 801 | 651 | 51 | | 251 |
| 20 | 344 | 246 | 36 | 1115 | 533 | 52 | | 51 |
| 21 | 266 | 254 | 37 | 1196 | 566 | 53 | | 122 |
| 22 | 466 | 384 | 38 | 1010 | 247 | 54 | | 14 |
| 23 | 735 | 414 | 39 | 2099 | 221 | 55 | | 16 |
| 24 | 842 | 502 | 40 | 2637 | 358 | | | |
| 25 | 1090 | 883 | 41 | 2286 | 340 | | | |
| 26 | 699 | 786 | 42 | 1370 | 722 | | | |
| 27 | 620 | 970 | 43 | 831 | 669 | | | |
| 28 | 802 | 659 | 44 | 745 | 936 | | | |
| 29 | 498 | 583 | 45 | 286 | 908 | | | |
| 30 | 486 | 743 | 46 | 108 | 910 | | | |
| 31 | 599 | 345 | 47 | 31 | 964 | Total | 26257 | 19861 |

**Table 18.** *Sebastes norvegicus*: frequency at age ('000) by strata in the 2023 survey. NOT AVAILABLE

| age | Strata | | | | | | | | | | | | | | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 14 | 15 | total | Weight | Length |
| 1 | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | |
| 25+ | | | | | | | | | | | | | | | | |
| Sets | | | | | | | | | | | | | | | | |
| n | | | | | | | | | | | | | | | | |

**Table 19**. Redfish (*Sebastes mentella*) mean catch per haul and the estimated biomass by stratum, and their standard error, in the 2023 survey.

| | area | tow | catch (kg) | | Biomass (t.) | |
|---|---|---|---|---|---|---|
| stratum | sq. miles | number | mean | s. e. | value | s.e. |
| 1 | 342 | 4 | | | | |
| 2 | 838 | 10 | | | | |
| 3 | 628 | 7 | 1.68 | 0.82 | 81 | 40 |
| 4 | 348 | 4 | 0.04 | 0.02 | 1 | 1 |
| 5 | 703 | 8 | 4.41 | 2.84 | 236 | 152 |
| 6 | 496 | 6 | 5.92 | 5.36 | 224 | 202 |
| 7 | 822 | 9 | 54.95 | 18.78 | 3441 | 1176 |
| 8 | 646 | 7 | 37.82 | 24.54 | 1861 | 1207 |
| 9 | 314 | 2 | 19.86 | 10.99 | 475 | 263 |
| 10 | 951 | 11 | 215.29 | 95.32 | 15599 | 6906 |
| 11 | 806 | 9 | 67.83 | 28.25 | 4165 | 1734 |
| 12 | 670 | 8 | 188.23 | 45.43 | 9609 | 2319 |
| 13 | 249 | 3 | 374.54 | 128.96 | 7106 | 2446 |
| 14 | 602 | 8 | 856.99 | 239.79 | 39308 | 10998 |
| 15 | 666 | 8 | 526.31 | 171.96 | 26707 | 8725 |
| 16 | 634 | 7 | 1.17 | 0.56 | 57 | 27 |
| 17 | 216 | 2 | 0.49 | 0.49 | 8 | 8 |
| 18 | 210 | 2 | 17.45 | 14.35 | 279 | 230 |
| 19 | 414 | 5 | 11.97 | 4.94 | 377 | 156 |
| 20 | 525 | 6 | 0.28 | 0.28 | 11 | 11 |
| 21 | 517 | 6 | | | | |
| 22 | 533 | 6 | | | | |
| 23 | 284 | 3 | | | | |
| 24 | 253 | 3 | | | | |
| 25 | 226 | 3 | | | | |
| 28 | 530 | 6 | 0.09 | 0.05 | 3 | 2 |
| 29 | 488 | 6 | | | | |
| 30 | 1134 | 11 | | | | |
| 31 | 203 | 2 | | | | |
| 32 | 238 | 2 | | | | |
| 33 | 98 | 2 | 0.58 | 0.58 | 4 | 4 |
| 34 | 486 | 5 | | | | |
| Total < 1460 m. | 16070 | 181 | 89.48 | 13.23 | 109552 | 16193 |
| Total <730 m. | 10555 | 120 | 136.20 | 20.14 | 109533 | 16193 |

**Table 20.** *Sebastes mentella*: age-length key in the 2023 survey. NOT AVAILABLE
**Male**

**Table 20 (cont.)** *Sebastes mentella*: age-length key in the 2023 survey. NOT AVAILABLE
**Female**

**Table 21**. Redfish (*Sebastes mentella*) length frequency ('000) in the 2023 survey.

| length | male | female | length | male | female | length | male | female |
|---|---|---|---|---|---|---|---|---|
| 13 | 10 | | 24 | 29430 | 24280 | 35 | 1800 | 3590 |
| 14 | 30 | | 25 | 44040 | 35110 | 36 | 640 | 2720 |
| 15 | | | 26 | 40930 | 31700 | 37 | 280 | 2580 |
| 16 | 11470 | 3580 | 27 | 22010 | 17590 | 38 | 60 | 1620 |
| 17 | 14770 | 4580 | 28 | 9180 | 8090 | 39 | 80 | 1340 |
| 18 | 7320 | 3240 | 29 | 5460 | 1820 | 40 | | 260 |
| 19 | 4490 | 2670 | 30 | 4430 | 1520 | 41 | | 250 |
| 20 | 3980 | 3350 | 31 | 5230 | 1430 | 42 | | 20 |
| 21 | 4940 | 3710 | 32 | 6170 | 1450 | 43 | | |
| 22 | 9320 | 6350 | 33 | 5050 | 1740 | 44 | | 50 |
| 23 | 13600 | 13160 | 34 | 3580 | 3080 | Total | 248300 | 180880 |

**Table 22.** *Sebastes mentella*: frequency at age ('000) by strata in the 2023 survey. NOT AVAILABLE

| age | strata | | | | | | | | | | | | | | | | | mean | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 33 | total | Weight | Length |
| 1 | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | | |
| 25+ | | | | | | | | | | | | | | | | | | | | |
| Sets | | | | | | | | | | | | | | | | | | | | |
| n | | | | | | | | | | | | | | | | | | | | |

**Table 23**. Redfish (*Sebastes fasciatus*) mean catch per haul and the estimated biomass by stratum, and their standard error, in the 2023 survey.

| | area | tow | catch (kg) | | Biomass (t.) | |
|---|---|---|---|---|---|---|
| stratum | sq. miles | number | mean | s. e. | value | s.e. |
| 1 | 342 | 4 | | | | |
| 2 | 838 | 10 | 0.02 | 0.02 | 1 | 1 |
| 3 | 628 | 7 | 6.20 | 3.66 | 297 | 175 |
| 4 | 348 | 4 | 0.53 | 0.35 | 14 | 9 |
| 5 | 703 | 8 | 2.36 | 1.19 | 127 | 64 |
| 6 | 496 | 6 | 4.25 | 3.43 | 161 | 130 |
| 7 | 822 | 9 | 112.98 | 46.97 | 7075 | 2942 |
| 8 | 646 | 7 | 60.80 | 35.93 | 2993 | 1768 |
| 9 | 314 | 2 | 127.09 | 95.10 | 3040 | 2275 |
| 10 | 951 | 11 | 220.69 | 77.56 | 15990 | 5620 |
| 11 | 806 | 9 | 106.47 | 69.81 | 6539 | 4287 |
| 12 | 670 | 8 | 391.27 | 141.05 | 19973 | 7201 |
| 13 | 249 | 3 | 157.59 | 86.61 | 2990 | 1643 |
| 14 | 602 | 8 | 199.80 | 81.10 | 9164 | 3720 |
| 15 | 666 | 8 | 88.06 | 27.86 | 4469 | 1414 |
| 16 | 634 | 7 | 0.09 | 0.09 | 4 | 4 |
| 17 | 216 | 2 | | | | |
| 18 | 210 | 2 | | | | |
| 19 | 414 | 5 | 3.43 | 3.43 | 108 | 108 |
| 20 | 525 | 6 | | | | |
| 21 | 517 | 6 | | | | |
| 22 | 533 | 6 | | | | |
| 23 | 284 | 3 | | | | |
| 24 | 253 | 3 | | | | |
| 25 | 226 | 3 | | | | |
| 28 | 530 | 6 | 0.39 | 0.26 | 16 | 11 |
| 29 | 488 | 6 | | | | |
| 30 | 1134 | 11 | | | | |
| 31 | 203 | 2 | | | | |
| 32 | 238 | 2 | | | | |
| 33 | 98 | 2 | | | | |
| 34 | 486 | 5 | | | | |
| Total < 1460 m. | 16070 | 181 | 59.59 | 9.57 | 72959 | 11720 |
| Total <730 m. | 10555 | 120 | 90.70 | 14.58 | 72944 | 11720 |

**Table 24.** *Sebastes fasciatus*: age-length key in the 2023 survey. NOT AVAILABLE
**Male**

**Table 24 (cont.)** *Sebastes fasciatus*: age-length key in the 2023 survey. NOT AVAILABLE
**Female**

**Table 25.** Redfish (*Sebastes fasciatus*) length frequencies ('000) in the 2023 survey.

| length | male | female | length | male | female | length | male | female |
|---|---|---|---|---|---|---|---|---|
| 15 | | 30 | 26 | 9780 | 6690 | 37 | | 3190 |
| 16 | 2100 | 980 | 27 | 8570 | 4430 | 38 | | 1030 |
| 17 | 3600 | 2150 | 28 | 14590 | 3990 | 39 | | 750 |
| 18 | 4600 | 2520 | 29 | 12670 | 3400 | 40 | | 390 |
| 19 | 4570 | 3340 | 30 | 7290 | 4450 | 41 | | 140 |
| 20 | 5200 | 3590 | 31 | 3600 | 3980 | 42 | 50 | 200 |
| 21 | 5460 | 4840 | 32 | 1730 | 6040 | 43 | | 50 |
| 22 | 6110 | 5390 | 33 | 1160 | 5700 | 44 | | 50 |
| 23 | 7400 | 6960 | 34 | 1000 | 6050 | | | |
| 24 | 8900 | 8690 | 35 | 170 | 5960 | | | |
| 25 | 8570 | 6840 | 36 | 130 | 4200 | Total | 117250 | 106020 |
| 15 | | 30 | 26 | 9780 | 6690 | 37 | | 3190 |

**Table 26.** *Sebastes fasciatus*: frequency at age ('000) by strata in the 2023 survey. NOT AVAILABLE

| age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 28 | 33 | total | Weight | Length |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | | | | | |
| 25+ | | | | | | | | | | | | | | | | | | | | | | | |
| Sets | 2 | | | | | | | | | | | | | | | | | | | | | | |
| n | 10 | | | | | | | | | | | | | | | | | | | | | | |

**Table 27**. Juvenile redfish (*Sebastes sp.*) mean catch per haul and the estimated biomass by stratum, and their standard error in the 2023 survey.

| | area | tow | catch (kg) | | Biomass (t.) | |
|---|---|---|---|---|---|---|
| stratum | sq. miles | number | mean | s. e. | value | s.e. |
| 1 | 342 | 4 | 0.11 | 0.07 | 3 | 2 |
| 2 | 838 | 10 | 0.07 | 0.05 | 5 | 3 |
| 3 | 628 | 7 | 1.26 | 0.28 | 60 | 13 |
| 4 | 348 | 4 | 0.30 | 0.11 | 8 | 3 |
| 5 | 703 | 8 | 1.66 | 0.91 | 89 | 49 |
| 6 | 496 | 6 | 3.52 | 1.44 | 133 | 54 |
| 7 | 822 | 9 | 3.71 | 1.24 | 233 | 78 |
| 8 | 646 | 7 | 12.60 | 7.81 | 620 | 385 |
| 9 | 314 | 2 | 2.28 | 0.96 | 54 | 23 |
| 10 | 951 | 11 | 11.17 | 1.84 | 809 | 133 |
| 11 | 806 | 9 | 16.80 | 3.26 | 1031 | 200 |
| 12 | 670 | 8 | 9.07 | 4.48 | 463 | 229 |
| 13 | 249 | 3 | 5.64 | 5.58 | 107 | 106 |
| 14 | 602 | 8 | 7.56 | 4.04 | 347 | 185 |
| 15 | 666 | 8 | 61.20 | 59.59 | 3105 | 3024 |
| 16 | 634 | 7 | | | | |
| 17 | 216 | 2 | | | | |
| 18 | 210 | 2 | | | | |
| 19 | 414 | 5 | | | | |
| 20 | 525 | 6 | | | | |
| 21 | 517 | 6 | | | | |
| 22 | 533 | 6 | | | | |
| 23 | 284 | 3 | | | | |
| 24 | 253 | 3 | | | | |
| 25 | 226 | 3 | | | | |
| 28 | 530 | 6 | | | | |
| 29 | 488 | 6 | | | | |
| 30 | 1134 | 11 | | | | |
| 31 | 203 | 2 | | | | |
| 32 | 238 | 2 | | | | |
| 33 | 98 | 2 | | | | |
| 34 | 486 | 5 | | | | |
| Total < 1460 m. | 16070 | 181 | 5.78 | 2.52 | 7066 | 3076 |
| Total <730 m. | 10555 | 120 | 8.79 | 3.83 | 7066 | 3076 |

**Table 28**. Juvenile redfish (*Sebastes sp*.) length frequency ('000) in the 2023 survey.

| length | Ind | Males | | length | Ind | Males |
|---|---|---|---|---|---|---|
| 6 | 10 | | | | 13 | 28200 |
| 7 | 90 | | | | 14 | 51500 |
| 8 | 270 | | | | 15 | 59310 |
| 9 | 710 | 10 | | | 16 | 340 |
| 10 | 1870 | 90 | | | 17 | 50 |
| 11 | 4690 | 120 | | | | |
| 12 | 15910 | 360 | 200 | | Total | 162950 |

**Table 29**. Greenland halibut (*Reinhardtius hippoglossoides*) mean catch per haul by strata and the estimated biomass with their standard errors in the 2023 survey.

| | Area | tow | catch (Kg) | | Biomass (t.) | |
|---|---|---|---|---|---|---|
| stratum | sq. miles | number | mean | s.e | value | s.e. |
| 1 | 342 | 4 | | | | |
| 2 | 838 | 10 | | | | |
| 3 | 628 | 7 | | | | |
| 4 | 348 | 4 | | | | |
| 5 | 703 | 8 | | | | |
| 6 | 496 | 6 | 0.26 | 0.26 | 10 | 10 |
| 7 | 822 | 9 | | | | |
| 8 | 646 | 7 | | | | |
| 9 | 314 | 2 | | | | |
| 10 | 951 | 11 | | | | |
| 11 | 806 | 9 | 0.09 | 0.09 | 5 | 5 |
| 12 | 670 | 8 | 7.82 | 3.82 | 399 | 195 |
| 13 | 249 | 3 | 2.33 | 1.19 | 44 | 23 |
| 14 | 602 | 8 | 1.07 | 0.74 | 49 | 34 |
| 15 | 666 | 8 | 2.54 | 0.95 | 129 | 48 |
| 16 | 634 | 7 | 60.62 | 4.36 | 2928 | 210 |
| 17 | 216 | 2 | 44.01 | 0.19 | 724 | 3 |
| 18 | 210 | 2 | 97.53 | 82.81 | 1561 | 1325 |
| 19 | 414 | 5 | 32.48 | 9.33 | 1024 | 294 |
| 20 | 525 | 6 | 53.03 | 5.81 | 2121 | 233 |
| 21 | 517 | 6 | 39.69 | 8.23 | 1563 | 324 |
| 22 | 533 | 6 | 38.76 | 11.66 | 1574 | 473 |
| 23 | 284 | 3 | 20.13 | 6.55 | 435 | 141 |
| 24 | 253 | 3 | 111.91 | 67.46 | 2157 | 1301 |
| 25 | 226 | 3 | 17.73 | 3.78 | 305 | 65 |
| 28 | 530 | 6 | 42.09 | 3.66 | 1699 | 147 |
| 29 | 488 | 6 | 81.53 | 17.24 | 3032 | 641 |
| 30 | 1134 | 11 | 103.22 | 21.40 | 8917 | 1849 |
| 31 | 203 | 2 | 20.77 | 9.85 | 321 | 152 |
| 32 | 238 | 2 | 99.75 | 2.15 | 1809 | 39 |
| 33 | 98 | 2 | 63.79 | 3.97 | 476 | 30 |
| 34 | 486 | 5 | 63.33 | 10.24 | 2345 | 379 |
| Total < 1460 m. | 16070 | 181 | 27.46 | 2.31 | 33629 | 2837 |
| Total < 730 m. | 10555 | 120 | 8.54 | 1.73 | 6873 | 1389 |

**Table 30**. Greenland halibut (*Reinhardtius hippoglossoides*) biomass (t.) by strata in 1988-2023 surveys.

| Strata | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 2 | |
| 2 | 0 | 3 | 6 | 0 | 0 | 0 | 0 | 121 | 0 | 2 | 6 | 3 | 0 | 15 | 10 | 0 | 14 | 7 |
| 3 | 26 | 31 | 8 | 8 | 18 | 3 | 0 | 21 | 108 | 90 | 367 | 347 | 244 | 384 | 140 | 55 | 852 | 416 |
| 4 | 144 | 20 | 0 | 15 | 27 | 10 | 0 | 5 | 0 | 23 | 41 | 197 | 207 | 157 | 58 | 105 | 348 | 91 |
| 5 | 74 | 98 | 0 | 28 | 42 | 1 | 2 | 21 | 36 | 98 | 173 | 409 | 307 | 268 | 66 | 92 | 253 | 280 |
| 6 | 31 | 18 | 15 | 12 | 8 | 15 | 0 | 31 | 106 | 228 | 361 | 301 | 178 | 265 | 104 | 21 | 466 | 332 |
| 7 | 85 | 63 | 58 | 189 | 246 | 94 | 214 | 904 | 1148 | 1423 | 2607 | 2356 | 1570 | 982 | 429 | 414 | 1032 | 596 |
| 8 | 151 | 222 | 62 | 180 | 379 | 140 | 46 | 333 | 359 | 1065 | 989 | 1993 | 1317 | 1124 | 878 | 507 | 811 | 934 |
| 9 | 180 | 165 | 53 | 76 | 323 | 30 | 43 | 178 | 160 | 254 | 471 | 354 | 245 | 355 | 138 | 140 | 464 | 91 |
| 10 | 108 | 82 | 58 | 172 | 362 | 31 | 235 | 526 | 716 | 862 | 1369 | 1528 | 1602 | 1743 | 744 | 286 | 754 | 1059 |
| 11 | 45 | 61 | 22 | 106 | 229 | 234 | 236 | 492 | 671 | 627 | 1227 | 1320 | 1088 | 1021 | 338 | 277 | 631 | 1063 |
| 12 | 405 | 647 | 288 | 761 | 619 | 933 | 1219 | 1147 | 2124 | 2248 | 3077 | 3661 | 2174 | 1582 | 1086 | 673 | 902 | 1020 |
| 13 | 64 | 124 | 218 | 44 | 24 | 143 | 152 | 127 | 298 | 484 | 554 | 978 | 382 | 291 | 521 | 61 | 447 | 311 |
| 14 | 368 | 302 | 284 | 787 | 847 | 0 | 620 | 410 | 902 | 1589 | 1461 | 1080 | 491 | 877 | 1081 | 885 | 1659 | 618 |
| 15 | 435 | 169 | 525 | 973 | 643 | 1378 | 1492 | 1768 | 1448 | 2689 | 4055 | 2987 | 2687 | 1616 | 1233 | 607 | 1084 | 1747 |
| 16 | 1374 | 1363 | 2543 | 2527 | 1827 | 2175 | 1524 | 1861 | 2098 | 1770 | 3356 | 1143 | 2016 | 1328 | 2182 | 633 | 1166 | 1357 |
| 17 | 266 | 120 | 127 | 415 | 40 | 0 | 742 | 742 | 258 | 525 | 737 | 603 | 498 | 170 | 204 | 148 | 223 | 429 |
| 18 | 106 | 50 | 506 | 354 | 58 | 0 | 386 | 958 | 191 | 557 | 775 | 932 | 179 | 574 | 694 | 1062 | 578 | 434 |
| 19 | 3064 | 934 | 1026 | 1522 | 3036 | 1342 | 1126 | 1230 | 971 | 1564 | 2603 | 1015 | 1774 | 1120 | 2194 | 248 | 608 | 915 |
| 20 | | | | | | | | | | | | | | | | | 1647 | 1061 |
| 21 | | | | | | | | | | | | | | | | | 906 | 345 |
| 22 | | | | | | | | | | | | | | | | | 607 | 510 |
| 23 | | | | | | | | | | | | | | | | | 407 | 42 |
| 24 | | | | | | | | | | | | | | | | | 208 | 328 |
| 25 | | | | | | | | | | | | | | | | | 2377 | 993 |
| 28 | | | | | | | | | | | | | | | | | 1614 | 1162 |
| 29 | | | | | | | | | | | | | | | | | 2300 | 1330 |
| 30 | | | | | | | | | | | | | | | | | 2025 | 602 |
| 31 | | | | | | | | | | | | | | | | | 546 | 186 |
| 32 | | | | | | | | | | | | | | | | | 598 | 596 |
| 33 | | | | | | | | | | | | | | | | | 358 | 147 |
| 34 | | | | | | | | | | | | | | | | | 2675 | 1461 |
| Total (1-19) | 6926 | 4472 | 5799 | 8169 | 8728 | 6529 | 8037 | 10875 | 11594 | 16098 | 24229 | 21207 | 16959 | 13872 | 12100 | 6214 | 12288 | 11701 |
| s.e. (1-19) | 768 | 392 | 809 | 817 | 1389 | 956 | 678 | 1226 | 882 | 1136 | 1348 | 1520 | 923 | 776 | 662 | 611 | 796 | 627 |
| Total (1-34) | | | | | | | | | | | | | | | | | 28565 | 20459 |
| s.e. total (1-34) | | | | | | | | | | | | | | | | | 2669 | 918 |
| total_700-1400 | | | | | | | | | | | | | | | | | 16269 | 8761 |
| s.e._700-1400 | | | | | | | | | | | | | | | | | 2544 | 664 |

**Table 30 (cont.)** Greenland halibut (*Reinhardtius hippoglossoides*) biomass (t.) by strata in 1988-2023 surveys.

| Strata | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | |
| 2 | 9 | | | | | | | | | | | | | 1 | | | | |
| 3 | 324 | 22 | | 4 | 7 | | | | | | 0 | 1 | 4 | 5 | 0 | 3 | 8 | |
| 4 | 182 | 8 | | | | | | | | | 0 | | 12 | | | | | |
| 5 | 231 | 92 | 14 | 7 | | 6 | | | 0 | 6 | | 2 | 4 | 0 | | | | |
| 6 | 61 | 75 | 8 | | | | | 0 | 2 | 1 | 8 | | 3 | 6 | 12 | 8 | 5 | 10 |
| 7 | 778 | 729 | 524 | 11 | 15 | 3 | | 4 | 9 | 12 | 21 | 9 | 18 | 39 | 47 | 4 | | |
| 8 | 910 | 432 | 226 | 31 | 0 | | 0 | | | | 15 | 2 | 20 | 12 | 16 | | | |
| 9 | 550 | 487 | 401 | 31 | 0 | | | 10 | | | | | | 6 | 47 | | 9 | |
| 10 | 851 | 559 | 777 | 25 | 19 | 5 | | | | 1 | 1 | 23 | 11 | 26 | 15 | 0 | | |
| 11 | 290 | 504 | 563 | 21 | 32 | 1 | 9 | 2 | 3 | | 17 | 8 | 17 | 11 | 18 | 6 | 14 | 5 |
| 12 | 978 | 1246 | 1393 | 1217 | 743 | 126 | 332 | 140 | 239 | 522 | 133 | 282 | 218 | 363 | 999 | 491 | 171 | 399 |
| 13 | 219 | 392 | 431 | 217 | 273 | 33 | 19 | | | 80 | 26 | 9 | 98 | 129 | 378 | 4 | 50 | 44 |
| 14 | 573 | 878 | 1023 | 742 | 62 | 35 | 256 | 28 | 22 | 22 | 89 | 121 | 131 | 169 | 285 | 190 | 119 | 49 |
| 15 | 1783 | 3041 | 1621 | 771 | 1224 | 112 | 111 | 89 | 119 | 241 | 49 | 171 | 81 | 476 | 1136 | 167 | 303 | 129 |
| 16 | 1752 | 2264 | 1623 | 2186 | 2079 | 1892 | 1911 | 1038 | 2165 | 3049 | 2188 | 3921 | 1772 | 2179 | 1762 | 2773 | 1891 | 2928 |
| 17 | 639 | 407 | 411 | 558 | 446 | | 401 | 170 | 298 | 395 | 682 | 562 | 369 | 208 | 625 | 788 | 475 | 724 |
| 18 | 606 | 864 | 944 | 540 | 526 | 563 | 325 | 395 | 696 | 687 | 277 | 74 | 308 | 249 | 497 | 171 | 409 | 1561 |
| 19 | 971 | 1042 | 2035 | 1414 | 1231 | 3700 | 927 | 924 | 1615 | 1560 | 2633 | 2447 | 2510 | 1617 | 812 | 1268 | 771 | 1024 |
| 20 | 666 | 2041 | 4119 | 1856 | 1490 | 2471 | 2381 | 1858 | 3556 | 2536 | 1904 | 4109 | 3498 | 1490 | 1081 | 1027 | 833 | 2121 |
| 21 | 359 | 742 | 2161 | 1569 | 1366 | 1257 | 1496 | 1952 | 1210 | 4577 | 1058 | 3080 | 1809 | 714 | 796 | 784 | 875 | 1563 |
| 22 | 845 | 551 | 883 | 1971 | 2411 | 1226 | 714 | 1220 | 1201 | 4707 | 1901 | 3530 | 1741 | 730 | 188 | 859 | 774 | 1574 |
| 23 | 130 | 495 | 1144 | 474 | 715 | 464 | 281 | 534 | 576 | 1623 | 677 | 1579 | 956 | 392 | 294 | 361 | 289 | 435 |
| 24 | 555 | 588 | 1082 | 1185 | 460 | 1749 | 652 | 379 | 540 | 846 | 1082 | 796 | 430 | 813 | 455 | 476 | 612 | 2157 |
| 25 | 322 | 436 | 441 | 732 | 473 | 593 | 459 | 392 | 968 | 450 | 506 | 1127 | 380 | 352 | 478 | 396 | 373 | 305 |
| 28 | 1239 | 2857 | 3920 | 3153 | 1994 | 4188 | 2244 | 2150 | 1955 | 5627 | 2920 | 7414 | 4914 | 1629 | 890 | 1703 | 1245 | 1699 |
| 29 | 674 | 1487 | 3335 | 2618 | 2091 | 2044 | 2238 | 2060 | 4603 | 7198 | 3038 | 6525 | 4561 | 1956 | 684 | 2260 | 1276 | 3032 |
| 30 | 2771 | 4719 | 5067 | 7692 | 5381 | 5061 | 4737 | 4684 | 3916 | 14974 | 5662 | 8756 | 7340 | 3933 | 2438 | 2418 | 3608 | 8917 |
| 31 | 354 | 347 | 385 | 944 | 319 | 414 | 82 | 461 | 754 | 1631 | 659 | 1393 | 563 | 374 | 32 | 279 | 482 | 321 |
| 32 | 1357 | 1040 | 1755 | 2391 | 1539 | 1916 | 1097 | 1244 | 2610 | 4308 | 2588 | 2597 | 2101 | 1375 | 1208 | 2102 | 842 | 1809 |
| 33 | 607 | 166 | 698 | 309 | 408 | 707 | 320 | 594 | 474 | 542 | 678 | 597 | 250 | 333 | 425 | 248 | 142 | 476 |
| 34 | 1886 | 2222 | 2627 | 3377 | 1790 | 3454 | 2514 | 3063 | 1756 | 2585 | 5831 | 3101 | 2362 | 1085 | 575 | 1185 | 954 | 2345 |
| Total (1-19) | 11709 | 13044 | 11990 | 7777 | 6659 | 6475 | 4291 | 2801 | 5168 | 6576 | 6139 | 7633 | 5578 | 5496 | 6649 | 5872 | 4226 | 6873 |
| s.e. (1-19) | 611 | 1576 | 1182 | 724 | 812 | 2744 | 338 | 352 | 542 | 1246 | 802 | 812 | 691 | 398 | 790 | 553 | 466 | 1389 |
| Total (1-34) | 23471 | 30732 | 39609 | 36046 | 27096 | 32019 | 23506 | 23398 | 29288 | 58180 | 34642 | 52237 | 36482 | 20673 | 16194 | 19969 | 16527 | 33629 |
| s.e. total (1-34) | 1237 | 2510 | 2620 | 3073 | 1788 | 3857 | 1414 | 1843 | 16736 | 4046 | 3454 | 3263 | 2152 | 1266 | 1145 | 1036 | 1117 | 2837 |
| total_700-1400 | 11765 | 17690 | 27615 | 28270 | 20438 | 25545 | 19214 | 20589 | 24121 | 51604 | 28503 | 44604 | 30904 | 15177 | 9545 | 14097 | 12302 | 26755 |
| s.e._700-1400 | 1080 | 1958 | 2349 | 2988 | 1597 | 2721 | 1375 | 1816 | 1802 | 3849 | 3360 | 3161 | 2038 | 1201 | 829 | 877 | 1015 | 2474 |

**Table 31**. Greenland halibut (*Reinhardtius hippoglossoides*) age-length key in the 2023 survey.

**MALE**

| Length | age | | | | | | | | | | | | | | | | total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cm | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16+ | |
| 24-25 | | | 1 | | | | | | | | | | | | | | 1 |
| 26-27 | | | 1 | | | | | | | | | | | | | | 1 |
| 28-29 | | | 1 | 7 | | | | | | | | | | | | | 8 |
| 30-31 | | | | 9 | 1 | | | | | | | | | | | | 10 |
| 32-33 | | | | 17 | 3 | | | | | | | | | | | | 20 |
| 34-35 | | | | 10 | 11 | 1 | | | | | | | | | | | 22 |
| 36-37 | | | | 6 | 18 | 1 | | | | | | | | | | | 25 |
| 38-39 | | | | | 20 | 2 | | | | | | | | | | | 22 |
| 40-41 | | | | | 13 | 8 | | | | | | | | | | | 21 |
| 42-43 | | | | | 11 | 11 | | | | | | | | | | | 22 |
| 44-45 | | | | | 2 | 18 | 3 | | | | | | | | | | 23 |
| 46-47 | | | | | | 19 | 4 | | | | | | | | | | 23 |
| 48-49 | | | | | | 9 | 10 | | | | | | | | | | 19 |
| 50-51 | | | | | | 5 | 14 | 2 | | | | | | | | | 21 |
| 52-53 | | | | | | 1 | 14 | 3 | 2 | | | | | | | | 20 |
| 54-55 | | | | | | | 13 | 4 | | 1 | | | | | | | 18 |
| 56-57 | | | | | | | 1 | 9 | 5 | 4 | | | | | | | 19 |
| 58-59 | | | | | | | 2 | | 2 | | | | | | | | 4 |
| 60-61 | | | | | | | | | | | | | | | | | 0 |
| 62-63 | | | | | | | | | | 1 | 1 | | | | | | 2 |
| total: | 0 | 0 | 3 | 49 | 79 | 75 | 61 | 18 | 9 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 301 |

**Table 31 (cont.)** Greenland halibut (*Reinhardtius hippoglossoides*) age-length key in the 2023 survey.

**FEMALE**

| length | age | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cm | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16+ | total |
| 14-15 | 1 | | | | | | | | | | | | | | | | 1 |
| 16-17 | | | | | | | | | | | | | | | | | 0 |
| 18-19 | | | | | | | | | | | | | | | | | 0 |
| 20-21 | | | | | | | | | | | | | | | | | 0 |
| 22-23 | | | | | | | | | | | | | | | | | 0 |
| 24-25 | | | | | | | | | | | | | | | | | 0 |
| 26-27 | | | | 1 | | | | | | | | | | | | | 1 |
| 28-29 | | | | | | | | | | | | | | | | | 0 |
| 30-31 | | | | 6 | | | | | | | | | | | | | 6 |
| 32-33 | | | | 18 | | | | | | | | | | | | | 18 |
| 34-35 | | | | 11 | 13 | | | | | | | | | | | | 24 |
| 36-37 | | | | 3 | 20 | 2 | | | | | | | | | | | 25 |
| 38-39 | | | | | 15 | 7 | | | | | | | | | | | 22 |
| 40-41 | | | | | 13 | 8 | | | | | | | | | | | 21 |
| 42-43 | | | | | 8 | 12 | | | | | | | | | | | 20 |
| 44-45 | | | | | 2 | 21 | 1 | | | | | | | | | | 24 |
| 46-47 | | | | | | 18 | 7 | | | | | | | | | | 25 |
| 48-49 | | | | | | 7 | 14 | 1 | | | | | | | | | 22 |
| 50-51 | | | | | | 4 | 16 | 1 | | | | | | | | | 21 |
| 52-53 | | | | | | | 15 | 7 | 1 | | | | | | | | 23 |
| 54-55 | | | | | | | 11 | 5 | 4 | | | | | | | | 20 |
| 56-57 | | | | | | | 4 | 4 | 9 | 4 | 2 | | | | | | 23 |
| 58-59 | | | | | | | 1 | 7 | 6 | 7 | | | | | | | 21 |
| 60-61 | | | | | | | | | 1 | 13 | 5 | 4 | | | | | 23 |
| 62-63 | | | | | | | | | 1 | 7 | 5 | 5 | 2 | | | | 20 |
| 64-65 | | | | | | | | | | 2 | 11 | 8 | 2 | | | | 23 |
| 66-67 | | | | | | | | | | 1 | 3 | 9 | 6 | | 1 | | 20 |
| 68-69 | | | | | | | | | | 1 | 6 | 4 | 7 | 2 | 1 | 1 | 22 |
| 70-71 | | | | | | | | | | | 1 | 1 | 8 | 5 | 2 | 2 | 19 |
| 72-73 | | | | | | | | | | | | 1 | | 5 | 1 | 5 | 12 |
| 74-75 | | | | | | | | | | | | | 2 | 4 | 1 | 3 | 10 |
| 76-77 | | | | | | | | | | | | | 3 | 3 | 4 | 2 | 12 |
| 78-79 | | | | | | | | | | | | | | 2 | 2 | 4 | 8 |
| 80-81 | | | | | | | | | | | | | | | 2 | 2 | 4 |
| 82-83 | | | | | | | | | | | | | | | | 6 | 6 |
| 84-85 | | | | | | | | | | | | | | | | 4 | 4 |
| 86-87 | | | | | | | | | | | | | | | | 2 | 2 |
| 88-89 | | | | | | | | | | | | | | | | 1 | 1 |
| 90-91 | | | | | | | | | | | | | | | | | 0 |
| 92-93 | | | | | | | | | | | | | | | | 1 | 1 |
| total: | 1 | 0 | 0 | 39 | 71 | 79 | 69 | 25 | 22 | 35 | 33 | 32 | 30 | 21 | 14 | 33 | 504 |

**Table 32**. Greenland halibut (*Reinhardtius hippoglossoides*) length frequency ('000) in the 2023 survey.

depths < 730 m.

| length | male | female | length | male | female | length | male | female |
|---|---|---|---|---|---|---|---|---|
| 14-15 | | 7 | 34-35 | 120 | 128 | 54-55 | 86 | 298 |
| 16-17 | | | 36-37 | 225 | 196 | 56-57 | 37 | 174 |
| 18-19 | | | 38-39 | 269 | 322 | 58-59 | 8 | 132 |
| 20-21 | | | 40-41 | 431 | 298 | 60-61 | | 69 |
| 22-23 | | | 42-43 | 427 | 471 | 62-63 | | 44 |
| 24-25 | 9 | | 44-45 | 478 | 530 | 64-65 | | 15 |
| 26-27 | 16 | 16 | 46-47 | 546 | 592 | 66-67 | | 8 |
| 28-29 | 15 | 8 | 48-49 | 424 | 607 | | | |
| 30-31 | 52 | 30 | 50-51 | 301 | 541 | | | |
| 32-33 | 87 | 23 | 52-53 | 160 | 441 | total | 3689 | 4947 |

depths < 1460 m.

| length | male | female | length | male | female | length | male | female |
|---|---|---|---|---|---|---|---|---|
| 14-15 | | 7 | 42-43 | 1549 | 1798 | 70-71 | | 180 |
| 16-17 | | | 44-45 | 1555 | 2146 | 72-73 | | 173 |
| 18-19 | | | 46-47 | 1426 | 2159 | 74-75 | | 58 |
| 20-21 | | | 48-49 | 1145 | 2159 | 76-77 | | 123 |
| 22-23 | | | 50-51 | 905 | 2190 | 78-79 | | 58 |
| 24-25 | 9 | 10 | 52-53 | 524 | 1620 | 80-81 | | 31 |
| 26-27 | 16 | 26 | 54-55 | 359 | 1218 | 82-83 | | 63 |
| 28-29 | 72 | 18 | 56-57 | 219 | 1017 | 84-85 | | 18 |
| 30-31 | 118 | 51 | 58-59 | 81 | 959 | 86-87 | | 25 |
| 32-33 | 228 | 122 | 60-61 | 9 | 723 | 88-89 | | 7 |
| 34-35 | 280 | 295 | 62-63 | 15 | 574 | 90-91 | | |
| 36-37 | 549 | 490 | 64-65 | | 519 | 92-93 | | 9 |
| 38-39 | 800 | 931 | 66-67 | | 294 | | | |
| 40-41 | 1540 | 1193 | 68-69 | 8 | 376 | total | 11407 | 21640 |

**Table 33**. Greenland halibut (*Reinhardtius hippoglossoides*) frequency at age ('000) and strata in the 2023 survey.

| | Stratum | | | | | | | | | | | | | | | | | | | | | | | | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| age | 6 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | total | Weight (g) | Length (cm) |
| 1 | | | | 10 | | | | | | | | | | | | | | | | | | | | 10 | 22 | 15 |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | 20 | 10 | | | | | | | | | | | | | | | | 30 | 144 | 26 |
| 4 | | | 30 | | | | 240 | 10 | 10 | 100 | 50 | 30 | 30 | 10 | 10 | | 90 | 110 | 230 | | 30 | 10 | 30 | 1020 | 290 | 33 |
| 5 | | | 120 | | 20 | 30 | 1000 | 170 | 150 | 390 | 340 | 180 | 290 | 50 | 150 | 50 | 430 | 540 | 1320 | 30 | 320 | 130 | 270 | 5990 | 518 | 40 |
| 6 | | 10 | 180 | 20 | 30 | 30 | 1510 | 360 | 590 | 490 | 720 | 340 | 470 | 120 | 630 | 90 | 610 | 800 | 2370 | 50 | 580 | 260 | 770 | 11050 | 748 | 45 |
| 7 | | | 120 | 20 | 10 | 30 | 880 | 190 | 650 | 330 | 640 | 280 | 250 | 80 | 760 | 90 | 460 | 570 | 1490 | 50 | 370 | 110 | 640 | 8020 | 1074 | 50 |
| 8 | | | 20 | | | 10 | 130 | 50 | 160 | 50 | 130 | 80 | 50 | 20 | 190 | 30 | 120 | 130 | 420 | 20 | 90 | 30 | 130 | 1840 | 1342 | 54 |
| 9 | | | 10 | | | 10 | 70 | 20 | 80 | 30 | 90 | 50 | 40 | 10 | 120 | 30 | 60 | 100 | 300 | 20 | 70 | 20 | 80 | 1200 | 1523 | 56 |
| 10 | | | 10 | | | 10 | 40 | 20 | 50 | 10 | 80 | 70 | 60 | 10 | 90 | 20 | 60 | 120 | 420 | 20 | 80 | 10 | 80 | 1260 | 1828 | 60 |
| 11 | | | 10 | | | 10 | 10 | | 10 | | 50 | 50 | 50 | 10 | 30 | 10 | 30 | 90 | 290 | 10 | 60 | 10 | 70 | 800 | 2171 | 63 |
| 12 | | | 10 | | | | 10 | | 10 | | 30 | 50 | 50 | 10 | 20 | | 20 | 90 | 260 | 10 | 40 | | 60 | 670 | 2299 | 64 |
| 13 | | | | | | | | | | | 20 | 40 | 40 | 10 | 10 | | 10 | 60 | 170 | 10 | 20 | | 30 | 430 | 2730 | 68 |
| 14 | | | | | | | | | | | 10 | 10 | 20 | 10 | | | 10 | 40 | 100 | | 10 | | 10 | 220 | 3344 | 73 |
| 15 | | | | | | | | | | | | 10 | 20 | 10 | | | | 30 | 60 | | 10 | | | 140 | 3549 | 74 |
| 16+ | | | | | | | | | | | 10 | 20 | 20 | 10 | | | | 50 | 170 | 10 | 20 | | | 310 | 4287 | 78 |
| Sets | 1 | 1 | 7 | 2 | 3 | 5 | 7 | 2 | 2 | 5 | 6 | 6 | 6 | 3 | 3 | 3 | 6 | 6 | 11 | 2 | 2 | 2 | 5 | 96 | 1028 | |
| n | 10 | 10 | 500 | 60 | 50 | 140 | 3910 | 830 | 1720 | 1400 | 2160 | 1220 | 1380 | 350 | 2000 | 330 | 1910 | 2720 | 7610 | 230 | 1690 | 590 | 2190 | 33000 | 3392 | 48.2 |

**Table 34**. Greenland halibut (*Reinhardtius hippoglossoides*) abundance at age ('000) in the 1991-2023 surveys.

<730 m. strata (1-19)

| | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1302 | 1677 | 1423 | 1429 | 9978 | 4699 | 2674 | 2200 | 852 | 3014 | 6459 | 3282 | 1768 | 1762 | 437 | 550 |
| 2 | 207 | 1260 | 1245 | 996 | 2045 | 6408 | 3036 | 1716 | 563 | 235 | 1153 | 2364 | 804 | 2644 | 652 | 312 |
| 3 | 348 | 447 | 777 | 1365 | 1793 | 1942 | 4822 | 6180 | 2419 | 479 | 1456 | 2248 | 489 | 3517 | 2554 | 525 |
| 4 | 1054 | 1023 | 692 | 1435 | 1535 | 2442 | 5225 | 8843 | 8419 | 1741 | 799 | 1342 | 1217 | 1585 | 2007 | 949 |
| 5 | 2307 | 1852 | 1021 | 1545 | 2136 | 3380 | 5714 | 9919 | 10787 | 5703 | 2242 | 3045 | 1991 | 5601 | 5537 | 4800 |
| 6 | 1291 | 2249 | 1545 | 2385 | 4099 | 4680 | 6800 | 9085 | 10119 | 11336 | 6262 | 4498 | 2362 | 6271 | 6105 | 6002 |
| 7 | 2212 | 1947 | 1627 | 2139 | 3029 | 2001 | 4014 | 6304 | 4467 | 4346 | 5328 | 4610 | 1552 | 2040 | 2345 | 2665 |
| 8 | 534 | 1054 | 1266 | 1180 | 1706 | 1299 | 1731 | 2108 | 1466 | 1865 | 2584 | 1025 | 375 | 518 | 491 | 623 |
| 9 | 462 | 468 | 776 | 631 | 1052 | 341 | 528 | 600 | 280 | 361 | 147 | 104 | 105 | 233 | 89 | 180 |
| 10 | 352 | 273 | 213 | 219 | 209 | 70 | 177 | 157 | 82 | 92 | 36 | 48 | 79 | 107 | 97 | 143 |
| 11 | 141 | 138 | 104 | 90 | 53 | 21 | 23 | 27 | 6 | 44 | 5 | 16 | 15 | 63 | 44 | 103 |
| 12 | 12 | 67 | 38 | 47 | 18 | 31 | 17 | 6 | 3 | 0 | 0 | 6 | 4 | 38 | 15 | 45 |
| 13 | 0 | 25 | 21 | 18 | 0 | 0 | 17 | 16 | 3 | 0 | 0 | 0 | 0 | 5 | 3 | 10 |
| 14 | 0 | 12 | 9 | 0 | 5 | 4 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 3 | 3 | |
| 15 | 15 | 0 | 0 | 0 | 0 | 5 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | |
| 16+ | 8 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | |
| Total | 10245 | 12490 | 10757 | 13479 | 27659 | 27323 | 34792 | 47160 | 39470 | 29216 | 26471 | 22587 | 10762 | 24390 | 20374 | 16907 |
| Freq 10+ | 528 | 515 | 385 | 374 | 285 | 131 | 249 | 206 | 99 | 136 | 41 | 70 | 98 | 222 | 168 | 301 |

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 301 | 157 | 61 | 38 | | | 6 | 20 | 40 | 211 | 924 | 369 | 458 | 60 | 22 | 7 | 7 |
| 2 | 64 | 78 | 7 | 9 | | 8 | | | 13 | 15 | 41 | 221 | 287 | 147 | | | |
| 3 | 455 | 121 | 30 | 29 | | 36 | 4 | 3 | | 7 | 21 | 255 | 226 | 372 | 28 | 27 | 27 |
| 4 | 275 | 155 | 81 | 47 | 60 | 87 | 112 | 97 | 48 | 3 | 78 | 84 | 381 | 528 | 391 | 156 | 393 |
| 5 | 2765 | 1203 | 606 | 894 | 880 | 822 | 643 | 1089 | 719 | 264 | 1067 | 1136 | 1655 | 2295 | 1807 | 1108 | 1869 |
| 6 | 5928 | 4586 | 2905 | 2469 | 2930 | 1827 | 1733 | 2315 | 3440 | 1826 | 3071 | 2705 | 2346 | 3307 | 3430 | 2671 | 3221 |
| 7 | 4632 | 4950 | 3255 | 2365 | 2850 | 1406 | 718 | 1566 | 2091 | 2256 | 2867 | 1687 | 1440 | 1323 | 1279 | 1036 | 2234 |
| 8 | 1217 | 909 | 713 | 715 | 570 | 349 | 158 | 283 | 493 | 733 | 735 | 502 | 413 | 305 | 305 | 269 | 426 |
| 9 | 247 | 283 | 153 | 259 | 160 | 112 | 39 | 63 | 120 | 219 | 225 | 149 | 205 | 238 | 157 | 98 | 220 |
| 10 | 165 | 210 | 215 | 137 | 110 | 83 | 44 | 66 | 115 | 123 | 160 | 147 | 102 | 175 | 90 | 51 | 143 |
| 11 | 62 | 100 | 62 | 50 | | 54 | 12 | 22 | 50 | 64 | 56 | 47 | 40 | 59 | 42 | 24 | 49 |
| 12 | 38 | 43 | 47 | 22 | 10 | 15 | 10 | 9 | 12 | 27 | 18 | 16 | 10 | 38 | 24 | 9 | 32 |
| 13 | 5 | 18 | 35 | 10 | | 10 | 6 | 12 | 2 | 17 | 18 | 5 | 7 | 11 | 9 | 3 | 8 |
| 14 | 2 | 10 | 12 | 2 | | 10 | 2 | 6 | | 5 | 4 | 6 | 1 | 5 | 3 | 1 | |
| 15 | | 4 | 0 | | | 3 | 4 | 3 | | 3 | | | 1 | | | | |
| 16+ | | 1 | 0 | | | 6 | 1 | 2 | | 2 | | | 1 | | | | |
| Total | 16156 | 12825 | 8182 | 7046 | 7420 | 4823 | 3492 | 5156 | 7143 | 5775 | 9284 | 7330 | 7573 | 8863 | 7587 | 5460 | 8629 |
| Freq 10+ | 272 | 386 | 371 | 221 | 120 | 181 | 79 | 54 | 179 | 241 | 256 | 221 | 162 | 288 | 168 | 88 | 232 |

**Table 34 (cont.)** Greenland halibut (*Reinhardtius hippoglossoides*) abundance at age ('000) in the 1991-2023 surveys.

< 1460 m. strata (1-34)

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1710 | 438 | 550 | 310 | 160 | 60 | 38 | | | 6 | 20 | 40 | 210 | 926 | 369 | 458 | 66 | 22 | 7 | 10 |
| 2 | 2680 | 652 | 320 | 60 | 80 | 10 | 9 | | 8 | | | 10 | 20 | 41 | 232 | 287 | 151 | | | 0 |
| 3 | 3580 | 2561 | 540 | 480 | 120 | 40 | 29 | 10 | 46 | 15 | 8 | 10 | 10 | 28 | 259 | 240 | 380 | 31 | 57 | 30 |
| 4 | 1880 | 2117 | 1110 | 360 | 200 | 100 | 137 | 110 | 200 | 393 | 200 | 150 | 10 | 363 | 152 | 758 | 621 | 482 | 246 | 1020 |
| 5 | 8330 | 6470 | 7160 | 4700 | 2480 | 1380 | 2447 | 2270 | 2964 | 2583 | 3405 | 3110 | 710 | 5134 | 2610 | 3738 | 3393 | 3126 | 2086 | 5990 |
| 6 | 11210 | 8314 | 10480 | 11130 | 11020 | 8330 | 7356 | 8200 | 7073 | 8608 | 9839 | 18180 | 5970 | 14080 | 7333 | 5408 | 5764 | 7344 | 6455 | 11050 |
| 7 | 6060 | 4182 | 5730 | 10490 | 15340 | 13990 | 9587 | 10390 | 6124 | 5538 | 8415 | 17190 | 11310 | 15536 | 8776 | 4204 | 2835 | 3809 | 3261 | 8020 |
| 8 | 1790 | 1206 | 1700 | 3530 | 3890 | 4340 | 3063 | 3140 | 2349 | 2005 | 1989 | 5650 | 4820 | 5902 | 3787 | 1611 | 887 | 1267 | 1154 | 1840 |
| 9 | 890 | 318 | 510 | 880 | 1400 | 1140 | 1200 | 1360 | 920 | 643 | 548 | 2040 | 1800 | 2586 | 1933 | 1105 | 815 | 829 | 637 | 1200 |
| 10 | 450 | 500 | 440 | 720 | 1060 | 1260 | 1019 | 1490 | 906 | 1026 | 780 | 1730 | 1300 | 2158 | 2671 | 1057 | 729 | 850 | 682 | 1260 |
| 11 | 320 | 282 | 370 | 370 | 540 | 440 | 383 | 560 | 587 | 412 | 406 | 960 | 660 | 845 | 1129 | 620 | 387 | 485 | 475 | 800 |
| 12 | 200 | 161 | 180 | 210 | 300 | 340 | 213 | 320 | 233 | 349 | 182 | 360 | 280 | 333 | 647 | 252 | 248 | 326 | 289 | 670 |
| 13 | 180 | 74 | 60 | 80 | 160 | 310 | 151 | 270 | 126 | 153 | 235 | 210 | 190 | 382 | 364 | 121 | 201 | 217 | 207 | 430 |
| 14 | 70 | 47 | 30 | 60 | 120 | 170 | 114 | 140 | 114 | 73 | 131 | 230 | 100 | 115 | 232 | 98 | 140 | 169 | 104 | 220 |
| 15 | 80 | 9 | 10 | 20 | 80 | 50 | 59 | 50 | 75 | 103 | 55 | 150 | 80 | 152 | 122 | 93 | 46 | 68 | 63 | 140 |
| 16+ | 60 | 9 | 10 | 10 | 70 | 70 | 55 | 40 | 140 | 94 | 81 | 120 | 90 | 194 | 101 | 118 | 64 | 83 | 85 | 310 |
| Total | 39490 | 27340 | 29200 | 33410 | 37020 | 32030 | 25860 | 28350 | 21865 | 22002 | 26294 | 50140 | 27560 | 48774 | 30717 | 20168 | 16727 | 19108 | 15808 | 32990 |
| Freq 10+ | 1360 | 1082 | 1100 | 1470 | 2330 | 2640 | 1994 | 2870 | 2181 | 2210 | 1870 | 3760 | 2700 | 4178 | 5266 | 2359 | 1815 | 2198 | 1905 | 3830 |

**Table 35**. Roughhead grenadier (*Macrourus berglax*) mean catch per haul by strata and the estimated biomass with their standard errors in the 2023 survey.

| stratum | Area sq. miles | tow number | catch per tow (Kg) | | Biomass (t.) | |
|---|---|---|---|---|---|---|
| | | | mean | s. e. | value | s.e. |
| 1 | 342 | 4 | | | | |
| 2 | 838 | 10 | | | | |
| 3 | 628 | 7 | | | | |
| 4 | 348 | 4 | | | | |
| 5 | 703 | 8 | | | | |
| 6 | 496 | 6 | | | | |
| 7 | 822 | 9 | | | | |
| 8 | 646 | 7 | | | | |
| 9 | 314 | 2 | | | | |
| 10 | 951 | 11 | | | | |
| 11 | 806 | 9 | | | | |
| 12 | 670 | 8 | 0.67 | 0.18 | 34 | 9 |
| 13 | 249 | 3 | 1.38 | 0.98 | 26 | 18 |
| 14 | 602 | 8 | 0.46 | 0.23 | 21 | 11 |
| 15 | 666 | 8 | 0.47 | 0.18 | 24 | 9 |
| 16 | 634 | 7 | 2.45 | 0.68 | 119 | 33 |
| 17 | 216 | 2 | 0.84 | 0.23 | 14 | 4 |
| 18 | 210 | 2 | 36.12 | 17.64 | 578 | 282 |
| 19 | 414 | 5 | 4.50 | 0.93 | 142 | 29 |
| 20 | 525 | 6 | 1.75 | 0.95 | 70 | 38 |
| 21 | 517 | 6 | 10.90 | 3.33 | 430 | 131 |
| 22 | 533 | 6 | 16.54 | 4.45 | 671 | 180 |
| 23 | 284 | 3 | 12.78 | 0.89 | 276 | 19 |
| 24 | 253 | 3 | 5.95 | 2.26 | 115 | 44 |
| 25 | 226 | 3 | 23.70 | 16.75 | 408 | 288 |
| 28 | 530 | 6 | 4.67 | 1.84 | 189 | 75 |
| 29 | 488 | 6 | 7.39 | 2.70 | 275 | 100 |
| 30 | 1134 | 11 | 14.28 | 4.46 | 1234 | 386 |
| 31 | 203 | 2 | 17.01 | 2.57 | 263 | 40 |
| 32 | 238 | 2 | 9.87 | 1.73 | 179 | 31 |
| 33 | 98 | 2 | 0.35 | 0.04 | 3 | 0 |
| 34 | 486 | 5 | 7.05 | 2.38 | 261 | 88 |
| Total < 1460 m. | 16070 | 181 | 4.36 | 0.51 | 5332 | 628 |
| Total <740 m. | 10555 | 120 | 1.19 | 0.35 | 958 | 287 |

**Table 36**. Roughhead grenadier (*Macrourus berglax*) biomass by strata in 1988-2023 surveys.

| Stratum | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | 8 | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | 10 | |
| 4 | | | | | | | | | | | | | | | | 9 | | |
| 5 | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | 22 | | | | | | | | | |
| 7 | | | | | 0 | | | | | | | | 3 | 0 | | 0 | 10 | |
| 8 | | 10 | | 1 | | | | | 11 | 3 | | 7 | | 16 | 2 | 13 | 28 | 65 |
| 9 | 47 | 4 | | 5 | 28 | 21 | 3 | 21 | 153 | 18 | 40 | 45 | 29 | 29 | | 30 | 282 | 82 |
| 10 | 1 | | | | | | | | 6 | 1 | | 18 | 68 | 18 | | 0 | 48 | 38 |
| 11 | | | | | | | | | | | | 3 | 8 | 6 | | | 3 | 2 |
| 12 | 112 | 103 | 40 | 108 | 100 | 413 | 55 | 126 | 46 | 137 | 55 | 191 | 81 | 236 | 154 | 165 | 292 | 207 |
| 13 | 21 | 64 | 18 | 18 | 60 | 18 | 32 | 75 | 5 | 18 | 78 | 92 | 50 | 116 | 121 | 123 | 299 | 94 |
| 14 | 200 | 145 | 107 | 85 | 139 | | 73 | 67 | 270 | 77 | 194 | 135 | 103 | 292 | 124 | 346 | 877 | 379 |
| 15 | 92 | 5 | 29 | 64 | 52 | 321 | 82 | 180 | 84 | 69 | 101 | 72 | 103 | 60 | 16 | 87 | 259 | 16 |
| 16 | 349 | 140 | 212 | 229 | 432 | 1333 | 523 | 256 | 397 | 211 | 405 | 150 | 225 | 338 | 272 | 352 | 594 | 426 |
| 17 | 134 | 45 | 31 | 180 | 123 | | 98 | 129 | 27 | 116 | 204 | 96 | 67 | 370 | 380 | 101 | 244 | 124 |
| 18 | 311 | 128 | 143 | 356 | 215 | | 756 | 414 | 154 | 224 | 189 | 313 | 219 | 383 | 27 | 877 | 423 | 588 |
| 19 | 743 | 227 | 273 | 289 | 429 | 915 | 352 | 282 | 187 | 322 | 424 | 129 | 92 | 216 | 116 | 245 | 228 | 366 |
| 20 | | | | | | | | | | | | | | | | | 419 | 182 |
| 21 | | | | | | | | | | | | | | | | | 1432 | 996 |
| 22 | | | | | | | | | | | | | | | | | 1095 | 1115 |
| 23 | | | | | | | | | | | | | | | | | 897 | 463 |
| 24 | | | | | | | | | | | | | | | | | 137 | 1030 |
| 25 | | | | | | | | | | | | | | | | | 344 | 870 |
| 28 | | | | | | | | | | | | | | | | | 425 | 695 |
| 29 | | | | | | | | | | | | | | | | | 3113 | 1012 |
| 30 | | | | | | | | | | | | | | | | | 3553 | 2869 |
| 31 | | | | | | | | | | | | | | | | | 650 | 327 |
| 32 | | | | | | | | | | | | | | | | | 274 | 267 |
| 33 | | | | | | | | | | | | | | | | | 118 | 17 |
| 34 | | | | | | | | | | | | | | | | | 1131 | 330 |
| total (1-19) | 2009 | 871 | 852 | 1335 | 1577 | 3021 | 1975 | 1558 | 1362 | 1197 | 1691 | 1250 | 1047 | 2079 | 1211 | 2348 | 3597 | 2387 |
| s.e. (1-19) | 264 | 142 | 149 | 250 | 270 | 487 | 169 | 223 | 277 | 169 | 243 | 338 | 196 | 284 | 176 | 611 | 362 | 281 |
| total | | | | | | | | | | | | | | | | | 17184 | 12560 |
| s.e. total (1-34) | | | | | | | | | | | | | | | | | 1616 | 1420 |

**Table 36 (cont.)** Roughhead grenadier (*Macrourus berglax*) biomass by strata in 1988-2023 surveys.

| Stratum | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | 13 | | | | | | | | | | | | | | | | | |
| 9 | 181 | 17 | 39 | | | | | | | | | | | | 3 | | | |
| 10 | 21 | | | | | | | | | | | 0 | 0 | | | | | |
| 11 | | | | | | | | | | | | | | | | | | |
| 12 | 97 | 22 | 92 | 73 | 60 | 0 | 27 | 39 | 17 | 14 | 29 | 34 | 35 | 35 | 50 | 37 | 17 | 34 |
| 13 | 154 | 80 | 108 | 25 | 97 | 43 | 6 | | | 0 | 2 | 15 | 12 | 20 | 57 | 39 | 8 | 26 |
| 14 | 362 | 223 | 539 | 1 | 3 | 10 | 67 | 28 | 14 | 27 | 42 | 70 | 19 | 4 | 30 | 79 | 50 | 21 |
| 15 | 85 | 55 | 12 | | 132 | 8 | | 34 | 4 | 14 | 20 | 15 | 38 | 85 | 40 | 28 | 14 | 24 |
| 16 | 1391 | 242 | 493 | 213 | 79 | 112 | 134 | 122 | 102 | 26 | 80 | 108 | 125 | 62 | 90 | 46 | 175 | 119 |
| 17 | 603 | 70 | 385 | 40 | 278 | 38 | 111 | 134 | 52 | 142 | 62 | 77 | 110 | 123 | 89 | 129 | 81 | 14 |
| 18 | 435 | 491 | 610 | 194 | 685 | 445 | 235 | 422 | 173 | 202 | 100 | 227 | 195 | 178 | 139 | 172 | 130 | 578 |
| 19 | 592 | 167 | 683 | 235 | 69 | 73 | 32 | 29 | 36 | 51 | 37 | 70 | 91 | 84 | 126 | 169 | 72 | 142 |
| 20 | 353 | 144 | 269 | 130 | 355 | 78 | 88 | 47 | 101 | 25 | 120 | 94 | 55 | 263 | 199 | 73 | 51 | 70 |
| 21 | 763 | 755 | 1114 | 528 | 1135 | 1606 | 768 | 299 | 375 | 198 | 394 | 349 | 399 | 405 | 439 | 319 | 251 | 430 |
| 22 | 1545 | 608 | 1735 | 1216 | 967 | 1610 | 945 | 537 | 747 | 658 | 669 | 548 | 376 | 906 | 712 | 490 | 306 | 671 |
| 23 | 342 | 332 | 399 | 305 | 388 | 506 | 325 | 382 | 168 | 251 | 259 | 113 | 264 | 229 | 141 | 175 | 194 | 276 |
| 24 | 419 | 165 | 152 | 146 | 207 | 222 | 218 | 97 | 160 | 87 | 53 | 158 | 278 | 135 | 97 | 164 | 44 | 115 |
| 25 | 817 | 197 | 391 | 362 | 149 | 98 | 146 | 260 | 326 | 226 | 100 | 1093 | 276 | 668 | 125 | 280 | 532 | 408 |
| 28 | 610 | 299 | 360 | 273 | 338 | 137 | 68 | 70 | 29 | 57 | 89 | 184 | 141 | 57 | 90 | 62 | 70 | 189 |
| 29 | 445 | 527 | 555 | 424 | 509 | 163 | 309 | 200 | 437 | 265 | 154 | 275 | 340 | 347 | 615 | 204 | 256 | 275 |
| 30 | 1108 | 2139 | 3356 | 2560 | 2816 | 2965 | 1582 | 1224 | 836 | 887 | 1137 | 1023 | 1217 | 2313 | 717 | 883 | 860 | 1234 |
| 31 | 235 | 242 | 176 | 225 | 107 | 295 | 137 | 60 | 199 | 270 | 153 | 113 | 123 | 127 | 35 | 168 | 209 | 263 |
| 32 | 132 | 86 | 222 | 197 | 242 | 172 | 63 | 100 | 80 | 117 | 92 | 361 | 94 | 264 | 100 | 98 | 74 | 179 |
| 33 | 122 | 105 | 38 | 12 | 57 | 112 | 54 | 22 | 42 | 39 | 89 | 43 | 28 | 40 | 27 | 72 | 28 | 3 |
| 34 | 511 | 305 | 410 | 144 | 419 | 145 | 162 | 191 | 212 | 146 | 154 | 171 | 159 | 155 | 115 | 278 | 297 | 261 |
| total (1-19) | 3933 | 1367 | 2961 | 782 | 1403 | 729 | 612 | 807 | 399 | 478 | 373 | 616 | 625 | 590 | 624 | 699 | 546 | 958 |
| s.e. (1-19) | 700 | 314 | 611 | 209 | 201 | 409 | 258 | 141 | 113 | 147 | 86 | 143 | 142 | 201 | 187 | 131 | 103 | 287 |
| total | 11336 | 7270 | 12139 | 7304 | 9091 | 8838 | 5476 | 4298 | 4111 | 3702 | 3836 | 5141 | 4375 | 6500 | 4037 | 3964 | 3720 | 5332 |
| s.e. total (1-34) | 1167 | 808 | 659 | 478 | 930 | 1212 | 678 | 475 | 407 | 300 | 403 | 914 | 356 | 1318 | 1318 | 395 | 536 | 628 |

**Table 37.** Roughhead grenadier (*Macrourus berglax*) age-length key in the 2023 survey.

**MALE**

| Length cm | age | | | | | | | | | | | | | | | | total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16+ | |
| 5 | | 2 | | | | | | | | | | | | | | | 2 |
| 6 | | 20 | | | | | | | | | | | | | | | 20 |
| 7 | | 3 | 3 | | | | | | | | | | | | | | 6 |
| 8 | | 3 | 6 | | | | | | | | | | | | | | 9 |
| 9 | | | 9 | 1 | | | | | | | | | | | | | 10 |
| 10 | | | 15 | 6 | | | | | | | | | | | | | 21 |
| 11 | | | 1 | 5 | 2 | | | | | | | | | | | | 8 |
| 12 | | | | 3 | 3 | | | | | | | | | | | | 6 |
| 13 | | | | 1 | 5 | 2 | | | | | | | | | | | 8 |
| 14 | | | | | 2 | 2 | 2 | | | | | | | | | | 6 |
| 15 | | | | | | 1 | 5 | | | | | | | | | | 6 |
| 16 | | | | | | | 4 | 2 | | | | | | | | | 6 |
| 17 | | | | | | | 2 | 3 | 1 | | | | | | | | 6 |
| 18 | | | | | | | | 2 | 2 | 2 | | | | | | | 6 |
| 19 | | | | | | | | | 6 | | 1 | | | | | | 7 |
| 20 | | | | | | | | | | 4 | 2 | | | | | | 6 |
| 21 | | | | | | | | | | | 3 | 3 | | | | | 6 |
| 22 | | | | | | | | | | | 1 | 1 | 2 | | | | 4 |
| 23 | | | | | | | | | | | | 3 | 2 | | | | 5 |
| 24 | | | | | | | | | | | | | 1 | | | | 1 |
| 25 | | | | | | | | | | | | | | 1 | | | 1 |
| total | | 28 | 34 | 16 | 12 | 5 | 13 | 7 | 9 | 6 | 7 | 7 | 5 | 1 | | | 150 |

**Table 37 (cont.)** Roughhead grenadier (*Macrourus berglax*) age-length key in the 2023 survey.

**FEMALE**

| Length | age | | | | | | | | | | | | | | | | total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cm | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16+ | |
| 3 | 2 | | | | | | | | | | | | | | | | 2 |
| 4 | | 2 | | | | | | | | | | | | | | | 2 |
| 5 | | 9 | | | | | | | | | | | | | | | 9 |
| 6 | | 11 | | | | | | | | | | | | | | | 11 |
| 7 | | 4 | 5 | | | | | | | | | | | | | | 9 |
| 8 | | 1 | 7 | | | | | | | | | | | | | | 8 |
| 9 | | | 8 | 2 | | | | | | | | | | | | | 10 |
| 10 | | | 6 | 8 | | | | | | | | | | | | | 14 |
| 11 | | | 1 | 6 | | | | | | | | | | | | | 7 |
| 12 | | | | 2 | 4 | | | | | | | | | | | | 6 |
| 13 | | | | | 5 | 1 | | | | | | | | | | | 6 |
| 14 | | | | | 5 | 2 | | | | | | | | | | | 7 |
| 15 | | | | | 1 | 3 | 2 | | | | | | | | | | 6 |
| 16 | | | | | | | 3 | 3 | | | | | | | | | 6 |
| 17 | | | | | | | 1 | 5 | 1 | | | | | | | | 7 |
| 18 | | | | | | | | 2 | 2 | 2 | | | | | | | 6 |
| 19 | | | | | | | | | 3 | 3 | | | | | | | 6 |
| 20 | | | | | | | | | 2 | 3 | 1 | | | | | | 6 |
| 21 | | | | | | | | | | 1 | 4 | 1 | | | | | 6 |
| 22 | | | | | | | | | | | 2 | 3 | 1 | | | | 6 |
| 23 | | | | | | | | | | | 1 | 2 | 1 | 2 | | | 6 |
| 24 | | | | | | | | | | | | 3 | 3 | | | | 6 |
| 25 | | | | | | | | | | | | 1 | 2 | 2 | 1 | | 6 |
| 26 | | | | | | | | | | | | | 3 | 2 | | 1 | 6 |
| 27 | | | | | | | | | | | | | 1 | 3 | 1 | | 5 |
| 28 | | | | | | | | | | | | | | 4 | | 3 | 7 |
| 29 | | | | | | | | | | | | | | 2 | 1 | 3 | 6 |
| 30 | | | | | | | | | | | | | | | | 8 | 8 |
| 31 | | | | | | | | | | | | | | | | 6 | 6 |
| 32 | | | | | | | | | | | | | | | | 5 | 5 |
| 33 | | | | | | | | | | | | | | | | 7 | 7 |
| 34 | | | | | | | | | | | | | | | | 6 | 6 |
| 35 | | | | | | | | | | | | | | | | 3 | 3 |
| 36 | | | | | | | | | | | | | | | | 3 | 3 |
| 37 | | | | | | | | | | | | | | | | 1 | 1 |
| 38 | | | | | | | | | | | | | | | | 1 | 1 |
| total | 2 | 27 | 27 | 18 | 15 | 6 | 6 | 10 | 8 | 9 | 8 | 10 | 11 | 15 | 3 | 47 | 222 |

**Table 38.** Roughhead grenadier (*Macrourus berglax*) length frequency ('000) in the 2023 survey.

depths < 730 m. strata (1-19)

| length | indet. | male | female | length | indet. | male | female | length | indet. | male | female |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | | | 16 | 15 | | 25 | 29 | 27 | | | |
| 4 | | | 7 | 16 | | 53 | 29 | 28 | | | |
| 5 | | | 25 | 17 | | 97 | 62 | 29 | | | 8 |
| 6 | | 8 | 8 | 18 | | 97 | 48 | 30 | | | |
| 7 | | | | 19 | | 165 | 54 | 31 | | | 8 |
| 8 | | 22 | | 20 | | 94 | 153 | 32 | | | |
| 9 | | | | 21 | | 54 | 36 | 33 | | | 11 |
| 10 | | 29 | | 22 | | 22 | 78 | | | | |
| 11 | | | | 23 | | 11 | 14 | | | | |
| 12 | | 11 | 18 | 24 | | | 14 | | | | |
| 13 | | 29 | 18 | 25 | | 11 | 18 | | | | |
| 14 | | 11 | 18 | 26 | | | 14 | Total | 0 | 738 | 684 |

depths < 1460 m. strata (1-34)

| length | indet. | male | female | length | indet. | male | female | length | indet. | male | female |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 27 | | 16 | 18 | | 520 | 291 | 33 | | | 83 |
| 4 | 24 | | 15 | 19 | | 521 | 161 | 34 | | | 55 |
| 5 | 15 | 30 | 72 | 20 | | 315 | 294 | 35 | | | 23 |
| 6 | | 174 | 77 | 21 | | 149 | 107 | 36 | | | 27 |
| 7 | | 52 | 73 | 22 | | 53 | 188 | 37 | | | 8 |
| 8 | | 97 | 62 | 23 | | 32 | 114 | 38 | | | 9 |
| 9 | | 75 | 92 | 24 | | 7 | 103 | | | | |
| 10 | | 175 | 123 | 25 | | 18 | 126 | | | | |
| 11 | | 181 | 85 | 26 | | 18 | 101 | | | | |
| 12 | | 125 | 68 | 27 | | 9 | 79 | | | | |
| 13 | | 253 | 99 | 28 | | 7 | 98 | | | | |
| 14 | | 343 | 241 | 29 | | 16 | 71 | | | | |
| 15 | | 368 | 192 | 30 | | 9 | 122 | | | | |
| 16 | | 511 | 239 | 31 | | | 66 | | | | |
| 17 | | 624 | 249 | 32 | | | 38 | Total | 65 | 4683 | 3863 |

**Table 39.** Roughhead grenadier (*Macrourus berglax*) frequency ('000) at age and strata in the 2023 survey.

| Age | strata | | | | | | | | | | | | | | | | | | | | | | total | mean | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | | | Weight (g) | Length (cm) |
| 1 | | | | | 16 | | | | 3 | 2 | | | | | | | 25 | | | | | | 46 | 4 | 3 |
| 2 | 7 | | 7 | | 16 | | 18 | 7 | 21 | 45 | 29 | 45 | 36 | 16 | 46 | 17 | 121 | 9 | 25 | 5 | 30 | | 500 | 22 | 6 |
| 3 | 5 | | | | | | 30 | | | 56 | 56 | 42 | 36 | 31 | 21 | 16 | 172 | 5 | 37 | 5 | 27 | | 539 | 70 | 9 |
| 4 | 3 | | 2 | | | | 18 | | | 20 | 64 | 40 | 1 | 18 | 10 | 19 | 167 | 13 | 34 | 4 | 34 | | 449 | 122 | 11 |
| 5 | 11 | | 6 | | | | 50 | 5 | 9 | 28 | 48 | 32 | | 24 | 5 | 48 | 238 | 26 | 110 | 8 | 66 | | 712 | 207 | 13 |
| 6 | 5 | | 3 | | | | 27 | 2 | 4 | 33 | 26 | 9 | 2 | 17 | | 21 | 139 | 22 | 66 | 3 | 43 | | 420 | 253 | 14 |
| 7 | 18 | 3 | 2 | 15 | 5 | 9 | 64 | 8 | 3 | 73 | 102 | 69 | 12 | 54 | 11 | 43 | 416 | 59 | 112 | 2 | 109 | | 1189 | 339 | 16 |
| 8 | 10 | 3 | 5 | 17 | 15 | 8 | 108 | 8 | 8 | 45 | 109 | 74 | 5 | 38 | 18 | 59 | 316 | 85 | 33 | 2 | 85 | | 1050 | 423 | 17 |
| 9 | 10 | 11 | 5 | 14 | 21 | 10 | 196 | 28 | 8 | 26 | 112 | 86 | 22 | 22 | 21 | 57 | 240 | 100 | 9 | 1 | 38 | | 1035 | 547 | 19 |
| 10 | 8 | 7 | 6 | 5 | 25 | | 136 | 34 | 8 | 13 | 71 | 47 | 27 | 15 | 28 | 70 | 129 | 59 | 3 | | 34 | | 725 | 601 | 19 |
| 11 | 8 | 6 | 5 | 1 | 23 | 1 | 90 | 31 | 3 | 16 | 23 | 30 | 19 | 19 | 26 | 42 | 78 | 25 | 3 | | 18 | | 469 | 739 | 21 |
| 12 | 1 | 3 | 1 | | 23 | | 39 | 30 | 9 | 24 | 15 | 19 | 6 | 26 | 29 | 13 | 64 | 7 | 5 | | 13 | | 329 | 942 | 22 |
| 13 | | 1 | | | 5 | | 24 | 20 | 8 | 26 | 25 | 10 | 16 | 21 | 23 | 9 | 48 | 3 | 12 | | 6 | | 257 | 1176 | 24 |
| 14 | | | | | 3 | | 15 | 12 | 3 | 32 | 39 | | 7 | 17 | 24 | 11 | 68 | 3 | 7 | | 18 | | 258 | 1489 | 26 |
| 15 | | | | | 1 | | 2 | 1 | 1 | 7 | 11 | | 1 | 2 | 4 | 4 | 11 | 1 | | | 2 | | 49 | 1551 | 27 |
| 16+ | | | | | 12 | | 11 | 2 | 8 | 68 | 106 | 25 | 6 | 84 | 13 | 21 | 117 | 27 | 14 | | 12 | | 525 | 2555 | 32 |
| Sets | 6 | 2 | 4 | 5 | 6 | 2 | 2 | 5 | 4 | 6 | 6 | 3 | 3 | 3 | 5 | 6 | 11 | 2 | 2 | 2 | 5 | | 90 | 581 | 17 |
| n | 87 | 35 | 41 | 52 | 163 | 28 | 828 | 188 | 94 | 515 | 836 | 527 | 196 | 405 | 279 | 450 | 2351 | 444 | 471 | 28 | 535 | | 8552 | 4966 | |

**Table 40.** Roughhead grenadier (*Macrourus berglax*) abundance at age ('000) in the 1994 - 2023 surveys.

<730 m. strata (1-19)

| age | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| 1 | | | 129 | | 51 | 15 | 3 | 63 | 39 | 467 | 216 | 109 | 10 | 12 | 5 | 3 | 30 | 18 | 9 | 14 | 16 | 18 | 15 | 34 | 37 | | 17 | 8 | 19 | 16 |
| 2 | 46 | 107 | 56 | 46 | 128 | 36 | 77 | 208 | 189 | 2139 | 466 | 267 | 353 | 23 | 79 | 15 | 73 | 48 | 49 | 31 | 63 | 112 | 255 | 178 | 171 | 95 | 34 | 86 | 33 | 55 |
| 3 | 136 | 209 | 110 | 186 | 227 | 49 | 108 | 271 | 220 | 1077 | 3119 | 362 | 438 | 59 | 228 | 31 | 232 | 76 | 79 | 26 | 25 | 73 | 81 | 170 | 110 | 157 | 49 | 62 | 68 | 35 |
| 4 | 487 | 467 | 224 | 153 | 236 | 216 | 50 | 120 | 57 | 672 | 1009 | 762 | 392 | 35 | 219 | 42 | 107 | 69 | 14 | 27 | 30 | 41 | 68 | 78 | 53 | 136 | 47 | 50 | 34 | 23 |
| 5 | 507 | 861 | 351 | 157 | 138 | 199 | 283 | 283 | 108 | 618 | 877 | 628 | 501 | 87 | 170 | 25 | 81 | 39 | 25 | 22 | 5 | 21 | 34 | 115 | 75 | 138 | 95 | 110 | 91 | 72 |
| 6 | 570 | 592 | 586 | 450 | 346 | 247 | 277 | 445 | 189 | 635 | 1105 | 544 | 561 | 202 | 285 | 96 | 66 | 54 | 24 | 15 | 0 | 32 | 36 | 59 | 77 | 104 | 65 | 145 | 76 | 38 |
| 7 | 566 | | 351 | 613 | 725 | 445 | 218 | 540 | 290 | 843 | 810 | 499 | 719 | 268 | 458 | 94 | 128 | 63 | 40 | 32 | 8 | 40 | 49 | 71 | 65 | 85 | 99 | 124 | 76 | 125 |
| 8 | 493 | 458 | 338 | 162 | 907 | 616 | 231 | 505 | 283 | 901 | 955 | 593 | 519 | 298 | 743 | 168 | 446 | 119 | 98 | 118 | 16 | 63 | 59 | 58 | 78 | 73 | 154 | 170 | 96 | 173 |
| 9 | 379 | 263 | 216 | 158 | 250 | 422 | 339 | 510 | 241 | 535 | 962 | 413 | 487 | 178 | 536 | 87 | 492 | 199 | 124 | 126 | 37 | 58 | 39 | 44 | 46 | 26 | 127 | 147 | 101 | 293 |
| 10 | 181 | 113 | 264 | 98 | 226 | 197 | 338 | 666 | 266 | 474 | 896 | 579 | 577 | 345 | 471 | 48 | 347 | 251 | 129 | 203 | 52 | 99 | 37 | 97 | 50 | 48 | 130 | 80 | 86 | 221 |
| 11 | 109 | 35 | 254 | 151 | 135 | 109 | 72 | 231 | 203 | 472 | 465 | 371 | 727 | 172 | 431 | 82 | 224 | 122 | 154 | 233 | 88 | 86 | 47 | 59 | 22 | 46 | 74 | 115 | 65 | 165 |
| 12 | 82 | 23 | 93 | 164 | 182 | 80 | 95 | 131 | 244 | 236 | 392 | 167 | 396 | 108 | 162 | 56 | 113 | 70 | 84 | 115 | 90 | 58 | 39 | 36 | 26 | 41 | 46 | 43 | 28 | 99 |
| 13 | 40 | 19 | 38 | 124 | 152 | 55 | 57 | 80 | 75 | 88 | 147 | 227 | 293 | 95 | 318 | 56 | 62 | 43 | 44 | 25 | 52 | 56 | 24 | 47 | 56 | 41 | 46 | 40 | 44 | 50 |
| 14 | 15 | 5 | 34 | 42 | 76 | 61 | 55 | 104 | 63 | 31 | 89 | 191 | 211 | 77 | 79 | 49 | 61 | 33 | 23 | 32 | 22 | 23 | 28 | 65 | 38 | 35 | 22 | 41 | 24 | 29 |
| 15 | 27 | 15 | 4 | 42 | 48 | 33 | 23 | 55 | 19 | 18 | 18 | 21 | 195 | 39 | 179 | 43 | 21 | 18 | 14 | 12 | 15 | 21 | 23 | 34 | 43 | 22 | 4 | 8 | 25 | 4 |
| 16+ | 9 | | 10 | 18 | 34 | 3 | 33 | 76 | 64 | 73 | 60 | 33 | 215 | 72 | 116 | 94 | 19 | 25 | 3 | 18 | 14 | 11 | 16 | 31 | 65 | 55 | 26 | 18 | 29 | 25 |
| Total | 3647 | 3685 | 3060 | 2564 | 3862 | 2783 | 2259 | 4288 | 2550 | 9278 | 11584 | 5765 | 6593 | 2069 | 4479 | 988 | 2501 | 1247 | 911 | 1049 | 533 | 811 | 851 | 1175 | 1010 | 1104 | 1035 | 1246 | 895 | 1422 |

**Table 40 (cont.).** Roughhead grenadier (*Macrourus berglax*) abundance at age ('000) in the 1994 - 2023 surveys.

< 1460 m. strata (1-34)

| Age | Year | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| 1 | 461 | 391 | 34 | 51 | 52 | 19 | 37 | 39 | 52 | 71 | 103 | 70 | 36 | 34 | 49 | 51 | 40 | 57 | 50 | 46 |
| 2 | 856 | 719 | 602 | 81 | 549 | 143 | 125 | 172 | 177 | 178 | 244 | 501 | 648 | 494 | 304 | 316 | 167 | 379 | 219 | 500 |
| 3 | 6380 | 1420 | 855 | 222 | 1086 | 306 | 622 | 395 | 405 | 279 | 221 | 482 | 575 | 863 | 648 | 793 | 402 | 329 | 481 | 539 |
| 4 | 2989 | 2303 | 1532 | 321 | 1268 | 419 | 616 | 509 | 349 | 320 | 298 | 531 | 818 | 902 | 767 | 1685 | 489 | 505 | 334 | 449 |
| 5 | 2576 | 2425 | 1399 | 543 | 1269 | 253 | 755 | 587 | 409 | 316 | 232 | 503 | 697 | 1303 | 1181 | 2023 | 1136 | 992 | 688 | 712 |
| 6 | 3062 | 2695 | 2316 | 1063 | 1578 | 954 | 1084 | 775 | 348 | 435 | 346 | 657 | 733 | 545 | 879 | 1487 | 855 | 1019 | 686 | 420 |
| 7 | 2552 | 2069 | 2351 | 1209 | 1954 | 936 | 1054 | 1009 | 572 | 533 | 344 | 688 | 713 | 791 | 873 | 1059 | 719 | 858 | 778 | 1189 |
| 8 | 3215 | 2418 | 1184 | 1285 | 2010 | 1680 | 2392 | 1466 | 1052 | 836 | 507 | 593 | 602 | 717 | 1003 | 963 | 831 | 1036 | 871 | 1050 |
| 9 | 2670 | 1442 | 1737 | 770 | 1649 | 866 | 1451 | 1241 | 919 | 610 | 436 | 449 | 405 | 365 | 554 | 386 | 517 | 756 | 609 | 1035 |
| 10 | 2282 | 1666 | 1643 | 1109 | 1454 | 476 | 911 | 1160 | 517 | 638 | 300 | 442 | 347 | 698 | 382 | 451 | 423 | 315 | 453 | 725 |
| 11 | 1863 | 1123 | 1409 | 697 | 1333 | 824 | 685 | 652 | 650 | 583 | 350 | 295 | 294 | 409 | 234 | 387 | 208 | 338 | 305 | 469 |
| 12 | 1374 | 676 | 739 | 473 | 626 | 564 | 565 | 660 | 491 | 317 | 441 | 219 | 204 | 299 | 254 | 275 | 149 | 117 | 149 | 329 |
| 13 | 670 | 1090 | 823 | 412 | 1170 | 563 | 461 | 516 | 429 | 116 | 350 | 316 | 200 | 357 | 252 | 332 | 142 | 153 | 199 | 257 |
| 14 | 416 | 1007 | 566 | 432 | 348 | 490 | 510 | 570 | 307 | 247 | 259 | 125 | 214 | 420 | 160 | 271 | 180 | 190 | 112 | 258 |
| 15 | 178 | 298 | 478 | 272 | 718 | 434 | 255 | 460 | 215 | 138 | 237 | 280 | 228 | 256 | 193 | 167 | 125 | 69 | 117 | 49 |
| 16+ | 1130 | 1113 | 1069 | 944 | 887 | 959 | 692 | 1044 | 373 | 443 | 372 | 338 | 352 | 468 | 457 | 746 | 464 | 292 | 339 | 525 |
| total | 32674 | 22855 | 18737 | 9884 | 17951 | 9886 | 12215 | 11255 | 7265 | 6059 | 5039 | 6487 | 7066 | 8920 | 8190 | 11391 | 6846 | 7405 | 6390 | 8552 |

**Table 41**. Squid (*Illex illecebrosus*) biomass (t.) by strata and total abundance ('000) in 1988-2023 surveys.

| Strata | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | 15 | 0 | 0 | | 17 | | 0 | | 8 | | | | | 5 | 42 |
| 2 | 1 | 0 | 120 | 18 | 12 | | 19 | | 6 | 8 | 17 | 3 | | 0 | 0 | 29 | 36 |
| 3 | | | 9 | 93 | 1 | | 6 | | 12 | 3 | 5 | 1 | | 1 | 0 | 8 | 19 |
| 4 | | | 3 | 3 | 4 | | 8 | | 3 | 1 | 3 | 0 | | | 0 | 2 | 51 |
| 5 | 1 | 4 | 1090 | 4 | 20 | | 58 | 0 | 26 | 9 | 12 | 3 | | 0 | 0 | 81 | 89 |
| 6 | | 0 | 468 | 472 | 4 | | 10 | 0 | 6 | 8 | 6 | 1 | | | 0 | 5 | 26 |
| 7 | 1 | | 22 | 130 | 1 | 0 | 8 | | 5 | 3 | 1 | 1 | | 0 | 0 | 22 | 39 |
| 8 | | | 1 | 29 | 3 | 0 | 8 | | 13 | 3 | 8 | 1 | | 0 | 0 | 8 | 8 |
| 9 | | 1 | 24 | 4 | 3 | | 6 | | 3 | 4 | 1 | | | | 0 | 2 | 25 |
| 10 | 3 | 4 | 216 | 646 | 17 | 0 | 81 | | 28 | 18 | 20 | 3 | | 1 | 1 | 25 | 52 |
| 11 | | | 128 | 40 | 12 | | 27 | 0 | 3 | 13 | 4 | 3 | | 1 | 0 | 12 | 36 |
| 12 | | | | 1 | | | | 0 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 6 | 11 |
| 13 | | | | 1 | | | 8 | | | 1 | 0 | 0 | 0 | | 0 | 0 | 9 |
| 14 | | | 4 | 22 | 4 | | 5 | 0 | 4 | 6 | 4 | 1 | | 1 | | 10 | 15 |
| 15 | | | 5 | 13 | 3 | | 4 | | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 6 | 3 |
| 16 | | | | 4 | | | | | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 |
| 17 | | | | | 0 | | 1 | | | 0 | | 0 | 0 | | 1 | 0 | 1 |
| 18 | | 0 | 1 | | 1 | | 4 | | | 0 | 0 | | | 0 | | 1 | 1 |
| 19 | | | | 3 | 0 | | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 3 |
| 20 | | | | | | | | | | | | | | | | | 1 |
| 21 | | | | | | | | | | | | | | | | | 0 |
| 22 | | | | | | | | | | | | | | | | | 0 |
| 23 | | | | | | | | | | | | | | | | | 1 |
| 24 | | | | | | | | | | | | | | | | | 1 |
| 25 | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | 1 |
| 29 | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | 1 |
| 31 | | | | | | | | | | | | | | | | | 1 |
| 32 | | | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | | | 2 |
| 34 | | | | | | | | | | | | | | | | | 2 |
| Total (1-19) | 6 | 9 | 2107 | 1483 | 83 | 1 | 269 | 1 | 113 | 81 | 92 | 22 | 3 | 10 | 8 | 222 | 470 |
| s.e. (1-19) | 4 | 4 | 604 | 395 | 18 | 1 | 33 | 1 | 15 | 12 | 12 | 4 | 1 | 3 | 3 | 60 | 55 |
| Total (1-34) | | | | | | | | | | | | | | | | | 479 |
| s.e. total (1-34) | | | | | | | | | | | | | | | | | 55 |
| Abundance (1-19) | 67 | 86 | 21184 | 17064 | 1114 | 32 | 3749 | 62 | 1561 | 1104 | 1481 | 801 | 182 | 608 | 457 | 3898 | 4675 |
| Abundance (1-34) | | | | | | | | | | | | | | | | | 4944 |

**Table 41 (cont.)** Squid (*Illex illecebrosus*) biomass (t.) by strata and total abundance ('000) in 1988-2023 surveys.

| Strata | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 385 | 1 | 7 | 13 | 0 | 1 | 1 | | | | | 18 | 0 | 10 | | | 1 | |
| 2 | 7 | 1181 | 10 | 1736 | 296 | 6 | 14 | 11 | | | | 0 | 383 | 4 | 86 | 4 | 10 | | |
| 3 | 2 | 8 | 62 | 66 | 158 | 1 | 1 | 1 | | 0 | | 0 | 630 | 1 | 33 | 2 | 63 | | |
| 4 | 2 | 130 | 0 | 6 | 17 | | | 1 | | 0 | | 0 | 31 | 3 | 41 | | 1 | | 0 |
| 5 | 5 | 1457 | 40 | 357 | 285 | 3 | 2 | 8 | | 0 | | | 114 | 15 | 22 | 14 | | | |
| 6 | 4 | 222 | 58 | 37 | 21 | 3 | 3 | 0 | | | | | 259 | 2 | 37 | 28 | 16 | | |
| 7 | 6 | 28 | 38 | 48 | 34 | 3 | 1 | 1 | | 0 | | 1 | 294 | 2 | 1 | 10 | 89 | | |
| 8 | 1 | 7 | 24 | 38 | 36 | 2 | 4 | 0 | | 1 | | 0 | 19 | 1 | 43 | 2 | 29 | | |
| 9 | | 1 | 22 | 16 | 345 | | 5 | | | | | | 10 | 8 | 8 | 1 | | | |
| 10 | 17 | 26 | 56 | 2560 | 359 | 16 | 24 | 8 | | 0 | | | 323 | 5 | 28 | 19 | 26 | 1 | 1 |
| 11 | 13 | 86 | 88 | 104 | 41 | 3 | 28 | 5 | | 0 | | 1 | 227 | 5 | 20 | 57 | 50 | 0 | |
| 12 | 1 | 3 | 2 | 2 | 23 | | | 0 | | | | | 0 | 1 | 16 | 1 | 30 | | 0 |
| 13 | 1 | | | | 0 | | | | | | | | 1 | | 5 | | | | |
| 14 | 4 | 1 | 6 | 106 | 52 | 5 | 5 | | | 0 | | | 17 | 1 | 5 | 1 | 3 | | 0 |
| 15 | 6 | 4 | 3 | 49 | 2 | | 0 | | | | | | 18 | 0 | 5 | 2 | 5 | 2 | 0 |
| 16 | 4 | | | 2 | 0 | | | | | | | | | 0 | 2 | | 6 | 0 | 0 |
| 17 | 2 | | | 0 | | 0 | | | | | | | 4 | | | 0 | | | |
| 18 | 0 | | | 1 | 3 | | | 1 | | | | | 1 | | | | | | |
| 19 | 2 | 1 | | 0 | 1 | | | | | | | | 1 | | 0 | | 1 | | |
| 20 | 3 | 0 | | | 0 | | | | | | | | | 1 | | | 6 | | |
| 21 | | 0 | | 1 | 0 | | | | | | | | | | | | 3 | | |
| 22 | 0 | 0 | | | | | 0 | | | | | | | 1 | | | 9 | | |
| 23 | | 0 | | | | | | | | | | | | | | | | | |
| 24 | 1 | | | | 1 | | | | | | | | | 0 | | | | | |
| 25 | | 1 | | 1 | 0 | | | | | | | | 0 | | 0 | | | | |
| 28 | 0 | 5 | | | 0 | | | | | | | | 2 | | 0 | | 1 | | |
| 29 | | 2 | | | 0 | | | 1 | | | | | 3 | | | | | | |
| 30 | | 3 | | 1 | 1 | | | 0 | | | | 1 | 9 | | | | 2 | | |
| 31 | | | | | 2 | | | | | | | | | | | | | | |
| 32 | | 0 | | | | | | 0 | | | | | | | | | 1 | | |
| 33 | | | | | | | | | | | | | | | | | | | |
| 34 | | | | 4 | 1 | | | 2 | | | | | 2 | 1 | 1 | | | 0 | |
| Total (1-19) | 79 | 3541 | 411 | 5137 | 1688 | 43 | 89 | 38 | | 3 | | 3 | 2350 | 49 | 363 | 142 | 329 | 4 | 2 |
| s.e. (1-19) | 8 | 1244 | 64 | 2392 | 346 | 7 | 19 | 8 | | 1 | | 1 | 490 | 6 | 50 | 22 | 41 | 2 | 1 |
| Total (1-34) | 83 | 3551 | 411 | 5144 | 1694 | 43 | 90 | 41 | | 3 | | 4 | 2366 | 52 | 365 | 142 | 351 | 4 | 2 |
| s.e (1-34) | 8 | 1244 | 64 | 2392 | 346 | 7 | 19 | 8 | | 1 | | 1 | 490 | 7 | 50 | 22 | 42 | 2 | 1 |
| Abundance (1-19) | 1463 | 28614 | 5793 | 48476 | 23029 | 616 | 699 | 695 | | 83 | | | | 683 | 3093 | 1679 | 2589 | | |
| Abundance (1-34) | 1711 | 28953 | 5793 | 48563 | 23112 | 616 | 707 | 765 | | 83 | | | | 712 | 3105 | 1679 | 2751 | | |

**Table 42**. Shrimp (*Pandalus borealis*) total and female biomass by strata (t.) in the 1988 - 2023 surveys.

| | Total | | Female | |
|---|---|---|---|---|
| Year | Biomass (t) | Catch per tow (kg) | Biomass (t) | Catch per tow (kg) |
| 1988 | 5615 | 6.98 | 4525 | 5.63 |
| 1989 | 2252 | 2.80 | 1359 | 1.69 |
| 1990 | 3405 | 4.23 | 1363 | 1.69 |
| 1991 | 11352 | 14.12 | 6365 | 7.91 |
| 1992 | 24508 | 30.48 | 15472 | 19.24 |
| 1993 | 11673 | 14.52 | 6923 | 8.61 |
| 1994 | 3879 | 4.82 | 2945 | 3.66 |
| 1995 | 7276 | 9.05 | 4857 | 6.04 |
| 1996 | 10461 | 13.01 | 5132 | 6.38 |
| 1997 | 7449 | 9.26 | 4885 | 6.07 |
| 1998 | 39367 | 48.95 | 11444 | 14.23 |
| 1999 | 24692 | 30.70 | 13669 | 17.00 |
| 2000 | 19003 | 23.63 | 10172 | 12.65 |
| 2001 | 27204 | 33.83 | 13336 | 16.58 |
| 2002 | 36510 | 45.40 | 17091 | 21.25 |
| 2003 | 21087 | 26.22 | 11589 | 14.41 |
| 2004 | 20182 | 25.10 | 12081 | 15.02 |
| 2005 | 30675 | 38.14 | 14381 | 17.88 |
| 2006 | 16235 | 20.19 | 11359 | 14.27 |
| 2007 | 17046 | 21.20 | 12843 | 15.97 |
| 2008 | 11092 | 13.79 | 8630 | 10.73 |
| 2009 | 2797 | 3.48 | 1764 | 2.19 |
| 2010 | 4894 | 6.09 | 3819 | 4.75 |
| 2011 | 1621 | 2.02 | 1132 | 1.41 |
| 2012 | 1055 | 1.31 | 791 | 0.98 |
| 2013 | 844 | 1.05 | 691 | 0.86 |
| 2014 | 900 | 1.12 | 716 | 0.89 |
| 2015 | 1551 | 1.93 | 1079 | 1.34 |
| 2016 | 2521 | 3.13 | 1982 | 2.46 |
| 2017 | 2885 | 3.59 | 2304 | 2.86 |
| 2018 | 4394 | 5.31 | 4051 | 4.90 |
| 2019 | 9273 | 11.53 | 8486 | 10.60 |
| 2020 | 6734 | 8.37 | 6048 | 7.52 |
| 2021 | 2101 | 2.61 | 1792 | 2.23 |
| 2022 | 862 | 1.07 | 705 | 0.88 |
| 2023 | 912 | 1.14 | 773 | 0.96 |

**Table 43**. Shrimp (*Pandalus borealis*) abundance at age ('00000) in the 1988 - 2023 surveys.

| Year/Age | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1988 | | | 1363 | 548 | 1815 | 1635 | 126 | | | | 5487 |
| 1989 | | 8 | 816 | 692 | 193 | 738 | 131 | | | | 2579 |
| 1990 | | | 3647 | 389 | 910 | 273 | 10 | | | | 5229 |
| 1991 | | 435 | 2651 | 4677 | 3882 | 1000 | 318 | | | | 12964 |
| 1992 | | | 3043 | 4751 | 13728 | 1282 | | | | | 22804 |
| 1993 | | 7878 | 3760 | 2052 | 4458 | 492 | | | | | 18640 |
| 1994 | | 427 | 875 | 726 | 1806 | 75 | | | | | 3909 |
| 1995 | | 2359 | 2682 | 1278 | 2146 | 1217 | | | | | 9682 |
| 1996 | | 3424 | 9557 | 1828 | 1523 | 571 | 437 | | | | 17339 |
| 1997 | | 695 | 3372 | 5078 | 980 | 258 | 77 | 0 | | | 10461 |
| 1998 | 1220 | 56080 | 38922 | 13786 | 5341 | 2006 | 145 | | | | 117501 |
| 1999 | 13 | 4735 | 23924 | 14962 | 6008 | 2043 | 81 | | | | 51766 |
| 2000 | 94 | 1148 | 17135 | 12744 | 5342 | 1651 | 669 | | | | 38783 |
| 2001 | 27 | 3711 | 18668 | 17331 | 13880 | 3875 | 7 | | | | 57500 |
| 2002 | 1806 | 11004 | 44684 | 7167 | 12874 | 8003 | 545 | | | | 86082 |
| 2003 | 146 | 13869 | 16468 | 5589 | 9089 | 2306 | 49 | | | | 47516 |
| 2004 | | 27415 | 9603 | 6425 | 7831 | 1330 | 206 | | | | 52810 |
| 2005 | | 1792 | 69026 | 5240 | 10500 | 7576 | 1407 | | | | 95541 |
| 2006 | | 809 | 18127 | 10561 | 7449 | 3698 | 616 | | | | 41260 |
| 2007 | | 301 | 3866 | 12213 | 12758 | 5882 | 1287 | | | | 36306 |
| 2008 | | 473 | 4708 | 5027 | 6865 | 4013 | 282 | | | | 21367 |
| 2009 | 6 | 1506 | 1783 | 1236 | 1004 | 241 | 70 | | | | 5846 |
| 2010 | 77 | 1106 | 4185 | 2747 | 243 | 0 | 0 | | | | 8358 |
| 2011 | 2 | 611 | 893 | 1063 | 330 | 3 | | | | | 2903 |
| 2012 | | 216 | 889 | 536 | 148 | 5 | | | | | 1795 |
| 2013 | 10 | 63 | 186 | 606 | 377 | 42 | | | | | 1284 |
| 2014 | 0 | 15 | 338 | 180 | 689 | 179 | | | | | 1401 |
| 2015 | | 1090 | 393 | 916 | 151 | 159 | | | | | 2710 |
| 2016 | 2 | 230 | 1089 | 2141 | 492 | 61 | | | | | 4014 |
| 2017 | | 662 | 1100 | 2018 | 612 | 25 | | | | | 4418 |
| 2018 | | 1048 | 2479 | 1939 | 1558 | 37 | | | | | 7061 |
| 2019 | 9 | 1010 | 5923 | 5445 | 1439 | 42 | 21 | 8 | 0 | 14 | 13911 |
| 2020 | | 1449 | 2598 | 5723 | 1746 | 152 | 0 | | | | 11666 |
| 2021 | | 125 | 1702 | 1620 | 707 | 39 | | | | | 4193 |
| 2022 | 0 | 61 | 552 | 1055 | 218 | 60 | | | | | 1945 |
| 2023 | 0 | 74 | 581 | 592 | 269 | 0 | 8 | | | | 1523 |

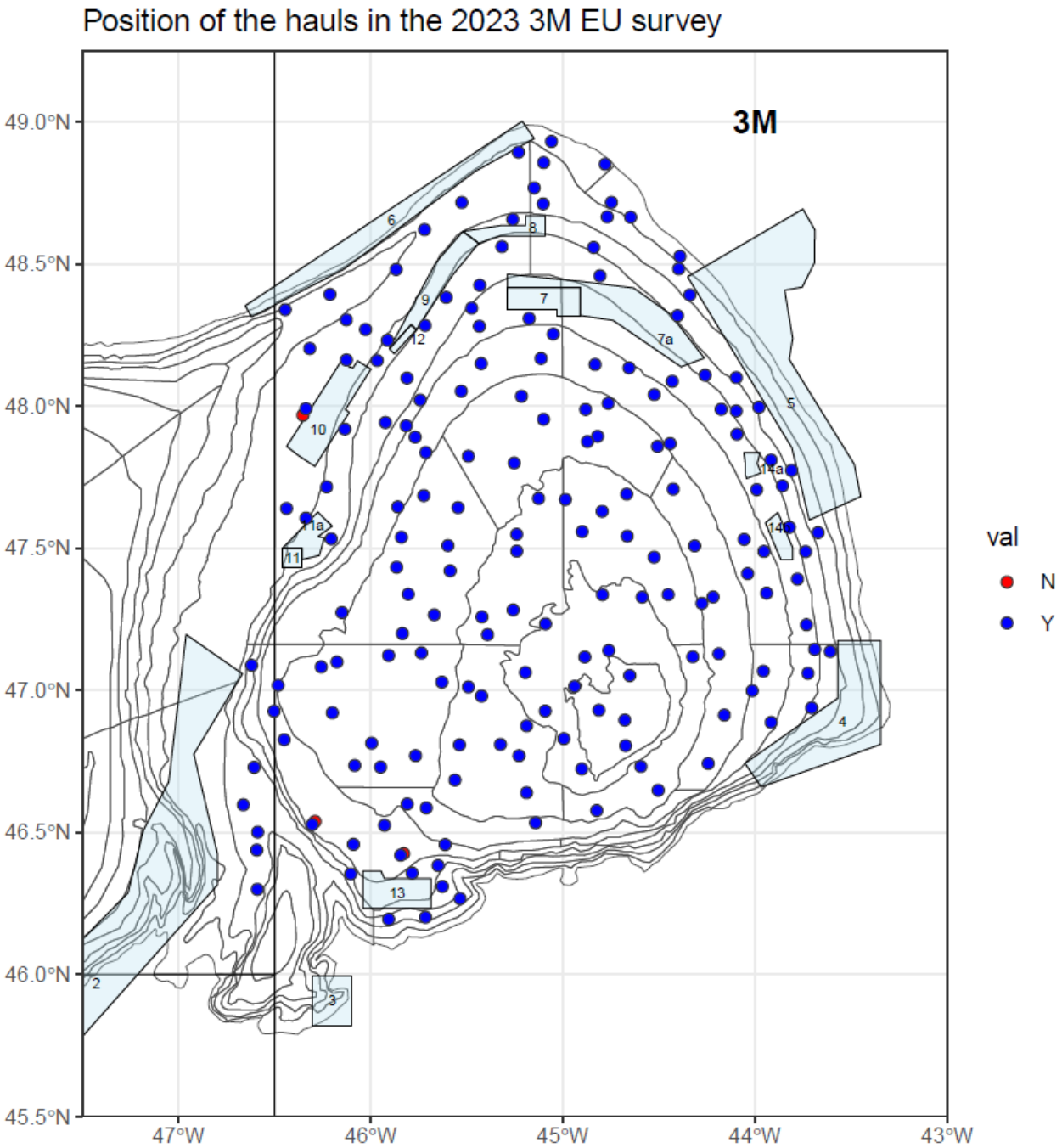


**Figure 1.** Haul positions in the Flemish Cap survey 2023. Coral and sponge protection areas (blue shaded) are displayed in the map.

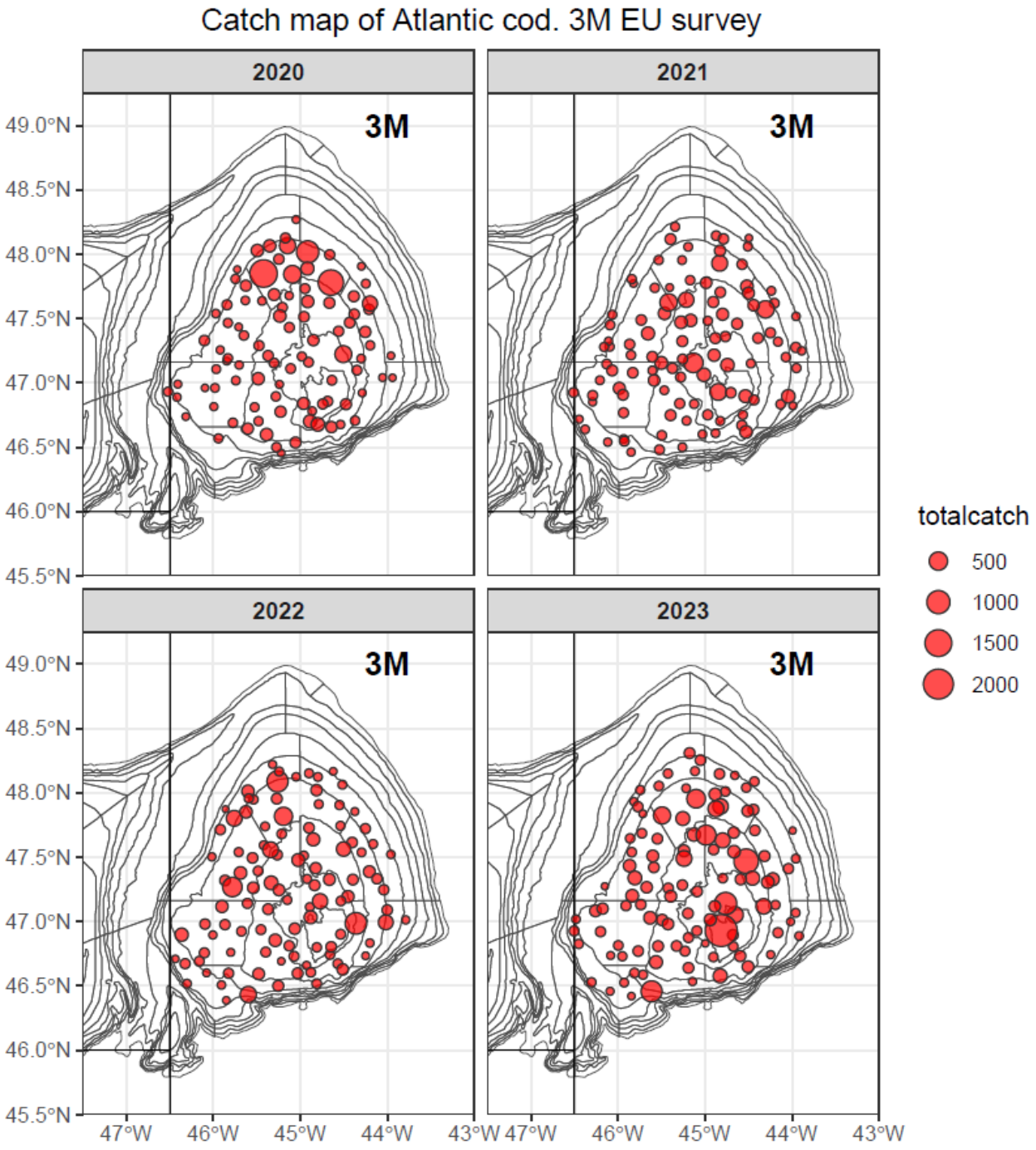


**Figure 2**. Cod (*Gadus morhua*) catch (kg.) distribution in the last four surveys.

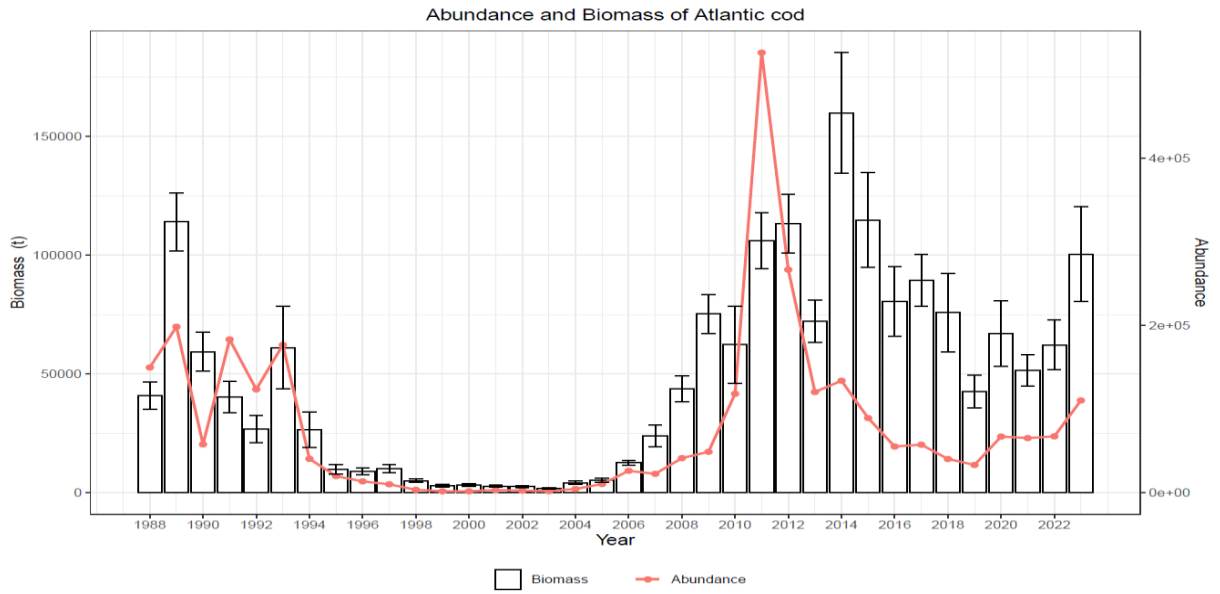


**Figure 3.** Cod biomass (t.) ± S.E. and abundance 1988-2023.

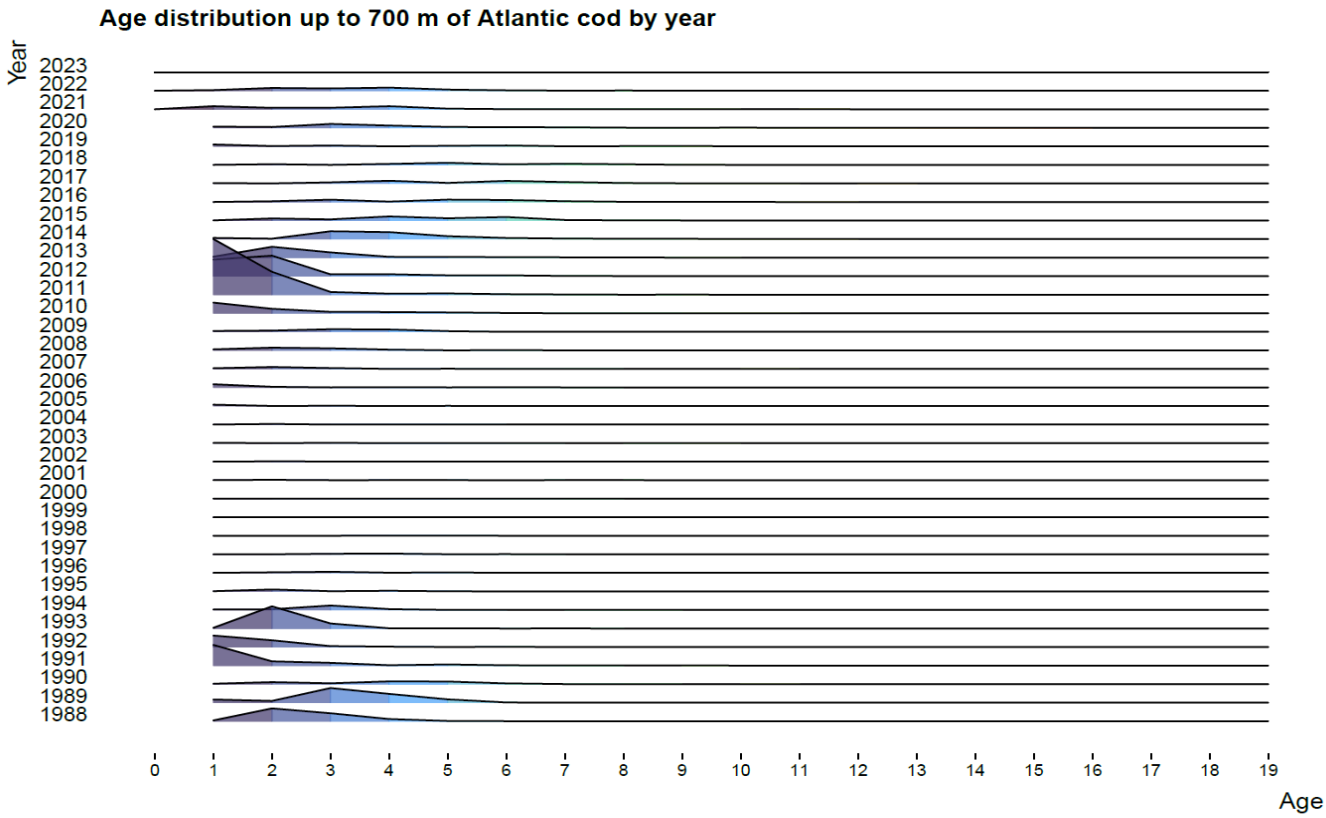


**Figure 4.** Cod age distribution in Flemish Cap NAFO 3M 1988-2023. 2023 NOT AVAILABLE.

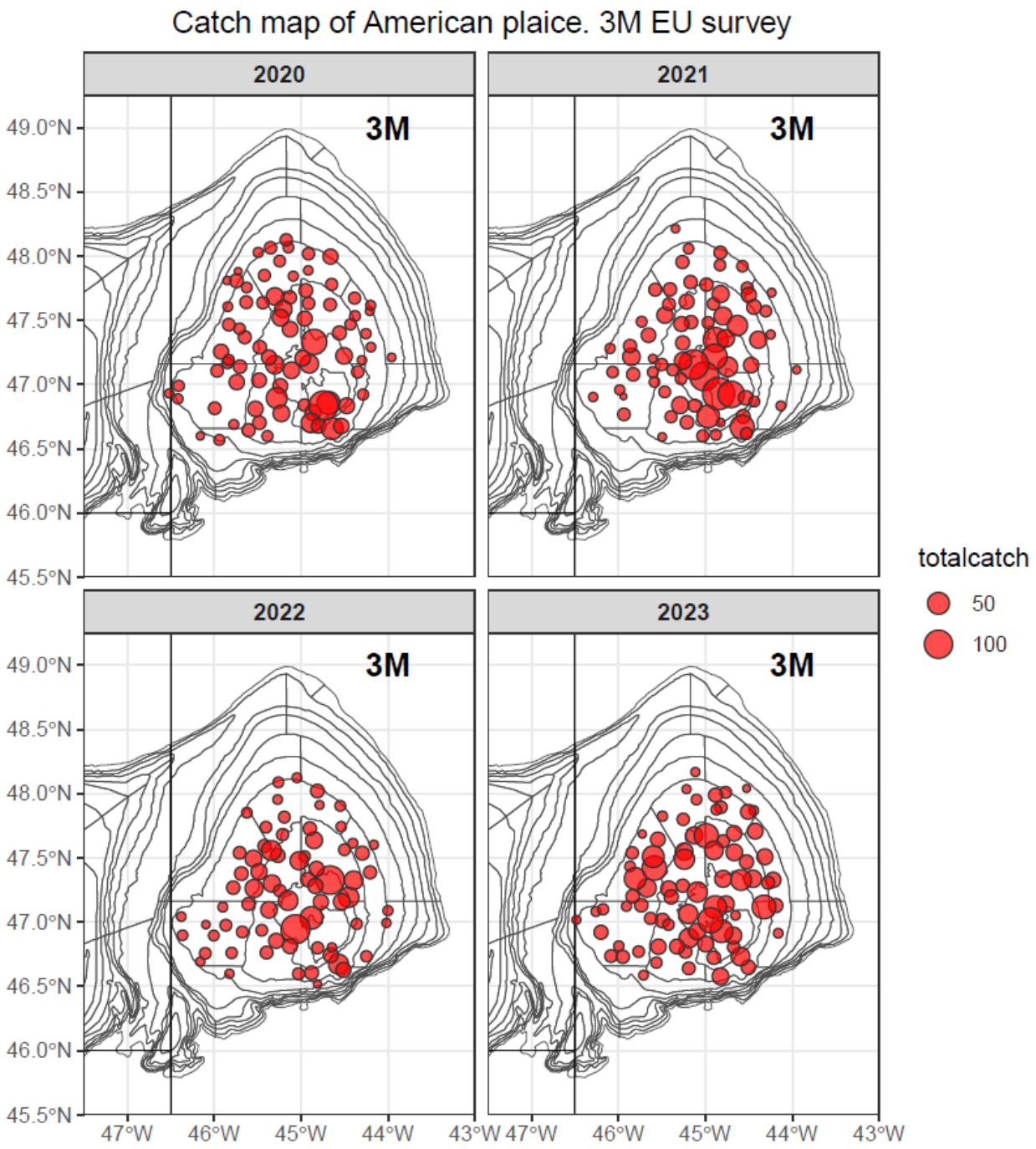


**Figure 5**. American plaice (*Hippoglossoides platessoides*) catch (kg) distribution in the last four surveys.

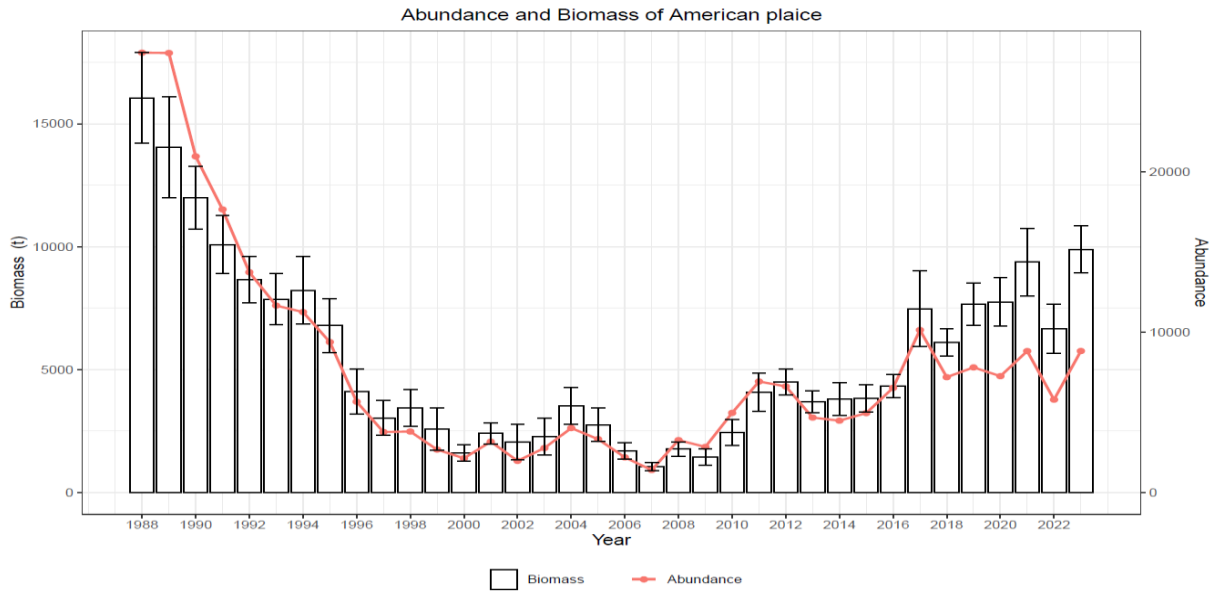


**Figure 6.** American plaice (*Hippoglossoides platessoides*) biomass (t.) ± S.E. and abundance 1988-2023.

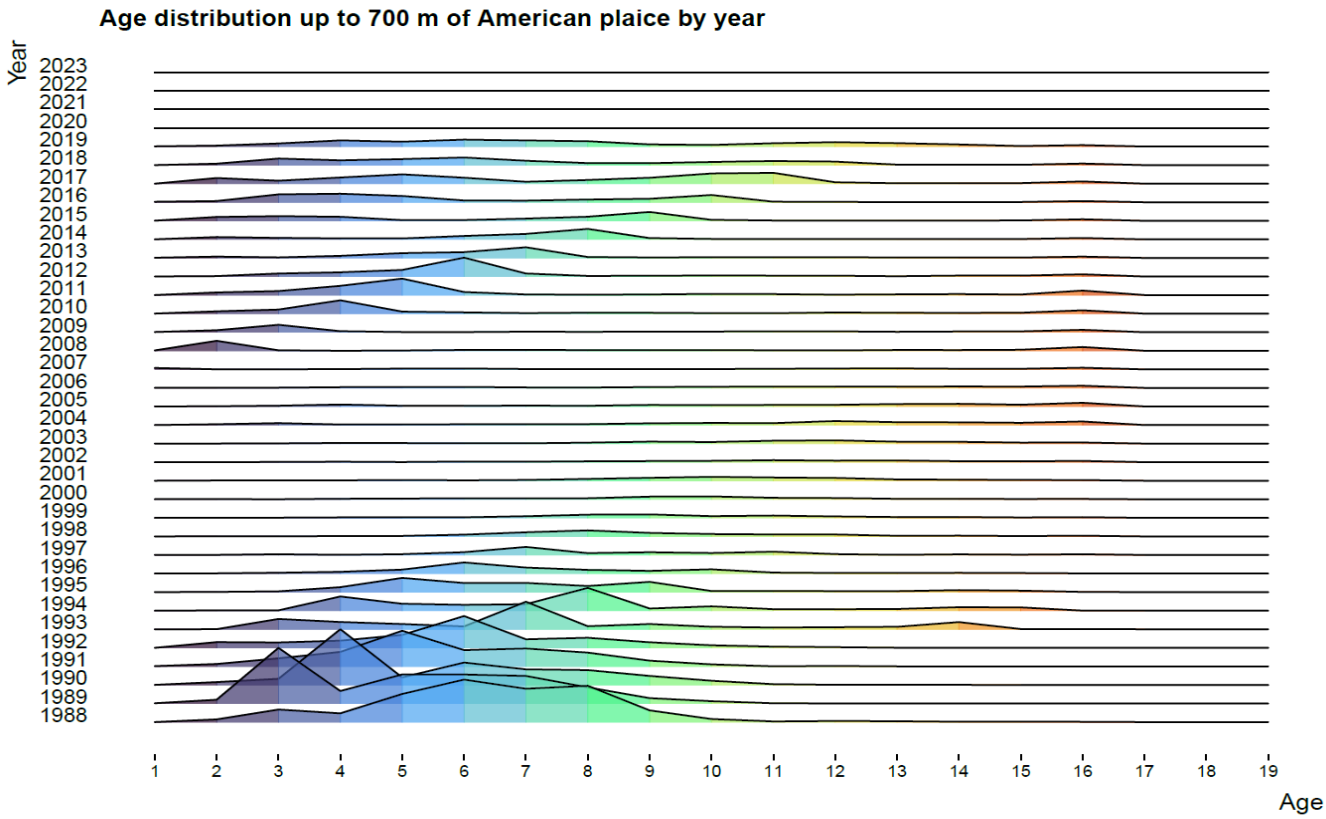


**Figure 7**. American plaice age distribution on Flemish Cap, NAFO Div. 3M: 1988-2023. 2020-2023 NOT YET AVAILABLE.

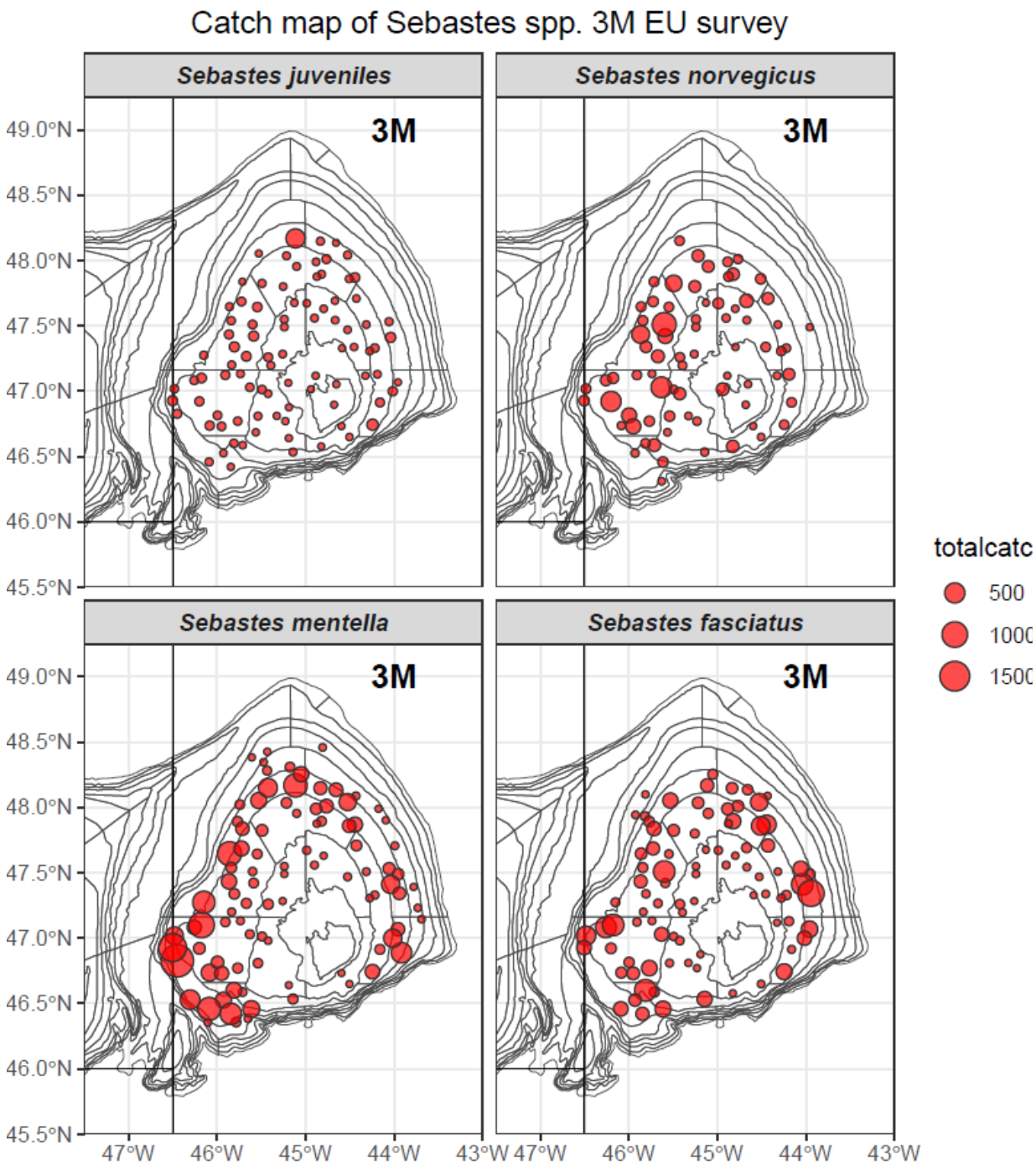


**Figure 8.** Catch distribution (kg) of *S. norvegicus, S. mentella, S. fasciatus* and *S. juvenile* in 2023 survey.

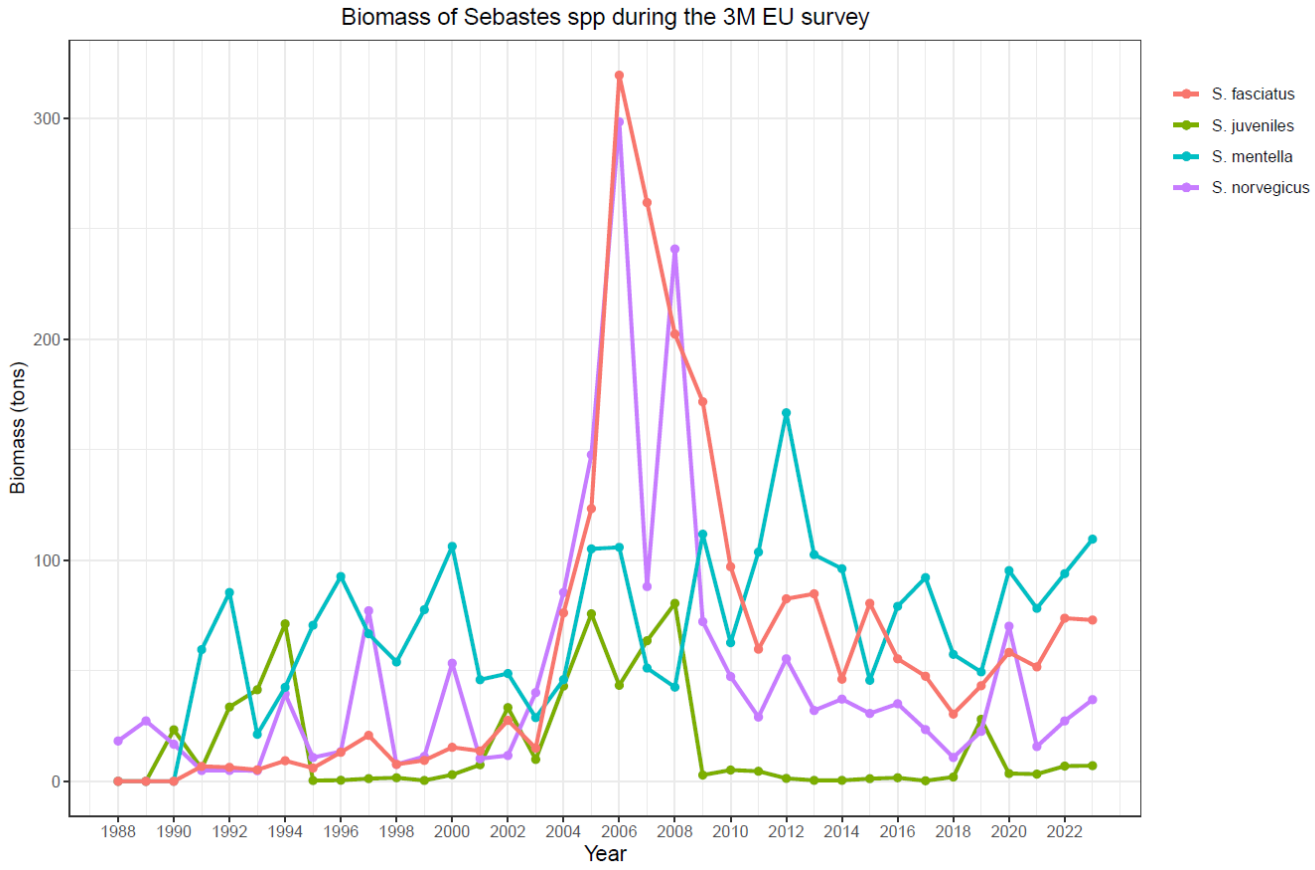


**Figure 9.** Redfish species biomass (t.) 1988-2023.

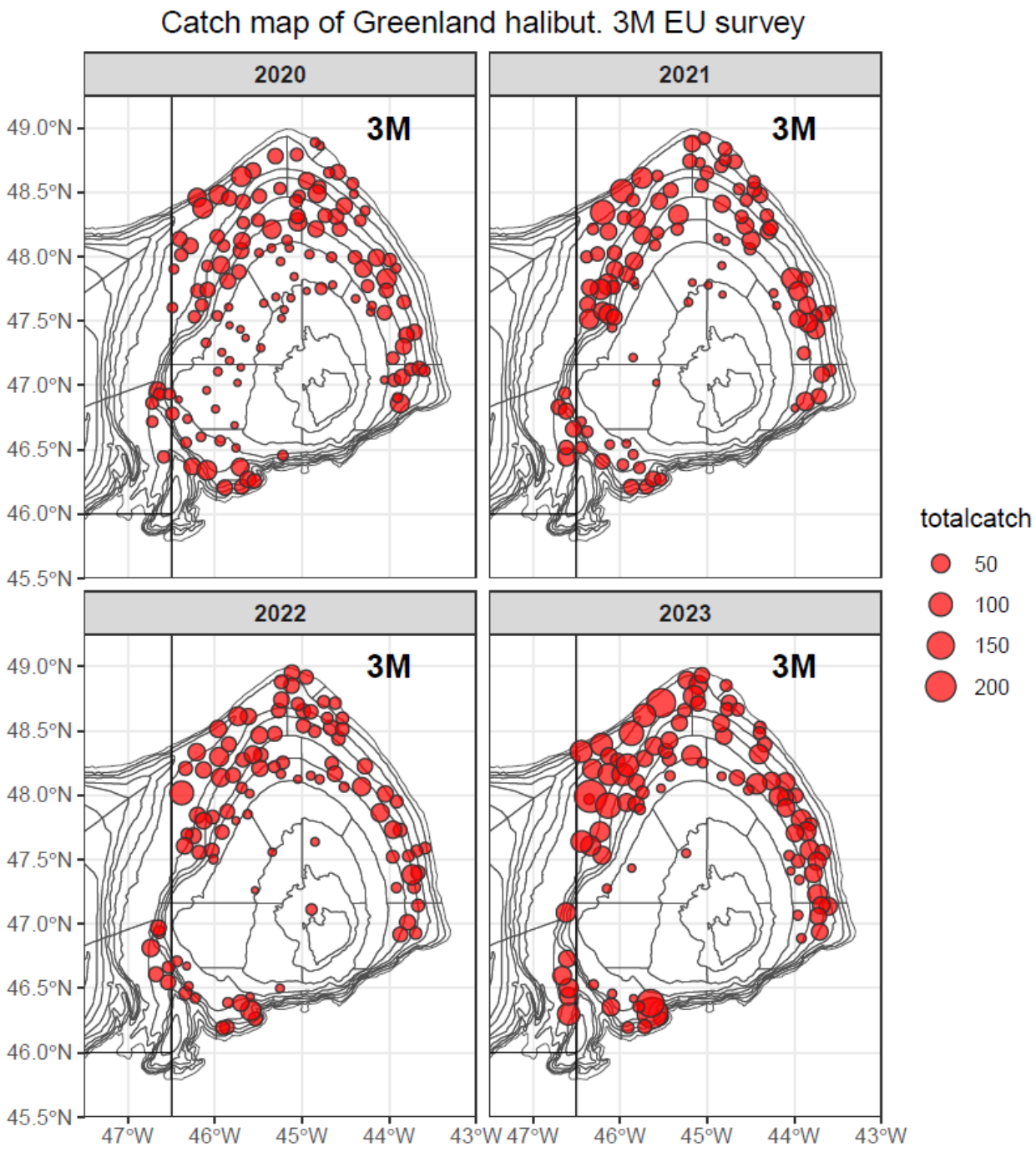


**Figure 10.** Greenland halibut (*Reinhardtius hippoglossoides*) catch distribution (kg) in the last four surveys.

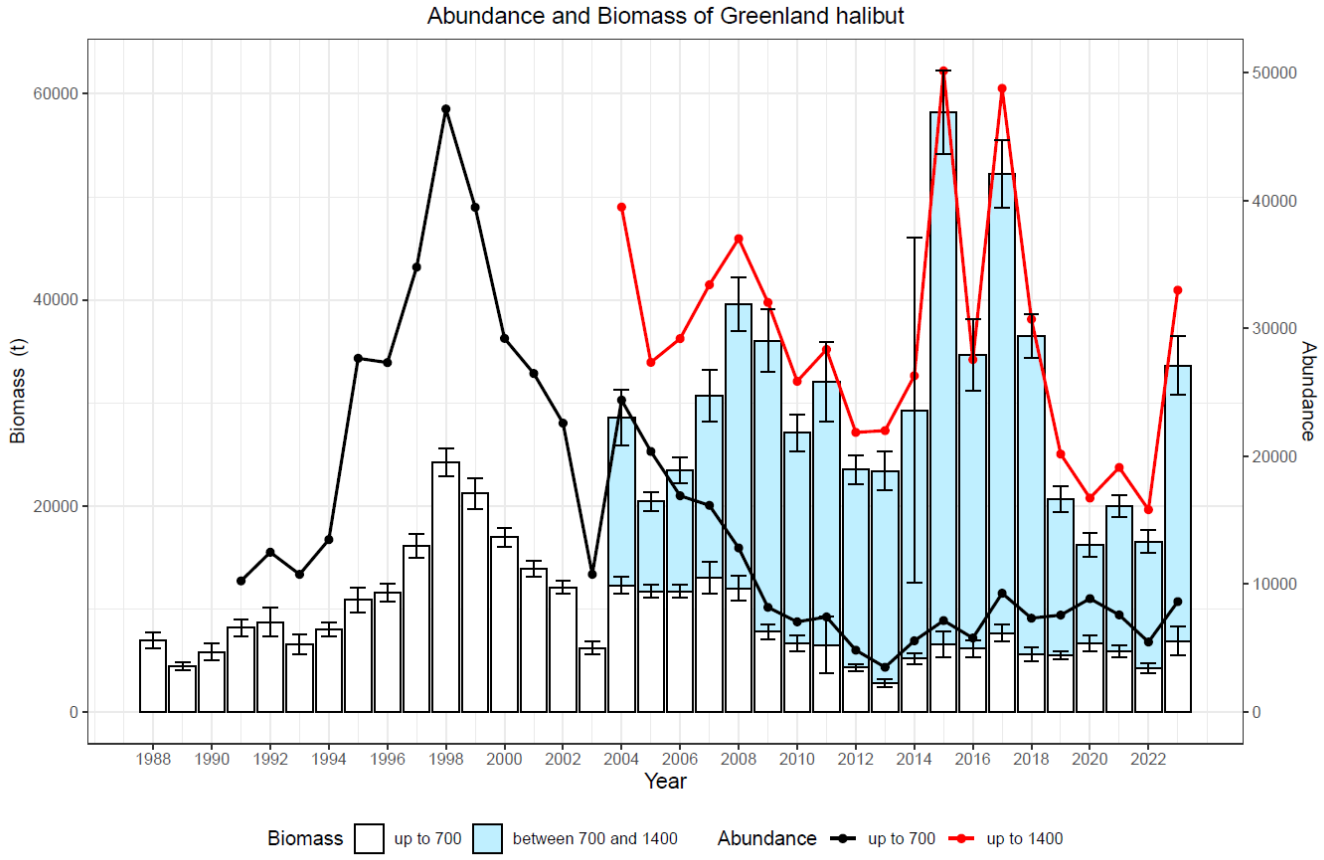


**Figure 11.** Greenland halibut (*Reinhardtius hippoglossoides*) biomass (t.) ± S.E. and abundance 1988-2023.

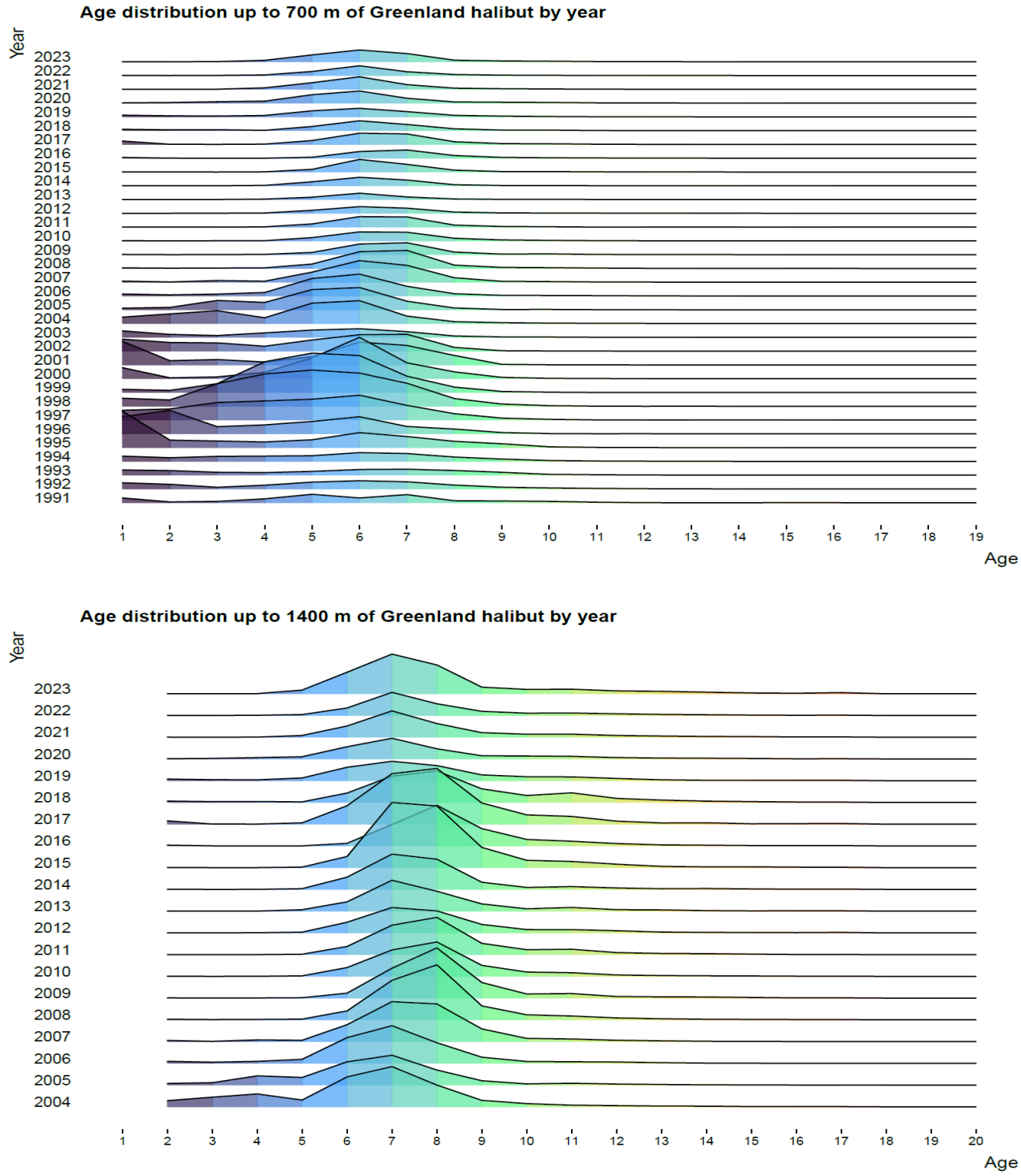


**Figure 12.** Greenland halibut (*Reinhardtius hippoglossoides*) age distribution on Flemish Cap in depths < 730 m. (up, 1988-2023) and until 1440 m. (bottom, 2004-2023), NAFO Div. 3M.

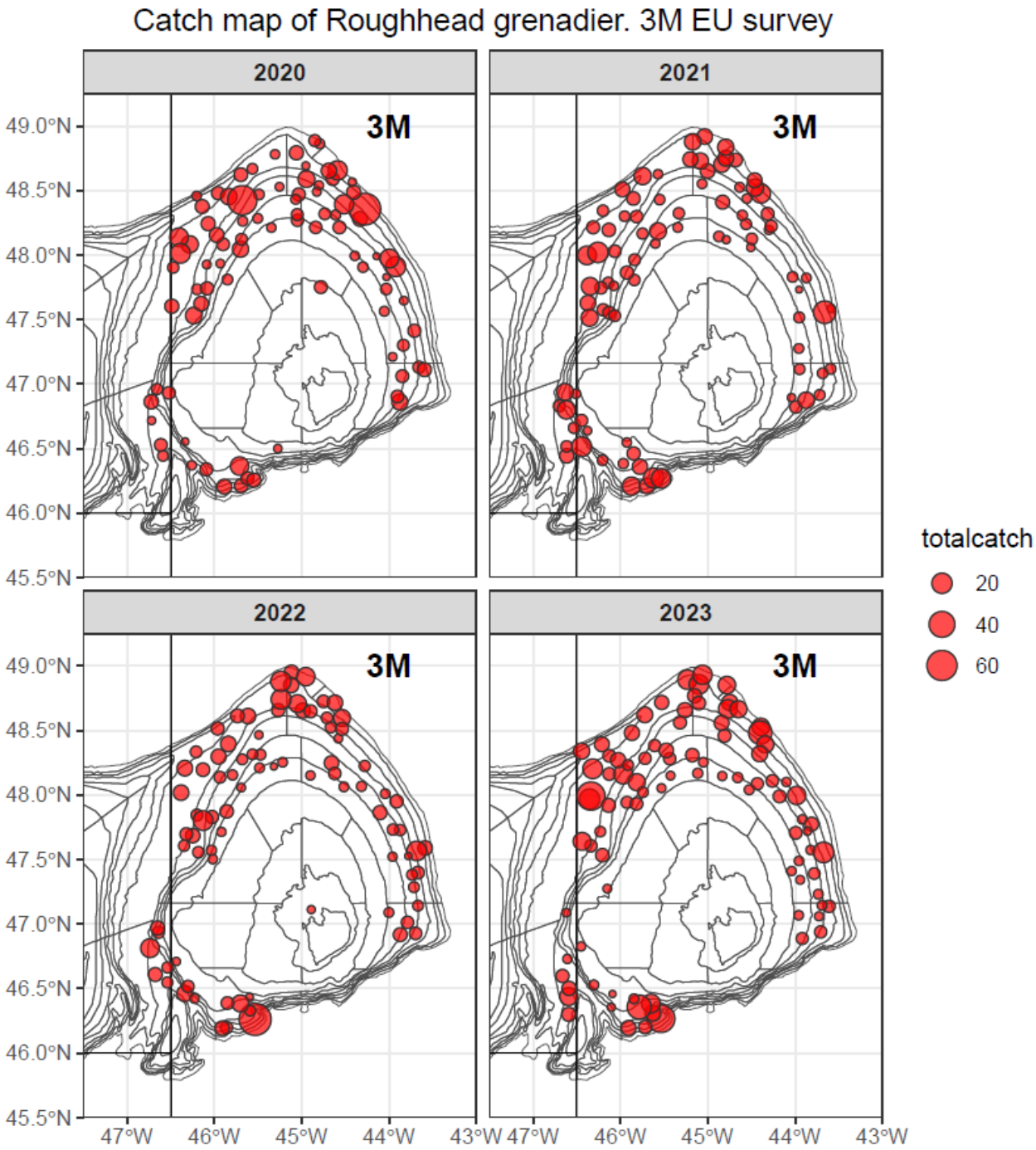


**Figure 13**. Roughhead grenadier (*Macrourus berglax*) catch distribution (kg) in the last four surveys.

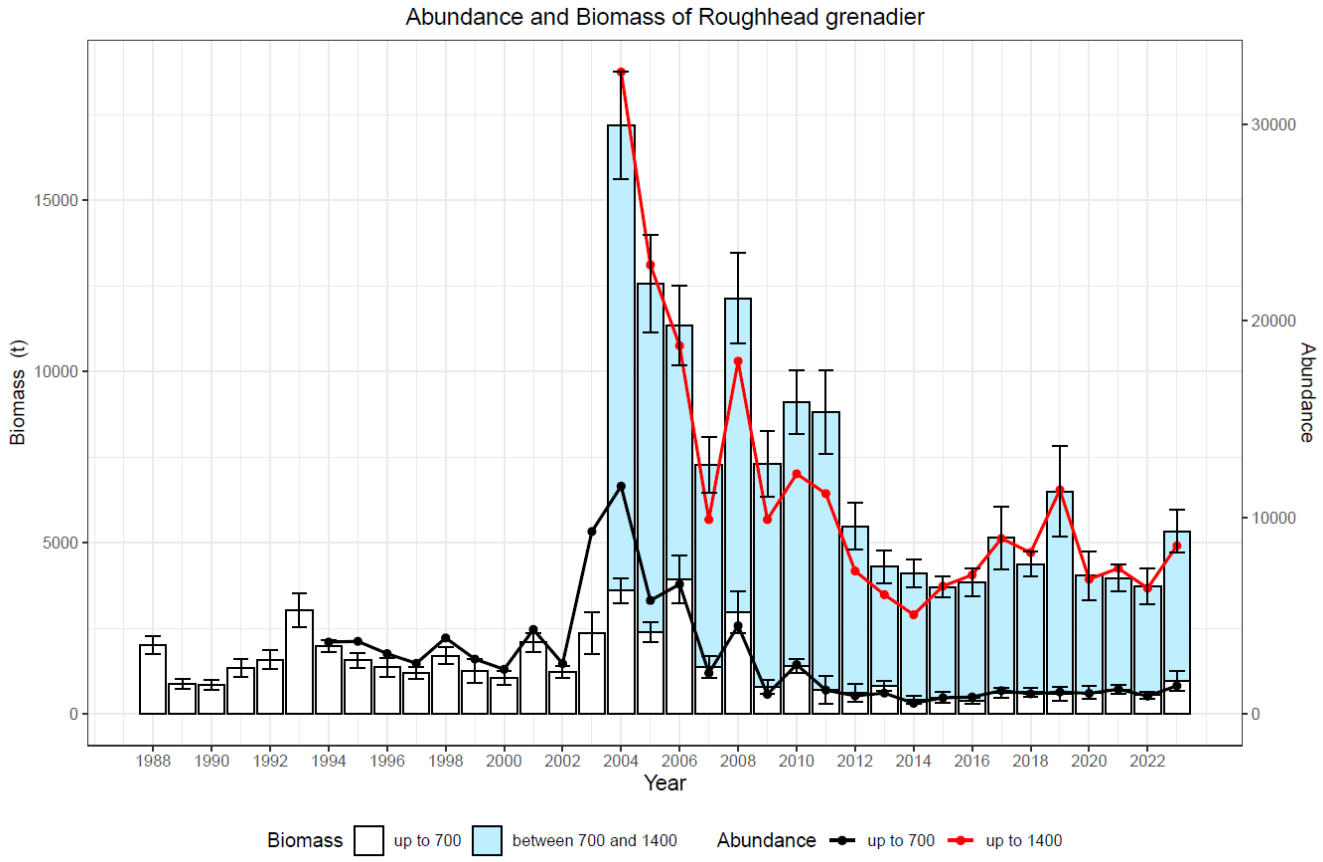


**Figure 14.** Roughhead grenadier (*Macrourus berglax*) biomass (t.) ± S.E. and number ('000) 1988-2023.

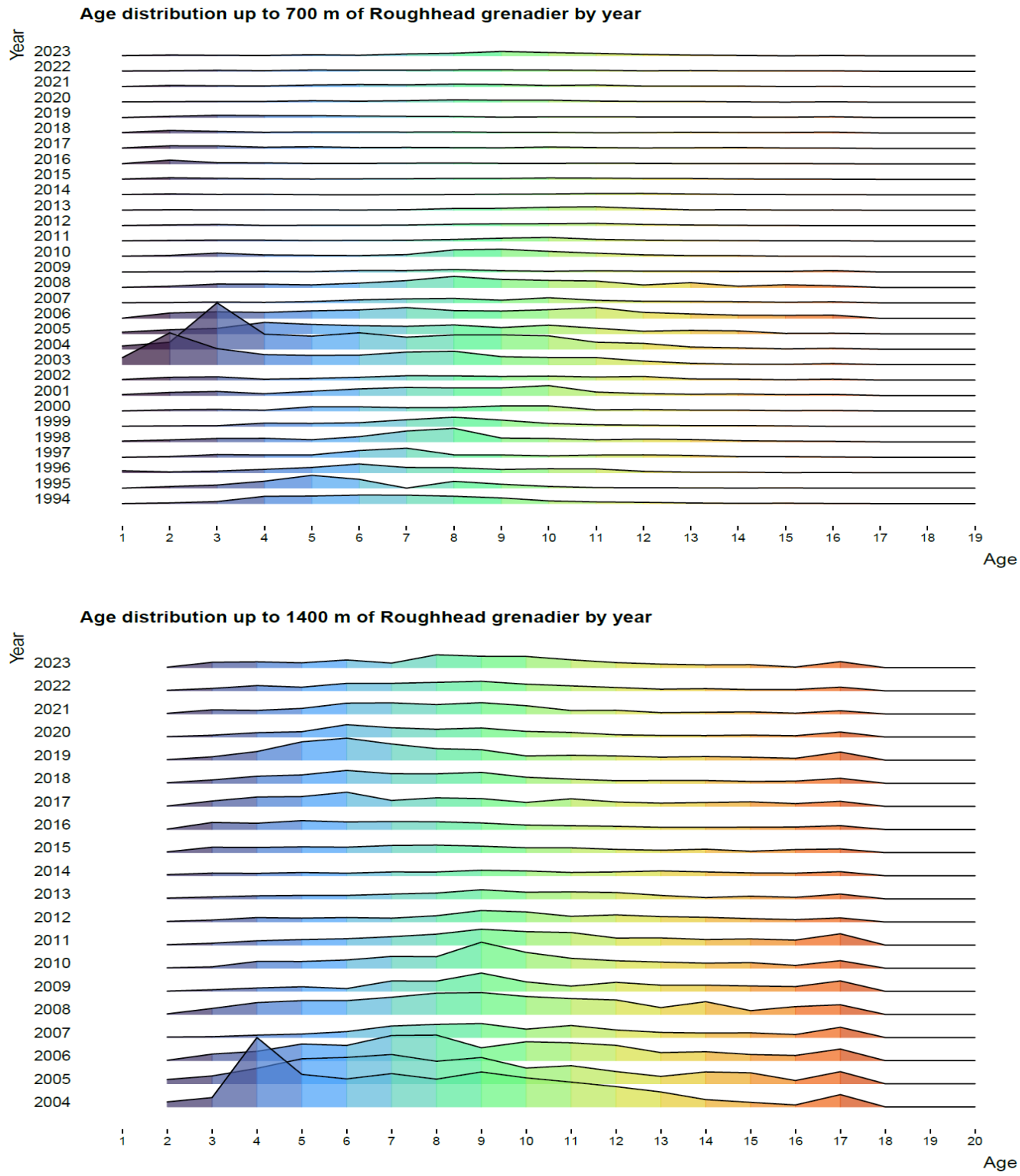


**Figure 15.** Roughhead grenadier (*Macrourus berglax*) age distribution on Flemish Cap in depths < 730 m. (up, 1988-2023) and until 1440 m. (bottom, 2004-2023), NAFO Div. 3M.

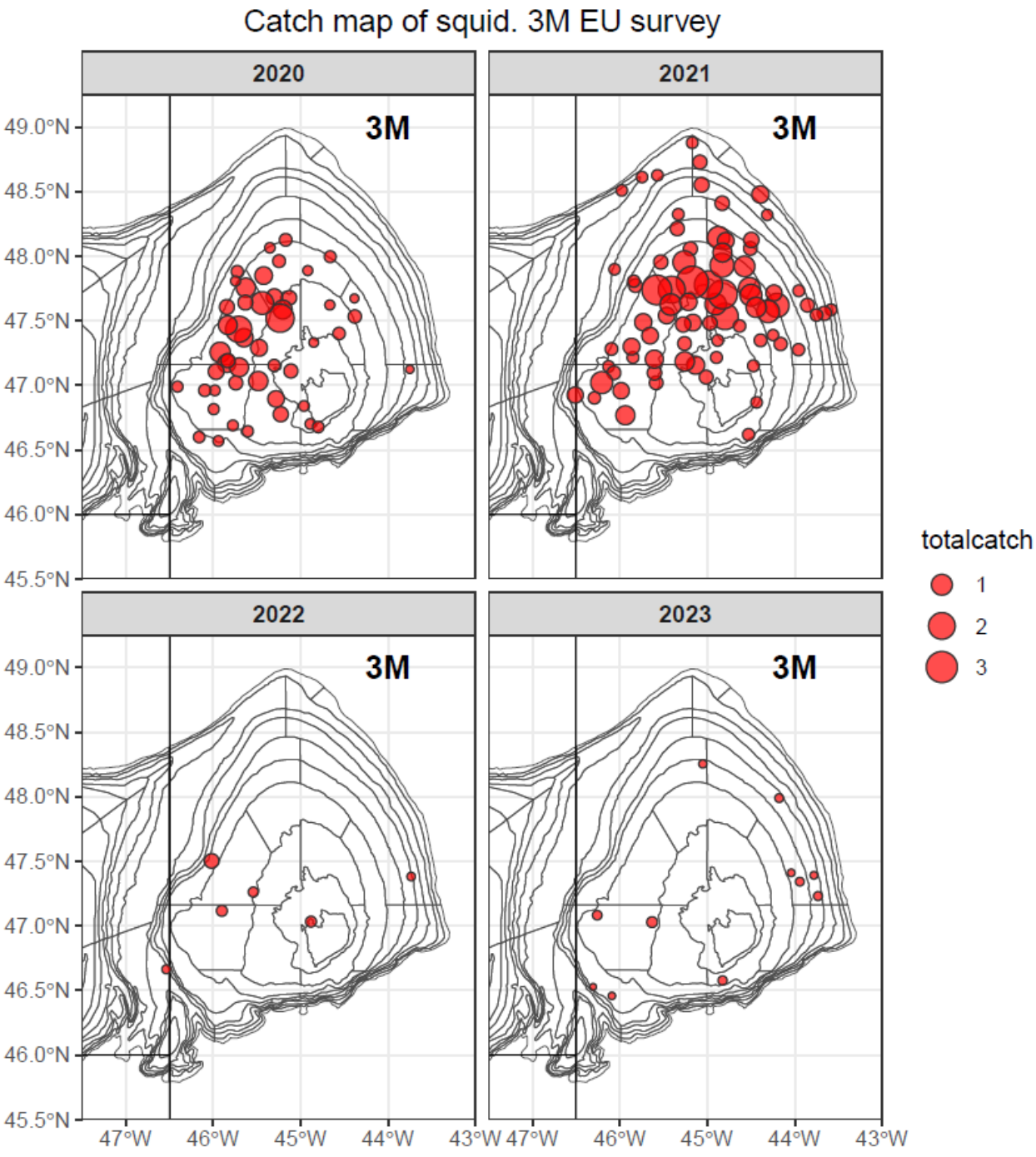


**Figure 16**. Squid (*Illex illecebrosus*) catch distribution (kg) in the last four surveys.

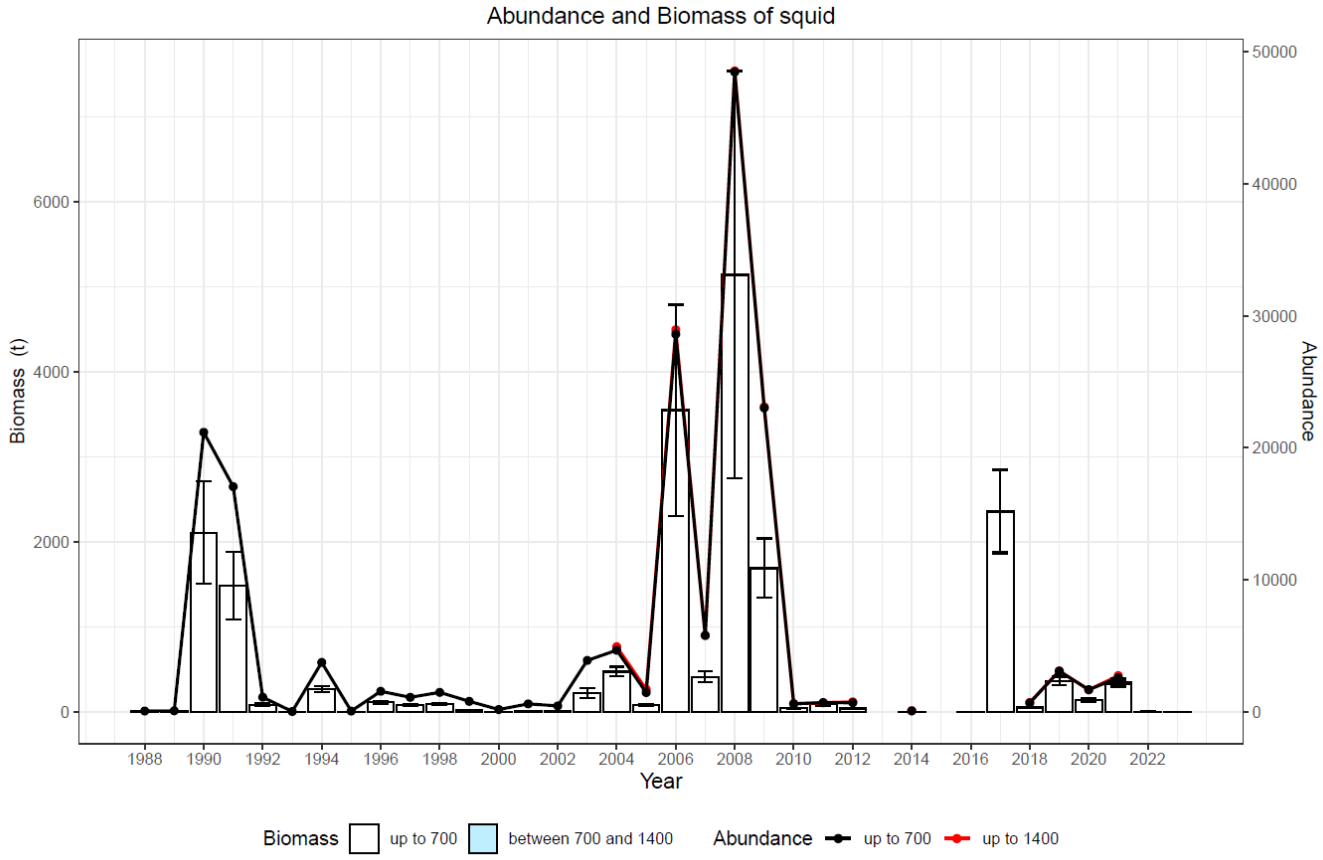


**Figure 17.** Squid (*Illex illecebrosus*) biomass (t.) ± S.E. and number ('000) 1988-2023.

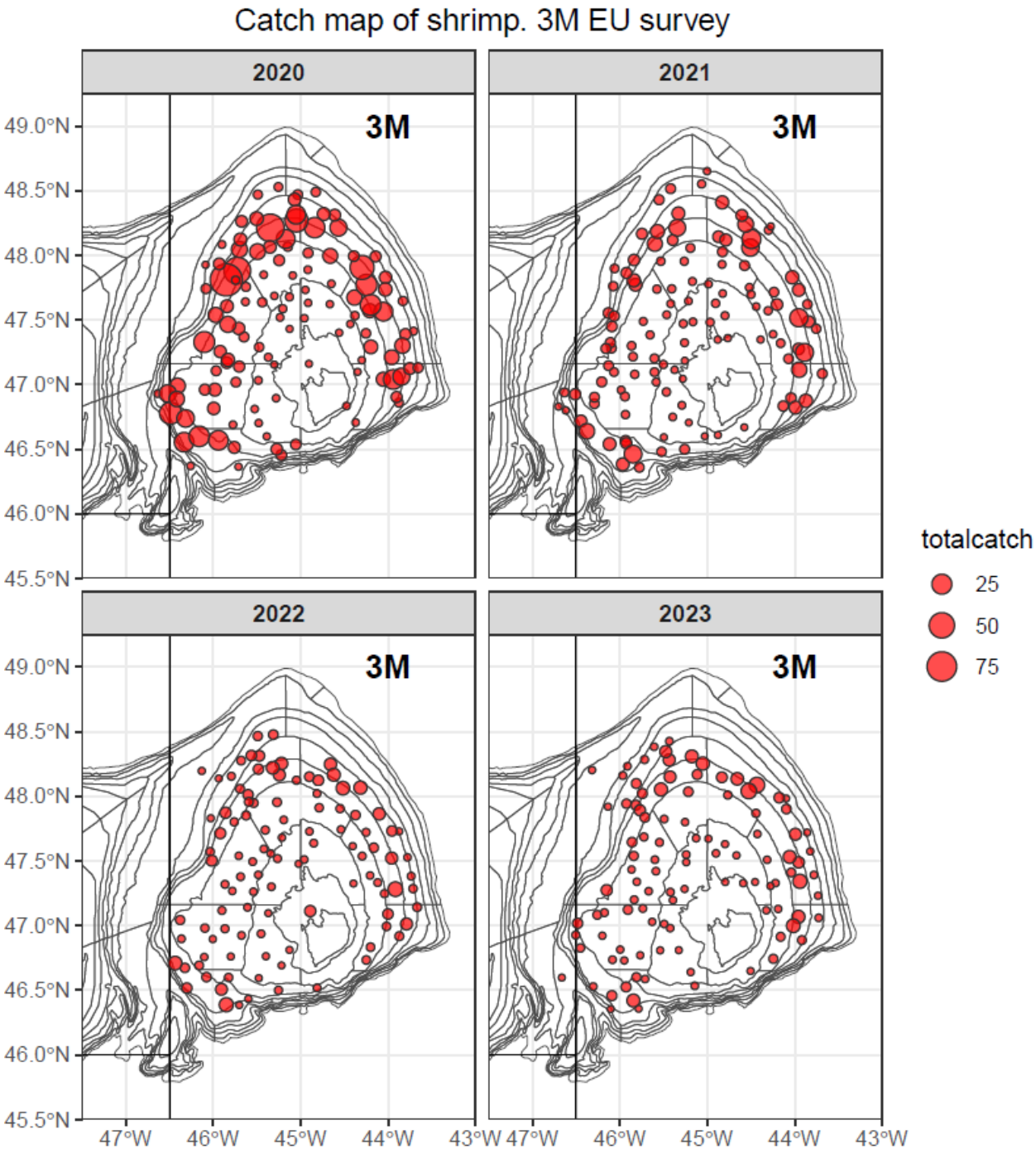


**Figure 18**. Shrimp (*Pandalus bolearis*) catch distribution (kg) in the last four surveys.

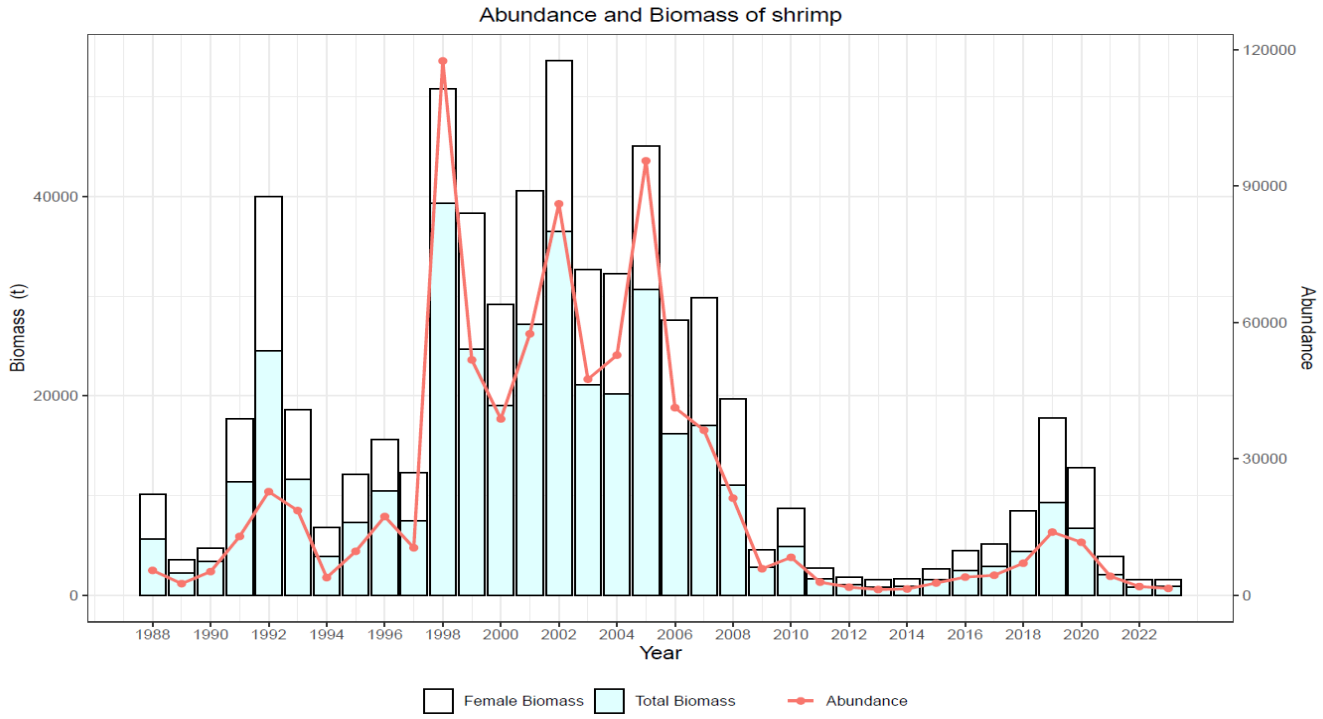


**Figure 19.** Shrimp (*Pandalus borealis*) biomass and female biomass (t.) and number ('00000) 1988-2023.

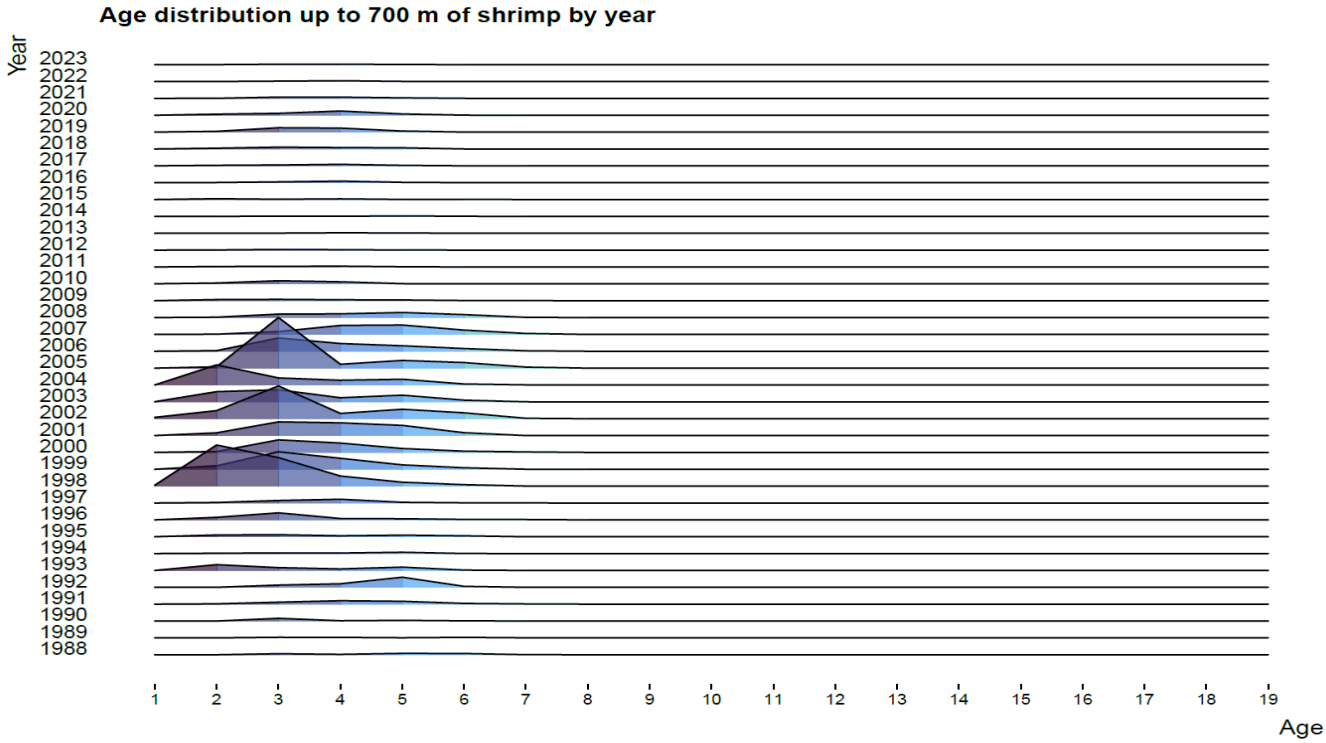


**Figure 20.** Shrimp age distribution on Flemish Cap, NAFO Div. 3M: 1988-2023.

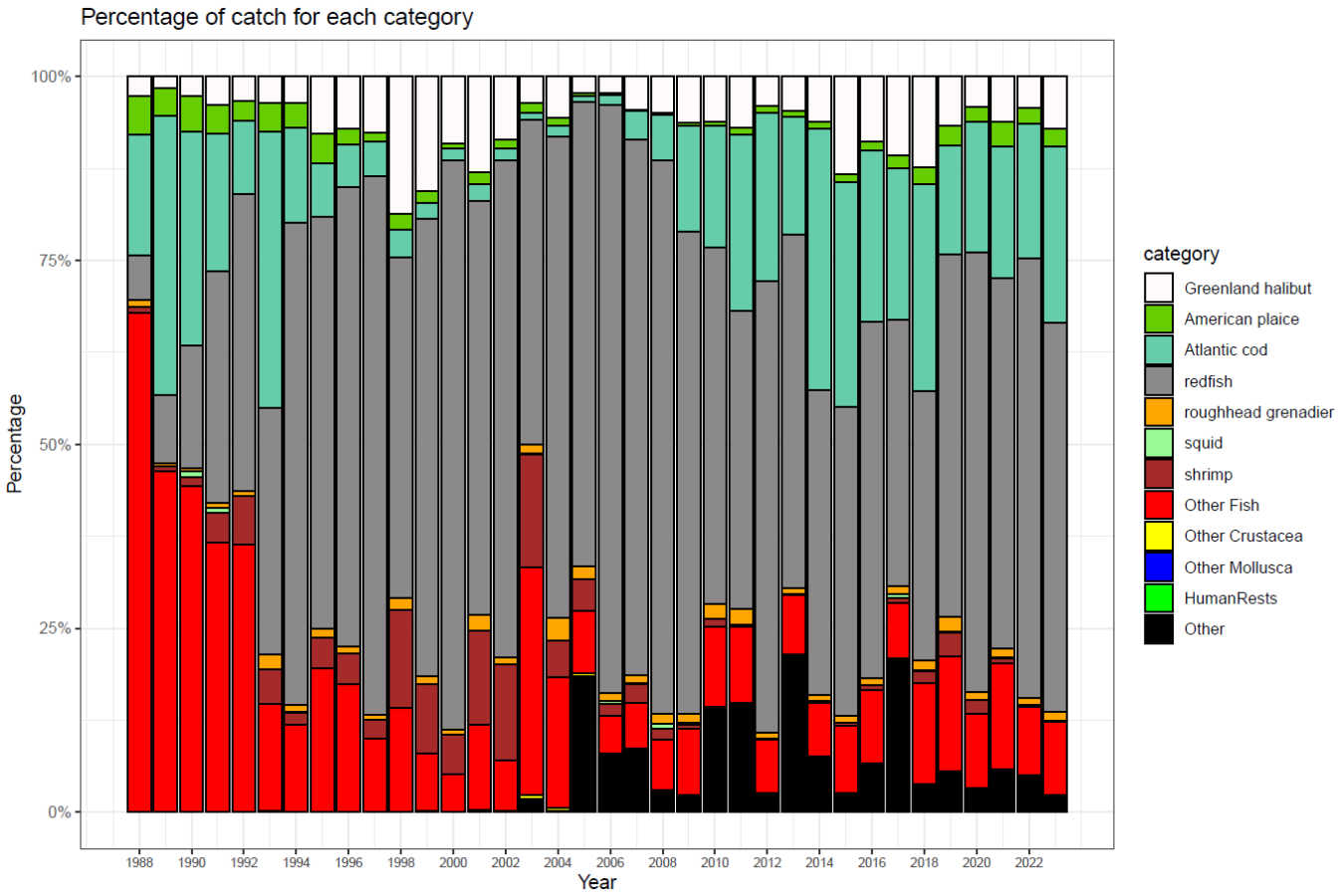


**Figure 21.** Biodiversity during the 2023 survey.