Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Canadian Science Advisory Secretariat (CSAS)

Research Document 2019/037

Quebec Region

Preliminary results from the groundfish and shrimp multidisciplinary survey in August 2018 in the Estuary and northern Gulf of St. Lawrence

Hugo Bourdages, Claude Brassard, Mathieu Desgagnés, Peter Galbraith, Johanne Gauthier, Claude Nozères, Pierre-Marc Scallon-Chouinard and Caroline Senay

Fisheries and Oceans Canada
Maurice Lamontagne Institute
850 Route de la Mer
Mont-Joli, Quebec G5H 3Z4

July 2019

Canada

Foreword

This series documents the scientific basis for the evaluation of aquatic resources and ecosystems in Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

Published by:

Fisheries and Oceans Canada
Canadian Science Advisory Secretariat
200 Kent Street
Ottawa ON K1A 0E6

http://www.dfo-mpo.gc.ca/csas-sccs/
csas-sccs@dfo-mpo.gc.ca

ISSN 1919-5044

Correct citation for this publication:

Bourdages, H., Brassard, C., Desgagnés, M., Galbraith, P., Gauthier, J., Nozères, C., Scallon-Chouinard, P.-M. and Senay, C. 2019. Preliminary results from the groundfish and shrimp multidisciplinary survey in August 2018 in the Estuary and northern Gulf of St. Lawrence. DFO Can. Sci. Advis. Sec. Res. Doc. 2019/037. iv + 87 p.

Aussi disponible en français :

Bourdages, H., Brassard, C., Desgagnés, M., Galbraith, P., Gauthier, J., Nozères, C., Scallon-Chouinard, P.-M. et Senay, C. 2019. Résultats préliminaires du relevé multidisciplinaire de poissons de fond et de crevette d'août 2018 dans l'estuaire et le nord du golfe du Saint-Laurent. Secr. can. de consult. sci. du MPO, Doc. de rech. 2019/037. iv + 87 p.

TABLE OF CONTENTS

ABSTRACT

Fisheries and Oceans Canada conducts an annual multidisciplinary survey in the Estuary and northern Gulf of St. Lawrence. The objectives of this survey are varied: assess the biodiversity of species found near the sea bottom, estimate the abundance of groundfish and invertebrates, assess physical and biological (phytoplankton and zooplankton) oceanographic conditions, monitor the pelagic ecosystem, take inventories of marine mammals and seabirds, and collect samples for various research projects. In 2018, the survey was conducted between August 2 and September 2 on board the *CCGS Teleost*. The survey successfully carried out 168 trawl tows as well as 109 CTD water column casts, and 73 zooplankton samples.

This report presents the results from catches from the 168 tows. In total, 93 fish taxa and 230 invertebrate taxa were identified during the mission. Historical perspectives (catch rates, spatial distribution and length frequency) are presented for 23 taxa. These commercial fishery-independent data will be used in several stock assessments including cod (*Gadus morhua*), redfish (*Sebastes spp.*), Greenland Halibut (*Reinhardtius hippoglossoides*), Atlantic Halibut (*Hippoglossus hippoglossus*) and Northern Shrimp (*Pandalus borealis*).

The increase in the biomass of Acadian Redfish (*Sebastes fasciatus*) and Deepwater Redfish (*Sebastes mentella*) is significant; they alone accounted for more than 80% of the catches. The biomasses of several other groundfish species are increasing or exceeding their historical average in the northern Gulf such as Black Dogfish (*Centroscyllium fabricii*), Atlantic Halibut, Silver Hake (*Merluccius bilinearis*), Longfin Hake (*Phycis chesteri*) and Witch Flounder (*Glyptocephalus cynoglossus*), while the biomasses of Northern Shrimp and Greenland Halibut are decreasing.

A preliminary analysis of water temperature data collected in 2018 shows that conditions were slightly warmer than normal at 150 m and 200 m depth, and have warmed further at 300 m. The surface water and cold intermediate layer temperatures were near normal in August.

INTRODUCTION

Fisheries and Oceans Canada conducts an annual bottom trawl survey in the Estuary and the northern Gulf of St. Lawrence. This is a multi-species, commercial fishery-independent survey. Its purpose is to assess the ecosystem with consistent and standardized protocols. This survey examines, among other things, spatial and temporal changes in the distribution and relative abundance of fish and their assemblages. It also aims to gather information on the biological parameters of commercial species.

The main objectives are to:

1. assess groundfish and Northern Shrimp population abundance and condition;
2. assess environmental conditions;
3. take a biodiversity inventory;
4. assess phytoplankton and mesozooplankton abundance;
5. monitor the pelagic ecosystem;
6. take an inventory of marine mammals;
7. take an inventory of seabirds;
8. collect samples for various research projects.

In 2018 the survey was conducted between August 2 and September 2 on board the *CCGS Teleost* (mission IML-2018-041).

SURVEY DESCRIPTION

The survey covers the waters of the Laurentian Channel and north of it, from the Lower Estuary in the west to the Strait of Belle Isle and the Cabot Strait in the east, namely, the Northwest Atlantic Fisheries Organization (NAFO) divisions 4R, 4S and the northern part of 4T (Figure 1). Since 2008, coverage of division 4T has been increased in the upstream part of the Lower Estuary in order to sample the depths between 37 and 183 m. The area of the study area is 118,587 km^2.

A stratified random sampling strategy is used for this survey. This technique consists in subdividing the study area into more homogeneous strata. This area is divided into 54 strata, which were divided based on depth, NAFO division and substrate type (Figure 2). A total of 200 trawl stations was initially allocated in the study area, a number proportional to the stratum surface, with a minimum of two stations per stratum. The tow positions were chosen randomly within each stratum. Since 2014, a new rule was added to respect a minimum distance of 10 km between stations in the same stratum.

The fishing gear used on the *CCGS Teleost* is a four-sided Campelen 1800 shrimp trawl equipped with a Rockhopper footgear (“bicycle”) (McCallum and Walsh 2002). The trawl lengthening and codend are equipped with a 12.7-mm knotless nylon lining. Standard trawling tows last 15 minutes, starting from the time the trawl touched the sea floor as determined by the *Scanmar*™ hydroacoustic system. Towing speed is 3 knots. Information on trawl geometry (horizontal spread of the doors and wings, vertical opening of the trawl, depth) was recorded for each tow using *Scanmar*™ hydroacoustic sensors mounted on the fishing gear.

In 2018, 168 fishing stations were successful, 53 in 4R, 75 in 4S and 40 in 4T (Appendix 1). Coverage of the study area was very good; only two strata were not covered with a minimum of two stations (Figure 3, Annexe 1).

For each fishing tow, the catch was sorted and weighed by taxa; biological data were then collected on a sub-sample. For fish, crab, squid and sea pens, size and weight are gathered by

individual. For some species, sex, gonad maturity, and the weight of certain organs (stomach, liver, gonads) are also evaluated. Count of soft rays of the anal fin for Redfish to split the two species, and otoliths are saved for Atlantic Cod, Atlantic Halibut, and Witch Flounder to age those fish. A roughly 2-kg shrimp sample is sorted and weighed by species (and by stage of maturity for Northern Shrimp). The shrimp are measured individually. The other invertebrates are counted (no individual measurements) and photographed. The photos are archived in a photo catalogue with keywords (taxonomic identification, station description, date, etc.).

Since 2001, digital photos have supported an increased effort to identify species. These additional efforts have targeted fish since 2004 (Dutil *et al.*, 2009) and invertebrates since 2005 (Nozères *et al.*, 2014). An identification guide for marine fishes in the estuary and northern Gulf of St. Lawrence (Nozères *et al.*, 2010), a shrimp atlas (Savard and Nozères 2012) and a guide for invertebrates (Nozères and Archambault 2014) are used during the mission to identify most taxa. The taxon codes and their names follow the list of Miller and Chabot (2014), with annual updates according to the World Register of Marine Species (WoRMS).

Additional samples were taken for various scientific projects. These samples include:

1. Environmental DNA (ADNe);
2. Samples of herring and capelin for maturity determination;
3. Stomachs of several fish species in order to describe their diet;
4. Identification of the maturity stages of the Lumpfish and sampling for a genetic study;
5. Ray capsules to identify them with the species and to locate spawning sites;
6. Black Dogfish embryos and juveniles, and ray capsules in order to study their developmental morphology and their chondrification and mineralization processes;
7. Winter Skate for identification of the population;
8. Stage of maturity of small demersal fish;
9. Marine mammal prey (several fish species and northern shrimp) to follow the development of isotopic signatures of key species in the St. Lawrence ecosystem;
10. Redfish and Atlantic Halibut samples for genetic analysis of Atlantic populations;
11. Monitoring redfish growth of the 2011 cohort;
12. Small redfish (< 11 cm) for genetic identification of the species (*Sebastes fasciatus* or *S. mentella*) and the population of new cohorts observed in the Gulf;
13. Potential prey of redfish in order to determine the basic signature (lipid profile) and use reference points as trophic markers to determine the contribution of these various prey to the diet in the medium- to long-term.
14. Sampling of redfish as part of a collaborative project on groundfish return (Ressources Aquatiques Québec);
15. Redfish otoliths to study growth as a function of the spatial variability and diet;
16. Redfish gonad samples to determine stage of maturity;
17. Several species of fish and invertebrates for the identification of these species from morphometric and genetic analyses.
18. Squid samples to study its trophic role in the ecosystem;
19. Some shrimp species for taxonomic identification;
20. Samples of sea pens;
21. Sponges for genetic identifications;
22. Invasive species (tunicates) to confirm their genetic and microscopic identification;
23. Boxes of shrimp and capelin for requests for aquacultural purposes by the MLI tank room.

Oceanographic conditions such as temperature, conductivity (salinity), turbidity, dissolved oxygen, luminosity and fluorescence were sampled during this survey. A total of 90 vertical

profiles of the water column were done at the fishing stations and 19 more on extra stations that fall under the Atlantic Zone Monitoring Program (AZMP). The various equipment, *CTD SeaBird 911Plus*™, dissolved oxygen sensor (*SBE 43*), photometer (*Biospherical*) and fluorometer (*Eco-FLNTU Wetlabs*) are coupled to the rosette of Niskin bottles. For each profile obtained using the rosette, water samples are also taken at many depths to determine their salinity, pH, dissolved oxygen concentration (Winkler titration), nutritive salt content (nitrite, nitrate, phosphate, silicate) and chlorophyll content. In addition, a *CTD SBE 19Plus*™ device (temperature and salinity), coupled to a dissolved oxygen sensor (*SBE 63*), was also installed on the back of the trawl, thereby allowing oceanographic data to be collected for the 168 fishing tows.

To study zooplankton distribution and biomass for the entire territory covered by the survey, a sampling program component consisted in using a zooplankton net (202 µm), pulled vertically from the floor to the surface at 73 stations.

Continuously throughout the mission, water column hydroacoustic data at four frequencies (38, 70, 120 and 200 kHz) were recorded using a *SIMRAD*™ *EK60* echosounder. These data will be used to develop a three-dimensional database to map the pelagic ecosystem.

A marine mammal and seabird inventory in the study area was taken by two observers stationed at the front of the bridge when conditions permitted.

DATA ANALYSIS

The analysis of 2018 abundance and biomass data were integrated into the combined annual summer survey series initiated in 1990. This combined series was developed following a comparative study between the two vessel-gear tandems (1990-2005: *CCGS Alfred Needler – URI 81'/114'* trawl; 2004-2017: *CCGS Teleost – Campelen 1800* trawl) to establish specific correction factors for about twenty species caught (Bourdages *et al*. 2007). This resulted in adjustment of *Needler* catches into *Teleost* equivalent catches.

Given that over the years, some strata were not sampled by a minimum of two successful tows (Appendix 1), a multiplicative model was used to estimate their catch rate indexes in number and weight. This model provides a predicted value for strata with less than two tows with the data of the current year and the previous three years. Thus, indicators presented for the series are representative of a standard total area 116 115 km^2, the sum of the area of all strata. In addition, reference points were also added to the catch rate figures. The solid line represents the 1990-2017 period average (long-term average) and the two dotted lines associated to the mean ±0.5 standard deviation corresponding respectively to the upper and lower reference limits.

Note that the distinction between the two redfish species, *S. fasciatus and S. mentella*, is based on the analysis of the soft anal fin rays count and the depth of capture of individuals (H. Bourdages, DFO Mont-Joli, pers. comm.).

Length frequency distributions are presented in two different forms. The first figure shows the distribution for the last two years of the series plus the average distribution for the 1990-2017 period (long-term average distribution). Frequency values are expressed as the average number of individuals caught per tow in increment of 1 cm, except for Northern Shrimp (0.5 mm) and Atlantic Halibut (3 cm). The second figure represents the length distributions in length mean per class length for each year of the historical surveys series (1990 to 2018).

The geographical distribution of catches by weight per tow (kg/15 minutes tow, except for sea pens number/15 minutes tow) was made for periods of four or five years. The interpolation of CPUE was performed on a grid covering the study area using a ponderation inversely

proportional to the distance (R version 2.13.0, Rgeos library; R Development Core Team 2011). The isoline contours were then plotted for four CPUE levels which approximate the 20th, 40th, 60th and 80th percentiles of the non-zero values. The catch rates distribution for the 2018 survey only is also presented in a bubbles type map.

The preliminary results for the abundance and biomass indices, the catch rate distribution maps, and the size frequency distributions for about 20 taxa commercially fished are presented at figures 4 to 56. These results are preliminary and must be considered as such until validations and laboratory analyses have been completed.

The average weight per tow for 57 taxa of fish and 99 taxa of invertebrates is given in figures 57 and 58. In these figures, a color code is used to represent the difference between the CPUE in a given year and the average CPUE in the time series divided by the standard deviation of this average for each taxon.

The catches per tow for fish taxa are available on the St. Lawrence Global Observatory (OGSL, http://ogsl.ca).

Finally, Appendix 2 provides a list of all taxa, vertebrates and invertebrates, caught among the 168 successful tows achieved during the 2018 survey. The occurrence, or the number of tows where the species was identified, as well as the total catch, by weight and numbers, are also presented. The number of specimens measured per taxon and some descriptive statistics for the length parameter are also presented in Appendix 3.

RESULTS

Attention: the bottom trawl survey is designed to sample demersal species. However, catches may also include pelagic species and species associated with coastal or rocky habitats which are more difficult to trawl. Although these taxa are found in catches, they have a low catchability by trawl net. Some caution is required in interpreting the results obtained for these taxa.

BIODIVERSITY

In total, 93 fish taxa and 230 invertebrate taxa were identified in 2018. More than 80% of the catches were composed of redfish.

Fish

The abundance and the biomass of the **black dogfish** (*Centroscyllium fabricii*) have been above average for the past seven years.

Capelin (*Mallotus villosus*) was mainly distributed in the Estuary and along the North Shore during the 2018 survey.

For the last five years, the abundance and biomass of **Atlantic halibut** (*Hippoglossus hippoglossus*) have been at some of the highest levels of the series.

In 2018, the abundance and biomass of **Greenland halibut** (*Reinhardtius hippoglossoides*) are comparable to 2017 and are below the series average. The size frequency distributions indicate that the abundance of the 2017 cohort (16 cm mode) is above the series average and fish greater than 40 cm are below the series average.

The **lumpfish** (*Cyclopterus lumpus*) is a rare but regular catch in this survey. The abundance and biomass have been on the rise for the past five years to reach the highest values of the series.

Since 2007, **silver hake** (*Merluccius bilinearis*) is more frequent in the northern Gulf.

The abundance and biomass of the **longfin hake** (*Phycis chesteri*) are up slightly and are above the average level in 2018. This increase is due in part to an above-average abundance of individuals having a modal size of 25 cm.

The abundance and the biomass of **white hake** (*Urophycis tenuis*) are decreasing in 2018 and are comparable to the historical average.

The abundance and biomass indices of **cod** (*Gadus morhua*) are slightly increase in 2018 and are comparable to the historical average. Cod is still present in 4S, along the North Shore and around Anticosti Island.

American plaice (*Hippoglossoides platessoides*) is very frequently caught and its abundance is stable.

Witch flounder (*Glyptocephalus cynoglossus*) is very frequently caught. The strong cohorts from 2007 and 2009 have contributed to the increase in biomass; these fish are now larger than 30 cm.

T**horny skate** (*Amblyraja radiata*) and **smooth skate** (*Malacoraja senta*) are very frequently caught. The abundance of Thorny skate is stable and decreasing for smooth skate.

The abundance and biomass of **Acadian redfish** (*Sebastes fasciatus*) are above the historical average.

Three strong cohorts (2011, 2012 and 2013) of **Atlantic redfish** (*Sebastes mentella*) have contributed to this increase in abundance and biomass since 2013. The 2011 cohort, which is the most abundant, now has a modal length of 22 cm. These young redfish are distributed throughout the channels of the northern Gulf.

Invertebrates

Indications of a decrease in the biomass for most **shrimp** species in the northern Gulf of St. Lawrence.

The abundance and biomass of **northern shrimp** (*Pandalus borealis*) has been declining since 2003 to reach the lowest values in the historical series in 2018.

Strong presence of the **northern shortfin squid** (*Illex illecebrosus*), a southern, seasonal pelagic species. The northern shortfin squid was present in over 50% of the catches in 2017 and 2018; this has not been observed for several years.

Four species of **sea pens** are present in the Northern Gulf of St. Lawrence. The larger sea pens (*Anthoptilum grandiflorum, Halipteris finmarchica, Pennatula grandis*) are distributed in the deeper areas of the Laurentian Channel, while the smaller sea pen (*Pennatula aculeata*) is more widespread.

PHYSICAL OCEANOGRAPHIC CONDITIONS

A preliminary analysis of water temperature data collected in 2018 (Figures 59 and 60) shows that conditions were slightly warmer than normal at 150 m and 200 m depth, and have warmed further (new record since 1915) at 300 m. Compared to conditions observed in August 2017, waters at 300 m have warmed by about 0.1°C from the Estuary out to Central Gulf while the August cold intermediate layer (CIL) minimum temperature was higher in 2018 except in the Estuary.

Air temperatures over the Gulf were below normal between April and June 2018, and then above normal in July and August. This led to below-normal average surface water temperatures for the May–August period (-0.6 standard deviations (SD) relative to the 1985–2010 climatology) and above-normal for the July–August period (+0.6 SD).

After a winter with above-normal average air temperature caused by warm temperatures in March, the minimum temperature of the summer cold intermediate layer, estimated using data from the August survey, was also above normal (+1.2 SD; Figure 60). The exception was the Estuary, where the CIL volume was above normal (+0.7 SD) and the minimum temperature below normal (0.1°C; -0.4 SD) (Figure 59).

Beneath the cold intermediate water layer, the estuarine flow that carries deep water to the channel heads has carried the increasingly warm waters that had been in Cabot Strait, central Gulf and Esquiman Channel for the past several years further upstream. Consequently, deep temperatures have increased since 2017 below 250 m everywhere except in Cabot Strait (Figure 59).

Taking into consideration all the data recorded in different months of the year, the four regions along the deep Laurentian Channel, meaning the Estuary, northwestern Gulf, Central Gulf and Cabot Strait, are experiencing record temperatures at 300 m (5.63°C, 6.0°C, 6.5°C, 6.8°C). The Gulf-wide average temperature has reached a record level since 1915 at 300 m of 6.38°C, an increase of 0.11°C since 2017 (Figure 60).

ACKNOWLEDGEMENTS

We would like to thank both crews of the *CCGS Teleost* and wish to highlight the excellent work of the 2018 scientific team. The science team consisted of Camille Aubé, Hugues Benoit, Denis Bernier, Hugo Bourdages, Claude Brassard, Rachel Brien-Lavergne, Sarah Brown-Vuillemin, Geneviève Côté, Nicolas Coulombe, Mathieu Desgagnés, Rémi Desmarais, Mylène Dufour, Jérôme Gagnon, Johanne Gauthier, Tanya Hansen, Laurie Isabel, Patrick Laniel, Camille Lavoie, Jean-François Lussier, Marie-Claude Marquis, Maria Angelica Martinez Silva, Claude Nozères, Anthony Ouellet, Jordan Ouellette-Plante, Éric Parent, Marie-Julie Roux, Pierre-Marc Scallon-Chouinard, Caroline Senay and Jean-Denis Thibeault.

Finally, we would like to thank Denis Bernier and Hans-Frédéric Ellefsen for reviewing this document.

REFERENCES CITED

Bourdages, H., Savard, L., Archambault, D. and Valois, S. 2007. Results from the August 2004 and 2005 comparative fishing experiments in the northern Gulf of St. Lawrence between the *CCGS Alfred Needler* and the *CCGS Teleost*. Can. Tech. Rep. Fish. Aquat. Sci. 2750: ix + 57 p.

Dutil, J.-D., Nozères, C., Scallon-Chouinard, P.-M., Van Guelpen, L., Bernier, D., Proulx, S., Miller, R. et Savenkoff, C. 2009. Poissons connus et méconnus des fonds marins du Saint-Laurent. Le naturaliste canadien 133: 70-82.

McCallum, B. and Walsh, S.J. 2002. An update on the performance of the Campelen 1800 during bottom trawl surveys in NAFO subareas 2 and 3 in 2001. NAFO SCR Doc. 02/36. 16 p.

Miller, R. and Chabot, D. 2014. Code List of Marine Plants, Invertebrates and Vertebrates Used by the Quebec Region of DFO. Can. Data Rep. Fish. Aquat. Sci. 1254: iv + 115 p.

Nozères, C., Archambault, D., Chouinard, P.-M., Gauthier, J., Miller, R., Parent, E., Schwab, P., Savard, L. et Dutil. J.-D. 2010. Guide d'identification des poissons marins et protocoles d'échantillonnage utilisés lors des relevés annuels de l'abondance du poisson de fond dans l'estuaire et le nord du golfe Saint-Laurent (2004-2009). Rapp. tech. can. sci. hal. aquat. 2866 : xi + 243 p.

Nozères, C. et Archambault, D. 2014. Portfolio pour l'identification rapide d'invertébrés capturés au chalut dans l'estuaire et le nord du golfe du Saint-Laurent. Rapp. manus. can. sci. halieut. aquat. 3033 : iv + 30 p.

Nozères C., Archambault, D. et Miller, R. 2014. Photo-catalogue d'invertébrés de l'estuaire et du nord du golfe du Saint-Laurent des relevés au chalut (2005-2013). Rapp. manus. can. sci. halieut. aquat. 3035 : iv + 222 p.

R Development Core Team. 2011. R: A language and environment for statistical computing. R Foundation for Statistical Computing. Vienna, Austria. (Accessed November 30th 2017).

Savard, L. et Nozères, C. 2012. Atlas des espèces de crevettes de l'estuaire et du nord du golfe du Saint-Laurent. Rapp. tech. can. sci. halieut. aquat. 3007: vi + 67 p

FIGURES

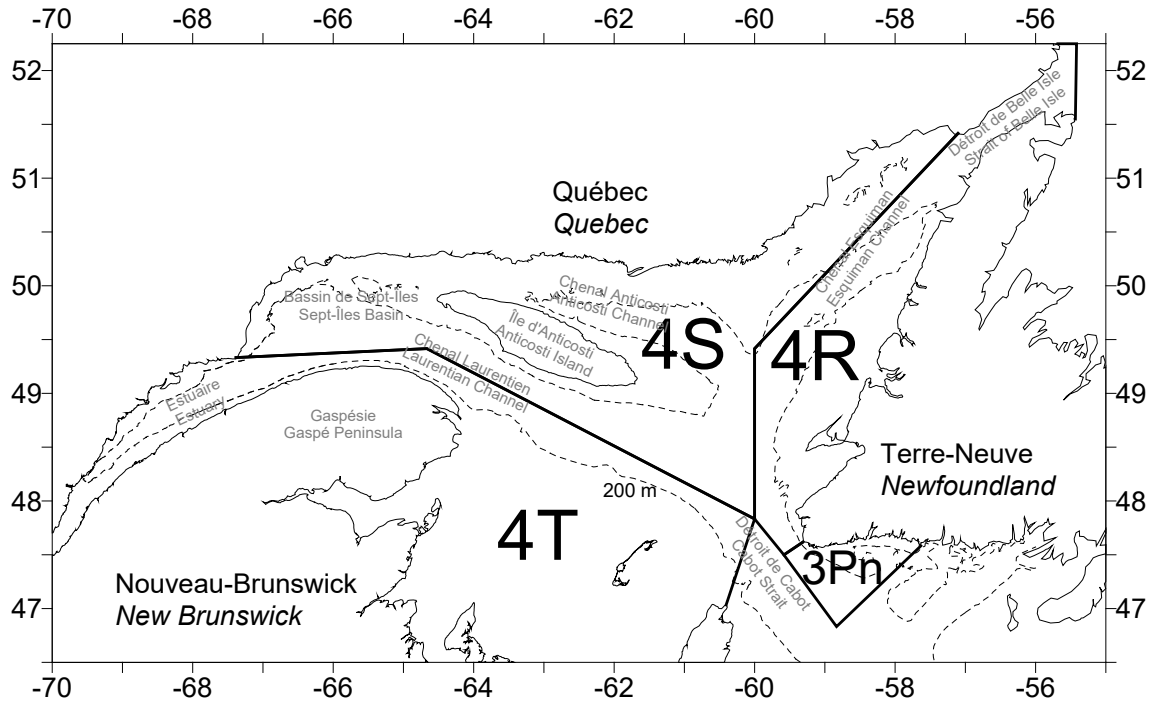

Figure 1. NAFO Divisions of the Estuary and Gulf of St. Lawrence and names of locations mentioned in the text.

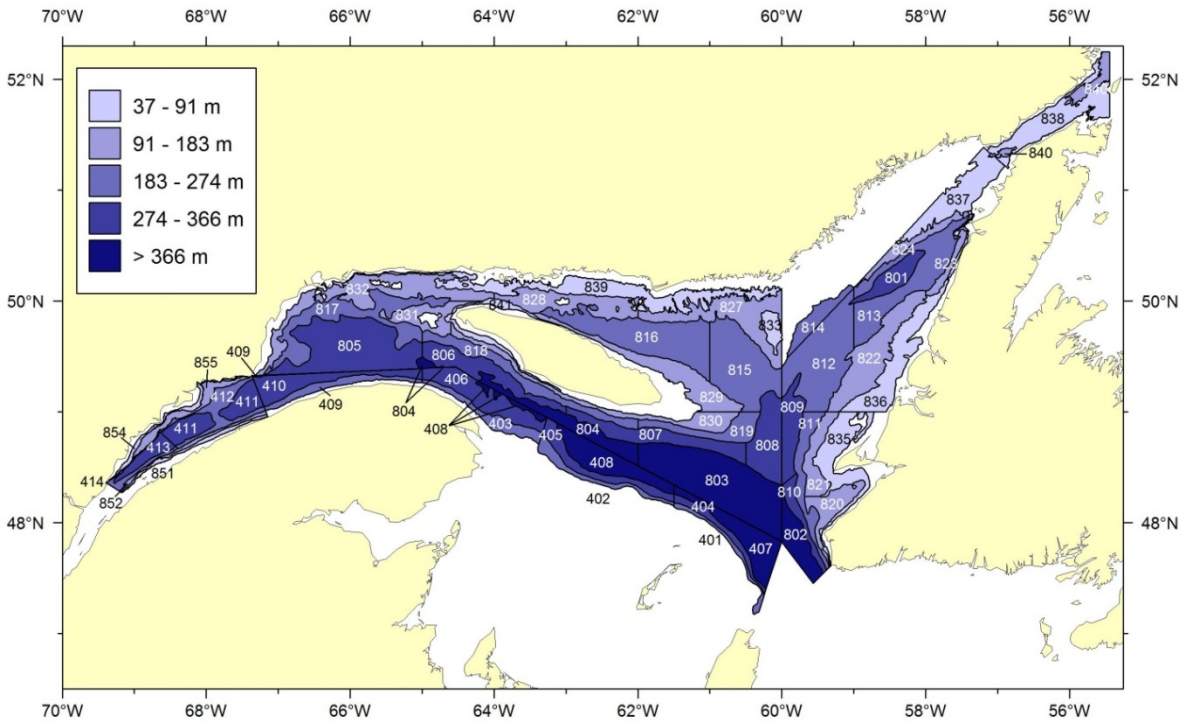

Figure 2. Stratification scheme used for the groundfish and shrimp research survey in the Estuary and northern Gulf of St. Lawrence.

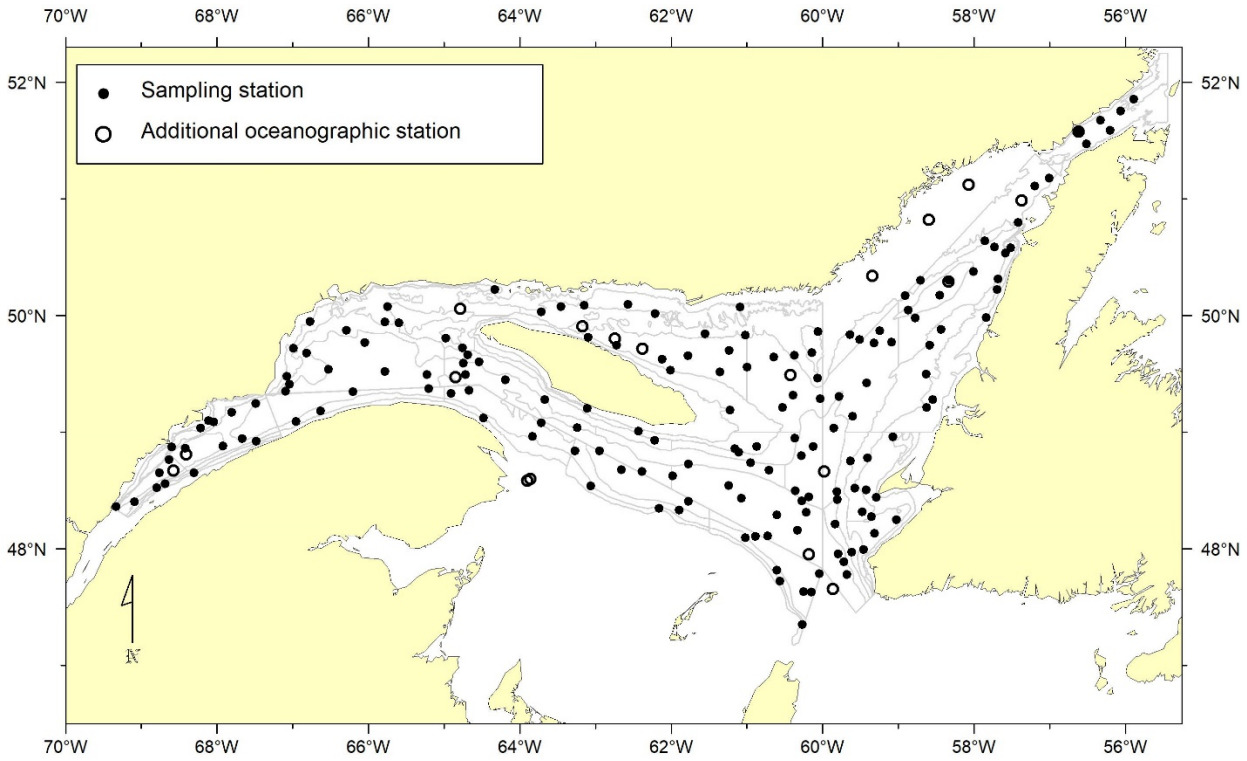

Figure 3. Locations of successful sampling stations (trawl and oceanography) and additional oceanographic stations for the 2018 survey.

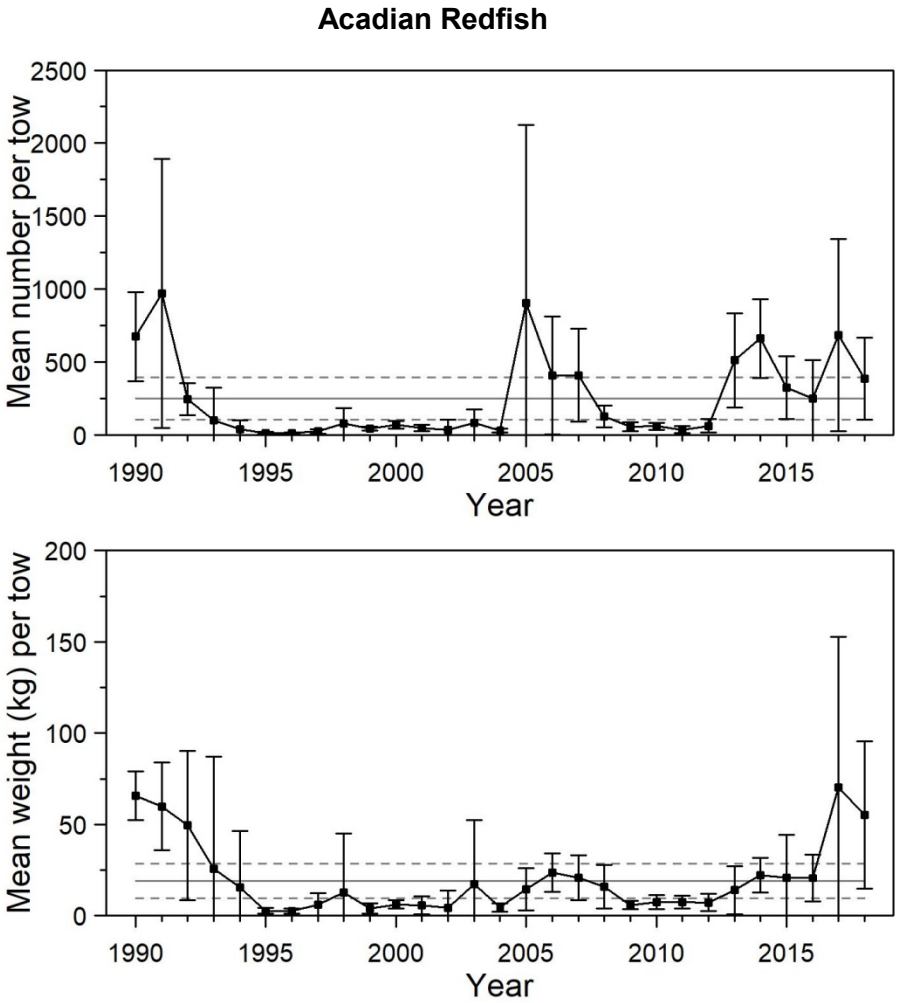

Figure 4. Mean numbers and mean weights per 15 minutes tow observed during the survey for Acadian Redfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

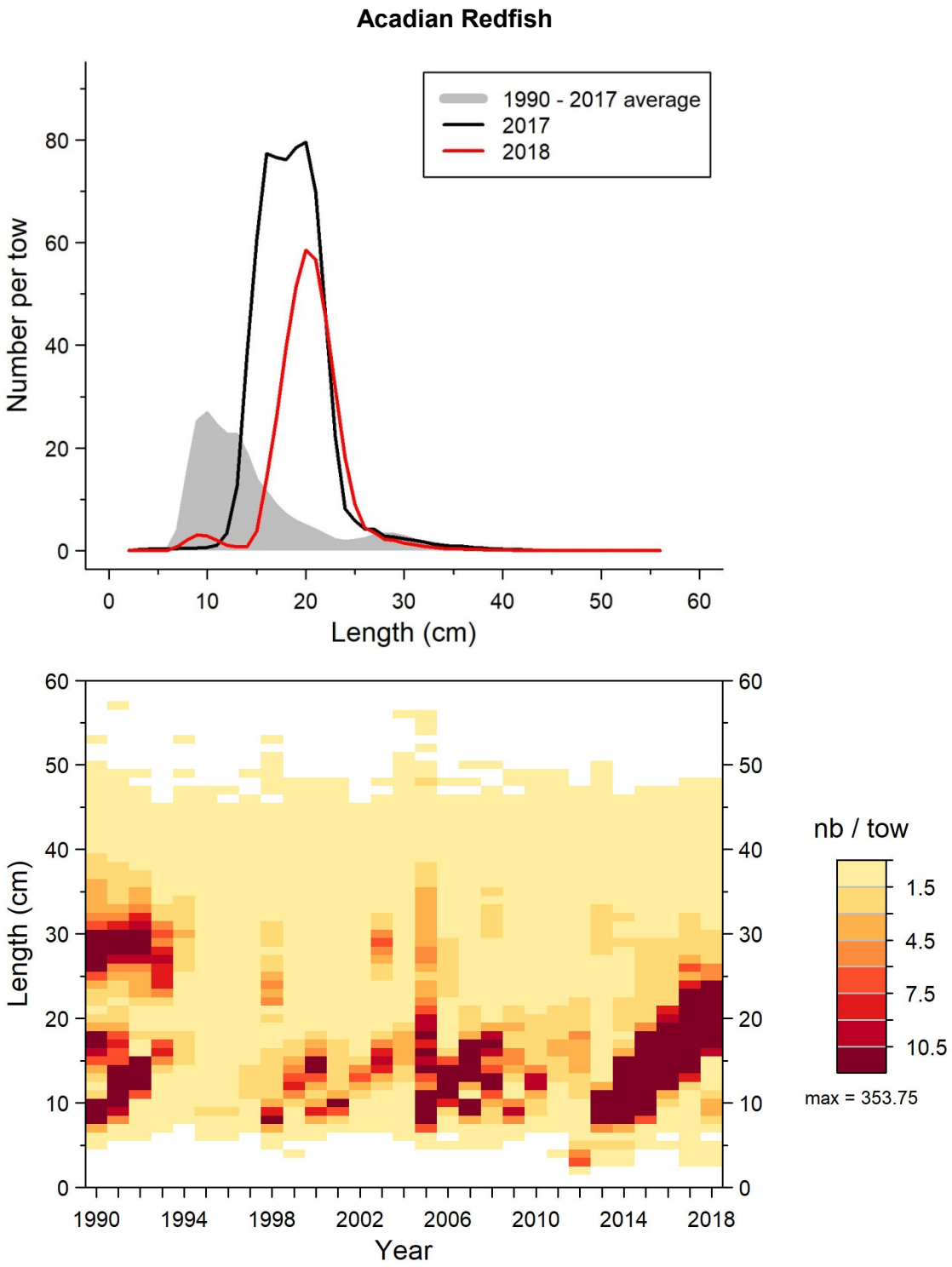

Figure 5. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Acadian Redfish in 4RST.

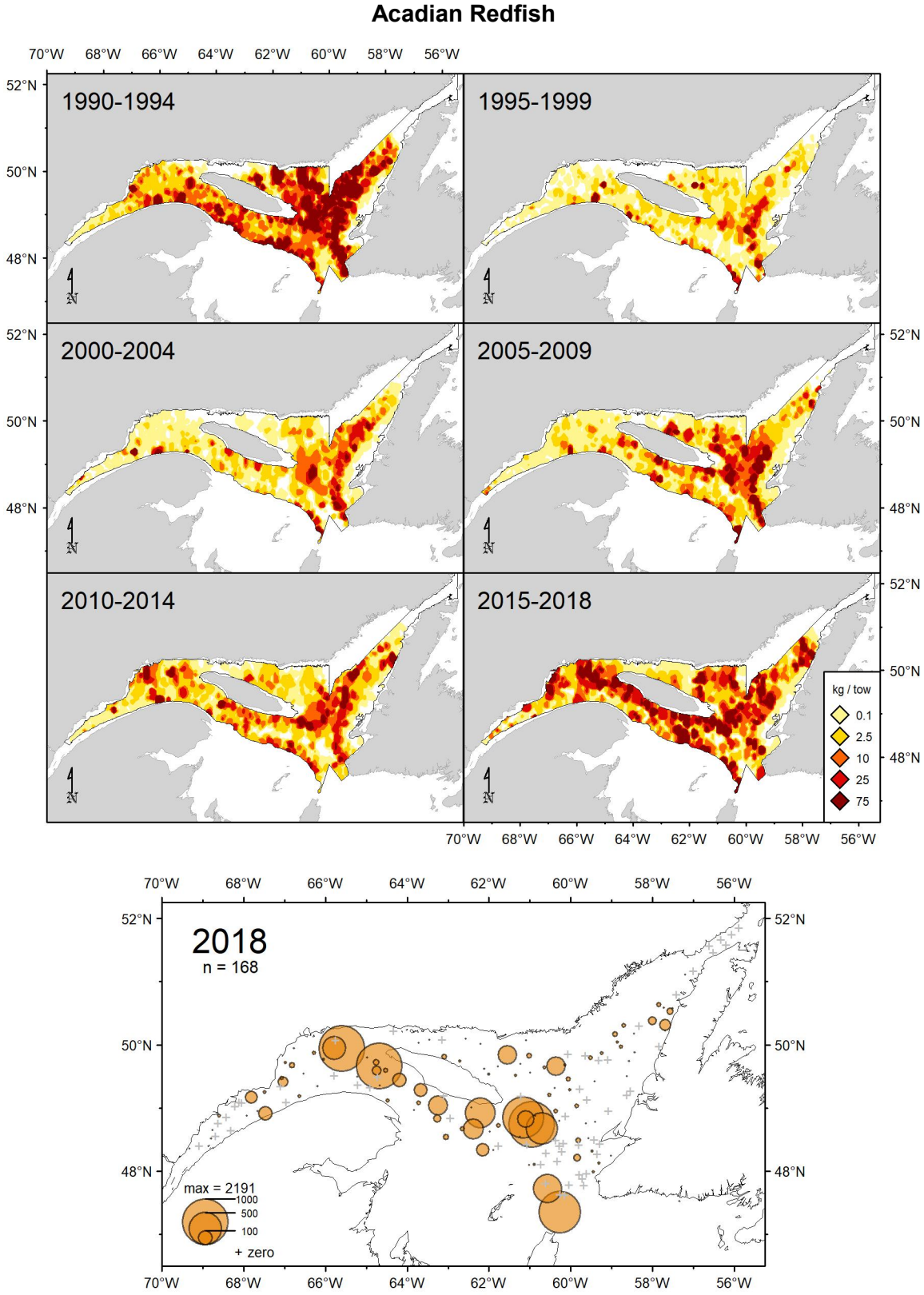

Figure 6. Acadian Redfish catch rates (kg/15 minutes tow) distribution.

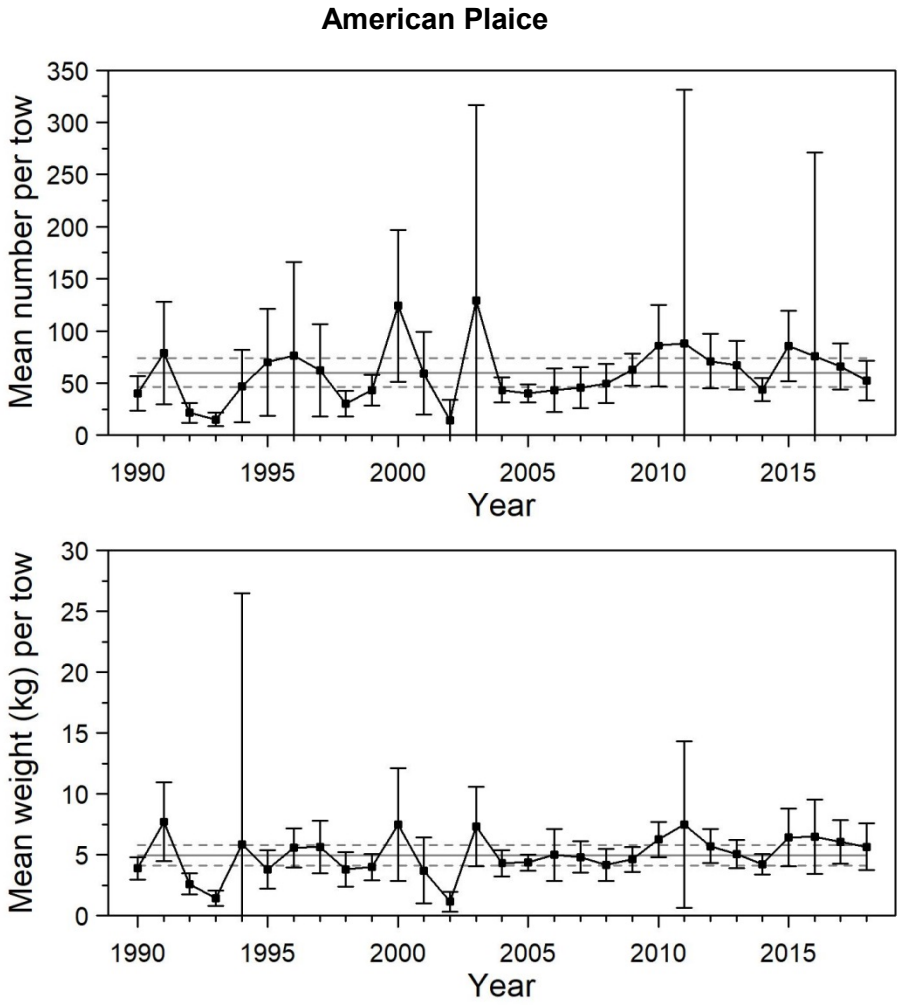

Figure 7. Mean numbers and mean weights per 15 minutes tow observed during the survey for American Plaice in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

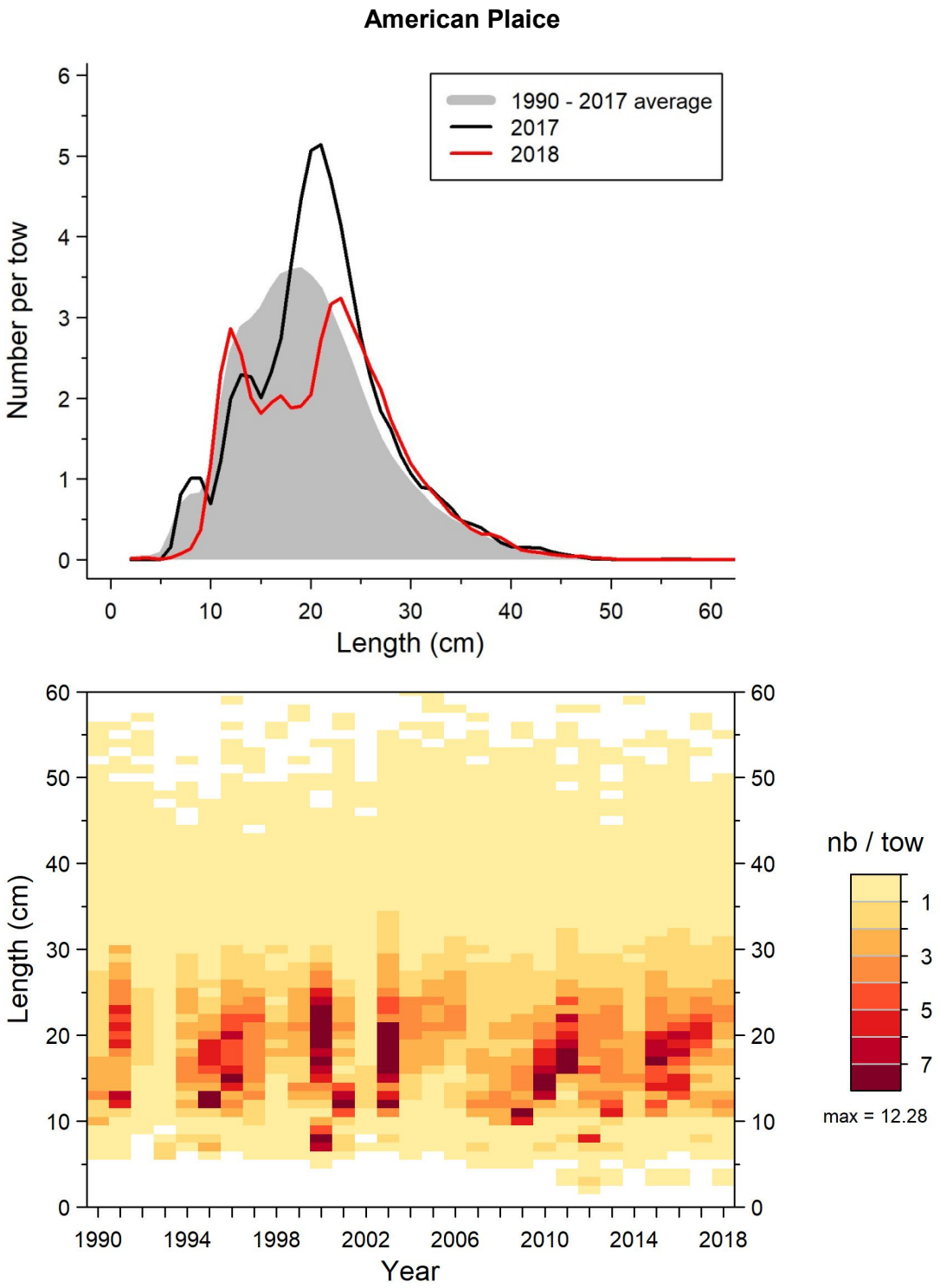

Figure 8. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for American Plaice in 4RST.

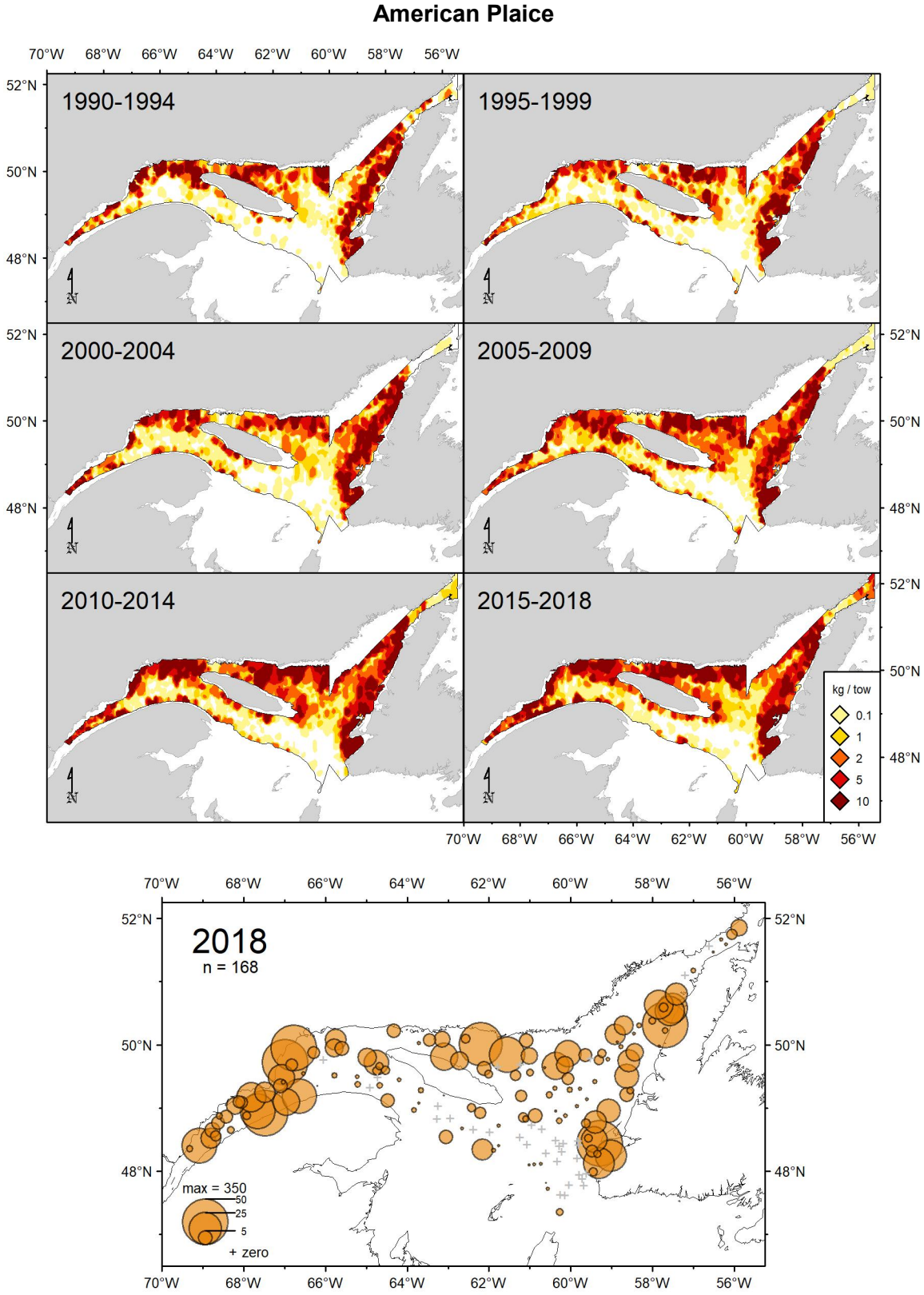

Figure 9. American Plaice catch rates (kg/15 minutes tow) distribution.

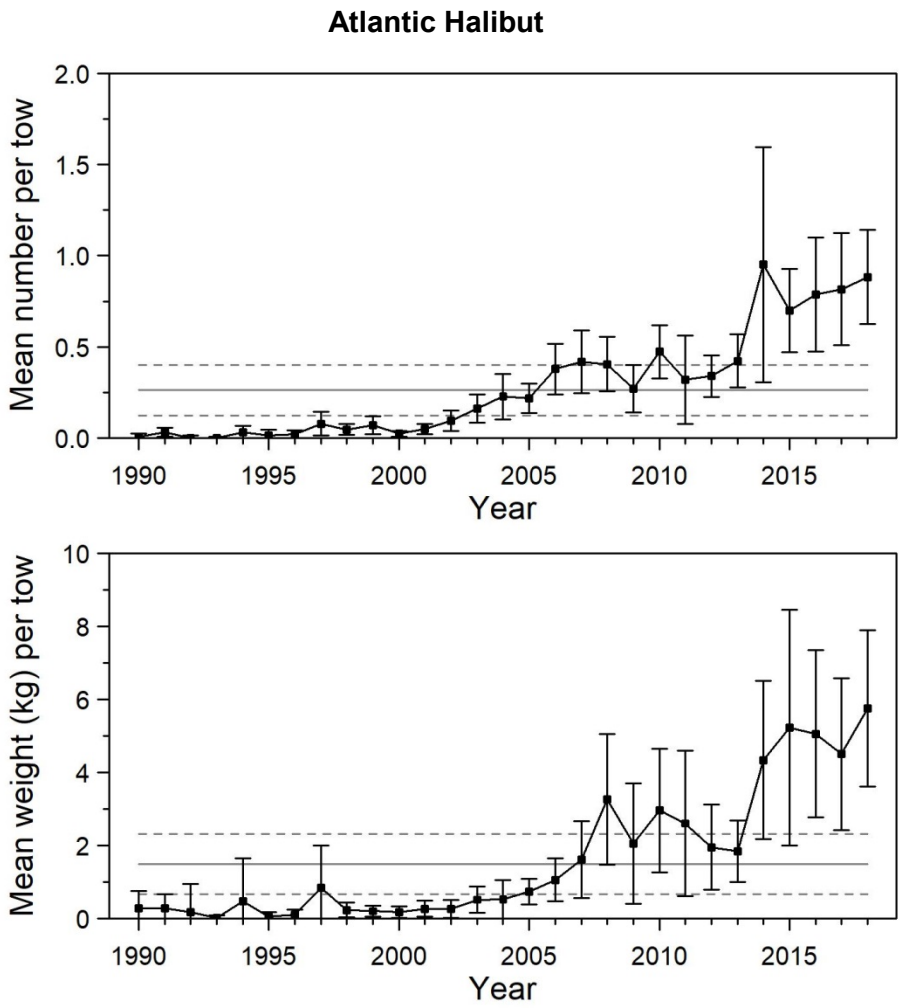

Figure 10. Mean numbers and mean weights per 15 minutes tow observed during the survey for Atlantic Halibut in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

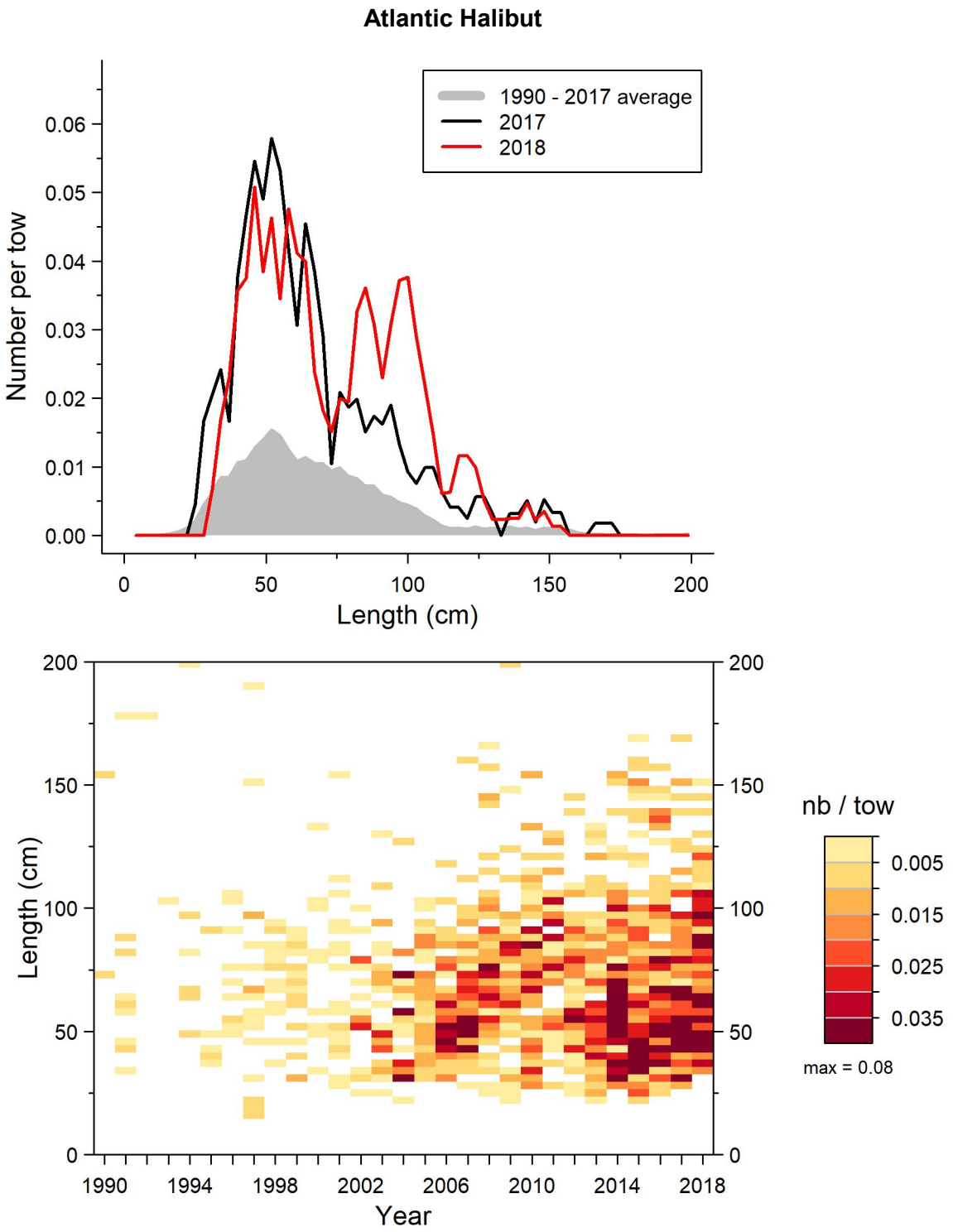

Figure 11. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Atlantic Halibut in 4RST.

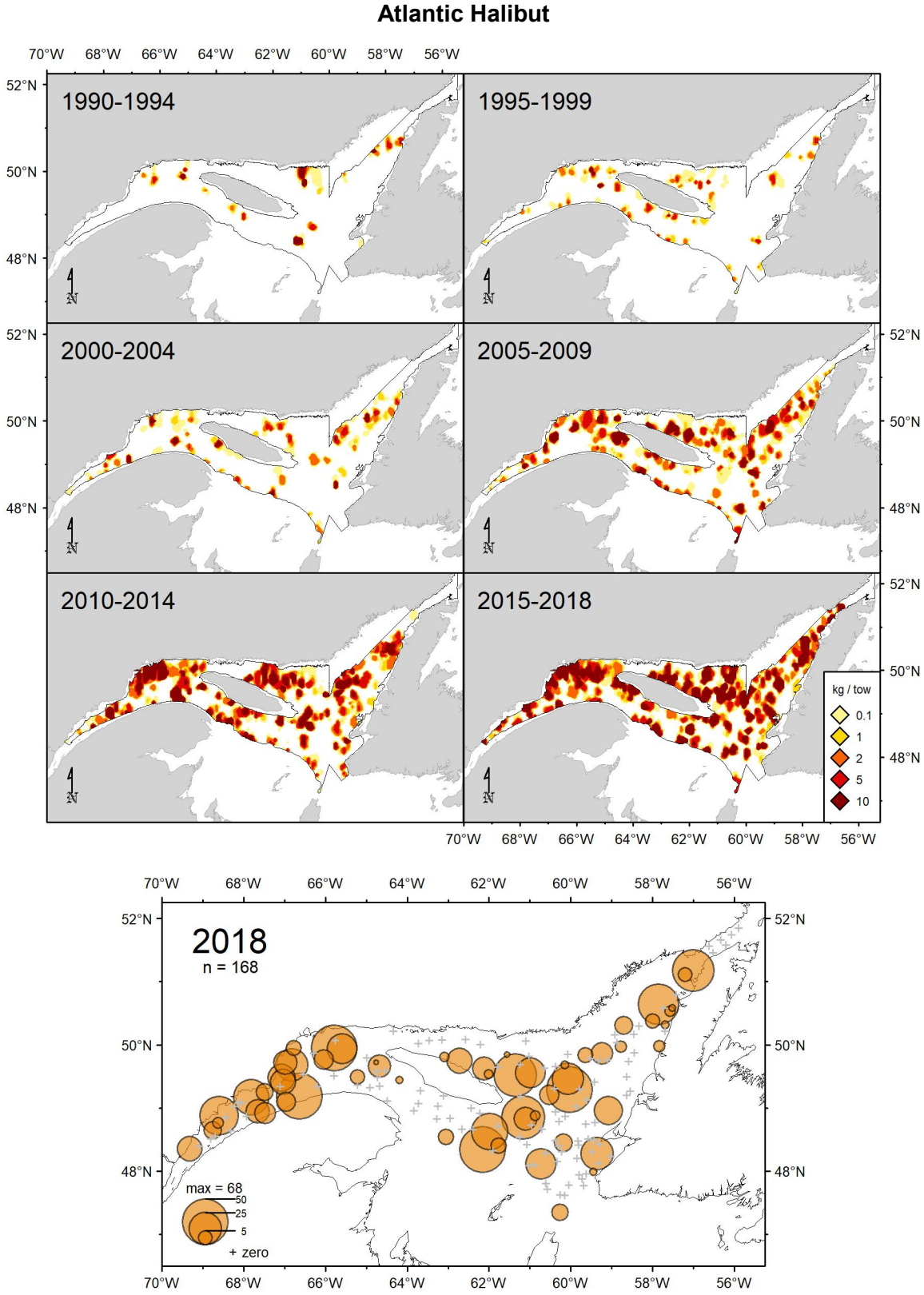

Figure 12. Atlantic Halibut catch rates (kg/15 minutes tow) distribution.

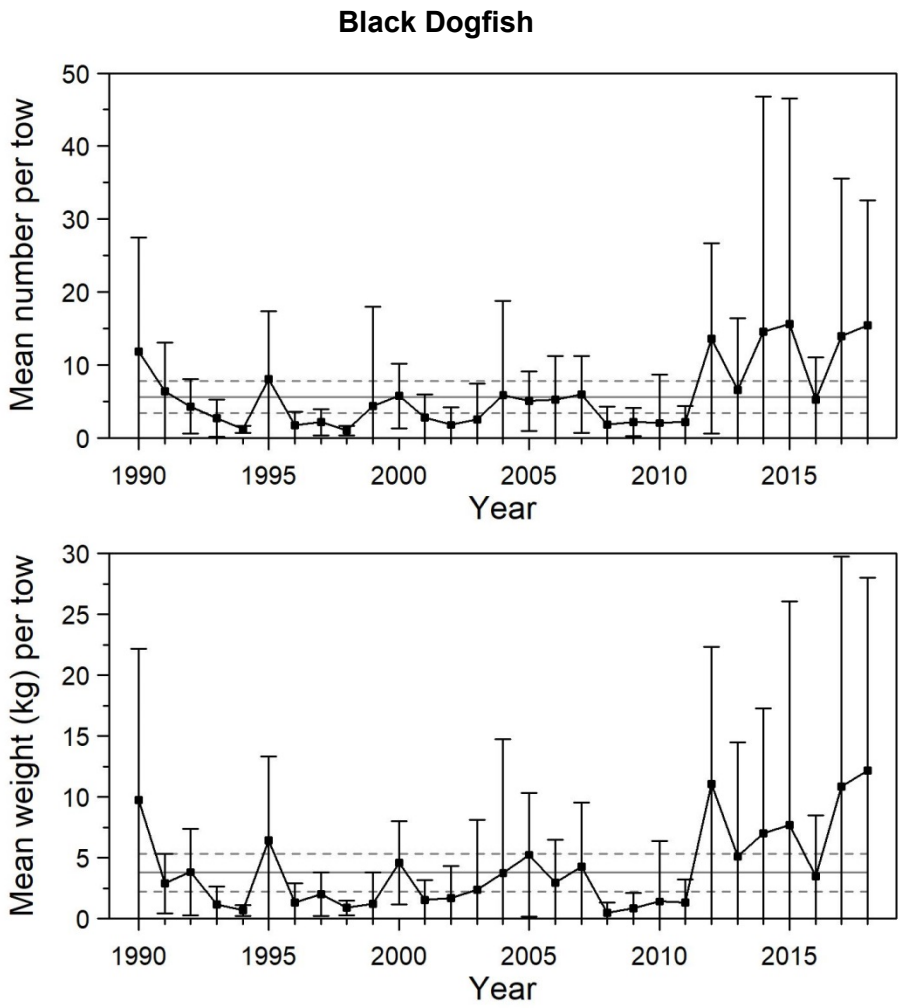

Figure 13. Mean numbers and mean weights per 15 minutes tow observed during the survey for Black Dogfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

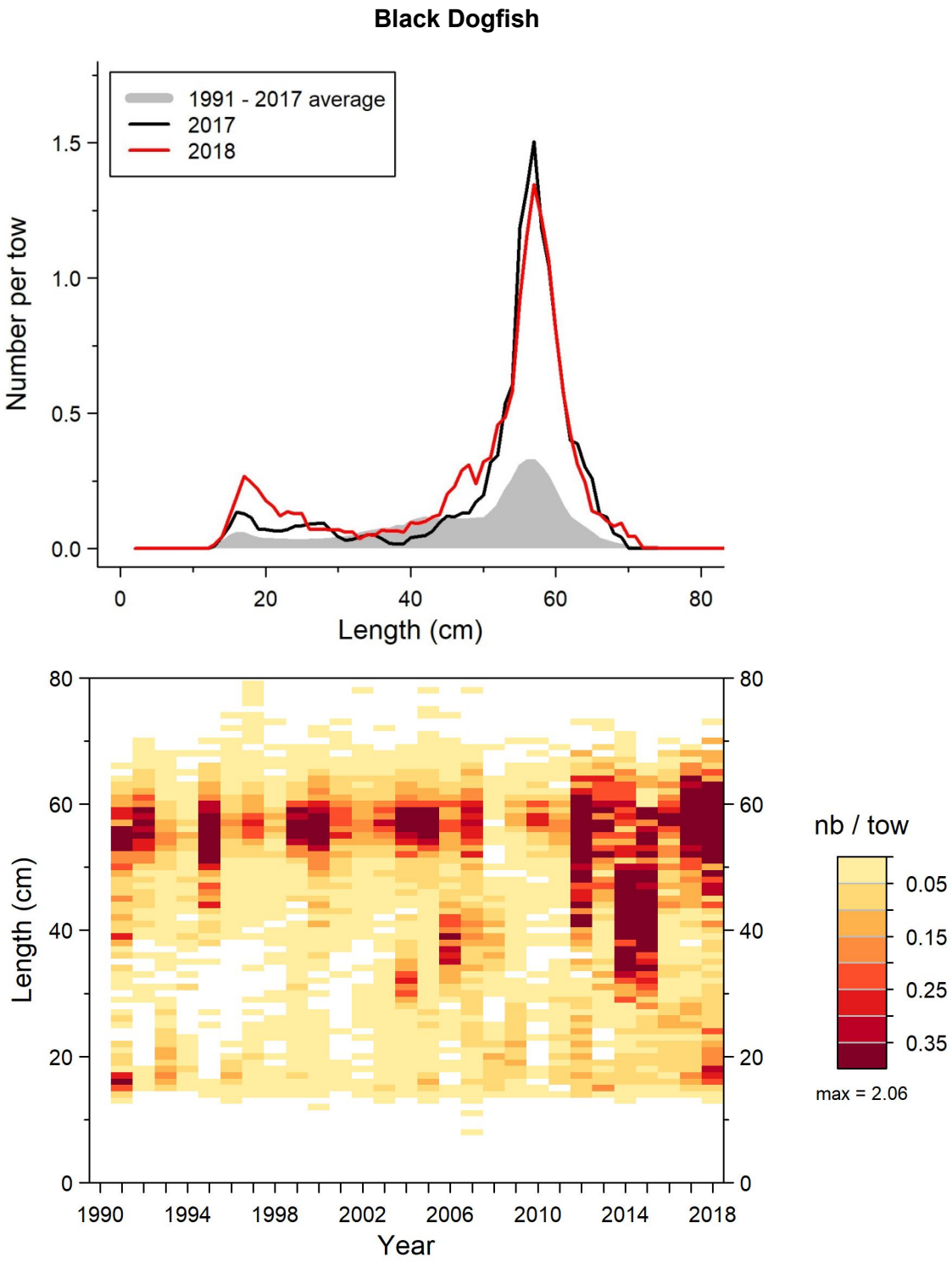

Figure 14. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Black Dogfish in 4RST.

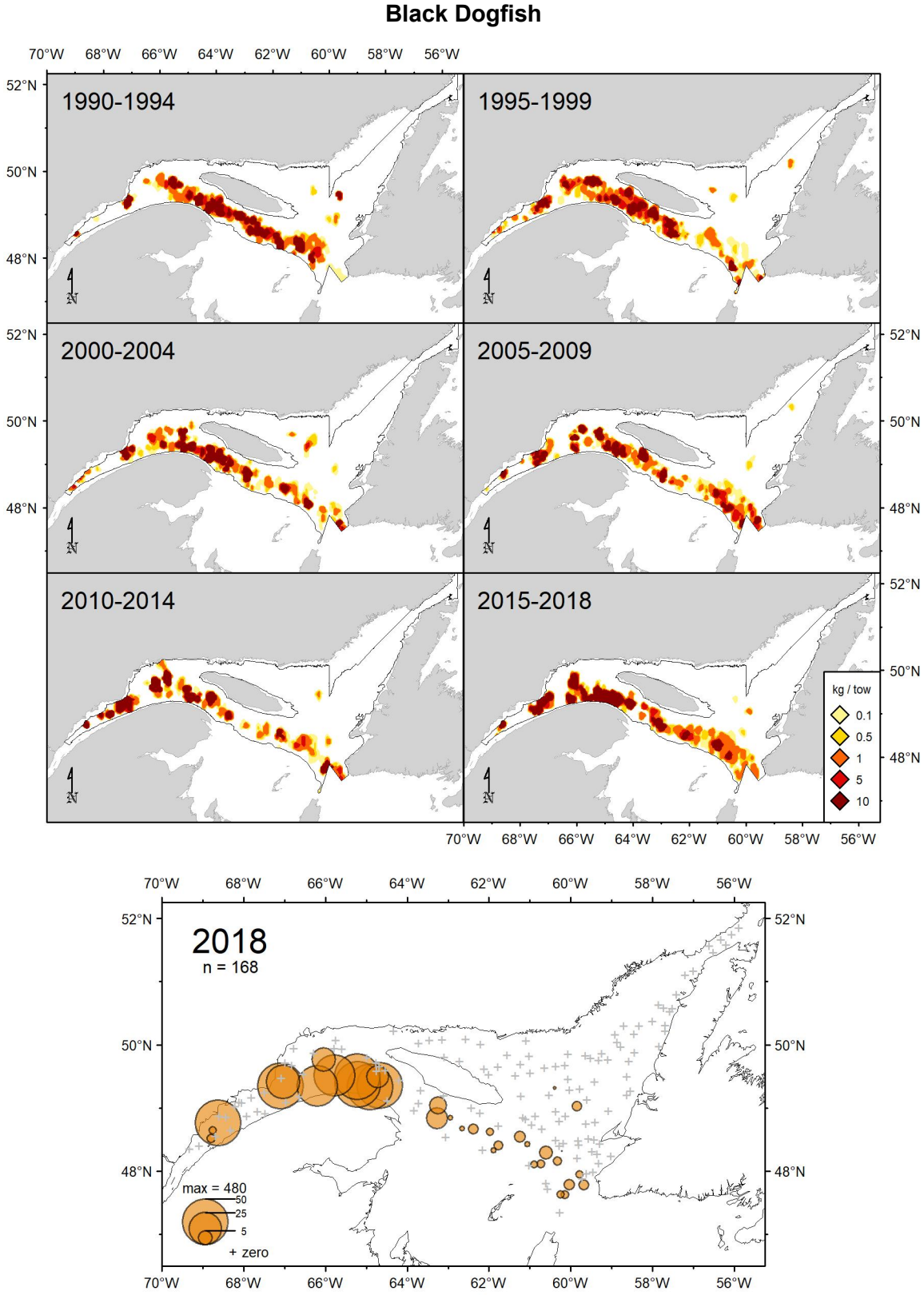

Figure 15. Black Dogfish catch rates (kg/15 minutes tow) distribution.

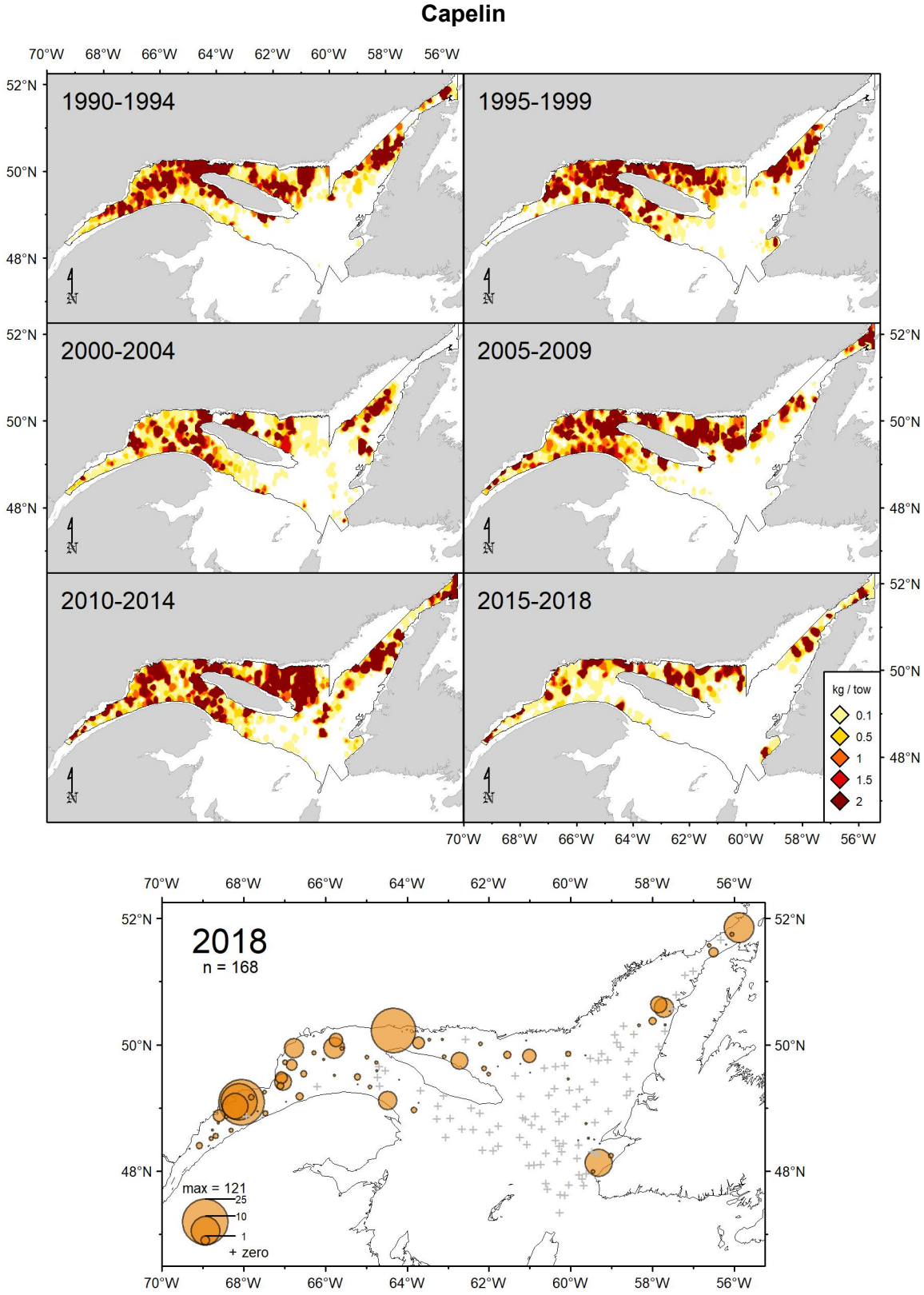

Figure 16. Capelin catch rates (kg/15 minutes tow) distribution.

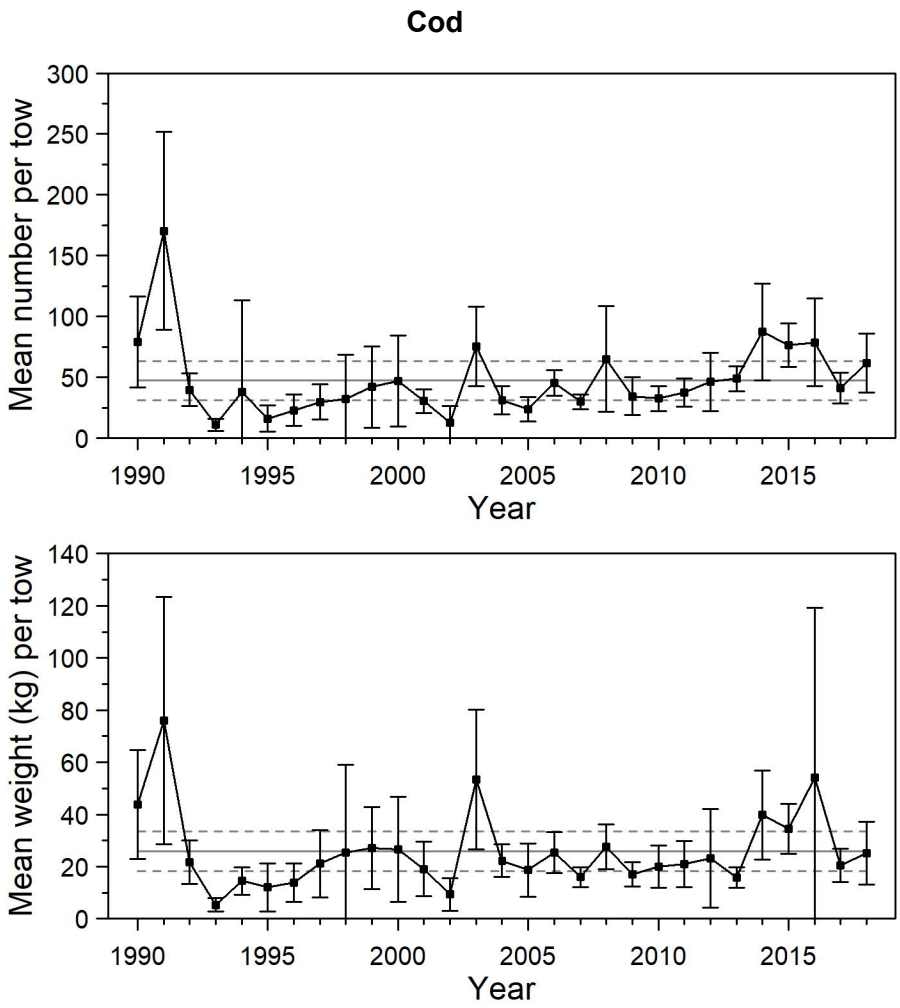

Figure 17. Mean numbers and mean weights per 15 minutes tow observed during the survey for Cod in 4RS. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

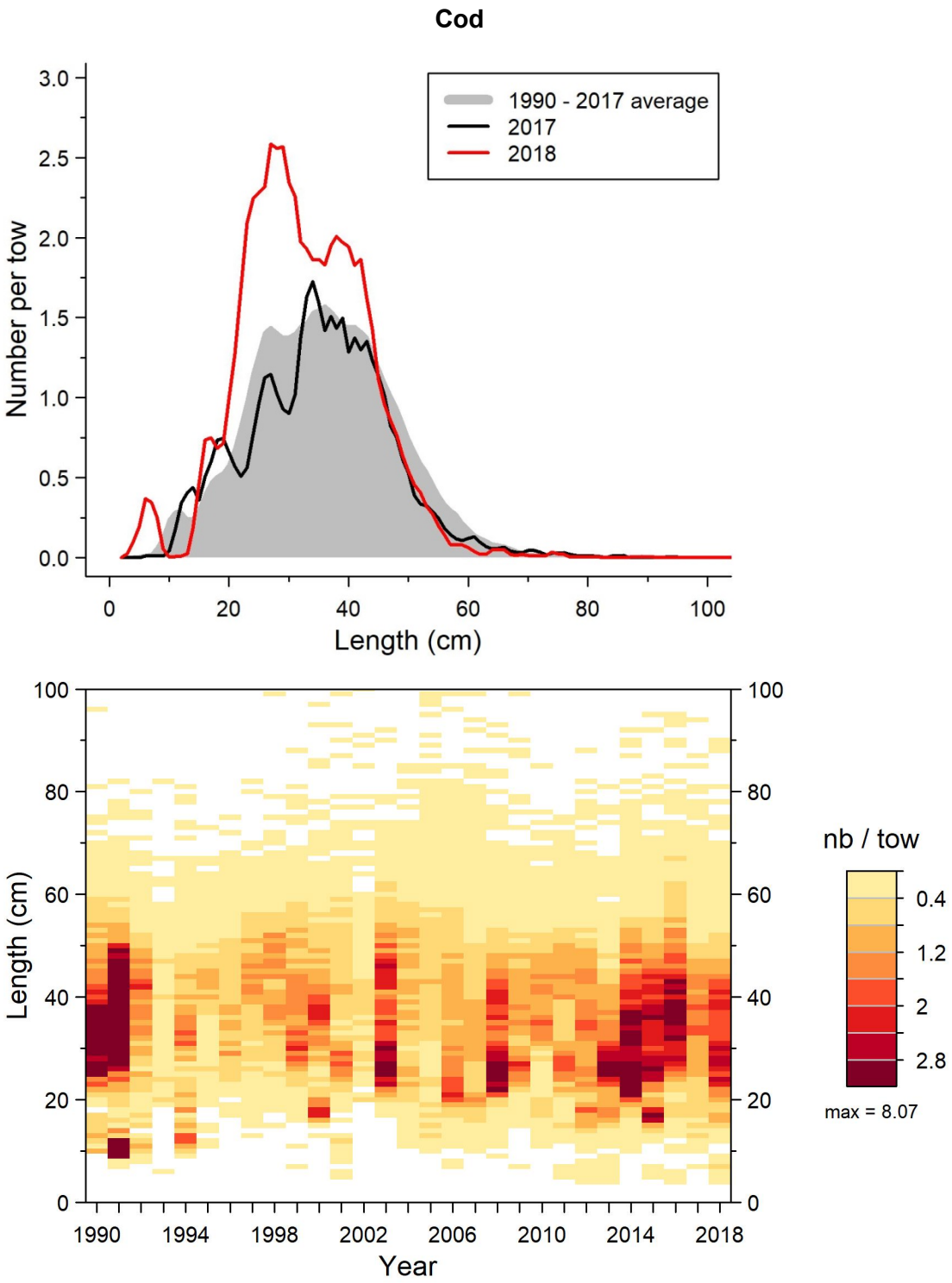

Figure 18. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Cod in 4RS.

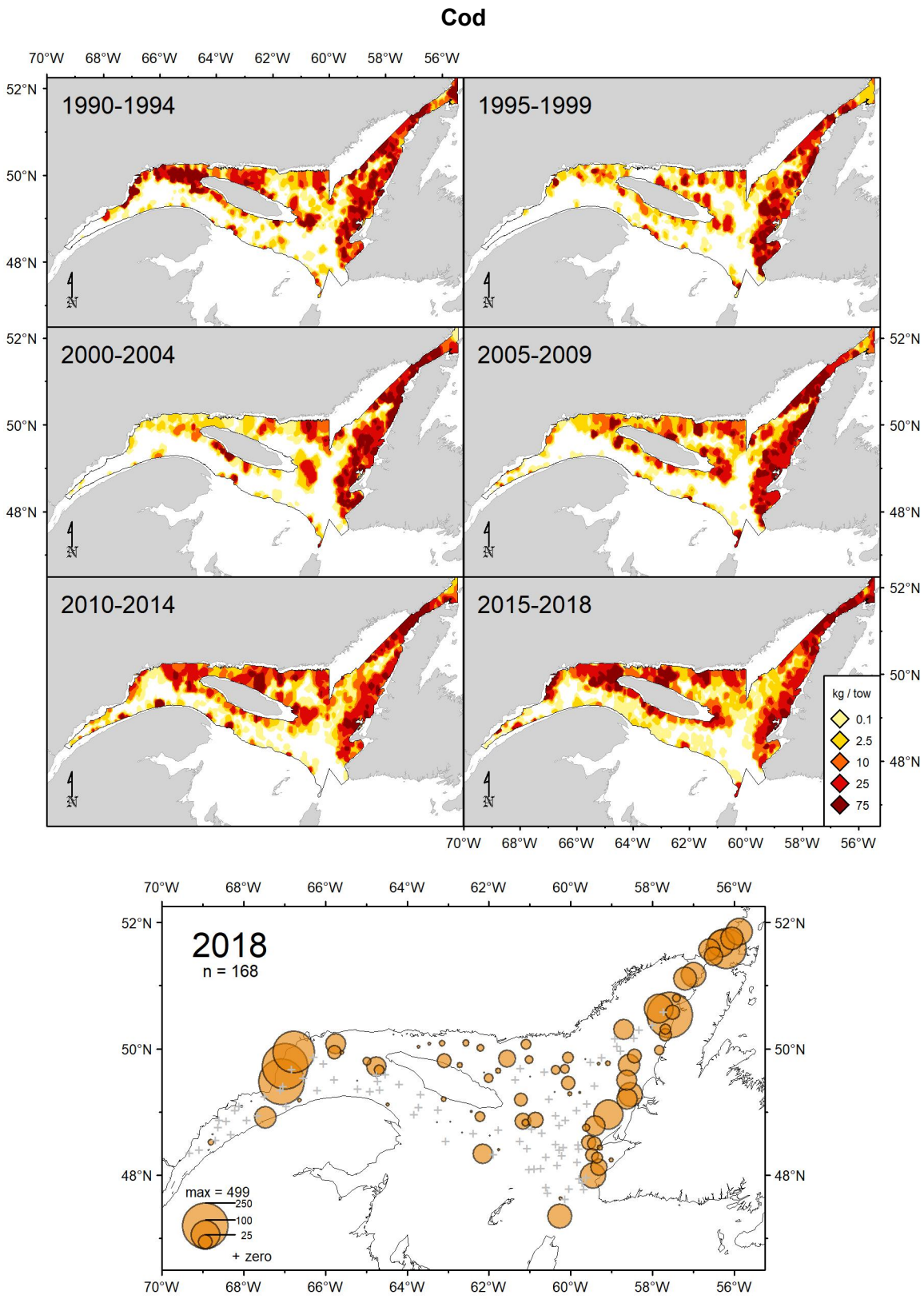

Figure 19. Cod catch rates (kg/15 minutes tow) distribution.

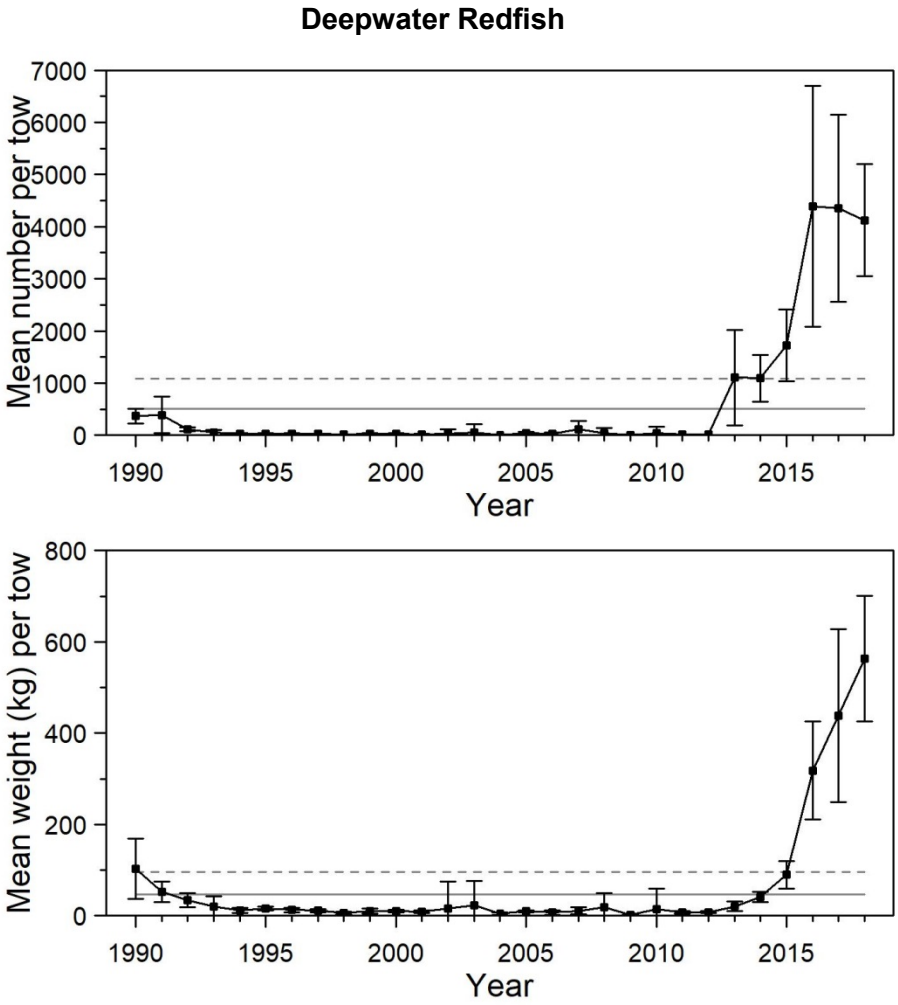

Figure 20. Mean numbers and mean weights per 15 minutes tow observed during the survey for Deepwater Redfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

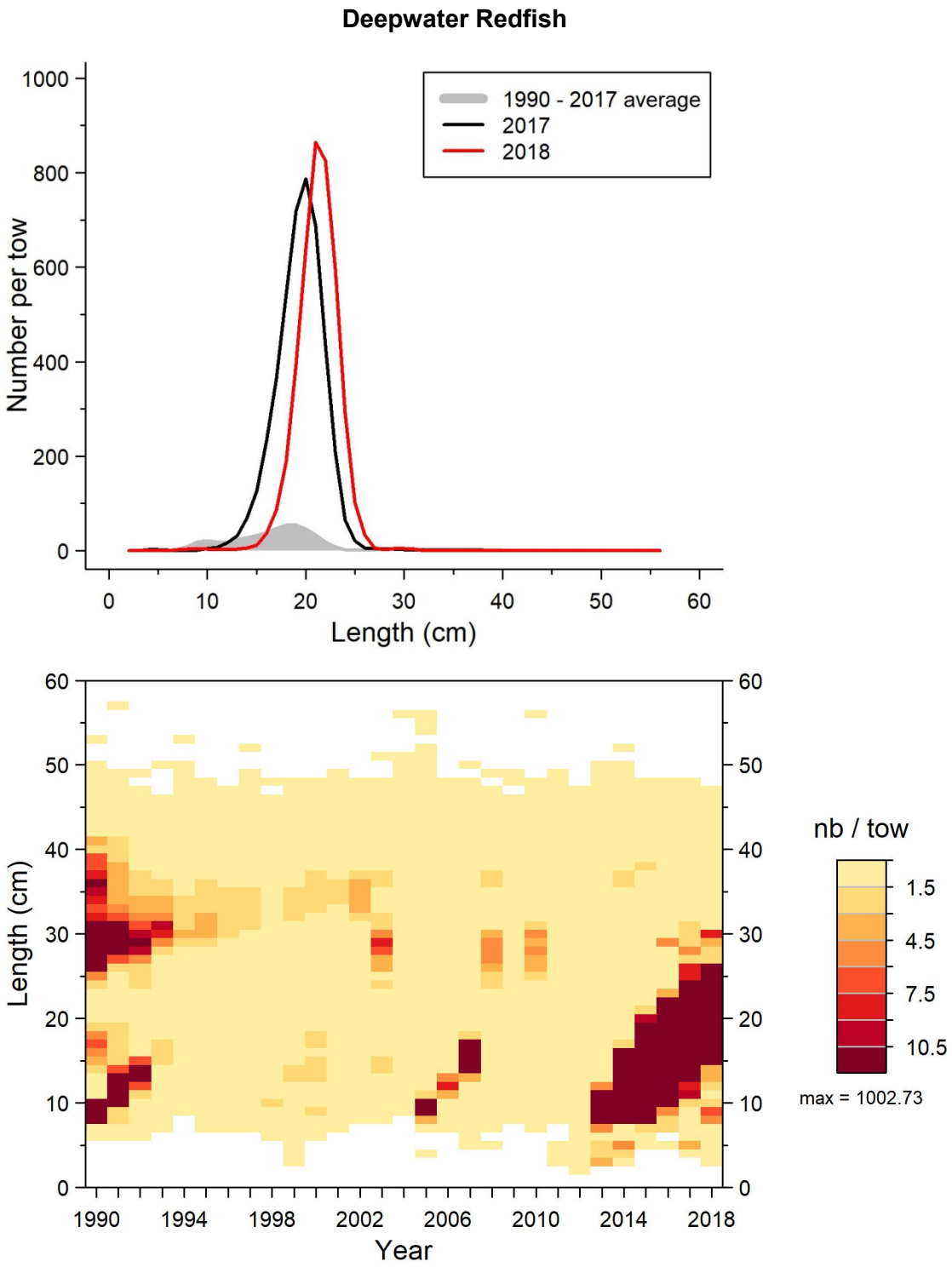

Figure 21. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Deepwater Redfish in 4RST.

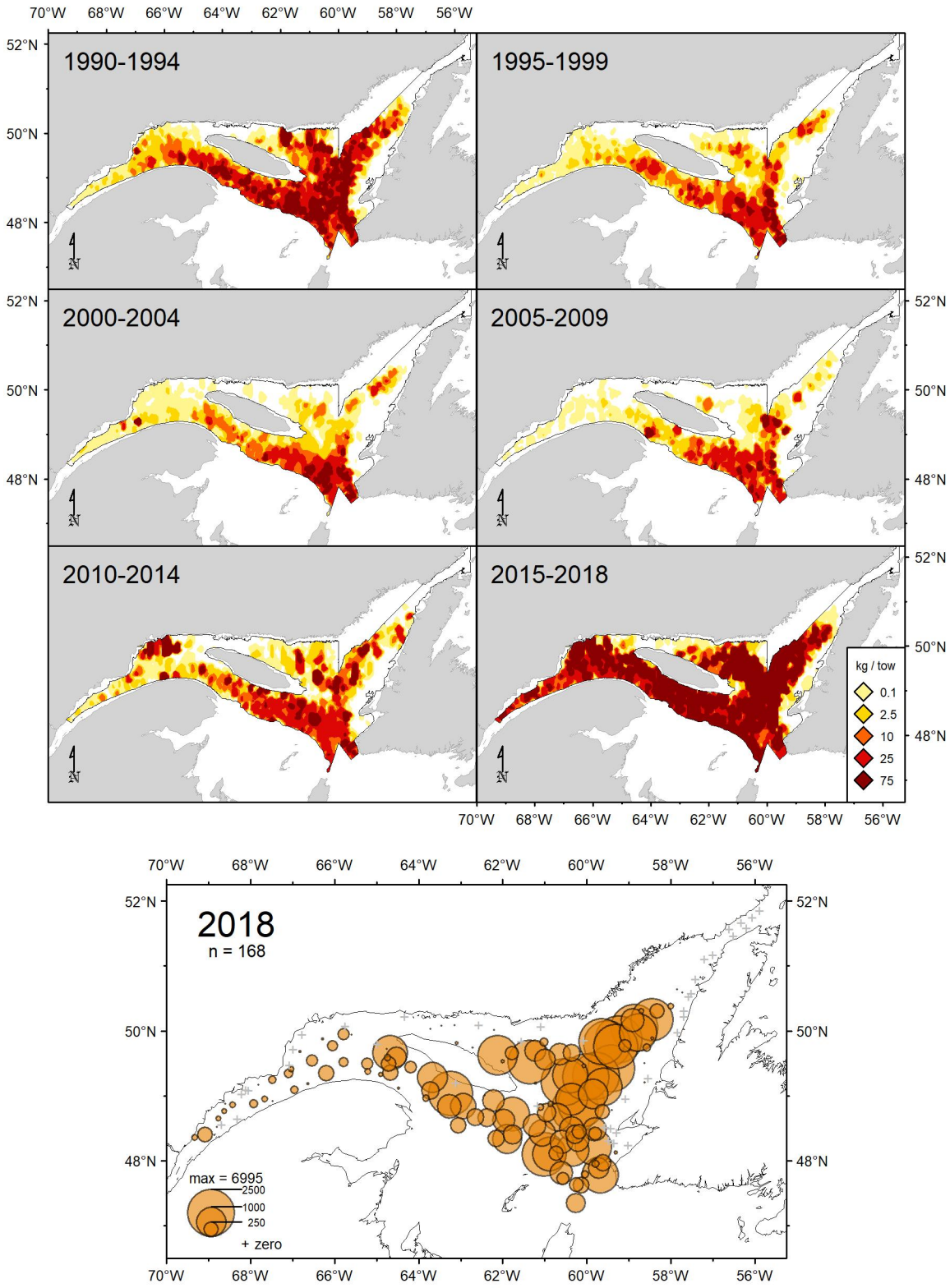

Figure 22. Deepwater Redfish catch rates (kg/15 minutes tow) distribution.

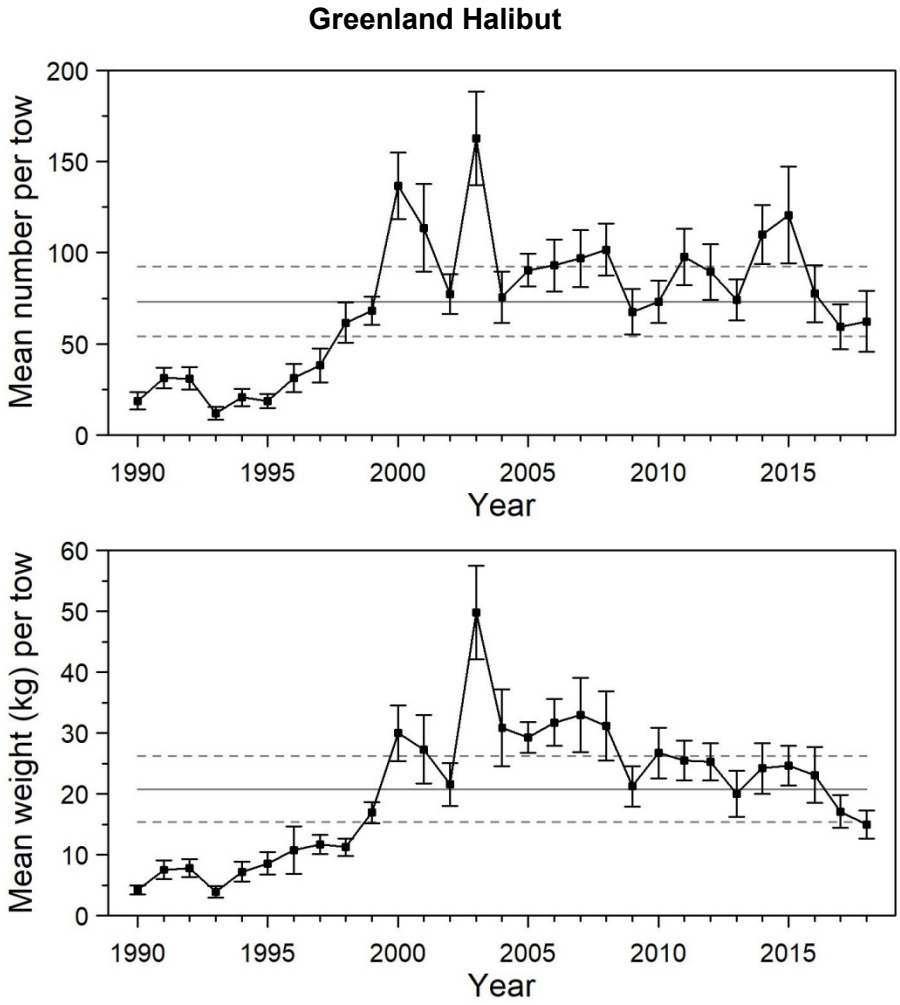

Figure 23. Mean numbers and mean weights per 15 minutes tow observed during the survey for Greenland Halibut in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

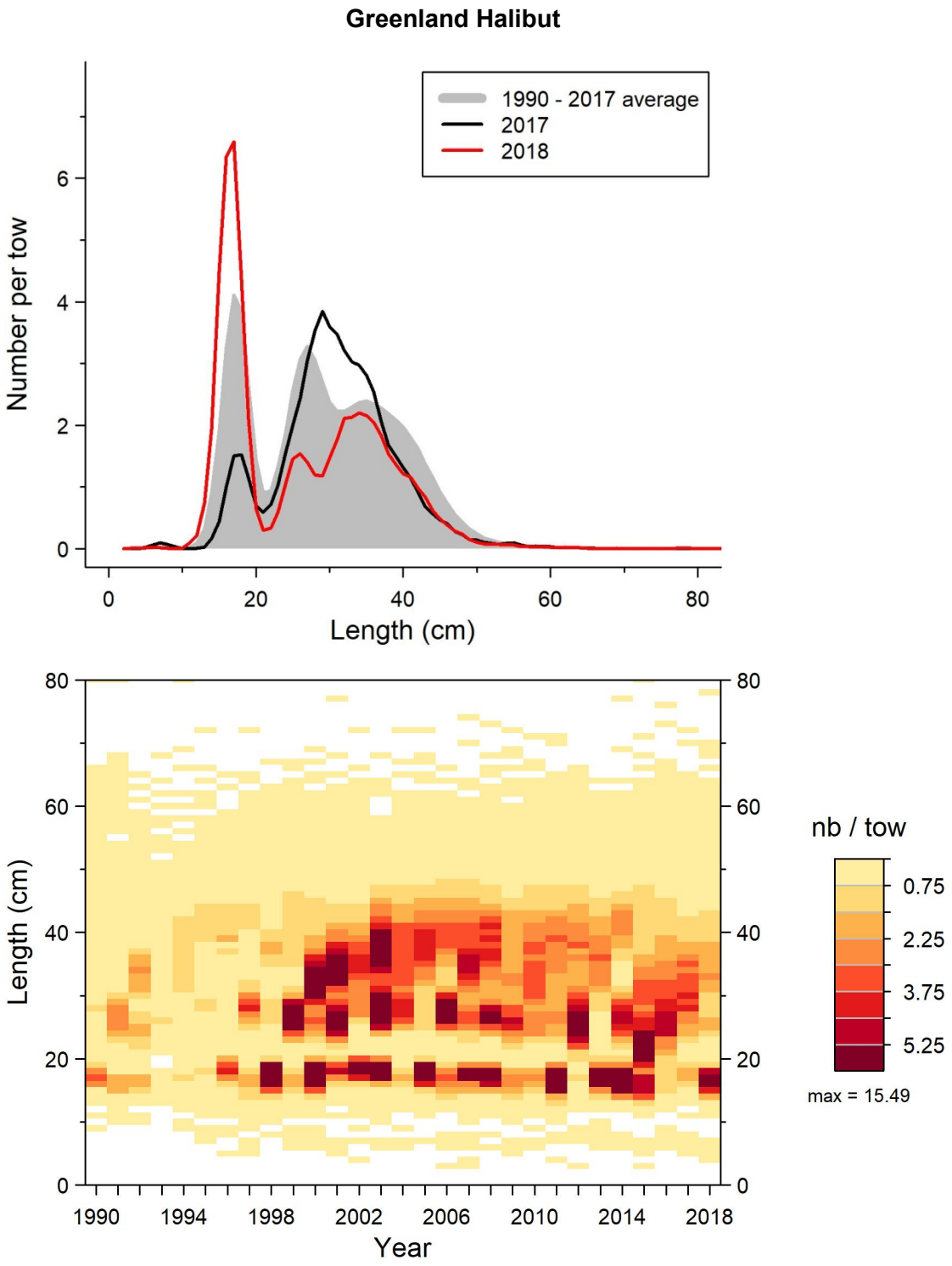

Figure 24. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Greenland Halibut in 4RST.

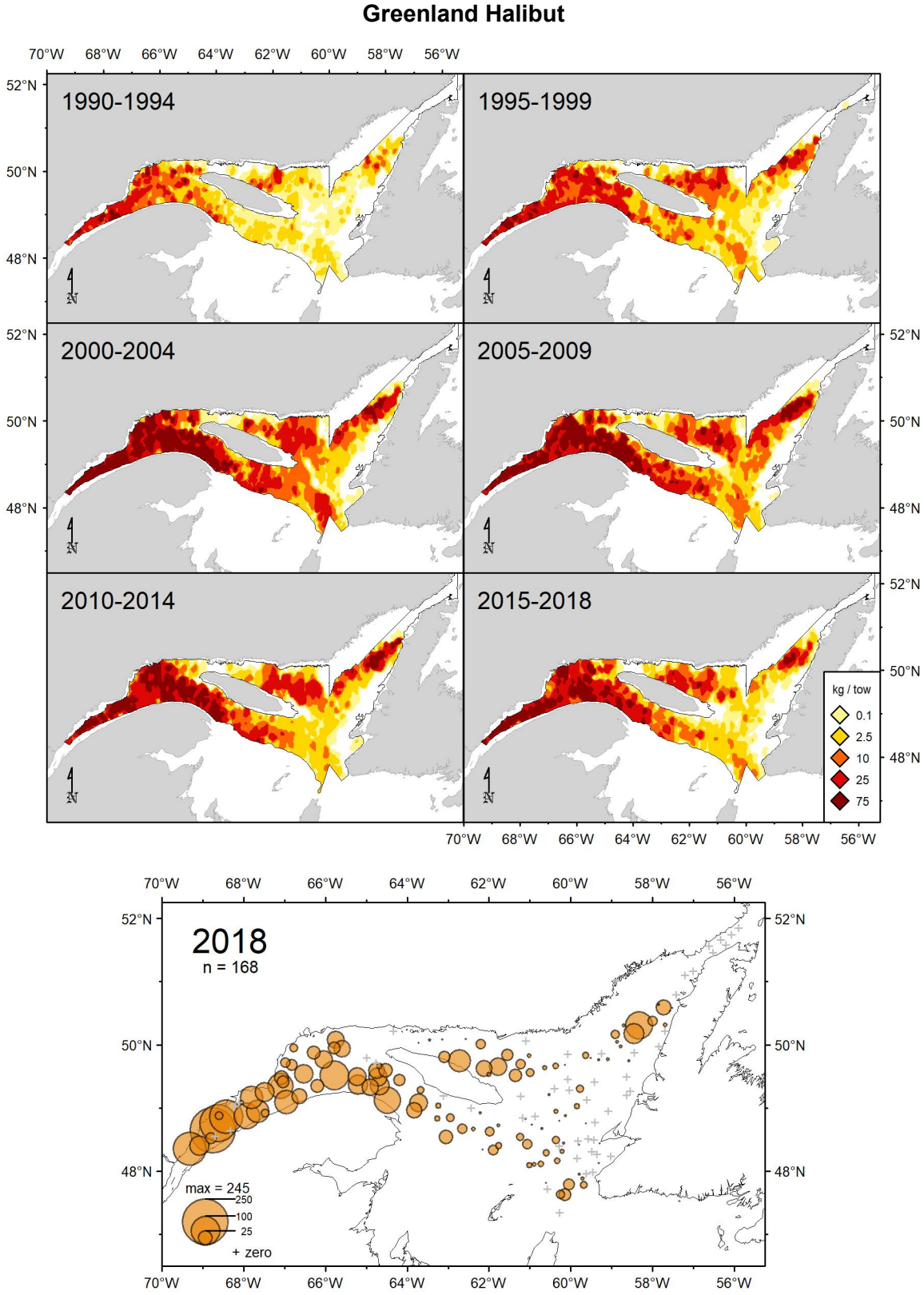

Figure 25. Greenland Halibut catch rates (kg/15 minutes tow) distribution.

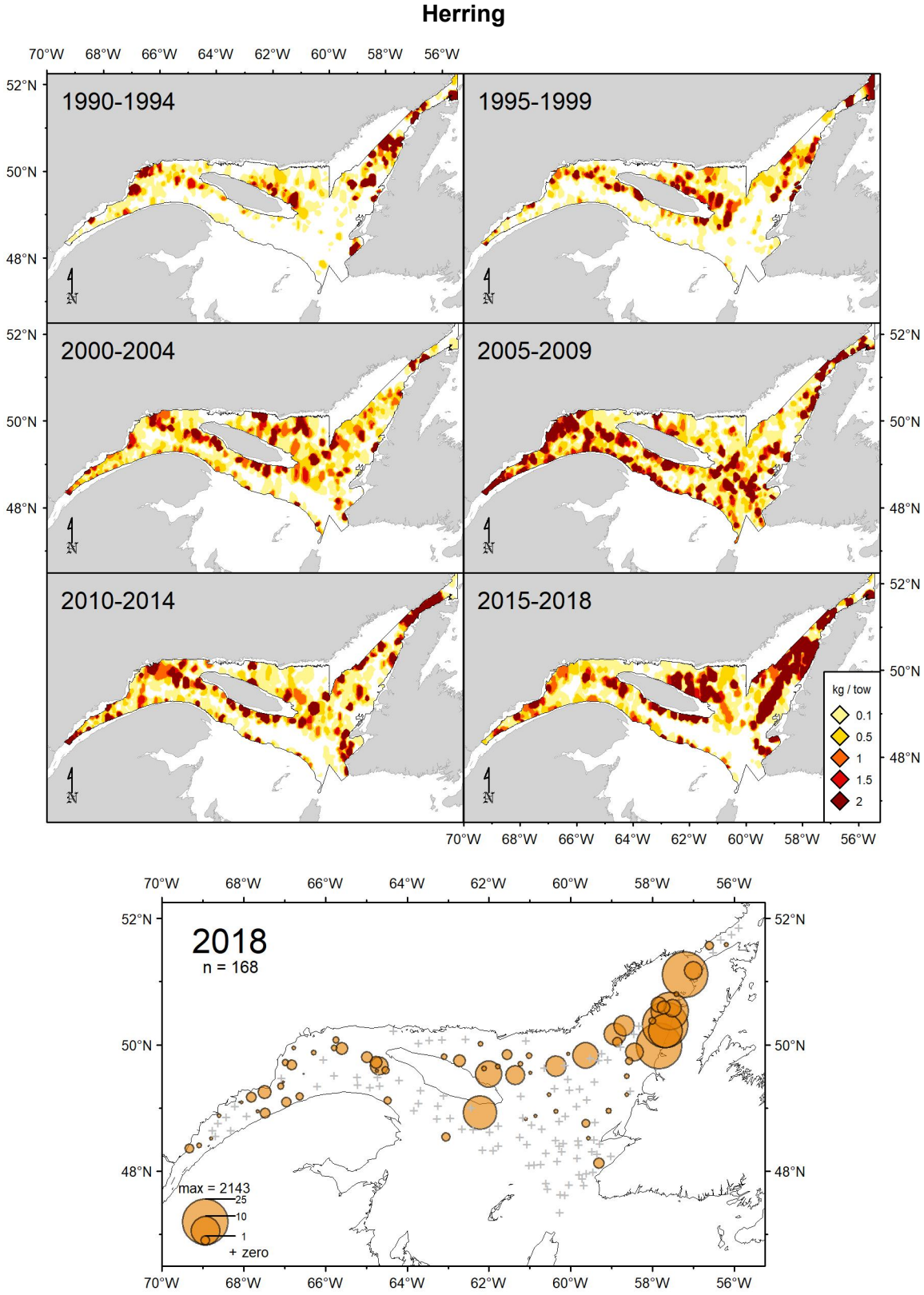

Figure 26. Herring catch rates (kg/15 minutes tow) distribution.

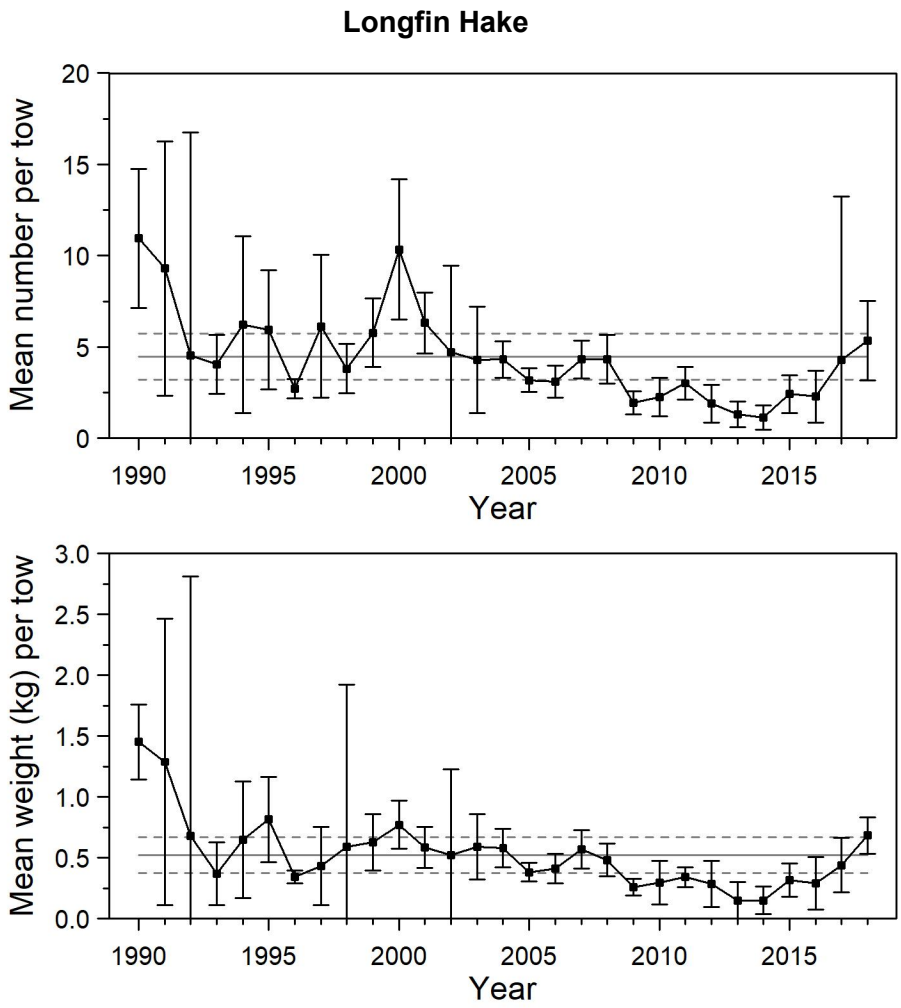

Figure 27. Mean numbers and mean weights per 15 minutes tow observed during the survey for Longfin Hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

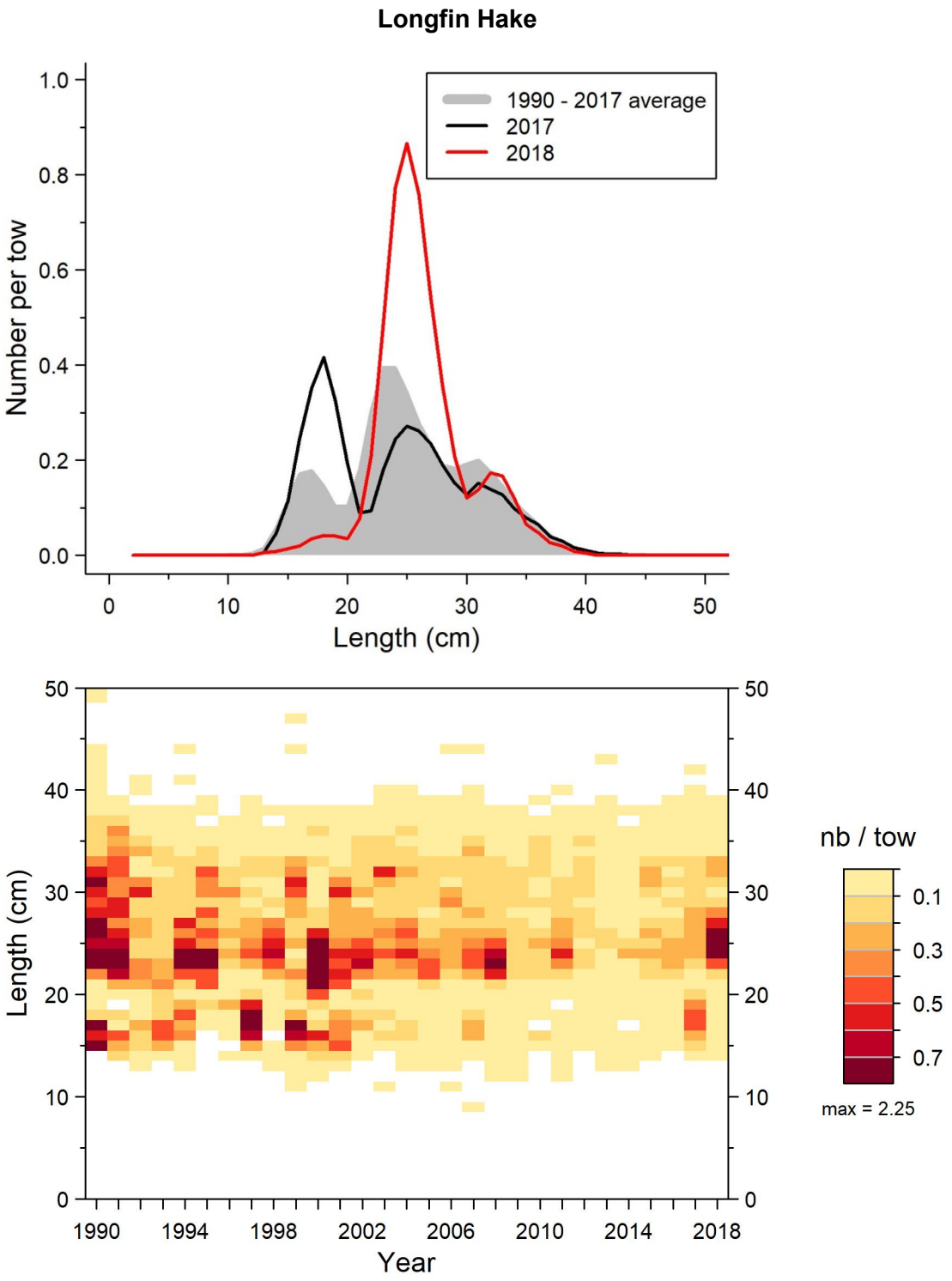

Figure 28. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Longfin Hake in 4RST.

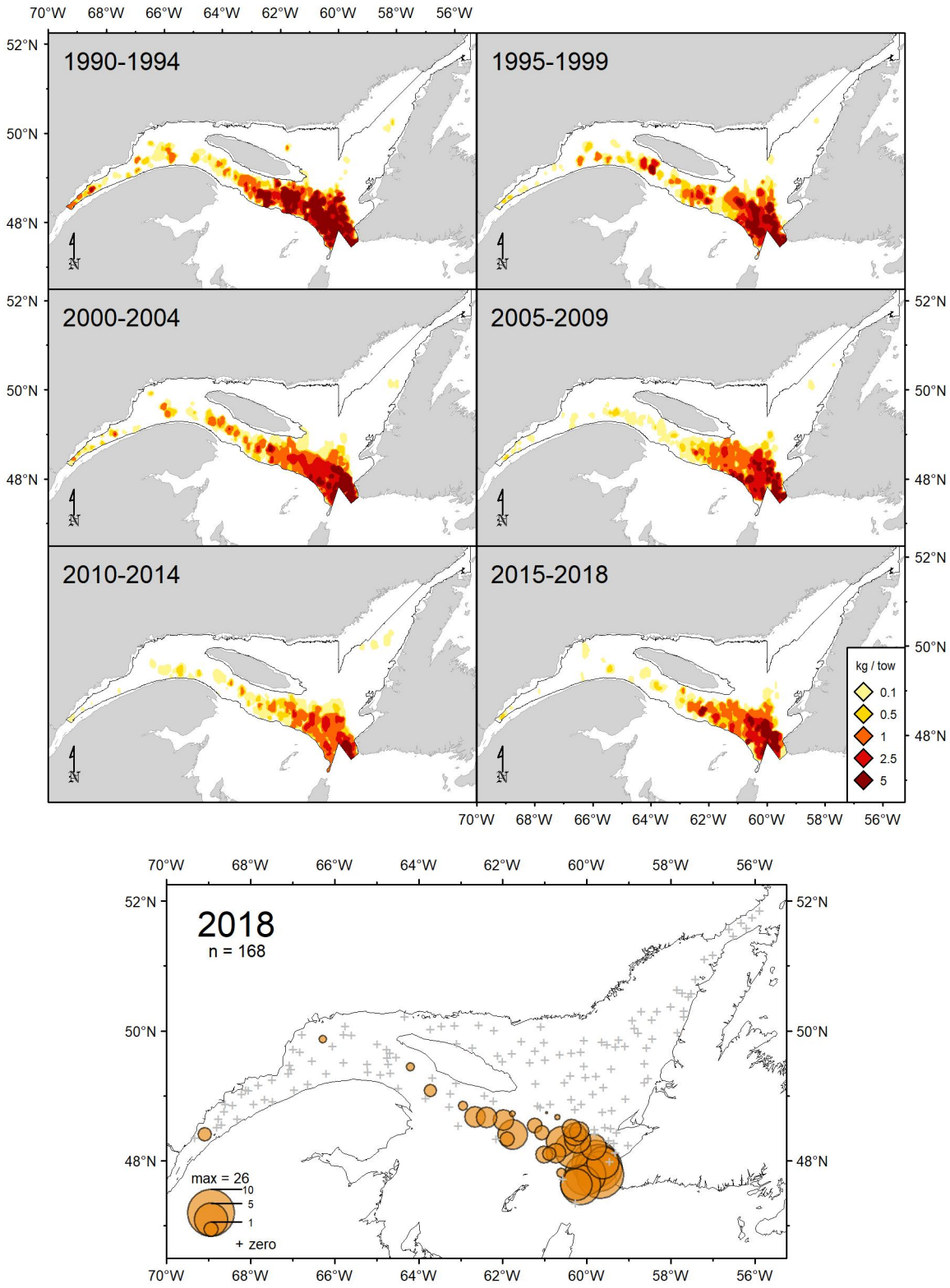

Figure 29. Longfin Hake catch rates (kg/15 minutes tow) distribution.

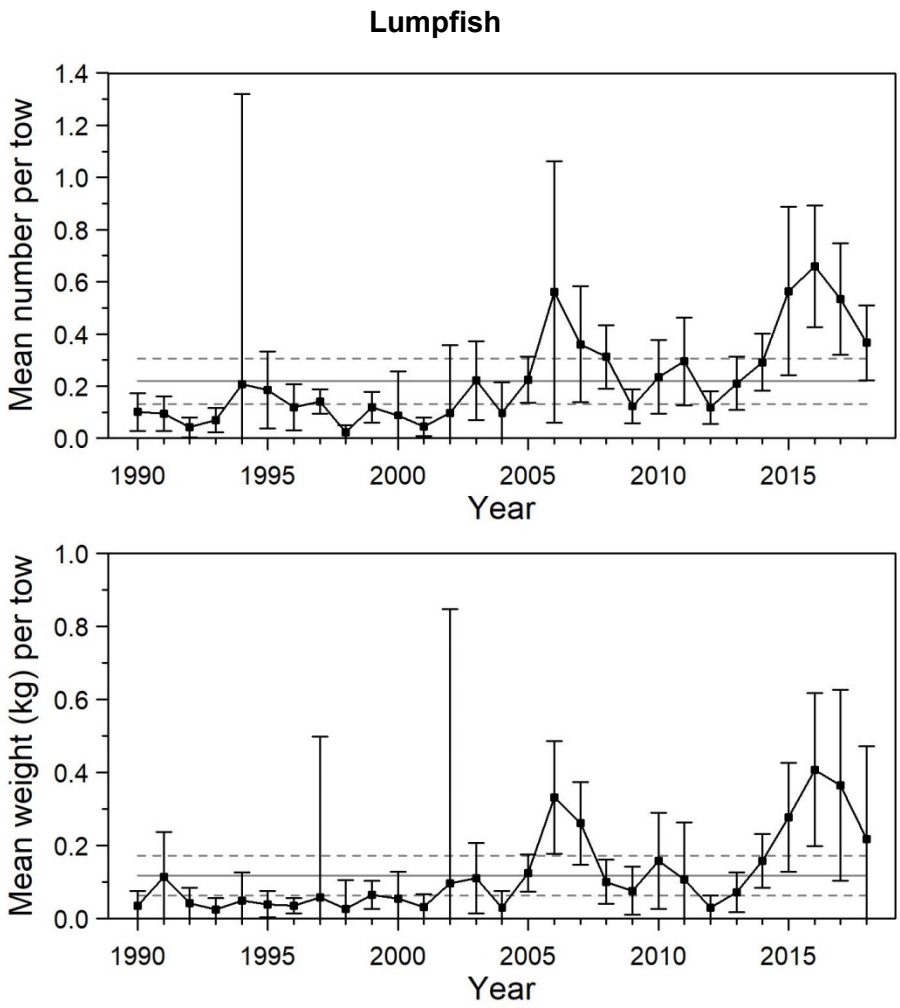

Figure 30. Mean numbers and mean weights per 15 minutes tow observed during the survey for Lumpfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

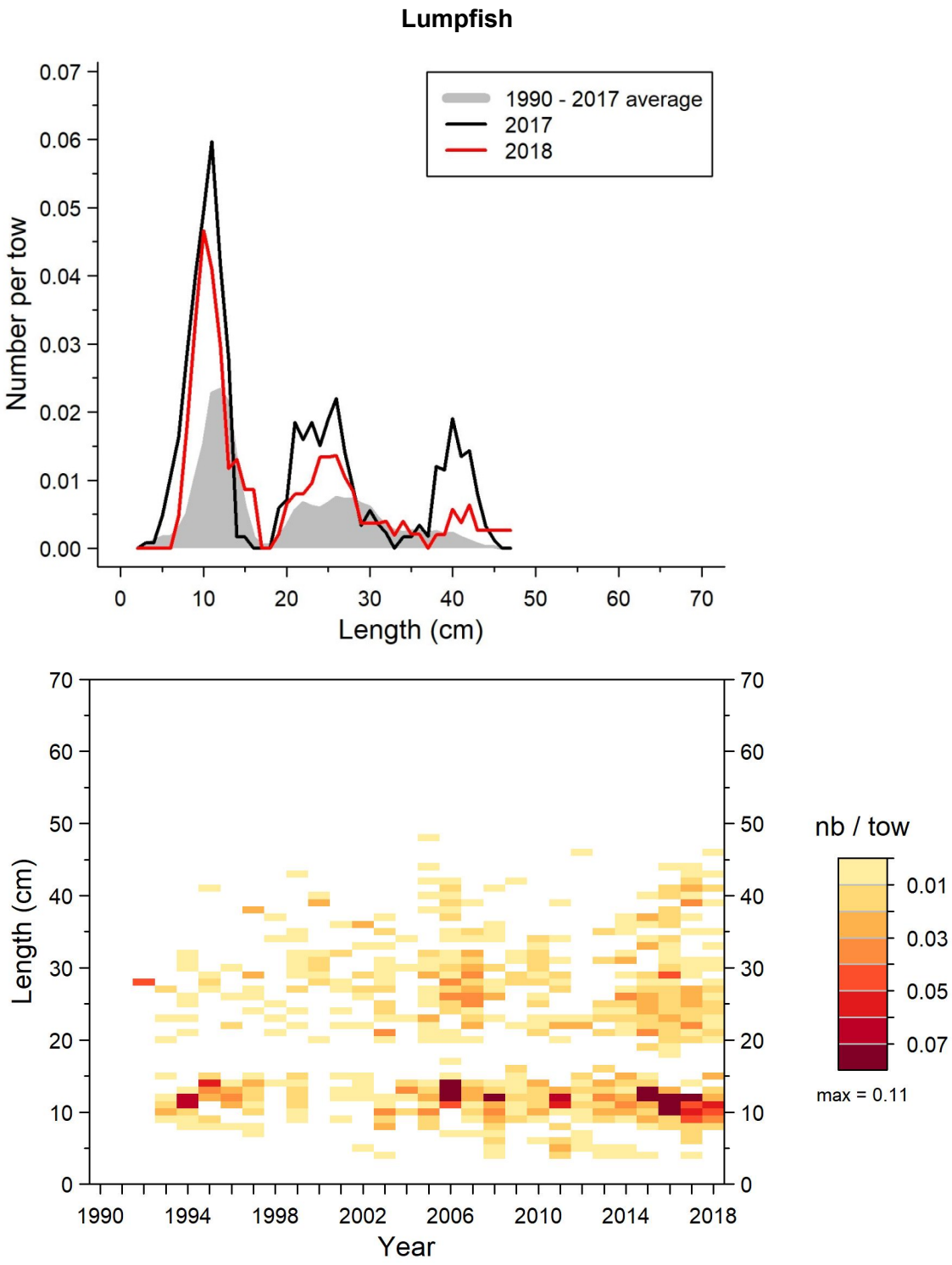

Figure 31. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Lumpfish in 4RST.

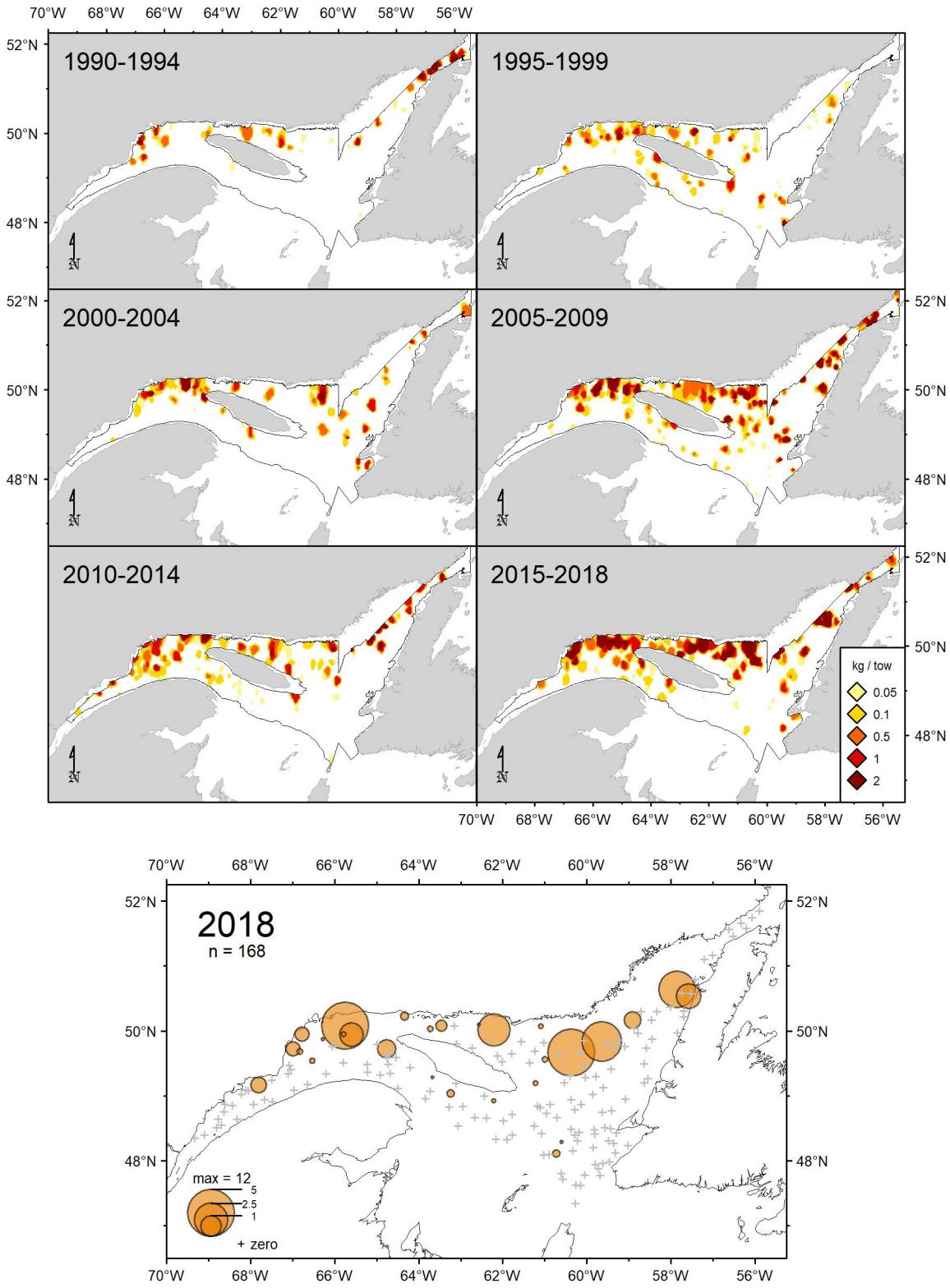

Figure 32. Lumpfish catch rates (kg/15 minutes tow) distribution.

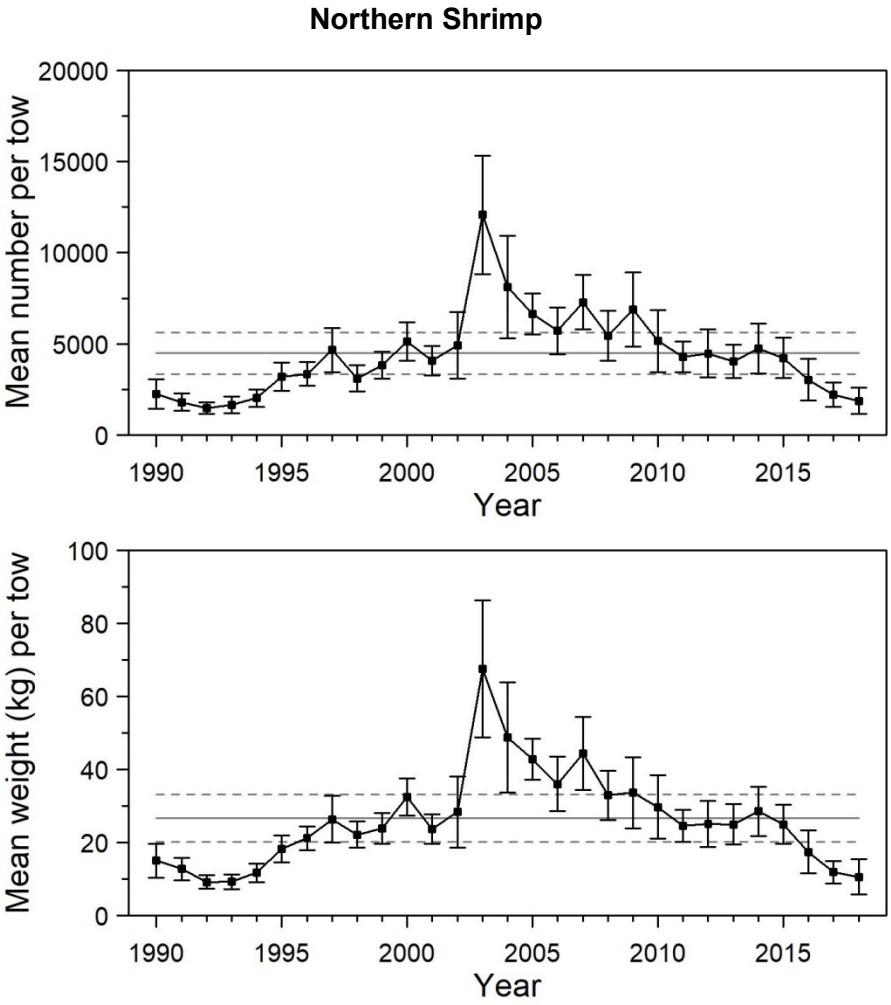

Figure 33. Mean numbers and mean weights per 15 minutes tow observed during the survey for Northern Shrimp in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

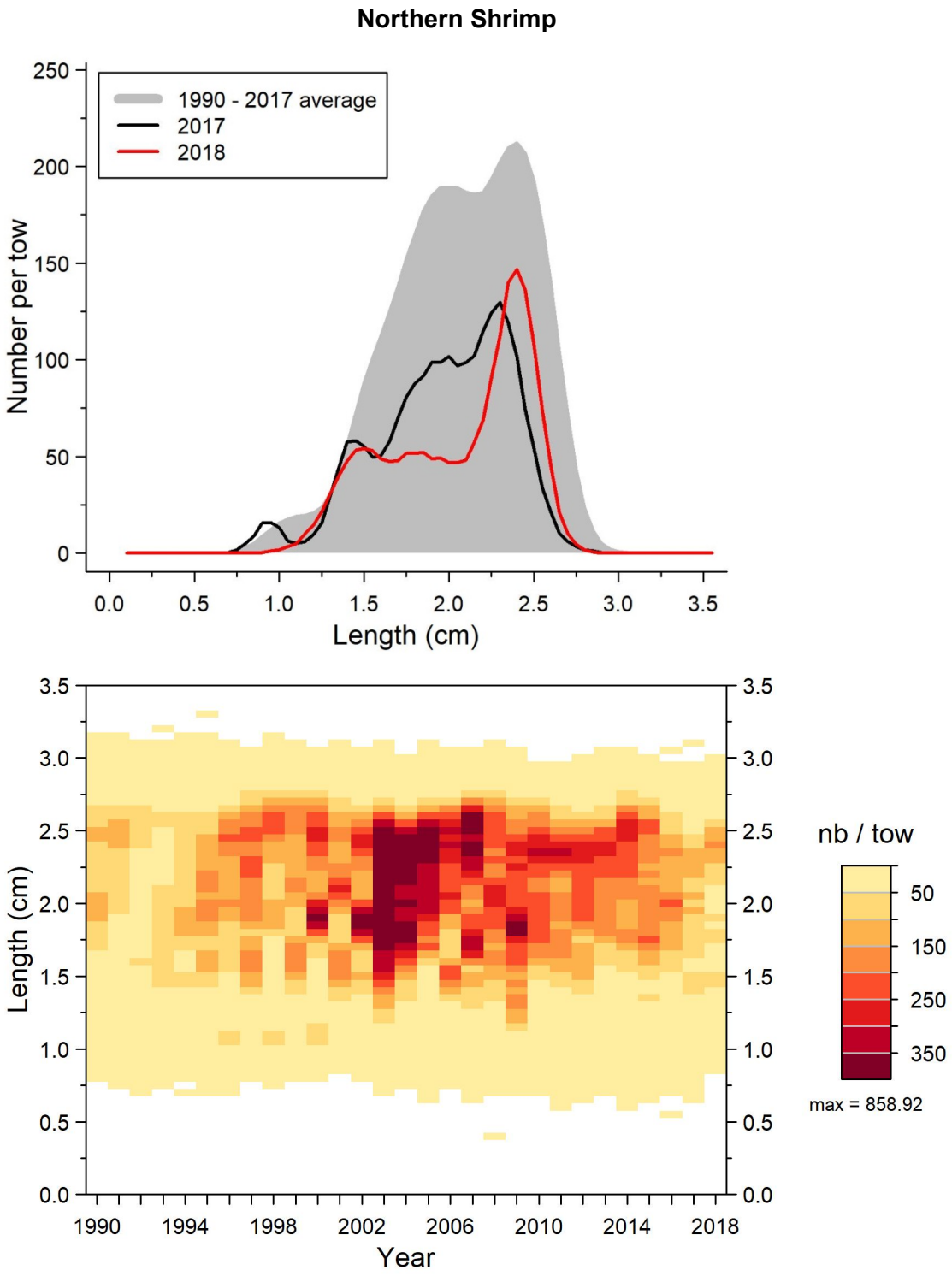

Figure 34. Carapace length frequency distributions (mean number per 15 minutes tow) observed during the survey for Northern Shrimp in 4RST.

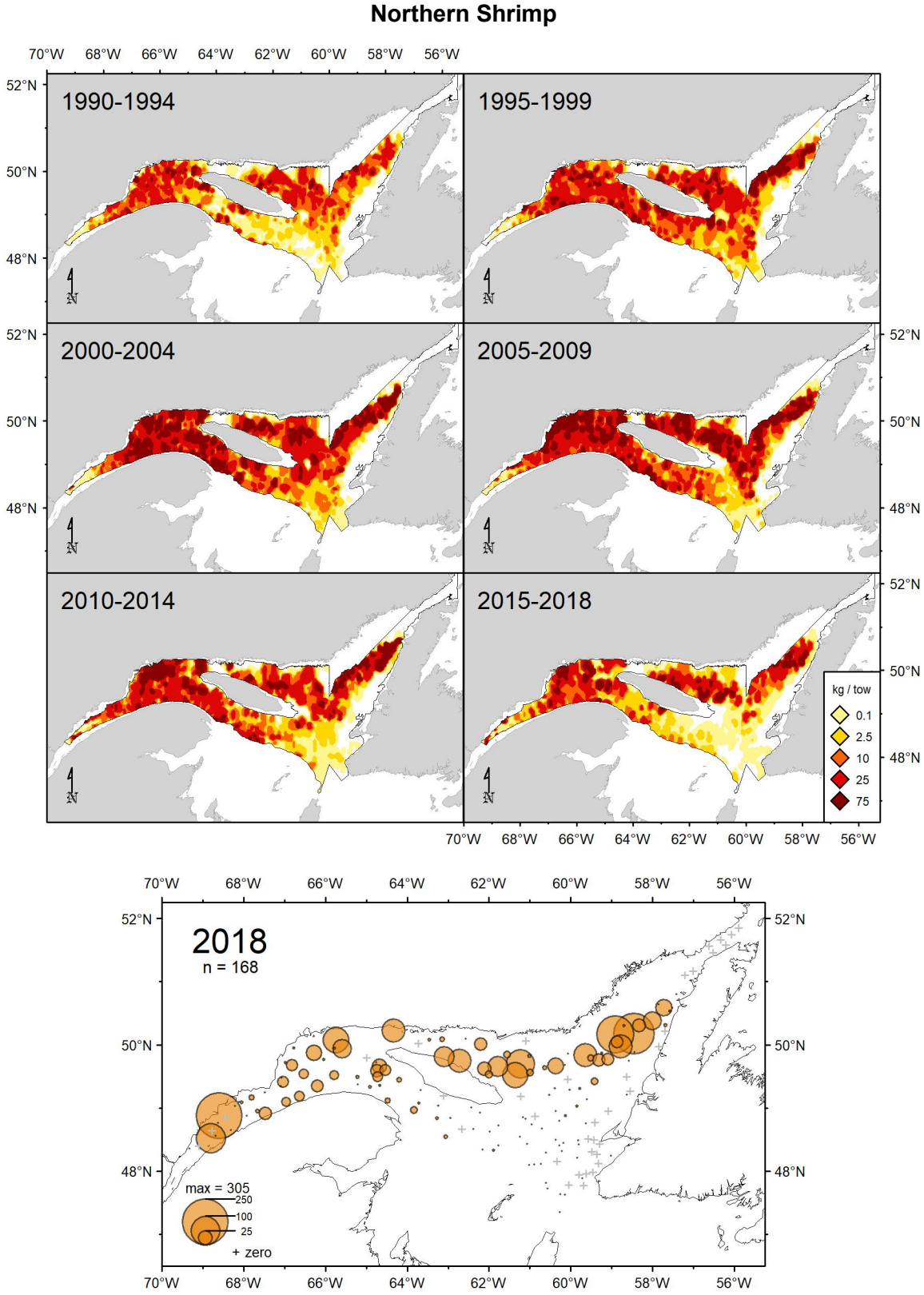

Figure 35. Northern Shrimp catch rates (kg/15 minutes tow) distribution.

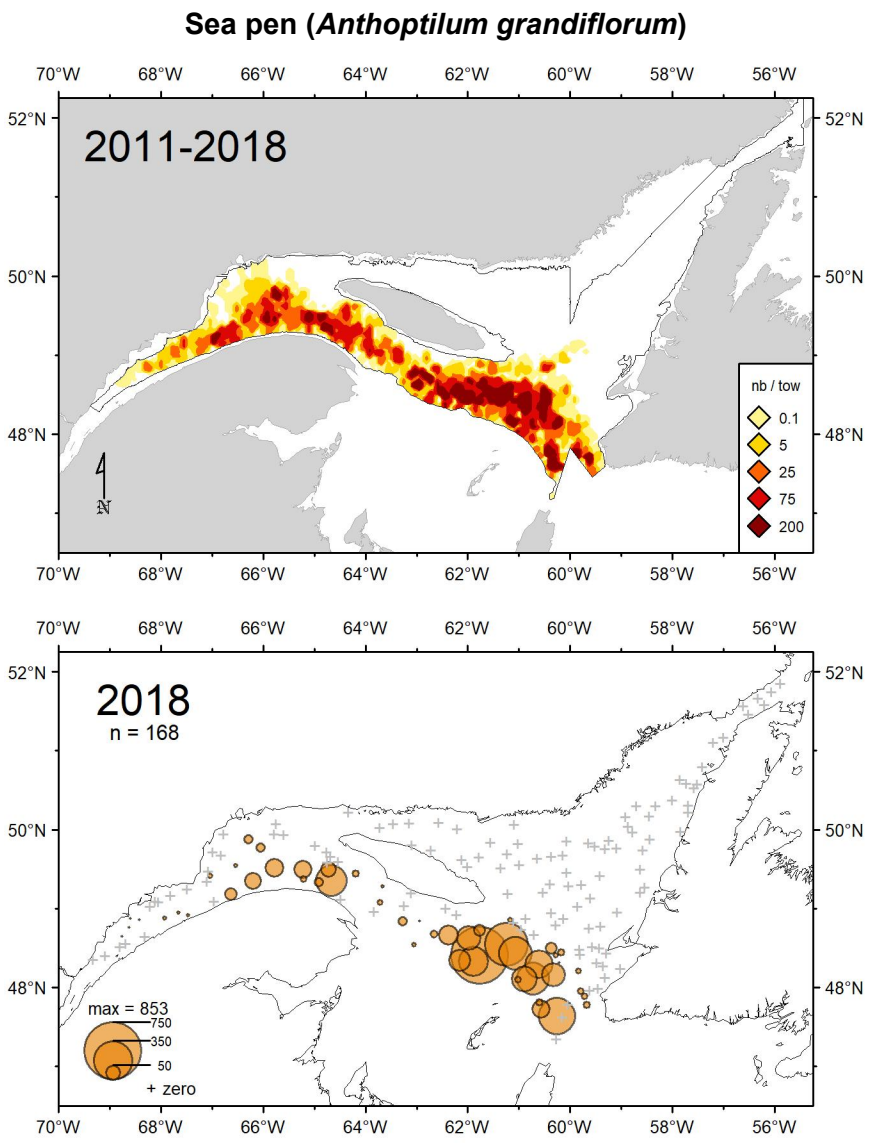

Figure 36. Sea pen Anthoptilum grandiflorum catch rates (nb/15 minutes tow) distribution.

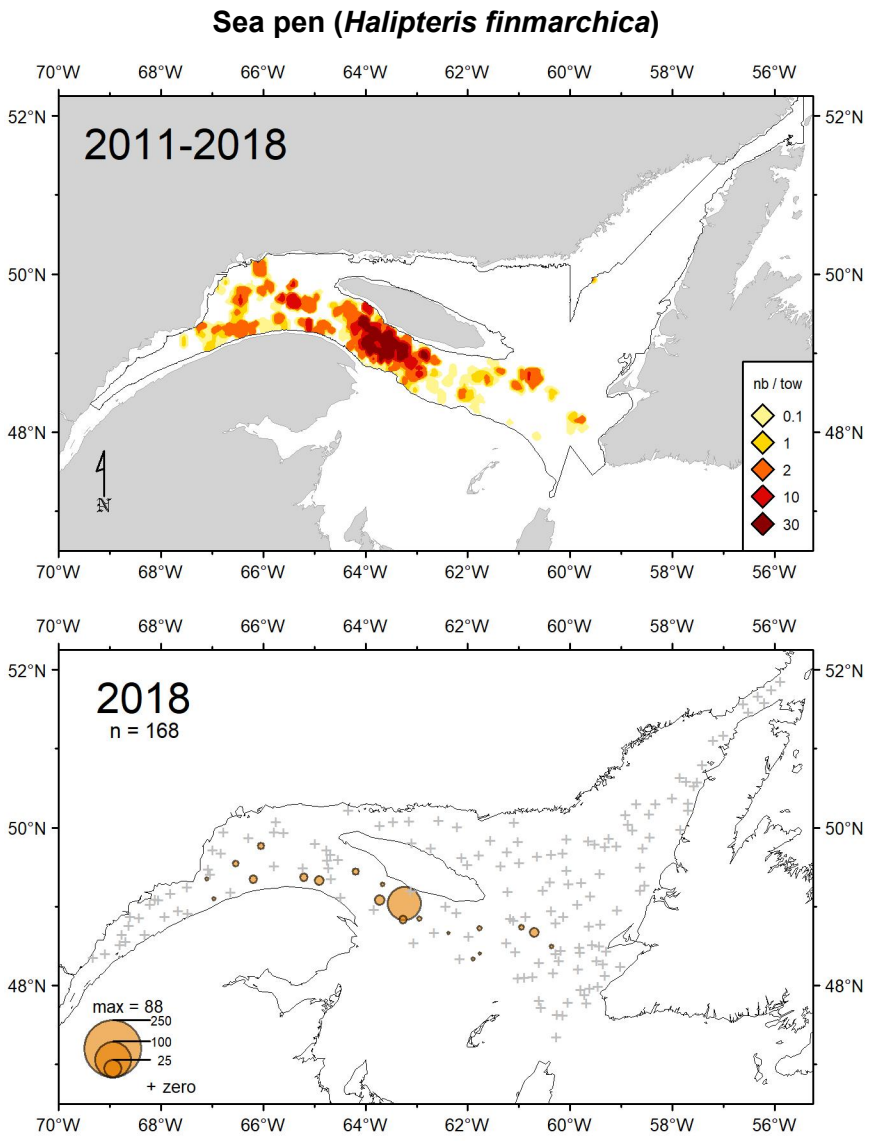

Figure 37. Sea pen Halipteris finmarchica catch rates (nb/15 minutes tow) distribution.

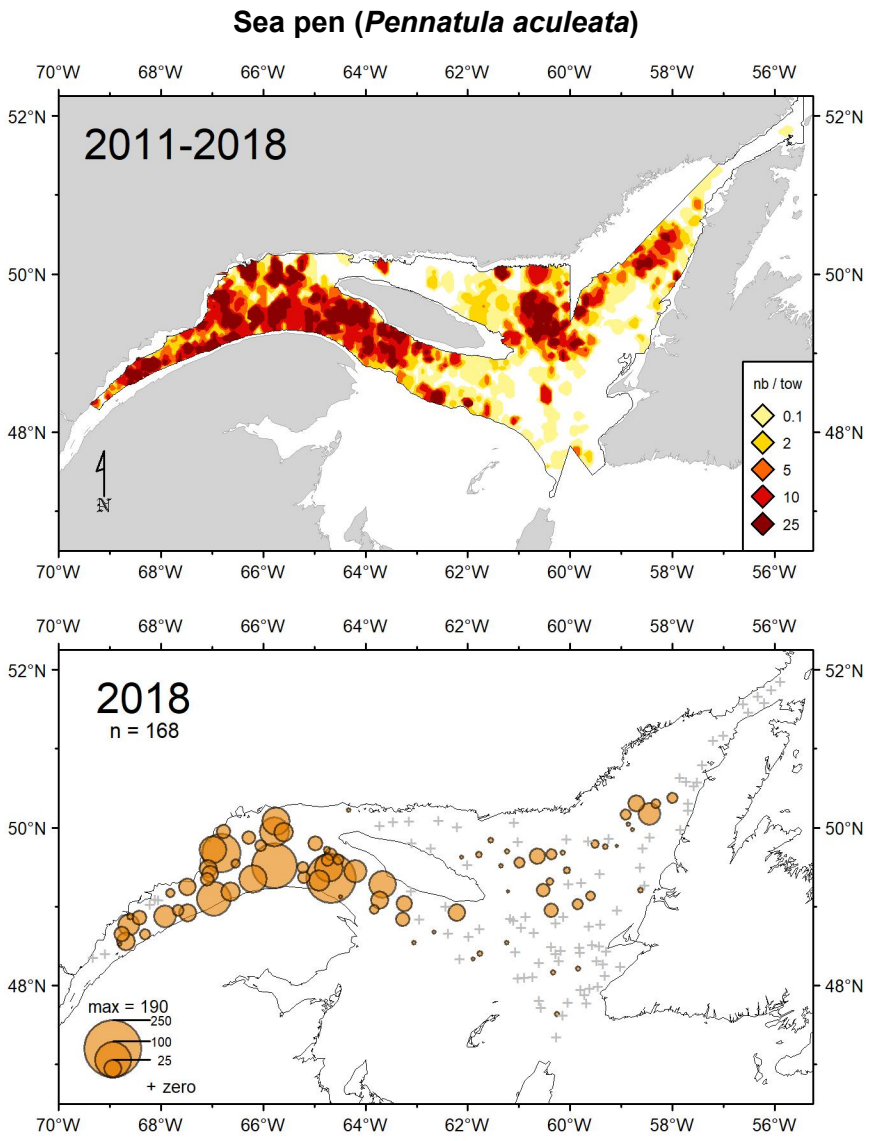

Figure 38. Sea pen Pennatula aculeata catch rates (nb/15 minutes tow) distribution.

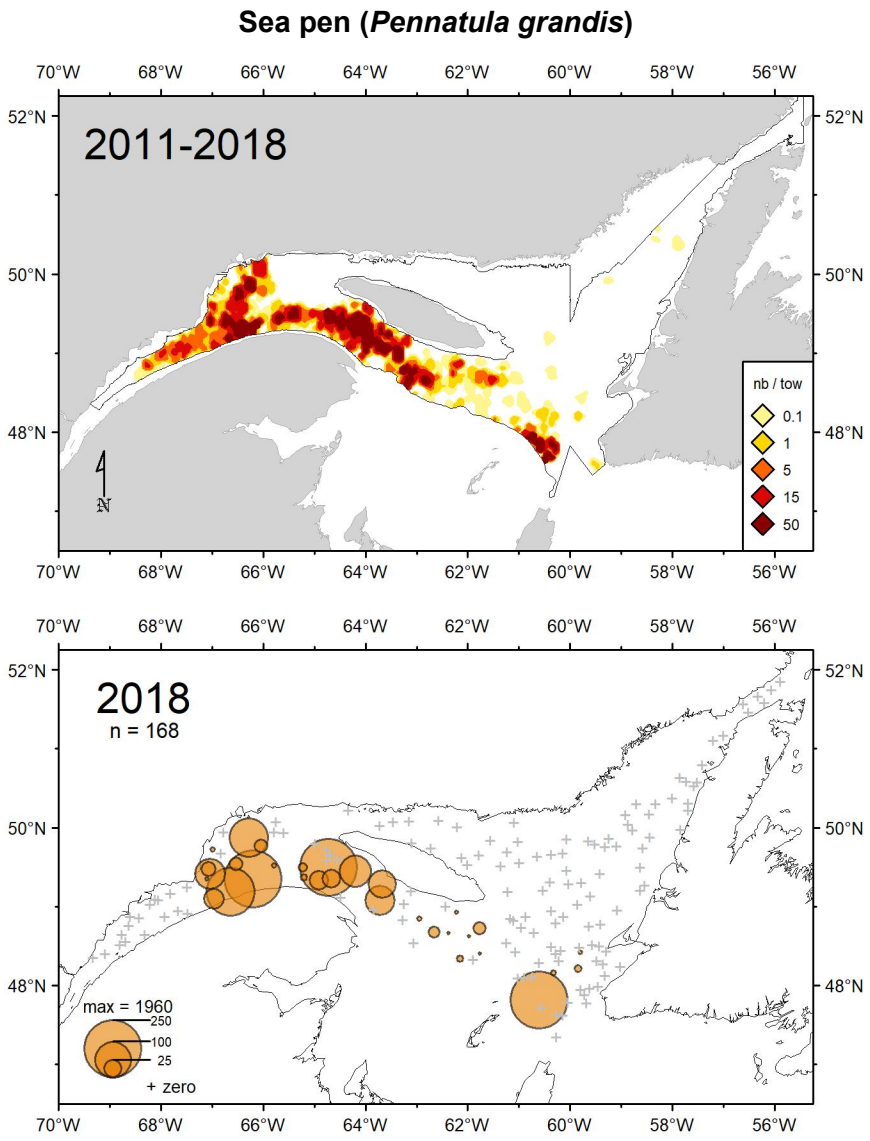

Figure 39. Sea pen Pennatula grandis catch rates (nb/15 minutes tow) distribution.

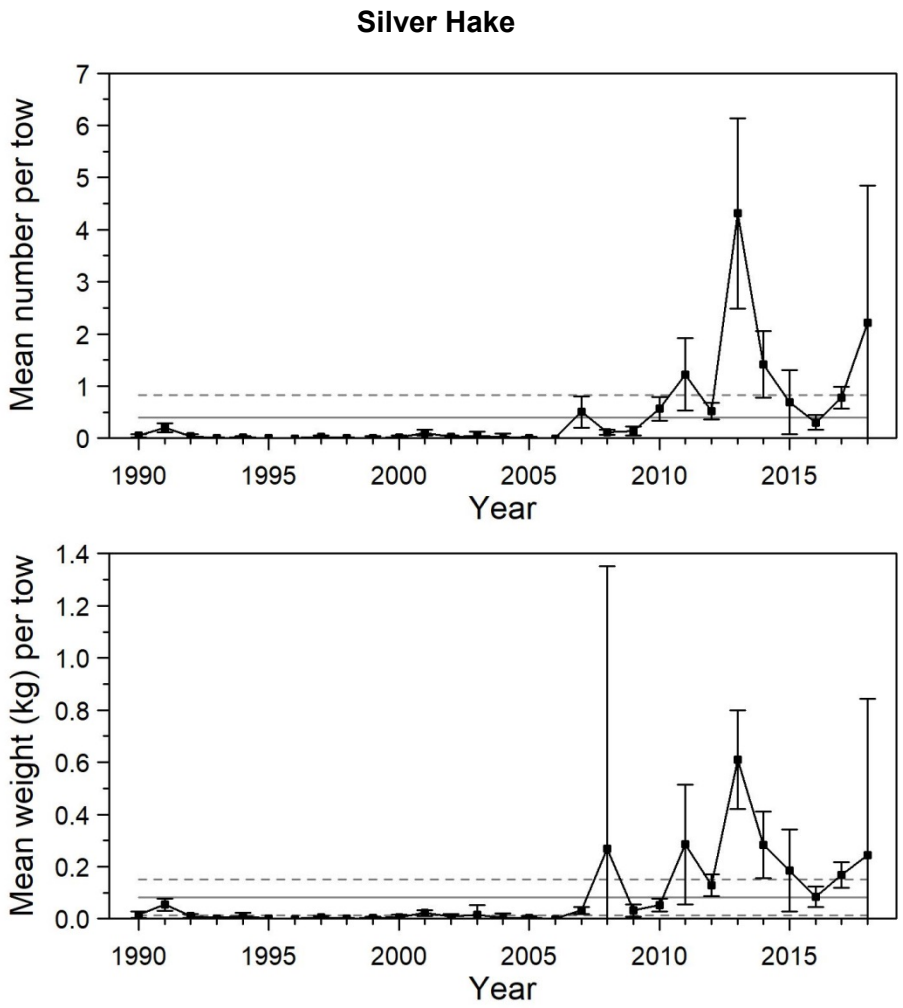

Figure 40. Mean numbers and mean weights per 15 minutes tow observed during the survey for Silver Hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

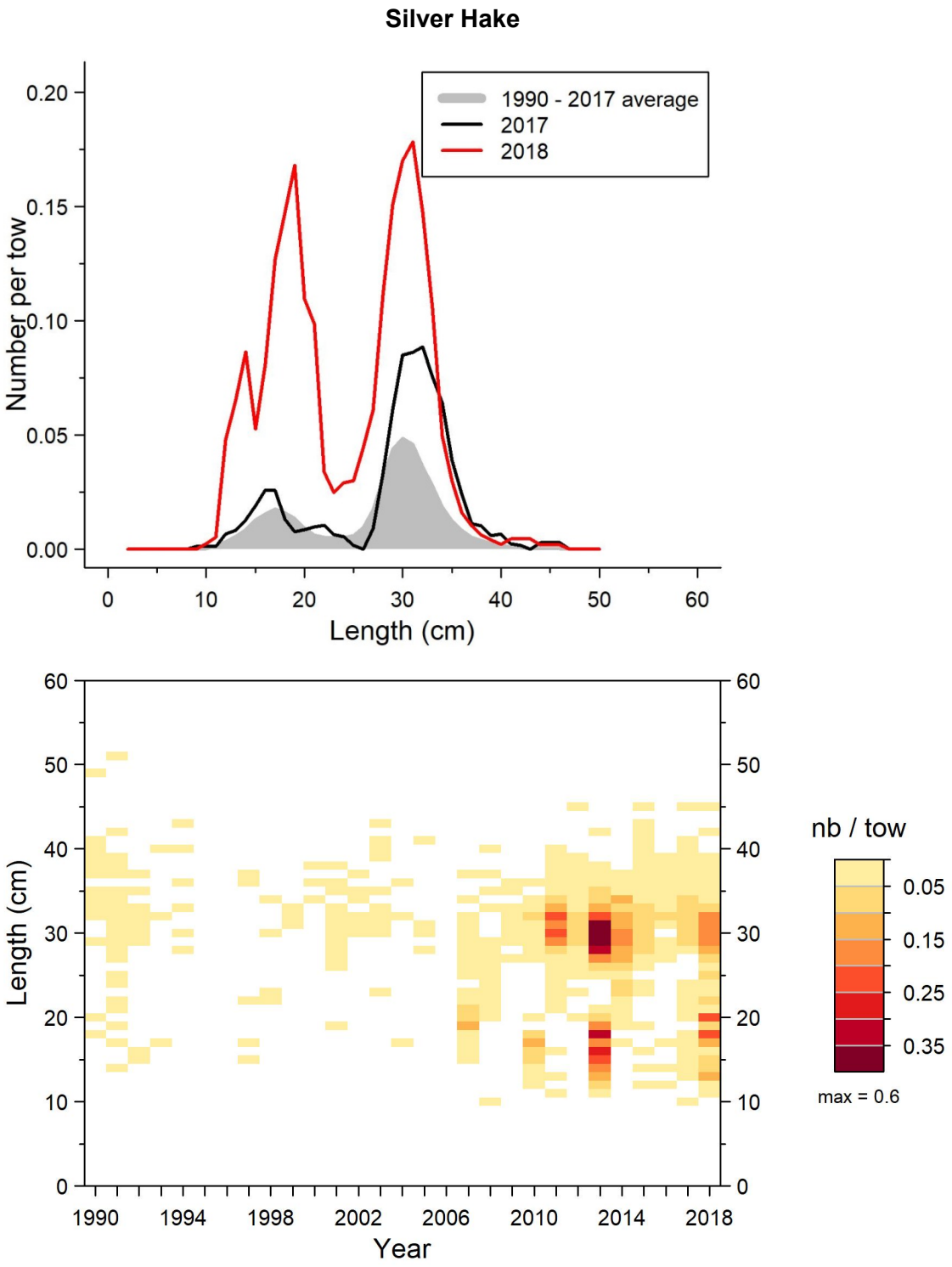

Figure 41. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Silver Hake in 4RST.

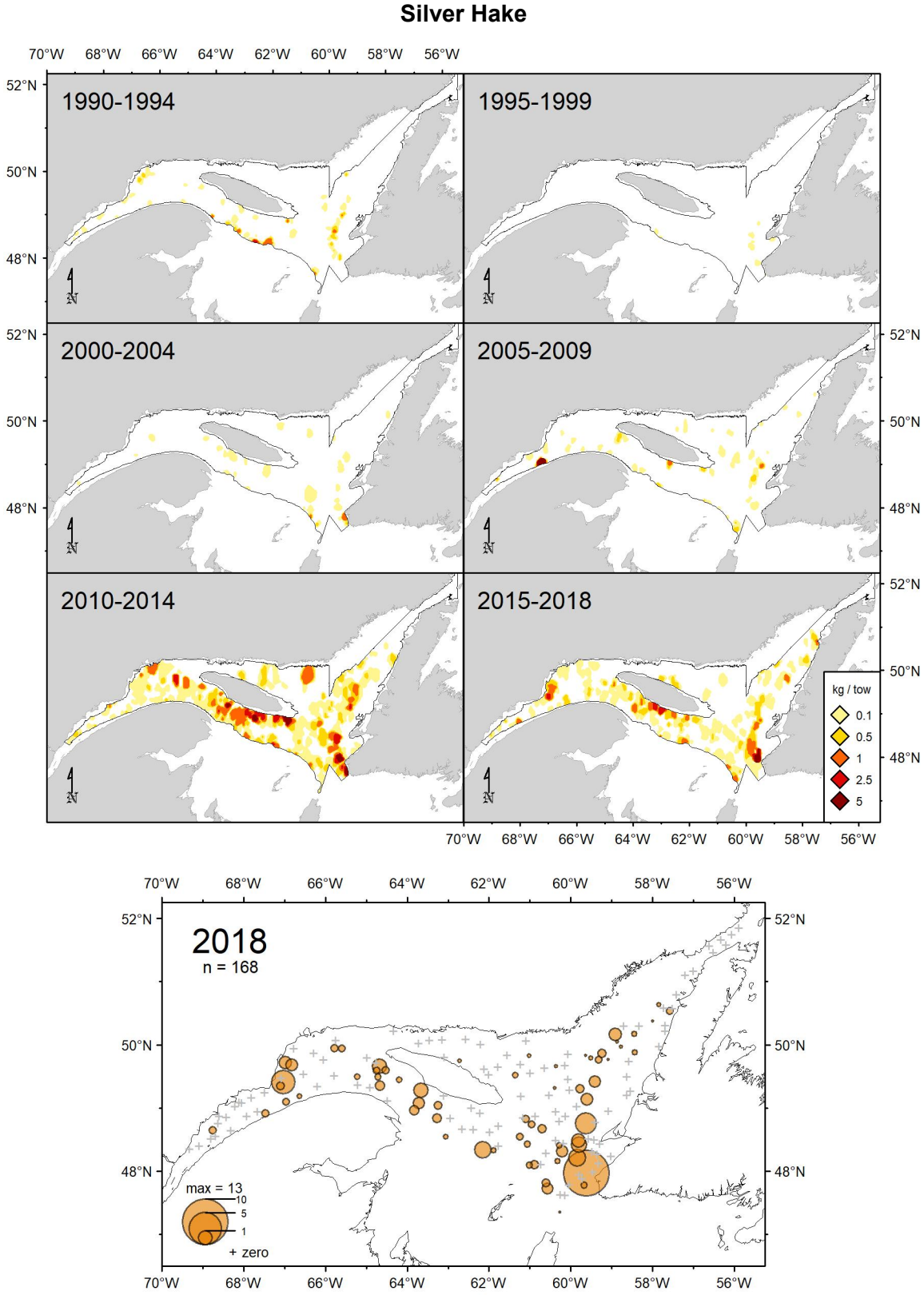

Figure 42. Silver Hake catch rates (kg/15 minutes tow) distribution.

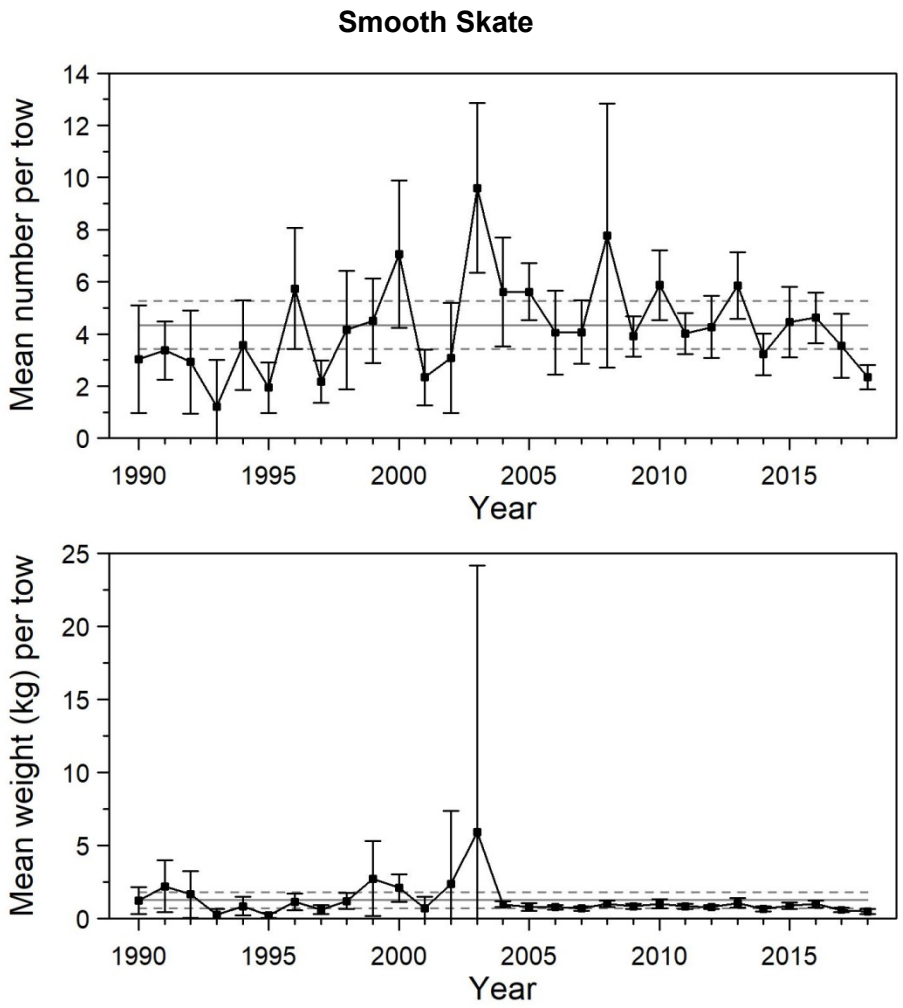

Figure 43. Mean numbers and mean weights per 15 minutes tow observed during the survey for Smooth Skate in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

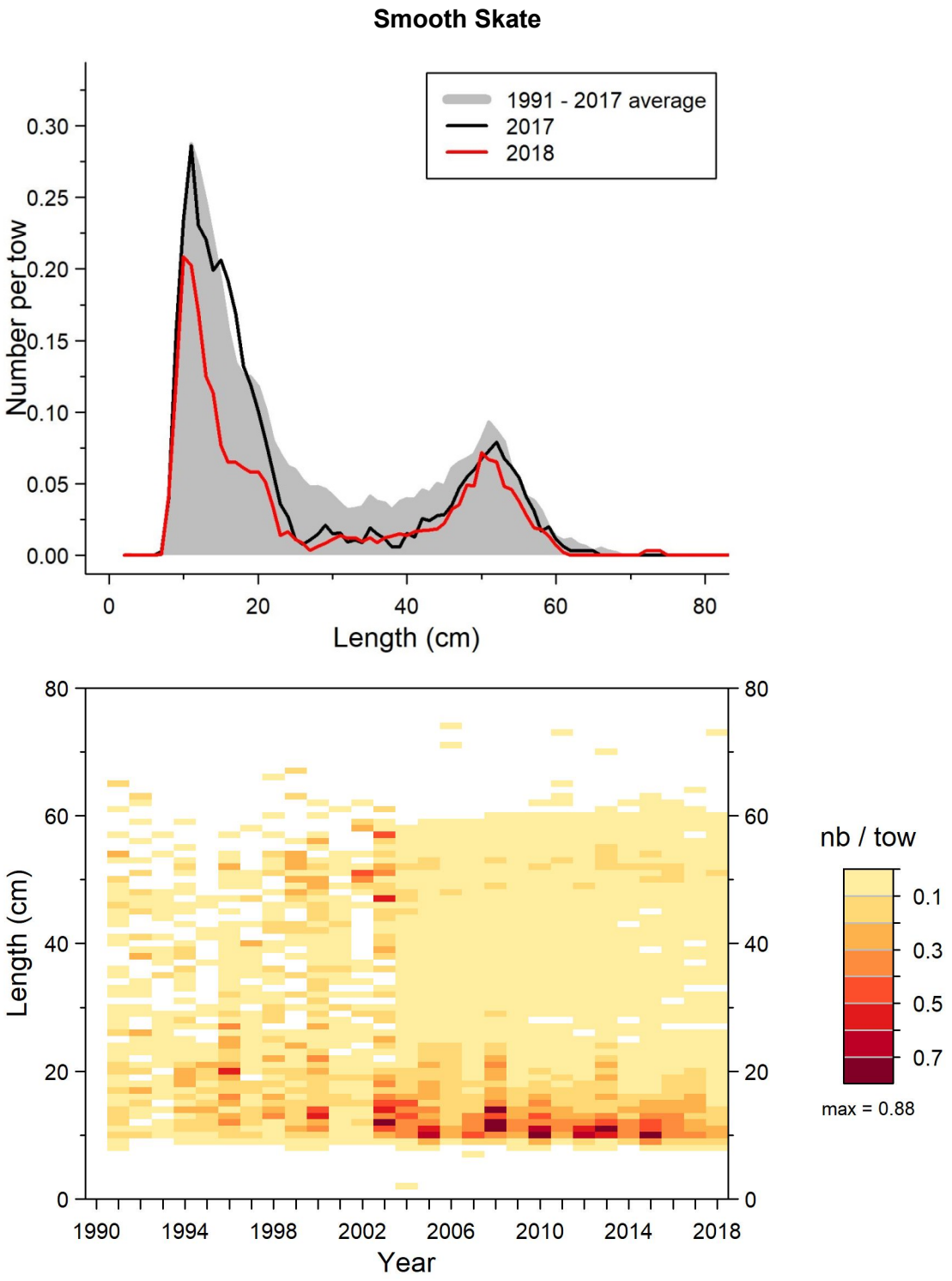

Figure 44. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Smooth Skate in 4RST.

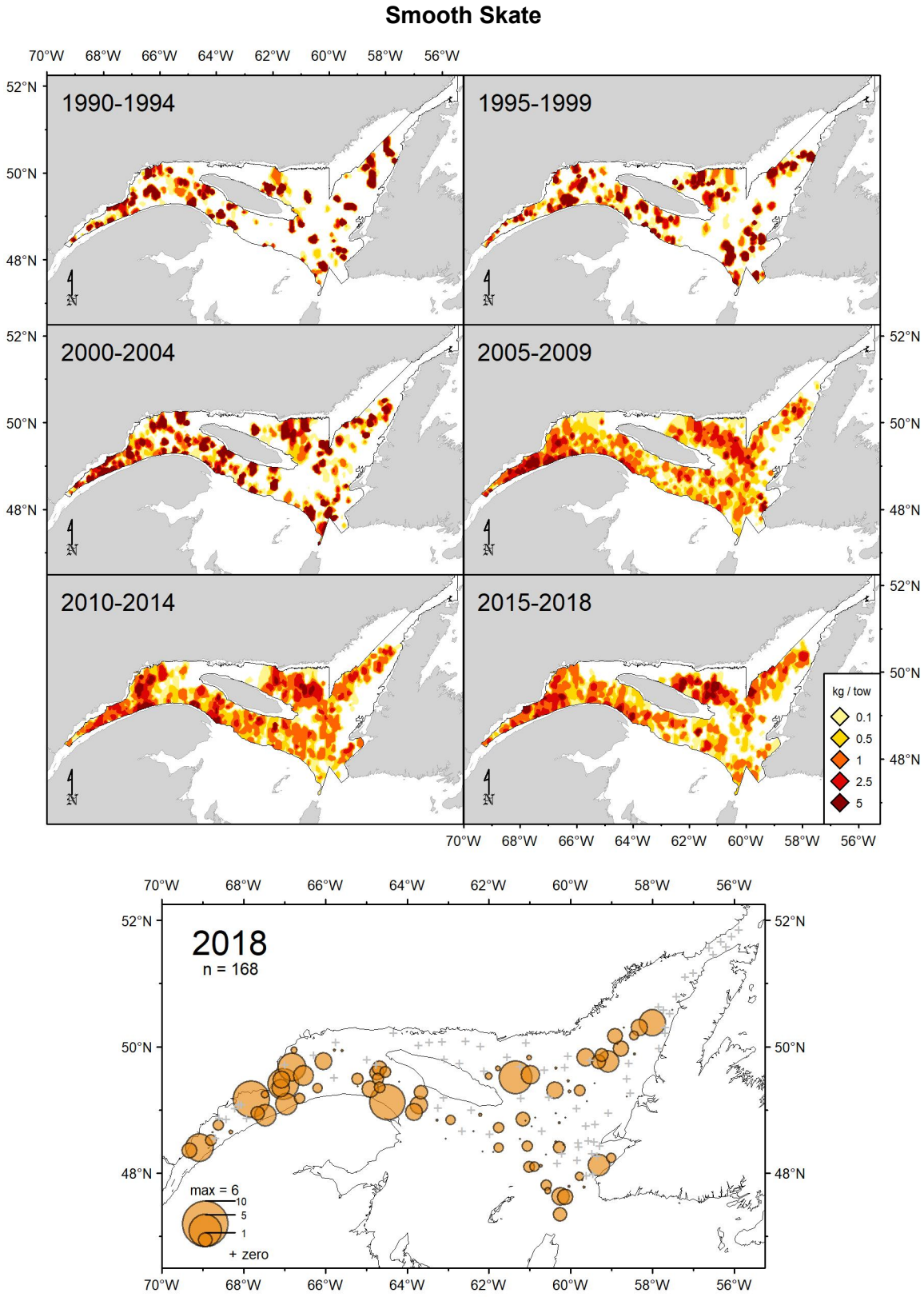

Figure 45. Smooth Skate catch rates (kg/15 minutes tow) distribution.

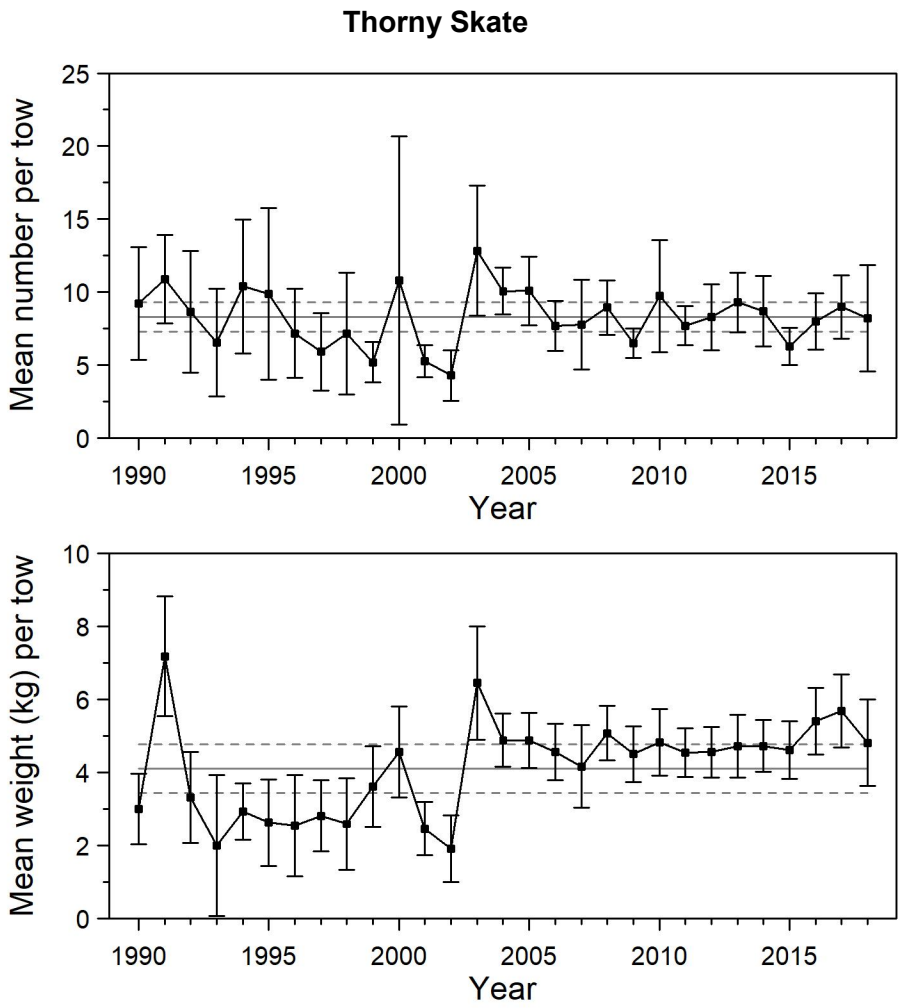

Figure 46. Mean numbers and mean weights per 15 minutes tow observed during the survey for Thorny Skate in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

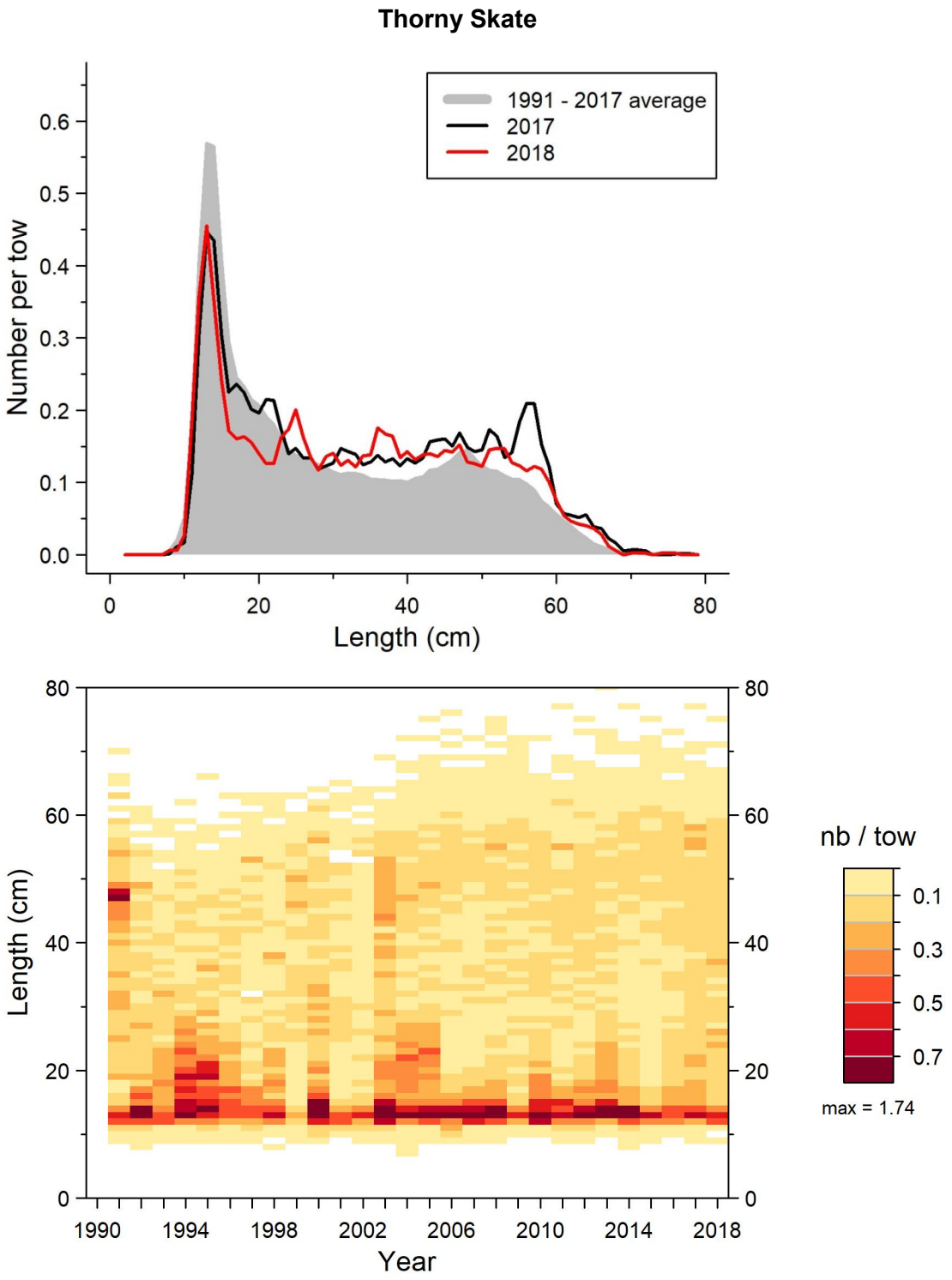

Figure 47. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Thorny Skate in 4RST.

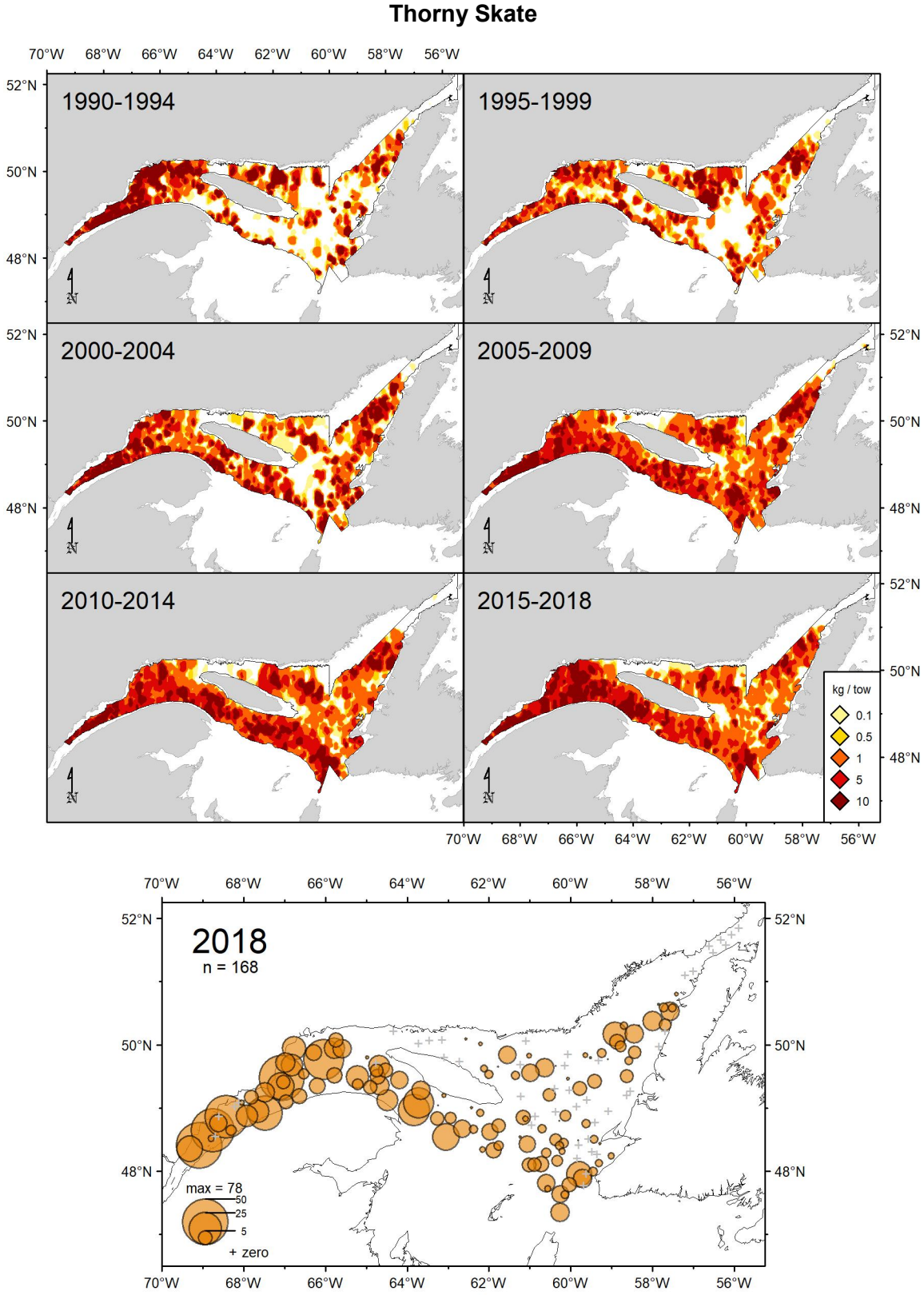

Figure 48. Thorny Skate catch rates (kg/15 minutes tow) distribution.

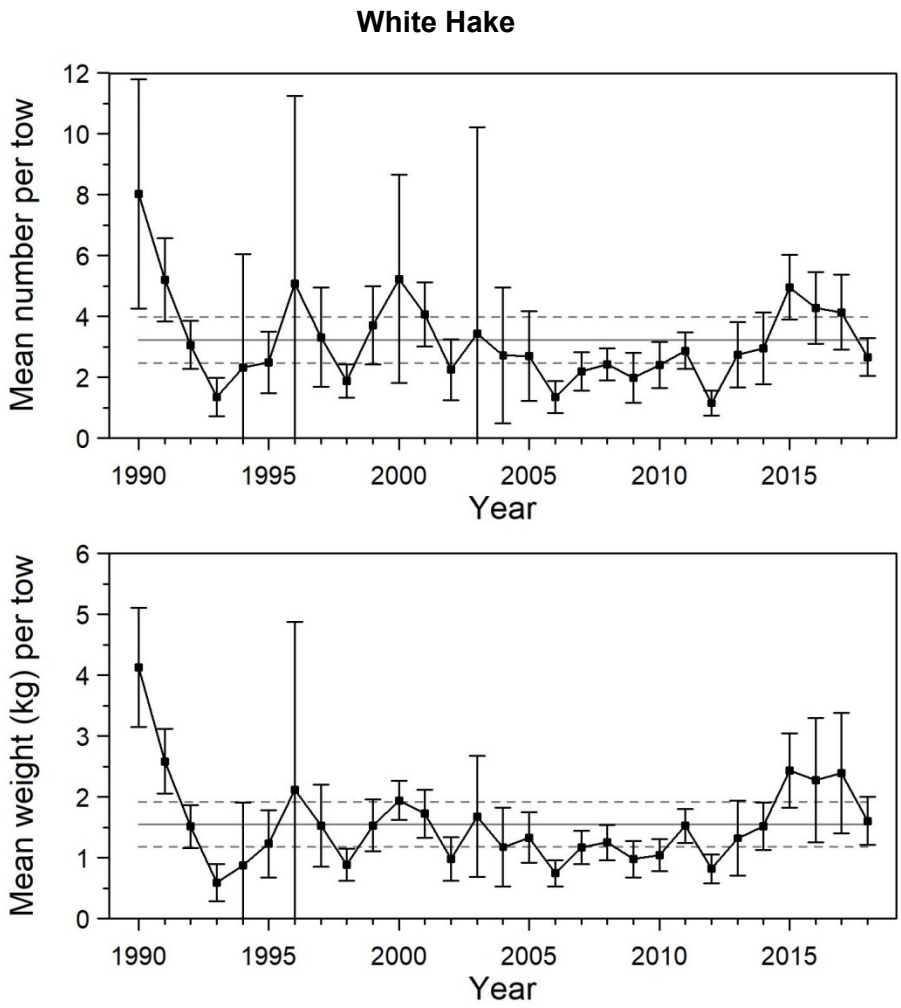

Figure 49. Mean numbers and mean weights per 15 minutes tow observed during the survey for White Hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

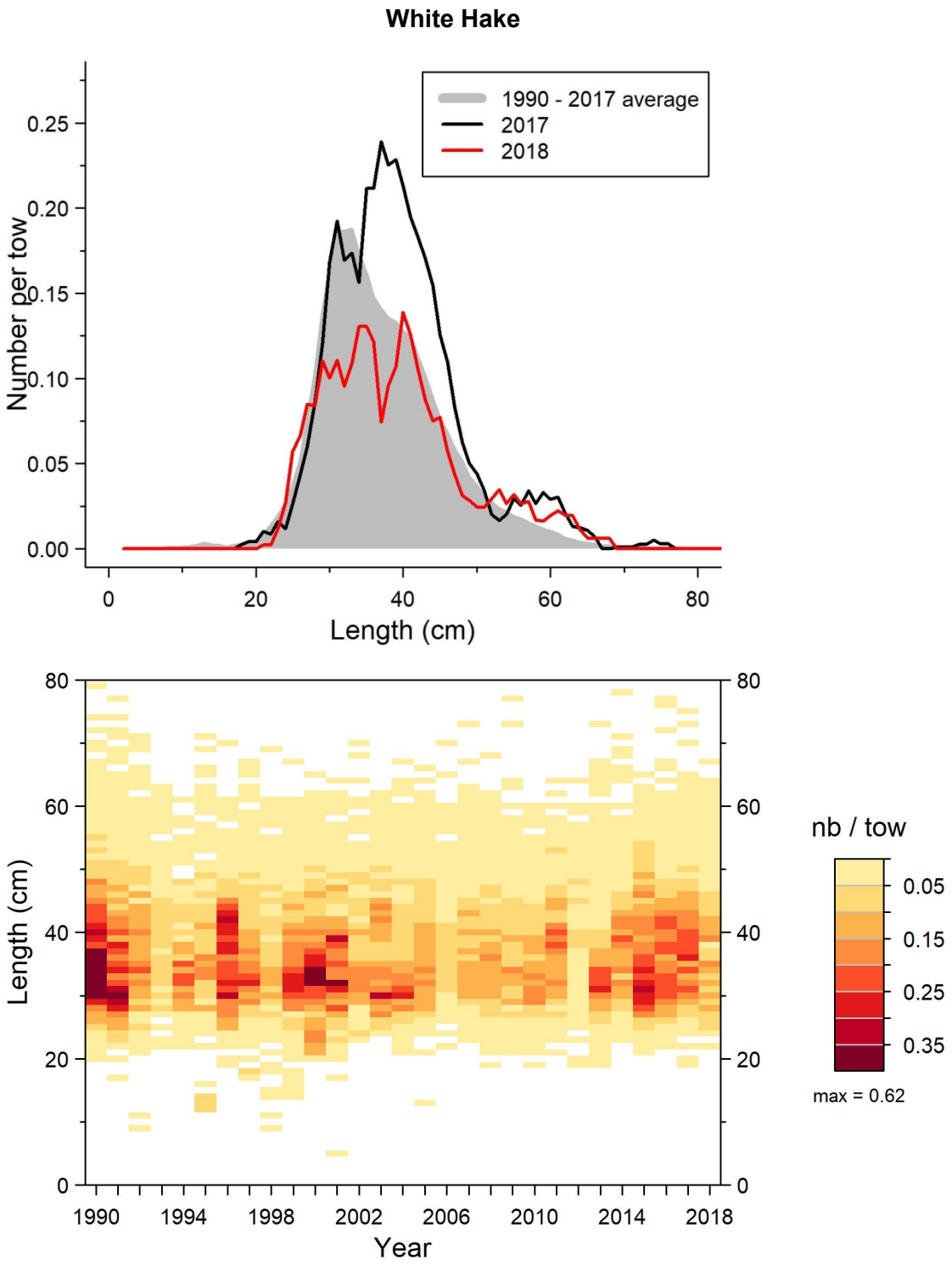

Figure 50. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for White Hake in 4RST.

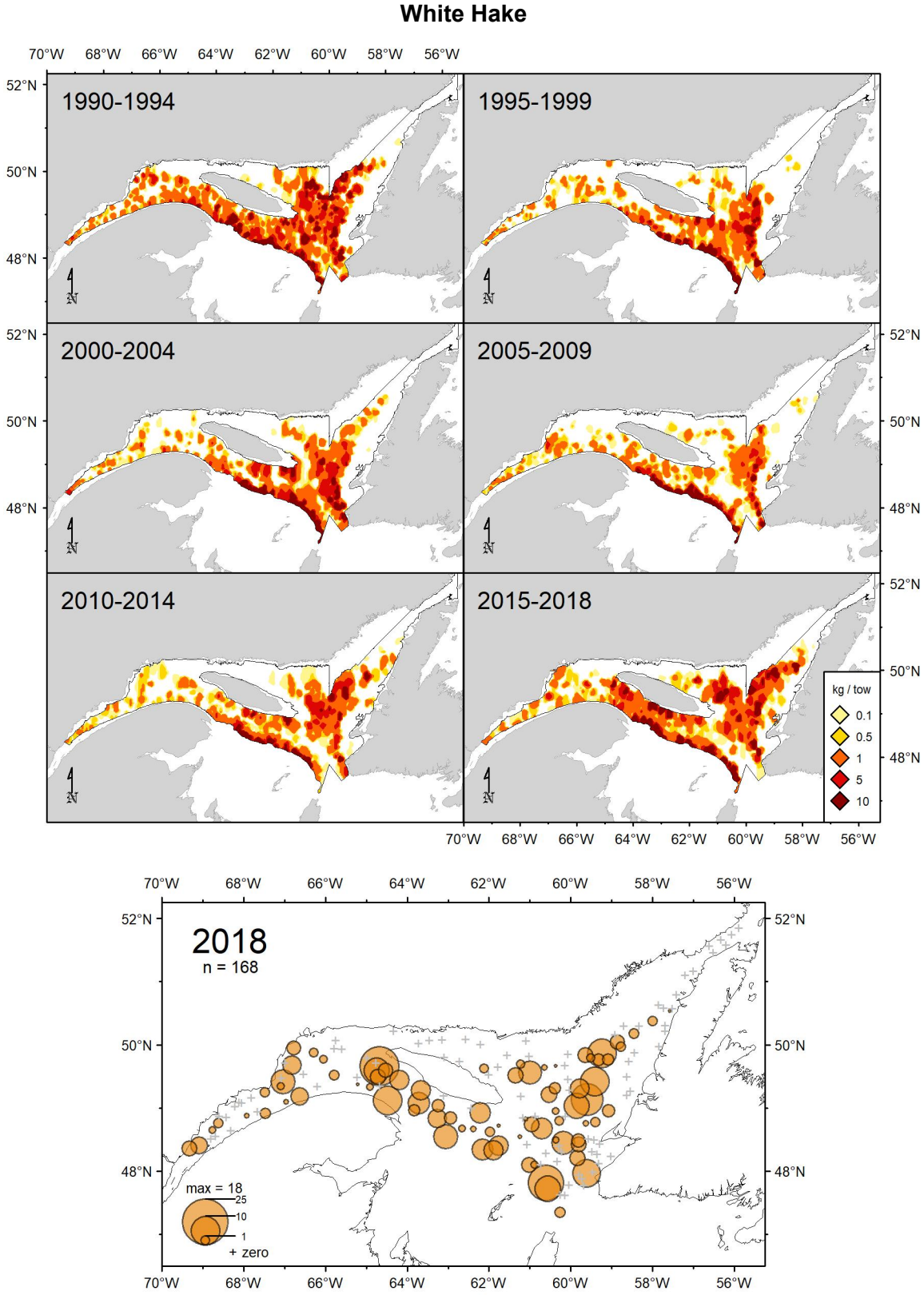

Figure 51. White Hake catch rates (kg/15 minutes tow) distribution.

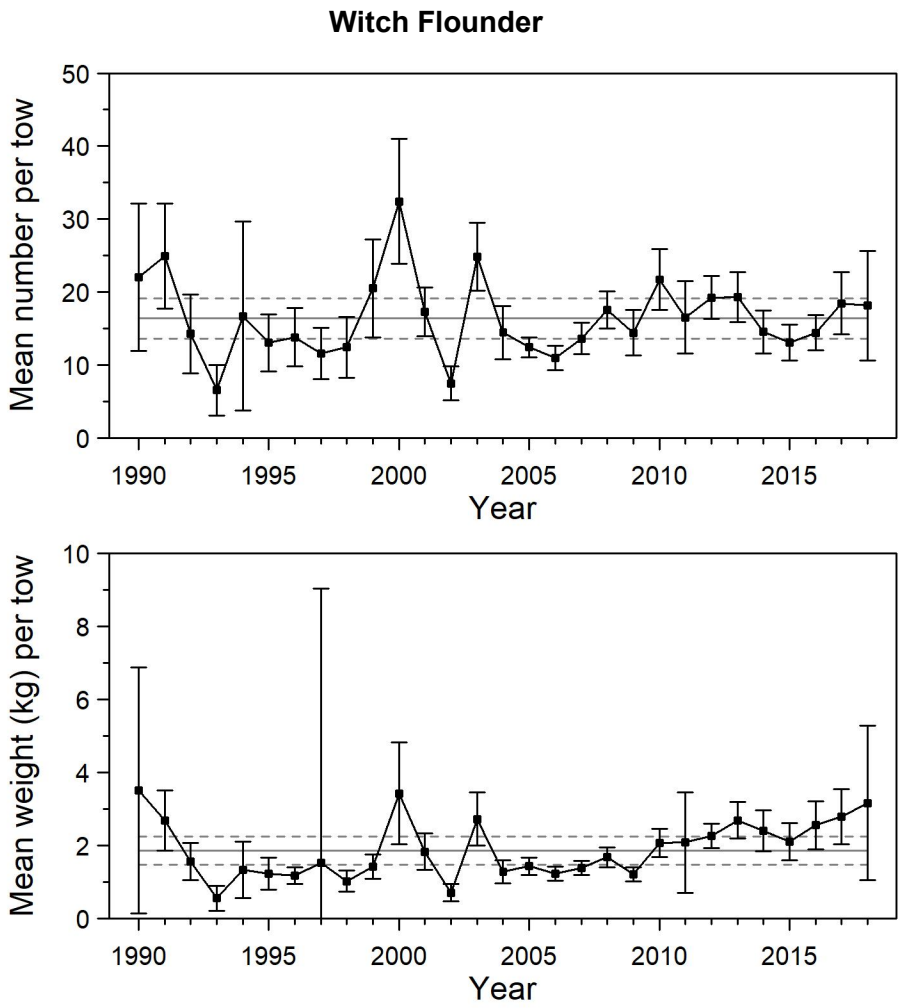

Figure 52. Mean numbers and mean weights per 15 minutes tow observed during the survey for Witch Flounder in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2017 period (solid line) and upper and lower reference (see text) limits (dashed lines).

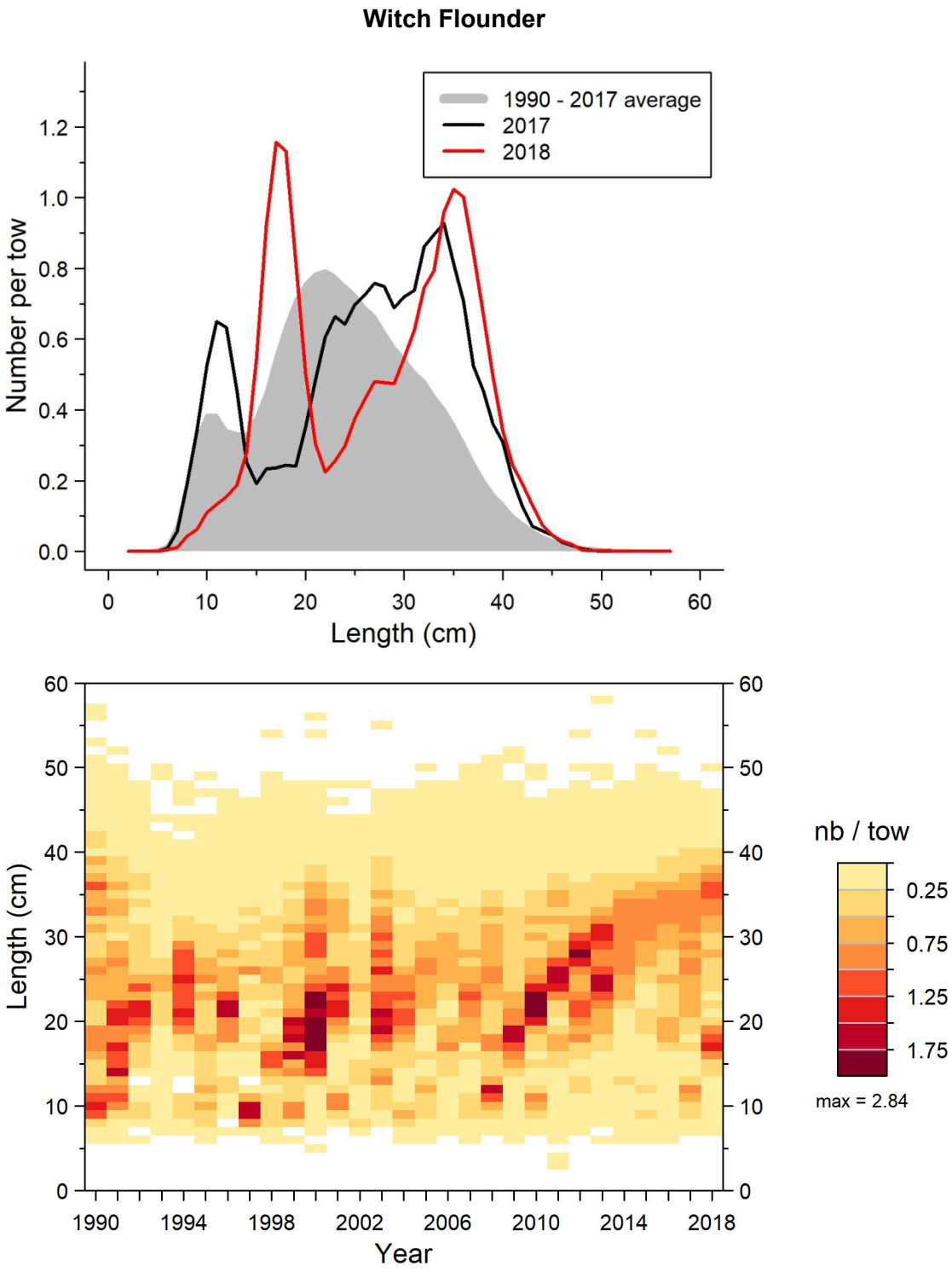

Figure 53. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Witch Flounder in 4RST.

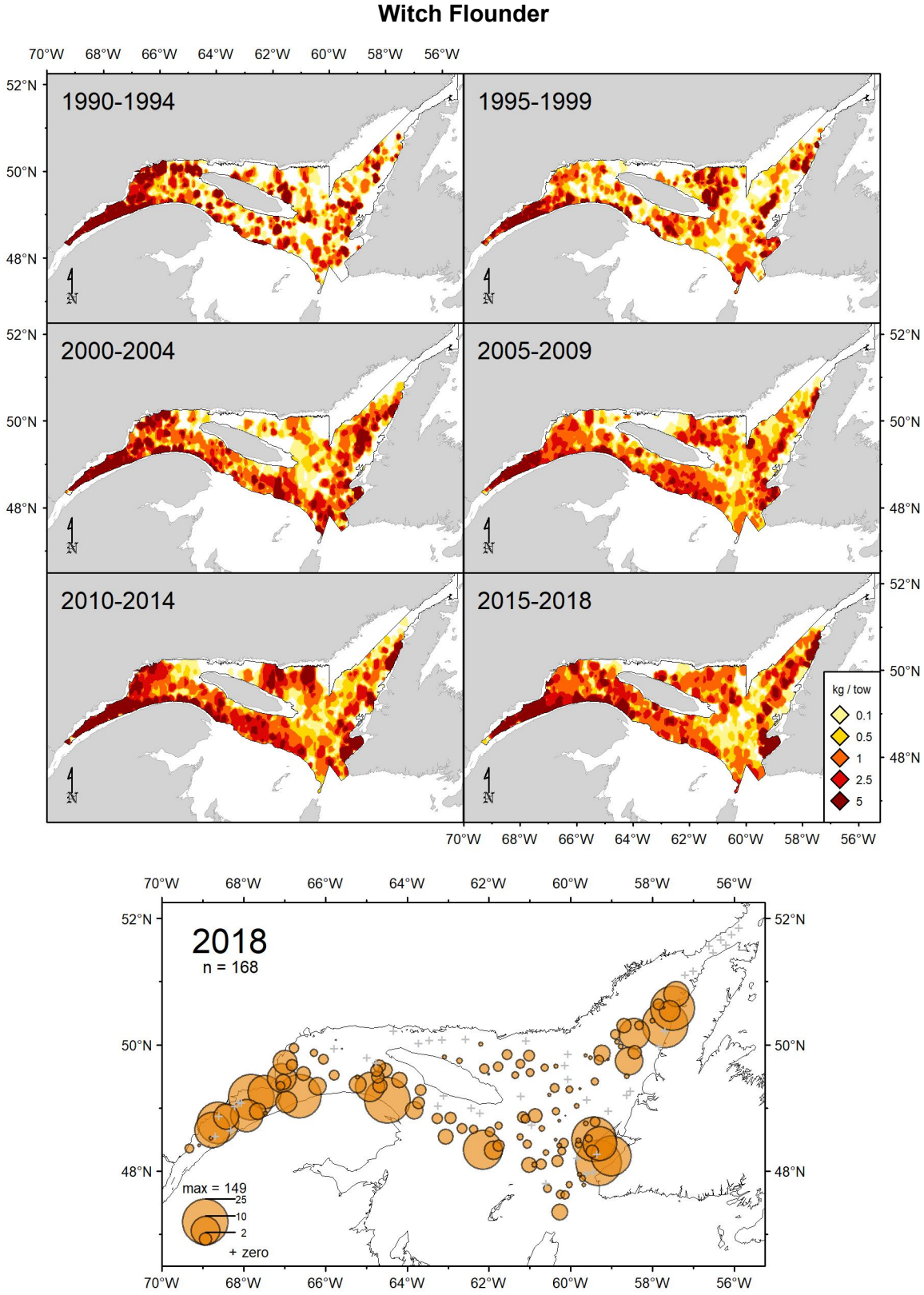

Figure 54. Witch Flounder catch rates (kg/15 minutes tow) distribution.

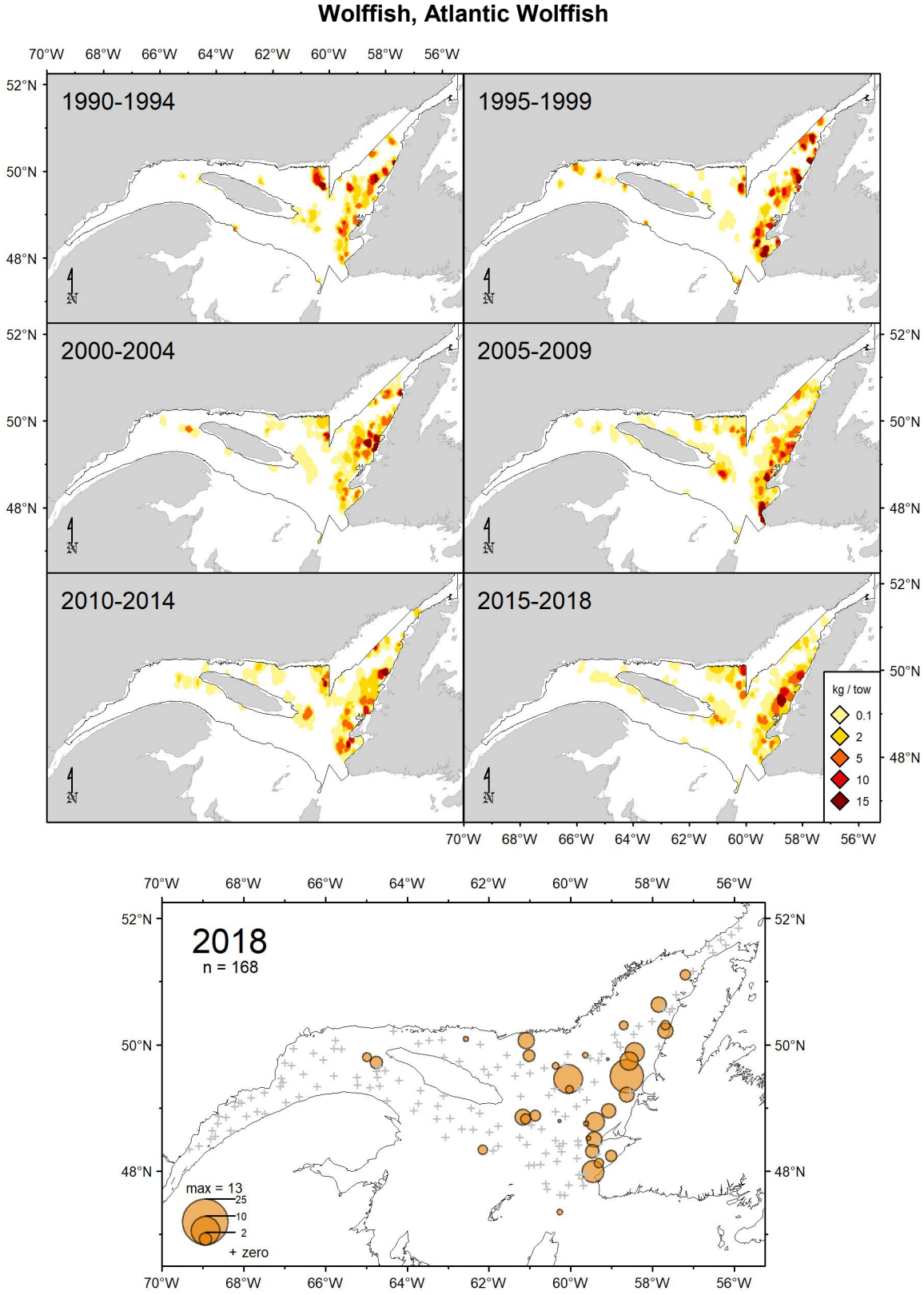

Figure 55. Atlantic Wolffish catch rates (kg/15 minutes tow) distribution.

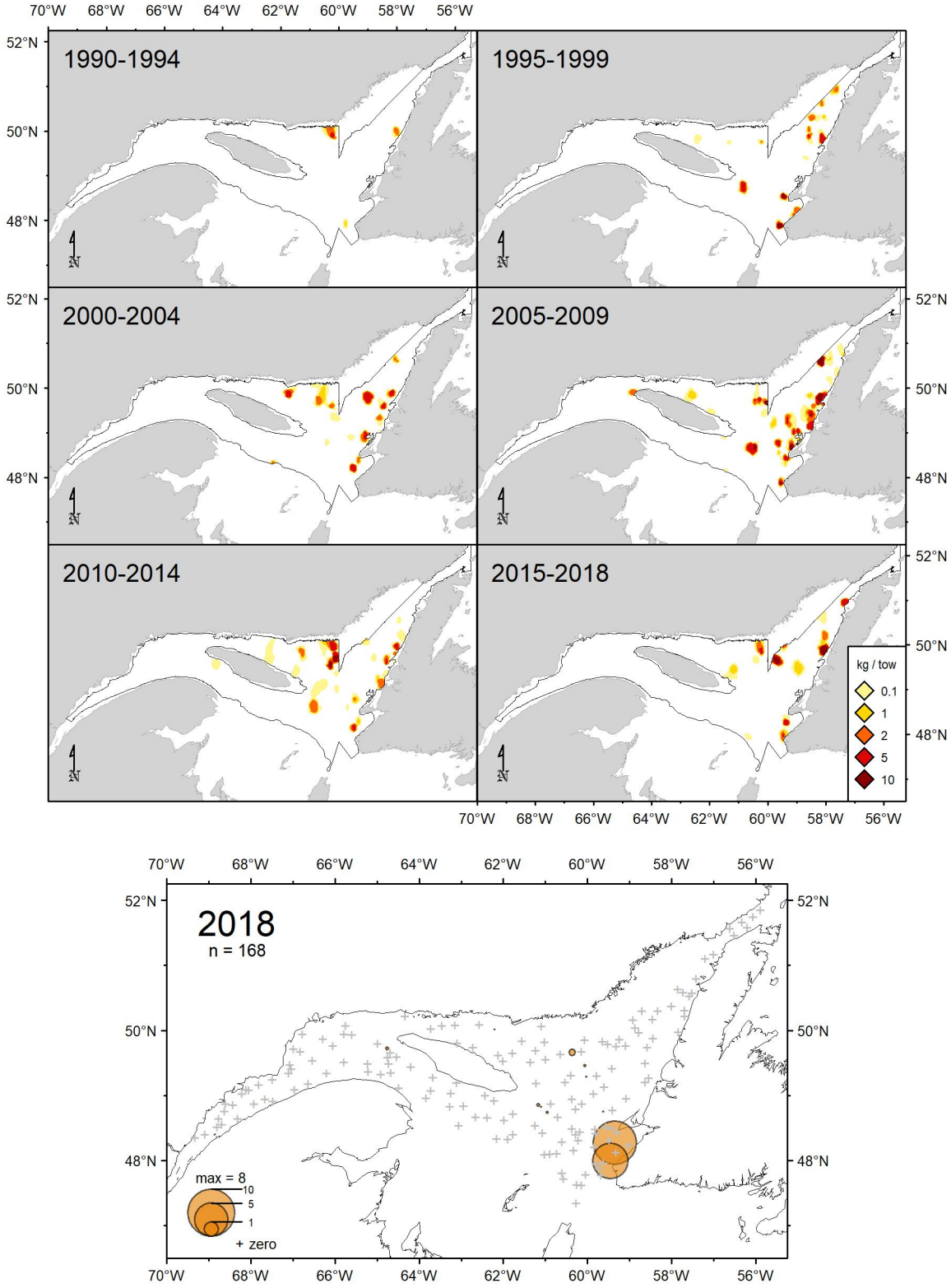

Figure 56. Spotted Wolffish catch rates (kg/15 minutes tow) distribution.

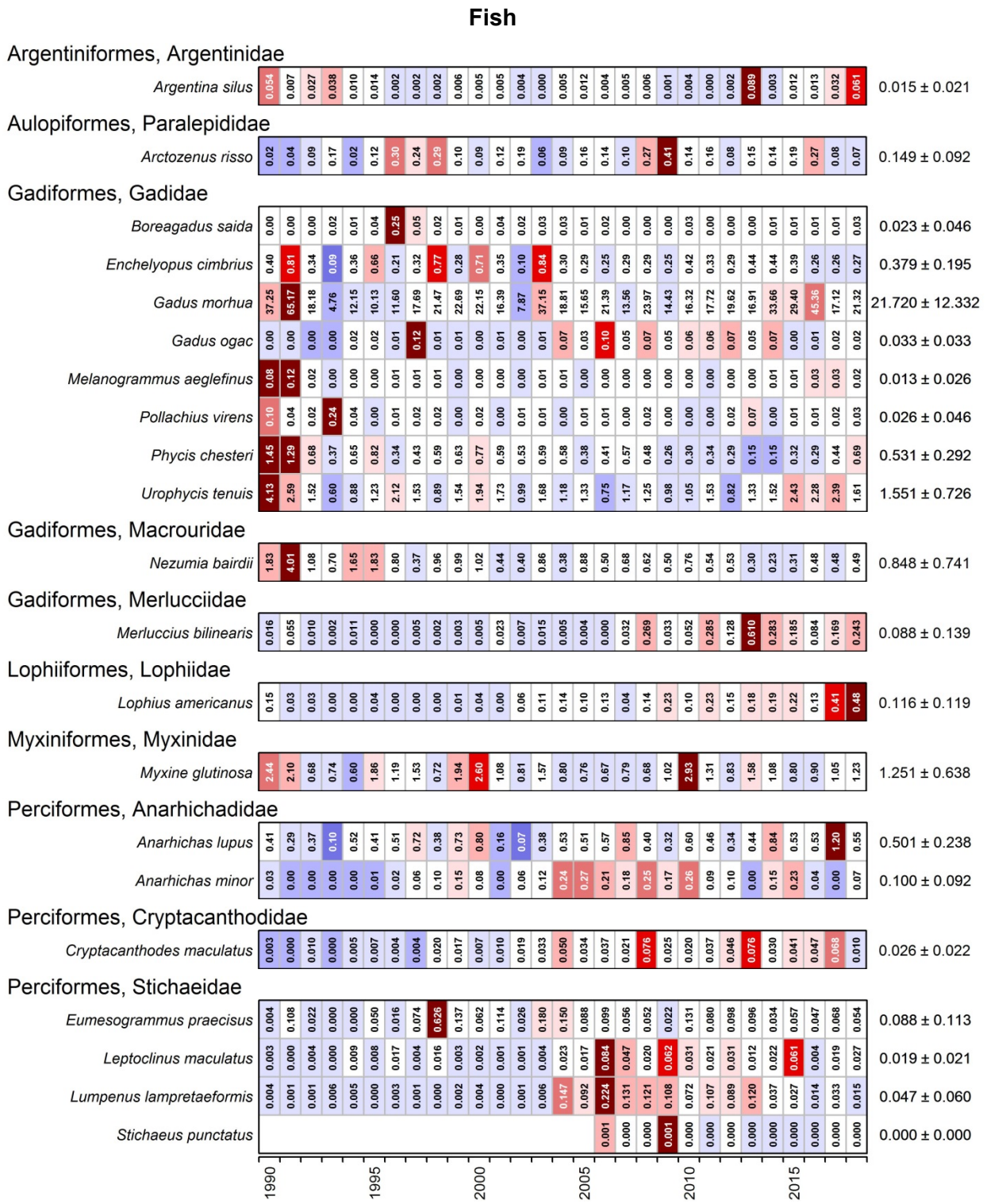

Figure 57. Average weight per 15-minute tow during the fish taxa survey. The colour code represents the anomaly value of the difference between the CPUE in a given year and the average CPUE in the time series divided by the standard deviation of this average for each taxon.

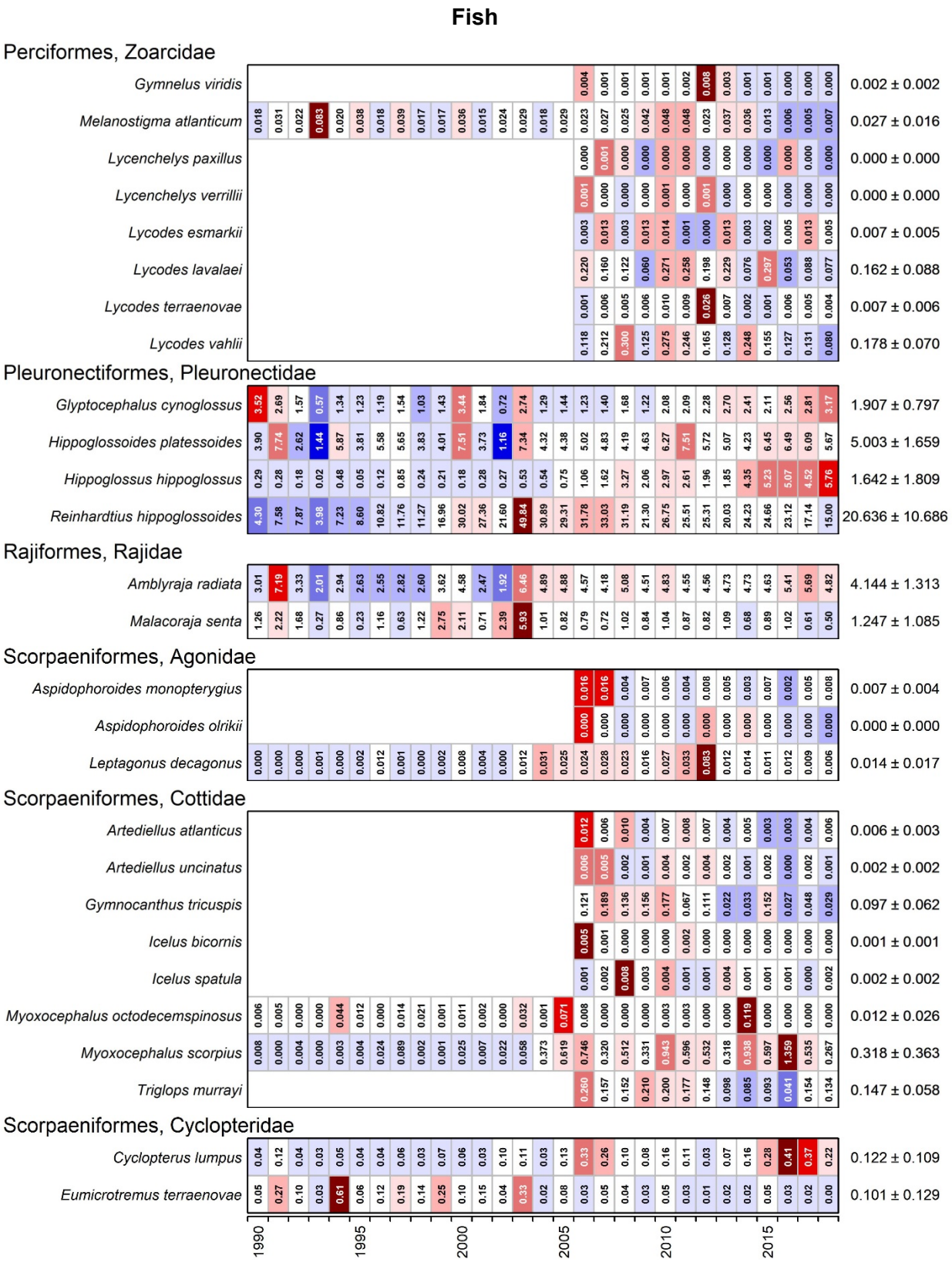

Figure 57. Continued.

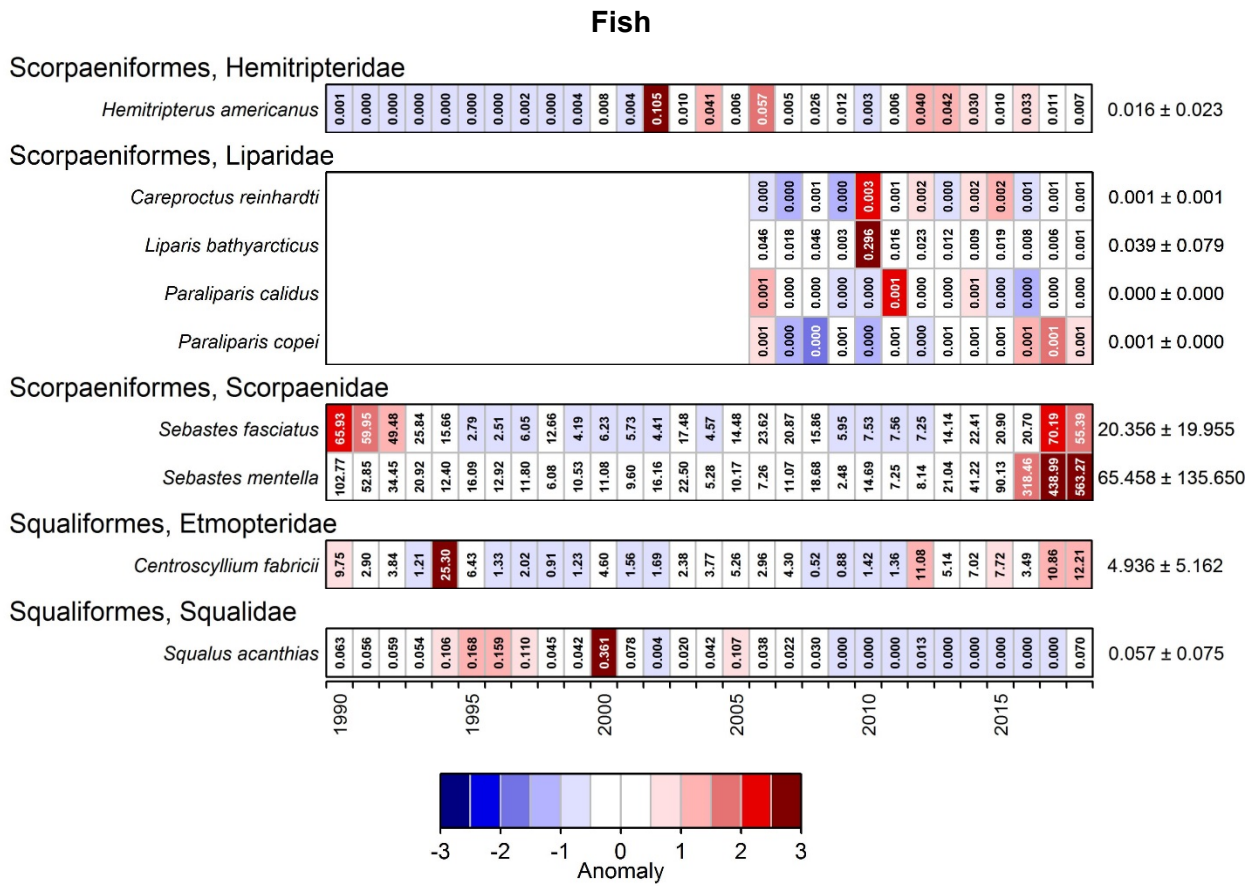

Figure 57. Continued.

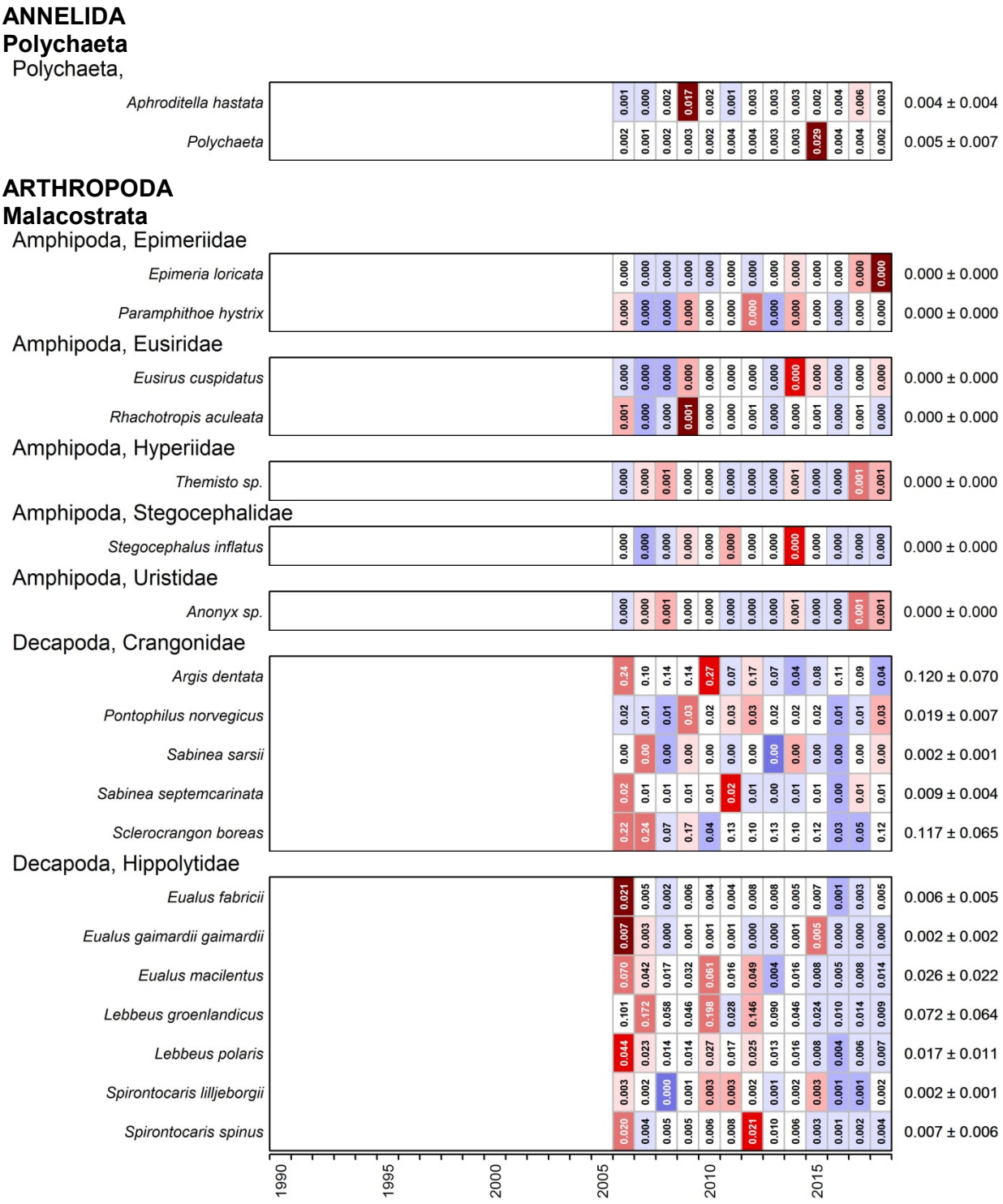

Figure 58. Average weight per 15-minute tow during the invertebrates. The colour code represents the anomaly value of the difference between the CPUE in a given year and the average CPUE in the time series divided by the standard deviation of this average for each taxon.

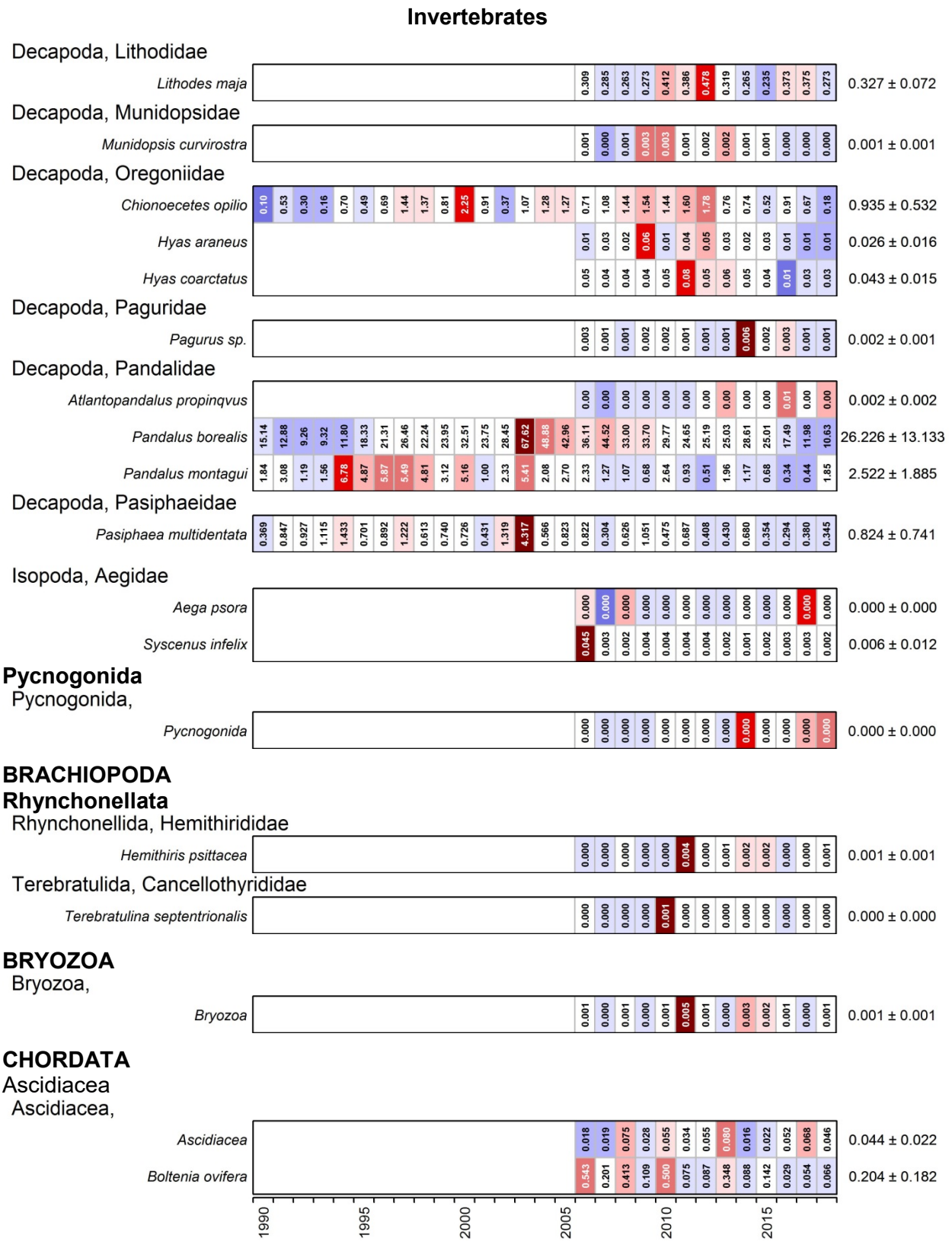

Figure 58. Continued.

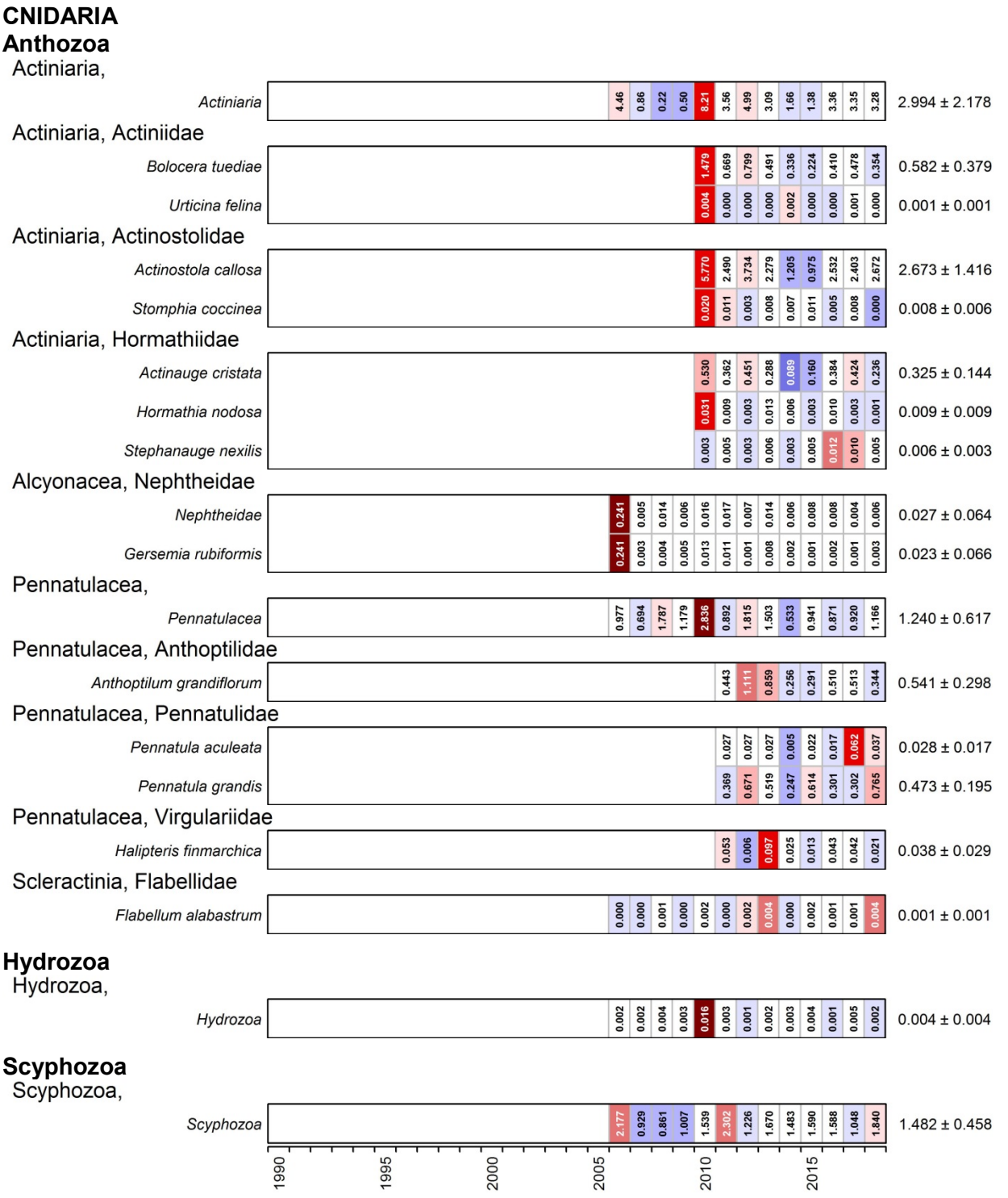

Figure 58. Continued.

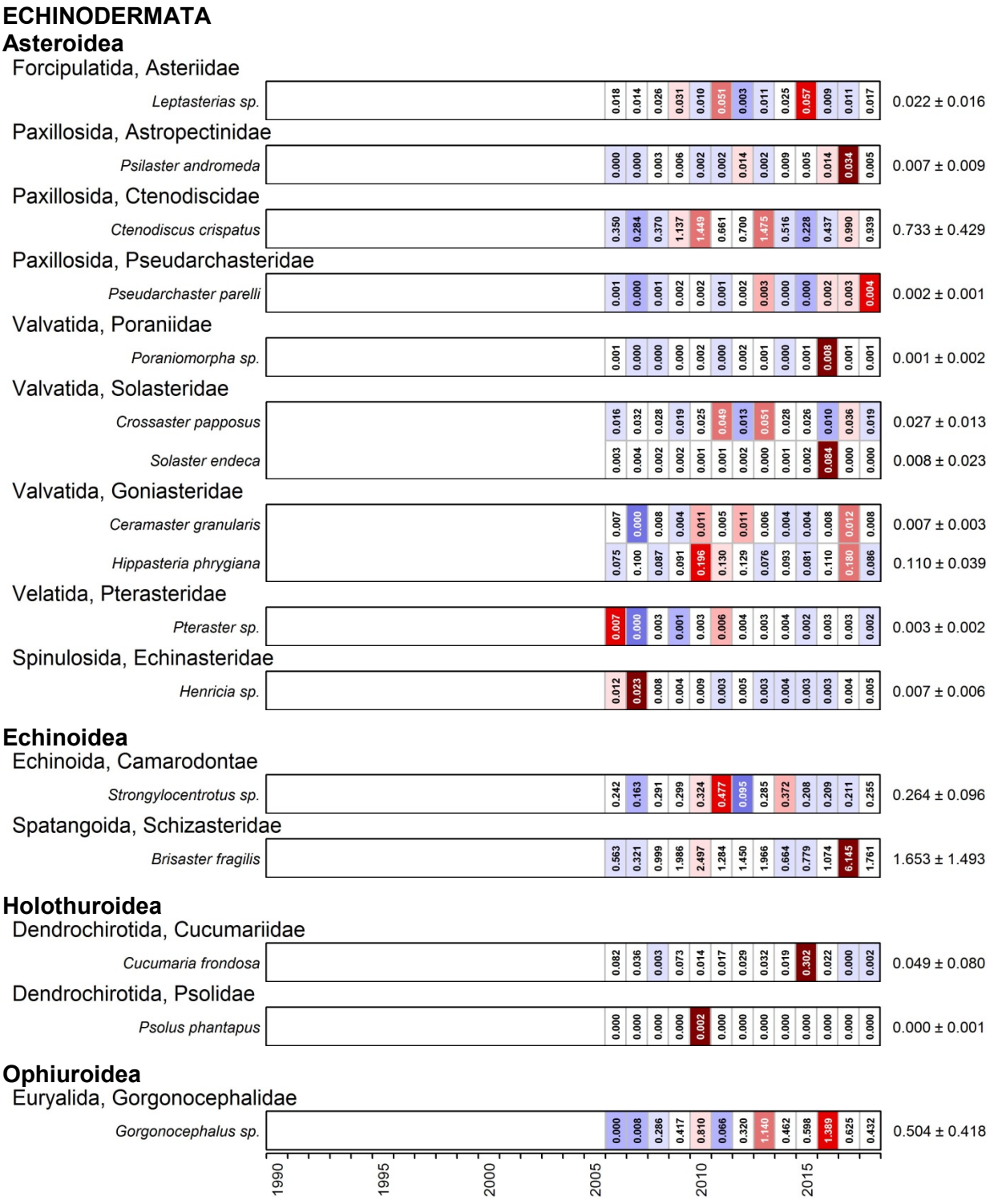

Figure 58. Continued.

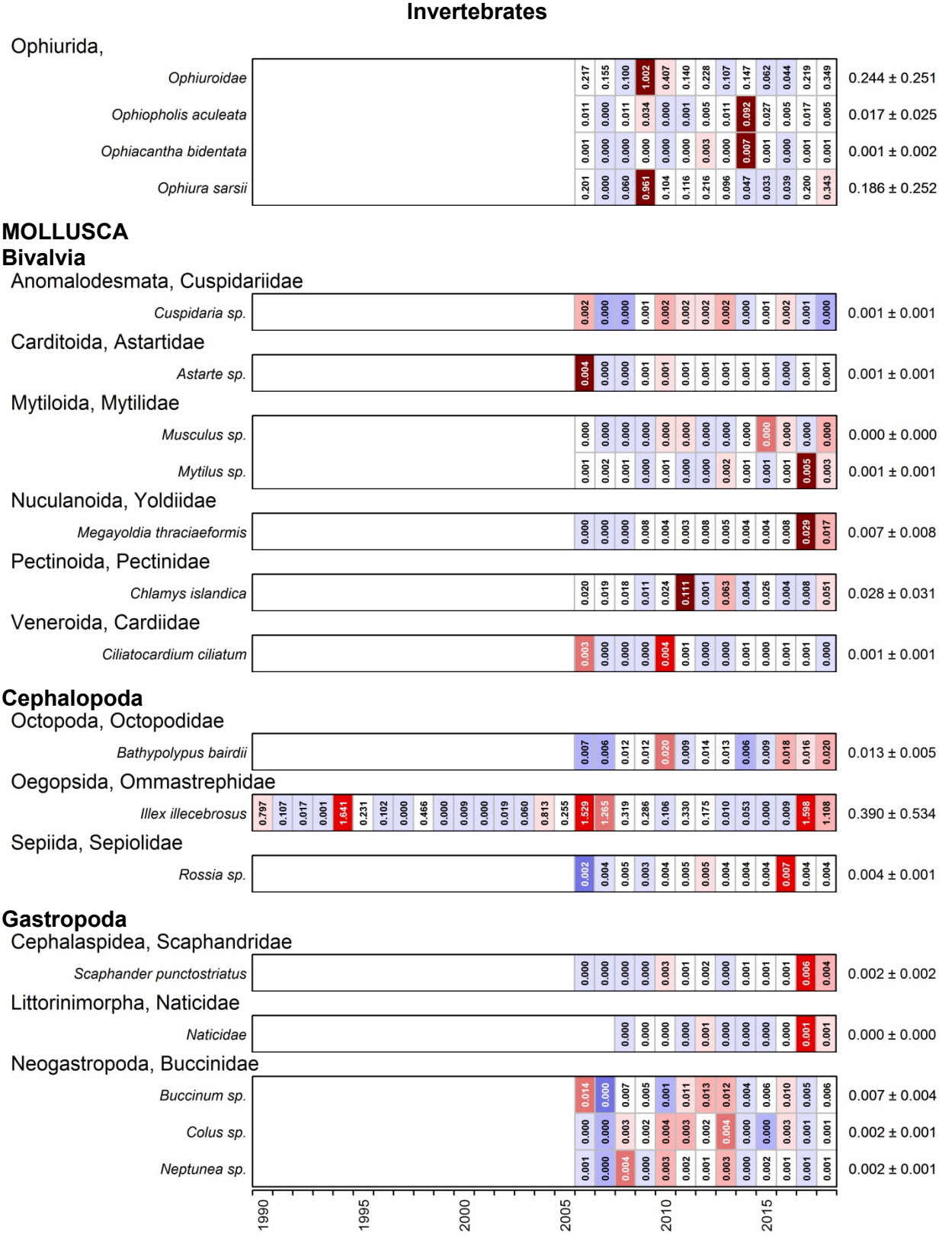

Figure 58. Continued.

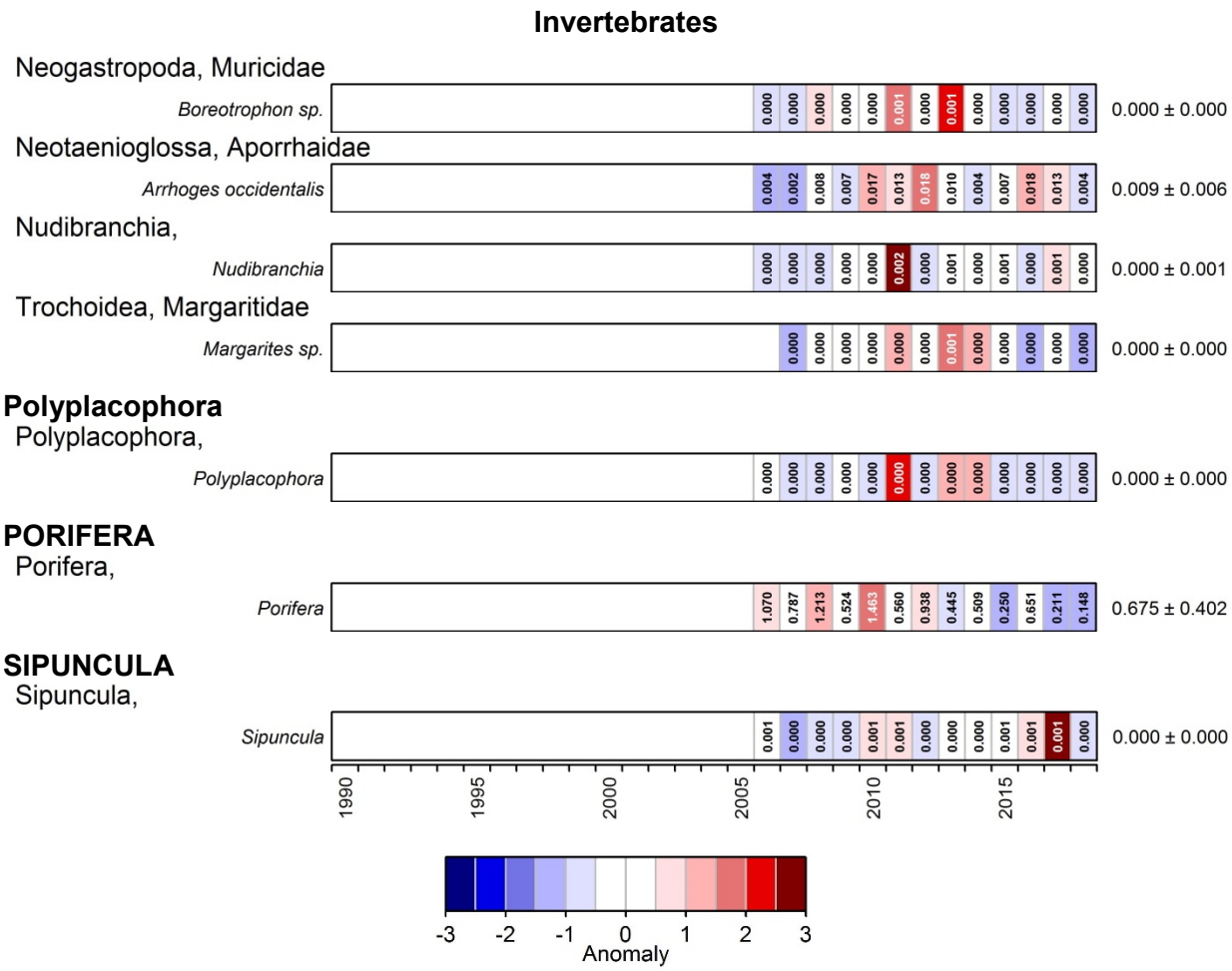

Figure 58. Continued.

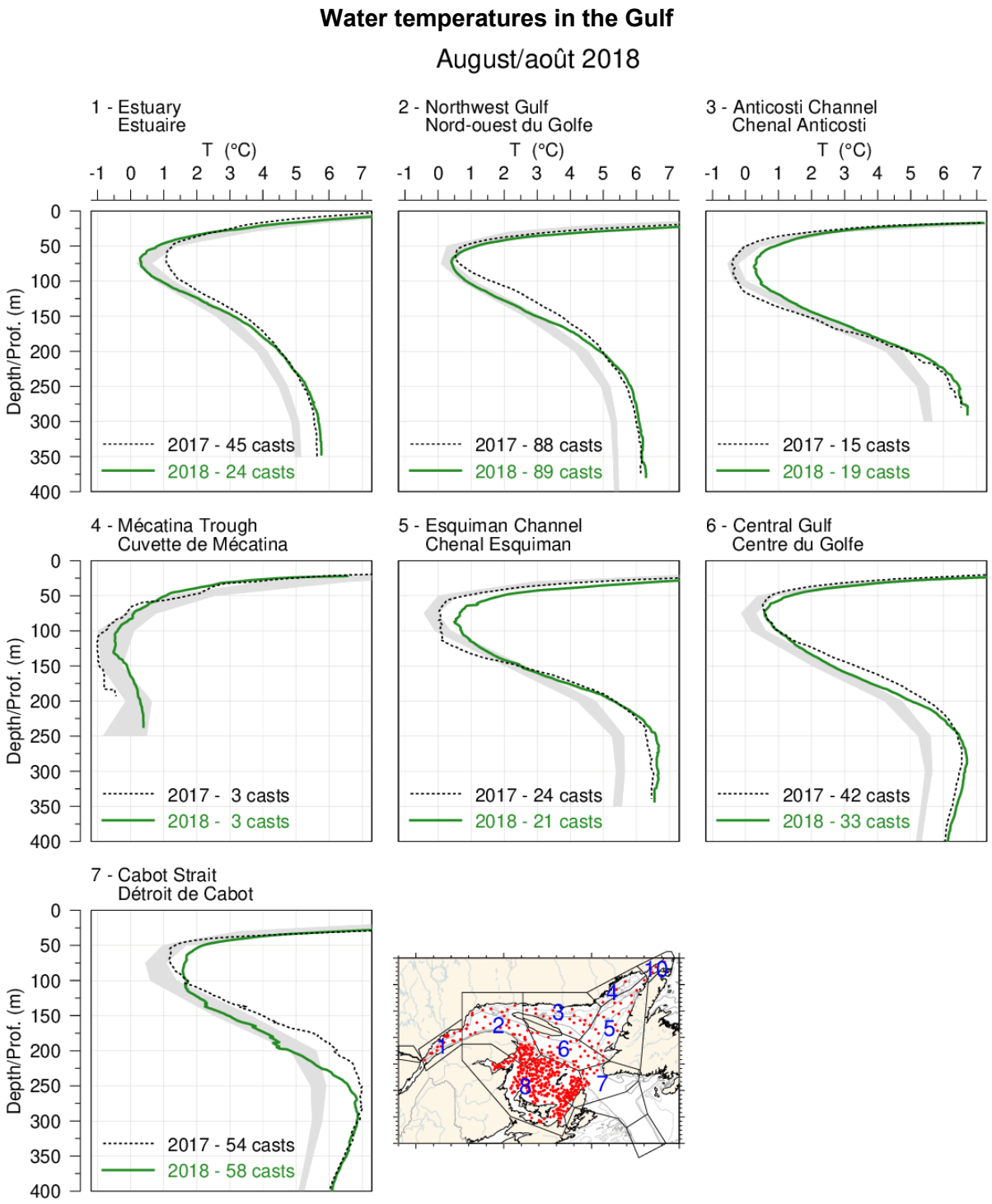

Figure 59. Mean temperature profiles observed in each region of the Gulf during August 2018. The shaded area represents the 1981–2010 climatological monthly mean ± 0.5 SD for August. Mean profiles for August and September 2017 are also shown for comparison.

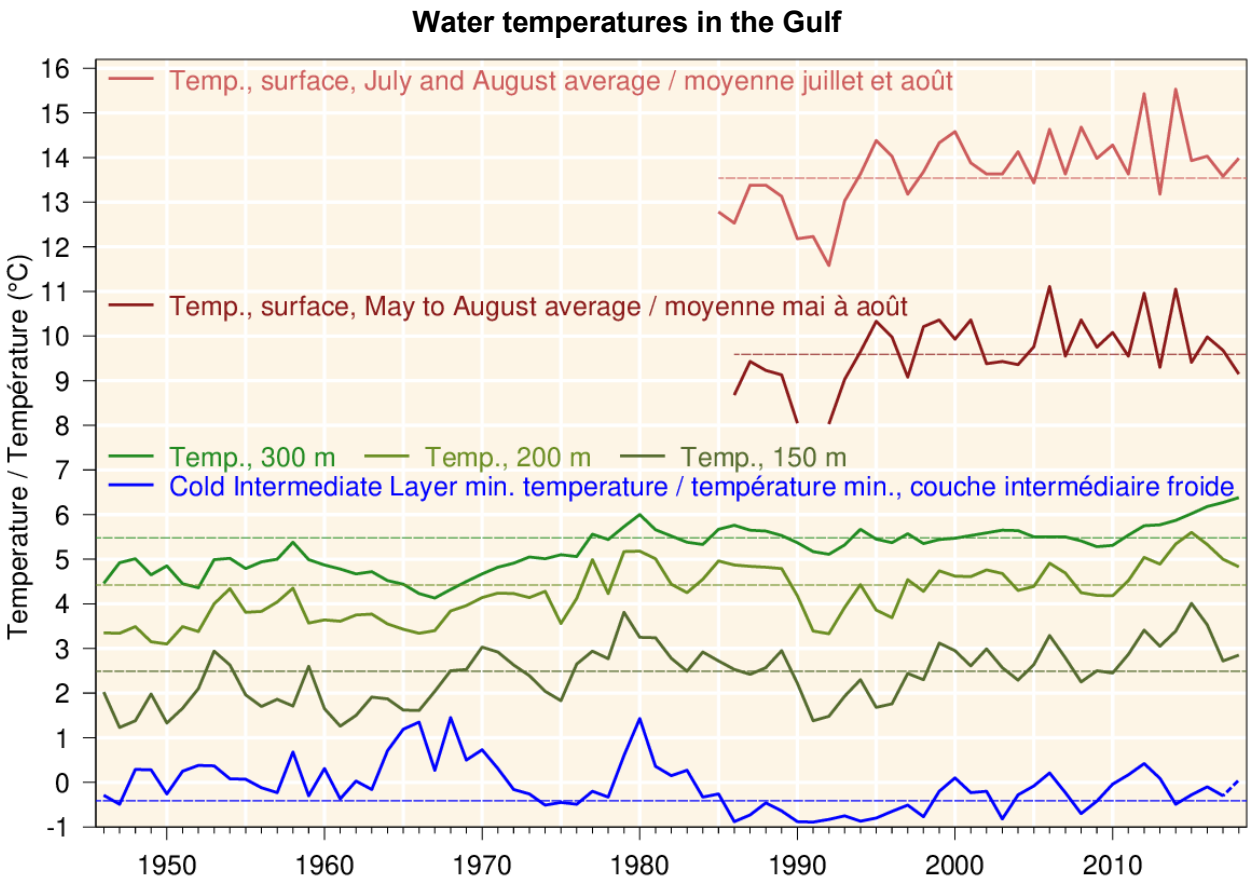

Figure 60. Water temperatures in the Gulf. Sea-surface temperature averaged over the Estuary and the northern Gulf for July–August and May-August (1985–2018) (red lines). Layer-averaged temperature for the Gulf of St. Lawrence at 150, 200 and 300 m (green lines). Cold intermediate layer minimum temperature index in the Gulf of St. Lawrence, adjusted to July 15 with 2018 value estimated from August survey data (blue line).

APPENDICES

Appendix 1. Number of successful stations per stratum for the DFO survey.

Stratum	OPANO	Surface (km^2)	1990	1991	1992	1993	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
401	4T	545	3	4	4	4	3	3	3	3	3	3	3	3	3	3	3	6	3	3	3	3	0	3	3	2	2	3	2	2	2
402	4T	909	3	5	5	3	3	1	3	2	3	5	3	3	3	2	0	3	3	3	3	3	3	3	3	3	2	3	2	2	2
403	4T	1190	3	3	3	3	3	3	10	10	3	5	3	3	3	3	6	4	3	3	3	3	3	3	3	2	2	3	2	2	1
404	4T	792	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	6	3	3	3	3	0	3	3	3	2	3	2	2	2
405	4T	1478	3	3	3	3	3	3	3	2	4	4	4	3	3	3	2	9	3	3	3	3	3	3	3	3	2	3	2	2	2
406	4T	2579	5	3	3	3	3	3	5	5	3	5	3	4	5	3	5	6	4	4	4	3	3	3	4	3	3	4	4	4	3
407	4T	2336	5	3	3	3	3	3	3	3	2	3	3	3	3	5	3	5	3	3	3	3	0	3	3	2	4	4	2	3	4
408	4T	2734	4	5	5	3	2	3	3	2	5	5	4	3	3	3	2	11	4	4	4	4	3	3	4	3	4	4	2	4	3
409	4T	909	3	3	3	3	0	3	4	3	3	4	4	4	3	3	3	4	3	3	3	3	3	3	2	3	2	2	2	2	2
410	4T	1818	2	3	3	3	4	6	10	6	5	4	4	4	5	3	3	6	3	3	3	3	3	3	3	3	3	3	3	3	2
411	4T	1859	3	3	3	3	4	7	9	7	6	9	5	9	4	3	5	8	3	3	3	3	3	3	3	3	3	2	3	3	3
412	4T	1283	3	3	3	3	4	5	3	3	3	4	4	4	3	3	2	5	3	3	3	3	3	3	3	3	2	2	2	2	2
413	4T	731	3	4	3	3	0	3	3	4	3	4	4	4	3	3	1	5	3	3	3	3	3	3	3	2	2	2	2	2	2
414	4T	388	3	2	3	3	1	3	3	3	3	4	4	4	3	3	3	6	3	3	2	1	3	3	2	3	2	2	2	0	2
801	4R	1214	3	3	3	4	3	3	3	3	4	5	5	5	2	3	3	4	3	3	3	3	2	3	3	3	3	3	2	3	3
802	4R	1369	3	3	3	3	3	3	3	3	3	3	3	3	2	8	3	8	2	3	3	3	0	3	3	3	3	3	2	3	3
803	4S	6976	14	3	2	4	3	3	3	3	4	5	3	4	6	2	1	14	6	8	8	7	3	6	7	3	10	8	5	8	8
804	4S	2490	5	4	3	3	4	3	3	3	3	3	3	6	3	2	3	10	3	3	3	3	3	3	3	3	4	4	4	4	3
805	4S	5762	14	7	4	4	6	4	11	8	4	5	5	5	12	8	4	10	8	7	7	6	4	5	7	5	7	7	9	7	5
806	4S	2127	4	4	3	3	3	3	3	3	3	3	3	3	3	3	5	4	3	3	2	3	3	3	3	3	3	3	3	3	3
807	4S	2370	3	12	11	10	5	5	4	4	3	3	4	3	2	1	0	7	3	3	3	3	3	2	3	3	4	4	4	4	3
808	4S	2428	4	7	6	4	5	4	3	3	2	4	3	3	3	3	0	3	3	3	3	3	2	3	3	2	4	4	4	4	4
809	4R	1547	3	9	7	6	4	3	3	3	3	3	3	3	3	3	1	5	3	3	3	3	3	3	2	3	3	3	4	3	3
810	4R	765	3	4	5	4	3	3	3	3	4	4	4	4	6	5	3	8	3	3	4	3	0	3	3	2	3	2	2	2	2
811	4R	1506	3	4	4	4	5	3	8	6	3	3	3	3	3	3	3	7	3	3	3	2	2	2	3	2	2	2	2	2	2
812	4R	4648	7	9	8	11	4	3	3	3	3	3	3	3	3	3	4	5	5	4	5	4	5	3	5	3	8	7	6	6	5
813	4R	3958	6	6	5	9	3	4	6	5	7	4	6	8	2	5	3	9	5	3	5	3	4	4	6	3	6	6	4	3	5
814	4S	1029	3	4	4	4	3	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2
815	4S	4407	9	15	11	8	5	4	3	3	8	9	9	2	6	3	3	14	5	5	6	5	5	3	6	4	6	7	6	6	5
816	4S	5032	9	11	9	9	6	6	17	17	20	21	21	1	6	4	4	11	7	7	7	6	4	4	3	6	6	8	7	7	5
817	4S	3646	7	18	11	7	9	10	9	5	11	17	13	14	8	5	2	7	5	5	4	5	3	3	4	4	5	4	6	6	5
818	4S	2774	4	7	5	4	3	3	3	4	4	4	4	5	7	5	1	6	4	4	2	4	3	4	3	3	4	5	4	5	4
819	4S	1441	3	7	9	5	4	5	3	2	3	3	4	1	1	3	0	8	2	3	3	2	3	3	3	3	2	2	2	2	2
820	4R	1358	3	3	3	3	3	3	7	5	6	5	5	3	2	3	3	14	3	3	3	3	0	2	3	3	3	3	2	3	3
821	4R	1272	3	3	3	2	3	3	3	2	3	3	3	3	3	3	3	7	3	3	3	3	2	4	3	3	2	2	3	3	3
822	4R	3245	6	4	3	2	3	3	6	4	10	8	10	9	3	3	3	8	4	4	4	3	4	2	4	2	5	3	4	2	3
823	4R	556	3	3	3	3	2	3	2	3	1	3	2	3	2	5	2	10	3	3	3	3	2	3	3	3	3	3	2	2	3
824	4R	837	3	1	3	1	3	3	3	3	3	3	2	3	2	2	3	6	3	3	3	3	2	3	3	2	2	2	1	2	2
827	4S	3231	0	1	1	1	3	3	0	2	3	1	3	0	2	2	3	6	4	4	3	3	3	2	3	2	2	3	3	3	4
828	4S	2435	4	1	2	2	3	3	3	3	3	1	0	1	0	3	3	1	3	3	3	3	3	2	2	2	2	2	2	4	4
829	4S	2692	3	2	3	3	3	3	3	0	3	3	2	0	2	1	0	8	4	4	3	2	3	2	2	3	2	4	3	2	3
830	4S	1917	3	3	4	3	3	3	2	2	3	3	3	2	1	1	0	6	3	3	3	3	3	3	2	3	2	4	4	3	3
831	4S	1204	3	0	2	3	3	3	3	2	3	4	3	3	1	3	3	4	3	3	3	3	3	3	3	2	2	2	2	2	2
832	4S	3962	4	12	11	7	7	9	8	5	3	3	3	3	2	3	4	8	4	5	5	3	4	3	6	4	4	4	3	5	5
833	4S	559	3	1	3	3	3	3	3	3	3	3	3	0	3	3	2	6	3	3	3	3	3	3	3	1	2	2	2	2	2
835	4R	2641	0	6	7	6	3	3	3	3	6	5	6	5	6	3	3	8	5	5	5	4	0	4	5	2	4	3	3	4	4
836	4R	3149	0	7	8	6	3	3	3	3	3	3	3	3	3	2	4	10	5	3	5	4	3	4	4	3	5	5	2	3	4
837	4R	2668	0	5	6	3	2	3	4	4	3	3	3	3	5	5	2	4	4	3	5	3	3	2	5	1	4	4	3	3	2
838	4R	3378	0	9	8	7	5	5	0	0	0	2	0	4	4	0	3	10	6	3	6	0	0	3	5	0	6	4	5	3	5
839	4S	4390	0	2	5	5	3	2	2	1	2	3	3	0	0	3	2	3	6	5	4	3	3	2	2	3	2	3	2	2	2
840	4R	765	0	3	3	1	1	0	0	0	0	0	0	2	0	0	0	5	3	0	3	0	0	1	3	0	2	3	2	0	1
841	4S	816	0	0	1	3	3	3	3	0	2	1	2	3	2	3	3	3	3	3	2	3	3	3	2	3	2	2	2	2	1
Total		116115	191	250	239	214	175	182	217	185	204	224	209	183	171	163	133	354	192	183	189	164	132	156	178	141	177	182	159	163	160
851	4T	456																			3	3	3	3	3	3	2	2	2	2	2
852	4T	427																			3	3	3	3	2	3	2	2	2	1	2
854	4T	465																			3	3	3	2	2	2	2	2	2	2	2
855	4T	928																			3	4	3	2	3	3	2	2	2	2	2

Appendix 2. Occurrences and total catches, in weight and number, by taxon during the 2018 survey (168 successful tows). Taxonomic codes (STRAP) follow Miller and Chabot (2014), with scientific name updates by the World Marine Species Registry (WoRMS 2018).

Vertebrates

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
90	*Amblyraja radiata*	Raie épineuse	Thorny Skate	123	868.8	1604
696	*Ammodytes* sp.	Lançons	Sand Lances	29	0.1	64
700	*Anarhichas lupus*	Loup atlantique	Atlantic Wolffish	35	89.4	344
701	*Anarhichas minor*	Loup tacheté	Spotted Wolffish	11	16.0	14
320	*Arctozenus risso*	Lussion blanc	White Barracudina	79	10.6	548
193	*Argentina silus*	Grande argentine	Atlantic Argentine	17	9.6	110
811	*Artediellus atlanticus*	Hameçon atlantique	Atlantic Hookear Sculpin	36	1.1	1296
810	*Artediellus* sp.	Hameçons	Hookear Sculpins	5	0.6	104
812	*Artediellus uncinatus*	Hameçon neigeux	Arctic Hookear Sculpin	9	0.4	89
838	*Aspidophoroides monopterygius*	Poisson-alligator atlantique	Alligatorfish	51	1.2	325
837	*Aspidophoroides olrikii*	Poisson-alligator arctique	Arctic Alligatorfish	1	< 0.1	3
102	*Bathyraja spinicauda*	Raie à queue épineuse	Spinytail Skate	3	21.5	3
290	*Benthosema glaciale*	Lanterne glacière	Glacier Lanternfish	1	< 0.1	8
451	*Boreogadus saida*	Saïda franc	Arctic Cod	50	7.9	619
865	*Careproctus reinhardti*	Petite limace de mer	Sea Tadpole	7	0.3	14
27	*Centroscyllium fabricii*	Aiguillat noir	Black Dogfish	35	1547.2	2097
227	*Chauliodus sloani*	Chauliode très lumineux	Sloane's Viperfish	1	< 0.1	1
150	*Clupea harengus*	Hareng atlantique	Atlantic Herring	72	2882.4	11184
829	*Cottunculus microps*	Cotte polaire	Polar Sculpin	1	< 0.1	1
721	*Cryptacanthodes maculatus*	Terrassier tacheté	Wrymouth	3	1.3	6
849	*Cyclopterus lumpus*	Grosse poule de mer	Lumpfish	28	34.1	52
208	*Cyclothone microdon*	Cyclothone à petites dents	Small-Toothed Bristlemouth	2	< 0.1	2
461	*Enchelyopus cimbrius*	Motelle à quatre barbillons	Fourbeard Rockling	109	48.2	1418
618	*Epigonus pandionis*	Cardinal	Big Eye	3	0.1	3
711	*Eumesogrammus praecisus*	Quatre-lignes atlantique	Fourline Snakeblenny	23	6.8	238
847	*Eumicrotremus terraenovae*	Petite poule Terre-Neuve	Newfoundland Spiny Lumpsucker	26	10.2	207
436	Gadidae	Gadidés	Codfishes	4	< 0.1	4
438	*Gadus morhua*	Morue franche	Atlantic Cod	90	3671.5	8013
439	*Gadus ogac*	Ogac, morue ogac	Greenland Cod	4	3.8	8
437	*Gadus* sp.	Morue ou ogac	Atlantic or Greenland cod	1	0.2	3
455	*Gaidropsarus argentatus*	Mustèle argentée	Silver Rockling	8	< 0.1	15
454	*Gaidropsarus ensis*	Mustèle arctique à trois barbillons	Threebeard Rockling	3	< 0.1	6
453	*Gaidropsarus* sp.	Mustèles	Threebeard Rocklings	2	< 0.1	7

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
426	*Gasterosteus aculeatus*	Épinoche à trois épines	Threespine Stickleback	2	< 0.1	2
890	*Glyptocephalus cynoglossus*	Plie grise	Witch Flounder	125	744.5	3682
746	*Gymnelus viridis*	Unernak caméléon	Fish Doctor	2	< 0.1	3
823	*Gymnocanthus tricuspis*	Tricorne arctique	Arctic Staghorn Sculpin	25	11.7	180
797	*Helicolenus dactylopterus*	Chèvre impériale	Blackbelly Rosefish	2	0.1	2
809	*Hemitripterus americanus*	Hémitriptère atlantique	Sea Sculpin	2	0.7	5
889	*Hippoglossoides platessoides*	Plie canadienne	American Plaice	136	1409.5	13080
893	*Hippoglossus hippoglossus*	Flétan atlantique	Atlantic Halibut	58	946.1	143
527	*Hoplostethus mediterraneus*	Poisson-montre	Rosy Soldierfish	1	< 0.1	1
831	*Icelus bicornis*	Icèle à deux cornes	Twohorn Sculpin	2	< 0.1	3
832	*Icelus spatula*	Icèle spatulée	Spatulate Sculpin	11	0.4	23
836	*Leptagonus decagonus*	Agone atlantique	Atlantic Poacher	22	3.3	174
717	*Leptoclinus maculatus*	Lompénie tachetée	Daubed Shanny	45	5.3	1091
100	*Leucoraja ocellata*	Raie tachetée	Winter Skate	1	< 0.1	1
891	*Limanda ferruginea*	Limande à queue jaune	Yellowtail Flounder	6	1.9	20
868	*Liparis bathyarcticus*	Limace nébuleuse	Nebulous Snailfish	6	1.4	23
857	*Liparis* sp.	Limaces	Snailfishes	3	< 0.1	4
966	*Lophius americanus*	Baudroie d'Amérique	Monkfish, Goosefish	13	89.1	16
716	*Lumpenus lampretaeformis*	Lompénie-serpent	Snakeblenny	26	8.1	309
750	*Lycenchelys paxillus*	Lycode commune	Common Wolf Eel	1	< 0.1	1
752	*Lycenchelys verrillii*	Lycode à tête longue	Wolf Eelpout	6	< 0.1	6
727	*Lycodes esmarkii*	Lycode d'Esmark	Esmark's Eelpout	4	0.9	5
728	*Lycodes lavalaei*	Lycode du Labrador	Newfoundland Eelpout	16	15.8	108
733	*Lycodes polaris*	Lycode polaire	Canadian Eelpout	1	0.1	4
726	*Lycodes* sp.	Lycodes	Eelpouts	3	0.2	8
734	*Lycodes terraenovae*	Lycode atlantique	Atlantic Eelpout	2	0.7	2
730	*Lycodes vahlii*	Lycode à carreaux	Vahl's Eelpout	36	25.3	369
91	*Malacoraja senta*	Raie lisse	Smooth Skate	97	85.7	391
304	*Malacosteus niger*	Drague sans lampe	Lightless Loosejaw	1	< 0.1	1
187	*Mallotus villosus*	Capelan	Capelin	78	239.1	22261
214	*Maurolicus muelleri*	Margerite perlée	Mueller's Pearlside	1	< 0.1	1
441	*Melanogrammus aeglefinus*	Aiglefin	Haddock	2	7.3	7
745	*Melanostigma atlanticum*	Molasse atlantique	Atlantic Soft Pout	41	1.2	367
449	*Merluccius bilinearis*	Merlu argenté	Silver Hake	65	41.3	352
272	Myctophidae	Poissons-lanterne	Lanternfishes	17	0.4	130
819	*Myoxocephalus scorpius*	Chaboisseau à épines courtes	Shorthorn Sculpin	22	35.9	98
12	*Myxine glutinosa*	Myxine du nord	Northern Hagfish	96	189.3	3133
278	*Neoscopelus macrolepidotus*	Lanterne à grandes écailles	Glowingfish	3	0.2	6

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
478	*Nezumia bairdii*	Grenadier du grand Banc	Common Grenadier	89	79.7	2006
275	*Notoscopelus kroyeri*	Lanterne-voilière nordique	Kroyer's Lanternfish	3	0.1	4
874	*Paraliparis calidus*	Limace ardente	Lowfin Snailfish	8	0.1	11
856	*Paraliparis copei*	Limace à museau noir	Blacksnout Seasnail	9	0.2	26
444	*Phycis chesteri*	Merluche à longues nageoires	Longfin Hake	33	152.7	1170
887	Pleuronectidae	Flétans, limandes et plies	Flounders, Halibuts and Plaices	1	< 0.1	
443	*Pollachius virens*	Goberge	Pollock	3	5.6	3
222	*Polyipnus clarus*	Hache	Slope Hachetfish	1	< 0.1	1
895	*Pseudopleuronectes americanus*	Plie rouge	Winter Flounder	1	0.1	1
94	*Rajella fyllae*	Raie ronde	Round Skate	4	0.9	5
892	*Reinhardtius hippoglossoides*	Flétan du Groenland, turbot	Greeenland Halibut, Turbot	119	2538.7	10929
572	*Scomber scombrus*	Maquereau bleu	Atlantic Mackerel	20	3.3	126
796	*Sebastes fasciatus*	Sébaste acadien	Acadian Redfish	107	9854.5	71241
794	*Sebastes mentella*	Sébaste atlantique	Deepwater Redfish	129	86041.0	627937
793	*Sebastes norvegicus*	Sébaste orangé	Golden Redfish	1	18.0	30
24	*Squalus acanthias*	Aiguillat commun	Spiny Dogfish	1	6.8	3
220	Sternoptychidae	Haches	Hatchetfishes	1	< 0.1	1
710	*Stichaeus punctatus*	Stichée arctique	Arctic Shanny	1	< 0.1	1
814	*Triglops murrayi*	Faux-trigle armé	Moustache Sculpin	49	20.3	1988
815	*Triglops nybelini*	Faux-trigle à grands yeux	Bigeye Sculpin	1	< 0.1	1
447	*Urophycis tenuis*	Merluche blanche	White Hake	81	265.4	436
725	Zoarcidae	Lycodes, Loquettes, Molasses	Eelpouts, Pouts, Wolf Eels	1	< 0.1	2
	Total	**Vertébrés**	**Vertebrates**		112 087	790 361

Invertebrates

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
2182	*Actinauge cristata*	Anémone de mer	Anemone	41	40.4	3910
2165	Actiniaria	Actinies et Anémones	Sea Anemones	22	0.7	53
2162	*Actinostola callosa*	Anémones de mer	Anemone	57	531.9	7661
6771	*Aega psora*	Isopode	Isopod	16	< 0.1	18
2677	*Alcyonidium pachydermatum*	Bryozoaire	Bryozoan	1	< 0.1	1
2675	*Alcyonidium* sp.	Bryozoaire	Bryozoan	2	< 0.1	3
6930	Amphipoda	Amphipodes	Amphipods	1	< 0.1	1
5675	*Amphitrite cirrata*	Polychète	Terebellid worm	1	< 0.1	1
8593	*Amphiura* sp.	Ophiures	Brittle star	5	< 0.1	7

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
4219	*Anomia* sp.	Anomies	Jingle shells	2	< 0.1	25
7389	*Anonyx* sp.	Gammarides	Gammarids	9	< 0.1	28
2218	*Anthoptilum grandiflorum*	Plume de mer	Sea pen	51	53.6	4367
5002	*Aphroditella hastata*	Souris de mer	Sea Mouse	16	0.7	21
6594	*Arcoscalpellum michelottianum*	Balane	Barnacle	7	0.3	24
8138	*Argis dentata*	Crevette verte	Arctic Argid	36	5.8	1870
3418	*Arrhoges occidentalis*	Pied-de-pélican	American Pelicanfoot	17	0.5	65
1128	*Artemisina arcigera*	Éponge	Sponge	15	0.5	89
8742	*Ascidia* sp.	Ascidie	Sea squirts	71	6.1	1174
8680	Ascidiacea	Ascidies, tuniqués sessiles	Ascidians, Sessile Tunicates	6	< 0.1	15
1120	*Asconema foliatum*	Éponge	Sponge	5	4.0	
4230	*Astarte montagui*	Astarte	Narrow Hinge Astarte	2	< 0.1	2
4227	*Astarte* sp.	Astartes	Astartes	24	0.1	68
8396	*Asterias rubens*	Astérie boréale commune	Purple Seastar	4	< 0.1	5
8113	*Atlantopandalus propinqvus*	Crevette	Shrimp	18	0.7	148
2097	*Atolla wyvillei*	Méduse	Jellyfish	4	0.6	6
3583	*Aulacofusus brevicauda*	Buccin	Whelk	1	< 0.1	2
2085	*Aurelia aurita*	Méduse de lune	Moon Jelly	2	< 0.1	4
5009	*Austrolaenilla mollis*	Polychètes	Fifteen scales worm	1	< 0.1	1
6595	Balanidae	Balanes	Barnacles	6	0.1	72
4904	*Bathypolypus bairdii*	Poulpe	North Atlantic Octopus	57	3.2	111
3519	*Beringius turtoni*	Buccin	Whelk	2	0.1	4
3995	Bivalvia	Bivalves	Bivalves	4	< 0.1	4
2158	*Bolocera tuediae*	Anémone de mer	Anemone	64	49.8	883
8793	*Boltenia echinata*	Cactus de mer	Cactus Sea Squirt	4	< 0.1	15
8792	*Boltenia ovifera*	Patate de mer	Sea Potato	13	11.5	106
3488	*Boreotrophon* sp.	Murex	Murex	2	< 0.1	2
8798	*Botrylloides* sp.	Ascidie	Tunicate	4	0.1	
5755	*Brada inhabilis*	Polychète	Flabelligerid worm	6	< 0.1	7
8378	*Brisaster fragilis*	Oursin coeur	Heart Urchin	59	323.7	32928
2670	Bryozoa	Bryozoaires	Bryozoans	20	0.1	73
3520	*Buccinum cyaneum*	Buccin bleu	Bluish Whelk	16	3.1	225
3523	*Buccinum scalariforme*	Buccin	Ladder Whelk	3	0.1	6
3516	*Buccinum* sp.	Buccins	Whelk	25	1.1	75
3517	*Buccinum undatum*	Buccin commun	Waved Whelk	8	0.3	21
8173	*Calocaris templemani*	Crevette fouisseuse	Lobster Shrimp	1	< 0.1	1
8206	*Cancer irroratus*	Crabe commun	Common Rock Crab	2	0.2	2
8037	Caridea	Crevettes	Caridean Shrimps	1	< 0.1	

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
8429	*Ceramaster granularis*	Étoile de mer	Sea Star	27	1.3	81
8213	*Chionoecetes opilio*	Crabe des neiges	Snow Crab	90	114.2	801
6593	*Chirona hameri*	Balane turbané	Turban Barnacle	3	0.5	32
4167	*Chlamys islandica*	Pétoncle d' Islande	Iceland Scallop	24	4.1	204
4351	*Ciliatocardium ciliatum*	Coque d'Islande	Iceland Cockle	8	1.1	56
8757	*Cnemidocarpa finmarkiensis*	Ascidie	Tunicate	1	< 0.1	1
3908	*Colga villosa*	Nudibranche	Nudibranch	7	< 0.1	10
3577	*Colus pubescens*	Buccin	Hairy Whelk	4	0.1	7
3575	*Colus* sp.	Buccins	Whelks	1	< 0.1	3
3576	*Colus stimpsoni*	Buccin	Whelk	6	0.2	7
1130	*Craniella polyura*	Éponge	Sponge	7	0.1	
8447	*Crossaster papposus*	Soleil de mer épineux	Spiny Sun Star	29	3.5	191
3422	*Cryptonatica affinis*	Lunaties	Arctic moonsnail	9	< 0.1	10
8407	*Ctenodiscus crispatus*	Étoile de mer	Mud Star	99	189.8	53505
8312	*Cucumaria frondosa*	Concombre de mer	Orange Footed Sea Cucumber	6	1.4	6
4526	*Cuspidaria glacialis*	Mye	Gacial Dipperclam	17	< 0.1	36
2080	*Cyanea capillata*	Crinière de lion	Lion's Mane	137	241.6	539
3894	*Dendronotus frondosus*	Nudibranche	Nudibranch	6	< 0.1	10
3895	*Dendronotus niveus*	Nudibranche orangé	Orange Nudibranch	6	< 0.1	11
3893	*Dendronotus* sp.	Nudibranche	Nudibranch	2	< 0.1	2
8760	*Didemnum* sp.	Ascidie	Tunicate	1	< 0.1	1
3965	*Doridoxa ingolfiana*	Nudibranche	Nudibranch	6	< 0.1	7
2191	*Drifa glomerata*	Corail mou	Soft coral	17	0.4	84
2183	*Duva florida*	Corail mou	Sea Cauliflower	11	0.1	21
8373	*Echinarachnius parma*	Dollar de sable	Common Sand Dollar	3	0.2	11
7383	*Epimeria loricata*	Gammaride	Gammarid	10	< 0.1	38
2156	*Epizoanthus erdmanni*	Zoanthide	Zoanthid	2	< 0.1	5
2157	*Epizoanthus* sp.	Anémone de mer	Sea Anemone	12	< 0.1	115
8075	*Eualus fabricii*	Bouc Arctique	Arctic Eualid	21	0.5	792
8080	*Eualus gaimardii*	Bouc	Circumpolar Eualid	7	< 0.1	24
8077	*Eualus macilentus*	Bouc du Groenland	Greenland Shrimp	15	3.0	3620
8074	*Eualus* sp.	Bouc	Eualid	2	< 0.1	32
8778	*Eudistoma vitreum*	Ascidie	Tunicate	16	0.2	103
5479	*Eunice pennata*	Polychète	Seaworm	3	< 0.1	3
5461	*Euphrosine borealis*	Polychète	Seaworm	1	< 0.1	1
8033	*Eusergestes arcticus*	Crevette	Shrimp	12	0.1	87
7195	*Eusirus cuspidatus*	Gammaride	Gammarid	6	< 0.1	20
3437	*Euspira pallida*	Lunatie du Groenland	Pale Moonsnail	14	0.2	43

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
2295	Fecampiidae	Vers flats	Flatworms	1	< 0.1	1
5746	Flabelligeridae	Polychète sédentaire	Flabelligerid Worm	1	< 0.1	1
2224	*Flabellum alabastrum*	Madrépore	Cup coral	10	0.9	124
3175	Gastropoda	Gastéropodes	Gastropods	3	< 0.1	4
2184	*Gersemia rubiformis*	Corail mou	Sea Strawberry	25	0.3	155
5902	*Golfingia margaritacea*	Sipunculide	Sipunculid	4	< 0.1	7
5089	*Goniada norvegica*	Polychète	Seaworm	4	< 0.1	6
8540	*Gorgonocephalus* sp.	Gorgonocéphales	Basket Stars	31	94.6	533
2217	*Halipteris finmarchica*	Plume de mer	Sea pen	20	2.9	149
5934	*Hamingia arctica*	Échiure	Echiurid	2	< 0.1	2
5046	*Harmothoe* sp.	Polychètes errantes	Fifteen-Scaled Worms	1	< 0.1	1
8263	*Heliometra glacialis*	Lis de mer	Feather star	3	< 0.1	31
1131	*Hemigellius arcofer*	Éponge	Sponge	11	6.0	
3090	*Hemithiris psittacea*	Brachiopode	Lamp Shell	7	0.1	66
8483	*Henricia* sp.	Étoiles de mer	Sea Stars	64	0.9	255
4437	*Hiatella arctica*	Saxicave arctique	Arctic Saxicave	4	< 0.1	6
8431	*Hippasteria phrygiana*	Étoile de mer	Sea Star	40	14.0	58
8290	Holothuroidea	Cocombres de mer	Sea Cucumbers	3	< 0.1	3
2150	*Hormathia digitata*	Anémone	Anemone	25	0.5	145
2167	*Hormathia nodosa*	Anémone noduleuse	Rugose Anemone	7	0.2	11
8217	*Hyas araneus*	Crabe lyre	Atlantic Lyre Crab	19	1.7	137
8218	*Hyas coarctatus*	Crabe lyre	Arctic Lyre Crab	56	4.5	893
1341	Hydrozoa	Hydrozoaires	Hydrozoans	45	0.2	
8028	*Hymenopenaeus debilis*	Crevette	Shrimp	1	< 0.1	1
6977	*Hyperia galba*	Hypéride	Hyperiid	1	< 0.1	1
4753	*Illex illecebrosus*	Encornet rouge nordique	Northern Shortfin Squid	100	181.2	1251
1132	*Iophon piceum*	Éponge	Sponge	5	1.6	
5003	*Laetmonice filicornis*	Polychète	Seaworm	48	0.2	175
8092	*Lebbeus groenlandicus*	Bouc	Spiny Lebbeid	10	1.3	303
8095	*Lebbeus microceros*	Bouc	Shrimp	2	< 0.1	6
8093	*Lebbeus polaris*	Bouc	Polar Lebbeid	51	1.0	703
8511	*Leptasterias polaris*	Étoile de mer polaire	Polar Sea Star	12	2.2	30
8510	*Leptasterias* sp.	Étoiles de mer	Sea Stars	23	0.1	72
8521	*Leptychaster arcticus*	Stelléridé	Sea Star	10	< 0.1	15
3459	*Limneria undata*	Veloutée rayée	Wavy Lamellaria	1	< 0.1	1
2207	*Liponema multicorne*	Anémone	Sea anemone	11	2.1	90
8196	*Lithodes maja*	Crabe épineux du Nord	Norway King Crab	59	47.5	119
4395	*Macoma calcarea*	Bivalve	Chalky Macoma	12	0.1	218

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
5309	*Maldane sarsi*	Polychètes	Bamboo worm	1	< 0.1	2
5277	Maldanidae	Polychète sédentaire	Bamboo Worm	7	< 0.1	14
3219	*Margarites costalis*	Margarite rosé du Nord	Boreal Rosy Margarite	6	< 0.1	6
3216	*Margarites groenlandicus*	Troque	Greenland marguerite	3	< 0.1	4
7994	*Meganyctiphanes norvegica*	Euphauside	Horned Krill	2	0.1	185
4025	*Megayoldia thraciaeformis*	Bivalve	Broad Yoldia	34	3.8	1062
5646	*Melinna cristata*	Polychète	Seaworm	4	< 0.1	13
8322	*Molpadia oolitica*	Holothurie	Sea Cucumber	2	0.1	7
8164	*Munidopsis curvirostra*	Munidopsis curvirostra	Squat Lobster	16	0.1	93
4127	*Musculus niger*	Moule noire	Black Mussel	1	< 0.1	1
1117	*Mycale lingua*	Éponge	Sponge	34	8.5	
1118	*Mycale loveni*	Éponge	Sponge	2	0.1	5
4121	*Mytilus* sp.	Moules	Mussels	14	0.7	79
3000	Nemertea	Némerte	Ribbon Worm	4	< 0.1	4
7483	*Neohela monstrosa*	Gammaride	Gammarid	5	< 0.1	5
5053	*Neoleanira tetragona*	Polychète	Scaled worm	19	< 0.1	65
2219	Nephtheidae	Coraux mous	Soft corals	9	< 0.1	15
5113	*Nephtys* sp.	Polychète errante	Red-Lined Worm	7	< 0.1	10
3566	*Neptunea decemcostata*	Neptunée à dix côtes	Wrinkle Whelk	5	0.1	8
3567	*Neptunea despecta*	Neptunée commune du nord	Lader Whelk	2	0.2	6
3565	*Neptunea* sp.	Buccins	Whelks	1	< 0.1	1
5225	Nereididae	Polychète errante	Clam Worm	1	< 0.1	1
5236	*Nereis pelagica*	Polychète	Clam worm	1	< 0.1	1
8448	*Novodinia americana*	Étoile de mer	Sea star	1	0.1	1
4019	*Nuculana* sp.	Bivalves	Nutclams	3	< 0.1	6
3850	Nudibranchia	Nudibranches	Nudibranchs	2	< 0.1	3
5964	*Nymphon hirtipes*	Araignée de mer	Sea spider	4	< 0.1	35
5961	*Nymphon* sp.	Araignées de mer	Sea Spiders	39	0.1	266
8575	*Ophiacantha bidentata*	Ophiure épineuse	Brittle Star	35	0.3	535
8583	*Ophiopholis aculeata*	Ophiure paquerette	Daisy Brittle Star	57	0.7	565
8585	*Ophioscolex glacialis*	Ophiure	Brittle star	17	< 0.1	32
8552	*Ophiura robusta*	Ophiure	Brittle Star	6	< 0.1	21
8553	*Ophiura sarsii*	Ophiure	Brittle Star	66	89.5	59078
8551	*Ophiura* sp.	Ophiures	Brittle Stars	1	< 0.1	1
8530	Ophiuroidea	Ophiures	Brittle Stars	1	< 0.1	1
8178	*Pagurus* sp.	Bernard hermite droitier	Hermit Crab	21	0.1	34
8111	*Pandalus borealis*	Crevette nordique	Northern Shrimp	131	1797.3	336495
8112	*Pandalus montagui*	Crevette ésope	Striped Pink Shrimp	75	182.9	75275

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
8110	*Pandalus* sp.	Crevette	Boreal Red Shrimp	1	0.1	
4438	*Panomya norvegica*	Saxicave	Arctic Roughmya	2	< 0.1	2
7586	*Paramphithoe hystrix*	Gammaride	Gammarid	7	< 0.1	12
8057	*Pasiphaea multidentata*	Sivade rose, Crevette blanche	Pink Glass Shrimp	72	52.8	15757
2203	*Pennatula aculeata*	Plume de mer	Sea Pen	83	5.1	1677
2210	*Pennatula grandis*	Plume de mer	Sea Pen	31	118.0	3650
2201	Pennatulacea	Plumes de mer	Sea Pens	1	< 0.1	1
2096	*Periphylla periphylla*	Méduse à coronne	Crown jellyfish	47	73.4	71
1136	*Phakellia bowerbanki*	Éponge	Sponge	7	2.7	
5907	*Phascolion strombus*	Sipunculide	Hermit Sipunculid	2	< 0.1	3
4955	*Phyllodoce groenlandica*	Polychète	Paddle Worm	1	< 0.1	1
2255	*Pleurobrachia pileus*	Groseille de mer ronde	Sea Gooseberry	31	0.3	205
3578	*Plicifusus kroeyeri*	Colus	Arctic Whelk	4	< 0.1	6
8783	*Polycarpa fibrosa*	Ascidie	Tunicate	7	1.3	921
4950	Polychaeta	Polychètes	Polychaetes	40	0.1	88
1122	*Polymastia andrica*	Éponge	Sponge	2	0.1	
1123	*Polymastia grimaldii*	Éponge	Sponge	5	0.2	11
1109	*Polymastia* sp.	Éponge	Sponge	42	116.2	16665
5007	Polynoidae	Polychète errante	Fifteen-Scaled Worm	37	0.1	71
5264	*Polyphysia crassa*	Polychète	Sea worm	3	< 0.1	3
8135	*Pontophilus norvegicus*	Crevette	Norwegian Shrimp	83	3.9	2269
8435	*Poraniomorpha* sp.	Étoile de mer	Sea star	11	0.2	13
1101	Porifera	Éponges	Sponges	84	24.9	
2573	*Priapulus caudatus*	Priapulide	Priapulid	1	< 0.1	1
8433	*Pseudarchaster parelii*	Étoile de mer	Sea Star	22	0.7	72
8520	*Psilaster andromeda*	Étoile de mer	Sea Star	24	1.0	223
8295	*Psolus fabricii*	Psolus écarlate	Scarlet Psolus	1	< 0.1	1
8294	*Psolus phantapus*	Holothurie	Sea Cucumber	5	< 0.1	6
8410	*Pteraster militaris*	Étoile de mer	Sea Star	15	0.2	45
8411	*Pteraster pulvillus*	Étoile de mer	Sea Star	10	0.2	30
8409	*Pteraster* sp.	Étoiles de mer	Sea stars	1	< 0.1	3
1353	*Ptychogena lactea*	Méduse	Jellyfish	31	0.4	84
1107	*Radiella hemisphaerica*	Éponge	Sponge	16	0.9	177
7211	*Rhachotropis aculeata*	Gammaride	Gammarid	8	< 0.1	69
4557	*Rossia* sp.	Sépioles	Bobtails	44	0.7	66
8129	*Sabinea sarsii*	Crevette	Sars Shrimp	16	0.4	218
8128	*Sabinea septemcarinata*	Crevette	Sevenline Shrimp	28	1.2	604
3491	*Scabrotrophon fabricii*	Murex	Murex	13	< 0.1	17

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
3715	*Scaphander punctostriatus*	Céphalaspide	Giant Canoe Bubble	39	0.7	292
8119	*Sclerocrangon boreas*	Crevette de roche	Scultured Shrimp	17	14.1	1610
2040	Scyphozoa	Scyphozoaires	Scyphozoans	2	< 0.1	2
2679	*Securiflustra securifrons*	Bryozoaires marins	Marine bryozoans	10	< 0.1	10
4352	*Serripes groenlandicus*	Coque du Groenland	Greenland Smoothcockle	2	0.1	2
3227	*Solariella varicosa*	Gastéropode	Varicose Solarelle	1	< 0.1	1
8445	*Solaster endeca*	Soleil de mer pourpre	Purple Sunstar	4	< 0.1	4
8087	*Spirontocaris liljeborgii*	Bouc épineux	Friendly Blade Shrimp	42	0.4	260
8086	*Spirontocaris phippsii*	Bouc	Punctate Blade Shrimp	2	< 0.1	3
8084	*Spirontocaris* sp.	Bouc	Blade Shrimp	7	< 0.1	
8085	*Spirontocaris spinus*	Bouc perroquet	Parrot Shrimp	26	0.6	337
1352	*Staurostoma mertensii*	Méduse à croix blanche	Whitecross Jellyfish	1	< 0.1	1
7750	*Stegocephalus inflatus*	Gammaride	Gammarid	7	< 0.1	9
8515	*Stephanasterias albula*	Étoile de mer	Sea star	6	< 0.1	12
2159	*Stephanauge nexilis*	Anémone de mer	Sea anemone	12	0.7	50
2173	*Stomphia coccinea*	Anémone marbrée	Anemone	16	0.2	41
8363	*Strongylocentrotus* sp.	Oursins	Sea Urchins	52	41.9	2810
1112	*Stylocordyla borealis*	Éponge	Sponge	16	< 0.1	102
1115	*Suberites ficus*	Éponge	Fig sponge	19	4.5	73
1113	*Sycon* sp.	Éponge	Sponge	2	< 0.1	2
8776	*Synoicum pulmonaria*	Ascidie	Tunicate	1	0.7	7
6791	*Syscenus infelix*	Isopode	Isopod	54	0.4	220
1108	*Tentorium semisuberites*	Éponge	Sponge	12	0.1	85
5673	Terebellidae	Polychète sédentaire	Terebellid Worm	1	< 0.1	1
3101	*Terebratulina septentrionalis*	Térébratule du Nord	Northern Lamp Shell	15	< 0.1	51
6972	*Themisto libellula*	Hypéride	Hyperiid	27	0.1	464
1114	*Thenea muricata*	Éponge	Sponge	13	0.9	30
1357	*Thuiaria thuja*	Hydrozoaire	Bottlebrush Hydroid	15	< 0.1	41
2176	*Urticina felina*	Anémone de mer	Sea Anemone	2	< 0.1	2
1127	*Weberella bursa*	Éponge	Sponge	12	4.7	66
4451	*Xylophaga atlantica*	Bivalve	Atlantic Woodeater	3	< 0.1	4
	Total	**Invertebrés**	**Invertebrates**		4 526	643 767

Others

Code STRAP	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
9970		Capsule de raies	Skates Eggs	84	5.4	1164

Appendix 3. Number of measured and weighed specimens and descriptive statistics for the length in 2018. Taxonomic codes (STRAP) follow Miller and Chabot (2014), with scientific name updates by the World Marine Species Registry (WoRMS 2018).

Vertebrates

Code STRAP	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1**	Median	P99**	Max
90	*Amblyraja radiata*	1318	1001	8.7	11.4	32.2	65.0	75.1
696	*Ammodytes* sp.	63	61	5.5	5.5	7.9	11.5	11.5
700	*Anarhichas lupus*	304	163	7.0	7.7	24.5	60.9	68.0
701	*Anarhichas minor*	14	14	8.5	8.5	14.8	96.0	96.0
320	*Arctozenus risso*	483	263	17.5	19.2	23.9	28.3	28.8
193	*Argentina silus*	109	56	10.2	10.5	22.2	33.2	35.0
811	*Artediellus atlanticus*	208	133	2.1	3.2	6.7	10.0	11.2
810	*Artediellus* sp.	74	18	5.6	5.6	6.7	8.8	8.8
812	*Artediellus uncinatus*	78	38	4.4	4.4	7.2	9.6	9.6
838	*Aspidophoroides monopterygius*	273	162	4.0	5.8	12.5	15.8	16.9
837	*Aspidophoroides olrikii*	3	3	4.8	4.8	6.5	8.2	8.2
102	*Bathyraja spinicauda*	3	3	28.0	28.0	107.0	131.0	131.0
290	*Benthosema glaciale*	1	1	6.7	6.7	6.7	6.7	6.7
451	*Boreogadus saida*	418	202	5.0	7.1	12.0	18.8	21.1
865	*Careproctus reinhardti*	14	14	6.6	6.6	10.8	13.2	13.2
27	*Centroscyllium fabricii*	642	223	13.3	14.5	40.9	66.1	73.0
227	*Chauliodus sloani*	1	1	20.5	20.5	20.5	20.5	20.5
150	*Clupea harengus*	1123	677	13.6	17.3	28.9	37.4	39.2
829	*Cottunculus microps*	1	1	11.2	11.2	11.2	11.2	11.2
721	*Cryptacanthodes maculatus*	6	6	15.5	15.5	35.3	72.0	72.0
849	*Cyclopterus lumpus*	52	52	7.7	7.7	13.8	45.5	45.5
208	*Cyclothone microdon*	1	1	6.6	6.6	6.6	6.6	6.6
461	*Enchelyopus cimbrius*	1192	420	4.9	6.7	19.1	27.6	29.9
618	*Epigonus pandionis*	1	1	12.5	12.5	12.5	12.5	12.5
711	*Eumesogrammus praecisus*	219	126	7.4	8.6	14.8	21.1	21.9
847	*Eumicrotremus terraenovae*	207	121	2.3	3.0	6.9	14.8	38.5
436	Gadidae	4	4	4.0	4.0	5.5	5.5	5.5
438	*Gadus morhua*	4068	1862	3.5	5.2	32.8	65.3	90.2
439	*Gadus ogac*	8	8	17.6	17.6	32.8	40.0	40.0
437	*Gadus* sp.	3	3	19.1	19.1	20.2	21.7	21.7
455	*Gaidropsarus argentatus*	15	15	5.2	5.2	6.1	6.5	6.5
454	*Gaidropsarus ensis*	6	6	5.7	5.7	6.3	6.6	6.6
453	*Gaidropsarus* sp.	7	6	5.3	5.3	5.9	6.2	6.2
426	*Gasterosteus aculeatus*	2	2	5.1	5.1	5.9	6.6	6.6
890	*Glyptocephalus cynoglossus*	2522	1581	7.0	9.6	30.5	43.5	49.8
746	*Gymnelus viridis*	3	3	8.2	8.2	12.9	14.5	14.5
823	*Gymnocanthus tricuspis*	161	78	7.7	8.4	16.4	23.3	23.5
797	*Helicolenus dactylopterus*	2	2	14.5	14.5	16.1	17.6	17.6
809	*Hemitripterus americanus*	5	5	9.1	9.1	12.3	26.2	26.2
889	*Hippoglossoides platessoides*	5345	2393	2.6	9.0	21.7	42.1	55.1
893	*Hippoglossus hippoglossus*	142	141	34.0	34.6	66.4	146.0	150.0
527	*Hoplostethus mediterraneus*	1	1	14.7	14.7	14.7	14.7	14.7
831	*Icelus bicornis*	3	3	5.3	5.3	6.0	7.3	7.3
832	*Icelus spatula*	23	22	4.8	4.8	8.3	13.9	13.9
836	*Leptagonus decagonus*	173	73	4.0	4.0	19.1	21.6	21.7
717	*Leptoclinus maculatus*	486	200	7.8	8.5	11.9	18.4	20.0
100	*Leucoraja ocellata*	1	1	14.7	14.7	14.7	14.7	14.7
891	*Limanda ferruginea*	20	19	14.1	14.1	19.2	40.8	40.8
868	*Liparis bathyarcticus*	22	16	6.4	6.4	13.1	26.4	26.4
857	*Liparis* sp.	4	4	3.0	3.0	3.6	3.9	3.9
966	*Lophius americanus*	16	15	33.8	33.8	52.5	99.5	99.5
716	*Lumpenus lampretaeformis*	194	110	13.4	13.5	29.2	42.1	44.0
750	*Lycenchelys paxillus*	1	1	11.9	11.9	11.9	11.9	11.9

Code STRAP	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1**	Median	P99**	Max
752	*Lycenchelys verrillii*	6	6	11.5	11.5	12.6	14.2	14.2
727	*Lycodes esmarkii*	5	5	22.2	22.2	35.3	41.8	41.8
728	*Lycodes lavalaei*	108	62	9.6	10.1	19.2	56.9	63.5
733	*Lycodes polaris*	4	4	13.9	13.9	16.0	19.7	19.7
726	*Lycodes* sp.	8	5	6.8	6.8	10.7	36.2	36.2
734	*Lycodes terraenovae*	2	2	40.4	40.4	42.8	45.1	45.1
730	*Lycodes vahlii*	221	108	7.6	10.5	26.7	40.0	44.1
91	*Malacoraja senta*	391	379	8.1	8.6	19.2	58.5	73.0
304	*Malacosteus niger*	1	1	12.0	12.0	12.0	12.0	12.0
187	*Mallotus villosus*	1376	473	7.7	10.1	14.2	17.3	18.5
441	*Melanogrammus aeglefinus*	7	7	41.5	41.5	49.8	56.5	56.5
745	*Melanostigma atlanticum*	354	143	5.5	6.2	10.8	13.6	15.4
449	*Merluccius bilinearis*	217	184	11.3	13.0	29.8	42.0	44.9
272	Myctophidae	3	3	8.7	8.7	9.0	15.0	15.0
819	*Myoxocephalus scorpius*	98	97	9.8	9.8	27.7	40.3	40.3
12	*Myxine glutinosa*	1922	508	13.3	23.6	36.3	49.1	56.6
278	*Neoscopelus macrolepidotus*	6	6	9.7	9.7	12.7	18.2	18.2
478	*Nezumia bairdii*	1628	456	7.2	9.0	22.7	31.5	35.3
275	*Notoscopelus kroyeri*	3	3	9.6	9.6	13.1	14.3	14.3
874	*Paraliparis calidus*	11	11	6.5	6.5	8.6	10.2	10.2
856	*Paraliparis copei*	26	25	4.2	4.2	9.4	13.0	13.0
444	*Phycis chesteri*	788	545	14.1	17.0	25.5	36.7	39.0
443	*Pollachius virens*	3	3	33.8	33.8	56.1	64.8	64.8
895	*Pseudopleuronectes americanus*	1	1	17.2	17.2	17.2	17.2	17.2
94	*Rajella fyllae*	5	5	17.7	17.7	30.6	44.2	44.2
892	*Reinhardtius hippoglossoides*	5236	2472	3.5	13.1	30.4	53.7	77.5
572	*Scomber scombrus*	125	57	4.2	4.5	14.0	31.3	32.1
796	*Sebastes fasciatus*	7938	3888	0.0	6.9	19.1	39.5	48.3
794	*Sebastes mentella*	15477	6689	0.0	7.0	21.2	40.9	48.2
793	*Sebastes norvegicus*	30	30	17.4	17.4	25.1	47.3	47.3
24	*Squalus acanthias*	3	3	77.0	77.0	77.5	87.0	87.0
710	*Stichaeus punctatus*	1	1	11.6	11.6	11.6	11.6	11.6
814	*Triglops murrayi*	811	285	6.8	7.2	11.4	15.5	17.9
815	*Triglops nybelini*	1	1	8.1	8.1	8.1	8.1	8.1
447	*Urophycis tenuis*	436	436	18.8	24.3	37.3	63.5	67.1
725	Zoarcidae	2	2	11.4	11.4	13.5	15.5	15.5
728	*Lycodes lavalaei*	108	62	9.6	10.1	19.2	56.9	63.5

Invertebrates

Code STRAP	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1**	Median	P99**	Max
2218	*Anthoptilum grandiflorum*	491	292	4.7	14.9	44.8	67.3	67.3
8138	*Argis dentata*	556	0	0.7	0.8	1.6	2.2	2.5
8113	*Atlantopandalus propinqvus*	96	0	1.2	1.2	1.7	2.5	2.5
8206	*Cancer irroratus*	2	1	7.8	7.8	9.1	10.4	10.4
8213	*Chionoecetes opilio*	705	349	0.7	0.8	3.4	12.2	13.3
8075	*Eualus fabricii*	169	0	0.4	0.5	0.8	1.1	1.2
8080	*Eualus gaimardii*	19	0	0.6	0.6	0.9	1.0	1.0
8077	*Eualus macilentus*	291	0	0.6	0.7	0.9	1.3	1.4
8074	*Eualus* sp.	11	0	0.7	0.7	0.9	1.1	1.1
8033	*Eusergestes arcticus*	48	0	1.3	1.3	1.6	2.1	2.1
2217	*Halipteris finmarchica*	53	29	8.8	8.8	70.0	141.5	141.5
8217	*Hyas araneus*	128	72	0.6	0.6	1.4	7.4	7.7
8218	*Hyas coarctatus*	437	211	0.5	0.6	1.6	5.9	7.5
8028	*Hymenopenaeus debilis*	1	0	1.7	1.7	1.7	1.7	1.7
4753	*Illex illecebrosus*	928	688	5.5	13.0	19.6	23.6	24.4
8092	*Lebbeus groenlandicus*	93	0	0.7	0.7	1.4	1.9	1.9
8095	*Lebbeus microceros*	2	0	1.0	1.0	1.1	1.2	1.2

Code STRAP	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1**	Median	P99**	Max
8093	*Lebbeus polaris*	279	0	0.6	0.7	1.0	1.4	1.4
8196	*Lithodes maja*	117	100	1.3	1.4	8.6	11.8	12.0
8111	*Pandalus borealis*	13156	713	0.8	1.1	2.1	2.7	3.0
8112	*Pandalus montagui*	2333	0	0.7	0.8	1.4	2.1	2.4
8057	*Pasiphaea multidentata*	2190	0	1.1	1.5	2.5	3.0	3.3
2203	*Pennatula aculeata*	675	503	0.1	3.6	10.9	26.0	30.3
2210	*Pennatula grandis*	244	184	10.9	14.2	33.3	58.1	67.1
8135	*Pontophilus norvegicus*	1081	0	0.7	0.8	1.3	1.6	1.7
8129	*Sabinea sarsii*	132	0	0.7	0.8	1.2	1.5	1.6
8128	*Sabinea septemcarinata*	300	0	0.5	0.7	1.3	1.6	1.7
8119	*Sclerocrangon boreas*	542	0	0.8	1.0	1.7	3.2	3.5
8087	*Spirontocaris liljeborgii*	111	0	0.5	0.5	1.1	1.4	1.4
8086	*Spirontocaris phippsii*	2	0	0.6	0.6	0.6	0.6	0.6
8084	*Spirontocaris* sp.	4	0	0.6	0.6	0.7	0.8	0.8
8085	*Spirontocaris spinus*	126	0	0.5	0.6	1.0	1.6	1.7

** Codes for vertebrates and invertebrates used by the Quebec Region of DFO (Miller and Chabot 2014).*
*** P1 : 1st percentile P99 : 99th percentile*