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 2018/036

Quebec Region

Preliminary results from the groundfish and shrimp multidisciplinary survey in August 2017 in the Estuary and northern Gulf of St. Lawrence

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August 2018

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., Senay, C., Scallon-Chouinard, P.-M. and Smith, A. 2018. Preliminary results from the groundfish and shrimp multidisciplinary survey in August 2017 in the Estuary and northern Gulf of St. Lawrence. DFO Can. Sci. Advis. Sec. Res. Doc. 2018/036. iv + 90 p.

Aussi disponible en français :

Bourdages, H., Brassard, C., Desgagnés, M., Galbraith, P., Gauthier, J., Nozères, C., Senay, C., Scallon-Chouinard, P.-M. et Smith, A. 2018. Résultats préliminaires du relevé multidisciplinaire de poissons de fond et de crevette d'août 2017 dans l'estuaire et le nord du golfe du Saint-Laurent. Secr. can. de consult. sci. du MPO, Doc. de rech. 2018/036. iv + 90 p.

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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 oceanographic conditions (phytoplankton and zooplankton), monitor the pelagic ecosystem, take inventories of marine mammals and seabirds, and collect samples for various research projects. In 2017, the survey was conducted between August 2 and September 2 on board the *CCGS Teleost*. The survey successfully carried out 170 trawl tows as well as 105 CTD water column casts, and 73 zooplankton samples.

This report presents the results from catches from the 170 tows. In total, 79 fish taxa and 215 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 Deepwater Redfish (*Sebastes mentella*) is significant, alone, it constituted nearly three quarters of the total catch. 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*), White Hake (*Urophycis tenuis*) and Witch Flounder (*Glyptocephalus cynoglossus*), while the biomasses of Northern Shrimp, Greenland Halibut and Cod are declining. Capelin (*Mallotus villosus*) is less present in catches in recent years.

A preliminary analysis of water temperature data collected in 2017 shows that the surface water and cold intermediate layer temperatures were near normal in August. At 150 m depth, the conditions have become less warm than in 2016, remained warm at 200 m and have warmed further at 300 m.

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, standardized protocols to examine the spatial and temporal changes in 1) the distribution, relative abundance and assemblages of fishes, and 2) 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 2017 the survey was conducted between August 2 and September 2 on board the *CCGS Teleost* (mission IML-2017-027).

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 2017, 170 fishing stations were successful, 47 in 4R, 83 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. For fish, crab and squid, size and weight are gathered by individual and, 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, and otoliths are saved for Atlantic Cod, Atlantic Halibut, and Witch Flounder. 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 (station description, scientific name, etc.).

In recent years, efforts to better describe catches of non-commercial species have intensified. Efforts were increased in 2003 for fish and in 2006 for invertebrates. An identification guide for marine fishes of the estuary and northern Gulf of St. Lawrence (Nozères et al. 2010) and a guide for invertebrates (Nozères et al. 2014) were used to identify most taxa at the species level.

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

1. Amplification of environmental DNA taken from water samples at different depths to detect species and characterize demersal communities in the Estuary and Gulf of St. Lawrence.
2. Several species of fish and invertebrates for the identification of these species from morphometric and genetic analyses.
3. Sponges for genetic identifications.
4. Invasive species (tunicates) to confirm their genetic and microscopic identification.
5. Atlantic halibut and cod samples for genetic analysis of Atlantic populations.
6. 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.
7. Greenland halibut in order to study the dynamics of the population.
8. Silver hake studied for its trophic role, growth, and origin.
9. Stomachs of several fish species in order to describe their diet.
10. Redfish to study their diet using various types of analyses of stomach contents (visual and DNA) and by the analysis of lipid markers in the liver.
11. Redfish otoliths to study growth as a function of the spatial variability in the diet.
12. 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.
13. Marine mammal prey (several fish species and northern shrimp) to follow the development of isotopic signatures of key species in the St. Lawrence ecosystem.
14. Ray capsules to identify them with the species and to locate spawning sites.
15. Black Dogfish embryos and juveniles, and ray capsules in order to study their developmental morphology and their chondrification and mineralization processes.
16. Bivalves and sea pens to study short- and long-term environmental variations in the Estuary and the northern Gulf of St. Lawrence using bioarchives, or by carrying out sclerochronology on these species.
17. Fish and invertebrates for the "Maurice Lamontagne Institute (MLI) Open House."
18. Boxes of shrimp and capelin for requests for aquacultural purposes by the MLI tank room.
19. Samples preserved for the pH-alkalinity and methane measurements.

Oceanographic conditions such as temperature, conductivity (salinity), turbidity, dissolved oxygen, luminosity and fluorescence were sampled during this survey. A total of 93 vertical profiles of the water column were done at the fishing stations, 12 of which were at 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 170 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 2017 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 1990-2016 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 for Capelin and Herring, the calculated indices are instead probability values (%) of encountering species during the survey. Indeed, due to the pelagic character of these two species, the bottom trawl is not an ideal fishing gear for their capture and, therefore, to accurately estimate abundance.

Note that the distinction between the two redfish species, *Sebastes 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 1990-2016 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 2017).

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 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 20^{th}, 40^{th}, 60^{th} and 80^{th}

percentiles of the non-zero values. The catch rates distribution for the 2017 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 60. These results are preliminary and must be considered as such until validations and laboratory analyses have been completed.

The average weight per tow for 56 taxa of fish and 97 taxa of invertebrates is given in figures 61 and 62. 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 (SLGO).

Finally, Appendix 2 provides a list of all taxa, vertebrates and invertebrates, caught among the 170 successful tows achieved during the 2017 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, 79 fish taxa and 215 invertebrate taxa were identified in 2017. More than three-quarters 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 six years.

The average probability of catching **capelin** (*Mallotus villosus*) has been below the historical average for the past four years.

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

The abundance and biomass of **Greenland halibut** (*Reinhardtius hippoglossoides*) decreased in 2017 and are under the series average. The size frequency distributions indicate that the abundance of the 2016 cohort (17 cm mode) 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 four years to reach the highest values of the series.

The average probability of catching **herring** (*Clupea harengus*) is above average in 4R and 4S.

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 at the average level in 2017. This increase is due in part to an above-average abundance of individuals having a modal size of 18 cm.

The abundance and the biomass of **white hake** (*Urophycis tenuis*) are stable and above the historical average for the past three years.

The abundance and biomass indices of **cod** (*Gadus morhua*) decreased in 2017 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; their abundance is stable.

The abundance and biomass of **Acadian redfish** (*Sebastes fasciatus*) are on the rise and 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. Abundance and biomass are at record highs, respectively 75 and 30 times higher than in the 20 years preceding this strong recruitment. The 2011 cohort, which is the most abundant, now has a modal length of 20 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*) have been below average for the past two years and have decreased by more than 50% over this period.

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; 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 2017 (Figures 63 and 64) shows that conditions have become less warm at 150 m depth, remained warm at 200 m and have warmed further (new record since 1915) at 300 m. Compared to conditions observed in August 2016, waters between depths of 175 m and 250 m have notably warmed in Cabot Strait, but have cooled at 150 m depth almost everywhere in the Gulf. This temperature decrease at 150 m is associated with a deeper lower limit of cold intermediate layer, especially in Esquiman Channel and Anticosti Channel. The August cold intermediate layer minimum temperature and summer surface water temperatures were nevertheless all near normal in 2017.

Air temperatures over the Gulf were near normal for each of the months between April and August 2017, which led to near-normal average surface water temperatures for both the May–August and July–August periods (+0.1 standard deviations (SD) relative to the 1985–2010 climatology in both cases).

After a winter with near-normal average air temperature, the minimum temperature of the summer cold intermediate layer, estimated using data from the August survey, was also near normal (+0.3 SD; Figure 64).

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 2016 below 250 m in the estuary, as well as in northwestern Gulf below 300 m (Figure 63). Note the large temperature increase below 175 m in Cabot Strait (Figure 63).

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 (5.54°C, 5.9°C, 6.4°C, 6.8°C). The Gulf-wide average temperature has reached a record level since 1915 at 300 m of 6.28°C (Figure 64).

ACKNOWLEDGEMENTS

We would like to thank both crews of the *CCGS Teleost* and wish to highlight the excellent work of the 2016 scientific team. The science team consisted of Laélien Bassi, Denis Bernier, Hugo Bourdages, Claude Brassard, Stéphanie Côté, Mariane Daneau-Lamoureux, Jérôme Gagnon, Johanne Gauthier, Katherine Gavrilchuk, Tanya Hansen, Laurie Isabel, Caroline Lafleur, Jean-François Lussier, Marie-Claude Marquis, Chantal Méthot, Claude Nozères, Anthony Ouellet, Jean-François Ouellet, Éric Parent, Mireille Poulin, Pierre-Marc Scallon-Chouinard, Caroline Senay, Félix St-Pierre, Sylvie St-Pierre, Jean-Denis Thibeault, Marylin Thorne and Lisa Treau de Coeli.

Finally, we would like to thank Jordan Ouellette-Plante and Claude Savenkoff for reviewing this document.

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FIGURES

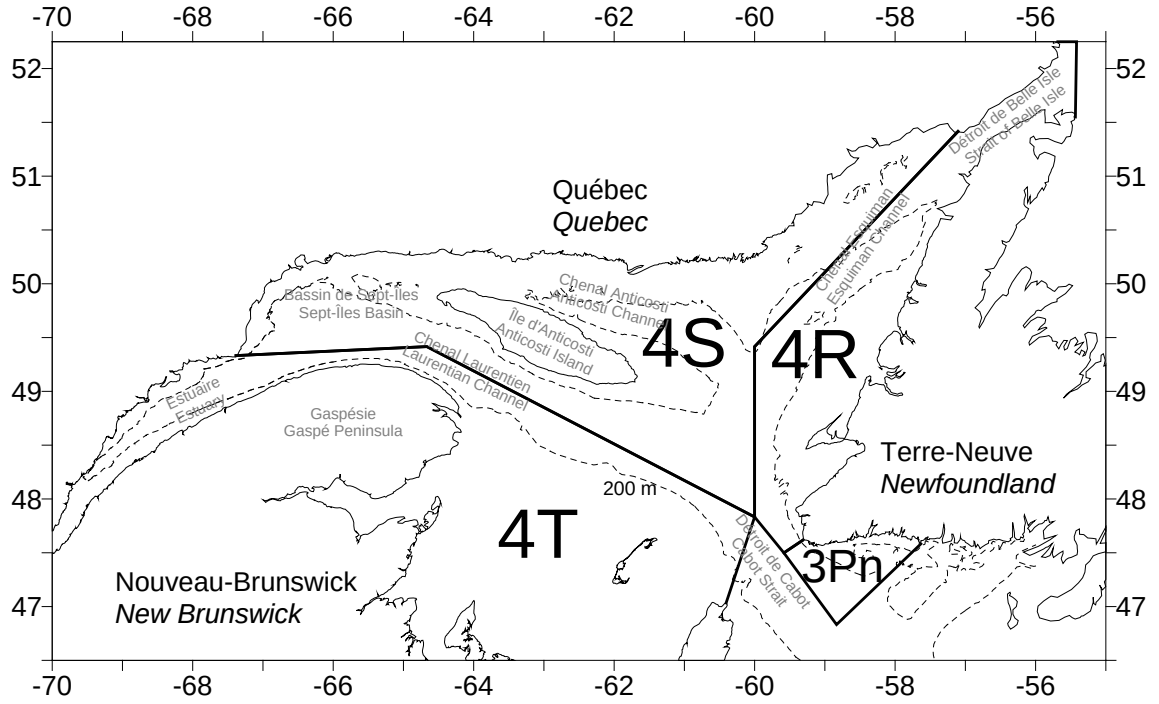

Figure 1. NAFO Divisions of the Estuary and Gulf of St. Lawrence and names of locations mentioned in the text.

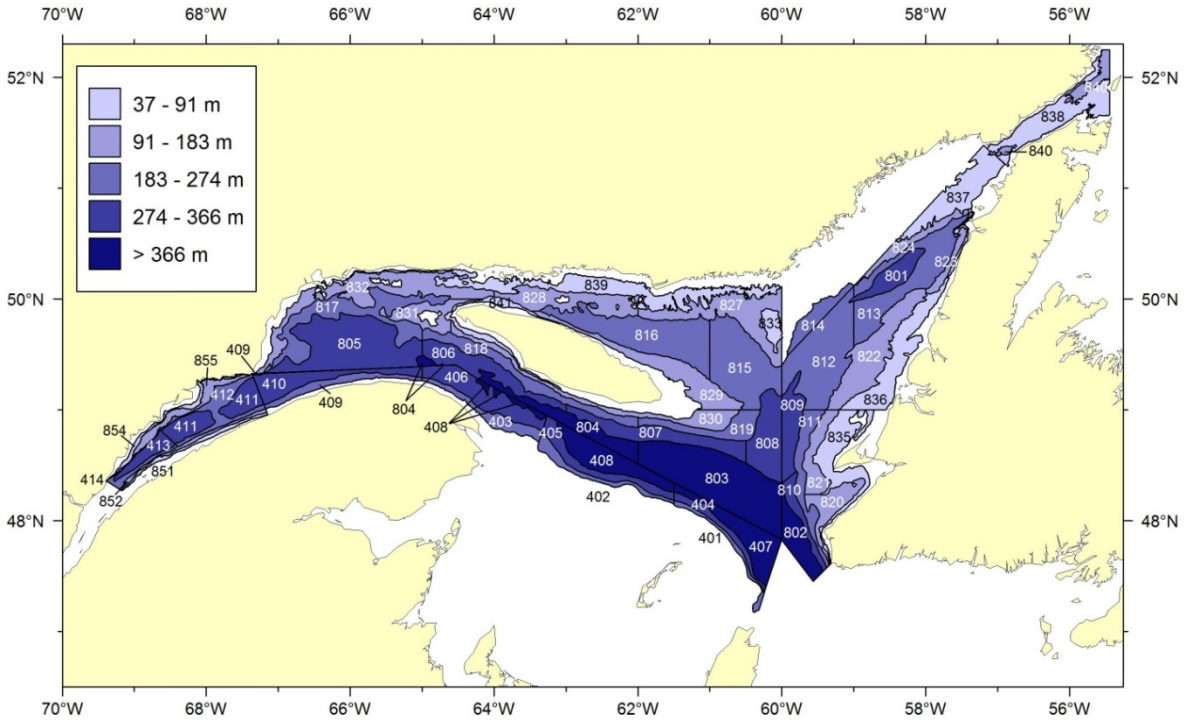

Figure 2. Stratification scheme used for the groundfish and shrimp research survey in the Estuary and northern Gulf of St. Lawrence.

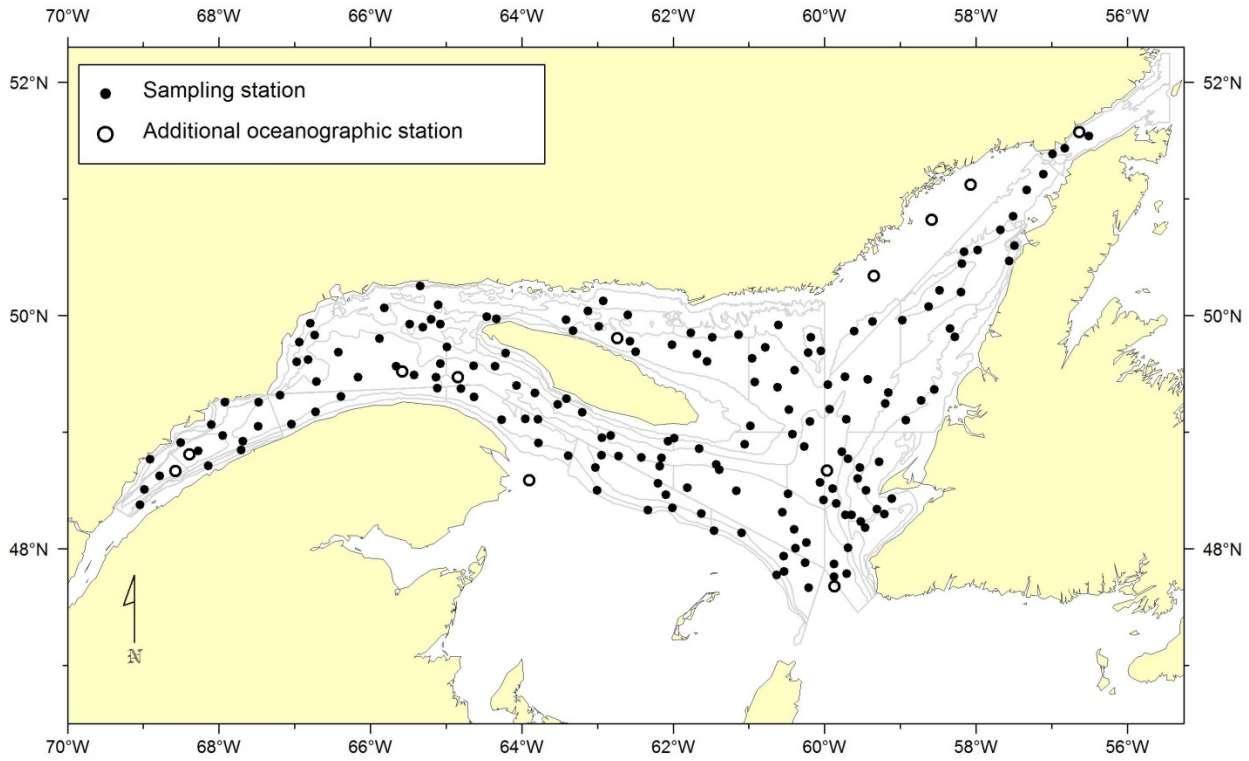

Figure 3. Locations of successful sampling stations (trawl and oceanography) and additional oceanographic stations for the 2017 survey.

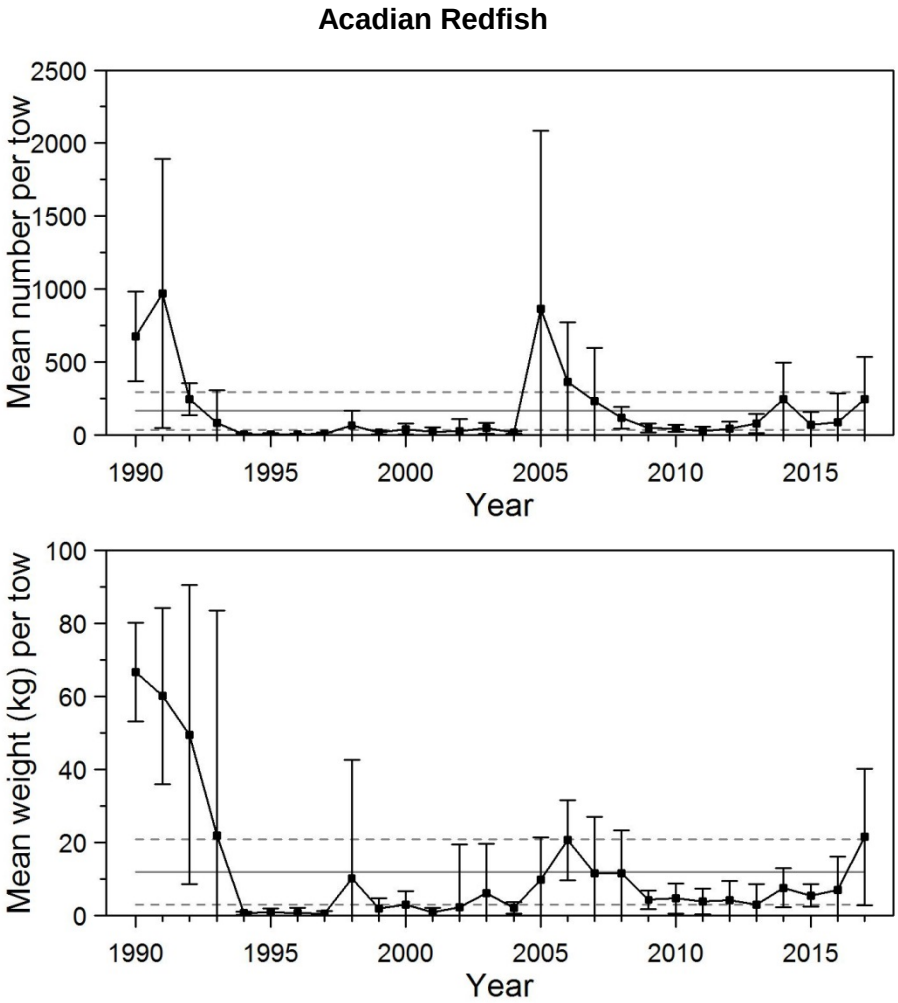

Figure 4. Mean numbers and mean weights per 15 minutes tow observed during the survey for Acadian Redfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

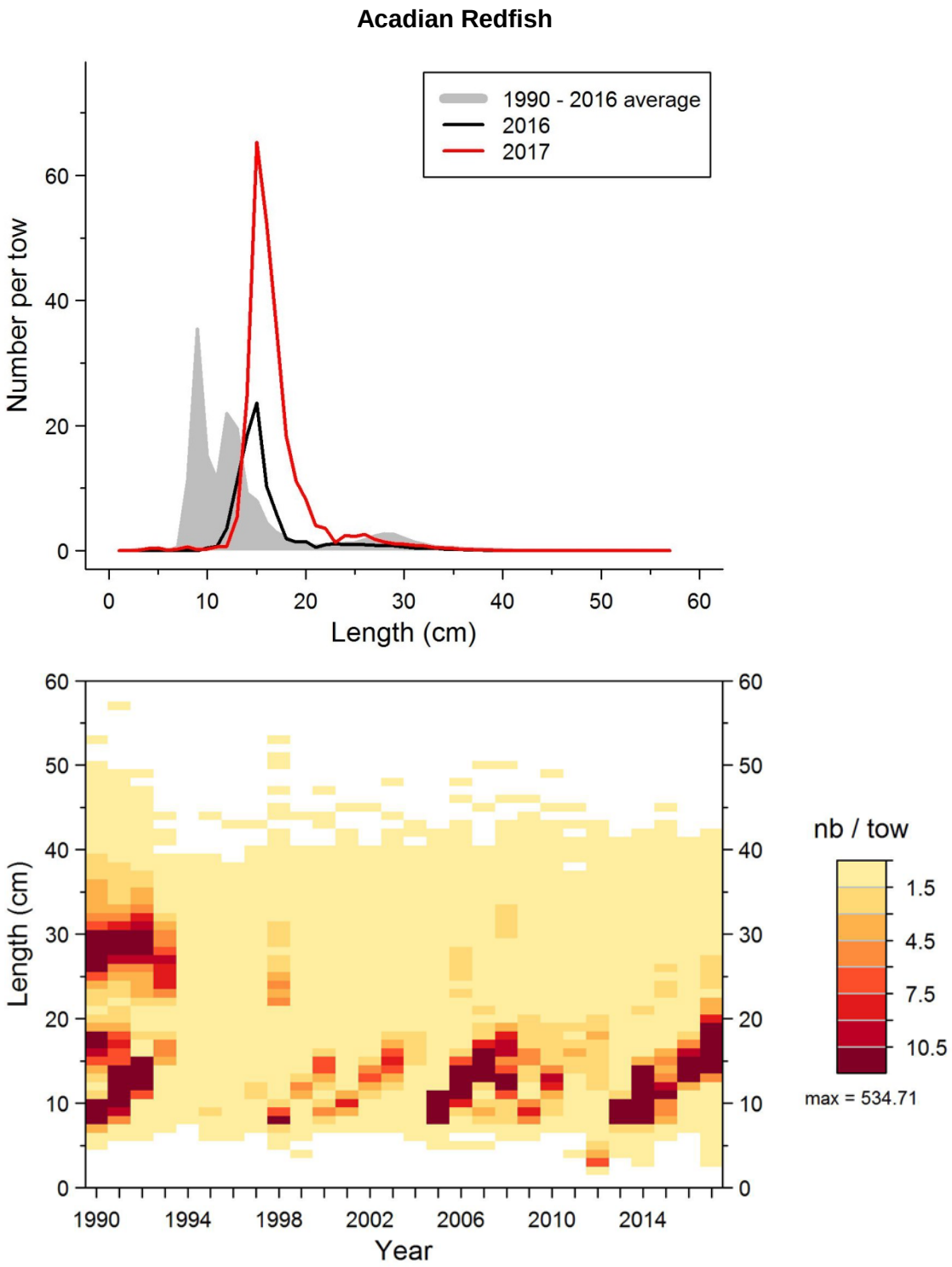

Figure 5. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Acadian Redfish in 4RST.

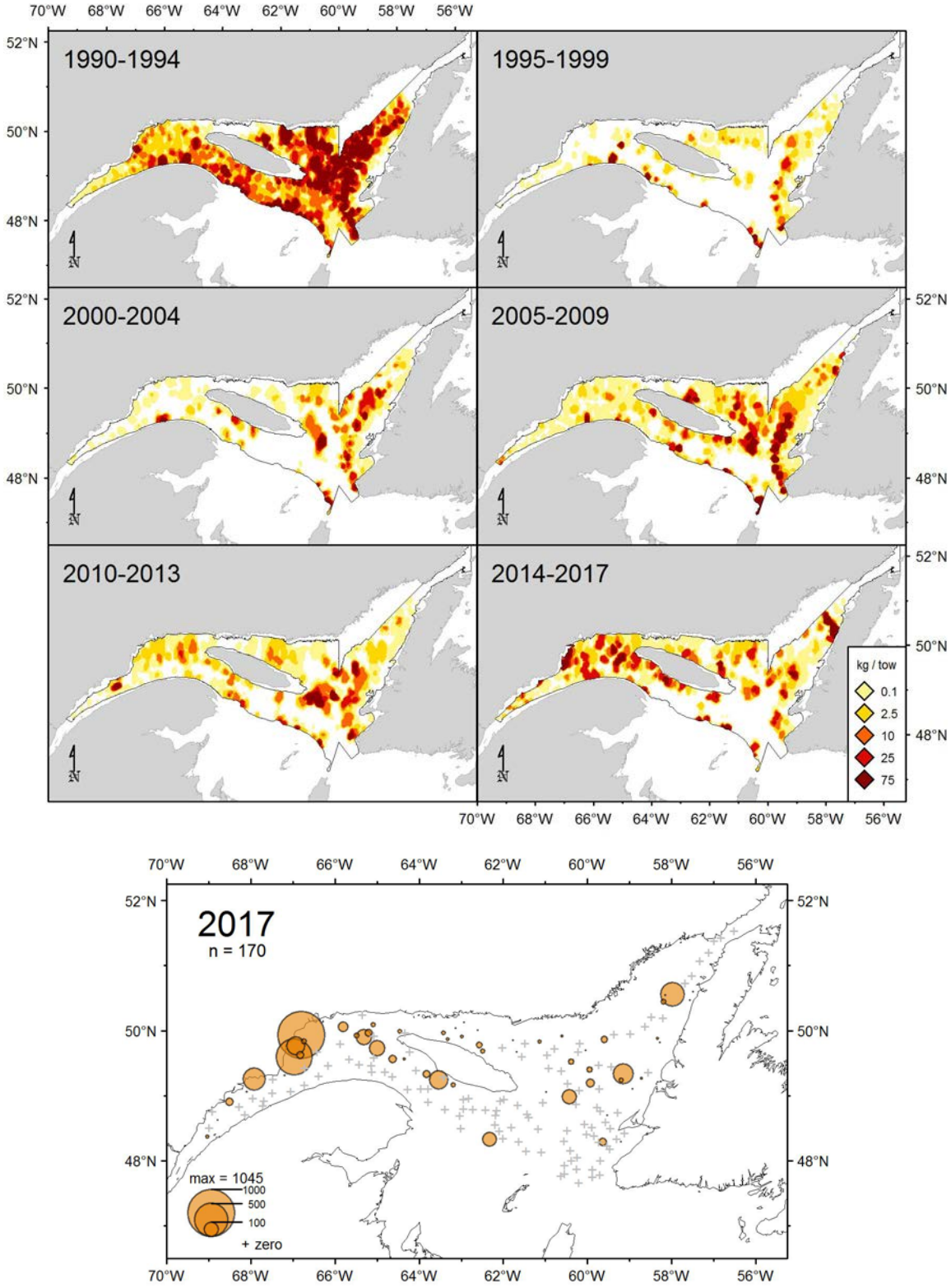

Figure 6. Acadian Redfish catch rates (kg/15 minutes tow) distribution.

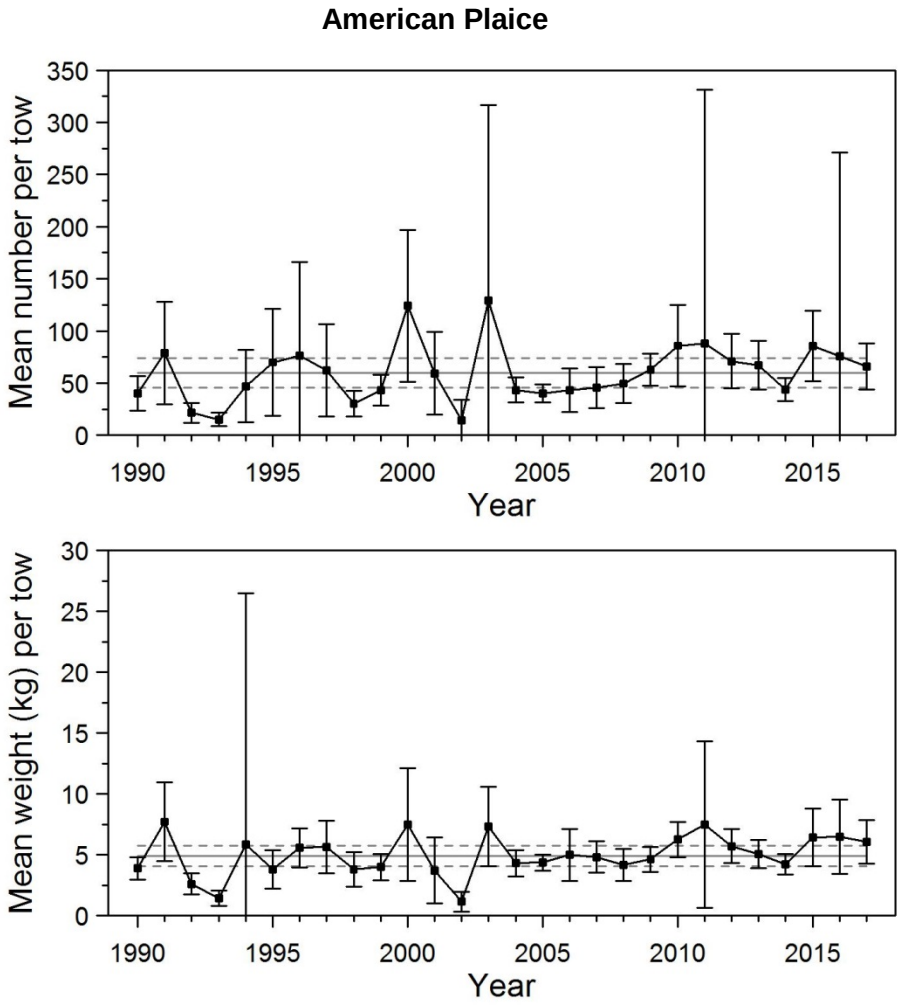

Figure 7. Mean numbers and mean weights per 15 minutes tow observed during the survey for American Plaice in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

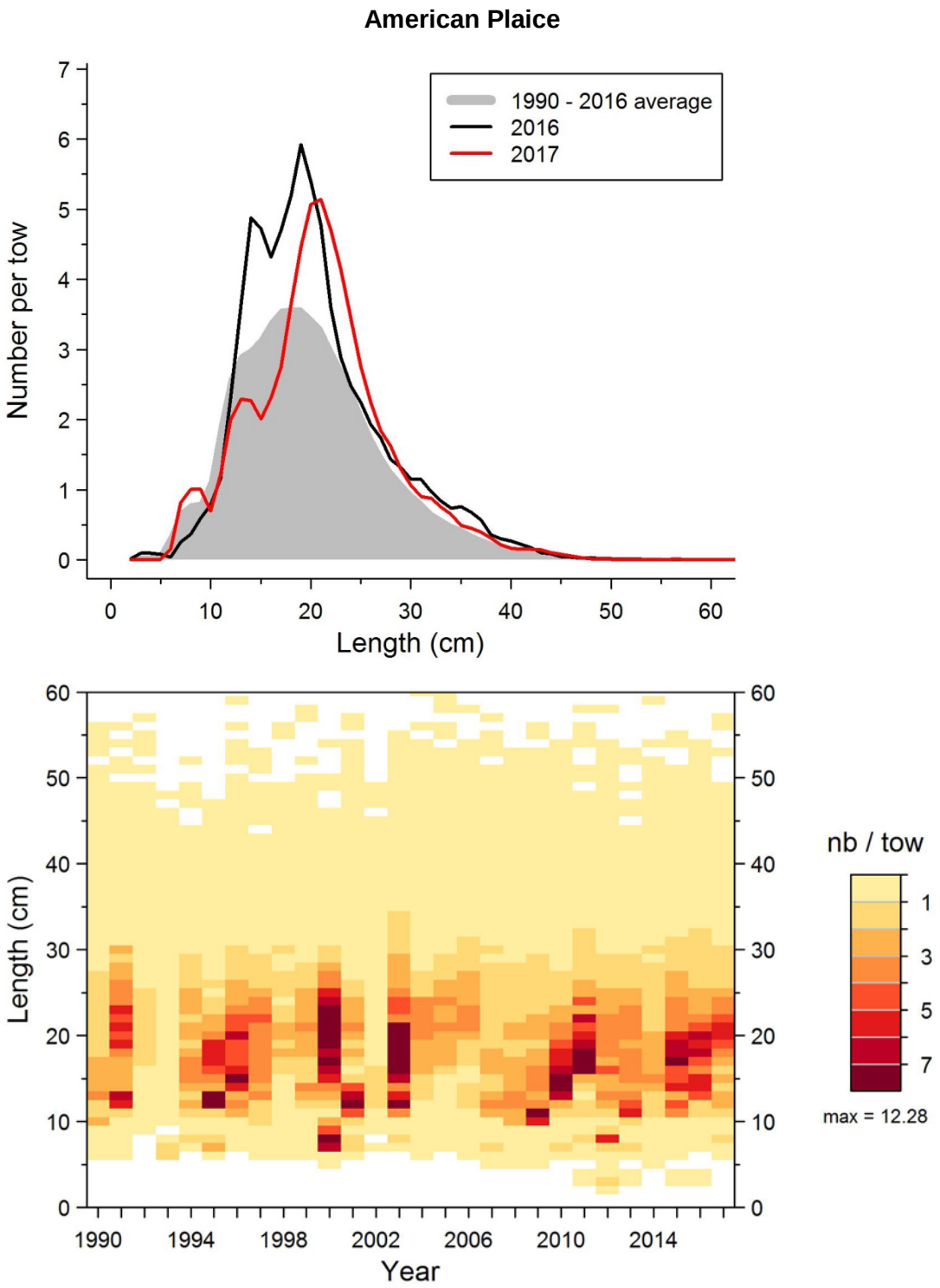

Figure 8. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for American Plaice in 4RST.

American Plaice

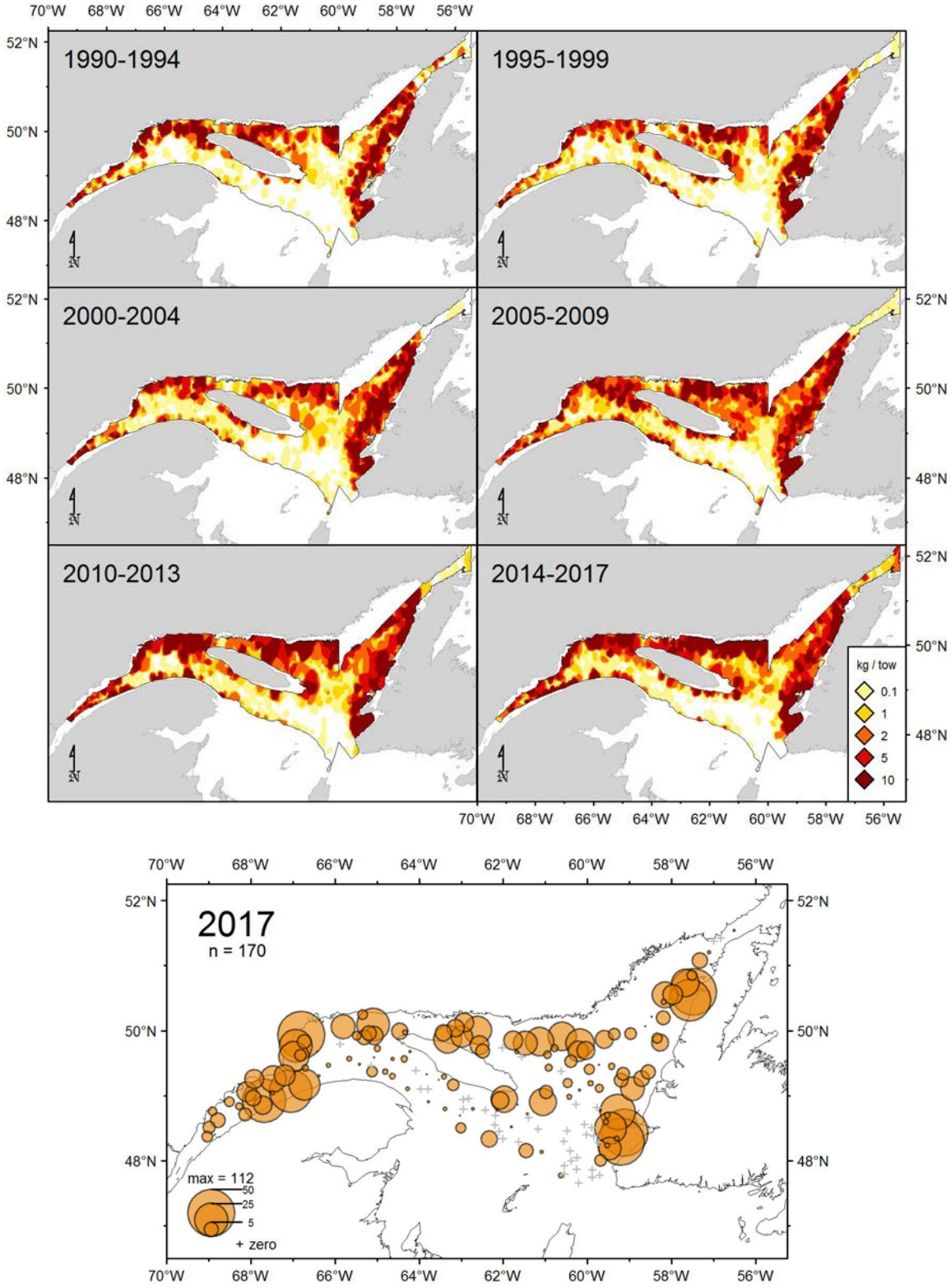

Figure 9. American Plaice catch rates (kg/15 minutes tow) distribution.

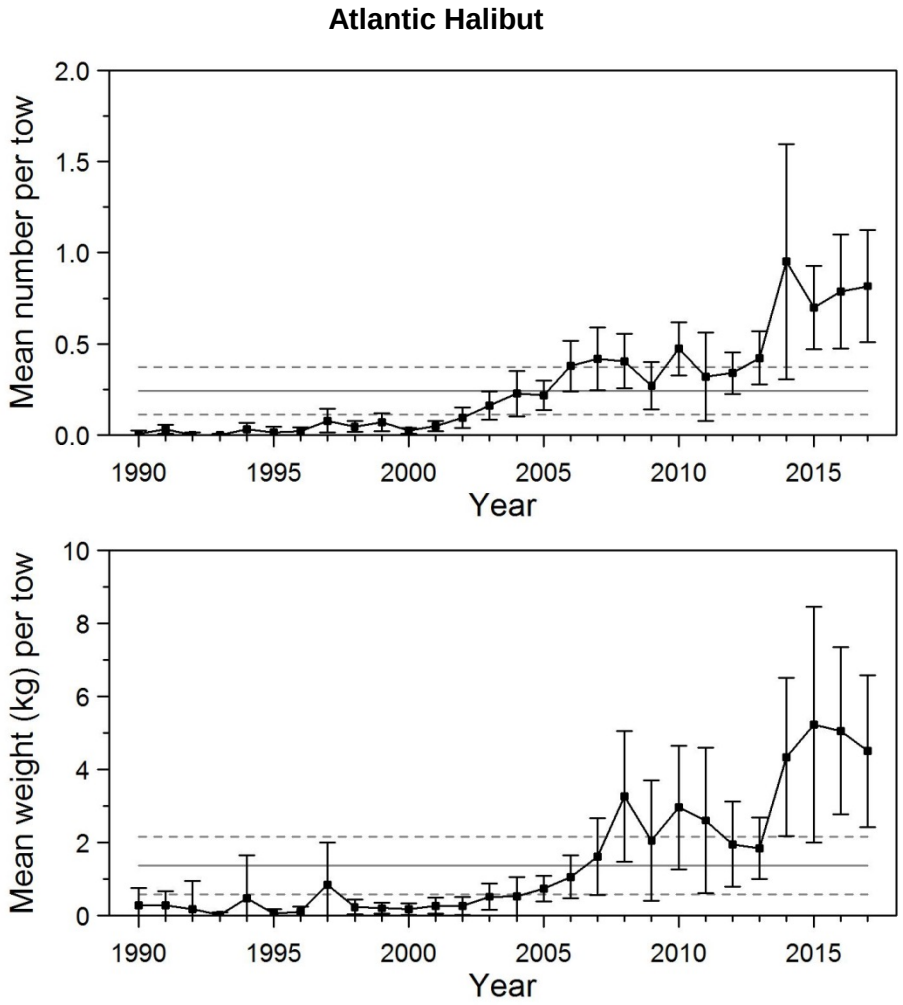

Figure 10. Mean numbers and mean weights per 15 minutes tow observed during the survey for Atlantic Halibut in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

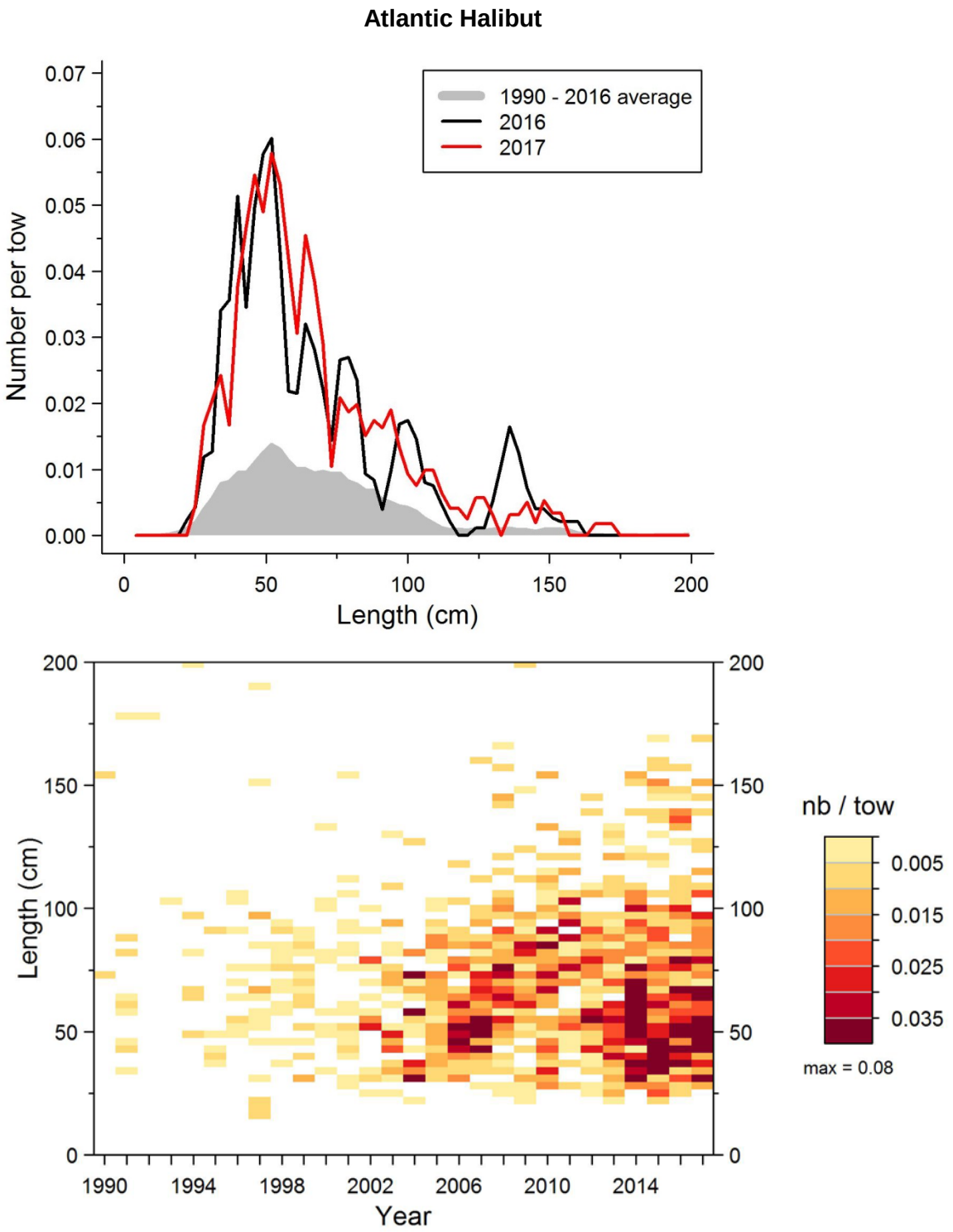

Figure 11. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Atlantic Halibut in 4RST.

Atlantic Halibut

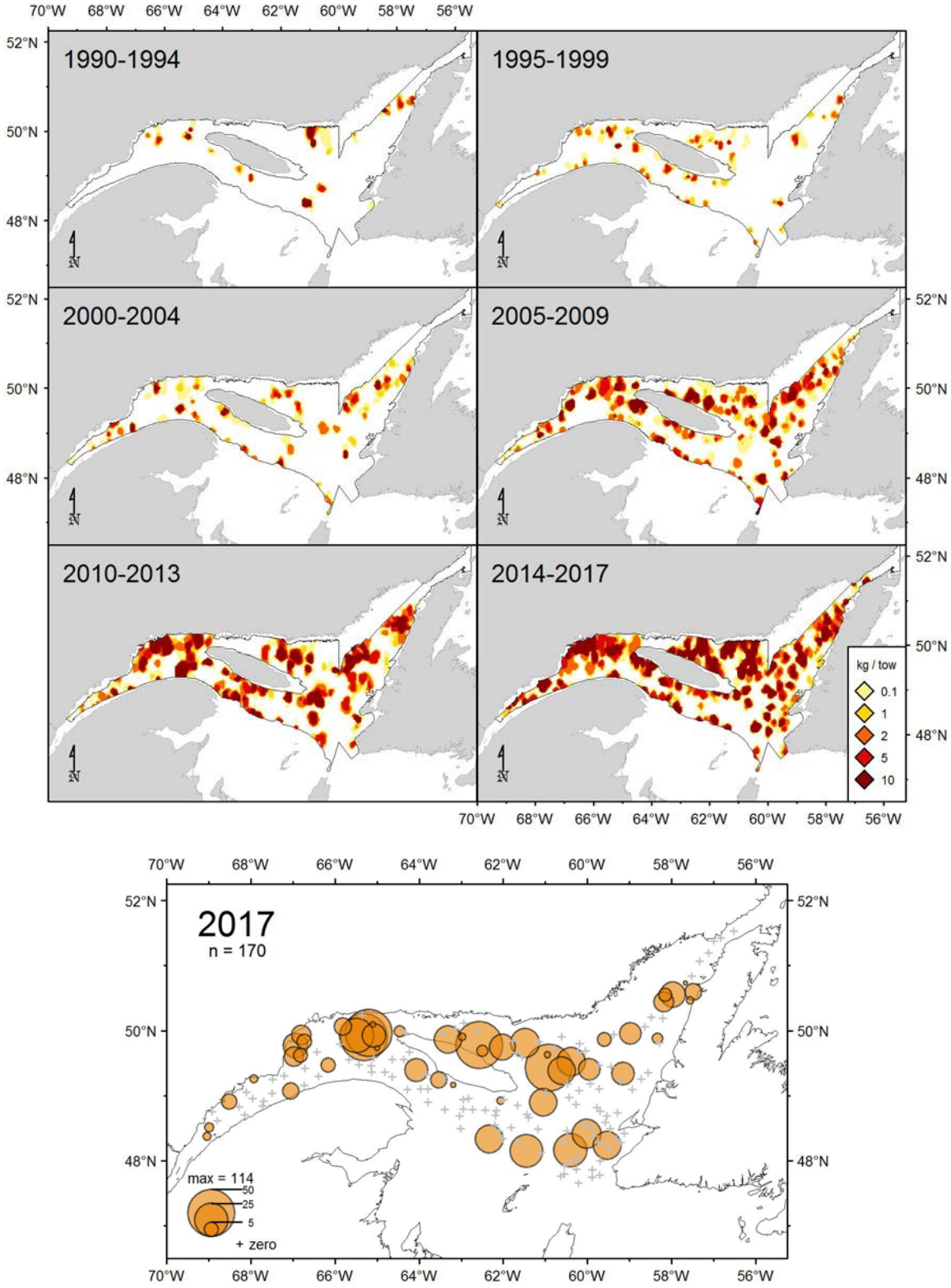

Figure 12. Atlantic Halibut catch rates (kg/15 minutes tow) distribution.

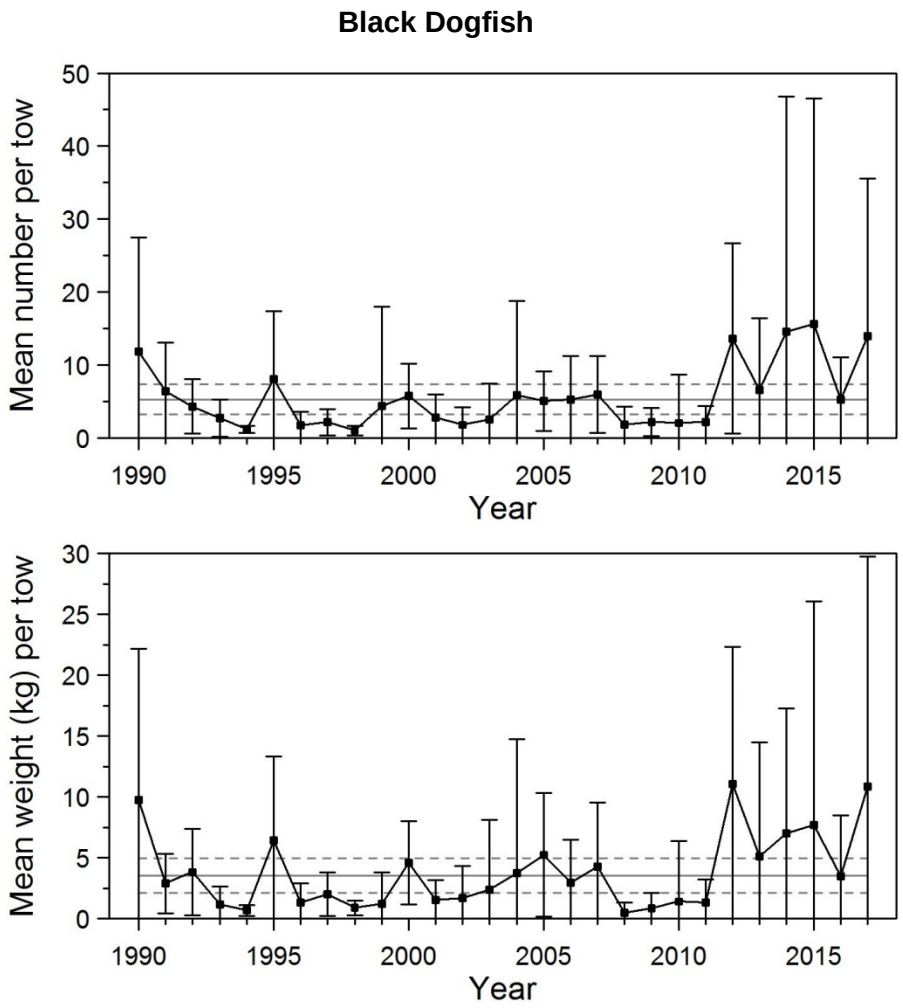

Figure 13. Mean numbers and mean weights per 15 minutes tow observed during the survey for Black Dogfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

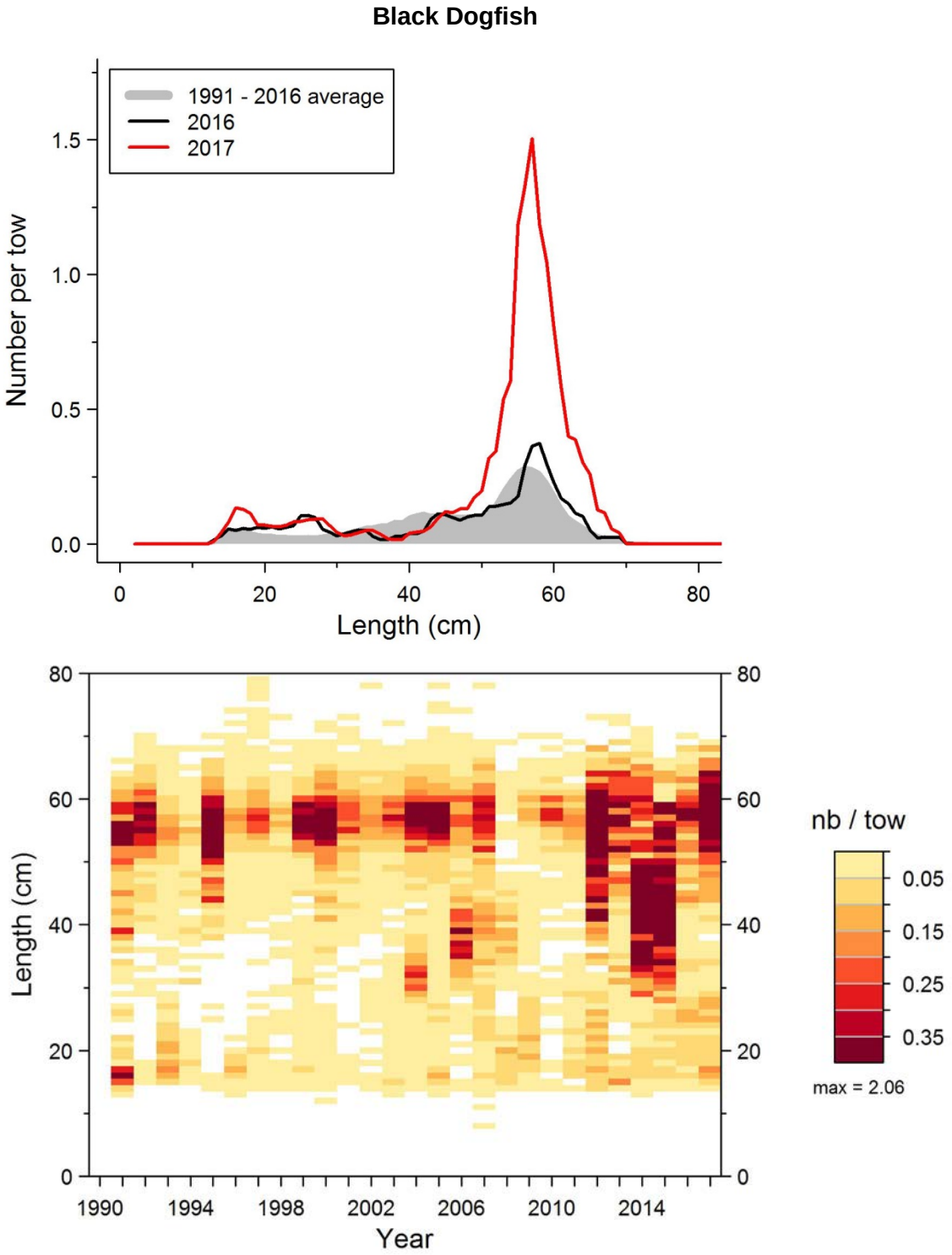

Figure 14. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Black Dogfish in 4RST.

Black Dogfish

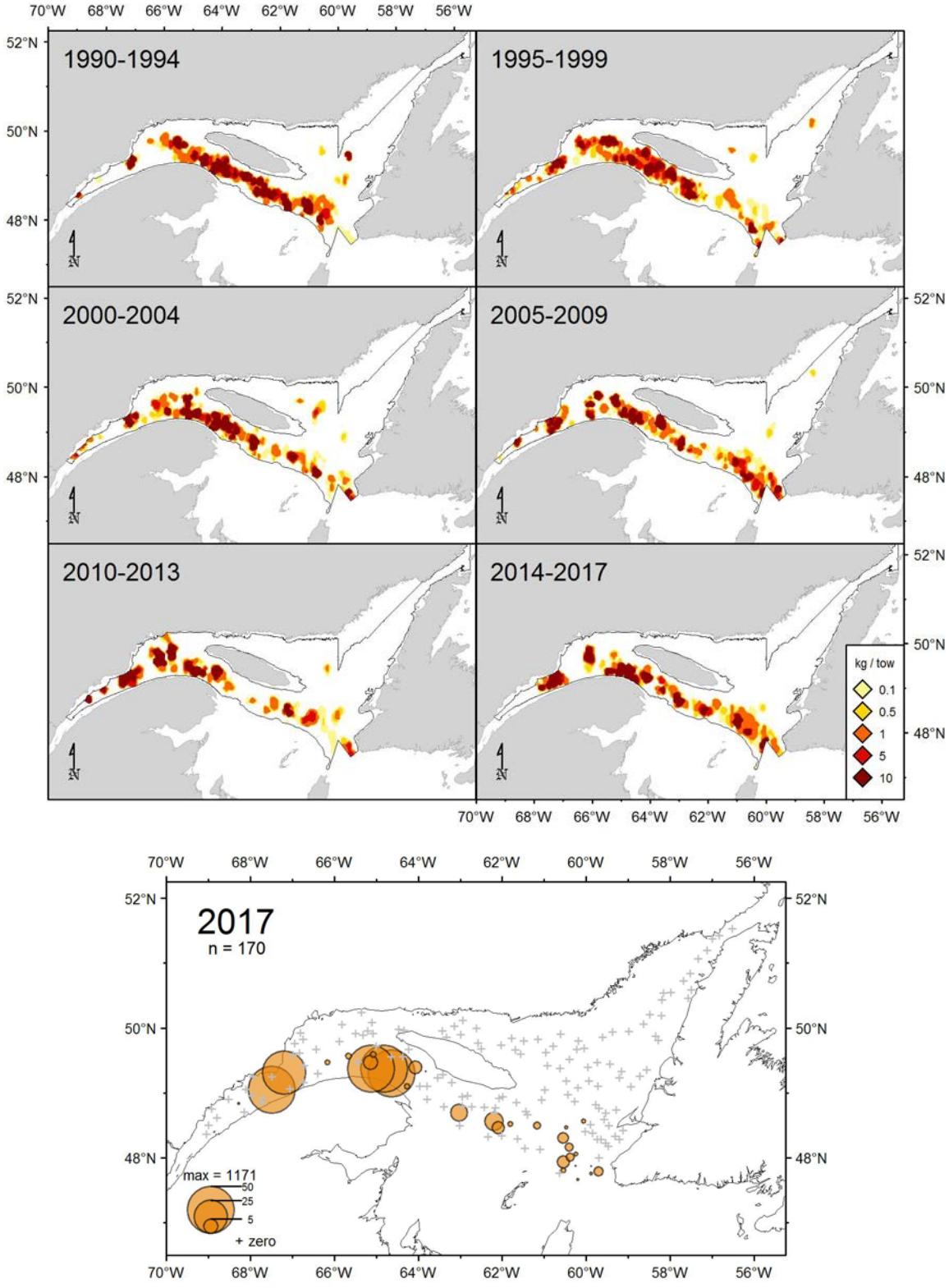

Figure 15. Black Dogfish catch rates (kg/15 minutes tow) distribution.

Capelin

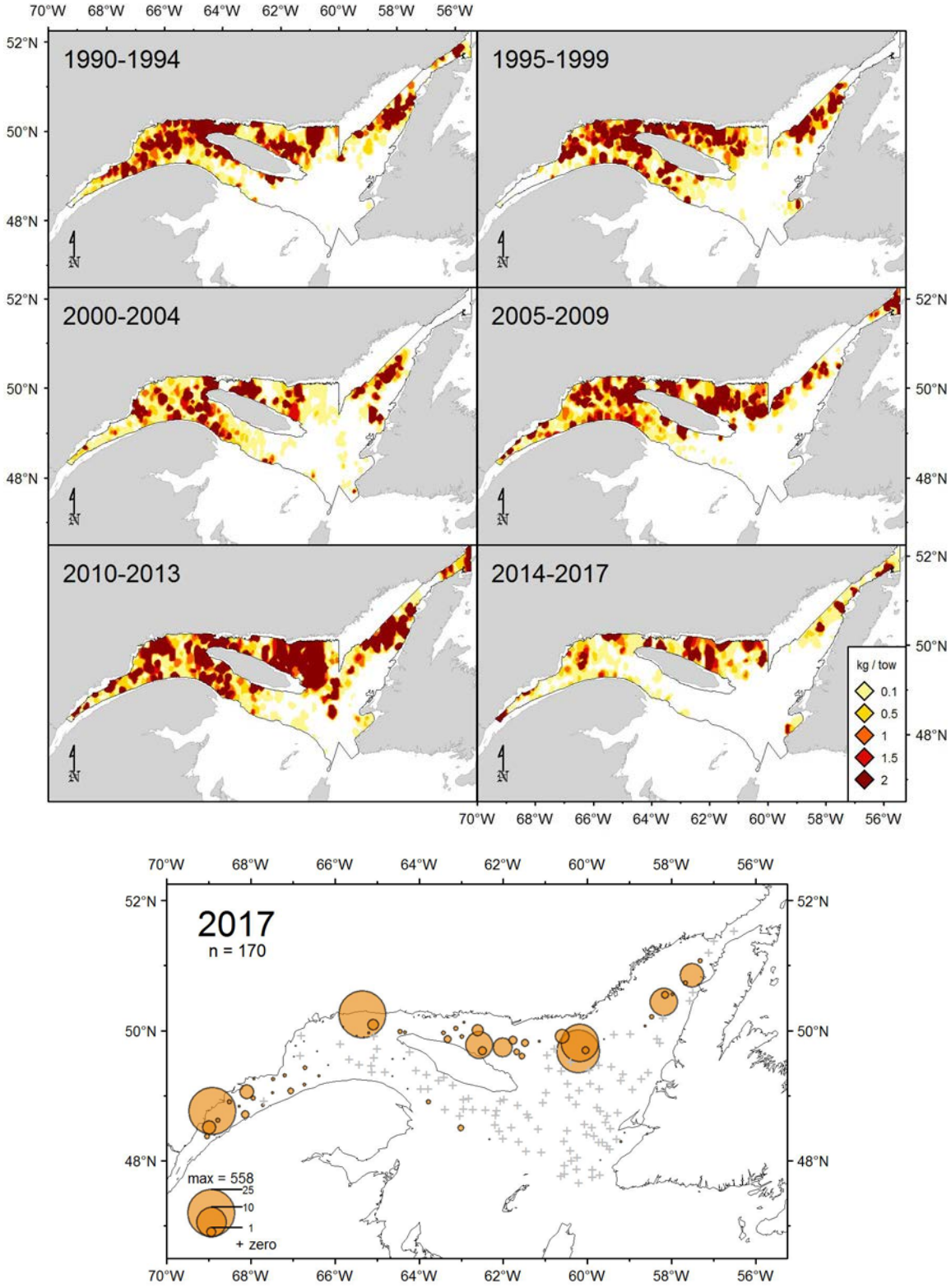

Figure 16. Capelin catch rates (kg/15 minutes tow) distribution.

Capelin

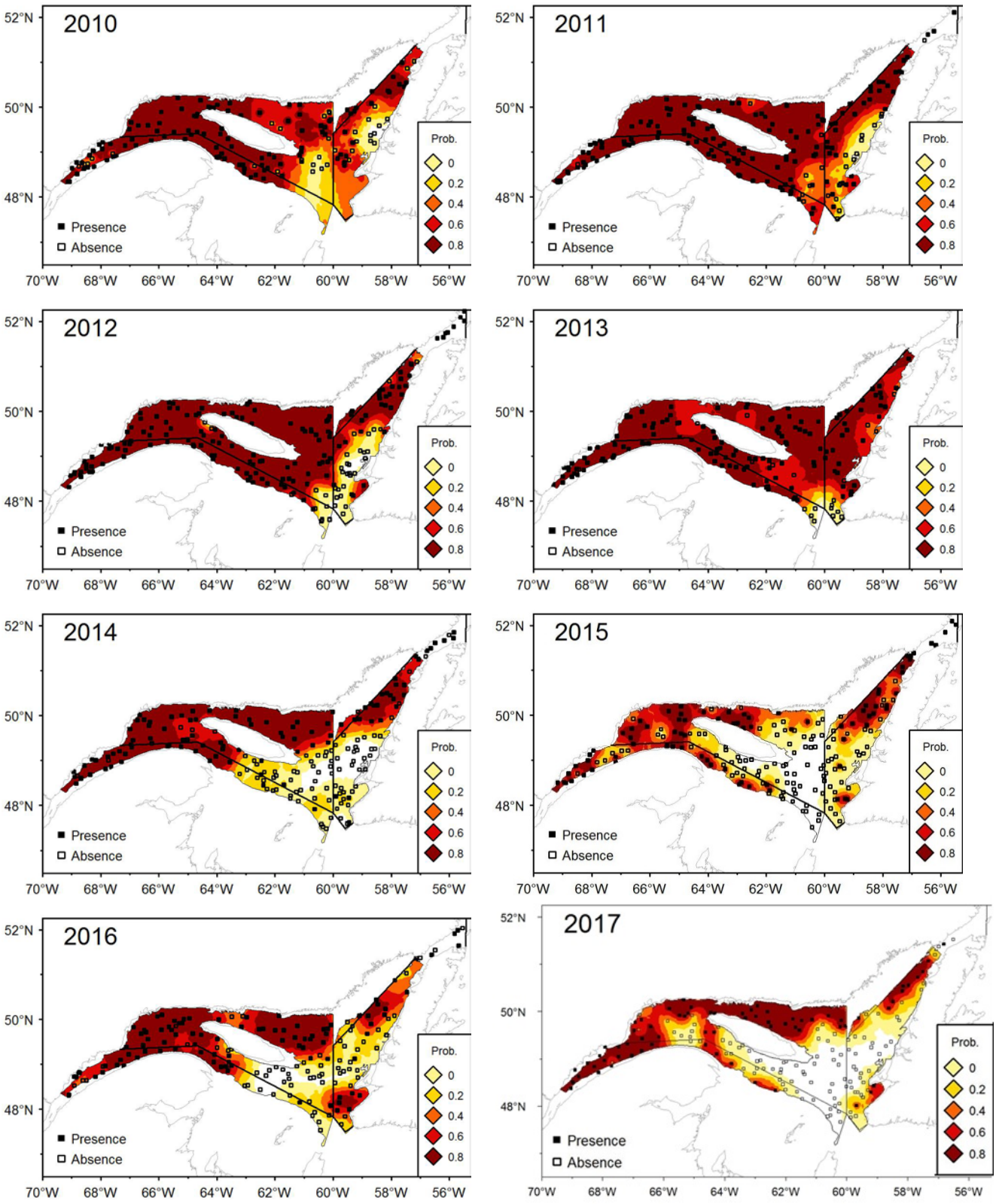

Figure 17. Probabilities areas (%) associated with the presence of Capelin.

Capelin

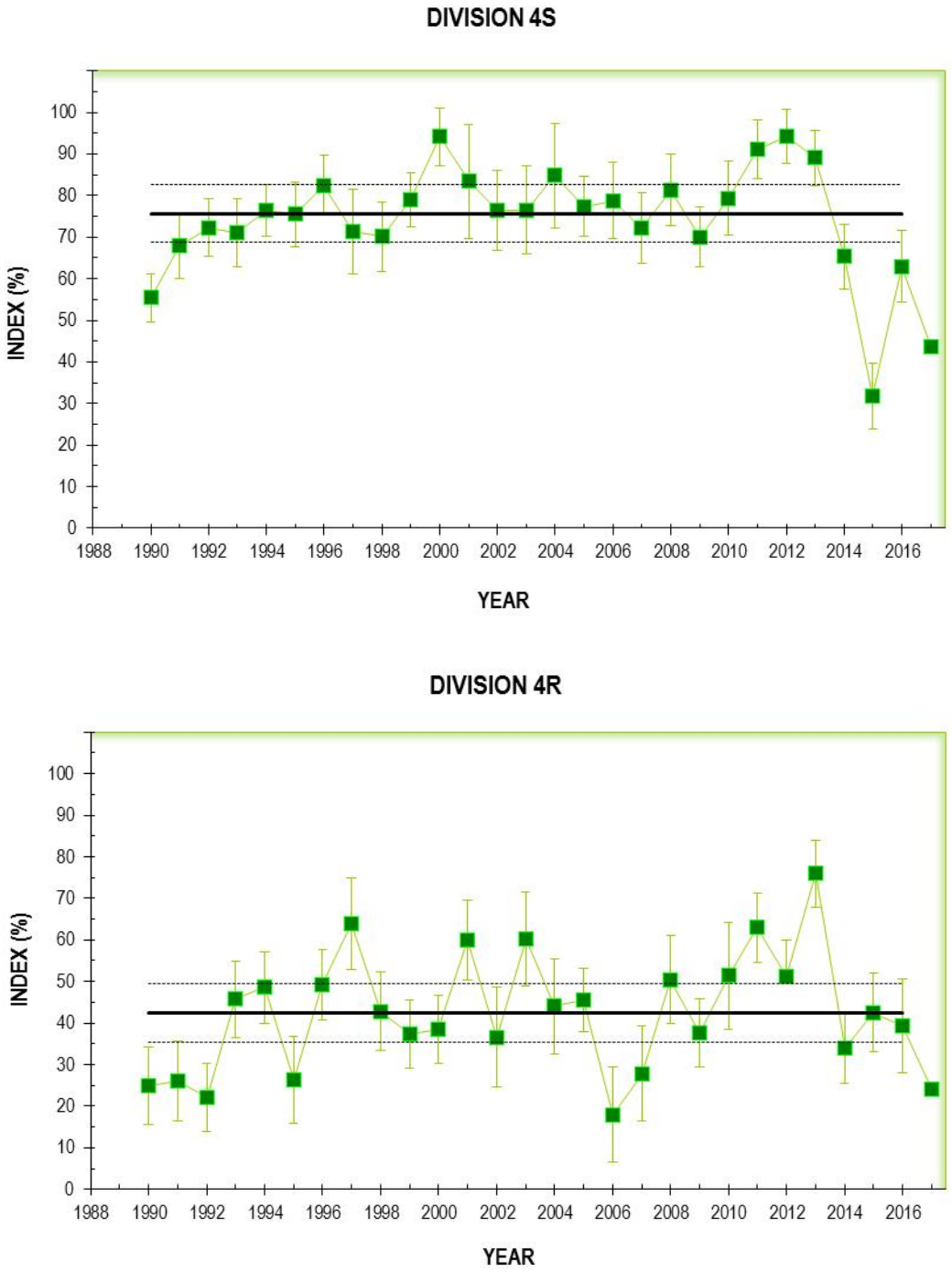

Figure 18. Mean probabilities of finding Capelin in NAFO Divisions 4R and 4S. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

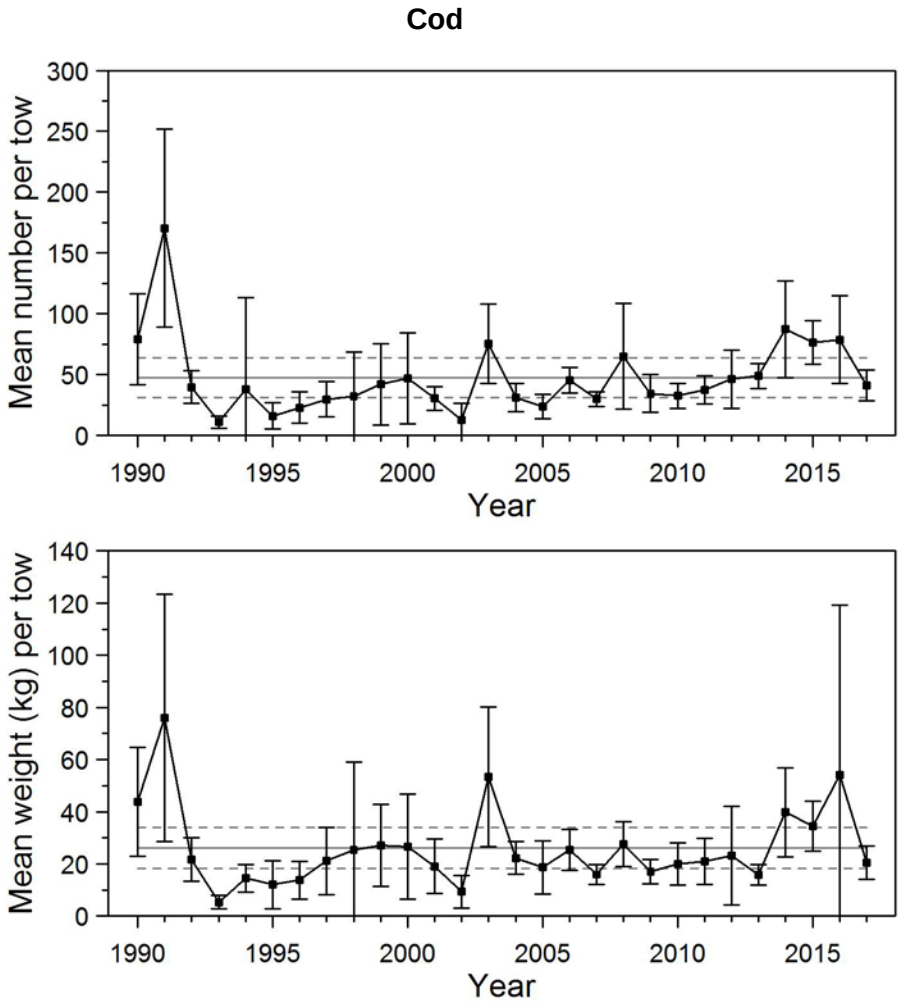

Figure 19. Mean numbers and mean weights per 15 minutes tow observed during the survey for Cod in 4RS. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

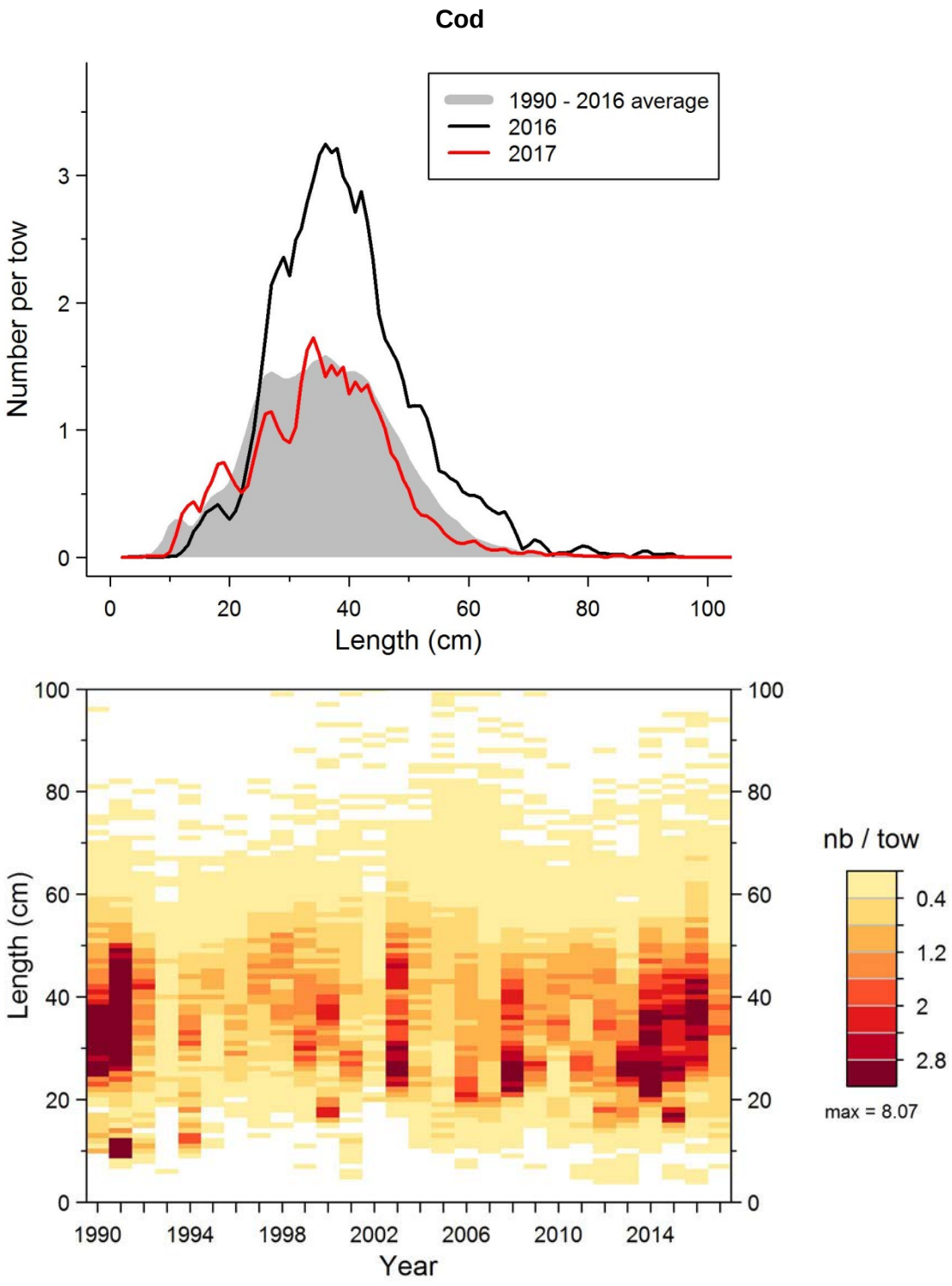

Figure 20. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Cod in 4RS.

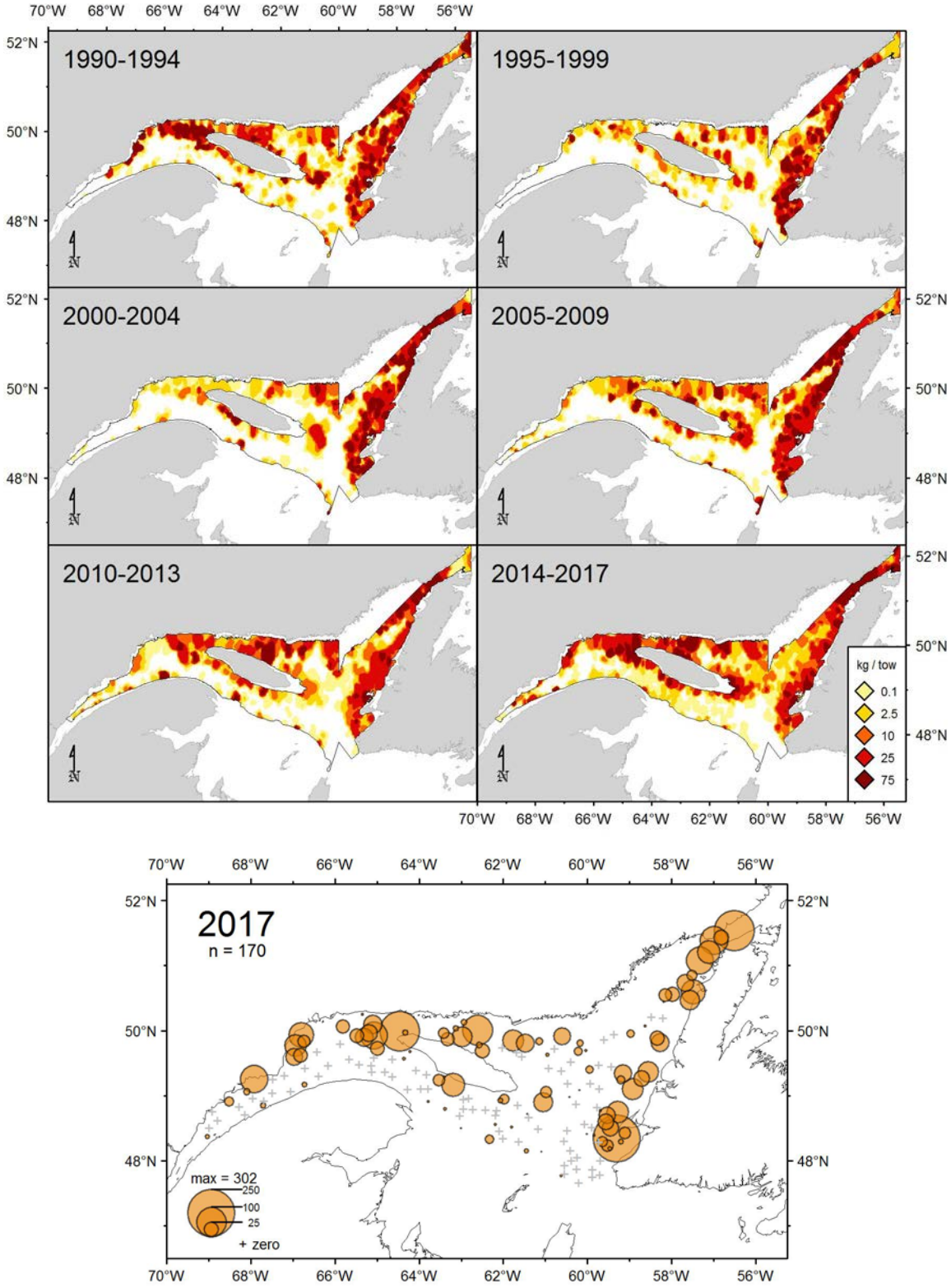

Figure 21. Cod catch rates (kg/15 minutes tow) distribution.

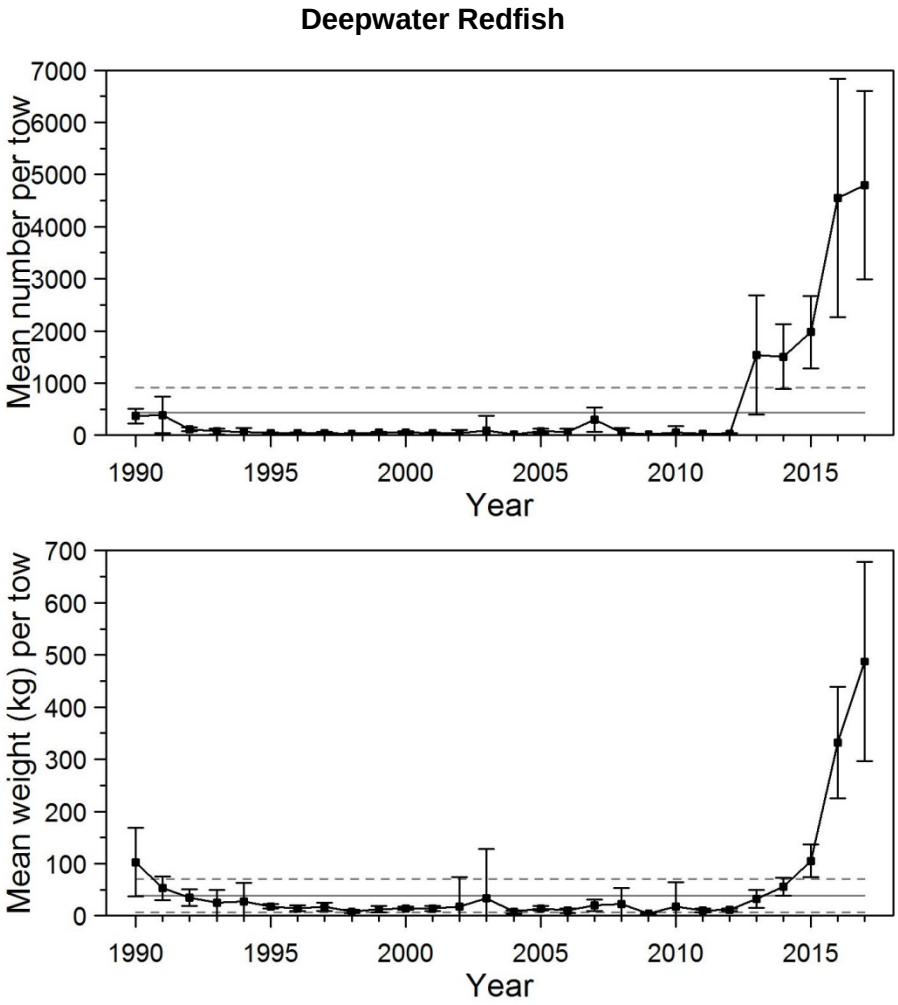

Figure 22. Mean numbers and mean weights per 15 minutes tow observed during the survey for Deepwater Redfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

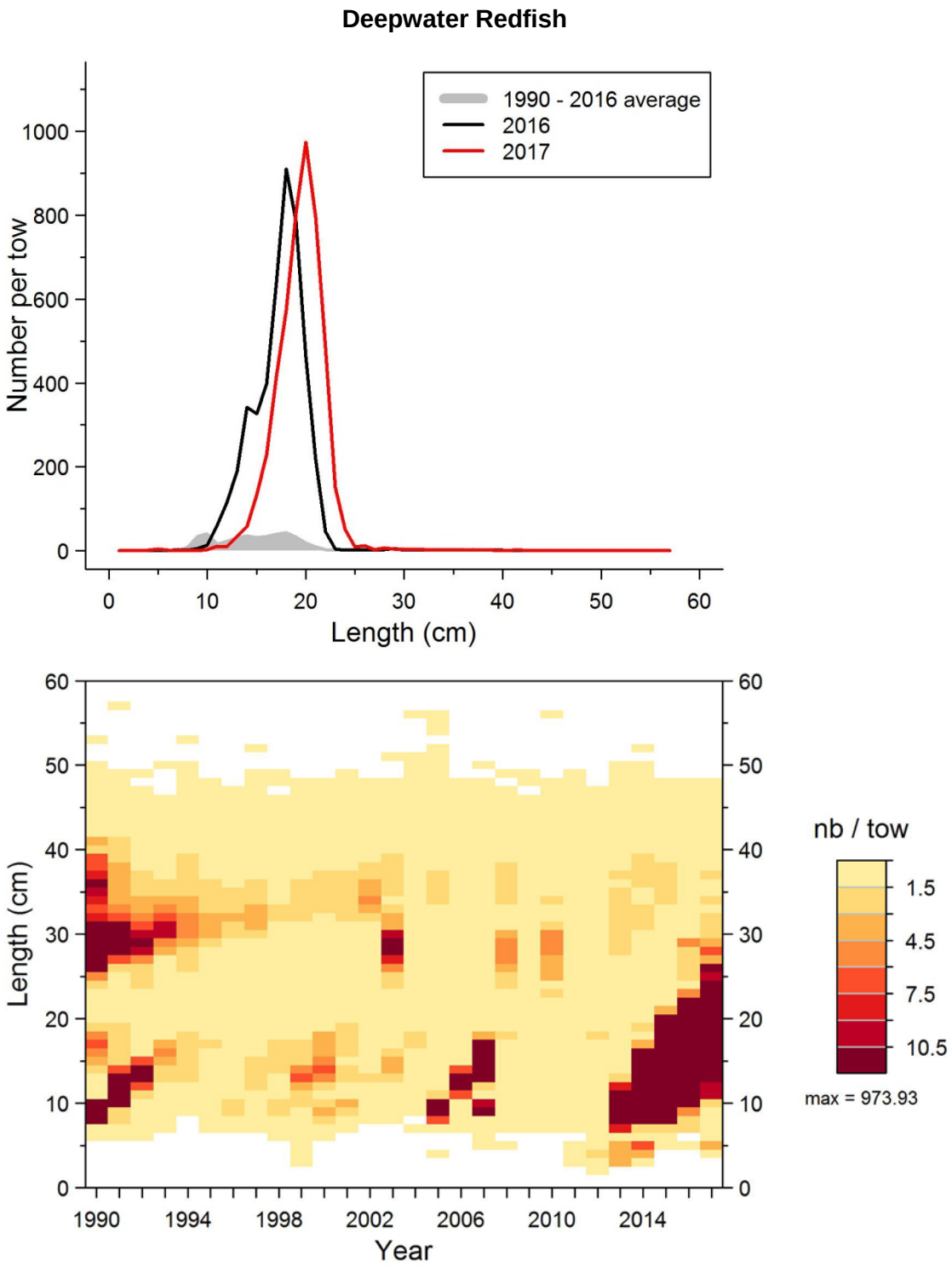

Figure 23. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Deepwater Redfish in 4RST.

Deepwater Redfish

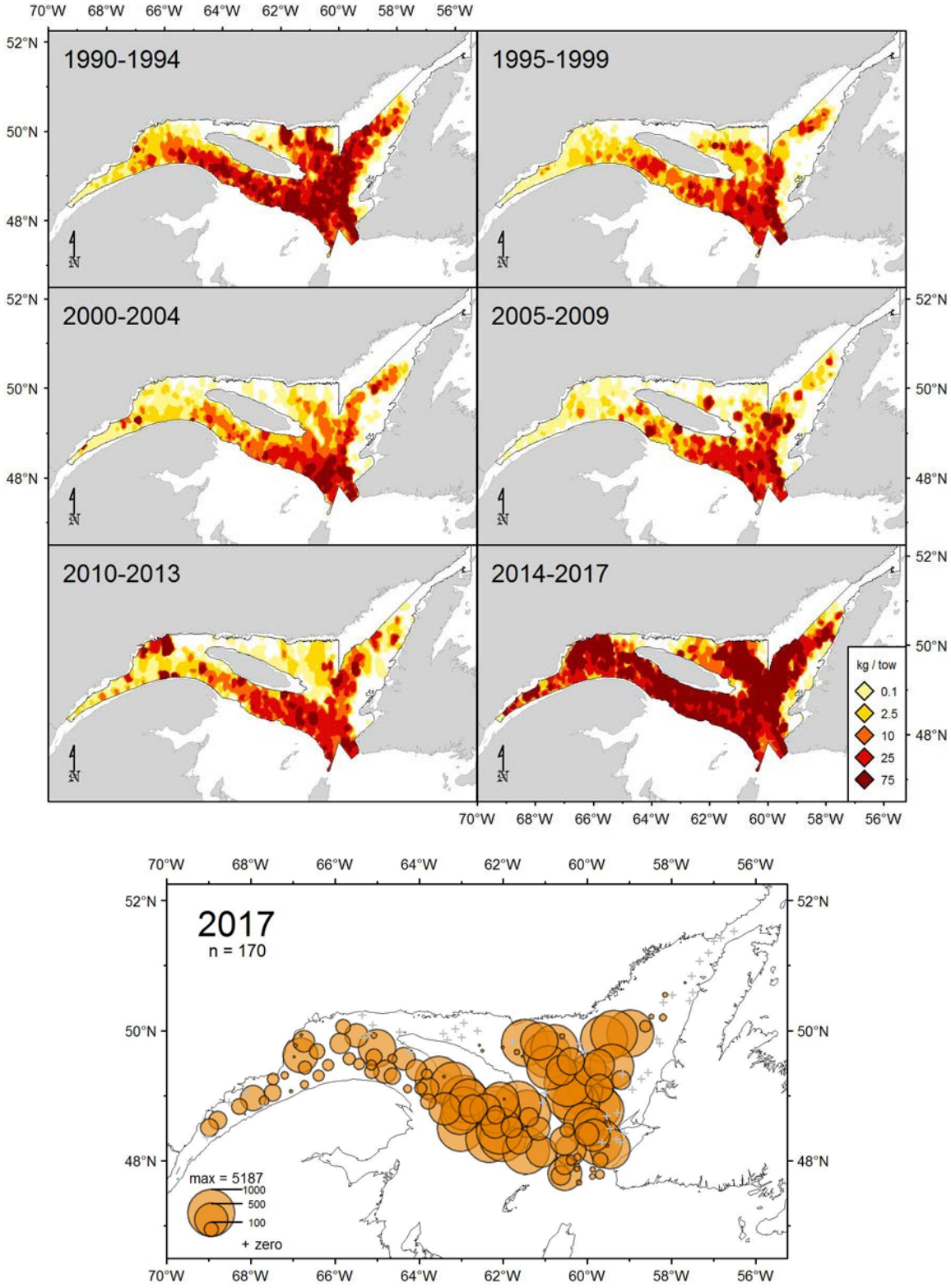

Figure 24. Deepwater Redfish catch rates (kg/15 minutes tow) distribution.

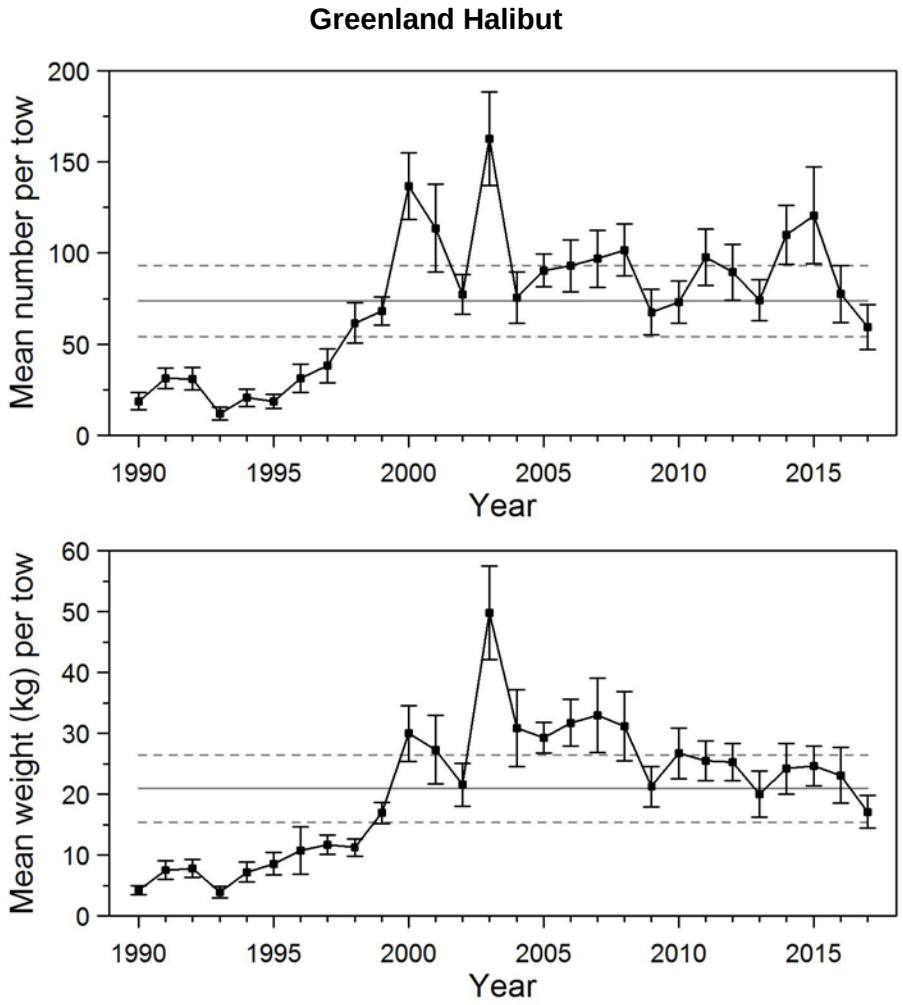

Figure 25. Mean numbers and mean weights per 15 minutes tow observed during the survey for Greenland Halibut in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

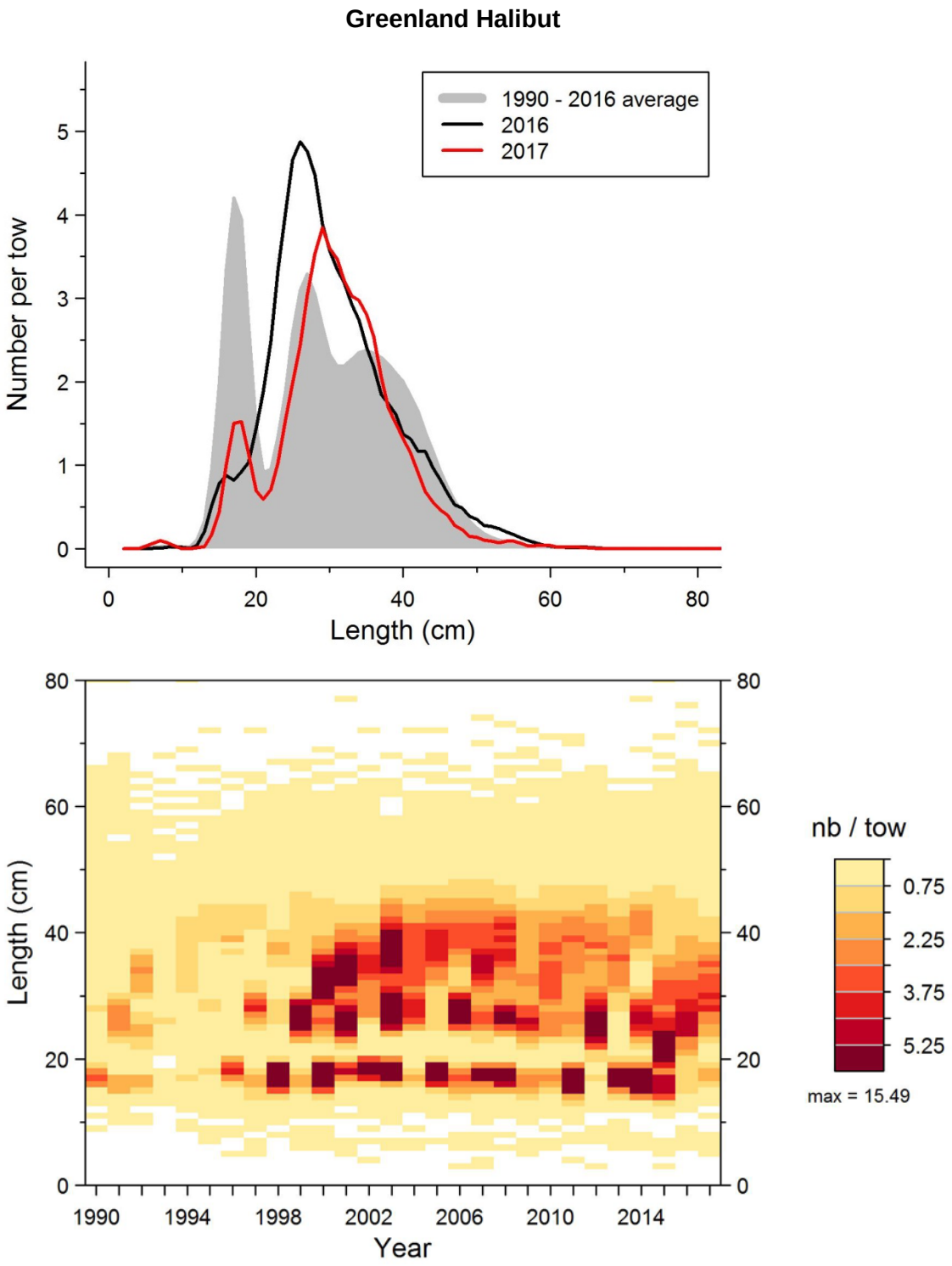

Figure 26. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Greenland Halibut in 4RST.

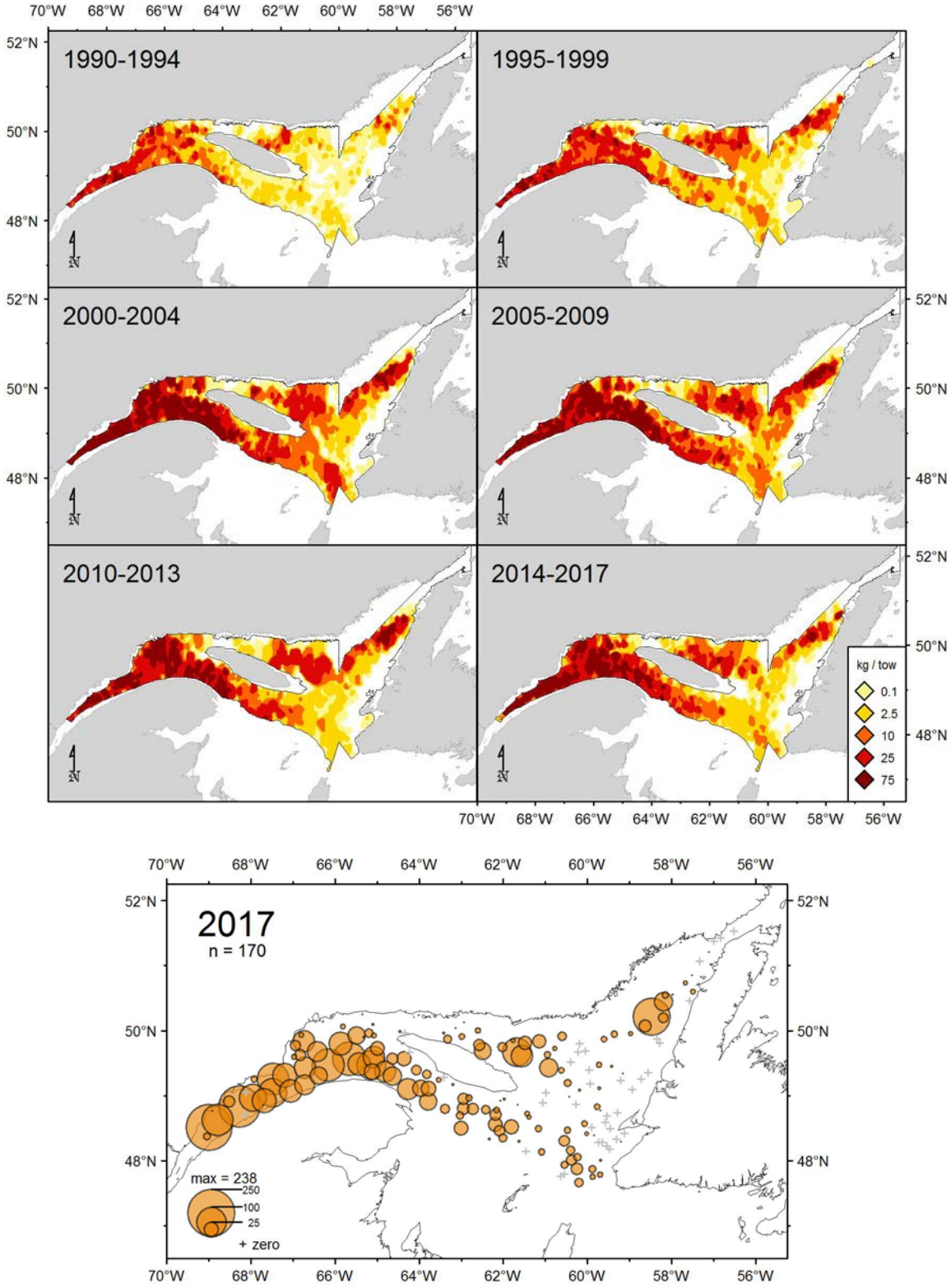

Figure 27. Greenland Halibut catch rates (kg/15 minutes tow) distribution.

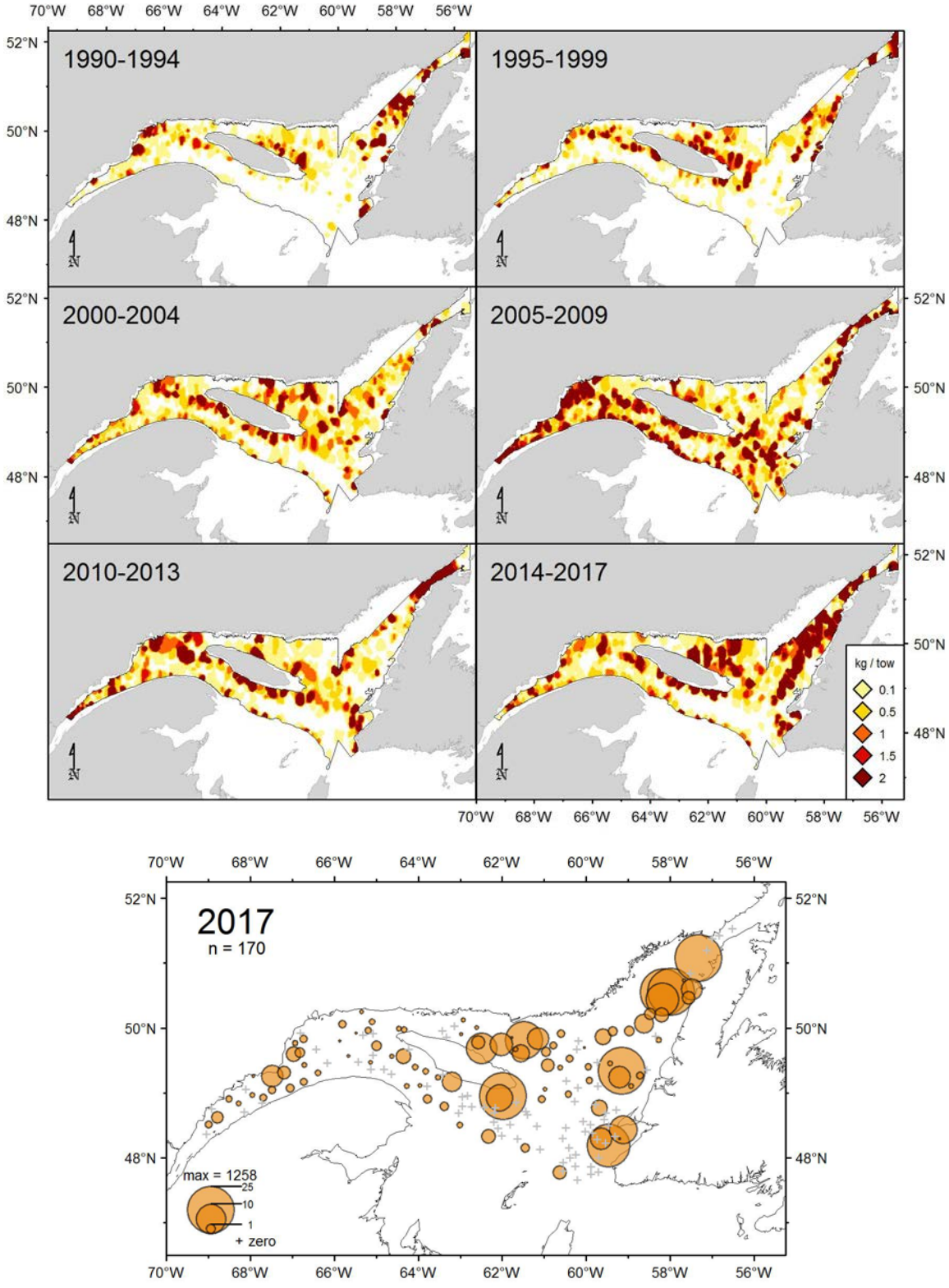

Figure 28. Herring catch rates (kg/15 minutes tow) distribution.

Herring

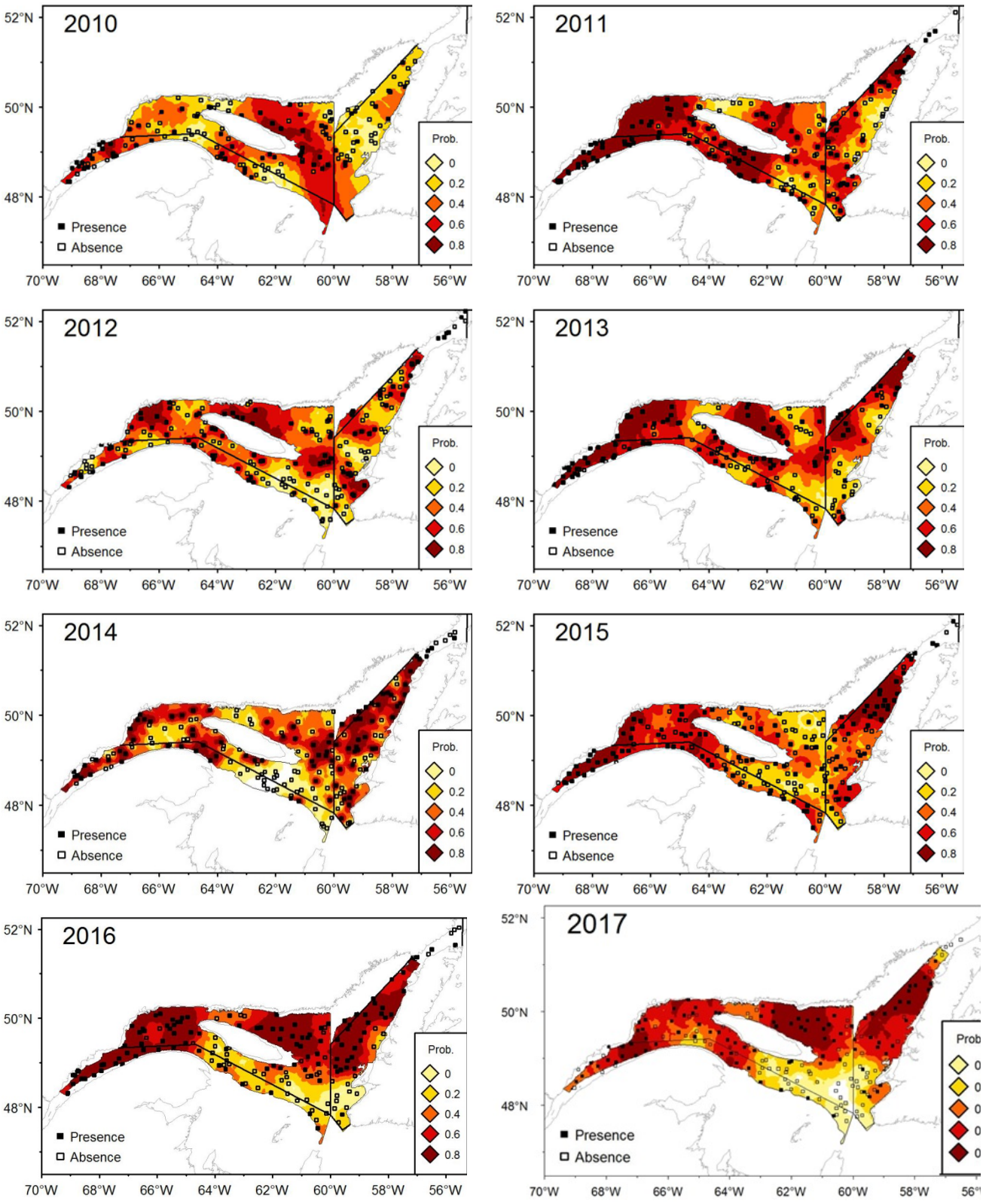

Figure 29. Probabilities areas (%) associated with the presence of Herring.

Herring

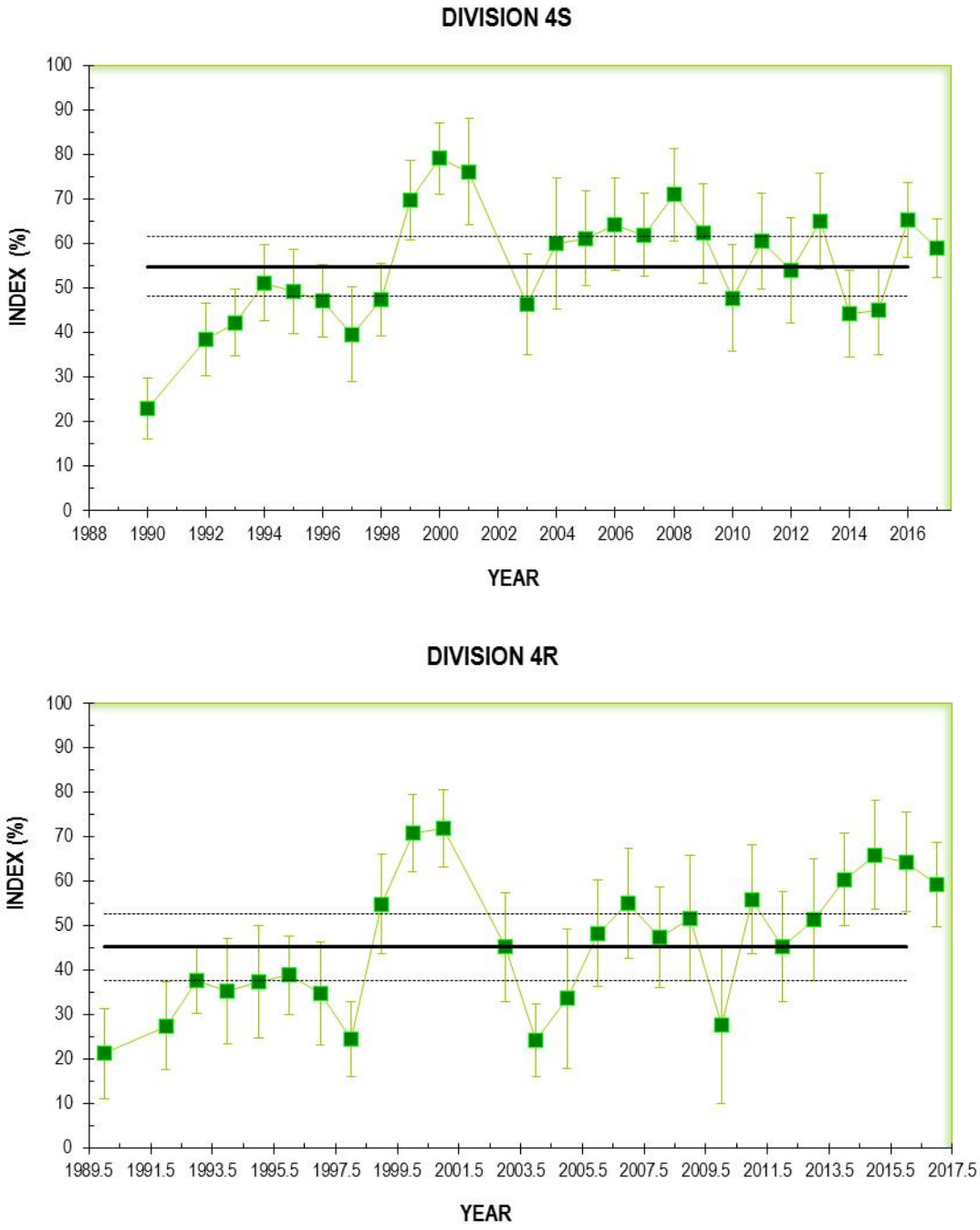

Figure 30. Mean probabilities of finding Herring in NAFO Divisions 4R and 4S. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

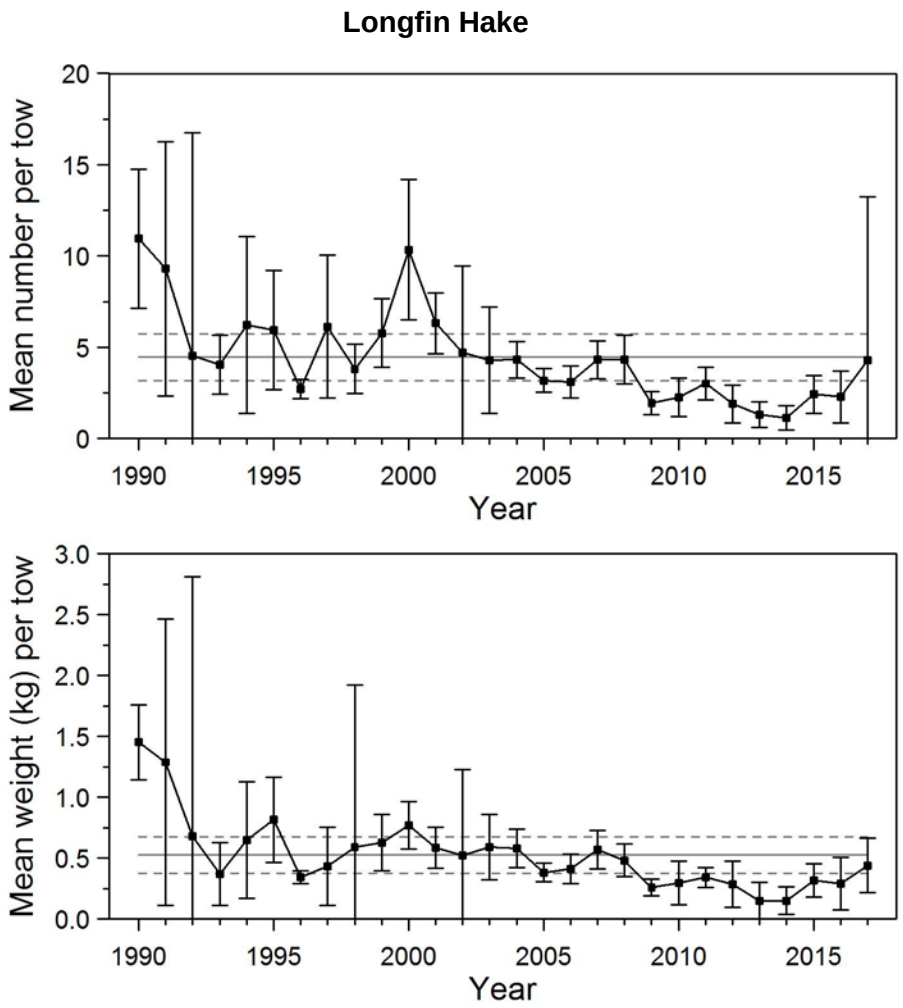

Figure 31. Mean numbers and mean weights per 15 minutes tow observed during the survey for Longfin Hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

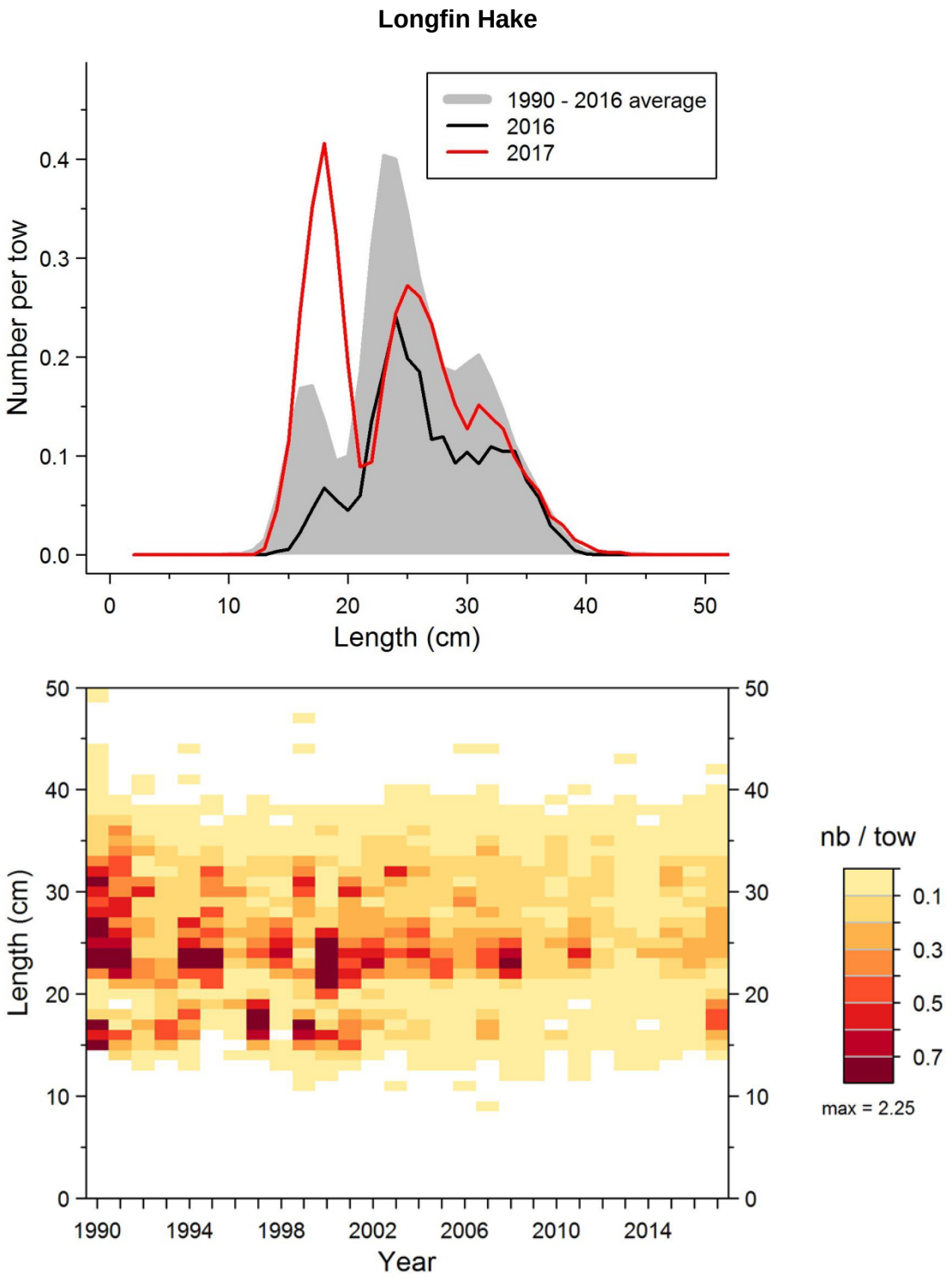

Figure 32. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Longfin Hake in 4RST.

Longfin Hake

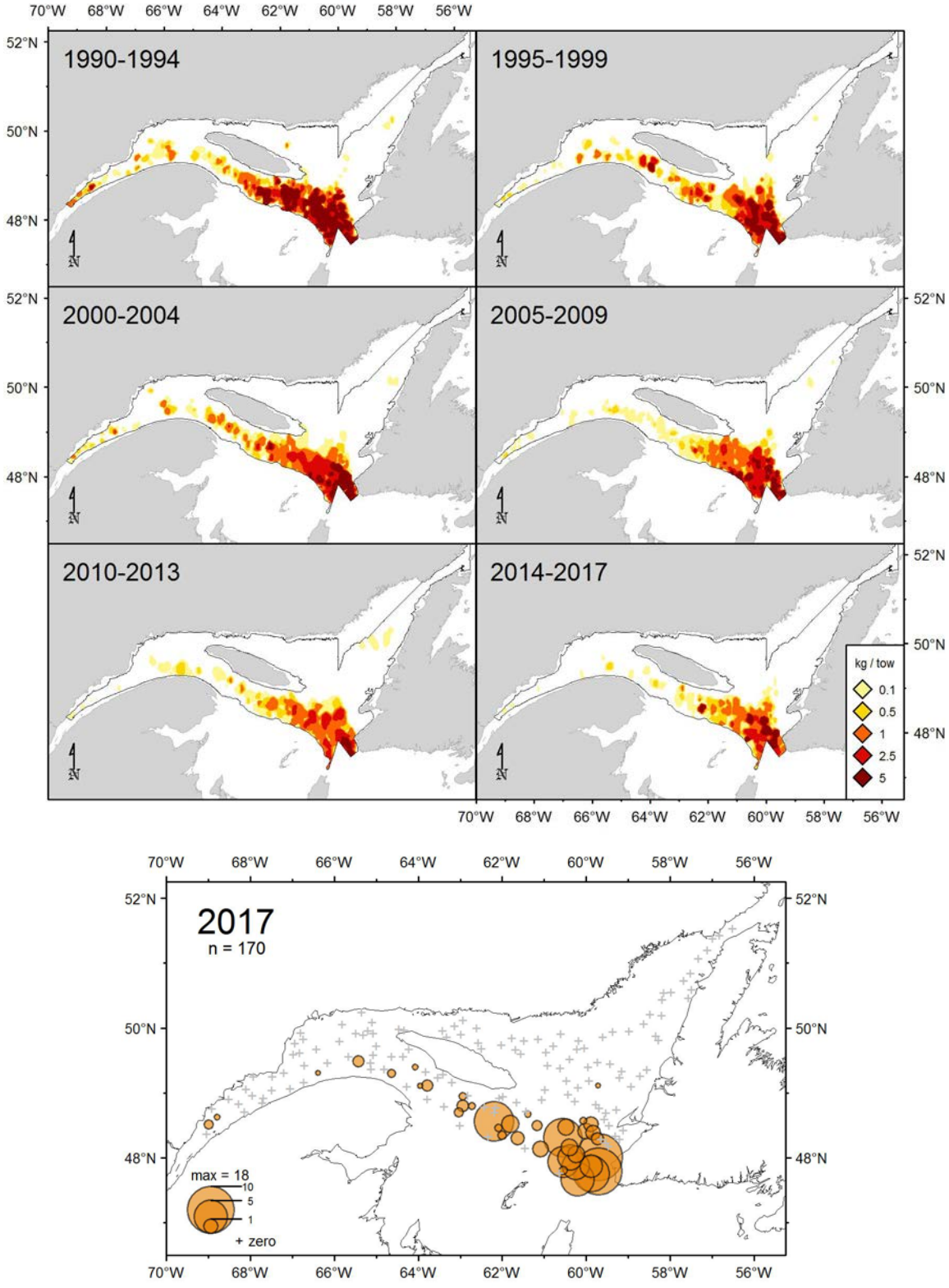

Figure 33. Longfin Hake catch rates (kg/15 minutes tow) distribution.

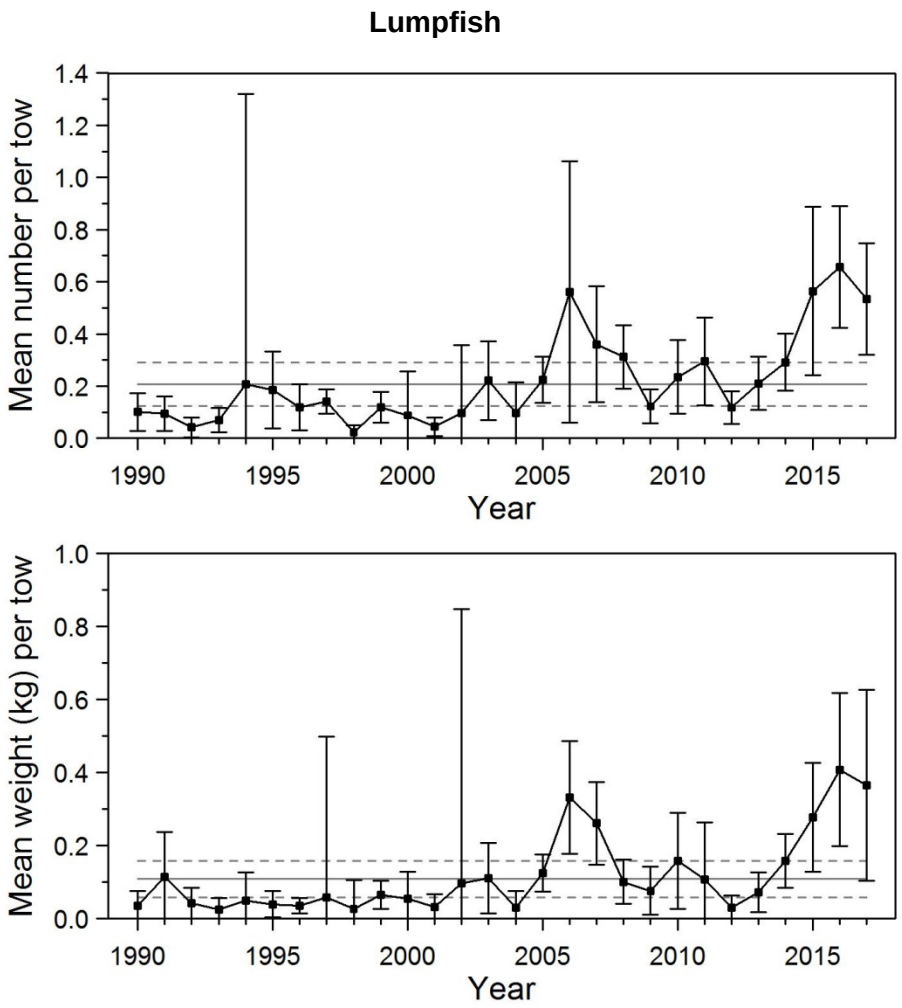

Figure 34. Mean numbers and mean weights per 15 minutes tow observed during the survey for Lumpfish in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

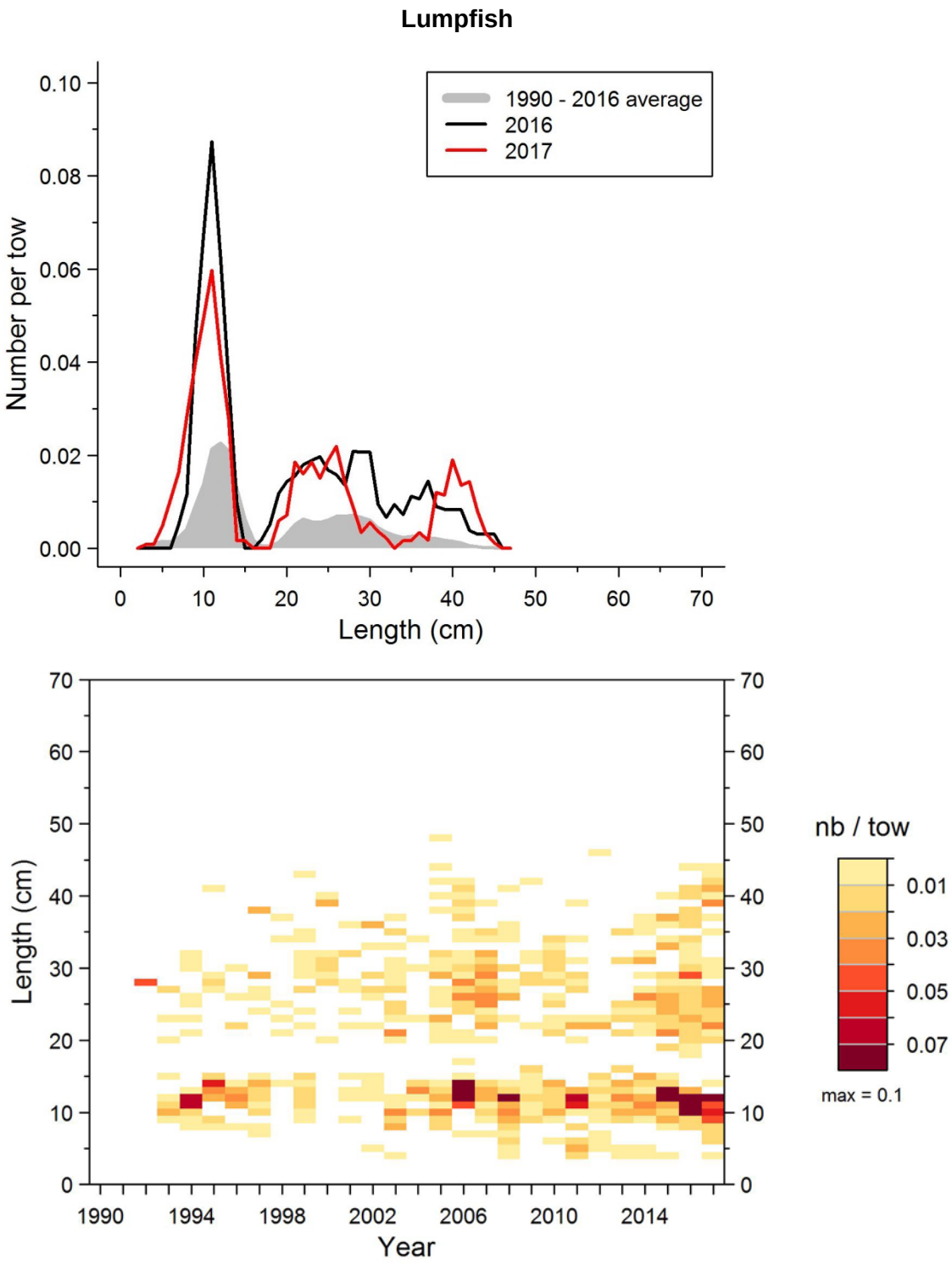

Figure 35. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Lumpfish in 4RST.

Lumpfish

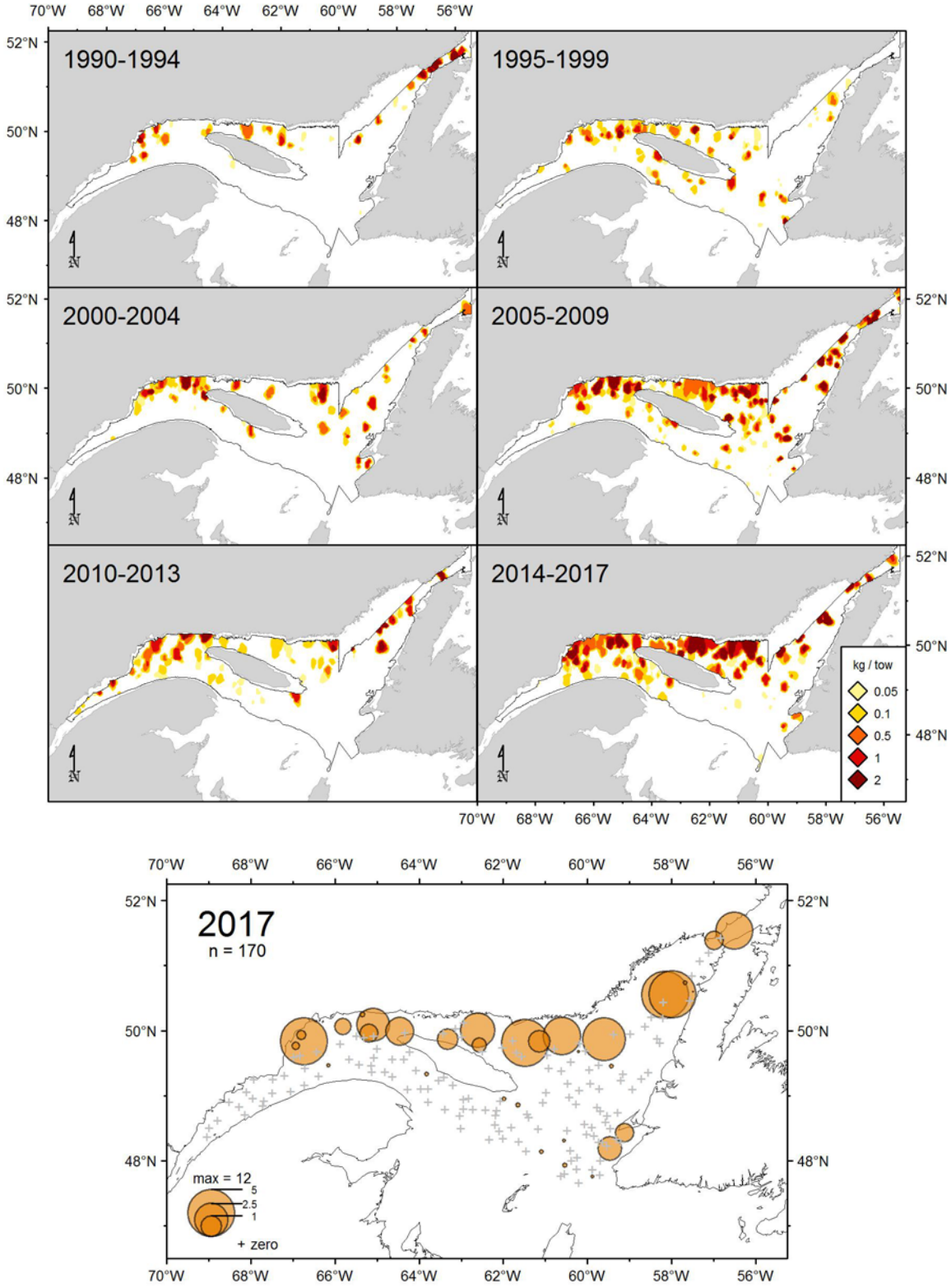

Figure 36. Lumpfish catch rates (kg/15 minutes tow) distribution.

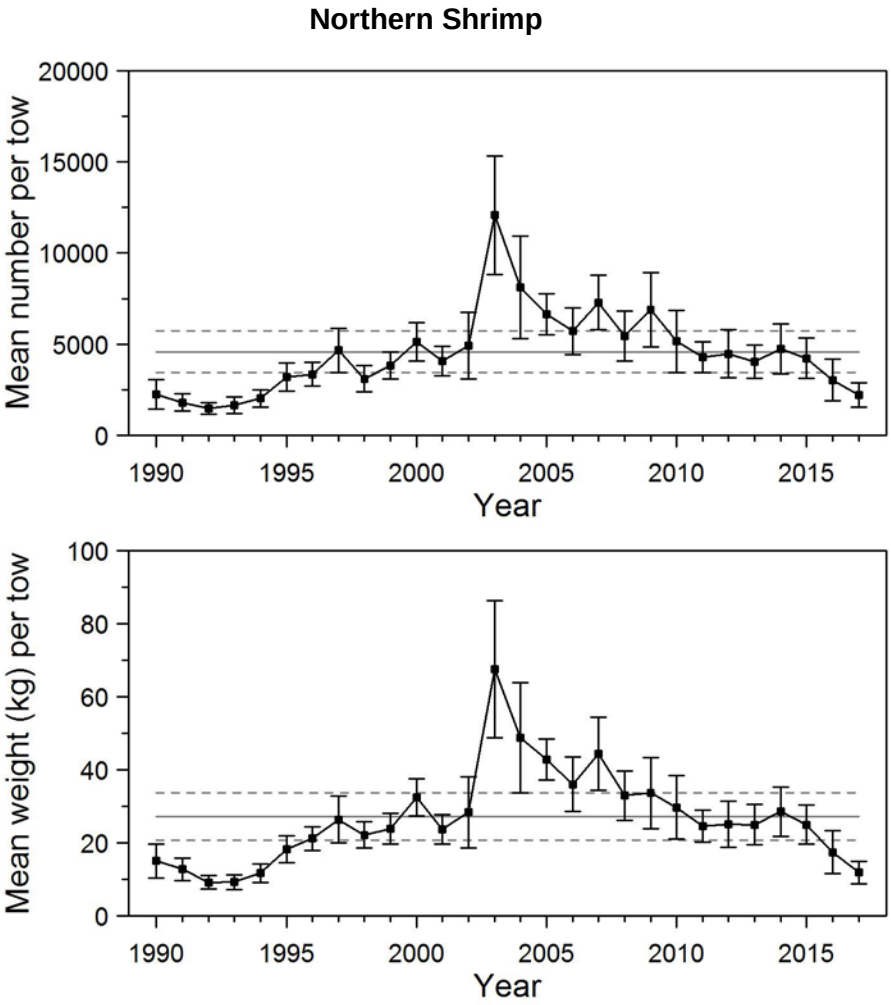

Figure 37. Mean numbers and mean weights per 15 minutes tow observed during the survey for Northern Shrimp in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

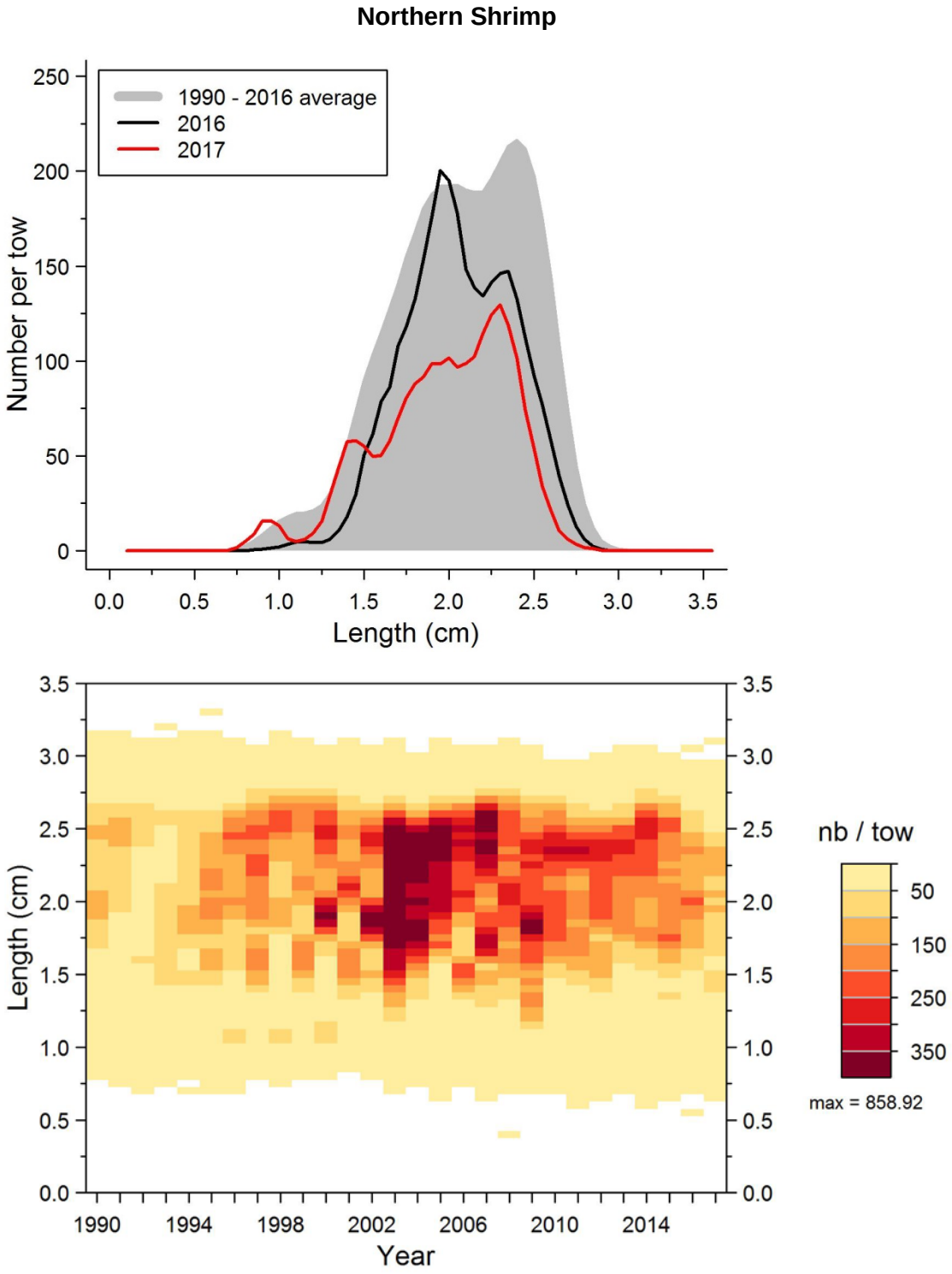

Figure 38. Carapace length frequency distributions (mean number per 15 minutes tow) observed during the survey for Northern Shrimp in 4RST.

Northern Shrimp

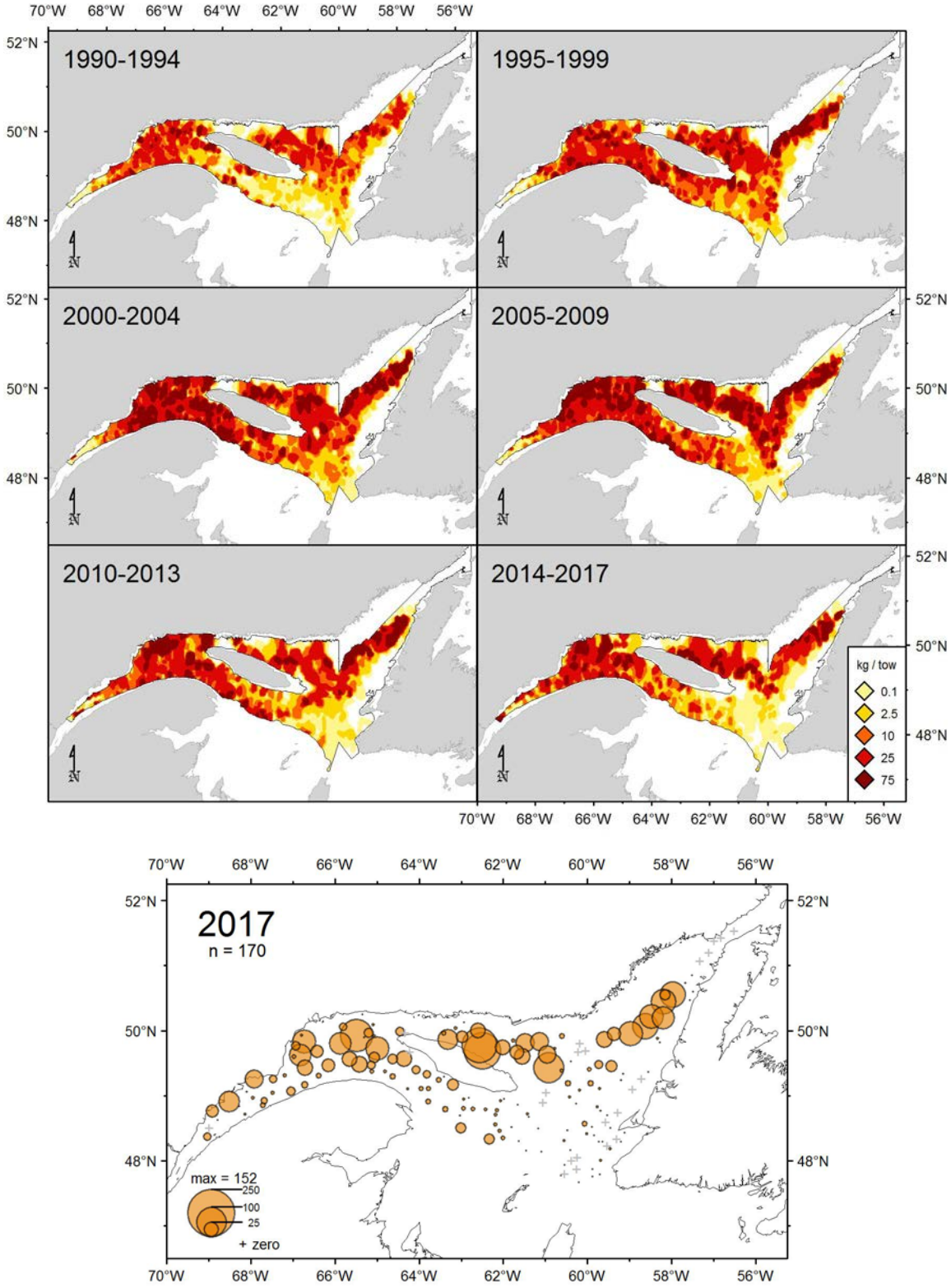

Figure 39. Northern Shrimp catch rates (kg/15 minutes tow) distribution.

Sea pen (*Anthoptilum grandiflorum*)

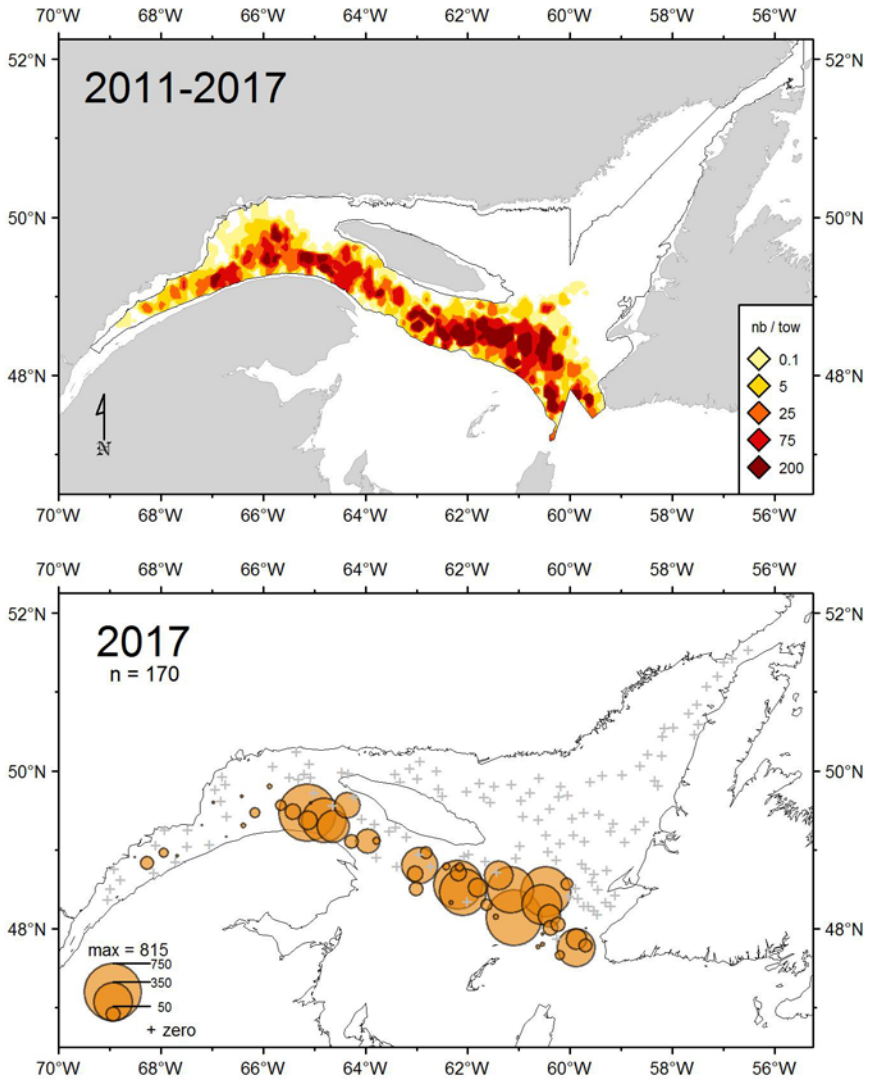

Figure 40. Sea pen Anthoptilum grandiflorum catch rates (nb/15 minutes tow) distribution.

Sea pen (*Halipteris finmarchica*)

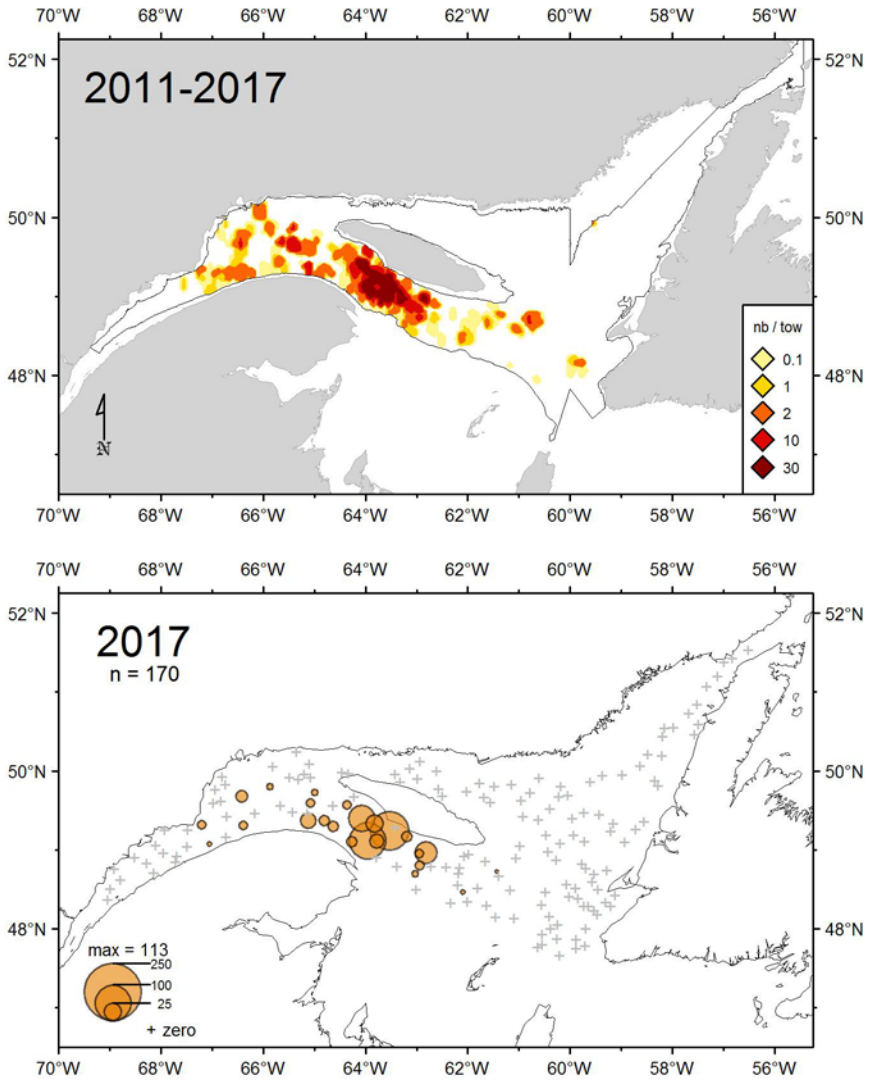

Figure 41. Sea pen Halipteris finmarchica catch rates (nb/15 minutes tow) distribution.

Sea pen (*Pennatula aculeata*)

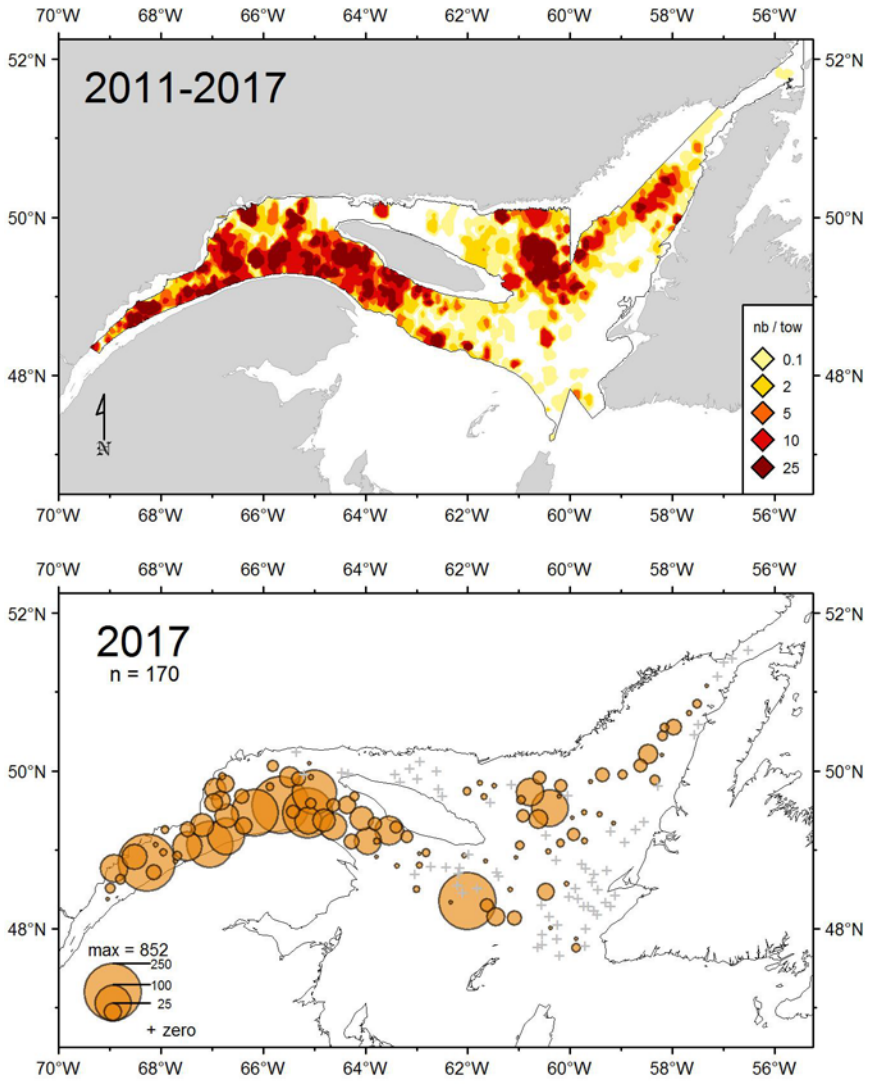

Figure 42. Sea pen Pennatula aculeata catch rates (nb/15 minutes tow) distribution.

Sea pen (*Pennatula grandis*)

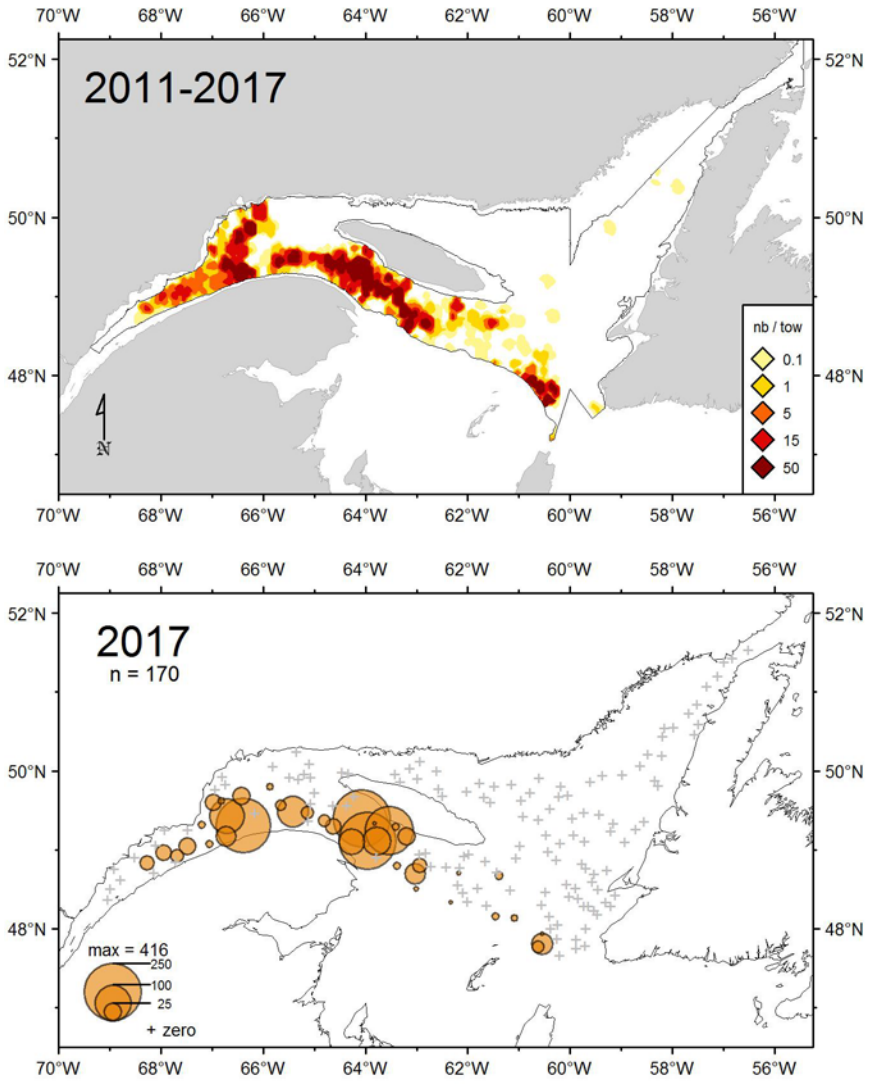

Figure 43. Sea pen Pennatula grandis catch rates (nb/15 minutes tow) distribution.

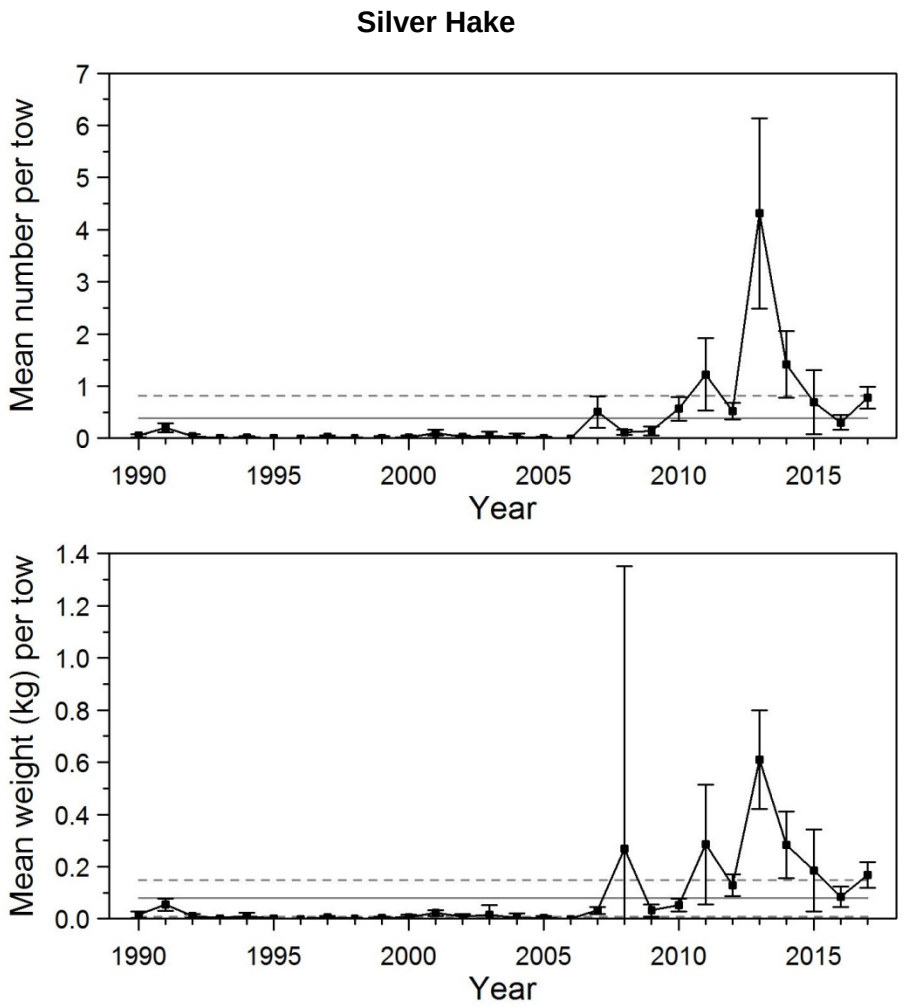

Figure 44. Mean numbers and mean weights per 15 minutes tow observed during the survey for Silver Hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

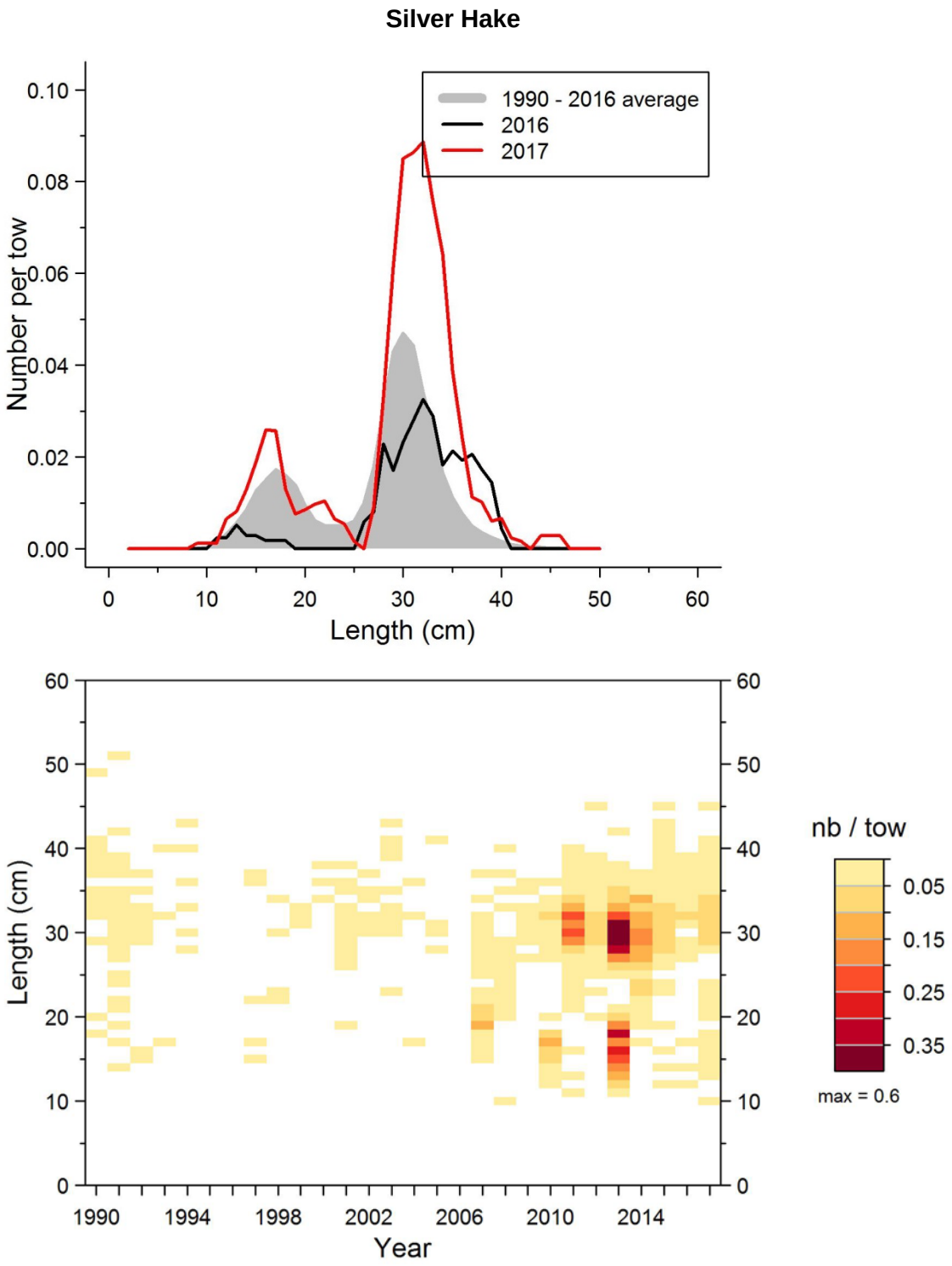

Figure 45. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Silver Hake in 4RST.

Silver Hake

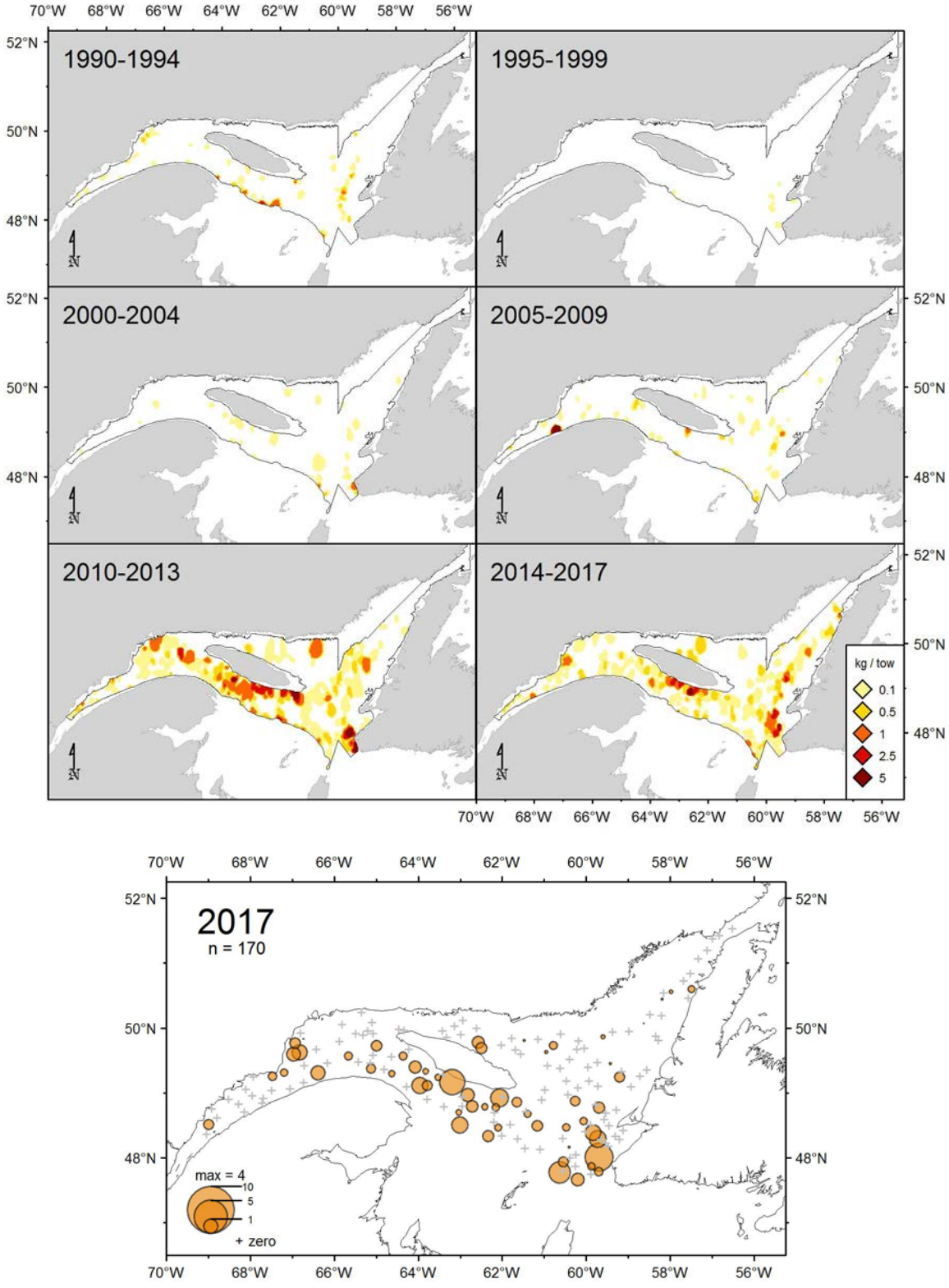

Figure 46. Silver Hake catch rates (kg/15 minutes tow) distribution.

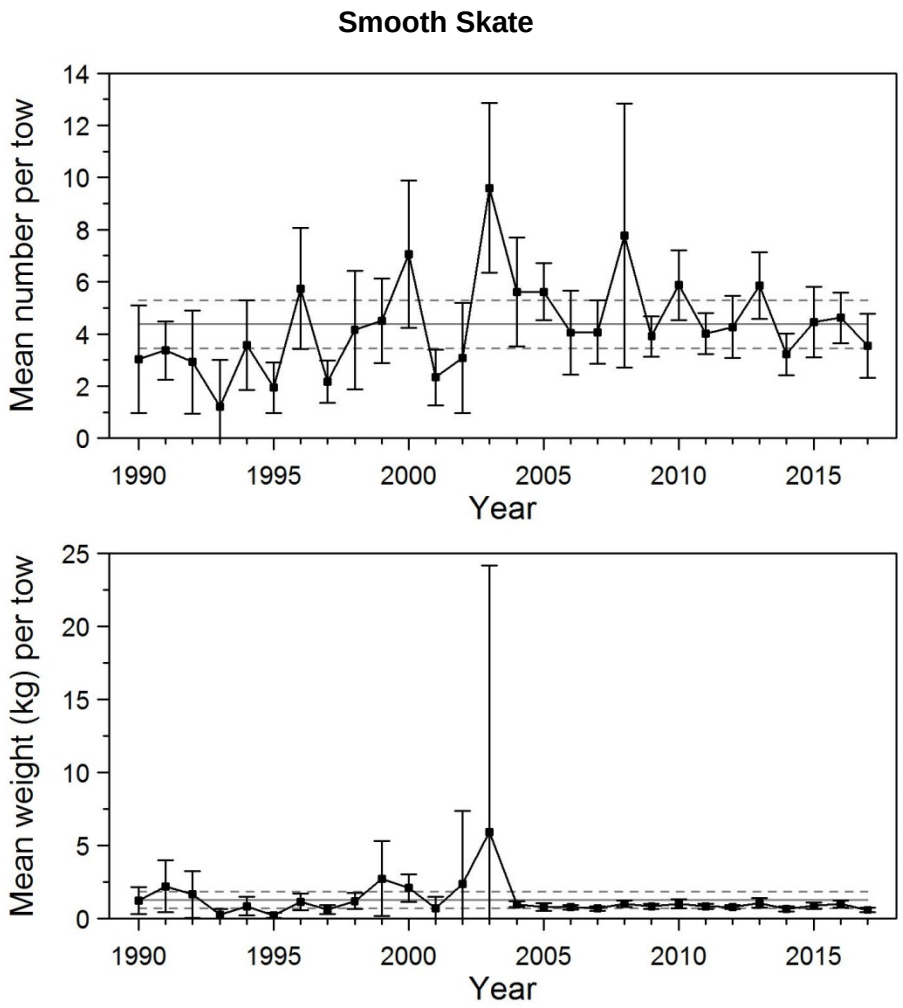

Figure 47. Mean numbers and mean weights per 15 minutes tow observed during the survey for Smooth Skate in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

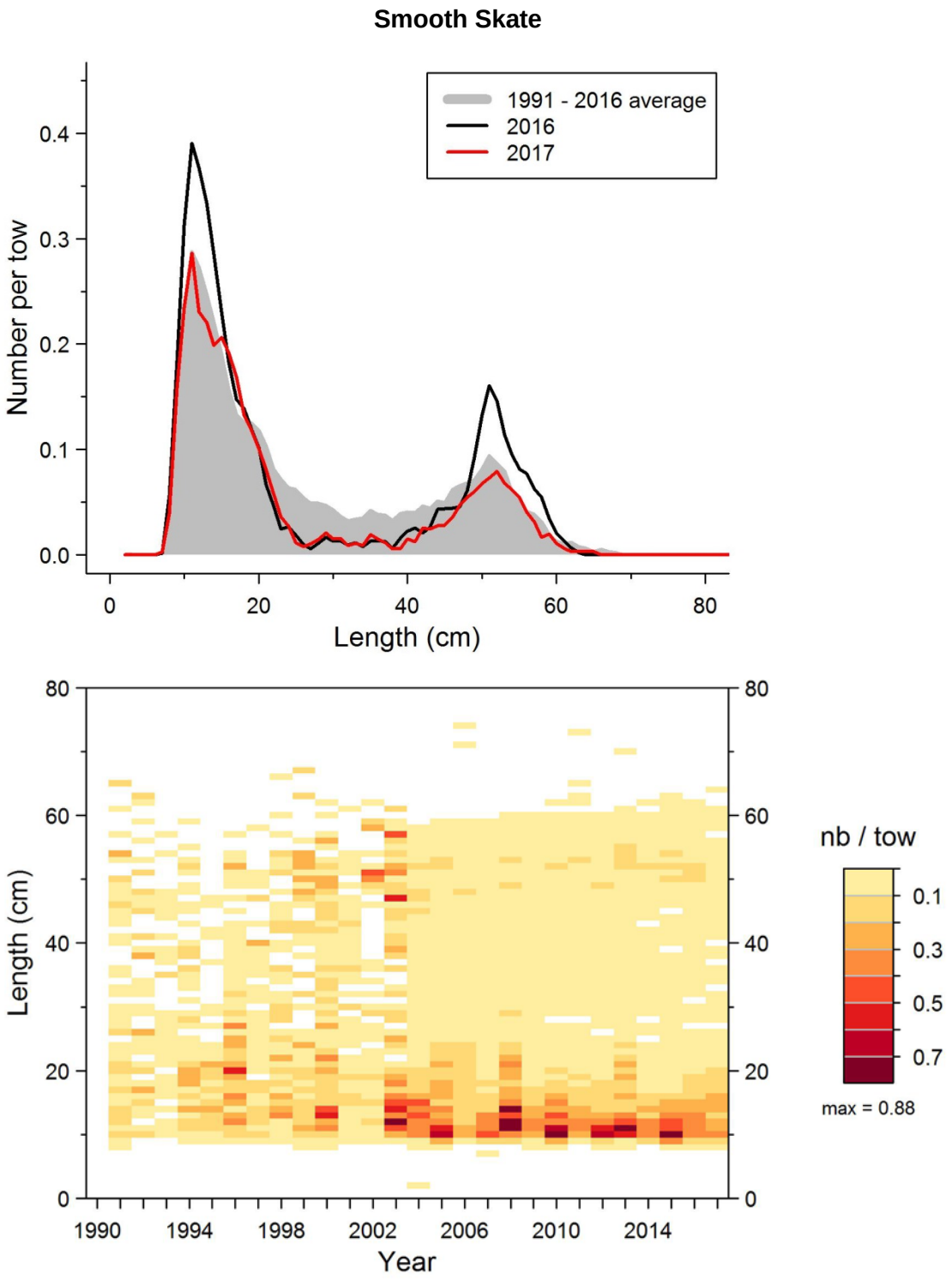

Figure 48. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Smooth Skate in 4RST.

Smooth Skate

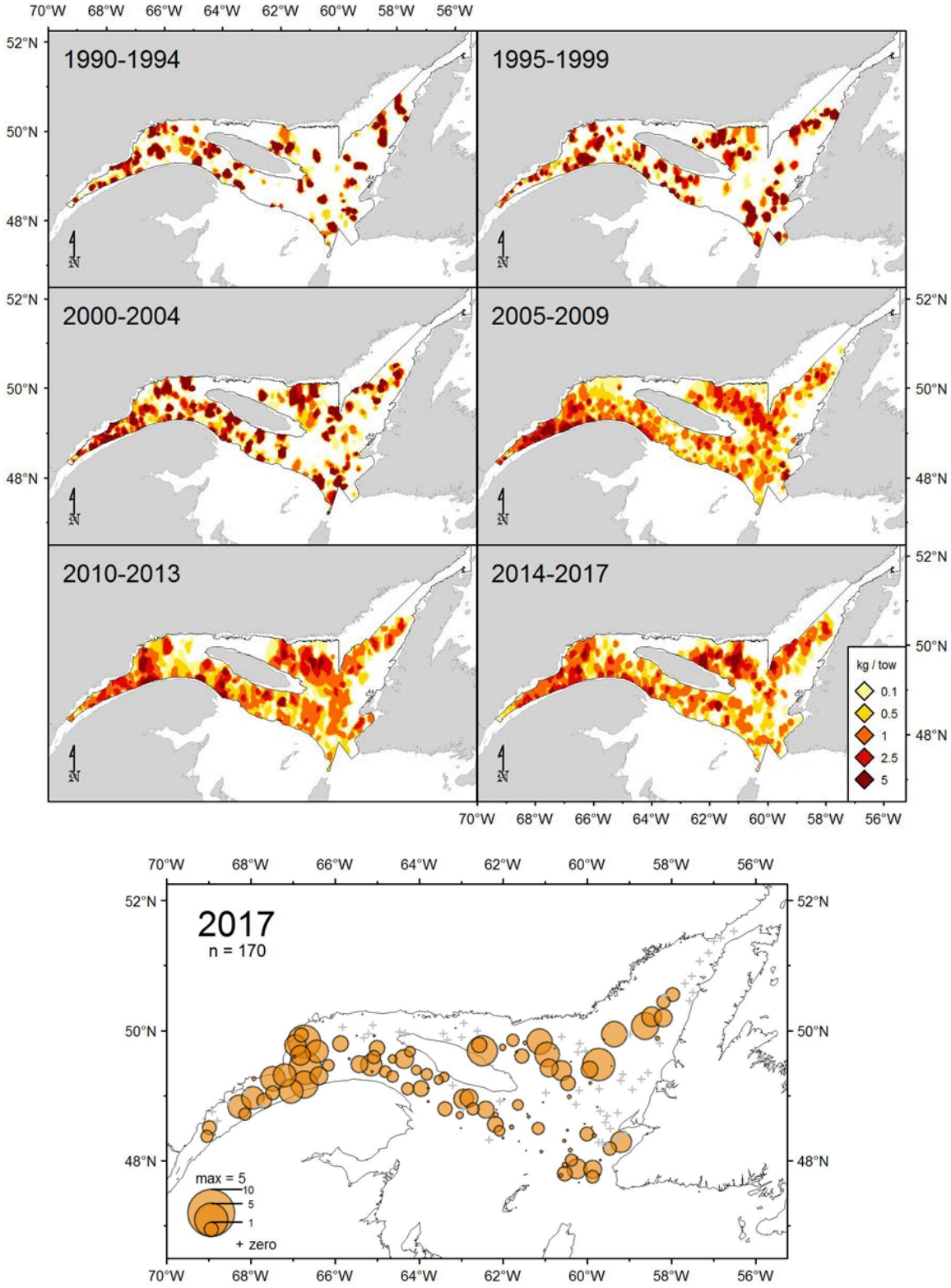

Figure 49. Smooth Skate catch rates (kg/15 minutes tow) distribution.

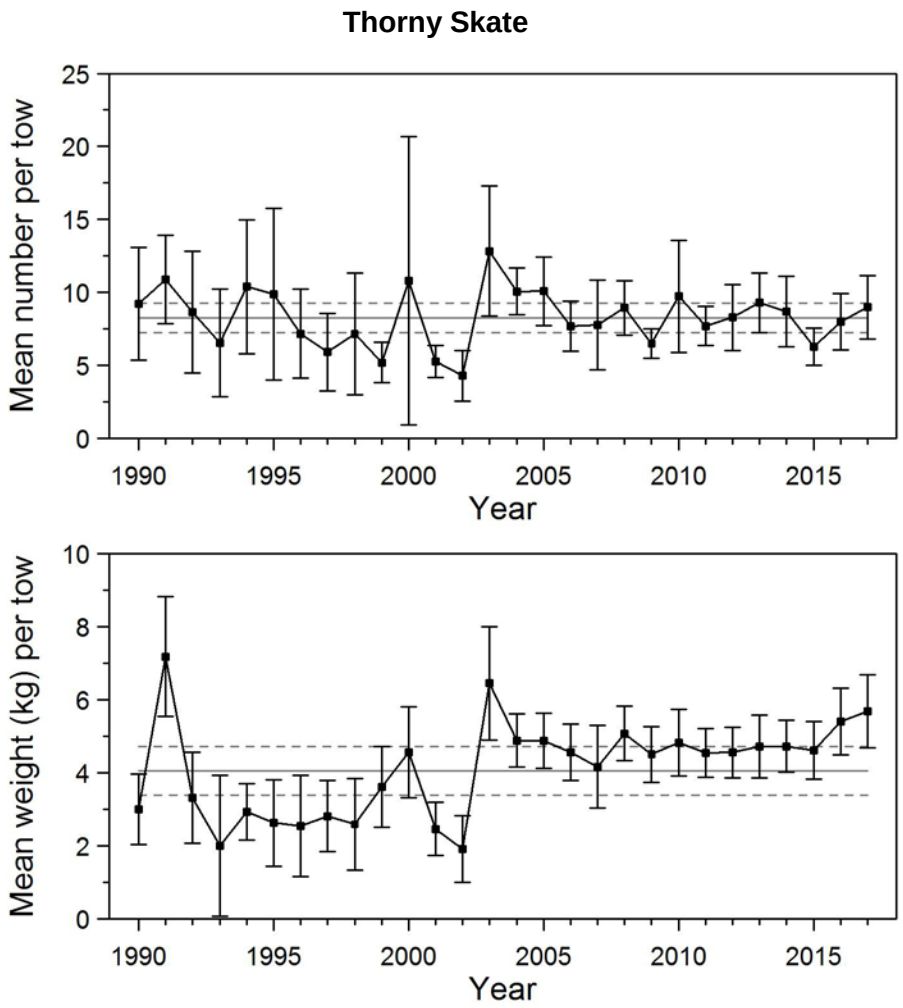

Figure 50. Mean numbers and mean weights per 15 minutes tow observed during the survey for Thorny Skate in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

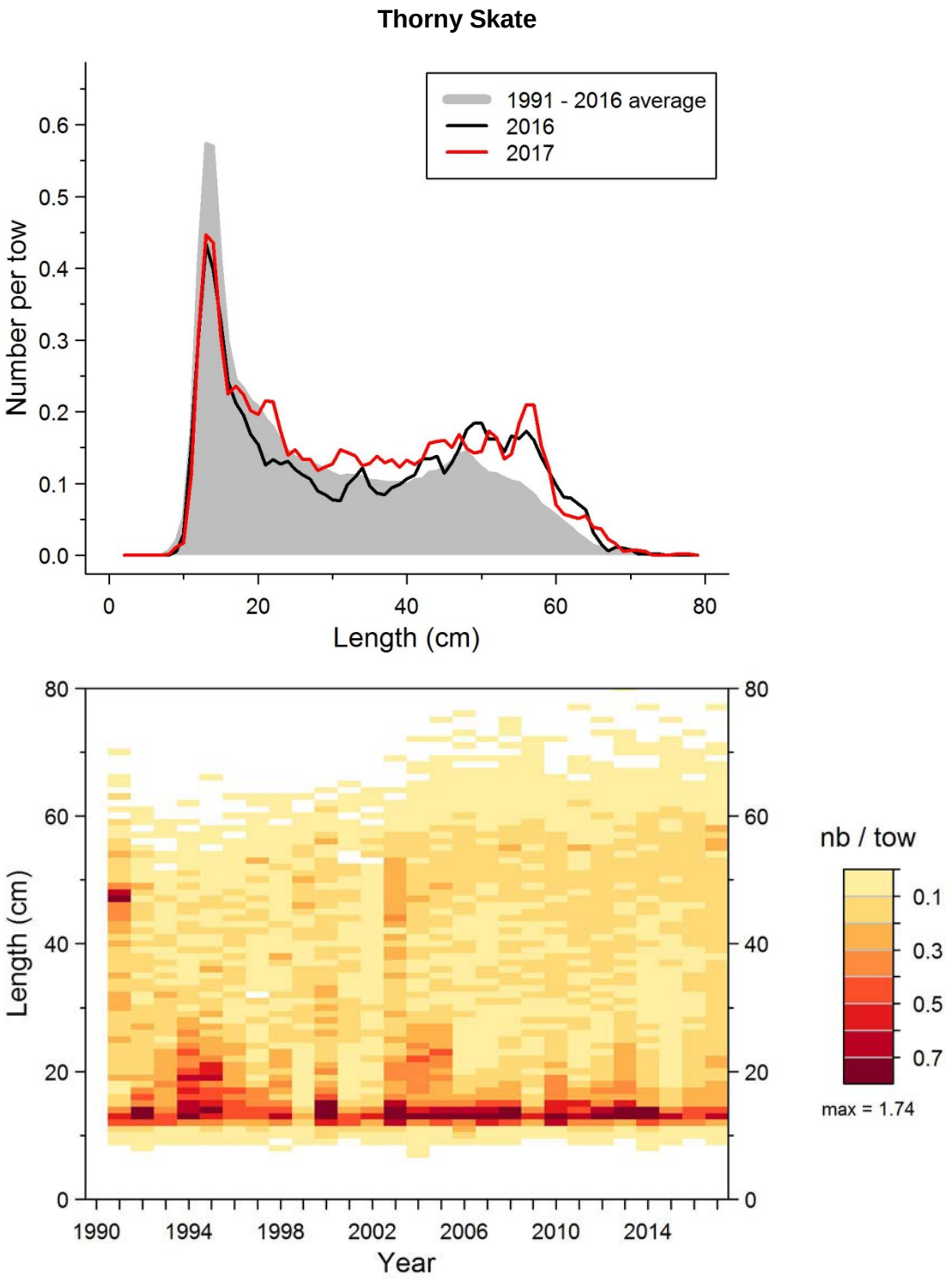

Figure 51. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Thorny Skate in 4RST.

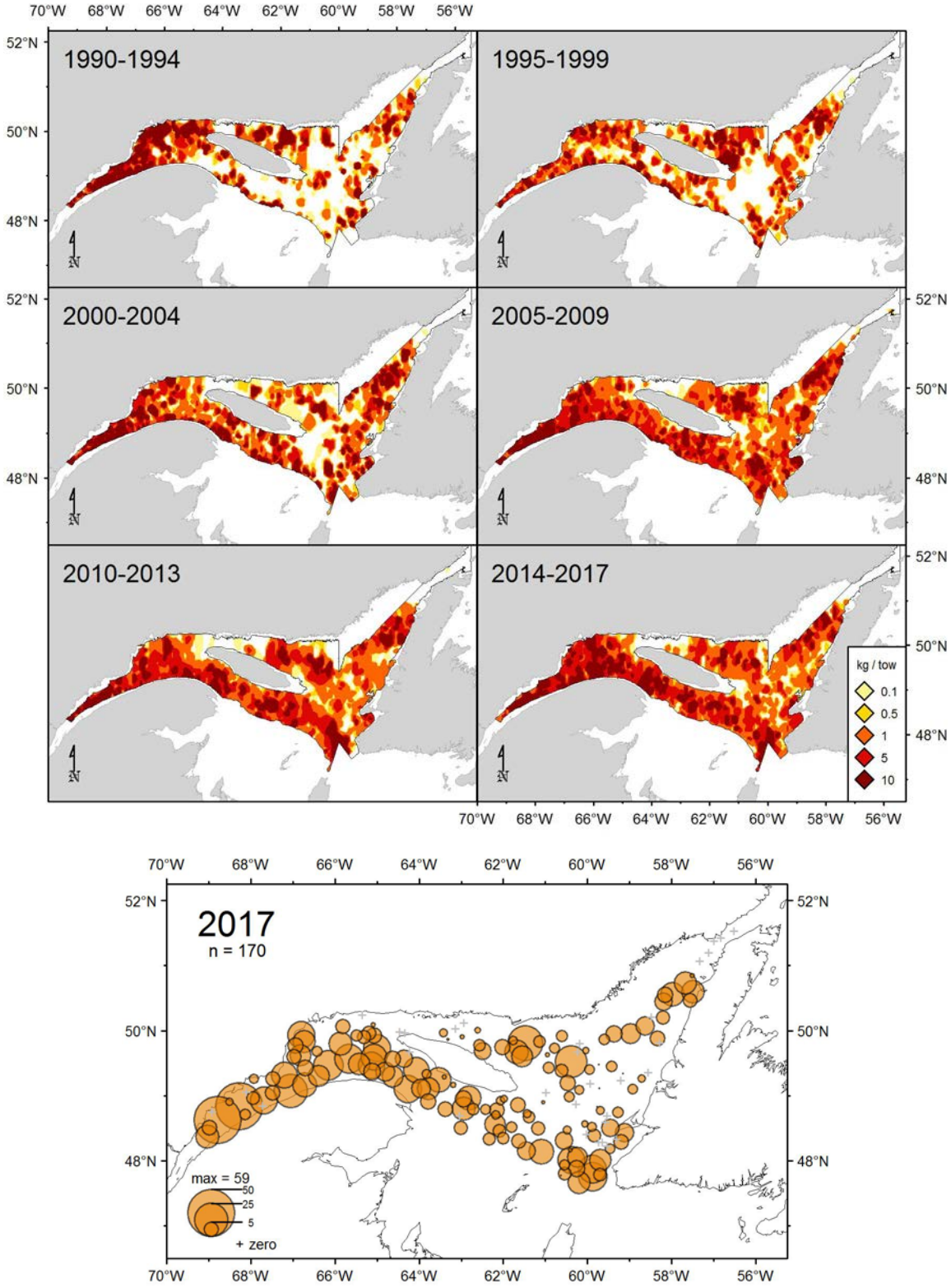

Figure 52. Thorny Skate catch rates (kg/15 minutes tow) distribution.

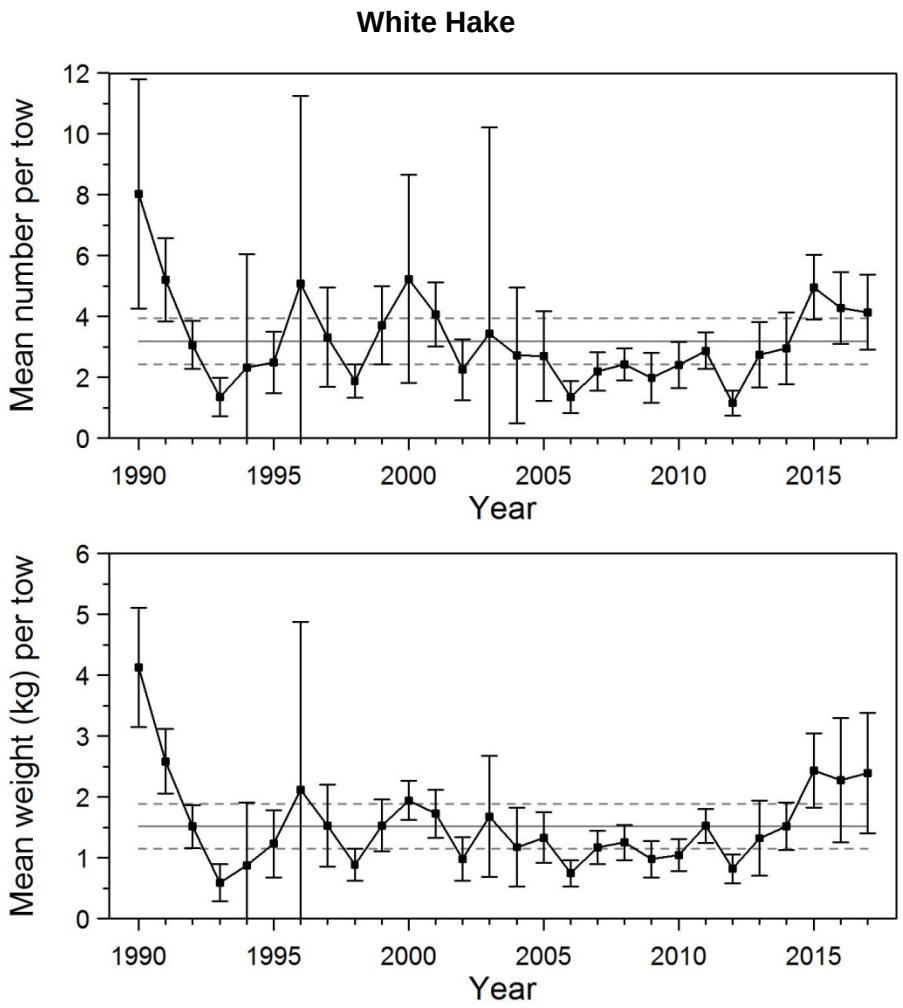

Figure 53. Mean numbers and mean weights per 15 minutes tow observed during the survey for White Hake in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

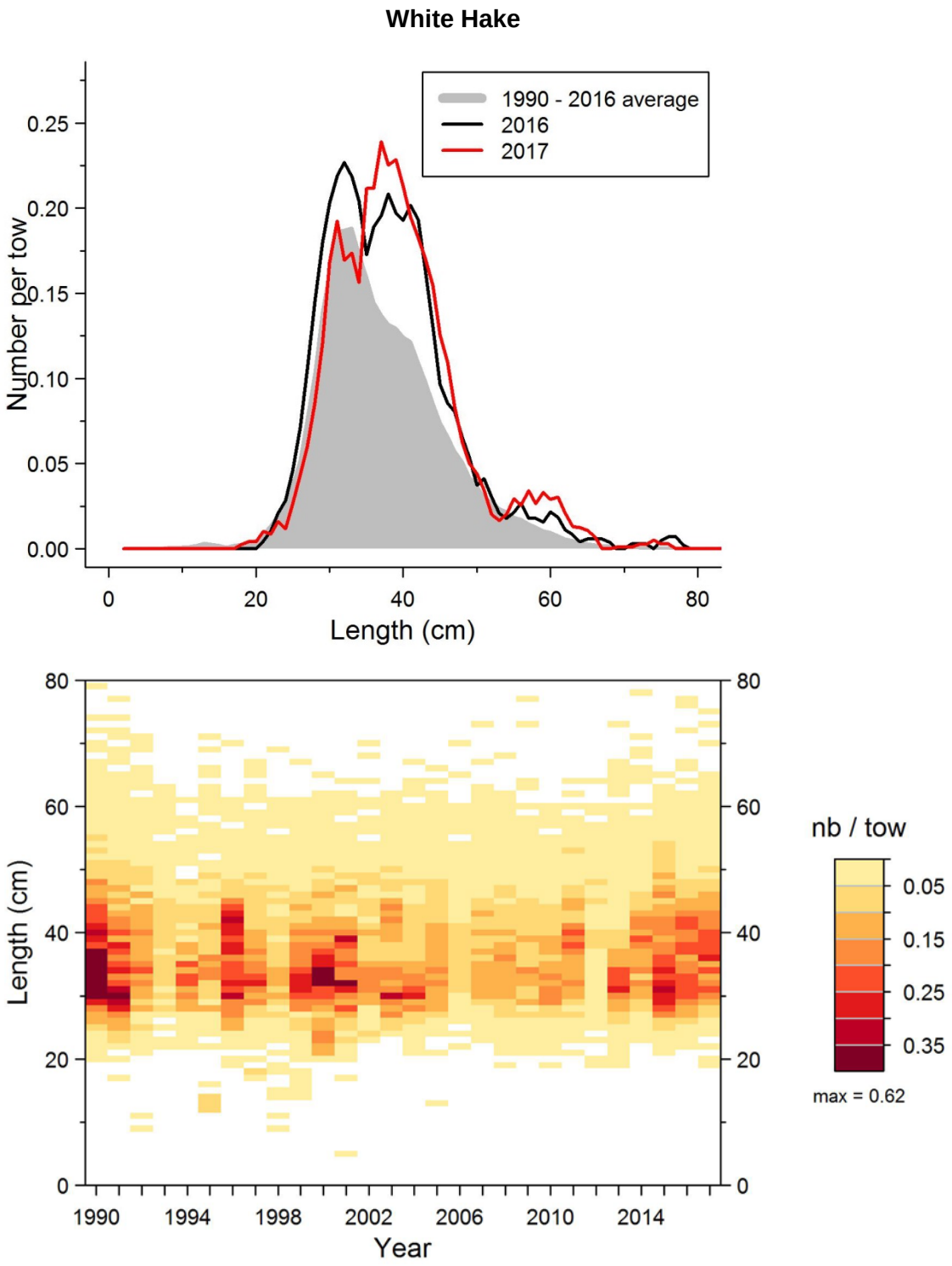

Figure 54. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for White Hake in 4RST.

White Hake

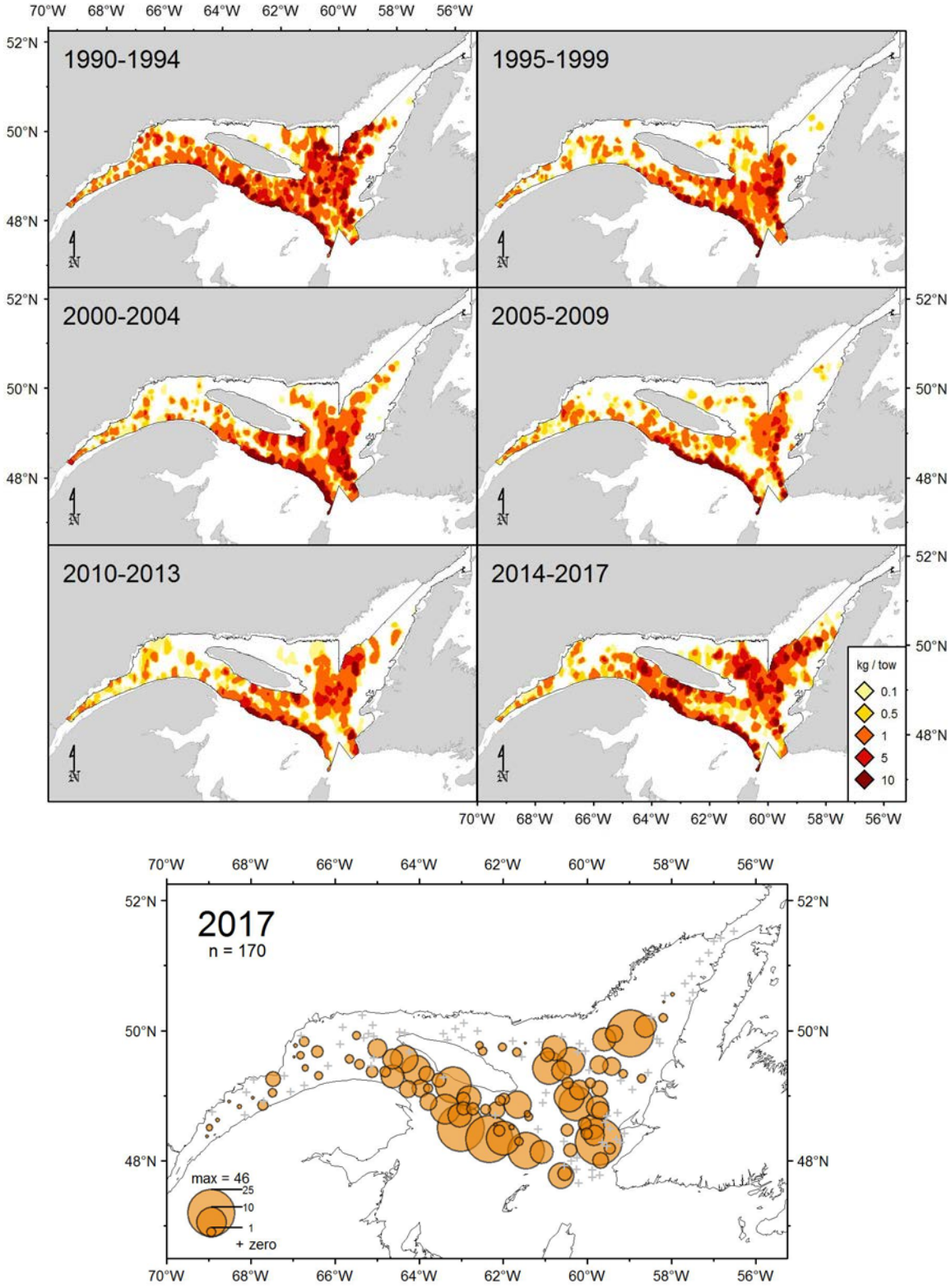

Figure 55. White Hake catch rates (kg/15 minutes tow) distribution.

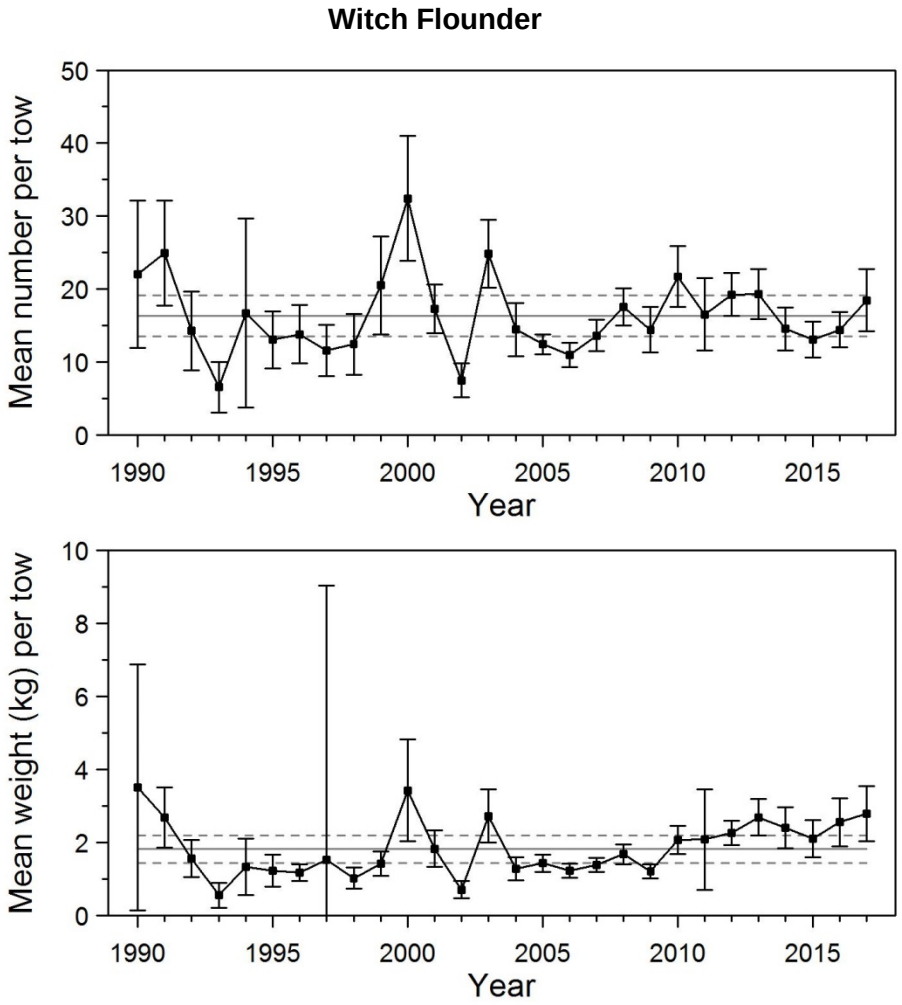

Figure 56. Mean numbers and mean weights per 15 minutes tow observed during the survey for Witch Flounder in 4RST. Error bars indicate the 95% confidence interval and the horizontal lines indicate the mean of the 1990-2016 period (solid line) and upper and lower reference (see text) limits (dashed lines).

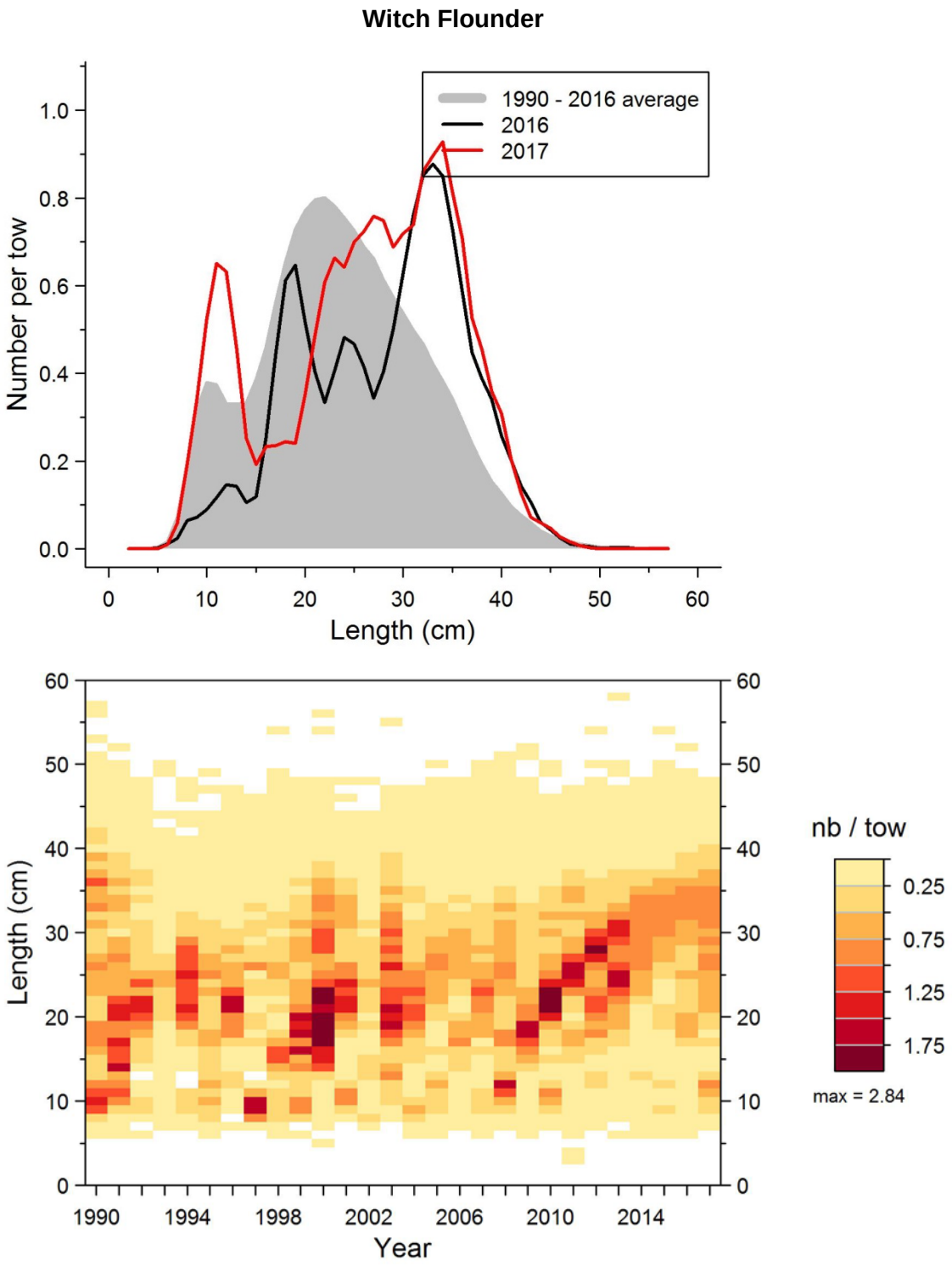

Figure 57. Length frequency distributions (mean number per 15 minutes tow) observed during the survey for Witch Flounder in 4RST.

Witch Flounder

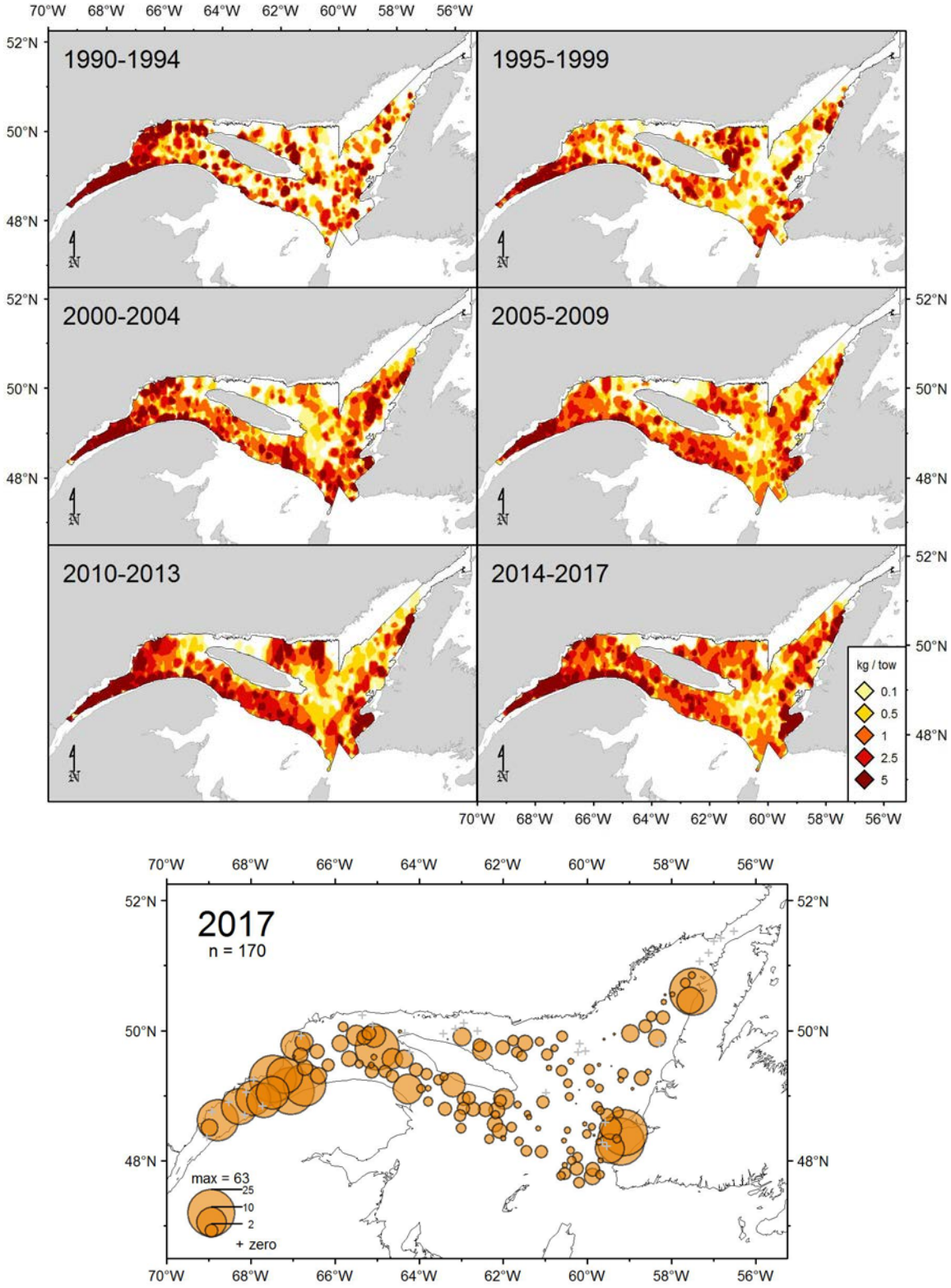

Figure 58. Witch Flounder catch rates (kg/15 minutes tow) distribution.

Wolffish, Atlantic Wolffish

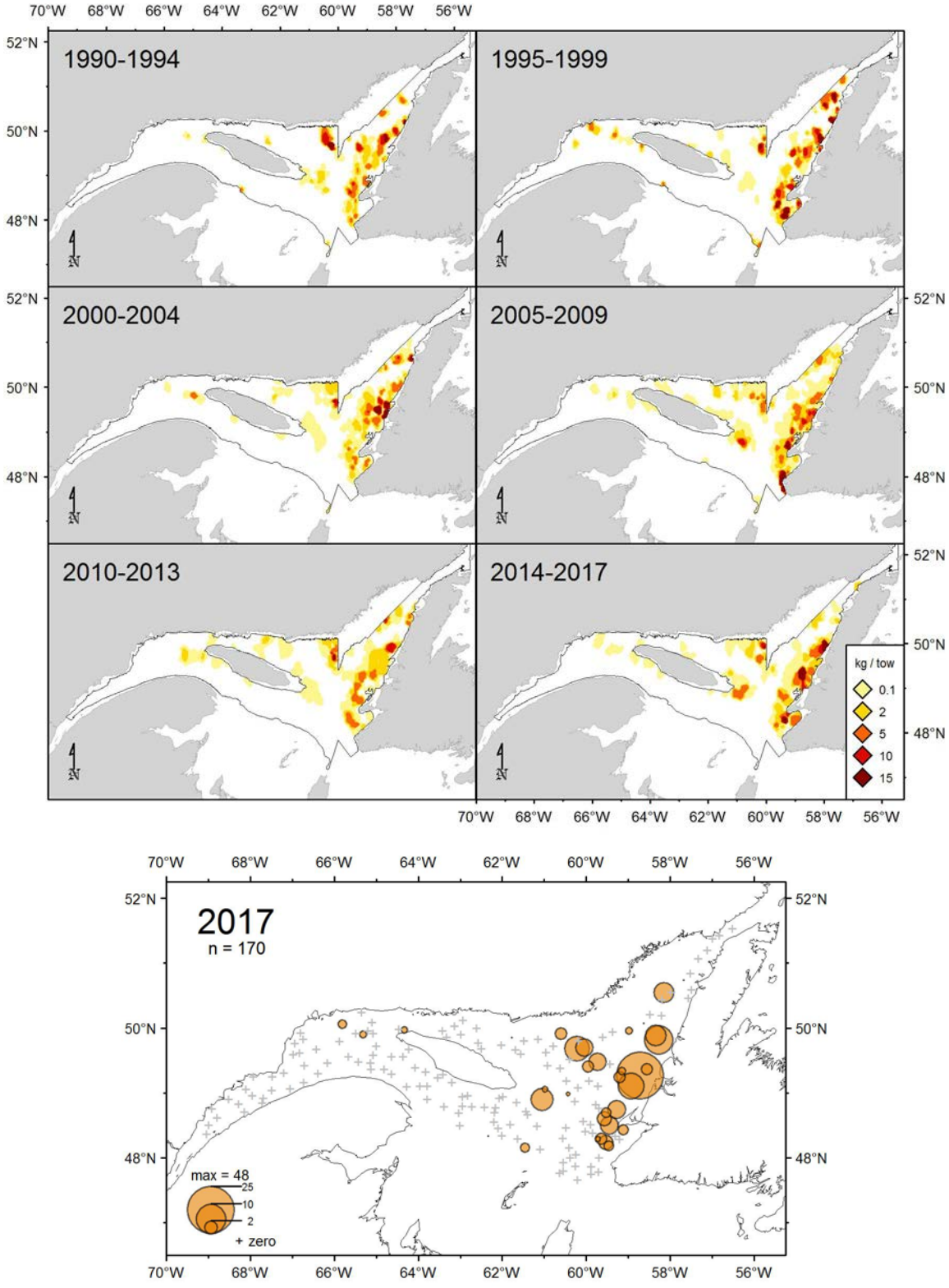

Figure 59. Atlantic Wolffish catch rates (kg/15 minutes tow) distribution.

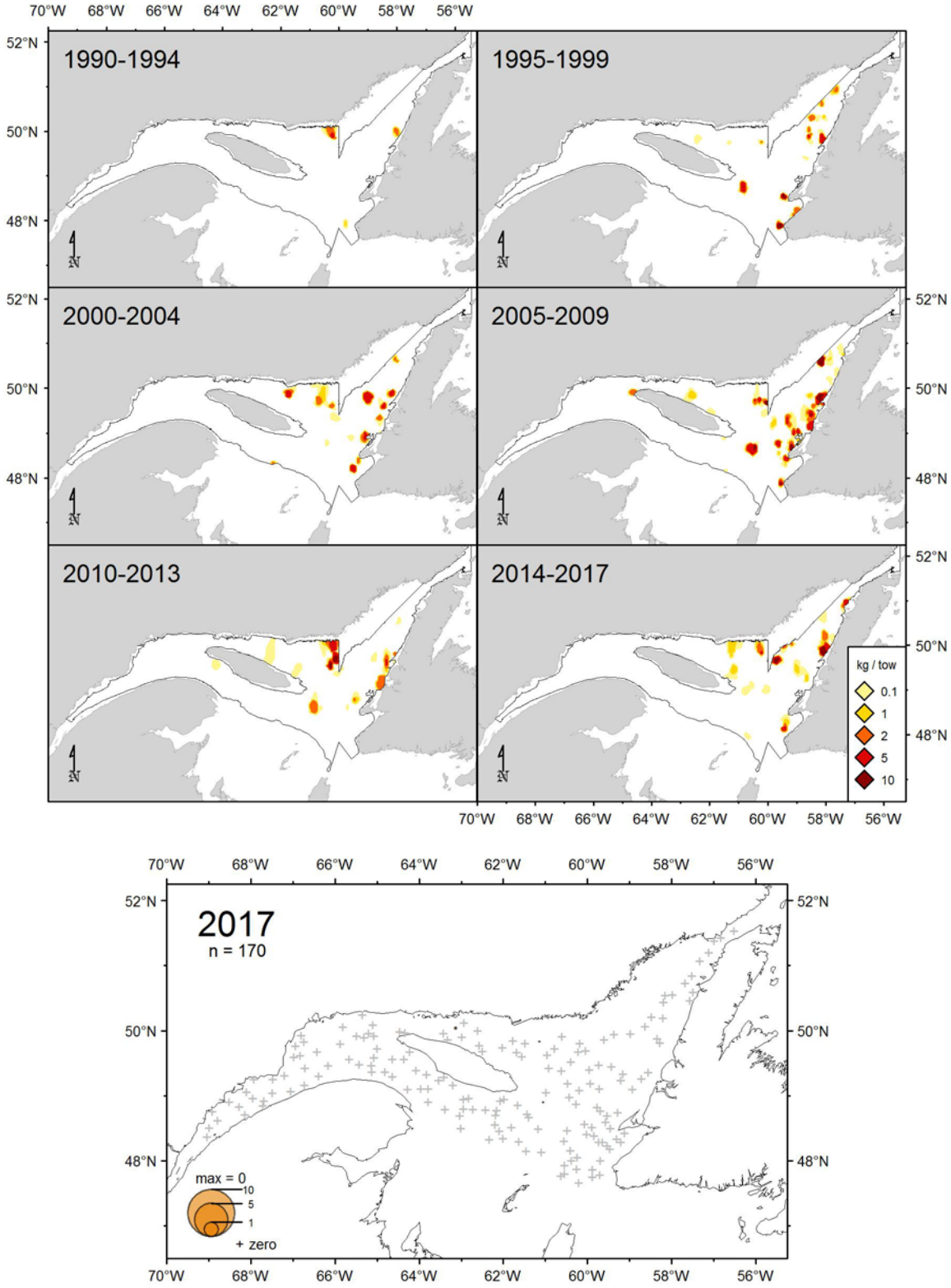

Figure 60. Spotted Wolffish catch rates (kg/15 minutes tow) distribution.

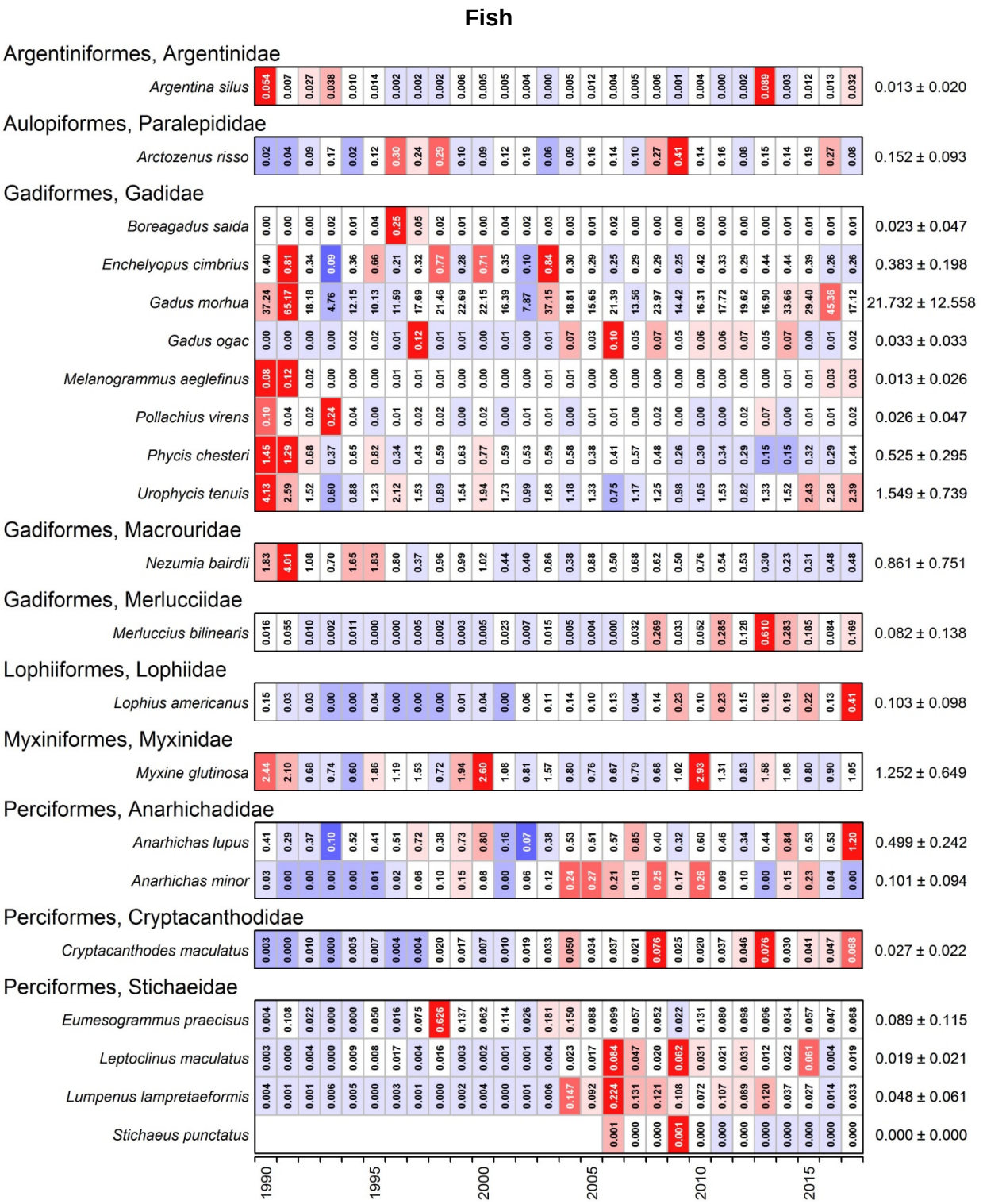

Figure 61. Average weight per 15-minute tow during the fish taxa survey. The colour code represents the anomaly value of the difference between the CPUE in a given year and the average CPUE in the time series divided by the standard deviation of this average for each taxon.

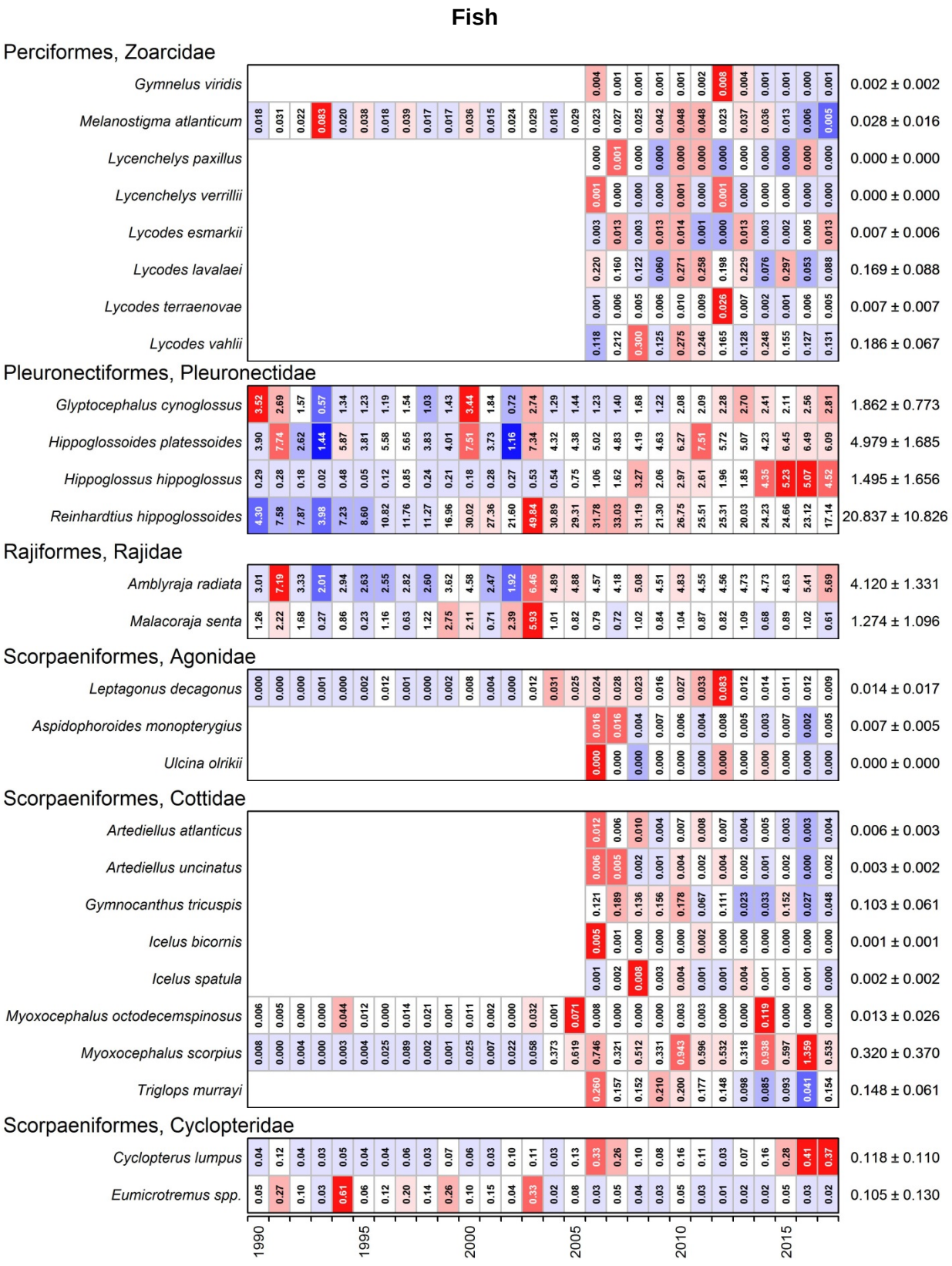

Figure 61. Continued.

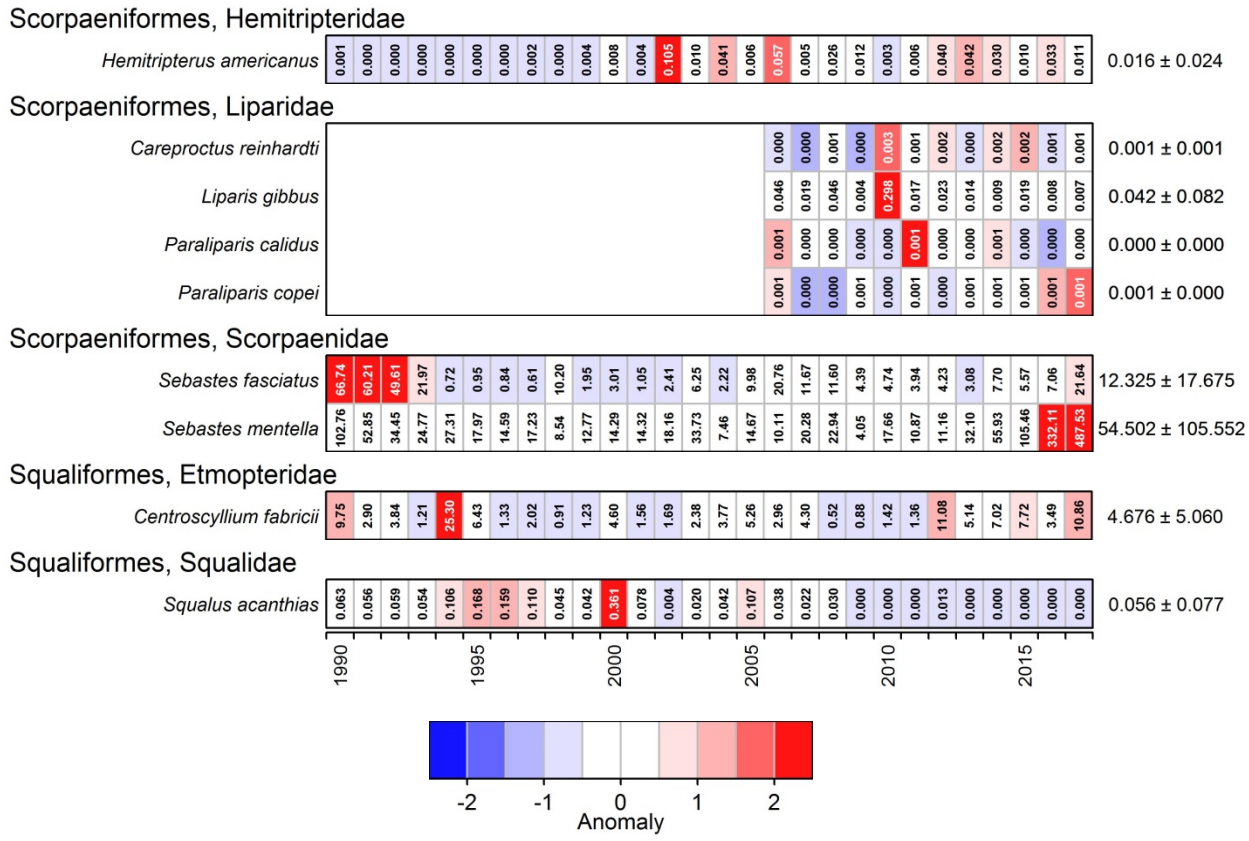

Figure 61. Continued.

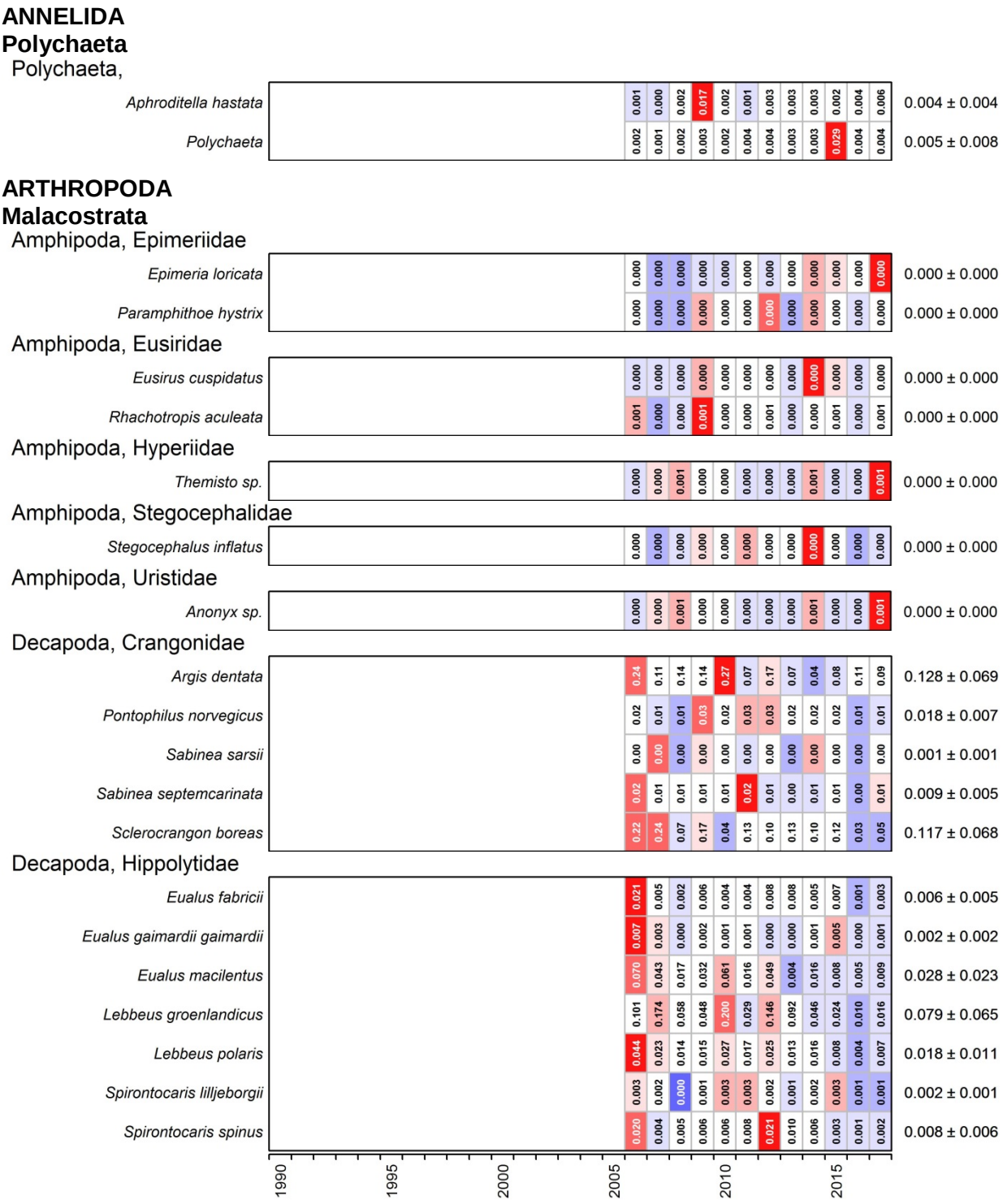

Figure 62. Average weight per 15-minute tow during the invertebrates. The colour code represents the anomaly value of the difference between the CPUE in a given year and the average CPUE in the time series divided by the standard deviation of this average for each taxon.

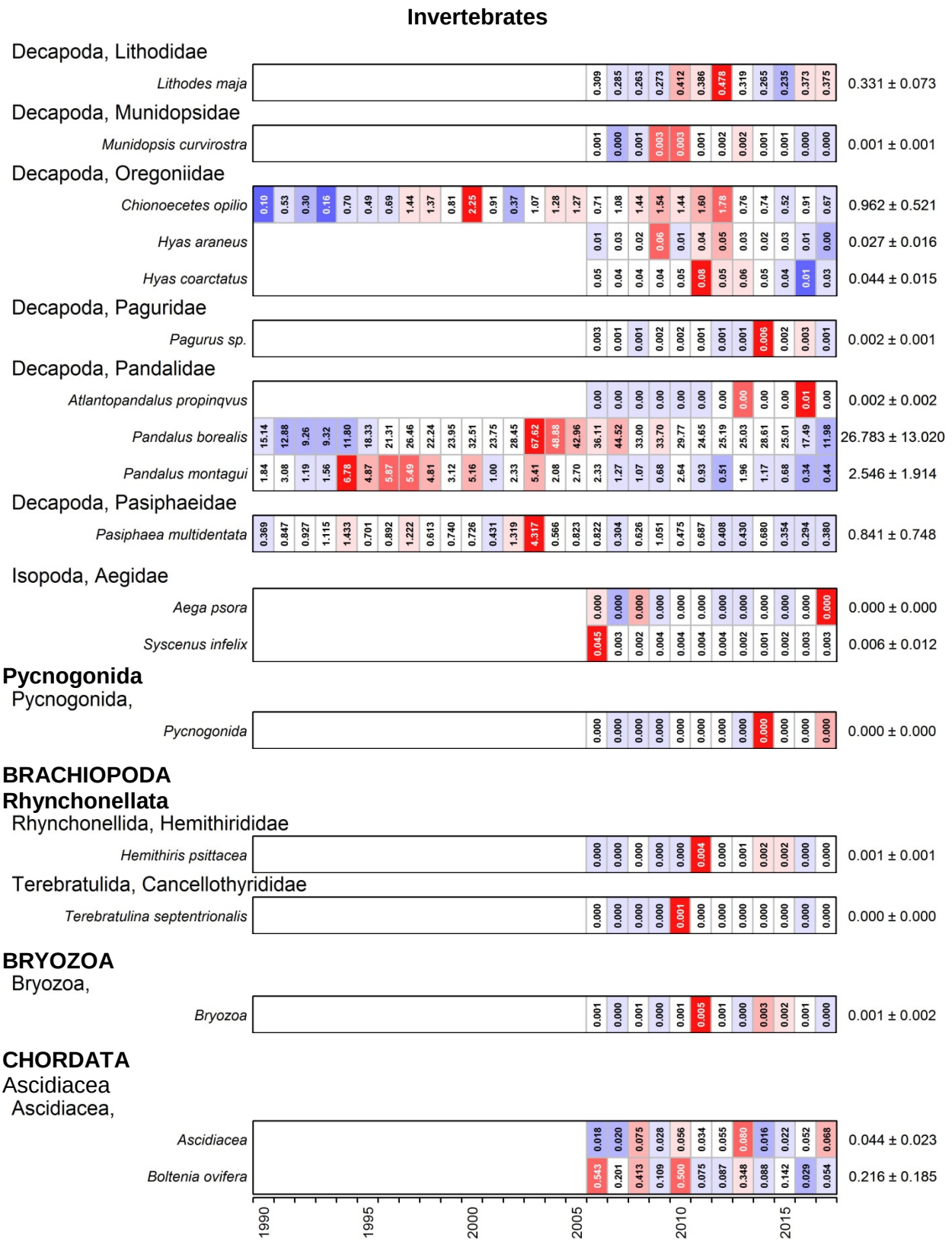

Figure 62. Continued.

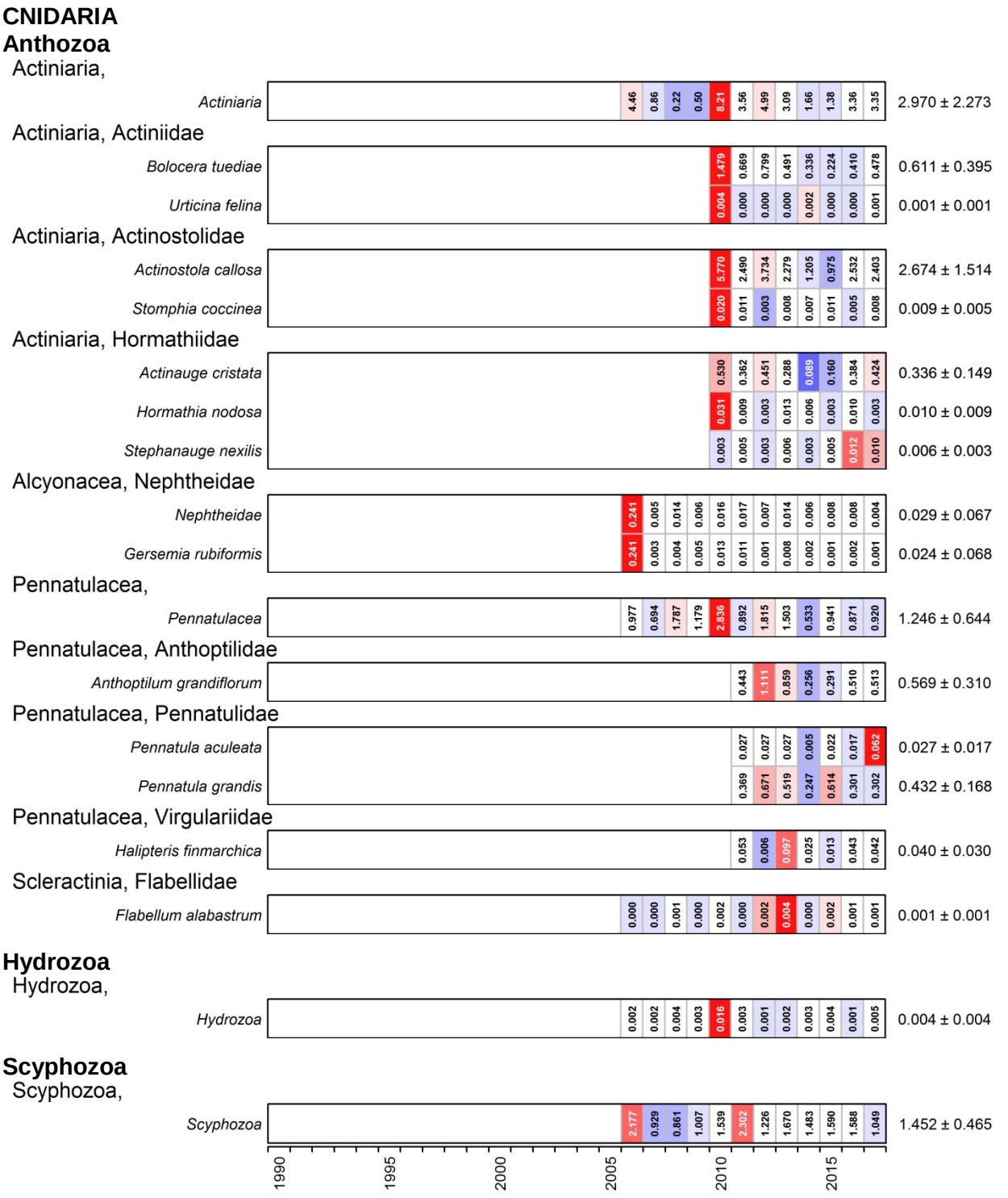

Figure 62. Continued.

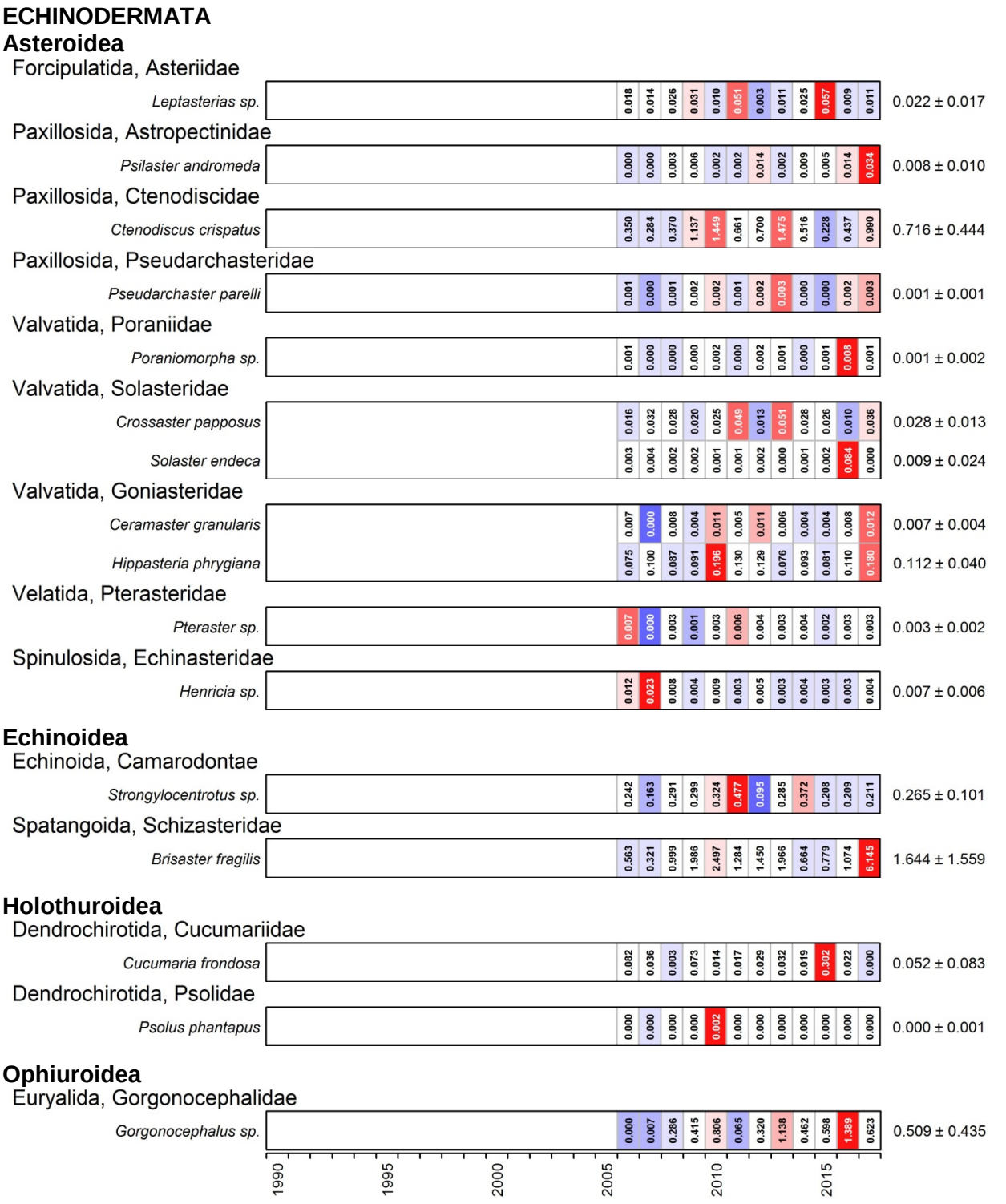

Figure 62. Continued.

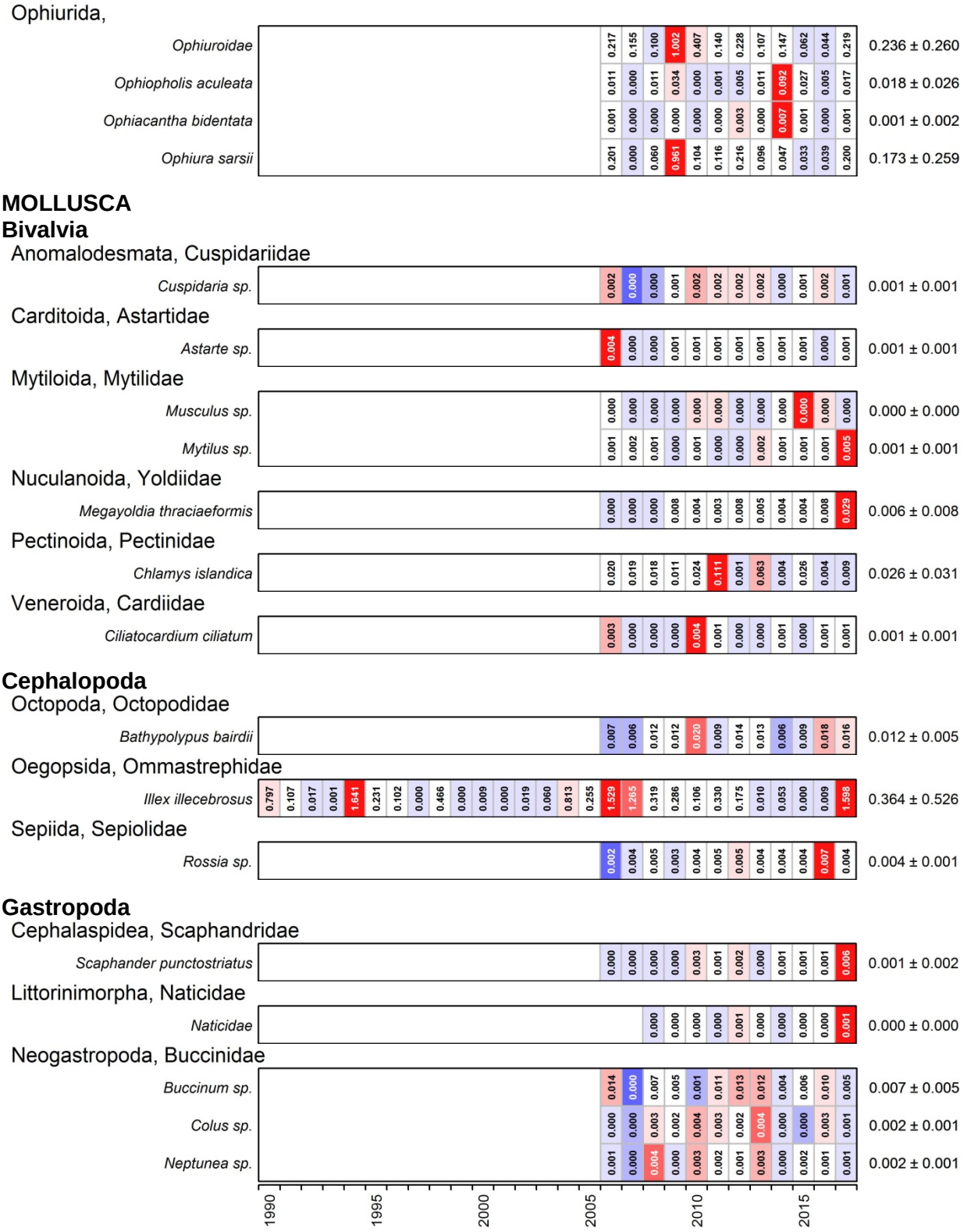

Figure 62. Continued.

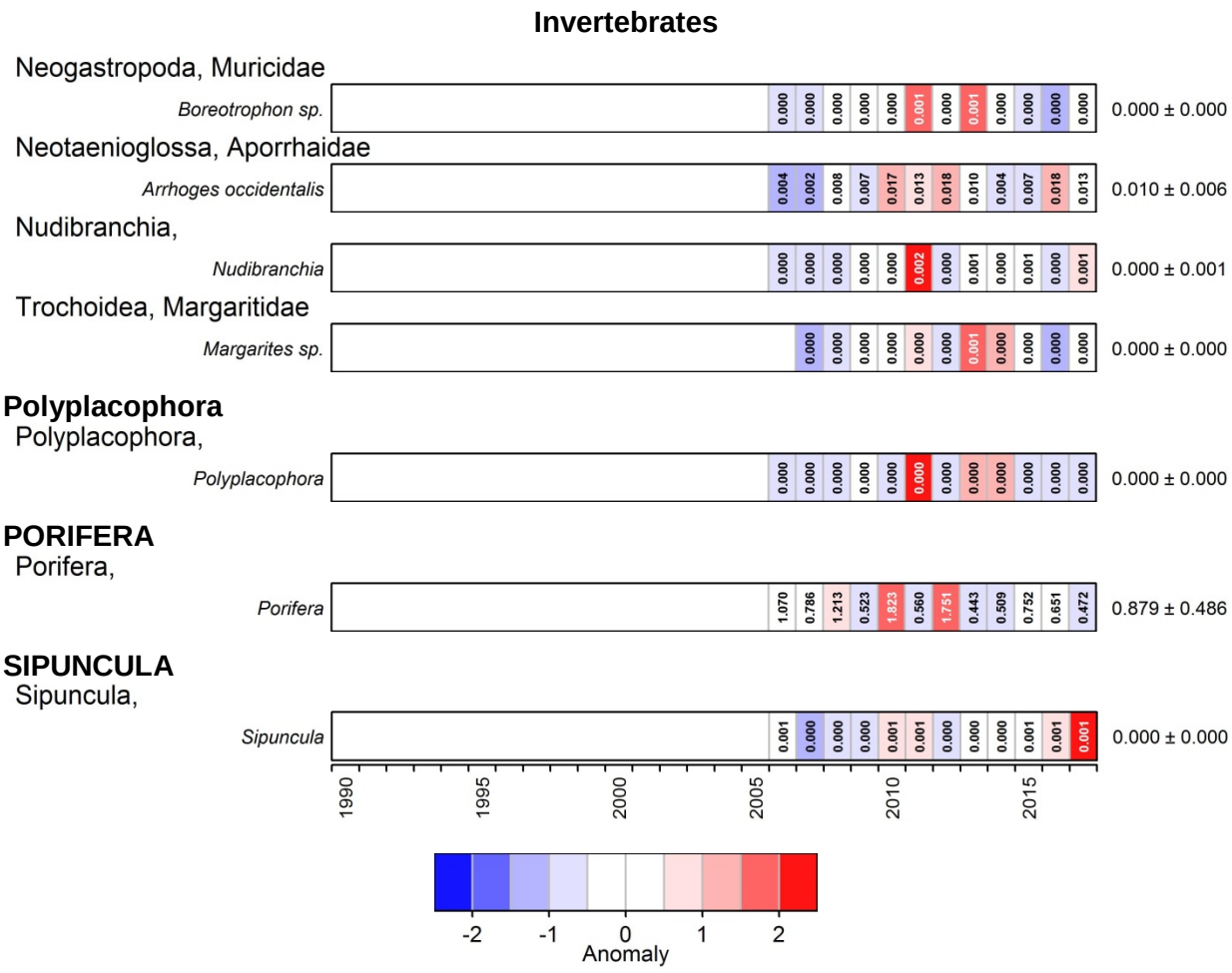

Figure 62. Continued.

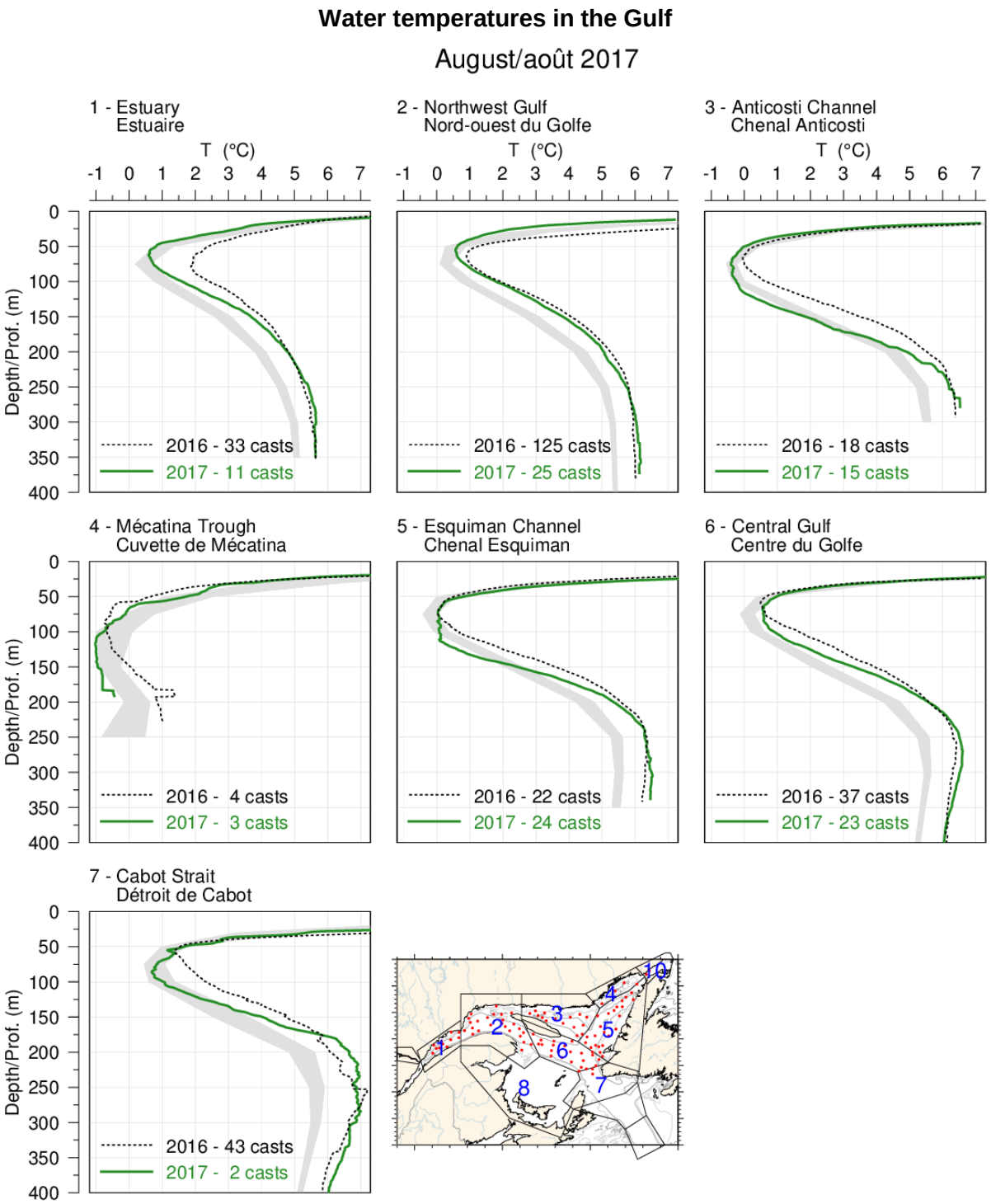

Figure 63. Mean temperature profiles observed in each region of the Gulf during August 2017. The shaded area represents the 1981–2010 climatological monthly mean ± 0.5 SD for August. Mean profiles for August and September 2016 are also shown for comparison.

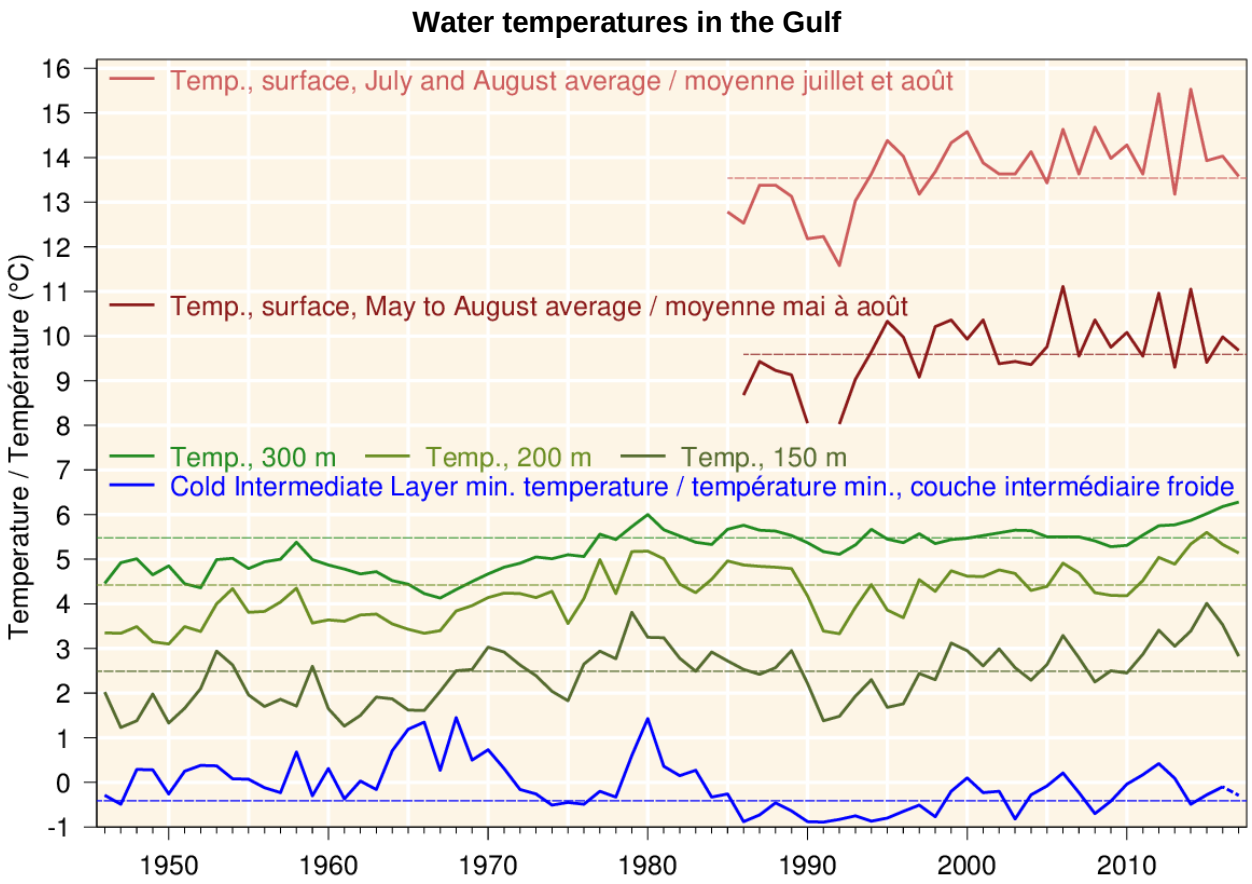

Figure 64. Water temperatures in the Gulf. Sea-surface temperature averaged over the Estuary and the northern Gulf for July–August and May-August (1985–2017) (red lines). Layer-averaged temperature for the Gulf of St. Lawrence at 150, 200 and 300 m (green lines). Cold intermediate layer minimum temperature index in the Gulf of St. Lawrence, adjusted to July 15 with 2017 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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
821	4R	1272	3	3	3	3	2	3	3	2	3	3	3	3	3	3	3	7	3	3	3	3	2	4	3	3	3	2	2	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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
851	4T	456	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3	3	3	2	2	2	2
852	4T	427	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3	2	3	2	2	2	1
854	4T	465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	2	2	2	2	2	2	2
855	4T	928	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4	3	2	3	3	2	2	2	2

Appendix 2. Occurrences and total catches, in weight and number, by taxon during the 2017 survey (170 successful tows).

Vertebrates

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
90	*Amblyraja radiata*	Raie épineuse	Thorny Skate	139	957.2	1721
696	*Ammodytes* sp.	Lançons	Sand Lances	8	< 0.1	9
700	*Anarhichas lupus*	Loup atlantique	Atlantic Wolffish	34	117.9	220
701	*Anarhichas minor*	Loup tacheté	Spotted Wolffish	3	< 0.1	3
718	*Anisarchus medius*	Lompénie naine	Stout Eelblenny	1	< 0.1	1
320	*Arctozenus risso*	Lussion blanc	White Barracudina	95	13.8	754
193	*Argentina silus*	Grande argentine	Atlantic Argentine	12	4.3	50
811	*Artediellus atlanticus*	Hameçon atlantique	Atlantic Hookear Sculpin	35	0.5	97
812	*Artediellus uncinatus*	Hameçon neigeux	Arctic Hookear Sculpin	6	0.1	39
838	*Aspidophoroides monopterygius*	Poisson-alligator atlantique	Alligatorfish	40	0.7	180
102	*Bathyraja spinicauda*	Raie à queue épineuse	Spinytail Skate	3	27.7	3
451	*Boreogadus saida*	Saïda franc	Arctic Cod	26	1.2	111
865	*Careproctus reinhardti*	Petite limace de mer	Sea Tadpole	7	0.3	13
27	*Centroscyllium fabricii*	Aiguillat noir	Black Dogfish	31	1934.5	2463
227	*Chauliodus sloani*	Chauliode très lumineux	Sloane's Viperfish	1	< 0.1	1
150	*Clupea harengus*	Hareng atlantique	Atlantic Herring	92	1569.9	8012
829	*Cottunculus microps*	Cotte polaire	Polar Sculpin	1	< 0.1	1
721	*Cryptacanthodes maculatus*	Terrassier tacheté	Wrymouth	12	9.3	17
982	*Cryptopsaras couesii*	Petit pêcheur abyssal	Triplewart Seadevil	2	0.3	2
849	*Cyclopterus lumpus*	Grosse poule de mer	Lumpfish	34	53.6	79
208	*Cyclothone microdon*	Cyclothone à petites dents	Small-Toothed Bristlemouth	9	< 0.1	12
461	*Enchelyopus cimbrius*	Motelle à quatre barbillons	Fourbeard Rockling	109	42.8	1283
711	*Eumesogrammus praecisus*	Quatre-lignes atlantique	Fourline Snakeblenny	20	5.3	145
844	*Eumicrotremus spinosus*	Petite poule de mer atlantique	Atlantic Spiny Lumpsucker	24	2.1	204
438	*Gadus morhua*	Morue franche	Atlantic Cod	93	2496.2	5183
439	*Gadus ogac*	Ogac, morue ogac	Greenland Cod	4	2.3	5
426	*Gasterosteus aculeatus aculeatus*	Épinoche à trois épines	Threespine Stickleback	1	< 0.1	1
890	*Glyptocephalus cynoglossus*	Plie grise	Witch Flounder	141	560.8	3478
746	*Gymnelus viridis*	Unernak caméléon	Fish Doctor	2	< 0.1	2
823	*Gymnocanthus tricuspis*	Tricorne arctique	Arctic Staghorn Sculpin	17	2.9	63
809	*Hemitripterus americanus*	Hémitriptère atlantique	Sea Sculpin	3	1.6	4
889	*Hippoglossoides platessoides*	Plie canadienne	American Plaice	130	1032.1	10896
893	*Hippoglossus hippoglossus*	Flétan atlantique	Atlantic Halibut	50	700.6	128
831	*Icelus bicornis*	Icèle à deux cornes	Twohorn Sculpin	1	< 0.1	2

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
832	*Icelus spatula*	Icèle spatulée	Spatulate Sculpin	3	< 0.1	5
836	*Leptagonus decagonus*	Agone atlantique	Atlantic Poacher	21	7.5	287
717	*Leptoclinus maculatus*	Lompénie tachetée	Daubed Shanny	33	1.8	613
100	*Leucoraja ocellata*	Raie tachetée	Winter Skate	1	5.6	1
891	*Limanda ferruginea*	Limande à queue jaune	Yellowtail Flounder	1	0.1	3
862	*Liparis gibbus*	Limace marbrée	Variegated Snailfish	6	0.4	7
966	*Lophius americanus*	Baudroie d'Amérique	Monkfish, Goosefish	18	74.4	18
716	*Lumpenus lampretaeformis*	Lompénie-serpent	Snakeblenny	25	7.9	248
750	*Lycenchelys paxillus*	Lycode commune	Common Wolf Eel	1	< 0.1	2
752	*Lycenchelys verrillii*	Lycode à tête longue	Wolf Eelpout	4	< 0.1	4
727	*Lycodes esmarkii*	Lycode d'Esmark	Esmark's Eelpout	10	2.5	13
728	*Lycodes lavalaei*	Lycode du Labrador	Newfoundland Eelpout	15	11.8	64
733	*Lycodes polaris*	Lycode polaire	Canadian Eelpout	1	0.1	2
734	*Lycodes terraenovae*	Lycode atlantique	Atlantic Eelpout	4	0.7	4
730	*Lycodes vahlii*	Lycode à carreaux	Vahl's Eelpout	31	21.4	334
91	*Malacoraja senta*	Raie lisse	Smooth Skate	115	103.2	572
187	*Mallotus villosus*	Capelan	Capelin	69	690.5	67422
441	*Melanogrammus aeglefinus*	Aiglefin	Haddock	1	8.2	7
745	*Melanostigma atlanticum*	Molasse atlantique	Atlantic Soft Pout	51	0.8	241
449	*Merluccius bilinearis*	Merlu argenté	Silver Hake	56	32.1	143
272	Myctophidae	Poissons-lanterne	Lanternfishes	20	1.8	588
271	Myctophiformes	Poissons des profondeurs	Deepwater Fishes	2	< 0.1	8
819	*Myoxocephalus scorpius*	Chaboisseau à épines courtes	Shorthorn Sculpin	23	49.6	119
12	*Myxine glutinosa*	Myxine du nord	Northern Hagfish	102	176.7	2932
368	*Nemichthys scolopaceus*	Avocette ruban	Atlantic Snipe Eel	3	0.1	3
478	*Nezumia bairdii*	Grenadier du grand Banc	Common Grenadier	96	77.8	2075
275	*Notoscopelus kroyeri*	Lanterne-voilière nordique	Kroyer's Lanternfish	6	0.6	26
874	*Paraliparis calidus*	Limace ardente	Lowfin Snailfish	5	0.1	6
856	*Paraliparis copei copei*	Limace à museau noir	Blacksnout Seasnail	11	0.3	36
444	*Phycis chesteri*	Merluche à longues nageoires	Longfin Hake	39	83.3	934
443	*Pollachius virens*	Goberge	Pollock	3	6.1	4
222	*Polyipnus clarus*	Hache	Slope Hachetfish	2	< 0.1	2
244	*Polymetme thaeocoryla*	Poisson lumineux	Ligthfishes	1	< 0.1	1
94	*Rajella fyllae*	Raie ronde	Round Skate	2	0.9	2
892	*Reinhardtius hippoglossoides*	Flétan du Groenland, turbot	Greeenland Halibut, Turbot	131	2977.5	10535
572	*Scomber scombrus*	Maquereau bleu	Atlantic Mackerel	30	4.5	496
398	*Scomberesox saurus saurus*	Balaou	Atlantic Saury	1	< 0.1	1
796	*Sebastes fasciatus*	Sébaste acadien	Acadian Redfish	57	2911.7	34722

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
794	*Sebastes mentella*	Sébaste atlantique	Deepwater Redfish	126	68788	683347
20	*Somniosus microcephalus*	Laimargue atlantique	Greenland Shark	1	9999	1
710	*Stichaeus punctatus punctatus*	Stichée arctique	Arctic Shanny	1	0.1	7
373	*Synaphobranchus kaupii*	Anguille égorgée bécuée	Northern Cutthroat Eel	2	< 0.1	2
814	*Triglops murrayi*	Faux-trigle armé	Moustache Sculpin	38	18	1846
815	*Triglops nybelini*	Faux-trigle à grands yeux	Bigeye Sculpin	1	0.1	14
447	*Urophycis tenuis*	Merluche blanche	White Hake	95	386.8	708
	Total	**Vertébrés**	**Vertebrates**	**-**	95 990	843 587

Invertebrates

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
8040	*Acanthephyra pelagica*	Crevette	Shrimp	2	< 0.1	2
2182	*Actinauge cristata*	Anémone de mer	Anemone	35	68.1	7686
2165	Actiniaria	Actinies et Anémones	Sea Anemones	9	< 0.1	38
2162	*Actinostola callosa*	Anémones de mer	Anemone	54	484.4	6579
6771	*Aega psora*	Isopode	Isopod	18	0.1	21
2677	*Alcyonidium pachydermatum*	Bryozoaire	Bryozoan	2	1.2	97
6930	Amphipoda	Amphipodes	Amphipods	1	< 0.1	1
8593	*Amphiura* sp.	Ophiures	Brittle Star	8	< 0.1	160
4219	*Anomia* sp.	Anomies	Jingle Shells	4	< 0.1	17
7389	*Anonyx* sp.	Gammarides	Gammarids	6	< 0.1	30
2218	*Anthoptilum grandiflorum*	Plume de mer	Sea Pen	52	83.6	6748
5002	*Aphroditella hastata*	Souris de mer	Sea Mouse	17	1	36
6594	*Arcoscalpellum michelottianum*	Balane	Barnacle	4	< 0.1	4
8138	*Argis dentata*	Crevette verte	Arctic Argid	34	8	1880
8024	*Aristaeopsis edwardsiana*	Gambon écarlate	Scarlet Shrimp	1	< 0.1	1
3418	*Arrhoges occidentalis*	Pied-de-pélican	American Pelicanfoot	19	1.5	149
1128	*Artemisina arcigera*	Éponge	Sponge	4	0.3	54
8742	*Ascidia* sp.	Ascidie	Sea Squirts	60	3.8	749
8680	Ascidiacea	Ascidies, tuniqués sessiles	Ascidians, Sessile Tunicates	19	5.4	1121
1120	*Asconema foliatum*	Éponge	Sponge	6	1.4	
4227	*Astarte* sp.	Astartes	Astartes	22	0.3	239
8113	*Atlantopandalus propinqvus*	Crevette	Shrimp	11	0.3	50
2097	*Atolla wyvillei*	Méduse	Jellyfish	7	0.6	10
2085	*Aurelia aurita*	Méduse de lune	Moon Jelly	3	0.9	5

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
6595	Balanidae	Balanes	Barnacles	3	< 0.1	8
4105	*Bathyarca glacialis*	Bivalve	Glacial Bathyark	1	< 0.1	1
4904	*Bathypolypus bairdii*	Poulpe	North Atlantic Octopus	55	2.6	102
3519	*Beringius turtoni*	Buccin	Whelk	2	< 0.1	2
3995	Bivalvia	Bivalves	Bivalves	1	< 0.1	1
2158	*Bolocera tuediae*	Anémone de mer	Anemone	93	76.2	1370
8792	*Boltenia ovifera*	Patate de mer	Sea Potato	11	6.6	90
3488	*Boreotrophon* sp.	Murex	Murex	3	< 0.1	5
8798	*Botrylloides* sp.	Ascidie	Tunicate	3	< 0.1	7
5755	*Brada inhabilis*	Polychète	Flabelligerid Worm	3	< 0.1	4
8378	*Brisaster fragilis*	Oursin coeur	Heart Urchin	82	1014.3	42611
2670	Bryozoa	Bryozoaires	Bryozoans	9	< 0.1	12
3520	*Buccinum cyaneum*	Buccin bleu	Bluish Whelk	15	3.9	298
3518	*Buccinum polare*	Buccin	Thin Whelk	2	0.1	3
3523	*Buccinum scalariforme*	Buccin	Ladder Whelk	4	< 0.1	8
3516	*Buccinum* sp.	Buccins	Whelk	8	0.3	19
3517	*Buccinum undatum*	Buccin commun	Waved Whelk	8	0.3	22
8173	*Calocaris templemani*	Crevette fouisseuse	Lobster Shrimp	6	< 0.1	6
8429	*Ceramaster granularis*	Étoile de mer	Sea Star	26	1.8	45
8213	*Chionoecetes opilio*	Crabe des neiges	Snow Crab	93	167.8	913
6593	*Chirona hameri*	Balane turbané	Turban Barnacle	4	0.5	17
4167	*Chlamys islandica*	Pétoncle d' Islande	Iceland Scallop	13	1.4	76
4351	*Ciliatocardium ciliatum*	Coque d'Islande	Iceland Cockle	5	1.6	72
3908	*Colga villosa*	Nudibranche	Nudibranch	13	< 0.1	22
3577	*Colus pubescens*	Buccin	Hairy Whelk	3	0.1	4
3575	*Colus* sp.	Buccins	Whelks	1	< 0.1	1
3576	*Colus stimpsoni*	Buccin	Whelk	4	0.1	4
1130	*Craniella polyura*	Éponge	Sponge	1	< 0.1	22
8447	*Crossaster papposus*	Soleil de mer épineux	Spiny Sun Star	23	2.6	130
3422	*Cryptonatica affinis*	Lunaties	Arctic Moonsnail	7	0.1	38
8407	*Ctenodiscus crispatus*	Étoile de mer	Mud Star	112	173.7	45046
8312	*Cucumaria frondosa*	Concombre de mer	Orange Footed Sea Cucumber	2	0.7	3
4526	*Cuspidaria glacialis*	Mye	Gacial Dipperclam	23	0.1	82
2080	*Cyanea capillata*	Crinière de lion	Lion's Mane	34	21.8	45
3894	*Dendronotus frondosus*	Nudibranche	Nudibranch	6	0.1	17
3895	*Dendronotus niveus*	Nudibranche orangé	Orange Nudibranch	1	< 0.1	2
3893	*Dendronotus* sp.	Nudibranche	Nudibranch	3	< 0.1	3
8408	*Diplopteraster multipes*	Étoile de mer	Sea Star	4	0.5	4

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
3965	*Doridoxa ingolfiana*	Nudibranche	Nudibranch	2	< 0.1	2
2191	*Drifa glomerata*	Corail mou	Soft Coral	30	0.3	83
2183	*Duva florida*	Corail mou	Sea Cauliflower	9	0.1	14
8373	*Echinarachnius parma*	Dollar de sable	Common Sand Dollar	1	< 0.1	2
7383	*Epimeria loricata*	Gammaride	Gammarid	5	< 0.1	6
2157	*Epizoanthus* sp.	Anémone de mer	Sea Anemone	36	0.1	-
8075	*Eualus fabricii*	Bouc Arctique	Arctic Eualid	14	0.2	336
8081	*Eualus gaimardii belcheri*	Bouc	Circumpolar Eualid	1	< 0.1	1
8080	*Eualus gaimardii gaimardii*	Bouc	Circumpolar Eualid	9	< 0.1	41
8077	*Eualus macilentus*	Bouc du Groenland	Greenland Shrimp	14	0.8	849
8074	*Eualus* sp.	Bouc	Eualid	3	< 0.1	-
8778	*Eudistoma vitreum*	Ascidie	Tunicate	11	0.2	53
5479	*Eunice pennata*	Polychète	Seaworm	1	< 0.1	2
5045	*Eunoe nodosa*	Polychète	Seaworm	8	< 0.1	22
5461	*Euphrosine borealis*	Polychète	Seaworm	1	< 0.1	1
8033	*Eusergestes arcticus*	Crevette	Shrimp	16	0.3	275
7195	*Eusirus cuspidatus*	Gammaride	Gammarid	4	< 0.1	6
3437	*Euspira pallida*	Lunatie du Groenland	Pale Moonsnail	10	0.1	21
2295	Fecampiidae	Vers flats	Flatworms	12	< 0.1	13
2224	*Flabellum alabastrum*	Madrépore	Cup coral	9	0.2	26
3175	Gastropoda	Gastéropodes	Gastropods	1	< 0.1	1
2184	*Gersemia rubiformis*	Corail mou	Sea Strawberry	19	0.1	59
5902	*Golfingia margaritacea*	Sipunculide	Sipunculid	5	< 0.1	6
8540	*Gorgonocephalus* sp.	Gorgonocéphales	Basket Stars	27	52.4	243
2217	*Halipteris finmarchica*	Plume de mer	Sea Pen	24	7.2	446
8263	*Heliometra glacialis*	Lis de mer	Feather Star	3	0.1	23
1131	*Hemigellius arcofer*	Éponge	Sponge	5	4.5	-
3090	*Hemithiris psittacea*	Brachiopode	Lamp Shell	4	< 0.1	19
8483	*Henricia* sp.	Étoiles de mer	Sea Stars	59	0.7	120
4437	*Hiatella arctica*	Saxicave arctique	Arctic Saxicave	1	< 0.1	1
8431	*Hippasteria phrygiana*	Étoile de mer	Sea Star	39	29.1	94
8290	Holothuroidea	Cocombres de mer	Sea Cucumbers	2	0.1	4
2150	*Hormathia digitata*	Anémone	Anemone	27	0.6	187
2167	*Hormathia nodosa*	Anémone noduleuse	Rugose Anemone	6	0.4	13
8217	*Hyas araneus*	Crabe lyre	Atlantic Lyre Crab	15	0.9	71
8218	*Hyas coarctatus*	Crabe lyre	Arctic Lyre Crab	41	2.1	212
1341	Hydrozoa	Hydrozoaires	Hydrozoans	53	0.5	-
8028	*Hymenopenaeus debilis*	Crevette	Shrimp	2	< 0.1	5

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
6977	*Hyperia galba*	Hypéride	Hyperiid	2	< 0.1	2
4753	*Illex illecebrosus*	Encornet rouge nordique	Northern Shortfin Squid	87	232.8	1730
5003	*Laetmonice filicornis*	Polychète	Seaworm	29	0.1	77
8092	*Lebbeus groenlandicus*	Bouc	Spiny Lebbeid	9	0.6	146
8095	*Lebbeus microceros*	Bouc	Shrimp	2	< 0.1	8
8093	*Lebbeus polaris*	Bouc	Polar Lebbeid	32	0.5	345
8091	*Lebbeus* sp.	Boucs	Lebbeids	1	< 0.1	-
3198	*Lepeta caeca*	Patelle	Northern Blind Limpet	1	< 0.1	1
8511	*Leptasterias polaris*	Étoile de mer polaire	Polar Sea Star	4	1	24
8510	*Leptasterias* sp.	Étoiles de mer	Sea Stars	5	< 0.1	5
8521	*Leptychaster arcticus*	Stelléridé	Sea Star	1	< 0.1	1
3459	*Limneria undata*	Veloutée rayée	Wavy Lamellaria	1	< 0.1	1
2207	*Liponema multicorne*	Anémone	Sea Anemone	6	2.4	64
8196	*Lithodes maja*	Crabe épineux du Nord	Norway King Crab	61	63.1	167
4395	*Macoma calcarea*	Bivalve	Chalky Macoma	6	0.1	27
5309	*Maldane sarsi*	Polychètes	Bamboo Worm	11	0.1	31
3219	*Margarites costalis*	Margarite rosé du Nord	Boreal Rosy Margarite	8	< 0.1	13
3216	*Margarites groenlandicus*	Troque	Greenland Marguerite	3	< 0.1	5
7994	*Meganyctiphanes norvegica*	Euphauside	Horned Krill	12	0.1	178
4025	*Megayoldia thraciaeformis*	Bivalve	Broad Yoldia	33	5.7	1057
5646	*Melinna cristata*	Polychète	Seaworm	9	0.2	18
8322	*Molpadia oolitica*	Holothurie	Sea Cucumber	2	< 0.1	3
8164	*Munidopsis curvirostra*	Munidopsis curvirostra	Squat Lobster	21	0.1	82
1117	*Mycale lingua*	Éponge	Sponge	11	2.6	-
1118	*Mycale loveni*	Éponge	Sponge	3	0.1	-
4121	*Mytilus* sp.	Moules	Mussels	8	0.9	61
3000	Nemertea	Némerte	Ribbon Worm	2	< 0.1	2
7483	*Neohela monstrosa*	Gammaride	Gammarid	4	< 0.1	5
5053	*Neoleanira tetragona*	Polychète	Scaled Worm	19	< 0.1	62
2219	Nephtheidae	Coraux mous	Soft corals	3	< 0.1	3
5113	*Nephtys* sp.	Polychète errante	Red-Lined Worm	5	< 0.1	8
3566	*Neptunea decemcostata*	Neptunée à dix côtes	Wrinkle Whelk	2	0.1	2
3567	*Neptunea despecta*	Neptunée commune du nord	Lader Whelk	1	< 0.1	1
3565	*Neptunea* sp.	Buccins	Whelks	3	0.1	3
8448	*Novodinia americana*	Étoile de mer	Sea Star	1	< 0.1	4
3850	Nudibranchia	Nudibranches	Nudibranchs	1	< 0.1	1
5961	*Nymphon* sp.	Araignées de mer	Sea Spiders	38	< 0.1	231
8575	*Ophiacantha bidentata*	Ophiure épineuse	Brittle Star	35	0.1	371

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
8583	*Ophiopholis aculeata*	Ophiure paquerette	Daisy Brittle Star	66	3	2500
8585	*Ophioscolex glacialis*	Ophiure	Brittle Star	14	< 0.1	36
8552	*Ophiura robusta*	Ophiure	Brittle Star	6	< 0.1	8
8553	*Ophiura sarsii*	Ophiure	Brittle Star	62	50.4	29053
8550	Ophiuridae	Ophiures	Brittle Stars	1	< 0.1	1
8178	*Pagurus* sp.	Bernard hermite droitier	Hermit Crab	12	0.1	32
8111	*Pandalus borealis*	Crevette nordique	Northern Shrimp	147	1893.1	348754
8112	*Pandalus montagui*	Crevette ésope	Striped Pink Shrimp	74	117.2	37447
4438	*Panomya norvegica*	Saxicave	Arctic Roughmya	1	< 0.1	1
7586	*Paramphithoe hystrix*	Gammaride	Gammarid	9	< 0.1	13
8057	*Pasiphaea multidentata*	Sivade rose, Crevette blanche	Pink Glass Shrimp	87	65	20337
2203	*Pennatula aculeata*	Plume de mer	Sea Pen	105	9.8	3532
2210	*Pennatula grandis*	Plume de mer	Sea Pen	38	53.3	1825
2096	*Periphylla periphylla*	Méduse à coronne	Crown Jellyfish	73	150.6	136
1136	*Phakellia bowerbanki*	Éponge	Sponge	2	0.6	-
8114	*Plesionika martia*	Crevette	Golden Shrimp	1	< 0.1	1
2255	*Pleurobrachia pileus*	Groseille de mer ronde	Sea Gooseberry	4	< 0.1	5
3578	*Plicifusus kroeyeri*	Colus	Arctic Whelk	1	< 0.1	1
8783	*Polycarpa fibrosa*	Ascidie	Tunicate	2	0.2	184
4950	Polychaeta	Polychètes	Polychaetes	39	0.2	528
1123	*Polymastia grimaldii*	Éponge	Sponge	2	0.1	5
1109	*Polymastia* sp.	Éponge	Sponge	35	1.6	220
5007	Polynoidae	Polychète errante	Fifteen-Scaled Worm	24	0.1	43
5264	*Polyphysia crassa*	Polychète	Sea Worm	12	0.1	24
8135	*Pontophilus norvegicus*	Crevette	Norwegian Shrimp	70	2	983
8435	*Poraniomorpha* sp.	Étoile de mer	Sea Star	7	0.2	8
1101	Porifera	Éponges	Sponges	83	104	-
2573	*Priapulus caudatus*	Priapulide	Priapulid	1	< 0.1	1
8433	*Pseudarchaster parelii*	Étoile de mer	Sea Star	18	0.6	28
8520	*Psilaster andromeda*	Étoile de mer	Sea Star	28	6.8	809
8295	*Psolus fabricii*	Psolus écarlate	Scarlet Psolus	2	< 0.1	2
8294	*Psolus phantapus*	Holothurie	Sea Cucumber	5	< 0.1	5
8410	*Pteraster militaris*	Étoile de mer	Sea Star	11	0.3	31
8412	*Pteraster obscurus*	Étoile de mer	Sea Star	2	< 0.1	3
8411	*Pteraster pulvillus*	Étoile de mer	Sea Star	12	0.1	21
1353	*Ptychogena lactea*	Méduse	Jellyfish	14	0.9	240
5951	Pycnogonida	Araignées de mer	Sea Spiders	3	< 0.1	5
1107	*Radiella hemisphaerica*	Éponge	Sponge	13	0.3	68

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
7211	*Rhachotropis aculeata*	Gammaride	Gammarid	18	0.1	164
4557	*Rossia* sp.	Sépioles	Bobtails	34	0.8	48
8129	*Sabinea sarsii*	Crevette	Sars Shrimp	11	0.2	110
8128	*Sabinea septemcarinata*	Crevette	Sevenline Shrimp	27	1	491
3491	*Scabrotrophon fabricii*	Murex	Murex	2	< 0.1	2
5267	*Scalibregma inflatum*	Polychète	Seaworm	1	< 0.1	2
3715	*Scaphander punctostriatus*	Céphalaspide	Giant Canoe Bubble	27	1	684
8119	*Sclerocrangon boreas*	Crevette de roche	Scultured Shrimp	9	3.9	388
2040	Scyphozoa	Scyphozoaires	Scyphozoans	9	1	21
2679	*Securiflustra securifrons*	Bryozoaires marins	Marine Bryozoans	8	< 0.1	-
8035	*Sergia robusta*	Sergistidé écarlate	Scarlet Sergestid	4	< 0.1	5
4352	*Serripes groenlandicus*	Coque du Groenland	Greenland Smoothcockle	3	0.3	9
5900	Sipuncula	Sipunculides	Sipunculids	7	0.1	43
8445	*Solaster endeca*	Soleil de mer pourpre	Purple Sunstar	3	0.1	3
8087	*Spirontocaris liljeborgii*	Bouc épineux	Friendly Blade Shrimp	25	0.1	97
8086	*Spirontocaris phippsii*	Bouc	Punctate Blade Shrimp	2	< 0.1	5
8084	*Spirontocaris* sp.	Bouc	Blade Shrimp	2	< 0.1	-
8085	*Spirontocaris spinus*	Bouc perroquet	Parrot Shrimp	17	0.1	76
1352	*Staurostoma mertensii*	Méduse à croix blanche	Whitecross Jellyfish	1	< 0.1	1
7750	*Stegocephalus inflatus*	Gammaride	Gammarid	4	< 0.1	8
8515	*Stephanasterias albula*	Étoile de mer	Sea Star	2	< 0.1	3
2159	*Stephanauge nexilis*	Anémone de mer	Sea Anemone	18	1.7	135
2173	*Stomphia coccinea*	Anémone marbrée	Anemone	31	1	90
8363	*Strongylocentrotus* sp.	Oursins	Sea Urchins	51	25.5	1740
1112	*Stylocordyla borealis*	Éponge	Sponge	24	0.1	271
1115	*Suberites ficus*	Éponge	Fig Sponge	9	1.5	15
1113	*Sycon* sp.	Éponge	Sponge	2	< 0.1	2
8776	*Synoicum pulmonaria*	Ascidie	Tunicate	2	< 0.1	4
6791	*Syscenus infelix*	Isopode	Isopod	57	0.5	203
1108	*Tentorium semisuberites*	Éponge	Sponge	11	0.1	72
3101	*Terebratulina septentrionalis*	Térébratule du Nord	Northern Lamp Shell	12	< 0.1	16
6972	*Themisto libellula*	Hypéride	Hyperiid	28	0.1	345
1114	*Thenea muricata*	Éponge	Sponge	5	1.5	49
1357	*Thuiaria thuja*	Hydrozoaire	Bottlebrush Hydroid	19	< 0.1	77
2176	*Urticina felina*	Anémone de mer	Sea Anemone	2	0.1	3
3460	*Velutina velutina*	Veloutée lisse	Smooth Lamellaria	2	< 0.1	2
3564	*Volutopsius norwegicus*	Buccin	Norway Whelk	1	0.1	1
1127	*Weberella bursa*	Éponge	Sponge	2	0.8	7

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
4451	*Xylophaga atlantica*	Bivalve	Atlantic Woodeater	4	0.1	507
9999	-	Inconnu	Unknown	6	0.2	59
	Total	**Invertebrés**	**Invertebrates**	**-**	5 052	577 436

Others

Code STRAP*	Scientific Name	French Name	English Name	Occurrence	Weight (kg)	Number
9995	-	Déchets	Trash	170	89.9	-
9970	-	Capsule de raies	Skates Eggs	101	5.3	963

** : Codes for vertebrates and invertebrates used by the Quebec Region of DFO (Miller and Chabot 2014).*

Appendix 3. Number of measured and weighed specimens and descriptive statistics for the length in 2017.

Vertebrates

Code STRAP*	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1**	Median	P99**	Max
90	*Amblyraja radiata*	1459	1220	9.2	11.5	32.0	65.5	76.8
696	*Ammodytes* sp.	9	9	7.6	7.6	8.9	10.9	10.9
700	*Anarhichas lupus*	217	216	7.0	7.3	25.0	66.7	74.0
701	*Anarhichas minor*	3	3	8.7	8.7	9.5	9.8	9.8
718	*Anisarchus medius*	1	1	11.4	11.4	11.4	11.4	11.4
320	*Arctozenus risso*	651	491	18.0	18.5	24.1	27.6	28.0
193	*Argentina silus*	50	50	8.0	8.0	21.5	35.0	35.0
811	*Artediellus atlanticus*	97	97	3.0	3.0	7.1	10.9	10.9
812	*Artediellus uncinatus*	39	35	3.6	3.6	6.1	8.2	8.2
838	*Aspidophoroides monopterygius*	171	115	7.4	7.8	13.0	15.8	16.6
102	*Bathyraja spinicauda*	3	3	29.8	29.8	100.5	157.0	157.0
451	*Boreogadus saida*	110	110	8.3	9.0	11.6	13.8	18.1
865	*Careproctus reinhardti*	13	13	7.6	7.6	11.5	13.6	13.6
27	*Centroscyllium fabricii*	711	408	13.5	14.5	53.0	66.3	68.8
227	*Chauliodus sloani*	1	1	21.0	21.0	21.0	21.0	21.0
150	*Clupea harengus*	1568	907	12.2	14.5	27.0	37.7	43.2
829	*Cottunculus microps*	1	1	10.0	10.0	10.0	10.0	10.0
721	*Cryptacanthodes maculatus*	17	16	22.2	22.2	48.3	92.9	92.9
982	*Cryptopsaras couesii*	2	2	16.5	16.5	18.3	20.0	20.0
849	*Cyclopterus lumpus*	70	67	4.0	4.0	20.6	43.5	43.5
208	*Cyclothone microdon*	5	5	4.5	4.5	5.7	7.0	7.0
461	*Enchelyopus cimbrius*	1075	619	5.7	10.2	19.7	28.2	30.6
711	*Eumesogrammus praecisus*	117	88	9.9	10.0	16.4	23.0	23.3
844	*Eumicrotremus spinosus*	187	123	2.0	2.5	4.5	11.5	11.8
438	*Gadus morhua*	3685	2104	6.8	12.8	36.0	67.4	94.3
439	*Gadus ogac*	4	5	18.8	18.8	30.5	48.0	48.0
426	*Gasterosteus aculeatus aculeatus*	1	1	5.4	5.4	5.4	5.4	5.4
890	*Glyptocephalus cynoglossus*	2875	1975	6.9	8.5	27.6	43.4	48.4
746	*Gymnelus viridis*	2	2	12.5	12.5	14.6	16.6	16.6
823	*Gymnocanthus tricuspis*	63	46	9.8	9.8	15.4	22.8	22.8
809	*Hemitripterus americanus*	4	4	6.4	6.4	25.9	36.5	36.5
889	*Hippoglossoides platessoides*	5505	2467	5.6	7.6	20.9	43.0	57.0
893	*Hippoglossus hippoglossus*	128	125	27.9	29.4	58.5	152.0	170.0
831	*Icelus bicornis*	2	2	6.6	6.6	6.8	6.9	6.9
832	*Icelus spatula*	5	5	4.6	4.6	6.6	7.9	7.9
836	*Leptagonus decagonus*	160	79	4.6	12.7	19.5	22.0	22.0
717	*Leptoclinus maculatus*	348	233	6.9	7.6	10.3	14.6	16.8
100	*Leucoraja ocellata*	1	1	89.0	89.0	89.0	89.0	89.0
891	*Limanda ferruginea*	3	3	6.8	6.8	17.6	21.0	21.0
862	*Liparis gibbus*	7	7	2.9	2.9	9.1	21.2	21.2
966	*Lophius americanus*	18	18	13.1	13.1	59.1	94.5	94.5
716	*Lumpenus lampretaeformis*	228	133	18.0	19.5	32.8	44.5	44.8
750	*Lycenchelys paxillus*	2	2	21.3	21.3	21.5	21.7	21.7
752	*Lycenchelys verrillii*	3	3	10.0	10.0	11.8	14.1	14.1
727	*Lycodes esmarkii*	12	12	20.1	20.1	29.8	54.4	54.4
728	*Lycodes lavalaei*	64	64	8.2	8.2	24.8	55.9	55.9
733	*Lycodes polaris*	2	2	17.6	17.6	20.5	23.4	23.4
734	*Lycodes terraenovae*	4	4	26.4	26.4	30.8	44.6	44.6
730	*Lycodes vahlii*	279	178	9.1	9.9	25.8	37.6	42.5
91	*Malacoraja senta*	568	536	8.4	9.0	16.7	58.4	63.5
187	*Mallotus villosus*	1146	711	6.8	8.1	13.1	16.5	18.1
441	*Melanogrammus aeglefinus*	7	7	34.0	34.0	49.3	54.8	54.8
745	*Melanostigma atlanticum*	222	160	6.2	6.5	10.9	13.5	14.5
449	*Merluccius bilinearis*	143	143	10.2	13.0	31.1	40.8	45.0

Code STRAP*	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1**	Median	P99**	Max
272	Myctophidae	4	4	6.0	6.0	6.4	6.6	6.6
271	Myctophiformes	1	1	10.4	10.4	10.4	10.4	10.4
819	*Myoxocephalus scorpius*	104	86	4.0	9.6	28.1	41.0	41.1
12	*Myxine glutinosa*	1777	1111	21.3	24.0	36.5	49.5	65.2
368	*Nemichthys scolopaceus*	3	3	66.5	66.5	82.0	83.6	83.6
478	*Nezumia bairdii*	1735	1005	6.7	9.1	23.2	31.2	33.6
275	*Notoscopelus kroyeri*	5	5	13.3	13.3	15.4	16.1	16.1
874	*Paraliparis calidus*	6	6	9.0	9.0	9.7	11.2	11.2
856	*Paraliparis copei copei*	36	36	4.5	4.5	10.1	14.4	14.4
444	*Phycis chesteri*	627	446	14.3	15.0	24.6	38.0	41.6
443	*Pollachius virens*	4	4	21.5	21.5	56.3	61.6	61.6
222	*Polyipnus clarus*	2	2	4.7	4.7	4.8	4.9	4.9
244	*Polymetme thaeocoryla*	1	1	16.0	16.0	16.0	16.0	16.0
94	*Rajella fyllae*	2	2	39.4	39.4	44.8	50.2	50.2
892	*Reinhardtius hippoglossoides*	5440	2886	5.2	15.0	31.1	55.0	72.1
572	*Scomber scombrus*	292	164	7.5	8.3	11.6	14.8	15.6
398	*Scomberesox saurus saurus*	1	1	19.4	19.4	19.4	19.4	19.4
796	*Sebastes fasciatus*	3184	1534	3.1	3.8	19.0	36.7	42.4
794	*Sebastes mentella*	12604	5350	3.4	10.6	20.2	41.2	48.4
20	*Somniosus microcephalus*	1	0	365.0	365.0	365.0	365.0	365.0
710	*Stichaeus punctatus punctatus*	7	7	9.0	9.0	11.1	12.2	12.2
373	*Synaphobranchus kaupii*	2	2	25.8	25.8	28.8	31.8	31.8
814	*Triglops murrayi*	639	394	7.2	7.6	11.0	15.6	105.2
815	*Triglops nybelini*	14	14	9.2	9.2	10.4	11.9	11.9
447	*Urophycis tenuis*	704	579	18.8	23.8	37.5	63.8	87.1

Invertebrates

Code STRAP*	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1**	Median	P99**	Max
8040	*Acanthephyra pelagica*	2	0	1.68	1.68	1.70	1.71	1.71
2218	*Anthoptilum grandiflorum*	536	316	9.00	18.70	47.65	67.10	72.70
8138	*Argis dentata*	518	0	0.65	0.79	1.62	2.25	2.35
8024	*Aristaeopsis edwardsiana*	1	0	3.58	3.58	3.58	3.58	3.58
8113	*Atlantopandalus propinqvus*	41	0	1.34	1.34	2.02	2.34	2.34
8213	*Chionoecetes opilio*	783	388	0.50	1.00	5.50	12.80	13.30
8075	*Eualus fabricii*	145	0	0.53	0.57	0.81	1.09	1.17
8081	*Eualus gaimardii belcheri*	1	0	0.75	0.75	0.75	0.75	0.75
8080	*Eualus gaimardii gaimardii*	27	0	0.62	0.62	0.86	1.35	1.35
8077	*Eualus macilentus*	169	0	0.66	0.71	0.96	1.28	1.29
8074	*Eualus* sp.	1	0	1.07	1.07	1.07	1.07	1.07
8033	*Eusergestes arcticus*	169	0	0.87	1.12	1.48	2.07	2.24
2217	*Halipteris finmarchica*	192	112	21.40	24.50	61.00	108.00	116.00
8217	*Hyas araneus*	69	26	0.50	0.50	1.40	8.00	8.00
8218	*Hyas coarctatus*	197	80	0.50	0.50	1.70	6.90	8.50
8028	*Hymenopenaeus debilis*	4	0	0.73	0.73	0.93	1.05	1.05
4753	*Illex illecebrosus*	885	649	12.10	14.60	19.30	23.20	28.00
8092	*Lebbeus groenlandicus*	49	0	0.89	0.89	1.46	2.12	2.12
8095	*Lebbeus microceros*	3	0	0.96	0.96	1.02	1.07	1.07
8093	*Lebbeus polaris*	193	0	0.47	0.57	1.09	1.34	1.35
8196	*Lithodes maja*	166	135	4.00	4.60	7.85	11.60	11.60
8111	*Pandalus borealis*	18280	870	0.67	0.91	2.16	2.72	3.08
8112	*Pandalus montagui*	1900	0	0.64	0.78	1.44	2.05	2.36
8057	*Pasiphaea multidentata*	2453	0	1.08	1.53	2.45	2.92	3.43
2203	*Pennatula aculeata*	821	491	2.00	3.30	12.90	24.30	30.00
2210	*Pennatula grandis*	353	180	4.00	8.00	32.20	51.60	53.50
8114	*Plesionika martia*	1	0	2.37	2.37	2.37	2.37	2.37
8135	*Pontophilus norvegicus*	520	0	0.51	0.69	1.36	2.53	3.05
8129	*Sabinea sarsii*	79	0	0.58	0.58	1.22	1.77	1.77

Code STRAP*	Scientific name	Sampled number		Length (cm)				
		Length	Weight	Min	P1**	Median	P99**	Max
8128	*Sabinea septemcarinata*	290	0	0.61	0.76	1.24	1.72	1.91
8119	*Sclerocrangon boreas*	205	0	0.82	1.04	1.62	2.82	2.99
8035	*Sergia robusta*	3	0	2.21	2.21	2.47	3.28	3.28
8087	*Spirontocaris liljeborgii*	50	0	0.62	0.62	1.05	1.41	1.41
8086	*Spirontocaris phippsii*	2	0	0.71	0.71	0.98	1.26	1.26
8085	*Spirontocaris spinus*	48	0	0.59	0.59	0.97	1.32	1.32

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