Research Vessel Bottom Trawl Survey Report (NL Region): A stock-by-stock summary of survey information up to and including the 2019 spring and autumn surveys

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Canadian Technical Report of Fisheries and Aquatic Sciences

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Rapport technique canadien des sciences halieutiques et aquatiques

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Les rapports techniques peuvent être cités comme des publications à part entière. Le titre exact figure au-dessus du résumé de chaque rapport. Les rapports techniques sont résumés dans la base de données *Résumés des sciences aquatiques et halieutiques.*

Les rapports techniques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre.

Les numéros 1 à 456 de cette série ont été publiés à titre de Rapports techniques de l'Office des recherches sur les pêcheries du Canada. Les numéros 457 à 714 sont parus à titre de Rapports techniques de la Direction générale de la recherche et du développement, Service des pêches et de la mer, ministère de l'Environnement. Les numéros 715 à 924 ont été publiés à titre de Rapports techniques du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 925.

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Rideout, R. M., and Ings, D. W. 2021. Research Vessel Bottom Trawl Survey Report (NL Region): A Stock-By-Stock Summary Of Survey Information Up To And Including The 2019 Spring And Autumn Surveys. Can. Tech. Rep. Fish. Aquat. Sci. 3425: vii + 52 p.

DFO in the Newfoundland and Labrador Region conducts an annual Autumn Research Vessel (RV) Multi-Species Bottom-trawl survey in parts of SA2 + SA3 as well as a Spring RV Multi-Species Bottom Trawl survey in parts of SA3. The primary goal of these surveys is to provide information on species distribution and abundance. Although stock-specific science advice is only provided through the process of a full stock assessment, DFO Resource Management regularly request updates on survey indices in non-assessment years as background for discussions with various stakeholders and in order to determine which stocks should be reviewed in more detail. This document provides a summary of RV bottom trawl survey information since the mid-1990s along with several caveats on how these data can and should be interpreted.

RÉSUMÉ

Rideout, R. M., and Ings, D. W. 2021. Research Vessel Bottom Trawl Survey Report (NL Region): A Stock-By-Stock Summary Of Survey Information Up To And Including The 2019 Spring And Autumn Surveys. Can. Tech. Rep. Fish. Aquat. Sci. 3425: vii + 52 p.

La Région de Terre-Neuve-et-Labrador de Pêches et Océans Canada (MPO) effectue chaque automne un relevé plurispécifique au chalut de fond au moyen de navires scientifiques dans certaines parties des divisions SA2 et SA3, et un relevé similaire au printemps dans certaines parties de la division SA3. L'objectif principal de ces relevés est de fournir des renseignements sur la répartition et l'abondance des espèces. Même si un avis scientifique propre à chaque stock n'est produit qu'à la suite d'une évaluation complète du stock, la Gestion des ressources du MPO demande régulièrement des mises à jour sur les indices des relevés durant les années où il n'y a pas d'évaluation, afin d'éclairer les discussions avec divers intervenants et de déterminer quels stocks devraient être examinés de plus près. Le présent document fournit un résumé des renseignements tirés des relevés au chalut de fond effectués depuis le milieu des années 1990, ainsi que plusieurs mises en garde sur la façon dont ces données peuvent et devraient être interprétées.

CONTEXT

DFO in the Newfoundland and Labrador Region conducts an annual Autumn Research Vessel (RV) Stratified Random Multi-Species Bottom-trawl survey in parts of NAFO Sub-area (SA) 2 + SA3 as well as a Spring RV Multi-Species Bottom Trawl survey in parts of SA3. These surveys provide information on species distribution and abundance of various commercial and non-commercial fish and invertebrate species, as well as other biological information (growth rates, maturation schedules, etc.). Survey data represent a critical component of most science-based stock assessments, as well as many other science advisory processes. During a full assessment, survey data are considered in conjunction with other data sources (e.g. fishery-dependent data), ideally (but not always) within the construct of an analytical population dynamics model in order to provide risk-based advice to fishery managers. Survey data on their own should not be considered as science advice. However, DFO Resource Management regularly request updates on survey indices as background for discussions with various stakeholders and in order to determine which stocks should be reviewed in more detail. In some cases, stocks have formalized “triggers” in place that determine when a full assessment is needed based on patterns/changes in survey indices. Stakeholders also commonly request summaries of survey data for various by-catch species as part of the ecocertification process for fisheries. It is the objective of the current document to satisfy both types of requests, with plans to update this document annually.

BACKGROUND

Fisheries and Oceans Canada has conducted annual stratified random multispecies trawl surveys covering offshore areas in NAFO SubAreas 2+3 in the spring since 1971 and autumn since 1990 (some areas have been covered in the autumn survey since 1977). Spring surveys currently cover Divs. 3LNOP, while autumn surveys cover Divs. 2HJ3KLNO. These surveys have gone through multiple vessel and gear changes since their inception, as well as multiple planned and unplanned changes in survey coverage (Brodie, 2005, Brodie and Stansbury, 2007, Rideout and Ings, 2019a, 2019b). Since the autumn 1995 and spring 1996 surveys, the gear used has been the Campelen 1800 shrimp trawl. The research vessels used to conduct the surveys over that time period have been a combination of the *CCGS Wilfred*

Templeman (decommissioned in 2008), *CCGS Alfred Needler*, and *CCGS Teleost*. Generally, two vessels were used to complete the autumn survey and only a single vessel used to conduct the spring survey (unless mechanical issues and/or time constraints required the use of the second vessel). The spring surveys cover depths down to a maximum of 732 m, whereas the autumn surveys extend down to 1500 m in some areas.

These surveys are stratified by depth range. Survey “sets” (i.e. standardized fishing hauls at a randomly selected sampling unit) for these stratified-random surveys are distributed using a proportional-allocation scheme, whereby the number of sets allocated for a given stratum is proportional to the stratum area, subject to the condition that each stratum must be allocated a minimum of two sets. Tow sites are randomly selected from sampling units within each stratum (Doubleday, 1981). Within each stratum, one alternate station is also selected, and is occupied if a sample from one of the other units cannot be obtained (e.g. untrawlable bottom). When computing the stratified estimators of abundance or biomass for any given species, individual strata must have a minimum of two successful survey sets to be considered completed and in order to enable calculation of stratum variance.

Prior to the use of the Campelen trawl in the autumn and spring RV surveys, the gear used was the Yankee 41.5 otter trawl (1971-1982) and the Engel 145 Hi-rise trawl (1983-1994). The selectivity of these gears are not equal and therefore results from earlier surveys are not necessarily comparable to recent surveys. In some cases (i.e. for some species/stocks), comparative fishing with the two gears has allowed data collected with one gear to be converted to units equivalent to another gear (i.e. convert from Engel trawl units to Campelen trawl units). This is particularly useful for stock assessment purposes, where a longer time series can provide greater insight to stock dynamics and therefore increase the ability to provide science advice with respect to specific management options. However, given that the data presented herein are not meant to be interpreted as science advice, and that such conversions are only available for a subset of species/stocks, we focus only on data collected during the Campelen time series.

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Brodie, W. (2005) A Description of the Autumn Multispeices Surveys in SA2+Divisions 3KLMNO from 1995-2004. NAFO SCR Doc. No. 05/8.

Brodie, W., Stansbury, D. (2007) A Brief Description of Canadian Multispeices Surveys in SA2+Divisions 3KLMNO from 1995-2006. NAFO SCR Doc. No. 07/18.

Doubleday, W.G. (1981) Manual on groundfish surveys in the Northwest Atlantic. *NAFO Scientific Council Studies* **2,** 7-55.

Rideout, R.M., Ings, D.W. (2019a) Research Vessel Bottom Trawl Survey Report (NL Region): A stock-by-stock summary of survey information up to and including the 2018 spring and autumn surveys. Canadian Technical Report of Fisheries and Aquatic Sciences No. 3326, 59 pp.

Rideout, R.M., Ings, D.W. (2019b) Temporal And Spatial Coverage Of Canadian (Newfoundland And Labrador Region) Spring And Autumn Multi-Species RV Bottom Trawl Surveys, With An Emphasis On Surveys Conducted In 2018. NAFO SCR No. 19/015, 59 pp.

NOTES FOR STOCK-BY-STOCK SUMMARIES

Before examining the stock-by-stock survey plots, it is important to understand what these data represent and what can and should not be interpreted from these plots. Readers should understand the below points before proceeding.

The following plots illustrate data collected during multi-species research vessel bottom trawl surveys conducted by the Science Branch of the Newfoundland and Labrador region of Fisheries and Oceans Canada. These data demonstrate stock trends, size composition and distribution, but on their own do not necessarily provide a complete picture of stock status. Only the recent Campelen trawl time series are presented here and perceptions of stock status may differ when other data sources, including older survey time series, are considered. For details of stock status, readers are directed to the pertinent stock assessment documents available either through NAFO (https://www.nafo.int/) or the Canadian Science Advisory Secretariat (http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm).

Mechanical, logistical and other issues sometimes prevent the RV survey from covering all intended areas. This partial coverage has the potential to influence survey indices and therefore years with partial survey coverage are sometimes excluded from stock assessments. These decisions are made during the peer review process of full assessments. Every attempt has been made to exclude incomplete surveys in the plots presented here. However, please note that some of the stocks/data presented herein have not previously been evaluated during a full assessment process and therefore interpretation of results should be done with consideration for potential survey coverage issues (e.g. see Rideout and Ings 2019b).

The plots of survey biomass and abundance presented herein should be taken only as indices and not as absolute estimates of stock size. The data within these plots should only be viewed with respect to trends over time or the stock size from one period relative to another (within the same time series).

Length-frequency plots are scaled on a stock-by-stock basis to allow the length composition to be easily viewed. This scaling often differs among stocks and therefore these plots should only be used to examine the size groupings of fish within a stock and should not be used to compare mean numbers per tow at length among different stocks.

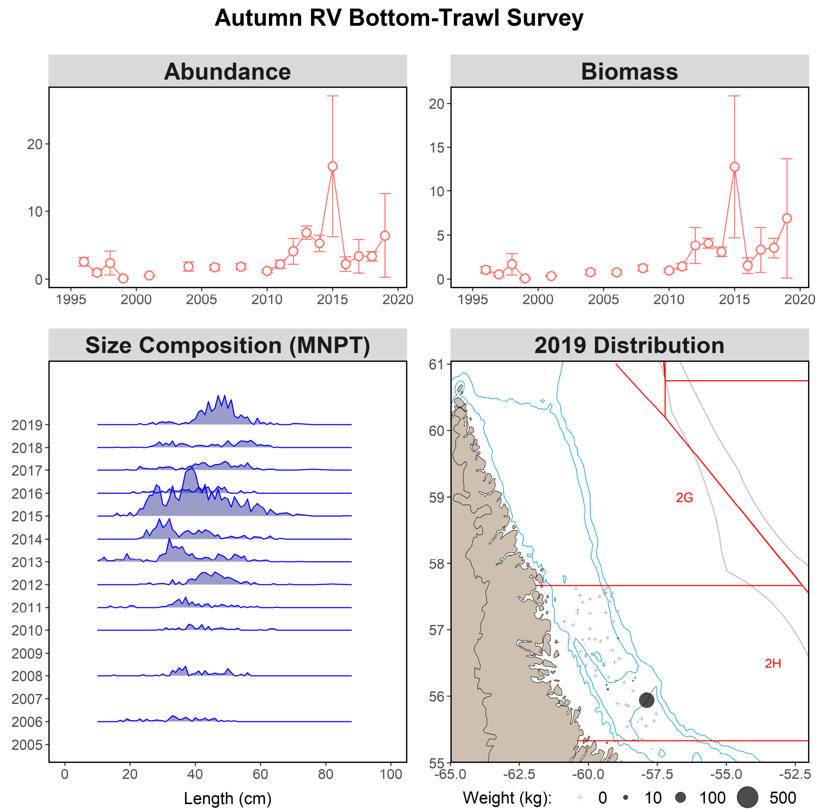

Figure 1. Atlantic cod (*Gadus morhua*) in Divs. 2H. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2005, 2007 and 2009 surveys are incomplete for this stock.

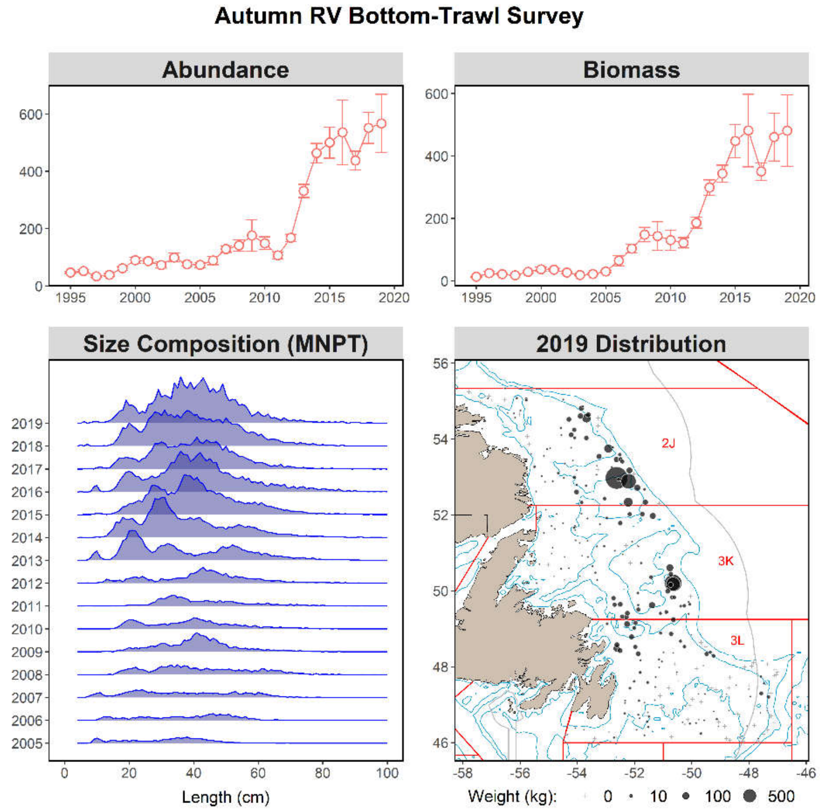

Figure 2. Atlantic cod (*Gadus morhua*) in Divs. 2J3KL. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on index strata. The spring survey (not shown here) covers Div. 3L but not Divs. 2J3K and is not currently used in the assessment of this stock.

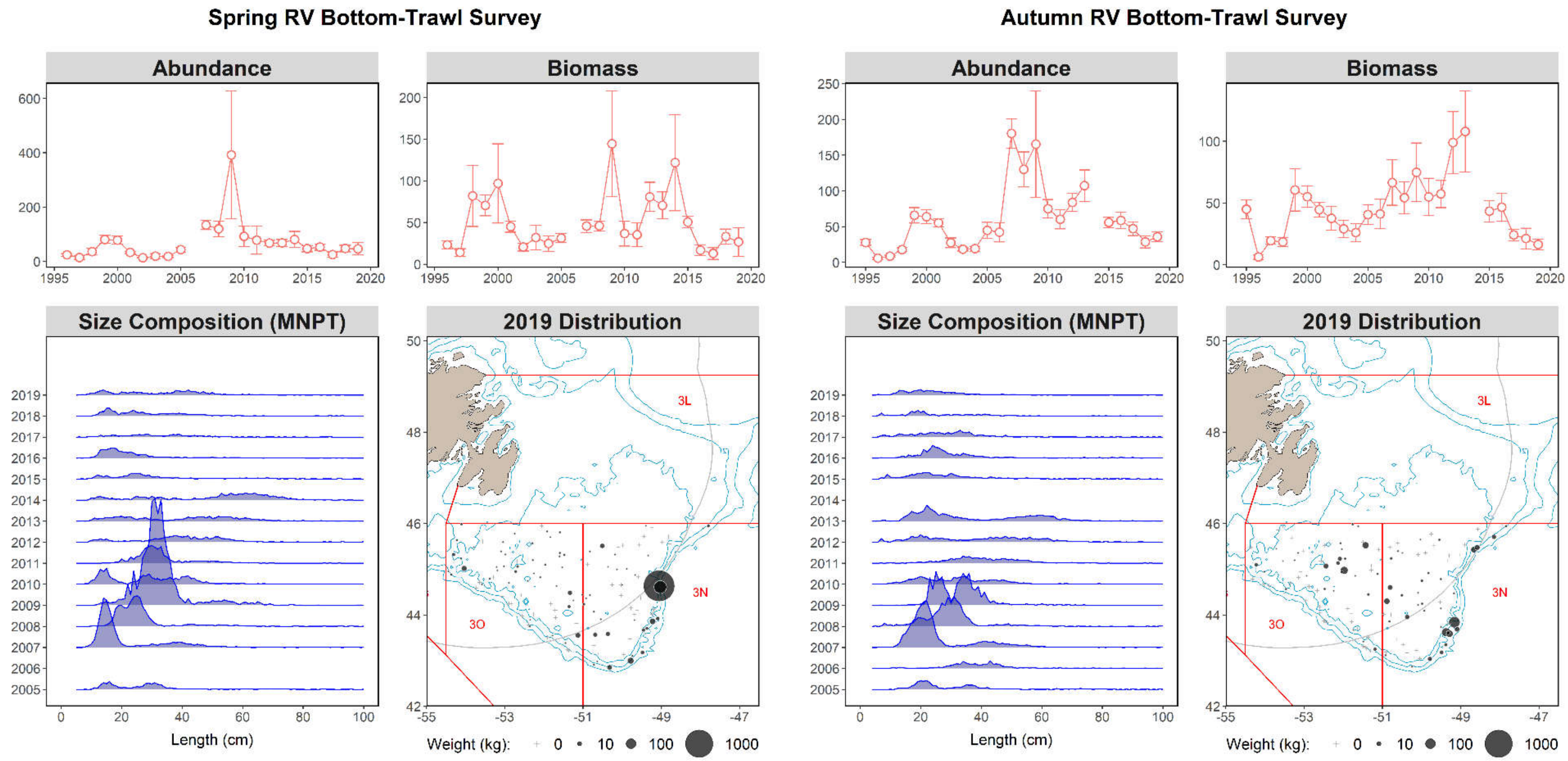

Figure 3. Atlantic cod (*Gadus morhua*) in Divs. 3NO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on index strata (<365 m). The 2006 spring and 2014 autumn surveys are incomplete for this stock.

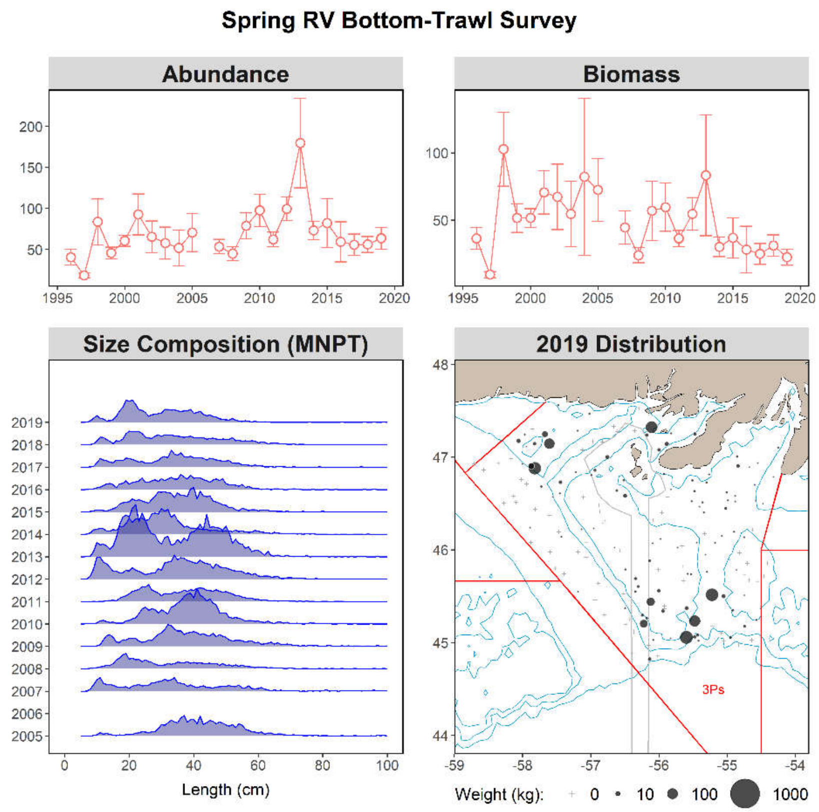

Figure 4. Atlantic cod (*Gadus morhua*) in Subdiv. 3Ps. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on index strata (<550 m). The 2006 survey is incomplete for this stock.

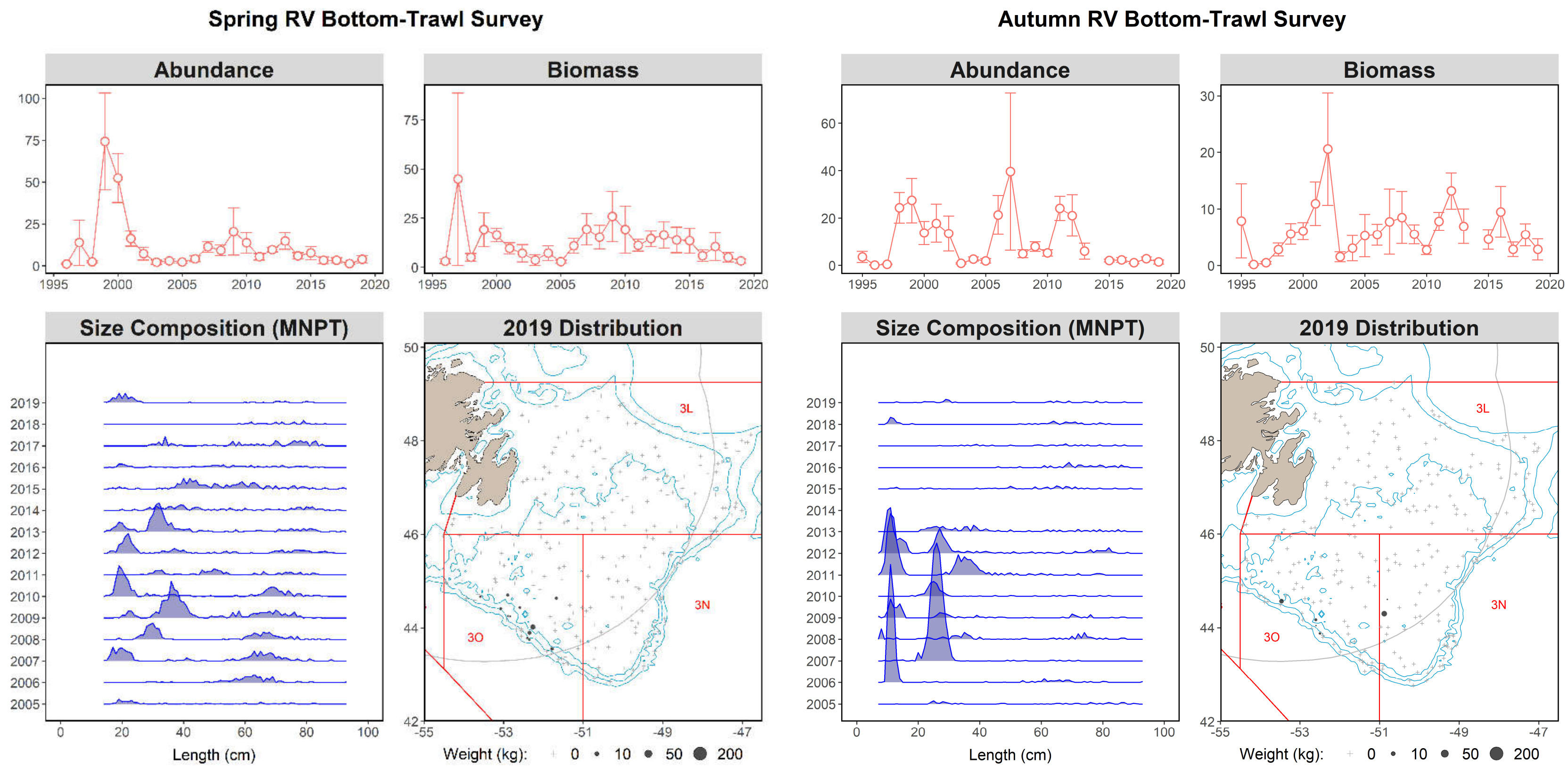

Figure 5. Haddock (*Melanogrammus aeglefinus*) in Divs. 3LNO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2014 autumn survey is incomplete for this stock.

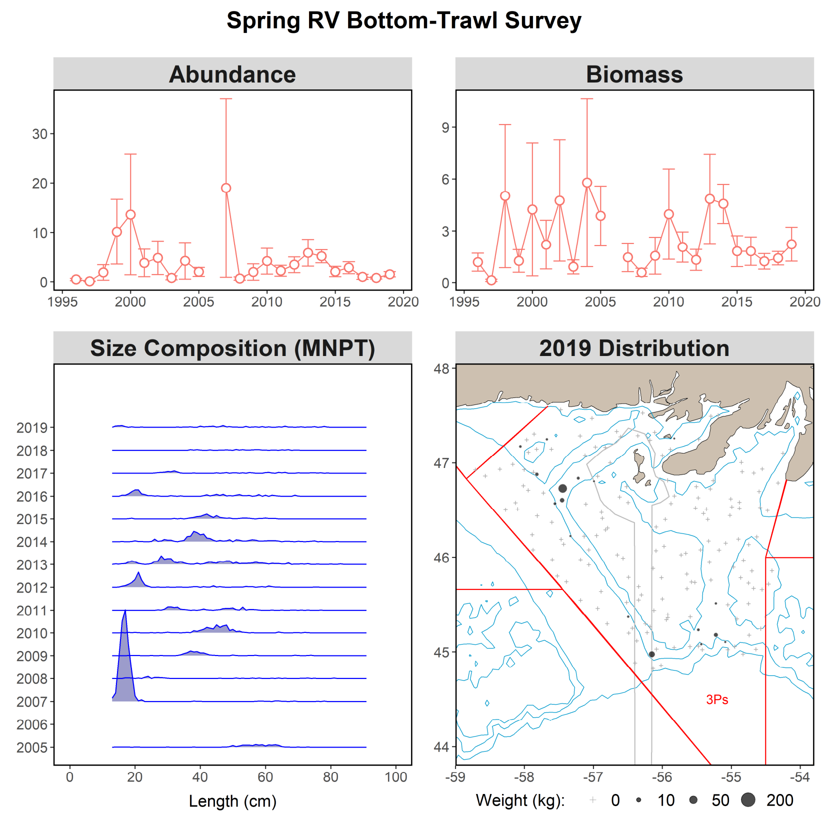

Figure 6. Haddock (*Melanogrammus aeglefinus*) in Subdiv. 3Ps. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 survey is incomplete for this stock.The autumn survey (not shown here) does not cover any portion of the stock area.

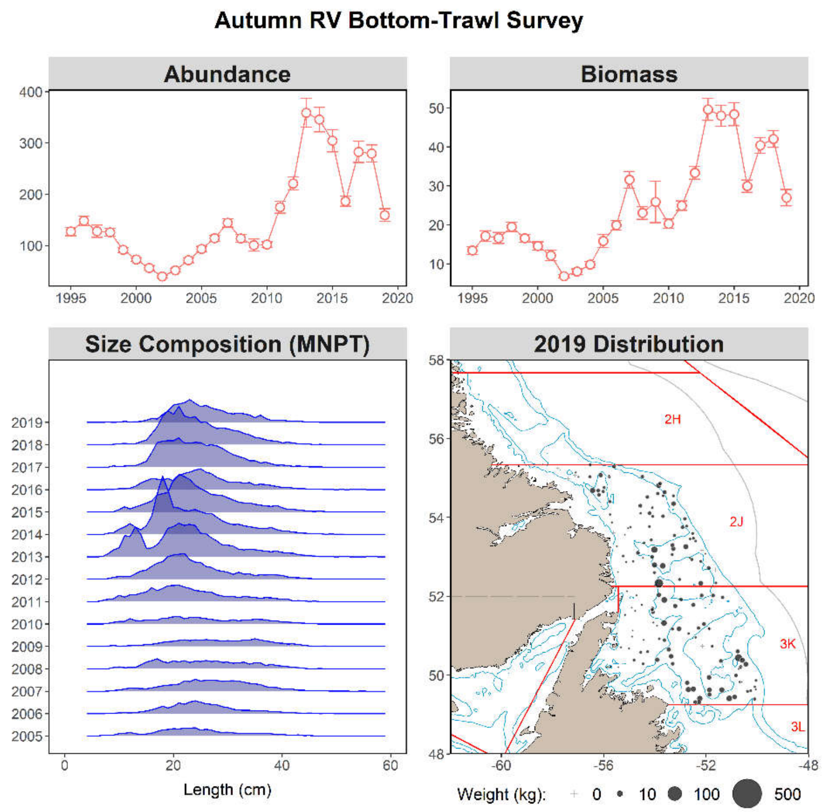

Figure 7. American plaice (*Hippoglossoides platessoides*) in Div. 2J3K. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The spring survey (not shown here) does not cover any portion of the stock area.

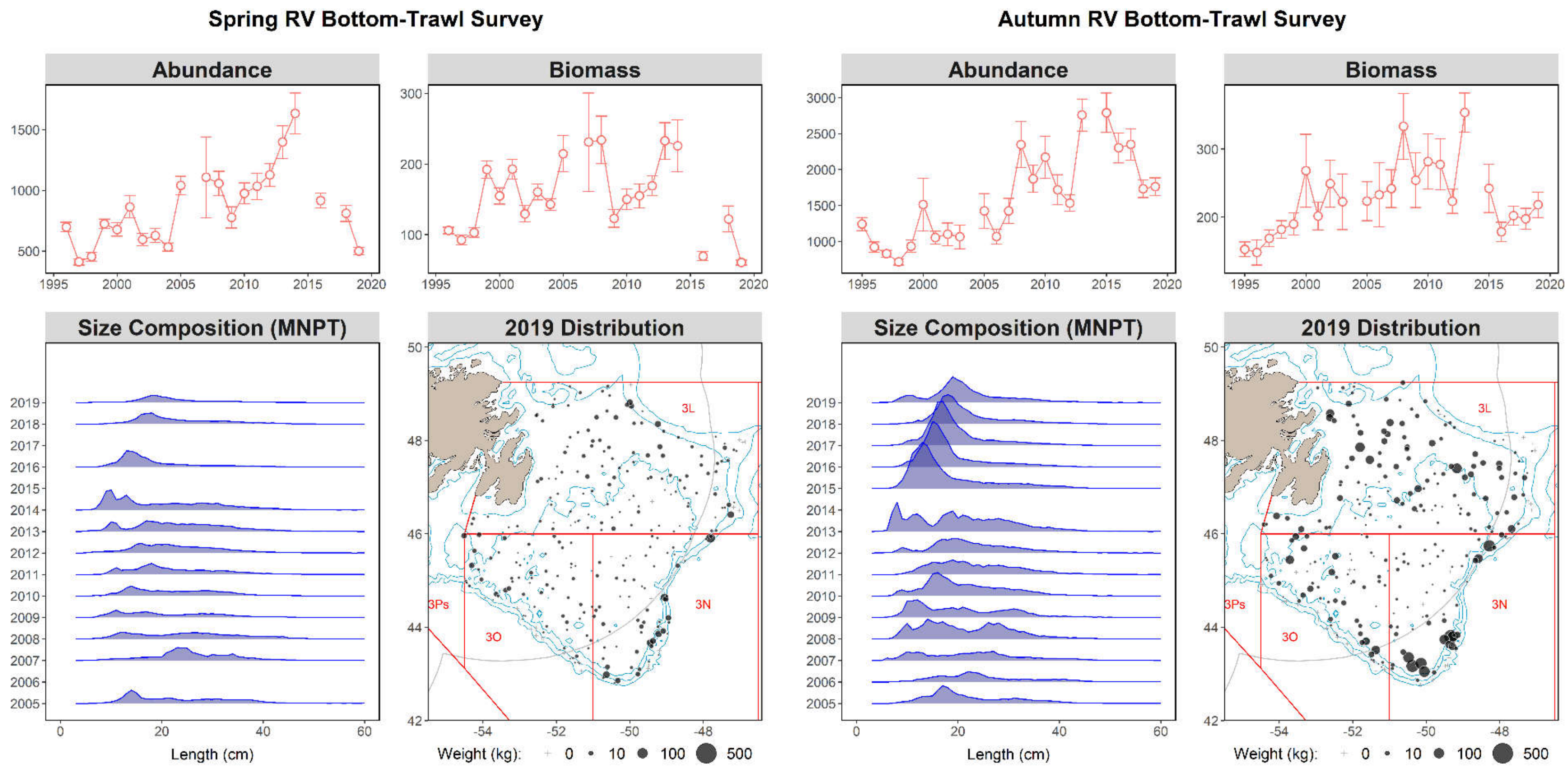

Figure 8. American plaice (*Hippoglossoides platessoides*) in Divs. 3LNO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006, 2015 and 2017 spring and 2014 autumn surveys are incomplete for this stock.

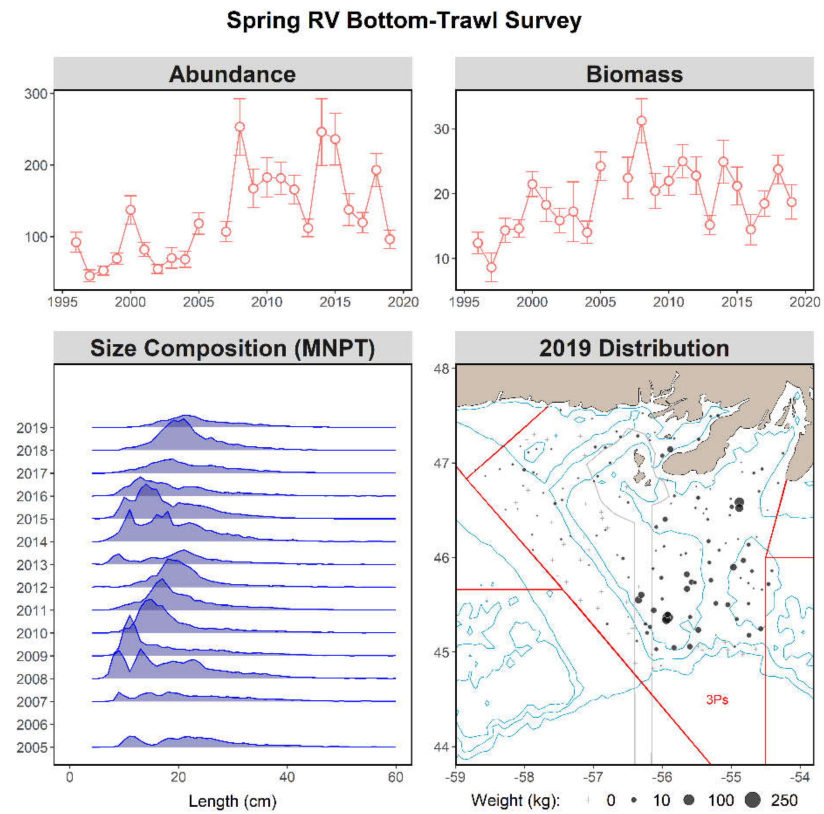

Figure 9. American plaice (*Hippoglossoides platessoides*) in Subdiv. 3Ps. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 survey is incomplete for this stock. The autumn survey (not shown here) does not cover any portion of the stock area.

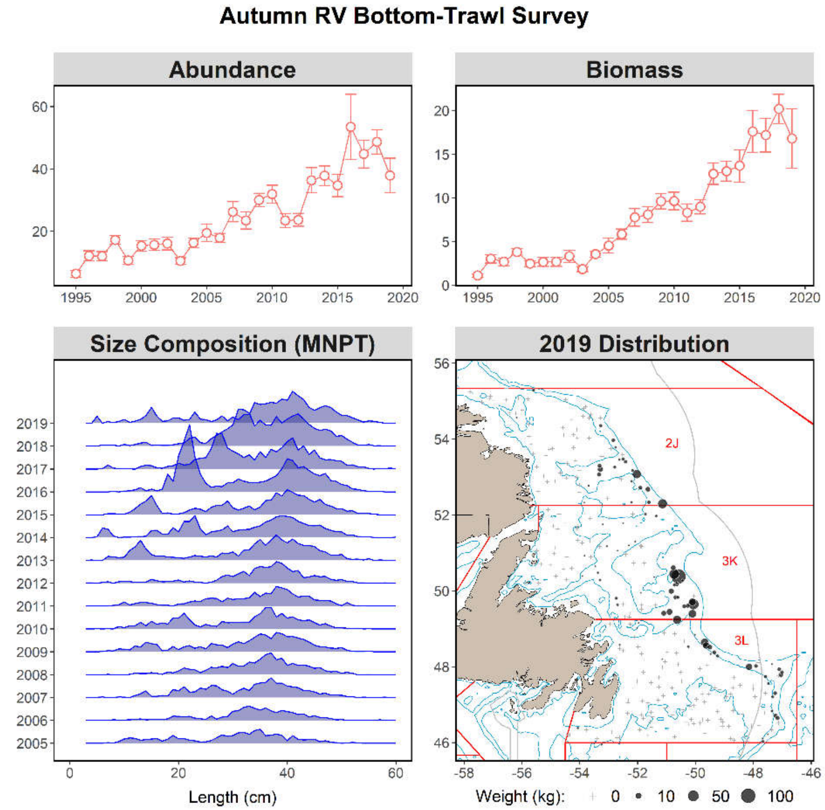

Figure 10. Witch flounder (*Glyptocephalus cynoglossus*) in Divs. 2J3KL.Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The spring survey (not shown here) covers Div. 3L but not Divs. 2J3K and is not currently used in the assessment of this stock.

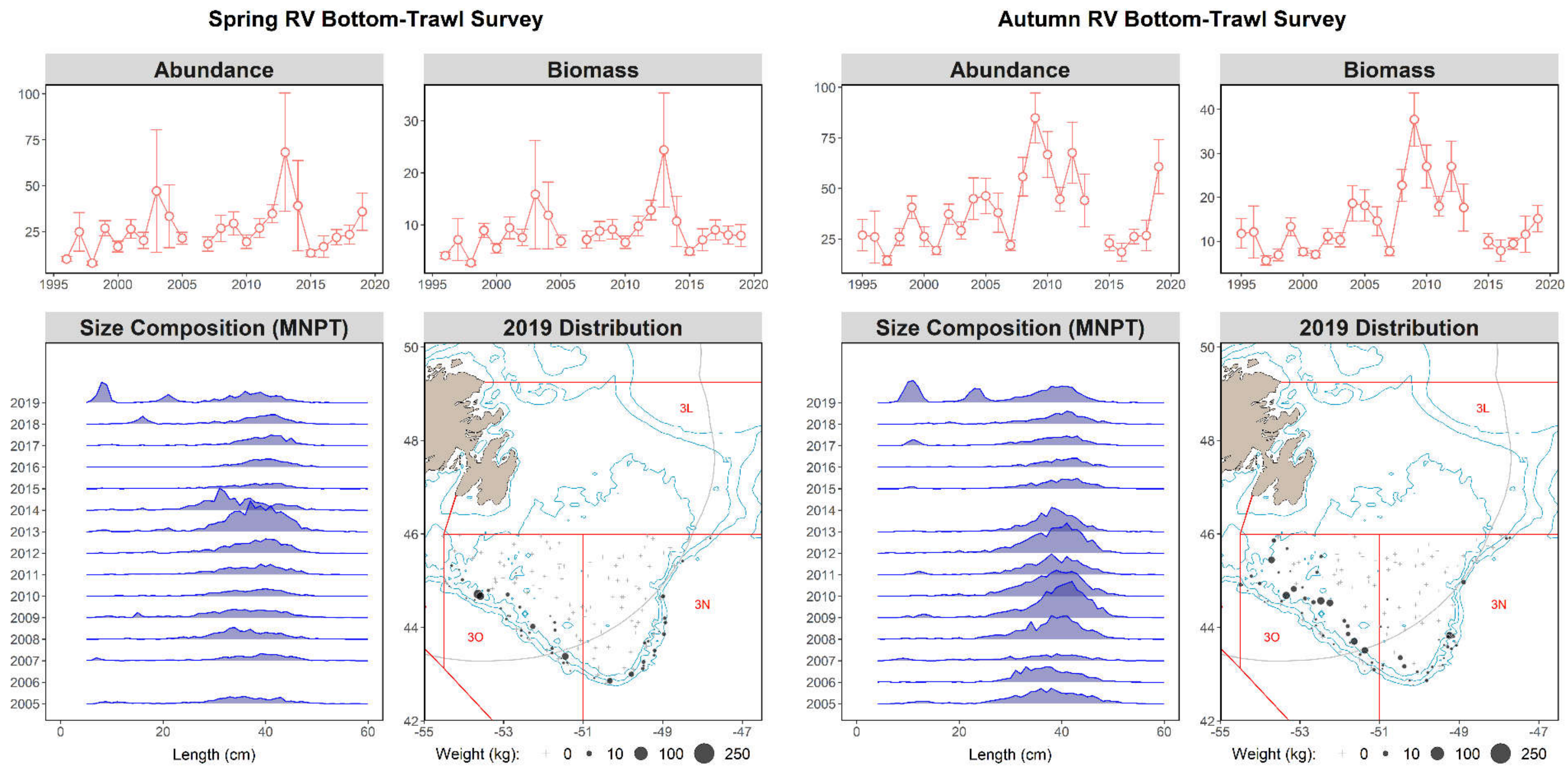

Figure 11. Witch flounder (*Glyptocephalus cynoglossus*) in Divs. 3NO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

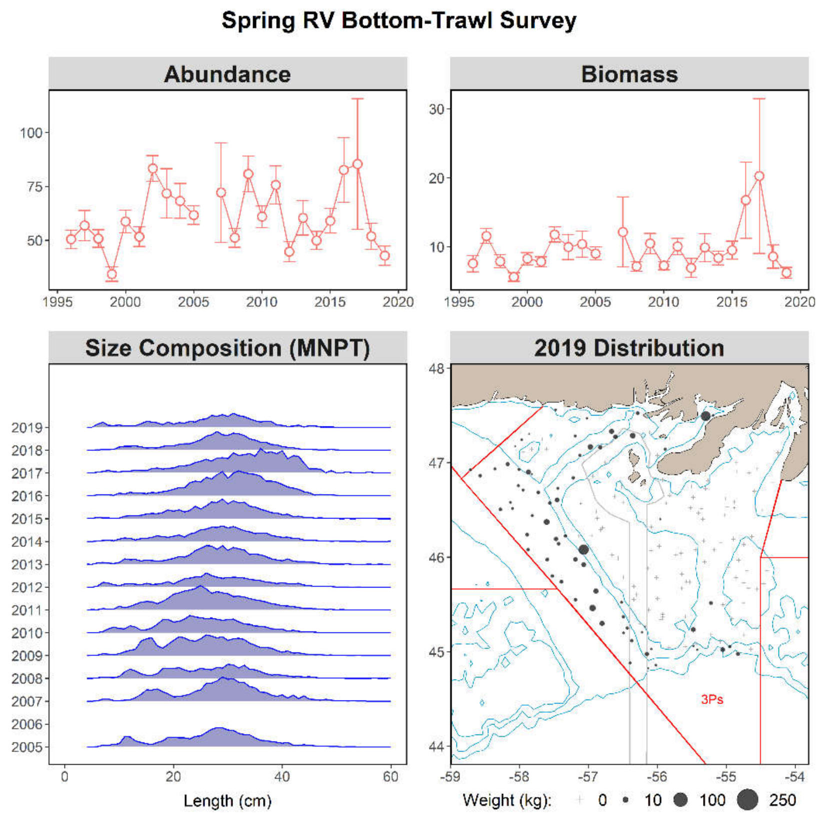

Figure 12. Witch flounder (*Glyptocephalus cynoglossus*) in Subdiv. 3Ps. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 surveys is incomplete for this stock. The autumn survey (not shown here) does not cover any portion of the stock area.

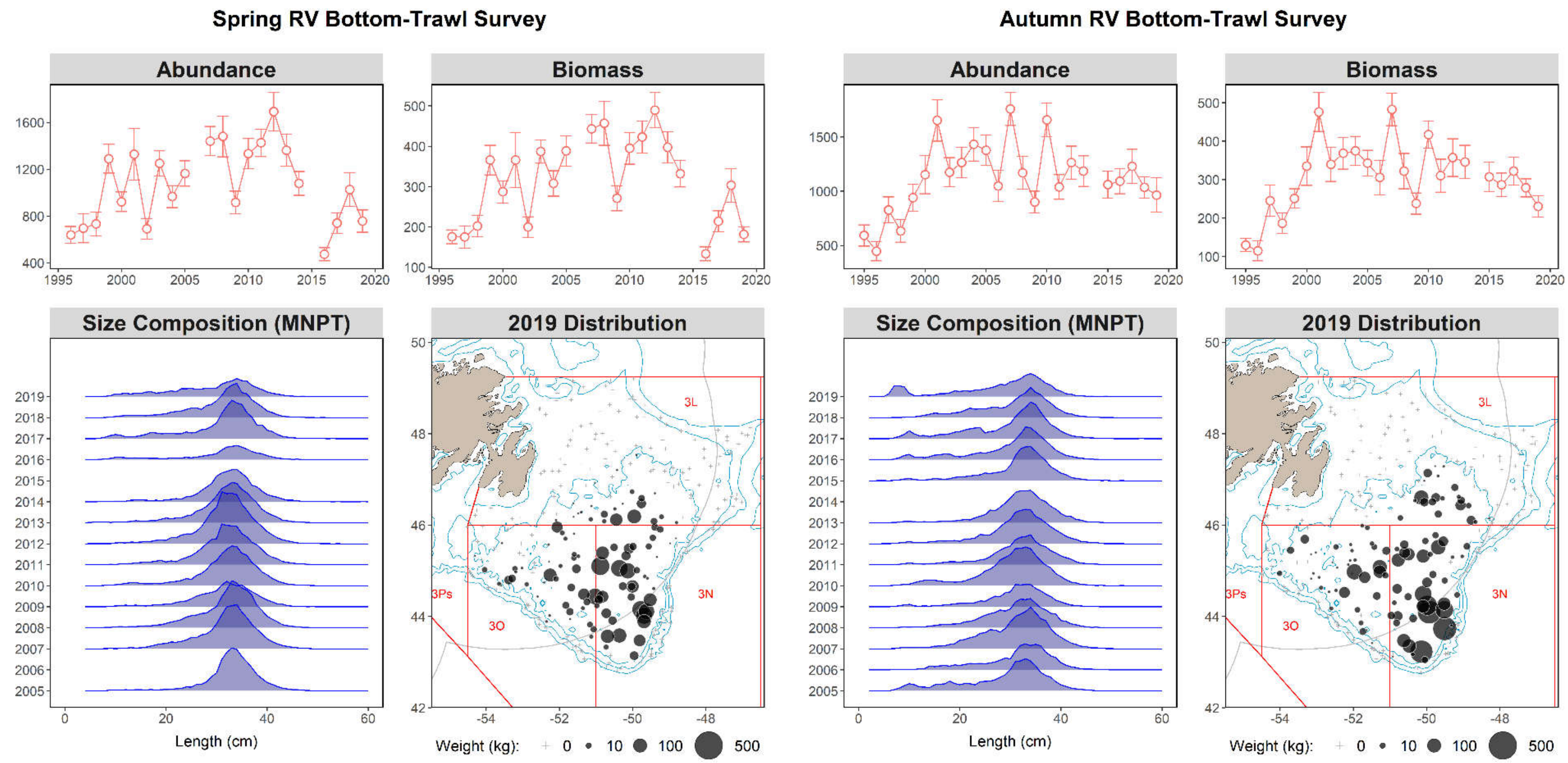

Figure 13. Yellowtail flounder (*Limanda ferruginea*) in Divs. 3LNO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 and 2015 spring and 2014 autumn surveys are incomplete for this stock.

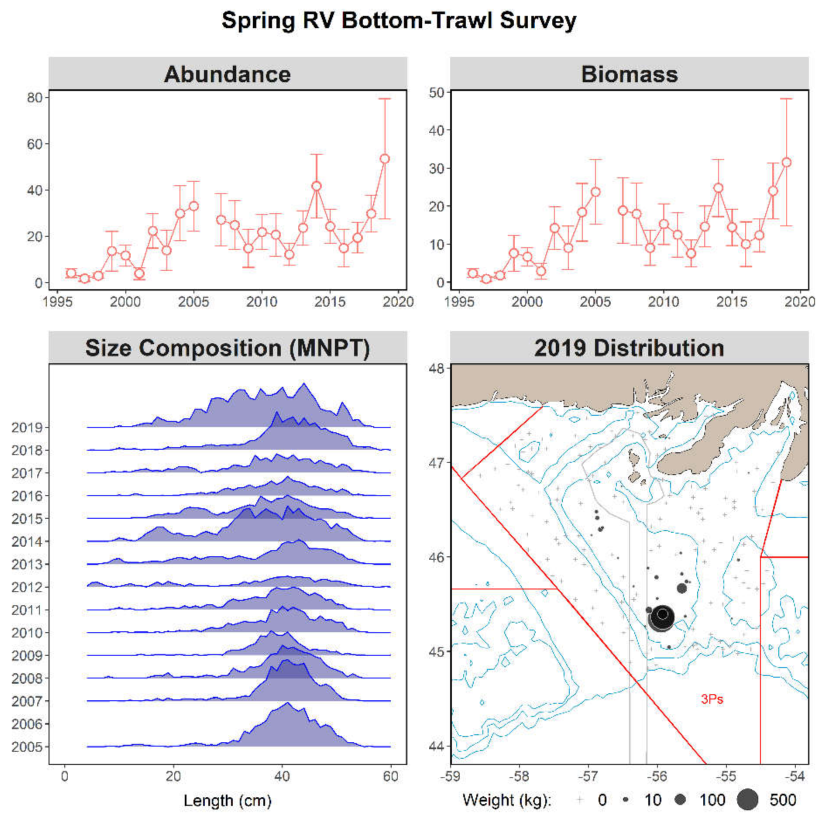

Figure 14. Yellowtail flounder (*Limanda ferruginea*) in Subdiv. 3Ps. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 survey is incomplete for this stock. The autumn survey (not shown here) does not cover any portion of the stock area. The status of this stock has never been assessed.

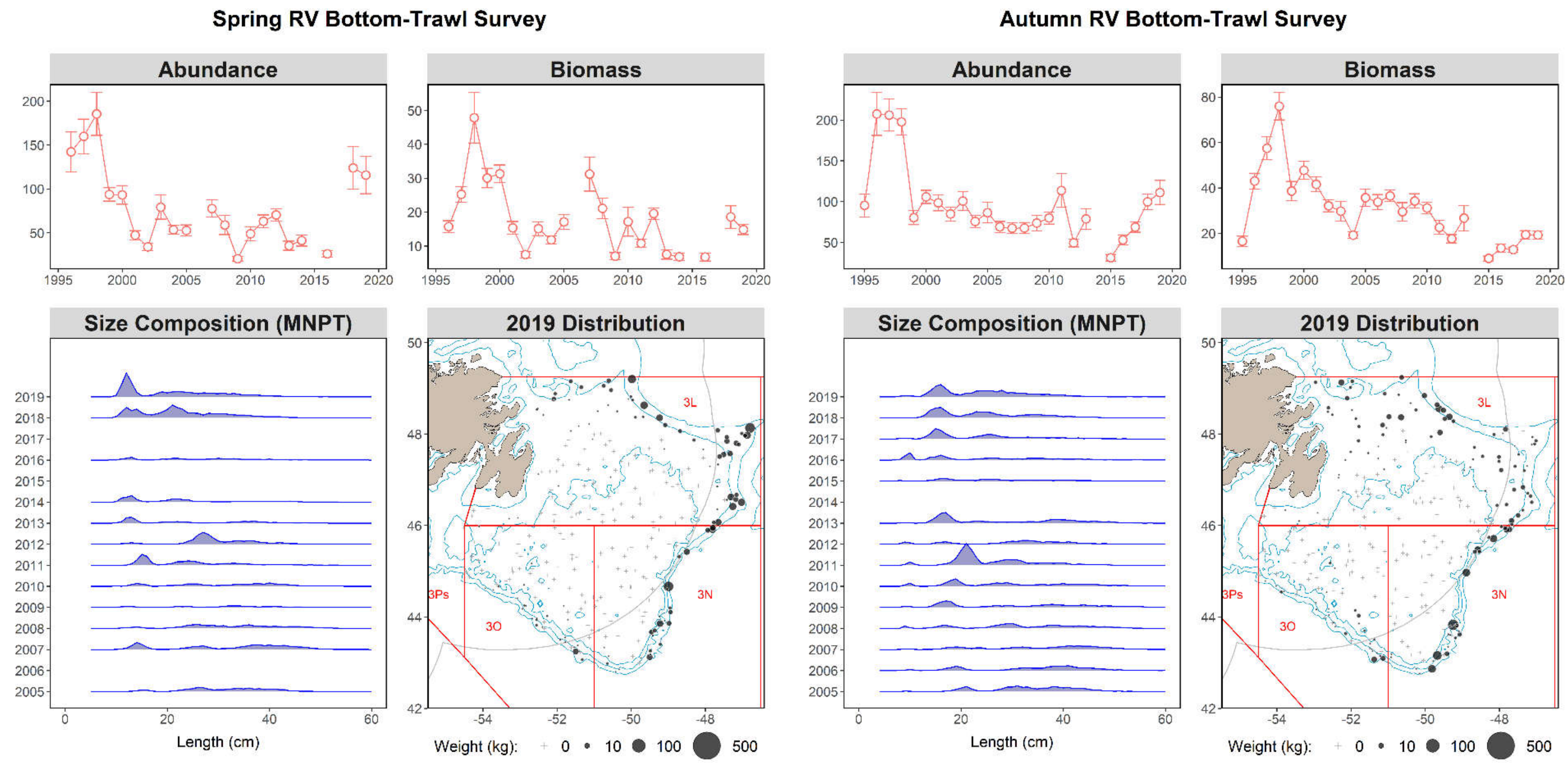

Figure 15. Greenland halibut (*Reinhardtius hippoglossoides*) in Divs. 3LNO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on index strata (<730 m). The 2006, 2015 and 2017 spring and 2008 autumn surveys are incomplete for this stock. Note that the autumn survey is currently treated as two separate indices for this stock, one index for Divs. 3LNO and one for Divs. 2J3K (see next figure).

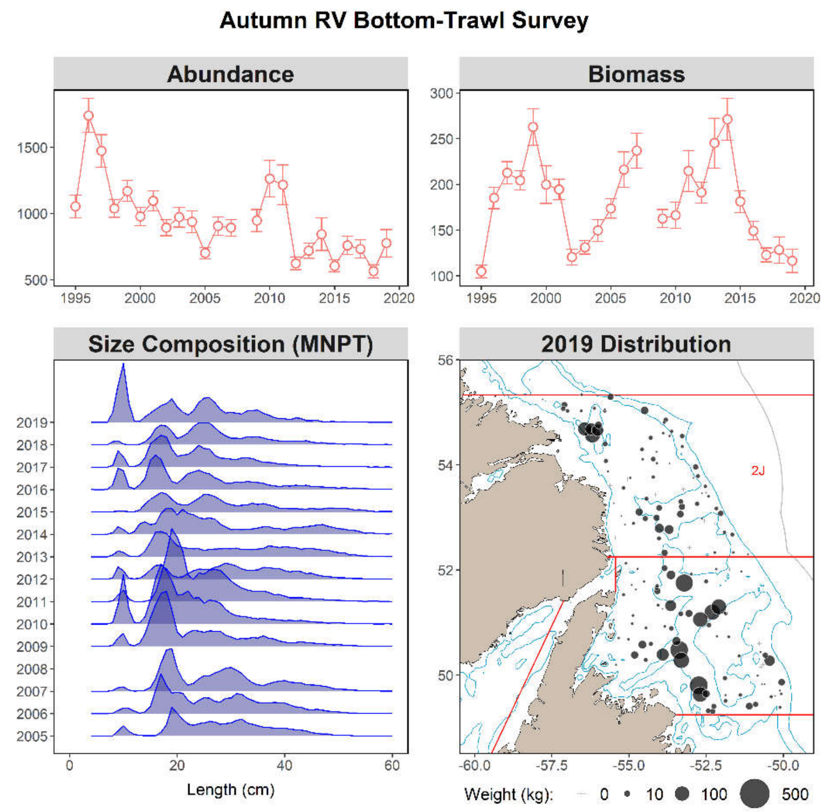

Figure 16. Greenland halibut (*Reinhardtius hippoglossoides*) in Divs. 2J3K. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2008 survey is incomplete for this stock. Note that the autumn survey is currently treated as two separate indices for this stock, one index for Divs. 3LNO (see previous figure) and one for Divs. 2J3K.

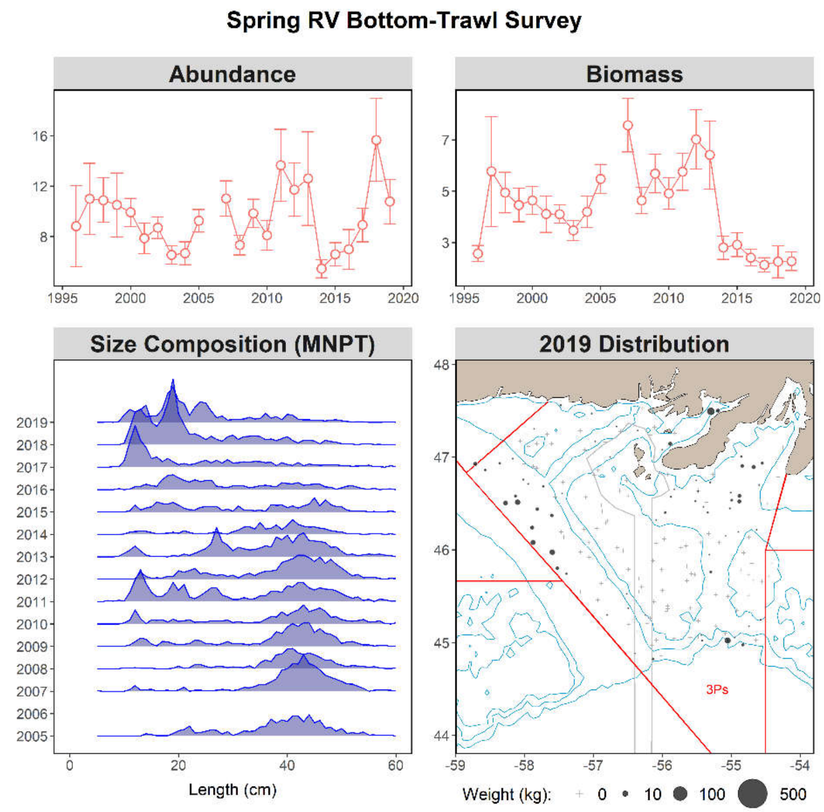

Figure 17. Greenland halibut (*Reinhardtius hippoglossoides*) in Subdiv. 3Ps. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 survey is incomplete for this stock. The autumn survey (not shown here) does not cover any portion of the stock area. The status of this stock has never been assessed.

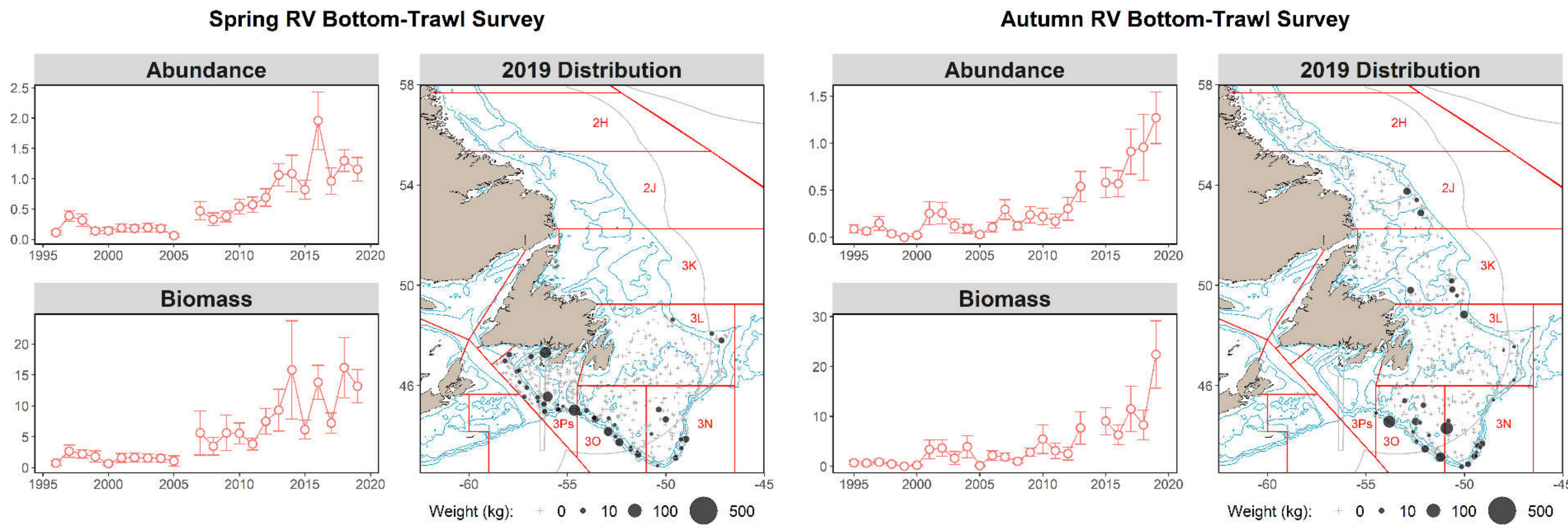

Figure 18. Atlantic halibut (*Hippoglossus hippoglossus*) in SA 2+3. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock. Note that the current assessment for this stock uses data from an industry longline survey of Divs. 3NOPs rather than the RV survey data presented here.

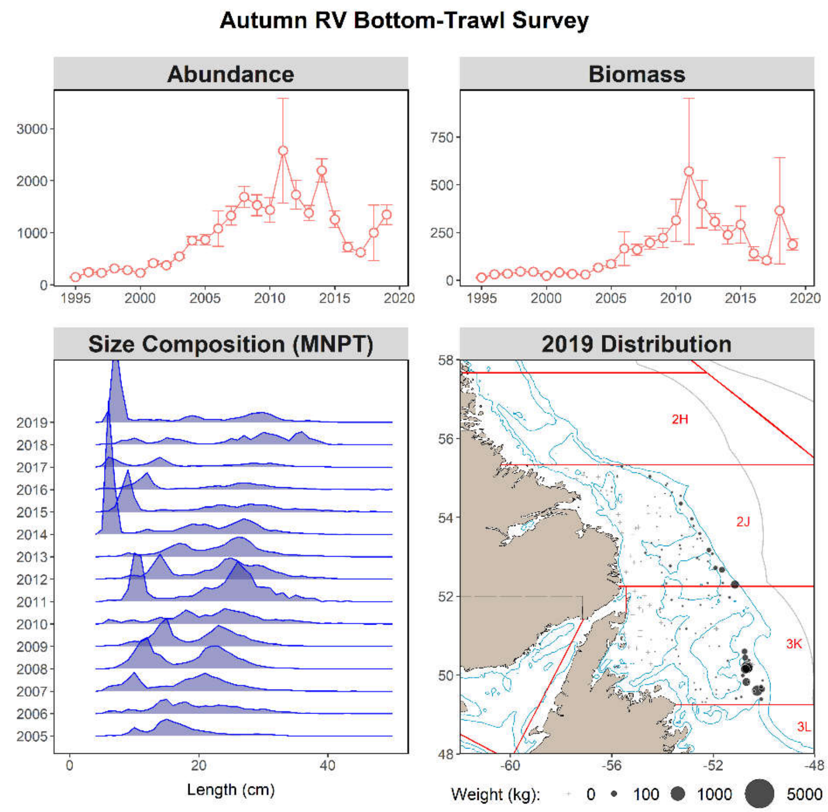

Figure 19. Beaked redfish (*Sebastes fasciatus* & *Sebastes mentella*) in SA2 + Div. 3K. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The spring survey (not shown here) does not cover any portion of the stock area.

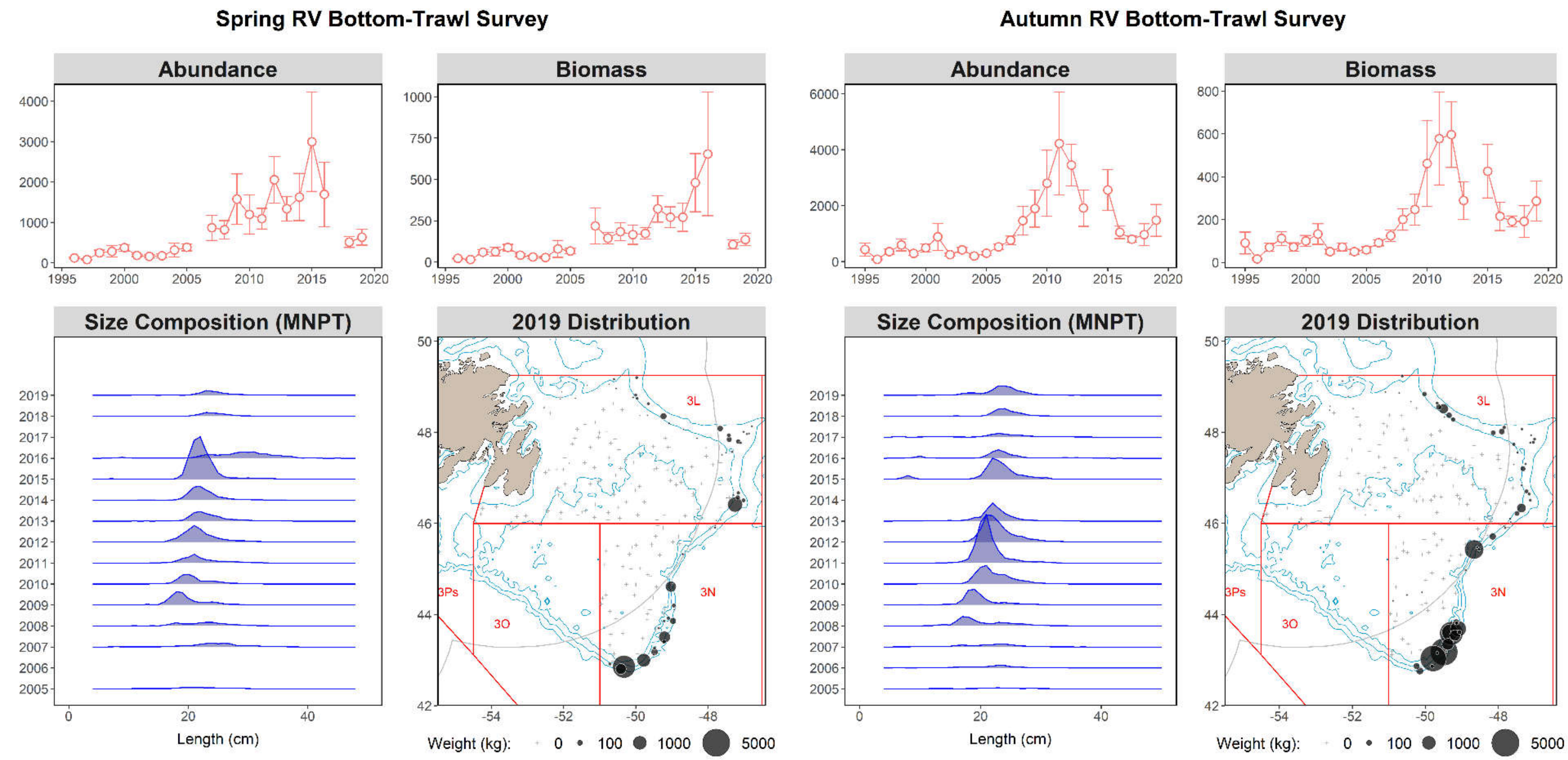

Figure 20. Beaked redfish (*Sebastes fasciatus* & *Sebastes mentella*) in Divs. 3LN. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 and 2017 spring and 2014 autumn surveys are incomplete for this stock.

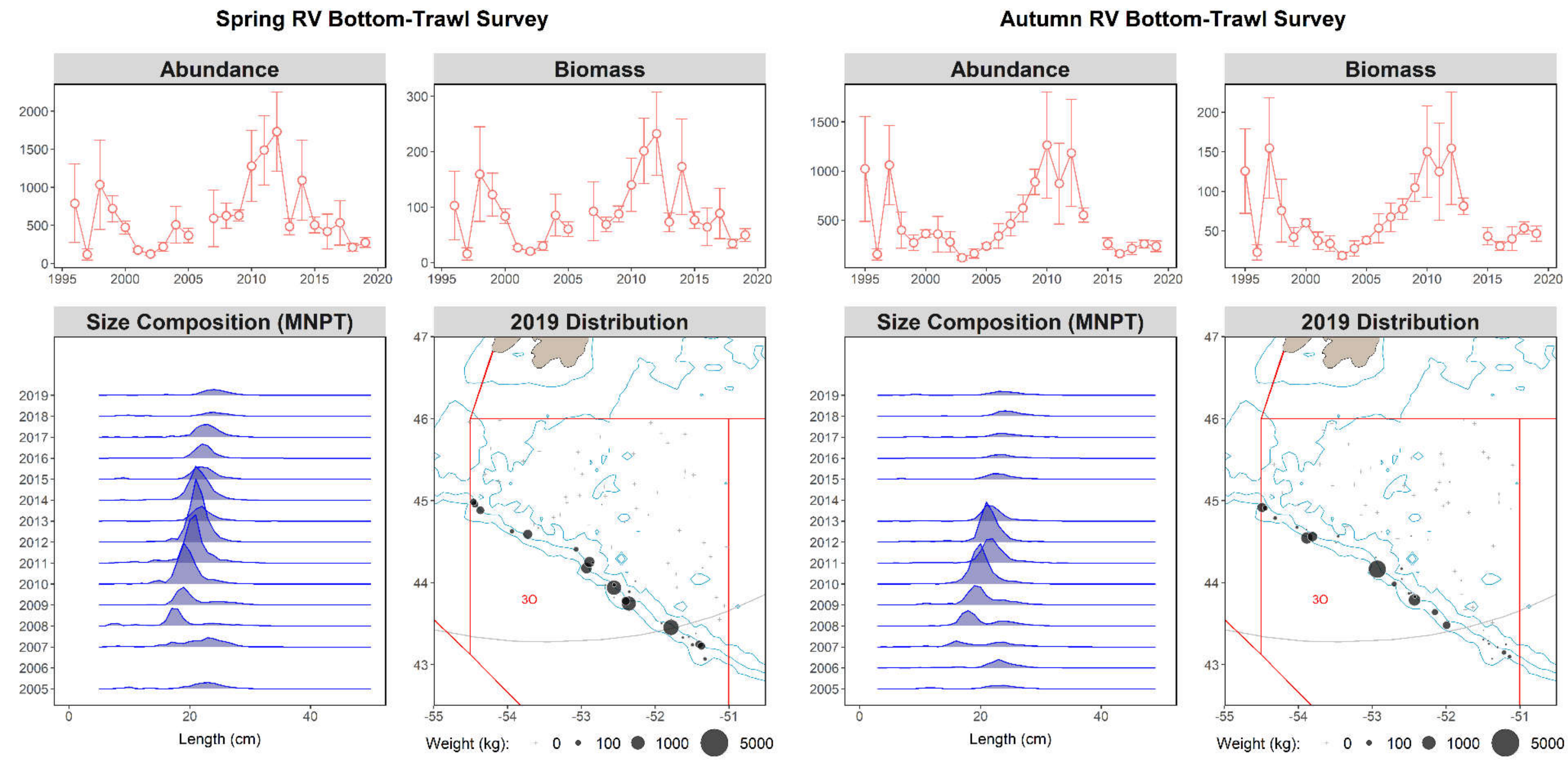

Figure 21. Beaked redfish (*Sebastes fasciatus* & *Sebastes mentella*) in Div. 3O. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

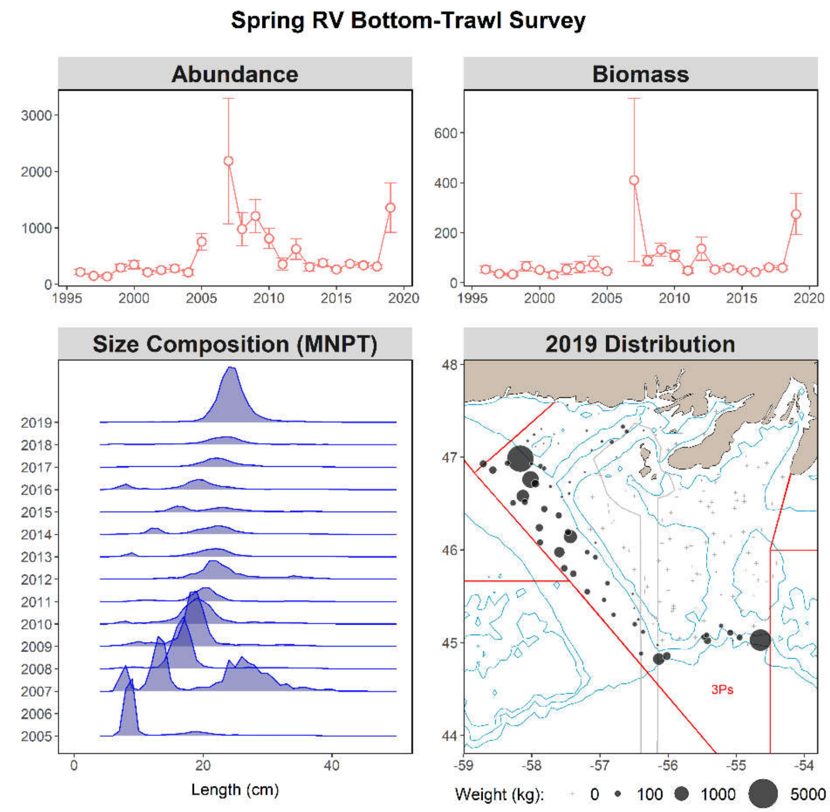

Figure 22. Beaked redfish (*Sebastes fasciatus* & *Sebastes mentella*) in Subdiv. 3Ps. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 survey is incomplete for this stock. The autumn survey (not shown here) does not cover any portion of the stock area. Note that redfish in this area are managed as part of a larger stock area (Unit 2) and the assessment is based on a DFO-Industry survey rather than these RV survey data.

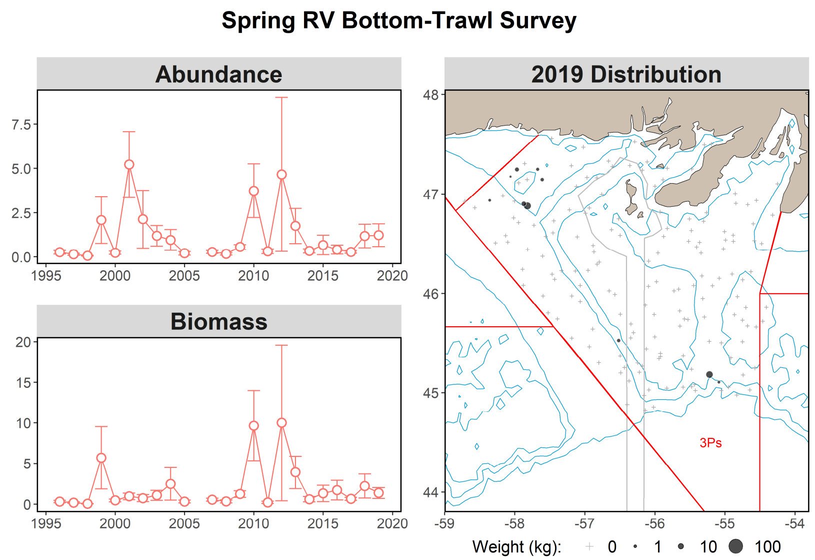

Figure 23. Pollock (*Pollachius virens*) in Subdiv. 3Ps. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 survey is incomplete for this stock. The autumn survey (not shown here) does not cover any portion of the stock area.

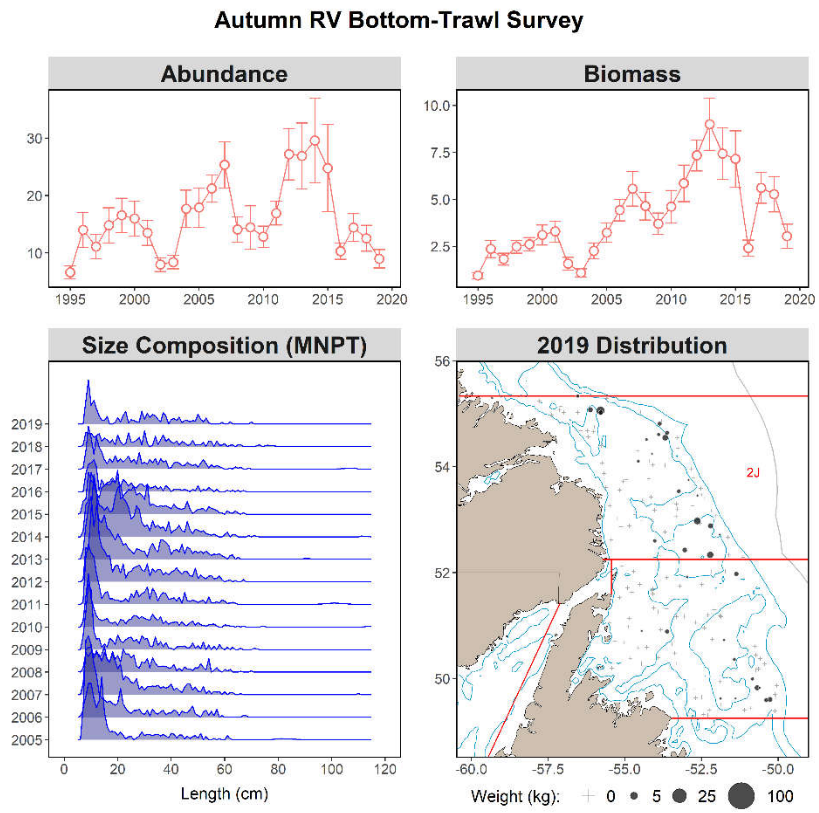

Figure 24. Striped wolffish (*Anarhichas lupus*) in Divs. 2J3K. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata.

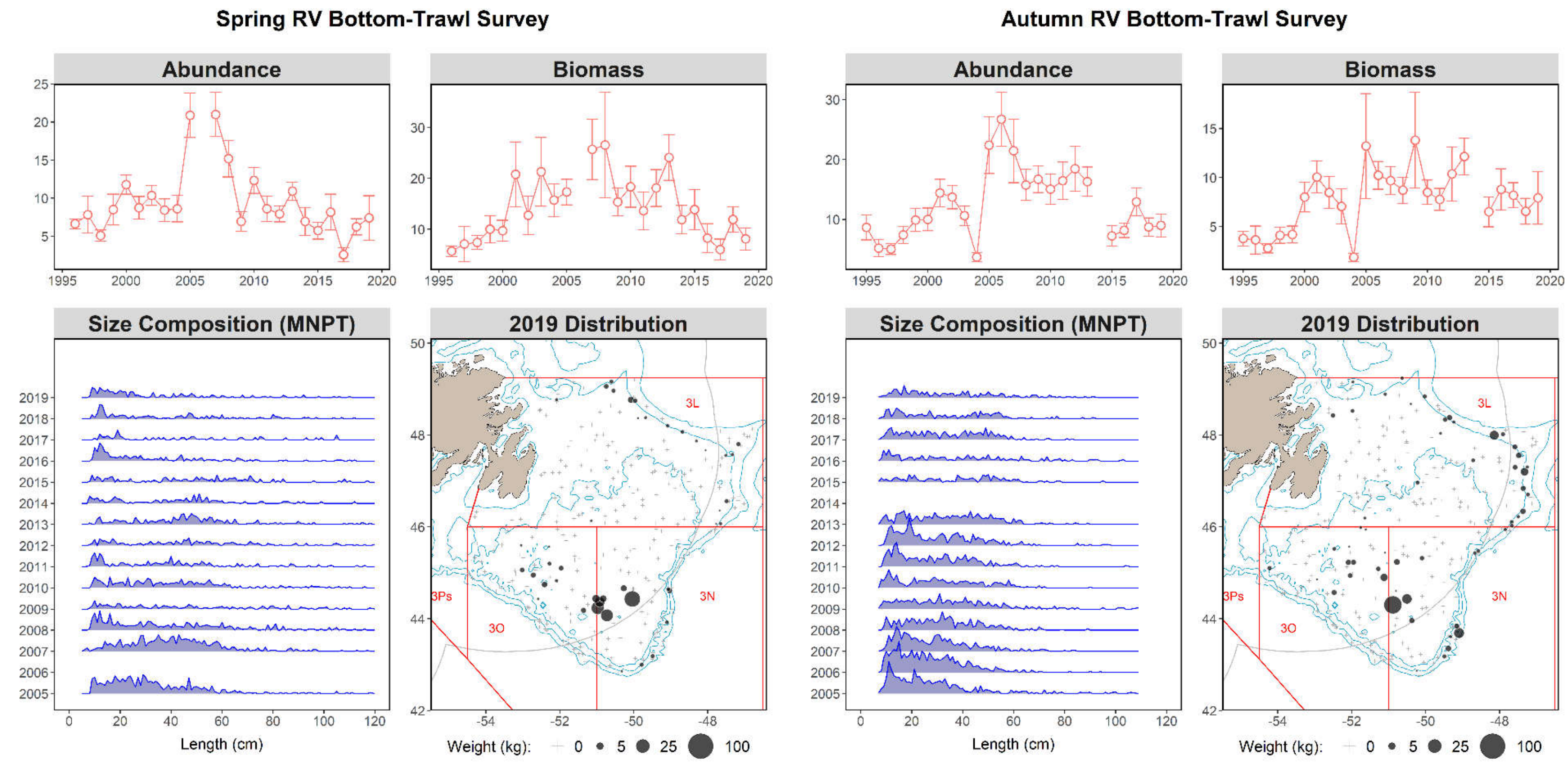

Figure 25. Striped wolffish (*Anarhichas lupus*) in Divs. 3LNO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

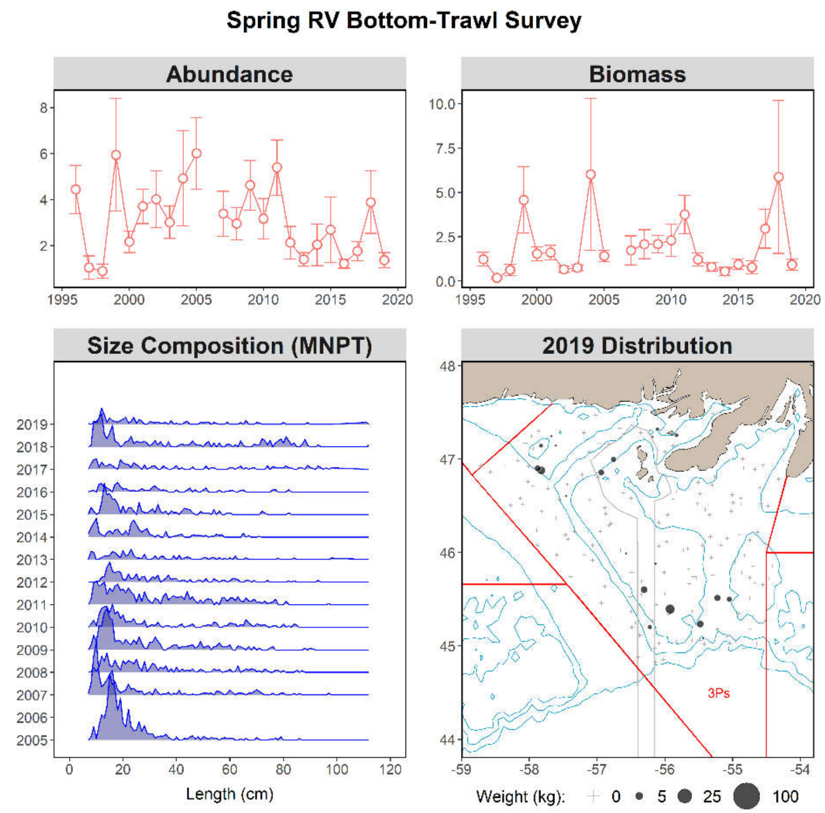

Figure 26. Striped wolffish (*Anarhichas lupus*) in Subdiv. 3Ps. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 survey is incomplete for this stock.

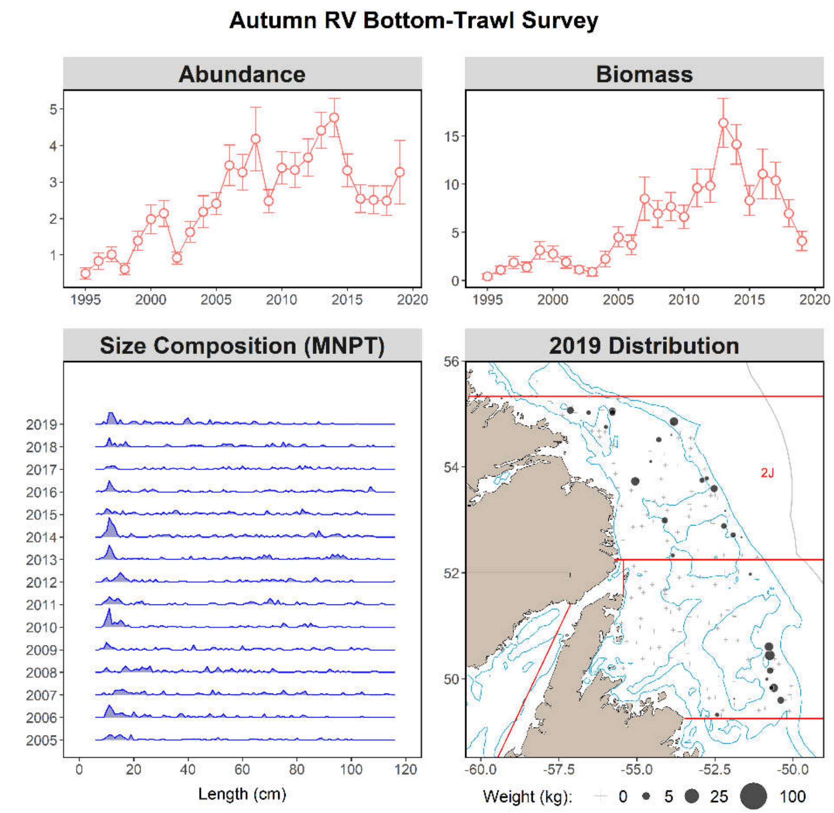

Figure 27. Spotted wolffish (*Anarhichas minor*) in Divs. 2J3K. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata.

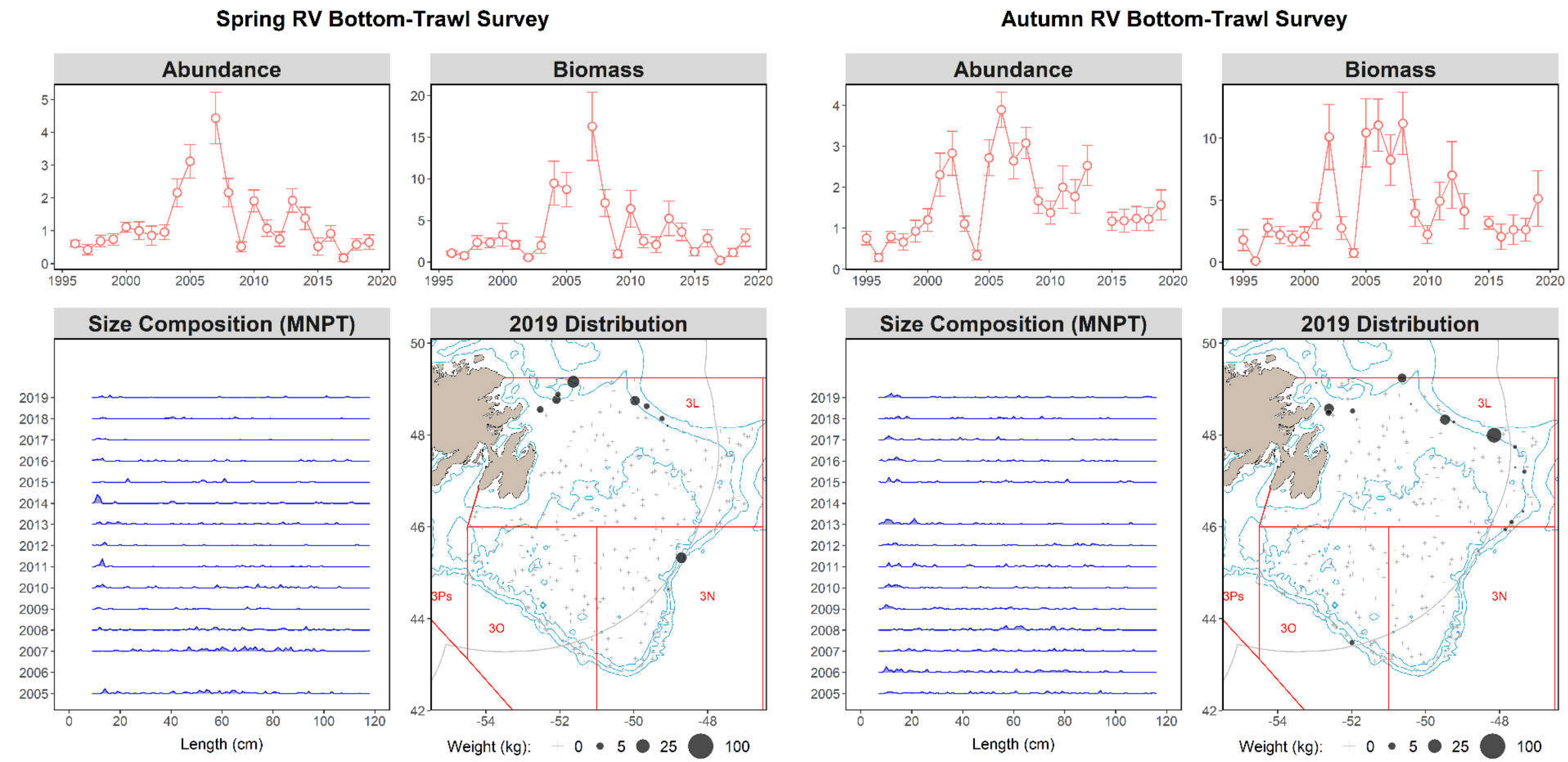

Figure 28. Spotted wolffish (*Anarhichas minor*) in Divs. 3LNO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

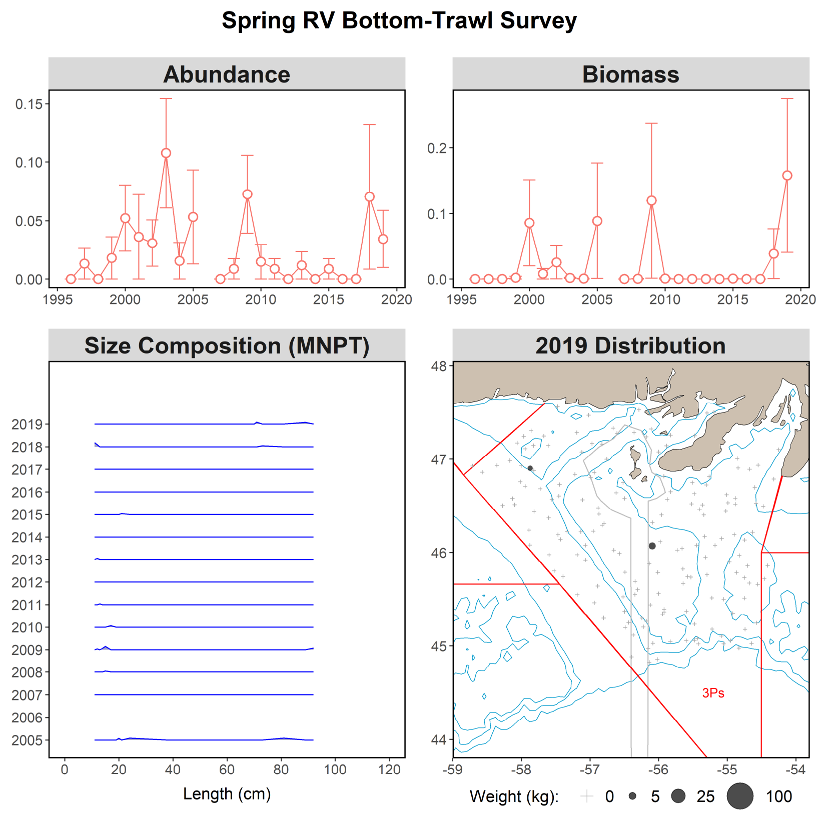

Figure 29. Spotted wolffish (*Anarhichas minor*) in Subdiv. 3Ps. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 survey is incomplete for this stock.

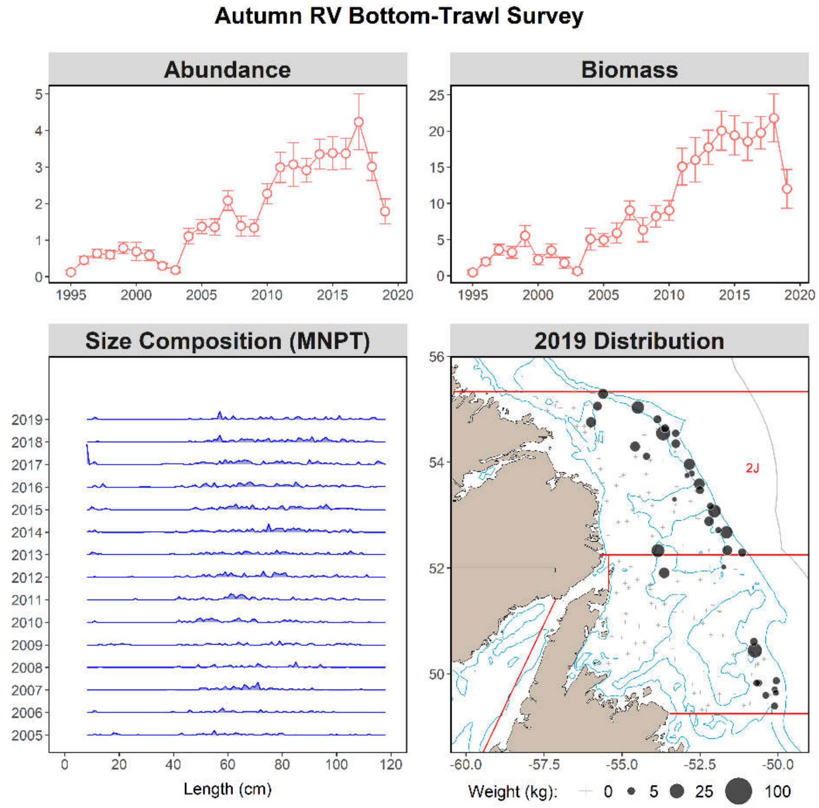

Figure 30. Broadhead wolffish (*Anarhichas denticulatus*) in Divs. 2J3K. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata.

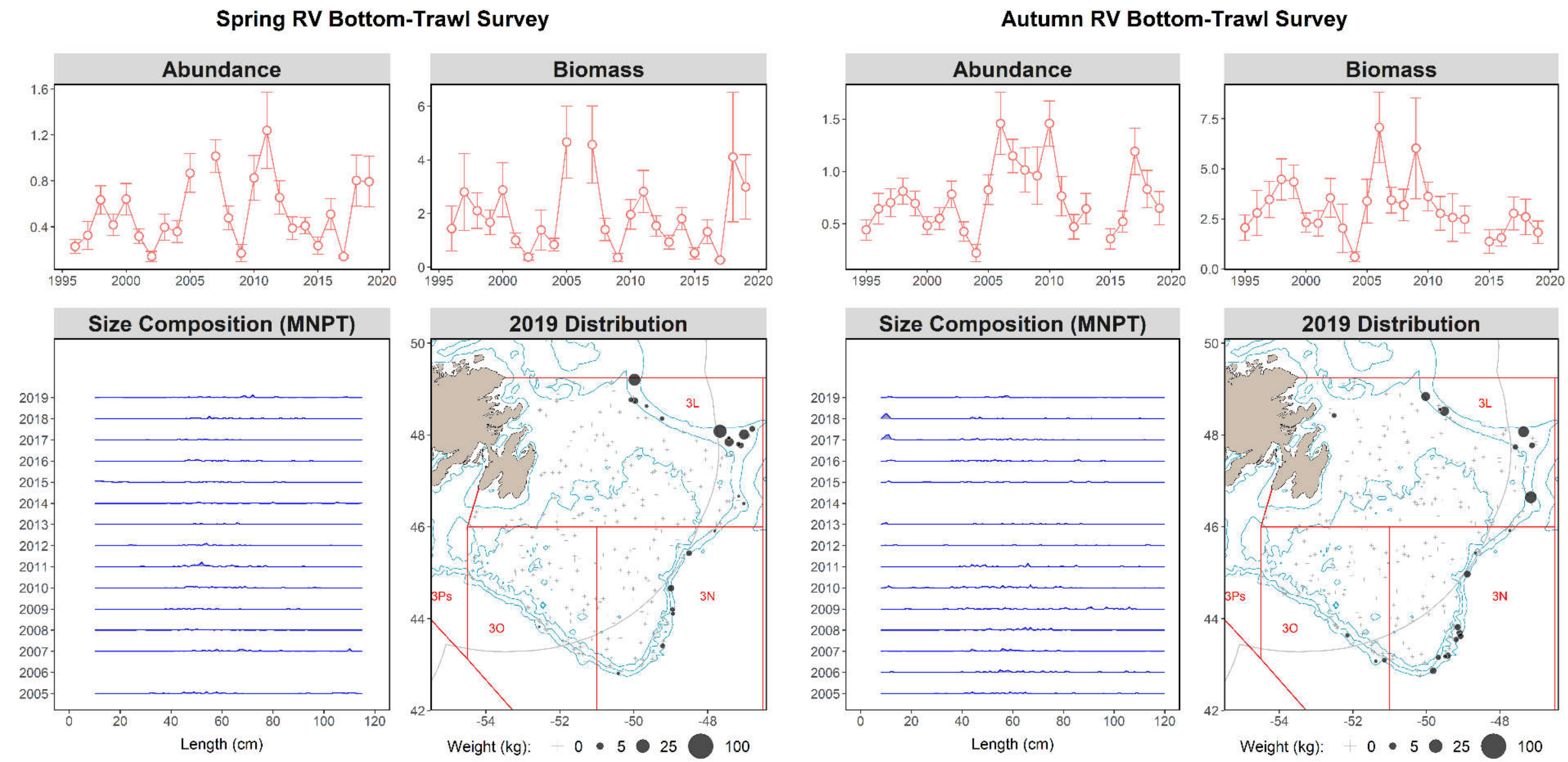

Figure 31. Broadhead wolffish (*Anarhichas denticulatus*) in Divs. 3LNO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

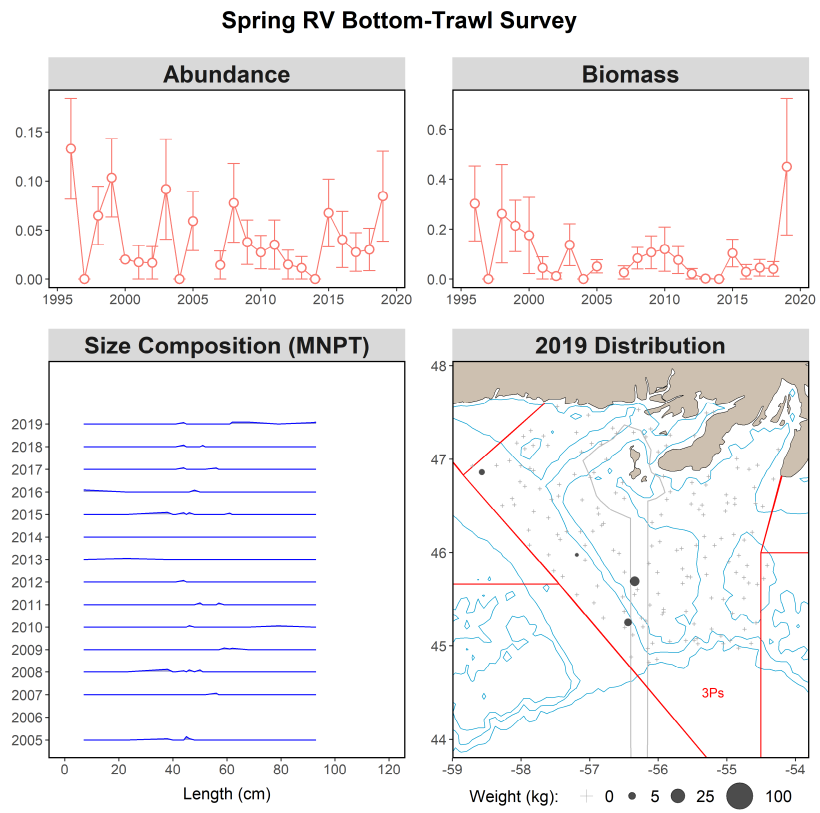

Figure 32. Broadhead wolffish (*Anarhichas denticulatus*) in Subdiv. 3Ps. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 survey is incomplete for this stock.

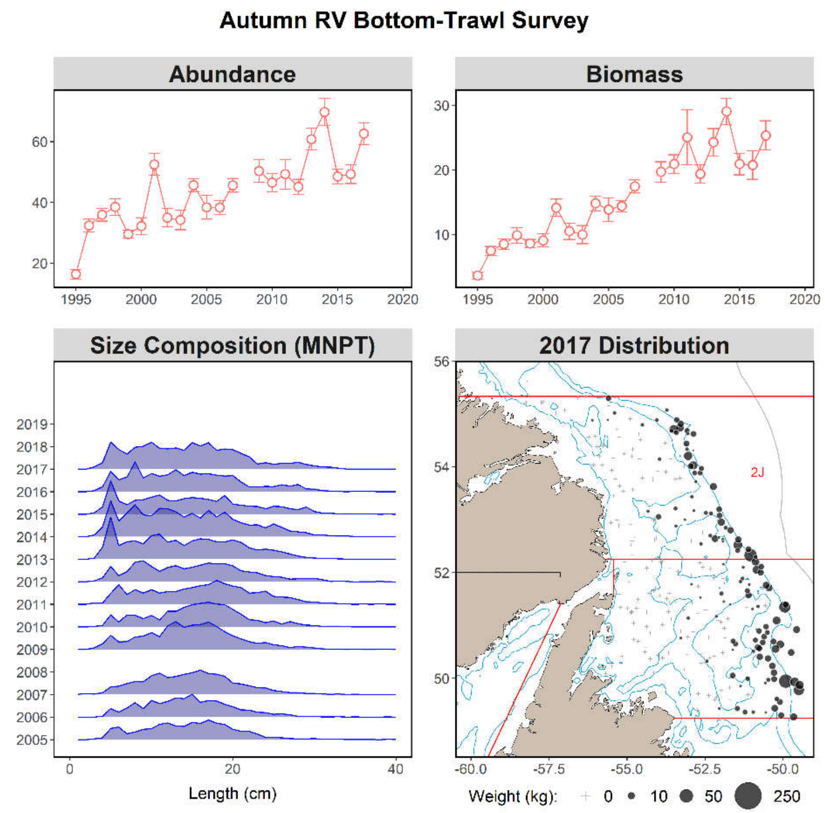

Figure 33. Roughhead Grenadier (*Macrourus berglax*) in Divs. 2J3K. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2008, 2018 and 2019 surveys are incomplete for this stock.

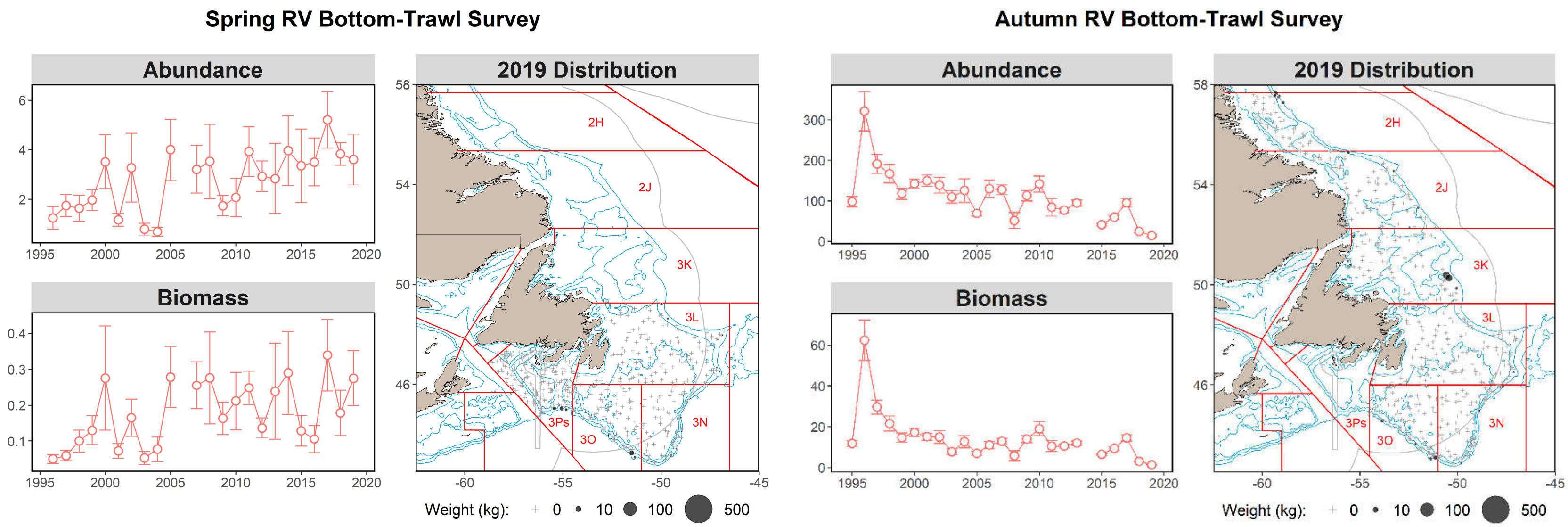

Figure 34. Roundnose grenadier (*Coryphaenoides rupestris*) in SA2+3. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

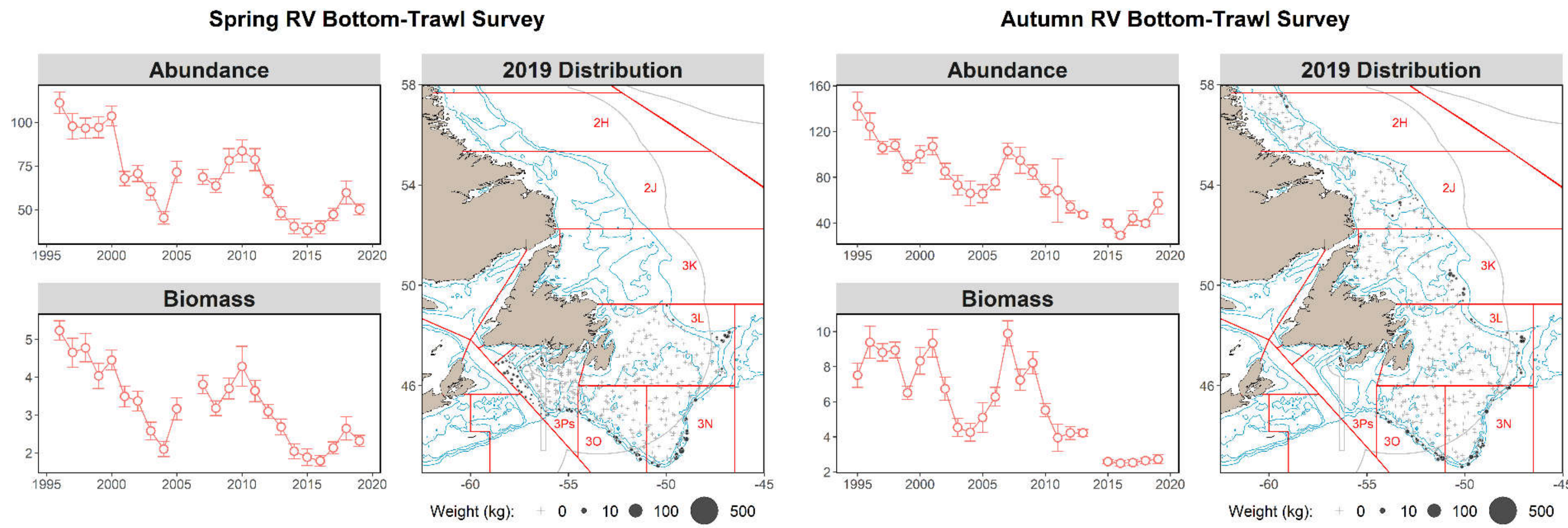

Figure 35. Common grenadier (*Nezumia bairdii*) in SA2+3. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock. The status of this stock has never been assessed.

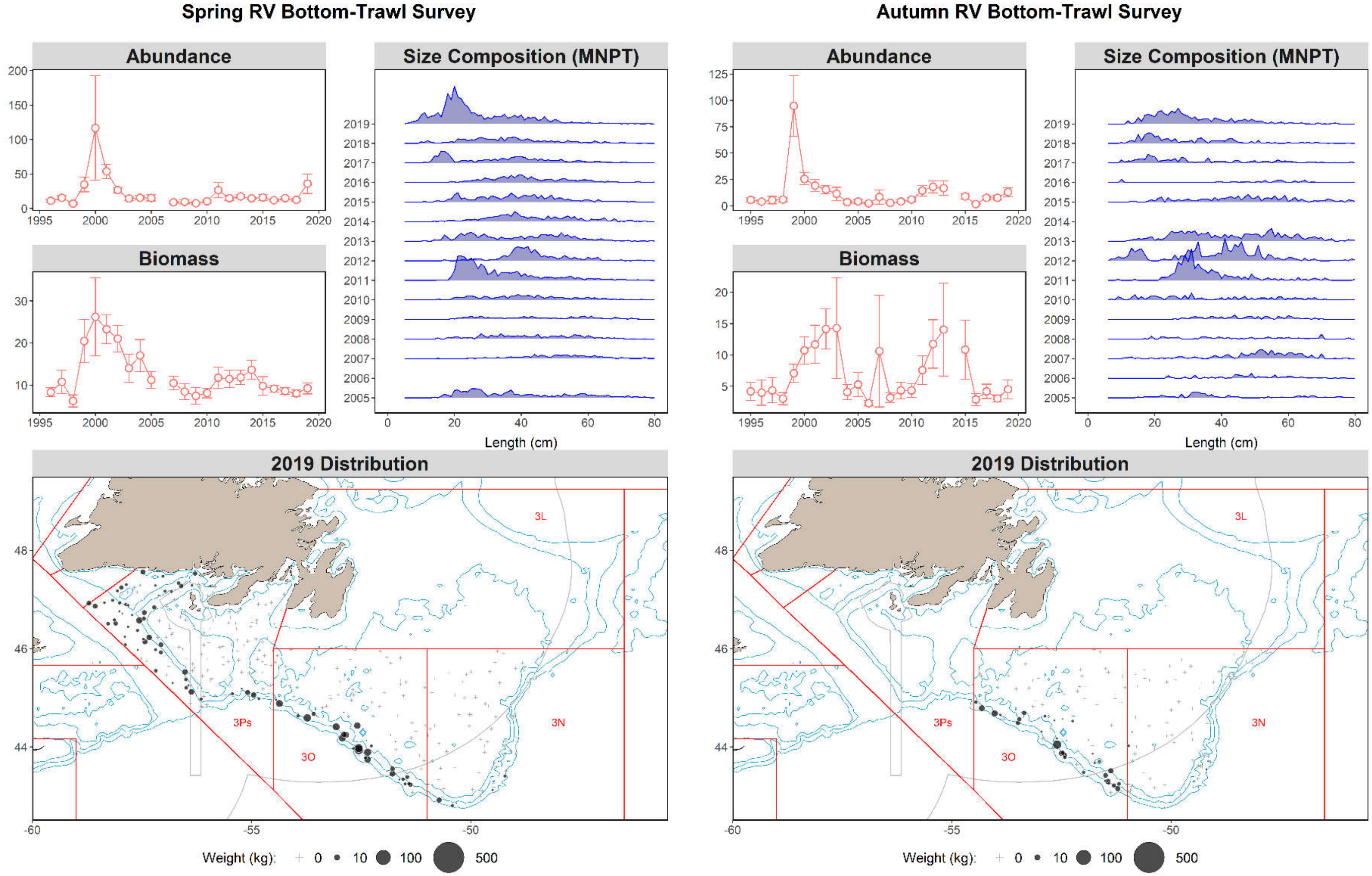

Figure 36. White hake (*Urophycis tenuis*) in Divs. 3NOPs. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

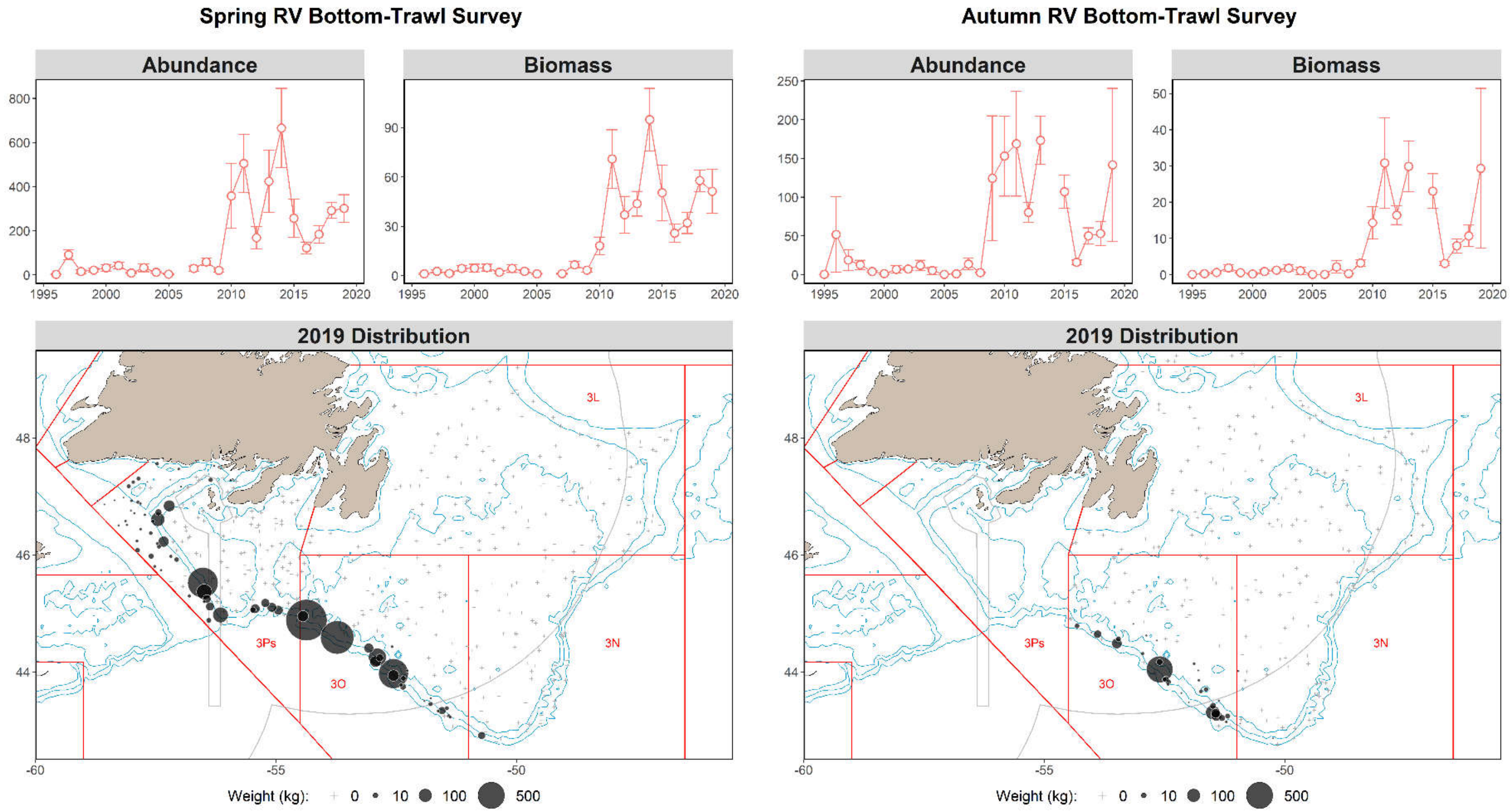

Figure 37. Silver hake (*Merluccius bilinearis*) in Divs. 3NOPs. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock. The autumn survey (not shown here) does not cover any portion of the stock area. The status of this stock has never been assessed.

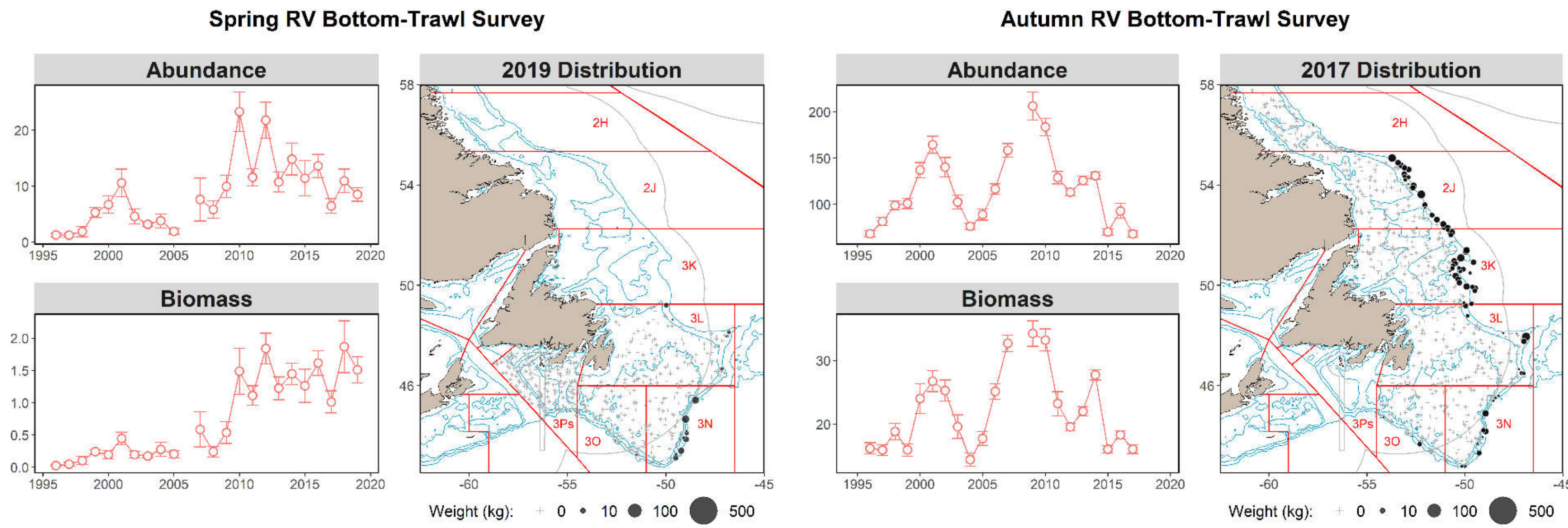

Figure 38. Blue hake (*Antimora rostrata*) in SA2+3. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock. The status of this stock has never been assessed.

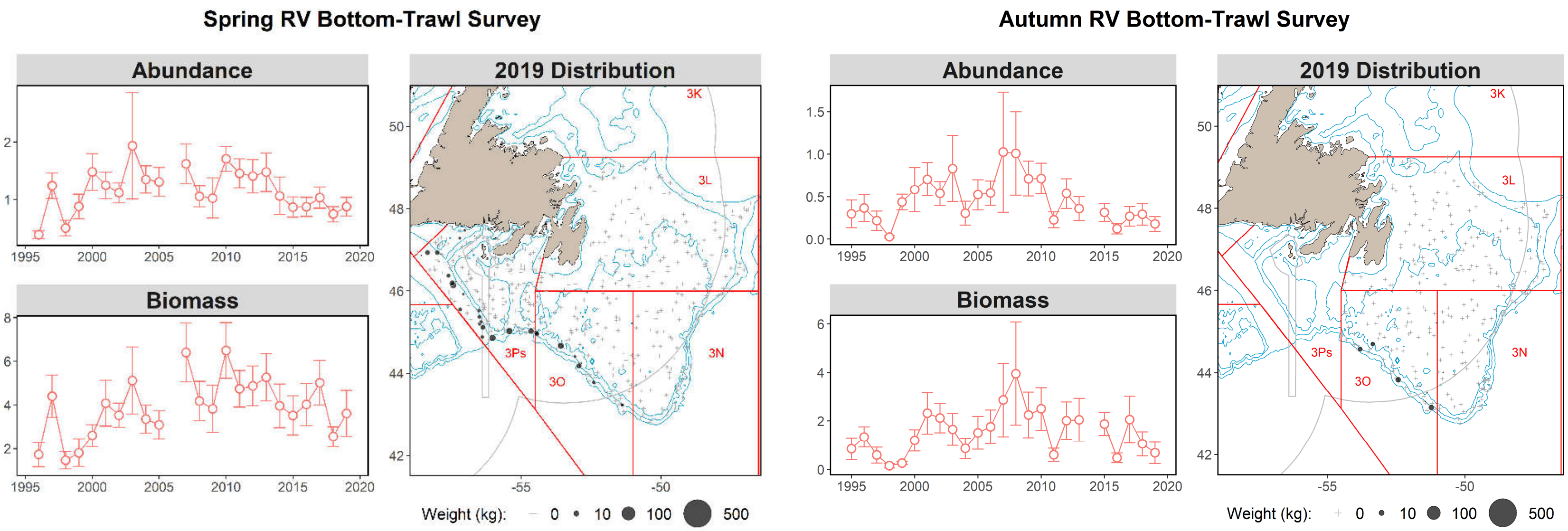

Figure 39. Monkfish (*Lophius americanus*) in Divs. 3LNOPs. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

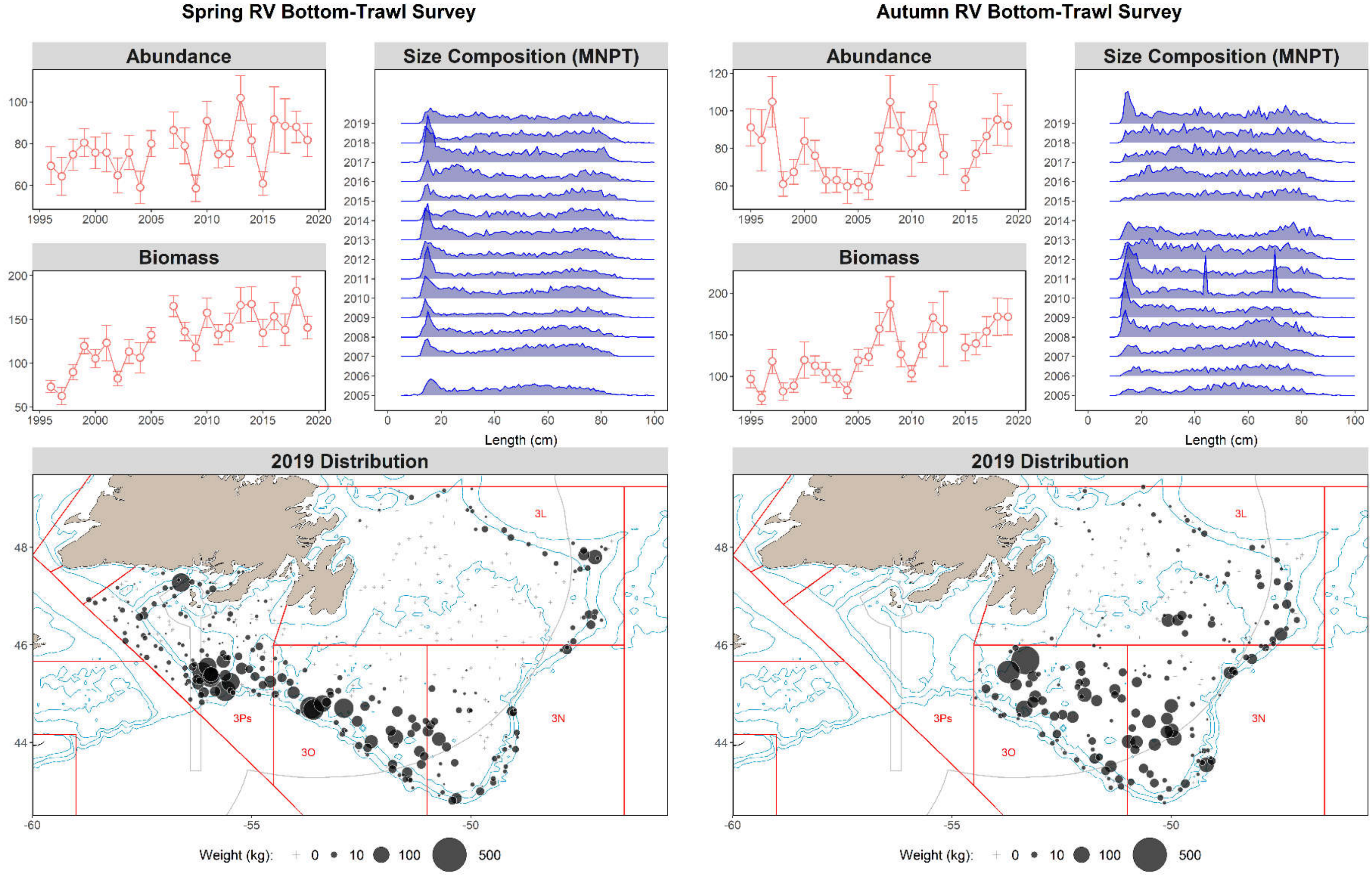

Figure 40. Thorny skate (*Amblyraja radiata*) in Divs. 3LNOPs. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

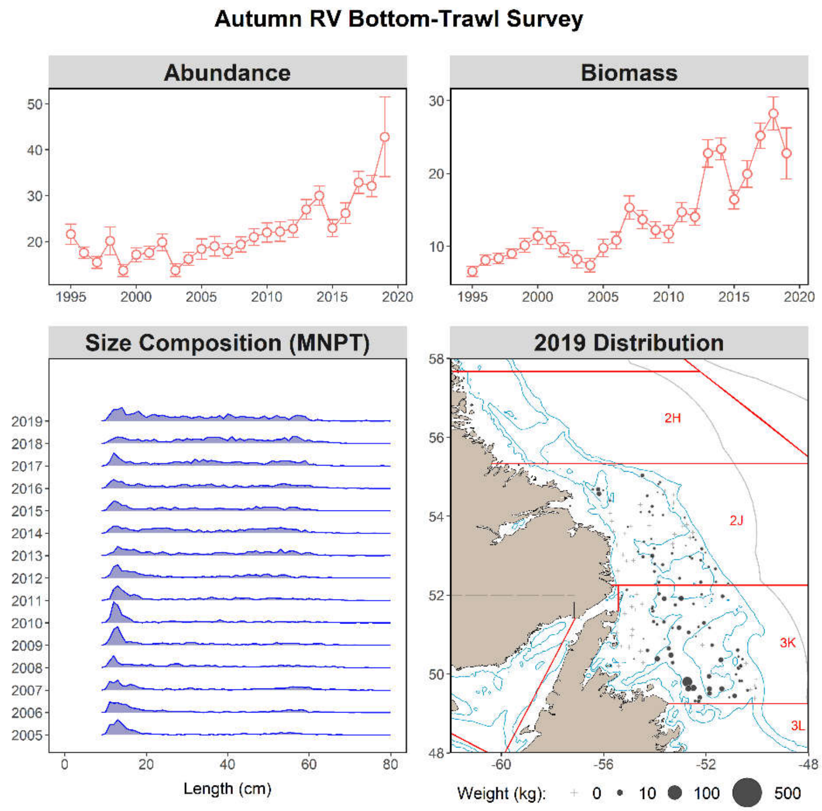

Figure 41. Thorny skate (*Amblyraja radiata*) in Divs. 2J3K. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata.

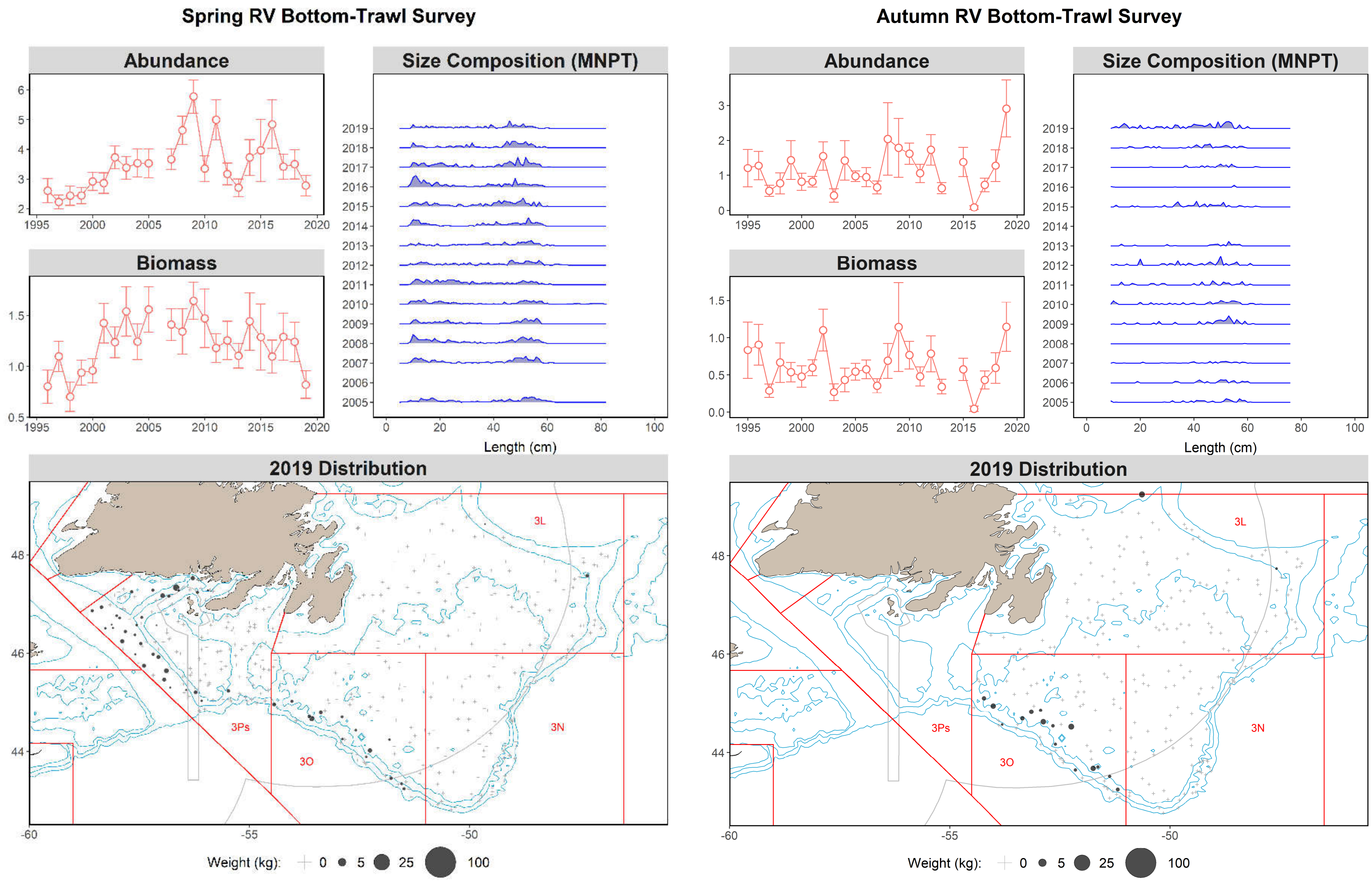

Figure 42. Smooth skate (*Malacoraja senta*) in Divs. 3LNOPs. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

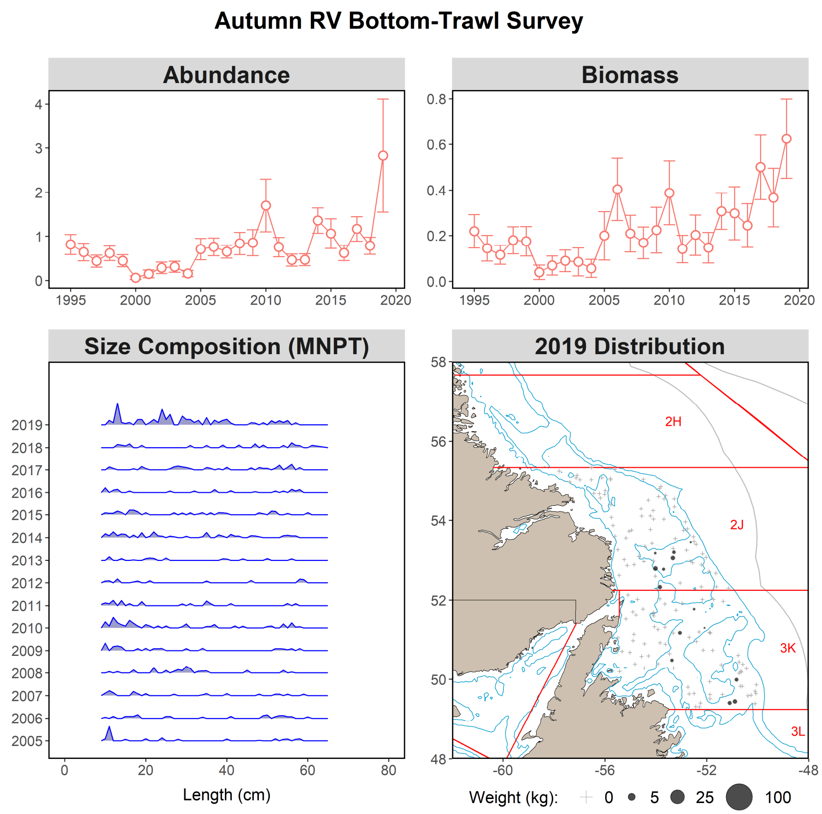

Figure 43. Smooth skate (*Malacoraja senta*) in Divs. 2J3K. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata.

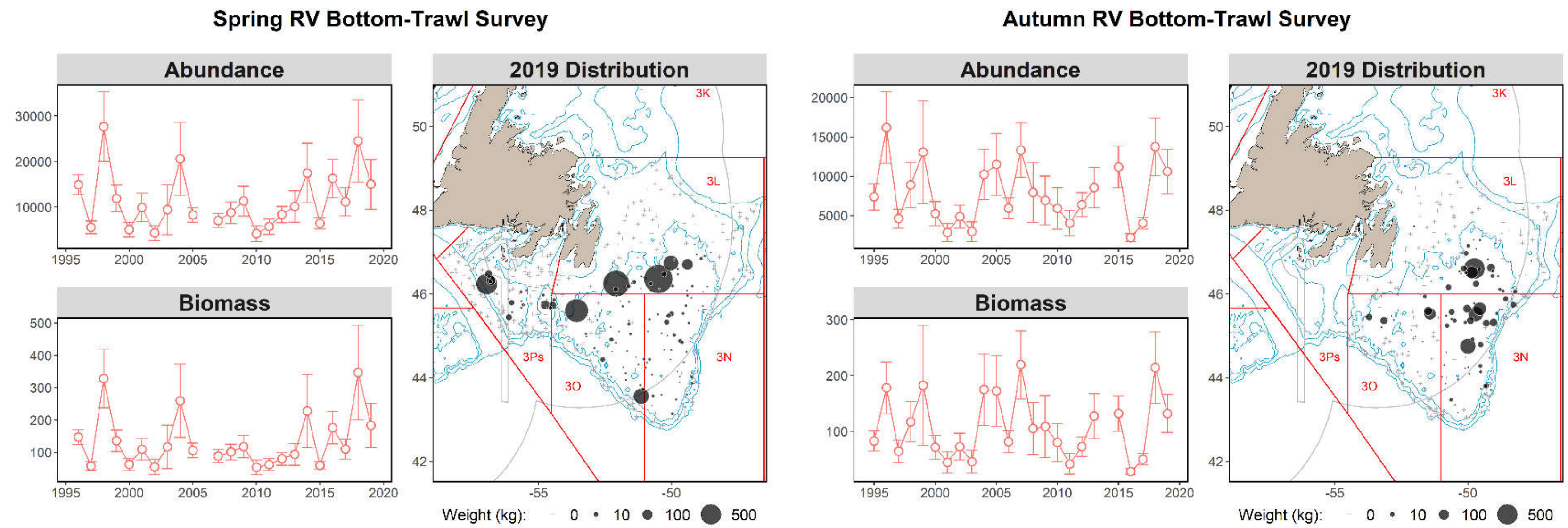

Figure 44. Sand lance (*Ammodytes* spp.) in Divs. 3LNOPs. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock. The status of this stock has never been assessed.

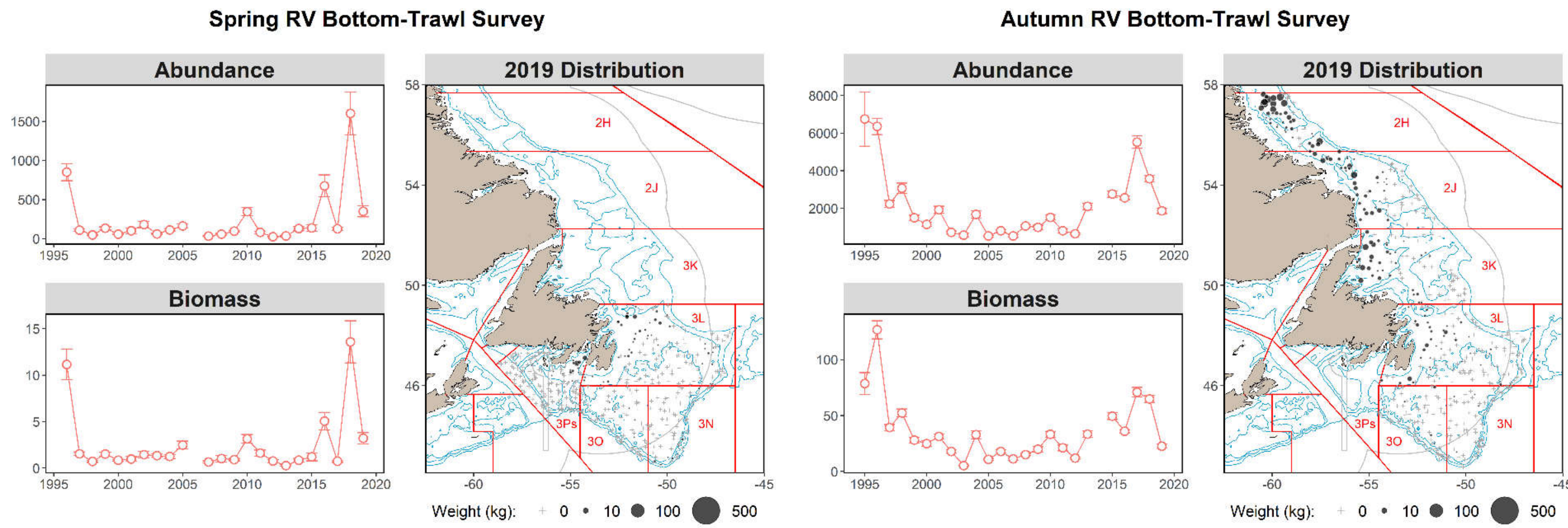

Figure 45. Arctic cod (*Boreogadus saida*) in SA2+3. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock. The status of this stock has never been assessed.

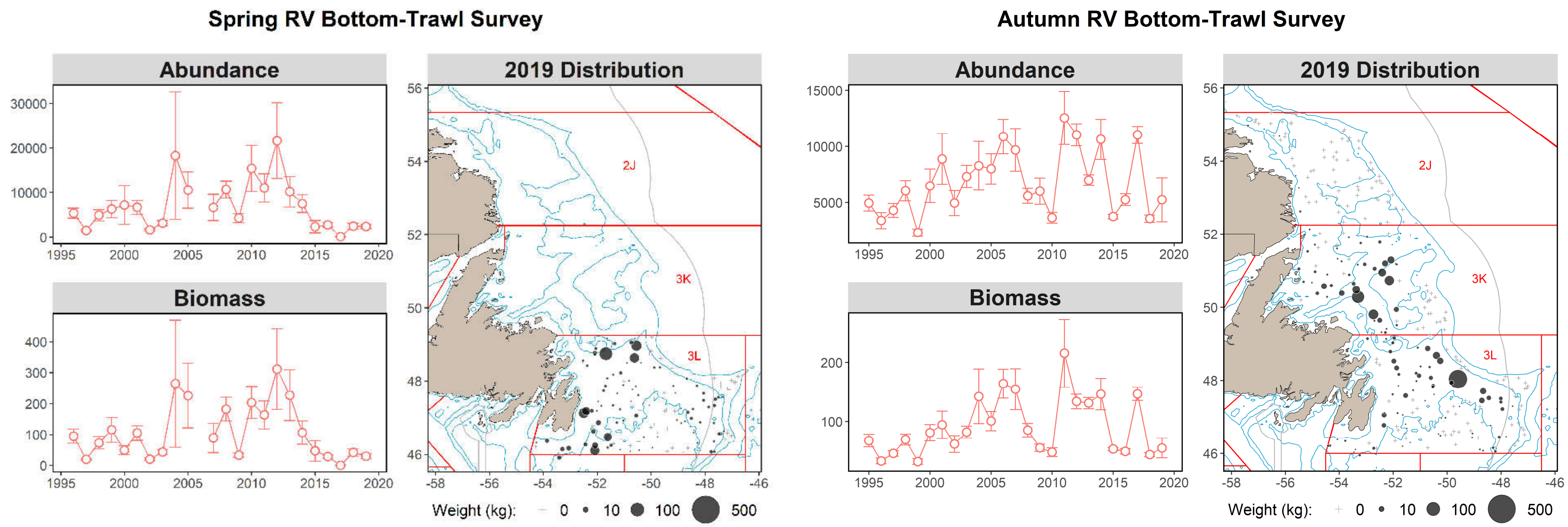

Figure 46. Capelin (*Mallotus villosus*) in Divs. 2J3KL. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring survey is incomplete for this stock. Note that these bottom-trawl indices may not reflect population trends for this pelagic species. The assessment for this stock is based on an acoustic survey of a portion of Div. 3L rather than these survey data.

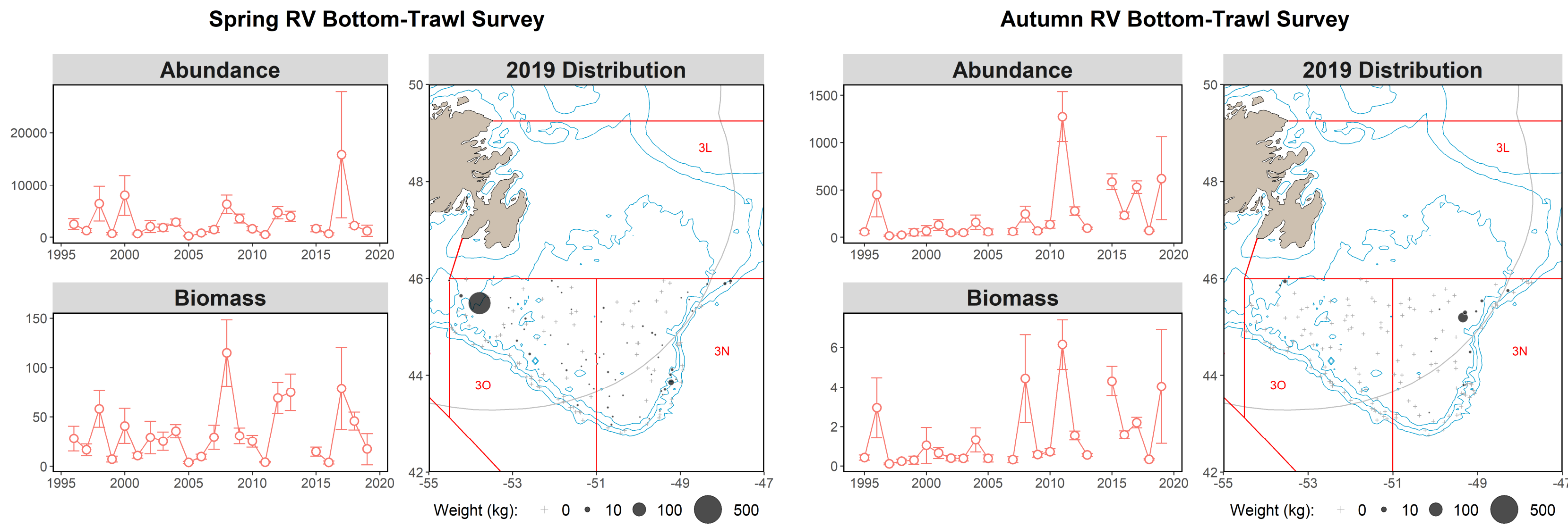

Figure 47. Capelin (*Mallotus villosus*) in Divs. 3NO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock. Note that these bottom-trawl indices may not reflect population trends for this pelagic species.