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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 2019

by

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Abstract

We update basic vessel performance and document the timing and spatial coverage of the annual spring and autumn multispecies bottom trawl surveys conducted by the Department of Fisheries and Oceans, Newfoundland and Labrador Region including new data for surveys in 2019. The current survey designs cover an expansive spatial area, spanning six NAFO Divisions (2HJ3KLNO) and 515,000 km^2 in the autumn and four NAFO Divisions (3LNOP) and 324,000 km^2 in the spring. Despite slight set density reductions in some strata, the 2019 spring survey successfully covered all intended strata except for one in Div. 3O. The 2019 autumn survey, however, was severely impacted by extremely poor weather conditions that resulted in 50 incomplete strata (primarily >730 m but also a few shallower strata) in Divs. 2HJ3KL and large set density reductions in many other strata in Divs. 2J + 3K. In recent years extensive vessel mechanical issues (combined with weather delays) have led to systemic coverage issues for deepwater strata, particularly those in Div. 2H and Div. 3L (as well as Div. 3K in the last two years). Coverage of Division 3L has been problematic in the spring survey as well, with multiple incomplete strata in three of the last six years. Deficiencies in these surveys are likely to influence the uncertainty of many groundfish and invertebrate assessments, which is particularly concerning for those stocks on the Grand Bank where ecosystem changes appear to be occurring and many stocks have undergone recent declines.

Introduction

The Canadian Department of Fisheries and Oceans (DFO), Newfoundland and Labrador Region, has undertaken stratified-random surveys in portions of NAFO subareas 2+3 since the early 1970's. A full description of the history of these surveys, including stratification, trawl gear, towing protocols, vessels employed, as well as details of spatial coverage have been detailed in previous documents (e.g. Brodie, 2005, Brodie and Stansbury, 2007, Healey and Brodie, 2009, Healey et al., 2012, and references therein). The current document, which is produced annually for the June meeting of NAFO Scientific Council (most recent version is Rideout and Ings, 2019) focusses on survey timing and coverage in recent years, and particularly the 2019 surveys.

Methods

The Canadian (NL Region) research vessel (RV) multispecies bottom trawl surveys cover Divisions 2HJ3KLNO (515,000 km^2) in the autumn and Divisions 3LNOP (324,000 km^2) in the spring. The survey area is stratified by depth range, as depicted in Figs. 1-9. 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, with each sampling unit typically encompassing an area of approximately 3.5 square nautical miles (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). A constraint is applied to the random sampling to permit selection of only one sampling unit within each consecutive group of 10 units (i.e maximum of one unit selected from units 1-10, 11-20, 21-30, etc.).

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 to enable calculation of stratum variance. Strata down to 1500 m are included in the survey design for the autumn survey, whereas the spring survey does not cover strata deeper than 732 m.

The Canadian Coast Guard vessels employed during current autumn surveys are the CCGS *Alfred Needler* and the CCGS *Teleost*. The CCGS *Alfred Needler* (overall length 50m) conducts fishing sets at depths down to 732m, whereas the CCGS *Teleost* (overall length 63m) completes survey sets to depths of 1500m. During spring surveys, typically only the CCGS *Alfred Needler* is used; the CCGS *Teleost* has been deployed at times when the CCGS *Alfred Needler* was unavailable due to significant mechanical problems. The CCGS *Wilfred Templeman,* which had been one of the primary vessels for survey work in the Newfoundland Region, was decommissioned in 2008. The current sampling gear used for the RV surveys is the Campelen 1800 shrimp trawl. This trawl was first deployed in the 1995 autumn survey, and has been used in all spring surveys since 1996. McCallum and Walsh (1996) provide a detailed description of the Campelen 1800 trawl.

Survey Design: Autumn Surveys

The current autumn survey design (Table 1) includes Divisions 2HJ3KLNO. Division 2G has not been surveyed since 1999 and is no longer included in survey planning. Likewise, Division 3M (the deep-water strata in the Flemish Pass and the western slopes of the Flemish Cap) were permanently excluded from survey planning starting in 2010. In the early-2000s, coverage of Division 2H was planned for every second year, but in 2011 the decision was made to cover Division 2H annually. The increased coverage of Div. 2H (84 planned sets annually) was deemed necessary for the assessment of key commercial species, primarily northern shrimp. However, since there was no increase in the amount of allotted vessel time for the survey, the increase in spatial coverage had to come at the expense of other areas that were previously part of the survey design. Starting in 2011, coverage of deep strata (>732 m) in Divs. 3NO was no longer included in the autumn survey design (a reduction of 48 planned sets). The decision to remove these strata was based on the fact that portions of these strata were unsuitable for trawling and often, a considerable amount of time was used to search for deployment sites near the intended sites. In addition, the inshore strata of Divs. 3K and 3L (19 and 34 planned sets respectively) were permanently removed from the survey design. These inshore strata were initially added to the survey design in the mid-1990s but have not been consistently covered since 2007. The limited survey coverage that has been attained in these inshore areas typically occurred at times when the survey vessels have had to leave the offshore area due to severe weather but were able to conduct fishing in the near shore areas. There have been no further substantive changes to the planned autumn survey coverage of Divs. 2HJ3KLNO in the years since 2011.

The autumn survey is generally conducted from mid-September to mid-December, although in some years (1995, 2002-2005, 2014) the survey has extended into January of the subsequent year (Table 2). The general plan has been for the CCGS Alfred Needler to start in the south, surveying Div. 3O, then Div. 3N and finally Div. 3L. The CCGS Teleost starts in the north, surveying Div. 2H, then to Div. 2J, Div. 3K and finally Div. 3L deep

strata (>732m). It is common for the CCGS Alfred Needler to share some of the survey work in Div. 3K once the Div. 3LNO portion has been covered (Table 3).

Survey Design: Spring Surveys

The spring survey encompasses Divs. 3LNOPs, and is typically conducted from early-April through to late June (Table 4). The only major change in the spring survey design in recent years was the removal of inshore strata in Division 3L. These inshore strata were always considered of lower priority and were only infrequently surveyed. This change resulted in the planned number of sets decreasing from 512 to 478 (Table 1). The spring survey typically utilizes a single vessel, the CCGS *Alfred Needler*, but mechanical issues with this vessel in some years have required the use of the CCGS *Teleost* to complete the survey (Table 5).

Survey summaries

This document summarizes the intended and realized coverage of the Canadian spring and autumn multispecies bottom trawl surveys. This includes an examination of the total number and spatial coverage of fishing sets conducted in each division as well as by individual research vessels. Years and areas with poor/inadequate survey coverage are highlighted.

Results

The autumn survey design has remained the same since 2011 (Table 1), but substantive mechanical issues with the research vessels have become commonplace in recent years and have resulted in reduced coverage (reduced number of fishing sets per stratum or failure to complete some strata) or a complete lack of coverage of certain areas in some years. In 2014, major mechanical issues with one of the research vessels (*CCGS Alfred Needler*) caused it to be out of service for the entire autumn survey. With limited vessel capacity, the decision was made to not survey Divisions 3NO and to not survey the strata deeper than 750 m in Division 2H. This reduced the planned coverage from 674 sets to 513 sets (24% reduction) and in order to accomplish this reduced survey using one vessel, an additional 28 days were added to the survey in January 2015. For the 2015 autumn survey, mechanical issues resulted in a delayed start to the survey and as a consequence it was decided to not survey beyond 500 m in Div. 2H (a reduction of 28 sets). In addition, the deep-water strata (>732 m) in Div. 3L were not covered (30 planned sets) because the survey ran out of time. In 2017 substantive mechanical issues again resulted in lack of coverage of strata deeper than 750 m in Division 2H and strata deeper than 732 m in Division 3L. In the 2018 autumn surveys the major coverage issues were again the deep strata in Division 3L, but also strata deeper than 750 m in Division 3K. In 2019 (Fig. 11), extreme weather conditions resulted in deep strata not being completed in Divs. 2H, 2J, 3K and 3L as well as extensive set density reductions in other strata (primarily in Divs. 2J + 3K).

An examination of the successful sets completed during the autumn survey in recent years (Tables 6-11; see also Figs. 10-17) demonstrates the difficulties that have been encountered in completing this survey. Both the planned number of sets (Table 1) and the number of sets actually completed (Fig. 10) have declined. The number of successful sets in 2014 was the lowest in the time series. Divisionally, there have been particular difficulties in recent years completing deep strata in Div. 2H and in Div. 3L. There has been no coverage of deep strata (2014, 2015, 2017, 2019) or reduced coverage (2016, 2018) of deep strata in Div. 2H in all of the last six years (Fig. 13, Table 6). However, only a single stratum was missed in 2018. In Div. 3L, deep strata have not been covered in five of the last six years (Fig. 15, Table 9). Deep strata have also not been covered in Div. 3K in the autumn survey in the last two years (Fig. 14).

Like the autumn survey, the spring RV survey has not been immune to mechanical issues in recent years. In 2014, major mechanical issues with the primary spring survey vessel (CCGS Alfred Needler) required an *a priori* reduction of 64 sets from Divisions 3LNOPs for a reduction of 13% from the entire survey but primarily from Div. 3NOPs) as well as the deployment of our second research vessel (*CCGS Teleost*). In 2015, significant mechanical issues with the primary spring vessel, as well as bad weather once the vessel returned to service, resulted in a major reduction in coverage of Div. 3L. In 2017, mechanical delays again impacted the survey

and resulted in most of the intended strata in Div. 3L not being covered. In 2018, there were 3 strata missed in the northern part of Div. 3L and 3 strata missed in Subdiv. 3Ps. Only one stratum (in Div. 3O) was missed in the 2019 survey.

In general, prior to 2014 (with the exception of 2006) the spring survey has provided good coverage of the area in the survey design. However, coverage has been sporadic and generally reduced since that time (Fig. 10). In 2014, 2016 and 2019 the reduction in the total number of sets was generally accomplished by reducing the number of sets in individual strata but still completing a sufficient number to consider the strata "complete". In 2015 and 2017 there was very poor coverage of Div. 3L and numerous strata were not covered at all (Fig. 18). In 2018, again there was incomplete coverage of Div. 3L, with three incomplete strata in the northern part of the division. In addition, the four strata in Subdivision 3Pn have not been covered since 2013.

Although, RV data trends for individual NAFO-managed fish stocks are not discussed here, plots of survey indices, length frequencies and distribution plots of species-specific survey catches are presented as an Appendix. It is important to note that:

1. These data 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 RV survey time series, are considered. For details of stock status, readers are directed to the pertinent stock assessment documents available at https://www.nafo.int/.

2. 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.

Discussion

Substantive mechanical issues with the research vessels in recent years have made completion of the autumn multispecies bottom trawl survey very difficult. In some instances, when one of the two vessels used during the autumn survey has been inoperative it has been possible to extend the usage time of the second vessel. This is not always possible due to the fact that vessels and vessel time are shared across multiple monitoring programs and multiple regions within Fisheries and Oceans Canada.

In recent years the main coverage issues for the autumn survey have been for the deeper strata within Div. 2H and Div. 3L. With respect to Div. 2H, the inclusion of this area in the annual survey design was expected to be beneficial in monitoring resource trends for Northern shrimp (*Pandalus Borealus*) within Shrimp Fishing Area 5, and perhaps to a lesser extent Greenland halibut. However, given the recent inability to cover the deeper strata within Div 2H, the added value for the assessment of deepwater demersal fish such as Greenland halibut is questionable.

The issues with covering the deep strata in Div. 3L in the autumn survey are perhaps magnified by the fact that the spring survey coverage of Div. 3L has also been very poor in two of the last three years. These coverage issues are likely to create a great deal of uncertainty in the assessment of fishery resources on the Grand Bank. These coverage issues are occurring at an unfortunate time as ecosystem changes appear to be occurring in this area and many of the Grand Bank fish stocks appear to be in decline. Complete coverage of Div. 3L could help contribute to a better understanding of the changes that are occurring in this area and the

implications for resource management. However, given the current rate of survey downtime and the realization that there are only two vessels operating the survey program since 2008, it is likely that in-situ unplanned reductions in survey coverage will continue to be frequent in the near future. The planned coverage at present has very limited scope for further reductions when survey delays inevitably arise. Any loss of coverage in the areas presently having long-standing time series is likely to have an adverse effect on the stock assessments and ecosystem monitoring of multiple species. The magnitude of this uncertainty introduced by such coverage shortfalls is unknown and is typically not reflected in assessment results nor management advice.

Conclusion

Extensive mechanical delays during both spring and autumn surveys in recent years have resulted in reduced survey coverage, interchange of research vessels outside of their normal area coverage pattern, and have extended the time required to complete surveys of the individual divisions. The autumn survey has had particular trouble covering the deep strata in Div. 2H and Div. 3L. In addition Divs. 3NO were completely excluded from the 2014 autumn survey. Spring surveys have generally provided good coverage of the survey area prior to 2014 but coverage of Div. 3L has been poor and incomplete in three of the last five years. Deficiencies in these surveys combined with those over 1995-2008 (see Brodie and Stansbury, 2007, Healey and Brodie, 2009) impact the assessments of many groundfish and invertebrate stocks to varying degrees, uncertainties which are typically not factored into the assessment results nor management advice. Nevertheless, recent negative trends in survey indices for several Grand Bank stocks raise concern over the status of many of the fishery resources in this area and poor survey coverage results in a higher degree of uncertainty with respect to monitoring and understanding the ecosystem changes that appear to be occurring in this area.

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Table 1. Number of survey sets planned per Division, for Canadian Autumn and Spring RV multispecies bottom trawl surveys over 2008-2019.

Survey	Division	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Autumn	2H	77		77	84	84	84	84	84	84	84	84	84
Autumn	2J	108	121	117	117	117	117	117	117	117	117	117	117
Autumn	3K	162	181	175	156	156	156	156	156	156	156	156	156
Autumn	3L	191	213	206	172	172	172	172	172	172	172	172	172
Autumn	3M	23	26										
Autumn	3N	88	97	94	70	70	70	70	70	70	70	70	70
Autumn	3O	92	103	99	75	75	75	75	75	75	75	75	75
	Total	**741**	**741**	**768**	**674**	**674**	**674**	**674**	**674**	**674**	**674**	**674**	**674**
Spring	3L	176	176	176	142	142	142	142	142	142	142	142	142
Spring	3N	79	79	79	79	79	79	79	79	79	79	79	79
Spring	3O	79	79	79	79	79	79	79	79	79	79	79	79
Spring	3Ps	178	178	178	178	178	178	178	178	178	178	178	178
	Total	**512**	**512**	**512**	**478**	**478**	**478**	**478**	**478**	**478**	**478**	**478**	**478**

Table 2. Start and end dates (corresponding to the first and last fishing set) for the Canadian Autumn RV multispecies bottom trawl surveys in Divs. 2HJ3KLNO. Note that Divs. 2G and 3M have not been included in the survey design since 1999 and 2007, respectively, and have not been included here.

Year	Div 2H Start	Div 2H End	Div 2J Start	Div 2J End	Div 3K Start	Div 3K End	Div 3L Start	Div 3L End	Div 3N Start	Div 3N End	Div 3O Start	Div 3O End	All Divs Start	All Divs End	Total Days
1995	NA	NA	1995-12-04	1996-01-22	1995-11-28	1996-01-25	1995-10-03	1996-01-25	1995-09-27	1995-10-26	1995-09-26	1995-10-20	1995-09-26	1996-01-25	121 days
1996	1996-09-18	1996-09-30	1996-10-22	1996-11-07	1996-11-07	1996-11-26	1996-10-09	1996-12-05	1996-11-25	1996-12-13	1996-11-24	1996-12-17	1996-09-18	1996-12-17	90 days
1997	1997-10-09	1997-10-19	1997-10-19	1997-11-04	1997-11-04	1997-12-19	1997-10-23	1997-12-20	1997-10-08	1997-11-05	1997-09-26	1997-10-19	1997-09-26	1997-12-20	85 days
1998	1998-10-07	1998-10-30	1998-10-20	1998-11-04	1998-11-04	1998-11-30	1998-11-02	1998-12-15	1998-10-16	1998-12-16	1998-10-10	1998-12-13	1998-10-07	1998-12-16	70 days
1999	1999-10-22	1999-11-09	1999-11-06	1999-11-25	1999-11-20	1999-12-11	1999-11-07	1999-12-12	1999-11-03	1999-11-22	1999-10-13	1999-11-13	1999-10-13	1999-12-12	60 days
2000	NA	NA	2000-11-01	2000-11-14	2000-11-14	2000-12-18	2000-10-24	2000-12-18	2000-10-17	2000-12-05	2000-10-11	2000-11-24	2000-10-11	2000-12-18	68 days
2001	2001-12-08	2001-12-15	2001-11-21	2001-12-08	2001-11-27	2001-12-18	2001-10-04	2001-12-06	2001-09-28	2001-10-29	2001-09-22	2001-10-14	2001-09-22	2001-12-18	87 days
2002	NA	NA	2002-12-07	2003-01-12	2002-12-01	2003-01-14	2002-10-23	2002-12-02	2002-10-13	2002-10-26	2002-10-05	2002-10-16	2002-10-05	2003-01-14	101 days
2003	NA	NA	2003-12-01	2003-12-17	2003-12-17	2004-01-31	2003-11-07	2004-01-20	2003-10-21	2003-11-07	2003-09-23	2003-10-21	2003-09-23	2004-01-31	130 days
2004	2004-10-08	2004-10-26	2004-10-27	2004-11-19	2004-11-13	2005-02-01	2004-11-24	2004-12-19	2004-11-11	2004-11-23	2004-10-31	2004-11-10	2004-10-08	2005-02-01	116 days
2005	NA	NA	2005-11-17	2005-12-16	2005-11-24	2006-01-28	2005-10-29	2006-01-29	2005-10-10	2005-11-19	2005-10-04	2005-10-17	2005-10-04	2006-01-29	117 days
2006	2006-10-05	2006-10-20	2006-10-20	2006-11-14	2006-11-06	2006-12-21	2006-10-21	2006-12-18	2006-10-12	2006-10-21	2006-09-30	2006-10-09	2006-09-30	2006-12-21	82 days
2007	NA	NA	2007-11-01	2007-11-30	2007-11-22	2007-12-16	2007-10-16	2007-12-20	2007-10-09	2007-11-14	2007-10-06	2007-10-31	2007-10-06	2007-12-20	75 days
2008	2008-10-04	2008-10-18	2008-11-07	2008-12-07	2008-11-11	2008-12-21	2008-11-01	2008-11-13	2008-10-24	2008-11-01	2008-10-03	2008-10-20	2008-10-03	2008-12-21	79 days
2009	NA	NA	2009-11-05	2009-11-23	2009-11-18	2009-12-13	2009-11-01	2009-12-20	2009-10-24	2009-11-12	2009-10-02	2009-10-25	2009-10-02	2009-12-20	79 days
2010	2010-10-07	2010-10-23	2010-10-21	2010-11-15	2010-11-15	2010-12-17	2010-10-29	2010-12-20	2010-10-12	2010-12-12	2010-09-30	2010-10-12	2010-09-30	2010-12-20	81 days
2011	2011-10-12	2011-10-27	2011-10-28	2011-11-26	2011-11-11	2011-12-19	2011-11-02	2011-12-18	2011-10-13	2011-11-20	2011-09-29	2011-10-17	2011-09-29	2011-12-19	81 days
2012	2012-10-07	2012-10-26	2012-10-14	2012-11-24	2012-11-12	2012-12-20	2012-10-27	2012-12-03	2012-10-11	2012-11-05	2012-09-30	2012-10-10	2012-09-30	2012-12-20	81 days
2013	2013-10-07	2013-10-25	2013-10-25	2013-11-18	2013-11-10	2013-12-18	2013-10-18	2013-11-25	2013-09-29	2013-10-18	2013-09-19	2013-09-29	2013-09-19	2013-12-18	90 days
2014	2014-10-06	2014-10-13	2014-10-18	2014-11-14	2014-11-08	2014-12-06	2014-12-06	2015-01-17	2015-01-17	2015-01-17	NA	NA	2014-10-06	2015-01-17	103 days
2015	2015-10-18	2015-10-24	2015-10-08	2015-11-14	2015-11-13	2015-12-13	2015-10-30	2015-12-14	2015-10-07	2015-10-30	2015-09-25	2015-10-16	2015-09-25	2015-12-14	80 days
2016	2016-10-07	2016-10-23	2016-10-28	2016-11-29	2016-11-15	2016-12-15	2016-10-28	2016-12-09	2016-09-29	2016-11-07	2016-09-16	2016-10-06	2016-09-16	2016-12-15	90 days
2017	2017-10-14	2017-10-29	2017-10-23	2017-12-02	2017-11-08	2017-12-09	2017-10-20	2017-12-15	2017-09-22	2017-10-22	2017-09-14	2017-09-24	2017-09-14	2017-12-15	92 days
2018	2018-10-14	2018-10-30	2018-10-26	2018-12-09	2018-11-02	2018-12-18	2018-10-05	2018-11-02	2018-09-24	2018-10-05	2018-09-14	2018-09-24	2018-09-14	2018-12-18	95 days
2019	2019-10-11	2019-10-26	2019-10-20	2019-12-07	2019-11-26	2019-12-22	2019-10-16	2019-11-26	2019-10-01	2019-10-16	2019-09-17	2019-10-01	2019-09-17	2019-12-22	96 days

Table 3. Start and end dates (corresponding to the first and last fishing set) for the Canadian Spring RV multispecies bottom trawl surveys in Divs. 3LNOP.

Year	Div 3L Start	Div 3L End	Div 3N Start	Div 3N End	Div 3O Start	Div 3O End	Subdiv 3Pn Start	Subdiv 3Pn End	Subdiv 3Ps Start	Subdiv 3Ps End	All Divs Start	All Divs End	Total Days
1996	1996-05-30	1996-06-27	1996-05-22	1996-05-30	1996-05-07	1996-05-22	NA	NA	1996-04-10	1996-05-01	1996-04-10	1996-06-27	78 days
1997	1997-06-04	1997-06-26	1997-05-18	1997-06-04	1997-04-30	1997-05-17	NA	NA	1997-04-02	1997-04-23	1997-04-02	1997-06-26	85 days
1998	1998-06-06	1998-06-30	1998-05-24	1998-06-04	1998-05-12	1998-05-30	NA	NA	1998-04-10	1998-05-05	1998-04-10	1998-06-30	81 days
1999	1999-06-06	1999-06-29	1999-05-19	1999-06-07	1999-05-11	1999-05-28	NA	NA	1999-04-13	1999-05-06	1999-04-13	1999-06-29	77 days
2000	2000-06-03	2000-06-29	2000-05-23	2000-06-09	2000-05-11	2000-06-05	NA	NA	2000-04-08	2000-05-11	2000-04-08	2000-06-29	82 days
2001	2001-05-26	2001-06-24	2001-05-14	2001-06-06	2001-04-29	2001-05-13	NA	NA	2001-04-07	2001-04-29	2001-04-07	2001-06-24	78 days
2002	2002-05-29	2002-06-22	2002-05-13	2002-05-29	2002-04-27	2002-05-14	NA	NA	2002-04-05	2002-04-27	2002-04-05	2002-06-22	78 days
2003	2003-06-04	2003-06-26	2003-05-18	2003-06-04	2003-05-08	2003-05-15	NA	NA	2003-04-05	2003-05-02	2003-04-05	2003-06-26	82 days
2004	2004-06-04	2004-06-26	2004-05-24	2004-06-08	2004-05-12	2004-05-24	2004-05-01	2004-05-11	2004-04-11	2004-05-11	2004-04-11	2004-06-26	76 days
2005	2005-06-11	2005-06-29	2005-05-22	2005-06-19	2005-05-09	2005-05-22	2005-05-06	2005-05-08	2005-04-17	2005-05-09	2005-04-17	2005-06-29	73 days
2006	2006-06-10	2006-06-29	2006-06-27	2006-06-29	2006-06-25	2006-06-30	2006-04-20	2006-04-21	2006-04-13	2006-04-18	2006-04-13	2006-06-30	78 days
2007	2007-06-05	2007-07-12	2007-06-16	2007-06-29	2007-05-03	2007-06-19	2007-04-13	2007-04-15	2007-04-04	2007-05-02	2007-04-04	2007-07-12	99 days
2008	2008-06-04	2008-06-30	2008-06-01	2008-06-22	2008-05-23	2008-06-01	NA	NA	2008-04-10	2008-05-23	2008-04-10	2008-06-30	81 days
2009	2009-05-21	2009-06-23	2009-05-26	2009-06-11	2009-05-13	2009-05-26	2009-04-16	2009-04-18	2009-04-08	2009-05-13	2009-04-08	2009-06-23	76 days
2010	2010-06-07	2010-06-25	2010-05-24	2010-06-06	2010-05-08	2010-05-24	2010-04-18	2010-04-26	2010-04-08	2010-05-08	2010-04-08	2010-06-25	78 days
2011	2011-05-29	2011-06-22	2011-05-21	2011-05-30	2011-05-08	2011-05-20	2011-04-14	2011-04-16	2011-04-07	2011-05-08	2011-04-07	2011-06-22	76 days
2012	2012-05-31	2012-06-19	2012-05-21	2012-06-03	2012-04-27	2012-05-21	2012-04-09	2012-04-12	2012-03-31	2012-04-26	2012-03-31	2012-06-19	80 days
2013	2013-05-24	2013-06-20	2013-05-11	2013-05-24	2013-04-23	2013-05-10	2013-04-08	2013-04-10	2013-03-26	2013-04-23	2013-03-26	2013-06-20	86 days
2014	2014-06-07	2014-06-22	2014-06-05	2014-06-17	2014-05-29	2014-06-05	NA	NA	2014-04-05	2014-05-10	2014-04-05	2014-06-22	78 days
2015	2015-06-03	2015-06-17	2015-05-21	2015-06-03	2015-05-10	2015-05-21	NA	NA	2015-04-11	2015-05-10	2015-04-11	2015-06-17	67 days
2016	2016-05-09	2016-06-15	2016-05-05	2016-05-31	2016-04-29	2016-05-09	NA	NA	2016-04-02	2016-05-01	2016-04-02	2016-06-15	74 days
2017	2017-05-21	2017-06-17	2017-05-26	2017-06-14	2017-05-12	2017-05-28	NA	NA	2017-04-06	2017-05-08	2017-04-06	2017-06-17	72 days
2018	2018-06-03	2018-06-21	2018-06-02	2018-06-12	2018-05-24	2018-06-07	NA	NA	2018-04-28	2018-05-27	2018-04-28	2018-06-21	54 days
2019	2019-05-28	2019-06-16	2019-05-16	2019-05-28	2019-05-04	2019-05-16	NA	NA	2019-03-30	2019-05-04	2019-03-30	2019-06-16	78 days

Table 4. Number of successful fishing sets per division and vessel (AN=*Alfred Needler*, Tel=*Teleost*) as well as the depth ranges fished by each vessel in the most recent five years of the Canadian Autumn RV multispecies bottom trawl surveys.

Year	Div	AN sets	AN depth (m)	Tel sets	Tel depth (m)	Total sets
2014	2H	0	NA	66	101–677	66
2014	2J	0	NA	110	118–1402	110
2014	3K	0	NA	154	132–1469	154
2014	3L	0	NA	170	62–1388	170
2014	3N	0	NA	3	313–692	3
2015	2H	0	NA	53	90–489	53
2015	2J	0	NA	114	116–1418	114
2015	3K	0	NA	151	134–1408	151
2015	3L	123	61–703	19	165–335	142
2015	3N	69	39–721	0	NA	69
2015	3O	75	64–694	0	NA	75
2016	2H	0	NA	77	93–1354	77
2016	2J	0	NA	115	108–1451	115
2016	3K	28	206–482	115	150–1385	143
2016	3L	138	60–673	0	NA	138
2016	3N	70	36–668	0	NA	70
2016	3O	74	60–678	0	NA	74
2017	2H	0	NA	68	98–640	68
2017	2J	0	NA	114	122–1399	114
2017	3K	88	162–672	65	133–1384	153
2017	3L	141	62–712	2	902–1379	143
2017	3N	70	42–652	0	NA	70
2017	3O	73	59–698	0	NA	73
2018	2H	0	NA	83	98–1399	83
2018	2J	0	NA	106	129–1357	106
2018	3K	46	139–474	65	207–658	111
2018	3L	141	64–668	0	NA	141
2018	3N	70	40–634	0	NA	70
2018	3O	75	64–665	0	NA	75
2019	2H	0	NA	58	107–1166	58
2019	2J	0	NA	76	107–648	76
2019	3K	40	153–634	38	138–746	78
2019	3L	129	64–620	0	NA	129
2019	3N	70	42–684	0	NA	70
2019	3O	75	62–650	0	NA	75

Table 5. Number of successful fishing sets per division and vessel (AN=*Alfred Needler*, Tel=*Teleost*) as well as the depth ranges fished by each vessel in the most recent five years of the Canadian Spring RV multispecies bottom trawl surveys.

Year	Div	AN sets	AN depth (m)	Tel sets	Tel depth (m)	Total sets
2014	3L	72	65–702	63	64–321	135
2014	3N	0	NA	60	47–662	60
2014	3O	0	NA	59	61–662	59
2014	3Ps	76	40–348	80	39–637	156
2015	3L	56	65–685	0	NA	56
2015	3N	72	39–674	0	NA	72
2015	3O	74	63–628	0	NA	74
2015	3Ps	175	38–667	0	NA	175
2016	3L	0	NA	140	61–694	140
2016	3N	0	NA	78	44–624	78
2016	3O	0	NA	75	64–592	75
2016	3Ps	0	NA	157	37–671	157
2017	3L	32	60–158	0	NA	32
2017	3N	68	44–658	0	NA	68
2017	3O	71	63–702	0	NA	71
2017	3Ps	179	40–623	0	NA	179
2018	3L	65	61–340	46	96–665	111
2018	3N	43	41–80	36	42–725	79
2018	3O	31	70–151	48	64–621	79
2018	3Ps	170	39–663	0	NA	170
2019	3L	133	62–694	0	NA	133
2019	3N	70	39–685	0	NA	70
2019	3O	77	64–620	0	NA	77
2019	3Ps	171	39–611	0	NA	171

Table 6. Number of successful fishing sets per stratum in Div. 2H over the last 15 years of the Canadian Autumn RV multispecies bottom trawl surveys.

stratum	depth range (m)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
930	<=200	0	4	0	3	0	3	4	5	5	3	5	4	5	5	5
954	<=200	0	4	0	3	0	3	4	5	5	5	5	4	5	5	5
956	<=200	0	4	0	3	0	3	5	6	6	6	6	6	6	6	6
957	<=200	0	6	0	5	0	5	6	7	6	7	4	7	7	7	7
931	201−300	0	2	0	2	0	2	2	2	2	2	2	2	2	2	0
943	201−300	0	2	0	2	0	2	2	2	2	2	2	2	2	2	0
950	201−300	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0
953	201−300	0	2	0	2	0	2	2	2	2	2	2	3	2	2	2
955	201−300	0	2	0	1	0	2	2	2	2	2	2	2	2	2	1
958	201−300	0	2	0	2	0	2	2	2	2	2	2	2	2	2	2
932	301−400	0	2	0	2	0	2	2	2	2	2	2	2	2	2	0
944	301−400	0	4	0	3	0	3	4	5	6	5	5	4	5	5	5
949	301−400	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
952	301−400	0	2	0	1	0	2	2	2	2	2	2	2	2	2	2
959	301−400	0	2	0	2	0	2	2	2	2	2	2	2	2	2	2
933	401−500	0	2	0	2	0	2	3	2	2	2	2	2	2	2	0
942	401−500	0	2	0	2	0	2	2	2	1	2	2	1	2	2	1
945	401−500	0	2	0	2	0	2	2	2	2	2	2	2	2	2	2
948	401−500	0	2	0	2	0	0	1	2	2	2	2	0	2	2	2
951	401−500	0	2	0	2	0	2	2	2	2	2	2	2	2	2	2
960	401−500	0	2	0	2	0	2	2	2	2	2	2	2	2	2	2
934	501−750	0	2	0	2	0	2	2	2	2	2	0	1	2	2	0
941	501−750	0	2	0	1	0	2	2	2	2	2	0	2	2	2	0
946	501−750	0	3	0	0	0	2	3	4	4	4	0	4	4	4	4
947	501−750	0	2	0	2	0	2	2	2	2	2	0	2	2	2	2
961	501−750	0	2	0	2	0	2	2	2	2	2	0	2	2	2	2
935	751−1000	0	2	0	2	0	2	2	2	2	0	0	2	0	2	0
940	751−1000	0	2	0	2	0	2	2	2	2	0	0	2	0	2	0
962	751−1000	0	2	0	2	0	2	2	2	2	0	0	2	0	2	2
936	1001−1250	0	2	0	2	0	2	1	2	2	0	0	2	0	1	0
939	1001−1250	0	1	0	2	0	2	2	2	2	0	0	1	0	2	0
963	1001−1250	0	2	0	2	0	2	2	2	2	0	0	2	0	2	2
937	1251−1500	0	2	0	2	0	0	1	0	0	0	0	0	0	0	0
938	1251−1500	0	2	0	2	0	2	2	2	2	0	0	2	0	2	0
964	1251−1500	0	2	0	2	0	2	2	2	2	0	0	2	0	2	0
all strata		0	81	0	69	0	70	79	84	83	66	53	77	68	83	58

Table 7. Number of successful fishing sets per stratum in Div. 2J over the last 15 years of the Canadian Autumn RV multispecies bottom trawl surveys.

stratum	depth range (m)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
201	<=200	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
205	<=200	6	6	6	5	5	6	4	6	6	6	6	6	6	6	4
206	<=200	7	7	7	6	6	7	5	7	7	7	8	7	7	7	4
207	<=200	9	9	9	8	8	7	5	8	9	5	6	9	8	5	5
237	<=200	3	3	3	2	2	3	0	3	3	2	2	2	2	3	2
238	<=200	3	3	2	3	3	2	3	2	2	2	2	2	2	2	2
202	201−300	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
209	201−300	3	3	3	2	2	3	2	3	3	3	3	3	3	2	2
210	201−300	4	4	4	3	3	4	3	4	4	4	4	4	4	3	2
213	201−300	6	6	6	5	5	6	5	6	6	5	7	6	6	5	4
214	201−300	5	5	4	5	5	5	4	5	5	5	5	5	5	5	3
215	201−300	5	5	5	4	4	4	4	5	5	5	4	5	5	5	3
228	201−300	8	8	8	7	7	8	6	8	8	8	8	8	8	6	5
234	201−300	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
203	301−400	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
208	301−400	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
211	301−400	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
216	301−400	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
222	301−400	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
229	301−400	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
204	401−500	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
217	401−500	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
223	401−500	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
227	401−500	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
235	401−500	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
240	401−500	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
212	501−750	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2
218	501−750	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
224	501−750	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
230	501−750	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
239	501−750	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
219	751−1000	2	2	2	0	2	2	2	2	2	2	2	2	2	2	0
231	751−1000	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
236	751−1000	2	2	2	1	2	2	2	2	2	2	2	2	2	2	0
220	1001−1250	2	2	2	0	2	2	2	2	2	2	2	2	2	3	0
225	1001−1250	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
232	1001−1250	2	2	2	2	2	2	2	2	2	2	2	2	2	1	0
221	1251−1500	2	2	2	0	2	2	2	2	2	2	2	2	2	2	0
226	1251−1500	2	2	2	0	2	2	2	2	2	2	2	2	2	2	0
233	1251−1500	2	2	2	2	2	2	2	2	2	2	2	2	2	1	0
all strata		117	117	115	99	108	113	99	115	116	110	114	115	114	106	76

Table 8. Number of successful fishing sets per stratum in Div. 3K over the last 15 years of the Canadian Autumn RV multispecies bottom trawl surveys. NA denotes strata that have been removed from the survey design (note however that some small amount of opportunistic fishing of these strata may still have occurred when poor weather forced survey vessels to the inshore).

stratum	depth range (m)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
608	<=200	2	3	0	1	0	4	NA	NA	NA	NA	NA	NA	NA	NA	NA
612	<=200	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
616	<=200	1	2	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
618	<=200	6	5	6	5	5	5	3	2	6	5	6	5	6	5	5
619	<=200	8	8	4	7	7	8	2	3	8	7	6	8	8	6	5
609	201−300	2	2	0	1	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
611	201−300	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
615	201−300	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
620	201−300	11	11	7	3	10	11	8	10	10	11	11	11	11	7	5
621	201−300	10	11	7	9	8	11	6	8	11	11	10	11	10	9	8
624	201−300	5	5	5	3	4	5	4	5	5	5	5	5	5	4	2
634	201−300	7	6	7	2	6	7	5	7	4	7	7	6	7	5	2
635	201−300	3	1	2	5	5	5	5	5	4	5	3	4	5	5	2
636	201−300	5	3	3	4	6	6	6	6	4	6	7	5	6	4	2
637	201−300	5	4	3	4	4	5	5	5	4	5	5	5	5	4	4
610	301−400	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
614	301−400	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
617	301−400	3	3	2	2	2	3	2	3	3	3	3	3	2	3	2
623	301−400	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2
625	301−400	4	4	4	2	4	4	3	3	3	4	4	4	5	2	2
626	301−400	5	5	2	4	4	5	4	5	5	5	4	5	5	4	4
628	301−400	5	3	3	4	4	5	4	6	5	5	5	5	5	5	4
629	301−400	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
630	301−400	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
633	301−400	9	8	9	5	8	9	7	8	5	9	9	6	7	6	2
638	301−400	9	5	9	7	8	9	9	8	6	9	9	9	9	7	7
639	301−400	5	3	6	3	6	6	6	6	6	6	6	5	6	3	3
613	401−500	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
622	401−500	3	3	3	2	3	3	2	3	3	3	3	3	3	3	2
627	401−500	5	4	4	5	5	5	4	5	5	5	5	5	5	5	2
631	401−500	5	6	6	2	5	6	4	6	3	6	6	5	6	5	2
640	401−500	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
645	401−500	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
650	401−500	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2
641	501−750	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
646	501−750	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
651	501−750	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
642	751−1000	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0
647	751−1000	2	2	2	1	2	2	2	2	2	2	2	2	2	0	0
652	751−1000	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0
643	1001−1250	3	3	3	0	3	3	2	3	3	3	3	2	3	0	0
648	1001−1250	2	2	2	1	2	2	2	2	2	2	2	2	2	0	0
653	1001−1250	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0
644	1251−1500	2	2	2	0	2	2	2	2	2	2	2	2	2	0	0
649	1251−1500	2	2	2	1	2	2	2	2	2	2	2	2	2	0	0
654	1251−1500	2	2	2	1	2	2	2	2	2	2	2	0	2	0	0
all strata		167	154	129	108	143	173	125	141	137	154	151	143	153	111	78

Table 9. Number of successful fishing sets per stratum in Div. 3L over the last 15 years of the Canadian Autumn RV multispecies bottom trawl surveys. NA denotes strata that have been removed from the survey design (note however that some small amount of opportunistic fishing of these strata may still have occurred when poor weather forced survey vessels to the inshore).

stratum	depth range (m)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
784	<=55	2	0	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
350	56-91	7	7	6	6	6	7	7	7	7	7	7	7	7	7	7
363	56-91	6	6	6	5	5	6	5	6	6	6	6	6	6	6	6
371	56-91	4	4	4	3	3	4	3	4	4	4	4	4	4	4	4
372	56-91	8	8	8	8	7	8	6	8	8	7	8	8	8	8	8
384	56-91	4	4	4	3	3	4	3	4	4	4	4	4	4	4	4
785	56-91	2	0	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
328	92-183	5	5	5	3	4	5	5	5	5	5	5	4	5	5	5
341	92-183	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5
342	92-183	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
343	92-183	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
348	92-183	7	7	7	6	6	7	5	7	7	7	7	7	6	7	6
349	92-183	7	7	7	6	6	7	7	7	7	7	7	6	7	7	7
364	92-183	9	9	9	8	8	9	7	9	9	9	9	8	9	9	8
365	92-183	3	3	3	3	3	3	2	3	3	3	4	3	3	3	2
370	92-183	4	4	4	4	4	4	3	4	4	4	4	4	4	4	3
385	92-183	8	8	8	7	7	8	6	8	8	8	8	8	8	8	6
390	92-183	5	5	5	4	4	5	4	5	5	5	5	5	5	5	5
786	92-183	2	0	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
787	92-183	2	2	0	0	0	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
788	92-183	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
790	92-183	2	0	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
793	92-183	2	0	0	0	1	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
794	92-183	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
797	92-183	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
799	92-183	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
344	184-274	5	5	4	3	4	5	2	5	5	4	4	5	5	5	4
347	184-274	3	3	2	3	3	3	2	3	3	3	3	3	3	3	3
366	184-274	5	5	5	4	4	5	4	5	5	5	5	5	5	5	4
369	184-274	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2
386	184-274	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2
389	184-274	3	3	3	2	2	3	2	3	3	3	3	3	3	3	2
391	184-274	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
791	184-274	2	0	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
795	184-274	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
345	275-366	5	5	5	4	4	4	3	5	5	5	5	4	5	5	4
346	275-366	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
368	275-366	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
387	275-366	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
388	275-366	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
392	275-366	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
789	275-366	2	2	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
796	275-366	2	2	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
798	275-366	2	0	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
800	275-366	2	1	0	0	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
729	367-549	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
731	367-549	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2
733	367-549	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
735	367-549	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
792	367-549	2	0	0	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
730	550-731	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
732	550-731	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
734	550-731	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2
736	550-731	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
737	732-914	2	2	2	0	2	2	0	0	0	2	0	0	0	0	0
741	732-914	0	2	2	0	2	2	0	0	0	2	0	0	1	0	0
745	732-914	0	2	2	0	2	2	0	0	0	2	0	0	0	0	0
748	732-914	0	2	2	0	2	2	0	0	0	2	0	0	0	0	0
738	915-1097	1	2	2	0	2	2	0	0	0	2	0	0	0	0	0
742	915-1097	0	2	2	0	2	2	0	0	0	2	0	0	0	0	0
746	915-1097	0	2	2	0	2	2	0	0	0	2	0	0	0	0	0
749	915-1097	0	1	2	0	2	2	0	0	0	2	0	0	0	0	0
739	1098-1280	2	2	2	0	2	2	0	0	0	2	0	0	0	0	0
743	1098-1280	0	2	2	0	2	2	0	0	0	2	0	0	0	0	0
747	1098-1280	0	2	2	0	2	2	0	0	0	2	0	0	0	0	0
750	1098-1280	0	1	2	0	2	2	0	0	0	2	0	0	0	0	0
740	1281-1463	2	2	2	0	2	2	0	0	0	2	0	0	0	0	0
744	1281-1463	0	2	2	0	2	2	0	0	0	2	0	0	1	0	0
751	1281-1463	0	0	2	0	2	2	0	0	0	2	0	0	0	0	0
all strata		184	185	168	126	160	196	116	142	142	170	142	138	143	141	129

Table 10. Number of successful fishing sets per stratum in Div. 3N over the last 15 years of the Canadian Autumn RV multispecies bottom trawl surveys. NA denotes strata removed from survey design.

stratum	depth range (m)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
375	<=55	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4
376	<=55	4	4	4	3	3	4	4	4	4	0	4	4	4	4	4
360	56-91	8	8	8	7	7	8	8	8	8	0	8	8	8	8	8
361	56-91	5	5	5	4	4	5	5	5	5	0	4	5	5	5	5
362	56-91	7	7	7	6	6	7	7	7	7	0	7	7	7	7	7
373	56-91	7	7	6	6	6	7	7	7	7	0	7	7	7	7	7
374	56-91	2	3	3	2	2	3	3	3	3	0	3	3	3	3	3
383	56-91	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
359	92-183	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
377	92-183	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
382	92-183	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
358	184-274	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
378	184-274	2	2	2	2	2	1	2	2	2	0	2	2	2	2	2
381	184-274	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
357	275-366	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
379	275-366	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
380	275-366	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2
723	367-549	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
725	367-549	2	2	2	2	2	1	2	2	2	0	2	2	2	2	2
727	367-549	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2
724	550-731	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
726	550-731	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
728	550-731	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2
752	732-914	0	0	2	0	0	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
756	732-914	2	0	2	0	1	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
760	732-914	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
753	915-1097	1	0	2	0	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
757	915-1097	2	0	2	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
761	915-1097	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
754	1098-1280	0	0	2	0	0	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
758	1098-1280	2	0	3	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
762	1098-1280	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
759	1281-1463	2	0	2	0	1	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
763	1281-1463	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
755	1281-1463	0	0	2	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
all strata		86	70	94	64	75	72	70	70	70	3	69	70	70	70	70

Table 11. Number of successful fishing sets per stratum in Div. 3O over the last 15 years of the Canadian Autumn RV multispecies bottom trawl surveys. NA denotes strata removed from survey design.

stratum	depth range (m)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
330	56-91	6	6	6	5	7	6	6	6	6	0	6	6	6	6	6
331	56-91	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
338	56-91	5	4	5	5	6	5	5	5	5	0	5	5	5	5	5
340	56-91	5	5	5	3	5	6	5	5	5	0	5	5	5	5	5
351	56-91	7	7	7	6	7	6	7	7	7	0	7	7	7	7	7
352	56-91	7	8	7	6	7	7	7	7	7	0	7	7	7	7	7
353	56-91	4	4	4	3	4	4	4	4	4	0	4	4	4	4	4
329	92-183	5	5	5	3	5	5	5	5	5	0	5	5	5	5	5
332	92-183	3	3	3	3	3	3	3	3	3	0	3	3	3	3	3
337	92-183	3	3	3	2	3	3	3	3	3	0	3	3	3	3	3
339	92-183	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
354	92-183	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
333	184-274	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
336	184-274	2	2	2	2	1	2	2	2	2	0	2	1	2	2	2
355	184-274	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
334	275-366	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
335	275-366	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
356	275-366	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
717	367-549	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
719	367-549	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
721	367-549	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
718	550-731	2	1	2	2	2	2	2	2	2	0	2	2	2	2	2
720	550-731	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2
722	550-731	2	2	2	2	2	2	2	2	2	0	2	2	0	2	2
764	732-914	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
768	732-914	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
772	732-914	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
765	915-1097	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
769	915-1097	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
773	915-1097	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
766	1098-1280	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
770	1098-1280	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
774	1098-1280	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
767	1281-1463	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
771	1281-1463	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
775	1281-1463	2	0	2	0	2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
all strata		99	74	99	66	100	75	75	75	75	0	75	74	73	75	75

Table 12. Number of successful fishing sets per stratum in Div. 3L over the last 15 years of the Canadian Spring RV multispecies bottom trawl surveys. NA denotes strata that have been removed from the survey design (note however that some small amount of opportunistic fishing of these strata may still have occurred when poor weather forced survey vessels to the inshore).

stratum	depth range (m)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
350	56–91	6	7	7	6	7	7	7	7	7	6	0	7	7	7	7
363	56–91	5	6	6	5	6	6	6	6	6	6	0	6	6	5	6
371	56–91	5	4	4	4	3	4	4	4	3	4	0	4	4	3	4
372	56–91	6	7	8	7	9	8	8	8	7	8	0	8	8	6	8
384	56–91	4	4	4	3	4	4	4	4	3	4	3	4	4	3	4
328	92–183	4	5	5	1	5	5	5	6	6	4	0	5	0	5	4
341	92–183	4	5	5	3	5	5	5	5	5	4	0	5	3	5	5
342	92–183	2	2	2	3	2	2	2	2	2	2	2	2	0	2	2
343	92–183	2	2	3	2	2	1	2	2	2	2	2	2	0	2	2
348	92–183	7	7	6	6	7	5	7	5	6	7	4	7	0	4	7
349	92–183	6	7	7	6	7	6	7	7	5	7	0	7	0	6	7
364	92–183	8	9	9	8	9	9	7	9	9	9	3	9	0	6	9
365	92–183	3	3	2	3	3	3	3	2	3	3	2	3	0	2	3
370	92–183	4	4	4	4	4	4	4	4	5	4	4	4	0	3	4
385	92–183	6	8	8	6	8	7	8	8	7	8	6	9	0	7	7
390	92–183	5	5	5	3	5	5	5	5	4	5	4	4	0	4	4
786	92–183	0	0	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
787	92–183	0	0	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
344	184–274	5	5	4	4	5	2	5	5	3	3	2	4	0	5	3
347	184–274	3	3	2	3	3	3	3	2	3	3	2	3	0	1	2
366	184–274	5	5	4	4	5	4	5	0	5	5	2	5	0	0	3
369	184–274	3	3	3	3	3	3	3	3	3	3	2	3	0	2	3
386	184–274	3	3	3	3	3	3	3	3	3	3	0	3	0	2	3
389	184–274	3	3	3	3	3	3	3	3	3	3	0	3	0	2	3
391	184–274	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2
345	275–366	5	5	4	4	5	3	5	3	5	4	2	4	0	3	4
346	275–366	3	3	3	3	3	3	3	3	3	2	2	3	0	0	3
368	275–366	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2
387	275–366	2	2	2	2	2	2	2	2	2	2	0	2	0	2	2
388	275–366	2	2	2	2	2	2	2	2	2	2	0	2	0	2	2
392	275–366	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2
729	367–549	2	2	2	2	2	1	2	2	2	2	2	2	0	2	2
731	367–549	2	2	2	2	2	2	2	2	2	2	0	2	0	2	2
733	367–549	2	2	2	2	2	2	2	2	2	2	0	2	0	2	2
735	367–549	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2
730	550–731	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2
732	550–731	2	2	2	2	2	2	1	2	2	2	0	2	0	2	2
734	550–731	2	2	2	1	2	2	3	2	2	2	0	2	0	2	2
736	550–731	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2
all strata		133	141	137	122	142	130	140	132	134	135	56	140	32	111	133

Table 13. Number of successful fishing sets per stratum in Div. 3N over the last 15 years of the Canadian Spring RV multispecies bottom trawl surveys.

stratum	depth range (m)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
375	<=55	5	3	5	4	5	5	5	5	5	3	5	5	4	5	5
376	<=55	5	3	5	4	5	5	5	5	5	3	4	5	3	5	4
360	56-91	9	6	10	8	10	10	10	10	10	6	9	10	8	10	8
361	56-91	7	4	6	5	6	6	6	6	6	4	5	6	5	6	5
362	56-91	8	4	9	9	9	8	9	9	9	5	7	9	8	9	6
373	56-91	9	0	9	8	8	9	9	9	9	5	7	8	8	9	7
374	56-91	3	2	3	2	3	3	3	3	3	2	3	3	2	3	3
383	56-91	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
359	92-183	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
377	92-183	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
382	92-183	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
358	184-274	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
378	184-274	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
381	184-274	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
357	275-366	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
379	275-366	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
380	275-366	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
723	367-549	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
725	367-549	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
727	367-549	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
724	550-731	2	0	2	1	2	2	2	1	2	2	2	2	0	2	2
726	550-731	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
728	550-731	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
all strata		78	22	79	71	78	78	79	78	79	60	72	78	68	79	70

Table 14. Number of successful fishing sets per stratum in Div. 3O over the last 15 years of the Canadian Spring RV multispecies bottom trawl surveys.

stratum	depth range (m)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
330	56-91	7	9	7	7	7	7	7	7	7	4	6	7	7	7	7
331	56-91	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
338	56-91	6	7	6	6	6	6	6	6	6	3	5	6	5	6	6
340	56-91	5	2	5	6	5	5	5	5	5	3	5	5	4	5	5
351	56-91	8	4	8	8	8	8	8	8	8	5	7	7	6	8	8
352	56-91	8	5	8	8	8	8	8	8	8	5	7	9	6	8	7
353	56-91	4	3	4	4	4	4	4	4	4	2	3	4	3	4	4
329	92-183	5	0	5	5	5	5	5	5	5	3	5	5	5	5	5
332	92-183	3	0	3	3	3	3	3	3	3	2	3	3	3	3	3
337	92-183	3	0	3	3	3	3	3	3	3	2	3	2	2	3	3
339	92-183	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
354	92-183	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
333	184-274	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
336	184-274	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
355	184-274	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
334	275-366	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
335	275-366	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
356	275-366	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
717	367-549	2	0	2	2	2	2	2	2	2	2	2	1	2	2	2
719	367-549	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
721	367-549	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
718	550-731	2	0	2	2	2	2	2	2	2	2	2	0	2	2	1
720	550-731	2	0	2	2	2	2	1	2	2	2	2	2	2	2	2
722	550-731	2	0	2	2	2	3	2	2	2	2	2	2	2	2	2
all strata		79	32	79	80	79	80	78	79	79	59	74	75	71	79	77

Table 15. Number of successful fishing sets per stratum in Div. 3Ps over the last 15 years of the Canadian Spring RV multispecies bottom trawl surveys.

stratum	depth range (m)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
314	<=55	8	4	8	6	8	7	8	8	8	7	8	6	8	8	6
320	<=55	11	0	11	9	10	11	11	10	11	8	11	9	11	11	10
293	56-91	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
308	56-91	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
312	56-91	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
315	56-91	7	0	7	5	7	7	7	7	7	6	7	6	7	7	7
321	56-91	10	1	10	10	9	10	10	10	10	8	10	8	10	10	10
325	56-91	8	0	8	8	8	8	8	8	8	7	8	7	8	8	8
326	56-91	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
783	56-91	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2
294	92-183	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
297	92-183	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
307	92-183	3	0	3	3	3	3	3	3	3	2	3	3	3	3	3
311	92-183	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3
317	92-183	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
319	92-183	8	0	8	8	8	8	8	8	8	7	8	7	8	8	8
322	92-183	13	5	13	12	13	13	12	13	14	12	13	11	13	13	11
323	92-183	6	0	6	6	6	6	5	6	6	5	5	5	6	6	6
324	92-183	4	1	4	4	4	4	4	4	4	4	4	3	4	4	3
781	92-183	4	4	4	5	4	4	4	4	4	4	4	4	4	4	4
782	92-183	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2
295	184-274	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2
298	184-274	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
300	184-274	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
306	184-274	3	0	3	3	3	3	3	3	3	2	3	3	3	3	3
309	184-274	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
310	184-274	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2
313	184-274	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2
316	184-274	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
318	184-274	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
779	184-274	4	2	4	4	4	4	4	4	4	4	4	3	4	4	4
780	184-274	3	0	3	3	3	3	3	3	3	3	3	3	3	2	3
296	275-366	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
299	275-366	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
705	275-366	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2
706	275-366	4	0	4	3	4	4	4	4	4	3	4	3	4	4	4
707	275-366	2	0	2	2	2	2	2	2	2	2	2	2	2	1	2
715	275-366	2	0	2	2	2	2	2	2	2	2	2	2	2	1	2
716	275-366	4	3	4	4	4	4	4	4	4	4	4	3	4	2	3
708	367-549	2	0	2	2	2	2	2	2	2	1	2	1	2	1	2
711	367-549	5	0	5	5	5	5	5	5	5	4	5	4	5	5	5
712	367-549	6	0	6	5	6	6	6	6	6	5	6	5	6	6	6
713	367-549	7	0	7	6	7	7	7	7	7	6	7	6	7	5	7
714	367-549	9	0	9	9	8	9	9	9	9	7	7	8	9	9	9
709	550-731	2	0	2	2	2	2	2	2	2	1	2	2	2	2	2
all strata		178	48	178	169	175	177	174	177	179	156	175	157	179	170	171

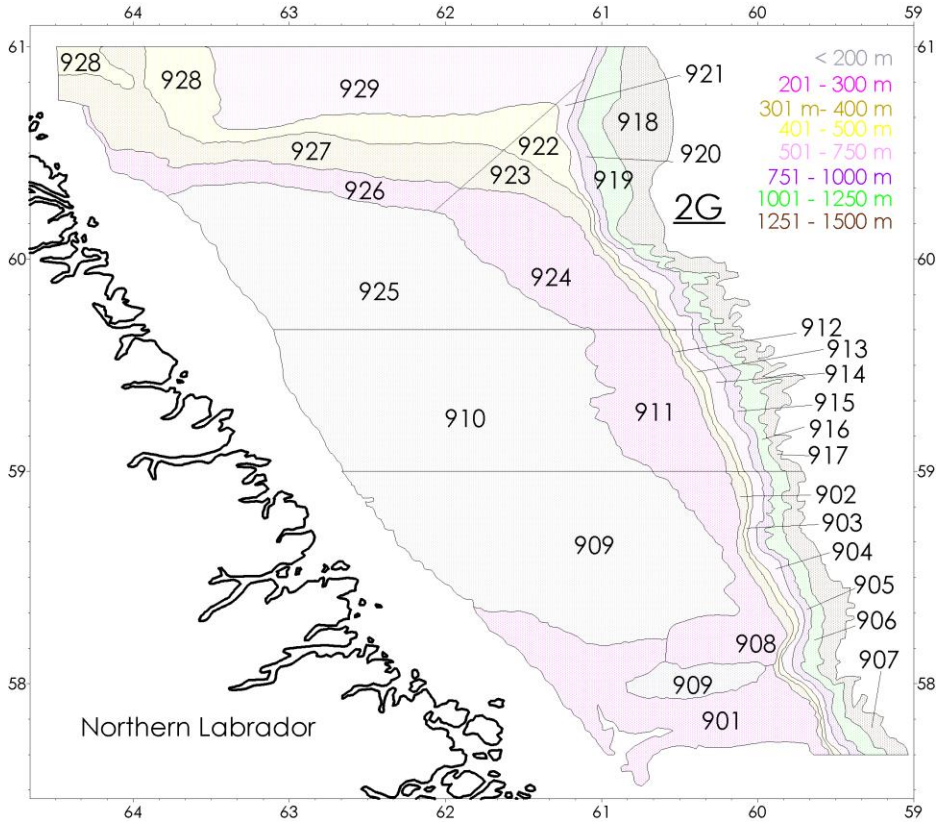

Fig 1. Stratification of Div. 2G

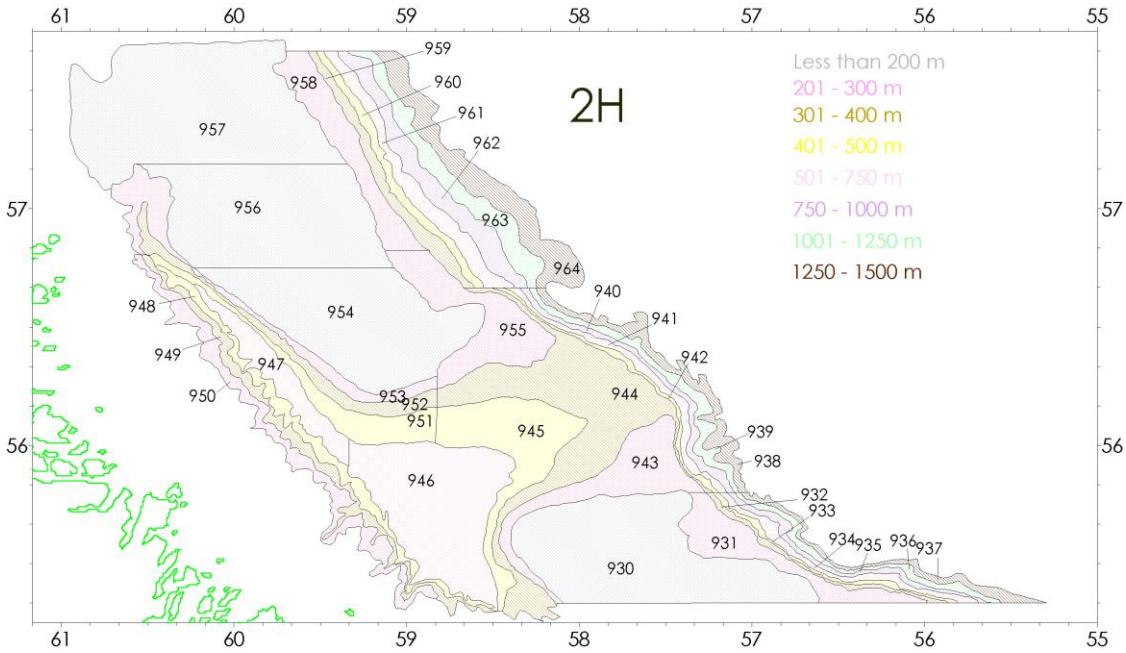

Fig 2. Stratification of Div. 2H

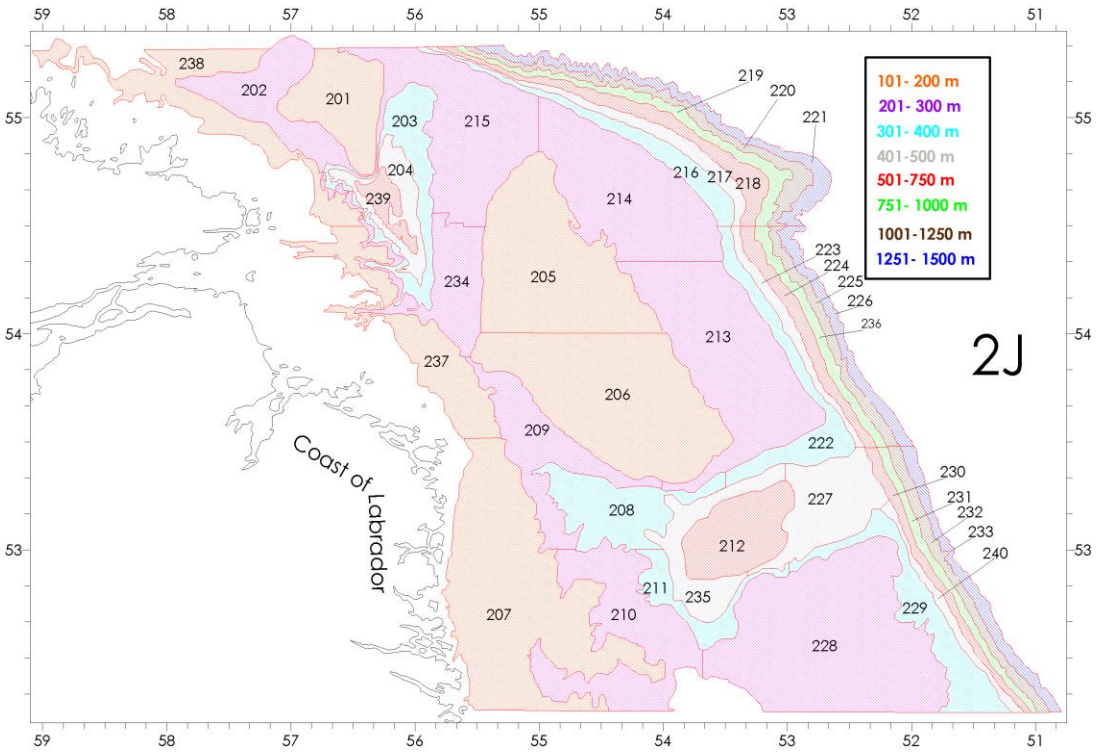

Fig 3. Stratification of Div. 2J

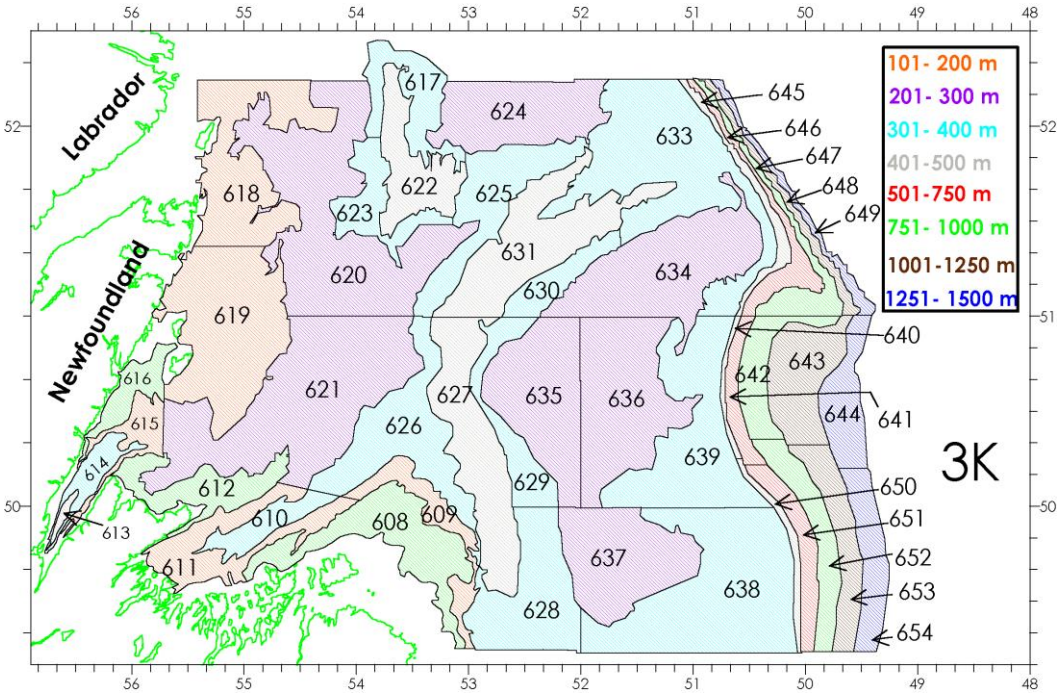

Fig 4. Stratification of Div. 3K

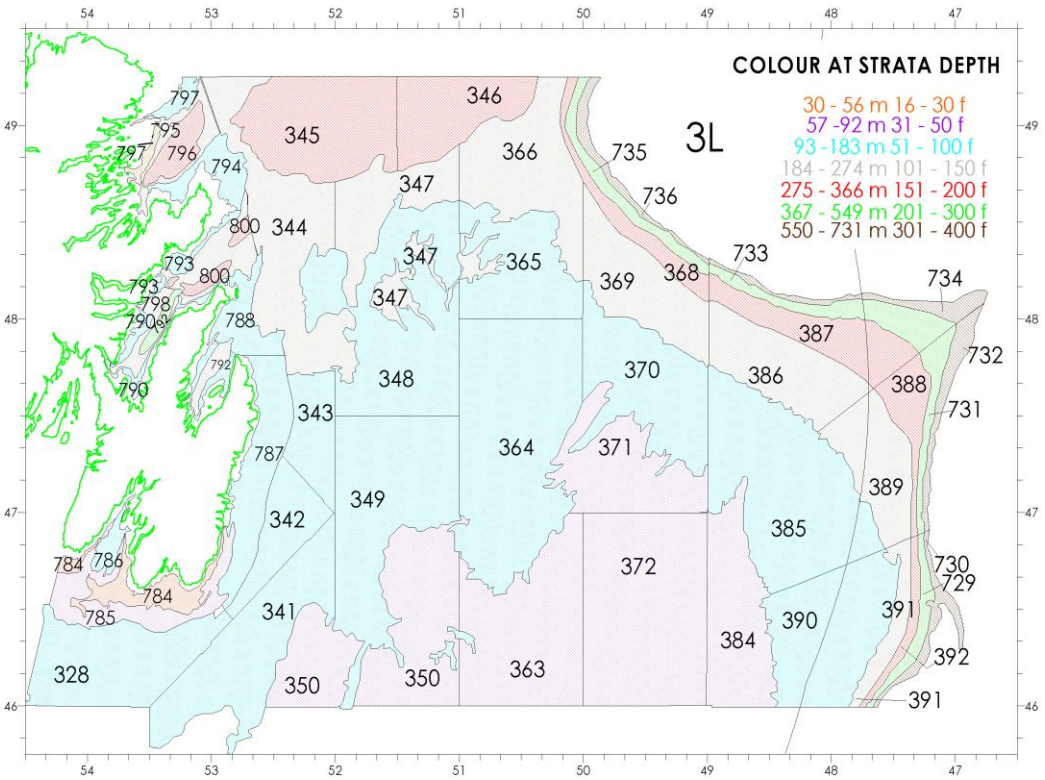

Fig 5. Stratification of Div. 3L

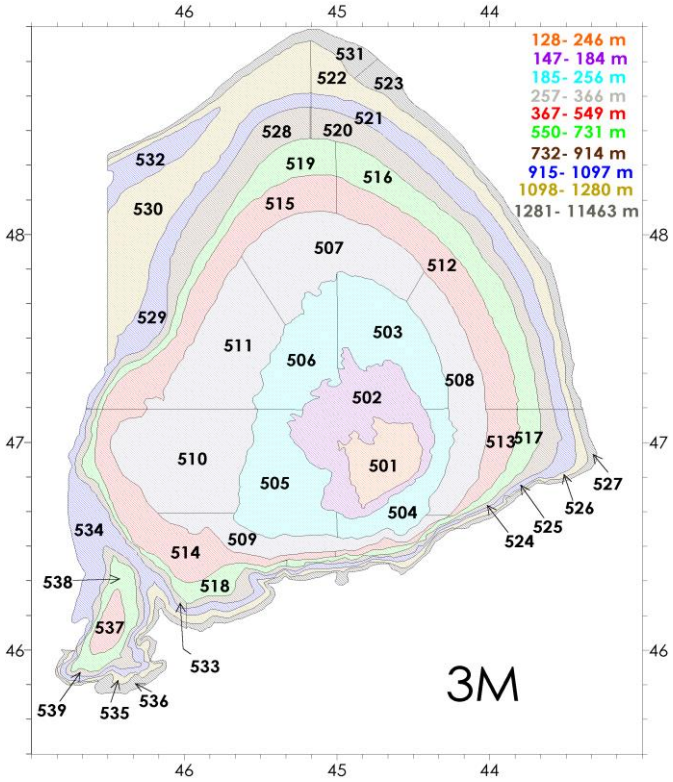

Fig 6. Stratification of Div. 3M

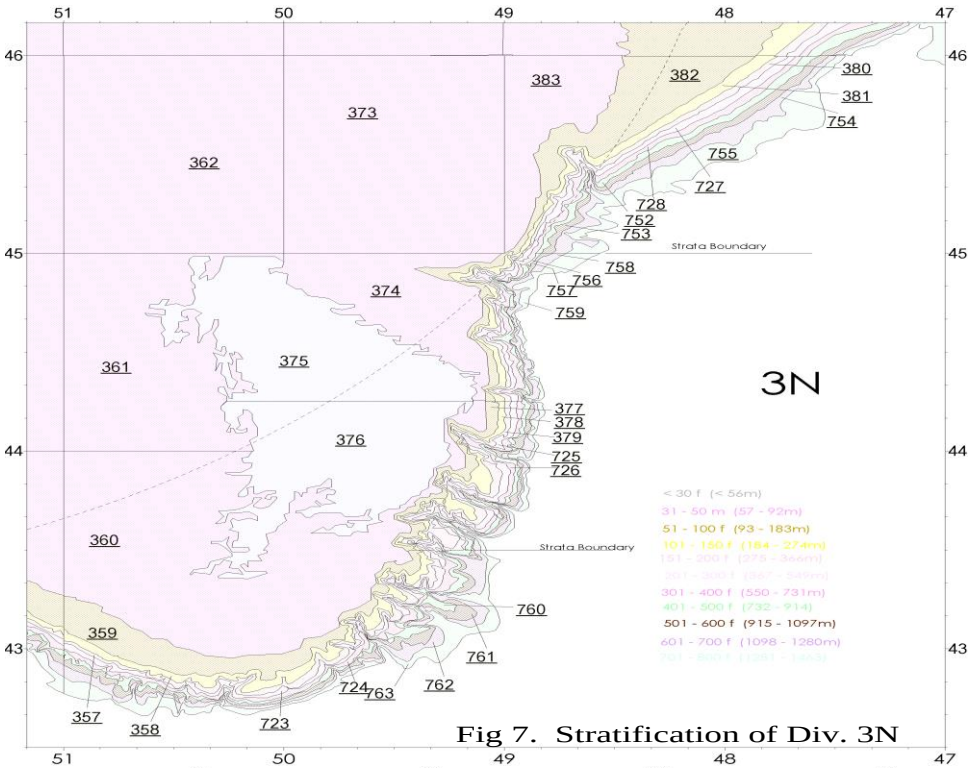

Fig 7. Stratification of Div. 3N

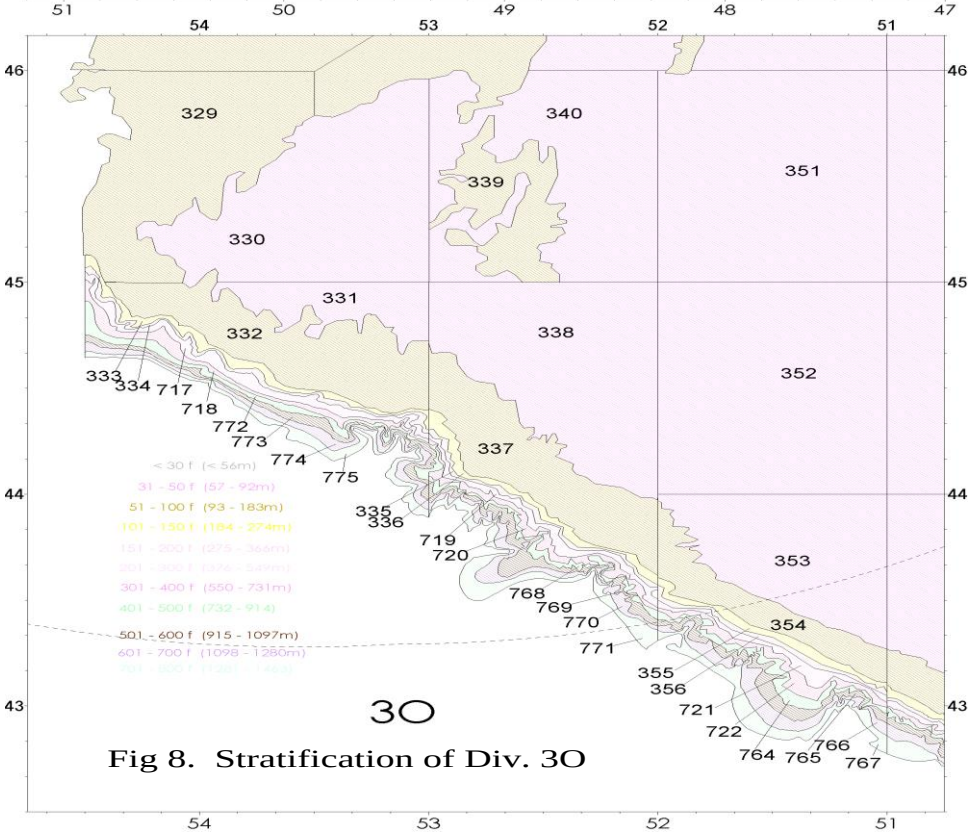

Fig 8. Stratification of Div. 3O

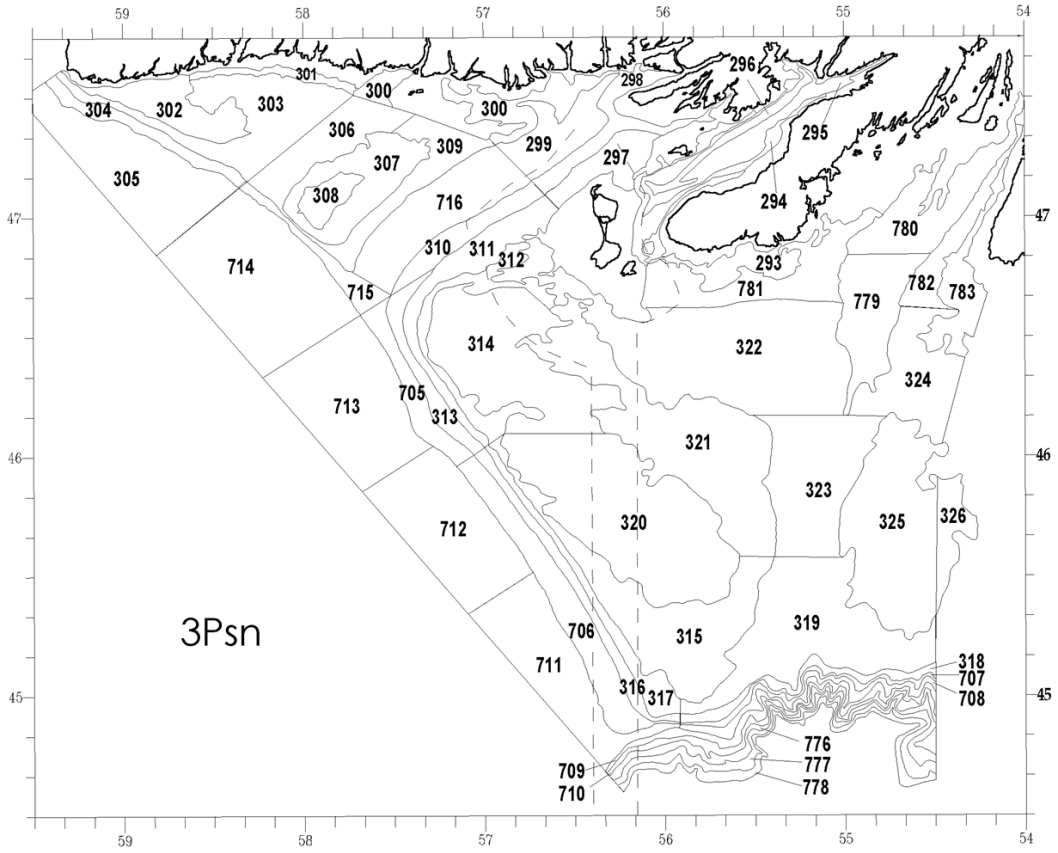

Fig. 9. Stratification of Div. 3P

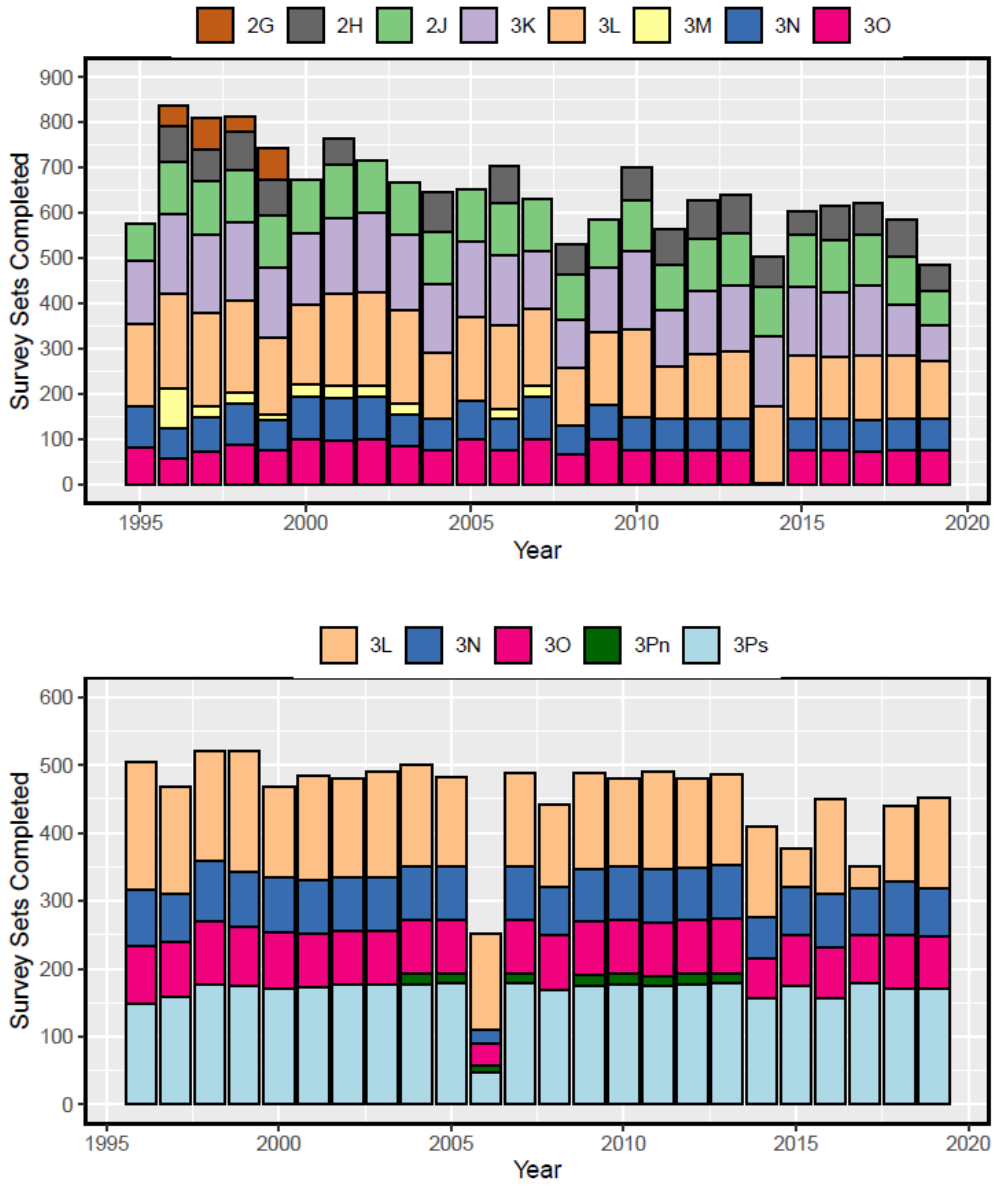

Figure 10. Total number of successful fishing sets in the Canadian Autumn (above) and Spring (below) multispecies bottom trawl surveys.

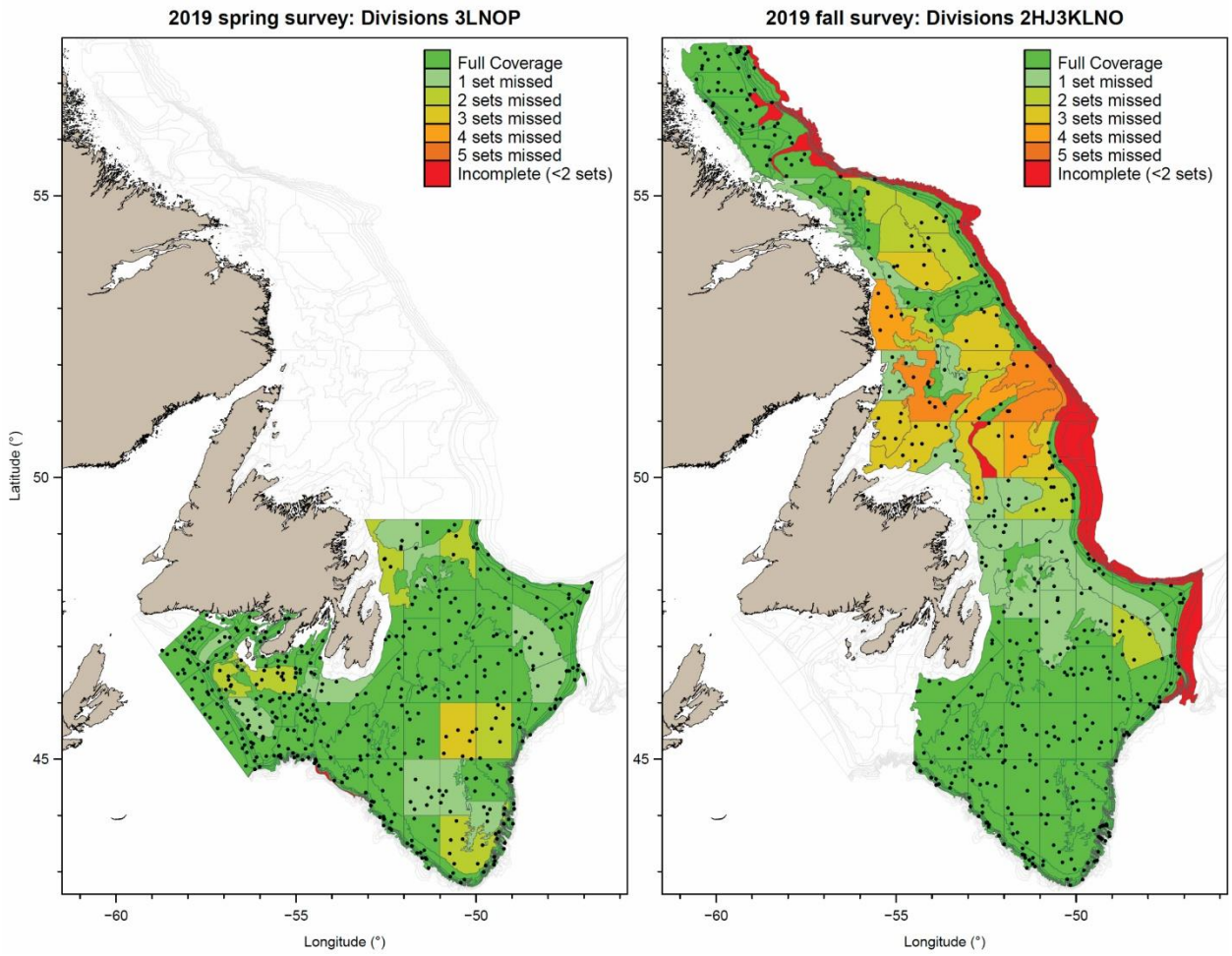

Figure 11. Successful fishing set locations for the 2019 Canadian Spring and Autumn multispecies bottom trawl surveys. Set positions are overlayed on the survey stratification scheme and strata are coloured based on the number of sets completed relative to the number of sets intended in the survey design. Strata that are not coloured are not included in the current survey design.

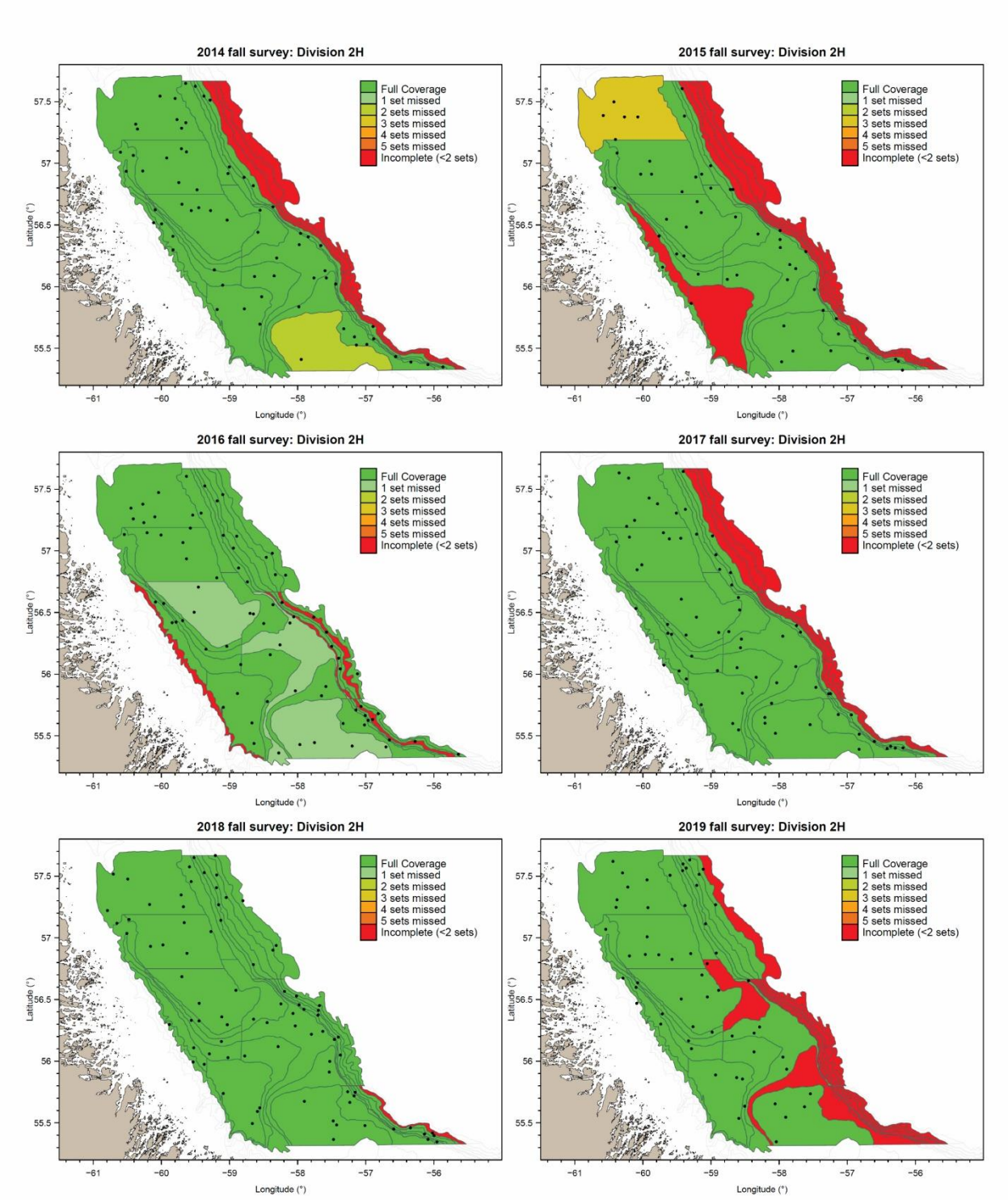

Figure 12. Successful fishing set locations for the 2014-2019 Canadian Autumn multispecies bottom trawl surveys in Div. 2H. Set positions are overlayed on the survey stratification scheme and strata are coloured based on the number of sets completed relative to the number of sets intended in the survey design. Strata that are not coloured are not included in the current survey design.

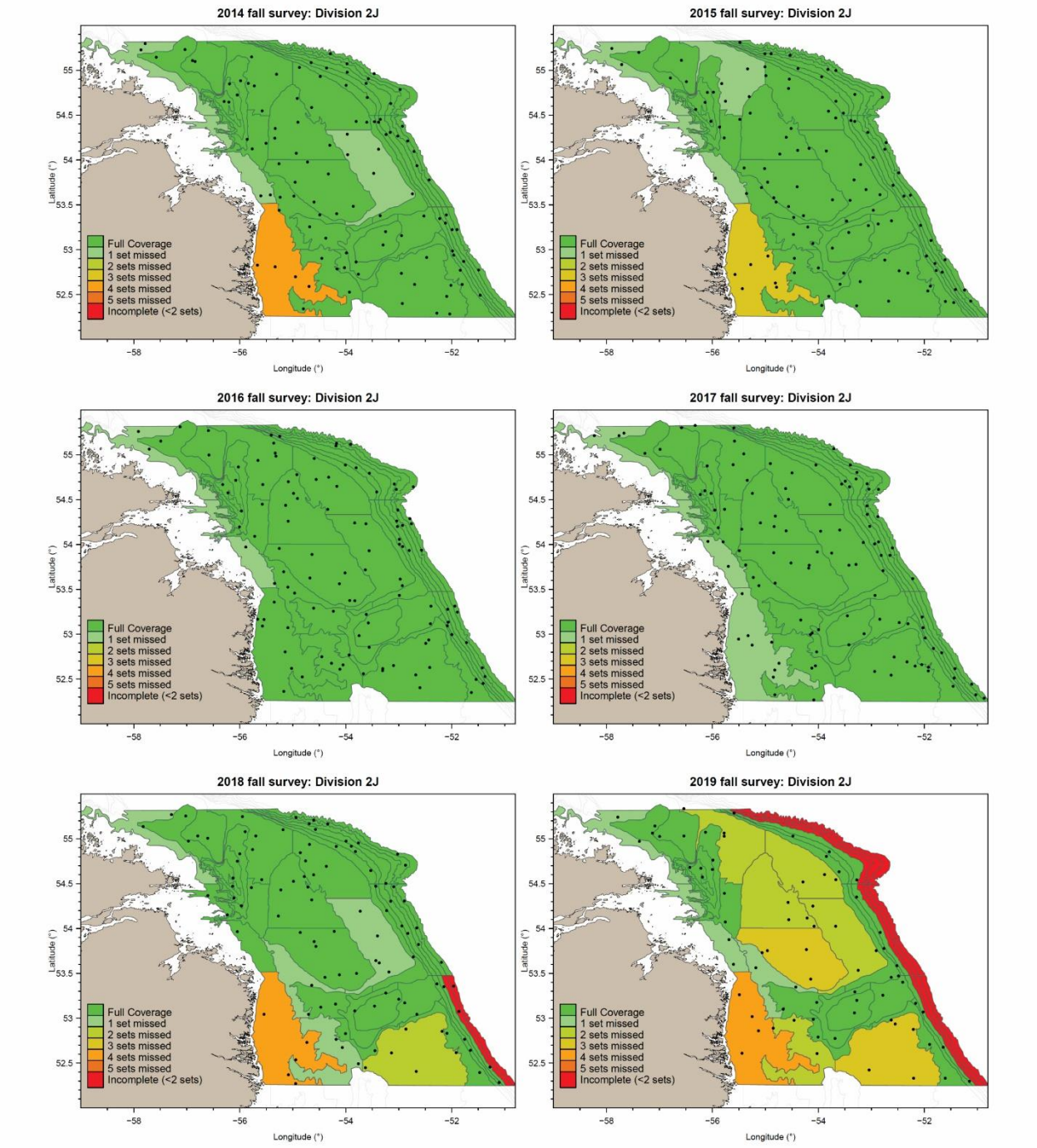

Figure 13. Successful fishing set locations for the 2014-2019 Canadian Autumn multispecies bottom trawl surveys in Div. 2J. Set positions are overlayed on the survey stratification scheme and strata are coloured based on the number of sets completed relative to the number of sets intended in the survey design. Strata that are not coloured are not included in the current survey design.

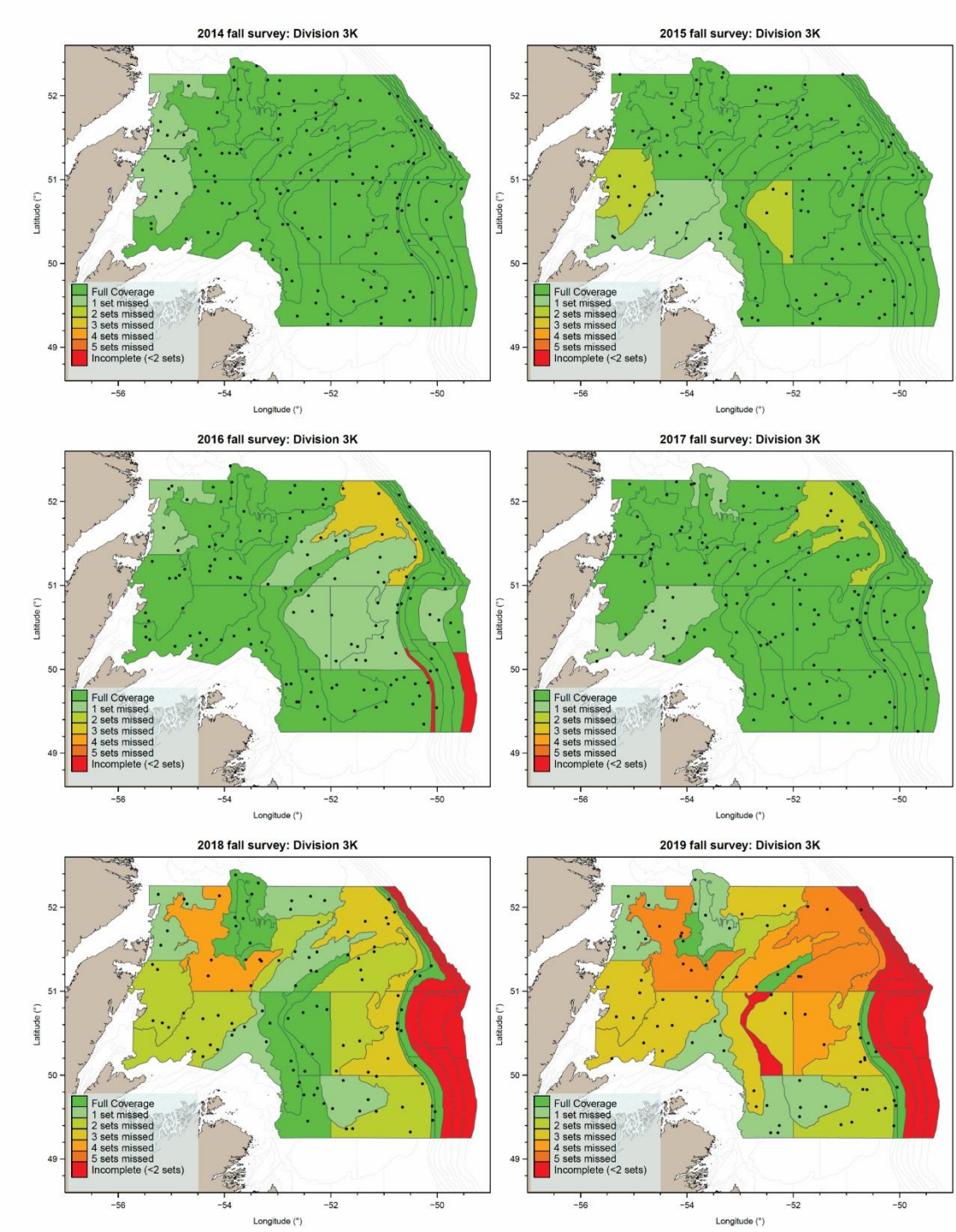

Figure 14. Successful fishing set locations for the 2014-2019 Canadian Autumn multispecies bottom trawl surveys in Div. 3K. Set positions are overlayed on the survey stratification scheme and strata are coloured based on the number of sets completed relative to the number of sets intended in the survey design. Strata that are not coloured are not included in the current survey design.

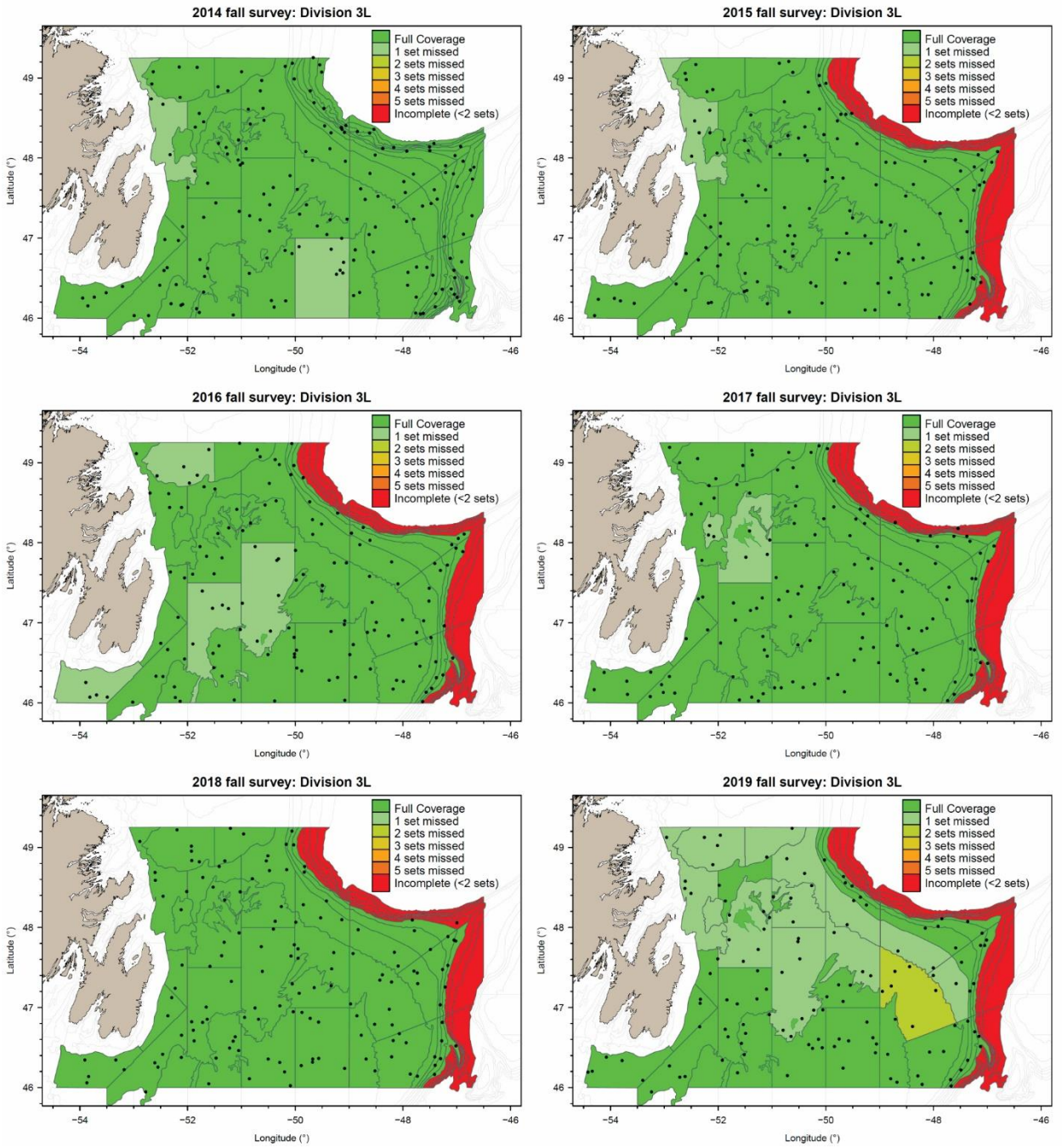

Figure 15. Successful fishing set locations for the 2014-2019 Canadian Autumn multispecies bottom trawl surveys in Div. 3L. Set positions are overlayed on the survey stratification scheme and strata are coloured based on the number of sets completed relative to the number of sets intended in the survey design. Strata that are not coloured are not included in the current survey design.

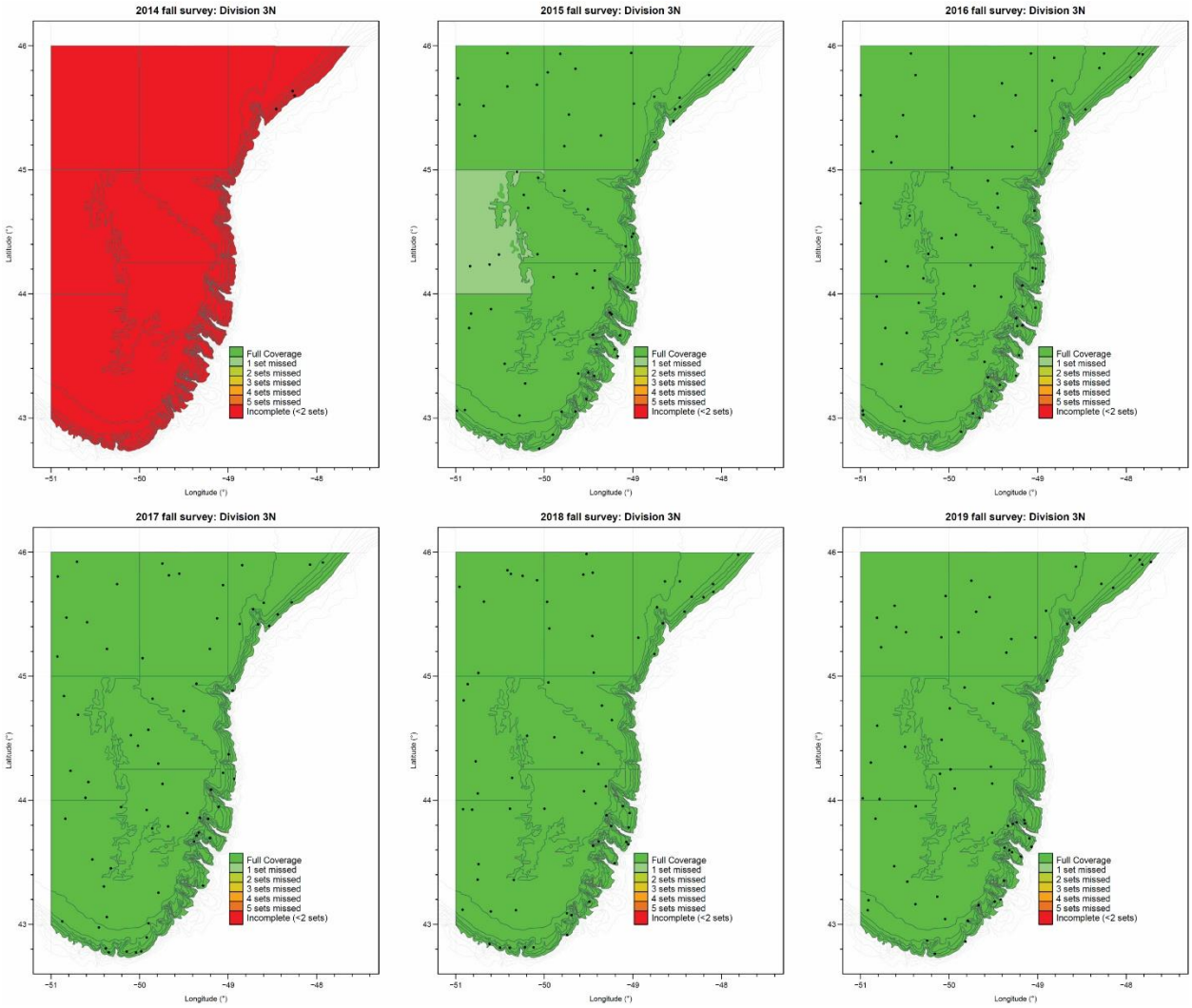

Figure 16. Successful fishing set locations for the 2014-2019 Canadian Autumn multispecies bottom trawl surveys in Divs. 3N. Set positions are overlayed on the survey stratification scheme and strata are coloured based on the number of sets completed relative to the number of sets intended in the survey design. Strata that are not coloured are not included in the current survey design.

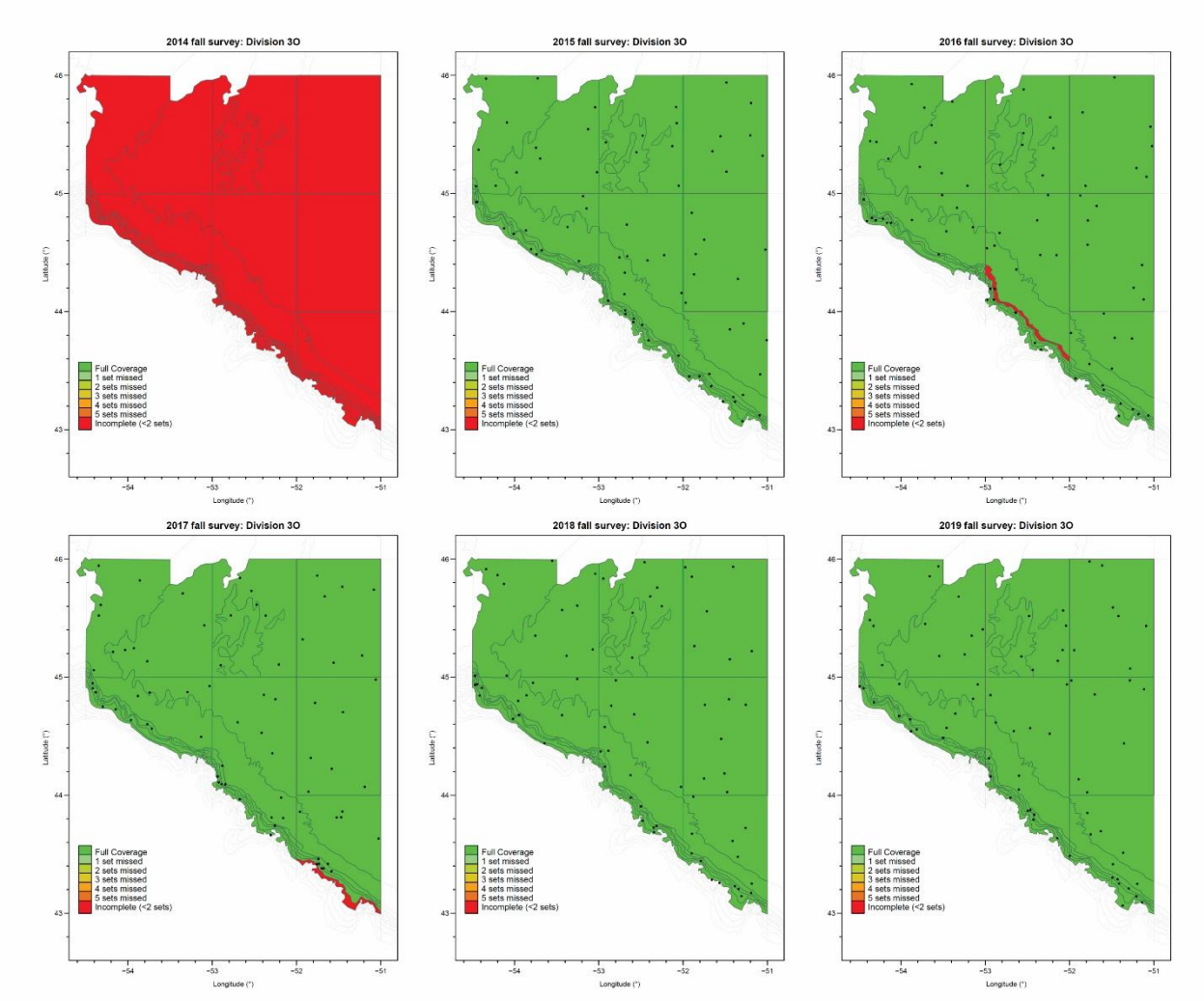

Figure 17. Successful fishing set locations for the 2014-2019 Canadian Autumn multispecies bottom trawl surveys in Divs. 3O. Set positions are overlayed on the survey stratification scheme and strata are coloured based on the number of sets completed relative to the number of sets intended in the survey design. Strata that are not coloured are not included in the current survey design.

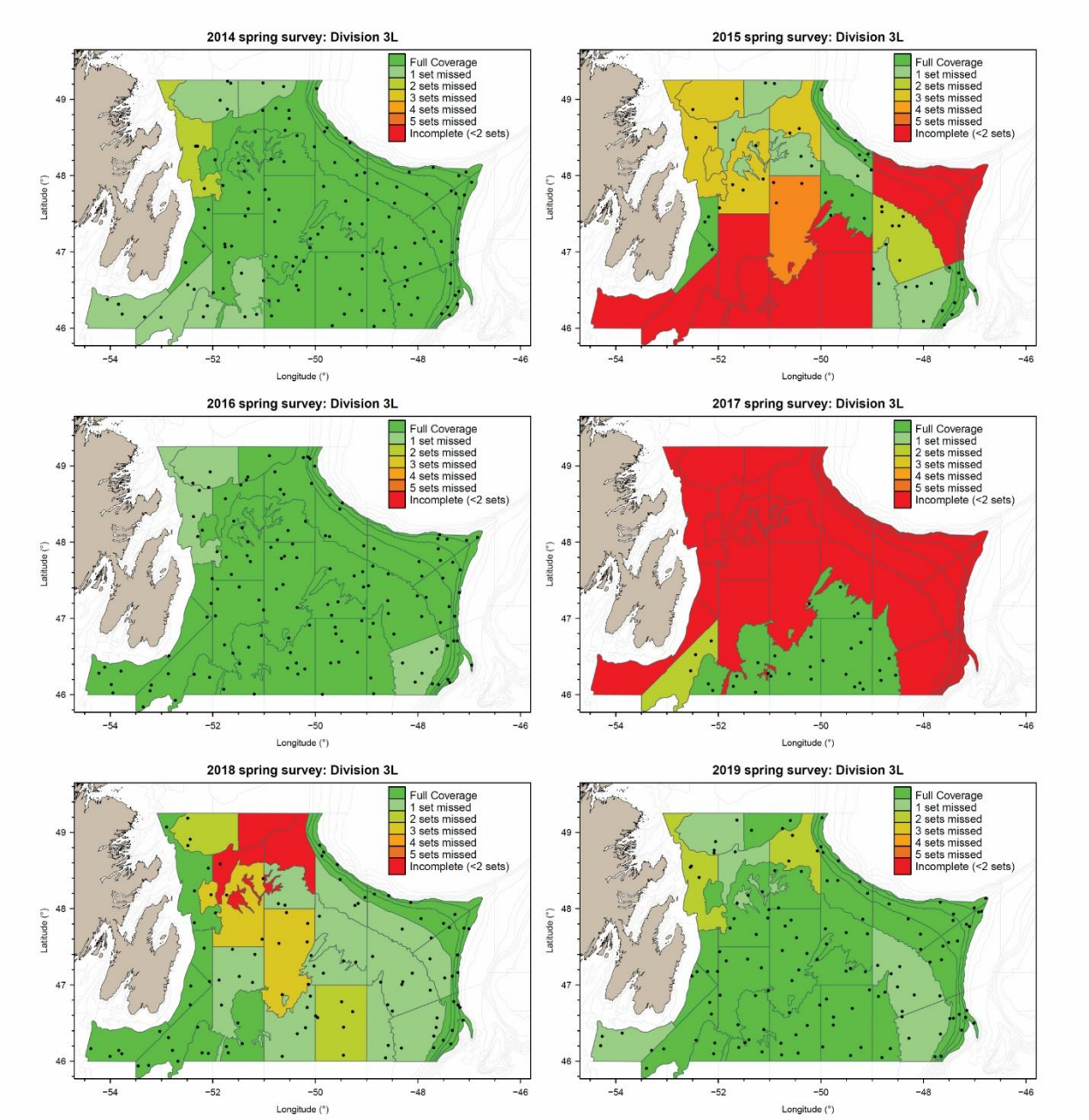

Figure 18. Successful fishing set locations for the 2014-2019 Canadian Spring multispecies bottom trawl survey in Divs. 3L. Set positions are overlayed on the survey stratification scheme and strata are coloured based on the number of sets completed relative to the number of sets intended in the survey design. Strata that are not coloured are not included in the current survey design.

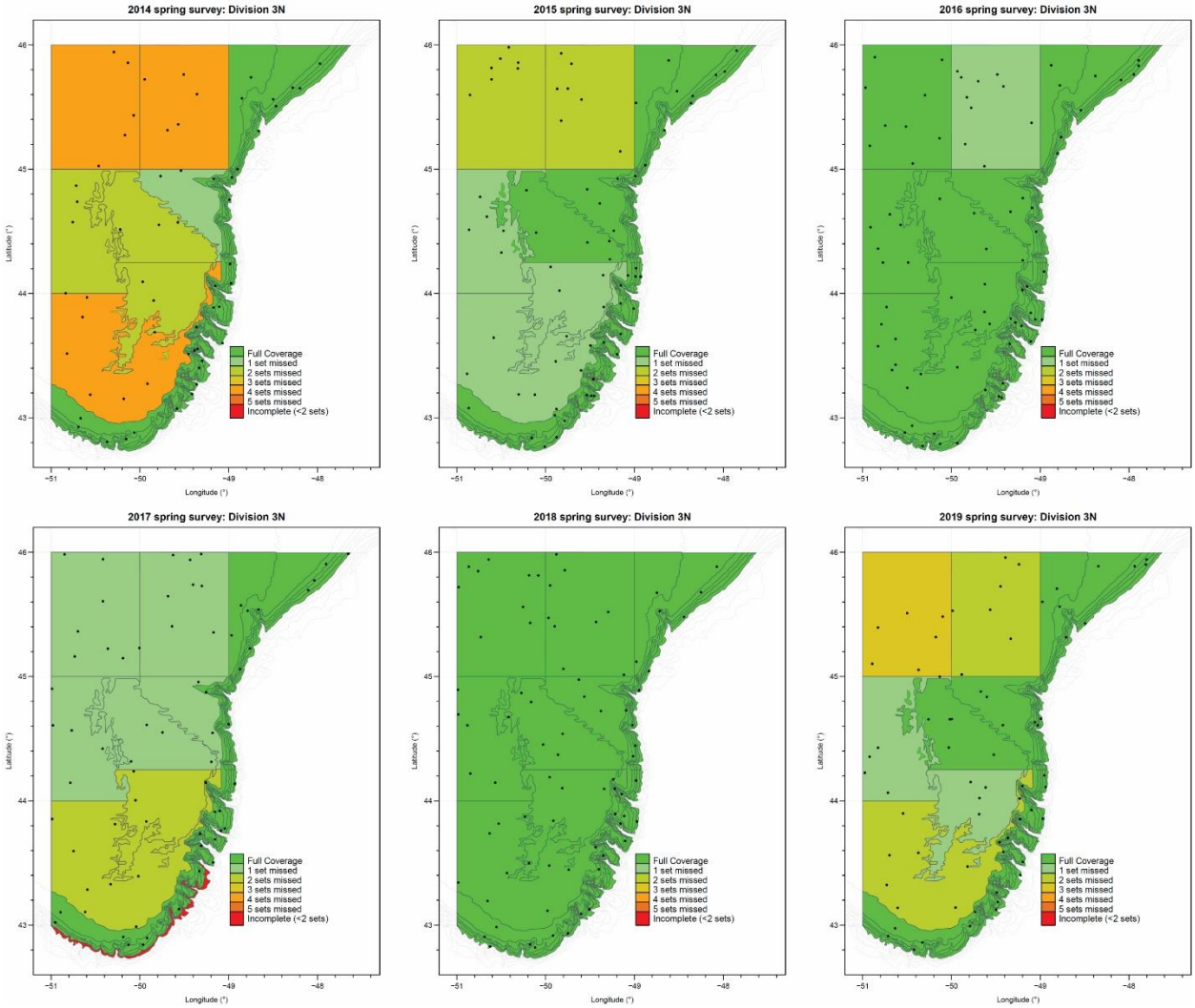

Figure 19. Successful fishing set locations for the 2014-2019 Canadian Spring multispecies bottom trawl surveys in Divs. 3N. Set positions are overlayed on the survey stratification scheme and strata are coloured based on the number of sets completed relative to the number of sets intended in the survey design. Strata that are not coloured are not included in the current survey design.

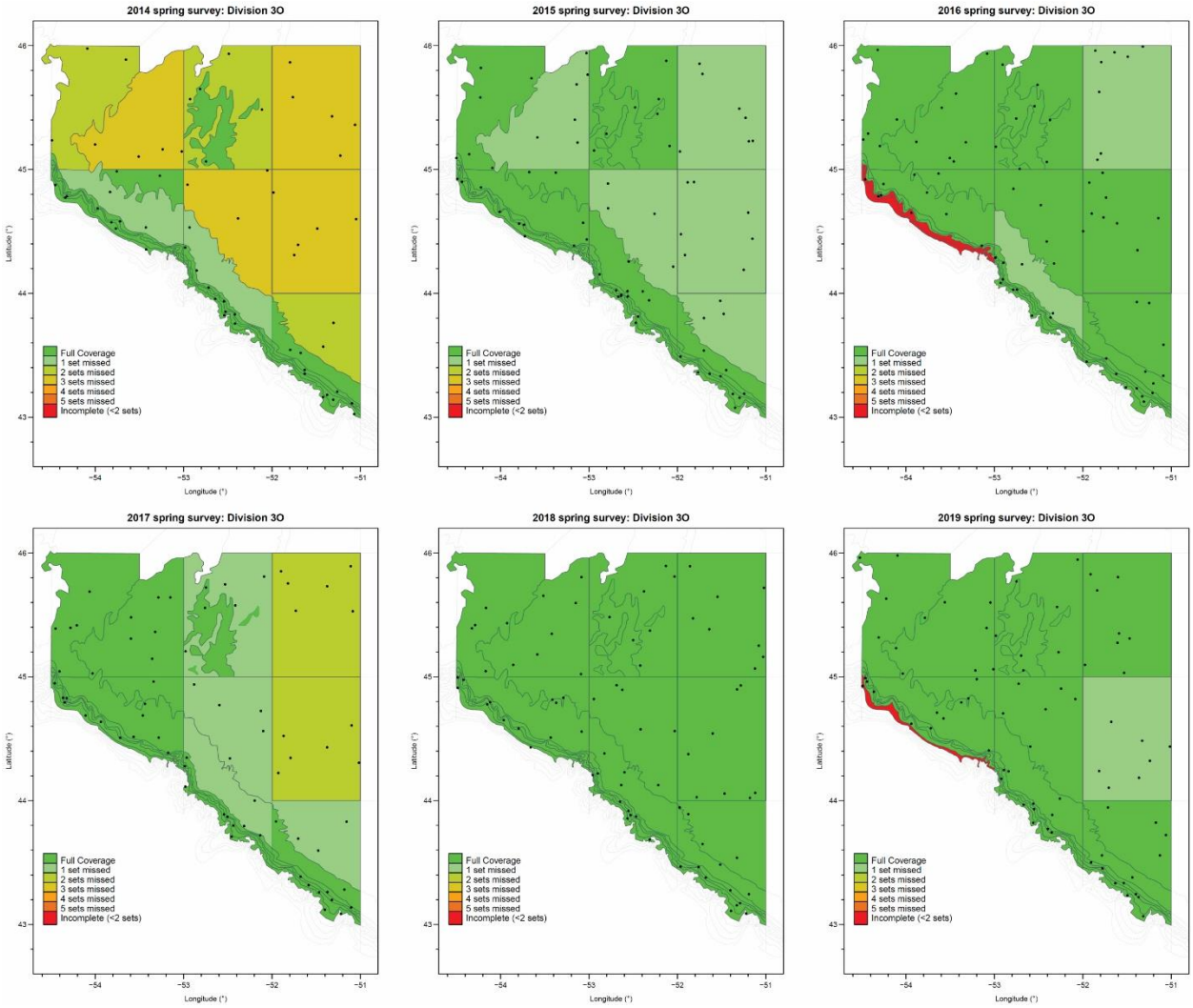

Figure 20. Successful fishing set locations for the 2014-2019 Canadian Spring multispecies bottom trawl surveys in Divs. 3O. Set positions are overlayed on the survey stratification scheme and strata are coloured based on the number of sets completed relative to the number of sets intended in the survey design. Strata that are not coloured are not included in the current survey design.

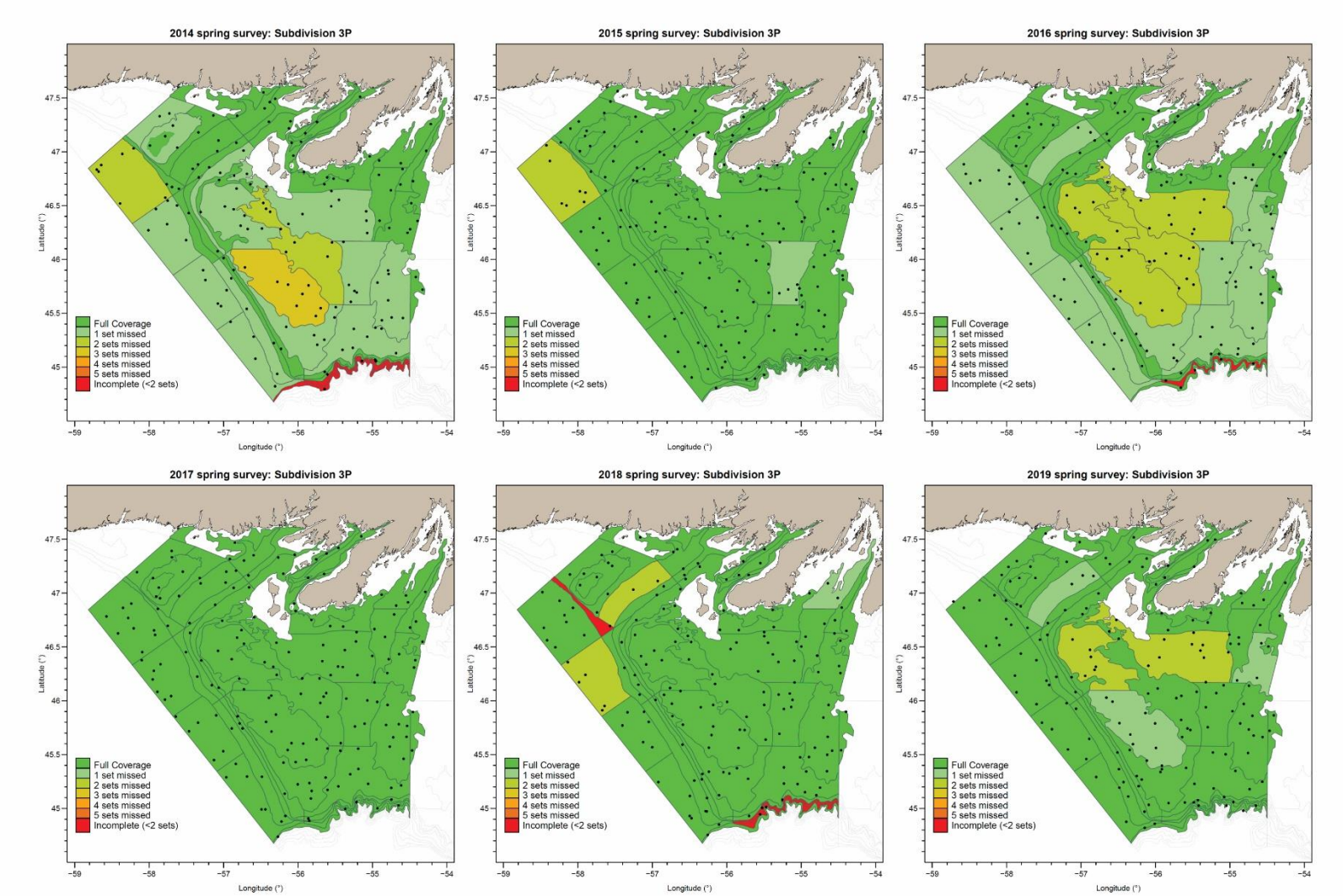

Figure 21. Successful fishing set locations for the 2013-2018 Canadian Spring multispecies bottom trawl survey in Subdiv. 3Ps. Set positions are overlayed on the survey stratification scheme and strata are coloured based on the number of sets completed relative to the number of sets intended in the survey design. Strata that are not coloured are not included in the current survey design.

Appendix

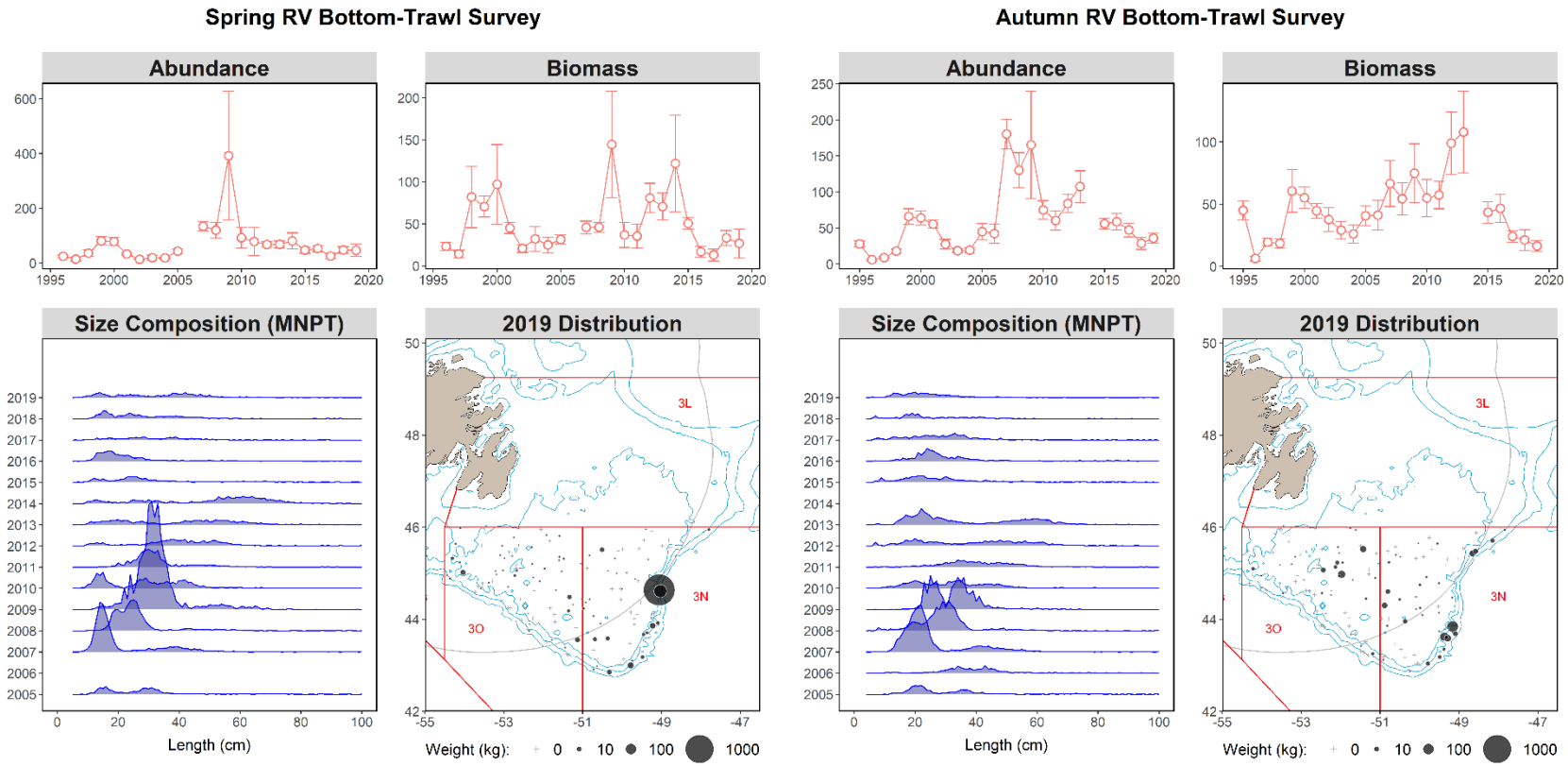

Figure 22. Atlantic Cod (*Gadus morhua*) in Divs. 3NO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on index strata (<365 m). The 2006 spring and 2014 autumn surveys are incomplete for this stock.

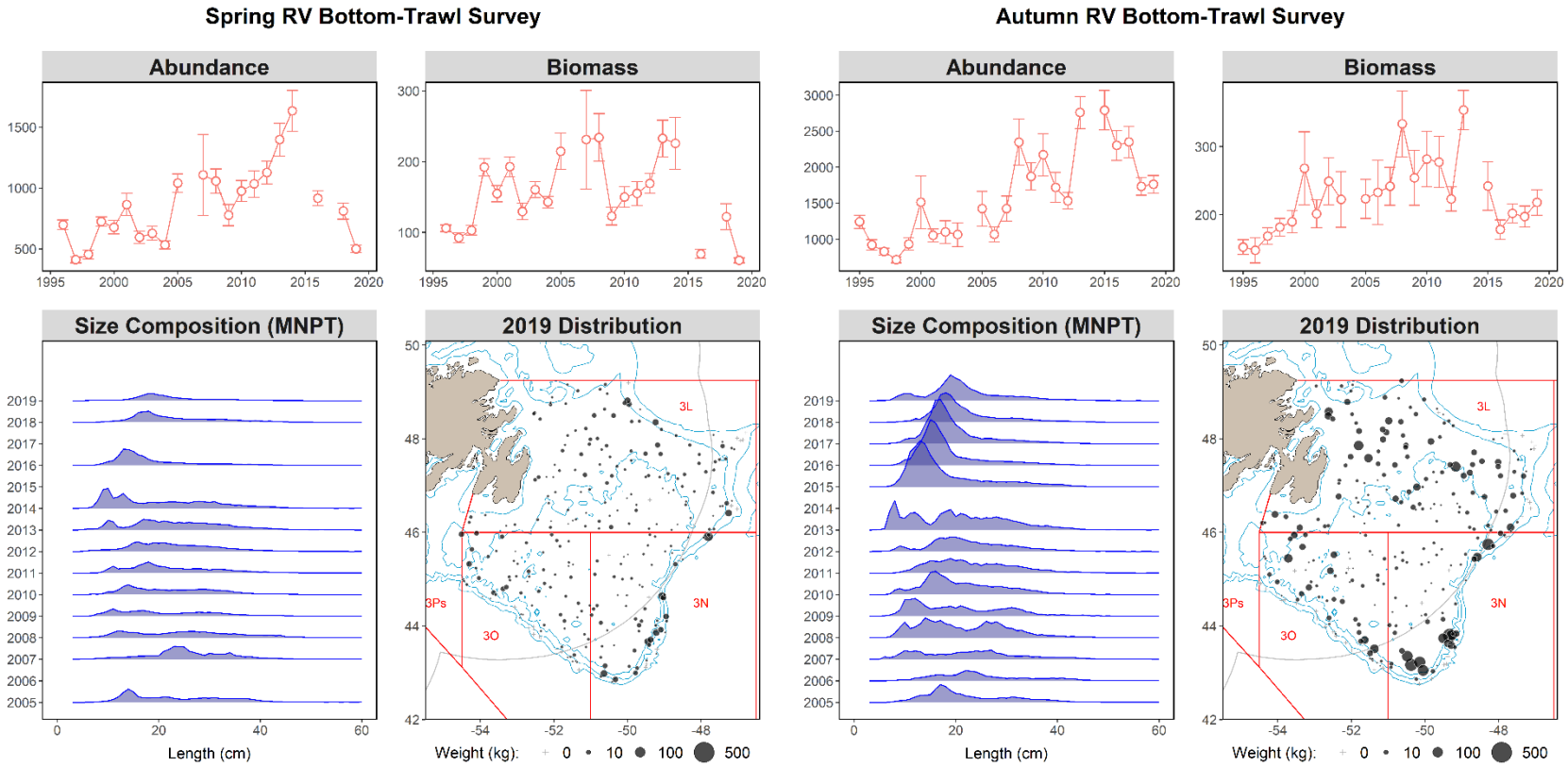

Figure 23. American Plaice (*Hippoglossoides platessoides*) in Divs. 3LNO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006, 2015 and 2017 spring and 2014 autumn surveys are incomplete for this stock.

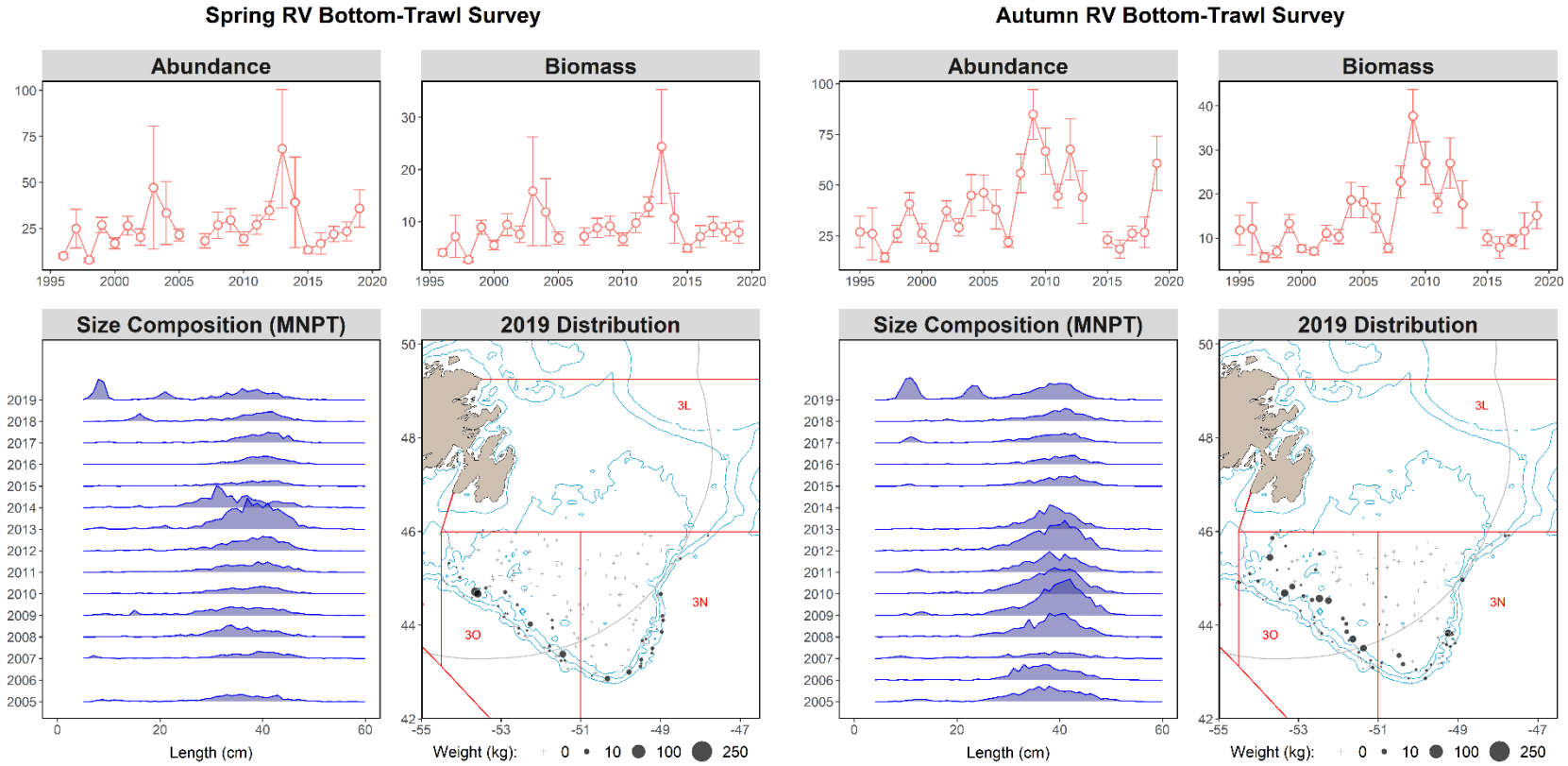

Figure 24. Witch Flounder (*Glyptocephalus cynoglossus*) in Divs. 3NO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

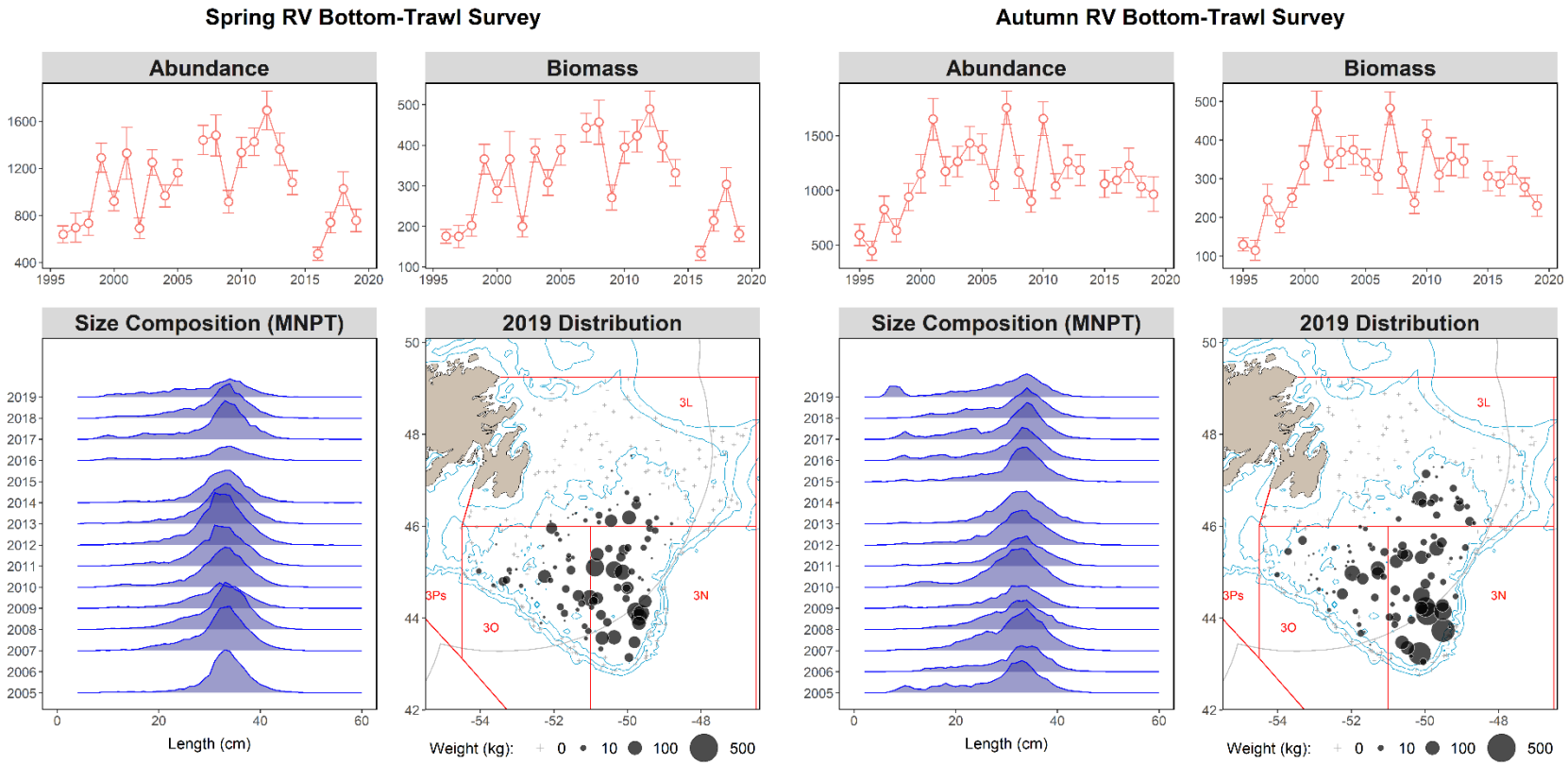

Figure 25. Yellowtail Flounder (*Limanda ferruginea*) in Divs. 3LNO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 and 2015 spring and 2014 autumn surveys are incomplete for this stock.

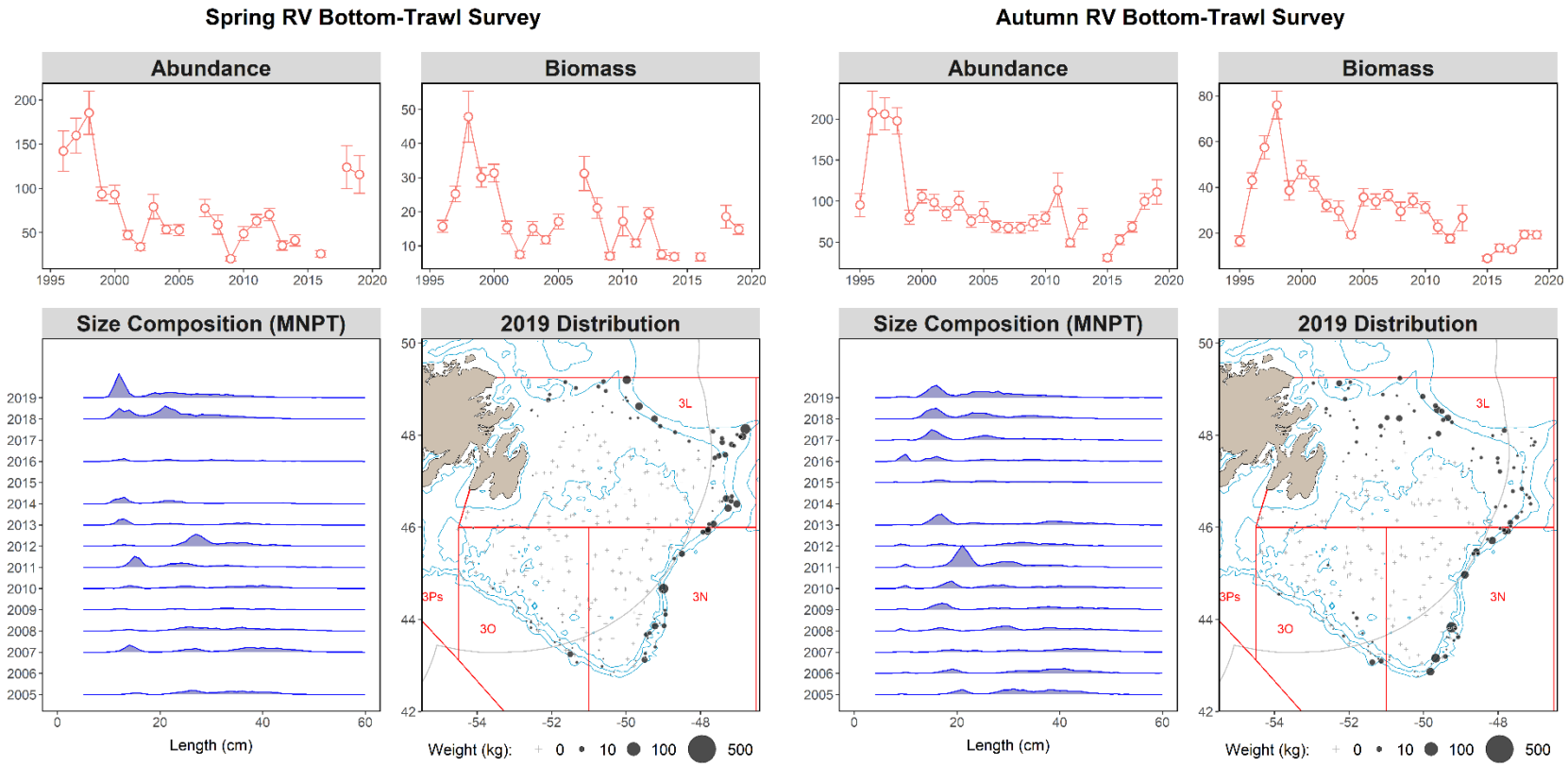

Figure 26. Greenland Halibut (*Reinhardtius hippoglossoides*) in Divs. 3LNO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on index strata (<730 m). The 2006, 2015 and 2017 spring and 2008 autumn 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).

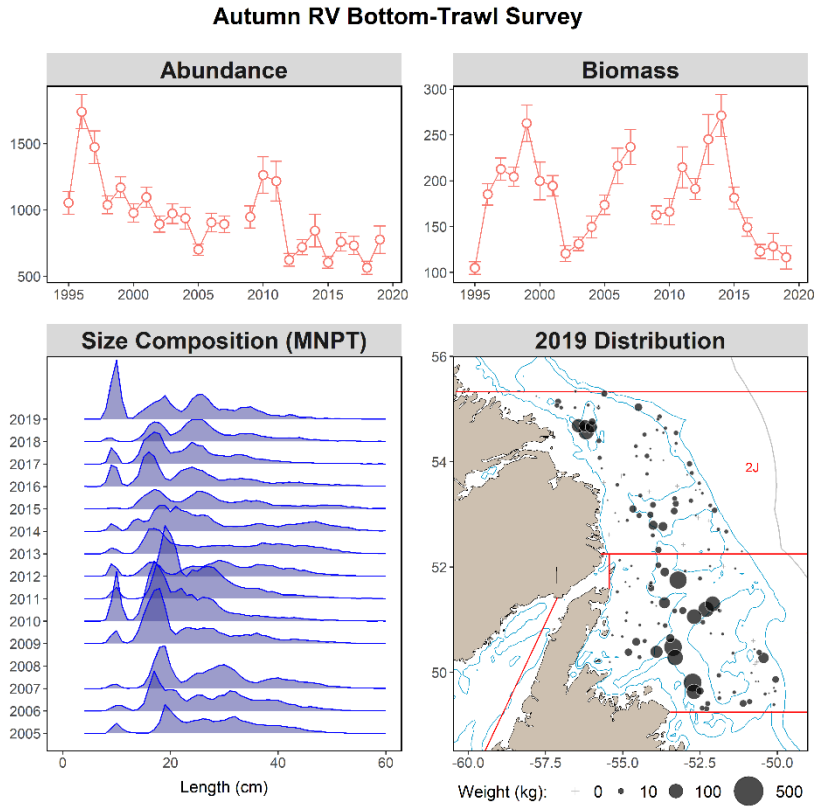

Figure 27. Greenland Halibut (*Reinhardtius hippoglossoides*) in Divs. 2J3K. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2008 autumn survey is incomplete for this stock. Note 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.

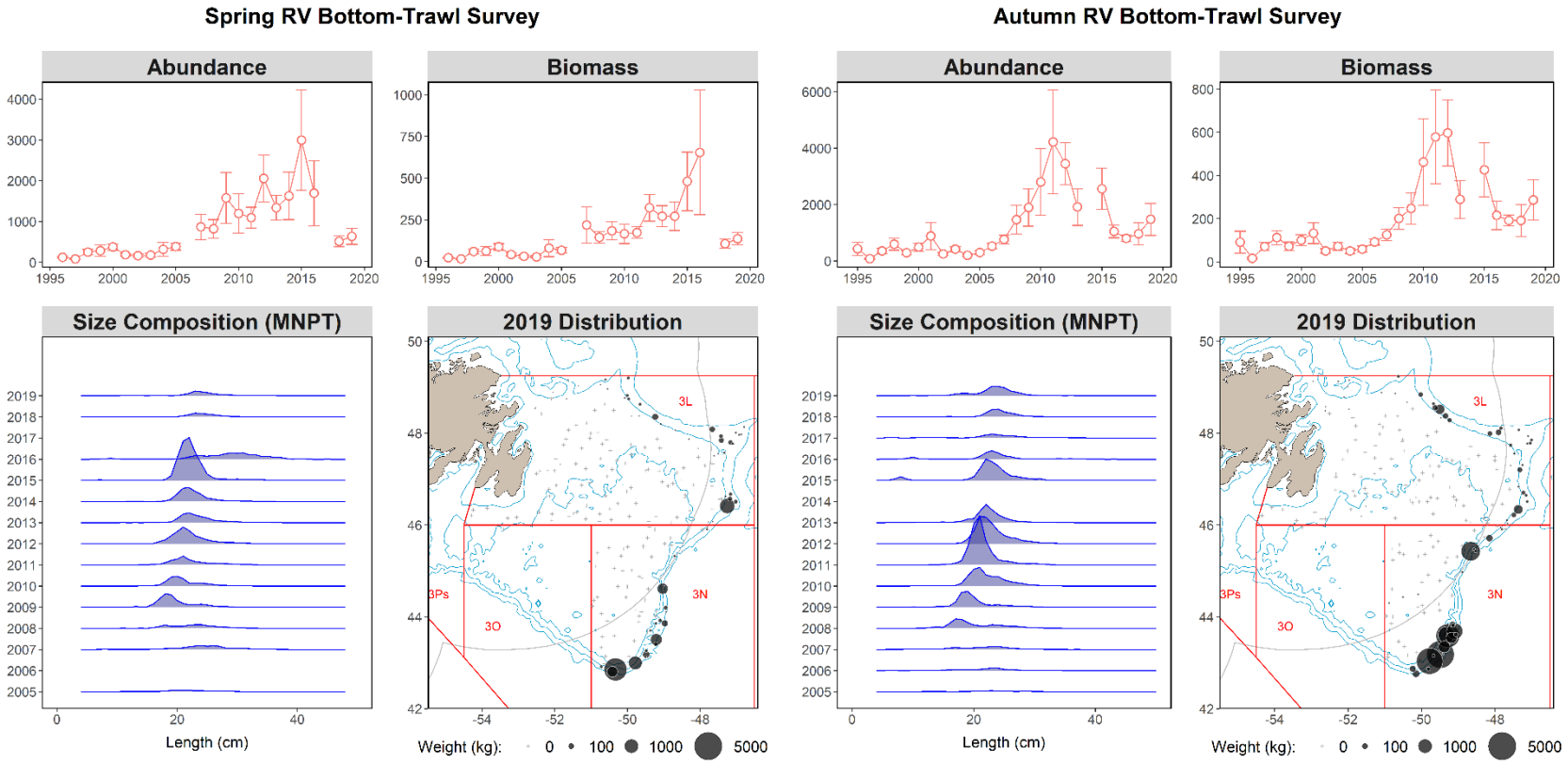

Figure 28. Beaked Redfish (*Sebastes fasciatus* & *Sebastes mentella*) in Divs. 3LN. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 and 2017 spring and 2014 autumn surveys are incomplete for this stock.

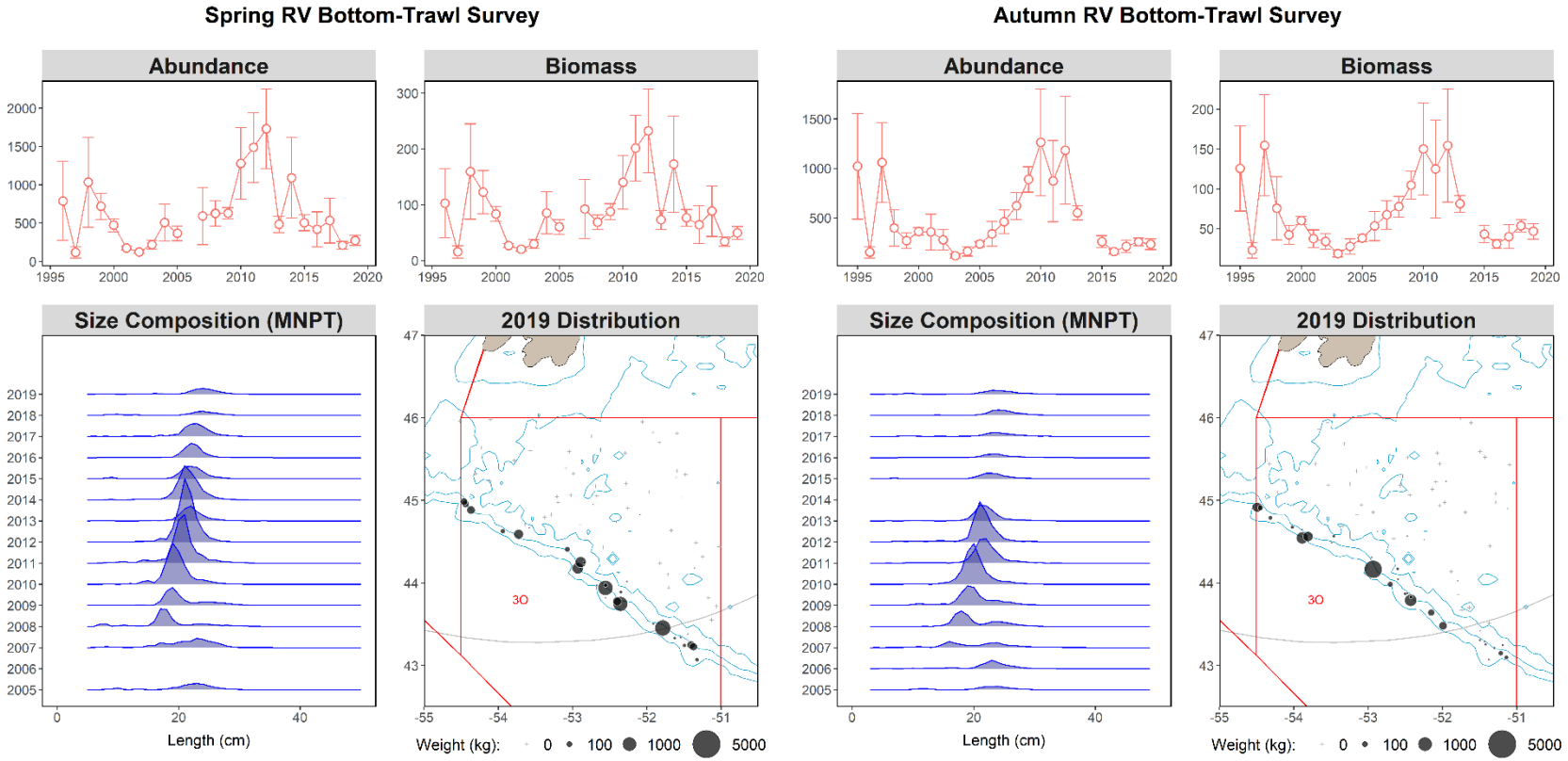

Figure 29. Beaked Redfish (*Sebastes fasciatus* & *Sebastes mentella*) in Div. 3O. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

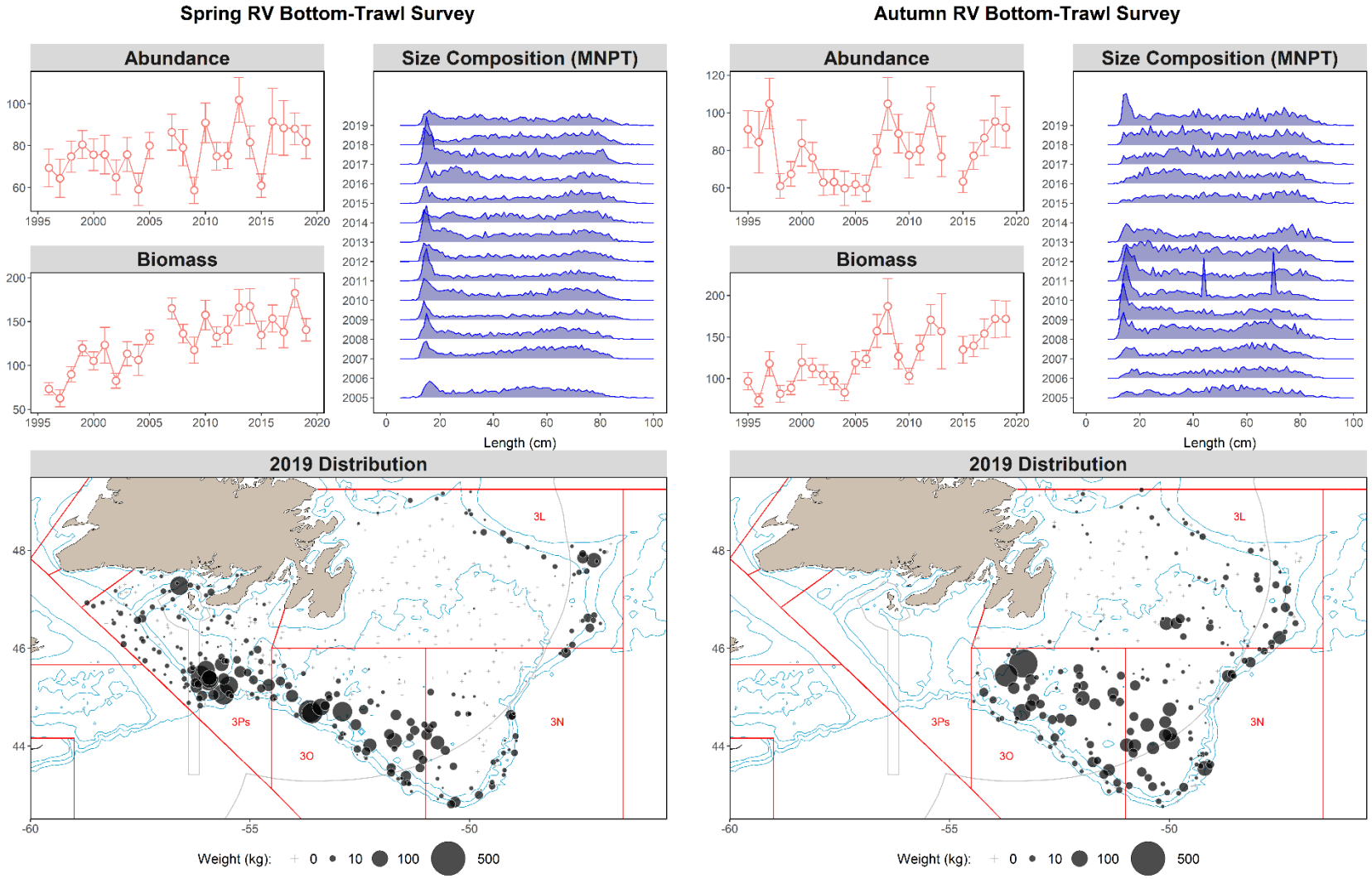

Figure 30. Thorny Skate (*Amblyraja radiata*) in Divs. 3LNOPs. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

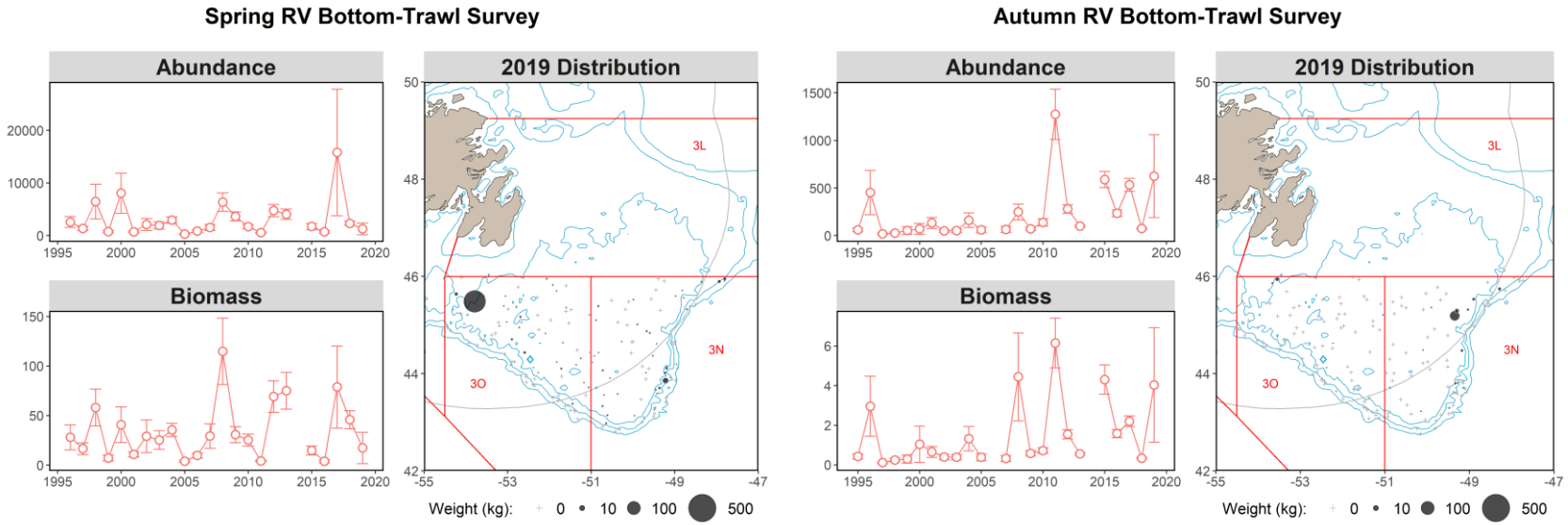

Figure 31. Capelin (*Mallotus villosus*) in Divs. 3NO. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock. Note that these bottom-trawl indices may not reflect population trends for this pelagic species.

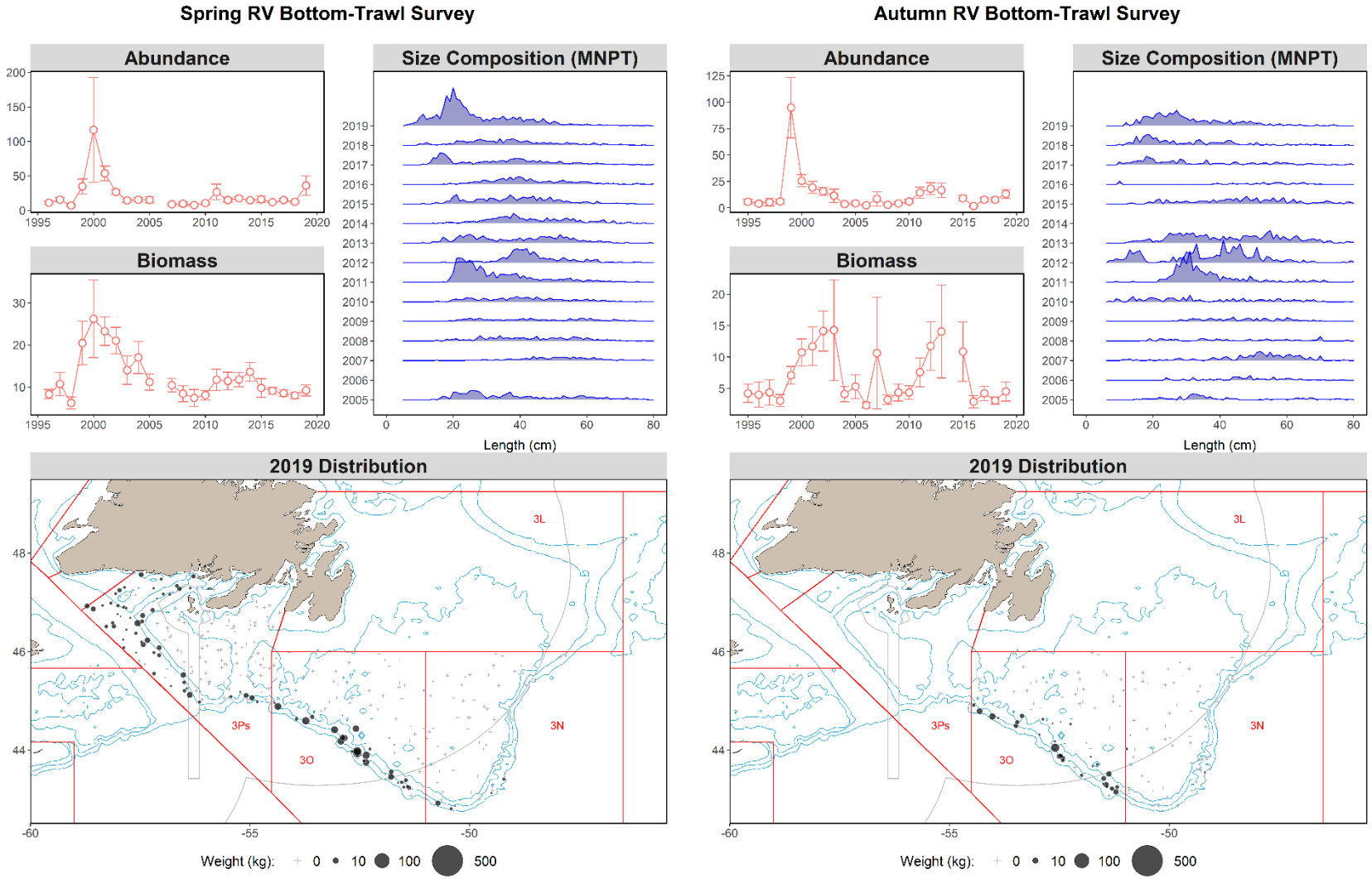

Figure 32. White Hake (*Urophycis tenuis*) in Divs. 3NOPs. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.

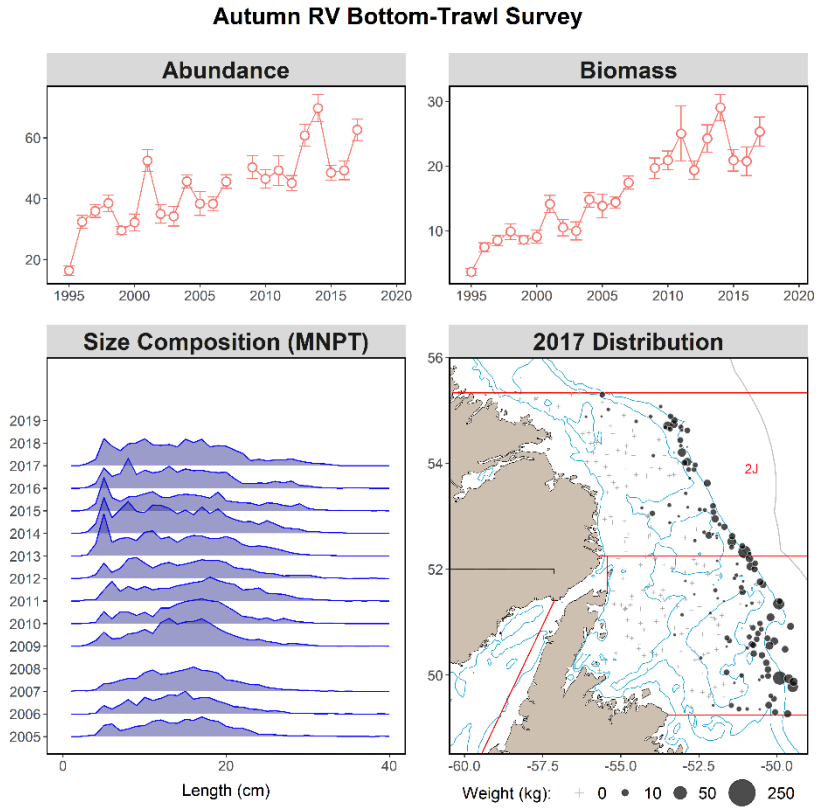

Figure 33. Roughhead Grenadier (*Macrourus berglax*) in Divs. 2J3K. Survey abundance indices are expressed in millions of fish and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2008, 2018 and 2019 surveys are incomplete for this stock.

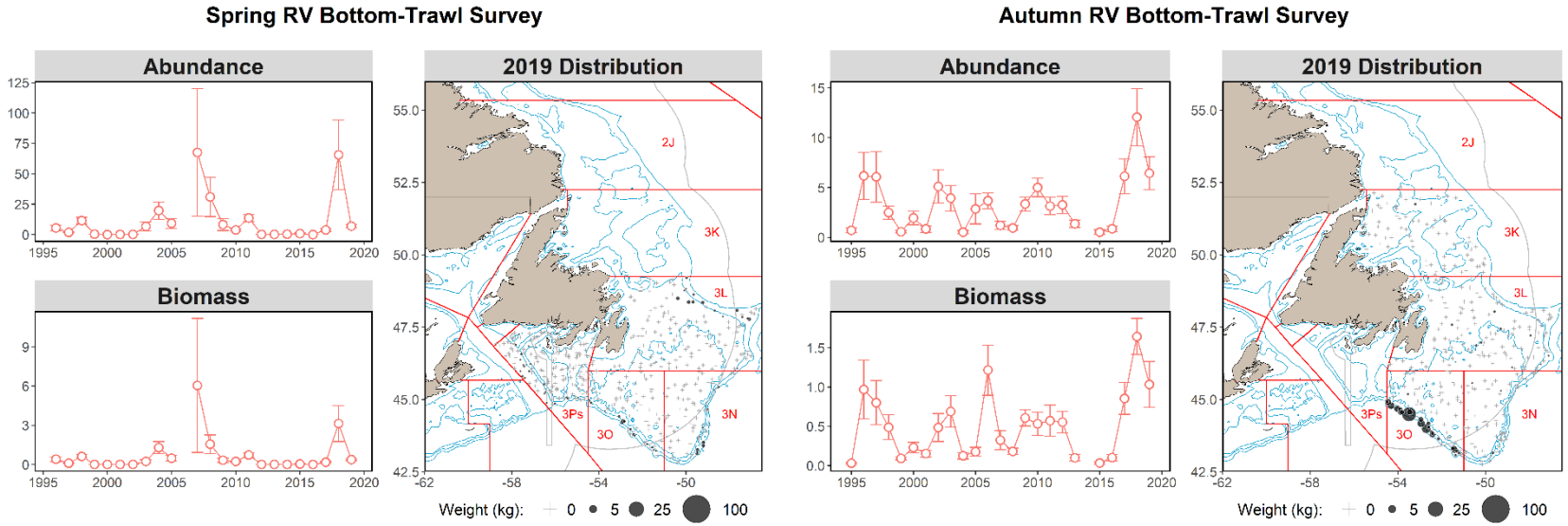

Figure 34. Northern shortfin squid (*Illex illecebrosus*) in SA 3. Survey abundance indices are expressed in millions of squid and biomass indices are expressed in thousands of tons (error bars are ± 1SD). Plots are based on all strata. The 2006 spring and 2014 autumn surveys are incomplete for this stock.