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Tini a Tangaroa

Observer sampling of deepwater fisheries, 1989–90 to 2024–25. Part 2: ORH to WWA

New Zealand Fisheries Assessment Report 2026/43

D.A.J. Middleton

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PLAIN LANGUAGE SUMMARY

Standardised reports of the quantity and representativeness of observer sampling are provided for ORH to WWA from 1989–90 to 2024–25.

EXECUTIVE SUMMARY

Middleton, D.A.J.[1] **(2026). Observer sampling of deepwater fisheries, 1989–90 to 2024–25. Part 2: ORH to WWA.**

***New Zealand Fisheries Assessment Report 2026/43*. 950 p.**

Observer sampling data are a key input for many assessments of the status of deepwater stocks. However, the quantity and quality of observer sampling has previously only been established when an assessment is attempted. Project OBS2025-01 has addressed this problem by implementing templates for routine reporting of observer sampling coverage, in a largely automated manner.

One of the key outputs of the project is annual sampling reports that examine observer coverage on a stock and fishery basis. This report provides the first iteration of these annual reports, for 1989–90 to 2024–25 and ORH to WWA stocks.

[1]Pisces Research, Wellington, New Zealand

1. INTRODUCTION

A format for providing a comprehensive summary of the observer sampling undertaken for all deepwater stocks, and the representativeness of that sampling, was developed by Middleton (2026). This document provides these reports for ORH to WWA stocks for the fishing years 1989–90 to 2024–25.

The process for identifying key fisheries and sampling thresholds, and an explanation of the graphical presentation and representativeness statistics used in this report, is provided by Middleton (2026).

2. SAMPLING REPRESENTATIVENESS REPORTS

2.1 ORH stocks

Observer sampling of orange roughy is considered with respect to the orange roughy Quota Management Areas.

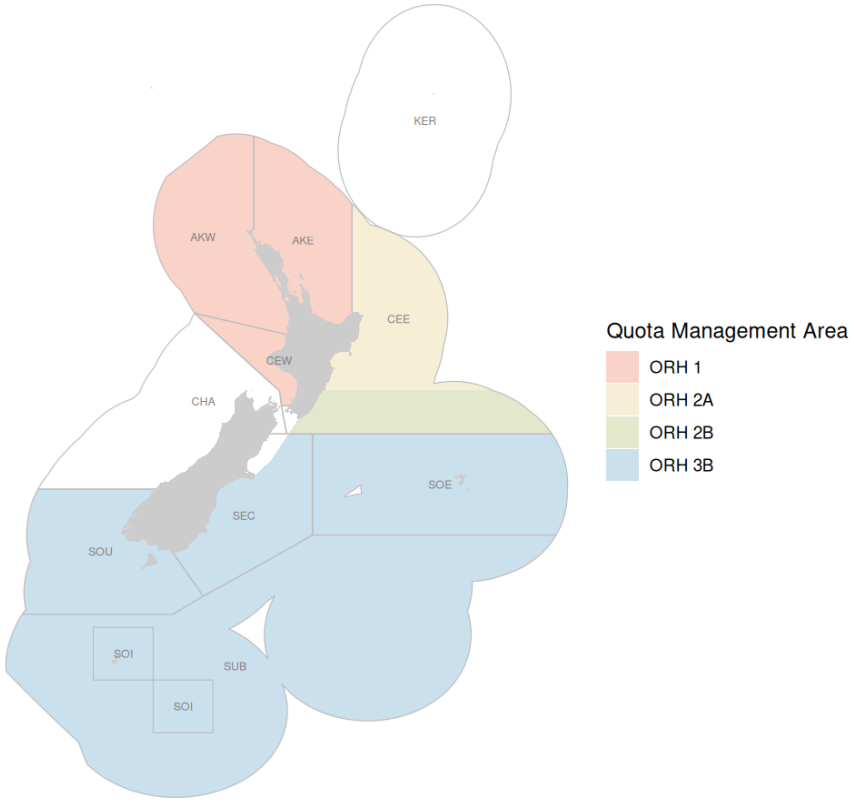


Figure 1: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for orange roughy (coloured areas, per legend).

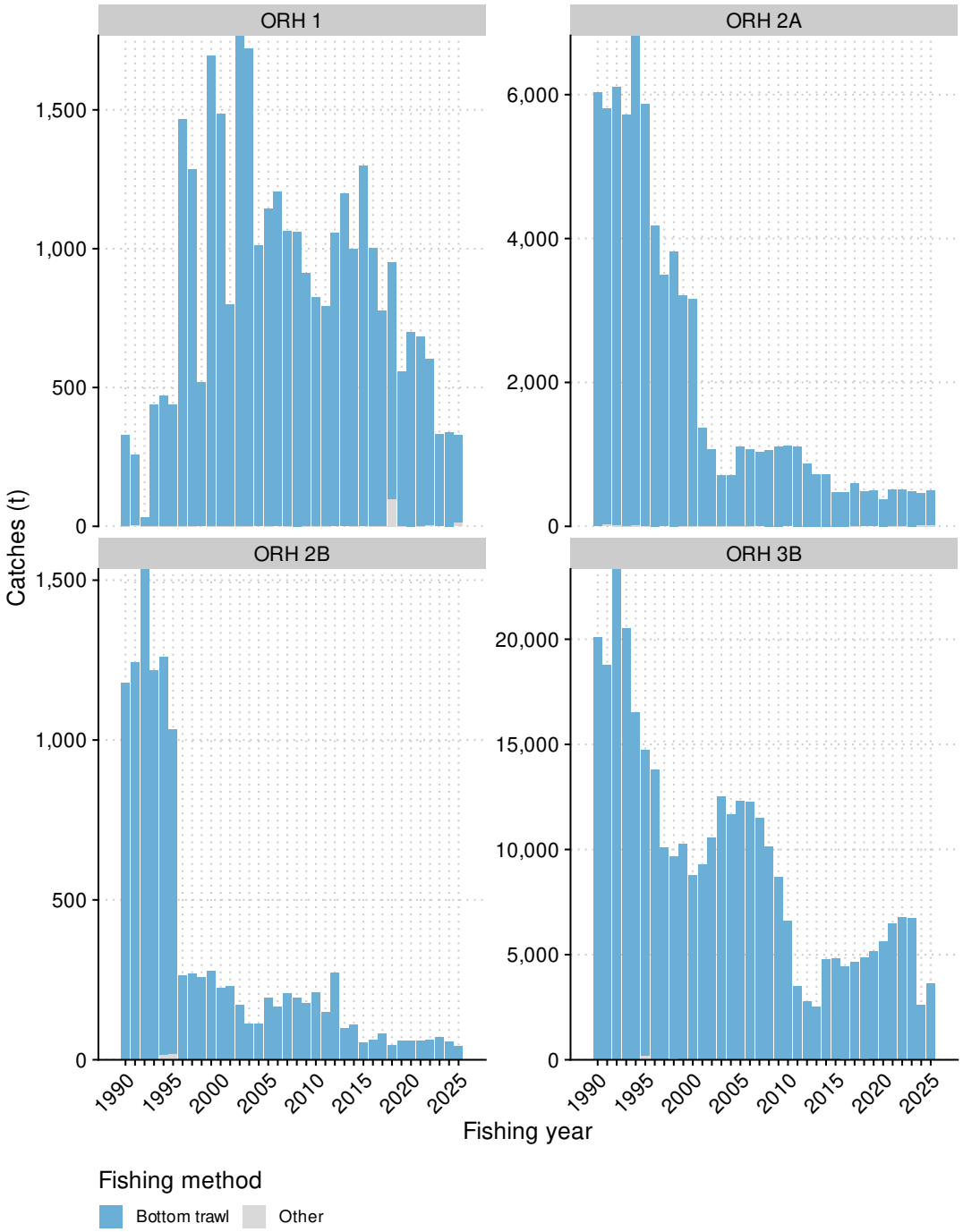


Figure 2: **Catches of orange roughy by fishing method, for events within the orange roughy Quota Management Areas. Methods grouped as Other include: BLL, BS, DS, HL, MW, PRB, PRM, PSH, RLP, SLL, SN, T.**

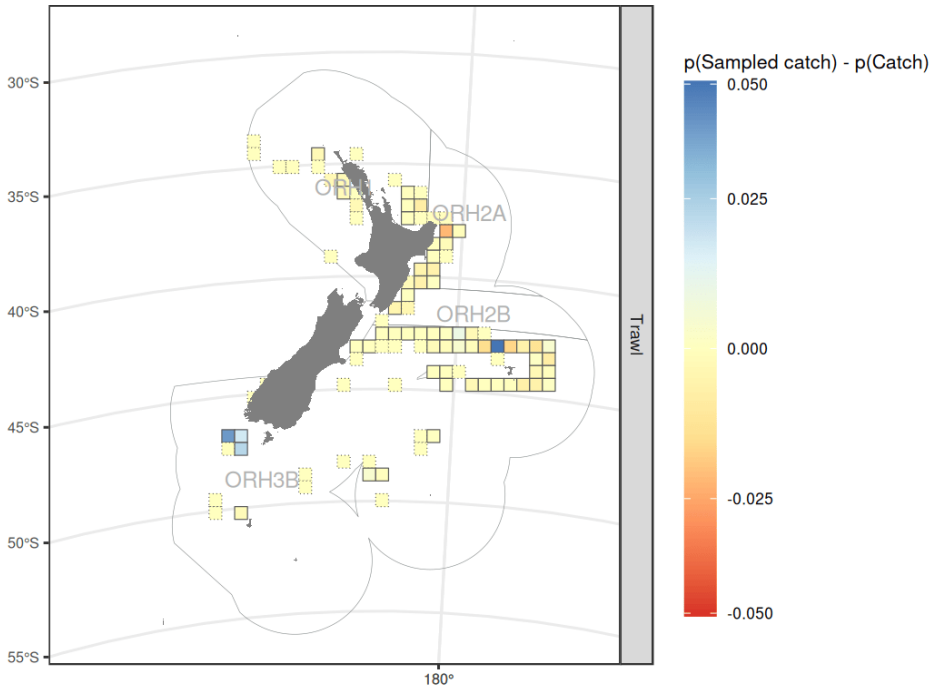


Figure 3: **Differences in the relative proportions of catch and sampled catch for orange roughy during 2021–2025. Cells with a dotted border had no sampling.**

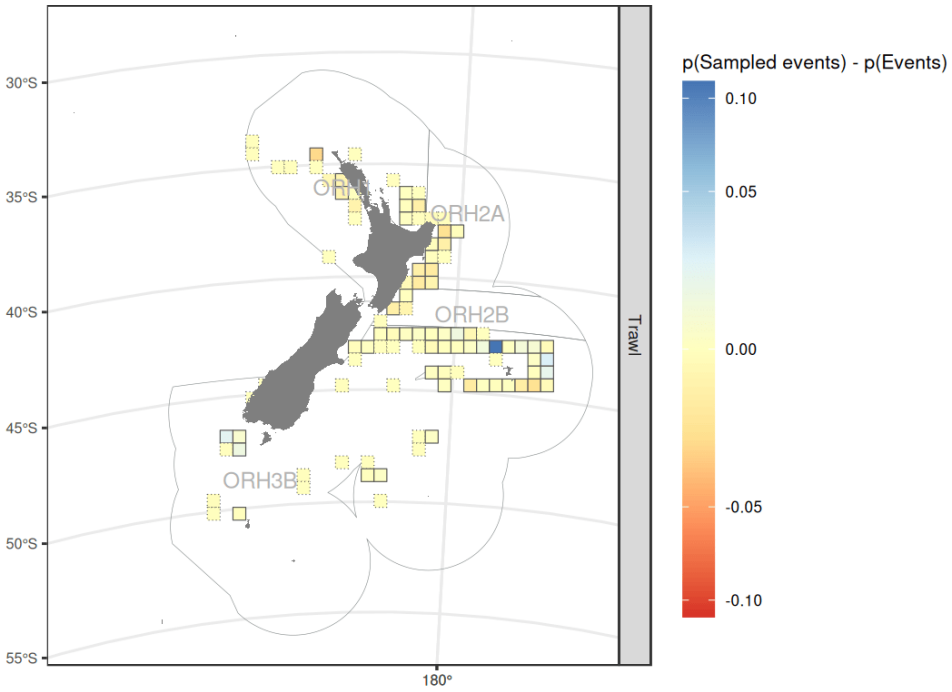


Figure 4: **Differences in the relative proportions of events meeting the sampling threshold and sampled events for orange roughy during 2021–2025. Cells with a dotted border had no sampling.**

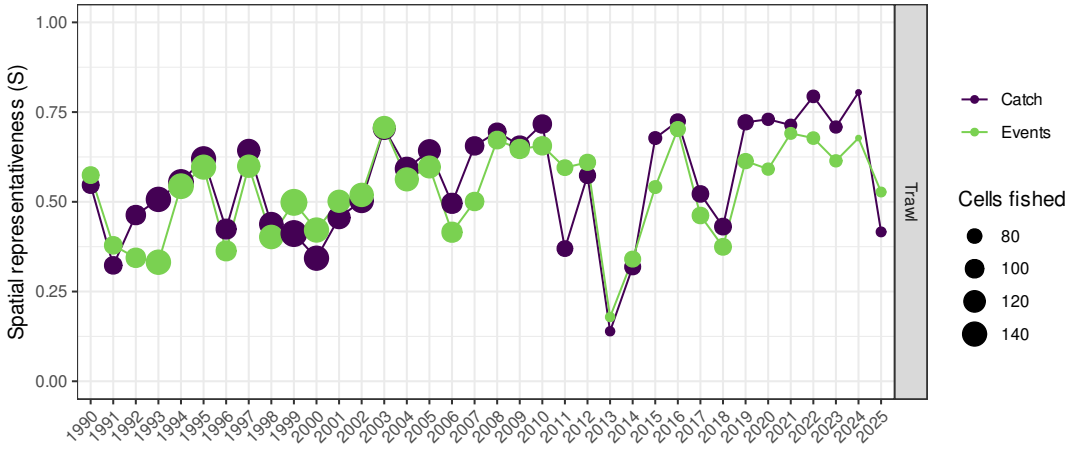


Figure 5: Spatial representativeness of observer sampling of orange roughy by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.

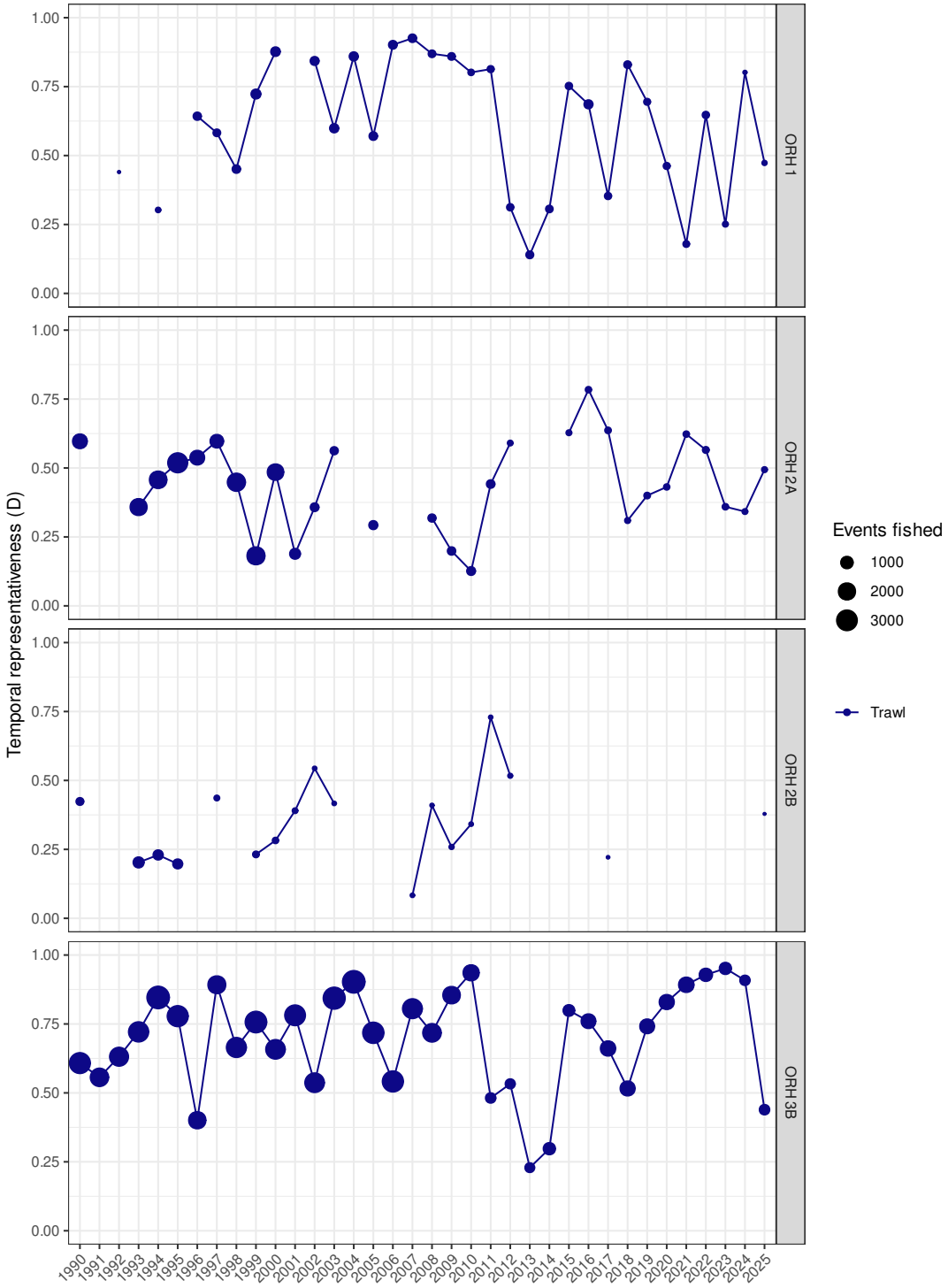


Figure 6: Temporal representativeness of observer sanpling of orange roughy by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.1.1 ORH 1: Trawl fishery

2.1.1.1 Length-frequency samples

Table 1: Length-frequency samples of orange roughy from the ORH 1 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of orange roughy exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	117	0	0	0.00
1991	82	0	0	0.00
1992	20	1	1	5.00
1993	197	0	0	0.00
1994	142	2	230	1.41
1995	104	0	0	0.00
1996	389	68	3 380	17.48
1997	332	27	2 558	8.13
1998	421	11	1 191	2.61
1999	606	51	5 052	8.42
2000	557	224	9 720	40.22
2001	209	0	0	0.00
2002	460	52	3 447	11.30
2003	503	116	7 131	23.06
2004	502	90	3 576	17.93
2005	433	56	3 121	12.93
2006	444	108	5 414	24.32
2007	424	182	10 131	42.92
2008	325	109	8 562	33.54
2009	332	87	7 035	26.20
2010	223	62	4 956	27.80
2011	275	36	2 722	13.09
2012	297	42	2 086	14.14
2013	350	3	204	0.86
2014	320	5	284	1.56
2015	294	55	3 039	18.71
2016	486	81	4 682	16.67
2017	287	4	233	1.39
2018	332	34	1 390	10.24
2019	252	13	564	5.16
2020	273	18	1 025	6.59
2021	245	7	358	2.86
2022	290	14	966	4.83
2023	175	9	632	5.14
2024	73	12	910	16.44
2025	130	4	270	3.08

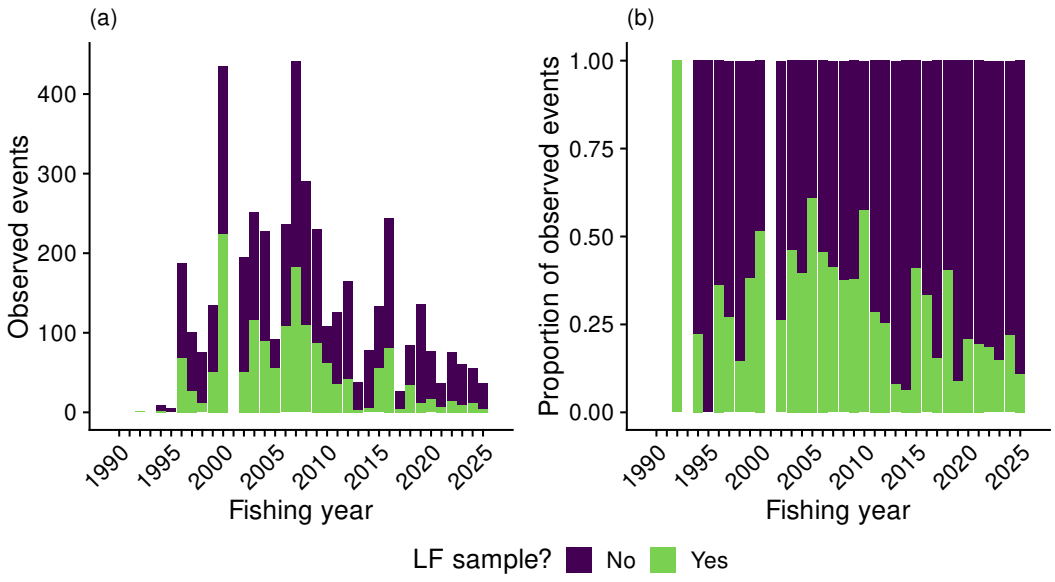


Figure 7: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in ORH 1 where the orange roughy catch exceeded the 40 kg threshold, with and without length-frequency sampling.**

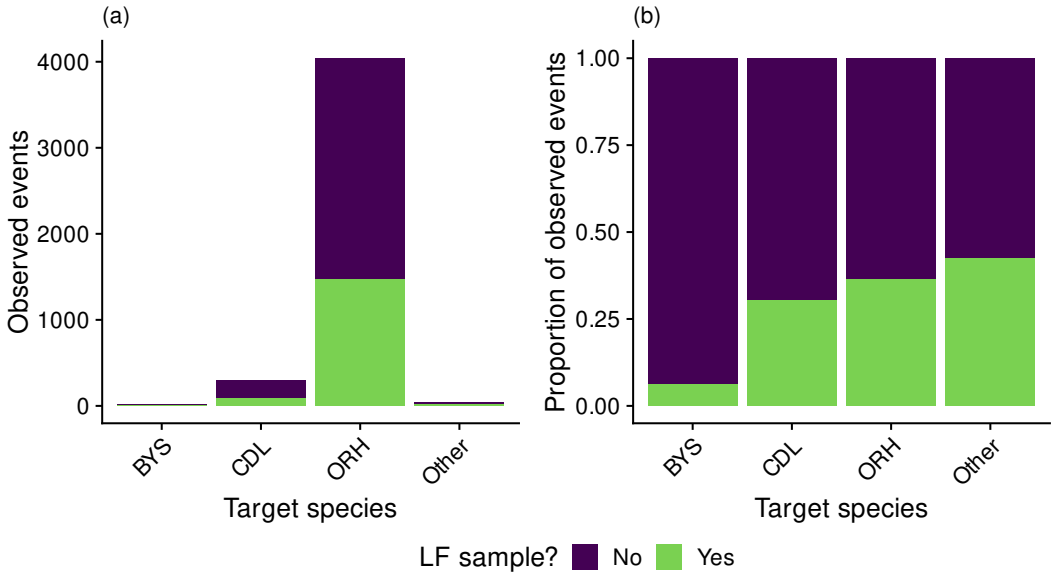


Figure 8: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in ORH 1 where the orange roughy catch exceeded the 40 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

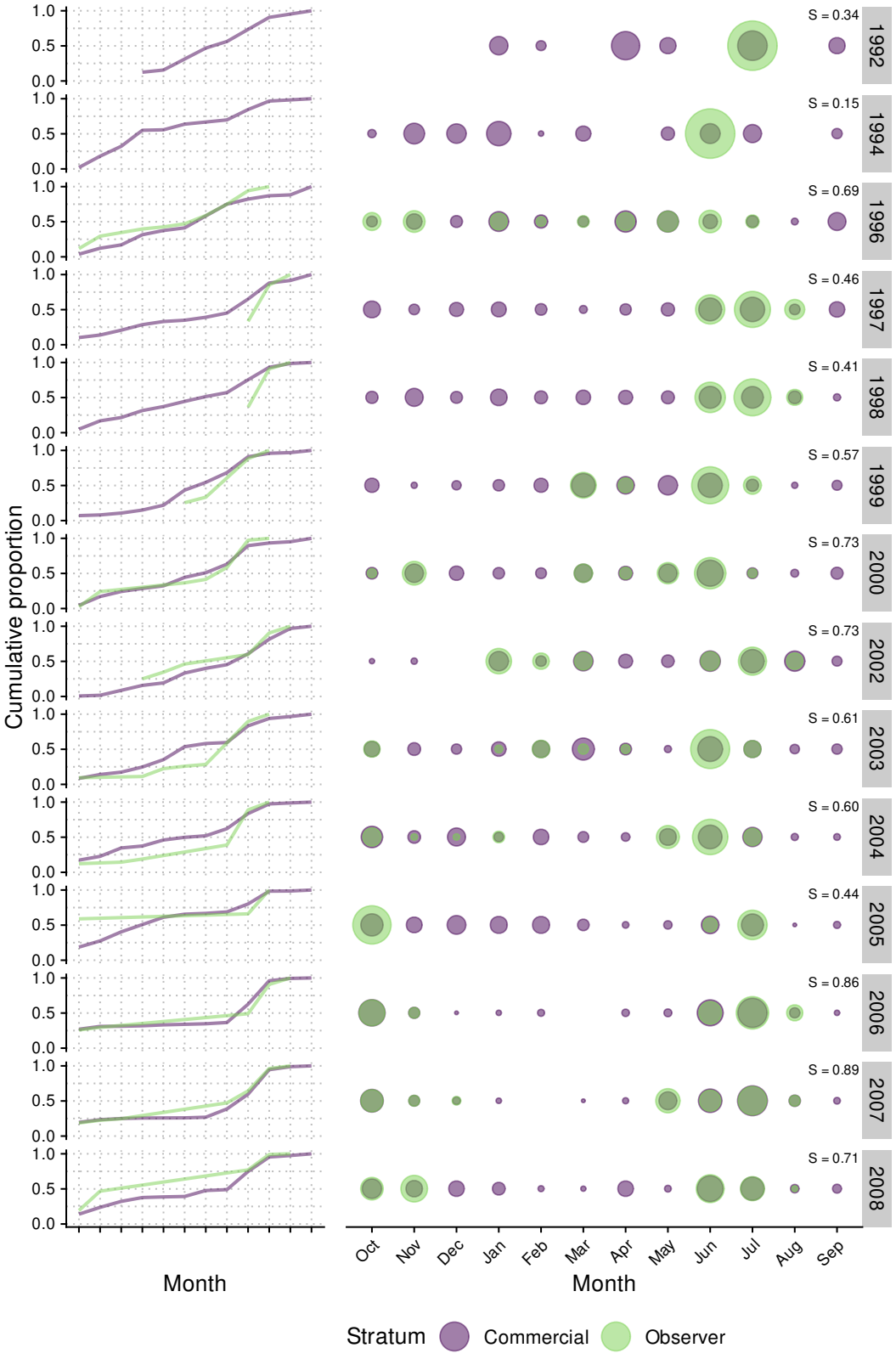


Figure 9: Monthly representativeness of observer sampling coverage of Trawl fishing events in ORH 1, where the orange roughy catch exceeded the 40kg threshold, in 1992 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

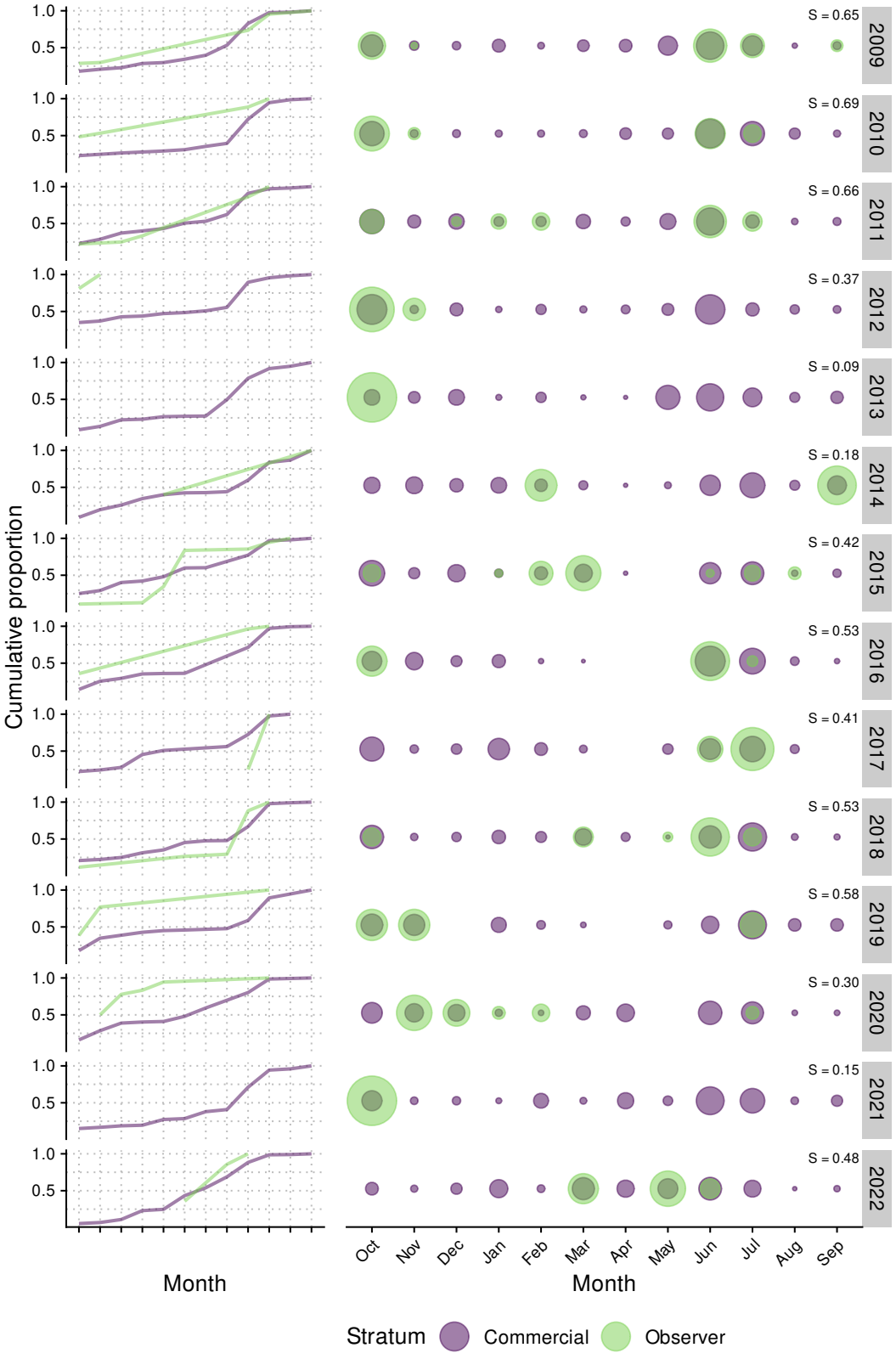


Figure 10: Monthly representativeness of observer sampling coverage of Trawl fishing events in ORH 1, where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

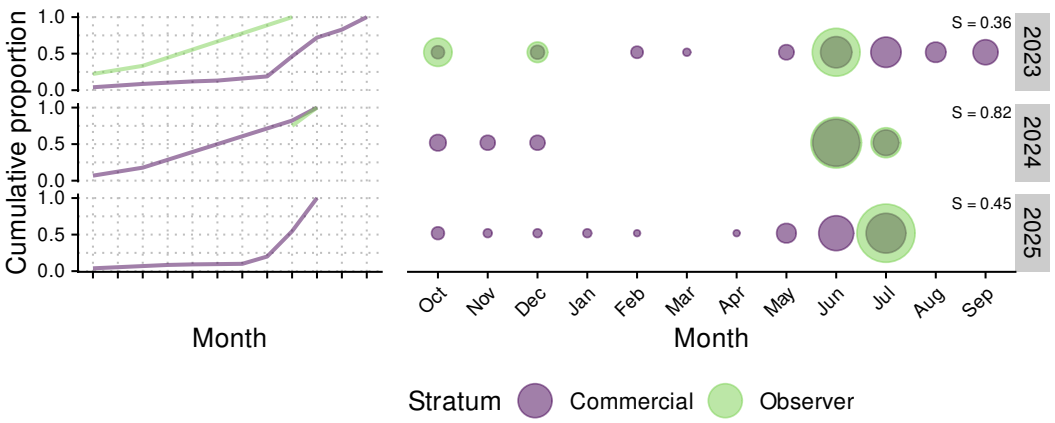


Figure 11: Monthly representativeness of observer sampling coverage of Trawl fishing events in ORH 1, where the orange roughy catch exceeded the 40kg threshold, in 2023 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

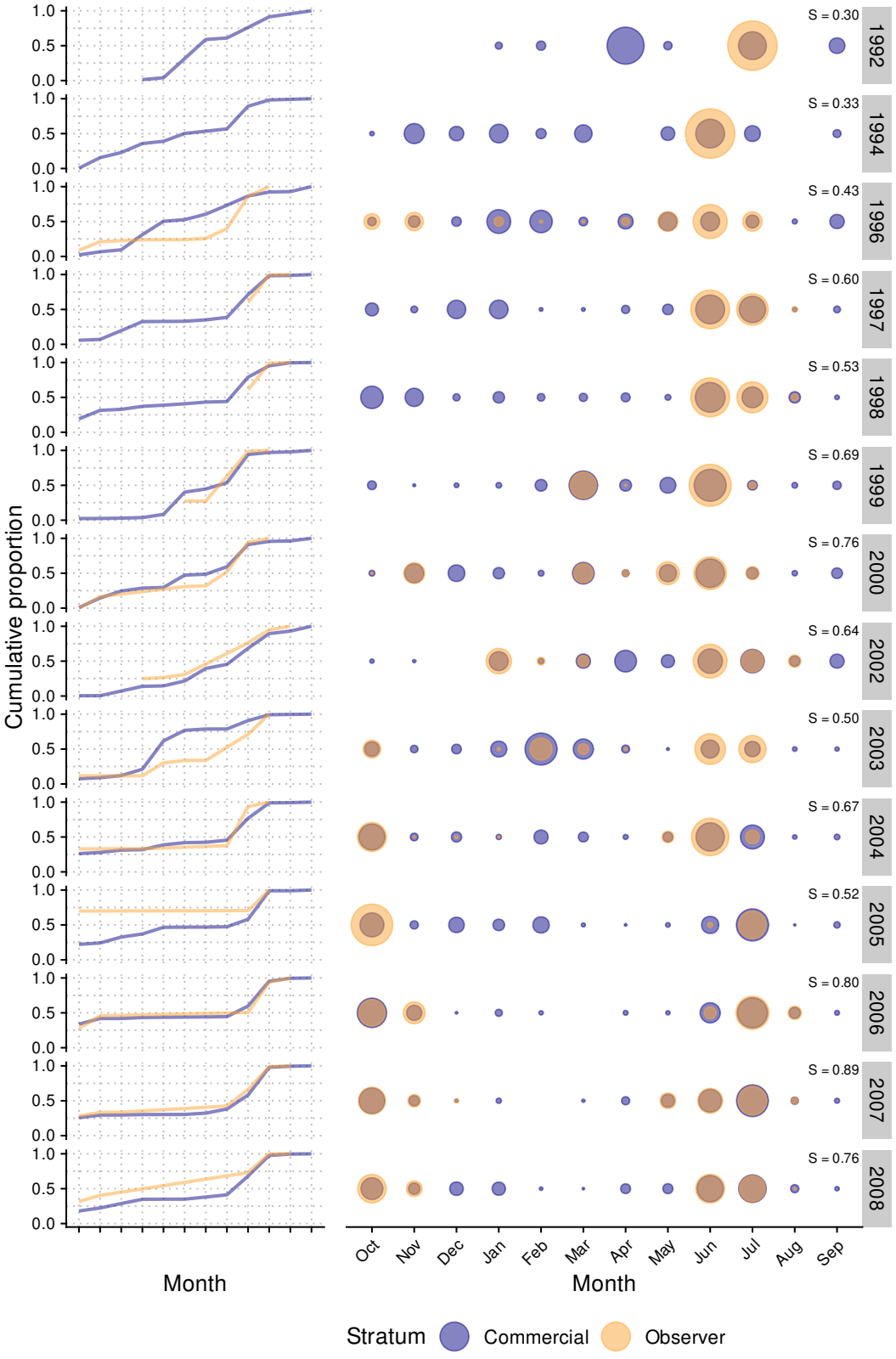


Figure 12: Monthly representativeness of observer sampling coverage of Trawl catch in ORH 1, from events where the orange roughy catch exceeded the 40kg threshold, in 1992 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

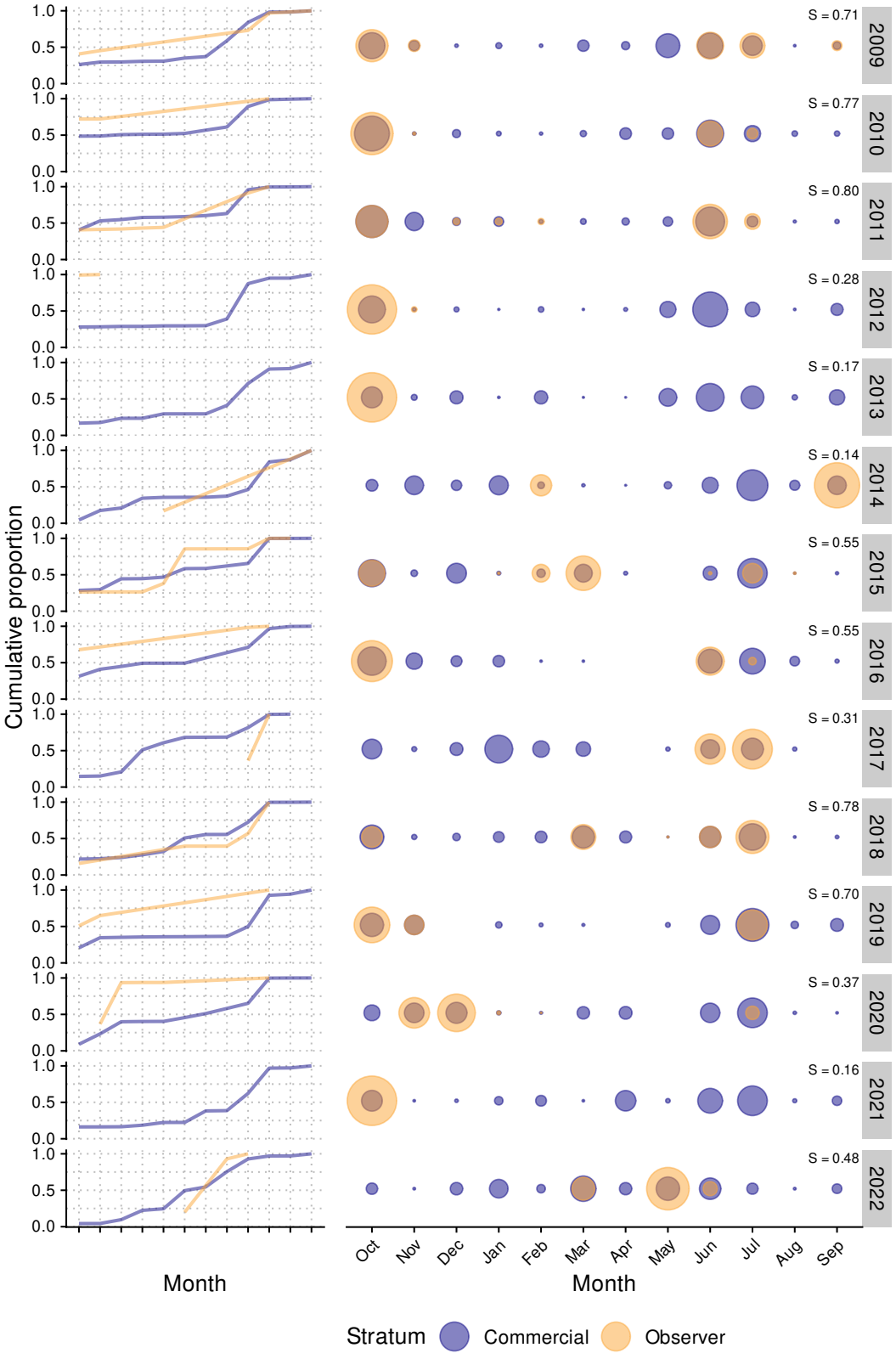


Figure 13: Monthly representativeness of observer sampling coverage of Trawl catch in ORH 1, from events where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

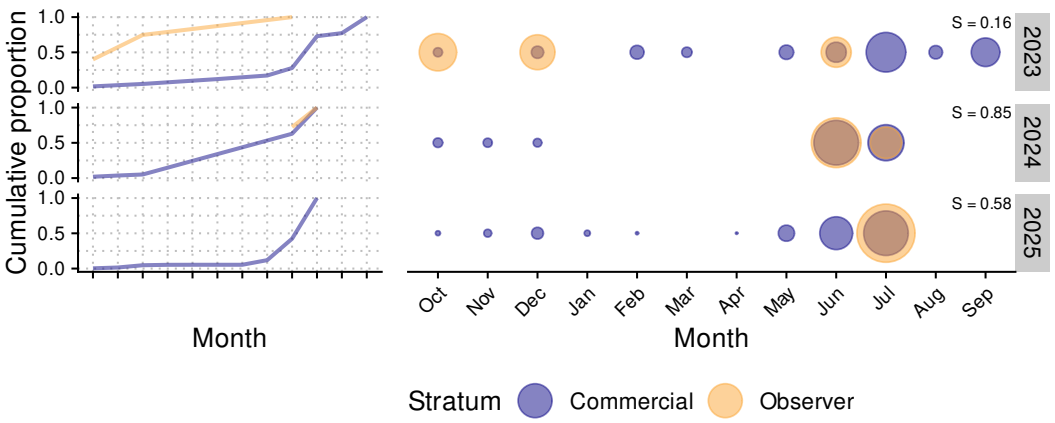


Figure 14: Monthly representativeness of observer sampling coverage of Trawl catch in ORH 1, from events where the orange roughy catch exceeded the 40kg threshold, in 2023 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

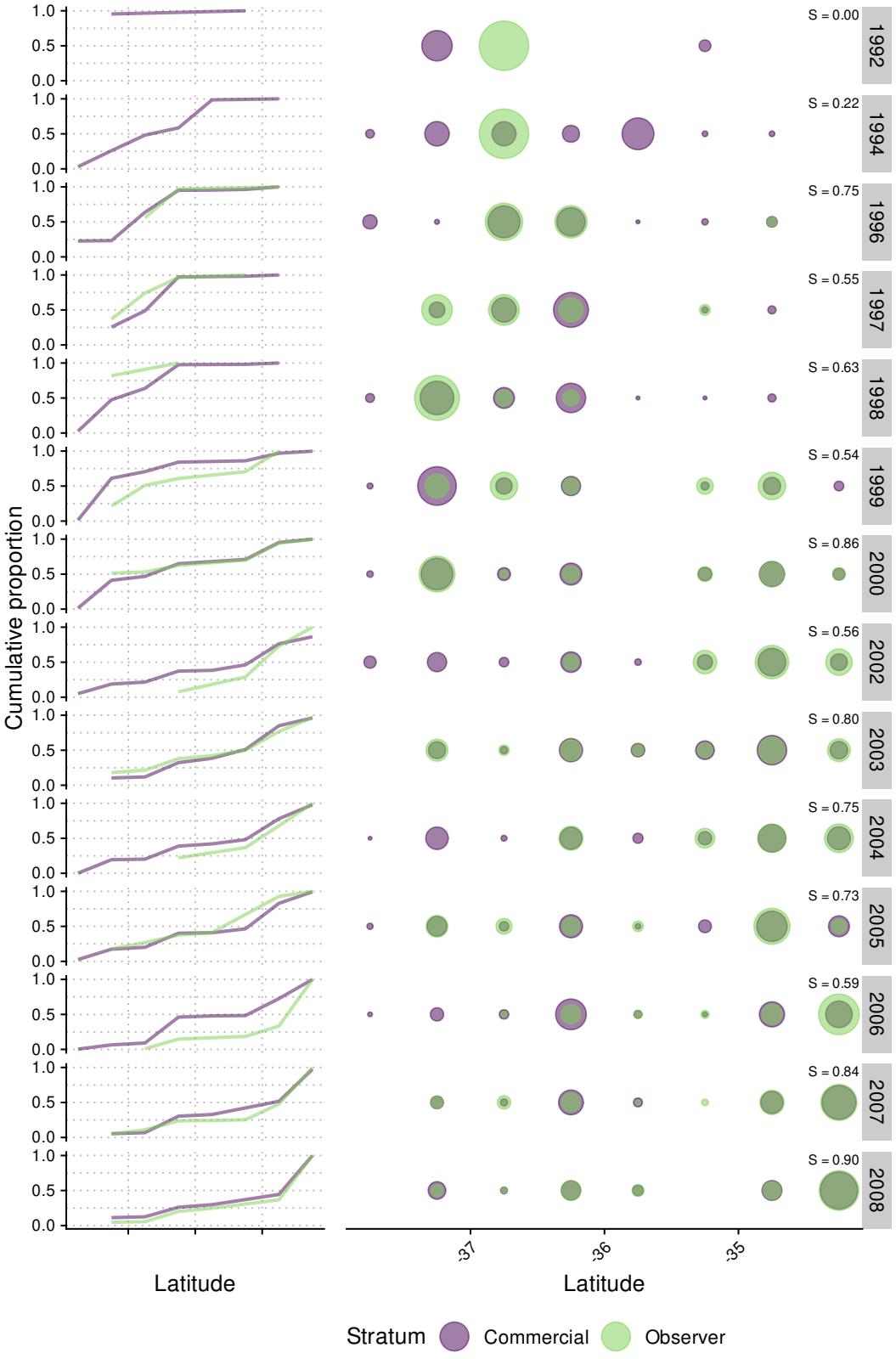


Figure 15: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 1, where the orange roughy catch exceeded the 40kg threshold, in 1992 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

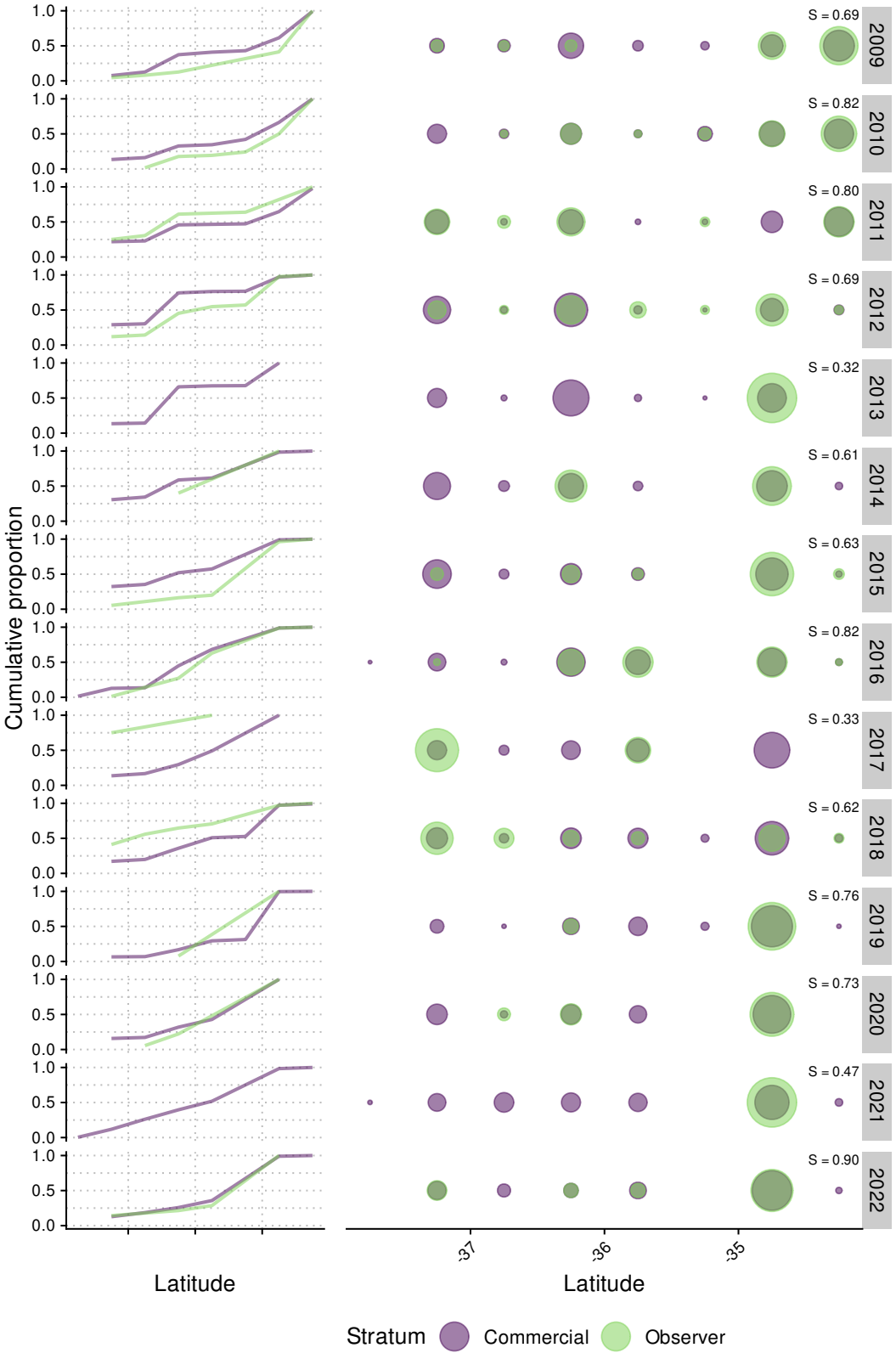


Figure 16: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 1, where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

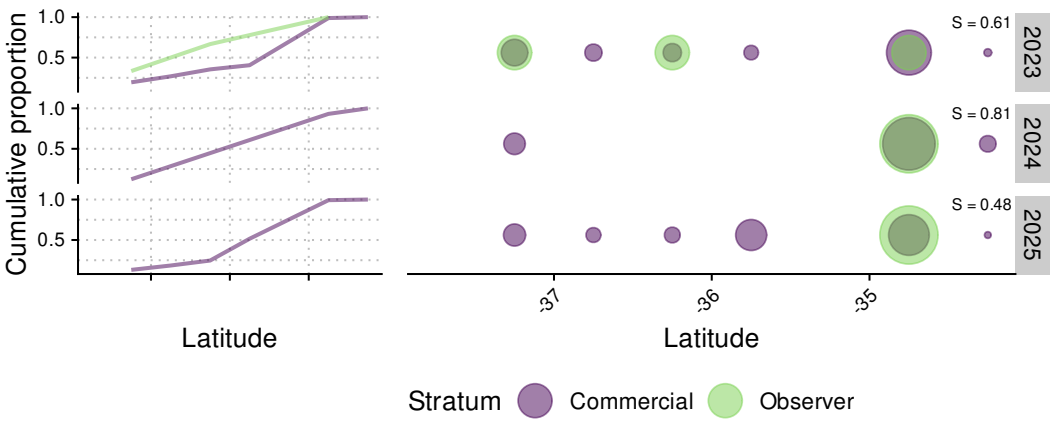


Figure 17: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 1, where the orange roughy catch exceeded the 40kg threshold, in 2023 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

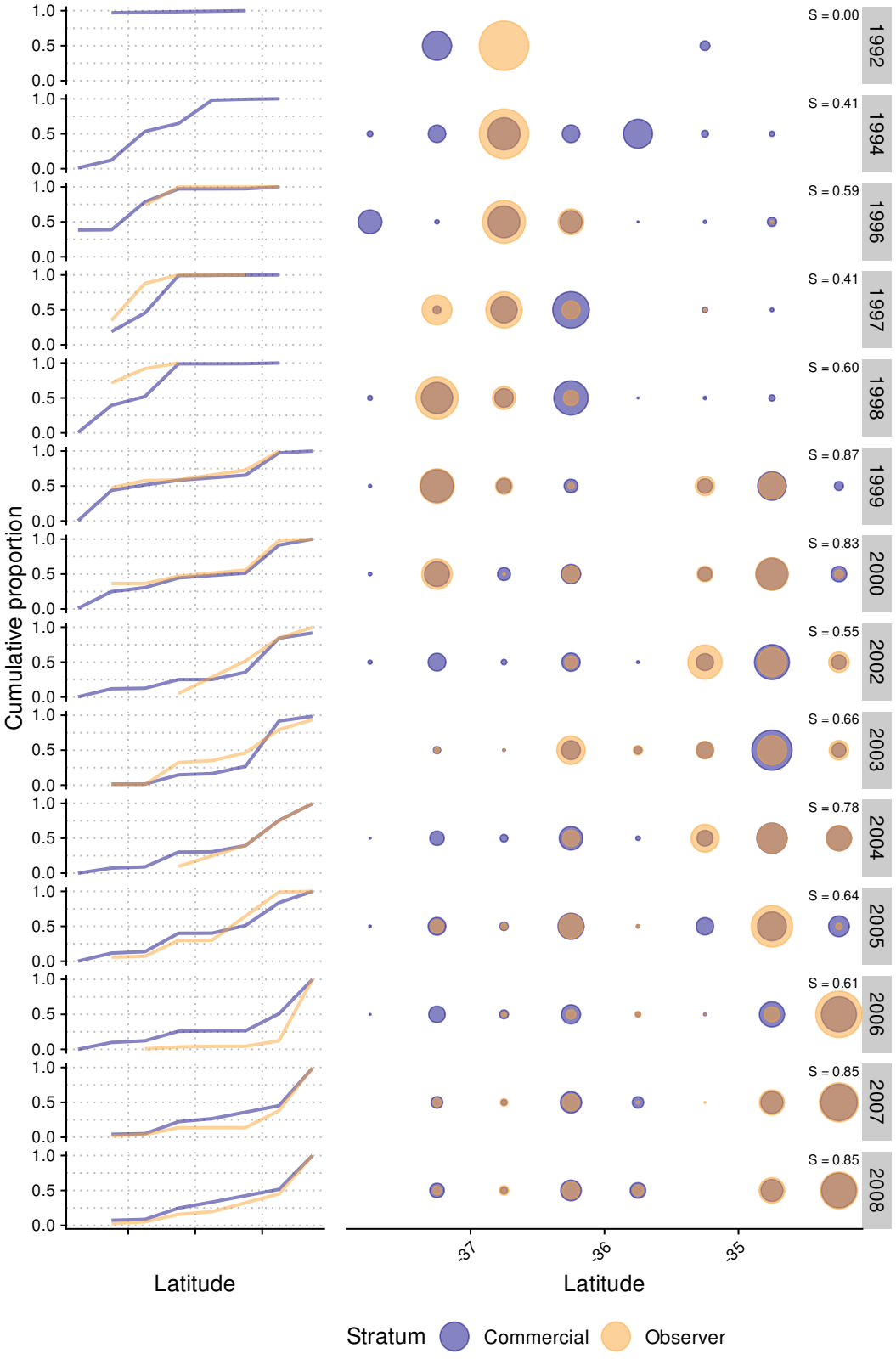


Figure 18: Latitudinal representativeness of observer sampling coverage of Trawl catch in ORH 1, from events where the orange roughy catch exceeded the 40kg threshold, in 1992 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

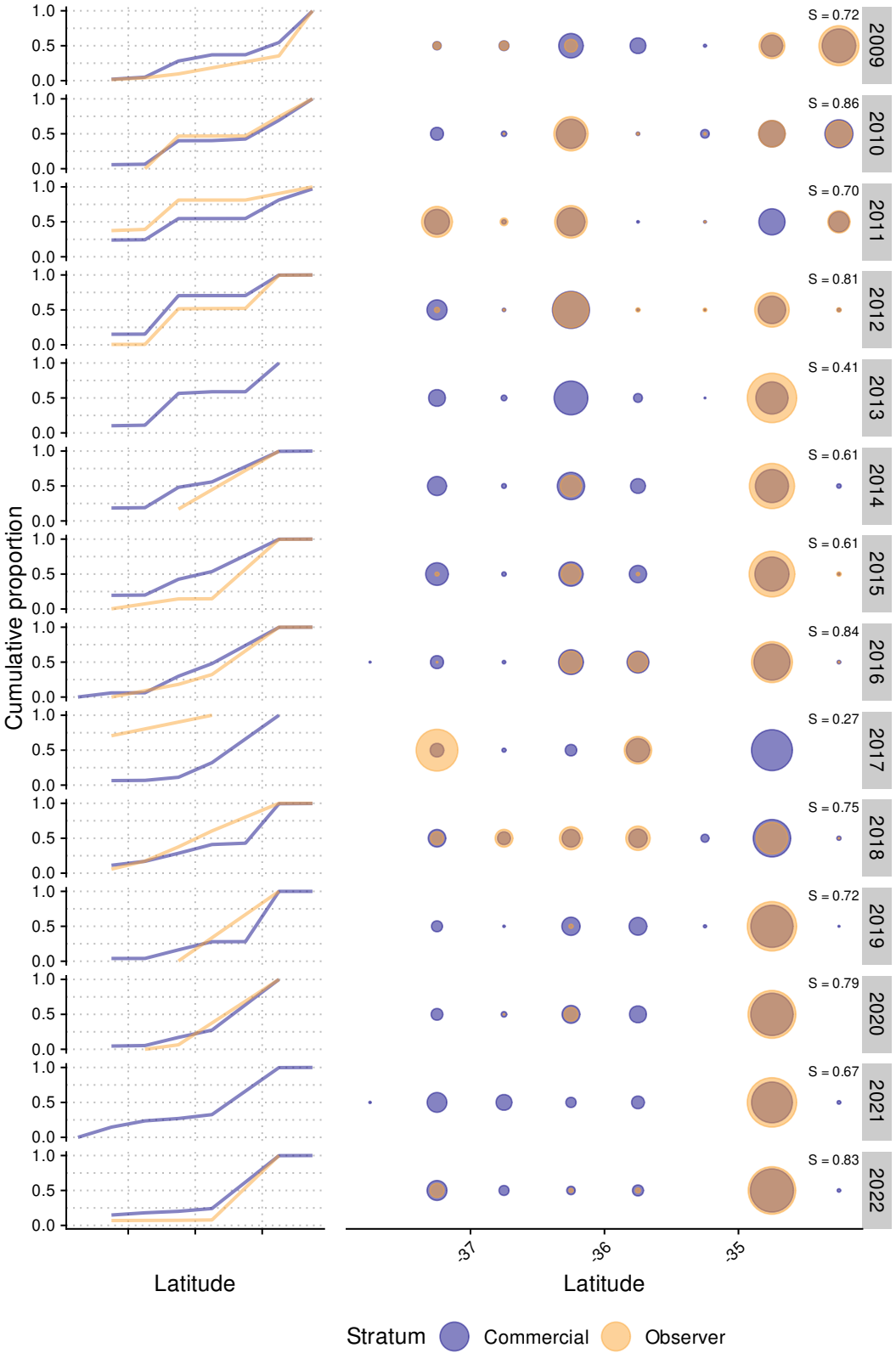


Figure 19: Latitudinal representativeness of observer sampling coverage of Trawl catch in ORH 1, from events where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

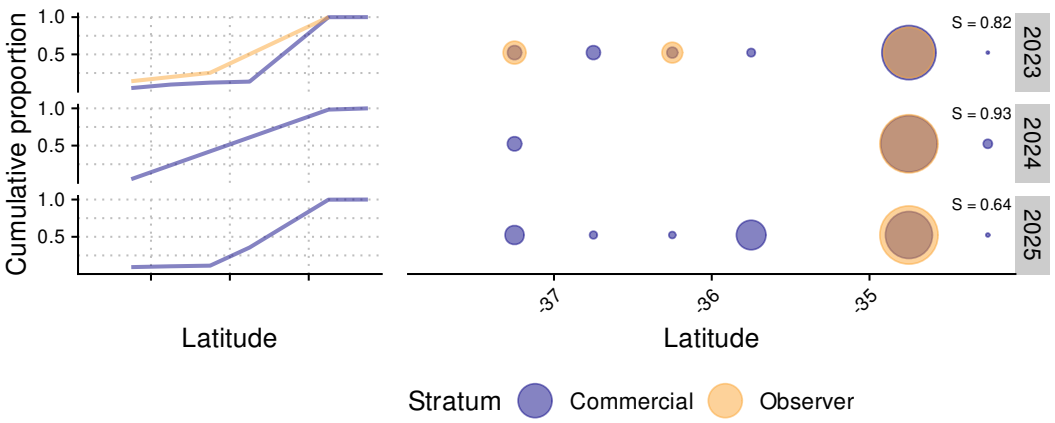


Figure 20: Latitudinal representativeness of observer sampling coverage of Trawl catch in ORH 1, from events where the orange roughy catch exceeded the 40kg threshold, in 2023 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

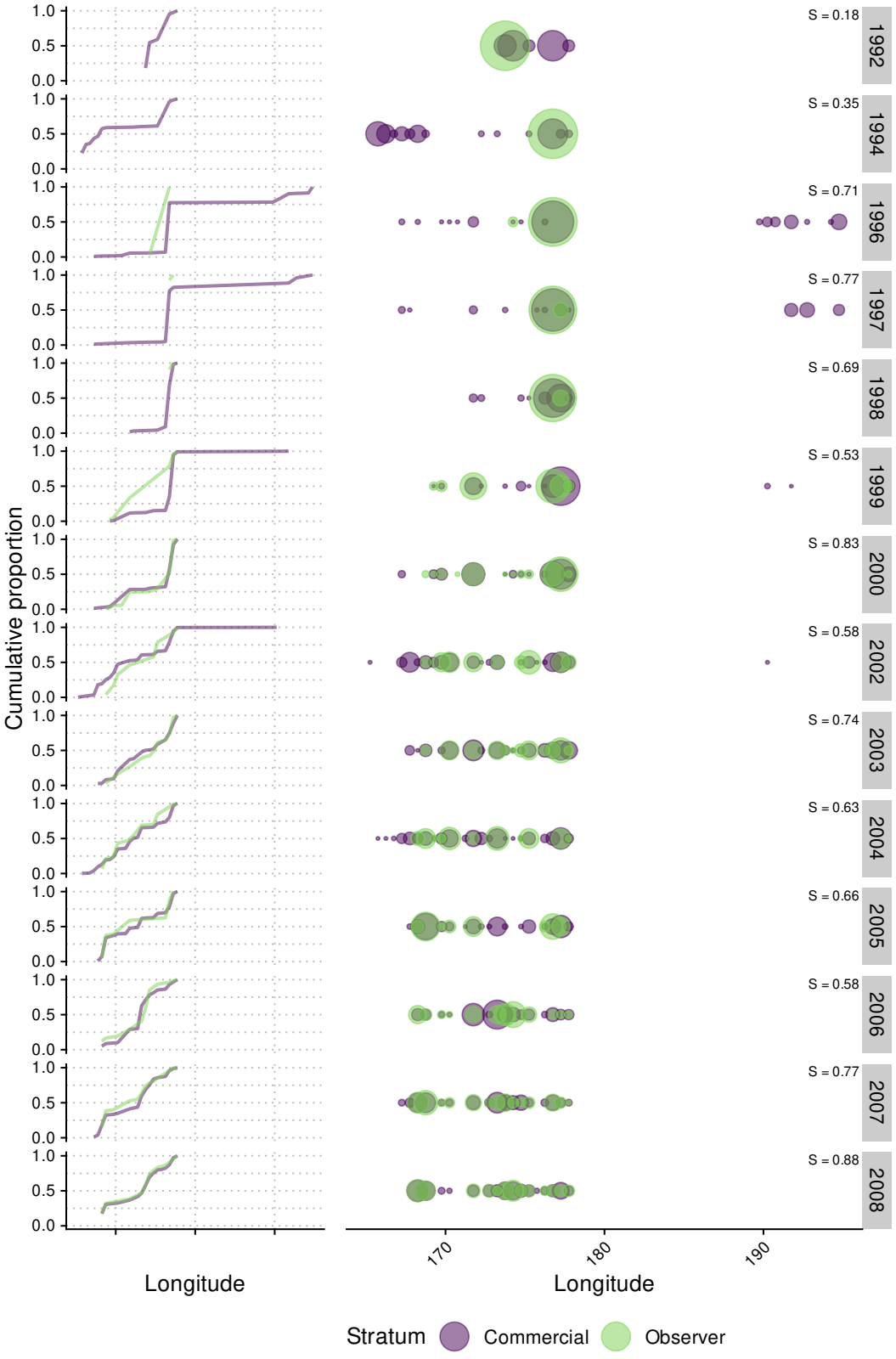


Figure 21: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 1, where the orange roughy catch exceeded the 40kg threshold, in 1992 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

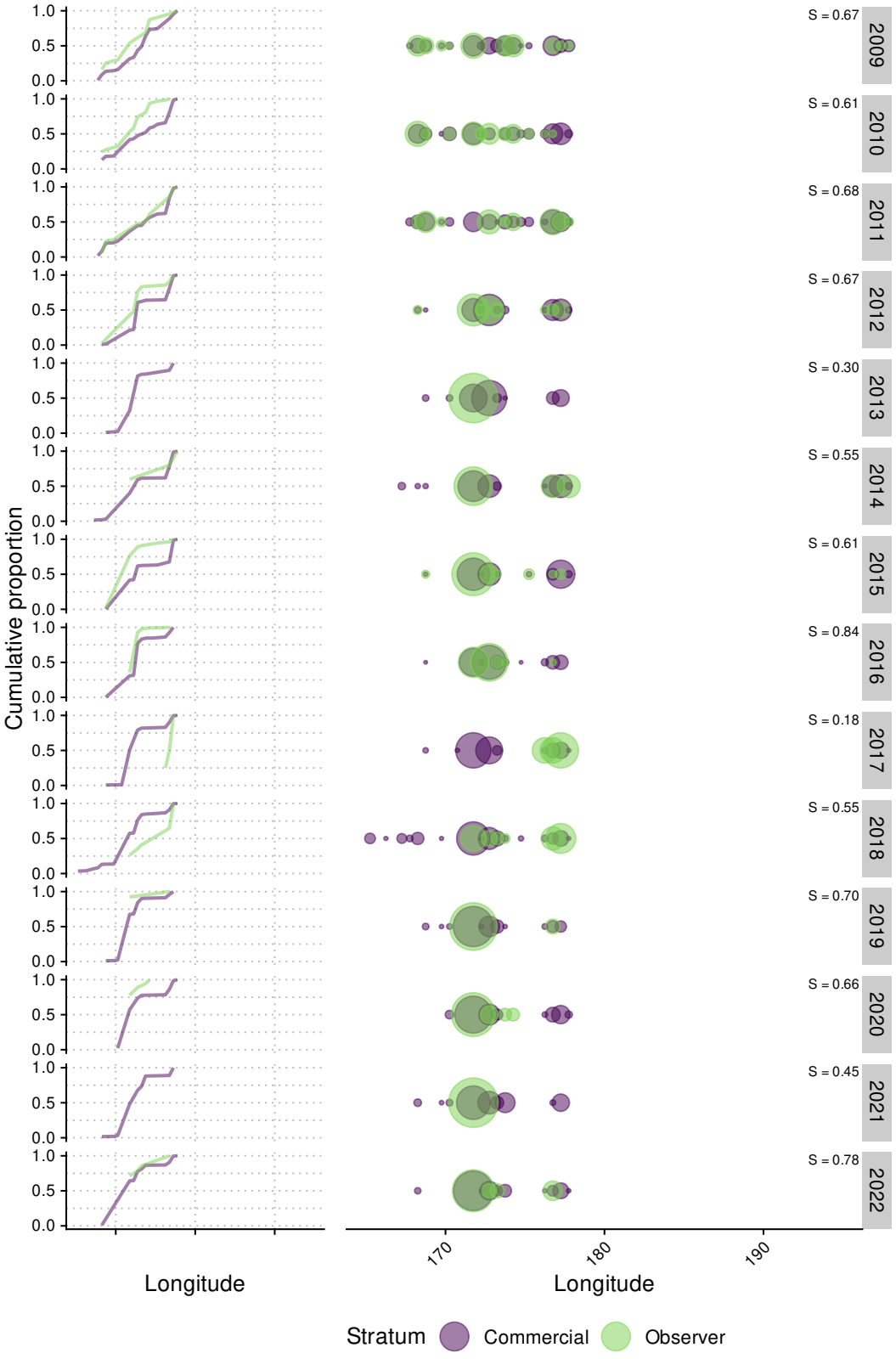


Figure 22: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 1, where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

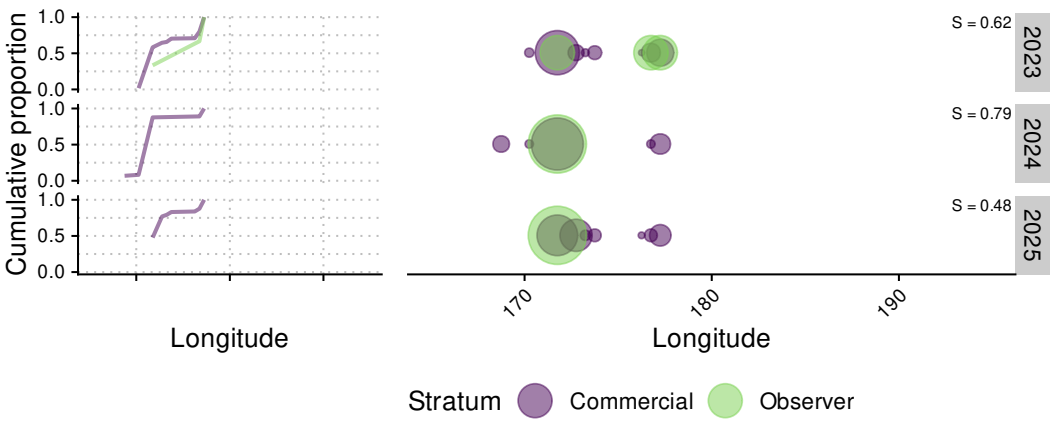


Figure 23: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 1, where the orange roughy catch exceeded the 40kg threshold, in 2023 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

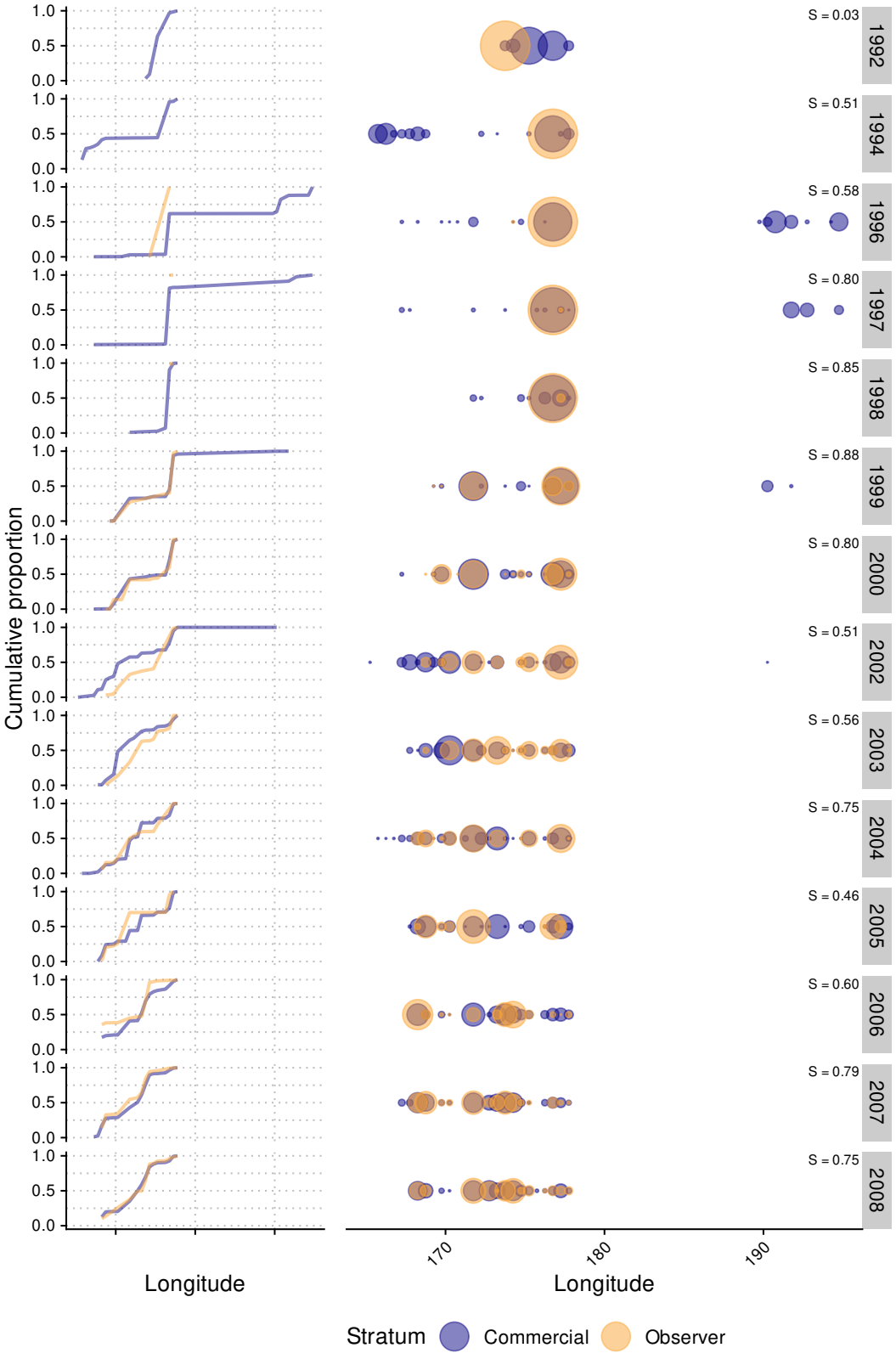


Figure 24: Longitudinal representativeness of observer sampling coverage of Trawl catch in ORH 1, from events where the orange roughy catch exceeded the 40kg threshold, in 1992 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

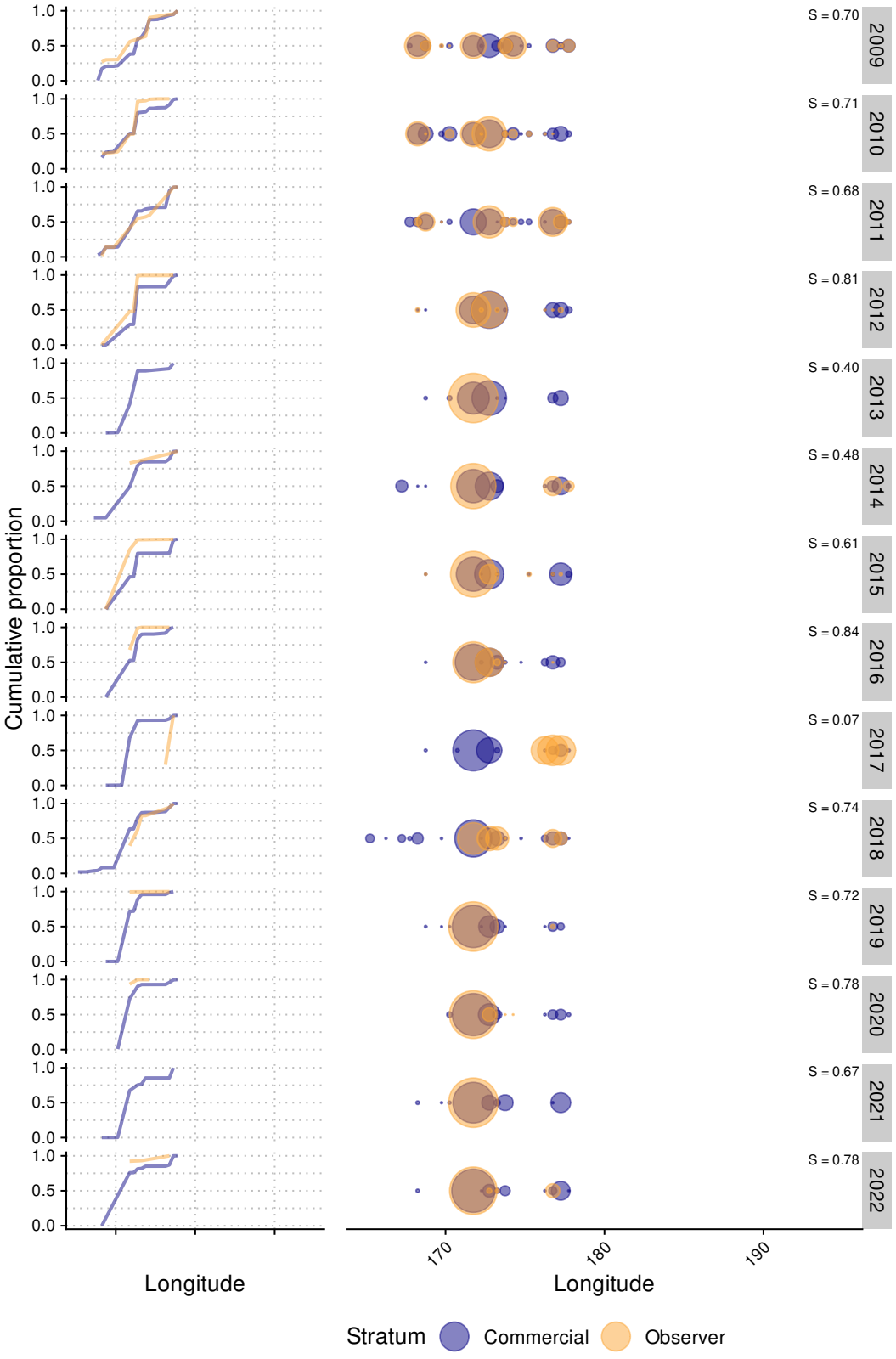


Figure 25: Longitudinal representativeness of observer sampling coverage of Trawl catch in ORH 1, from events where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

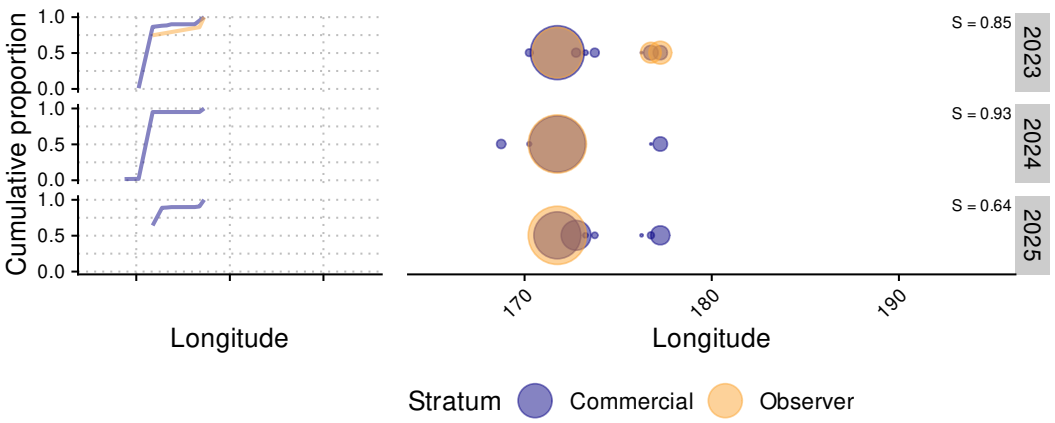


Figure 26: **Longitudinal representativeness of observer sampling coverage of Trawl catch in ORH 1, from events where the orange roughy catch exceeded the 40kg threshold, in 2023 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

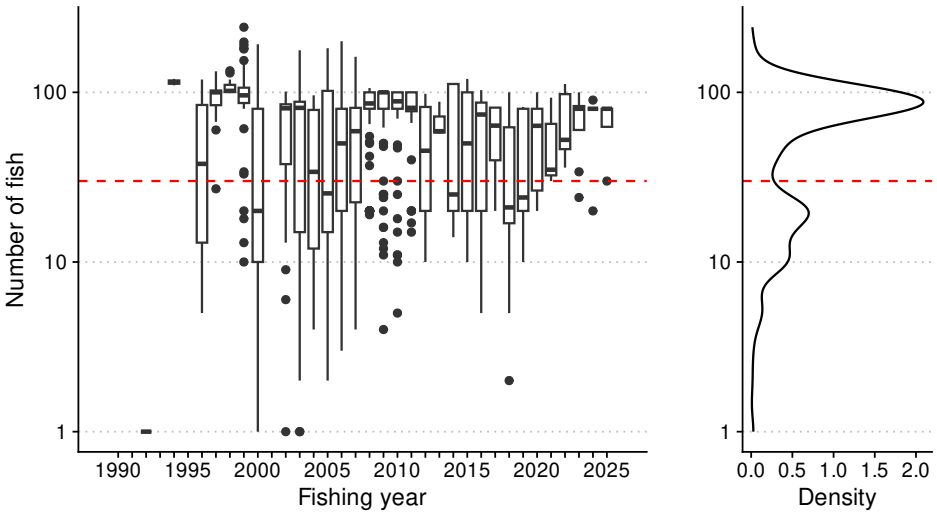


Figure 27: **Length-frequency sample sizes for observed fishing events in ORH 1 where orange roughy were sampled. The red dashed line indicates a sample size of 30 fish.**

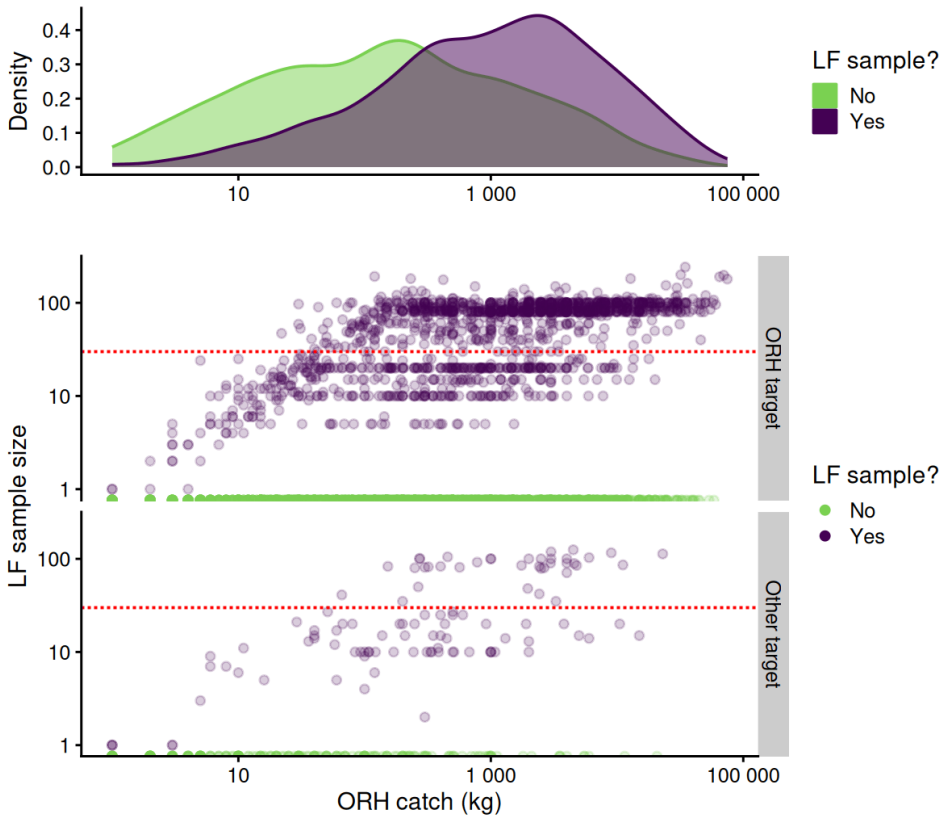


Figure 28: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in ORH 1 in relation to the total orange roughy catch from an event, separately for orange roughy target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.1.1.2 Otolith samples

Table 2: Otolith samples of orange roughy from the ORH 1 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of orange roughy exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	117	0	0	0.00
1991	82	0	0	0.00
1992	20	0	0	0.00
1993	197	0	0	0.00
1994	142	0	0	0.00
1995	104	0	0	0.00
1996	389	0	0	0.00
1997	332	0	0	0.00
1998	421	0	0	0.00
1999	606	0	0	0.00
2000	557	0	0	0.00
2001	209	0	0	0.00
2002	460	0	0	0.00
2003	503	0	0	0.00
2004	502	0	0	0.00
2005	433	0	0	0.00
2006	444	0	0	0.00
2007	424	0	0	0.00
2008	325	0	0	0.00
2009	332	0	0	0.00
2010	223	0	0	0.00
2011	275	0	0	0.00
2012	297	0	0	0.00
2013	350	0	0	0.00
2014	320	2	14	0.62
2015	294	0	0	0.00
2016	486	27	395	5.56
2017	287	2	30	0.70
2018	332	21	222	6.33
2019	252	10	109	3.97
2020	273	4	65	1.47
2021	245	0	0	0.00
2022	290	6	123	2.07
2023	175	7	123	4.00
2024	73	12	225	16.44
2025	130	4	64	3.08

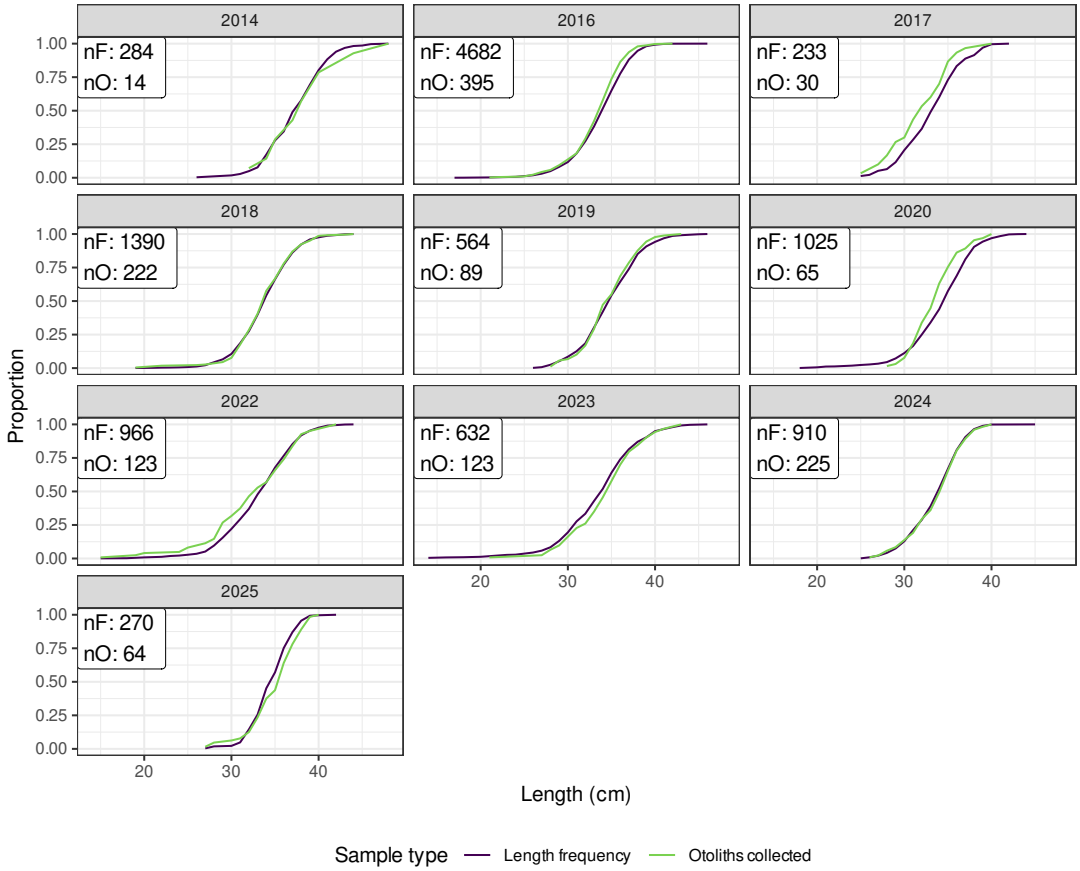


Figure 29: Cumulative distributions of the length of fish in the length frequency and otolith samples of orange roughy in the ORH 1 Trawl fishery for the 2014 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.1.1.3 Catch quantification

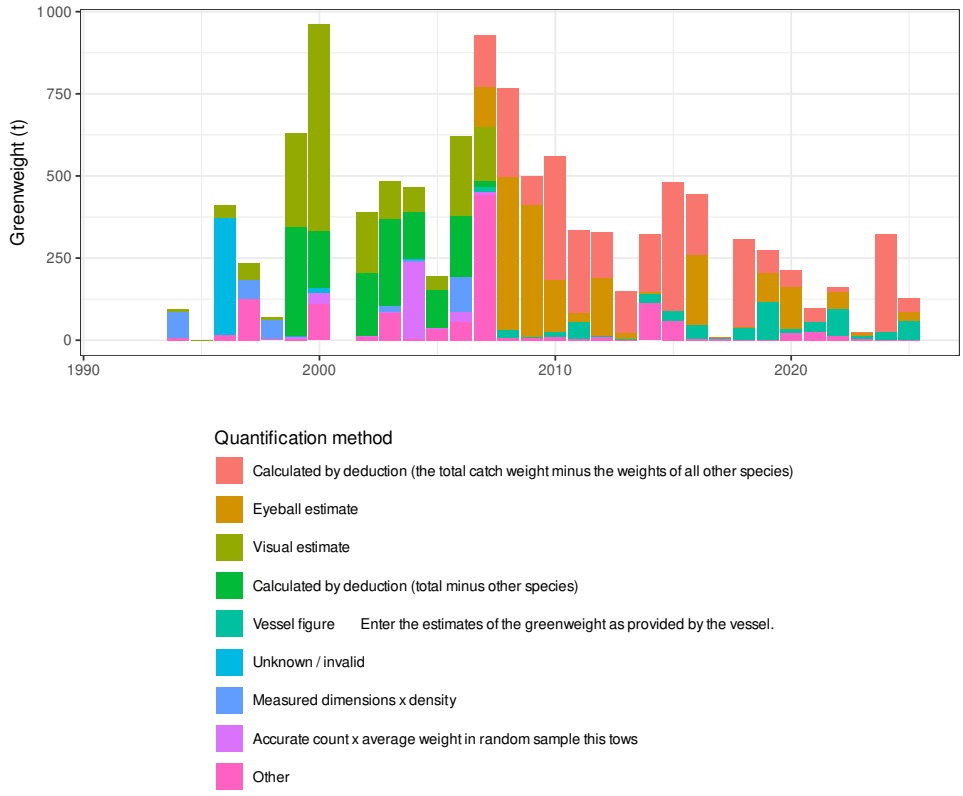


Figure 30: Methods used by observers to quantify the catch of orange roughy in the ORH 1 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.1.2 ORH 2A: Trawl fishery

2.1.2.1 Length-frequency samples

Table 3: Length-frequency samples of orange roughy from the ORH 2A Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of orange roughy exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	1 455	30	2 357	2.06
1991	1 603	0	0	0.00
1992	1 782	0	0	0.00
1993	1 977	2	180	0.10
1994	2 097	23	3 388	1.10
1995	2 789	72	5 763	2.58
1996	1 412	13	1 205	0.92
1997	1 213	18	1 600	1.48
1998	2 278	9	756	0.40
1999	2 220	27	2 284	1.22
2000	1 849	39	2 765	2.11
2001	739	7	580	0.95
2002	451	9	510	2.00
2003	385	8	657	2.08
2004	362	0	0	0.00
2005	486	5	441	1.03
2006	417	0	0	0.00
2007	395	0	0	0.00
2008	387	25	1 373	6.46
2009	410	13	442	3.17
2010	462	8	706	1.73
2011	428	19	1 241	4.44
2012	166	25	1 922	15.06
2013	286	0	0	0.00
2014	223	0	0	0.00
2015	173	19	1 348	10.98
2016	216	16	1 115	7.41
2017	222	34	1 852	15.32
2018	178	5	154	2.81
2019	236	13	453	5.51
2020	208	5	165	2.40
2021	217	10	808	4.61
2022	254	7	279	2.76
2023	221	9	658	4.07
2024	170	8	483	4.71
2025	178	9	420	5.06

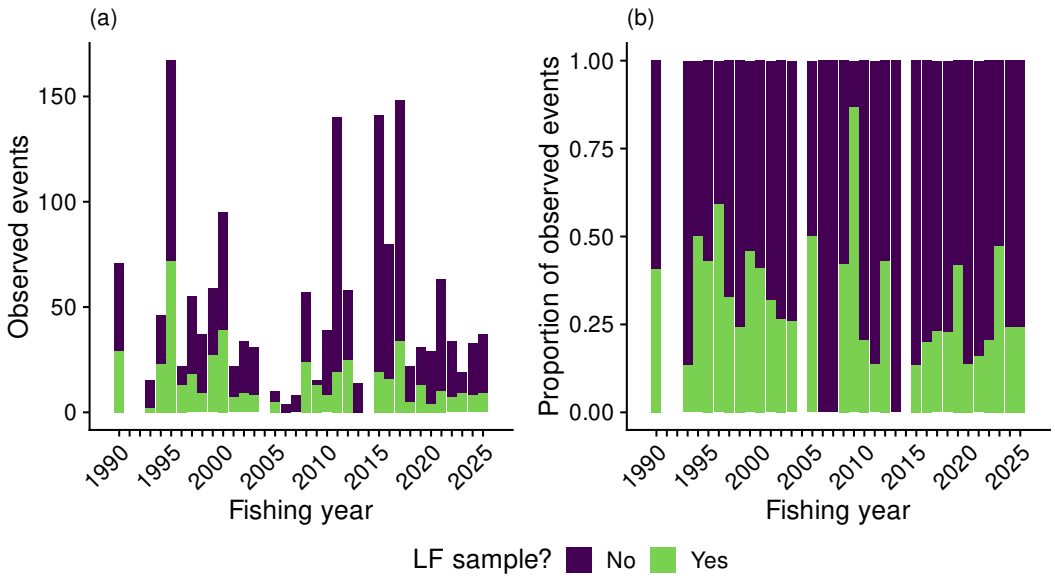


Figure 31: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in ORH 2A where the orange roughy catch exceeded the 40 kg threshold, with and without length-frequency sampling.**

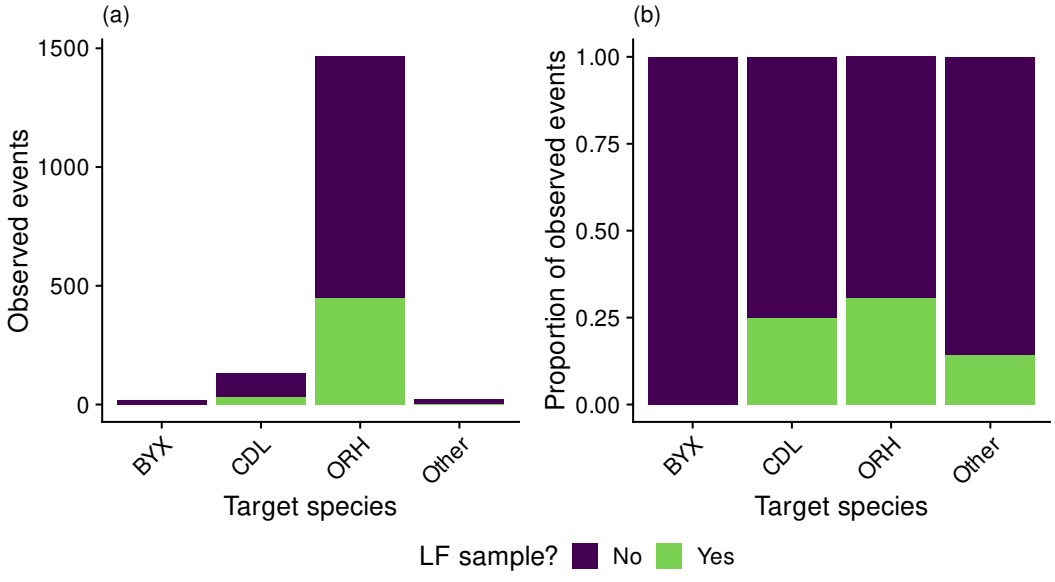


Figure 32: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in ORH 2A where the orange roughy catch exceeded the 40 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

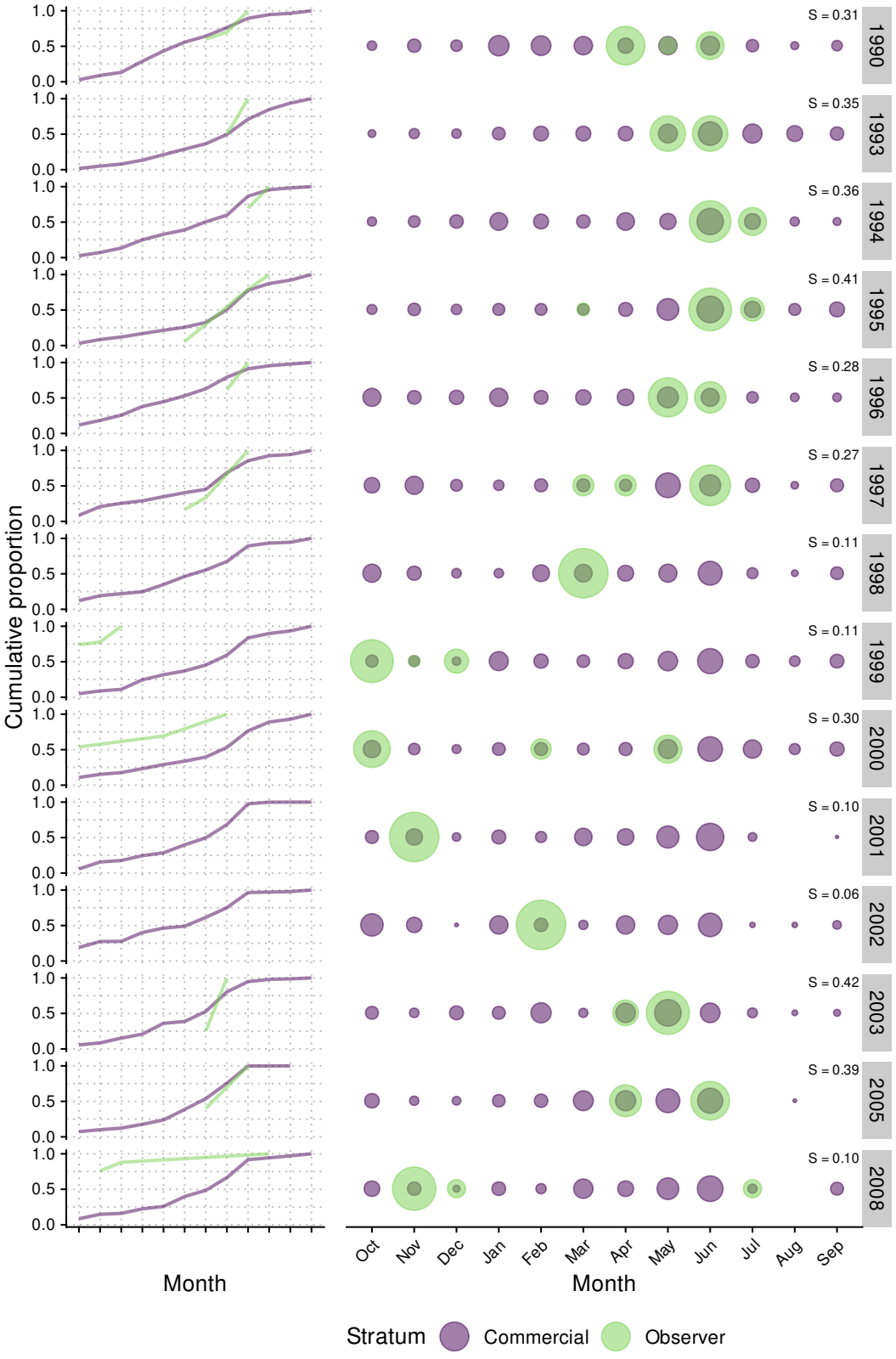


Figure 33: Monthly representativeness of observer sampling coverage of Trawl fishing events in ORH 2A, where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

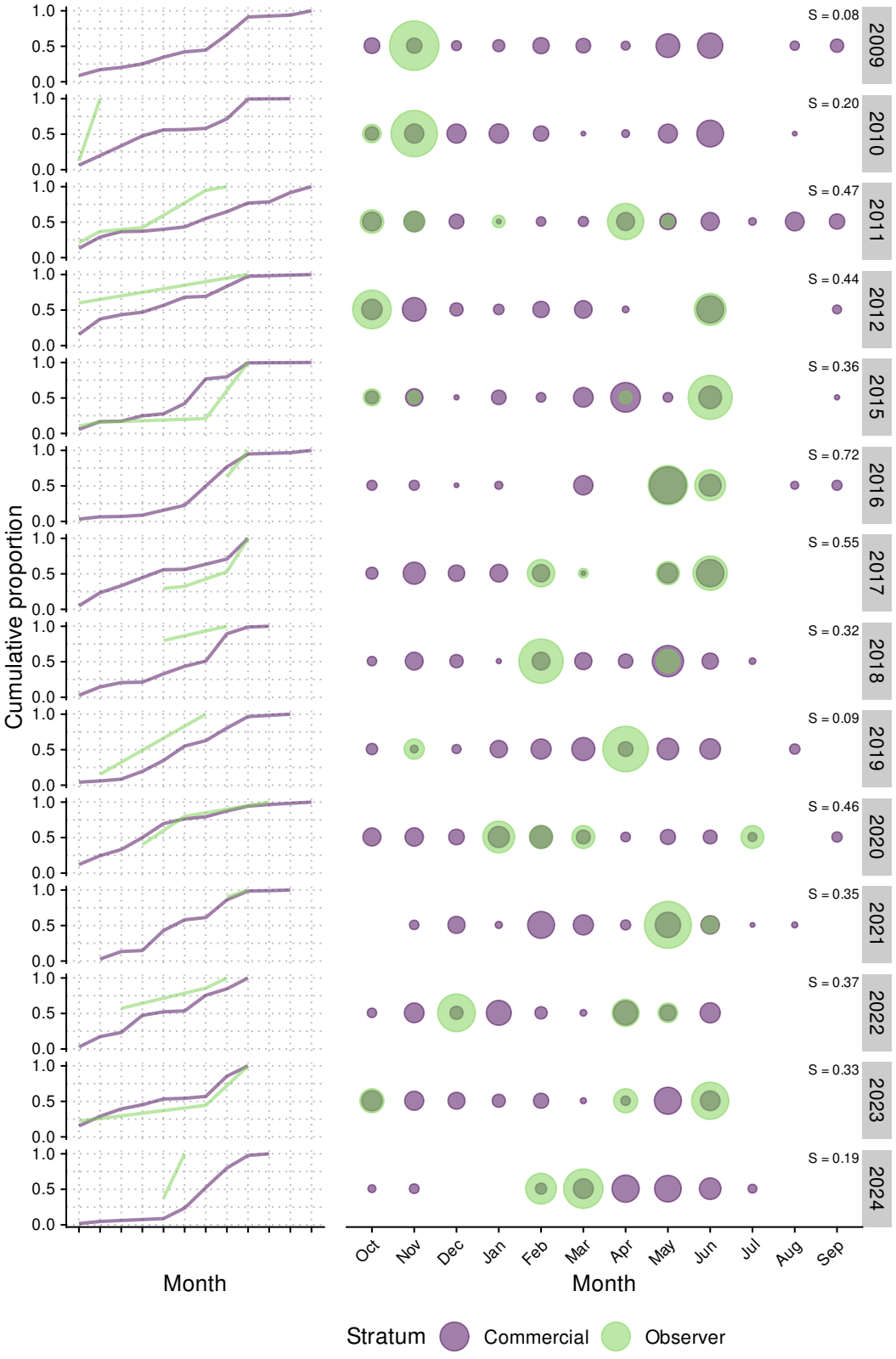


Figure 34: Monthly representativeness of observer sampling coverage of Trawl fishing events in ORH 2A, where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

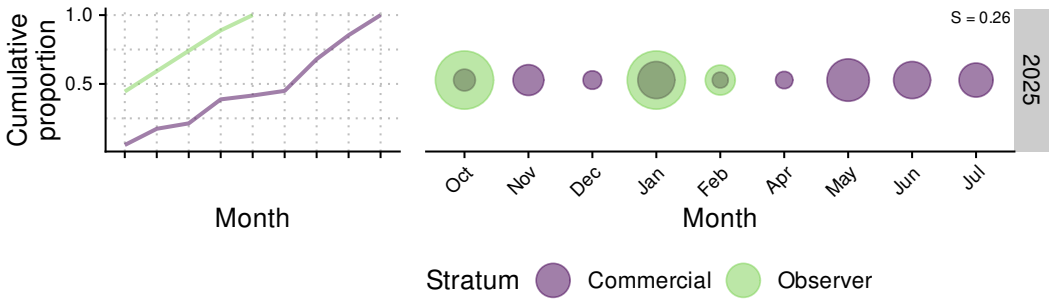


Figure 35: **Monthly representativeness of observer sampling coverage of Trawl fishing events in ORH 2A, where the orange roughy catch exceeded the 40kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

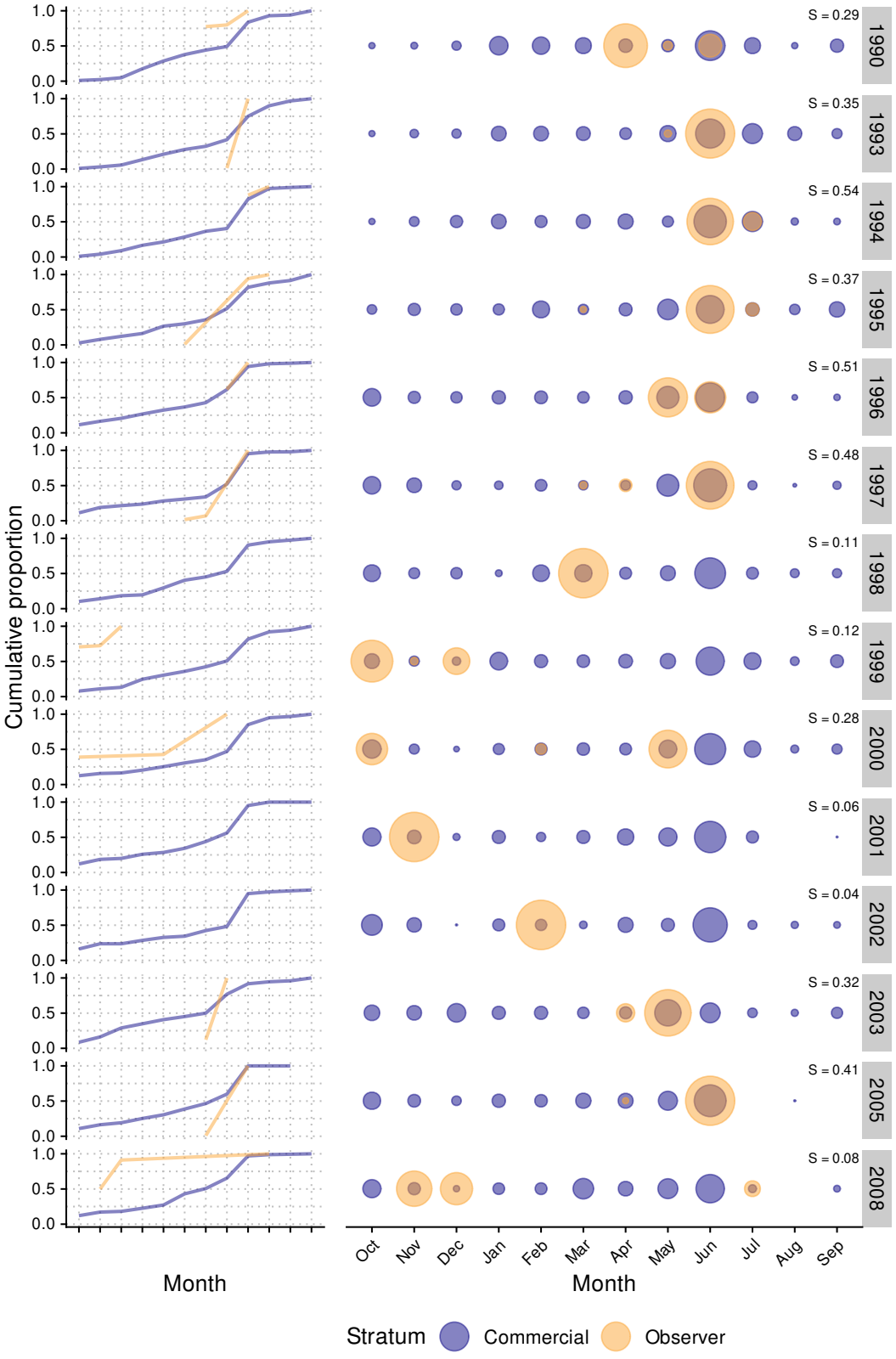


Figure 36: Monthly representativeness of observer sampling coverage of Trawl catch in ORH 2A, from events where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

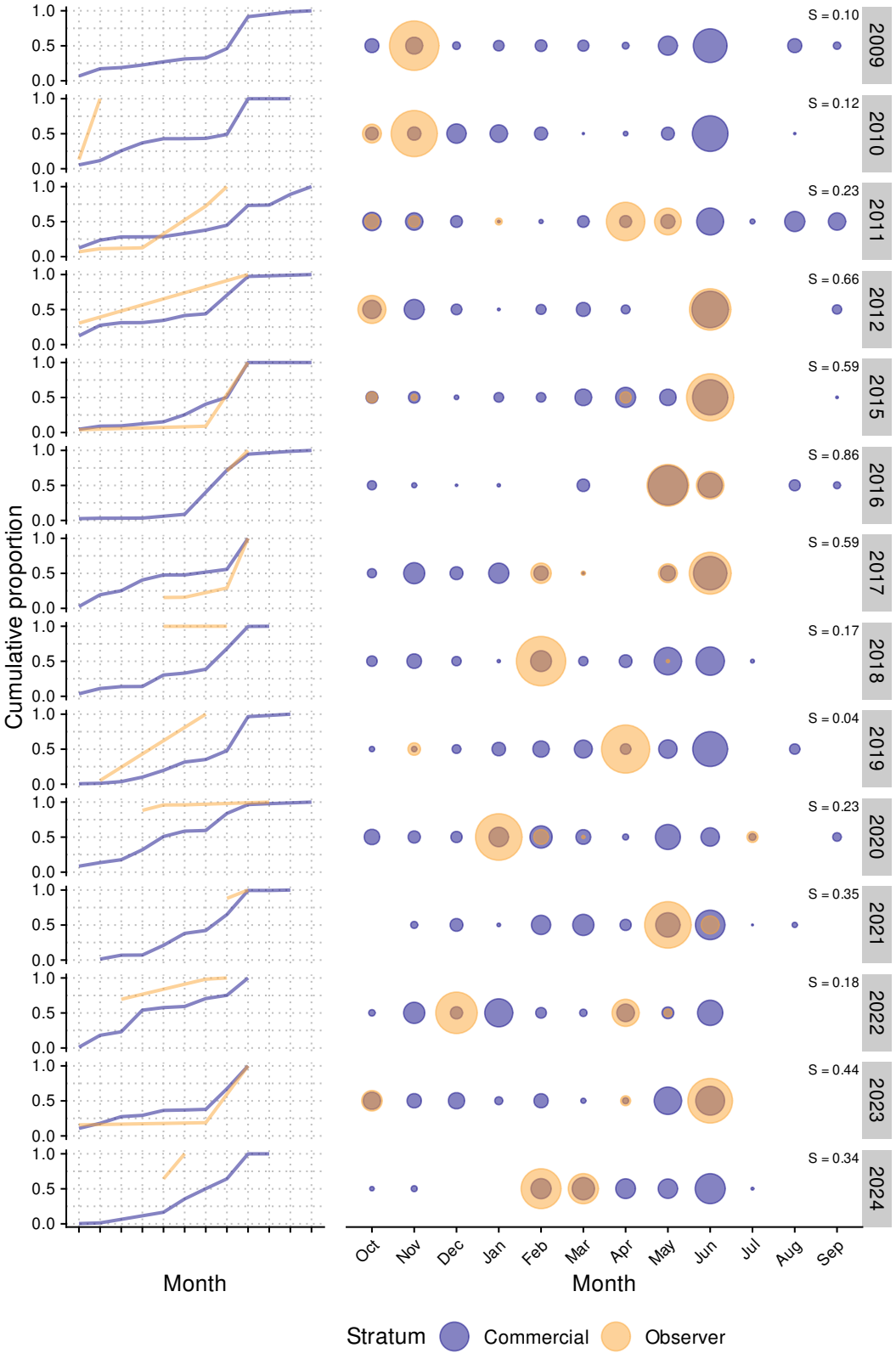


Figure 37: Monthly representativeness of observer sampling coverage of Trawl catch in ORH 2A, from events where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

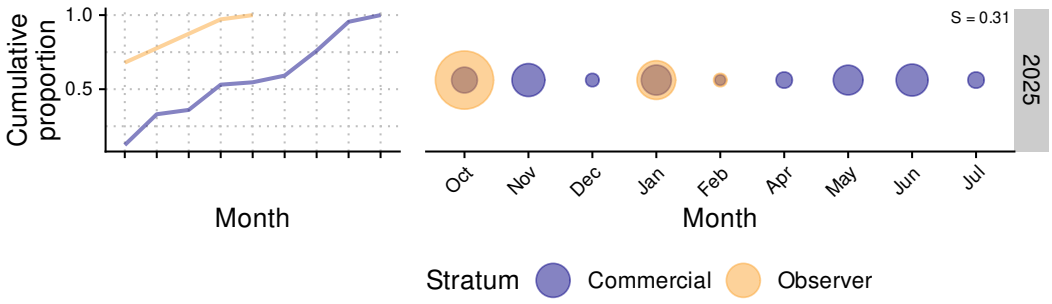


Figure 38: **Monthly representativeness of observer sampling coverage of Trawl catch in ORH 2A, from events where the orange roughy catch exceeded the 40kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

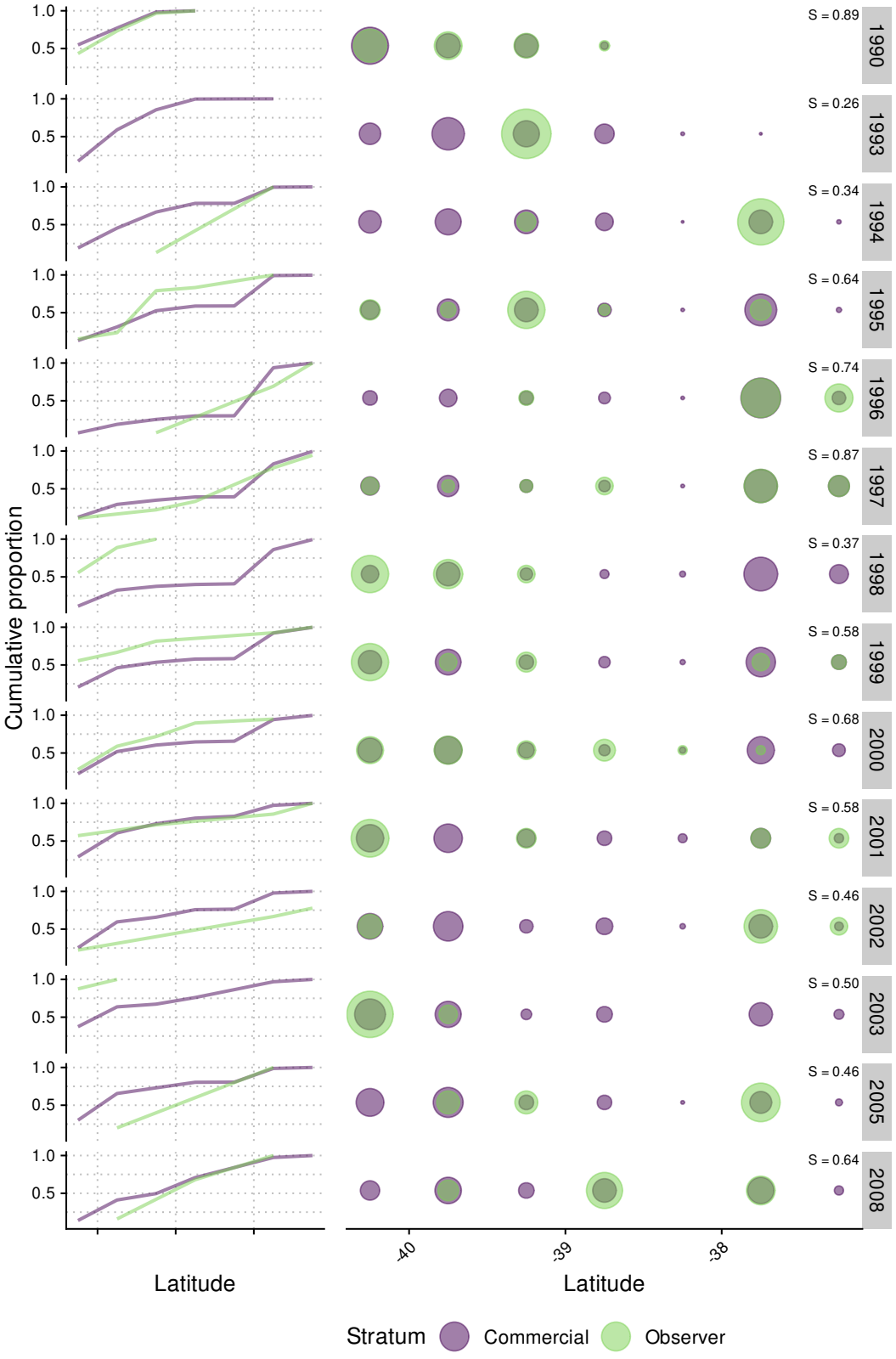


Figure 39: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 2A, where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

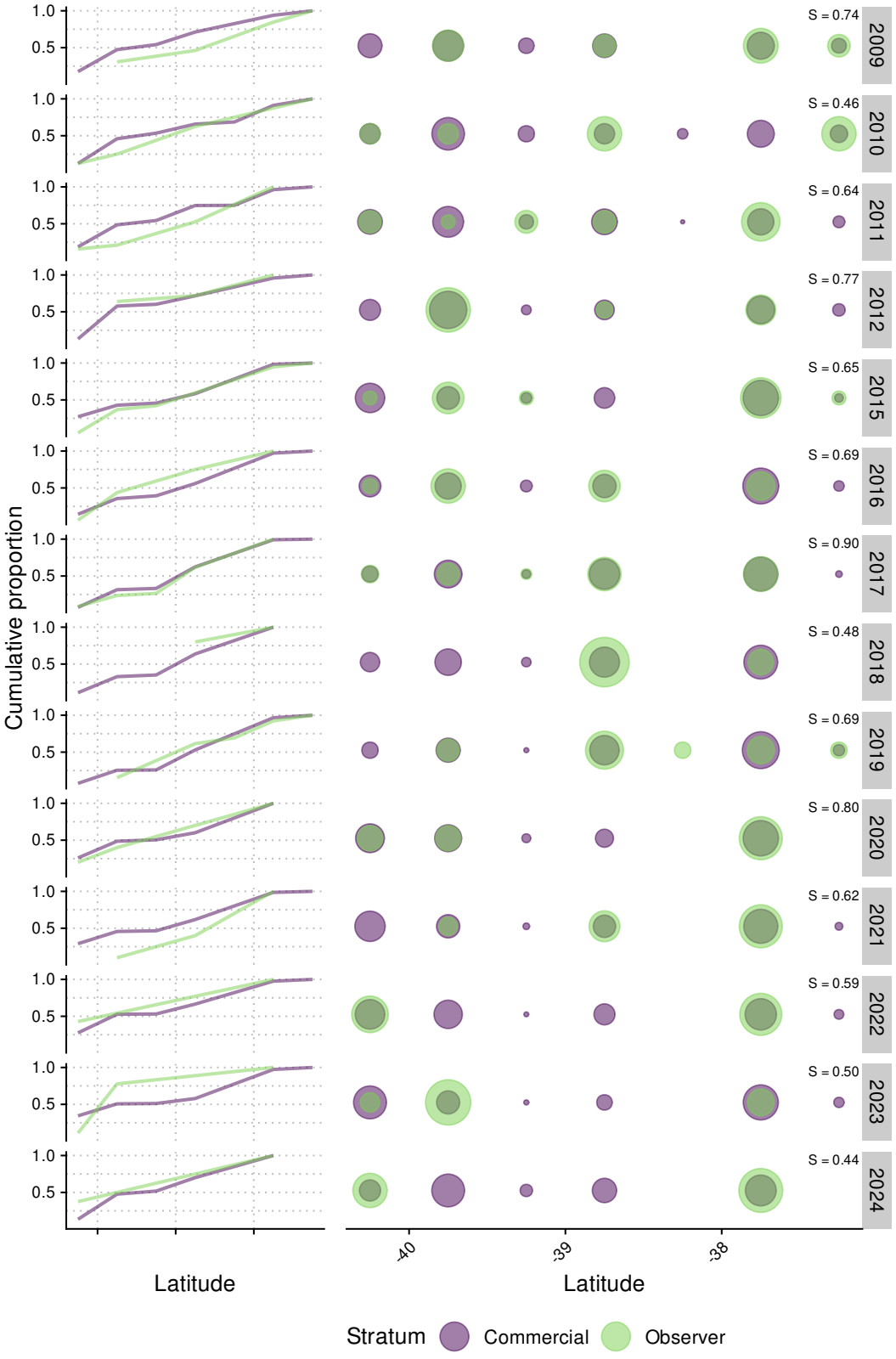


Figure 40: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 2A, where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

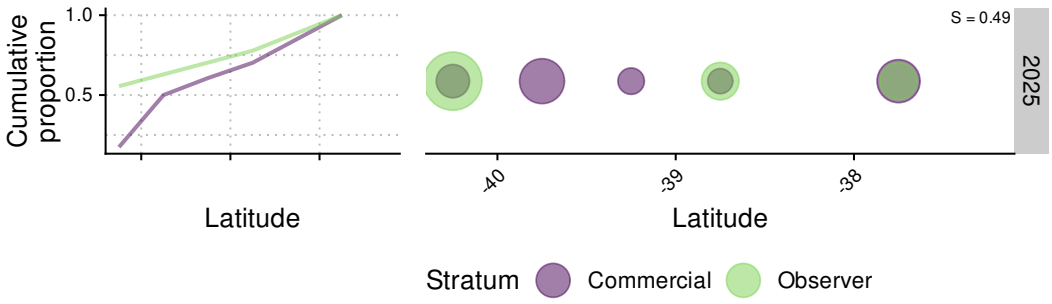


Figure 41: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 2A, where the orange roughy catch exceeded the 40kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

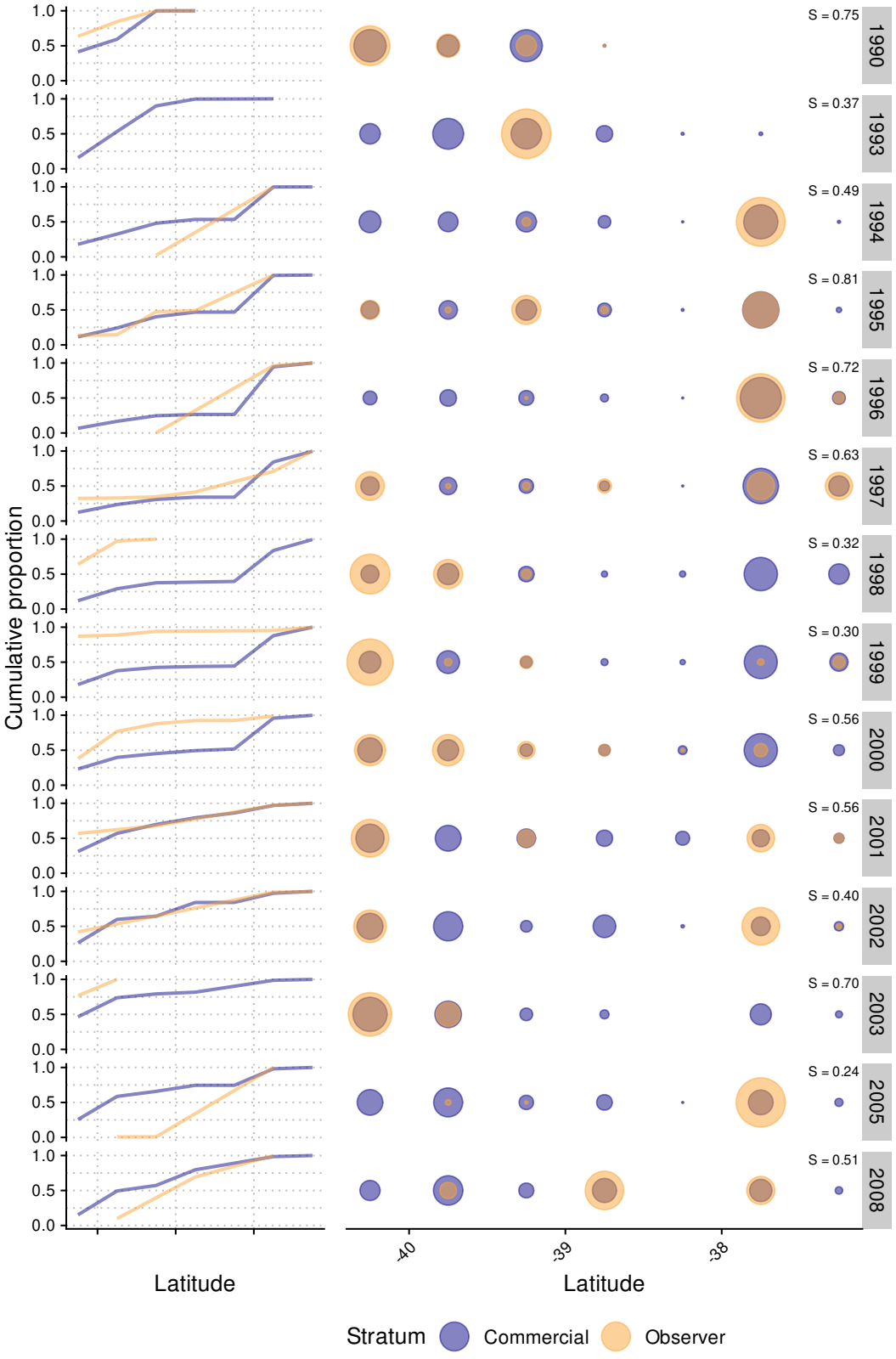


Figure 42: Latitudinal representativeness of observer sampling coverage of Trawl catch in ORH 2A, from events where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

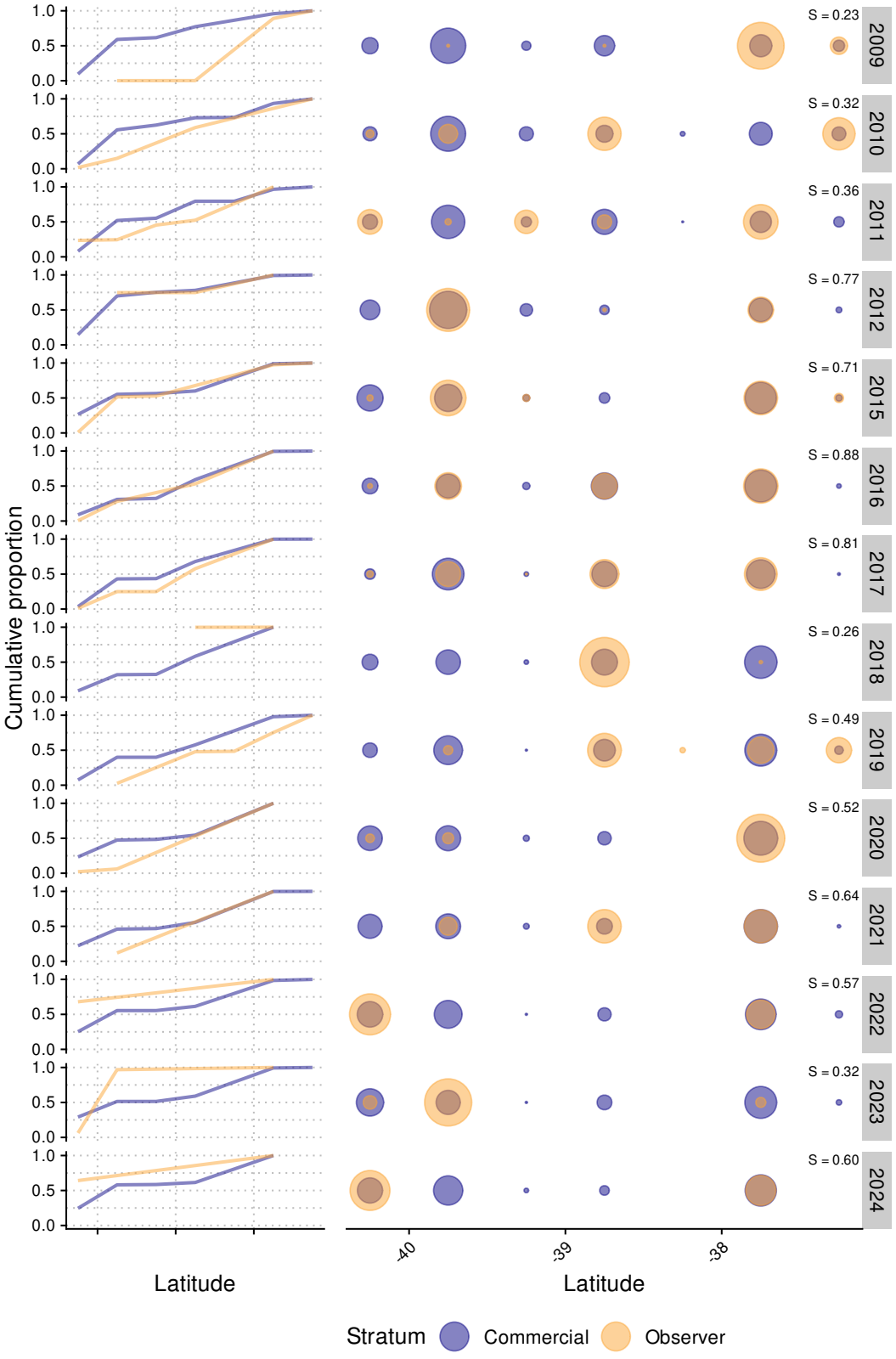


Figure 43: Latitudinal representativeness of observer sampling coverage of Trawl catch in ORH 2A, from events where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

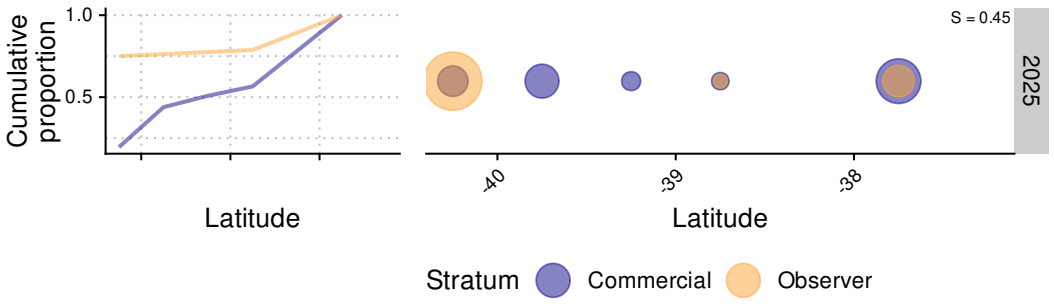


Figure 44: Latitudinal representativeness of observer sampling coverage of Trawl catch in ORH 2A, from events where the orange roughy catch exceeded the 40kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

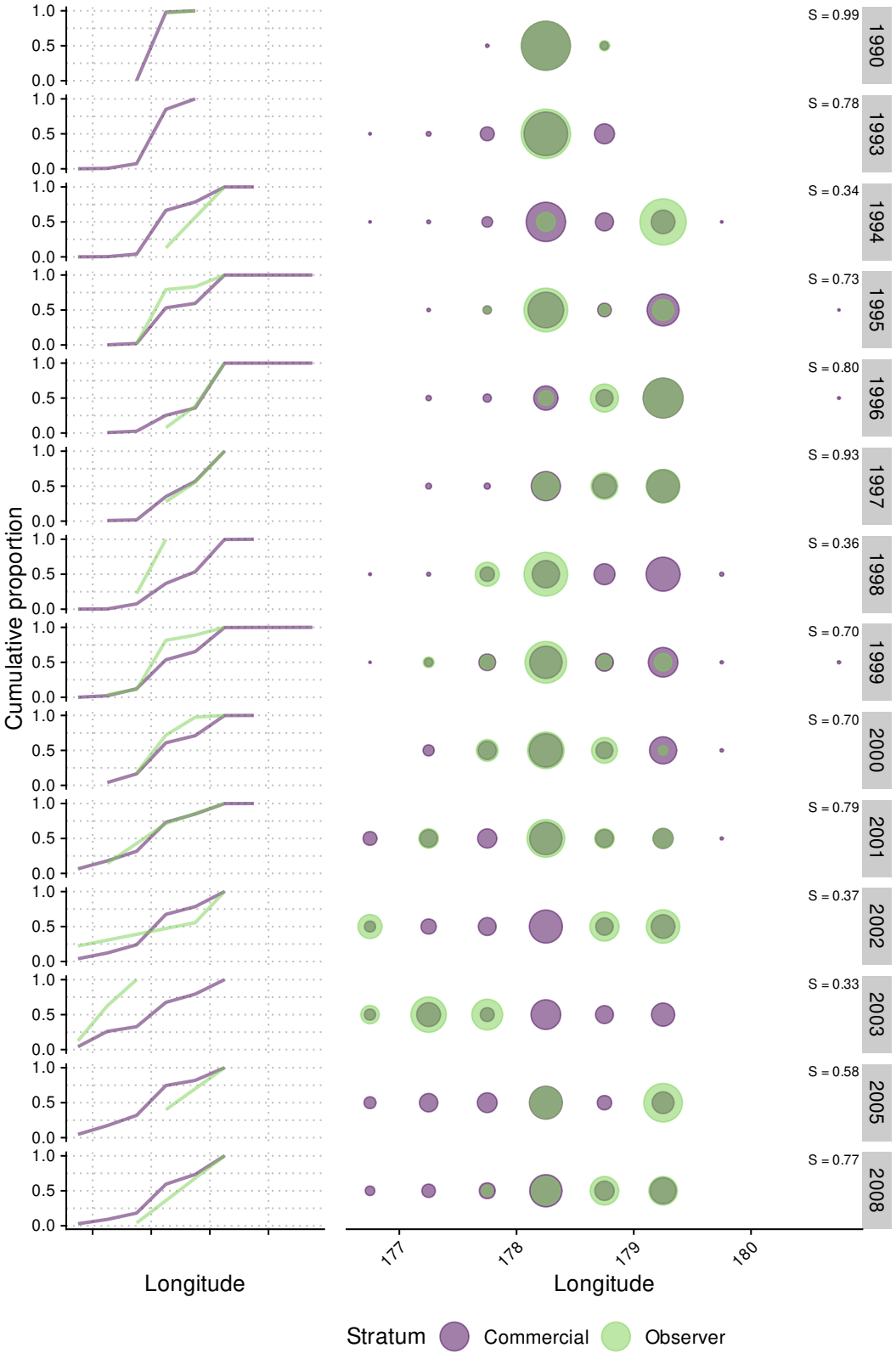


Figure 45: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 2A, where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

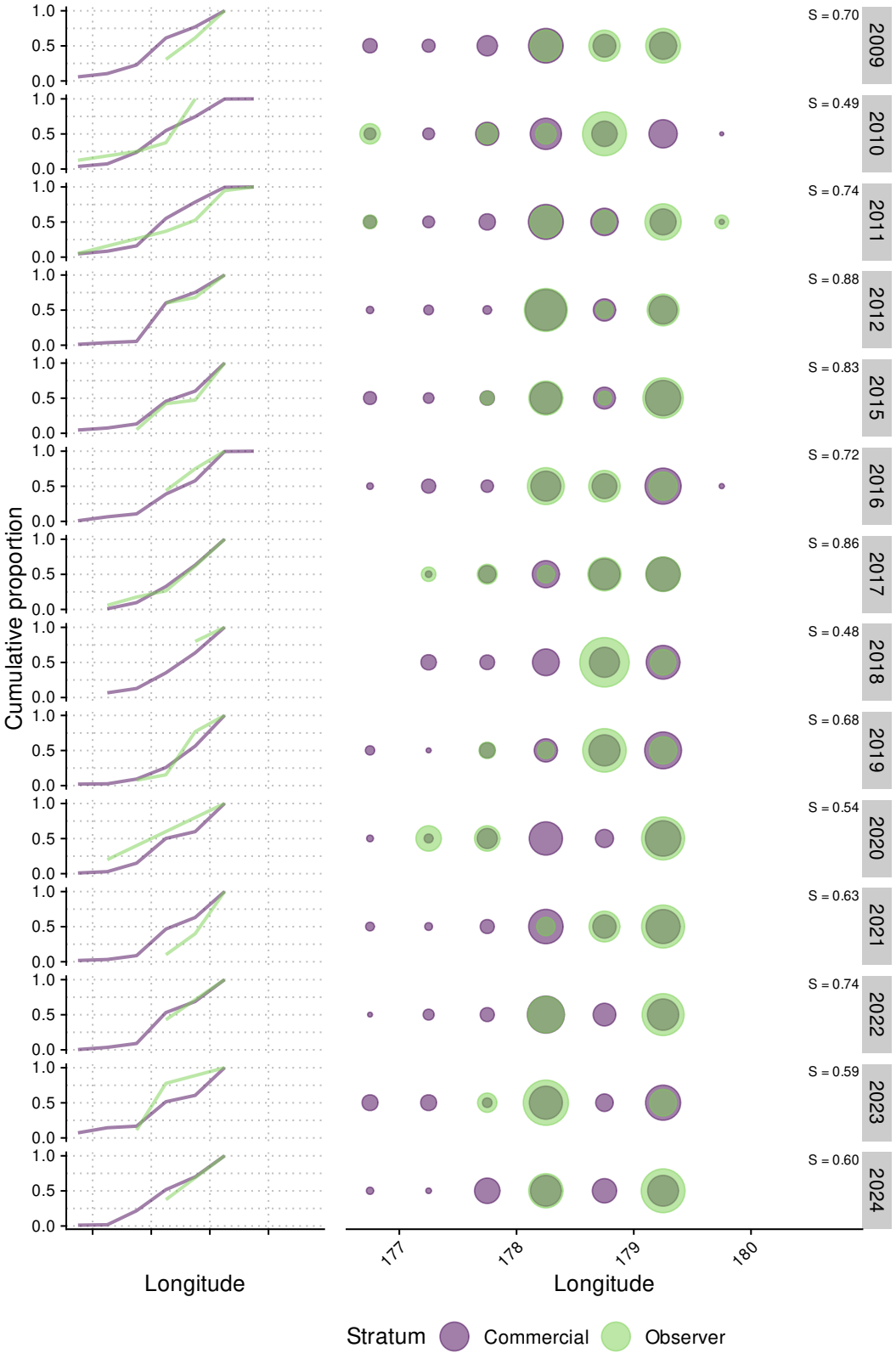


Figure 46: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 2A, where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

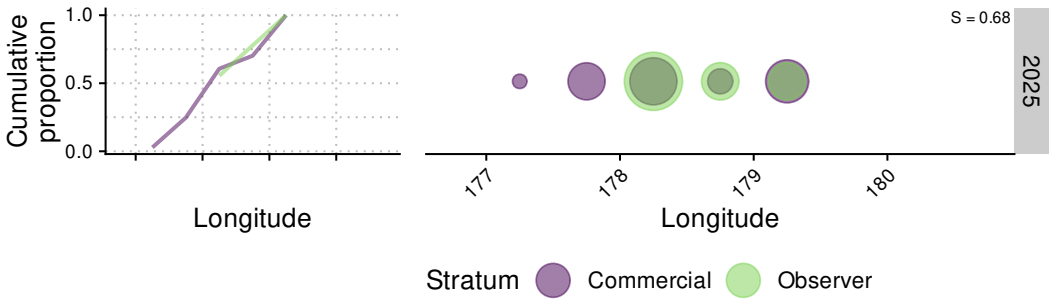


Figure 47: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 2A, where the orange roughy catch exceeded the 40kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

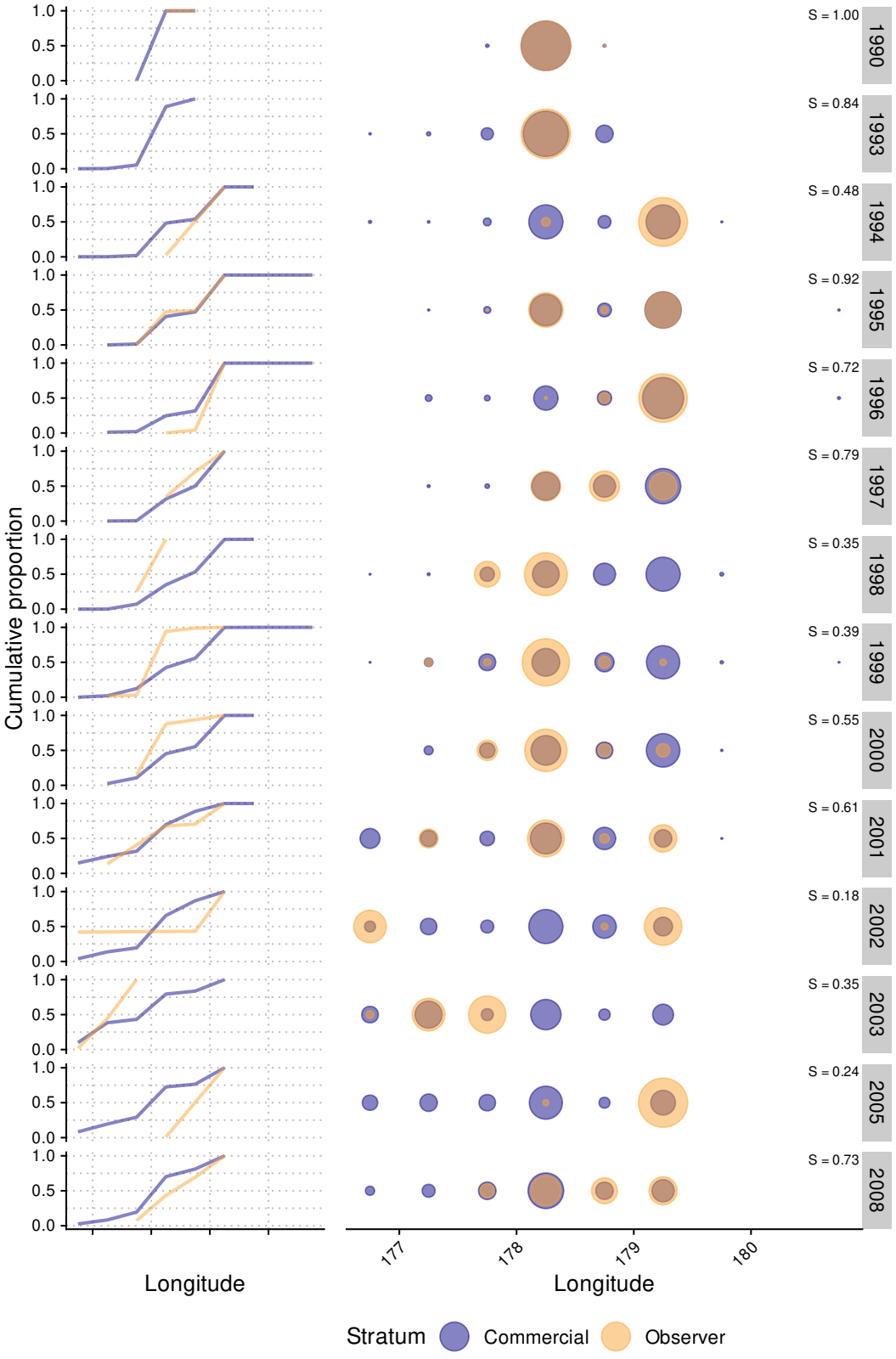


Figure 48: Longitudinal representativeness of observer sampling coverage of Trawl catch in ORH 2A, from events where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2008. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

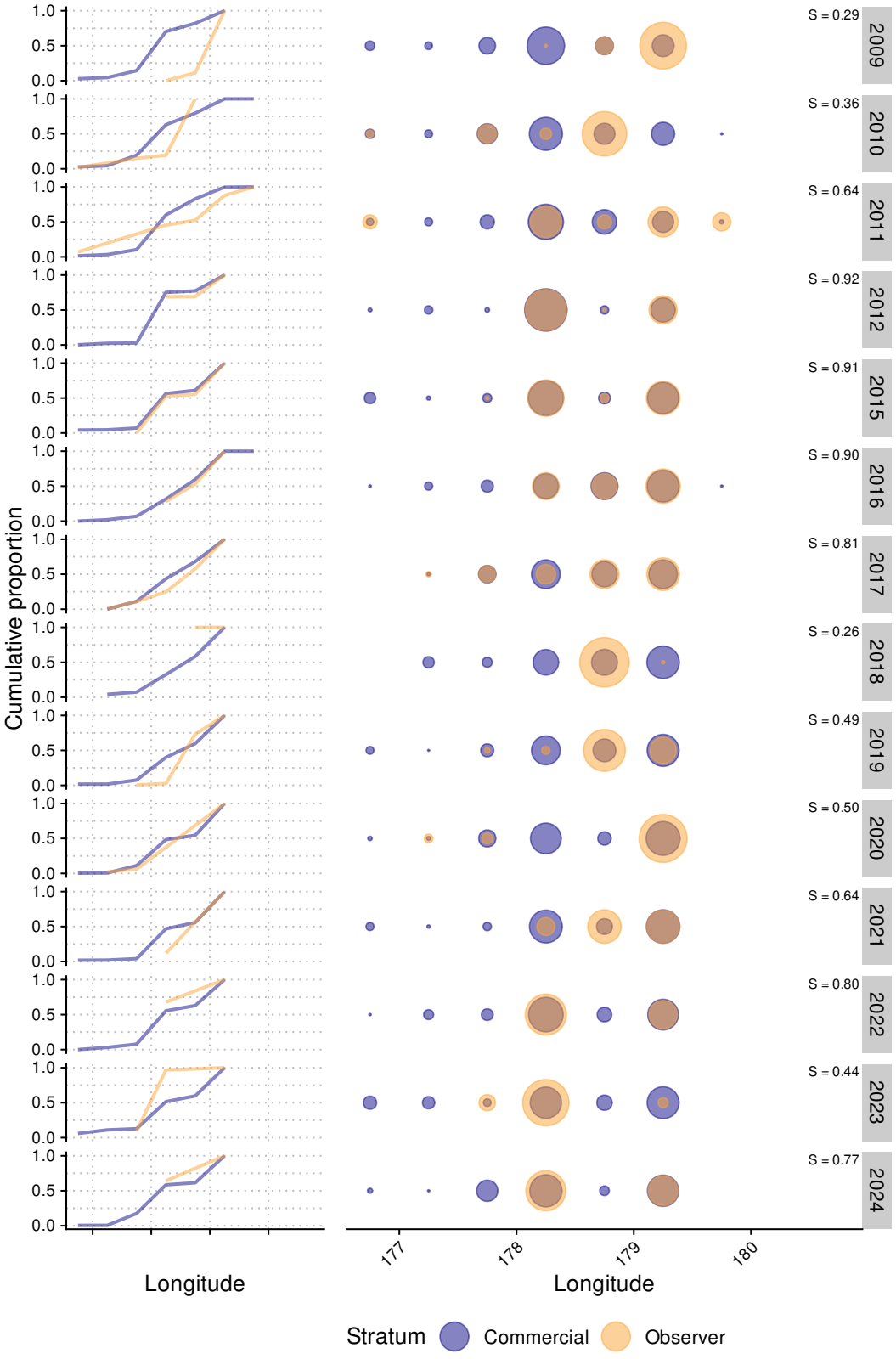


Figure 49: Longitudinal representativeness of observer sampling coverage of Trawl catch in ORH 2A, from events where the orange roughy catch exceeded the 40kg threshold, in 2009 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

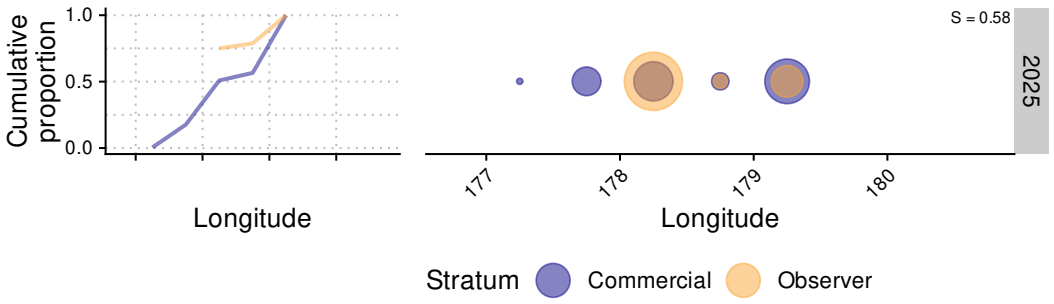


Figure 50: **Longitudinal representativeness of observer sampling coverage of Trawl catch in ORH 2A, from events where the orange roughy catch exceeded the 40kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

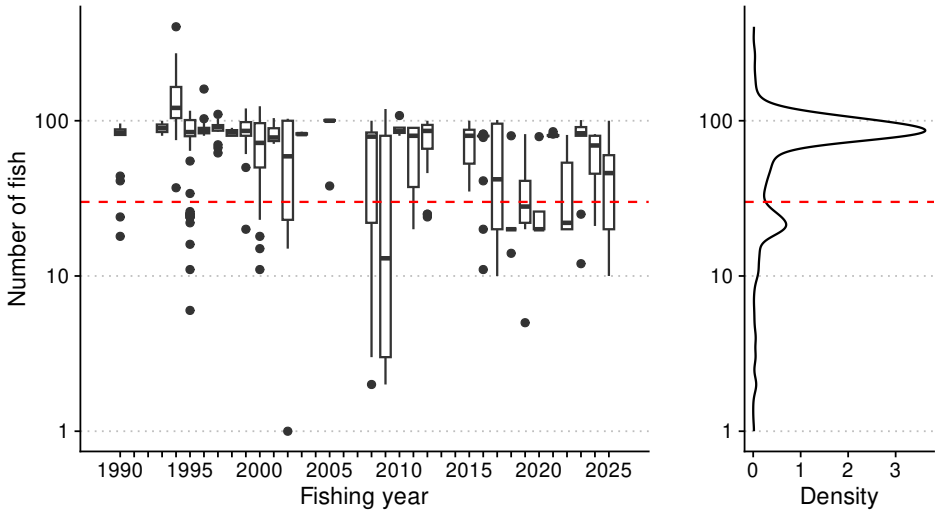


Figure 51: **Length-frequency sample sizes for observed fishing events in ORH 2A where orange roughy were sampled. The red dashed line indicates a sample size of 30 fish.**

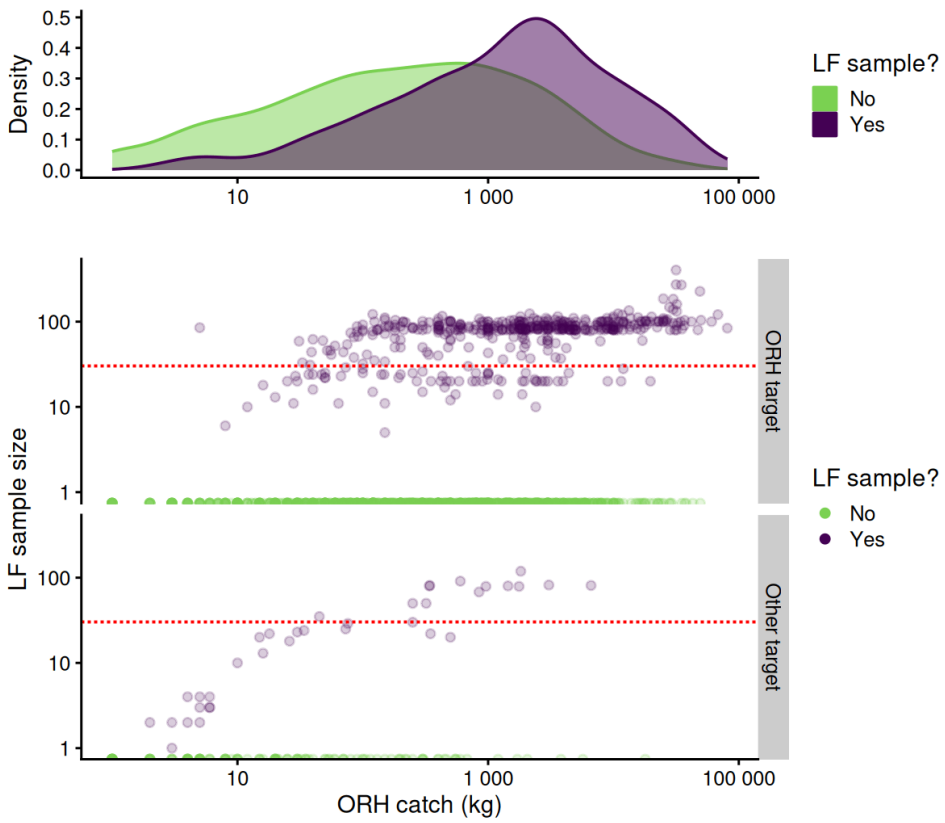


Figure 52: Length-frequency sample sizes (number of fish sampled) for observed fishing events in ORH 2A in relation to the total orange roughy catch from an event, separately for orange roughy target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.1.2.2 Otolith samples

Table 4: Otolith samples of orange roughy from the ORH 2A Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of orange roughy exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	1 455	0	0	0.00
1991	1 603	0	0	0.00
1992	1 782	0	0	0.00
1993	1 977	0	0	0.00
1994	2 097	0	0	0.00
1995	2 789	0	0	0.00
1996	1 412	0	0	0.00
1997	1 213	0	0	0.00
1998	2 278	0	0	0.00
1999	2 220	0	0	0.00
2000	1 849	0	0	0.00
2001	739	0	0	0.00
2002	451	0	0	0.00
2003	385	0	0	0.00
2004	362	0	0	0.00
2005	486	0	0	0.00
2006	417	0	0	0.00
2007	395	0	0	0.00
2008	387	0	0	0.00
2009	410	0	0	0.00
2010	462	0	0	0.00
2011	428	0	0	0.00
2012	166	0	0	0.00
2013	286	0	0	0.00
2014	223	0	0	0.00
2015	173	0	0	0.00
2016	216	0	0	0.00
2017	222	11	220	4.95
2018	178	0	0	0.00
2019	236	11	120	4.66
2020	208	1	19	0.48
2021	217	0	0	0.00
2022	254	5	68	1.97
2023	221	9	161	4.07
2024	170	6	120	3.53
2025	178	9	134	5.06

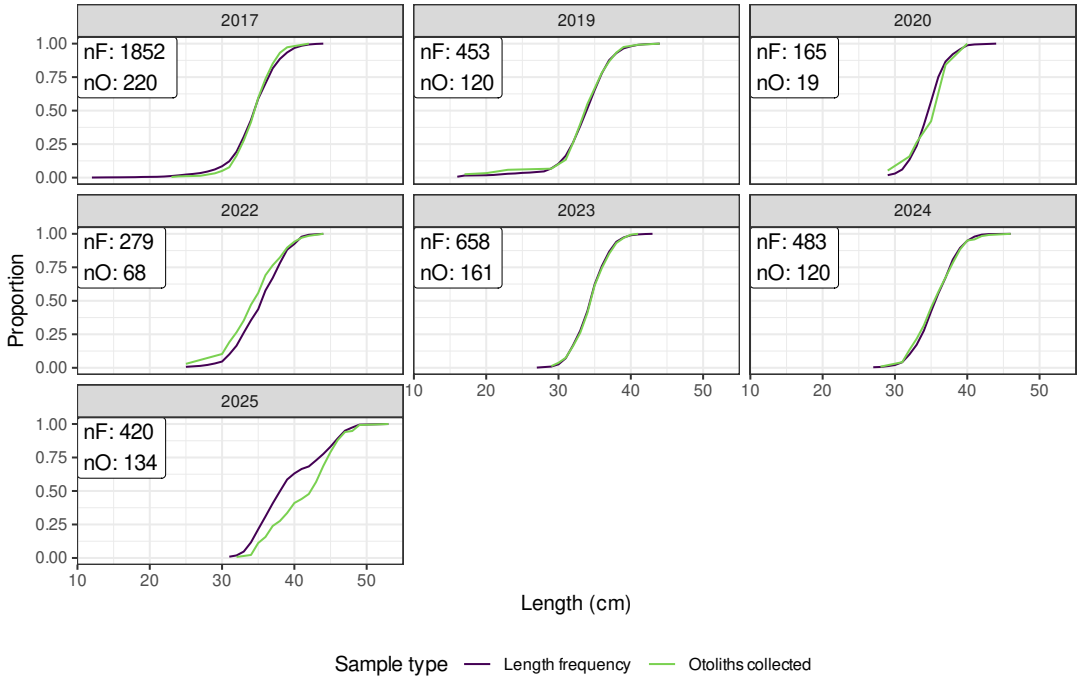


Figure 53: Cumulative distributions of the length of fish in the length frequency and otolith samples of orange roughy in the ORH 2A Trawl fishery for the 2017 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.1.2.3 Catch quantification

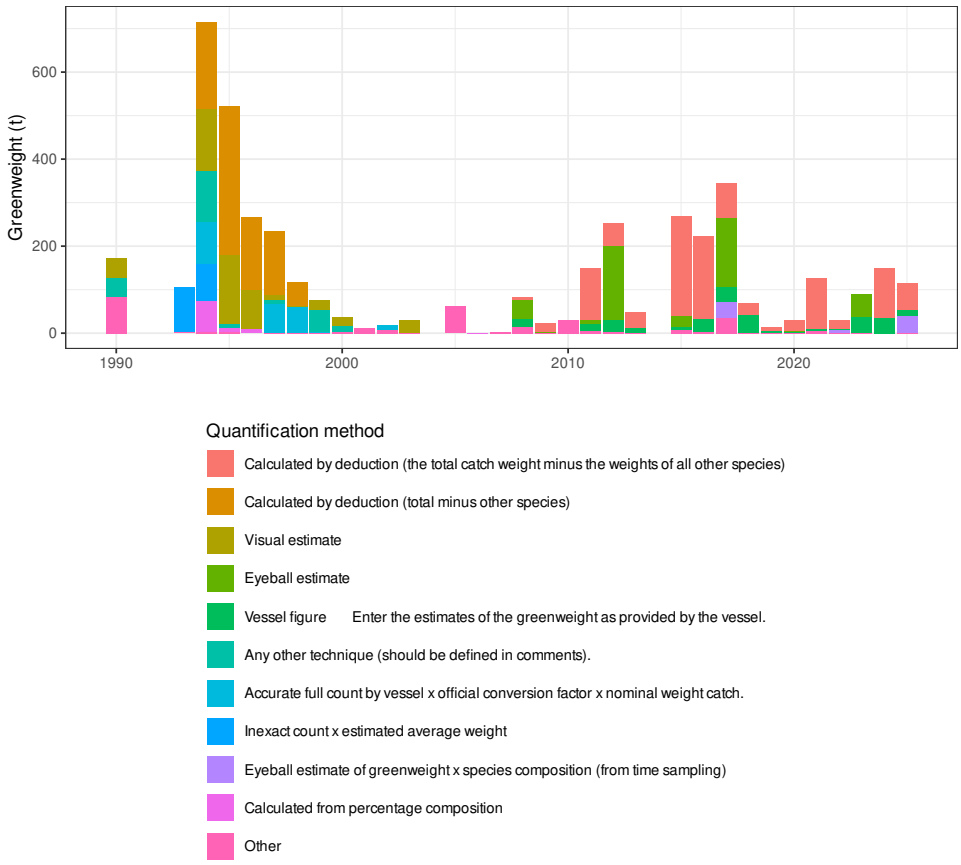


Figure 54: Methods used by observers to quantify the catch of orange roughy in the ORH 2A Trawl fishery. The legend lists the methods used in descending order of total catch.

2.1.3 ORH 2B: Trawl fishery

2.1.3.1 Length-frequency samples

Table 5: Length-frequency samples of orange roughy from the ORH 2B Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of orange roughy exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	351	3	231	0.85
1991	476	0	0	0.00
1992	792	0	0	0.00
1993	767	1	70	0.13
1994	637	1	74	0.16
1995	610	2	201	0.33
1996	151	0	0	0.00
1997	168	1	81	0.60
1998	233	0	0	0.00
1999	239	4	384	1.67
2000	216	7	548	3.24
2001	165	1	79	0.61
2002	90	1	102	1.11
2003	91	2	157	2.20
2004	47	0	0	0.00
2005	91	0	0	0.00
2006	82	0	0	0.00
2007	92	1	80	1.09
2008	79	12	698	15.19
2009	128	2	36	1.56
2010	95	10	798	10.53
2011	83	8	575	9.64
2012	118	7	481	5.93
2013	65	0	0	0.00
2014	82	0	0	0.00
2015	29	0	0	0.00
2016	46	0	0	0.00
2017	47	2	145	4.26
2018	30	0	0	0.00
2019	40	0	0	0.00
2020	46	0	0	0.00
2021	28	0	0	0.00
2022	38	0	0	0.00
2023	43	0	0	0.00
2024	28	0	0	0.00
2025	25	3	138	12.00

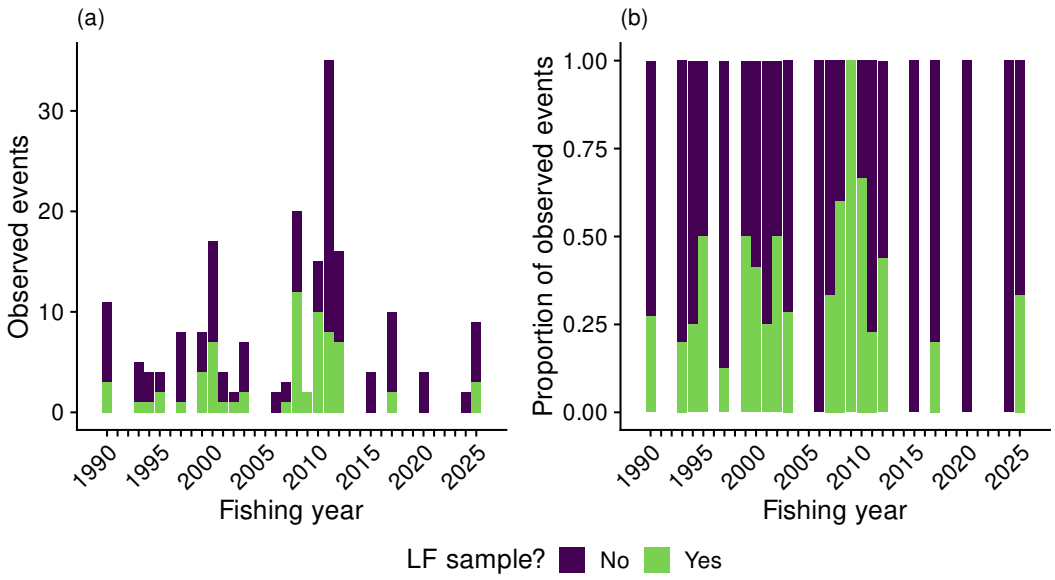


Figure 55: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in ORH 2B where the orange roughy catch exceeded the 40 kg threshold, with and without length-frequency sampling.**

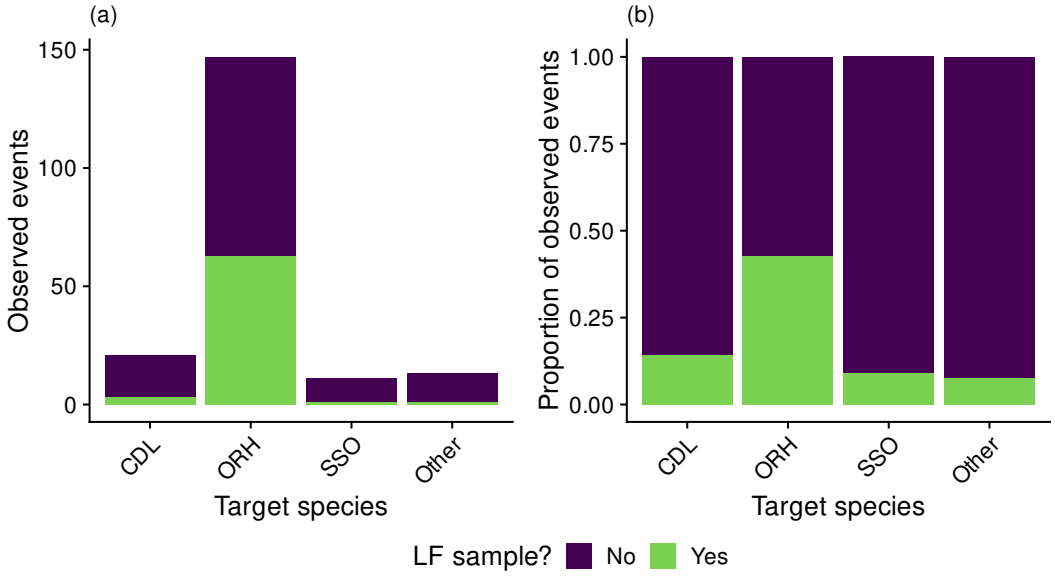


Figure 56: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in ORH 2B where the orange roughy catch exceeded the 40 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

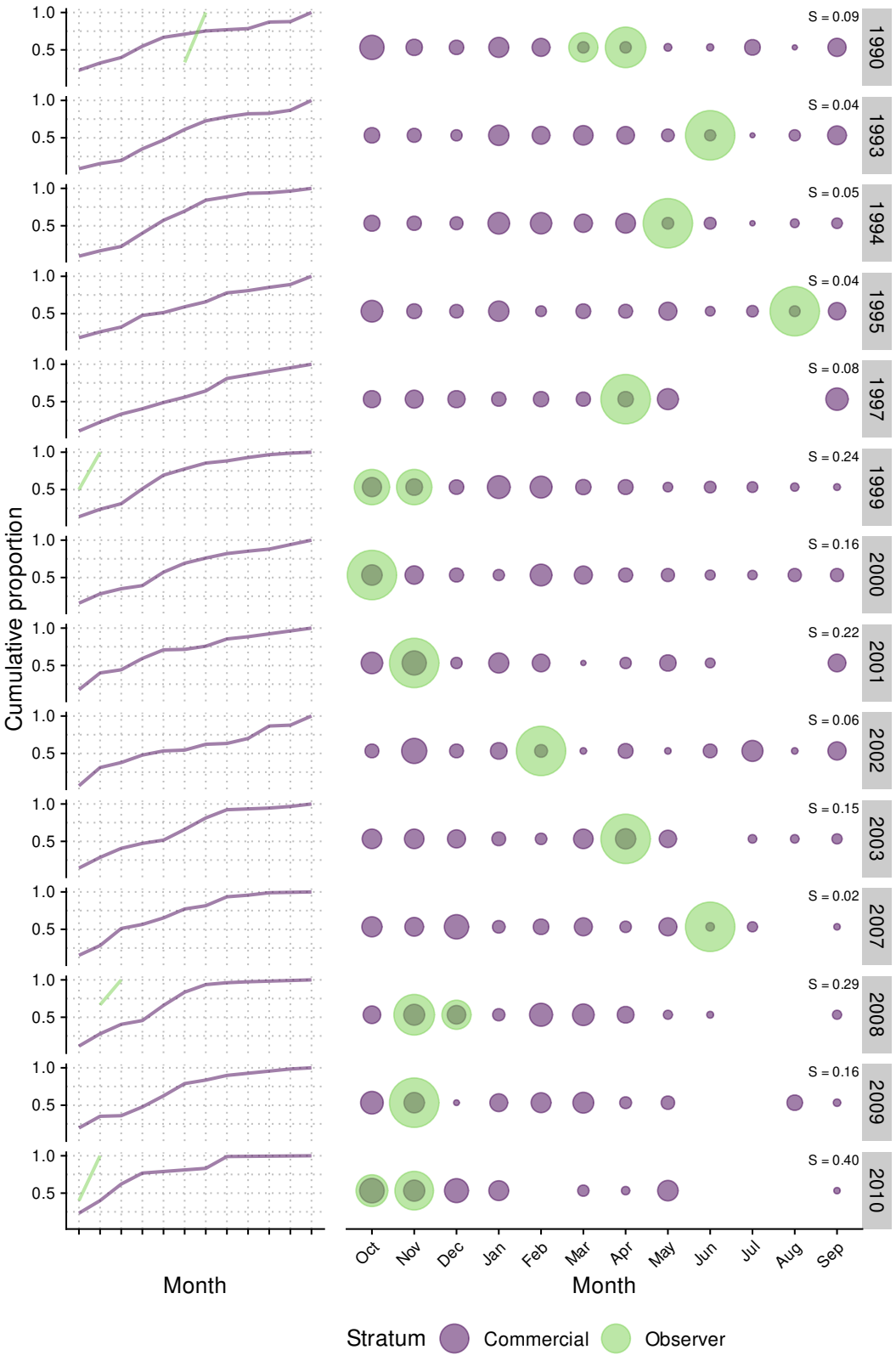


Figure 57: Monthly representativeness of observer sampling coverage of Trawl fishing events in ORH 2B, where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

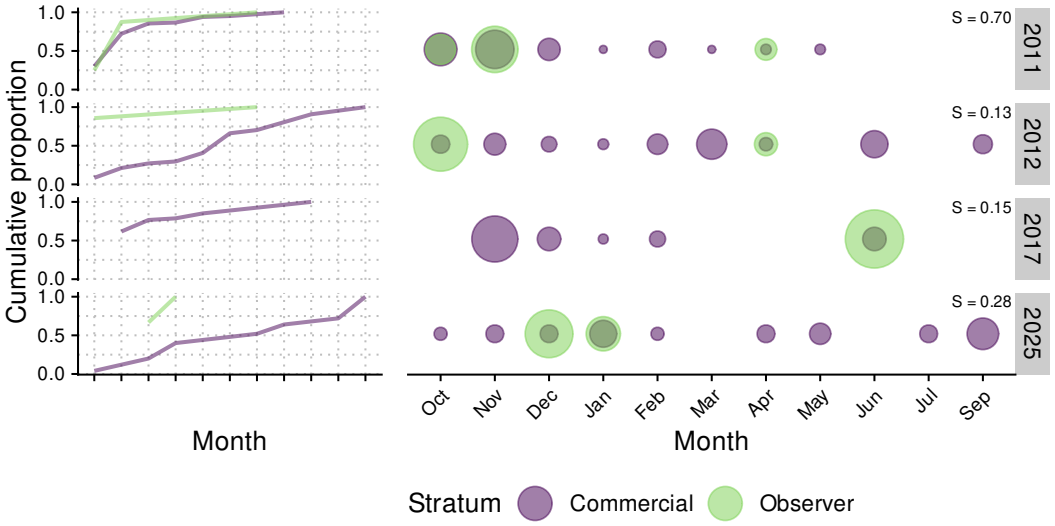


Figure 58: **Monthly representativeness of observer sampling coverage of Trawl fishing events in ORH 2B, where the orange roughy catch exceeded the 40kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

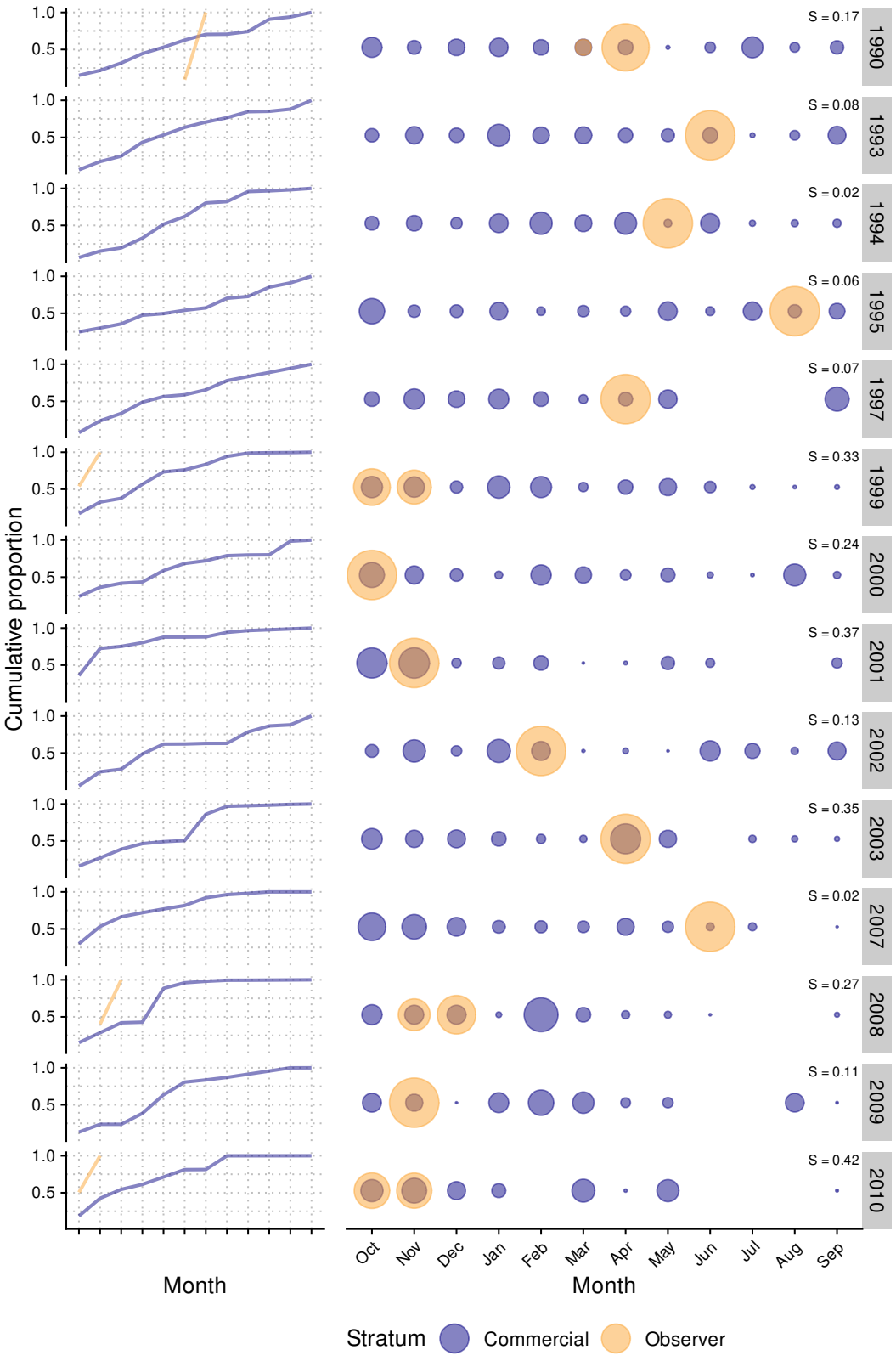


Figure 59: **Monthly representativeness of observer sampling coverage of Trawl catch in ORH 2B, from events where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

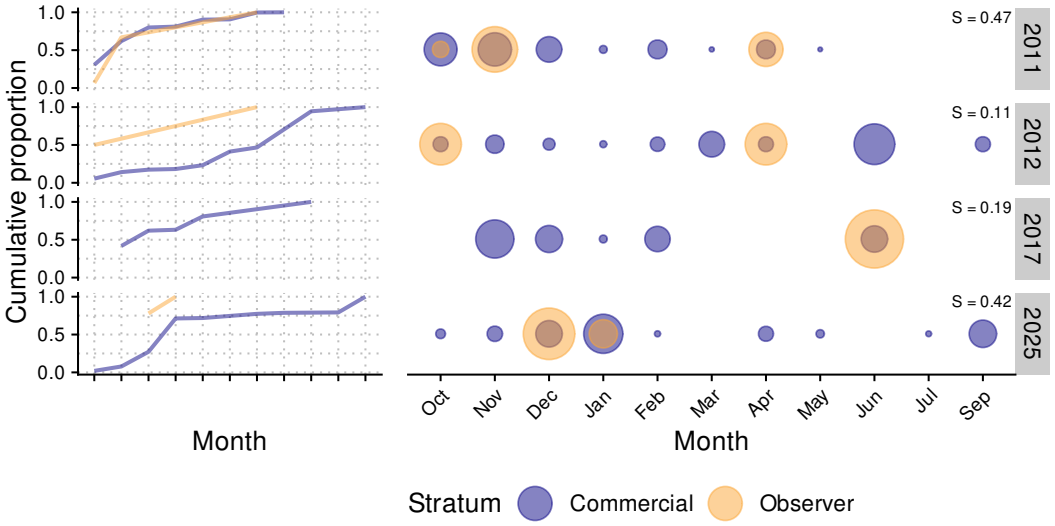


Figure 60: **Monthly representativeness of observer sampling coverage of Trawl catch in ORH 2B, from events where the orange roughy catch exceeded the 40kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

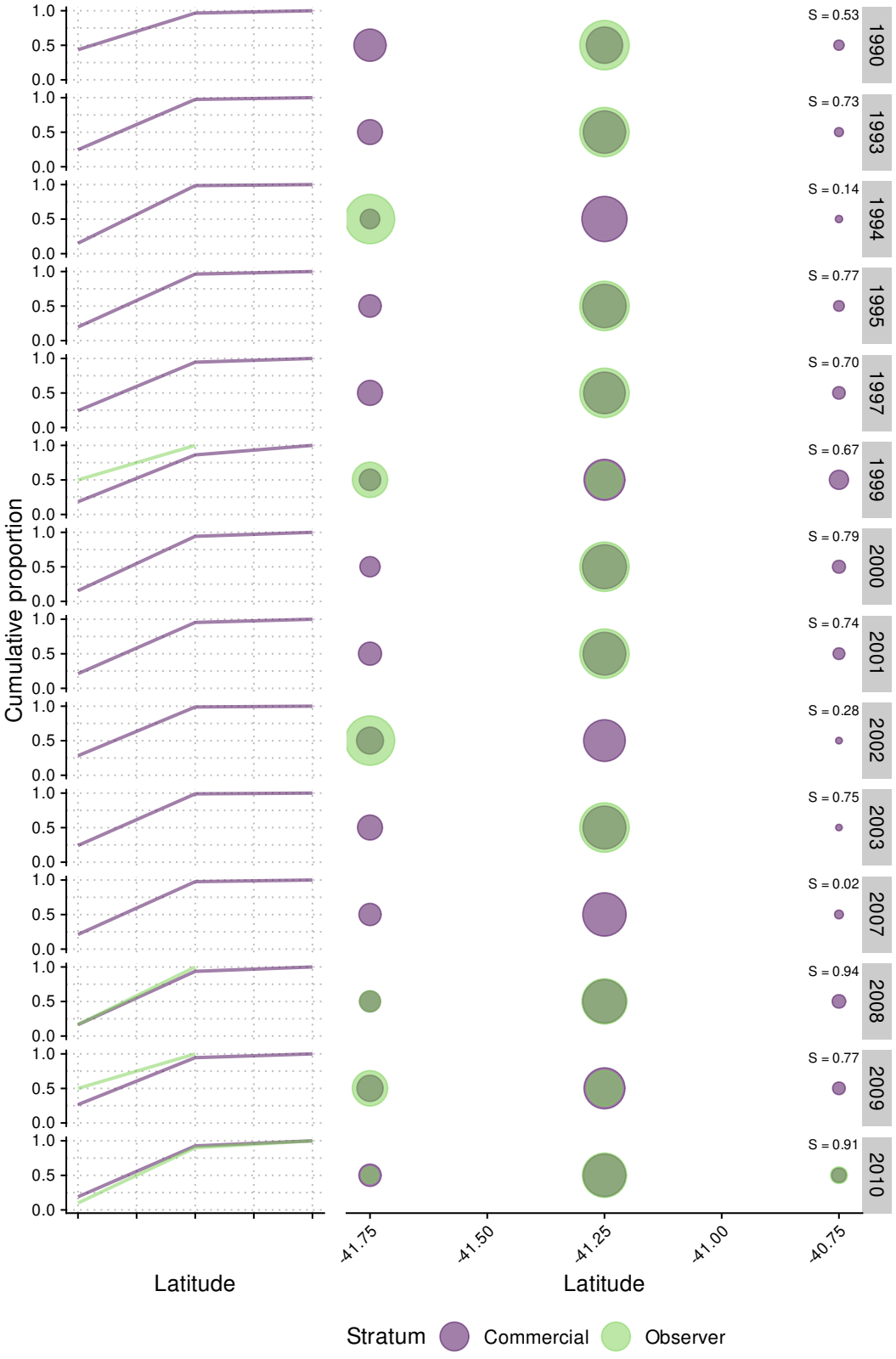


Figure 61: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 2B, where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

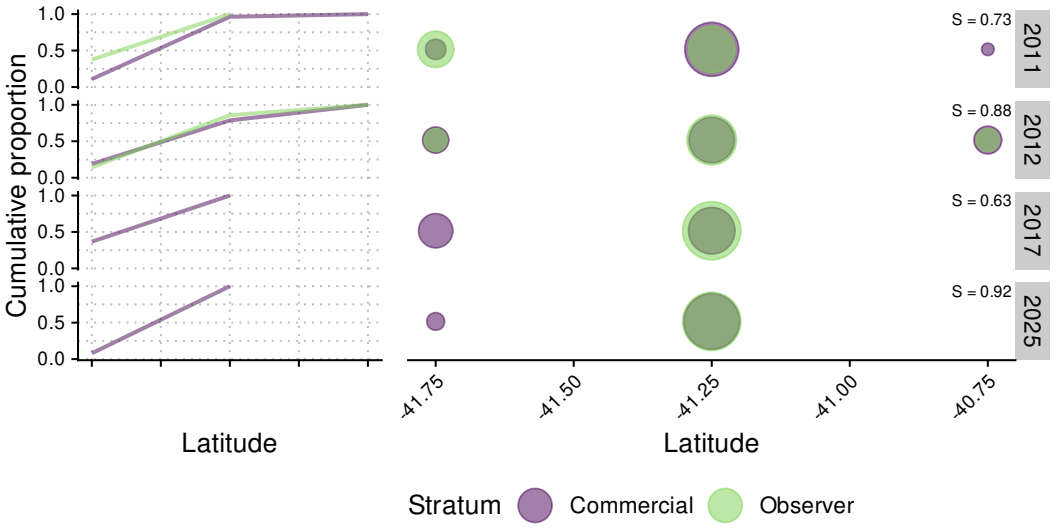


Figure 62: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 2B, where the orange roughy catch exceeded the 40kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

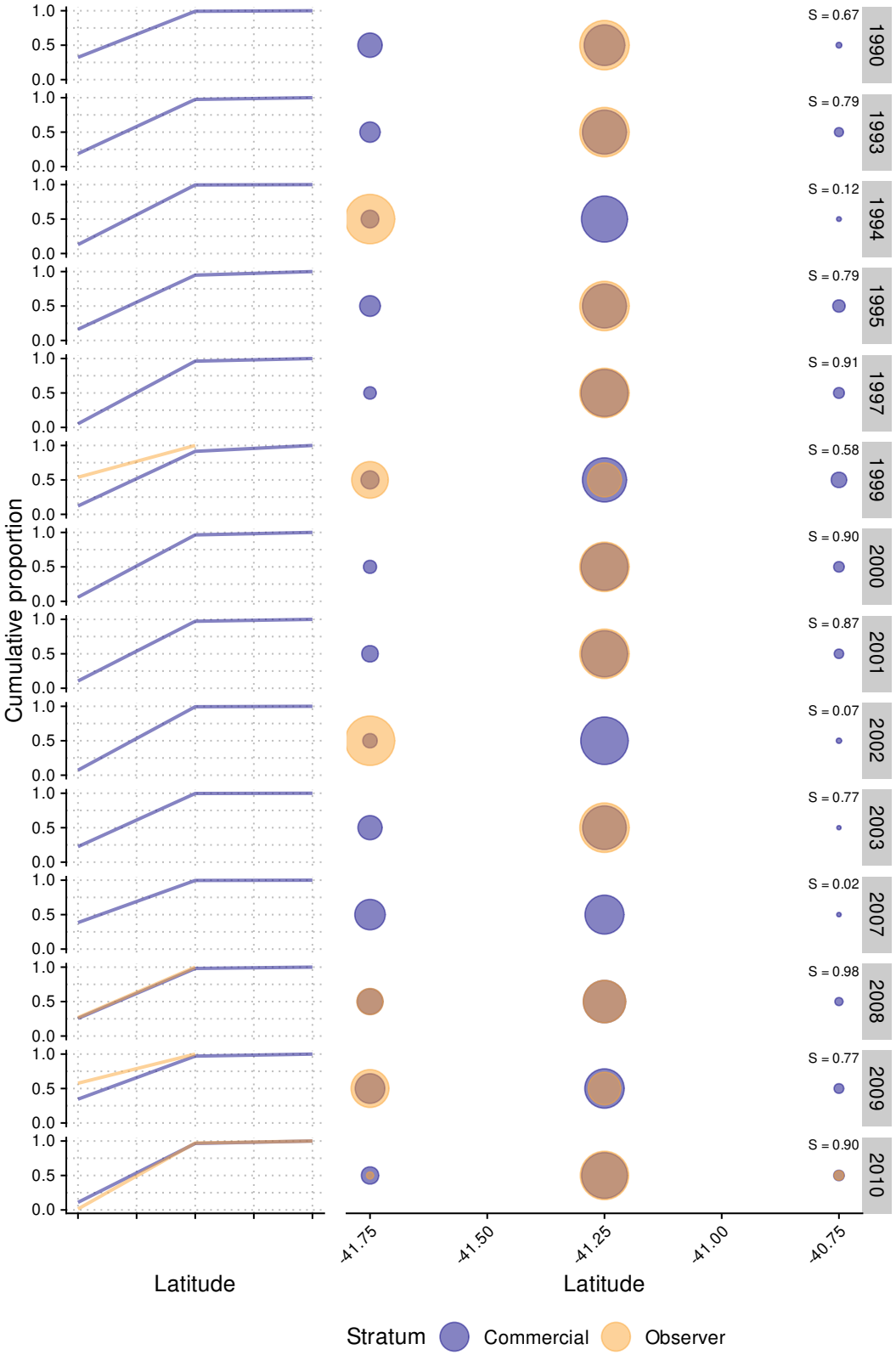


Figure 63: Latitudinal representativeness of observer sampling coverage of Trawl catch in ORH 2B, from events where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

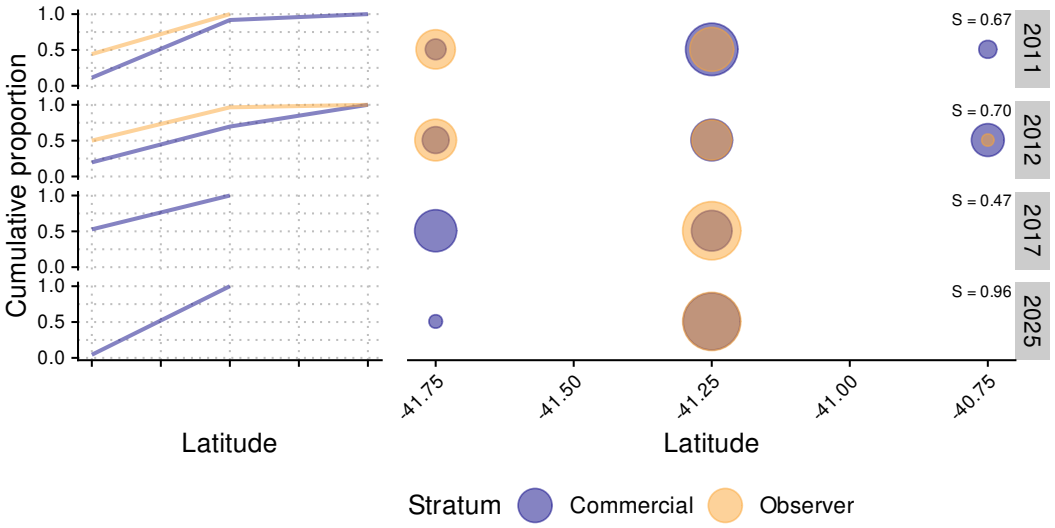


Figure 64: Latitudinal representativeness of observer sampling coverage of Trawl catch in ORH 2B, from events where the orange roughy catch exceeded the 40kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

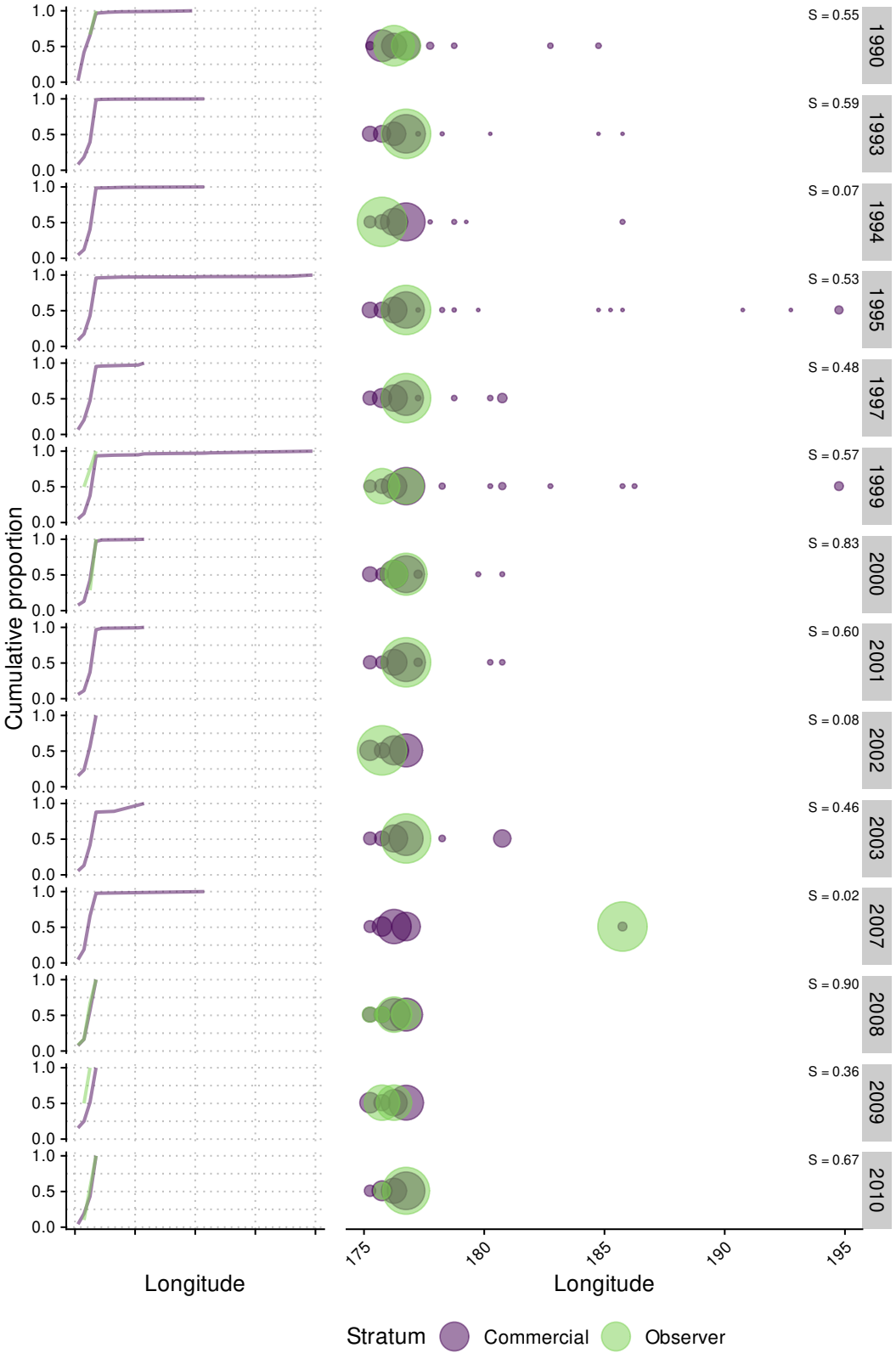


Figure 65: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 2B, where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

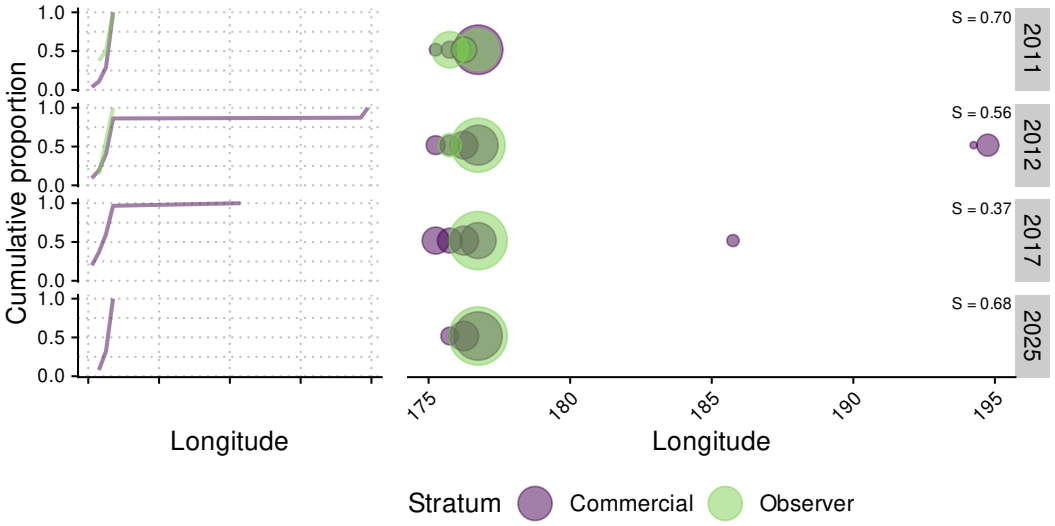


Figure 66: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 2B, where the orange roughy catch exceeded the 40kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

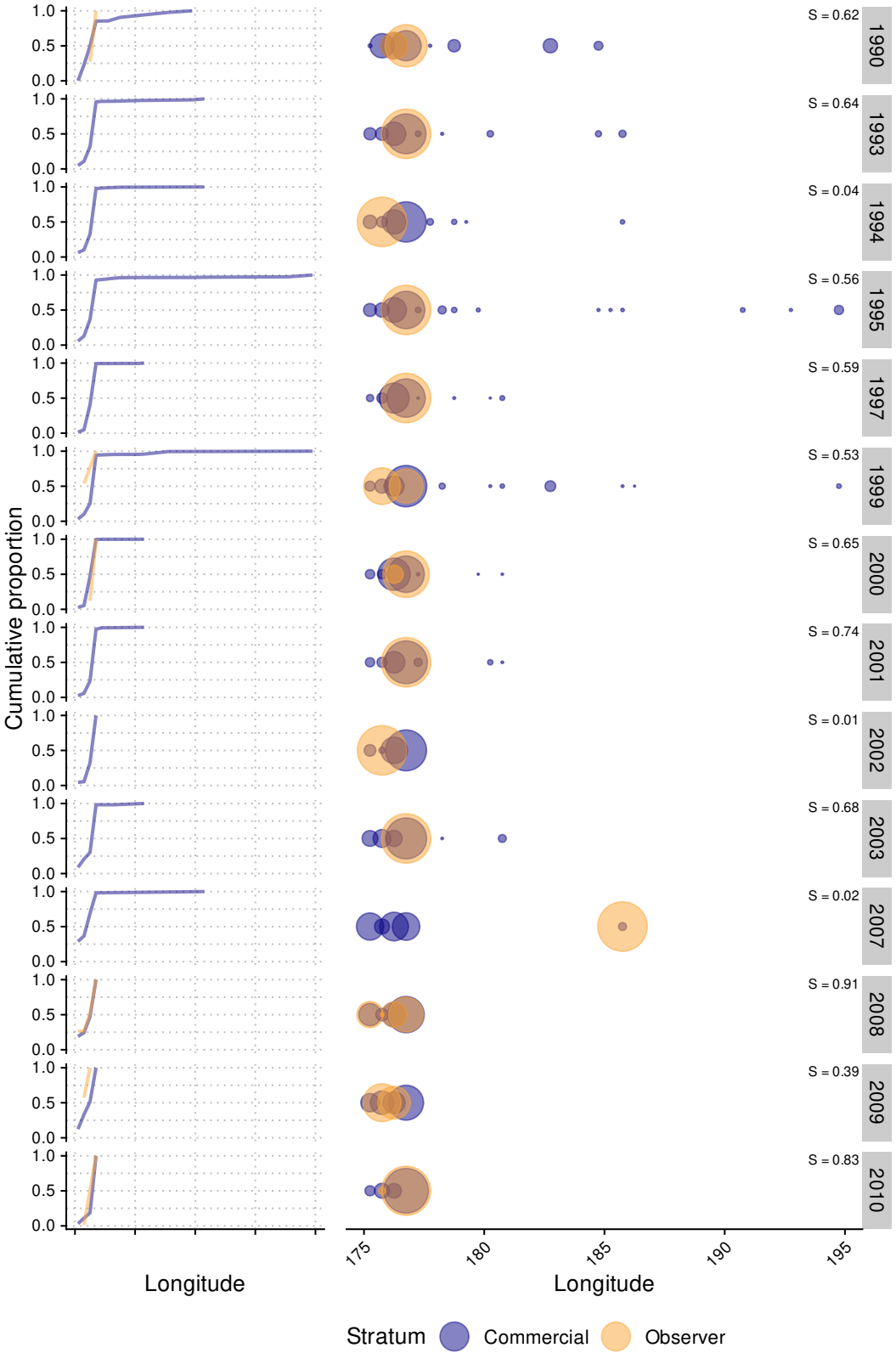


Figure 67: Longitudinal representativeness of observer sampling coverage of Trawl catch in ORH 2B, from events where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

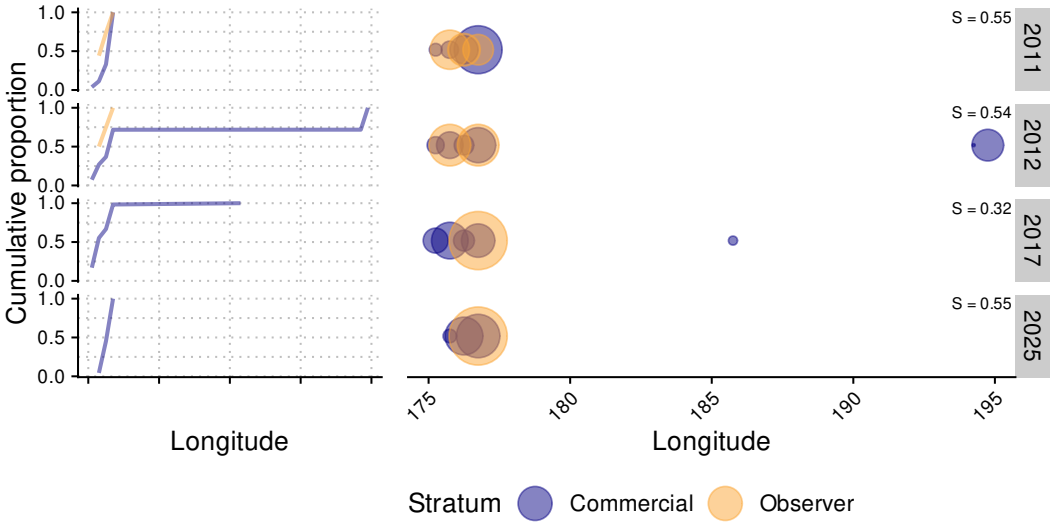


Figure 68: **Longitudinal representativeness of observer sampling coverage of Trawl catch in ORH 2B, from events where the orange roughy catch exceeded the 40kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

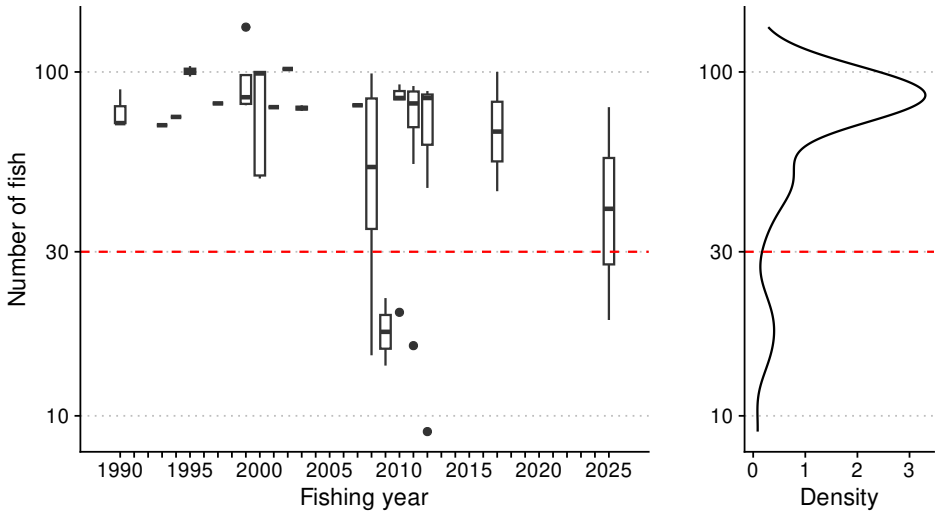


Figure 69: **Length-frequency sample sizes for observed fishing events in ORH 2B where orange roughy were sampled. The red dashed line indicates a sample size of 30 fish.**

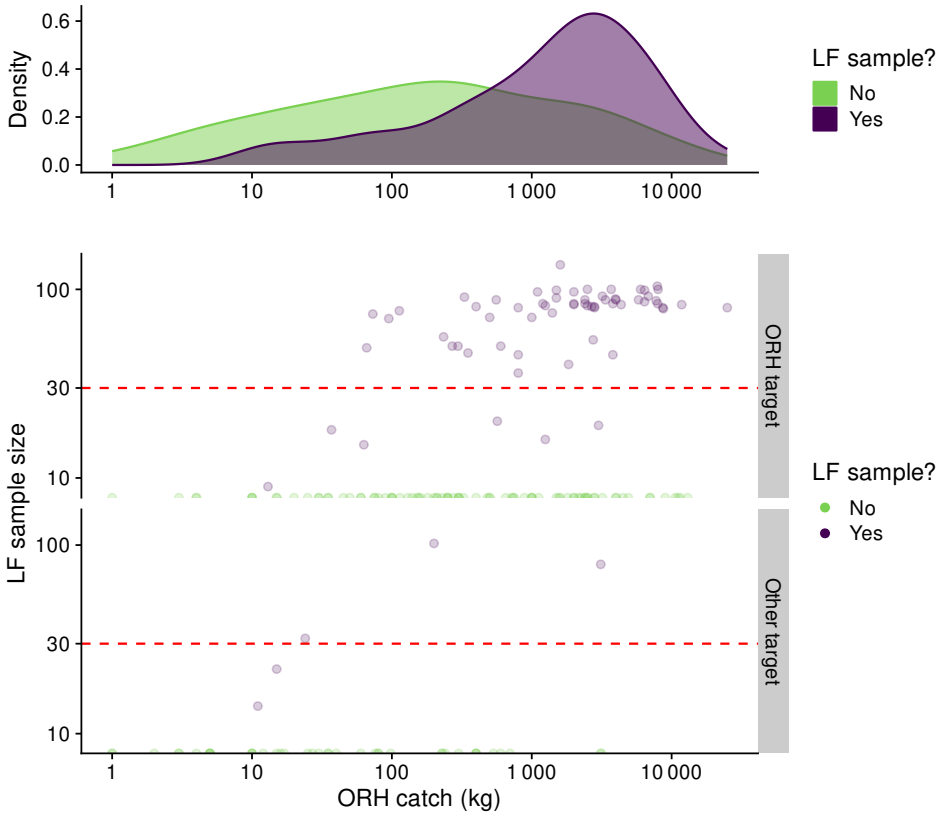


Figure 70: Length-frequency sample sizes (number of fish sampled) for observed fishing events in ORH 2B in relation to the total orange roughy catch from an event, separately for orange roughy target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.1.3.2 Otolith samples

Table 6: Otolith samples of orange roughy from the ORH 2B Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of orange roughy exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	351	0	0	0
1991	476	0	0	0
1992	792	0	0	0
1993	767	0	0	0
1994	637	0	0	0
1995	610	0	0	0
1996	151	0	0	0
1997	168	0	0	0
1998	233	0	0	0
1999	239	0	0	0
2000	216	0	0	0
2001	165	0	0	0
2002	90	0	0	0
2003	91	0	0	0
2004	47	0	0	0
2005	91	0	0	0
2006	82	0	0	0
2007	92	0	0	0
2008	79	0	0	0
2009	128	0	0	0
2010	95	0	0	0
2011	83	0	0	0
2012	118	0	0	0
2013	65	0	0	0
2014	82	0	0	0
2015	29	0	0	0
2016	46	0	0	0
2017	47	0	0	0
2018	30	0	0	0
2019	40	0	0	0
2020	46	0	0	0
2021	28	0	0	0
2022	38	0	0	0
2023	43	0	0	0
2024	28	0	0	0
2025	25	3	46	12

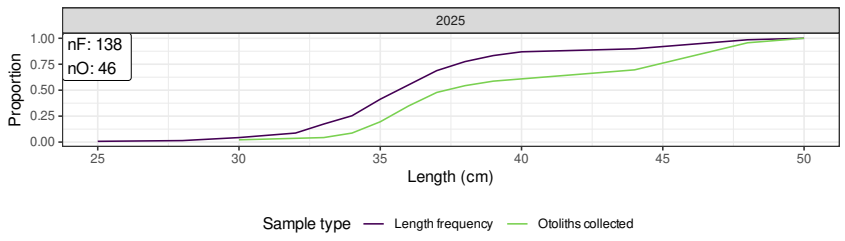


Figure 71: Cumulative distributions of the length of fish in the length frequency and otolith samples of orange roughy in the ORH 2B Trawl fishery for the 2025 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.1.3.3 Catch quantification

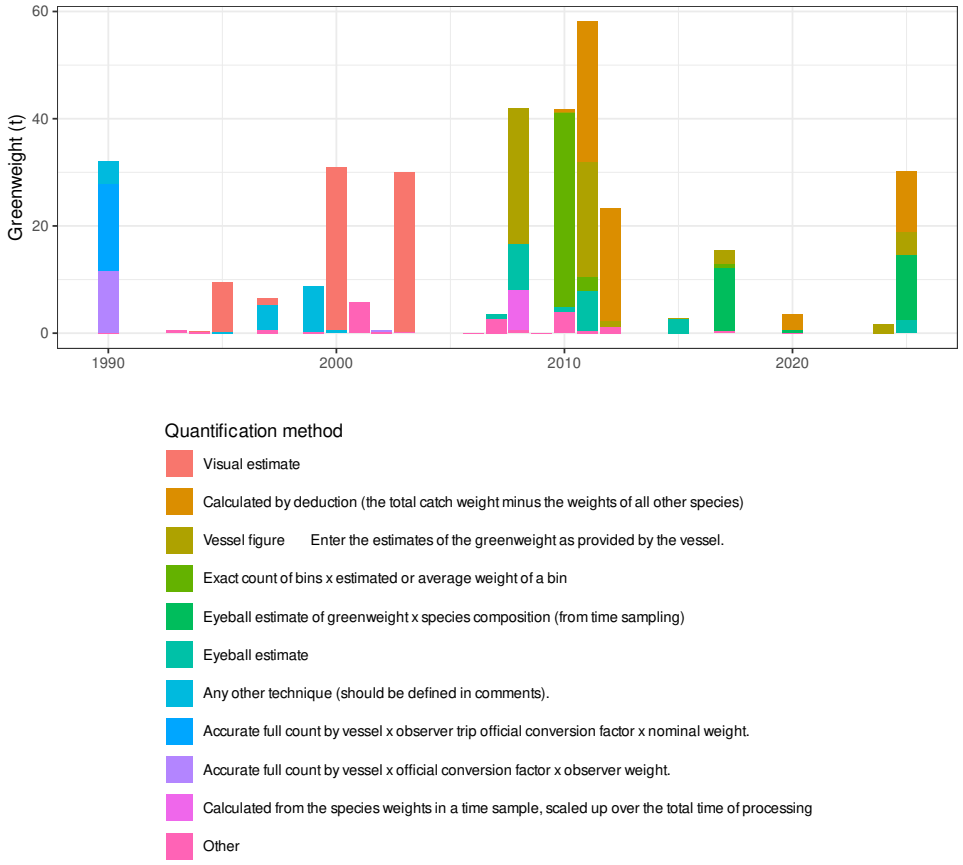


Figure 72: Methods used by observers to quantify the catch of orange roughy in the ORH 2B Trawl fishery. The legend lists the methods used in descending order of total catch.

2.1.4 ORH 3B: Trawl fishery

2.1.4.1 Length-frequency samples

Table 7: Length-frequency samples of orange roughy from the ORH 3B Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of orange roughy exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	2951	110	8541	3.73
1991	2341	119	10815	5.08
1992	2482	110	10277	4.43
1993	2828	96	9021	3.39
1994	3577	224	19564	6.26
1995	3123	171	14251	5.48
1996	2014	58	9598	2.88
1997	2091	129	11033	6.17
1998	2808	166	14210	5.91
1999	3167	92	8124	2.90
2000	2505	157	11535	6.27
2001	3025	300	16684	9.92
2002	2615	246	16428	9.41
2003	3434	305	21323	8.88
2004	3606	142	9285	3.94
2005	3195	384	36248	12.02
2006	3143	300	30205	9.55
2007	2767	304	25278	10.99
2008	2396	421	33715	17.57
2009	2094	417	32769	19.91
2010	1765	321	23238	18.19
2011	672	46	2391	6.85
2012	627	38	2404	6.06
2013	534	10	264	1.87
2014	961	25	1593	2.60
2015	876	64	4327	7.31
2016	1432	82	6130	5.73
2017	1573	88	5345	5.59
2018	1513	63	3028	4.16
2019	1464	118	7135	8.06
2020	1532	90	5543	5.87
2021	1602	140	9973	8.74
2022	1155	206	13644	17.84
2023	956	123	9170	12.87
2024	667	191	12256	28.64
2025	676	71	5057	10.50

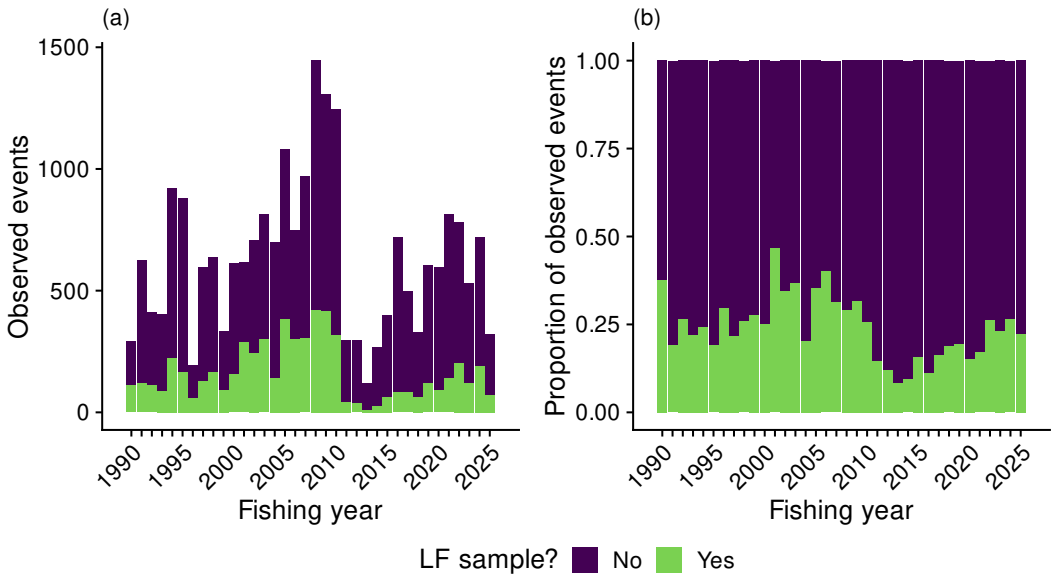


Figure 73: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in ORH 3B where the orange roughy catch exceeded the 40 kg threshold, with and without length-frequency sampling.**

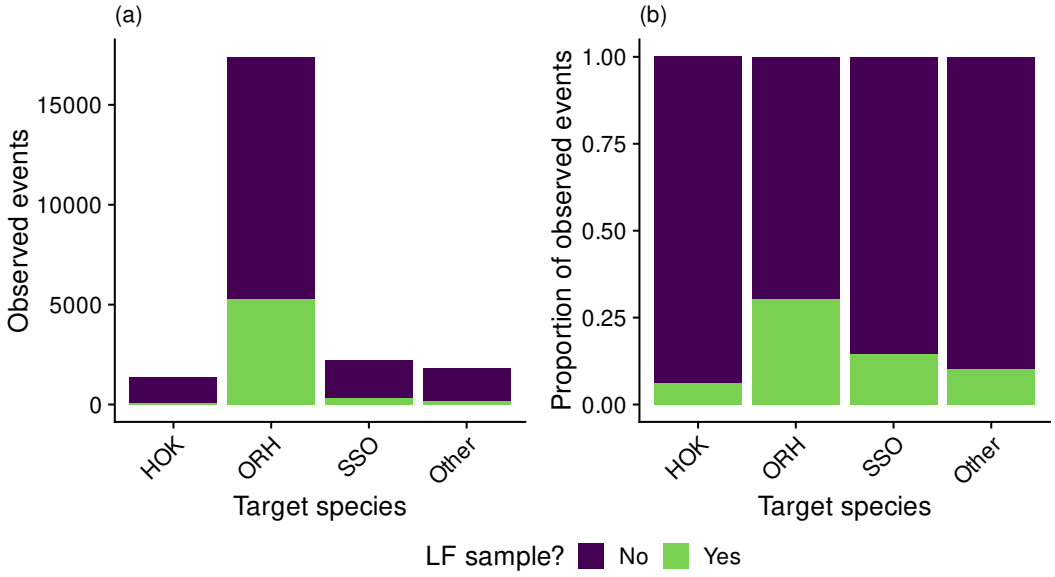


Figure 74: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in ORH 3B where the orange roughy catch exceeded the 40 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

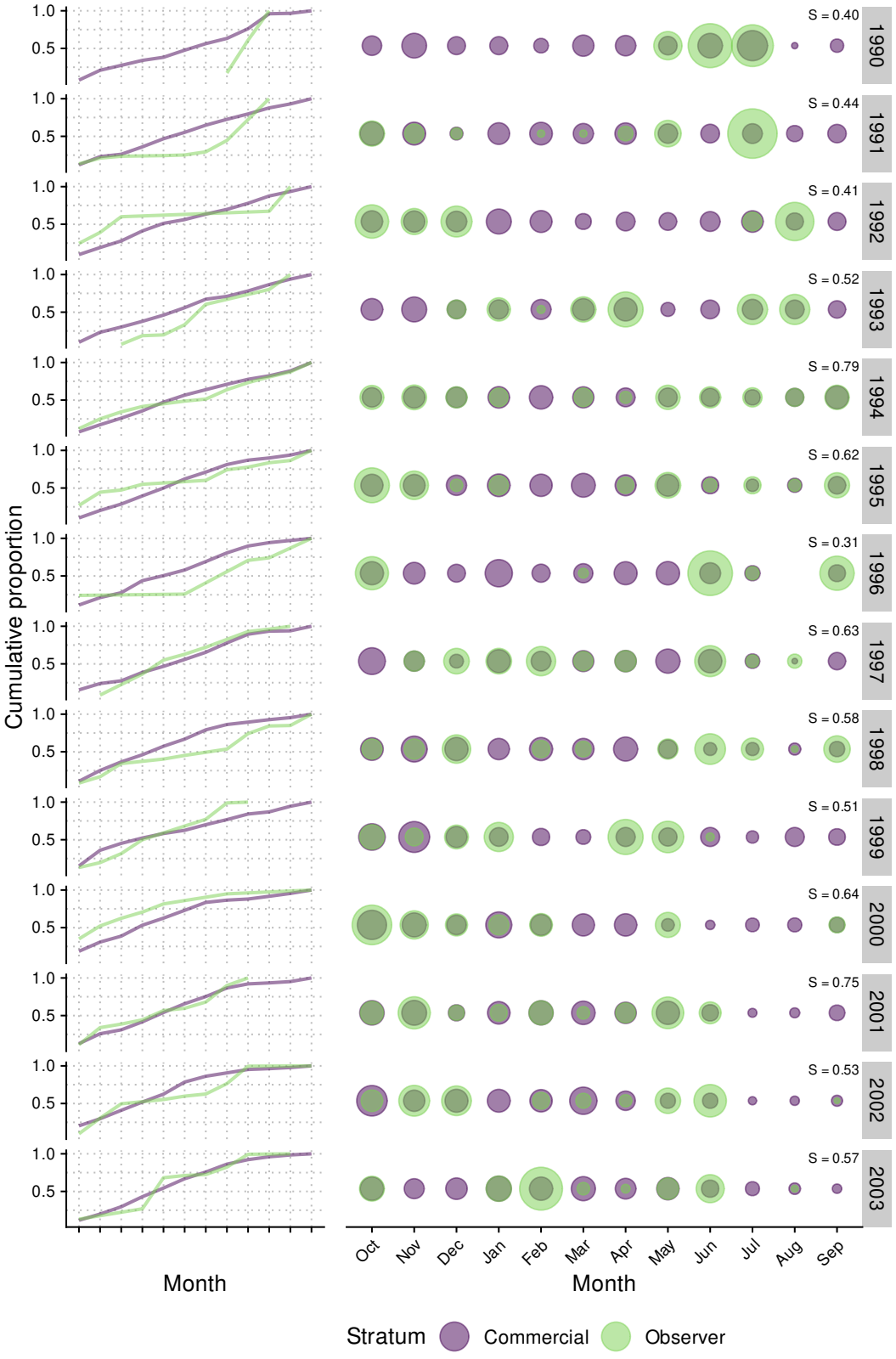


Figure 75: Monthly representativeness of observer sampling coverage of Trawl fishing events in ORH 3B, where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

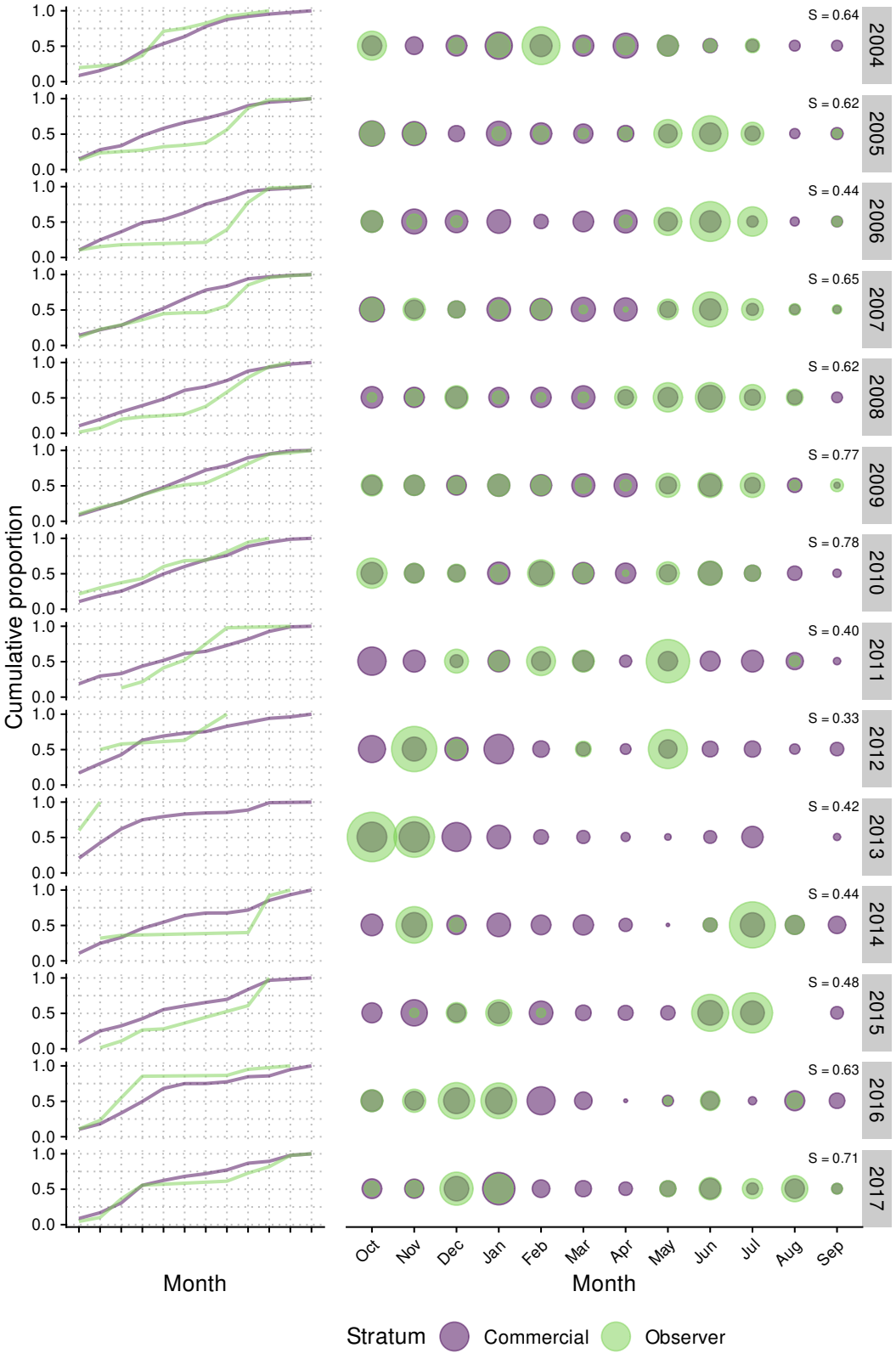


Figure 76: Monthly representativeness of observer sampling coverage of Trawl fishing events in ORH 3B, where the orange roughy catch exceeded the 40kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

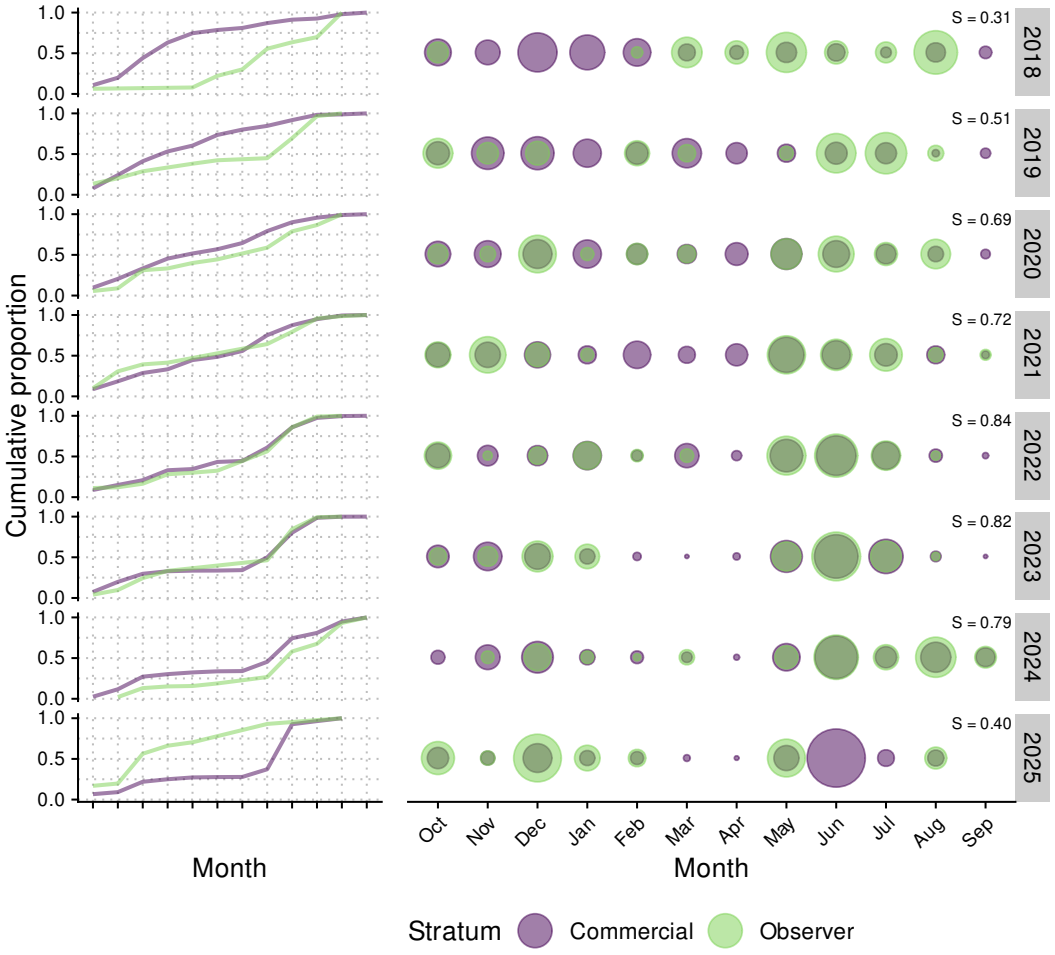


Figure 77: Monthly representativeness of observer sampling coverage of Trawl fishing events in ORH 3B, where the orange roughy catch exceeded the 40kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

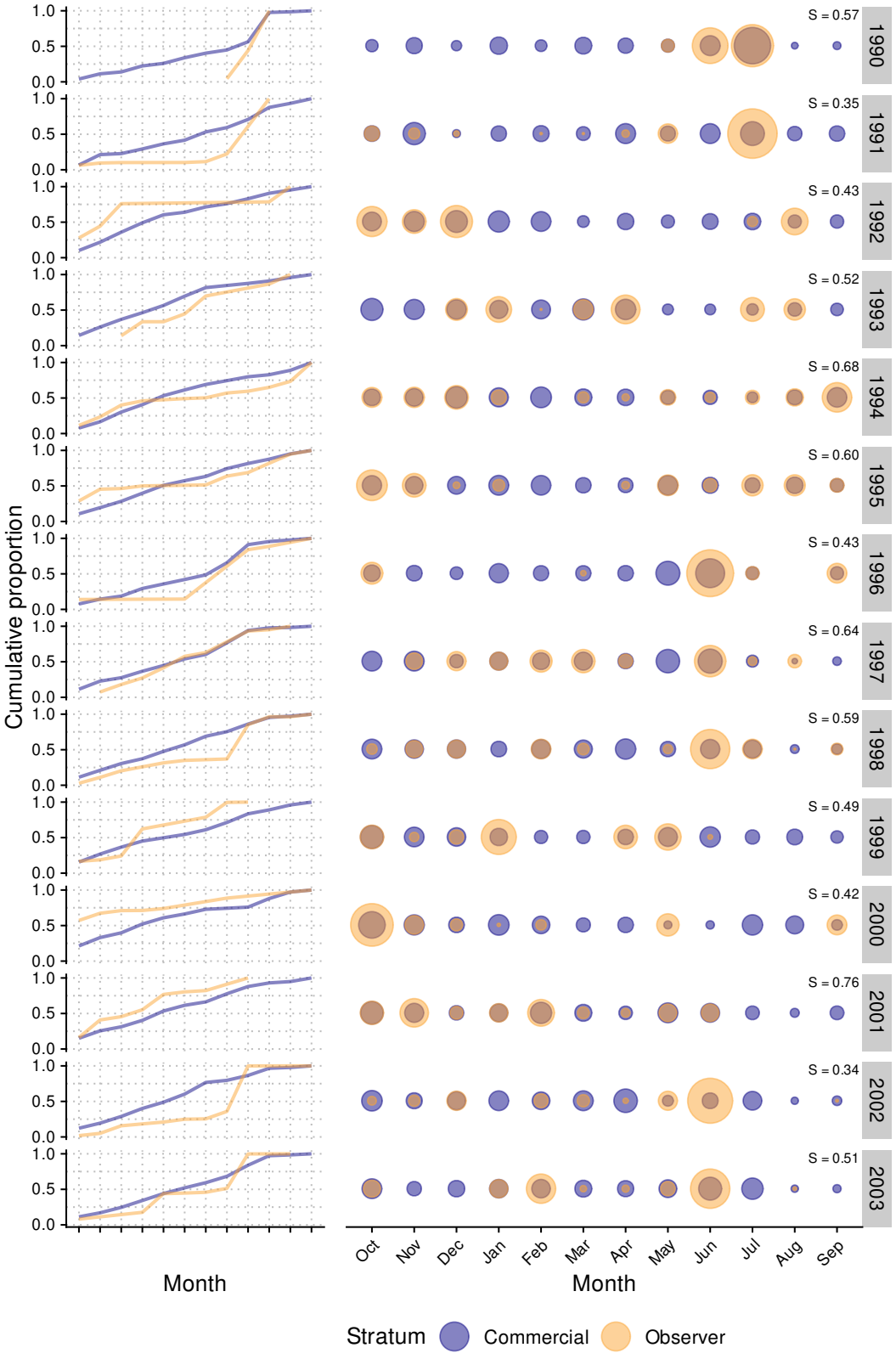


Figure 78: Monthly representativeness of observer sampling coverage of Trawl catch in ORH 3B, from events where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

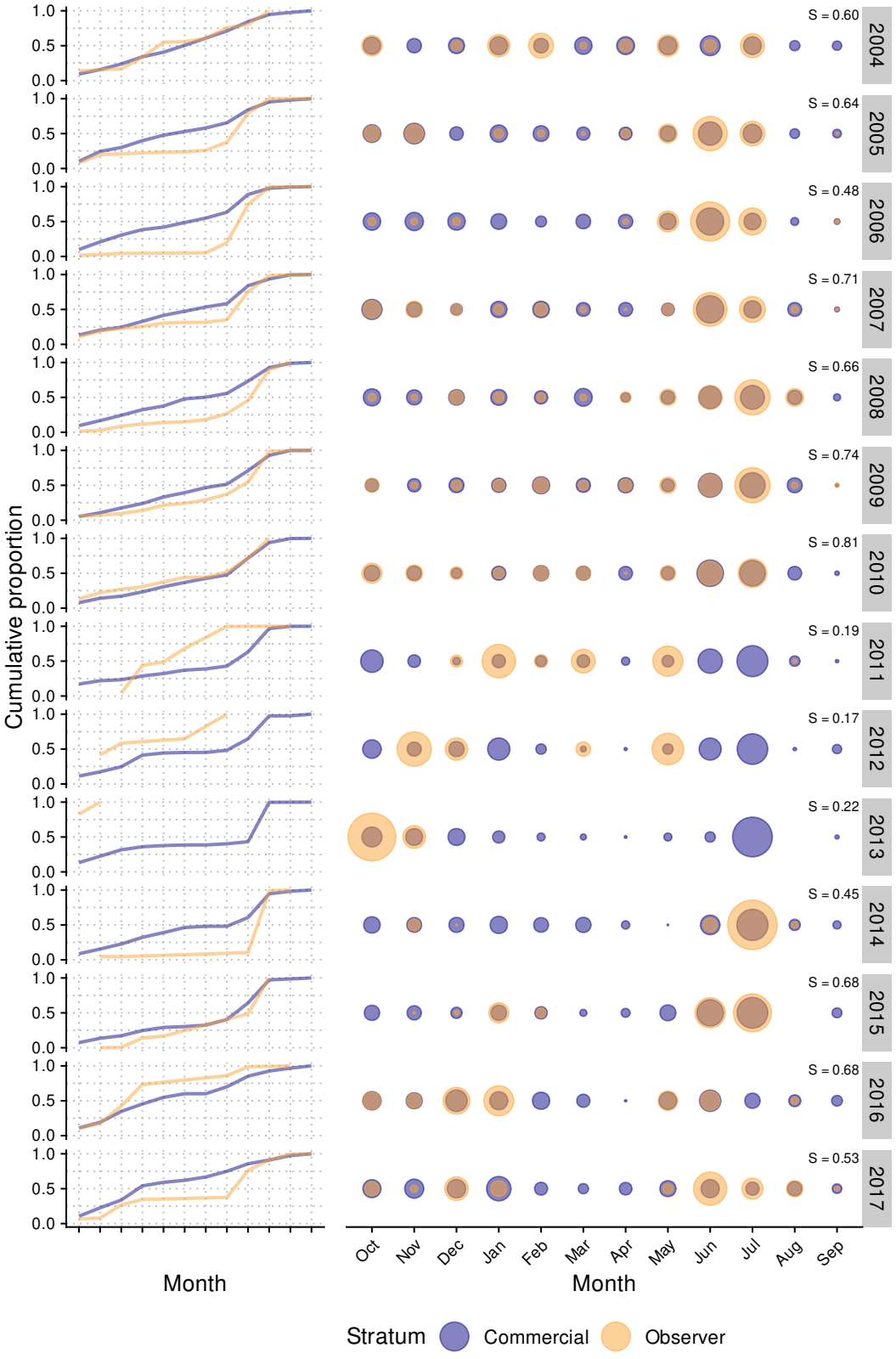


Figure 79: Monthly representativeness of observer sampling coverage of Trawl catch in ORH 3B, from events where the orange roughy catch exceeded the 40kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

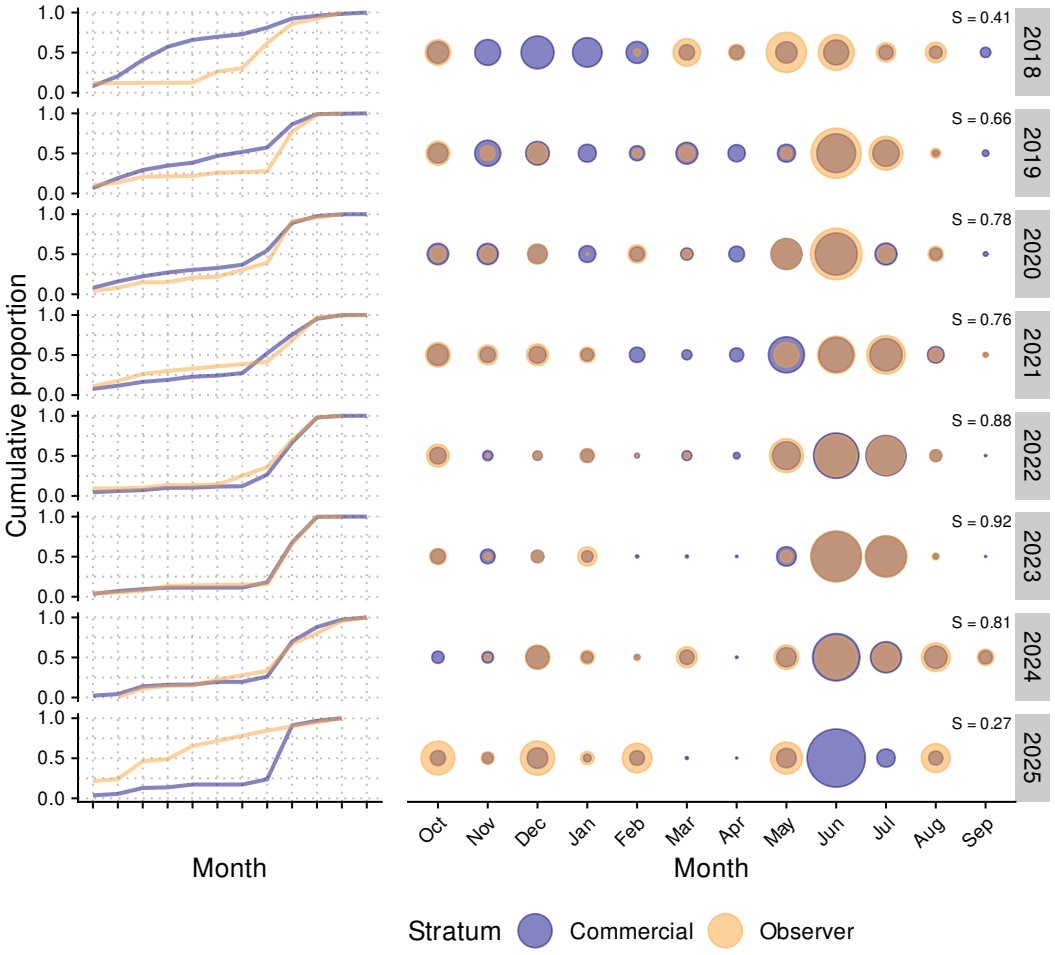


Figure 80: Monthly representativeness of observer sampling coverage of Trawl catch in ORH 3B, from events where the orange roughy catch exceeded the 40kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

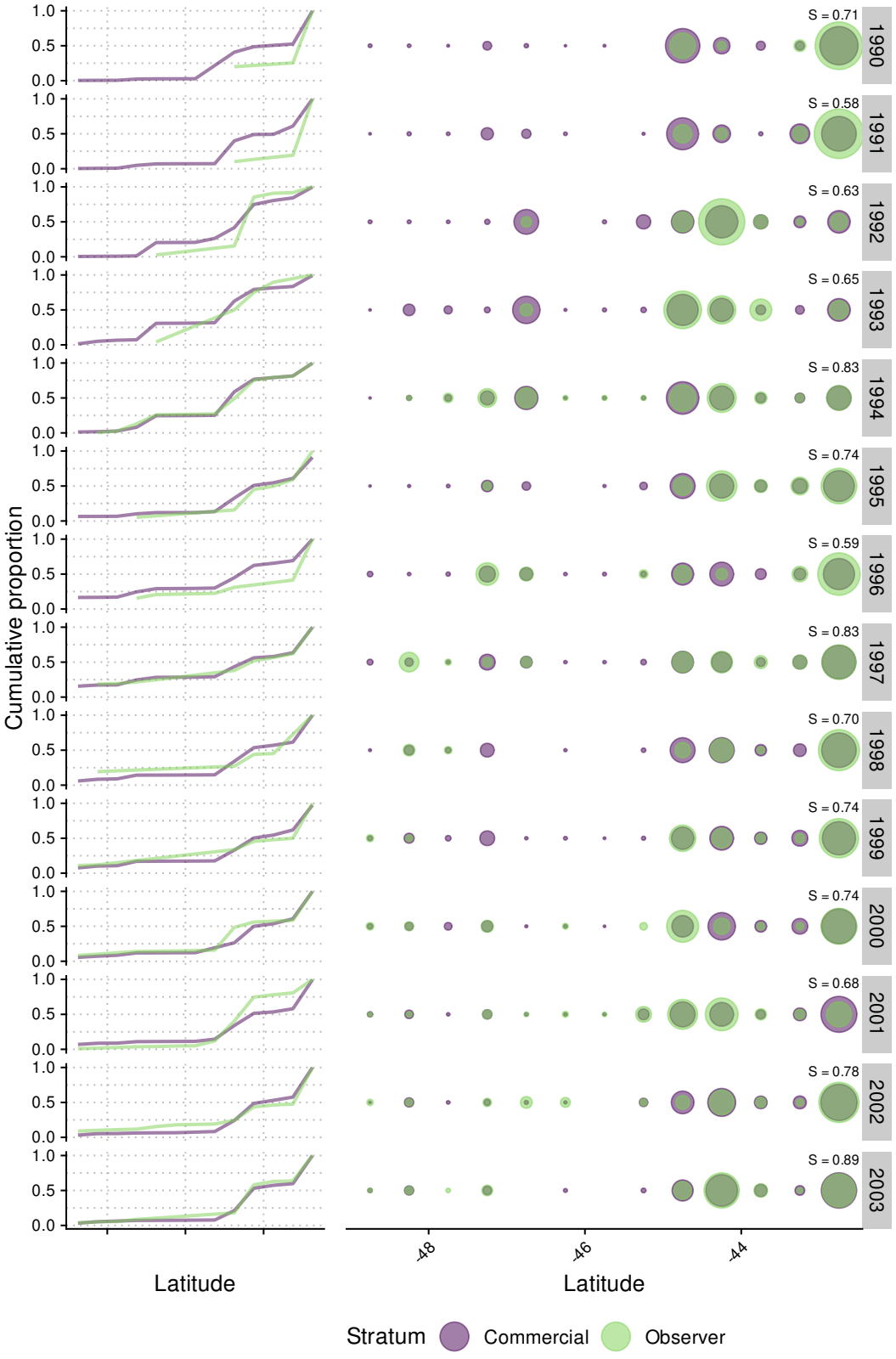


Figure 81: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 3B, where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

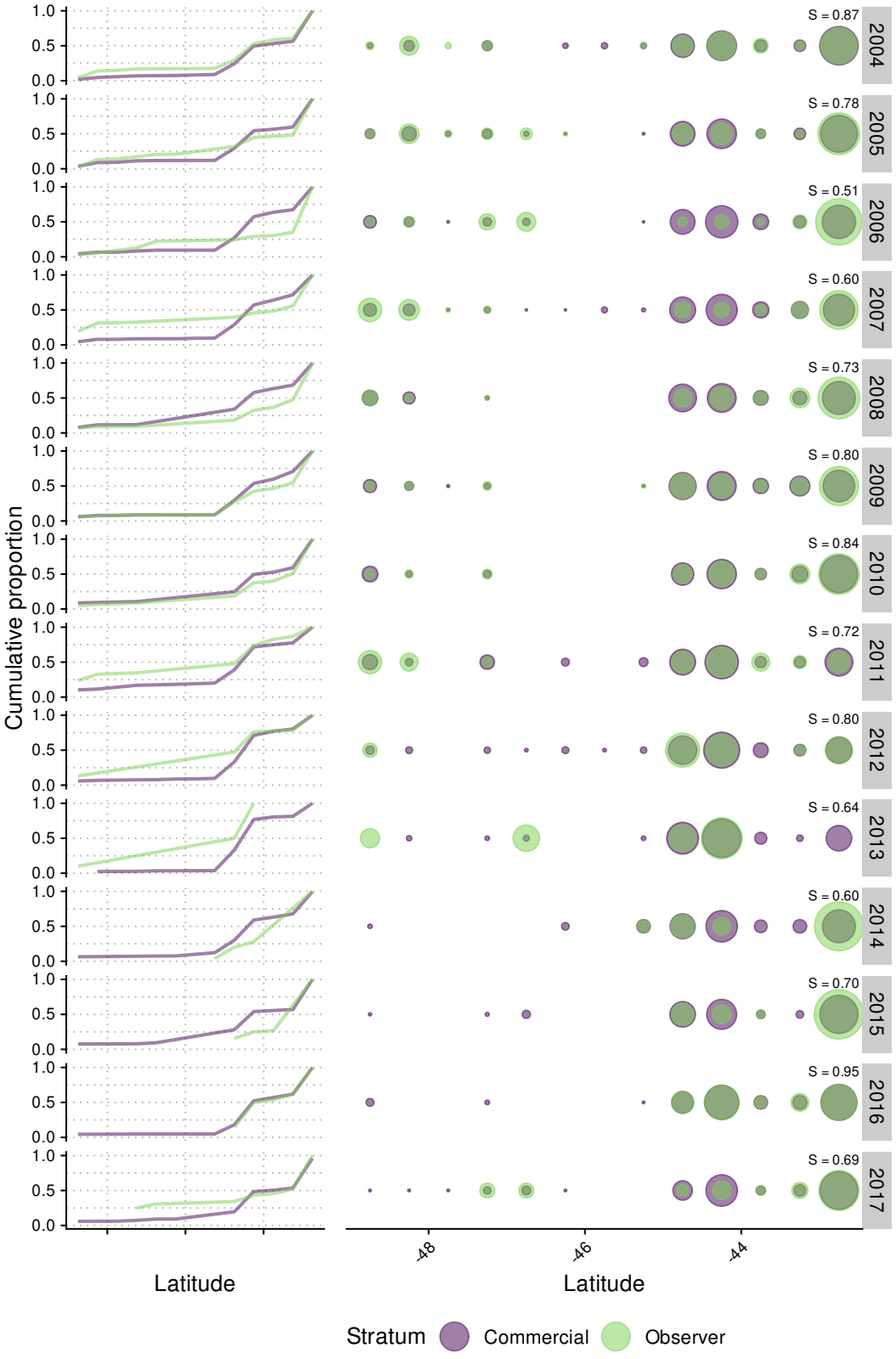


Figure 82: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 3B, where the orange roughy catch exceeded the 40kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

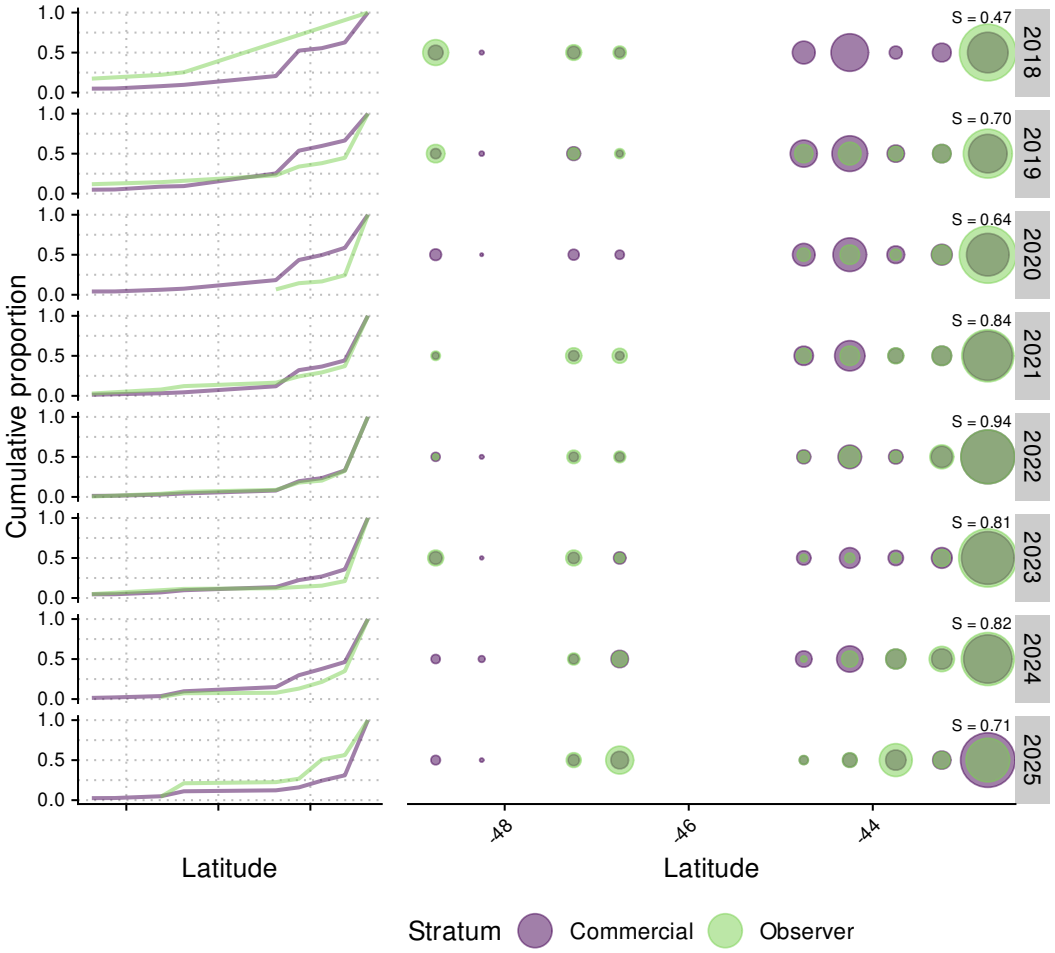


Figure 83: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 3B, where the orange roughy catch exceeded the 40kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

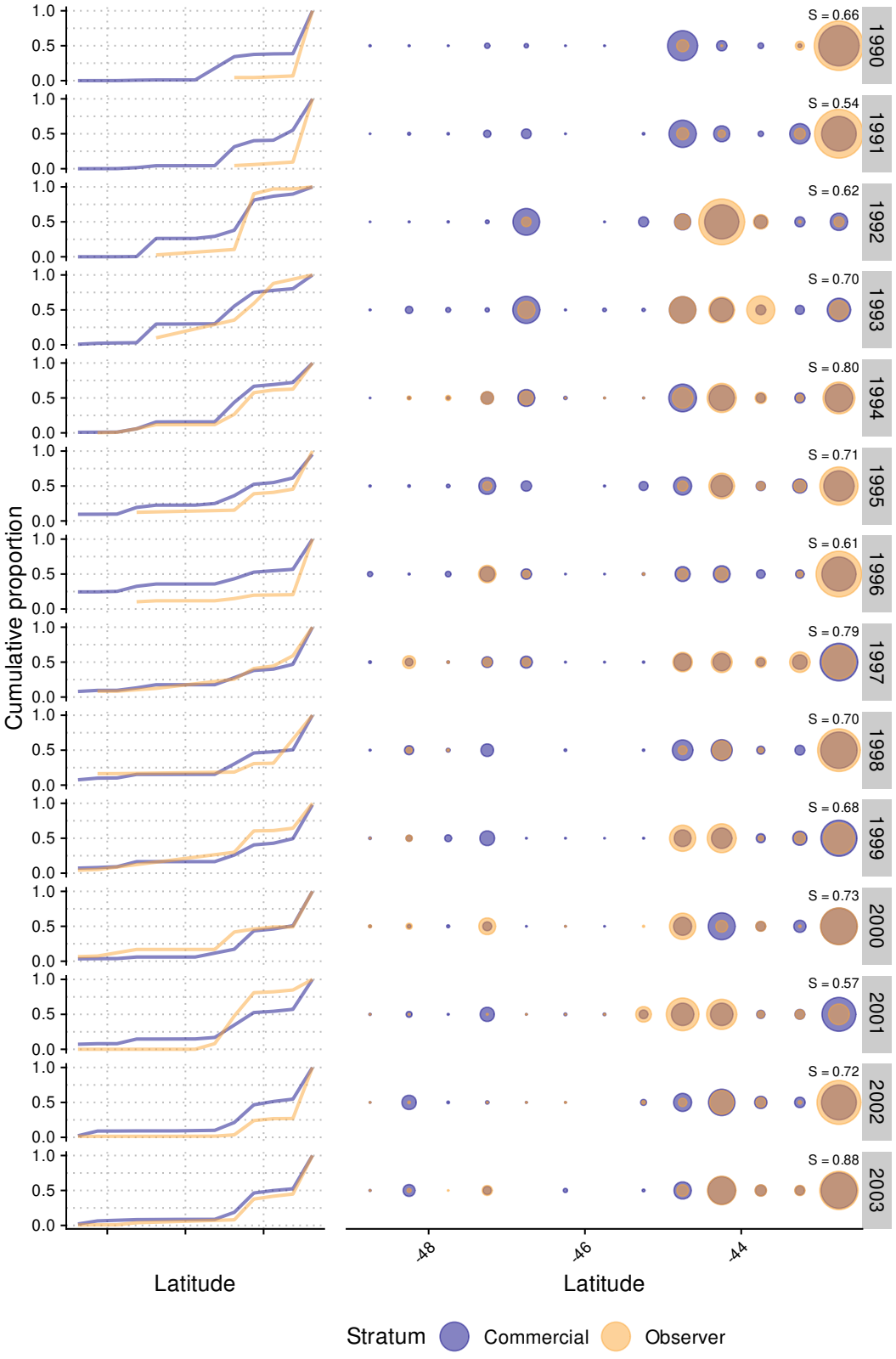


Figure 84: **Latitudinal representativeness of observer sampling coverage of Trawl catch in ORH 3B, from events where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

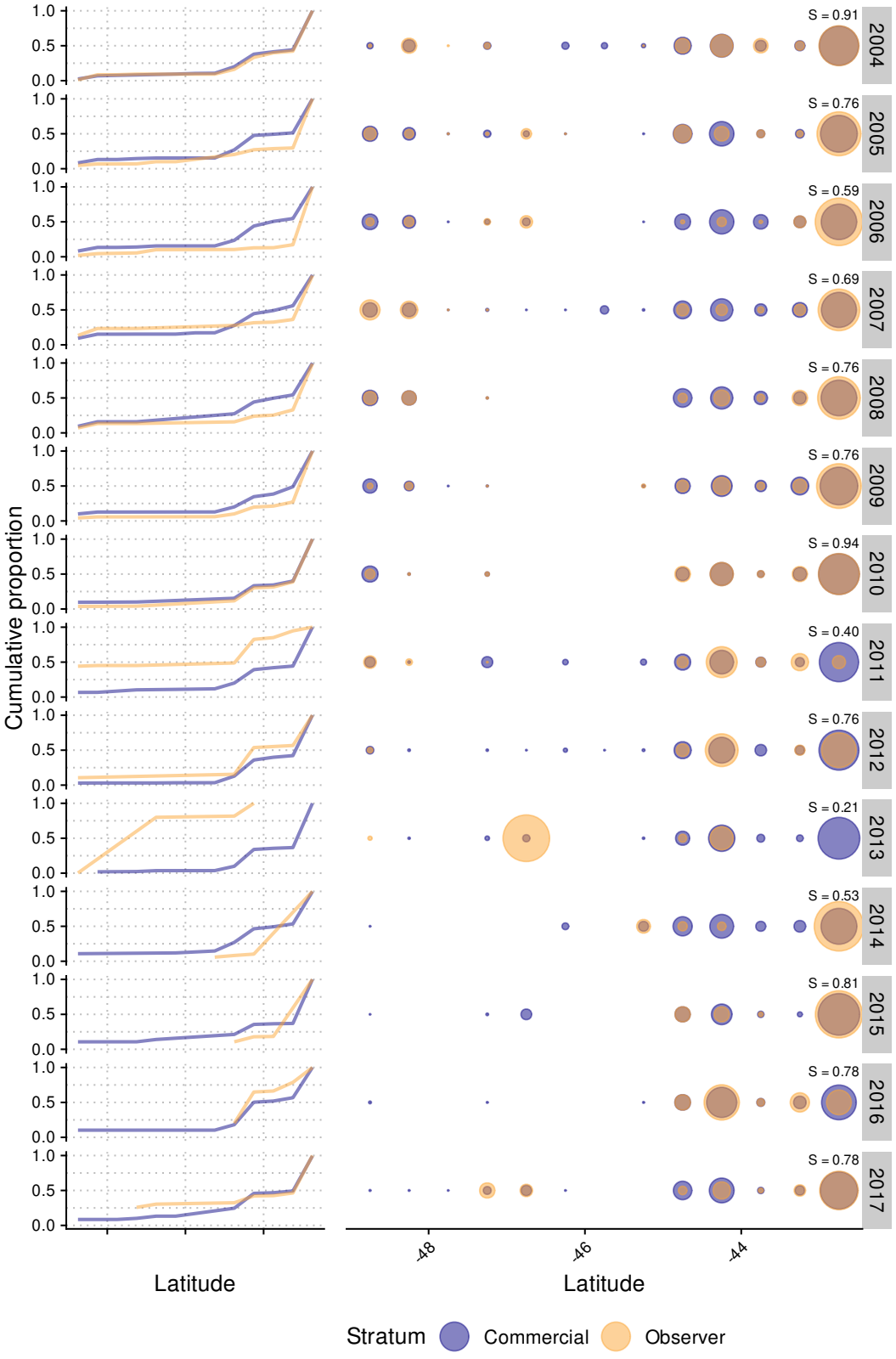


Figure 85: **Latitudinal representativeness of observer sampling coverage of Trawl catch in ORH 3B, from events where the orange roughy catch exceeded the 40kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

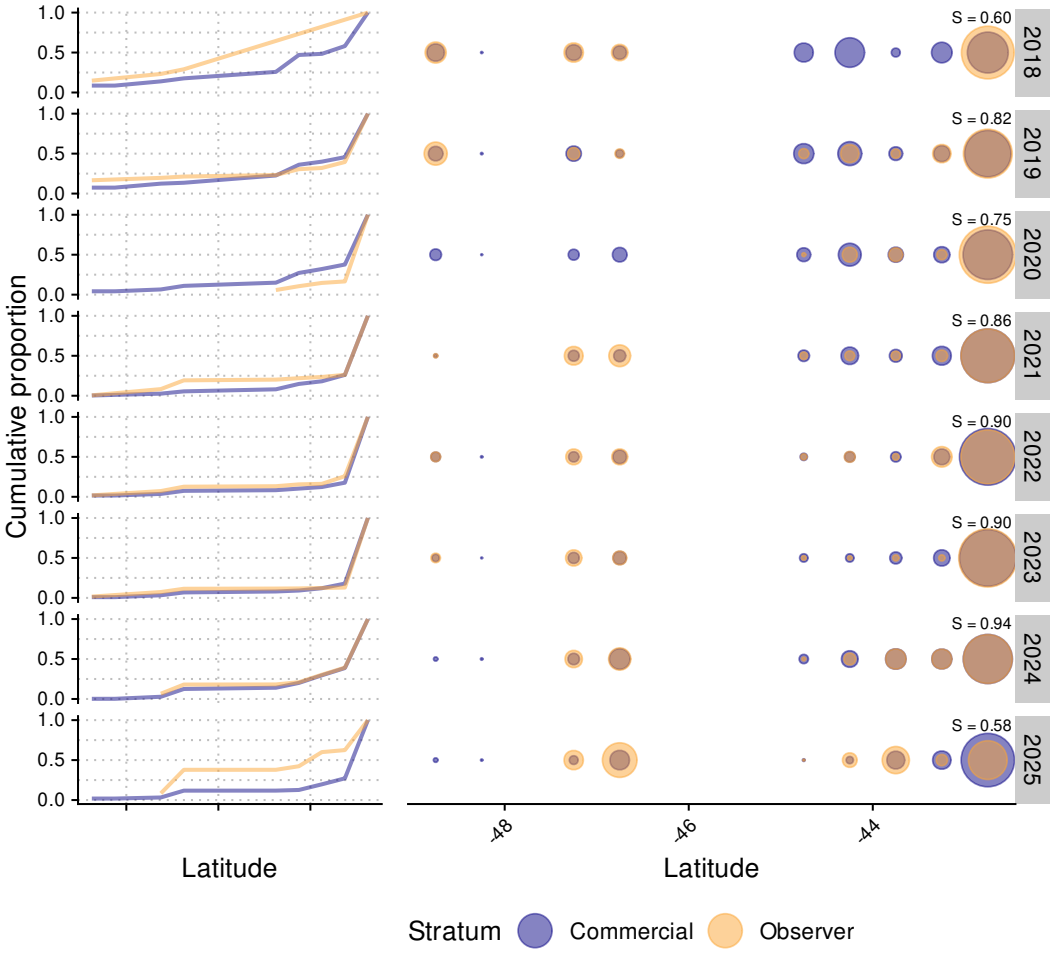


Figure 86: Latitudinal representativeness of observer sampling coverage of Trawl catch in ORH 3B, from events where the orange roughy catch exceeded the 40kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

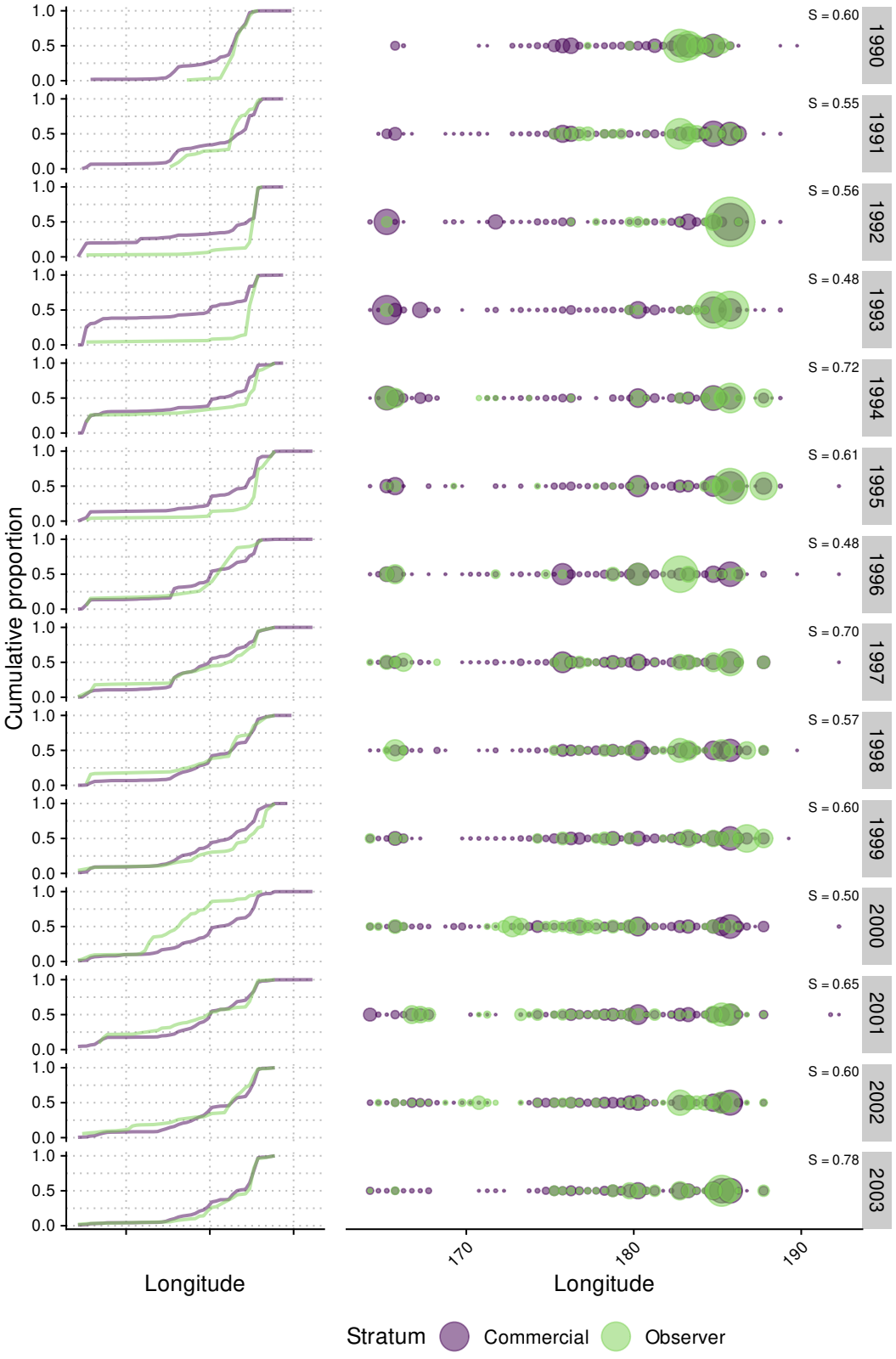


Figure 87: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 3B, where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

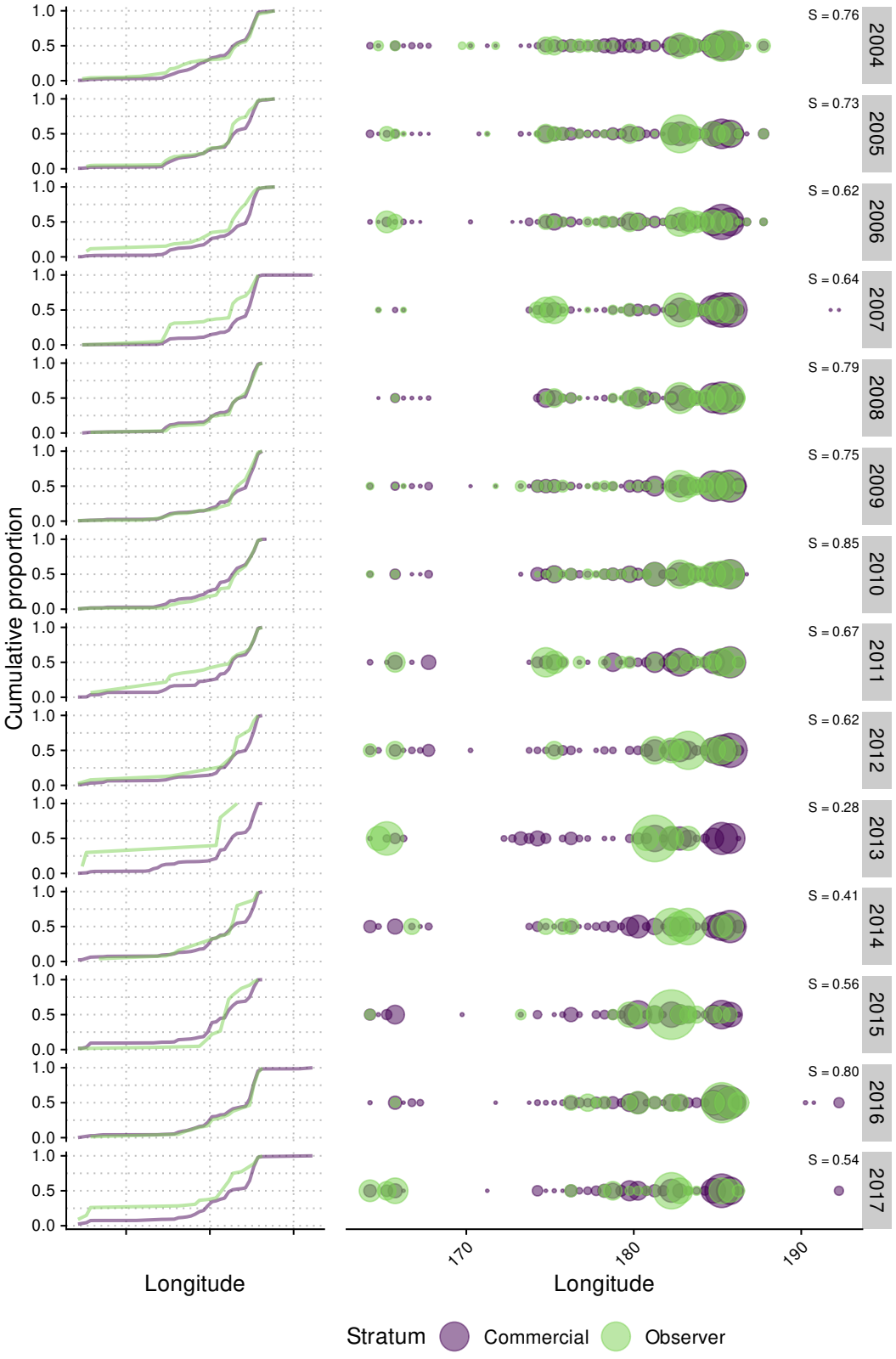


Figure 88: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 3B, where the orange roughy catch exceeded the 40kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

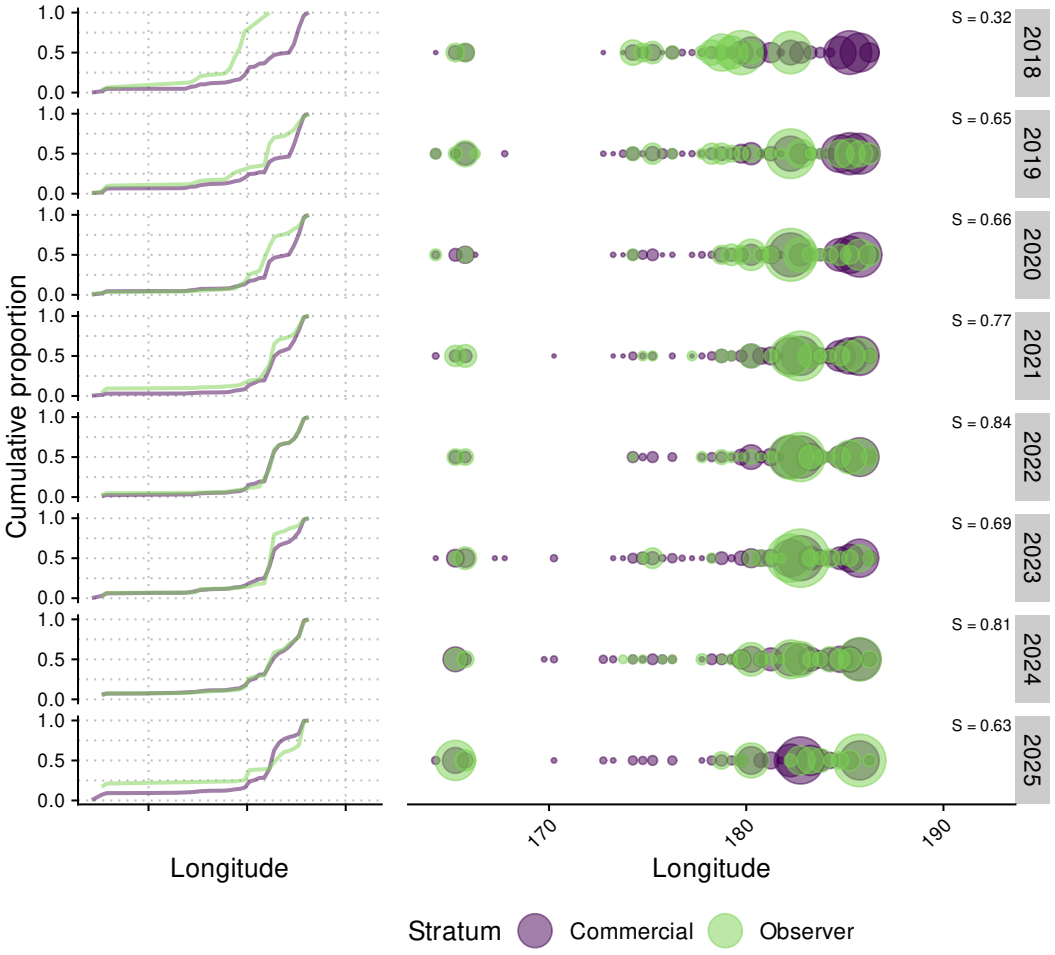


Figure 89: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in ORH 3B, where the orange roughy catch exceeded the 40kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

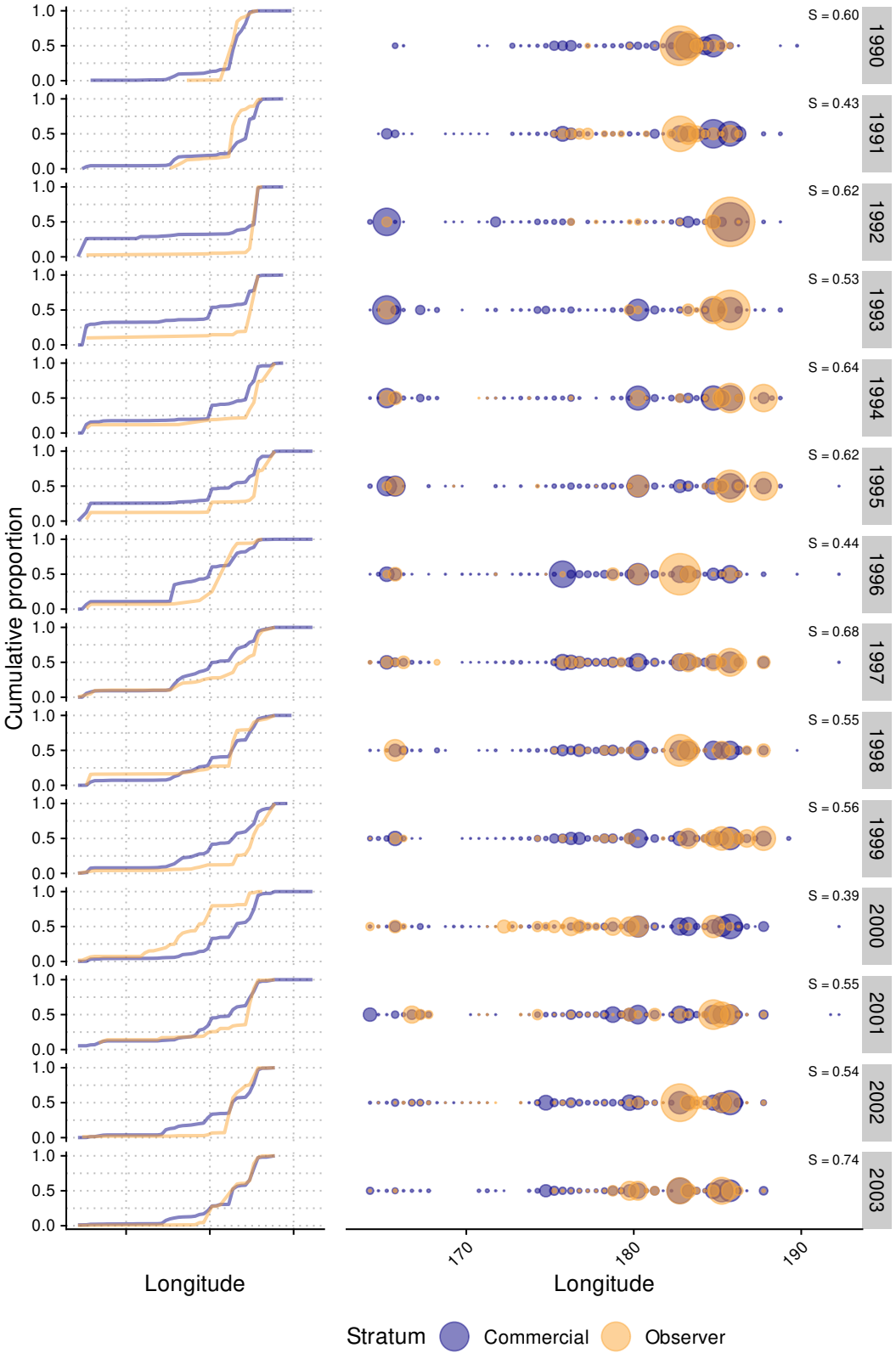


Figure 90: **Longitudinal representativeness of observer sampling coverage of Trawl catch in ORH 3B, from events where the orange roughy catch exceeded the 40kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

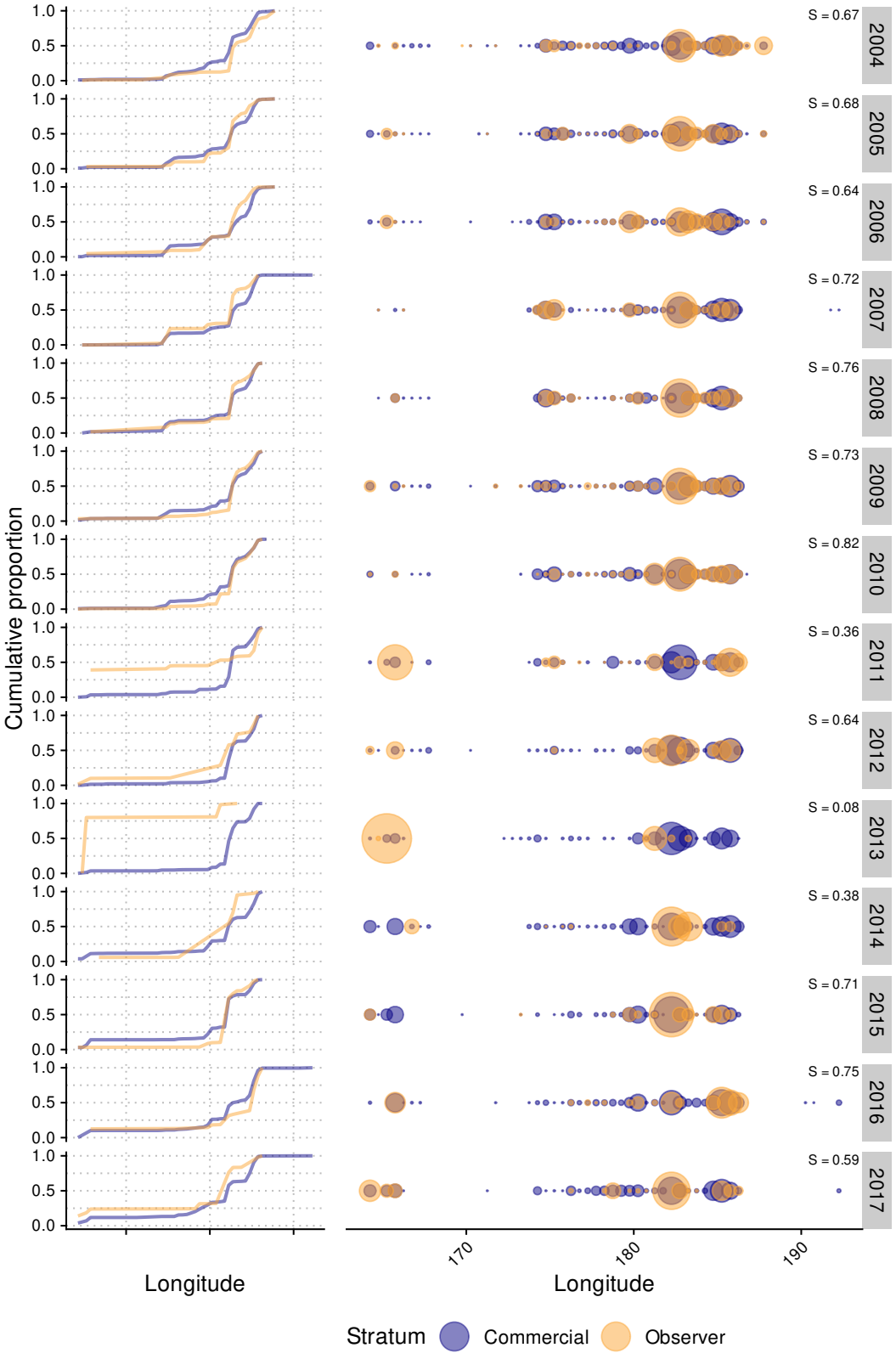


Figure 91: Longitudinal representativeness of observer sampling coverage of Trawl catch in ORH 3B, from events where the orange roughy catch exceeded the 40kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

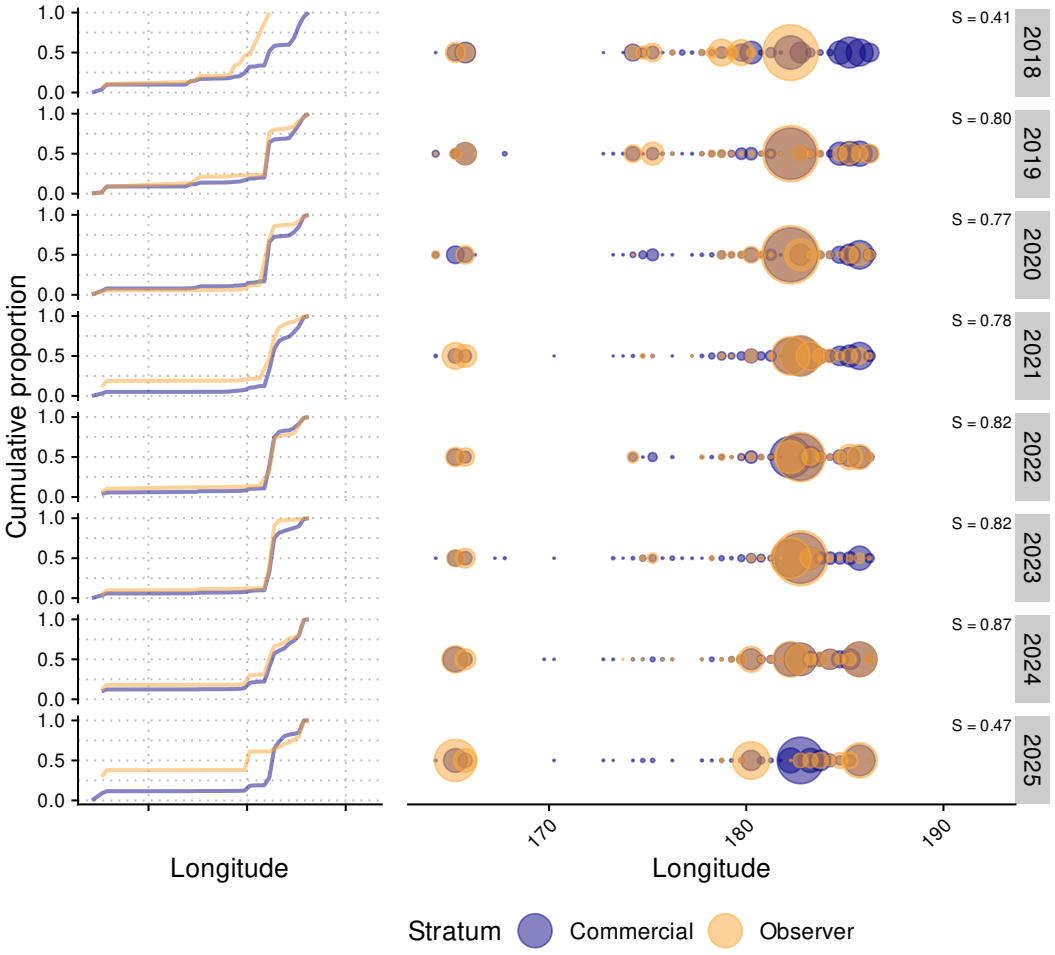


Figure 92: **Longitudinal representativeness of observer sampling coverage of Trawl catch in ORH 3B, from events where the orange roughy catch exceeded the 40kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

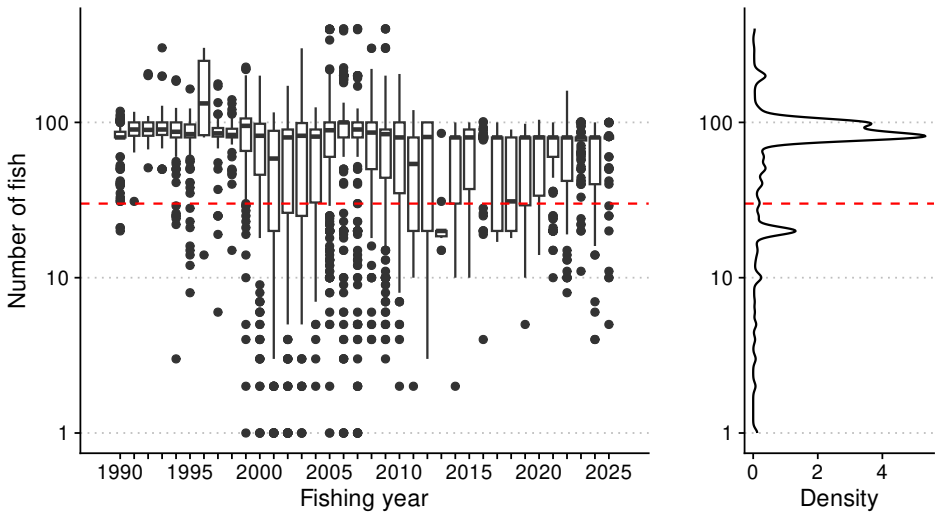


Figure 93: **Length-frequency sample sizes for observed fishing events in ORH 3B where orange roughy were sampled. The red dashed line indicates a sample size of 30 fish.**

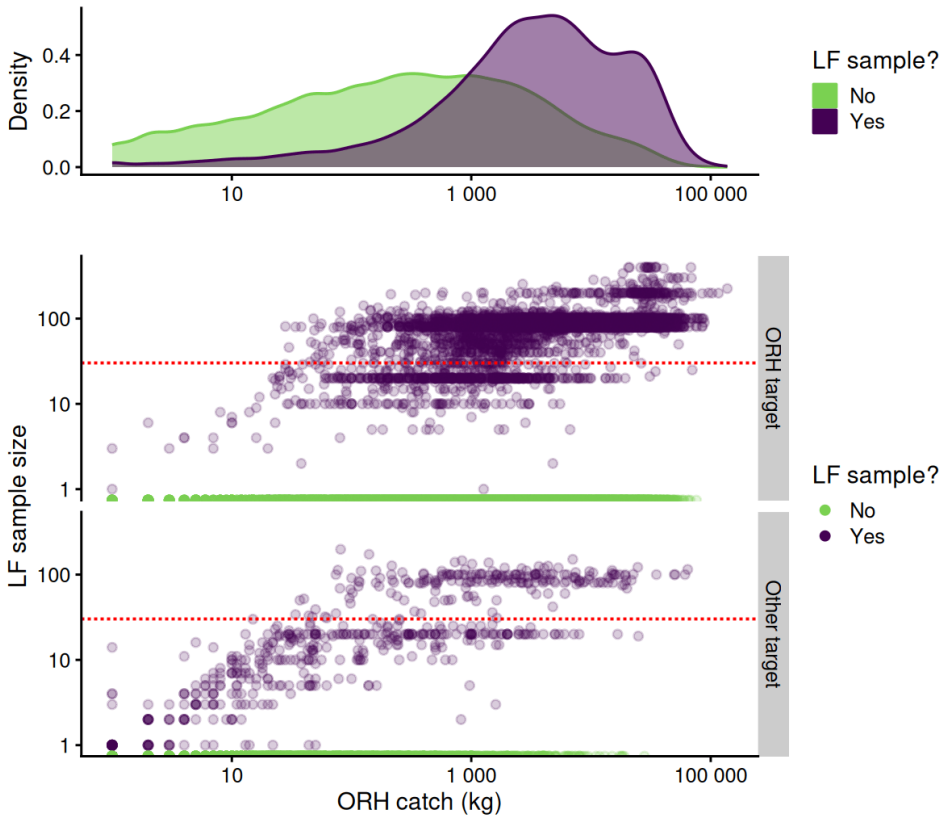


Figure 94: Length-frequency sample sizes (number of fish sampled) for observed fishing events in ORH 3B in relation to the total orange roughy catch from an event, separately for orange roughy target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.1.4.2 Otolith samples

Table 8: Otolith samples of orange roughy from the ORH 3B Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of orange roughy exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	2 951	0	0	0.00
1991	2 341	0	0	0.00
1992	2 482	0	0	0.00
1993	2 828	0	0	0.00
1994	3 577	0	0	0.00
1995	3 123	0	0	0.00
1996	2 014	0	0	0.00
1997	2 091	0	0	0.00
1998	2 808	0	0	0.00
1999	3 167	0	0	0.00
2000	2 505	0	0	0.00
2001	3 025	0	0	0.00
2002	2 615	0	0	0.00
2003	3 434	0	0	0.00
2004	3 606	0	0	0.00
2005	3 195	0	0	0.00
2006	3 143	0	0	0.00
2007	2 767	0	0	0.00
2008	2 396	0	0	0.00
2009	2 094	0	0	0.00
2010	1 765	0	0	0.00
2011	672	0	0	0.00
2012	627	0	0	0.00
2013	534	0	0	0.00
2014	961	24	368	2.50
2015	876	2	10	0.23
2016	1 432	5	48	0.35
2017	1 573	63	1 022	4.01
2018	1 513	53	646	3.50
2019	1 464	101	1 714	6.90
2020	1 532	68	1 092	4.44
2021	1 602	105	1 750	6.55
2022	1 155	194	2 949	16.80
2023	956	121	2 149	12.66
2024	667	179	3 252	26.84
2025	676	68	1 066	10.06

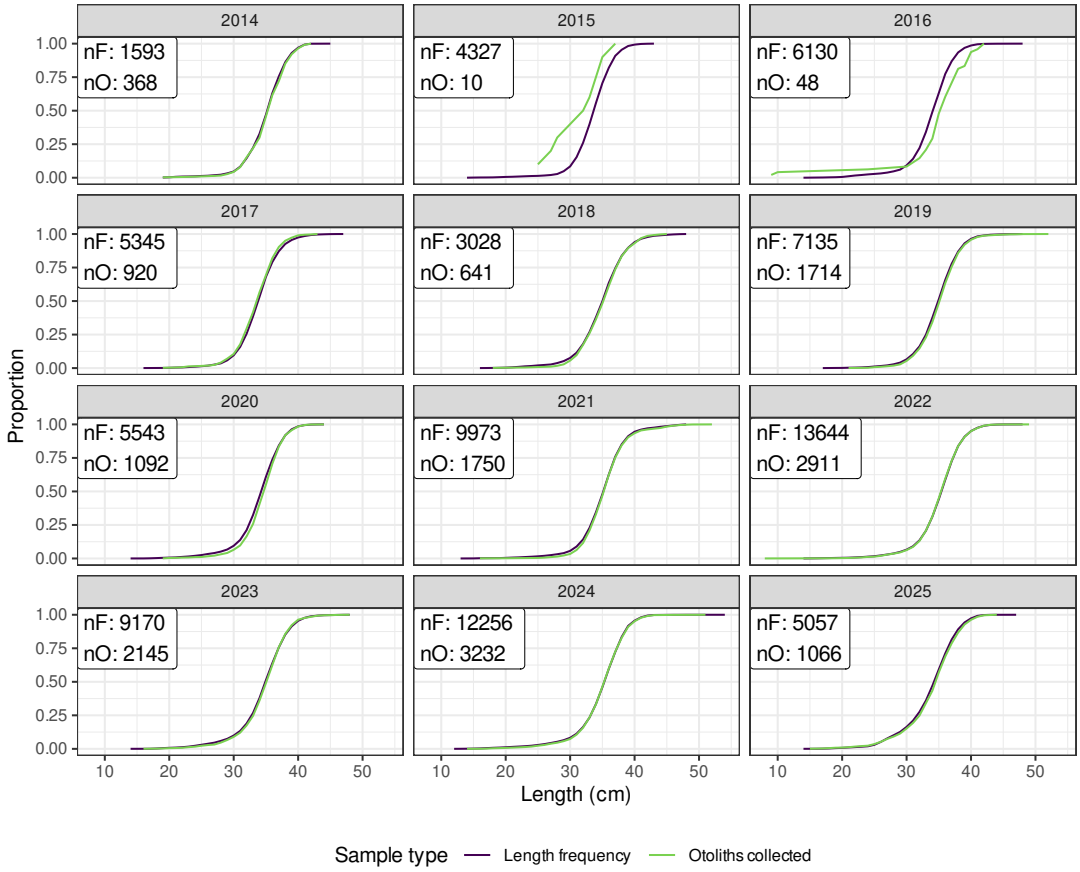


Figure 95: Cumulative distributions of the length of fish in the length frequency and otolith samples of orange roughy in the ORH 3B Trawl fishery for the 2014 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.1.4.3 Catch quantification

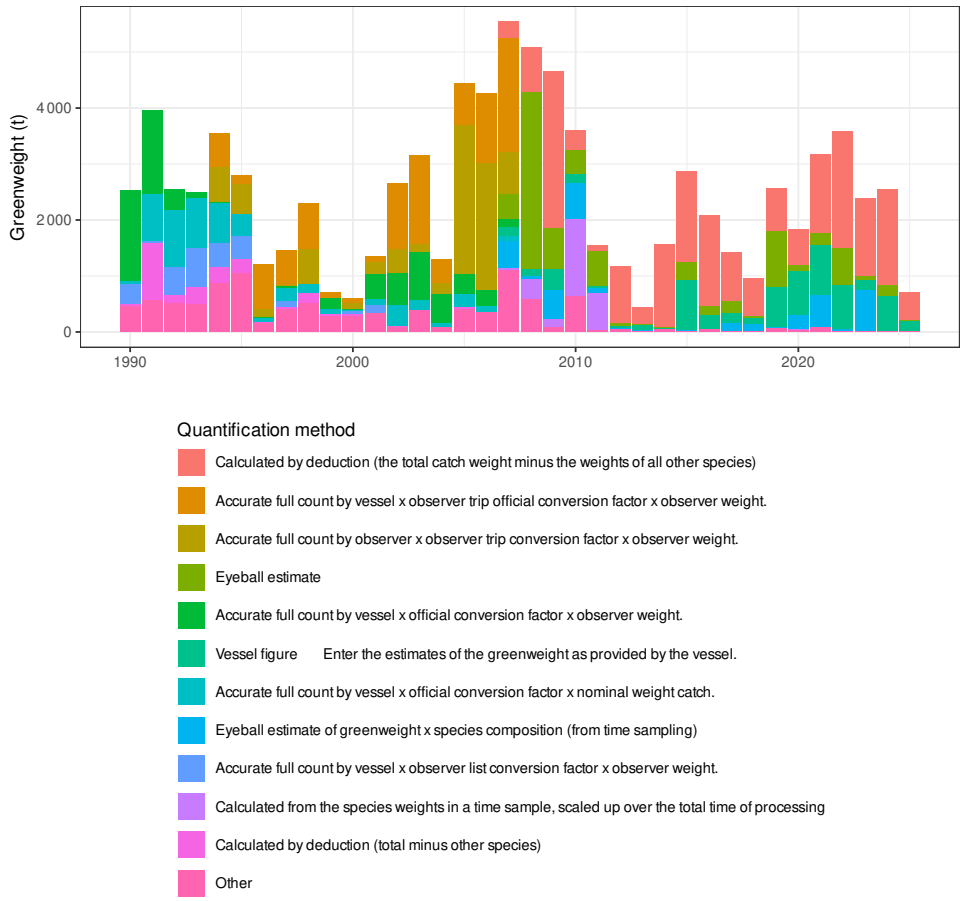


Figure 96: Methods used by observers to quantify the catch of orange roughy in the ORH 3B Trawl fishery. The legend lists the methods used in descending order of total catch.

2.2 RBT stocks

Observer sampling of redbait is considered with respect to the redbait Quota Management Areas.

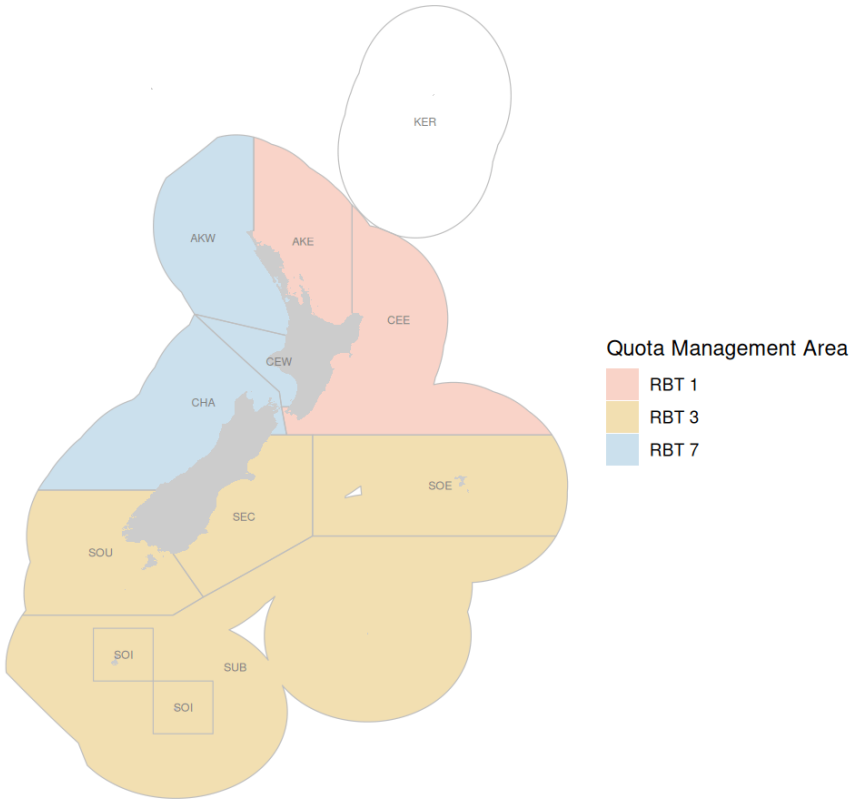


Figure 97: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for redbait (coloured areas, per legend).

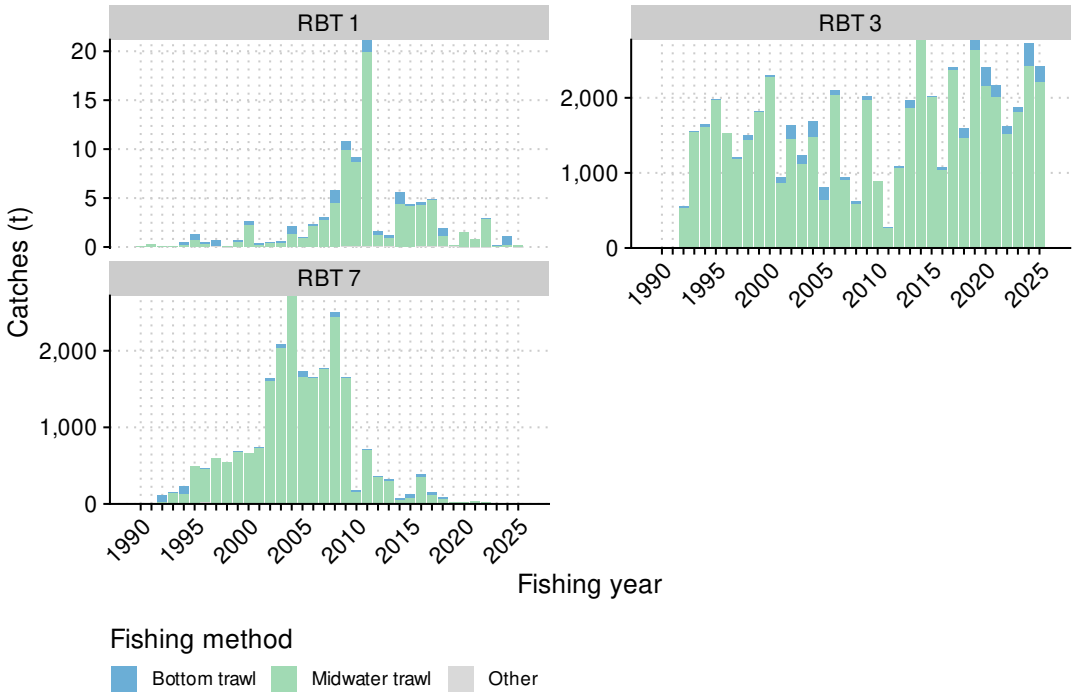


Figure 98: **Catches of redbait by fishing method, for events within the redbait Quota Management Areas. Methods grouped as Other include: BLL, DL, DS, HL, MPT, PRB, PRM, PS, PSH, SN, T, TL.**

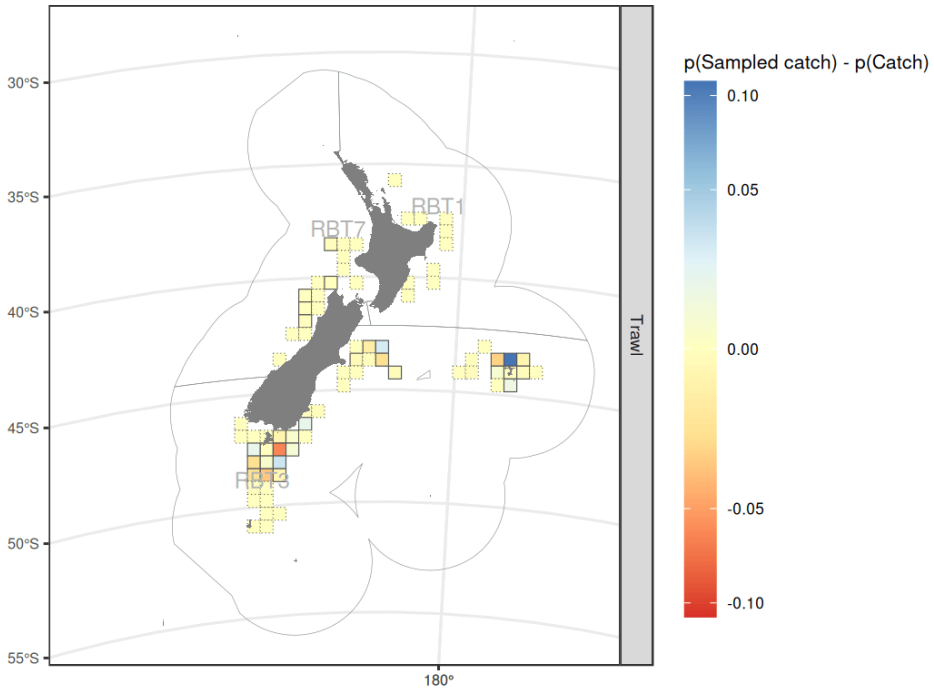


Figure 99: **Differences in the relative proportions of catch and sampled catch for redbait during 2021–2025. Cells with a dotted border had no sampling.**

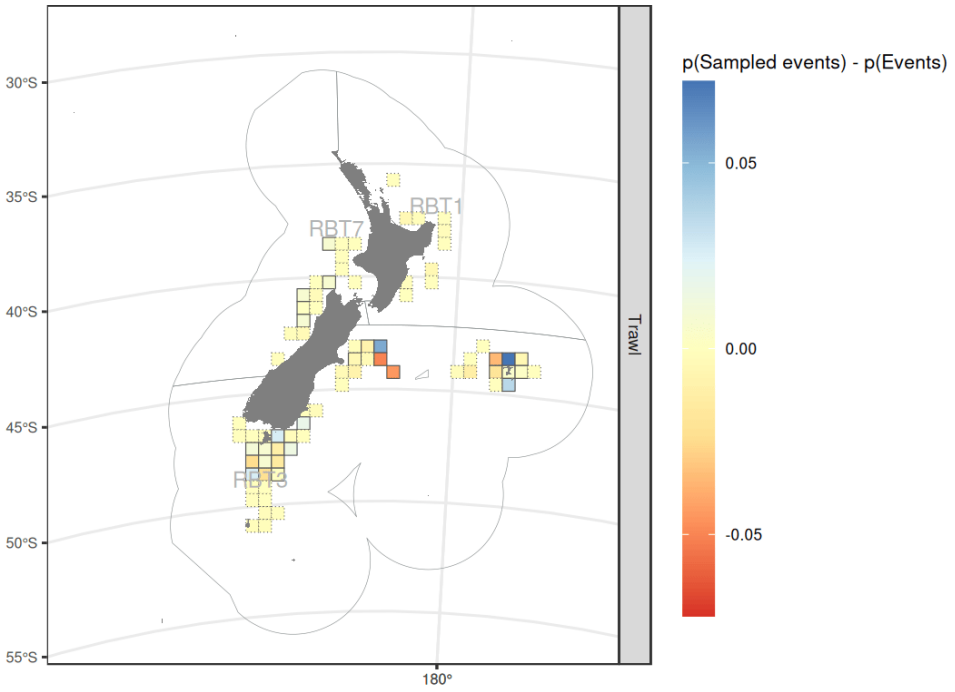


Figure 100: **Differences in the relative proportions of events meeting the sampling threshold and sampled events for redbait during 2021–2025. Cells with a dotted border had no sampling.**

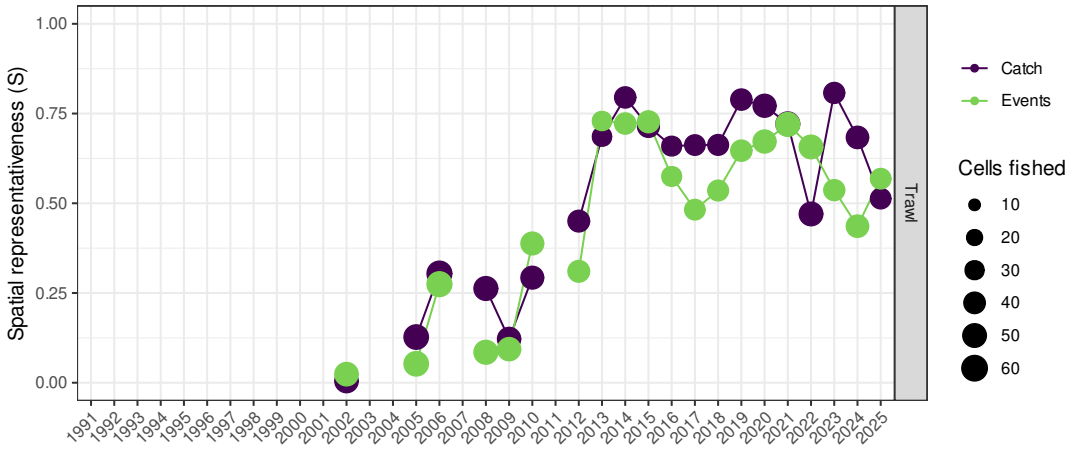


Figure 101: **Spatial representativeness of observer sampling of redbait by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.**

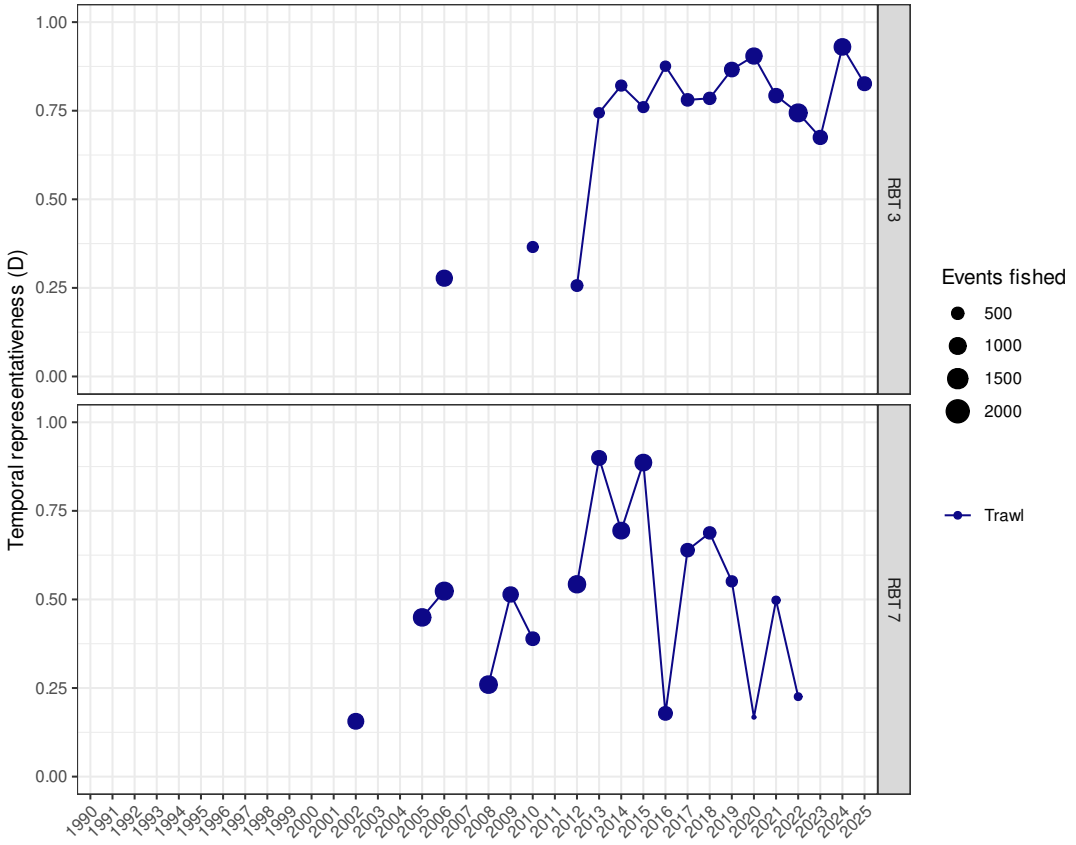


Figure 102: Temporal representativeness of observer sanpling of redbait by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.2.1 RBT 3: Trawl fishery

2.2.1.1 Length-frequency samples

Table 9: Length-frequency samples of redbait from the RBT 3 Trawl fishery sampled by the Observer Programme in fishing years 1991 to 2025. Positive fishing events are those where the catch of redbait exceeded a potential sampling threshold of 10 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1991	2	0	0	0.00
1992	79	0	0	0.00
1993	588	0	0	0.00
1994	480	0	0	0.00
1995	382	0	0	0.00
1996	303	0	0	0.00
1997	322	0	0	0.00
1998	363	0	0	0.00
1999	571	0	0	0.00
2000	874	0	0	0.00
2001	425	0	0	0.00
2002	649	0	0	0.00
2003	589	0	0	0.00
2004	694	0	0	0.00
2005	385	0	0	0.00
2006	504	2	200	0.40
2007	292	0	0	0.00
2008	200	0	0	0.00
2009	225	0	0	0.00
2010	164	9	341	5.49
2011	106	0	0	0.00
2012	188	4	149	2.13
2013	234	47	2 254	20.09
2014	250	60	3 647	24.00
2015	249	60	1 647	24.10
2016	186	26	918	13.98
2017	338	56	2 703	16.57
2018	301	42	1 673	13.95
2019	570	43	2 081	7.54
2020	837	52	1 560	6.21
2021	547	30	1 227	5.48
2022	927	32	773	3.45
2023	506	25	1 362	4.94
2024	766	36	1 731	4.70
2025	541	25	881	4.62

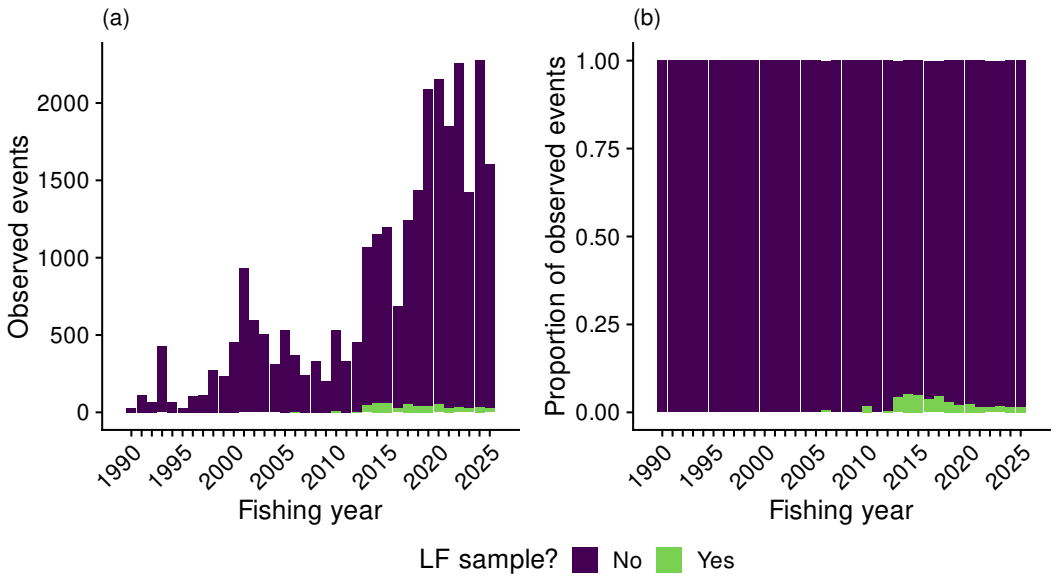


Figure 103: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RBT 3 where the redbait catch exceeded the 10 kg threshold, with and without length-frequency sampling.**

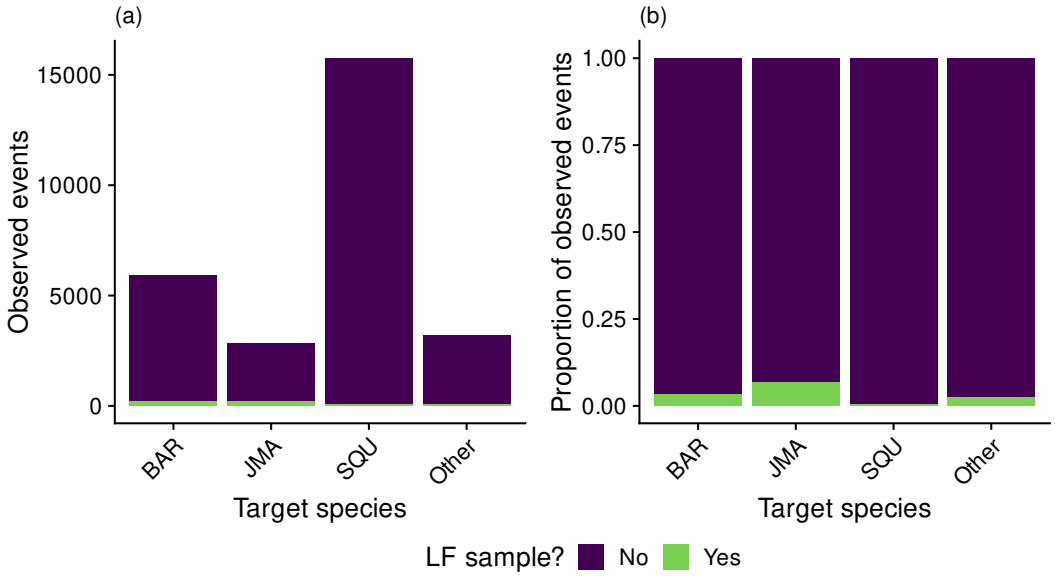


Figure 104: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RBT 3 where the redbait catch exceeded the 10 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

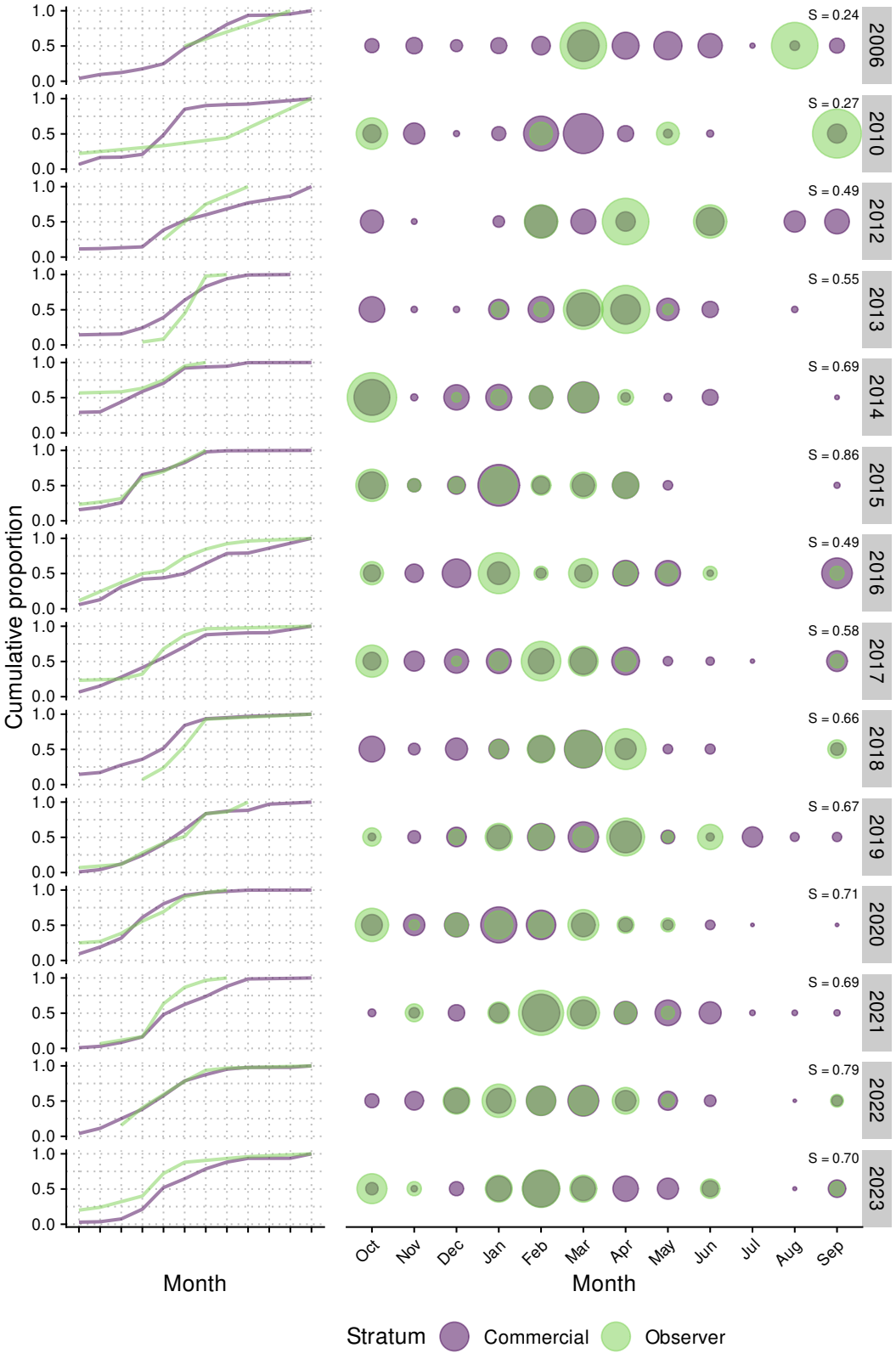


Figure 105: Monthly representativeness of observer sampling coverage of Trawl fishing events in RBT 3, where the redbait catch exceeded the 10kg threshold, in 2006 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

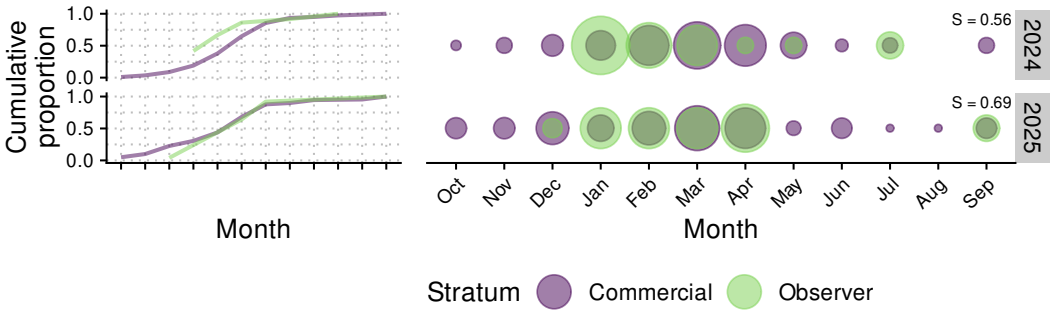


Figure 106: Monthly representativeness of observer sampling coverage of Trawl fishing events in RBT 3, where the redbait catch exceeded the 10kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

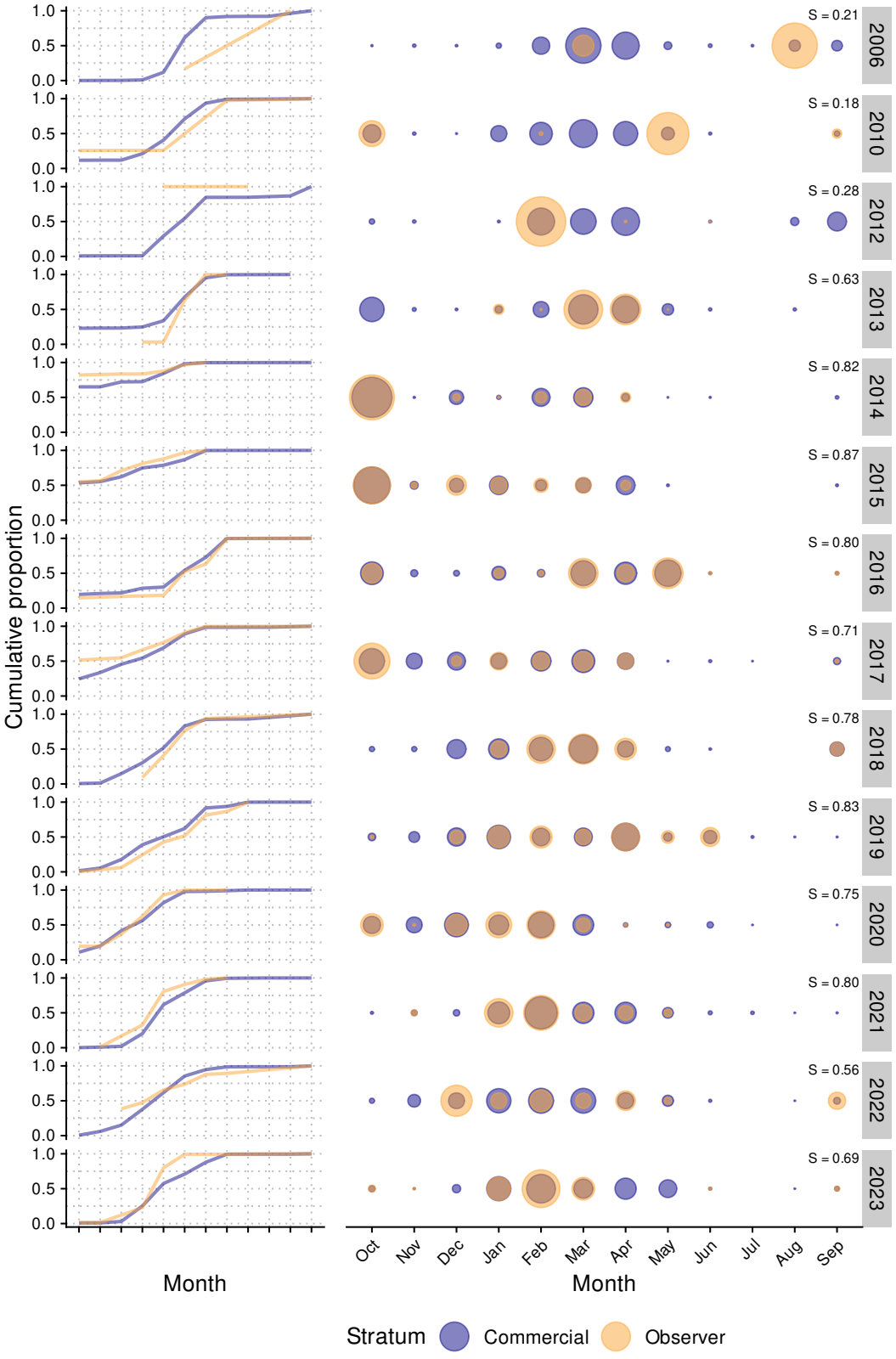


Figure 107: **Monthly representativeness of observer sampling coverage of Trawl catch in RBT 3, from events where the redbait catch exceeded the 10kg threshold, in 2006 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

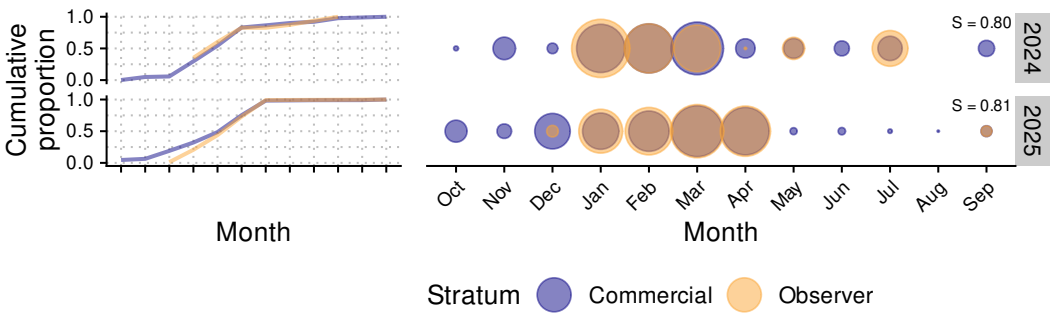


Figure 108: Monthly representativeness of observer sampling coverage of Trawl catch in RBT 3, from events where the redbait catch exceeded the 10kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

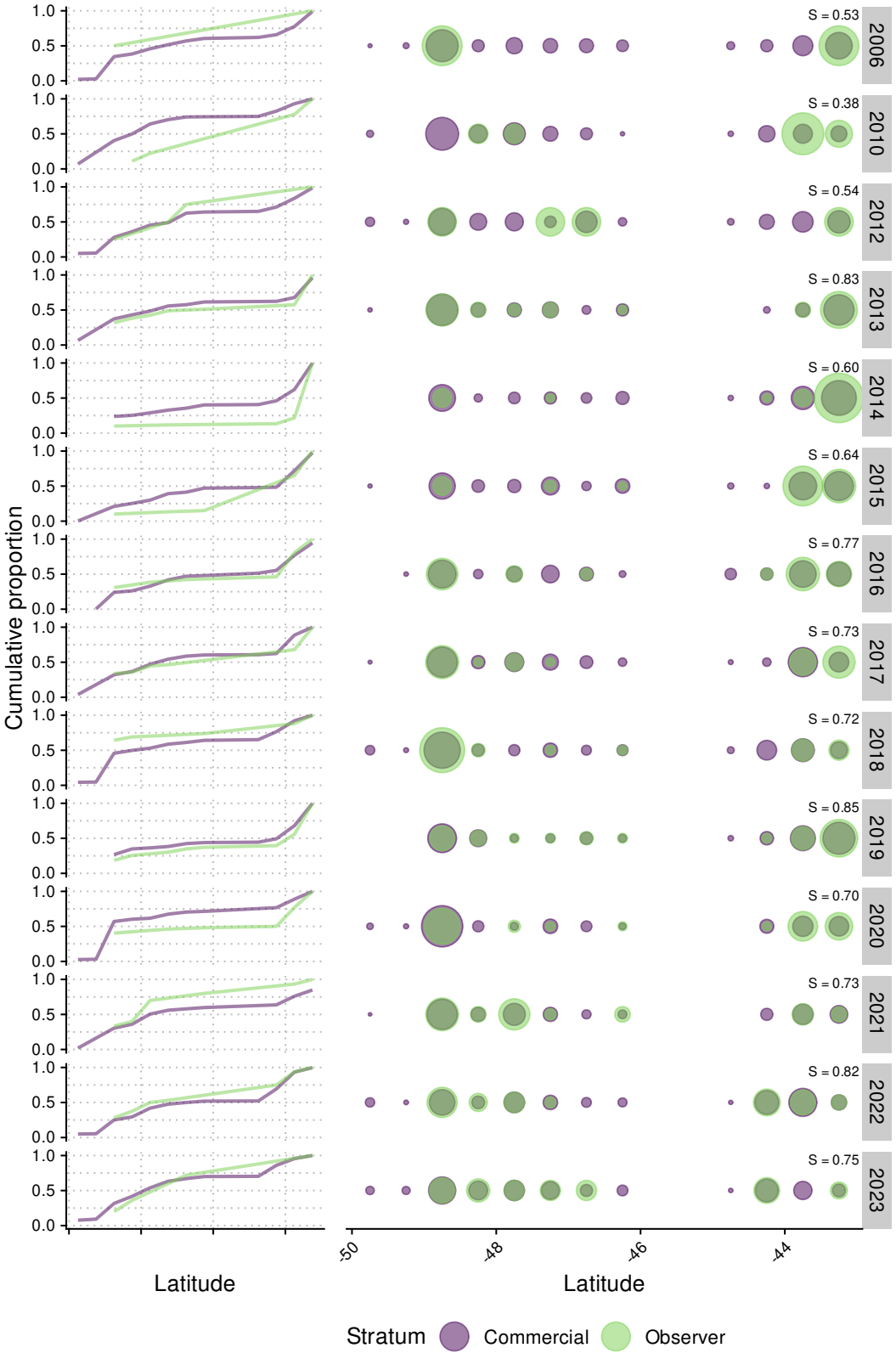


Figure 109: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RBT 3, where the redbait catch exceeded the 10kg threshold, in 2006 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

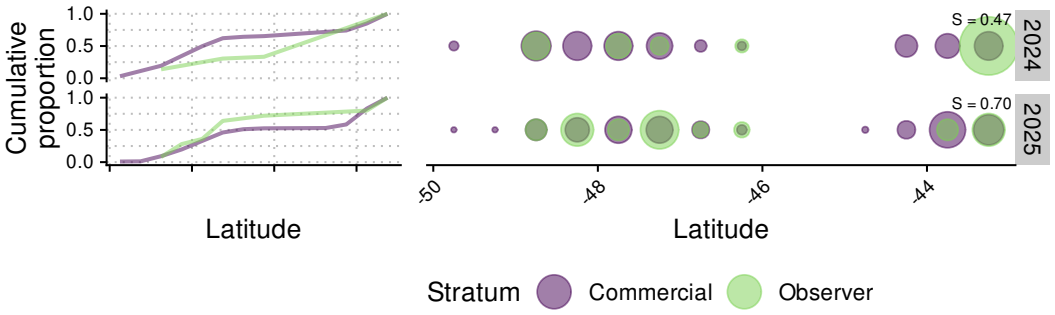


Figure 110: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RBT 3, where the redbait catch exceeded the 10kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

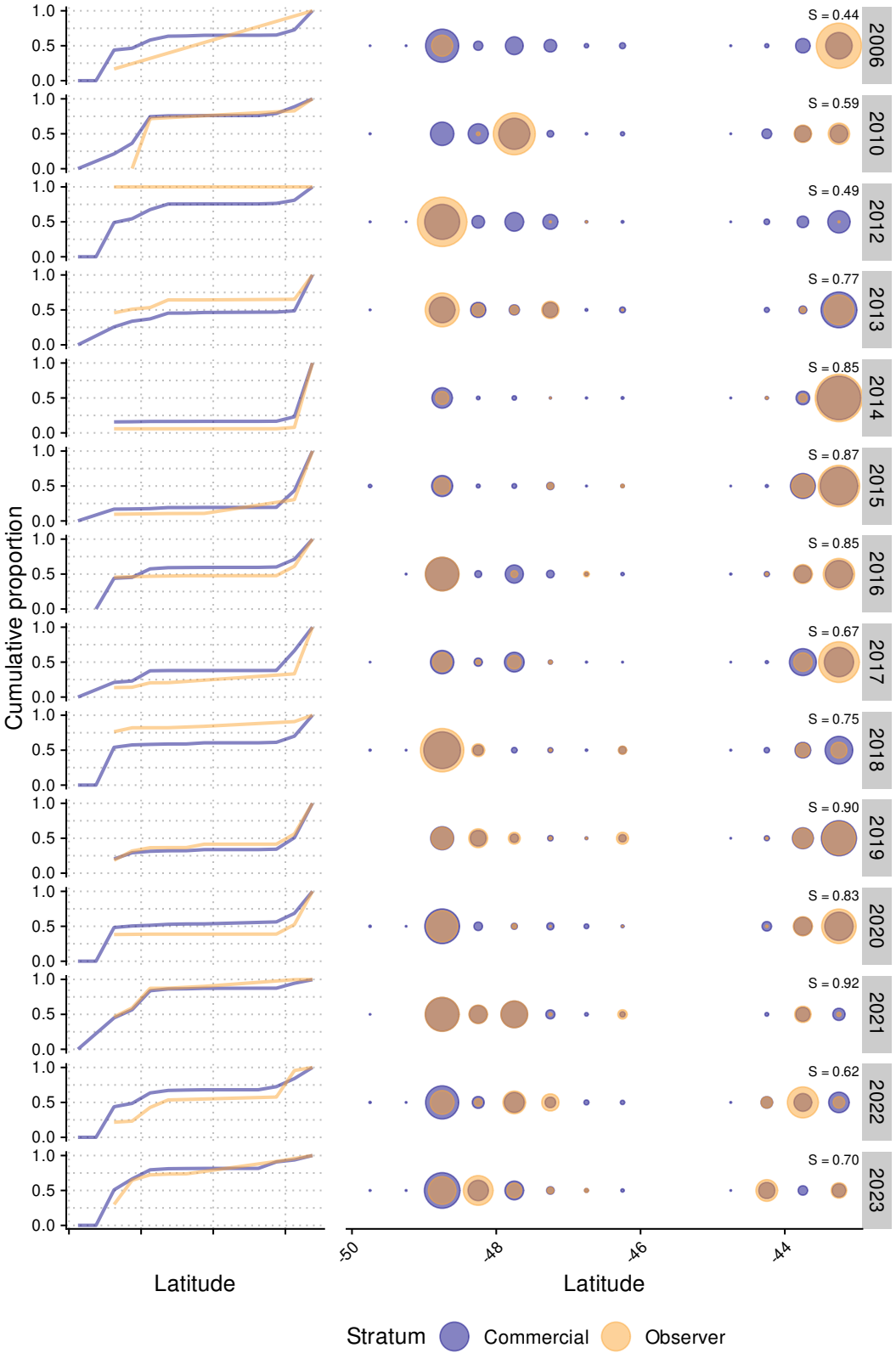


Figure 111: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RBT 3, from events where the redbait catch exceeded the 10kg threshold, in 2006 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

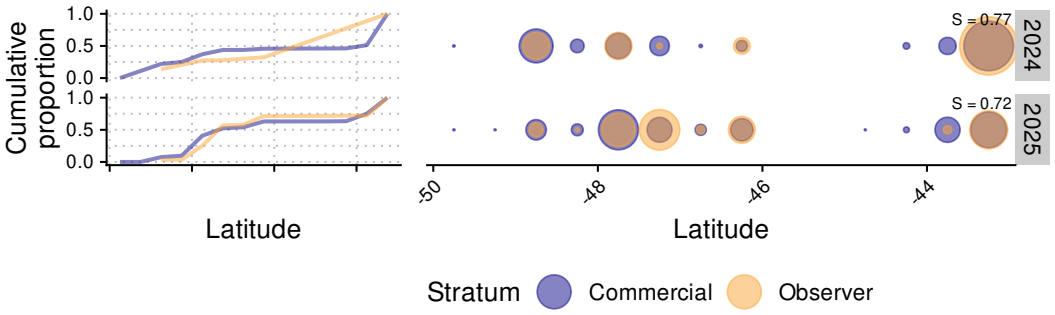


Figure 112: Latitudinal representativeness of observer sampling coverage of Trawl catch in RBT 3, from events where the redbait catch exceeded the 10kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

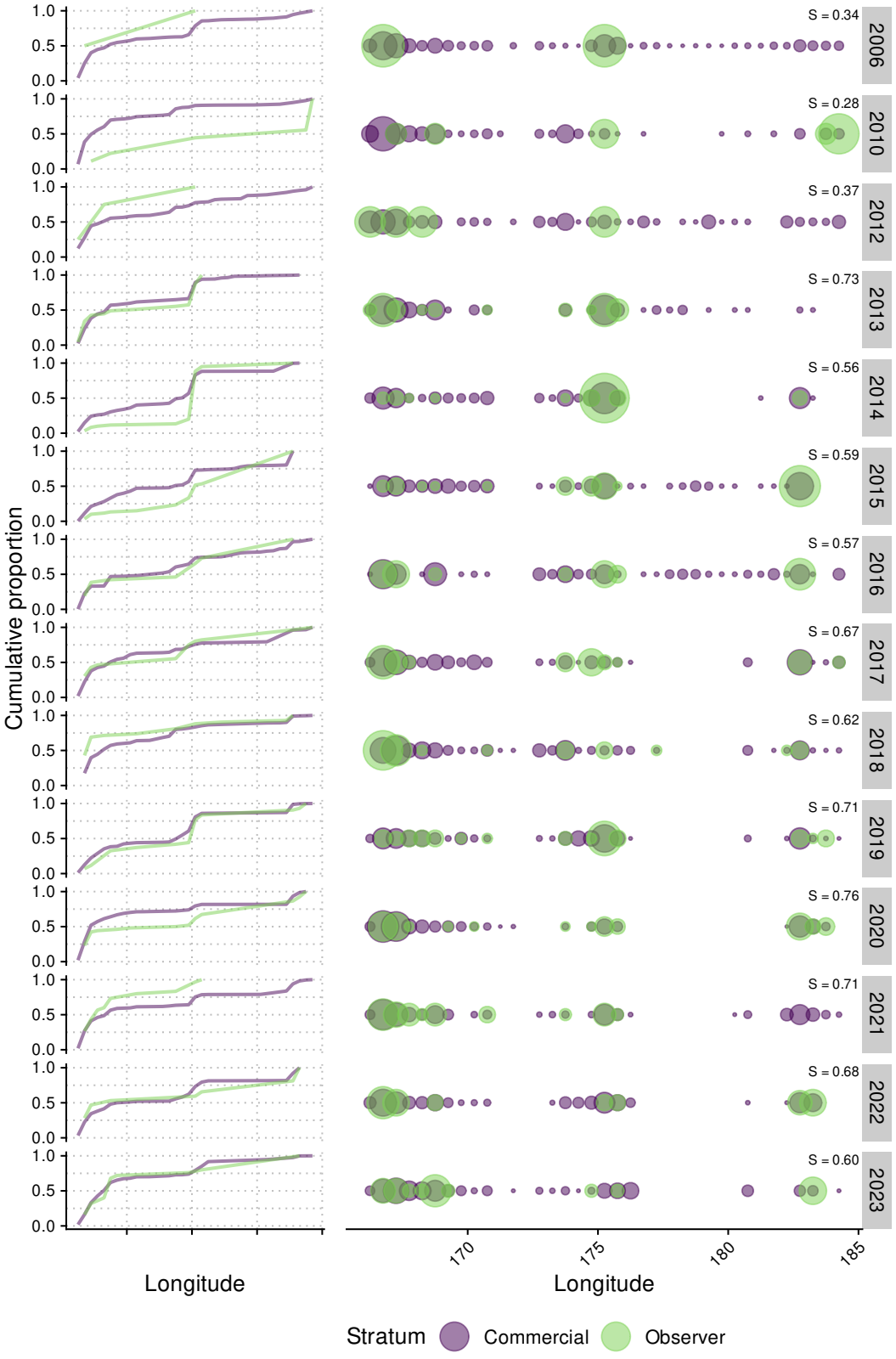


Figure 113: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RBT 3, where the redbait catch exceeded the 10kg threshold, in 2006 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

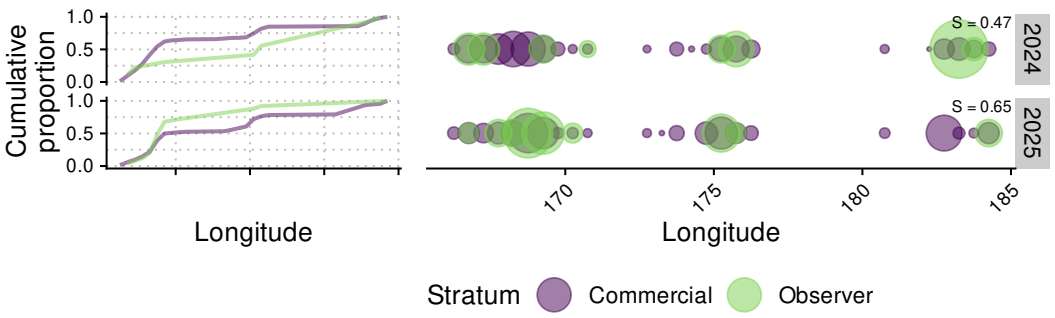


Figure 114: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RBT 3, where the redbait catch exceeded the 10kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

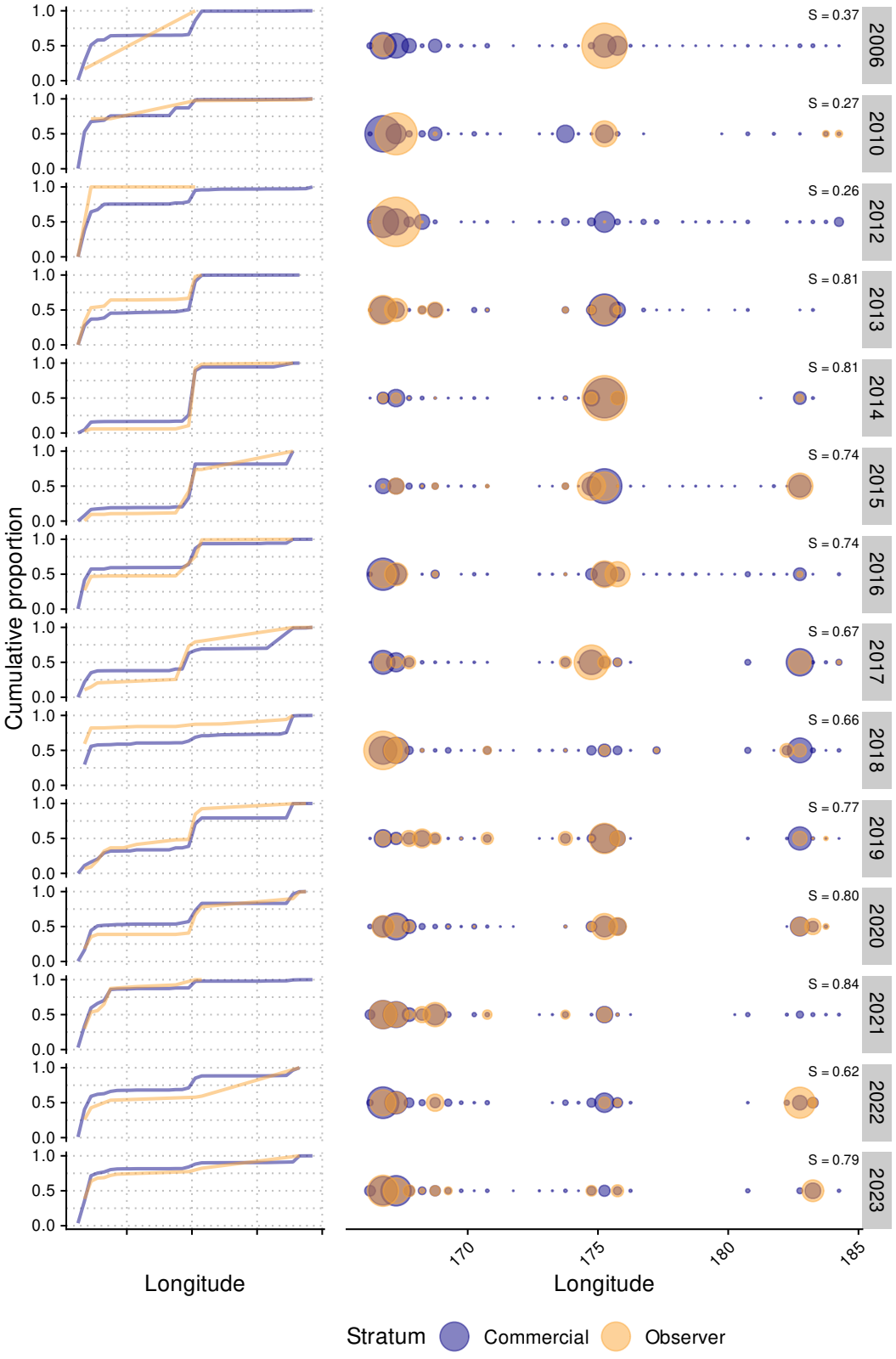


Figure 115: Longitudinal representativeness of observer sampling coverage of Trawl catch in RBT 3, from events where the redbait catch exceeded the 10kg threshold, in 2006 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

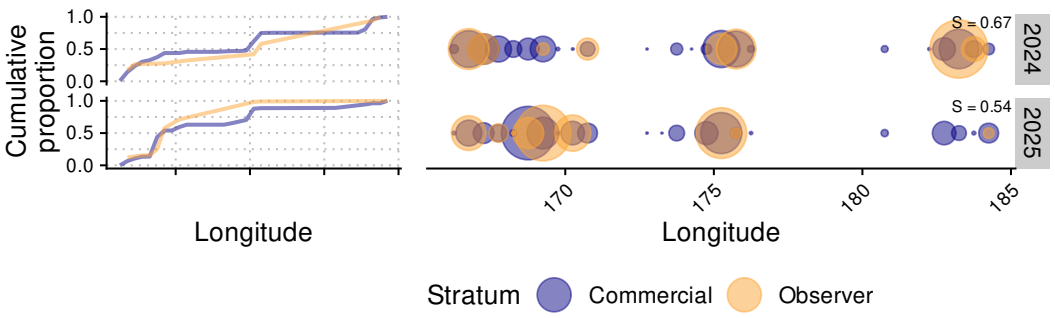


Figure 116: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RBT 3, from events where the redbait catch exceeded the 10kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

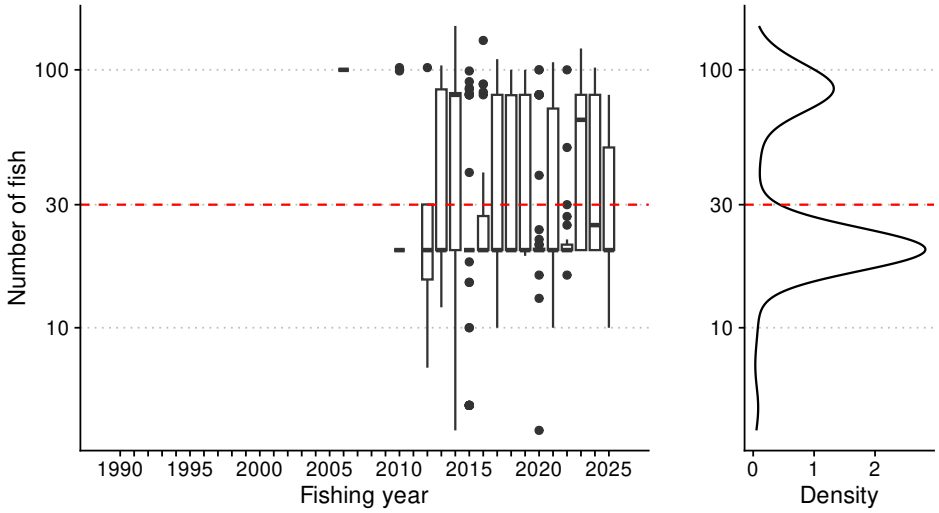


Figure 117: **Length-frequency sample sizes for observed fishing events in RBT 3 where redbait were sampled. The red dashed line indicates a sample size of 30 fish.**

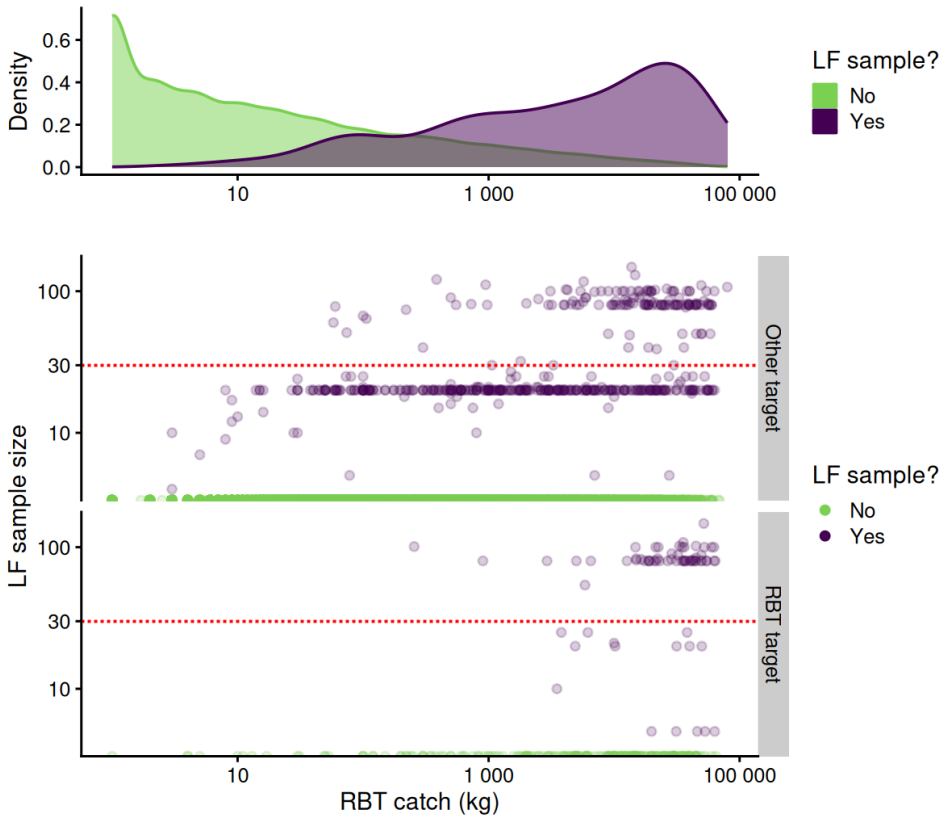


Figure 118: Length-frequency sample sizes (number of fish sampled) for observed fishing events in RBT 3 in relation to the total redbait catch from an event, separately for redbait target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.2.1.2 Otolith samples

Table 10: Otolith samples of redbait from the RBT 3 Trawl fishery sampled by the Observer Programme in fishing years 1991 to 2025. Positive fishing events are those where the catch of redbait exceeded a potential sampling threshold of 10 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1991	2	0	0	0.00
1992	79	0	0	0.00
1993	588	0	0	0.00
1994	480	0	0	0.00
1995	382	0	0	0.00
1996	303	0	0	0.00
1997	322	0	0	0.00
1998	363	0	0	0.00
1999	571	0	0	0.00
2000	874	0	0	0.00
2001	425	0	0	0.00
2002	649	0	0	0.00
2003	589	0	0	0.00
2004	694	0	0	0.00
2005	385	0	0	0.00
2006	504	0	0	0.00
2007	292	0	0	0.00
2008	200	0	0	0.00
2009	225	0	0	0.00
2010	164	1	1	0.61
2011	106	0	0	0.00
2012	188	0	0	0.00
2013	234	40	204	17.09
2014	250	54	339	21.60
2015	249	15	72	6.02
2016	186	3	15	1.61
2017	338	55	282	16.27
2018	301	33	164	10.96
2019	570	42	212	7.37
2020	837	42	209	5.02
2021	547	21	118	3.84
2022	927	24	124	2.59
2023	506	22	111	4.35
2024	766	36	186	4.70
2025	541	22	109	4.07

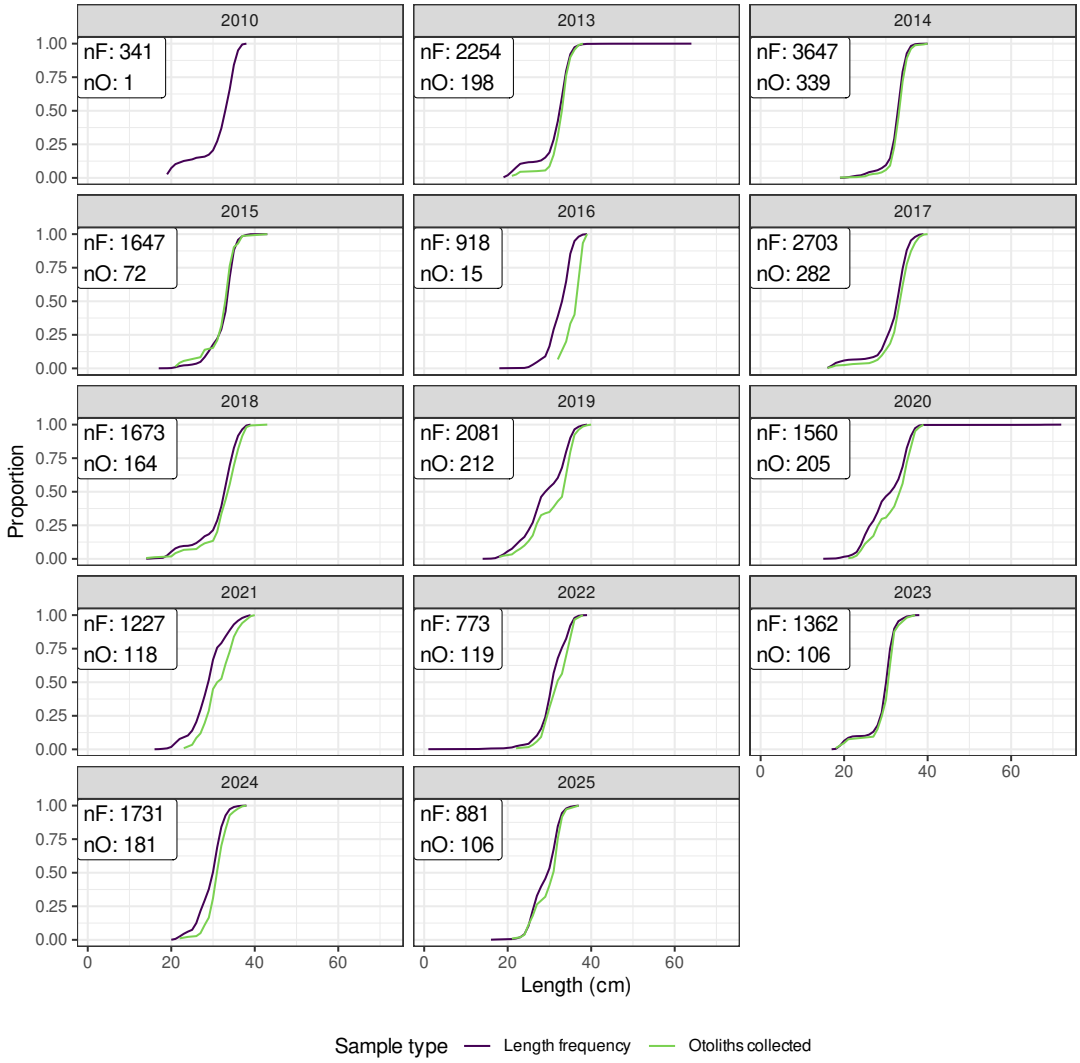


Figure 119: Cumulative distributions of the length of fish in the length frequency and otolith samples of redbait in the RBT 3 Trawl fishery for the 2010 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.2.1.3 Catch quantification

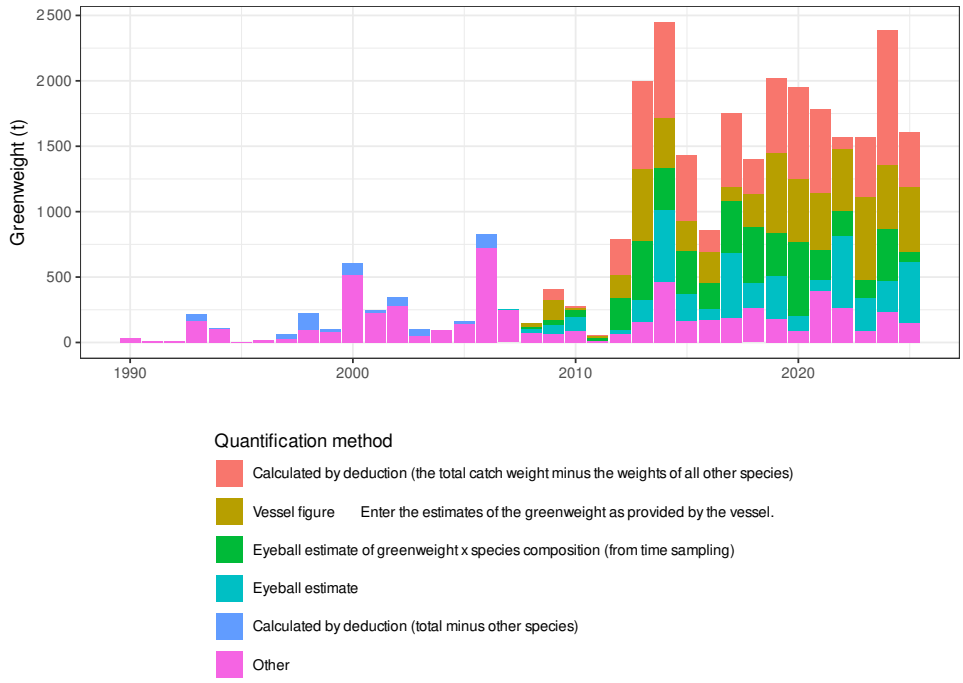


Figure 120: Methods used by observers to quantify the catch of redbait in the RBT 3 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.2.2 RBT 7: Trawl fishery

2.2.2.1 Length-frequency samples

Table 11: Length-frequency samples of redbait from the RBT 7 Trawl fishery sampled by the Observer Programme in fishing years 1991 to 2025. Positive fishing events are those where the catch of redbait exceeded a potential sampling threshold of 10 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1991	3	0	0	0.00
1992	10	0	0	0.00
1993	28	0	0	0.00
1994	75	0	0	0.00
1995	183	0	0	0.00
1996	163	0	0	0.00
1997	146	0	0	0.00
1998	74	0	0	0.00
1999	216	0	0	0.00
2000	188	0	0	0.00
2001	315	0	0	0.00
2002	607	1	10	0.16
2003	520	0	0	0.00
2004	947	0	0	0.00
2005	523	2	219	0.38
2006	486	1	20	0.21
2007	441	0	0	0.00
2008	512	2	160	0.39
2009	267	4	368	1.50
2010	110	2	40	1.82
2011	121	0	0	0.00
2012	76	12	553	15.79
2013	175	34	720	19.43
2014	265	41	734	15.47
2015	376	43	778	11.44
2016	336	11	326	3.27
2017	257	4	80	1.56
2018	204	16	248	7.84
2019	57	8	101	14.04
2020	25	2	43	8.00
2021	40	4	104	10.00
2022	34	2	44	5.88
2023	7	0	0	0.00
2024	9	0	0	0.00
2025	2	0	0	0.00

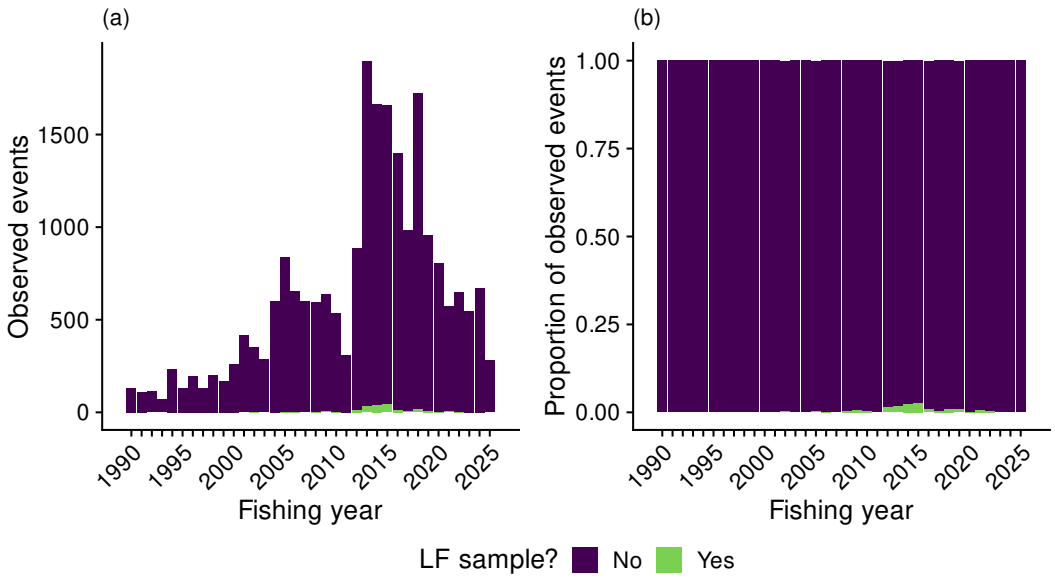


Figure 121: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RBT 7 where the redbait catch exceeded the 10 kg threshold, with and without length-frequency sampling.**

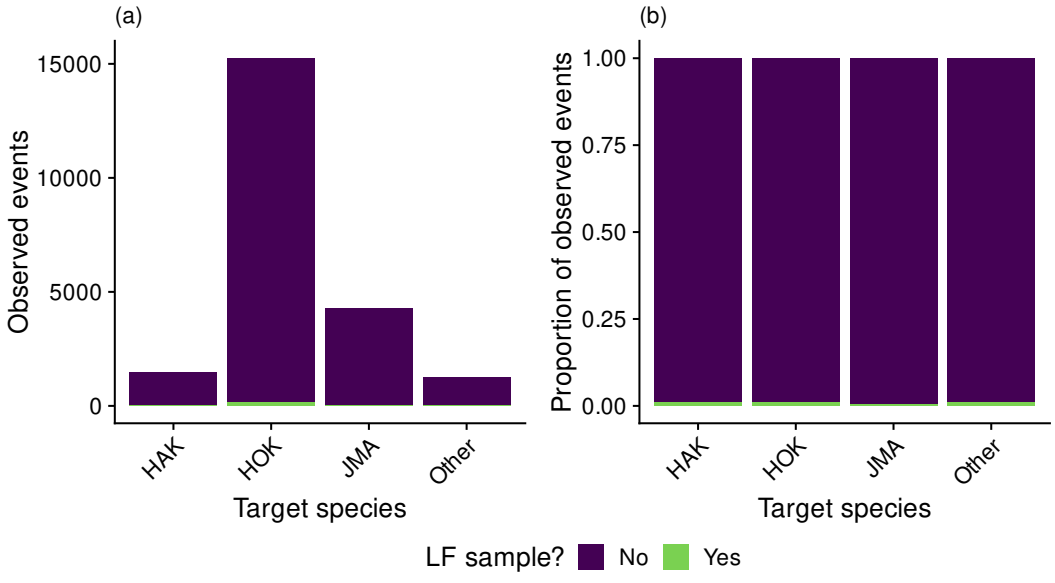


Figure 122: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RBT 7 where the redbait catch exceeded the 10 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

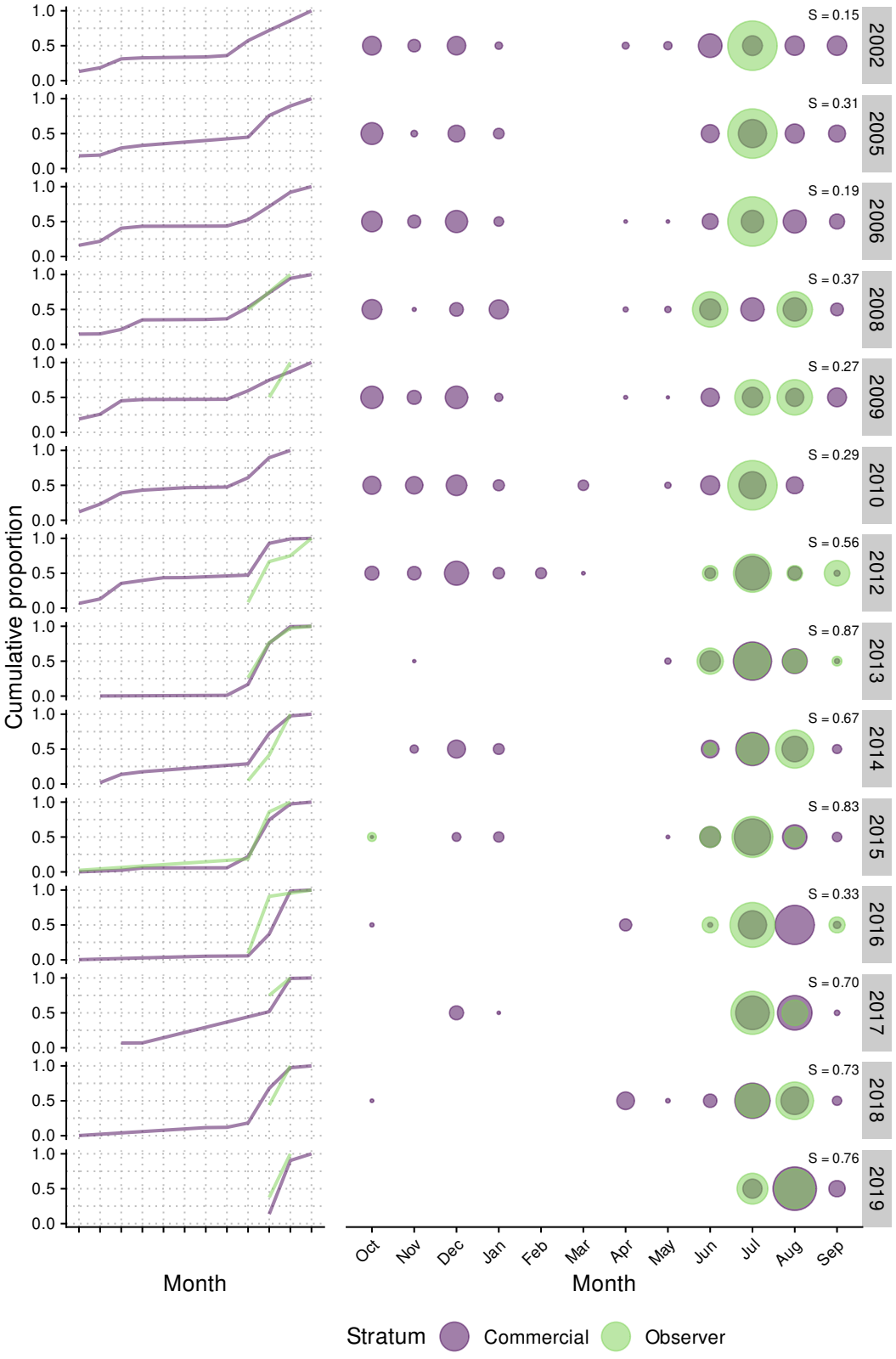


Figure 123: Monthly representativeness of observer sampling coverage of Trawl fishing events in RBT 7, where the redbait catch exceeded the 10kg threshold, in 2002 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

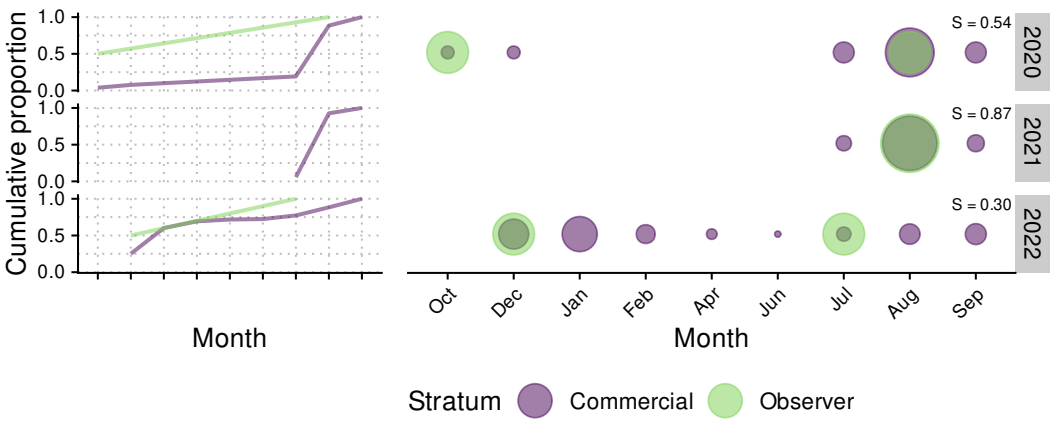


Figure 124: **Monthly representativeness of observer sampling coverage of Trawl fishing events in RBT 7, where the redbait catch exceeded the 10kg threshold, in 2020 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

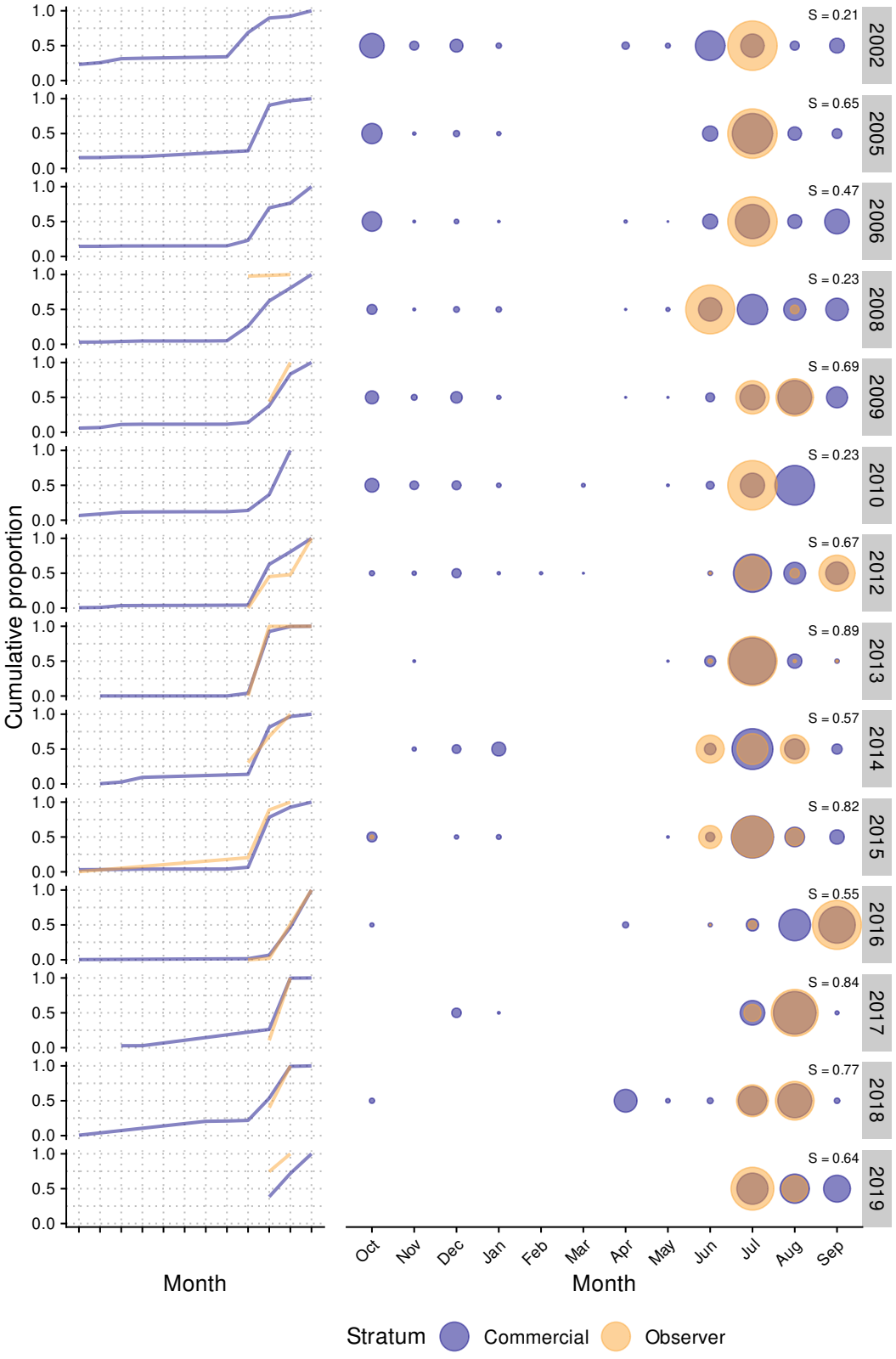


Figure 125: Monthly representativeness of observer sampling coverage of Trawl catch in RBT 7, from events where the redbait catch exceeded the 10kg threshold, in 2002 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

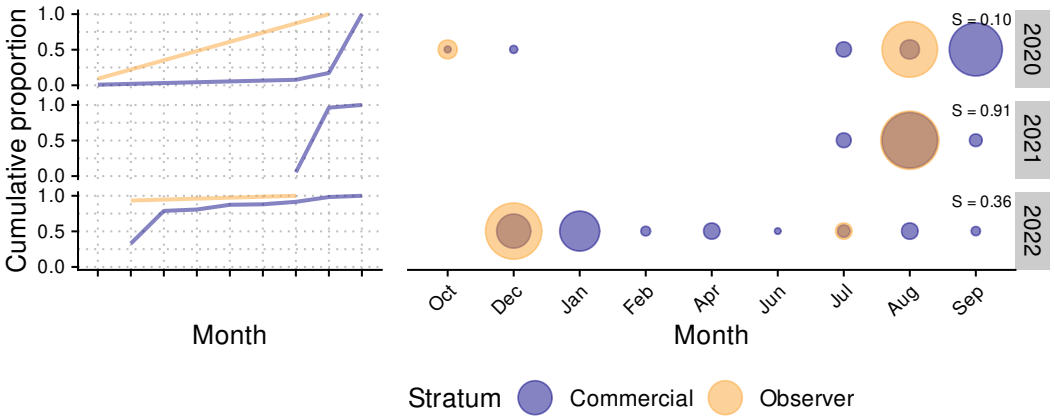


Figure 126: **Monthly representativeness of observer sampling coverage of Trawl catch in RBT 7, from events where the redbait catch exceeded the 10kg threshold, in 2020 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

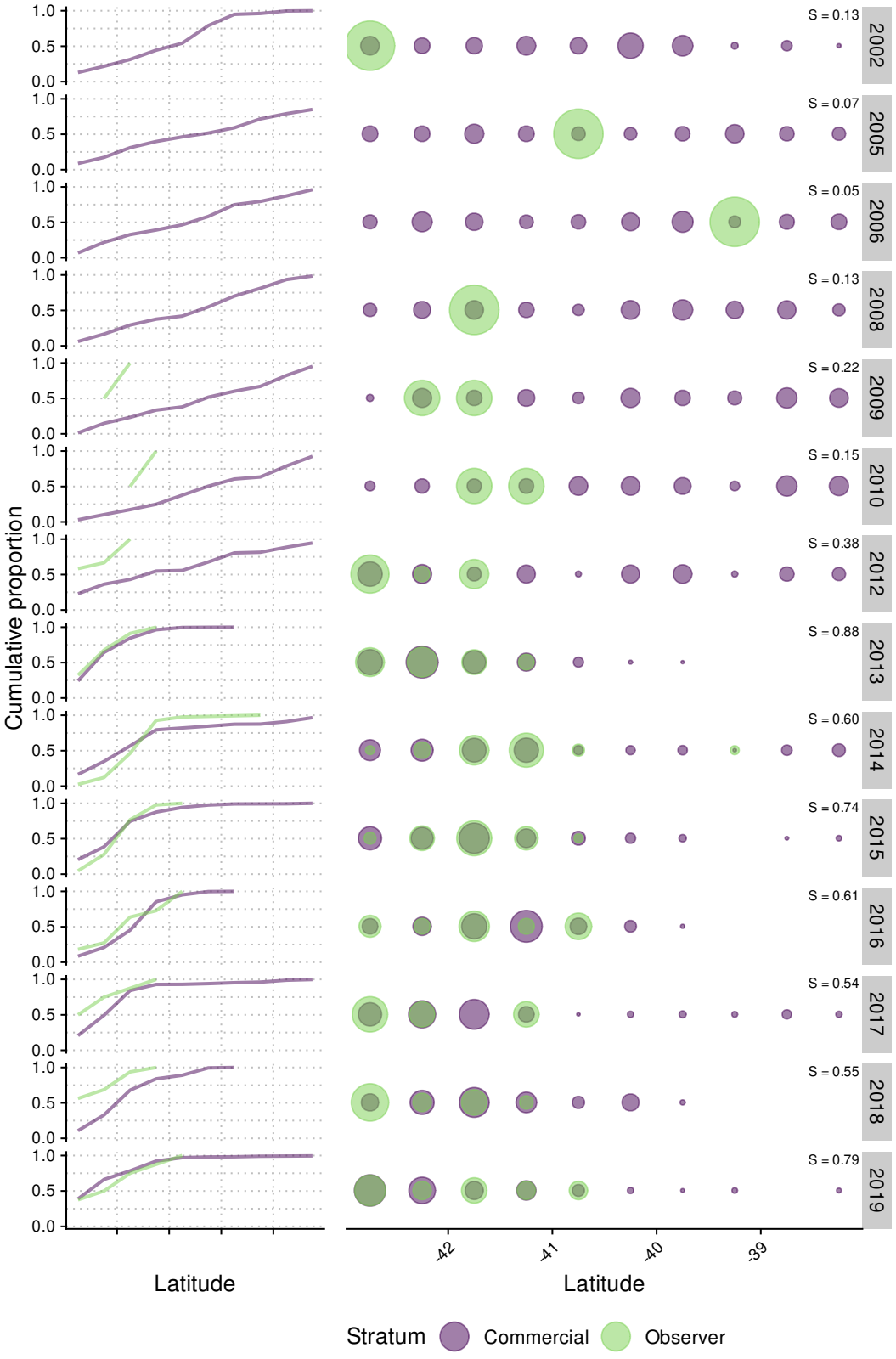


Figure 127: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RBT 7, where the redbait catch exceeded the 10kg threshold, in 2002 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

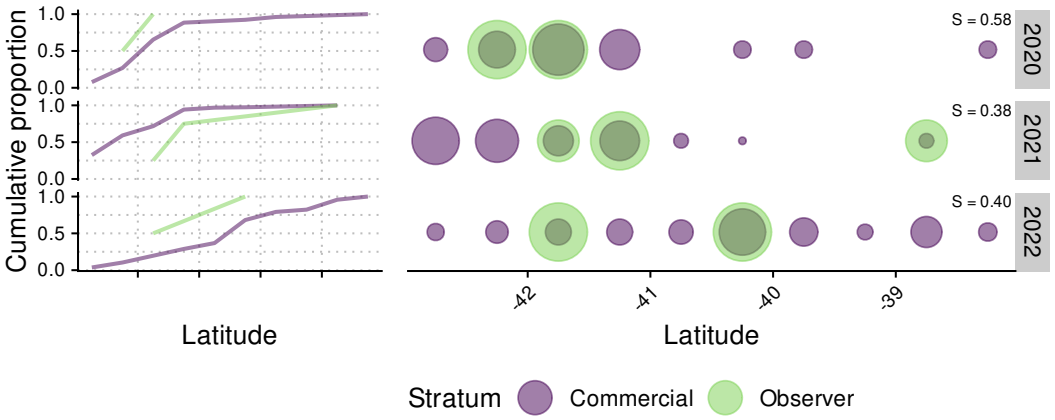


Figure 128: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RBT 7, where the redbait catch exceeded the 10kg threshold, in 2020 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

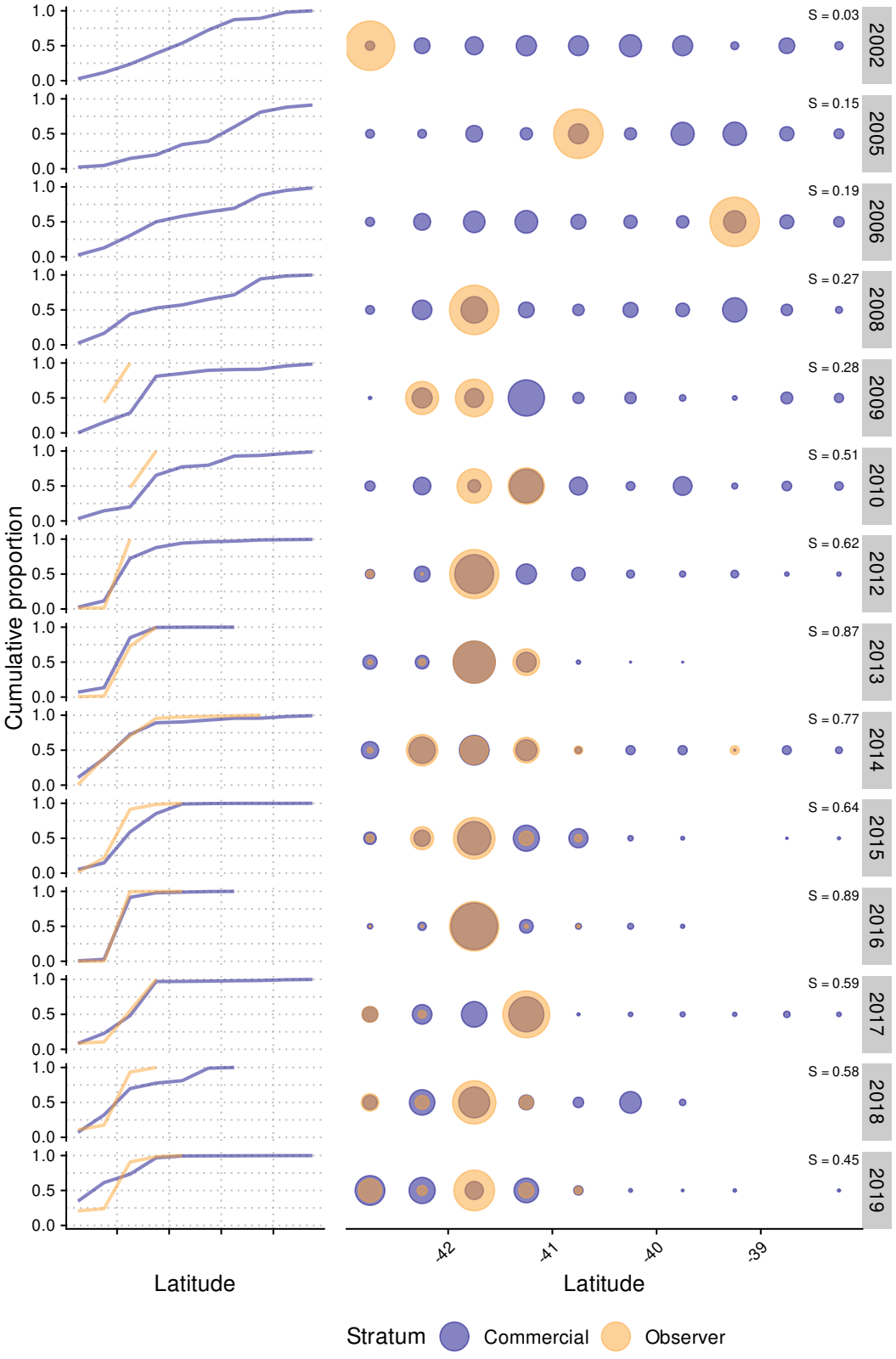


Figure 129: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RBT 7, from events where the redbait catch exceeded the 10kg threshold, in 2002 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

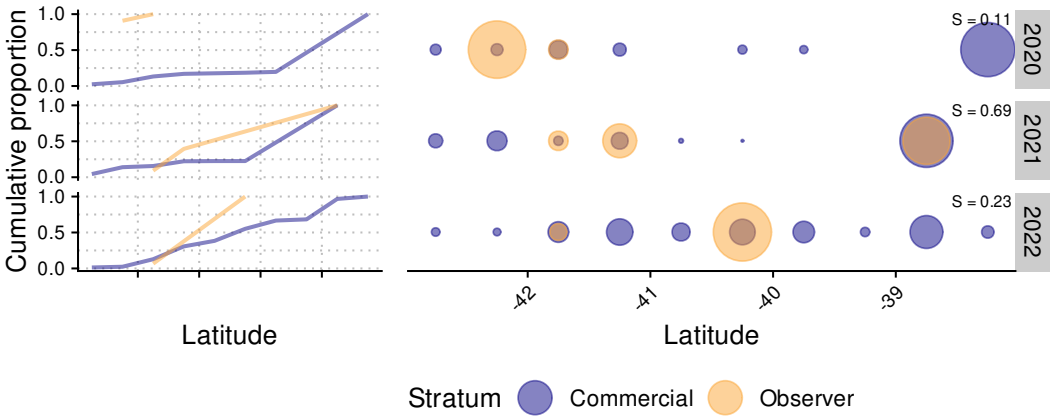


Figure 130: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RBT 7, from events where the redbait catch exceeded the 10kg threshold, in 2020 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

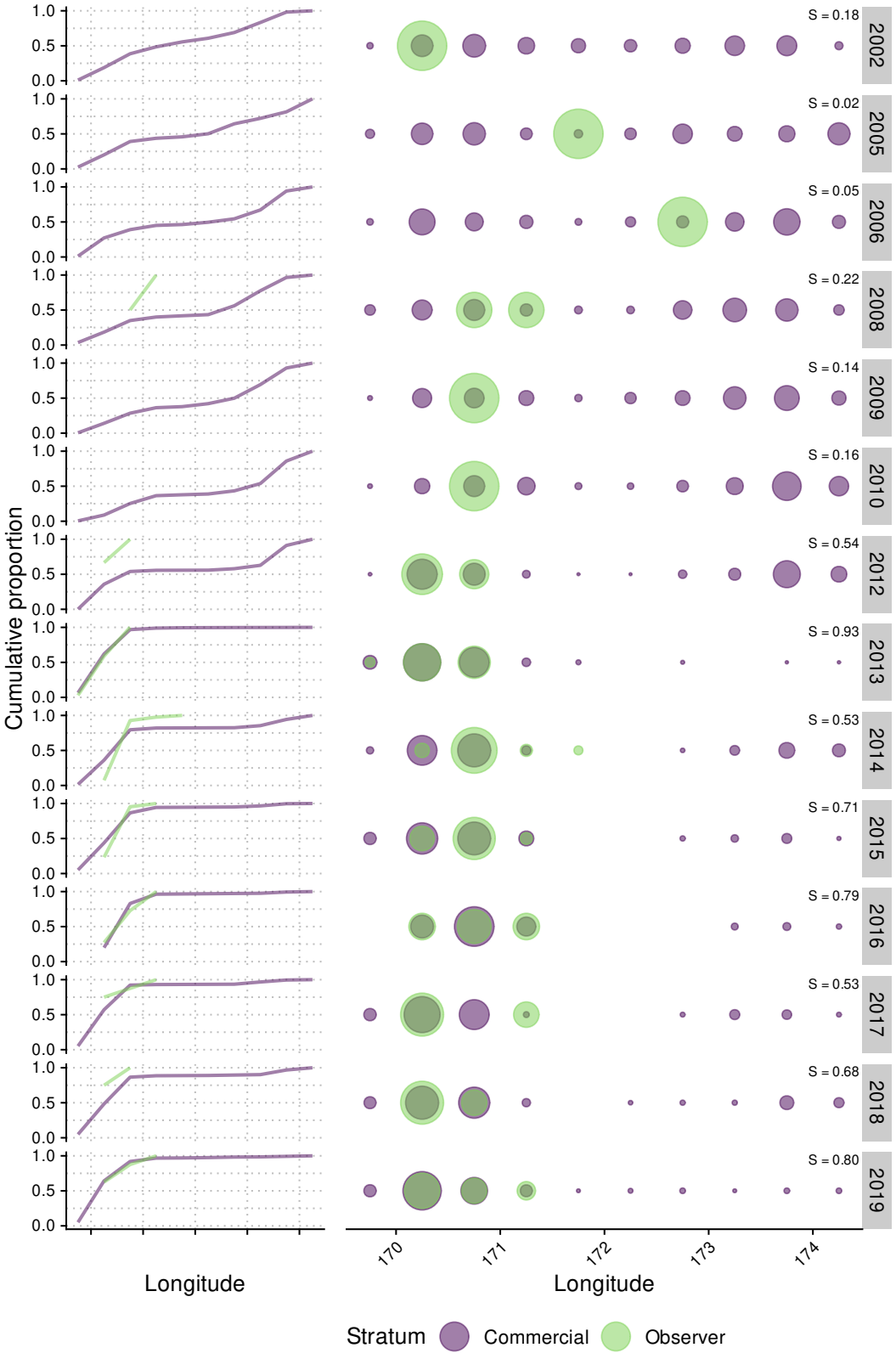


Figure 131: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RBT 7, where the redbait catch exceeded the 10kg threshold, in 2002 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

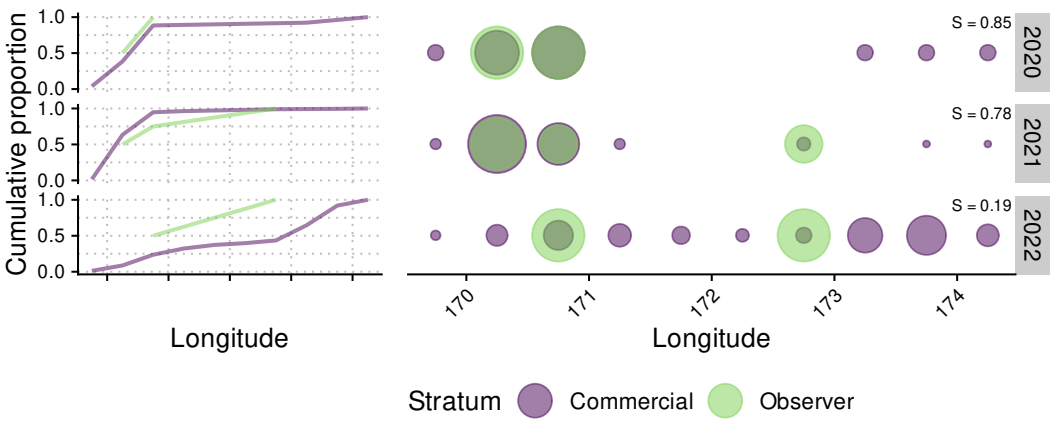


Figure 132: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RBT 7, where the redbait catch exceeded the 10kg threshold, in 2020 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

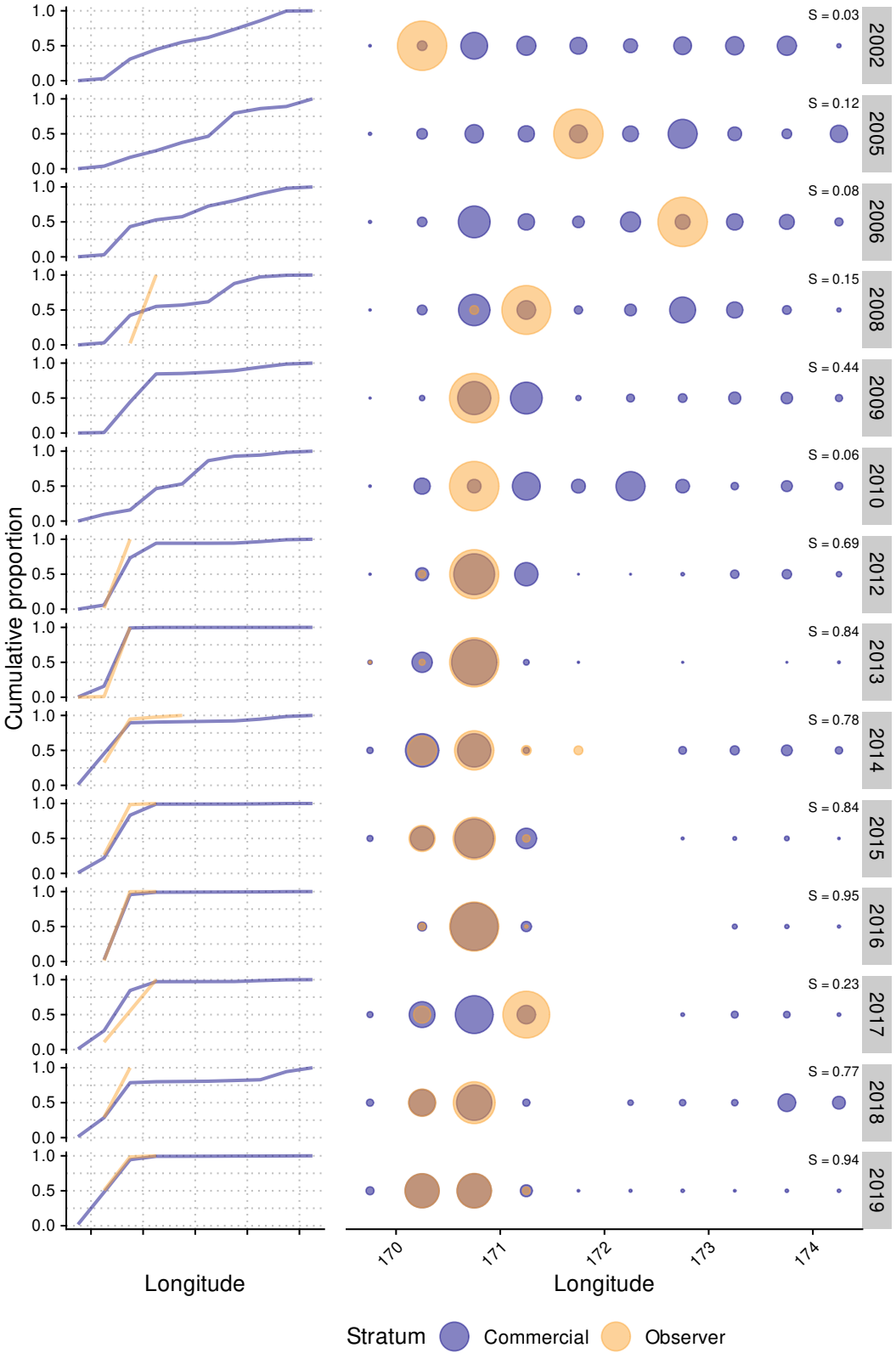


Figure 133: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RBT 7, from events where the redbait catch exceeded the 10kg threshold, in 2002 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

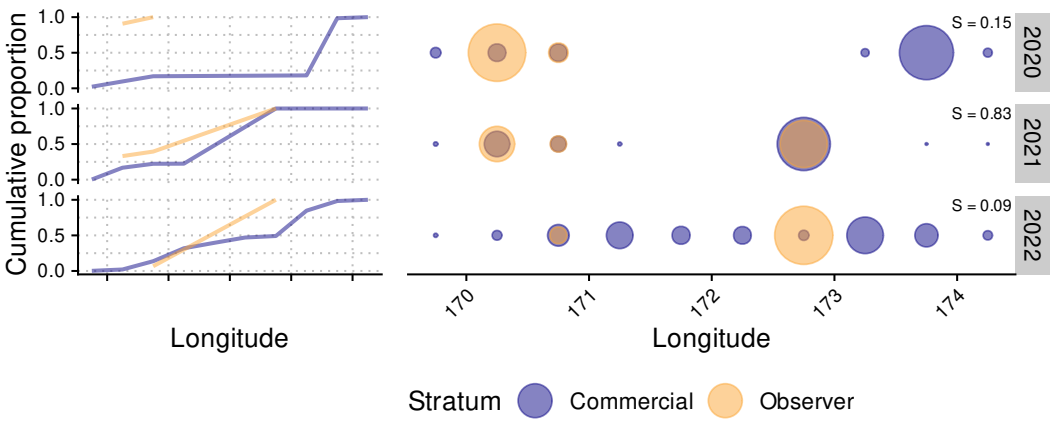


Figure 134: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RBT 7, from events where the redbait catch exceeded the 10kg threshold, in 2020 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

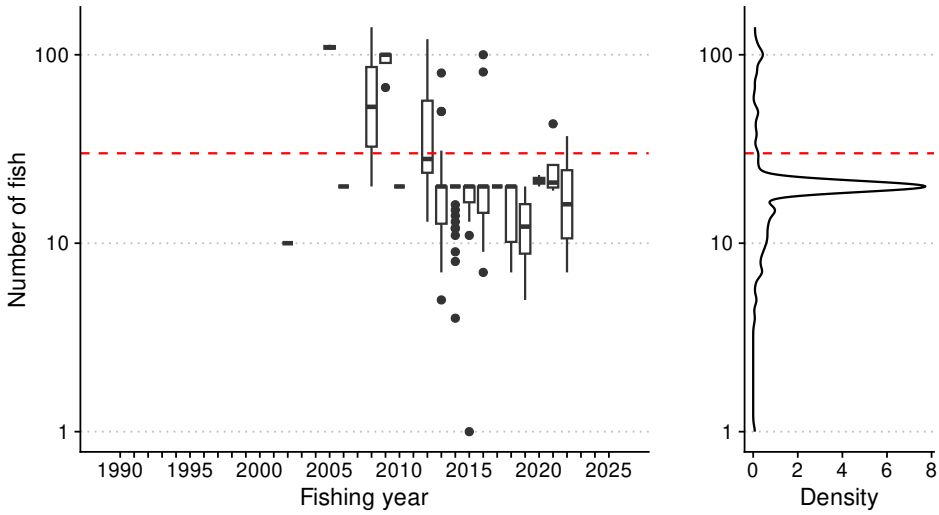


Figure 135: **Length-frequency sample sizes for observed fishing events in RBT 7 where redbait were sampled. The red dashed line indicates a sample size of 30 fish.**

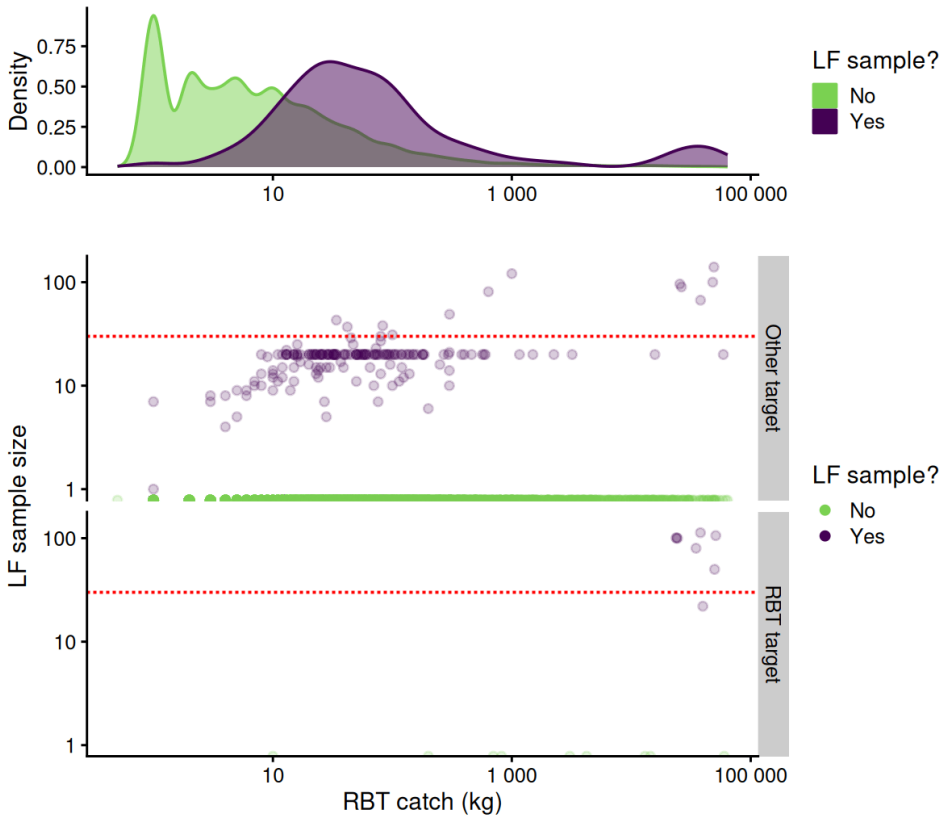


Figure 136: Length-frequency sample sizes (number of fish sampled) for observed fishing events in RBT 7 in relation to the total redbait catch from an event, separately for redbait target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.2.2.2 Otolith samples

Table 12: Otolith samples of redbait from the RBT 7 Trawl fishery sampled by the Observer Programme in fishing years 1991 to 2025. Positive fishing events are those where the catch of redbait exceeded a potential sampling threshold of 10 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1991	3	0	0	0.00
1992	10	0	0	0.00
1993	28	0	0	0.00
1994	75	0	0	0.00
1995	183	0	0	0.00
1996	163	0	0	0.00
1997	146	0	0	0.00
1998	74	0	0	0.00
1999	216	0	0	0.00
2000	188	0	0	0.00
2001	315	0	0	0.00
2002	607	0	0	0.00
2003	520	0	0	0.00
2004	947	0	0	0.00
2005	523	0	0	0.00
2006	486	0	0	0.00
2007	441	0	0	0.00
2008	512	0	0	0.00
2009	267	0	0	0.00
2010	110	0	0	0.00
2011	121	0	0	0.00
2012	76	0	0	0.00
2013	175	20	133	11.43
2014	265	15	69	5.66
2015	376	4	20	1.06
2016	336	10	52	2.98
2017	257	4	20	1.56
2018	204	16	71	7.84
2019	57	4	16	7.02
2020	25	2	9	8.00
2021	40	3	15	7.50
2022	34	2	11	5.88
2023	7	0	0	0.00
2024	9	0	0	0.00
2025	2	0	0	0.00

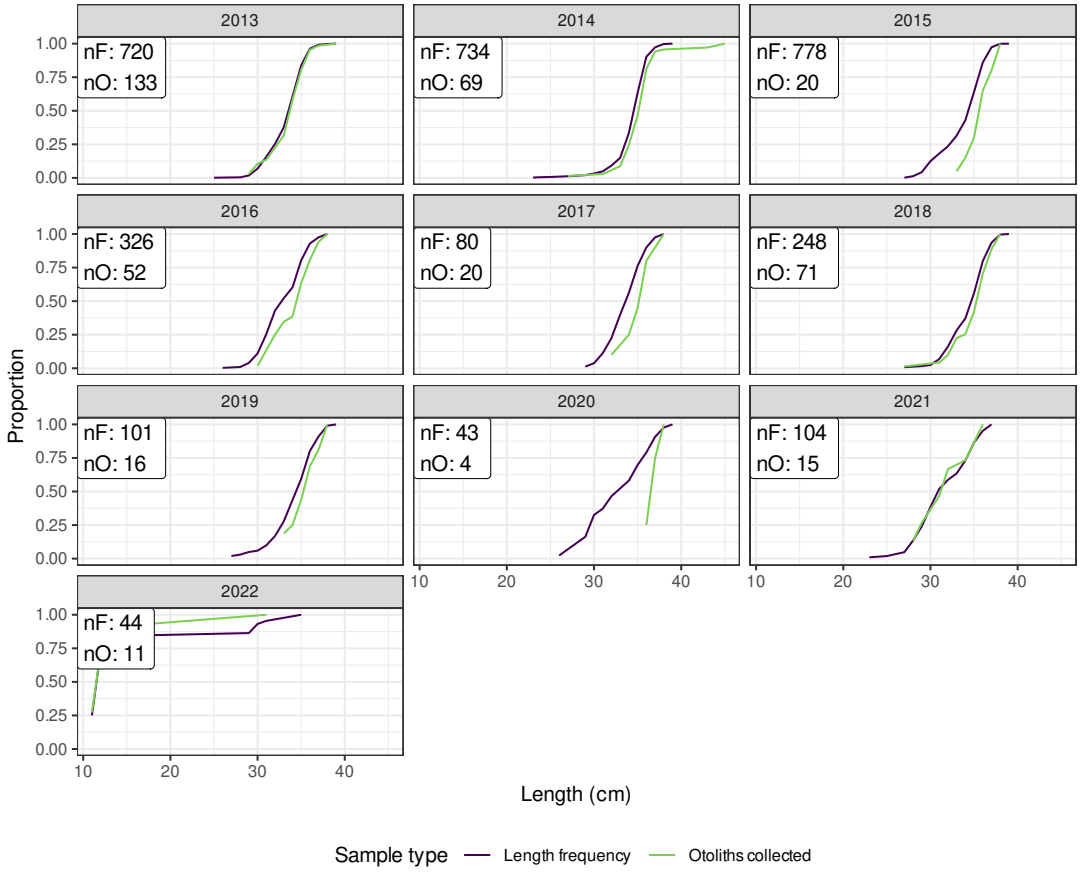


Figure 137: Cumulative distributions of the length of fish in the length frequency and otolith samples of redbait in the RBT 7 Trawl fishery for the 2013 to 2022 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.2.2.3 Catch quantification

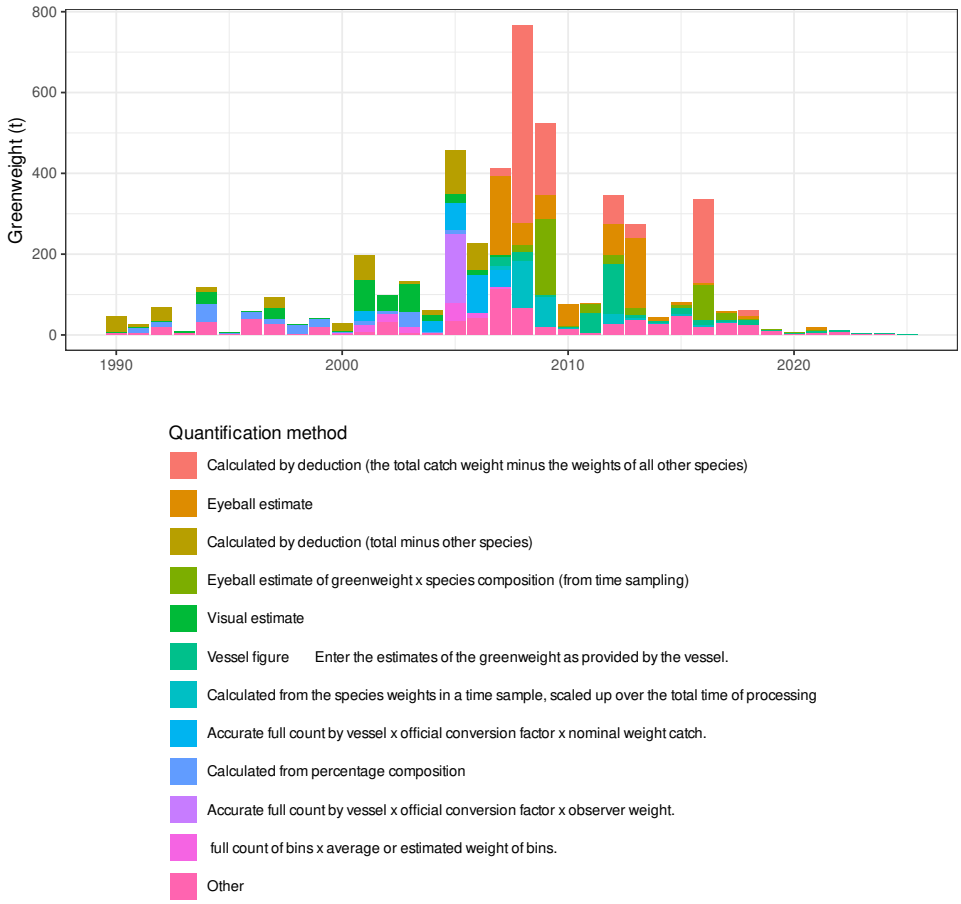


Figure 138: Methods used by observers to quantify the catch of redbait in the RBT 7 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.3 RBY stocks

Observer sampling of rubyfish is considered with respect to the rubyfish Quota Management Areas.

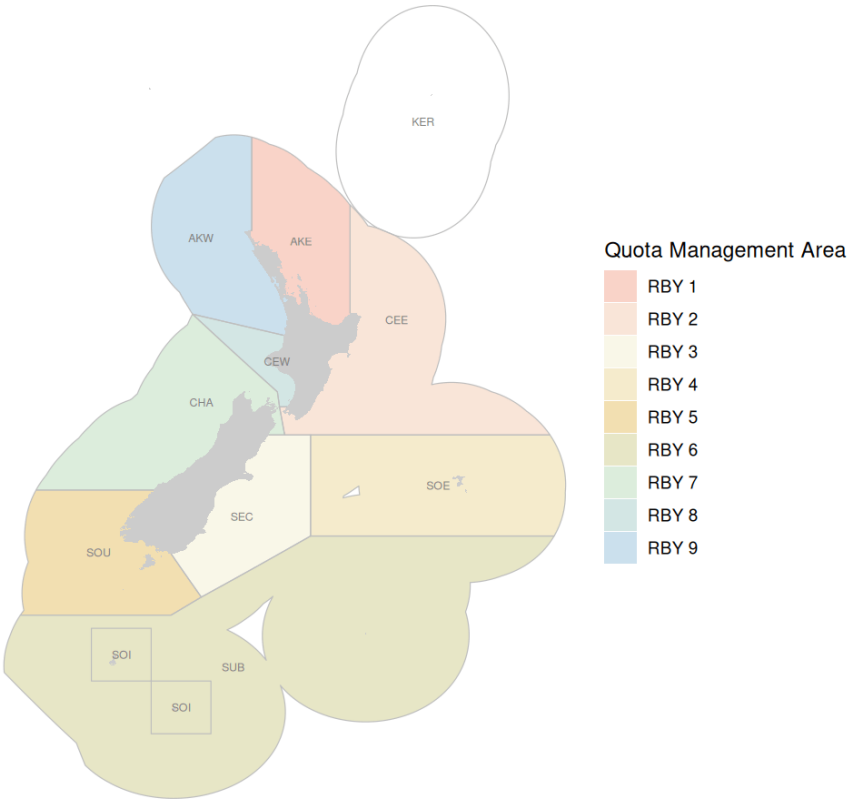


Figure 139: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for rubyfish (coloured areas, per legend).

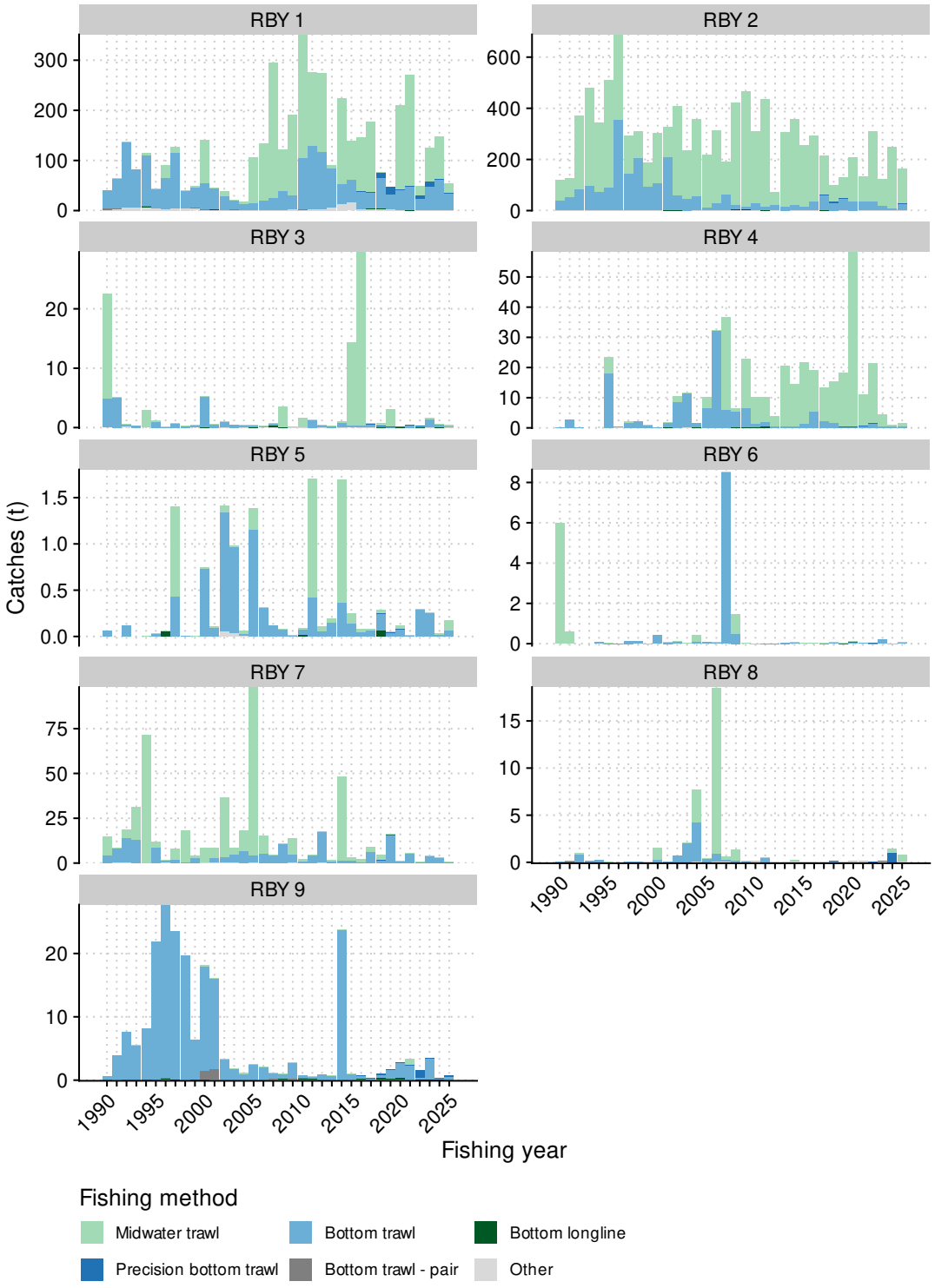


Figure 140: Catches of rubyfish by fishing method, for events within the rubyfish Quota Management Areas. Methods grouped as Other include: CP, CRP, D, DL, DN, DS, DV, FP, HL, PL, POT, PRM, PS, PSH, RLP, SCN, SLL, SN, T, TL.

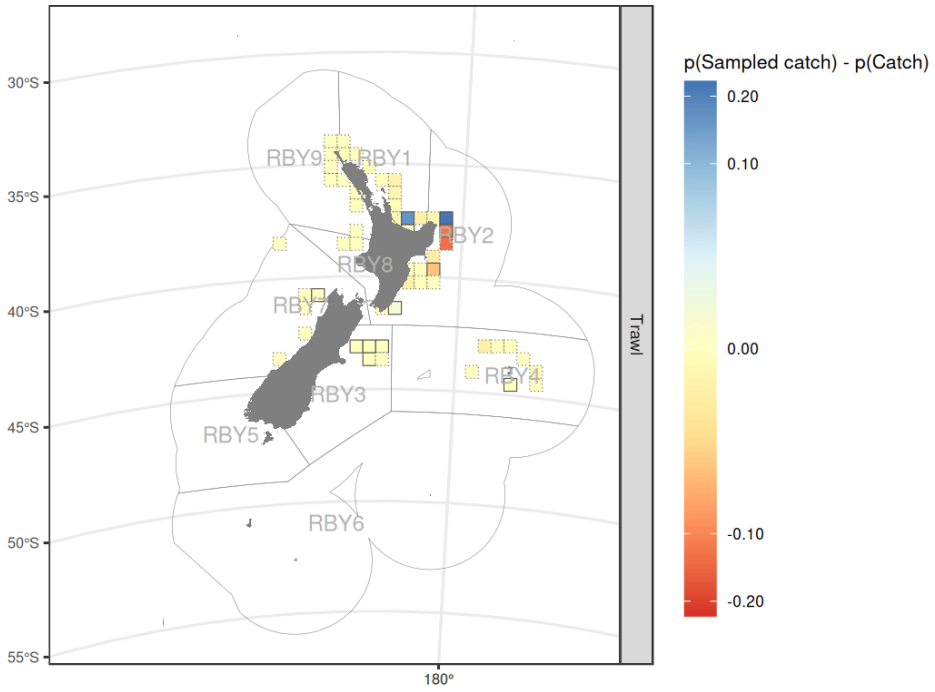


Figure 141: Differences in the relative proportions of catch and sampled catch for rubyfish during 2021–2025. Cells with a dotted border had no sampling.

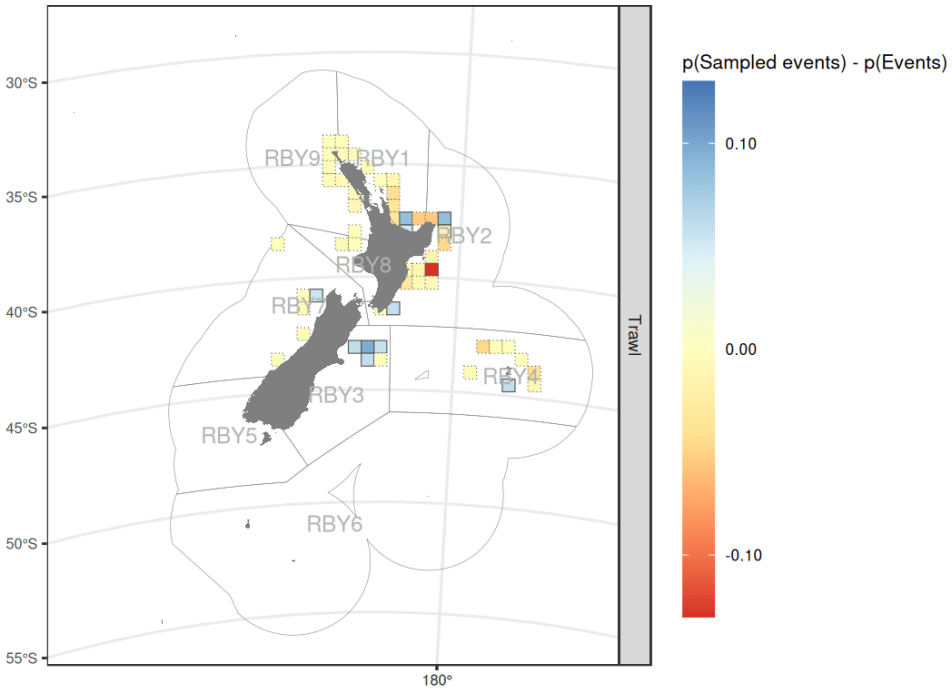


Figure 142: Differences in the relative proportions of events meeting the sampling threshold and sampled events for rubyfish during 2021–2025. Cells with a dotted border had no sampling.

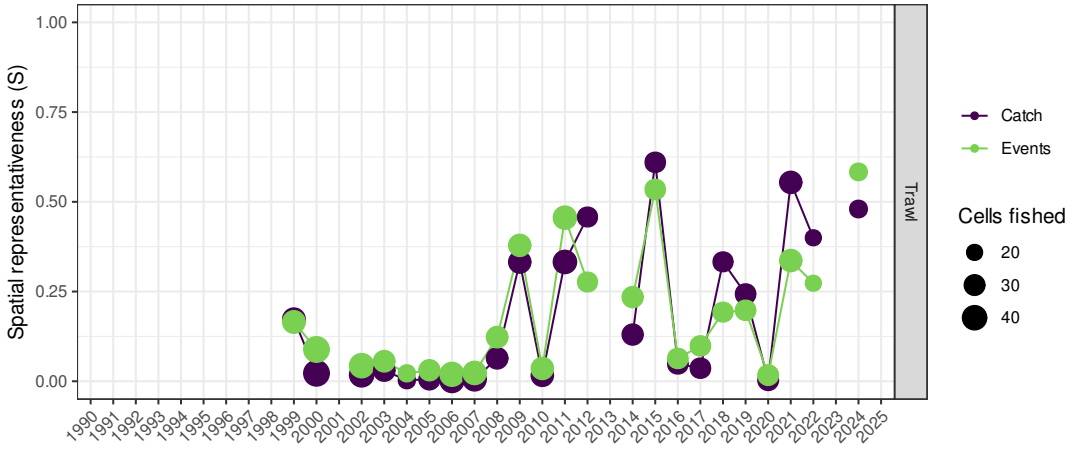


Figure 143: Spatial representativeness of observer sampling of rubyfish by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.

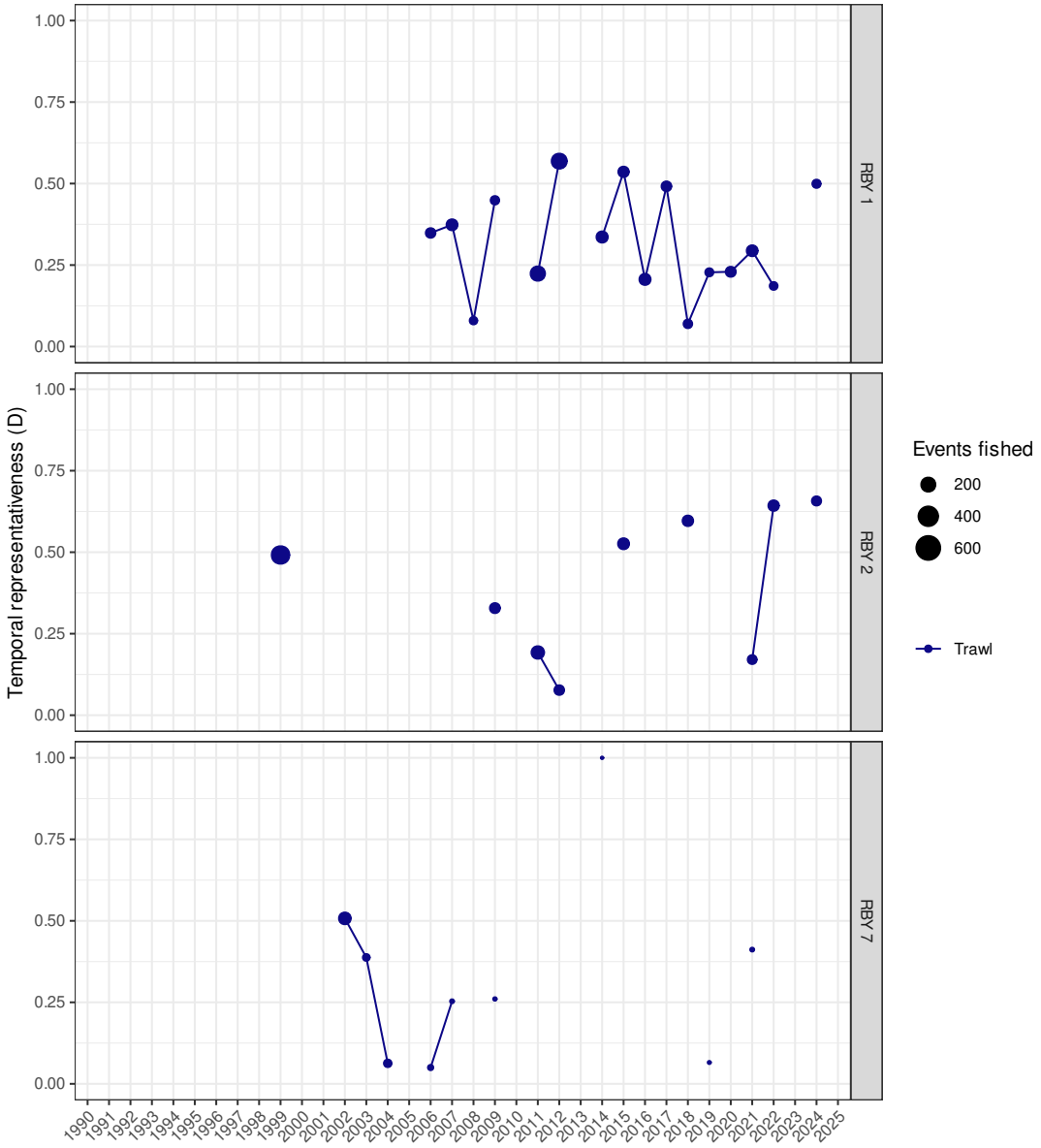


Figure 144: Temporal representativeness of observer sanpling of rubyfish by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.3.1 RBY 1: Trawl fishery

2.3.1.1 Length-frequency samples

Table 13: Length-frequency samples of rubyfish from the RBY 1 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of rubyfish exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	248	0	0	0.00
1991	304	0	0	0.00
1992	442	0	0	0.00
1993	314	0	0	0.00
1994	183	0	0	0.00
1995	93	0	0	0.00
1996	150	0	0	0.00
1997	240	0	0	0.00
1998	108	0	0	0.00
1999	114	0	0	0.00
2000	167	0	0	0.00
2001	96	0	0	0.00
2002	105	0	0	0.00
2003	81	0	0	0.00
2004	40	0	0	0.00
2005	66	0	0	0.00
2006	89	2	2	2.25
2007	111	2	40	1.80
2008	53	2	40	3.77
2009	66	7	661	10.61
2010	162	0	0	0.00
2011	204	2	161	0.98
2012	201	15	589	7.46
2013	140	0	0	0.00
2014	124	6	125	4.84
2015	106	4	90	3.77
2016	122	4	174	3.28
2017	92	2	100	2.17
2018	67	1	82	1.49
2019	48	1	100	2.08
2020	98	3	4	3.06
2021	117	5	220	4.27
2022	57	1	100	1.75
2023	79	0	0	0.00
2024	63	2	100	3.17
2025	41	0	0	0.00

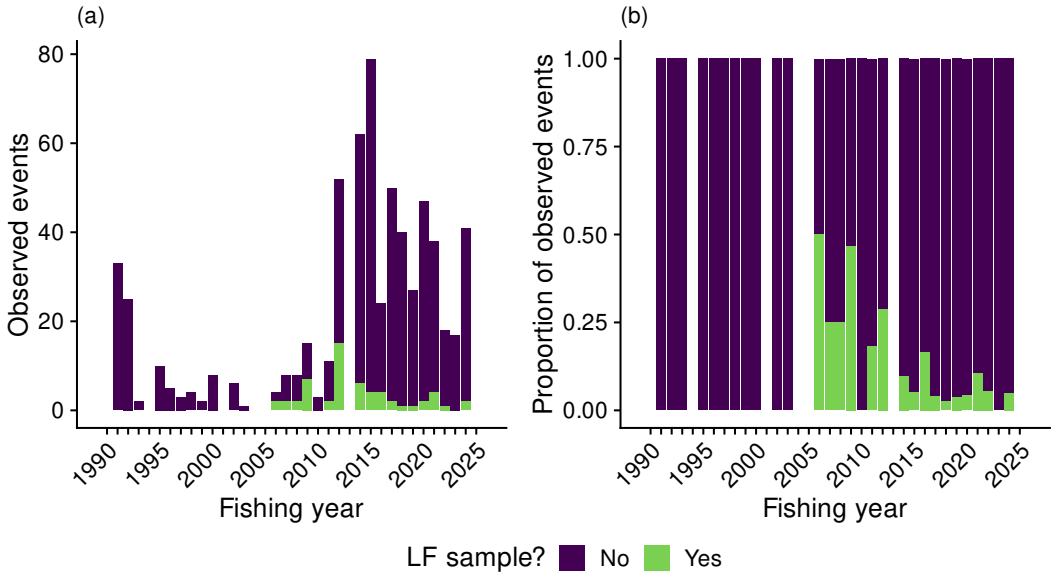


Figure 145: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RBY 1 where the rubyfish catch exceeded the 40 kg threshold, with and without length-frequency sampling.**

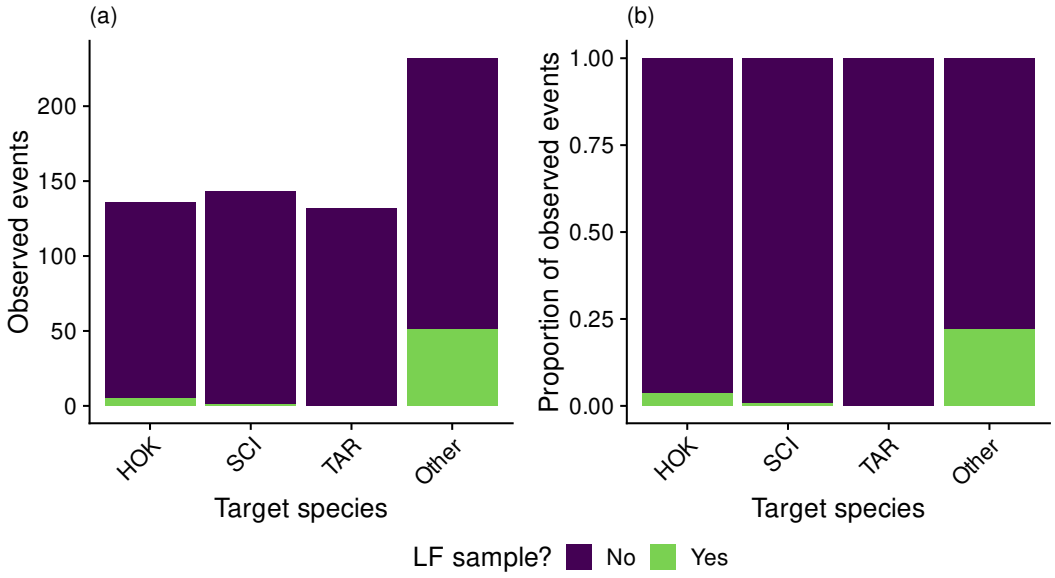


Figure 146: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RBY 1 where the rubyfish catch exceeded the 40 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

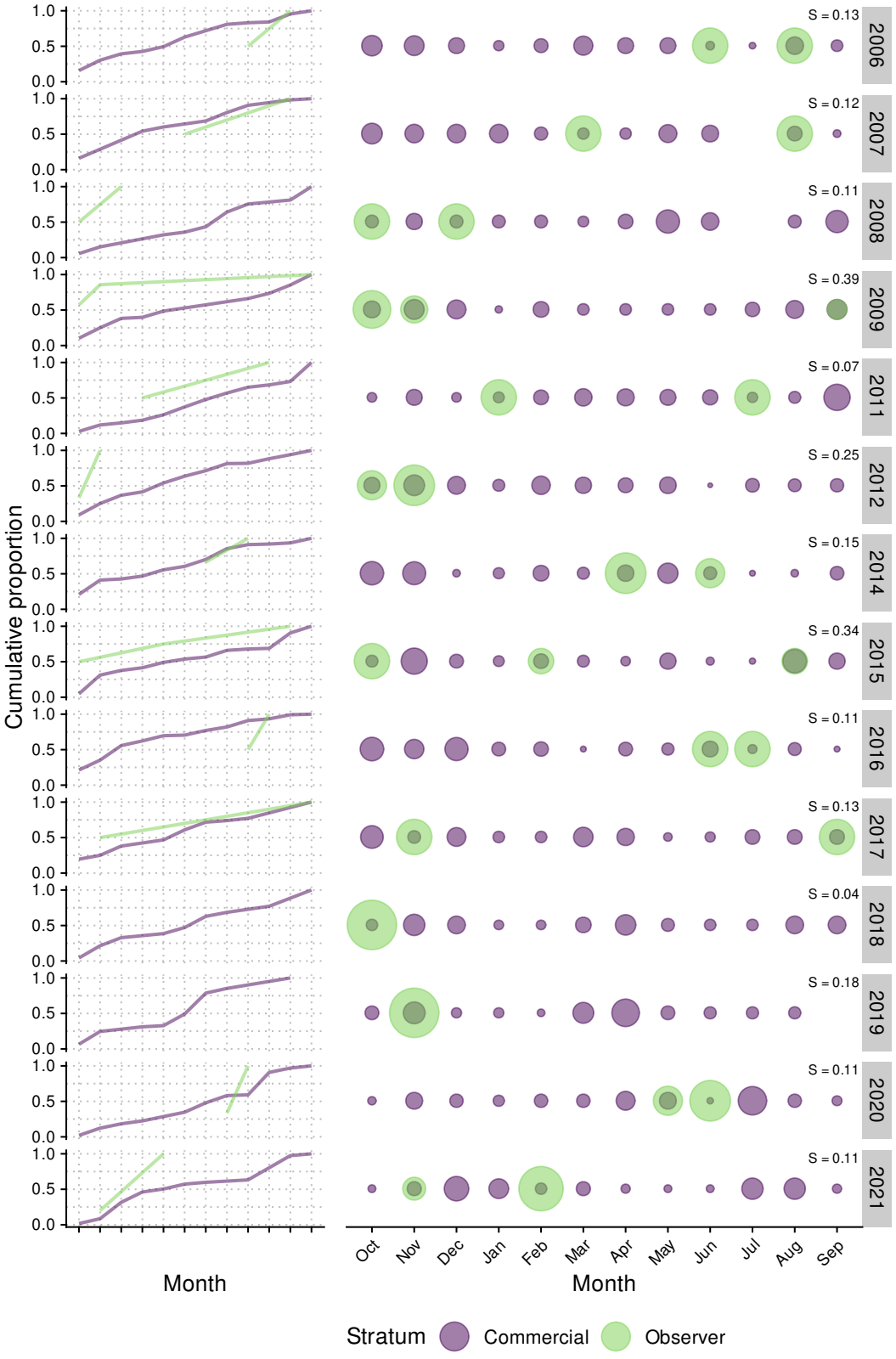


Figure 147: **Monthly representativeness of observer sampling coverage of Trawl fishing events in RBY 1, where the rubyfish catch exceeded the 40kg threshold, in 2006 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

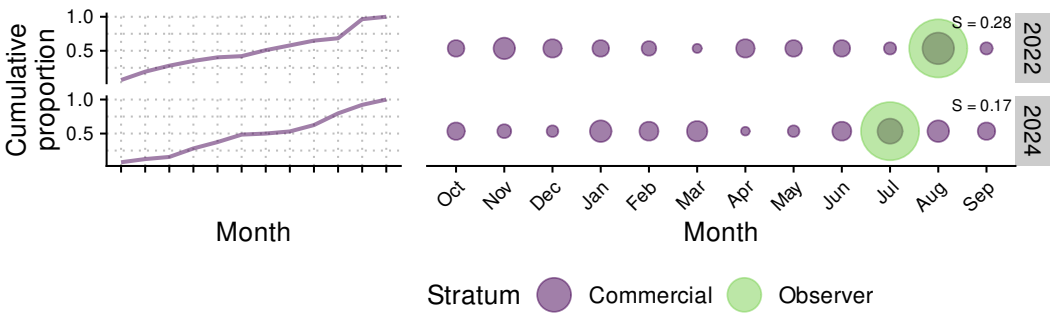


Figure 148: Monthly representativeness of observer sampling coverage of Trawl fishing events in RBY 1, where the rubyfish catch exceeded the 40kg threshold, in 2022 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

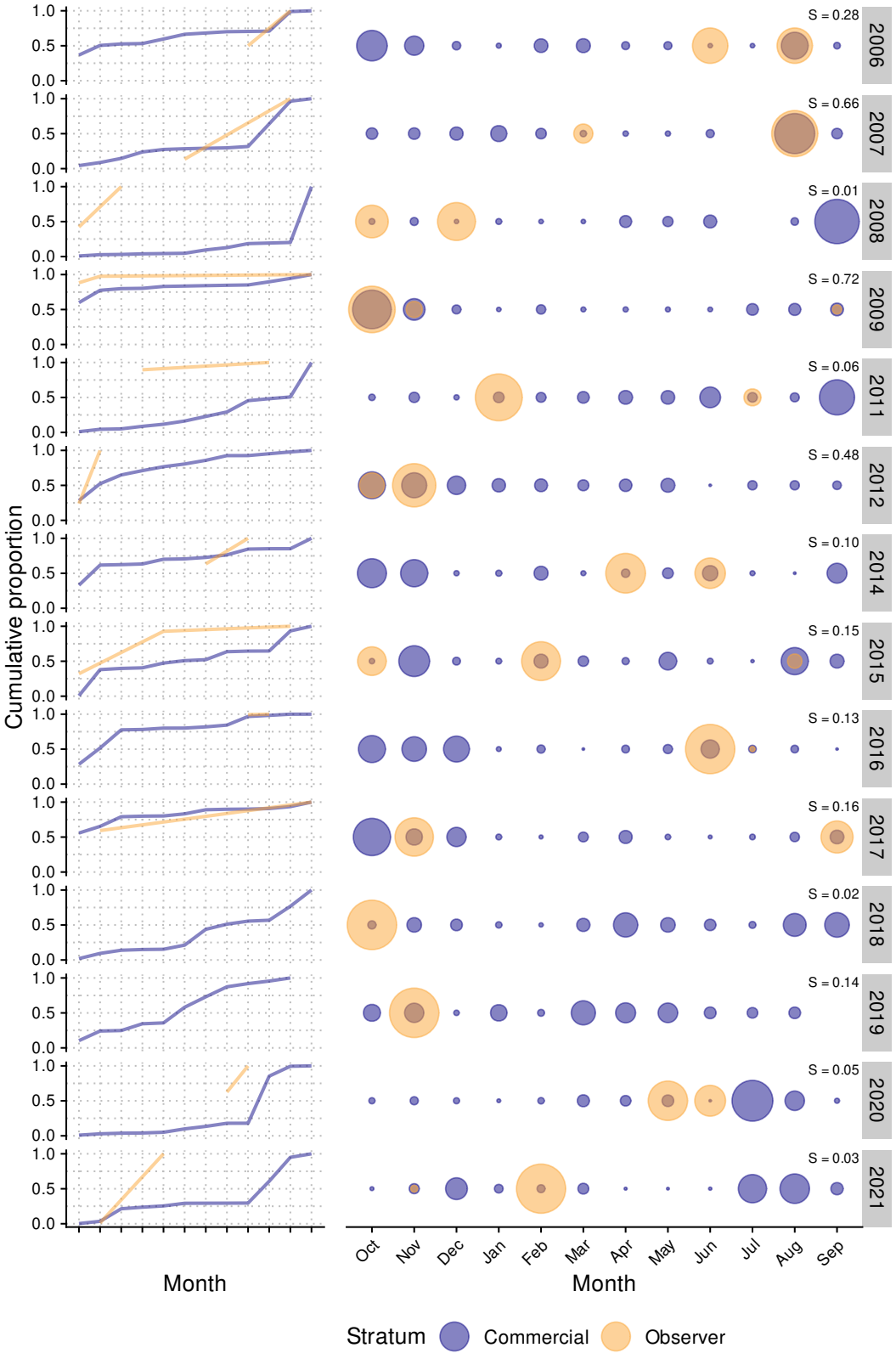


Figure 149: Monthly representativeness of observer sampling coverage of Trawl catch in RBY 1, from events where the rubyfish catch exceeded the 40kg threshold, in 2006 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

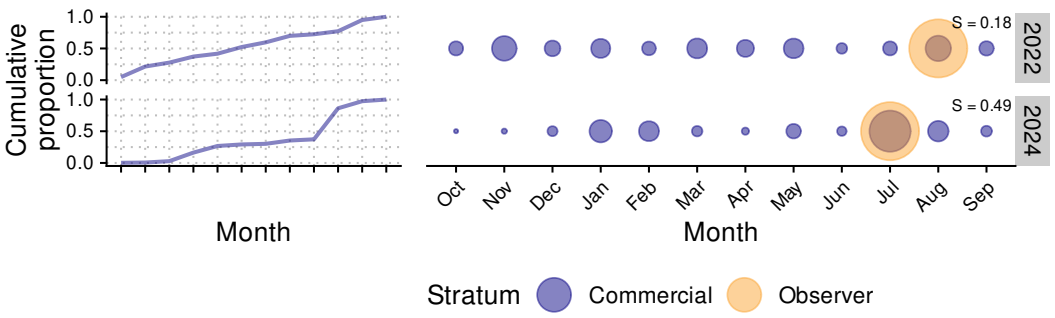


Figure 150: Monthly representativeness of observer sampling coverage of Trawl catch in RBY 1, from events where the rubyfish catch exceeded the 40kg threshold, in 2022 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

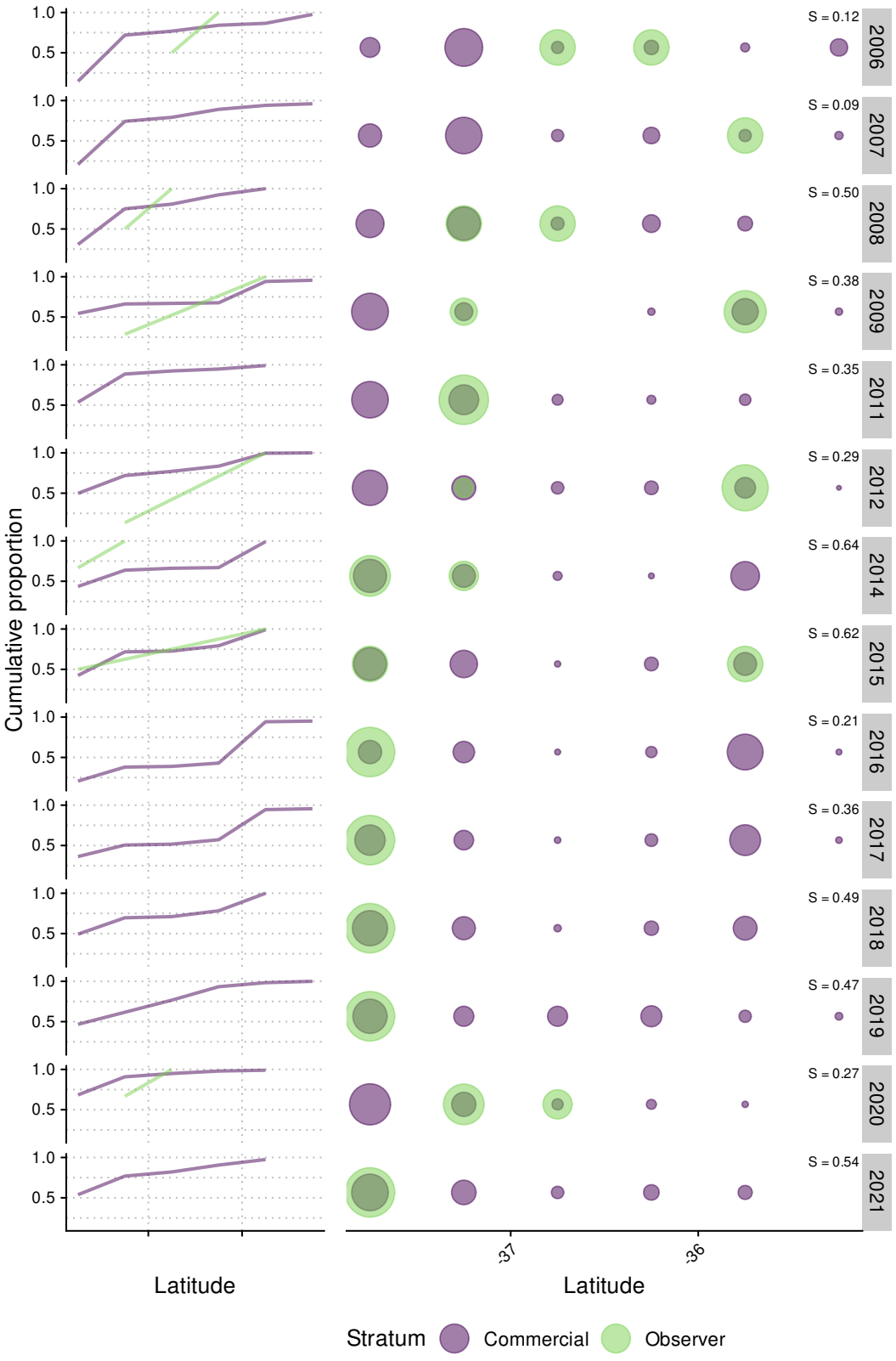


Figure 151: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RBY 1, where the rubyfish catch exceeded the 40kg threshold, in 2006 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

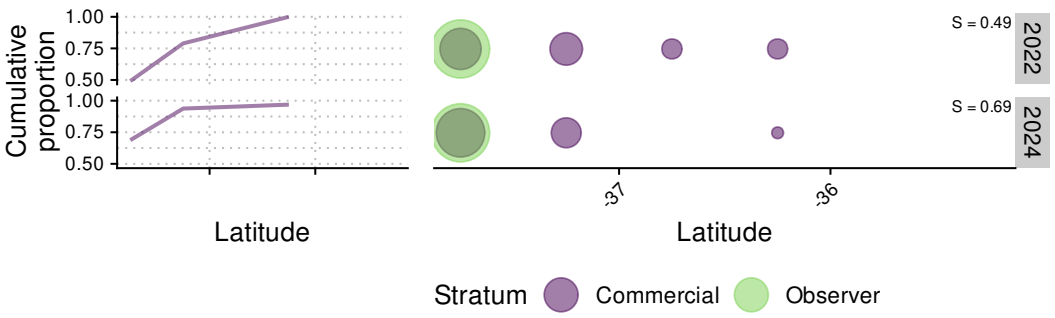


Figure 152: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RBY 1, where the rubyfish catch exceeded the 40kg threshold, in 2022 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

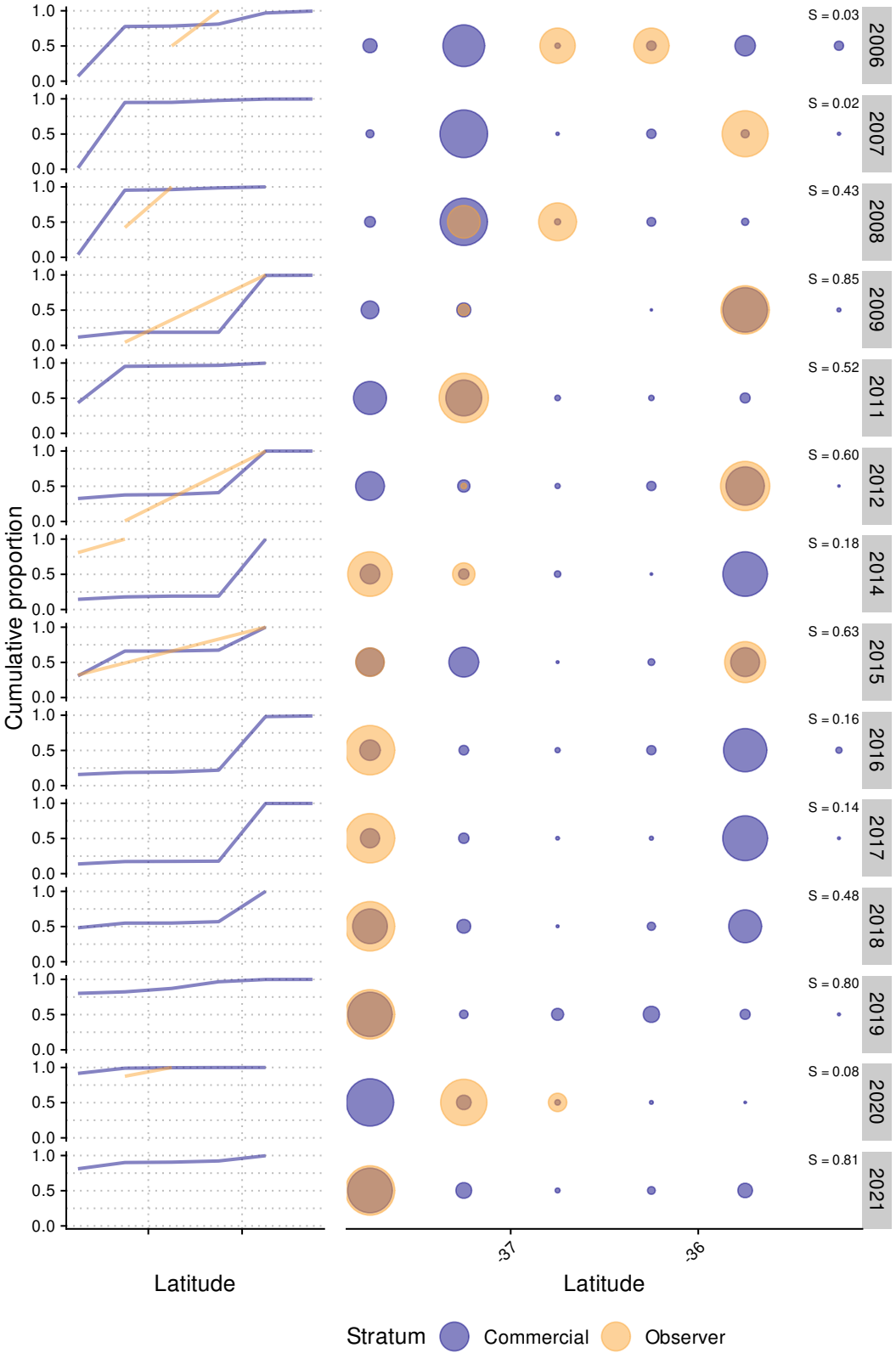


Figure 153: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RBY 1, from events where the rubyfish catch exceeded the 40kg threshold, in 2006 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

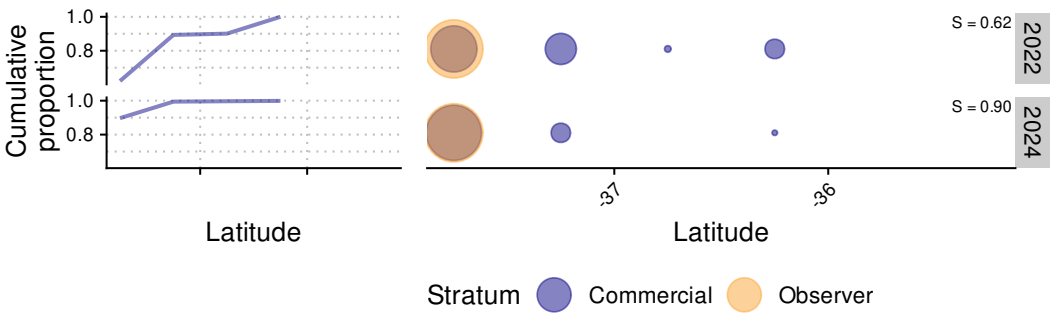


Figure 154: Latitudinal representativeness of observer sampling coverage of Trawl catch in RBY 1, from events where the rubyfish catch exceeded the 40kg threshold, in 2022 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

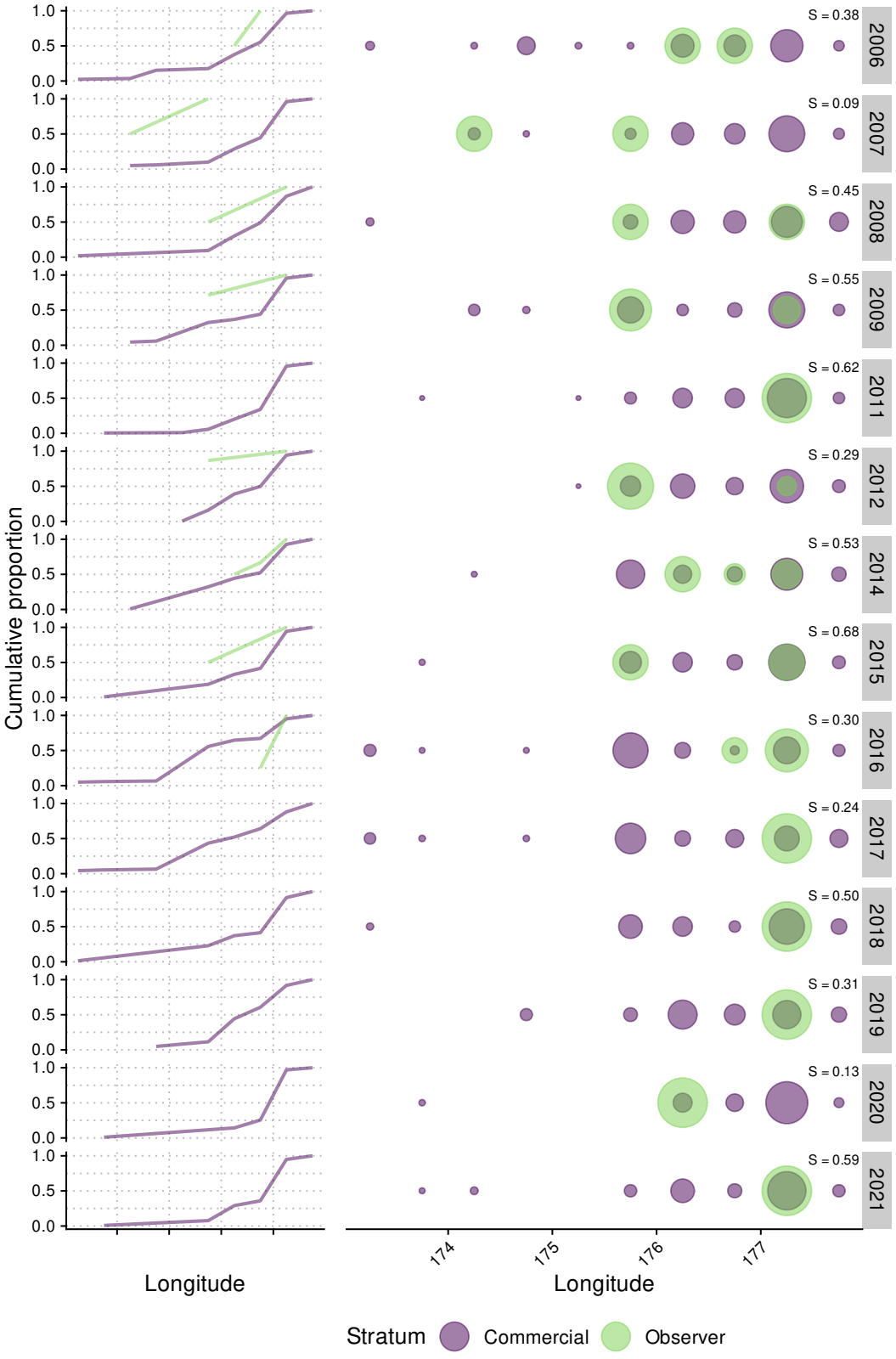


Figure 155: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RBY 1, where the rubyfish catch exceeded the 40kg threshold, in 2006 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

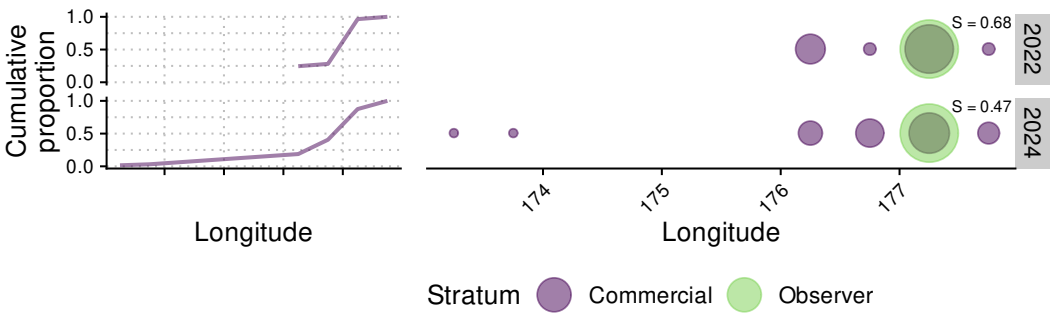


Figure 156: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RBY 1, where the rubyfish catch exceeded the 40kg threshold, in 2022 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

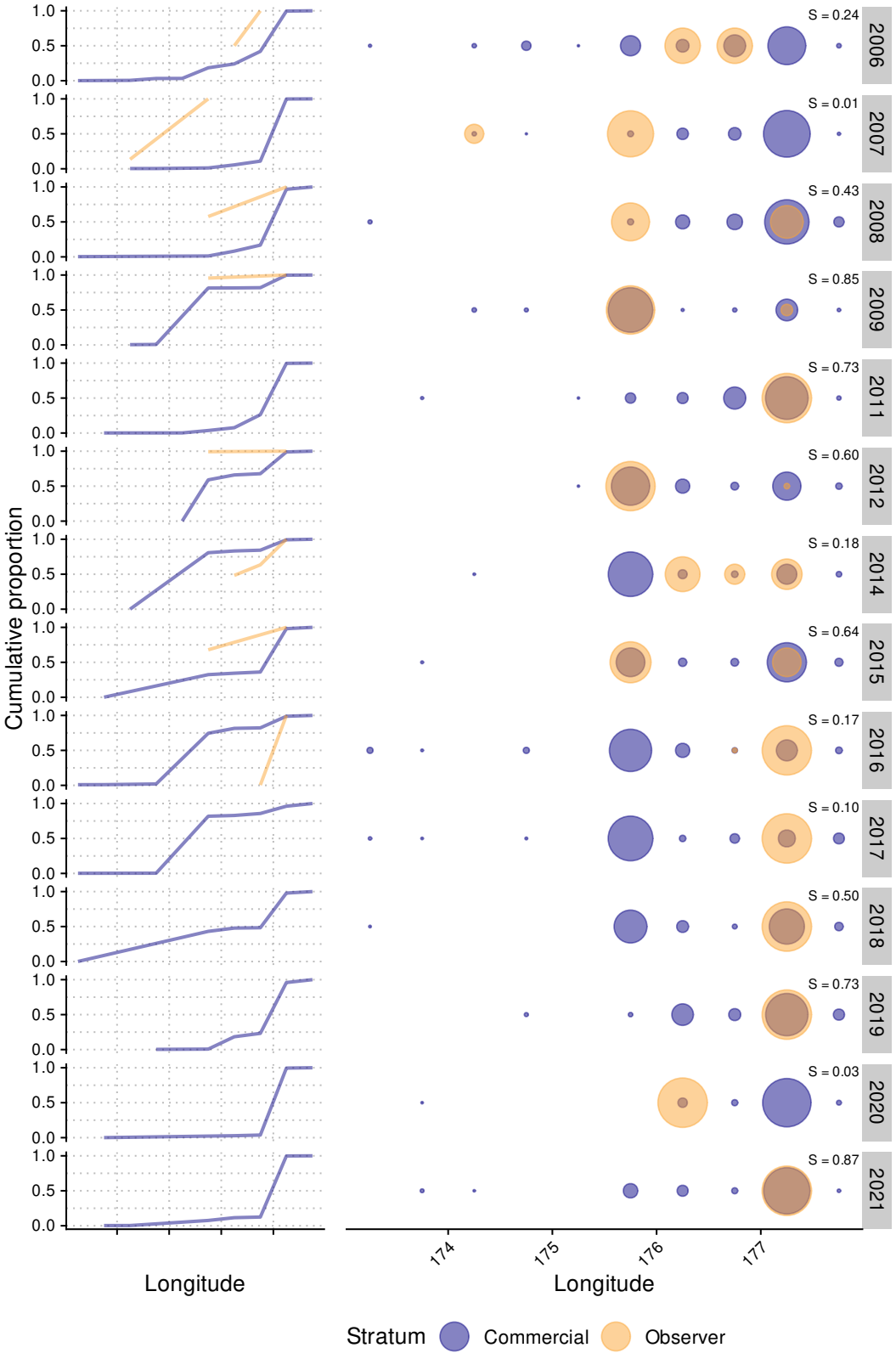


Figure 157: Longitudinal representativeness of observer sampling coverage of Trawl catch in RBY 1, from events where the rubyfish catch exceeded the 40kg threshold, in 2006 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

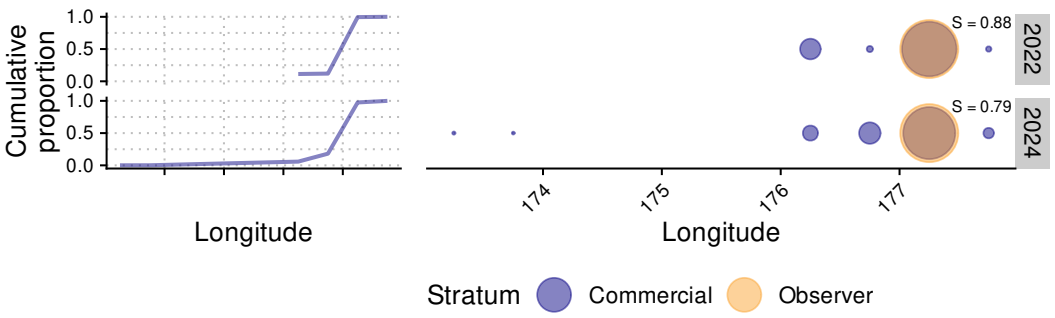


Figure 158: Longitudinal representativeness of observer sampling coverage of Trawl catch in RBY 1, from events where the rubyfish catch exceeded the 40kg threshold, in 2022 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

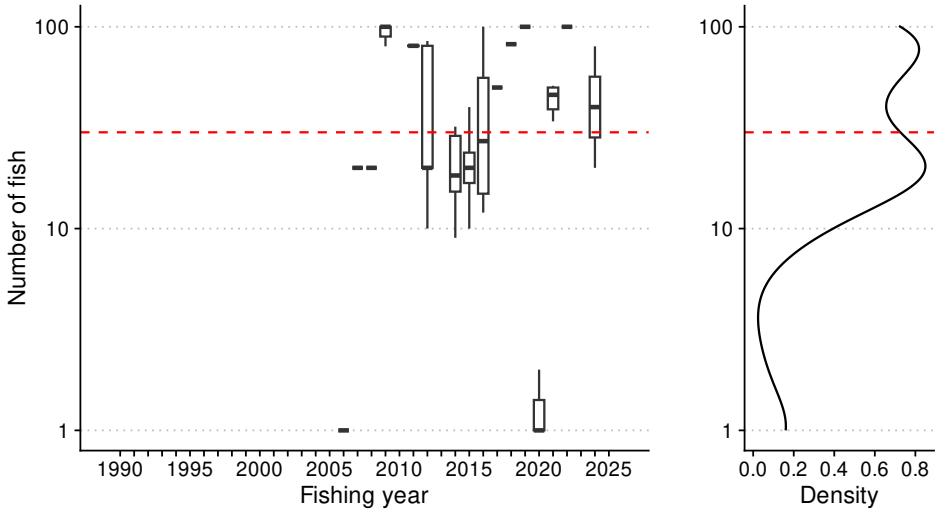


Figure 159: Length-frequency sample sizes for observed fishing events in RBY 1 where rubyfish were sampled. The red dashed line indicates a sample size of 30 fish.

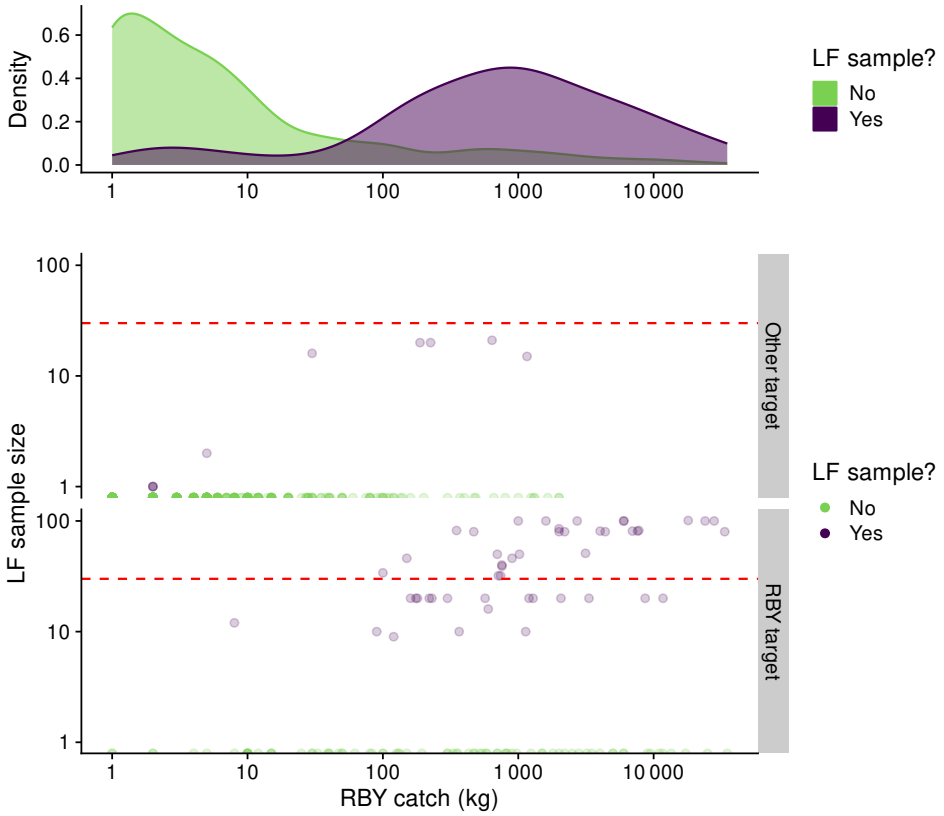


Figure 160: Length-frequency sample sizes (number of fish sampled) for observed fishing events in RBY 1 in relation to the total rubyfish catch from an event, separately for rubyfish target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.3.1.2 Otolith samples

Table 14: Otolith samples of rubyfish from the RBY 1 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of rubyfish exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	248	0	0	0.00
1991	304	0	0	0.00
1992	442	0	0	0.00
1993	314	0	0	0.00
1994	183	0	0	0.00
1995	93	0	0	0.00
1996	150	0	0	0.00
1997	240	0	0	0.00
1998	108	0	0	0.00
1999	114	0	0	0.00
2000	167	0	0	0.00
2001	96	0	0	0.00
2002	105	0	0	0.00
2003	81	0	0	0.00
2004	40	0	0	0.00
2005	66	0	0	0.00
2006	89	0	0	0.00
2007	111	0	0	0.00
2008	53	0	0	0.00
2009	66	1	10	1.52
2010	162	0	0	0.00
2011	204	1	10	0.49
2012	201	15	97	7.46
2013	140	0	0	0.00
2014	124	0	0	0.00
2015	106	0	0	0.00
2016	122	0	0	0.00
2017	92	0	0	0.00
2018	67	0	0	0.00
2019	48	0	0	0.00
2020	98	0	0	0.00
2021	117	0	0	0.00
2022	57	0	0	0.00
2023	79	0	0	0.00
2024	63	0	0	0.00
2025	41	0	0	0.00

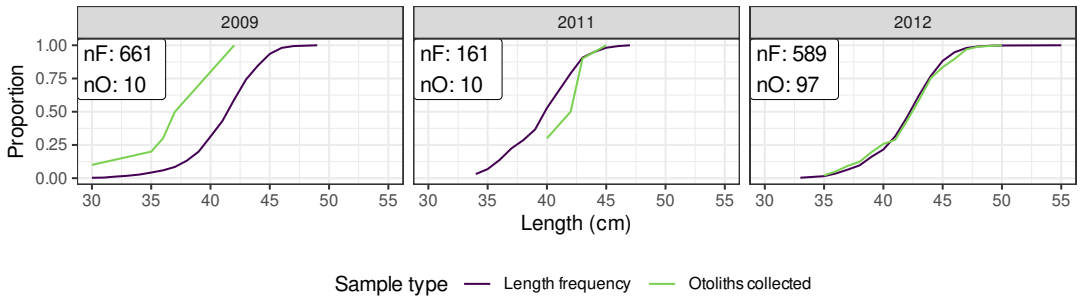


Figure 161: Cumulative distributions of the length of fish in the length frequency and otolith samples of rubyfish in the RBY 1 Trawl fishery for the 2009 to 2012 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.3.1.3 Catch quantification

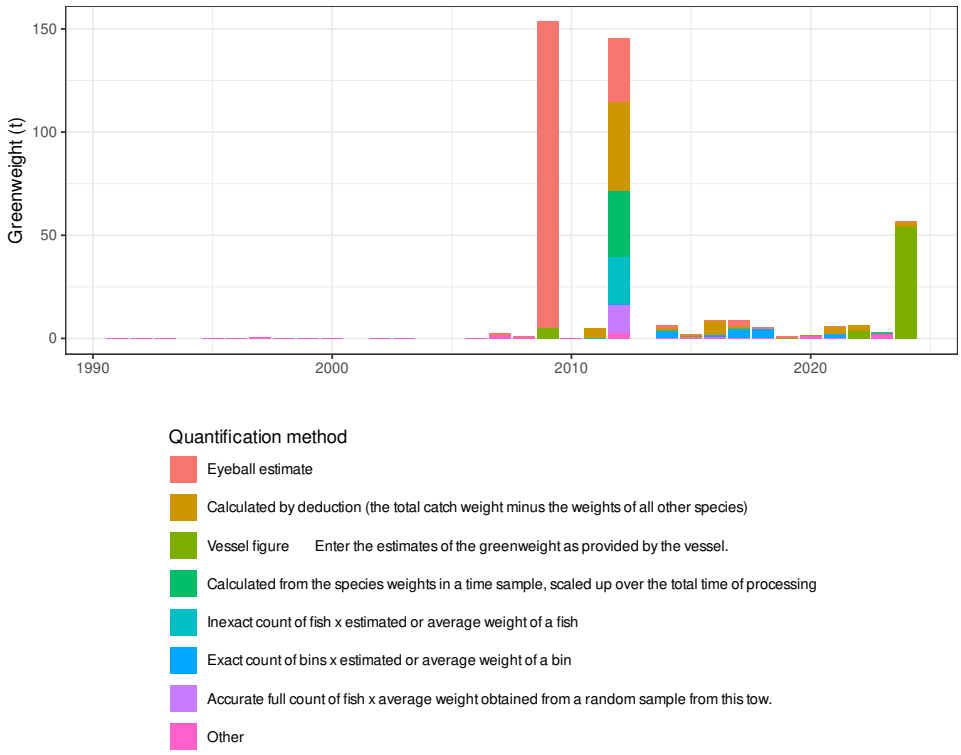


Figure 162: Methods used by observers to quantify the catch of rubyfish in the RBY 1 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.3.2 RBY 2: Trawl fishery

2.3.2.1 Length-frequency samples

Table 15: Length-frequency samples of rubyfish from the RBY 2 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of rubyfish exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	307	0	0	0.00
1991	290	0	0	0.00
1992	370	0	0	0.00
1993	322	0	0	0.00
1994	322	0	0	0.00
1995	389	0	0	0.00
1996	478	0	0	0.00
1997	324	0	0	0.00
1998	447	0	0	0.00
1999	287	1	88	0.35
2000	298	0	0	0.00
2001	246	0	0	0.00
2002	241	0	0	0.00
2003	198	0	0	0.00
2004	171	0	0	0.00
2005	143	0	0	0.00
2006	127	0	0	0.00
2007	115	0	0	0.00
2008	104	0	0	0.00
2009	97	4	350	4.12
2010	122	0	0	0.00
2011	157	4	331	2.55
2012	88	1	32	1.14
2013	105	0	0	0.00
2014	139	0	0	0.00
2015	119	3	60	2.52
2016	205	0	0	0.00
2017	145	0	0	0.00
2018	109	5	225	4.59
2019	83	0	0	0.00
2020	68	0	0	0.00
2021	76	1	50	1.32
2022	108	3	240	2.78
2023	78	0	0	0.00
2024	81	2	40	2.47
2025	64	0	0	0.00

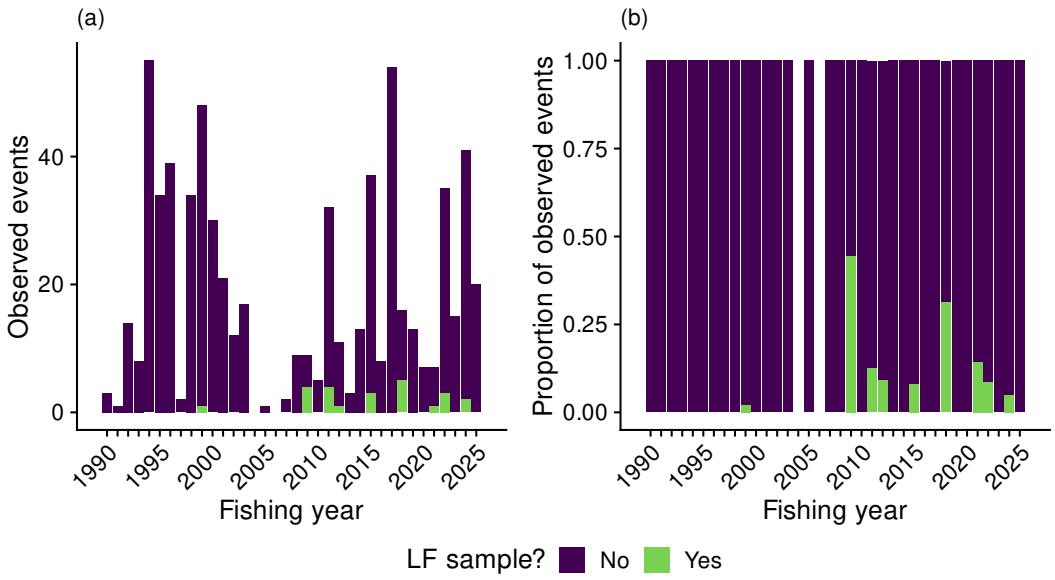


Figure 163: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RBY 2 where the rubyfish catch exceeded the 40 kg threshold, with and without length-frequency sampling.**

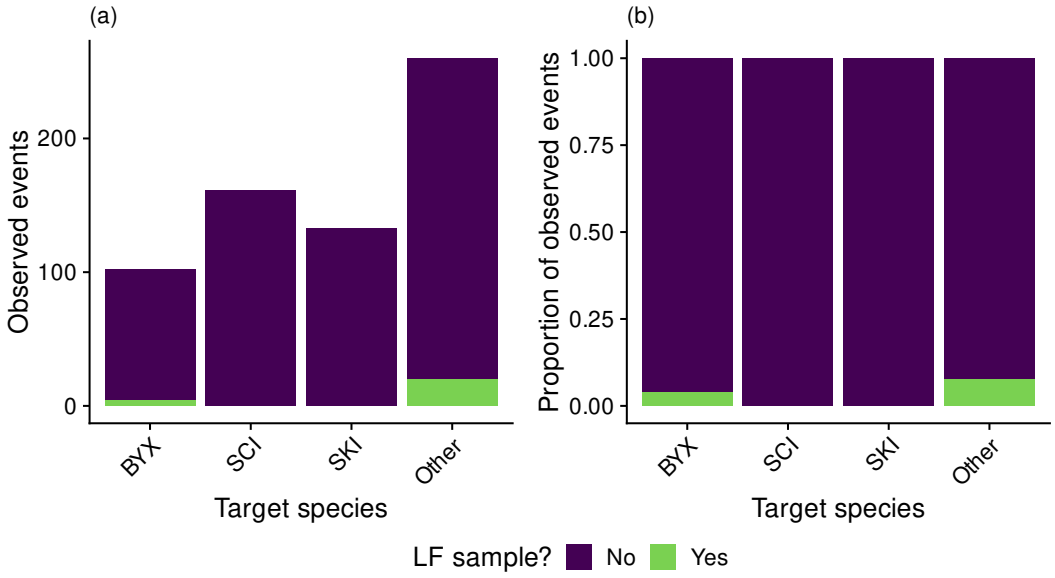


Figure 164: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RBY 2 where the rubyfish catch exceeded the 40 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

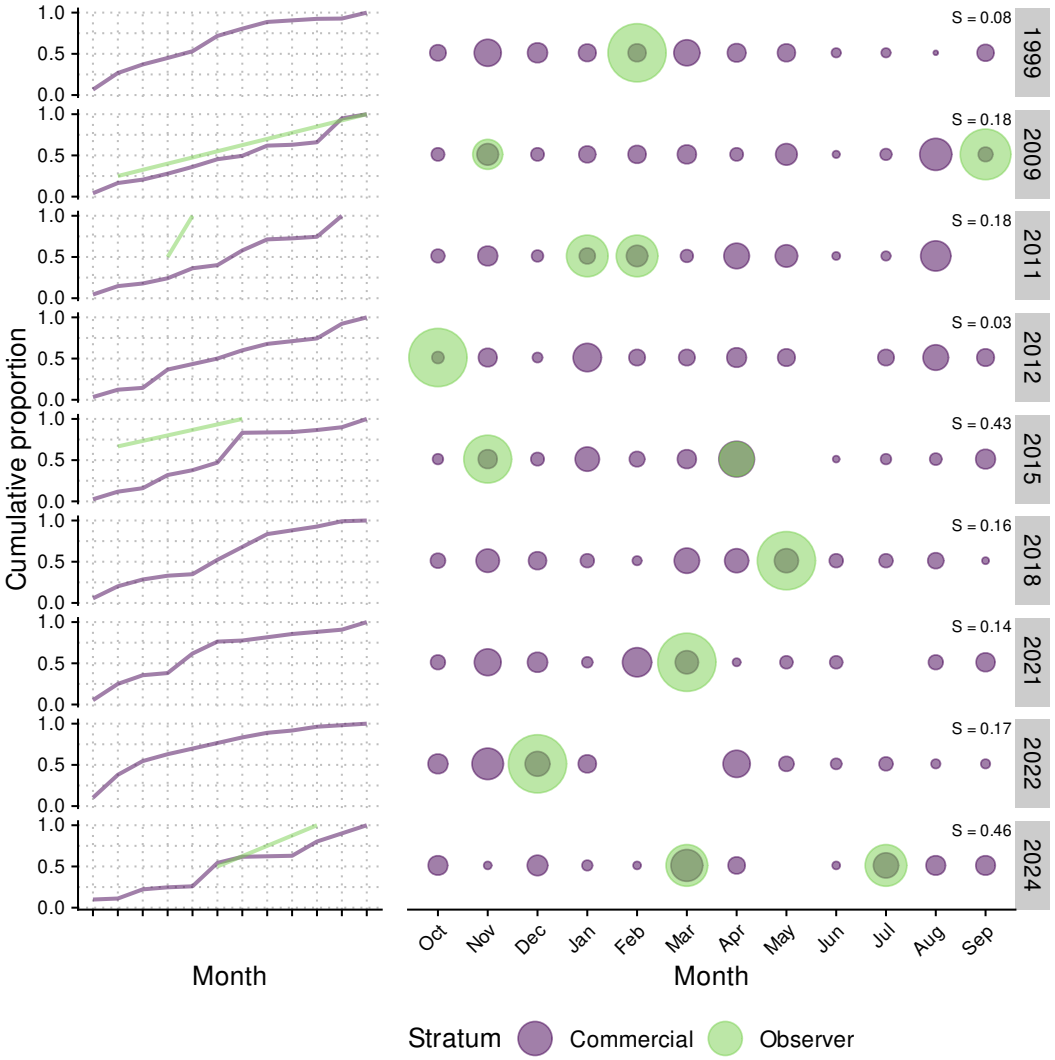


Figure 165: Monthly representativeness of observer sampling coverage of Trawl fishing events in RBY 2, where the rubyfish catch exceeded the 40kg threshold, in 1999 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

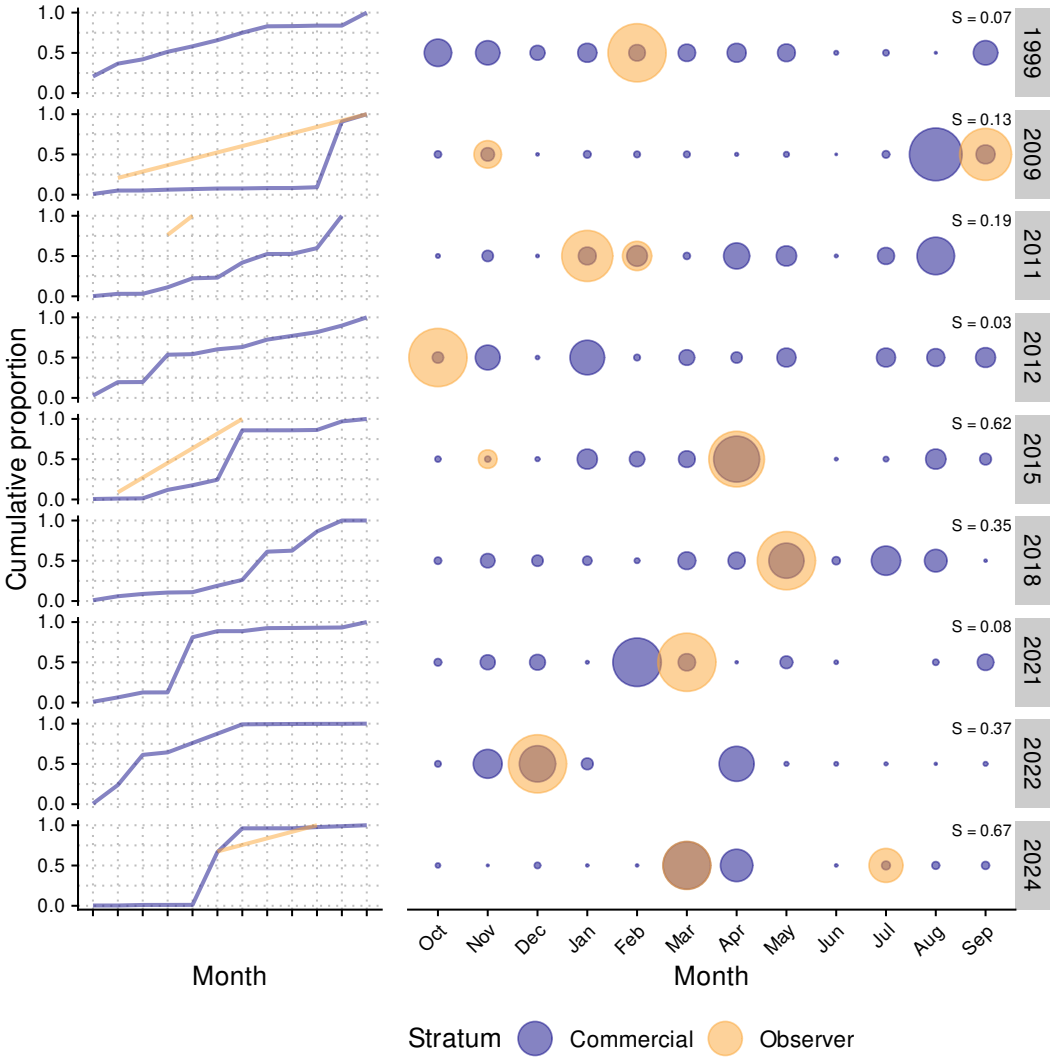


Figure 166: **Monthly representativeness of observer sampling coverage of Trawl catch in RBY 2, from events where the rubyfish catch exceeded the 40kg threshold, in 1999 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

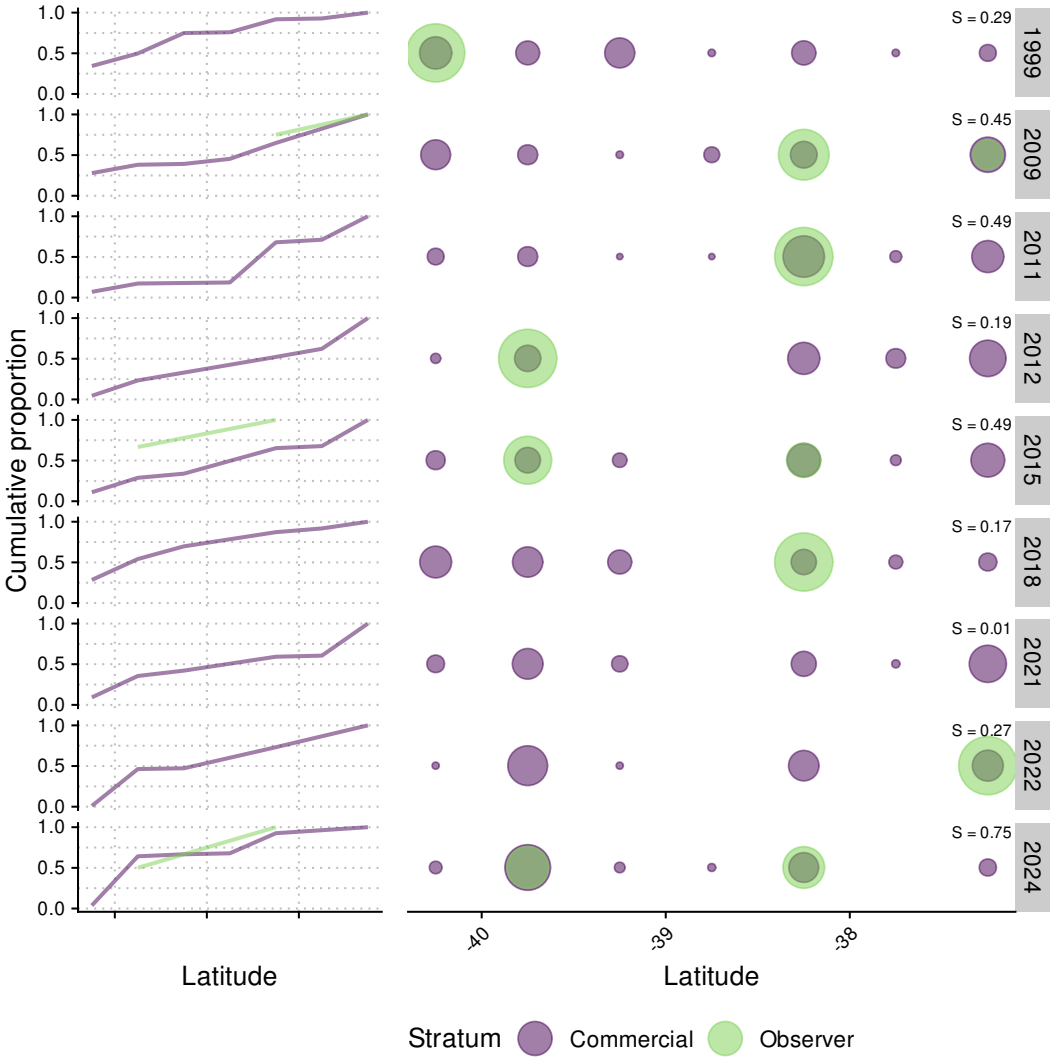


Figure 167: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RBY 2, where the rubyfish catch exceeded the 40kg threshold, in 1999 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

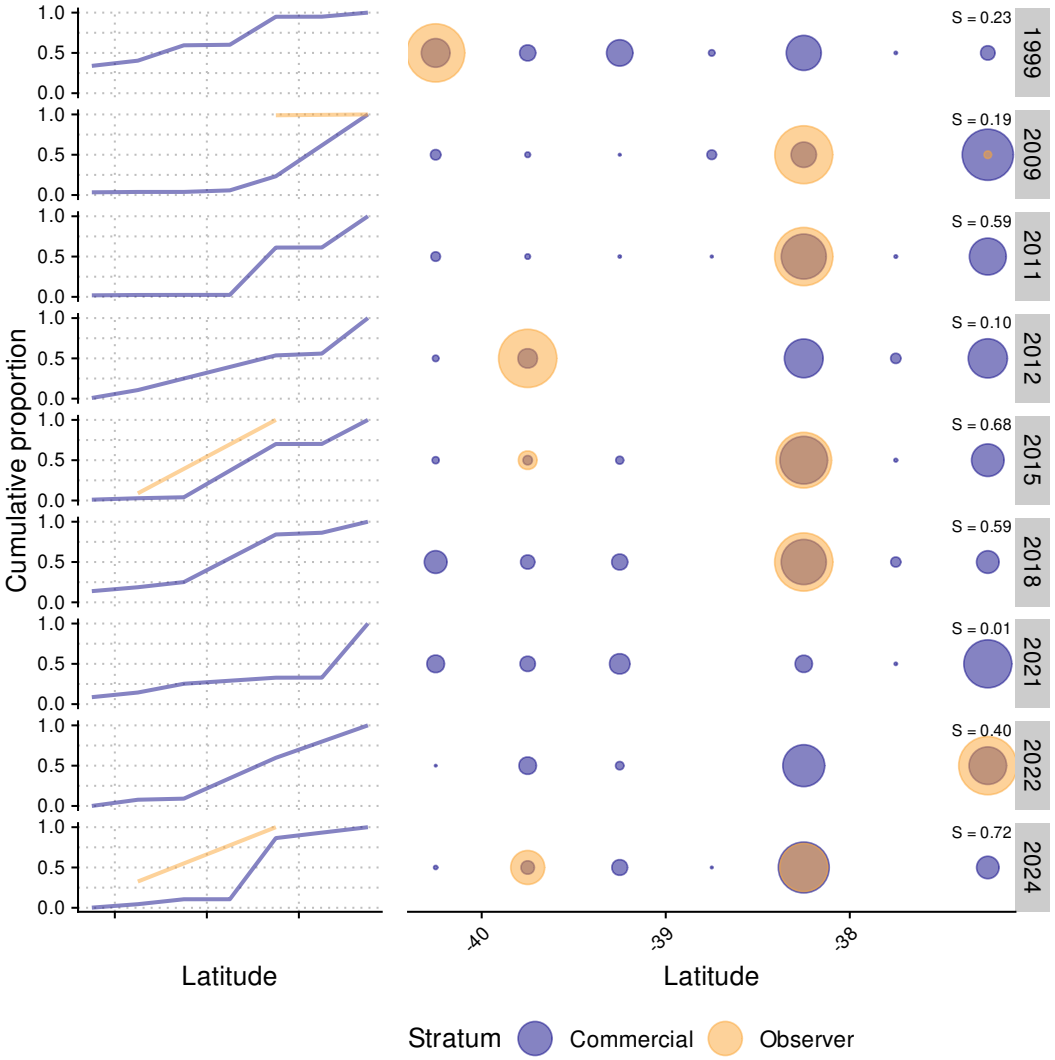


Figure 168: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RBY 2, from events where the rubyfish catch exceeded the 40kg threshold, in 1999 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

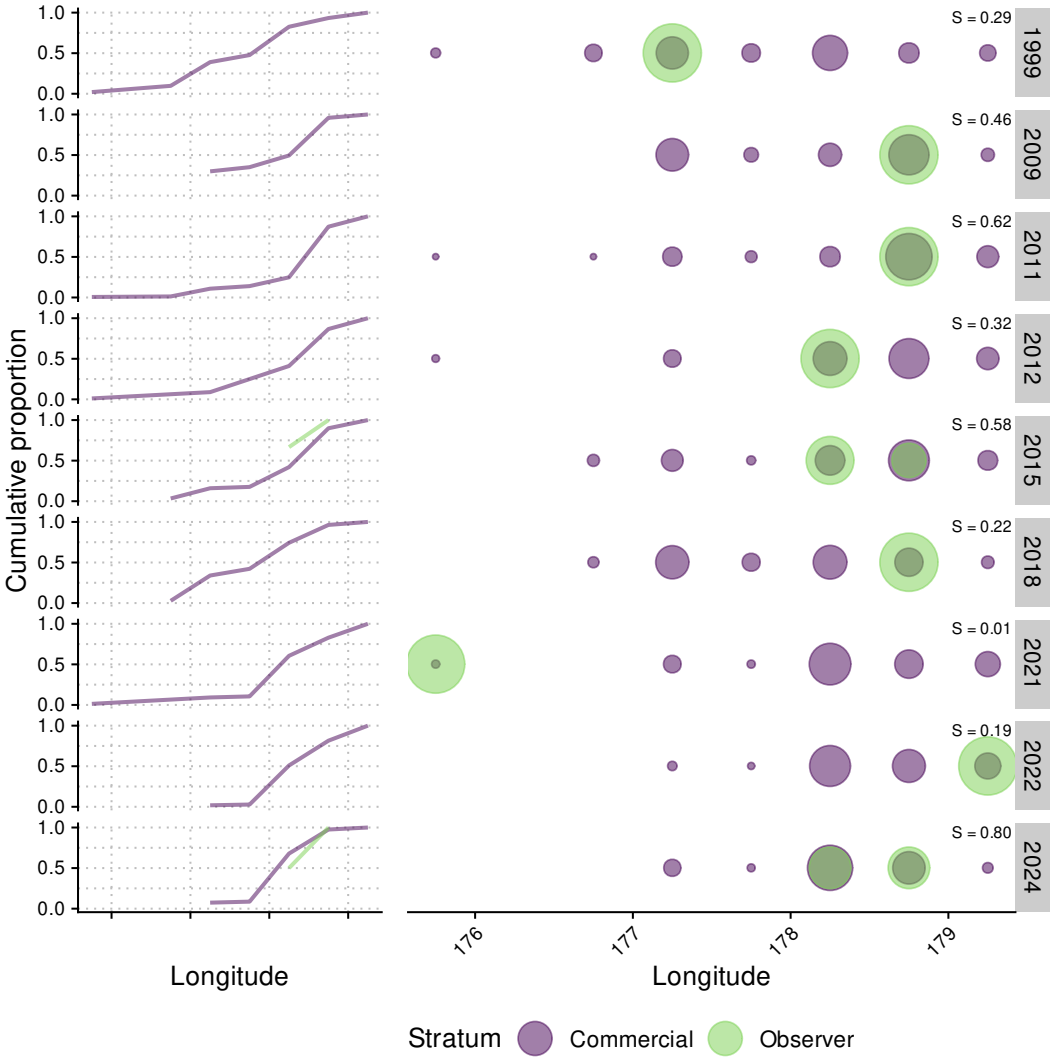


Figure 169: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RBY 2, where the rubyfish catch exceeded the 40kg threshold, in 1999 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

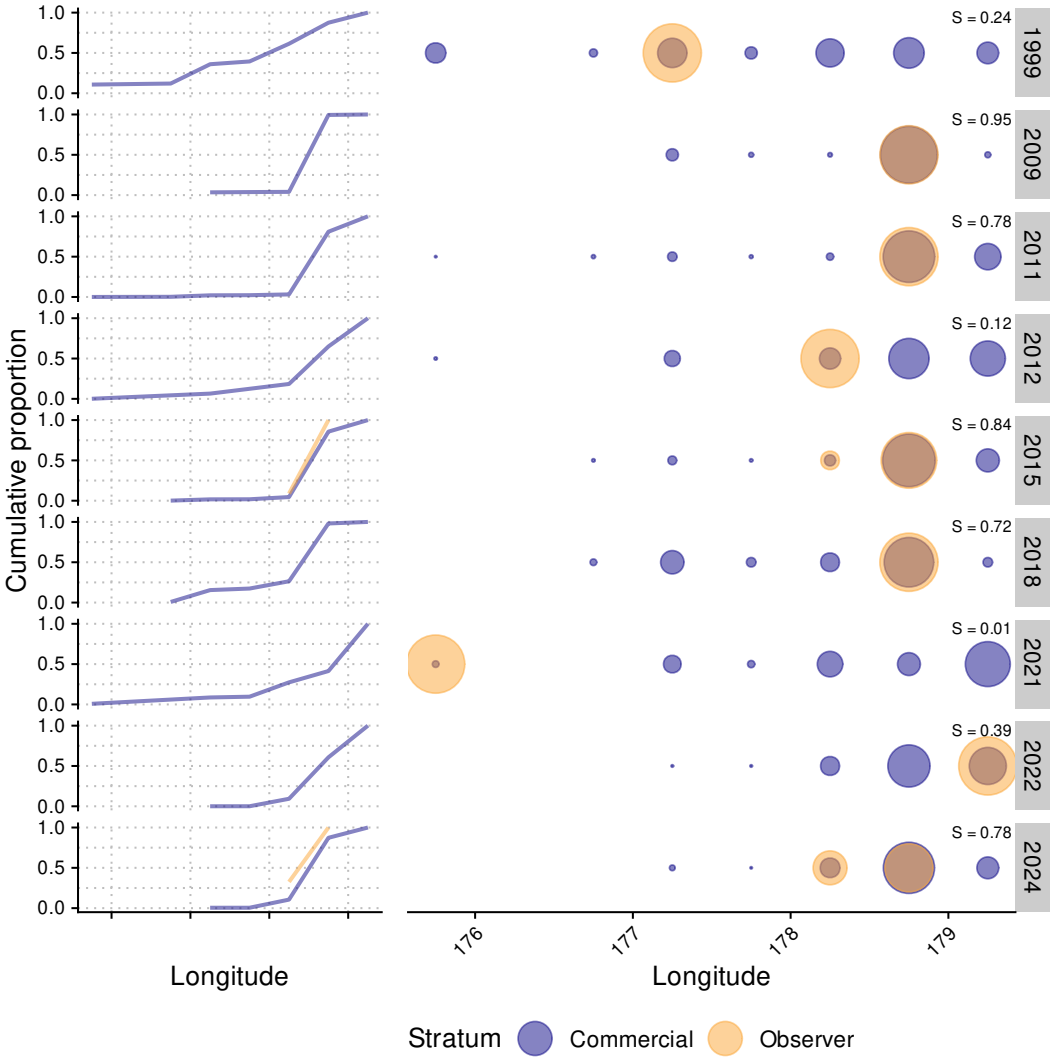


Figure 170: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RBY 2, from events where the rubyfish catch exceeded the 40kg threshold, in 1999 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

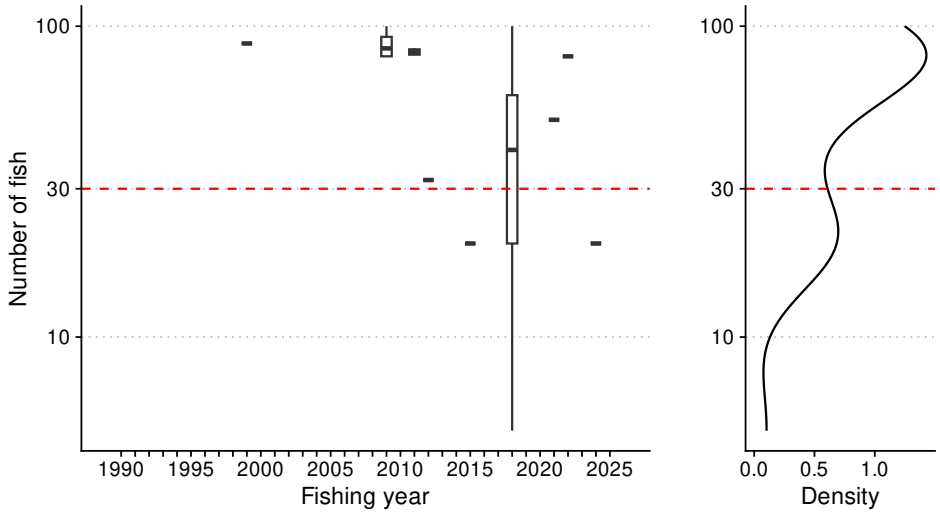


Figure 171: Length-frequency sample sizes for observed fishing events in RBY 2 where rubyfish were sampled. The red dashed line indicates a sample size of 30 fish.

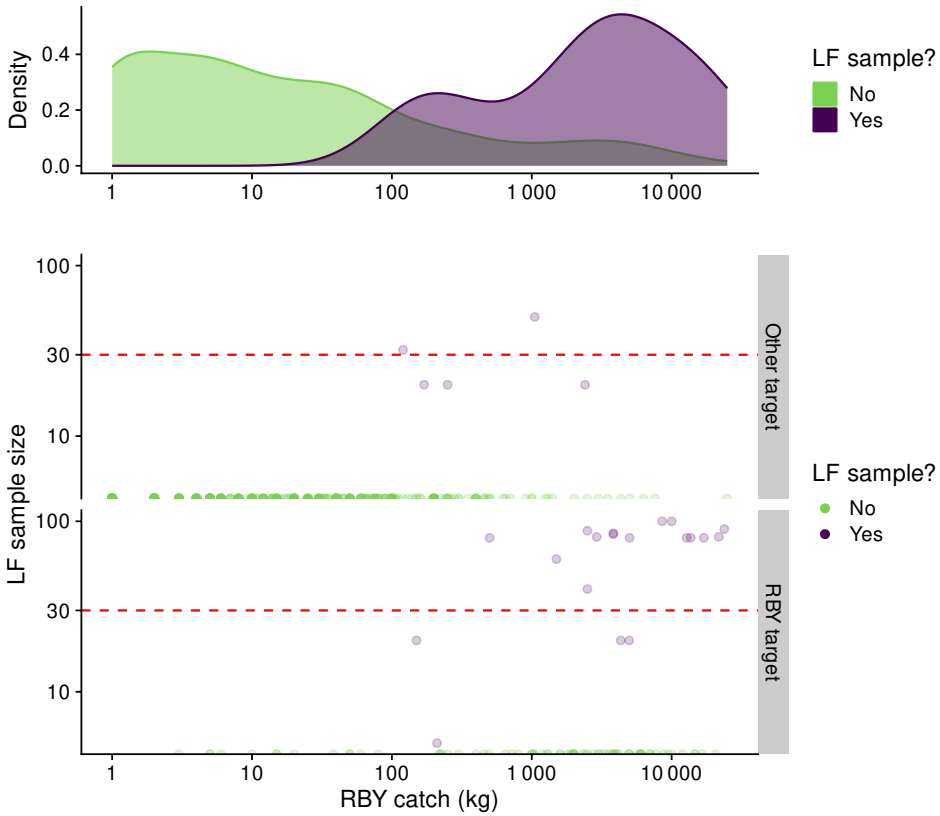


Figure 172: Length-frequency sample sizes (number of fish sampled) for observed fishing events in RBY 2 in relation to the total rubyfish catch from an event, separately for rubyfish target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.3.2.2 Otolith samples

Table 16: Otolith samples of rubyfish from the RBY 2 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of rubyfish exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	307	0	0	0.00
1991	290	0	0	0.00
1992	370	0	0	0.00
1993	322	0	0	0.00
1994	322	0	0	0.00
1995	389	0	0	0.00
1996	478	0	0	0.00
1997	324	0	0	0.00
1998	447	0	0	0.00
1999	287	0	0	0.00
2000	298	0	0	0.00
2001	246	0	0	0.00
2002	241	0	0	0.00
2003	198	0	0	0.00
2004	171	0	0	0.00
2005	143	0	0	0.00
2006	127	0	0	0.00
2007	115	0	0	0.00
2008	104	0	0	0.00
2009	97	3	30	3.09
2010	122	0	0	0.00
2011	157	4	39	2.55
2012	88	1	5	1.14
2013	105	0	0	0.00
2014	139	0	0	0.00
2015	119	0	0	0.00
2016	205	0	0	0.00
2017	145	0	0	0.00
2018	109	4	20	3.67
2019	83	0	0	0.00
2020	68	0	0	0.00
2021	76	0	0	0.00
2022	108	3	30	2.78
2023	78	0	0	0.00
2024	81	2	10	2.47
2025	64	0	0	0.00

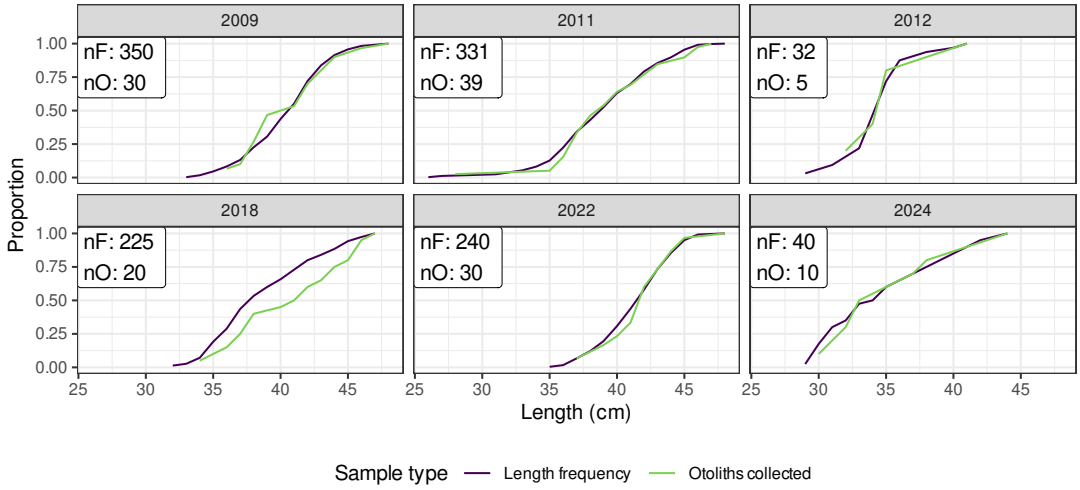


Figure 173: Cumulative distributions of the length of fish in the length frequency and otolith samples of rubyfish in the RBY 2 Trawl fishery for the 2009 to 2024 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.3.2.3 Catch quantification

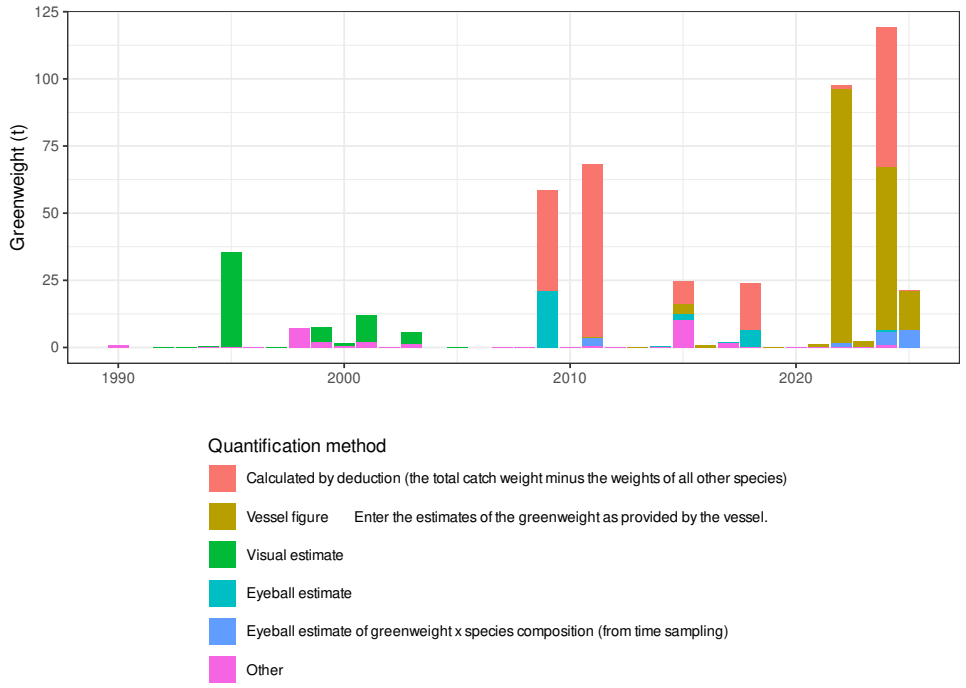


Figure 174: Methods used by observers to quantify the catch of rubyfish in the RBY 2 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.3.3 RBY 7: Trawl fishery

2.3.3.1 Length-frequency samples

Table 17: Length-frequency samples of rubyfish from the RBY 7 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2023. Positive fishing events are those where the catch of rubyfish exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	12	0	0	0.00
1991	3	0	0	0.00
1992	13	0	0	0.00
1993	18	0	0	0.00
1994	4	0	0	0.00
1995	9	0	0	0.00
1997	5	0	0	0.00
1998	5	0	0	0.00
1999	2	0	0	0.00
2000	13	0	0	0.00
2001	10	0	0	0.00
2002	22	4	26	18.18
2003	13	8	48	61.54
2004	9	1	1	11.11
2005	14	0	0	0.00
2006	7	2	3	28.57
2007	12	2	6	16.67
2008	9	0	0	0.00
2009	9	1	1	11.11
2010	11	0	0	0.00
2011	13	0	0	0.00
2012	11	0	0	0.00
2013	5	0	0	0.00
2014	4	1	20	25.00
2015	6	0	0	0.00
2016	5	0	0	0.00
2017	13	0	0	0.00
2018	4	0	0	0.00
2019	7	1	20	14.29
2020	4	0	0	0.00
2021	12	1	16	8.33
2022	1	0	0	0.00
2023	2	0	0	0.00

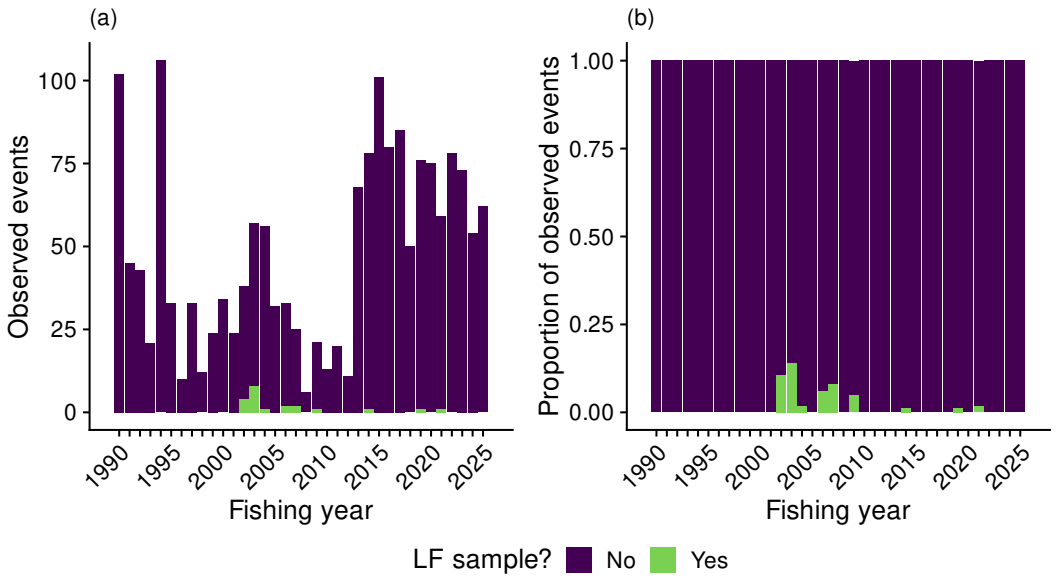


Figure 175: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RBY 7 where the rubyfish catch exceeded the 40 kg threshold, with and without length-frequency sampling.**

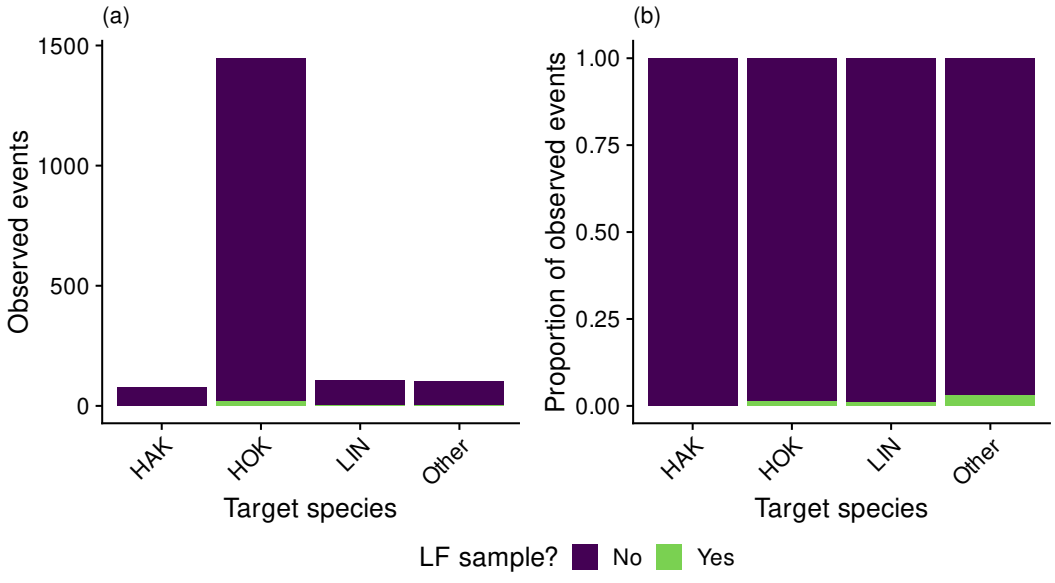


Figure 176: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RBY 7 where the rubyfish catch exceeded the 40 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

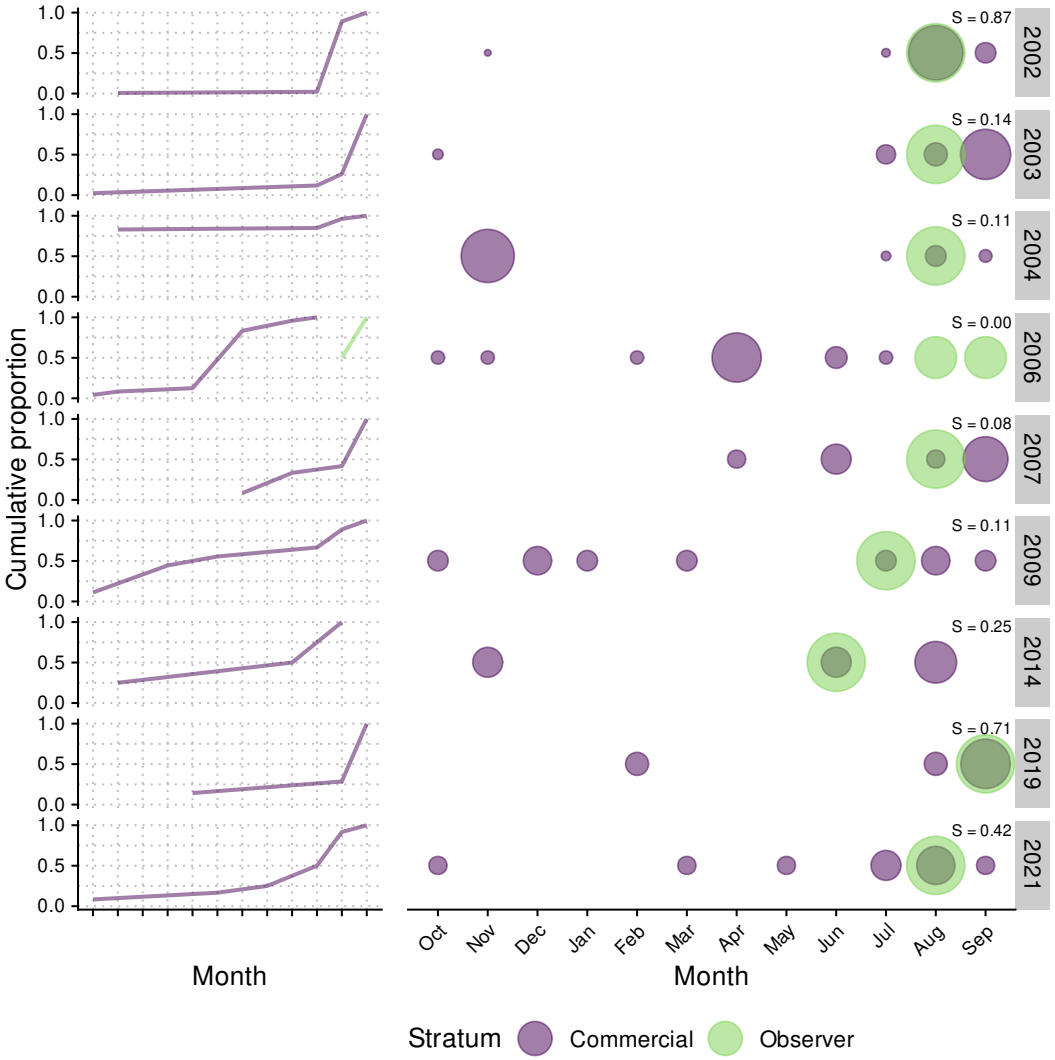


Figure 177: Monthly representativeness of observer sampling coverage of Trawl fishing events in RBY 7, where the rubyfish catch exceeded the 40kg threshold, in 2002 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

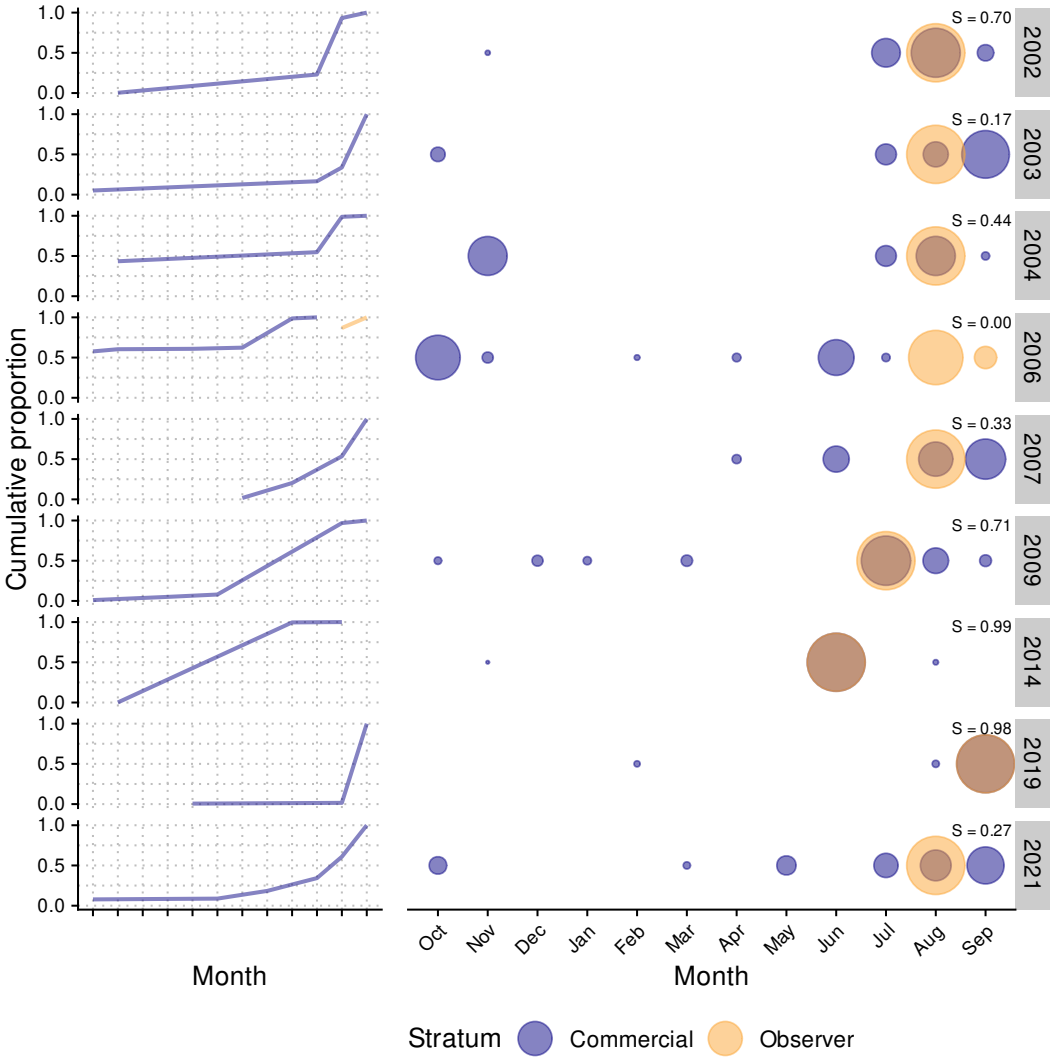


Figure 178: **Monthly representativeness of observer sampling coverage of Trawl catch in RBY 7, from events where the rubyfish catch exceeded the 40kg threshold, in 2002 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

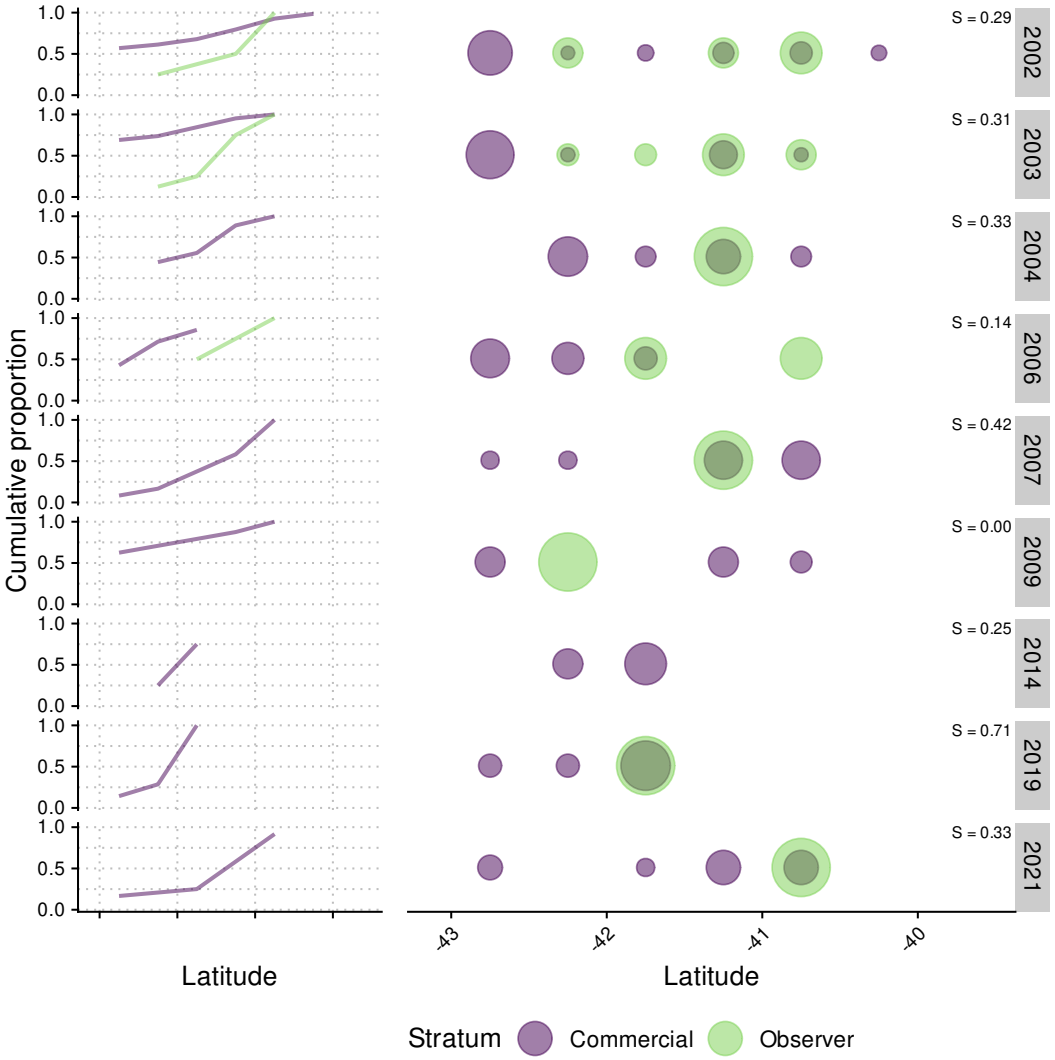


Figure 179: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RBY 7, where the rubyfish catch exceeded the 40kg threshold, in 2002 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

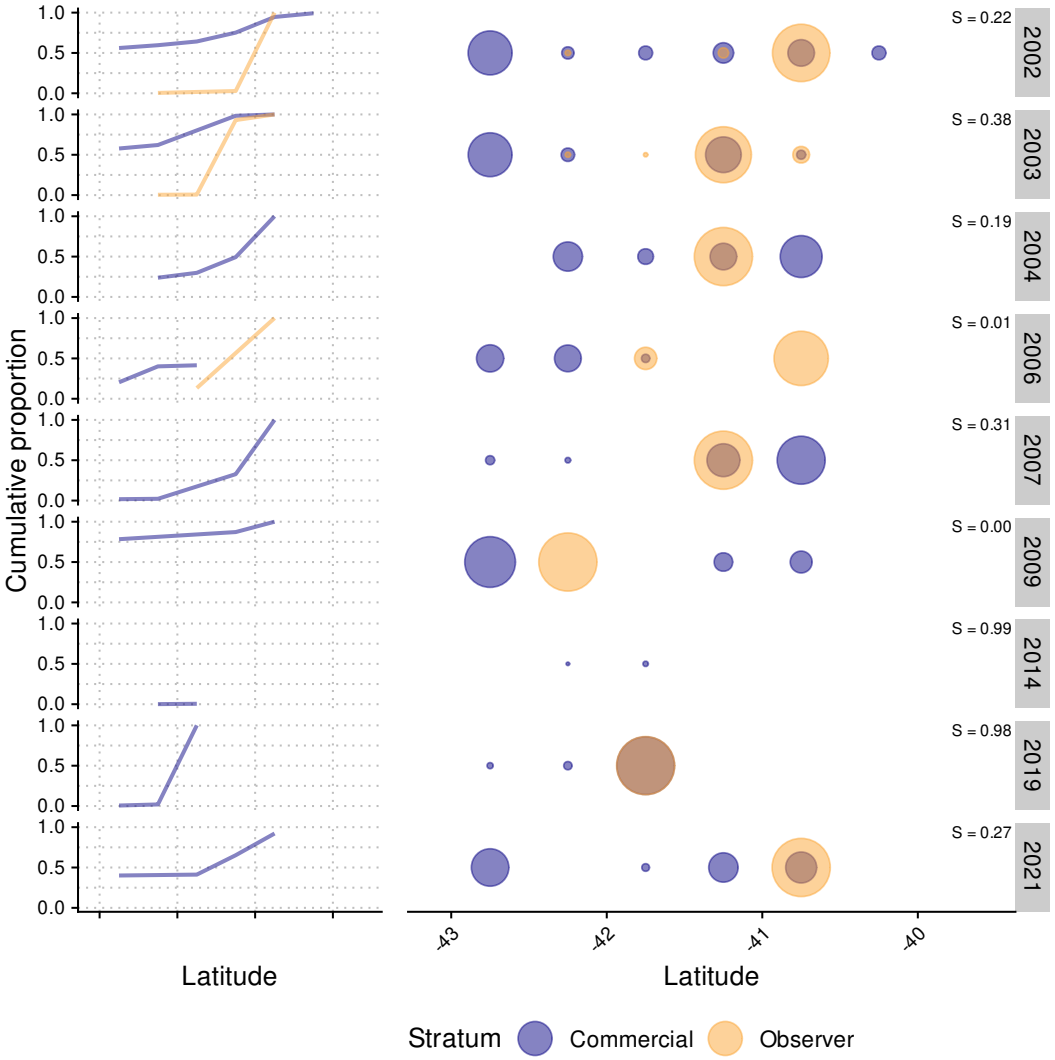


Figure 180: Latitudinal representativeness of observer sampling coverage of Trawl catch in RBY 7, from events where the rubyfish catch exceeded the 40kg threshold, in 2002 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

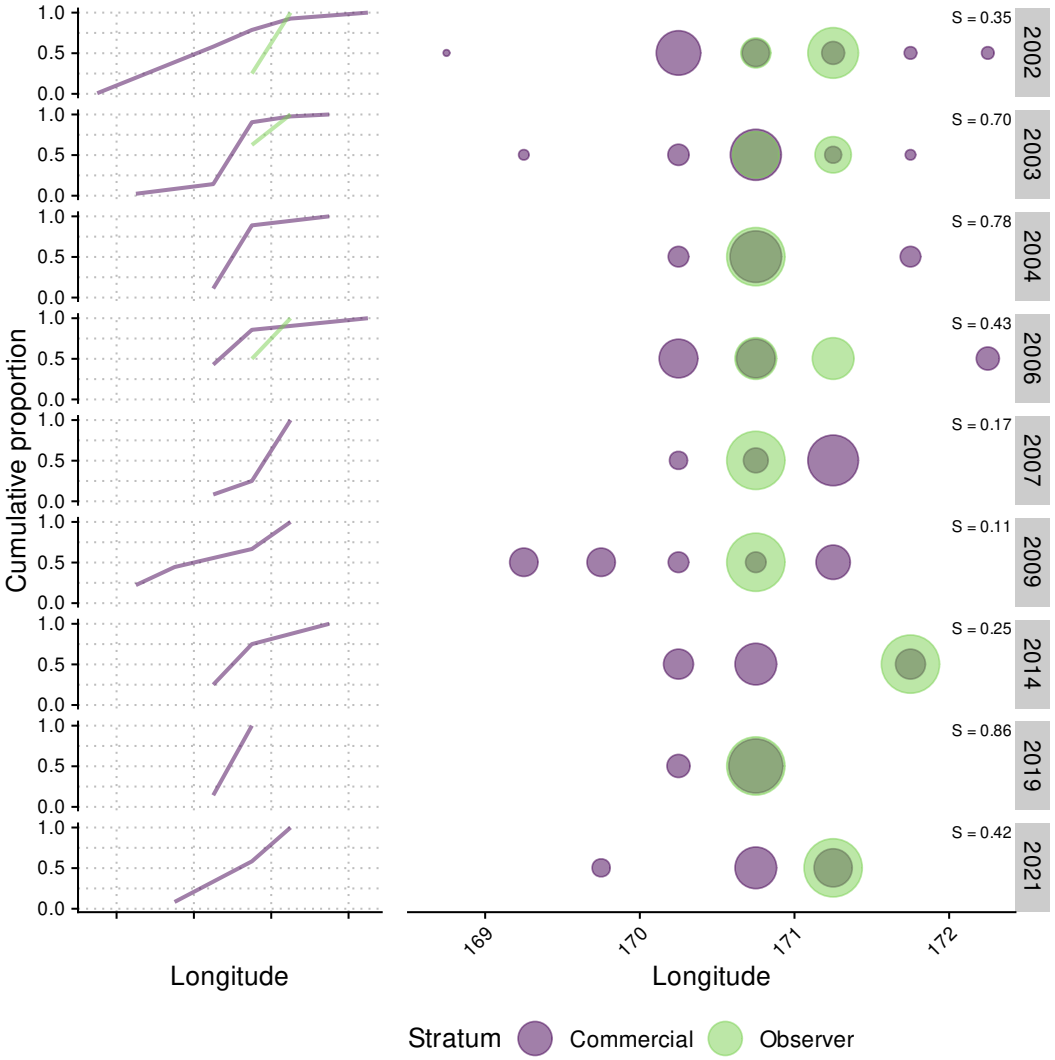


Figure 181: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RBY 7, where the rubyfish catch exceeded the 40kg threshold, in 2002 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

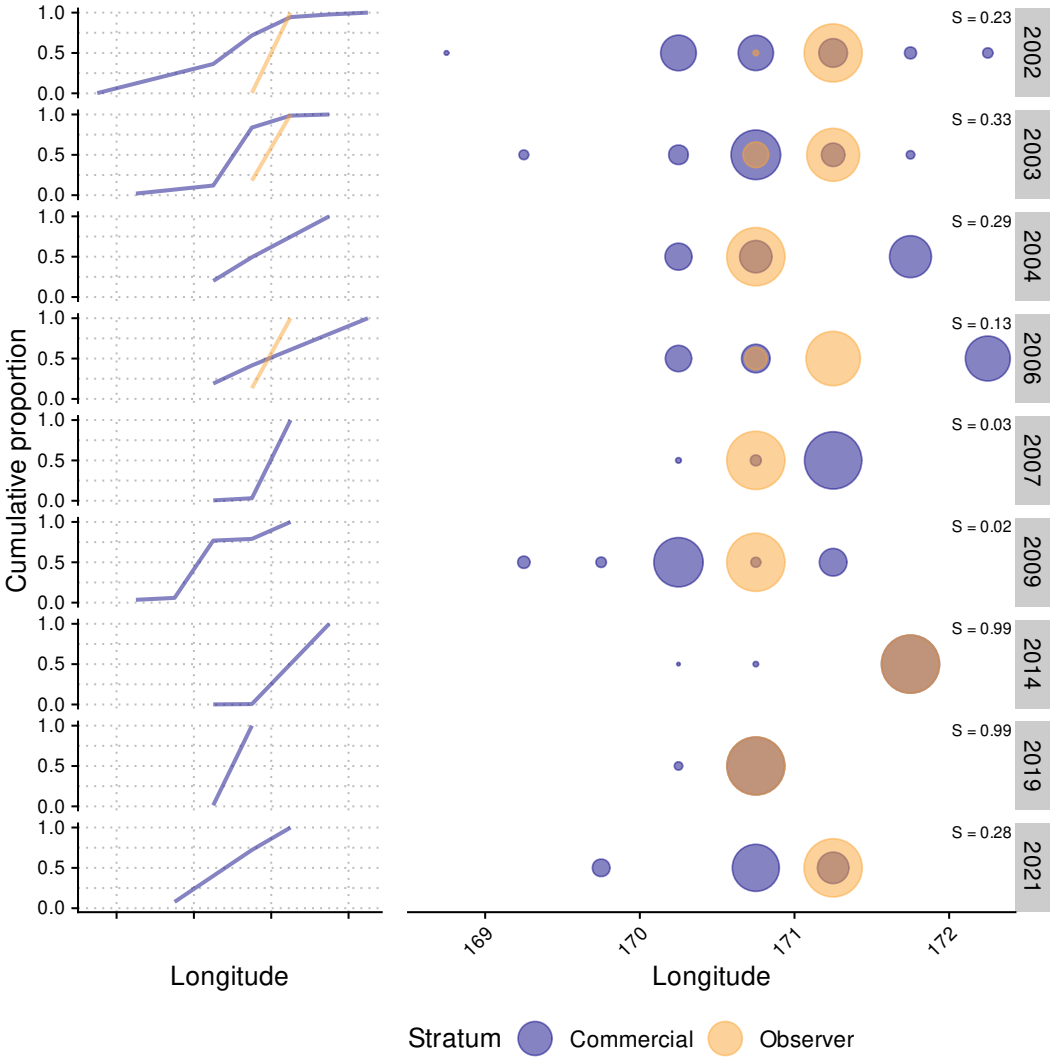


Figure 182: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RBY 7, from events where the rubyfish catch exceeded the 40kg threshold, in 2002 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

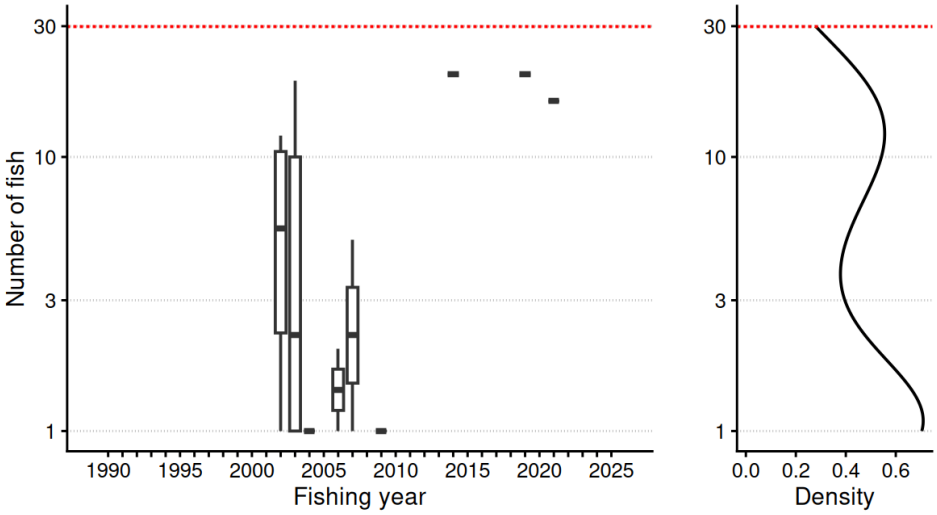


Figure 183: **Length-frequency sample sizes for observed fishing events in RBY 7 where rubyfish were sampled. The red dashed line indicates a sample size of 30 fish.**

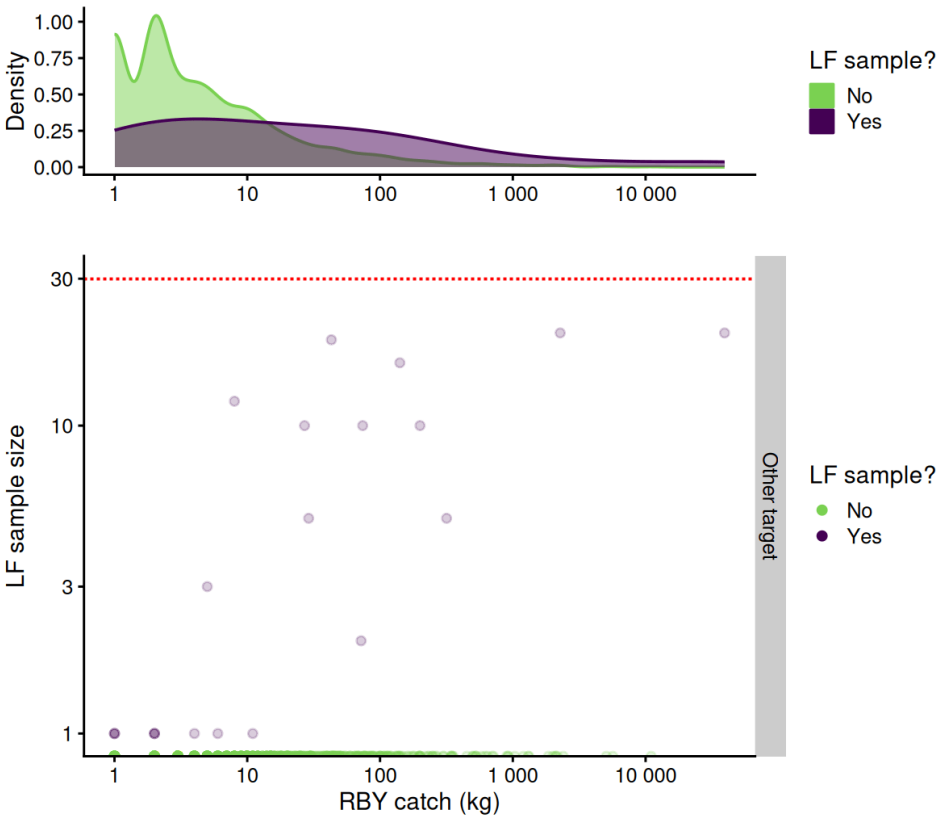


Figure 184: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in RBY 7 in relation to the total rubyfish catch from an event, separately for rubyfish target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.3.3.2 Otolith samples

Table 18: Otolith samples of rubyfish from the RBY 7 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2023. Positive fishing events are those where the catch of rubyfish exceeded a potential sampling threshold of 40 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	12	0	0	0.00
1991	3	0	0	0.00
1992	13	0	0	0.00
1993	18	0	0	0.00
1994	4	0	0	0.00
1995	9	0	0	0.00
1997	5	0	0	0.00
1998	5	0	0	0.00
1999	2	0	0	0.00
2000	13	0	0	0.00
2001	10	0	0	0.00
2002	22	0	0	0.00
2003	13	0	0	0.00
2004	9	0	0	0.00
2005	14	0	0	0.00
2006	7	0	0	0.00
2007	12	0	0	0.00
2008	9	0	0	0.00
2009	9	0	0	0.00
2010	11	0	0	0.00
2011	13	0	0	0.00
2012	11	0	0	0.00
2013	5	0	0	0.00
2014	4	1	5	25.00
2015	6	0	0	0.00
2016	5	0	0	0.00
2017	13	0	0	0.00
2018	4	0	0	0.00
2019	7	1	5	14.29
2020	4	0	0	0.00
2021	12	1	5	8.33
2022	1	0	0	0.00
2023	2	0	0	0.00

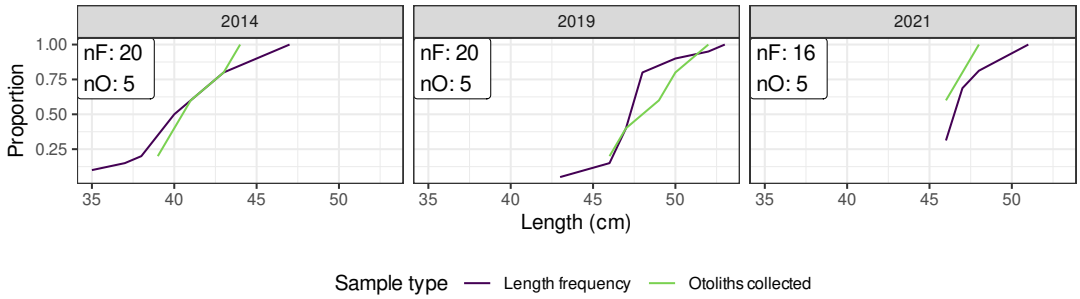


Figure 185: Cumulative distributions of the length of fish in the length frequency and otolith samples of rubyfish in the RBY 7 Trawl fishery for the 2014 to 2021 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.3.3.3 Catch quantification

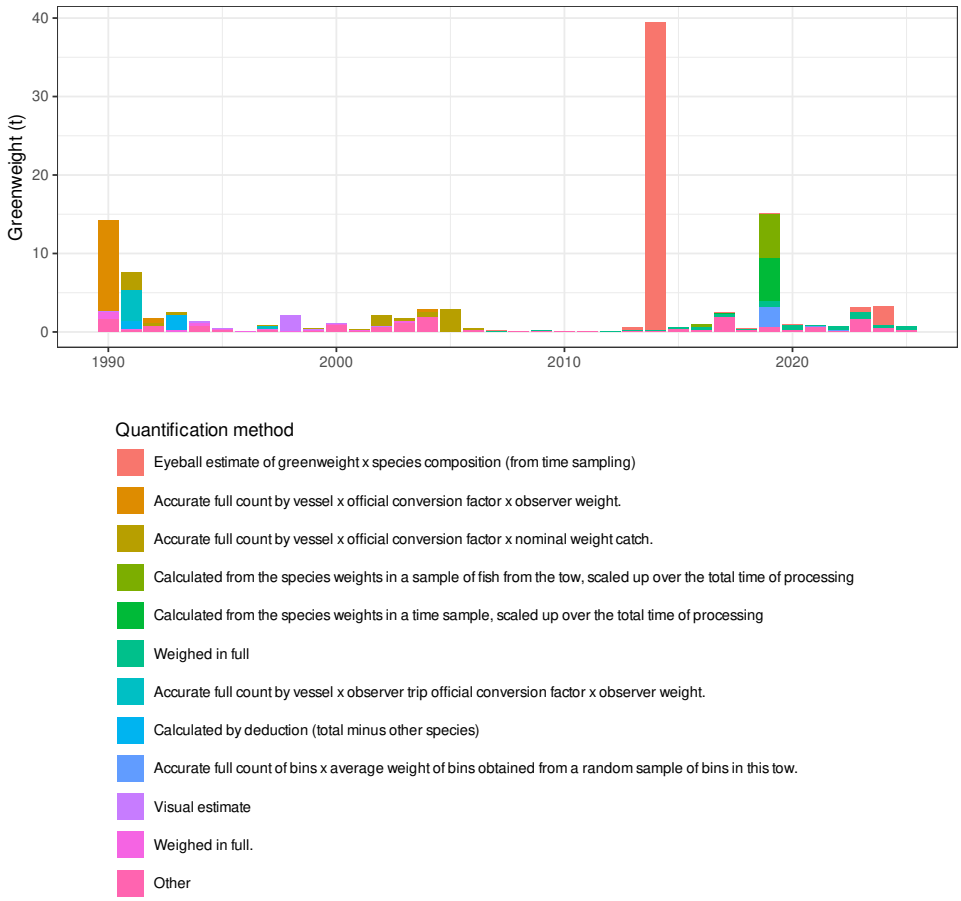


Figure 186: Methods used by observers to quantify the catch of rubyfish in the RBY 7 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.4 RIB stocks

Observer sampling of ribaldo is considered with respect to the ribaldo Quota Management Areas.

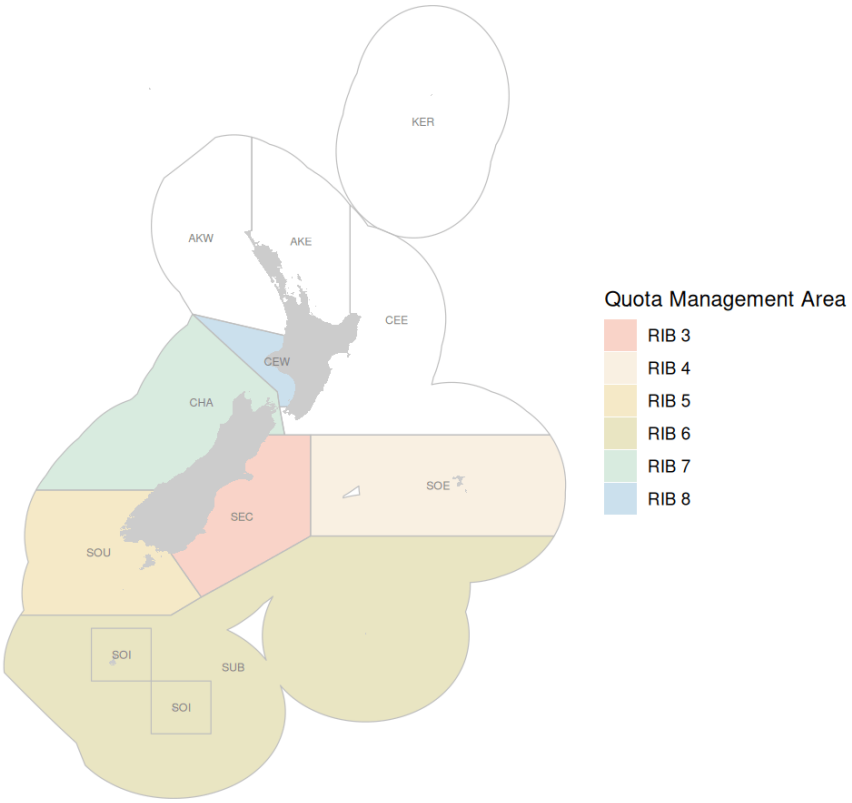


Figure 187: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for ribaldo (coloured areas, per legend).

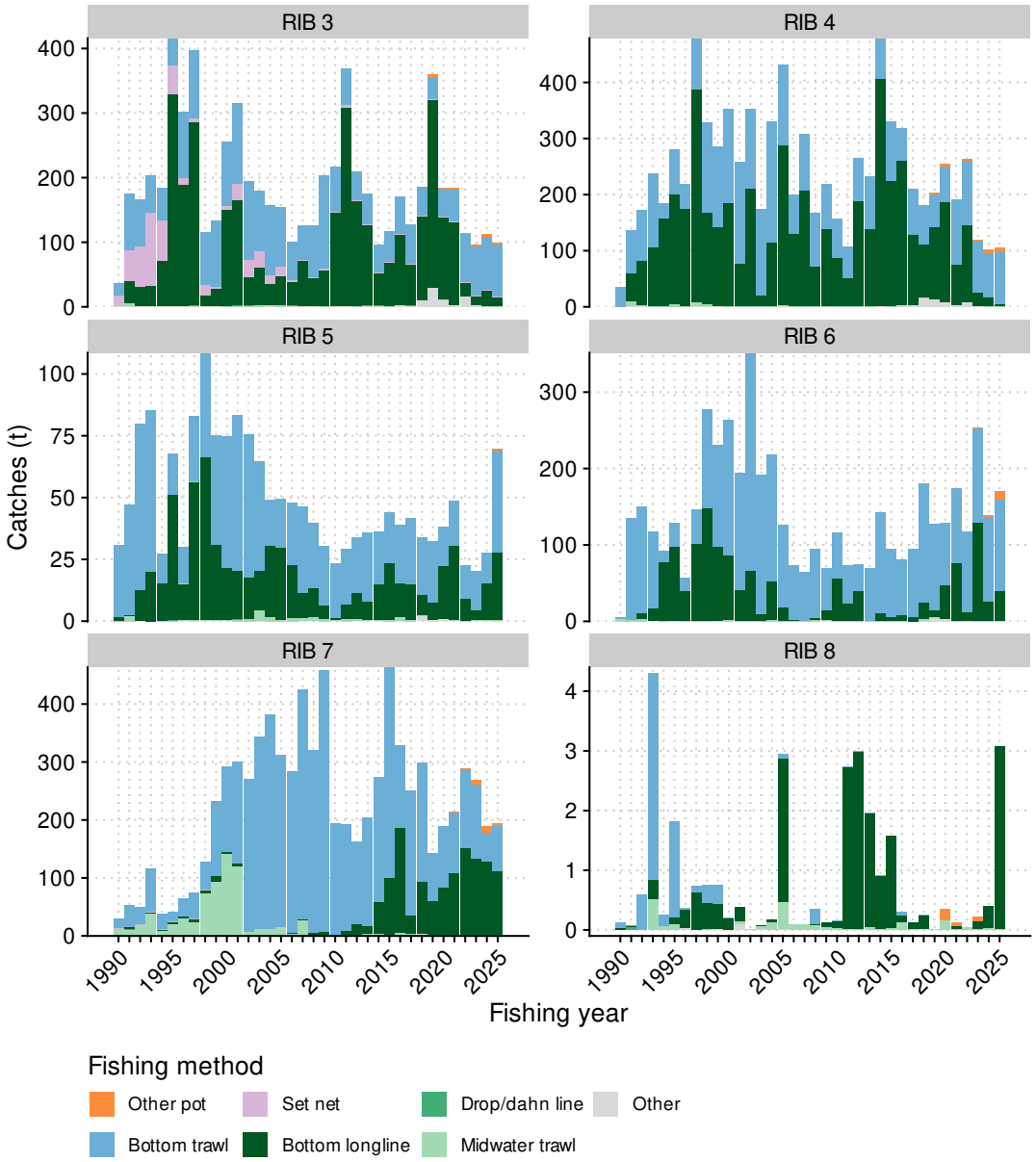


Figure 188: **Catches of ribaldo by fishing method, for events within the ribaldo Quota Management Areas. Methods grouped as Other include: BPT, BS, CP, DS, FP, HL, L, MPT, OCP, PRB, PRM, PSH, RLP, SJ, SLL, T, TL.**

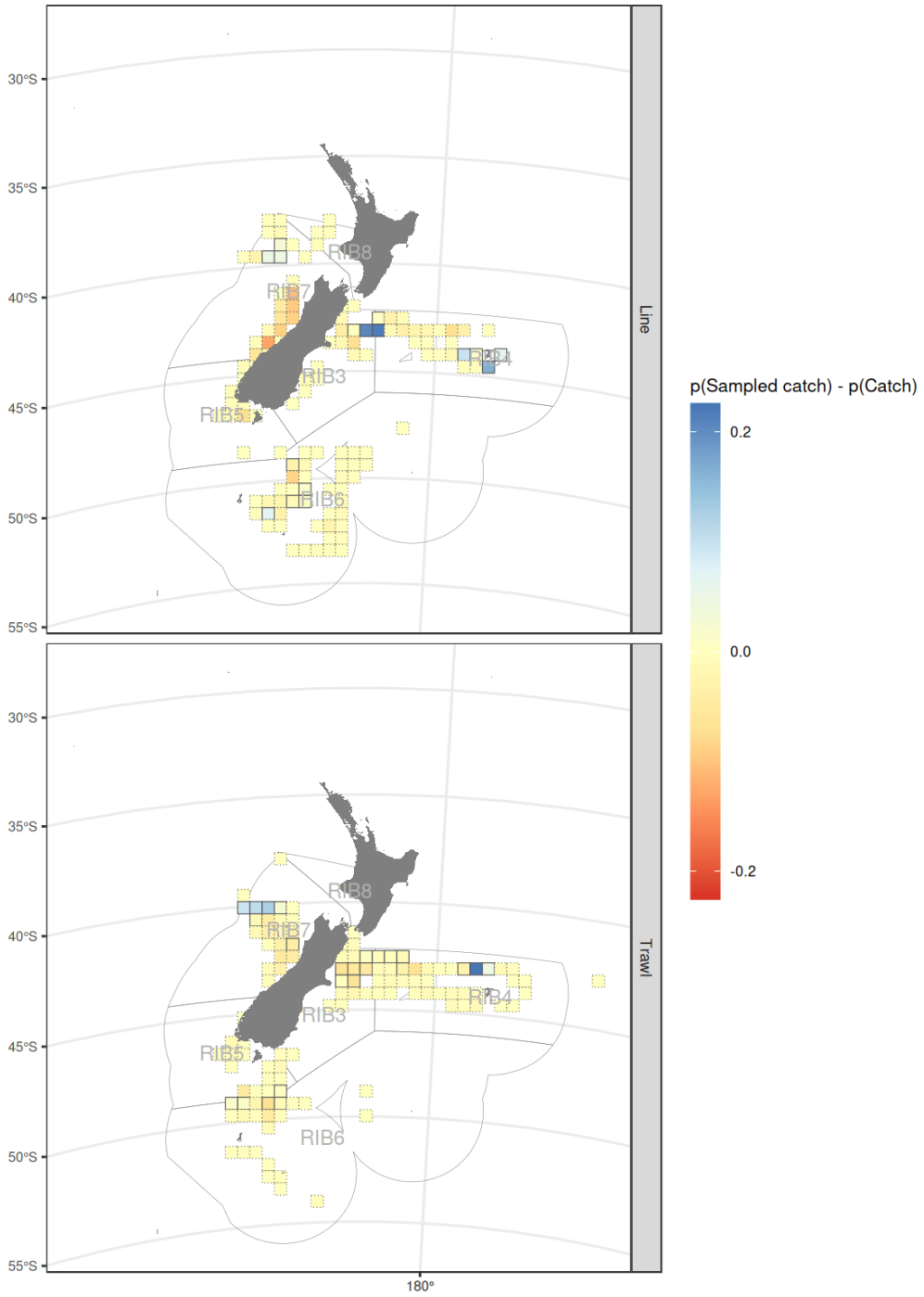


Figure 189: Differences in the relative proportions of catch and sampled catch for ribaldo during 2021–2025. Cells with a dotted border had no sampling.

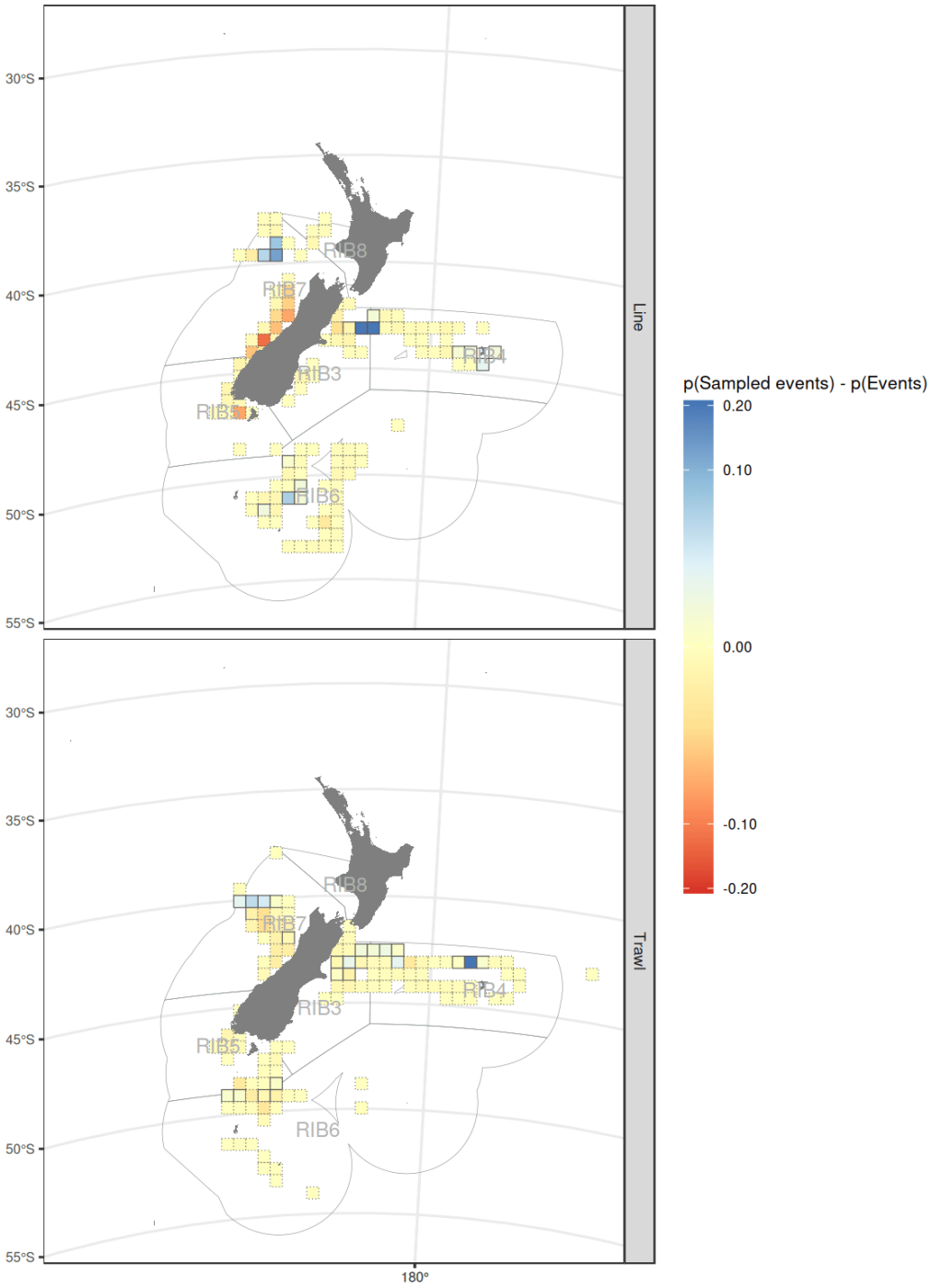


Figure 190: Differences in the relative proportions of events meeting the sampling threshold and sampled events for ribaldo during 2021–2025. Cells with a dotted border had no sampling.

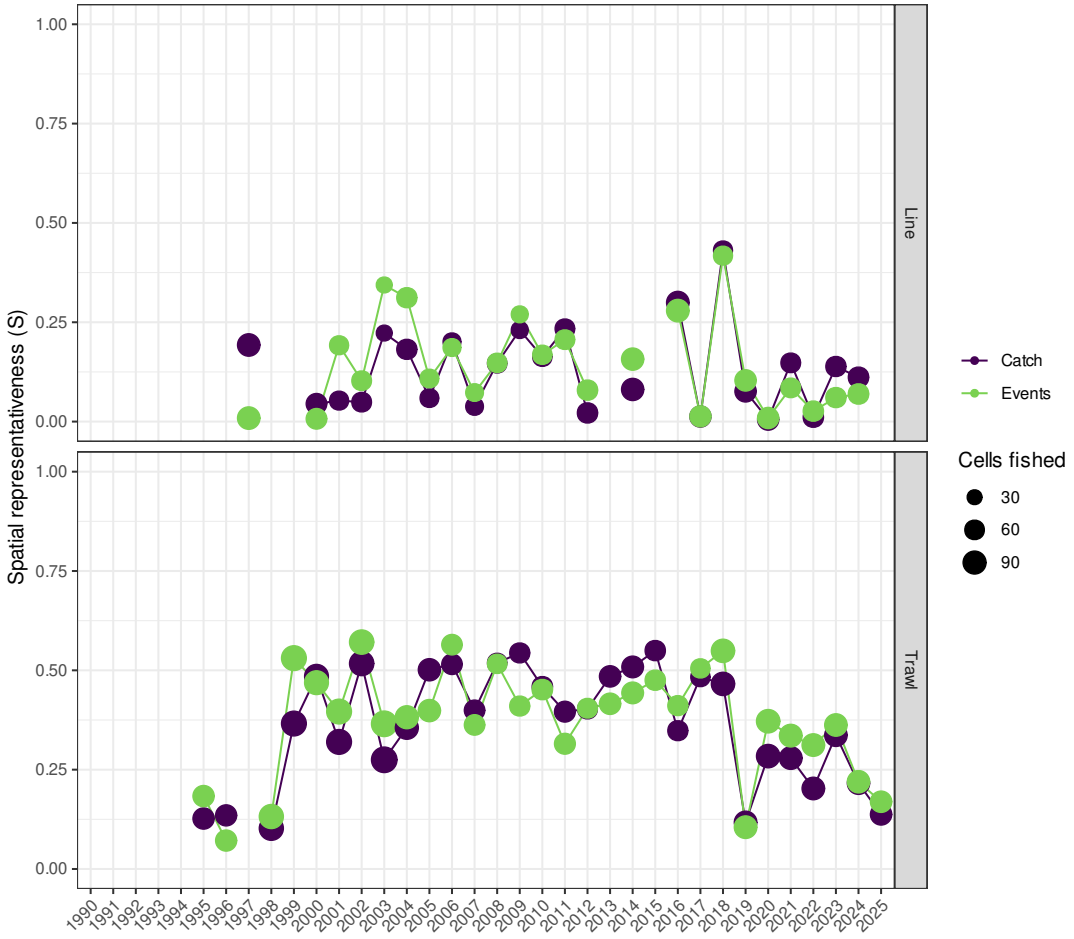


Figure 191: Spatial representativeness of observer sampling of ribaldo by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.

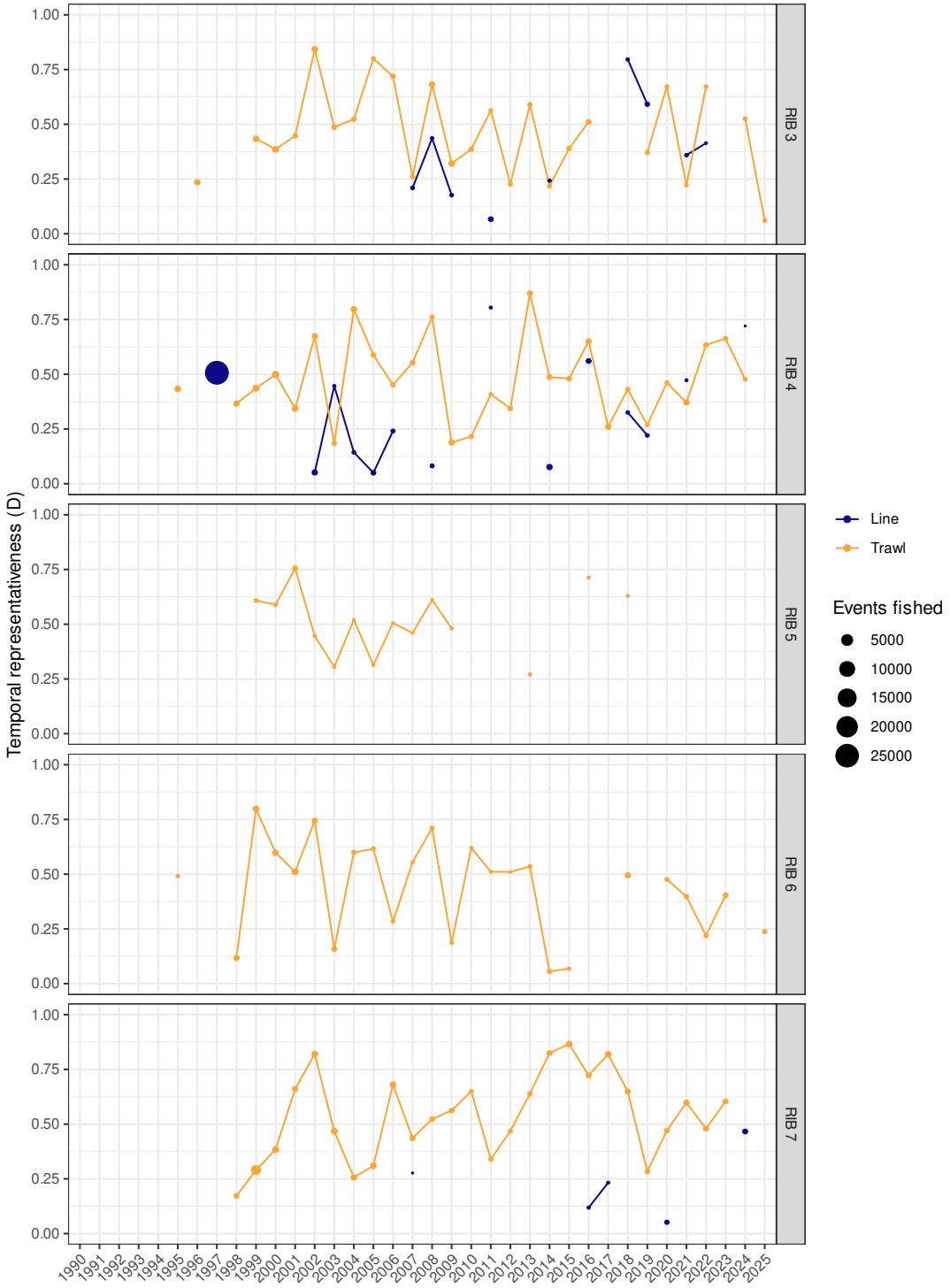


Figure 192: Temporal representativeness of observer sanpling of ribaldo by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.4.1 RIB 3: Line fishery

2.4.1.1 Length-frequency samples

Table 19: Length-frequency samples of ribaldo from the RIB 3 Line fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	31	0	0	0.00
1991	277	0	0	0.00
1992	434	0	0	0.00
1993	614	0	0	0.00
1994	247	0	0	0.00
1995	522	0	0	0.00
1996	512	0	0	0.00
1997	441	0	0	0.00
1998	90	0	0	0.00
1999	235	0	0	0.00
2000	859	0	0	0.00
2001	302	0	0	0.00
2002	6 867	0	0	0.00
2003	10 089	0	0	0.00
2004	20 070	0	0	0.00
2005	1 669	0	0	0.00
2006	187	0	0	0.00
2007	306	2	24	0.65
2008	215	3	24	1.40
2009	298	6	66	2.01
2010	431	0	0	0.00
2011	647	2	40	0.31
2012	279	0	0	0.00
2013	311	0	0	0.00
2014	208	5	62	2.40
2015	220	0	0	0.00
2016	225	0	0	0.00
2017	259	0	0	0.00
2018	232	22	295	9.48
2019	518	3	40	0.58
2020	401	0	0	0.00
2021	266	20	130	7.52
2022	96	1	20	1.04
2023	107	0	0	0.00
2024	188	0	0	0.00
2025	111	0	0	0.00

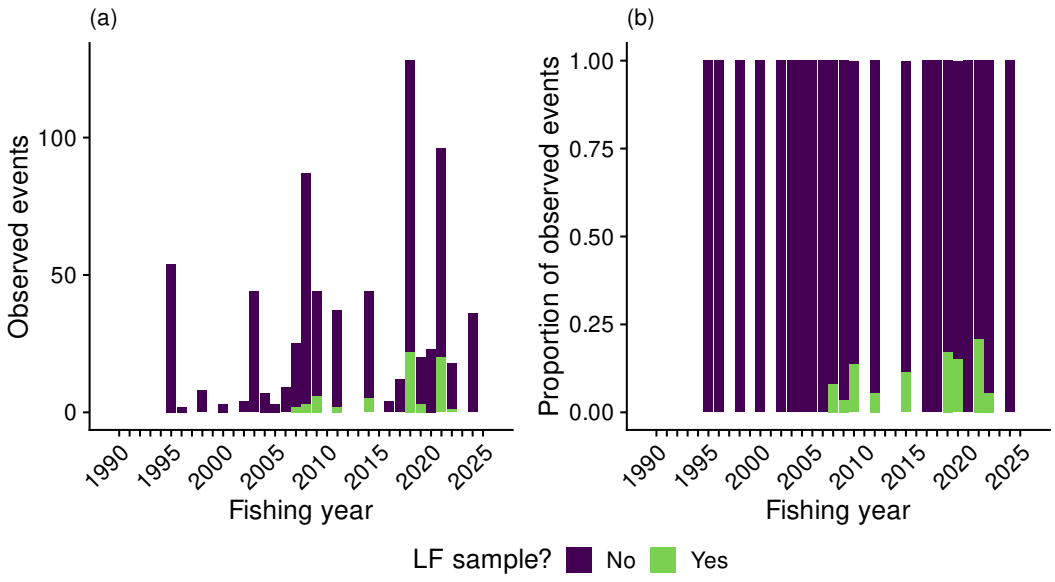


Figure 193: **(a) Observed Line fishing events, and (b) proportion of observed events, in RIB 3 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

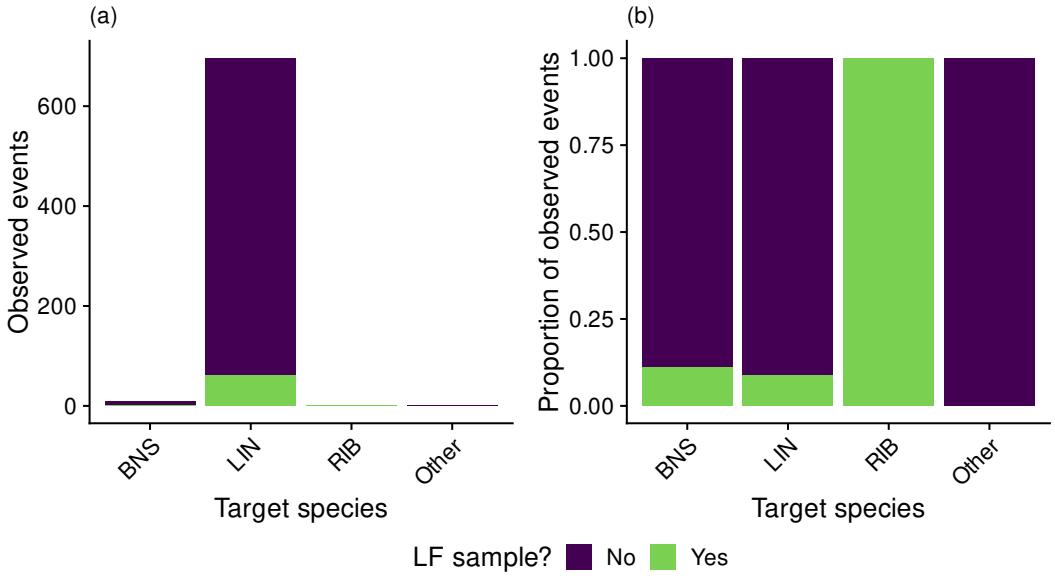


Figure 194: **(a) Observed Line fishing events, and (b) proportion of observed events, in RIB 3 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

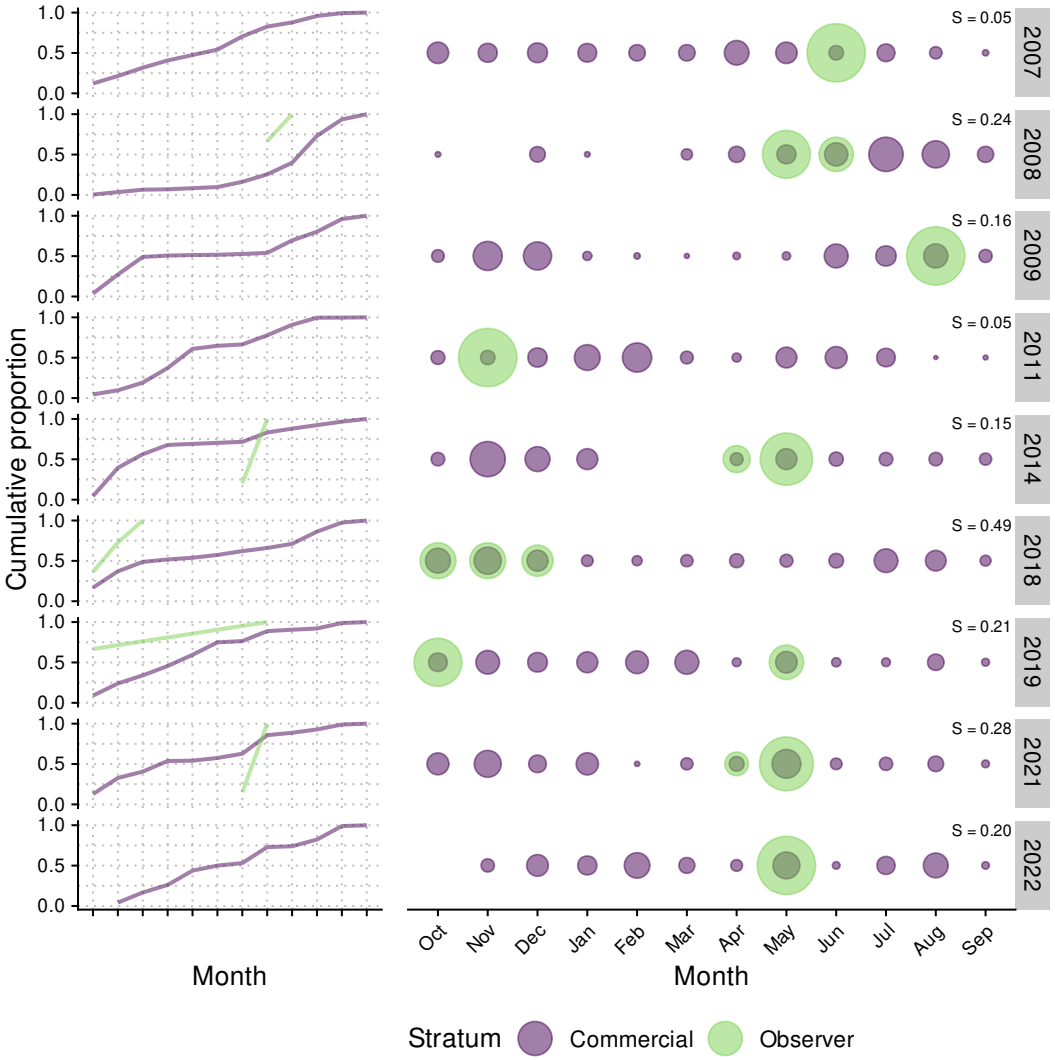


Figure 195: Monthly representativeness of observer sampling coverage of Line fishing events in RIB 3, where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

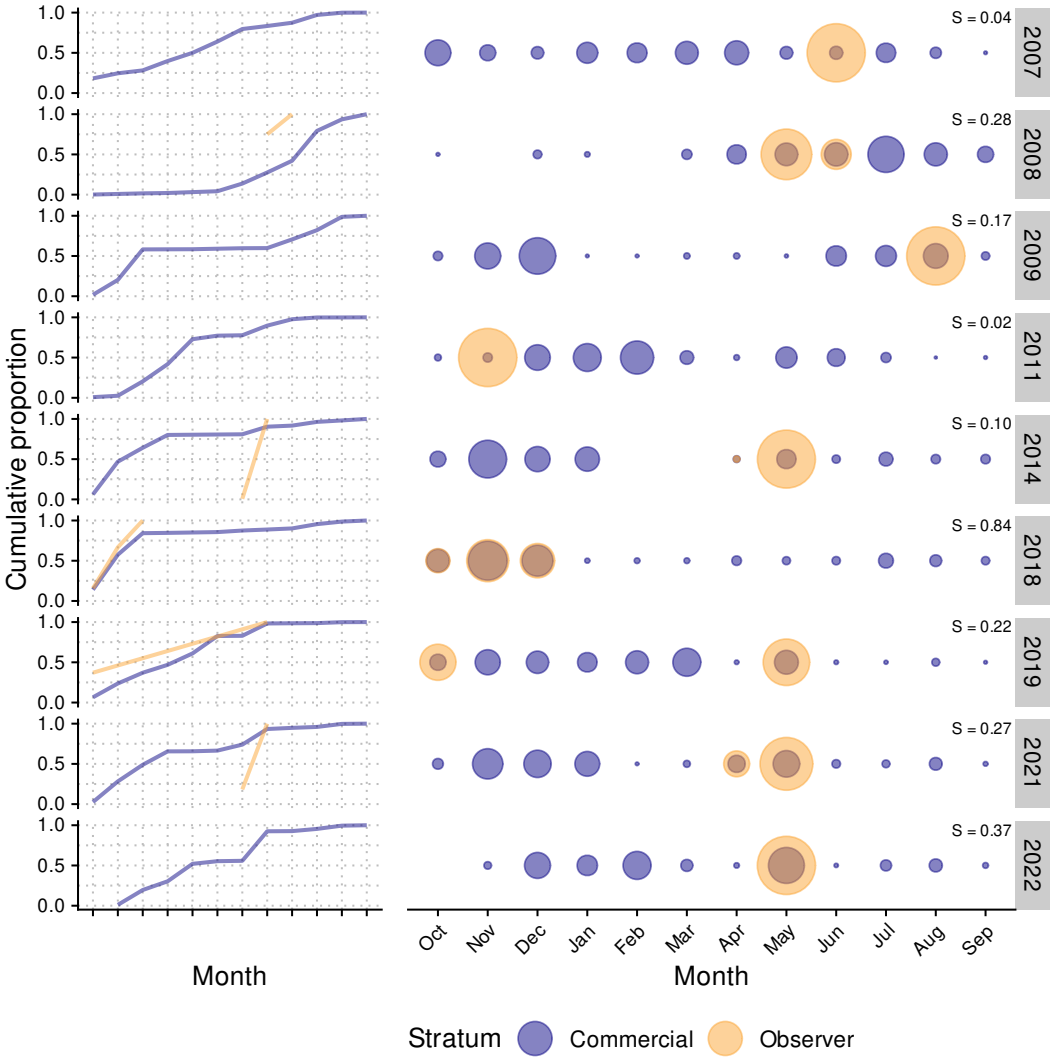


Figure 196: **Monthly representativeness of observer sampling coverage of Line catch in RIB 3, from events where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

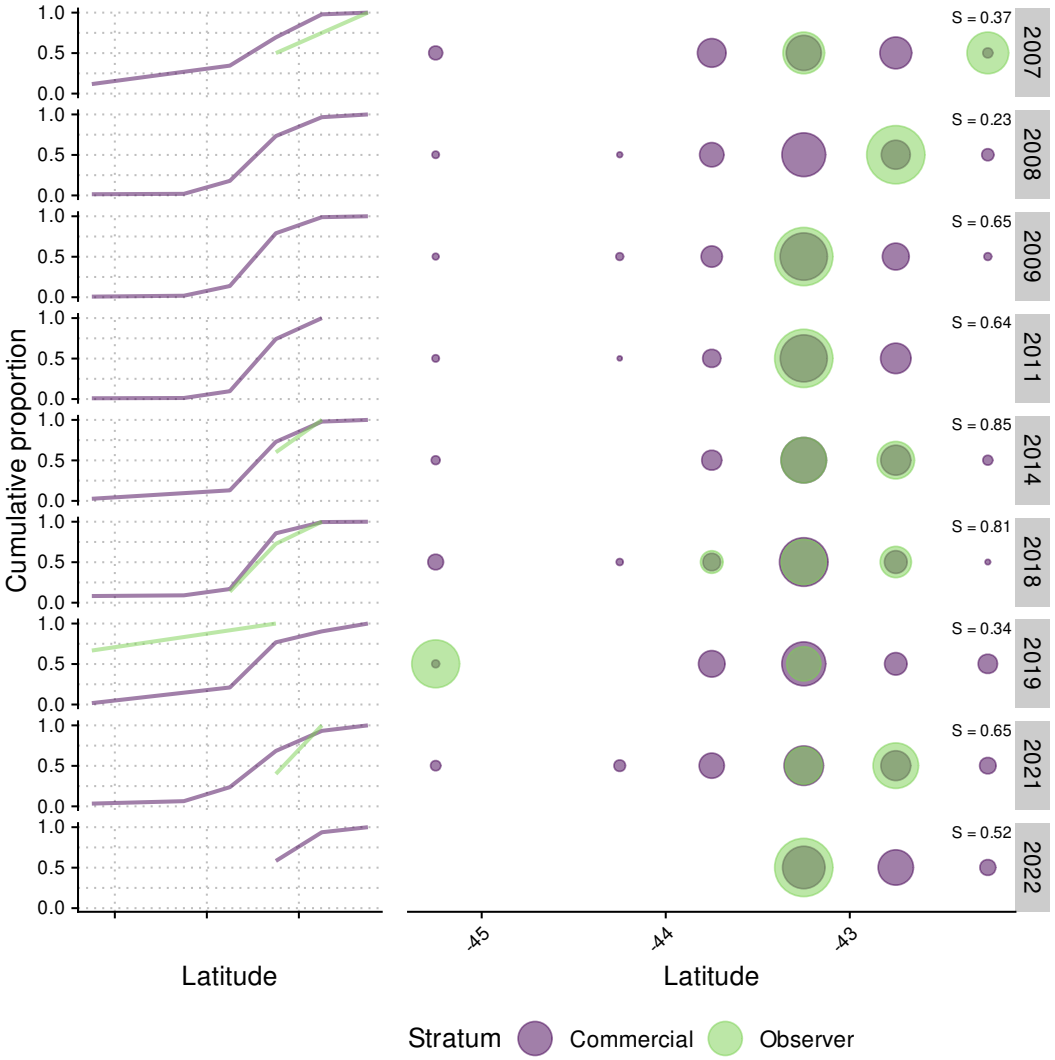


Figure 197: Latitudinal representativeness of observer sampling coverage of Line fishing events in RIB 3, where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

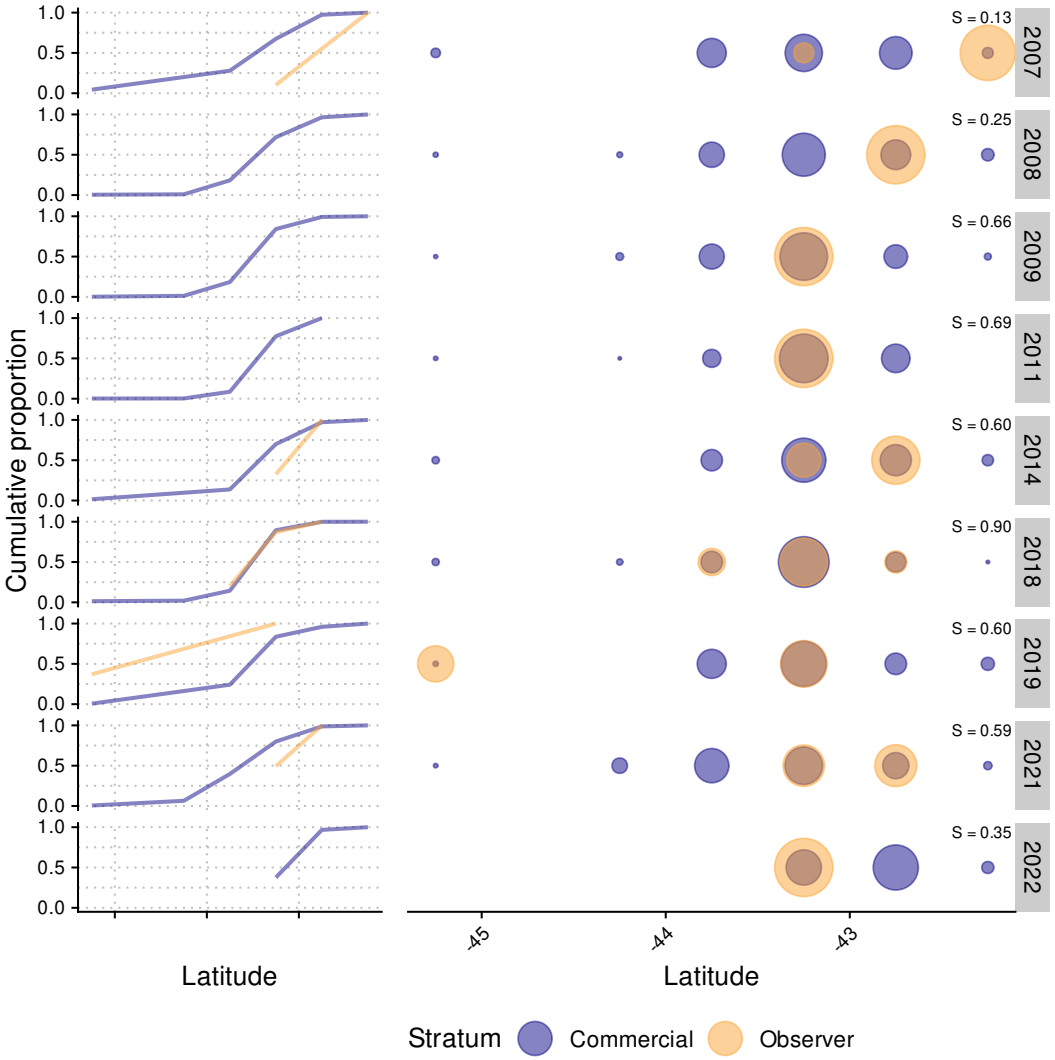


Figure 198: **Latitudinal representativeness of observer sampling coverage of Line catch in RIB 3, from events where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

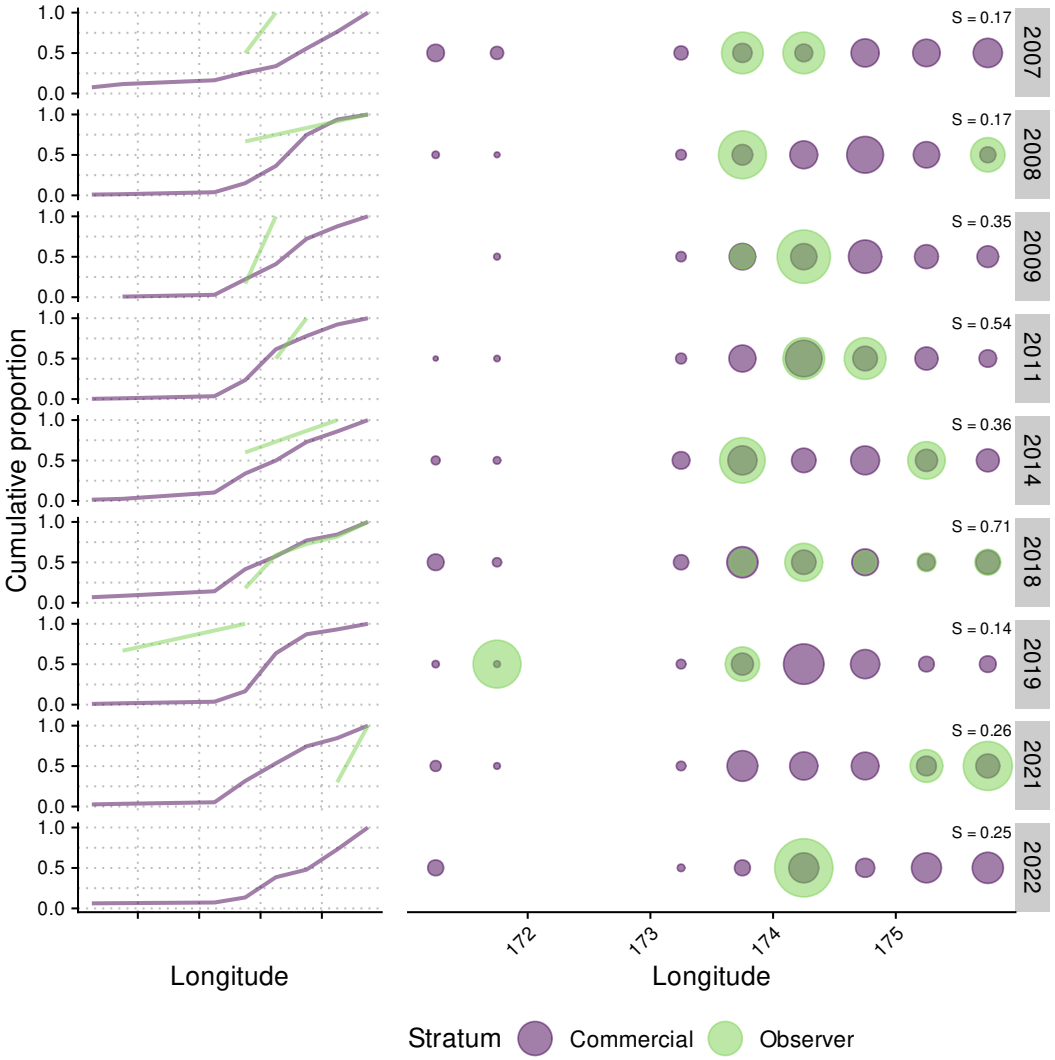


Figure 199: Longitudinal representativeness of observer sampling coverage of Line fishing events in RIB 3, where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

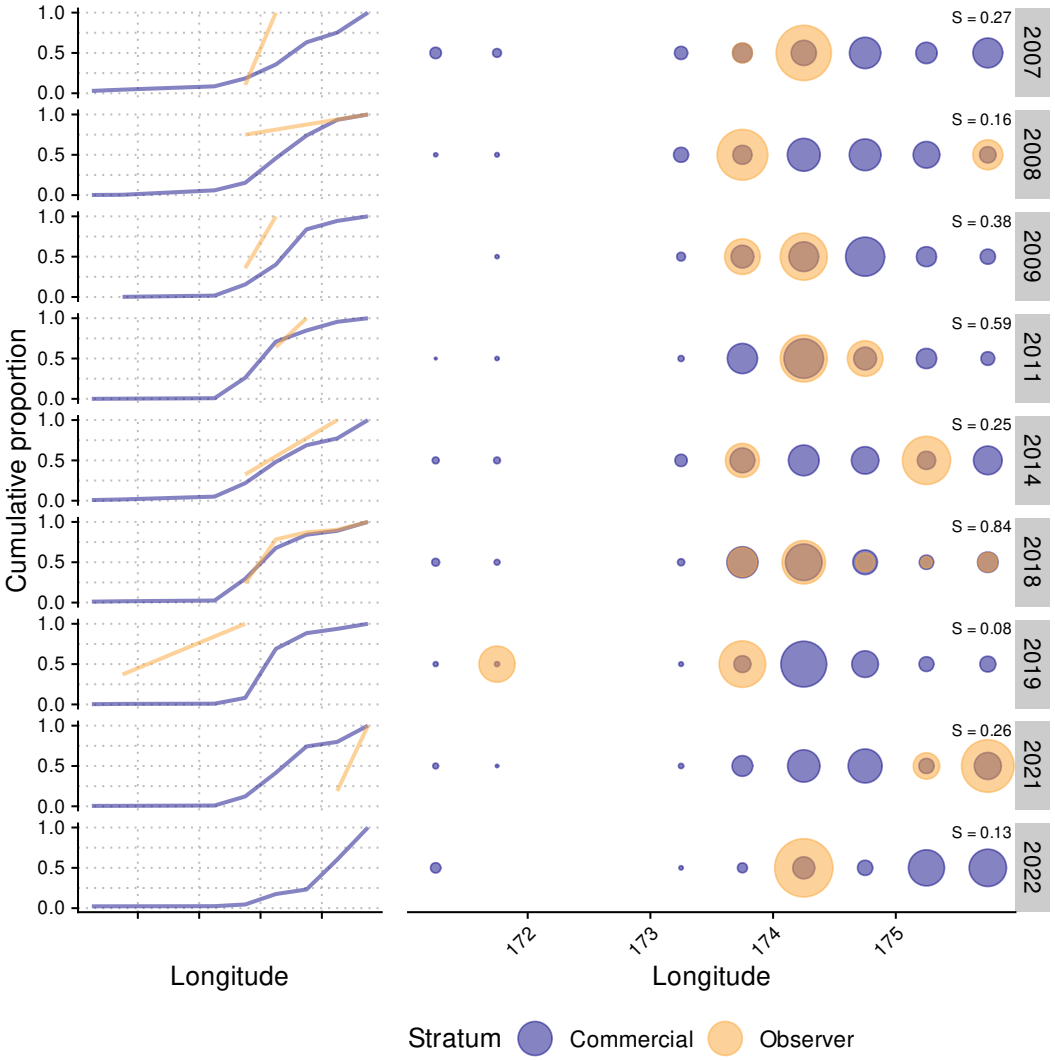


Figure 200: Longitudinal representativeness of observer sampling coverage of Line catch in RIB 3, from events where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

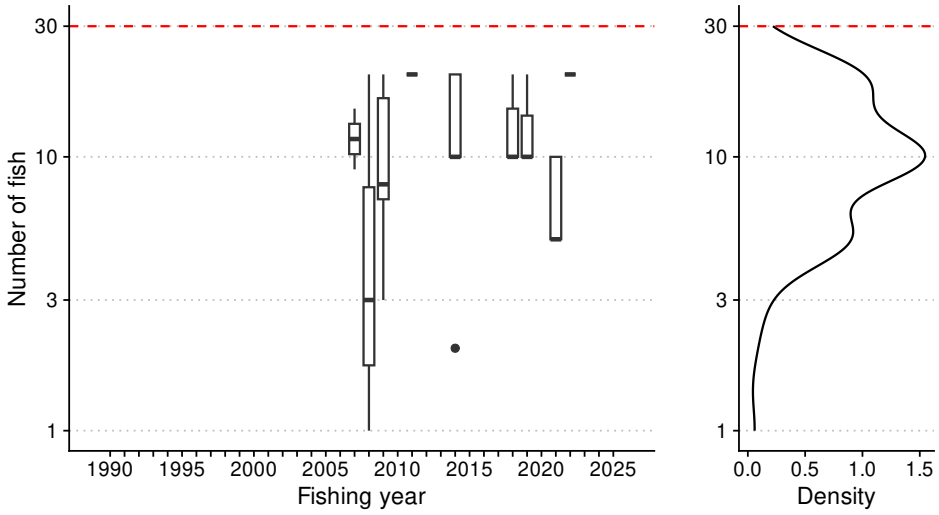


Figure 201: Length-frequency sample sizes for observed fishing events in RIB 3 where ribaldo were sampled. The red dashed line indicates a sample size of 30 fish.

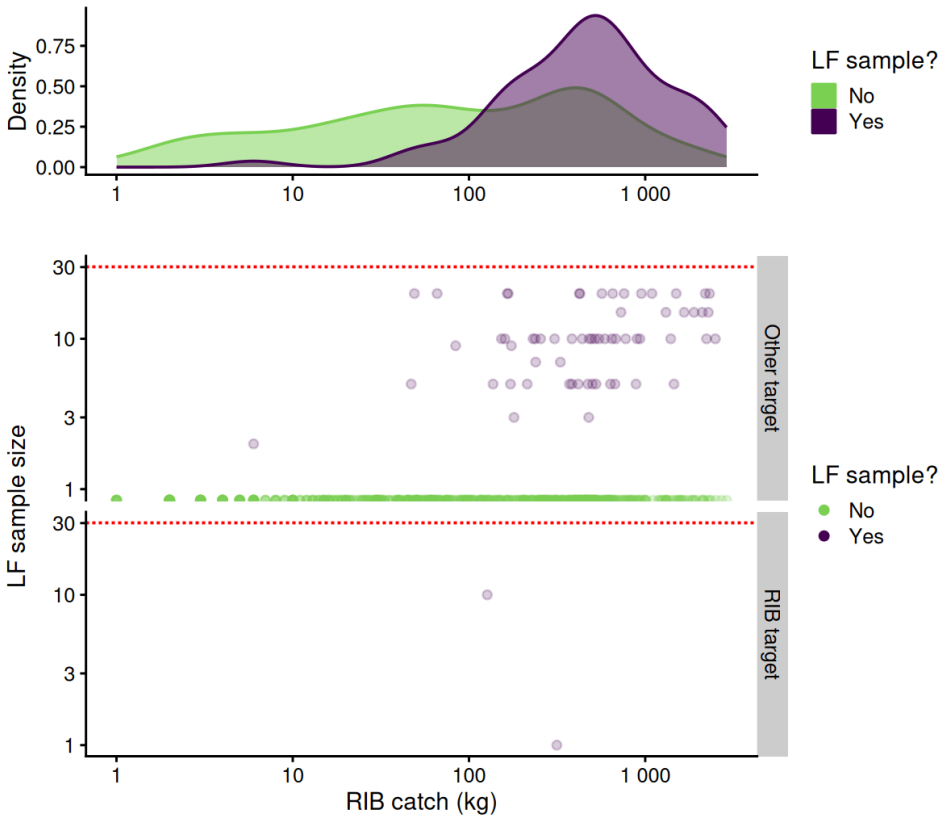


Figure 202: Length-frequency sample sizes (number of fish sampled) for observed fishing events in RIB 3 in relation to the total ribaldo catch from an event, separately for ribaldo target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.4.1.2 Catch quantification

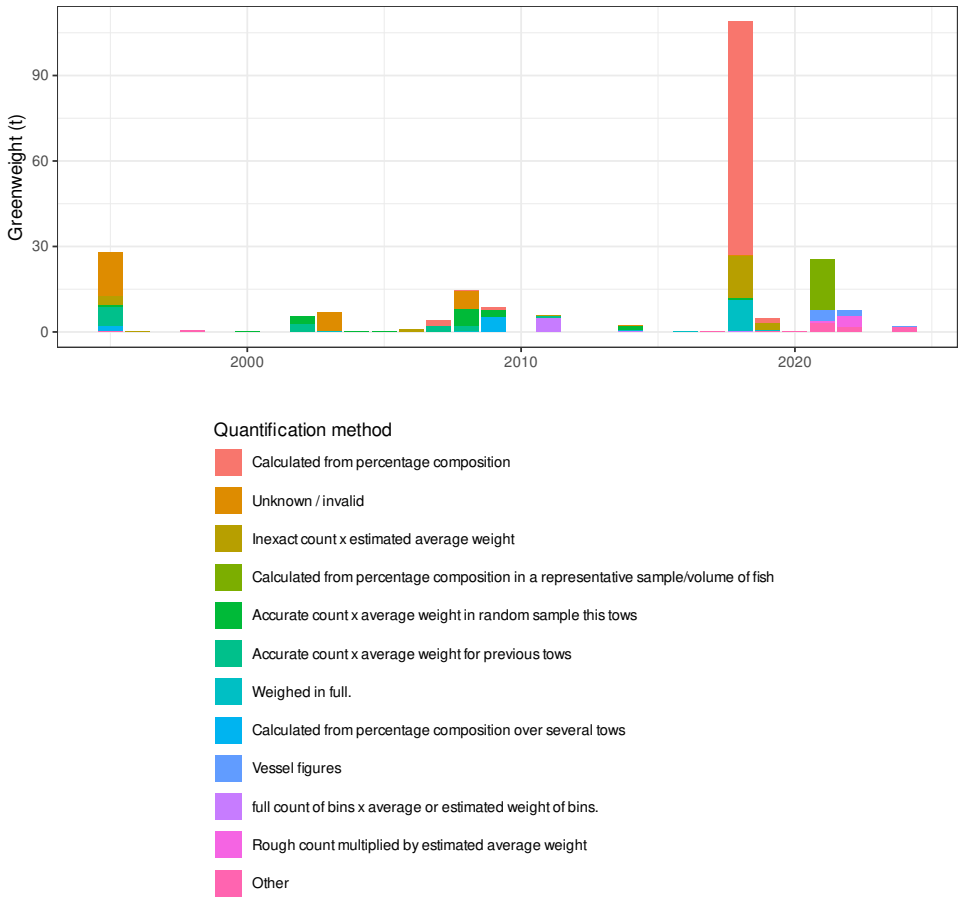


Figure 203: Methods used by observers to quantify the catch of ribaldo in the RIB 3 Line fishery. The legend lists the methods used in descending order of total catch.

2.4.2 RIB 3: Trawl fishery

2.4.2.1 Length-frequency samples

Table 20: Length-frequency samples of ribaldo from the RIB 3 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	92	0	0	0.00
1991	245	0	0	0.00
1992	208	0	0	0.00
1993	264	0	0	0.00
1994	275	0	0	0.00
1995	178	0	0	0.00
1996	502	1	11	0.20
1997	463	0	0	0.00
1998	338	0	0	0.00
1999	309	5	61	1.62
2000	299	8	22	2.68
2001	277	28	183	10.11
2002	205	34	133	16.59
2003	216	6	31	2.78
2004	197	48	334	24.37
2005	163	33	119	20.25
2006	77	18	115	23.38
2007	103	10	48	9.71
2008	219	23	196	10.50
2009	272	14	139	5.15
2010	98	22	71	22.45
2011	46	24	110	52.17
2012	59	1	1	1.69
2013	37	2	18	5.41
2014	52	7	73	13.46
2015	28	1	1	3.57
2016	23	2	39	8.70
2017	25	0	0	0.00
2018	206	0	0	0.00
2019	276	1	19	0.36
2020	244	2	45	0.82
2021	255	6	85	2.35
2022	306	2	30	0.65
2023	293	0	0	0.00
2024	339	8	117	2.36
2025	294	2	40	0.68

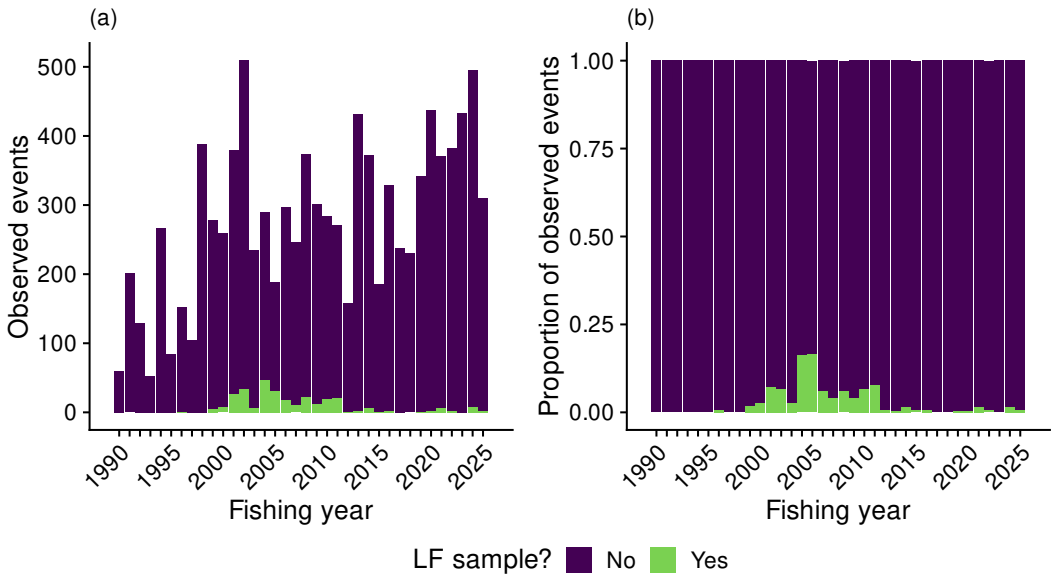


Figure 204: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RIB 3 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

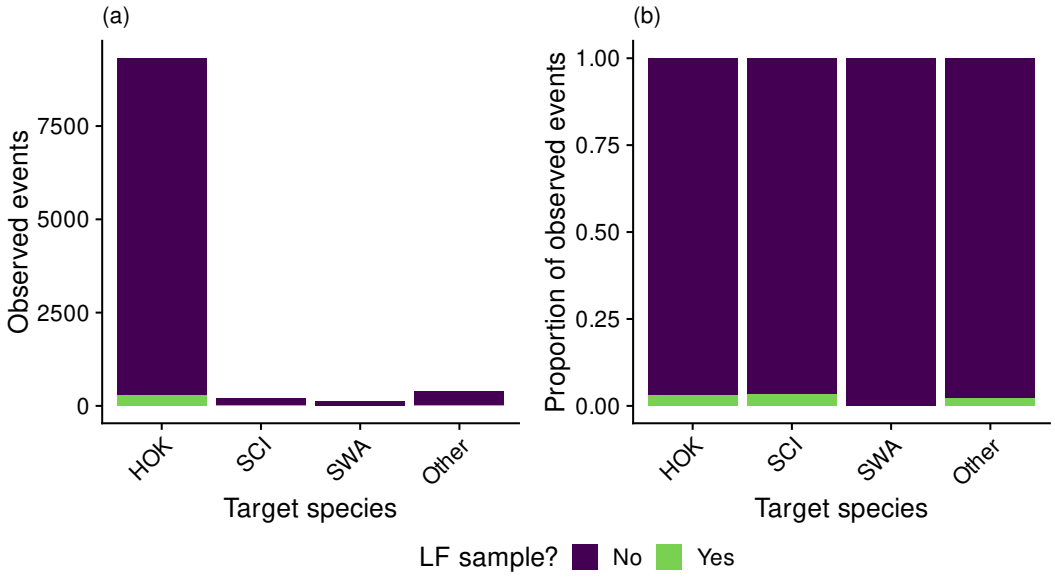


Figure 205: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RIB 3 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

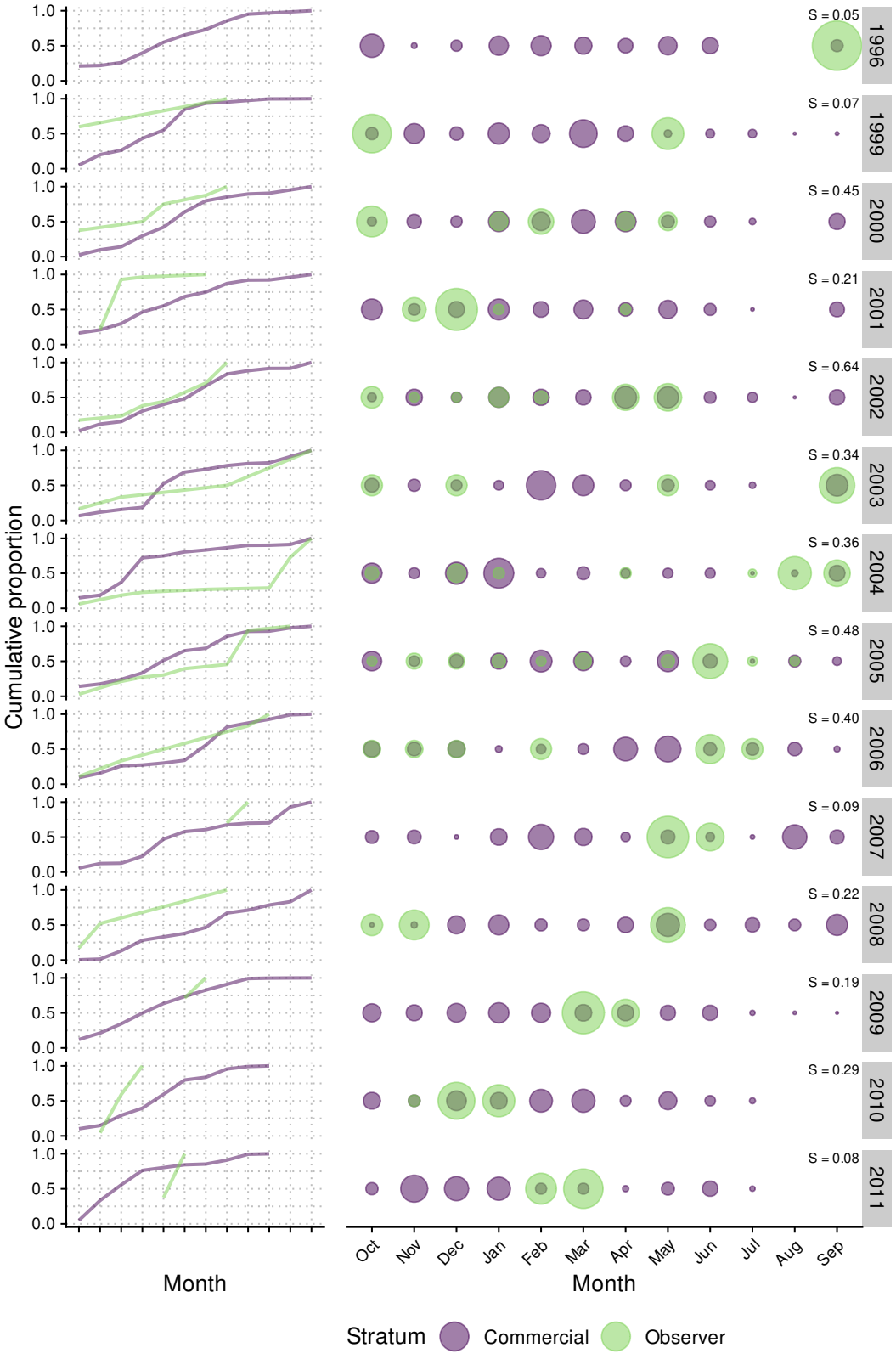


Figure 206: **Monthly representativeness of observer sampling coverage of Trawl fishing events in RIB 3, where the ribaldo catch exceeded the 20kg threshold, in 1996 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

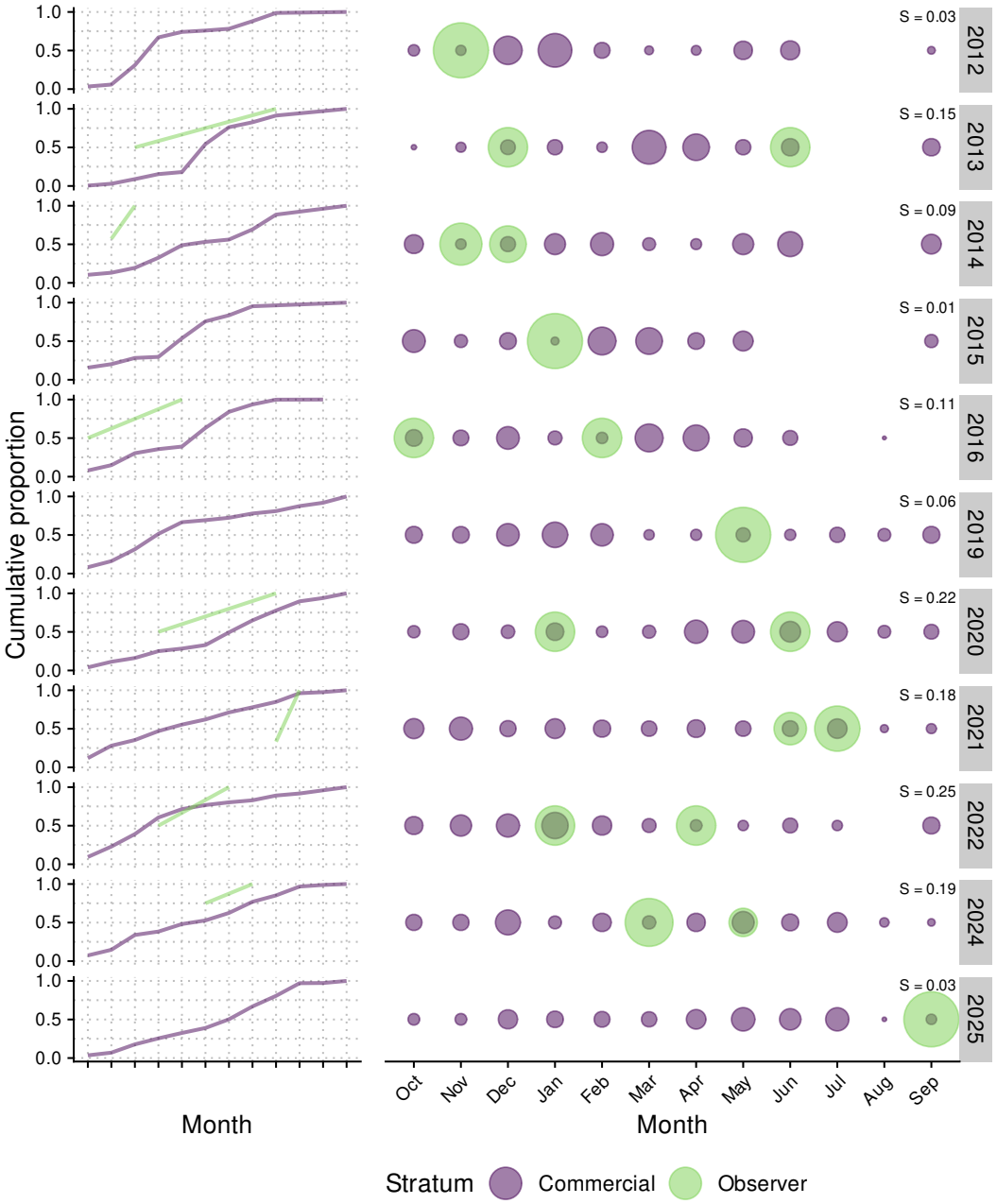


Figure 207: Monthly representativeness of observer sampling coverage of Trawl fishing events in RIB 3, where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

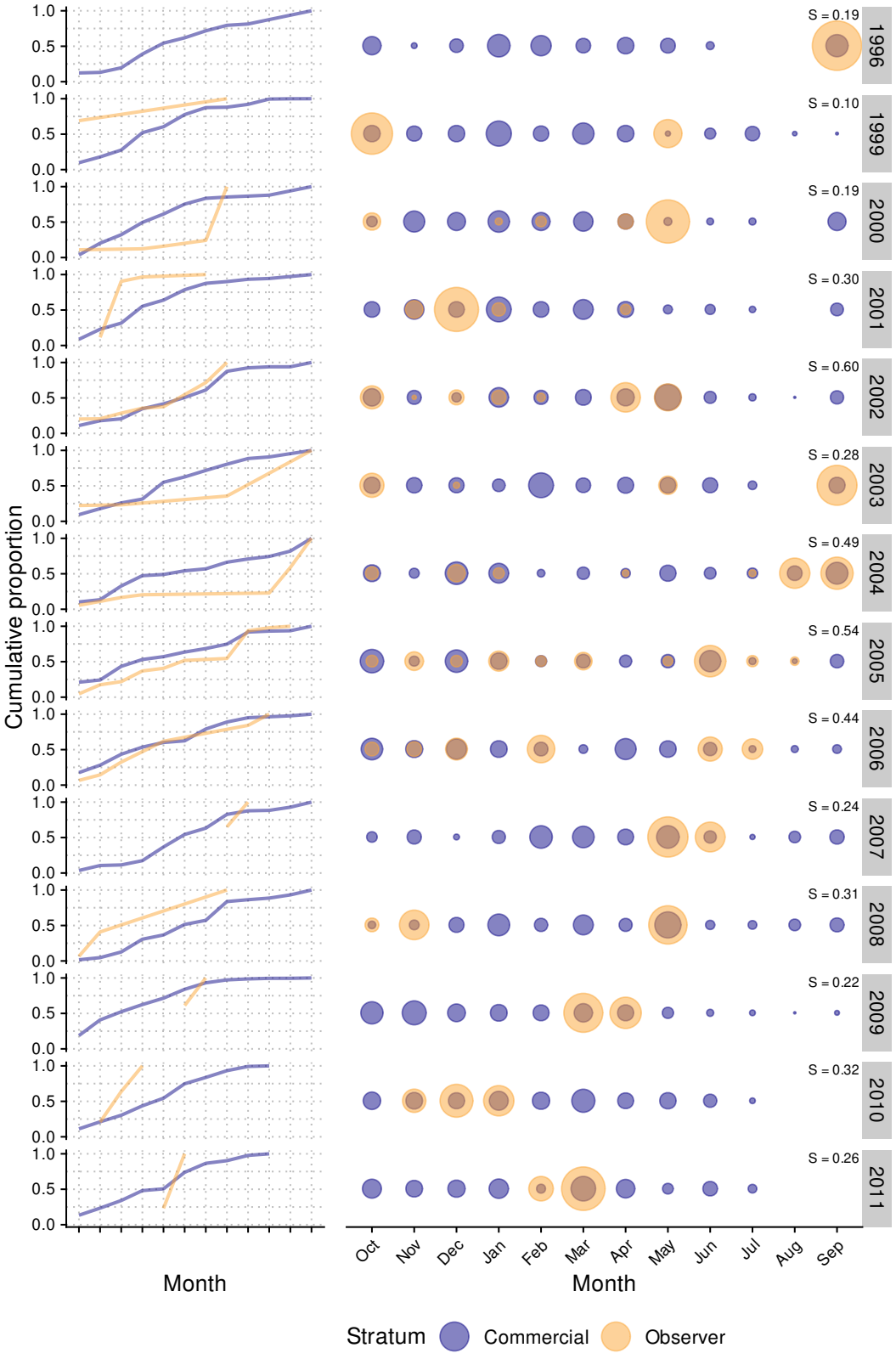


Figure 208: **Monthly representativeness of observer sampling coverage of Trawl catch in RIB 3, from events where the ribaldo catch exceeded the 20kg threshold, in 1996 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

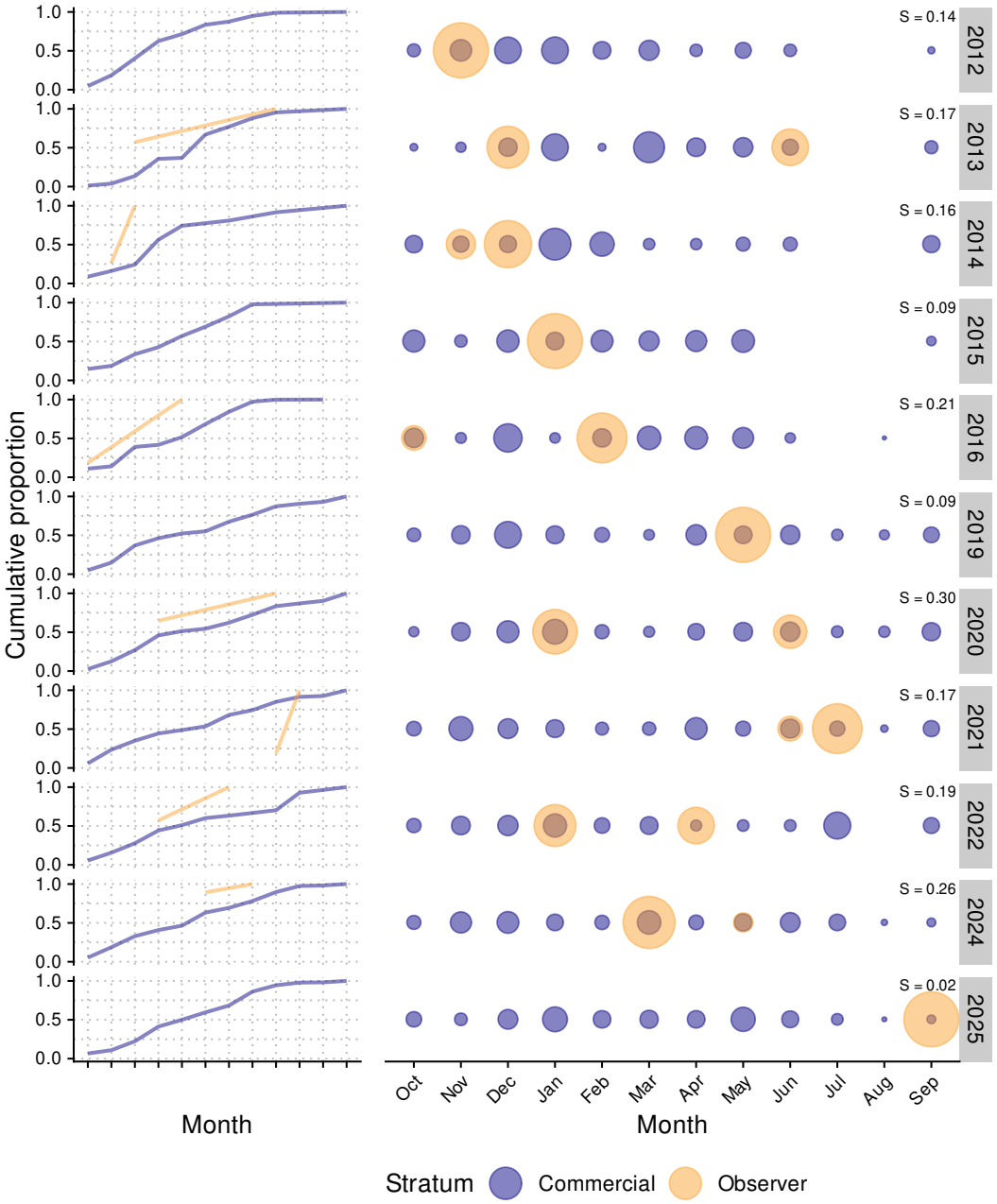


Figure 209: **Monthly representativeness of observer sampling coverage of Trawl catch in RIB 3, from events where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

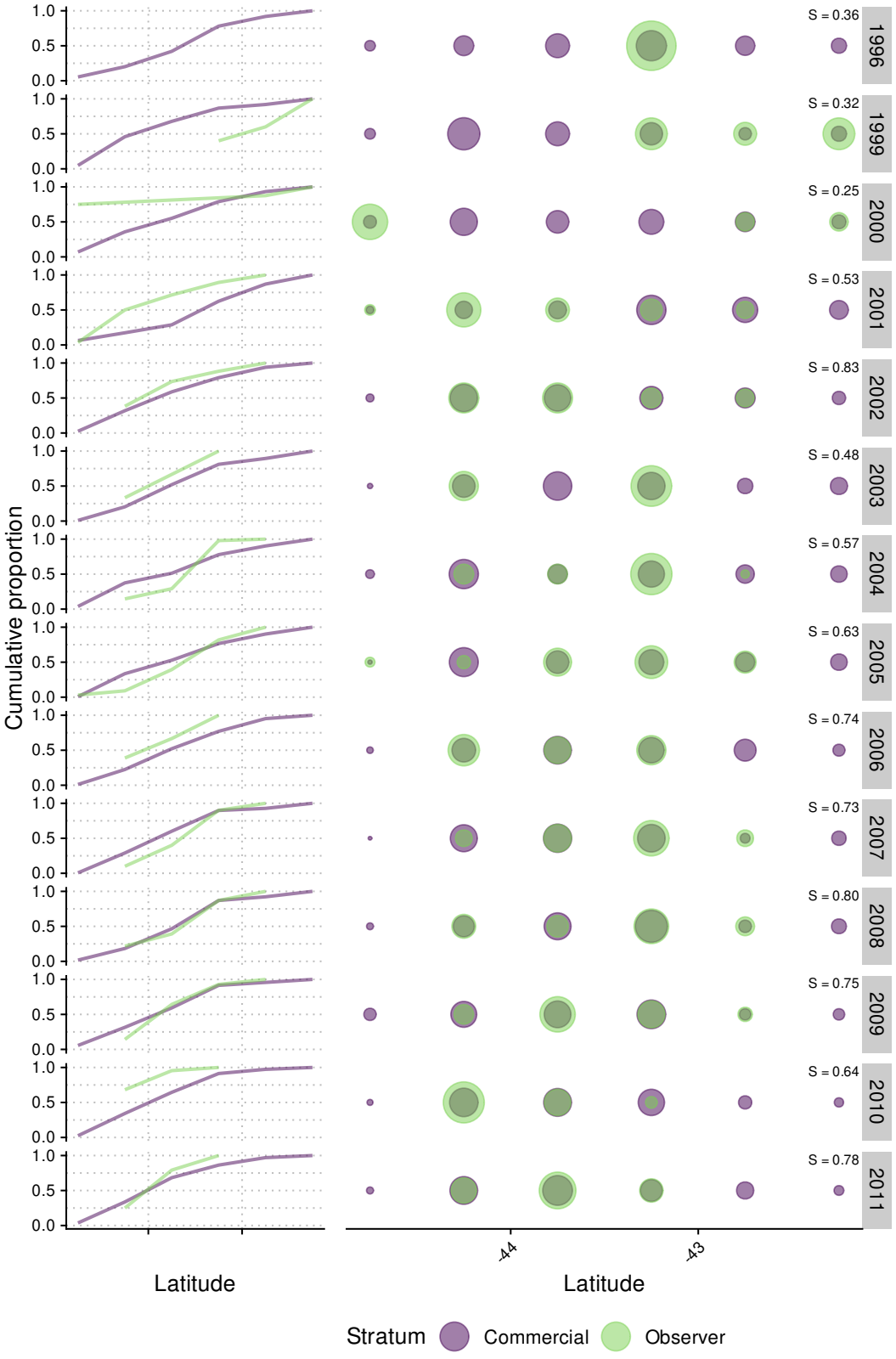


Figure 210: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 3, where the ribaldo catch exceeded the 20kg threshold, in 1996 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

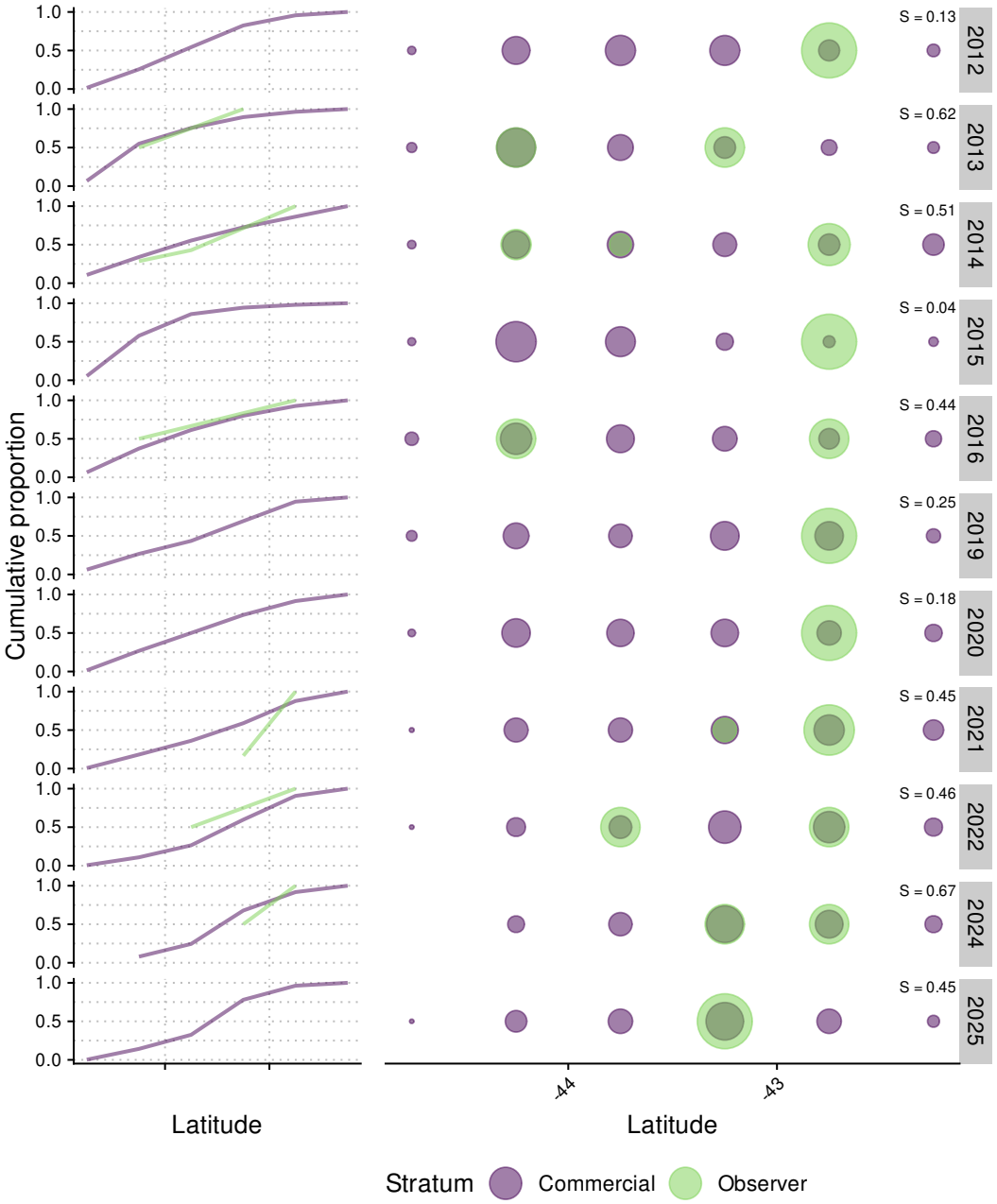


Figure 211: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 3, where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

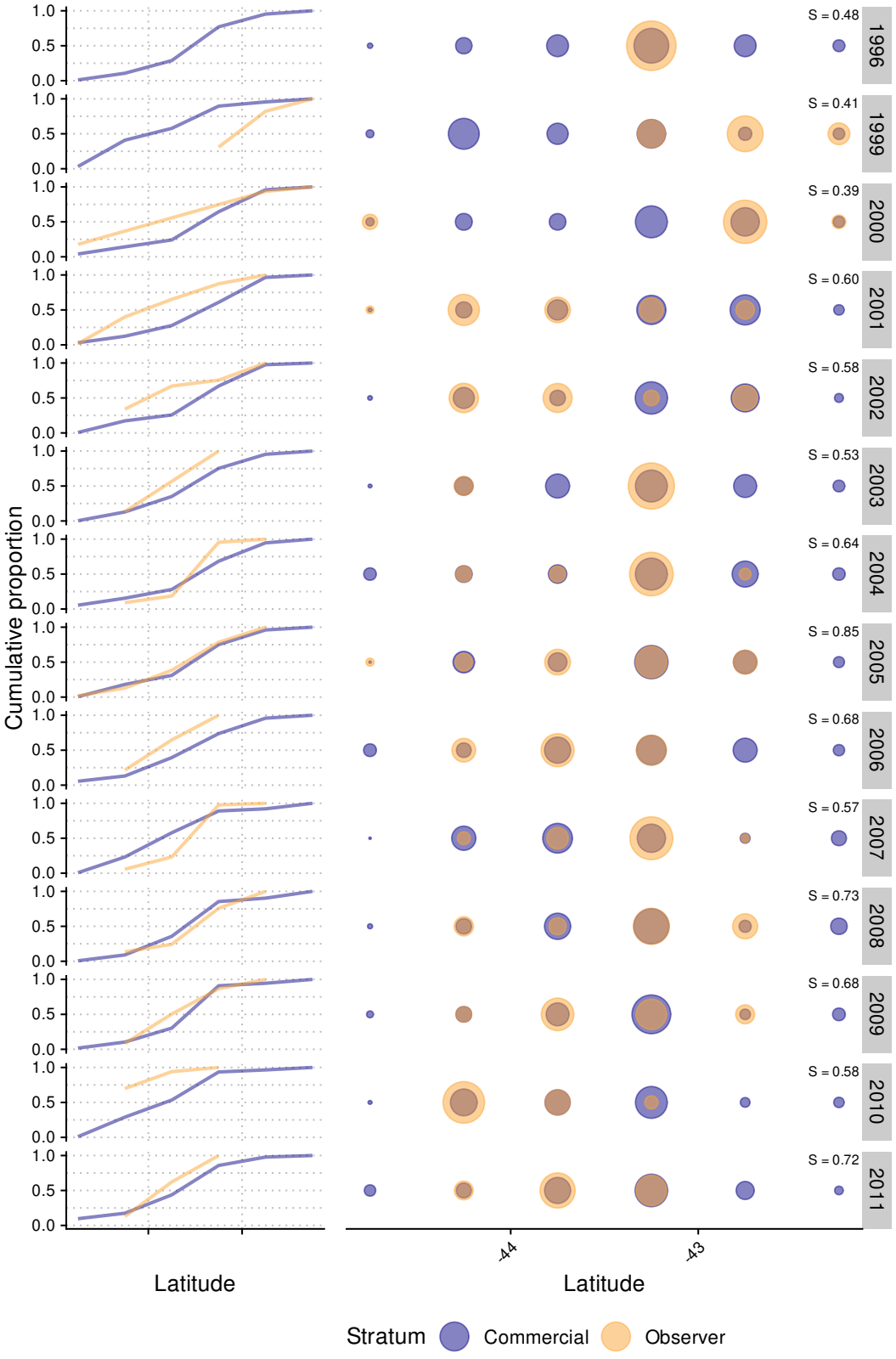


Figure 212: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RIB 3, from events where the ribaldo catch exceeded the 20kg threshold, in 1996 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

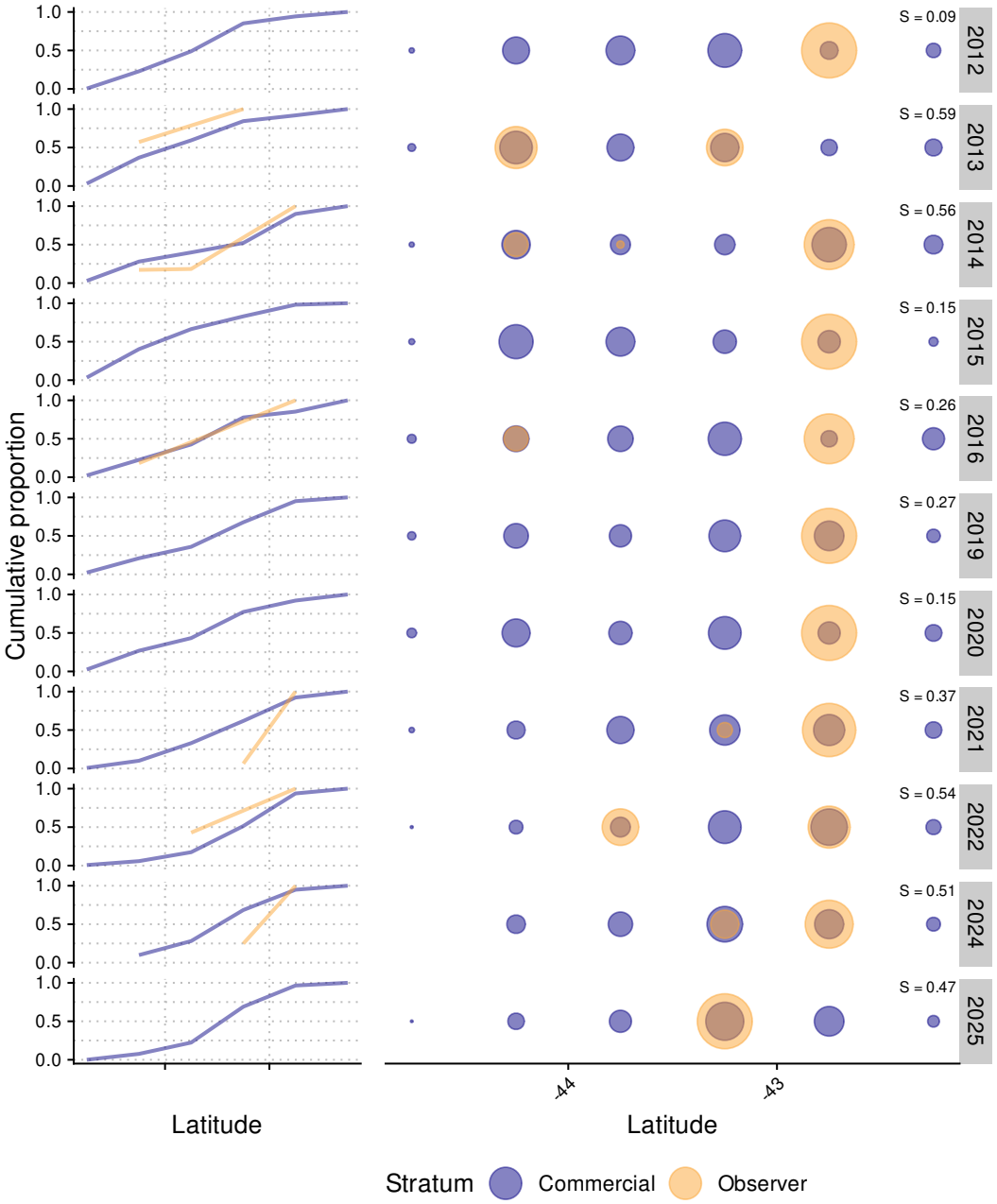


Figure 213: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RIB 3, from events where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

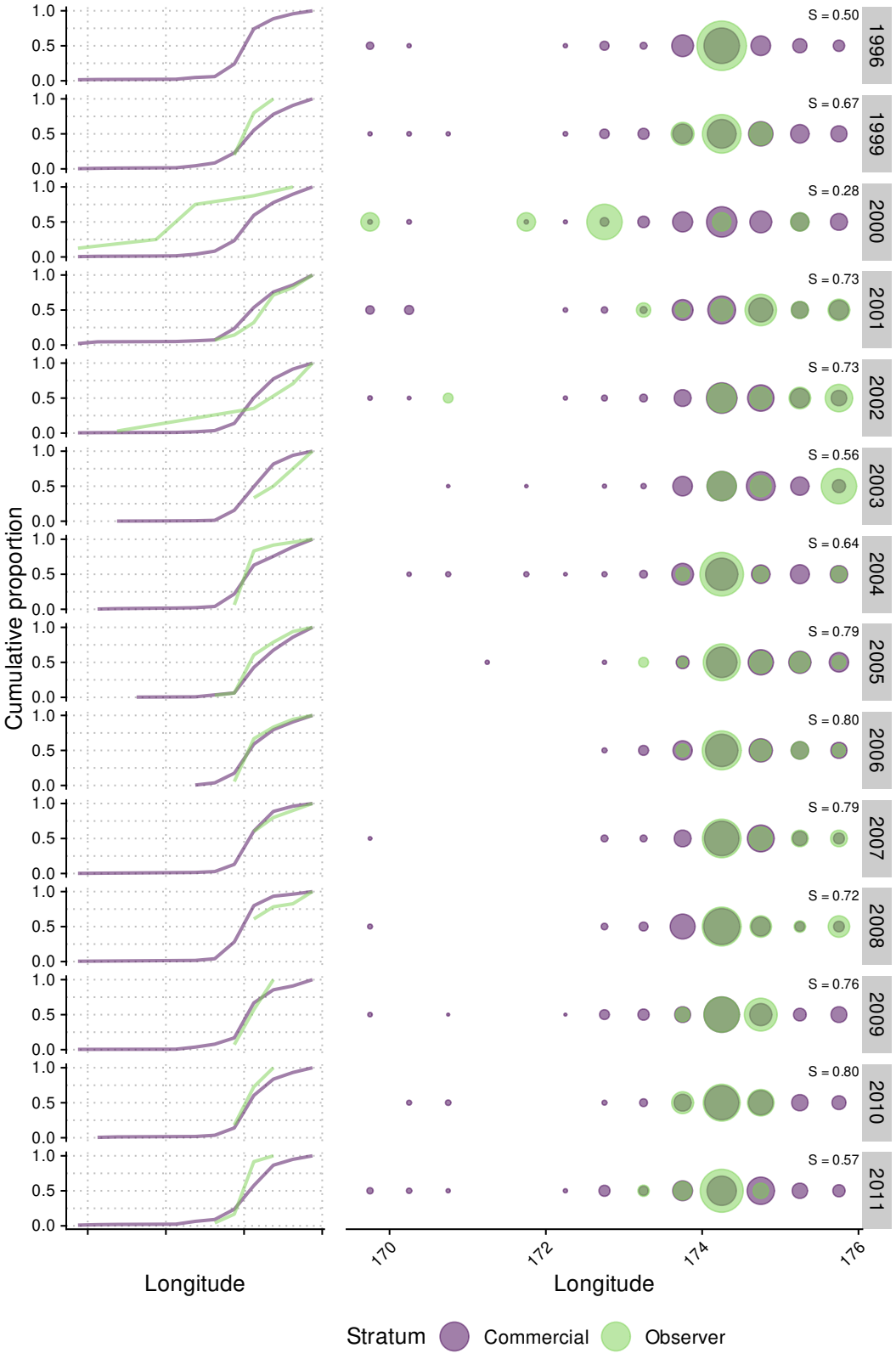


Figure 214: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 3, where the ribaldo catch exceeded the 20kg threshold, in 1996 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

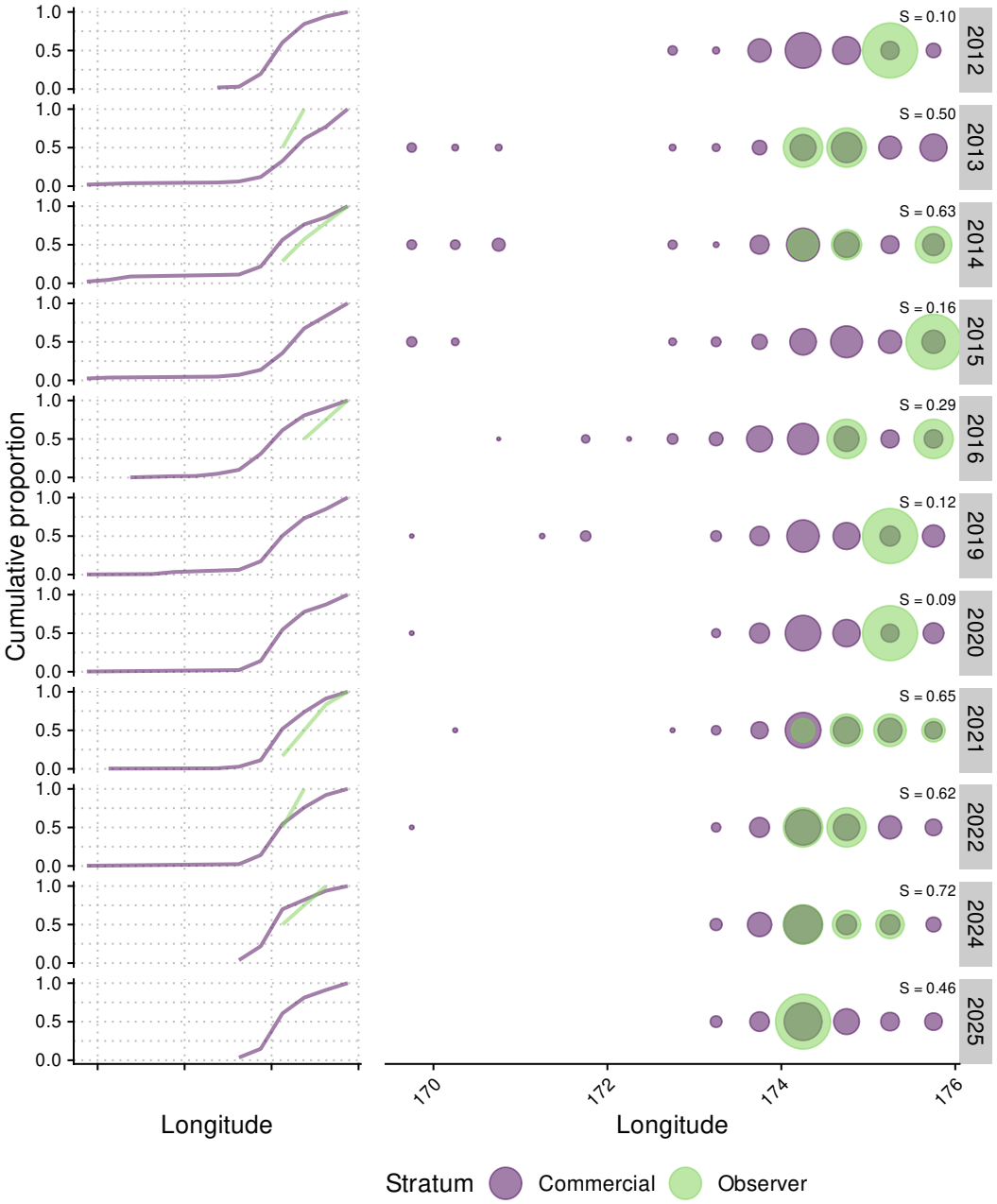


Figure 215: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 3, where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

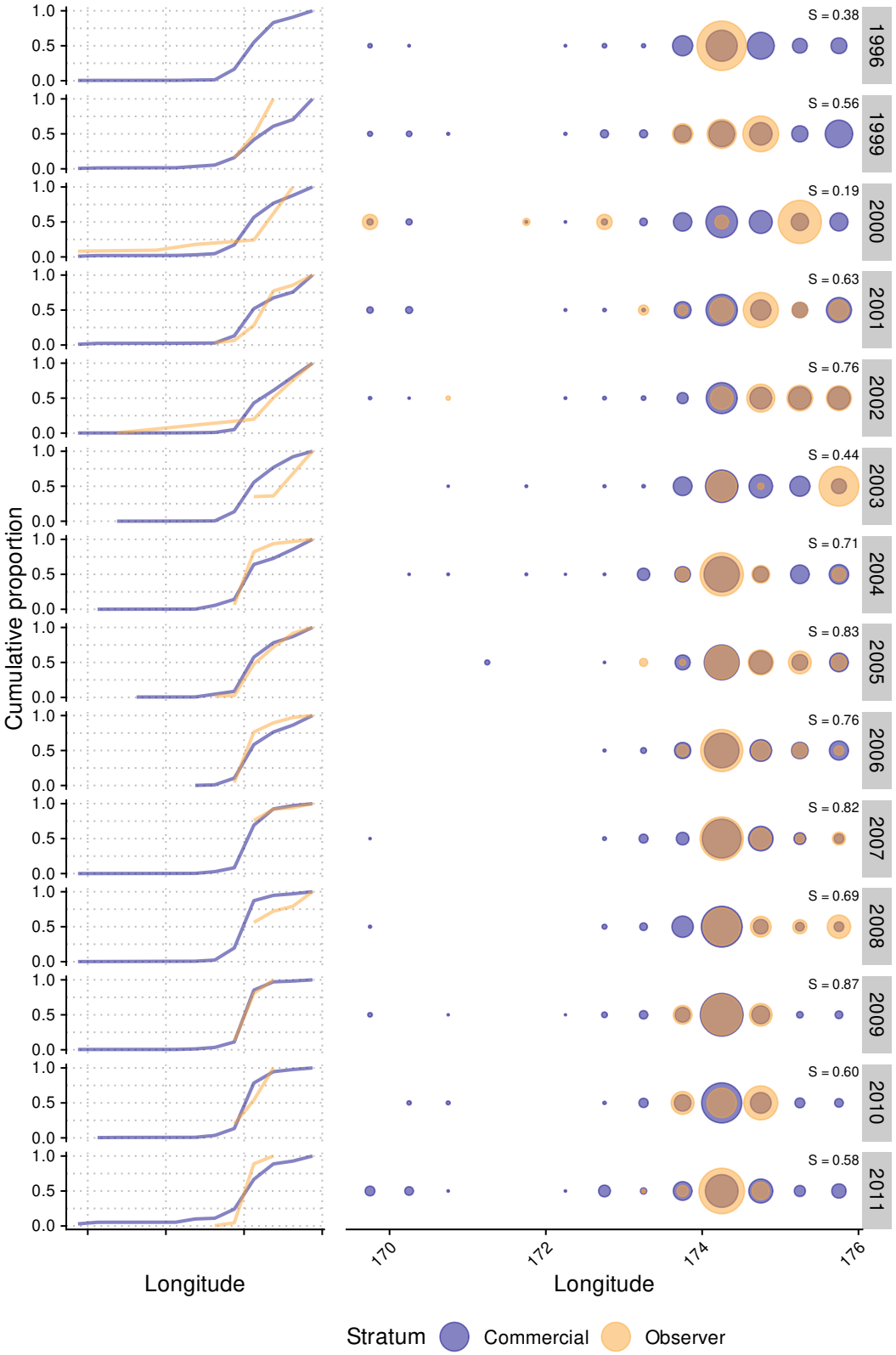


Figure 216: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RIB 3, from events where the ribaldo catch exceeded the 20kg threshold, in 1996 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

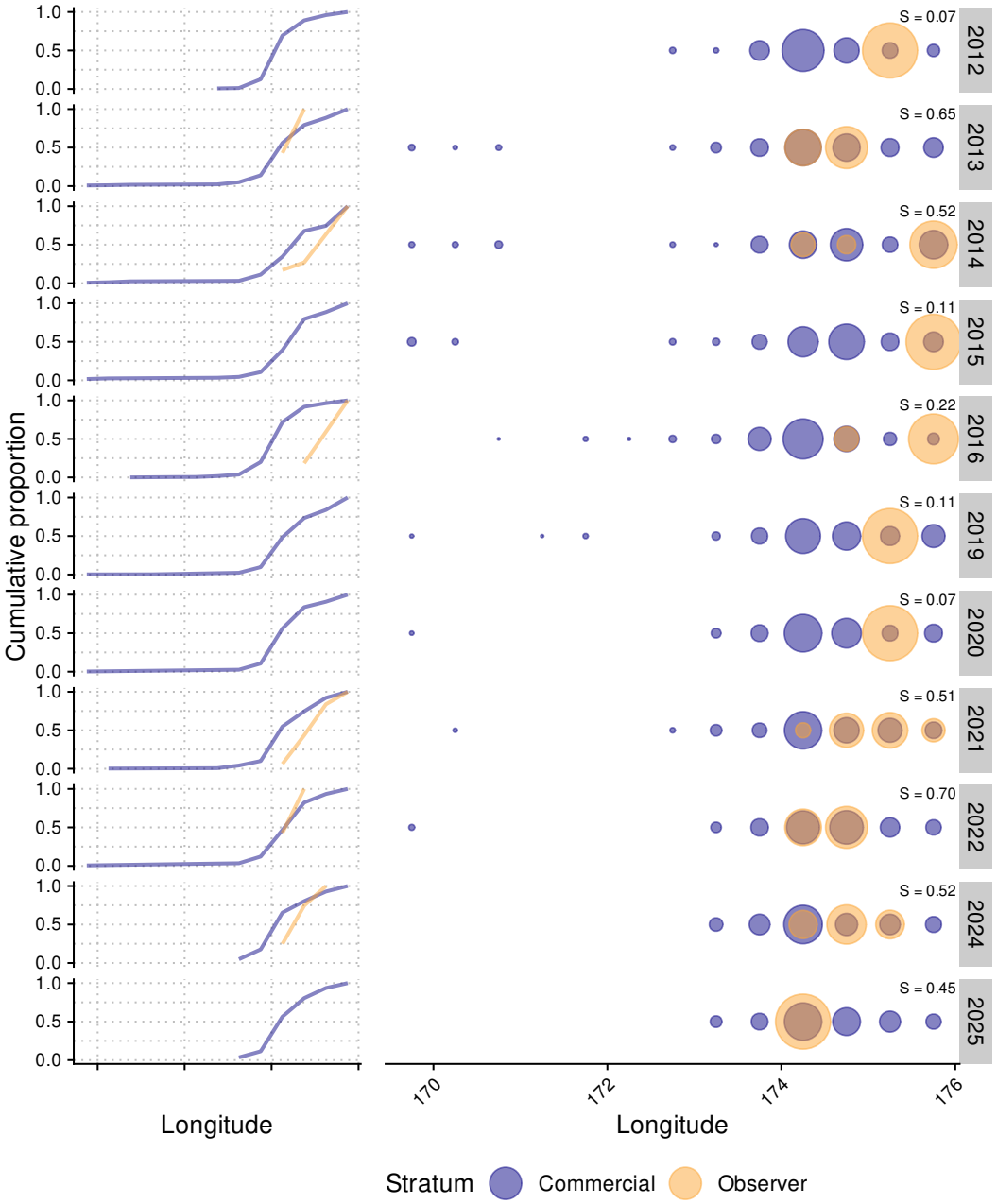


Figure 217: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RIB 3, from events where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

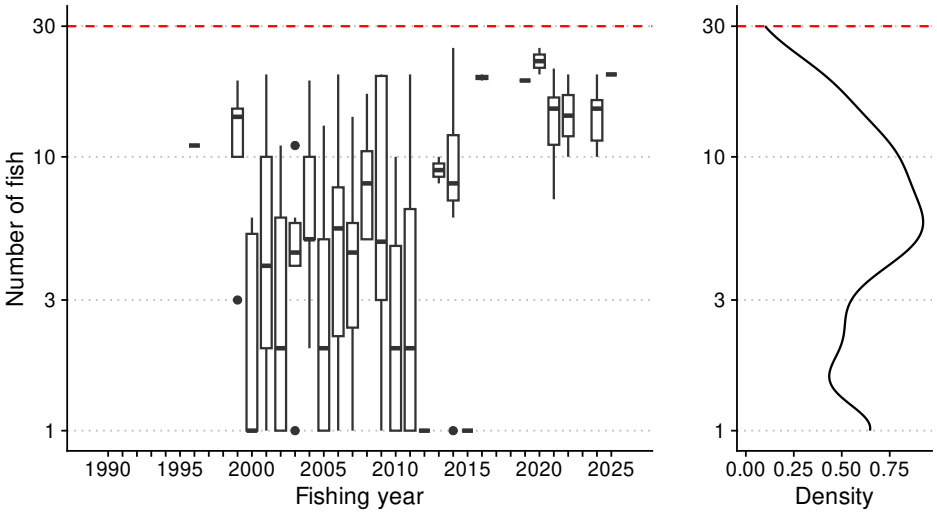


Figure 218: Length-frequency sample sizes for observed fishing events in RIB 3 where ribaldo were sampled. The red dashed line indicates a sample size of 30 fish.

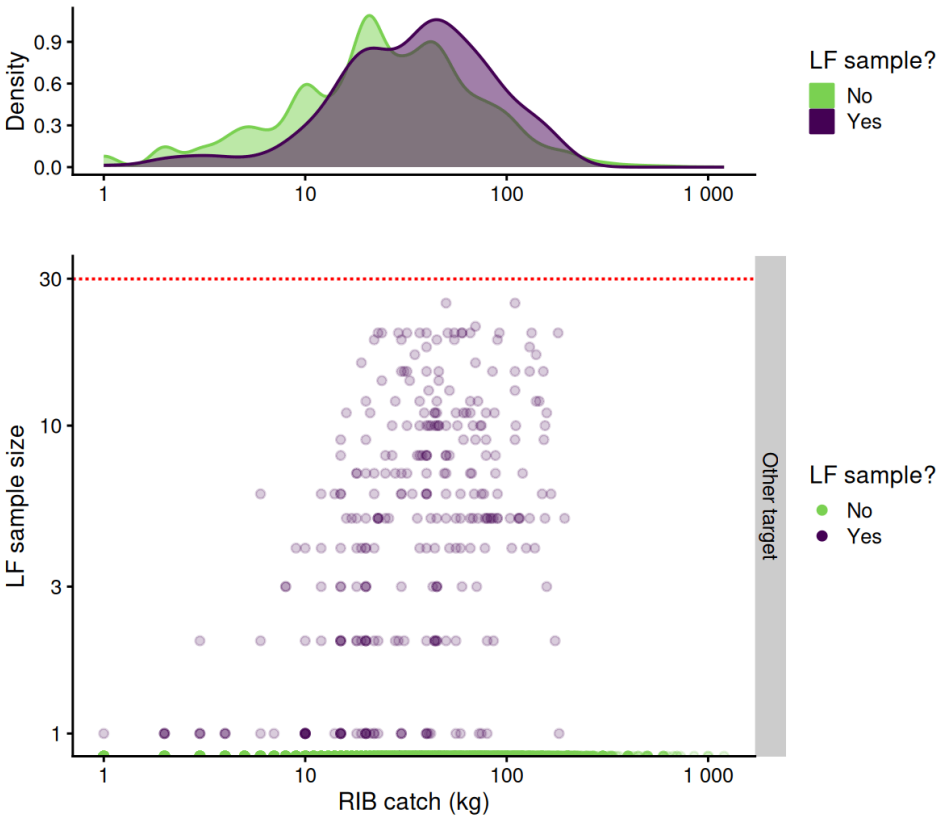


Figure 219: Length-frequency sample sizes (number of fish sampled) for observed fishing events in RIB 3 in relation to the total ribaldo catch from an event, separately for ribaldo target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.4.2.2 Otolith samples

Table 21: Otolith samples of ribaldo from the RIB 3 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	92	0	0	0.00
1991	245	0	0	0.00
1992	208	0	0	0.00
1993	264	0	0	0.00
1994	275	0	0	0.00
1995	178	0	0	0.00
1996	502	0	0	0.00
1997	463	0	0	0.00
1998	338	0	0	0.00
1999	309	0	0	0.00
2000	299	0	0	0.00
2001	277	0	0	0.00
2002	205	0	0	0.00
2003	216	0	0	0.00
2004	197	0	0	0.00
2005	163	0	0	0.00
2006	77	0	0	0.00
2007	103	0	0	0.00
2008	219	0	0	0.00
2009	272	6	33	2.21
2010	98	16	40	16.33
2011	46	0	0	0.00
2012	59	0	0	0.00
2013	37	1	5	2.70
2014	52	7	32	13.46
2015	28	0	0	0.00
2016	23	1	5	4.35
2017	25	0	0	0.00
2018	206	0	0	0.00
2019	276	1	4	0.36
2020	244	2	9	0.82
2021	255	6	32	2.35
2022	306	1	9	0.33
2023	293	0	0	0.00
2024	339	8	40	2.36
2025	294	2	10	0.68

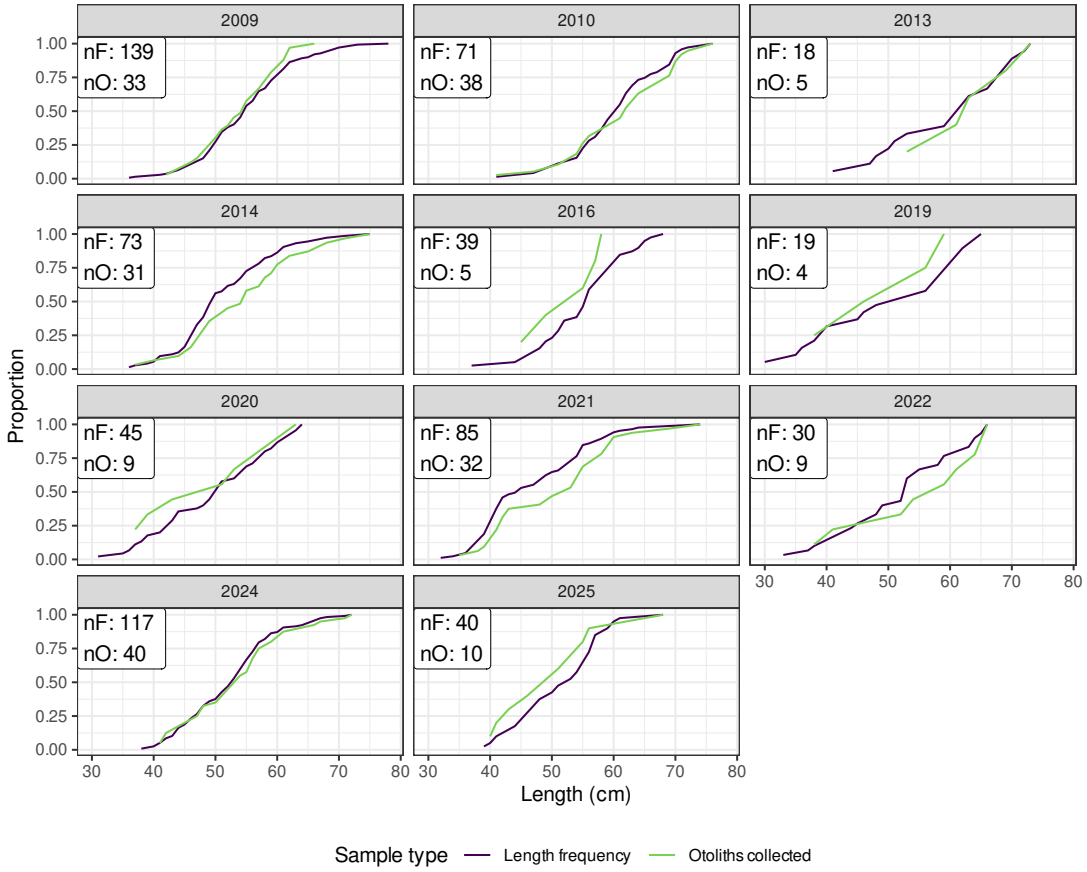


Figure 220: Cumulative distributions of the length of fish in the length frequency and otolith samples of ribaldo in the RIB 3 Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.4.2.3 Catch quantification

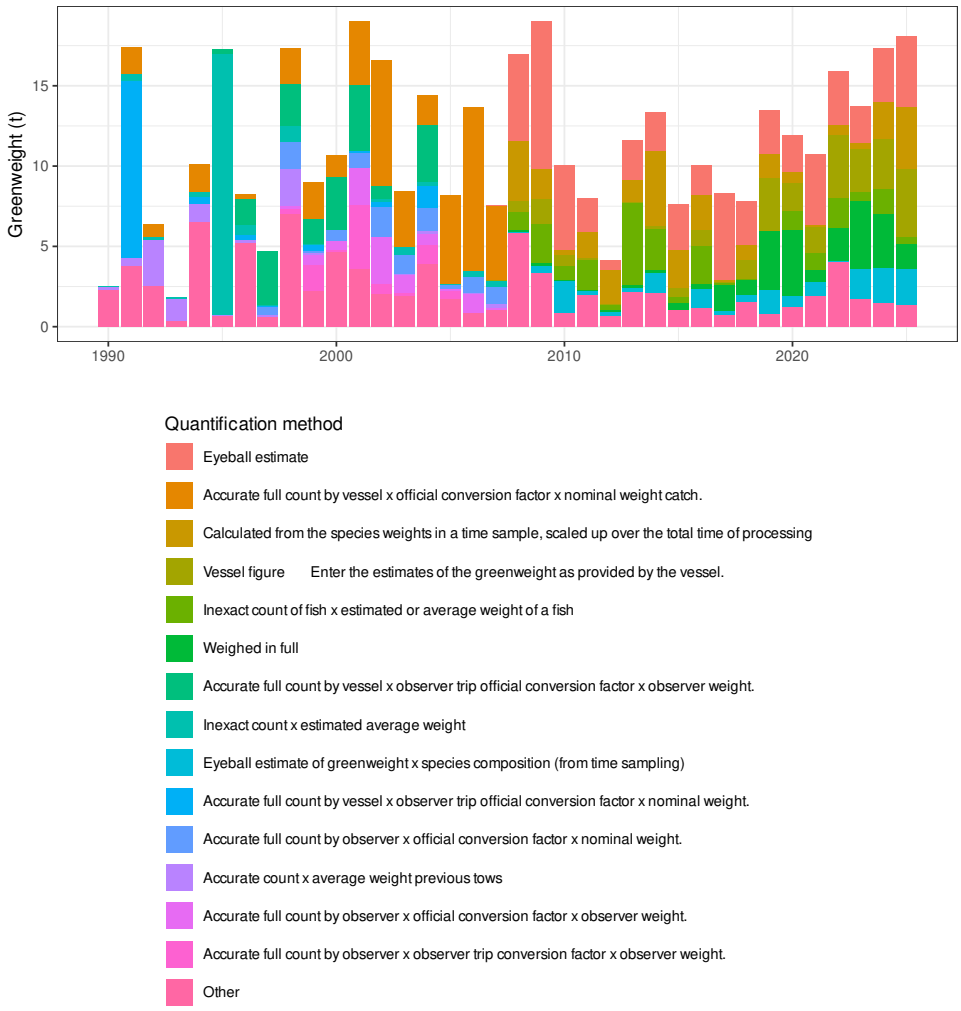


Figure 221: Methods used by observers to quantify the catch of ribaldo in the RIB 3 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.4.3 RIB 4: Line fishery

2.4.3.1 Length-frequency samples

Table 22: Length-frequency samples of ribaldo from the RIB 4 Line fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	22	0	0	0.00
1991	316	0	0	0.00
1992	268	0	0	0.00
1993	524	0	0	0.00
1994	655	0	0	0.00
1995	580	0	0	0.00
1996	722	0	0	0.00
1997	25 423	14	970	0.06
1998	490	0	0	0.00
1999	889	0	0	0.00
2000	691	0	0	0.00
2001	349	0	0	0.00
2002	808	3	19	0.37
2003	168	29	216	17.26
2004	292	23	120	7.88
2005	592	4	4	0.68
2006	378	4	51	1.06
2007	529	0	0	0.00
2008	389	1	20	0.26
2009	344	0	0	0.00
2010	299	0	0	0.00
2011	178	16	309	8.99
2012	454	0	0	0.00
2013	468	0	0	0.00
2014	867	2	20	0.23
2015	585	0	0	0.00
2016	672	19	272	2.83
2017	365	0	0	0.00
2018	256	17	252	6.64
2019	301	20	348	6.64
2020	266	0	0	0.00
2021	145	13	95	8.97
2022	287	0	0	0.00
2023	50	0	0	0.00
2024	18	6	71	33.33
2025	27	0	0	0.00

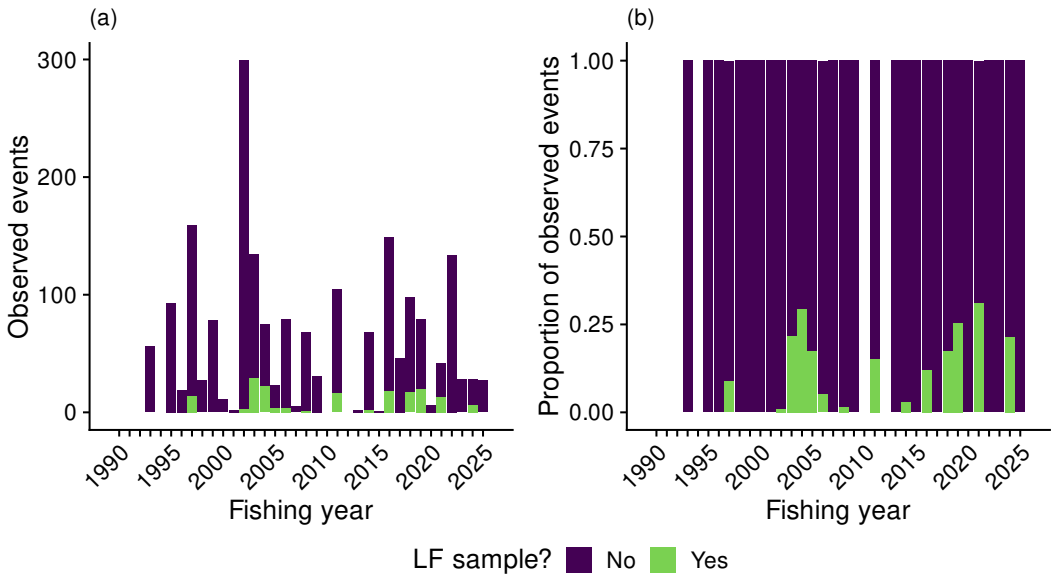


Figure 222: **(a) Observed Line fishing events, and (b) proportion of observed events, in RIB 4 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

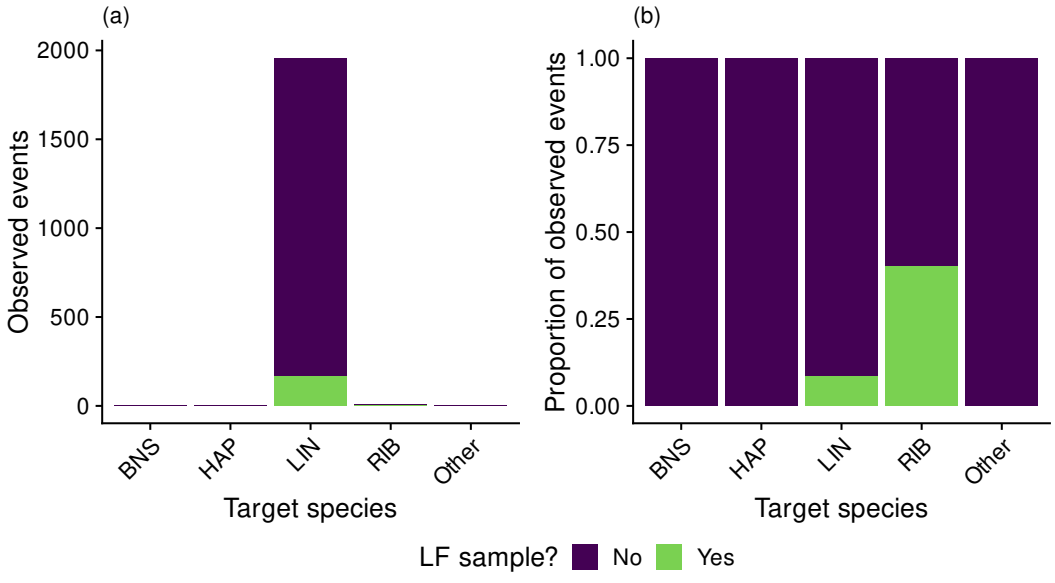


Figure 223: **(a) Observed Line fishing events, and (b) proportion of observed events, in RIB 4 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

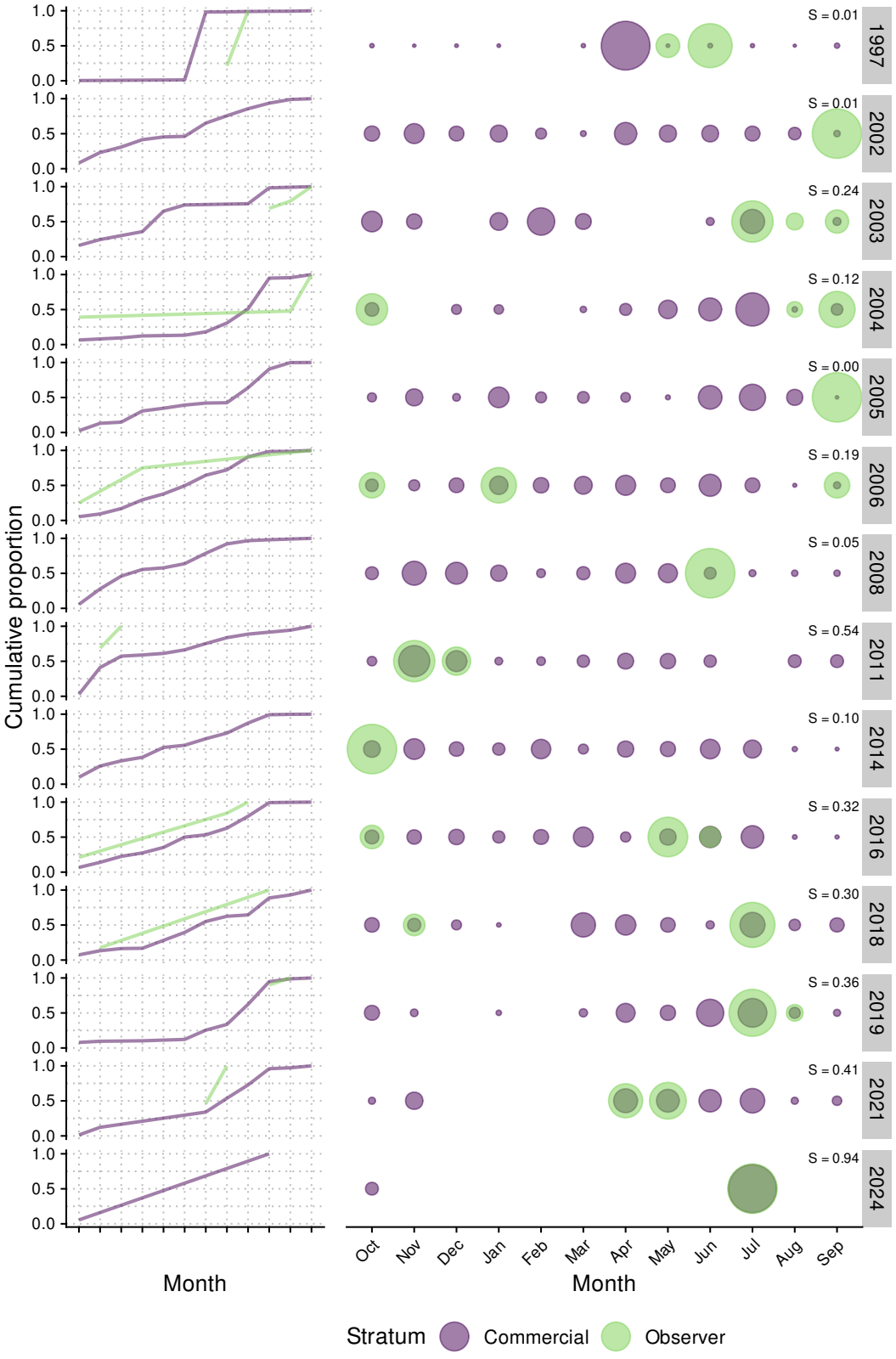


Figure 224: Monthly representativeness of observer sampling coverage of Line fishing events in RIB 4, where the ribaldo catch exceeded the 20kg threshold, in 1997 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

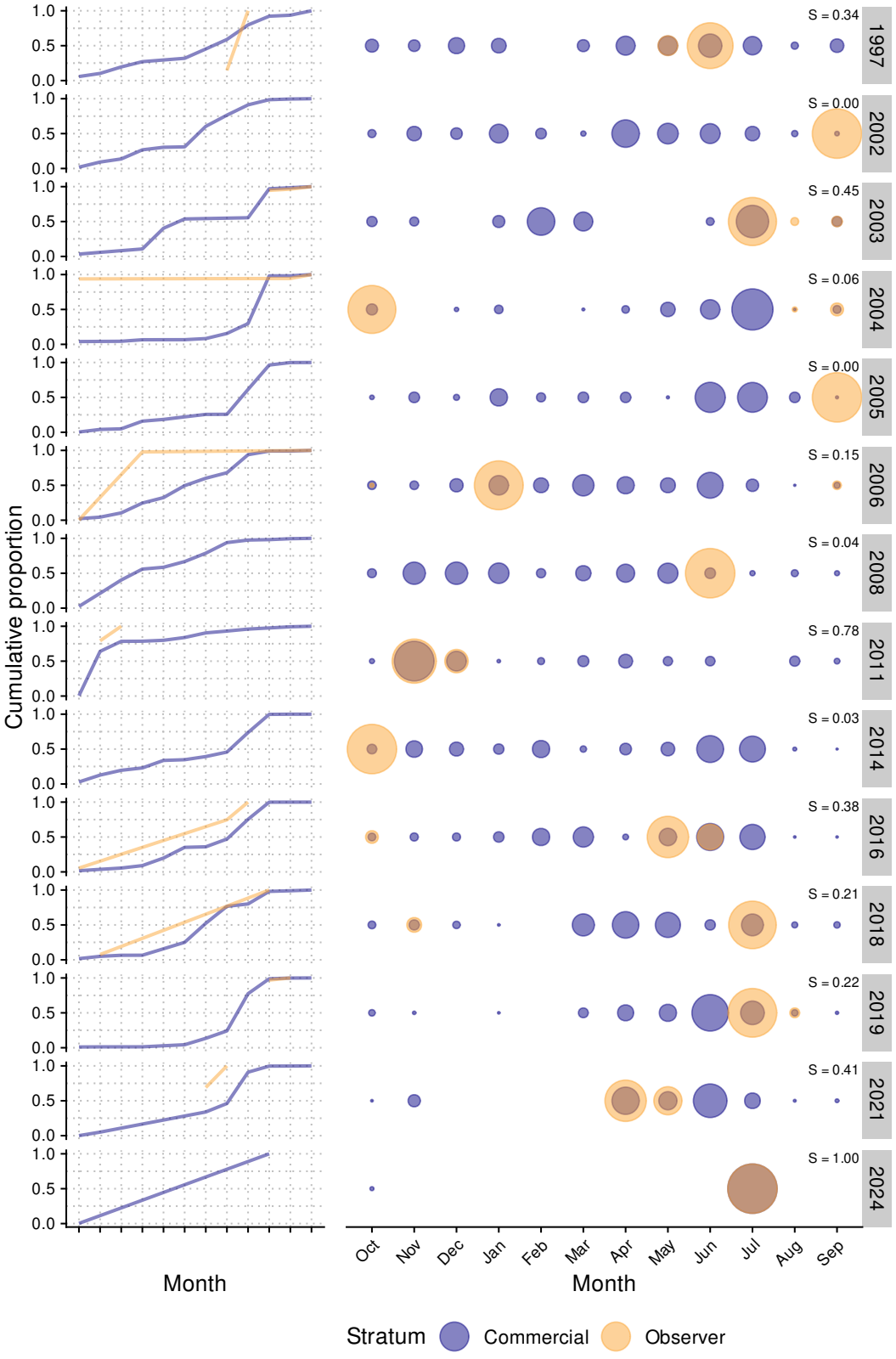


Figure 225: **Monthly representativeness of observer sampling coverage of Line catch in RIB 4, from events where the ribaldo catch exceeded the 20kg threshold, in 1997 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

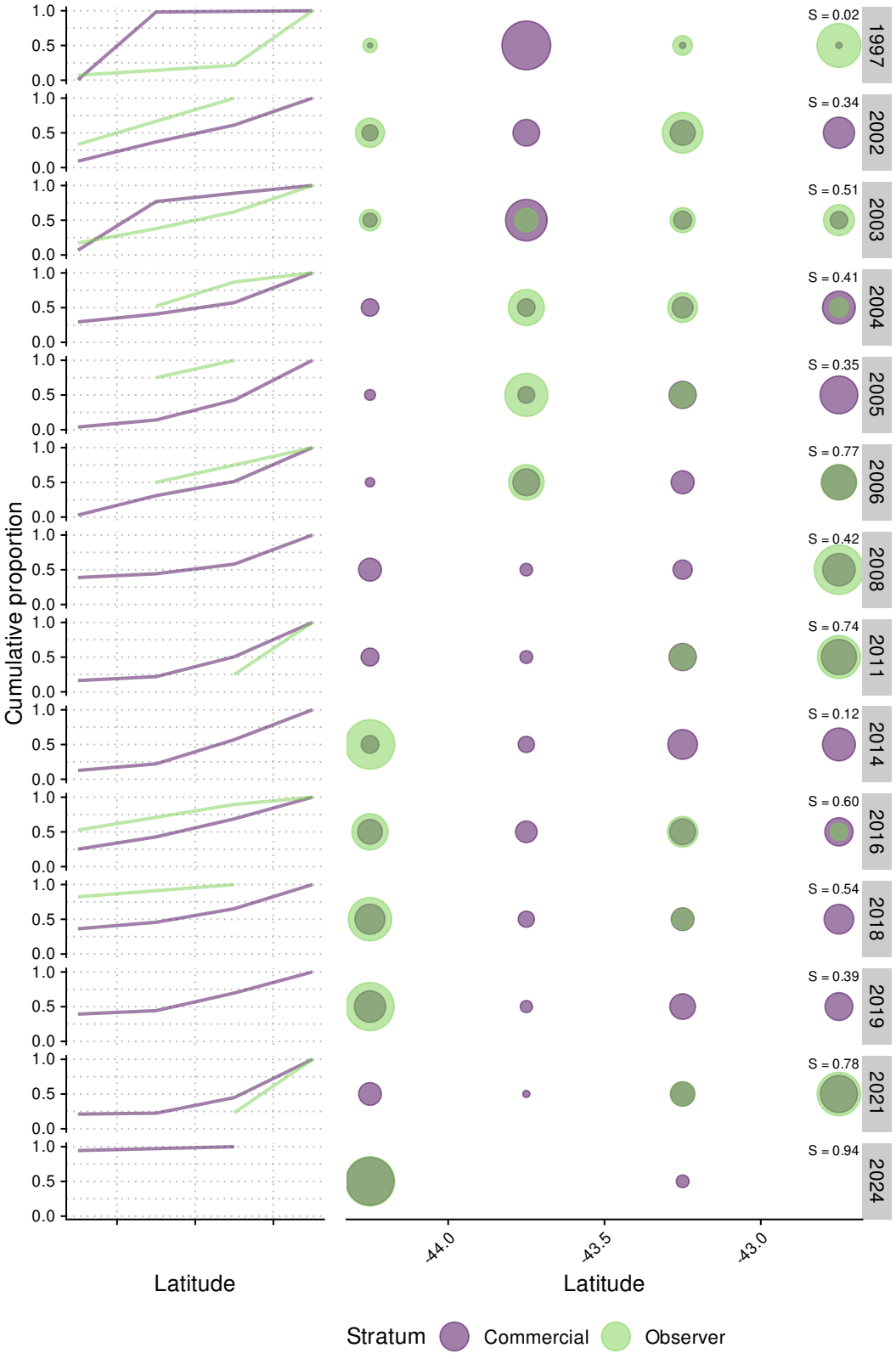


Figure 226: **Latitudinal representativeness of observer sampling coverage of Line fishing events in RIB 4, where the ribaldo catch exceeded the 20kg threshold, in 1997 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

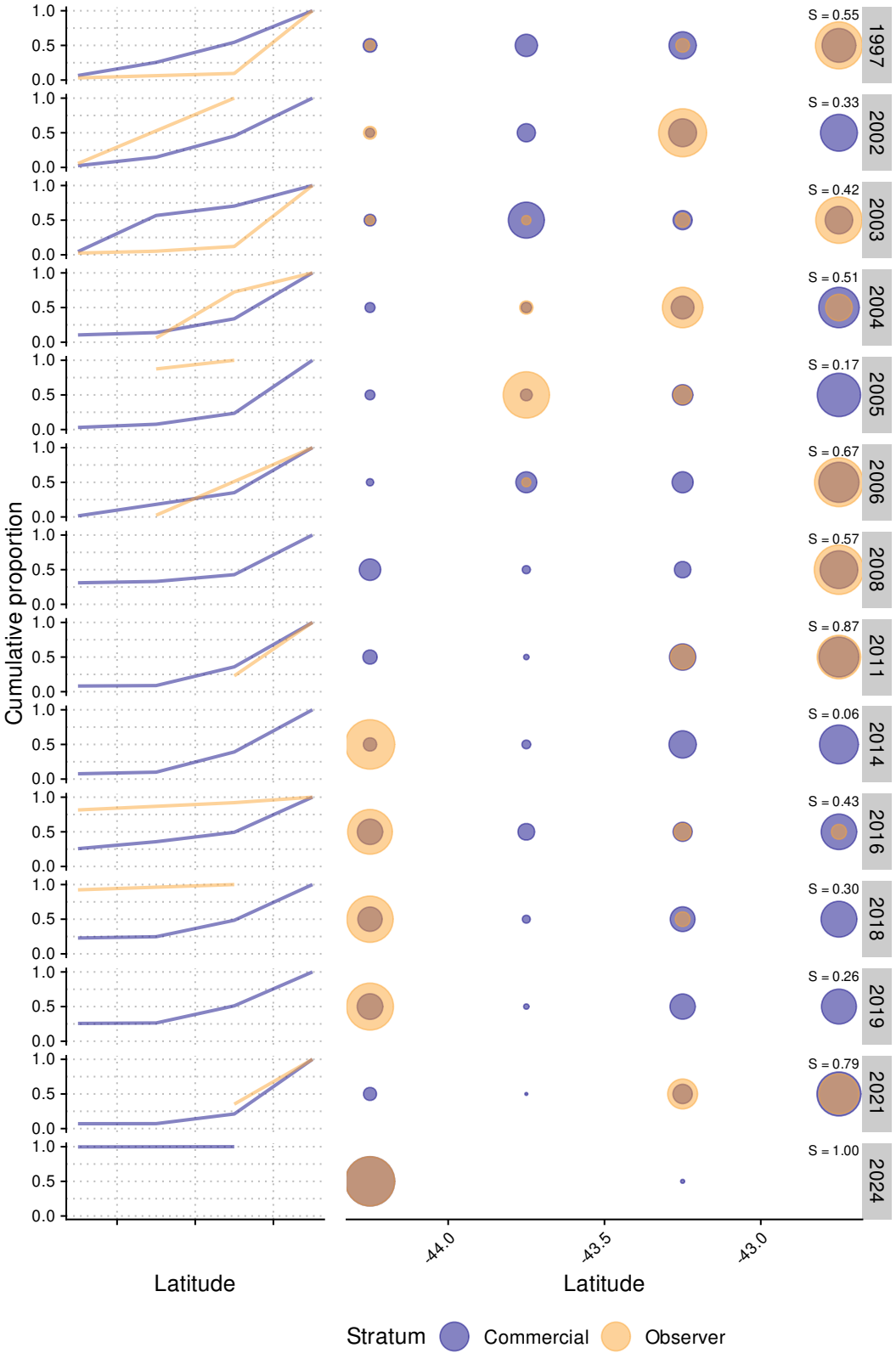


Figure 227: **Latitudinal representativeness of observer sampling coverage of Line catch in RIB 4, from events where the ribaldo catch exceeded the 20kg threshold, in 1997 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

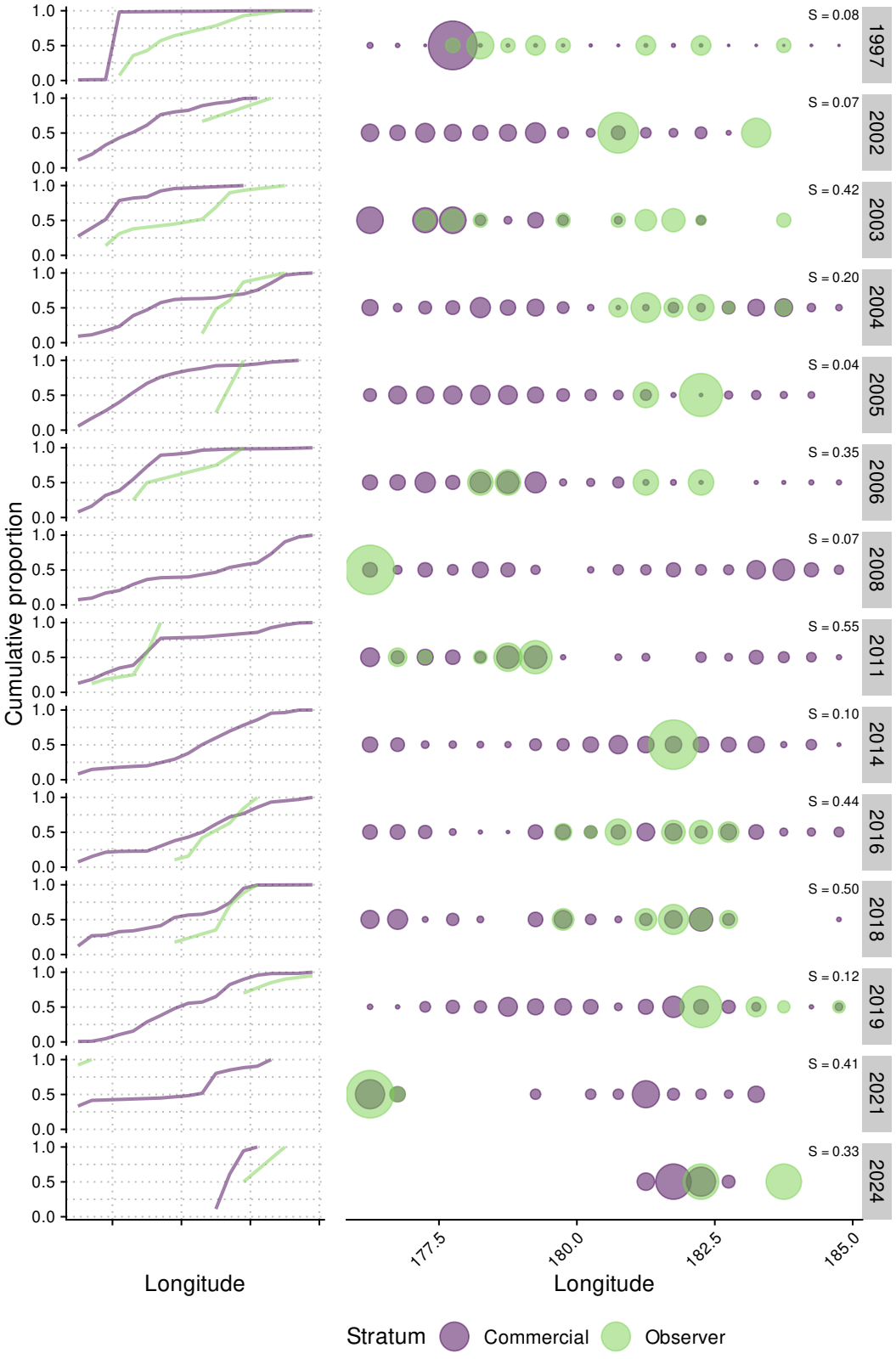


Figure 228: **Longitudinal representativeness of observer sampling coverage of Line fishing events in RIB 4, where the ribaldo catch exceeded the 20kg threshold, in 1997 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

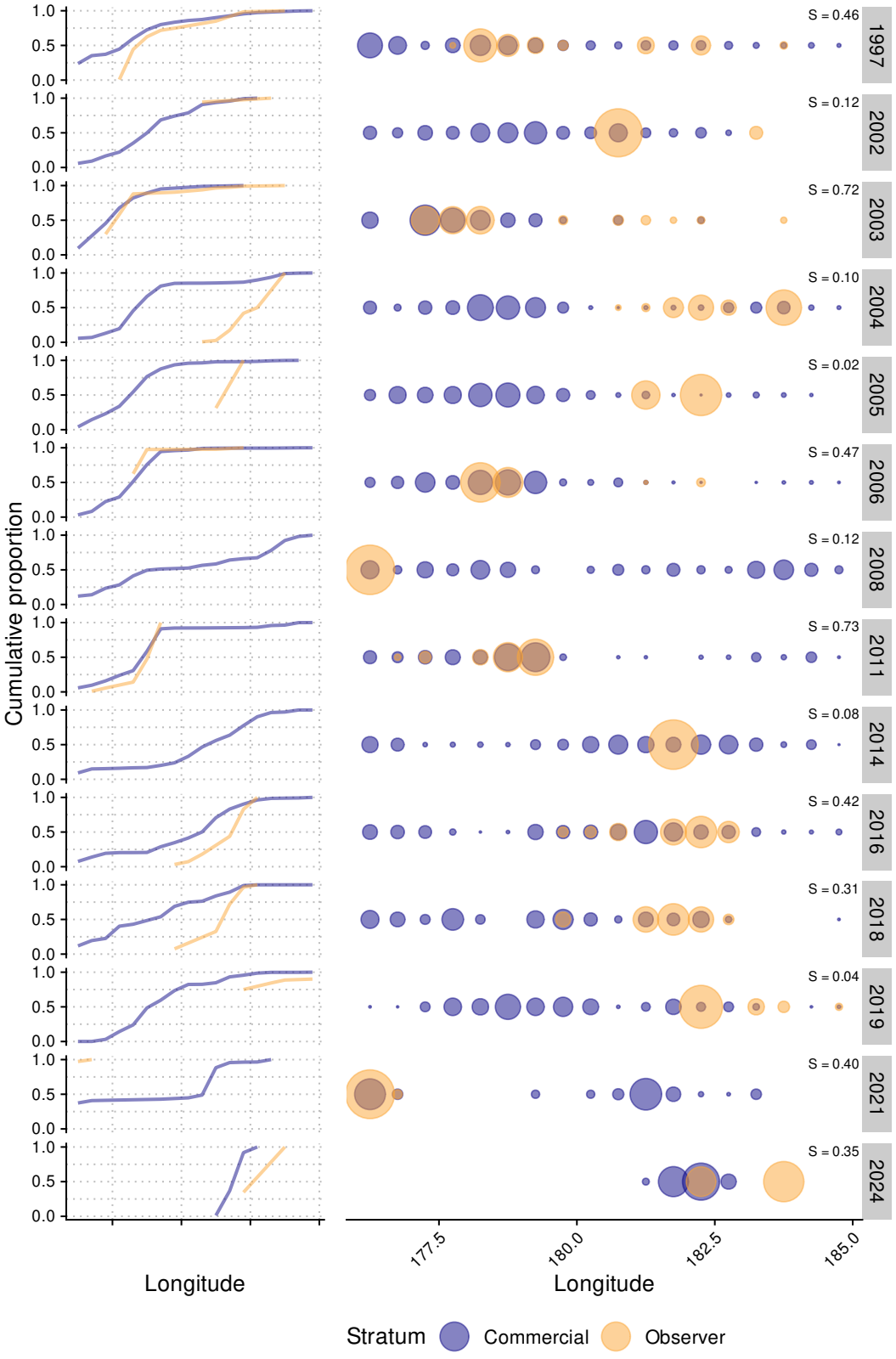


Figure 229: Longitudinal representativeness of observer sampling coverage of Line catch in RIB 4, from events where the ribaldo catch exceeded the 20kg threshold, in 1997 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

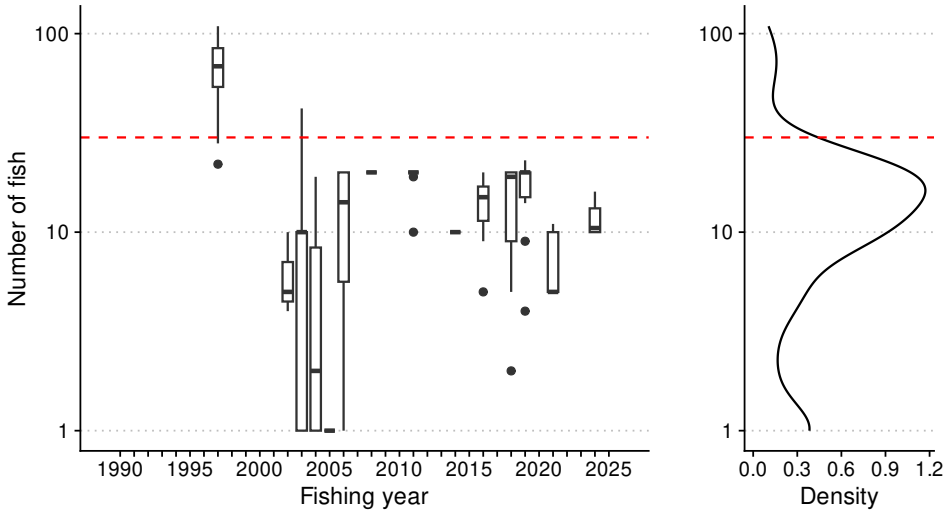


Figure 230: **Length-frequency sample sizes for observed fishing events in RIB 4 where ribaldo were sampled. The red dashed line indicates a sample size of 30 fish.**

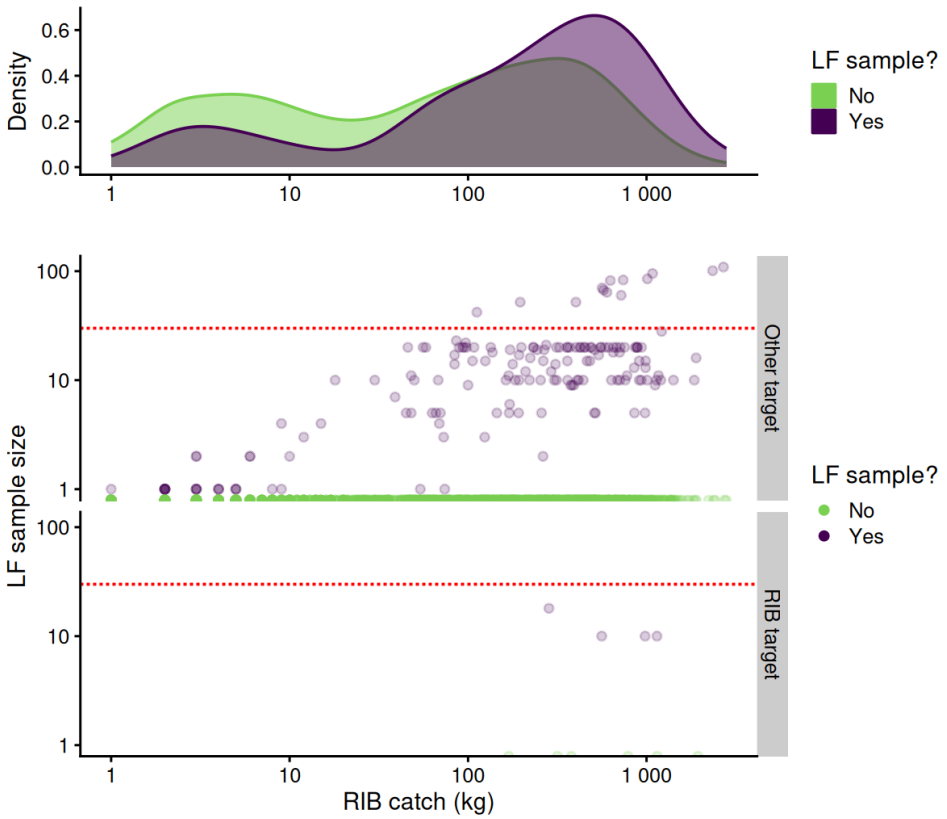


Figure 231: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in RIB 4 in relation to the total ribaldo catch from an event, separately for ribaldo target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.4.3.2 Otolith samples

Table 23: Otolith samples of ribaldo from the RIB 4 Line fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	22	0	0	0.00
1991	316	0	0	0.00
1992	268	0	0	0.00
1993	524	0	0	0.00
1994	655	0	0	0.00
1995	580	0	0	0.00
1996	722	0	0	0.00
1997	25 423	0	0	0.00
1998	490	0	0	0.00
1999	889	0	0	0.00
2000	691	0	0	0.00
2001	349	0	0	0.00
2002	808	0	0	0.00
2003	168	0	0	0.00
2004	292	0	0	0.00
2005	592	0	0	0.00
2006	378	0	0	0.00
2007	529	0	0	0.00
2008	389	0	0	0.00
2009	344	0	0	0.00
2010	299	0	0	0.00
2011	178	0	0	0.00
2012	454	0	0	0.00
2013	468	0	0	0.00
2014	867	0	0	0.00
2015	585	0	0	0.00
2016	672	0	0	0.00
2017	365	0	0	0.00
2018	256	0	0	0.00
2019	301	0	0	0.00
2020	266	0	0	0.00
2021	145	0	0	0.00
2022	287	0	0	0.00
2023	50	0	0	0.00
2024	18	6	30	33.33
2025	27	0	0	0.00

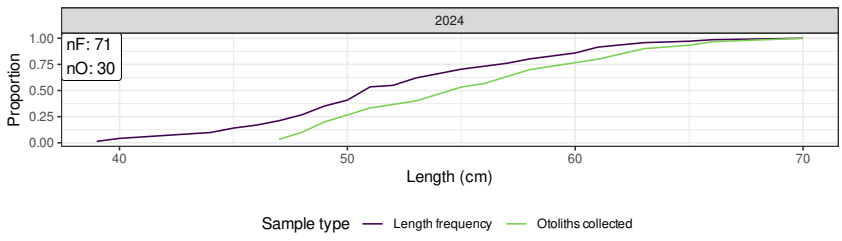


Figure 232: Cumulative distributions of the length of fish in the length frequency and otolith samples of ribaldo in the RIB 4 Line fishery for the 2024 to 2024 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.4.3.3 Catch quantification

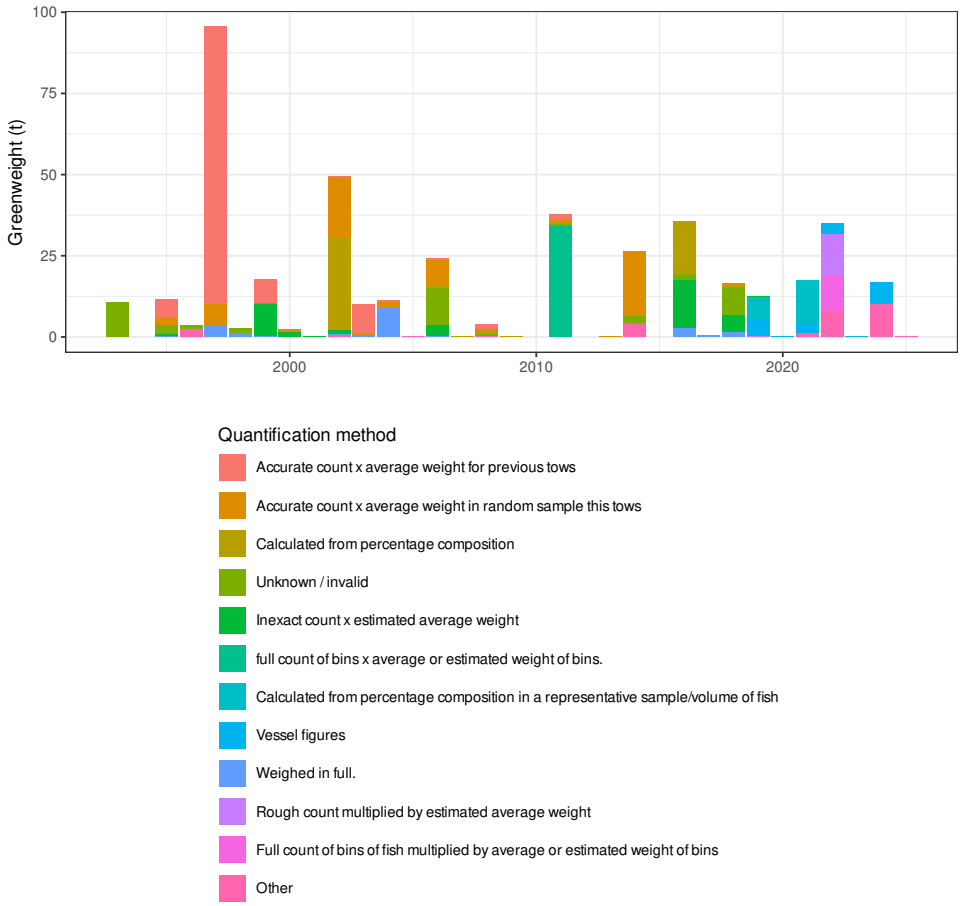


Figure 233: Methods used by observers to quantify the catch of ribaldo in the RIB 4 Line fishery. The legend lists the methods used in descending order of total catch.

2.4.4 RIB 4: Trawl fishery

2.4.4.1 Length-frequency samples

Table 24: Length-frequency samples of ribaldo from the RIB 4 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	137	0	0	0.00
1991	255	0	0	0.00
1992	316	0	0	0.00
1993	349	0	0	0.00
1994	95	0	0	0.00
1995	359	5	30	1.39
1996	90	0	0	0.00
1997	218	0	0	0.00
1998	378	4	24	1.06
1999	266	13	104	4.89
2000	339	9	76	2.65
2001	253	15	45	5.93
2002	226	41	346	18.14
2003	312	17	172	5.45
2004	475	16	123	3.37
2005	250	78	743	31.20
2006	118	48	517	40.68
2007	226	49	303	21.68
2008	202	22	288	10.89
2009	122	31	636	25.41
2010	155	17	291	10.97
2011	101	5	81	4.95
2012	100	16	194	16.00
2013	120	10	184	8.33
2014	131	5	96	3.82
2015	127	22	437	17.32
2016	65	11	188	16.92
2017	110	7	124	6.36
2018	323	4	57	1.24
2019	196	8	151	4.08
2020	324	4	80	1.23
2021	469	13	243	2.77
2022	447	12	271	2.68
2023	288	15	288	5.21
2024	274	11	320	4.01
2025	317	0	0	0.00

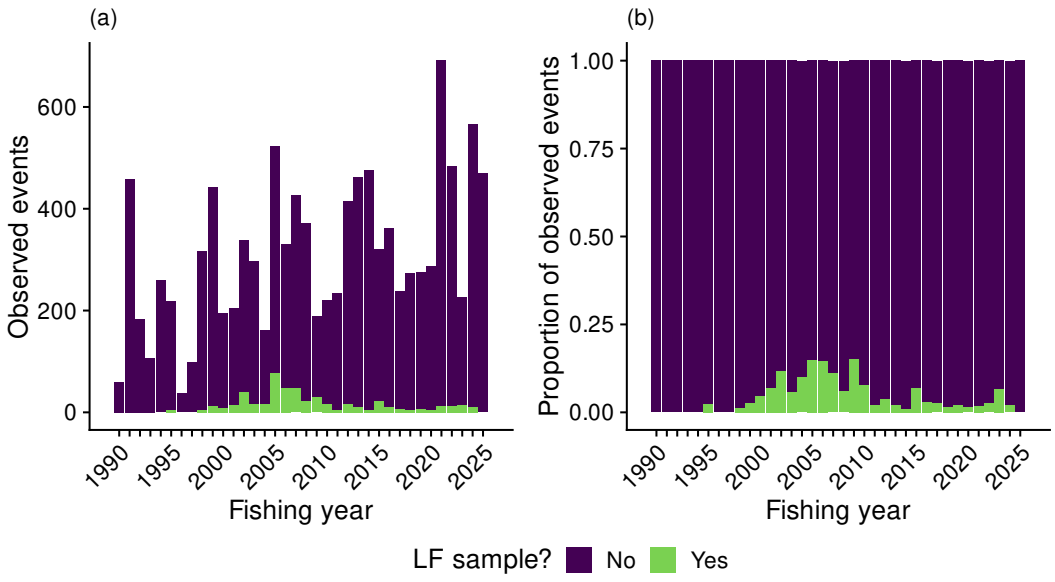


Figure 234: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RIB 4 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

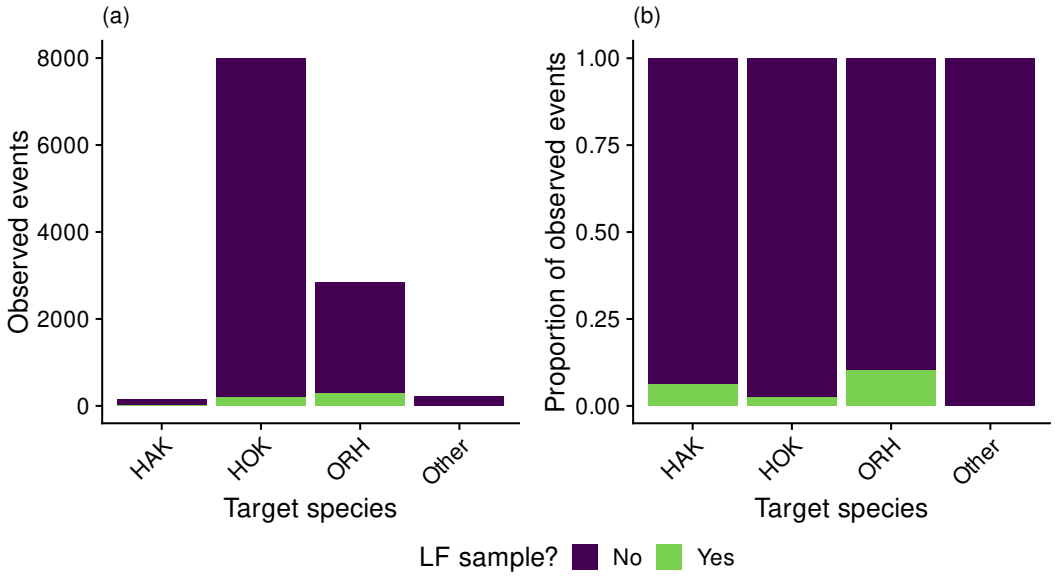


Figure 235: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RIB 4 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

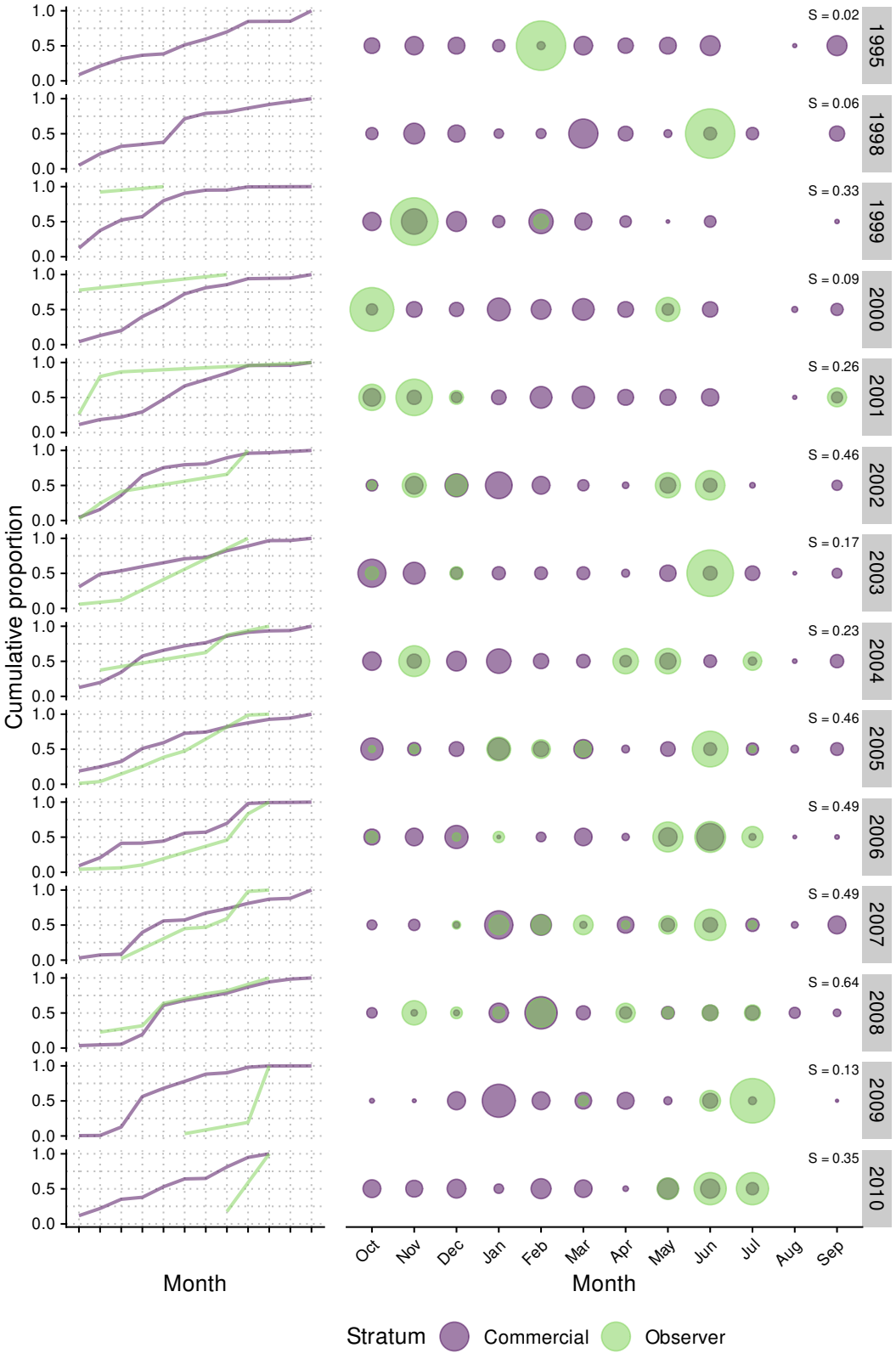


Figure 236: Monthly representativeness of observer sampling coverage of Trawl fishing events in RIB 4, where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

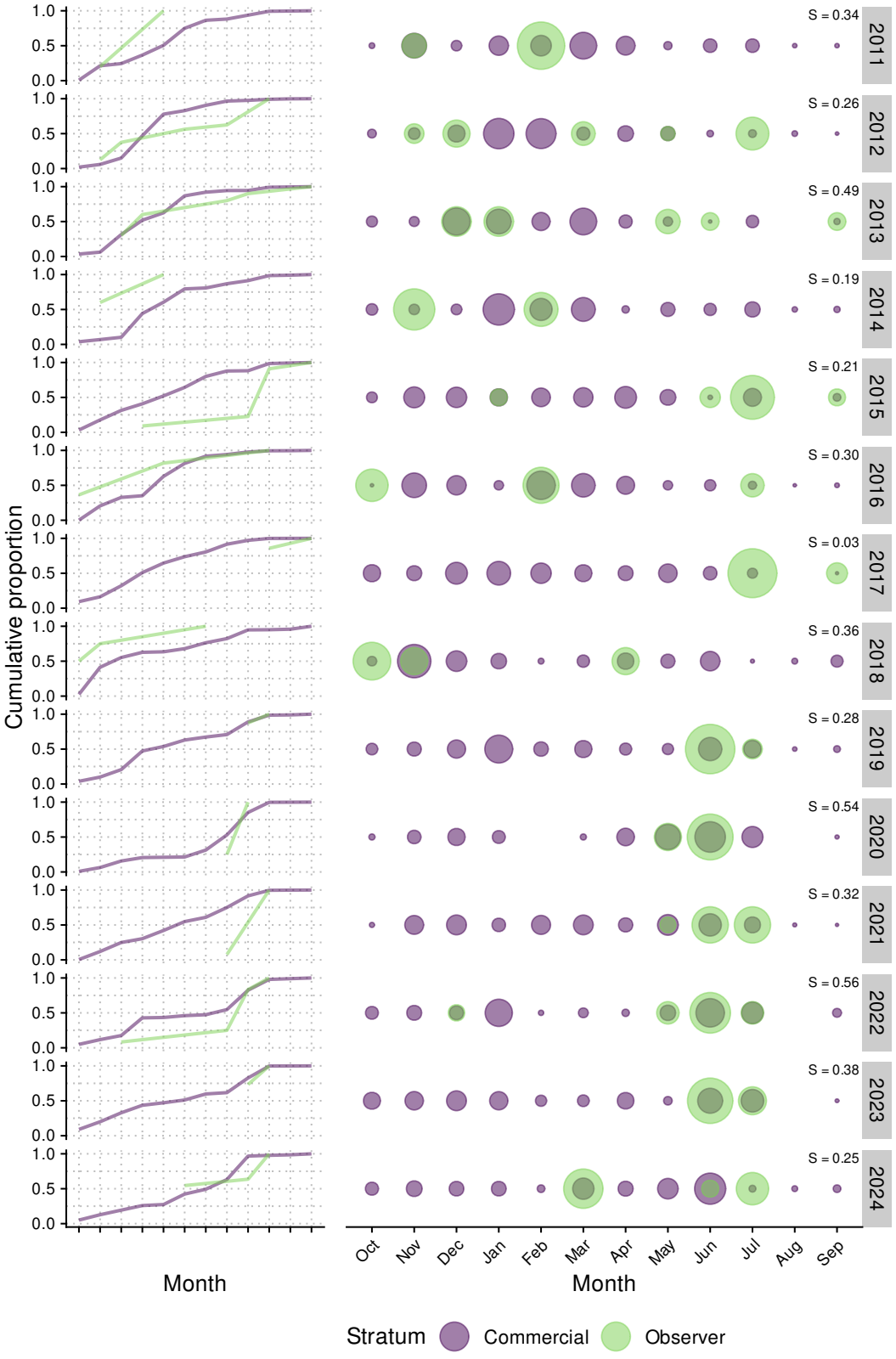


Figure 237: Monthly representativeness of observer sampling coverage of Trawl fishing events in RIB 4, where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

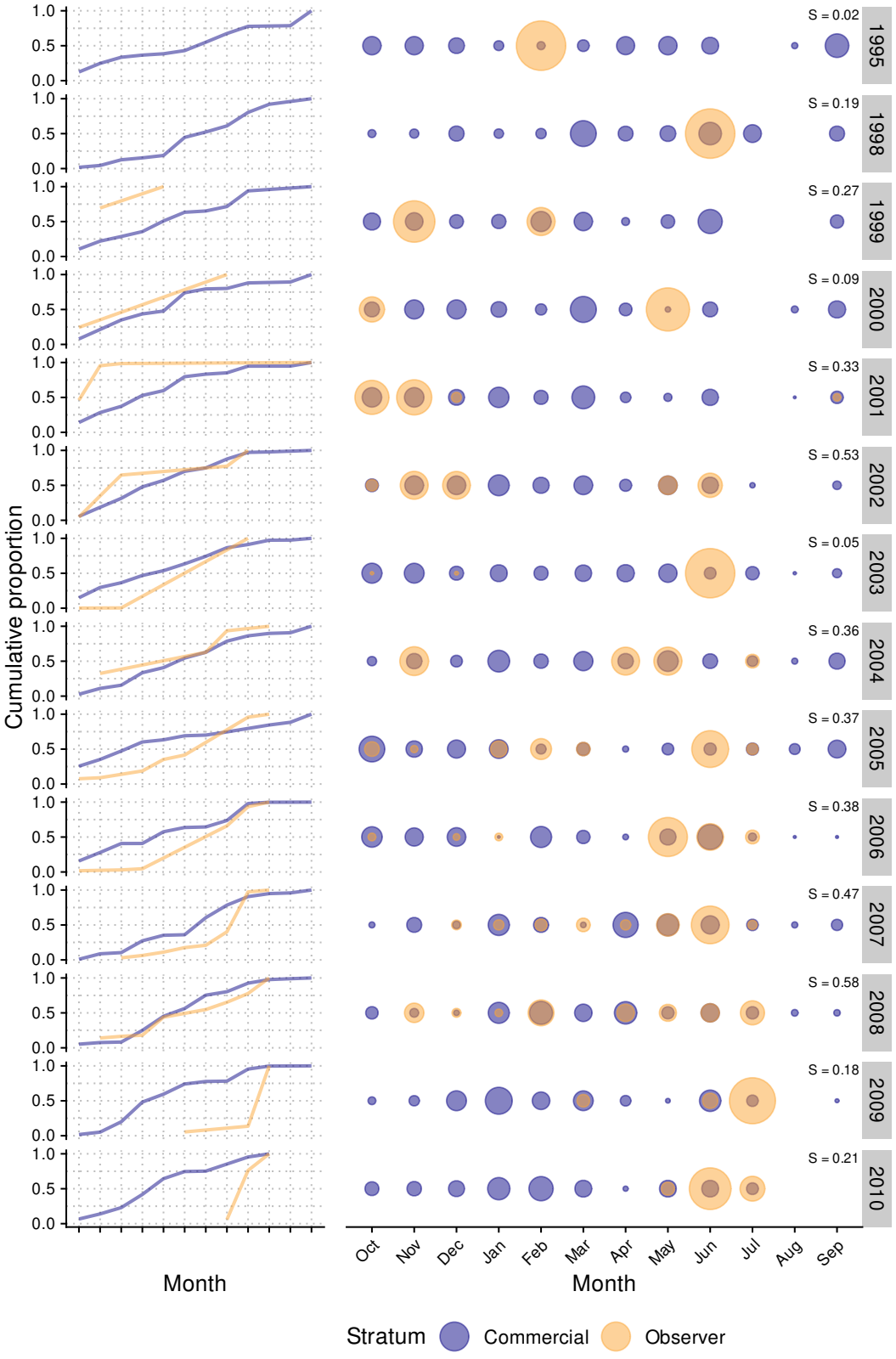


Figure 238: Monthly representativeness of observer sampling coverage of Trawl catch in RIB 4, from events where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

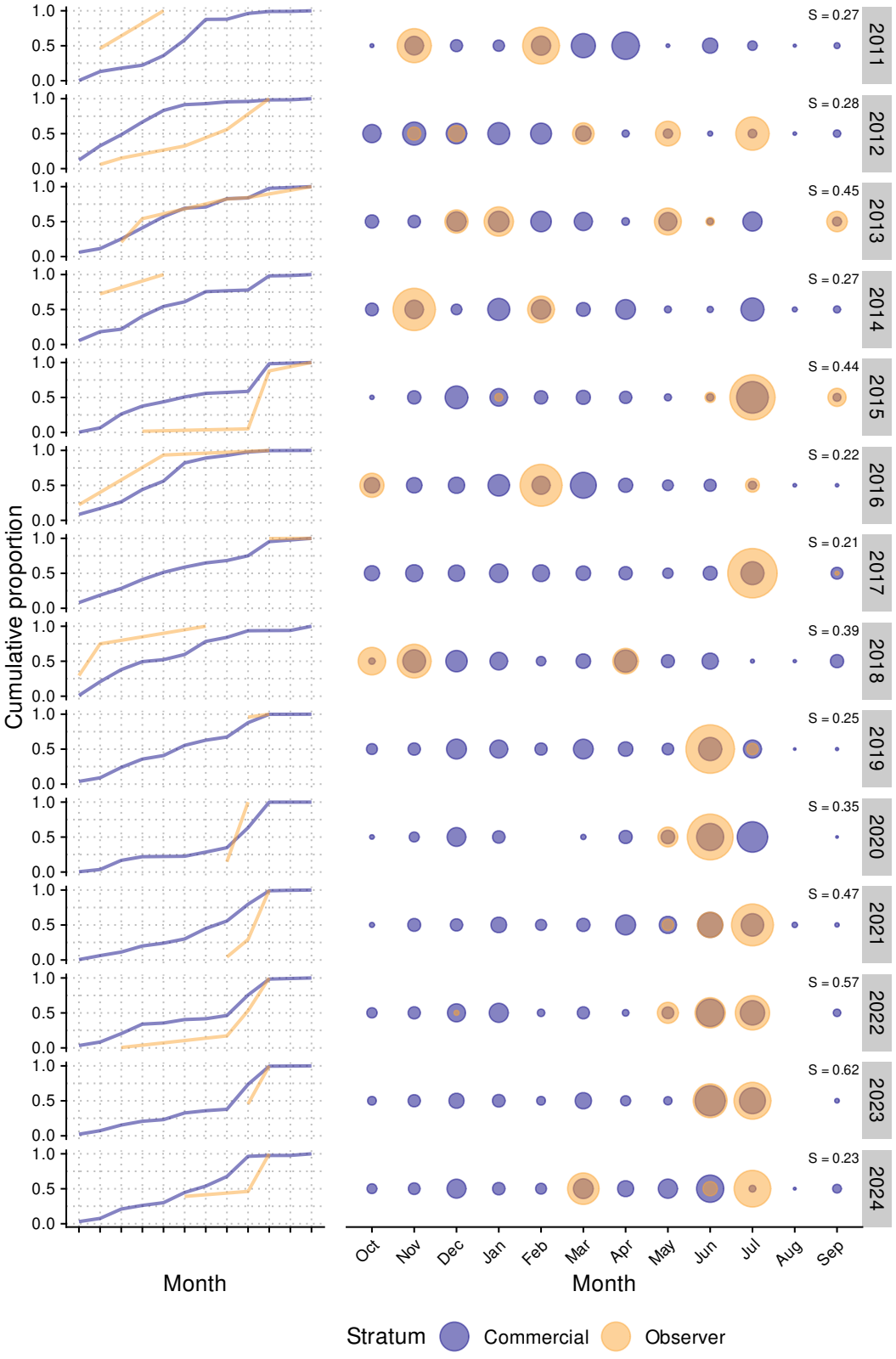


Figure 239: Monthly representativeness of observer sampling coverage of Trawl catch in RIB 4, from events where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

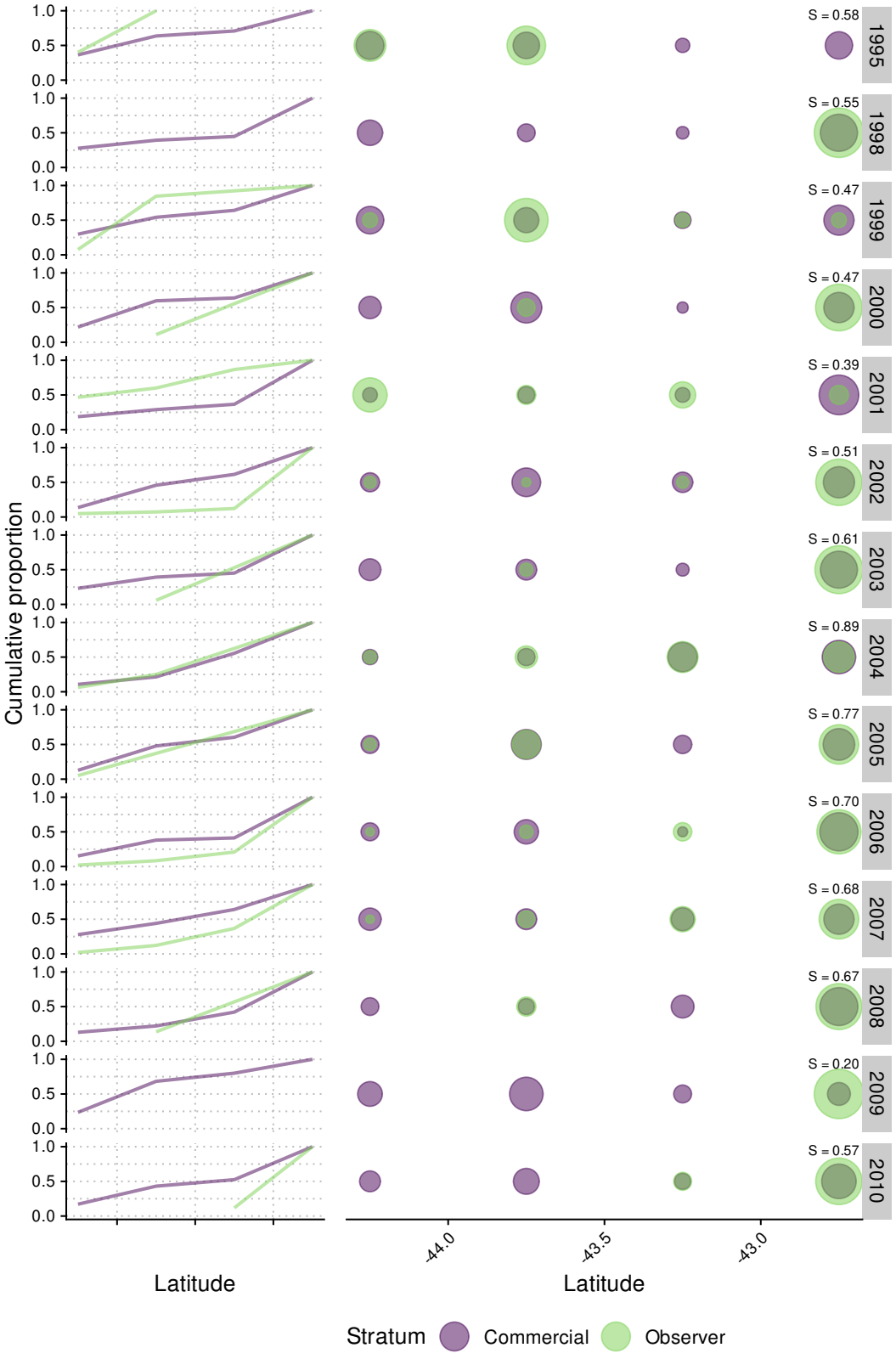


Figure 240: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 4, where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

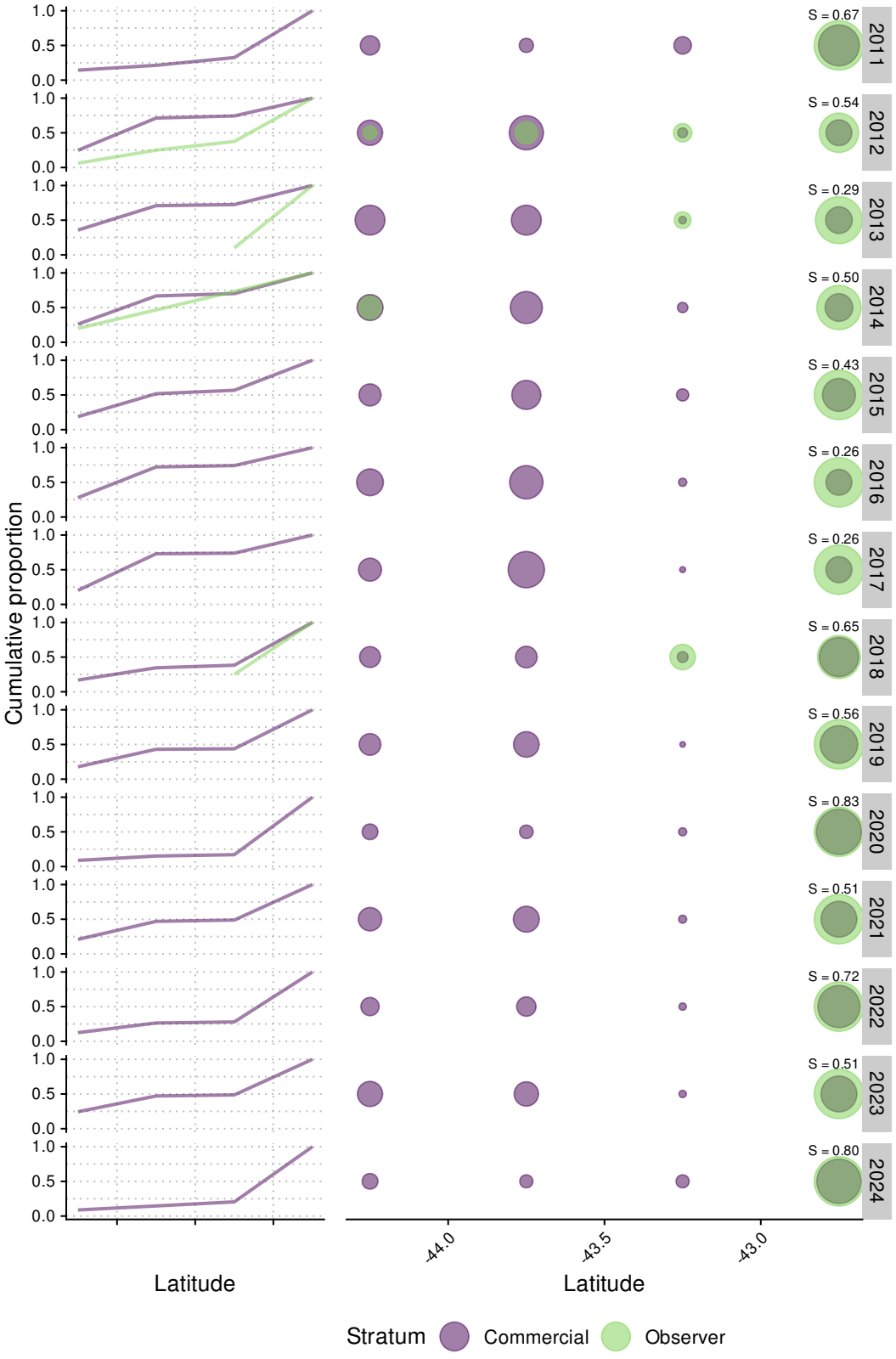


Figure 241: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 4, where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

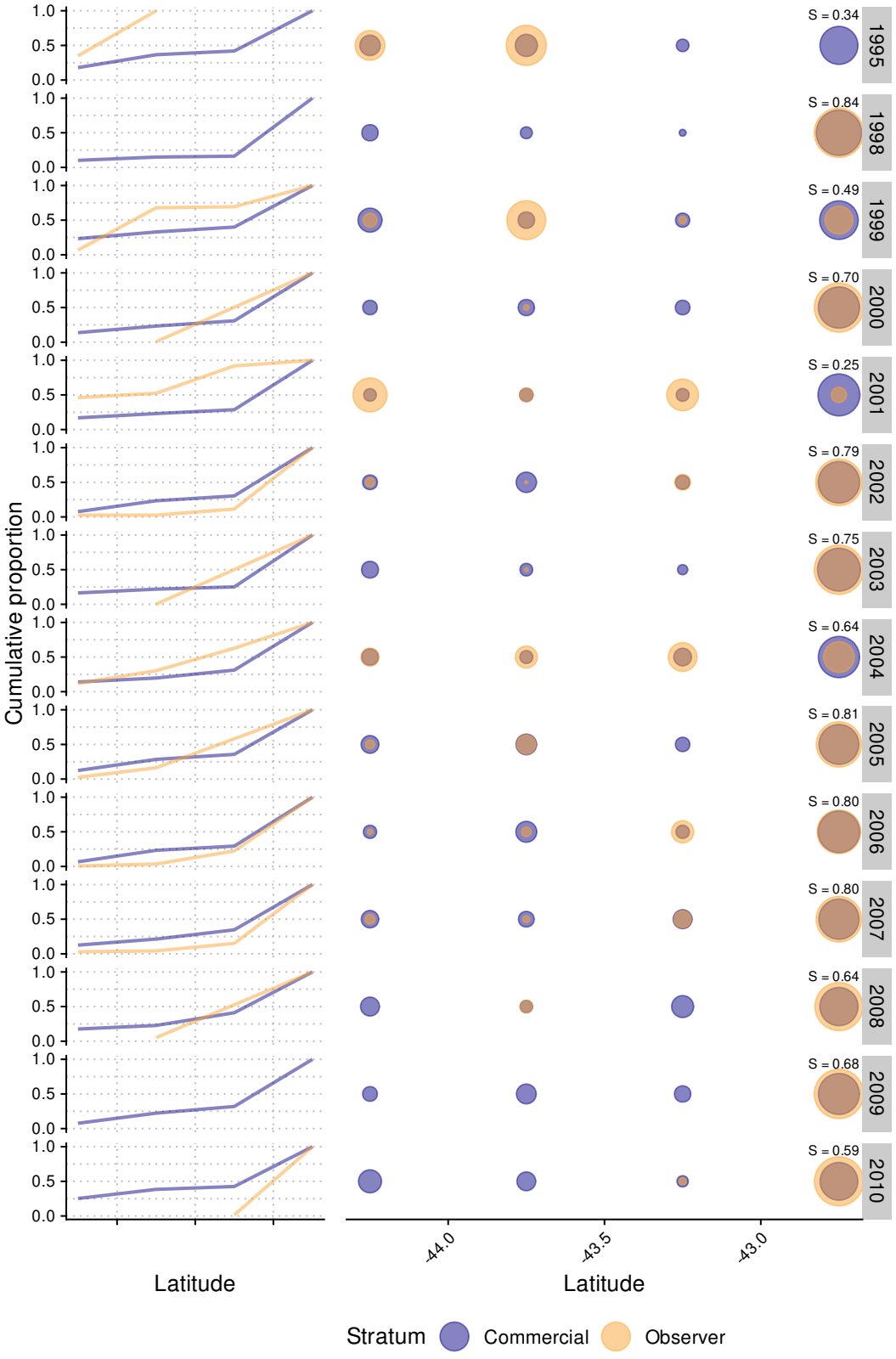


Figure 242: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RIB 4, from events where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

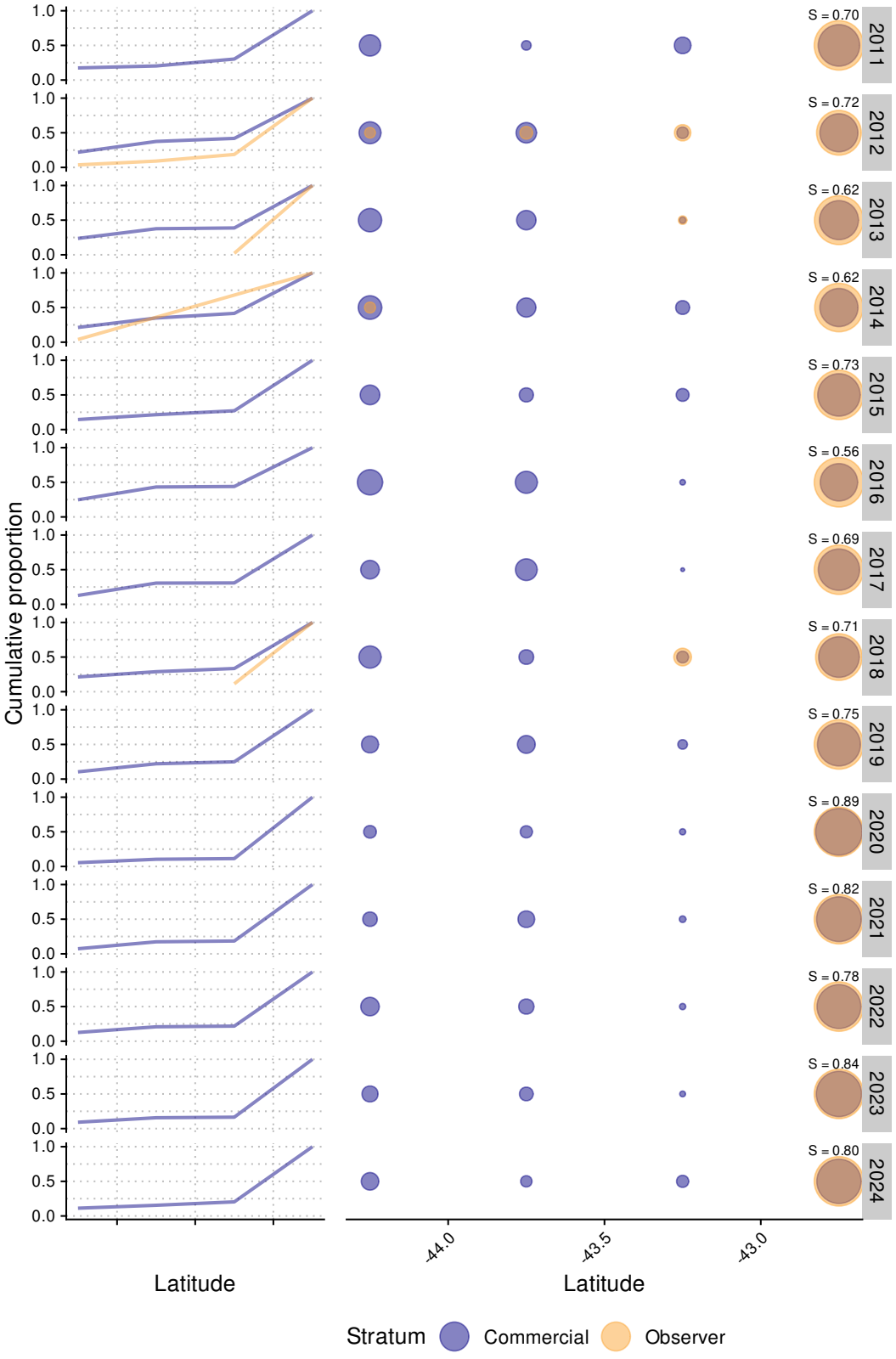


Figure 243: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RIB 4, from events where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

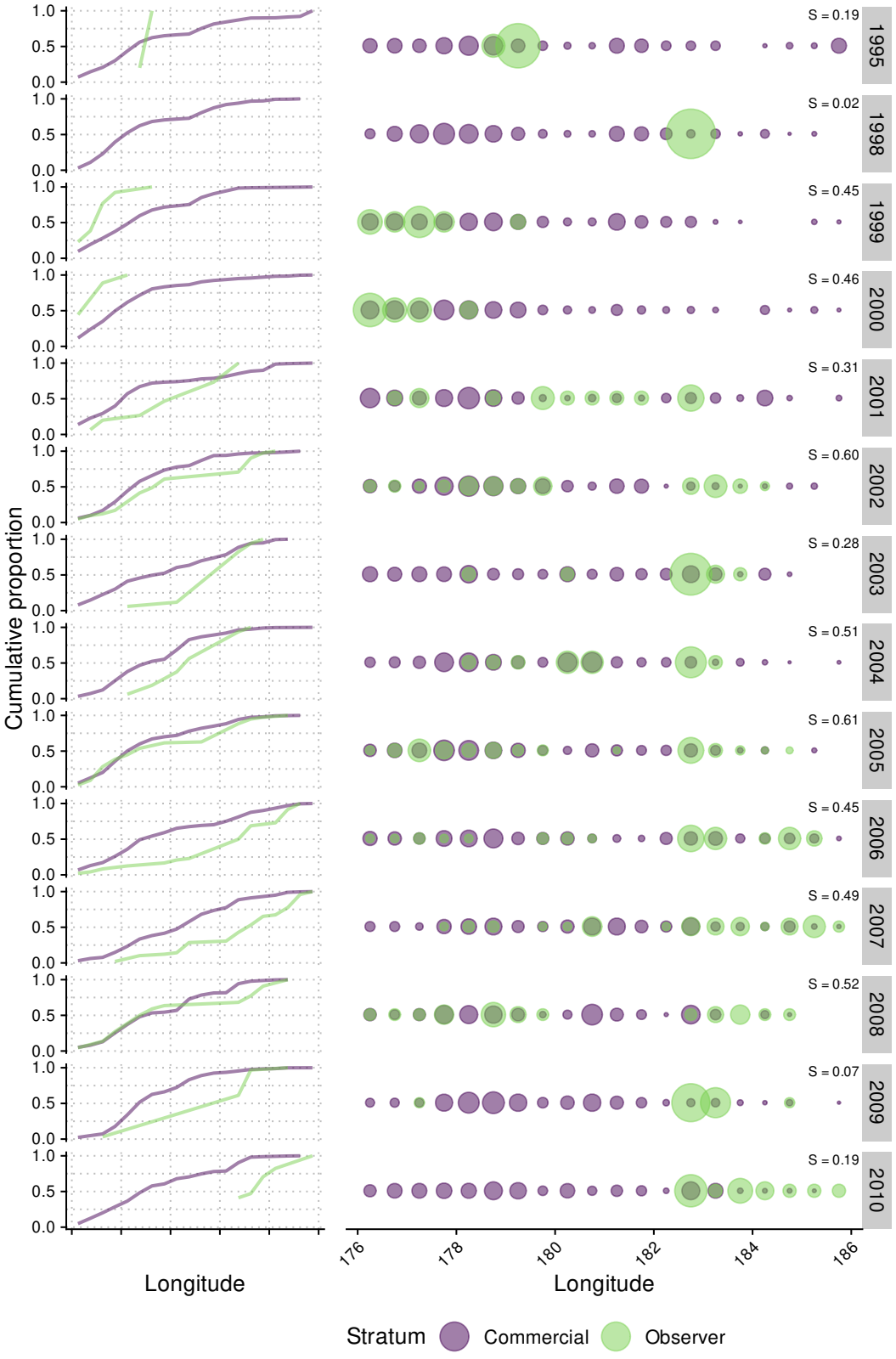


Figure 244: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 4, where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

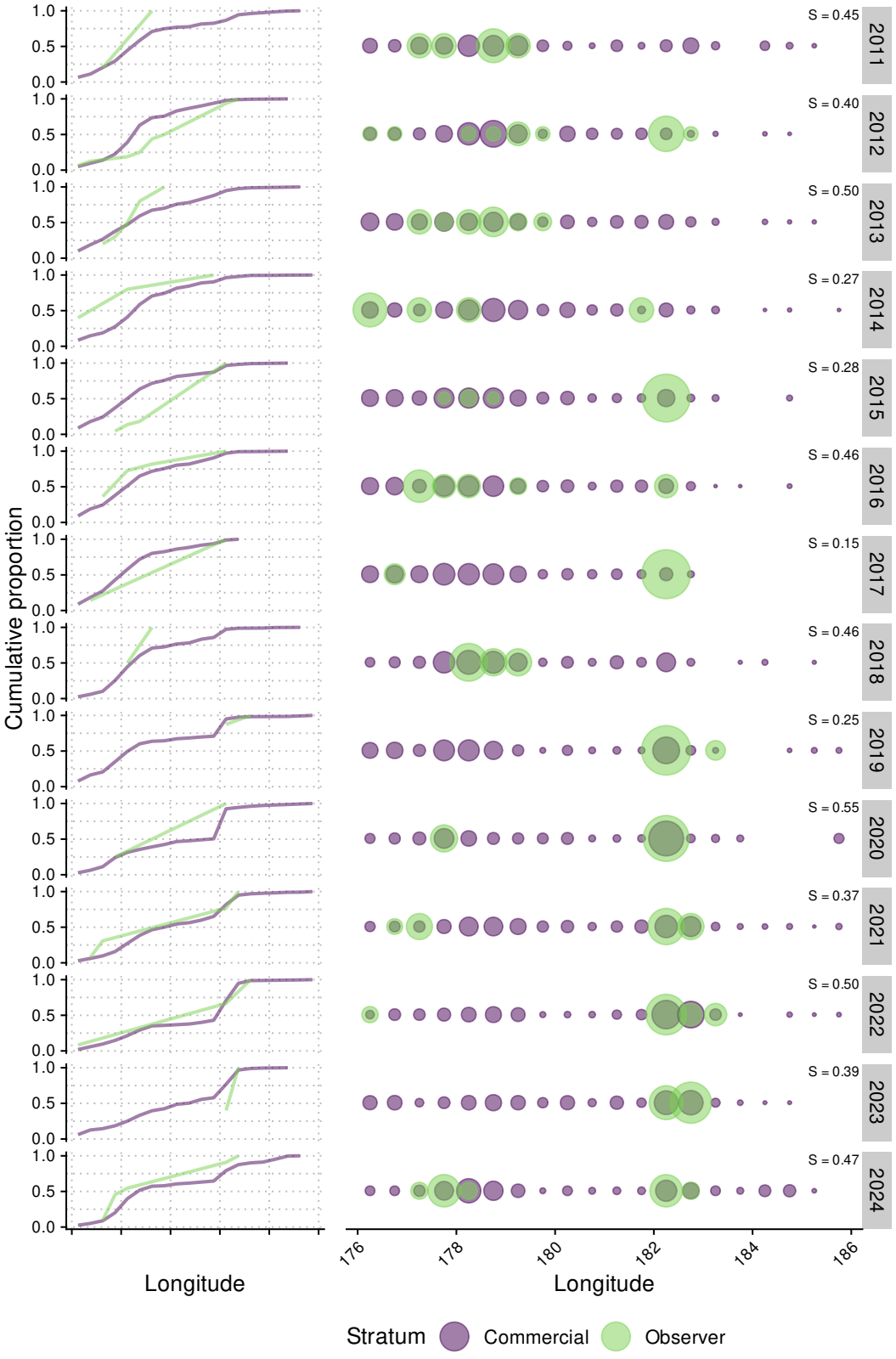


Figure 245: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 4, where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

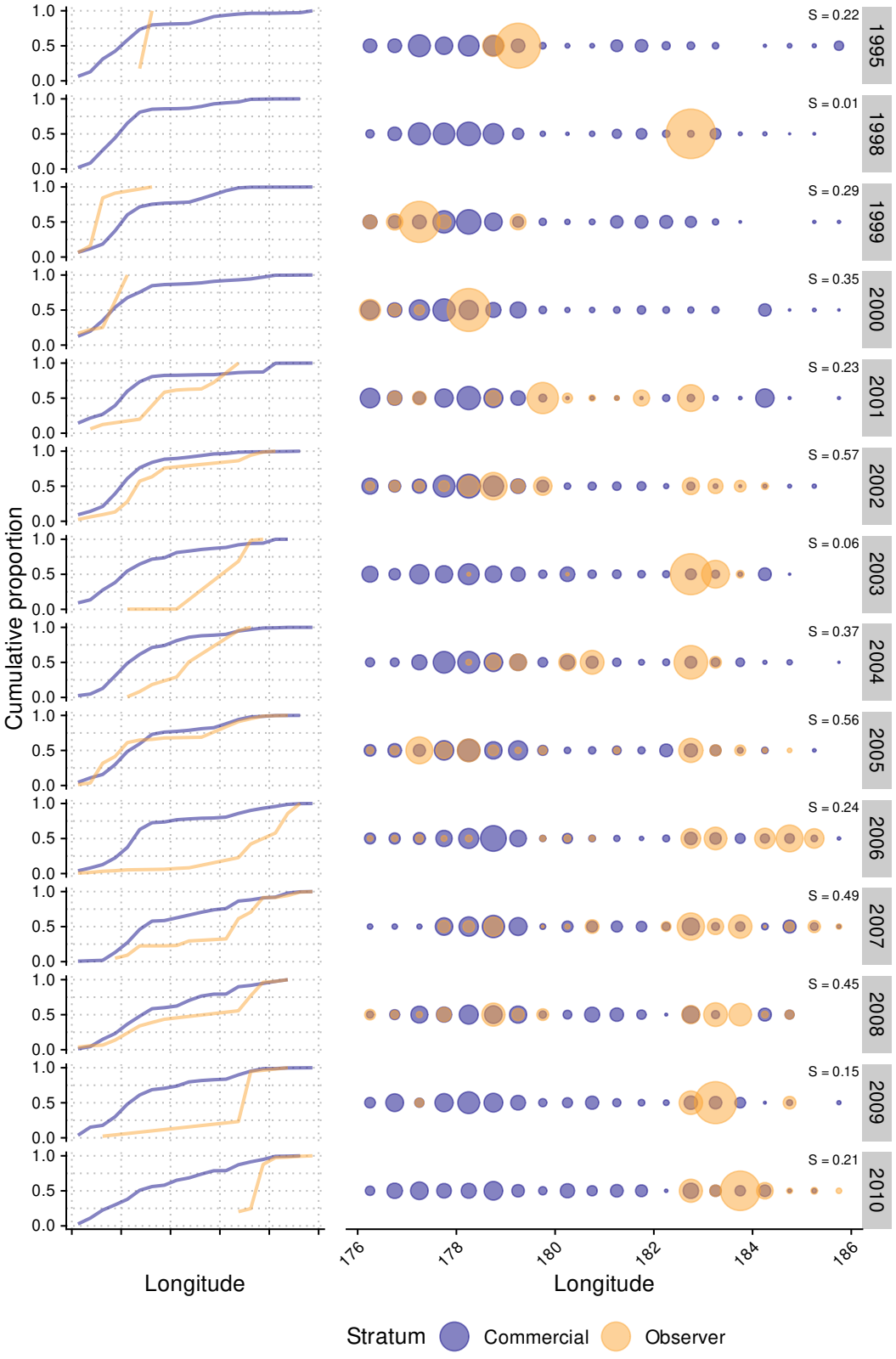


Figure 246: Longitudinal representativeness of observer sampling coverage of Trawl catch in RIB 4, from events where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

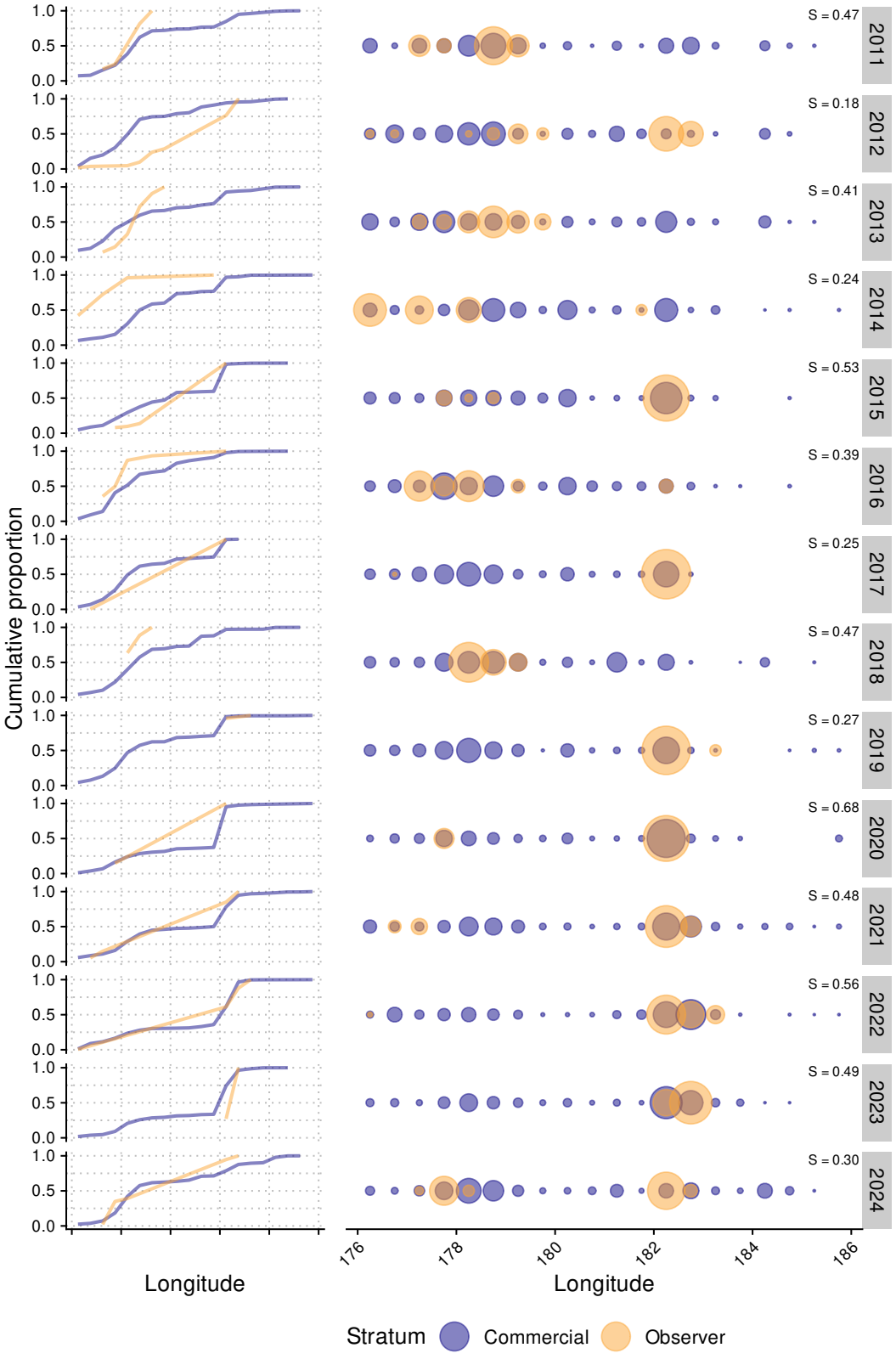


Figure 247: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RIB 4, from events where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

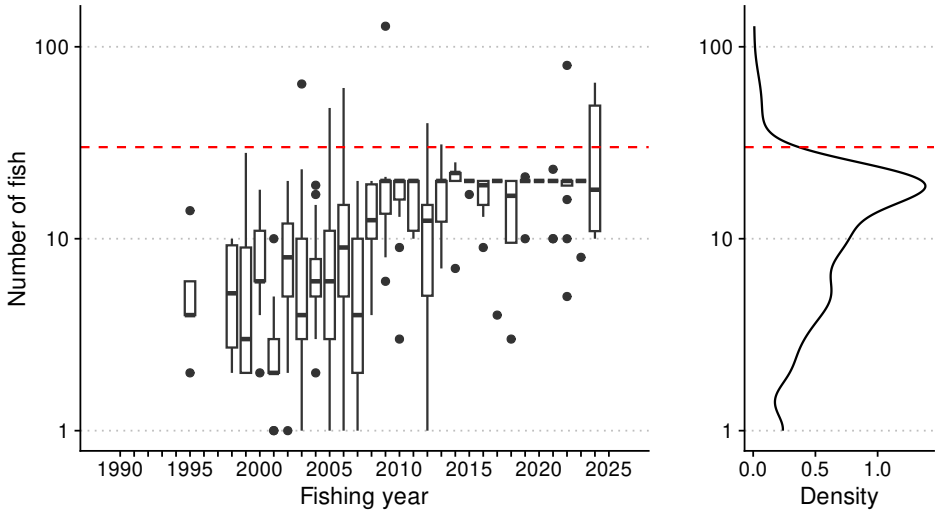


Figure 248: **Length-frequency sample sizes for observed fishing events in RIB 4 where ribaldo were sampled. The red dashed line indicates a sample size of 30 fish.**

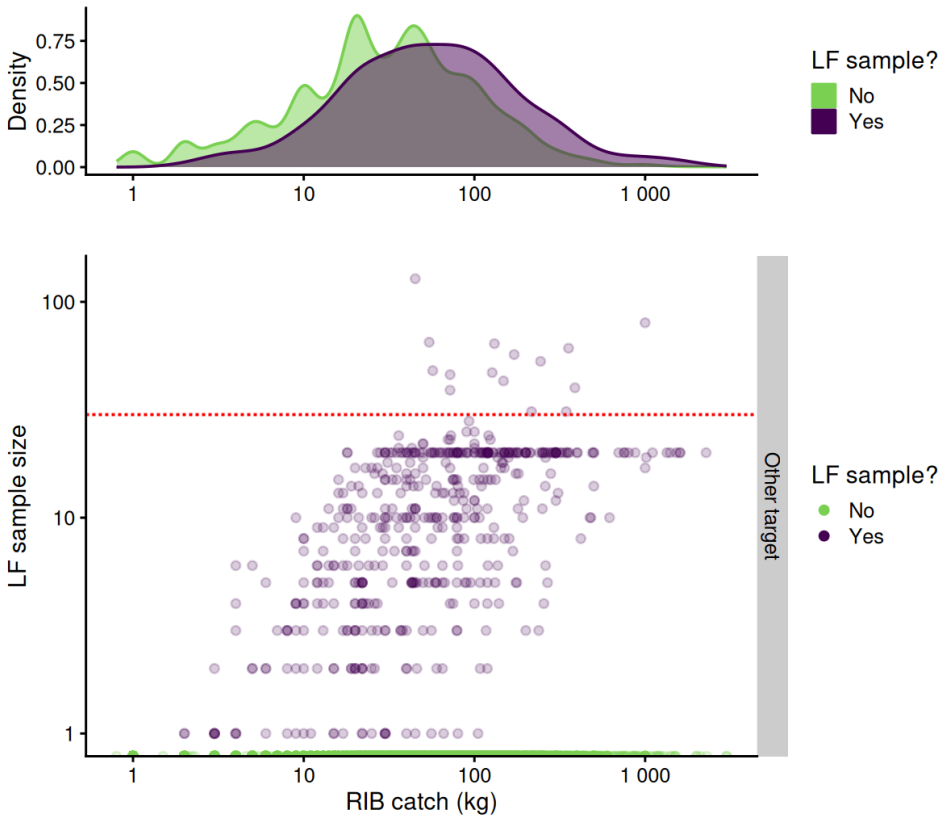


Figure 249: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in RIB 4 in relation to the total ribaldo catch from an event, separately for ribaldo target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.4.4.2 Otolith samples

Table 25: Otolith samples of ribaldo from the RIB 4 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	137	0	0	0.00
1991	255	0	0	0.00
1992	316	0	0	0.00
1993	349	0	0	0.00
1994	95	0	0	0.00
1995	359	0	0	0.00
1996	90	0	0	0.00
1997	218	0	0	0.00
1998	378	0	0	0.00
1999	266	0	0	0.00
2000	339	0	0	0.00
2001	253	0	0	0.00
2002	226	0	0	0.00
2003	312	0	0	0.00
2004	475	0	0	0.00
2005	250	0	0	0.00
2006	118	0	0	0.00
2007	226	0	0	0.00
2008	202	0	0	0.00
2009	122	6	55	4.92
2010	155	0	0	0.00
2011	101	1	5	0.99
2012	100	1	5	1.00
2013	120	10	67	8.33
2014	131	5	31	3.82
2015	127	14	71	11.02
2016	65	7	36	10.77
2017	110	0	0	0.00
2018	323	3	15	0.93
2019	196	8	36	4.08
2020	324	4	20	1.23
2021	469	13	66	2.77
2022	447	11	58	2.46
2023	288	15	74	5.21
2024	274	6	30	2.19
2025	317	0	0	0.00

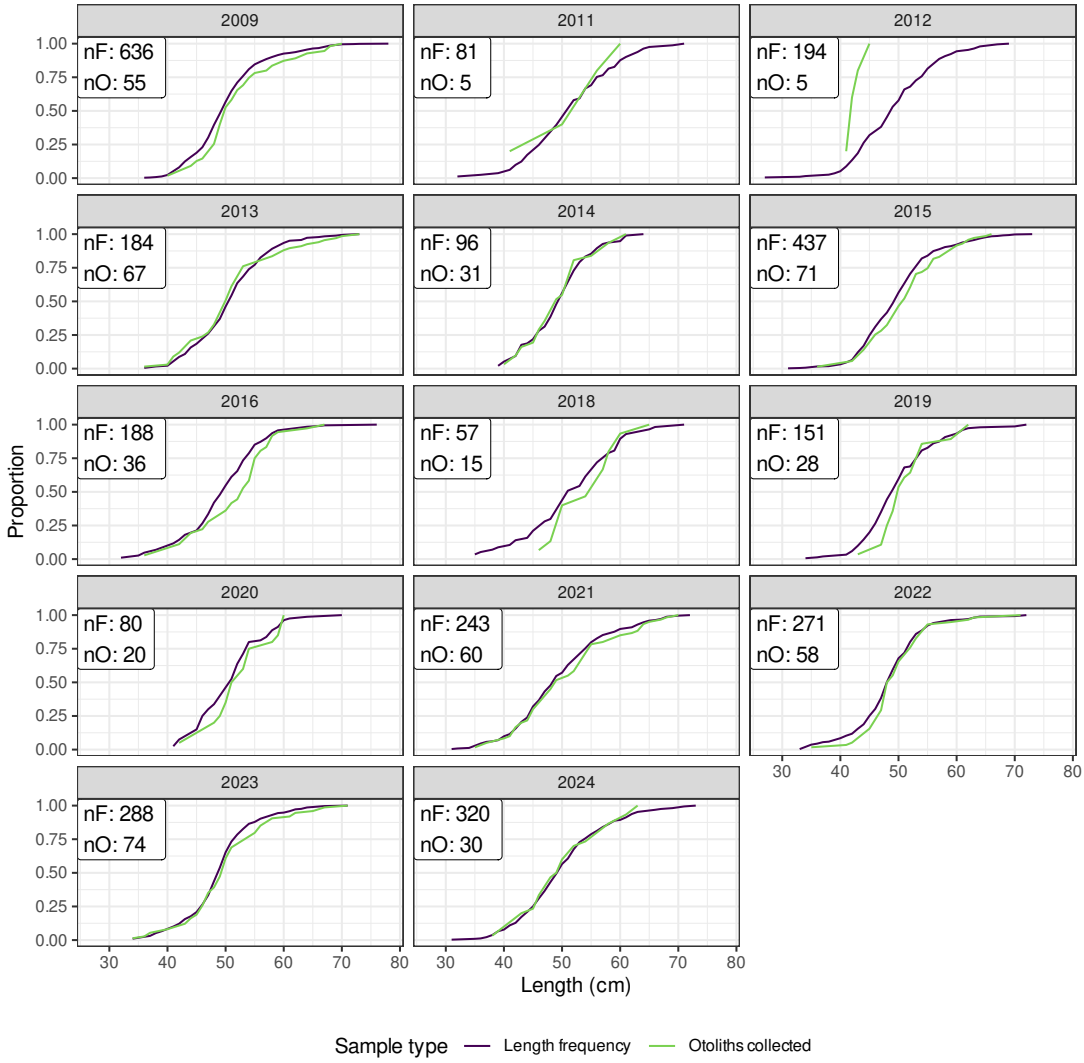


Figure 250: Cumulative distributions of the length of fish in the length frequency and otolith samples of ribaldo in the RIB 4 Trawl fishery for the 2009 to 2024 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.4.4.3 Catch quantification

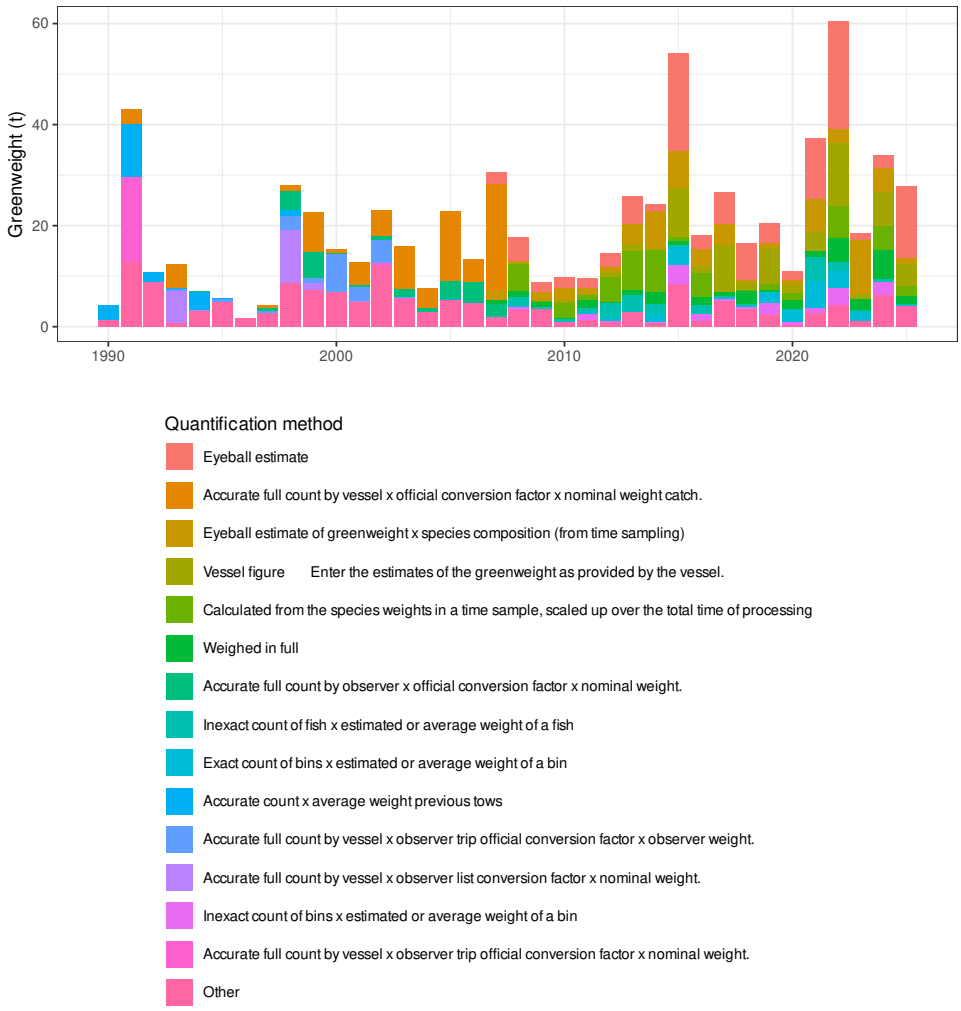


Figure 251: Methods used by observers to quantify the catch of ribaldo in the RIB 4 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.4.5 RIB 5: Trawl fishery

2.4.5.1 Length-frequency samples

Table 26: Length-frequency samples of ribaldo from the RIB 5 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	136	0	0	0.00
1991	147	0	0	0.00
1992	214	0	0	0.00
1993	297	0	0	0.00
1994	93	0	0	0.00
1995	98	0	0	0.00
1996	76	0	0	0.00
1997	136	0	0	0.00
1998	284	0	0	0.00
1999	195	10	168	5.13
2000	144	14	71	9.72
2001	264	8	68	3.03
2002	137	6	41	4.38
2003	97	3	19	3.09
2004	49	2	4	4.08
2005	36	1	1	2.78
2006	56	1	1	1.79
2007	76	2	18	2.63
2008	53	6	85	11.32
2009	52	1	12	1.92
2010	37	0	0	0.00
2011	34	0	0	0.00
2012	48	0	0	0.00
2013	41	4	54	9.76
2014	61	0	0	0.00
2015	34	0	0	0.00
2016	70	6	113	8.57
2017	50	0	0	0.00
2018	135	3	47	2.22
2019	103	0	0	0.00
2020	79	0	0	0.00
2021	82	0	0	0.00
2022	68	0	0	0.00
2023	82	0	0	0.00
2024	95	0	0	0.00
2025	222	0	0	0.00

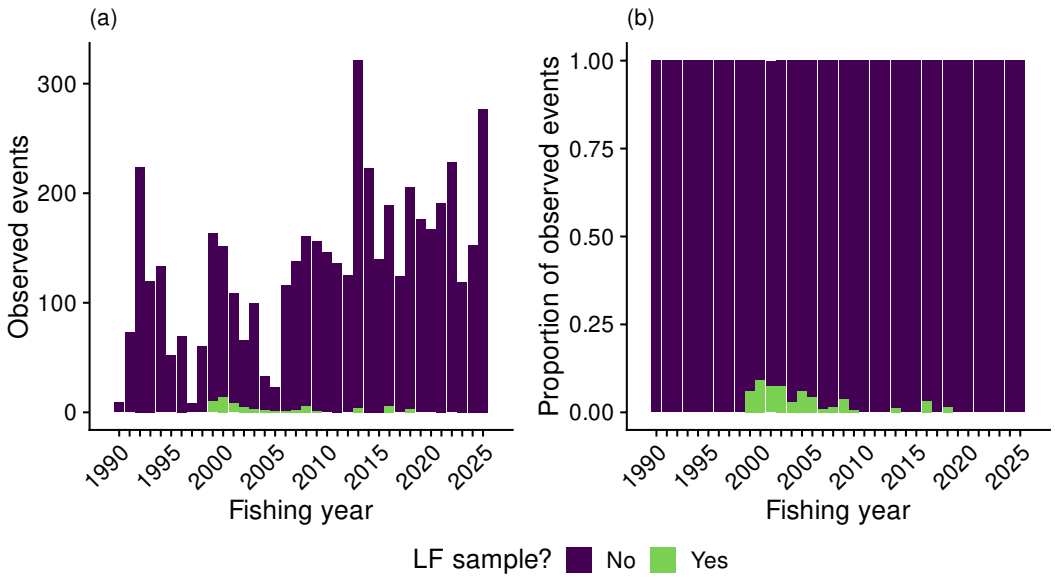


Figure 252: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RIB 5 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

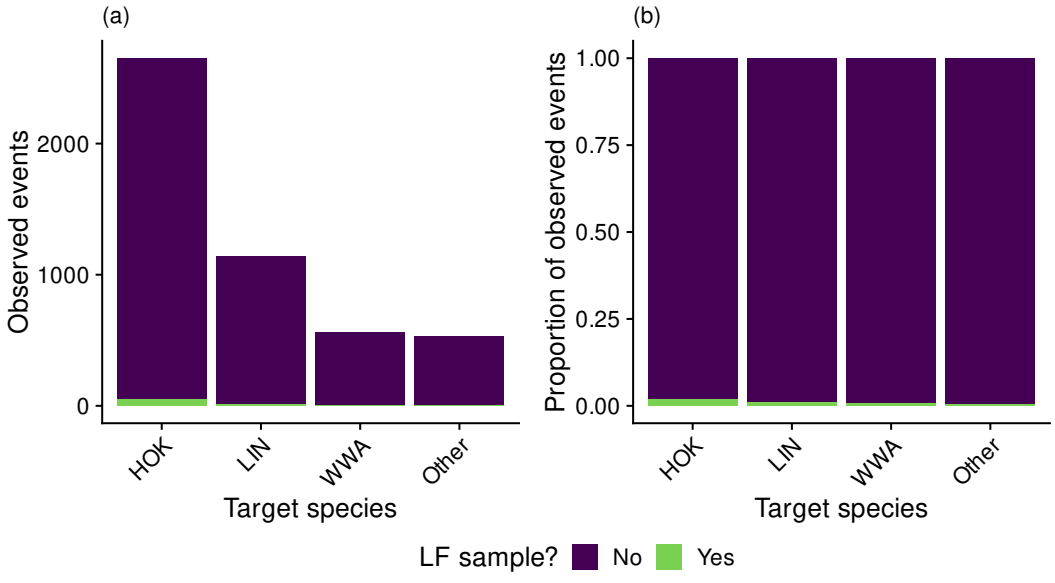


Figure 253: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RIB 5 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

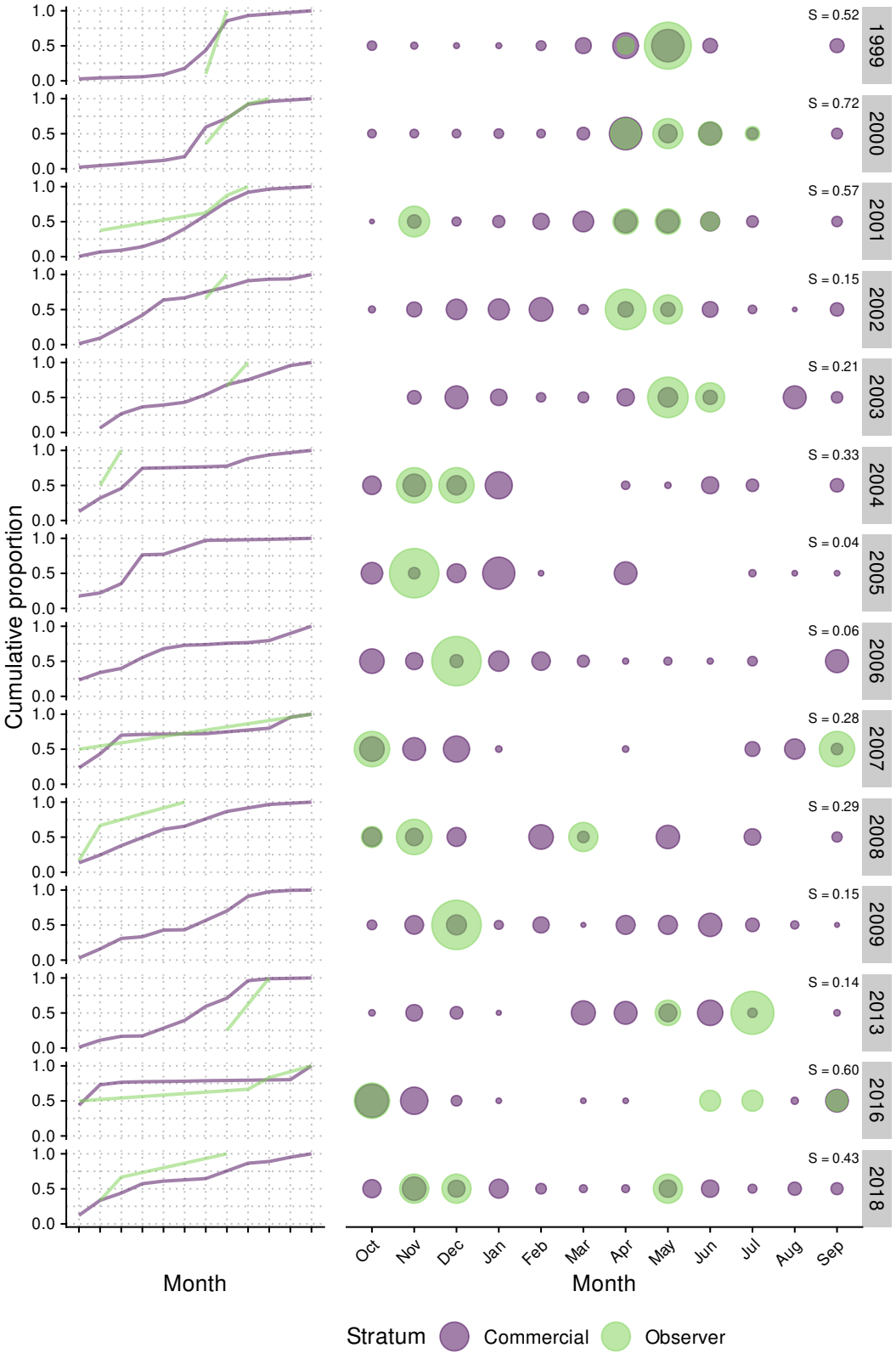


Figure 254: Monthly representativeness of observer sampling coverage of Trawl fishing events in RIB 5, where the ribaldo catch exceeded the 20kg threshold, in 1999 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

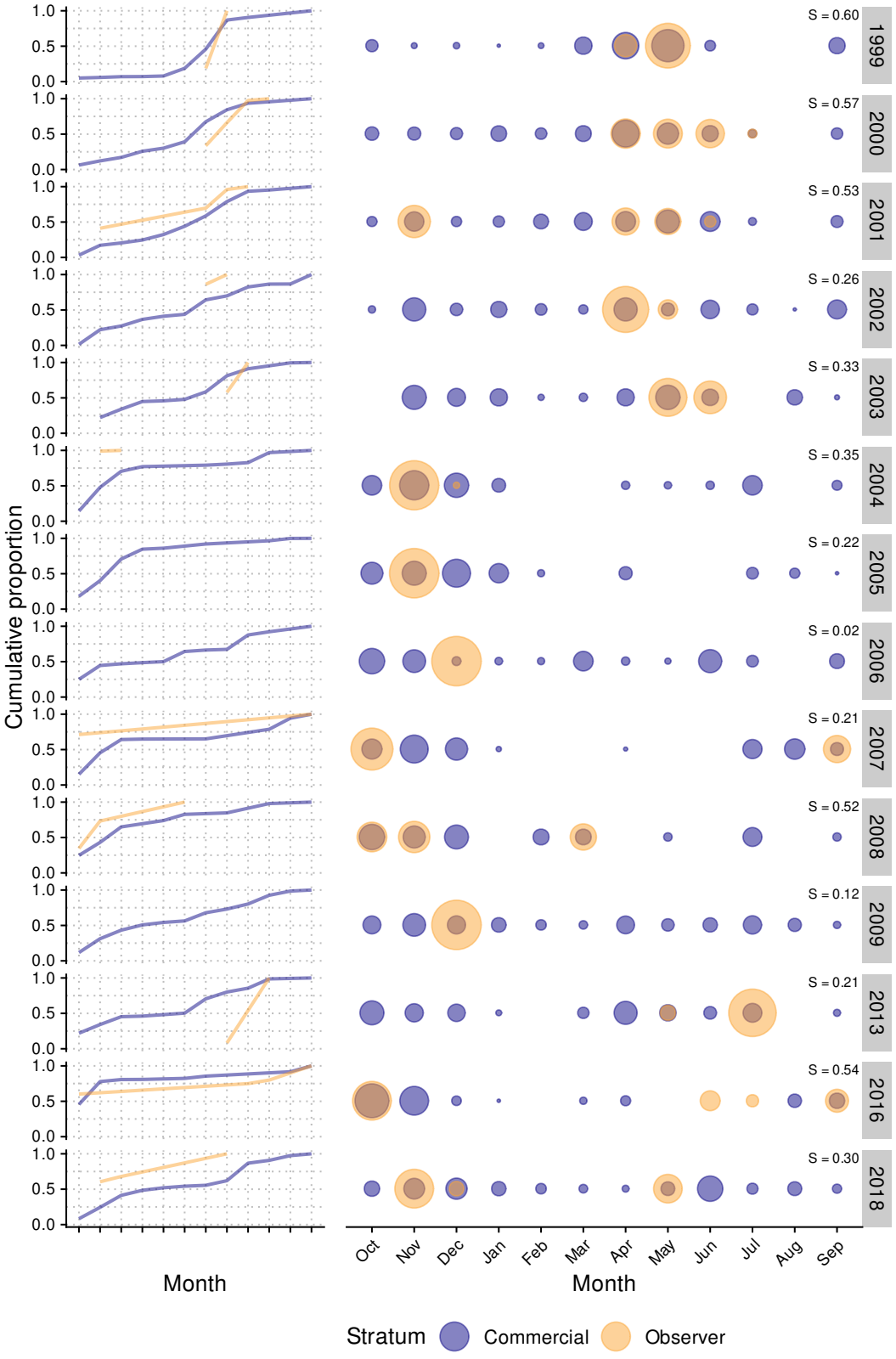


Figure 255: **Monthly representativeness of observer sampling coverage of Trawl catch in RIB 5, from events where the ribaldo catch exceeded the 20kg threshold, in 1999 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

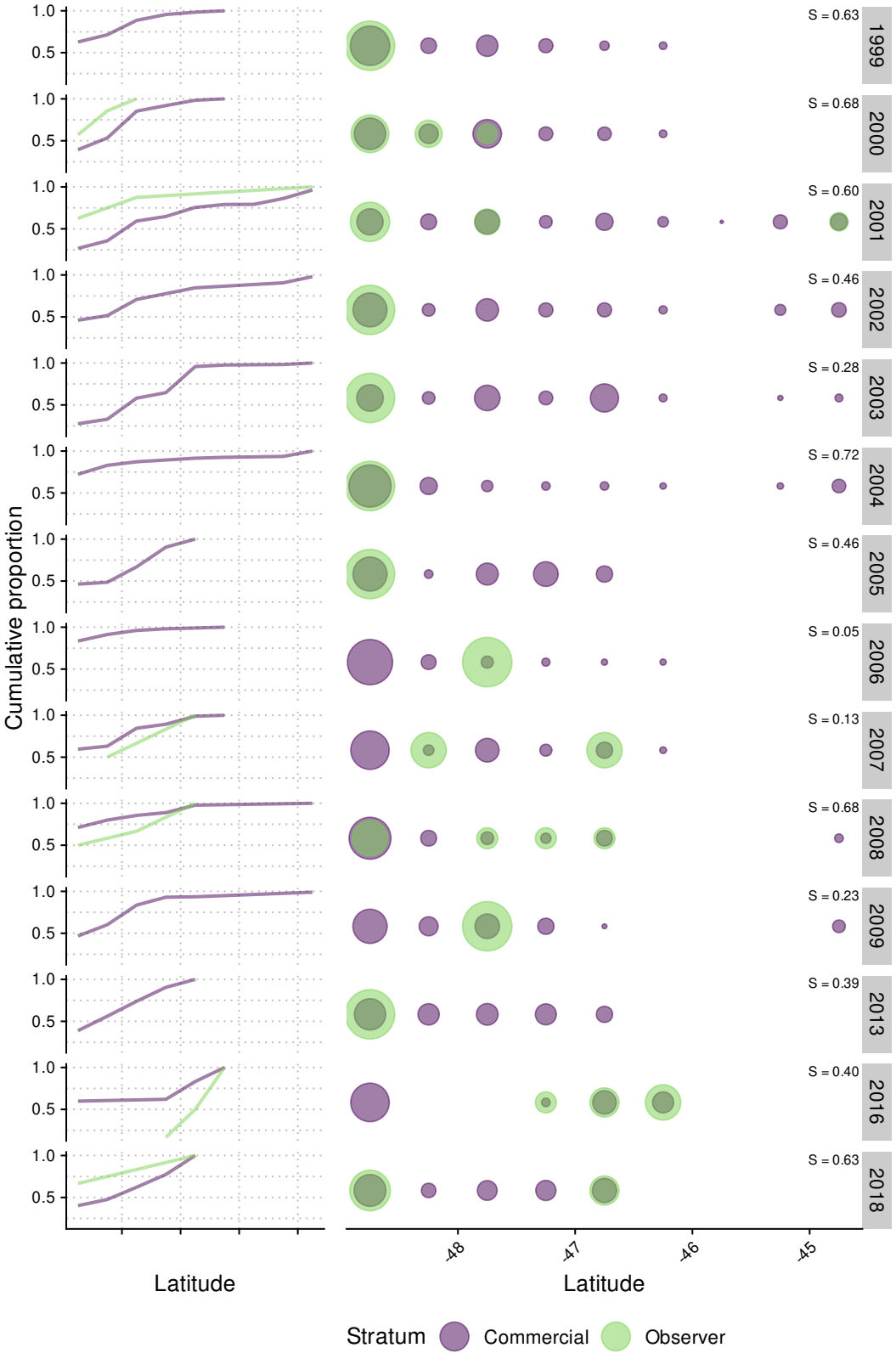


Figure 256: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 5, where the ribaldo catch exceeded the 20kg threshold, in 1999 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

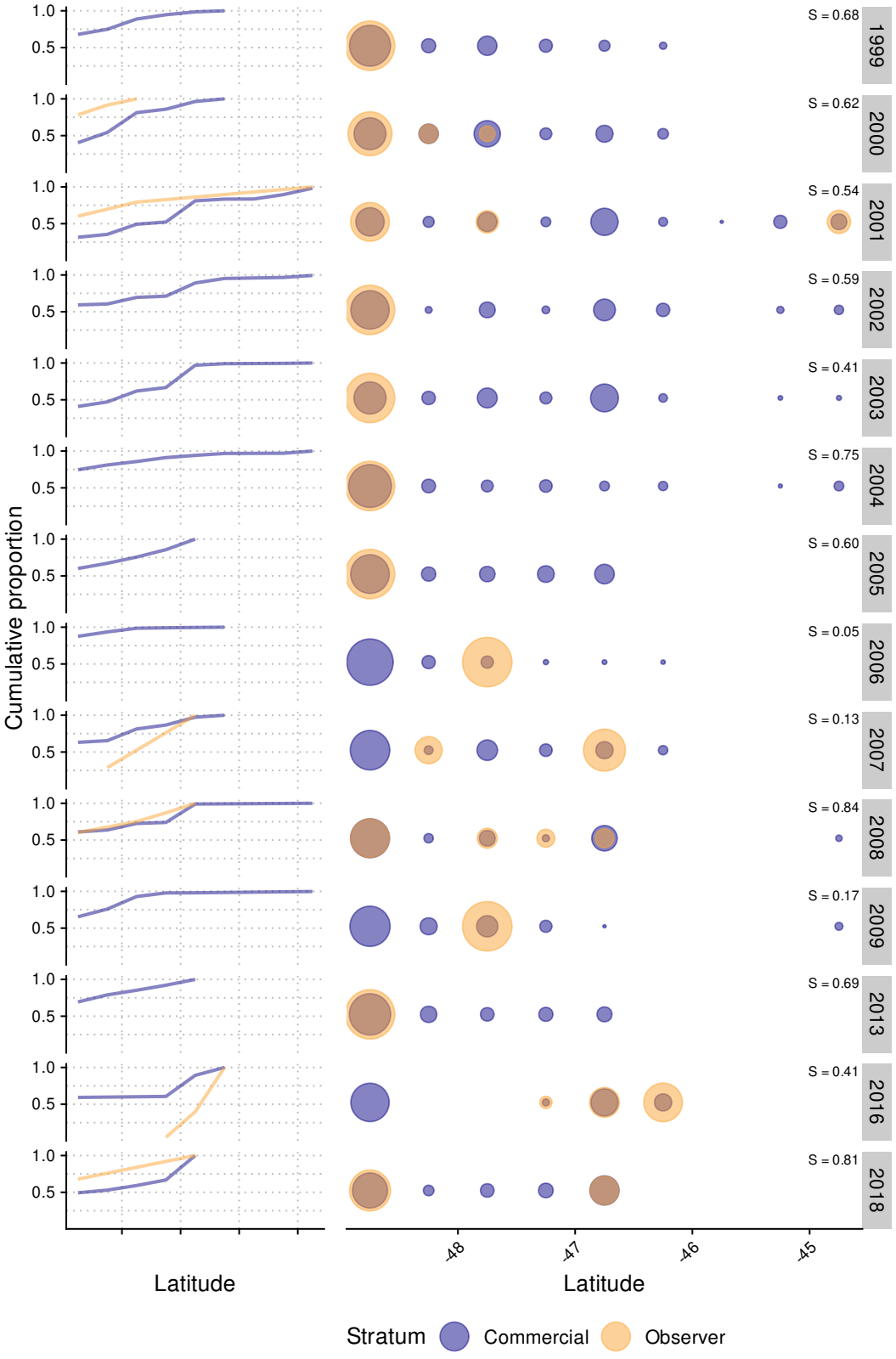


Figure 257: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RIB 5, from events where the ribaldo catch exceeded the 20kg threshold, in 1999 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

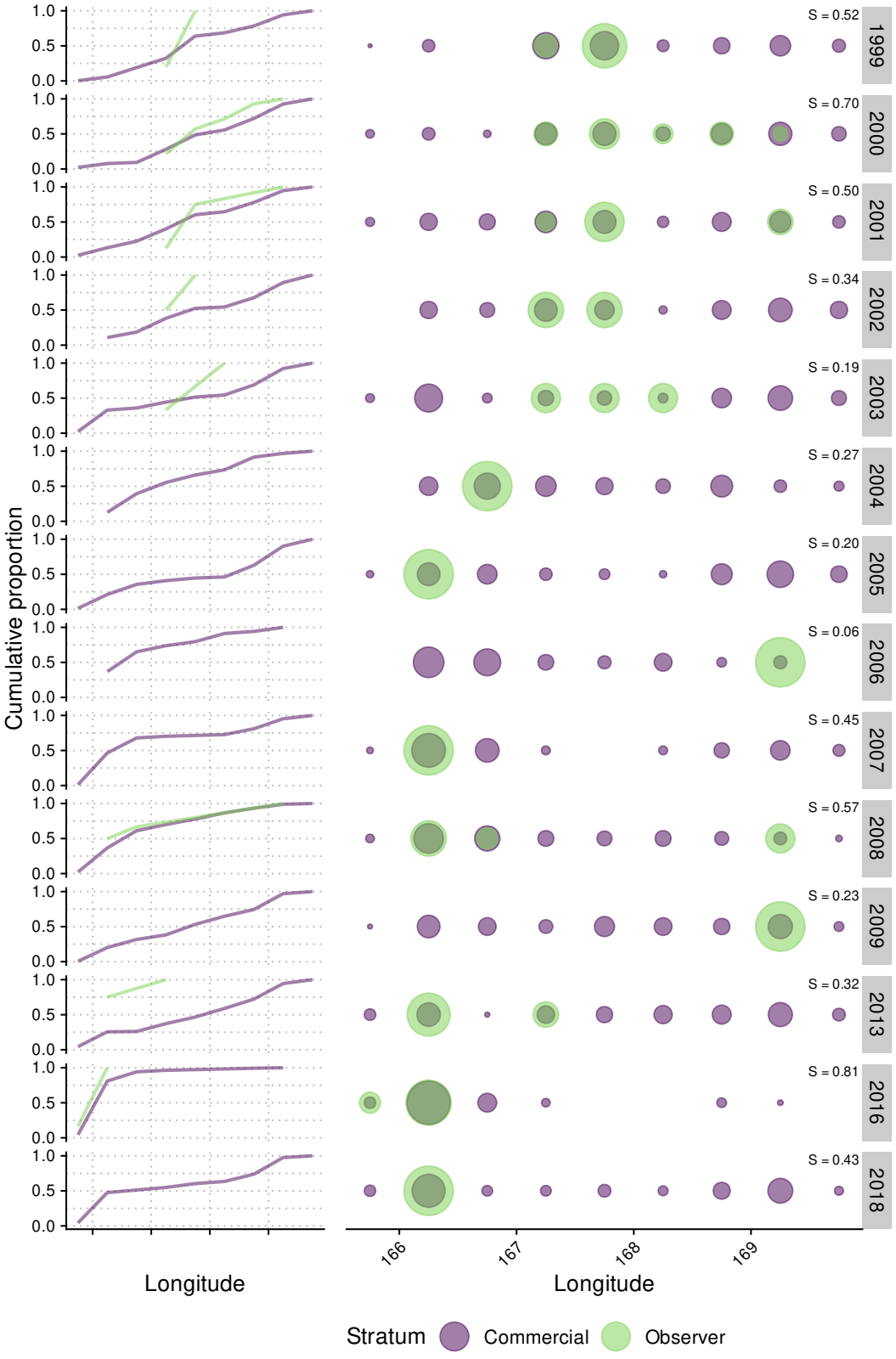


Figure 258: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 5, where the ribaldo catch exceeded the 20kg threshold, in 1999 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

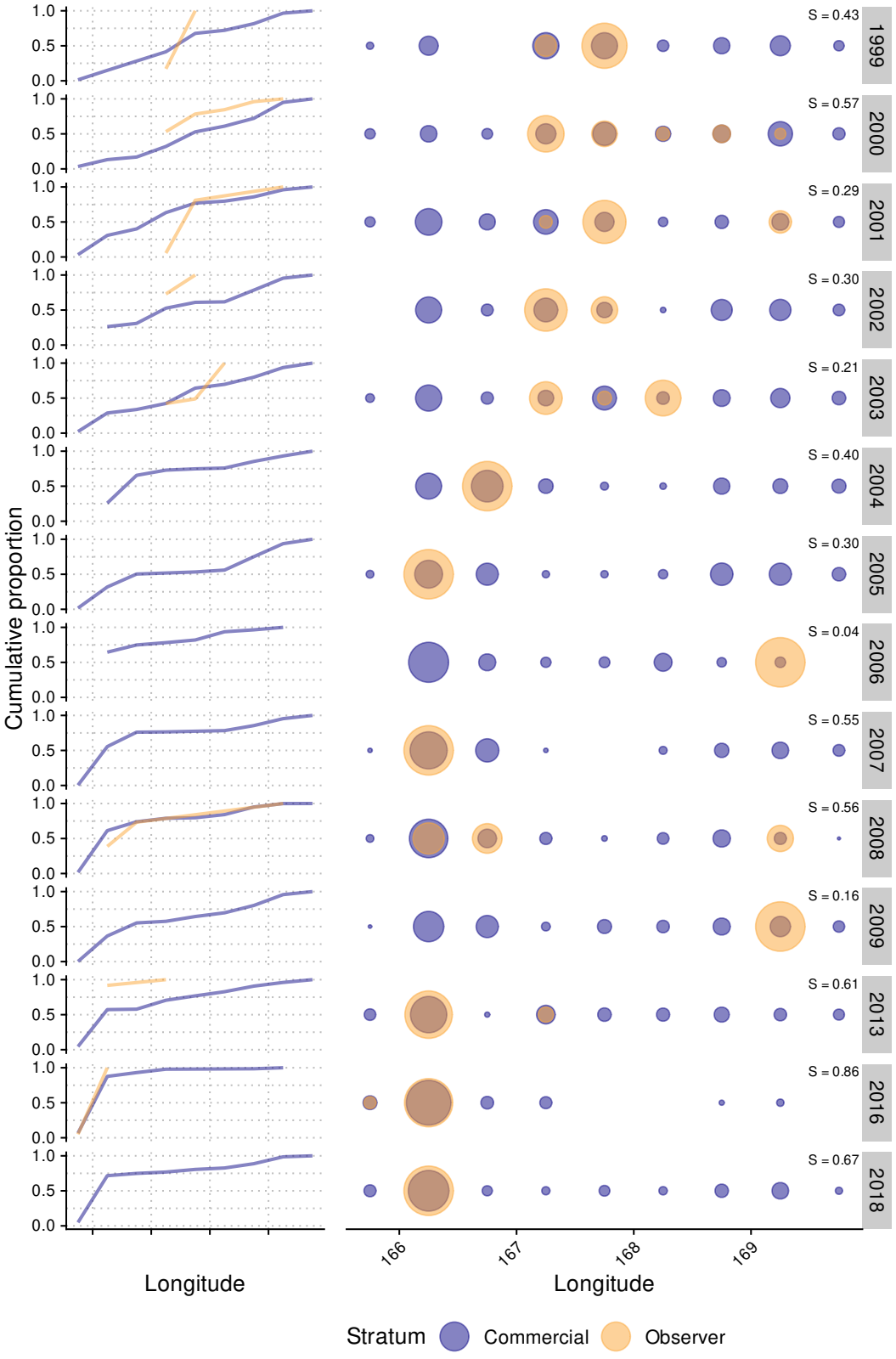


Figure 259: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RIB 5, from events where the ribaldo catch exceeded the 20kg threshold, in 1999 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

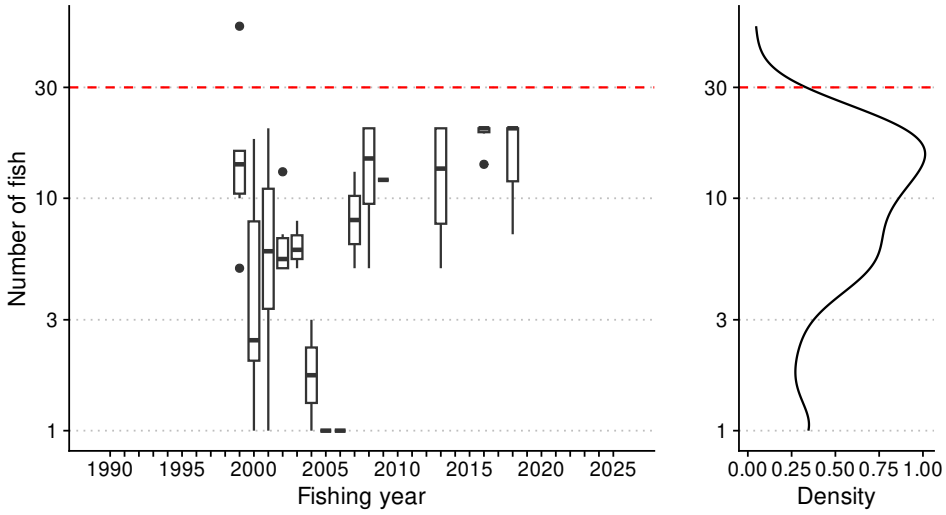


Figure 260: Length-frequency sample sizes for observed fishing events in RIB 5 where ribaldo were sampled. The red dashed line indicates a sample size of 30 fish.

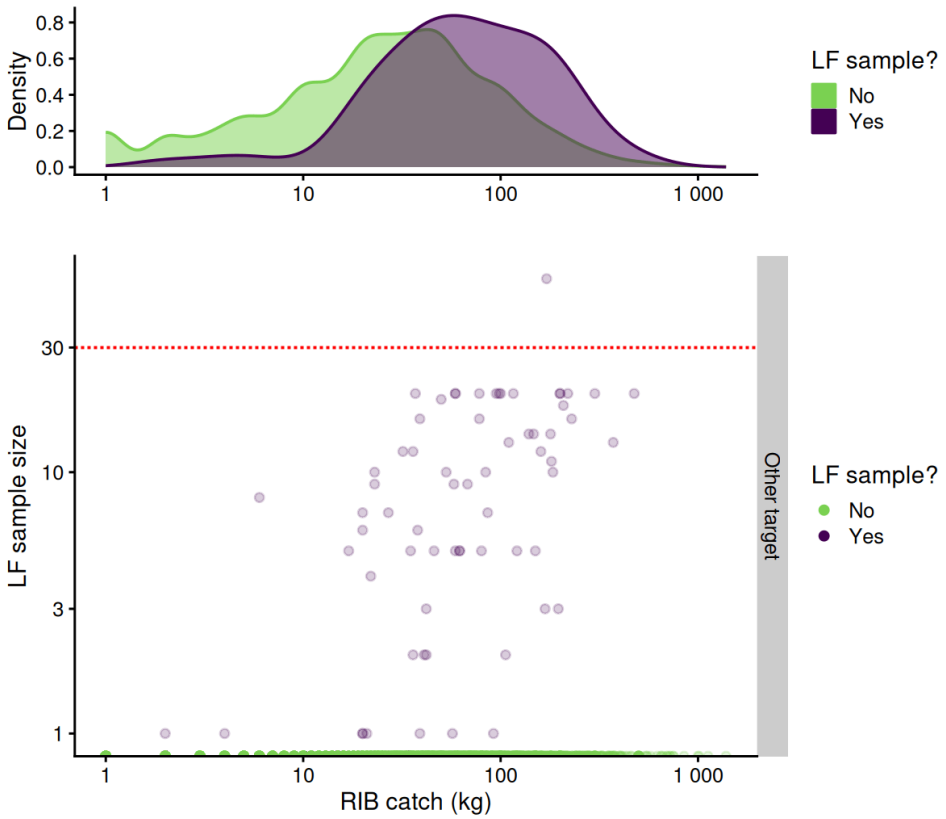


Figure 261: Length-frequency sample sizes (number of fish sampled) for observed fishing events in RIB 5 in relation to the total ribaldo catch from an event, separately for ribaldo target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.4.5.2 Otolith samples

Table 27: Otolith samples of ribaldo from the RIB 5 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	136	0	0	0.00
1991	147	0	0	0.00
1992	214	0	0	0.00
1993	297	0	0	0.00
1994	93	0	0	0.00
1995	98	0	0	0.00
1996	76	0	0	0.00
1997	136	0	0	0.00
1998	284	0	0	0.00
1999	195	0	0	0.00
2000	144	0	0	0.00
2001	264	0	0	0.00
2002	137	0	0	0.00
2003	97	0	0	0.00
2004	49	0	0	0.00
2005	36	0	0	0.00
2006	56	0	0	0.00
2007	76	0	0	0.00
2008	53	0	0	0.00
2009	52	0	0	0.00
2010	37	0	0	0.00
2011	34	0	0	0.00
2012	48	0	0	0.00
2013	41	4	20	9.76
2014	61	0	0	0.00
2015	34	0	0	0.00
2016	70	5	25	7.14
2017	50	0	0	0.00
2018	135	3	15	2.22
2019	103	0	0	0.00
2020	79	0	0	0.00
2021	82	0	0	0.00
2022	68	0	0	0.00
2023	82	0	0	0.00
2024	95	0	0	0.00
2025	222	0	0	0.00

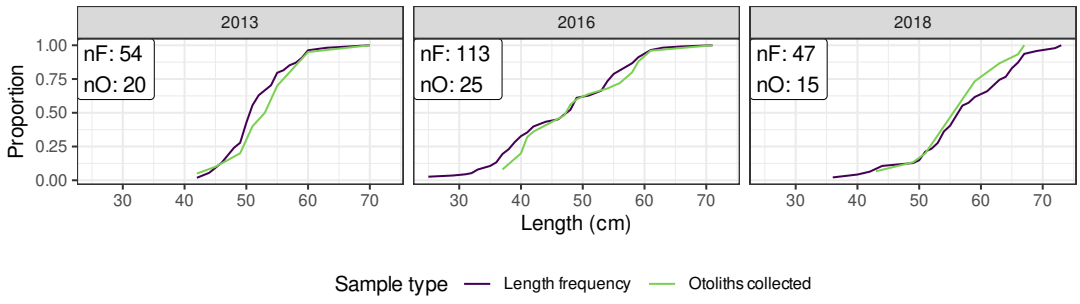


Figure 262: Cumulative distributions of the length of fish in the length frequency and otolith samples of ribaldo in the RIB 5 Trawl fishery for the 2013 to 2018 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.4.5.3 Catch quantification

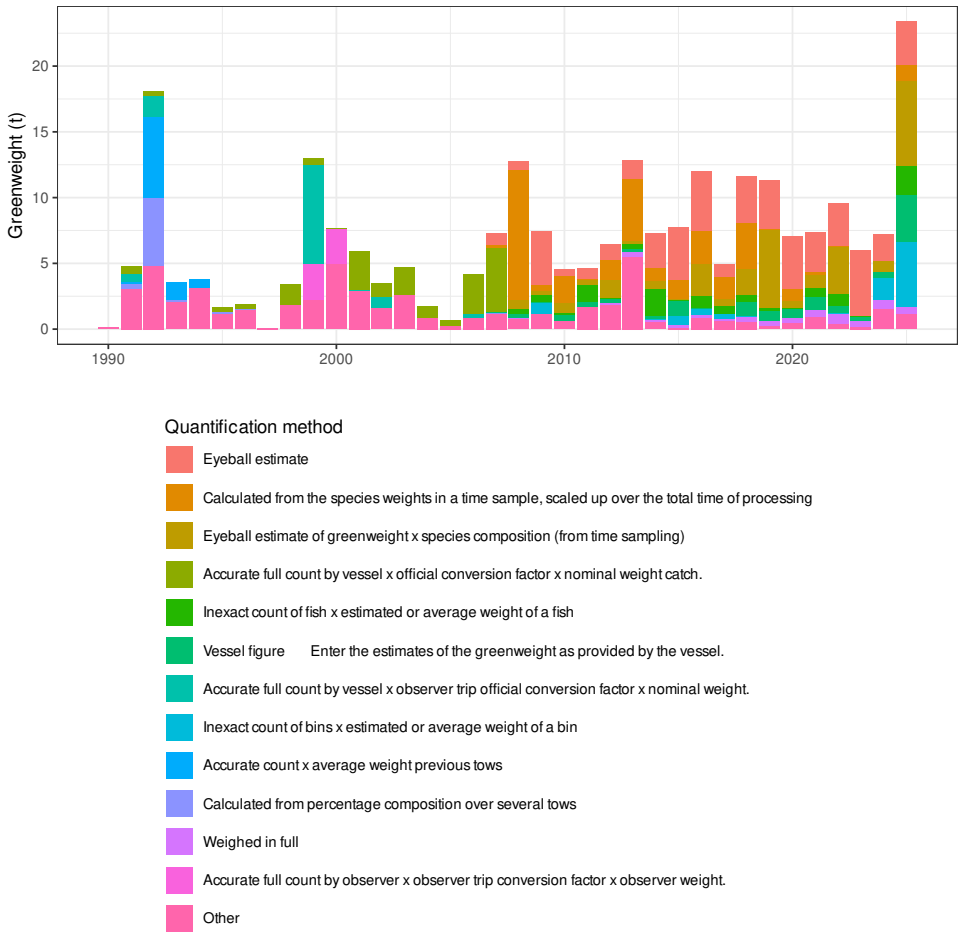


Figure 263: Methods used by observers to quantify the catch of ribaldo in the RIB 5 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.4.6 RIB 6: Trawl fishery

2.4.6.1 Length-frequency samples

Table 28: Length-frequency samples of ribaldo from the RIB 6 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	46	0	0	0.00
1991	482	0	0	0.00
1992	390	0	0	0.00
1993	352	0	0	0.00
1994	142	0	0	0.00
1995	210	1	11	0.48
1996	126	0	0	0.00
1997	240	0	0	0.00
1998	695	3	34	0.43
1999	653	38	729	5.82
2000	855	50	395	5.85
2001	601	23	381	3.83
2002	675	69	711	10.22
2003	448	17	126	3.79
2004	399	31	220	7.77
2005	243	21	159	8.64
2006	169	4	29	2.37
2007	160	11	45	6.88
2008	206	7	94	3.40
2009	130	5	34	3.85
2010	121	17	255	14.05
2011	122	6	41	4.92
2012	113	6	161	5.31
2013	214	4	50	1.87
2014	303	1	5	0.33
2015	154	1	20	0.65
2016	136	0	0	0.00
2017	146	0	0	0.00
2018	782	25	271	3.20
2019	473	0	0	0.00
2020	378	1	20	0.26
2021	434	2	40	0.46
2022	445	1	20	0.22
2023	596	21	415	3.52
2024	554	0	0	0.00
2025	484	4	33	0.83

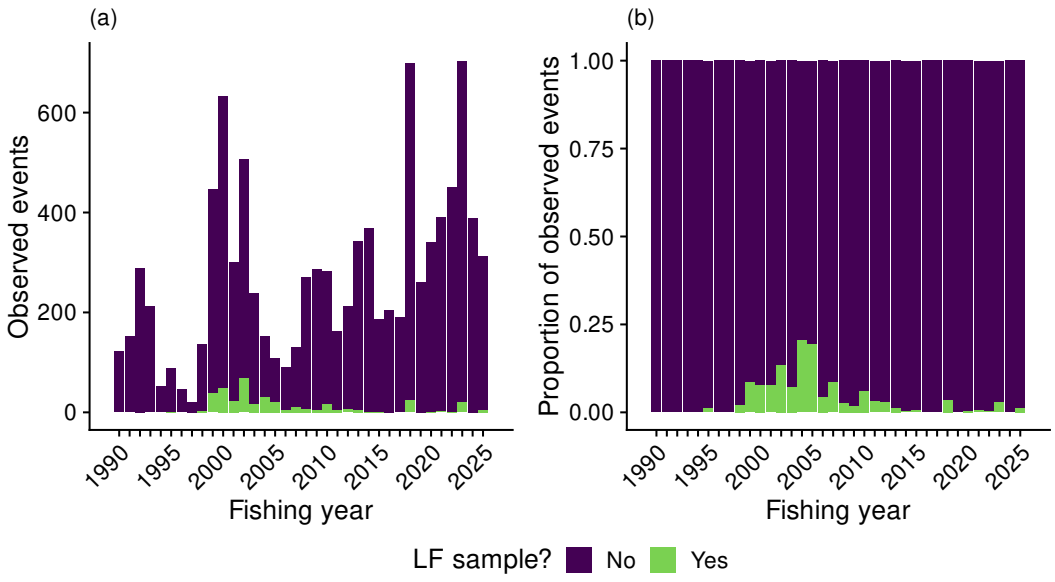


Figure 264: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RIB 6 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

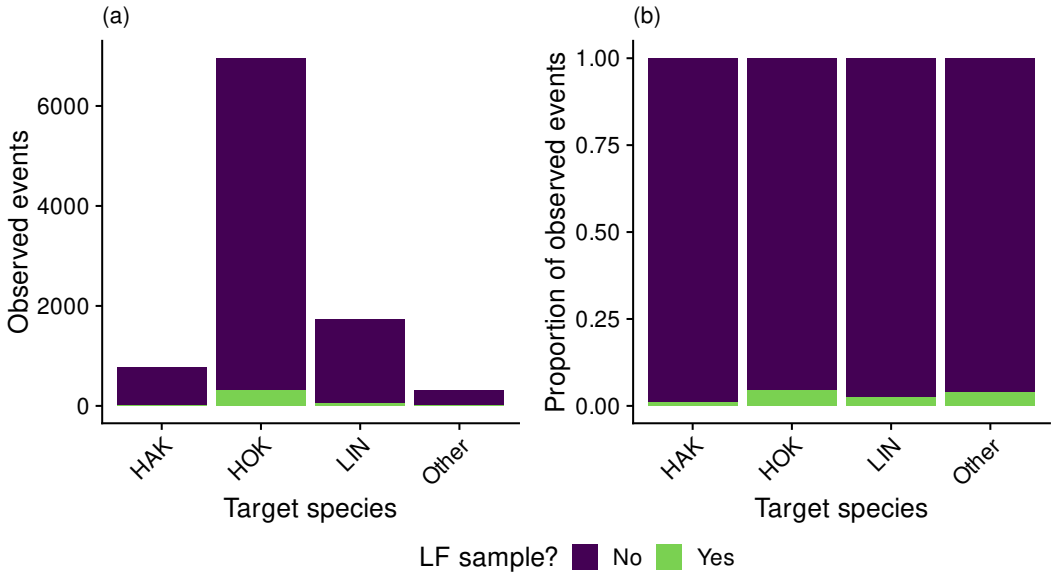


Figure 265: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RIB 6 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

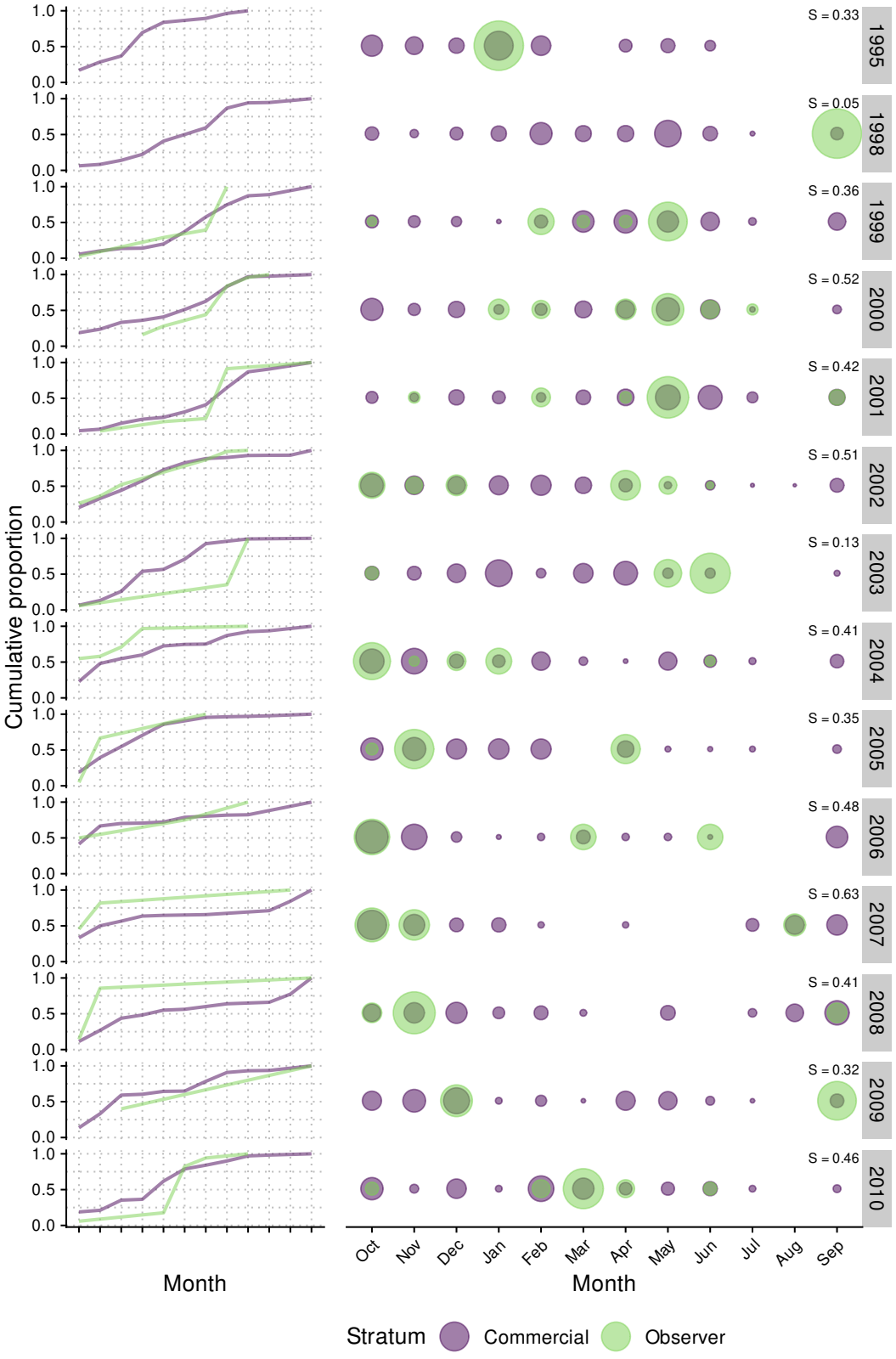


Figure 266: Monthly representativeness of observer sampling coverage of Trawl fishing events in RIB 6, where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

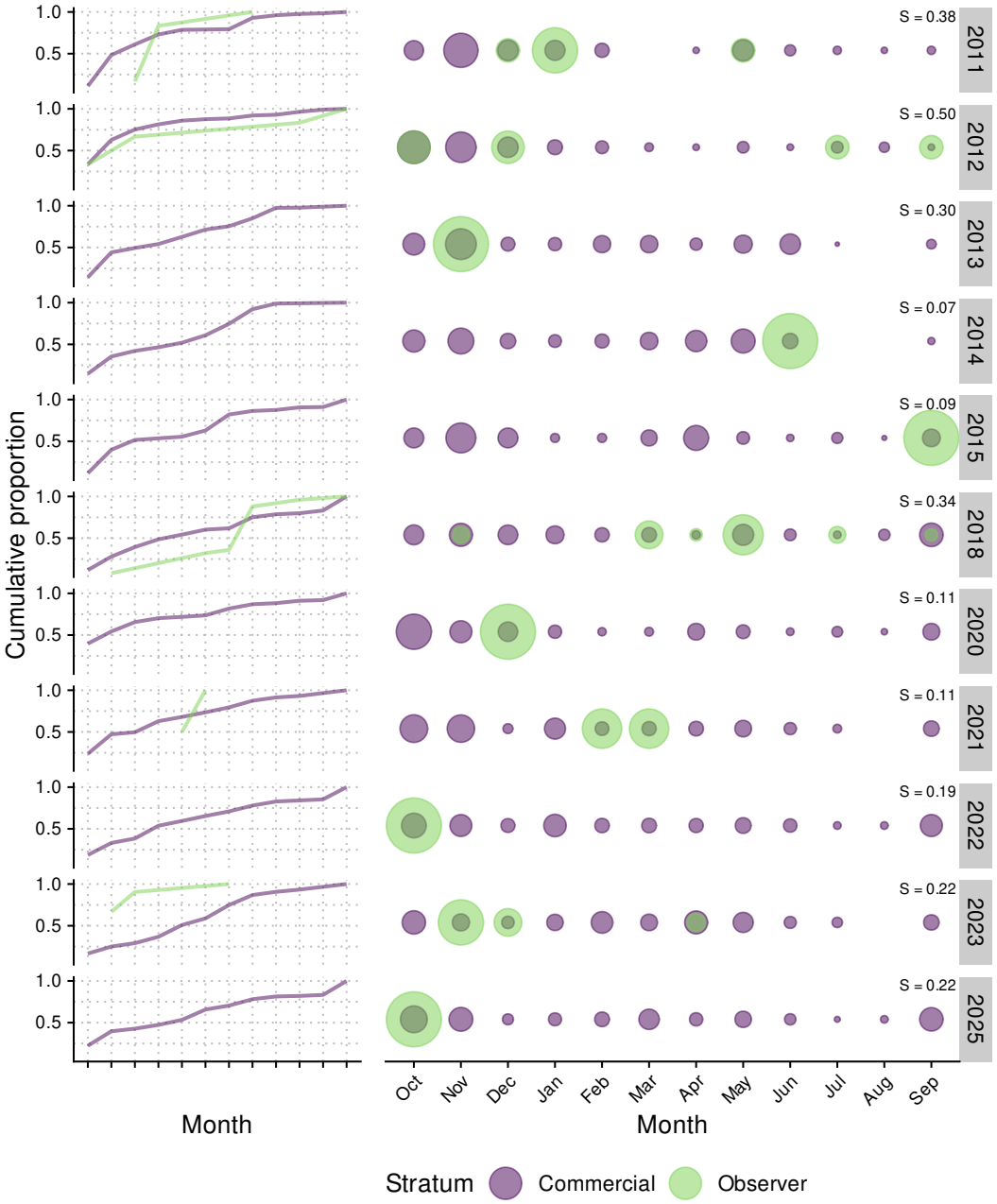


Figure 267: **Monthly representativeness of observer sampling coverage of Trawl fishing events in RIB 6, where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

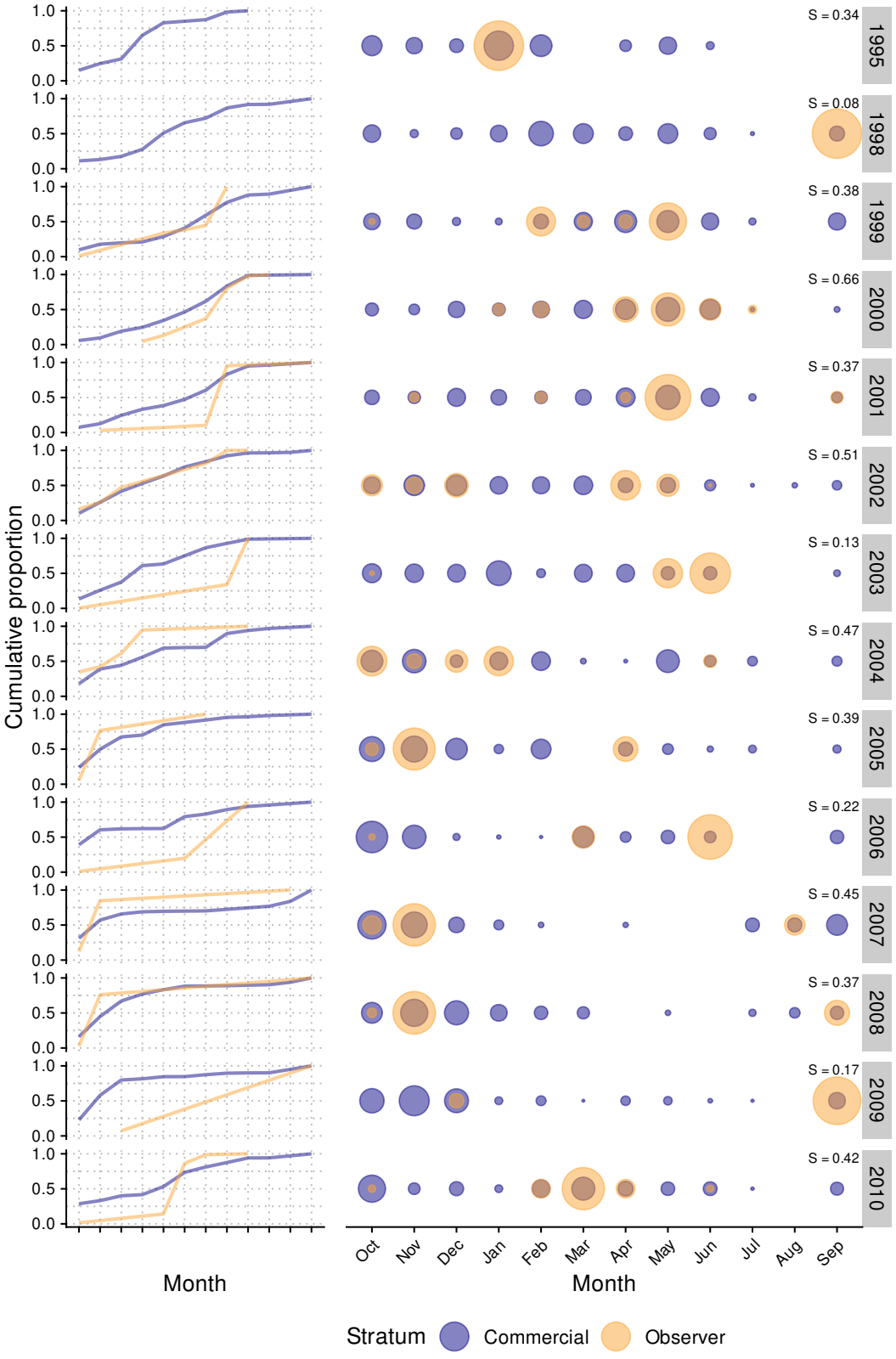


Figure 268: **Monthly representativeness of observer sampling coverage of Trawl catch in RIB 6, from events where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

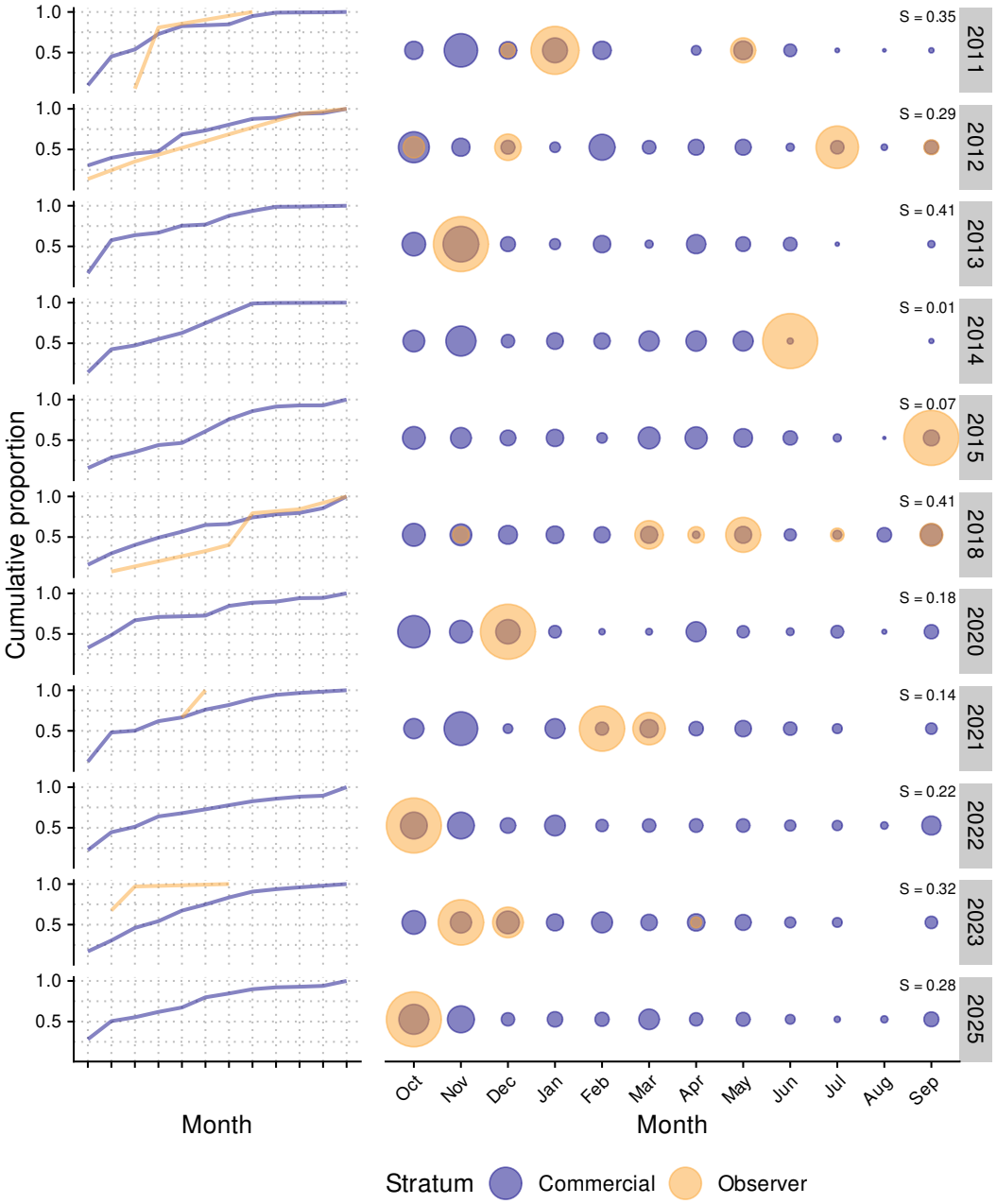


Figure 269: **Monthly representativeness of observer sampling coverage of Trawl catch in RIB 6, from events where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

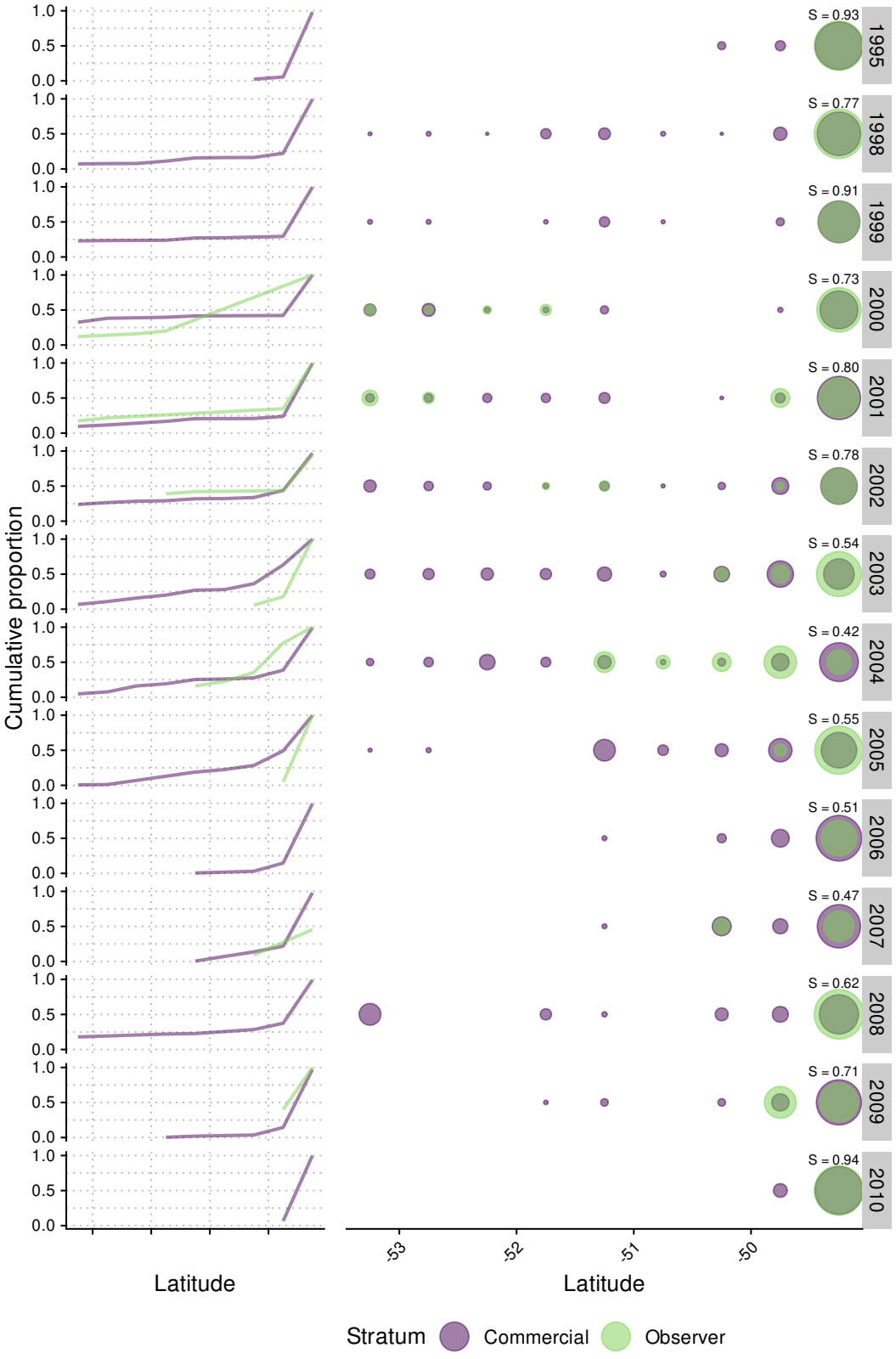


Figure 270: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 6, where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

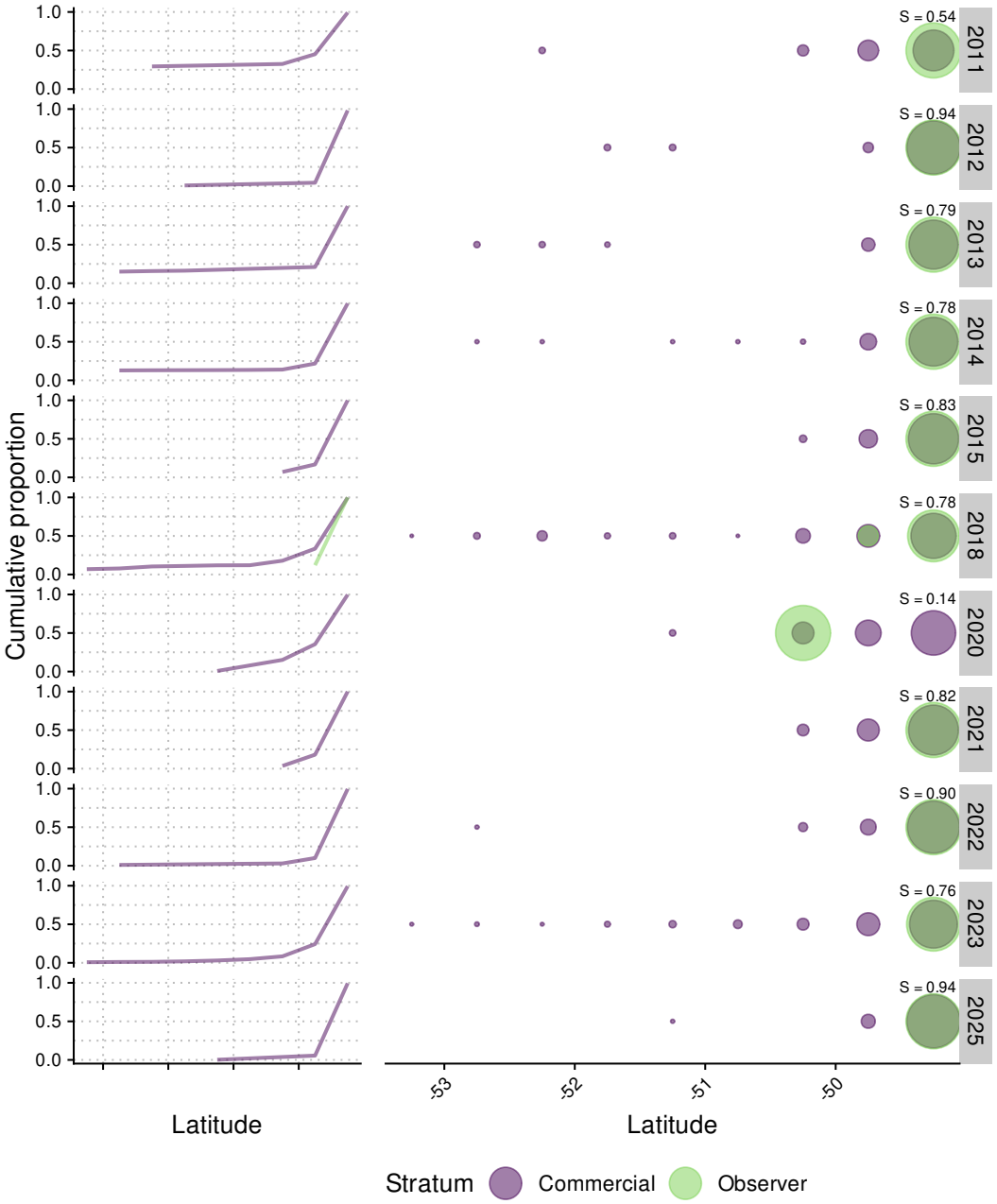


Figure 271: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 6, where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

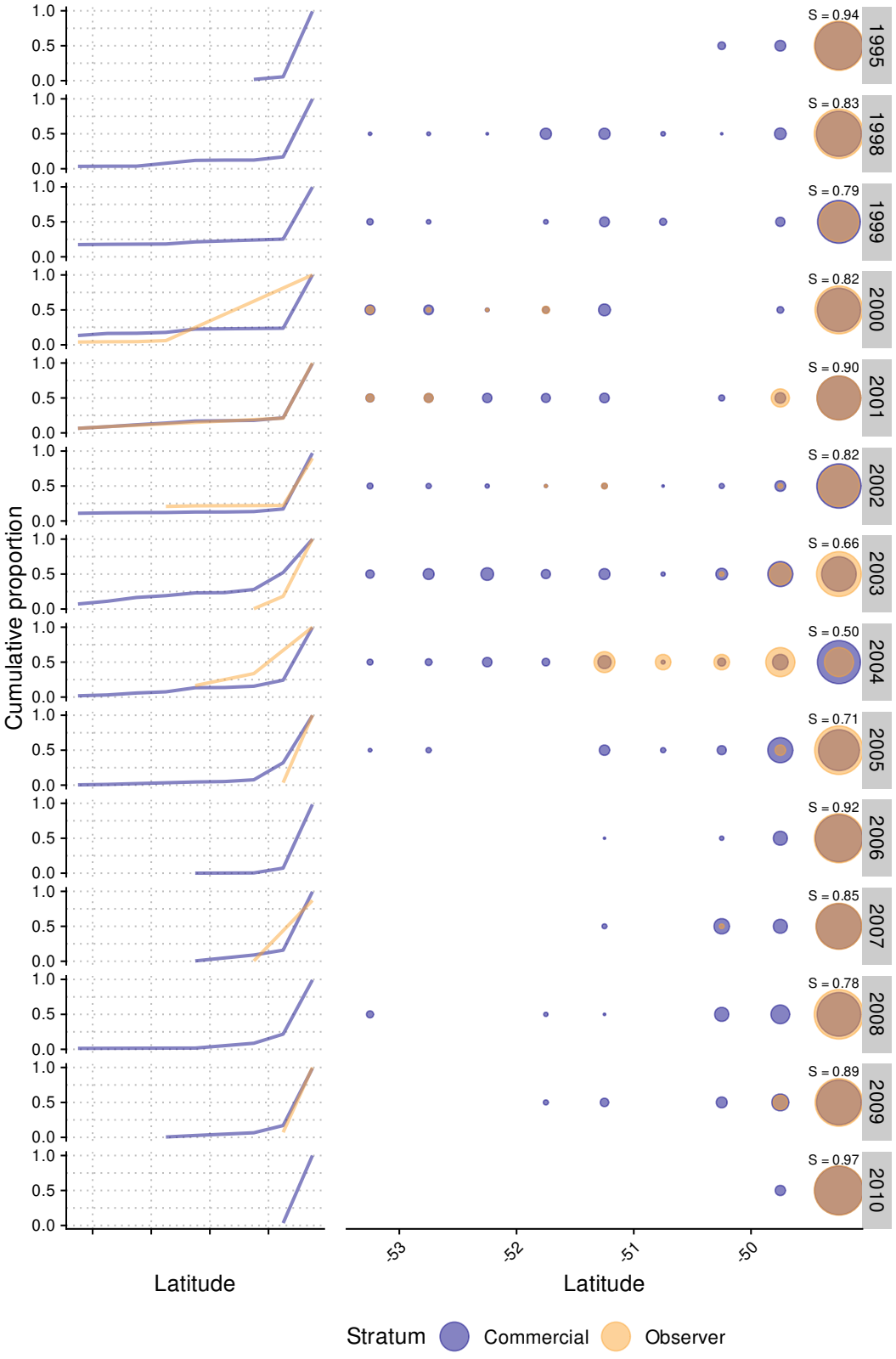


Figure 272: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RIB 6, from events where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

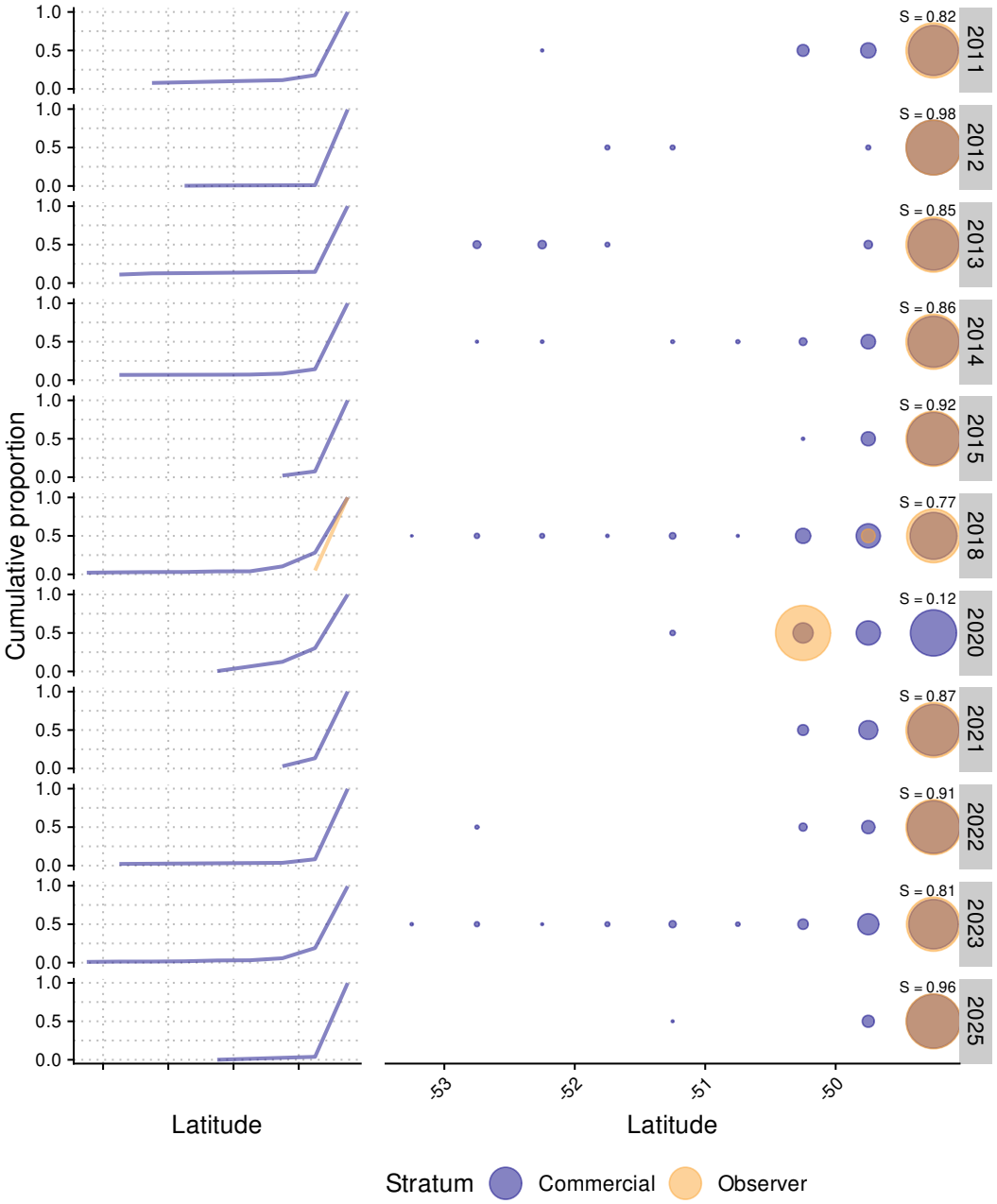


Figure 273: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RIB 6, from events where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

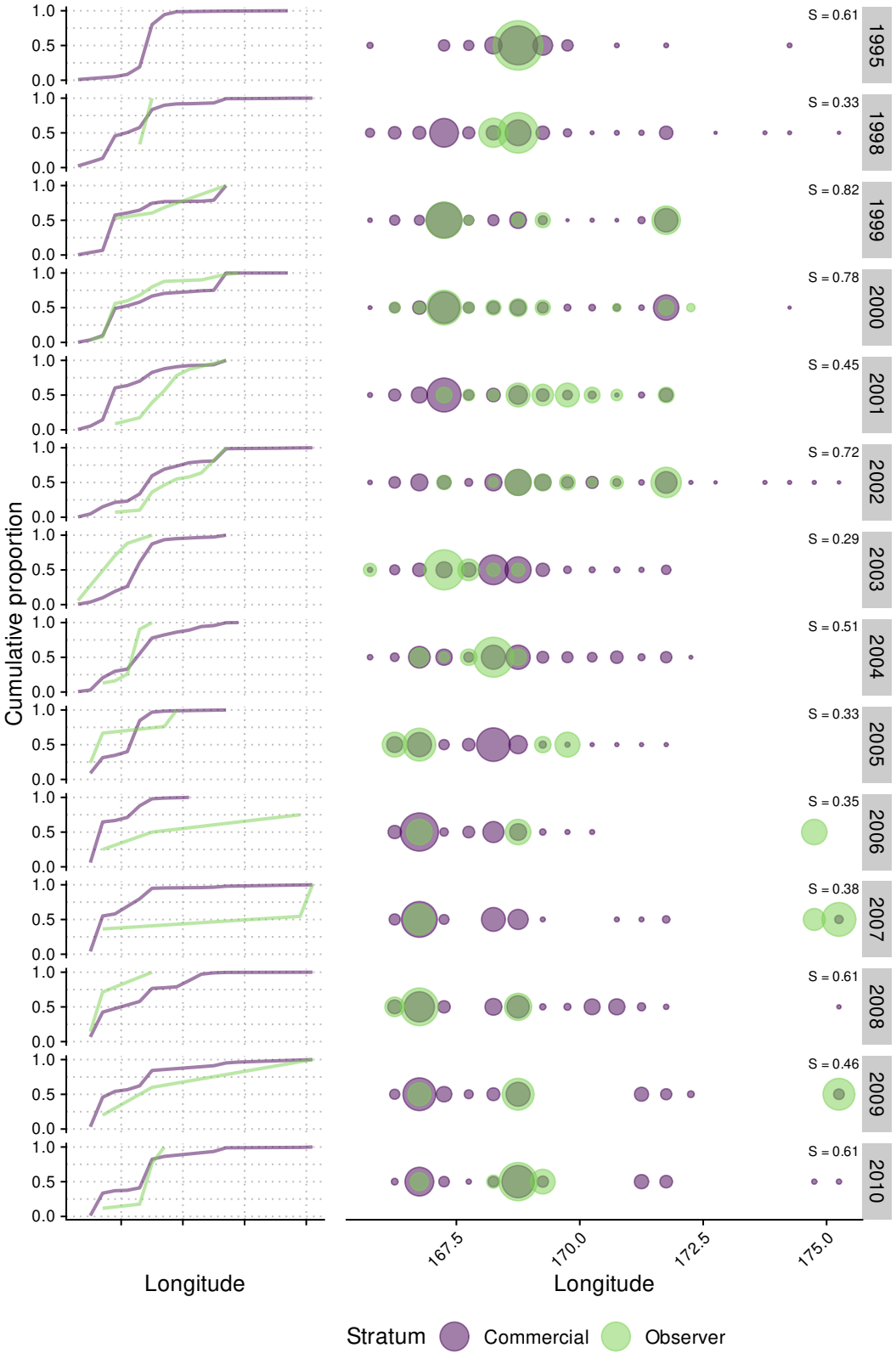


Figure 274: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 6, where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

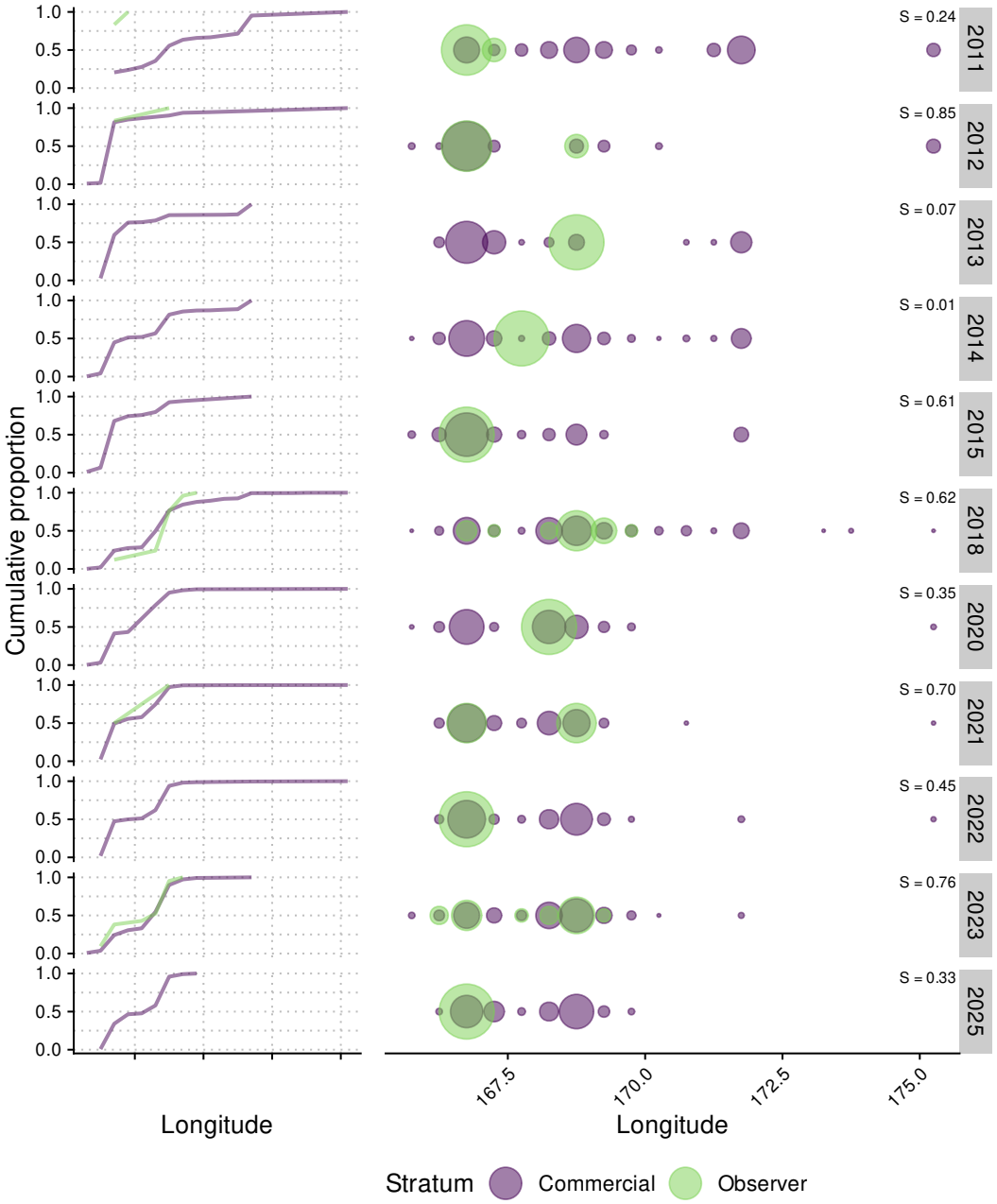


Figure 275: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 6, where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

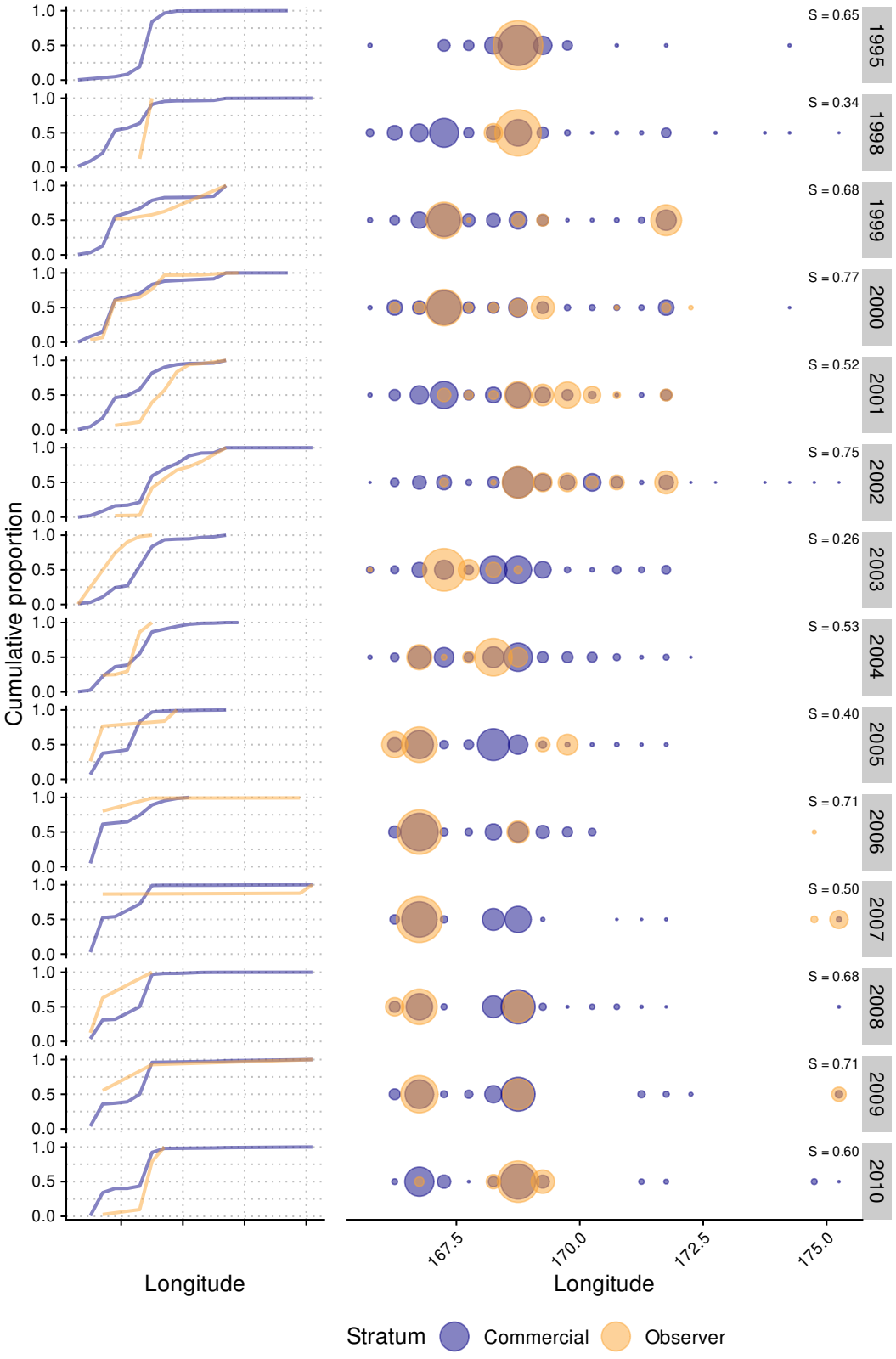


Figure 276: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RIB 6, from events where the ribaldo catch exceeded the 20kg threshold, in 1995 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

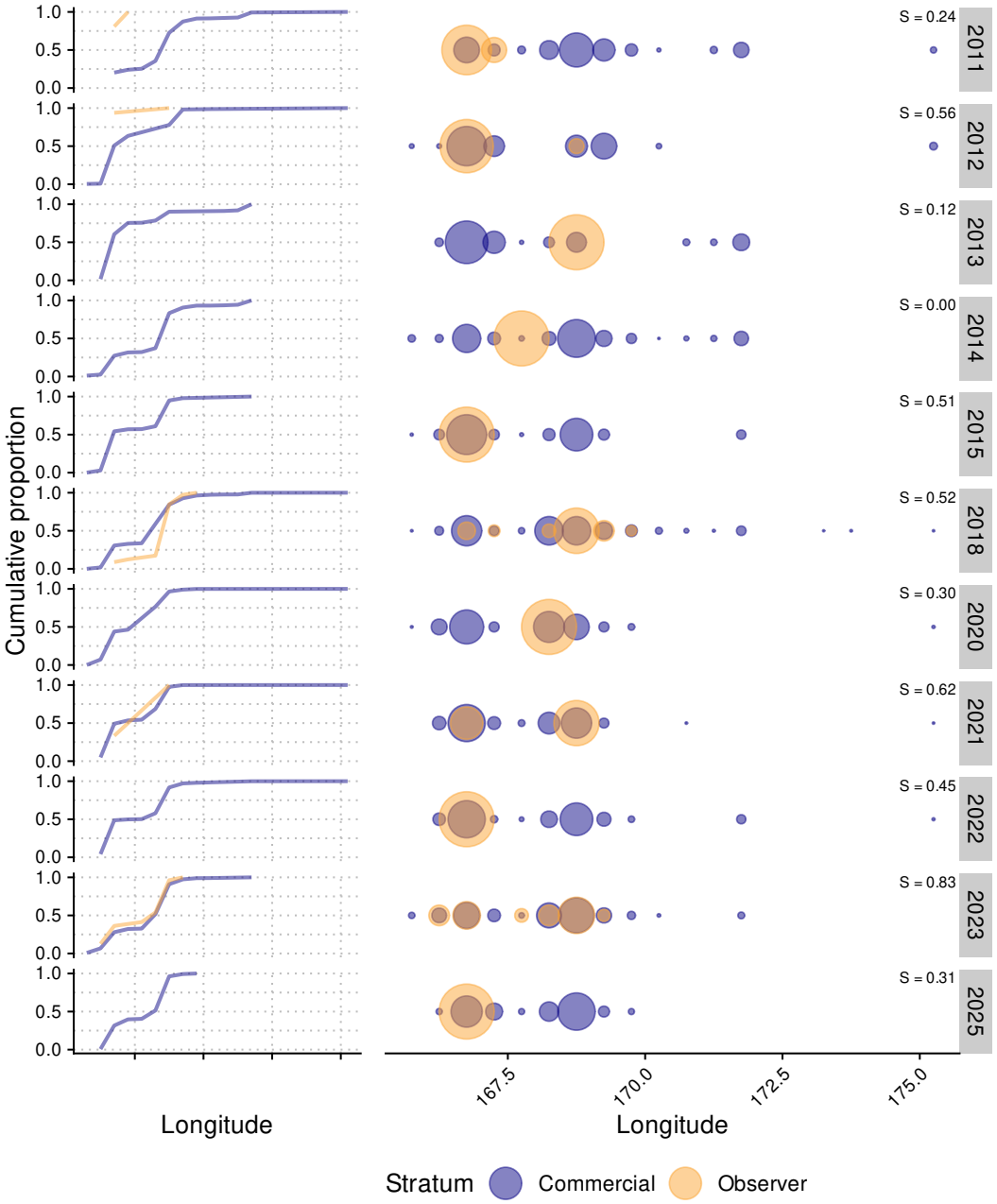


Figure 277: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RIB 6, from events where the ribaldo catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

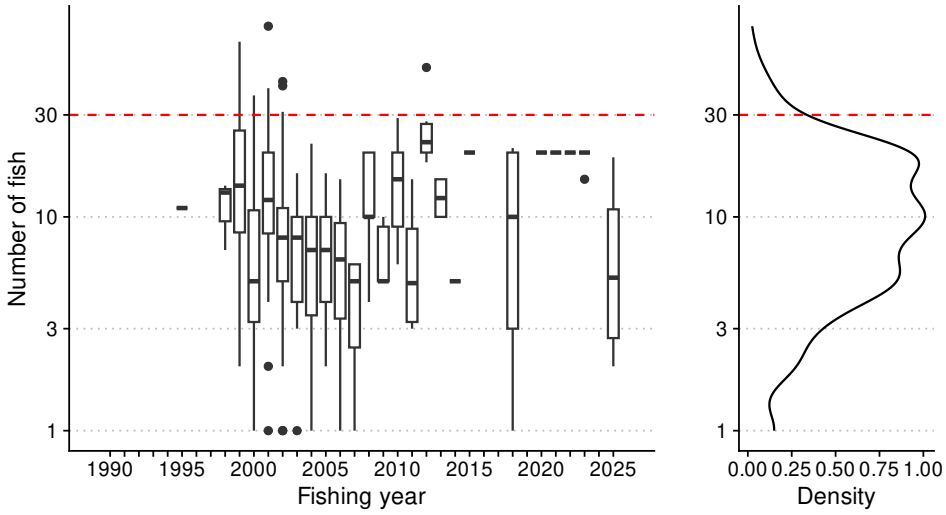


Figure 278: **Length-frequency sample sizes for observed fishing events in RIB 6 where ribaldo were sampled. The red dashed line indicates a sample size of 30 fish.**

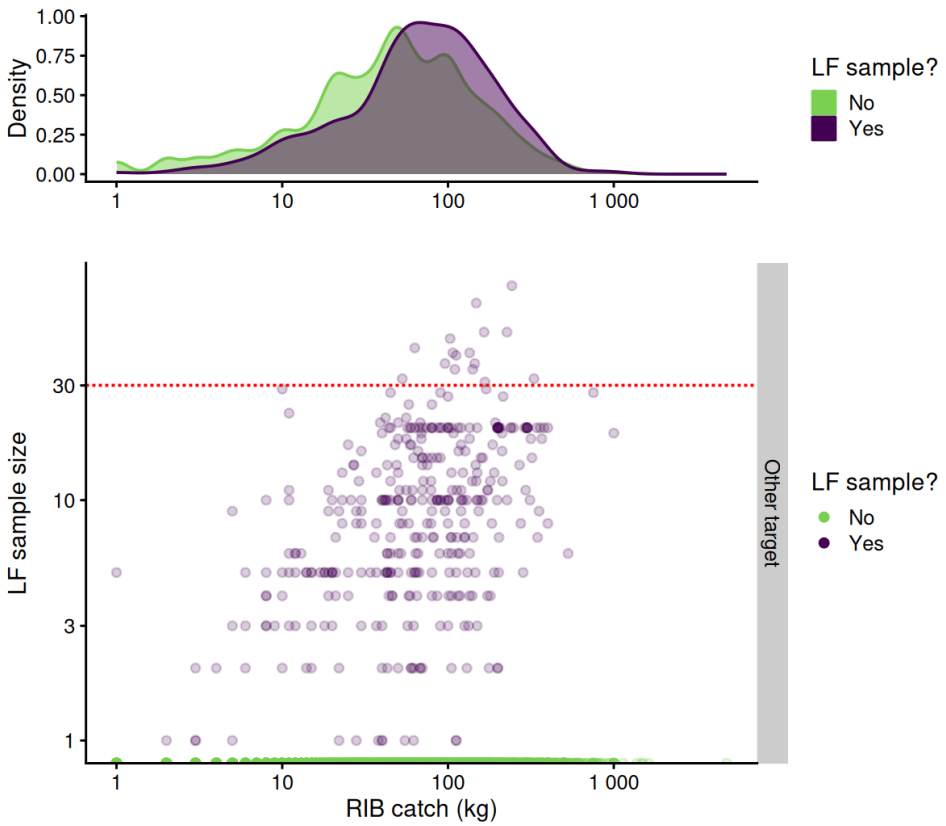


Figure 279: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in RIB 6 in relation to the total ribaldo catch from an event, separately for ribaldo target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.4.6.2 Otolith samples

Table 29: Otolith samples of ribaldo from the RIB 6 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	46	0	0	0.00
1991	482	0	0	0.00
1992	390	0	0	0.00
1993	352	0	0	0.00
1994	142	0	0	0.00
1995	210	0	0	0.00
1996	126	0	0	0.00
1997	240	0	0	0.00
1998	695	0	0	0.00
1999	653	0	0	0.00
2000	855	0	0	0.00
2001	601	0	0	0.00
2002	675	0	0	0.00
2003	448	0	0	0.00
2004	399	0	0	0.00
2005	243	0	0	0.00
2006	169	0	0	0.00
2007	160	0	0	0.00
2008	206	0	0	0.00
2009	130	3	20	2.31
2010	121	2	10	1.65
2011	122	1	3	0.82
2012	113	6	36	5.31
2013	214	4	21	1.87
2014	303	0	0	0.00
2015	154	0	0	0.00
2016	136	0	0	0.00
2017	146	0	0	0.00
2018	782	24	97	3.07
2019	473	0	0	0.00
2020	378	1	5	0.26
2021	434	1	5	0.23
2022	445	1	5	0.22
2023	596	21	105	3.52
2024	554	0	0	0.00
2025	484	4	15	0.83

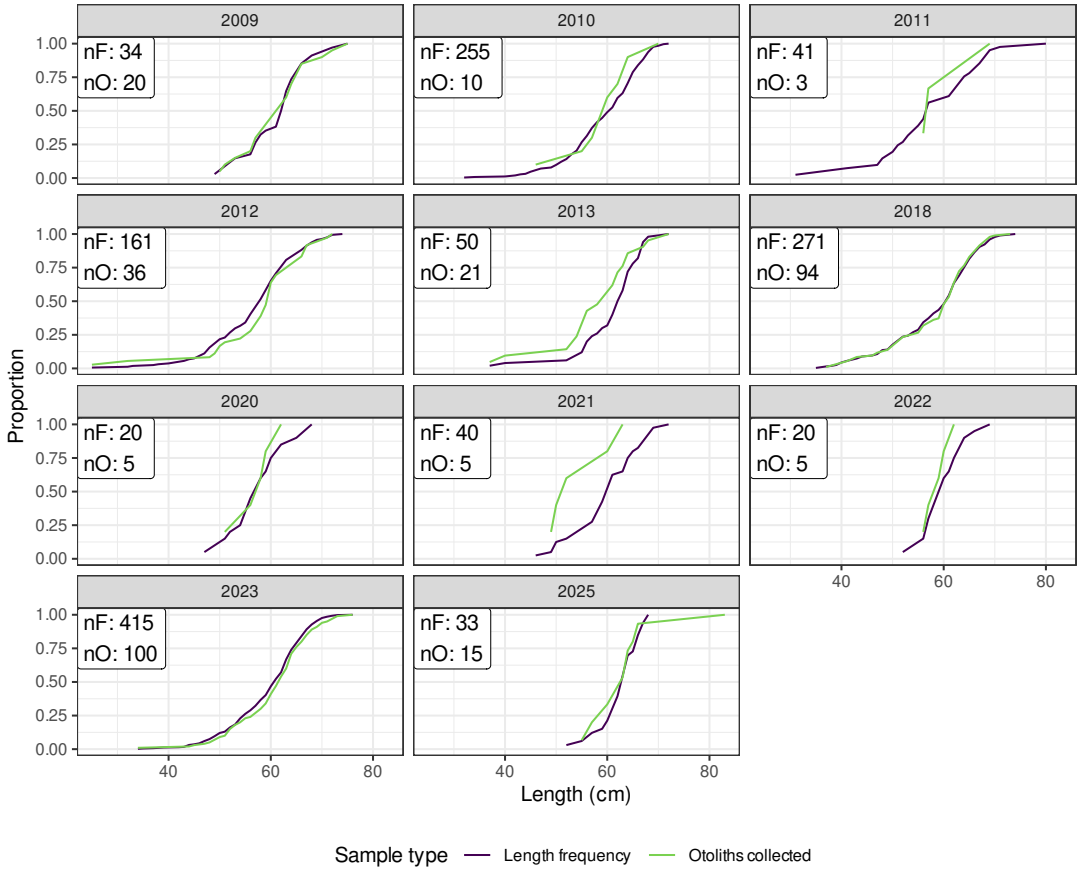


Figure 280: Cumulative distributions of the length of fish in the length frequency and otolith samples of ribaldo in the RIB 6 Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.4.6.3 Catch quantification

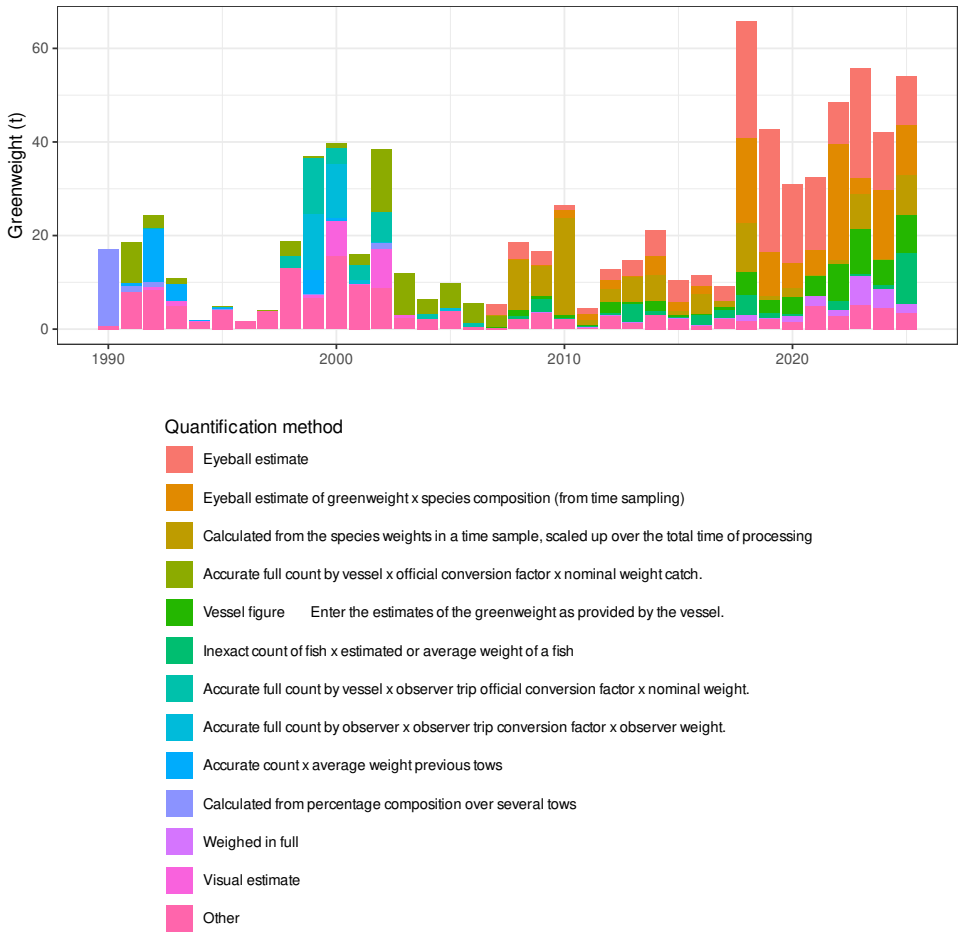


Figure 281: Methods used by observers to quantify the catch of ribaldo in the RIB 6 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.4.7 RIB 7: Trawl fishery

2.4.7.1 Length-frequency samples

Table 30: Length-frequency samples of ribaldo from the RIB 7 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	120	0	0	0.00
1991	202	0	0	0.00
1992	133	0	0	0.00
1993	298	0	0	0.00
1994	175	0	0	0.00
1995	144	0	0	0.00
1996	262	0	0	0.00
1997	275	0	0	0.00
1998	269	2	16	0.74
1999	876	20	118	2.28
2000	872	12	146	1.38
2001	664	7	36	1.05
2002	833	39	401	4.68
2003	848	20	113	2.36
2004	710	14	76	1.97
2005	871	20	150	2.30
2006	912	63	703	6.91
2007	689	9	75	1.31
2008	626	22	363	3.51
2009	572	14	250	2.45
2010	338	14	339	4.14
2011	395	8	157	2.03
2012	342	6	124	1.75
2013	468	21	319	4.49
2014	630	32	722	5.08
2015	967	55	1 054	5.69
2016	553	14	305	2.53
2017	766	54	1 008	7.05
2018	799	60	1 058	7.51
2019	558	2	39	0.36
2020	634	9	169	1.42
2021	738	23	438	3.12
2022	733	3	60	0.41
2023	663	4	61	0.60
2024	391	0	0	0.00
2025	361	0	0	0.00

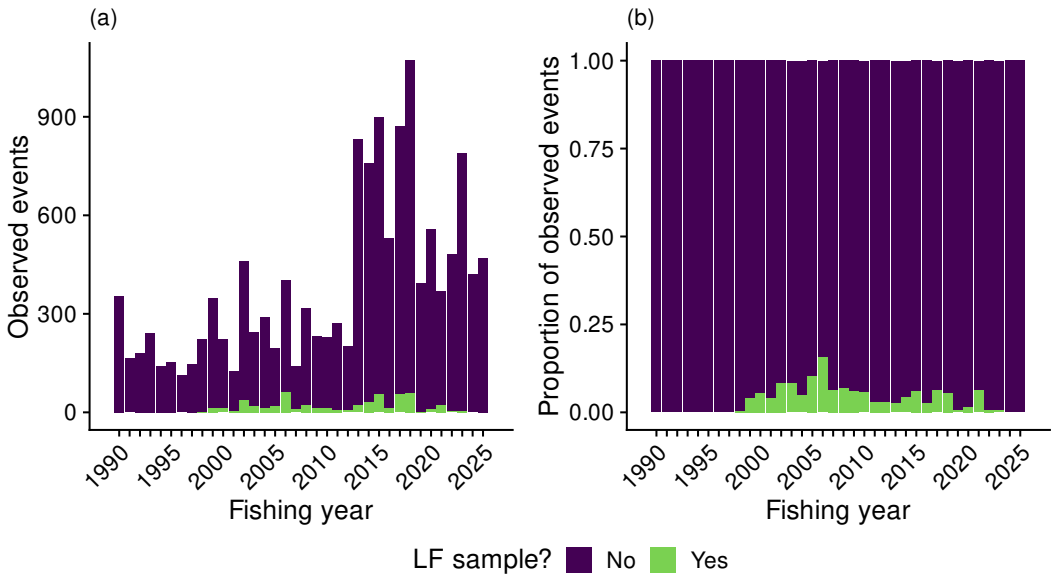


Figure 282: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RIB 7 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

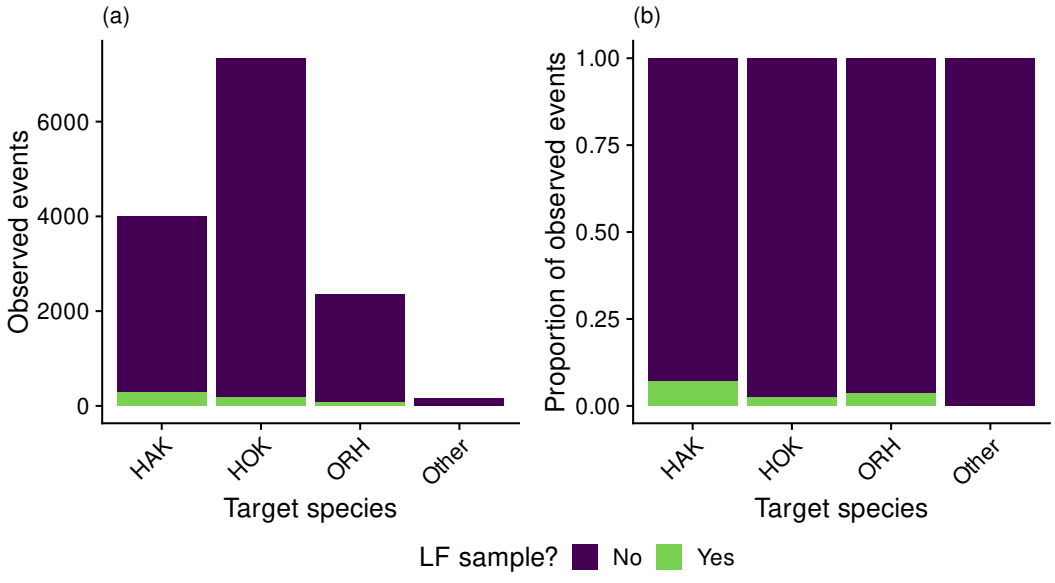


Figure 283: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in RIB 7 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

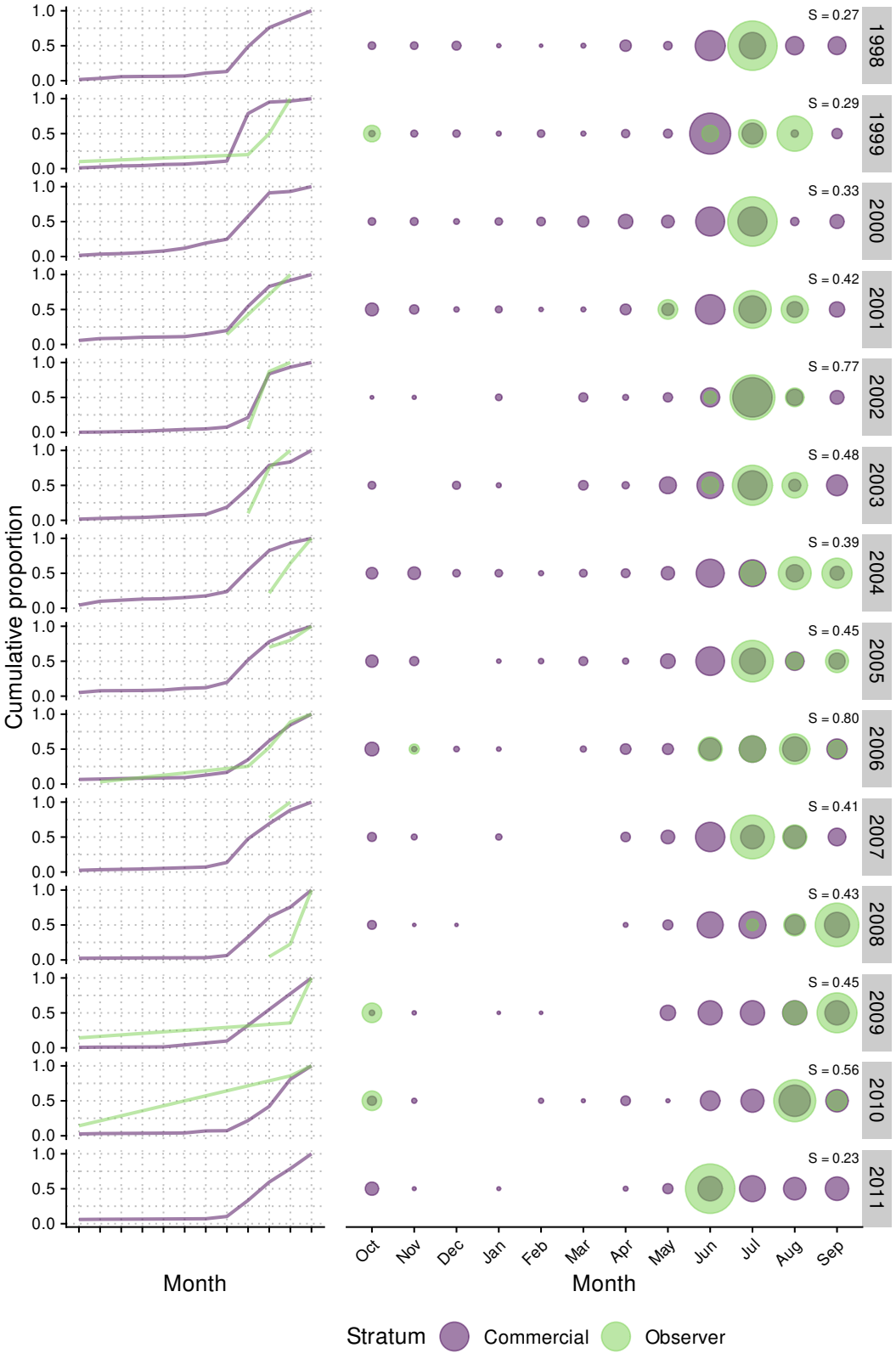


Figure 284: Monthly representativeness of observer sampling coverage of Trawl fishing events in RIB 7, where the ribaldo catch exceeded the 20kg threshold, in 1998 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

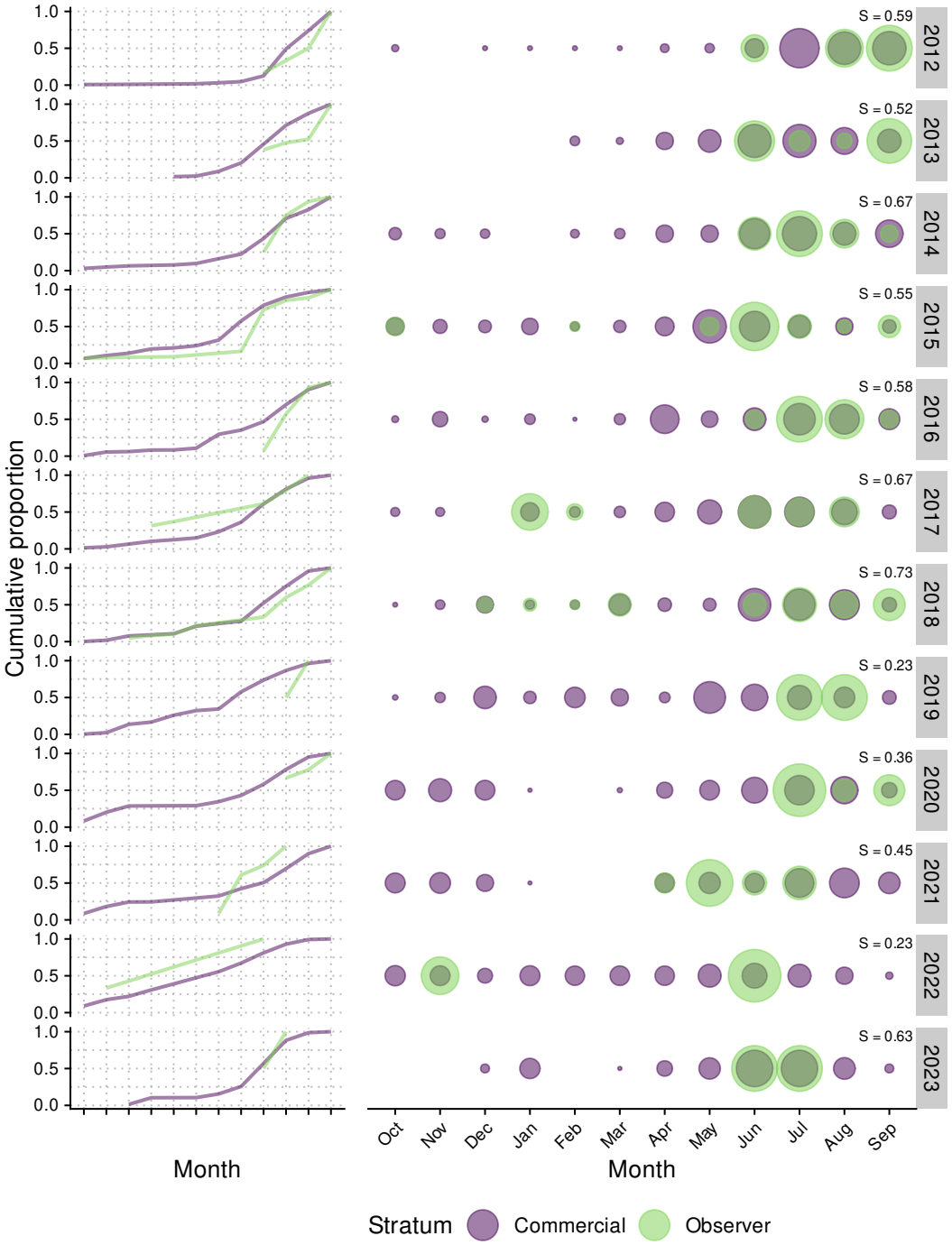


Figure 285: Monthly representativeness of observer sampling coverage of Trawl fishing events in RIB 7, where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

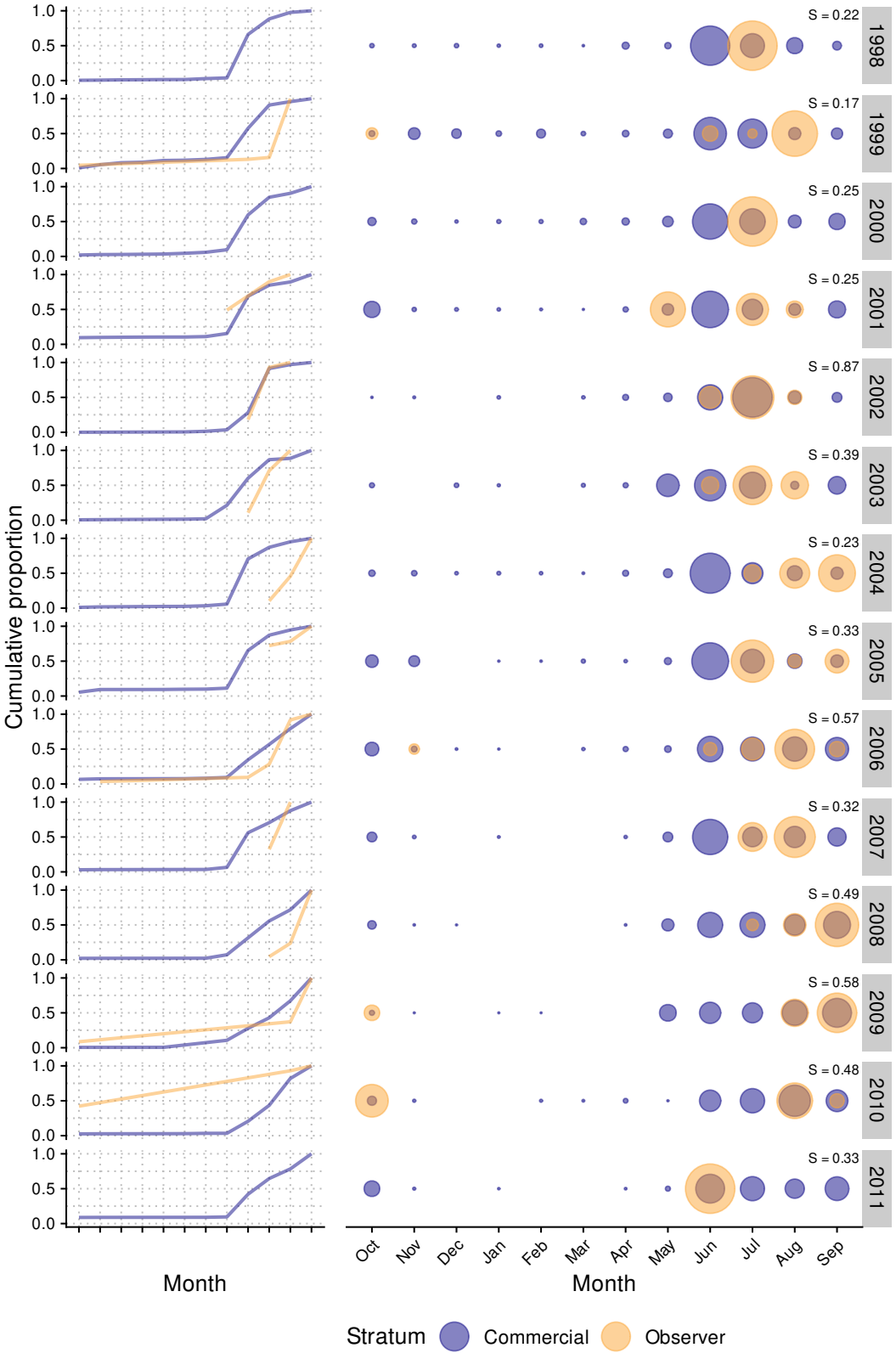


Figure 286: Monthly representativeness of observer sampling coverage of Trawl catch in RIB 7, from events where the ribaldo catch exceeded the 20kg threshold, in 1998 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

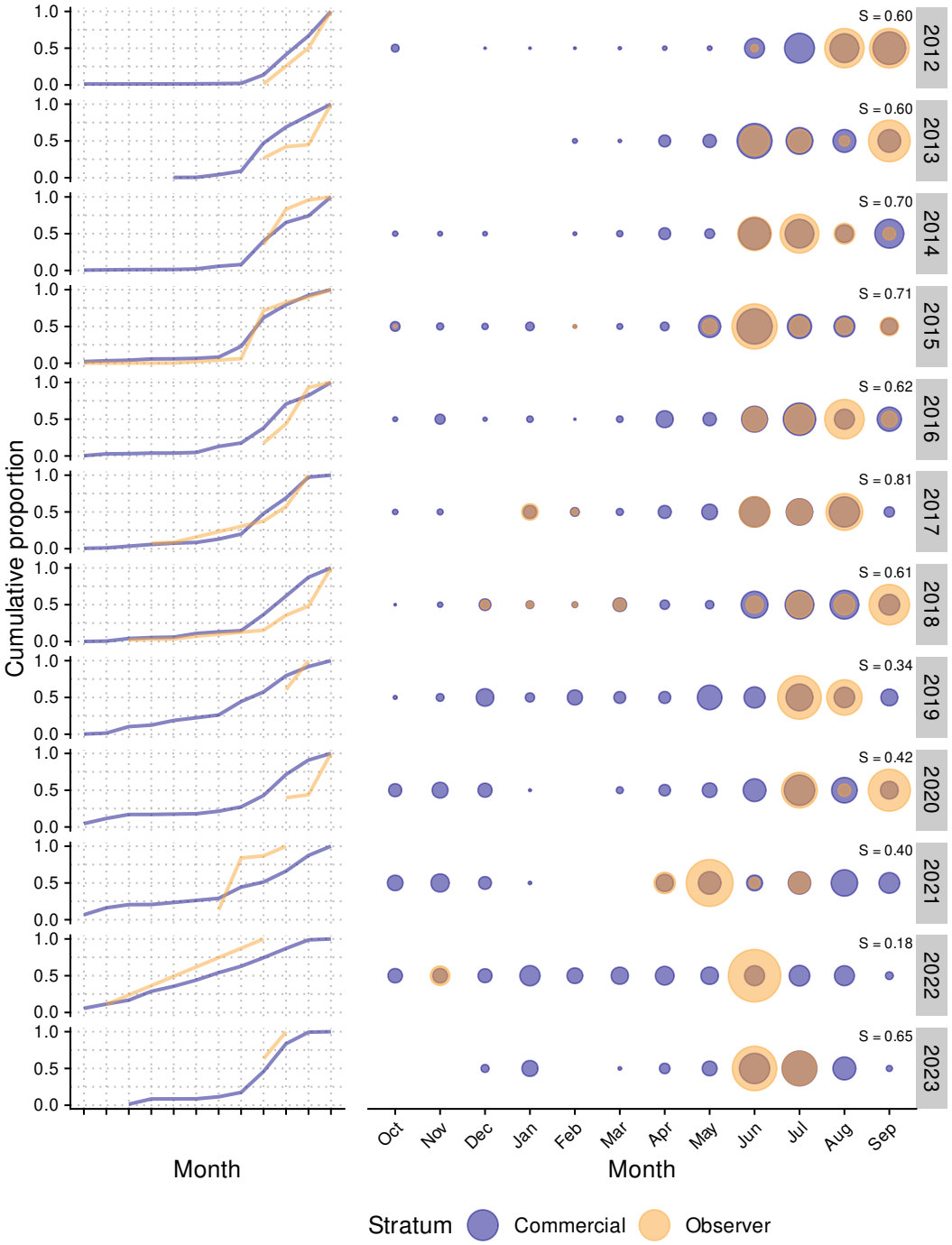


Figure 287: **Monthly representativeness of observer sampling coverage of Trawl catch in RIB 7, from events where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

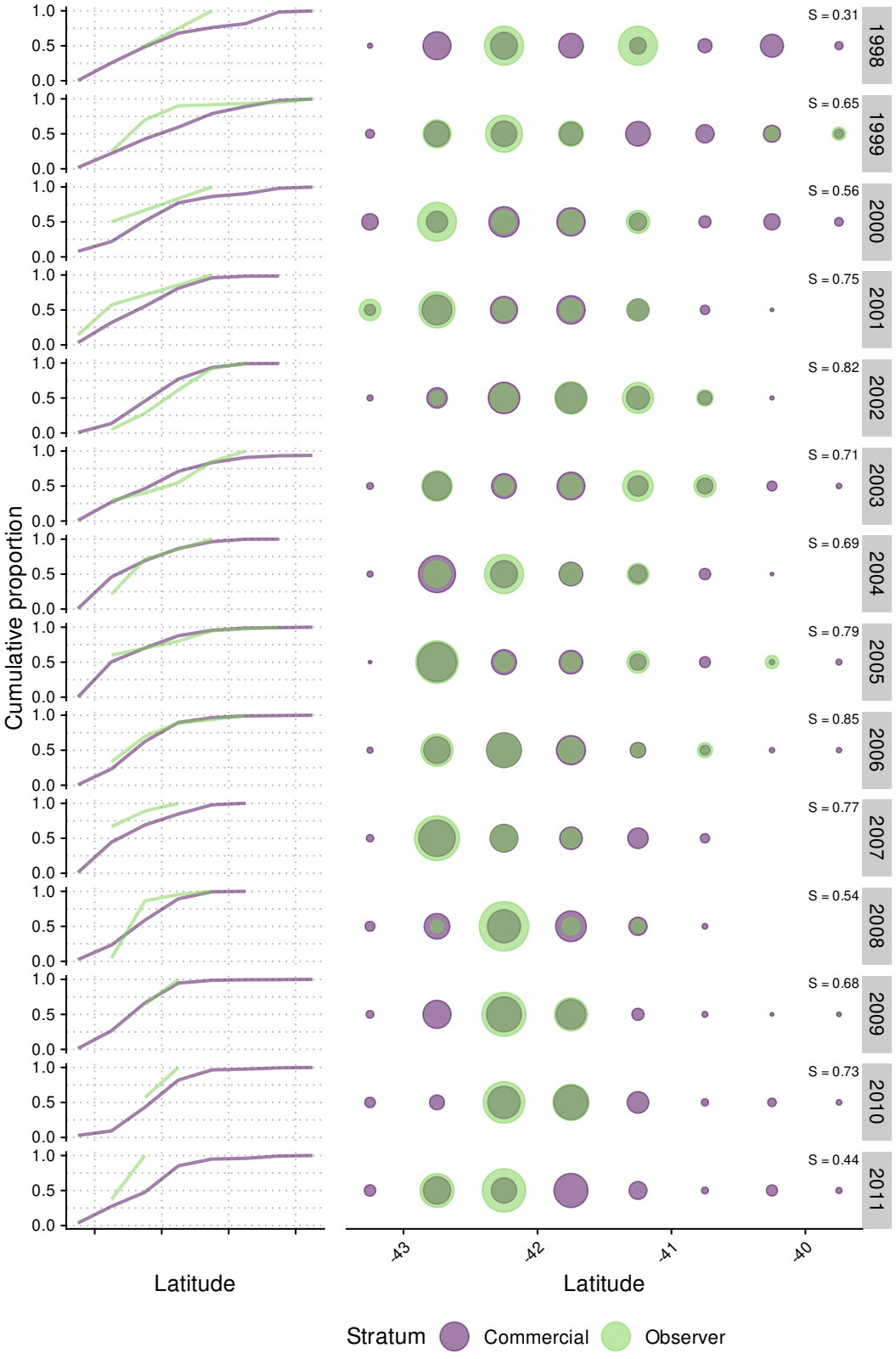


Figure 288: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 7, where the ribaldo catch exceeded the 20kg threshold, in 1998 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

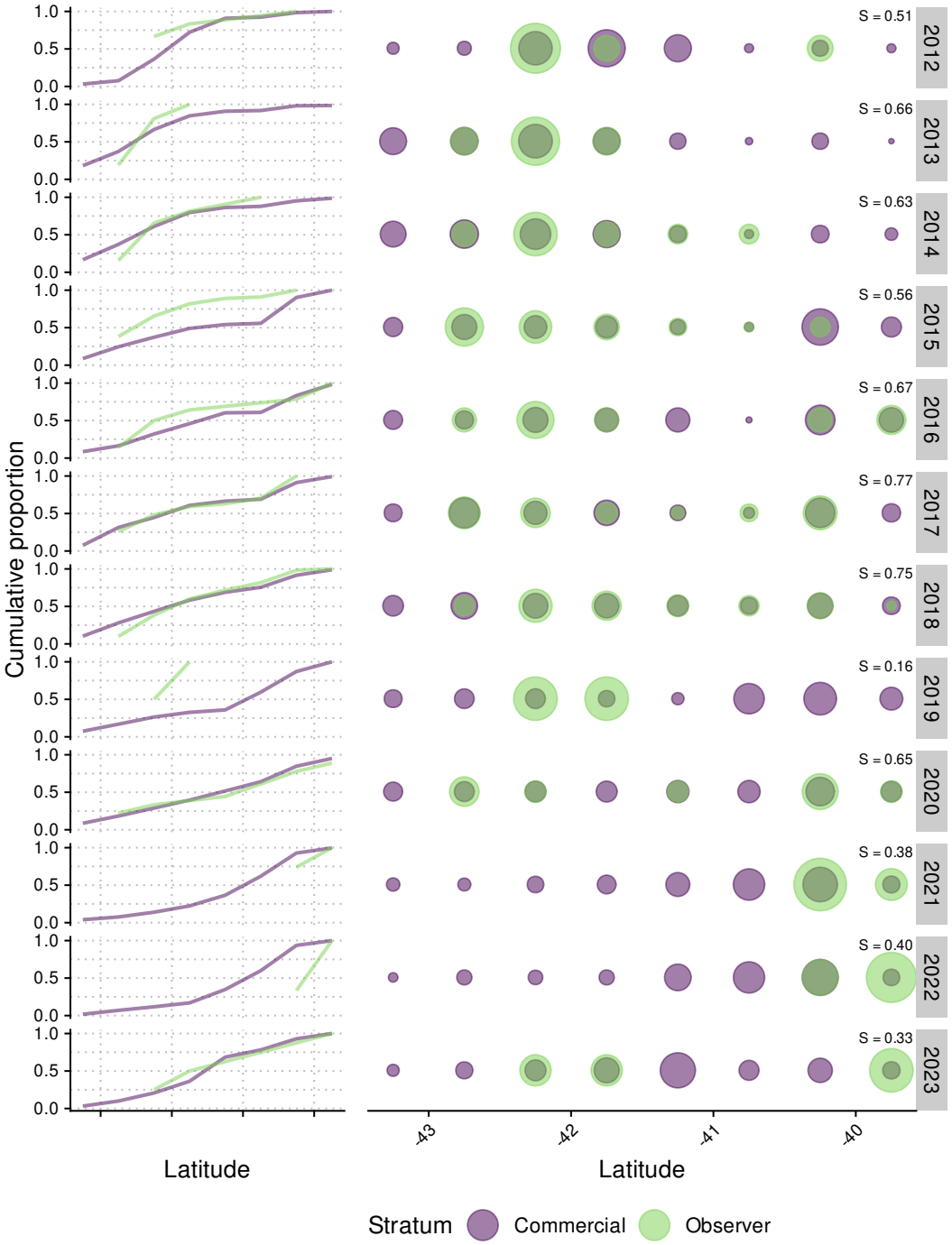


Figure 289: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 7, where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

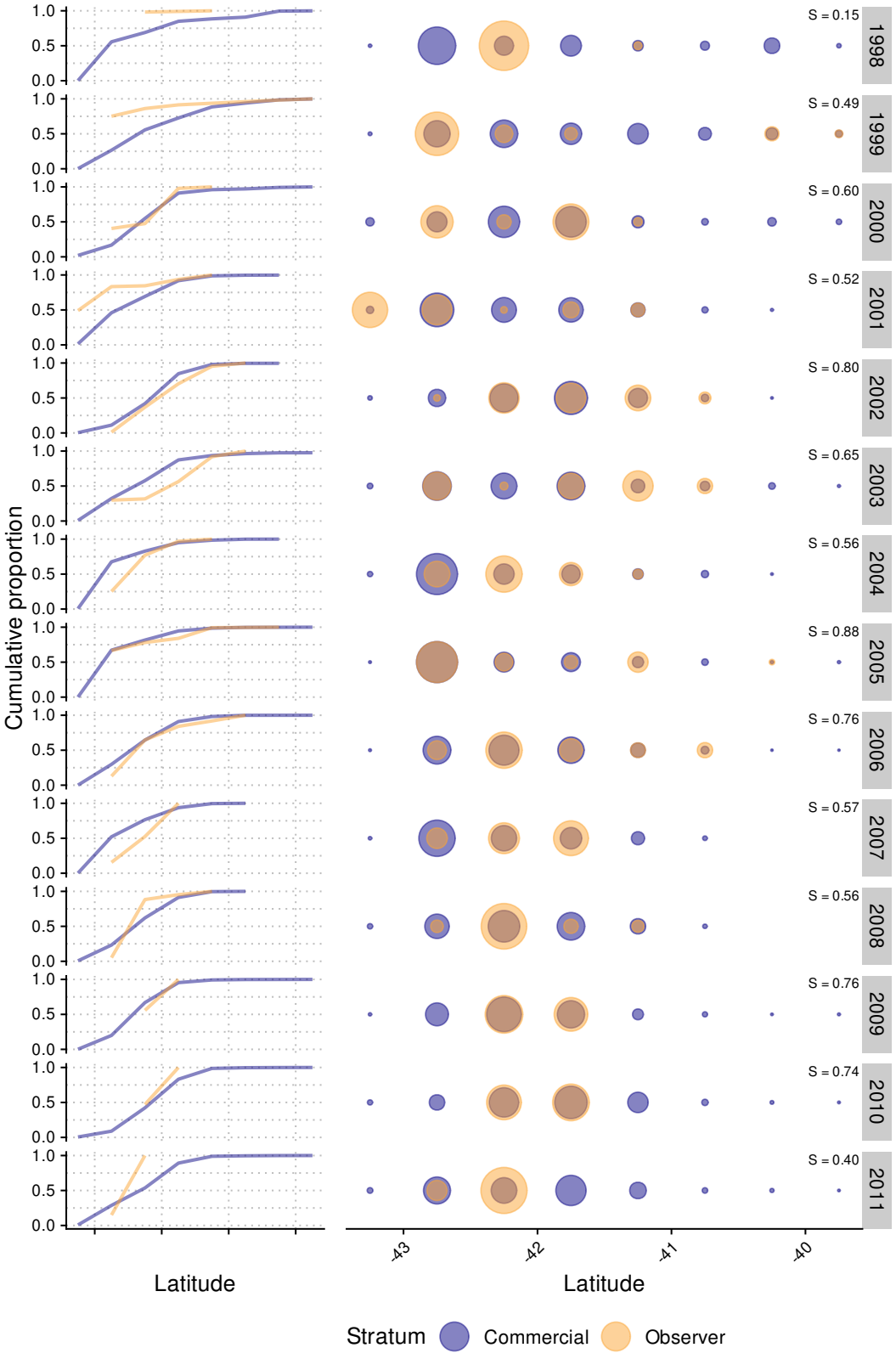


Figure 290: **Latitudinal representativeness of observer sampling coverage of Trawl catch in RIB 7, from events where the ribaldo catch exceeded the 20kg threshold, in 1998 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

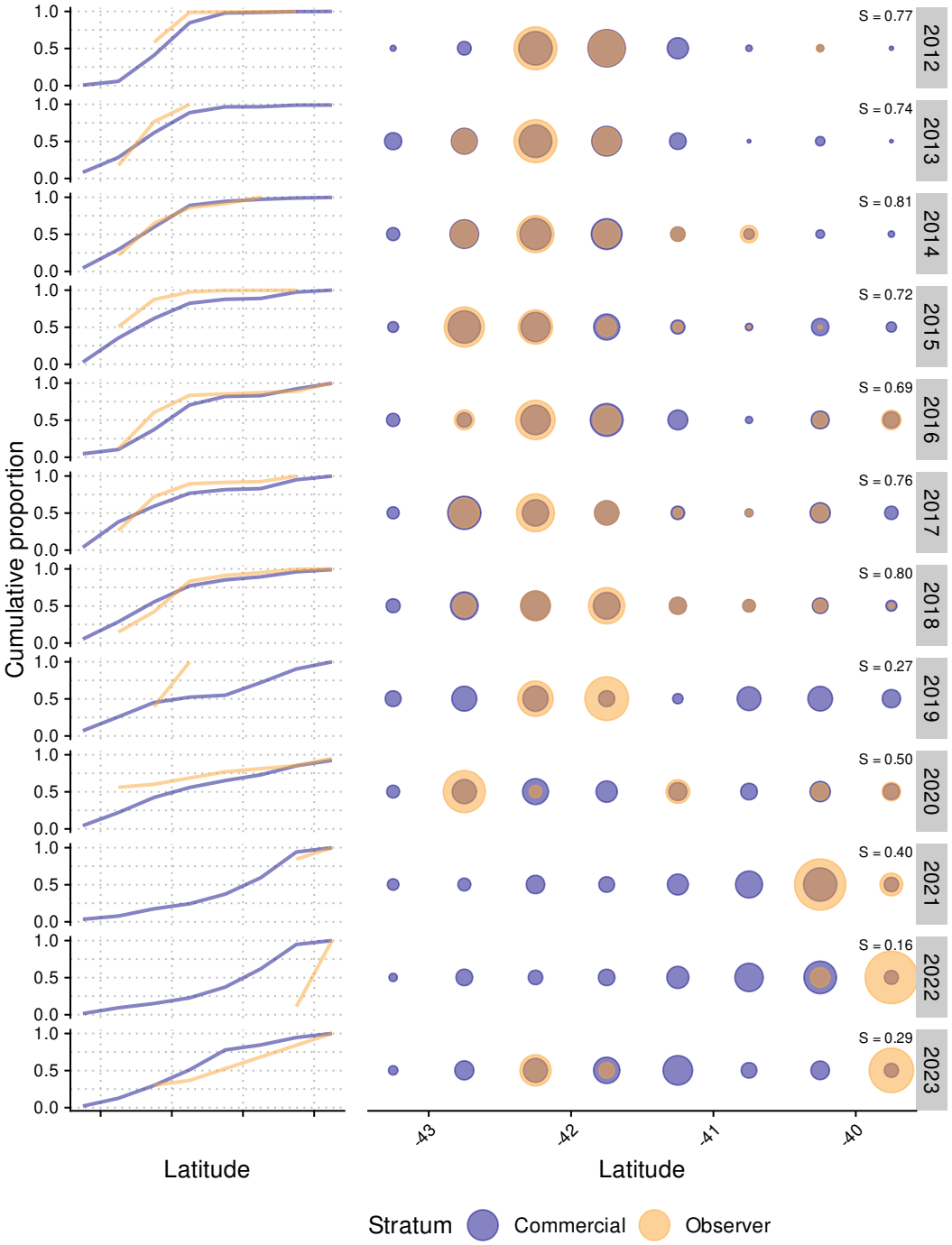


Figure 291: Latitudinal representativeness of observer sampling coverage of Trawl catch in RIB 7, from events where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

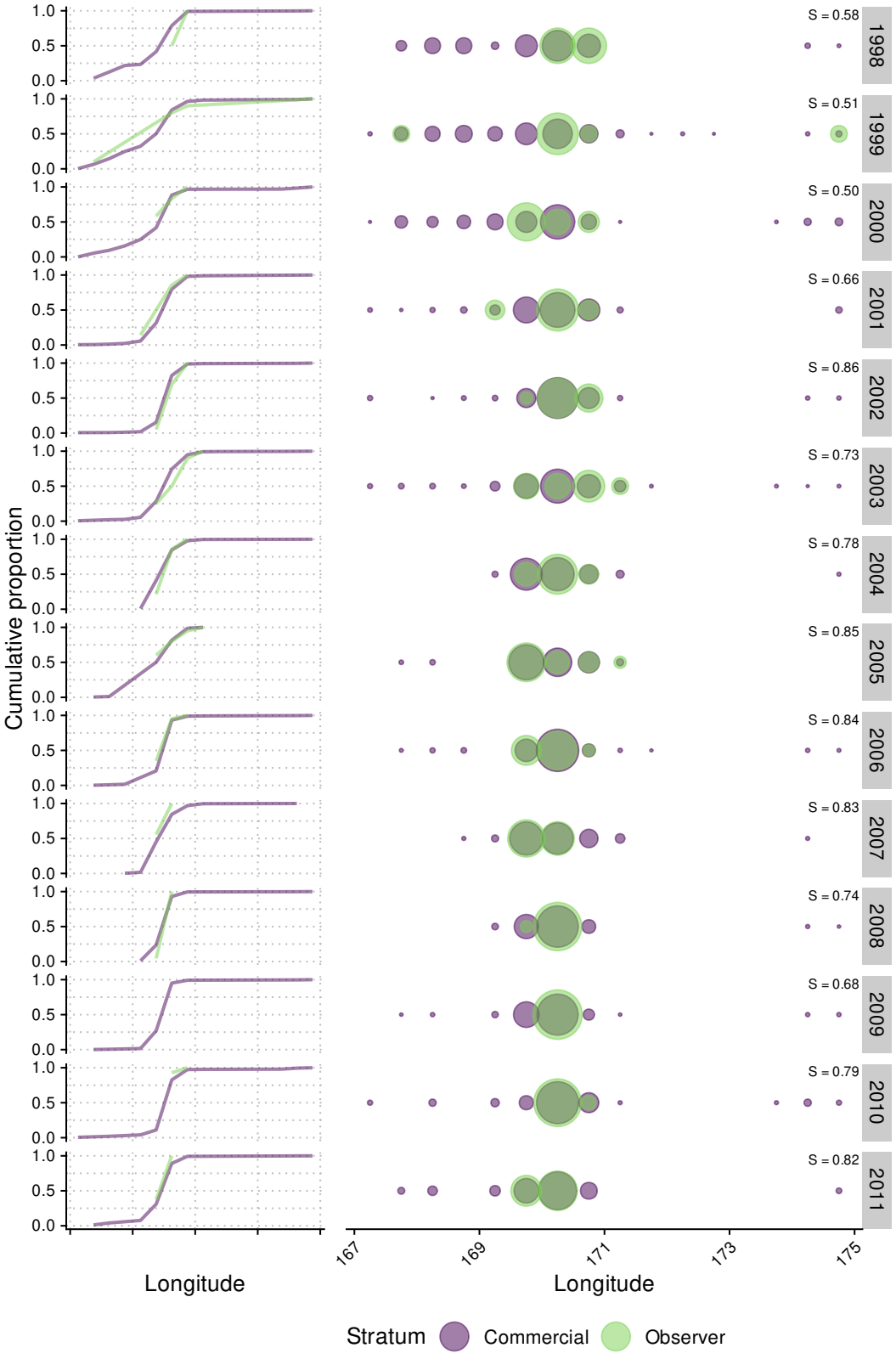


Figure 292: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 7, where the ribaldo catch exceeded the 20kg threshold, in 1998 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

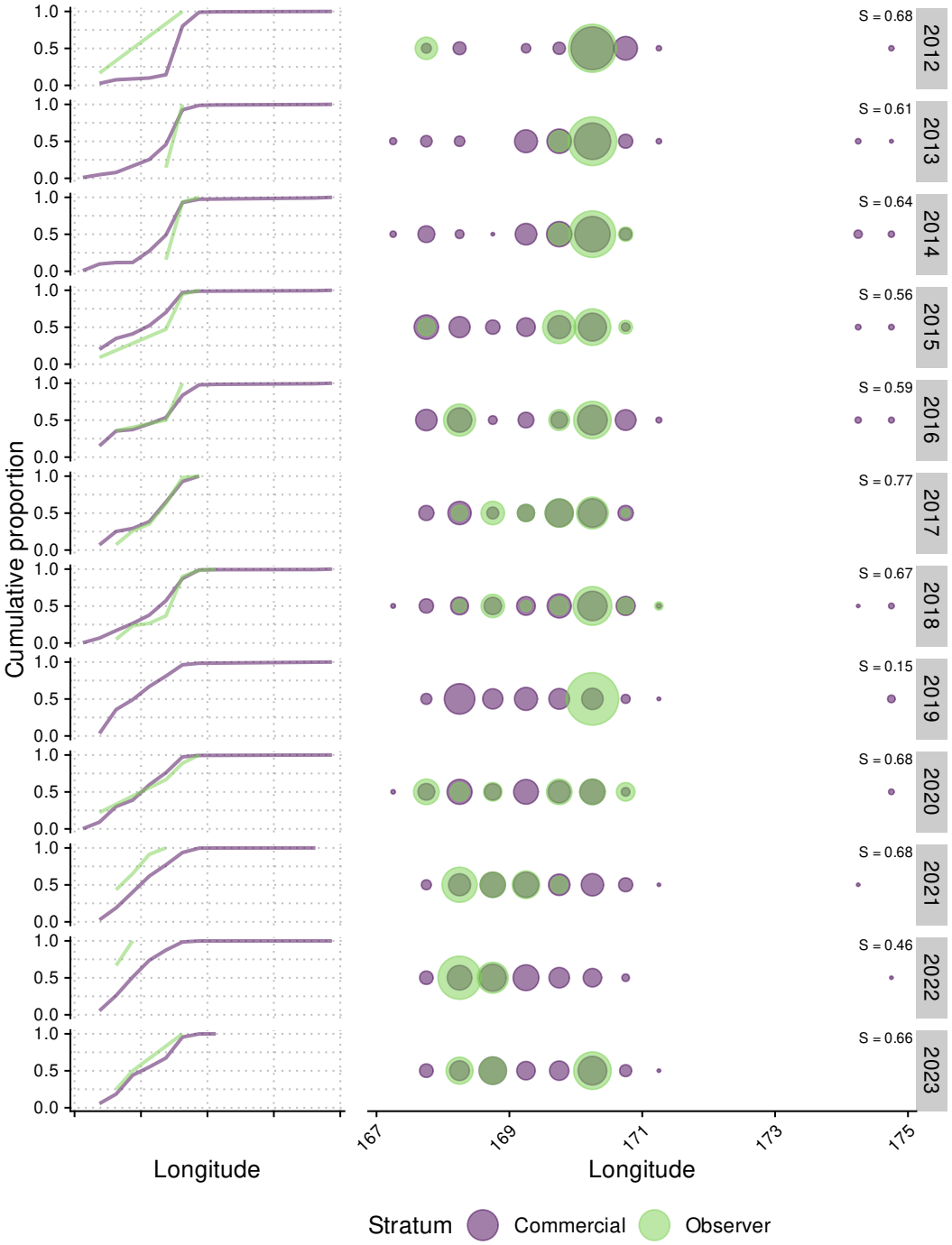


Figure 293: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in RIB 7, where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

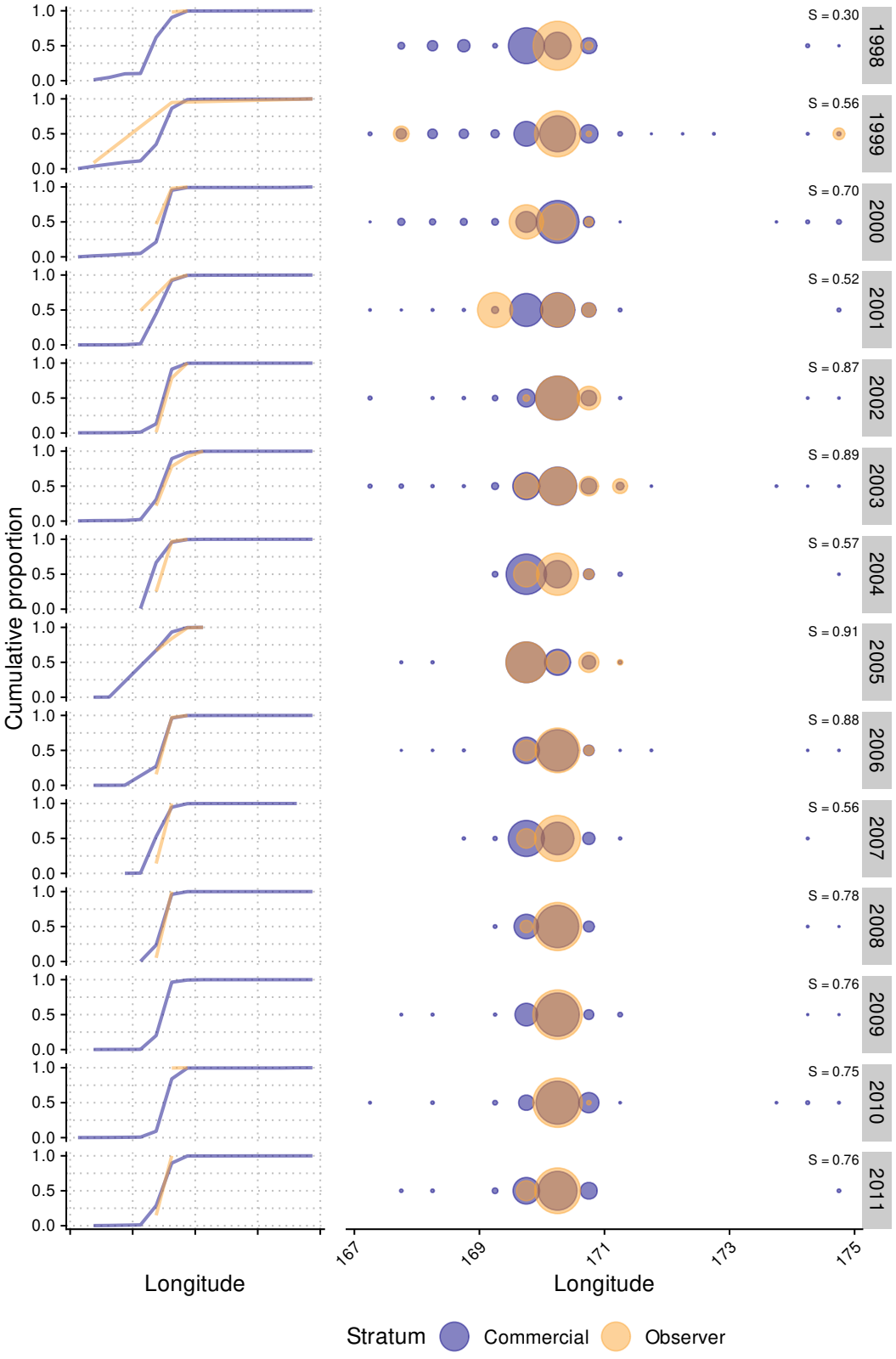


Figure 294: **Longitudinal representativeness of observer sampling coverage of Trawl catch in RIB 7, from events where the ribaldo catch exceeded the 20kg threshold, in 1998 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

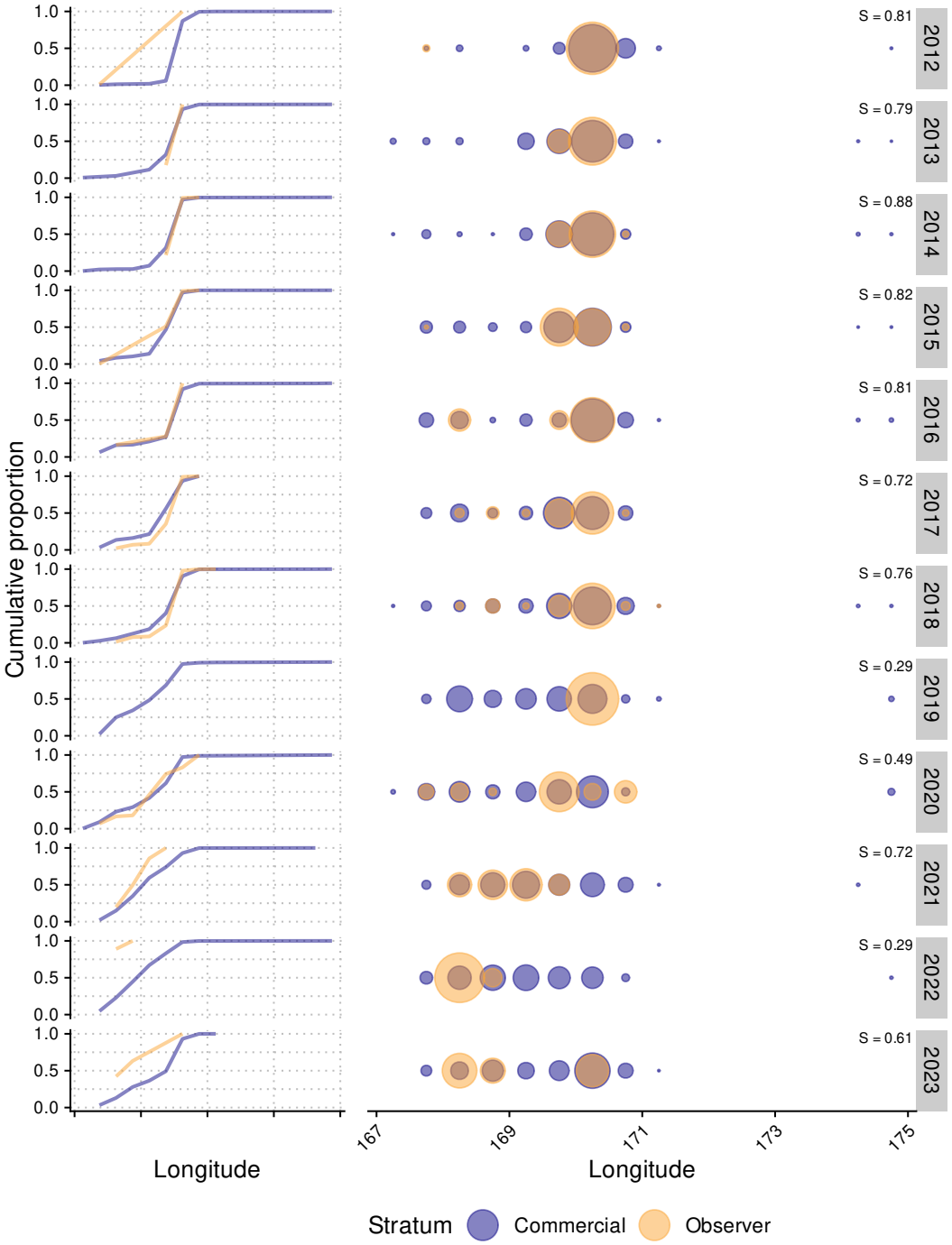


Figure 295: Longitudinal representativeness of observer sampling coverage of Trawl catch in RIB 7, from events where the ribaldo catch exceeded the 20kg threshold, in 2012 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

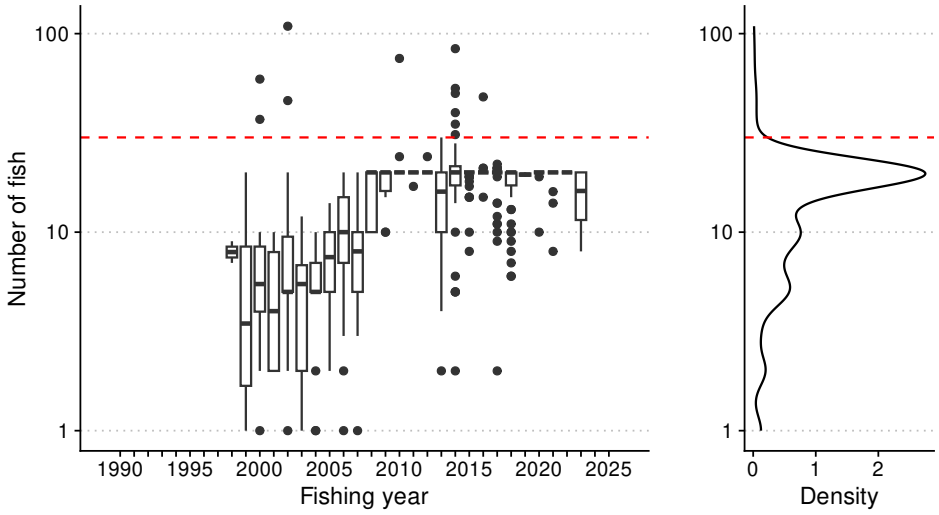


Figure 296: Length-frequency sample sizes for observed fishing events in RIB 7 where ribaldo were sampled. The red dashed line indicates a sample size of 30 fish.

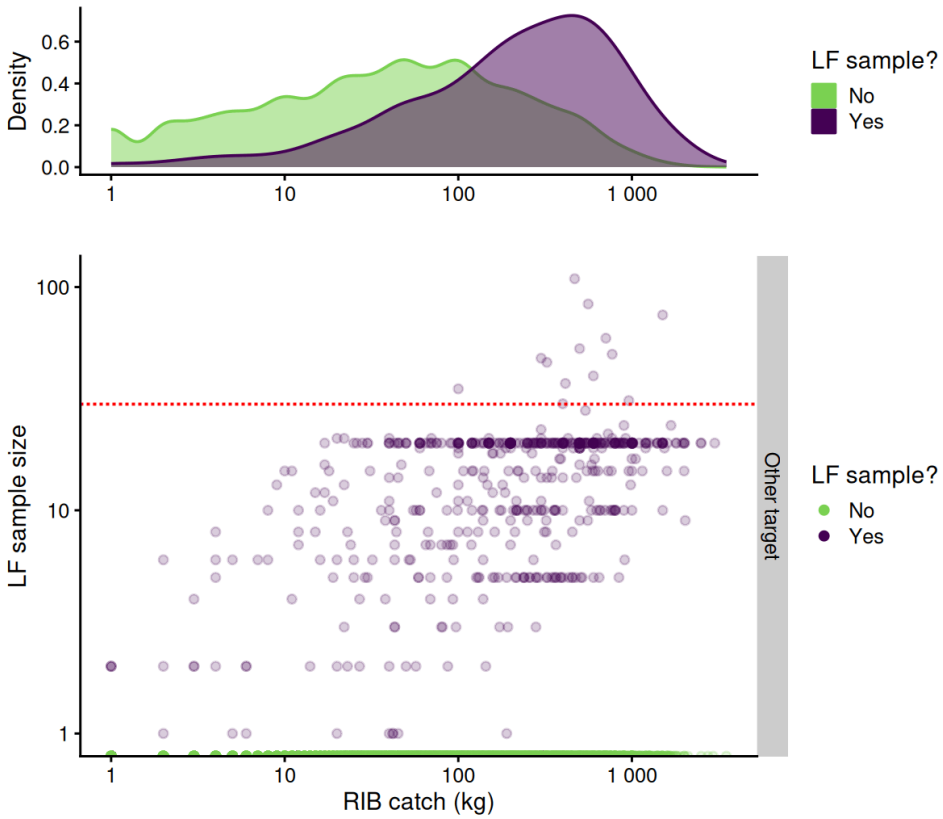


Figure 297: Length-frequency sample sizes (number of fish sampled) for observed fishing events in RIB 7 in relation to the total ribaldo catch from an event, separately for ribaldo target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.4.7.2 Otolith samples

Table 31: Otolith samples of ribaldo from the RIB 7 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	120	0	0	0.00
1991	202	0	0	0.00
1992	133	0	0	0.00
1993	298	0	0	0.00
1994	175	0	0	0.00
1995	144	0	0	0.00
1996	262	0	0	0.00
1997	275	0	0	0.00
1998	269	0	0	0.00
1999	876	0	0	0.00
2000	872	0	0	0.00
2001	664	0	0	0.00
2002	833	0	0	0.00
2003	848	0	0	0.00
2004	710	0	0	0.00
2005	871	0	0	0.00
2006	912	0	0	0.00
2007	689	0	0	0.00
2008	626	0	0	0.00
2009	572	9	45	1.57
2010	338	3	15	0.89
2011	395	1	10	0.25
2012	342	5	25	1.46
2013	468	17	87	3.63
2014	630	20	98	3.17
2015	967	0	0	0.00
2016	553	12	60	2.17
2017	766	50	275	6.53
2018	799	59	333	7.38
2019	558	2	8	0.36
2020	634	9	44	1.42
2021	738	23	127	3.12
2022	733	3	15	0.41
2023	663	4	21	0.60
2024	391	0	0	0.00
2025	361	0	0	0.00

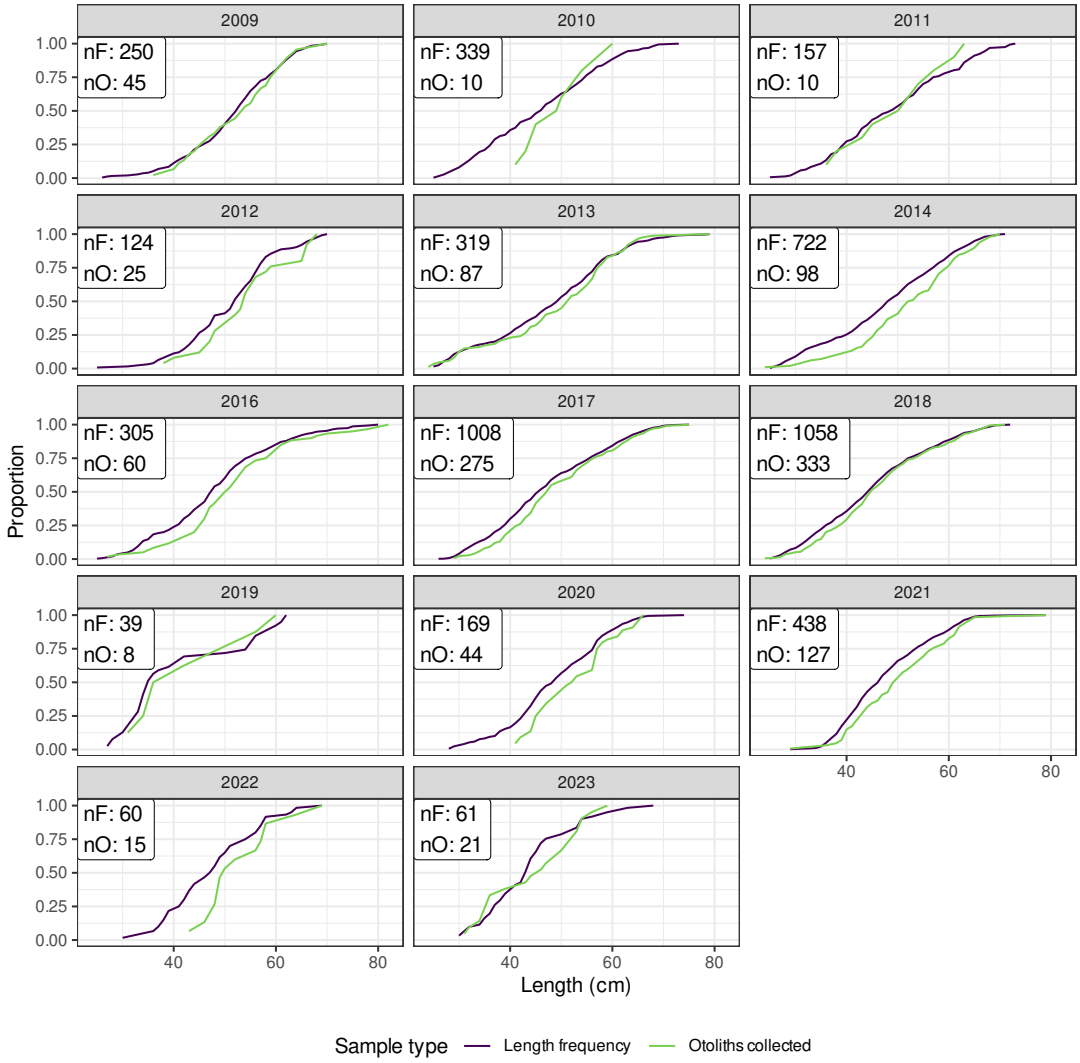


Figure 298: Cumulative distributions of the length of fish in the length frequency and otolith samples of ribaldo in the RIB 7 Trawl fishery for the 2009 to 2023 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.4.7.3 Catch quantification

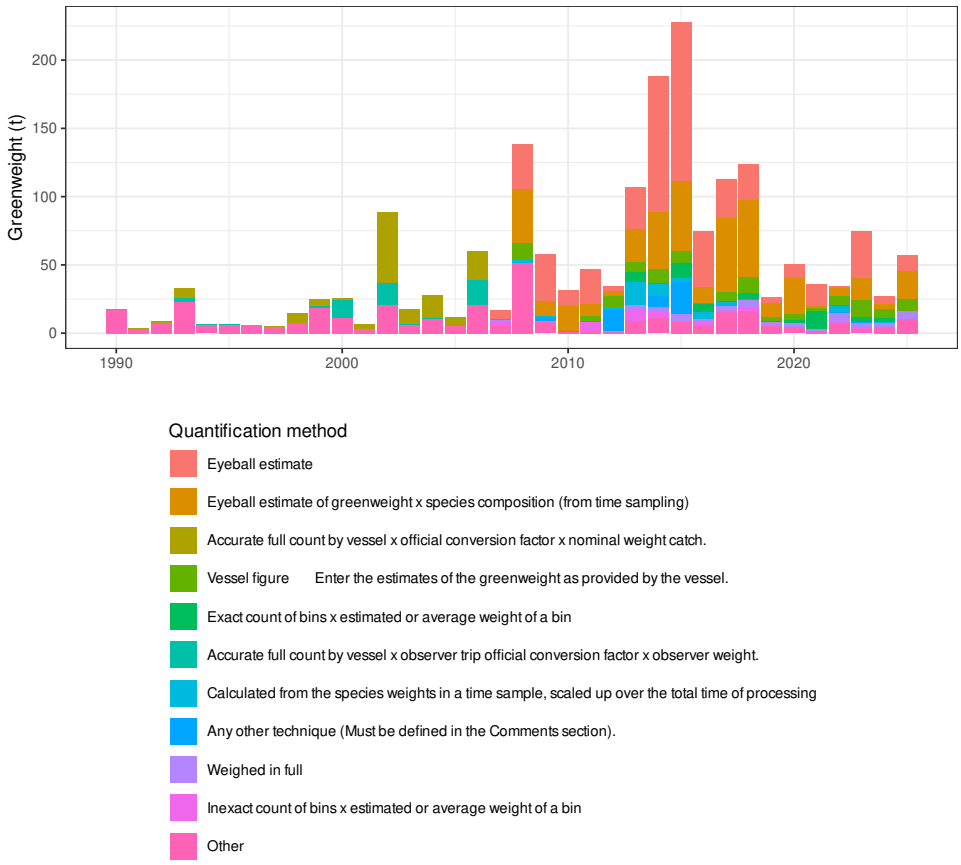


Figure 299: Methods used by observers to quantify the catch of ribaldo in the RIB 7 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.4.8 RIB 7: Line fishery

2.4.8.1 Length-frequency samples

Table 32: Length-frequency samples of ribaldo from the RIB 7 Line fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of ribaldo exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	6	0	0	0.00
1991	52	0	0	0.00
1992	41	0	0	0.00
1993	20	0	0	0.00
1994	63	0	0	0.00
1995	39	0	0	0.00
1996	35	0	0	0.00
1997	34	0	0	0.00
1998	58	0	0	0.00
1999	20 015	0	0	0.00
2000	12 612	0	0	0.00
2001	733	0	0	0.00
2002	7	0	0	0.00
2003	9	0	0	0.00
2004	2	0	0	0.00
2005	3	0	0	0.00
2006	14	0	0	0.00
2007	31	1	15	3.23
2008	43	0	0	0.00
2009	45	0	0	0.00
2010	9	0	0	0.00
2011	38	0	0	0.00
2012	62	0	0	0.00
2013	55	0	0	0.00
2014	132	0	0	0.00
2015	118	0	0	0.00
2016	185	4	50	2.16
2017	150	1	10	0.67
2018	178	0	0	0.00
2019	247	0	0	0.00
2020	495	1	7	0.20
2021	596	0	0	0.00
2022	737	0	0	0.00
2023	577	0	0	0.00
2024	681	20	390	2.94
2025	561	0	0	0.00

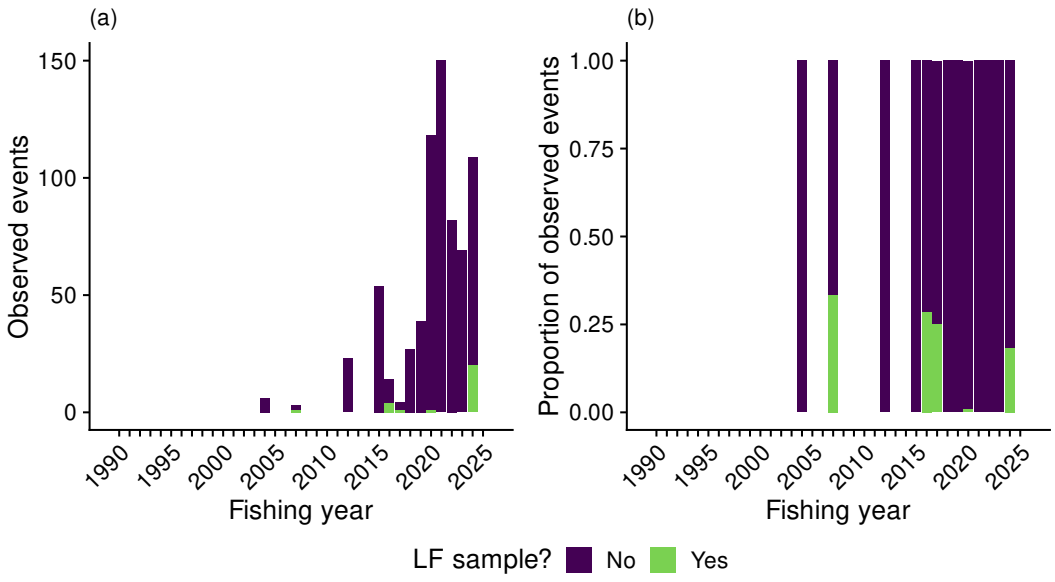


Figure 300: **(a) Observed Line fishing events, and (b) proportion of observed events, in RIB 7 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

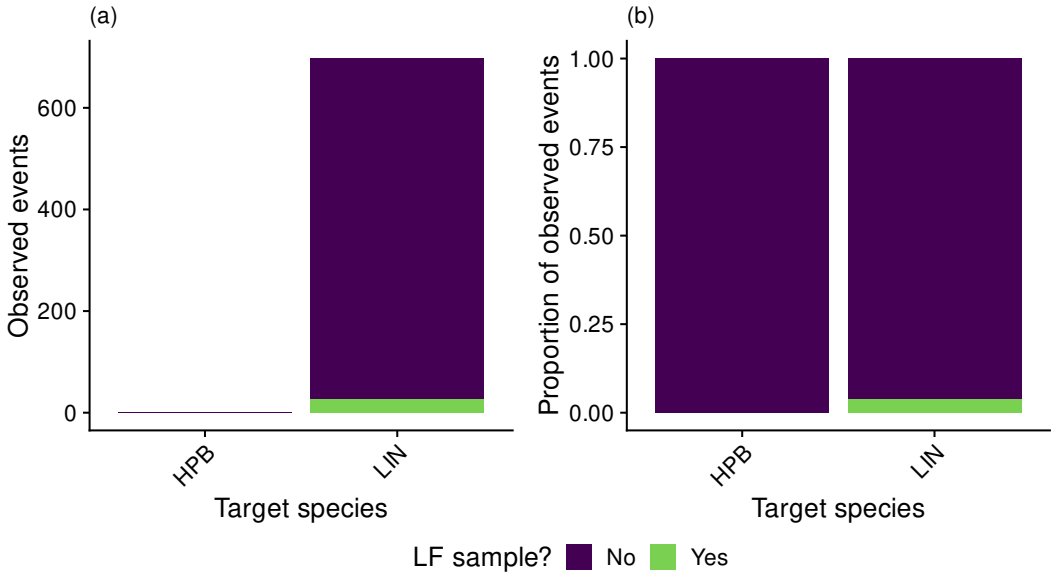


Figure 301: **(a) Observed Line fishing events, and (b) proportion of observed events, in RIB 7 where the ribaldo catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

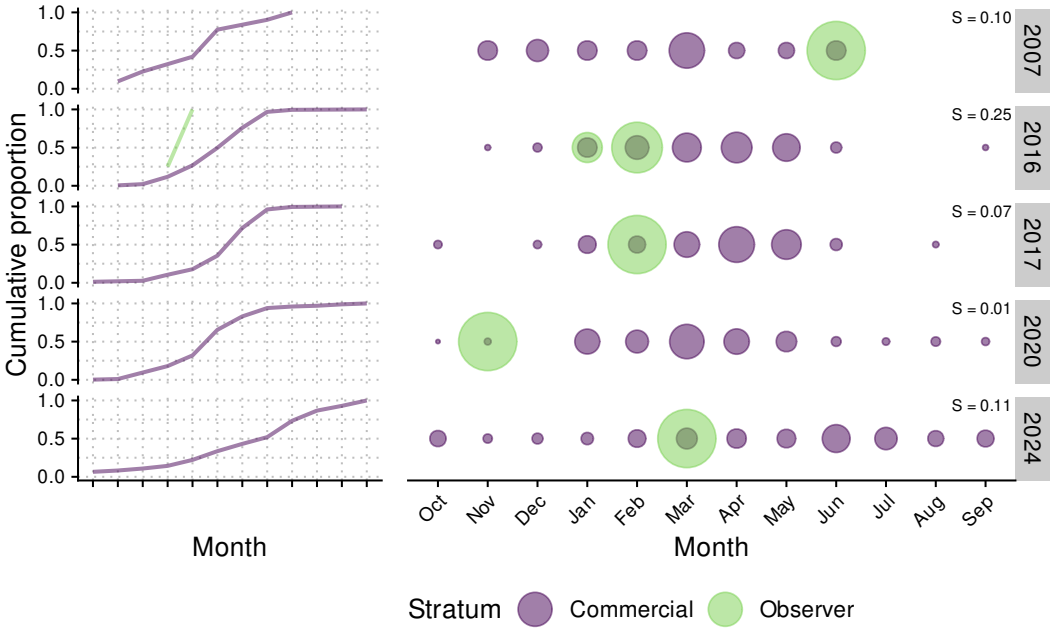


Figure 302: **Monthly representativeness of observer sampling coverage of Line fishing events in RIB 7, where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

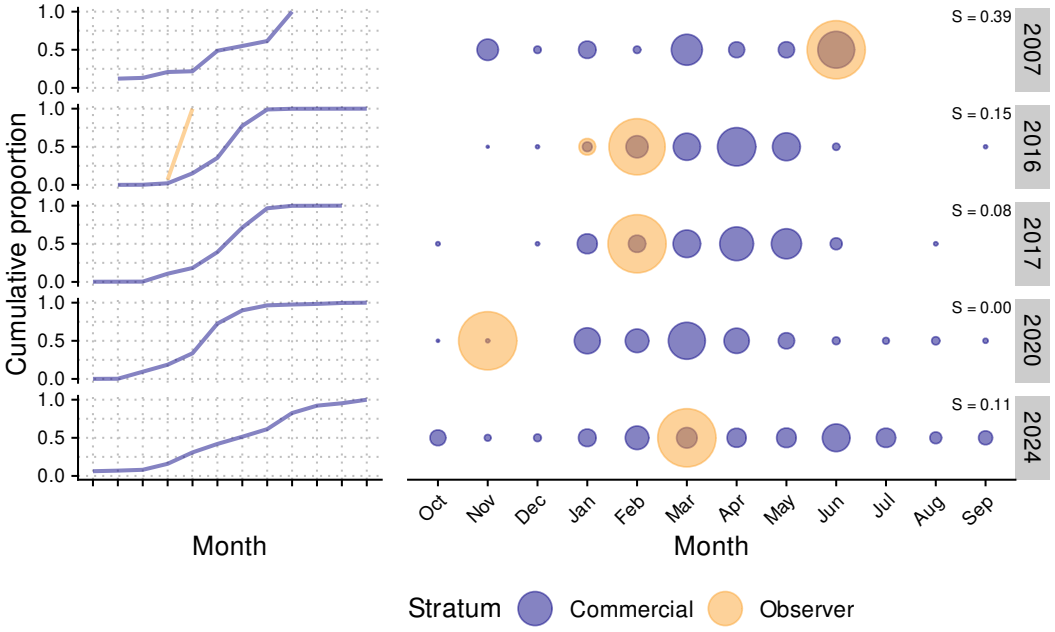


Figure 303: **Monthly representativeness of observer sampling coverage of Line catch in RIB 7, from events where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

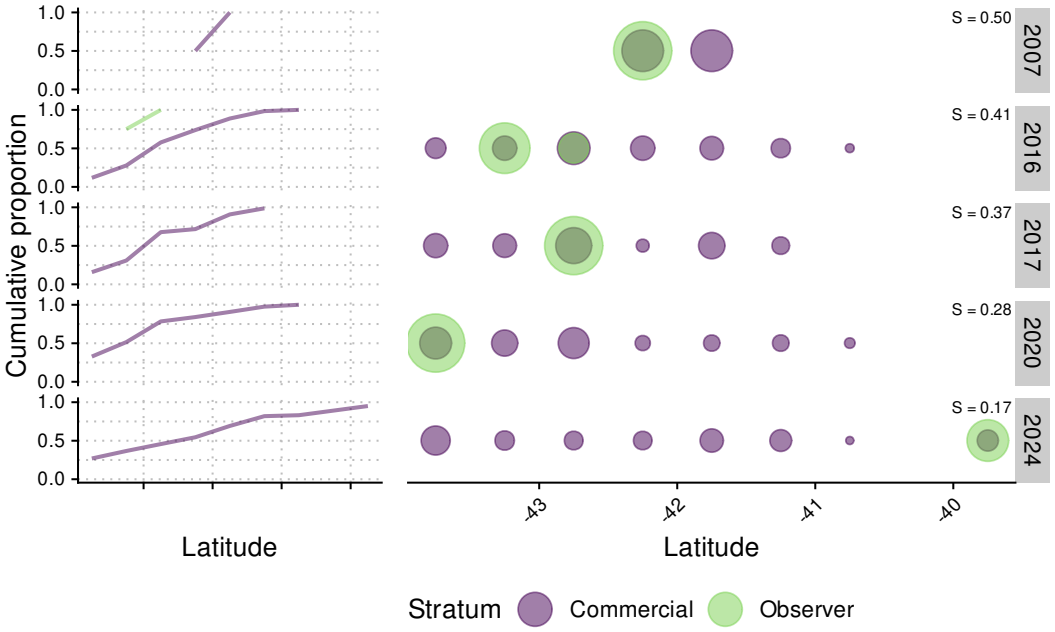


Figure 304: **Latitudinal representativeness of observer sampling coverage of Line fishing events in RIB 7, where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

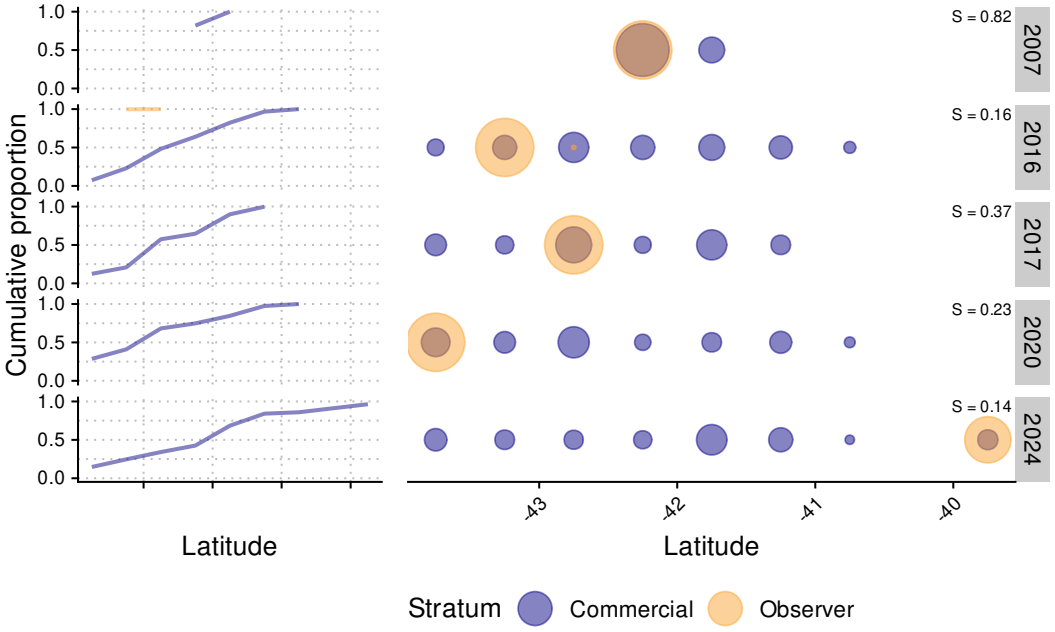


Figure 305: **Latitudinal representativeness of observer sampling coverage of Line catch in RIB 7, from events where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

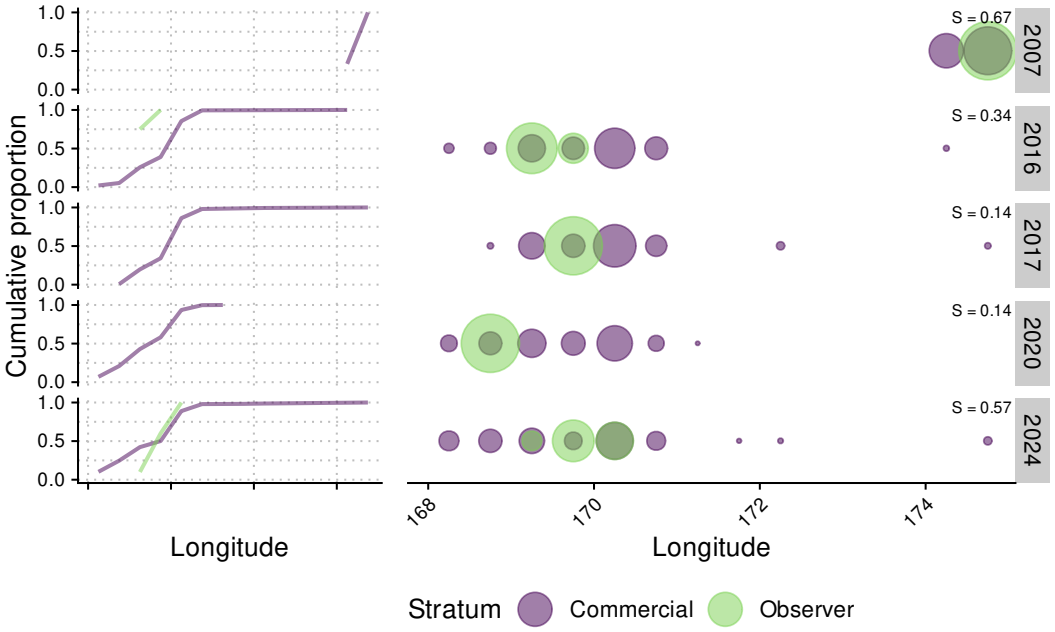


Figure 306: **Longitudinal representativeness of observer sampling coverage of Line fishing events in RIB 7, where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

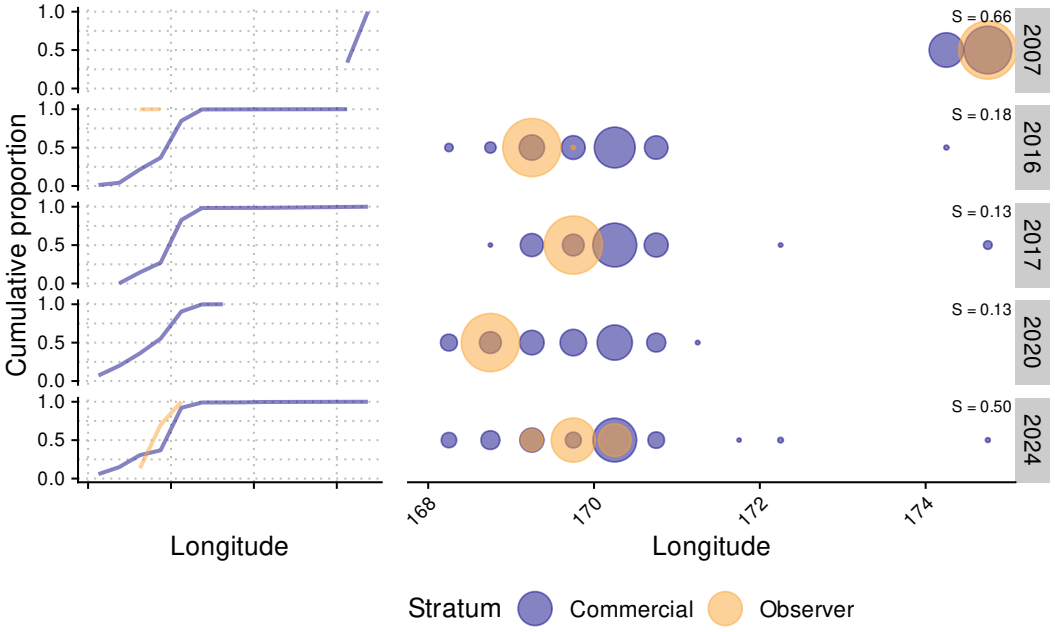


Figure 307: **Longitudinal representativeness of observer sampling coverage of Line catch in RIB 7, from events where the ribaldo catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

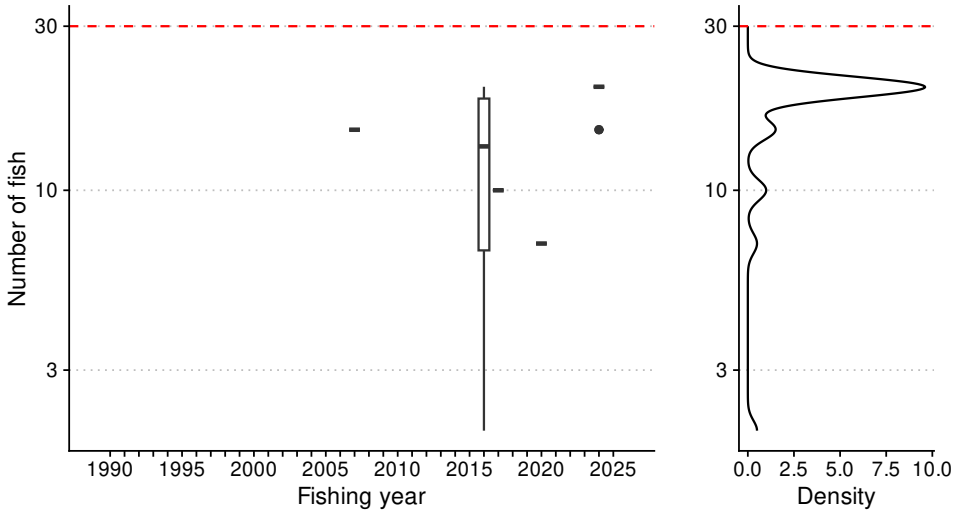


Figure 308: Length-frequency sample sizes for observed fishing events in RIB 7 where ribaldo were sampled. The red dashed line indicates a sample size of 30 fish.

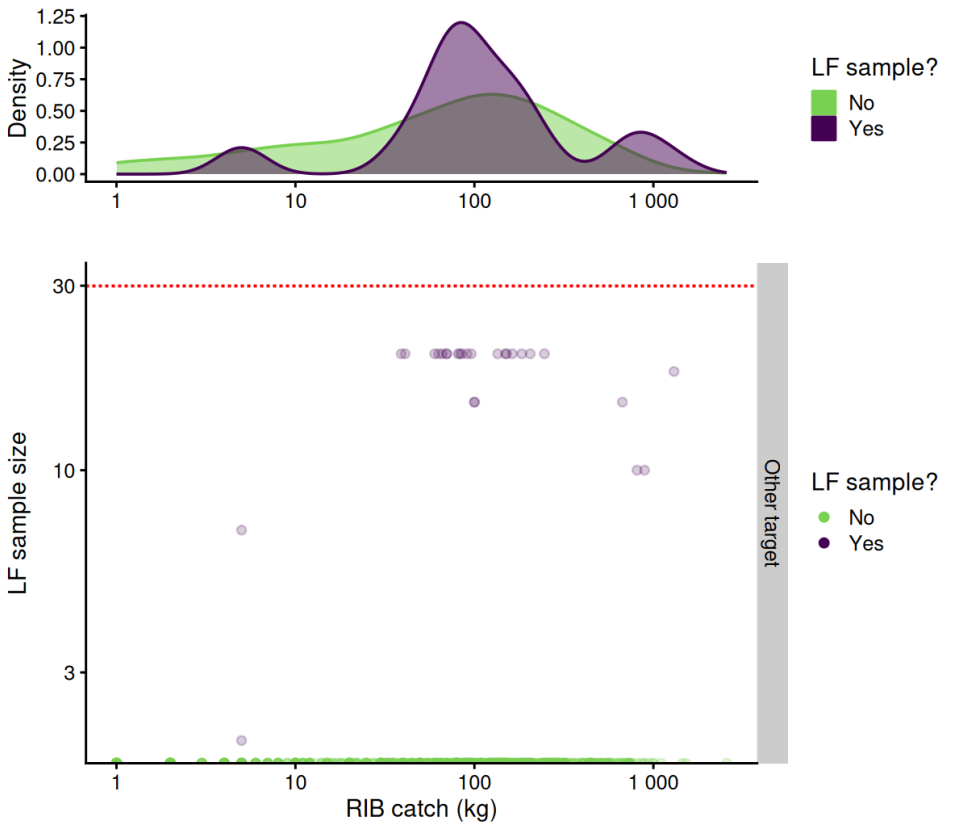


Figure 309: Length-frequency sample sizes (number of fish sampled) for observed fishing events in RIB 7 in relation to the total ribaldo catch from an event, separately for ribaldo target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.4.8.2 Catch quantification

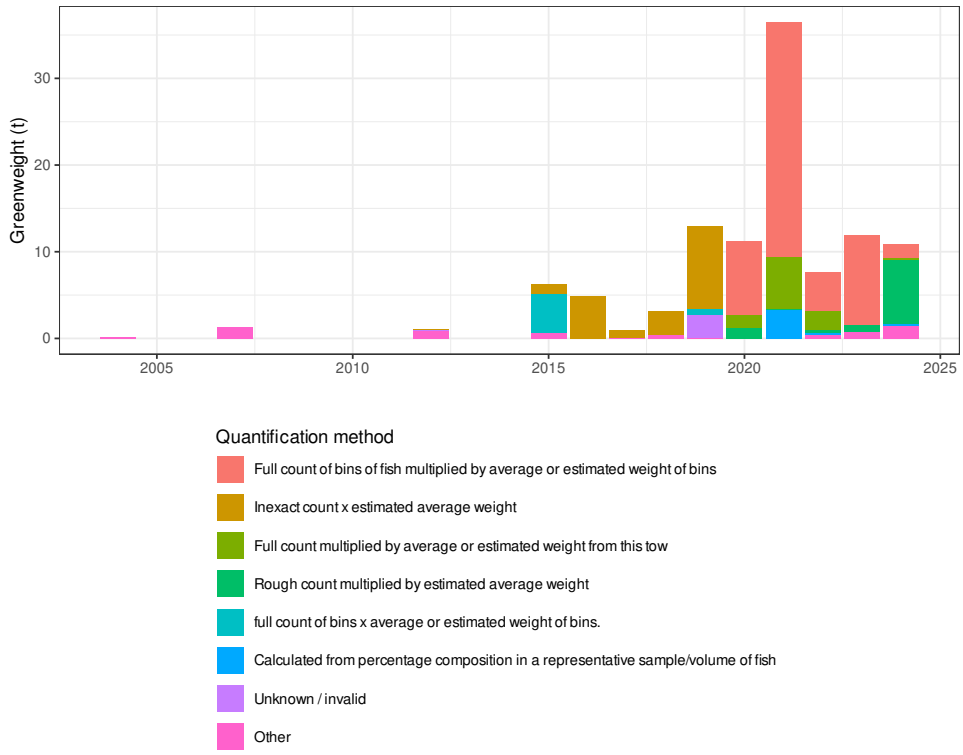


Figure 310: Methods used by observers to quantify the catch of ribaldo in the RIB 7 Line fishery. The legend lists the methods used in descending order of total catch.

2.5 SBW stocks

Observer sampling of southern blue whiting is considered with respect to the southern blue whiting Quota Management Areas.

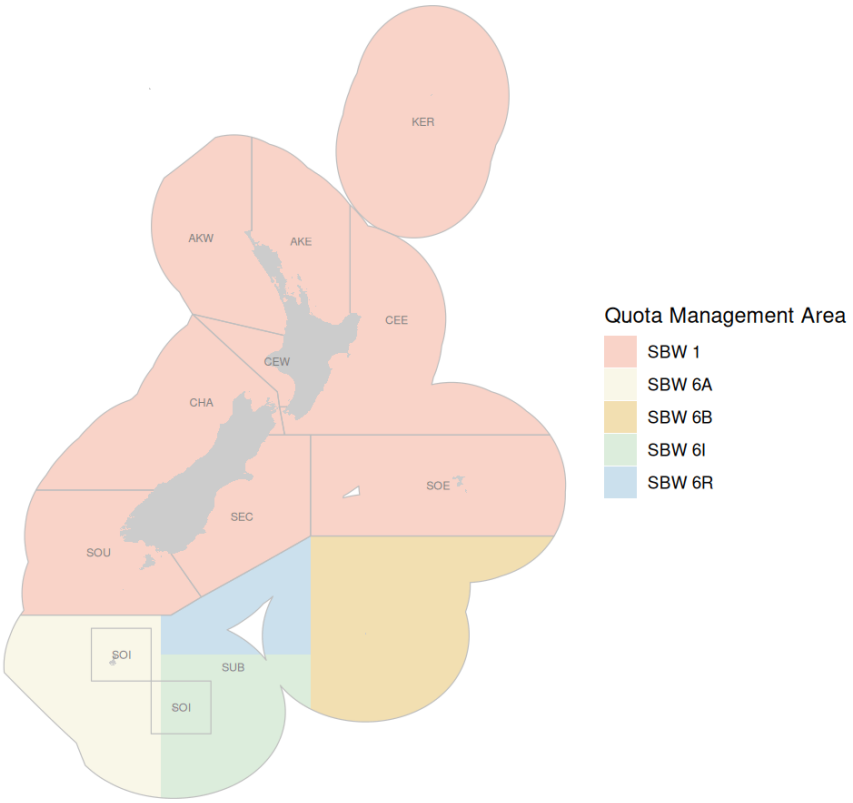


Figure 311: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for southern blue whiting (coloured areas, per legend).

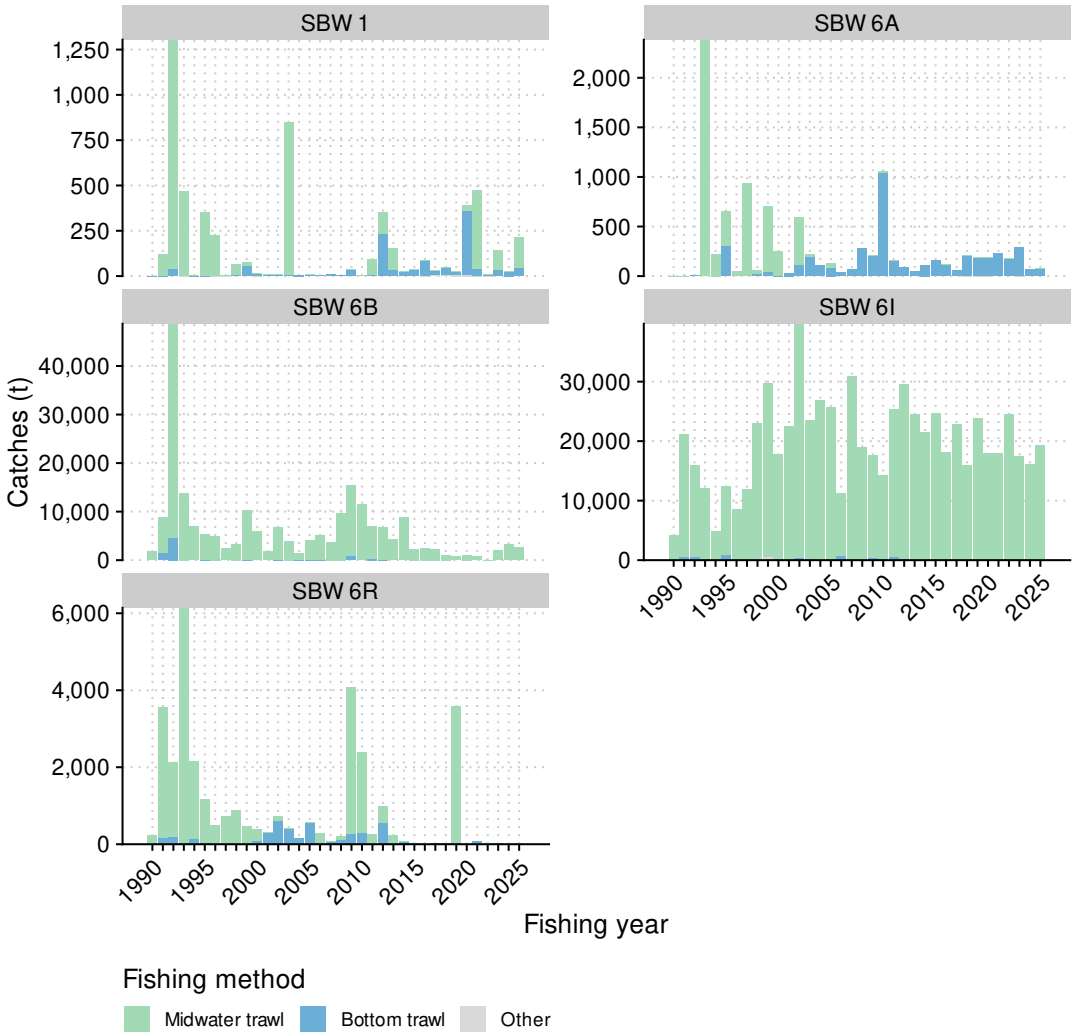


Figure 312: Catches of southern blue whiting by fishing method, for events within the southern blue whiting Quota Management Areas. Methods grouped as Other include: BLL, MPT, PRB, PRM, SLL, SN.

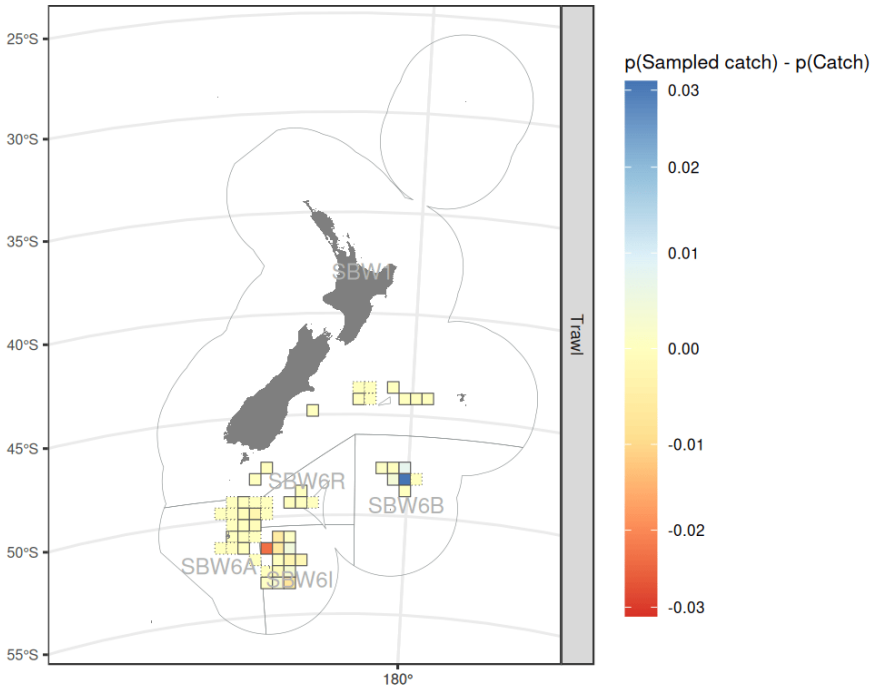


Figure 313: Differences in the relative proportions of catch and sampled catch for southern blue whiting during 2021–2025. Cells with a dotted border had no sampling.

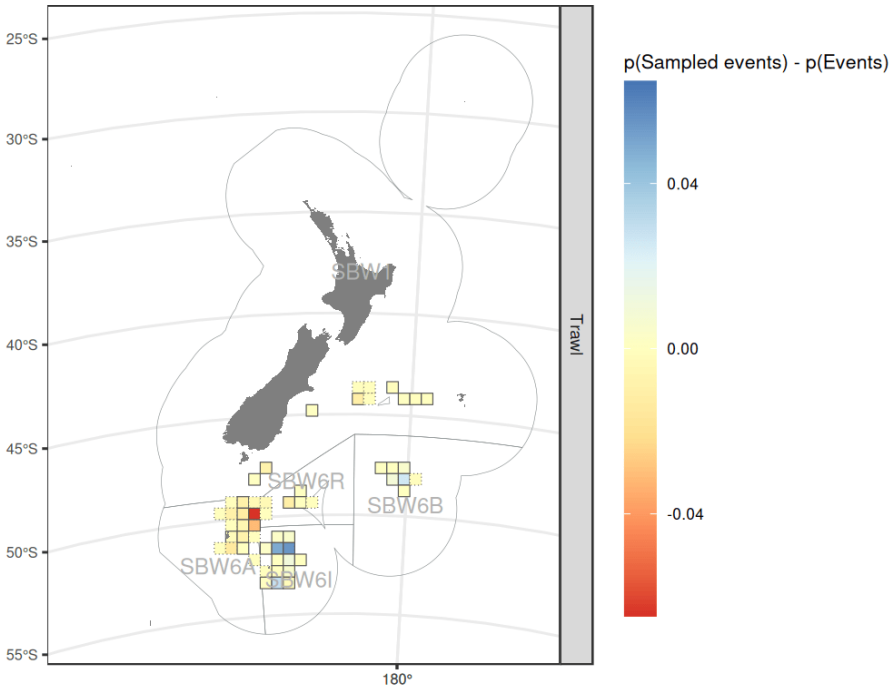


Figure 314: Differences in the relative proportions of events meeting the sampling threshold and sampled events for southern blue whiting during 2021–2025. Cells with a dotted border had no sampling.

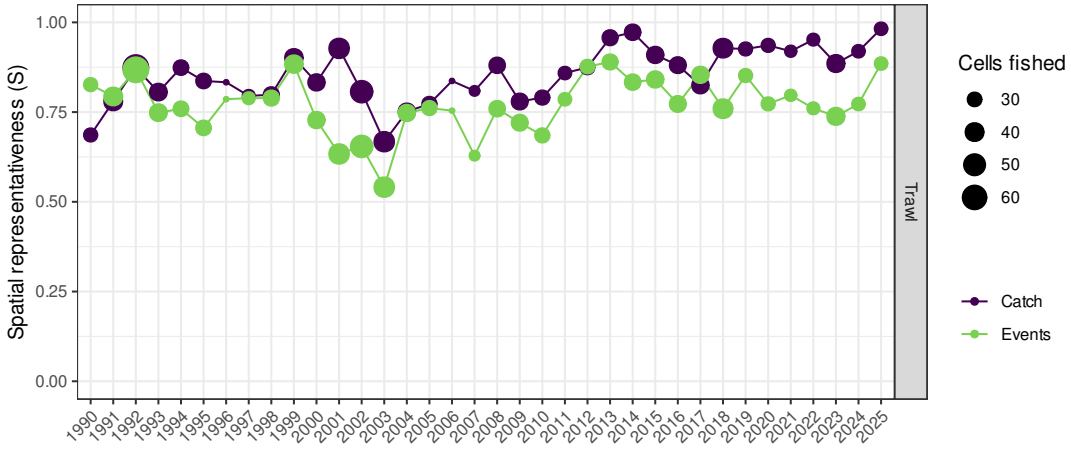


Figure 315: Spatial representativeness of observer sampling of southern blue whiting by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.

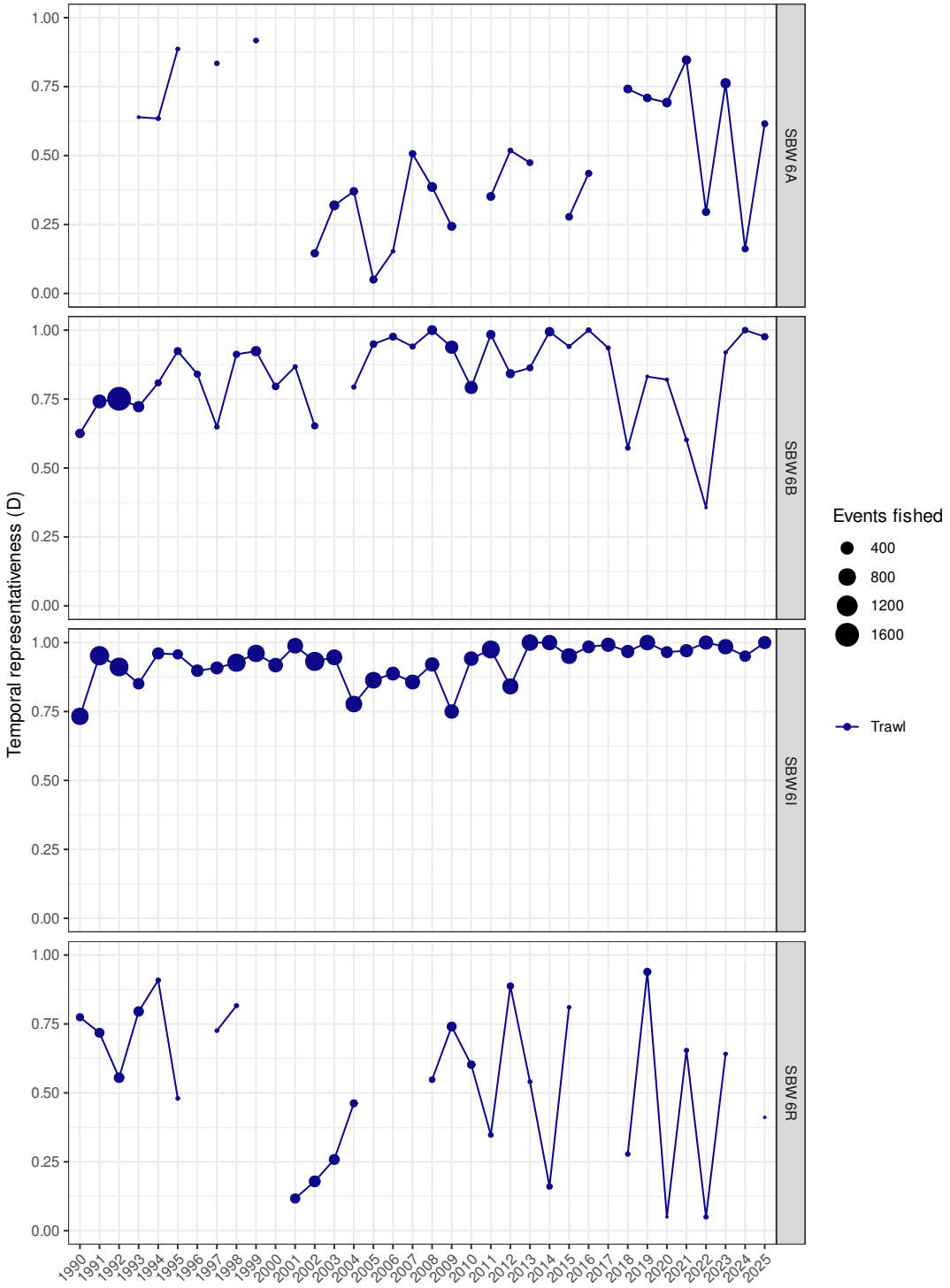


Figure 316: Temporal representativeness of observer sanpling of southern blue whiting by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.5.1 SBW 6A: Trawl fishery

2.5.1.1 Length-frequency samples

Table 33: Length-frequency samples of southern blue whiting from the SBW 6A Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of southern blue whiting exceeded a potential sampling threshold of 150 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	1	0	0	0.00
1991	5	0	0	0.00
1992	3	0	0	0.00
1993	8	5	768	62.50
1994	26	29	1320	111.54
1995	22	12	2046	54.55
1996	3	0	0	0.00
1997	35	11	1847	31.43
1998	18	0	0	0.00
1999	18	6	1199	33.33
2000	24	0	0	0.00
2001	57	0	0	0.00
2002	125	3	189	2.40
2003	202	3	46	1.49
2004	132	5	200	3.79
2005	114	1	40	0.88
2006	16	14	207	87.50
2007	89	4	5	4.49
2008	200	9	235	4.50
2009	159	13	691	8.18
2010	74	0	0	0.00
2011	145	5	390	3.45
2012	39	2	126	5.13
2013	71	3	67	4.23
2014	87	0	0	0.00
2015	99	5	215	5.05
2016	81	2	231	2.47
2017	48	0	0	0.00
2018	144	21	532	14.58
2019	138	13	251	9.42
2020	183	40	791	21.86
2021	169	16	321	9.47
2022	121	1	20	0.83
2023	223	12	679	5.38
2024	79	1	20	1.27
2025	74	17	664	22.97

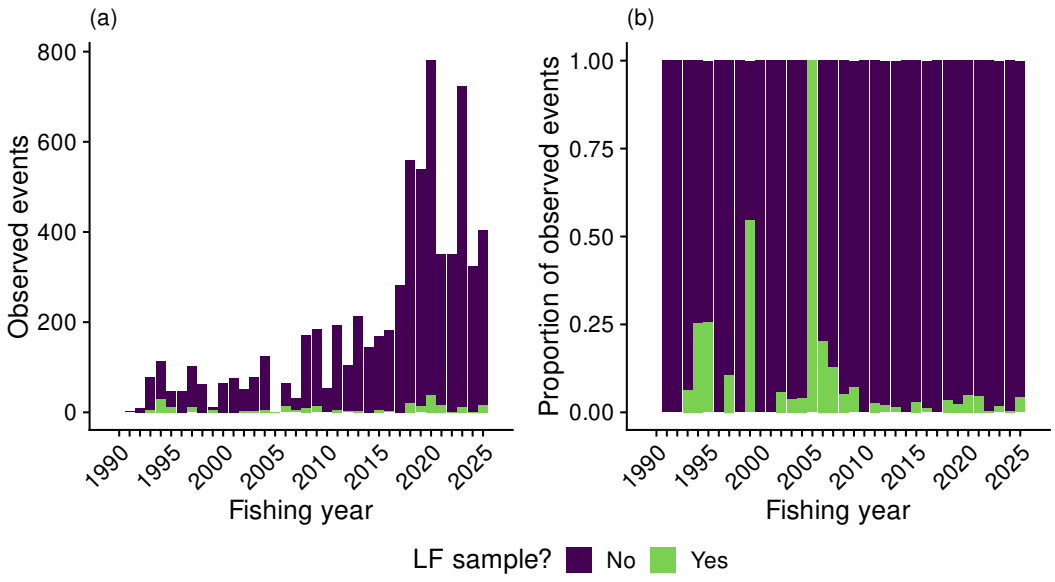


Figure 317: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SBW 6A where the southern blue whiting catch exceeded the 150 kg threshold, with and without length-frequency sampling.**

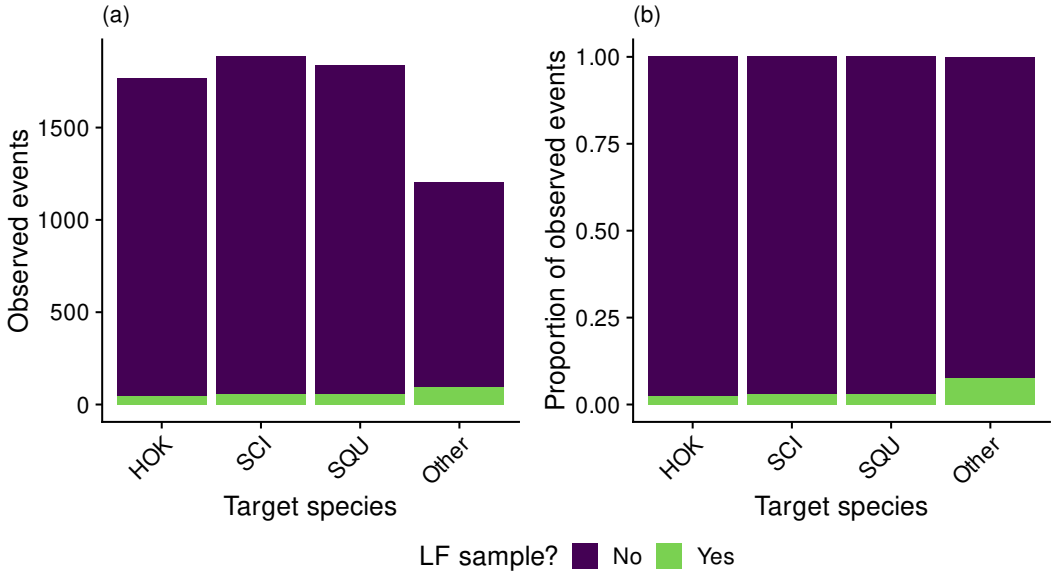


Figure 318: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SBW 6A where the southern blue whiting catch exceeded the 150 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

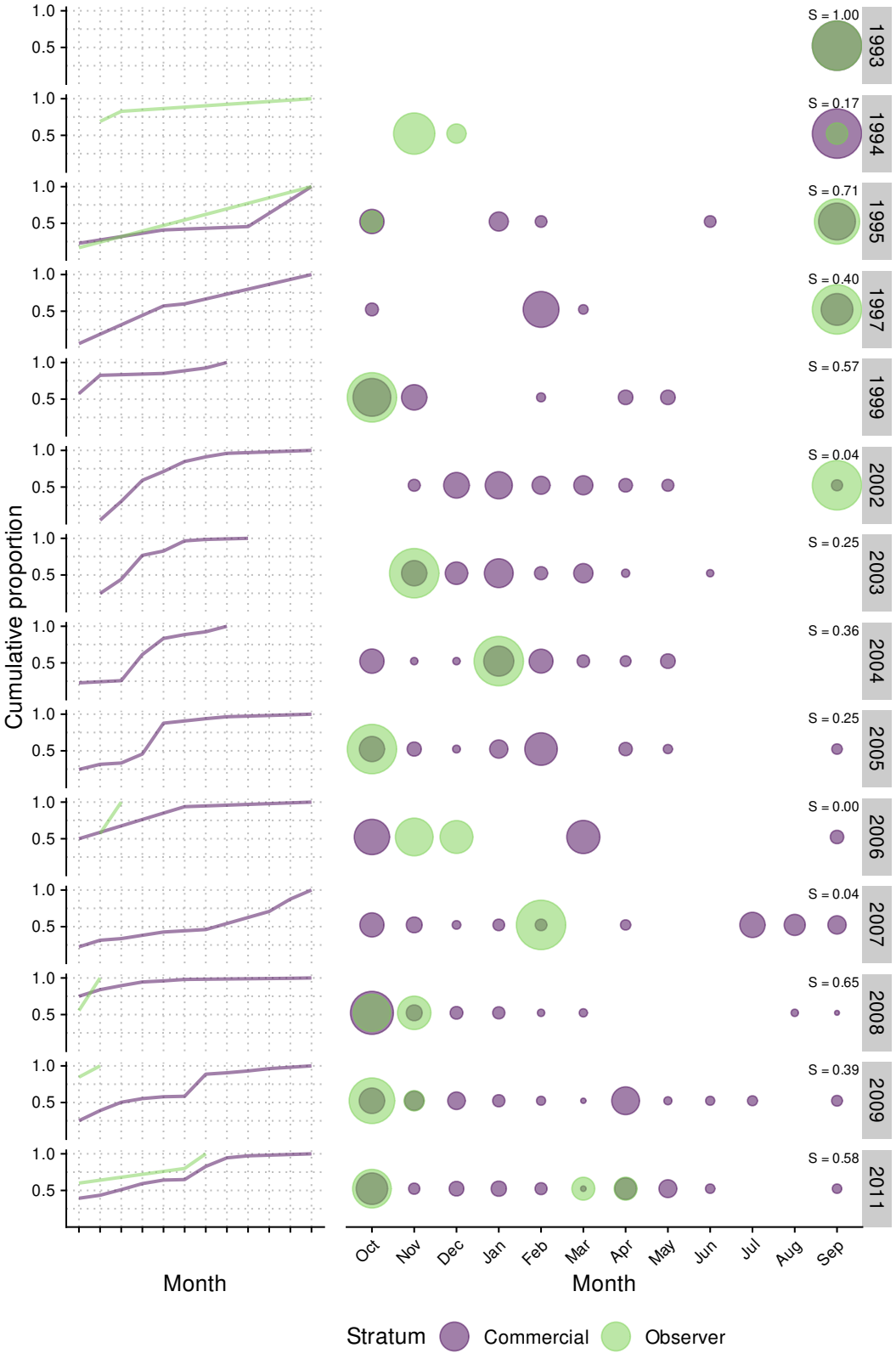


Figure 319: Monthly representativeness of observer sampling coverage of Trawl fishing events in SBW 6A, where the southern blue whiting catch exceeded the 150kg threshold, in 1993 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

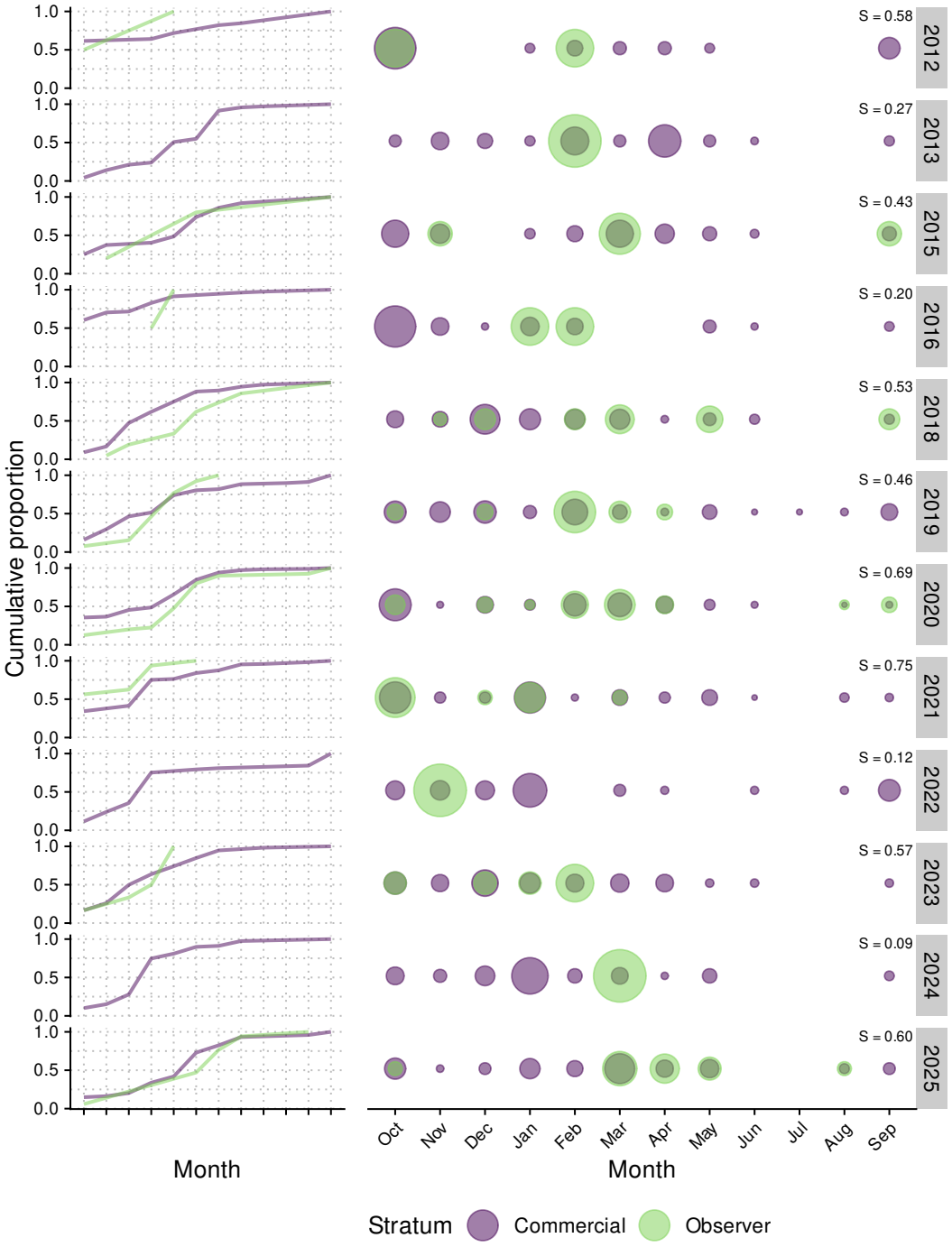


Figure 320: Monthly representativeness of observer sampling coverage of Trawl fishing events in SBW 6A, where the southern blue whiting catch exceeded the 150kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

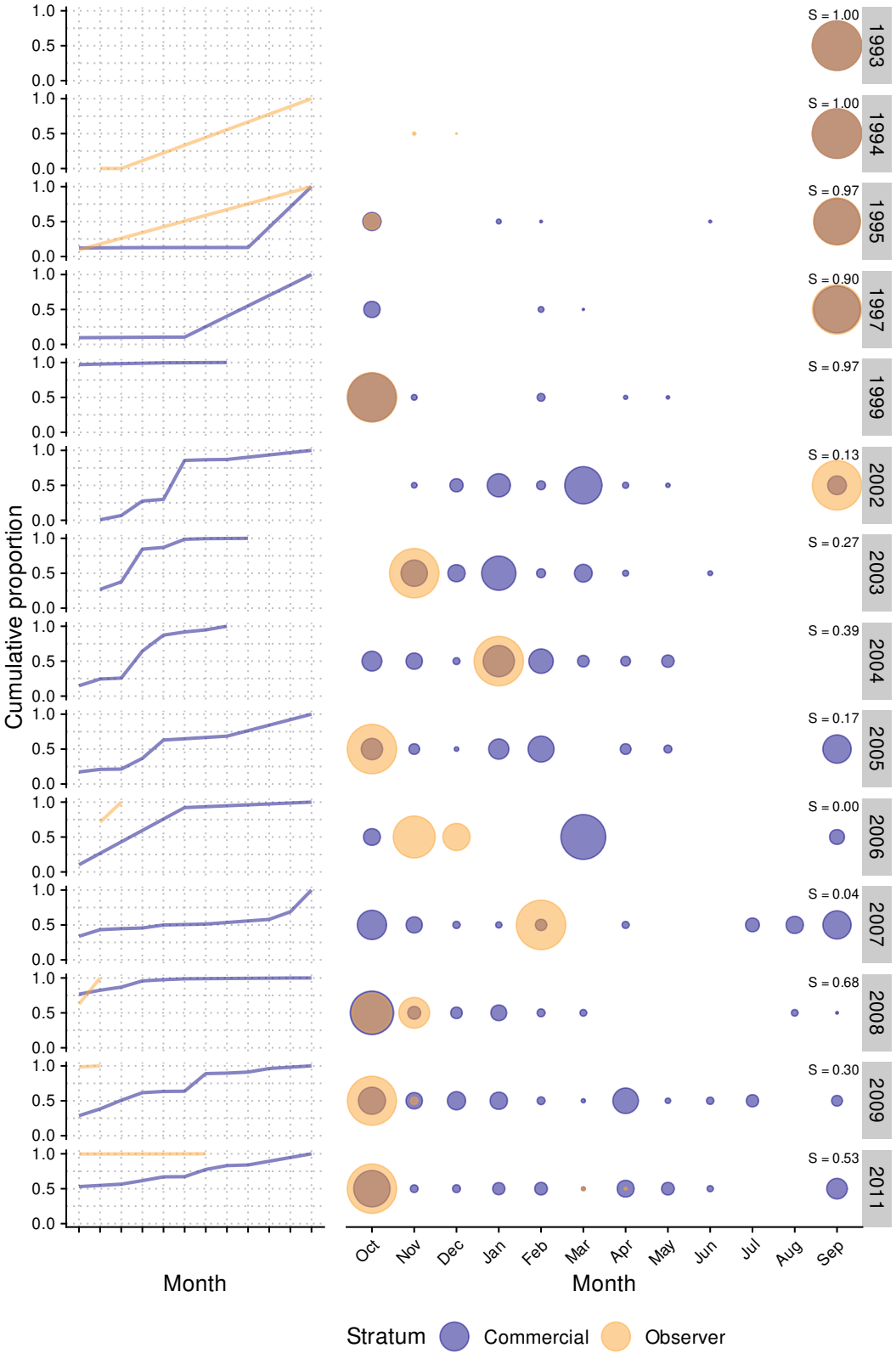


Figure 321: Monthly representativeness of observer sampling coverage of Trawl catch in SBW 6A, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1993 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

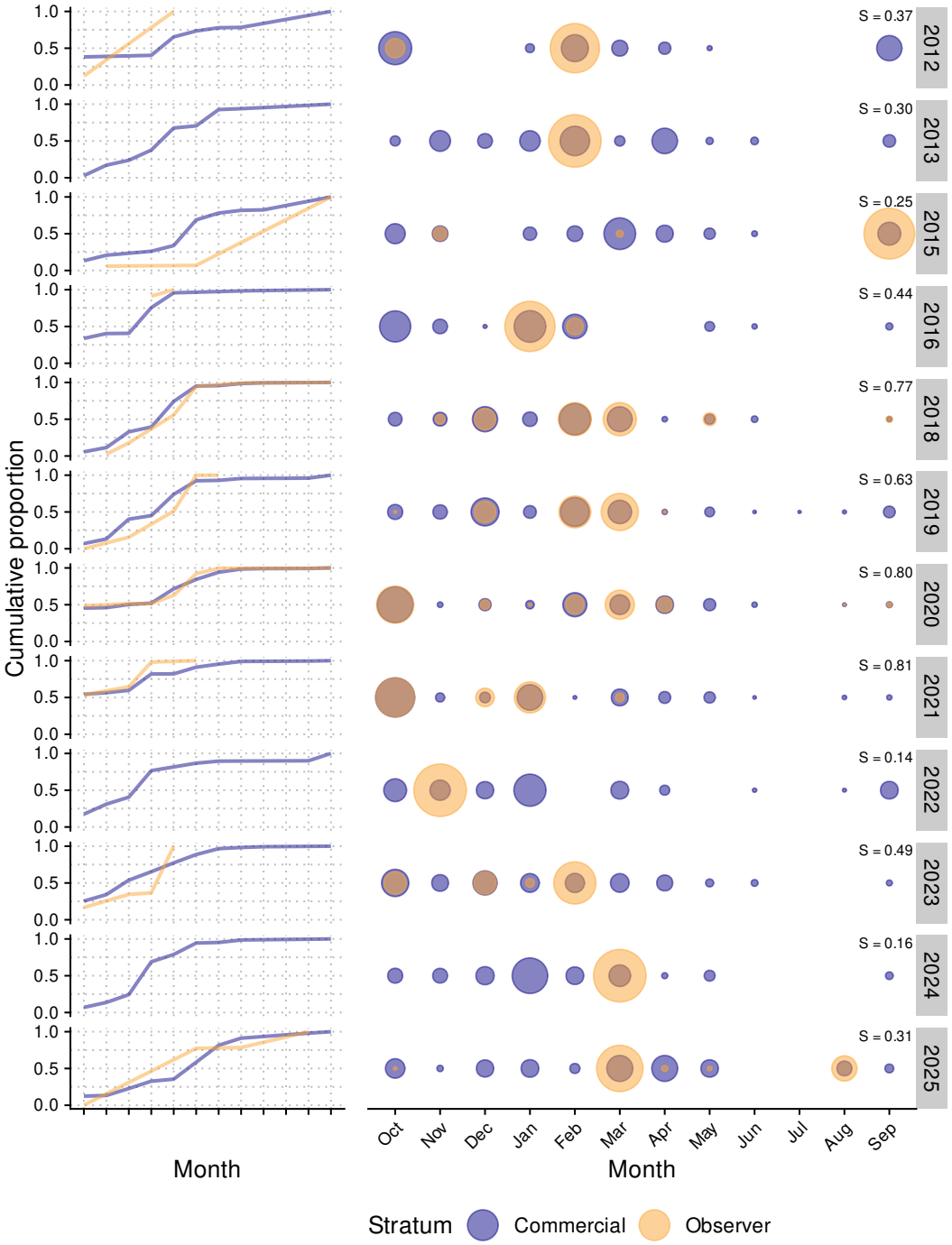


Figure 322: **Monthly representativeness of observer sampling coverage of Trawl catch in SBW 6A, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

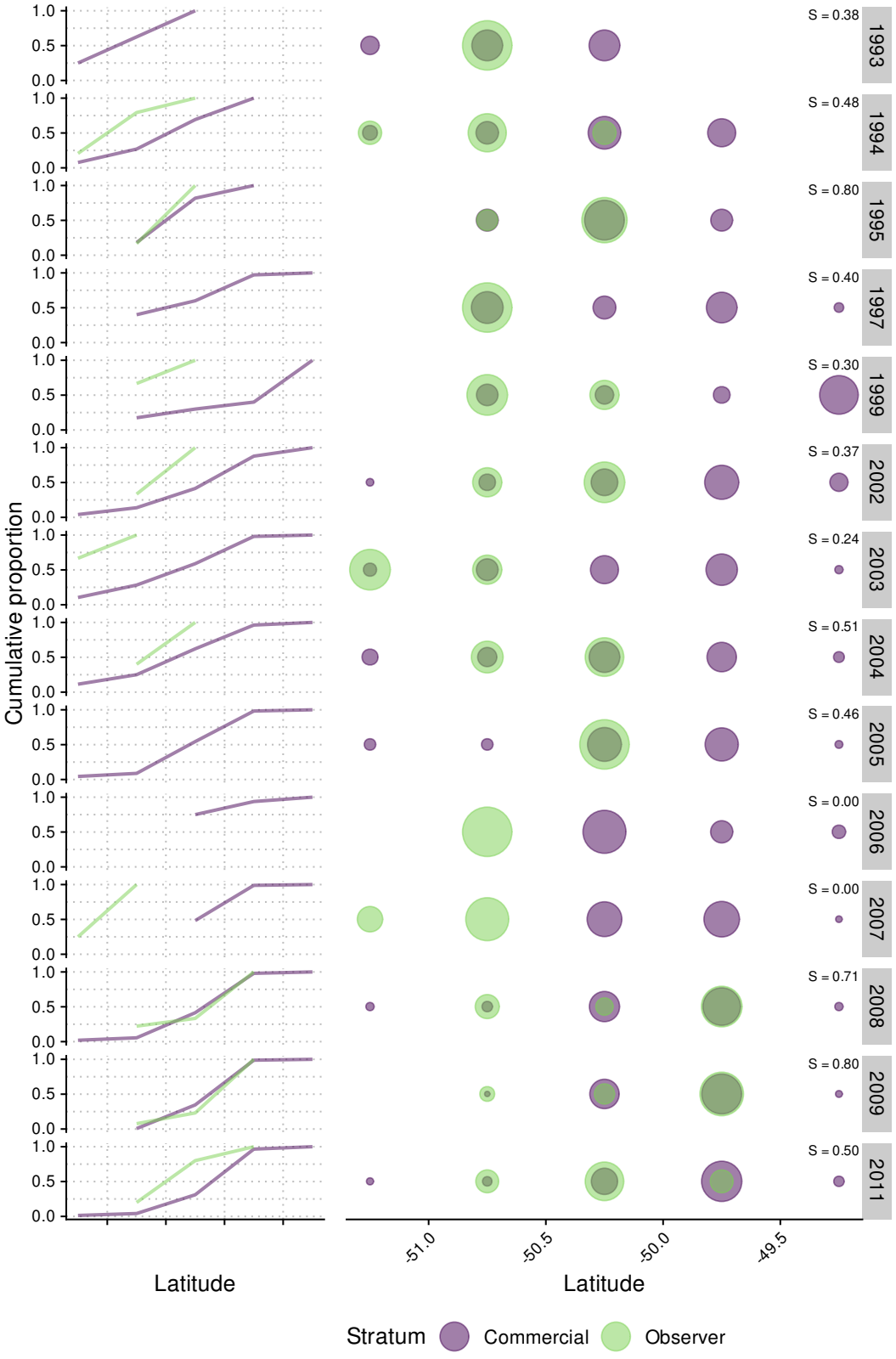


Figure 323: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6A, where the southern blue whiting catch exceeded the 150kg threshold, in 1993 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

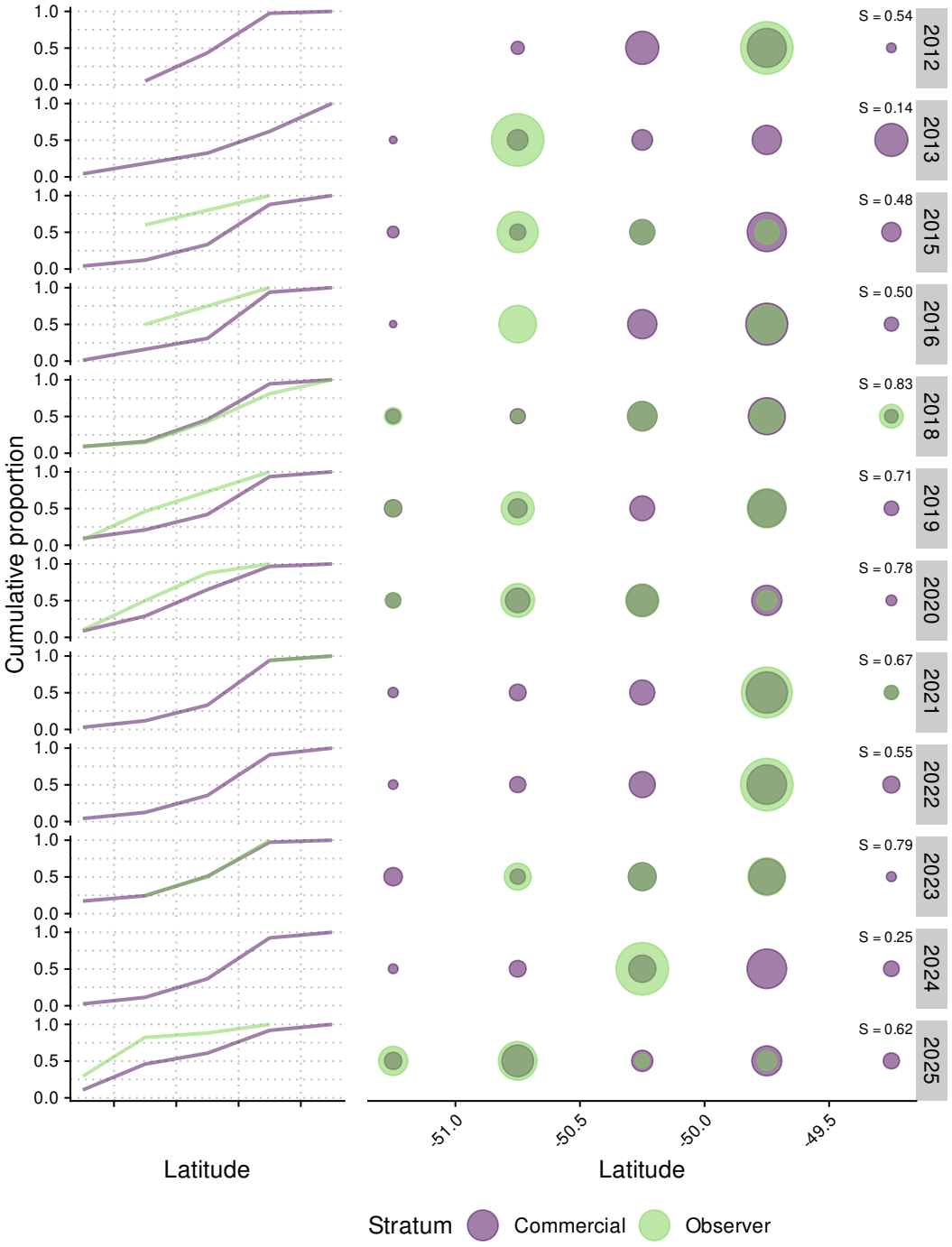


Figure 324: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6A, where the southern blue whiting catch exceeded the 150kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

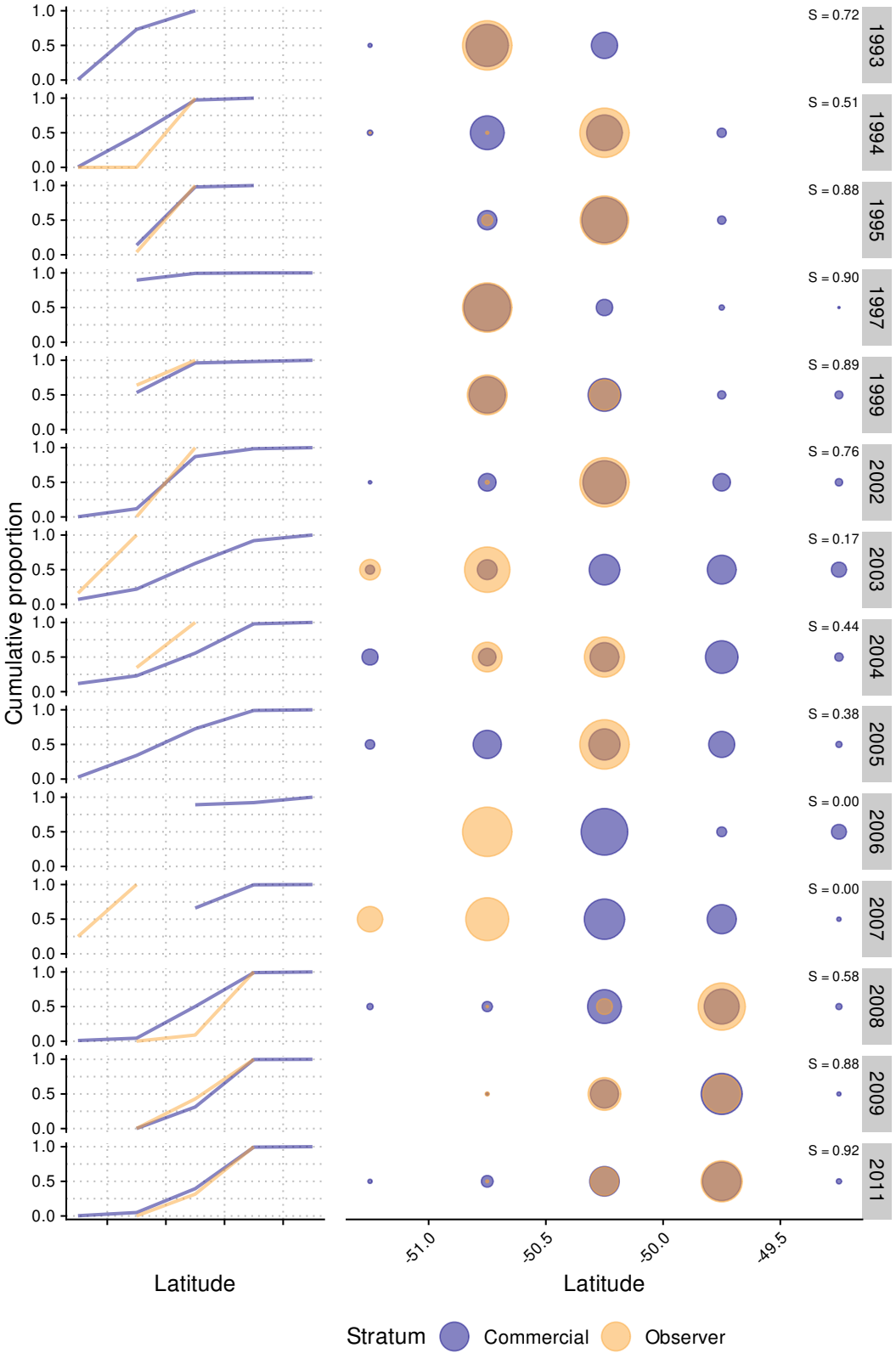


Figure 325: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6A, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1993 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

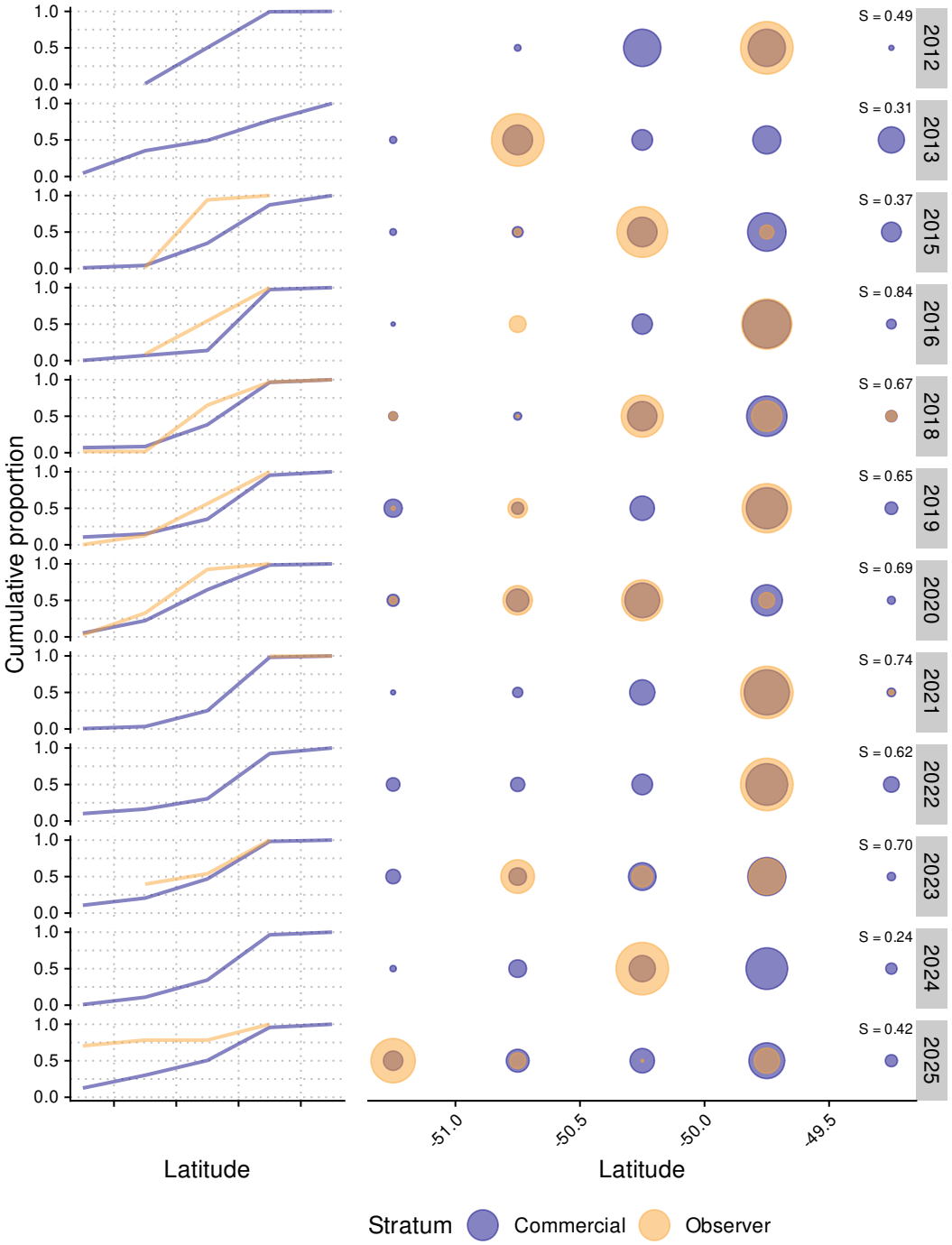


Figure 326: Latitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6A, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

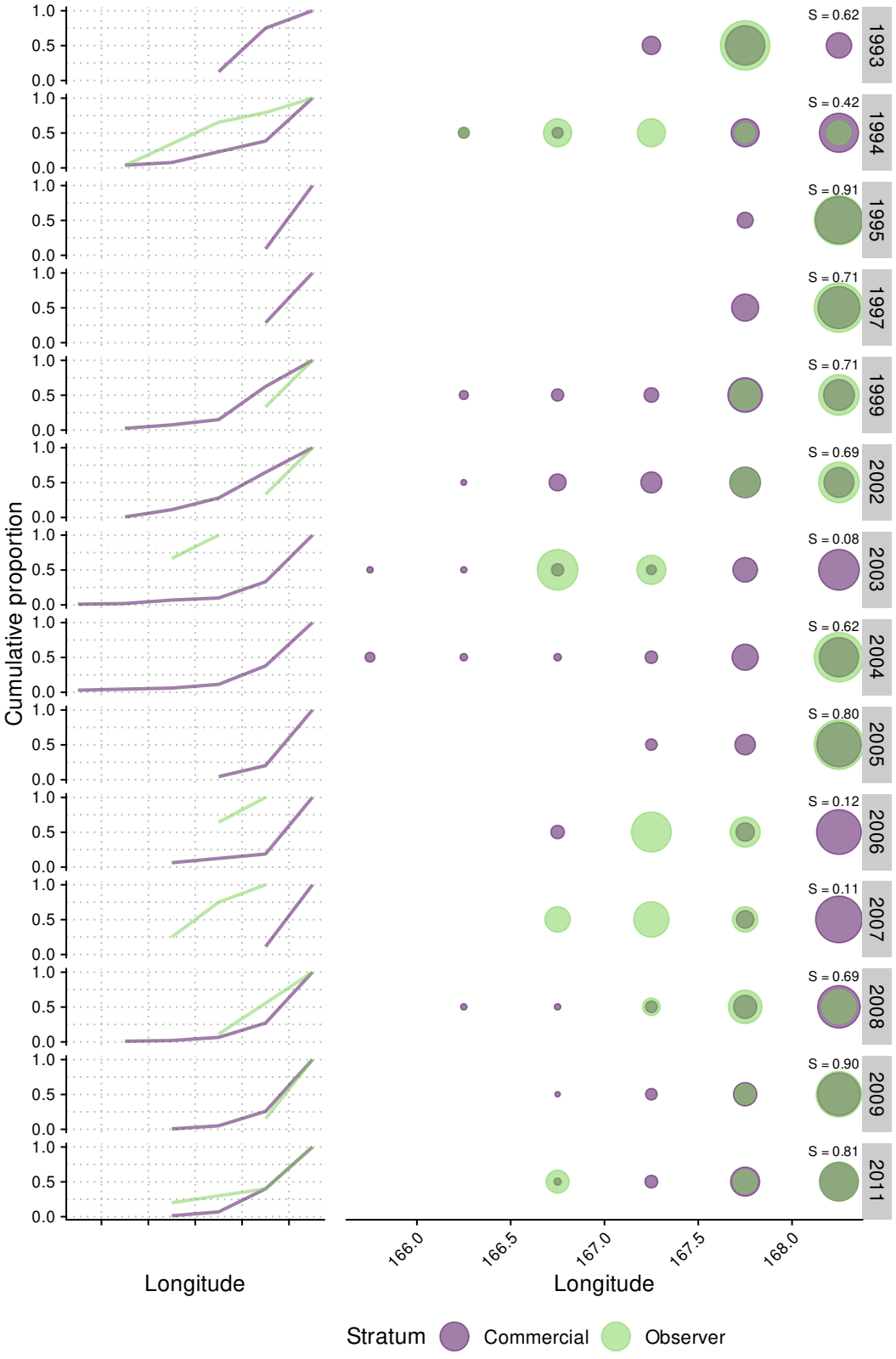


Figure 327: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6A, where the southern blue whiting catch exceeded the 150kg threshold, in 1993 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

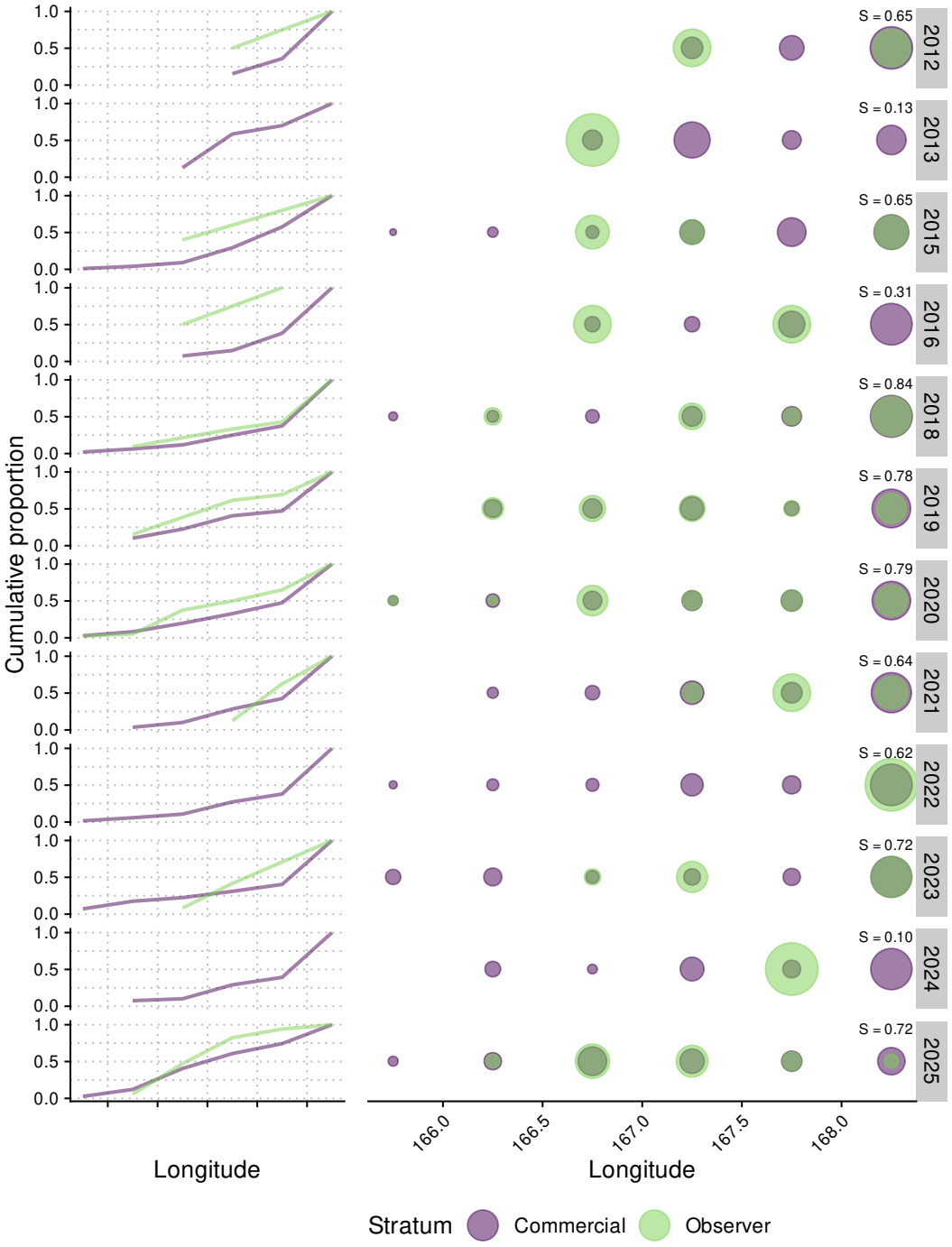


Figure 328: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6A, where the southern blue whiting catch exceeded the 150kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

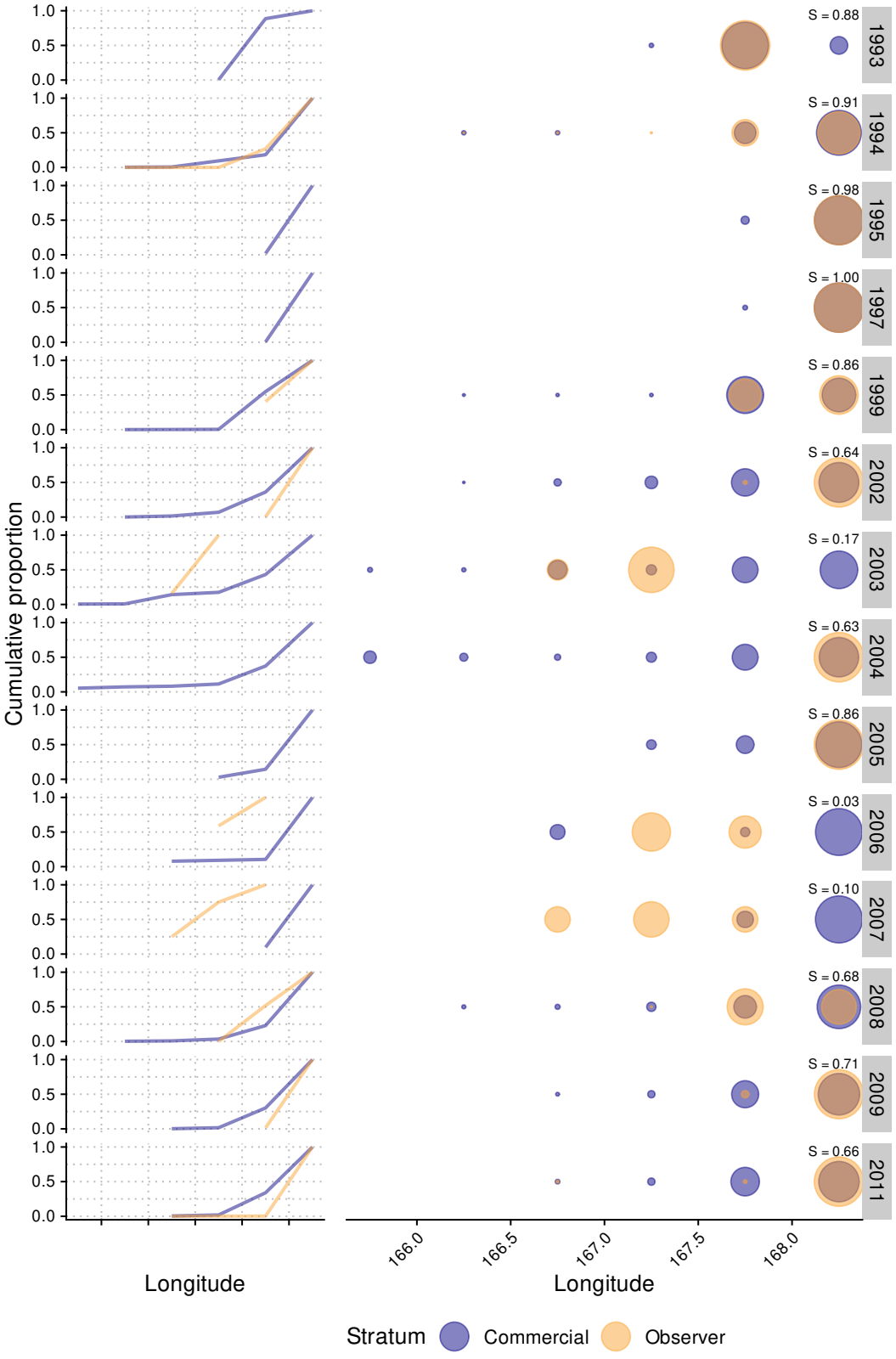


Figure 329: Longitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6A, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1993 to 2011. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

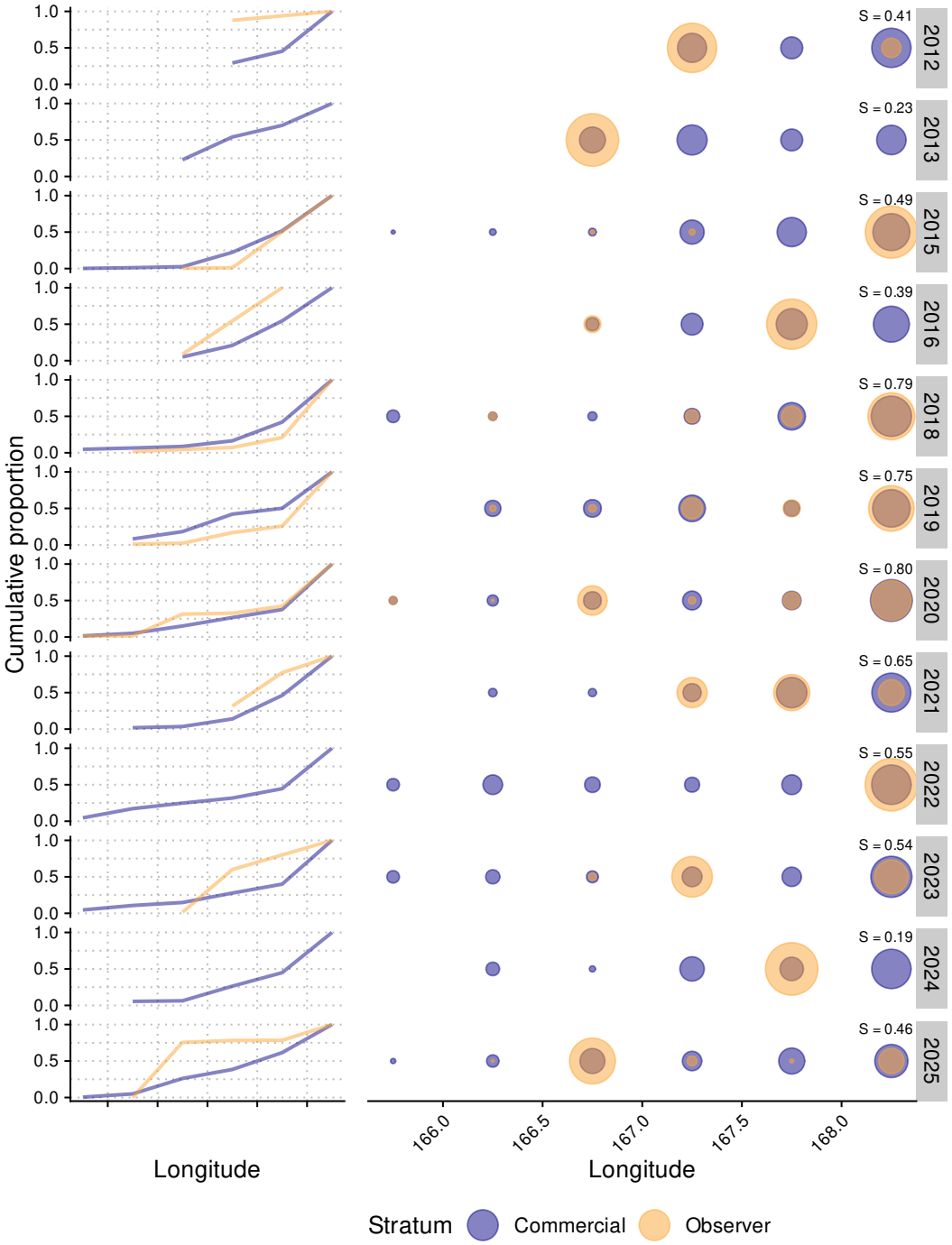


Figure 330: Longitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6A, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2012 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

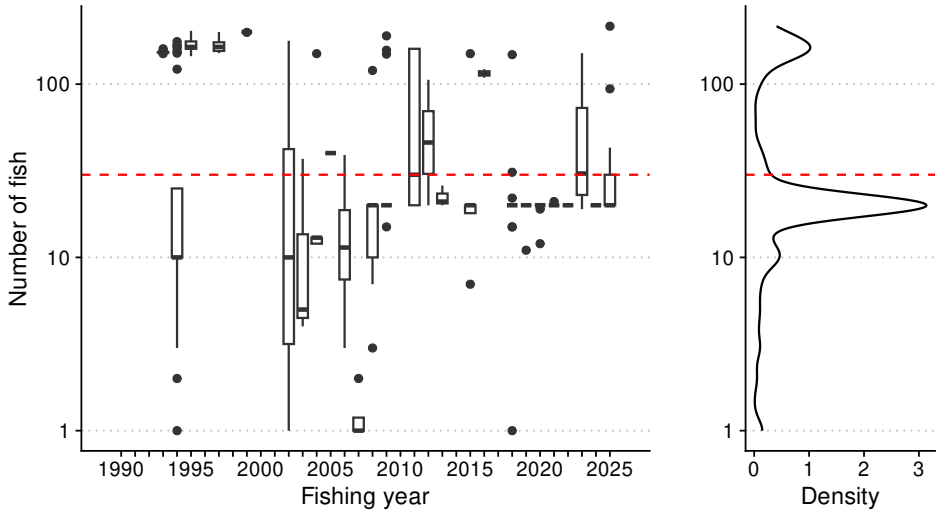


Figure 331: Length-frequency sample sizes for observed fishing events in SBW 6A where southern blue whiting were sampled. The red dashed line indicates a sample size of 30 fish.

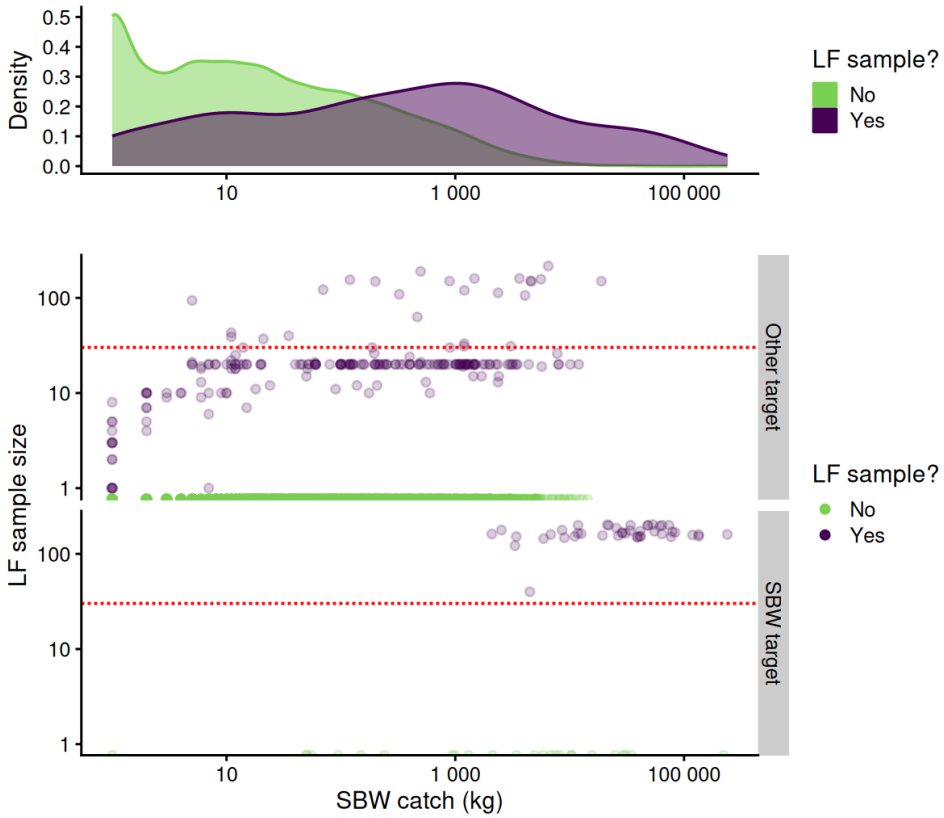


Figure 332: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SBW 6A in relation to the total southern blue whiting catch from an event, separately for southern blue whiting target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.5.1.2 Otolith samples

Table 34: Otolith samples of southern blue whiting from the SBW 6A Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of southern blue whiting exceeded a potential sampling threshold of 150 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	1	0	0	0.00
1991	5	0	0	0.00
1992	3	0	0	0.00
1993	8	0	0	0.00
1994	26	0	0	0.00
1995	22	0	0	0.00
1996	3	0	0	0.00
1997	35	0	0	0.00
1998	18	0	0	0.00
1999	18	0	0	0.00
2000	24	0	0	0.00
2001	57	0	0	0.00
2002	125	0	0	0.00
2003	202	0	0	0.00
2004	132	0	0	0.00
2005	114	0	0	0.00
2006	16	0	0	0.00
2007	89	0	0	0.00
2008	200	0	0	0.00
2009	159	0	0	0.00
2010	74	0	0	0.00
2011	145	4	80	2.76
2012	39	2	20	5.13
2013	71	1	5	1.41
2014	87	0	0	0.00
2015	99	0	0	0.00
2016	81	0	0	0.00
2017	48	0	0	0.00
2018	144	20	95	13.89
2019	138	12	59	8.70
2020	183	39	236	21.31
2021	169	14	64	8.28
2022	121	1	5	0.83
2023	223	12	111	5.38
2024	79	1	5	1.27
2025	74	17	112	22.97

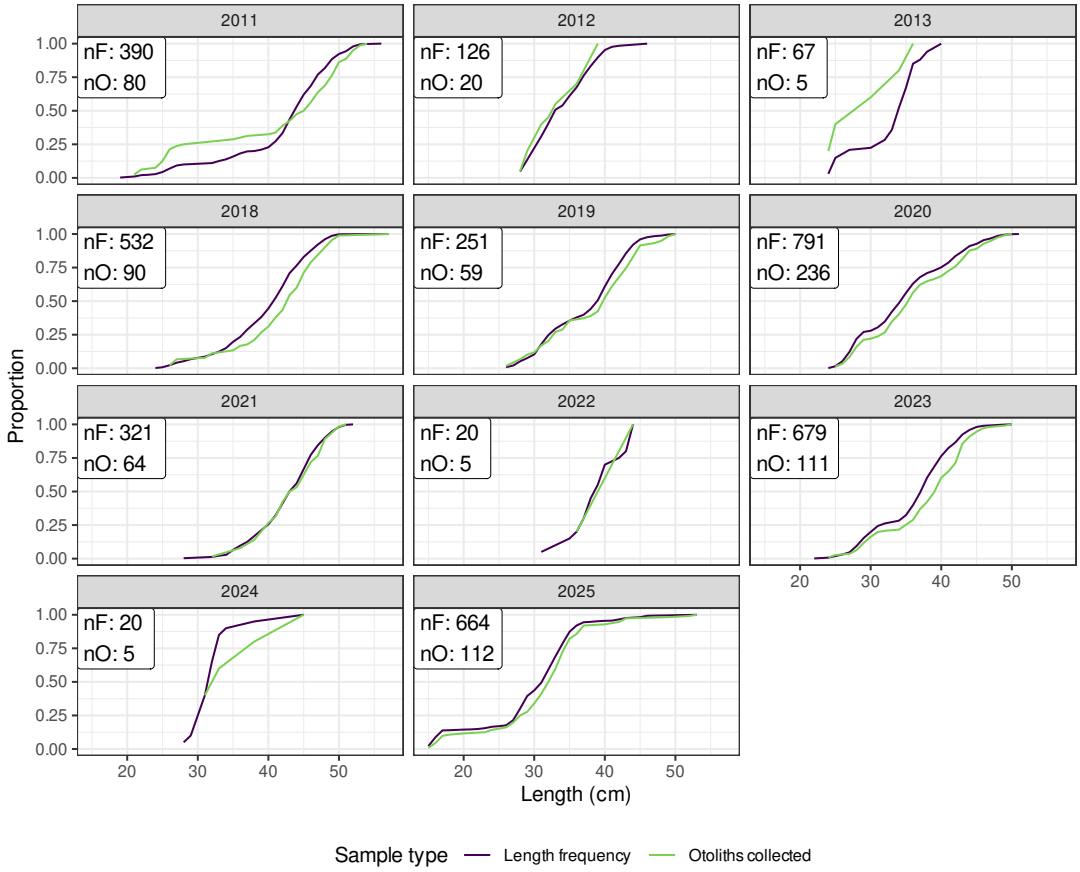


Figure 333: Cumulative distributions of the length of fish in the length frequency and otolith samples of southern blue whiting in the SBW 6A Trawl fishery for the 2011 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.5.1.3 Catch quantification

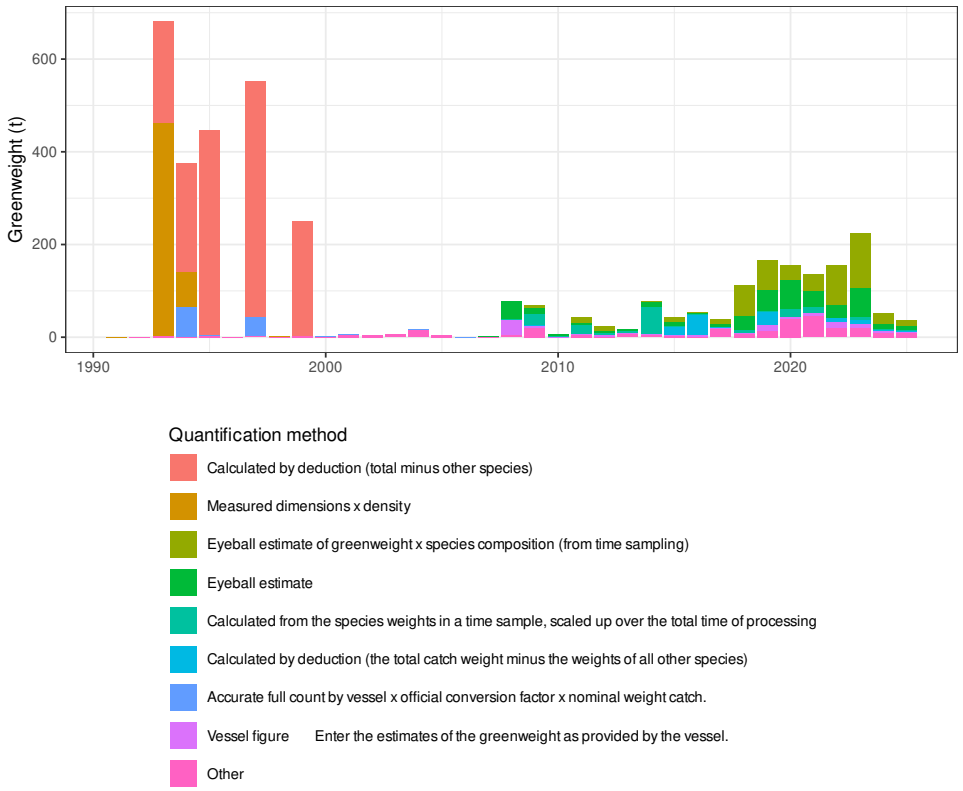


Figure 334: Methods used by observers to quantify the catch of southern blue whiting in the SBW 6A Trawl fishery. The legend lists the methods used in descending order of total catch.

2.5.2 SBW 6B: Trawl fishery

2.5.2.1 Length-frequency samples

Table 35: Length-frequency samples of southern blue whiting from the SBW 6B Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of southern blue whiting exceeded a potential sampling threshold of 150 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	174	15	2 336	8.62
1991	471	16	2 753	3.40
1992	1 613	160	24 793	9.92
1993	285	73	12 114	25.61
1994	78	40	7 385	51.28
1995	112	65	10 295	58.04
1996	82	22	4 645	26.83
1997	34	8	1 576	23.53
1998	84	69	14 321	82.14
1999	222	73	12 362	32.88
2000	95	27	5 181	28.42
2001	25	12	1 969	48.00
2002	81	8	1 261	9.88
2003	26	0	0	0.00
2004	29	4	645	13.79
2005	96	39	6 436	40.62
2006	109	63	9 952	57.80
2007	49	27	4 242	55.10
2008	198	92	14 772	46.46
2009	417	104	16 036	24.94
2010	412	59	8 794	14.32
2011	167	48	8 109	28.74
2012	161	62	11 327	38.51
2013	77	30	4 609	38.96
2014	178	134	22 564	75.28
2015	25	20	3 498	80.00
2016	39	31	6 501	79.49
2017	25	21	3 152	84.00
2018	34	11	1 536	32.35
2019	9	8	1 384	88.89
2020	11	10	1 465	90.91
2021	20	9	1 350	45.00
2022	3	3	574	100.00
2023	13	12	2 115	92.31
2024	62	51	11 519	82.26
2025	86	43	7 084	50.00

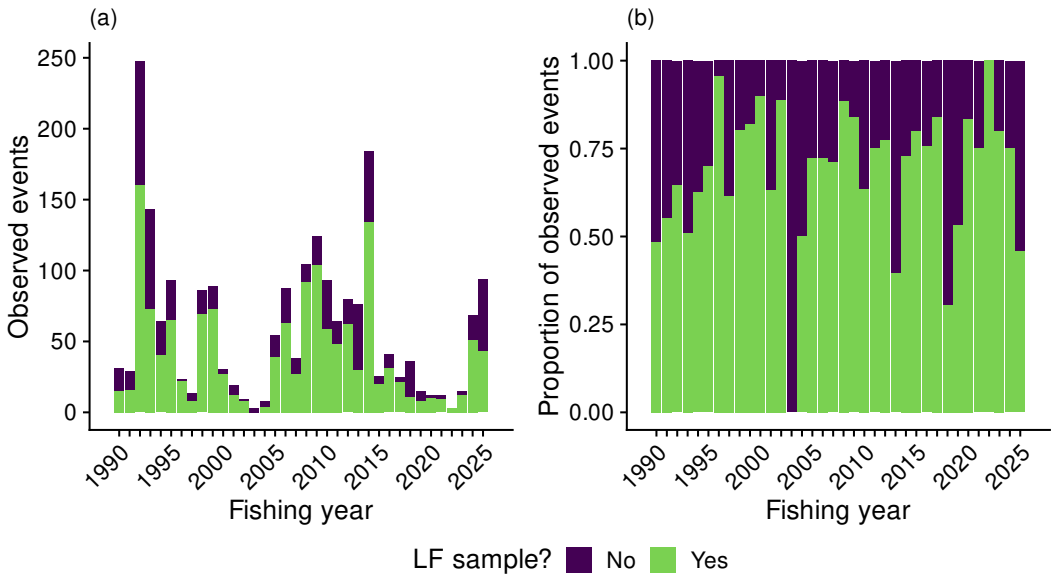


Figure 335: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SBW 6B where the southern blue whiting catch exceeded the 150 kg threshold, with and without length-frequency sampling.**

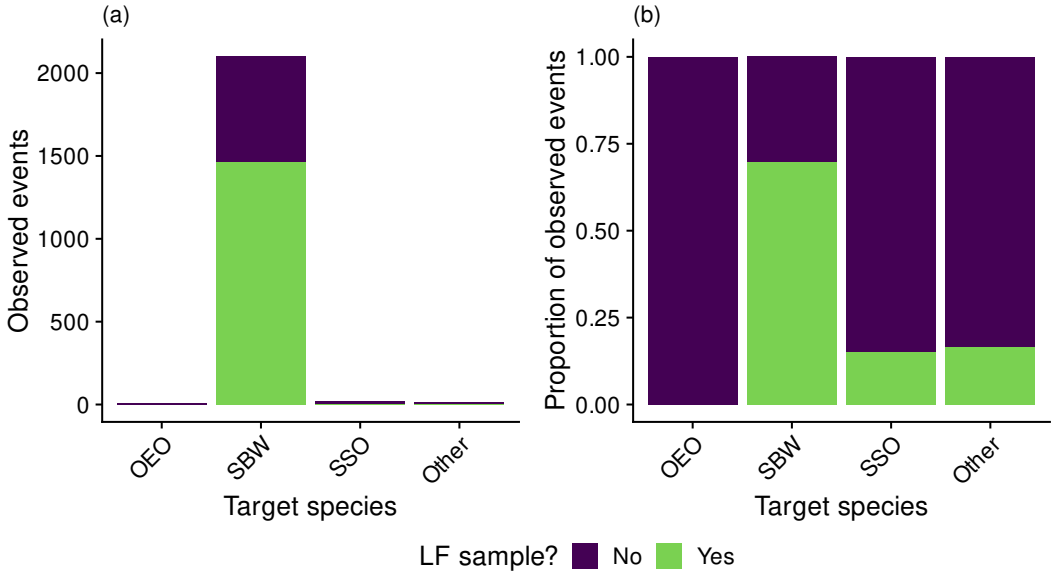


Figure 336: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SBW 6B where the southern blue whiting catch exceeded the 150 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

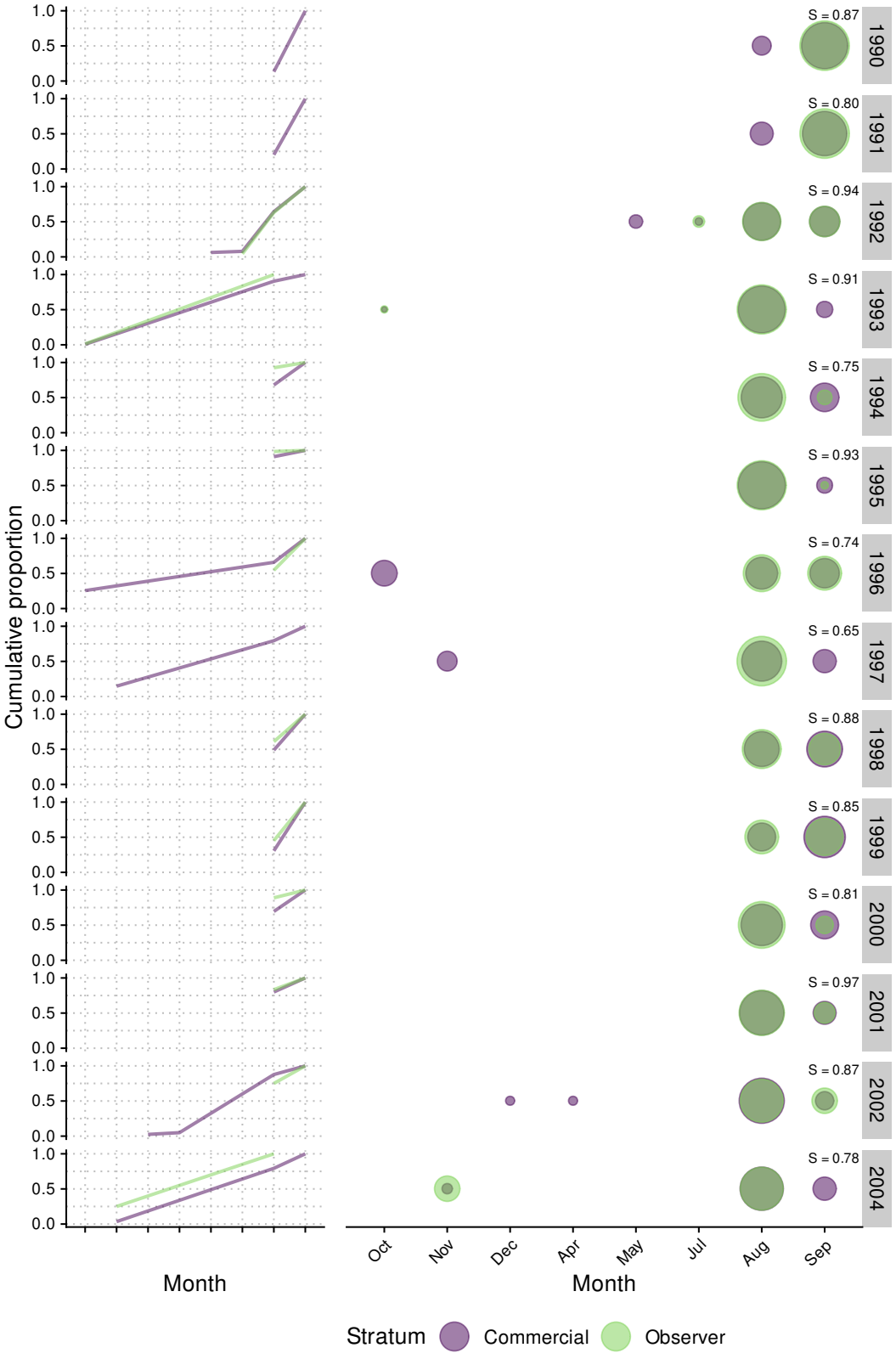


Figure 337: Monthly representativeness of observer sampling coverage of Trawl fishing events in SBW 6B, where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2004. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

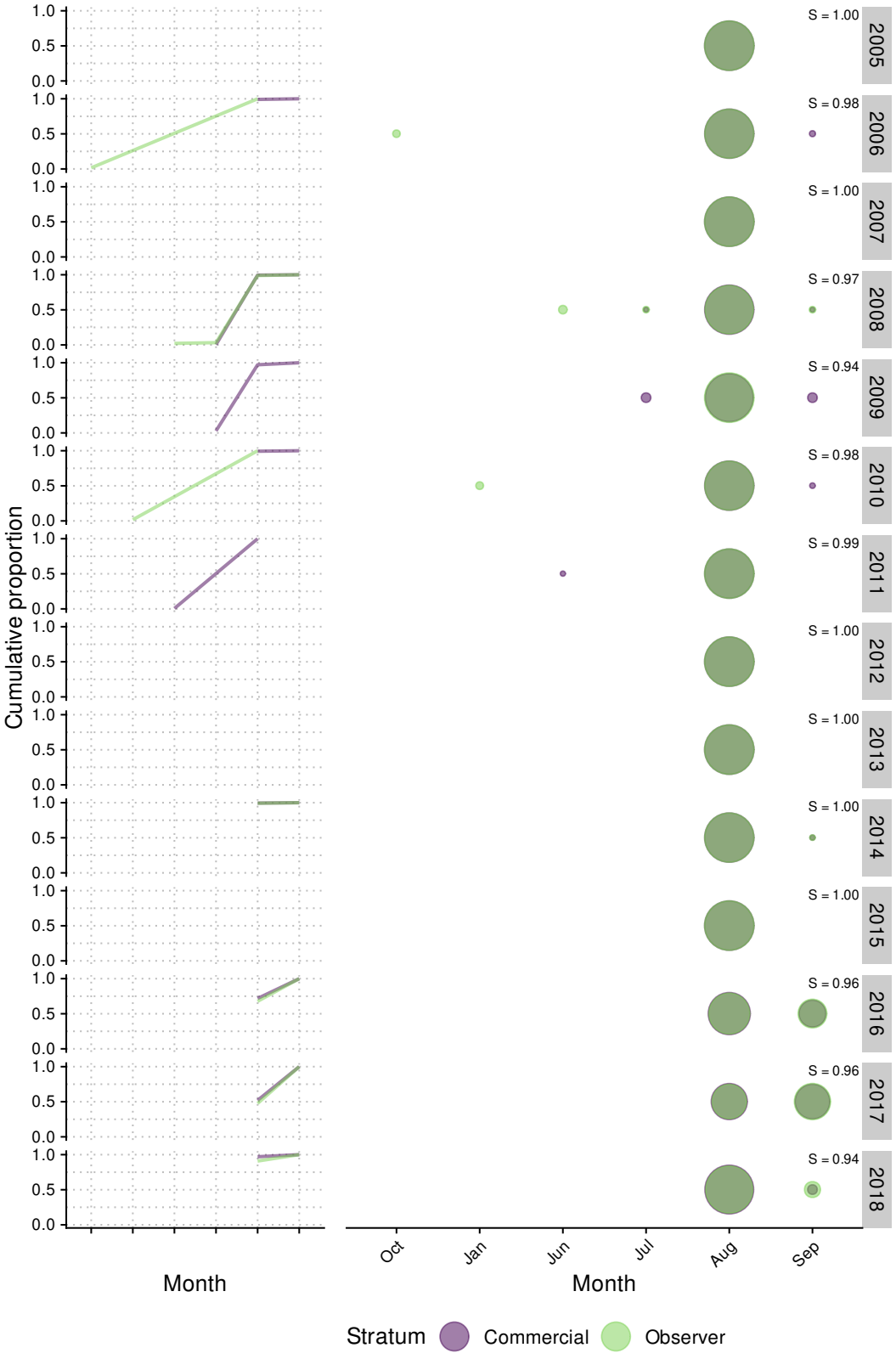


Figure 338: Monthly representativeness of observer sampling coverage of Trawl fishing events in SBW 6B, where the southern blue whiting catch exceeded the 150kg threshold, in 2005 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

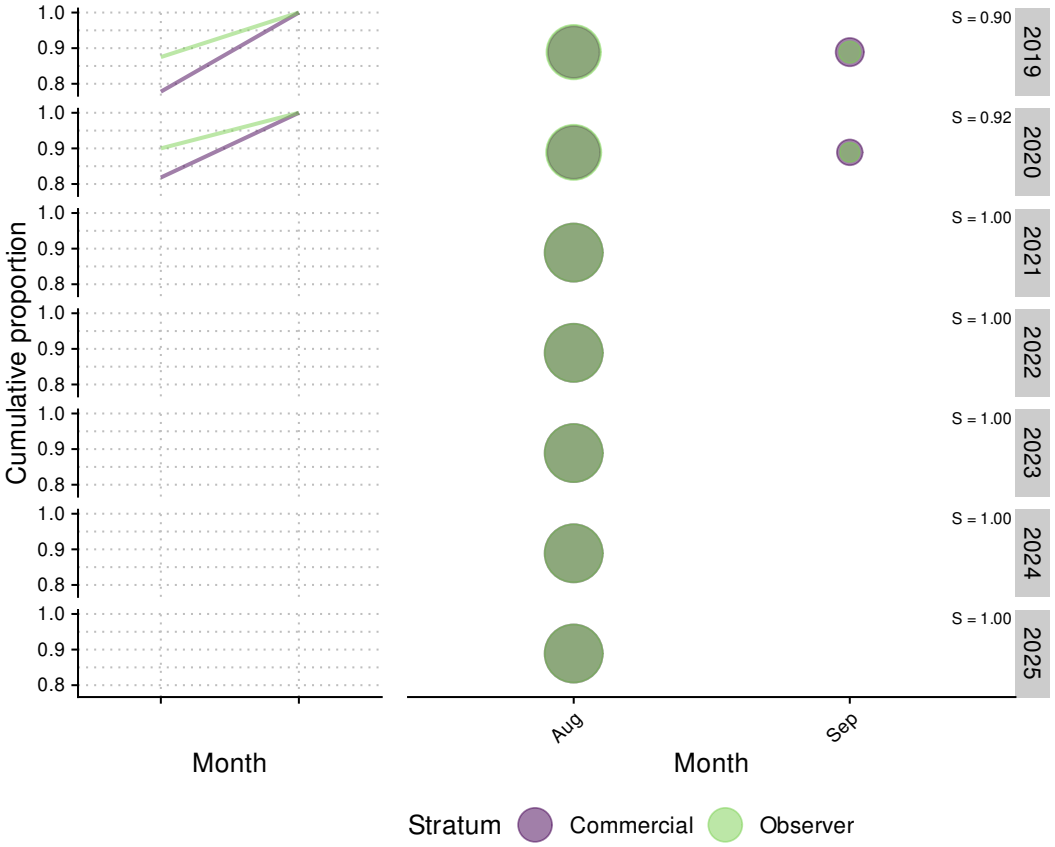


Figure 339: Monthly representativeness of observer sampling coverage of Trawl fishing events in SBW 6B, where the southern blue whiting catch exceeded the 150kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

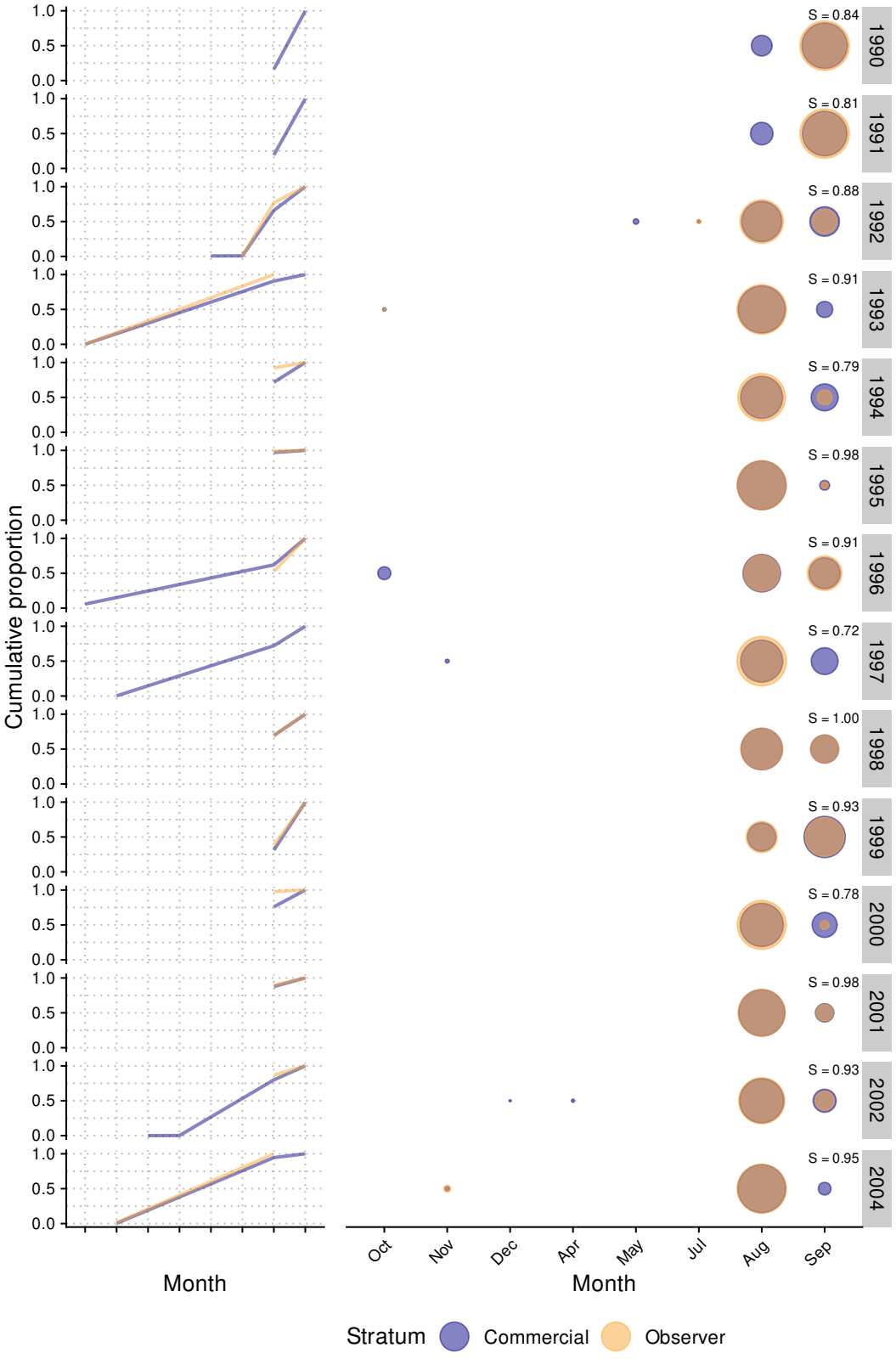


Figure 340: Monthly representativeness of observer sampling coverage of Trawl catch in SBW 6B, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2004. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

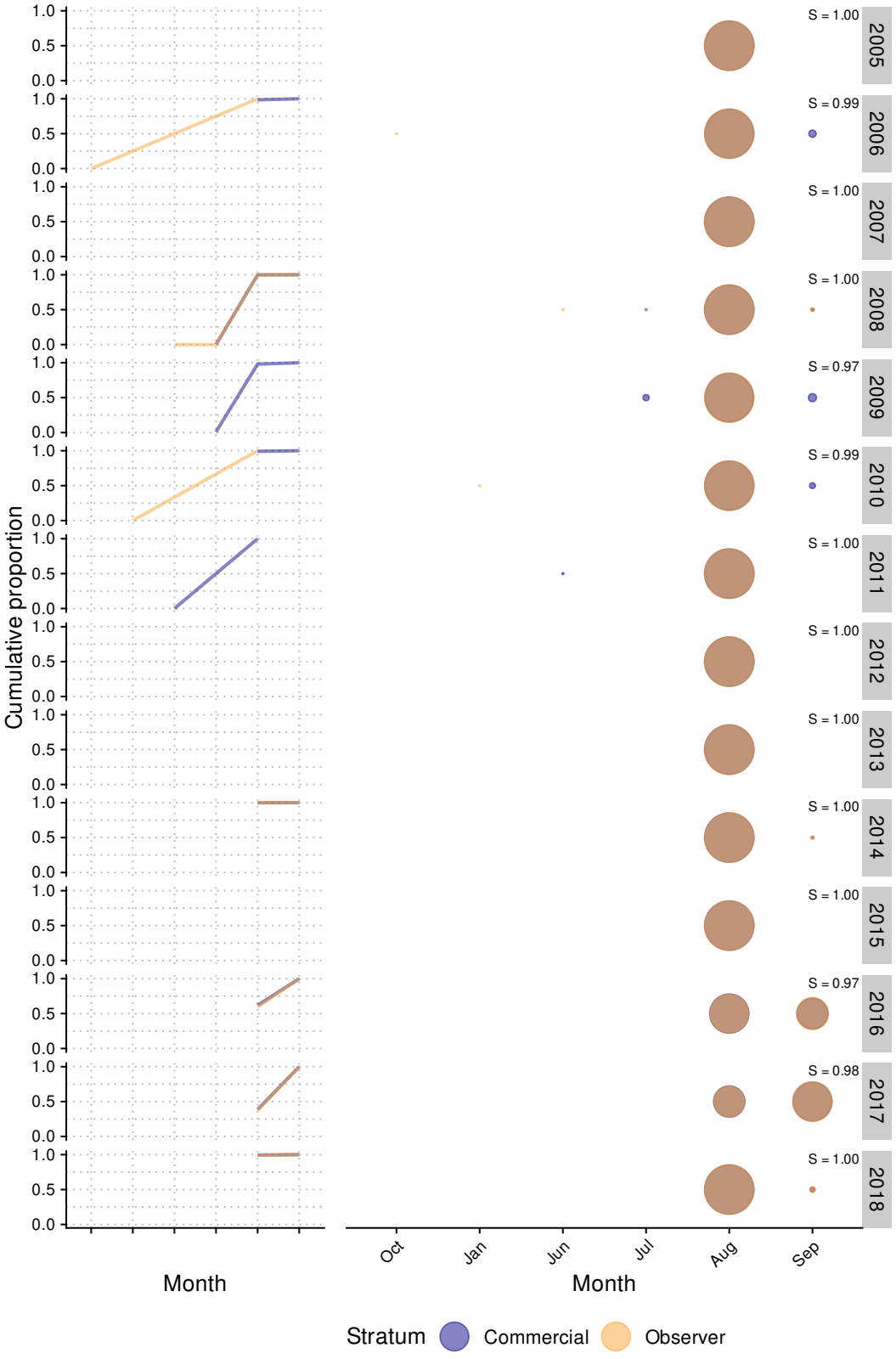


Figure 341: **Monthly representativeness of observer sampling coverage of Trawl catch in SBW 6B, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2005 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

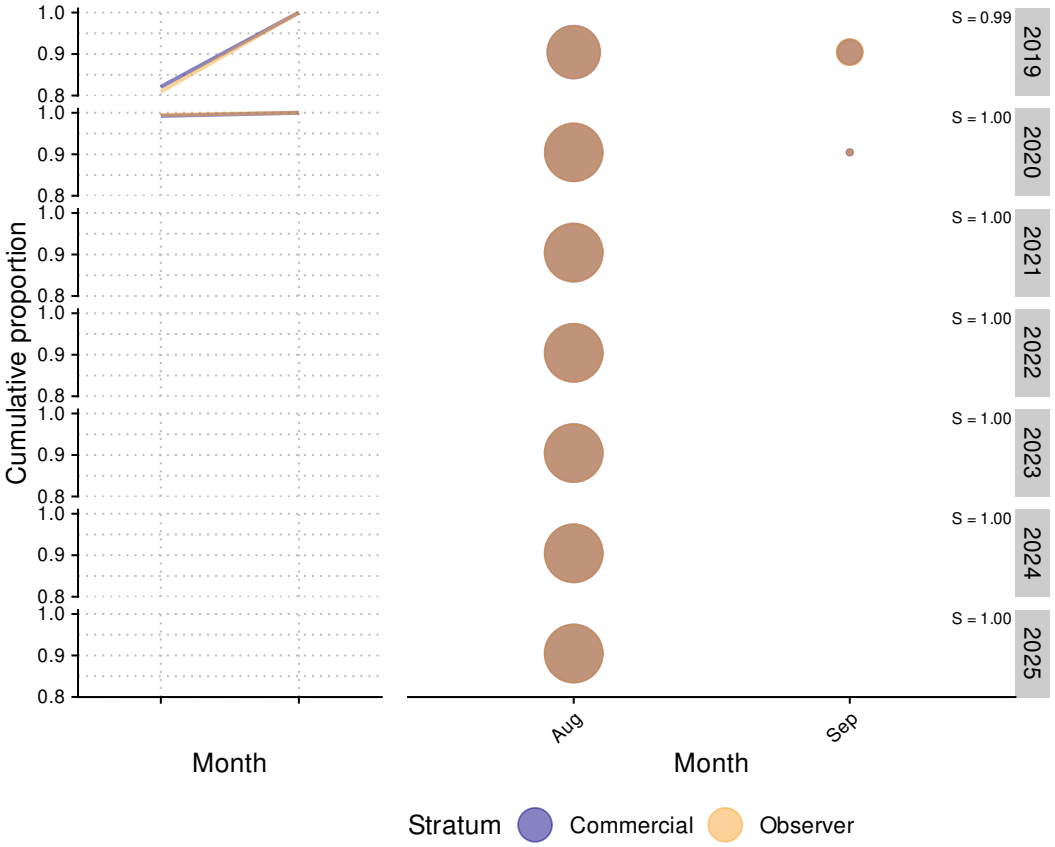


Figure 342: Monthly representativeness of observer sampling coverage of Trawl catch in SBW 6B, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

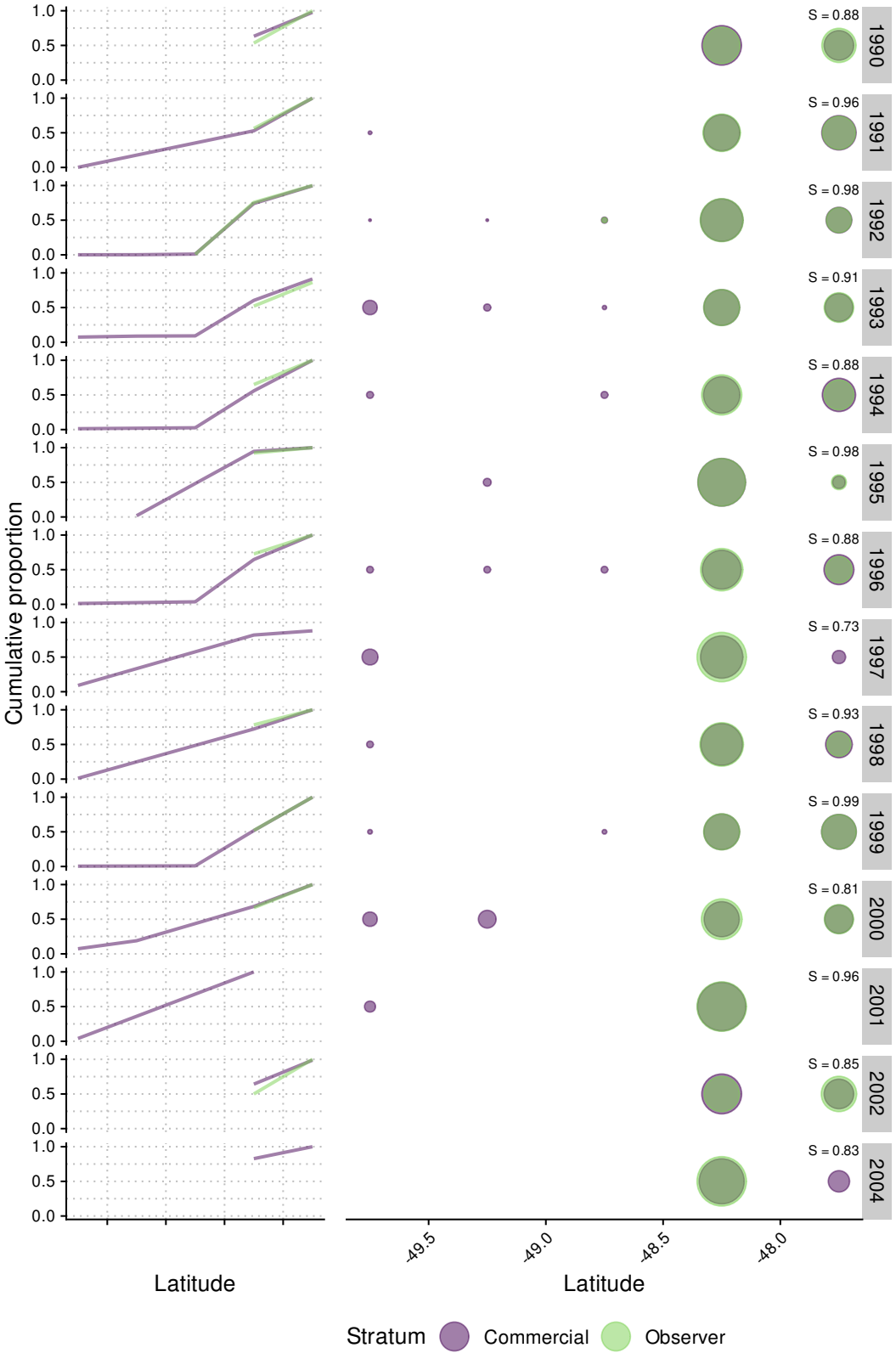


Figure 343: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6B, where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2004. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

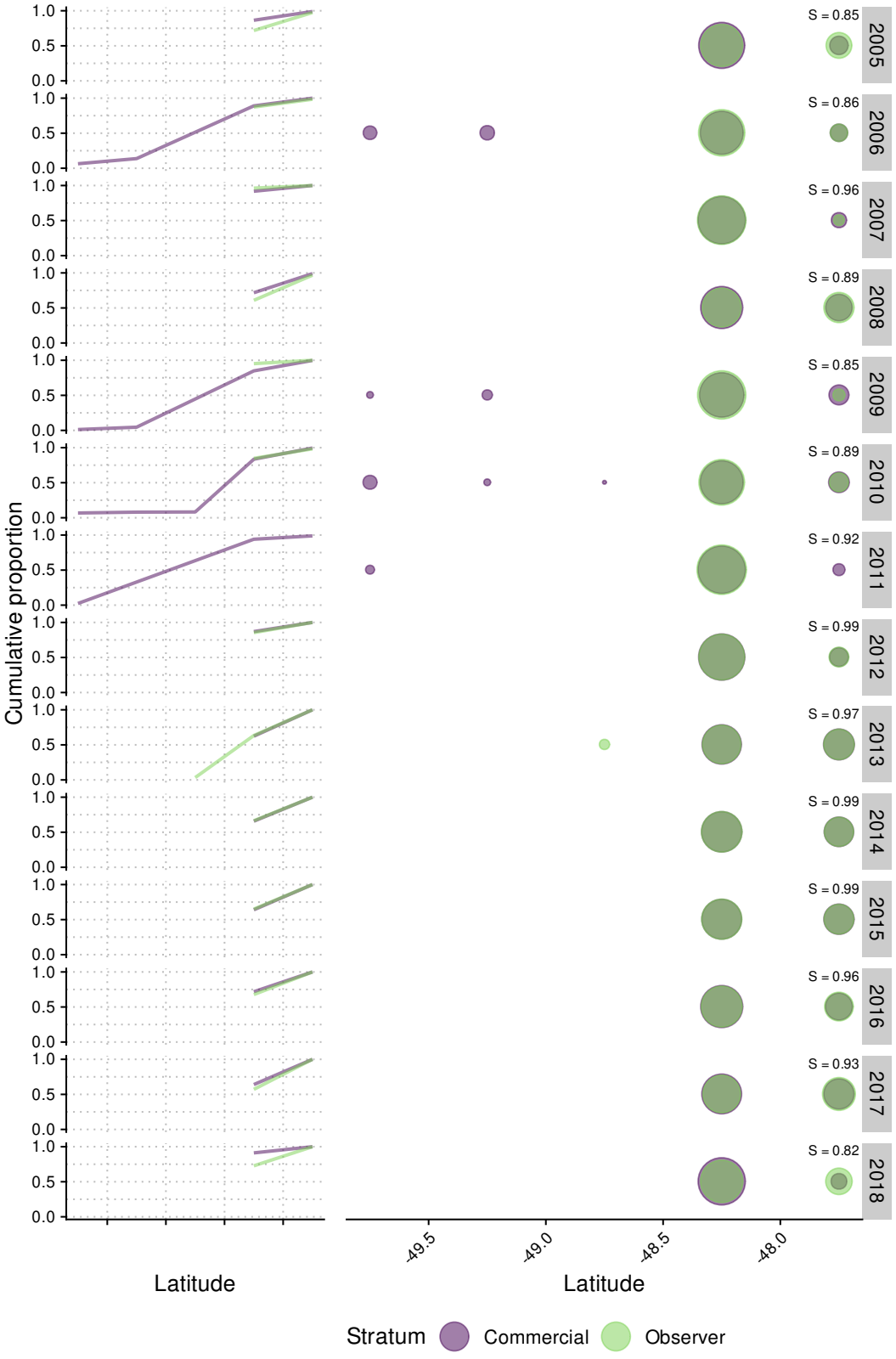


Figure 344: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6B, where the southern blue whiting catch exceeded the 150kg threshold, in 2005 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

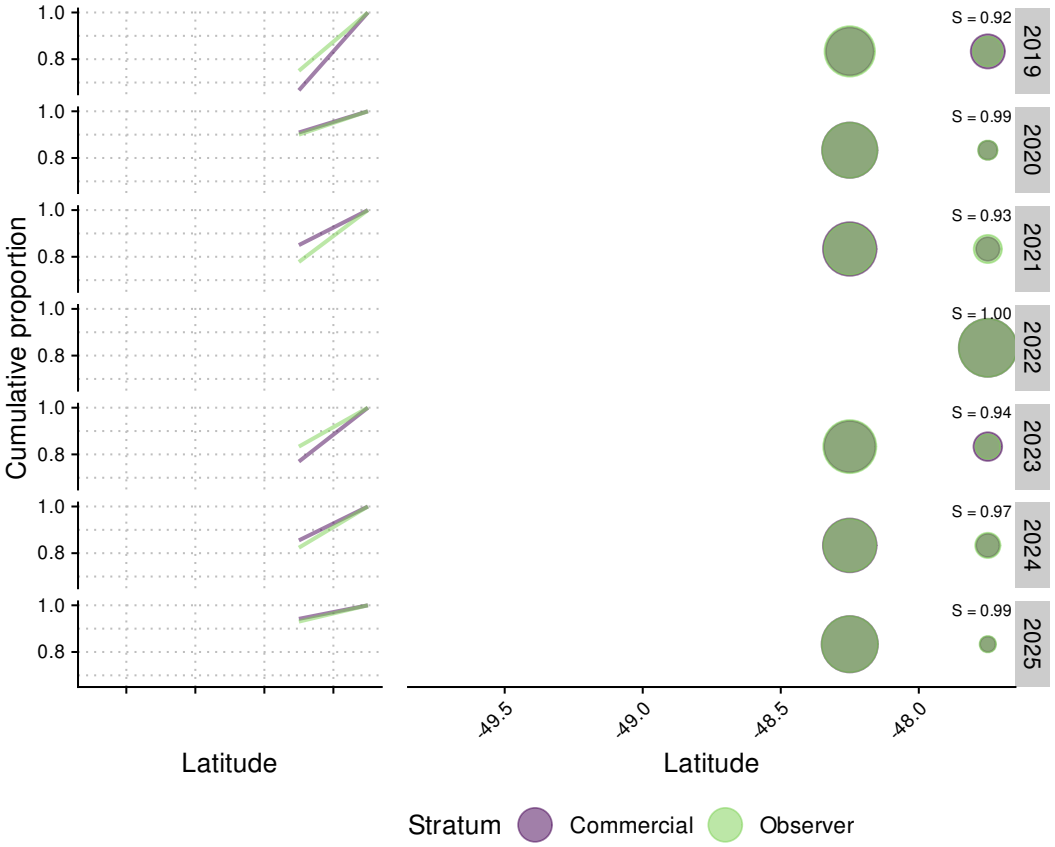


Figure 345: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6B, where the southern blue whiting catch exceeded the 150kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

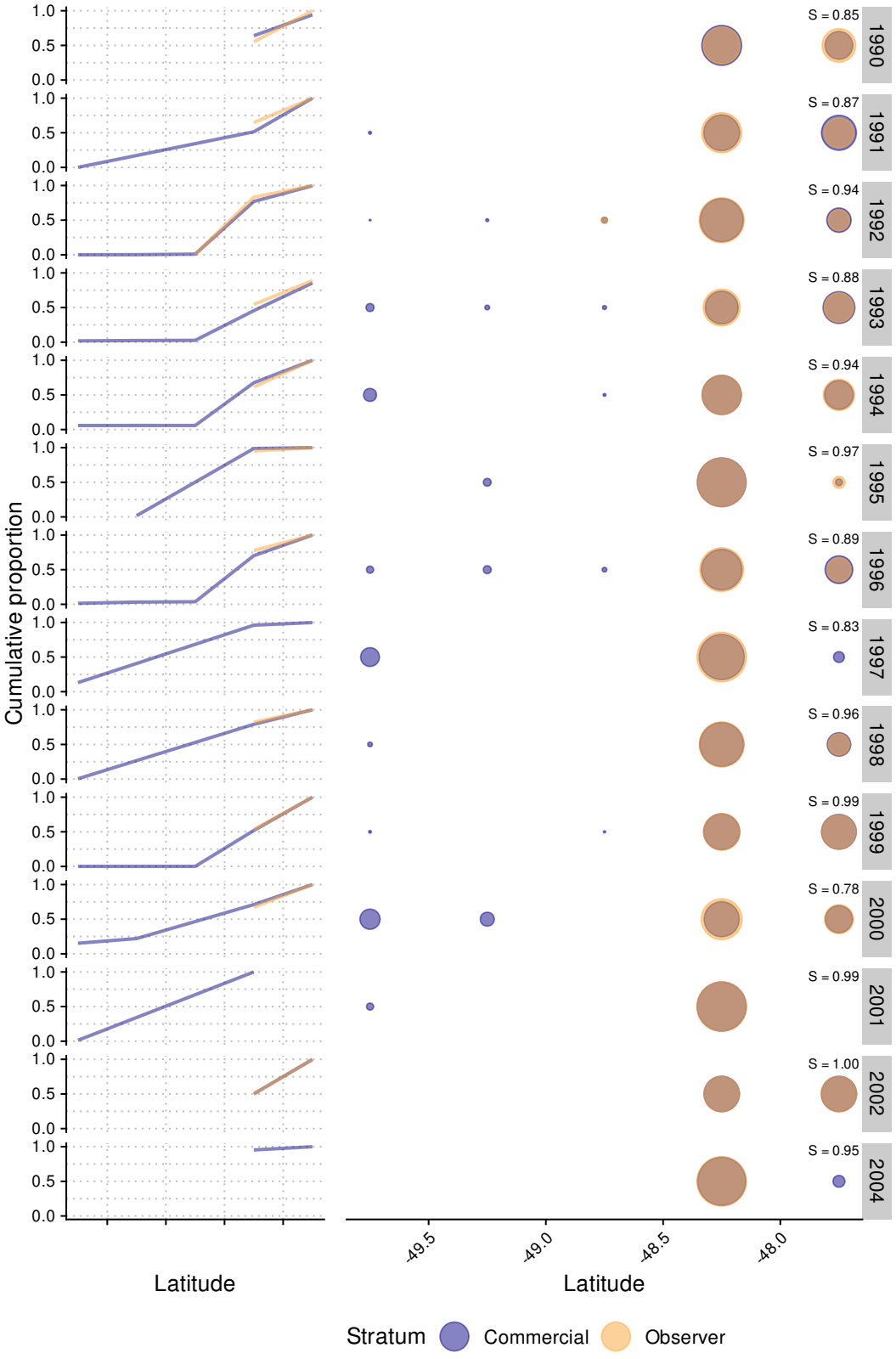


Figure 346: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6B, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2004. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

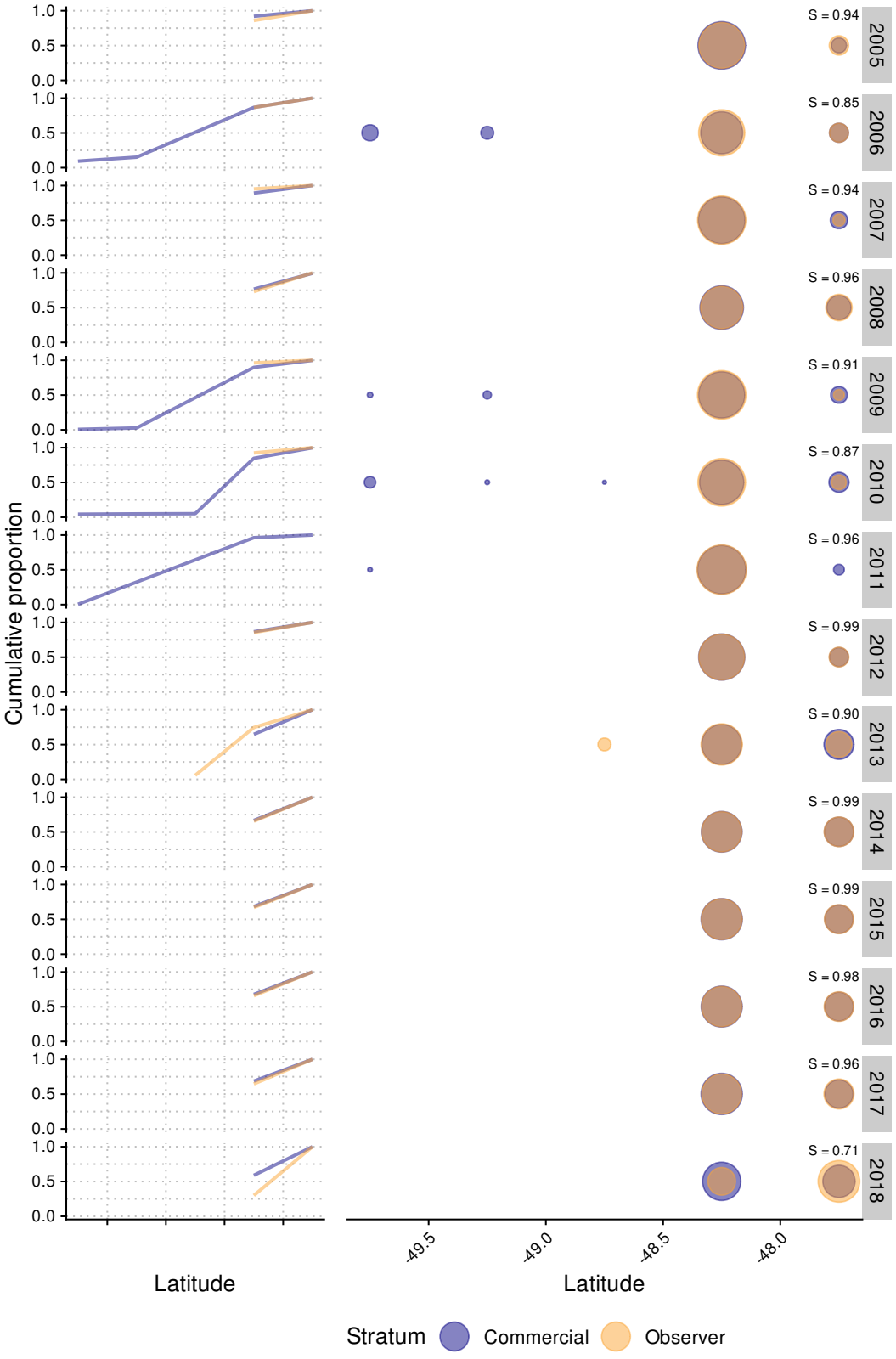


Figure 347: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6B, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2005 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

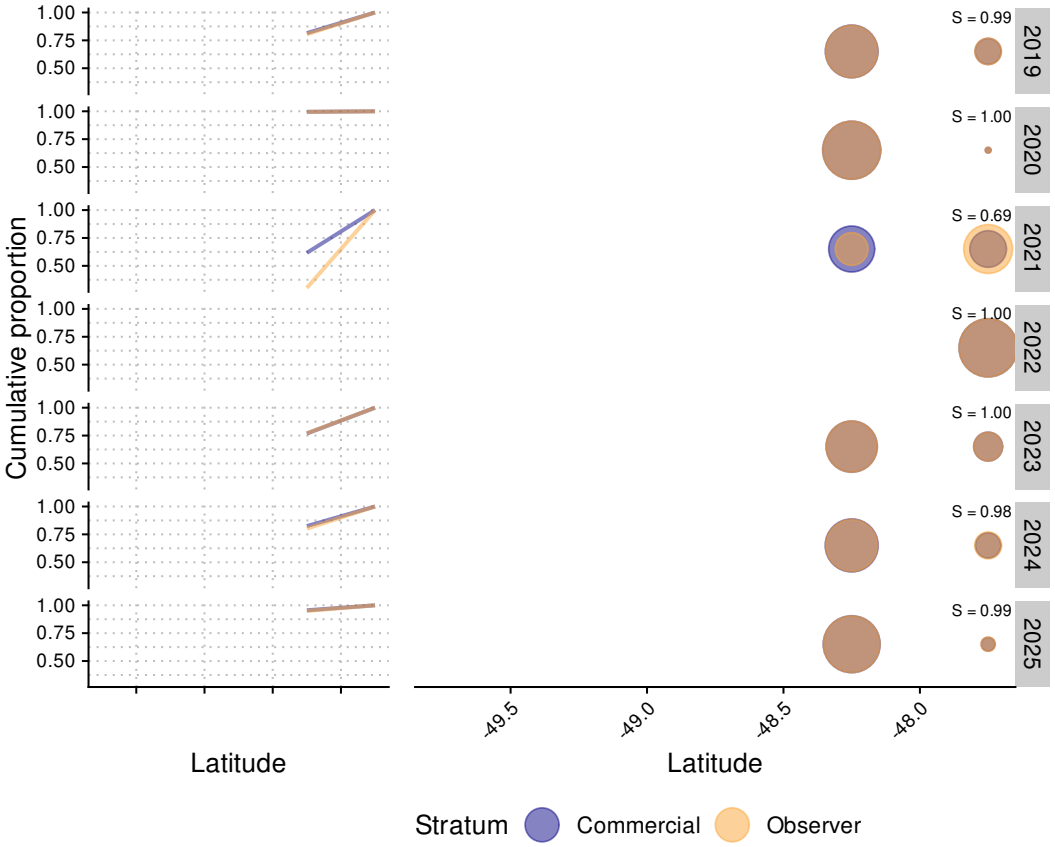


Figure 348: Latitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6B, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

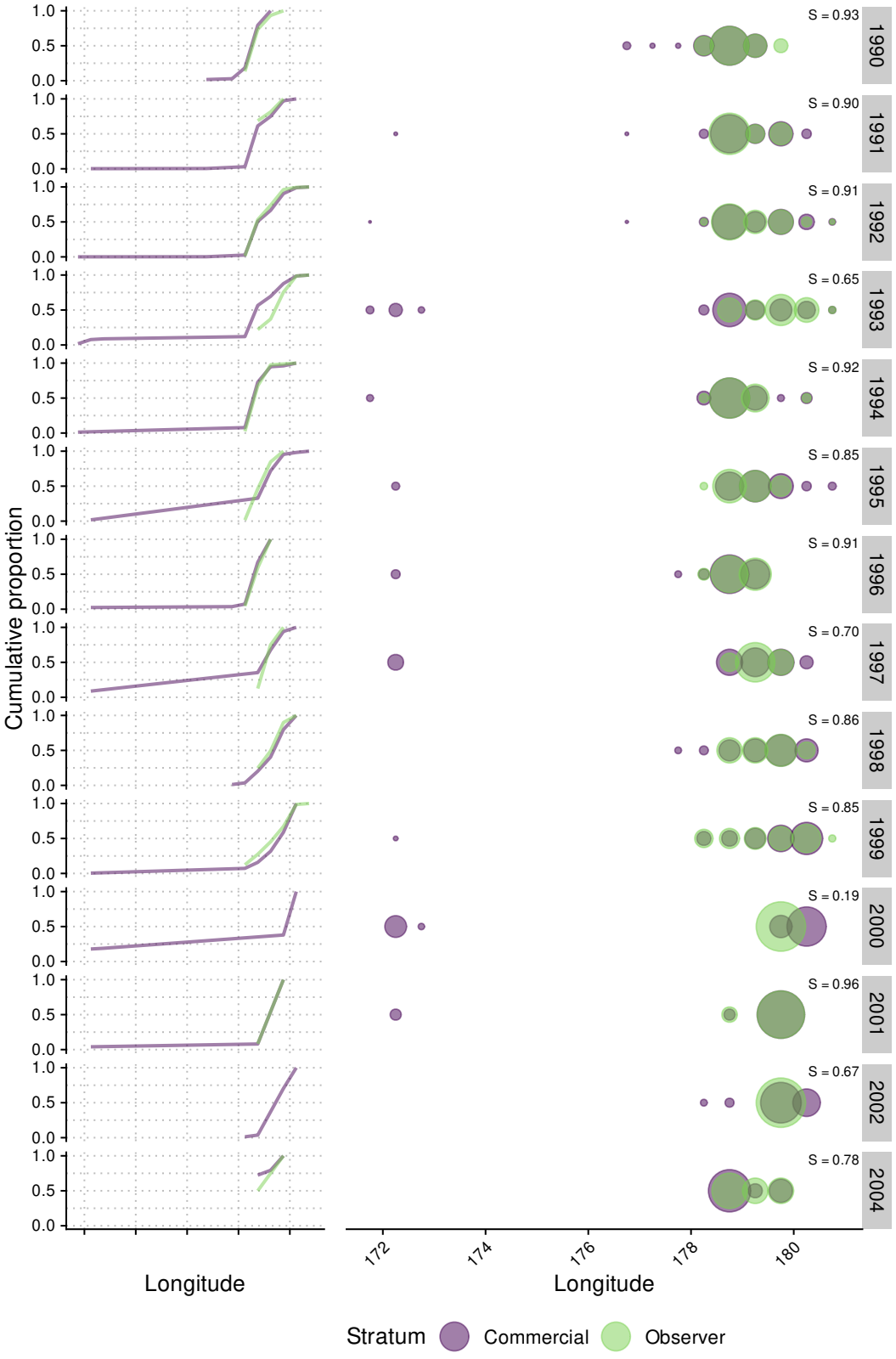


Figure 349: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6B, where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2004. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

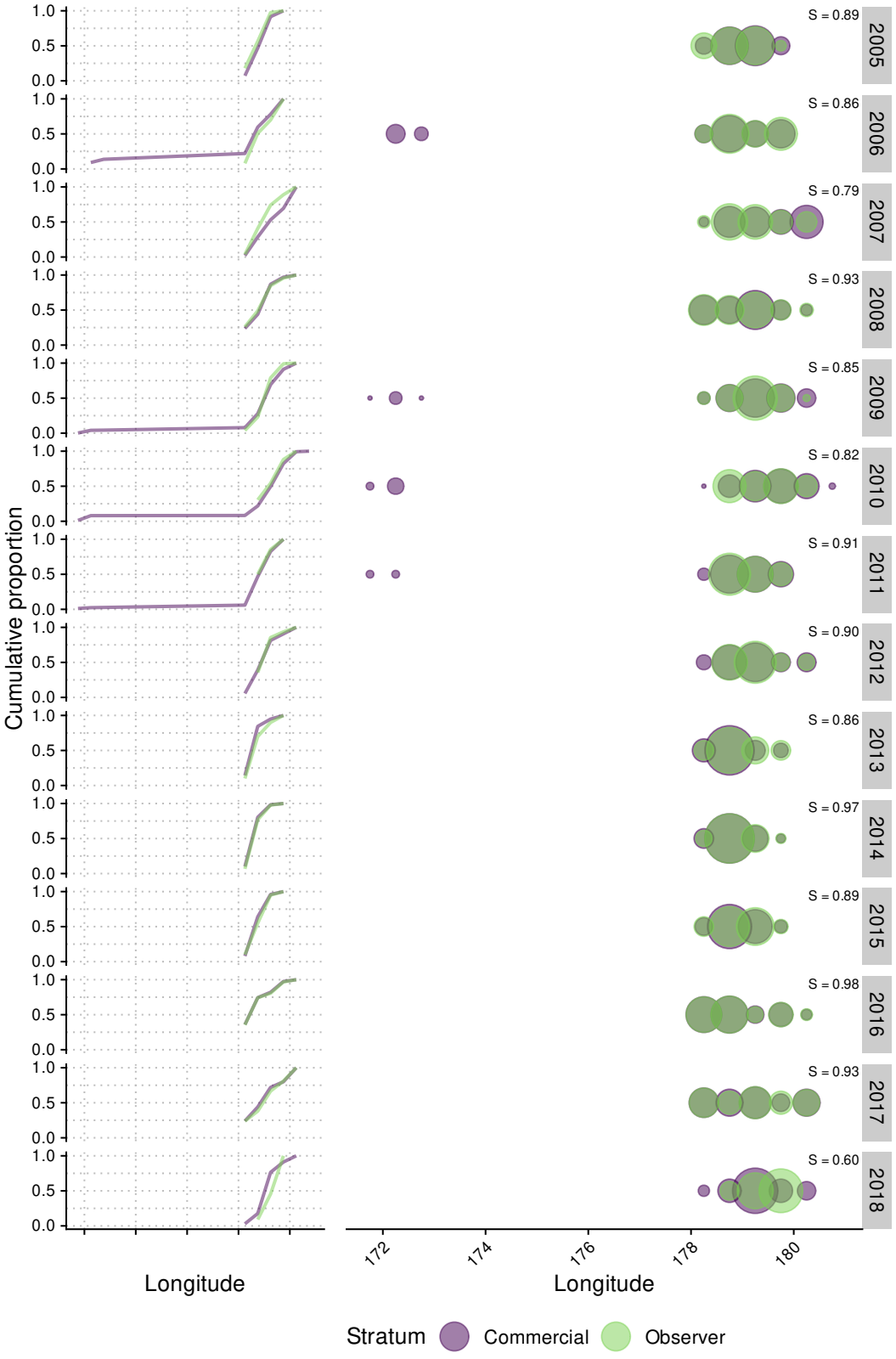


Figure 350: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6B, where the southern blue whiting catch exceeded the 150kg threshold, in 2005 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

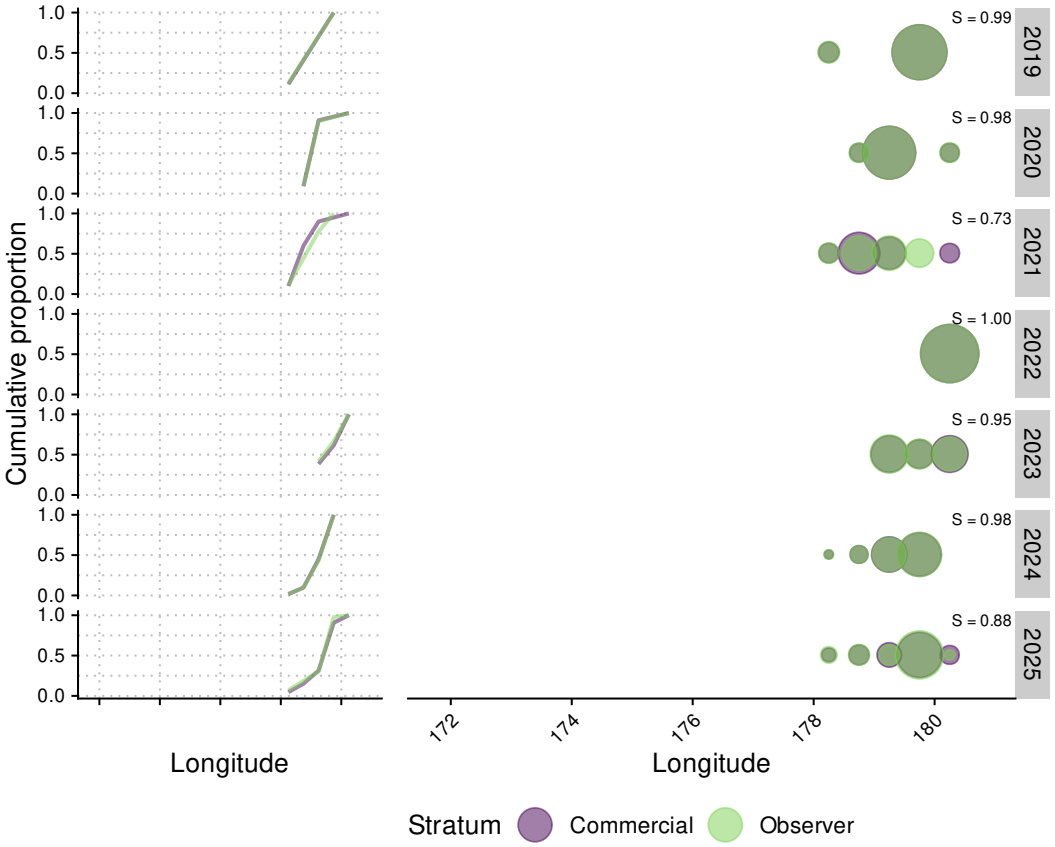


Figure 351: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6B, where the southern blue whiting catch exceeded the 150kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

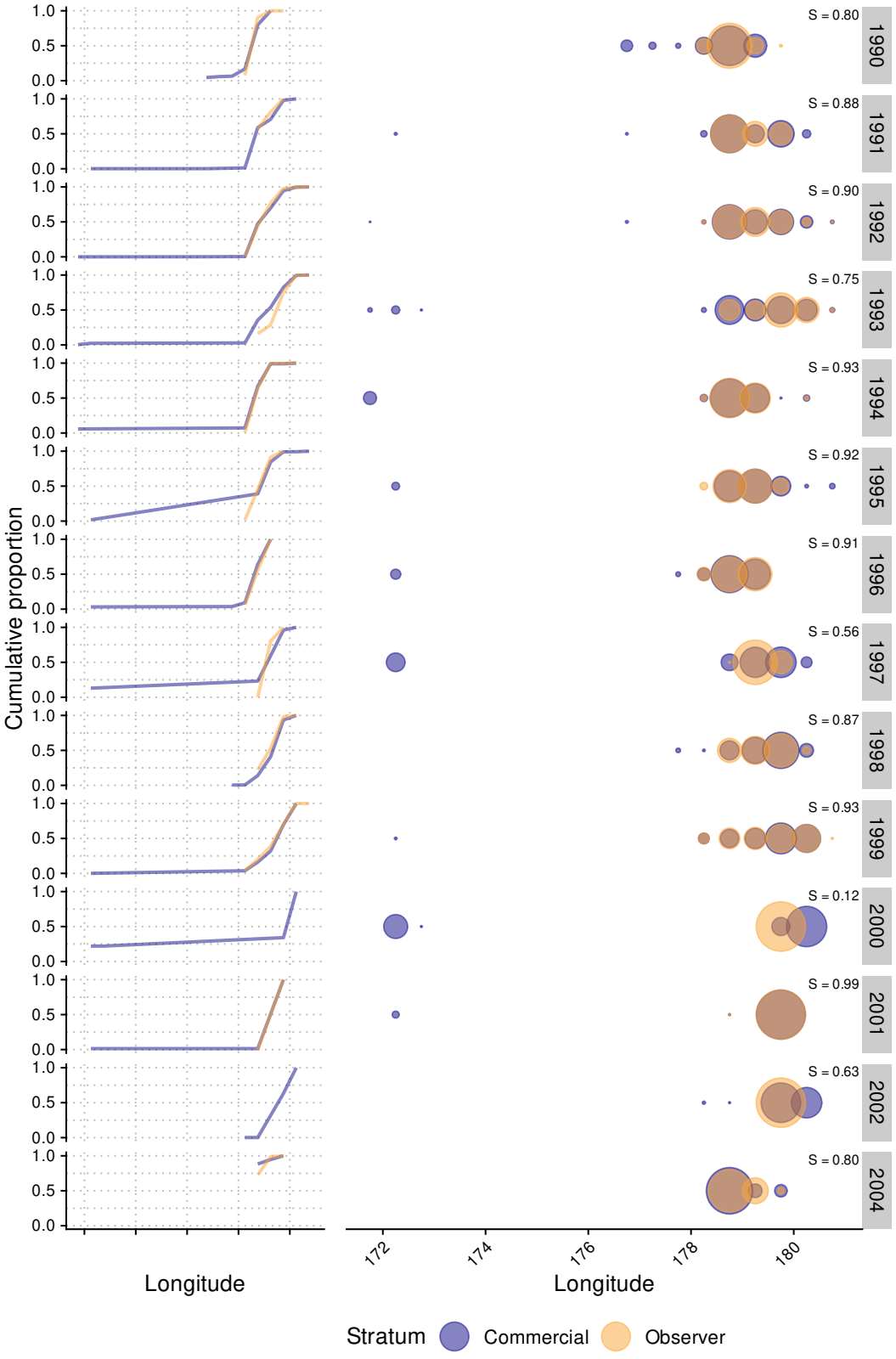


Figure 352: Longitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6B, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2004. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

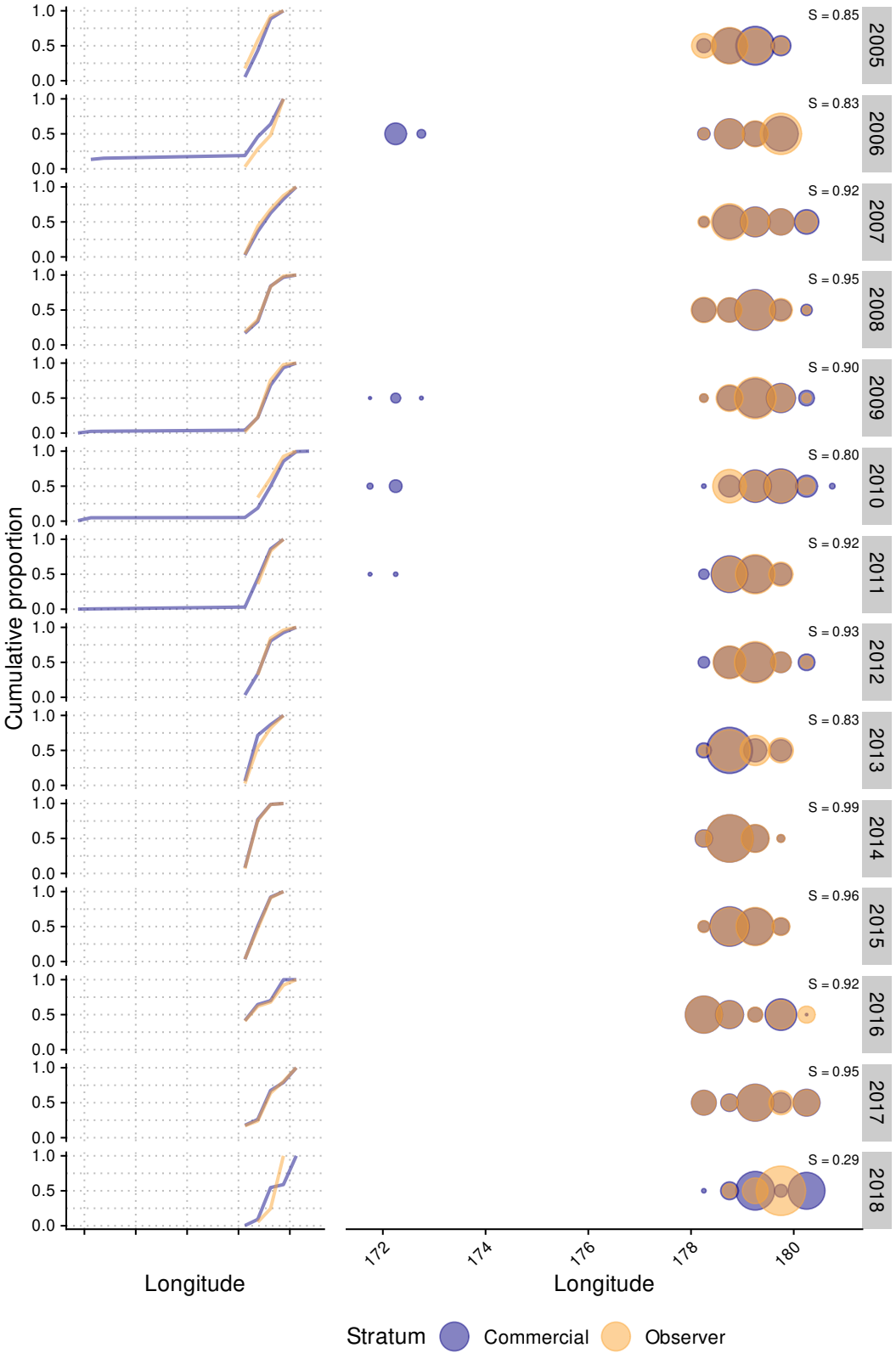


Figure 353: Longitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6B, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2005 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

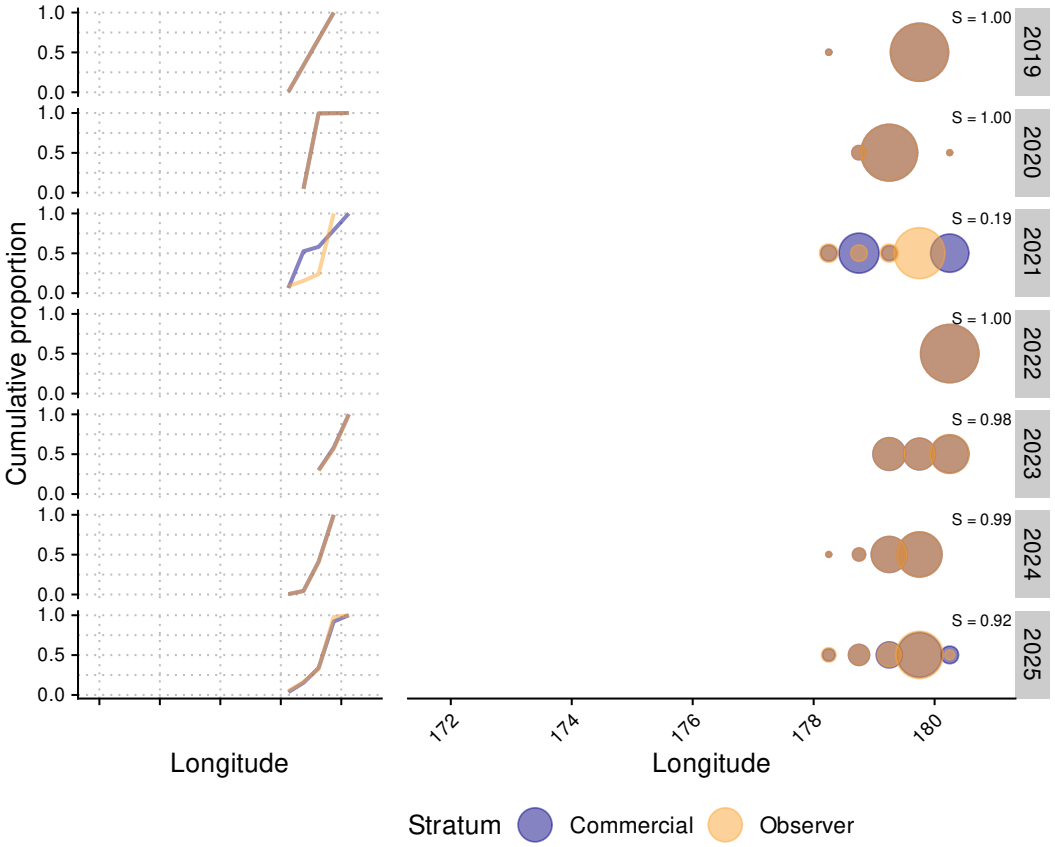


Figure 354: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6B, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

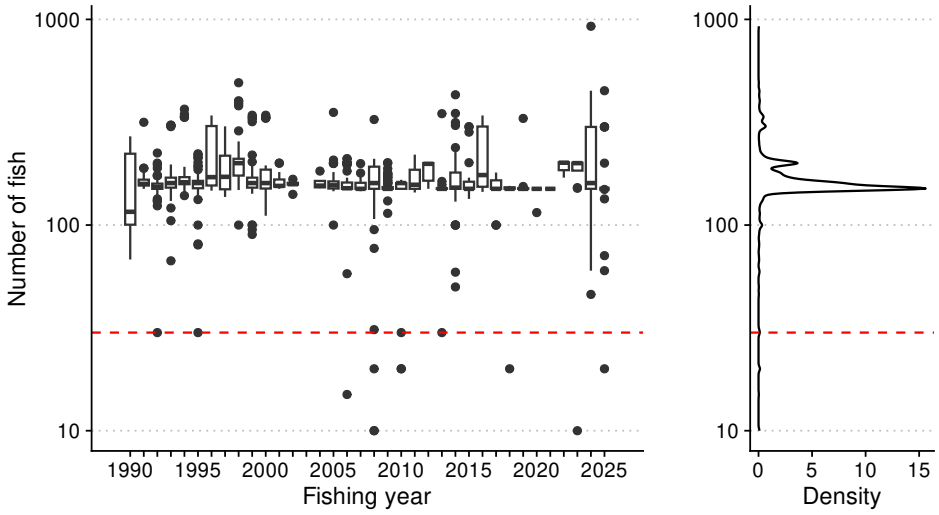


Figure 355: **Length-frequency sample sizes for observed fishing events in SBW 6B where southern blue whiting were sampled. The red dashed line indicates a sample size of 30 fish.**

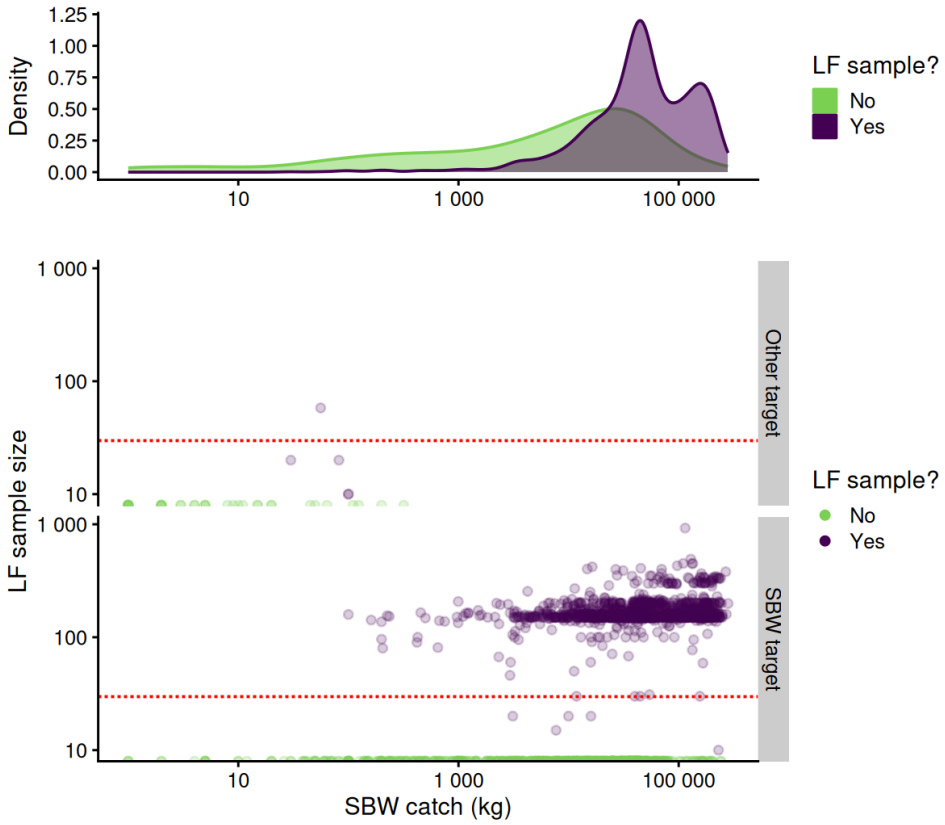


Figure 356: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SBW 6B in relation to the total southern blue whiting catch from an event, separately for southern blue whiting target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.5.2.2 Otolith samples

Table 36: Otolith samples of southern blue whiting from the SBW 6B Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of southern blue whiting exceeded a potential sampling threshold of 150 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	174	0	0	0.00
1991	471	0	0	0.00
1992	1 613	0	0	0.00
1993	285	0	0	0.00
1994	78	0	0	0.00
1995	112	0	0	0.00
1996	82	0	0	0.00
1997	34	0	0	0.00
1998	84	0	0	0.00
1999	222	0	0	0.00
2000	95	0	0	0.00
2001	25	0	0	0.00
2002	81	0	0	0.00
2003	26	0	0	0.00
2004	29	0	0	0.00
2005	96	0	0	0.00
2006	109	0	0	0.00
2007	49	0	0	0.00
2008	198	0	0	0.00
2009	417	75	1 079	17.99
2010	412	51	788	12.38
2011	167	13	240	7.78
2012	161	62	957	38.51
2013	77	28	422	36.36
2014	178	63	898	35.39
2015	25	0	0	0.00
2016	39	31	468	79.49
2017	25	21	303	84.00
2018	34	11	157	32.35
2019	9	8	216	88.89
2020	11	10	164	90.91
2021	20	9	135	45.00
2022	3	3	85	100.00
2023	13	11	168	84.62
2024	62	51	1 356	82.26
2025	86	43	974	50.00

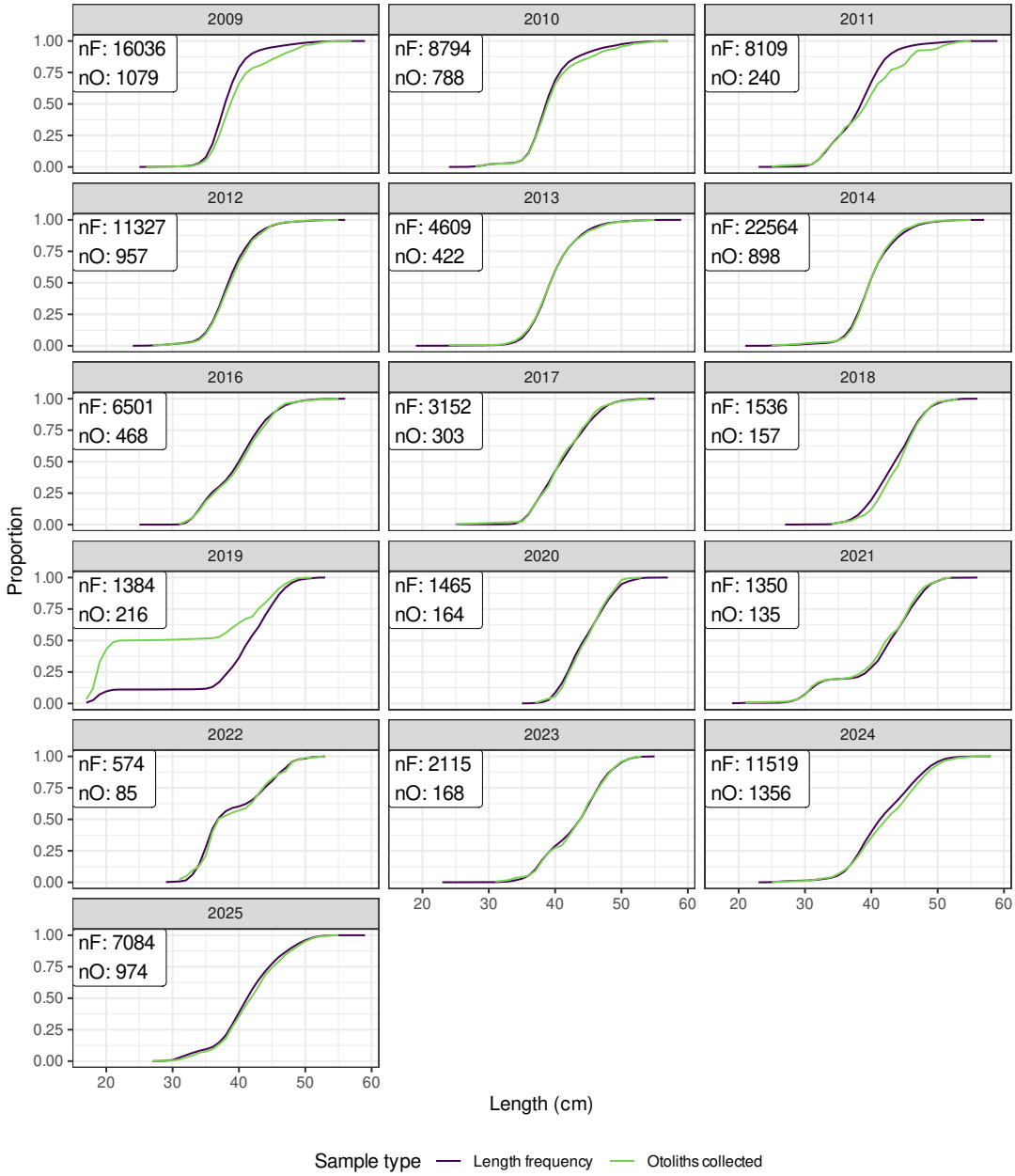


Figure 357: Cumulative distributions of the length of fish in the length frequency and otolith samples of southern blue whiting in the SBW 6B Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.5.2.3 Catch quantification

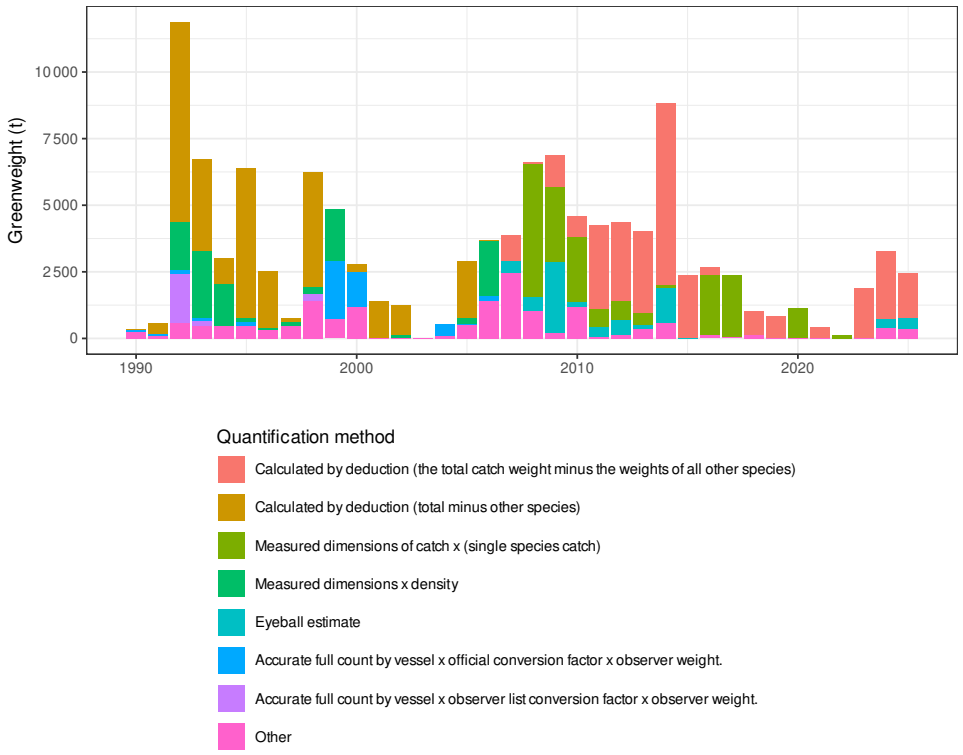


Figure 358: Methods used by observers to quantify the catch of southern blue whiting in the SBW 6B Trawl fishery. The legend lists the methods used in descending order of total catch.

2.5.3 SBW 6I: Trawl fishery

2.5.3.1 Length-frequency samples

Table 37: Length-frequency samples of southern blue whiting from the SBW 6I Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of southern blue whiting exceeded a potential sampling threshold of 150 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	794	49	8 097	6.17
1991	1 008	52	8 719	5.16
1992	947	121	18 189	12.78
1993	298	55	9 119	18.46
1994	338	80	13 189	23.67
1995	221	76	13 108	34.39
1996	358	84	15 478	23.46
1997	397	130	24 451	32.75
1998	886	260	50 187	29.35
1999	790	189	33 811	23.92
2000	528	180	31 334	34.09
2001	623	272	45 023	43.66
2002	981	230	39 299	23.45
2003	638	132	22 202	20.69
2004	713	130	23 588	18.23
2005	724	191	33 604	26.38
2006	469	103	18 242	21.96
2007	557	125	22 917	22.44
2008	503	170	29 149	33.80
2009	512	53	8 363	10.35
2010	521	169	27 275	32.44
2011	850	249	41 118	29.29
2012	664	265	45 775	39.91
2013	705	301	47 588	42.70
2014	591	453	73 403	76.65
2015	642	305	46 196	47.51
2016	382	175	29 504	45.81
2017	496	159	25 239	32.06
2018	416	187	28 628	44.95
2019	609	262	40 858	43.02
2020	327	162	24 585	49.54
2021	417	158	24 709	37.89
2022	496	227	38 782	45.77
2023	597	261	41 762	43.72
2024	291	186	32 300	63.92
2025	410	235	35 260	57.32

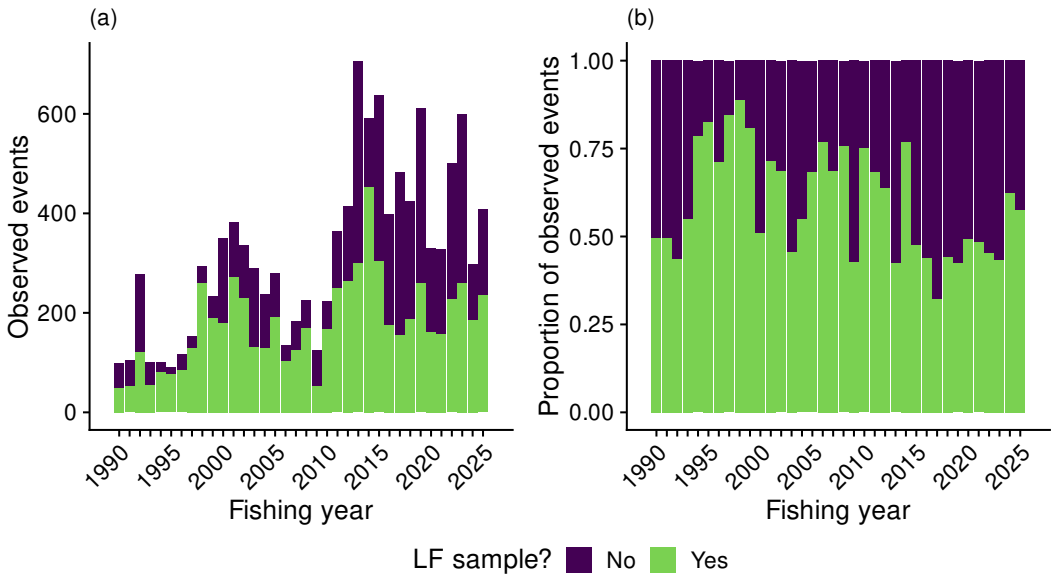


Figure 359: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SBW 6I where the southern blue whiting catch exceeded the 150 kg threshold, with and without length-frequency sampling.**

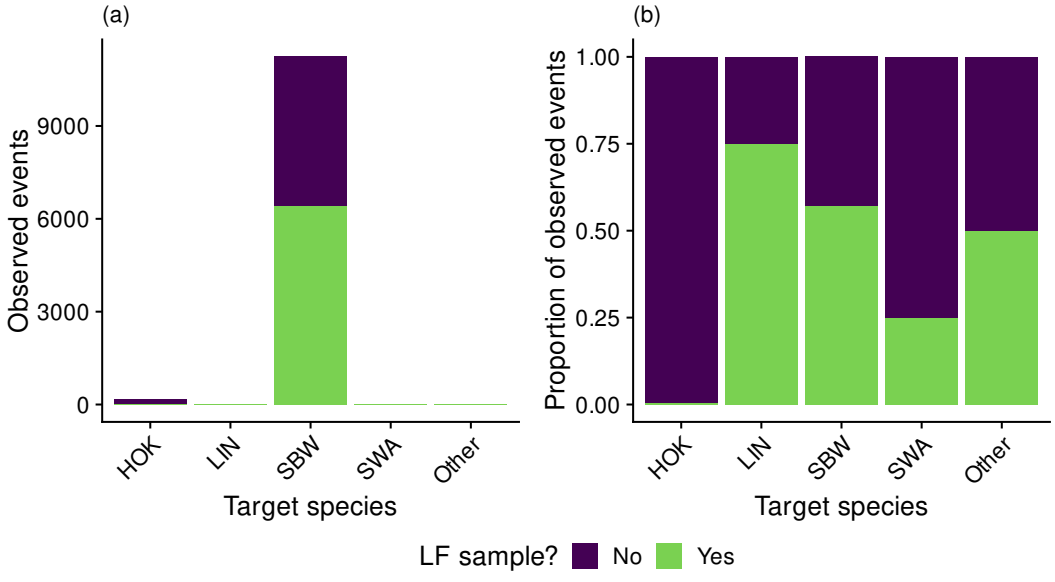


Figure 360: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SBW 6I where the southern blue whiting catch exceeded the 150 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

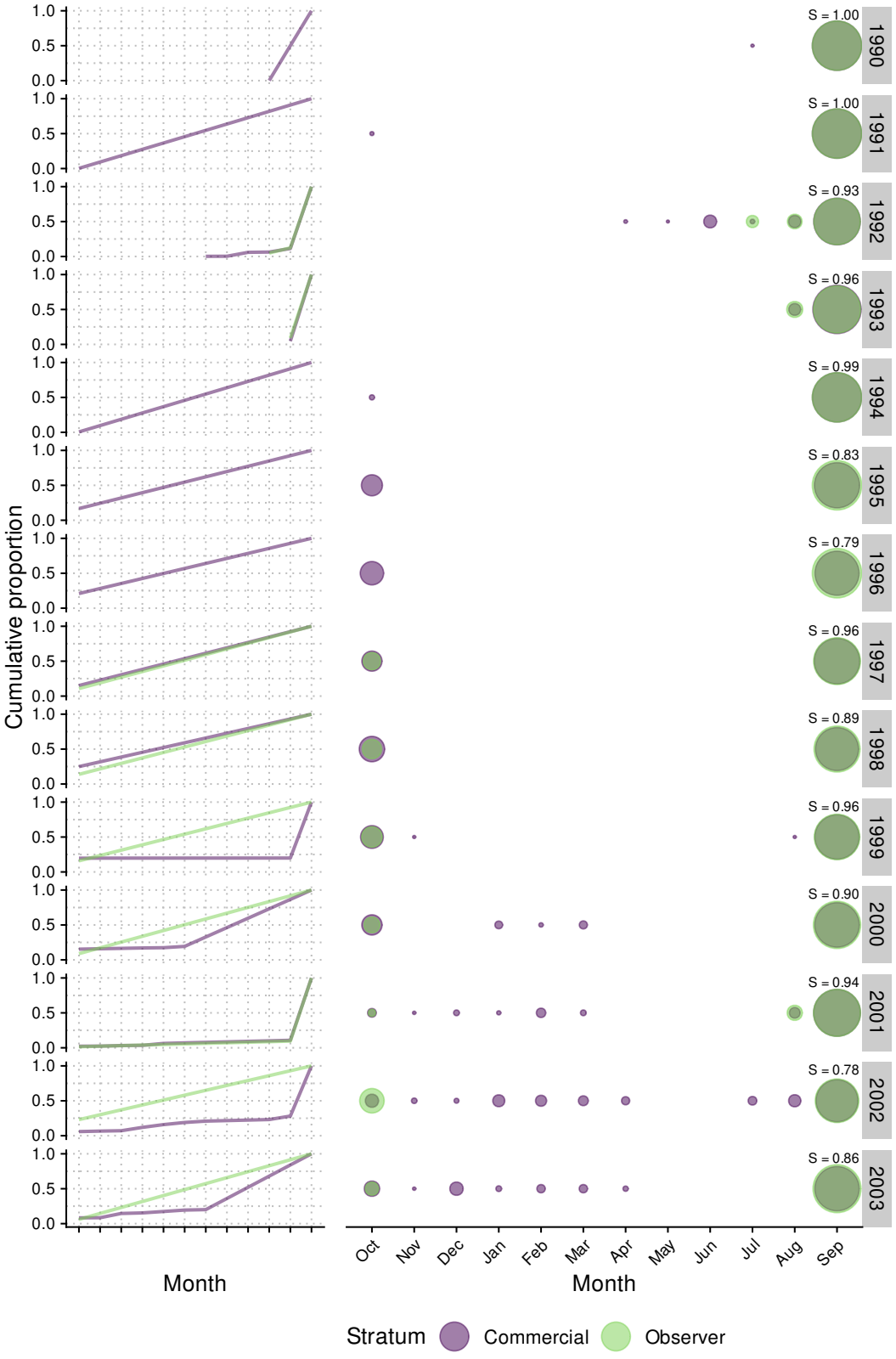


Figure 361: Monthly representativeness of observer sampling coverage of Trawl fishing events in SBW 6I, where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

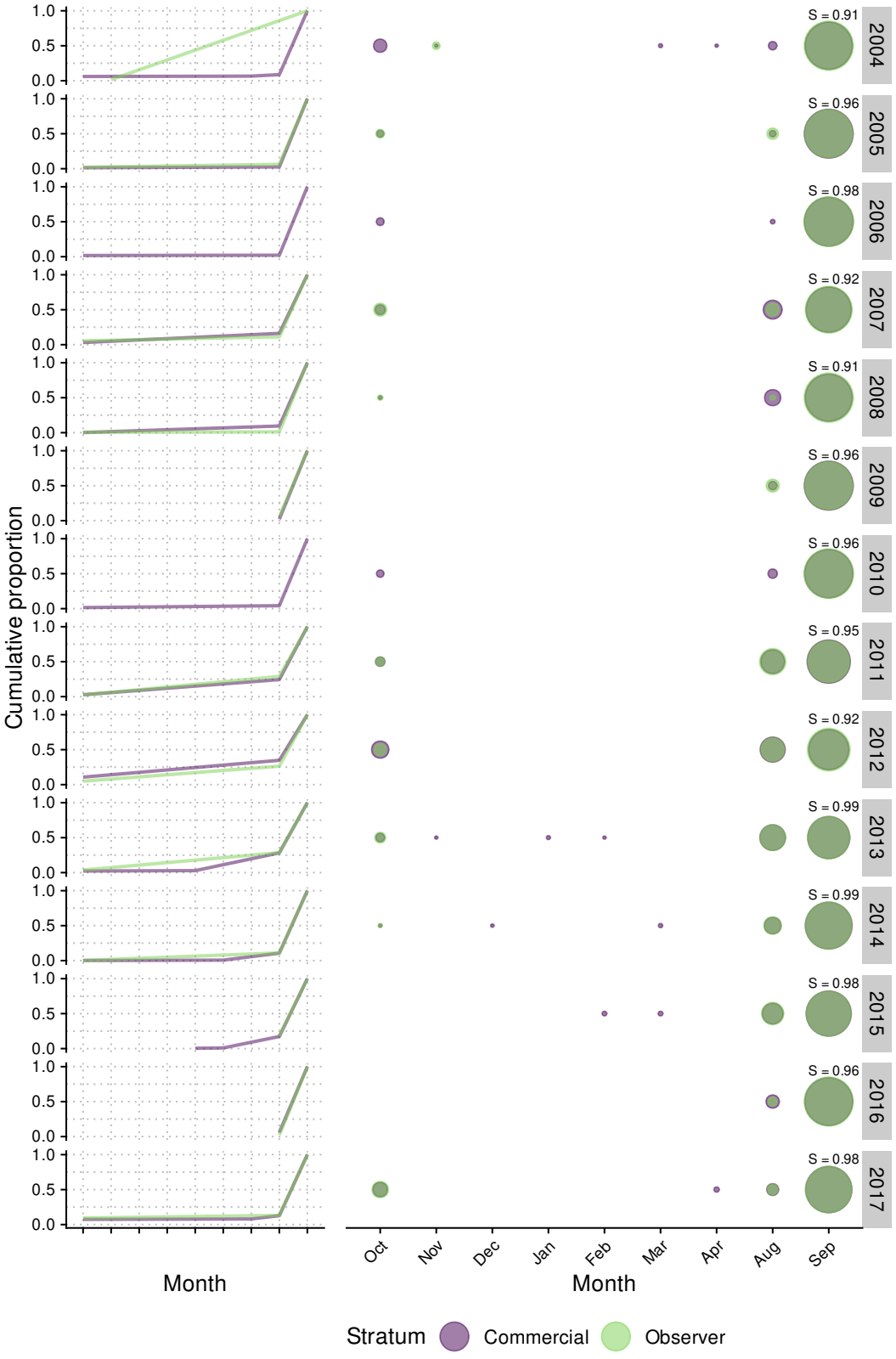


Figure 362: Monthly representativeness of observer sampling coverage of Trawl fishing events in SBW 6I, where the southern blue whiting catch exceeded the 150kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

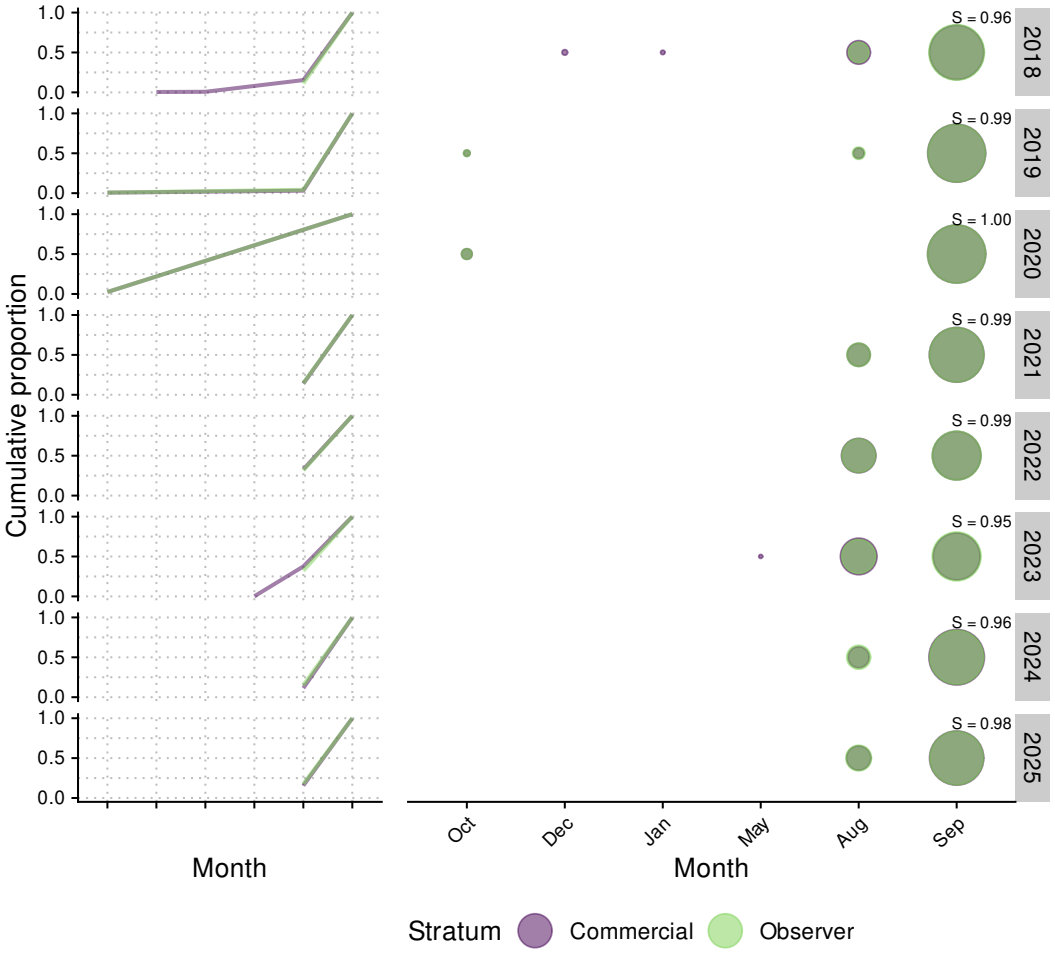


Figure 363: Monthly representativeness of observer sampling coverage of Trawl fishing events in SBW 6I, where the southern blue whiting catch exceeded the 150kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

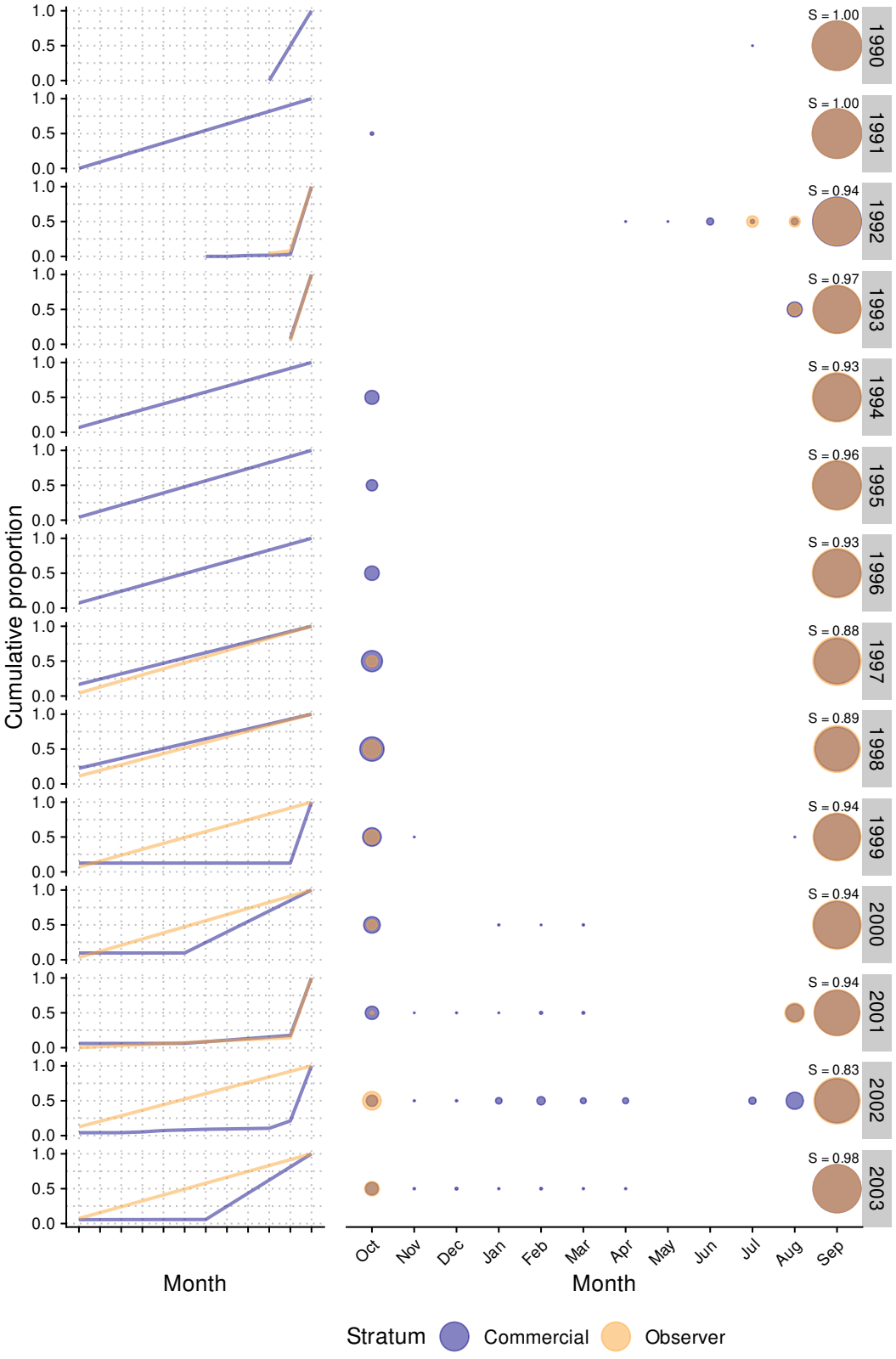


Figure 364: Monthly representativeness of observer sampling coverage of Trawl catch in SBW 6I, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

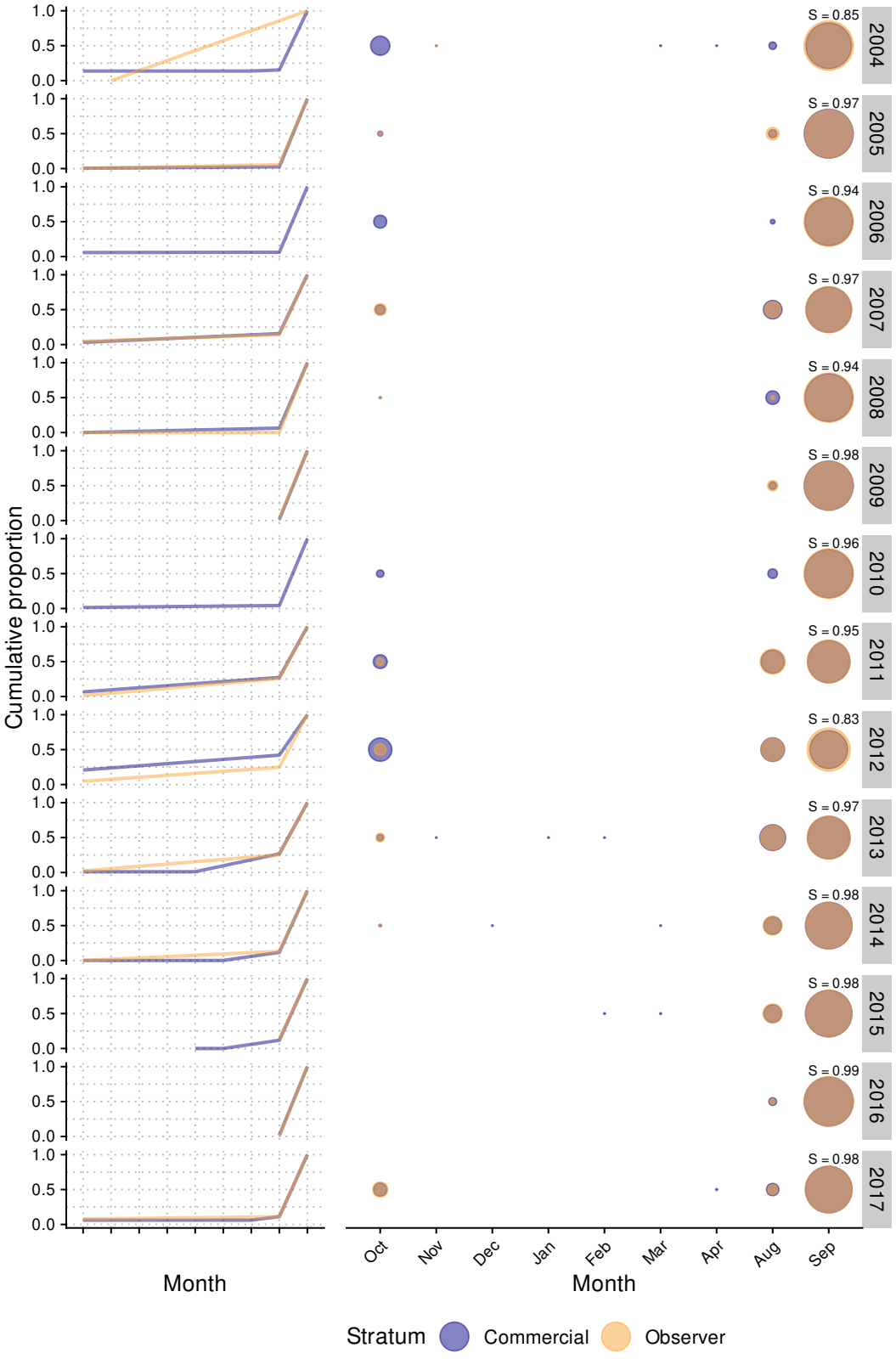


Figure 365: Monthly representativeness of observer sampling coverage of Trawl catch in SBW 6I, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

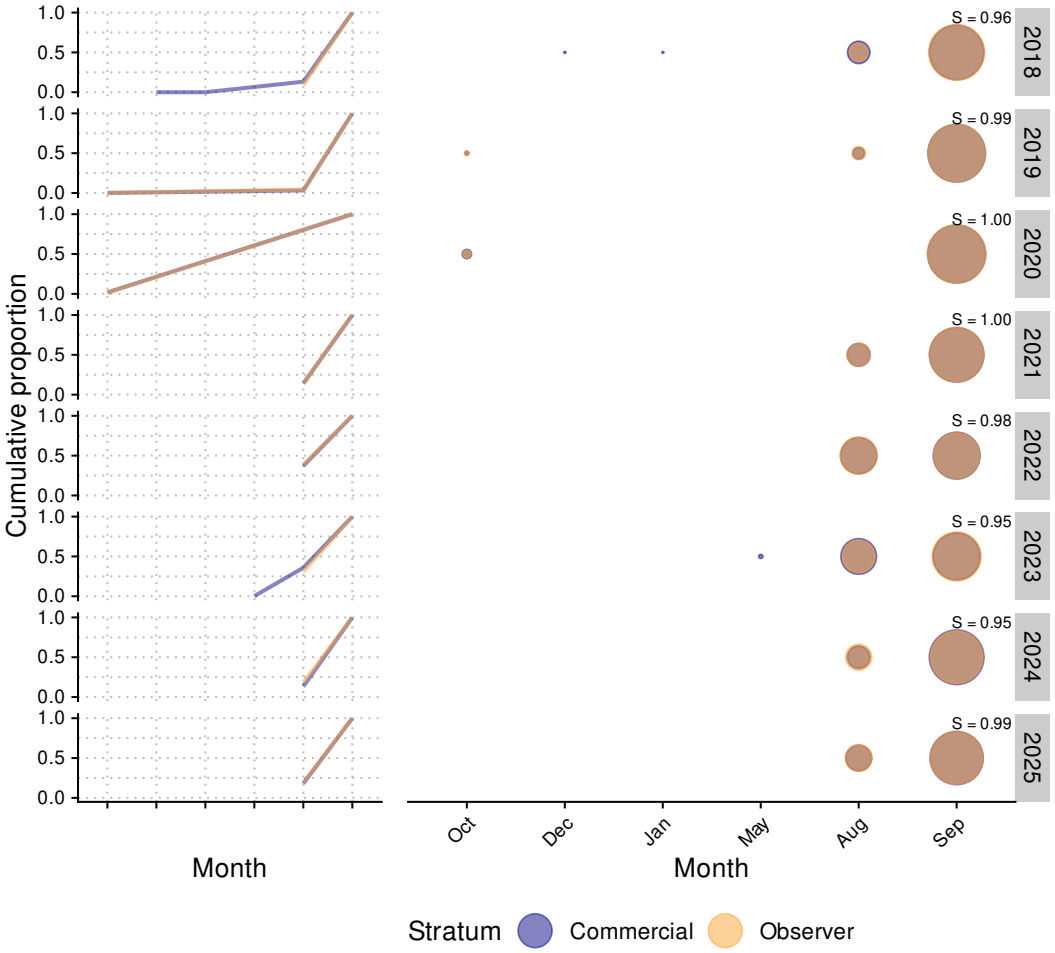


Figure 366: **Monthly representativeness of observer sampling coverage of Trawl catch in SBW 6I, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

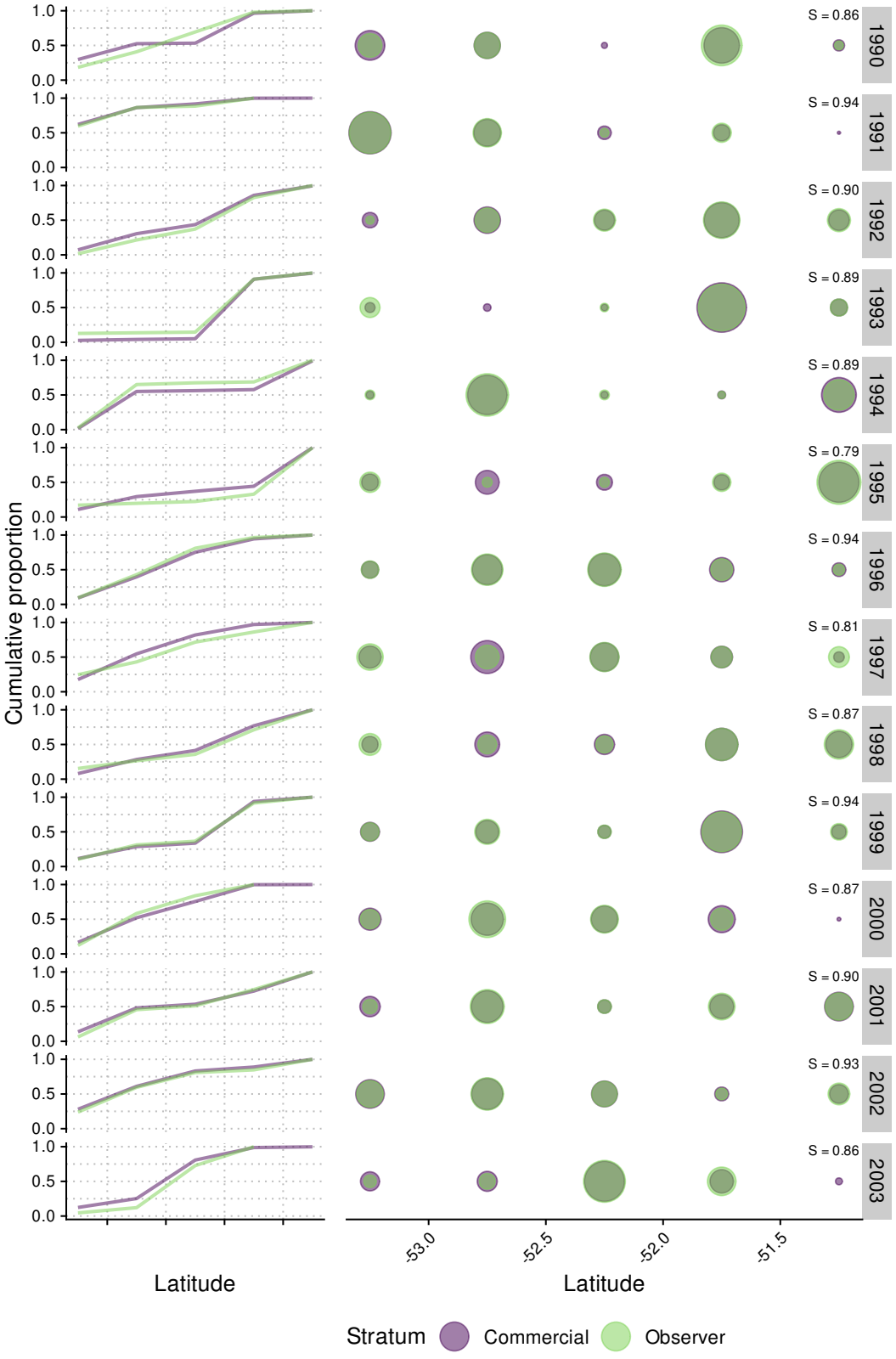


Figure 367: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6I, where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

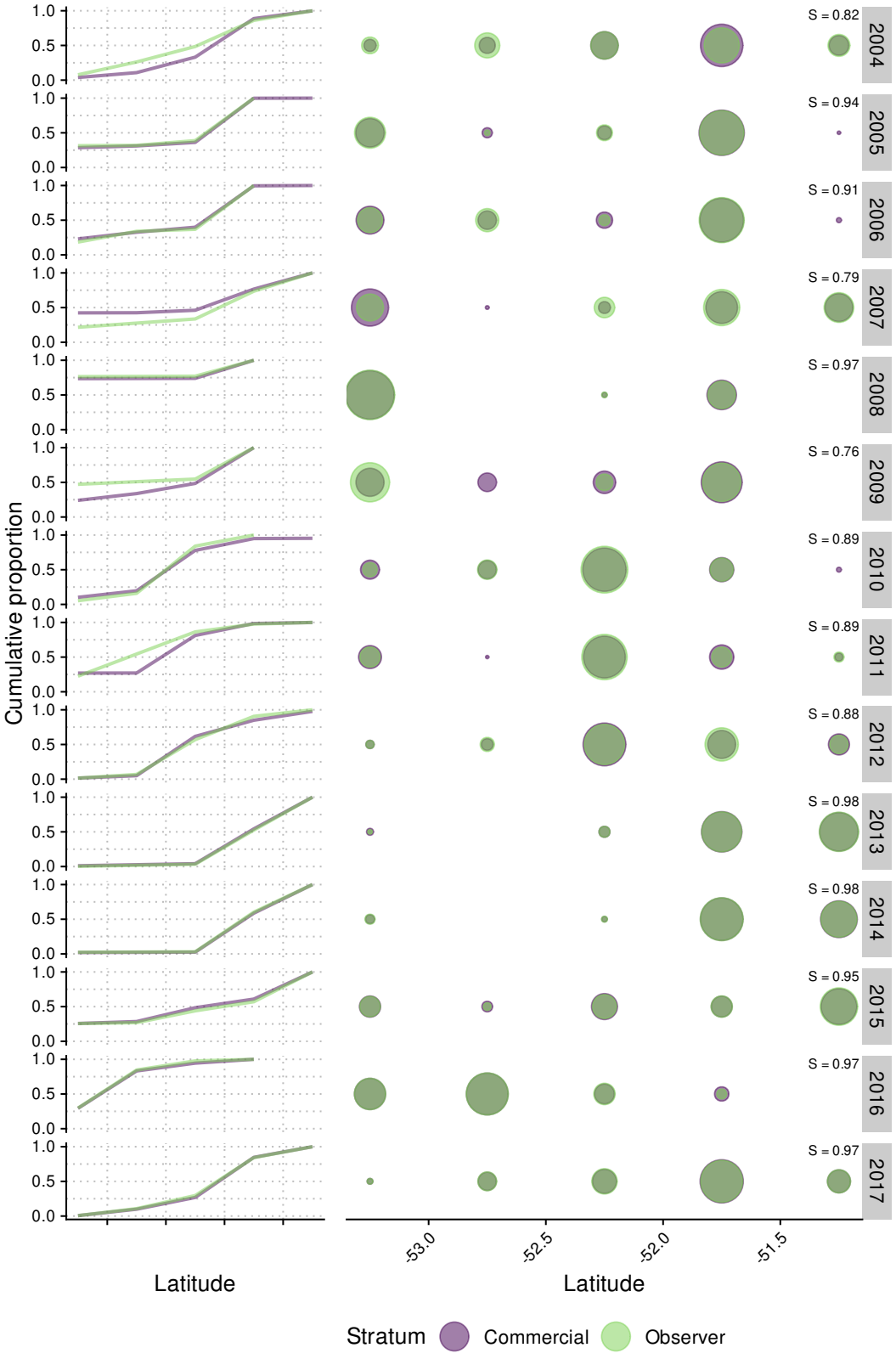


Figure 368: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6I, where the southern blue whiting catch exceeded the 150kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

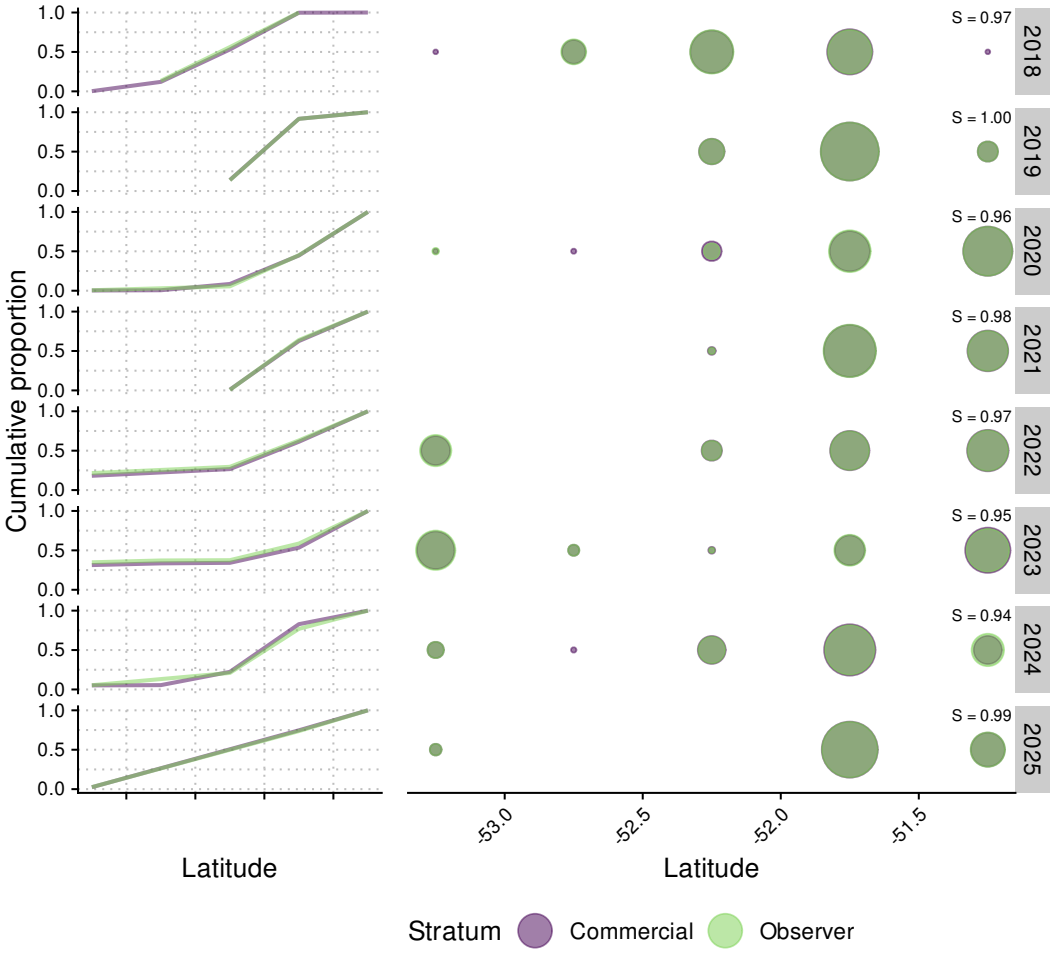


Figure 369: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6I, where the southern blue whiting catch exceeded the 150kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

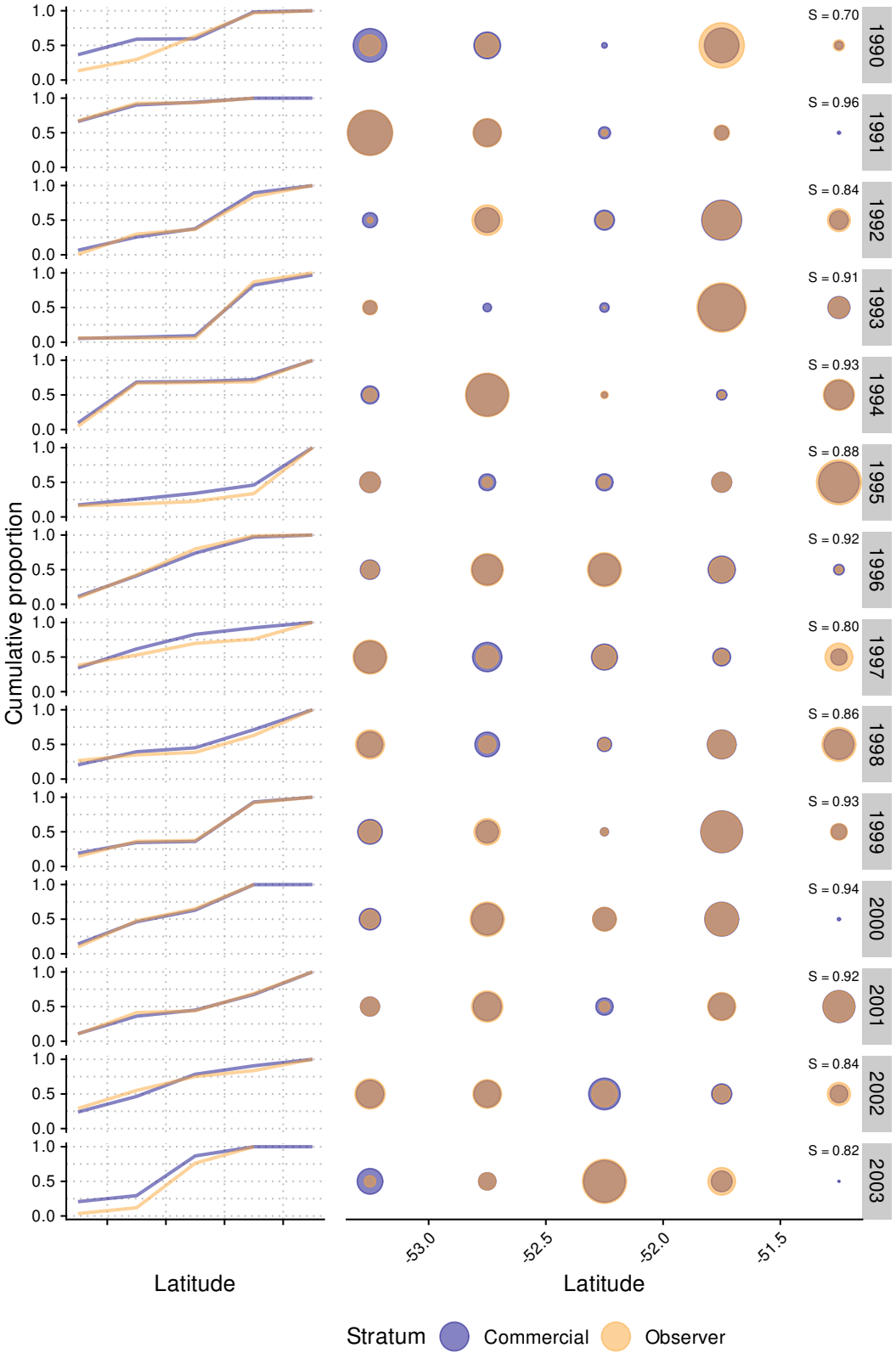


Figure 370: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6I, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

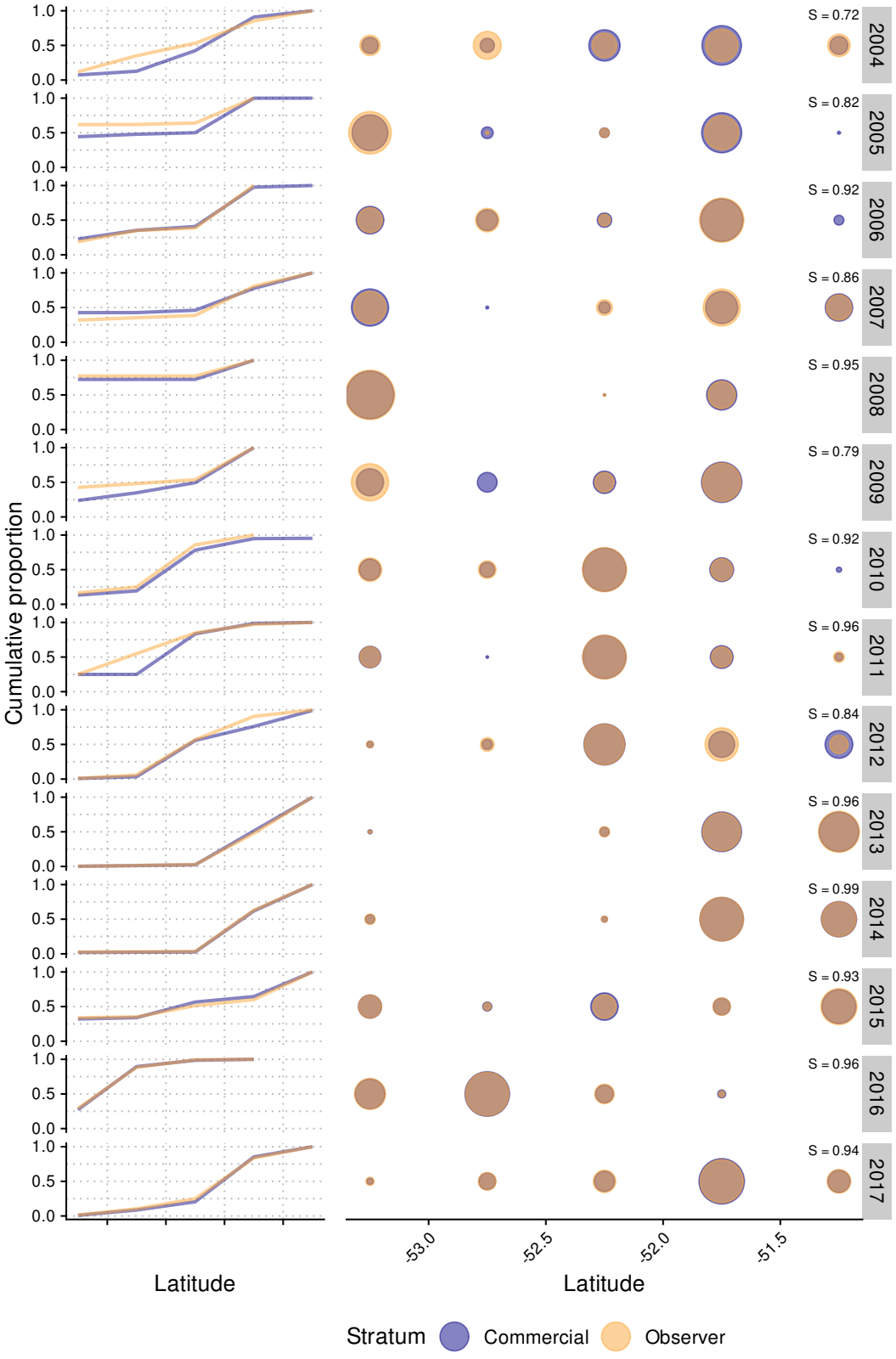


Figure 371: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6I, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

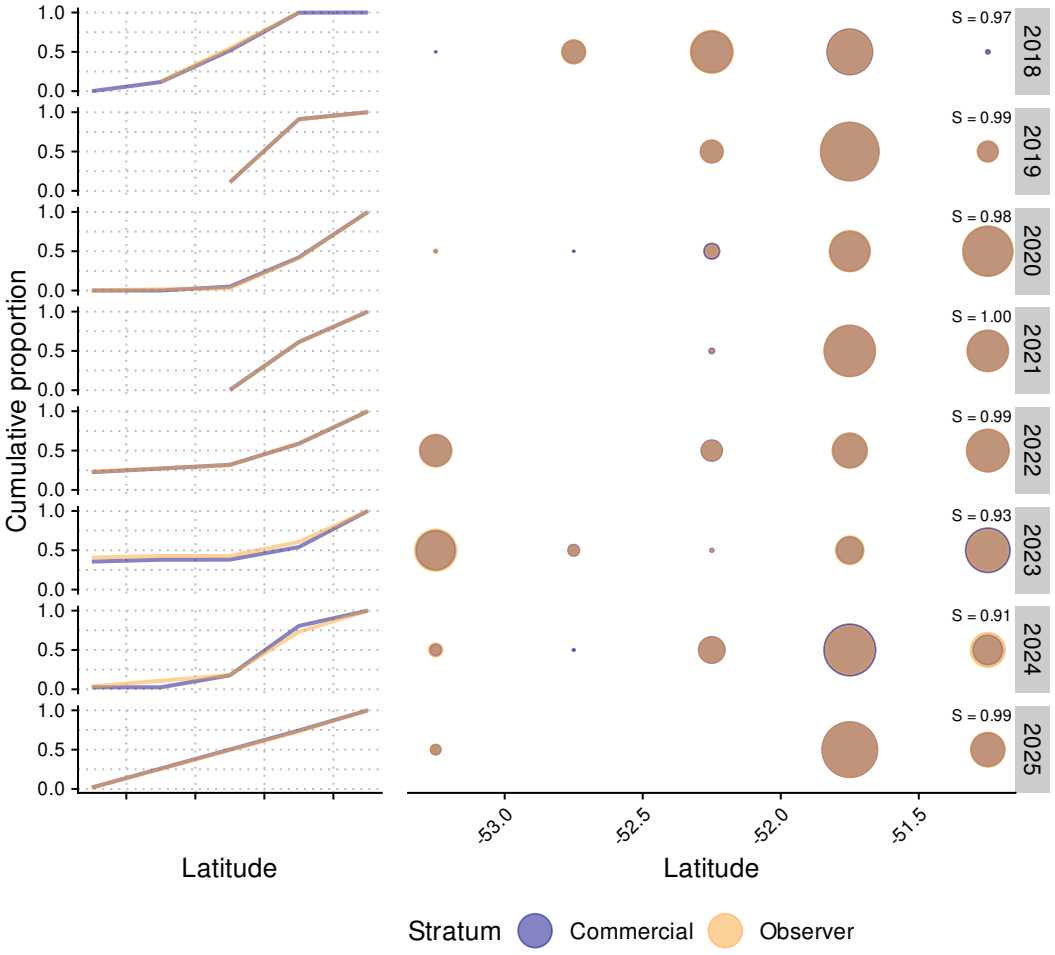


Figure 372: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6I, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

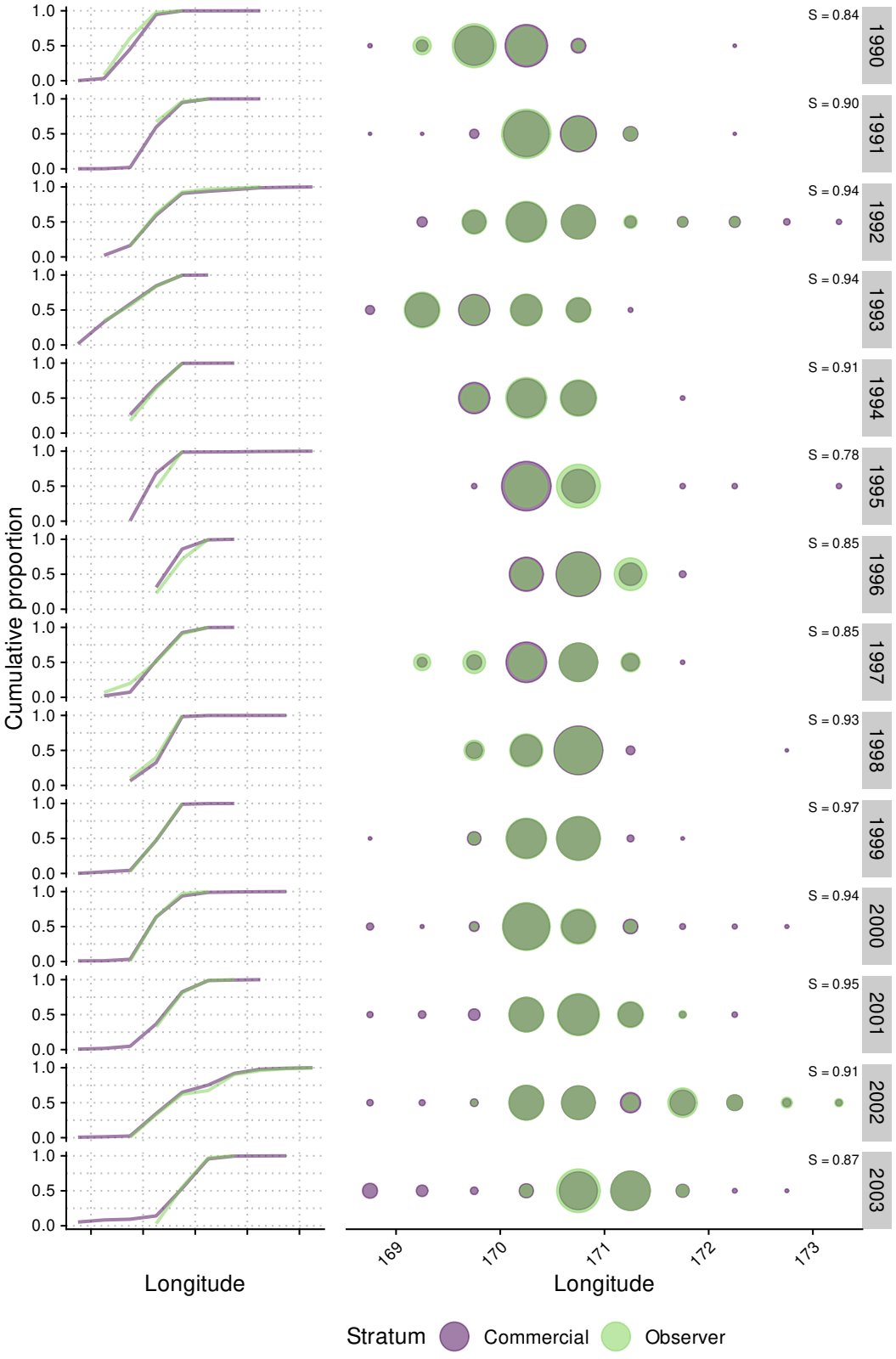


Figure 373: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6I, where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

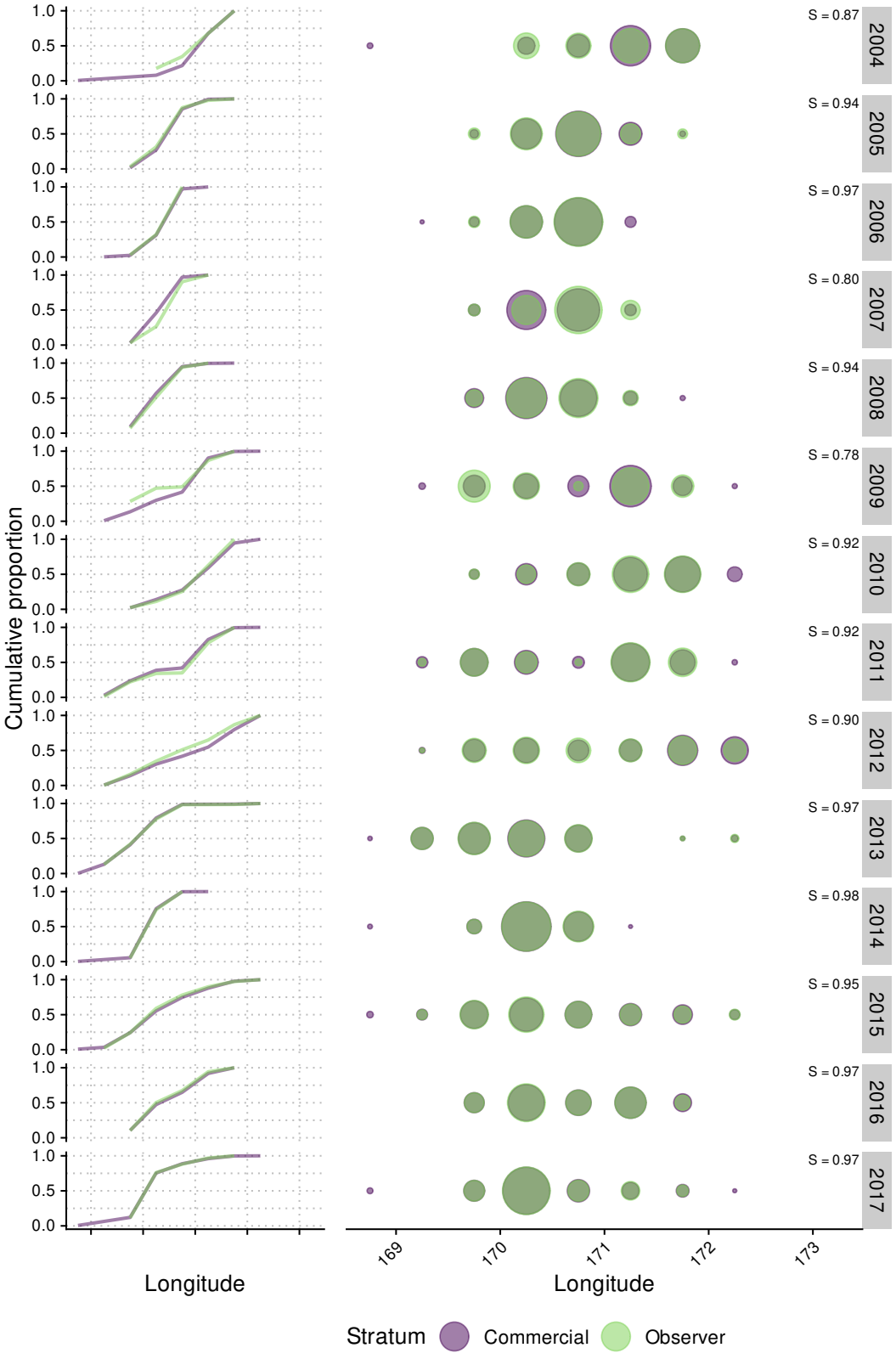


Figure 374: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6I, where the southern blue whiting catch exceeded the 150kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

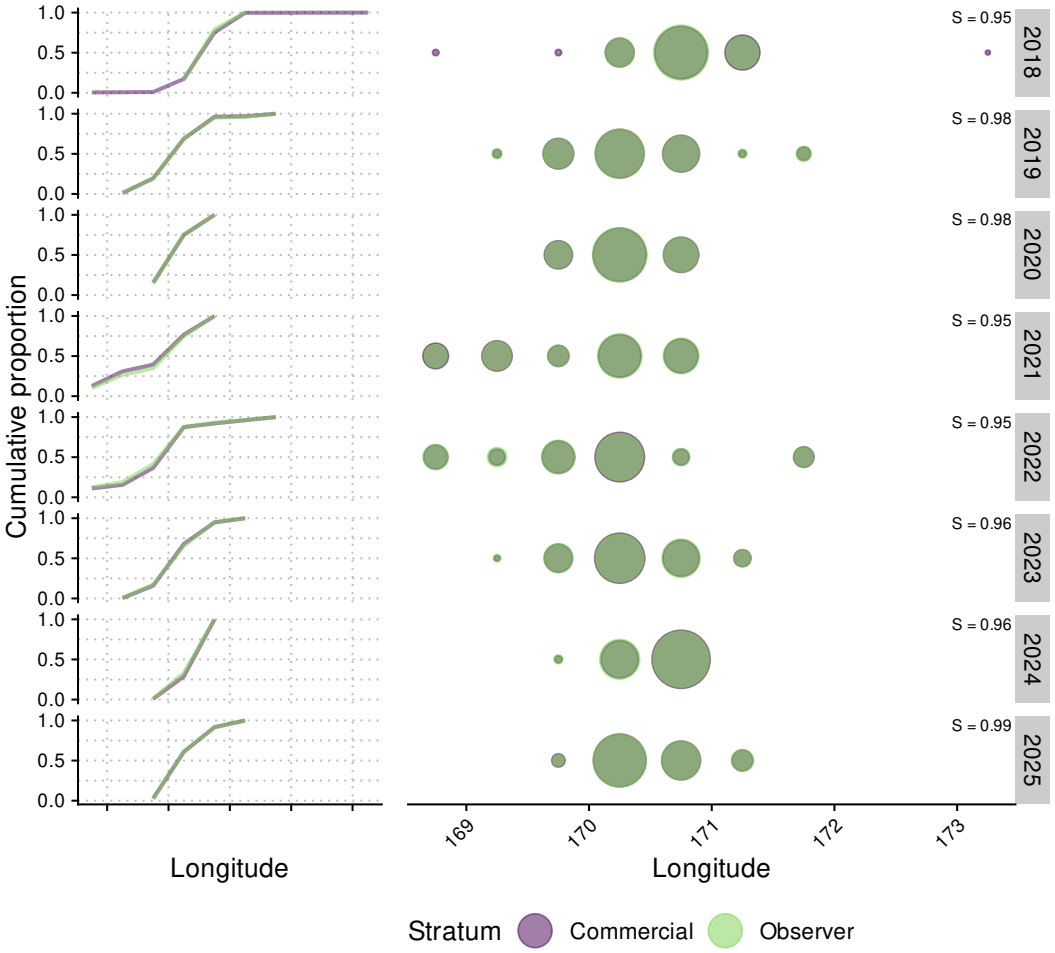


Figure 375: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6I, where the southern blue whiting catch exceeded the 150kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

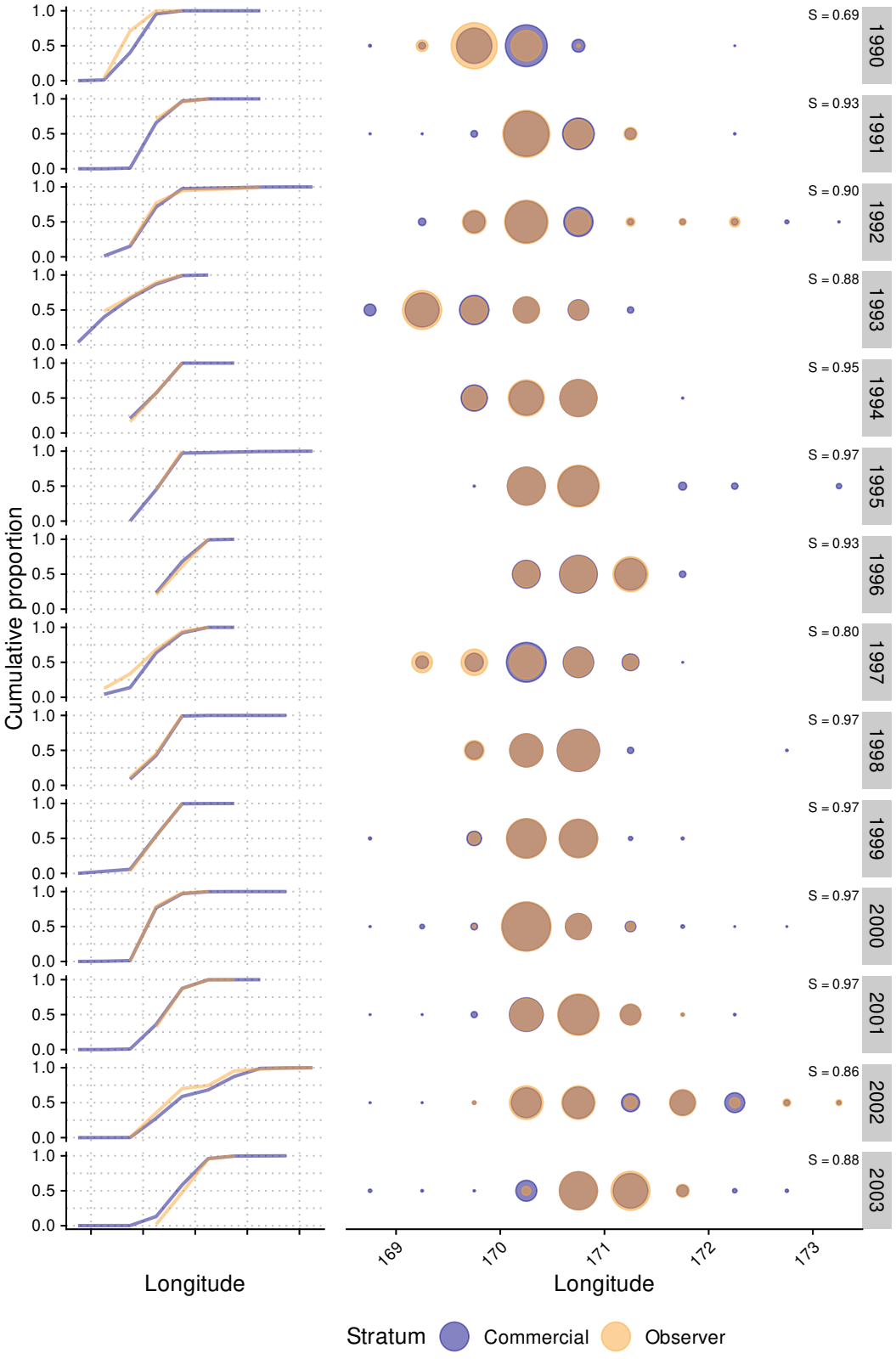


Figure 376: Longitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6I, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

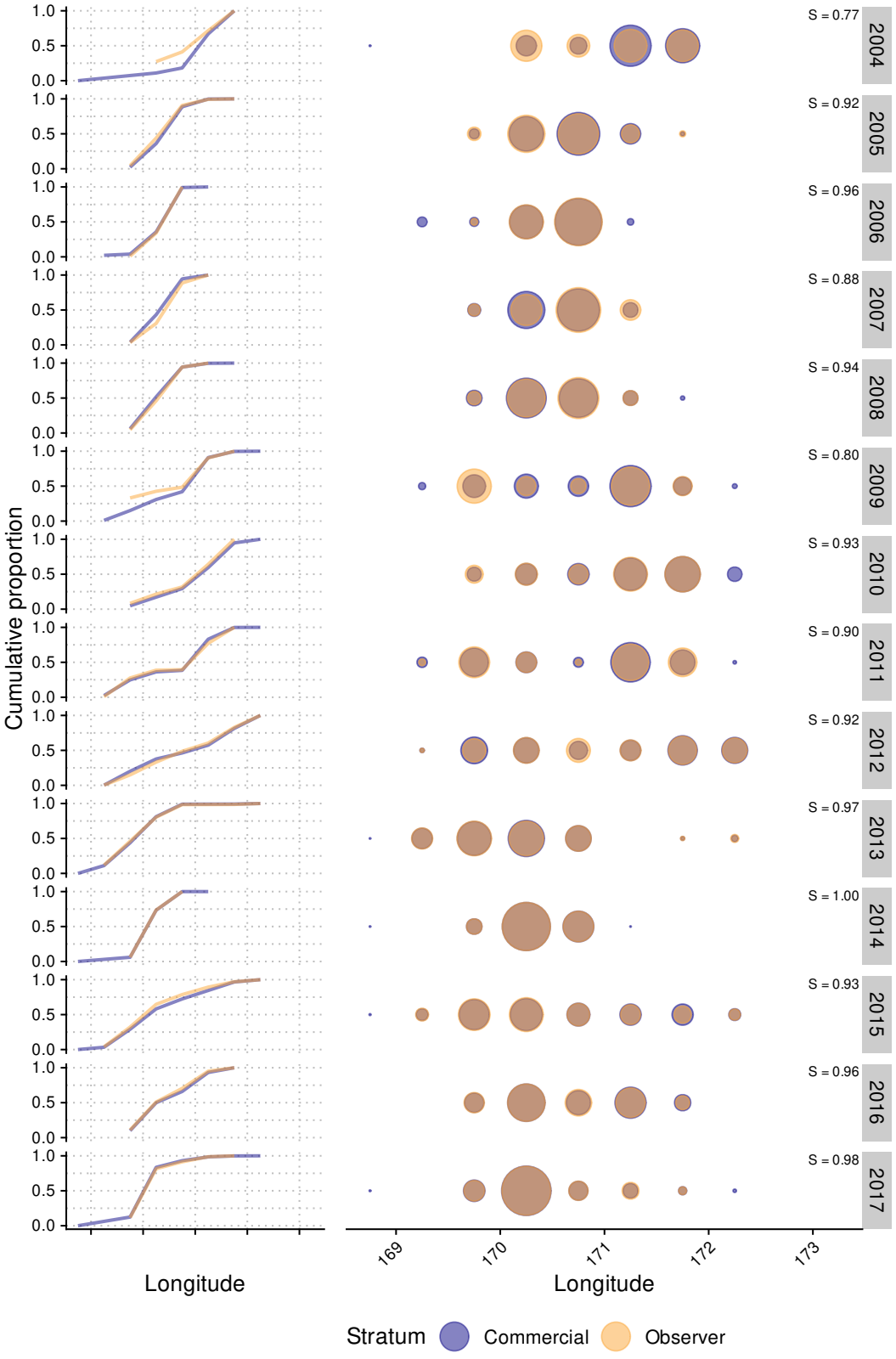


Figure 377: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6I, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

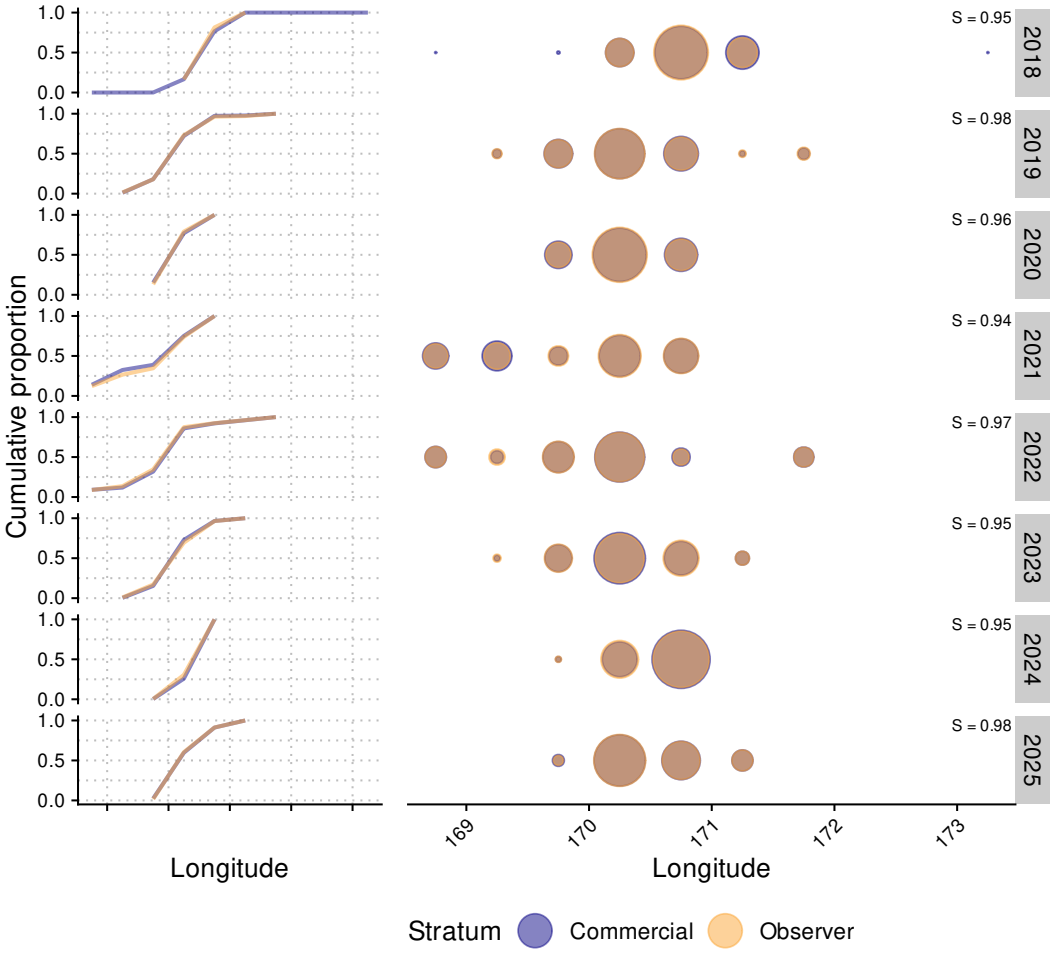


Figure 378: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6I, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

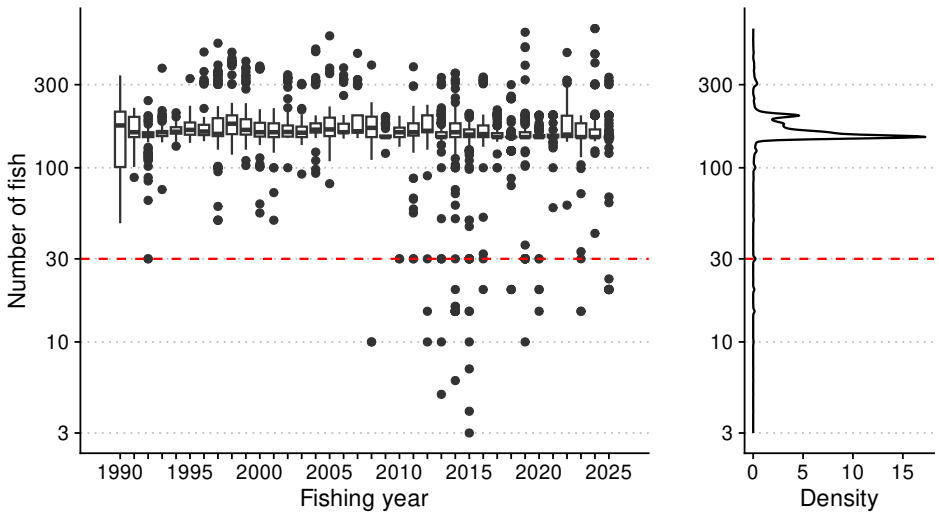


Figure 379: **Length-frequency sample sizes for observed fishing events in SBW 6I where southern blue whiting were sampled. The red dashed line indicates a sample size of 30 fish.**

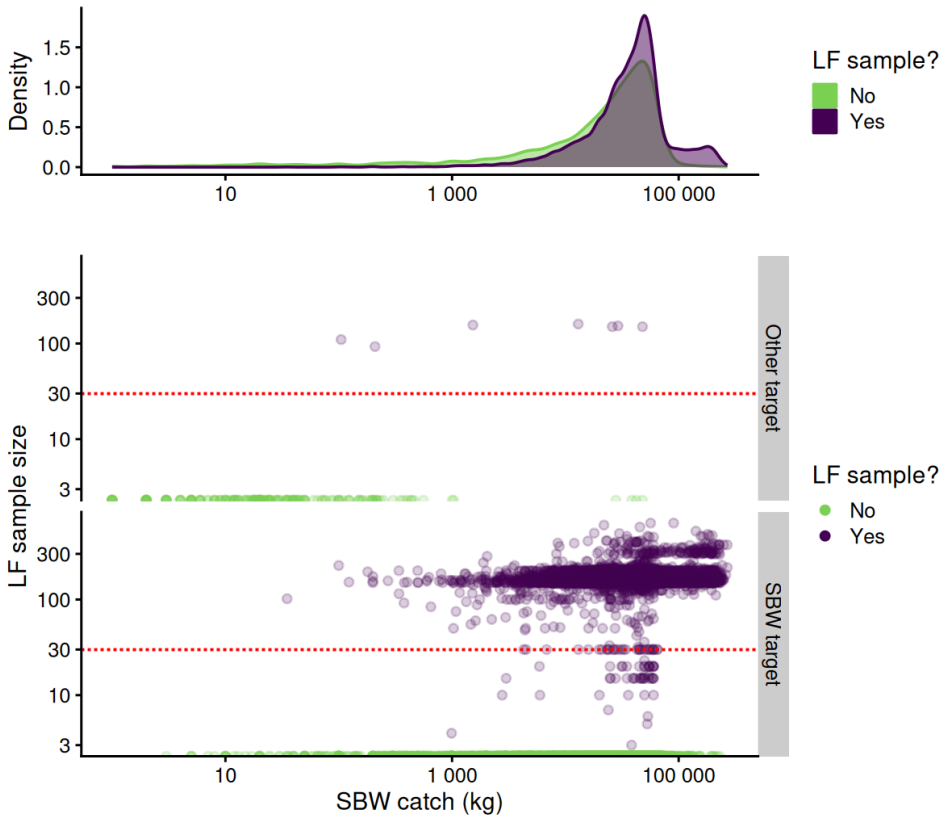


Figure 380: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SBW 6I in relation to the total southern blue whiting catch from an event, separately for southern blue whiting target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.5.3.2 Otolith samples

Table 38: Otolith samples of southern blue whiting from the SBW 6I Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of southern blue whiting exceeded a potential sampling threshold of 150 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	794	0	0	0.00
1991	1 008	0	0	0.00
1992	947	0	0	0.00
1993	298	0	0	0.00
1994	338	0	0	0.00
1995	221	0	0	0.00
1996	358	0	0	0.00
1997	397	0	0	0.00
1998	886	0	0	0.00
1999	790	0	0	0.00
2000	528	0	0	0.00
2001	623	0	0	0.00
2002	981	0	0	0.00
2003	638	0	0	0.00
2004	713	0	0	0.00
2005	724	0	0	0.00
2006	469	0	0	0.00
2007	557	0	0	0.00
2008	503	0	0	0.00
2009	512	38	506	7.42
2010	521	161	2 496	30.90
2011	850	91	1 461	10.71
2012	664	181	2 784	27.26
2013	705	200	2 970	28.37
2014	591	145	2 181	24.53
2015	642	45	681	7.01
2016	382	156	2 367	40.84
2017	496	138	2 074	27.82
2018	416	185	2 585	44.47
2019	609	256	4 137	42.04
2020	327	160	2 443	48.93
2021	417	135	2 055	32.37
2022	496	226	3 493	45.56
2023	597	260	3 999	43.55
2024	291	186	3 966	63.92
2025	410	234	4 817	57.07

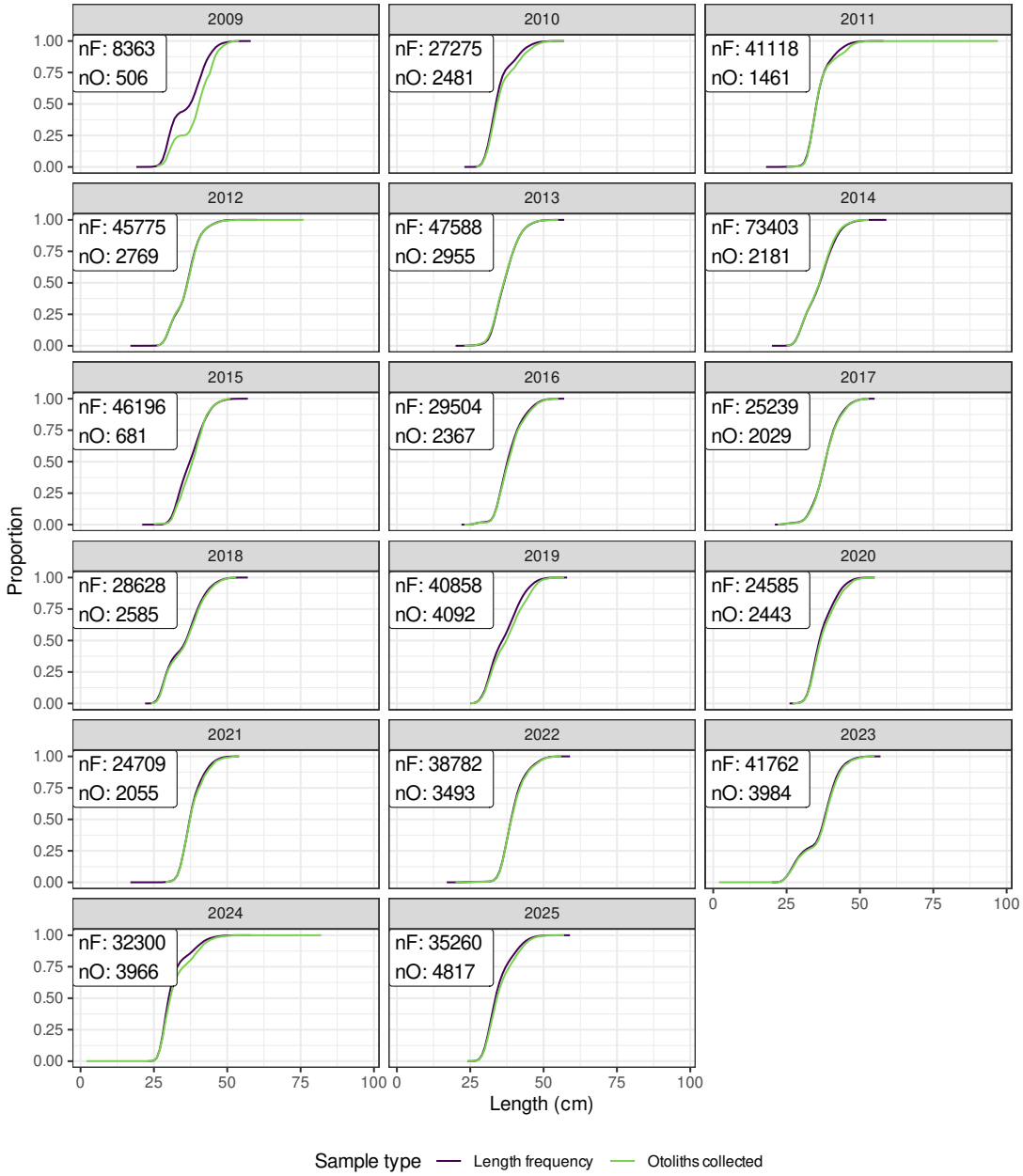


Figure 381: Cumulative distributions of the length of fish in the length frequency and otolith samples of southern blue whiting in the SBW 6I Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.5.3.3 Catch quantification

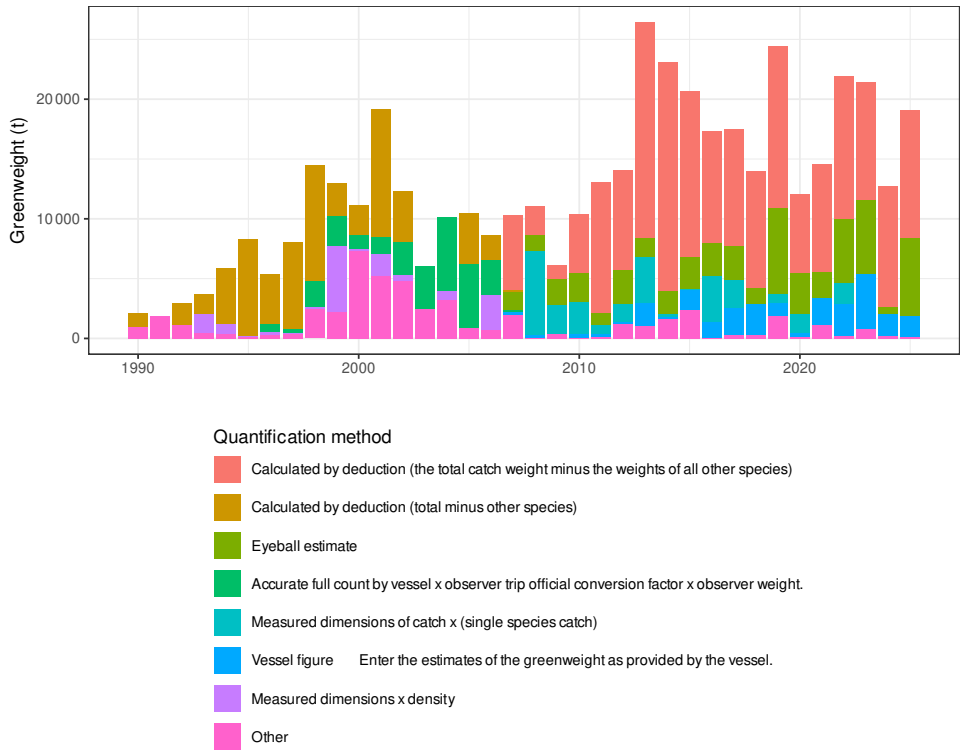


Figure 382: Methods used by observers to quantify the catch of southern blue whiting in the SBW 6I Trawl fishery. The legend lists the methods used in descending order of total catch.

2.5.4 SBW 6R: Trawl fishery

2.5.4.1 Length-frequency samples

Table 39: Length-frequency samples of southern blue whiting from the SBW 6R Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of southern blue whiting exceeded a potential sampling threshold of 150 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	118	8	1318	6.78
1991	203	24	4248	11.82
1992	236	25	3309	10.59
1993	227	34	5544	14.98
1994	34	15	2654	44.12
1995	21	9	1512	42.86
1996	21	0	0	0.00
1997	19	14	2470	73.68
1998	27	18	3446	66.67
1999	20	0	0	0.00
2000	69	0	0	0.00
2001	215	1	160	0.47
2002	315	1	10	0.32
2003	256	6	87	2.34
2004	117	8	1100	6.84
2005	114	0	0	0.00
2006	18	0	0	0.00
2007	51	0	0	0.00
2008	63	5	338	7.94
2009	202	43	6120	21.29
2010	135	20	2712	14.81
2011	40	4	705	10.00
2012	88	38	5881	43.18
2013	21	5	364	23.81
2014	57	4	80	7.02
2015	17	5	180	29.41
2016	1	0	0	0.00
2017	16	0	0	0.00
2018	35	9	319	25.71
2019	115	58	7717	50.43
2020	3	1	93	33.33
2021	29	10	682	34.48
2022	30	1	150	3.33
2023	17	3	399	17.65
2024	11	0	0	0.00
2025	4	2	289	50.00

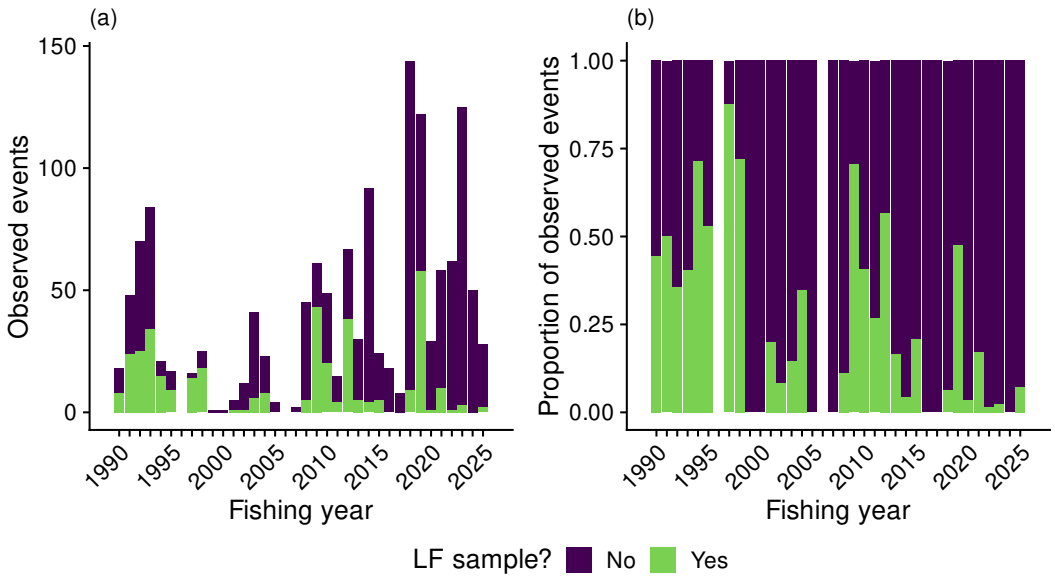


Figure 383: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SBW 6R where the southern blue whiting catch exceeded the 150 kg threshold, with and without length-frequency sampling.**

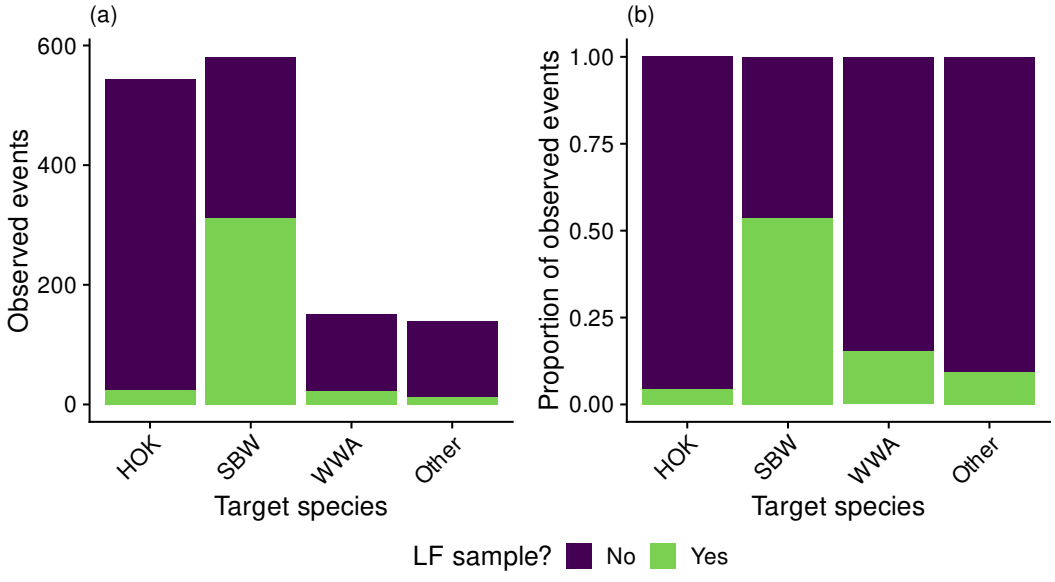


Figure 384: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SBW 6R where the southern blue whiting catch exceeded the 150 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

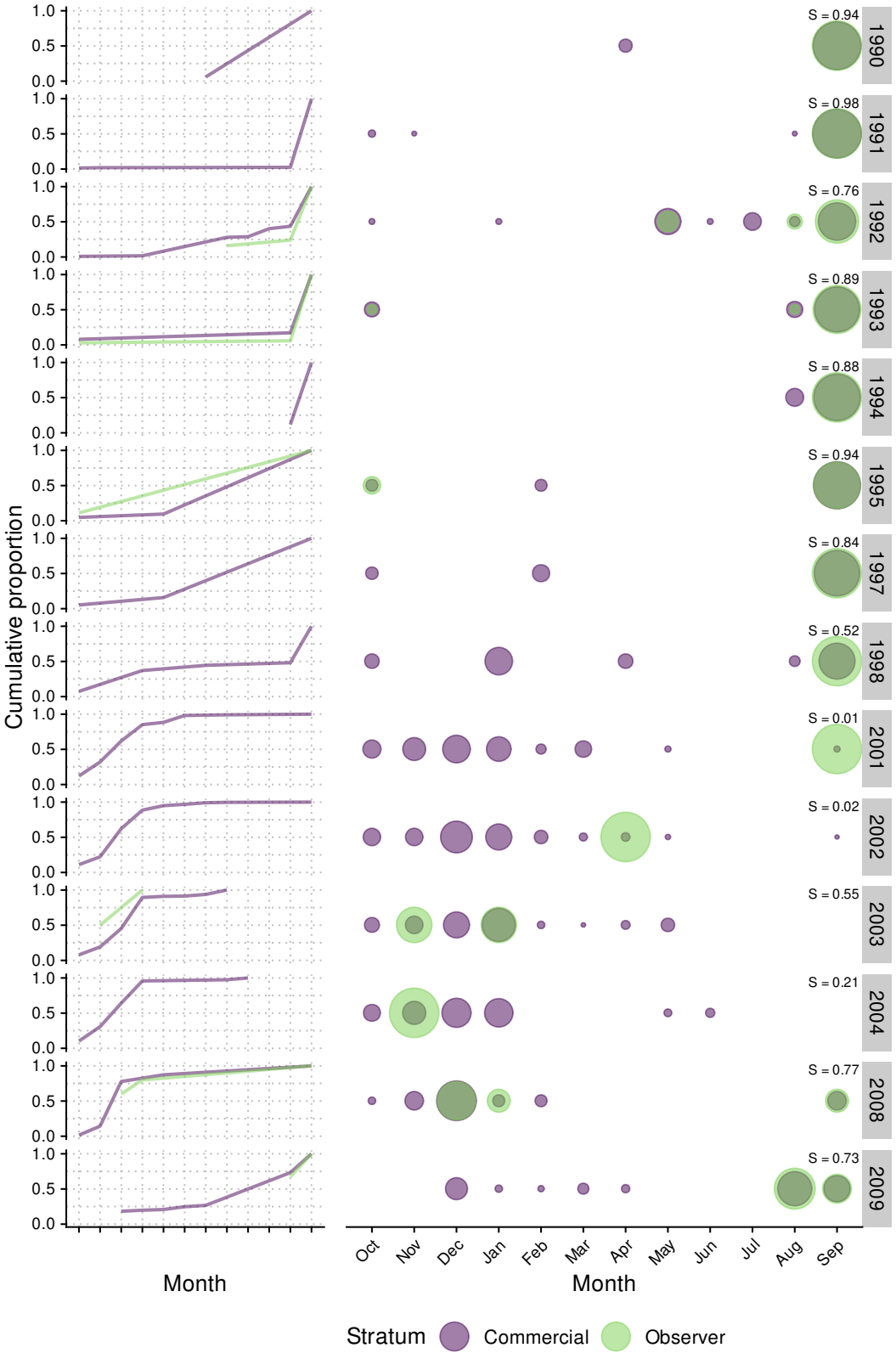


Figure 385: **Monthly representativeness of observer sampling coverage of Trawl fishing events in SBW 6R, where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

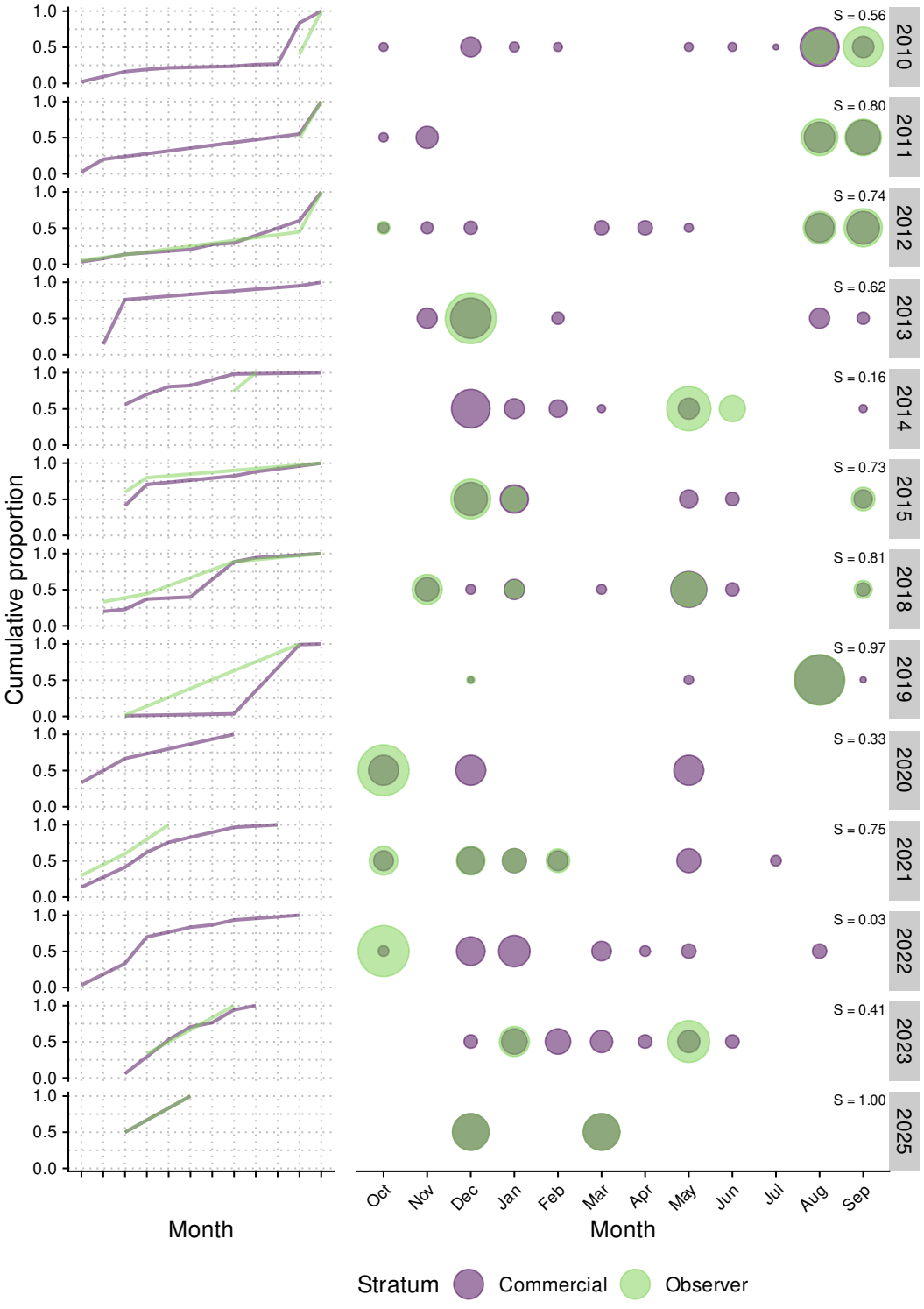


Figure 386: Monthly representativeness of observer sampling coverage of Trawl fishing events in SBW 6R, where the southern blue whiting catch exceeded the 150kg threshold, in 2010 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

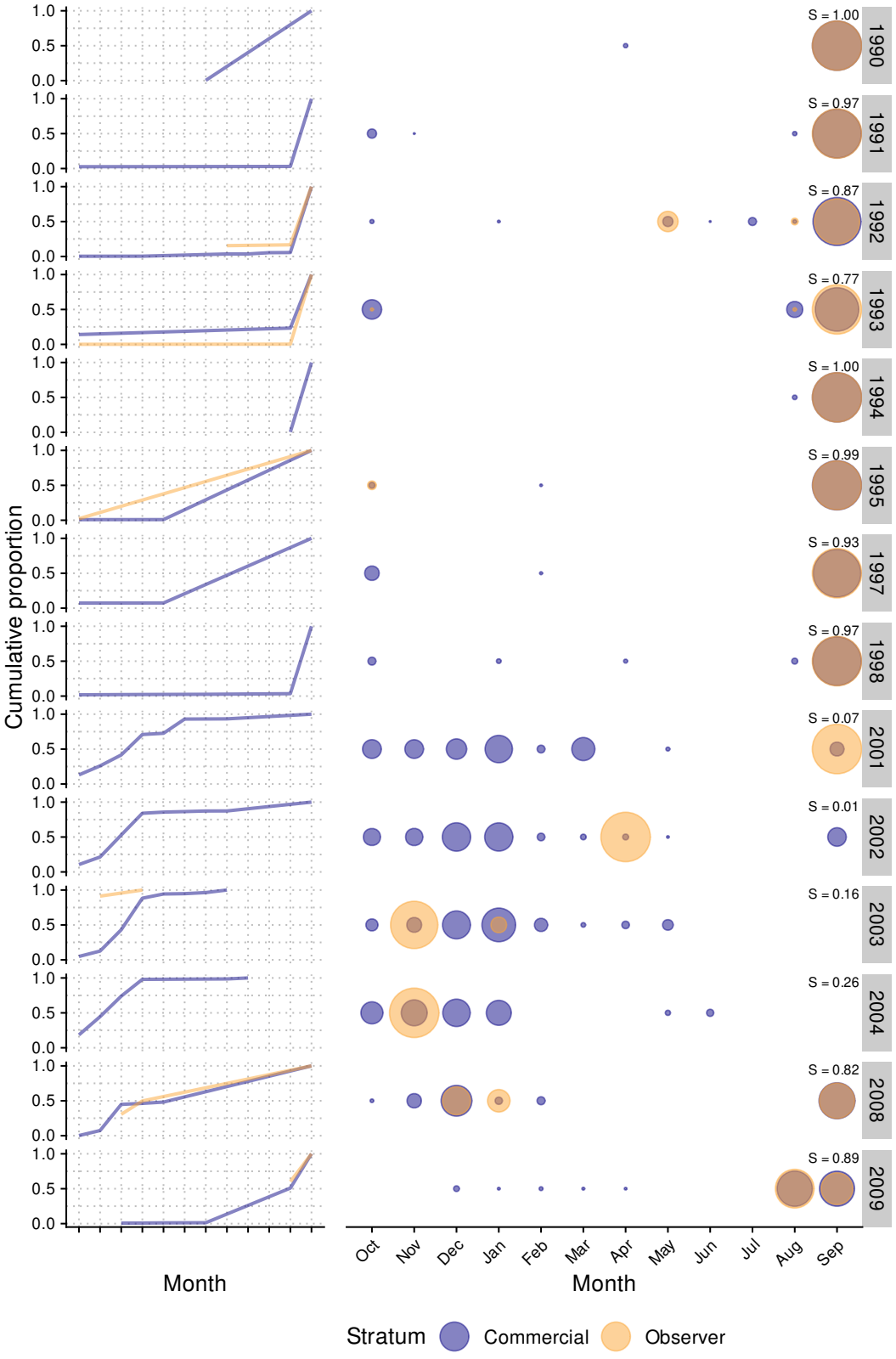


Figure 387: **Monthly representativeness of observer sampling coverage of Trawl catch in SBW 6R, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

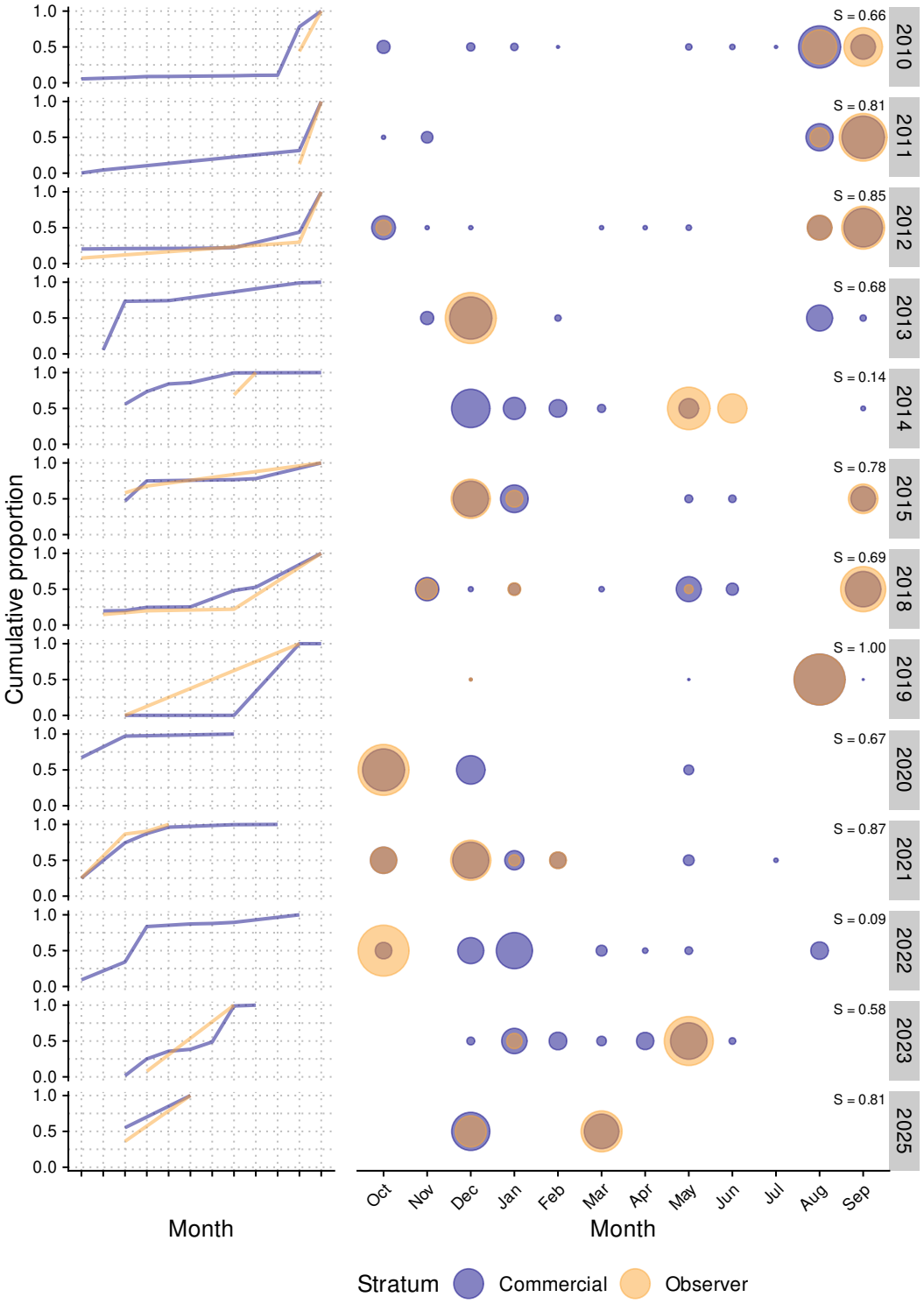


Figure 388: Monthly representativeness of observer sampling coverage of Trawl catch in SBW 6R, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2010 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

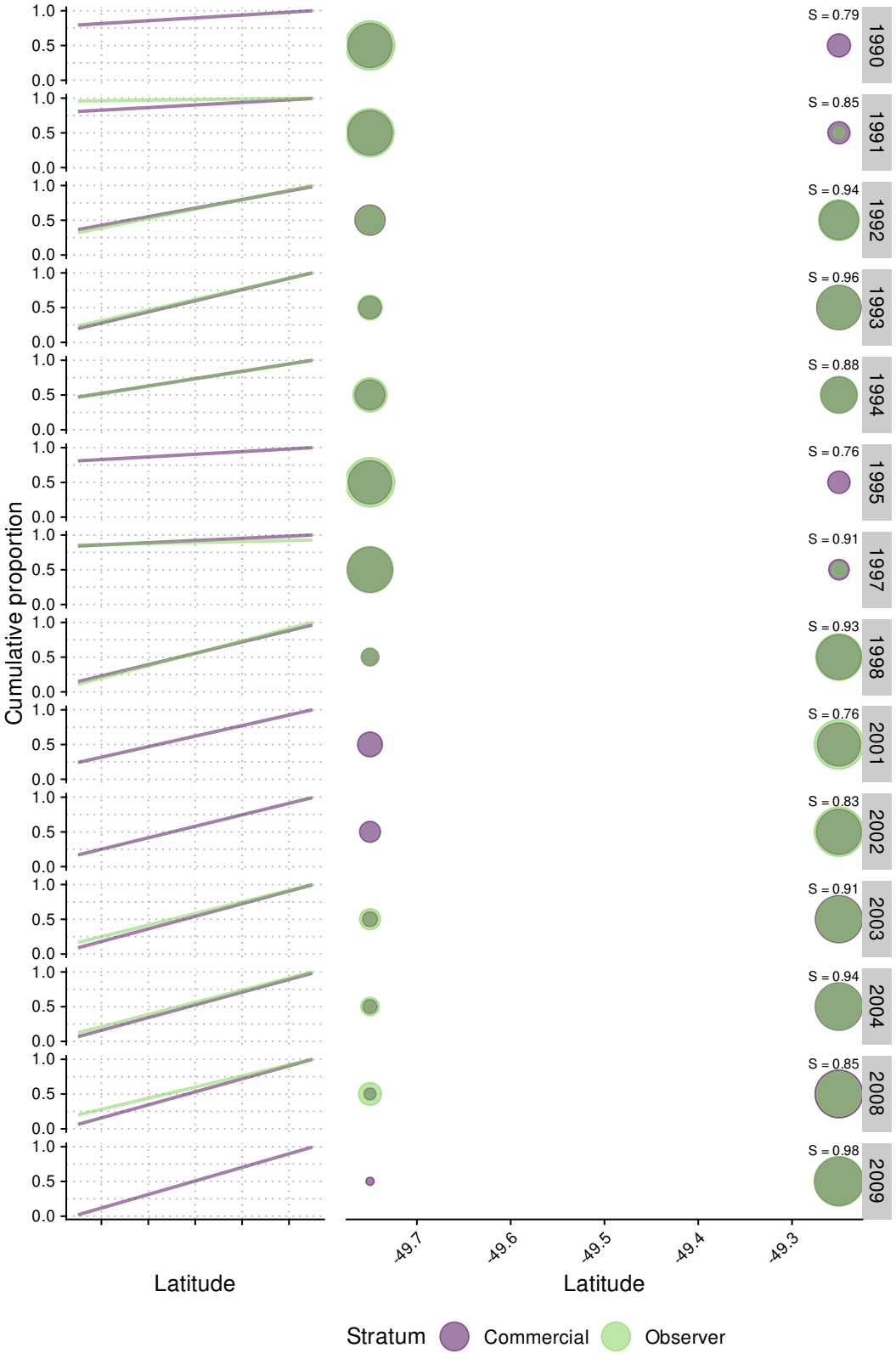


Figure 389: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6R, where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

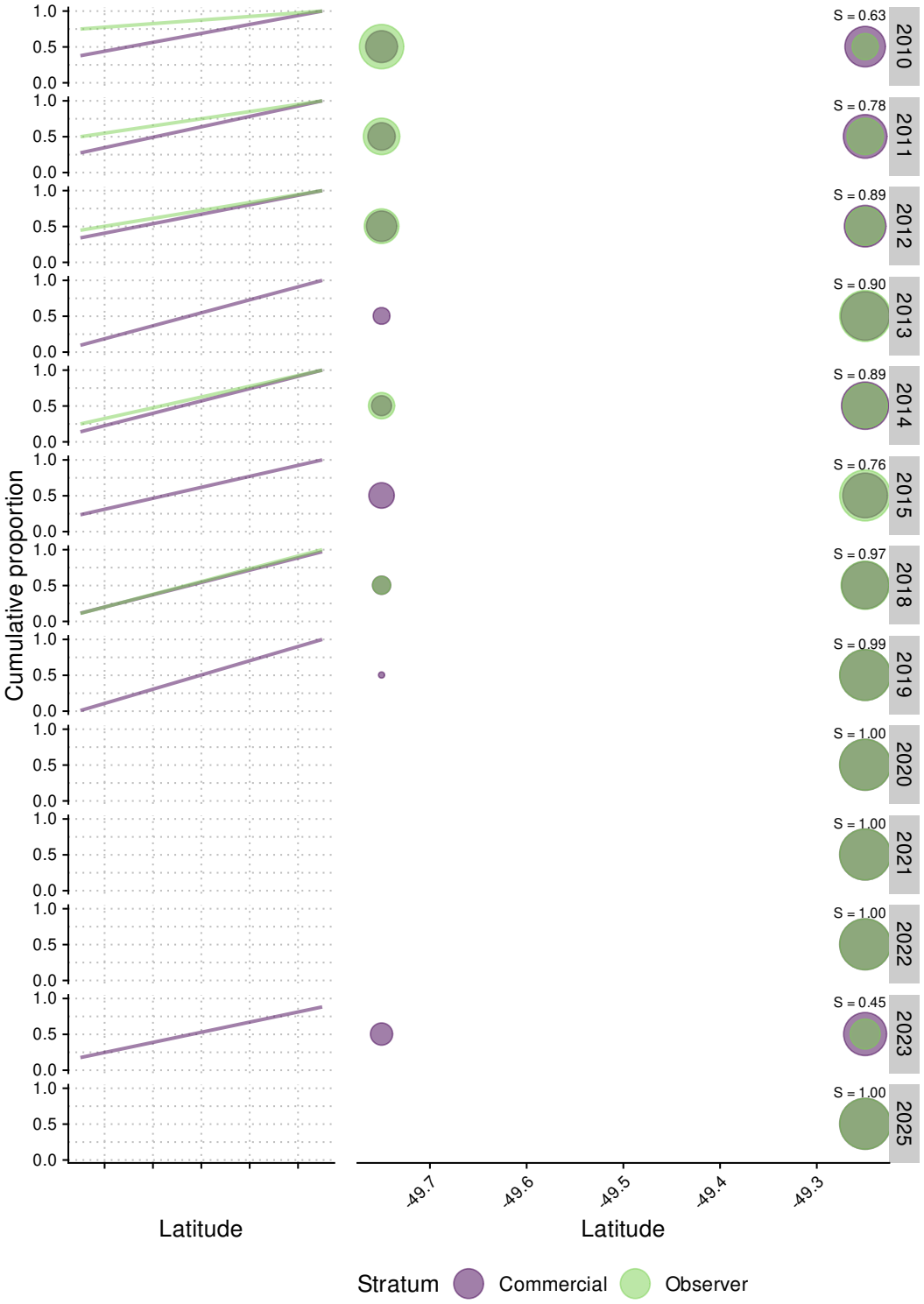


Figure 390: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6R, where the southern blue whiting catch exceeded the 150kg threshold, in 2010 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

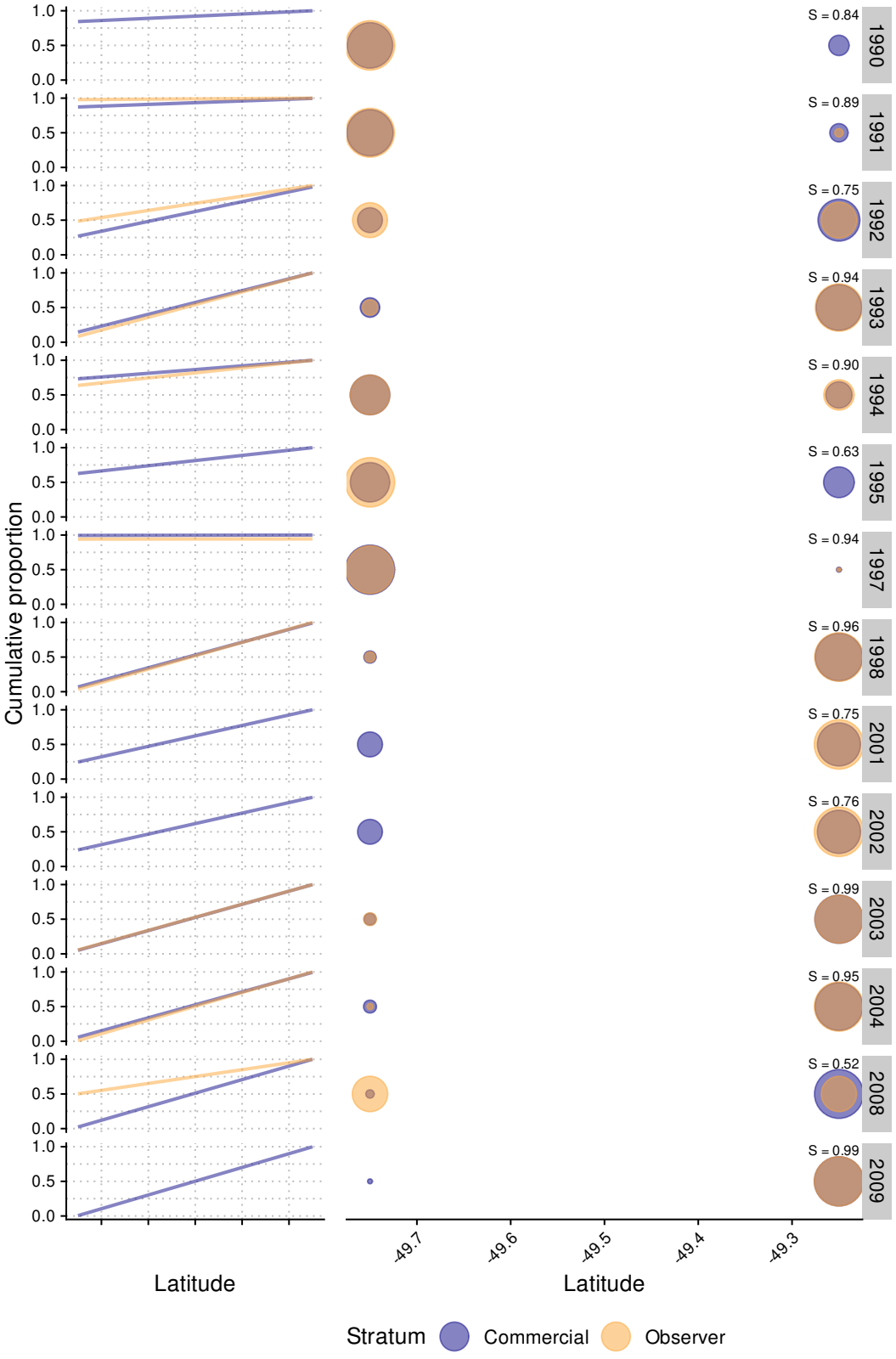


Figure 391: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6R, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

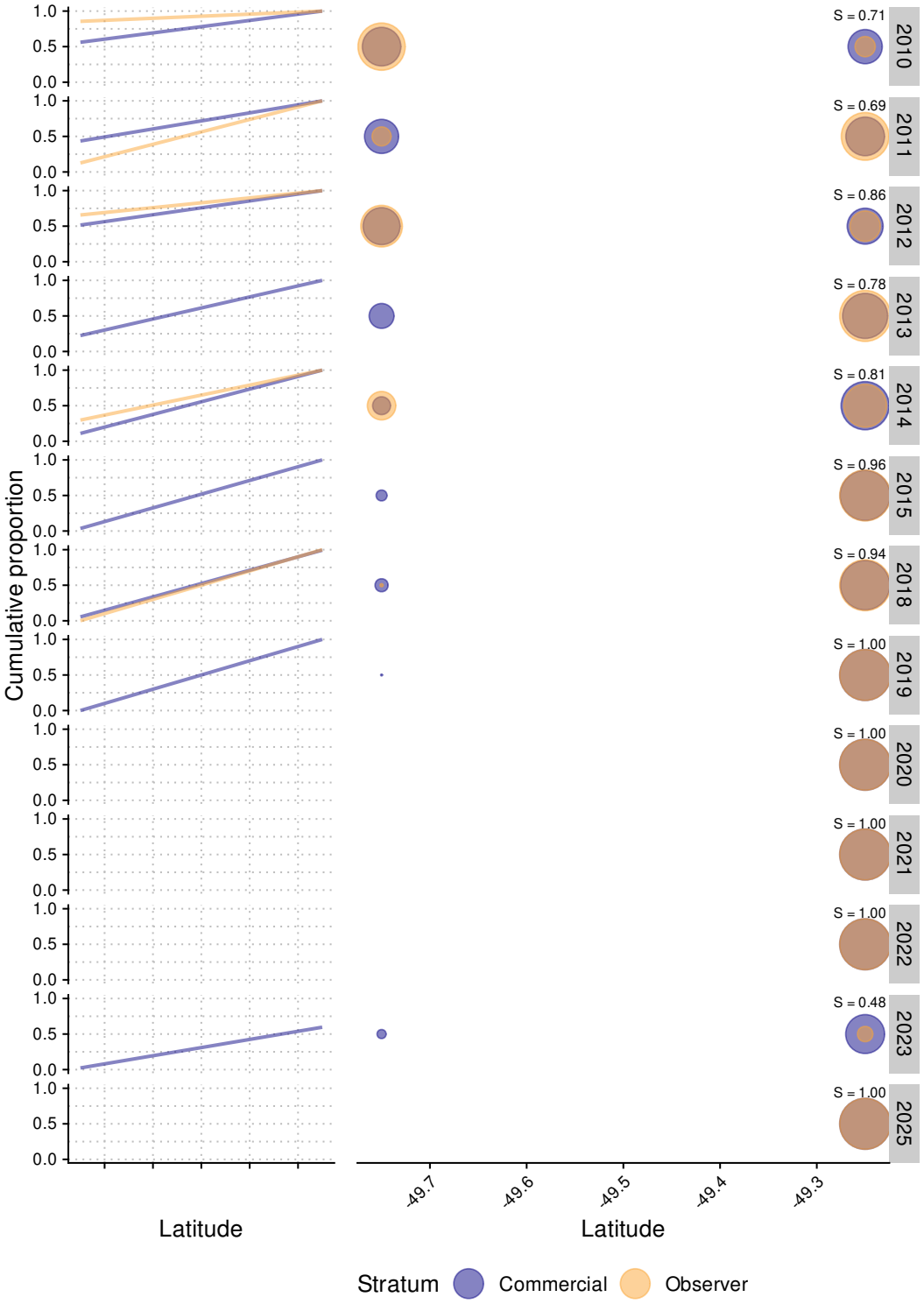


Figure 392: Latitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6R, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2010 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

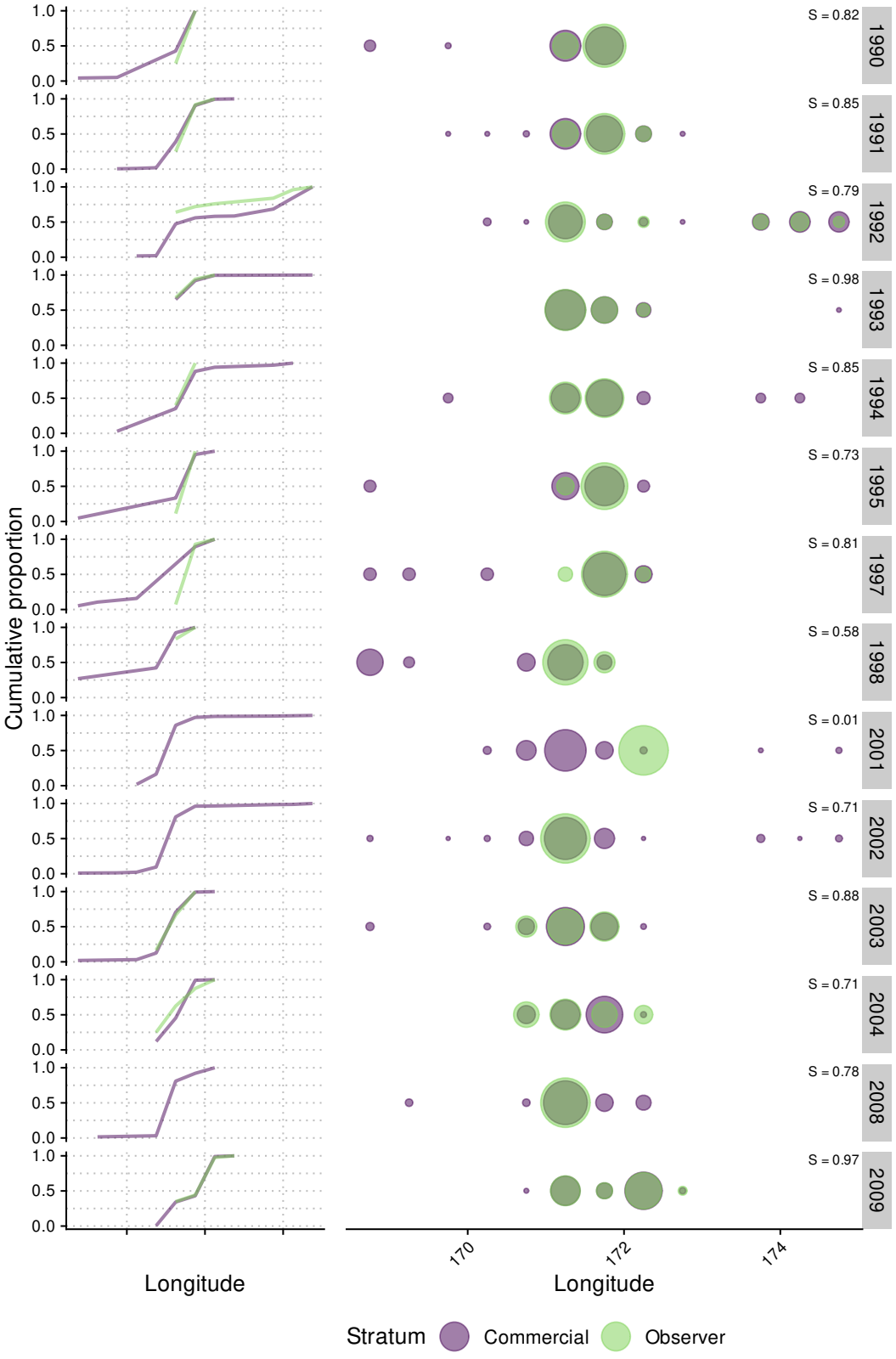


Figure 393: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6R, where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

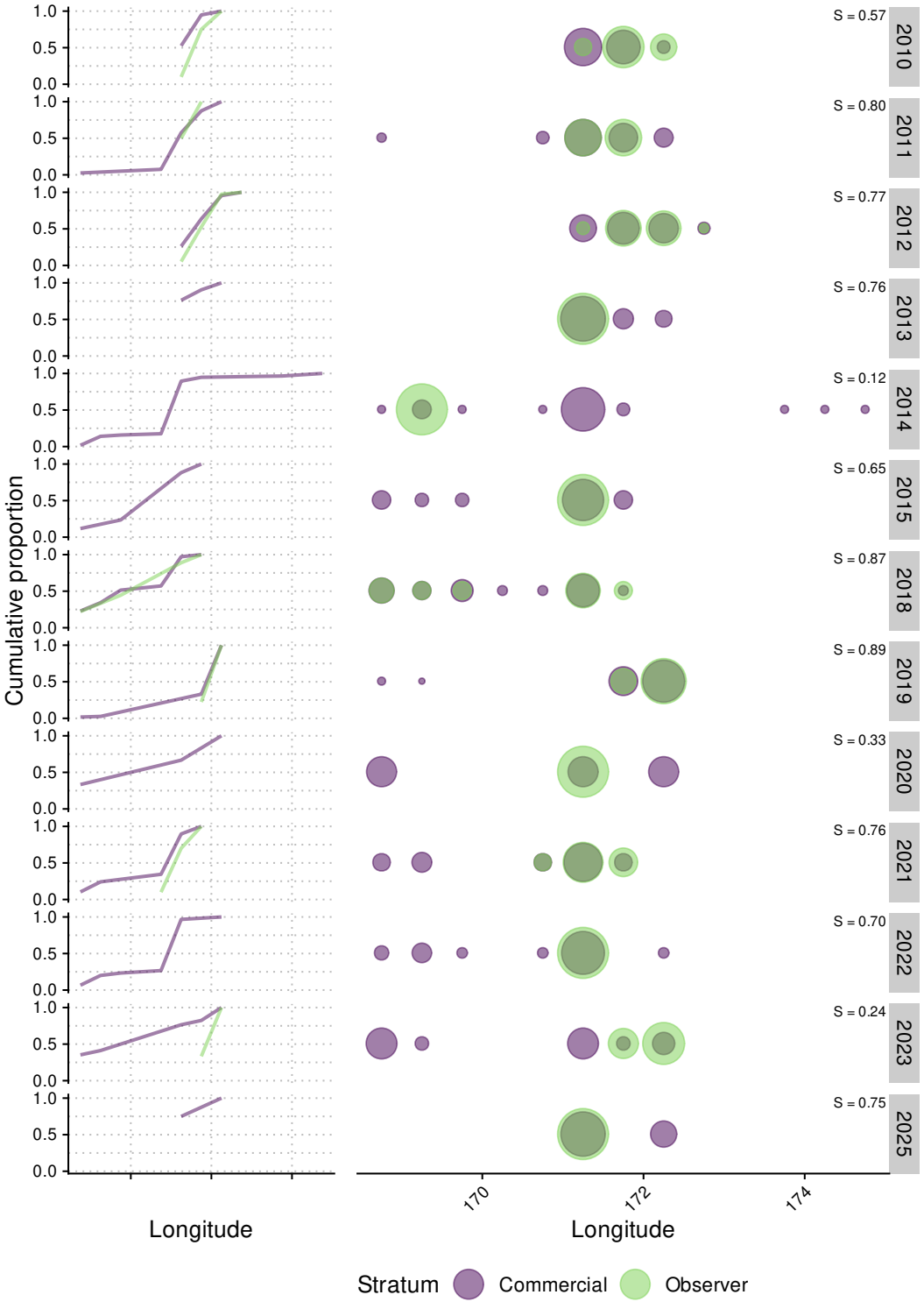


Figure 394: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SBW 6R, where the southern blue whiting catch exceeded the 150kg threshold, in 2010 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

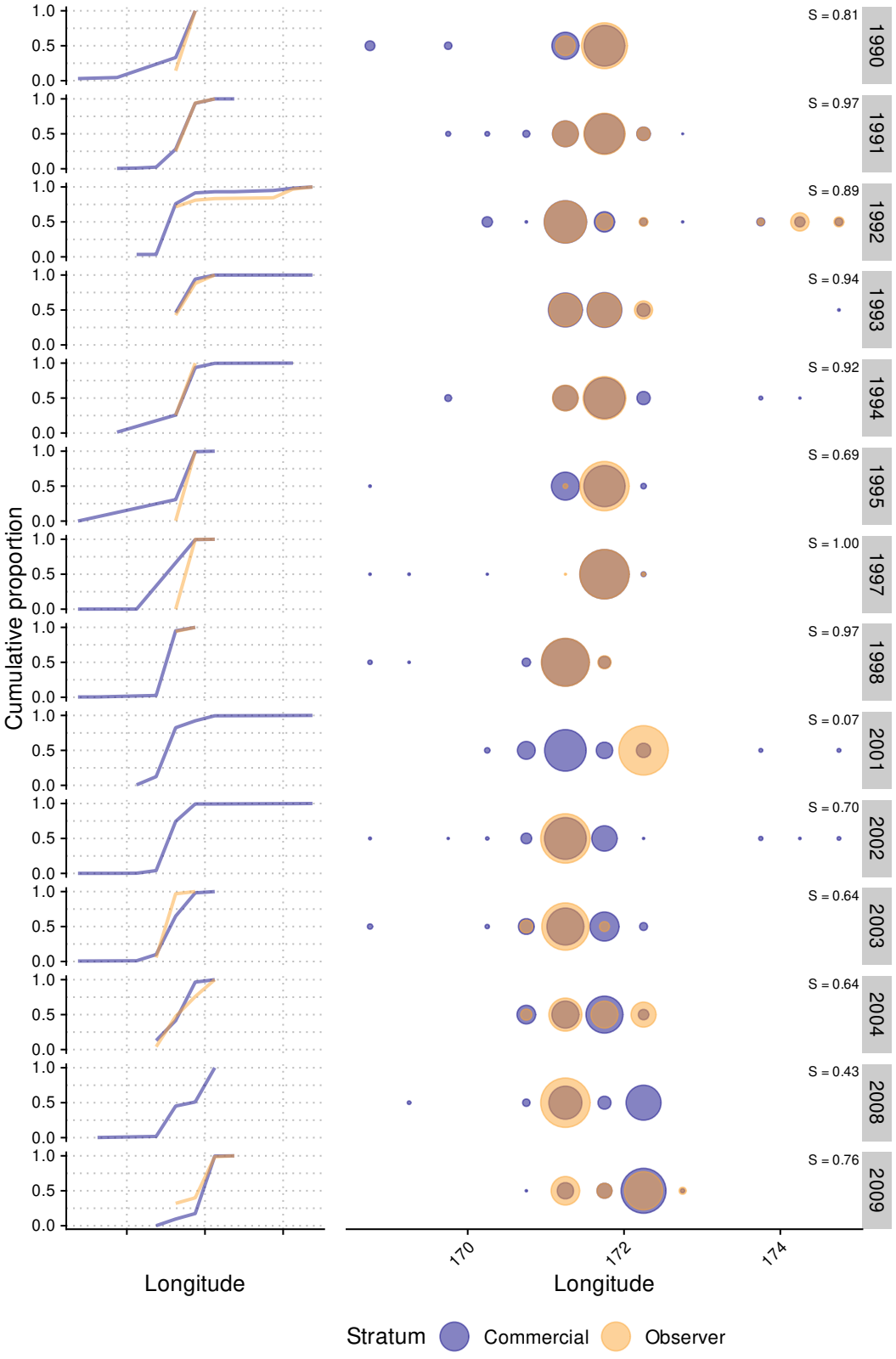


Figure 395: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6R, from events where the southern blue whiting catch exceeded the 150kg threshold, in 1990 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

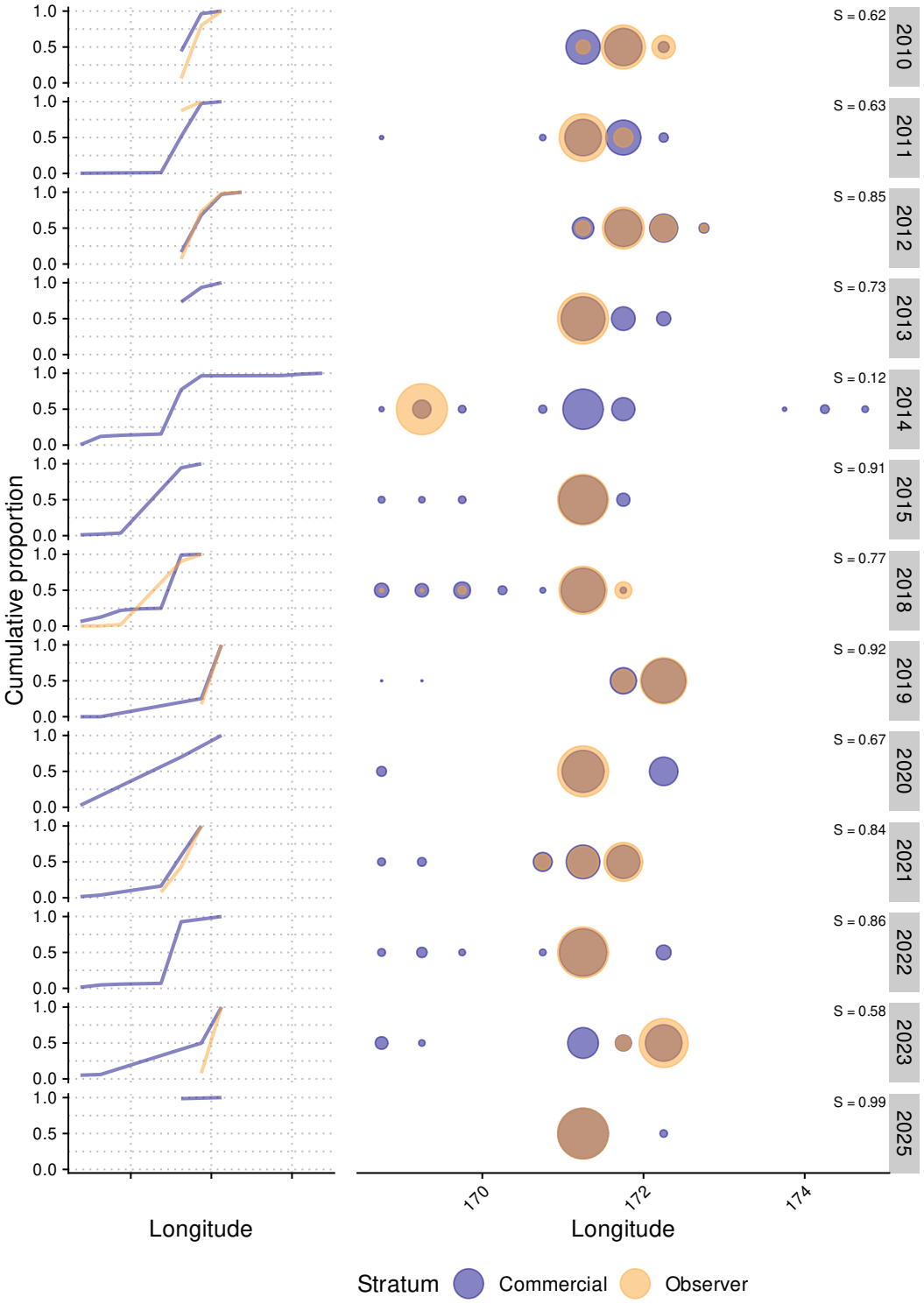


Figure 396: Longitudinal representativeness of observer sampling coverage of Trawl catch in SBW 6R, from events where the southern blue whiting catch exceeded the 150kg threshold, in 2010 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

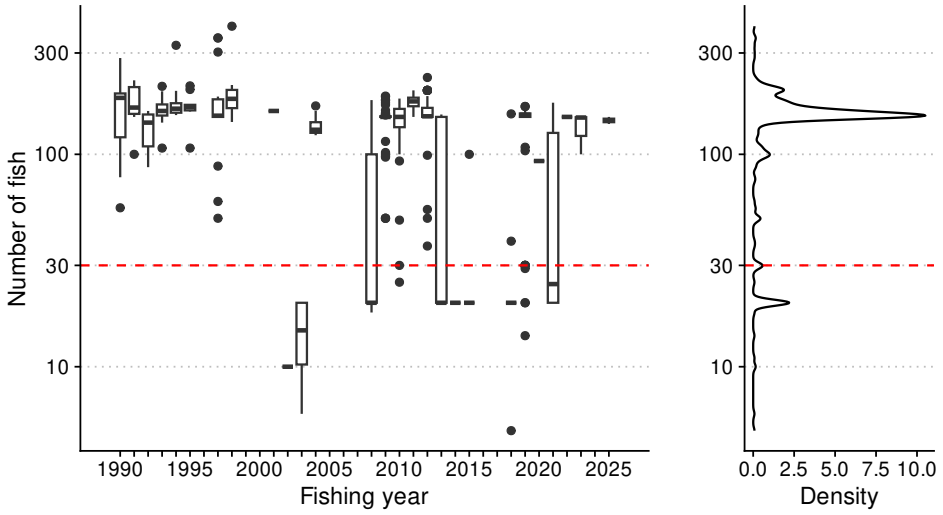


Figure 397: Length-frequency sample sizes for observed fishing events in SBW 6R where southern blue whiting were sampled. The red dashed line indicates a sample size of 30 fish.

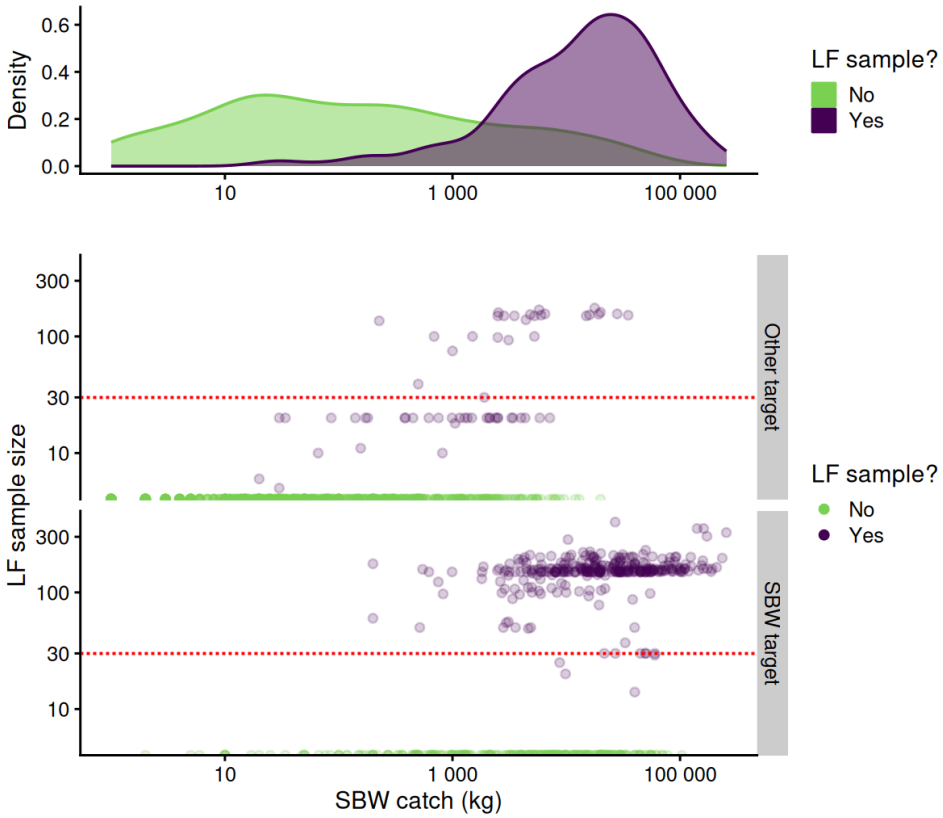


Figure 398: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SBW 6R in relation to the total southern blue whiting catch from an event, separately for southern blue whiting target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.5.4.2 Otolith samples

Table 40: Otolith samples of southern blue whiting from the SBW 6R Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of southern blue whiting exceeded a potential sampling threshold of 150 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	118	0	0	0.00
1991	203	0	0	0.00
1992	236	0	0	0.00
1993	227	0	0	0.00
1994	34	0	0	0.00
1995	21	0	0	0.00
1996	21	0	0	0.00
1997	19	0	0	0.00
1998	27	0	0	0.00
1999	20	0	0	0.00
2000	69	0	0	0.00
2001	215	0	0	0.00
2002	315	0	0	0.00
2003	256	0	0	0.00
2004	117	0	0	0.00
2005	114	0	0	0.00
2006	18	0	0	0.00
2007	51	0	0	0.00
2008	63	0	0	0.00
2009	202	28	382	13.86
2010	135	19	282	14.07
2011	40	2	32	5.00
2012	88	22	341	25.00
2013	21	5	64	23.81
2014	57	4	19	7.02
2015	17	1	6	5.88
2016	1	0	0	0.00
2017	16	0	0	0.00
2018	35	9	56	25.71
2019	115	57	995	49.57
2020	3	1	10	33.33
2021	29	10	91	34.48
2022	30	1	15	3.33
2023	17	3	35	17.65
2024	11	0	0	0.00
2025	4	2	33	50.00

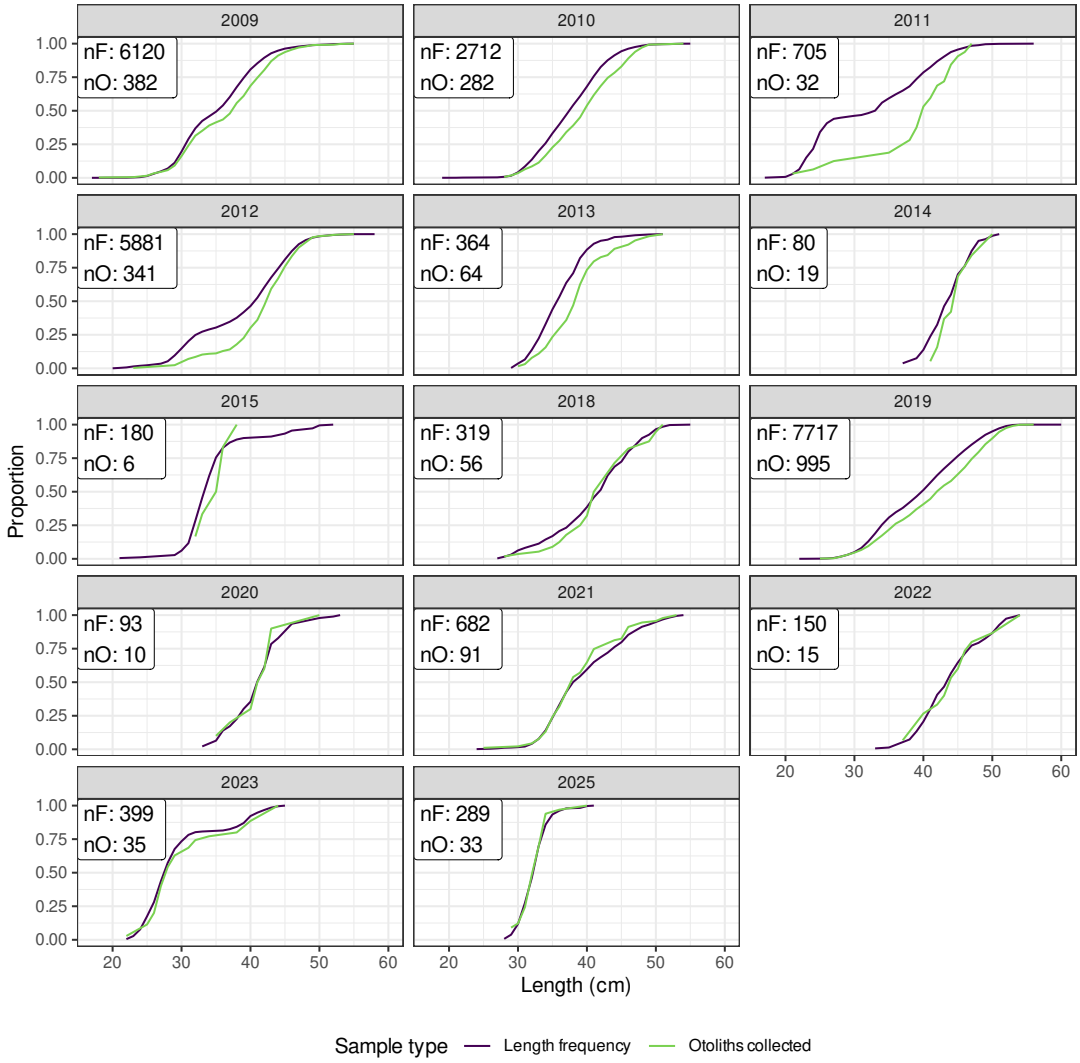


Figure 399: Cumulative distributions of the length of fish in the length frequency and otolith samples of southern blue whiting in the SBW 6R Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.5.4.3 Catch quantification

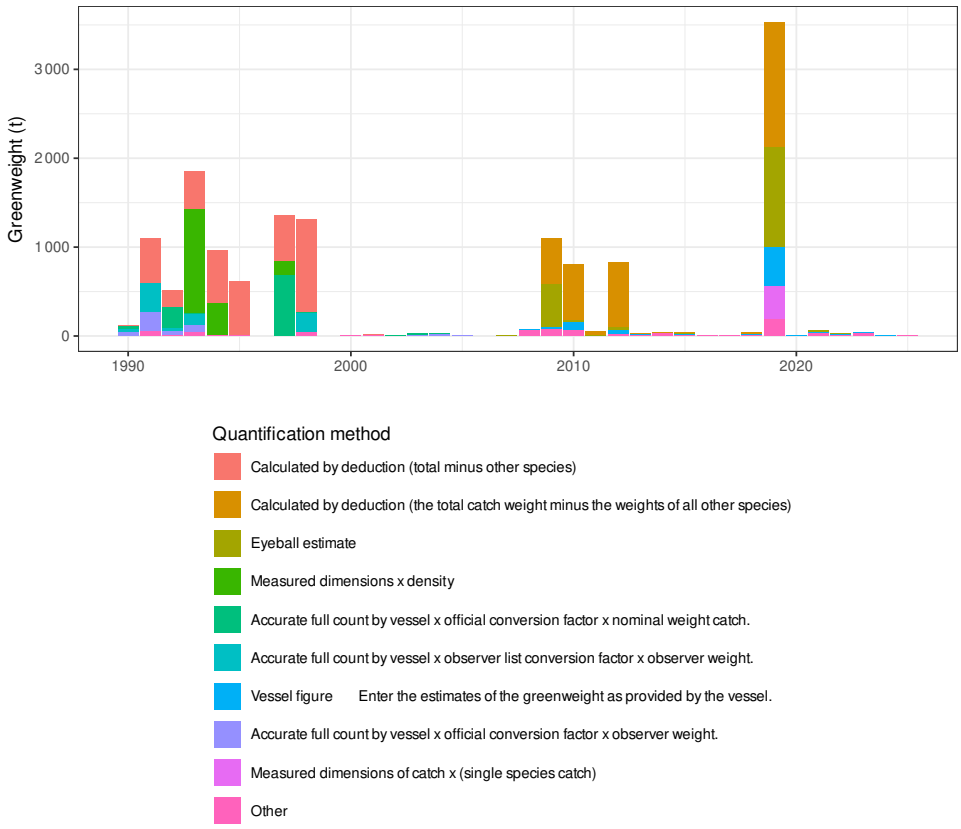


Figure 400: Methods used by observers to quantify the catch of southern blue whiting in the SBW 6R Trawl fishery. The legend lists the methods used in descending order of total catch.

2.6 SCI stocks

Observer sampling of scampi is considered with respect to the scampi Quota Management Areas.

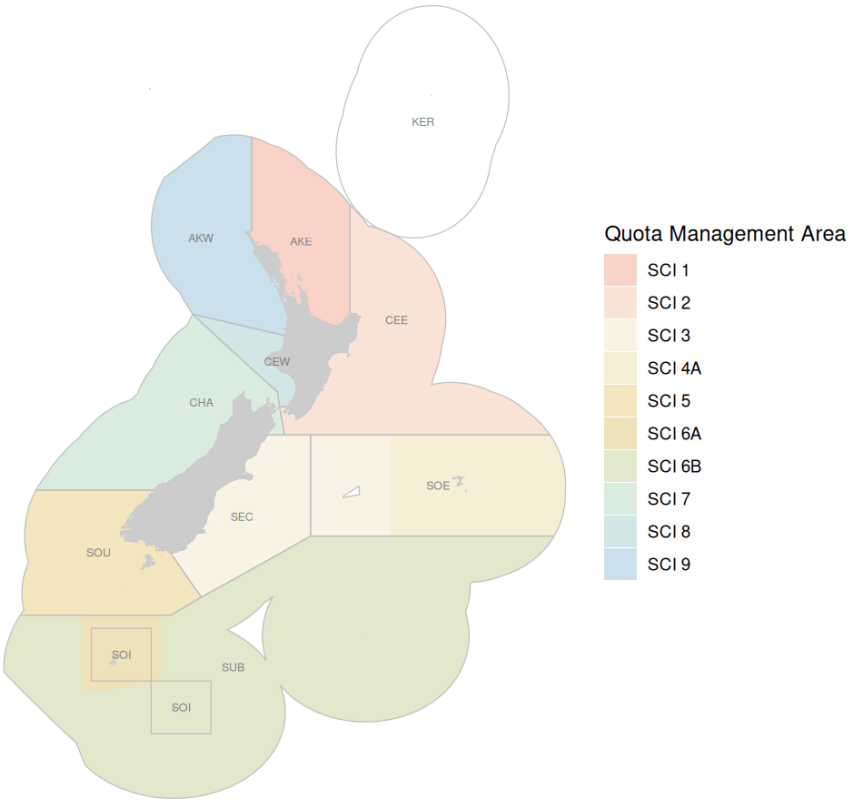


Figure 401: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for scampi (coloured areas, per legend).

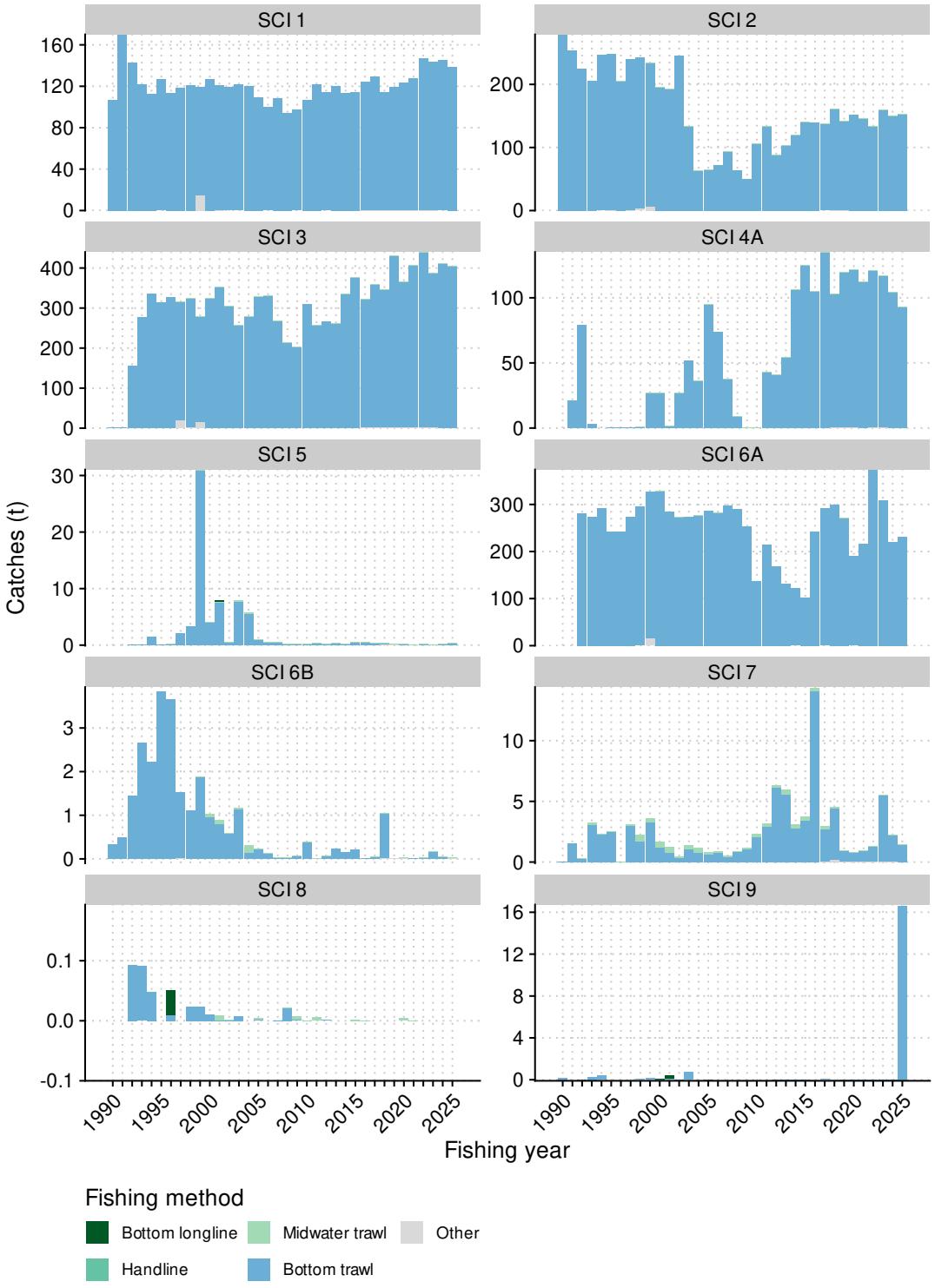


Figure 402: Catches of scampi by fishing method, for events within the scampi Quota Management Areas. Methods grouped as Other include: CP, DL, DS, POT, PRB, PRM, PSH, SLL.

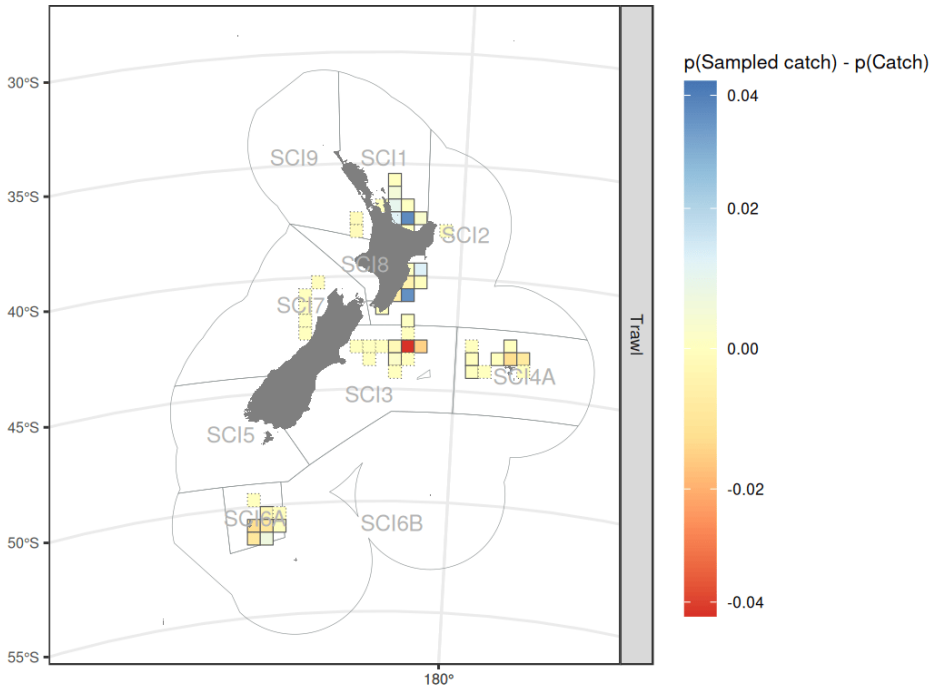


Figure 403: Differences in the relative proportions of catch and sampled catch for scampi during 2021–2025. Cells with a dotted border had no sampling.

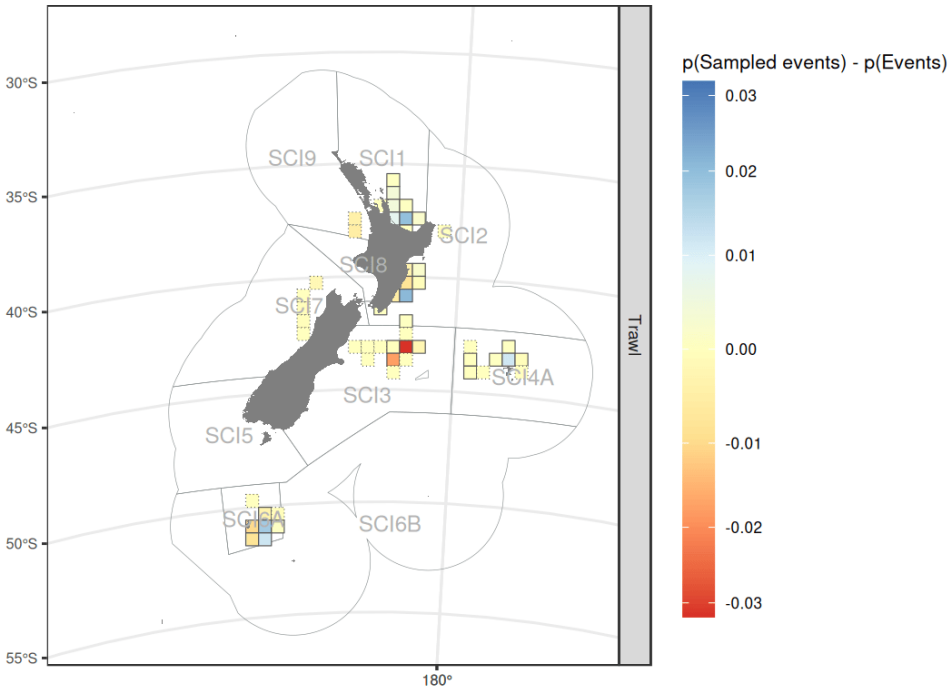


Figure 404: Differences in the relative proportions of events meeting the sampling threshold and sampled events for scampi during 2021–2025. Cells with a dotted border had no sampling.

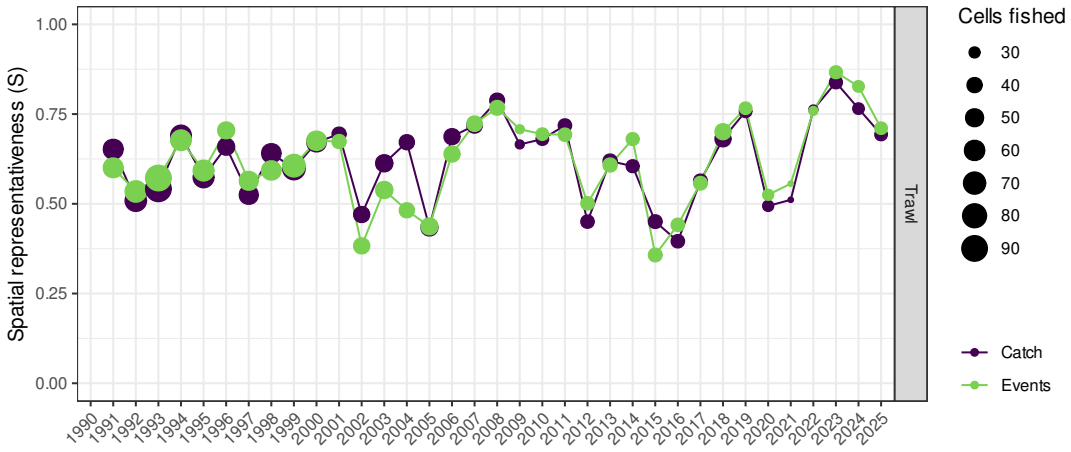


Figure 405: Spatial representativeness of observer sampling of scampi by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.

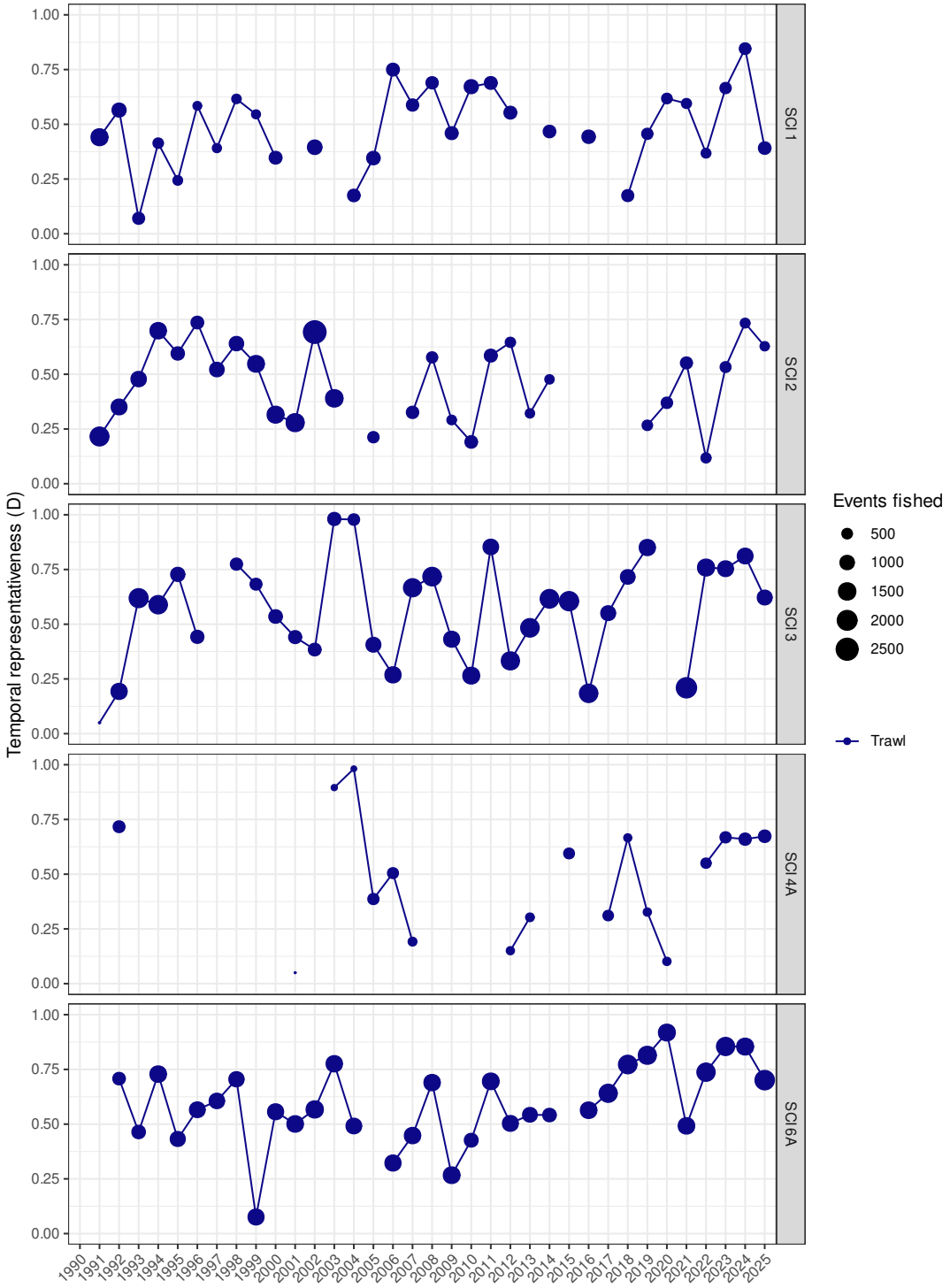


Figure 406: Temporal representativeness of observer sanpling of scampi by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.6.1 SCI 1: Trawl fishery

2.6.1.1 Length-frequency samples

Table 41: Length-frequency samples of scampi from the SCI 1 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of scampi exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	663	0	0	0.00
1991	1 430	101	10 245	7.06
1992	950	32	3 568	3.37
1993	661	3	263	0.45
1994	491	1	100	0.20
1995	411	17	2 519	4.14
1996	324	17	2 254	5.25
1997	358	15	1 905	4.19
1998	390	12	2 096	3.08
1999	342	14	2 586	4.09
2000	767	31	3 891	4.04
2001	849	0	0	0.00
2002	996	16	2 458	1.61
2003	783	0	0	0.00
2004	740	2	315	0.27
2005	866	16	2 113	1.85
2006	777	40	5 190	5.15
2007	698	39	5 004	5.59
2008	703	56	4 997	7.97
2009	788	27	2 473	3.43
2010	954	57	5 636	5.97
2011	776	74	12 046	9.54
2012	777	35	3 605	4.50
2013	933	0	0	0.00
2014	739	39	2 840	5.28
2015	799	0	0	0.00
2016	858	72	4 682	8.39
2017	782	0	0	0.00
2018	669	55	8 905	8.22
2019	574	55	2 927	9.58
2020	501	53	3 112	10.58
2021	445	104	8 459	23.37
2022	419	17	1 680	4.06
2023	579	83	5 774	14.34
2024	626	183	11 875	29.23
2025	737	26	1 298	3.53

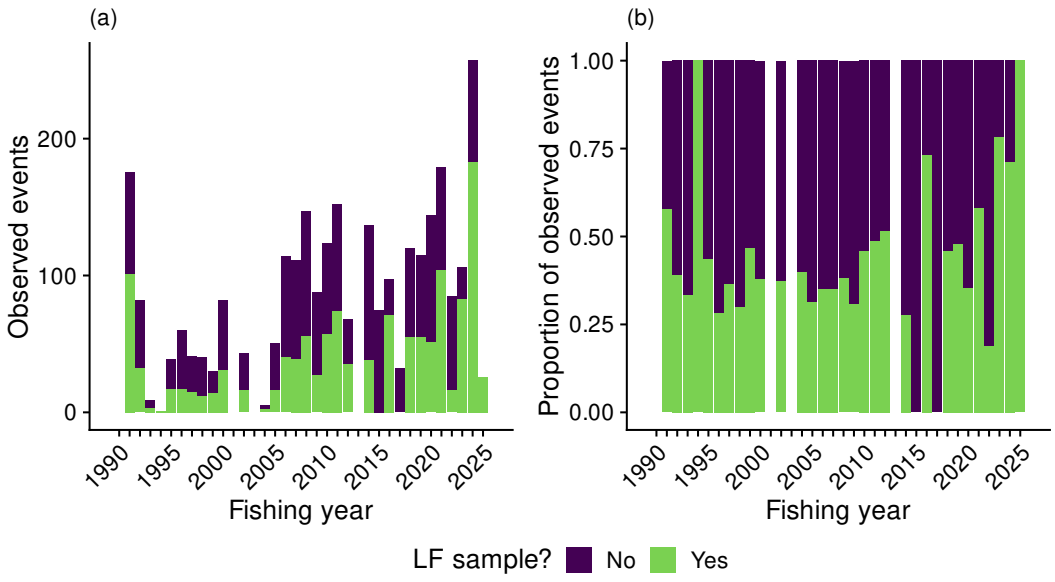


Figure 407: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SCI 1 where the scampi catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

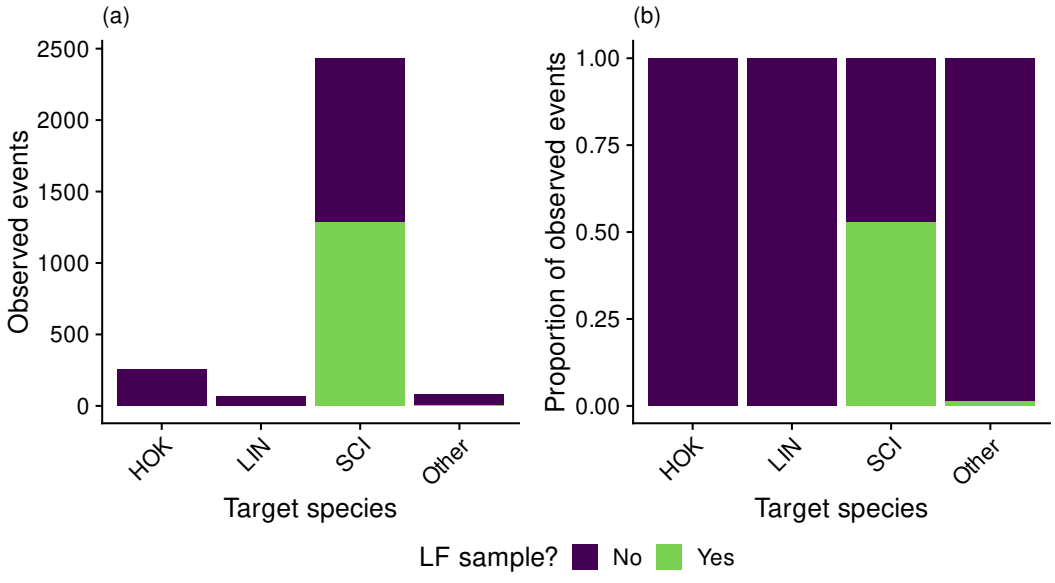


Figure 408: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SCI 1 where the scampi catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

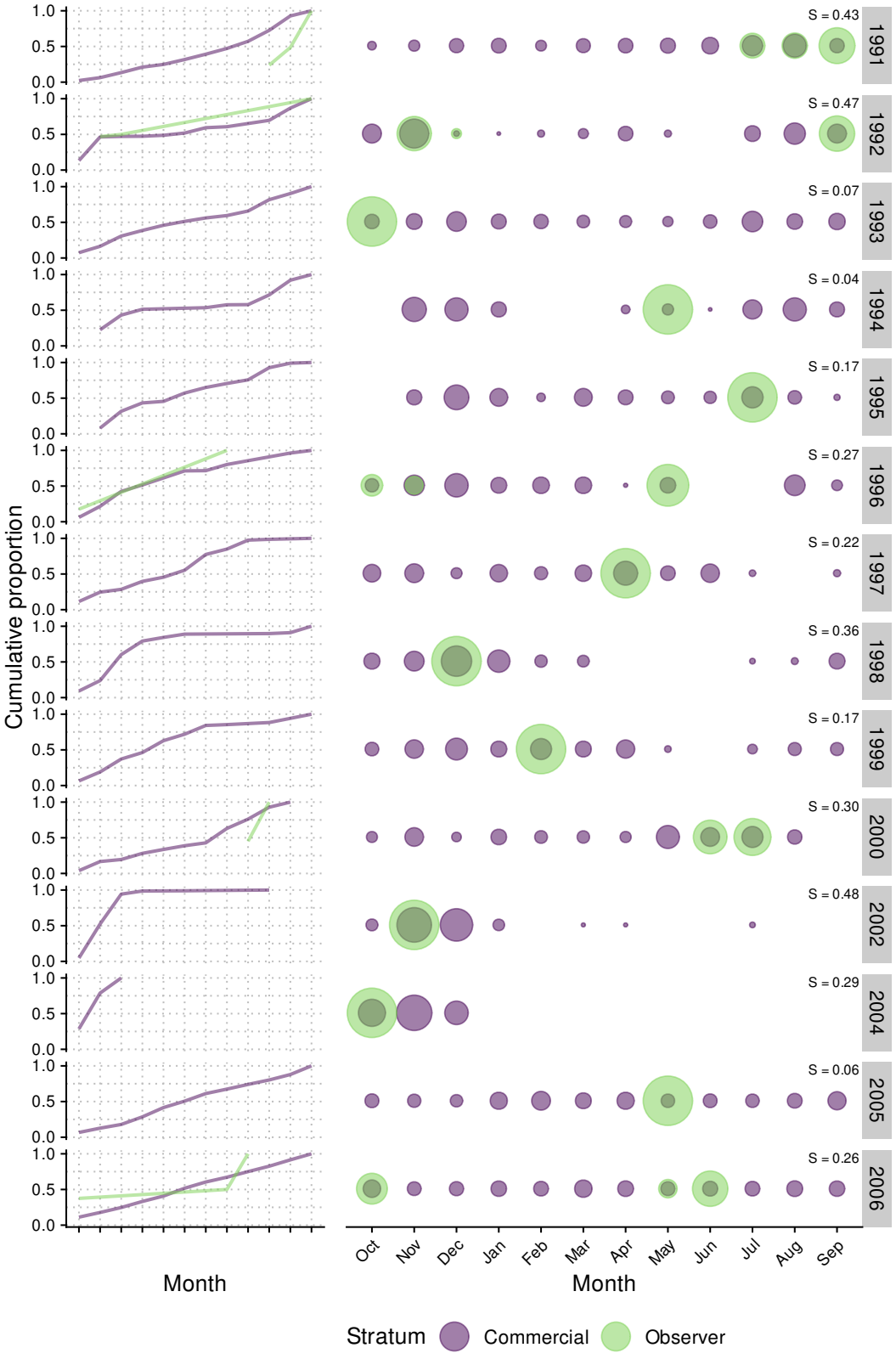


Figure 409: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 1, where the scampi catch exceeded the 20kg threshold, in 1991 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

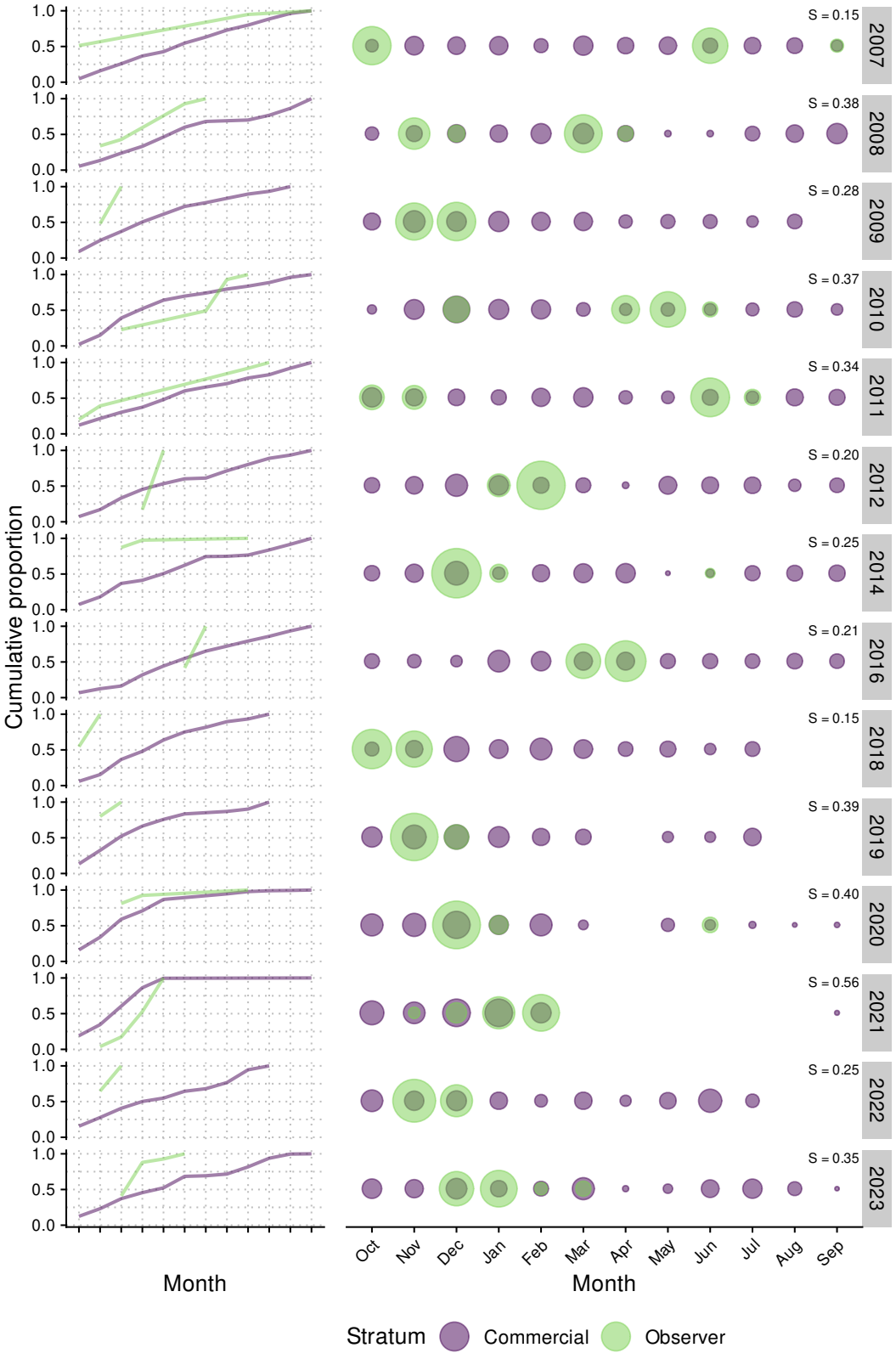


Figure 410: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 1, where the scampi catch exceeded the 20kg threshold, in 2007 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

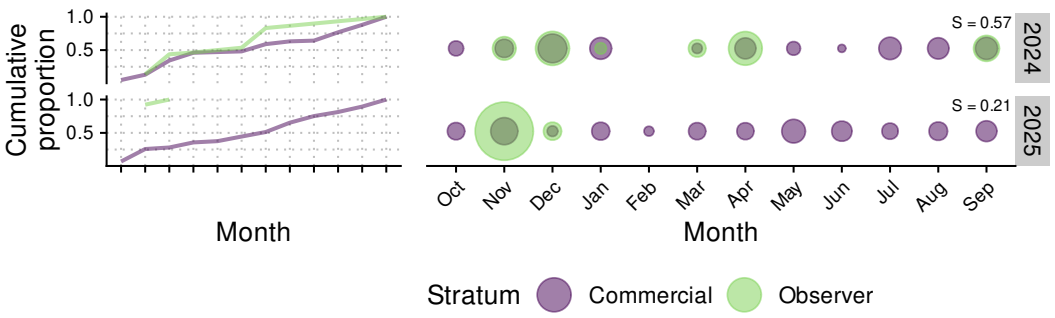


Figure 411: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 1, where the scampi catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

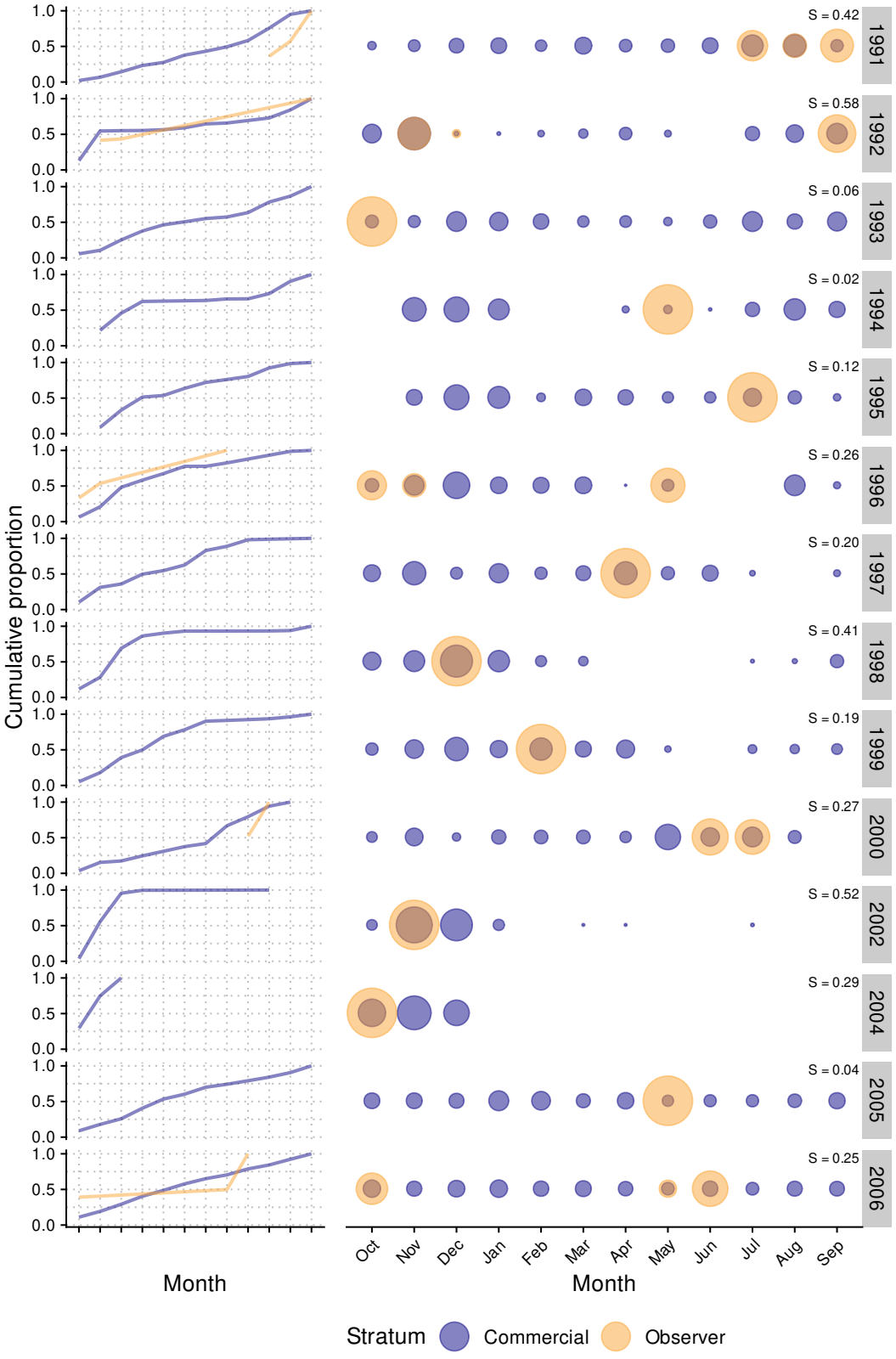


Figure 412: **Monthly representativeness of observer sampling coverage of Trawl catch in SCI 1, from events where the scampi catch exceeded the 20kg threshold, in 1991 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

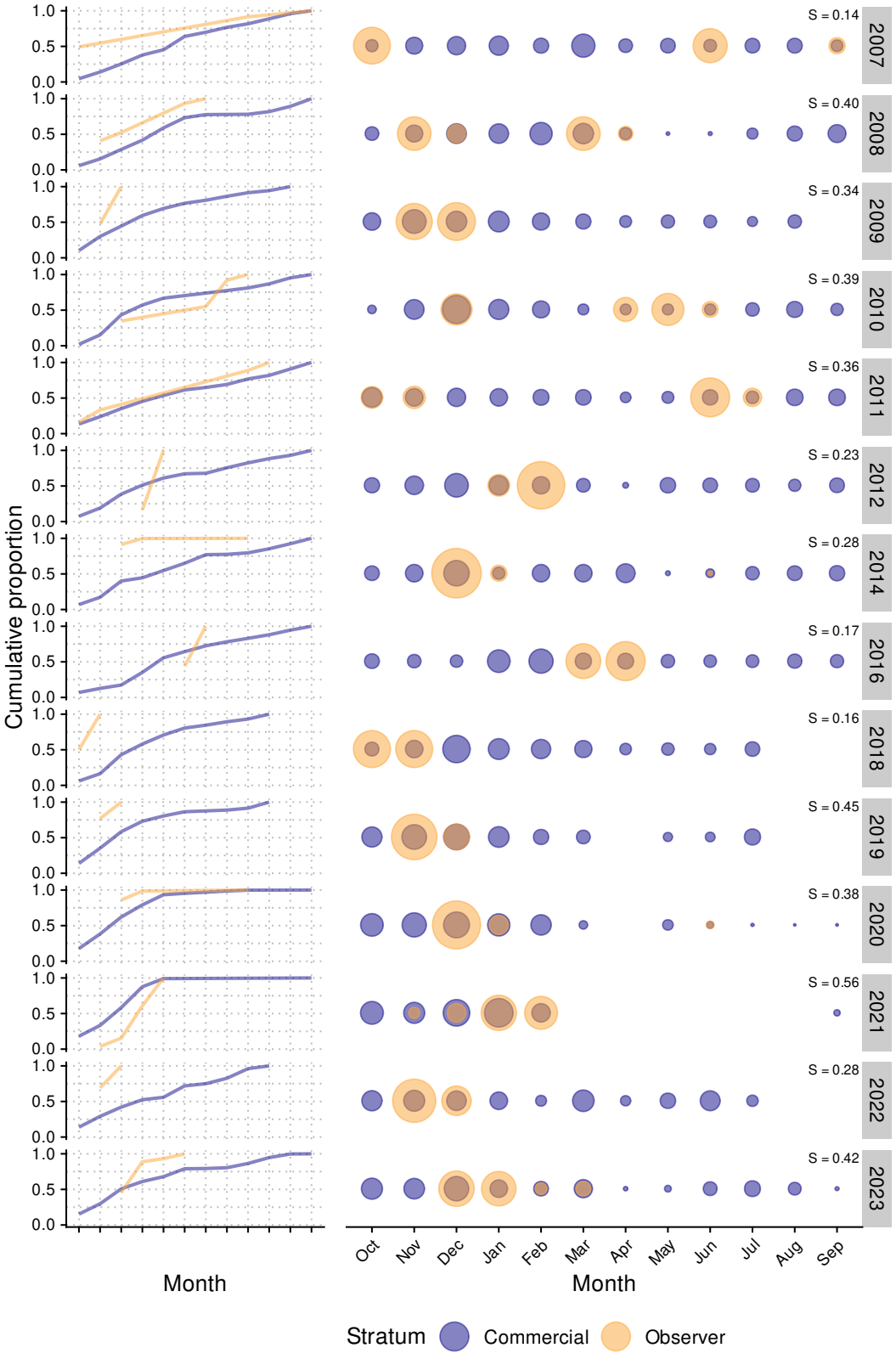


Figure 413: **Monthly representativeness of observer sampling coverage of Trawl catch in SCI 1, from events where the scampi catch exceeded the 20kg threshold, in 2007 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

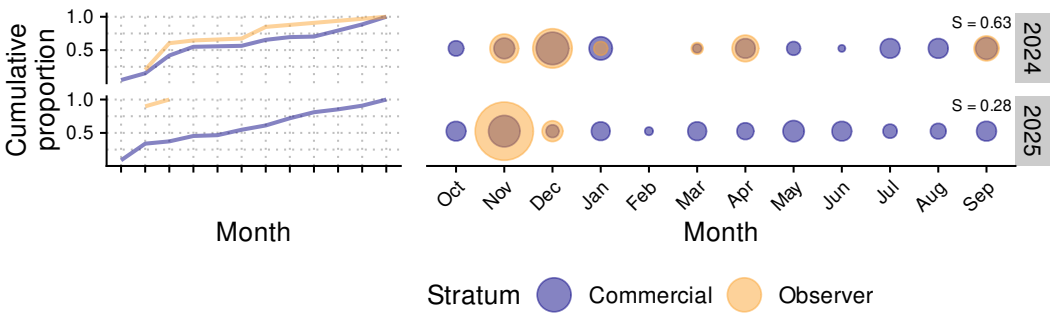


Figure 414: Monthly representativeness of observer sampling coverage of Trawl catch in SCI 1, from events where the scampi catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

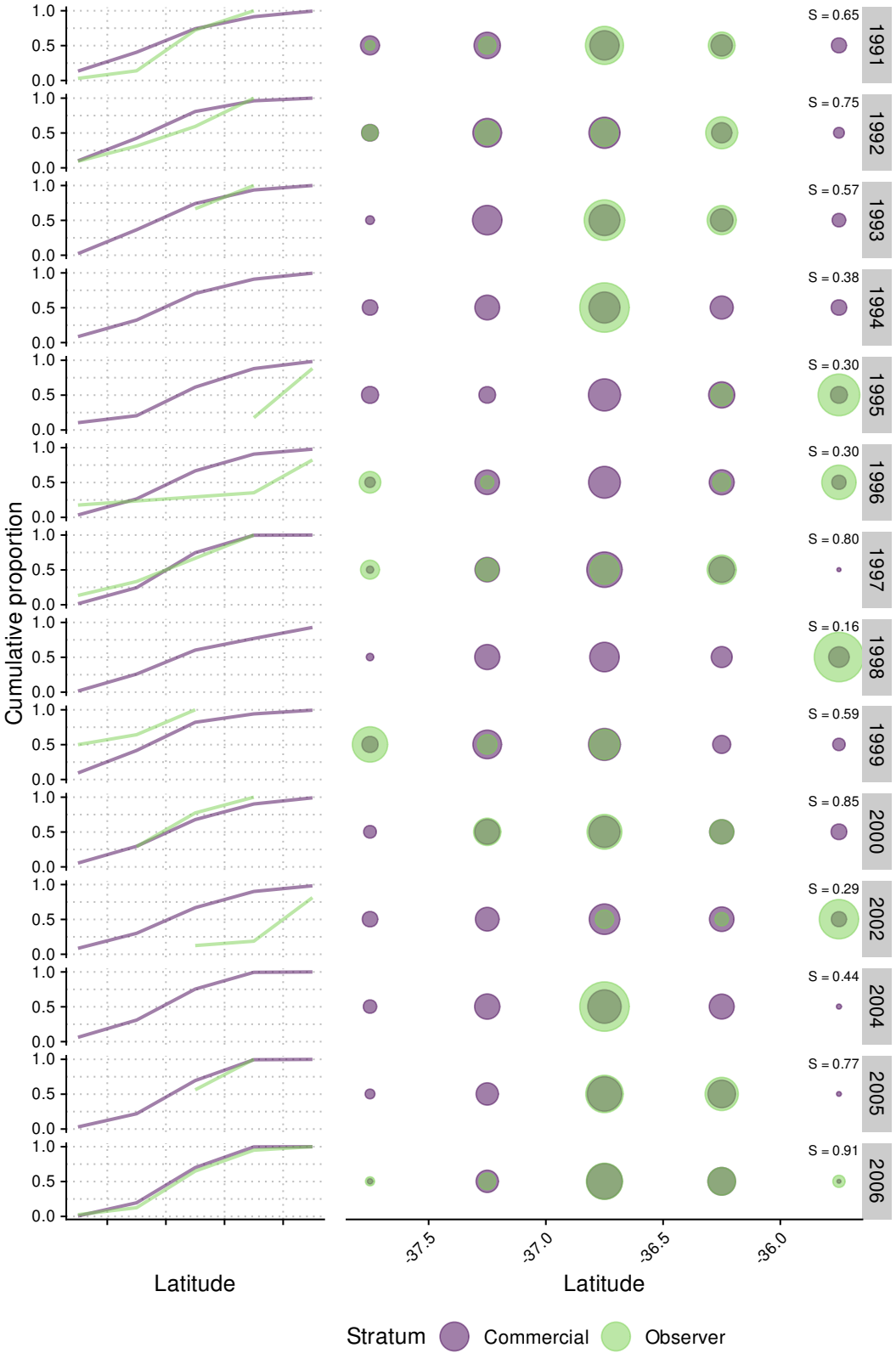


Figure 415: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 1, where the scampi catch exceeded the 20kg threshold, in 1991 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

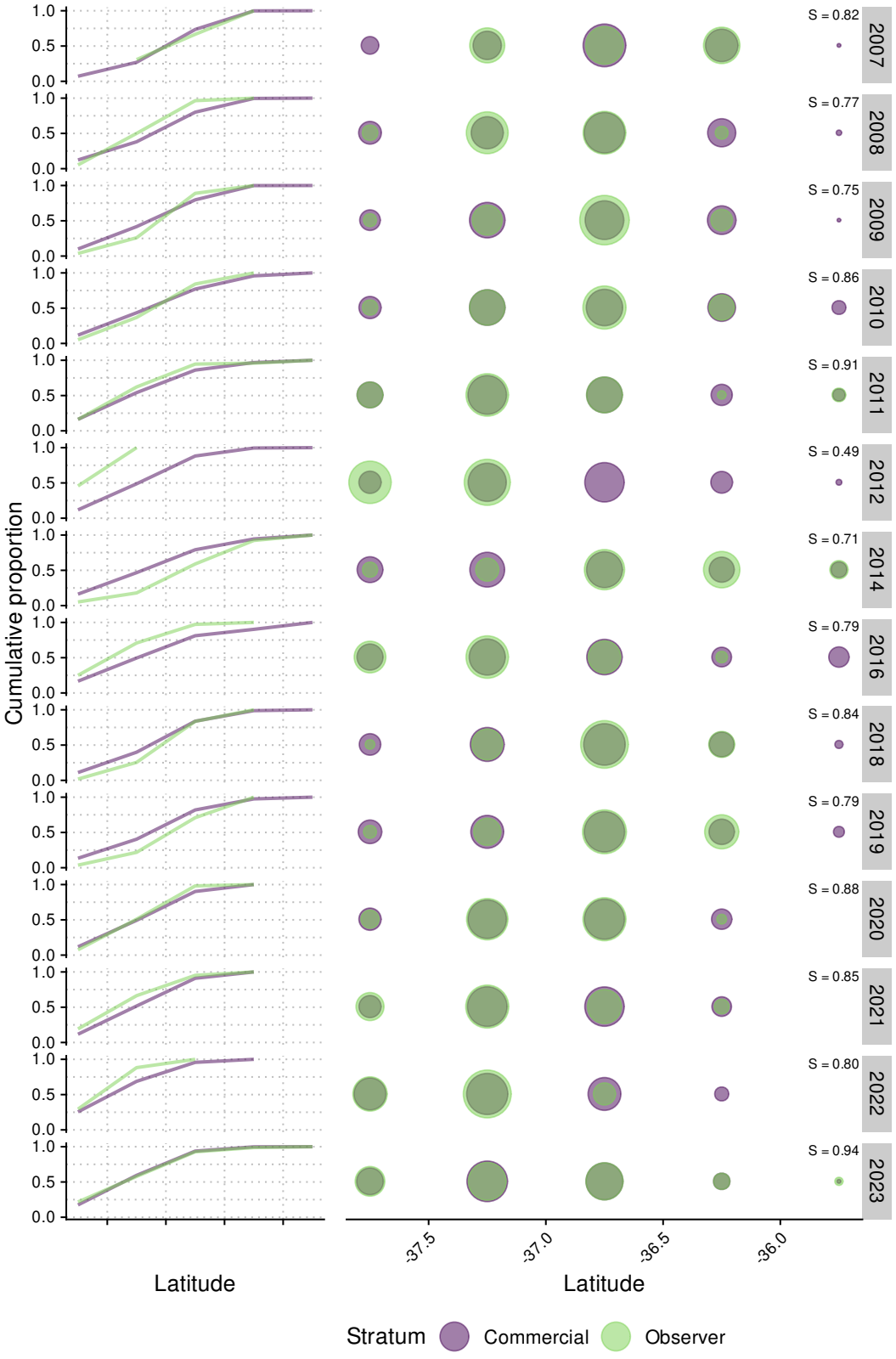


Figure 416: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 1, where the scampi catch exceeded the 20kg threshold, in 2007 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

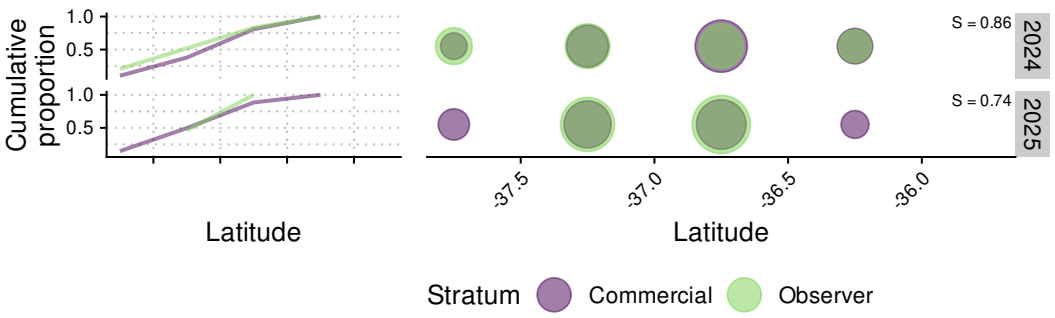


Figure 417: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 1, where the scampi catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

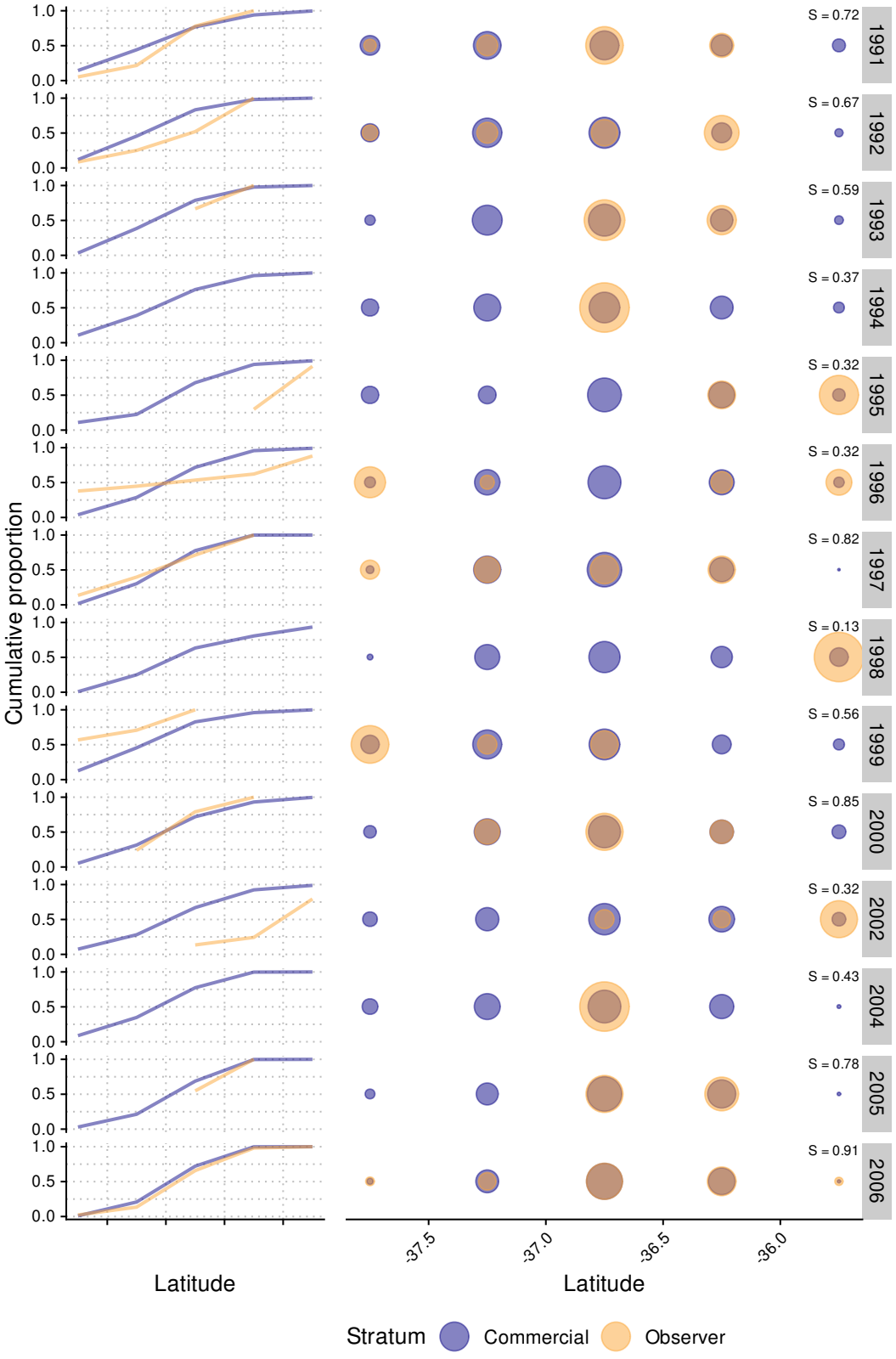


Figure 418: Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 1, from events where the scampi catch exceeded the 20kg threshold, in 1991 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

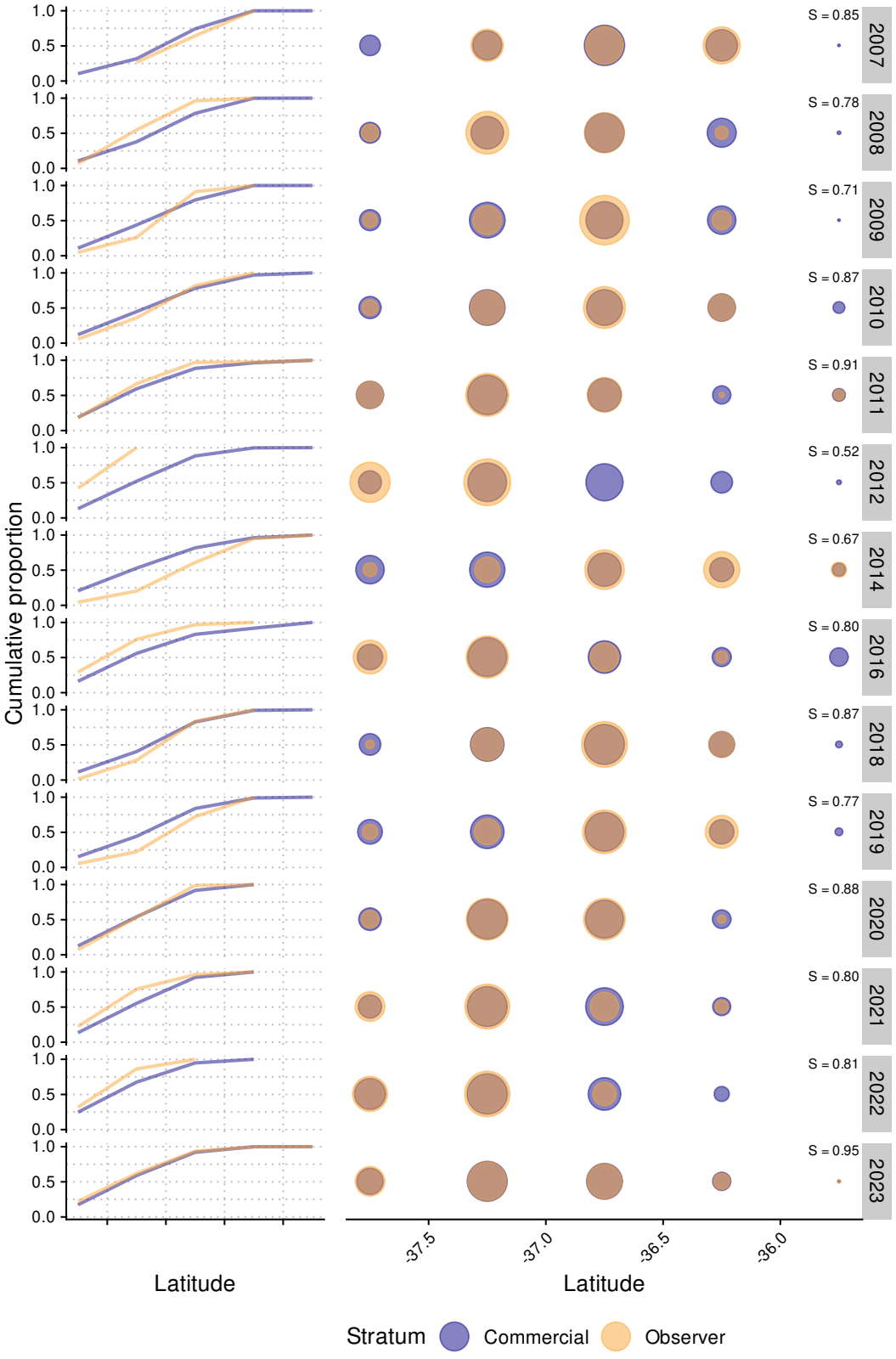


Figure 419: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 1, from events where the scampi catch exceeded the 20kg threshold, in 2007 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

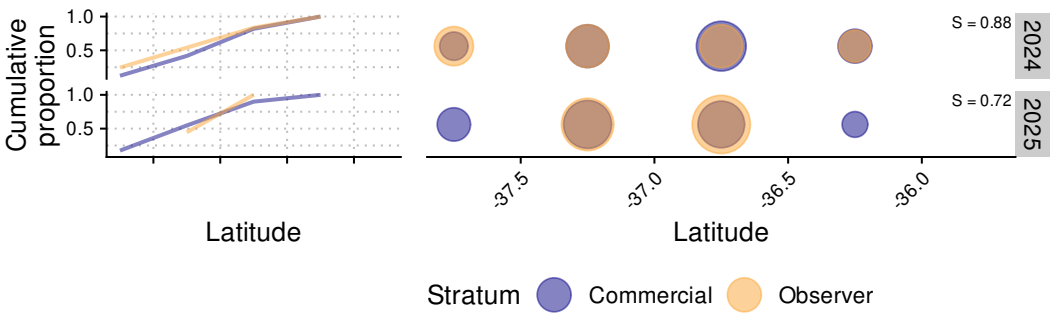


Figure 420: Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 1, from events where the scampi catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

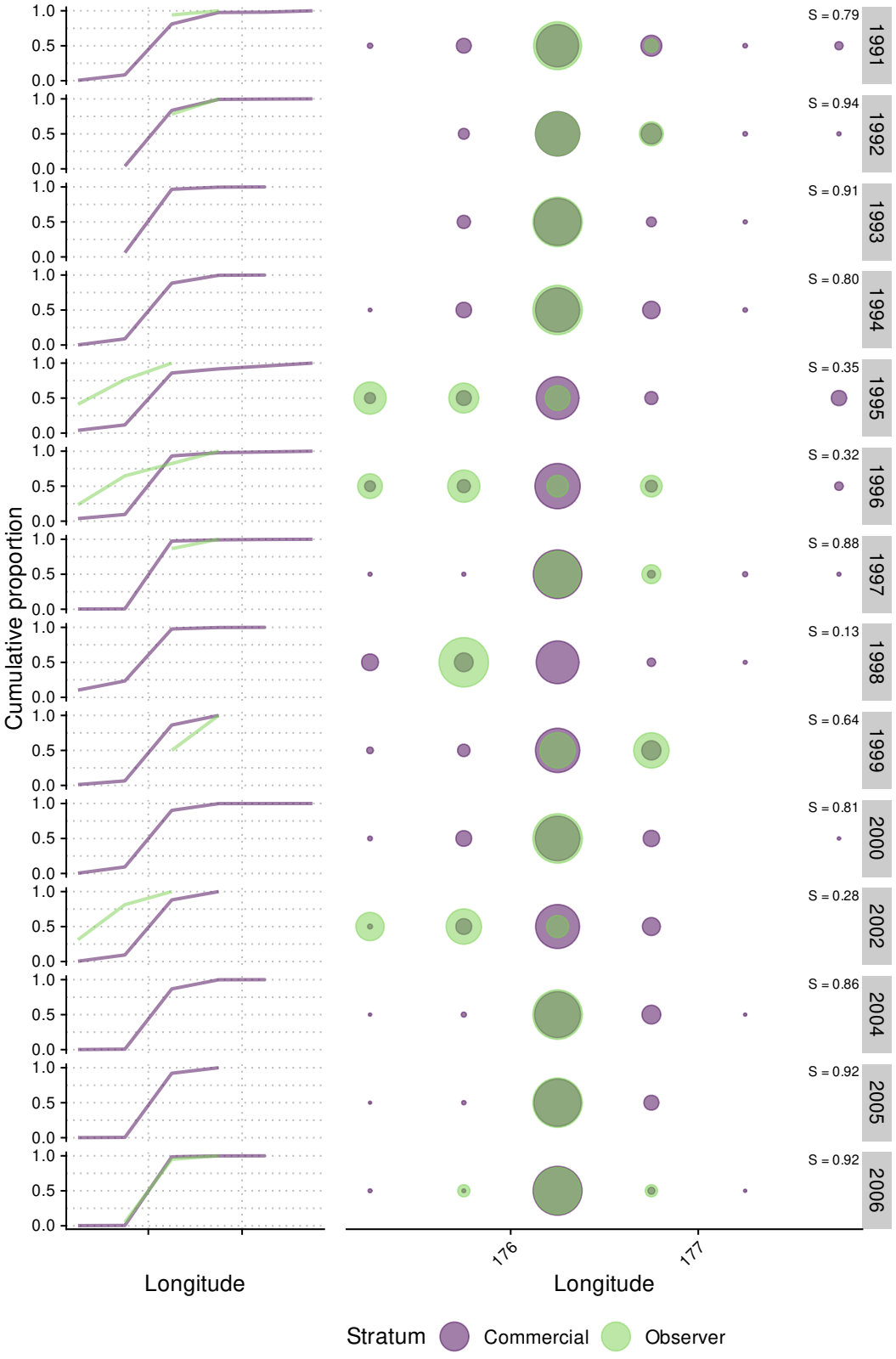


Figure 421: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 1, where the scampi catch exceeded the 20kg threshold, in 1991 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

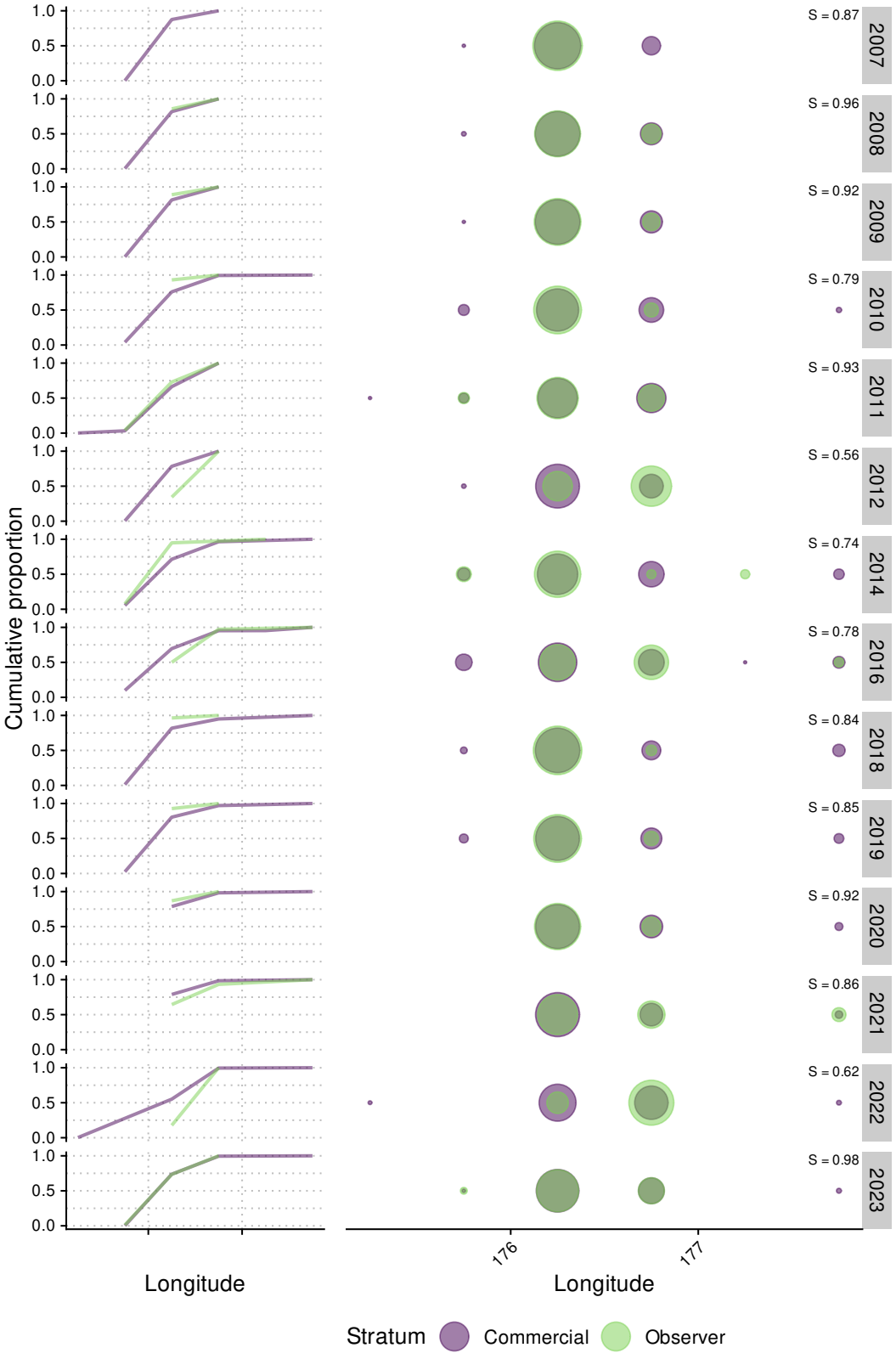


Figure 422: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 1, where the scampi catch exceeded the 20kg threshold, in 2007 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

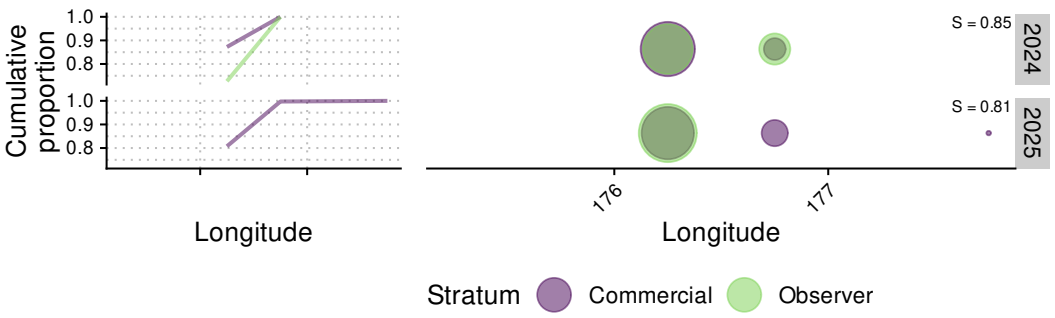


Figure 423: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 1, where the scampi catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

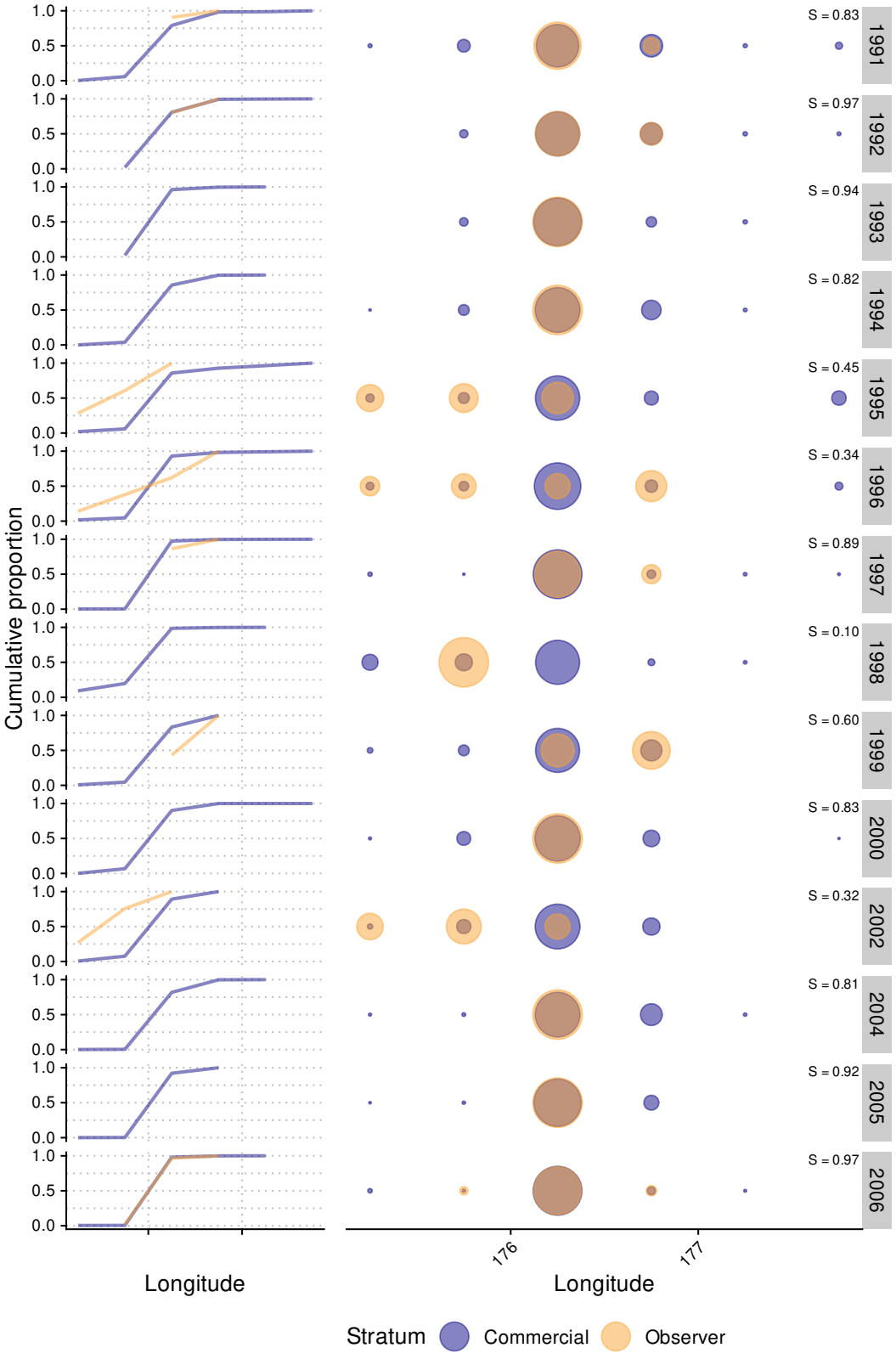


Figure 424: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 1, from events where the scampi catch exceeded the 20kg threshold, in 1991 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

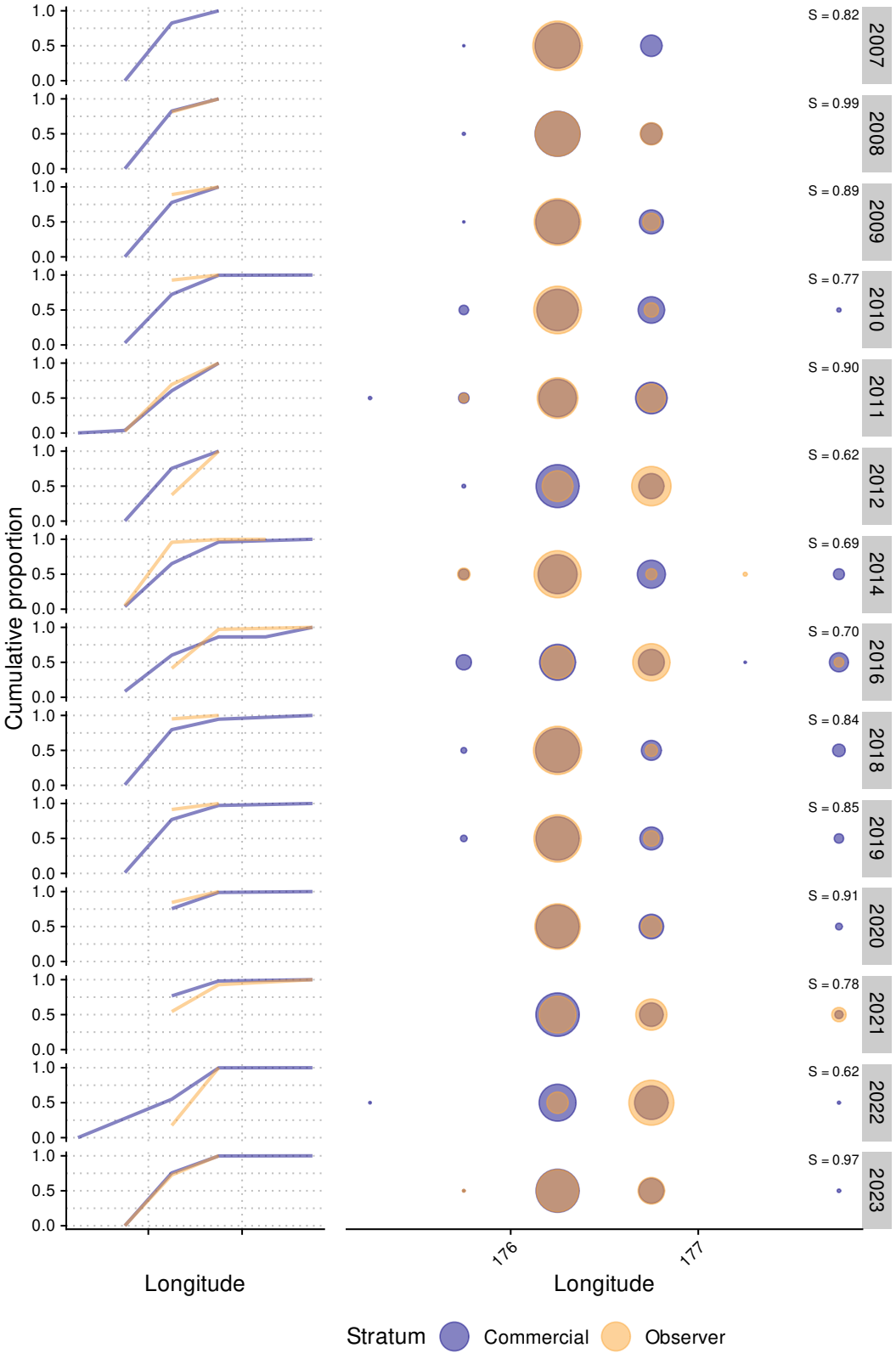


Figure 425: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 1, from events where the scampi catch exceeded the 20kg threshold, in 2007 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

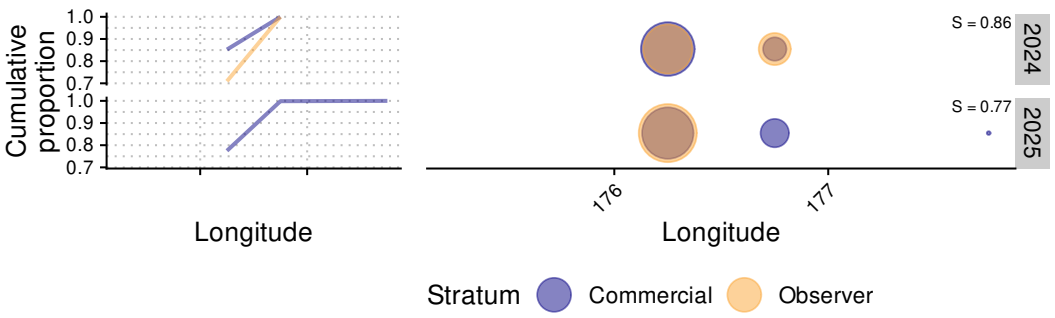


Figure 426: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 1, from events where the scampi catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

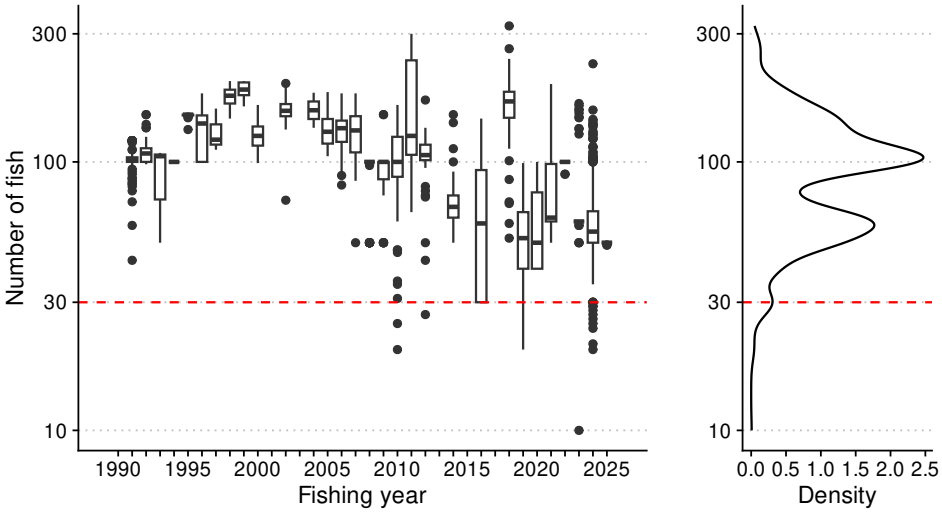


Figure 427: **Length-frequency sample sizes for observed fishing events in SCI 1 where scampi were sampled. The red dashed line indicates a sample size of 30 fish.**

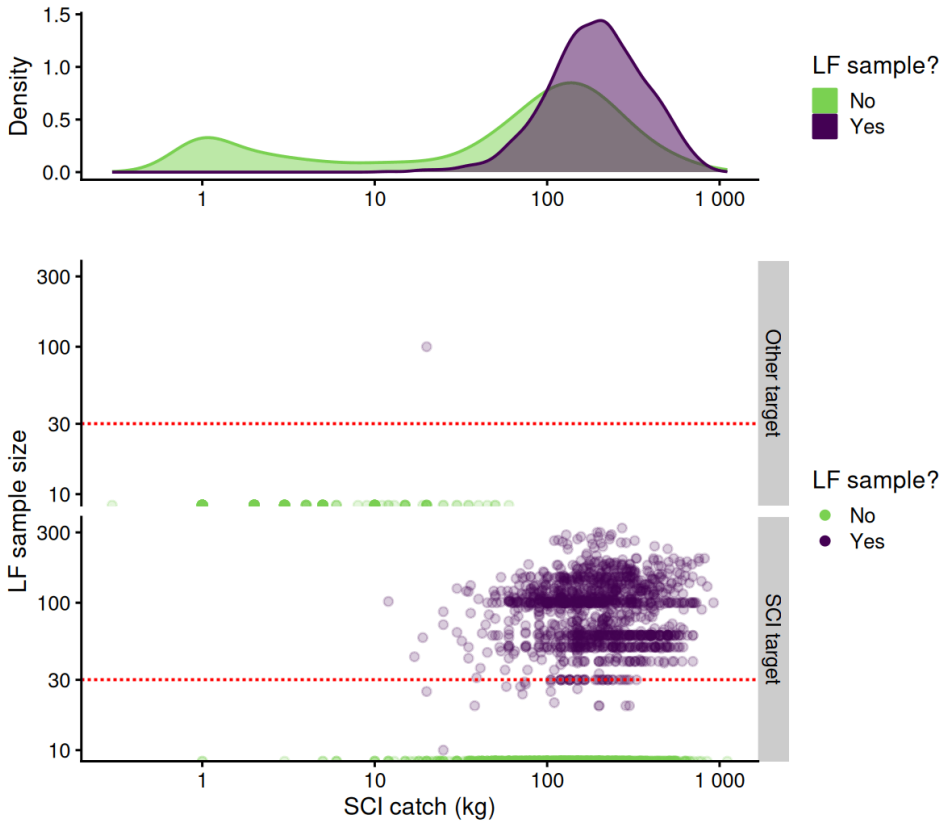


Figure 428: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SCI 1 in relation to the total scampi catch from an event, separately for scampi target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.6.1.2 Catch quantification

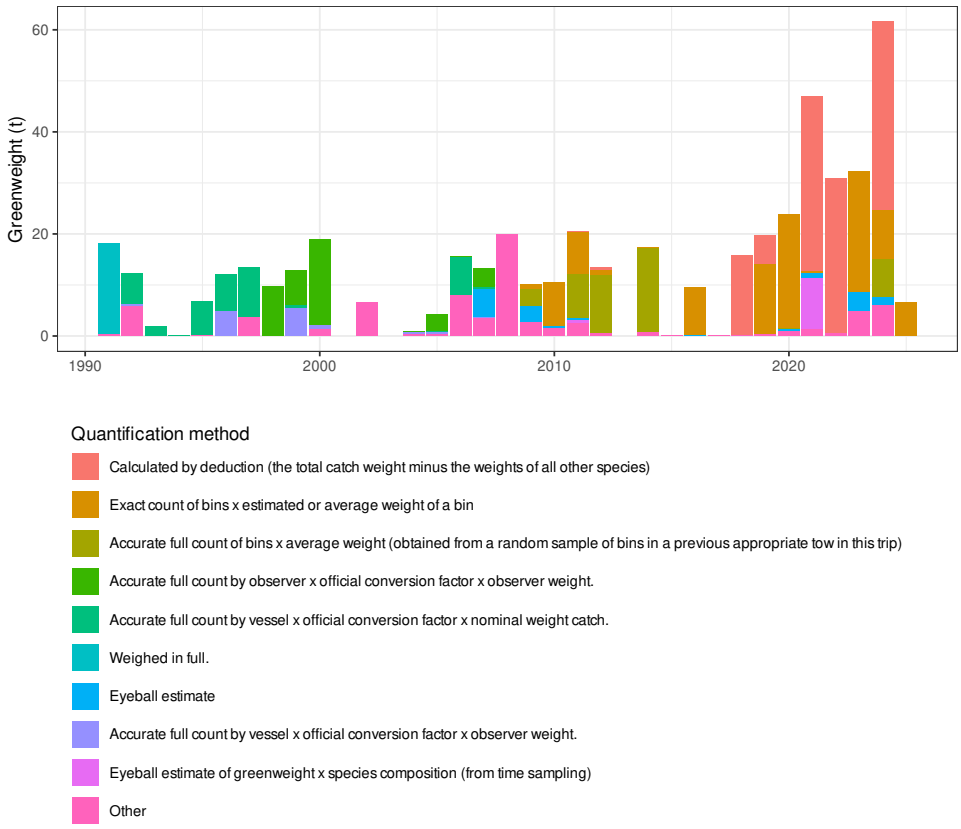


Figure 429: Methods used by observers to quantify the catch of scampi in the SCI 1 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.6.2 SCI 2: Trawl fishery

2.6.2.1 Length-frequency samples

Table 42: Length-frequency samples of scampi from the SCI 2 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of scampi exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	1 019	0	0	0.00
1991	1 805	47	4 321	2.60
1992	1 227	20	2 336	1.63
1993	1 154	30	2 985	2.60
1994	1 332	62	7 537	4.65
1995	844	62	7 635	7.35
1996	756	29	3 790	3.84
1997	1 006	42	4 668	4.17
1998	998	7	1 196	0.70
1999	1 392	113	20 381	8.12
2000	1 428	81	8 000	5.67
2001	1 616	78	11 360	4.83
2002	2 651	121	14 687	4.56
2003	1 452	18	2 828	1.24
2004	587	0	0	0.00
2005	585	6	630	1.03
2006	654	0	0	0.00
2007	656	8	763	1.22
2008	570	37	4 200	6.49
2009	403	13	1 445	3.23
2010	741	23	3 244	3.10
2011	787	55	7 583	6.99
2012	470	114	19 165	24.26
2013	379	11	660	2.90
2014	381	1	130	0.26
2015	493	0	0	0.00
2016	492	0	0	0.00
2017	607	0	0	0.00
2018	602	0	0	0.00
2019	490	4	200	0.82
2020	596	29	1 966	4.87
2021	669	32	1 830	4.78
2022	455	11	1 012	2.42
2023	538	33	6 229	6.13
2024	424	111	10 220	26.18
2025	377	102	5 850	27.06

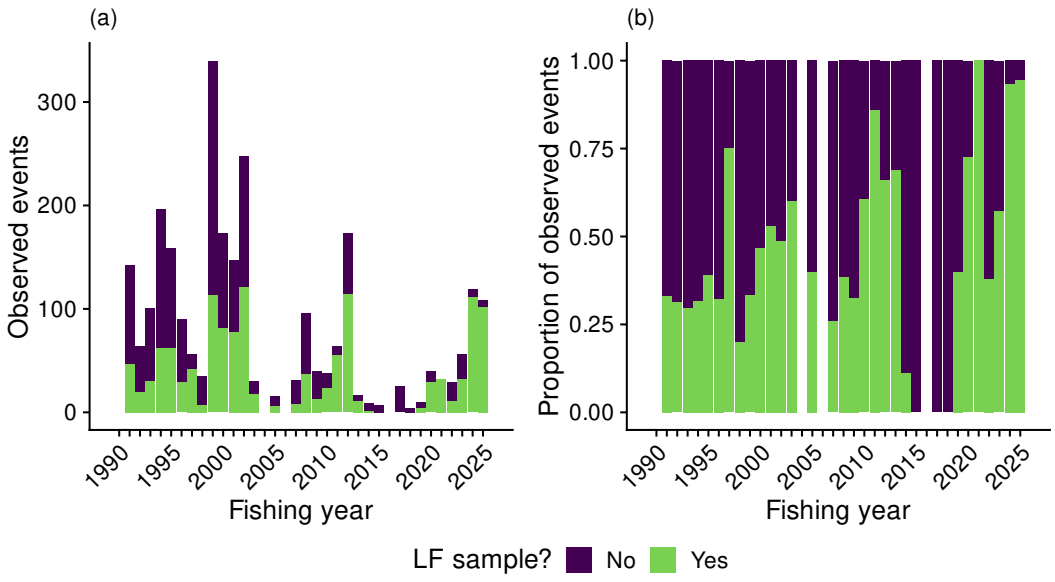


Figure 430: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SCI 2 where the scampi catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

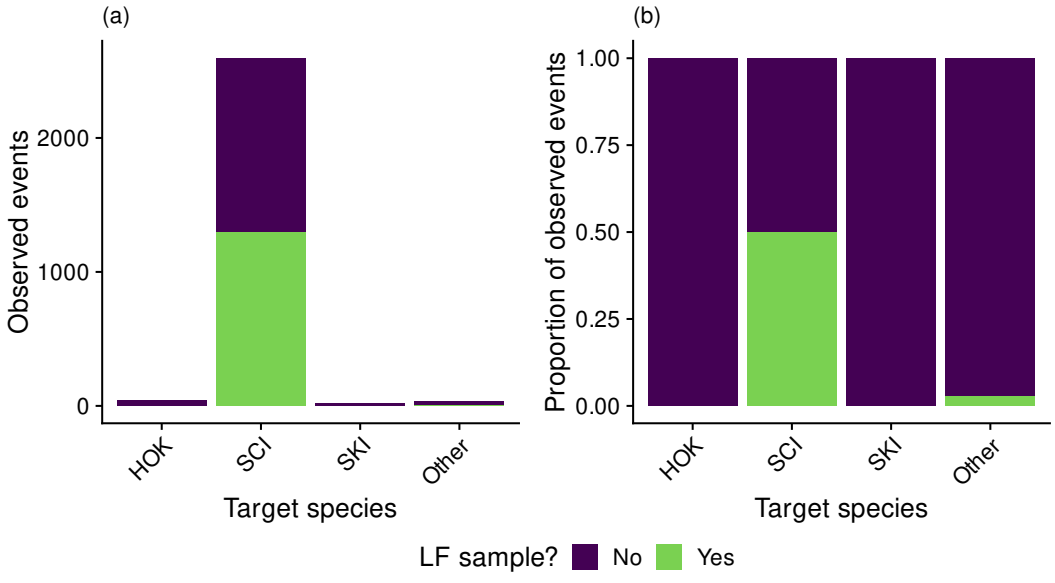


Figure 431: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SCI 2 where the scampi catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

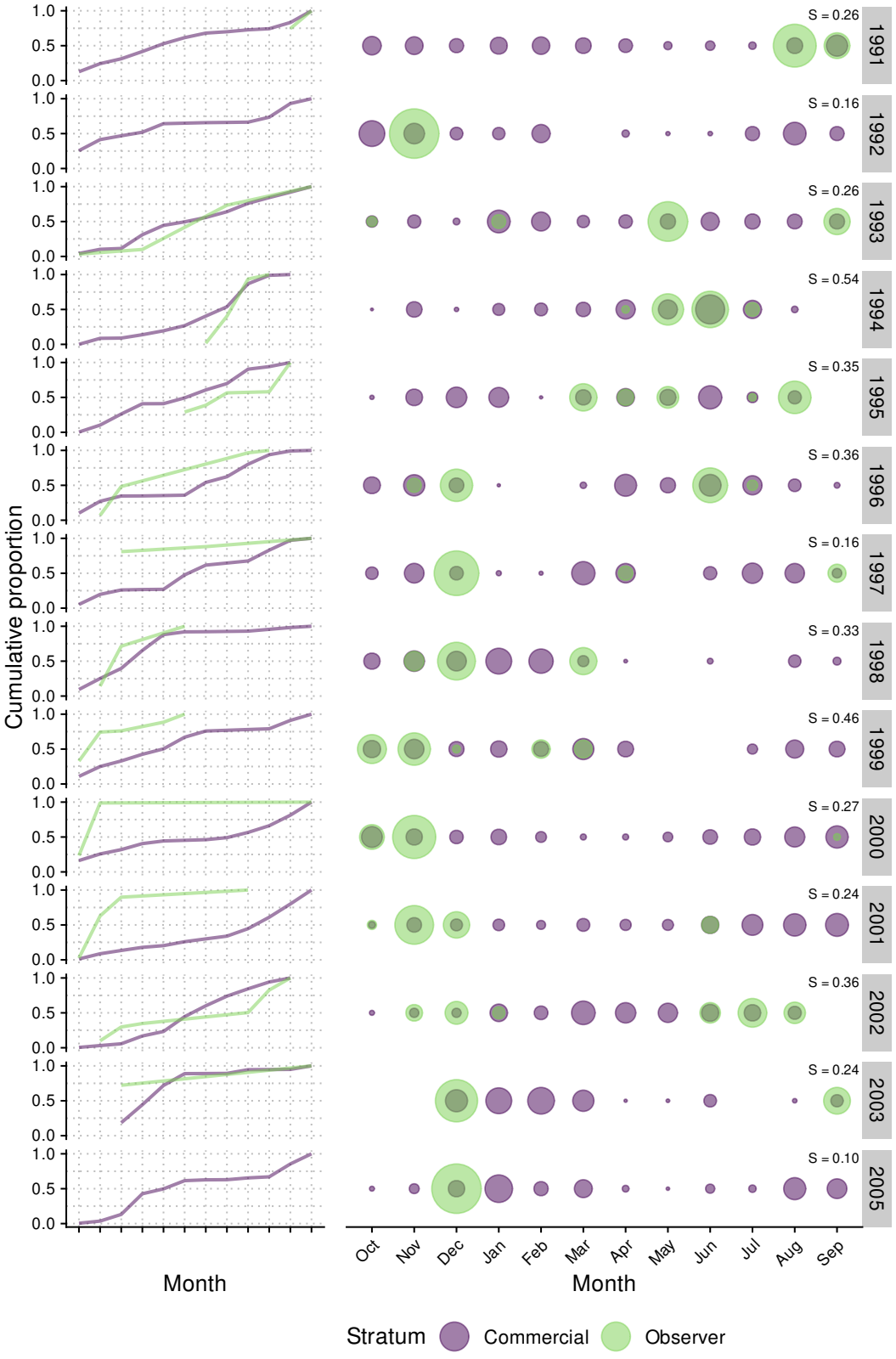


Figure 432: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 2, where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

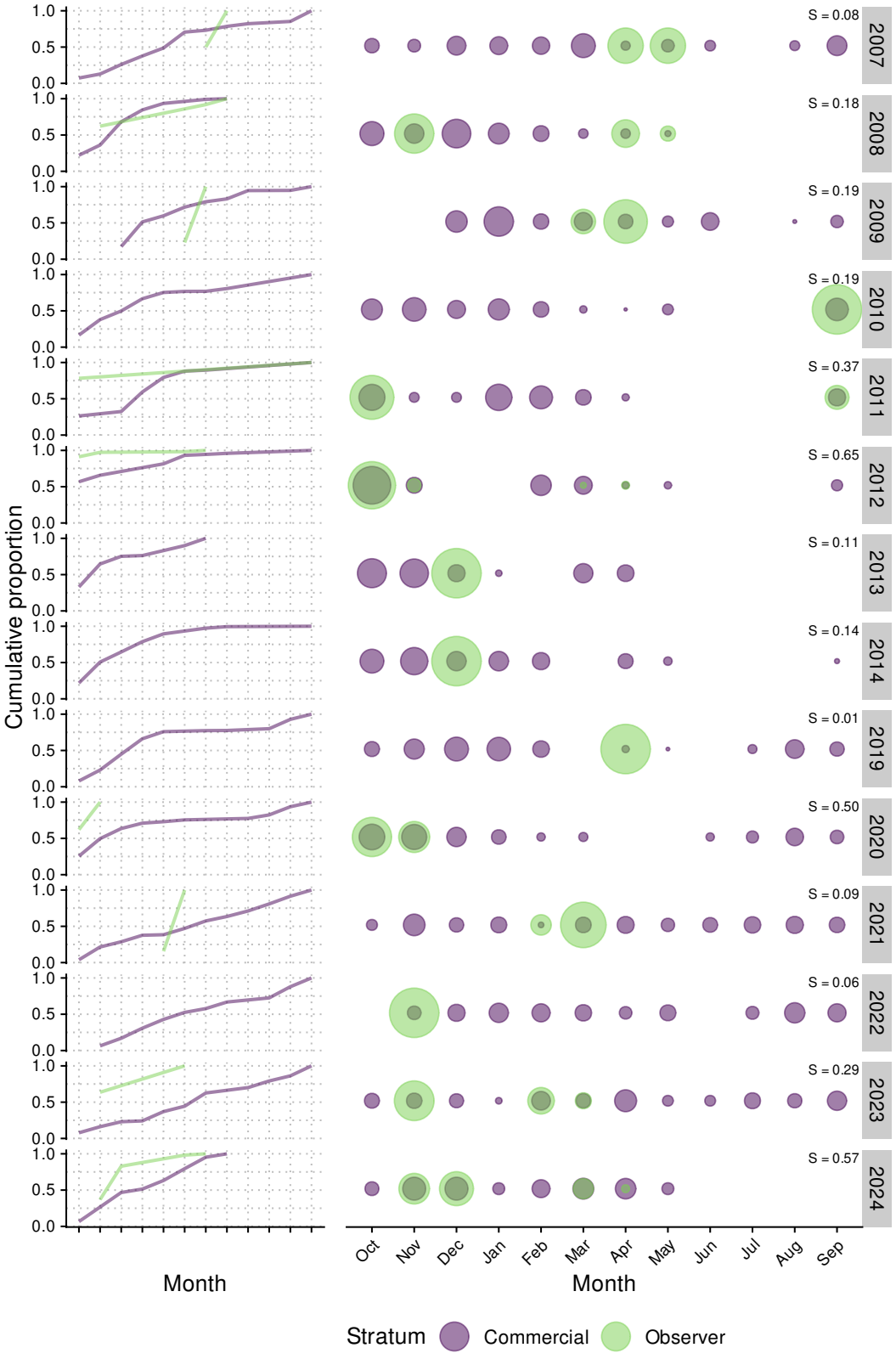


Figure 433: **Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 2, where the scampi catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

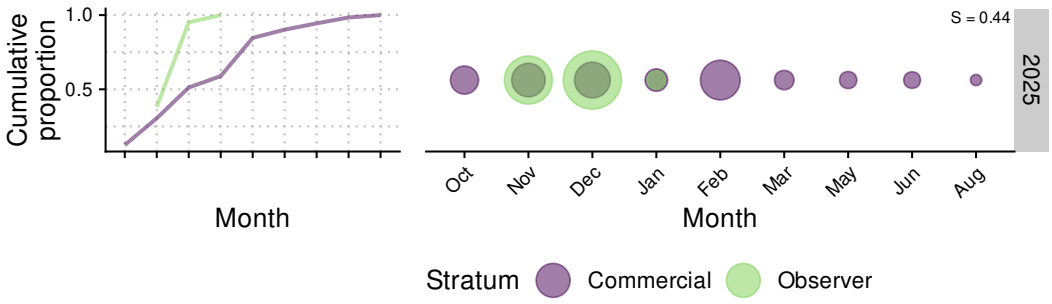


Figure 434: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 2, where the scampi catch exceeded the 20kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

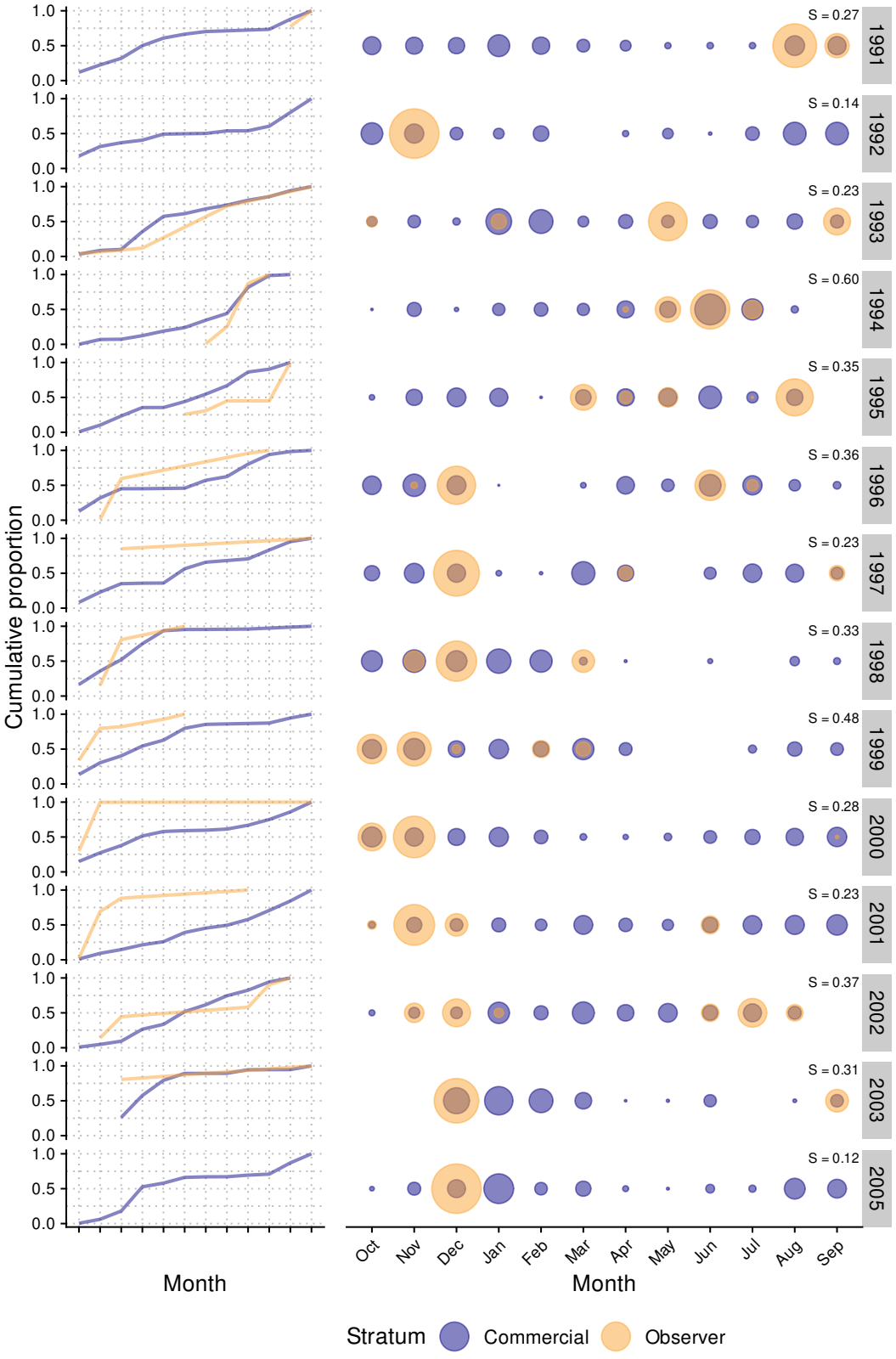


Figure 435: Monthly representativeness of observer sampling coverage of Trawl catch in SCI 2, from events where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

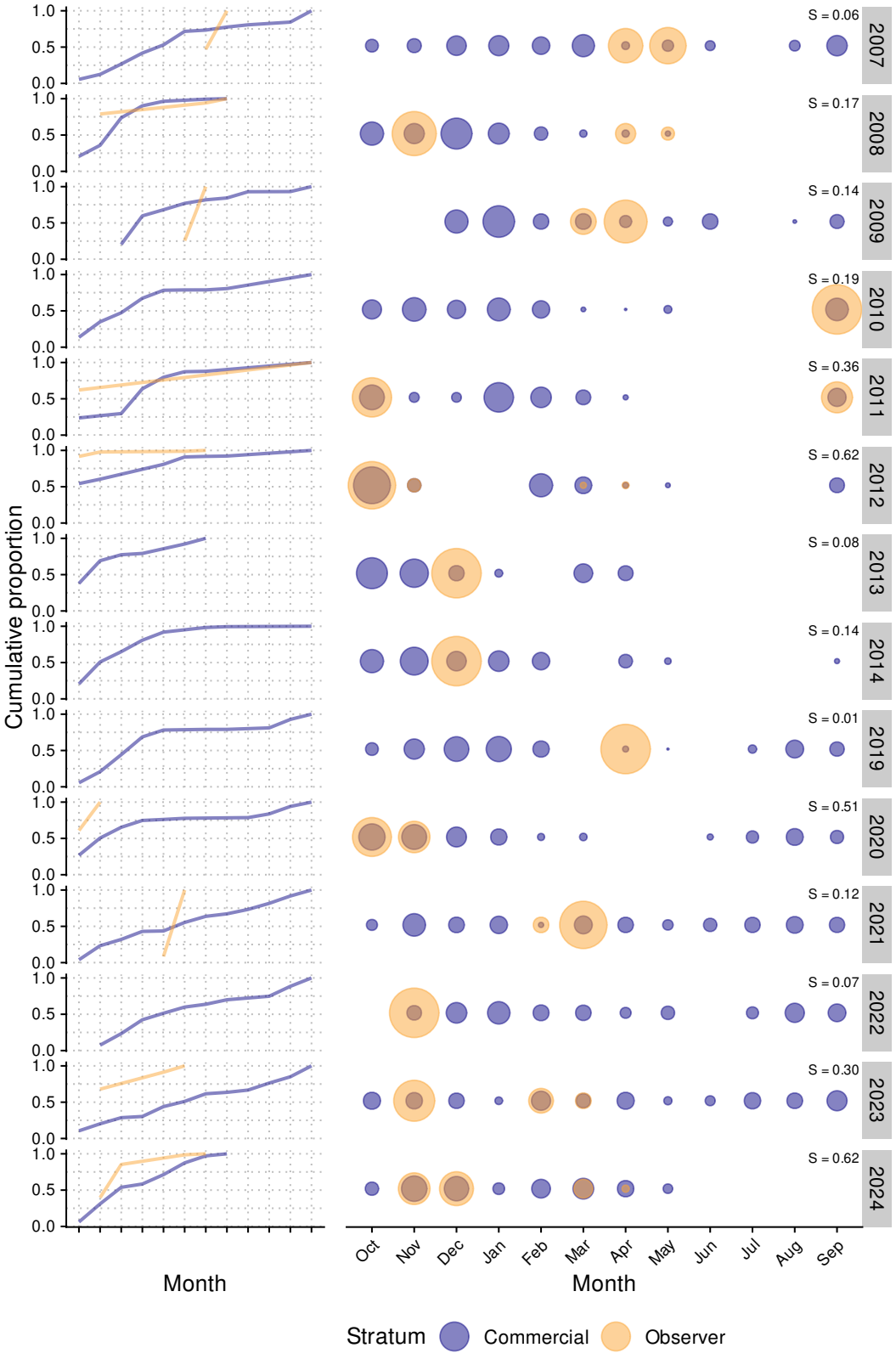


Figure 436: **Monthly representativeness of observer sampling coverage of Trawl catch in SCI 2, from events where the scampi catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

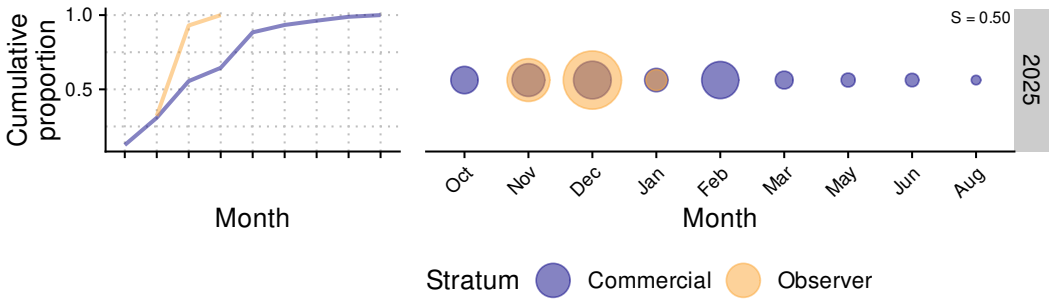


Figure 437: **Monthly representativeness of observer sampling coverage of Trawl catch in SCI 2, from events where the scampi catch exceeded the 20kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

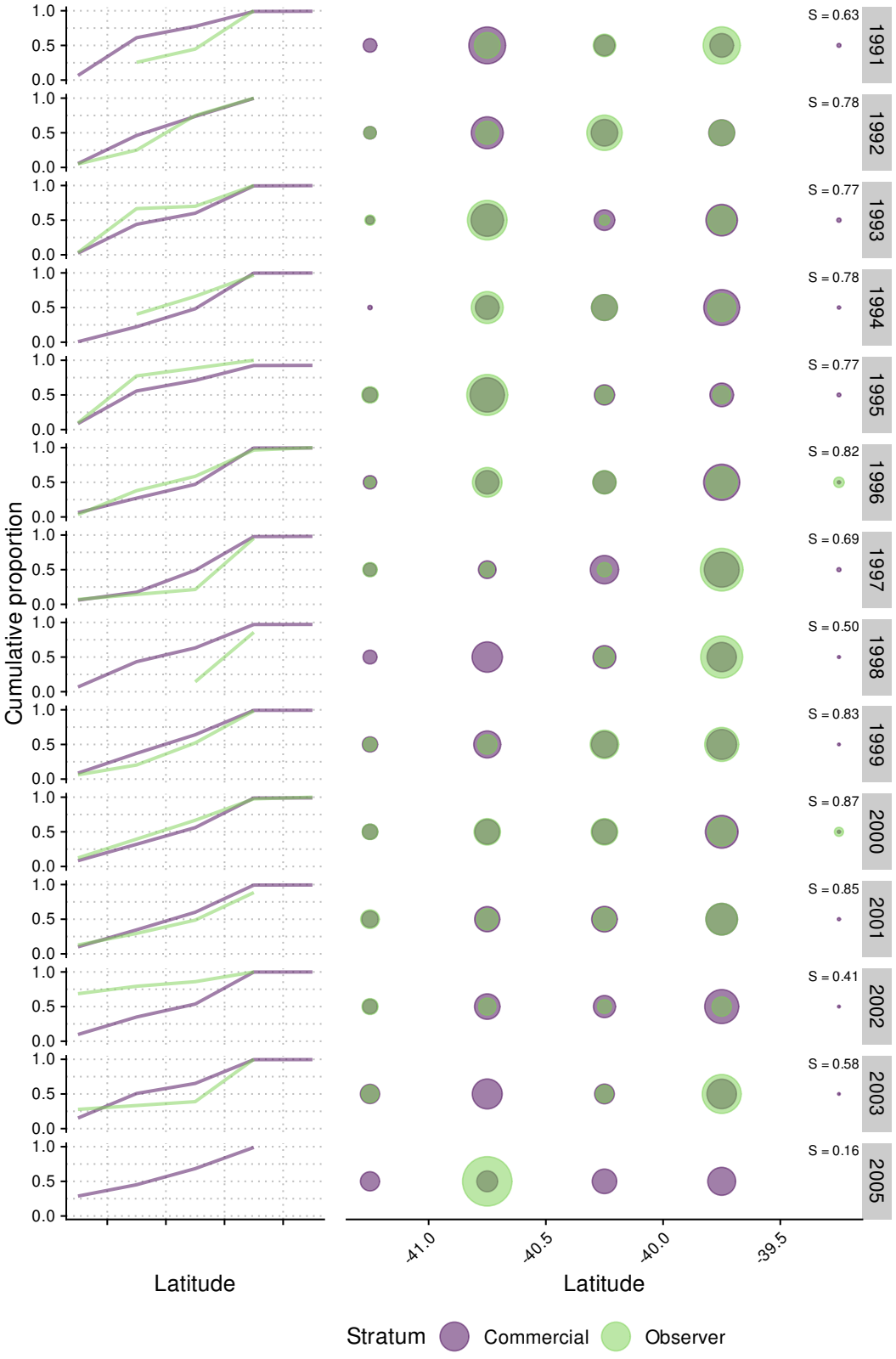


Figure 438: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 2, where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

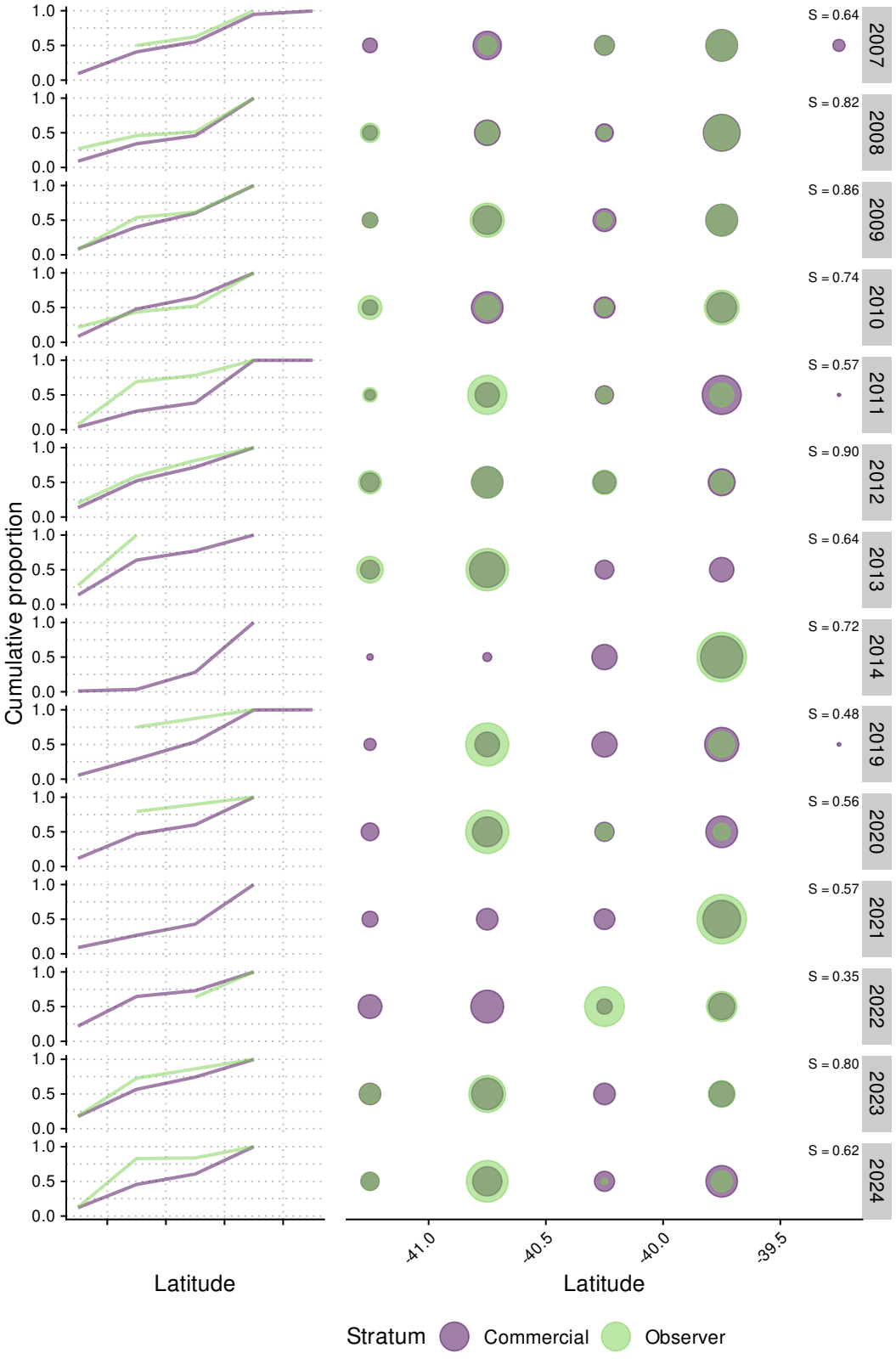


Figure 439: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 2, where the scampi catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

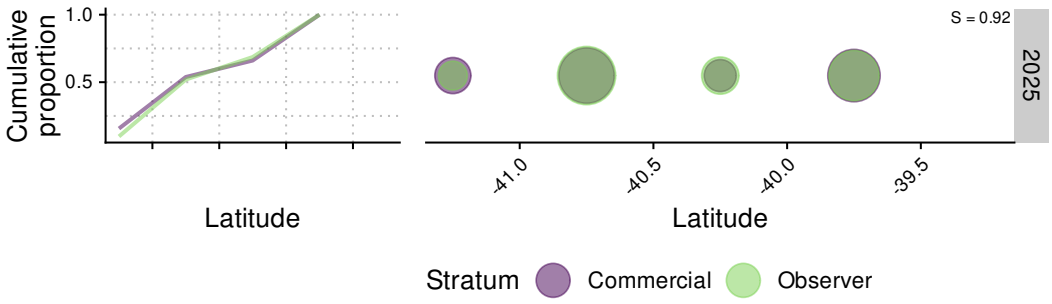


Figure 440: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 2, where the scampi catch exceeded the 20kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

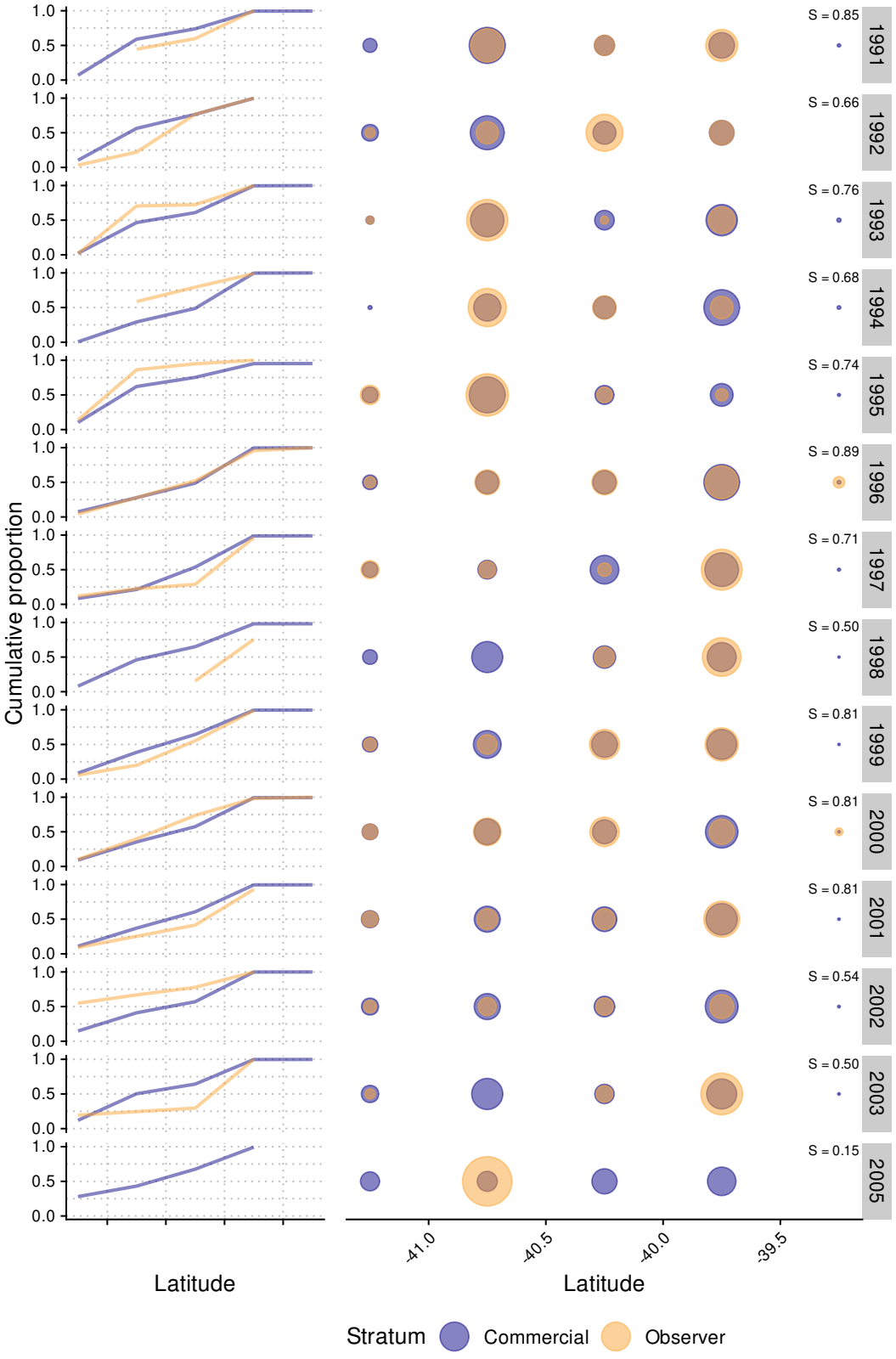


Figure 441: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 2, from events where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

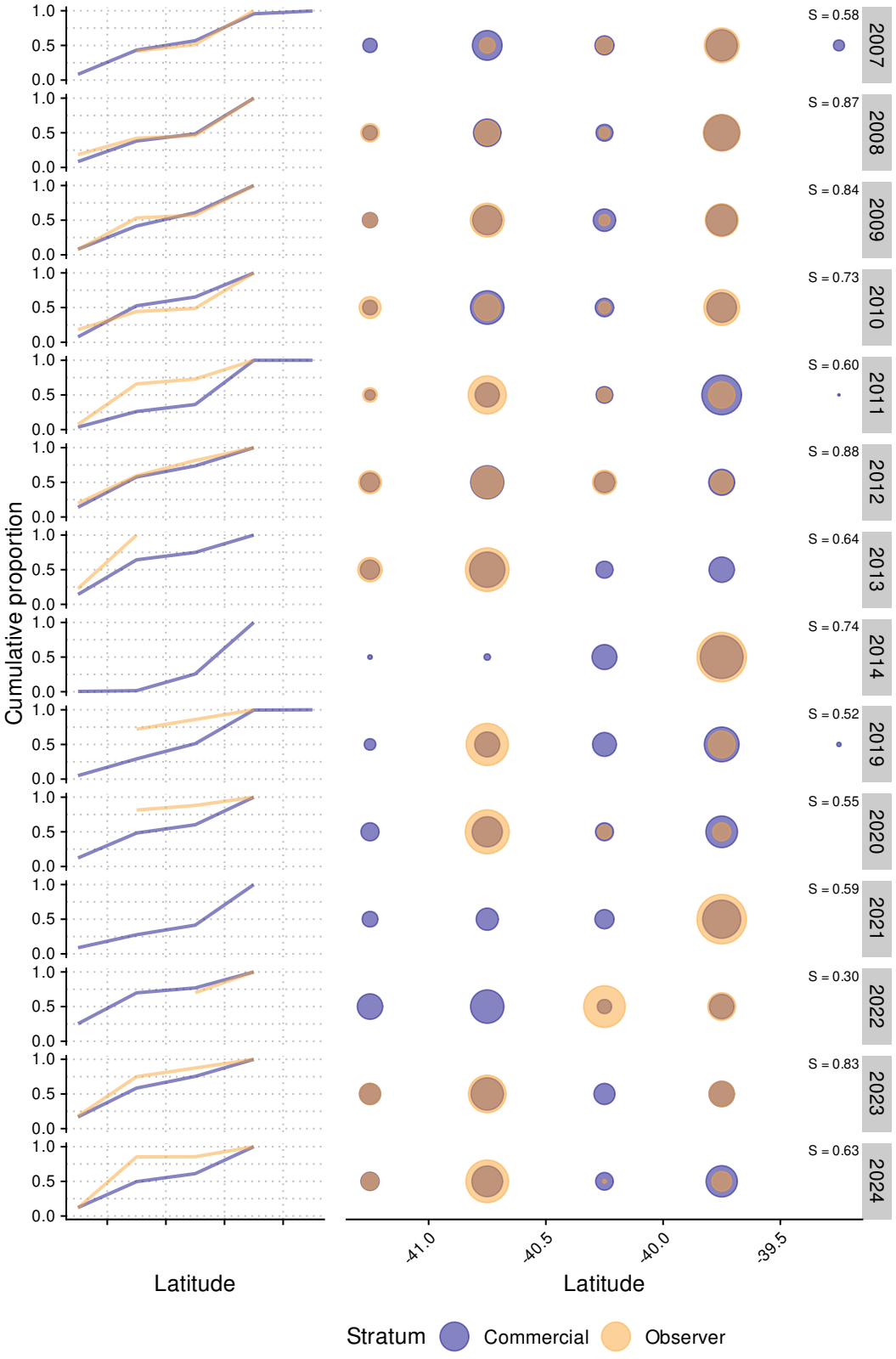


Figure 442: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 2, from events where the scampi catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

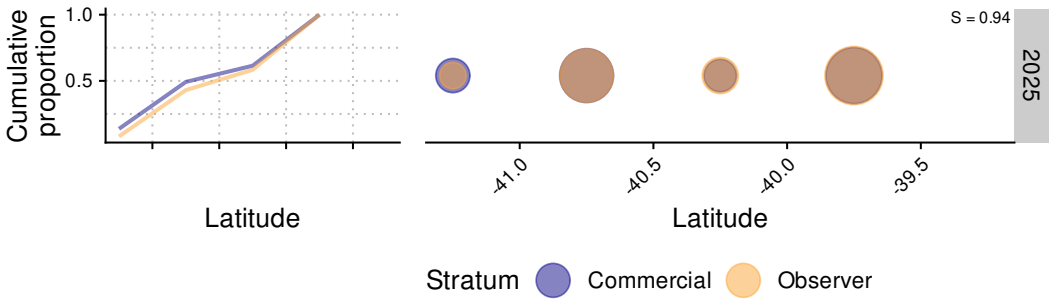


Figure 443: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 2, from events where the scampi catch exceeded the 20kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

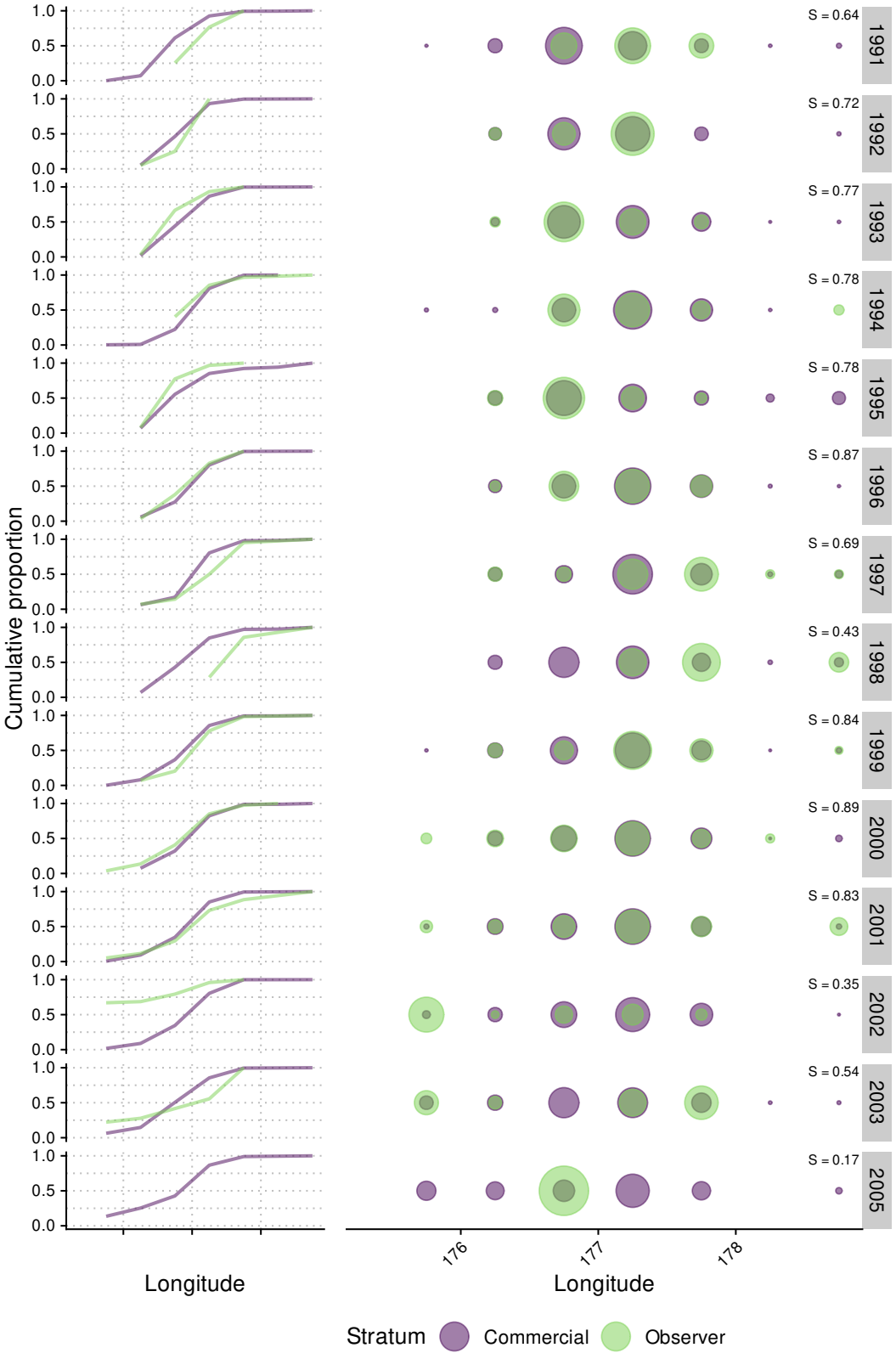


Figure 444: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 2, where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

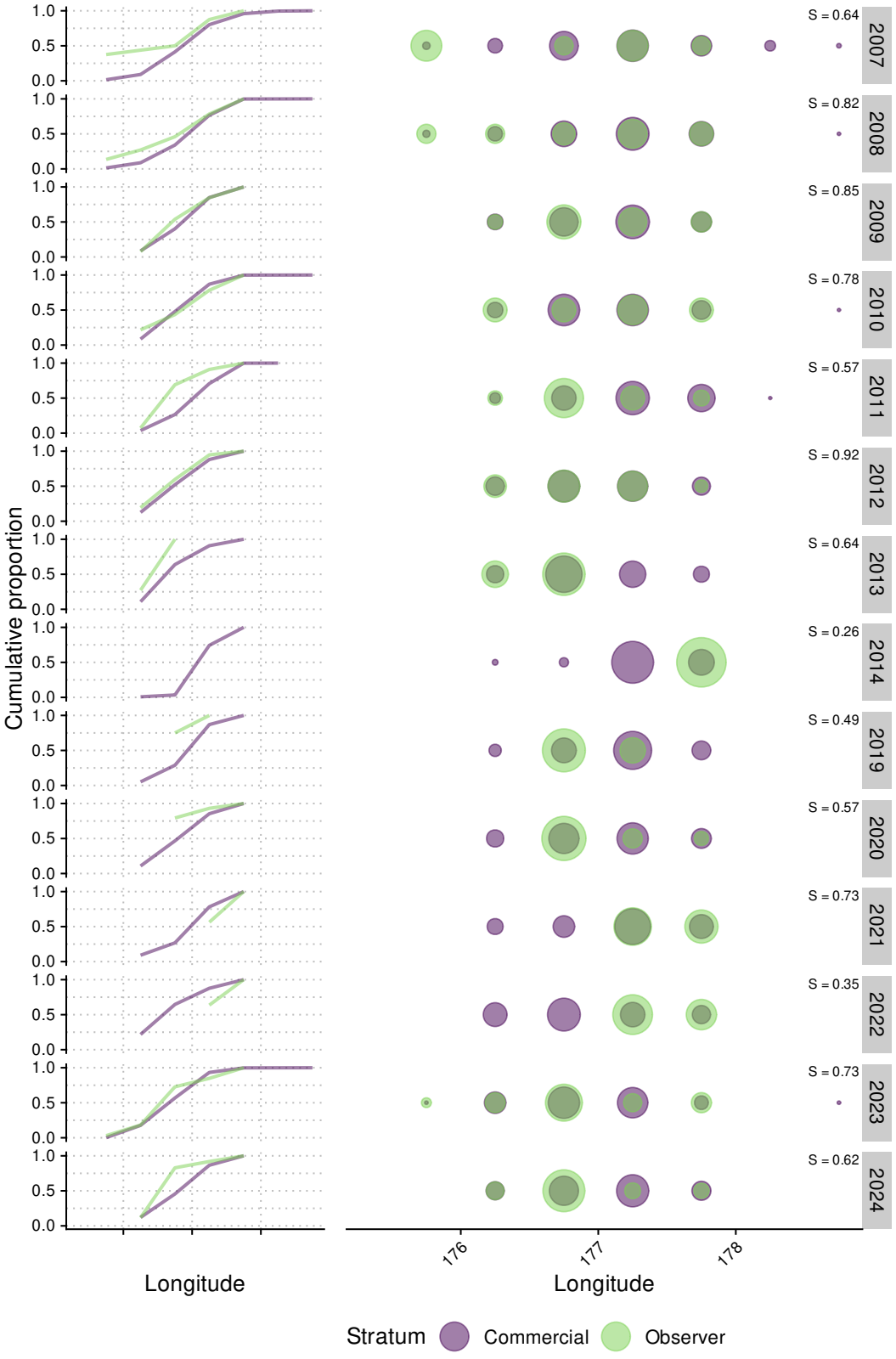


Figure 445: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 2, where the scampi catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

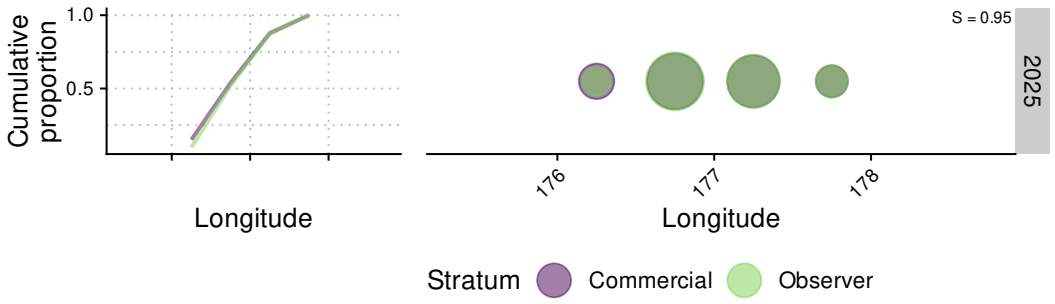


Figure 446: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 2, where the scampi catch exceeded the 20kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

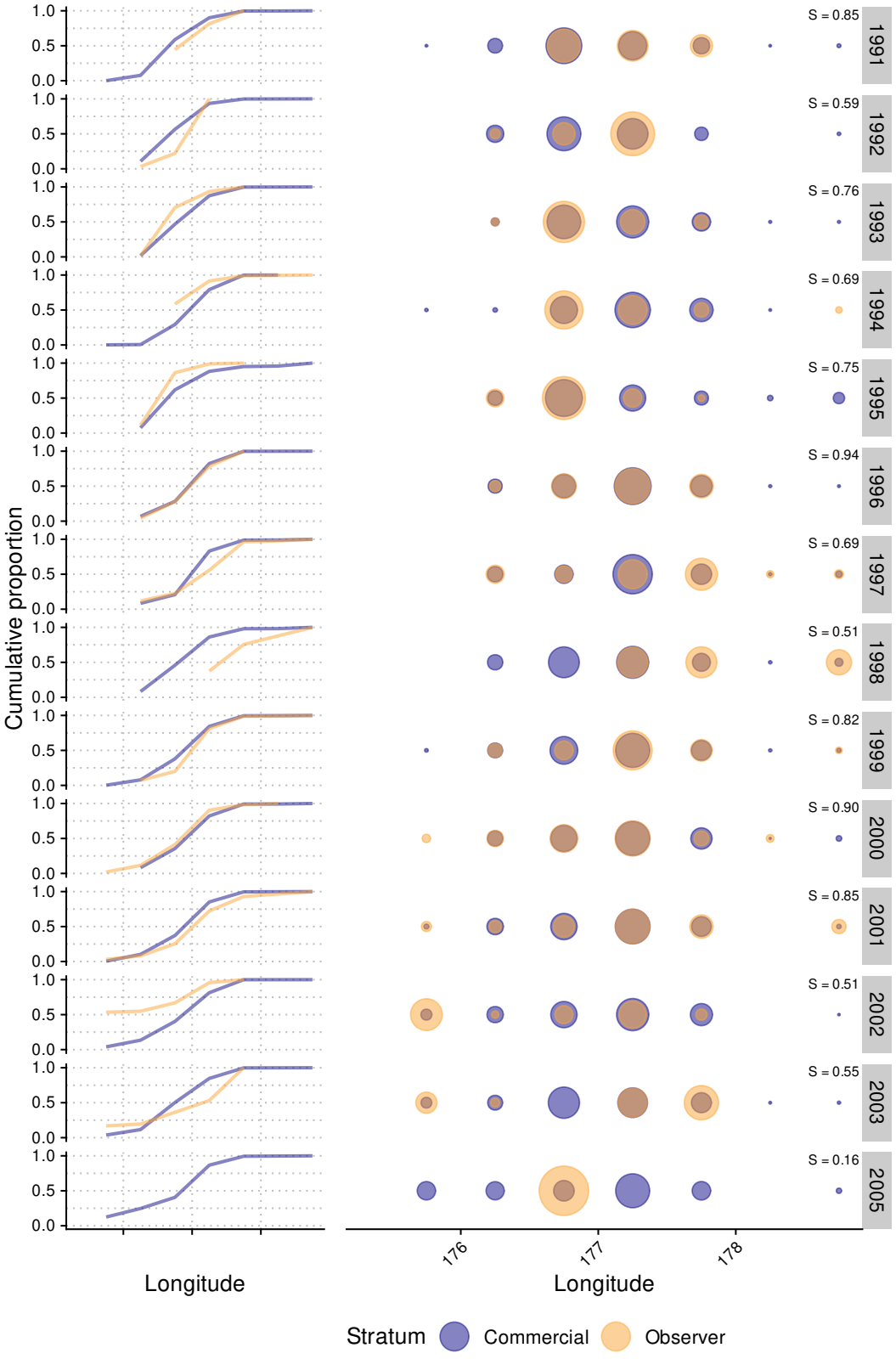


Figure 447: Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 2, from events where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

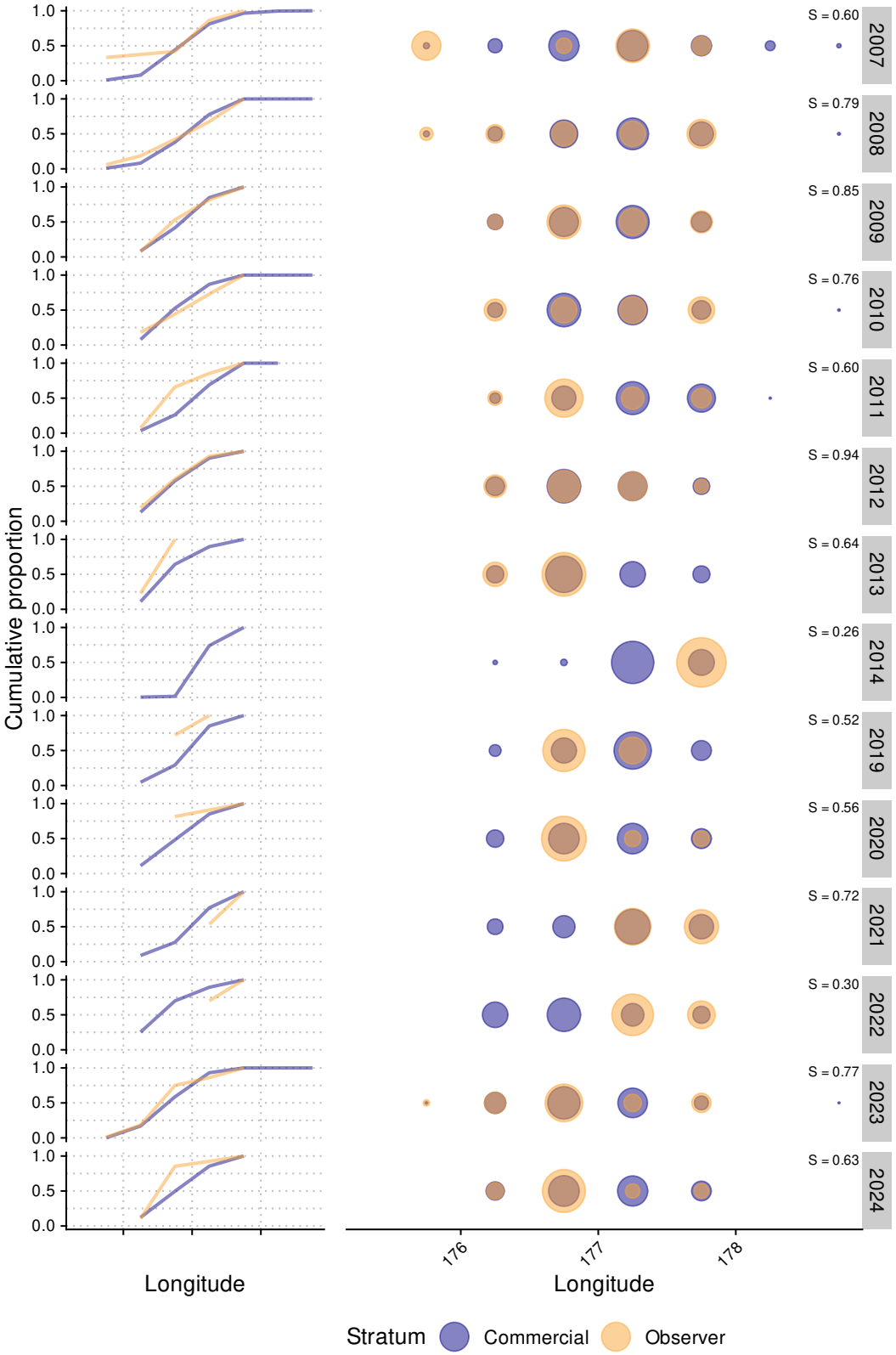


Figure 448: Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 2, from events where the scampi catch exceeded the 20kg threshold, in 2007 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

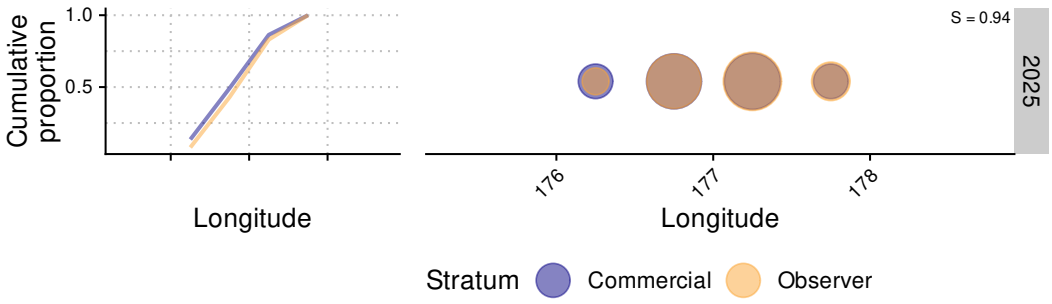


Figure 449: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 2, from events where the scampi catch exceeded the 20kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

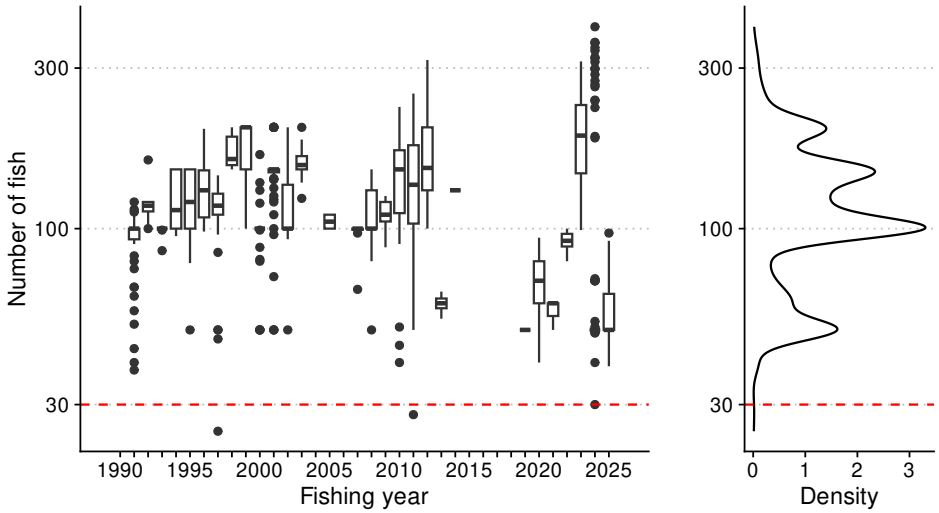


Figure 450: **Length-frequency sample sizes for observed fishing events in SCI 2 where scampi were sampled. The red dashed line indicates a sample size of 30 fish.**

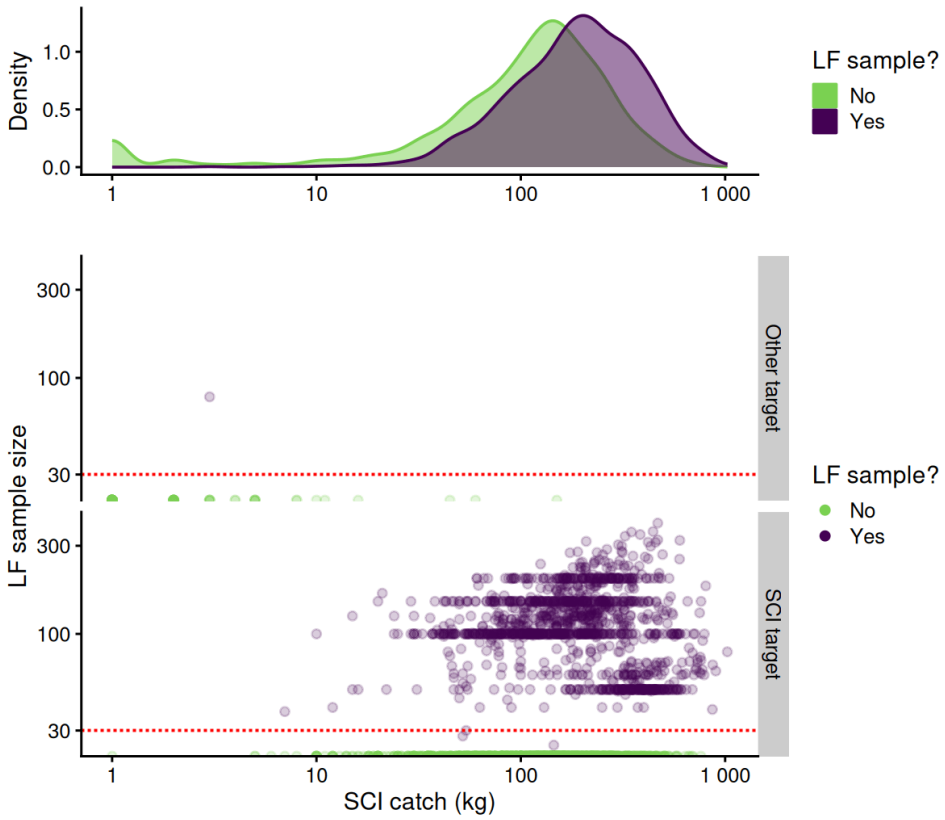


Figure 451: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SCI 2 in relation to the total scampi catch from an event, separately for scampi target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.6.2.2 Catch quantification

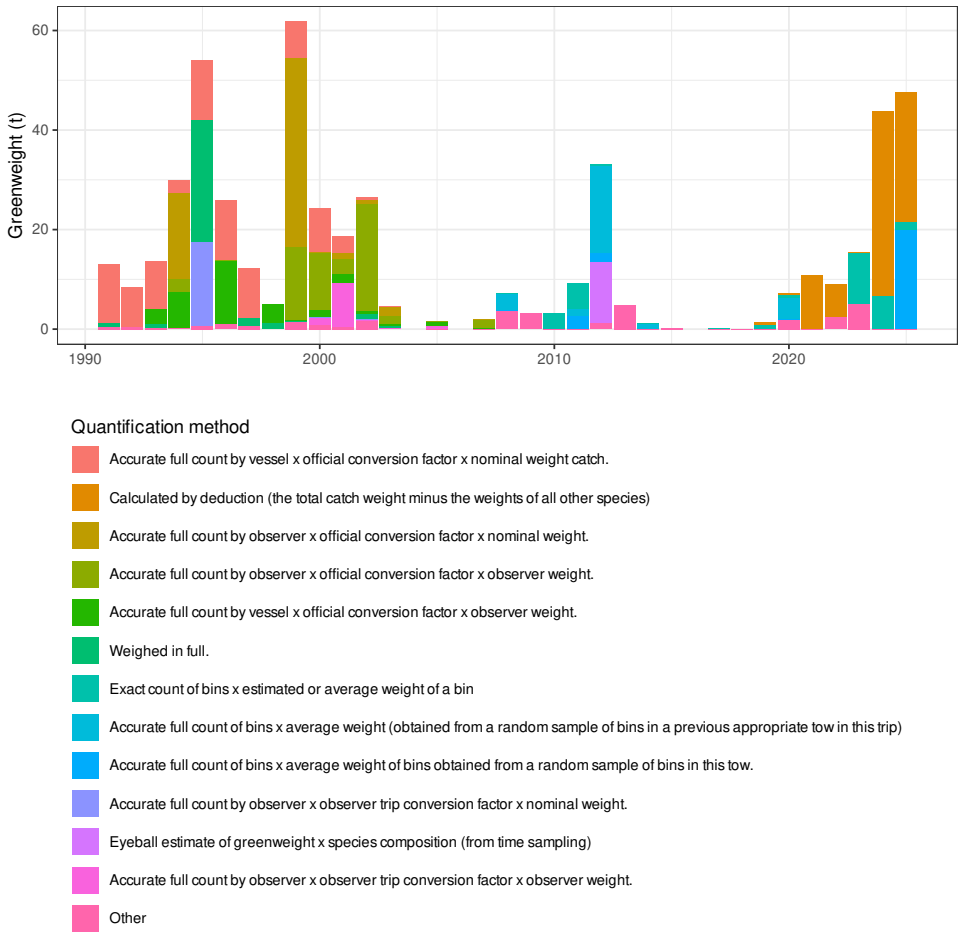


Figure 452: Methods used by observers to quantify the catch of scampi in the SCI 2 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.6.3 SCI 3: Trawl fishery

2.6.3.1 Length-frequency samples

Table 43: Length-frequency samples of scampi from the SCI 3 Trawl fishery sampled by the Observer Programme in fishing years 1991 to 2025. Positive fishing events are those where the catch of scampi exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1991	5	3	38	60.00
1992	1 280	3	417	0.23
1993	1 820	52	5 126	2.86
1994	1 699	102	10 666	6.00
1995	963	93	6 800	9.66
1996	815	24	2 050	2.94
1997	718	0	0	0.00
1998	687	40	4 500	5.82
1999	654	46	7 747	7.03
2000	877	36	3 700	4.10
2001	800	38	6 542	4.75
2002	736	45	6 445	6.11
2003	817	74	8 813	9.06
2004	604	75	10 053	12.42
2005	1 071	28	3 368	2.61
2006	1 290	32	3 374	2.48
2007	1 650	39	4 306	2.36
2008	1 736	73	8 352	4.21
2009	1 257	71	10 166	5.65
2010	1 406	47	6 686	3.34
2011	1 177	38	4 424	3.23
2012	1 644	8	1 092	0.49
2013	1 727	64	4 741	3.71
2014	1 756	54	7 695	3.08
2015	1 849	147	11 239	7.95
2016	1 705	7	305	0.41
2017	1 068	68	4 113	6.37
2018	996	56	6 699	5.62
2019	1 292	142	16 458	10.99
2020	1 764	0	0	0.00
2021	2 104	38	4 214	1.81
2022	1 434	102	9 785	7.11
2023	1 226	142	18 575	11.58
2024	1 211	232	26 890	19.16
2025	1 075	129	6 886	12.00

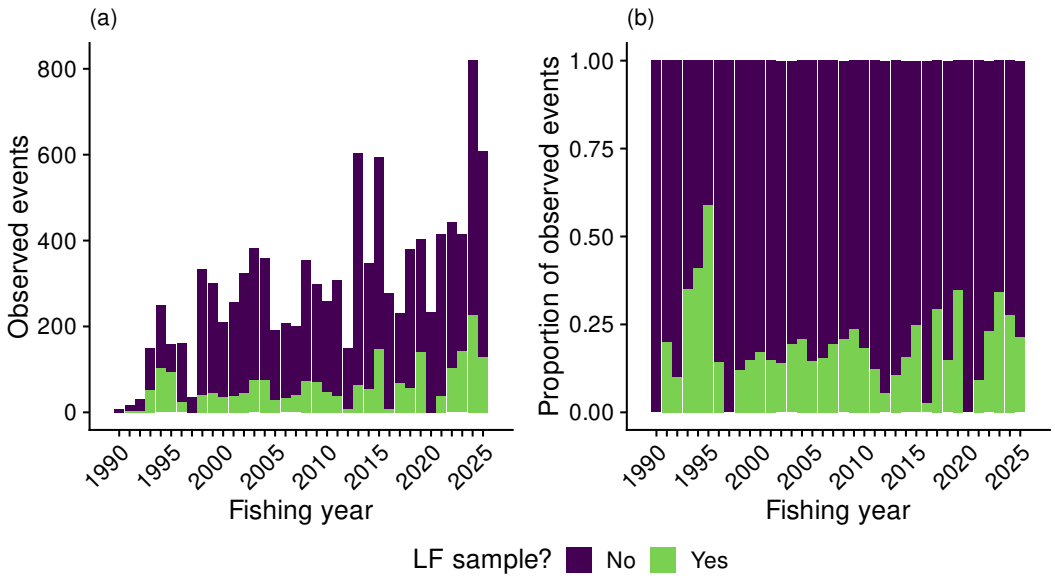


Figure 453: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SCI 3 where the scampi catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

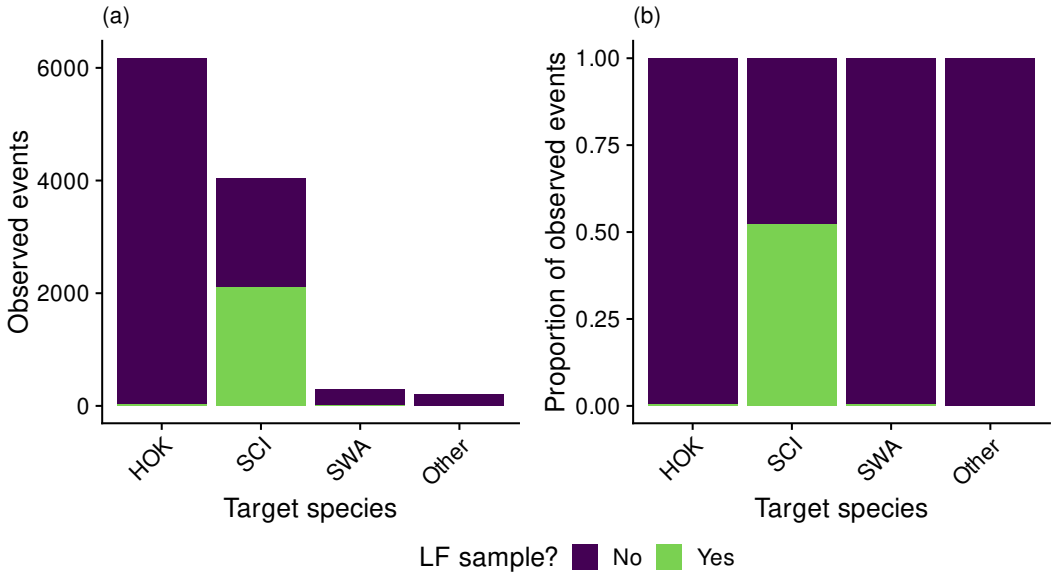


Figure 454: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SCI 3 where the scampi catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

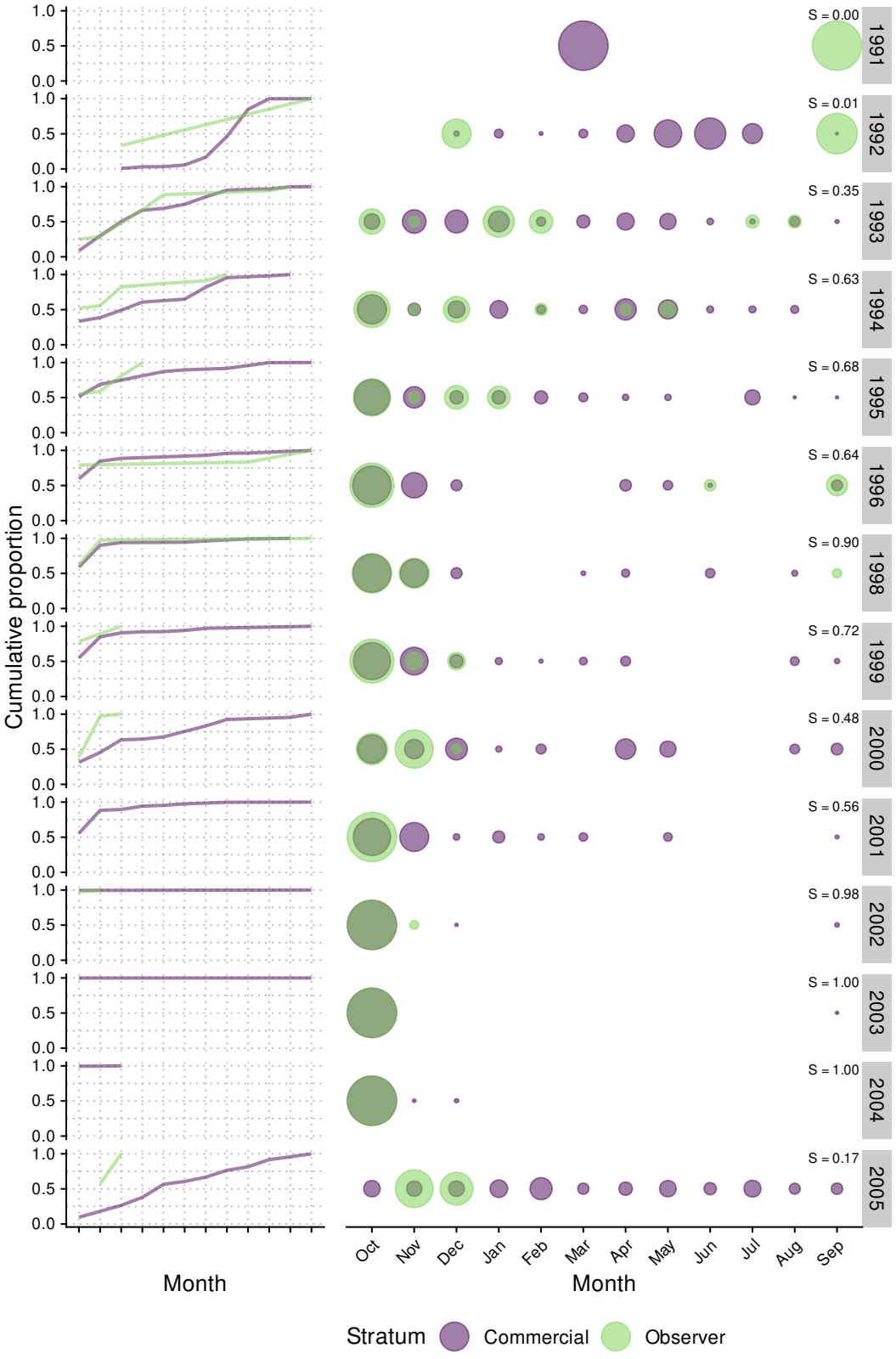


Figure 455: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 3, where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

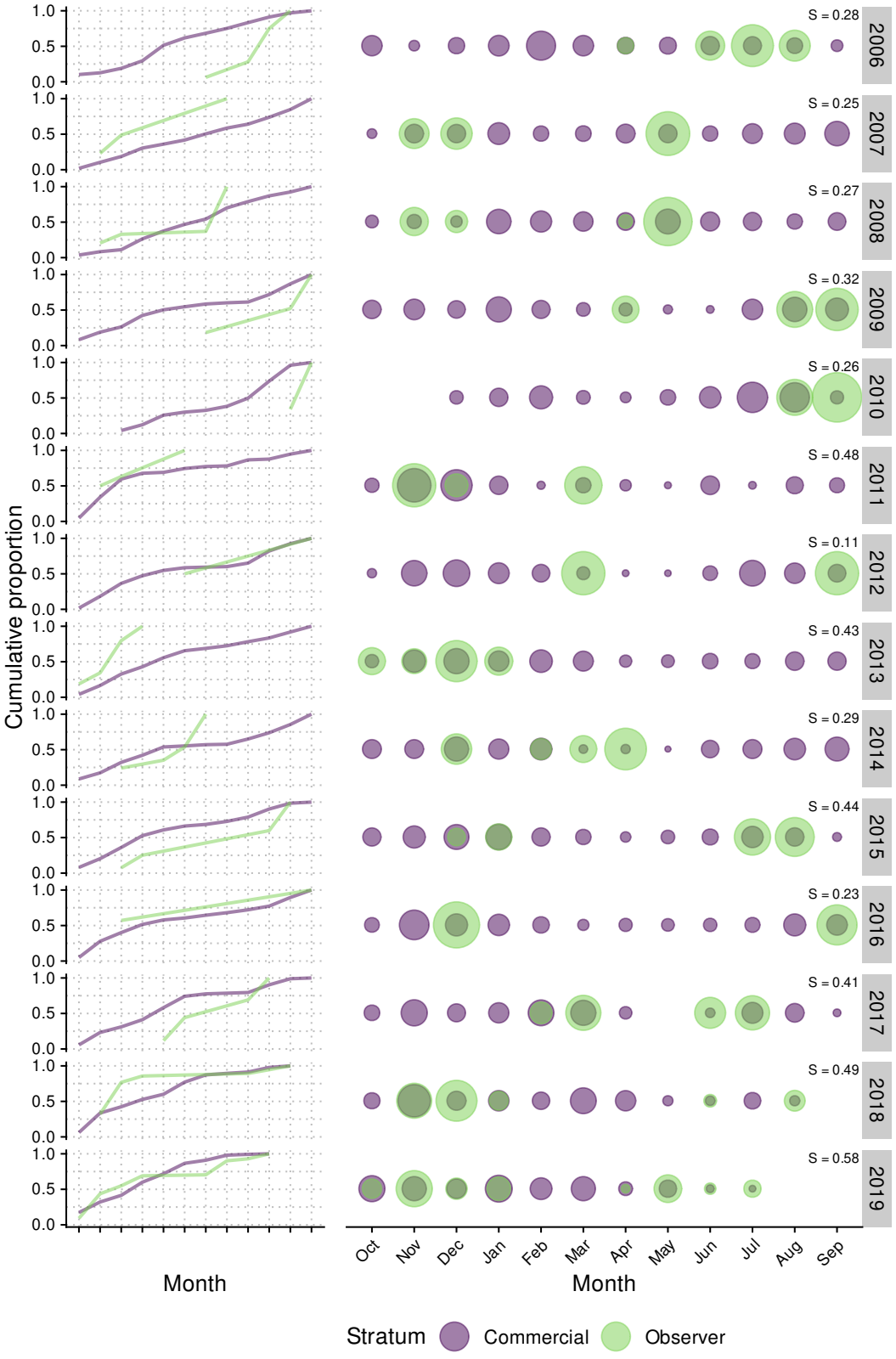


Figure 456: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 3, where the scampi catch exceeded the 20kg threshold, in 2006 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

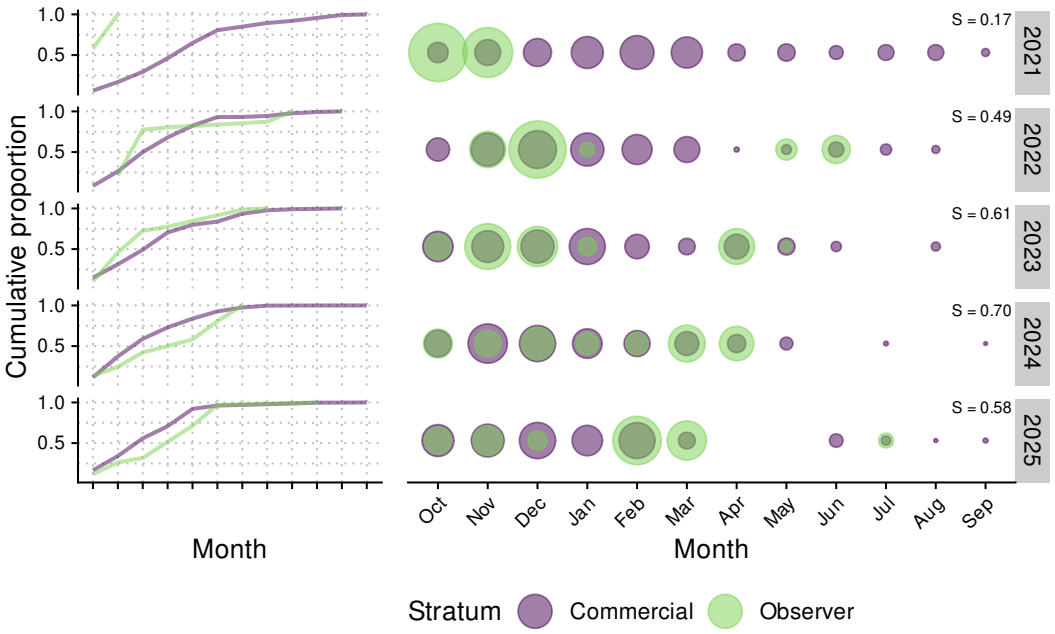


Figure 457: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 3, where the scampi catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

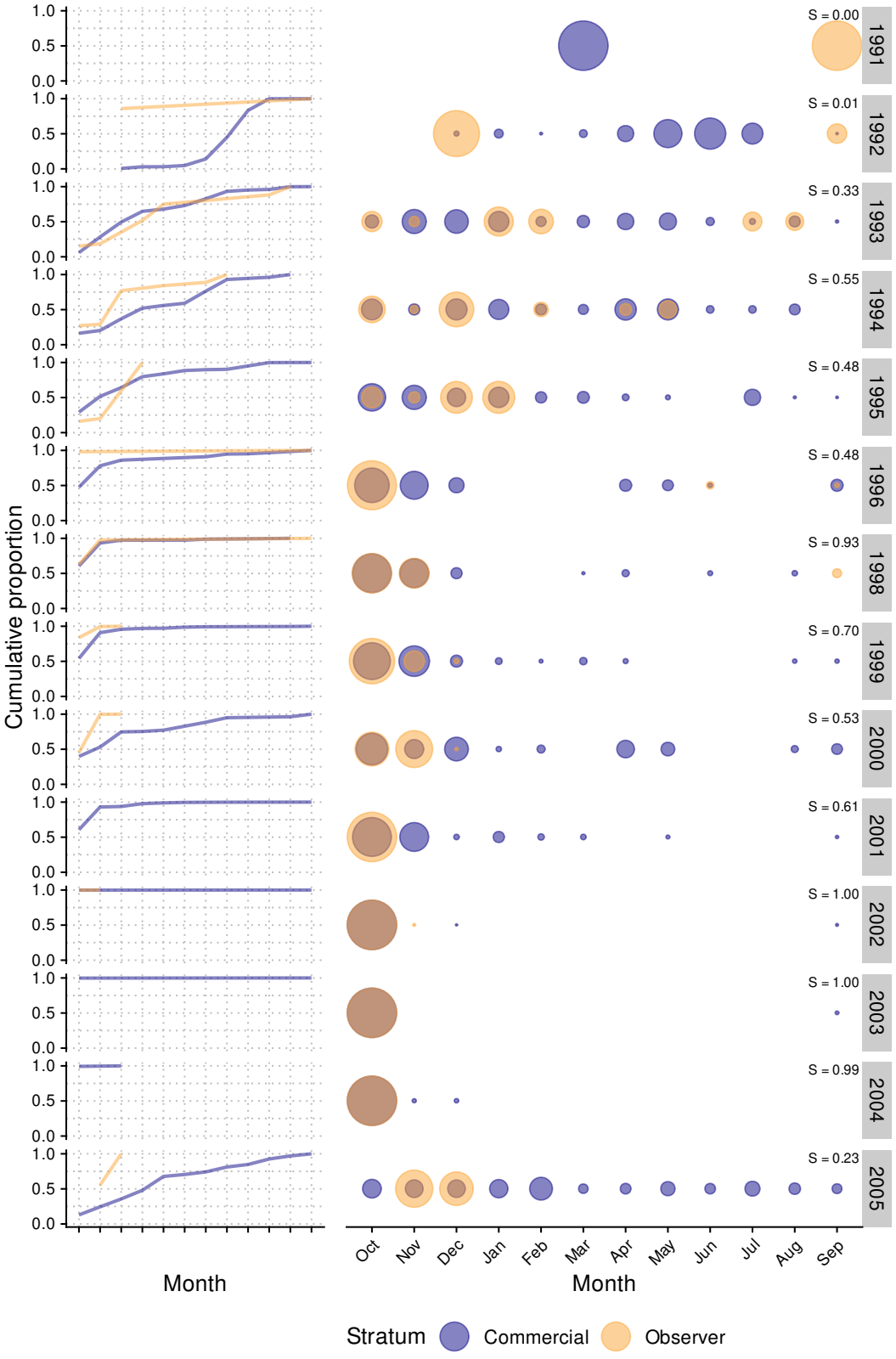


Figure 458: Monthly representativeness of observer sampling coverage of Trawl catch in SCI 3, from events where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

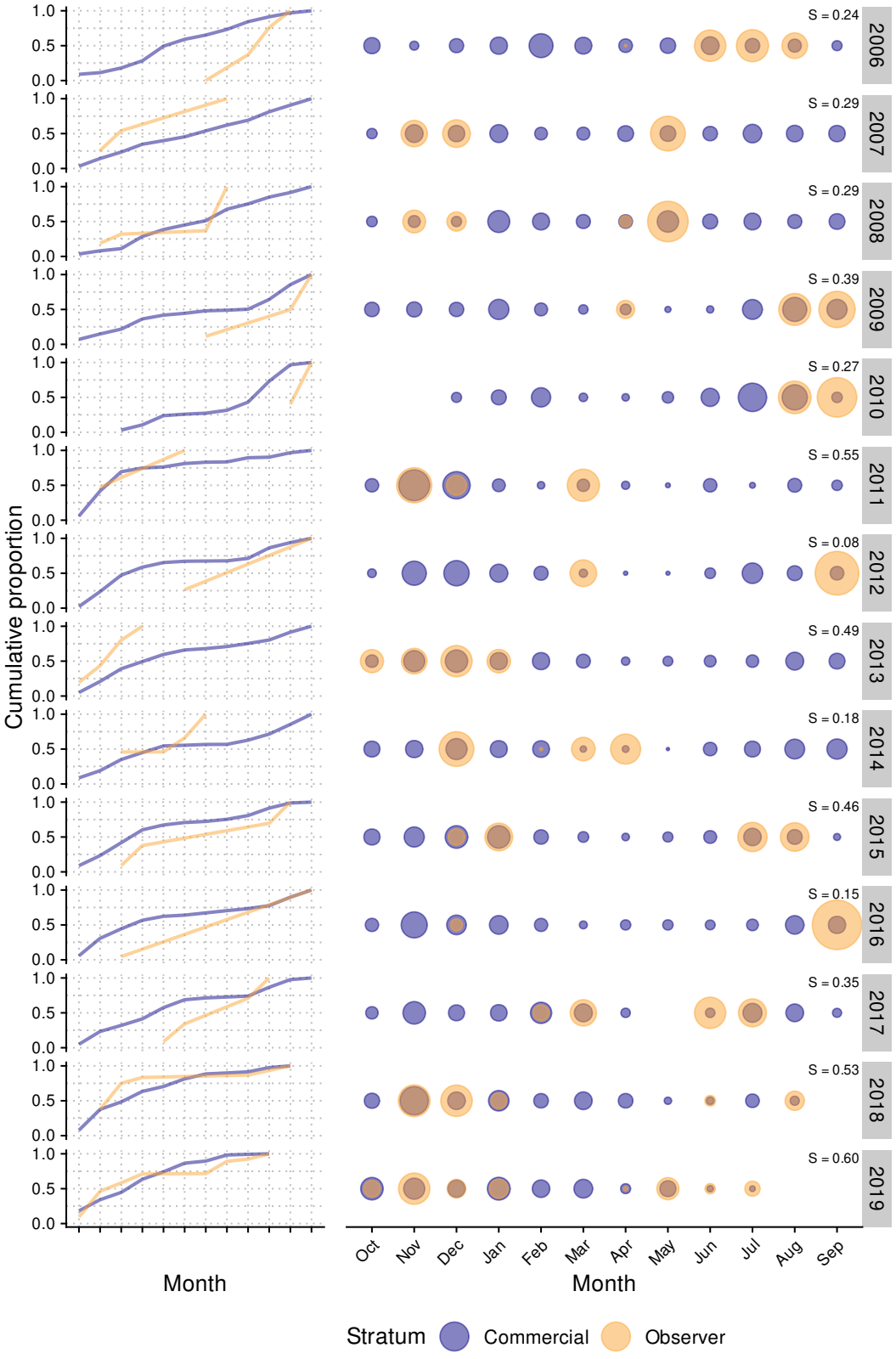


Figure 459: **Monthly representativeness of observer sampling coverage of Trawl catch in SCI 3, from events where the scampi catch exceeded the 20kg threshold, in 2006 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

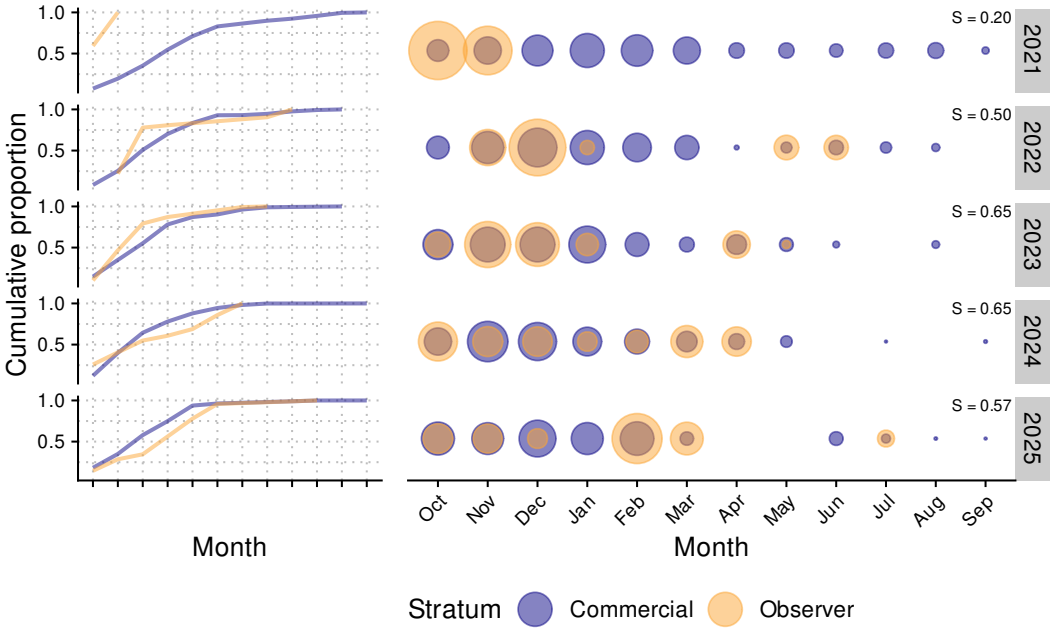


Figure 460: Monthly representativeness of observer sampling coverage of Trawl catch in SCI 3, from events where the scampi catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

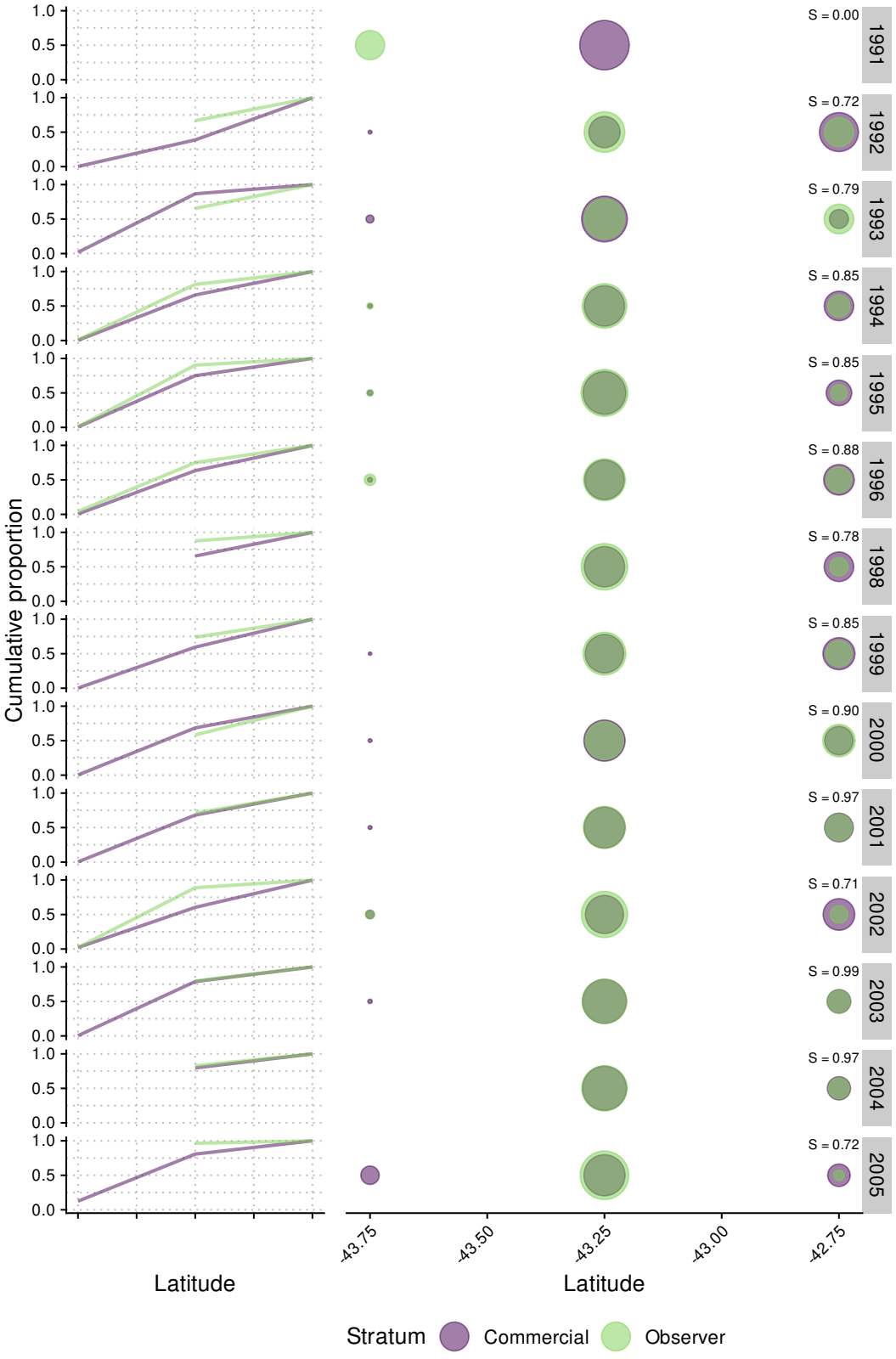


Figure 461: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 3, where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

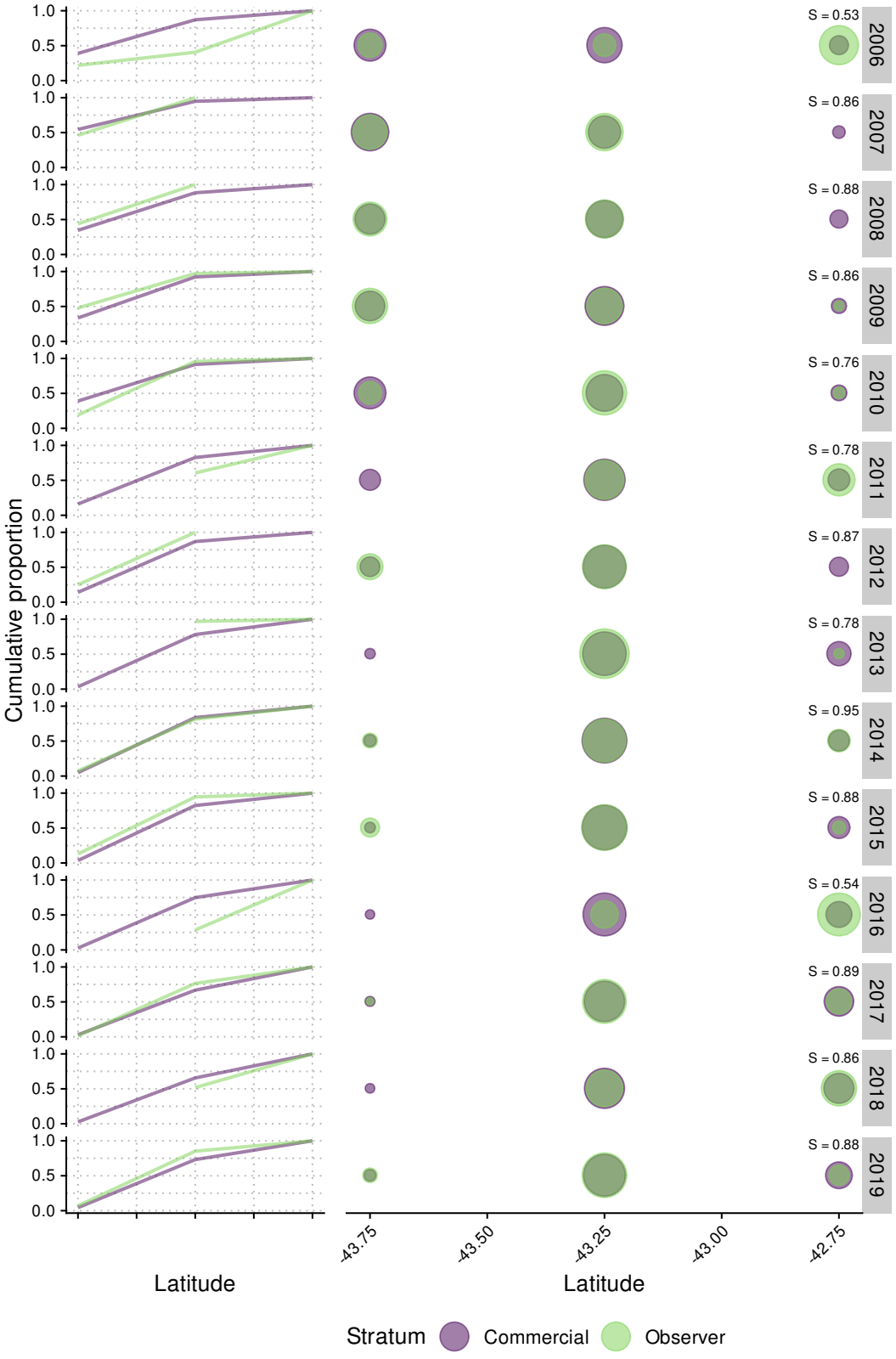


Figure 462: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 3, where the scampi catch exceeded the 20kg threshold, in 2006 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

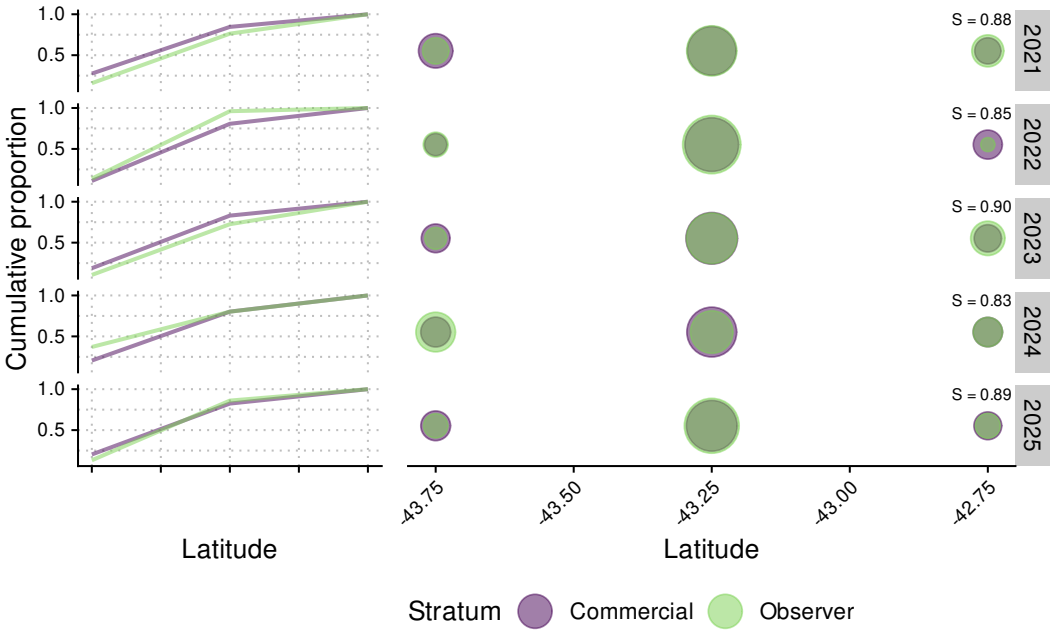


Figure 463: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 3, where the scampi catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

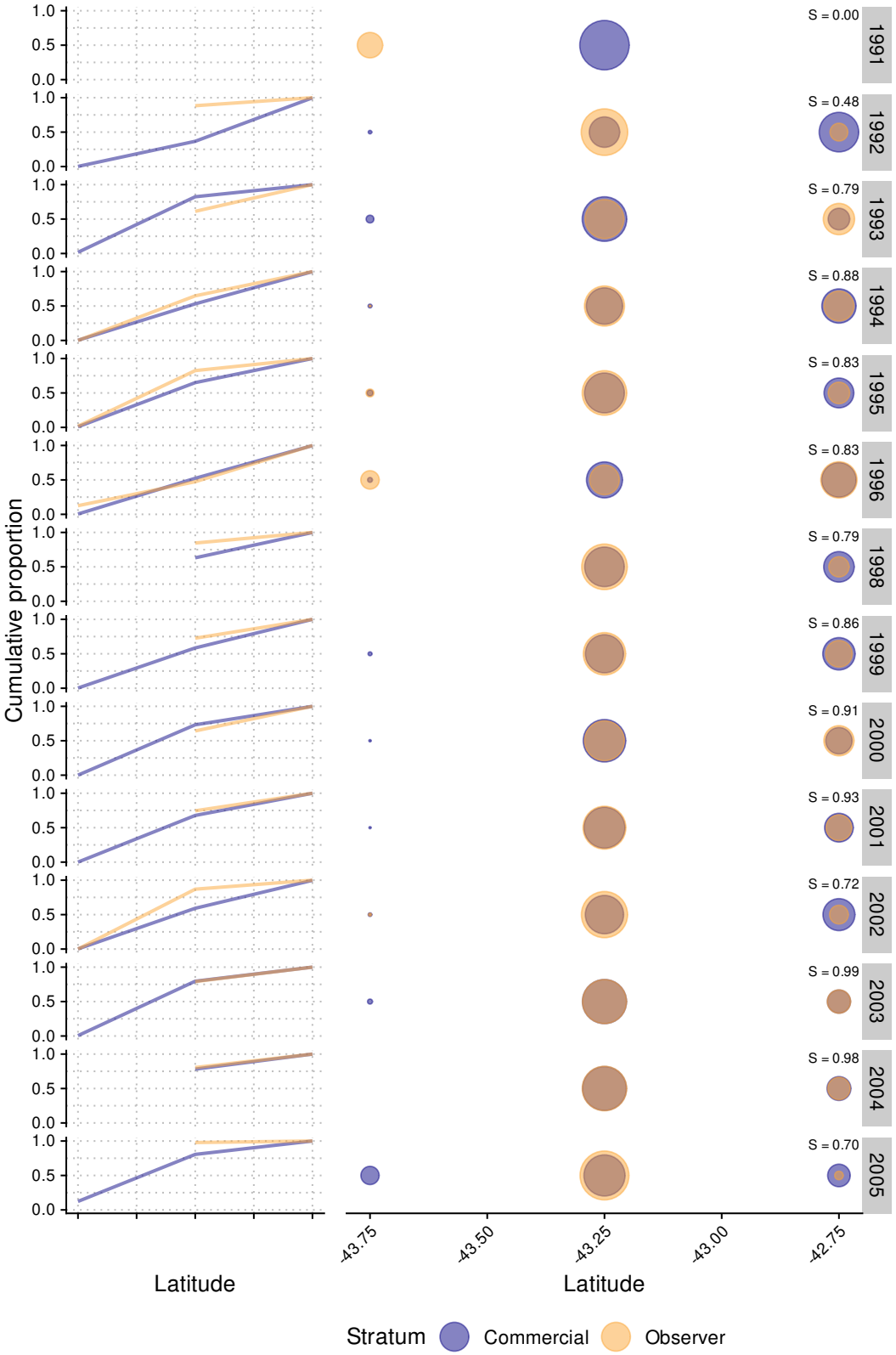


Figure 464: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 3, from events where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

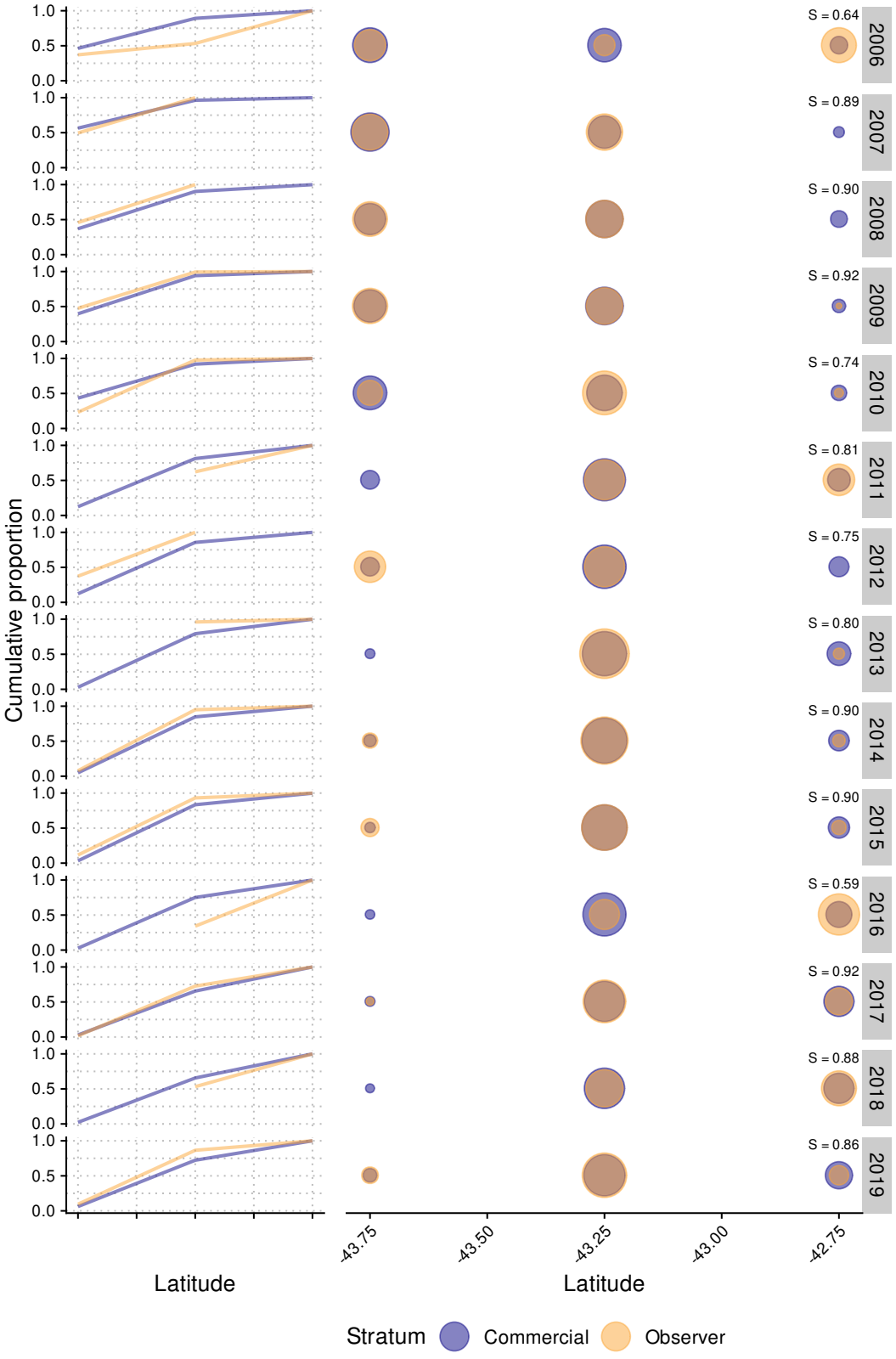


Figure 465: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 3, from events where the scampi catch exceeded the 20kg threshold, in 2006 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

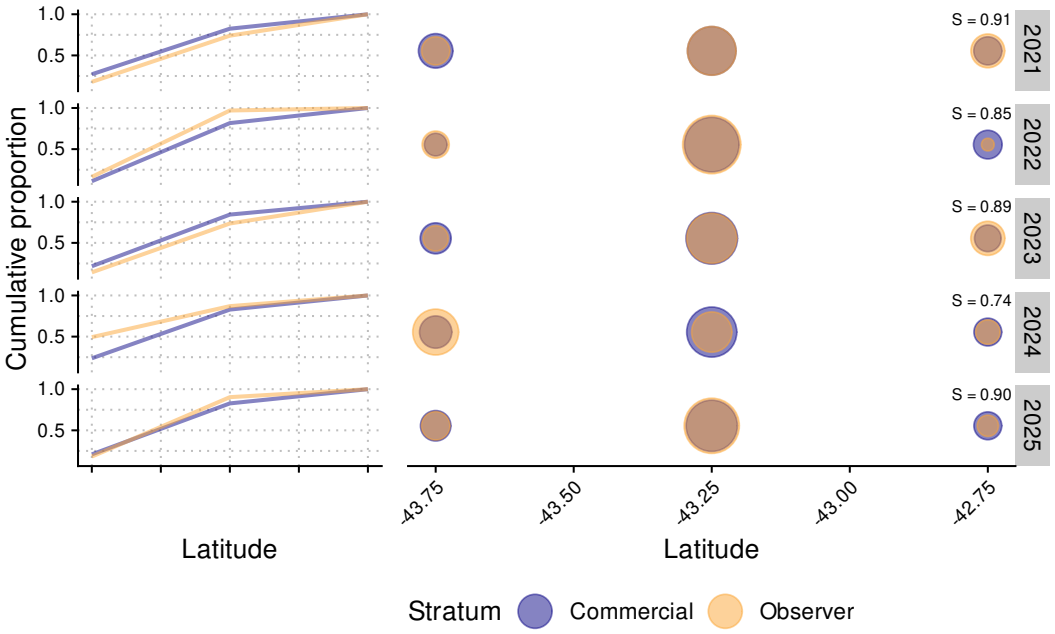


Figure 466: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 3, from events where the scampi catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

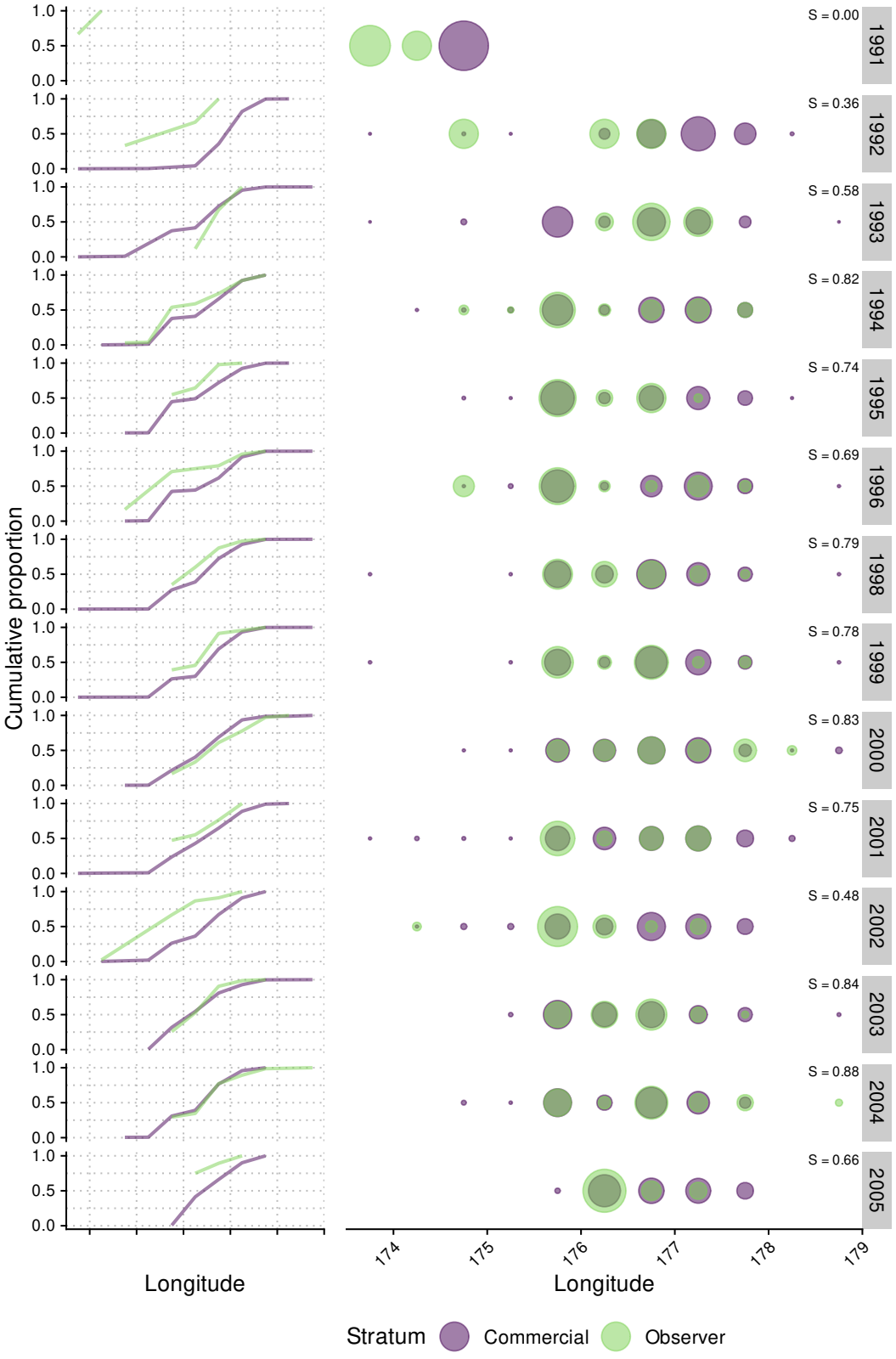


Figure 467: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 3, where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

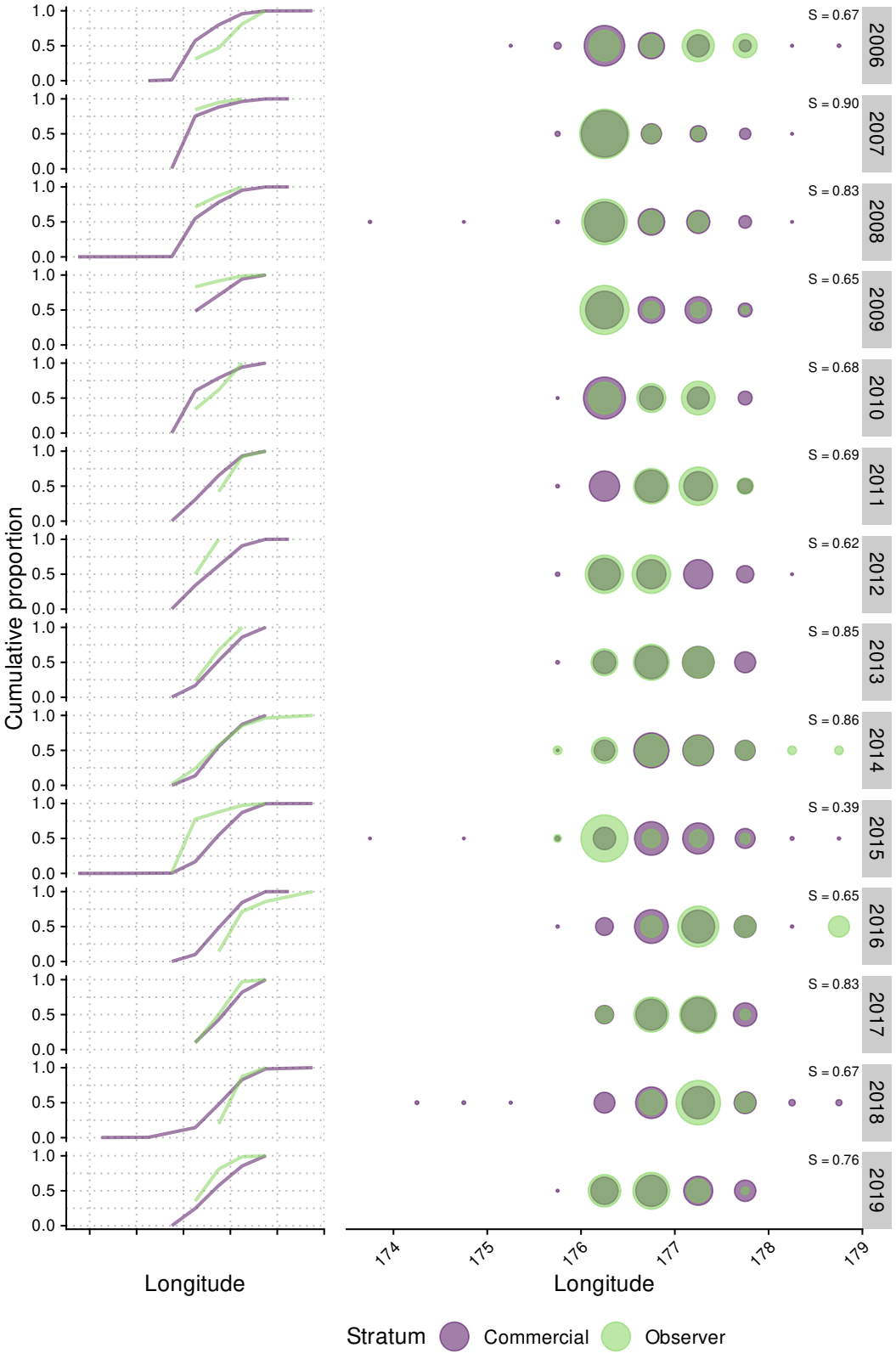


Figure 468: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 3, where the scampi catch exceeded the 20kg threshold, in 2006 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

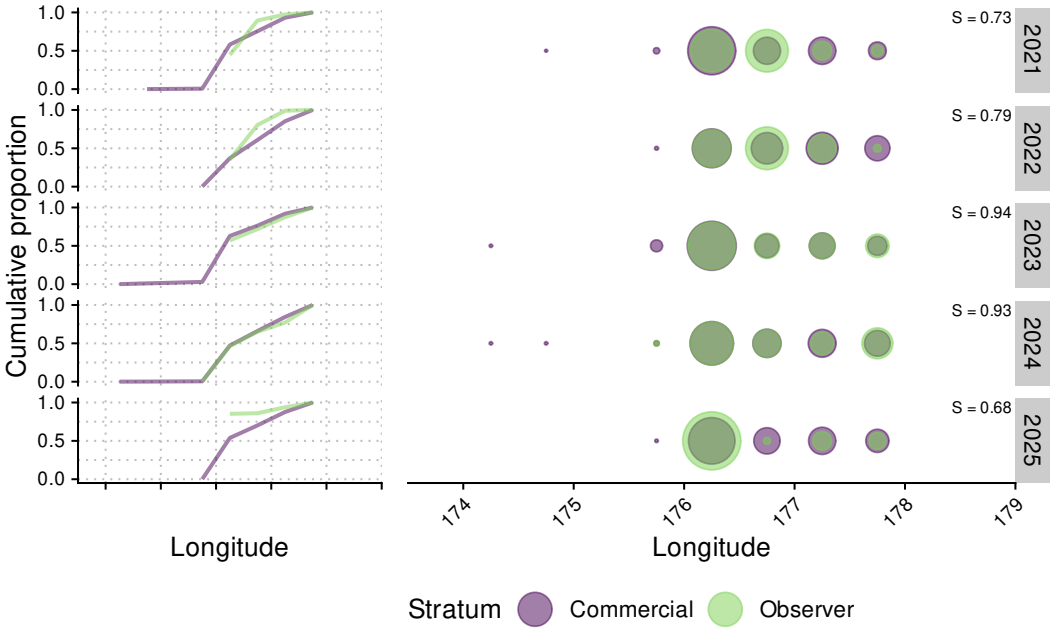


Figure 469: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 3, where the scampi catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

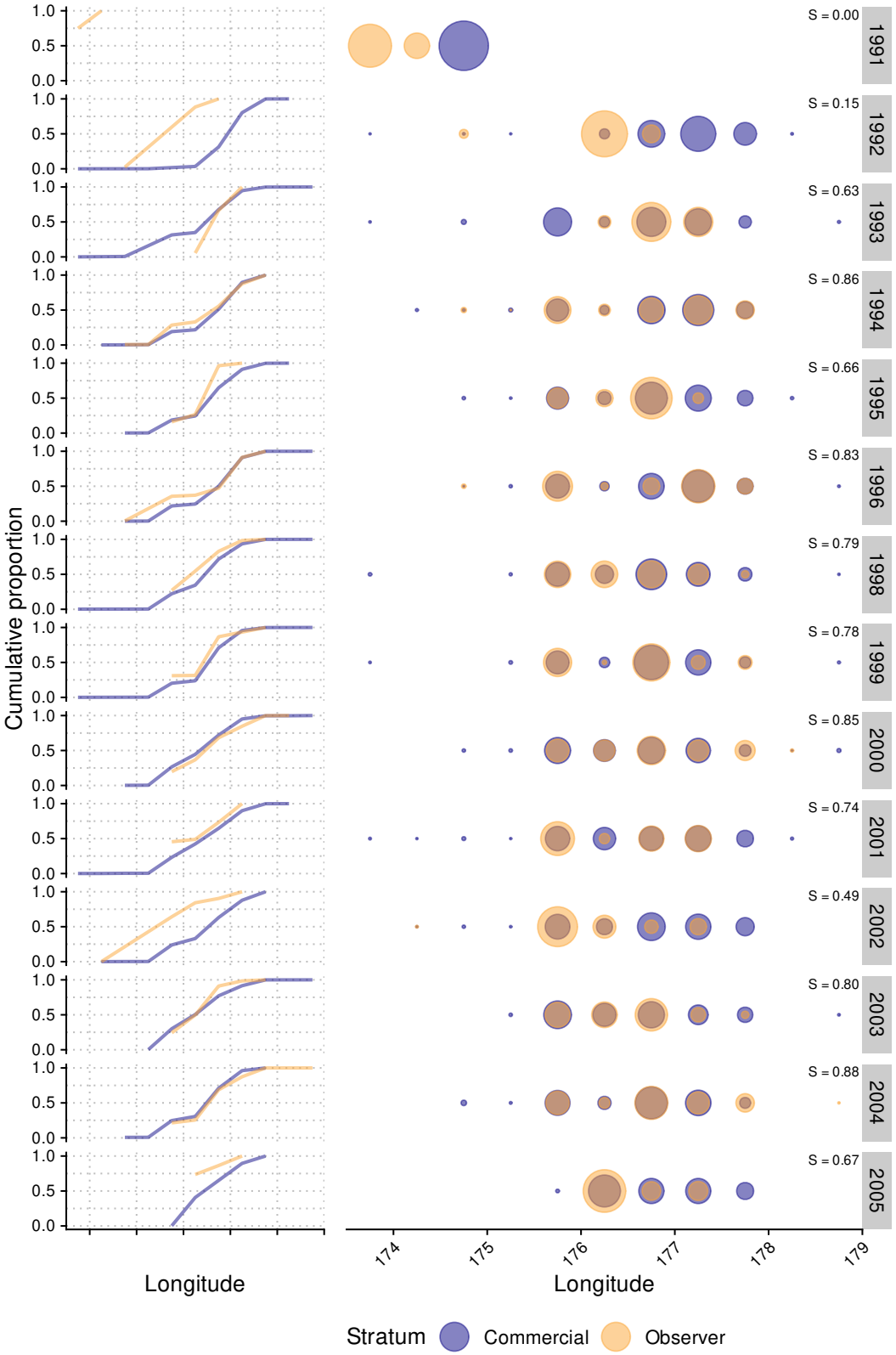


Figure 470: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 3, from events where the scampi catch exceeded the 20kg threshold, in 1991 to 2005. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

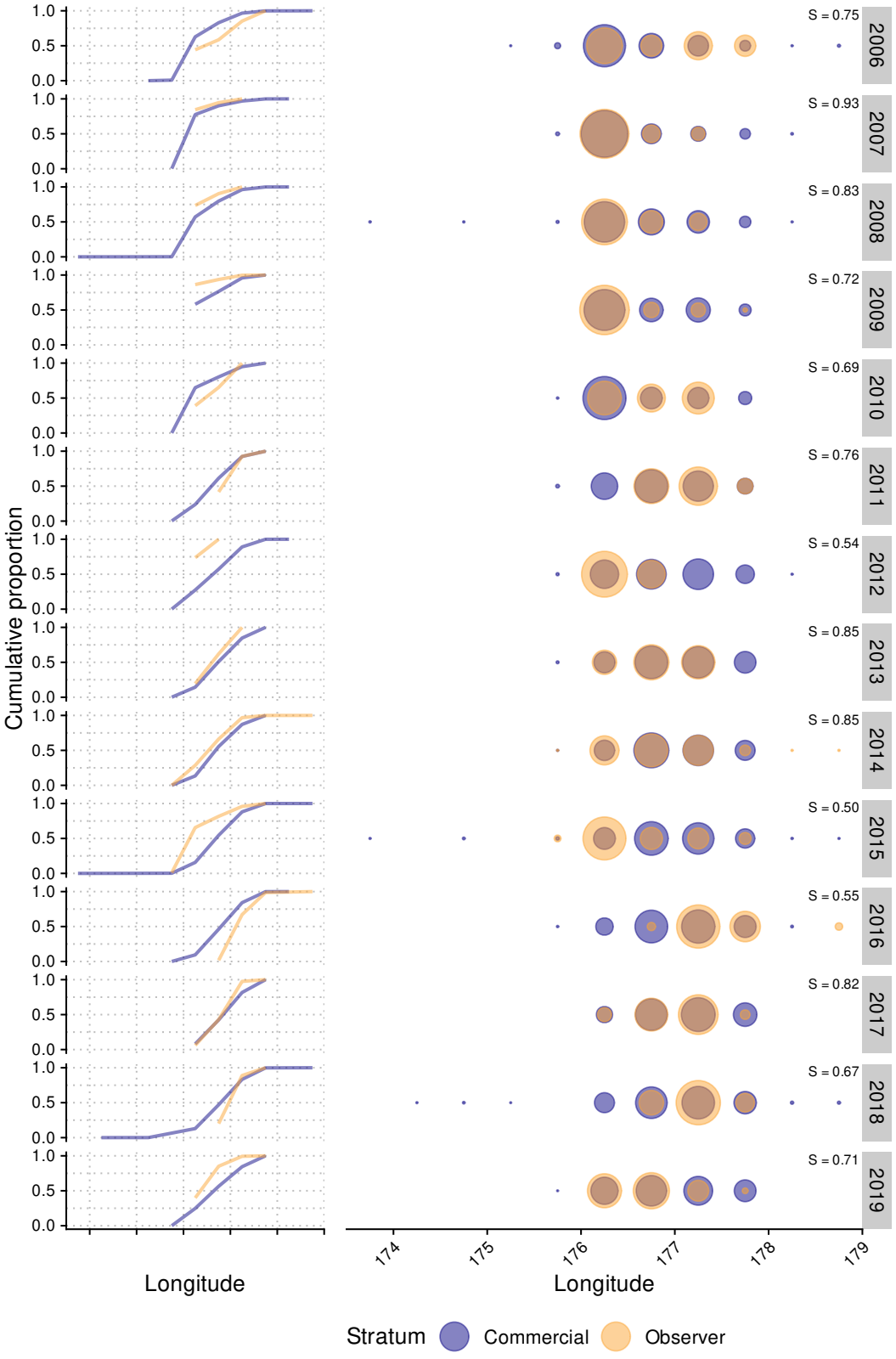


Figure 471: Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 3, from events where the scampi catch exceeded the 20kg threshold, in 2006 to 2019. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

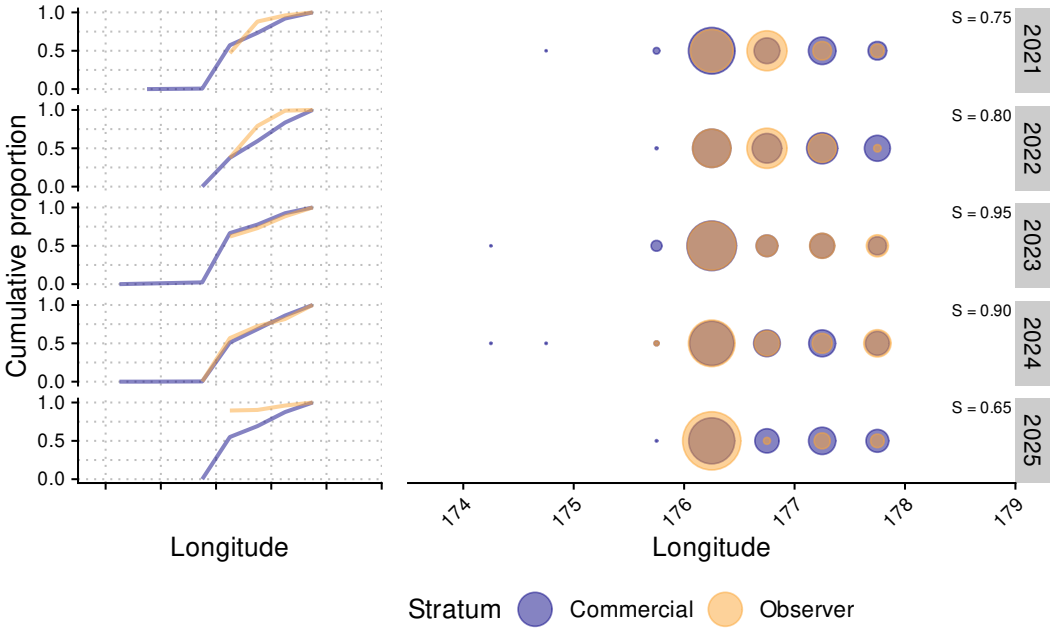


Figure 472: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 3, from events where the scampi catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

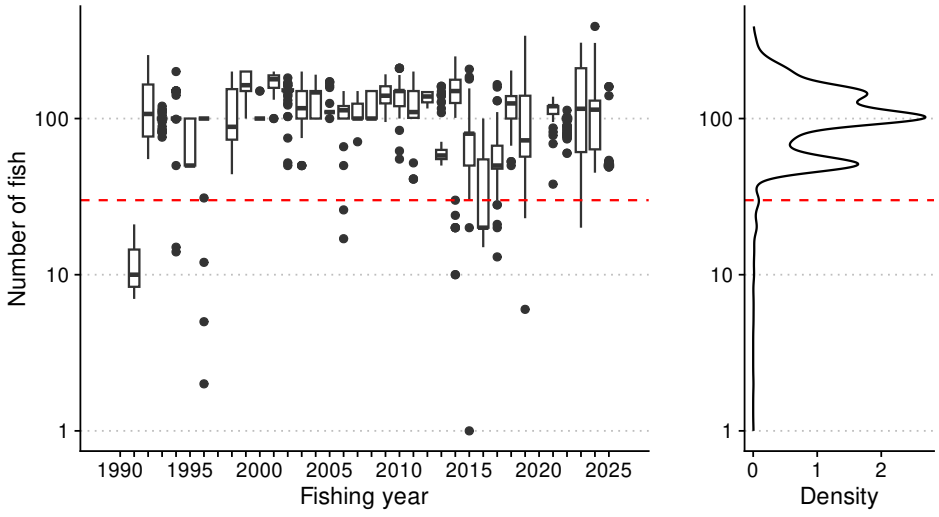


Figure 473: **Length-frequency sample sizes for observed fishing events in SCI 3 where scampi were sampled. The red dashed line indicates a sample size of 30 fish.**

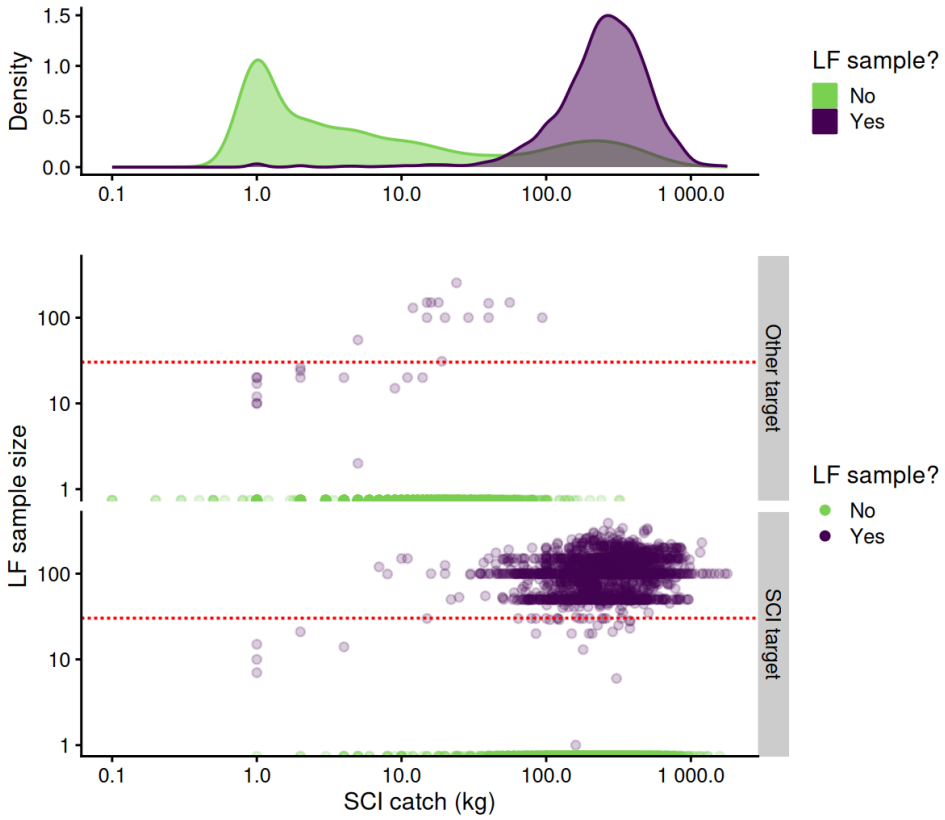


Figure 474: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SCI 3 in relation to the total scampi catch from an event, separately for scampi target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.6.3.2 Catch quantification

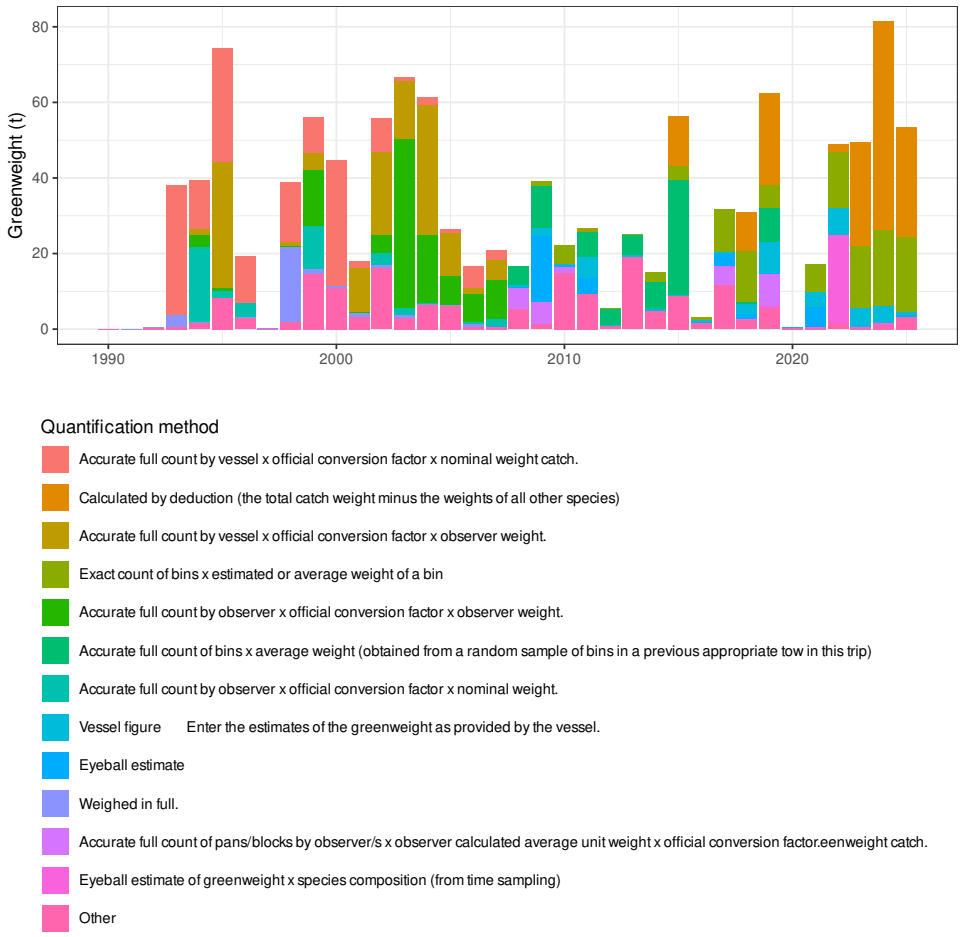


Figure 475: Methods used by observers to quantify the catch of scampi in the SCI 3 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.6.4 SCI 4A: Trawl fishery

2.6.4.1 Length-frequency samples

Table 44: Length-frequency samples of scampi from the SCI 4A Trawl fishery sampled by the Observer Programme in fishing years 1991 to 2025. Positive fishing events are those where the catch of scampi exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1991	165	0	0	0.00
1992	646	27	3 367	4.18
1993	71	0	0	0.00
1995	3	0	0	0.00
1996	1	0	0	0.00
1998	1	0	0	0.00
1999	60	0	0	0.00
2000	78	0	0	0.00
2001	3	5	500	166.67
2002	39	0	0	0.00
2003	142	22	3 123	15.49
2004	113	24	3 743	21.24
2005	569	4	628	0.70
2006	546	10	1 000	1.83
2007	330	16	1 600	4.85
2008	105	0	0	0.00
2010	3	0	0	0.00
2011	242	0	0	0.00
2012	277	20	2 865	7.22
2013	319	3	169	0.94
2014	454	0	0	0.00
2015	504	34	5 030	6.75
2016	516	0	0	0.00
2017	494	6	153	1.21
2018	267	93	8 139	34.83
2019	283	21	2 683	7.42
2020	288	21	1 054	7.29
2021	352	0	0	0.00
2022	477	13	1 240	2.73
2023	574	55	6 586	9.58
2024	703	146	7 306	20.77
2025	730	130	8 289	17.81

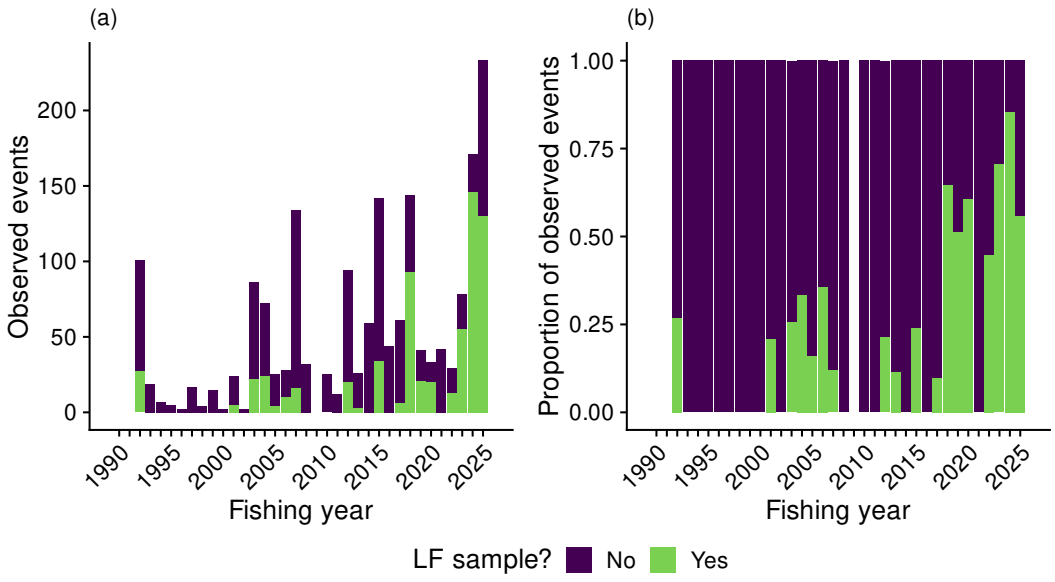


Figure 476: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SCI 4A where the scampi catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

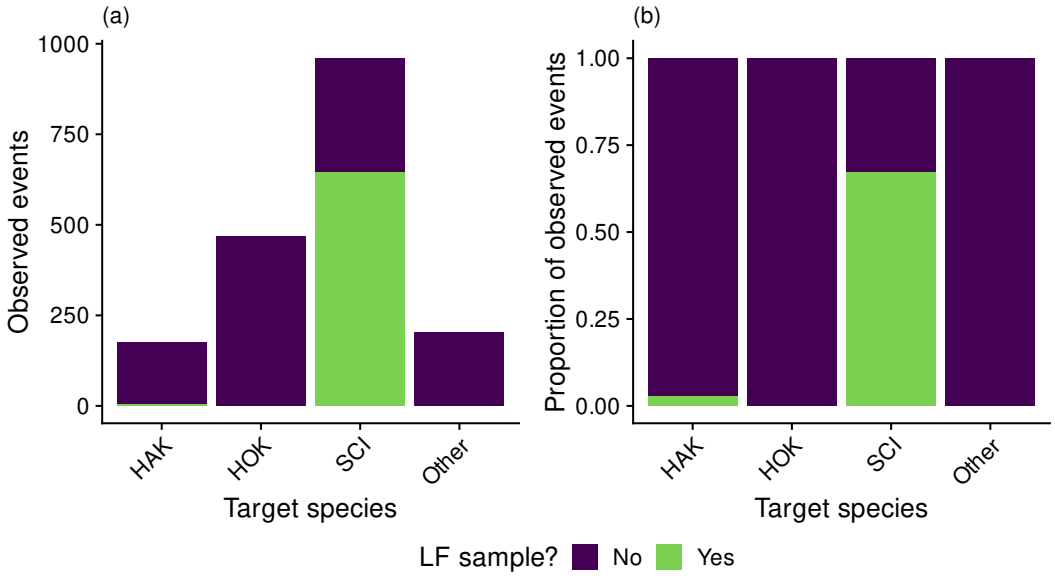


Figure 477: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SCI 4A where the scampi catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

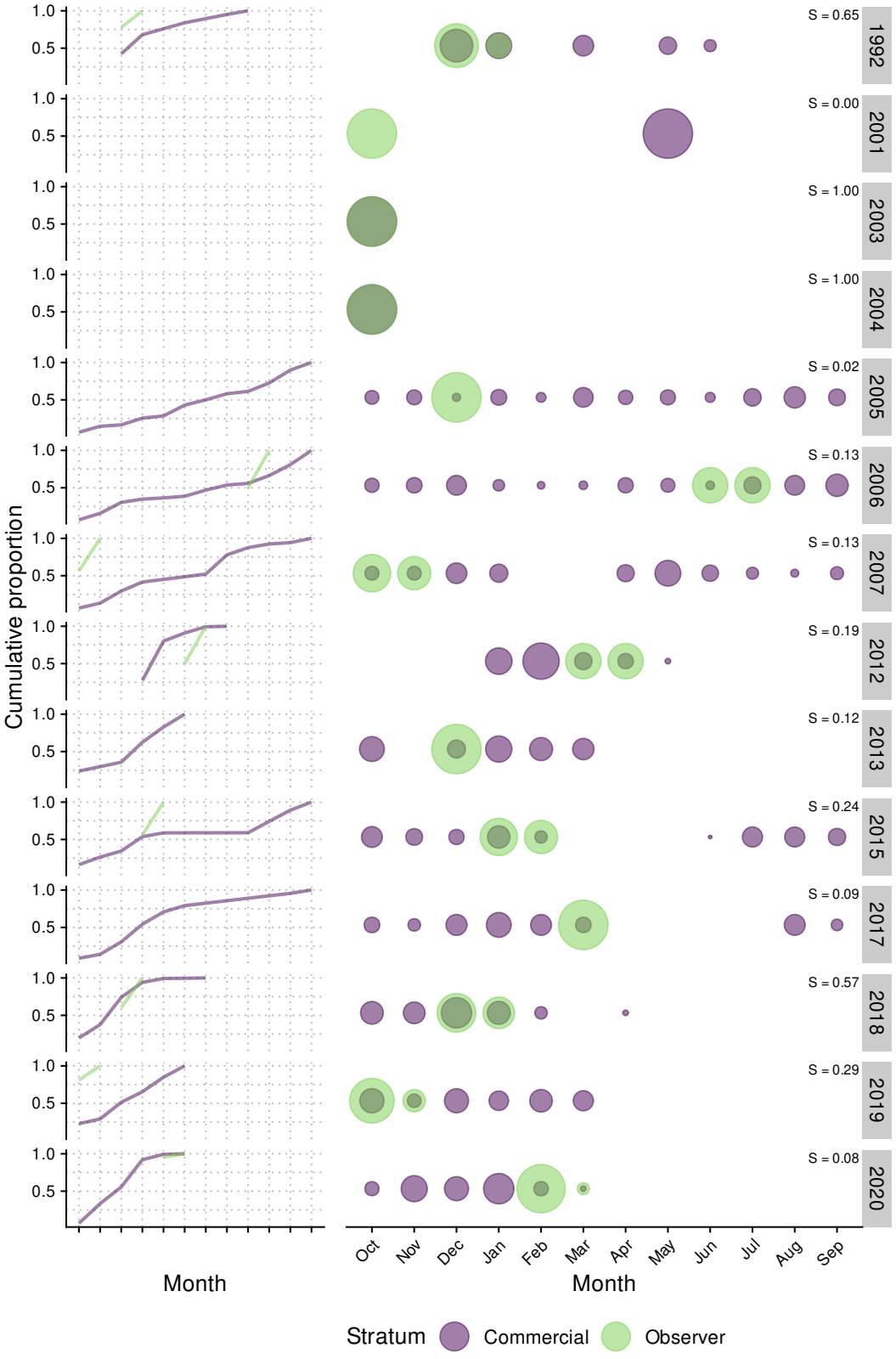


Figure 478: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 4A, where the scampi catch exceeded the 20kg threshold, in 1992 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

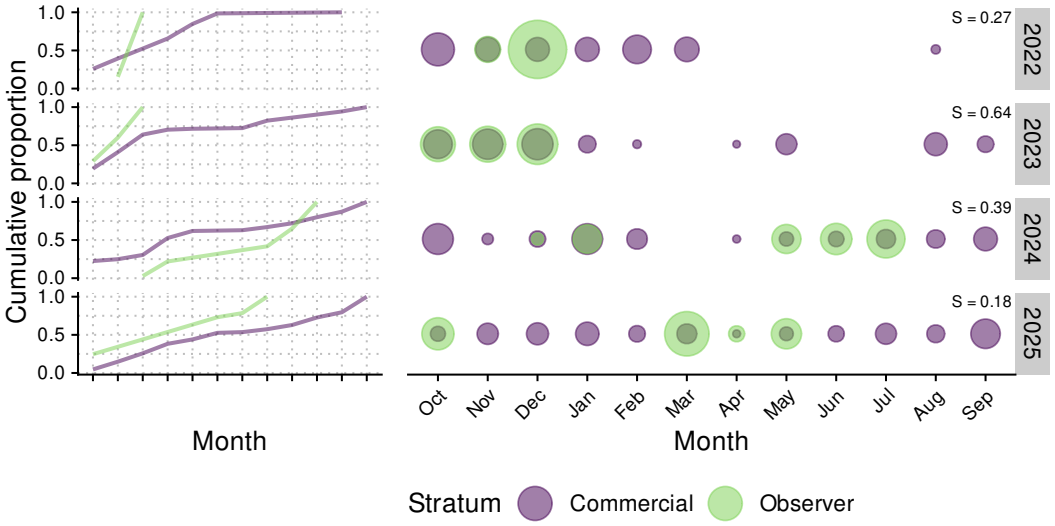


Figure 479: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 4A, where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

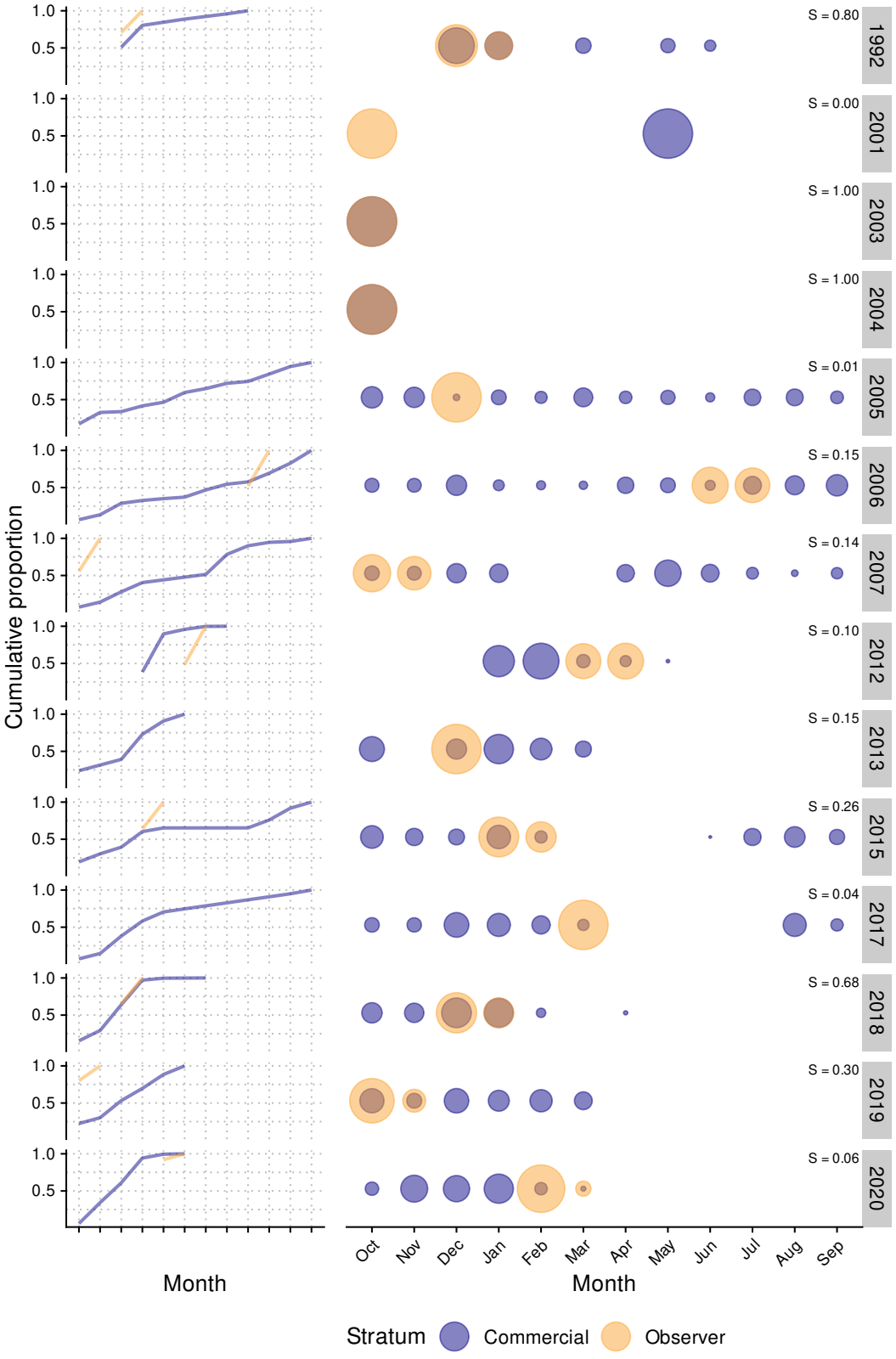


Figure 480: **Monthly representativeness of observer sampling coverage of Trawl catch in SCI 4A, from events where the scampi catch exceeded the 20kg threshold, in 1992 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

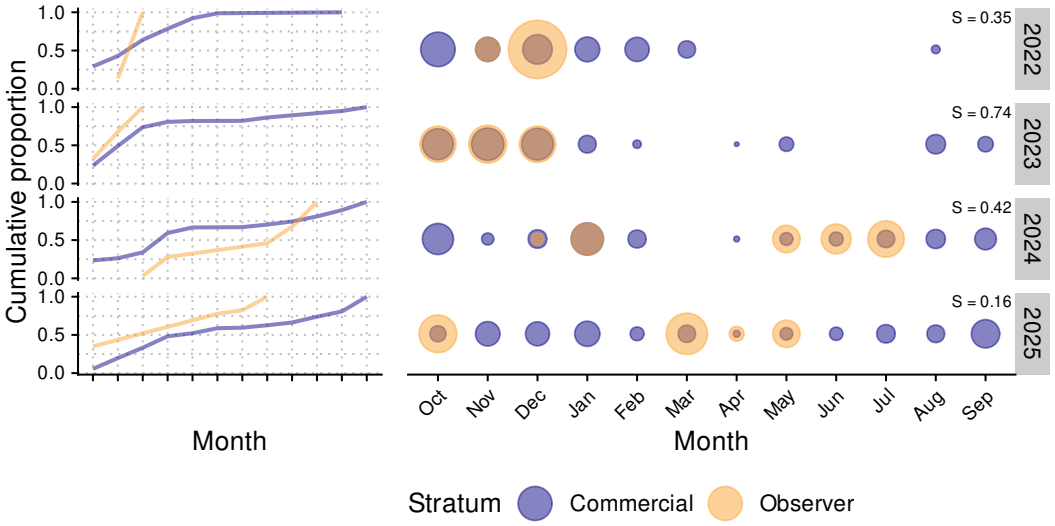


Figure 481: Monthly representativeness of observer sampling coverage of Trawl catch in SCI 4A, from events where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

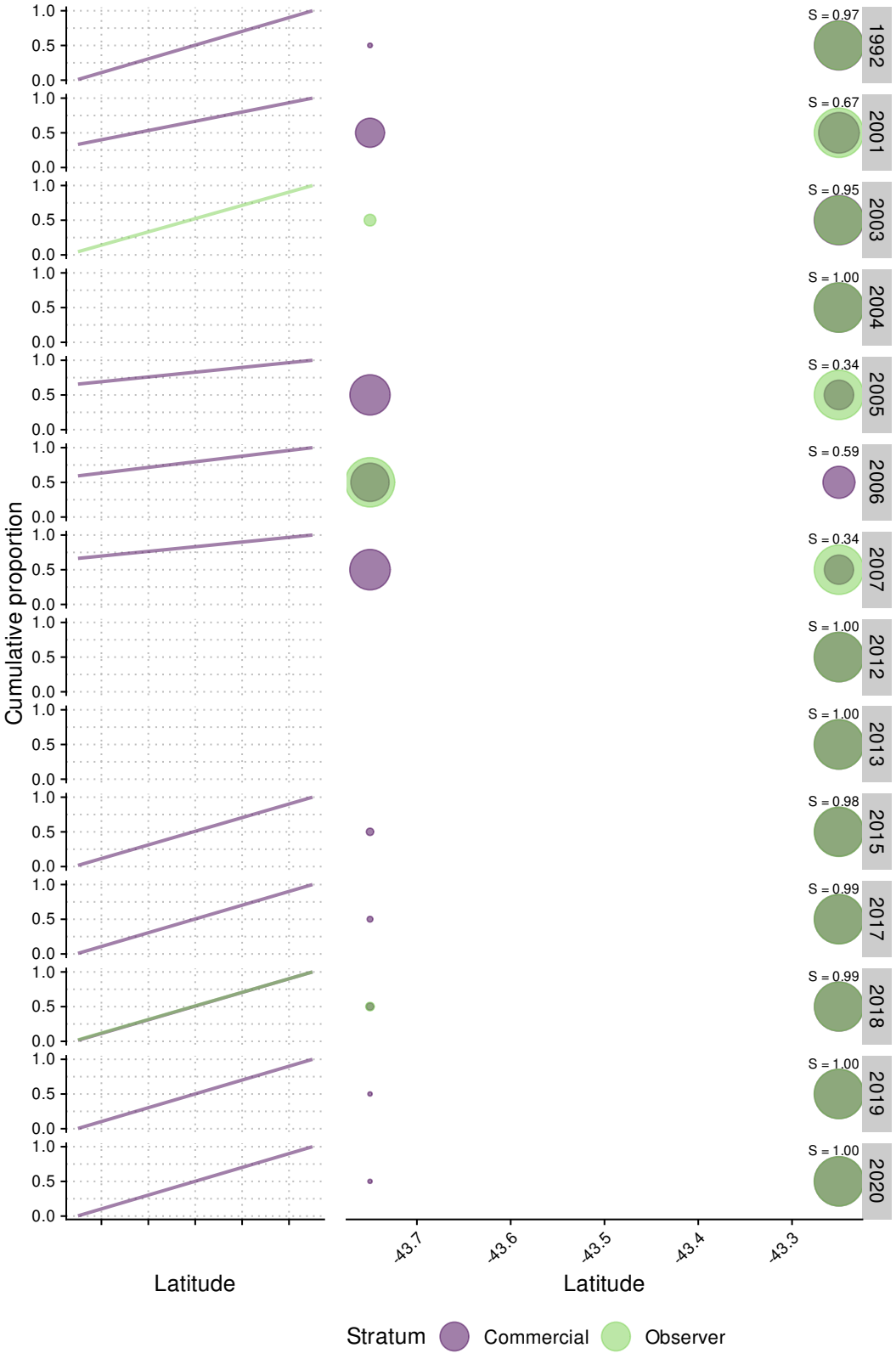


Figure 482: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 4A, where the scampi catch exceeded the 20kg threshold, in 1992 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

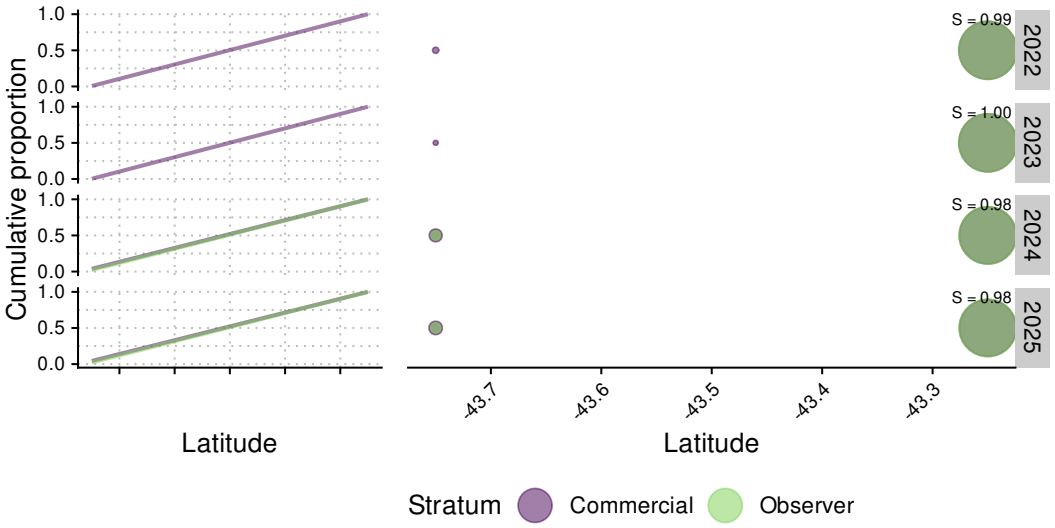


Figure 483: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 4A, where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

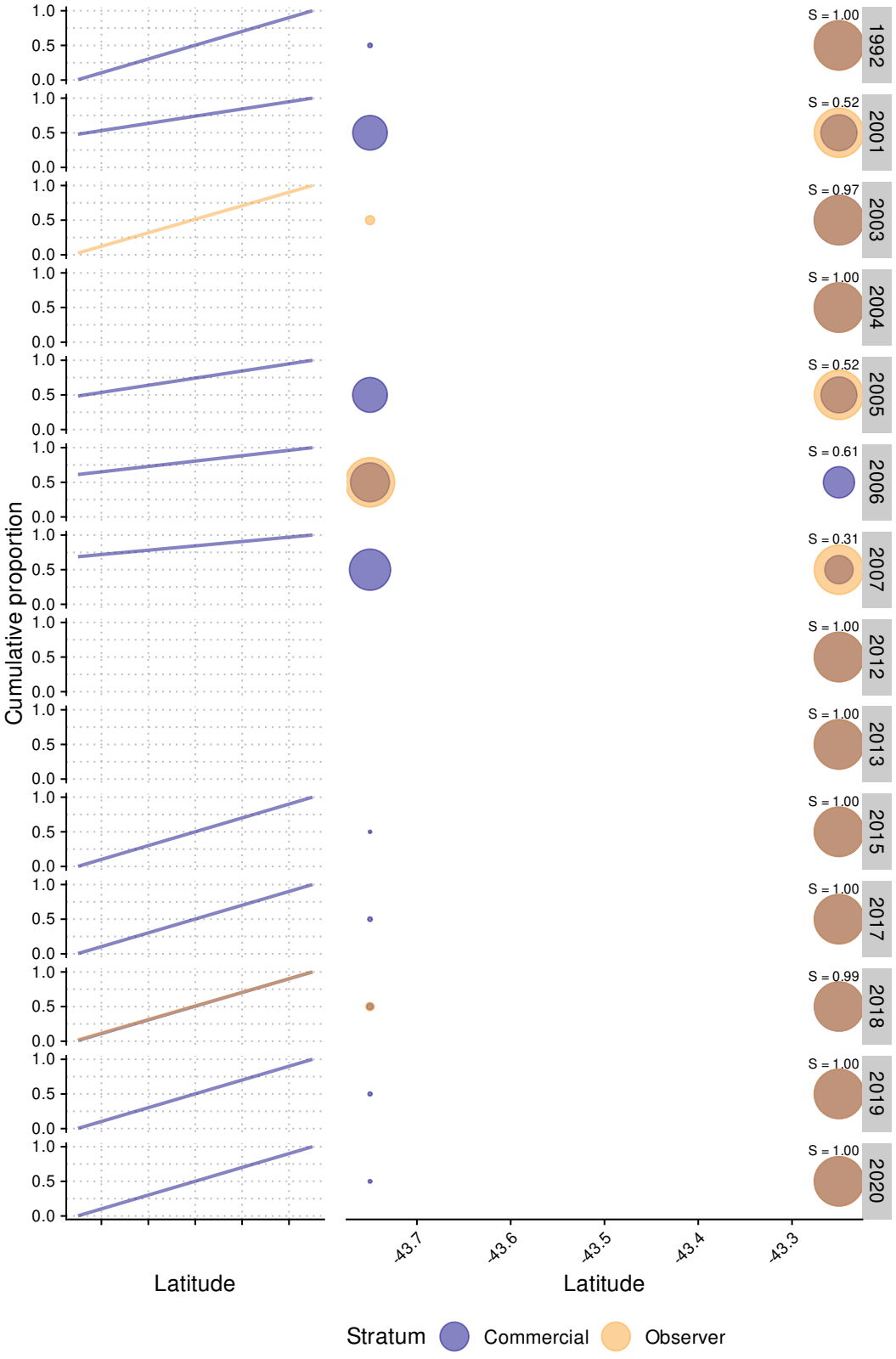


Figure 484: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 4A, from events where the scampi catch exceeded the 20kg threshold, in 1992 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

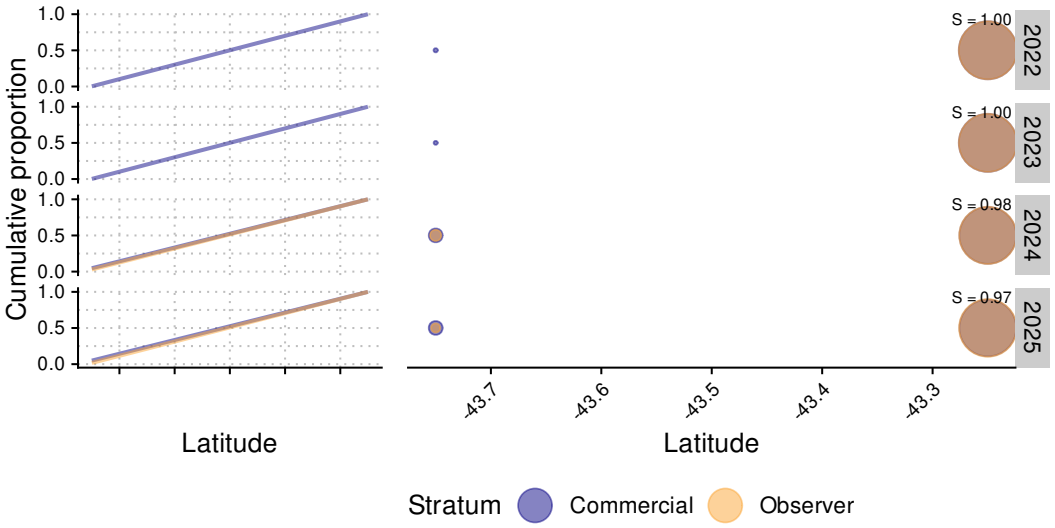


Figure 485: Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 4A, from events where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

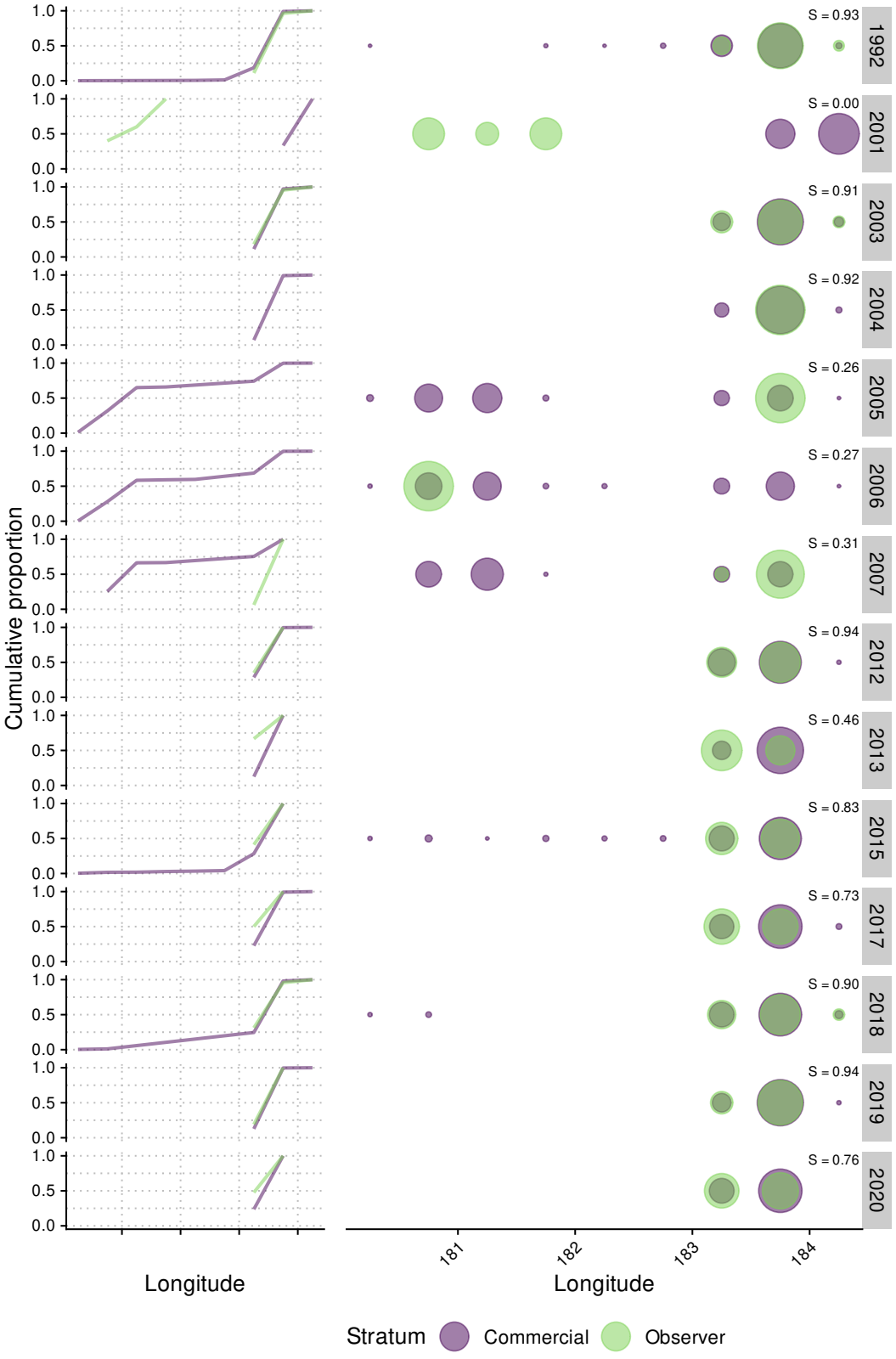


Figure 486: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 4A, where the scampi catch exceeded the 20kg threshold, in 1992 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

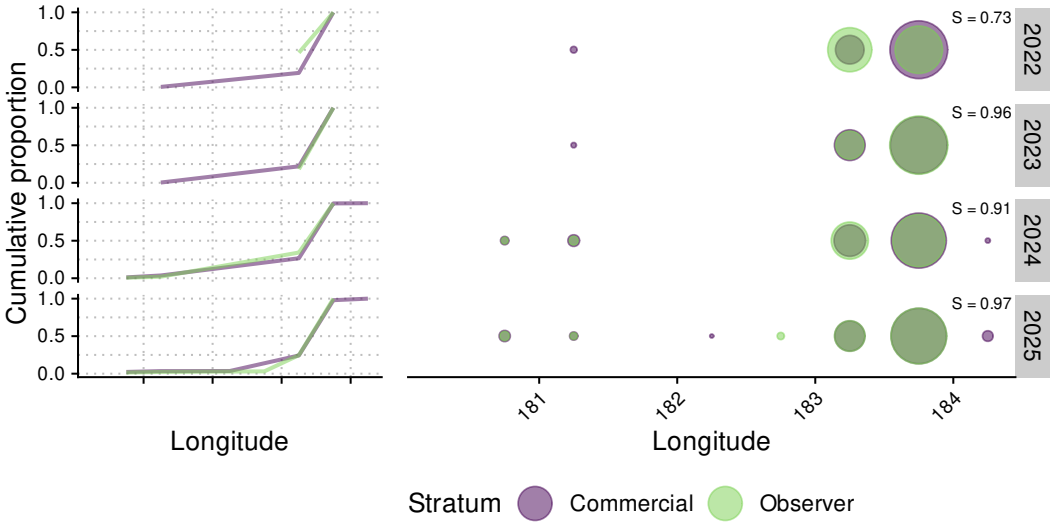


Figure 487: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 4A, where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

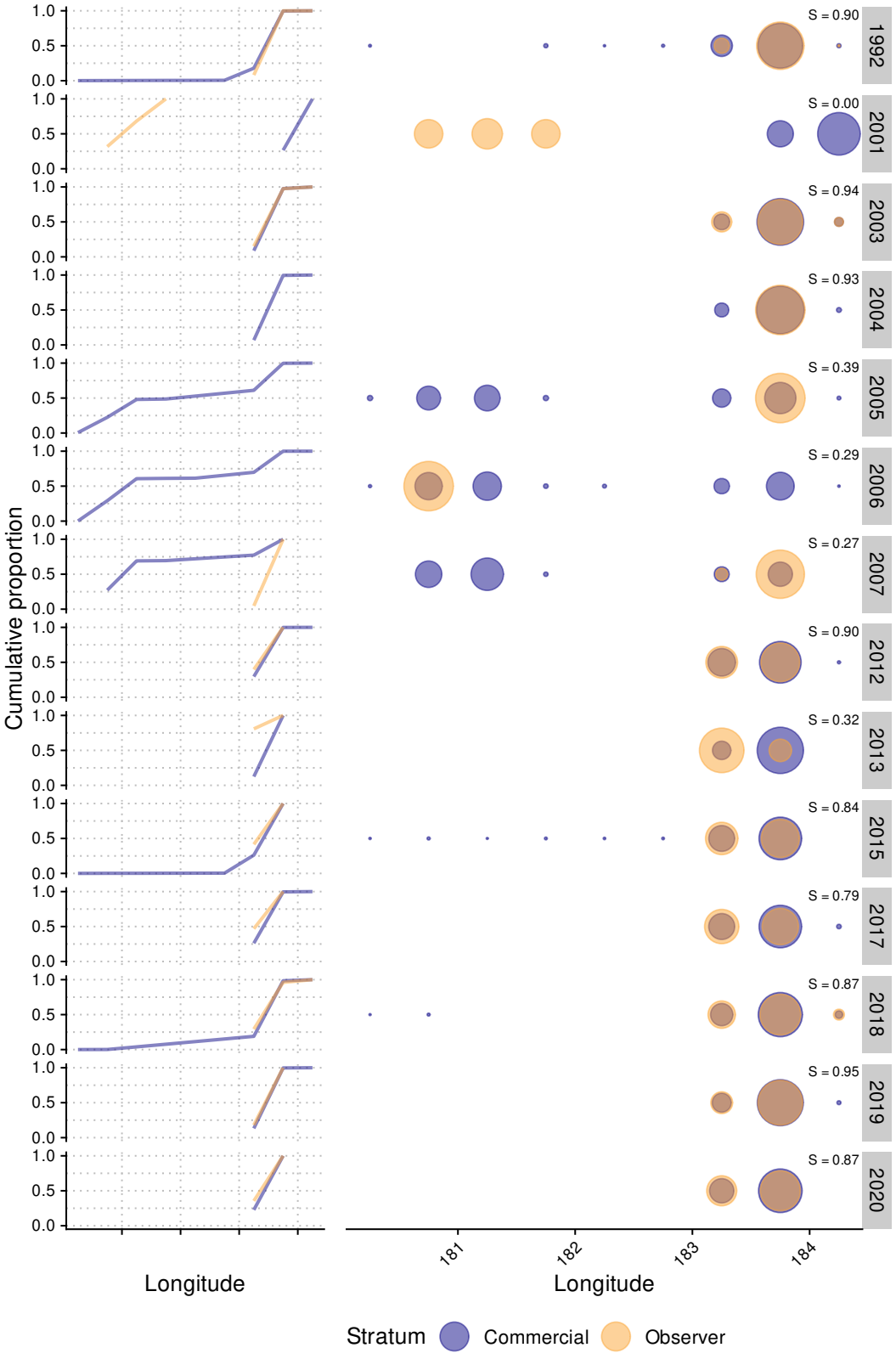


Figure 488: Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 4A, from events where the scampi catch exceeded the 20kg threshold, in 1992 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

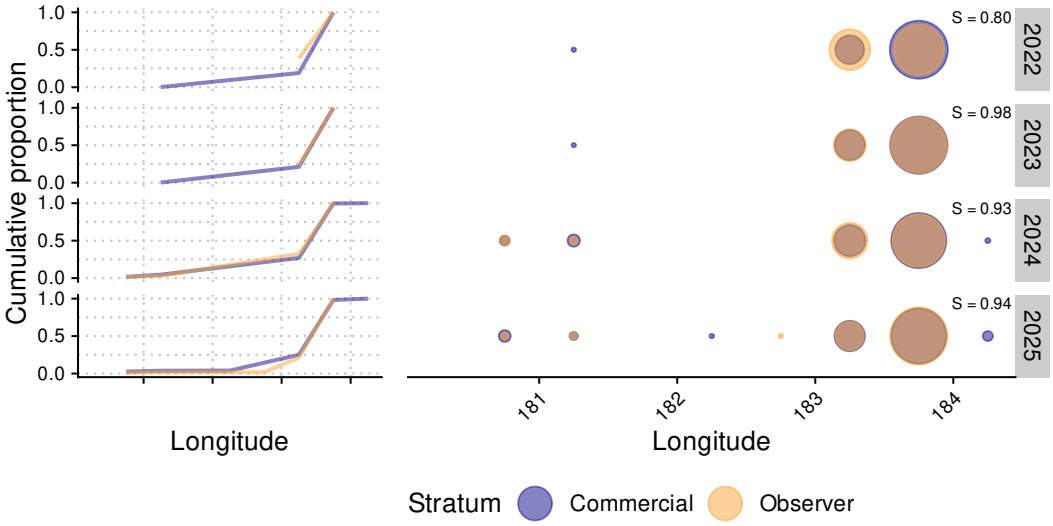


Figure 489: Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 4A, from events where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

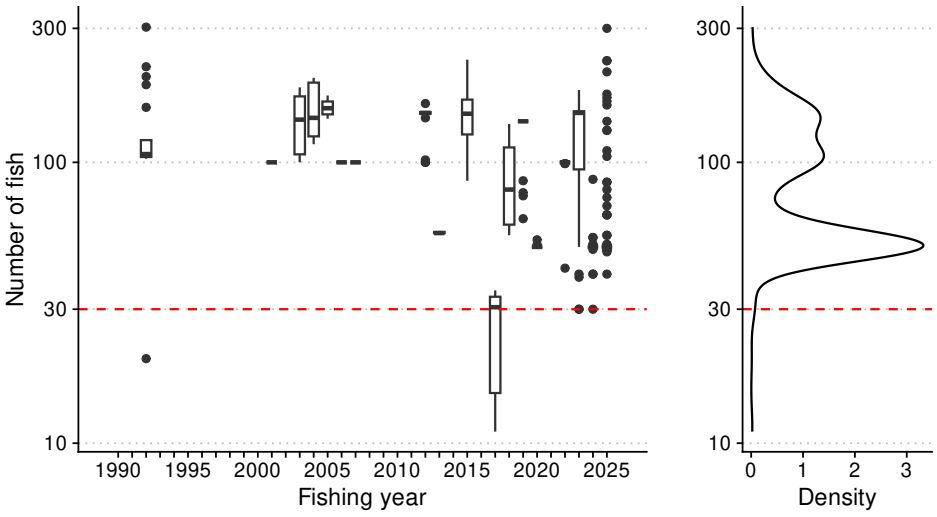


Figure 490: Length-frequency sample sizes for observed fishing events in SCI 4A where scampi were sampled. The red dashed line indicates a sample size of 30 fish.

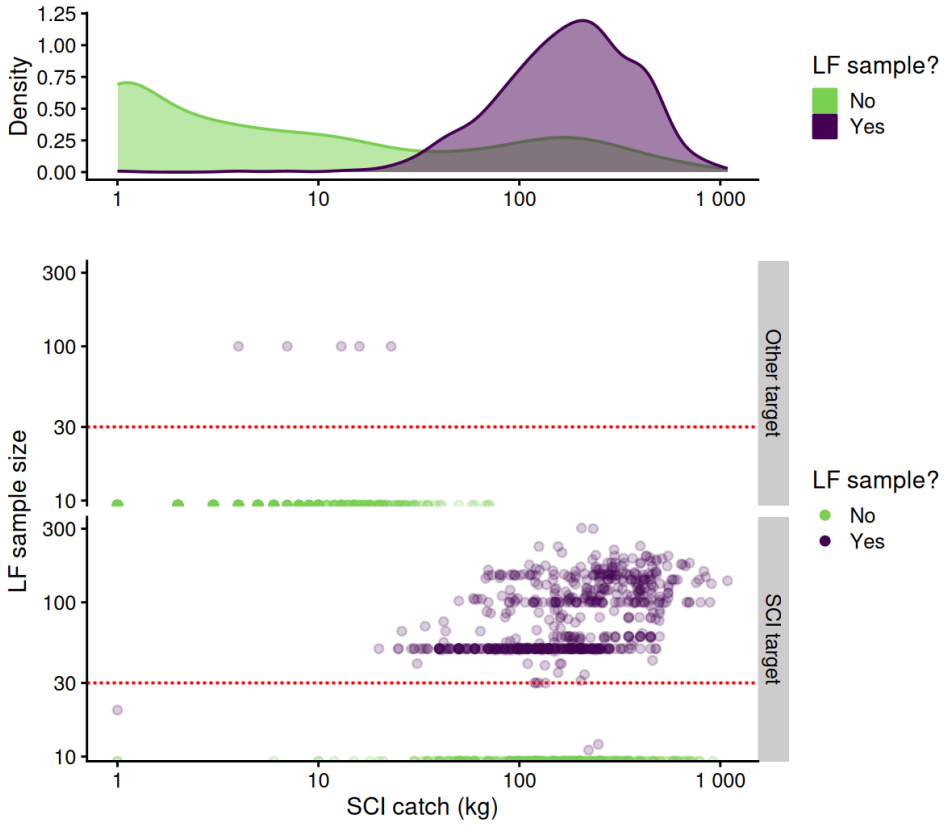


Figure 491: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SCI 4A in relation to the total scampi catch from an event, separately for scampi target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.6.4.2 Catch quantification

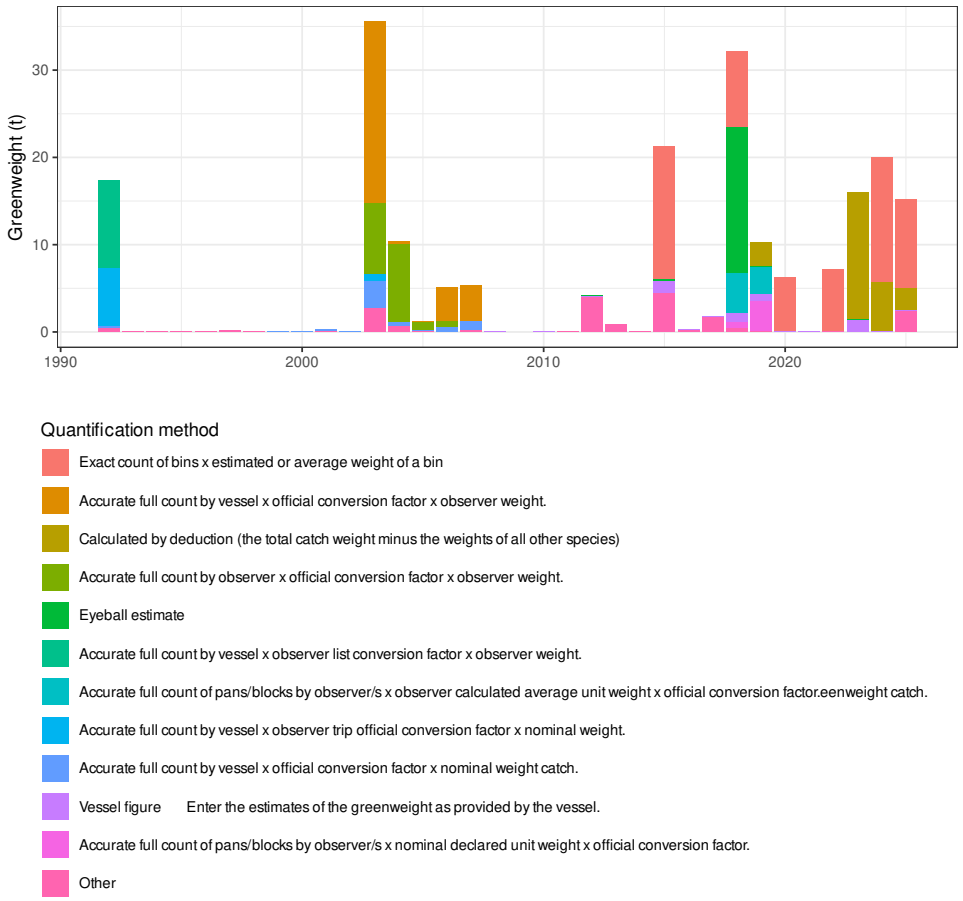


Figure 492: Methods used by observers to quantify the catch of scampi in the SCI 4A Trawl fishery. The legend lists the methods used in descending order of total catch.

2.6.5 SCI 6A: Trawl fishery

2.6.5.1 Length-frequency samples

Table 45: Length-frequency samples of scampi from the SCI 6A Trawl fishery sampled by the Observer Programme in fishing years 1992 to 2025. Positive fishing events are those where the catch of scampi exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1992	734	81	9250	11.04
1993	863	69	6625	8.00
1994	1345	136	12524	10.11
1995	1095	20	2600	1.83
1996	1210	32	3200	2.64
1997	1164	125	16932	10.74
1998	1127	93	12667	8.25
1999	1255	12	1493	0.96
2000	1254	33	3663	2.63
2001	1350	36	4782	2.67
2002	1475	64	7721	4.34
2003	1316	55	6532	4.18
2004	1199	64	9960	5.34
2005	1222	0	0	0.00
2006	1276	41	4599	3.21
2007	1318	34	3235	2.58
2008	1317	42	3876	3.19
2009	1380	35	4344	2.54
2010	909	30	4194	3.30
2011	1374	103	8482	7.50
2012	1234	57	4023	4.62
2013	1046	89	10883	8.51
2014	870	56	9263	6.44
2015	606	0	0	0.00
2016	1350	46	2140	3.41
2017	1649	264	20516	16.01
2018	1734	115	14485	6.63
2019	1626	274	19085	16.85
2020	1404	239	21477	17.02
2021	1345	51	3457	3.79
2022	1676	184	15383	10.98
2023	1660	184	20636	11.08
2024	1421	240	17874	16.89
2025	1921	253	25862	13.17

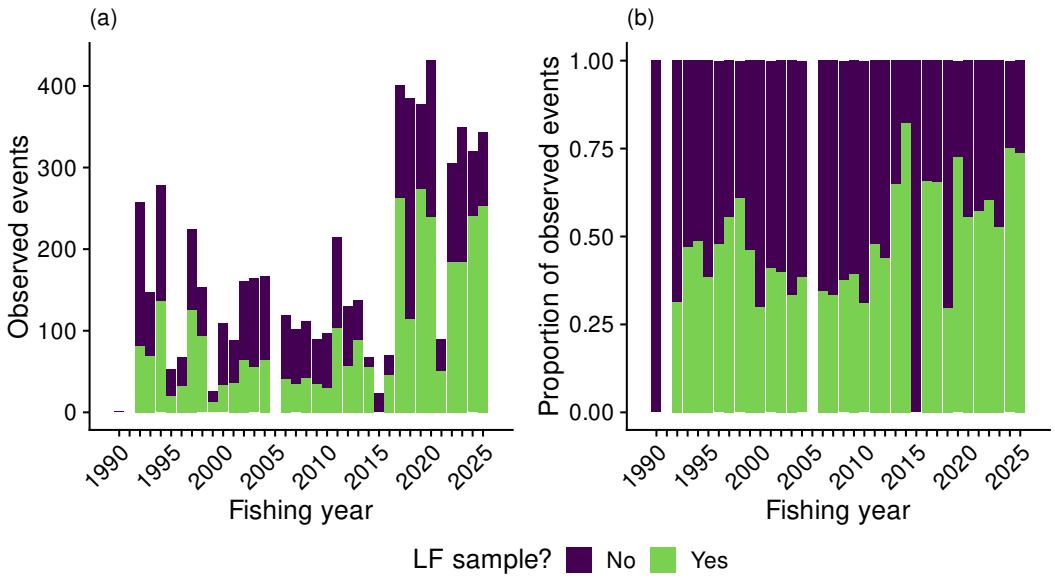


Figure 493: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SCI 6A where the scampi catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

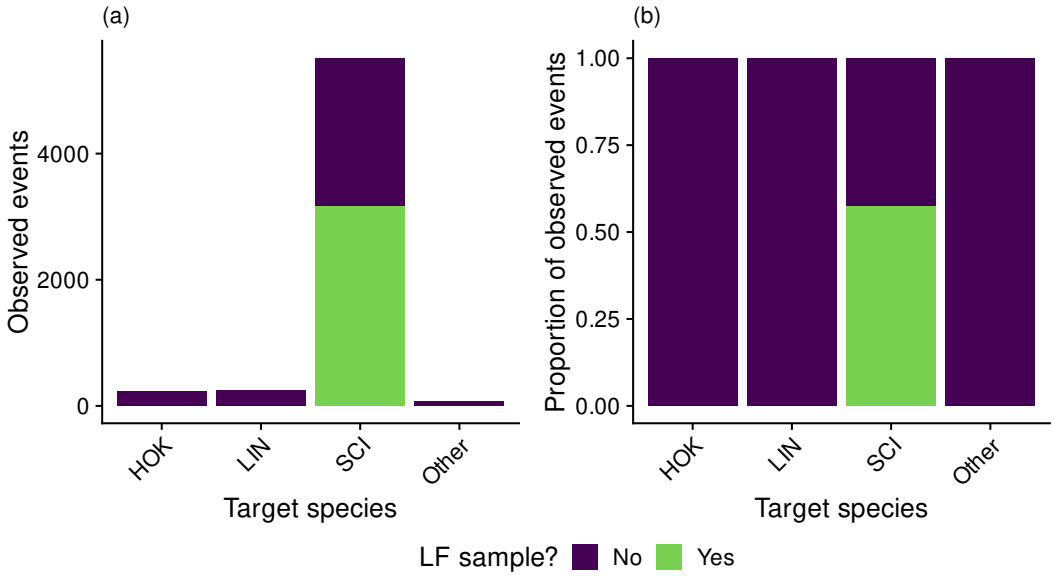


Figure 494: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SCI 6A where the scampi catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

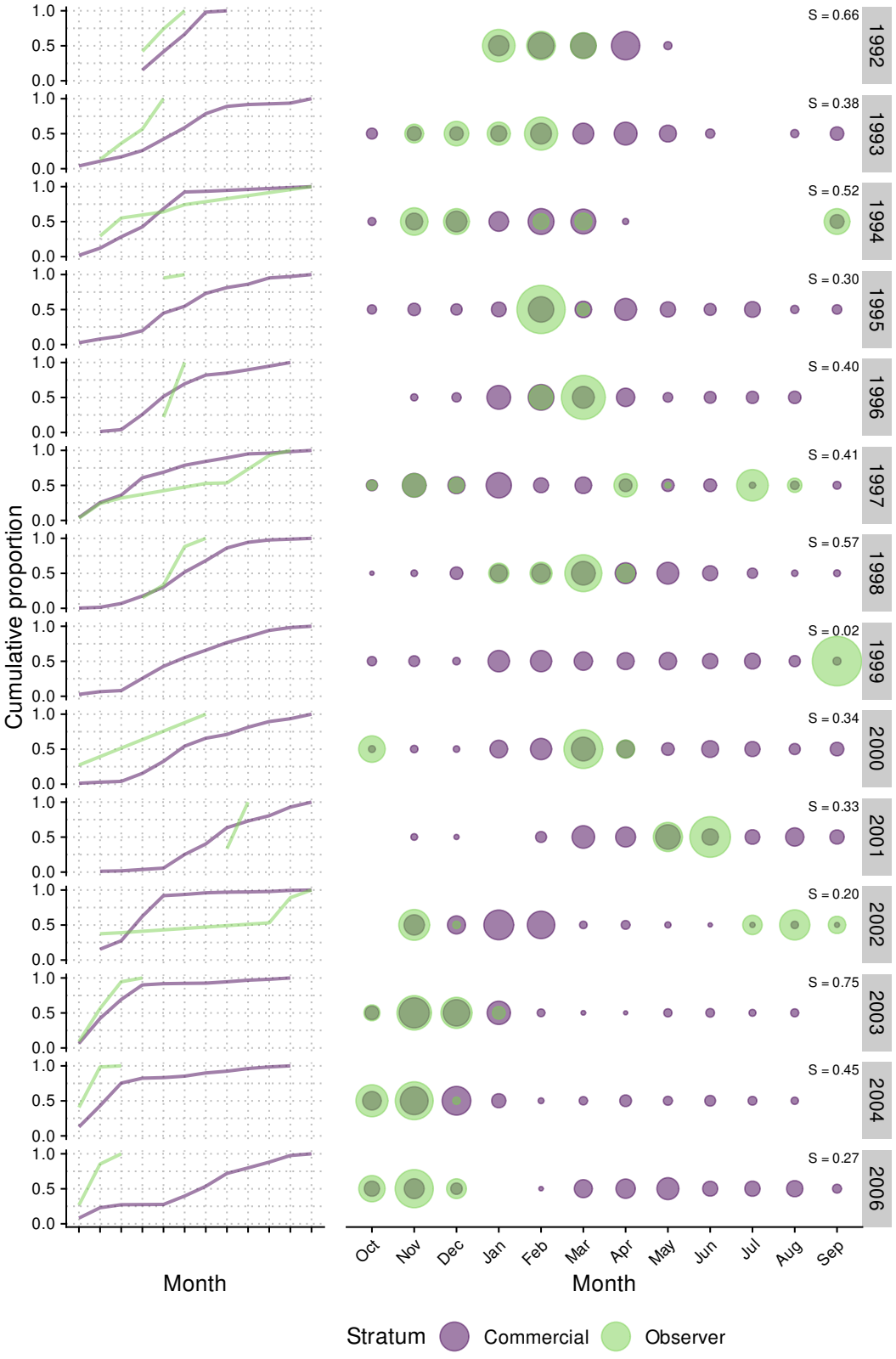


Figure 495: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 6A, where the scampi catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

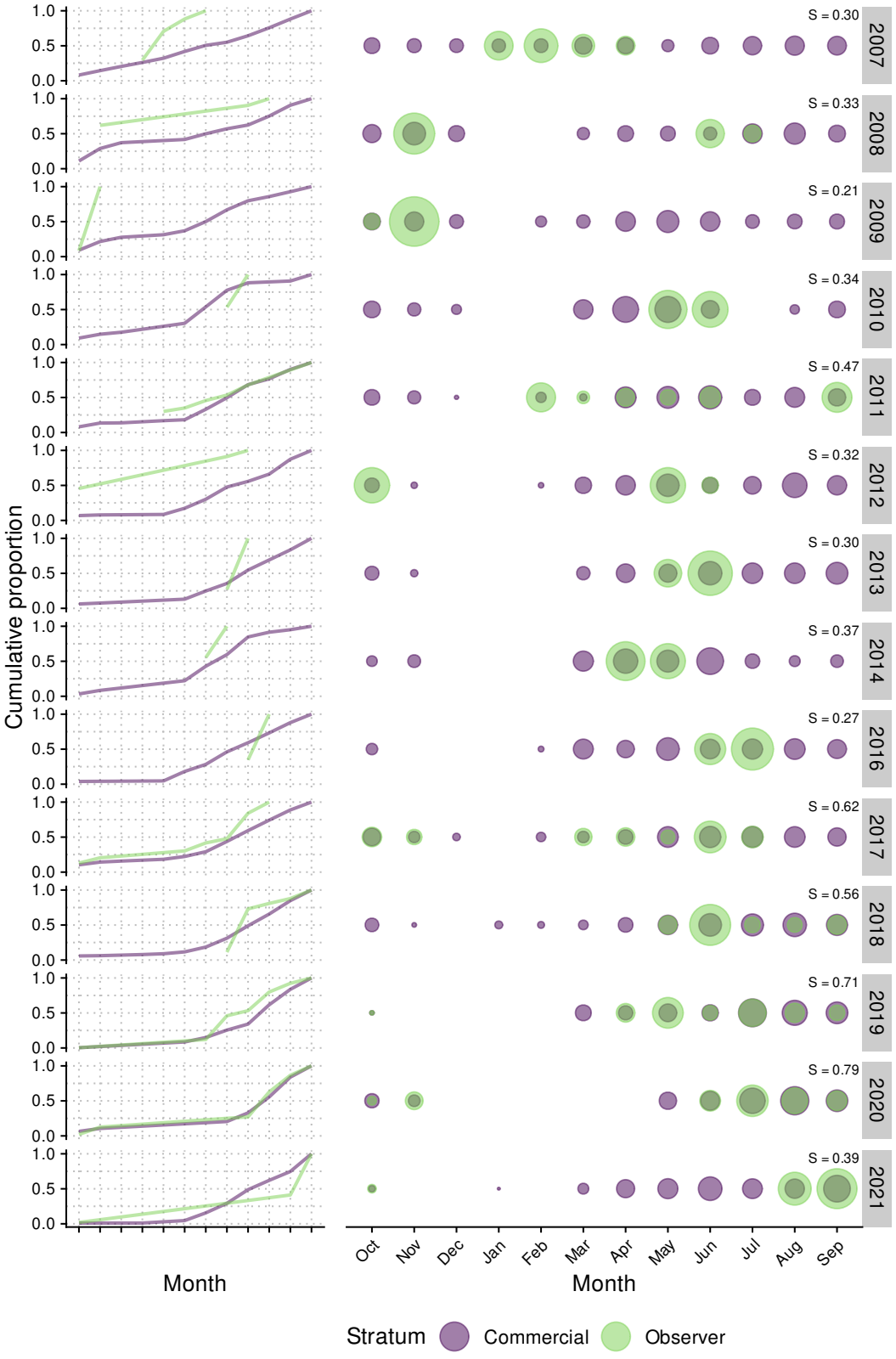


Figure 496: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 6A, where the scampi catch exceeded the 20kg threshold, in 2007 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

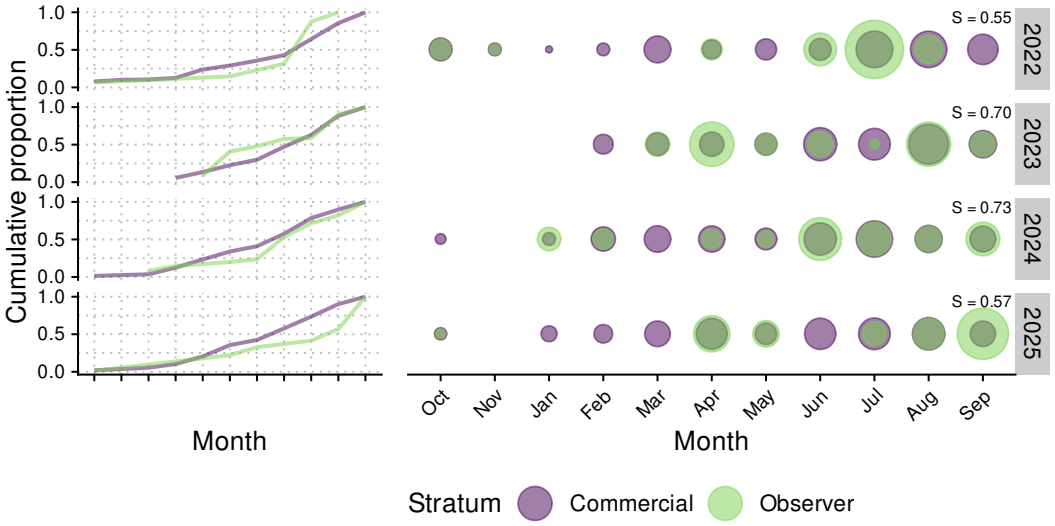


Figure 497: Monthly representativeness of observer sampling coverage of Trawl fishing events in SCI 6A, where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

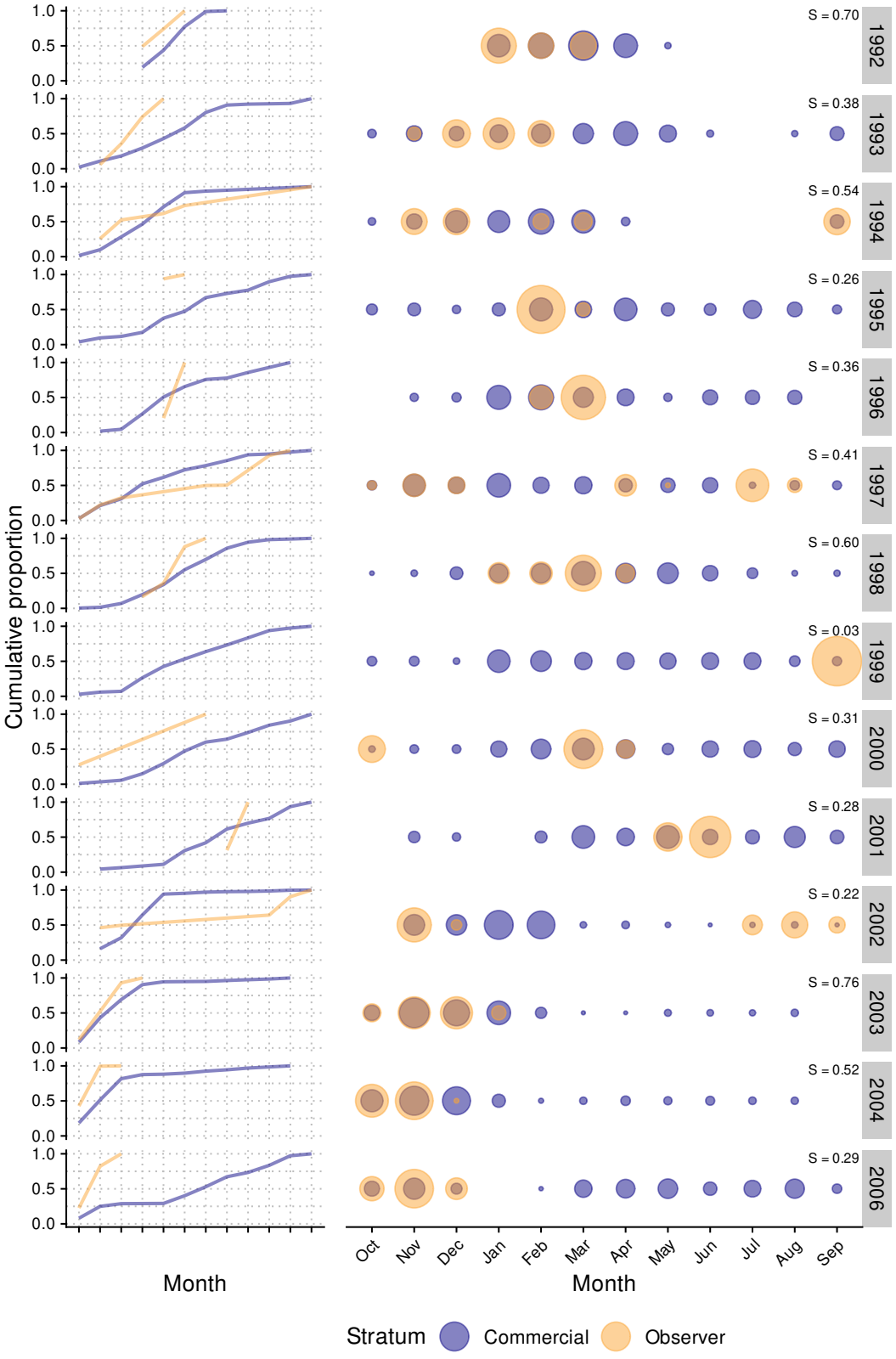


Figure 498: Monthly representativeness of observer sampling coverage of Trawl catch in SCI 6A, from events where the scampi catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

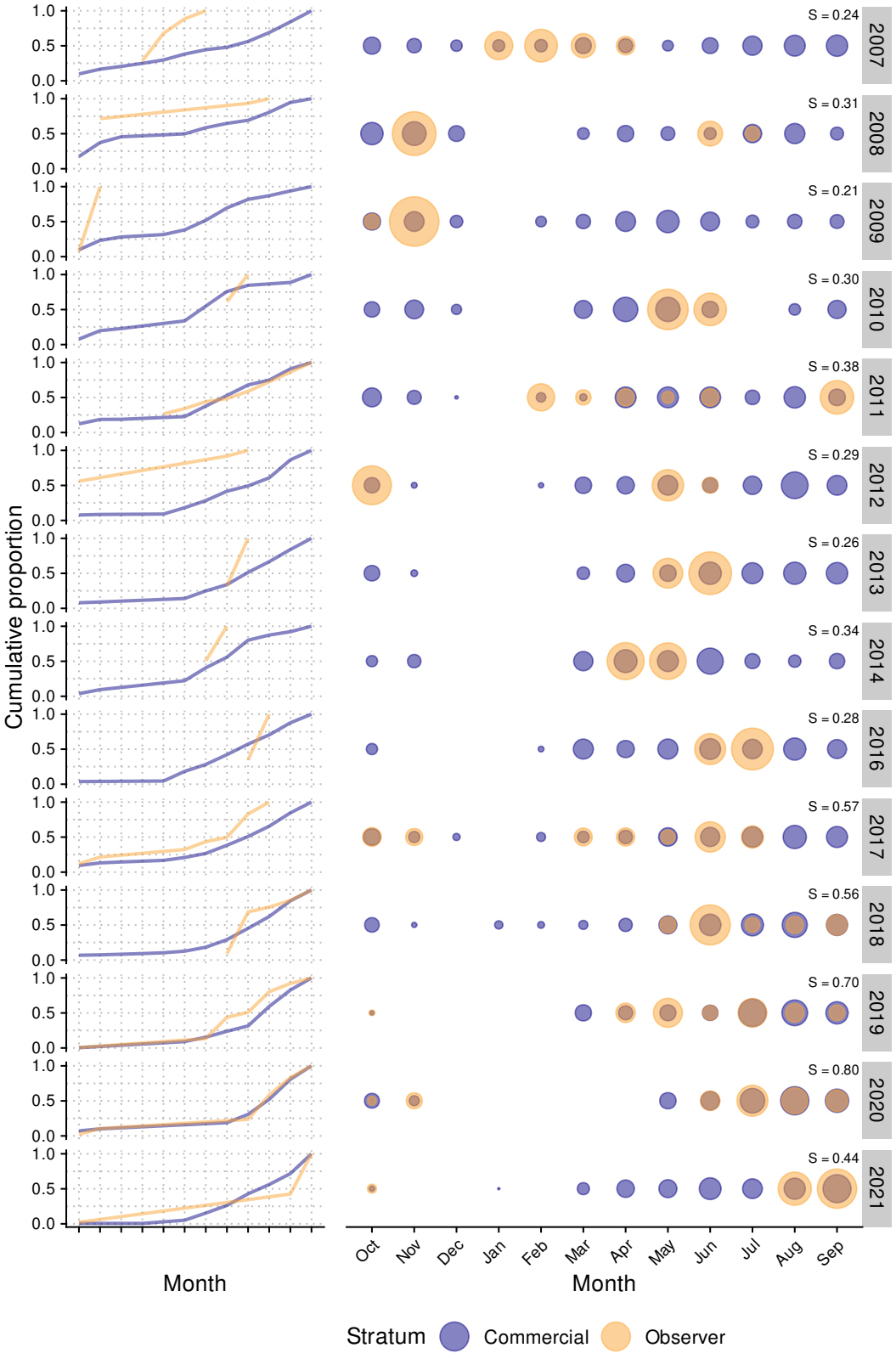


Figure 499: **Monthly representativeness of observer sampling coverage of Trawl catch in SCI 6A, from events where the scampi catch exceeded the 20kg threshold, in 2007 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

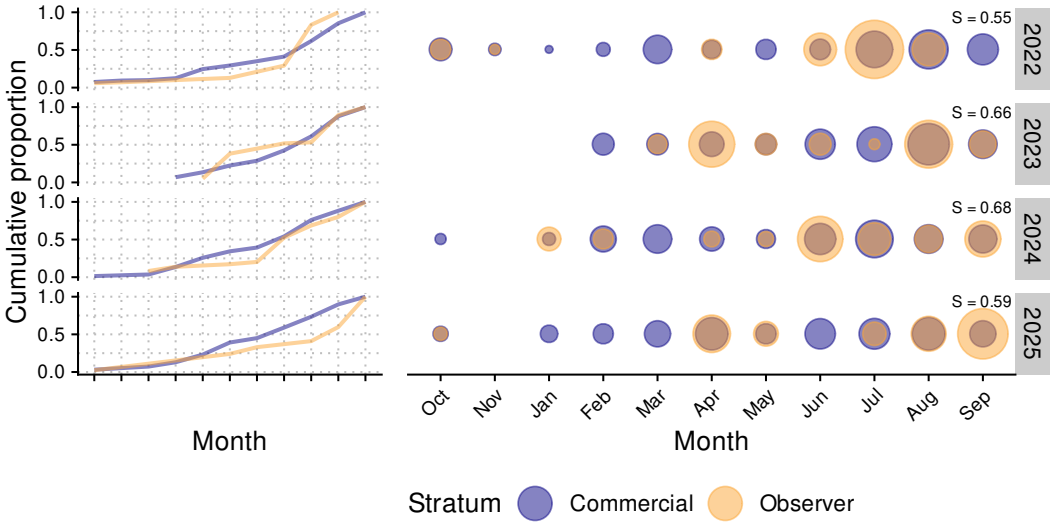


Figure 500: **Monthly representativeness of observer sampling coverage of Trawl catch in SCI 6A, from events where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

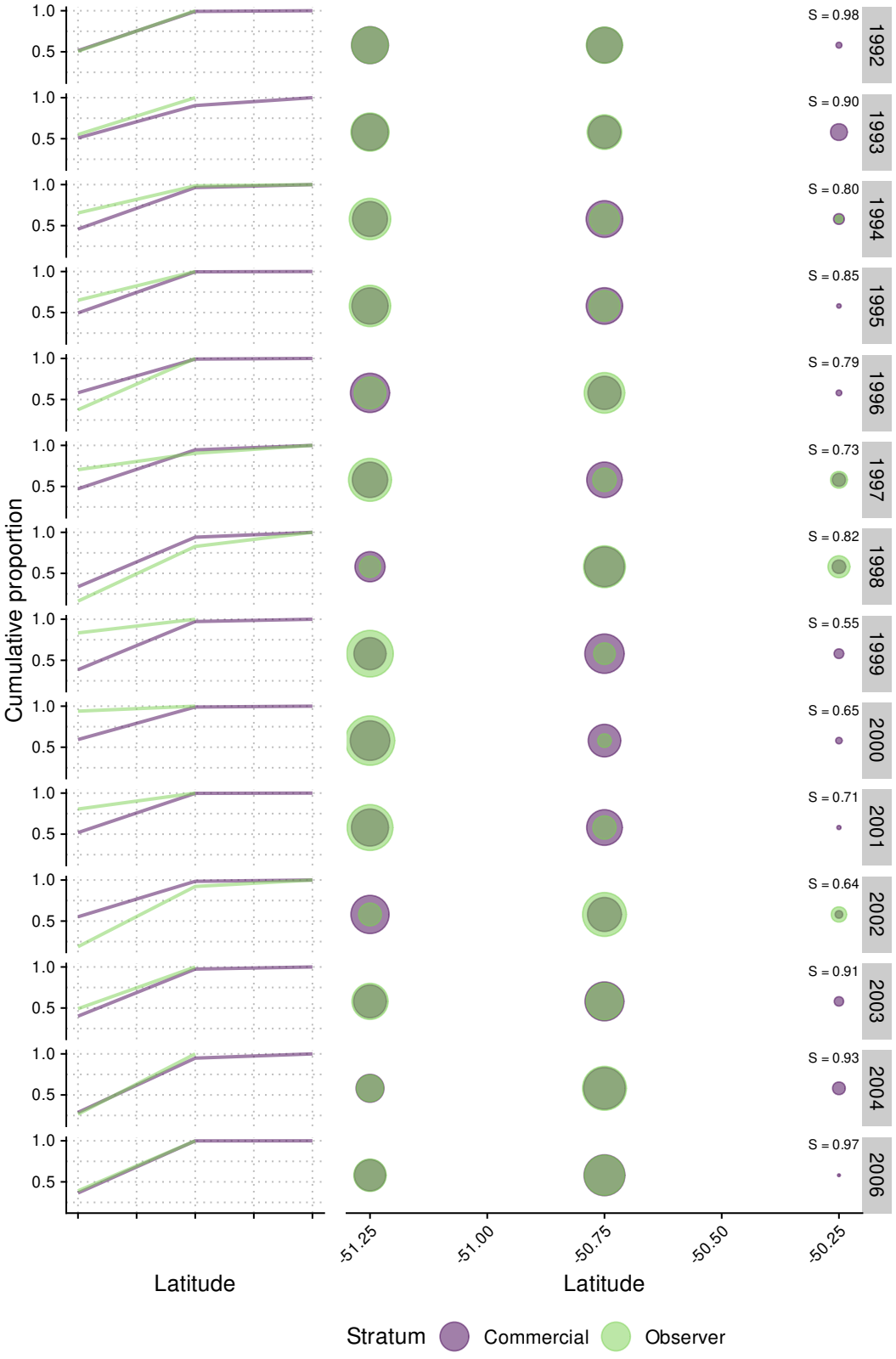


Figure 501: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 6A, where the scampi catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

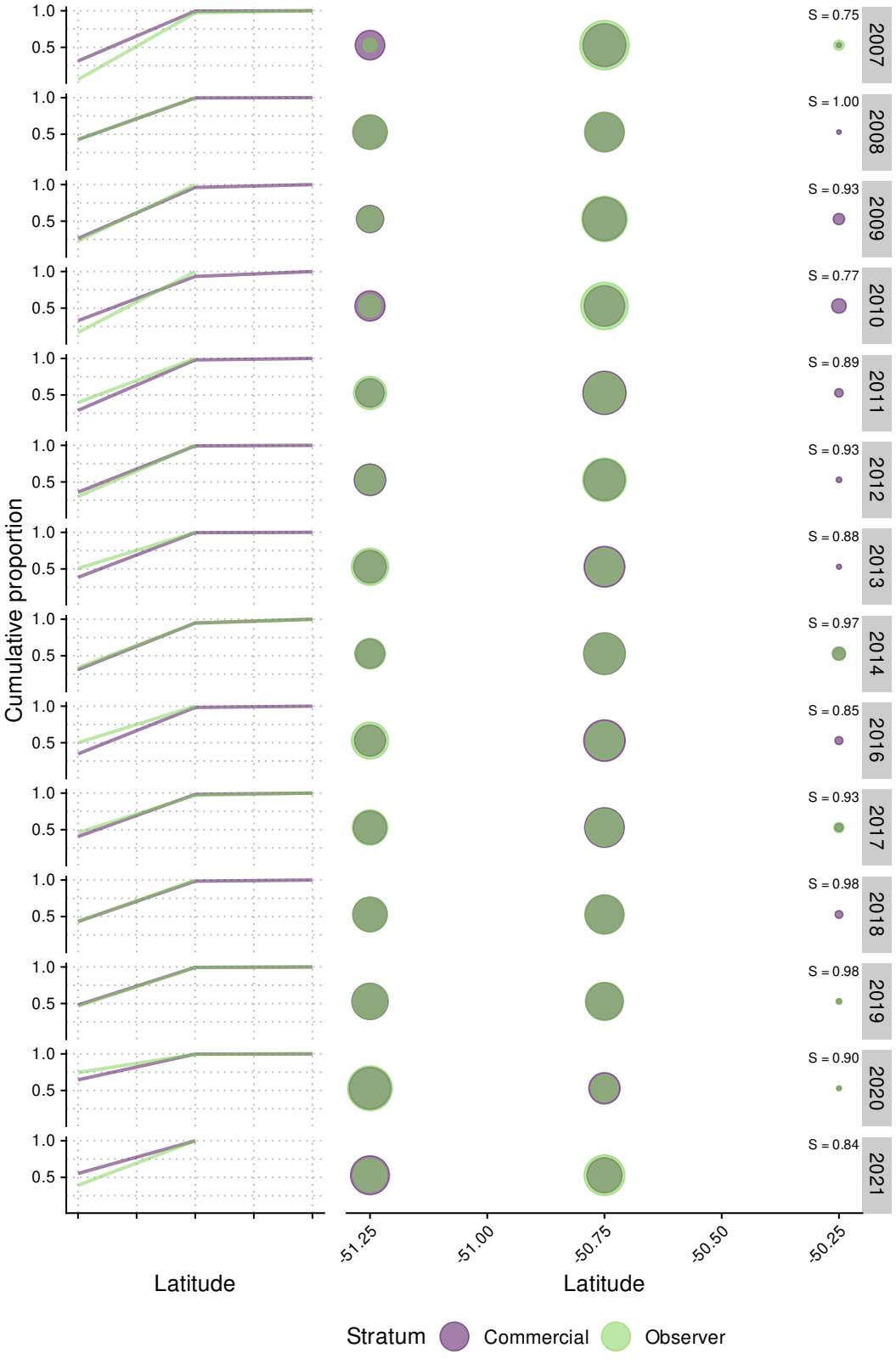


Figure 502: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 6A, where the scampi catch exceeded the 20kg threshold, in 2007 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

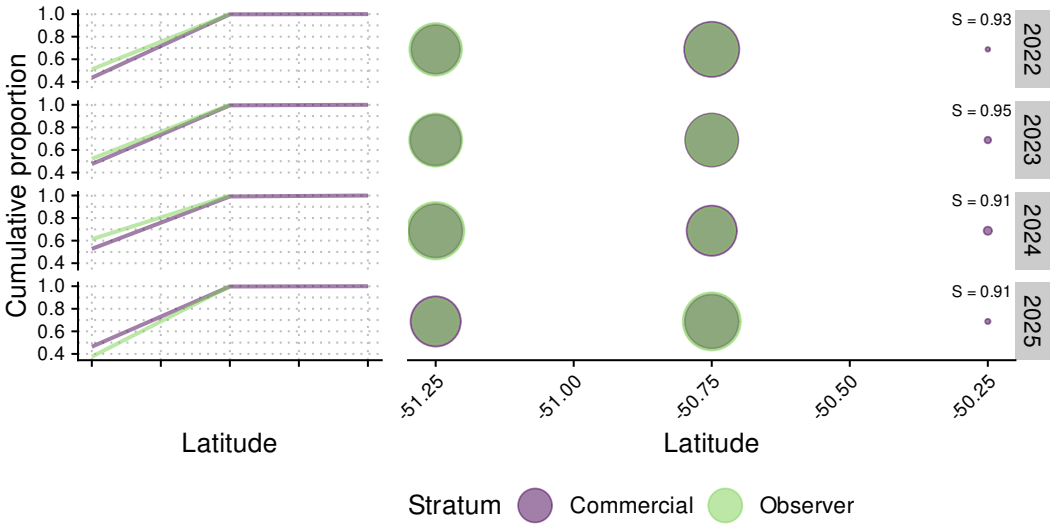


Figure 503: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 6A, where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

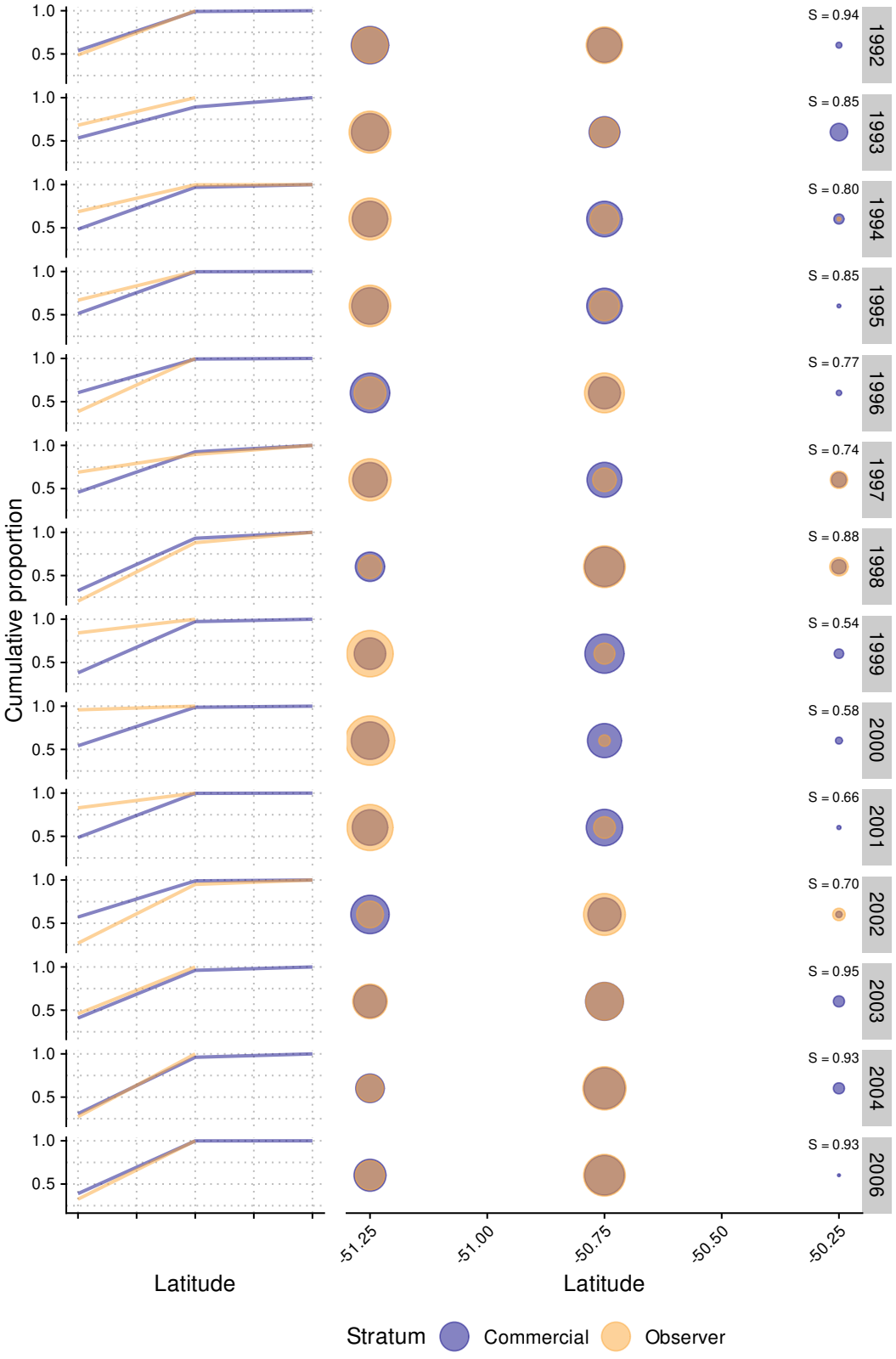


Figure 504: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 6A, from events where the scampi catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

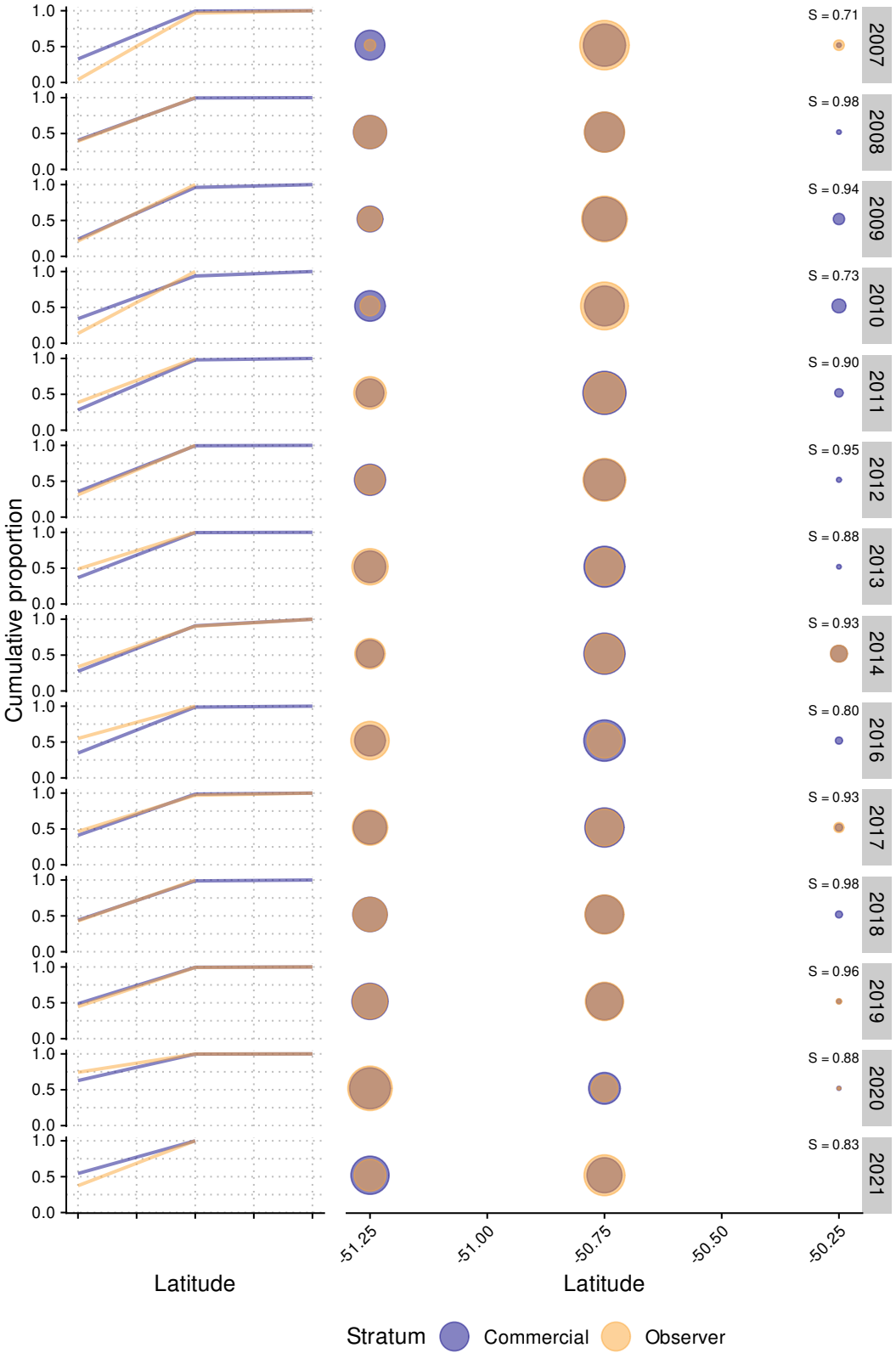


Figure 505: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 6A, from events where the scampi catch exceeded the 20kg threshold, in 2007 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

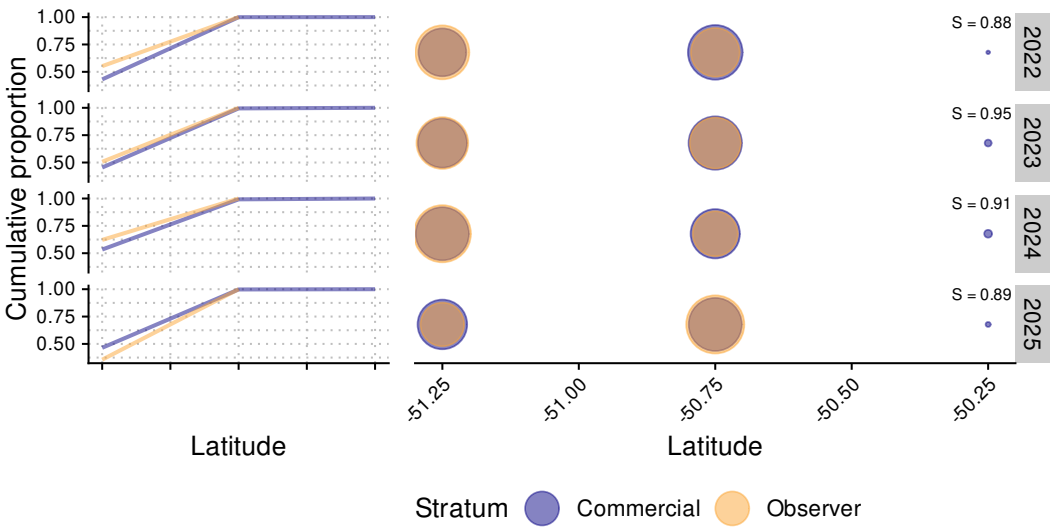


Figure 506: Latitudinal representativeness of observer sampling coverage of Trawl catch in SCI 6A, from events where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

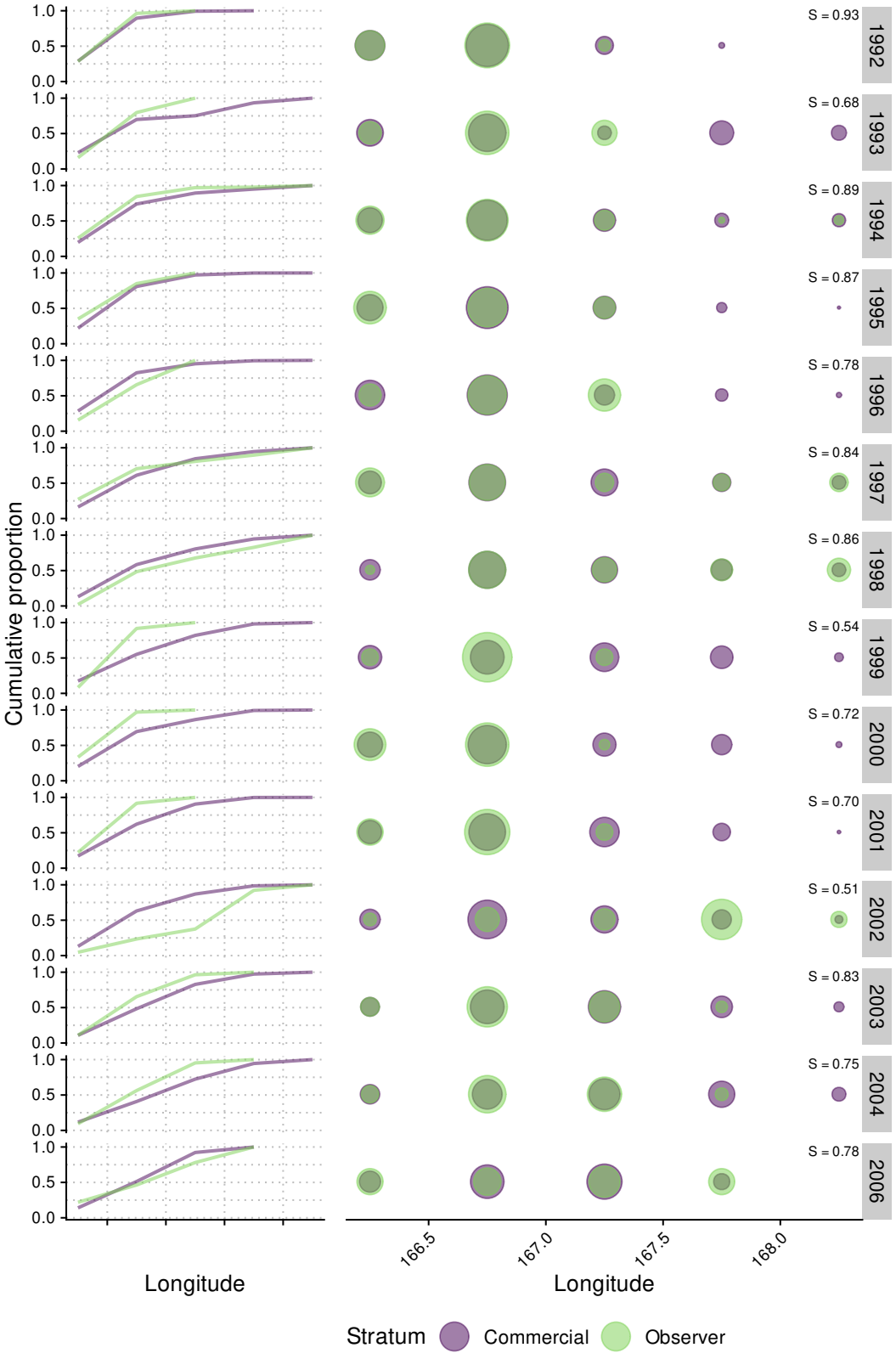


Figure 507: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 6A, where the scampi catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

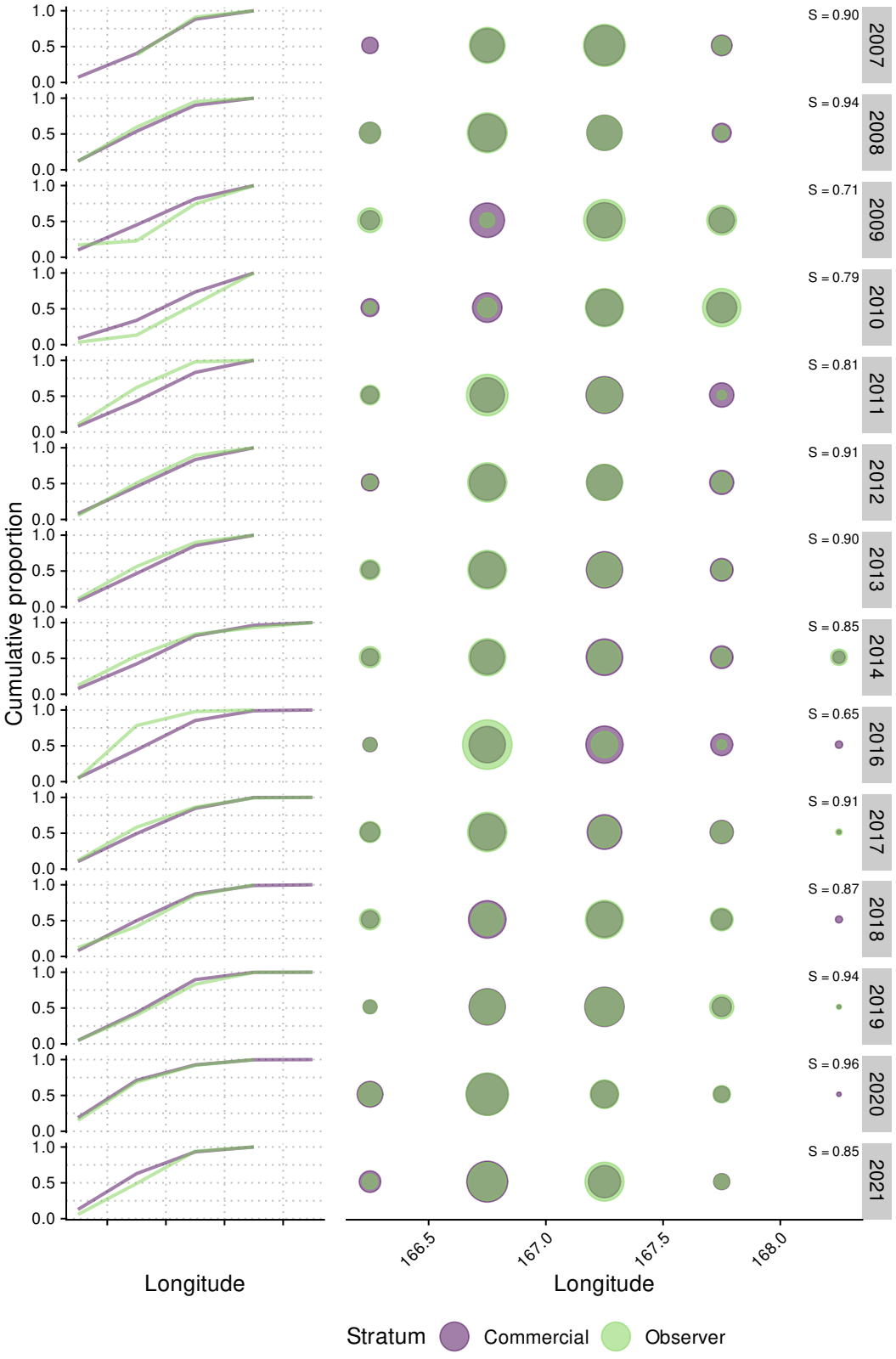


Figure 508: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 6A, where the scampi catch exceeded the 20kg threshold, in 2007 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

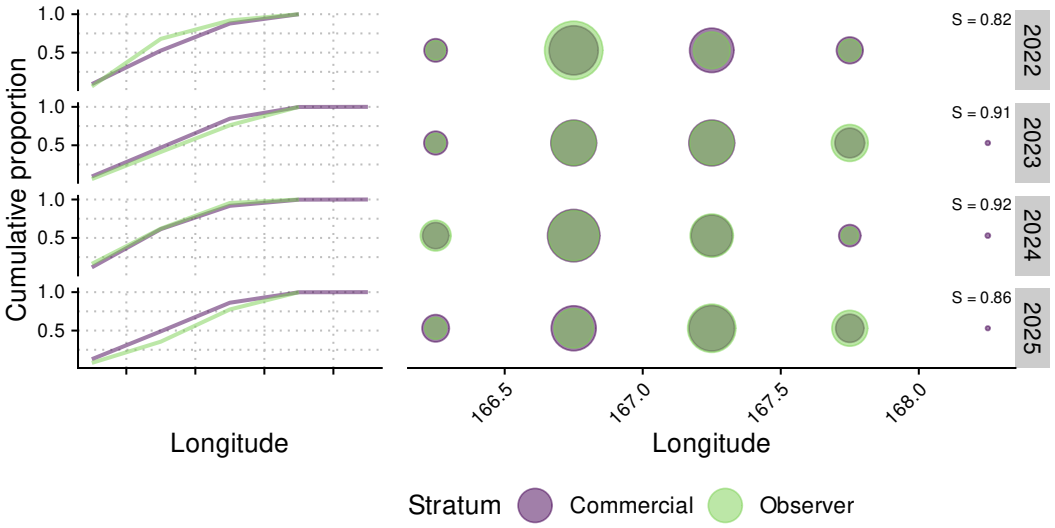


Figure 509: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SCI 6A, where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

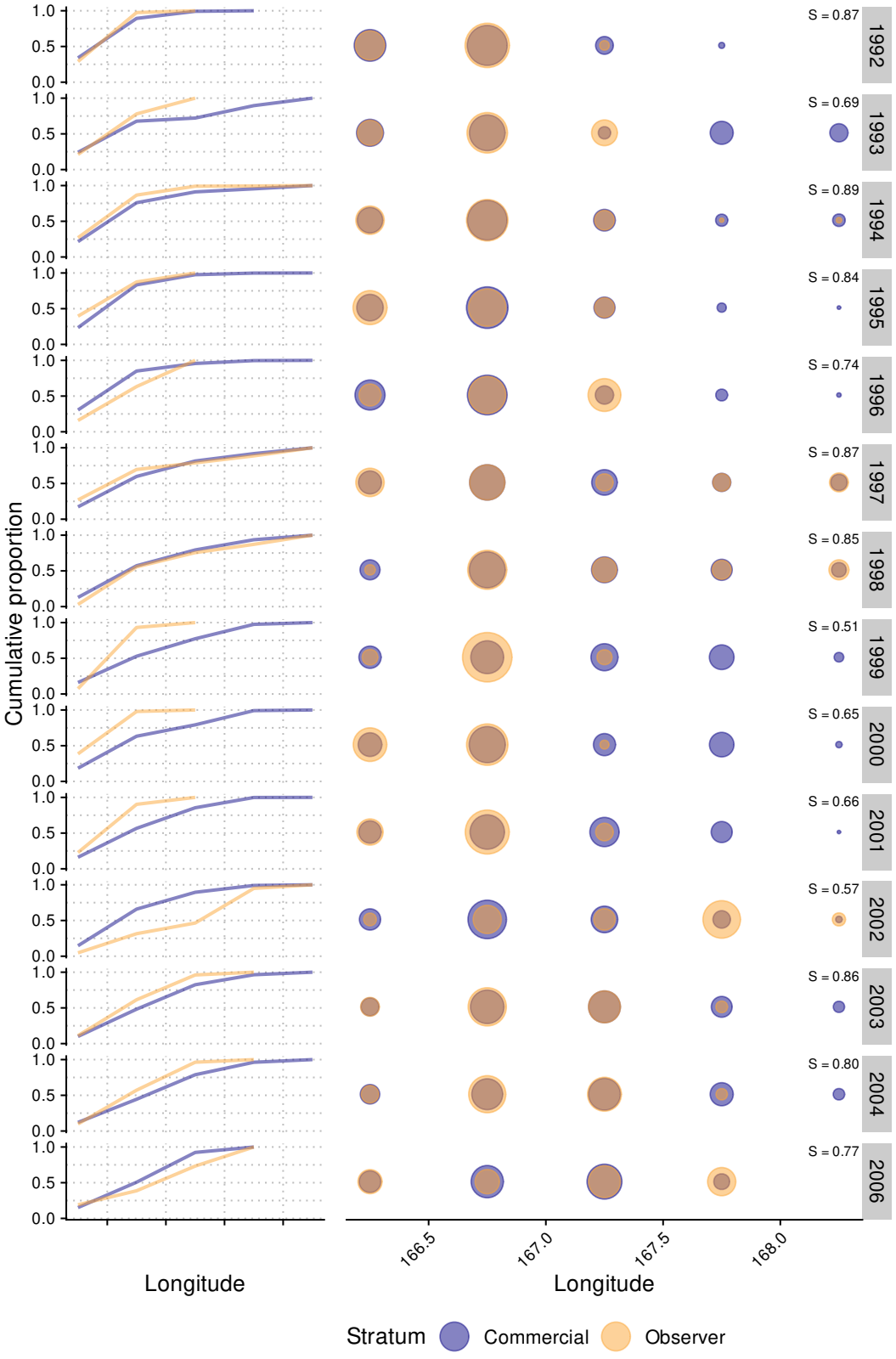


Figure 510: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 6A, from events where the scampi catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

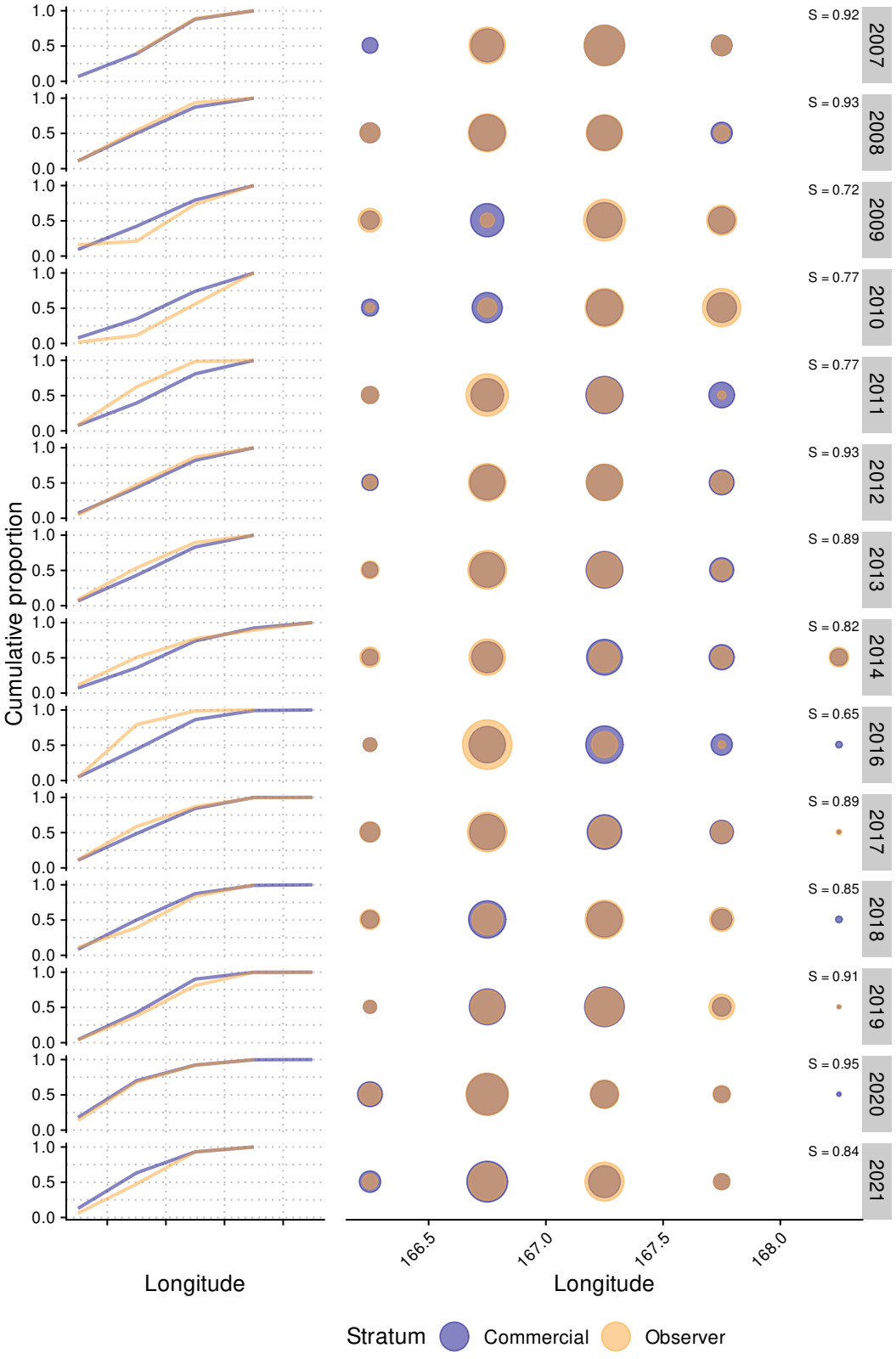


Figure 511: Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 6A, from events where the scampi catch exceeded the 20kg threshold, in 2007 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

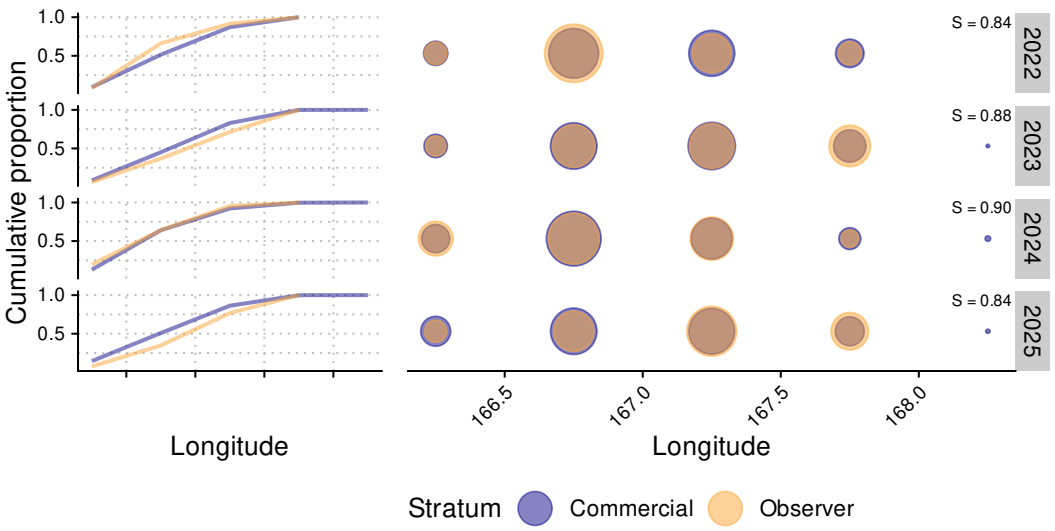


Figure 512: Longitudinal representativeness of observer sampling coverage of Trawl catch in SCI 6A, from events where the scampi catch exceeded the 20kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

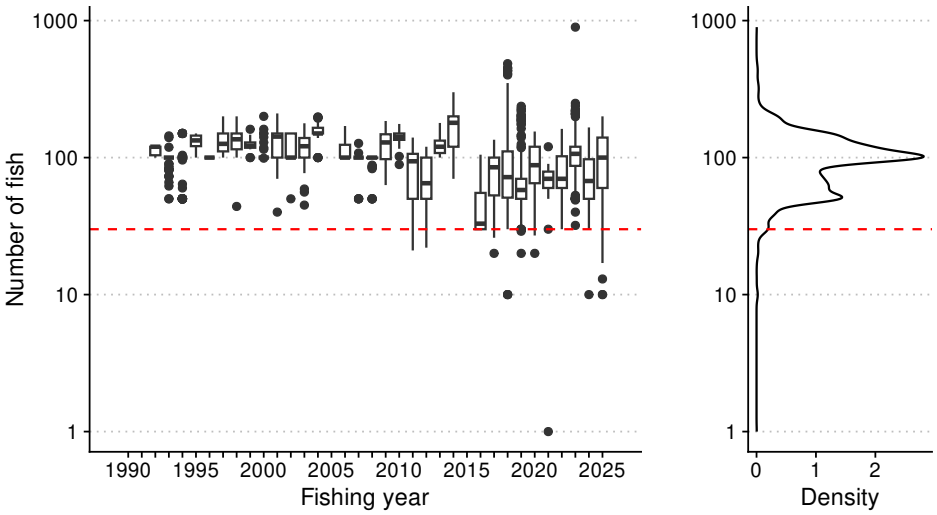


Figure 513: Length-frequency sample sizes for observed fishing events in SCI 6A where scampi were sampled. The red dashed line indicates a sample size of 30 fish.

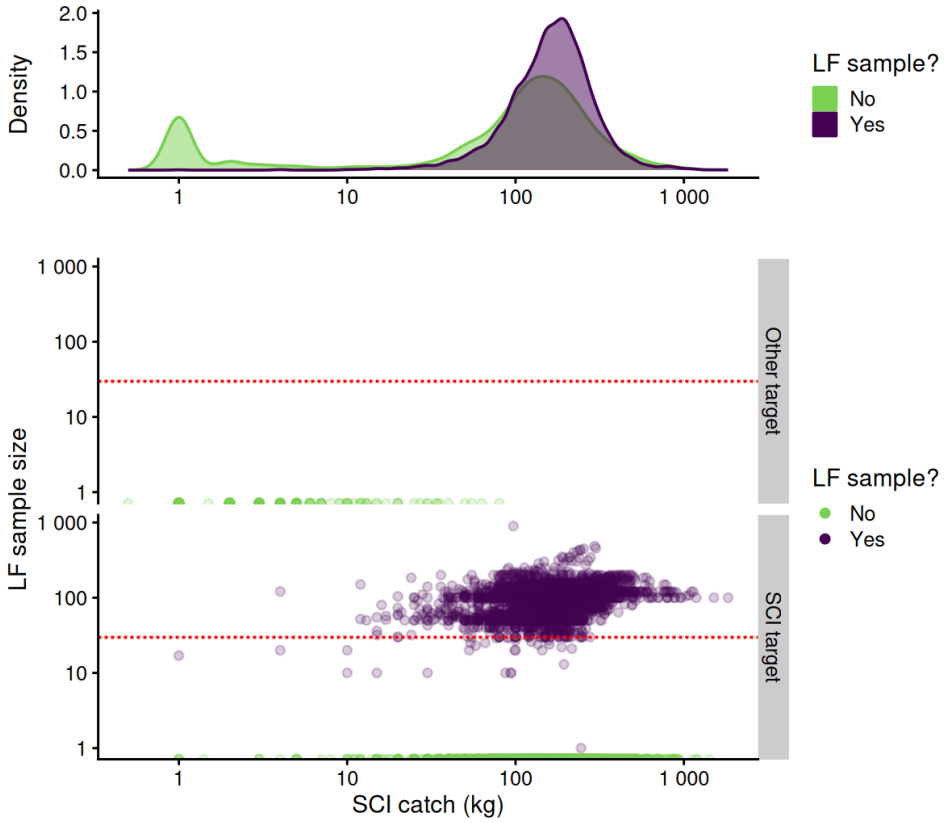


Figure 514: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in SCI 6A in relation to the total scampi catch from an event, separately for scampi target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.6.5.2 Catch quantification

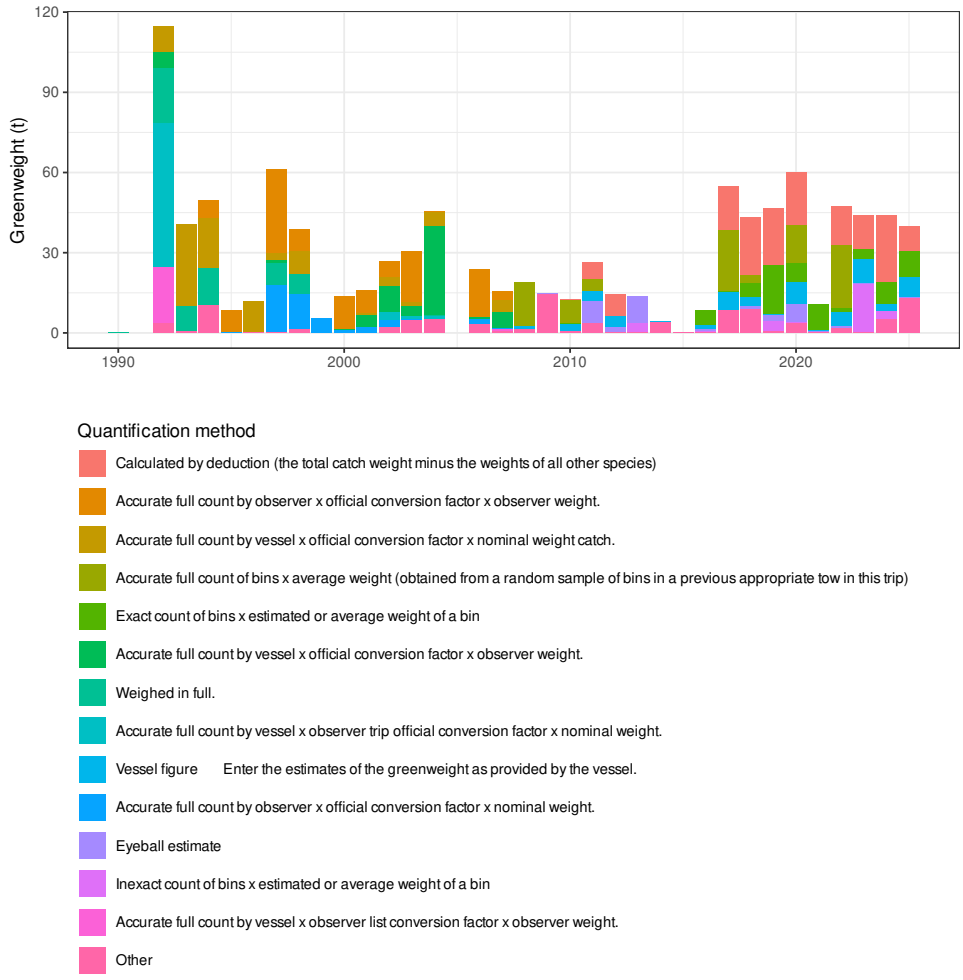


Figure 515: Methods used by observers to quantify the catch of scampi in the SCI 6A Trawl fishery. The legend lists the methods used in descending order of total catch.

2.7 SKI stocks

Observer sampling of gemfish is considered with respect to the gemfish Quota Management Areas.

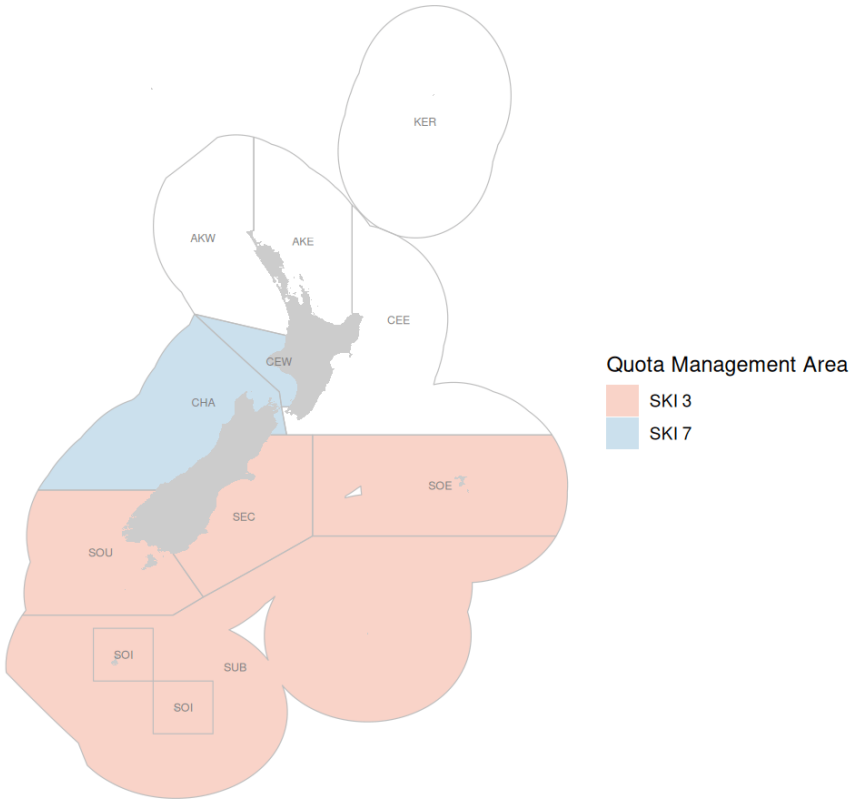


Figure 516: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for gemfish (coloured areas, per legend).

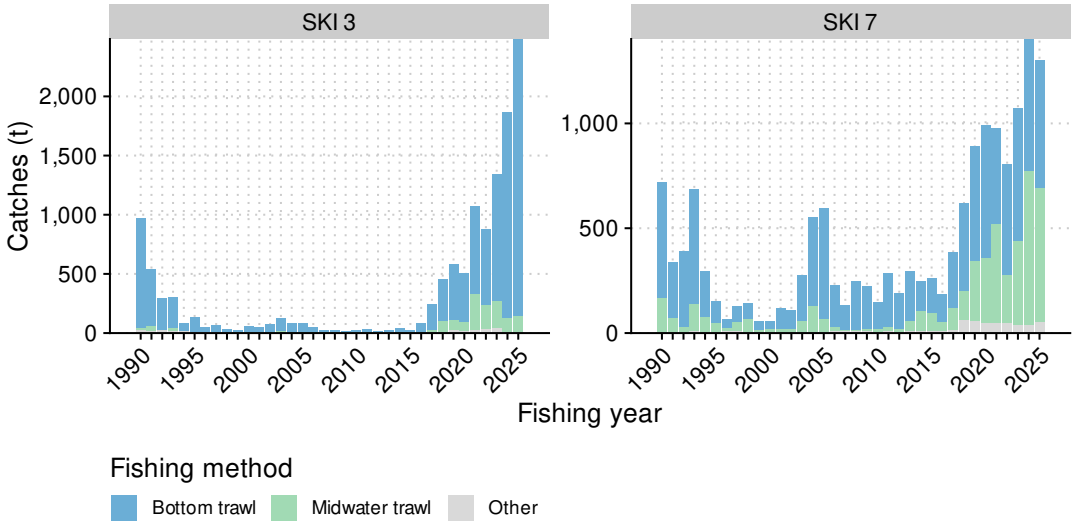


Figure 517: Catches of gemfish by fishing method, for events within the gemfish Quota Management Areas. Methods grouped as Other include: BLL, BPT, CP, DL, DS, FP, HL, MPT, PL, PRB, PRM, PS, PSH, RLP, RN, SJ, SLL, SN, T, TL.

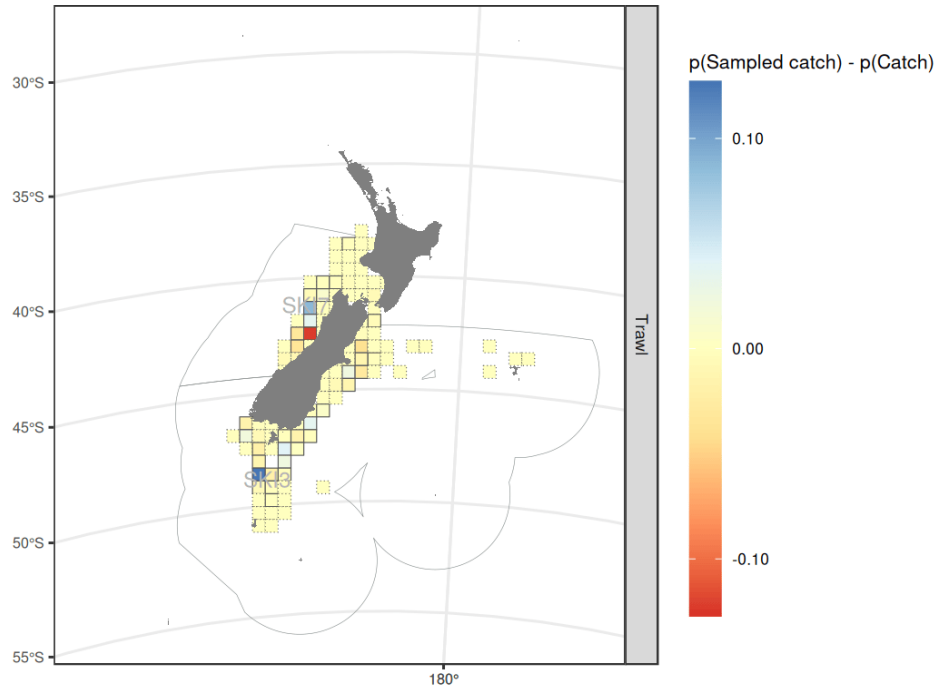


Figure 518: Differences in the relative proportions of catch and sampled catch for gemfish during 2021–2025. Cells with a dotted border had no sampling.

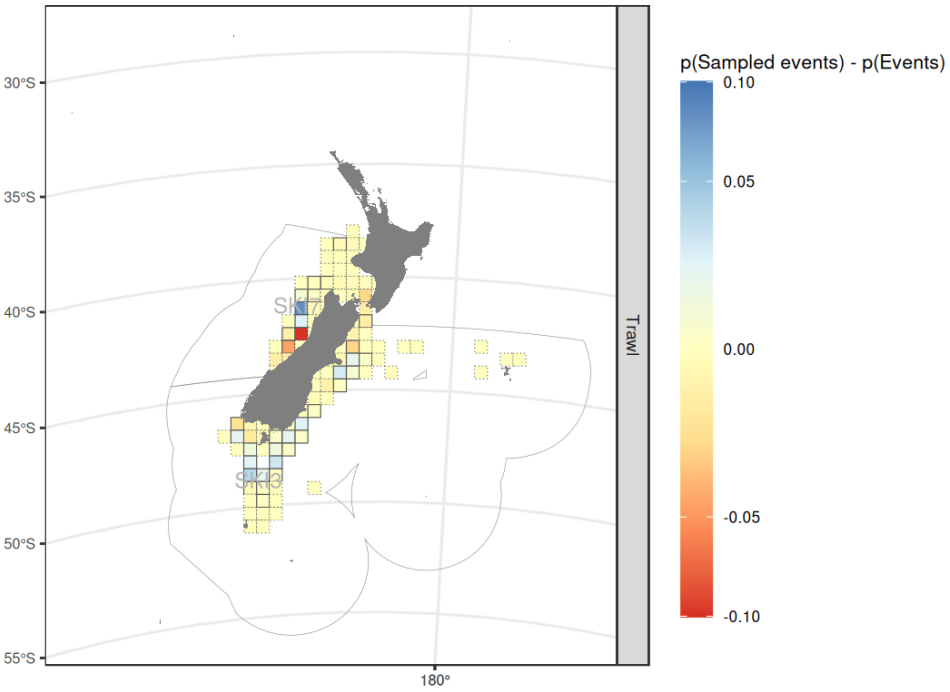


Figure 519: Differences in the relative proportions of events meeting the sampling threshold and sampled events for gemfish during 2021–2025. Cells with a dotted border had no sampling.

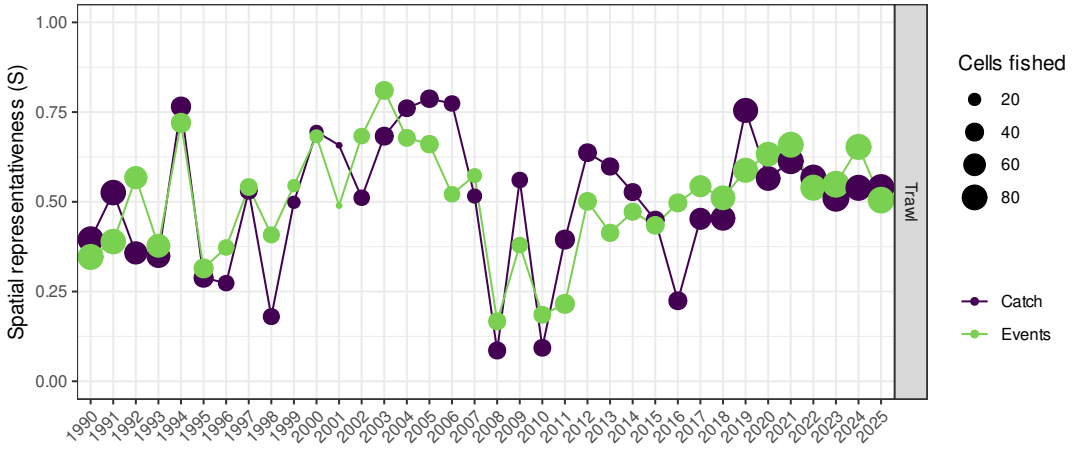


Figure 520: Spatial representativeness of observer sampling of gemfish by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.

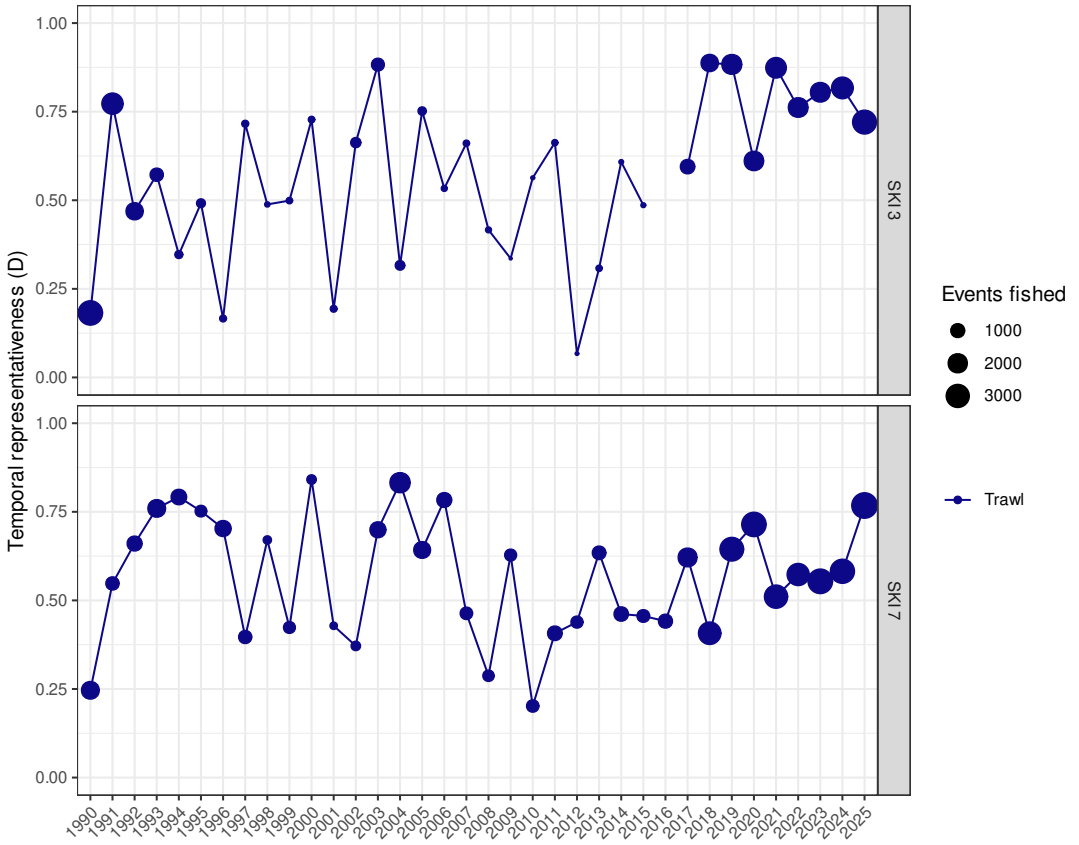


Figure 521: Temporal representativeness of observer sanpling of gemfish by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.7.1 SKI 3: Trawl fishery

2.7.1.1 Length-frequency samples

Table 46: Length-frequency samples of gemfish from the SKI 3 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of gemfish exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	2 485	18	89	0.72
1991	1 835	29	322	1.58
1992	780	55	548	7.05
1993	485	143	464	29.48
1994	166	127	584	76.51
1995	217	146	561	67.28
1996	128	58	100	45.31
1997	100	29	78	29.00
1998	80	39	155	48.75
1999	27	55	74	203.70
2000	84	53	374	63.10
2001	152	30	86	19.74
2002	280	78	646	27.86
2003	433	141	1 400	32.56
2004	206	54	141	26.21
2005	153	67	312	43.79
2006	90	42	281	46.67
2007	54	17	30	31.48
2008	56	1	3	1.79
2009	18	1	1	5.56
2010	39	15	32	38.46
2011	103	7	102	6.80
2012	36	1	14	2.78
2013	58	5	23	8.62
2014	72	3	12	4.17
2015	32	3	60	9.38
2016	39	0	0	0.00
2017	441	40	713	9.07
2018	875	83	1 421	9.49
2019	1 590	126	2 634	7.92
2020	1 751	99	1 453	5.65
2021	2 022	95	2 000	4.70
2022	1 943	77	1 530	3.96
2023	1 890	63	1 915	3.33
2024	2 542	98	2 570	3.86
2025	3 191	59	1 872	1.85

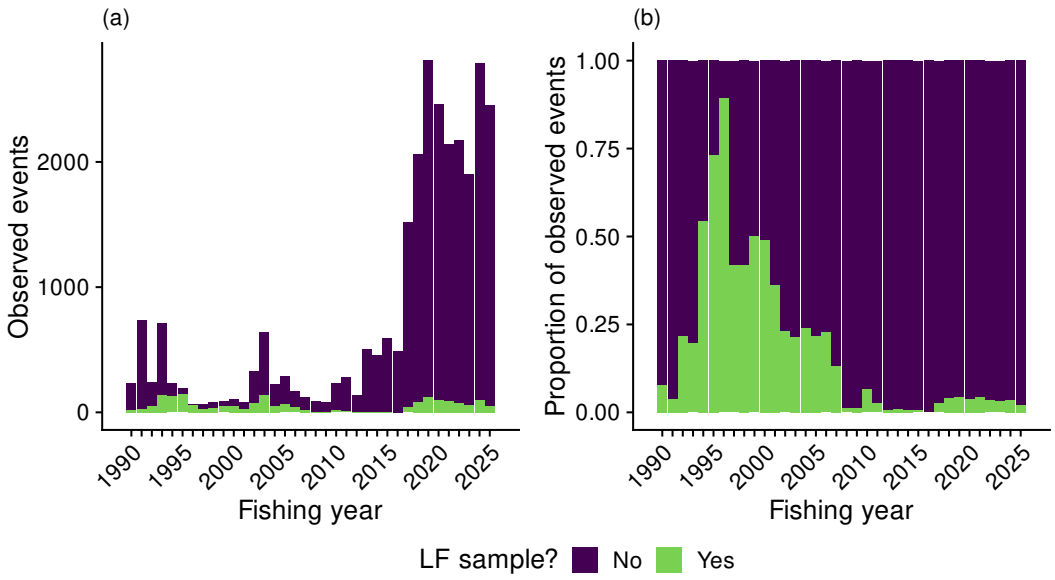


Figure 522: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SKI 3 where the gemfish catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

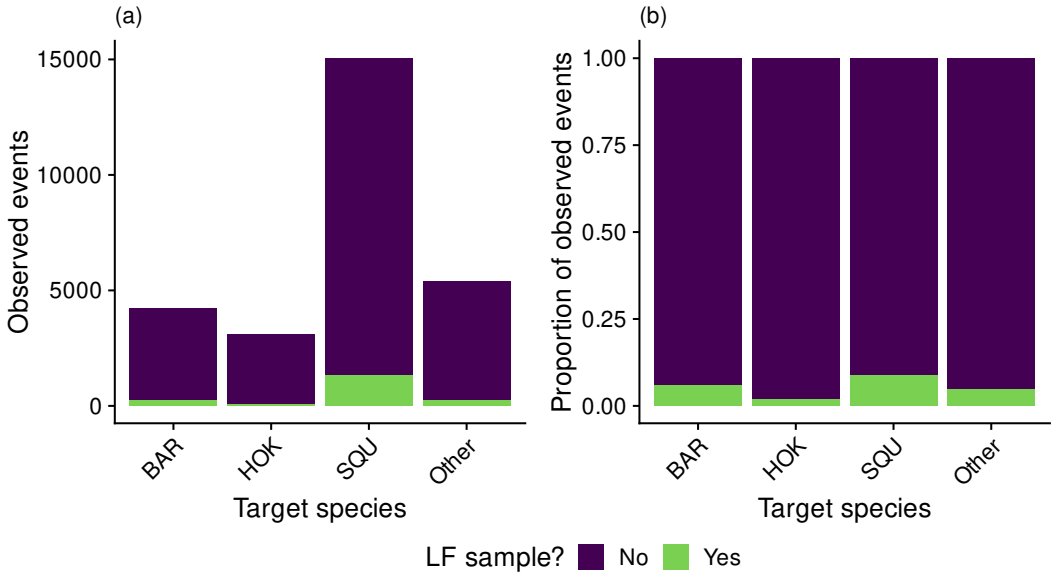


Figure 523: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SKI 3 where the gemfish catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

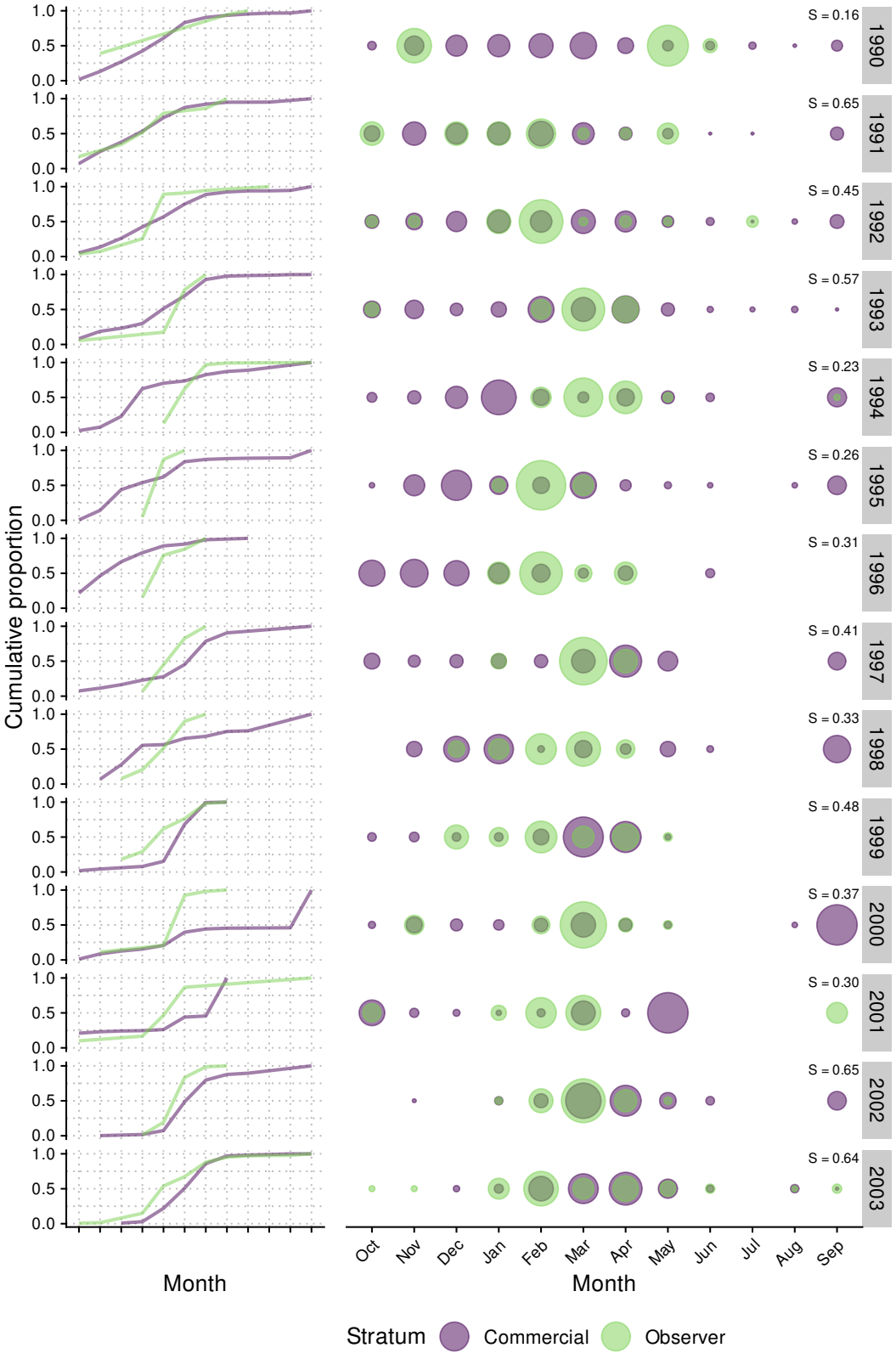


Figure 524: Monthly representativeness of observer sampling coverage of Trawl fishing events in SKI 3, where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

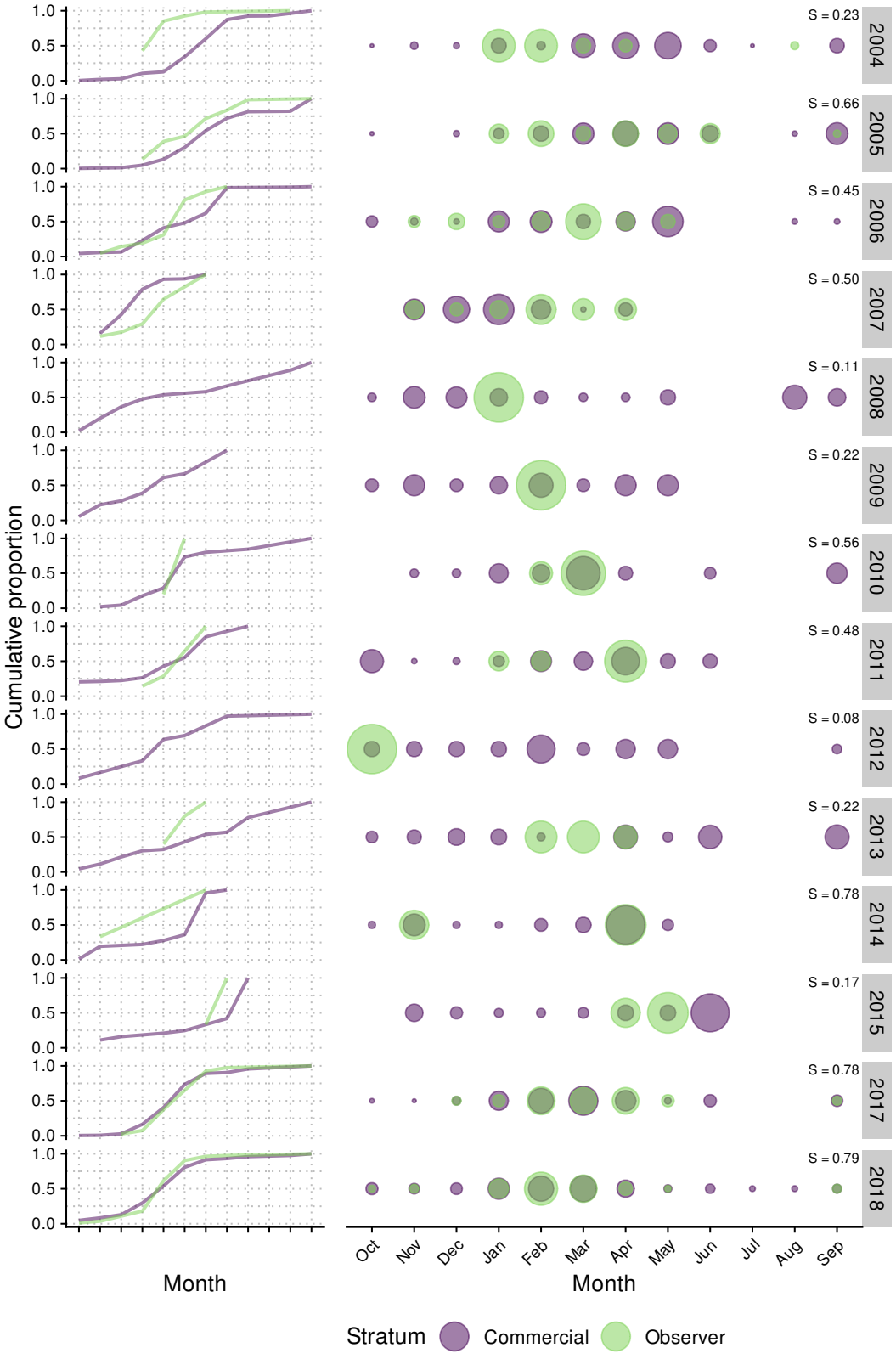


Figure 525: Monthly representativeness of observer sampling coverage of Trawl fishing events in SKI 3, where the gemfish catch exceeded the 20kg threshold, in 2004 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

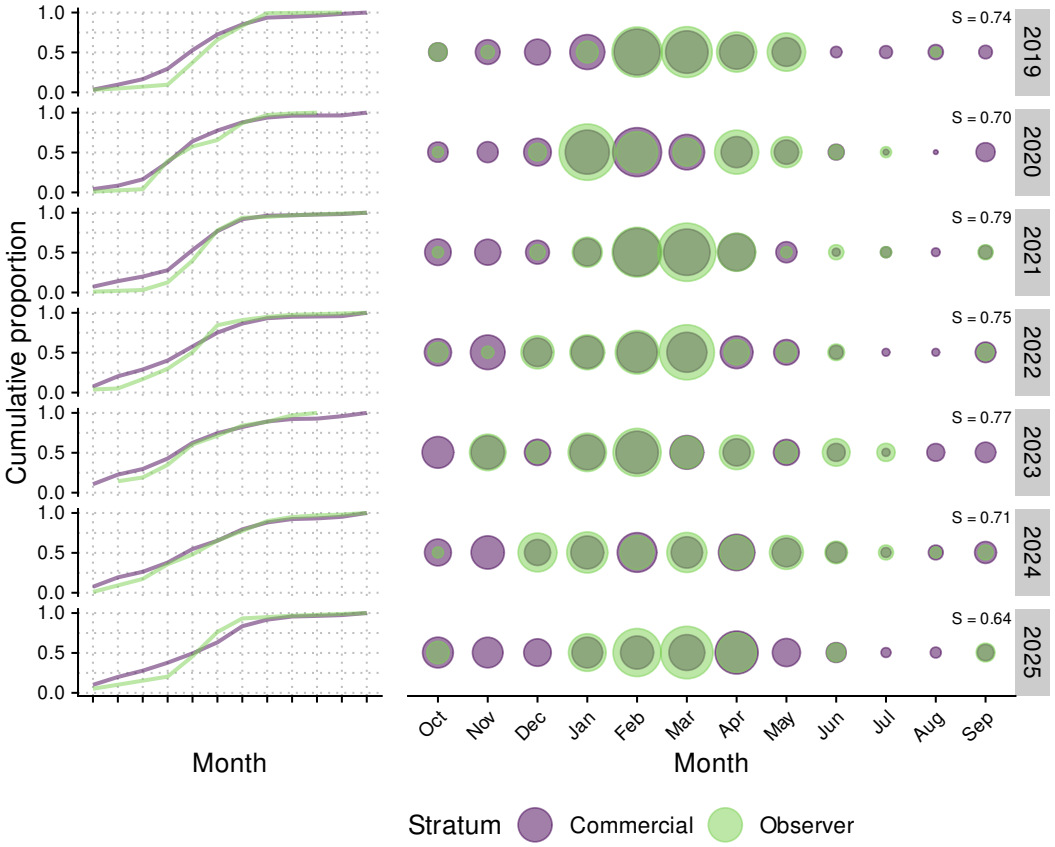


Figure 526: Monthly representativeness of observer sampling coverage of Trawl fishing events in SKI 3, where the gemfish catch exceeded the 20kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

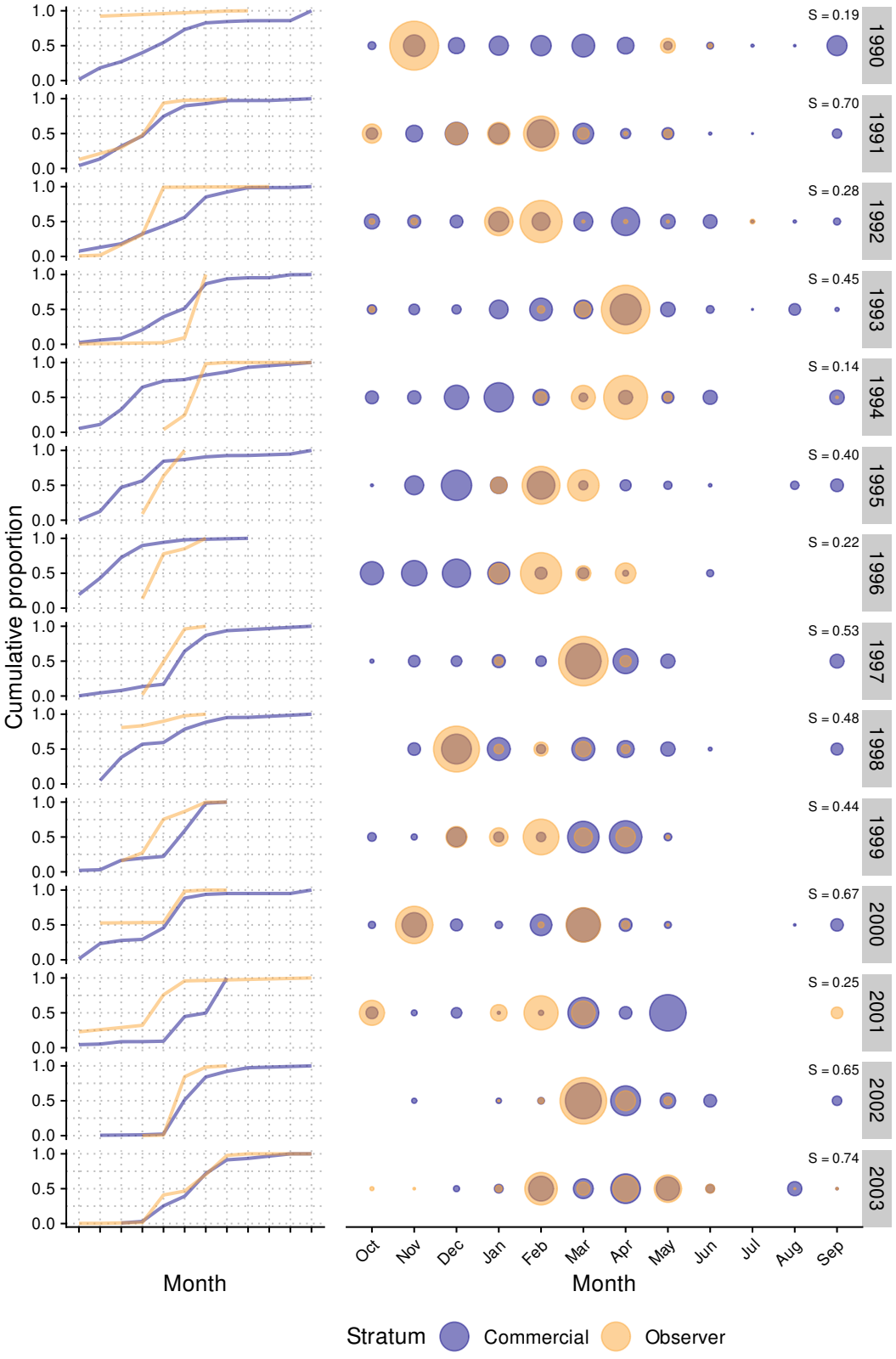


Figure 527: **Monthly representativeness of observer sampling coverage of Trawl catch in SKI 3, from events where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

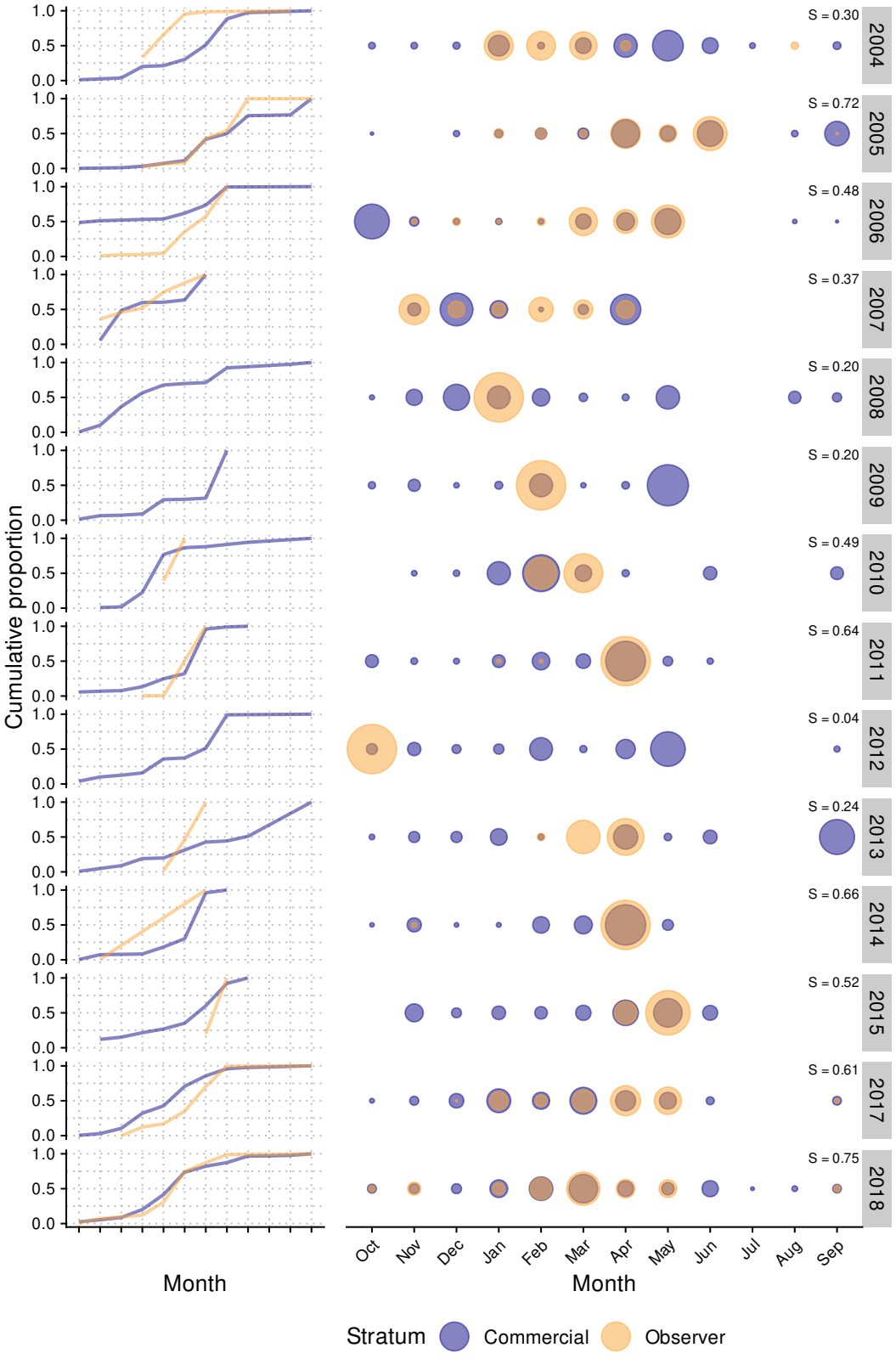


Figure 528: Monthly representativeness of observer sampling coverage of Trawl catch in SKI 3, from events where the gemfish catch exceeded the 20kg threshold, in 2004 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

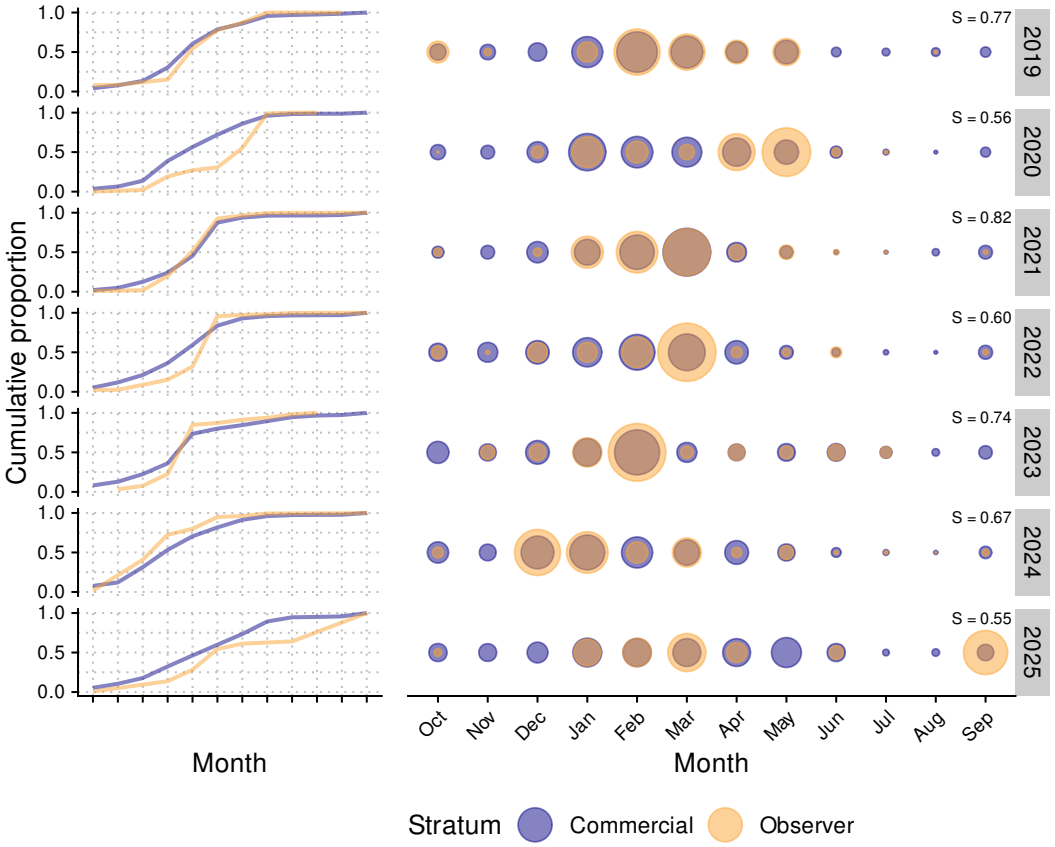


Figure 529: Monthly representativeness of observer sampling coverage of Trawl catch in SKI 3, from events where the gemfish catch exceeded the 20kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

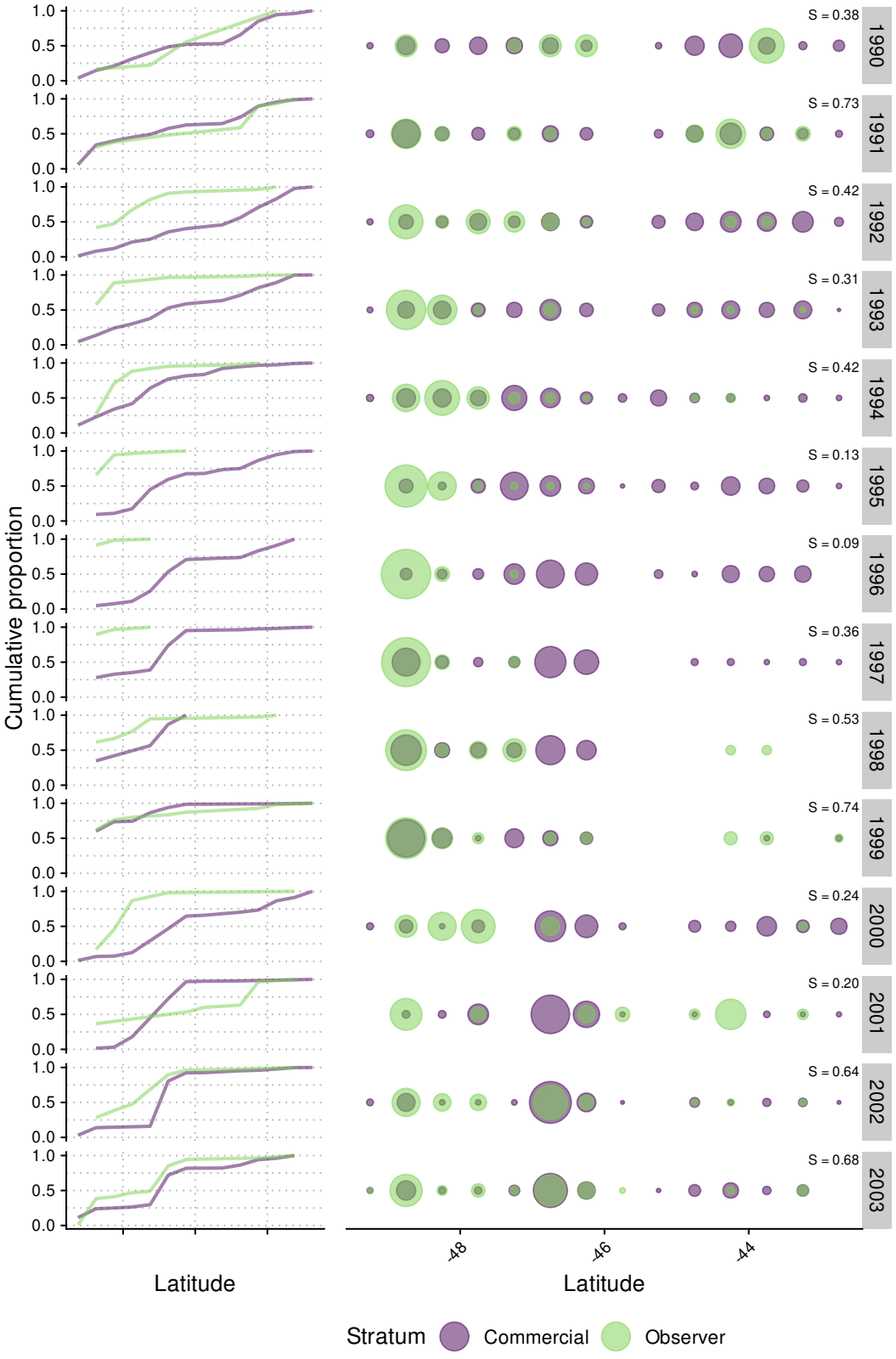


Figure 530: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 3, where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

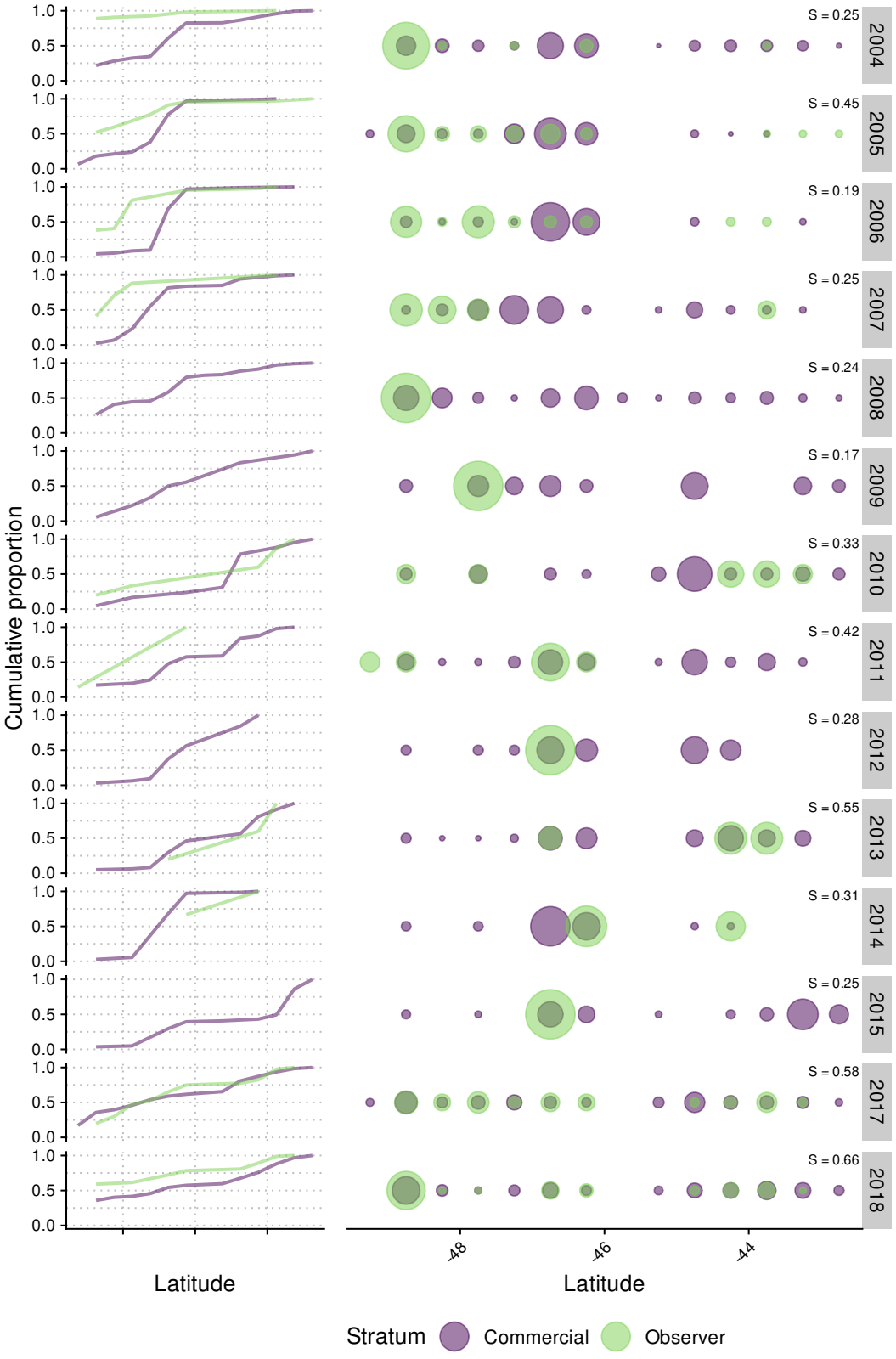


Figure 531: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 3, where the gemfish catch exceeded the 20kg threshold, in 2004 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

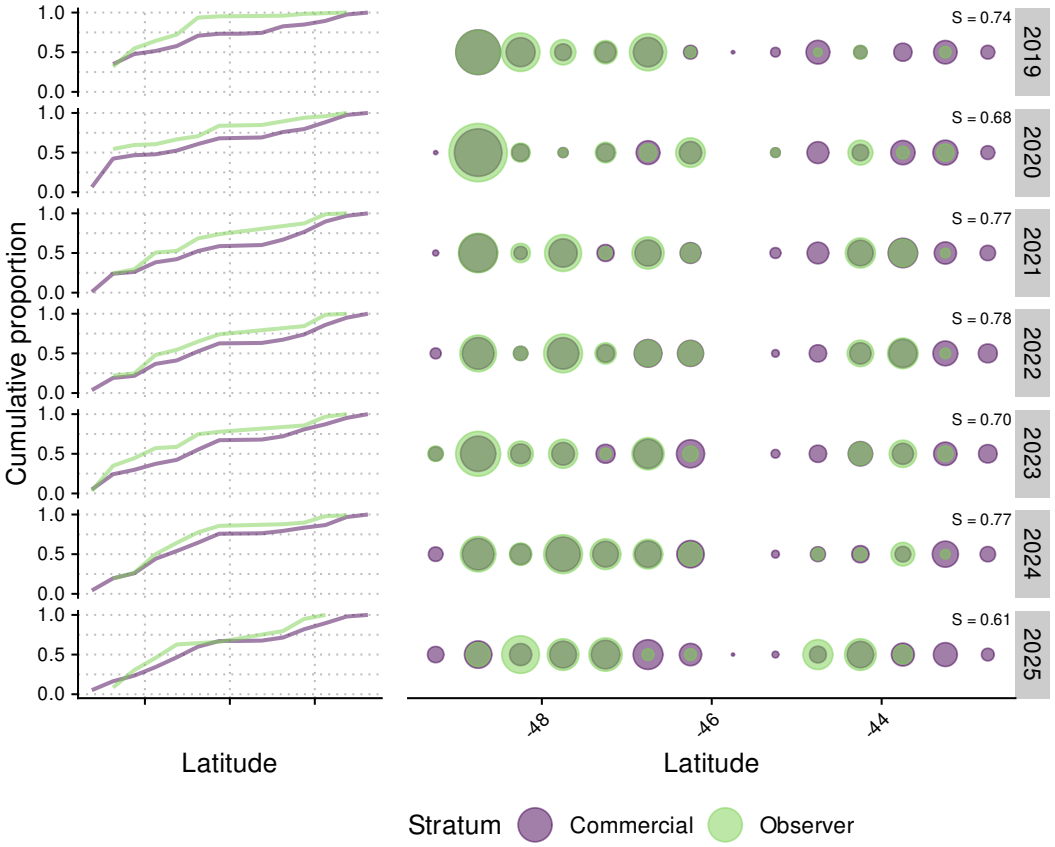


Figure 532: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 3, where the gemfish catch exceeded the 20kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

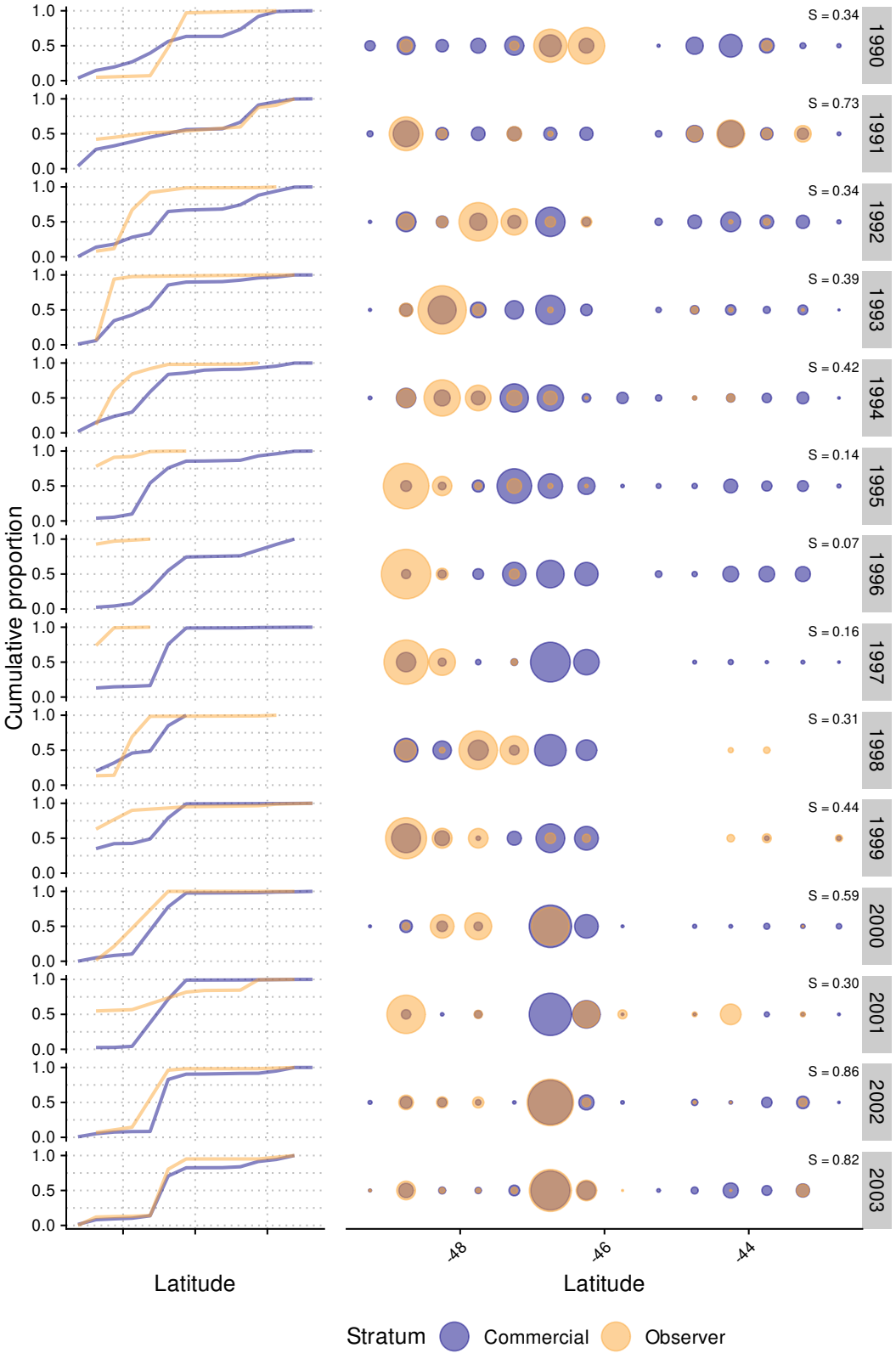


Figure 533: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SKI 3, from events where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

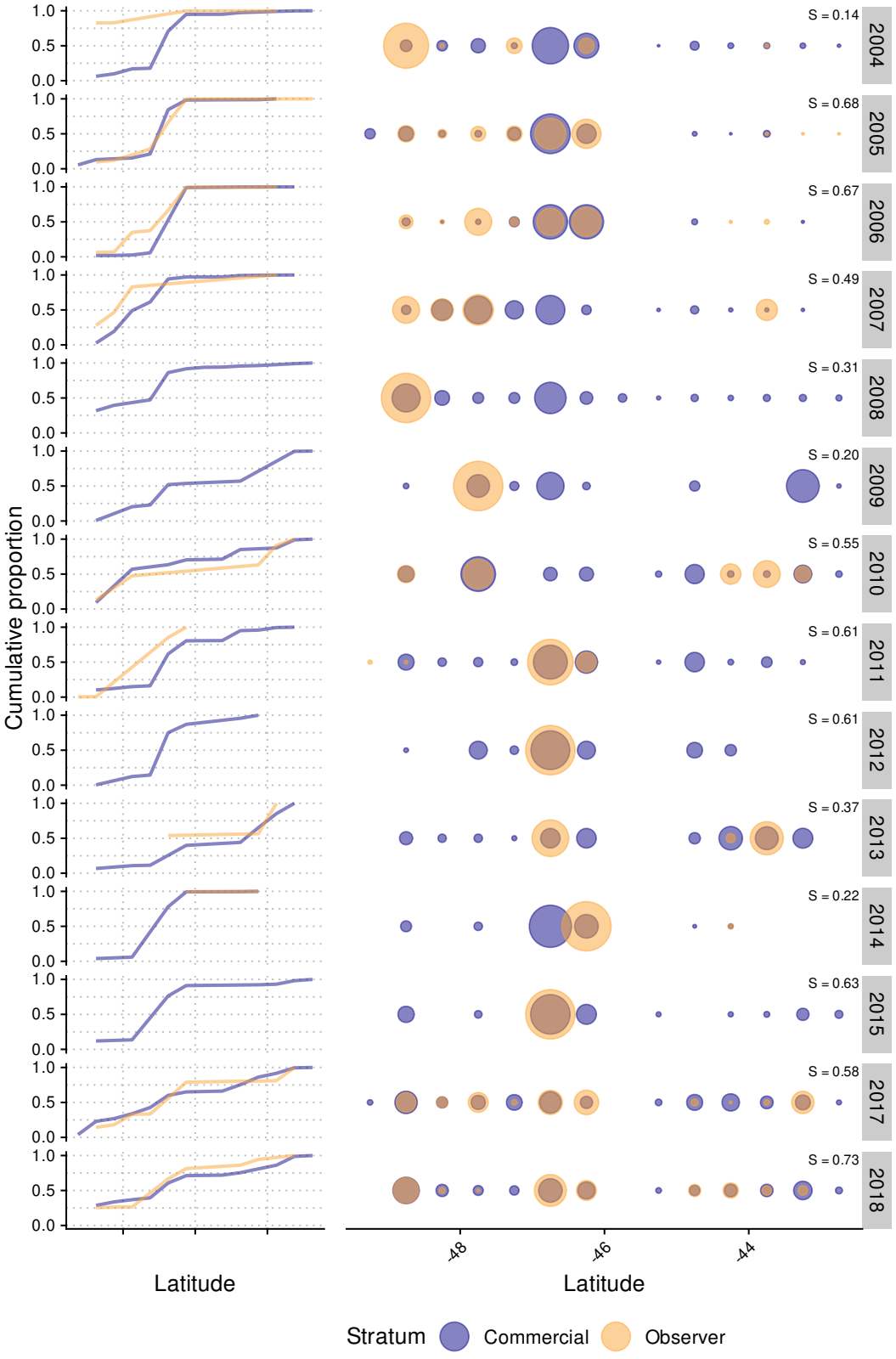


Figure 534: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SKI 3, from events where the gemfish catch exceeded the 20kg threshold, in 2004 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

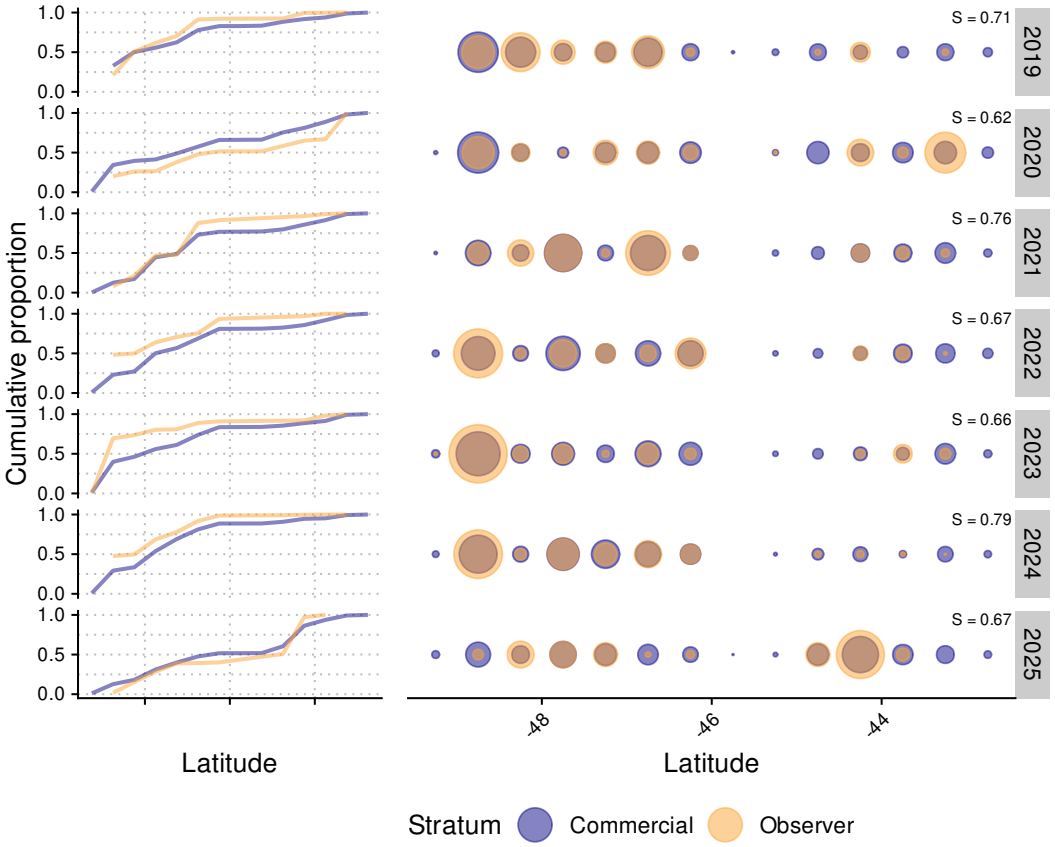


Figure 535: Latitudinal representativeness of observer sampling coverage of Trawl catch in SKI 3, from events where the gemfish catch exceeded the 20kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

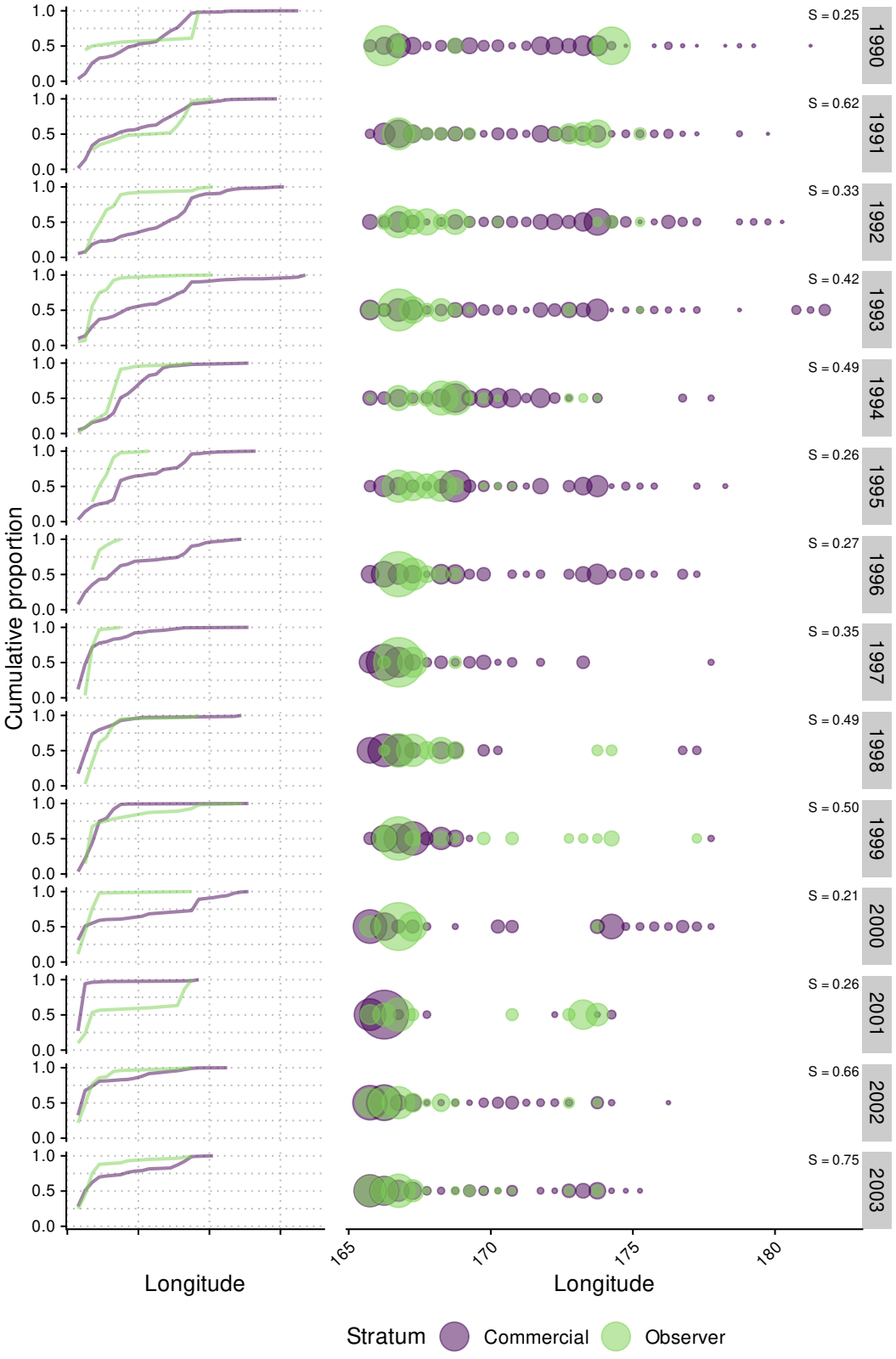


Figure 536: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 3, where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

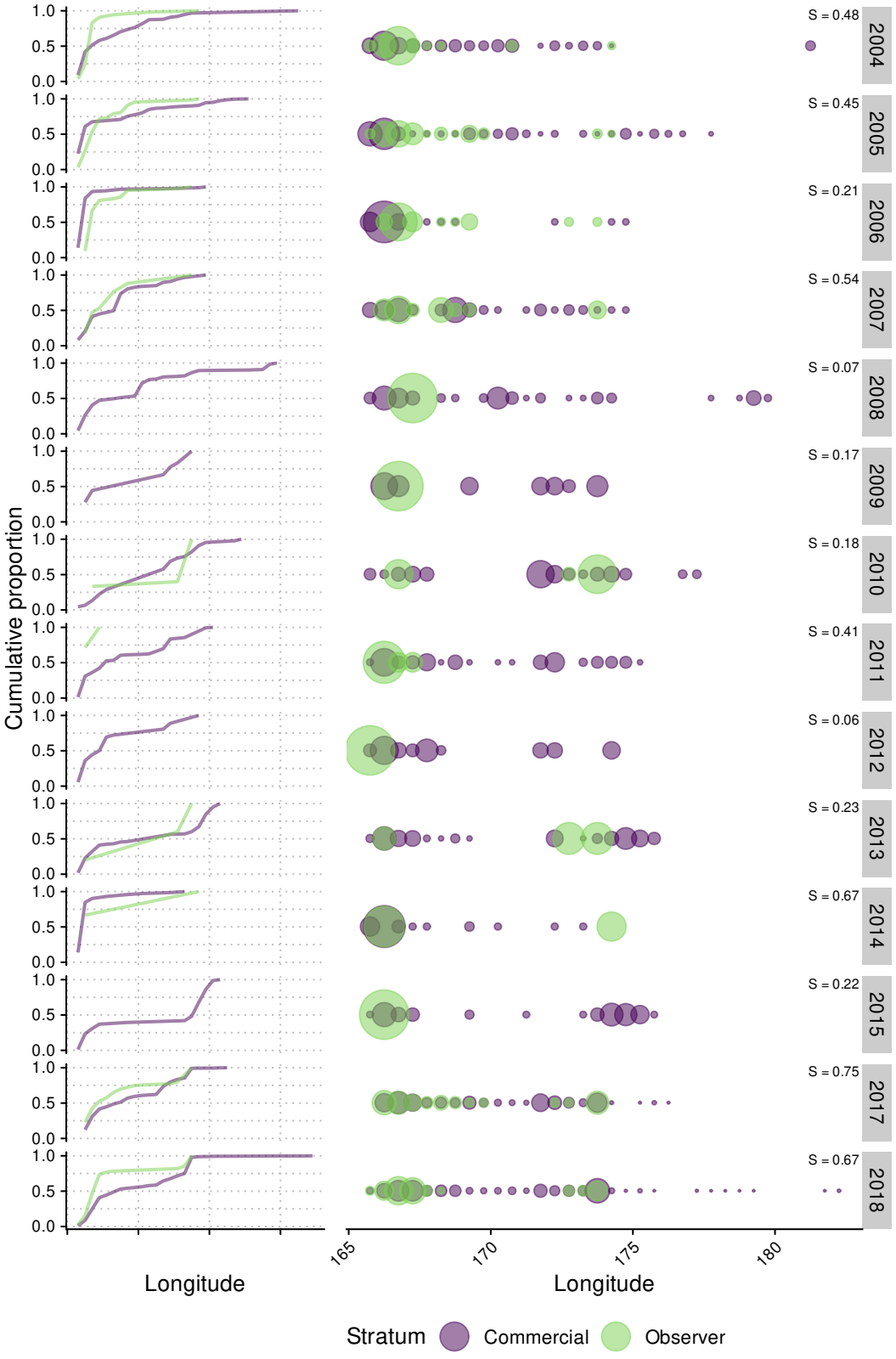


Figure 537: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 3, where the gemfish catch exceeded the 20kg threshold, in 2004 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

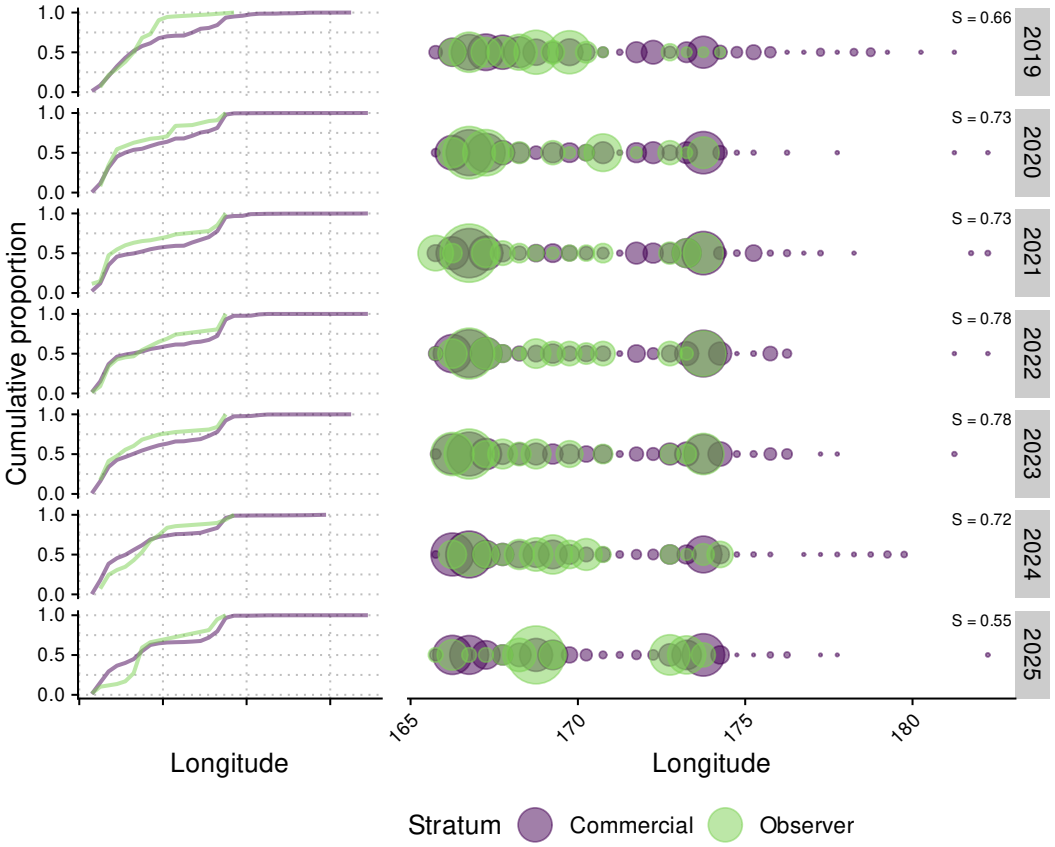


Figure 538: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 3, where the gemfish catch exceeded the 20kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

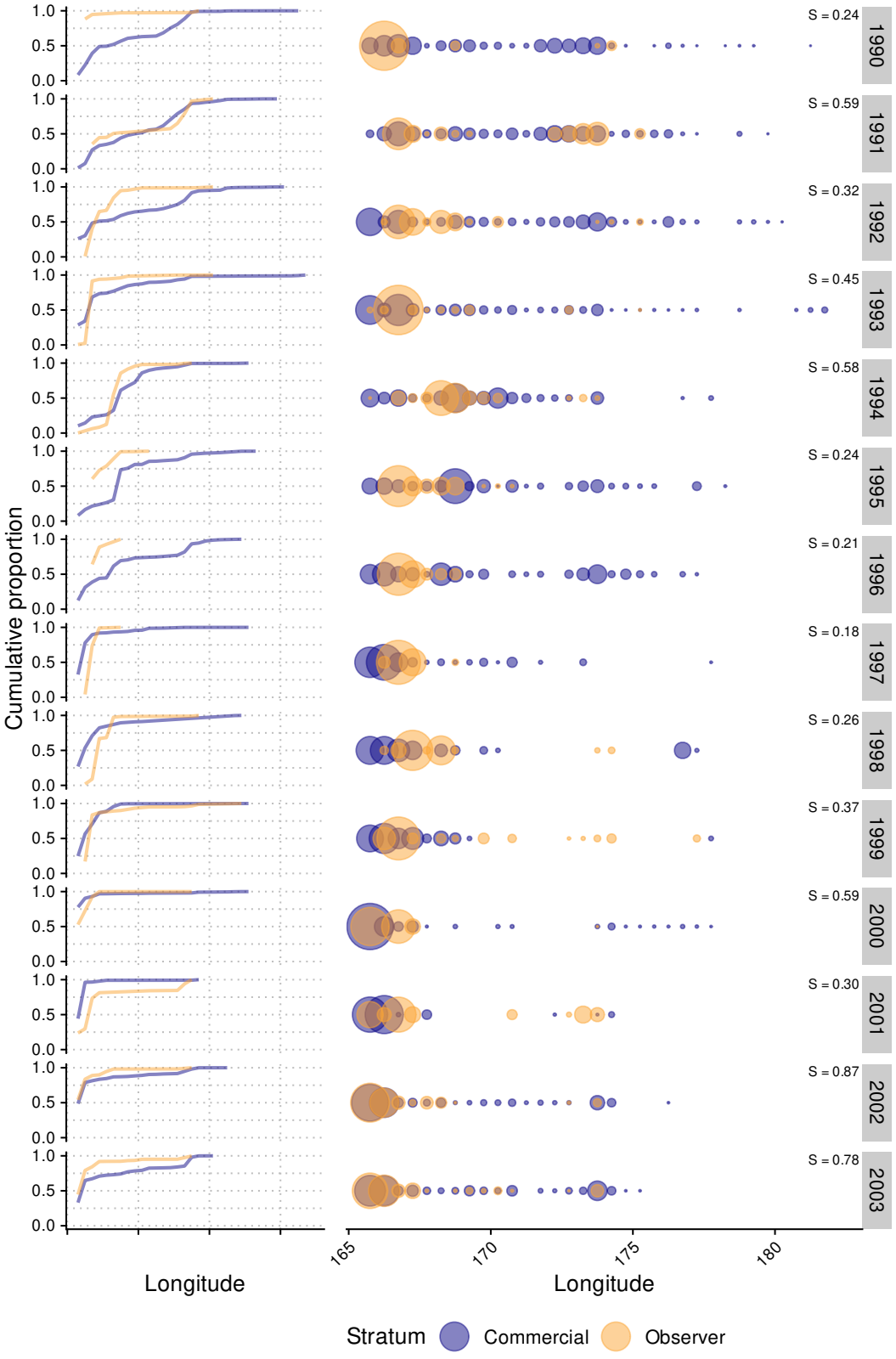


Figure 539: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SKI 3, from events where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

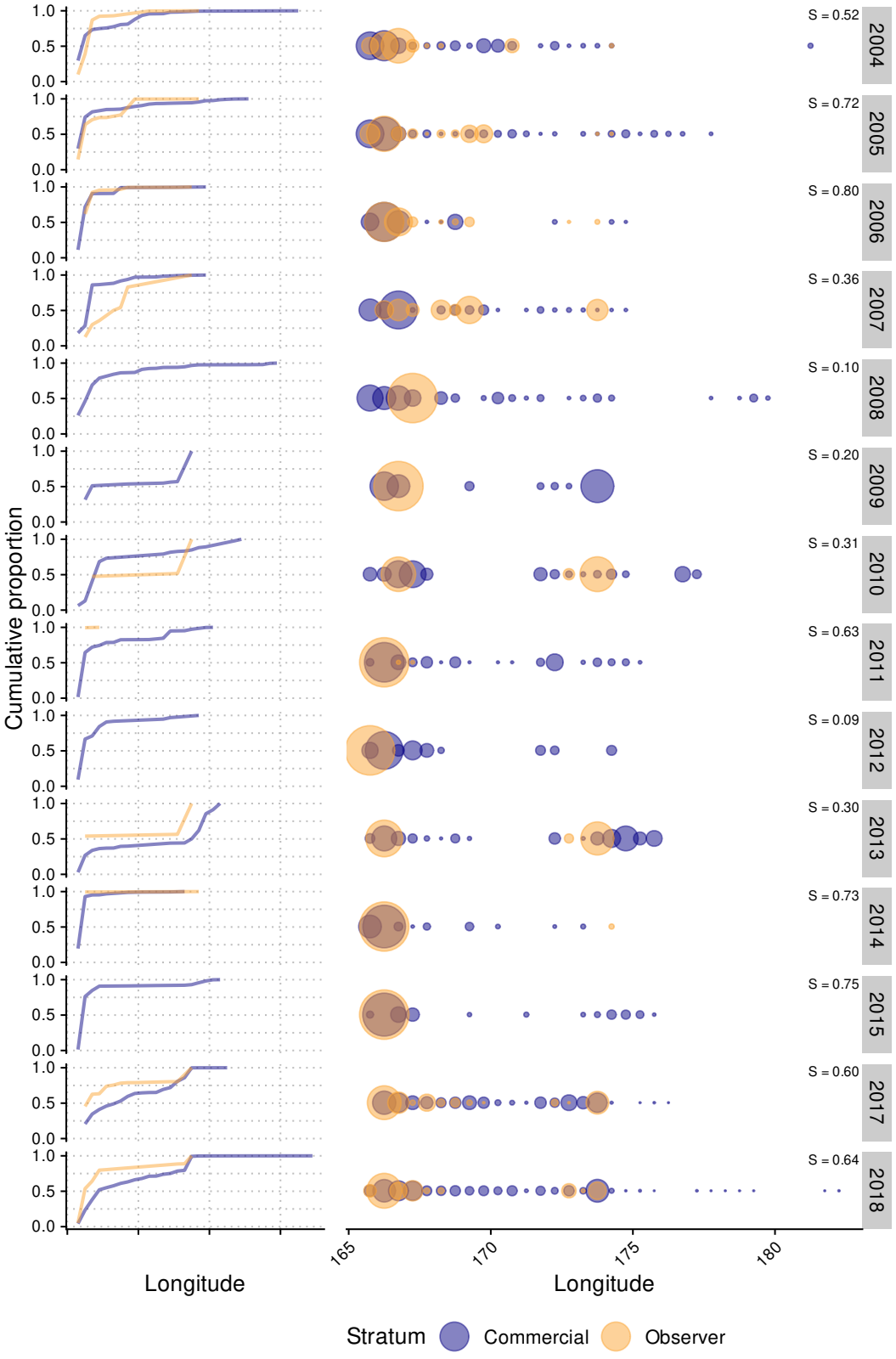


Figure 540: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SKI 3, from events where the gemfish catch exceeded the 20kg threshold, in 2004 to 2018. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

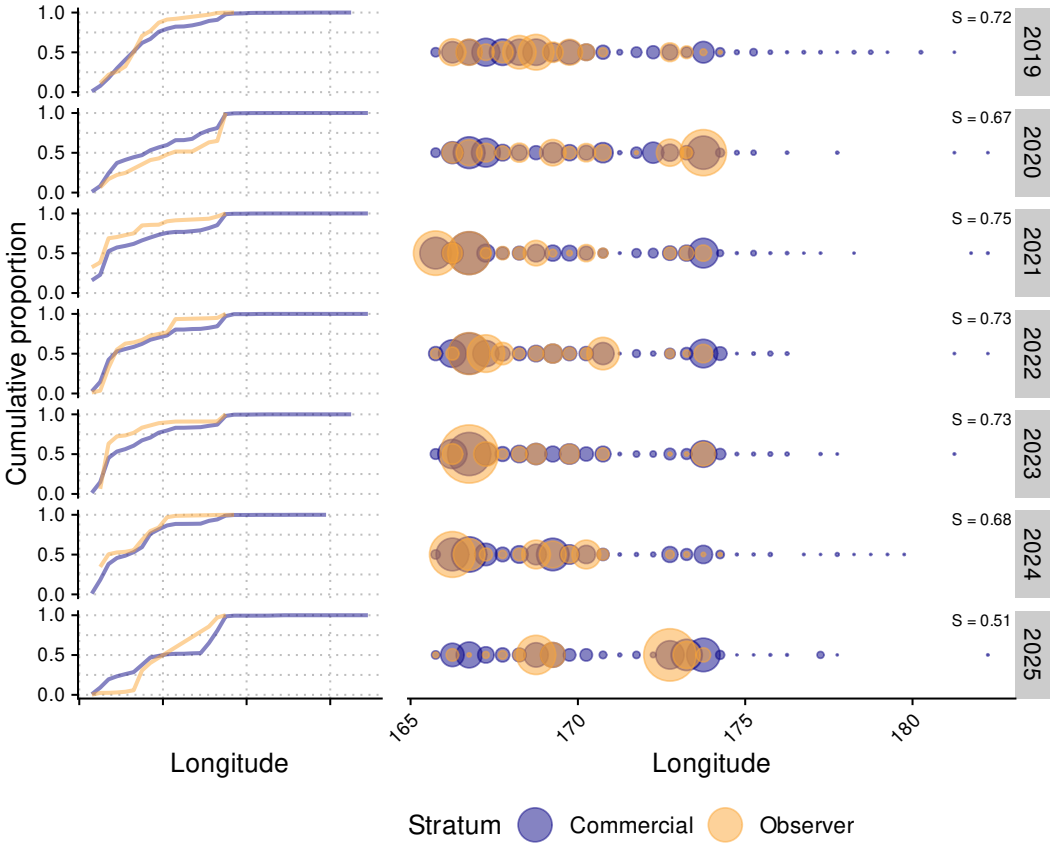


Figure 541: Longitudinal representativeness of observer sampling coverage of Trawl catch in SKI 3, from events where the gemfish catch exceeded the 20kg threshold, in 2019 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

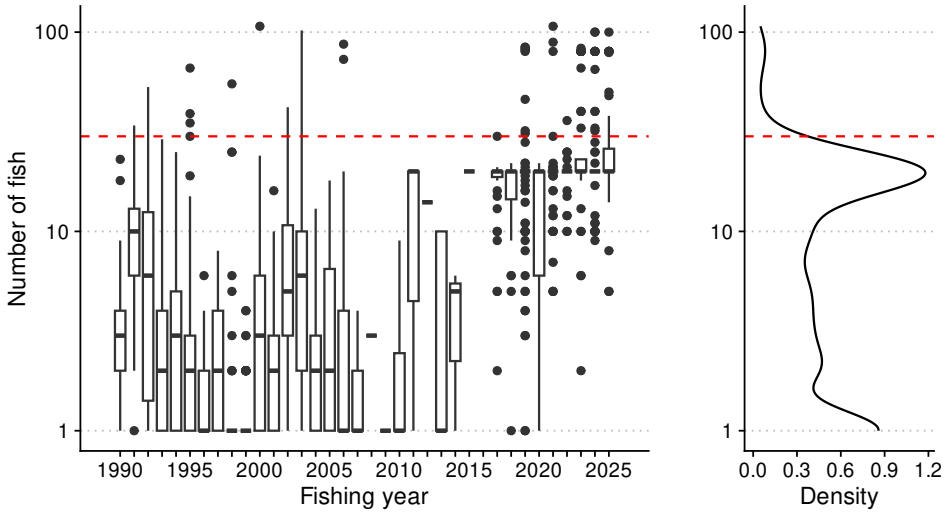


Figure 542: Length-frequency sample sizes for observed fishing events in SKI 3 where gemfish were sampled. The red dashed line indicates a sample size of 30 fish.

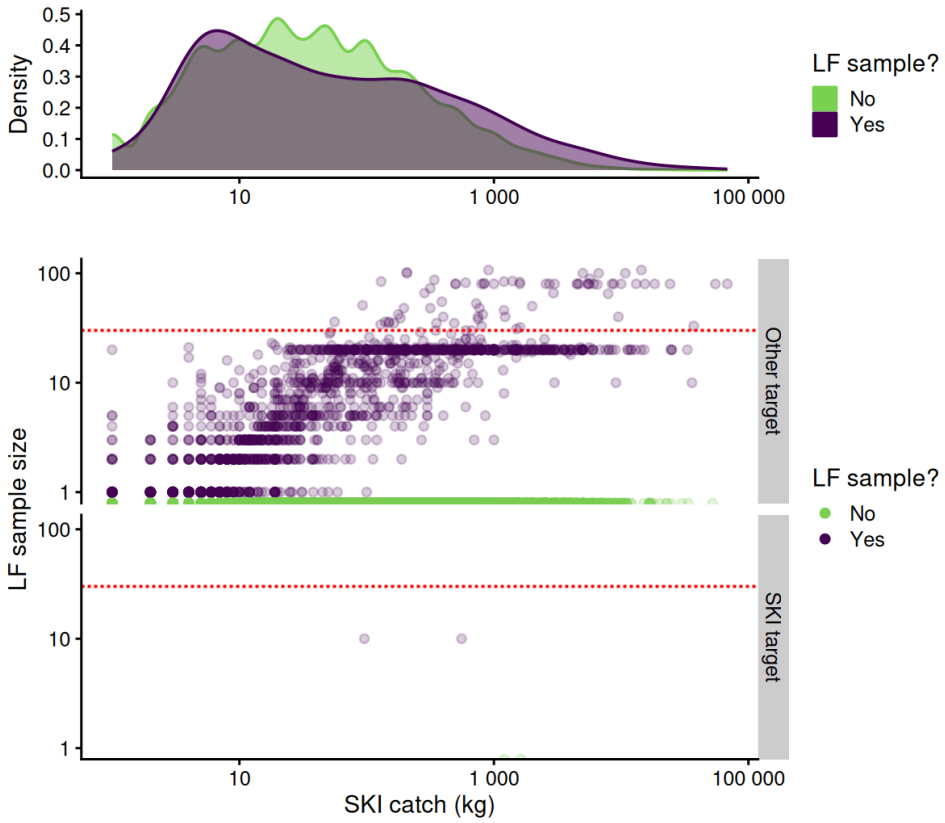


Figure 543: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in SKI 3 in relation to the total gemfish catch from an event, separately for gemfish target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.7.1.2 Otolith samples

Table 47: Otolith samples of gemfish from the SKI 3 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of gemfish exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	2 485	0	0	0.00
1991	1 835	0	0	0.00
1992	780	0	0	0.00
1993	485	0	0	0.00
1994	166	0	0	0.00
1995	217	0	0	0.00
1996	128	0	0	0.00
1997	100	0	0	0.00
1998	80	0	0	0.00
1999	27	0	0	0.00
2000	84	0	0	0.00
2001	152	0	0	0.00
2002	280	0	0	0.00
2003	433	0	0	0.00
2004	206	0	0	0.00
2005	153	0	0	0.00
2006	90	0	0	0.00
2007	54	0	0	0.00
2008	56	0	0	0.00
2009	18	0	0	0.00
2010	39	14	27	35.90
2011	103	0	0	0.00
2012	36	0	0	0.00
2013	58	1	5	1.72
2014	72	2	11	2.78
2015	32	0	0	0.00
2016	39	0	0	0.00
2017	441	31	161	7.03
2018	875	82	425	9.37
2019	1 590	112	568	7.04
2020	1 751	97	462	5.54
2021	2 022	77	383	3.81
2022	1 943	76	385	3.91
2023	1 890	63	348	3.33
2024	2 542	94	484	3.70
2025	3 191	59	313	1.85

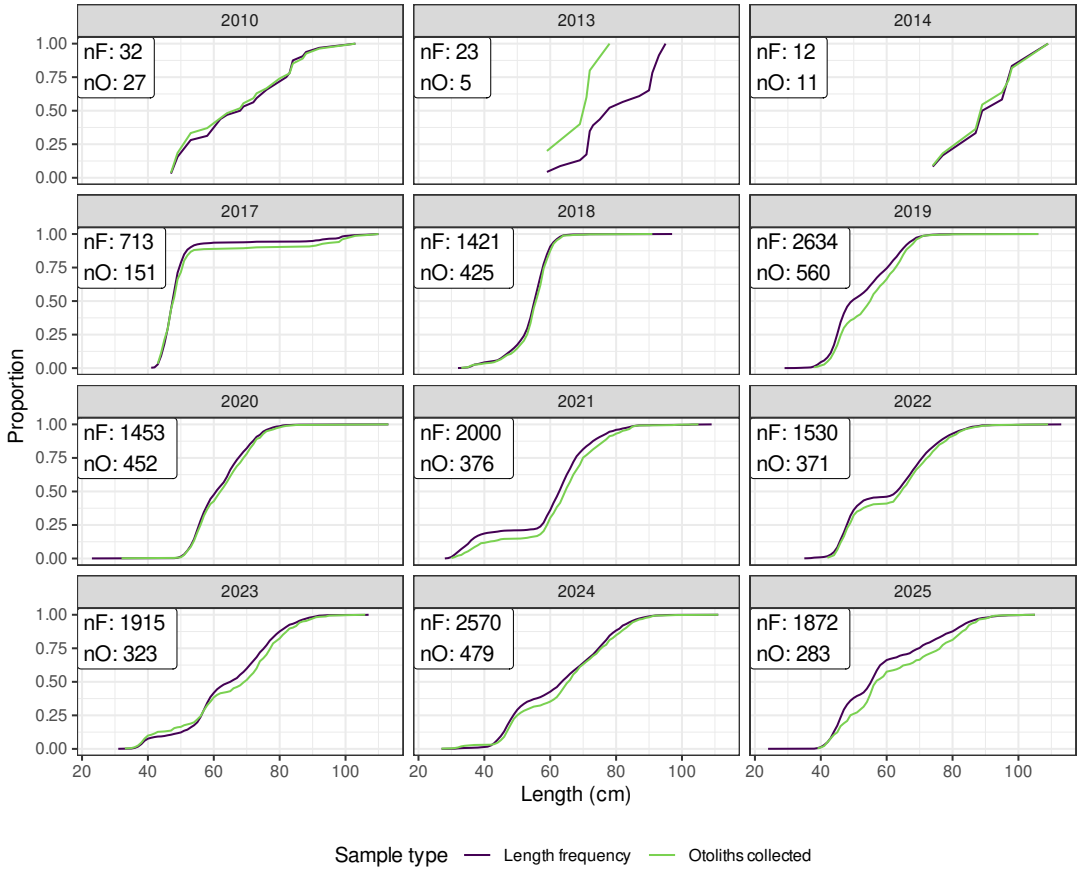


Figure 544: Cumulative distributions of the length of fish in the length frequency and otolith samples of gemfish in the SKI 3 Trawl fishery for the 2010 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.7.1.3 Catch quantification

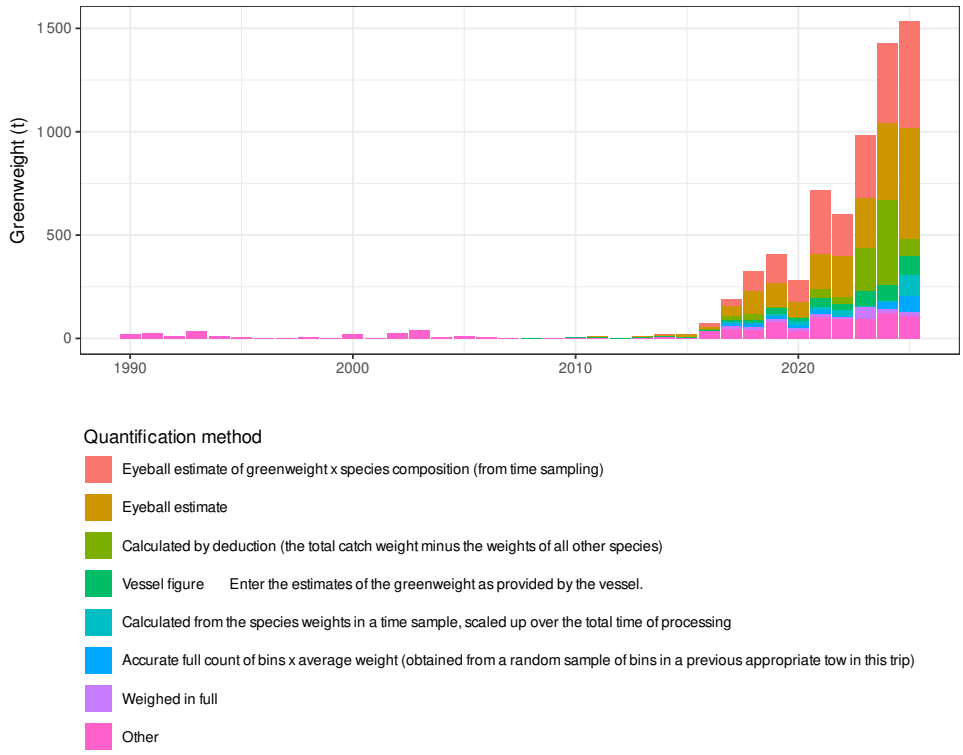


Figure 545: Methods used by observers to quantify the catch of gemfish in the SKI 3 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.7.2 SKI 7: Trawl fishery

2.7.2.1 Length-frequency samples

Table 48: Length-frequency samples of gemfish from the SKI 7 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of gemfish exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	1 059	23	66	2.17
1991	643	89	936	13.84
1992	618	92	869	14.89
1993	909	39	274	4.29
1994	679	282	2 570	41.53
1995	330	92	283	27.88
1996	258	99	420	38.37
1997	325	34	107	10.46
1998	157	21	46	13.38
1999	177	64	612	36.16
2000	277	109	533	39.35
2001	133	81	259	60.90
2002	313	102	499	32.59
2003	638	171	994	26.80
2004	1 631	167	1 240	10.24
2005	1 129	121	857	10.72
2006	706	77	315	10.91
2007	295	37	79	12.54
2008	500	4	6	0.80
2009	612	23	177	3.76
2010	739	2	5	0.27
2011	958	9	161	0.94
2012	719	20	239	2.78
2013	901	34	320	3.77
2014	922	18	299	1.95
2015	687	18	278	2.62
2016	784	14	97	1.79
2017	1 499	45	660	3.00
2018	2 113	49	738	2.32
2019	2 678	89	1 631	3.32
2020	2 839	148	2 979	5.21
2021	2 933	81	1 552	2.76
2022	2 548	48	1 010	1.88
2023	3 300	62	1 835	1.88
2024	3 285	67	1 518	2.04
2025	3 693	35	1 047	0.95

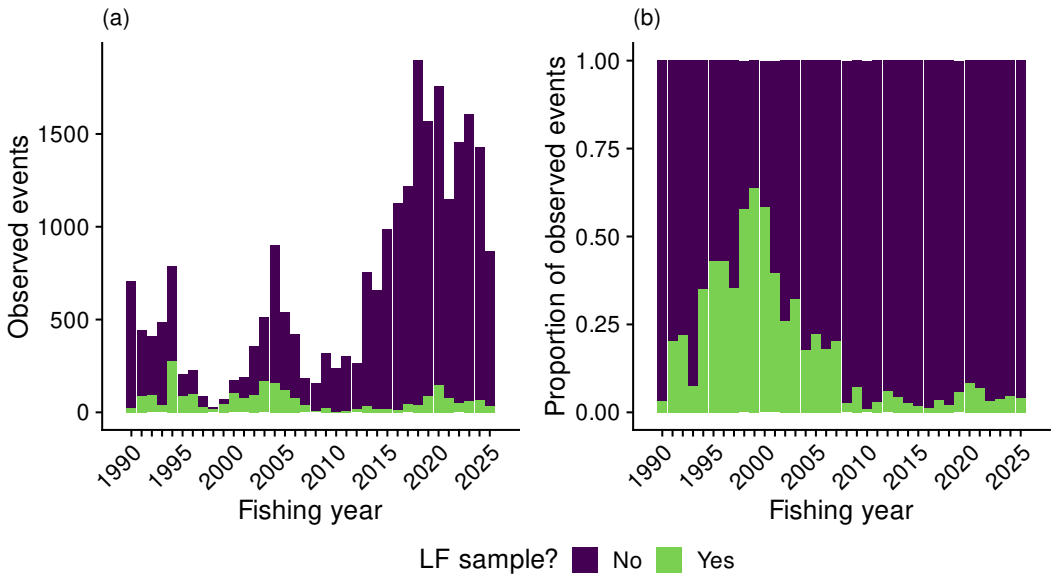


Figure 546: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SKI 7 where the gemfish catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

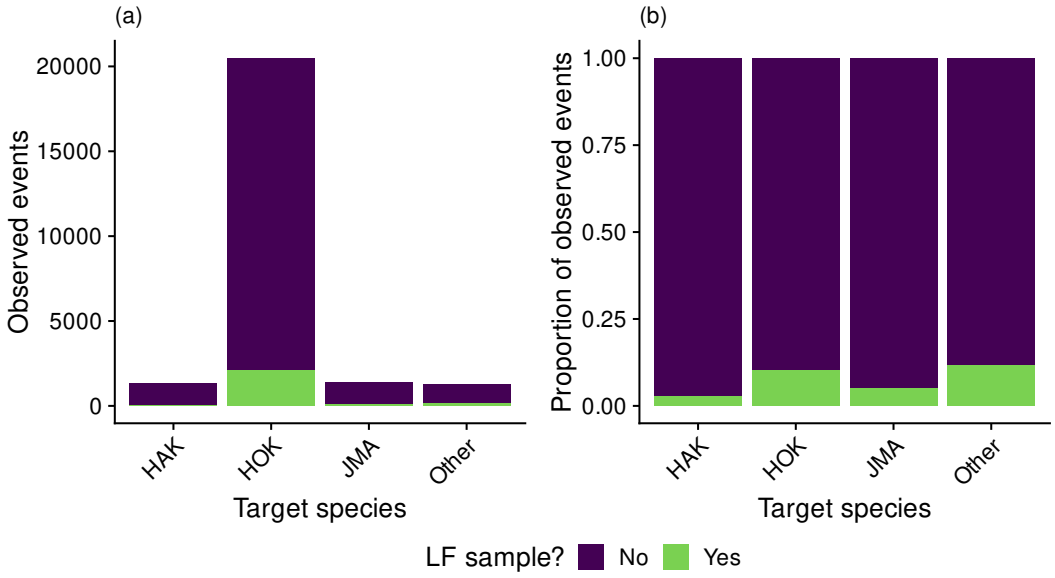


Figure 547: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SKI 7 where the gemfish catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

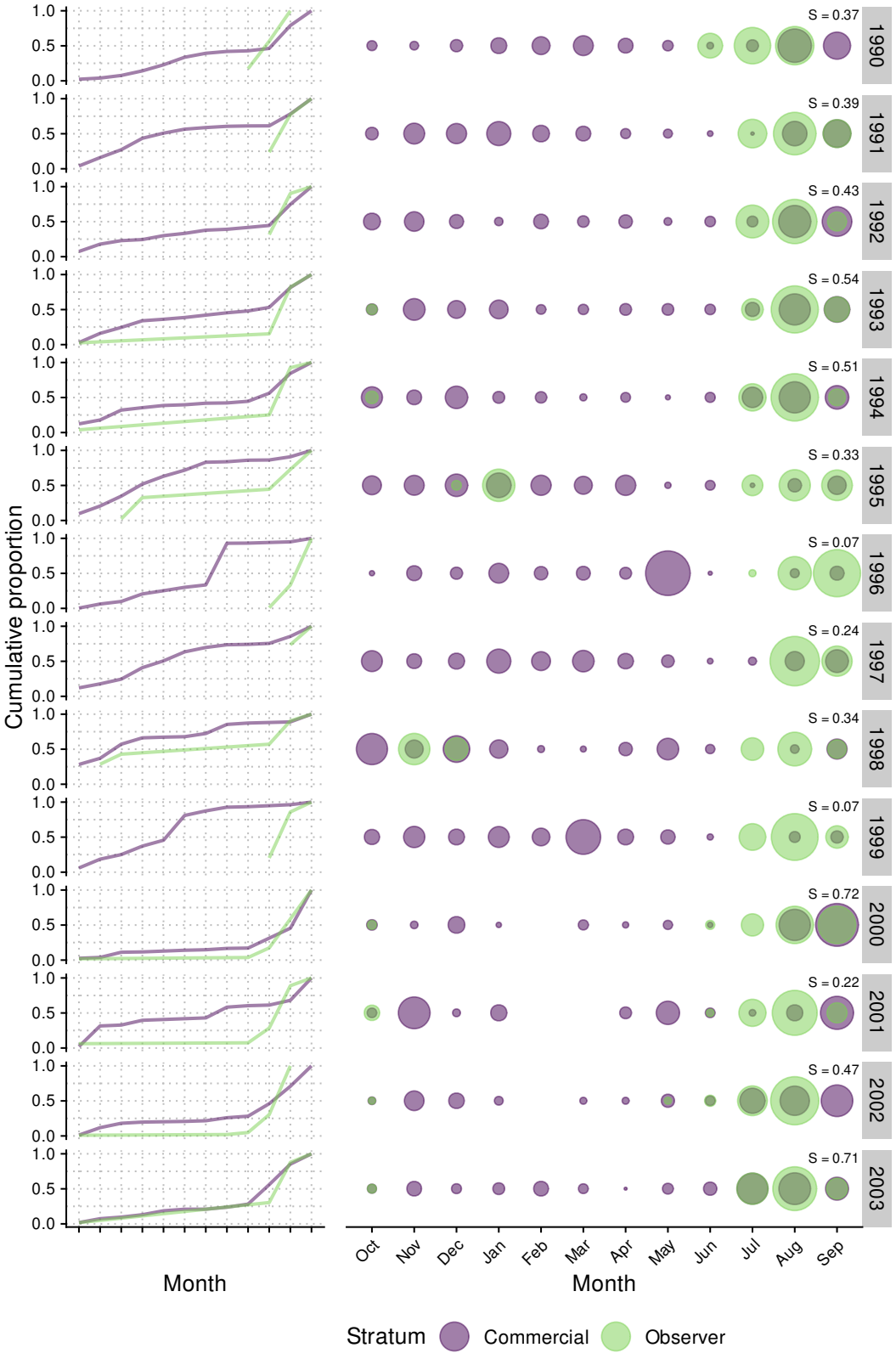


Figure 548: Monthly representativeness of observer sampling coverage of Trawl fishing events in SKI 7, where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

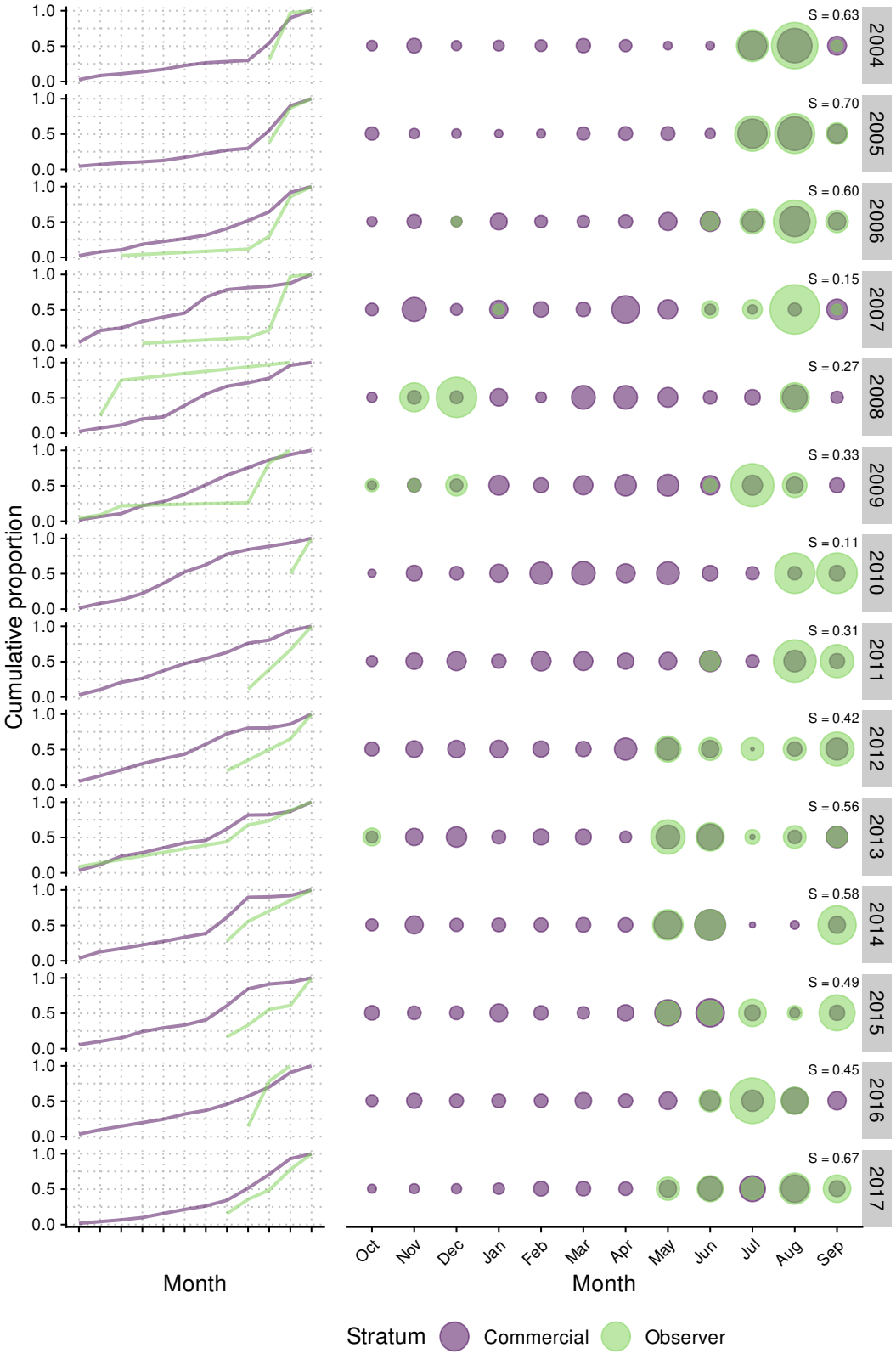


Figure 549: Monthly representativeness of observer sampling coverage of Trawl fishing events in SKI 7, where the gemfish catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

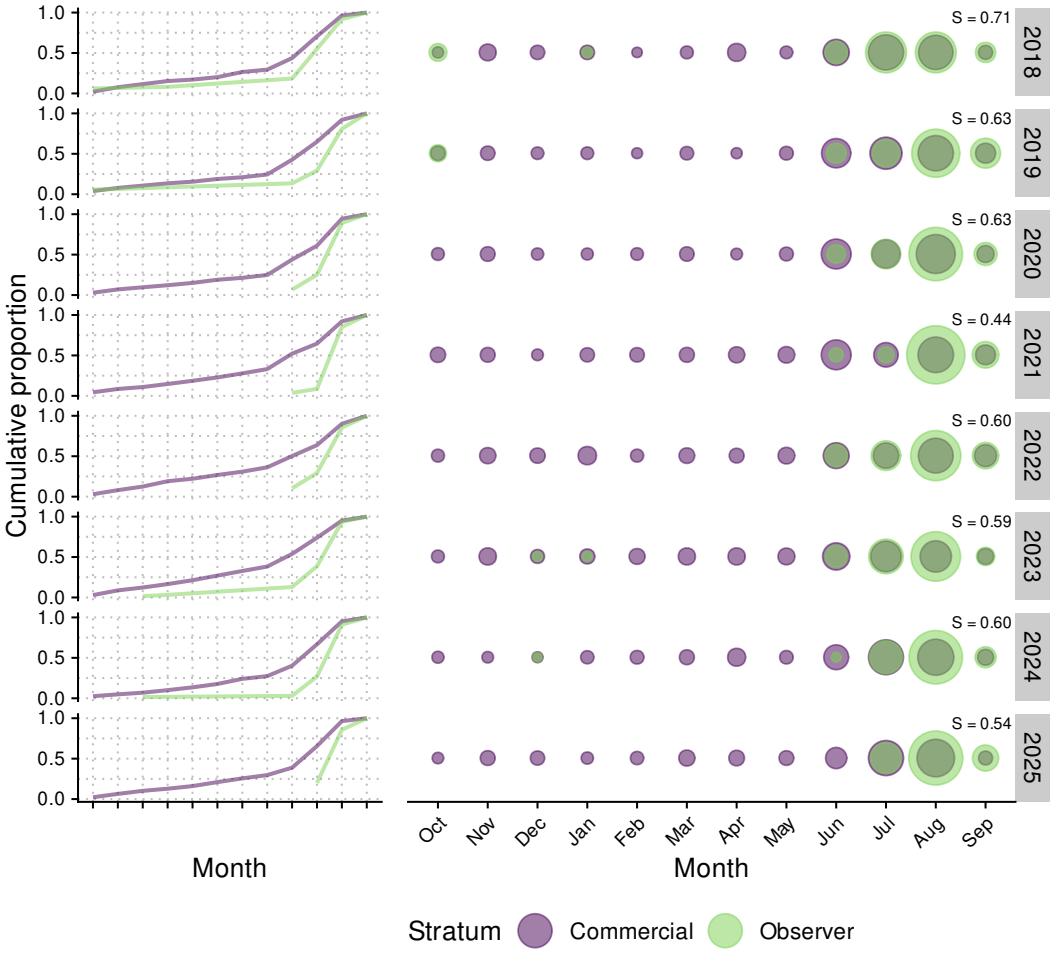


Figure 550: Monthly representativeness of observer sampling coverage of Trawl fishing events in SKI 7, where the gemfish catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

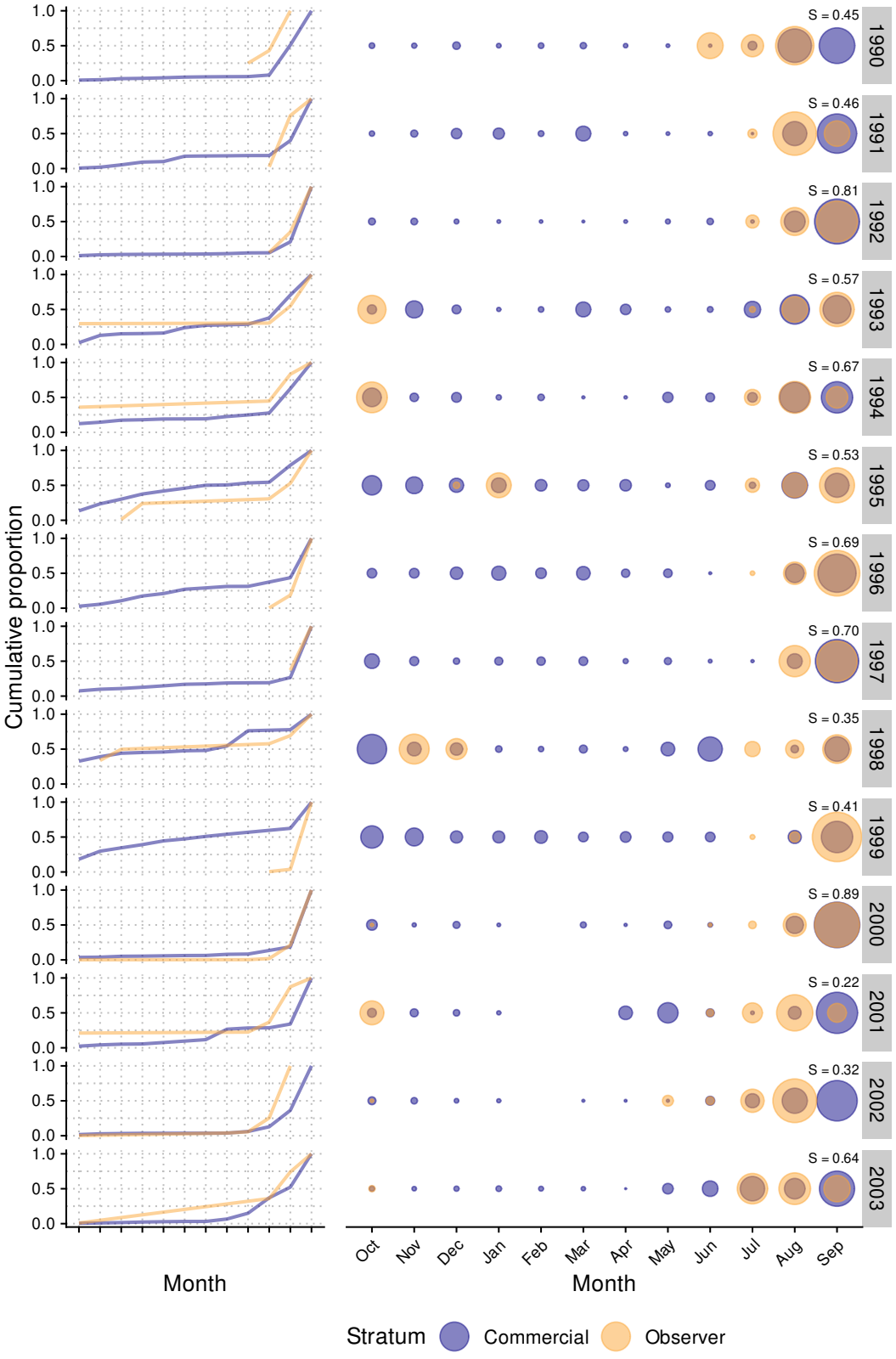


Figure 551: Monthly representativeness of observer sampling coverage of Trawl catch in SKI 7, from events where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

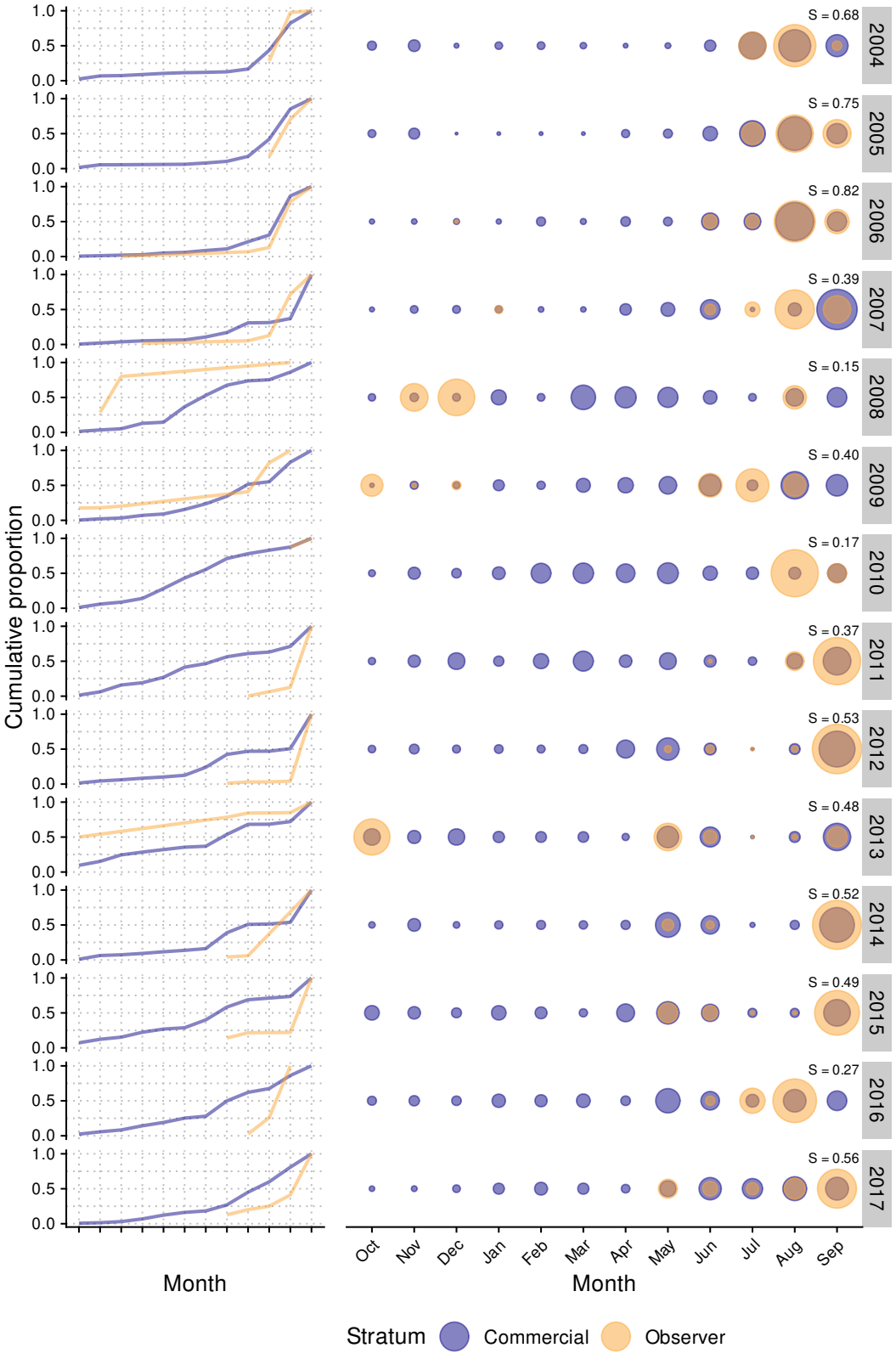


Figure 552: **Monthly representativeness of observer sampling coverage of Trawl catch in SKI 7, from events where the gemfish catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

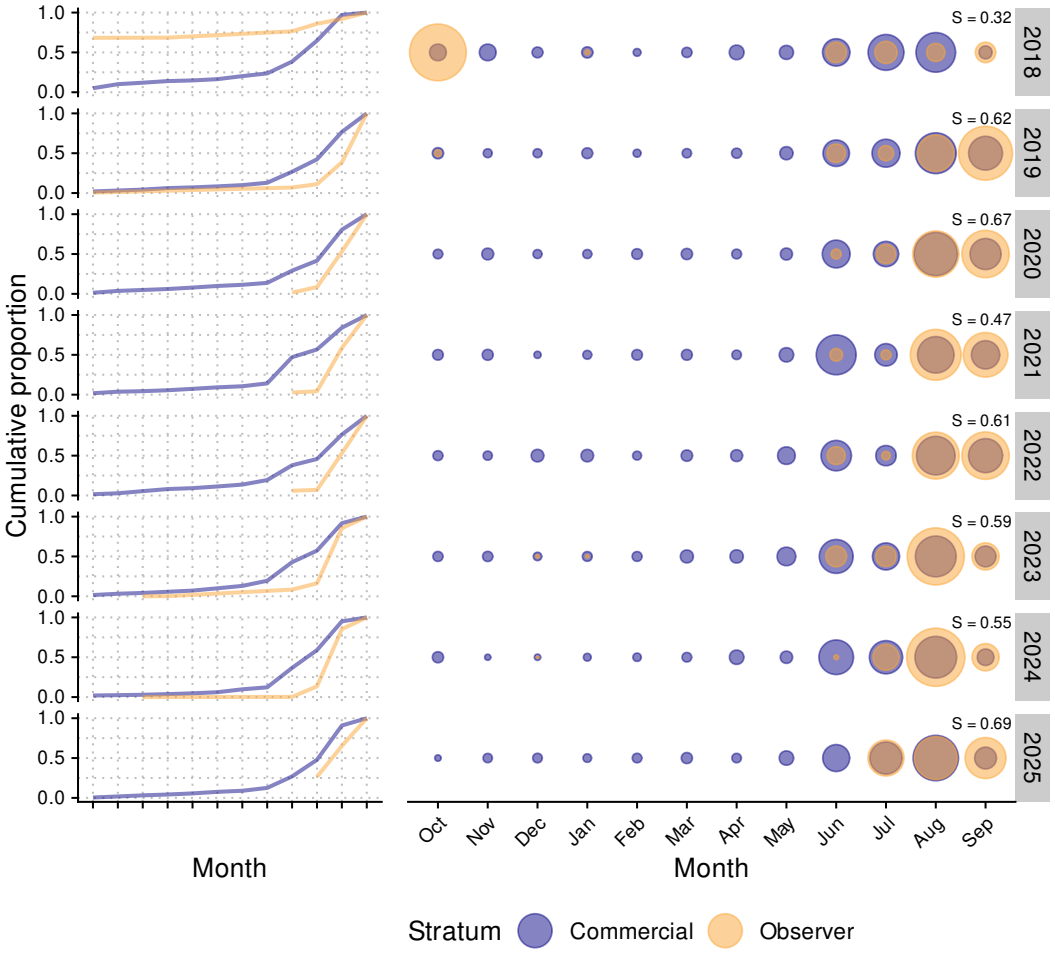


Figure 553: Monthly representativeness of observer sampling coverage of Trawl catch in SKI 7, from events where the gemfish catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

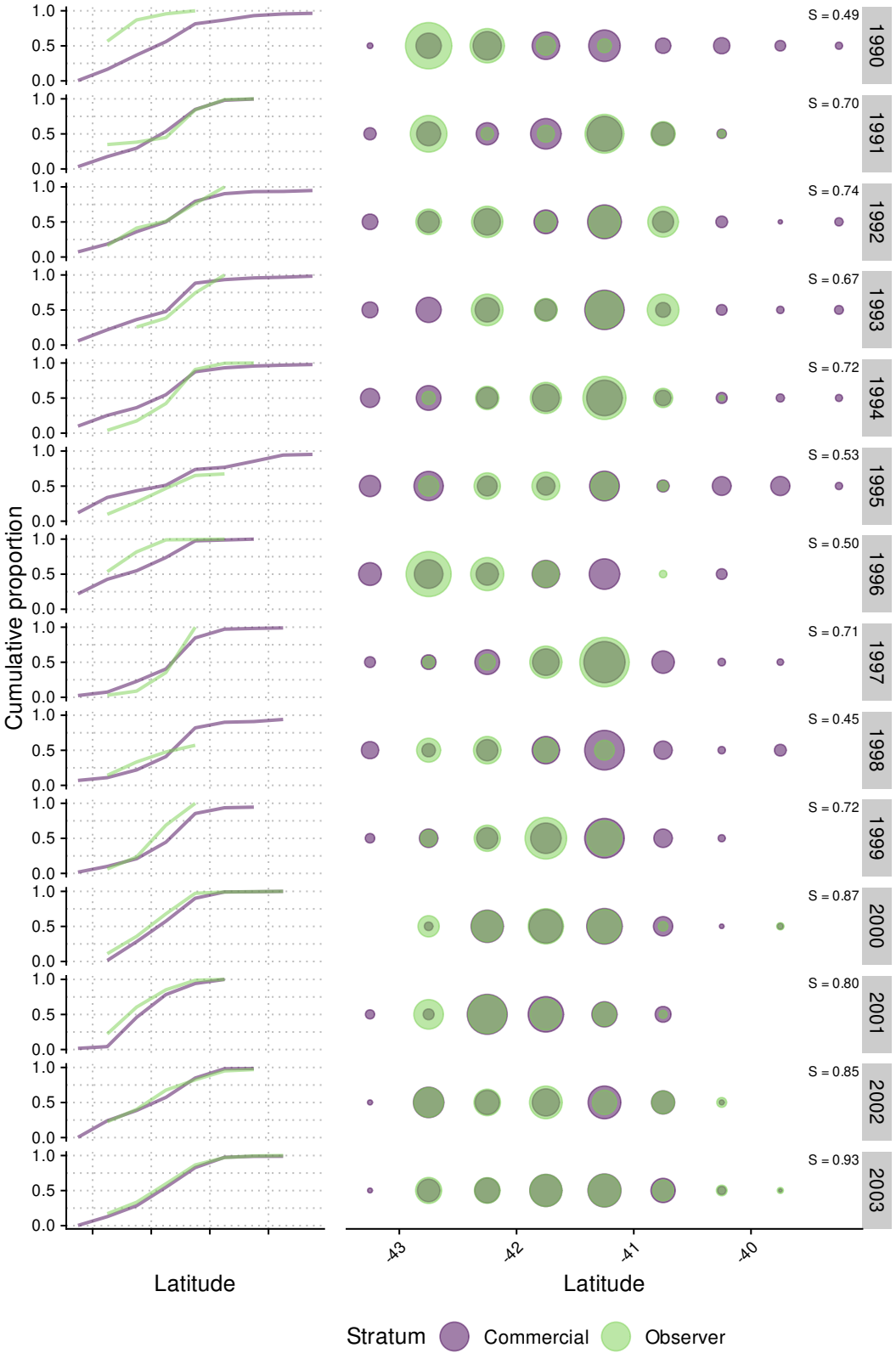


Figure 554: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 7, where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

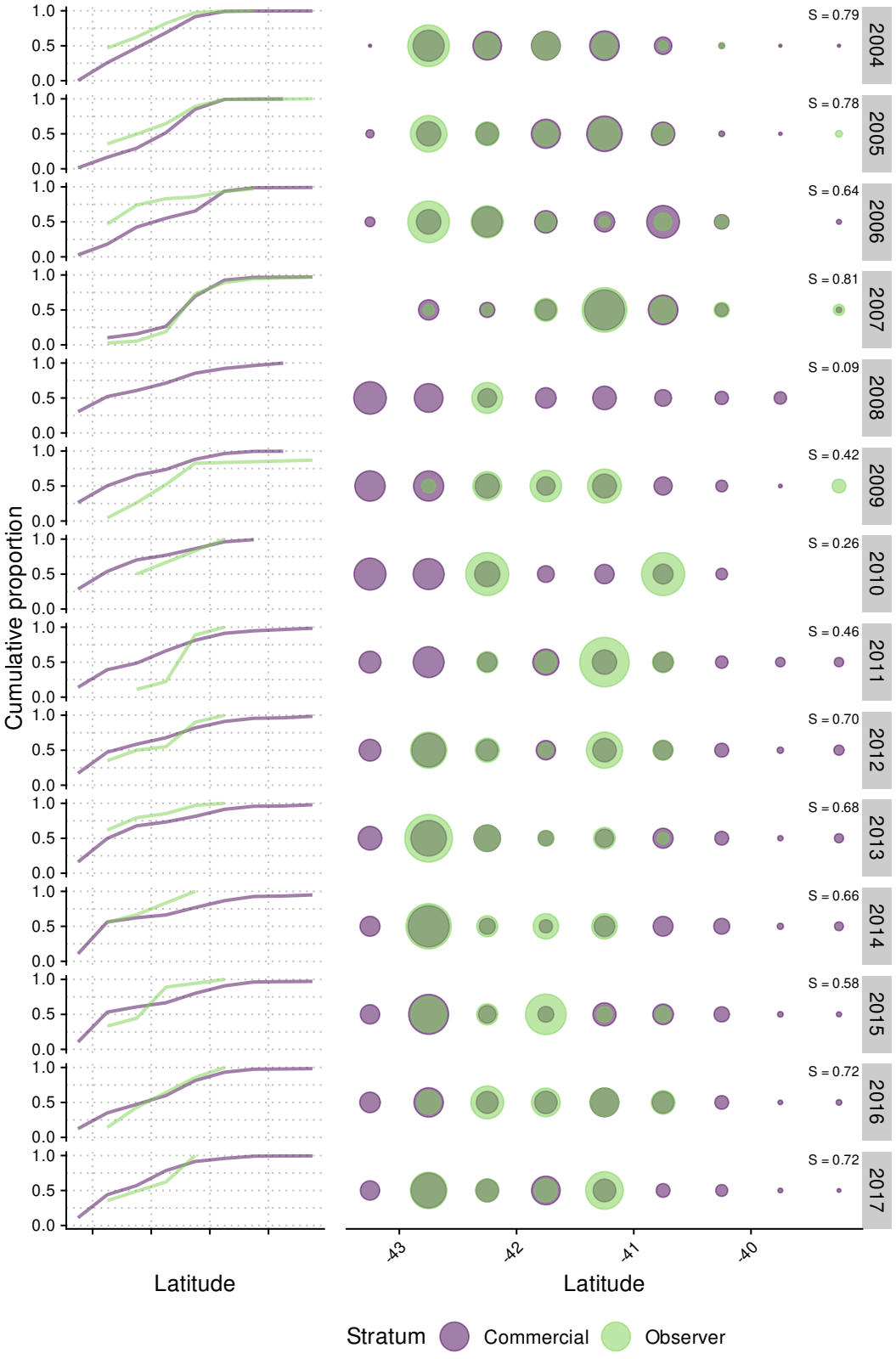


Figure 555: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 7, where the gemfish catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

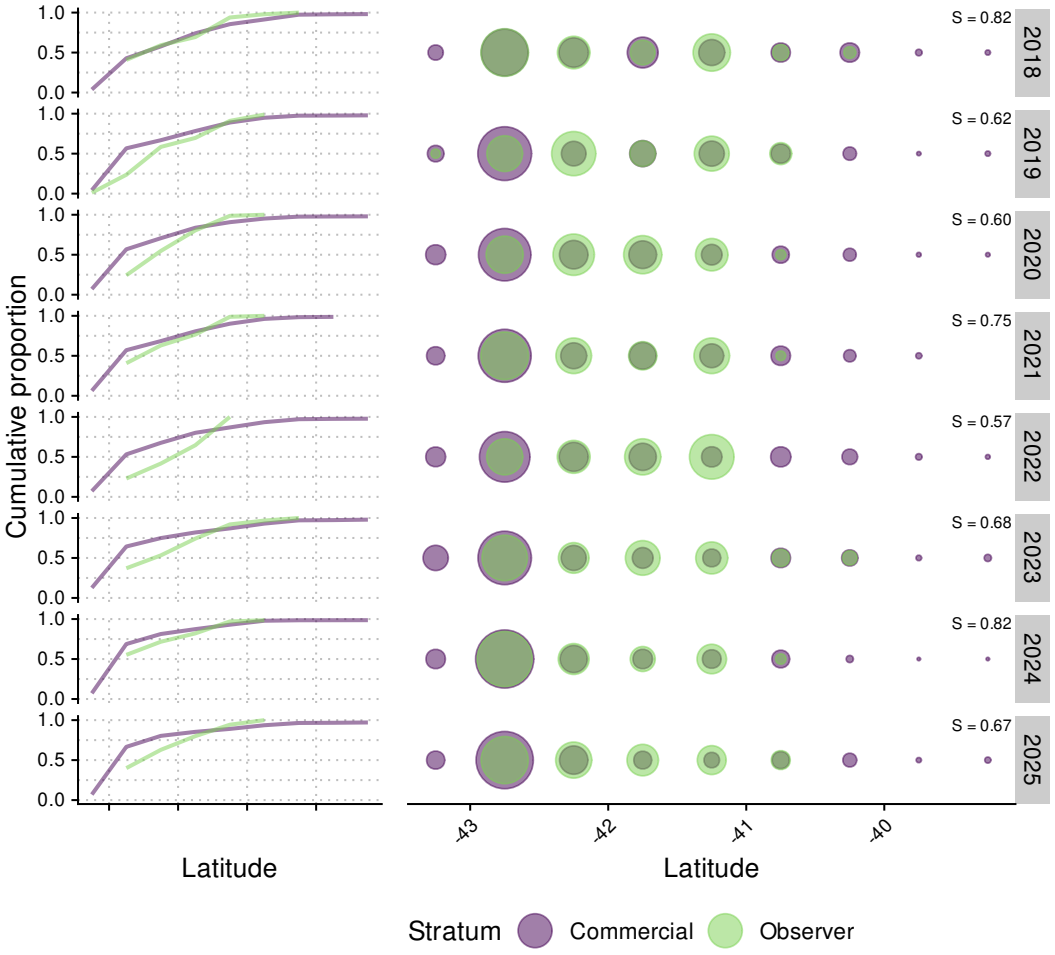


Figure 556: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 7, where the gemfish catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

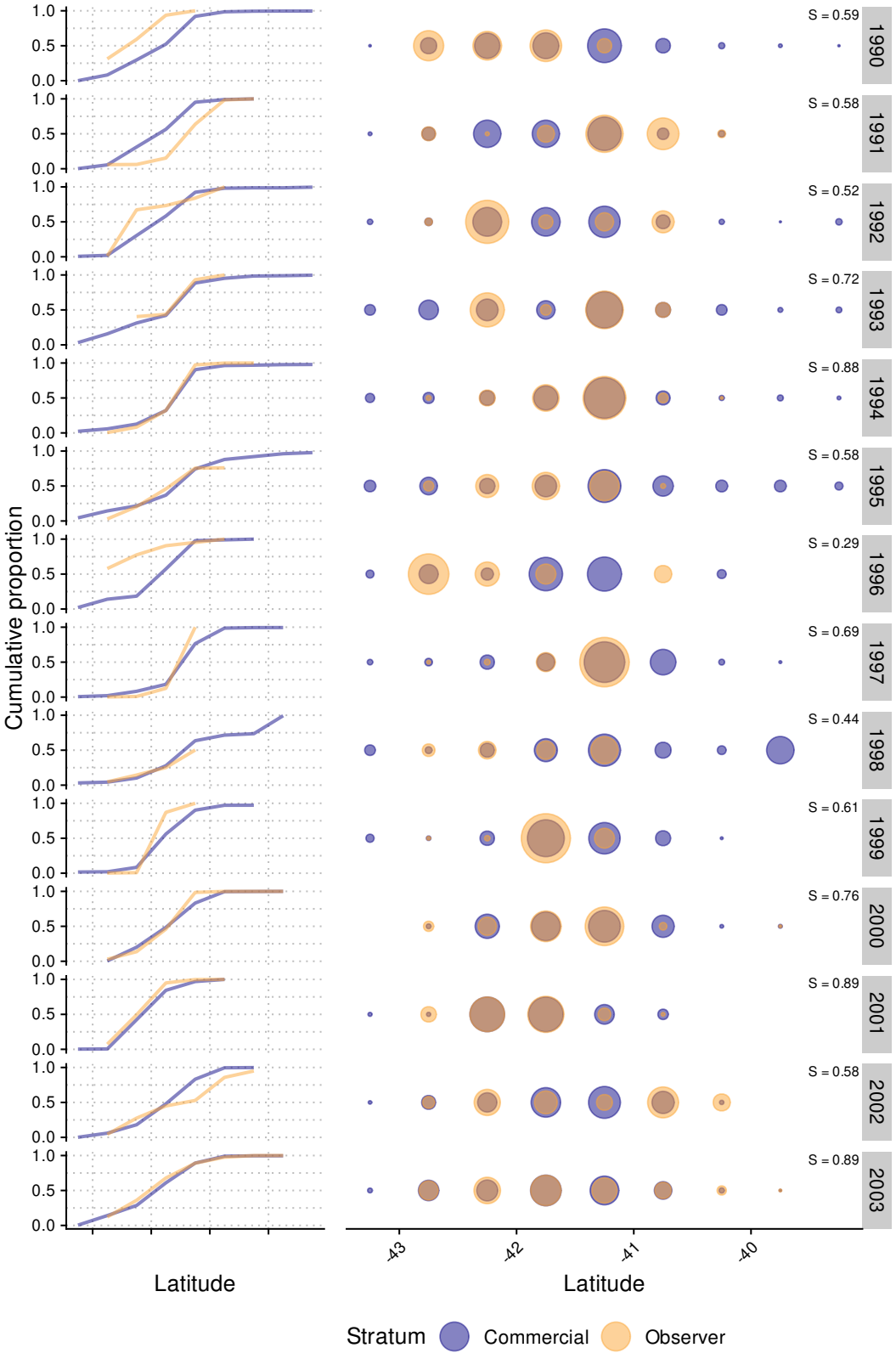


Figure 557: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SKI 7, from events where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

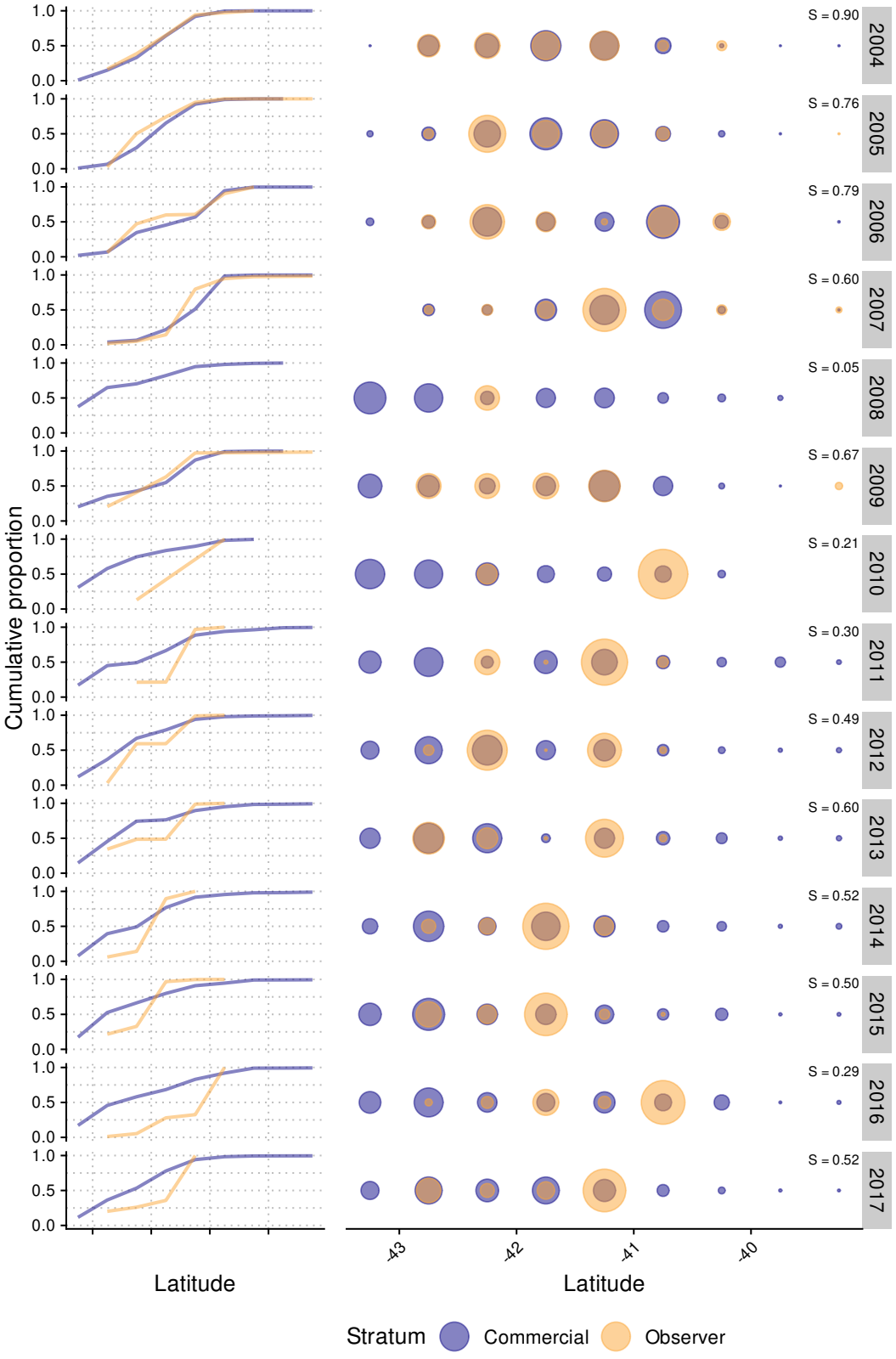


Figure 558: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SKI 7, from events where the gemfish catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

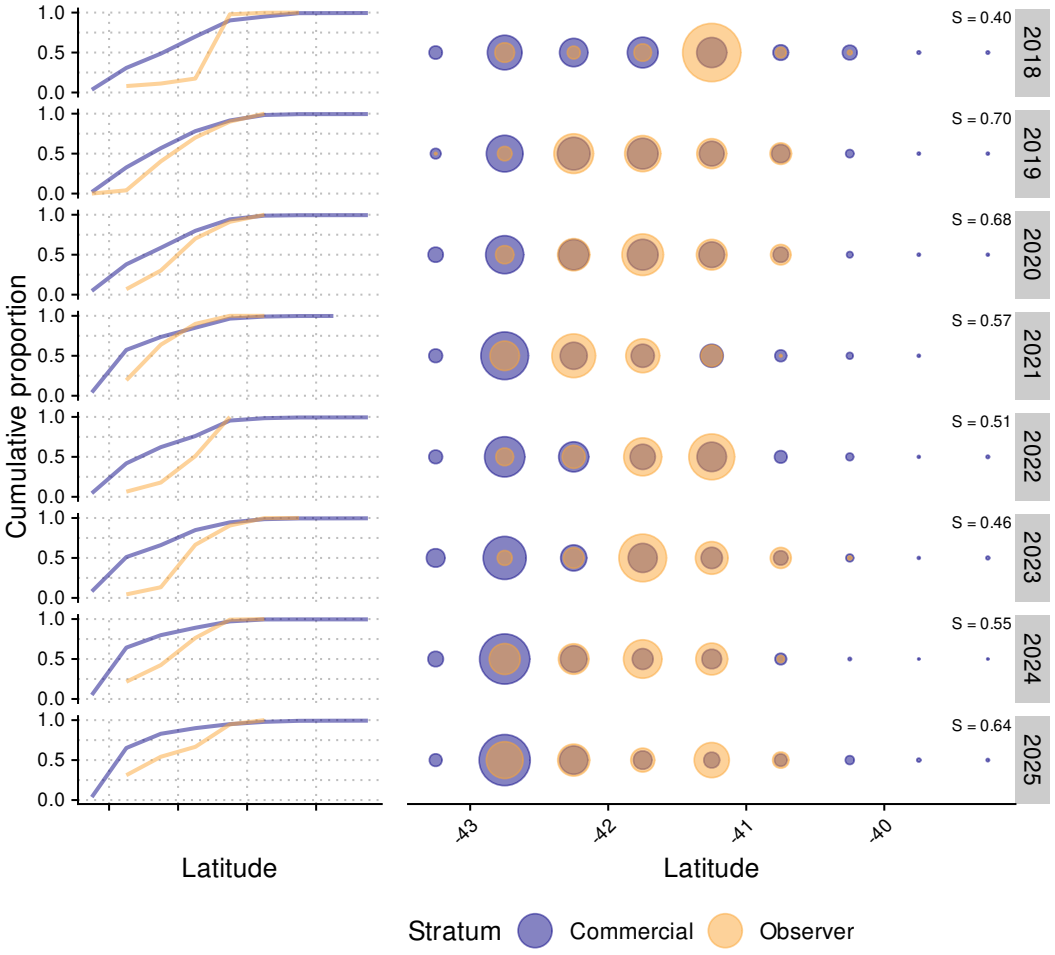


Figure 559: Latitudinal representativeness of observer sampling coverage of Trawl catch in SKI 7, from events where the gemfish catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

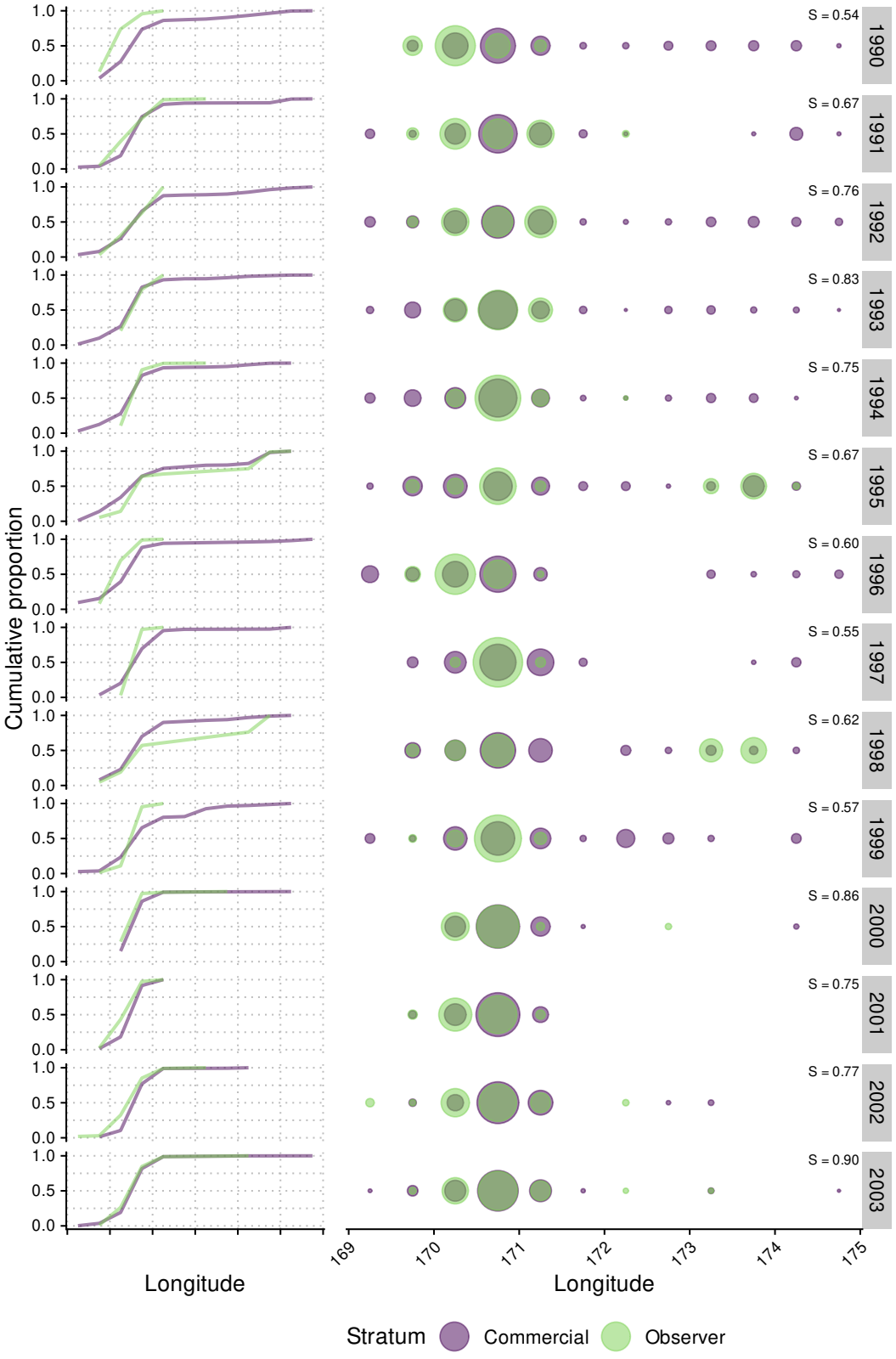


Figure 560: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 7, where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

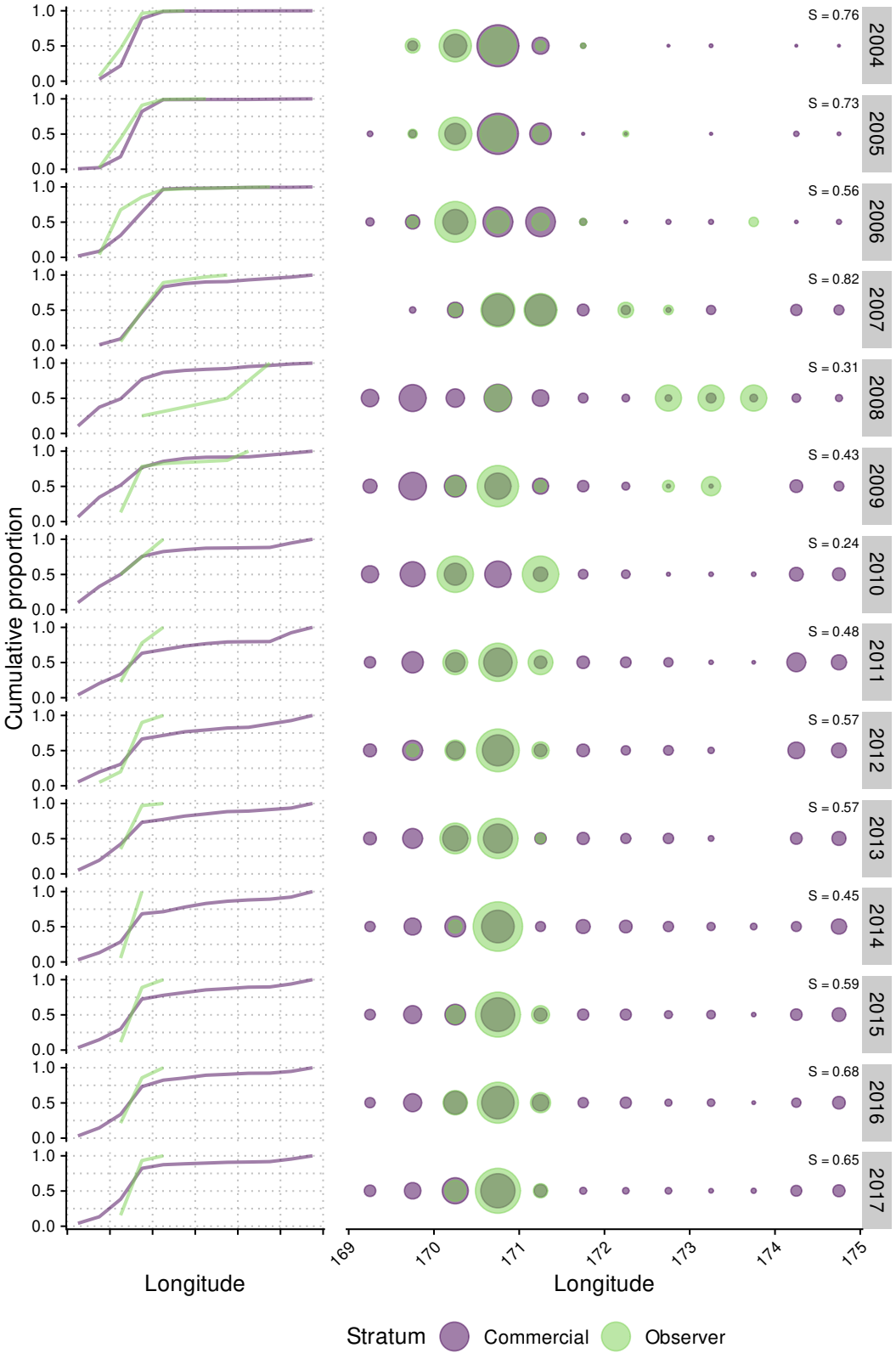


Figure 561: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 7, where the gemfish catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

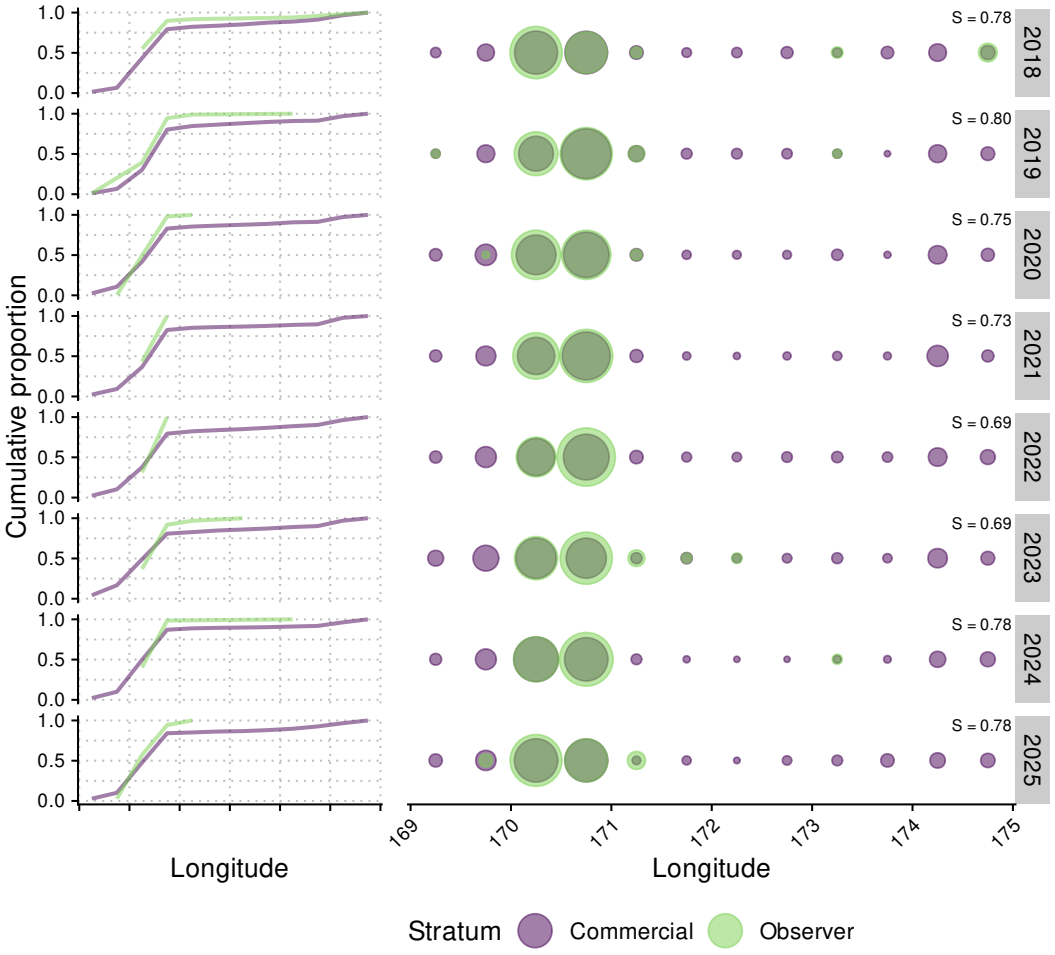


Figure 562: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SKI 7, where the gemfish catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

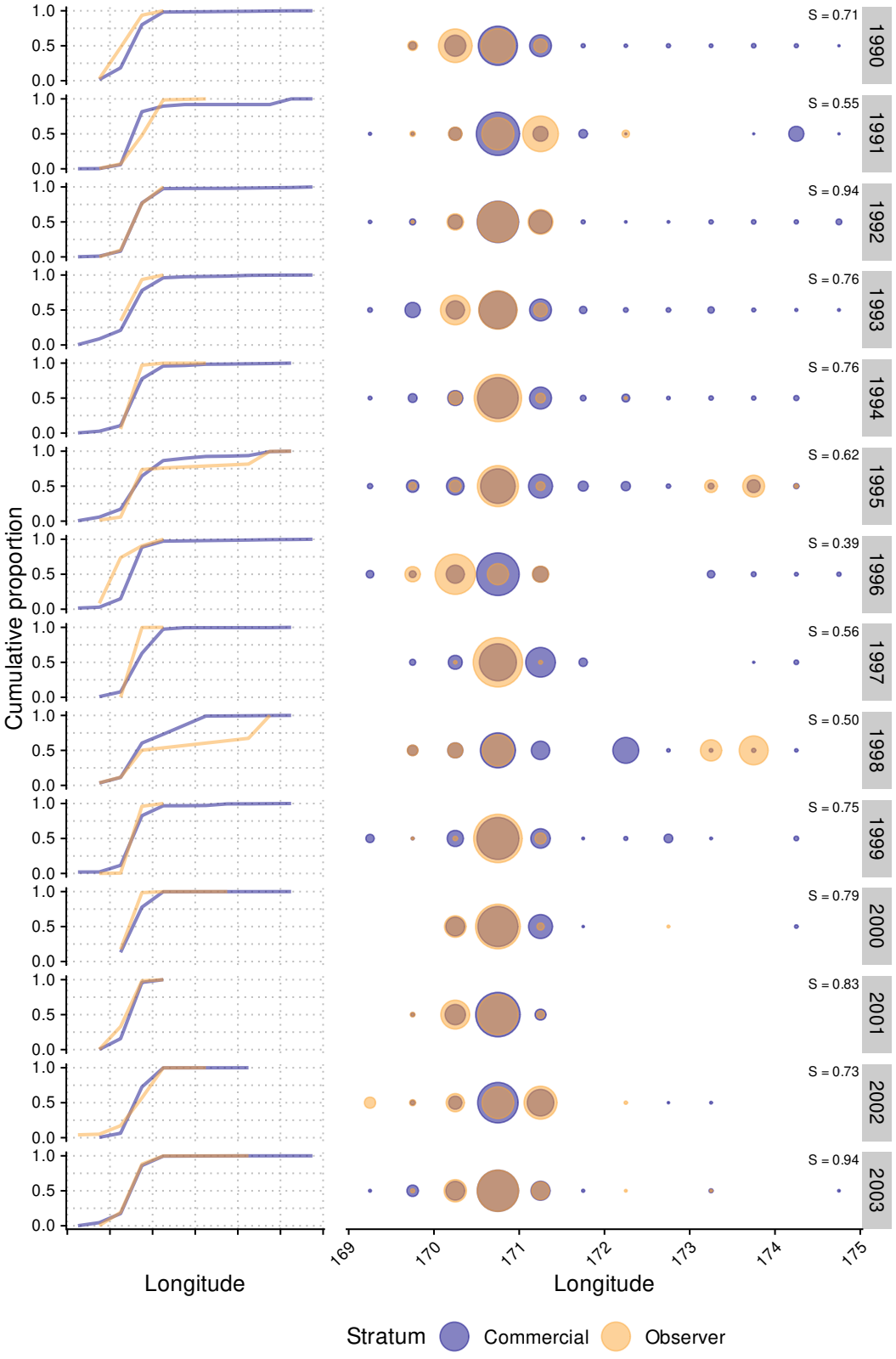


Figure 563: Longitudinal representativeness of observer sampling coverage of Trawl catch in SKI 7, from events where the gemfish catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

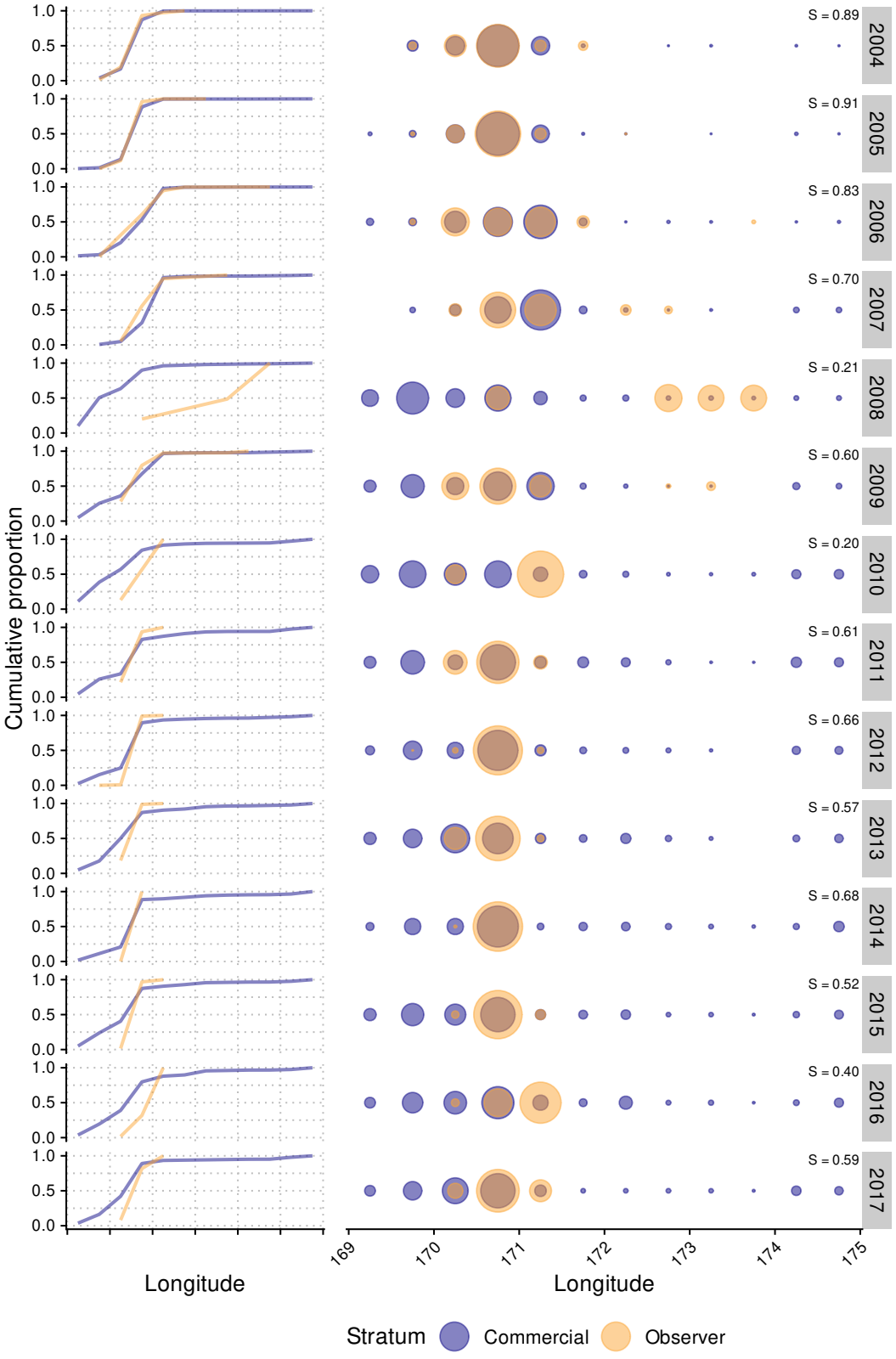


Figure 564: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SKI 7, from events where the gemfish catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

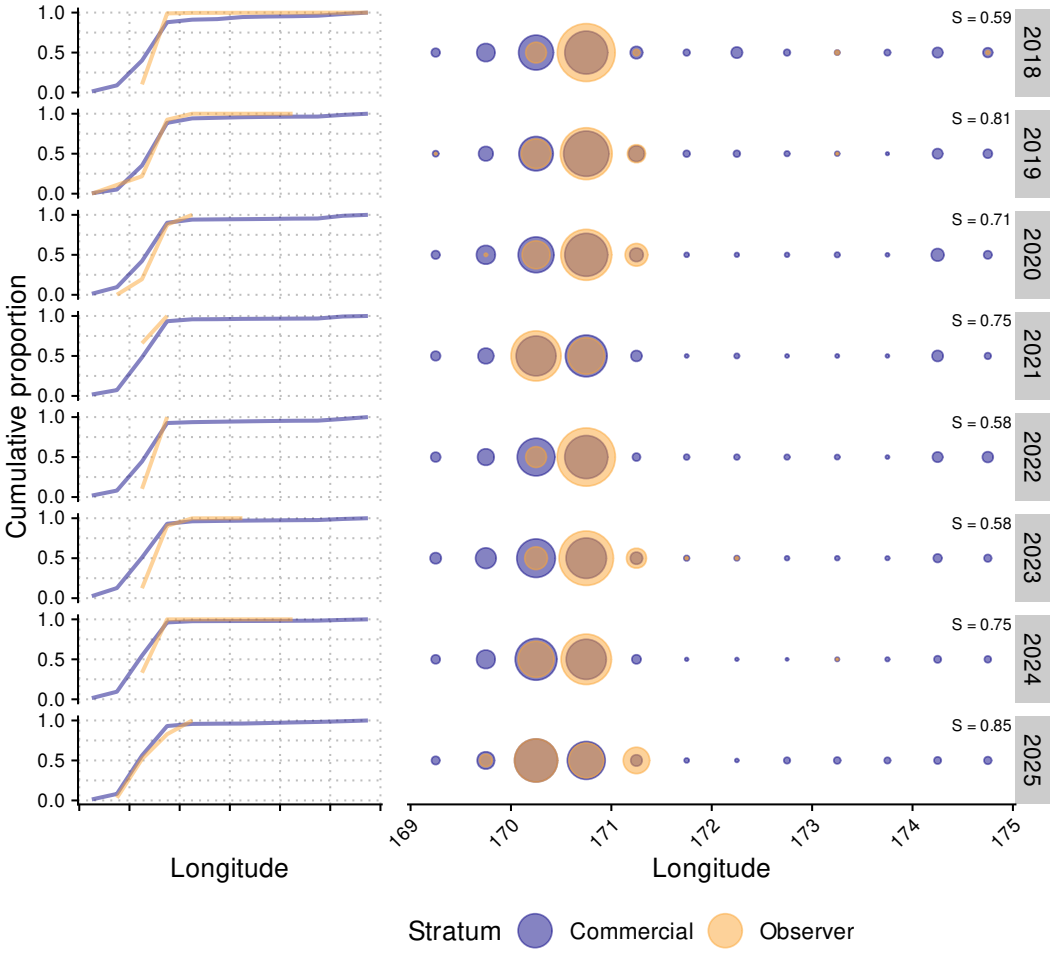


Figure 565: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SKI 7, from events where the gemfish catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

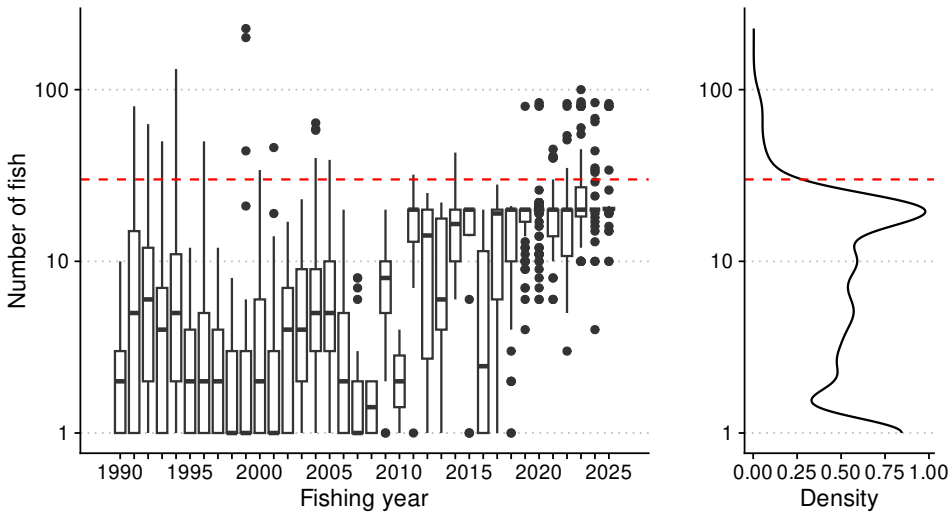


Figure 566: **Length-frequency sample sizes for observed fishing events in SKI 7 where gemfish were sampled. The red dashed line indicates a sample size of 30 fish.**

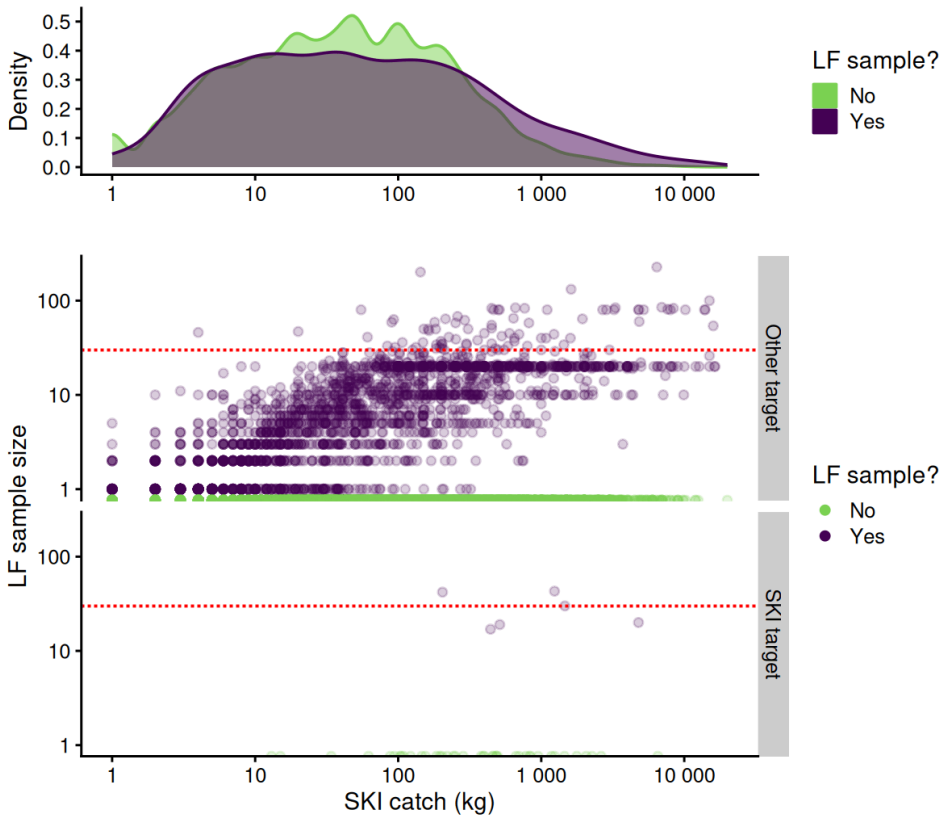


Figure 567: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SKI 7 in relation to the total gemfish catch from an event, separately for gemfish target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.7.2.2 Otolith samples

Table 49: Otolith samples of gemfish from the SKI 7 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of gemfish exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	1 059	0	0	0.00
1991	643	0	0	0.00
1992	618	0	0	0.00
1993	909	0	0	0.00
1994	679	0	0	0.00
1995	330	0	0	0.00
1996	258	0	0	0.00
1997	325	0	0	0.00
1998	157	0	0	0.00
1999	177	0	0	0.00
2000	277	0	0	0.00
2001	133	0	0	0.00
2002	313	0	0	0.00
2003	638	0	0	0.00
2004	1 631	0	0	0.00
2005	1 129	0	0	0.00
2006	706	0	0	0.00
2007	295	0	0	0.00
2008	500	0	0	0.00
2009	612	2	14	0.33
2010	739	1	1	0.14
2011	958	8	60	0.84
2012	719	4	9	0.56
2013	901	22	89	2.44
2014	922	16	79	1.74
2015	687	3	15	0.44
2016	784	12	31	1.53
2017	1 499	27	127	1.80
2018	2 113	43	196	2.04
2019	2 678	80	411	2.99
2020	2 839	145	734	5.11
2021	2 933	75	391	2.56
2022	2 548	48	285	1.88
2023	3 300	62	325	1.88
2024	3 285	67	433	2.04
2025	3 693	35	187	0.95

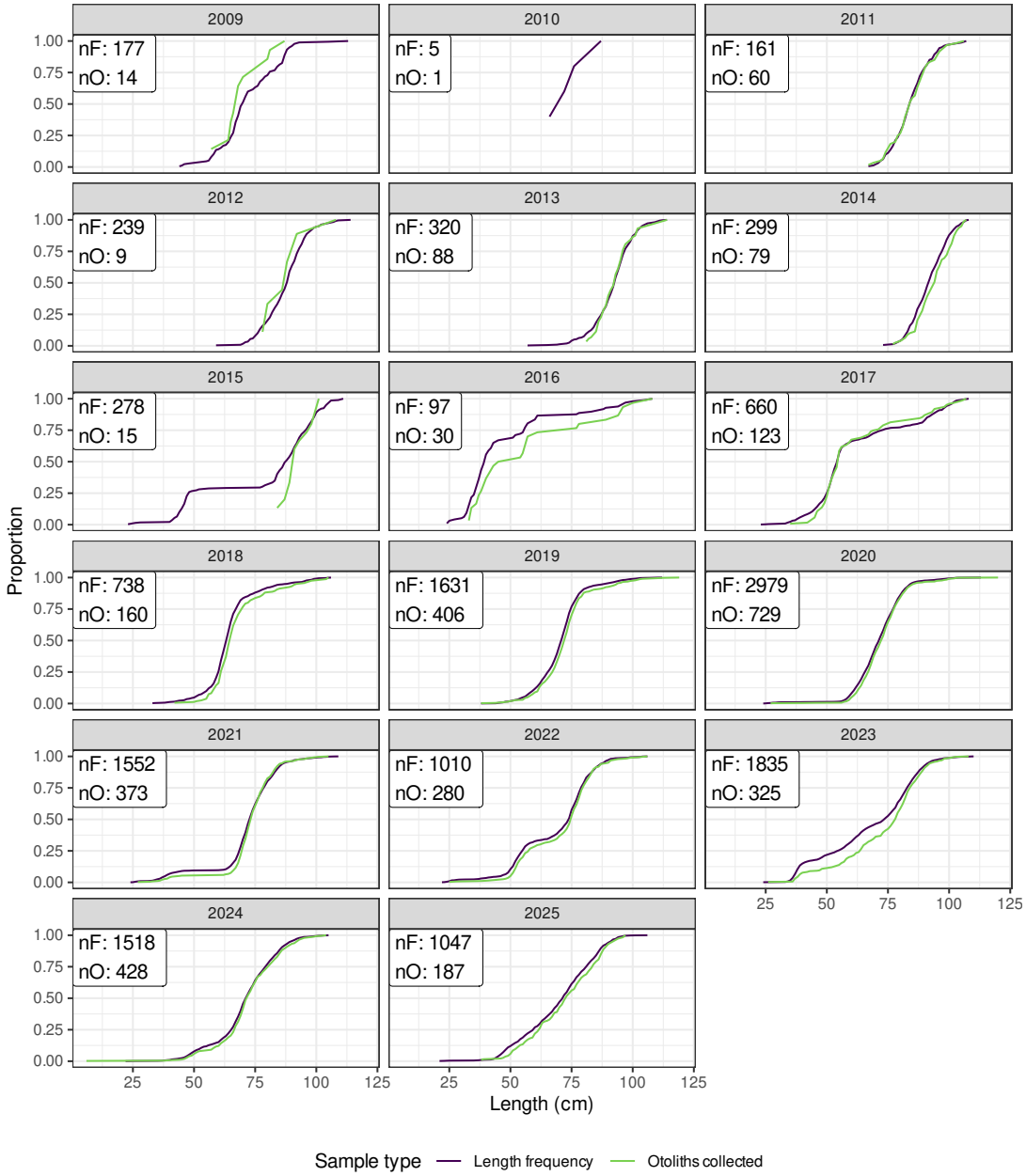


Figure 568: Cumulative distributions of the length of fish in the length frequency and otolith samples of gemfish in the SKI 7 Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.7.2.3 Catch quantification

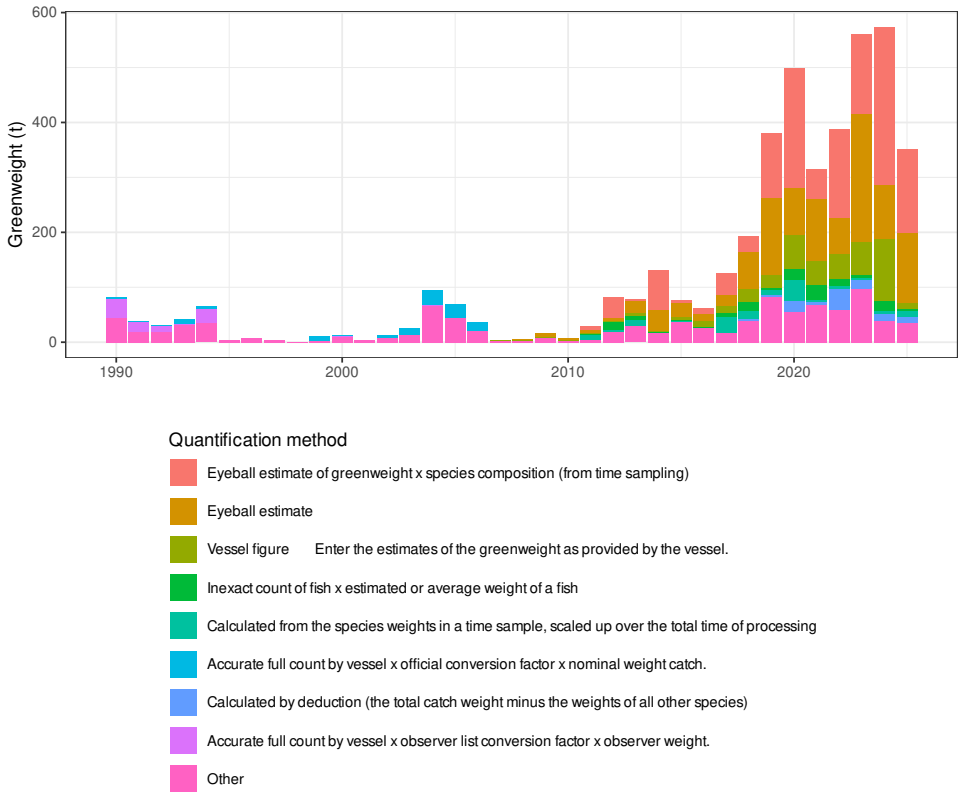


Figure 569: Methods used by observers to quantify the catch of gemfish in the SKI 7 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.8 SPD stocks

Observer sampling of spiny dogfish is considered with respect to the spiny dogfish Quota Management Areas.

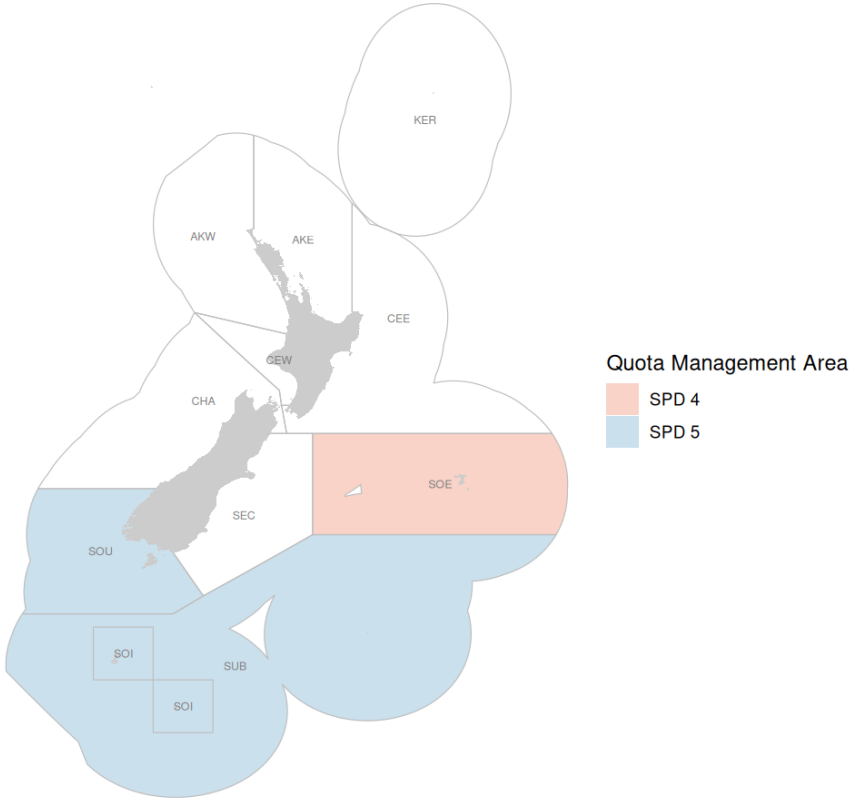


Figure 570: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for spiny dogfish (coloured areas, per legend).

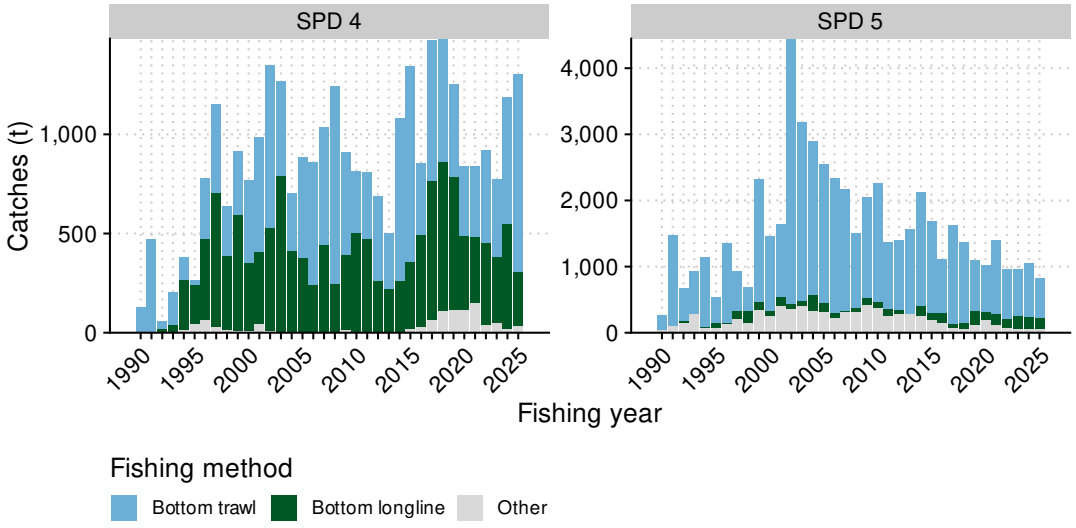


Figure 571: Catches of spiny dogfish by fishing method, for events within the spiny dogfish Quota Management Areas. Methods grouped as Other include: BPT, CP, D, DL, DN, DV, FP, HL, MW, POT, PRB, PRM, PSH, RLP, SLL, SN, T, TL.

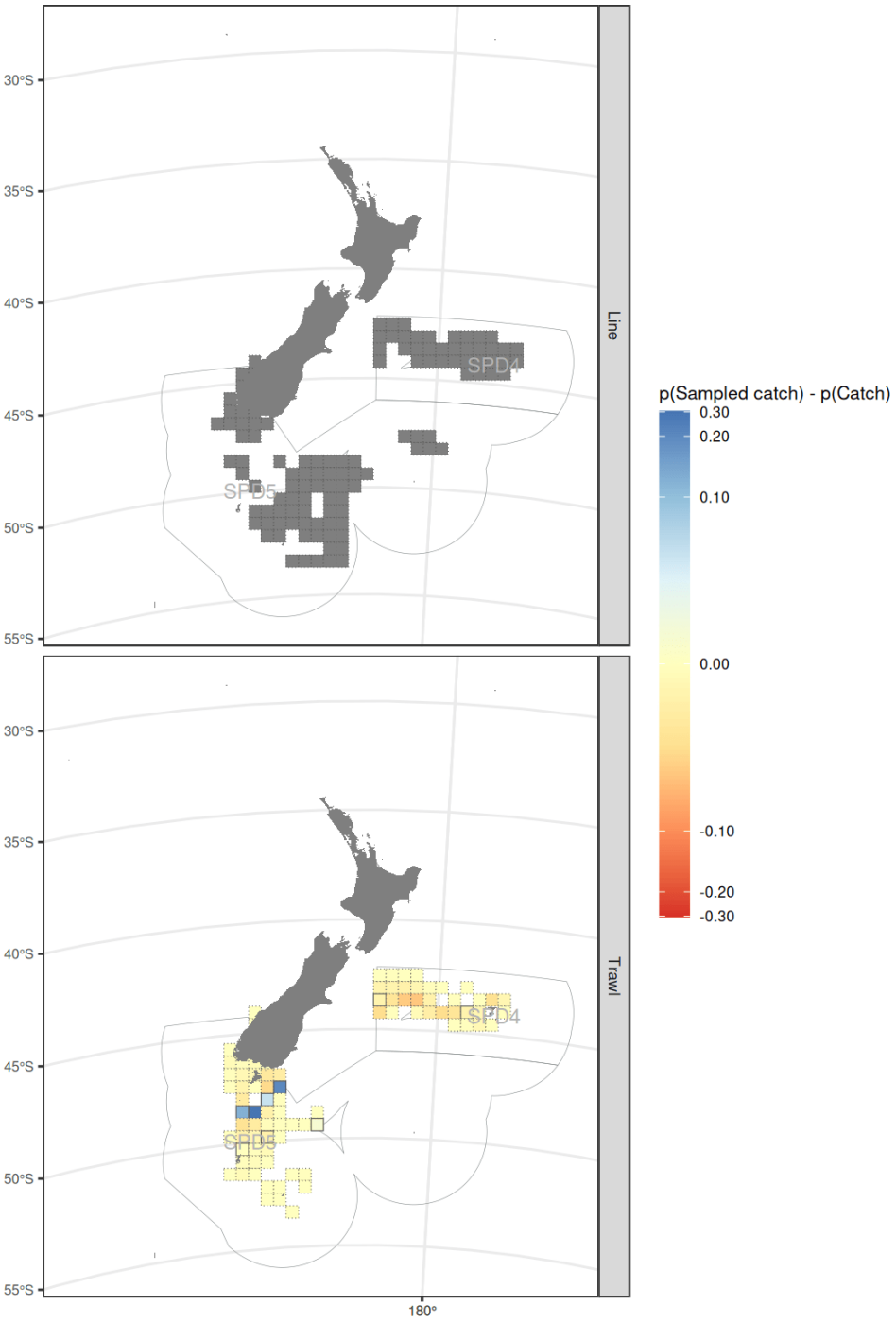


Figure 572: Differences in the relative proportions of catch and sampled catch for spiny dogfish during 2021–2025. Cells with a dotted border had no sampling. Where all cells are grey, no sampling from the fishery occurred in this period.

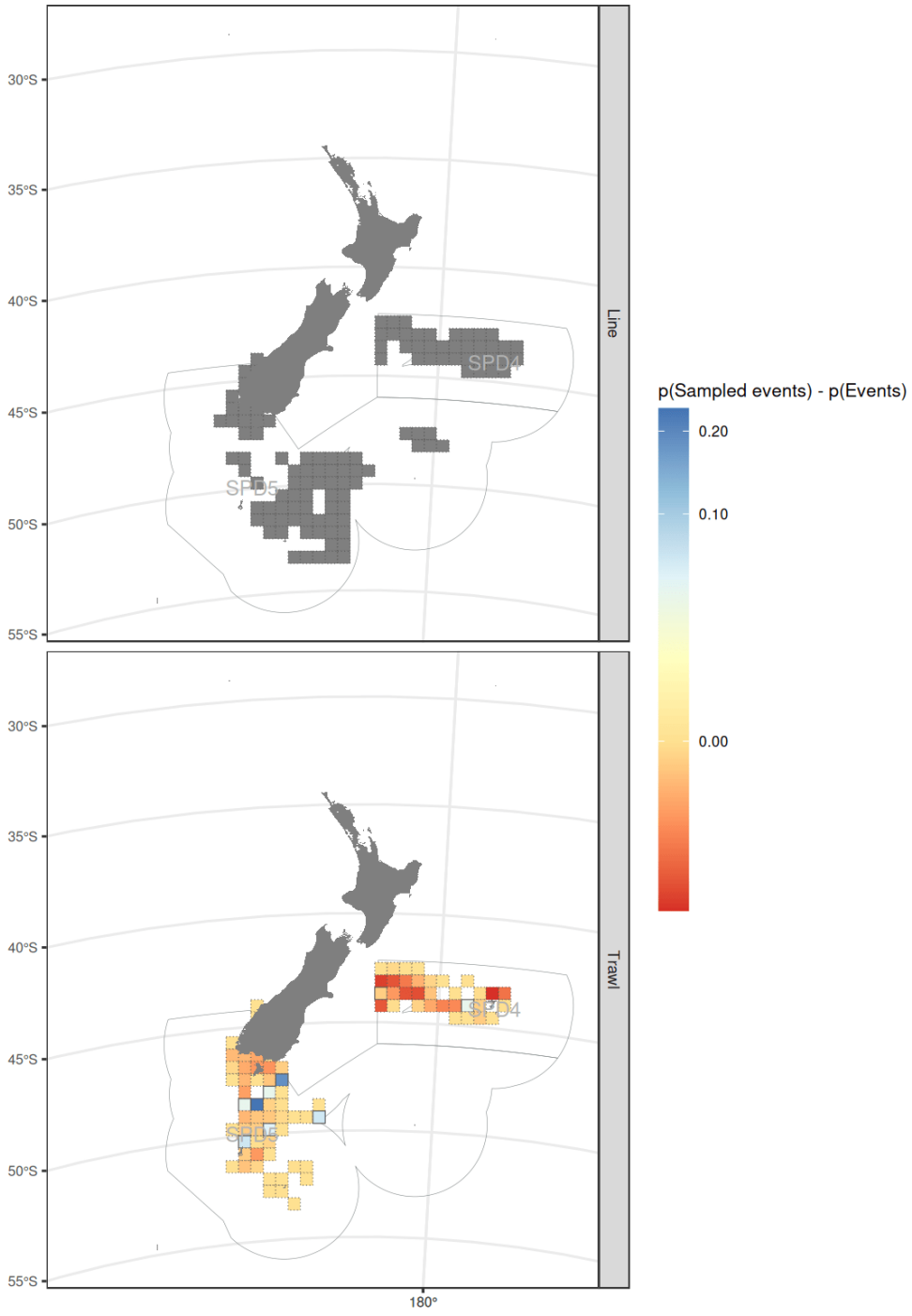


Figure 573: Differences in the relative proportions of events meeting the sampling threshold and sampled events for spiny dogfish during 2021–2025. Cells with a dotted border had no sampling. Where all cells are grey, no sampling from the fishery occurred in this period.

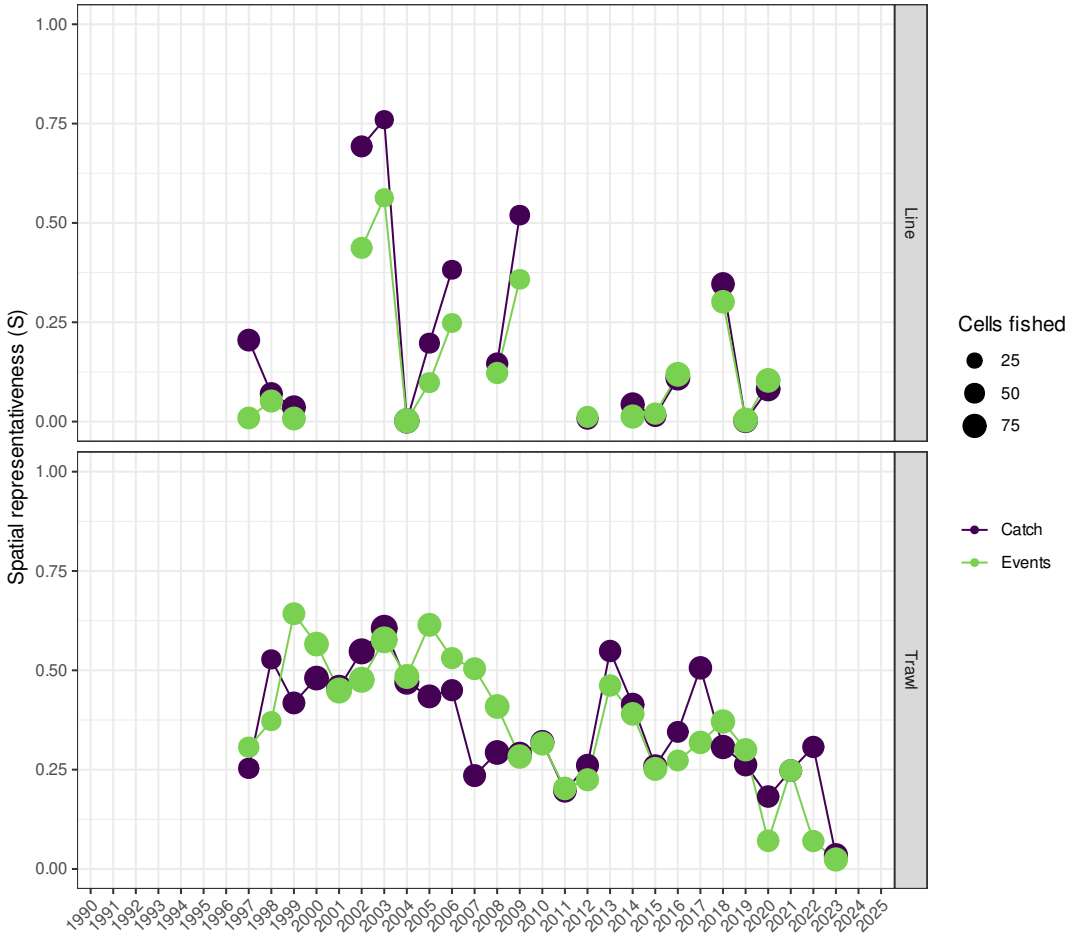


Figure 574: Spatial representativeness of observer sampling of spiny dogfish by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.

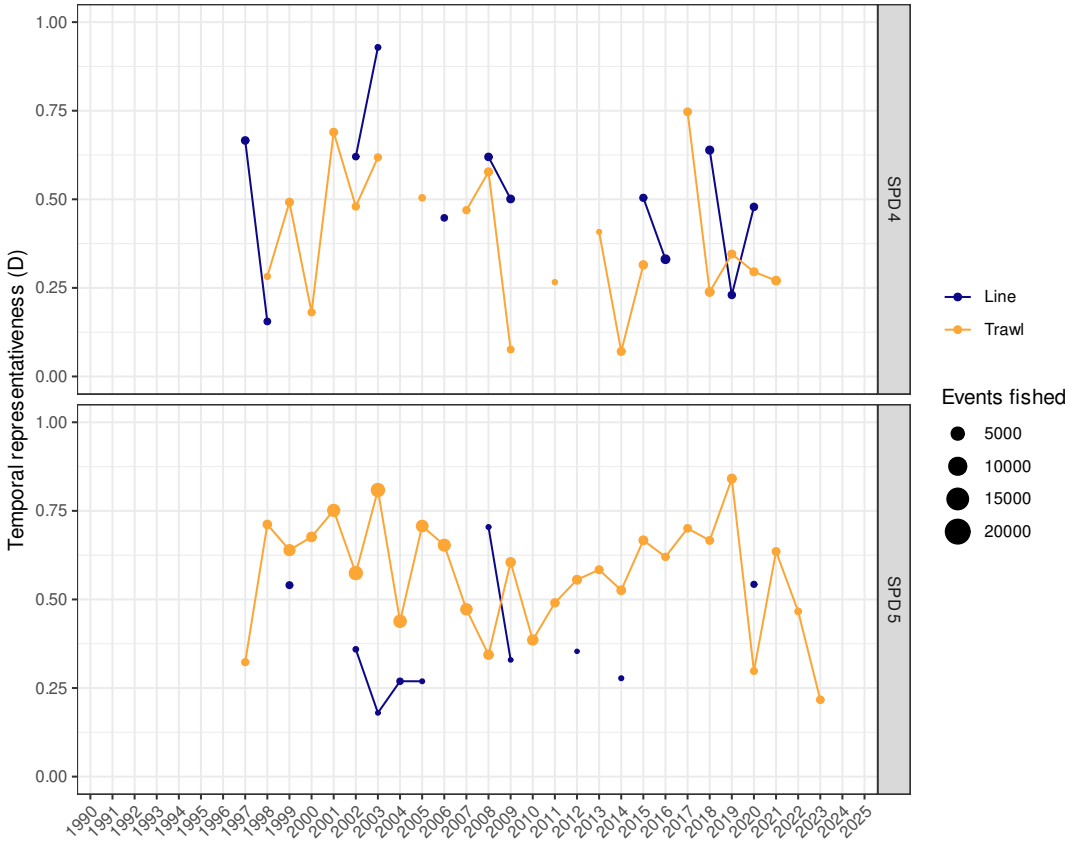


Figure 575: Temporal representativeness of observer sanpling of spiny dogfish by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.8.1 SPD 4: Trawl fishery

2.8.1.1 Length-frequency samples

Table 50: Length-frequency samples of spiny dogfish from the SPD 4 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of spiny dogfish exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	192	0	0	0.00
1991	386	0	0	0.00
1992	72	0	0	0.00
1993	144	0	0	0.00
1994	122	0	0	0.00
1995	31	0	0	0.00
1996	387	0	0	0.00
1997	369	0	0	0.00
1998	292	23	562	7.88
1999	420	7	533	1.67
2000	671	10	970	1.49
2001	882	9	490	1.02
2002	899	8	823	0.89
2003	661	4	338	0.61
2004	516	0	0	0.00
2005	718	19	1 259	2.65
2006	896	0	0	0.00
2007	1 073	13	576	1.21
2008	1 220	9	224	0.74
2009	872	2	21	0.23
2010	689	0	0	0.00
2011	506	8	400	1.58
2012	967	0	0	0.00
2013	373	6	59	1.61
2014	1 396	3	206	0.21
2015	1 607	1	20	0.06
2016	969	0	0	0.00
2017	1 263	9	139	0.71
2018	1 558	8	242	0.51
2019	1 347	1	20	0.07
2020	1 464	4	64	0.27
2021	1 620	2	70	0.12
2022	1 292	0	0	0.00
2023	1 333	0	0	0.00
2024	2 113	0	0	0.00
2025	2 578	0	0	0.00

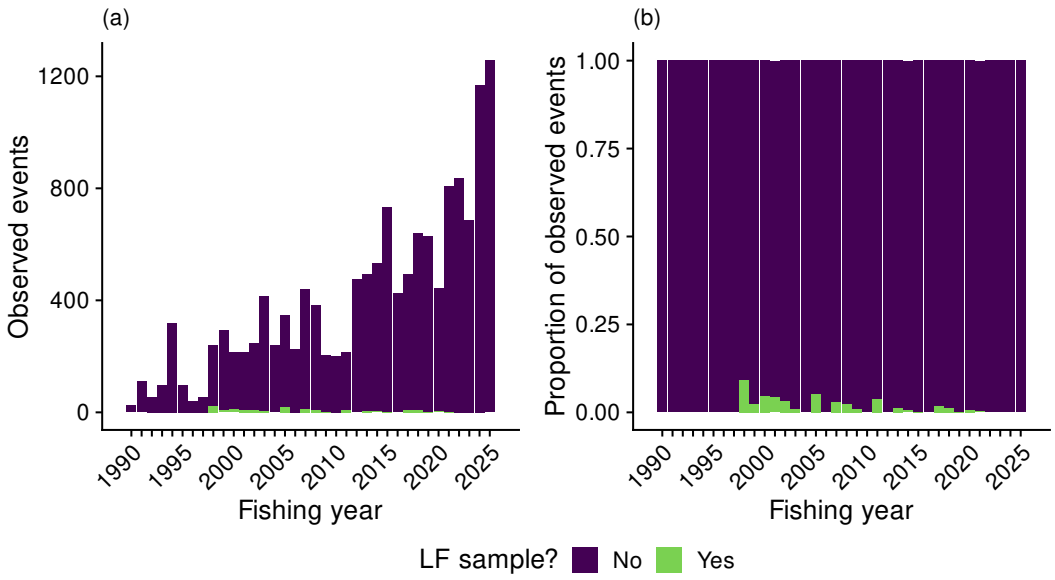


Figure 576: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SPD 4 where the spiny dogfish catch exceeded the 30 kg threshold, with and without length-frequency sampling.**

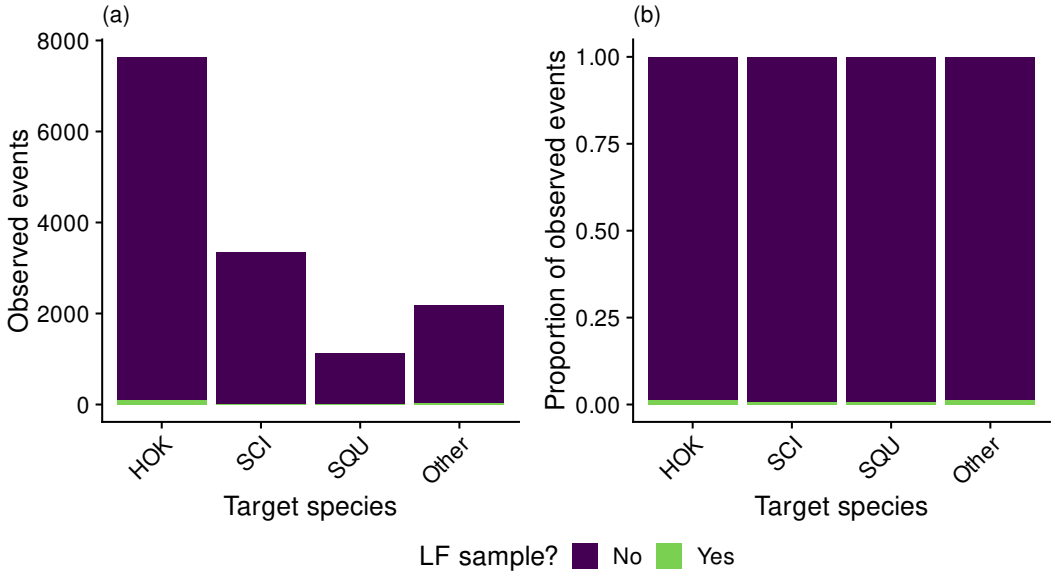


Figure 577: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SPD 4 where the spiny dogfish catch exceeded the 30 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

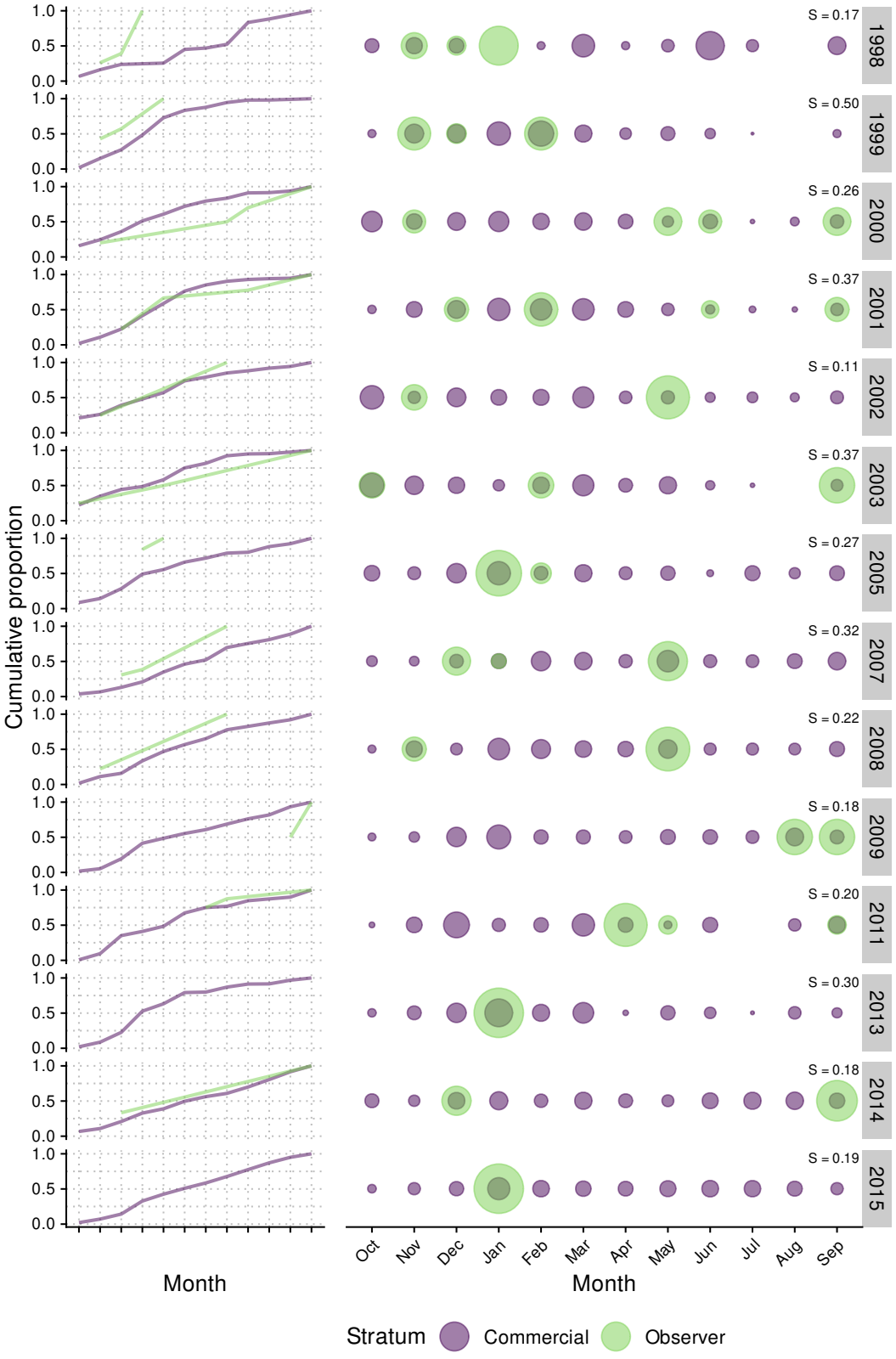


Figure 578: Monthly representativeness of observer sampling coverage of Trawl fishing events in SPD 4, where the spiny dogfish catch exceeded the 30kg threshold, in 1998 to 2015. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

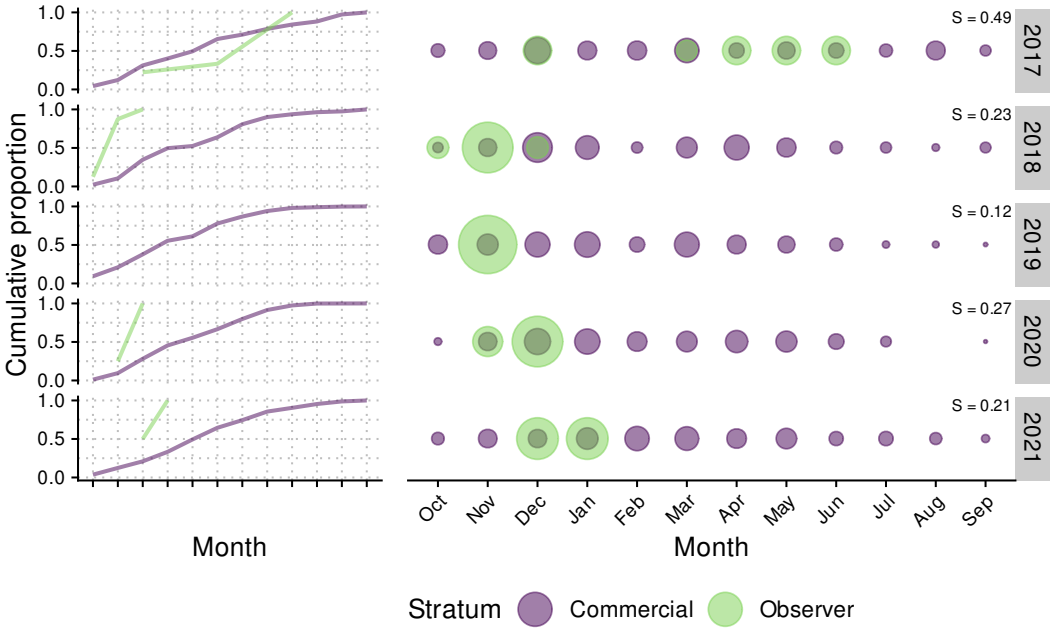


Figure 579: Monthly representativeness of observer sampling coverage of Trawl fishing events in SPD 4, where the spiny dogfish catch exceeded the 30kg threshold, in 2017 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

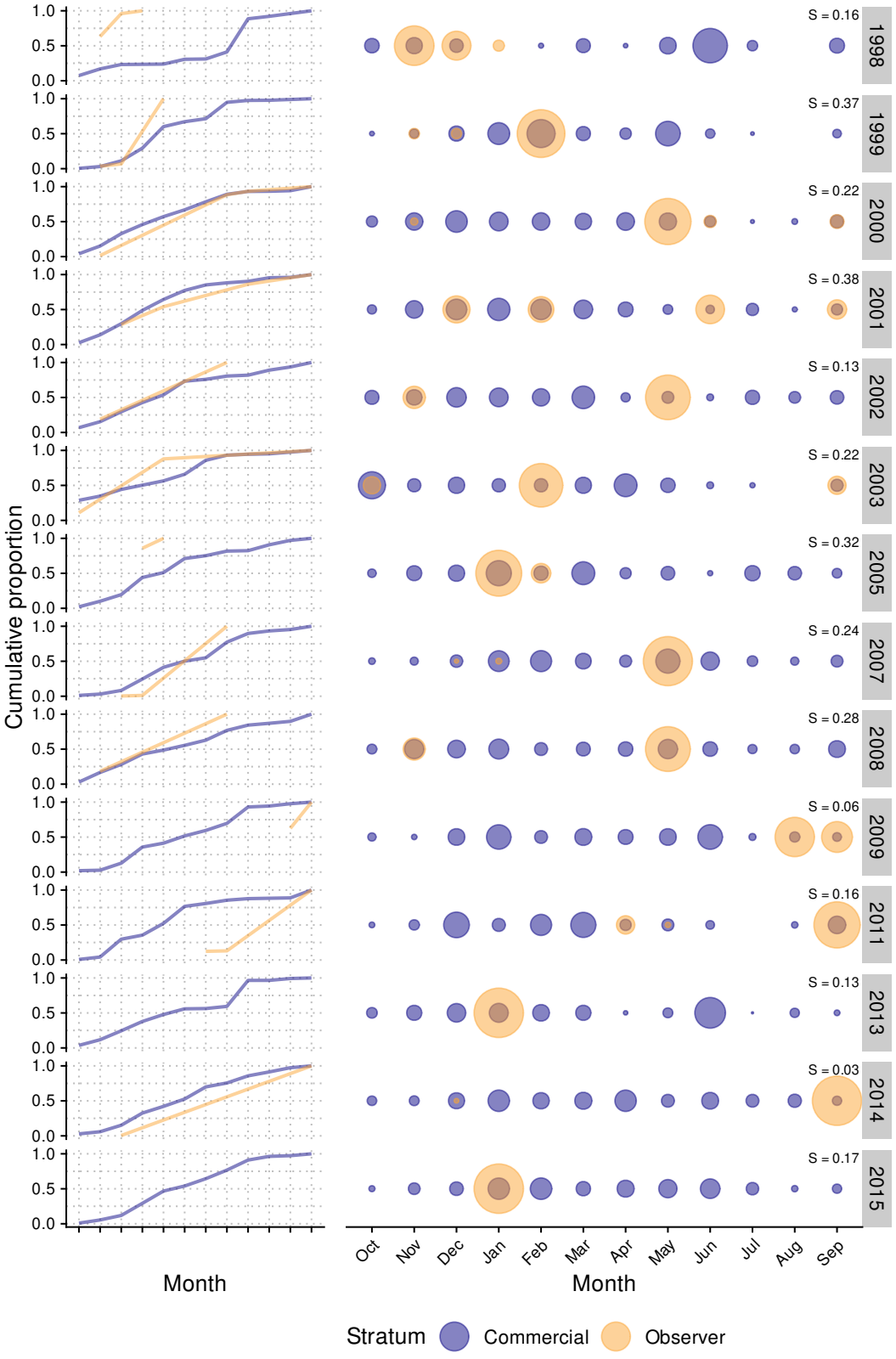


Figure 580: Monthly representativeness of observer sampling coverage of Trawl catch in SPD 4, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1998 to 2015. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

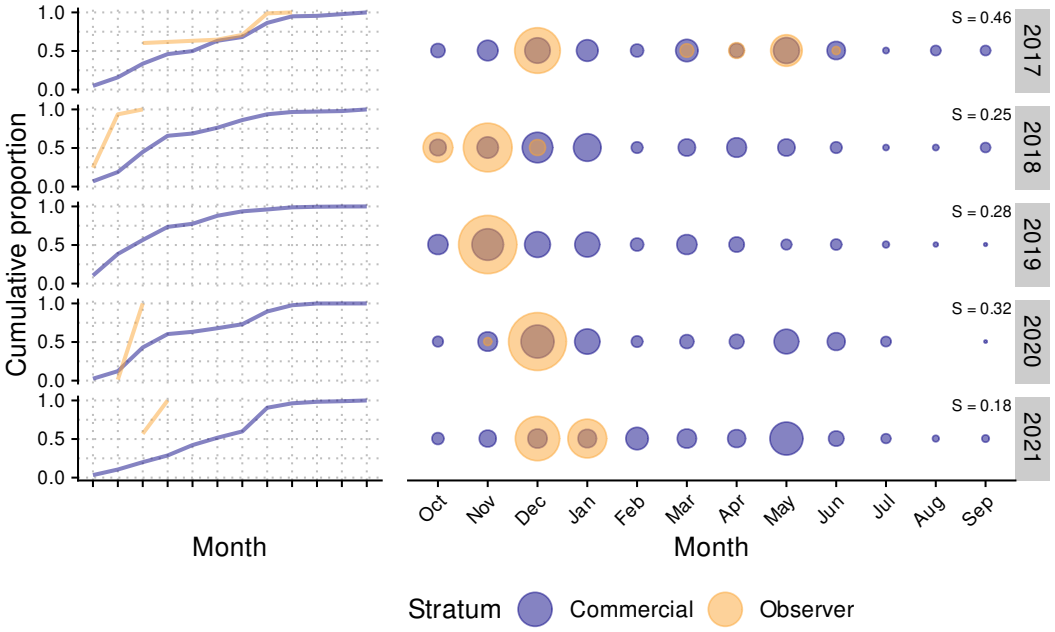


Figure 581: Monthly representativeness of observer sampling coverage of Trawl catch in SPD 4, from events where the spiny dogfish catch exceeded the 30kg threshold, in 2017 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

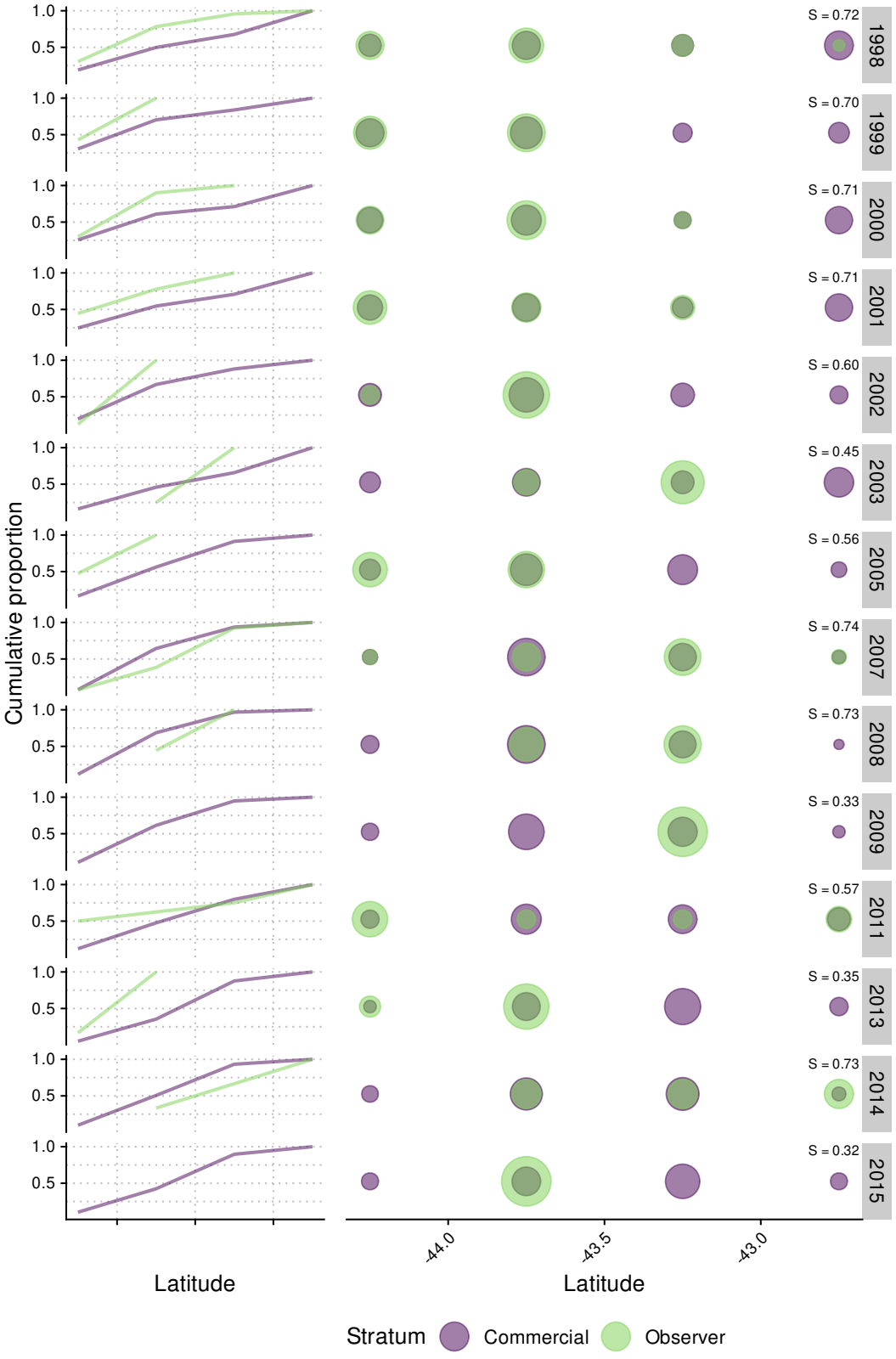


Figure 582: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SPD 4, where the spiny dogfish catch exceeded the 30kg threshold, in 1998 to 2015. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

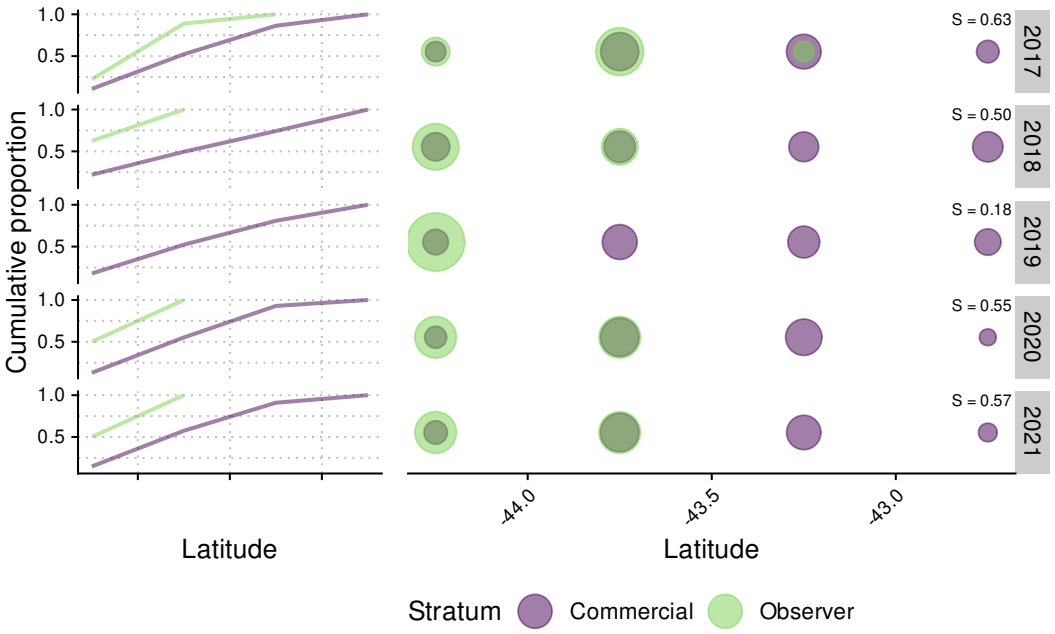


Figure 583: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SPD 4, where the spiny dogfish catch exceeded the 30kg threshold, in 2017 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

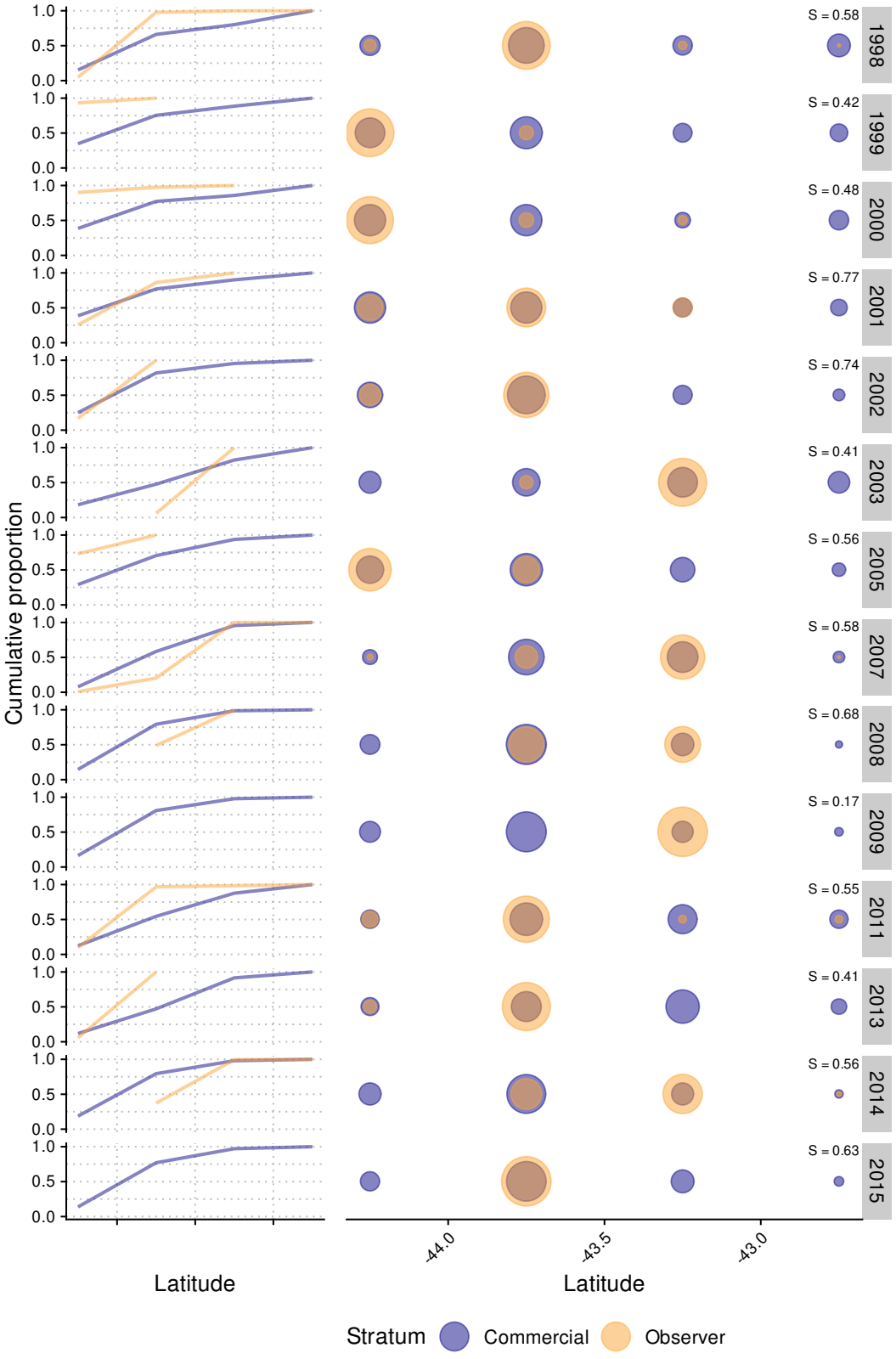


Figure 584: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SPD 4, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1998 to 2015. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

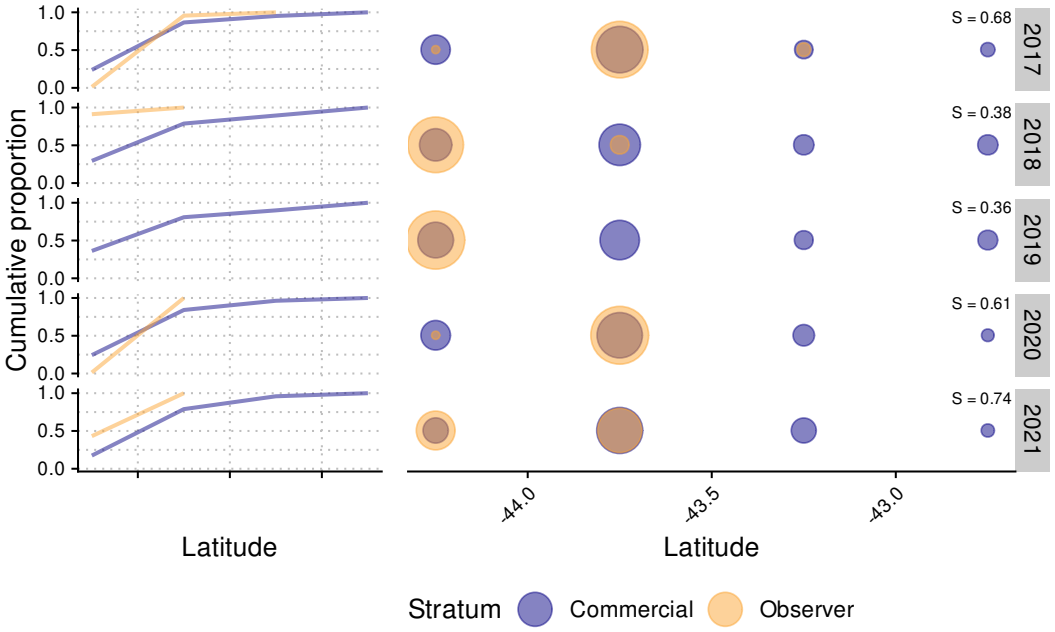


Figure 585: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SPD 4, from events where the spiny dogfish catch exceeded the 30kg threshold, in 2017 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

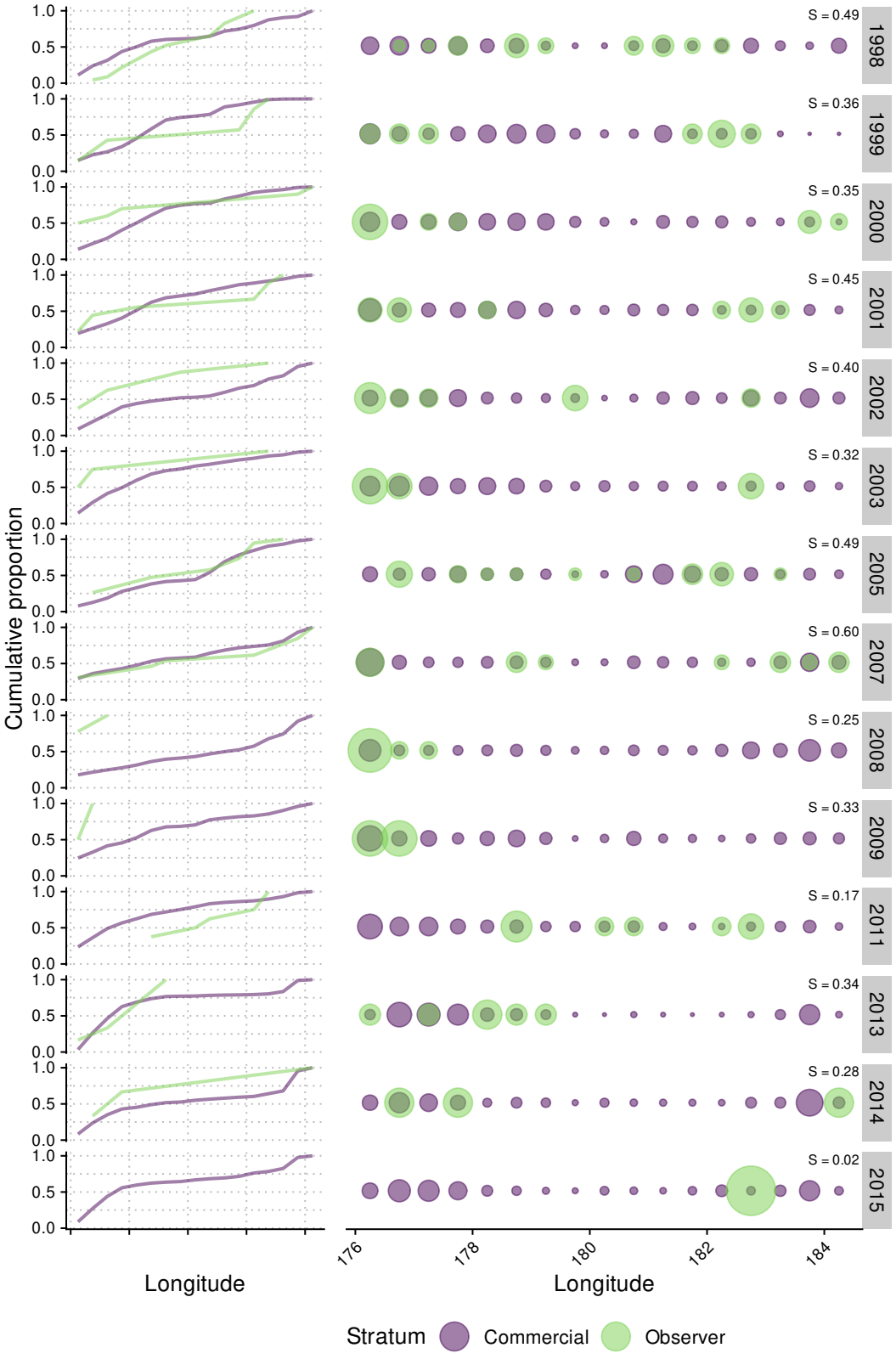


Figure 586: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SPD 4, where the spiny dogfish catch exceeded the 30kg threshold, in 1998 to 2015. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

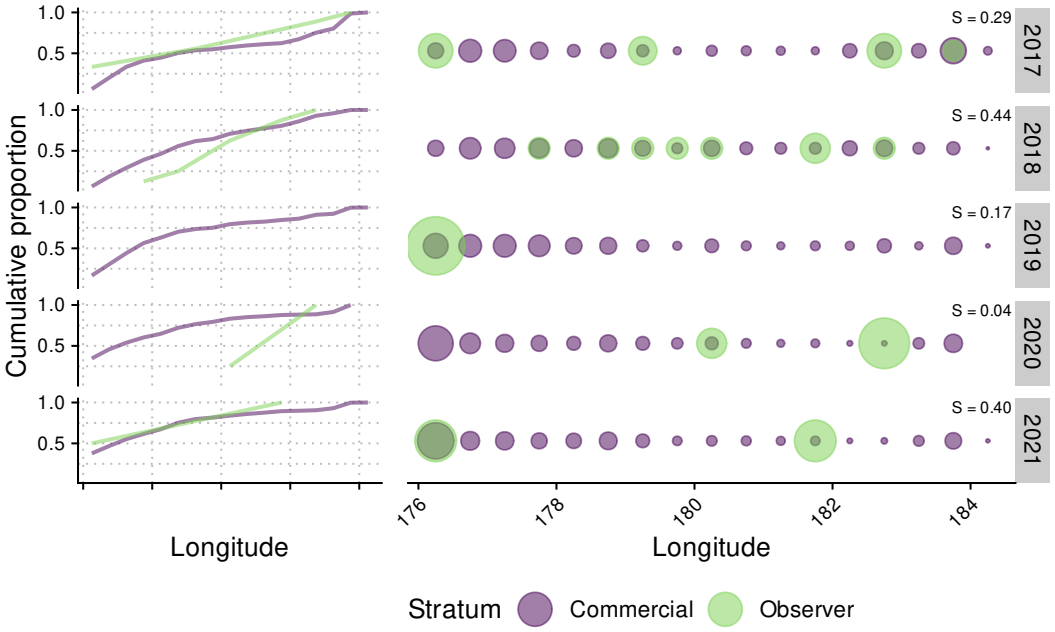


Figure 587: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SPD 4, where the spiny dogfish catch exceeded the 30kg threshold, in 2017 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

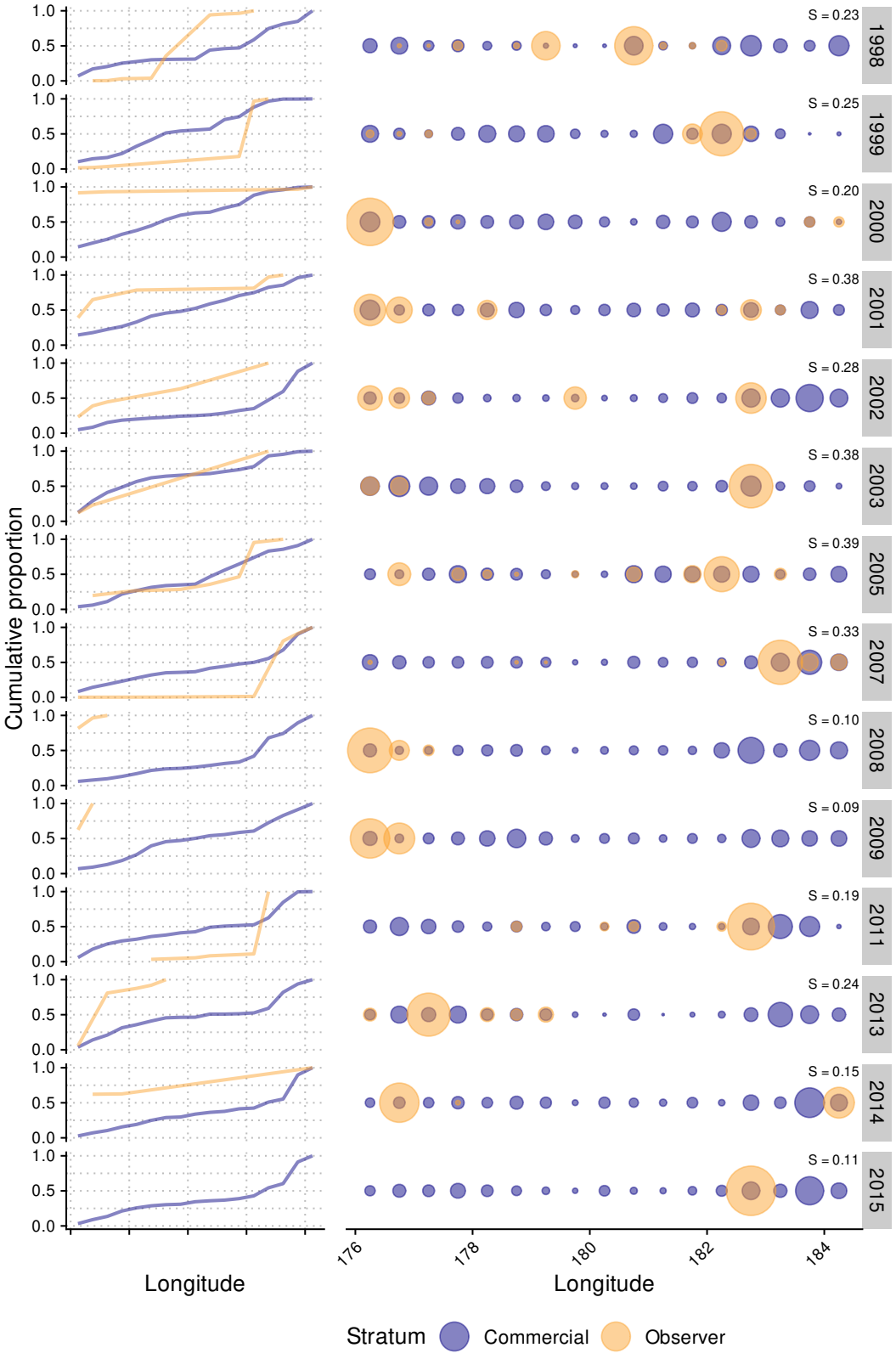


Figure 588: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SPD 4, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1998 to 2015. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

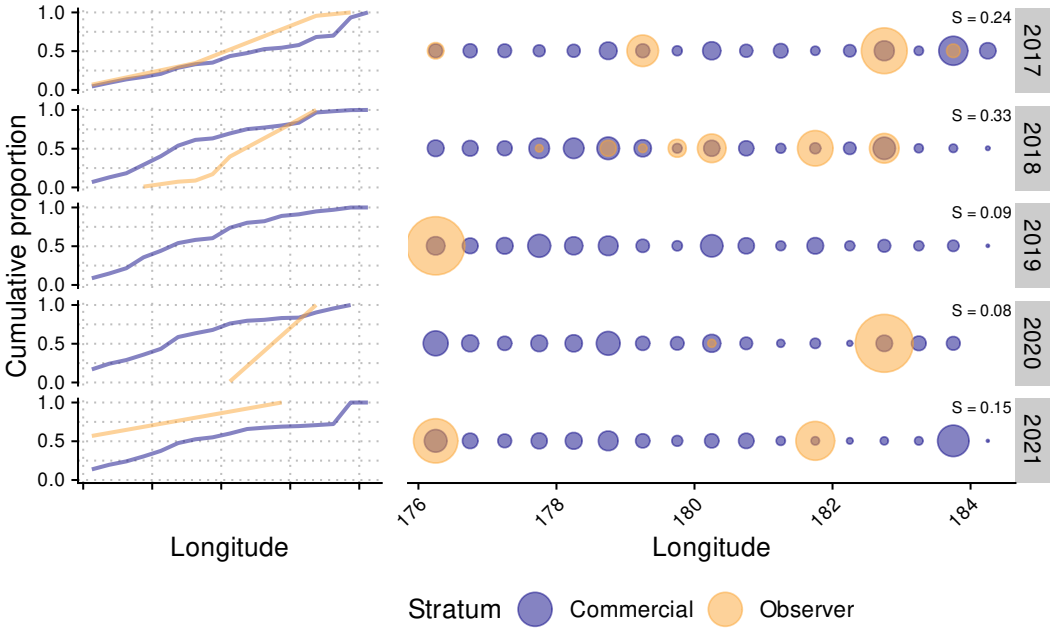


Figure 589: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SPD 4, from events where the spiny dogfish catch exceeded the 30kg threshold, in 2017 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

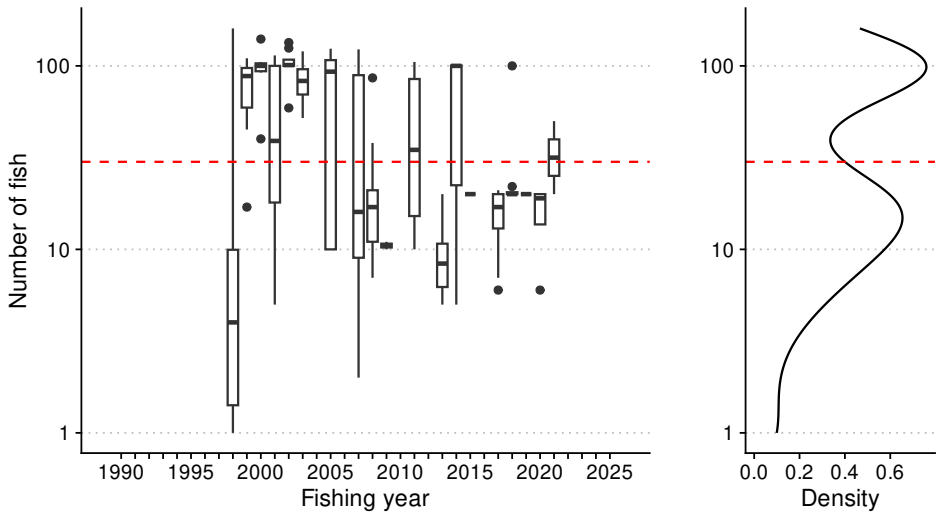


Figure 590: **Length-frequency sample sizes for observed fishing events in SPD 4 where spiny dogfish were sampled. The red dashed line indicates a sample size of 30 fish.**

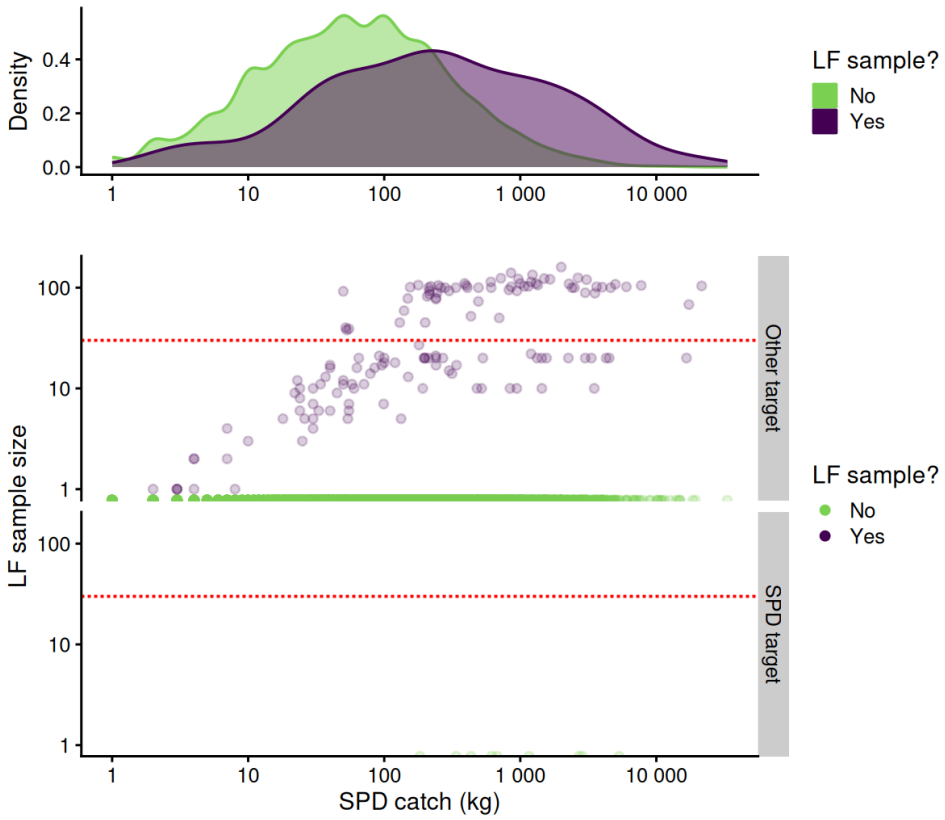


Figure 591: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SPD 4 in relation to the total spiny dogfish catch from an event, separately for spiny dogfish target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.8.1.2 Catch quantification

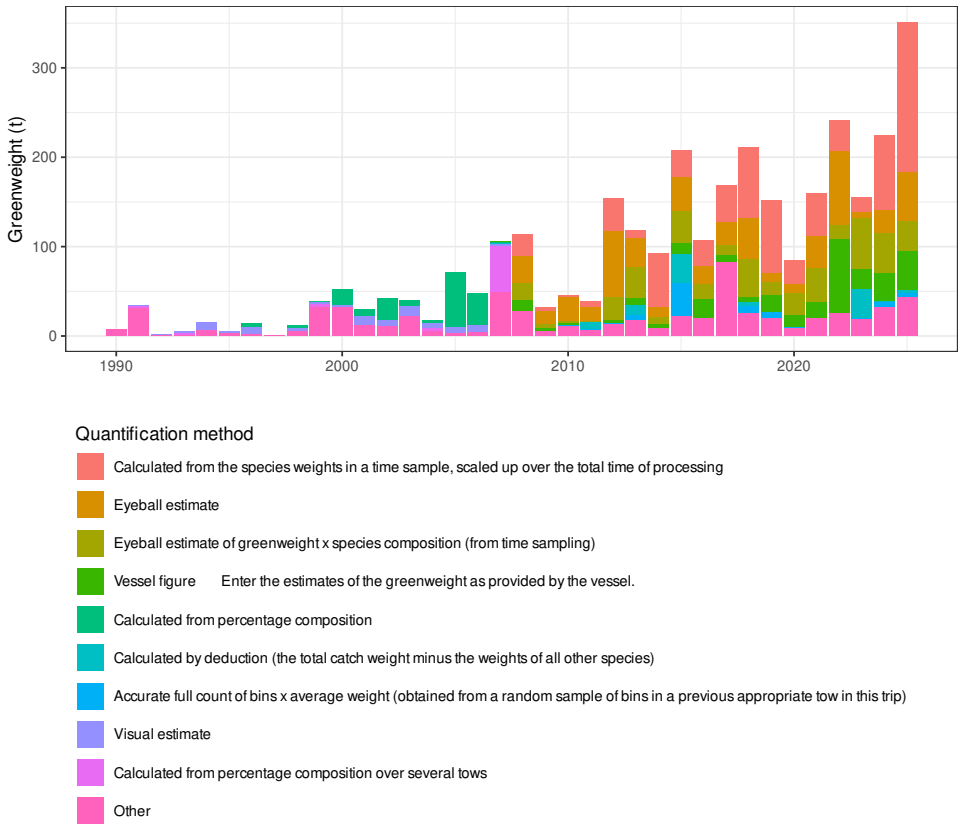


Figure 592: Methods used by observers to quantify the catch of spiny dogfish in the SPD 4 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.8.2 SPD 4: Line fishery

2.8.2.1 Length-frequency samples

Table 51: Length-frequency samples of spiny dogfish from the SPD 4 Line fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of spiny dogfish exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	20	0	0	0.00
1992	71	0	0	0.00
1993	246	0	0	0.00
1994	849	0	0	0.00
1995	761	0	0	0.00
1996	4 153	0	0	0.00
1997	747	8	874	1.07
1998	651	6	895	0.92
1999	9 982	0	0	0.00
2000	511	0	0	0.00
2001	585	0	0	0.00
2002	877	34	1 255	3.88
2003	558	33	699	5.91
2004	1 199	0	0	0.00
2005	1 071	0	0	0.00
2006	890	10	424	1.12
2007	784	0	0	0.00
2008	1 094	2	49	0.18
2009	1 311	3	50	0.23
2010	1 515	0	0	0.00
2011	1 694	0	0	0.00
2012	1 128	0	0	0.00
2013	1 102	0	0	0.00
2014	1 308	0	0	0.00
2015	1 140	1	20	0.09
2016	1 840	5	83	0.27
2017	1 578	0	0	0.00
2018	1 509	30	554	1.99
2019	1 197	1	20	0.08
2020	1 176	1	20	0.09
2021	1 046	0	0	0.00
2022	923	0	0	0.00
2023	335	0	0	0.00
2024	513	0	0	0.00
2025	507	0	0	0.00

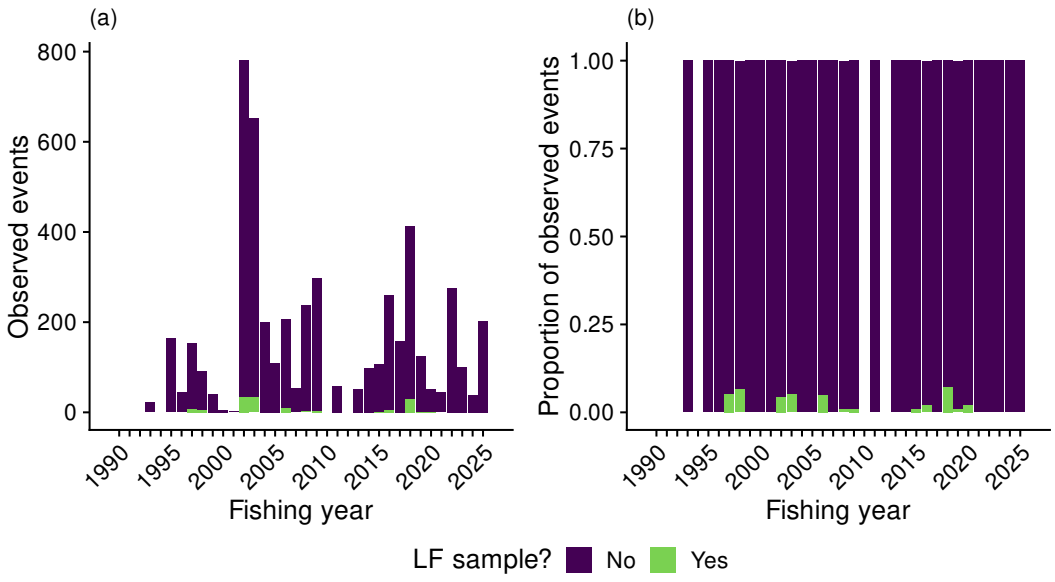


Figure 593: **(a) Observed Line fishing events, and (b) proportion of observed events, in SPD 4 where the spiny dogfish catch exceeded the 30 kg threshold, with and without length-frequency sampling.**

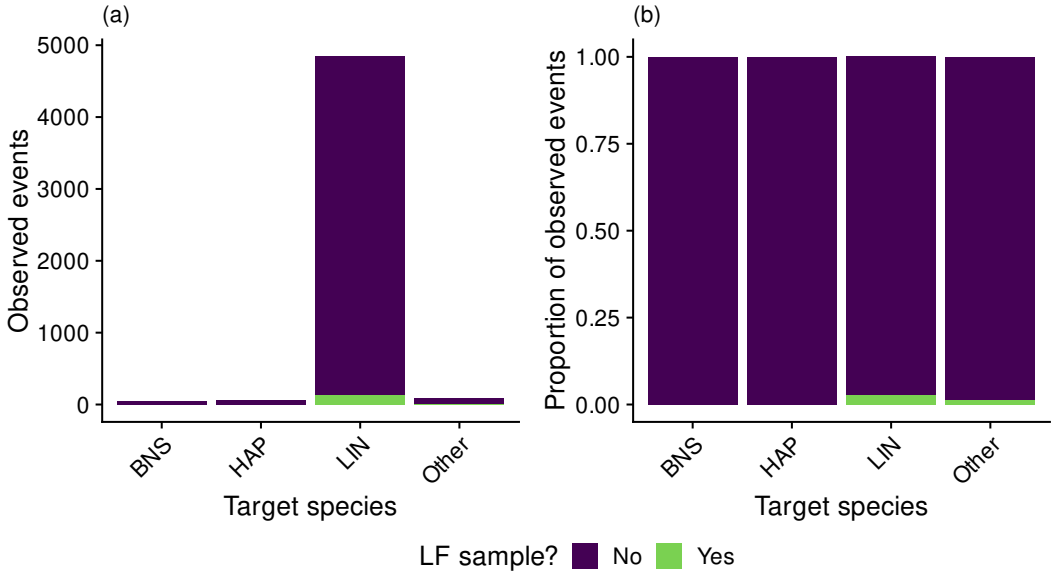


Figure 594: **(a) Observed Line fishing events, and (b) proportion of observed events, in SPD 4 where the spiny dogfish catch exceeded the 30 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

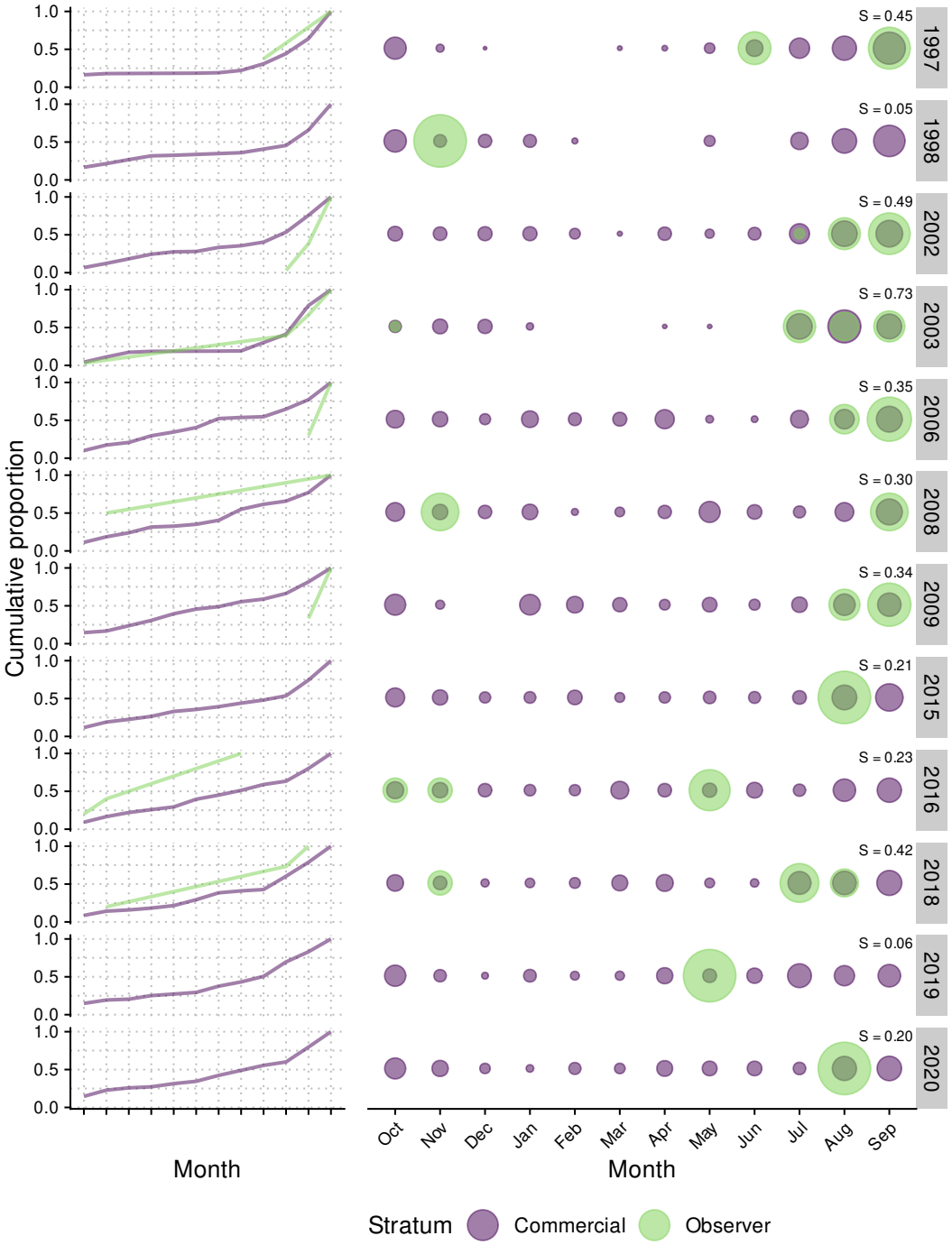


Figure 595: Monthly representativeness of observer sampling coverage of Line fishing events in SPD 4, where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

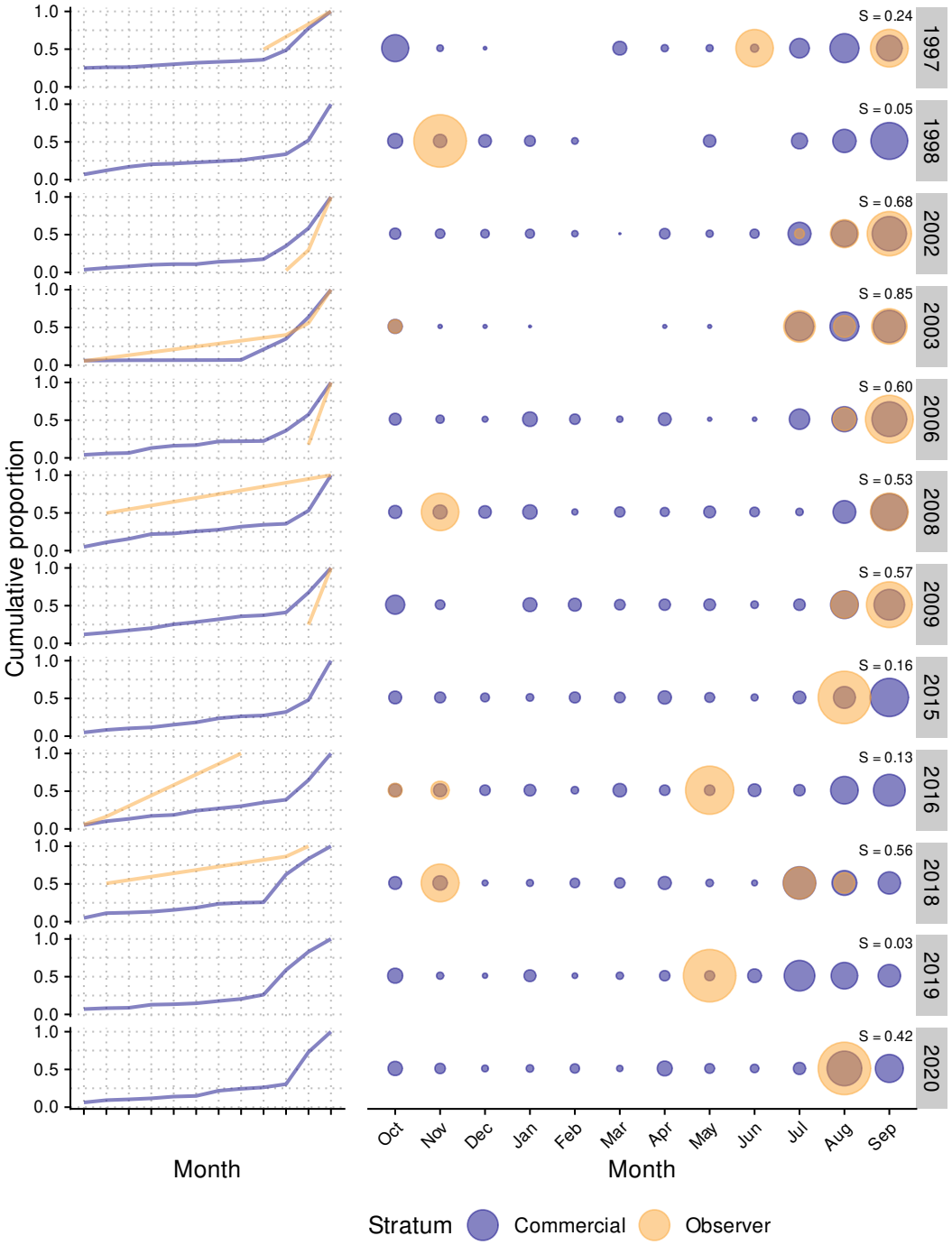


Figure 596: **Monthly representativeness of observer sampling coverage of Line catch in SPD 4, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

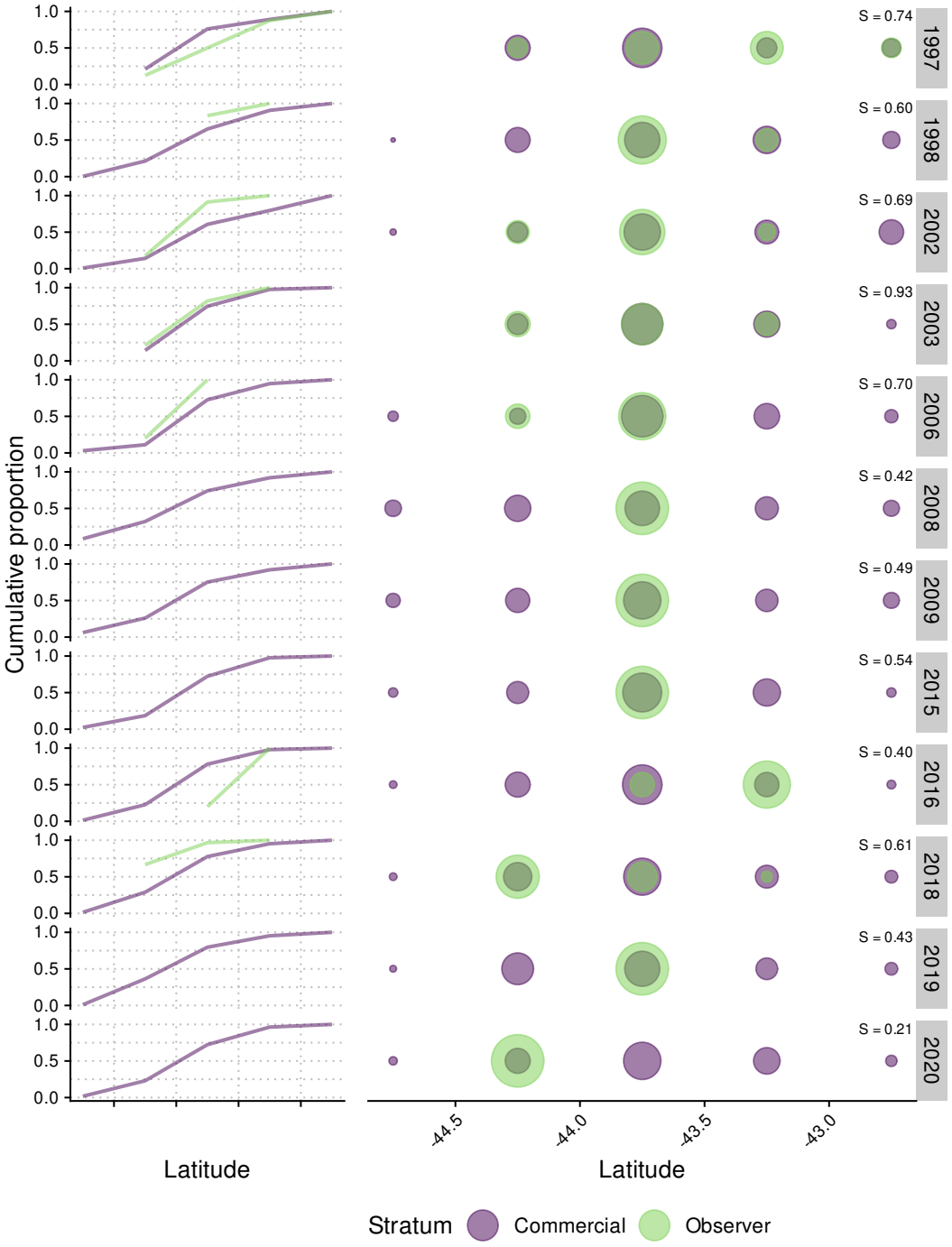


Figure 597: Latitudinal representativeness of observer sampling coverage of Line fishing events in SPD 4, where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

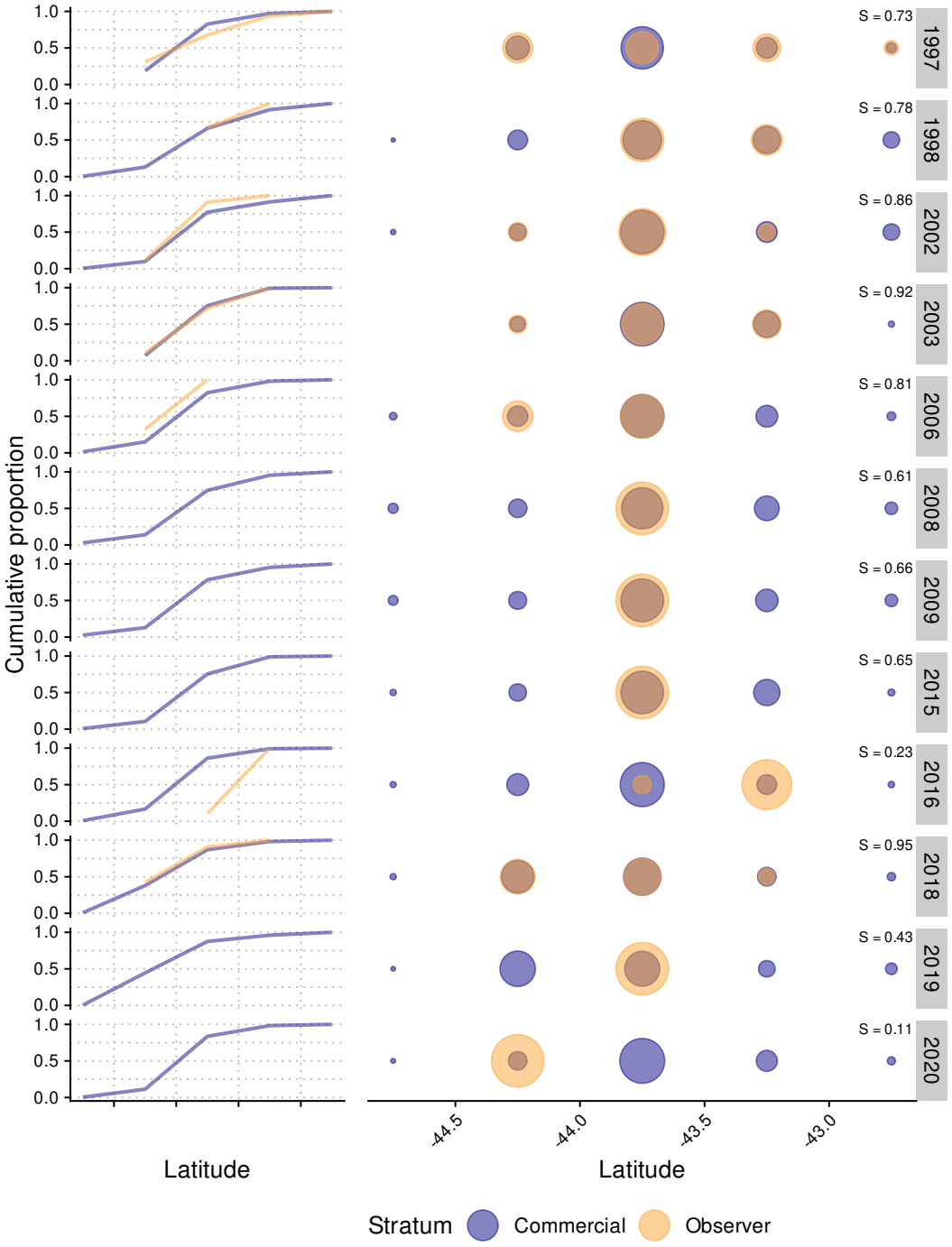


Figure 598: **Latitudinal representativeness of observer sampling coverage of Line catch in SPD 4, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

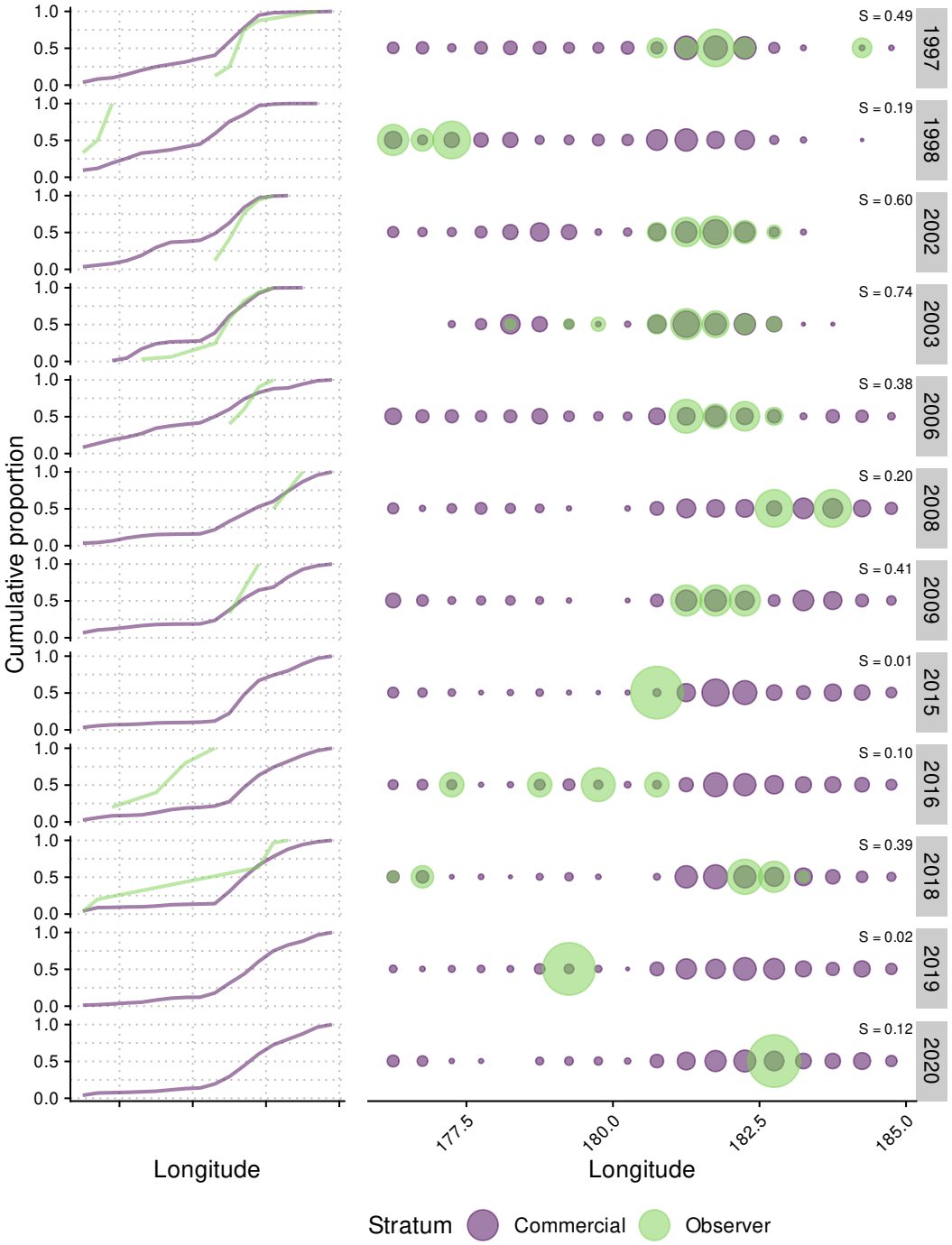


Figure 599: **Longitudinal representativeness of observer sampling coverage of Line fishing events in SPD 4, where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

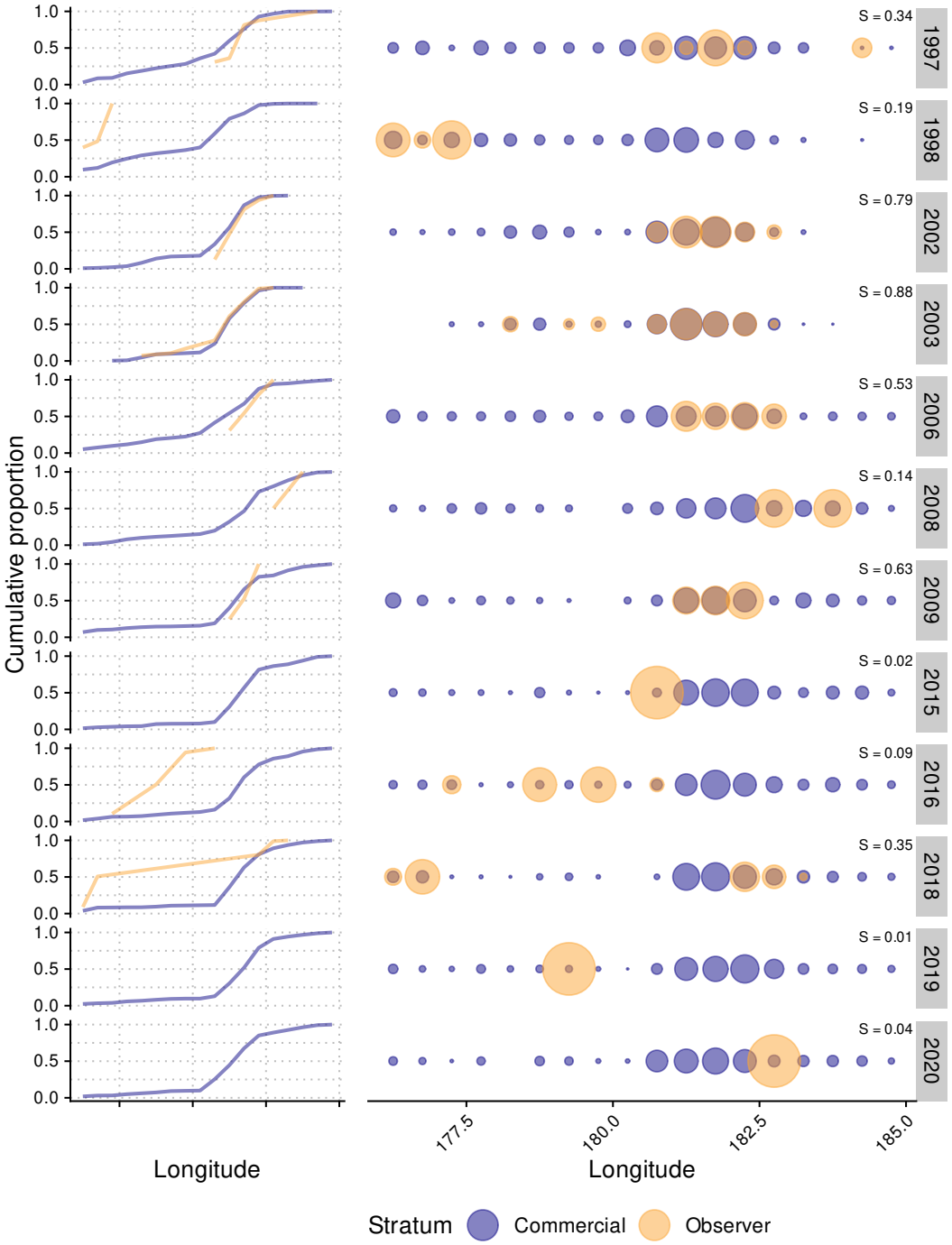


Figure 600: Longitudinal representativeness of observer sampling coverage of Line catch in SPD 4, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

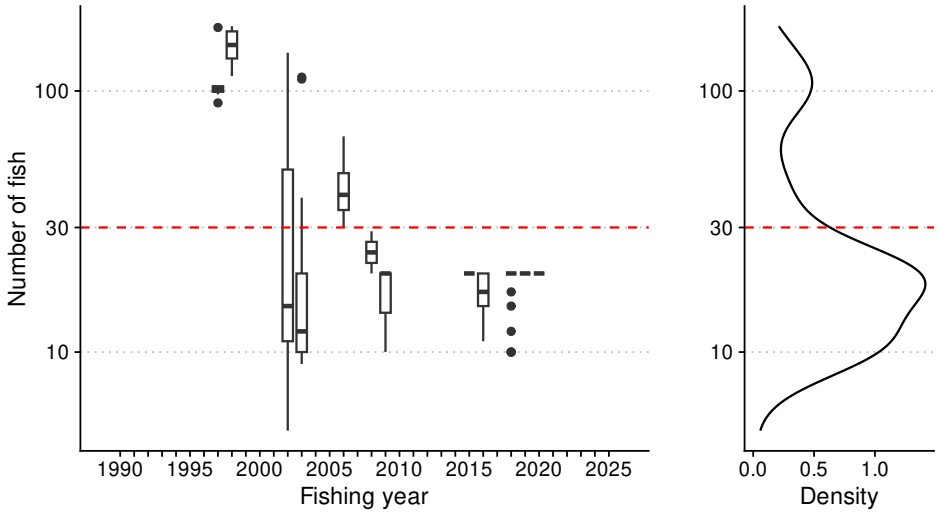


Figure 601: Length-frequency sample sizes for observed fishing events in SPD 4 where spiny dogfish were sampled. The red dashed line indicates a sample size of 30 fish.

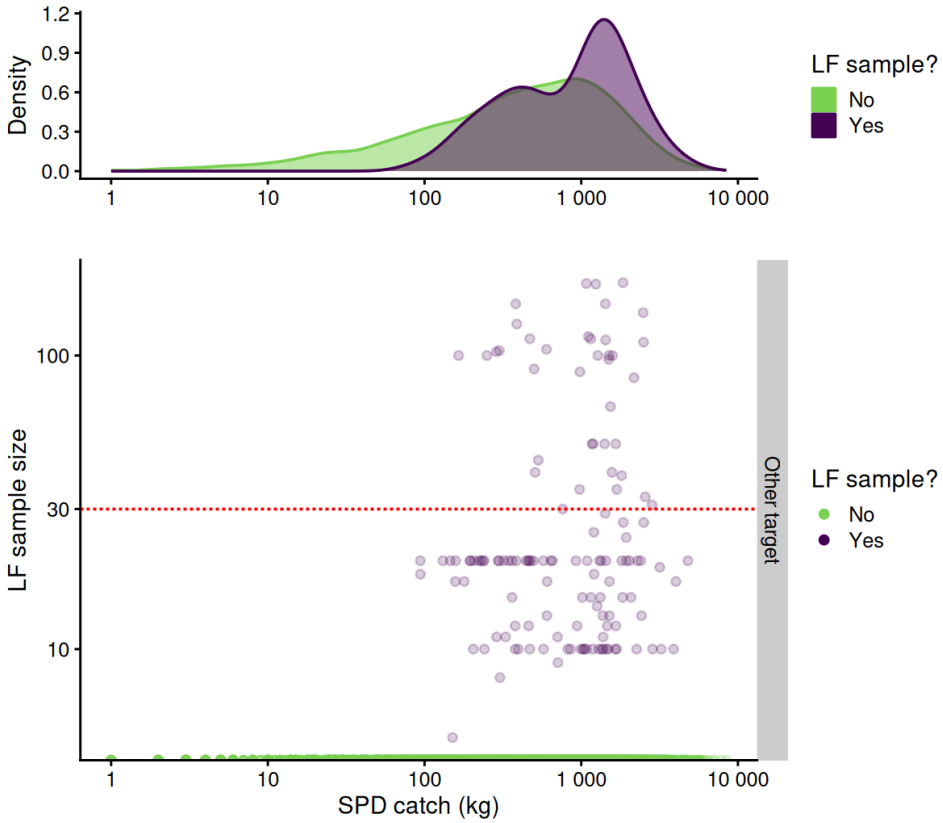


Figure 602: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SPD 4 in relation to the total spiny dogfish catch from an event, separately for spiny dogfish target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.8.2.2 Catch quantification

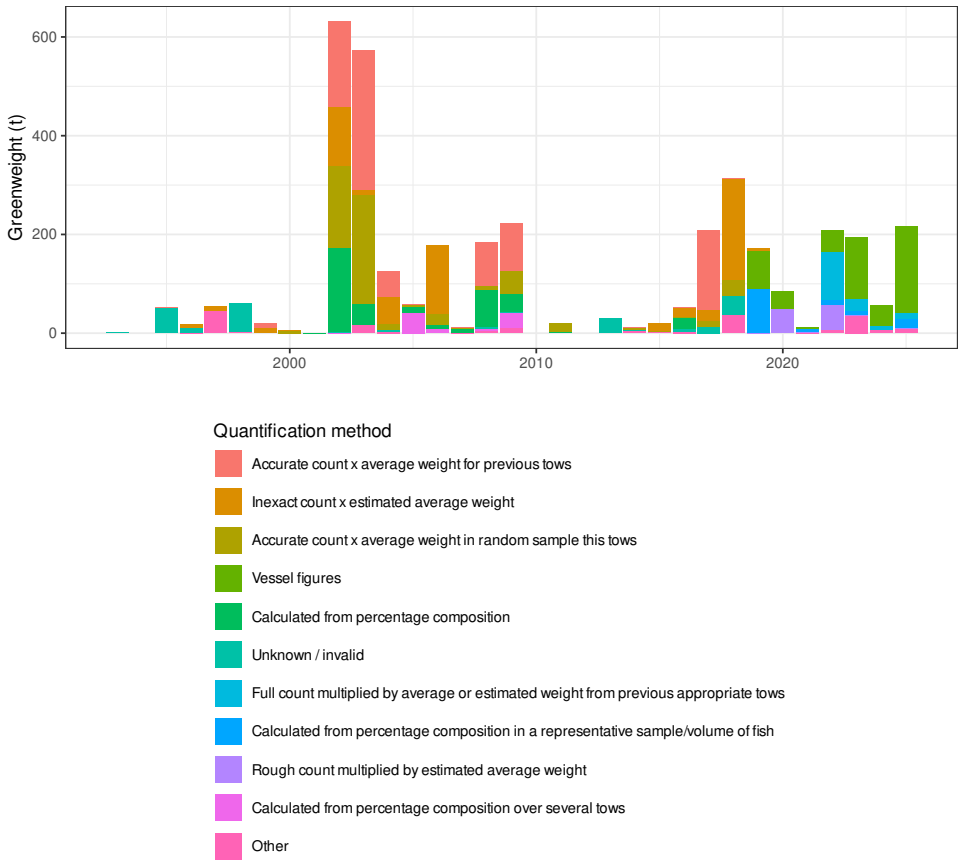


Figure 603: Methods used by observers to quantify the catch of spiny dogfish in the SPD 4 Line fishery. The legend lists the methods used in descending order of total catch.

2.8.3 SPD 5: Trawl fishery

2.8.3.1 Length-frequency samples

Table 52: Length-frequency samples of spiny dogfish from the SPD 5 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of spiny dogfish exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	410	0	0	0.00
1991	1 329	0	0	0.00
1992	808	0	0	0.00
1993	742	0	0	0.00
1994	955	0	0	0.00
1995	838	0	0	0.00
1996	592	0	0	0.00
1997	782	20	1 692	2.56
1998	308	72	3 496	23.38
1999	1 967	93	3 560	4.73
2000	1 612	46	4 187	2.85
2001	2 695	118	7 627	4.38
2002	3 470	52	4 067	1.50
2003	3 626	60	4 213	1.65
2004	2 702	40	2 244	1.48
2005	3 290	67	3 316	2.04
2006	3 504	13	1 138	0.37
2007	2 879	22	867	0.76
2008	1 990	17	305	0.85
2009	2 094	11	806	0.53
2010	2 496	17	857	0.68
2011	1 523	4	39	0.26
2012	1 589	21	717	1.32
2013	1 346	63	1 727	4.68
2014	1 624	51	1 488	3.14
2015	1 634	24	628	1.47
2016	962	17	388	1.77
2017	882	66	1 426	7.48
2018	1 106	26	565	2.35
2019	1 138	13	334	1.14
2020	660	2	40	0.30
2021	952	5	97	0.53
2022	674	6	458	0.89
2023	1 090	1	99	0.09
2024	1 213	0	0	0.00
2025	1 140	0	0	0.00

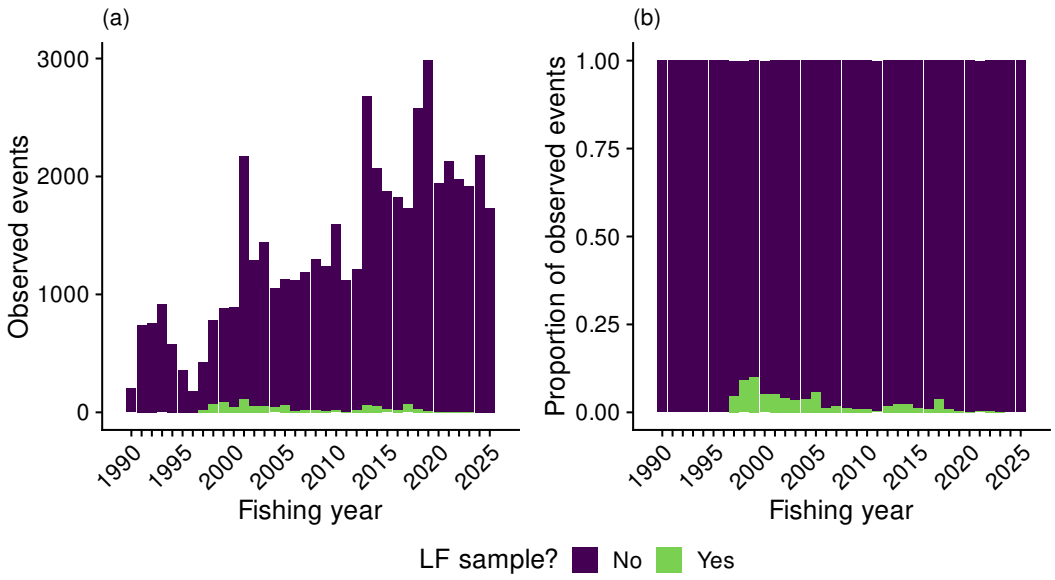


Figure 604: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SPD 5 where the spiny dogfish catch exceeded the 30 kg threshold, with and without length-frequency sampling.**

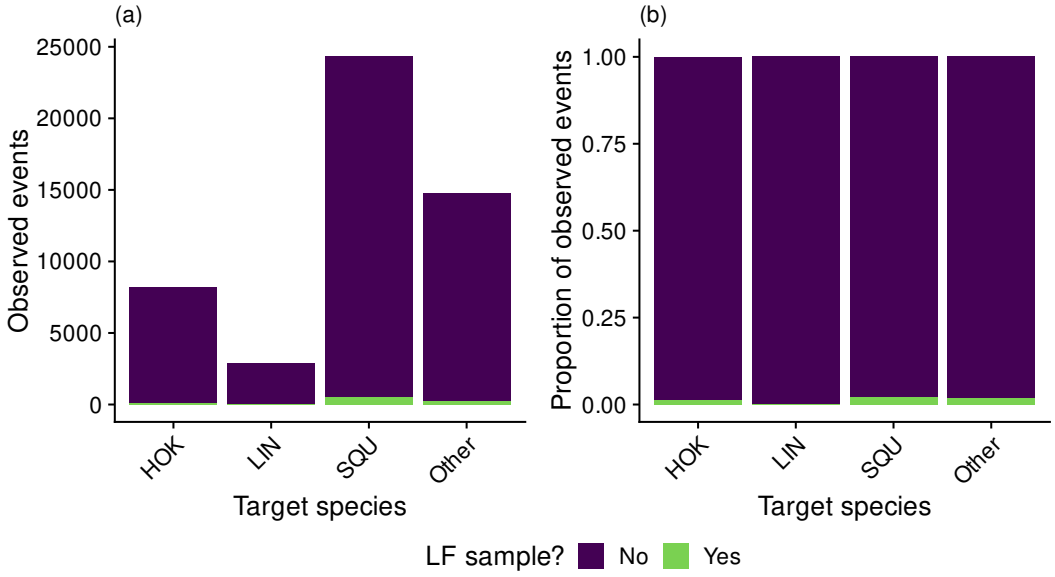


Figure 605: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SPD 5 where the spiny dogfish catch exceeded the 30 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

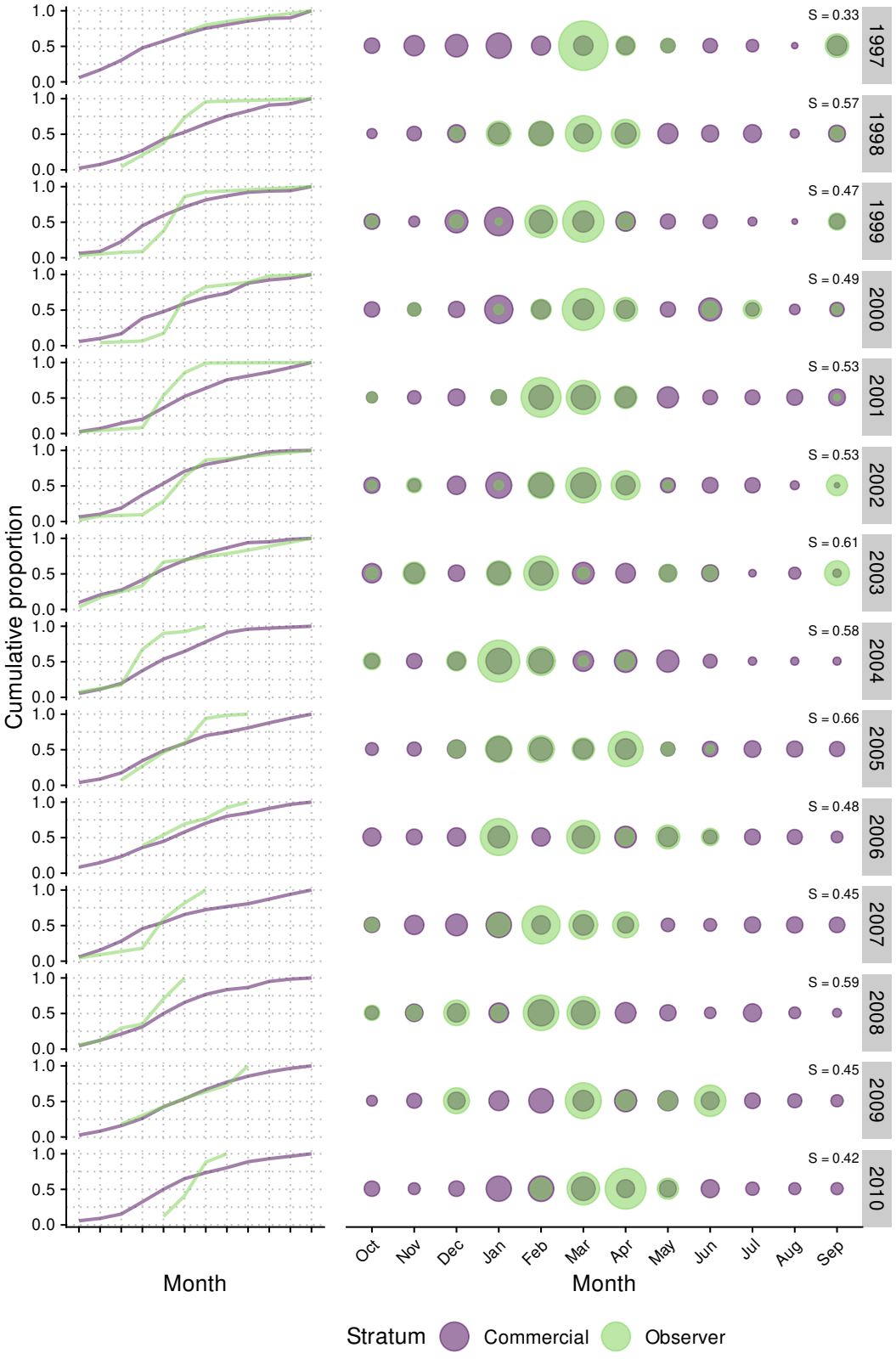


Figure 606: Monthly representativeness of observer sampling coverage of Trawl fishing events in SPD 5, where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

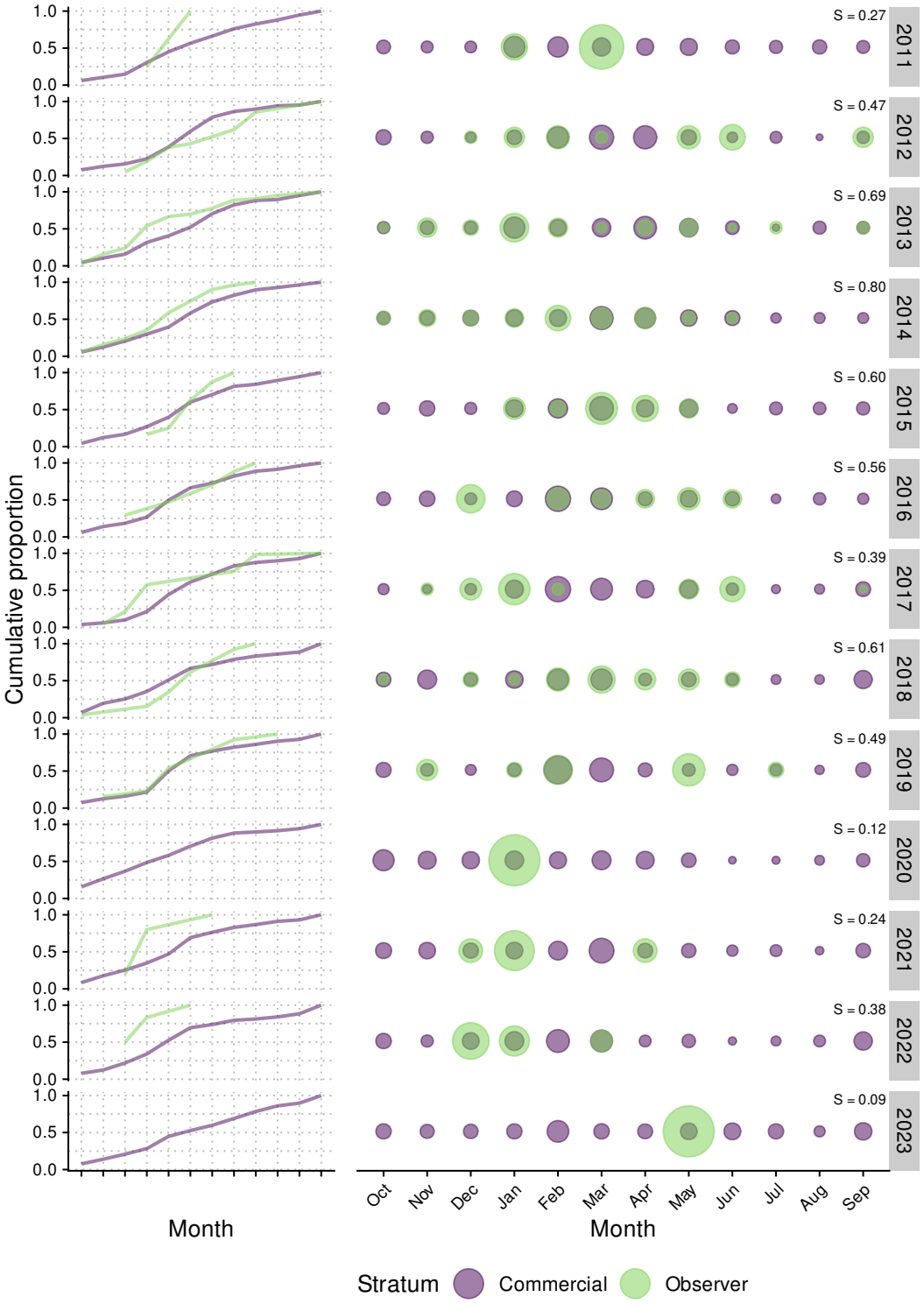


Figure 607: Monthly representativeness of observer sampling coverage of Trawl fishing events in SPD 5, where the spiny dogfish catch exceeded the 30kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

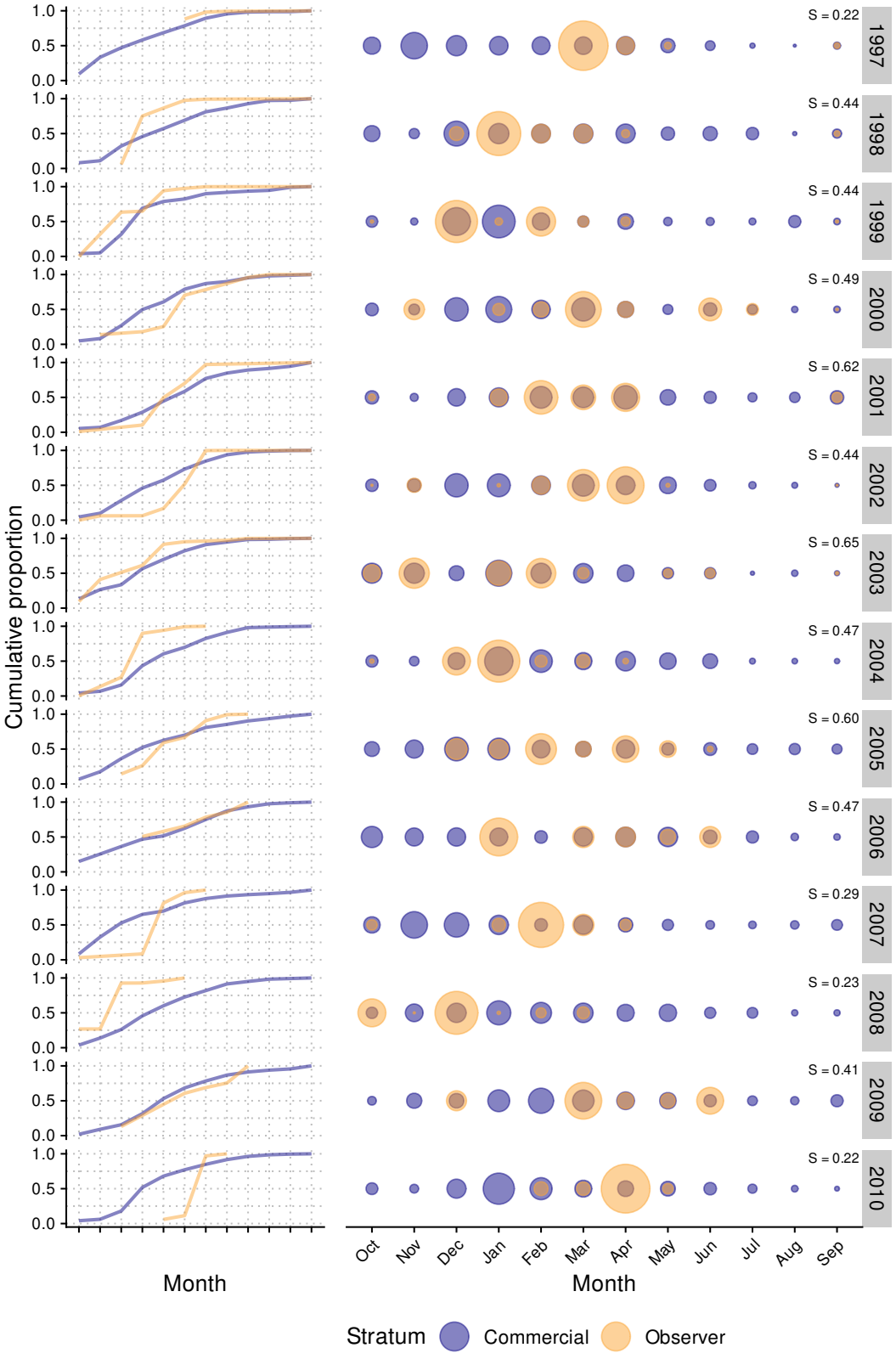


Figure 608: **Monthly representativeness of observer sampling coverage of Trawl catch in SPD 5, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

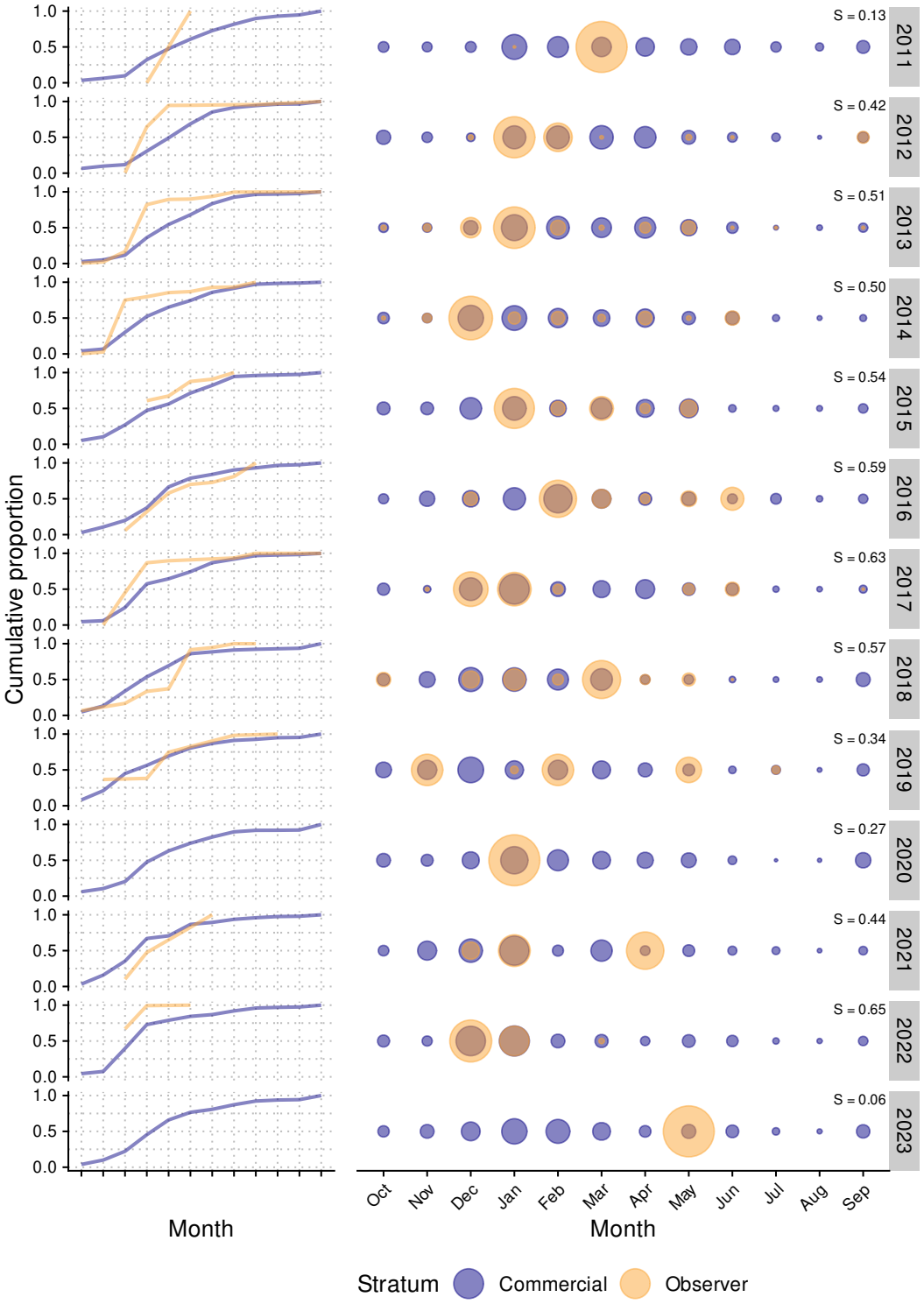


Figure 609: Monthly representativeness of observer sampling coverage of Trawl catch in SPD 5, from events where the spiny dogfish catch exceeded the 30kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

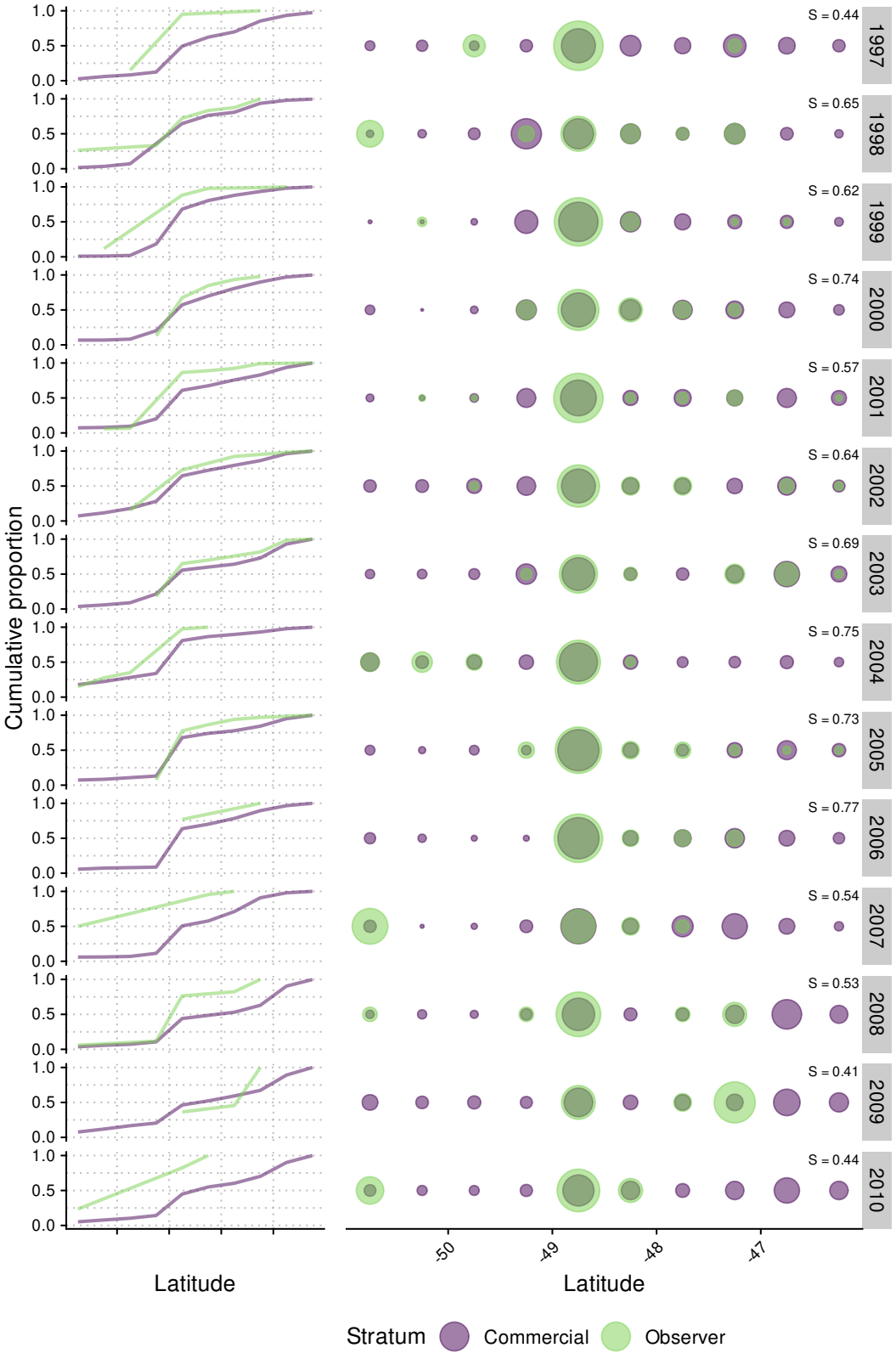


Figure 610: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SPD 5, where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

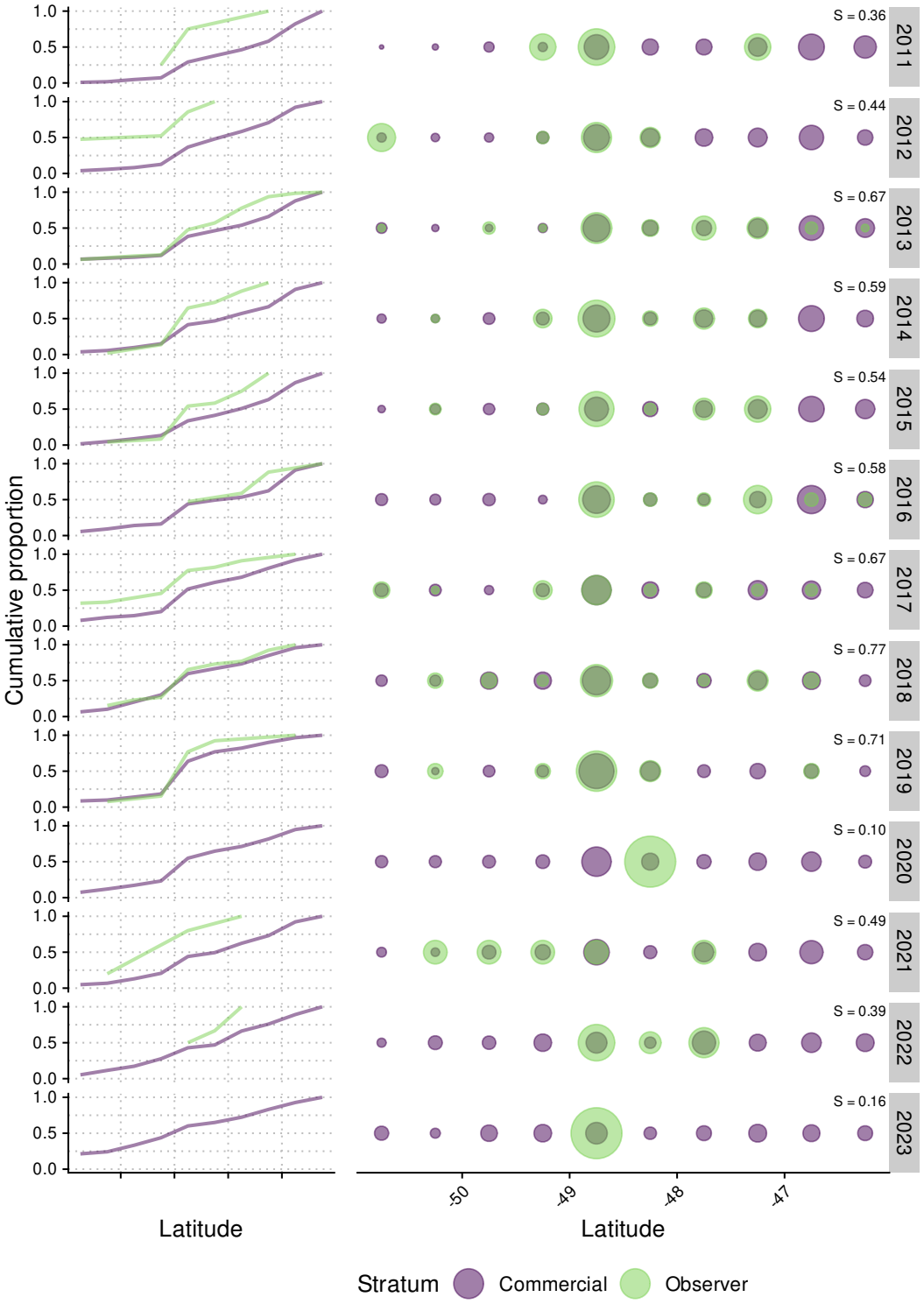


Figure 611: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SPD 5, where the spiny dogfish catch exceeded the 30kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

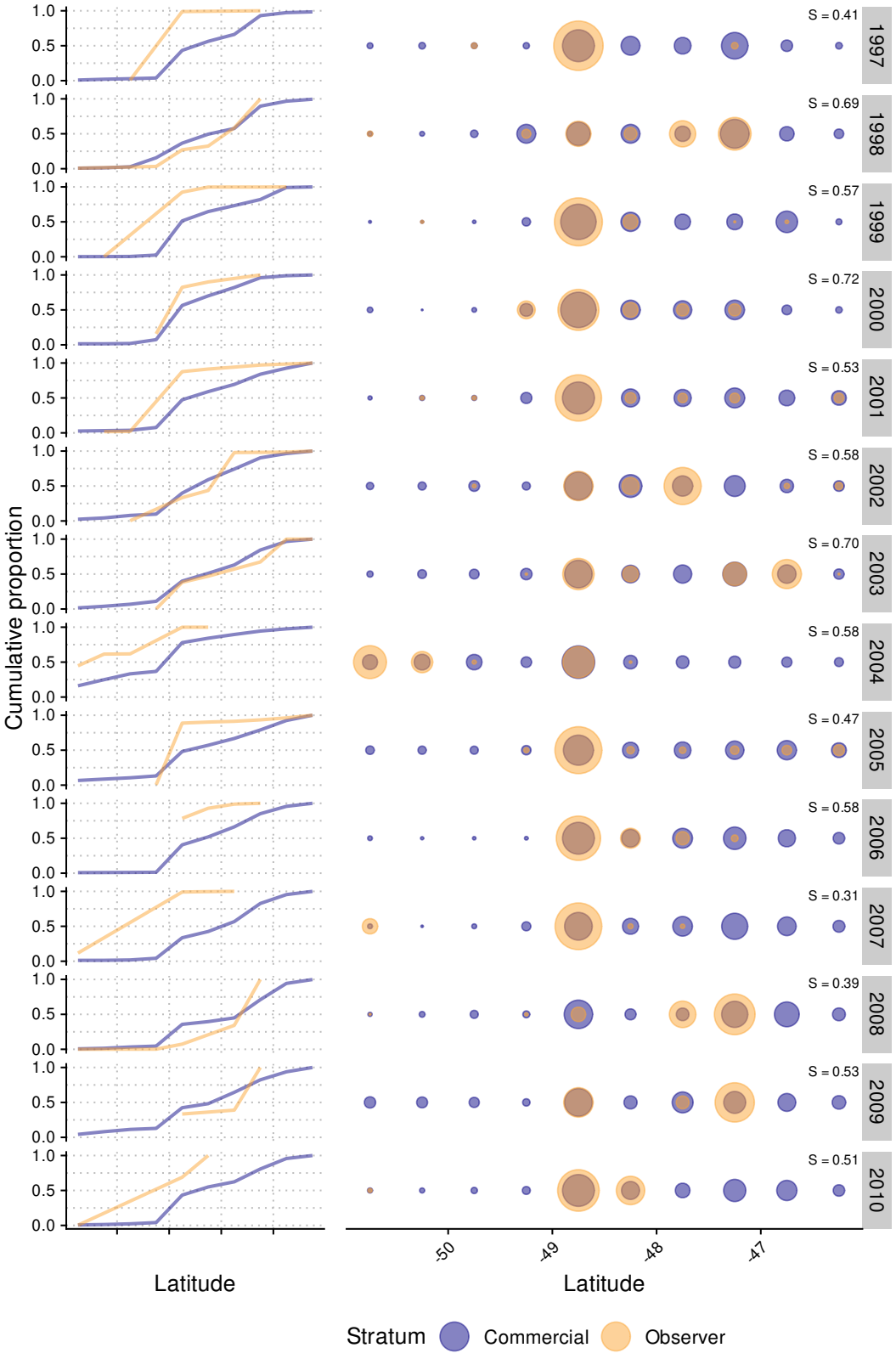


Figure 612: Latitudinal representativeness of observer sampling coverage of Trawl catch in SPD 5, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

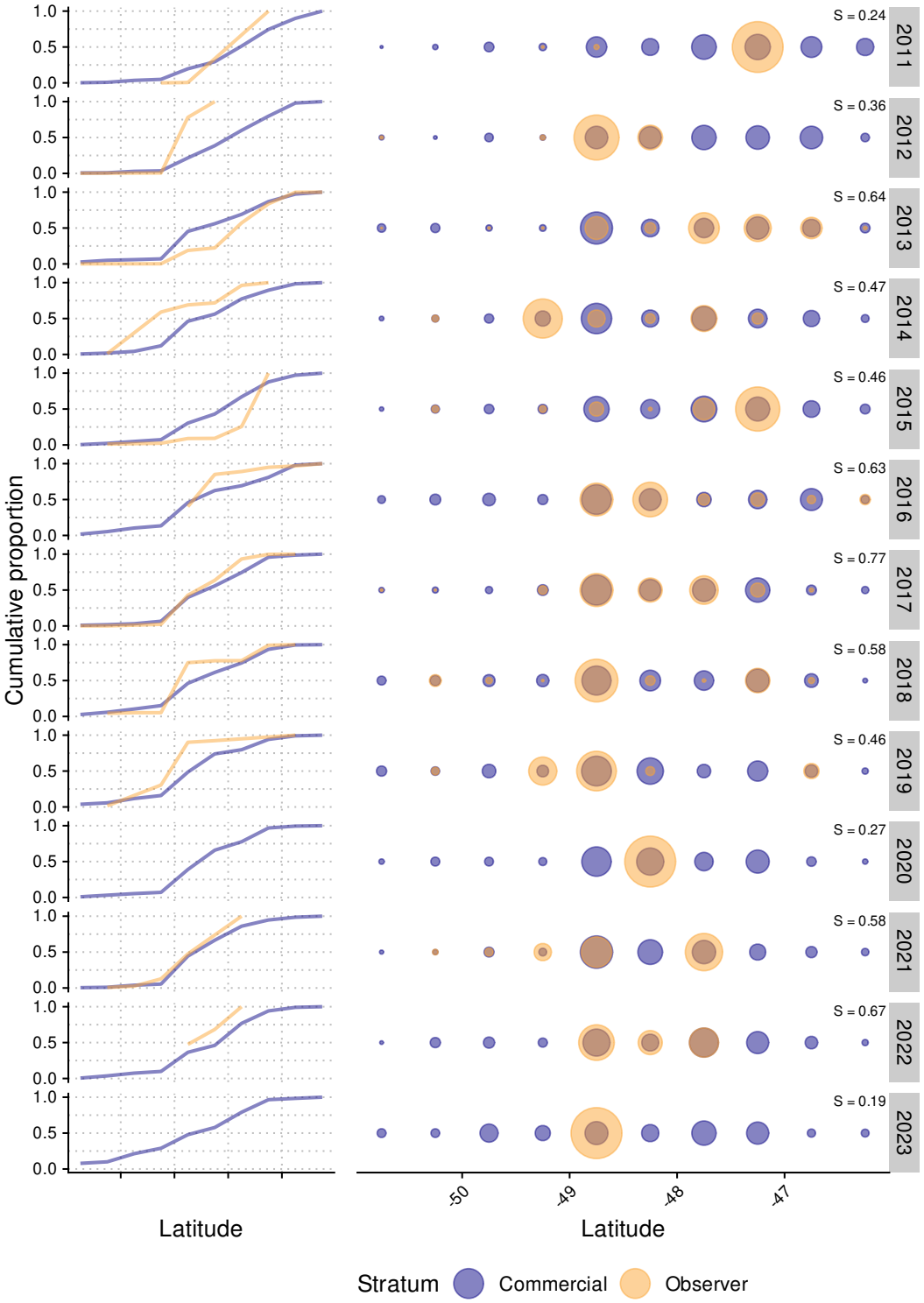


Figure 613: Latitudinal representativeness of observer sampling coverage of Trawl catch in SPD 5, from events where the spiny dogfish catch exceeded the 30kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

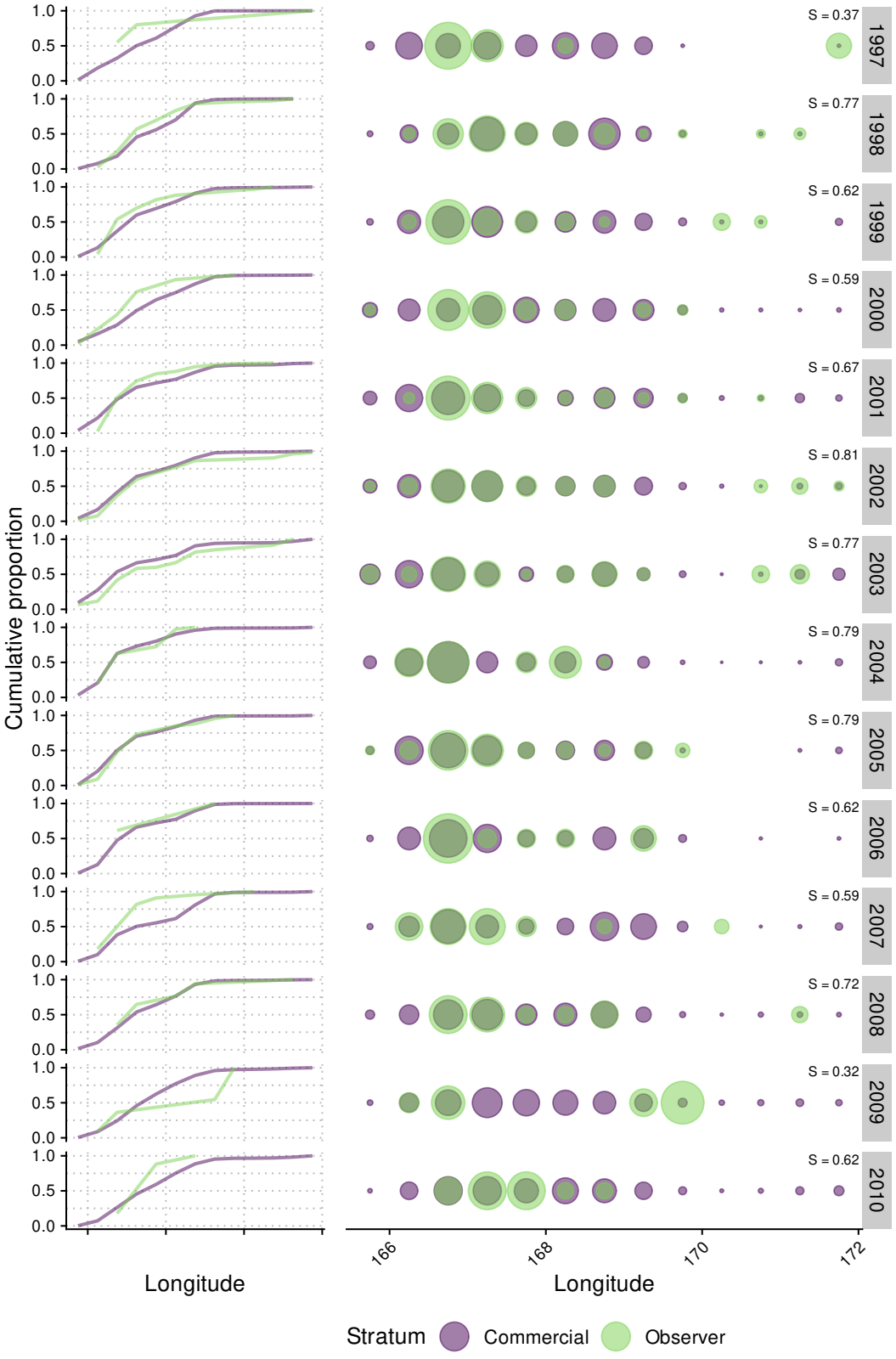


Figure 614: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SPD 5, where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

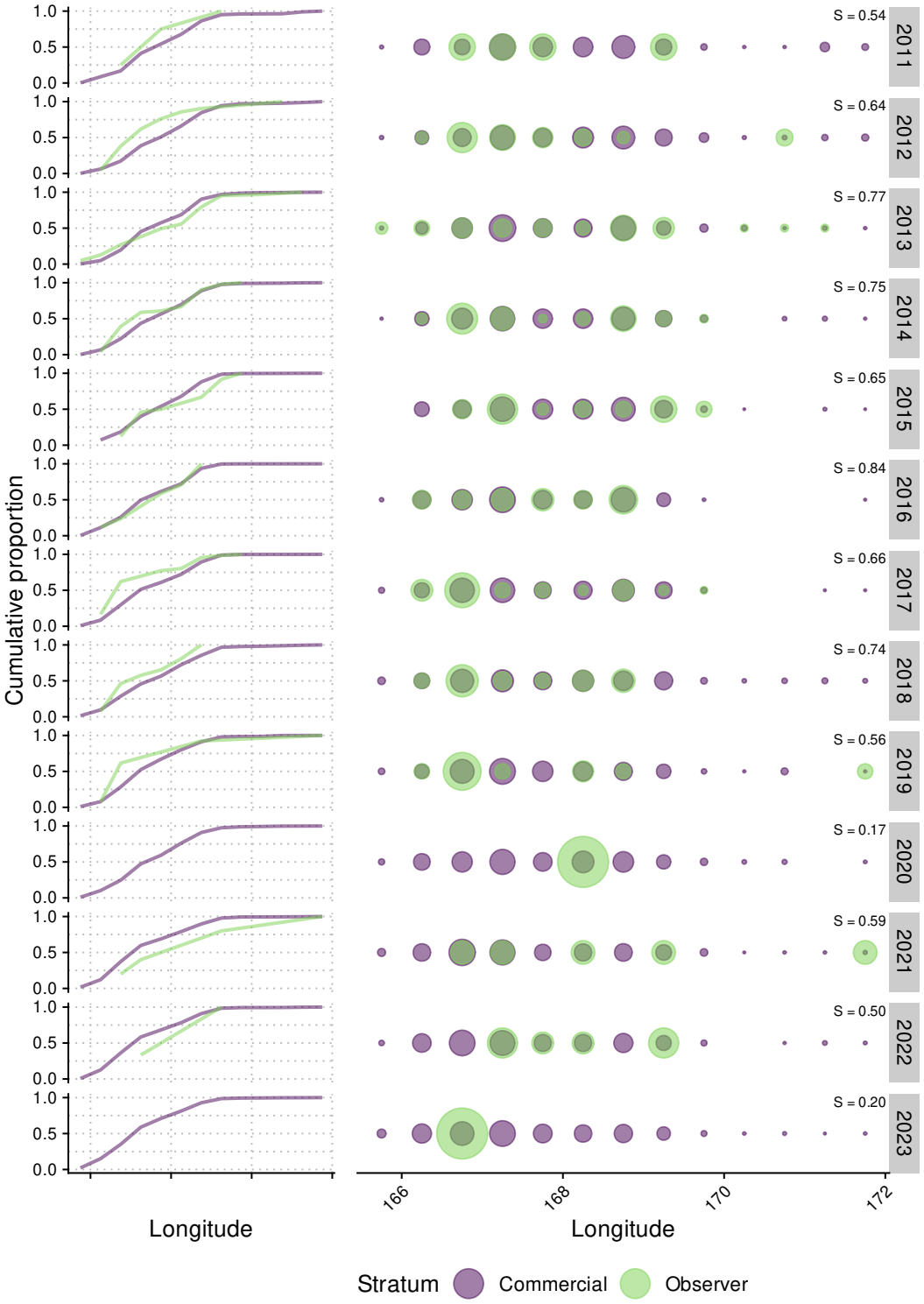


Figure 615: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SPD 5, where the spiny dogfish catch exceeded the 30kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

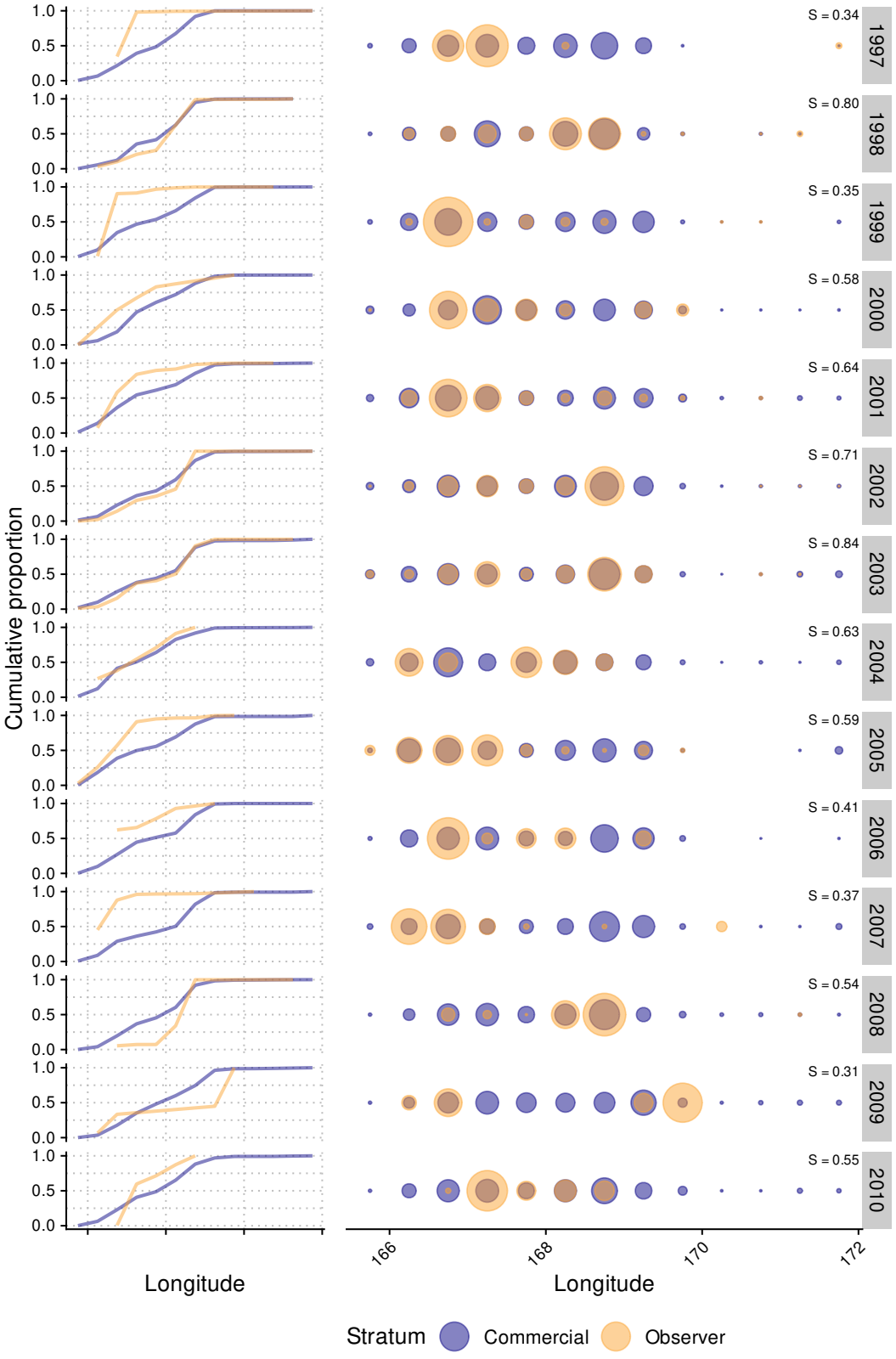


Figure 616: Longitudinal representativeness of observer sampling coverage of Trawl catch in SPD 5, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

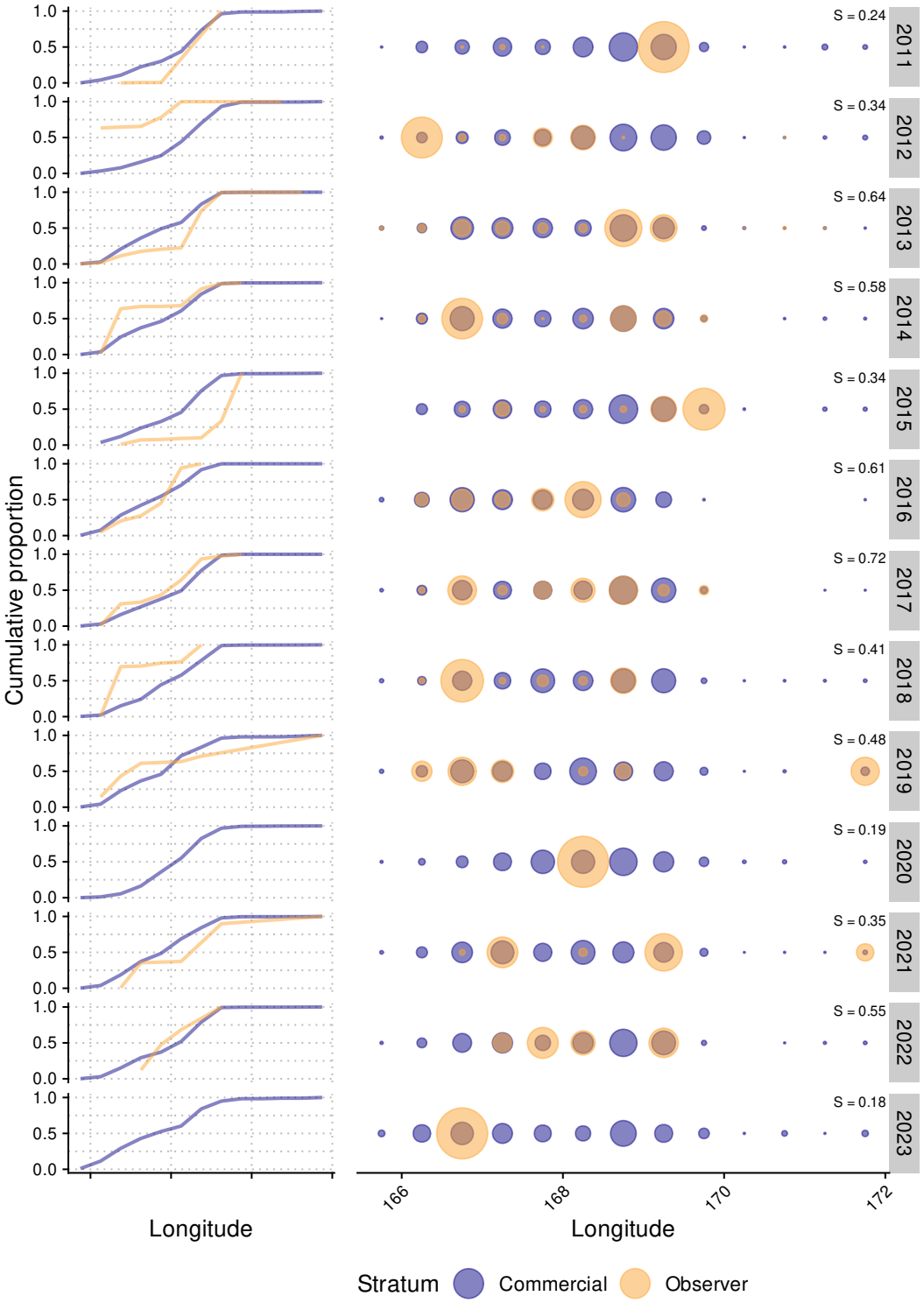


Figure 617: Longitudinal representativeness of observer sampling coverage of Trawl catch in SPD 5, from events where the spiny dogfish catch exceeded the 30kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

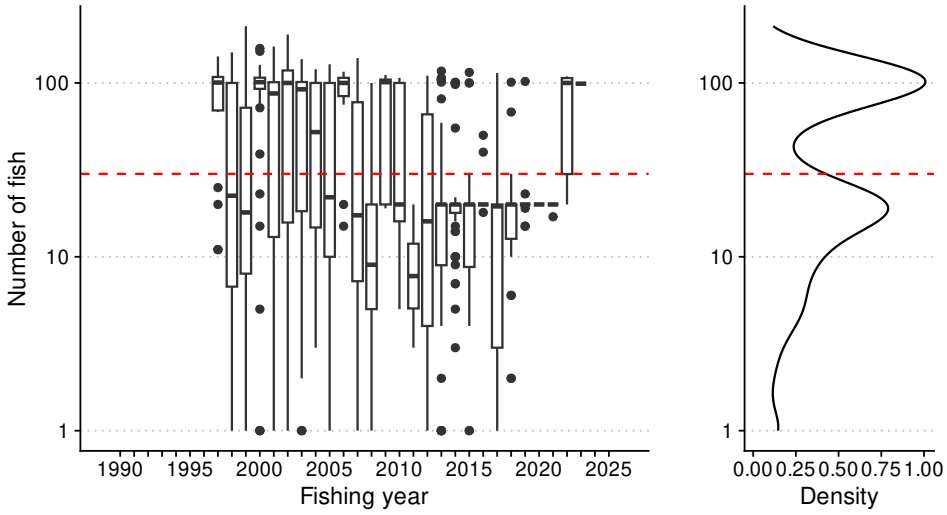


Figure 618: **Length-frequency sample sizes for observed fishing events in SPD 5 where spiny dogfish were sampled. The red dashed line indicates a sample size of 30 fish.**

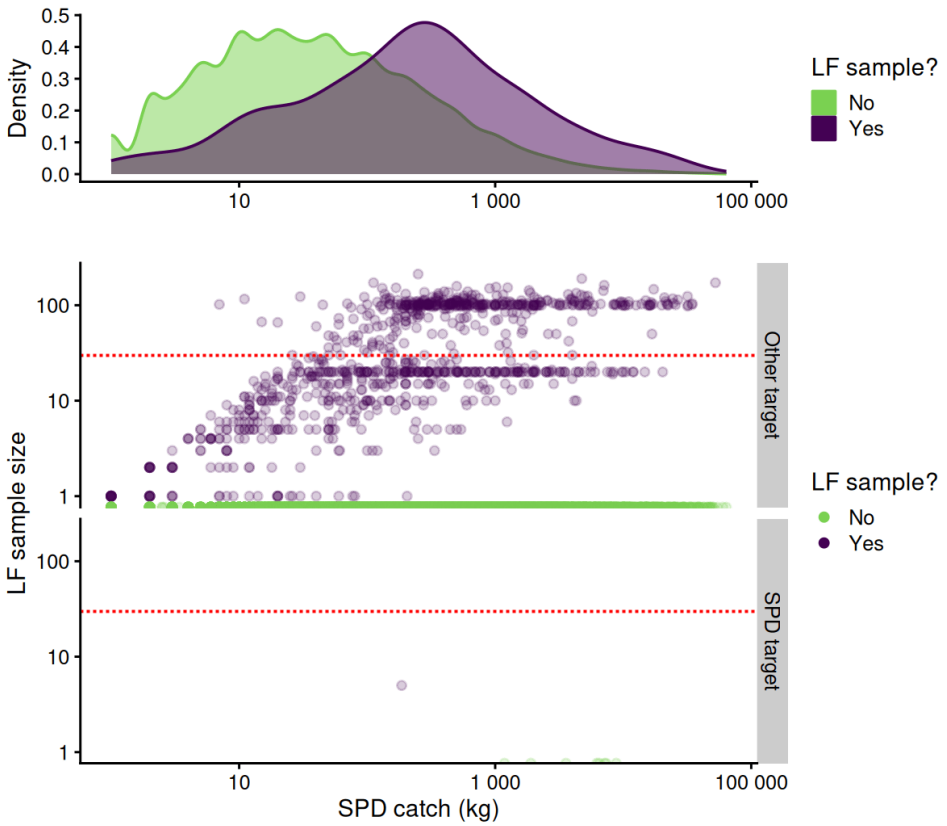


Figure 619: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in SPD 5 in relation to the total spiny dogfish catch from an event, separately for spiny dogfish target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.8.3.2 Catch quantification

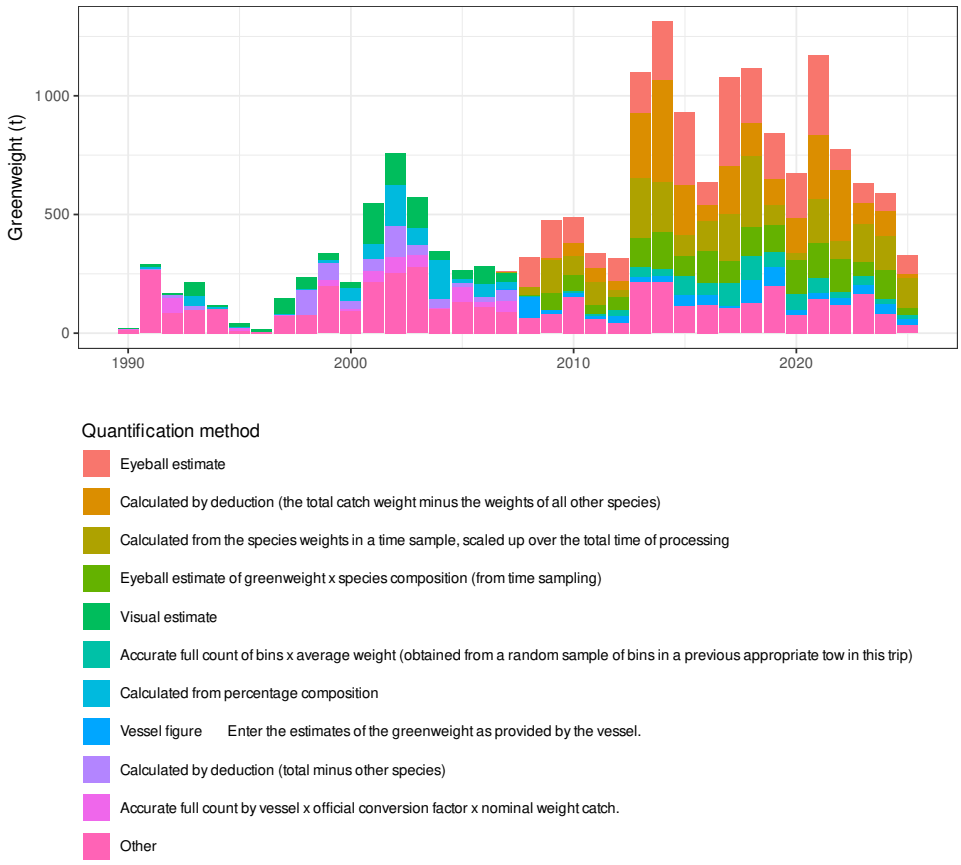


Figure 620: Methods used by observers to quantify the catch of spiny dogfish in the SPD 5 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.8.4 SPD 5: Line fishery

2.8.4.1 Length-frequency samples

Table 53: Length-frequency samples of spiny dogfish from the SPD 5 Line fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of spiny dogfish exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	5	0	0	0.00
1991	24	0	0	0.00
1992	97	0	0	0.00
1993	62	0	0	0.00
1994	966	0	0	0.00
1995	1 392	0	0	0.00
1996	622	0	0	0.00
1997	21 511	0	0	0.00
1998	608	0	0	0.00
1999	593	13	176	2.19
2000	513	0	0	0.00
2001	1 036	0	0	0.00
2002	412	1	18	0.24
2003	221	1	101	0.45
2004	845	1	43	0.12
2005	385	14	1 298	3.64
2006	189	0	0	0.00
2007	192	0	0	0.00
2008	413	7	84	1.69
2009	339	2	204	0.59
2010	344	0	0	0.00
2011	332	0	0	0.00
2012	300	2	29	0.67
2013	72	0	0	0.00
2014	422	5	100	1.18
2015	497	0	0	0.00
2016	422	0	0	0.00
2017	395	0	0	0.00
2018	366	0	0	0.00
2019	574	0	0	0.00
2020	710	3	45	0.42
2021	660	0	0	0.00
2022	592	0	0	0.00
2023	621	0	0	0.00
2024	609	0	0	0.00
2025	591	0	0	0.00

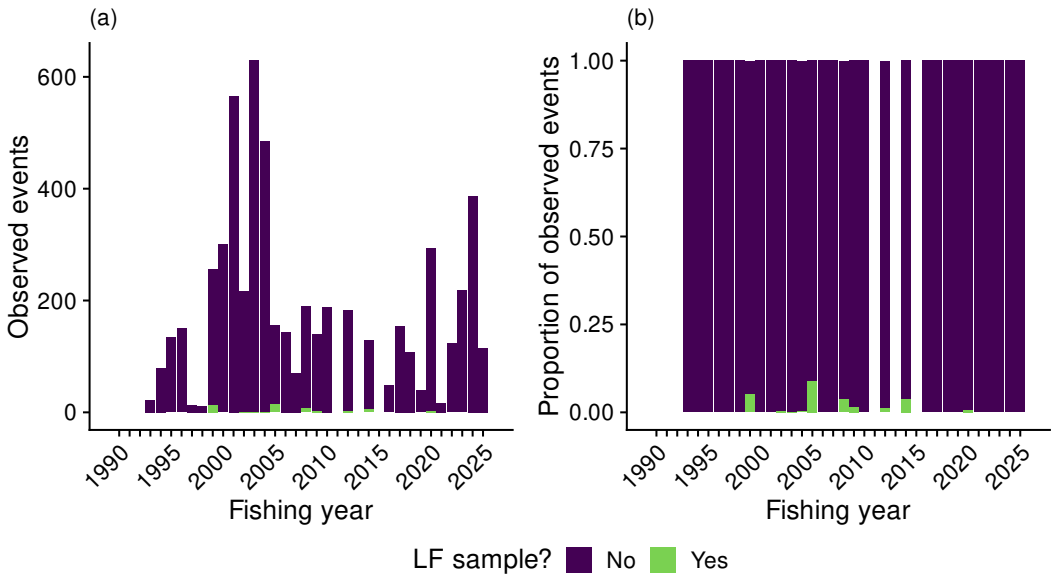


Figure 621: (a) Observed Line fishing events, and (b) proportion of observed events, in SPD 5 where the spiny dogfish catch exceeded the 30 kg threshold, with and without length-frequency sampling.

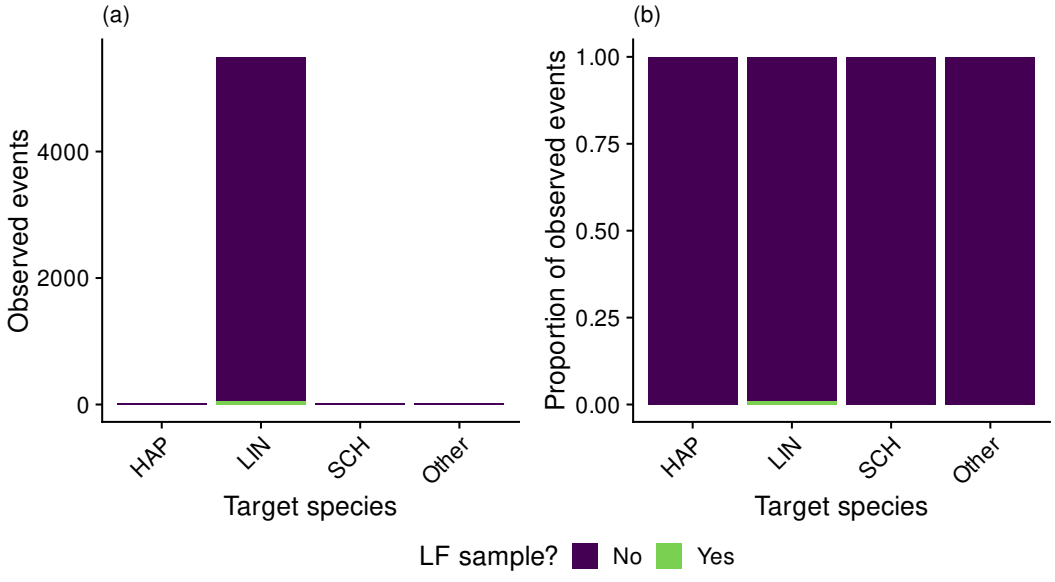


Figure 622: (a) Observed Line fishing events, and (b) proportion of observed events, in SPD 5 where the spiny dogfish catch exceeded the 30 kg threshold, with and without length-frequency sampling, by observer assessed target species.

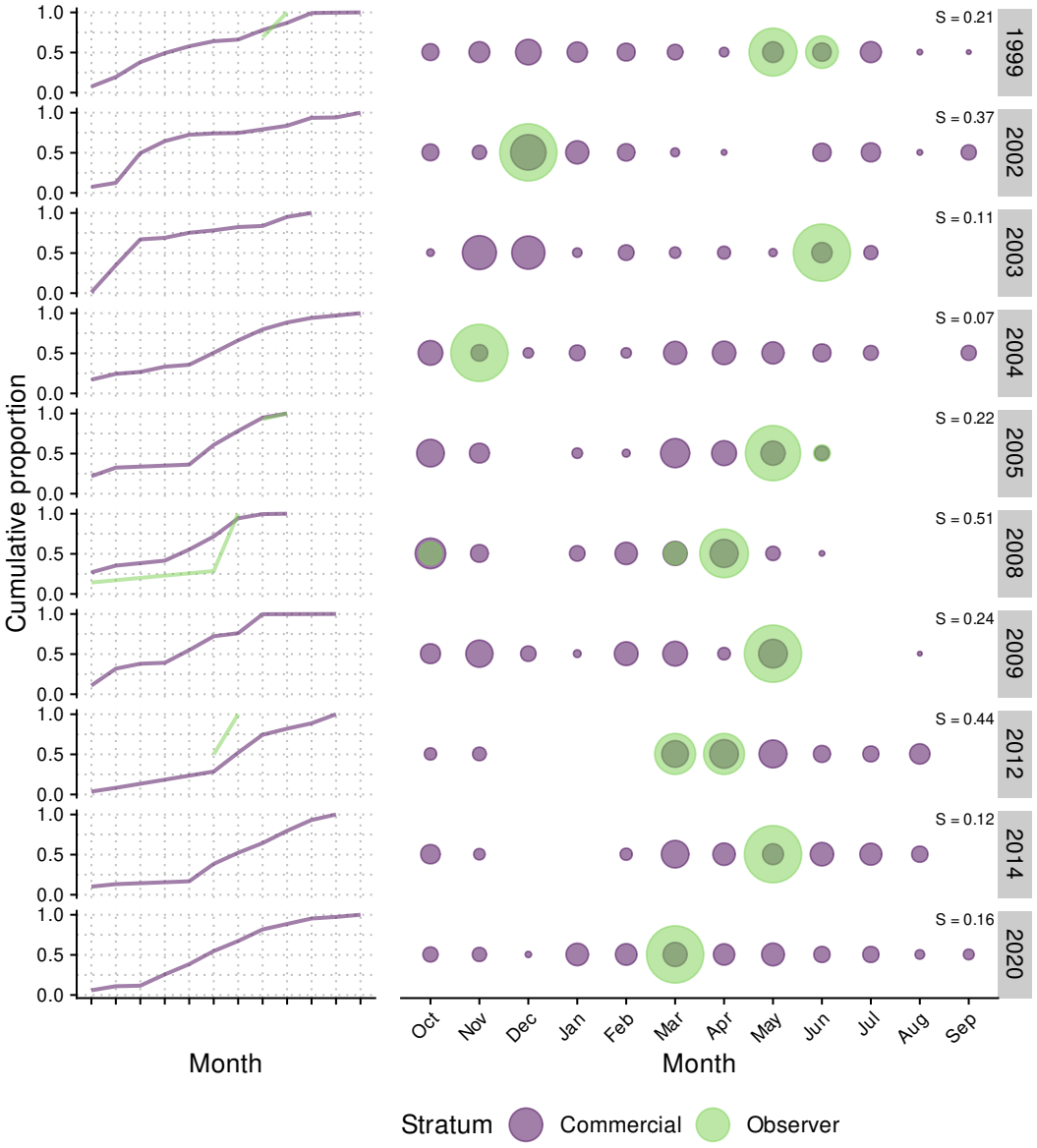


Figure 623: Monthly representativeness of observer sampling coverage of Line fishing events in SPD 5, where the spiny dogfish catch exceeded the 30kg threshold, in 1999 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

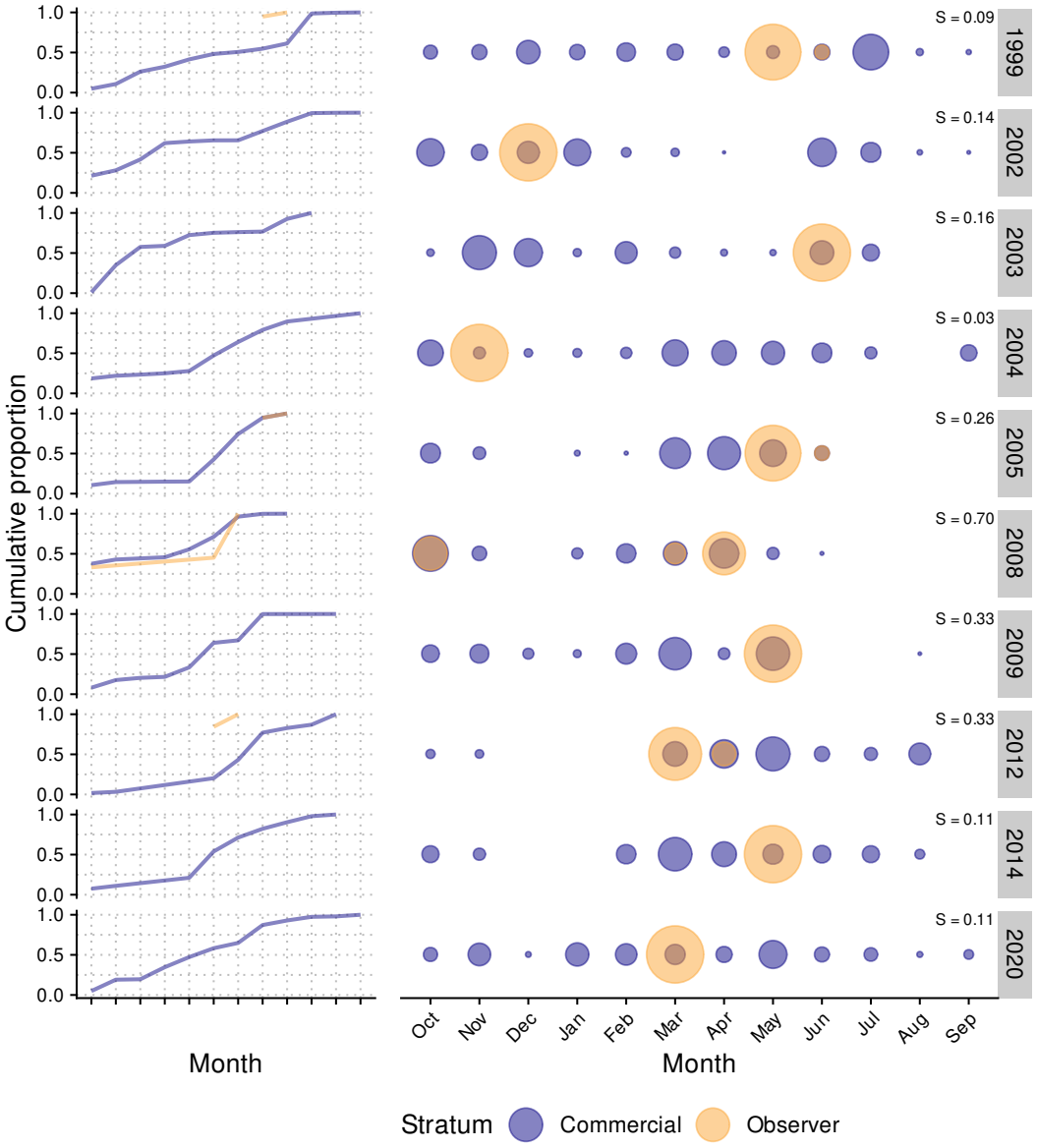


Figure 624: **Monthly representativeness of observer sampling coverage of Line catch in SPD 5, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1999 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

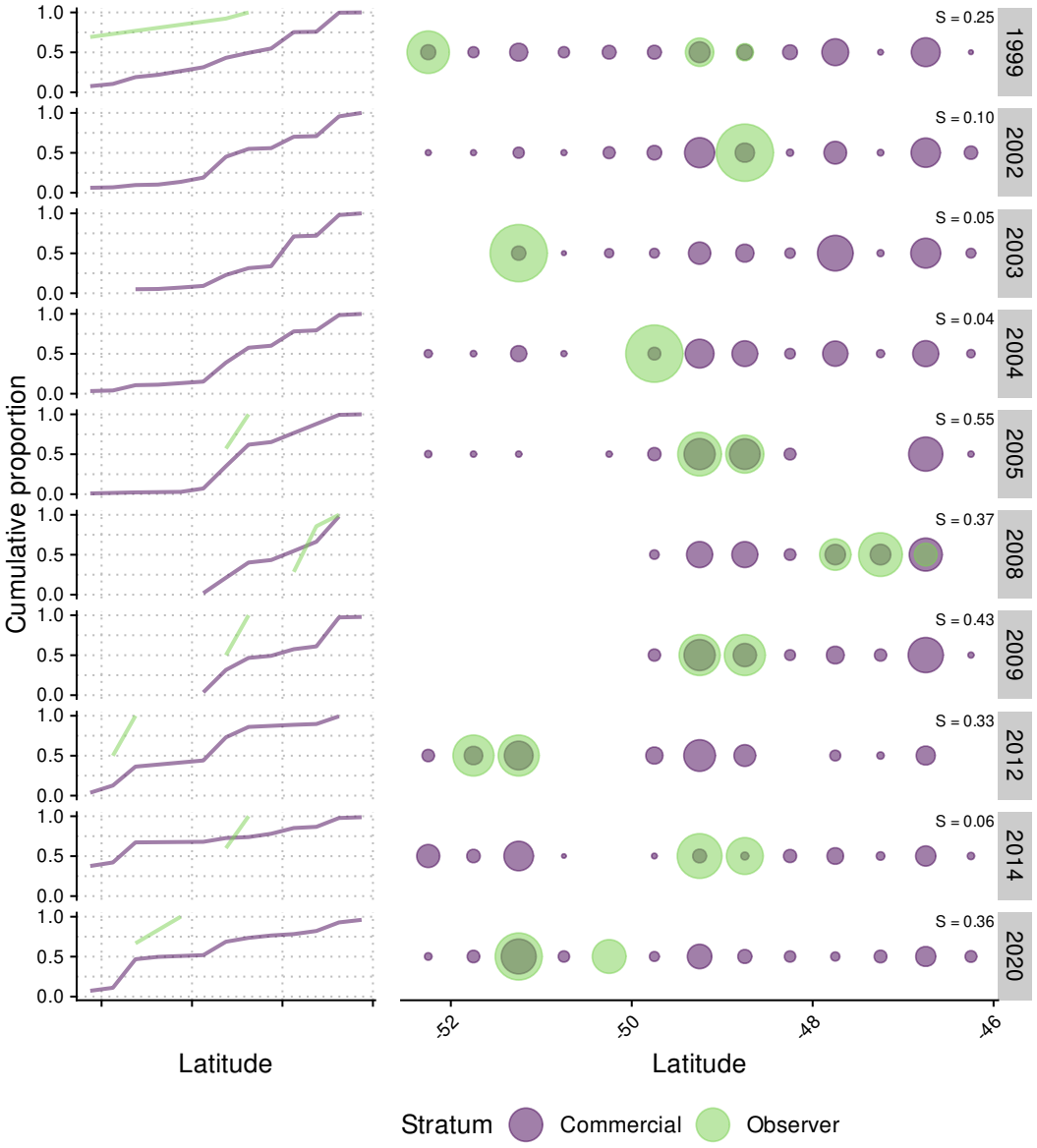


Figure 625: Latitudinal representativeness of observer sampling coverage of Line fishing events in SPD 5, where the spiny dogfish catch exceeded the 30kg threshold, in 1999 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

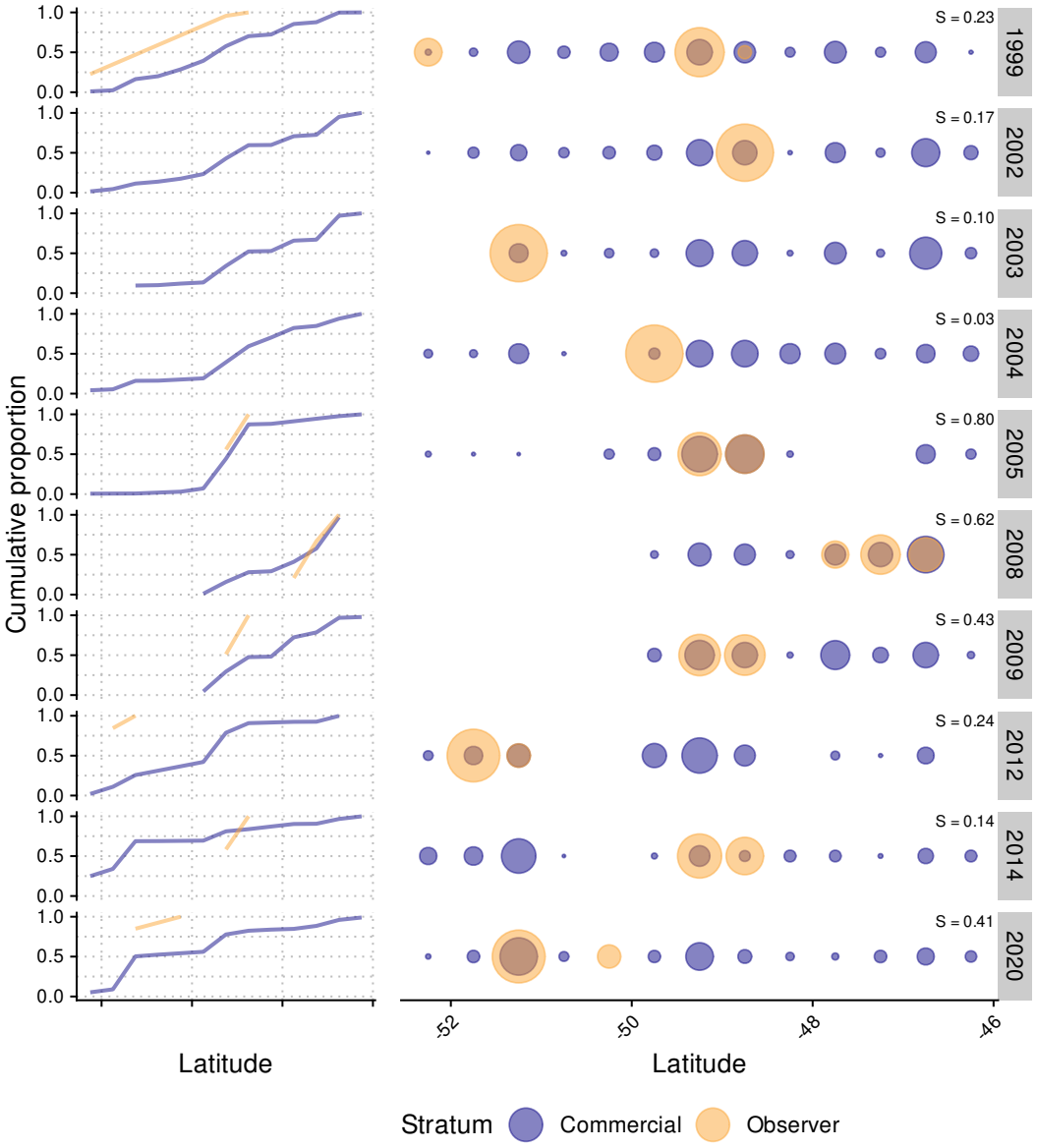


Figure 626: **Latitudinal representativeness of observer sampling coverage of Line catch in SPD 5, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1999 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

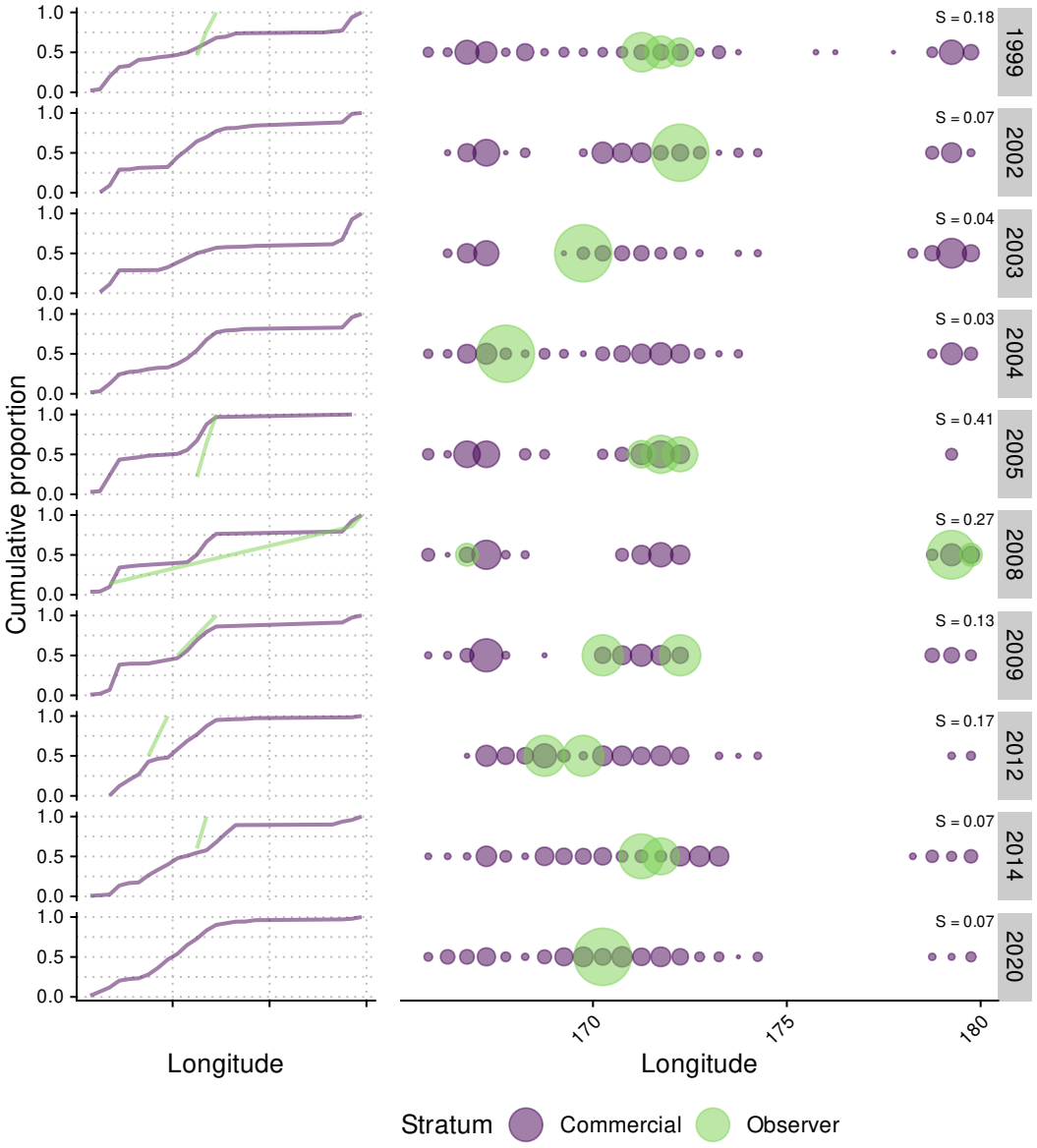


Figure 627: Longitudinal representativeness of observer sampling coverage of Line fishing events in SPD 5, where the spiny dogfish catch exceeded the 30kg threshold, in 1999 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

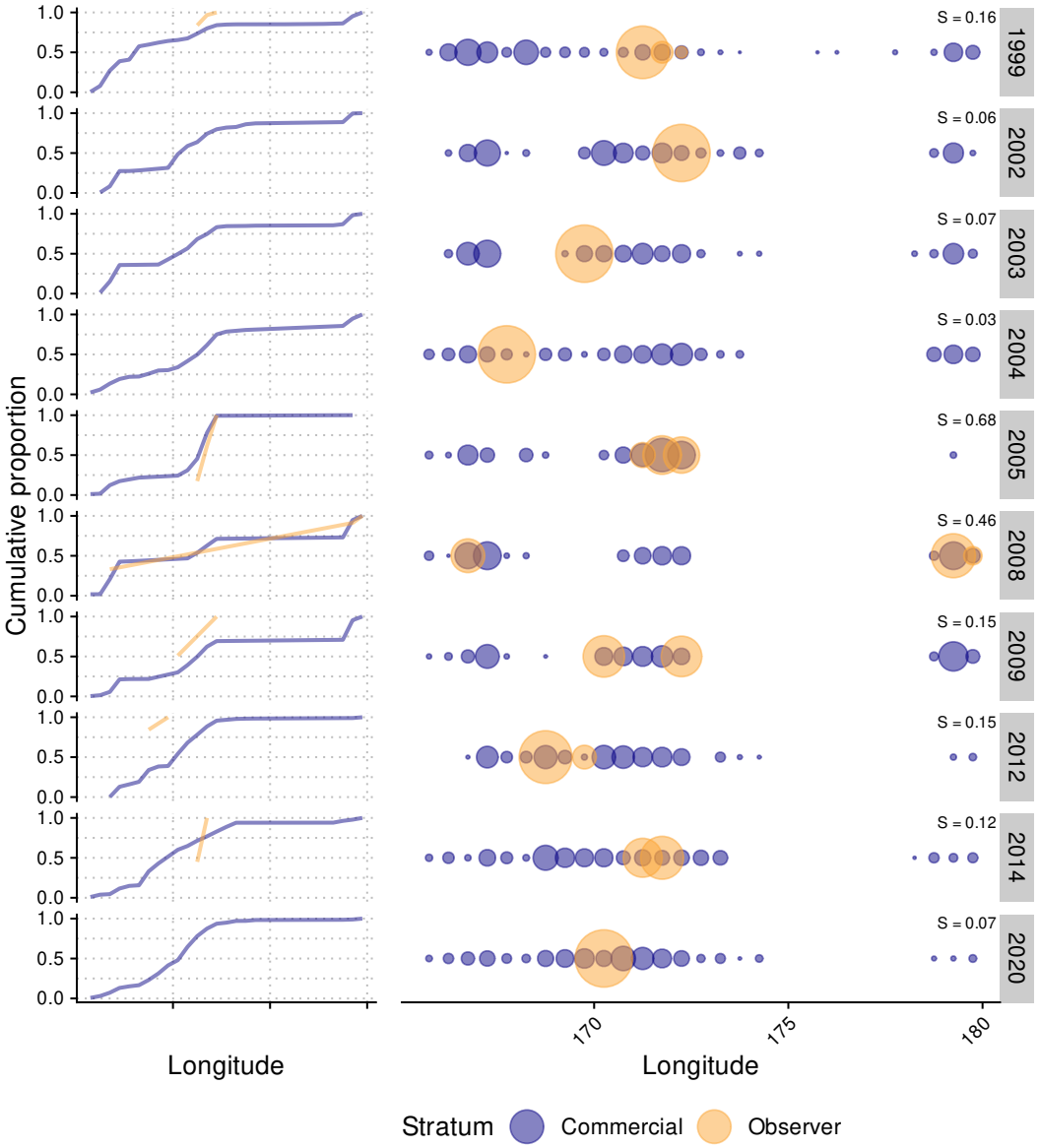


Figure 628: **Longitudinal representativeness of observer sampling coverage of Line catch in SPD 5, from events where the spiny dogfish catch exceeded the 30kg threshold, in 1999 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

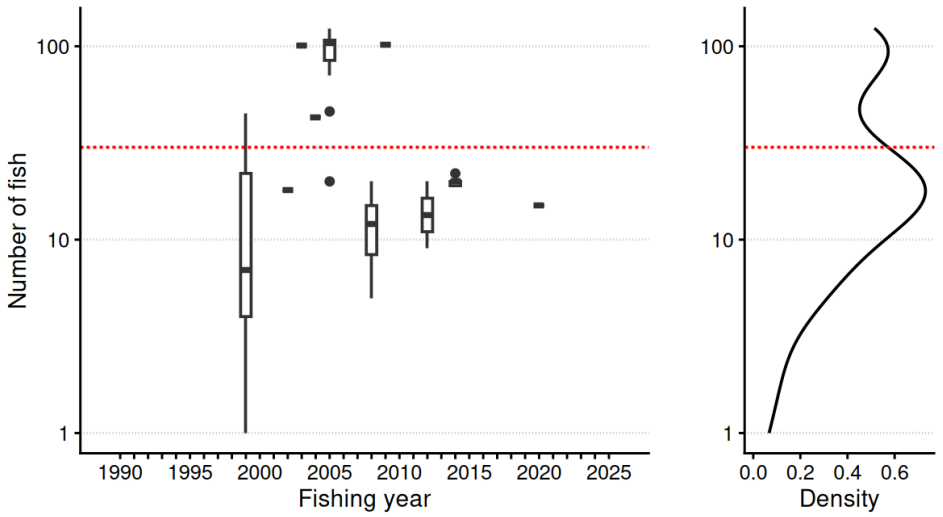


Figure 629: Length-frequency sample sizes for observed fishing events in SPD 5 where spiny dogfish were sampled. The red dashed line indicates a sample size of 30 fish.

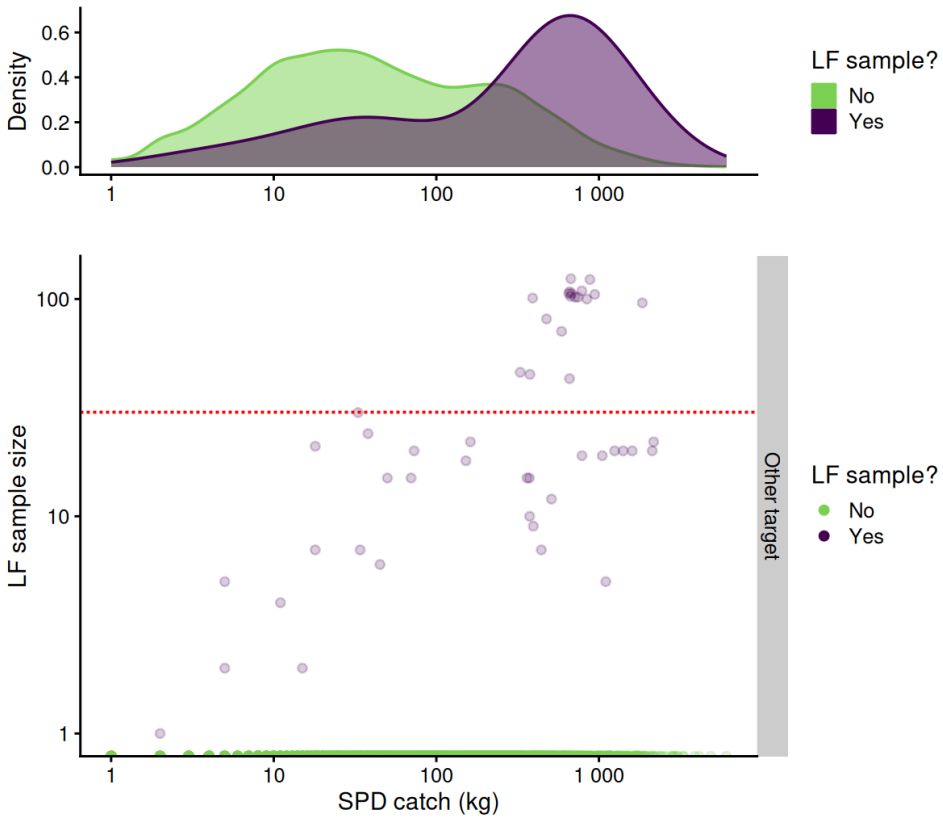


Figure 630: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SPD 5 in relation to the total spiny dogfish catch from an event, separately for spiny dogfish target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.8.4.2 Catch quantification

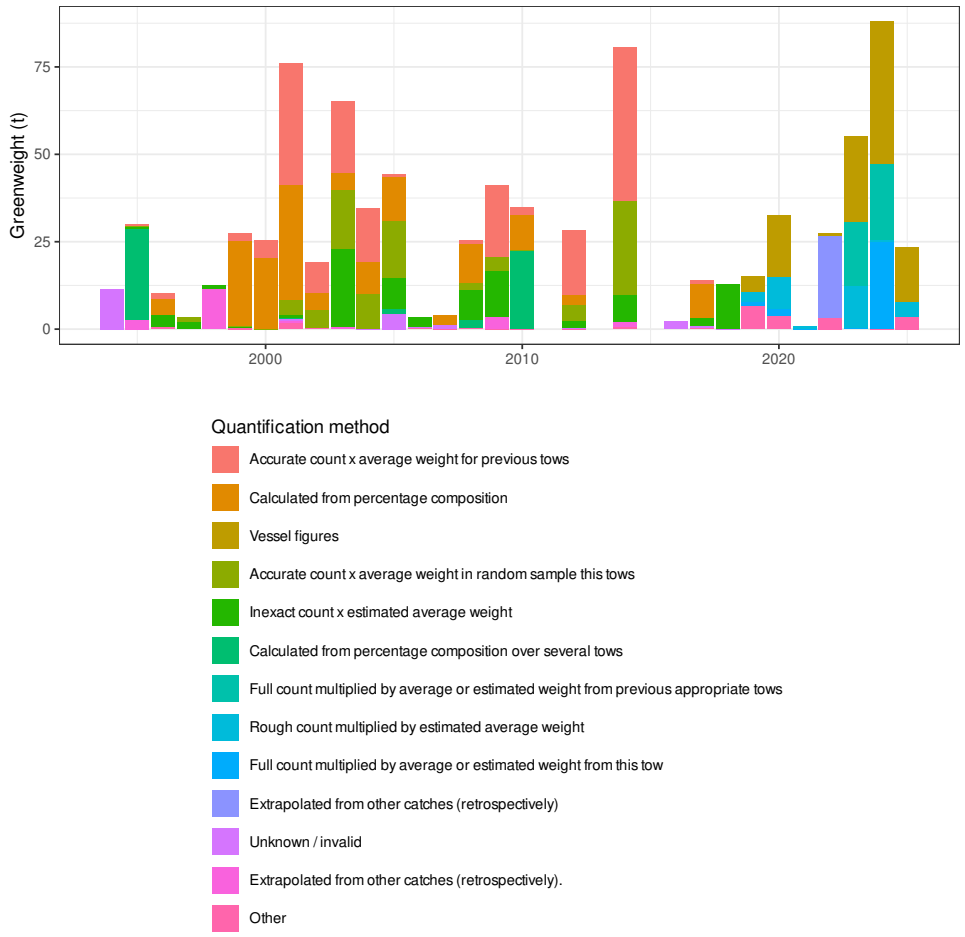


Figure 631: Methods used by observers to quantify the catch of spiny dogfish in the SPD 5 Line fishery. The legend lists the methods used in descending order of total catch.

2.9 SPE stocks

Observer sampling of sea perch is considered with respect to the sea perch Quota Management Areas.

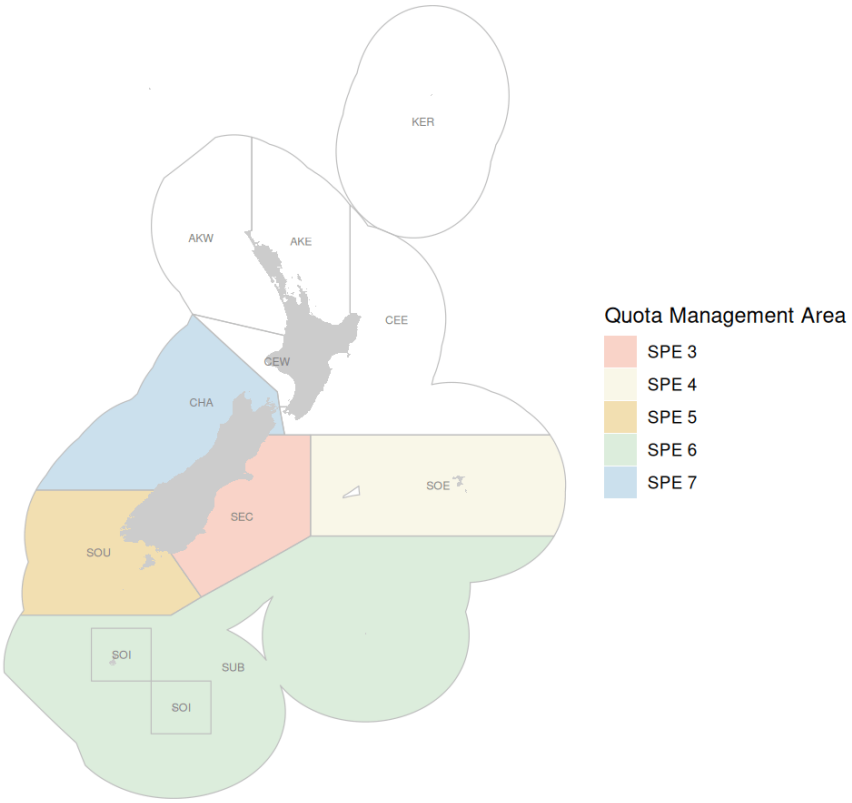


Figure 632: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for sea perch (coloured areas, per legend).

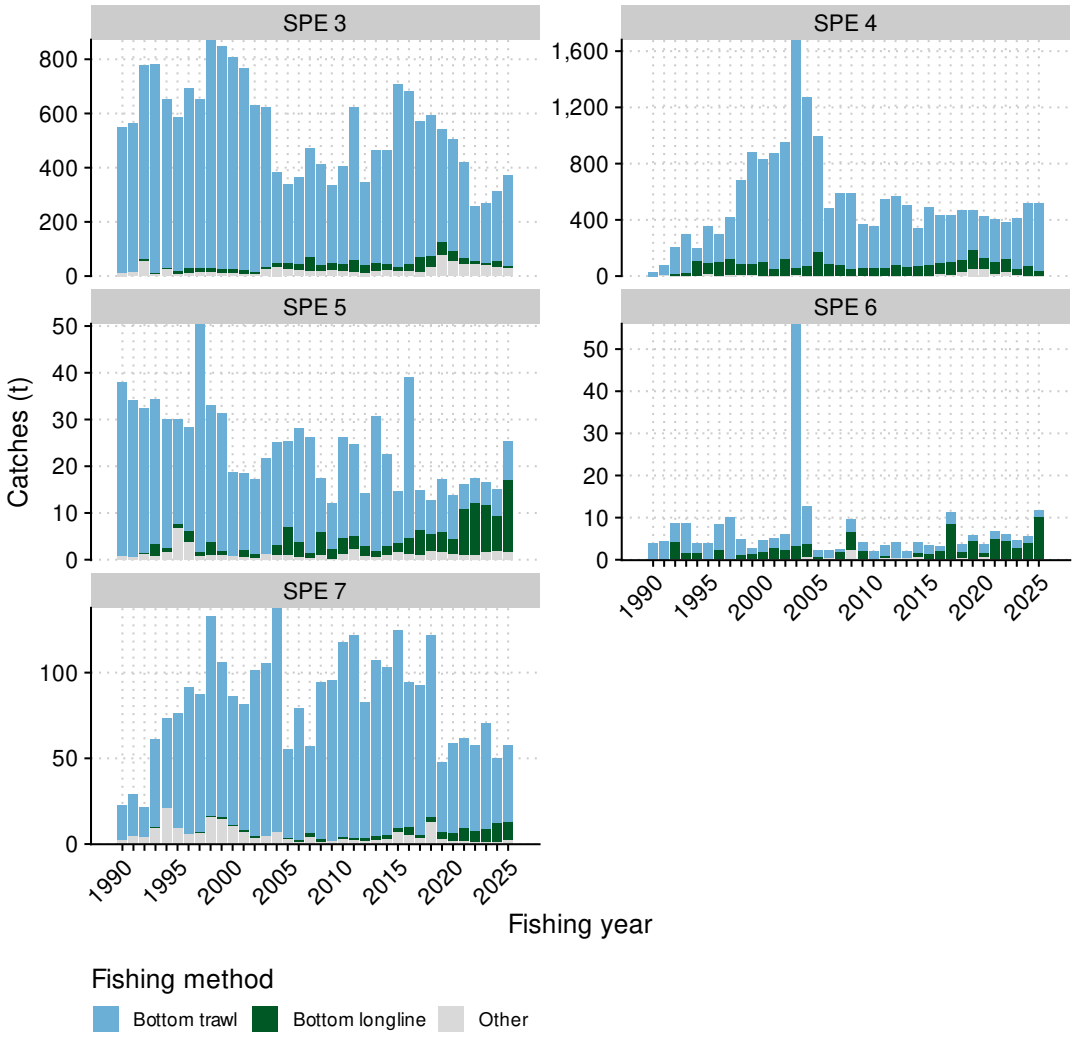


Figure 633: **Catches of sea perch by fishing method, for events within the sea perch Quota Management Areas. Methods grouped as Other include: BPT, BS, CP, CRP, D, DL, DN, DS, DV, EP, FN, FP, H, HL, MH, MPT, MW, PL, POT, PRB, PRM, PS, PSH, RLP, RN, SJ, SLL, SN, T, TL.**

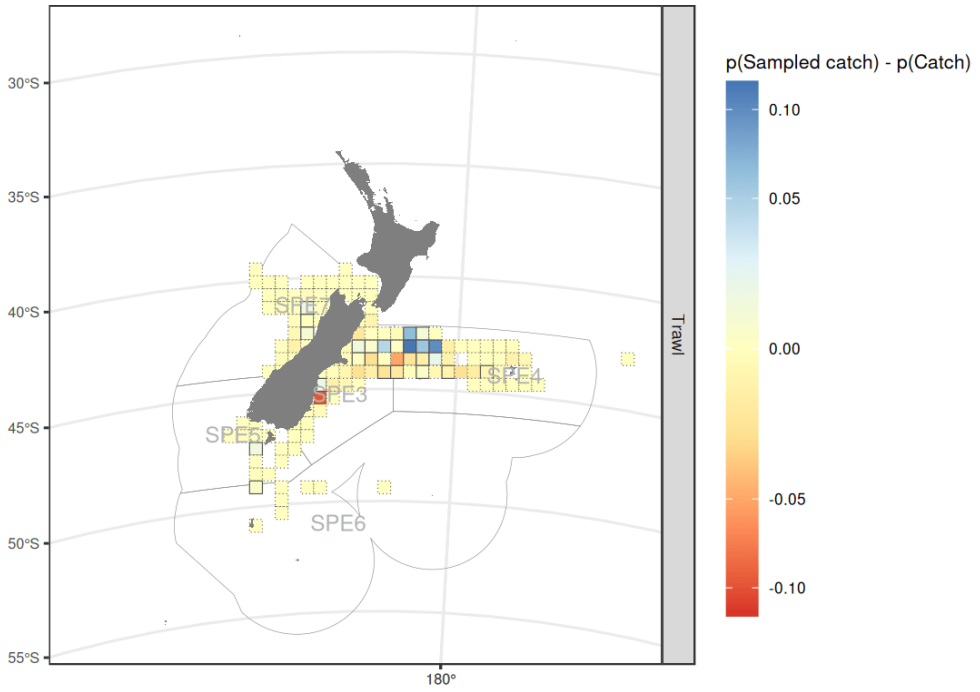


Figure 634: Differences in the relative proportions of catch and sampled catch for sea perch during 2021–2025. Cells with a dotted border had no sampling.

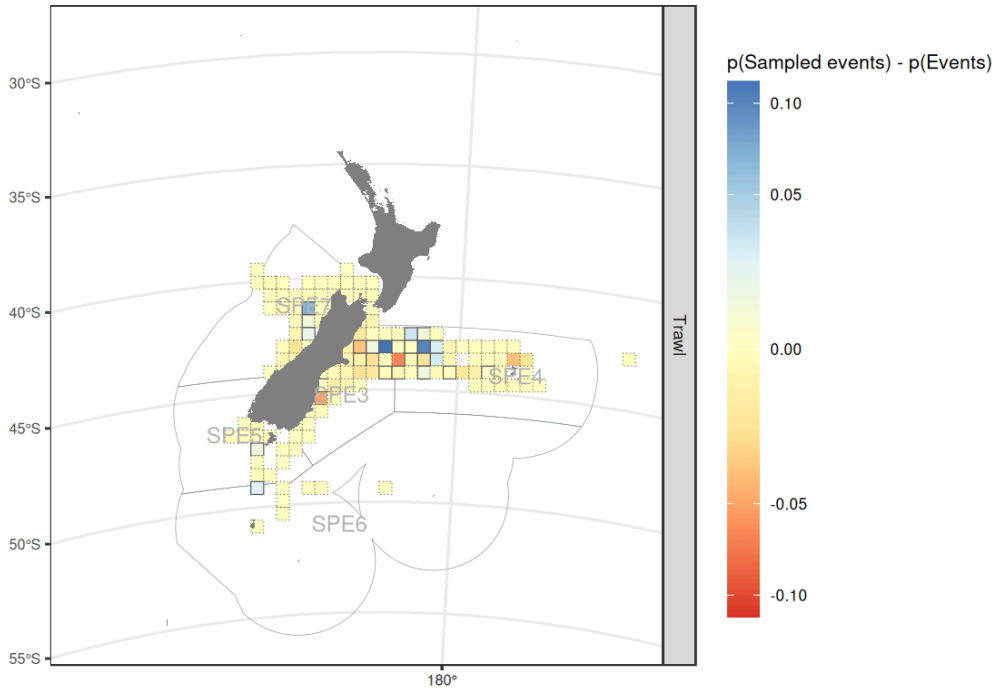


Figure 635: Differences in the relative proportions of events meeting the sampling threshold and sampled events for sea perch during 2021–2025. Cells with a dotted border had no sampling.

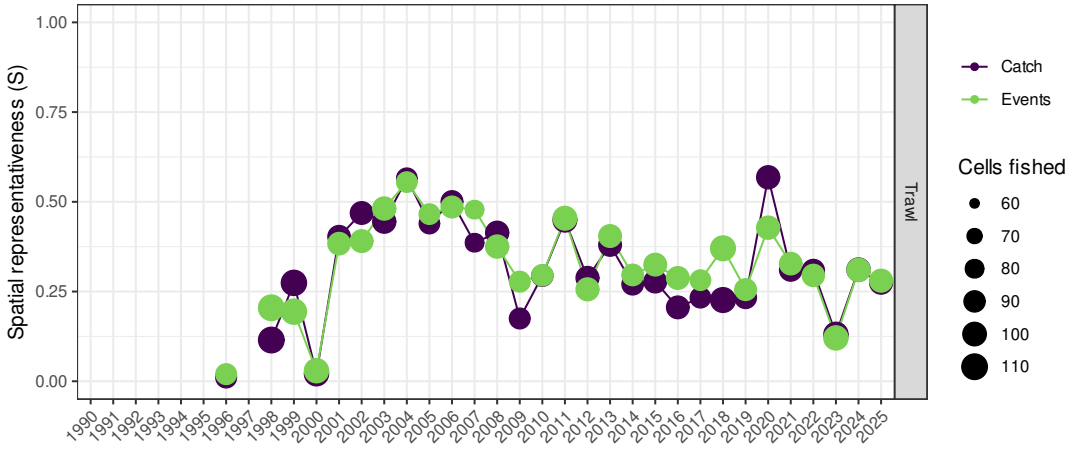


Figure 636: Spatial representativeness of observer sampling of sea perch by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.

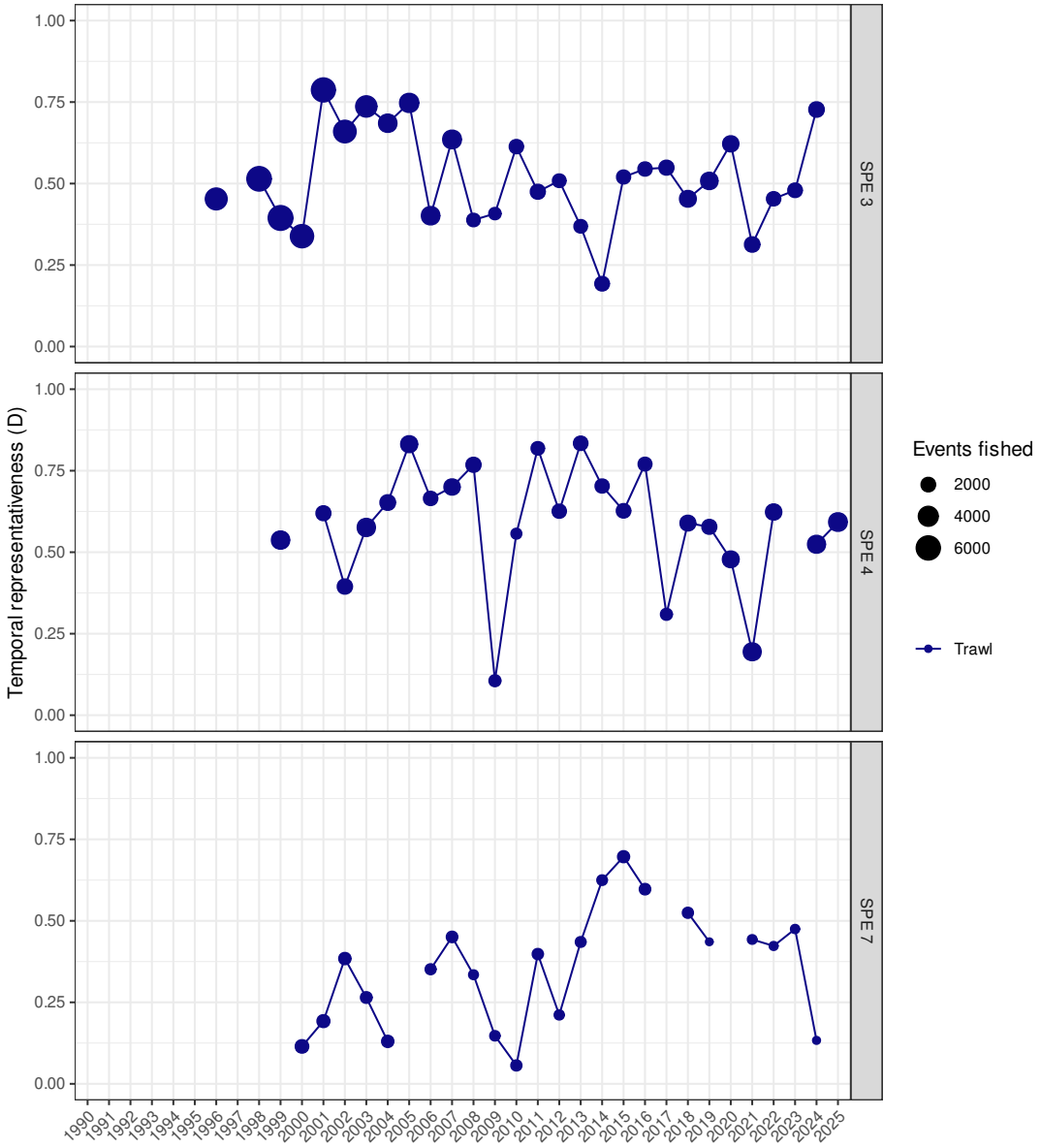


Figure 637: Temporal representativeness of observer sanpling of sea perch by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.9.1 SPE 3: Trawl fishery

2.9.1.1 Length-frequency samples

Table 54: Length-frequency samples of sea perch from the SPE 3 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of sea perch exceeded a potential sampling threshold of 10 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	2 331	0	0	0.00
1991	2 452	0	0	0.00
1992	3 187	0	0	0.00
1993	3 435	0	0	0.00
1994	3 088	0	0	0.00
1995	2 643	0	0	0.00
1996	2 900	1	2	0.03
1997	2 690	0	0	0.00
1998	3 517	16	122	0.45
1999	3 461	3	204	0.09
2000	3 554	2	3	0.06
2001	3 571	53	589	1.48
2002	3 205	32	244	1.00
2003	2 800	48	579	1.71
2004	1 559	31	292	1.99
2005	1 704	29	263	1.70
2006	1 688	23	206	1.36
2007	1 677	21	142	1.25
2008	1 217	11	91	0.90
2009	1 278	5	100	0.39
2010	1 716	35	551	2.04
2011	1 969	42	997	2.13
2012	1 523	13	477	0.85
2013	1 574	26	564	1.65
2014	1 811	11	203	0.61
2015	1 670	12	207	0.72
2016	1 628	5	95	0.31
2017	1 939	14	202	0.72
2018	2 642	5	86	0.19
2019	2 886	3	60	0.10
2020	2 423	19	400	0.78
2021	2 243	10	293	0.45
2022	1 896	4	60	0.21
2023	1 971	2	40	0.10
2024	2 268	7	120	0.31
2025	2 286	0	0	0.00

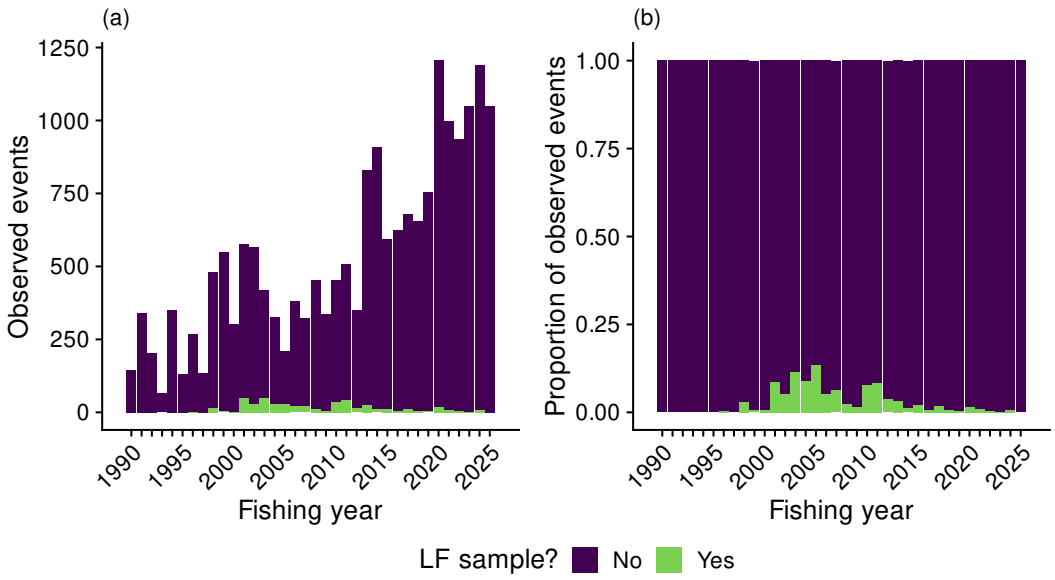


Figure 638: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SPE 3 where the sea perch catch exceeded the 10 kg threshold, with and without length-frequency sampling.**

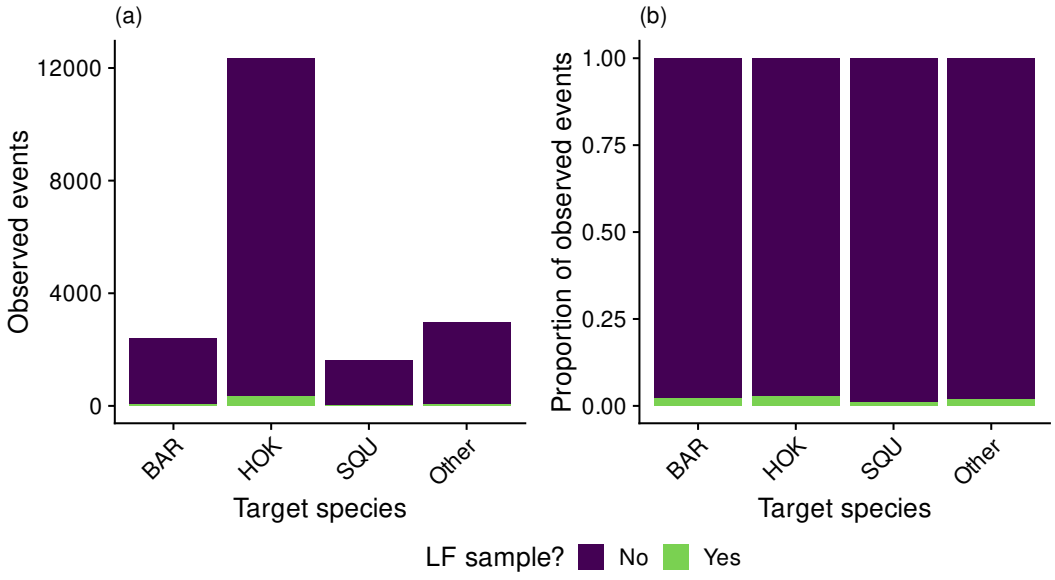


Figure 639: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SPE 3 where the sea perch catch exceeded the 10 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

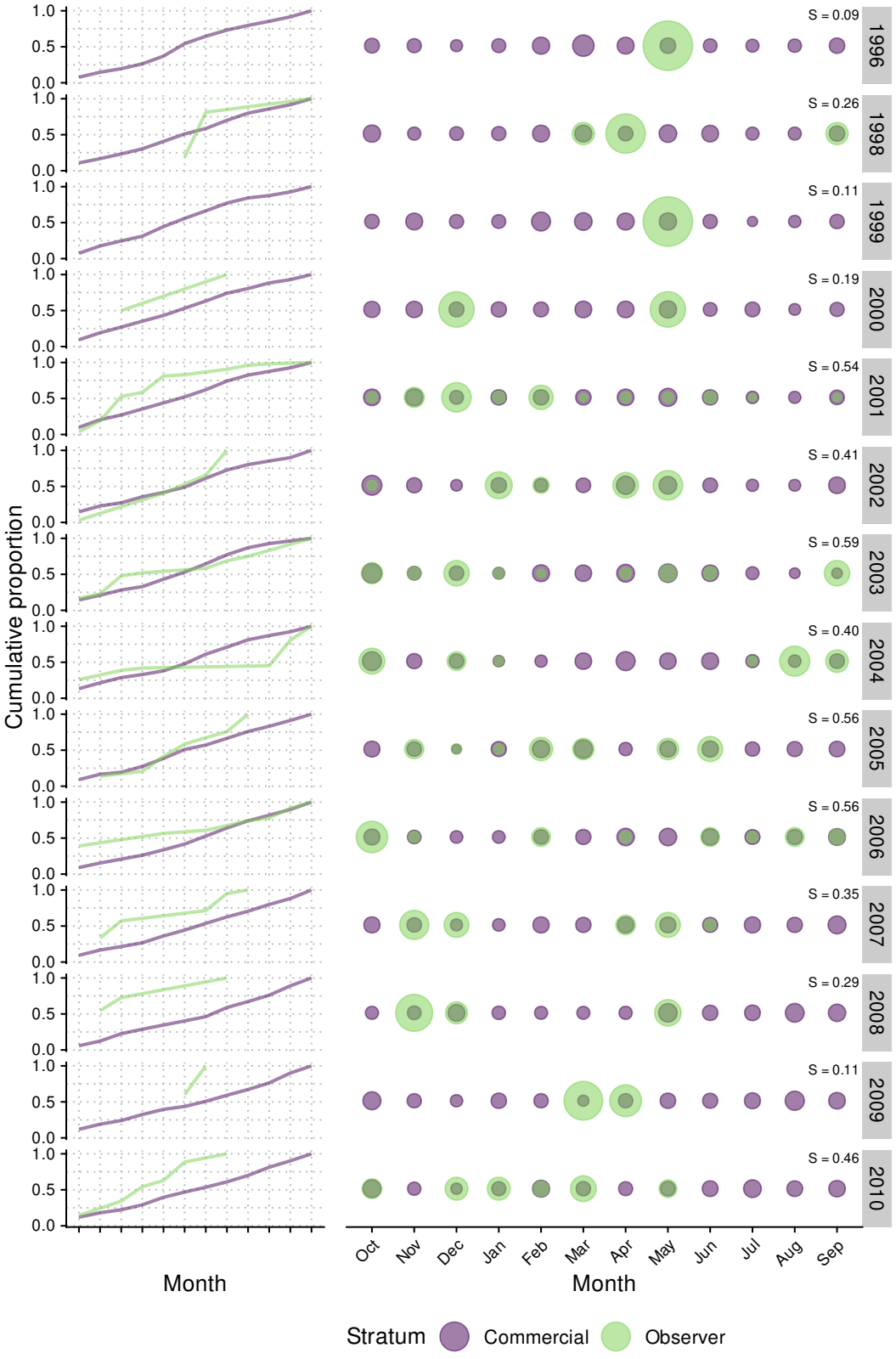


Figure 640: Monthly representativeness of observer sampling coverage of Trawl fishing events in SPE 3, where the sea perch catch exceeded the 10kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

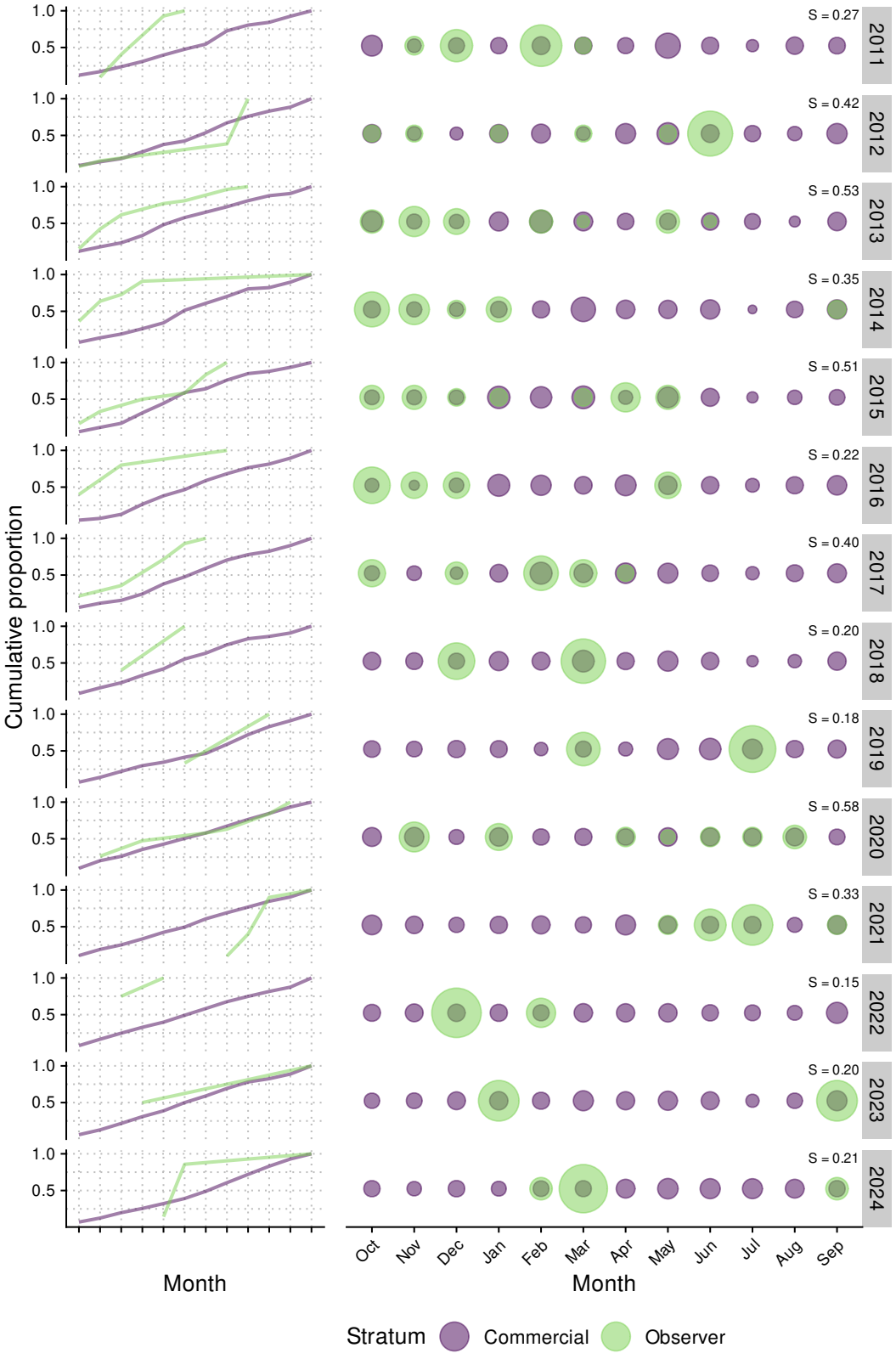


Figure 641: Monthly representativeness of observer sampling coverage of Trawl fishing events in SPE 3, where the sea perch catch exceeded the 10kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

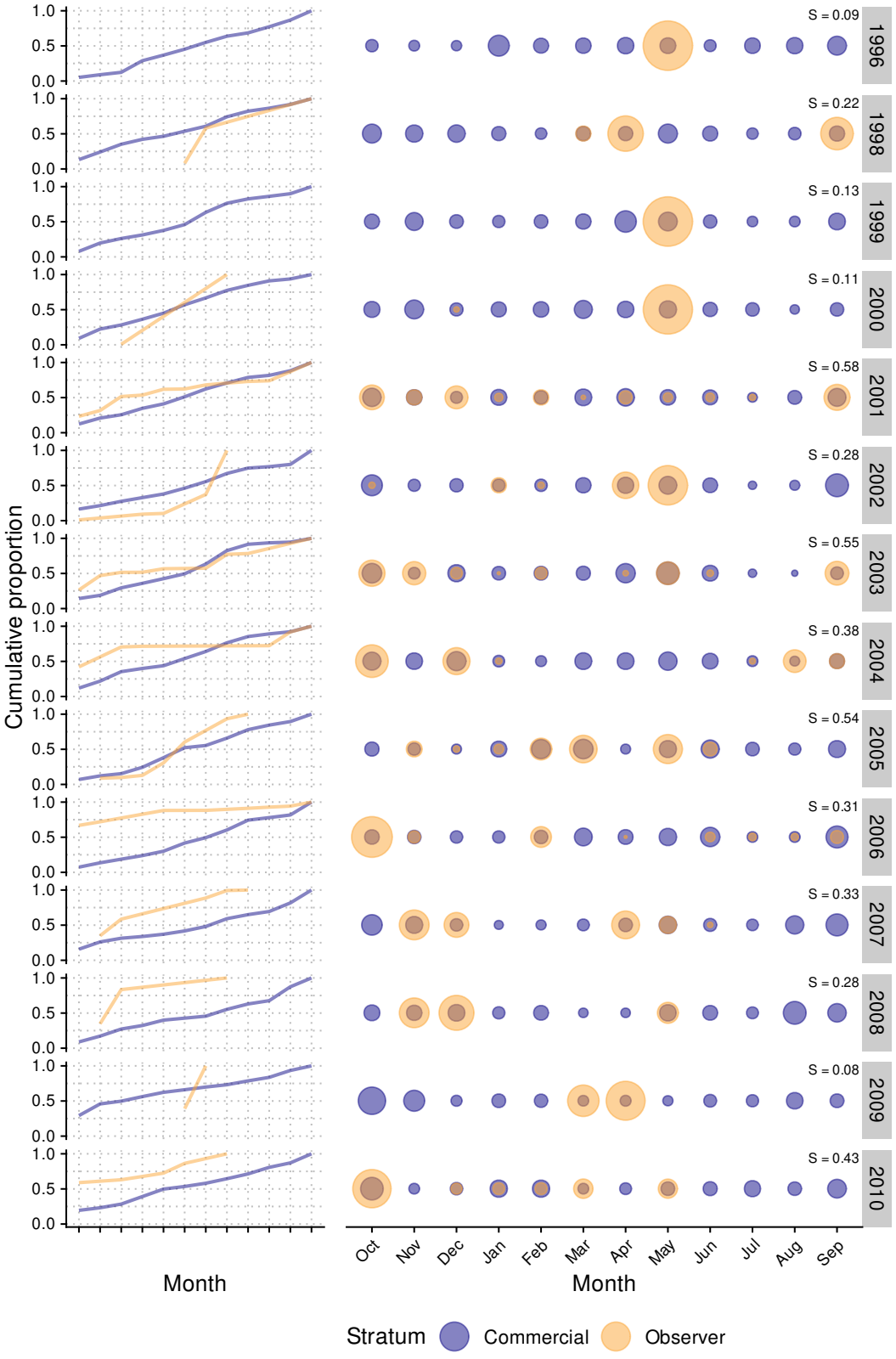


Figure 642: **Monthly representativeness of observer sampling coverage of Trawl catch in SPE 3, from events where the sea perch catch exceeded the 10kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

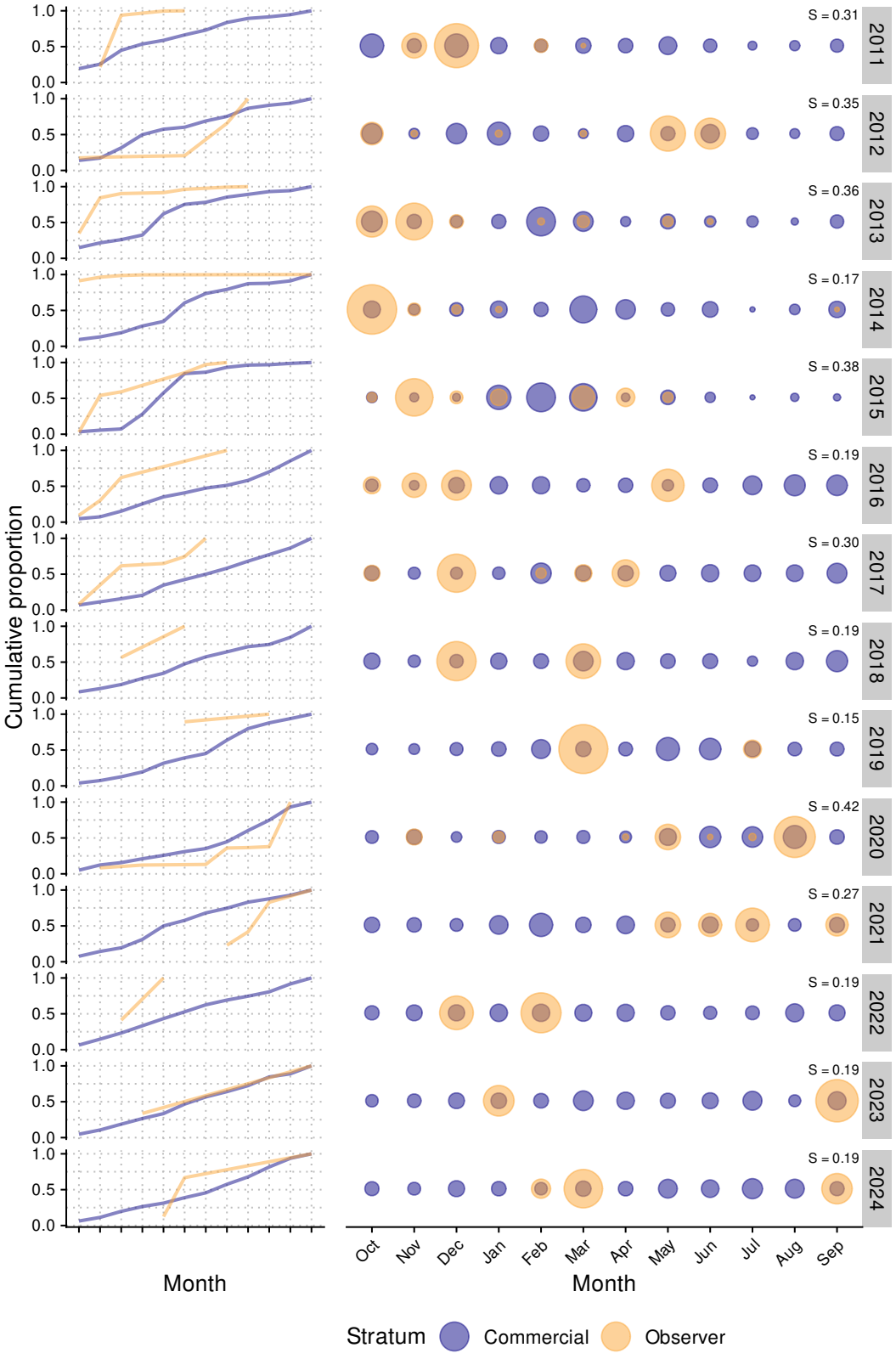


Figure 643: **Monthly representativeness of observer sampling coverage of Trawl catch in SPE 3, from events where the sea perch catch exceeded the 10kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

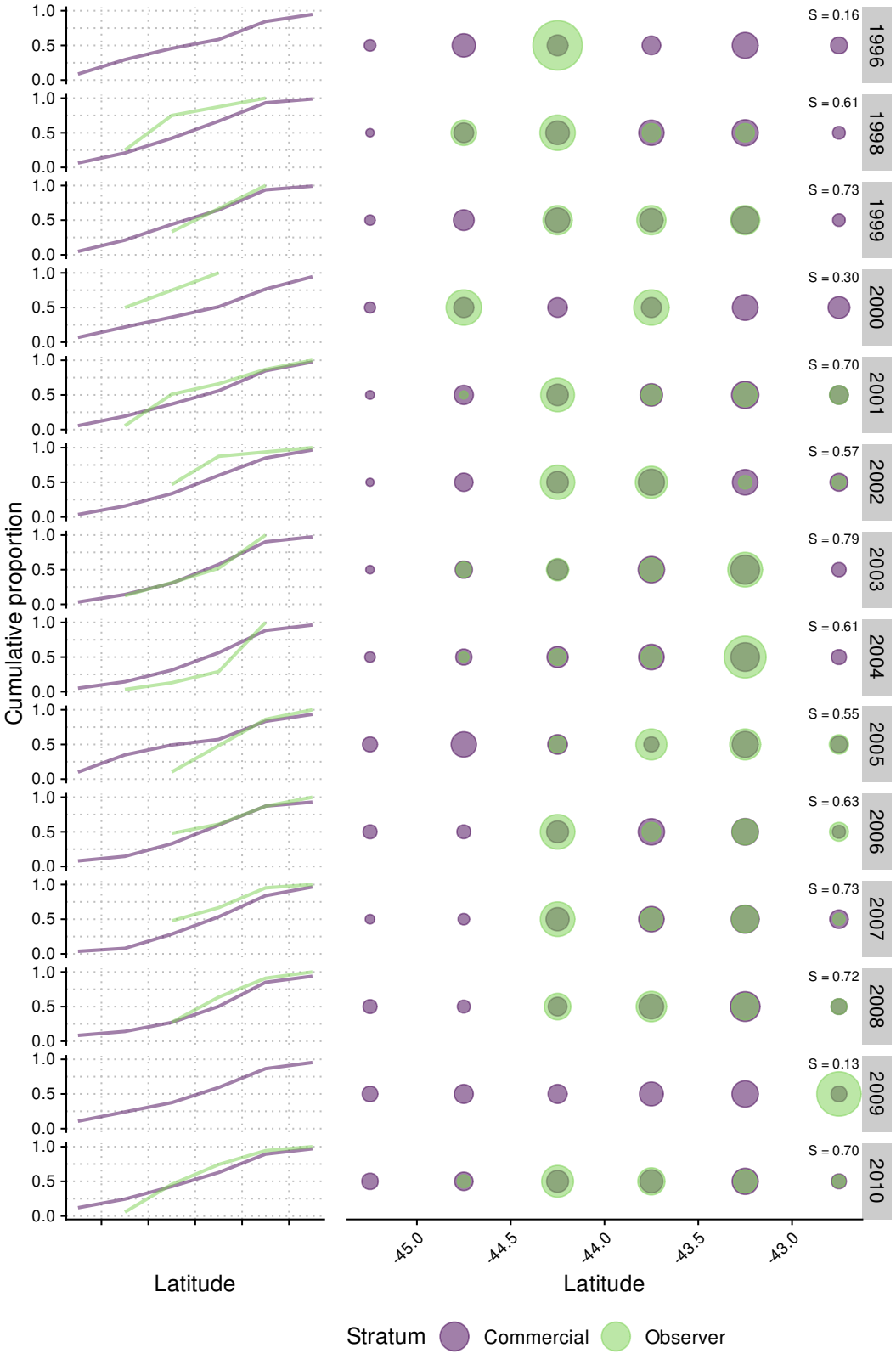


Figure 644: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 3, where the sea perch catch exceeded the 10kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

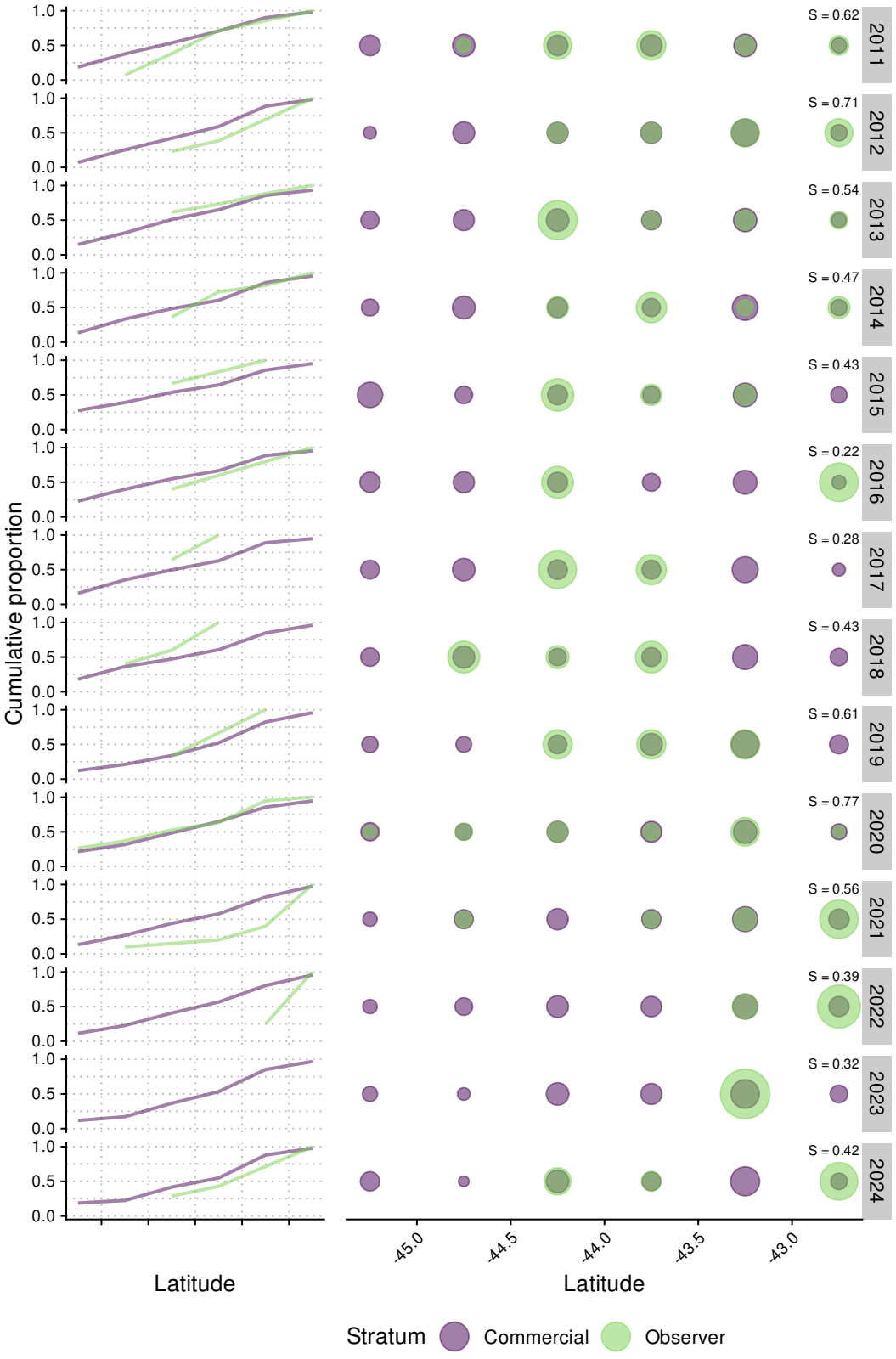


Figure 645: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 3, where the sea perch catch exceeded the 10kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

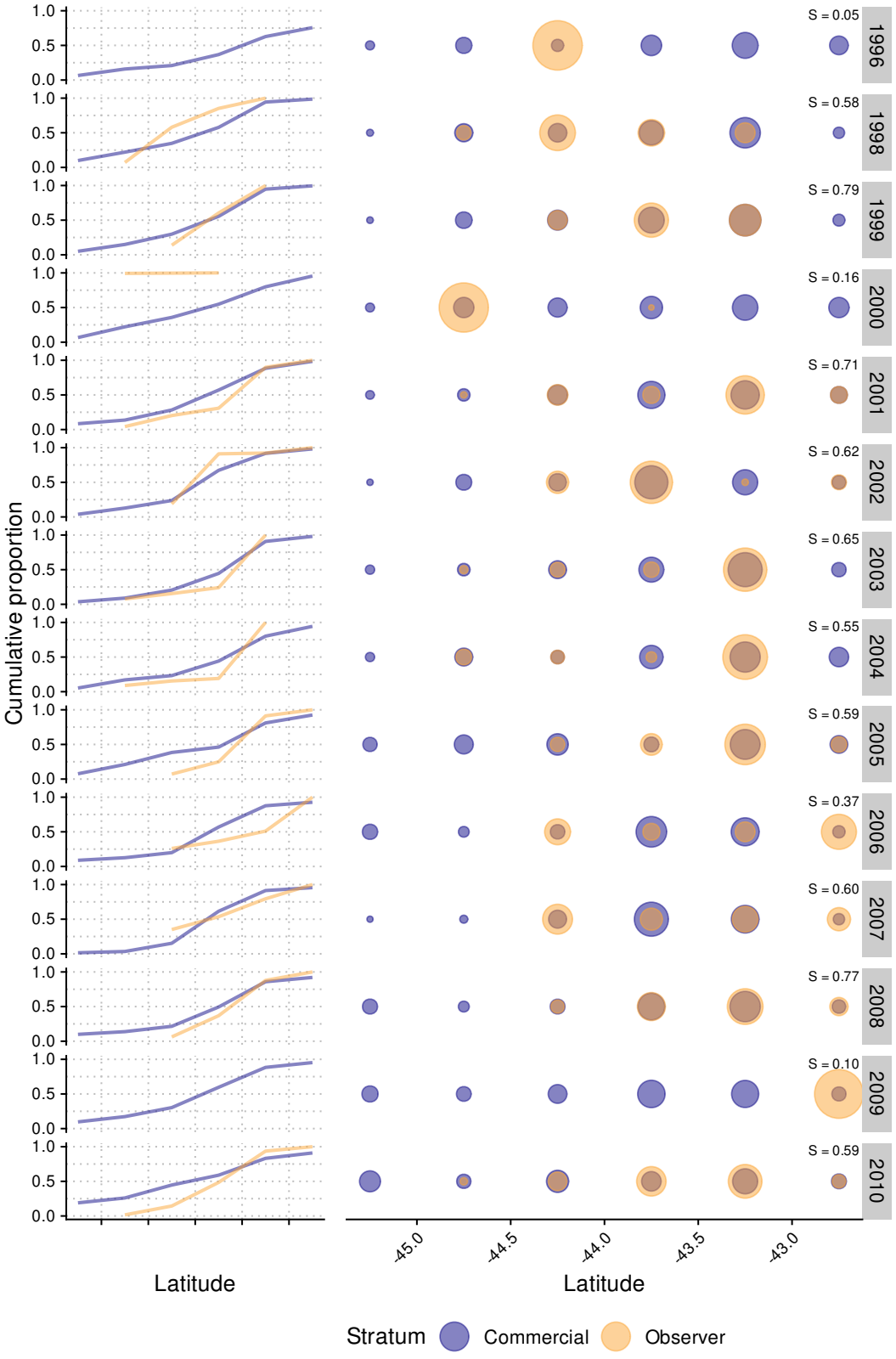


Figure 646: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SPE 3, from events where the sea perch catch exceeded the 10kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

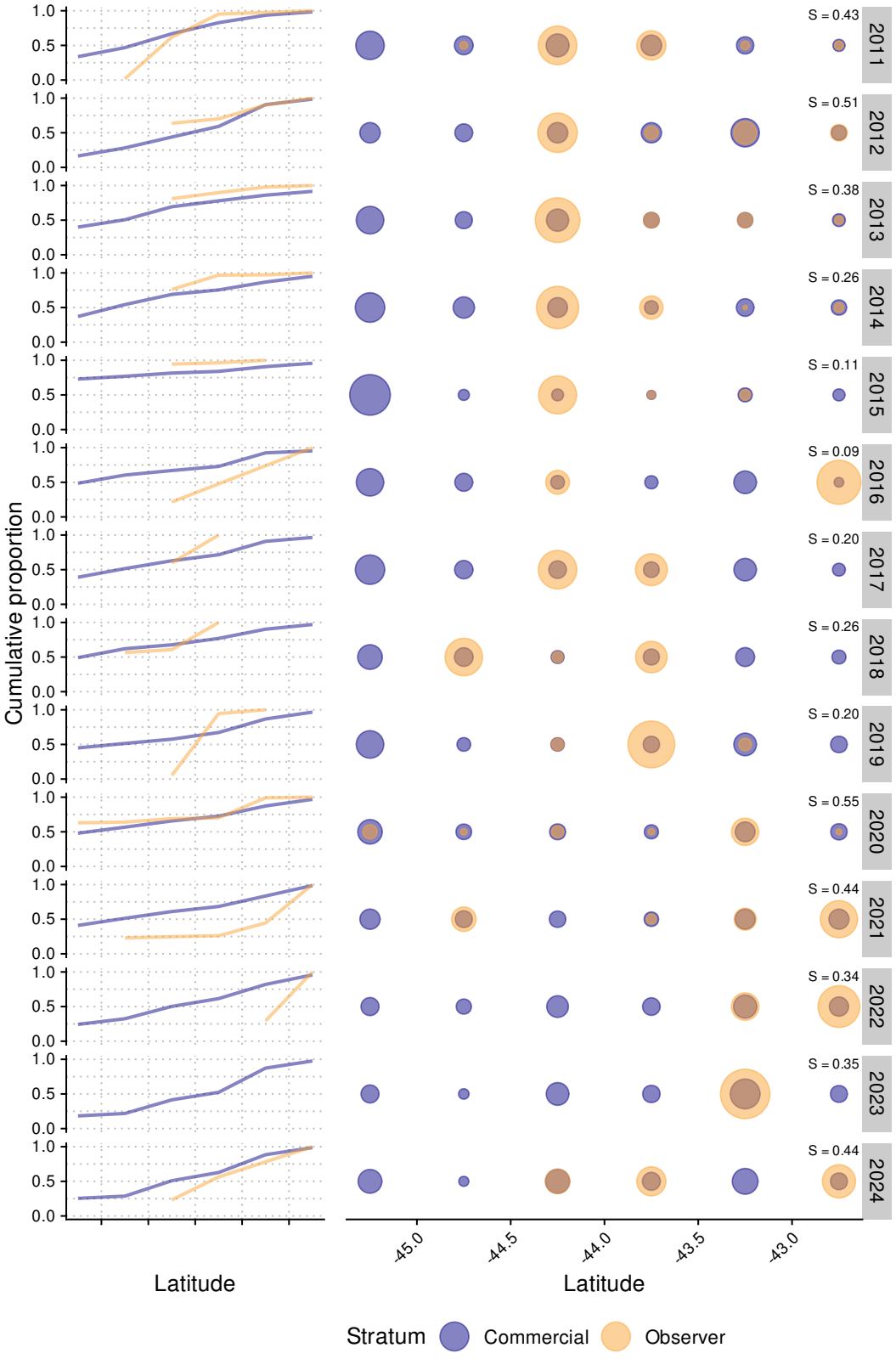


Figure 647: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SPE 3, from events where the sea perch catch exceeded the 10kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

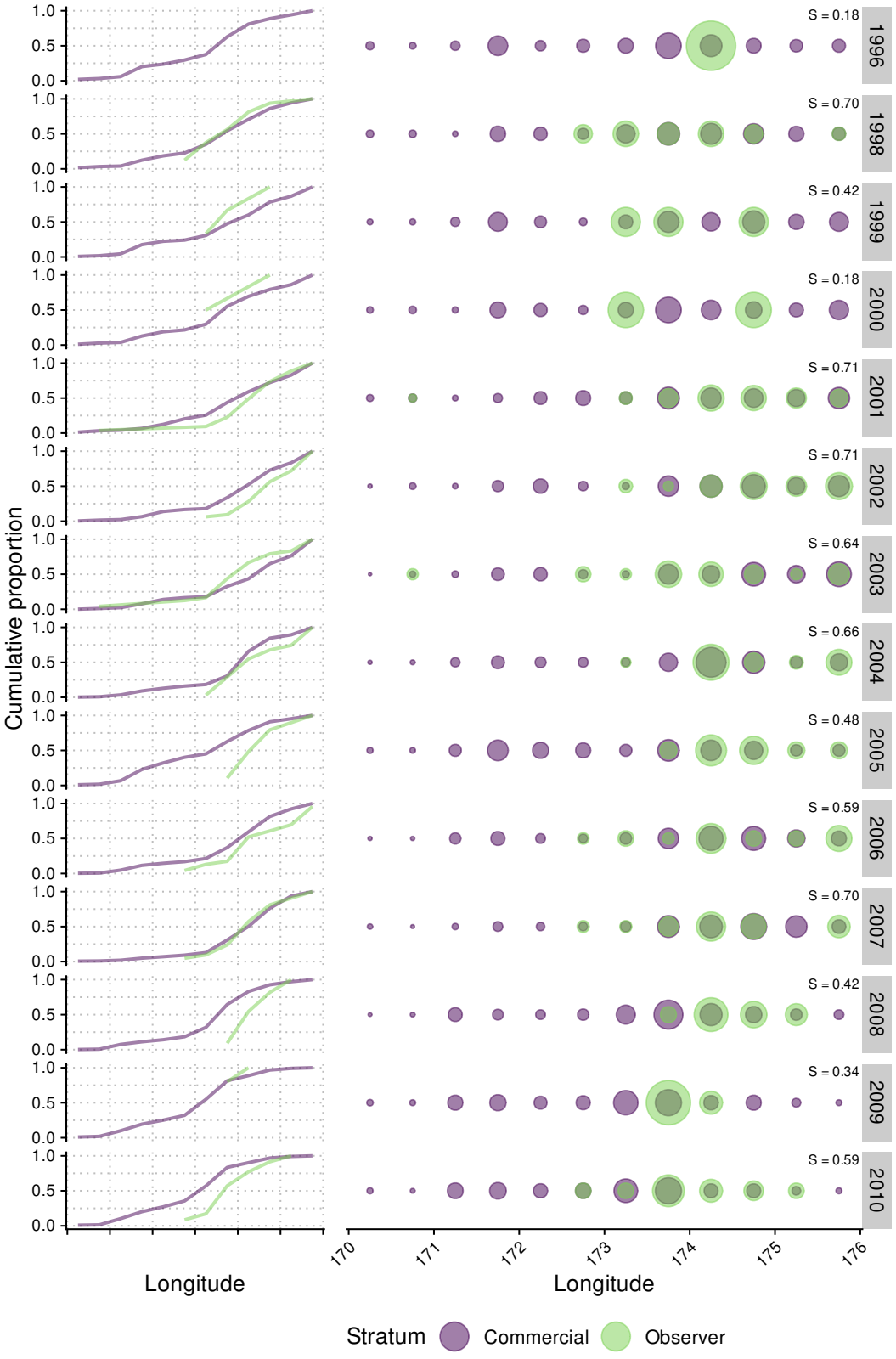


Figure 648: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 3, where the sea perch catch exceeded the 10kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

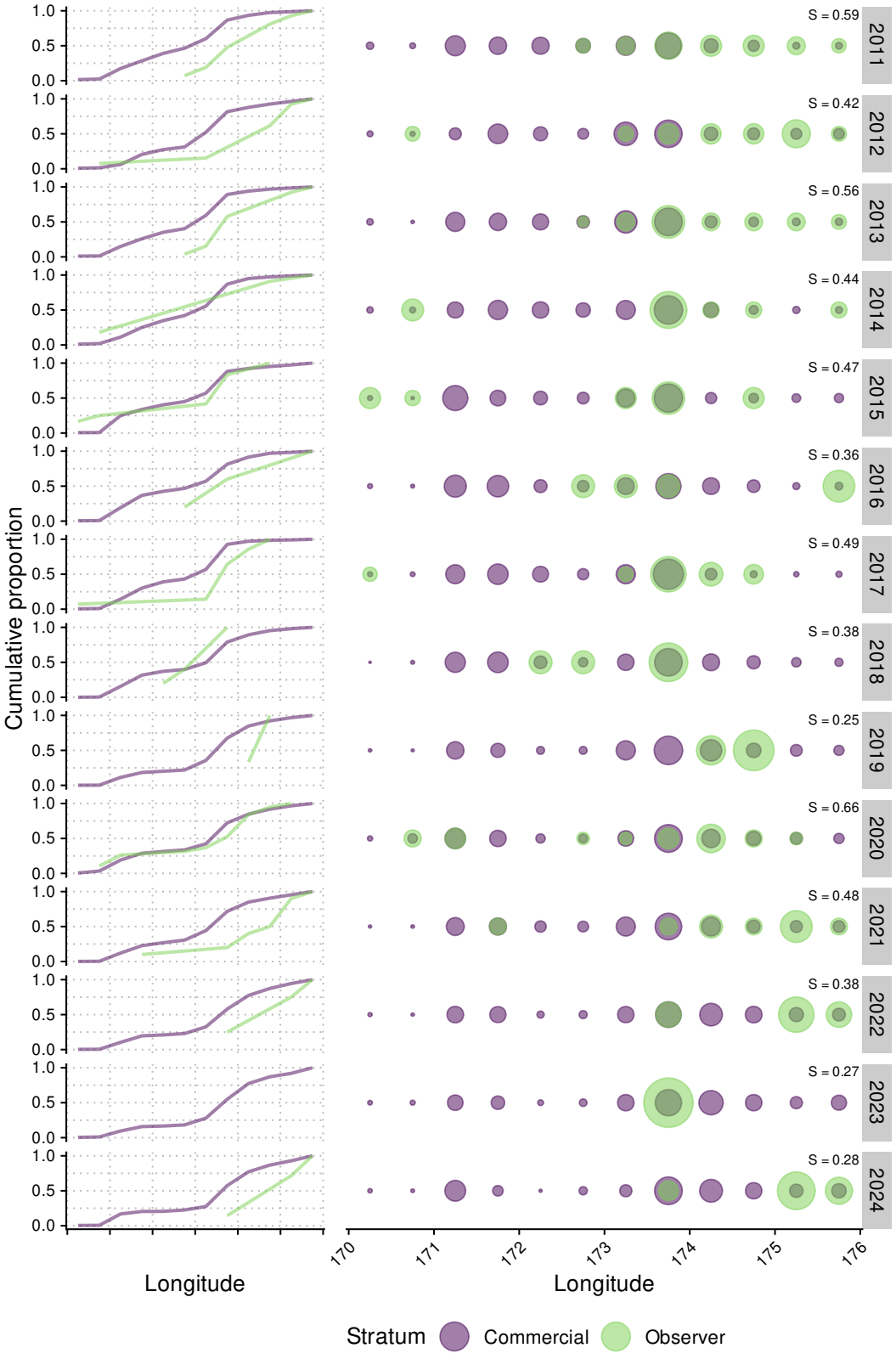


Figure 649: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 3, where the sea perch catch exceeded the 10kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

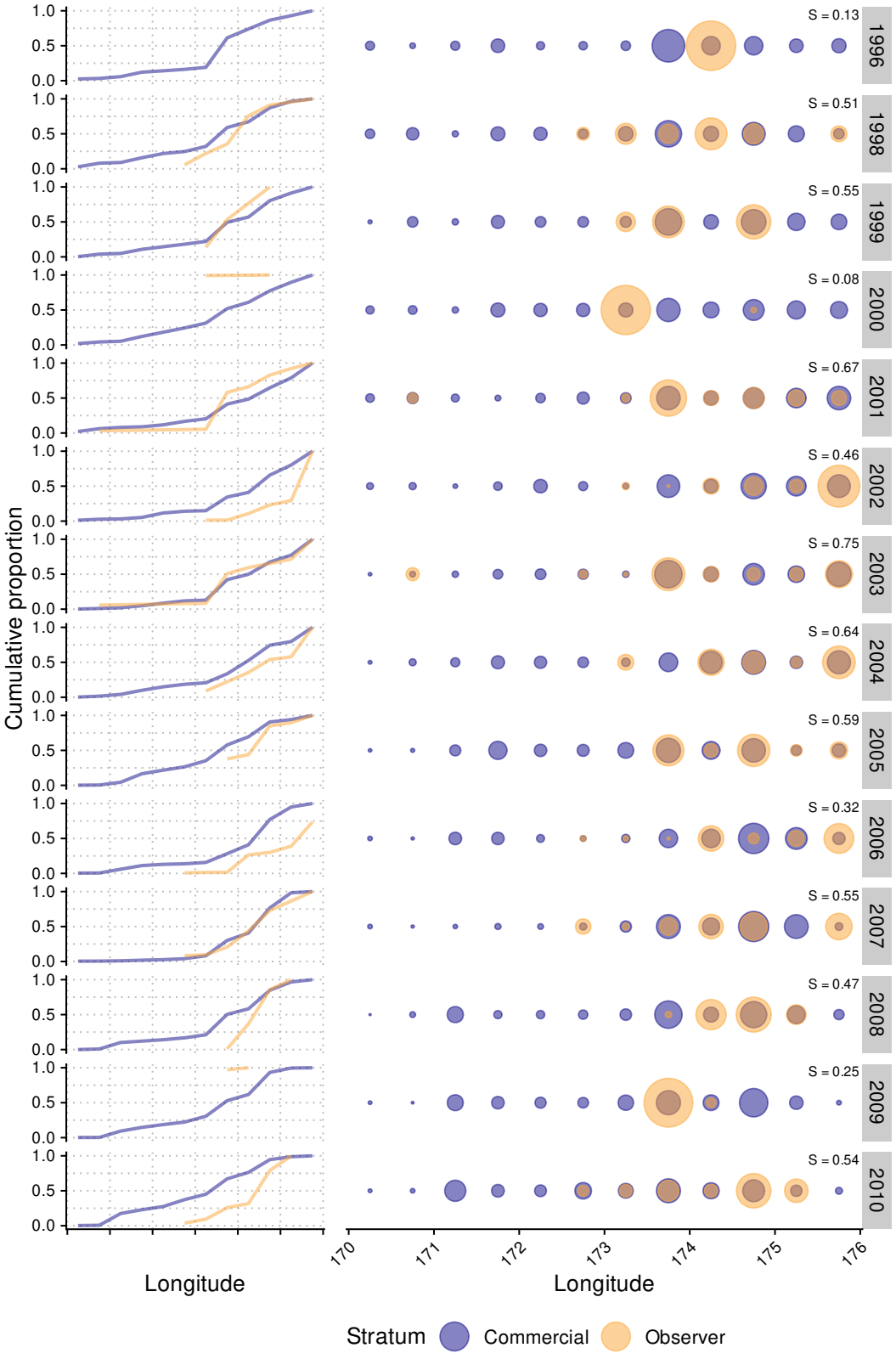


Figure 650: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SPE 3, from events where the sea perch catch exceeded the 10kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

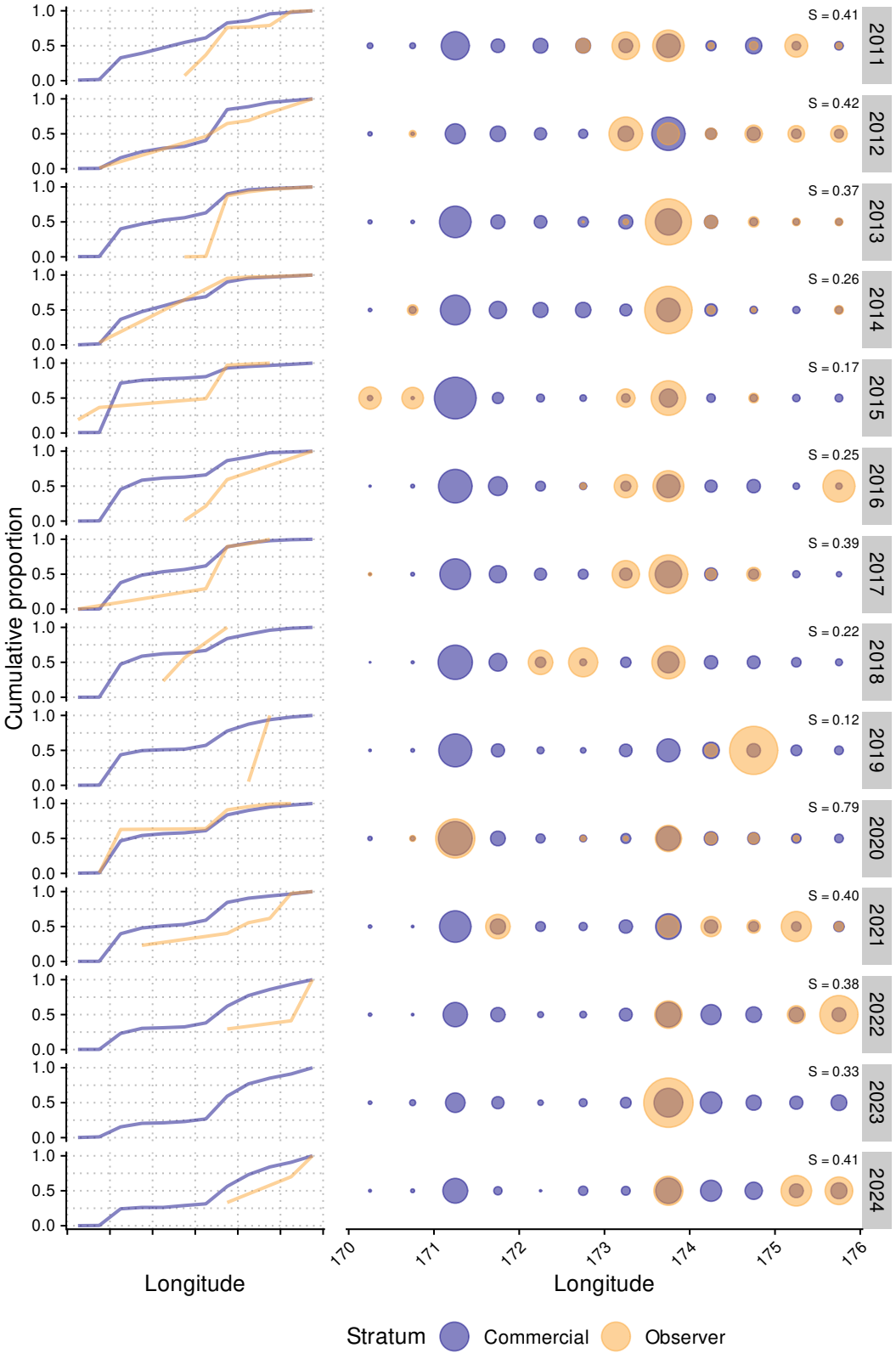


Figure 651: Longitudinal representativeness of observer sampling coverage of Trawl catch in SPE 3, from events where the sea perch catch exceeded the 10kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

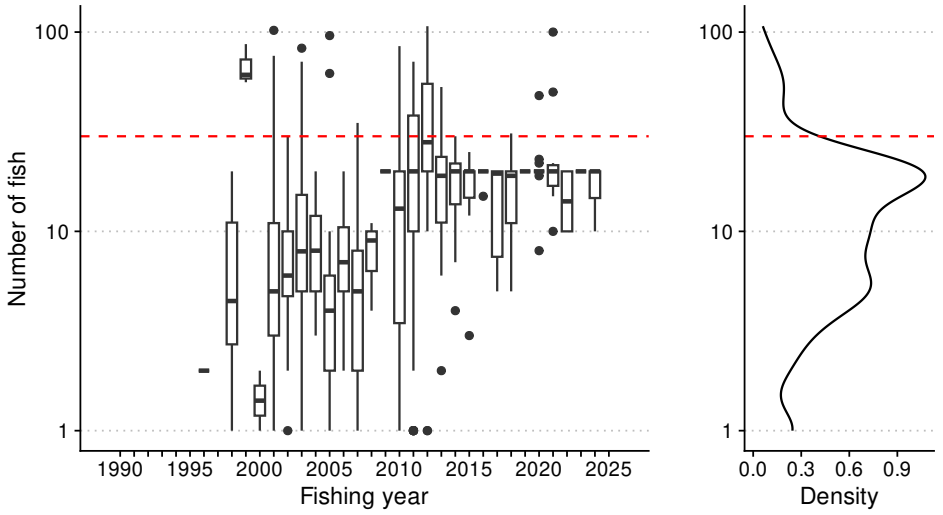


Figure 652: Length-frequency sample sizes for observed fishing events in SPE 3 where sea perch were sampled. The red dashed line indicates a sample size of 30 fish.

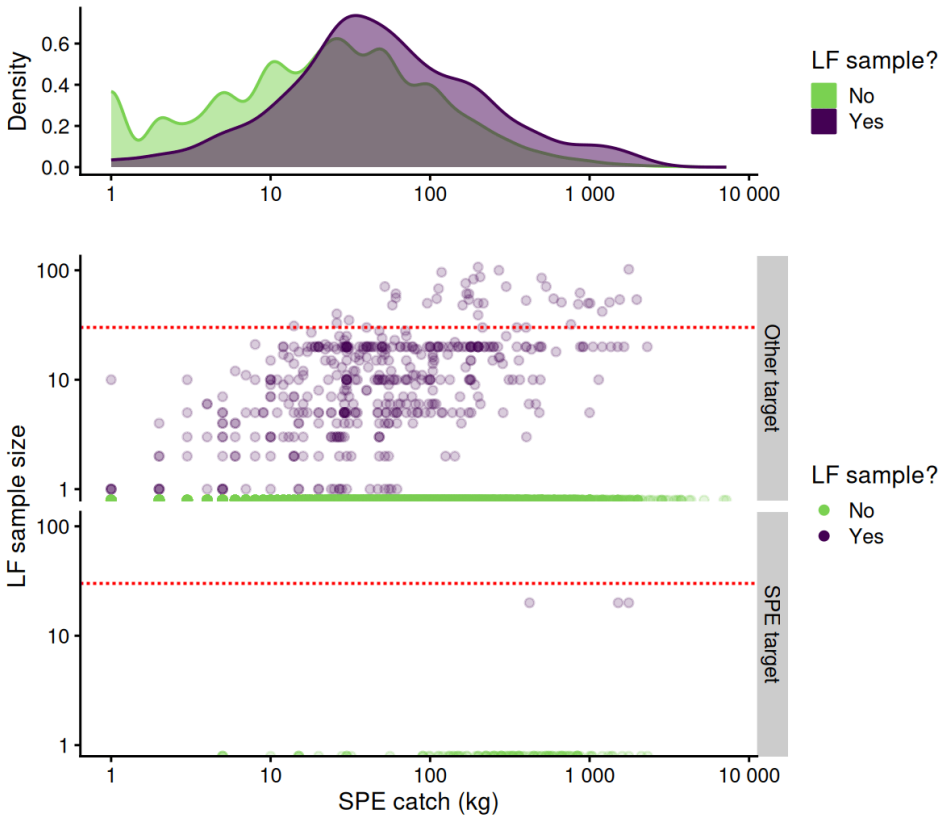


Figure 653: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SPE 3 in relation to the total sea perch catch from an event, separately for sea perch target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.9.1.2 Otolith samples

Table 55: Otolith samples of sea perch from the SPE 3 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of sea perch exceeded a potential sampling threshold of 10 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	2 331	0	0	0.00
1991	2 452	0	0	0.00
1992	3 187	0	0	0.00
1993	3 435	0	0	0.00
1994	3 088	0	0	0.00
1995	2 643	0	0	0.00
1996	2 900	0	0	0.00
1997	2 690	0	0	0.00
1998	3 517	0	0	0.00
1999	3 461	0	0	0.00
2000	3 554	0	0	0.00
2001	3 571	0	0	0.00
2002	3 205	0	0	0.00
2003	2 800	0	0	0.00
2004	1 559	0	0	0.00
2005	1 704	0	0	0.00
2006	1 688	0	0	0.00
2007	1 677	0	0	0.00
2008	1 217	0	0	0.00
2009	1 278	5	28	0.39
2010	1 716	25	105	1.46
2011	1 969	20	159	1.02
2012	1 523	10	84	0.66
2013	1 574	19	95	1.21
2014	1 811	6	24	0.33
2015	1 670	1	5	0.06
2016	1 628	1	5	0.06
2017	1 939	10	47	0.52
2018	2 642	4	21	0.15
2019	2 886	2	9	0.07
2020	2 423	16	86	0.66
2021	2 243	8	40	0.36
2022	1 896	4	28	0.21
2023	1 971	2	10	0.10
2024	2 268	7	35	0.31
2025	2 286	0	0	0.00

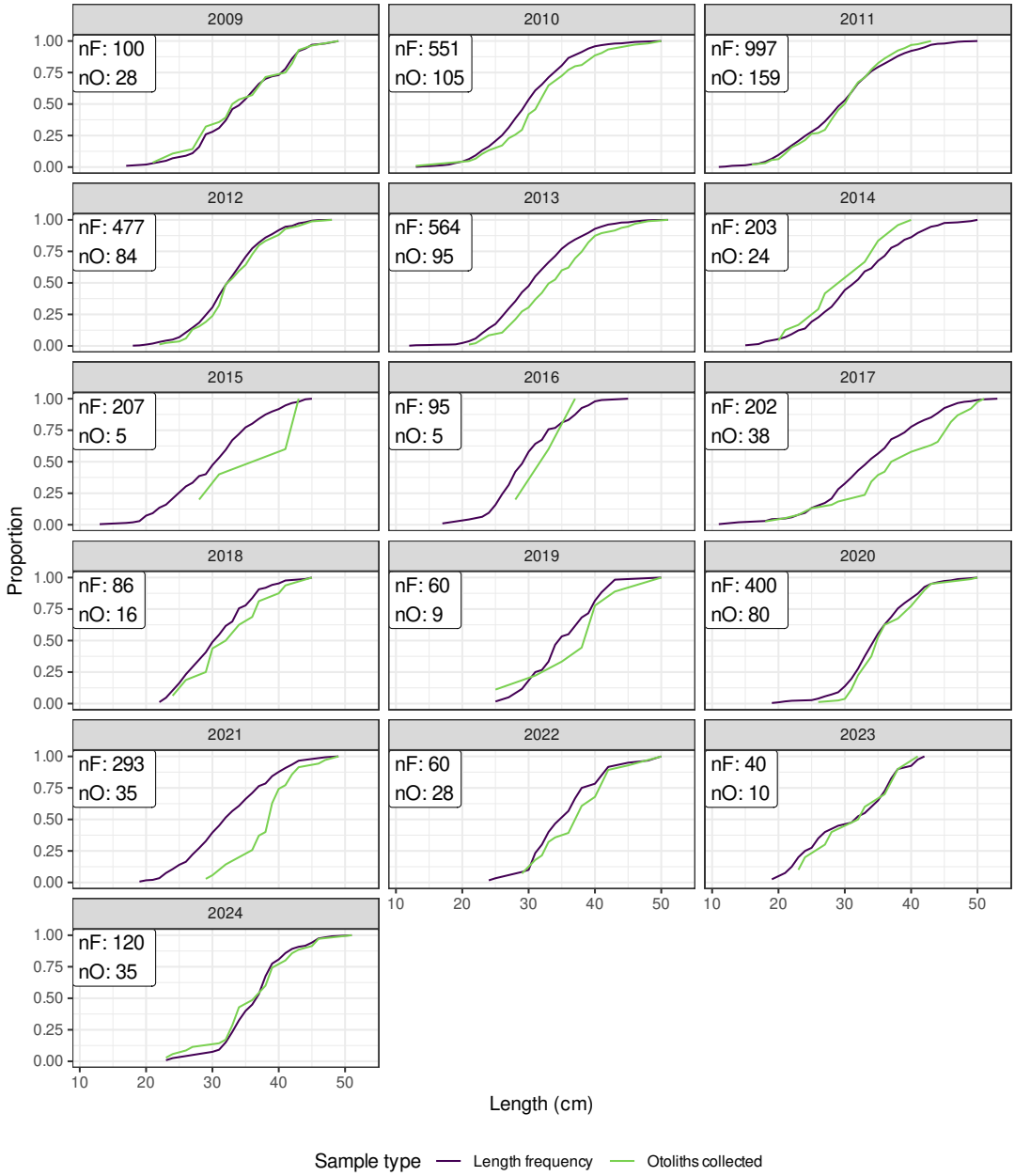


Figure 654: Cumulative distributions of the length of fish in the length frequency and otolith samples of sea perch in the SPE 3 Trawl fishery for the 2009 to 2024 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.9.1.3 Catch quantification

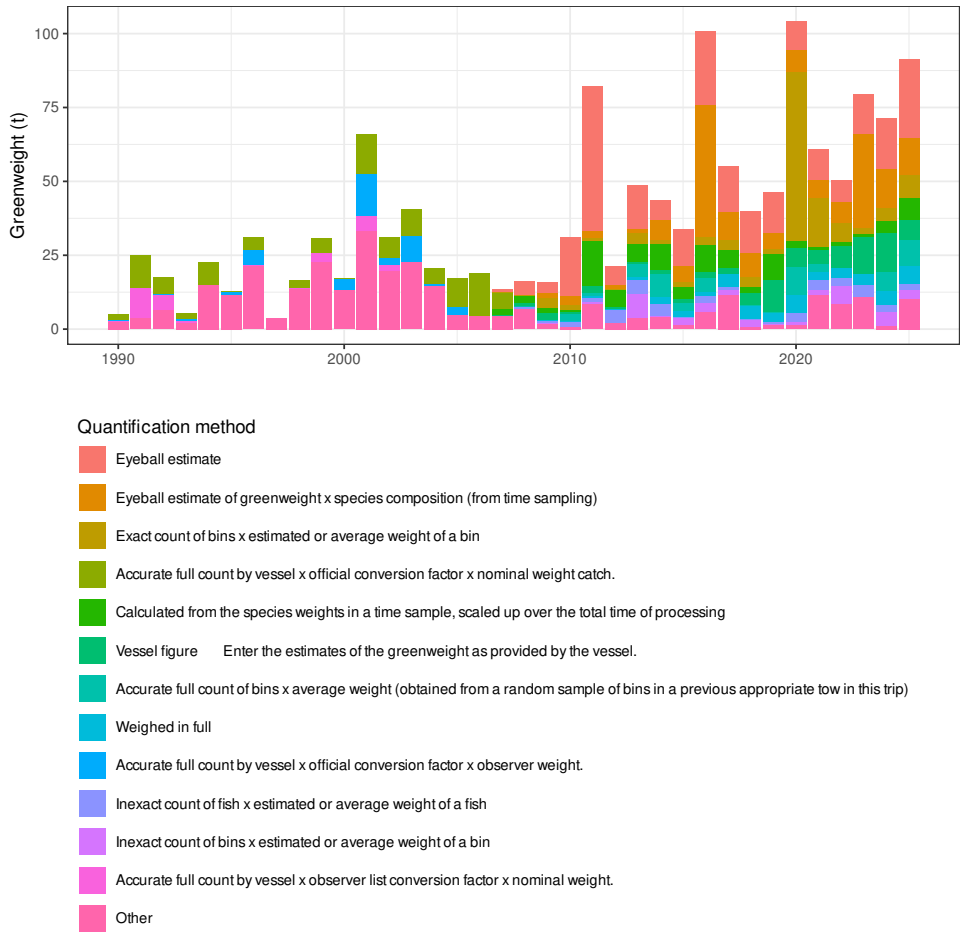


Figure 655: Methods used by observers to quantify the catch of sea perch in the SPE 3 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.9.2 SPE 4: Trawl fishery

2.9.2.1 Length-frequency samples

Table 56: Length-frequency samples of sea perch from the SPE 4 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of sea perch exceeded a potential sampling threshold of 10 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	94	0	0	0.00
1991	165	0	0	0.00
1992	730	0	0	0.00
1993	673	0	0	0.00
1994	428	0	0	0.00
1995	1 169	0	0	0.00
1996	775	0	0	0.00
1997	859	0	0	0.00
1998	1 413	0	0	0.00
1999	2 296	2	147	0.09
2000	1 919	0	0	0.00
2001	1 811	36	314	1.99
2002	1 885	14	172	0.74
2003	3 239	40	714	1.23
2004	2 276	54	724	2.37
2005	2 767	67	871	2.42
2006	1 809	40	606	2.21
2007	2 292	57	566	2.49
2008	1 960	30	433	1.53
2009	1 296	10	125	0.77
2010	1 045	17	280	1.63
2011	1 667	104	3 859	6.24
2012	1 892	116	4 443	6.13
2013	1 947	58	1 437	2.98
2014	1 884	14	318	0.74
2015	1 976	13	248	0.66
2016	1 649	8	167	0.49
2017	1 118	10	246	0.89
2018	2 402	45	898	1.87
2019	2 062	8	160	0.39
2020	2 668	15	290	0.56
2021	3 054	12	240	0.39
2022	2 550	9	148	0.35
2023	2 816	0	0	0.00
2024	3 173	8	121	0.25
2025	3 387	11	221	0.32

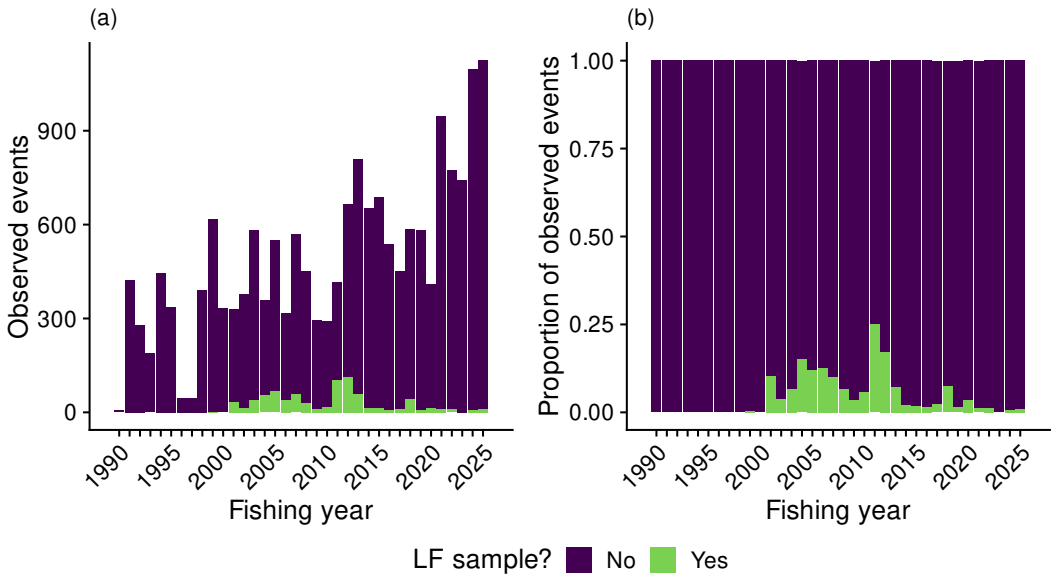


Figure 656: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SPE 4 where the sea perch catch exceeded the 10 kg threshold, with and without length-frequency sampling.**

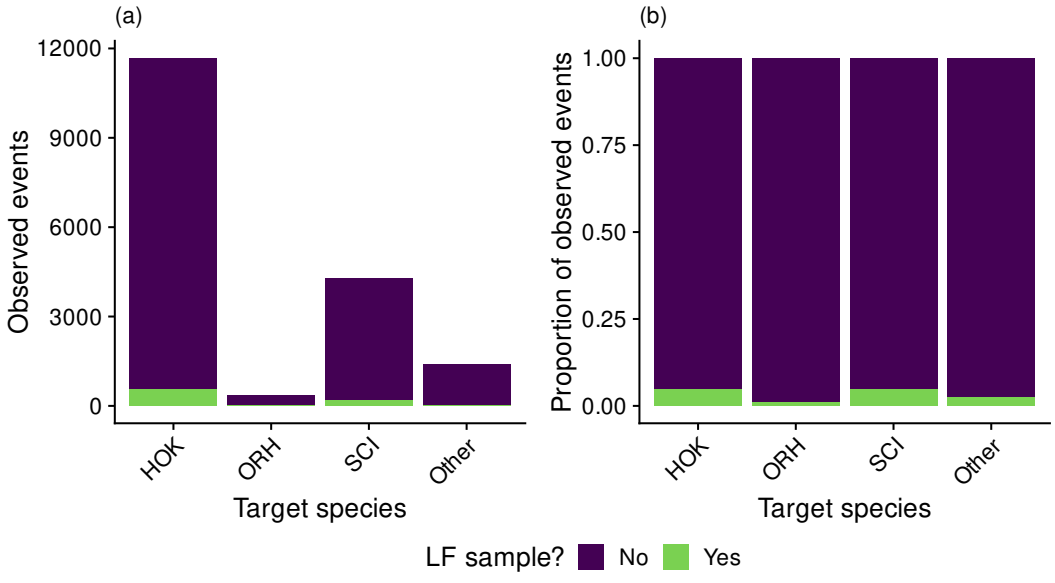


Figure 657: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SPE 4 where the sea perch catch exceeded the 10 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

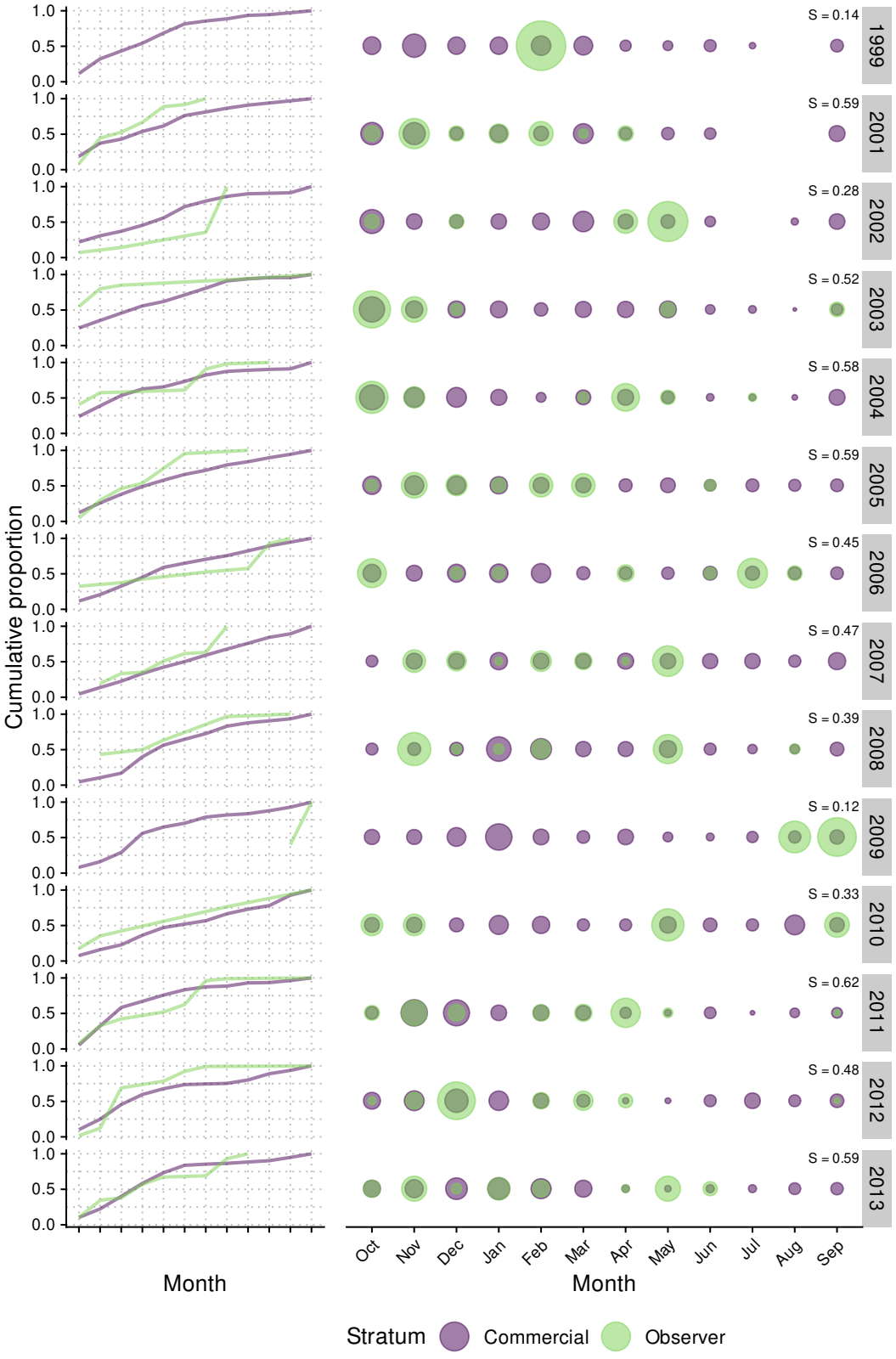


Figure 658: Monthly representativeness of observer sampling coverage of Trawl fishing events in SPE 4, where the sea perch catch exceeded the 10kg threshold, in 1999 to 2013. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

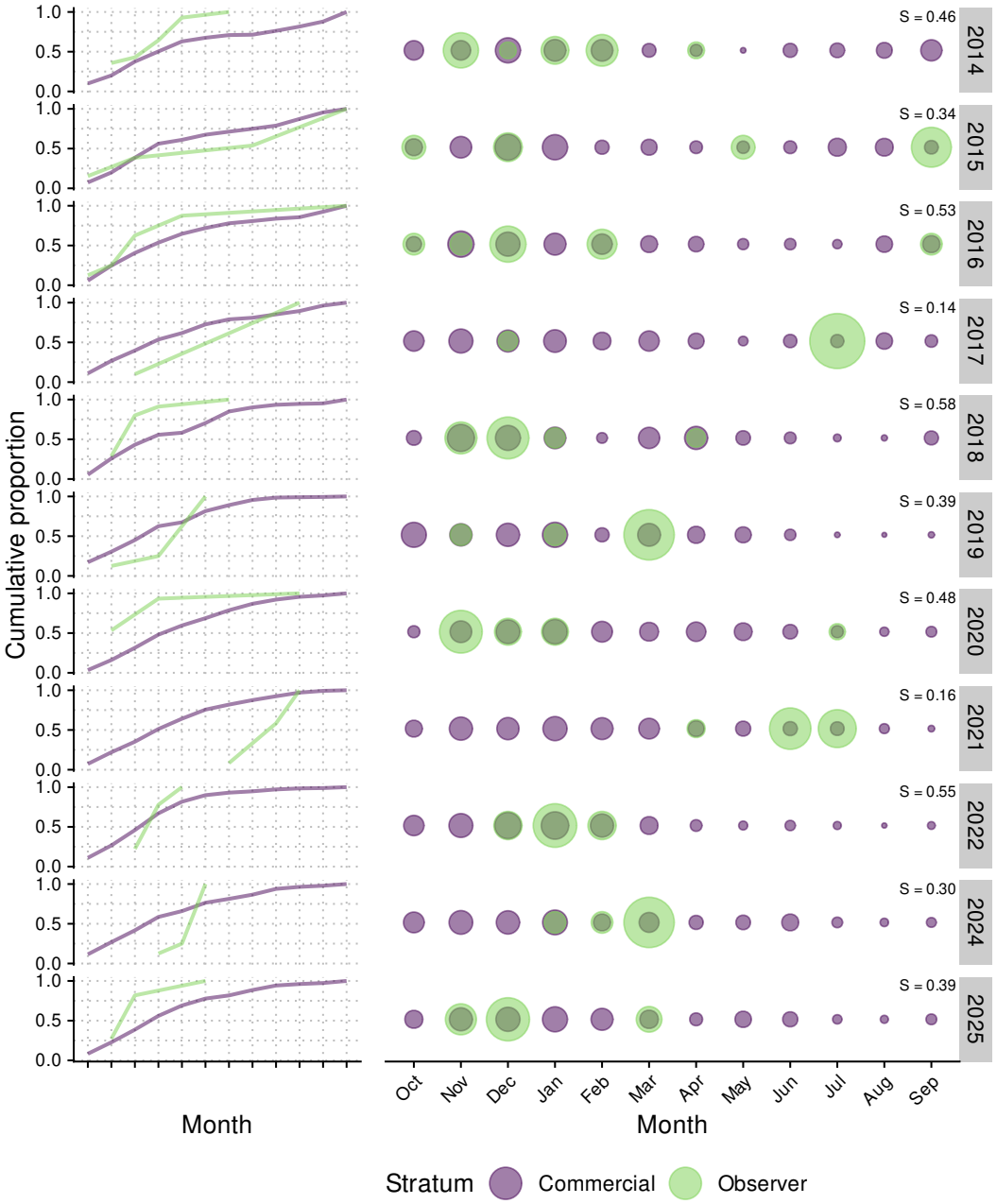


Figure 659: Monthly representativeness of observer sampling coverage of Trawl fishing events in SPE 4, where the sea perch catch exceeded the 10kg threshold, in 2014 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

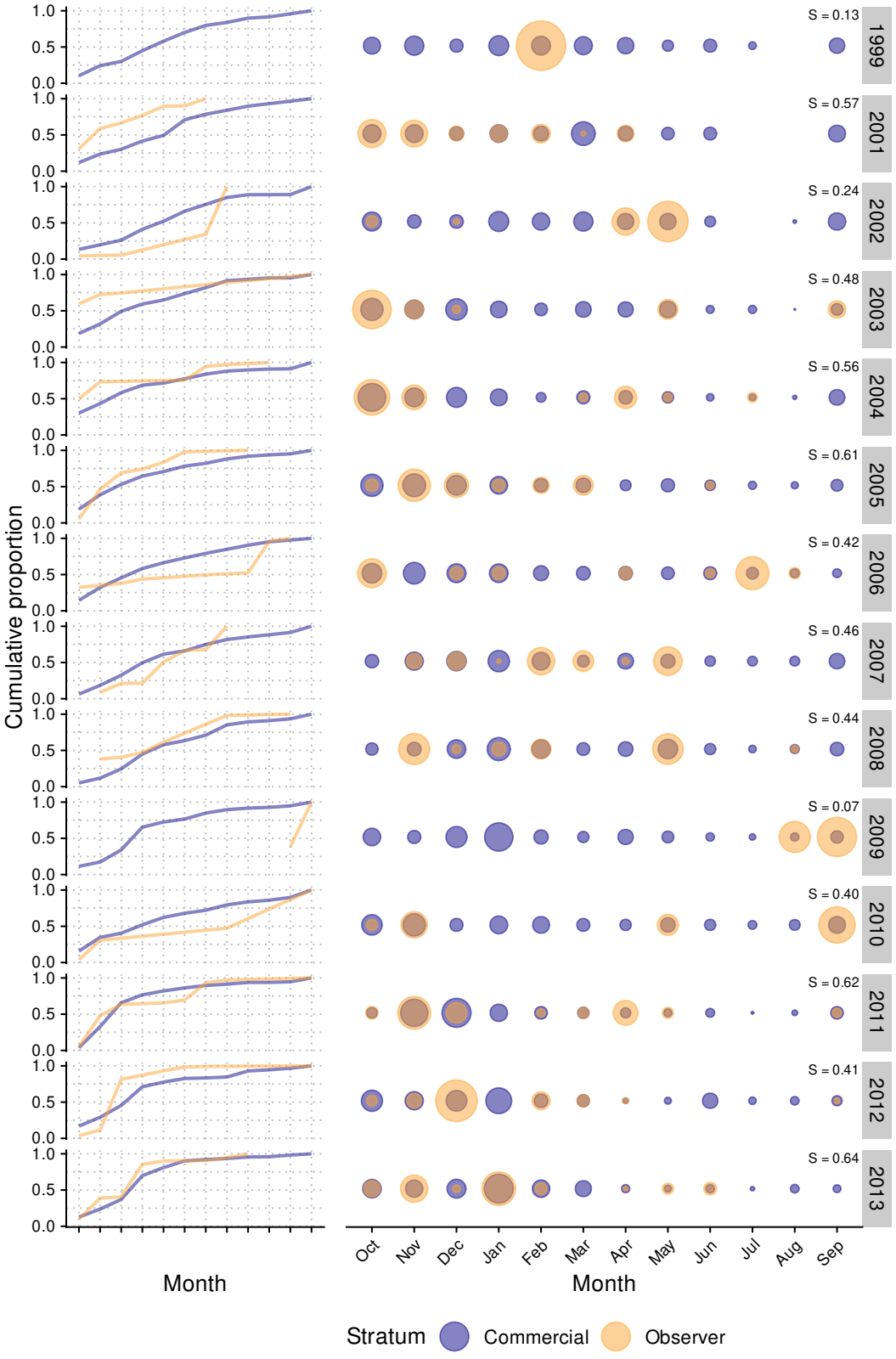


Figure 660: **Monthly representativeness of observer sampling coverage of Trawl catch in SPE 4, from events where the sea perch catch exceeded the 10kg threshold, in 1999 to 2013. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

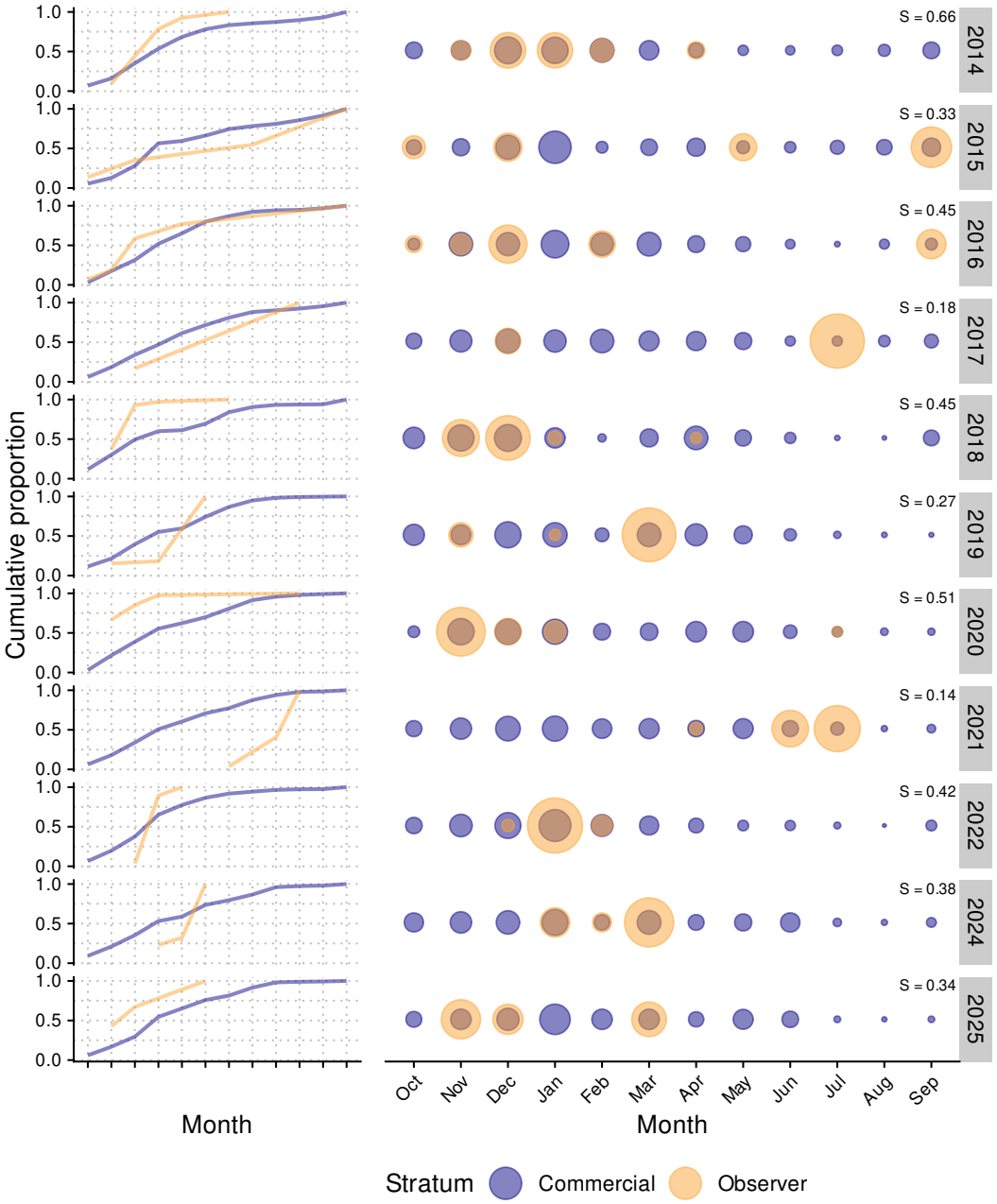


Figure 661: **Monthly representativeness of observer sampling coverage of Trawl catch in SPE 4, from events where the sea perch catch exceeded the 10kg threshold, in 2014 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

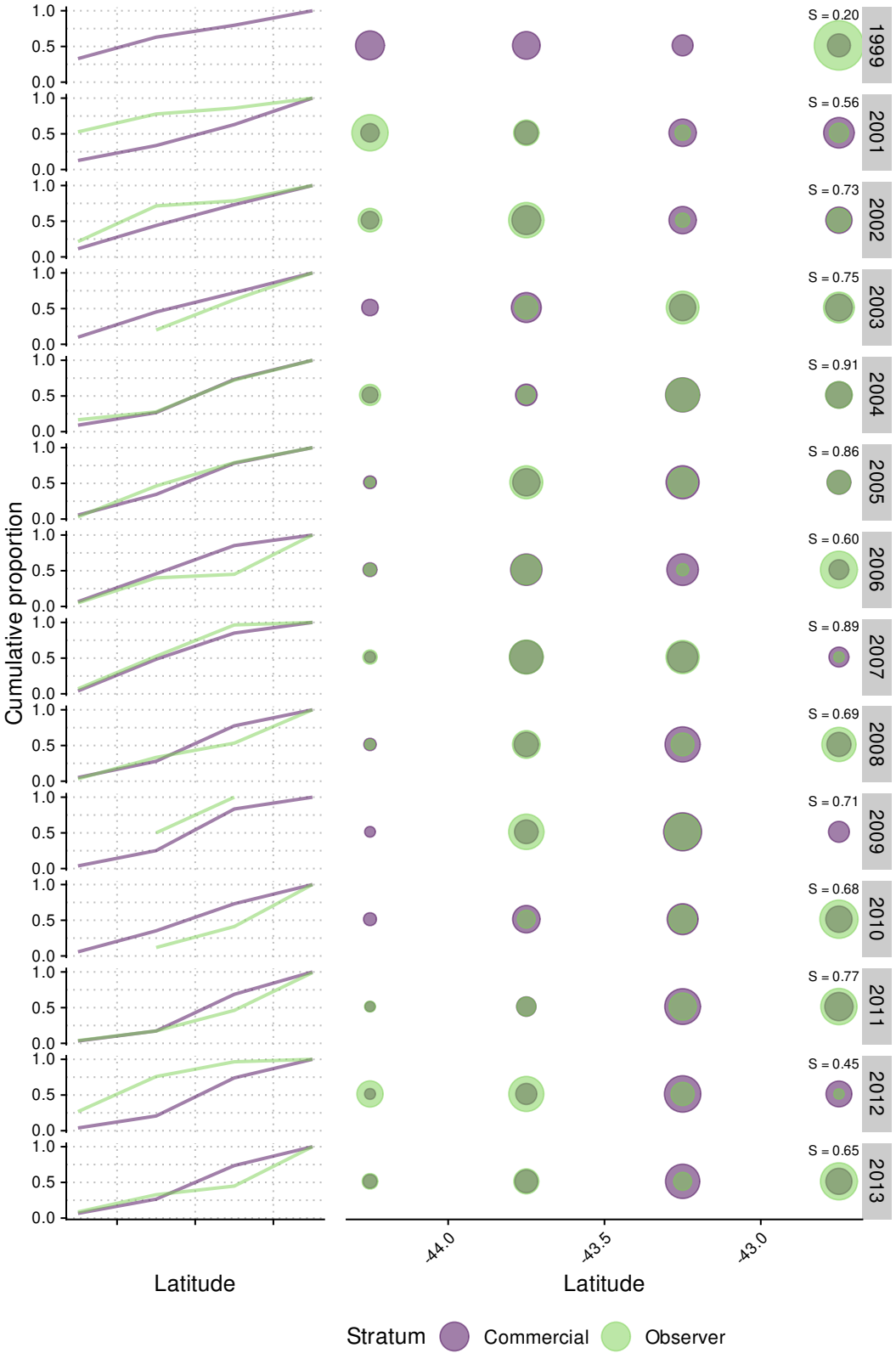


Figure 662: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 4, where the sea perch catch exceeded the 10kg threshold, in 1999 to 2013. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

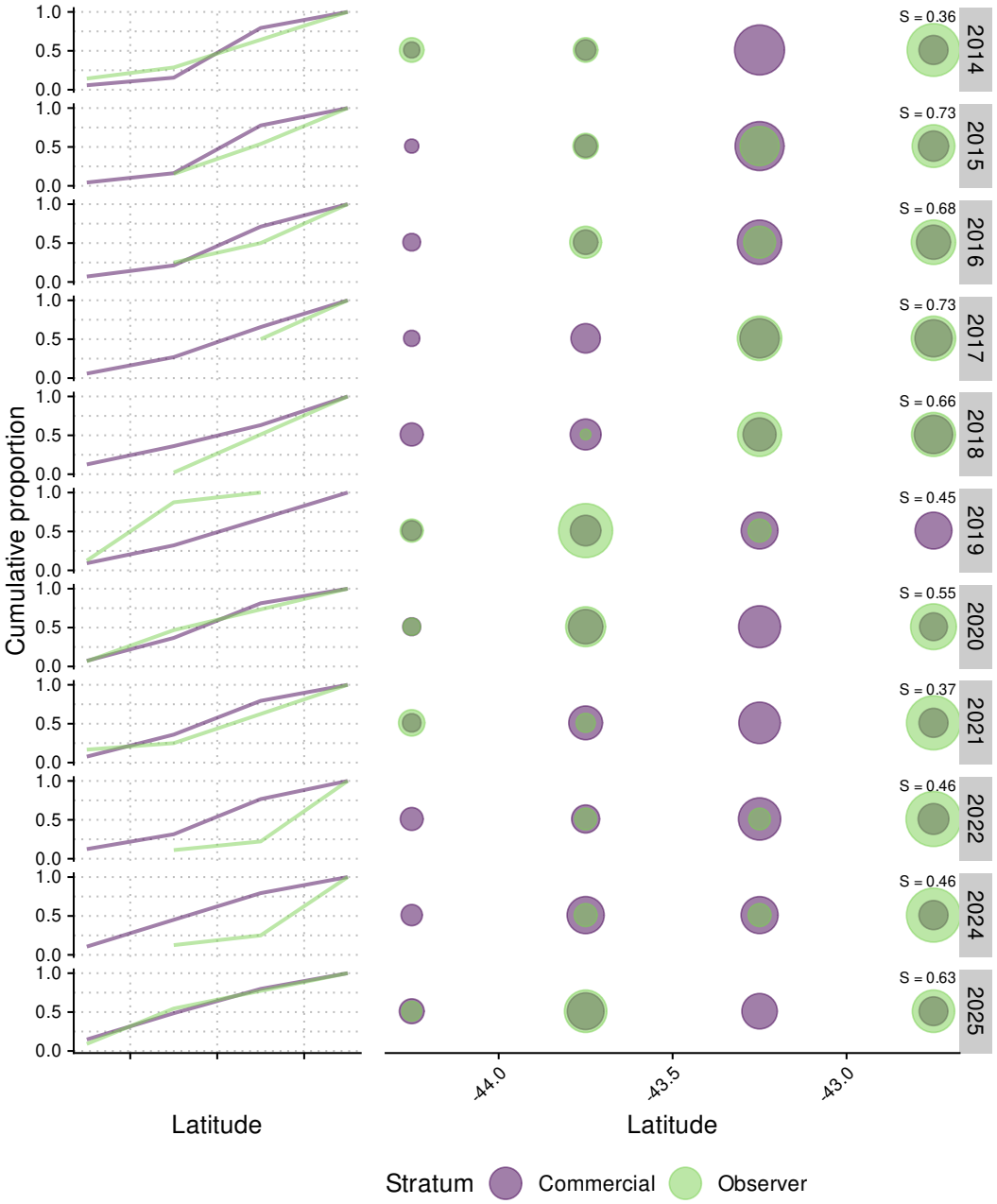


Figure 663: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 4, where the sea perch catch exceeded the 10kg threshold, in 2014 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

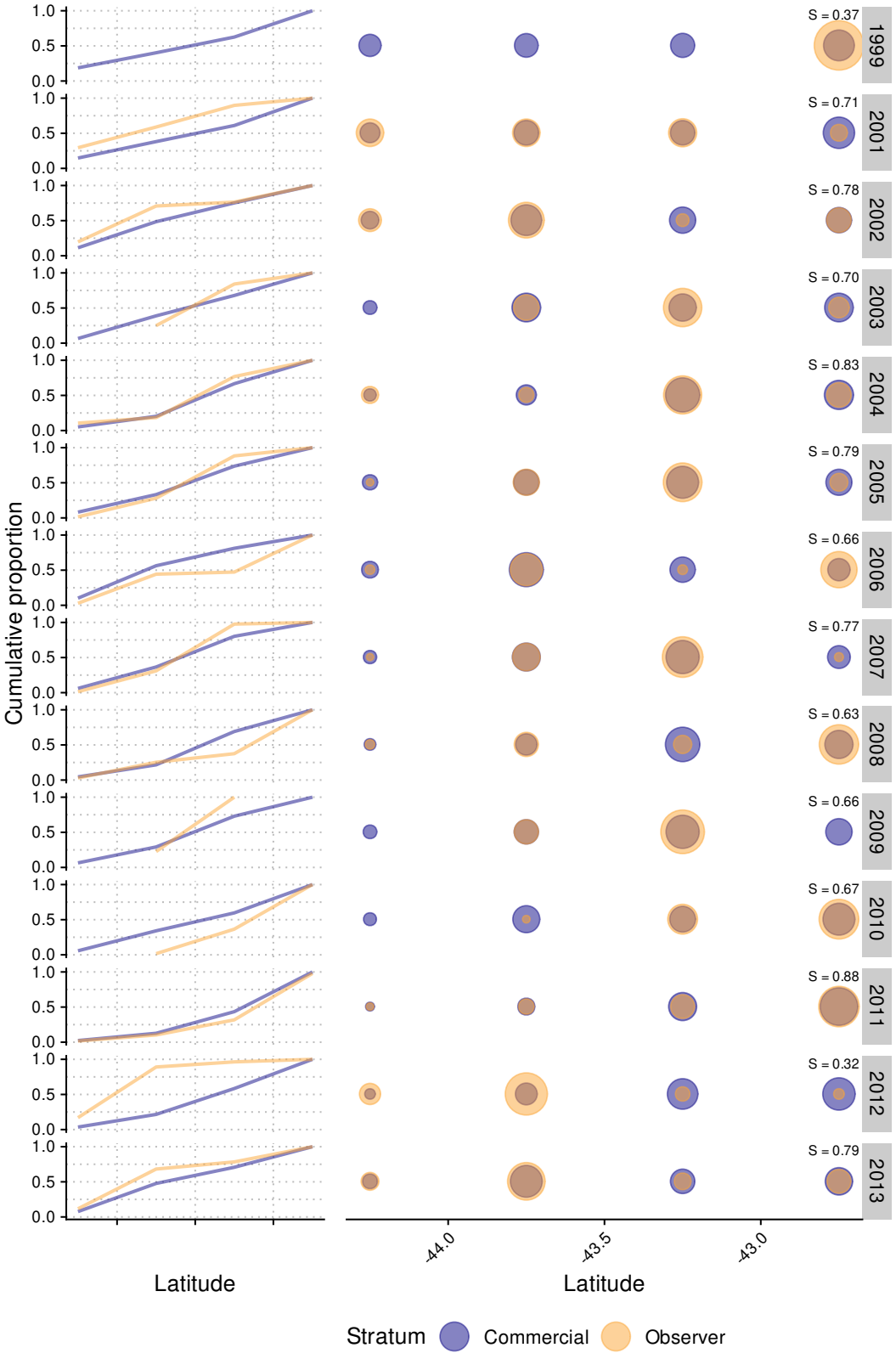


Figure 664: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SPE 4, from events where the sea perch catch exceeded the 10kg threshold, in 1999 to 2013. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

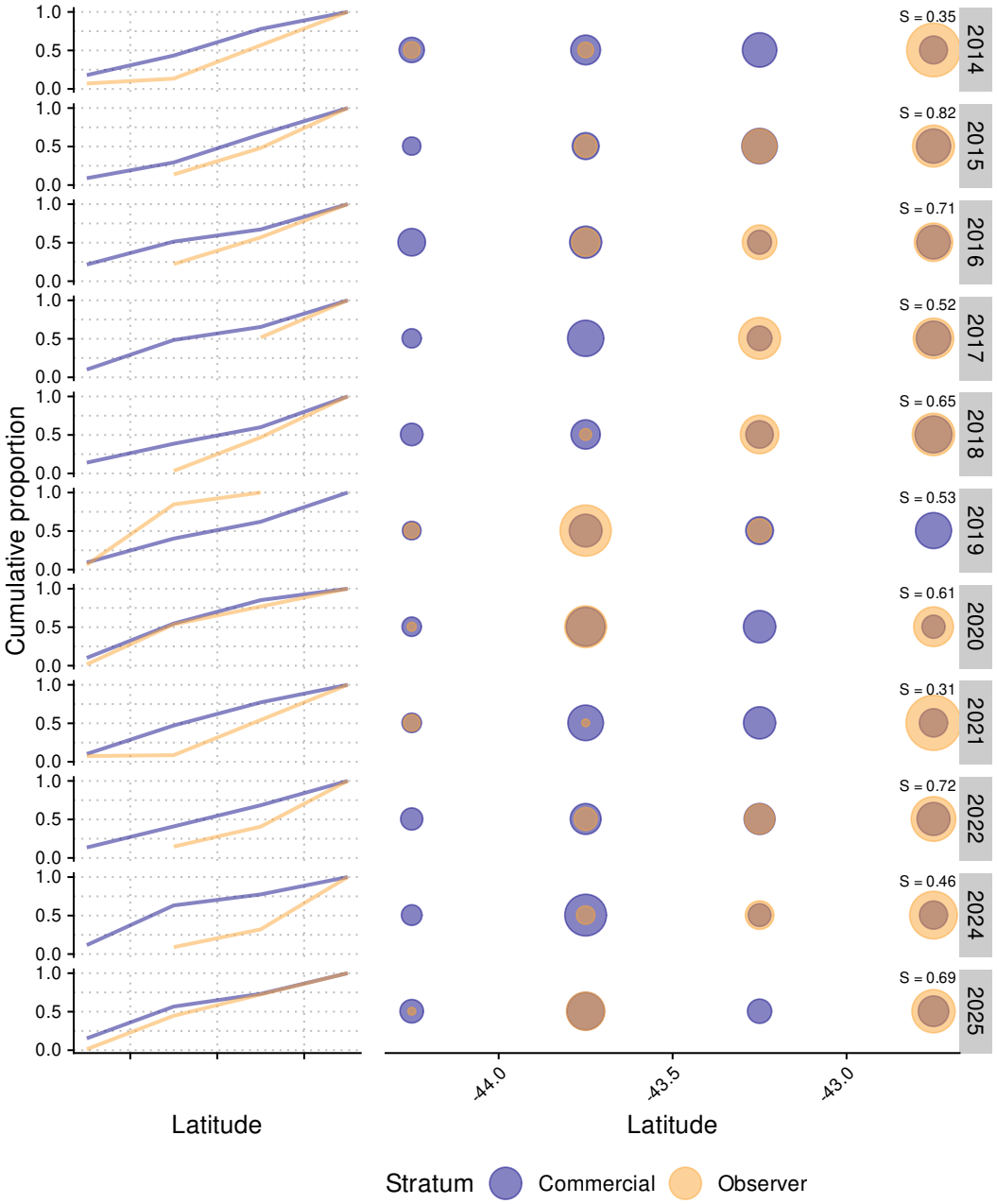


Figure 665: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SPE 4, from events where the sea perch catch exceeded the 10kg threshold, in 2014 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

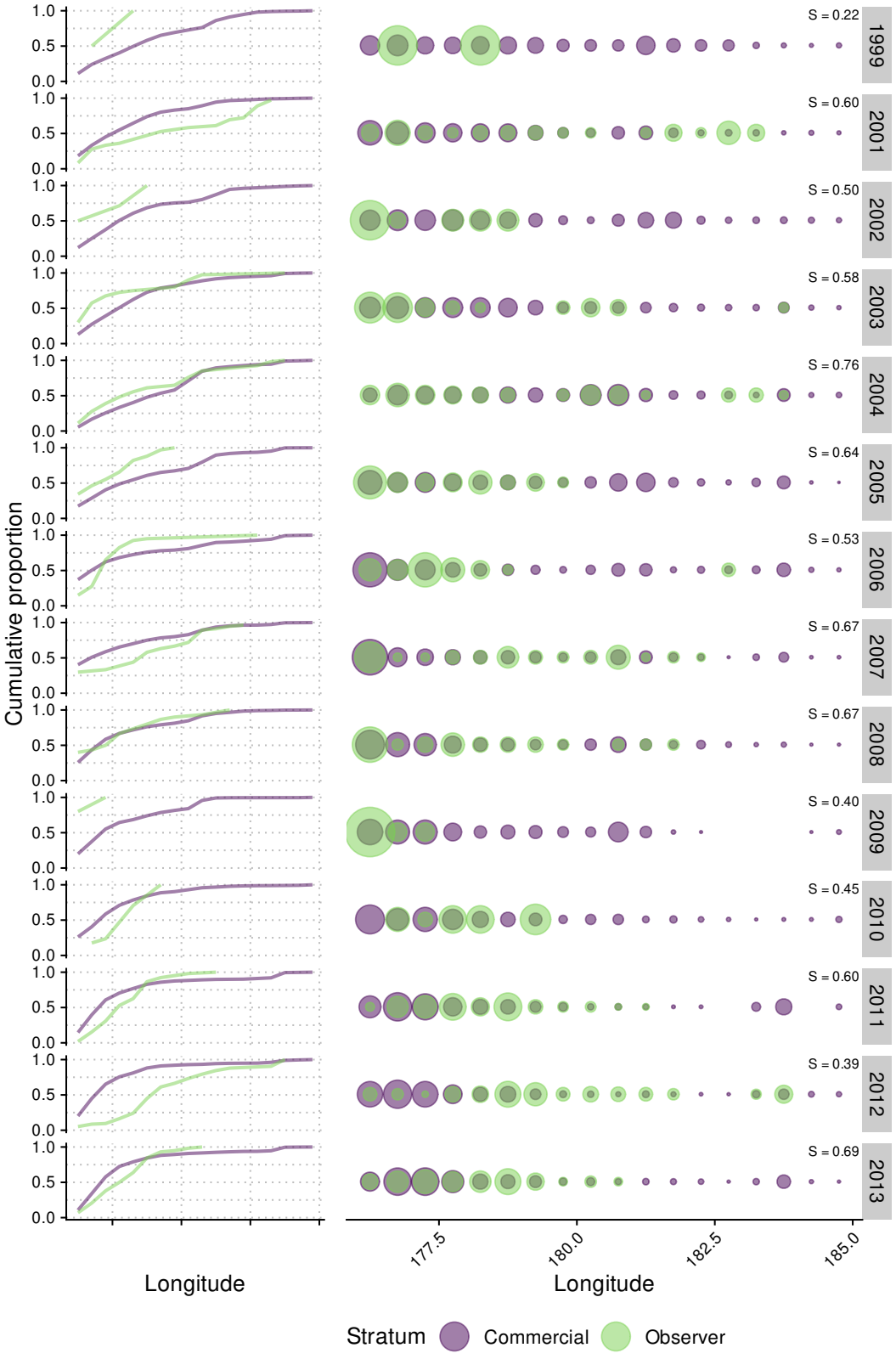


Figure 666: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 4, where the sea perch catch exceeded the 10kg threshold, in 1999 to 2013. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

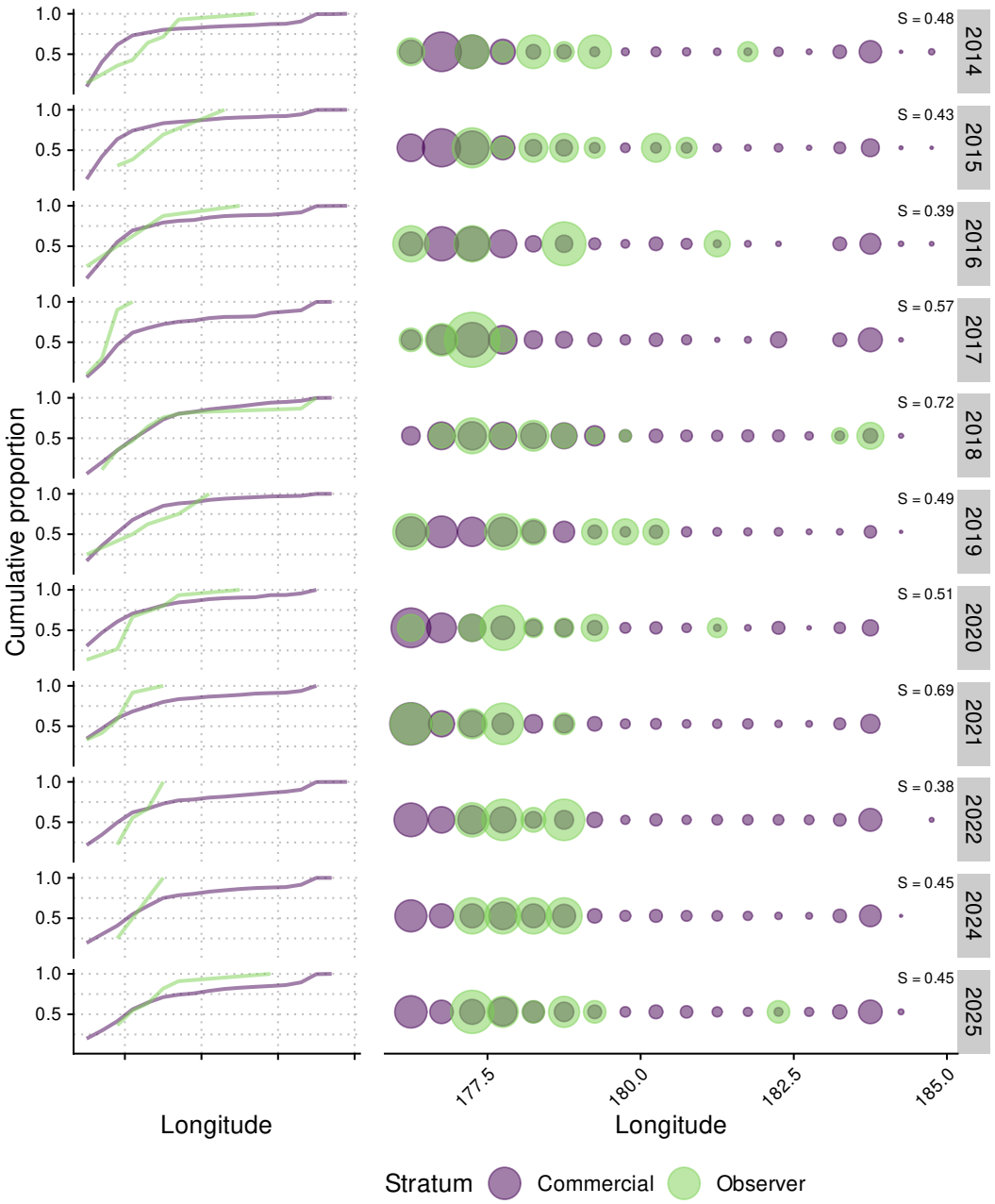


Figure 667: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 4, where the sea perch catch exceeded the 10kg threshold, in 2014 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

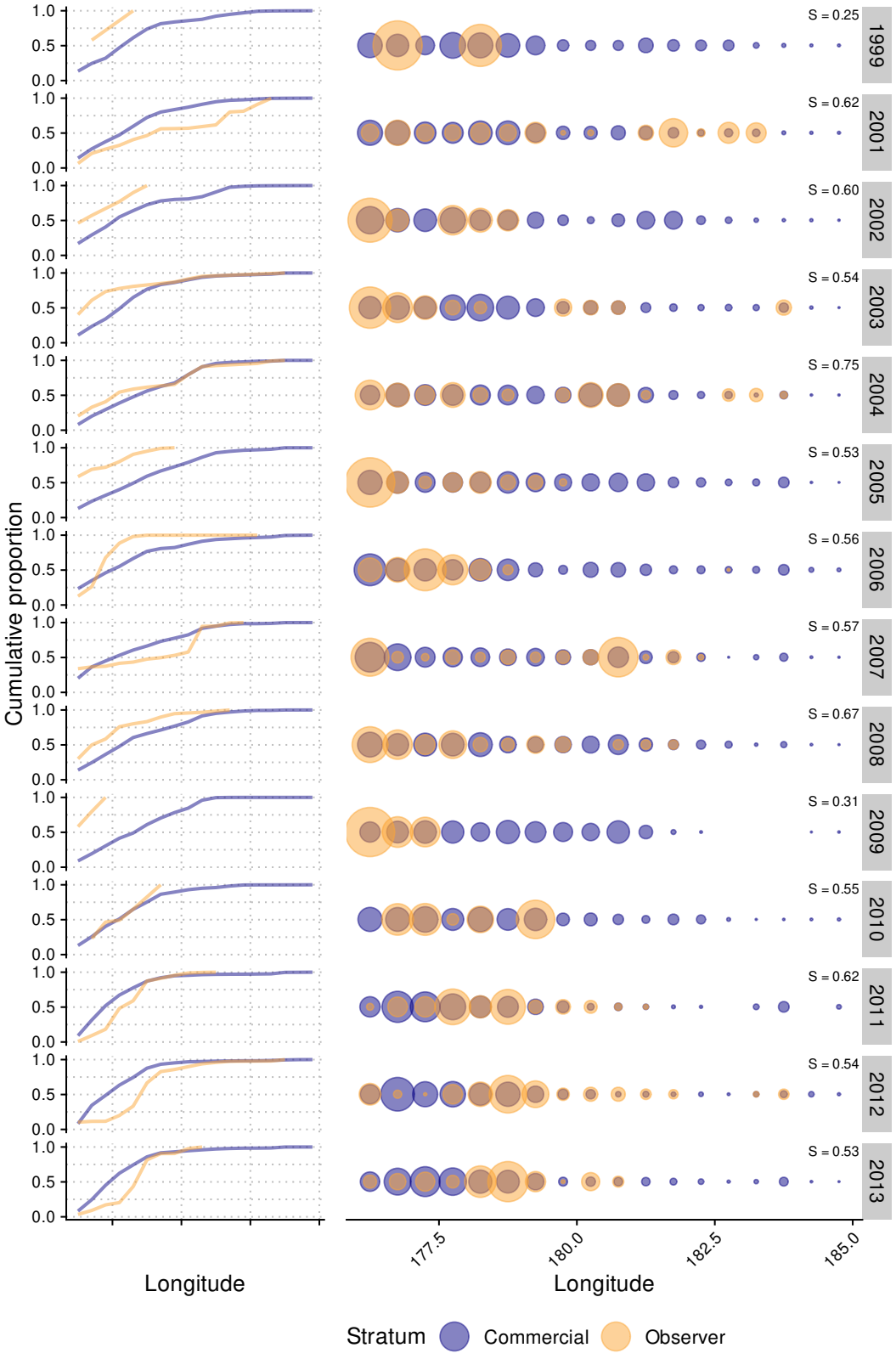


Figure 668: Longitudinal representativeness of observer sampling coverage of Trawl catch in SPE 4, from events where the sea perch catch exceeded the 10kg threshold, in 1999 to 2013. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

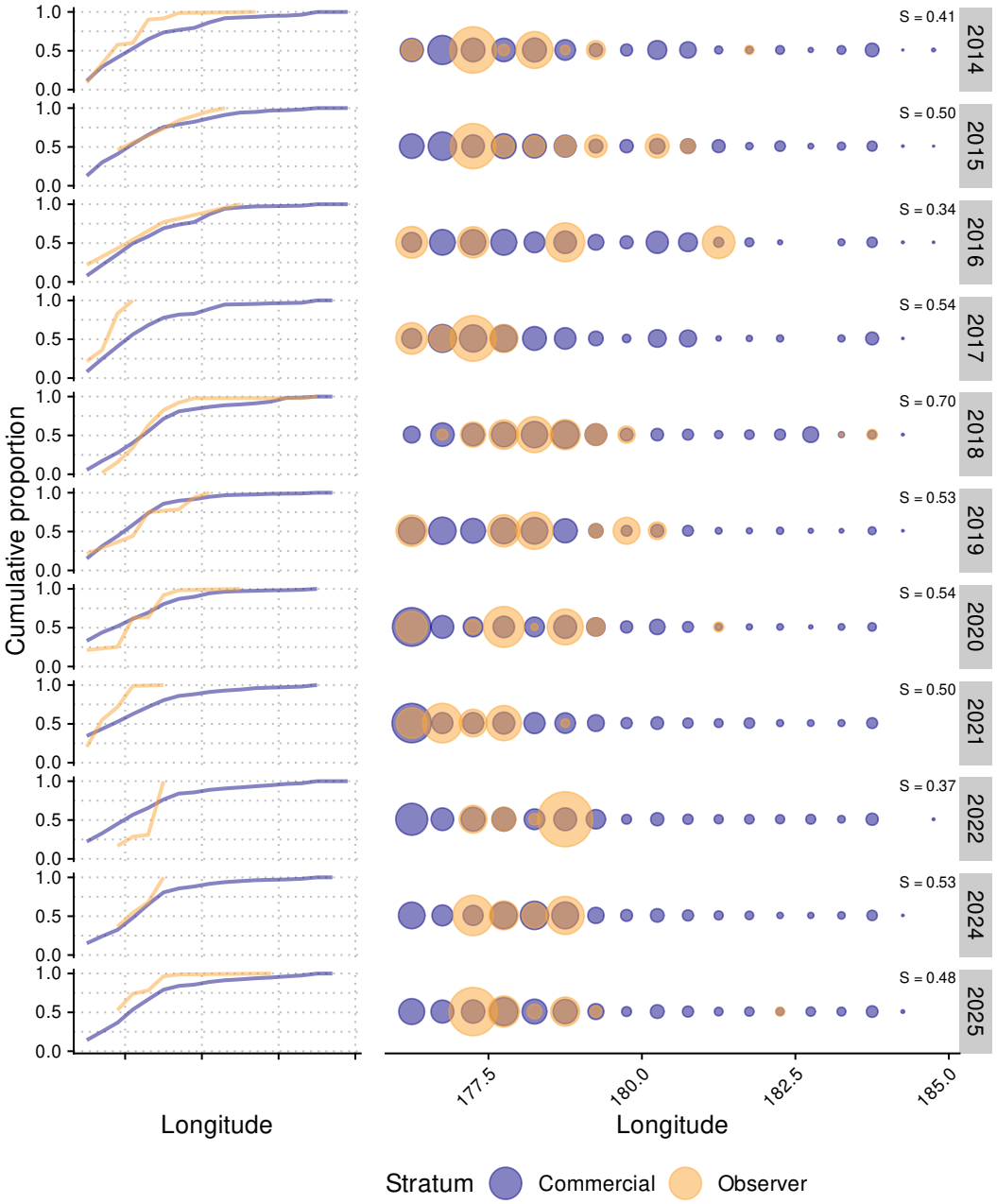


Figure 669: Longitudinal representativeness of observer sampling coverage of Trawl catch in SPE 4, from events where the sea perch catch exceeded the 10kg threshold, in 2014 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

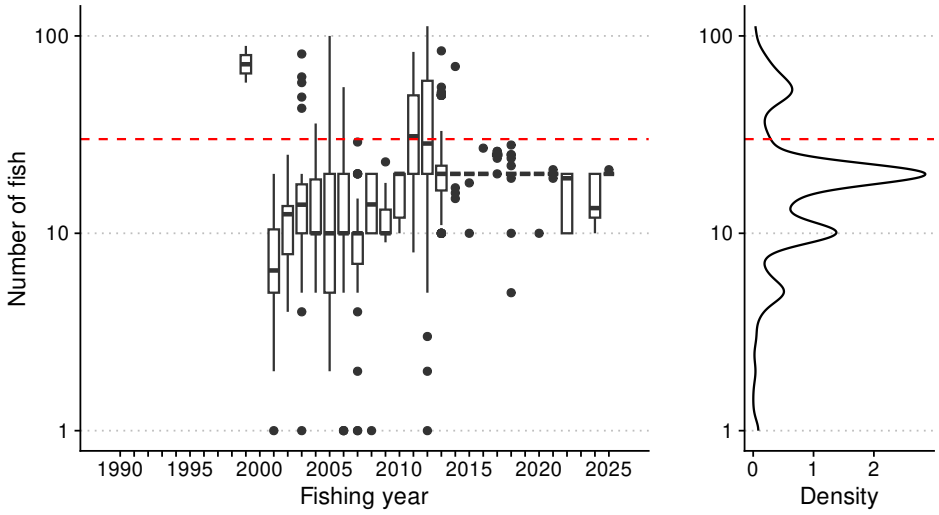


Figure 670: Length-frequency sample sizes for observed fishing events in SPE 4 where sea perch were sampled. The red dashed line indicates a sample size of 30 fish.

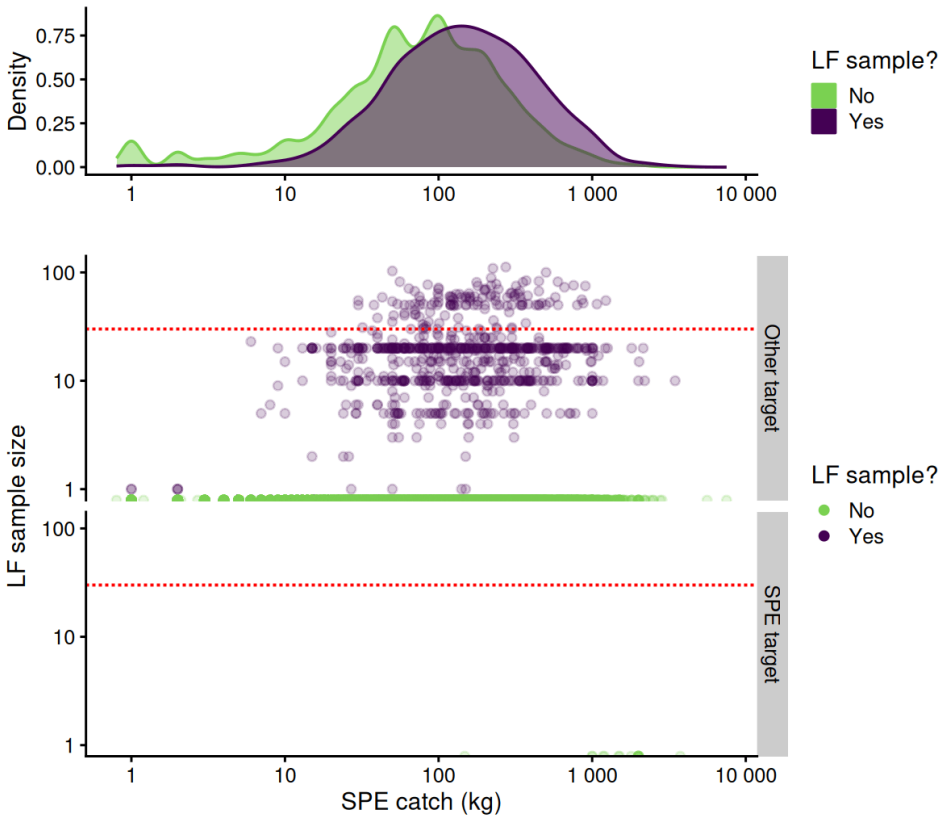


Figure 671: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SPE 4 in relation to the total sea perch catch from an event, separately for sea perch target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.9.2.2 Otolith samples

Table 57: Otolith samples of sea perch from the SPE 4 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of sea perch exceeded a potential sampling threshold of 10 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	94	0	0	0.00
1991	165	0	0	0.00
1992	730	0	0	0.00
1993	673	0	0	0.00
1994	428	0	0	0.00
1995	1 169	0	0	0.00
1996	775	0	0	0.00
1997	859	0	0	0.00
1998	1 413	0	0	0.00
1999	2 296	0	0	0.00
2000	1 919	0	0	0.00
2001	1 811	0	0	0.00
2002	1 885	0	0	0.00
2003	3 239	0	0	0.00
2004	2 276	0	0	0.00
2005	2 767	0	0	0.00
2006	1 809	0	0	0.00
2007	2 292	0	0	0.00
2008	1 960	0	0	0.00
2009	1 296	0	0	0.00
2010	1 045	11	55	1.05
2011	1 667	63	491	3.78
2012	1 892	6	24	0.32
2013	1 947	56	324	2.88
2014	1 884	9	42	0.48
2015	1 976	3	15	0.15
2016	1 649	4	20	0.24
2017	1 118	9	47	0.81
2018	2 402	45	197	1.87
2019	2 062	8	40	0.39
2020	2 668	15	72	0.56
2021	3 054	12	58	0.39
2022	2 550	8	48	0.31
2023	2 816	0	0	0.00
2024	3 173	8	39	0.25
2025	3 387	11	55	0.32

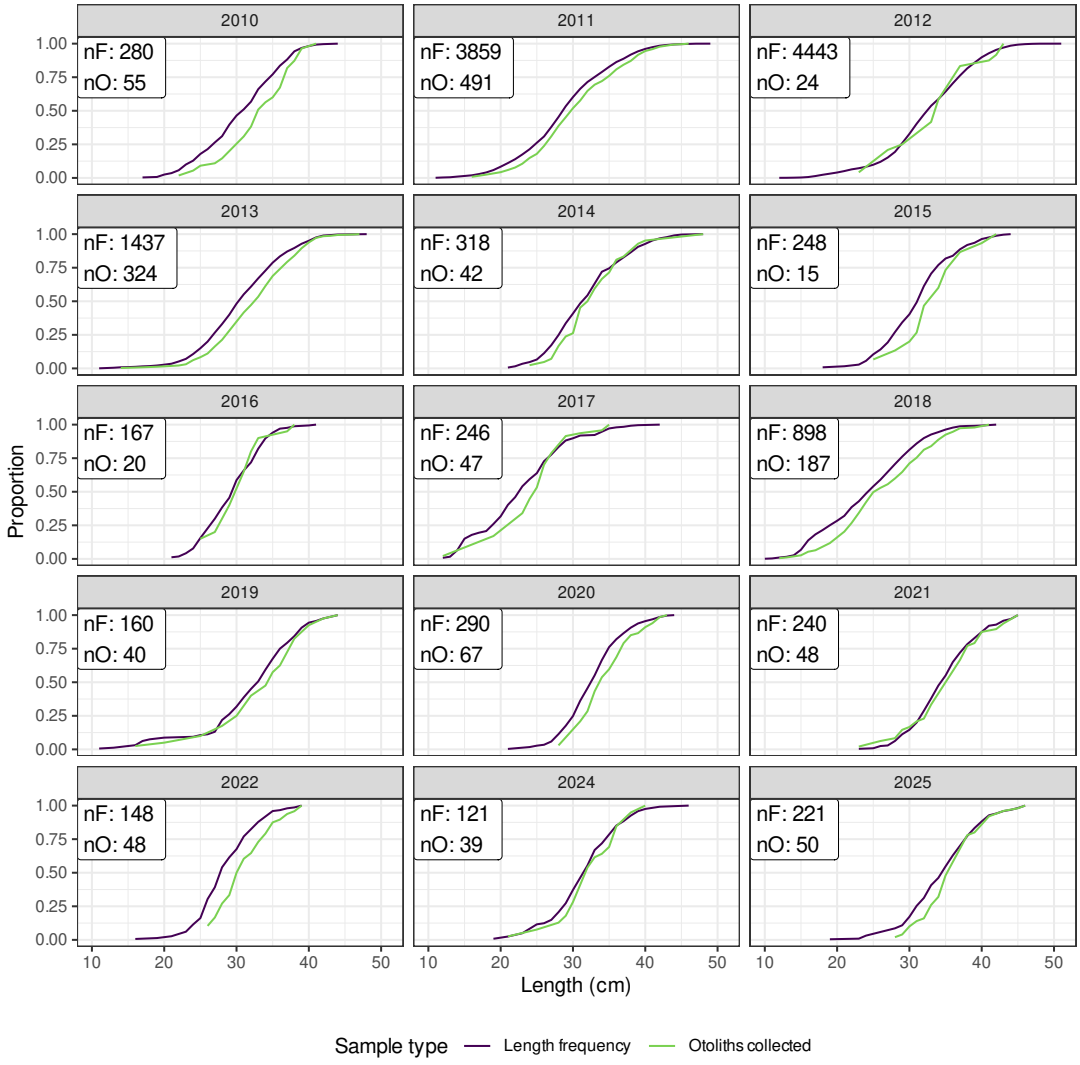


Figure 672: Cumulative distributions of the length of fish in the length frequency and otolith samples of sea perch in the SPE 4 Trawl fishery for the 2010 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.9.2.3 Catch quantification

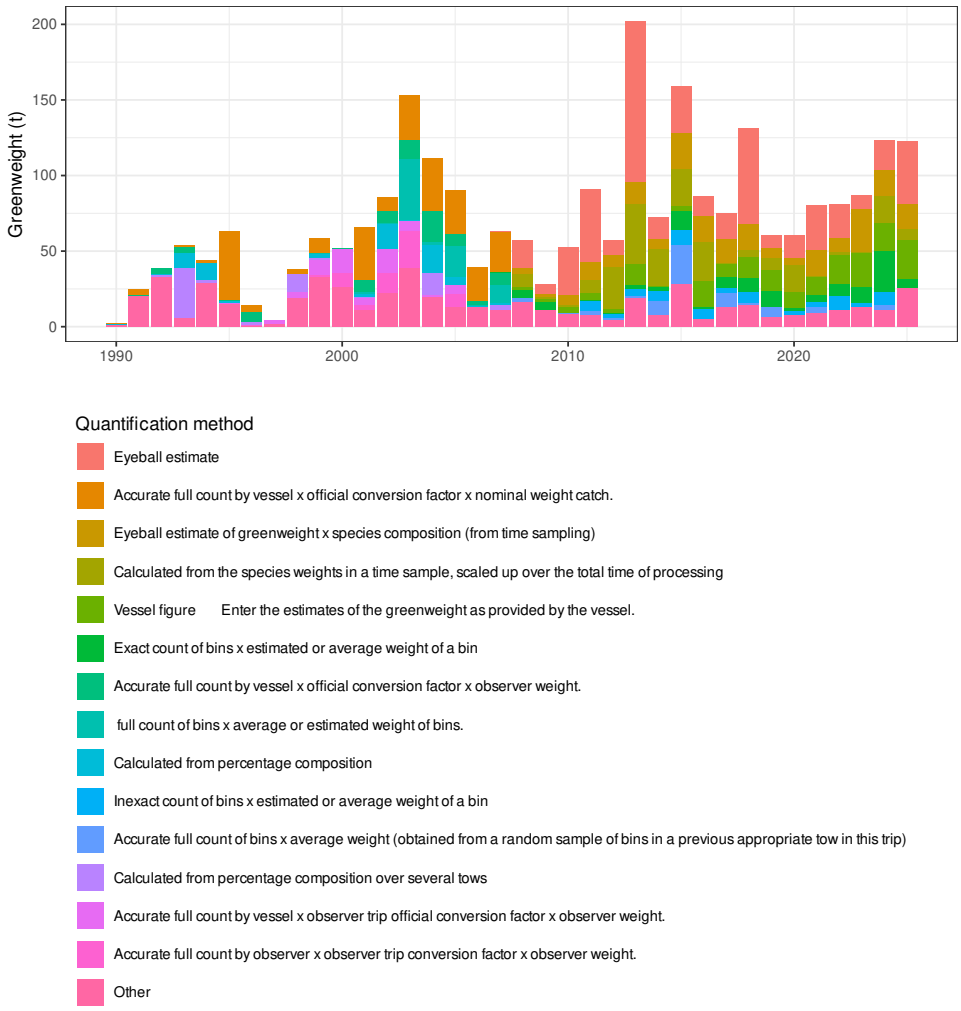


Figure 673: Methods used by observers to quantify the catch of sea perch in the SPE 4 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.9.3 SPE 7: Trawl fishery

2.9.3.1 Length-frequency samples

Table 58: Length-frequency samples of sea perch from the SPE 7 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of sea perch exceeded a potential sampling threshold of 10 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	121	0	0	0.00
1991	134	0	0	0.00
1992	92	0	0	0.00
1993	173	0	0	0.00
1994	215	0	0	0.00
1995	259	0	0	0.00
1996	342	0	0	0.00
1997	330	0	0	0.00
1998	436	0	0	0.00
1999	776	0	0	0.00
2000	540	1	1	0.19
2001	360	1	1	0.28
2002	488	4	8	0.82
2003	357	12	95	3.36
2004	249	3	10	1.20
2005	192	0	0	0.00
2006	308	5	72	1.62
2007	196	13	108	6.63
2008	406	7	95	1.72
2009	477	1	80	0.21
2010	713	1	20	0.14
2011	765	7	87	0.92
2012	520	5	98	0.96
2013	590	15	338	2.54
2014	640	10	178	1.56
2015	676	20	359	2.96
2016	625	3	46	0.48
2017	537	0	0	0.00
2018	1 016	6	98	0.59
2019	460	2	30	0.43
2020	729	0	0	0.00
2021	667	5	247	0.75
2022	582	1	20	0.17
2023	667	4	70	0.60
2024	489	1	20	0.20
2025	524	0	0	0.00

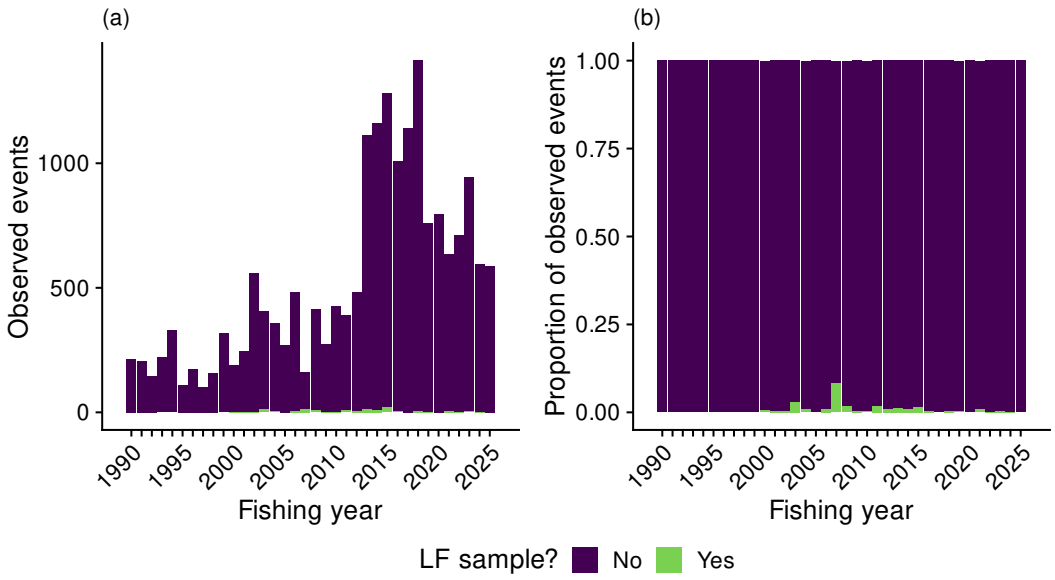


Figure 674: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SPE 7 where the sea perch catch exceeded the 10 kg threshold, with and without length-frequency sampling.**

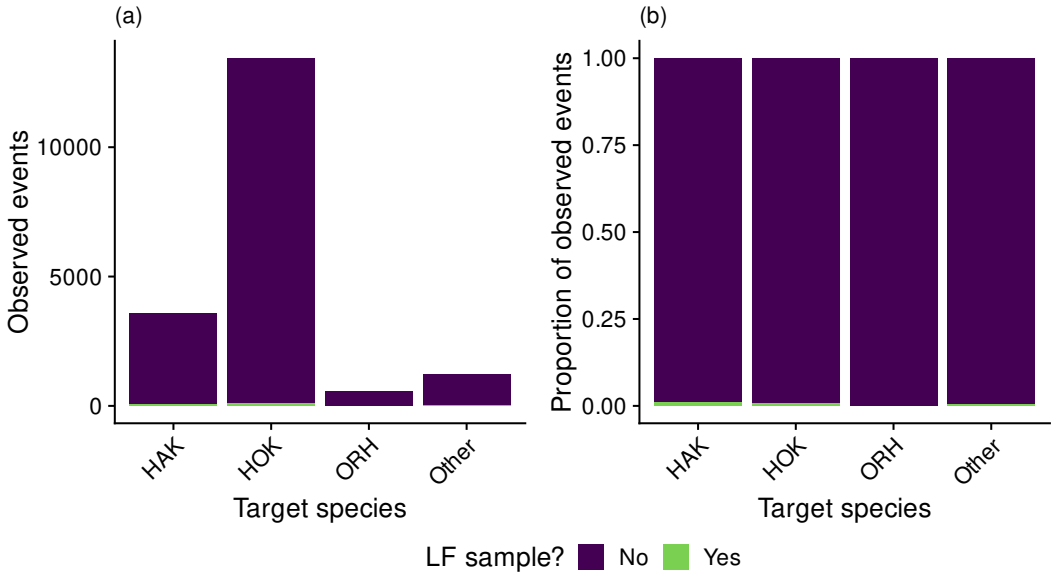


Figure 675: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SPE 7 where the sea perch catch exceeded the 10 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

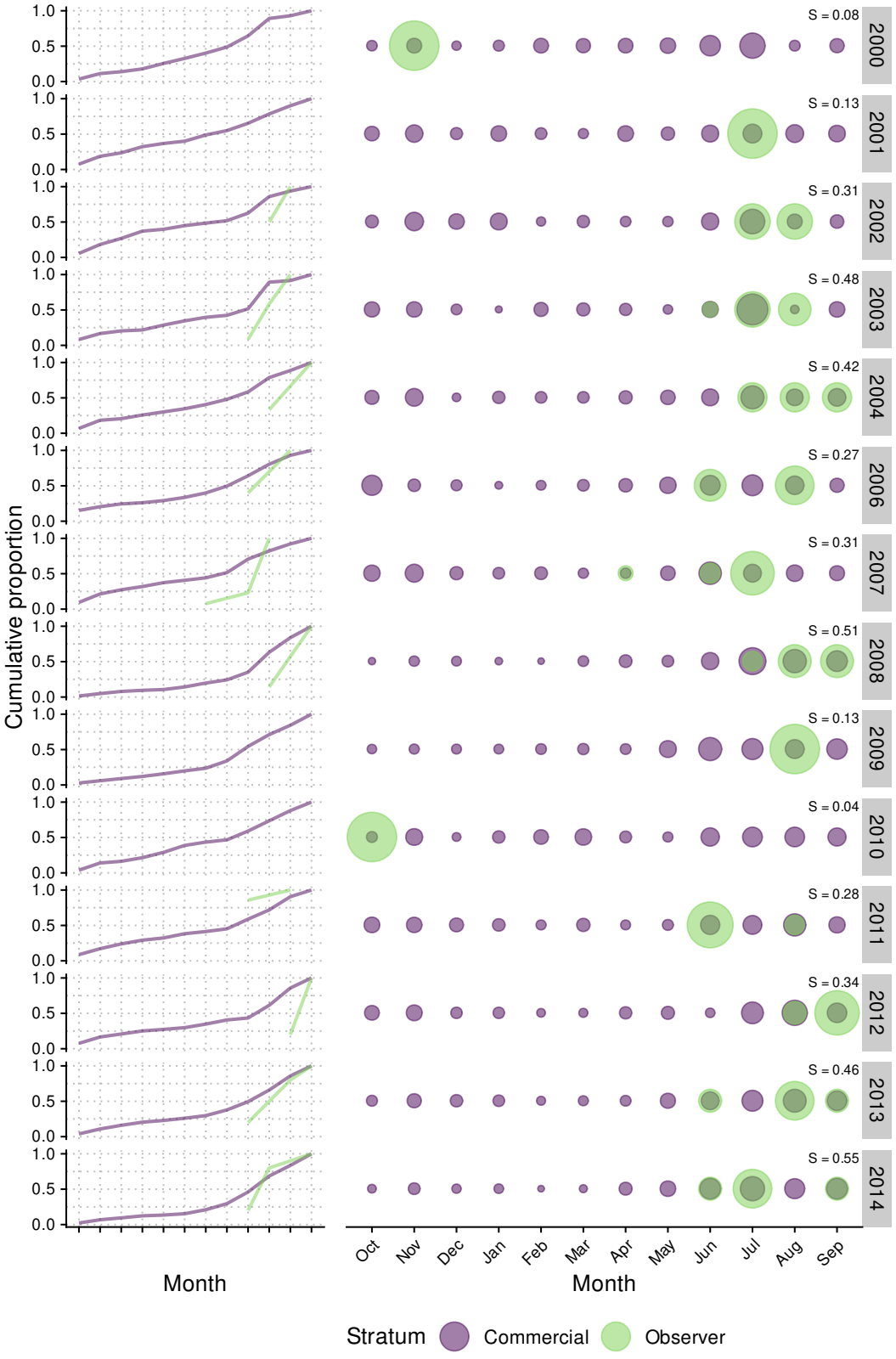


Figure 676: Monthly representativeness of observer sampling coverage of Trawl fishing events in SPE 7, where the sea perch catch exceeded the 10kg threshold, in 2000 to 2014. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

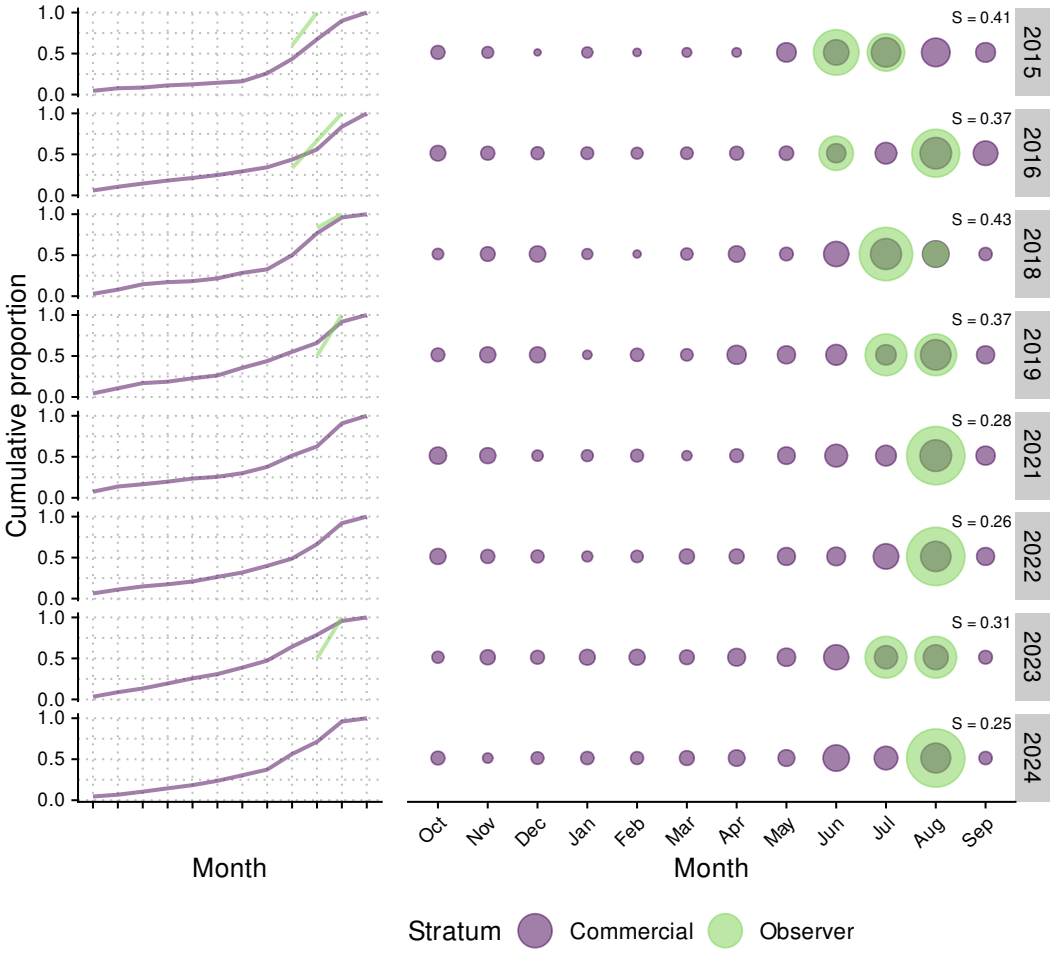


Figure 677: Monthly representativeness of observer sampling coverage of Trawl fishing events in SPE 7, where the sea perch catch exceeded the 10kg threshold, in 2015 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

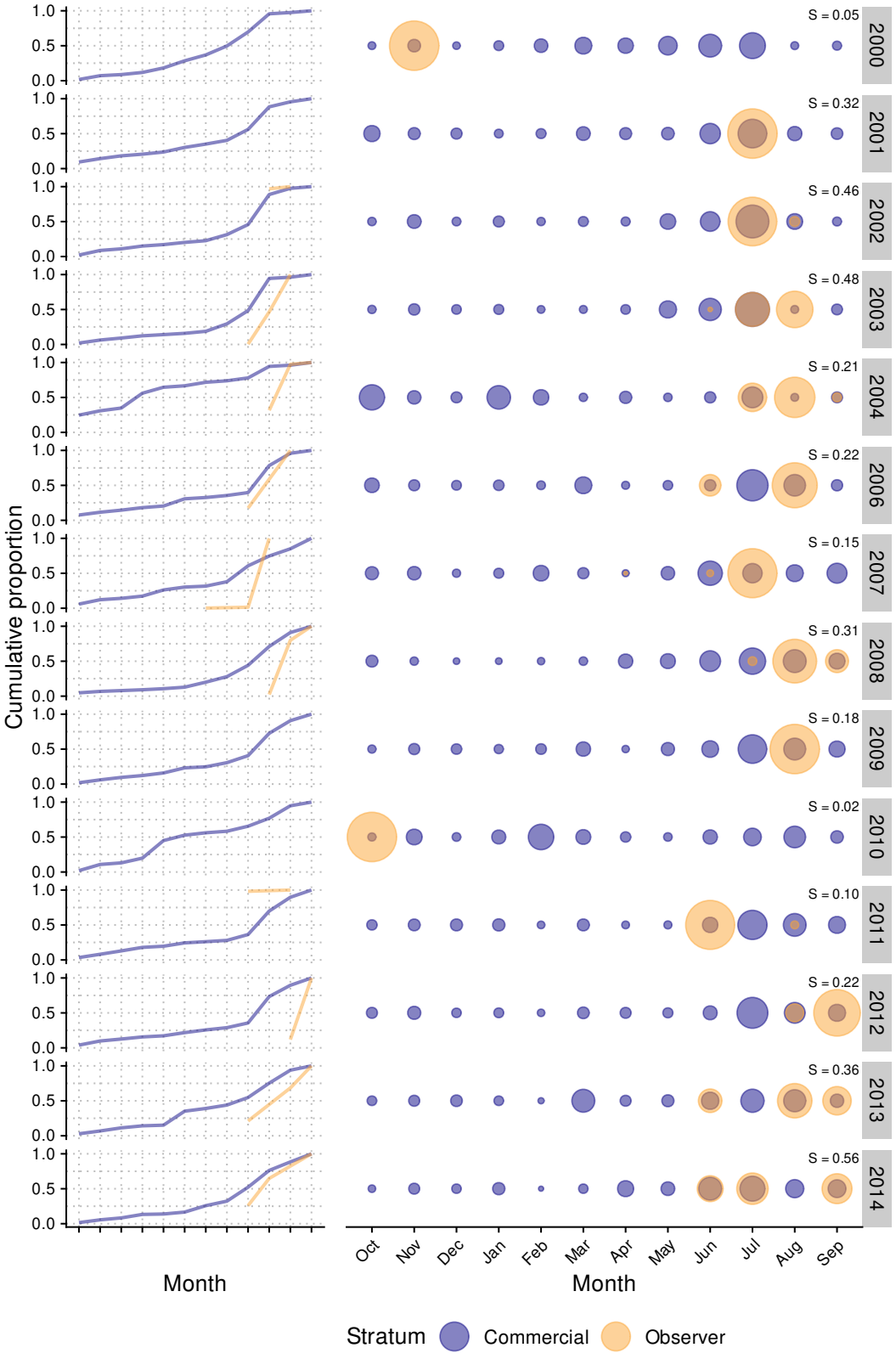


Figure 678: **Monthly representativeness of observer sampling coverage of Trawl catch in SPE 7, from events where the sea perch catch exceeded the 10kg threshold, in 2000 to 2014. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

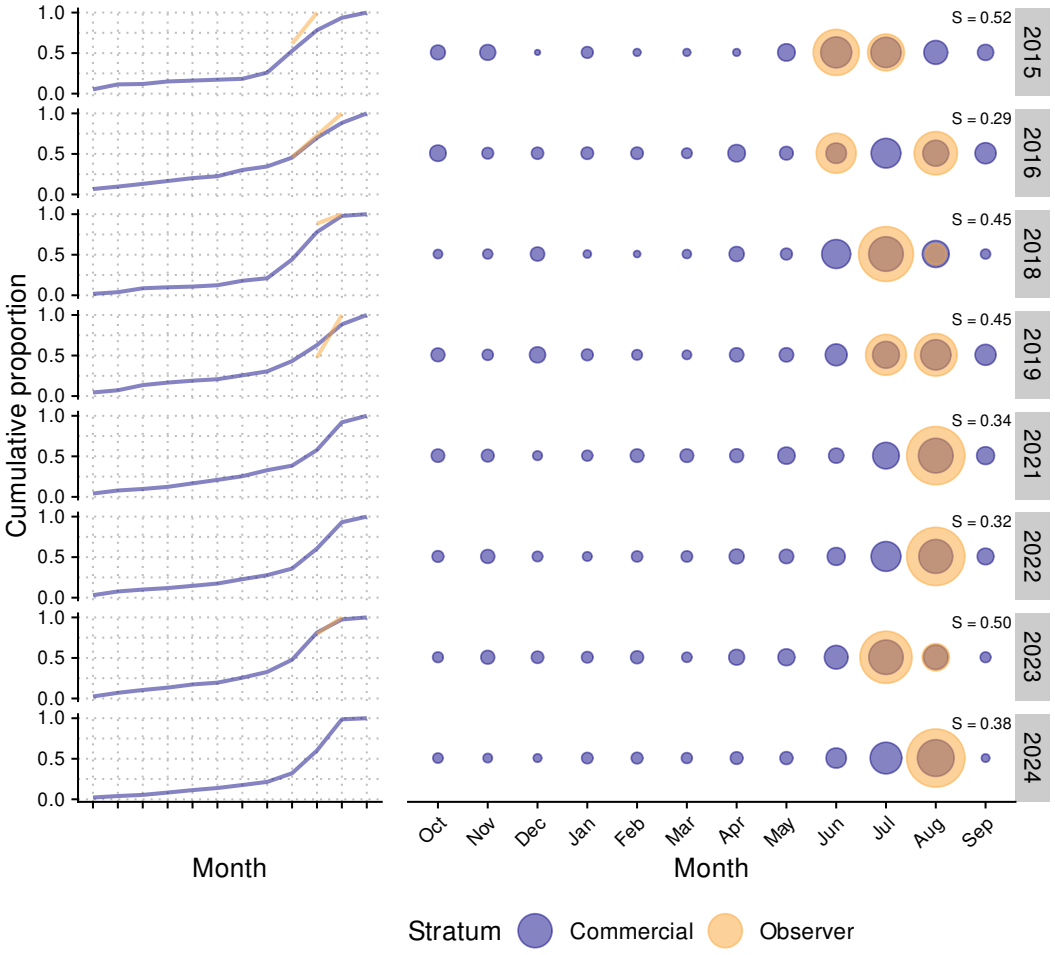


Figure 679: Monthly representativeness of observer sampling coverage of Trawl catch in SPE 7, from events where the sea perch catch exceeded the 10kg threshold, in 2015 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

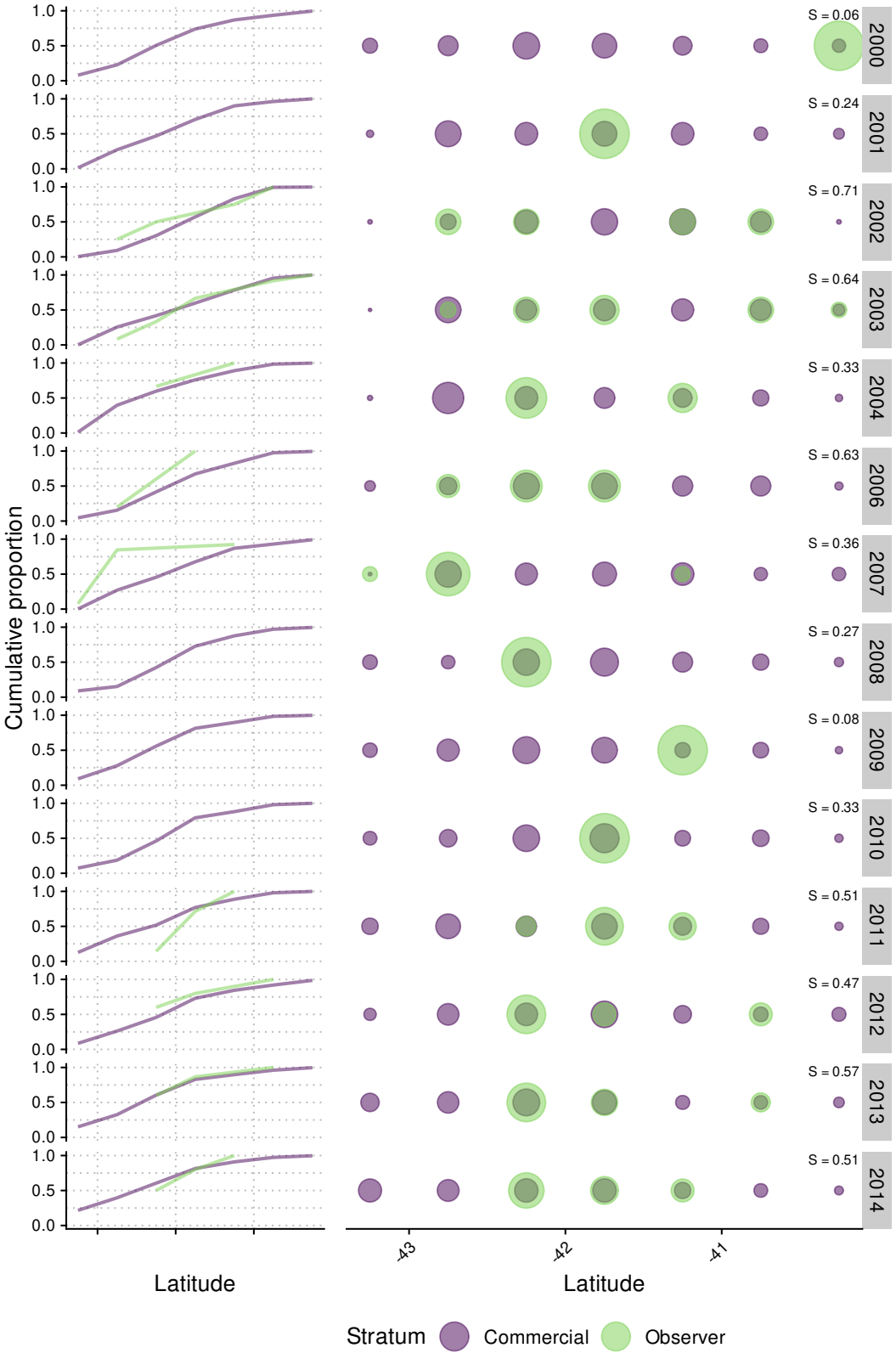


Figure 680: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 7, where the sea perch catch exceeded the 10kg threshold, in 2000 to 2014. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

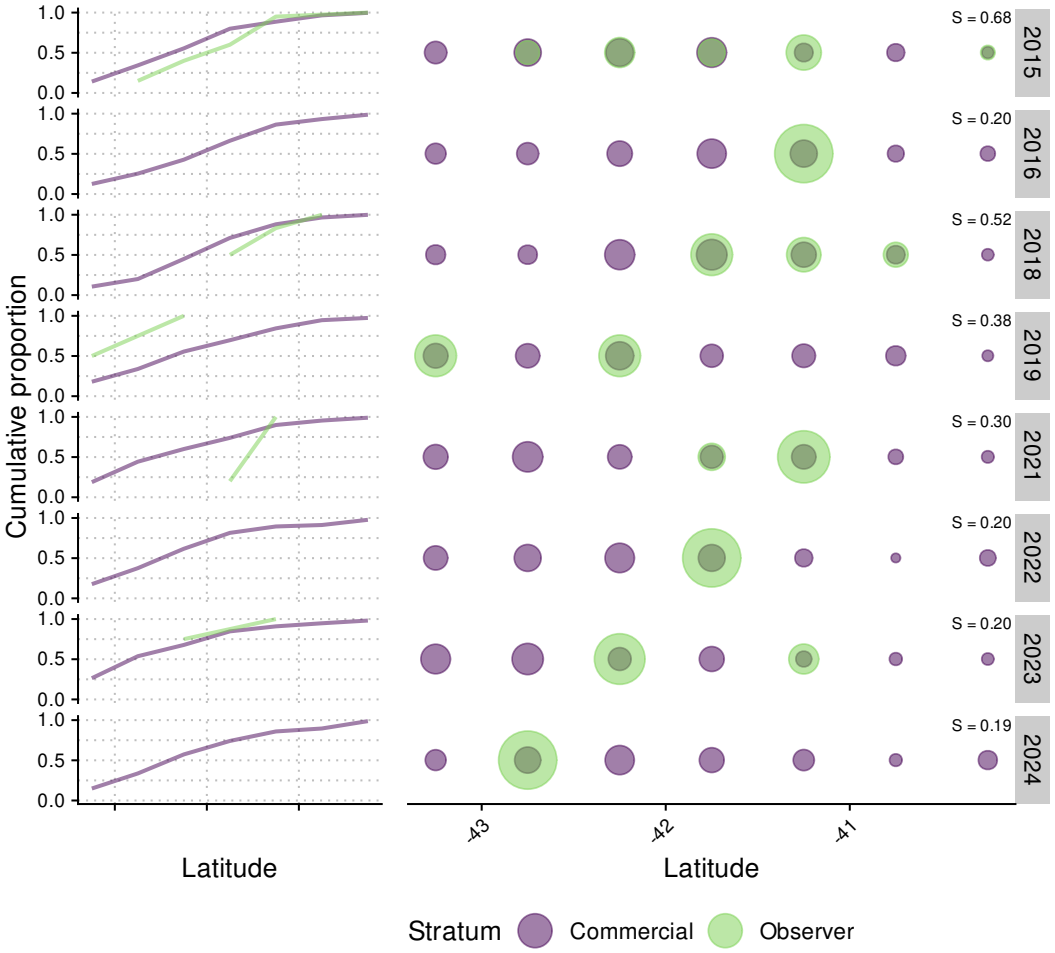


Figure 681: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 7, where the sea perch catch exceeded the 10kg threshold, in 2015 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

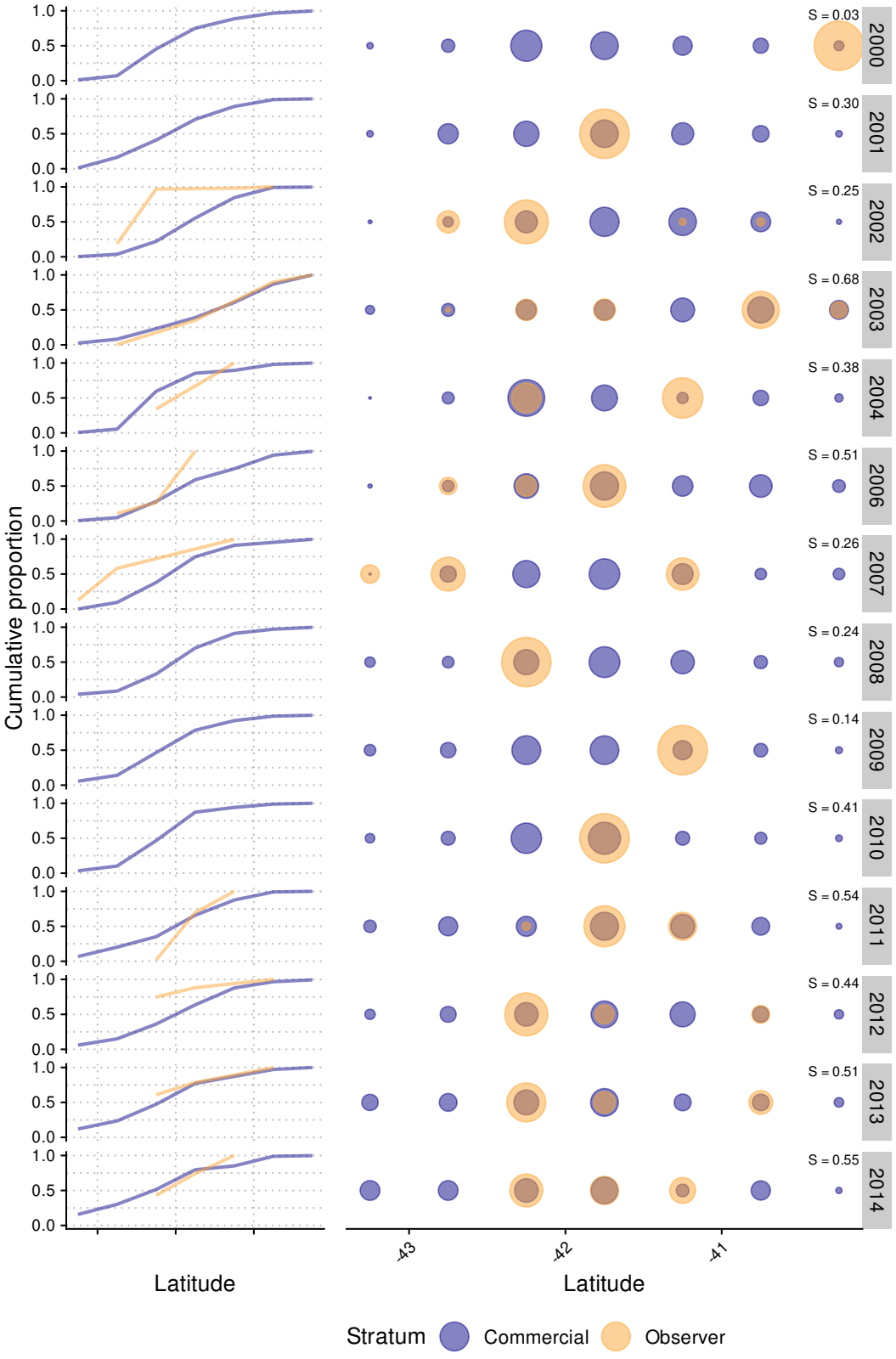


Figure 682: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SPE 7, from events where the sea perch catch exceeded the 10kg threshold, in 2000 to 2014. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

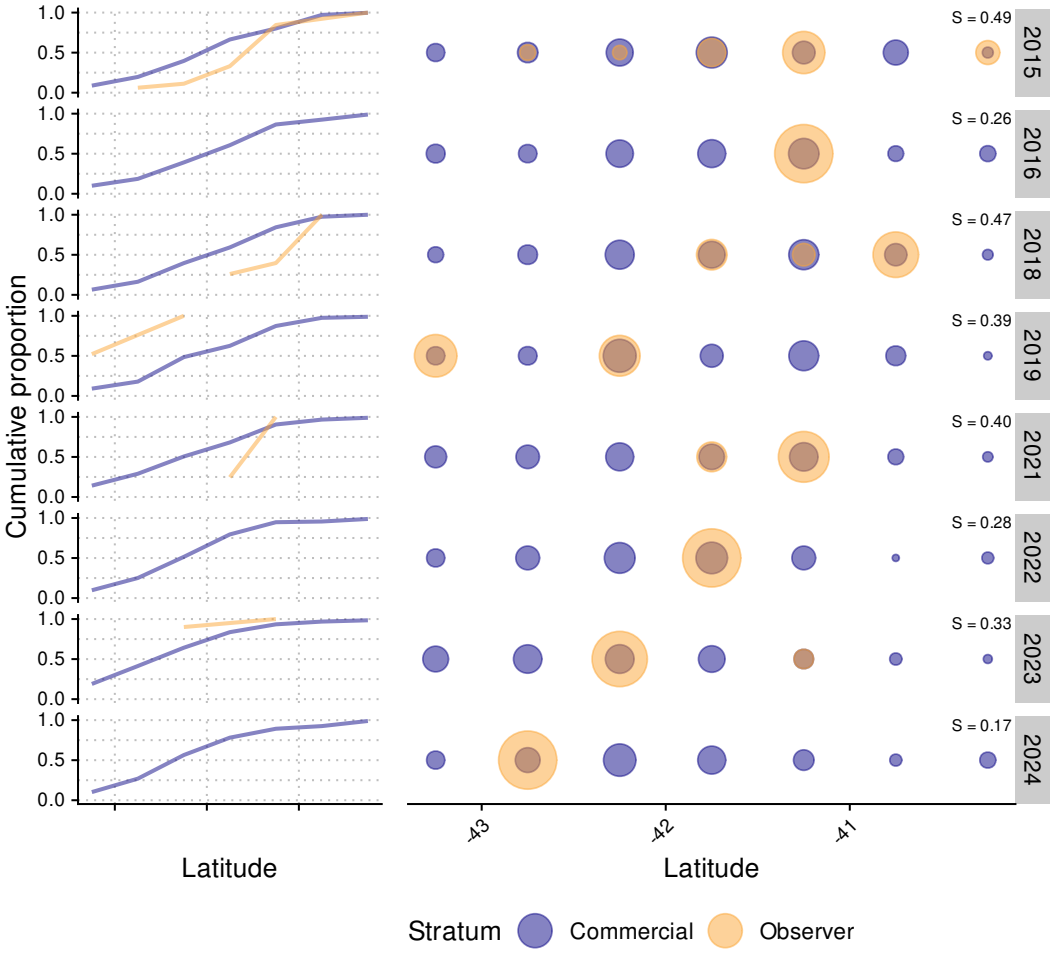


Figure 683: Latitudinal representativeness of observer sampling coverage of Trawl catch in SPE 7, from events where the sea perch catch exceeded the 10kg threshold, in 2015 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

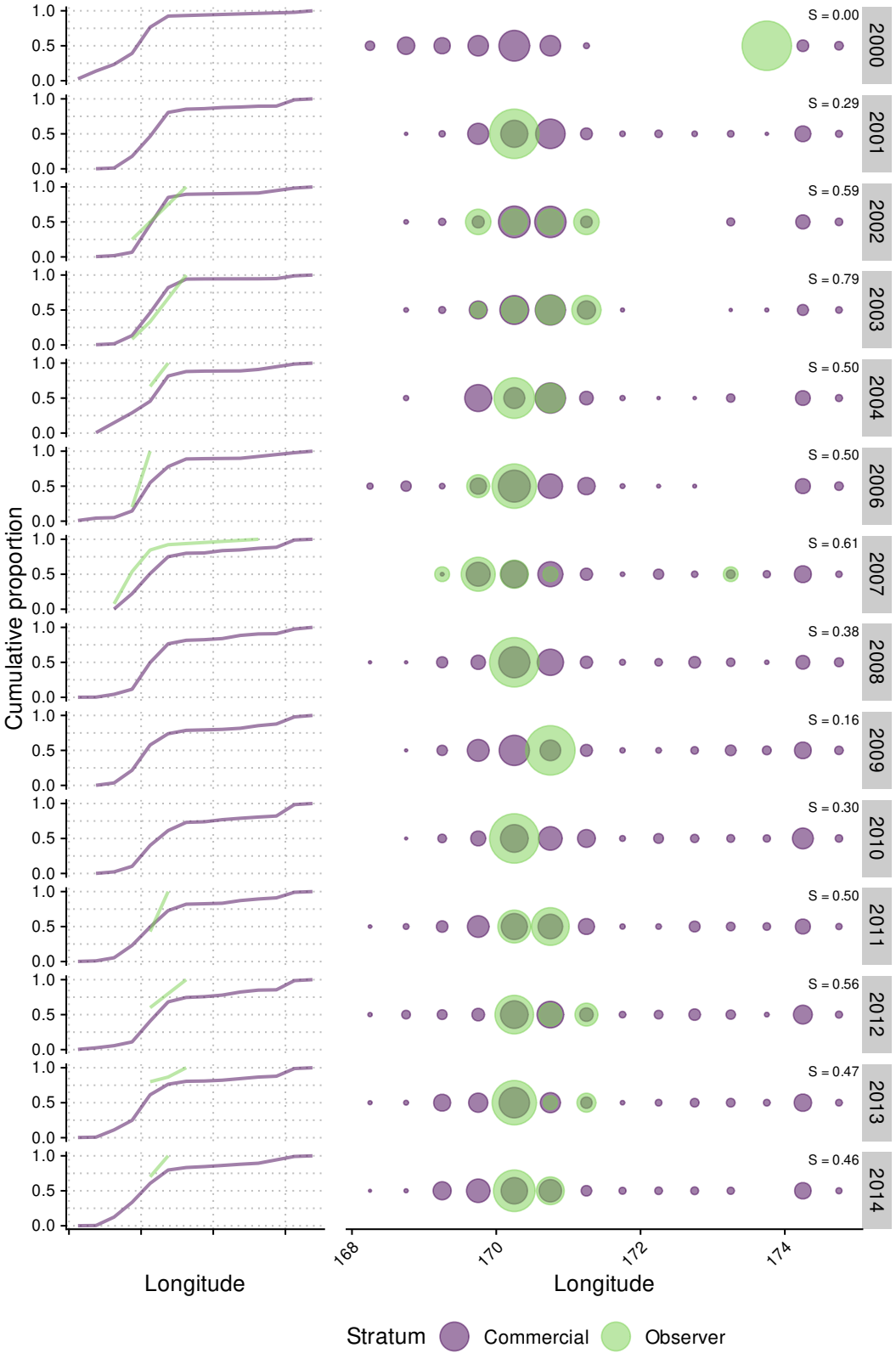


Figure 684: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 7, where the sea perch catch exceeded the 10kg threshold, in 2000 to 2014. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

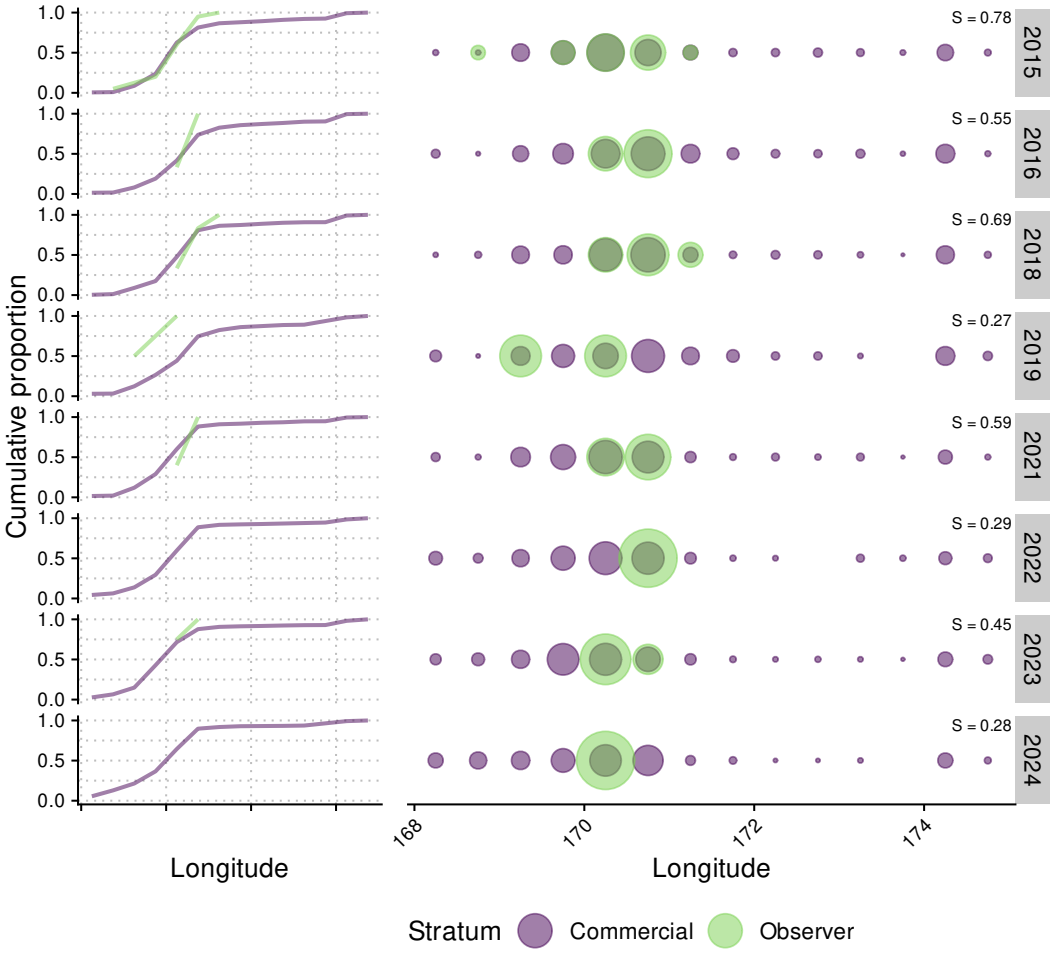


Figure 685: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SPE 7, where the sea perch catch exceeded the 10kg threshold, in 2015 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

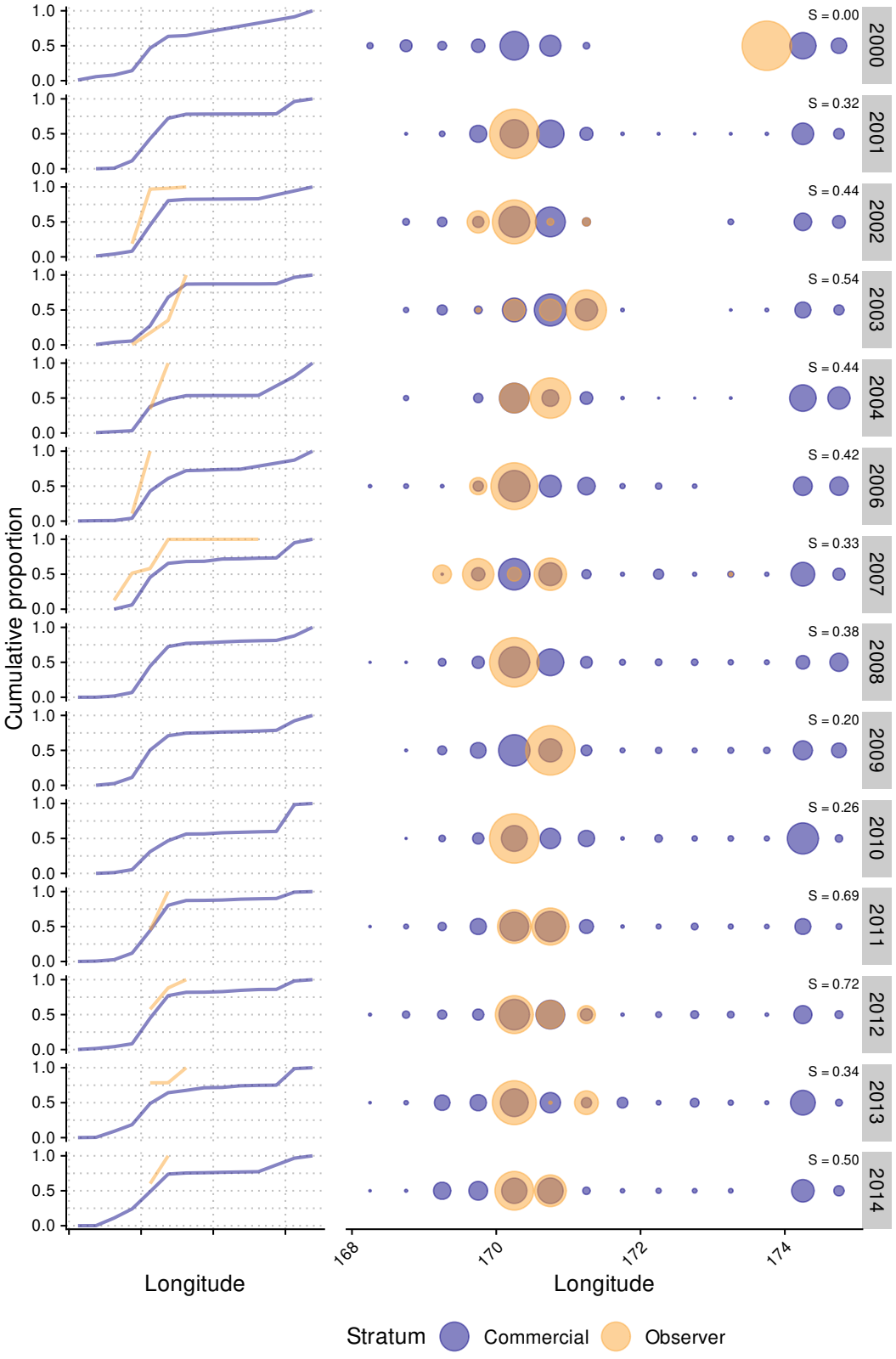


Figure 686: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SPE 7, from events where the sea perch catch exceeded the 10kg threshold, in 2000 to 2014. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

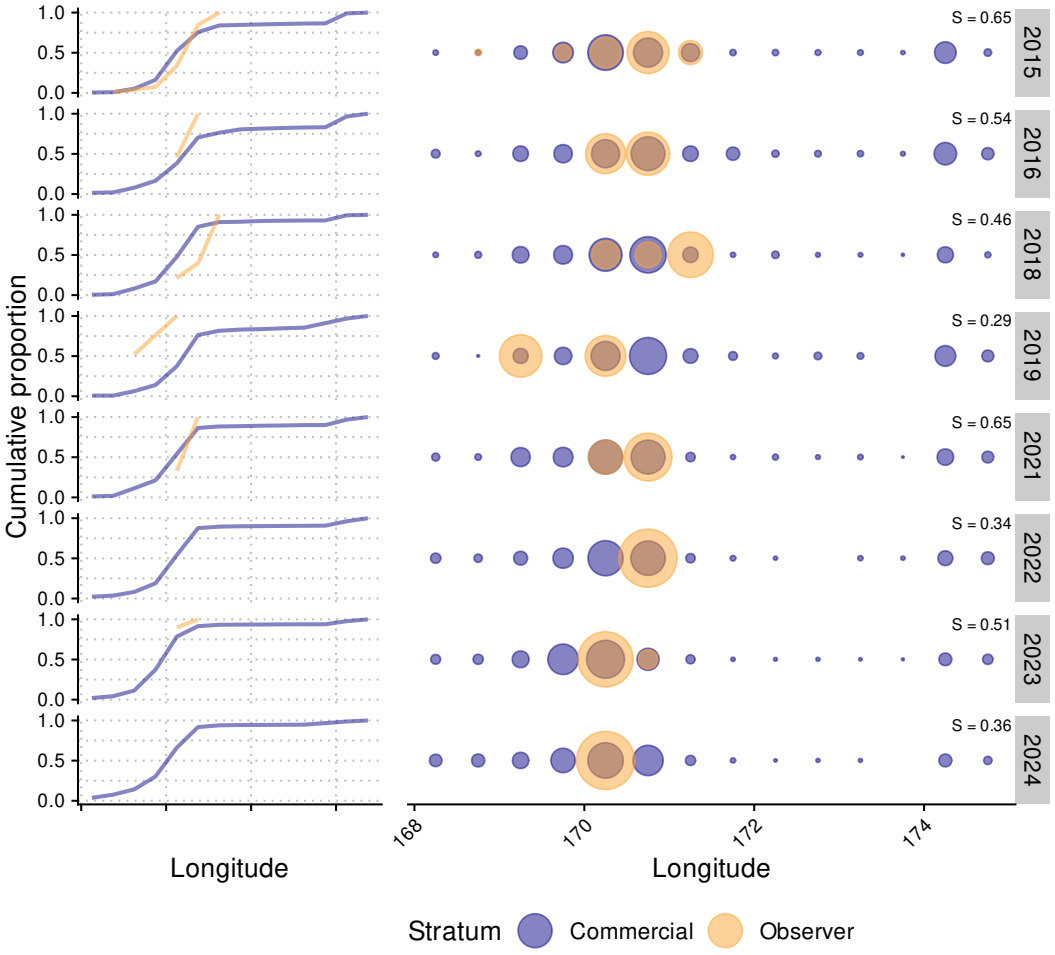


Figure 687: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SPE 7, from events where the sea perch catch exceeded the 10kg threshold, in 2015 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

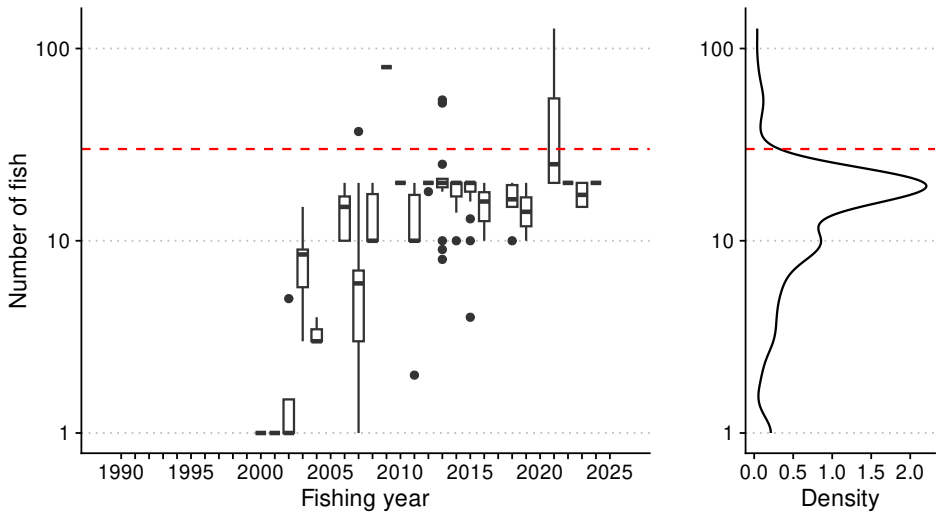


Figure 688: **Length-frequency sample sizes for observed fishing events in SPE 7 where sea perch were sampled. The red dashed line indicates a sample size of 30 fish.**

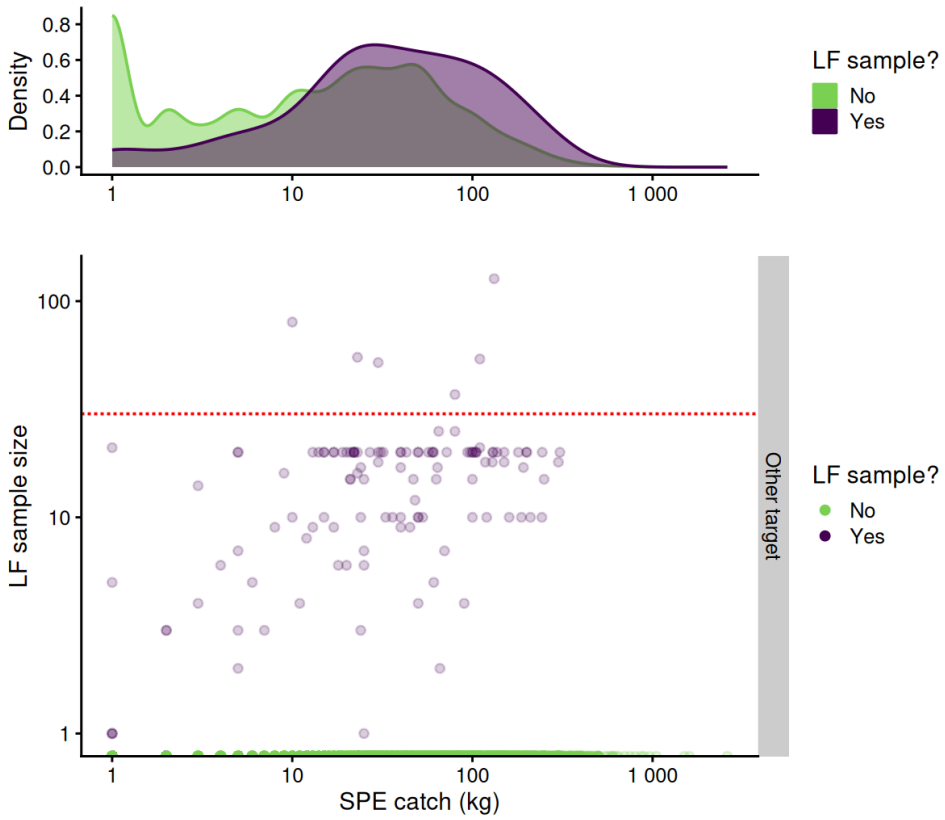


Figure 689: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SPE 7 in relation to the total sea perch catch from an event, separately for sea perch target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.9.3.2 Otolith samples

Table 59: Otolith samples of sea perch from the SPE 7 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of sea perch exceeded a potential sampling threshold of 10 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	121	0	0	0.00
1991	134	0	0	0.00
1992	92	0	0	0.00
1993	173	0	0	0.00
1994	215	0	0	0.00
1995	259	0	0	0.00
1996	342	0	0	0.00
1997	330	0	0	0.00
1998	436	0	0	0.00
1999	776	0	0	0.00
2000	540	0	0	0.00
2001	360	0	0	0.00
2002	488	0	0	0.00
2003	357	0	0	0.00
2004	249	0	0	0.00
2005	192	0	0	0.00
2006	308	0	0	0.00
2007	196	0	0	0.00
2008	406	0	0	0.00
2009	477	0	0	0.00
2010	713	1	5	0.14
2011	765	2	8	0.26
2012	520	1	5	0.19
2013	590	7	35	1.19
2014	640	5	22	0.78
2015	676	0	0	0.00
2016	625	1	5	0.16
2017	537	0	0	0.00
2018	1016	6	29	0.59
2019	460	2	10	0.43
2020	729	0	0	0.00
2021	667	5	26	0.75
2022	582	1	5	0.17
2023	667	4	20	0.60
2024	489	1	5	0.20
2025	524	0	0	0.00

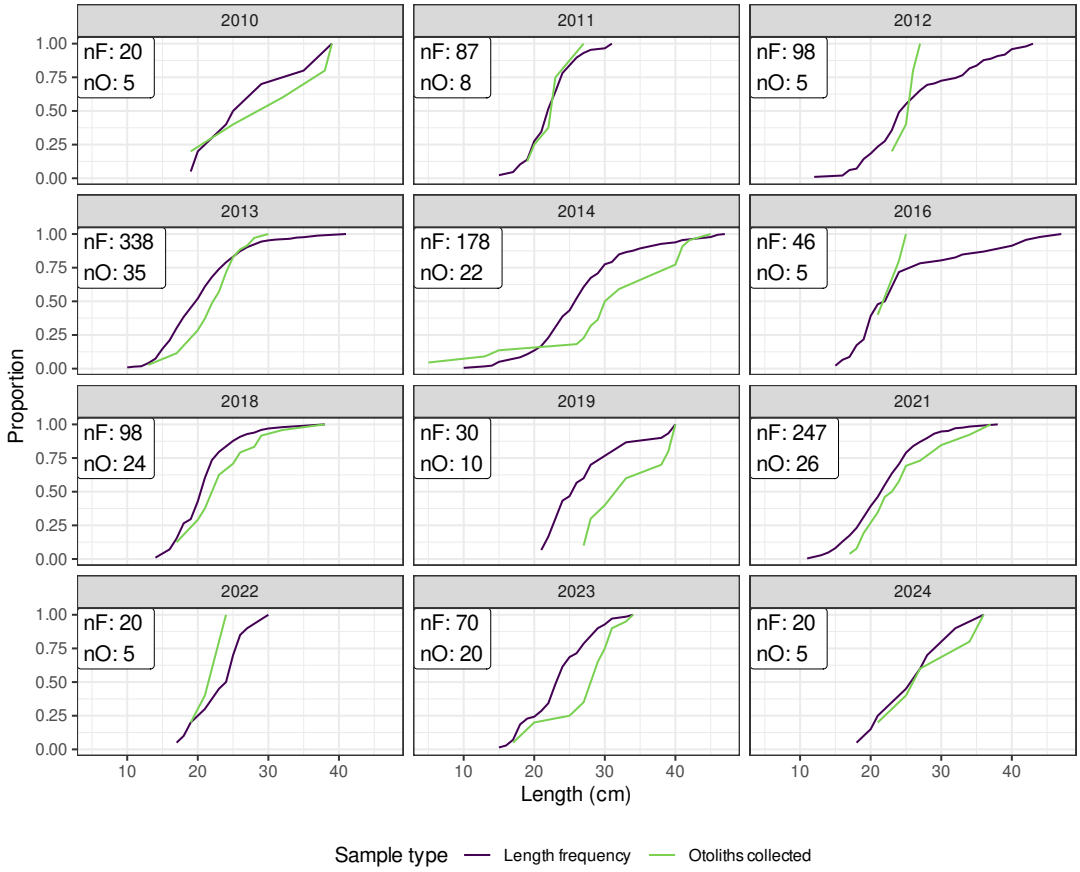


Figure 690: Cumulative distributions of the length of fish in the length frequency and otolith samples of sea perch in the SPE 7 Trawl fishery for the 2010 to 2024 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.9.3.3 Catch quantification

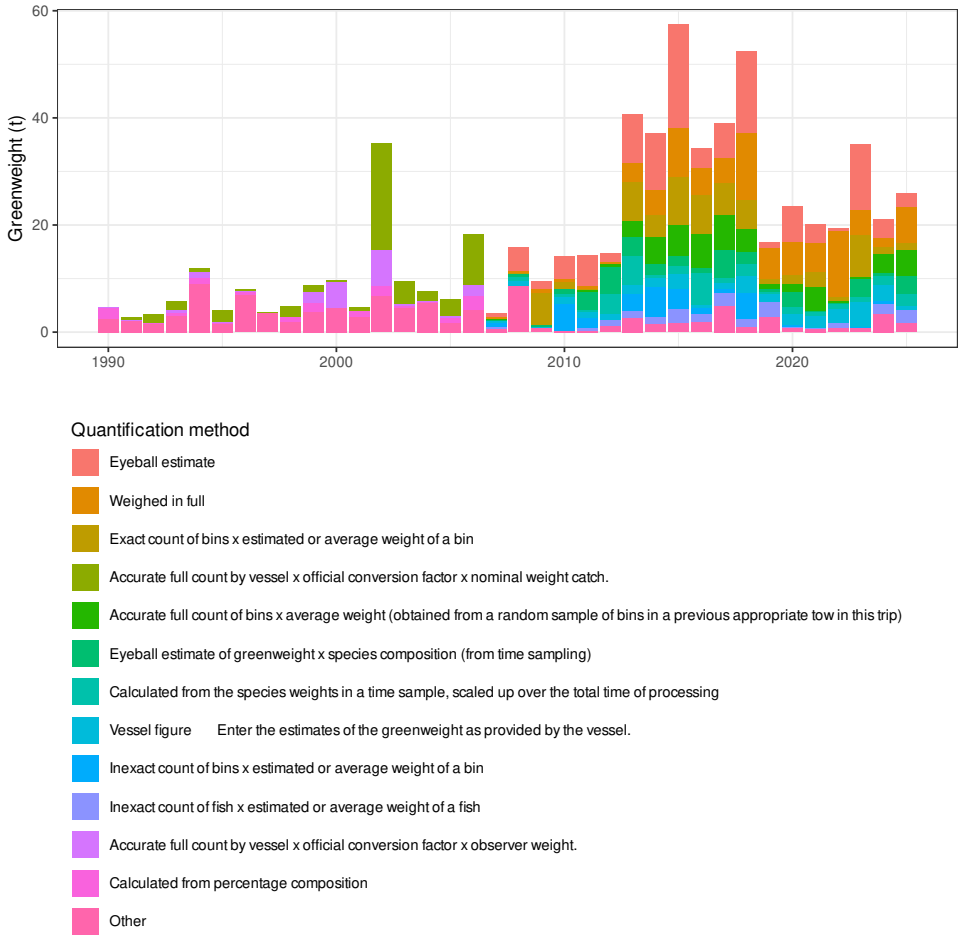


Figure 691: Methods used by observers to quantify the catch of sea perch in the SPE 7 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.10 SQU stocks

Observer sampling of squid is considered with respect to the squid Quota Management Areas.

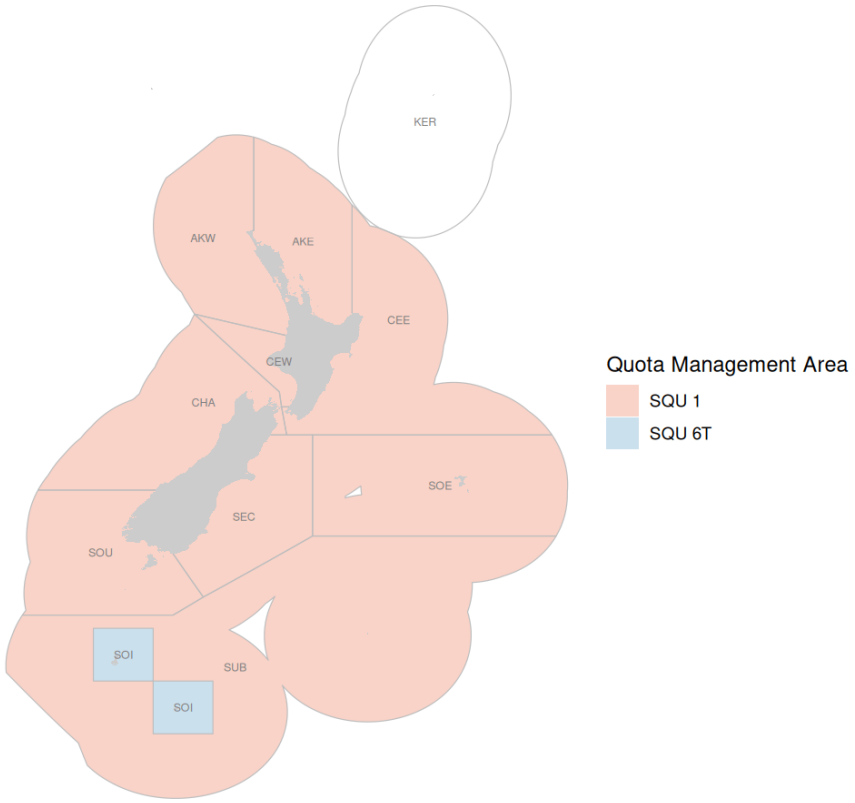


Figure 692: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for squid (coloured areas, per legend).

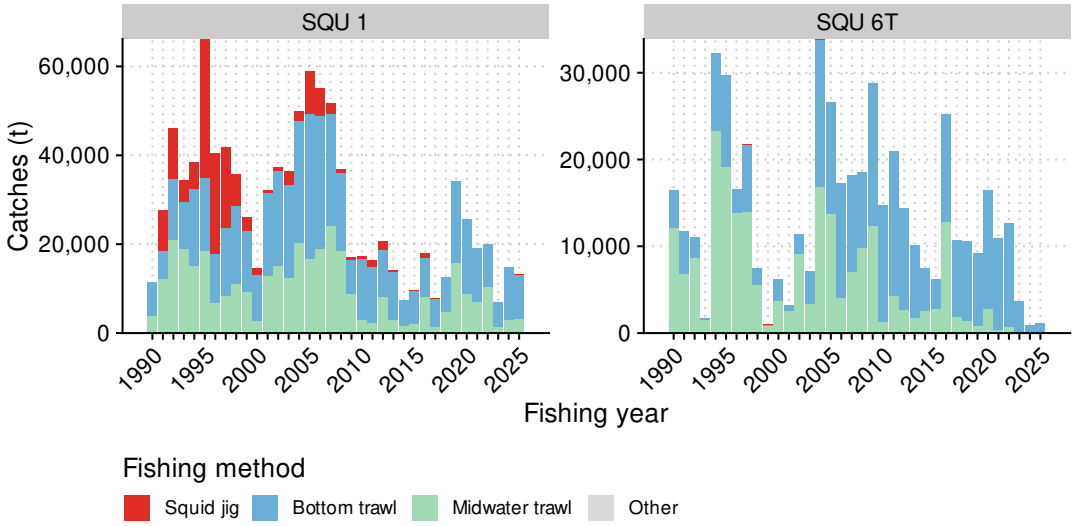


Figure 693: Catches of squid by fishing method, for events within the squid Quota Management Areas. Methods grouped as Other include: BLL, BPT, BS, CP, CRP, D, DL, DPN, DPS, DS, DV, FN, FP, HL, L, MPT, OCP, PL, POT, PRB, PRM, PS, PSH, RLP, RN, SLL, SN, T, TL.

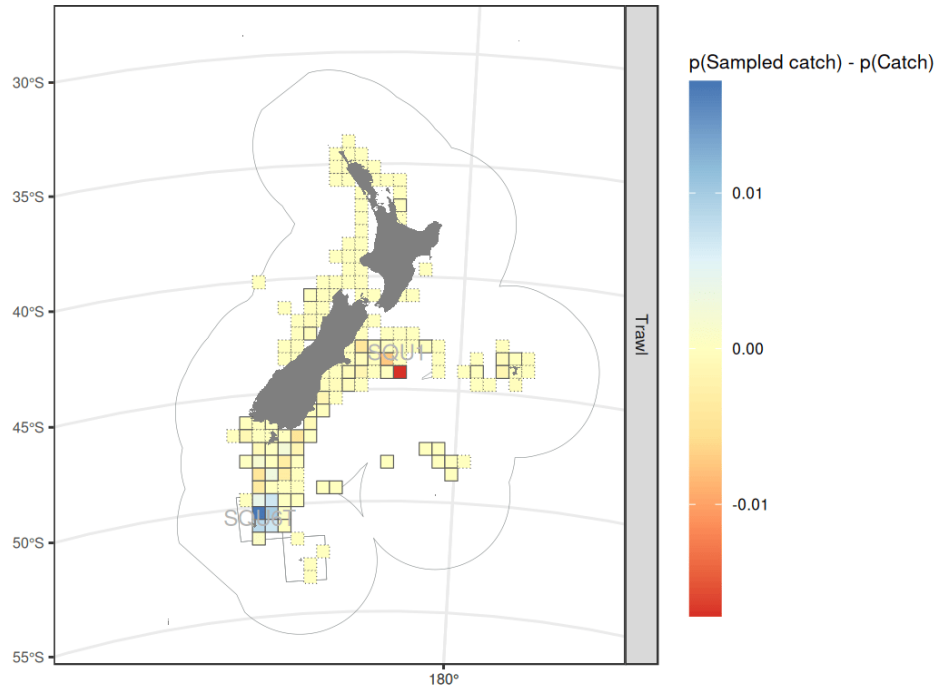


Figure 694: Differences in the relative proportions of catch and sampled catch for squid during 2021–2025. Cells with a dotted border had no sampling.

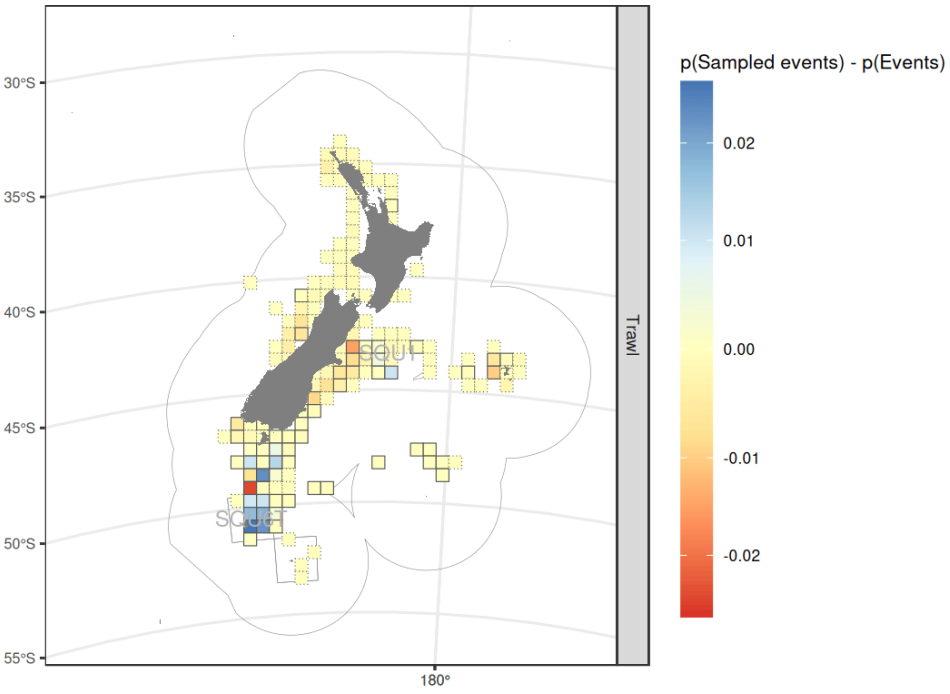


Figure 695: Differences in the relative proportions of events meeting the sampling threshold and sampled events for squid during 2021–2025. Cells with a dotted border had no sampling.

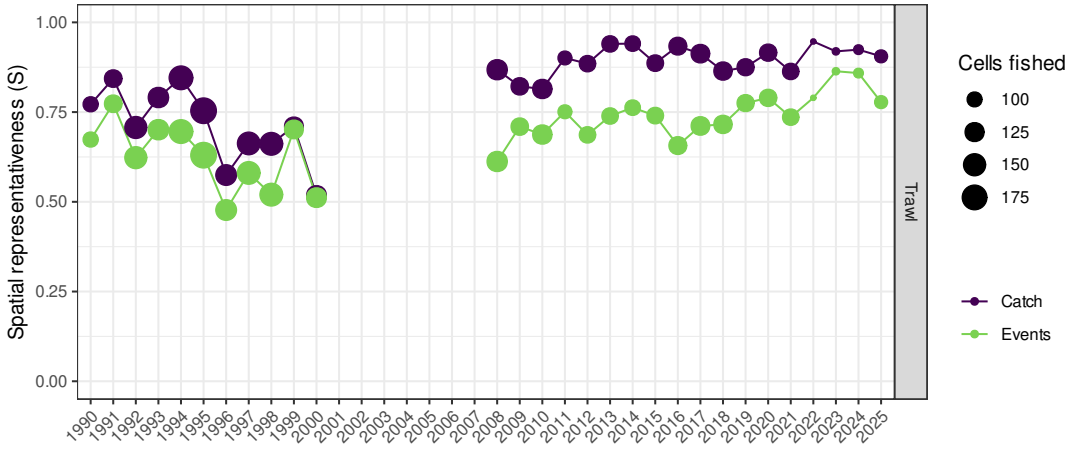


Figure 696: Spatial representativeness of observer sampling of squid by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.

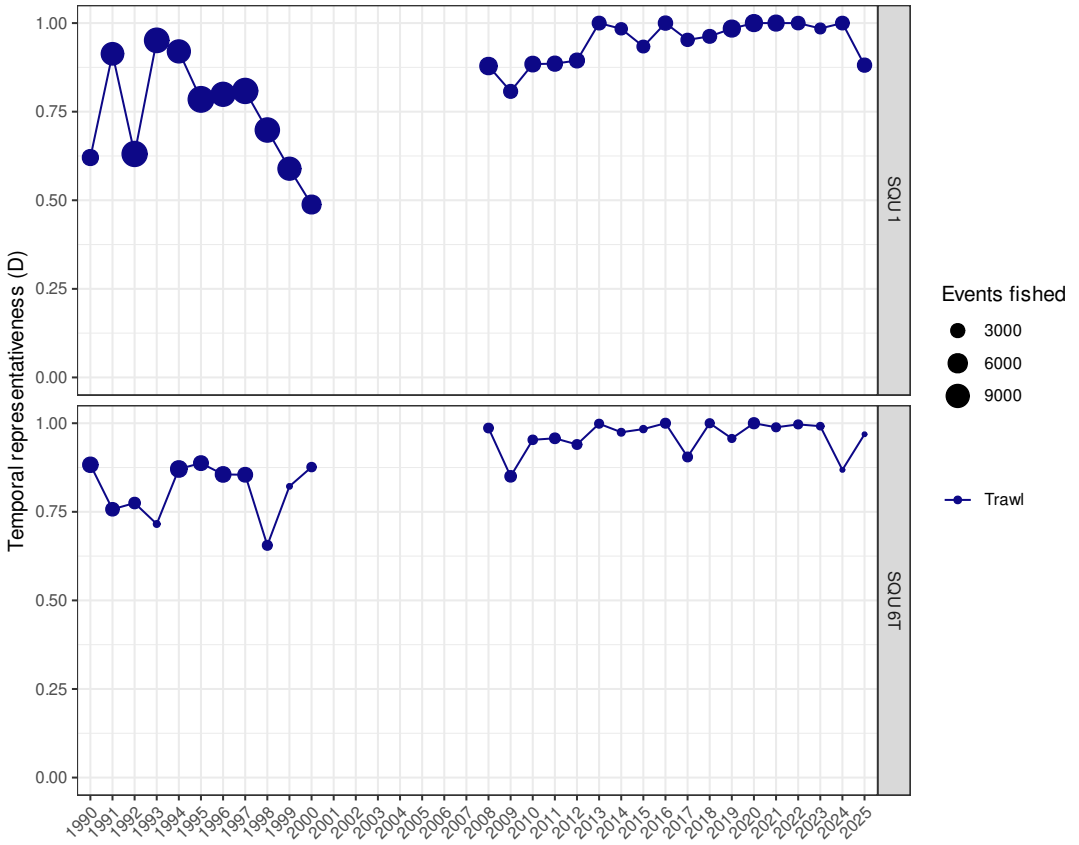


Figure 697: Temporal representativeness of observer sanpling of squid by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.10.1 SQU 1: Trawl fishery

2.10.1.1 Length-frequency samples

Table 60: Length-frequency samples of squid from the SQU 1 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of squid exceeded a potential sampling threshold of 110 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	3 976	63	6 860	1.58
1991	8 286	318	32 903	3.84
1992	10 365	113	10 917	1.09
1993	9 853	526	54 176	5.34
1994	8 585	166	17 107	1.93
1995	10 854	133	13 313	1.23
1996	8 476	41	4 193	0.48
1997	10 269	86	8 582	0.84
1998	9 634	75	7 020	0.78
1999	8 415	76	7 905	0.90
2000	5 608	81	8 244	1.44
2001	10 183	0	0	0.00
2002	7 794	0	0	0.00
2003	9 543	0	0	0.00
2004	8 507	0	0	0.00
2005	10 540	0	0	0.00
2006	8 869	0	0	0.00
2007	8 495	0	0	0.00
2008	4 831	323	32 757	6.69
2009	2 945	275	29 433	9.34
2010	3 845	413	40 769	10.74
2011	3 517	433	43 511	12.31
2012	3 418	372	38 079	10.88
2013	2 783	779	81 454	27.99
2014	2 174	628	62 143	28.89
2015	2 355	625	58 694	26.54
2016	3 044	590	57 236	19.38
2017	2 615	498	46 424	19.04
2018	2 670	666	70 145	24.94
2019	4 607	1 248	128 892	27.09
2020	4 587	1 032	106 798	22.50
2021	3 945	908	93 754	23.02
2022	2 753	1 160	125 953	42.14
2023	1 696	660	71 153	38.92
2024	2 807	1 380	142 070	49.16
2025	3 057	824	80 432	26.95

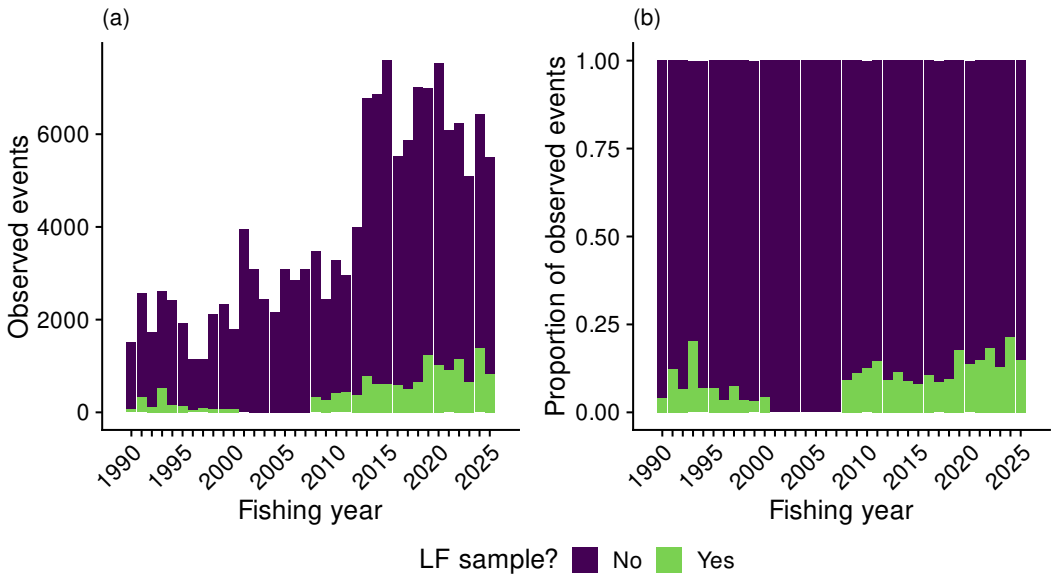


Figure 698: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SQU 1 where the squid catch exceeded the 110 kg threshold, with and without length-frequency sampling.**

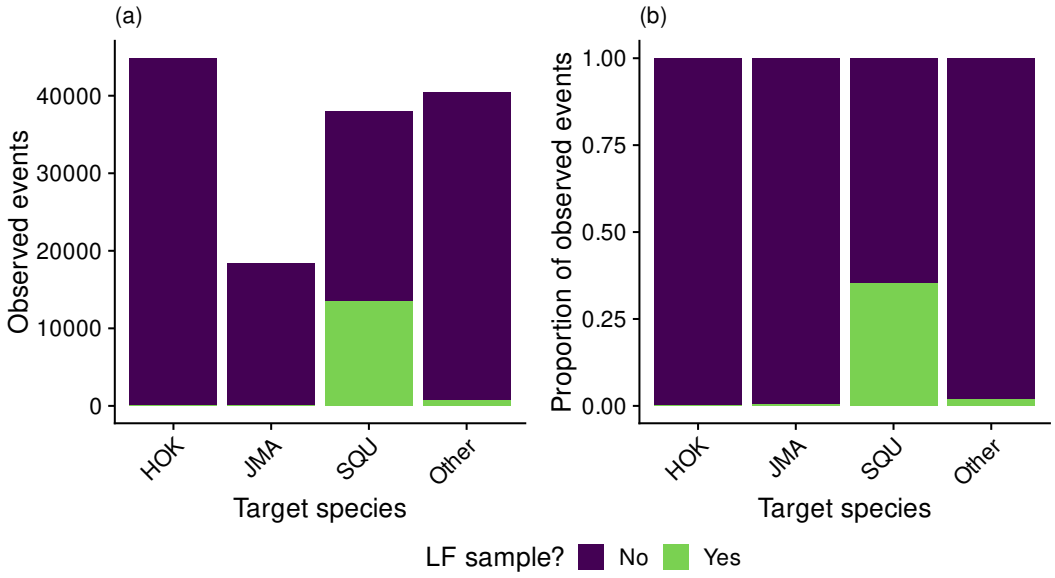


Figure 699: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SQU 1 where the squid catch exceeded the 110 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

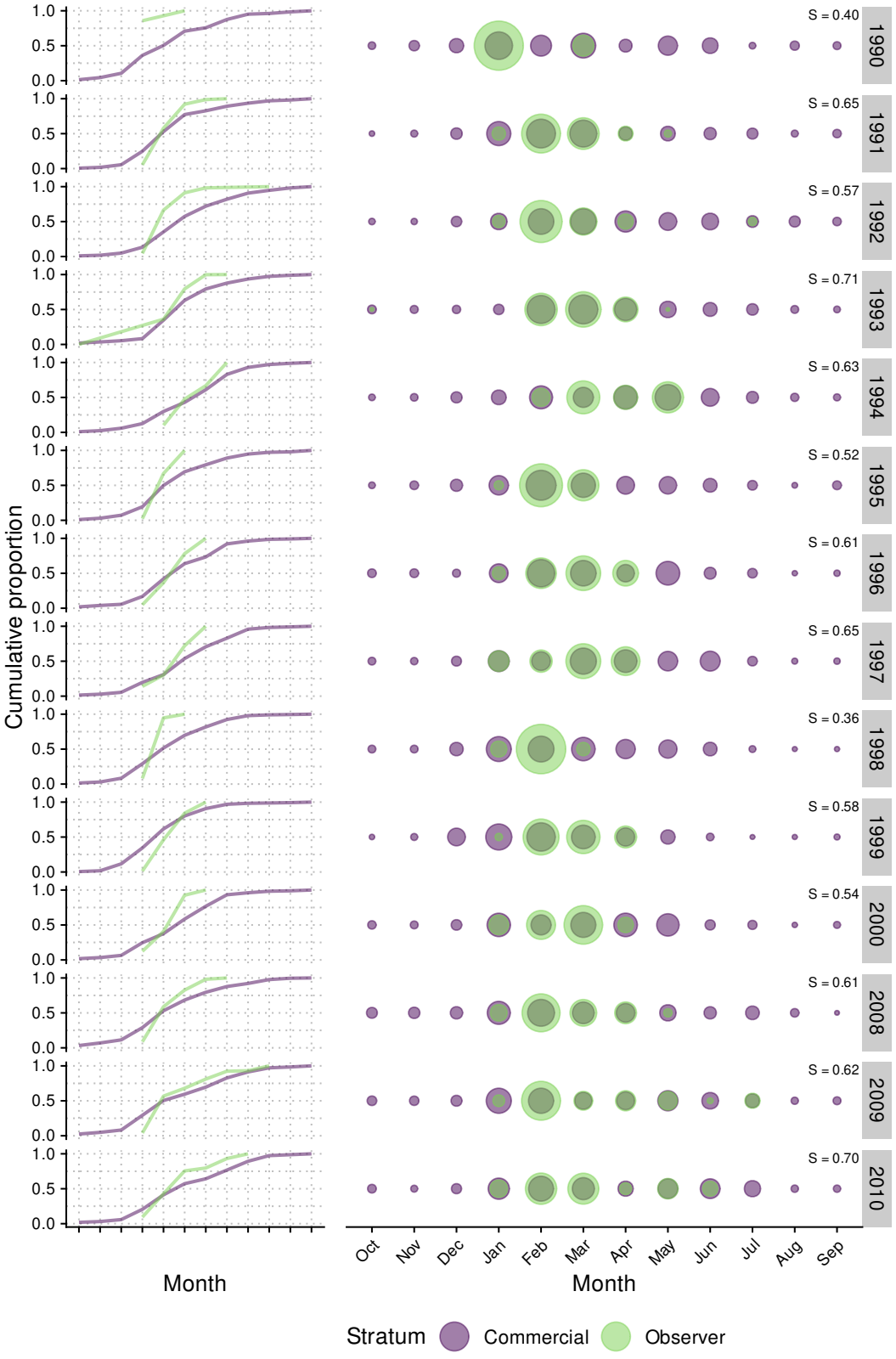


Figure 700: Monthly representativeness of observer sampling coverage of Trawl fishing events in SQU 1, where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

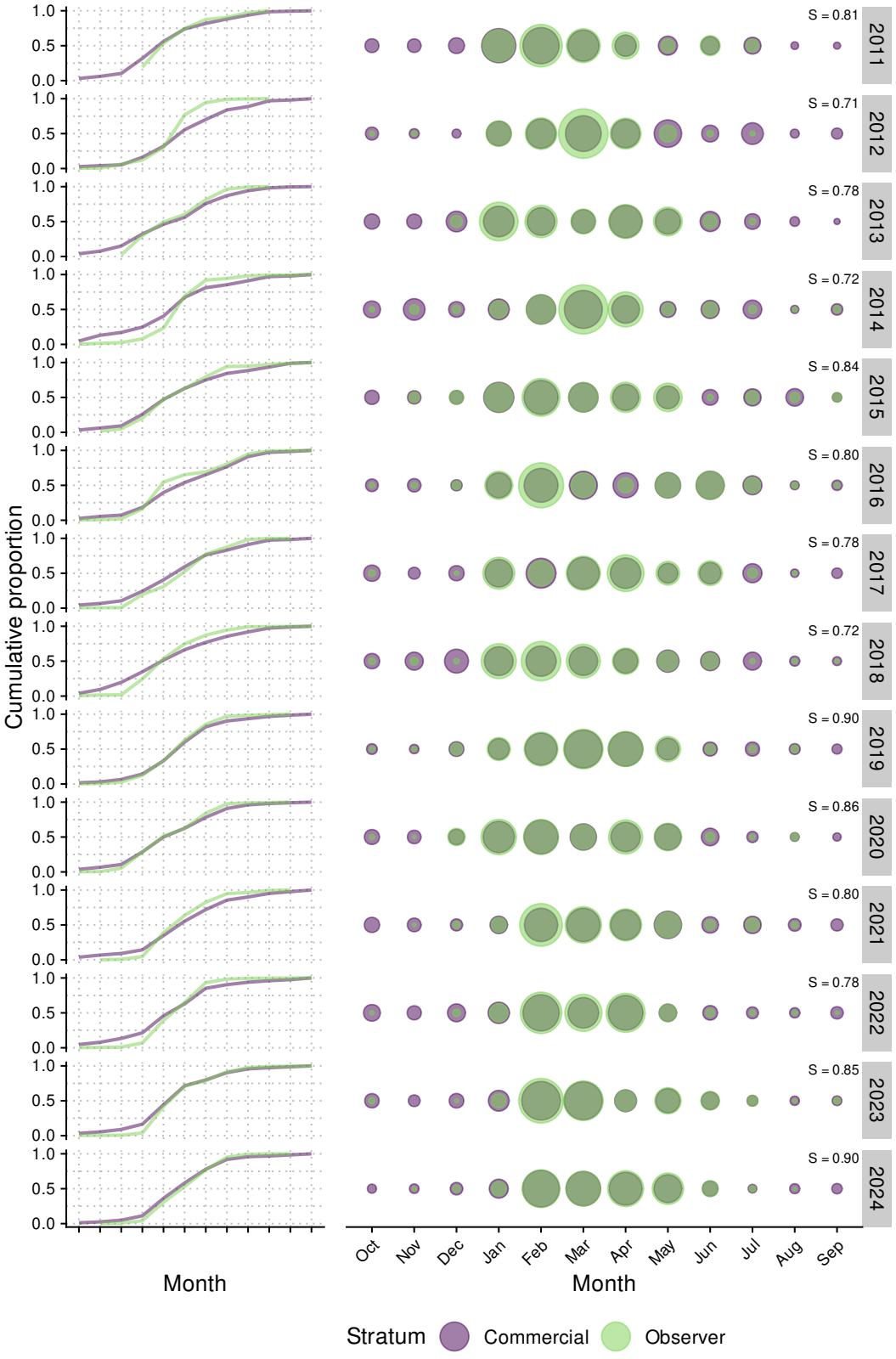


Figure 701: Monthly representativeness of observer sampling coverage of Trawl fishing events in SQU 1, where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

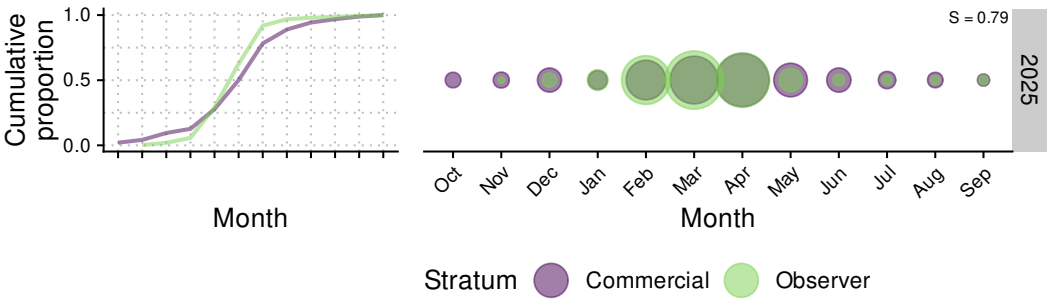


Figure 702: **Monthly representativeness of observer sampling coverage of Trawl fishing events in SQU 1, where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

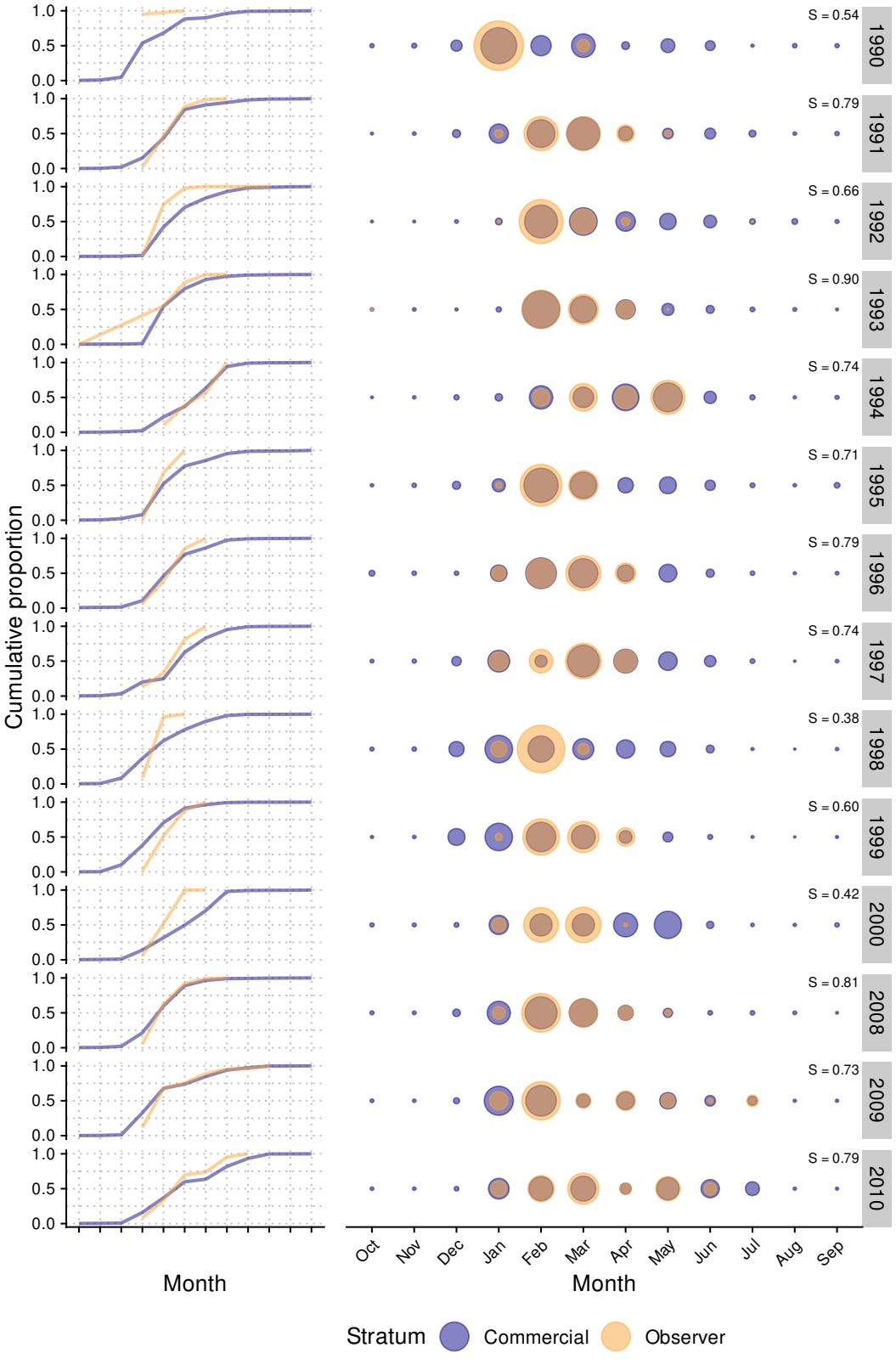


Figure 703: **Monthly representativeness of observer sampling coverage of Trawl catch in SQU 1, from events where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

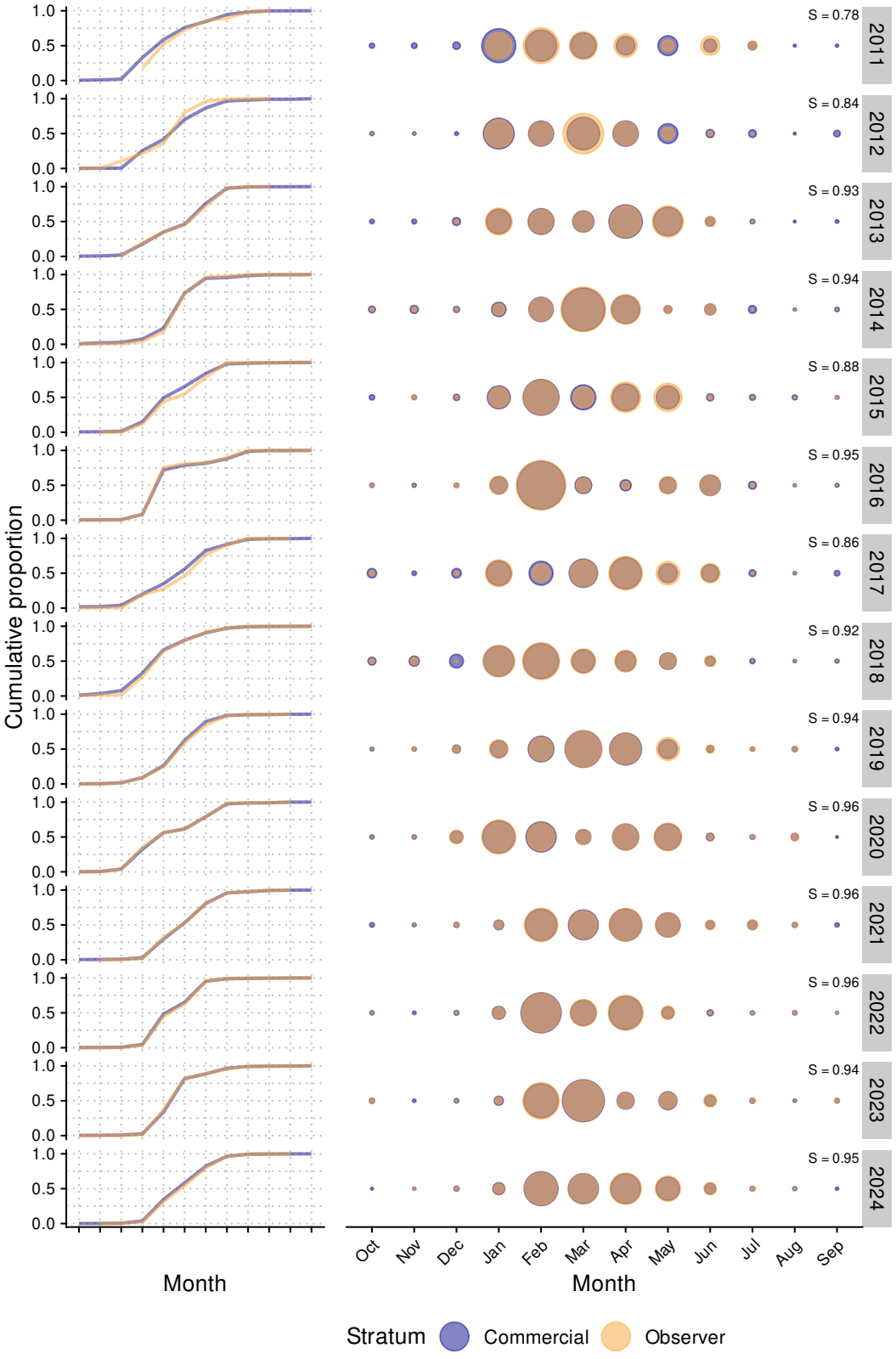


Figure 704: **Monthly representativeness of observer sampling coverage of Trawl catch in SQU 1, from events where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

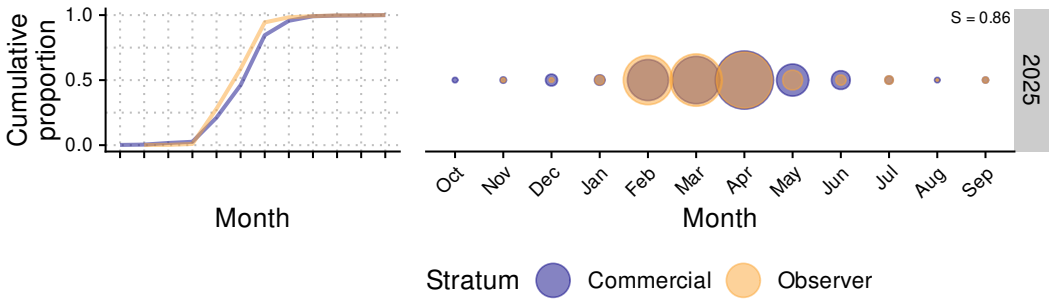


Figure 705: **Monthly representativeness of observer sampling coverage of Trawl catch in SQU 1, from events where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

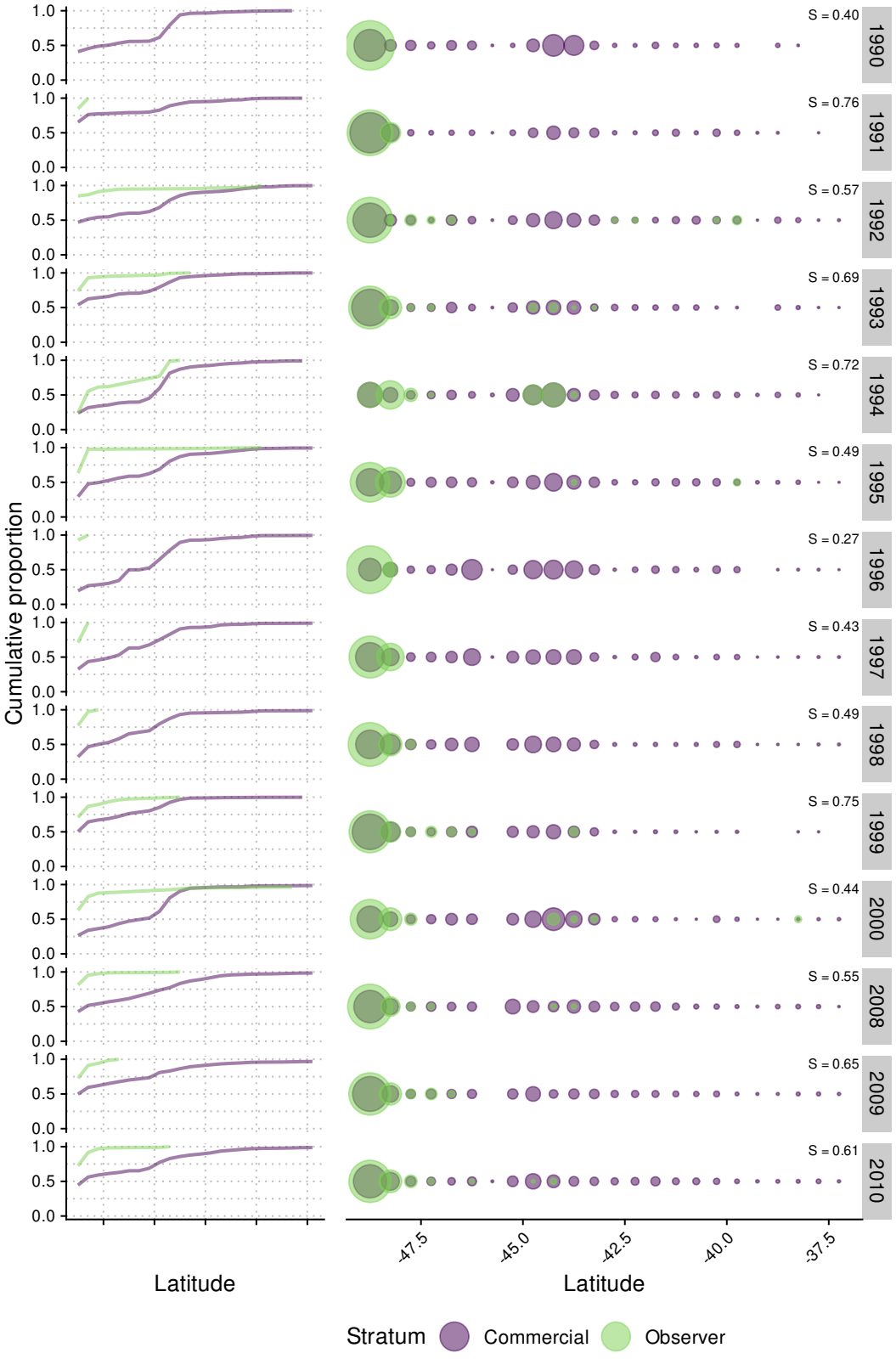


Figure 706: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 1, where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

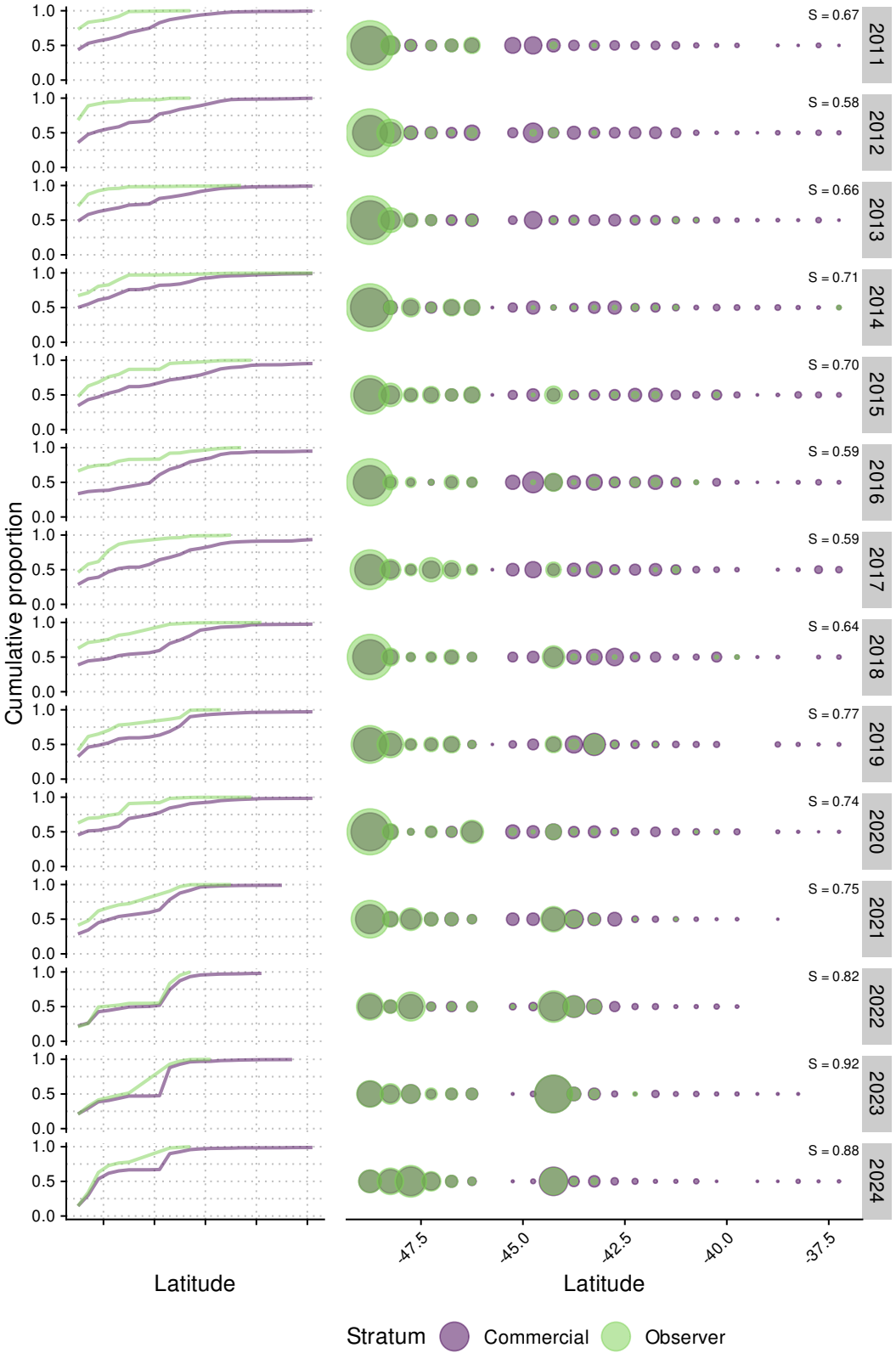


Figure 707: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 1, where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

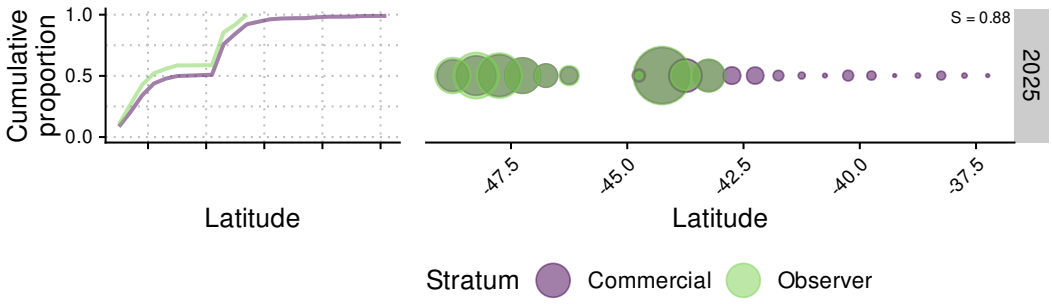


Figure 708: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 1, where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

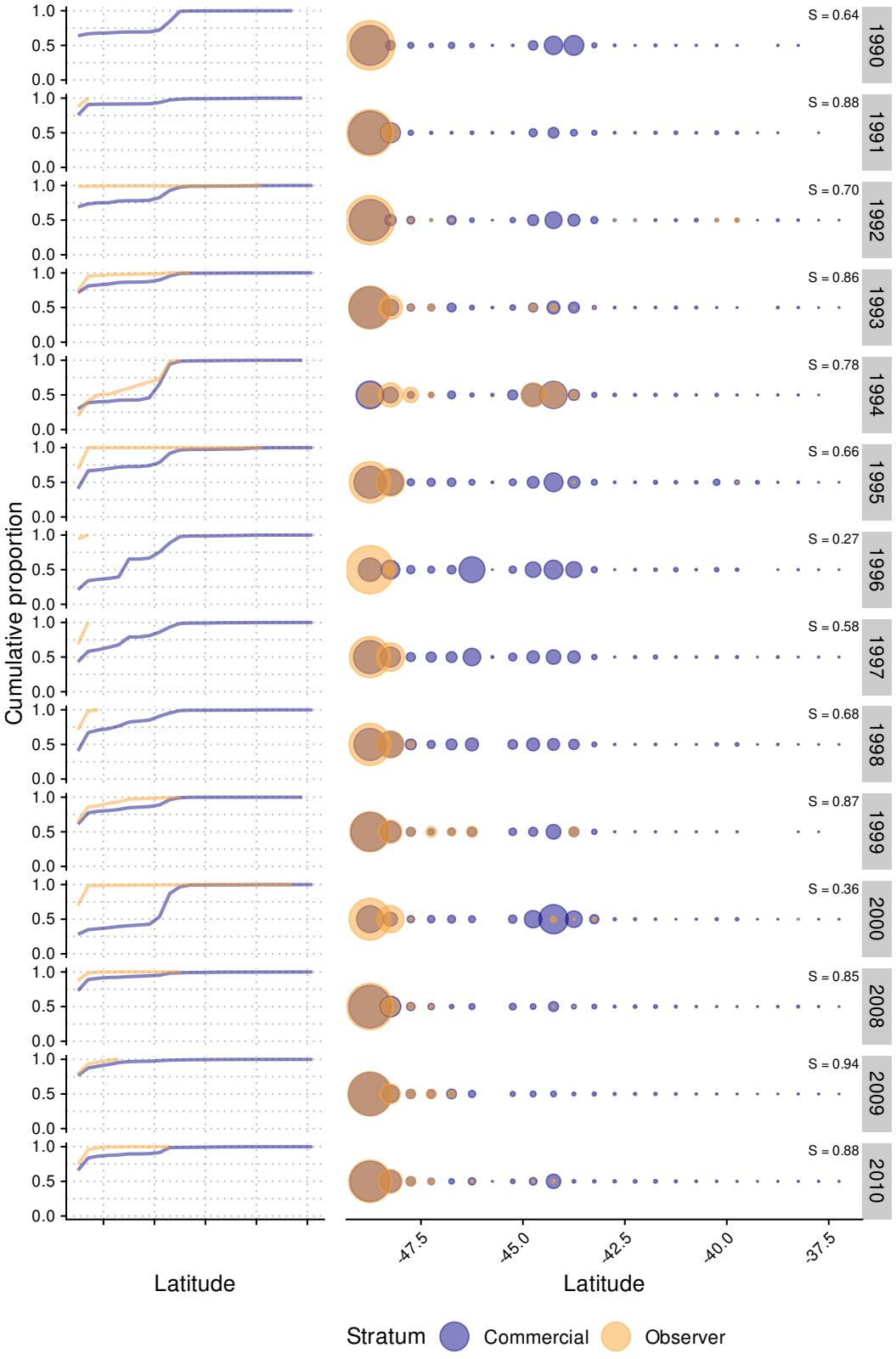


Figure 709: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SQU 1, from events where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

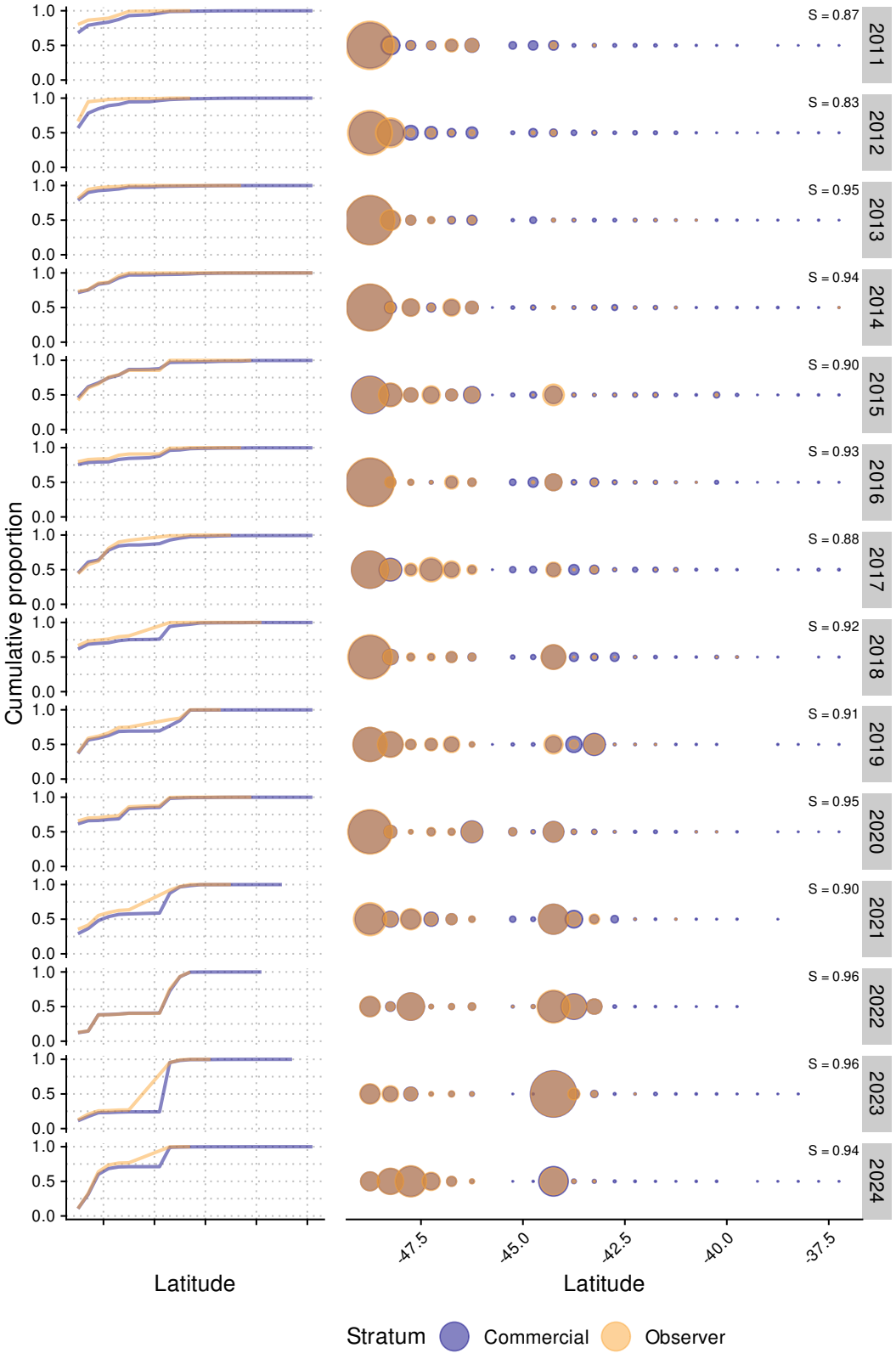


Figure 710: Latitudinal representativeness of observer sampling coverage of Trawl catch in SQU 1, from events where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

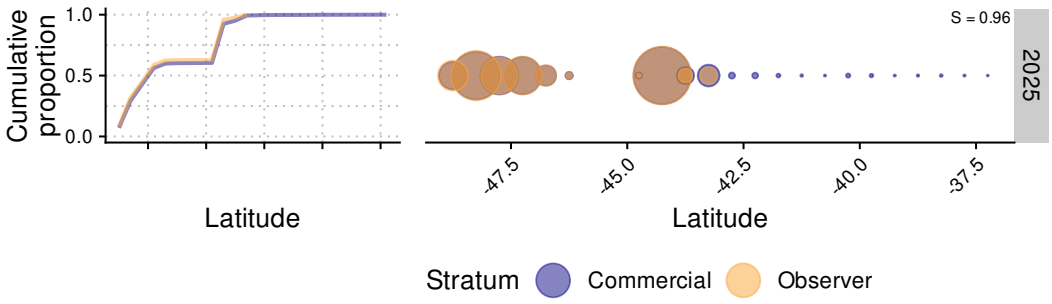


Figure 711: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SQU 1, from events where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

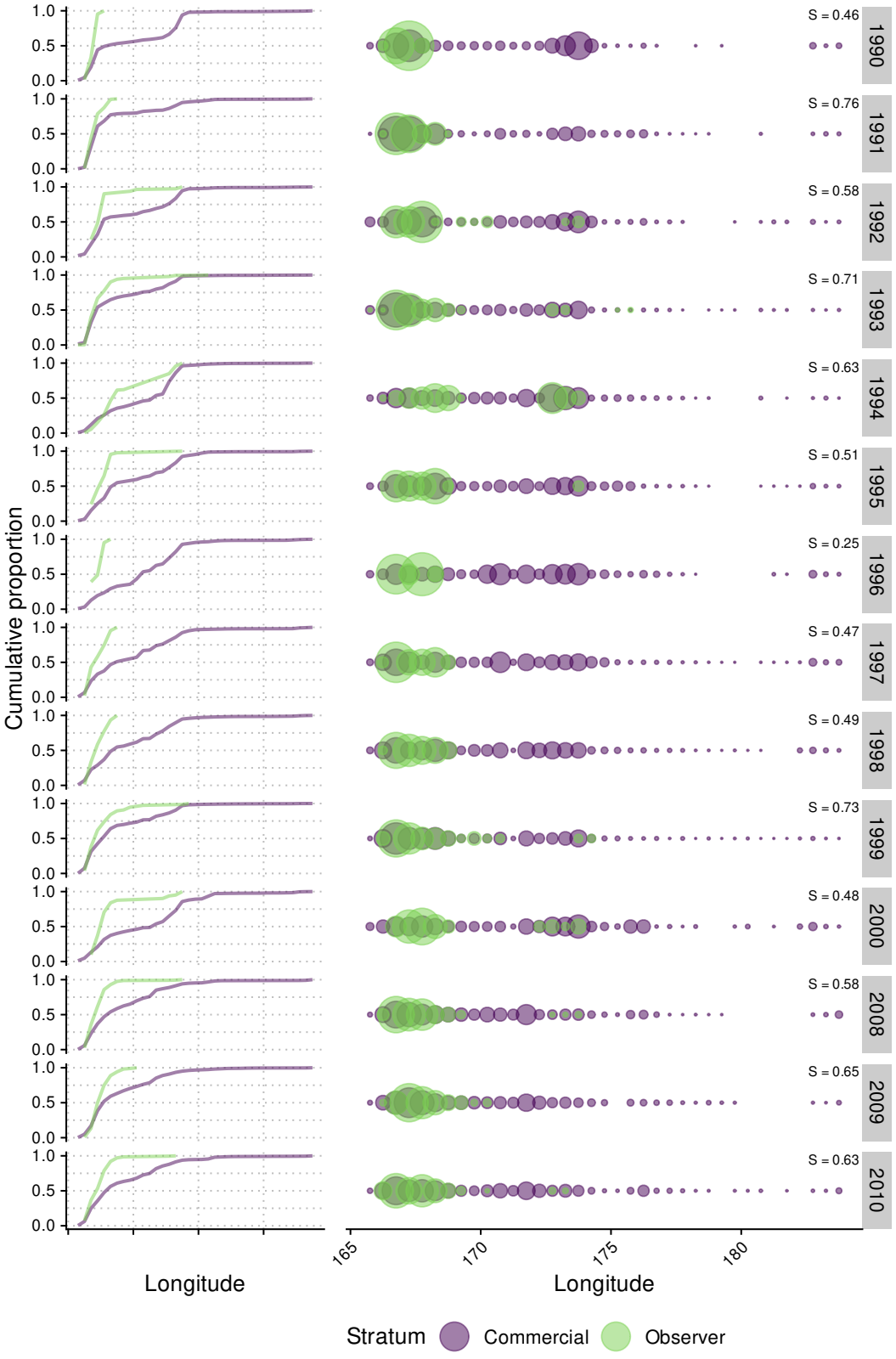


Figure 712: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 1, where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

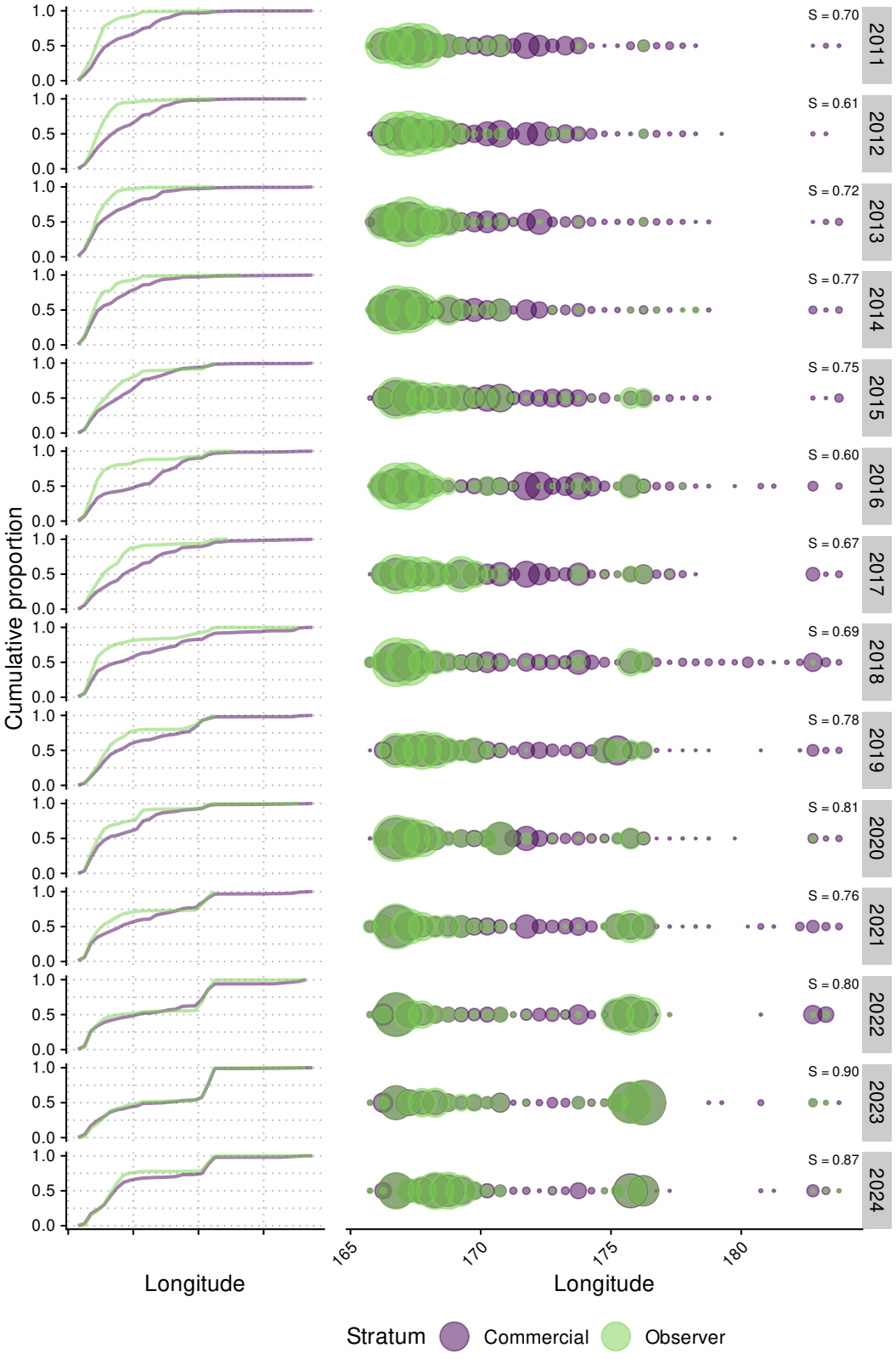


Figure 713: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 1, where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

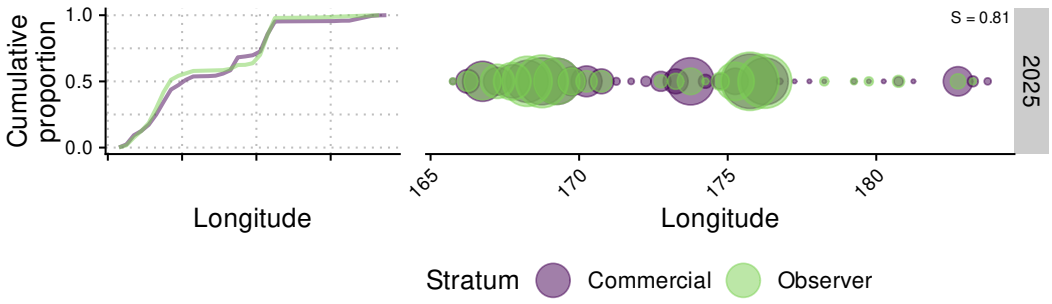


Figure 714: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 1, where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

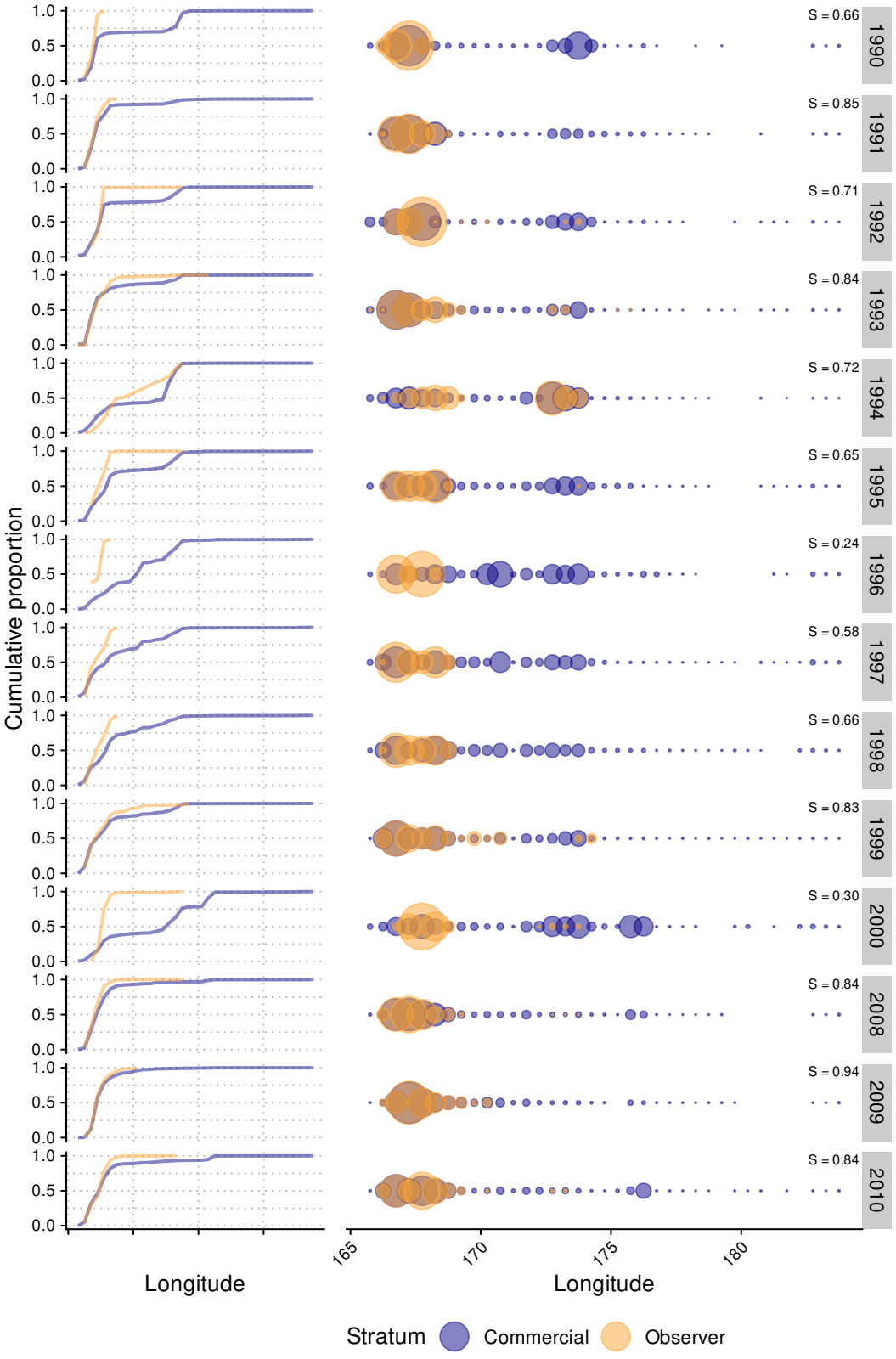


Figure 715: Longitudinal representativeness of observer sampling coverage of Trawl catch in SQU 1, from events where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

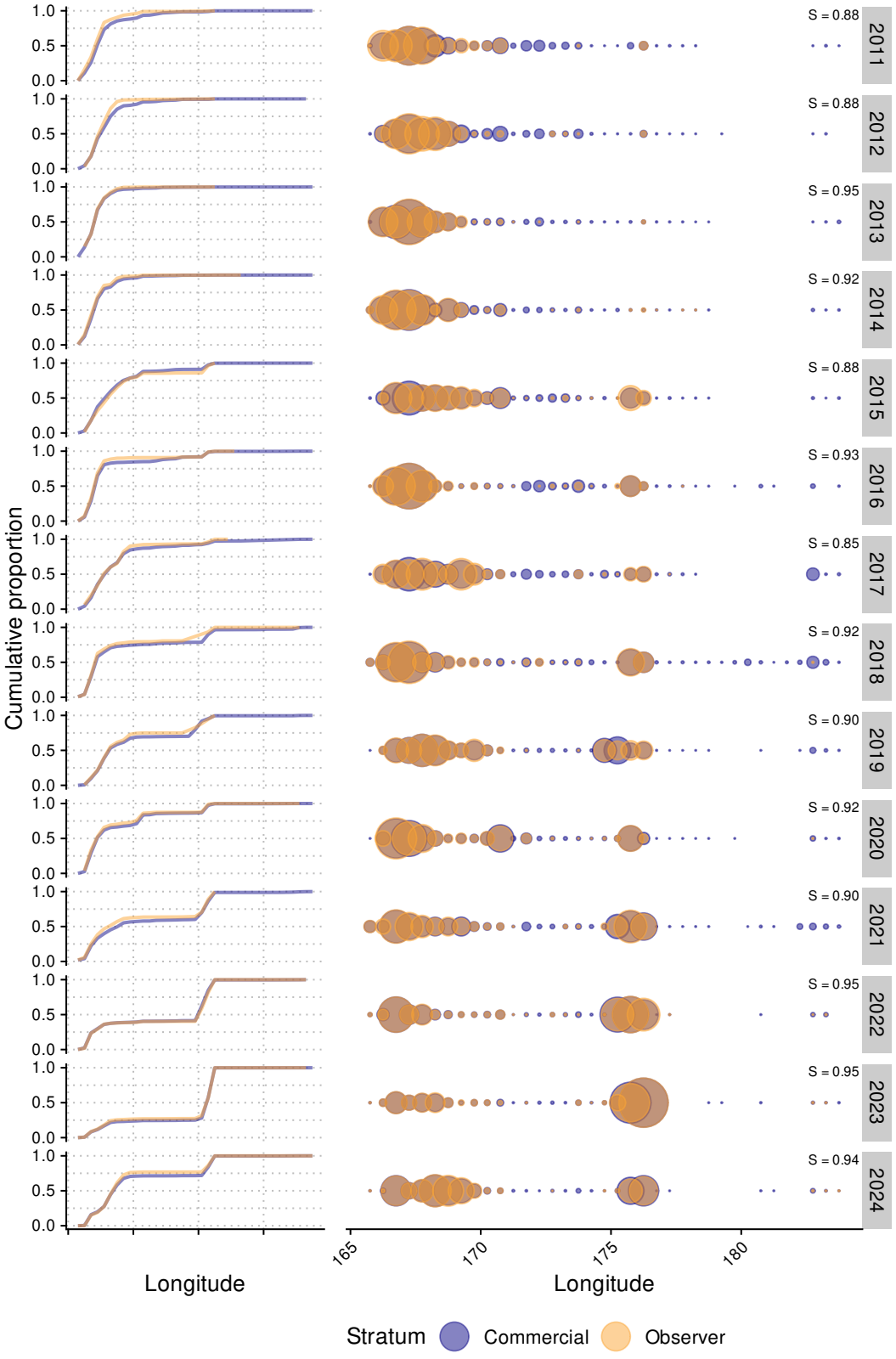


Figure 716: Longitudinal representativeness of observer sampling coverage of Trawl catch in SQU 1, from events where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

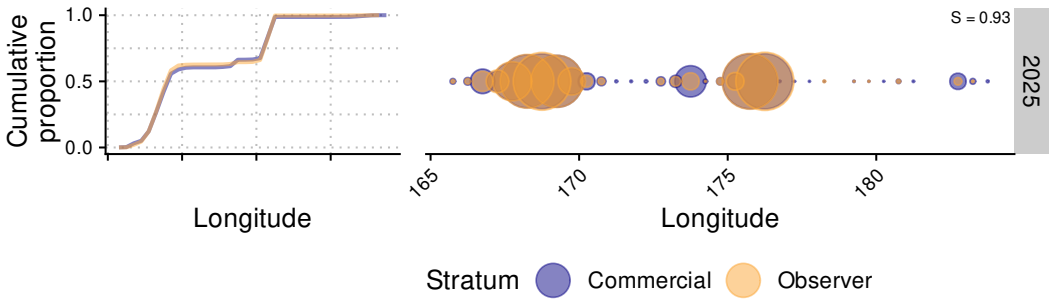


Figure 717: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SQU 1, from events where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

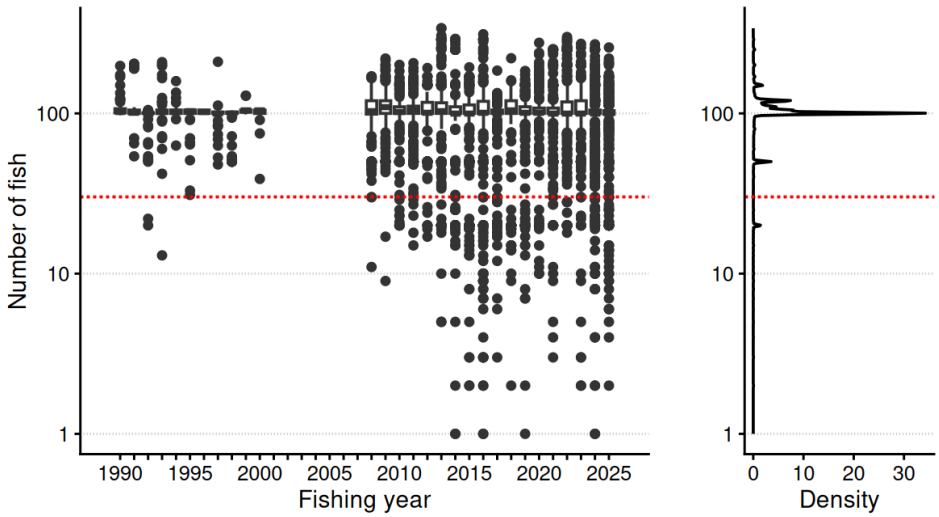


Figure 718: **Length-frequency sample sizes for observed fishing events in SQU 1 where squid were sampled. The red dashed line indicates a sample size of 30 fish.**

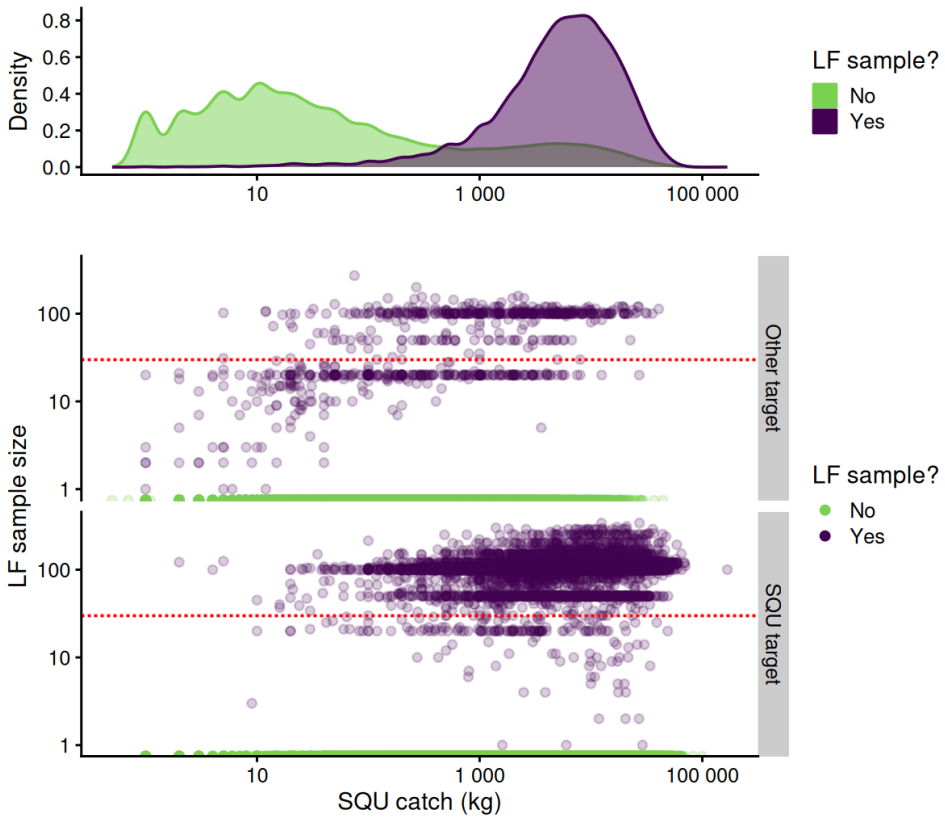


Figure 719: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in SQU 1 in relation to the total squid catch from an event, separately for squid target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.10.1.2 Catch quantification

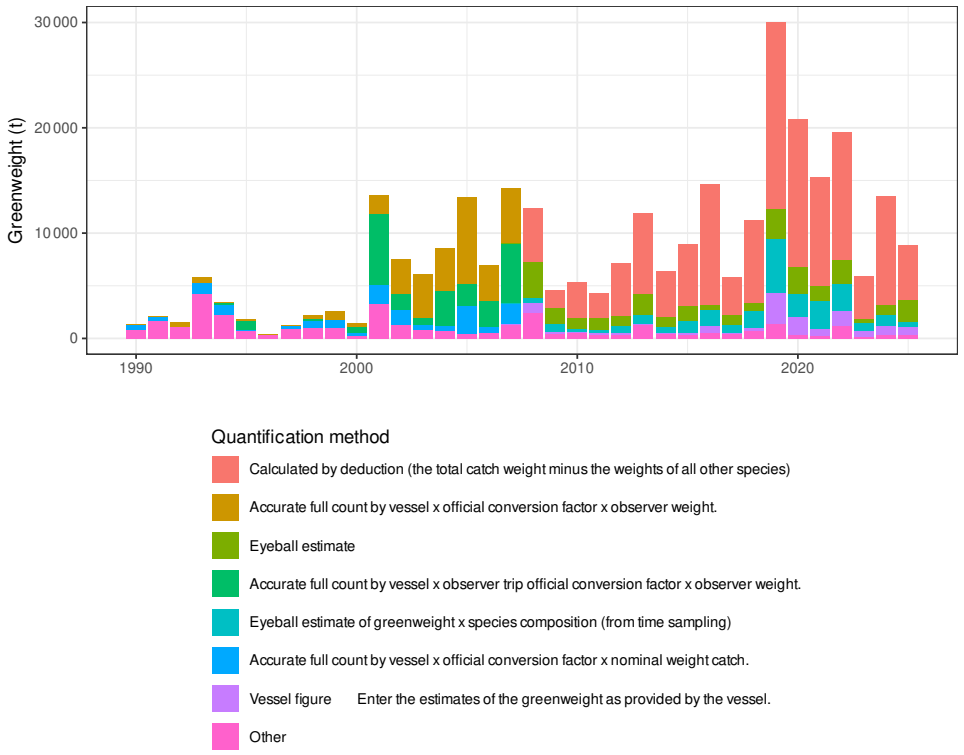


Figure 720: Methods used by observers to quantify the catch of squid in the SQU 1 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.10.2 SQU 6T: Trawl fishery

2.10.2.1 Length-frequency samples

Table 61: Length-frequency samples of squid from the SQU 6T Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of squid exceeded a potential sampling threshold of 110 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	3 685	242	26 534	6.57
1991	2 745	128	12 967	4.66
1992	1 886	79	7 765	4.19
1993	531	54	5 347	10.17
1994	4 342	175	17 740	4.03
1995	3 355	95	9 873	2.83
1996	3 784	231	23 552	6.10
1997	3 330	146	14 191	4.38
1998	1 335	60	5 361	4.49
1999	329	26	2 731	7.90
2000	1 177	47	4 777	3.99
2001	588	0	0	0.00
2002	1 655	0	0	0.00
2003	1 401	0	0	0.00
2004	2 540	0	0	0.00
2005	2 652	0	0	0.00
2006	2 403	0	0	0.00
2007	1 300	0	0	0.00
2008	1 256	265	27 414	21.10
2009	1 913	475	51 697	24.83
2010	1 191	176	18 866	14.78
2011	1 588	386	42 378	24.31
2012	1 301	291	30 623	22.37
2013	1 044	566	58 809	54.21
2014	746	387	39 903	51.88
2015	626	263	24 568	42.01
2016	1 346	699	72 705	51.93
2017	1 312	482	48 155	36.74
2018	1 068	517	54 358	48.41
2019	796	421	44 217	52.89
2020	1 759	804	82 212	45.71
2021	1 046	602	67 627	57.55
2022	1 052	774	84 802	73.57
2023	686	423	42 623	61.66
2024	205	90	9 091	43.90
2025	197	146	14 480	74.11

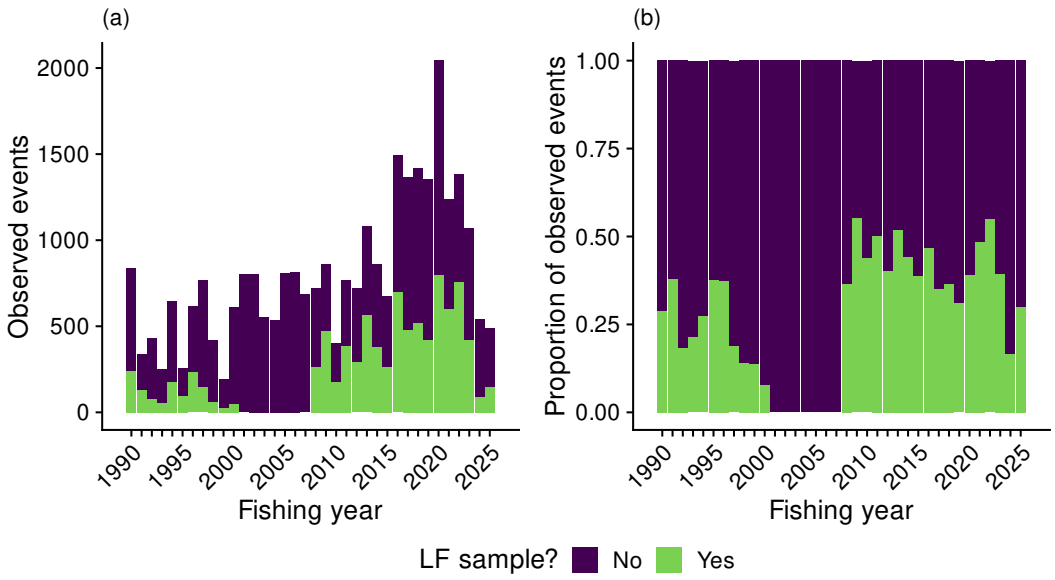


Figure 721: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SQU 6T where the squid catch exceeded the 110 kg threshold, with and without length-frequency sampling.**

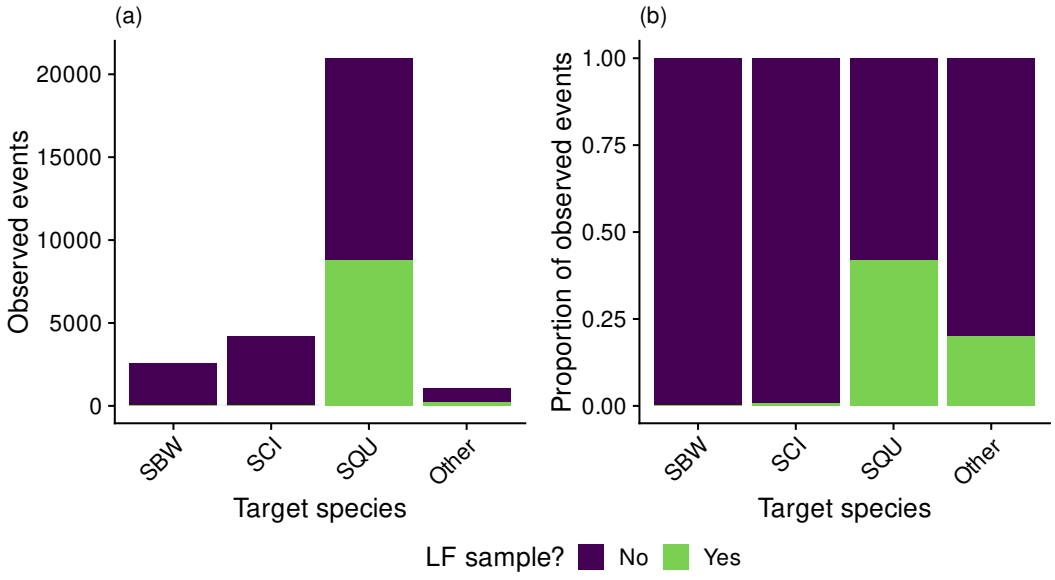


Figure 722: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SQU 6T where the squid catch exceeded the 110 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

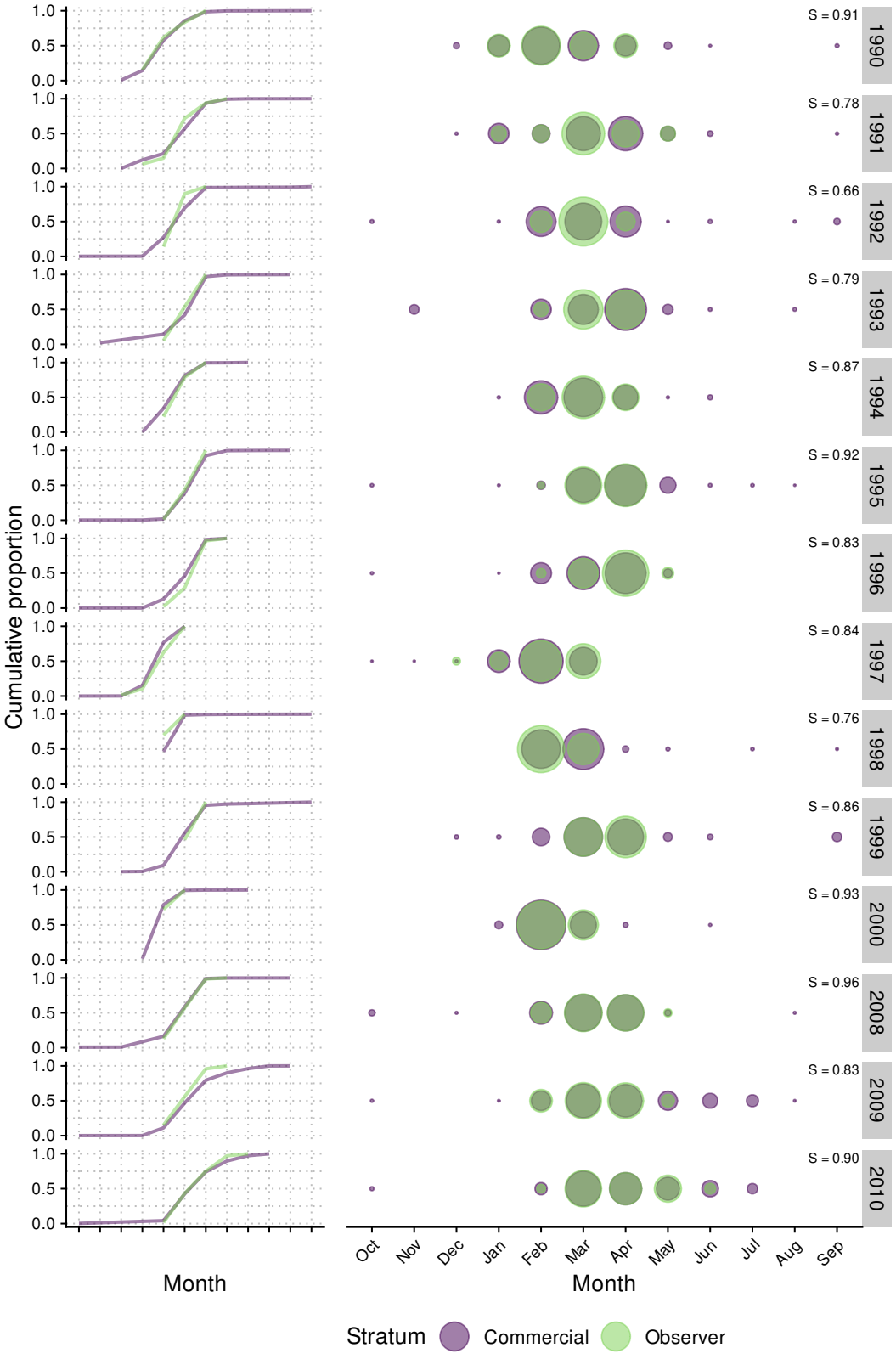


Figure 723: Monthly representativeness of observer sampling coverage of Trawl fishing events in SQU 6T, where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

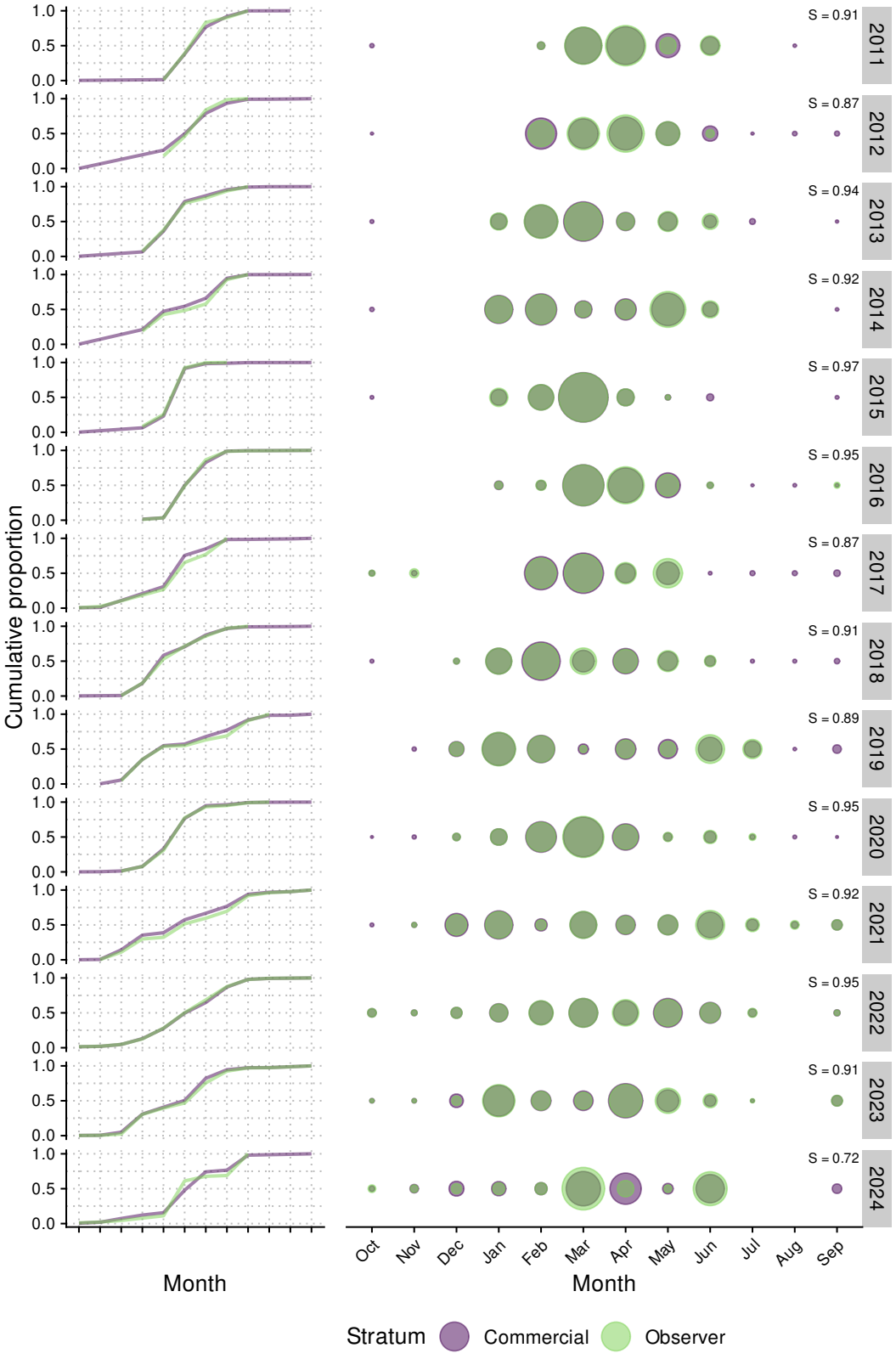


Figure 724: Monthly representativeness of observer sampling coverage of Trawl fishing events in SQU 6T, where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

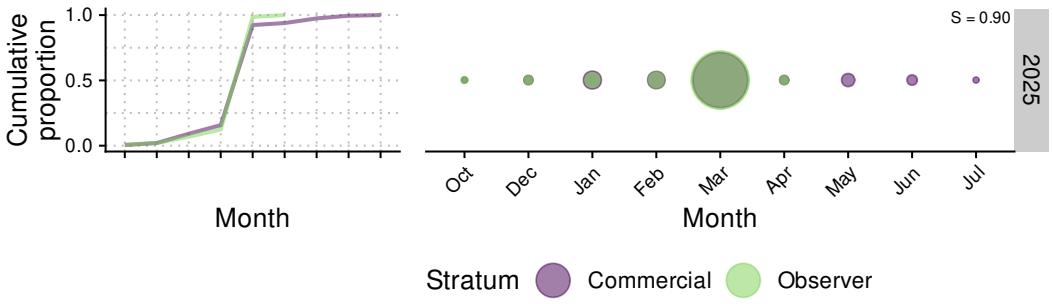


Figure 725: **Monthly representativeness of observer sampling coverage of Trawl fishing events in SQU 6T, where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

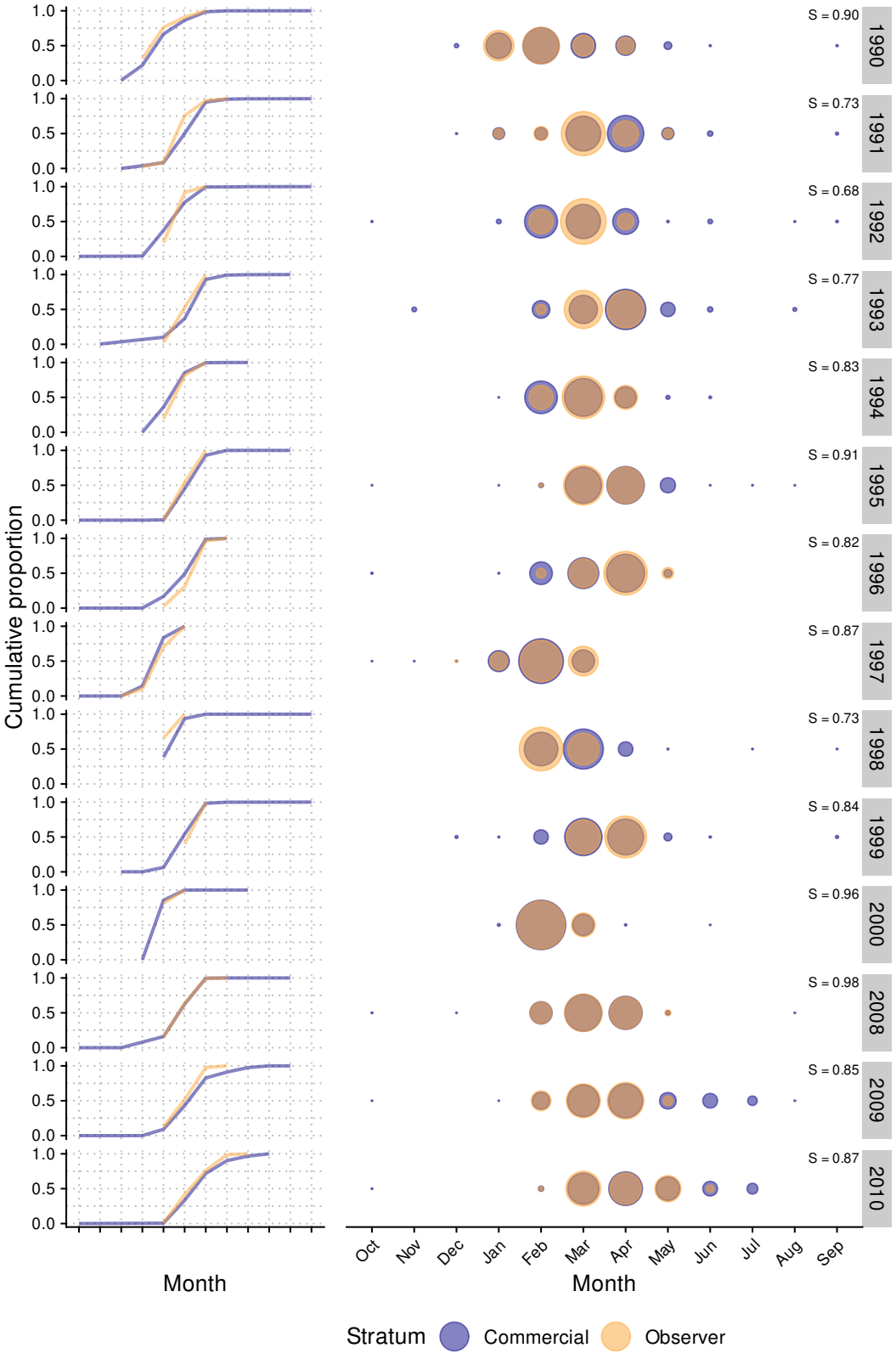


Figure 726: **Monthly representativeness of observer sampling coverage of Trawl catch in SQU 6T, from events where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

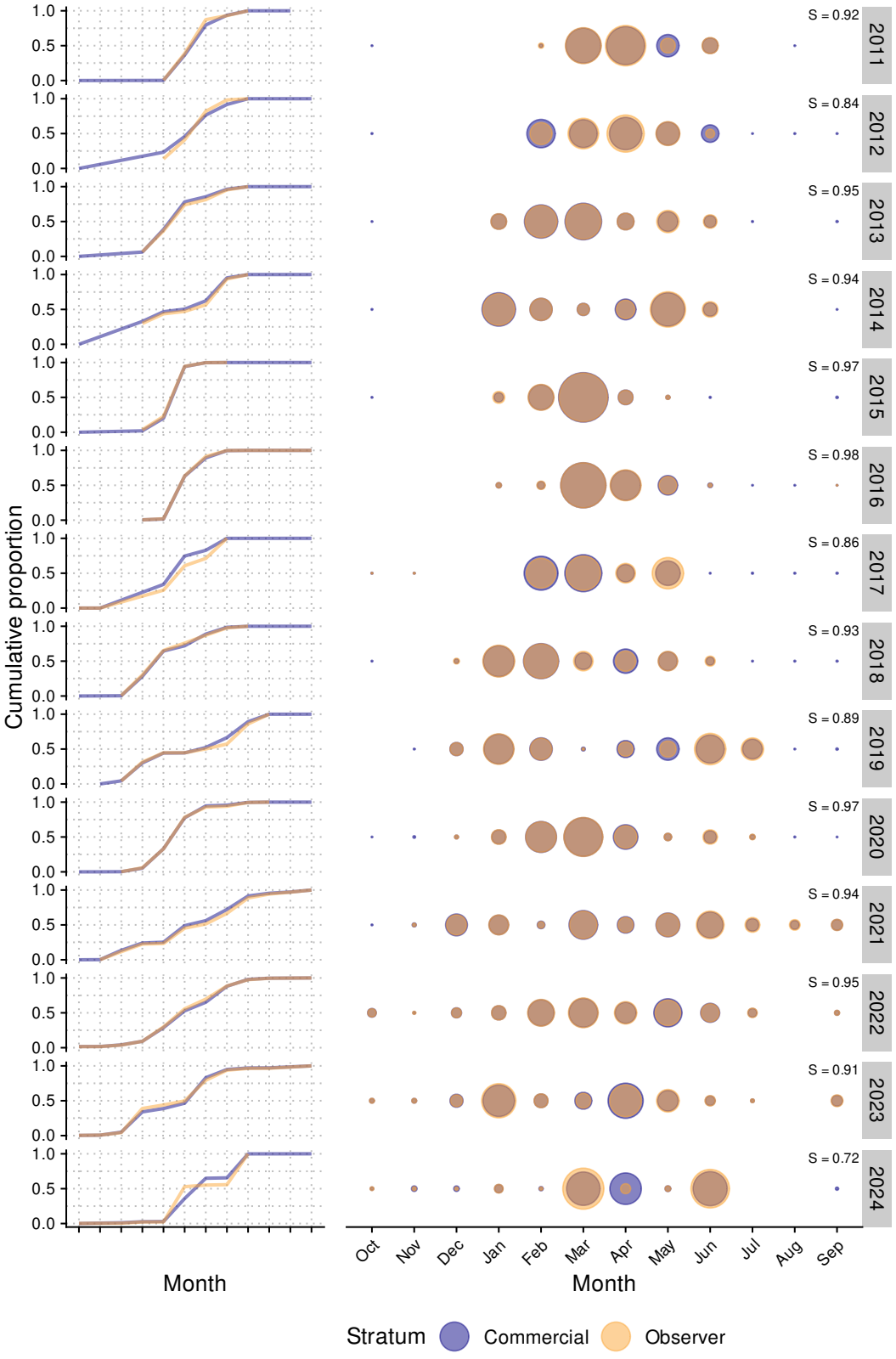


Figure 727: Monthly representativeness of observer sampling coverage of Trawl catch in SQU 6T, from events where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

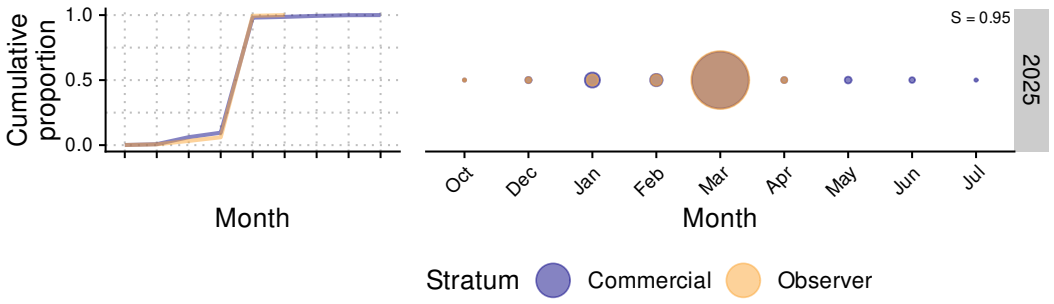


Figure 728: **Monthly representativeness of observer sampling coverage of Trawl catch in SQU 6T, from events where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

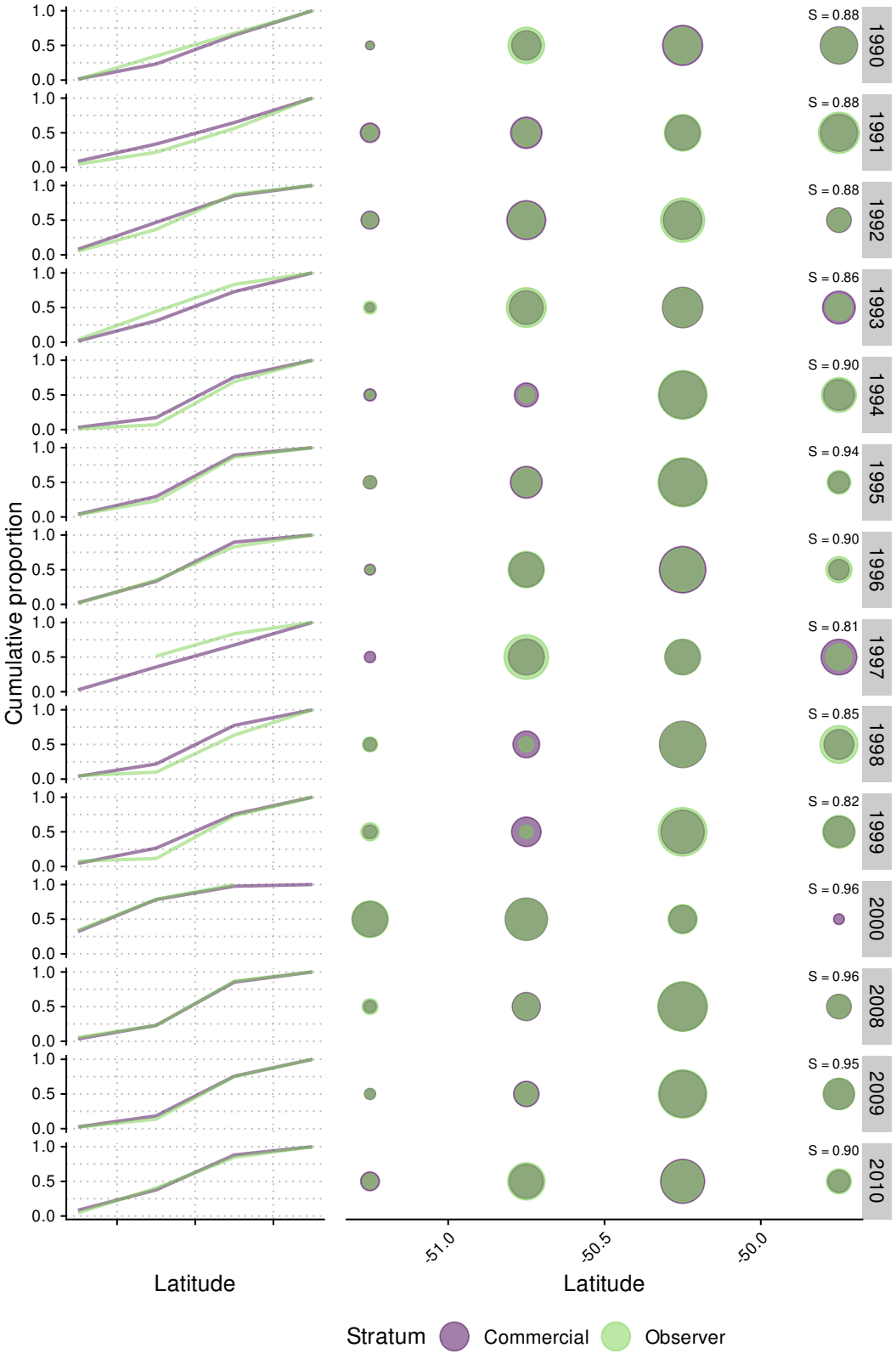


Figure 729: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 6T, where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

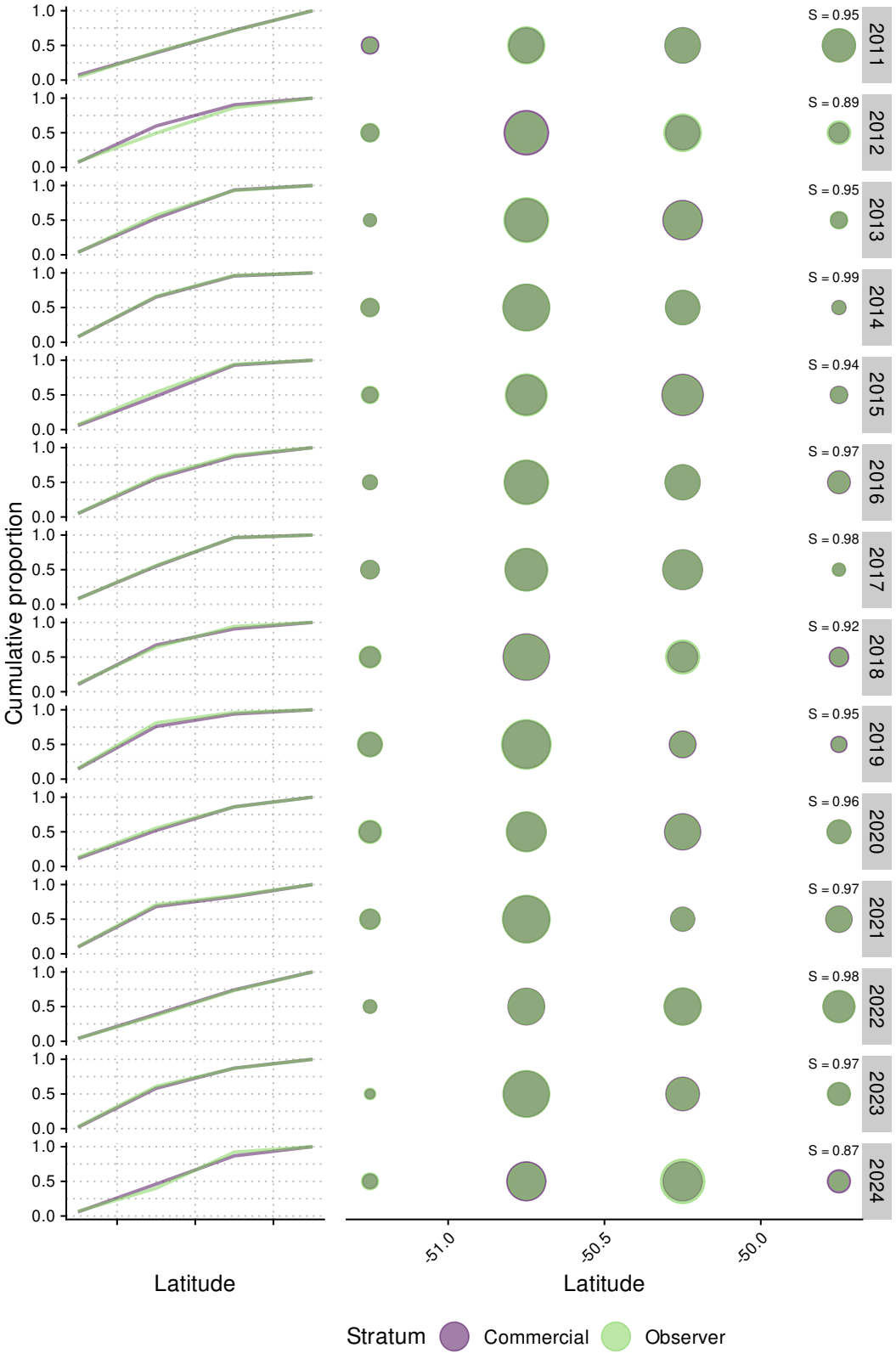


Figure 730: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 6T, where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

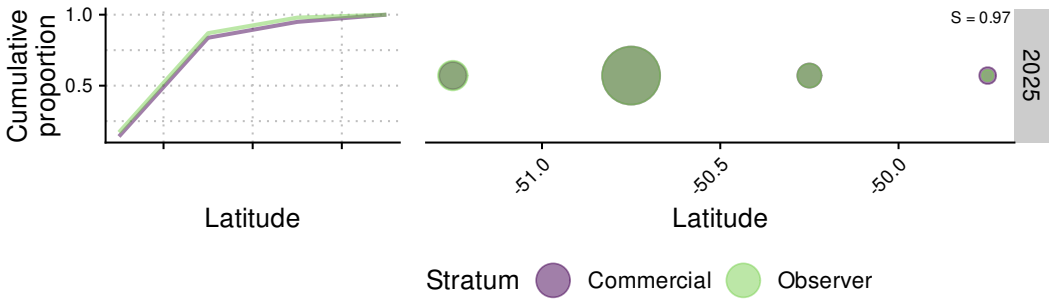


Figure 731: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 6T, where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

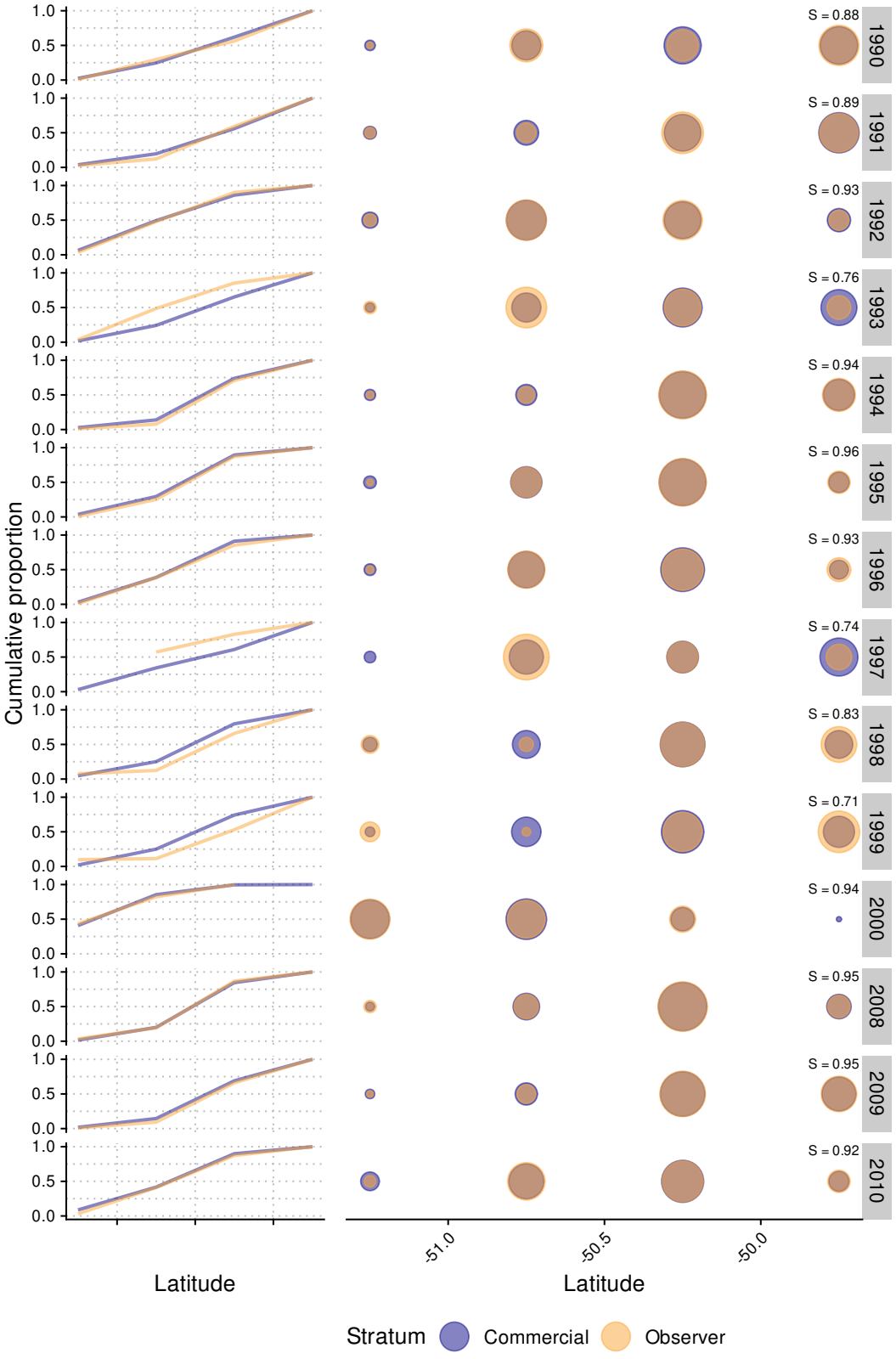


Figure 732: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SQU 6T, from events where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

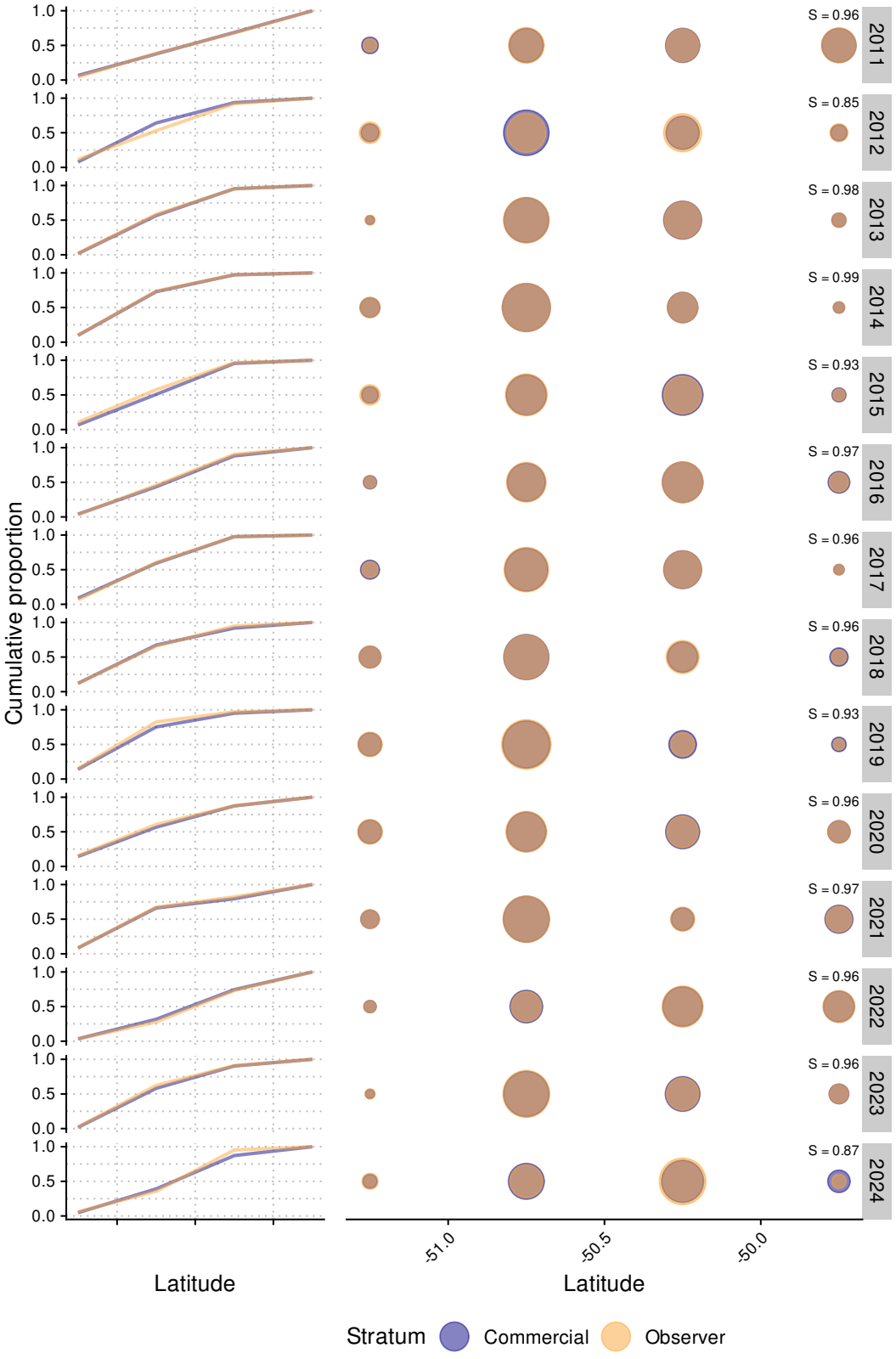


Figure 733: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SQU 6T, from events where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

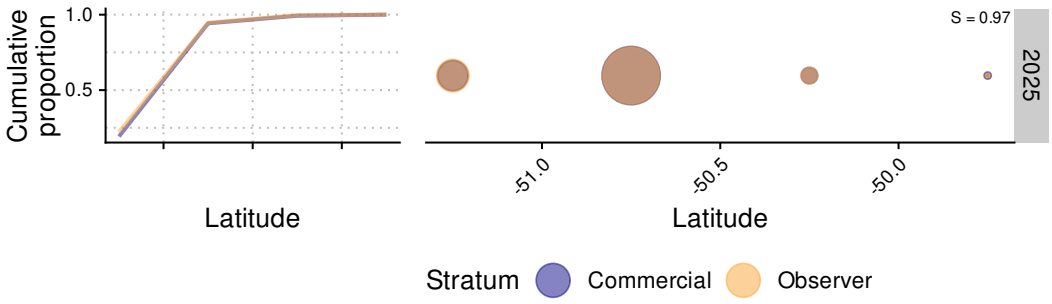


Figure 734: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SQU 6T, from events where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

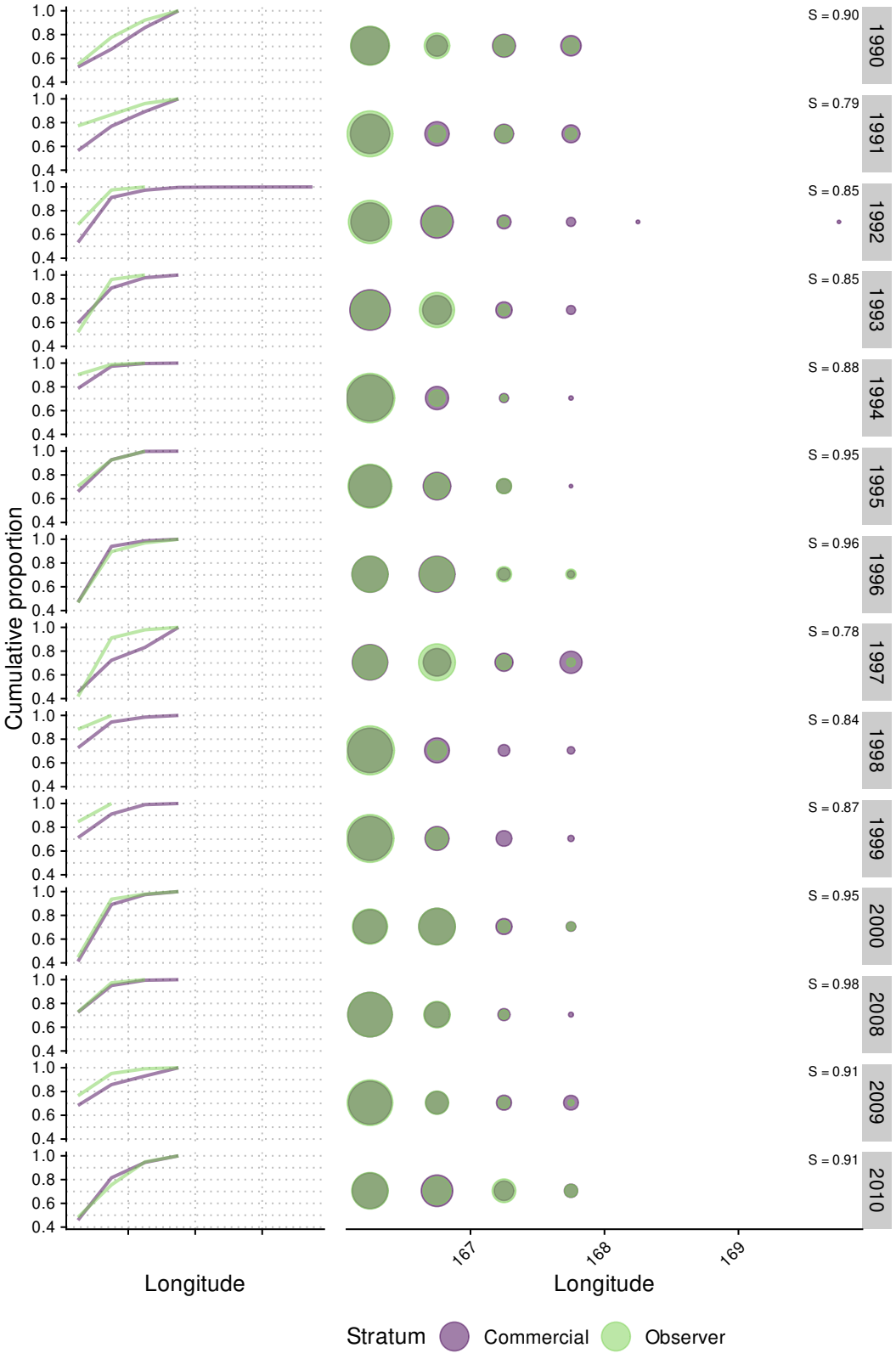


Figure 735: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 6T, where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

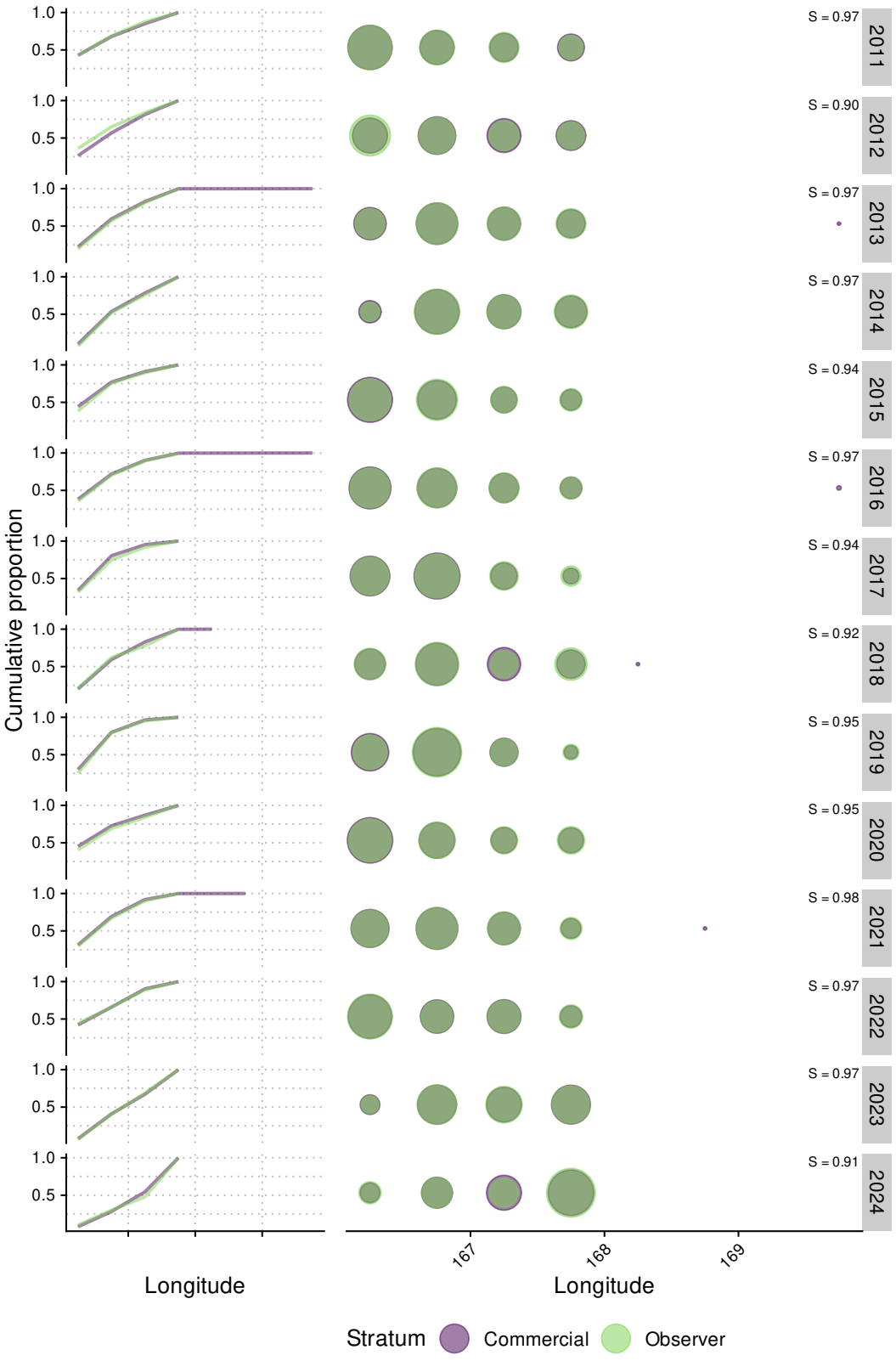


Figure 736: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 6T, where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

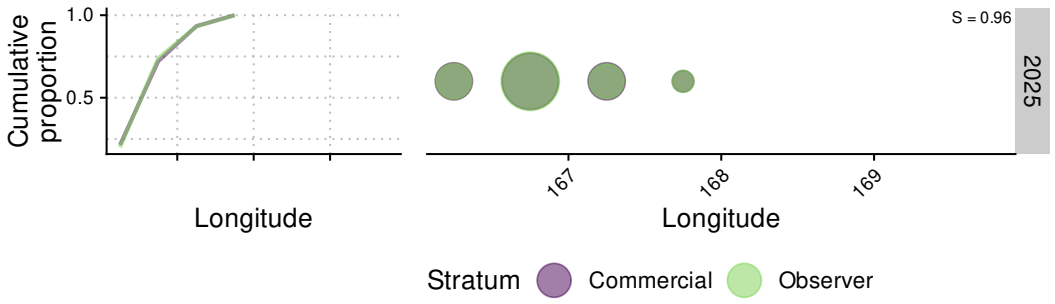


Figure 737: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SQU 6T, where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

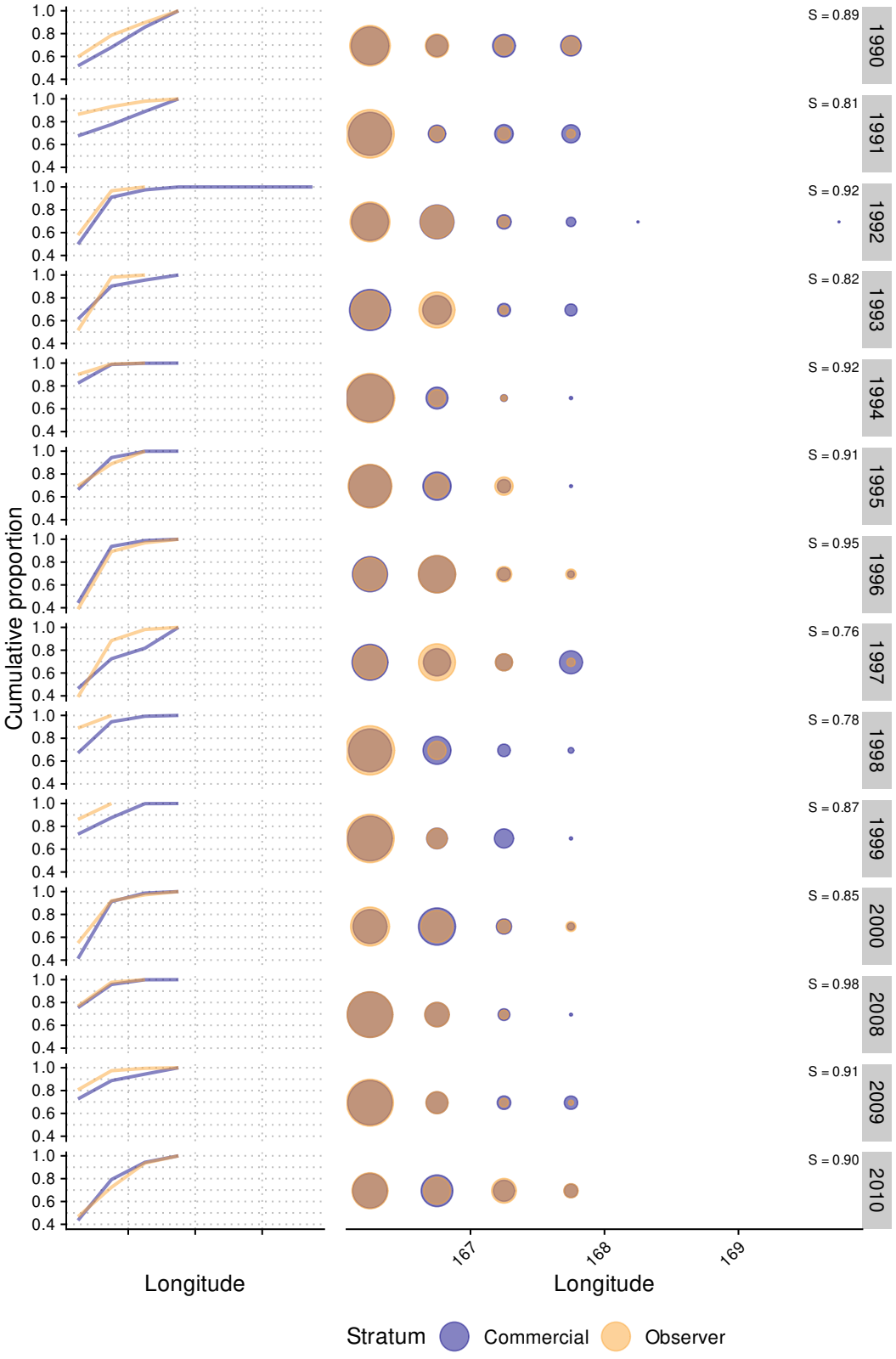


Figure 738: Longitudinal representativeness of observer sampling coverage of Trawl catch in SQU 6T, from events where the squid catch exceeded the 110kg threshold, in 1990 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

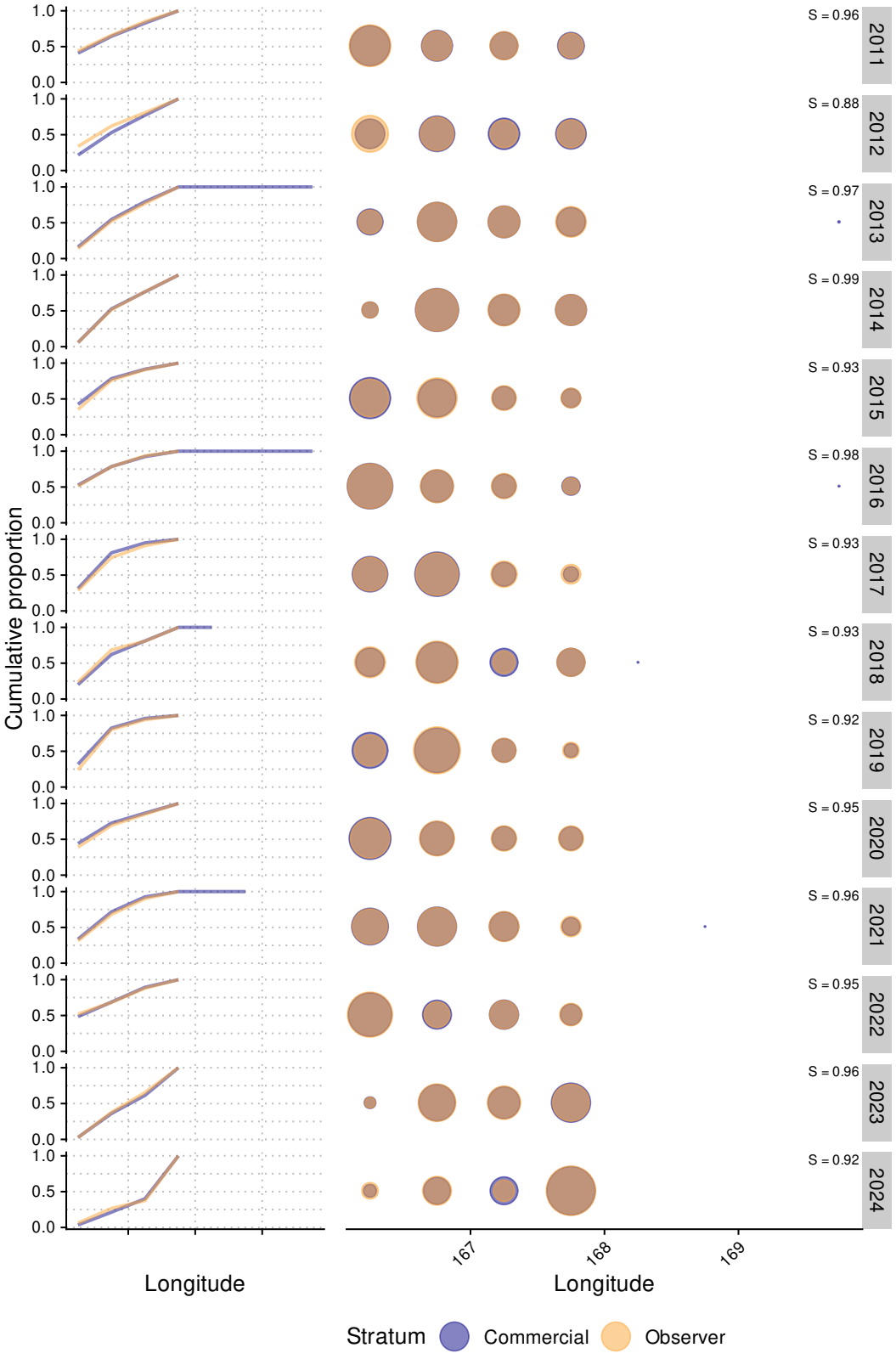


Figure 739: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SQU 6T, from events where the squid catch exceeded the 110kg threshold, in 2011 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

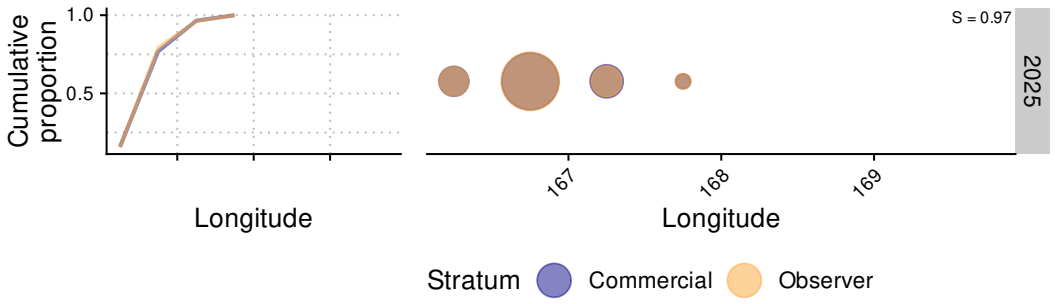


Figure 740: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SQU 6T, from events where the squid catch exceeded the 110kg threshold, in 2025 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

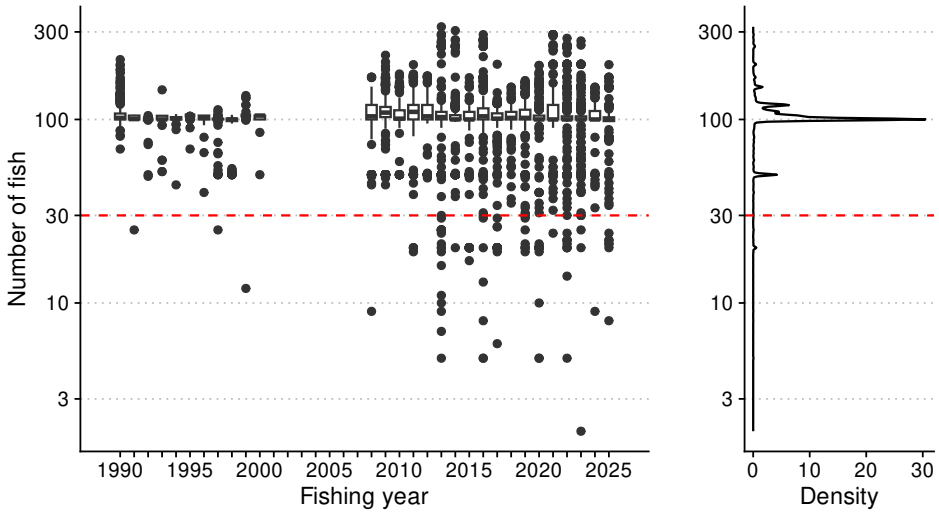


Figure 741: **Length-frequency sample sizes for observed fishing events in SQU 6T where squid were sampled. The red dashed line indicates a sample size of 30 fish.**

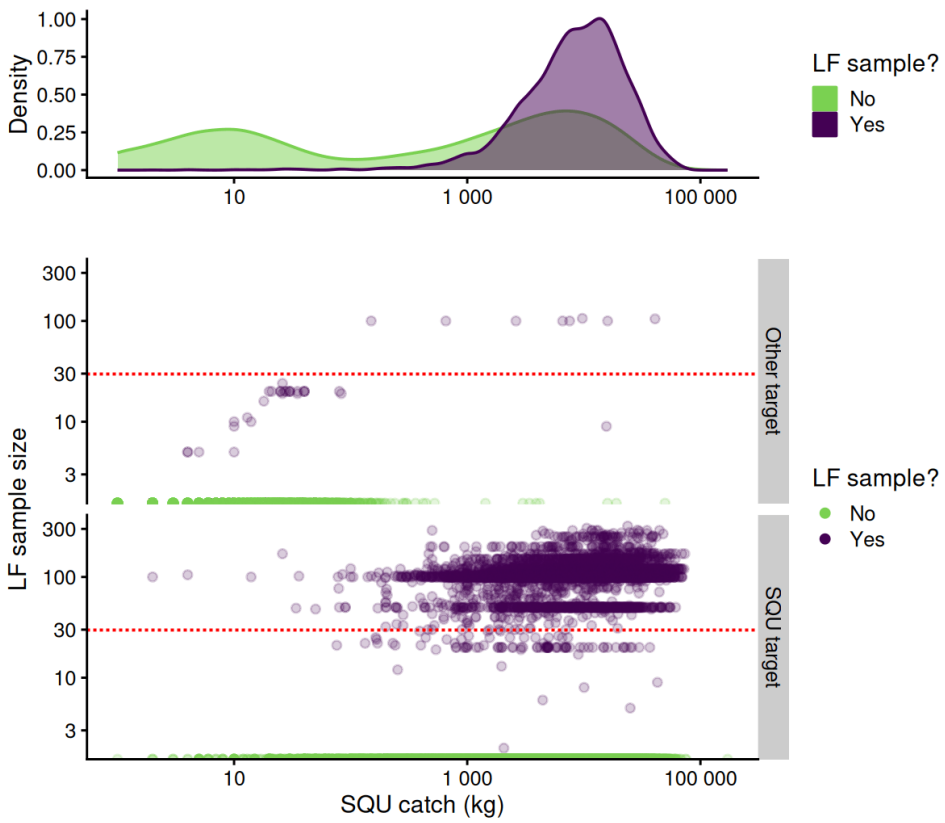


Figure 742: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SQU 6T in relation to the total squid catch from an event, separately for squid target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.10.2.2 Catch quantification

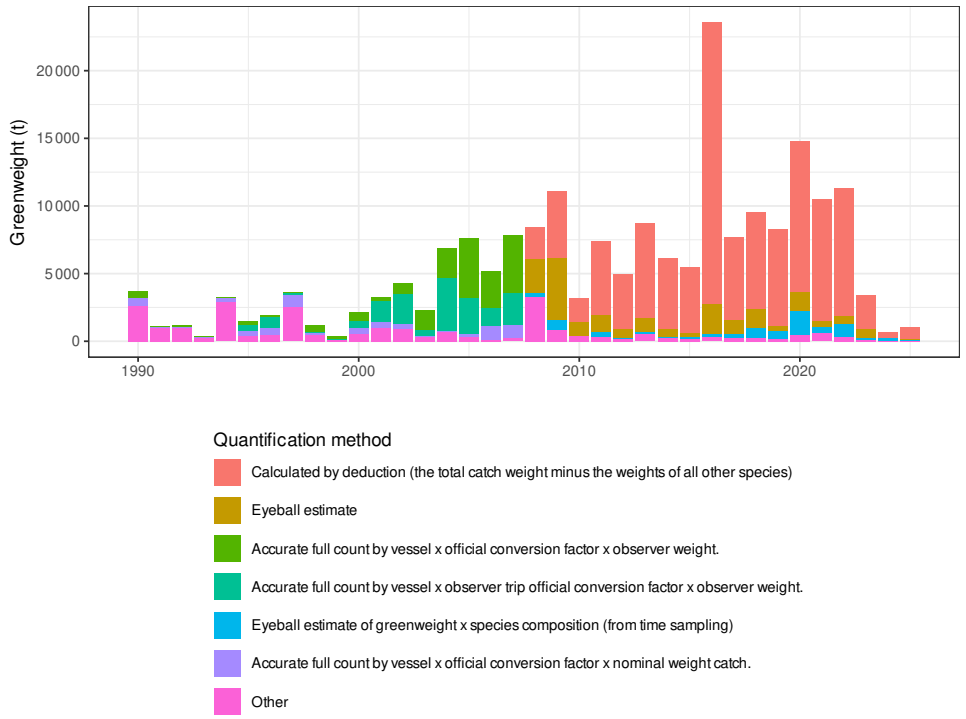


Figure 743: Methods used by observers to quantify the catch of squid in the SQU 6T Trawl fishery. The legend lists the methods used in descending order of total catch.

2.11 SSO stocks

Observer sampling of smooth oreo is considered with respect to the oreo Quota Management Areas.

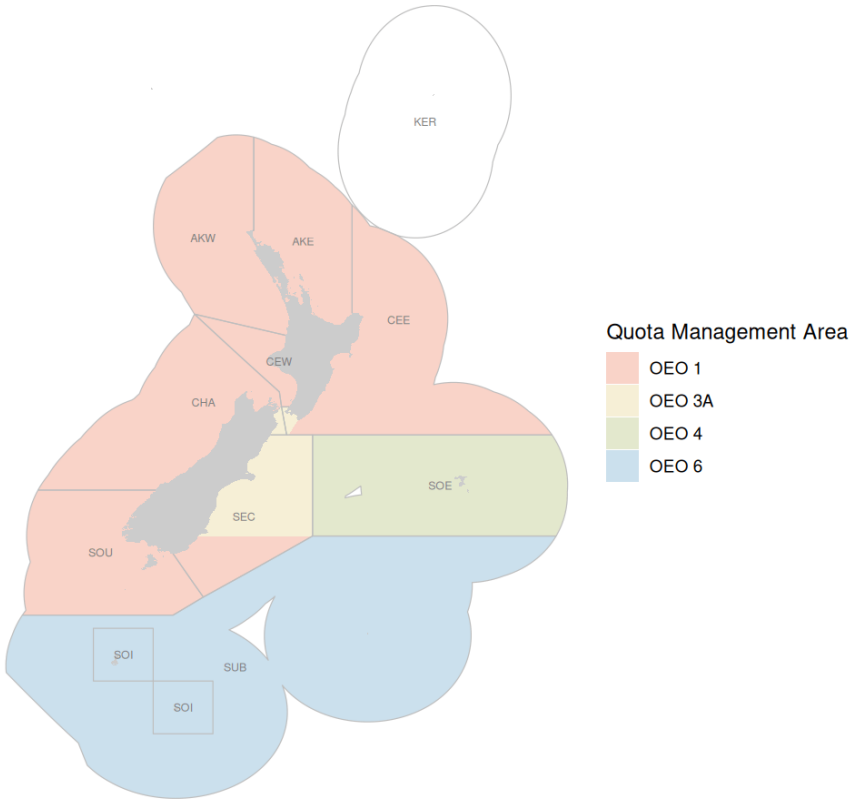


Figure 744: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for oreo (coloured areas, per legend).

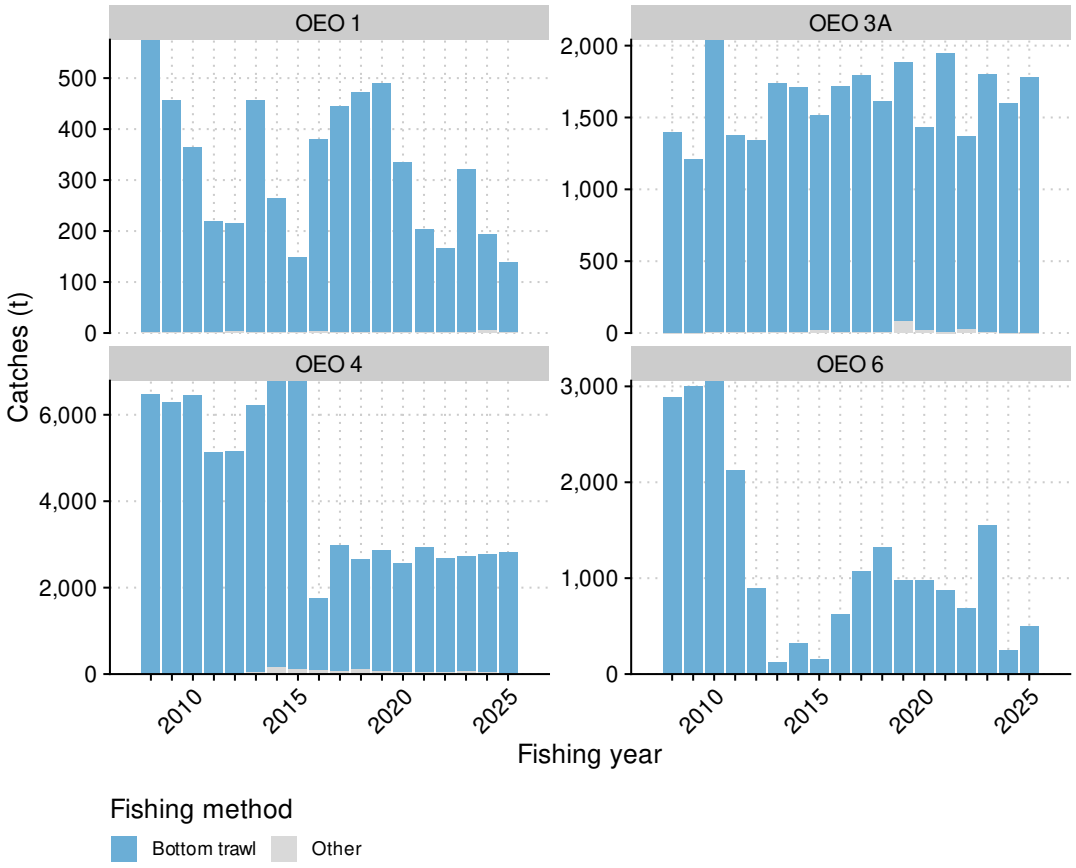


Figure 745: **Catches of smooth oreo by fishing method, for events within the oreo Quota Management Areas. Methods grouped as Other include: BLL, BS, DL, HL, MW, POT, PRB, PRM, SN, T.**

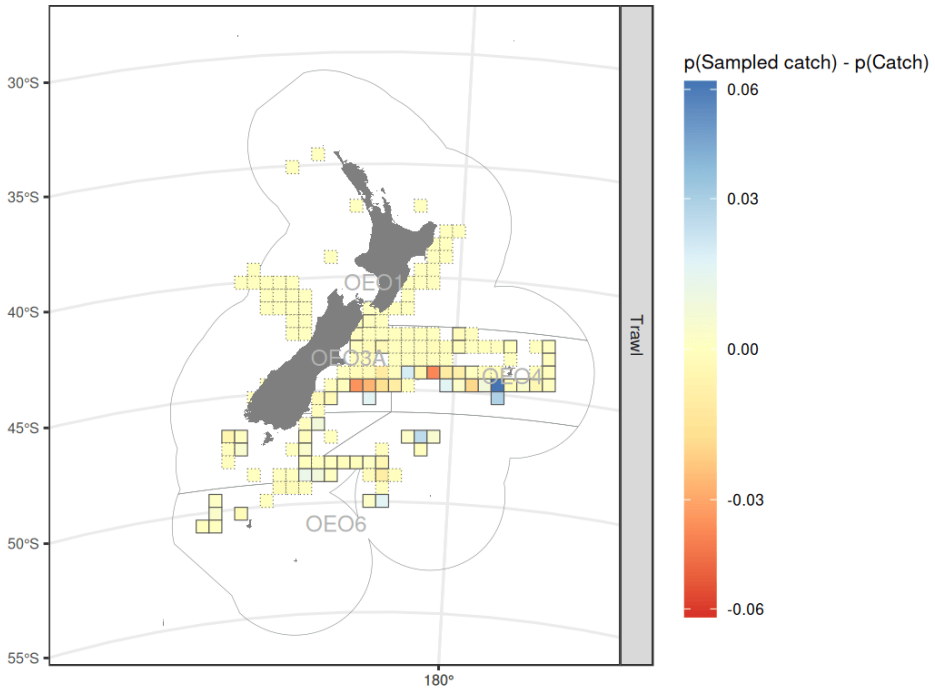


Figure 746: **Differences in the relative proportions of catch and sampled catch for smooth oreo during 2021–2025. Cells with a dotted border had no sampling.**

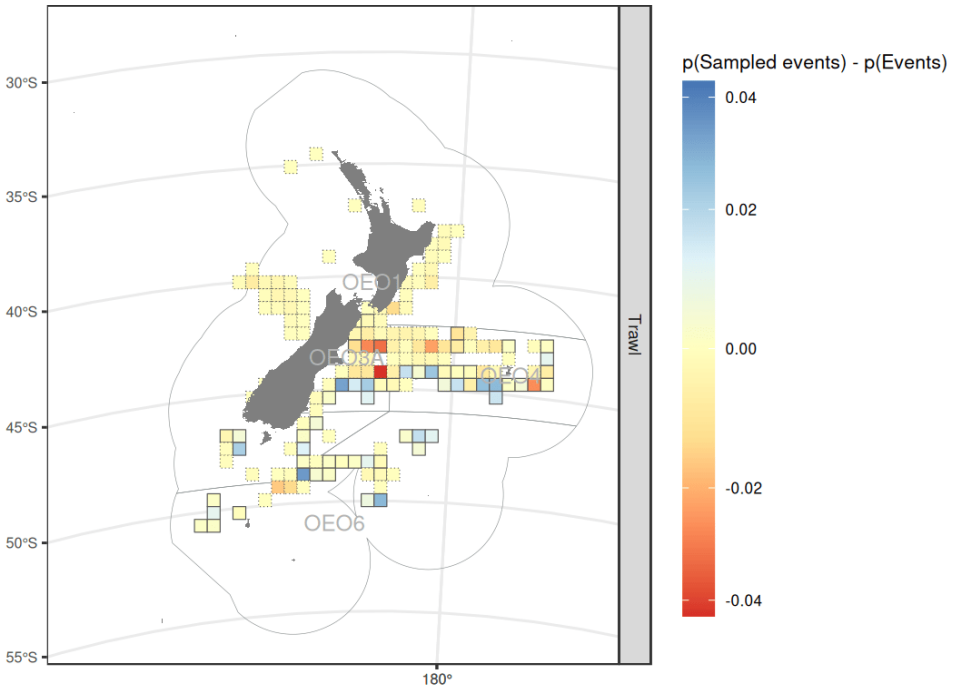


Figure 747: **Differences in the relative proportions of events meeting the sampling threshold and sampled events for smooth oreo during 2021–2025. Cells with a dotted border had no sampling.**

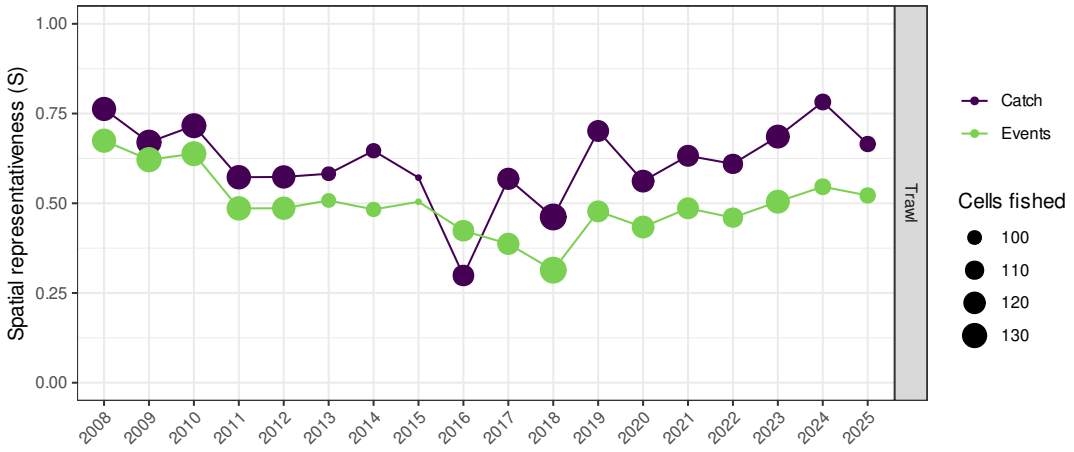


Figure 748: **Spatial representativeness of observer sampling of smooth oreo by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.**

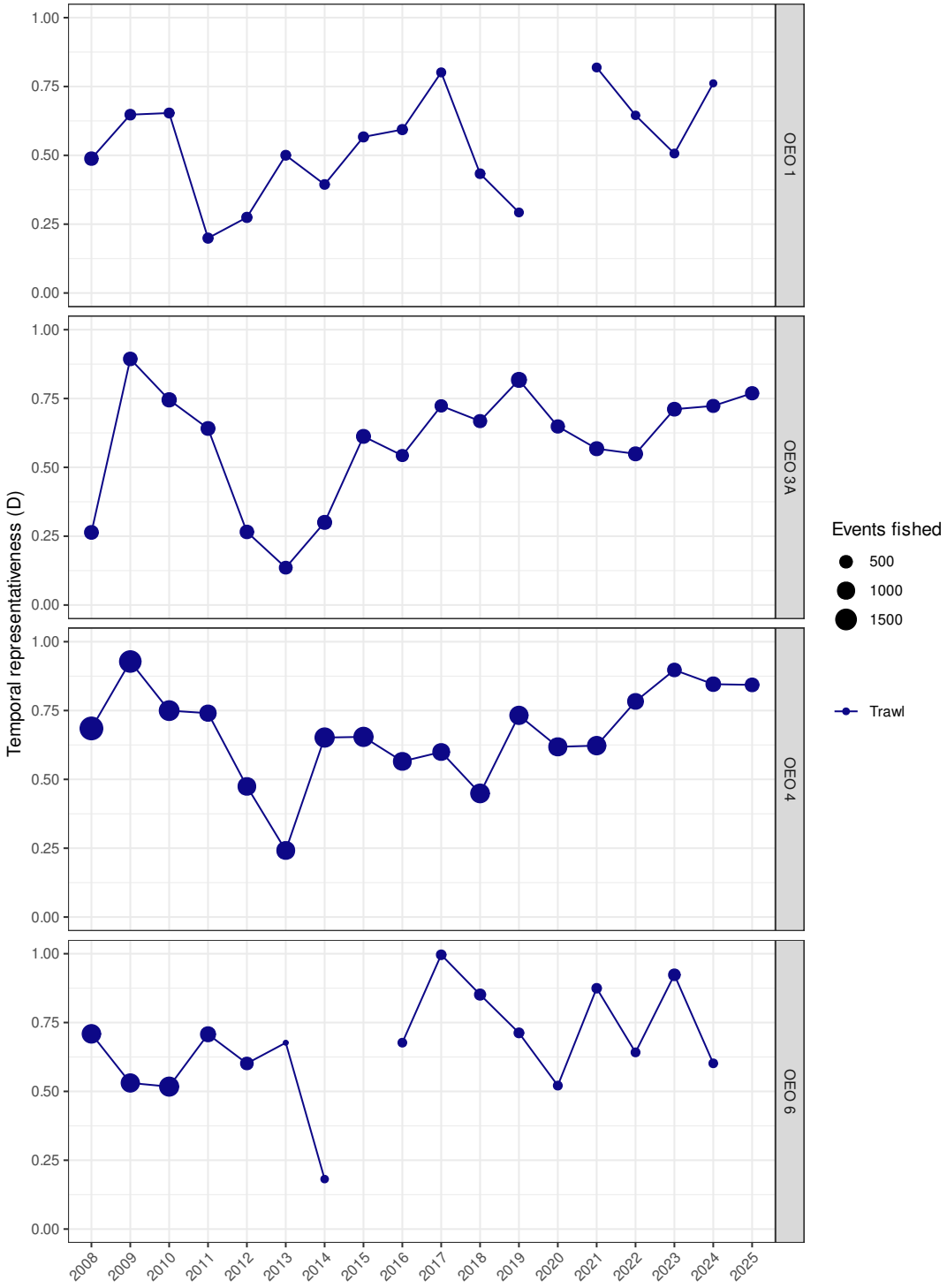


Figure 749: **Temporal representativeness of observer sanpling of smooth oreo by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.**

2.11.1 SSO 1: Trawl fishery

2.11.1.1 Length-frequency samples

Table 62: Length-frequency samples of smooth oreo from the SSO 1 Trawl fishery sampled by the Observer Programme in fishing years 2008 to 2025. Positive fishing events are those where the catch of smooth oreo exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
2008	458	16	1 011	3.49
2009	342	29	2 076	8.48
2010	292	16	1 307	5.48
2011	309	6	430	1.94
2012	304	5	445	1.64
2013	269	5	575	1.86
2014	251	2	140	0.80
2015	268	4	280	1.49
2016	251	4	430	1.59
2017	235	12	1 174	5.11
2018	277	8	443	2.89
2019	220	10	1 009	4.55
2020	235	0	0	0.00
2021	225	14	997	6.22
2022	202	8	220	3.96
2023	222	8	480	3.60
2024	129	9	277	6.98
2025	103	0	0	0.00

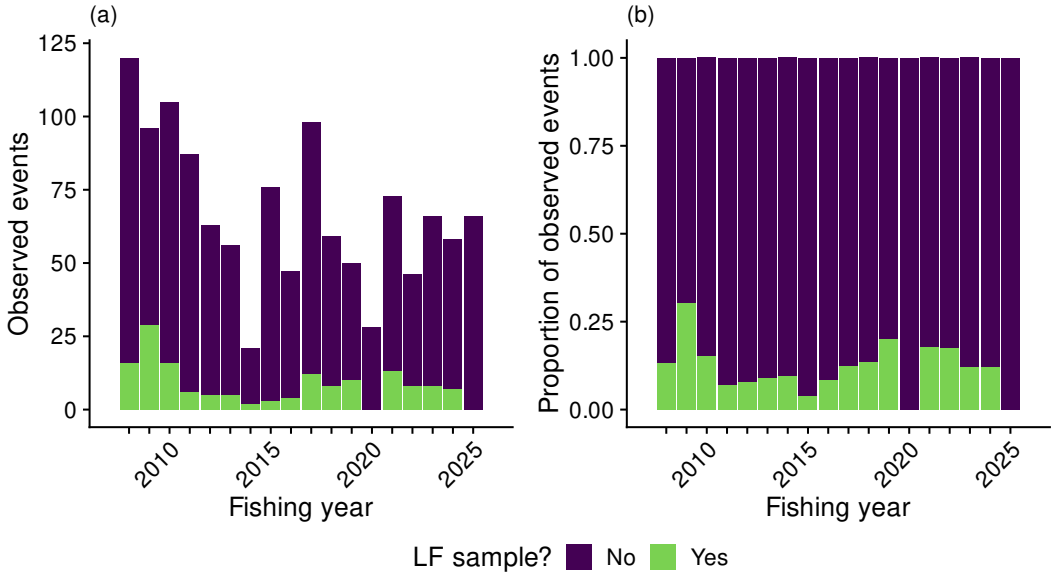


Figure 750: (a) Observed Trawl fishing events, and (b) proportion of observed events, in SSO 1 where the smooth oreo catch exceeded the 30 kg threshold, with and without length-frequency sampling.

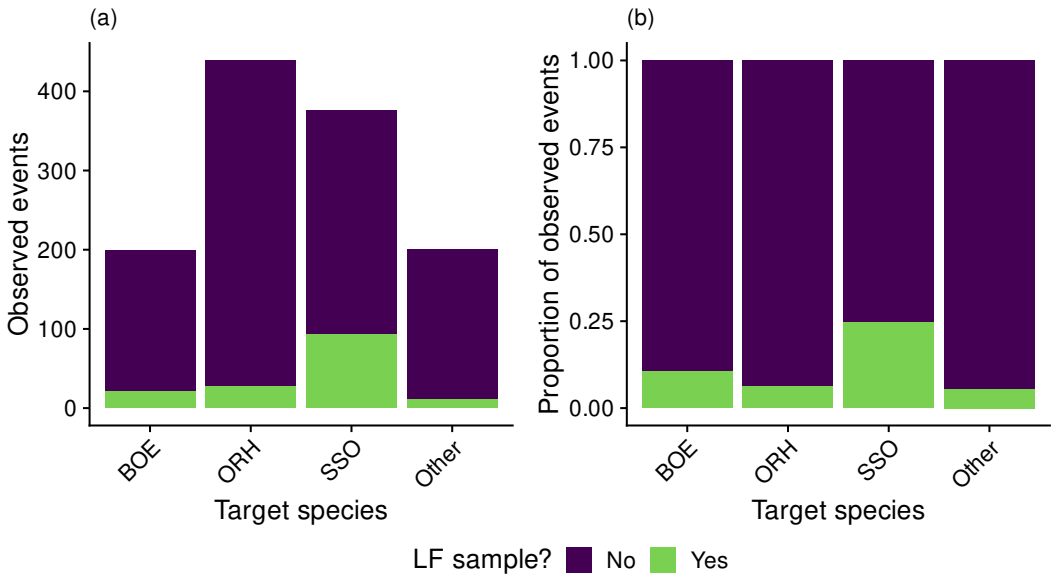


Figure 751: (a) Observed Trawl fishing events, and (b) proportion of observed events, in SSO 1 where the smooth oreo catch exceeded the 30 kg threshold, with and without length-frequency sampling, by observer assessed target species.

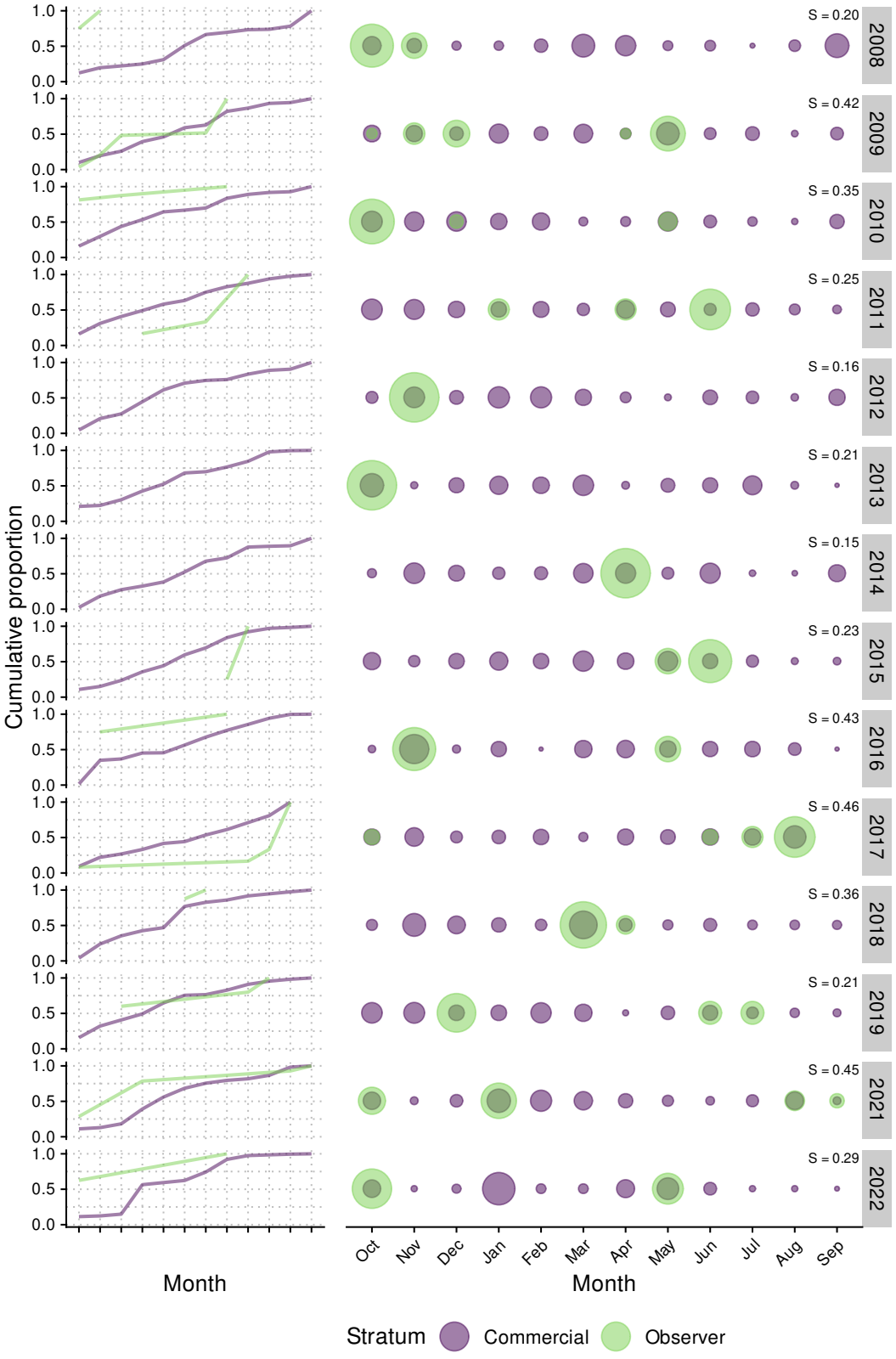


Figure 752: Monthly representativeness of observer sampling coverage of Trawl fishing events in SSO 1, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

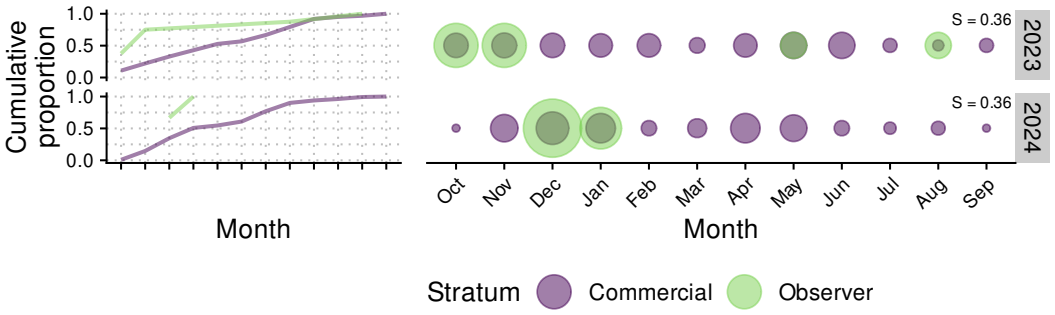


Figure 753: Monthly representativeness of observer sampling coverage of Trawl fishing events in SSO 1, where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

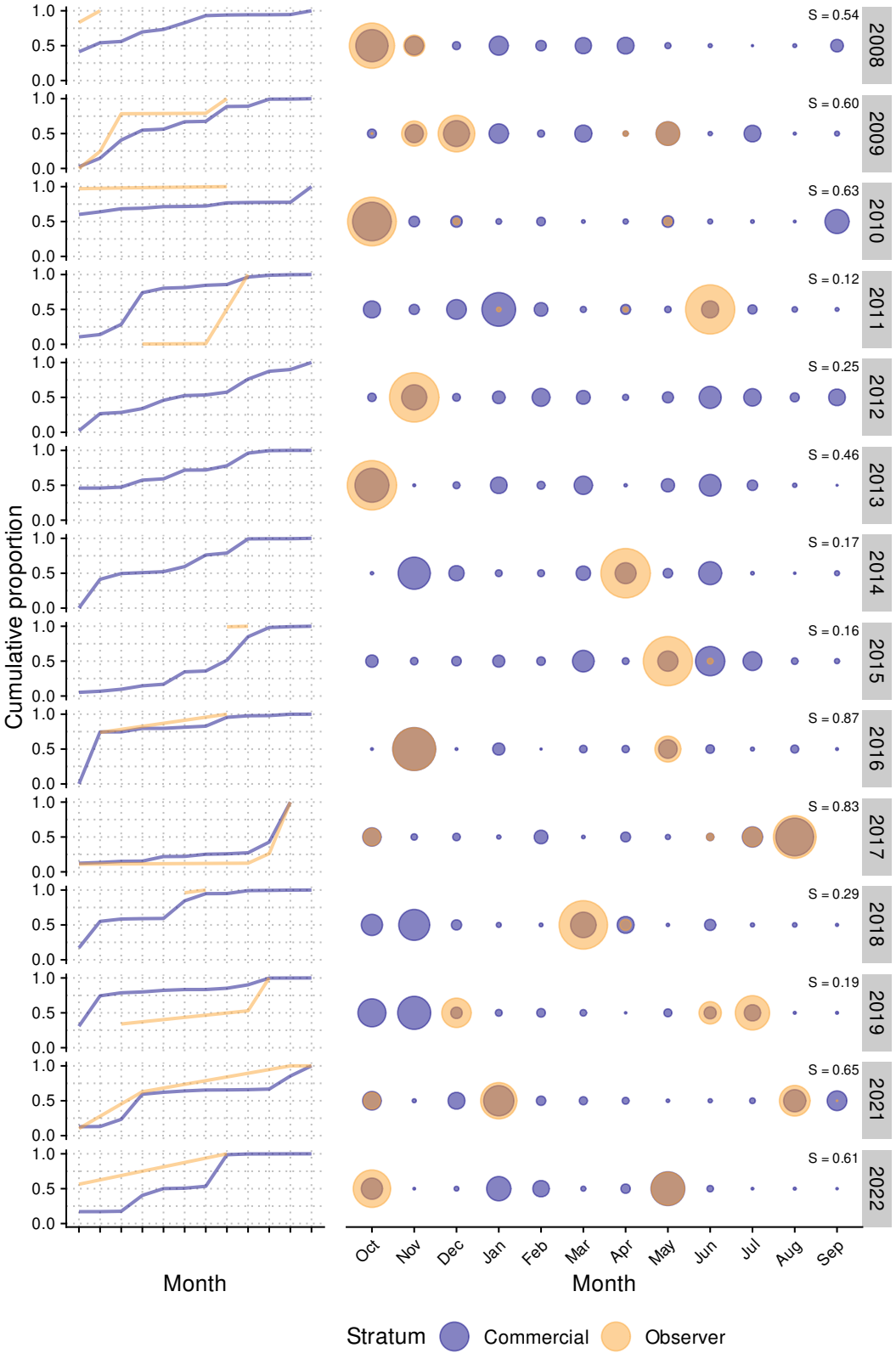


Figure 754: **Monthly representativeness of observer sampling coverage of Trawl catch in SSO 1, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

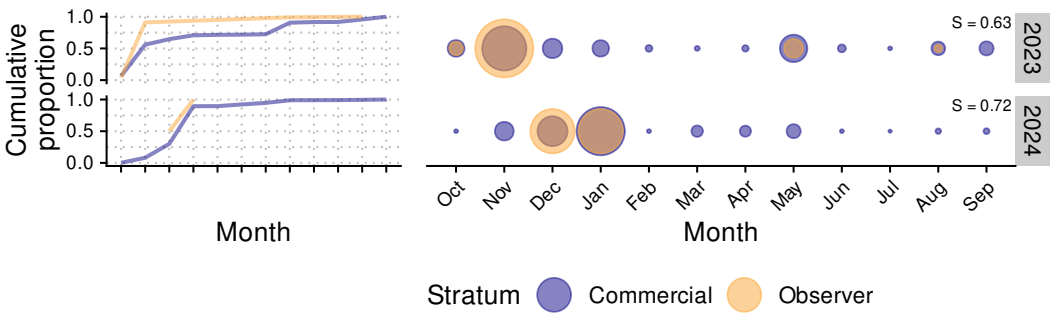


Figure 755: Monthly representativeness of observer sampling coverage of Trawl catch in SSO 1, from events where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

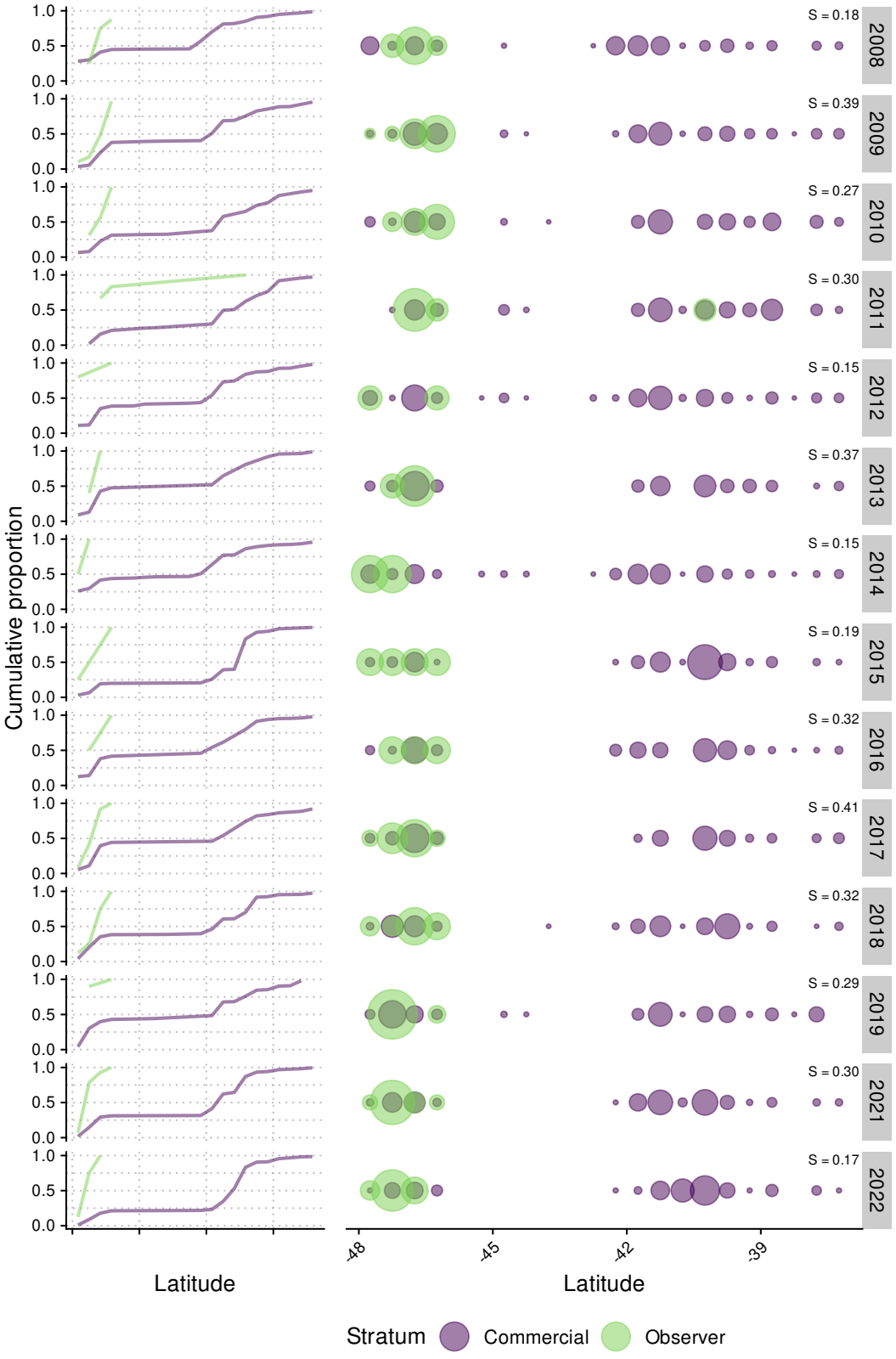


Figure 756: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 1, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

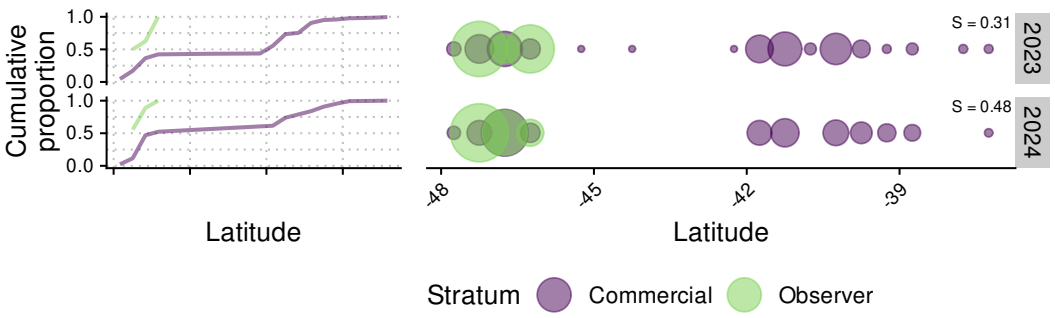


Figure 757: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 1, where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

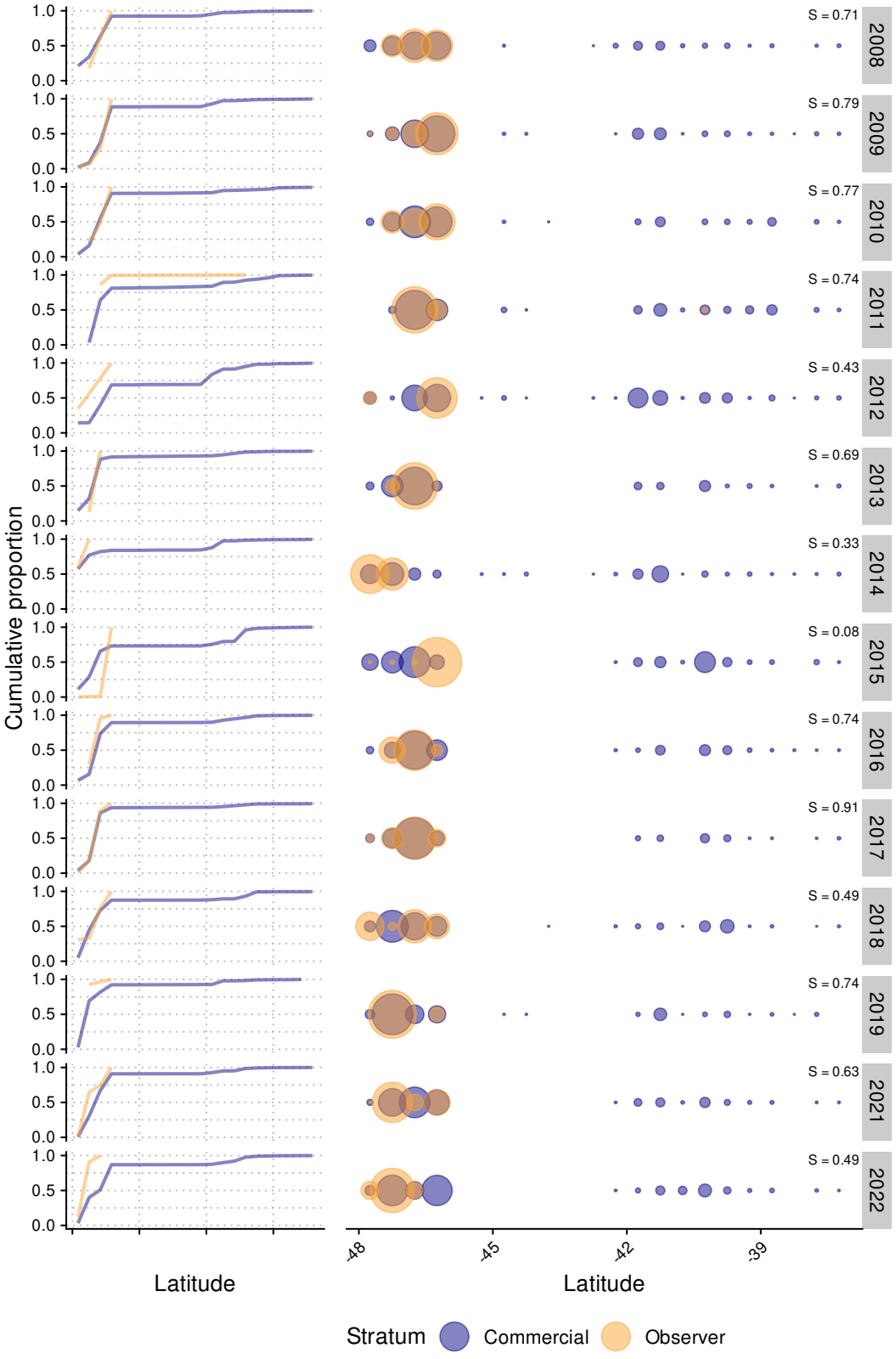


Figure 758: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SSO 1, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

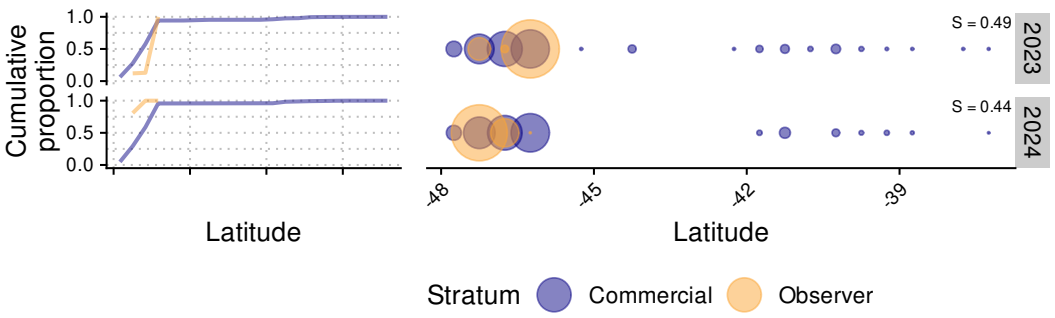


Figure 759: Latitudinal representativeness of observer sampling coverage of Trawl catch in SSO 1, from events where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

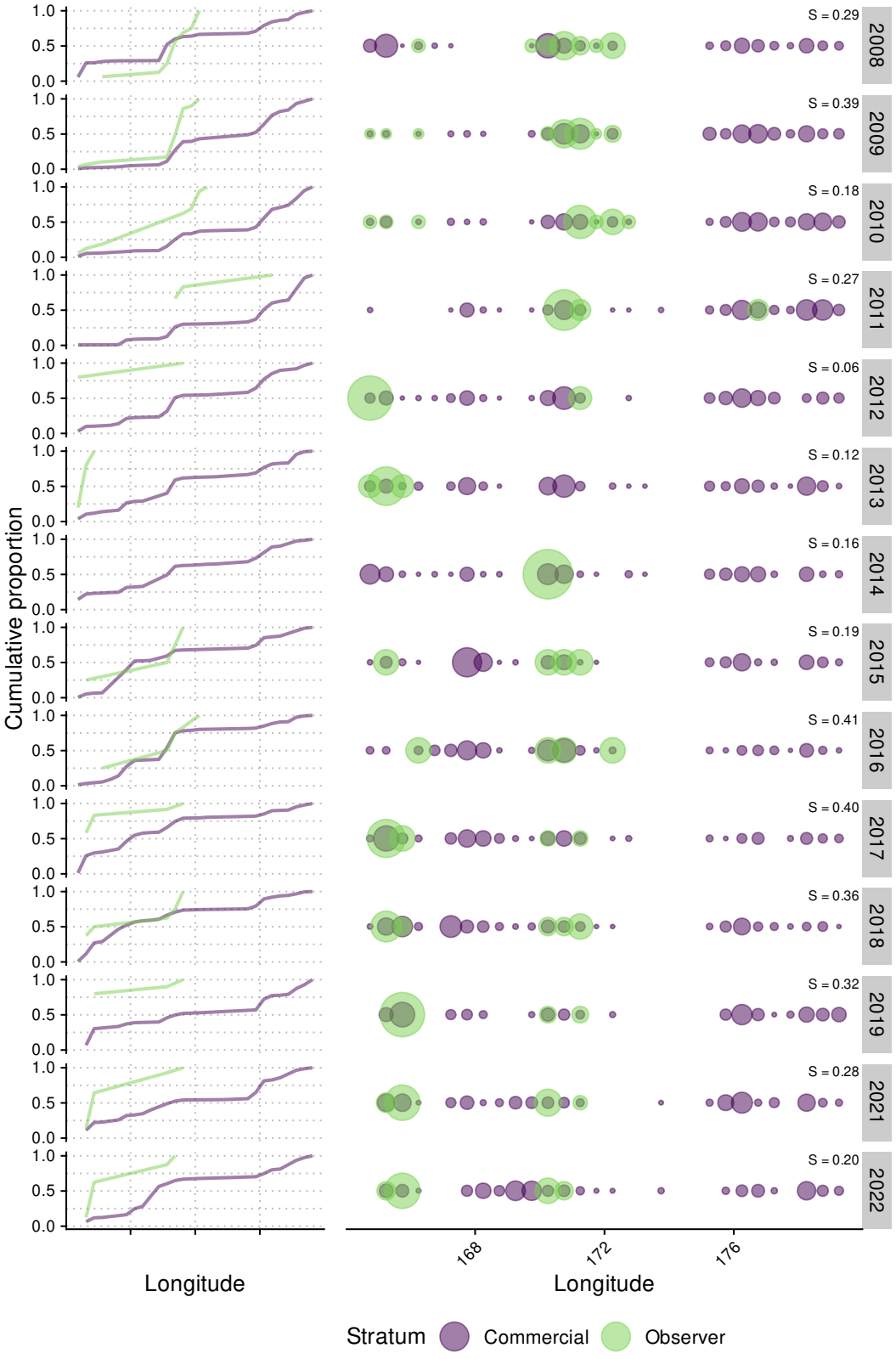


Figure 760: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 1, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

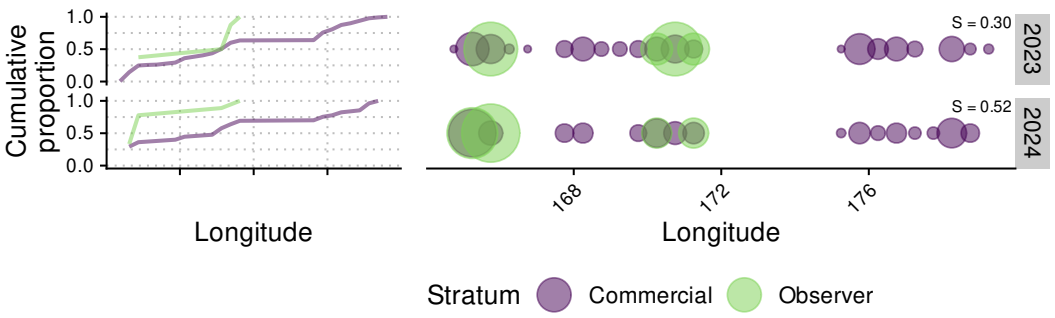


Figure 761: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 1, where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

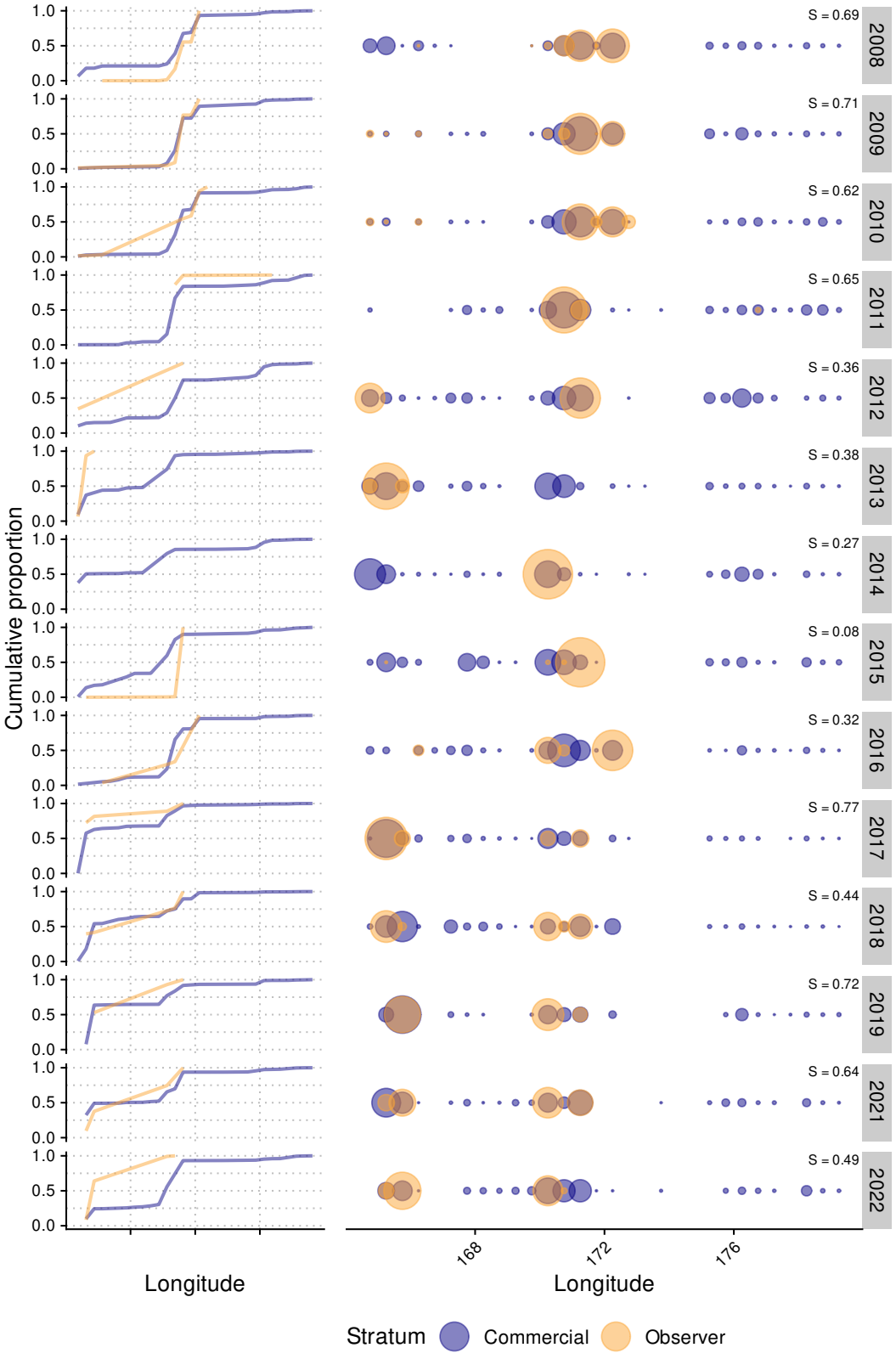


Figure 762: Longitudinal representativeness of observer sampling coverage of Trawl catch in SSO 1, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

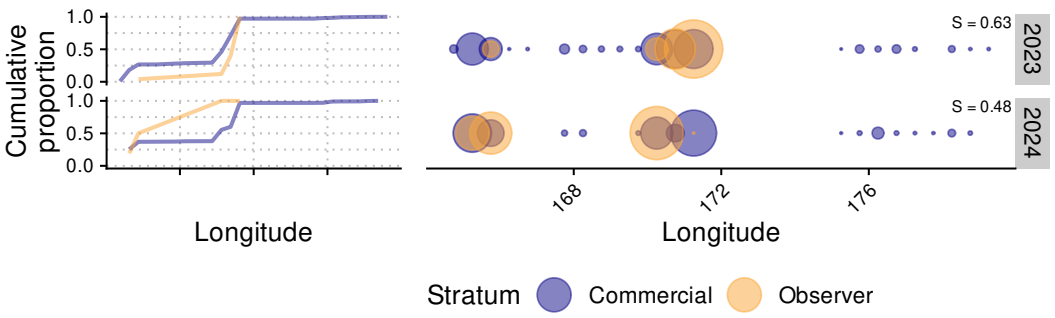


Figure 763: Longitudinal representativeness of observer sampling coverage of Trawl catch in SSO 1, from events where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

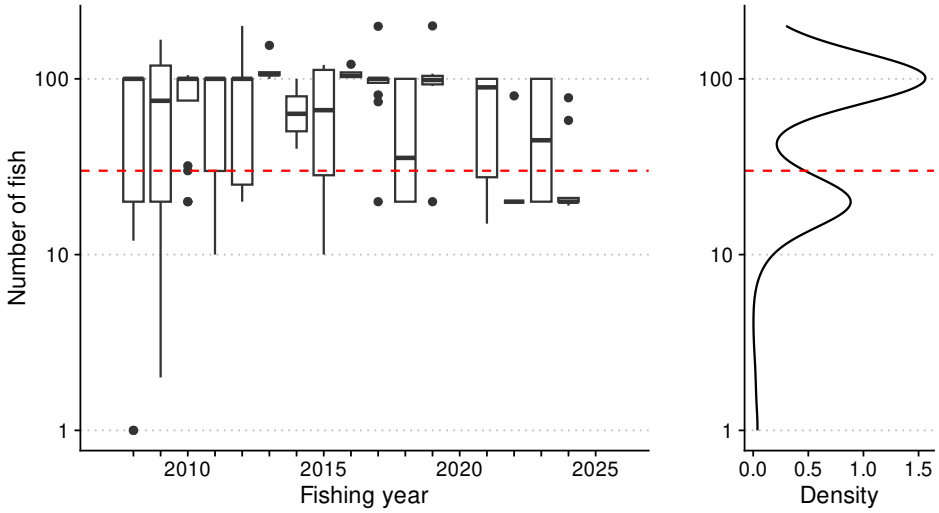


Figure 764: Length-frequency sample sizes for observed fishing events in SSO 1 where smooth oreo were sampled. The red dashed line indicates a sample size of 30 fish.

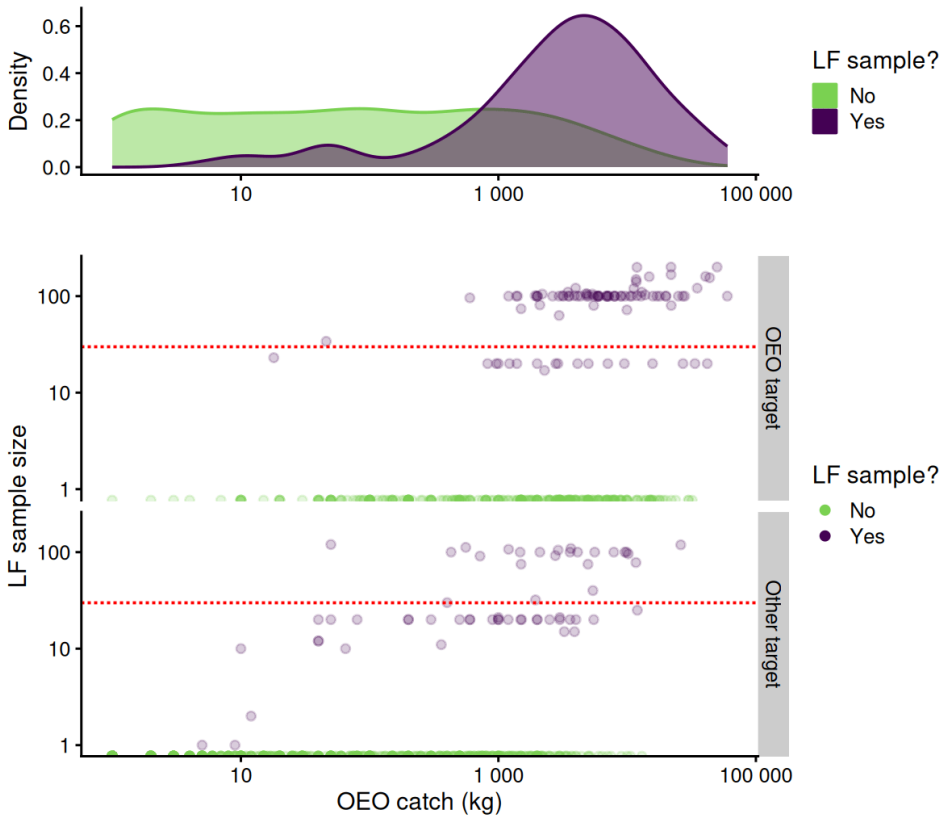


Figure 765: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SSO 1 in relation to the total smooth oreo catch from an event, separately for smooth oreo target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.11.1.2 Otolith samples

Table 63: Otolith samples of smooth oreo from the SSO 1 Trawl fishery sampled by the Observer Programme in fishing years 2008 to 2025. Positive fishing events are those where the catch of smooth oreo exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
2008	458	0	0	0.00
2009	342	0	0	0.00
2010	292	11	95	3.77
2011	309	1	2	0.32
2012	304	5	46	1.64
2013	269	5	66	1.86
2014	251	1	10	0.40
2015	268	0	0	0.00
2016	251	0	0	0.00
2017	235	0	0	0.00
2018	277	8	58	2.89
2019	220	4	46	1.82
2020	235	0	0	0.00
2021	225	14	120	6.22
2022	202	8	41	3.96
2023	222	8	60	3.60
2024	129	9	54	6.98
2025	103	0	0	0.00

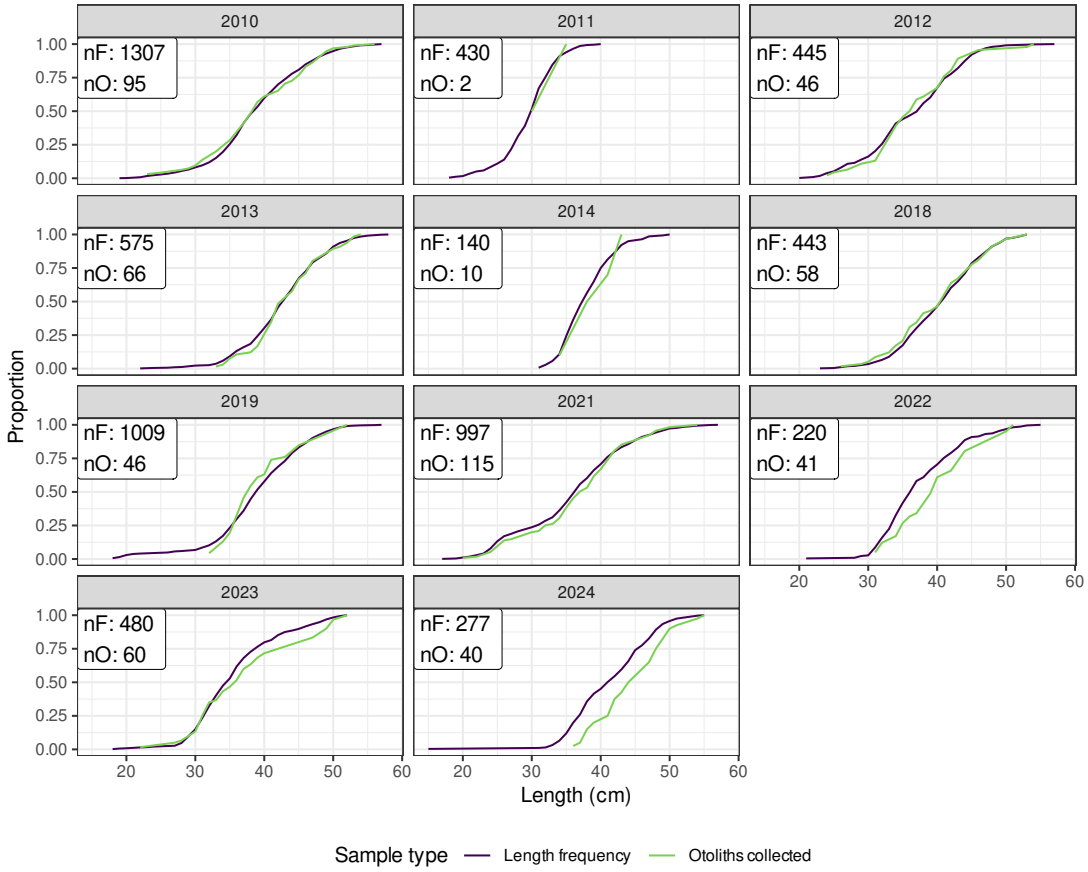


Figure 766: Cumulative distributions of the length of fish in the length frequency and otolith samples of smooth oreo in the SSO 1 Trawl fishery for the 2010 to 2024 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.11.1.3 Catch quantification

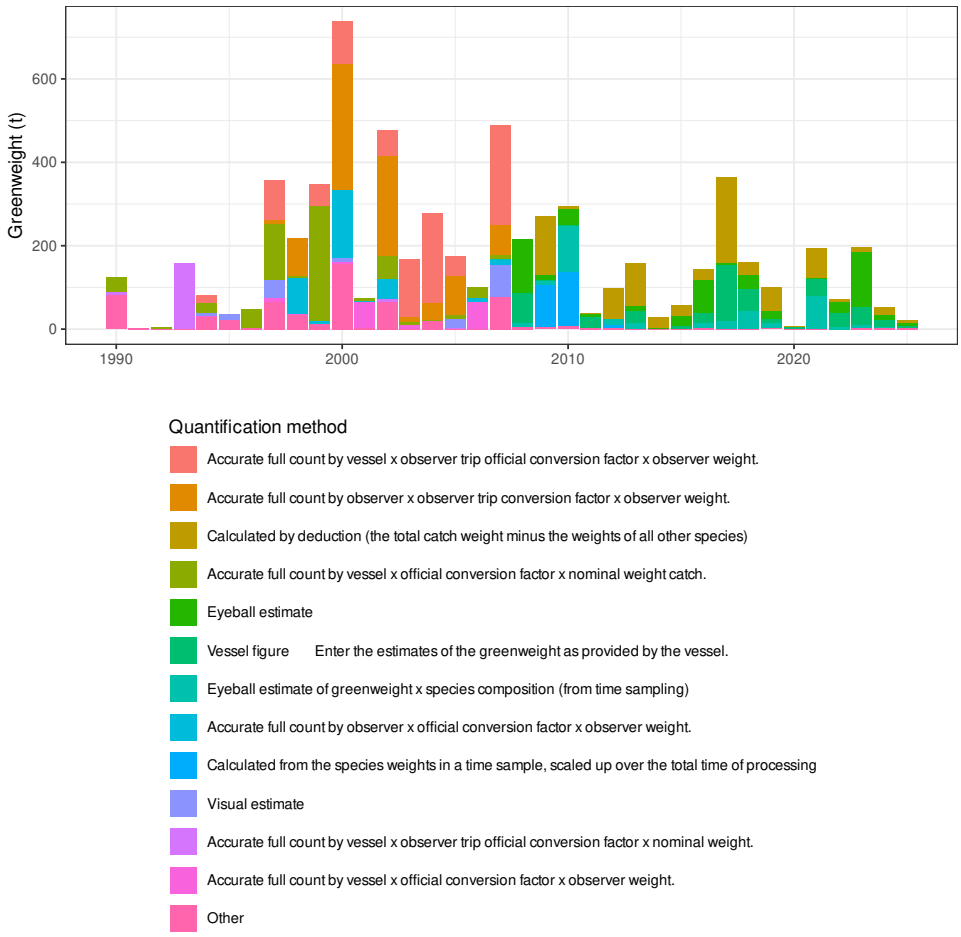


Figure 767: Methods used by observers to quantify the catch of smooth oreo in the SSO 1 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.11.2 SSO 3A: Trawl fishery

2.11.2.1 Length-frequency samples

Table 64: Length-frequency samples of smooth oreo from the SSO 3A Trawl fishery sampled by the Observer Programme in fishing years 2008 to 2025. Positive fishing events are those where the catch of smooth oreo exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
2008	613	19	996	3.10
2009	595	46	3 206	7.73
2010	667	27	2 110	4.05
2011	622	27	2 907	4.34
2012	592	11	1 461	1.86
2013	518	17	1 391	3.28
2014	635	24	1 677	3.78
2015	577	26	2 129	4.51
2016	453	5	365	1.10
2017	483	10	553	2.07
2018	554	20	1 531	3.61
2019	744	41	3 232	5.51
2020	567	14	967	2.47
2021	641	15	1 282	2.34
2022	634	17	1 091	2.68
2023	615	33	2 388	5.37
2024	550	35	3 171	6.36
2025	566	33	2 901	5.83

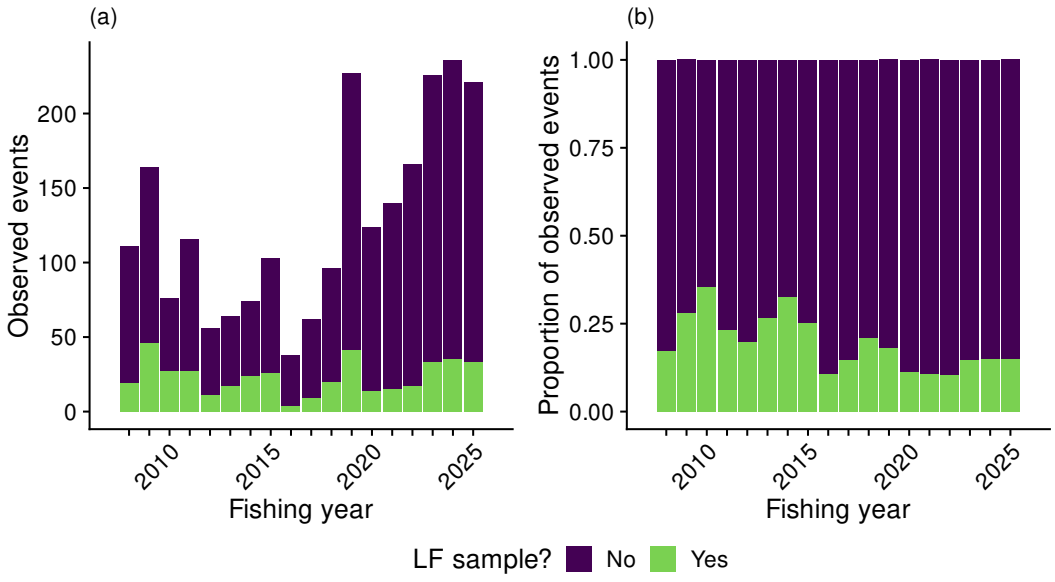


Figure 768: (a) Observed Trawl fishing events, and (b) proportion of observed events, in SSO 3A where the smooth oreo catch exceeded the 30 kg threshold, with and without length-frequency sampling.

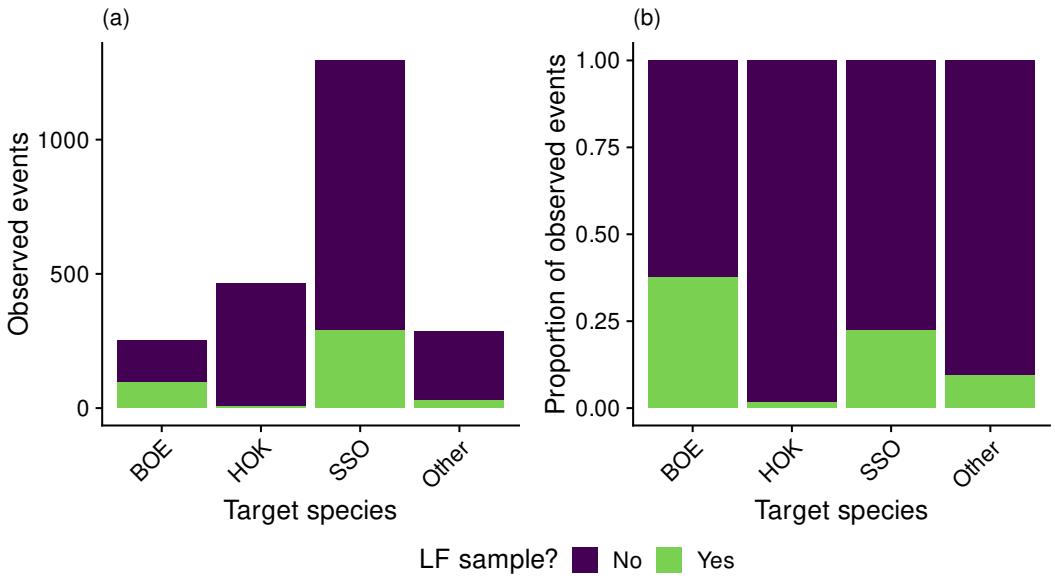


Figure 769: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SSO 3A where the smooth oreo catch exceeded the 30 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

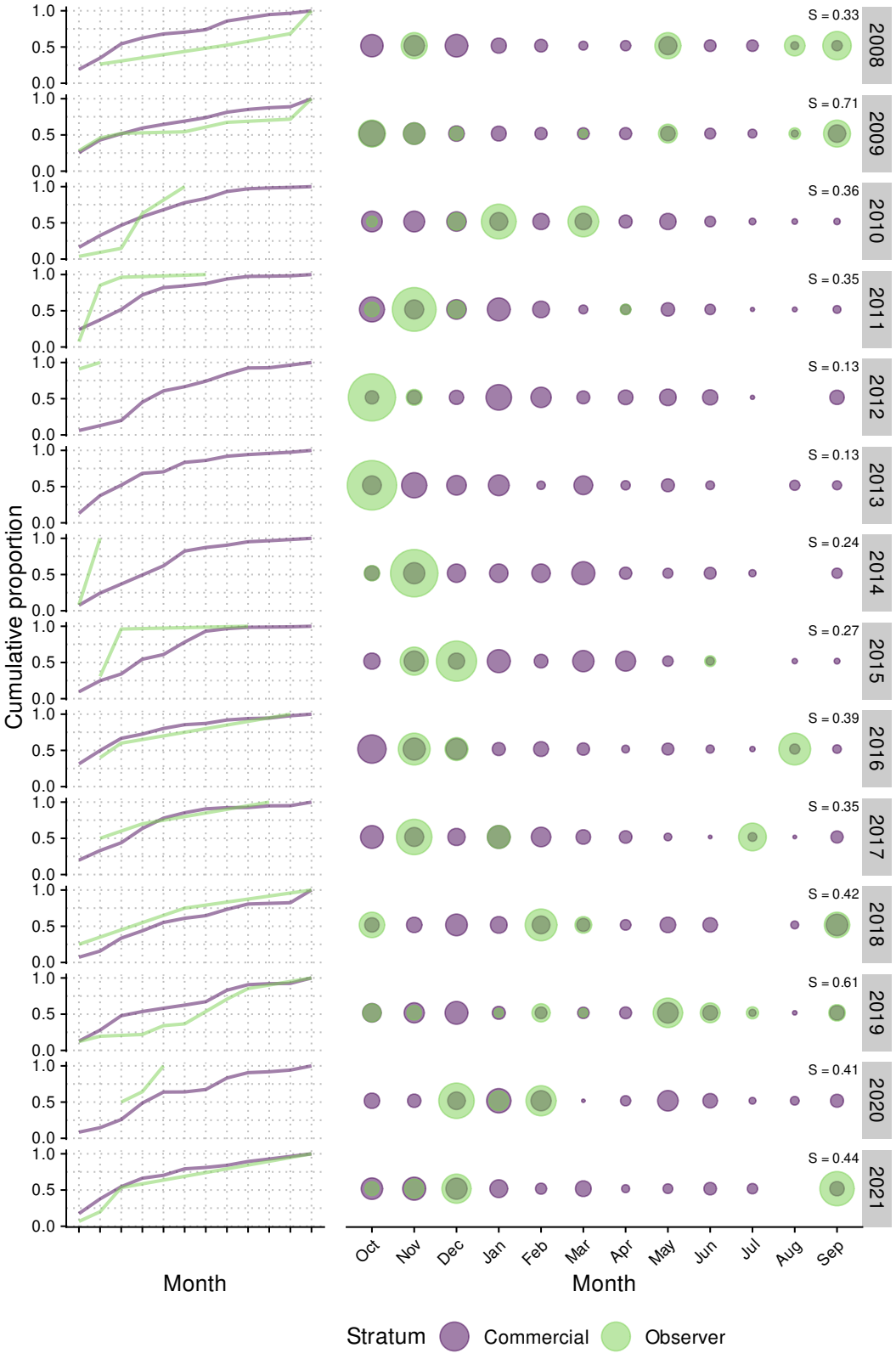


Figure 770: Monthly representativeness of observer sampling coverage of Trawl fishing events in SSO 3A, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

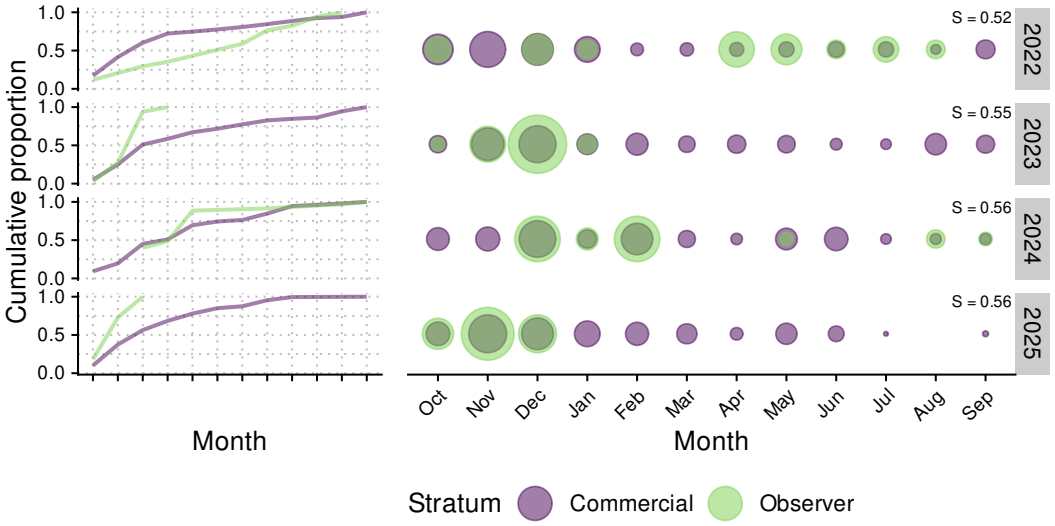


Figure 771: Monthly representativeness of observer sampling coverage of Trawl fishing events in SSO 3A, where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

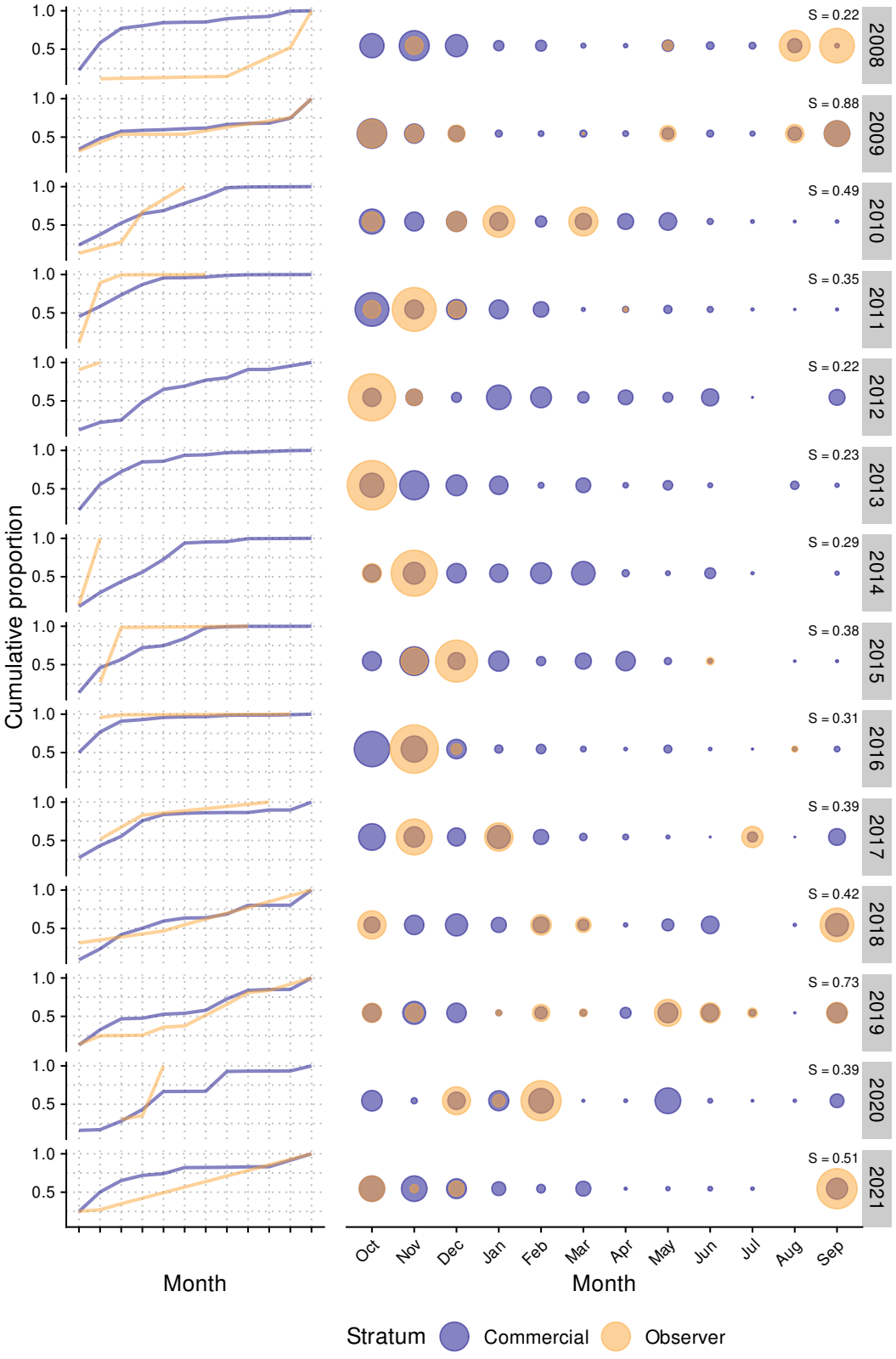


Figure 772: **Monthly representativeness of observer sampling coverage of Trawl catch in SSO 3A, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

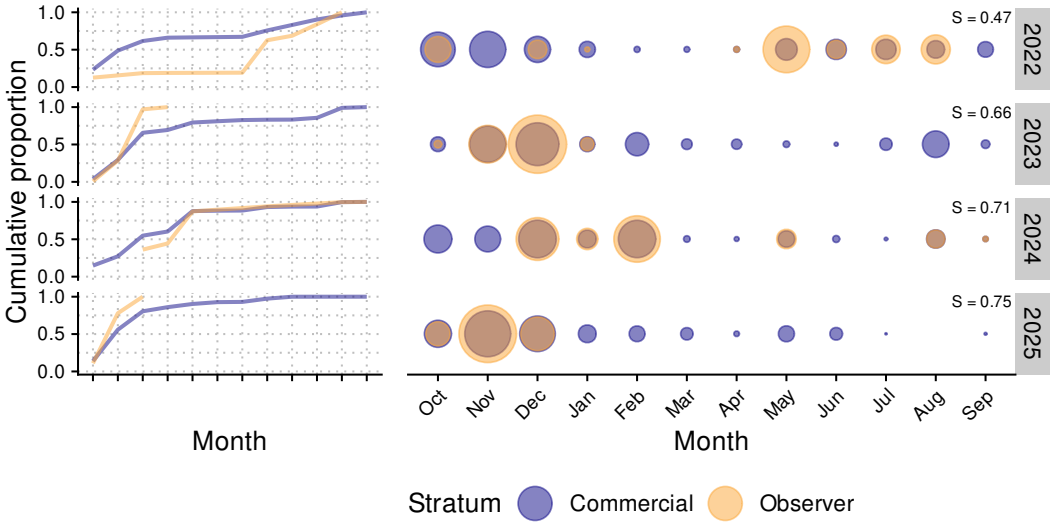


Figure 773: Monthly representativeness of observer sampling coverage of Trawl catch in SSO 3A, from events where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

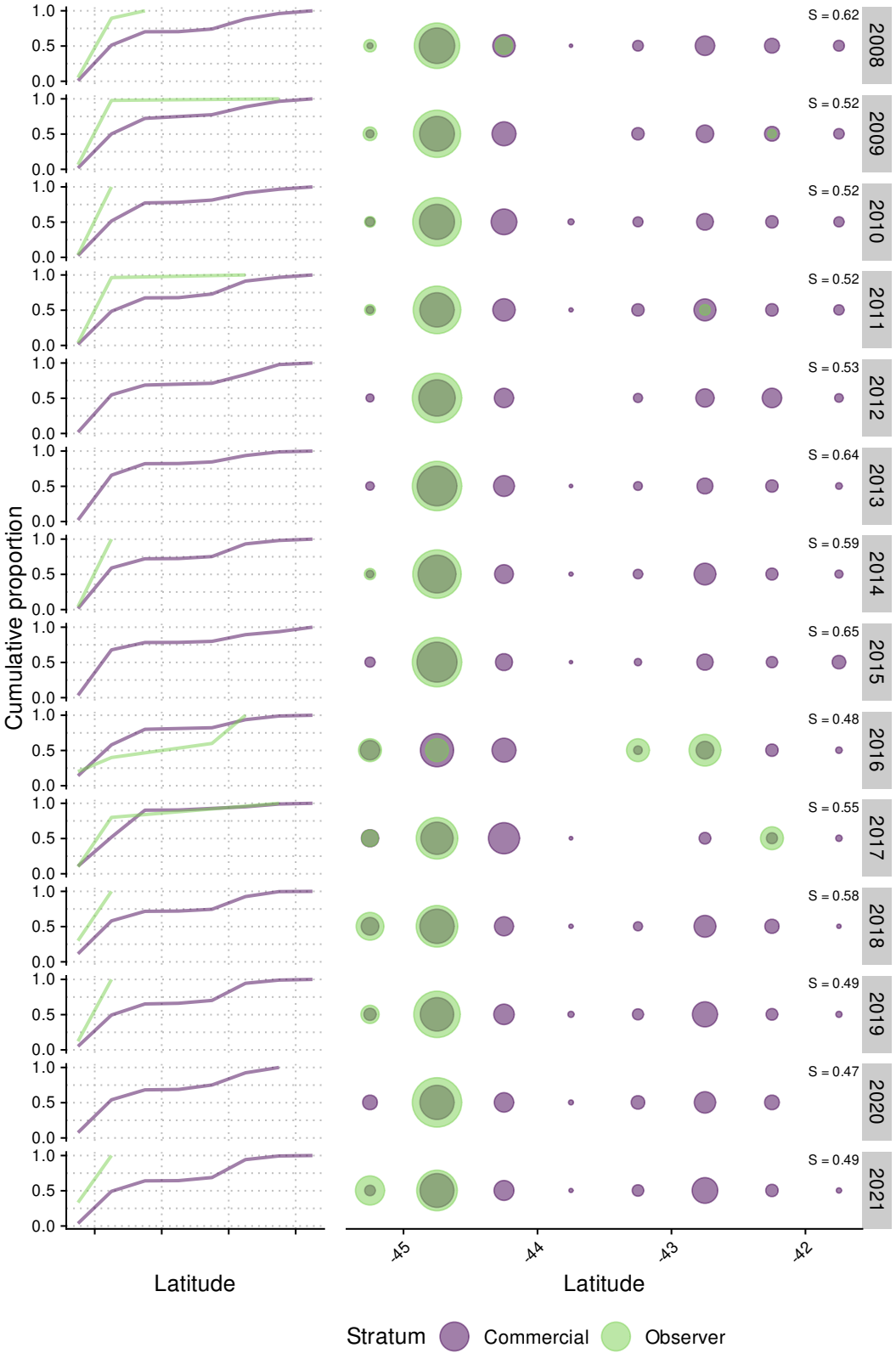


Figure 774: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 3A, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

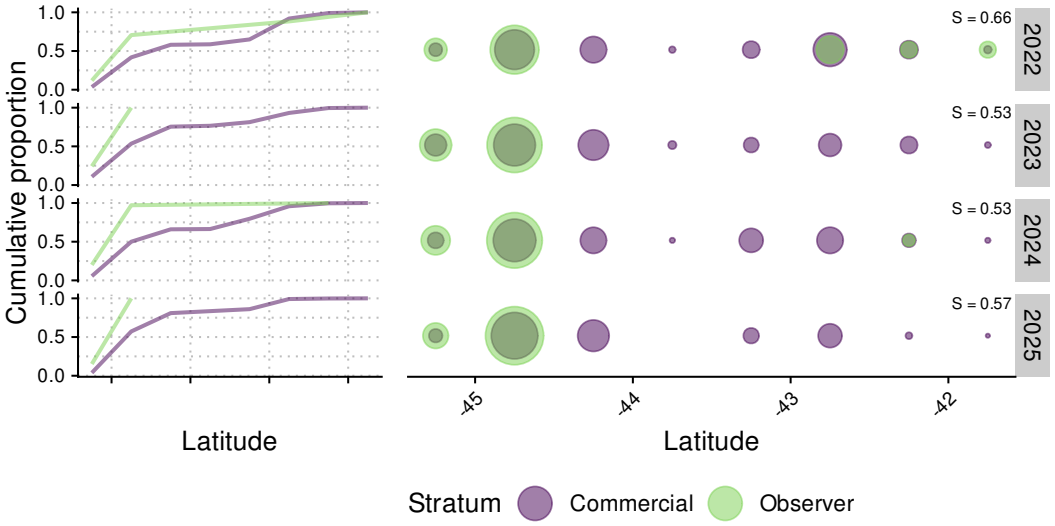


Figure 775: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 3A, where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

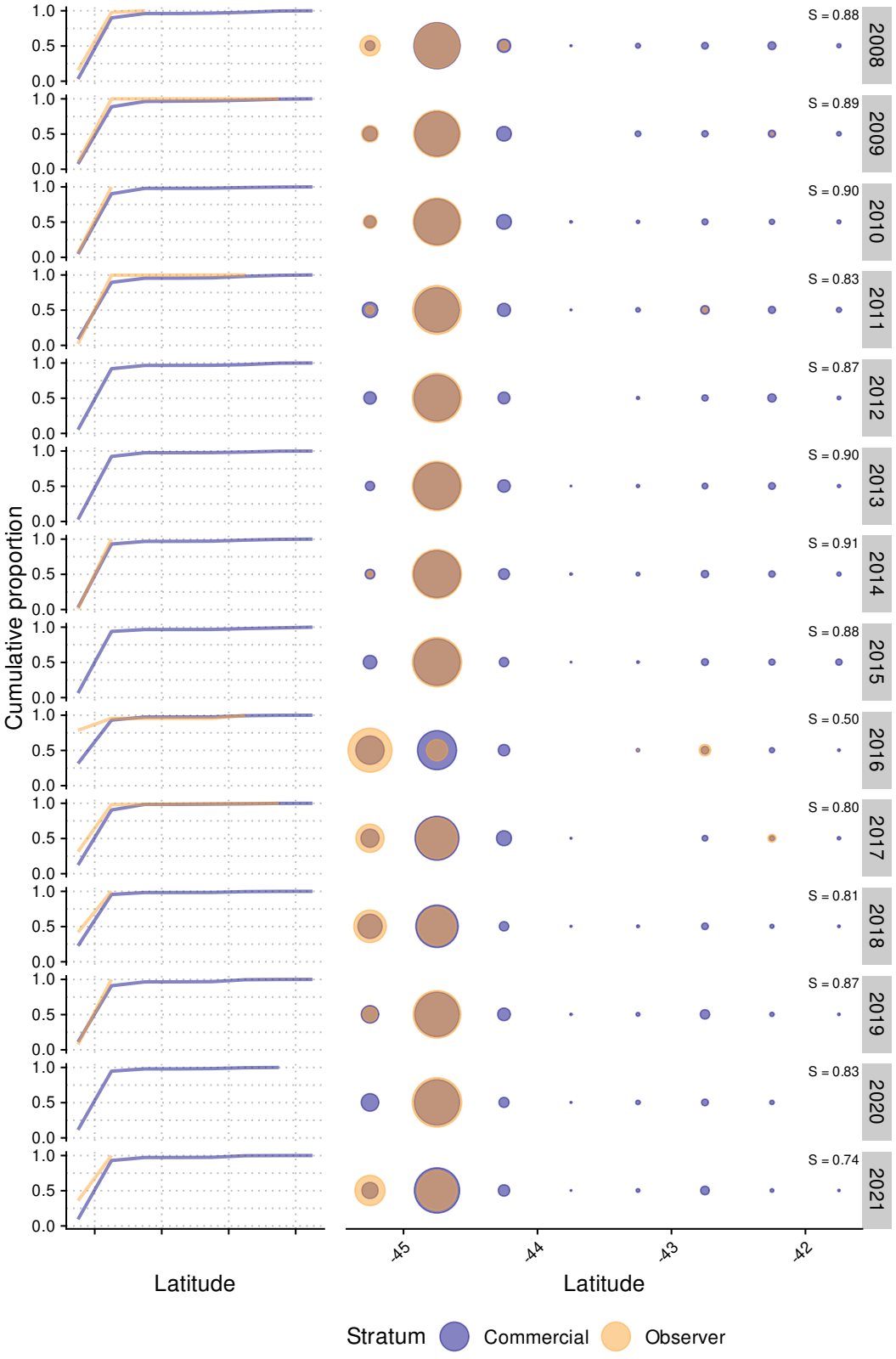


Figure 776: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SSO 3A, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

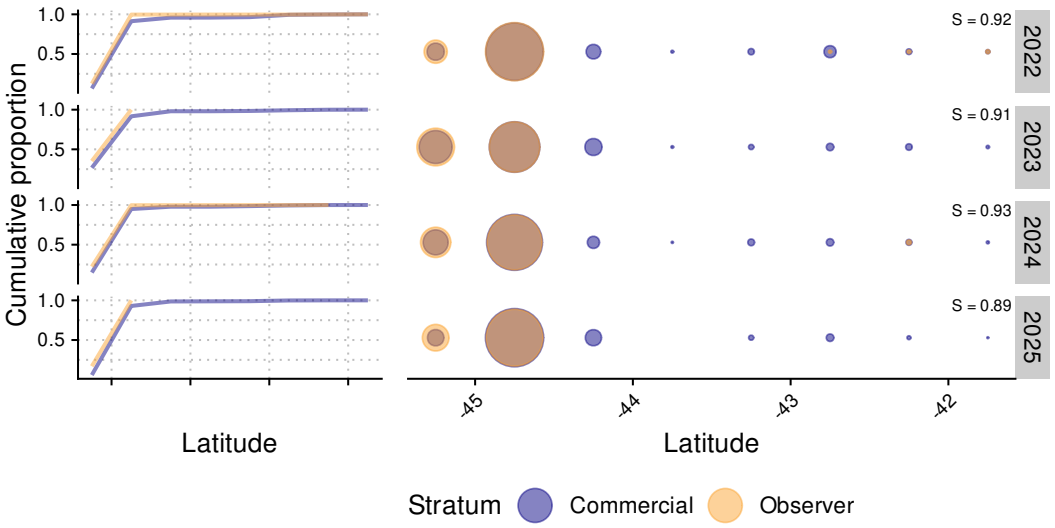


Figure 777: Latitudinal representativeness of observer sampling coverage of Trawl catch in SSO 3A, from events where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

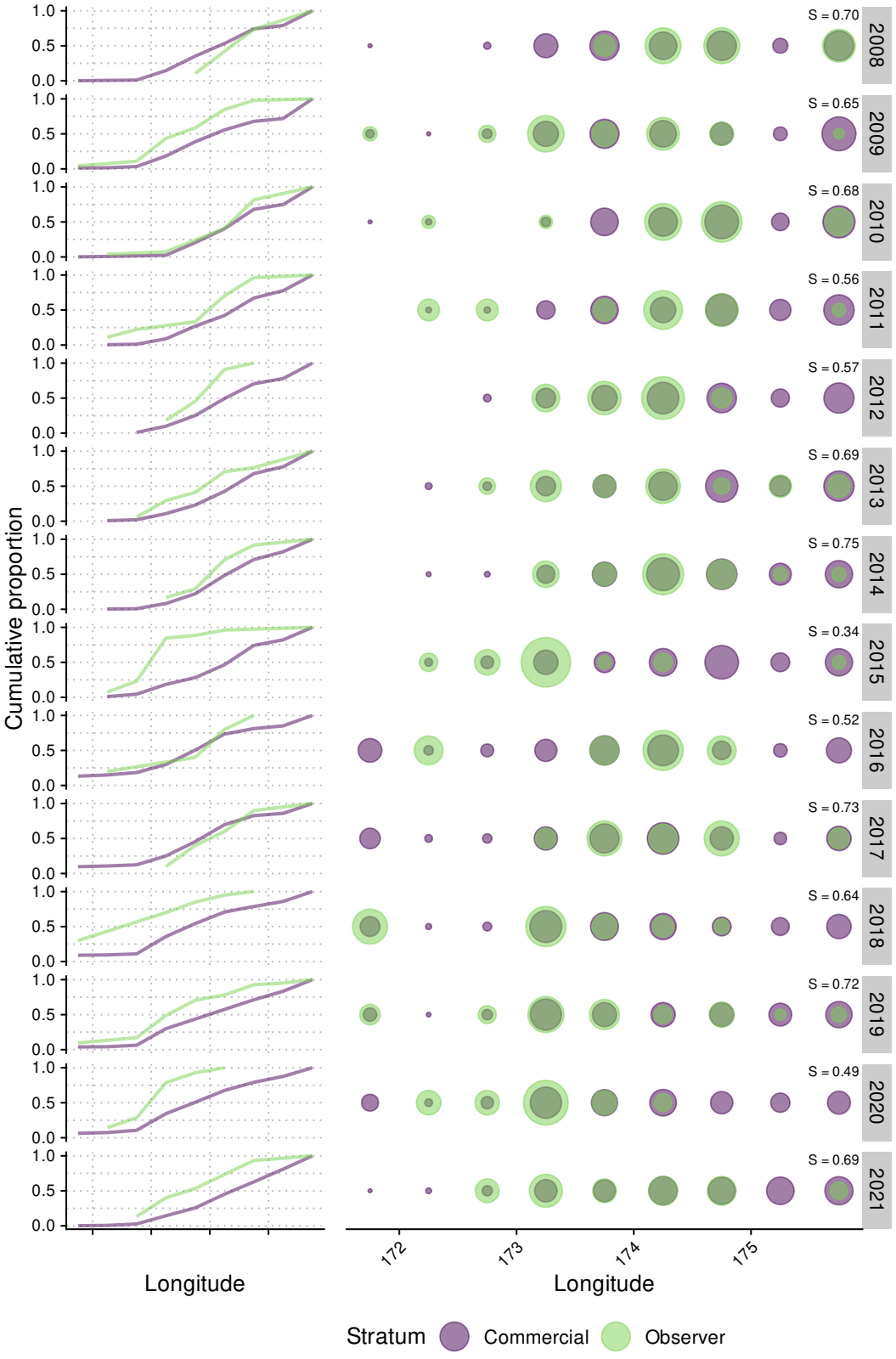


Figure 778: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 3A, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

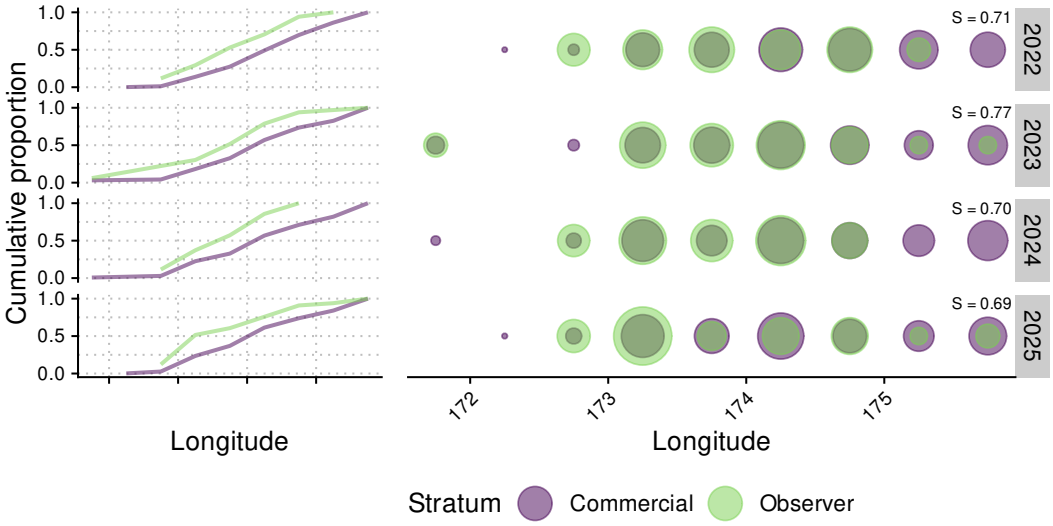


Figure 779: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 3A, where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

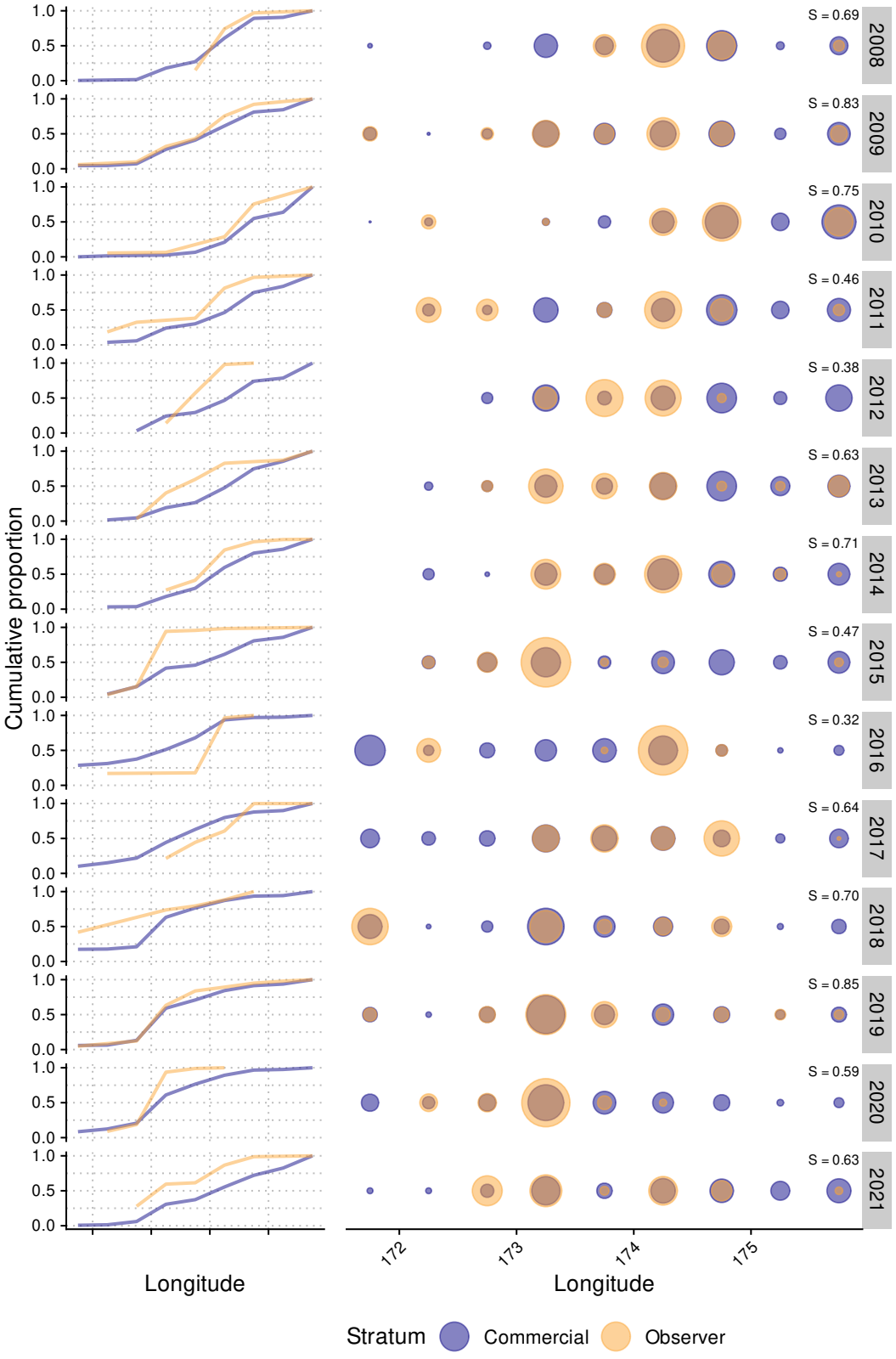


Figure 780: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SSO 3A, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

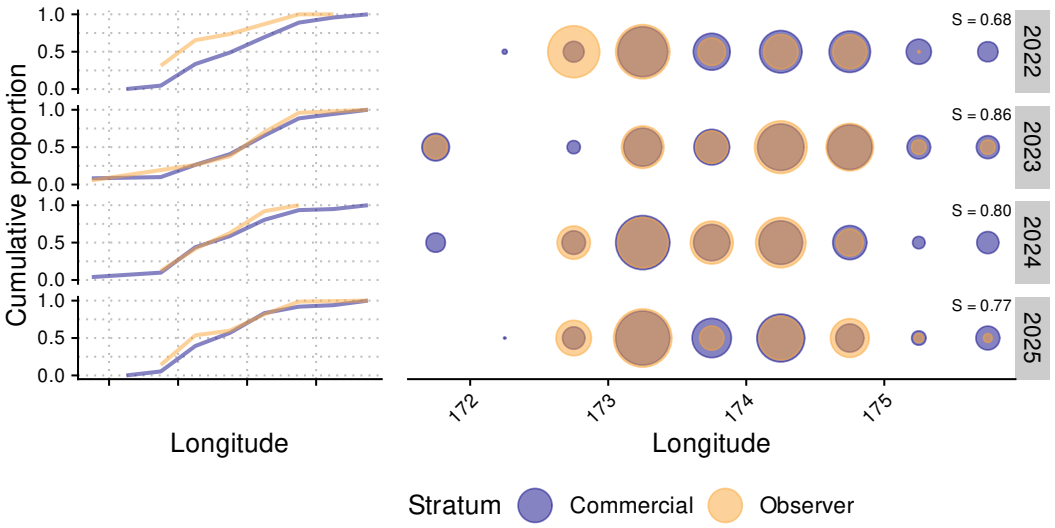


Figure 781: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SSO 3A, from events where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

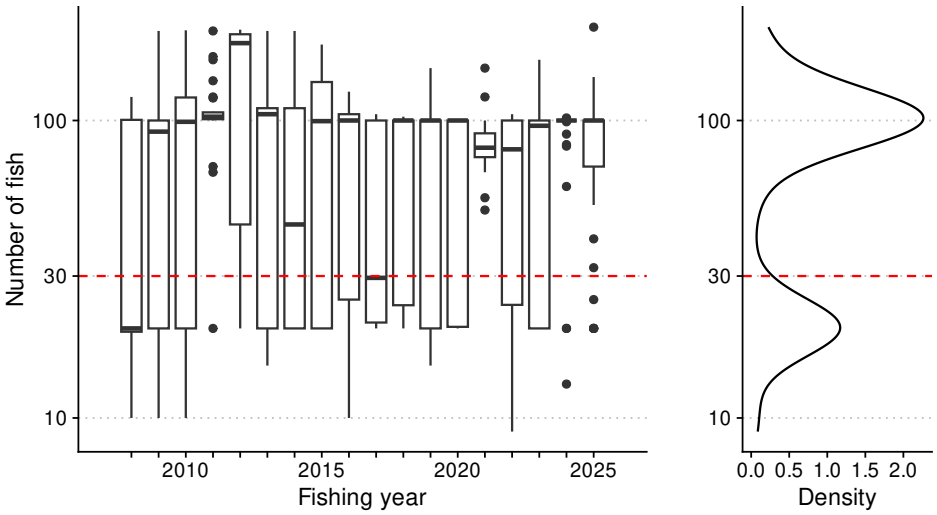


Figure 782: **Length-frequency sample sizes for observed fishing events in SSO 3A where smooth oreo were sampled. The red dashed line indicates a sample size of 30 fish.**

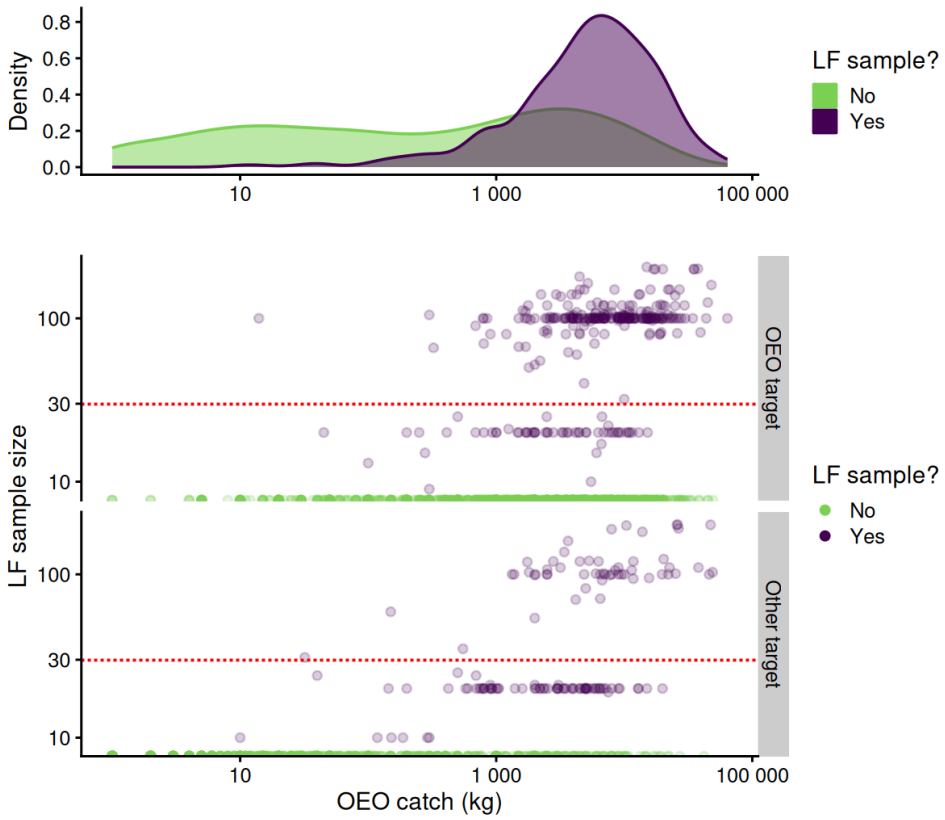


Figure 783: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SSO 3A in relation to the total smooth oreo catch from an event, separately for smooth oreo target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.11.2.2 Otolith samples

Table 65: Otolith samples of smooth oreo from the SSO 3A Trawl fishery sampled by the Observer Programme in fishing years 2008 to 2025. Positive fishing events are those where the catch of smooth oreo exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
2008	613	0	0	0.00
2009	595	18	113	3.03
2010	667	7	64	1.05
2011	622	23	254	3.70
2012	592	11	176	1.86
2013	518	17	148	3.28
2014	635	24	167	3.78
2015	577	0	0	0.00
2016	453	0	0	0.00
2017	483	7	51	1.45
2018	554	20	193	3.61
2019	744	40	358	5.38
2020	567	13	101	2.29
2021	641	12	107	1.87
2022	634	13	114	2.05
2023	615	31	293	5.04
2024	550	35	329	6.36
2025	566	33	317	5.83

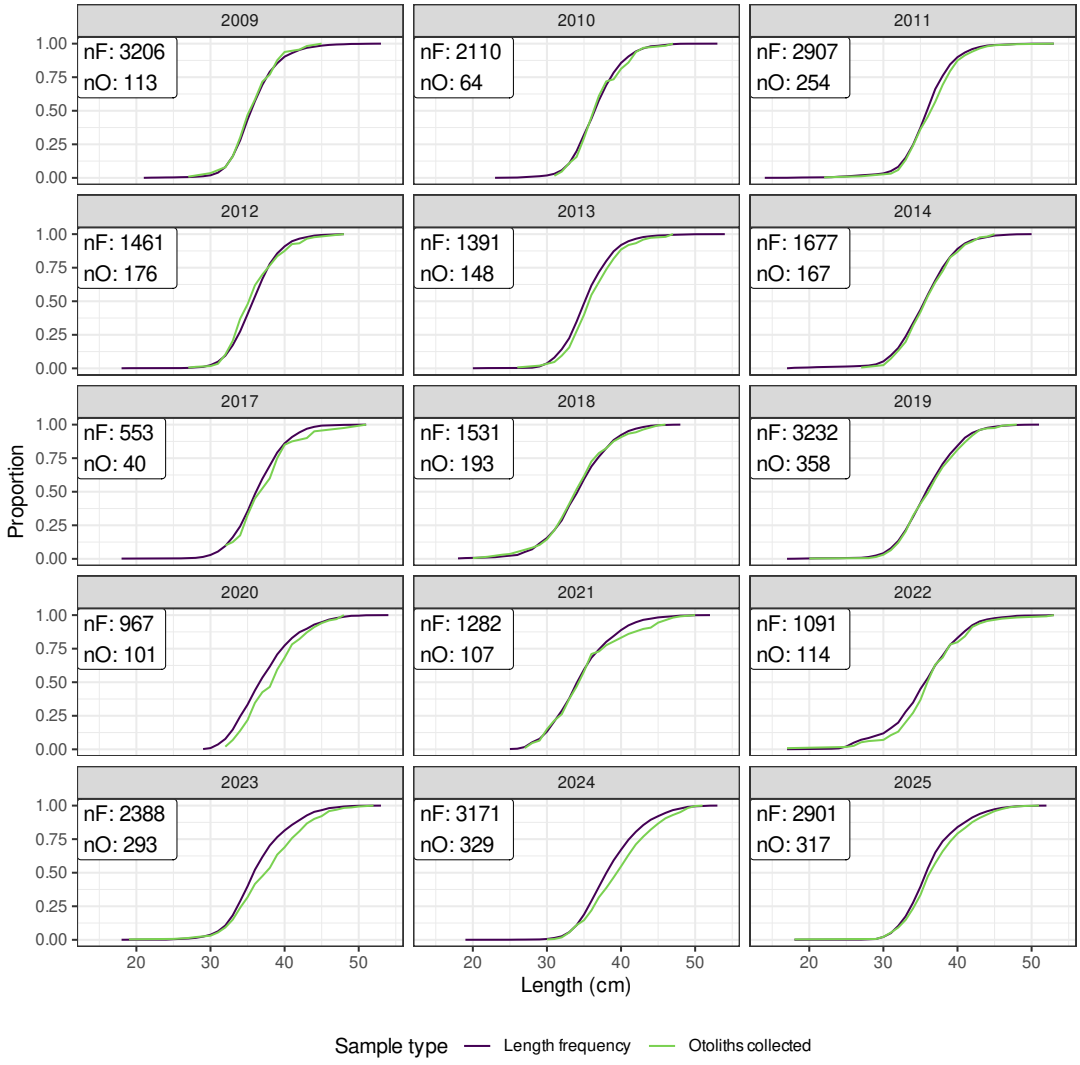


Figure 784: Cumulative distributions of the length of fish in the length frequency and otolith samples of smooth oreo in the SSO 3A Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.11.2.3 Catch quantification

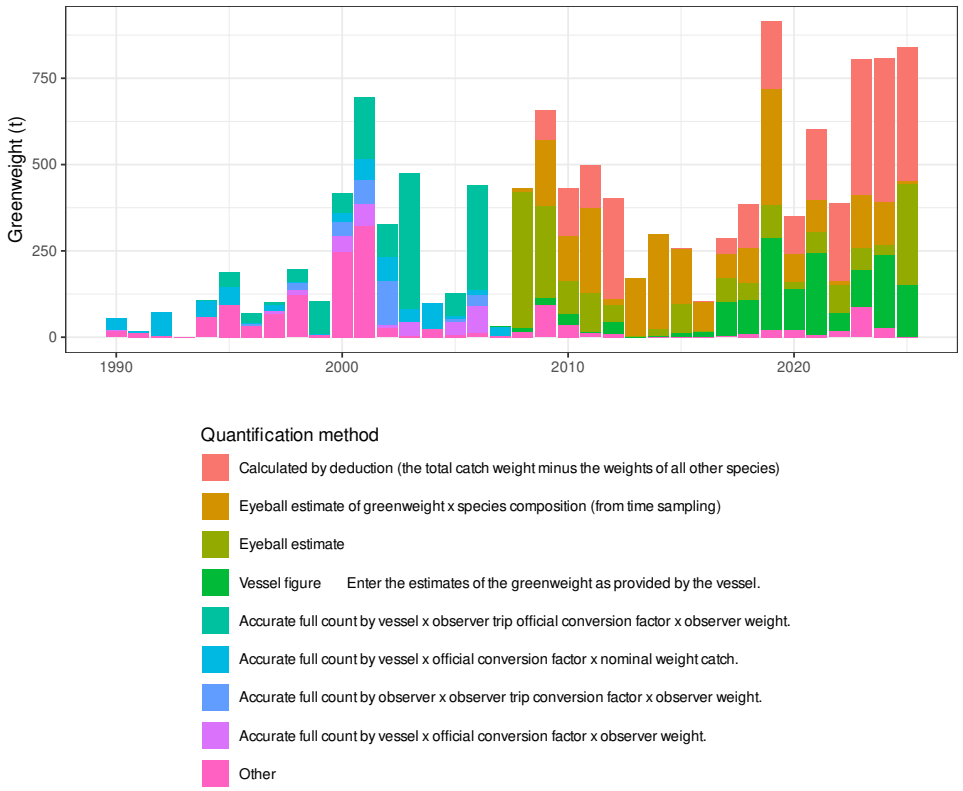


Figure 785: Methods used by observers to quantify the catch of smooth oreo in the SSO 3A Trawl fishery. The legend lists the methods used in descending order of total catch.

2.11.3 SSO 4: Trawl fishery

2.11.3.1 Length-frequency samples

Table 66: Length-frequency samples of smooth oreo from the SSO 4 Trawl fishery sampled by the Observer Programme in fishing years 2008 to 2025. Positive fishing events are those where the catch of smooth oreo exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
2008	1 825	143	8 960	7.84
2009	1 625	155	12 018	9.54
2010	1 354	154	12 533	11.37
2011	882	70	8 978	7.94
2012	1 058	49	6 175	4.63
2013	1 082	32	2 710	2.96
2014	1 277	50	4 099	3.92
2015	1 235	51	4 238	4.13
2016	1 080	33	2 007	3.06
2017	952	27	1 504	2.84
2018	1 205	10	704	0.83
2019	1 141	52	2 959	4.56
2020	1 117	38	2 550	3.40
2021	1 160	46	4 025	3.97
2022	827	38	2 538	4.59
2023	596	32	2 738	5.37
2024	651	60	5 009	9.22
2025	608	47	4 998	7.73

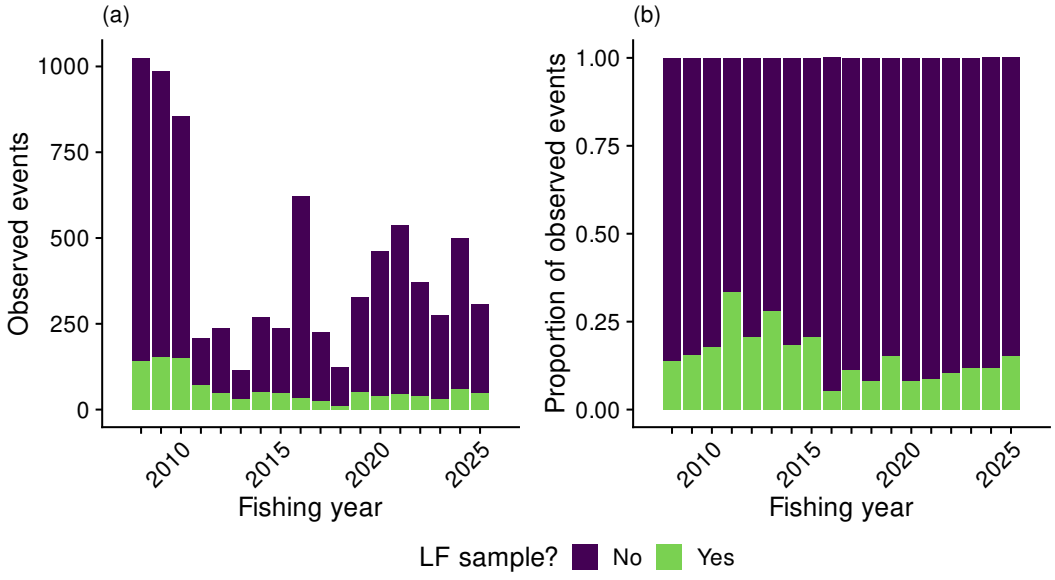


Figure 786: (a) Observed Trawl fishing events, and (b) proportion of observed events, in SSO 4 where the smooth oreo catch exceeded the 30 kg threshold, with and without length-frequency sampling.

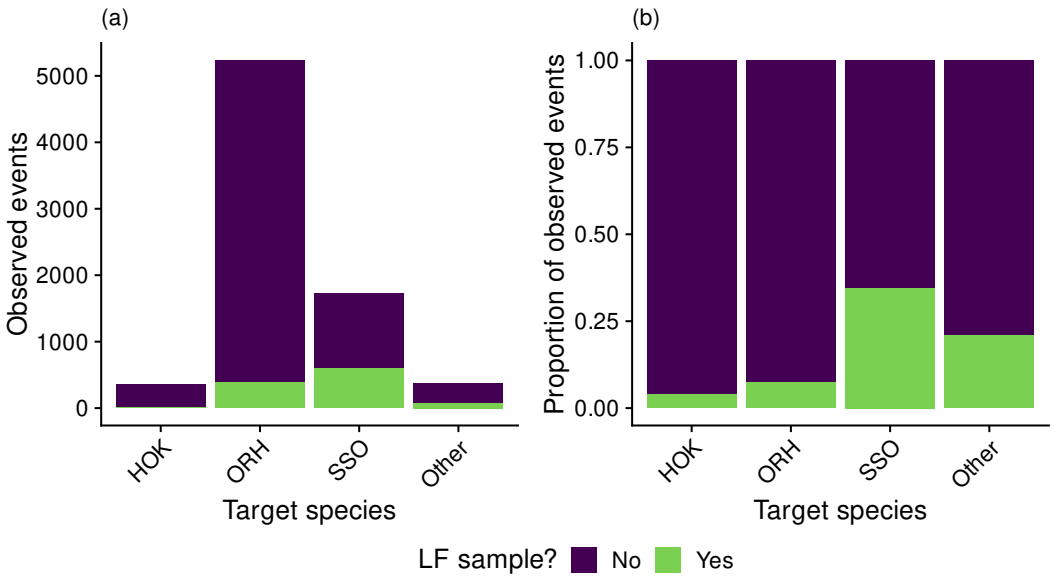


Figure 787: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SSO 4 where the smooth oreo catch exceeded the 30 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

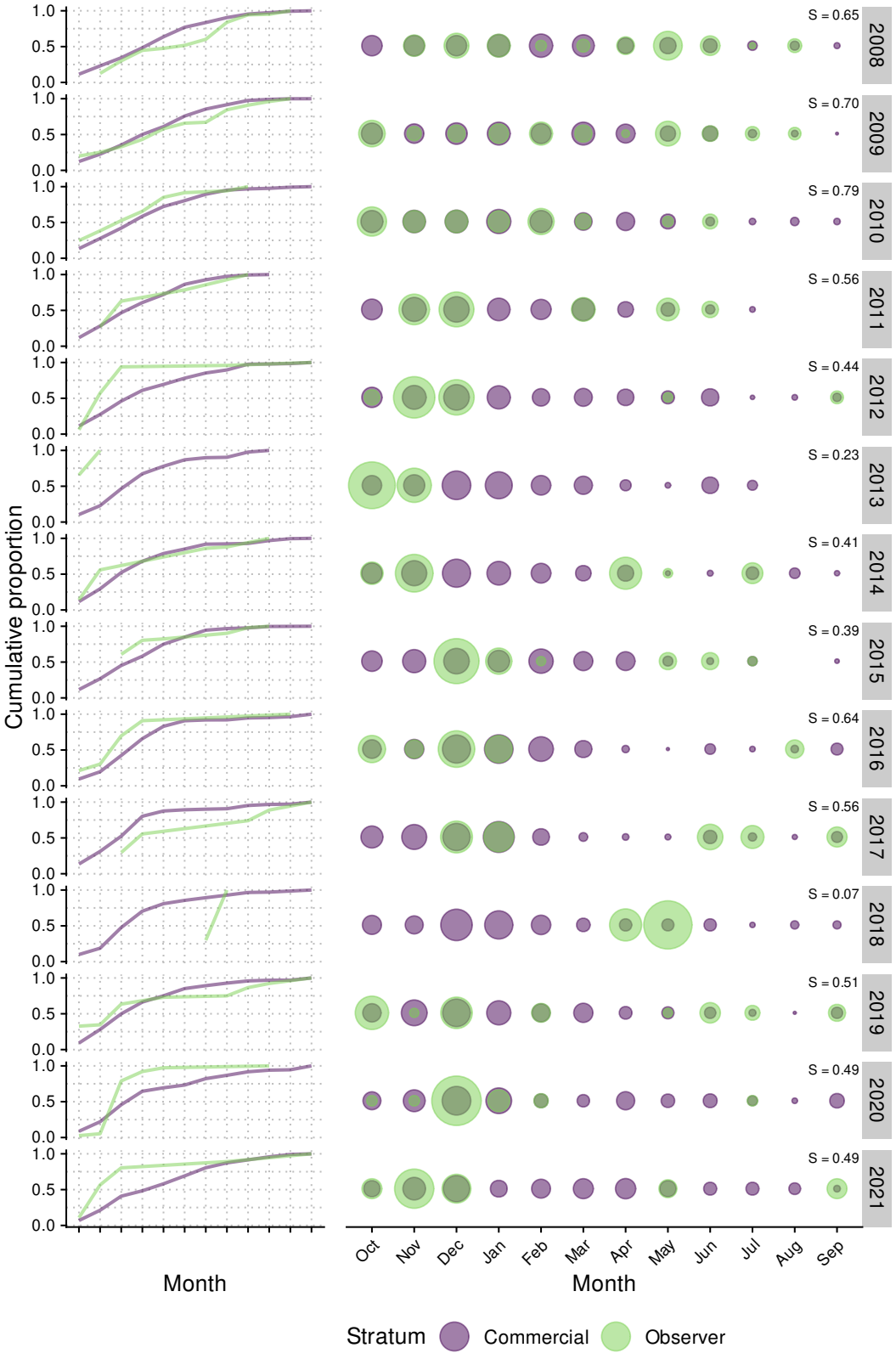


Figure 788: Monthly representativeness of observer sampling coverage of Trawl fishing events in SSO 4, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

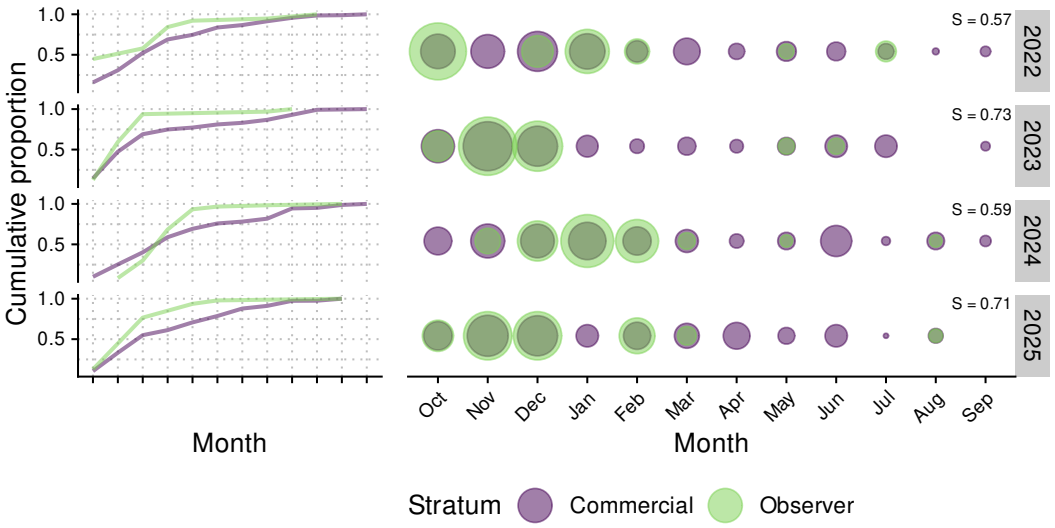


Figure 789: Monthly representativeness of observer sampling coverage of Trawl fishing events in SSO 4, where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

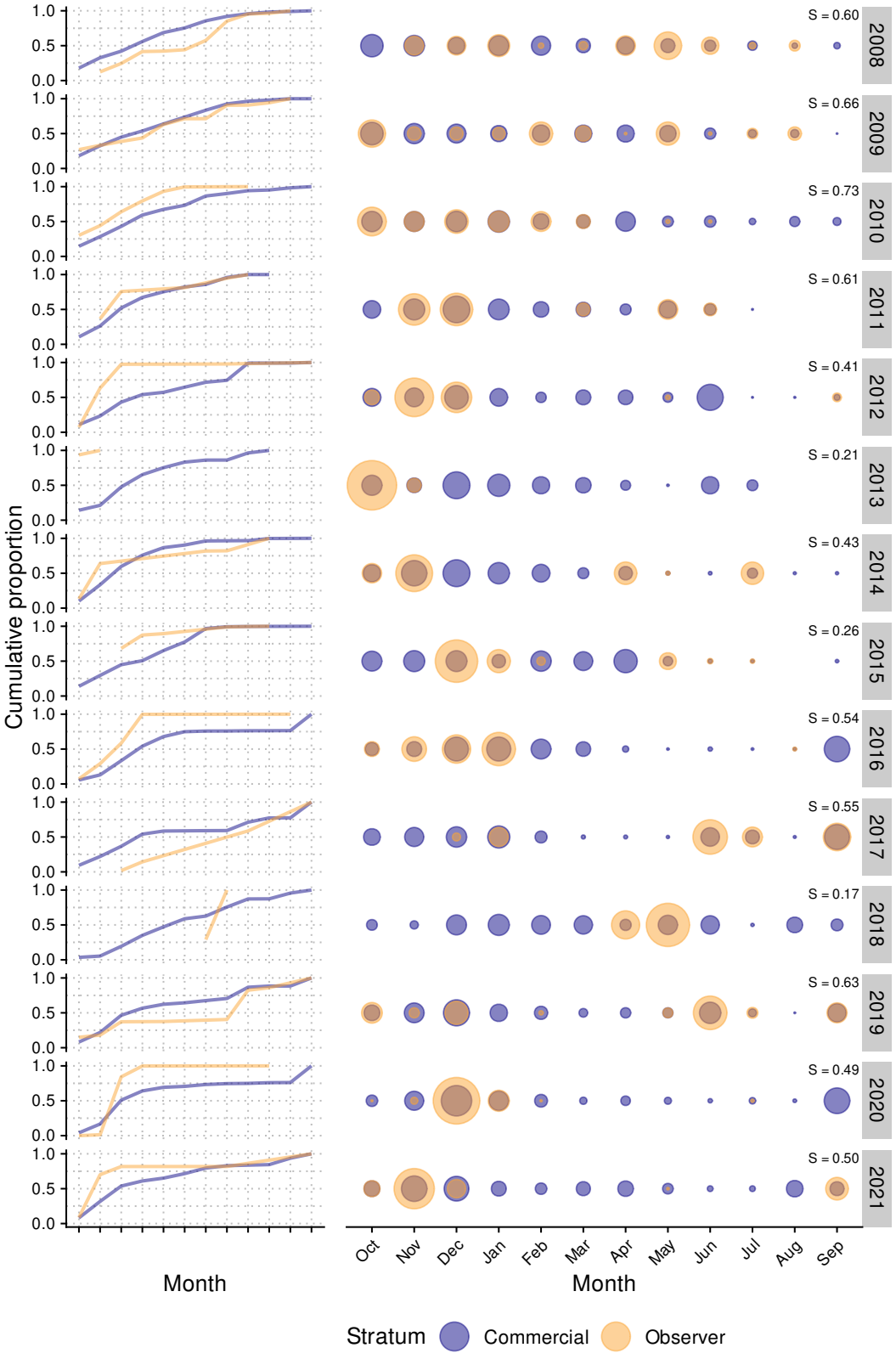


Figure 790: **Monthly representativeness of observer sampling coverage of Trawl catch in SSO 4, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

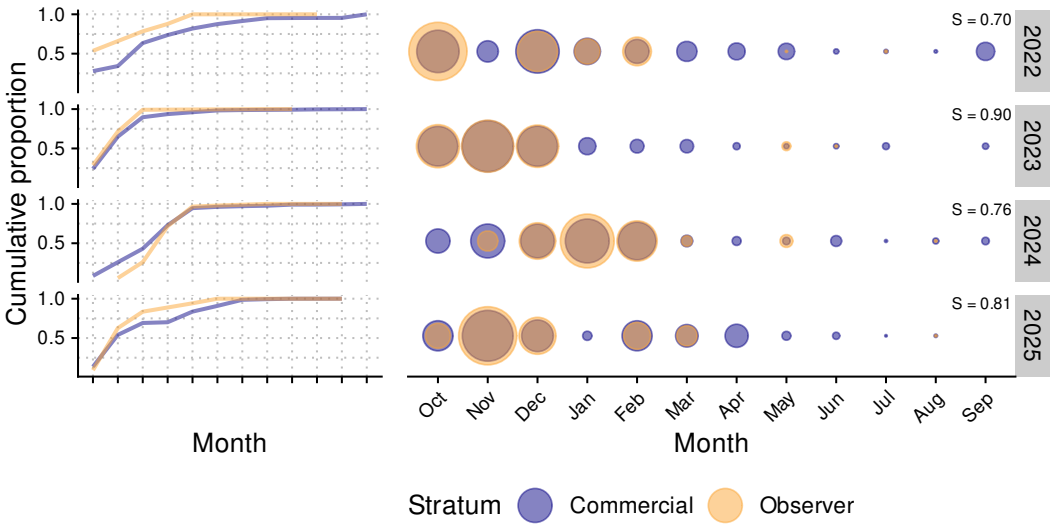


Figure 791: Monthly representativeness of observer sampling coverage of Trawl catch in SSO 4, from events where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

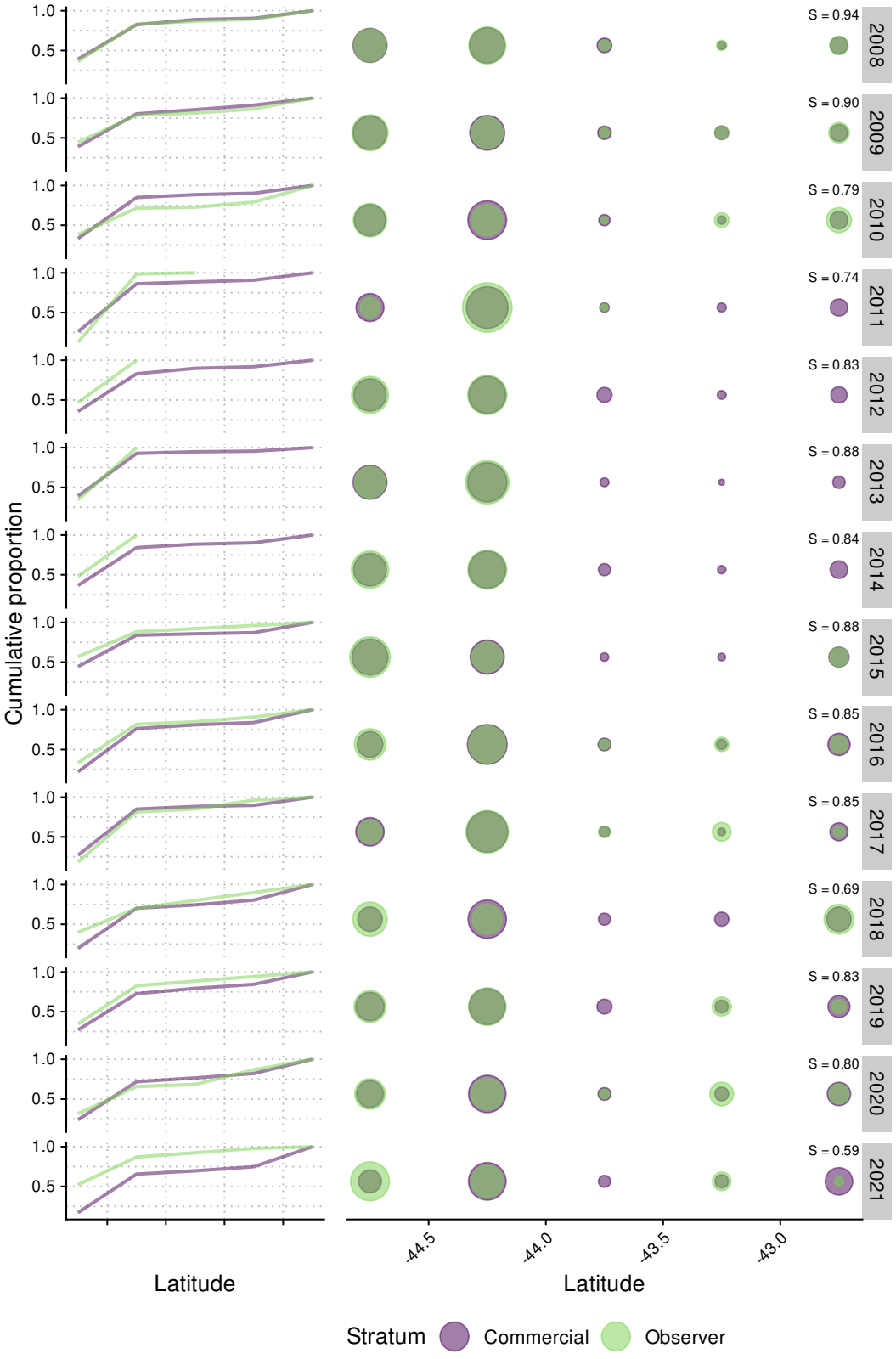


Figure 792: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 4, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

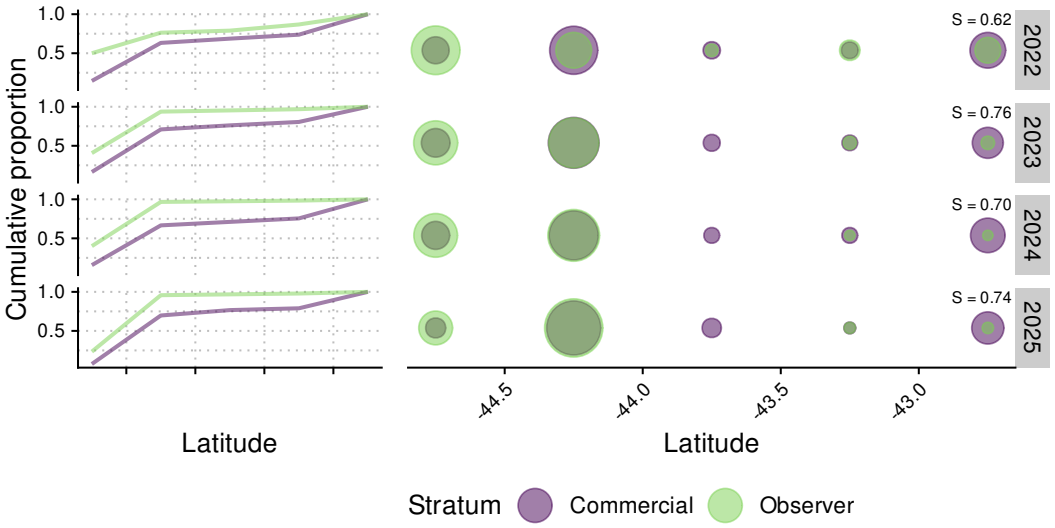


Figure 793: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 4, where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

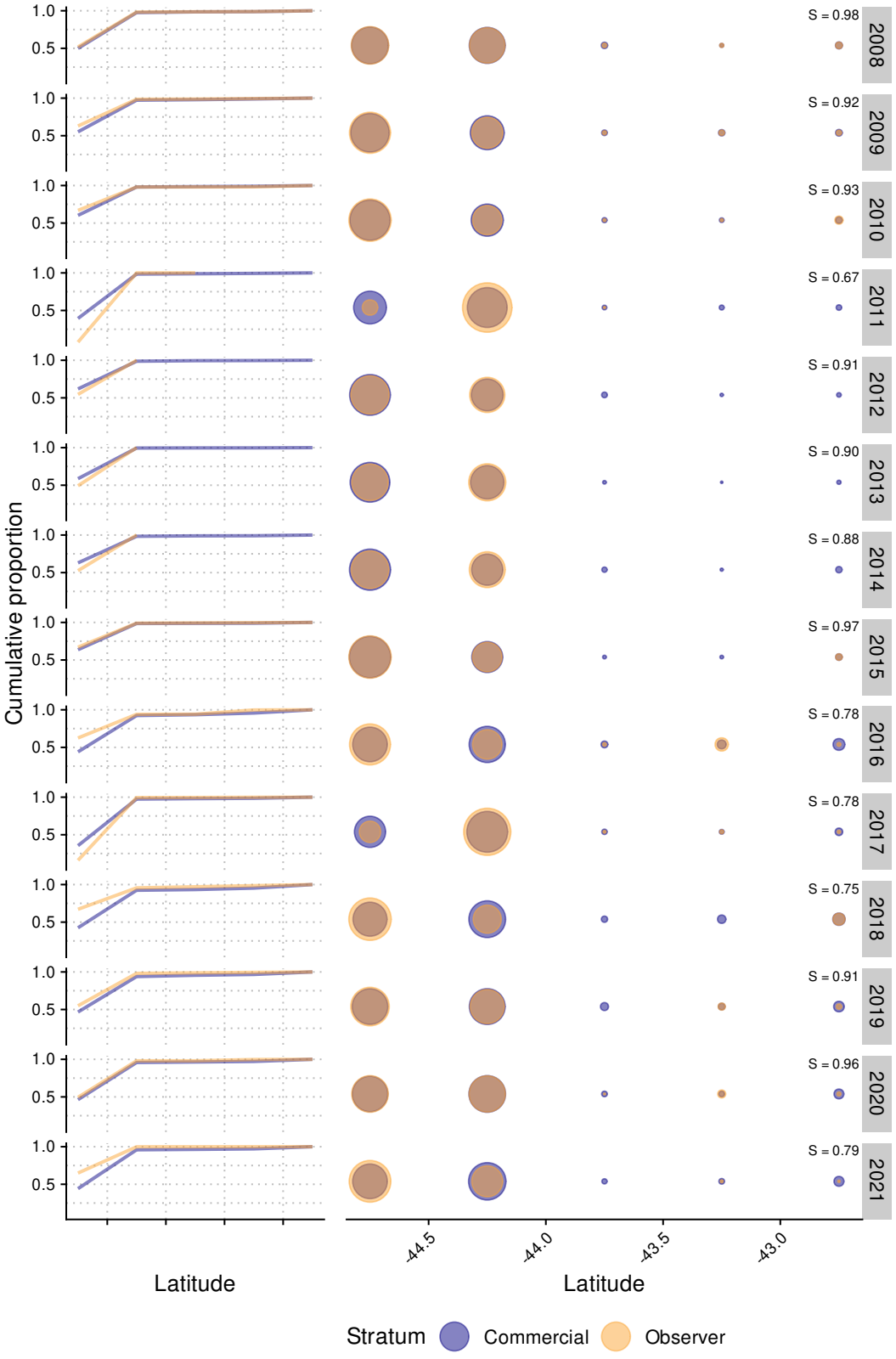


Figure 794: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SSO 4, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

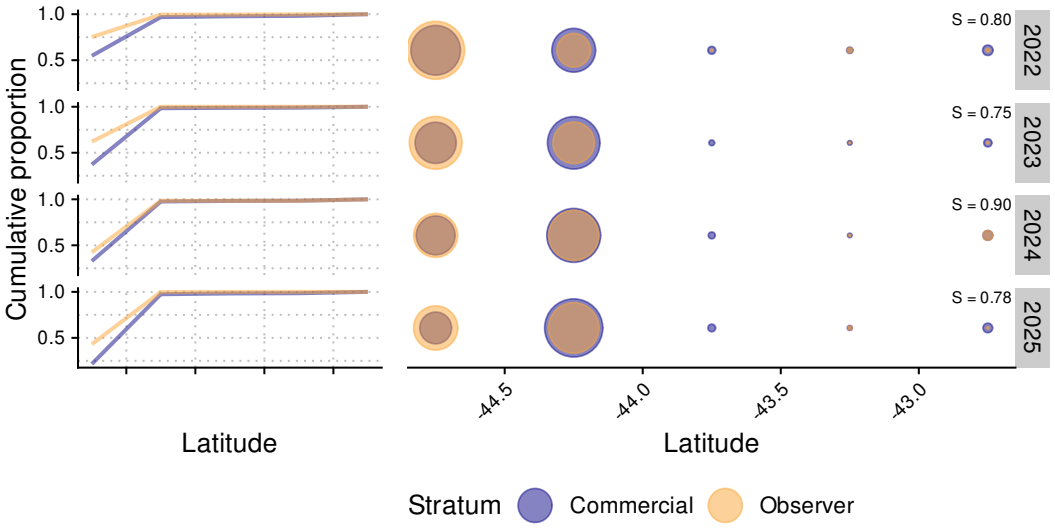


Figure 795: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SSO 4, from events where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

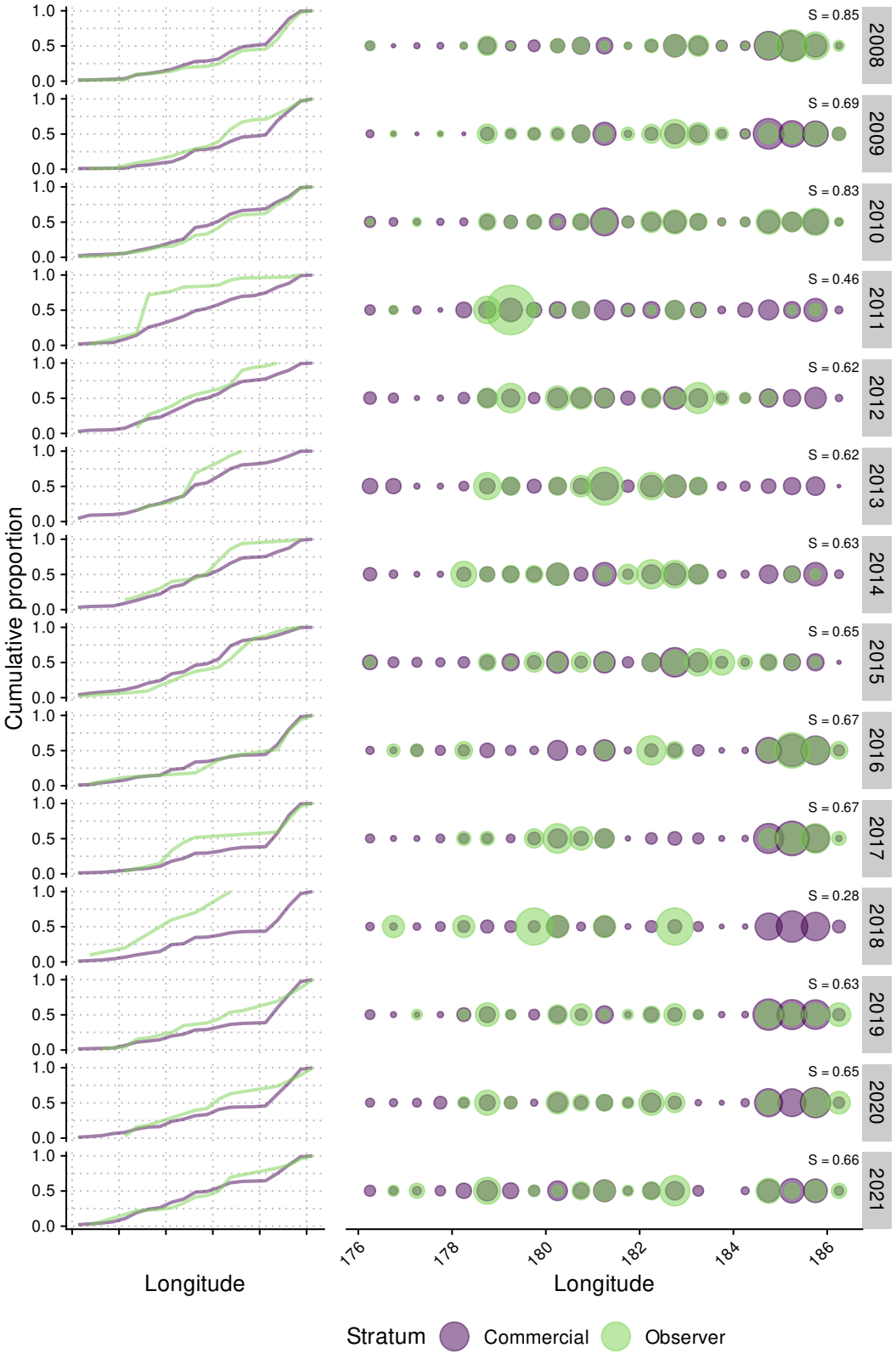


Figure 796: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 4, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

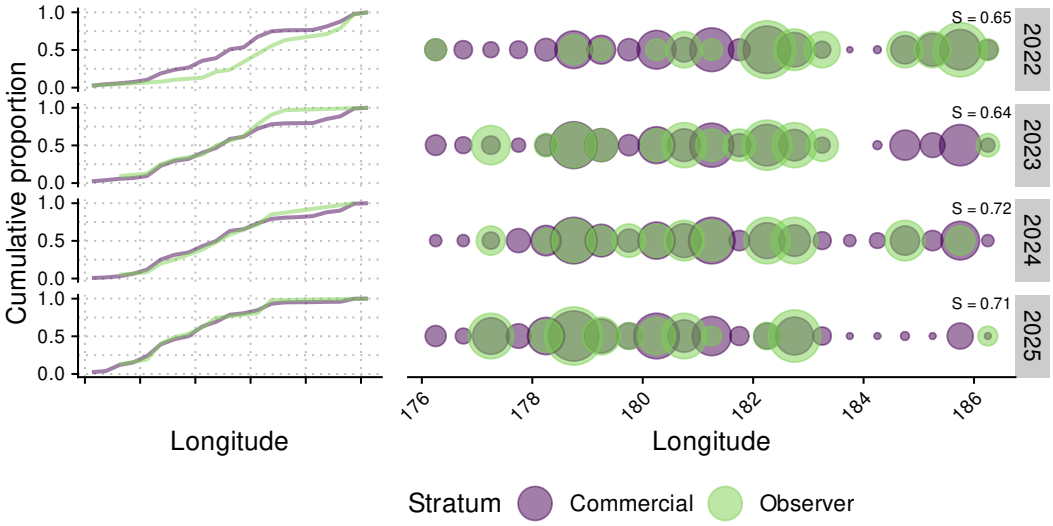


Figure 797: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 4, where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

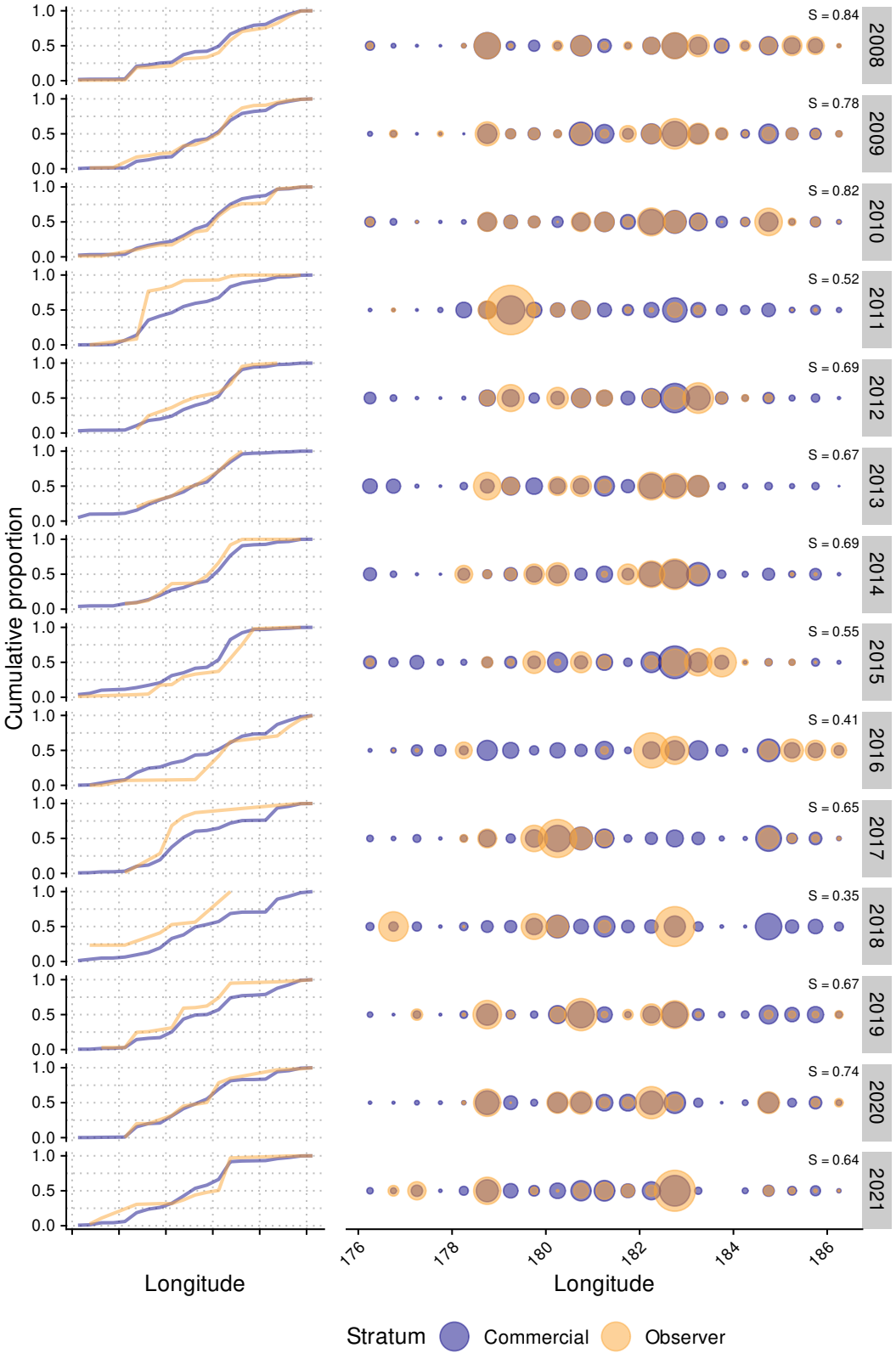


Figure 798: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SSO 4, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2021. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

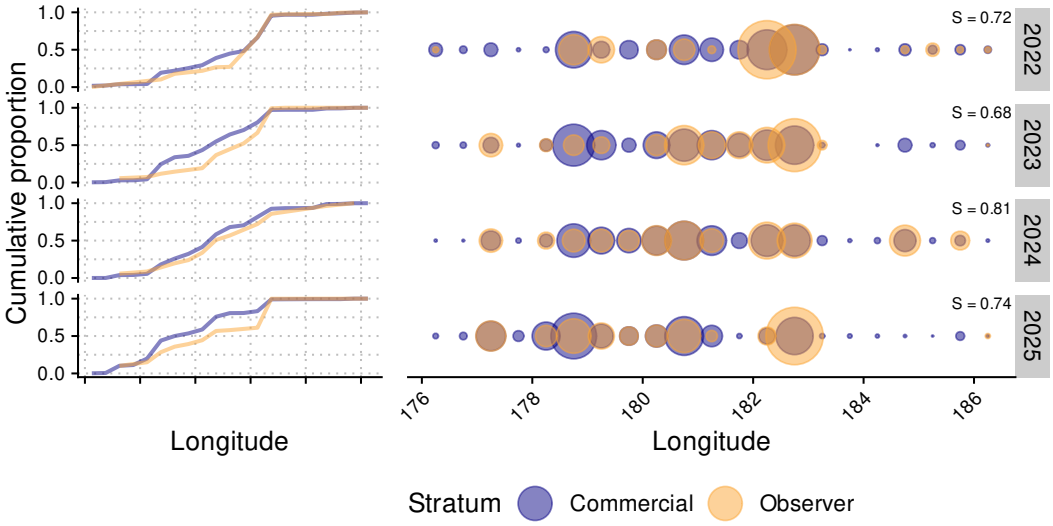


Figure 799: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SSO 4, from events where the smooth oreo catch exceeded the 30kg threshold, in 2022 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

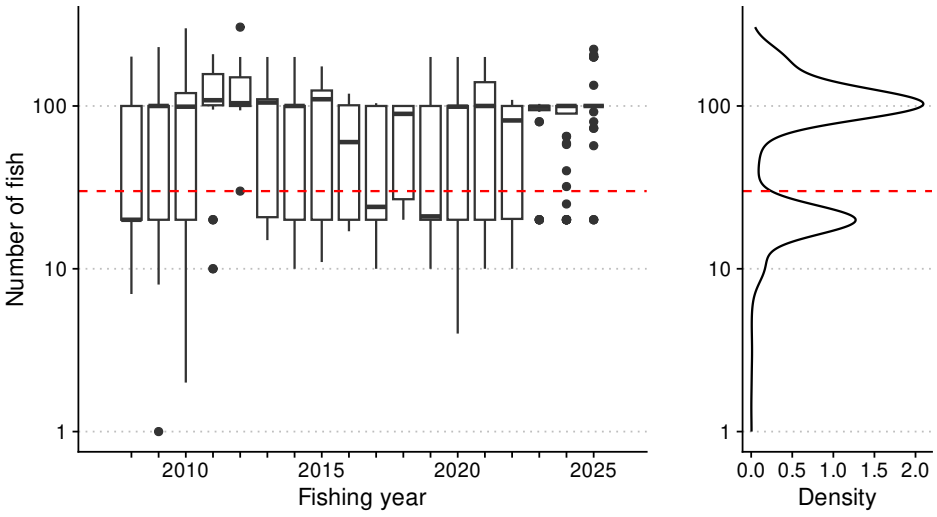


Figure 800: **Length-frequency sample sizes for observed fishing events in SSO 4 where smooth oreo were sampled. The red dashed line indicates a sample size of 30 fish.**

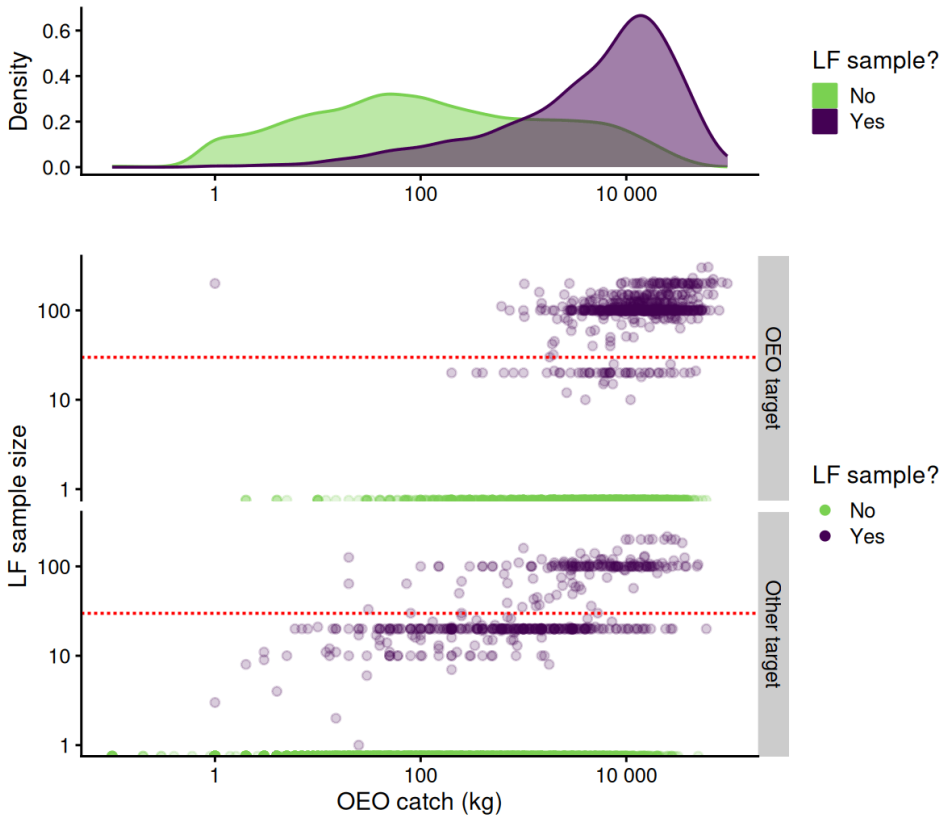


Figure 801: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SSO 4 in relation to the total smooth oreo catch from an event, separately for smooth oreo target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.11.3.2 Otolith samples

Table 67: Otolith samples of smooth oreo from the SSO 4 Trawl fishery sampled by the Observer Programme in fishing years 2008 to 2025. Positive fishing events are those where the catch of smooth oreo exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
2008	1 825	0	0	0.00
2009	1 625	31	248	1.91
2010	1 354	66	489	4.87
2011	882	28	347	3.17
2012	1 058	41	684	3.88
2013	1 082	32	304	2.96
2014	1 277	49	498	3.84
2015	1 235	0	0	0.00
2016	1 080	0	0	0.00
2017	952	23	176	2.42
2018	1 205	8	65	0.66
2019	1 141	44	355	3.86
2020	1 117	36	304	3.22
2021	1 160	37	347	3.19
2022	827	38	318	4.59
2023	596	30	289	5.03
2024	651	60	536	9.22
2025	608	47	528	7.73

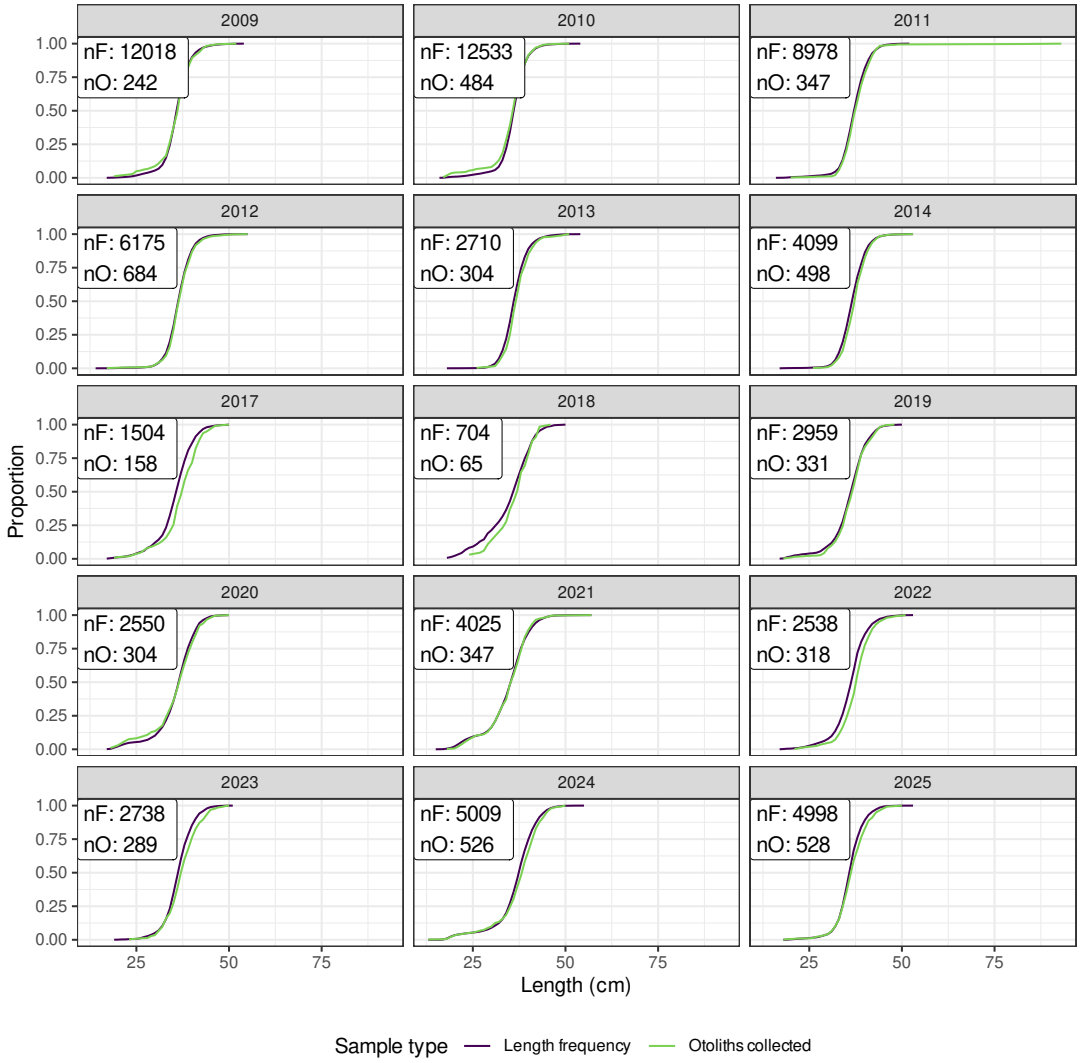


Figure 802: Cumulative distributions of the length of fish in the length frequency and otolith samples of smooth oreo in the SSO 4 Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.11.3.3 Catch quantification

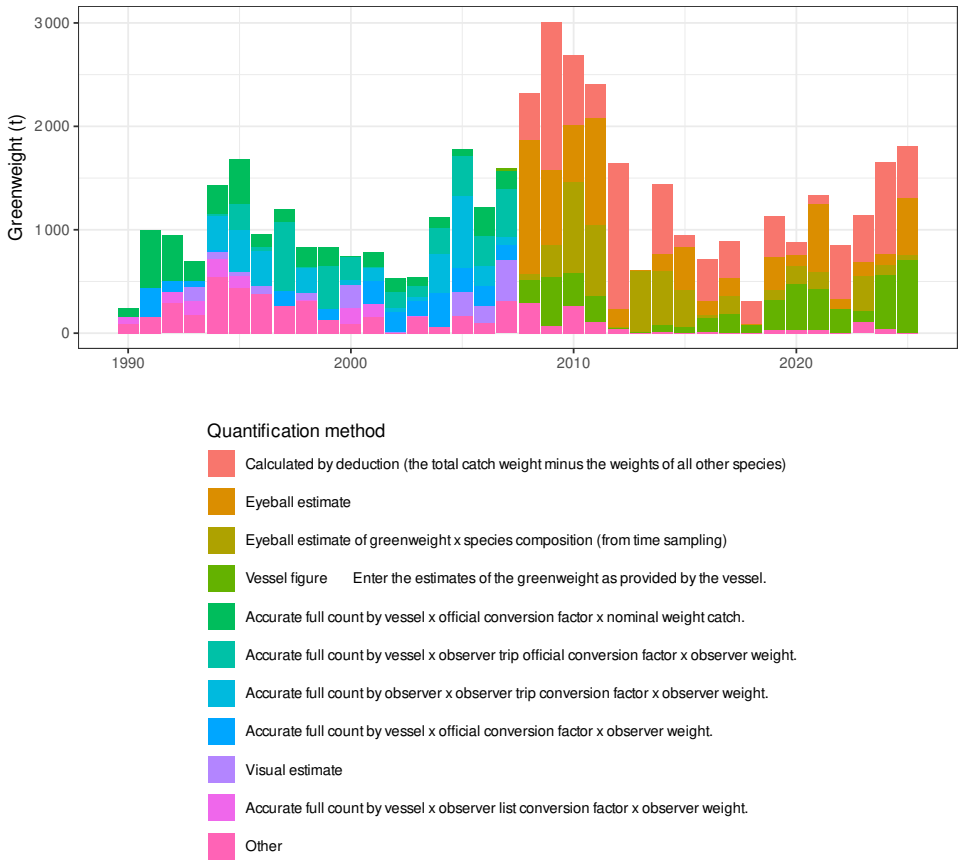


Figure 803: Methods used by observers to quantify the catch of smooth oreo in the SSO 4 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.11.4 SSO 6: Trawl fishery

2.11.4.1 Length-frequency samples

Table 68: Length-frequency samples of smooth oreo from the SSO 6 Trawl fishery sampled by the Observer Programme in fishing years 2008 to 2025. Positive fishing events are those where the catch of smooth oreo exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
2008	1 177	153	7 728	13.00
2009	1 138	97	5 690	8.52
2010	1 255	77	4 651	6.14
2011	743	156	8 253	21.00
2012	506	31	1 504	6.13
2013	52	4	295	7.69
2014	150	1	100	0.67
2015	94	0	0	0.00
2016	211	19	1 939	9.00
2017	272	47	4 136	17.28
2018	382	41	3 420	10.73
2019	284	35	2 032	12.32
2020	223	5	100	2.24
2021	267	41	2 620	15.36
2022	223	9	669	4.04
2023	421	62	4 650	14.73
2024	213	12	727	5.63
2025	114	0	0	0.00

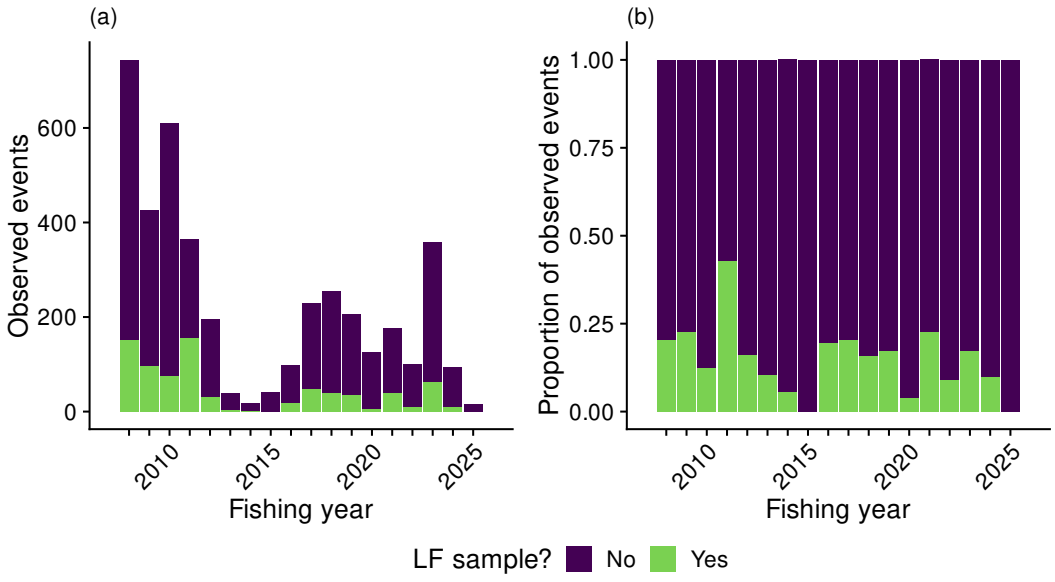


Figure 804: (a) Observed Trawl fishing events, and (b) proportion of observed events, in SSO 6 where the smooth oreo catch exceeded the 30 kg threshold, with and without length-frequency sampling.

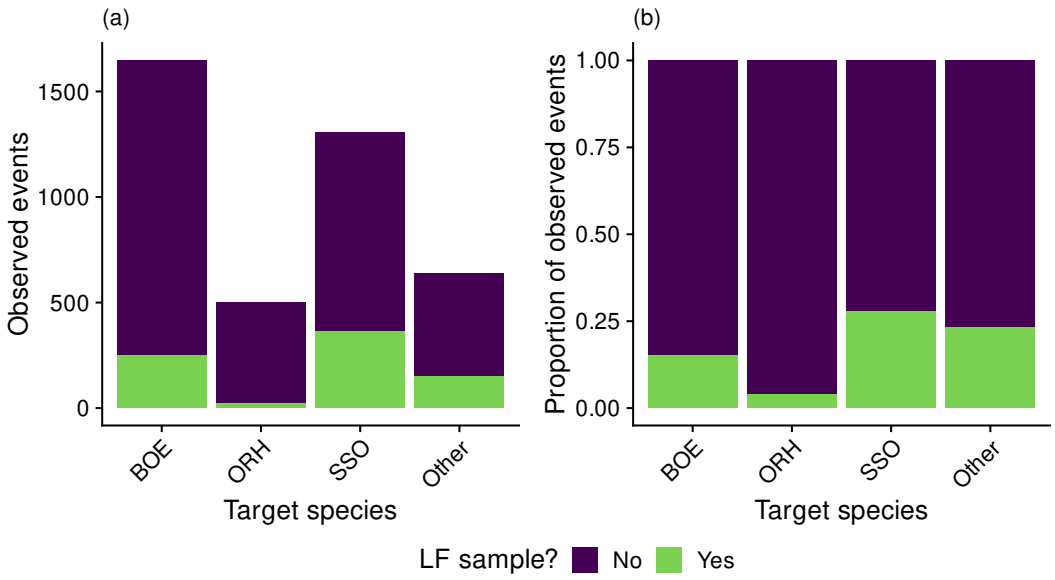


Figure 805: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SSO 6 where the smooth oreo catch exceeded the 30 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

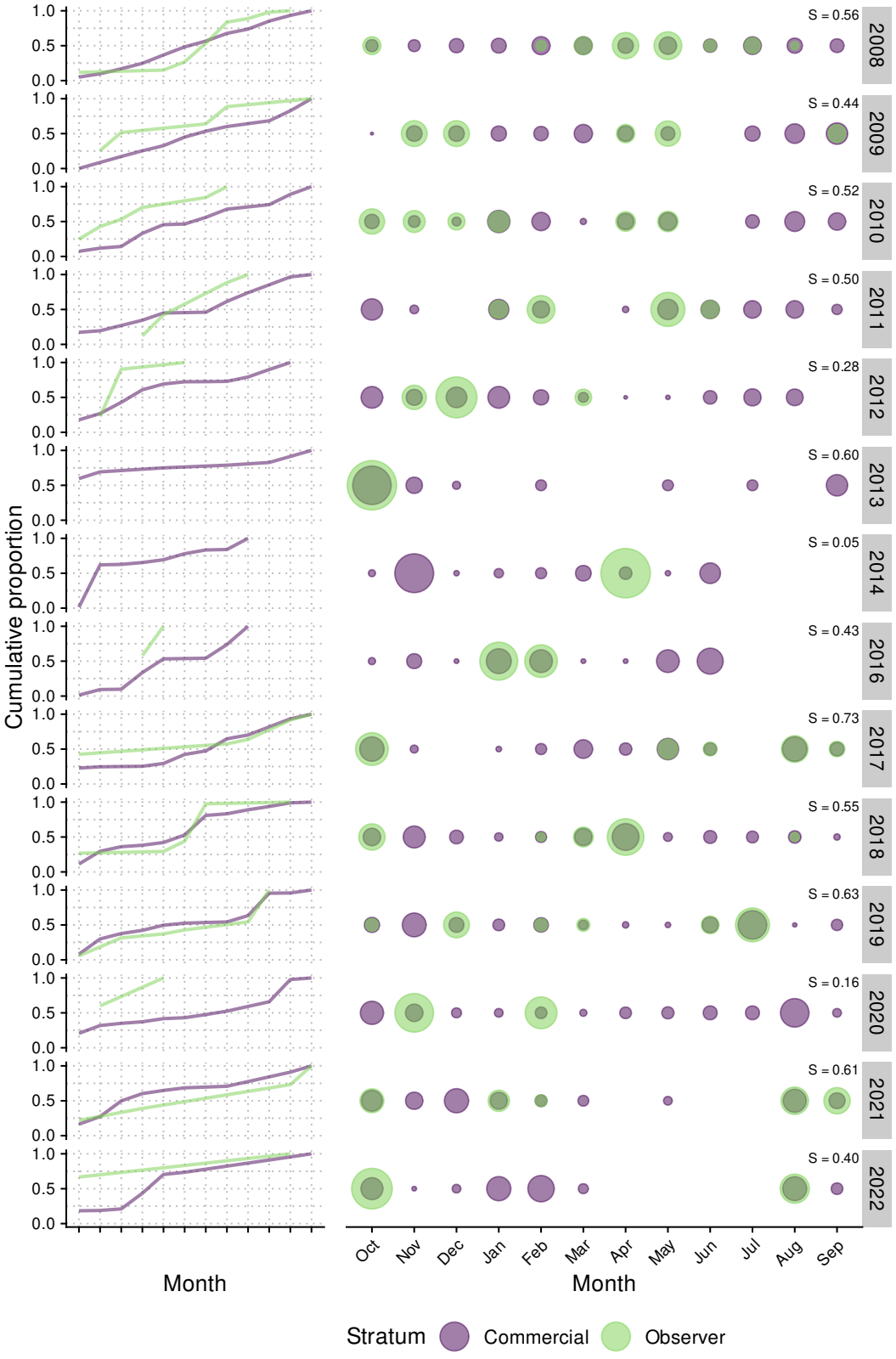


Figure 806: Monthly representativeness of observer sampling coverage of Trawl fishing events in SSO 6, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

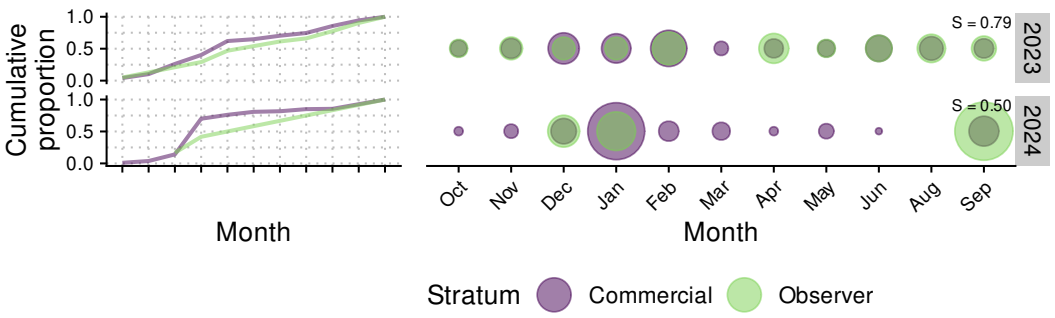


Figure 807: Monthly representativeness of observer sampling coverage of Trawl fishing events in SSO 6, where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

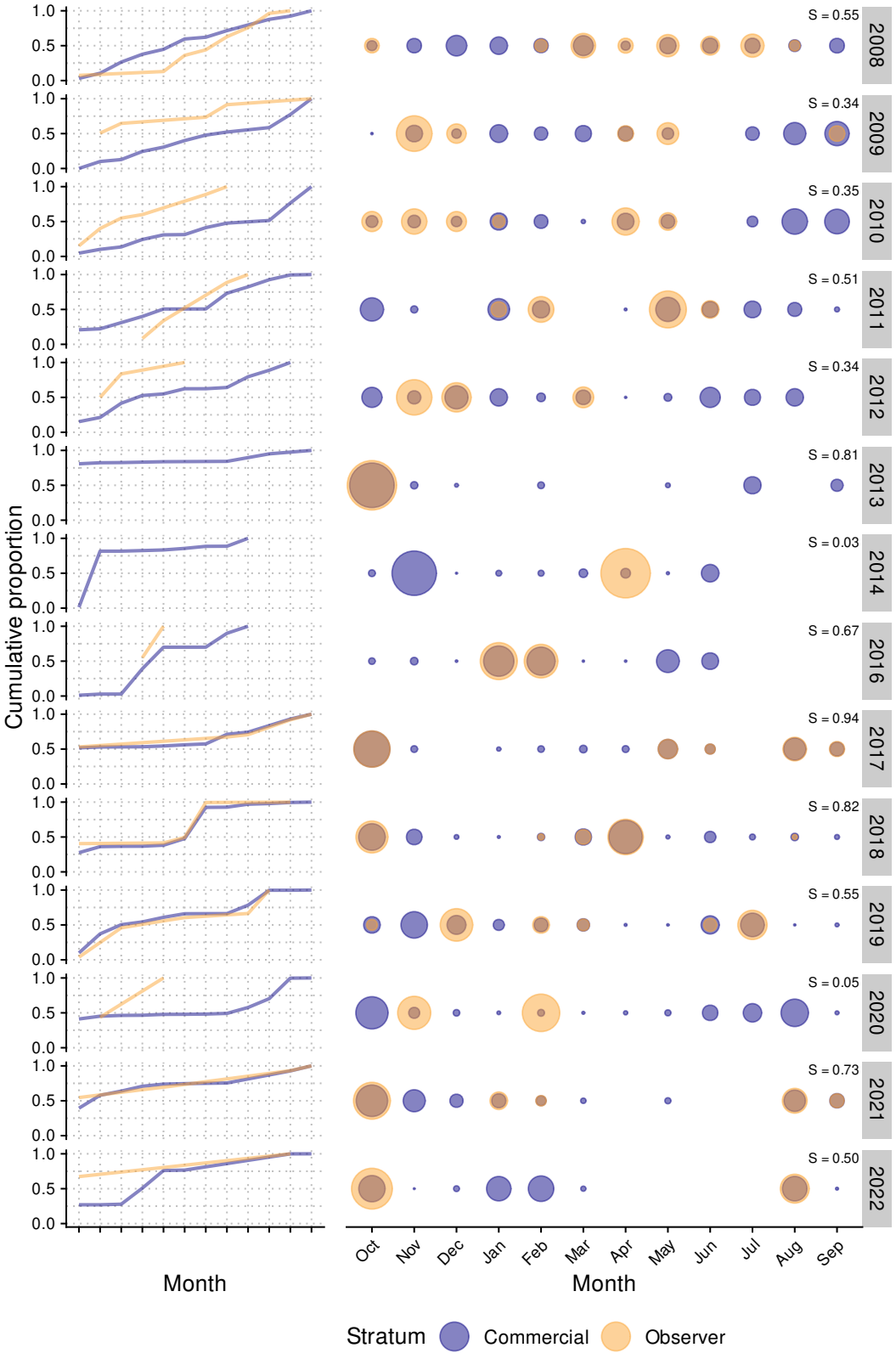


Figure 808: Monthly representativeness of observer sampling coverage of Trawl catch in SSO 6, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

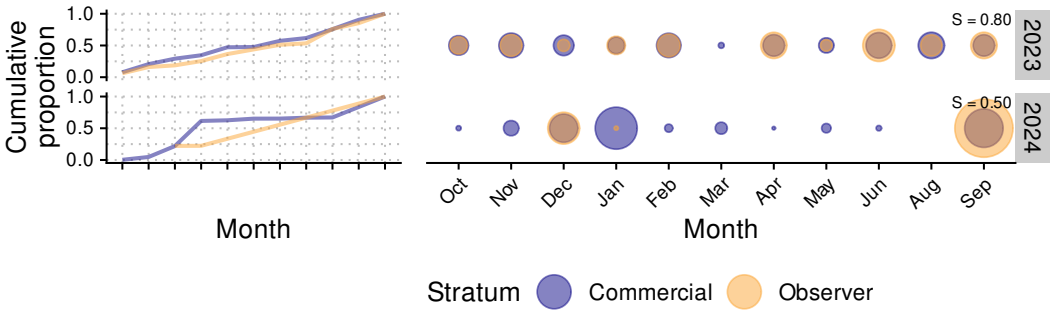


Figure 809: Monthly representativeness of observer sampling coverage of Trawl catch in SSO 6, from events where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

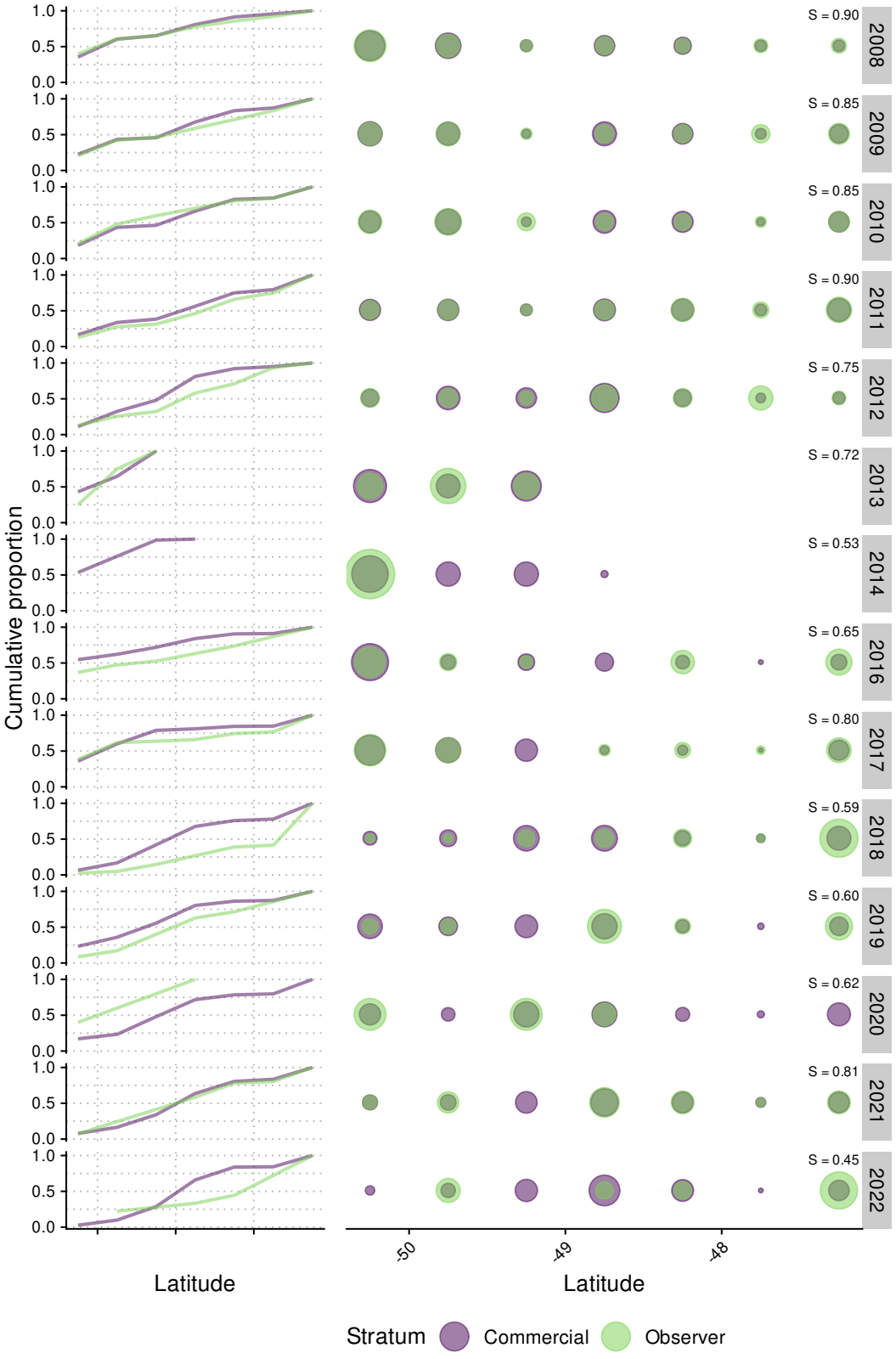


Figure 810: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 6, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

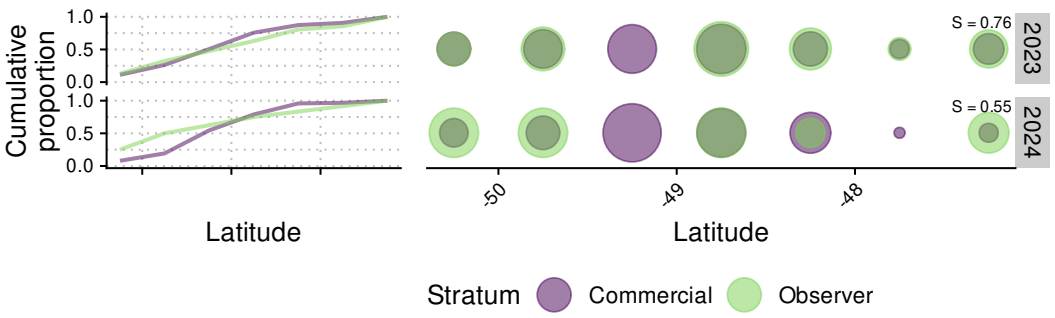


Figure 811: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 6, where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

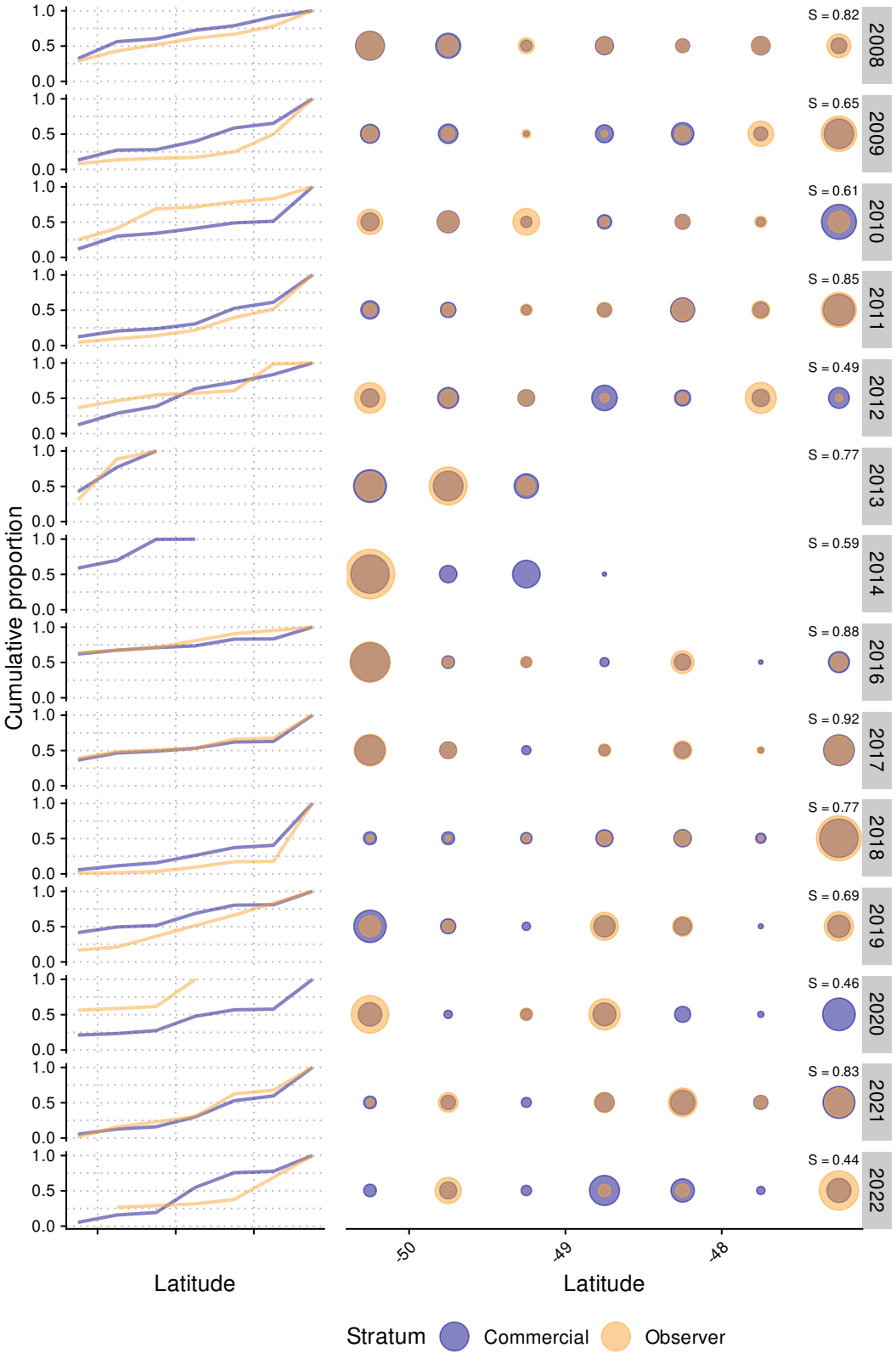


Figure 812: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SSO 6, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

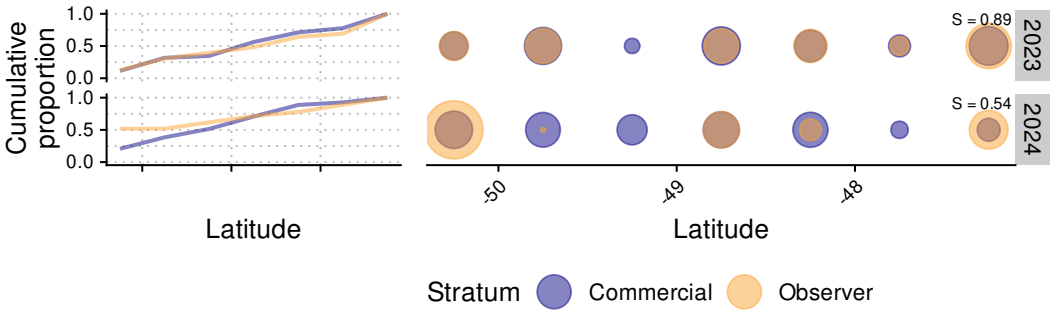


Figure 813: Latitudinal representativeness of observer sampling coverage of Trawl catch in SSO 6, from events where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

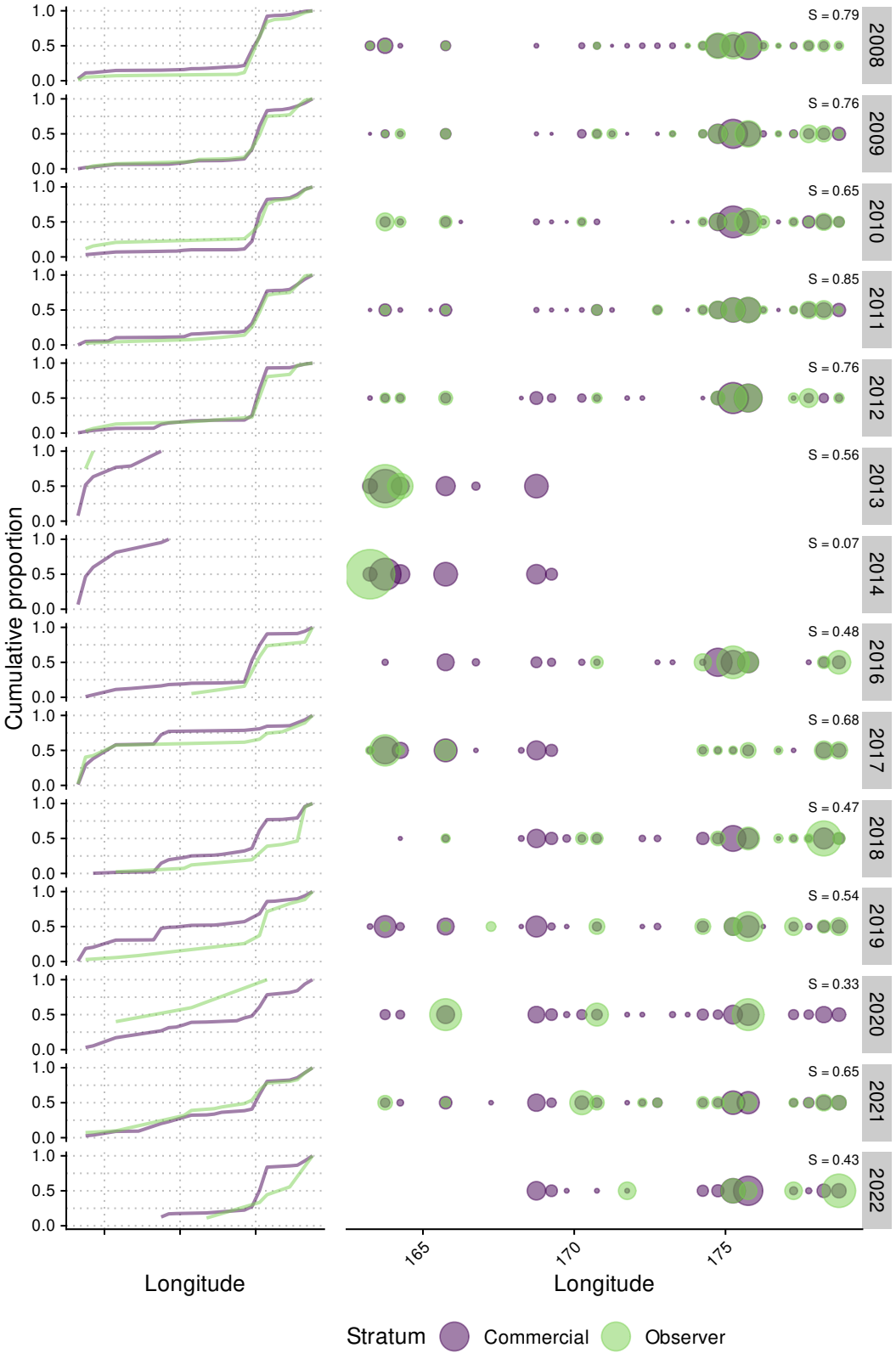


Figure 814: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 6, where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

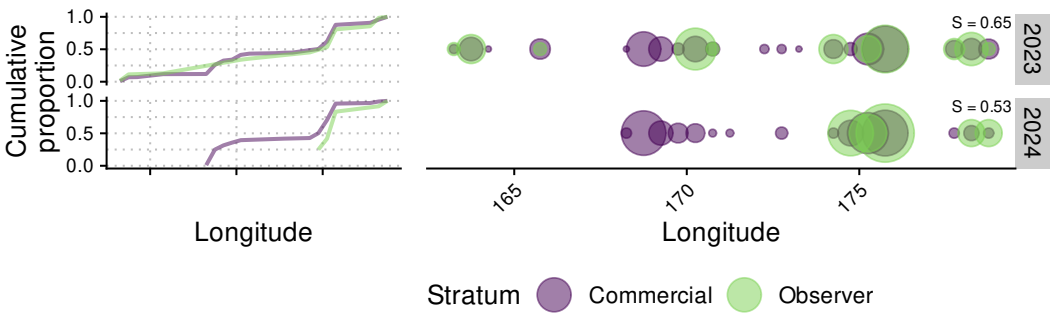


Figure 815: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SSO 6, where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

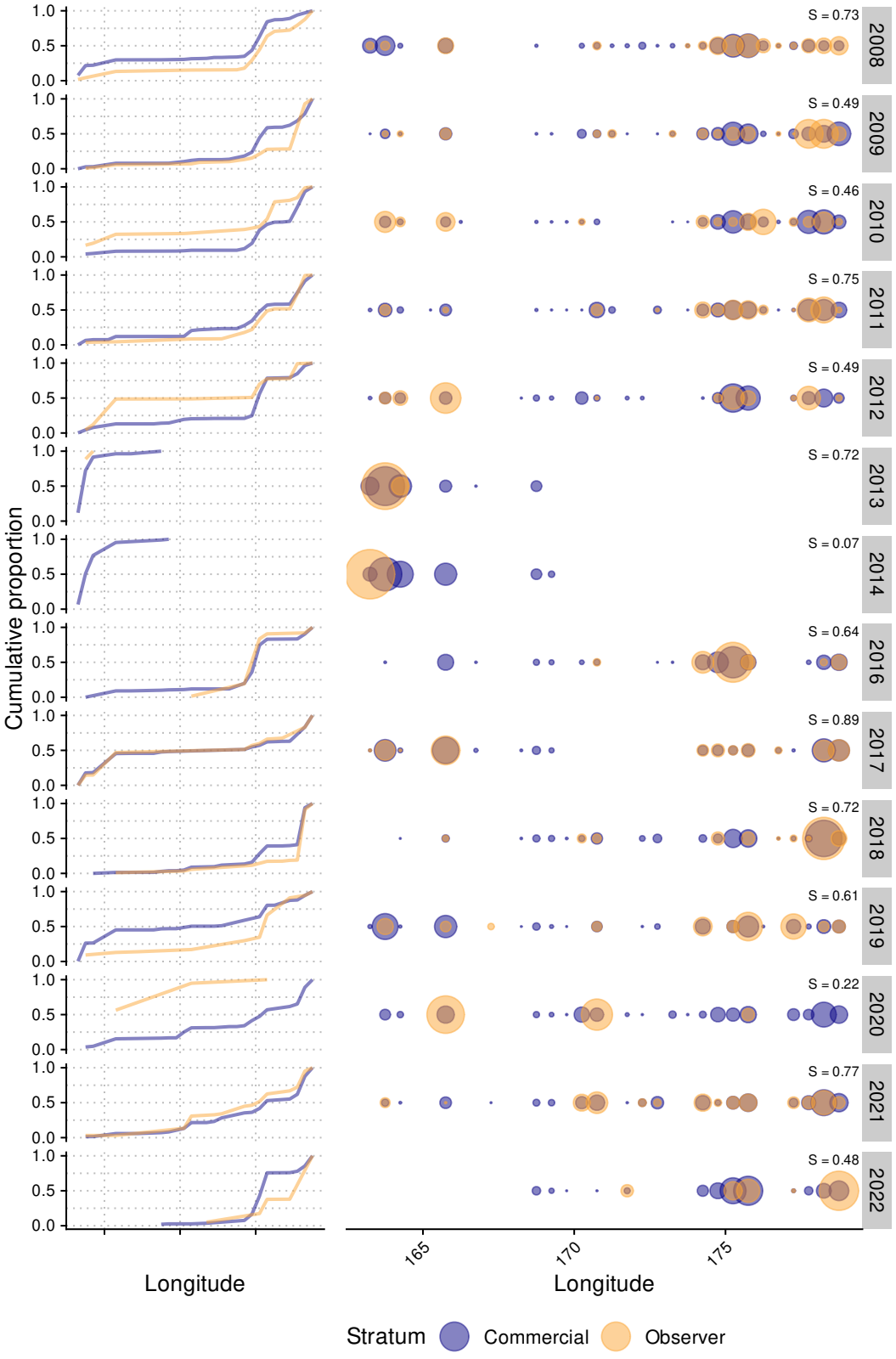


Figure 816: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SSO 6, from events where the smooth oreo catch exceeded the 30kg threshold, in 2008 to 2022. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

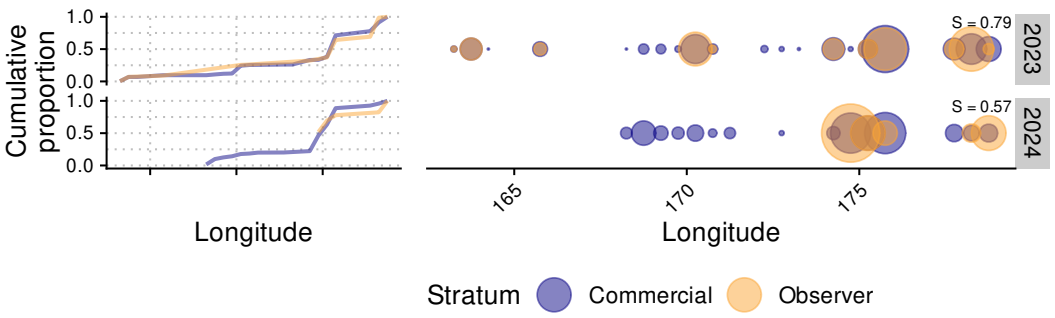


Figure 817: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SSO 6, from events where the smooth oreo catch exceeded the 30kg threshold, in 2023 to 2024. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

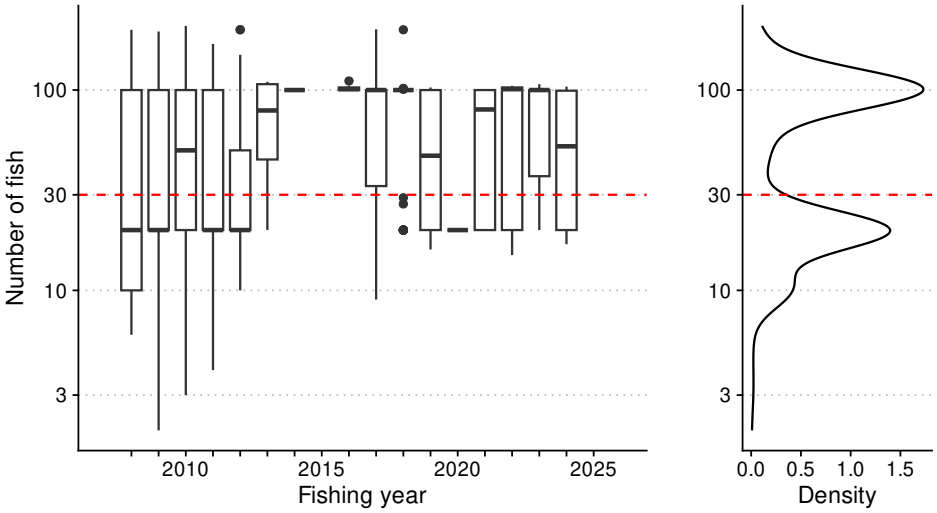


Figure 818: **Length-frequency sample sizes for observed fishing events in SSO 6 where smooth oreo were sampled. The red dashed line indicates a sample size of 30 fish.**

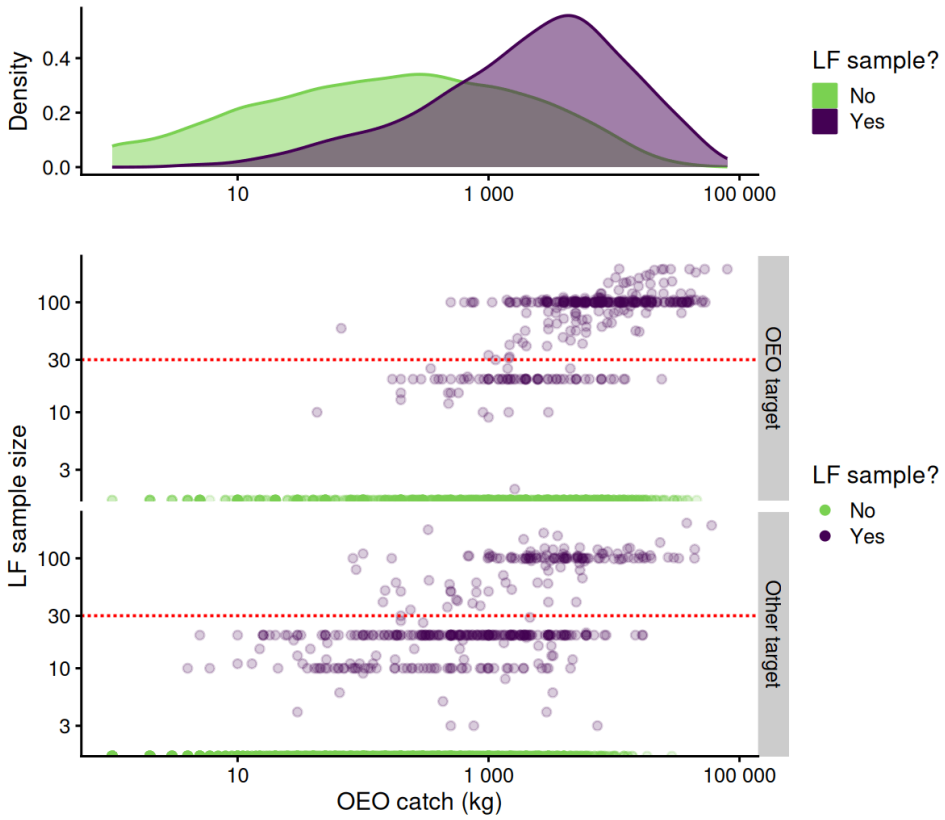


Figure 819: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SSO 6 in relation to the total smooth oreo catch from an event, separately for smooth oreo target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.11.4.2 Otolith samples

Table 69: Otolith samples of smooth oreo from the SSO 6 Trawl fishery sampled by the Observer Programme in fishing years 2008 to 2025. Positive fishing events are those where the catch of smooth oreo exceeded a potential sampling threshold of 30 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
2008	1 177	0	0	0.00
2009	1 138	8	38	0.70
2010	1 255	36	229	2.87
2011	743	71	542	9.56
2012	506	24	135	4.74
2013	52	4	30	7.69
2014	150	1	10	0.67
2015	94	0	0	0.00
2016	211	0	0	0.00
2017	272	32	292	11.76
2018	382	39	350	10.21
2019	284	24	154	8.45
2020	223	4	20	1.79
2021	267	41	324	15.36
2022	223	9	79	4.04
2023	421	60	523	14.25
2024	213	12	90	5.63
2025	114	0	0	0.00

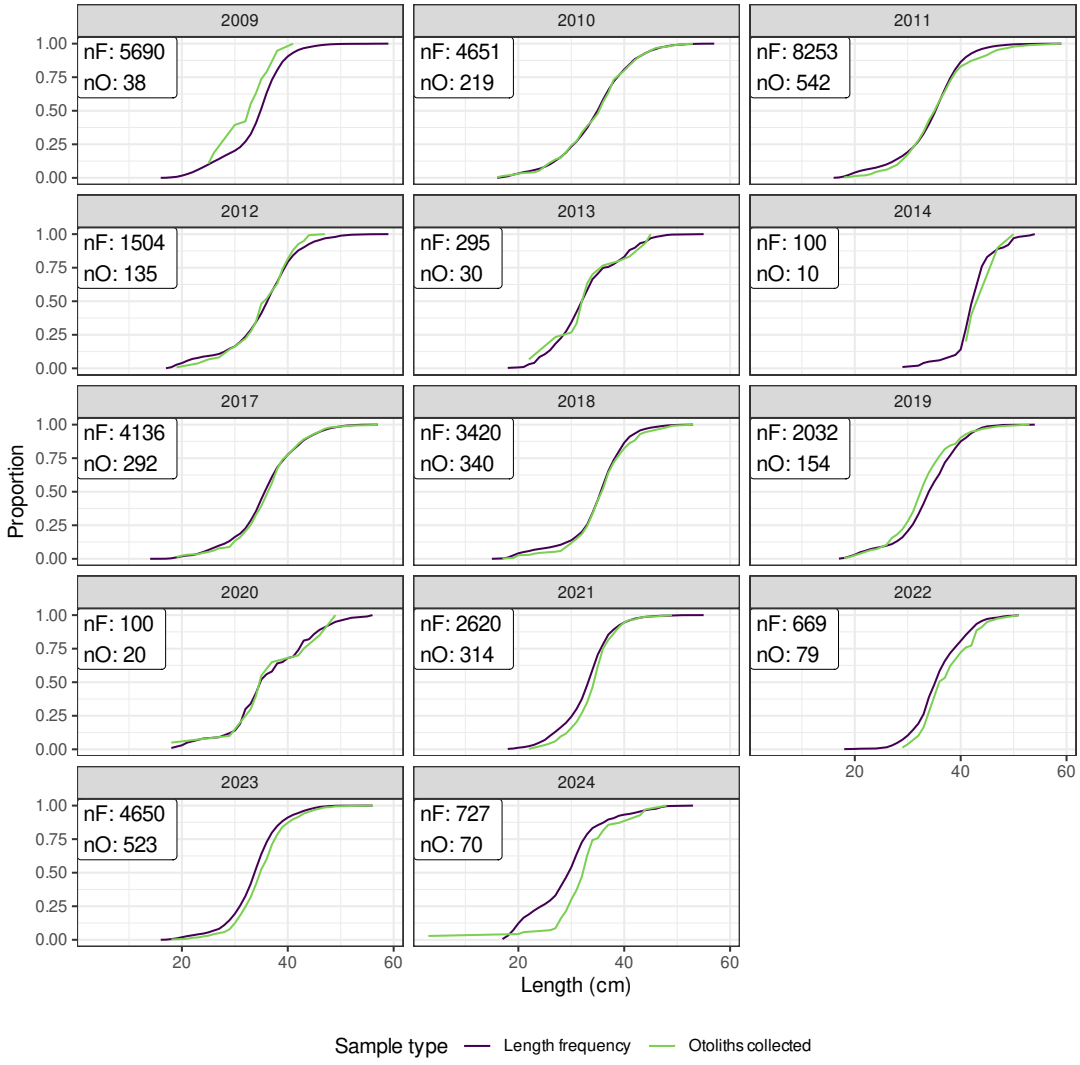


Figure 820: Cumulative distributions of the length of fish in the length frequency and otolith samples of smooth oreo in the SSO 6 Trawl fishery for the 2009 to 2024 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.11.4.3 Catch quantification

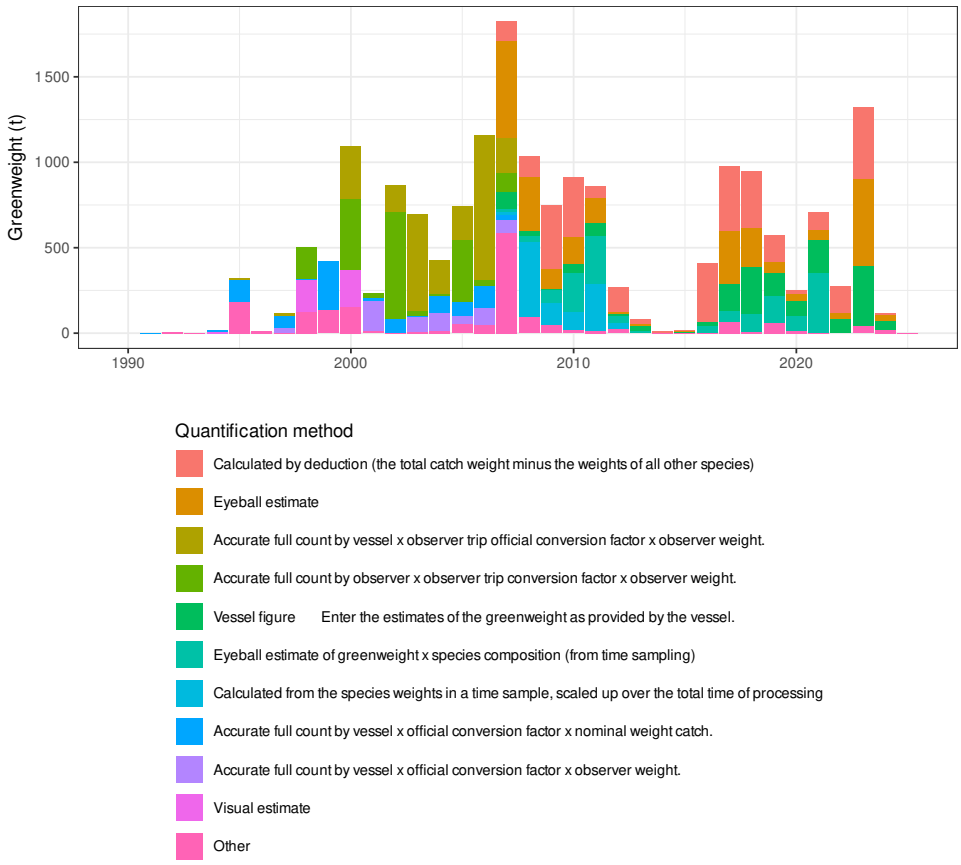


Figure 821: Methods used by observers to quantify the catch of smooth oreo in the SSO 6 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.12 SWA stocks

Observer sampling of silver warehou is considered with respect to the silver warehou Quota Management Areas.

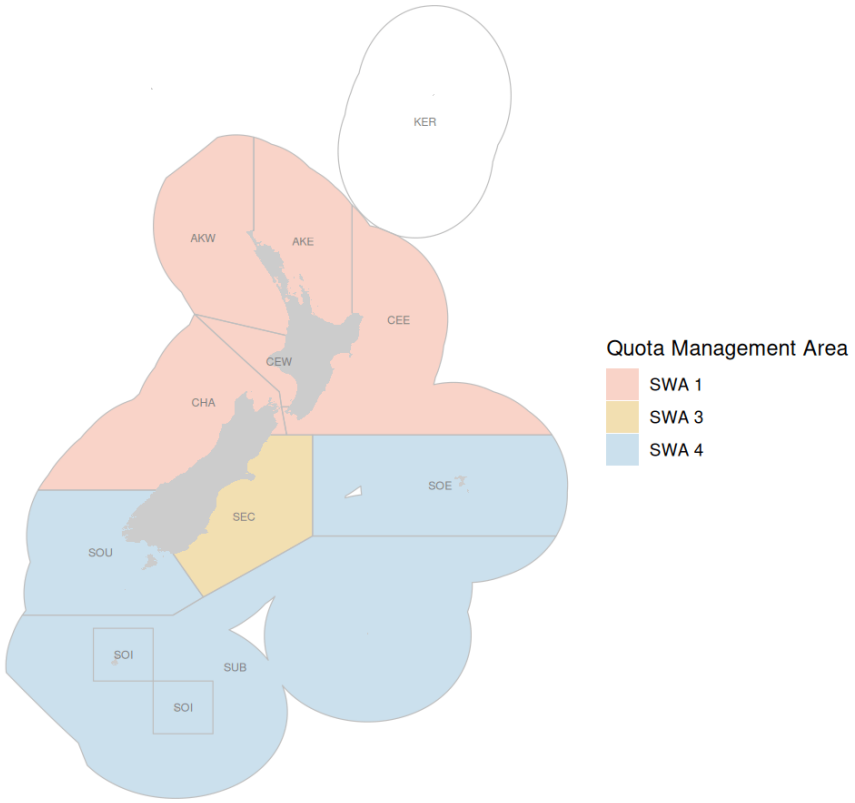


Figure 822: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for silver warehou (coloured areas, per legend).

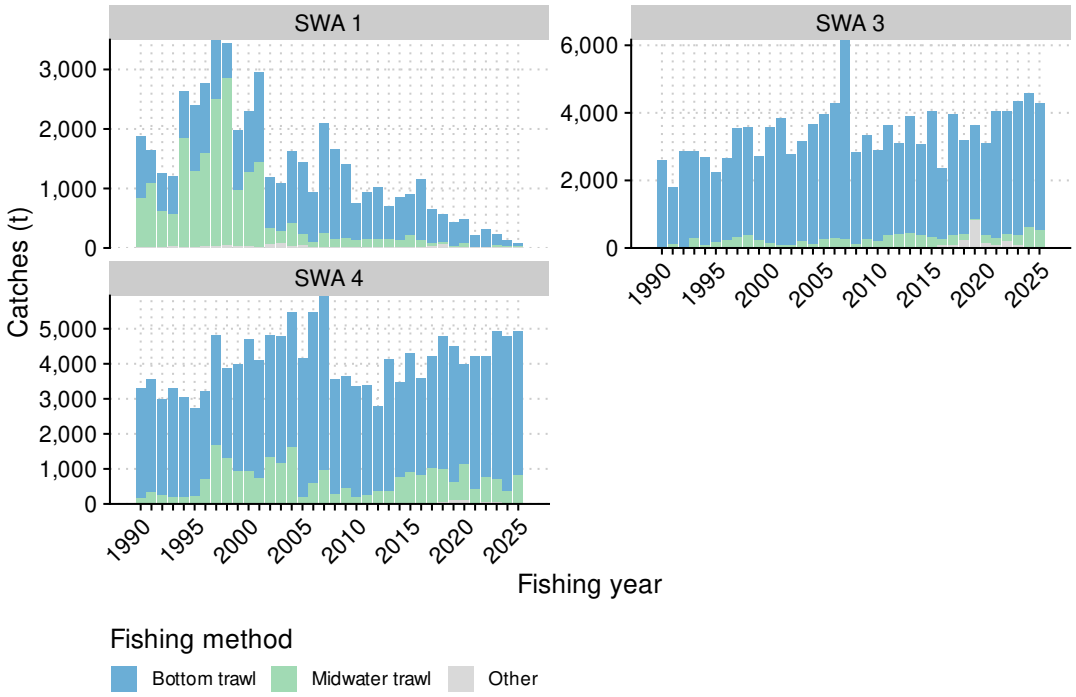


Figure 823: **Catches of silver warehou by fishing method, for events within the silver warehou Quota Management Areas. Methods grouped as Other include: BLL, BPT, BS, CP, D, DL, DN, DS, FP, H, HL, MPT, PL, POT, PRB, PRM, PS, PSH, RLP, RN, SCN, SJ, SLL, SN, T, TL.**

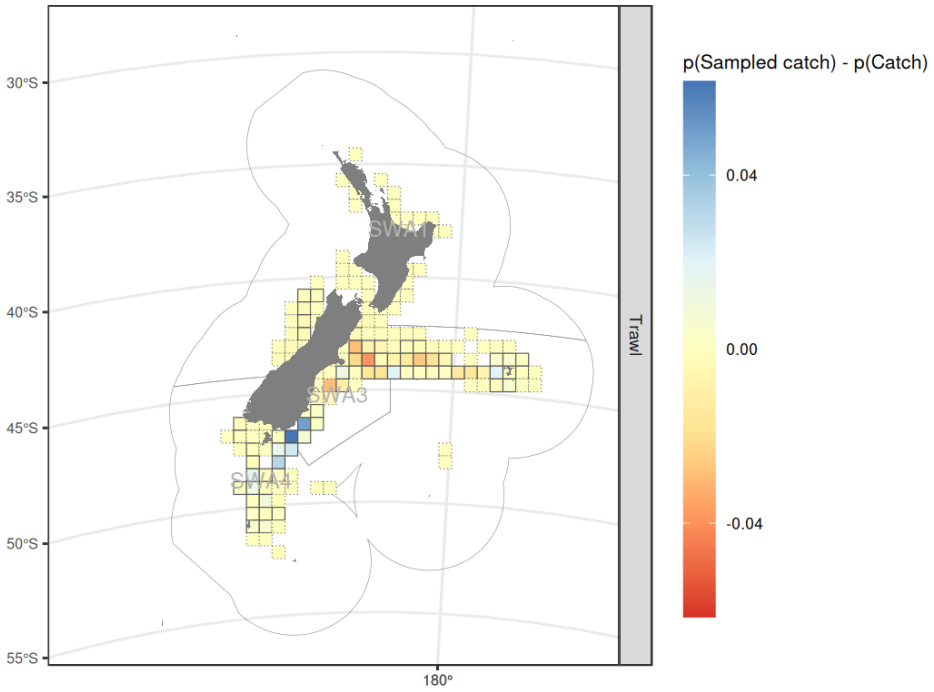


Figure 824: **Differences in the relative proportions of catch and sampled catch for silver warehou during 2021–2025. Cells with a dotted border had no sampling.**

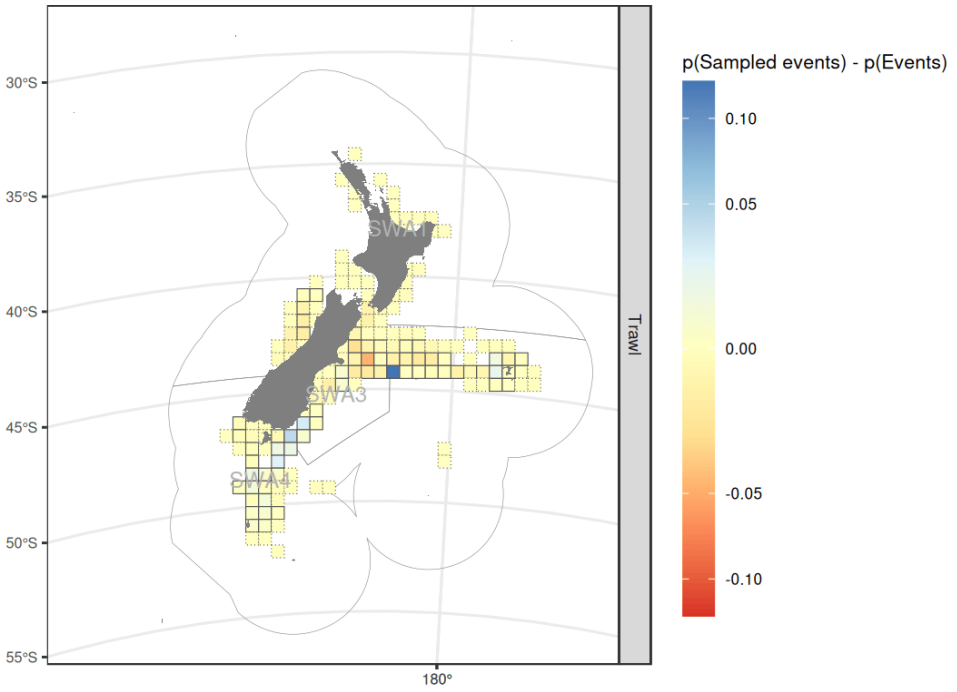


Figure 825: **Differences in the relative proportions of events meeting the sampling threshold and sampled events for silver warehou during 2021–2025. Cells with a dotted border had no sampling.**

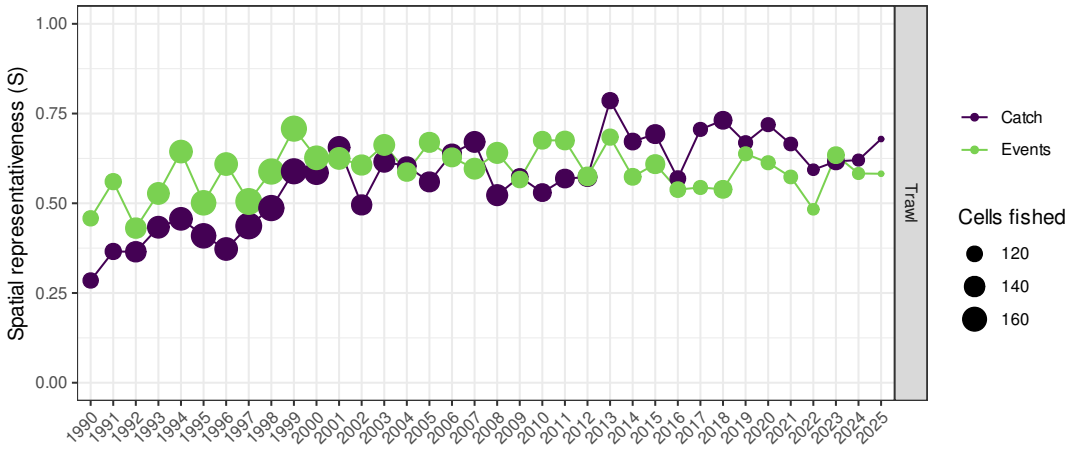


Figure 826: **Spatial representativeness of observer sampling of silver warehou by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.**

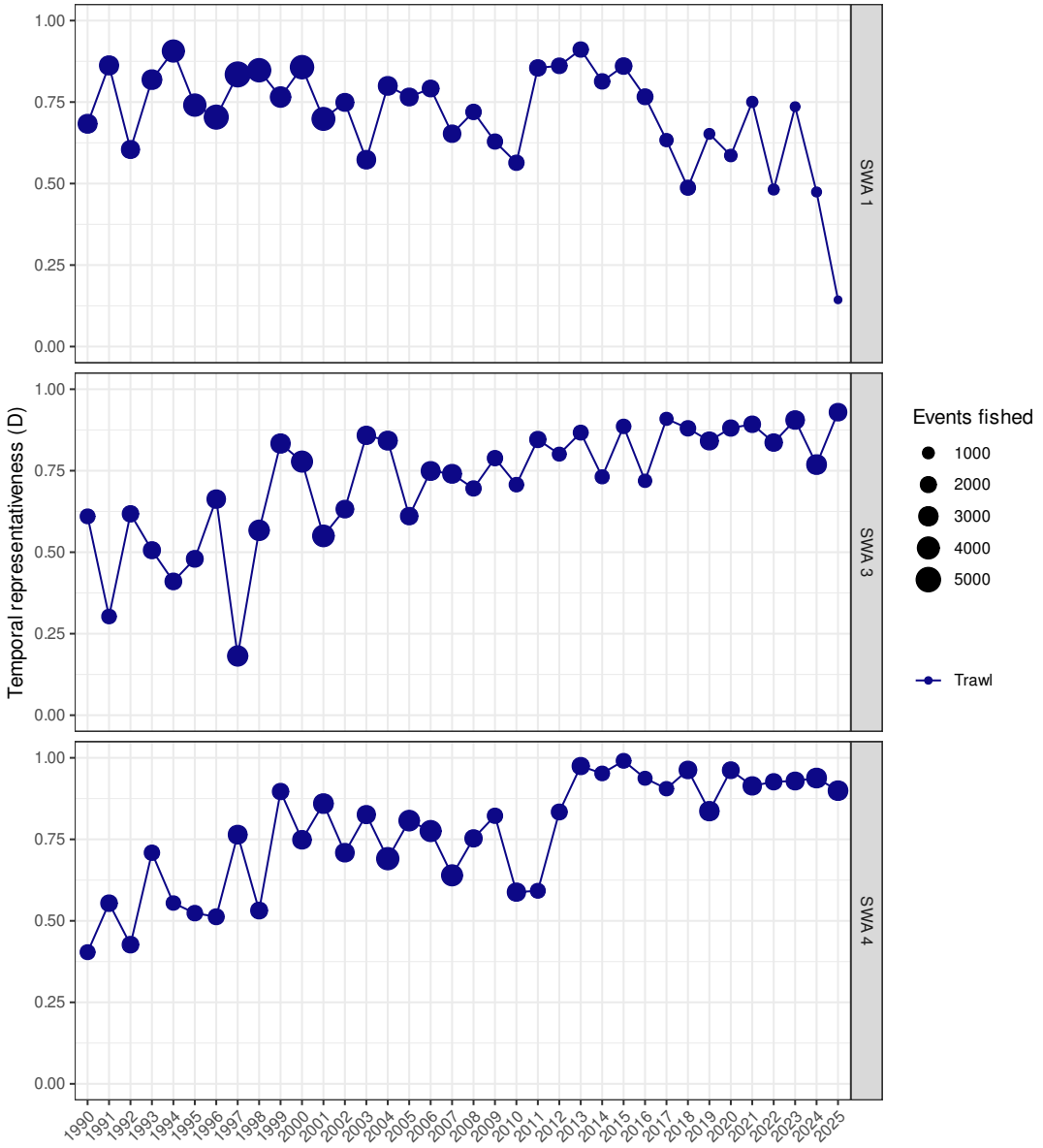


Figure 827: Temporal representativeness of observer sanpling of silver warehou by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.12.1 SWA 1: Trawl fishery

2.12.1.1 Length-frequency samples

Table 70: Length-frequency samples of silver warehou from the SWA 1 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of silver warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	2 516	65	929	2.58
1991	2 333	127	4 324	5.44
1992	2 022	153	3 380	7.57
1993	2 323	95	1 285	4.09
1994	3 413	366	9 166	10.72
1995	3 103	156	2 591	5.03
1996	3 828	152	3 831	3.97
1997	3 961	116	2 502	2.93
1998	3 952	162	2 648	4.10
1999	2 974	207	3 306	6.96
2000	4 041	322	5 007	7.97
2001	3 886	299	3 971	7.69
2002	2 007	189	1 555	9.42
2003	2 271	221	1 829	9.73
2004	2 422	197	2 020	8.13
2005	2 078	156	2 334	7.51
2006	1 812	108	957	5.96
2007	1 980	142	1 726	7.17
2008	1 717	108	2 352	6.29
2009	1 699	93	2 181	5.47
2010	1 649	50	1 280	3.03
2011	1 972	66	1 444	3.35
2012	1 826	78	1 136	4.27
2013	1 384	166	2 689	11.99
2014	1 655	117	2 084	7.07
2015	1 695	95	1 699	5.60
2016	1 543	91	1 576	5.90
2017	1 071	30	299	2.80
2018	1 619	23	321	1.42
2019	772	24	901	3.11
2020	986	28	731	2.84
2021	797	6	118	0.75
2022	848	5	152	0.59
2023	628	15	366	2.39
2024	551	3	34	0.54
2025	346	1	10	0.29

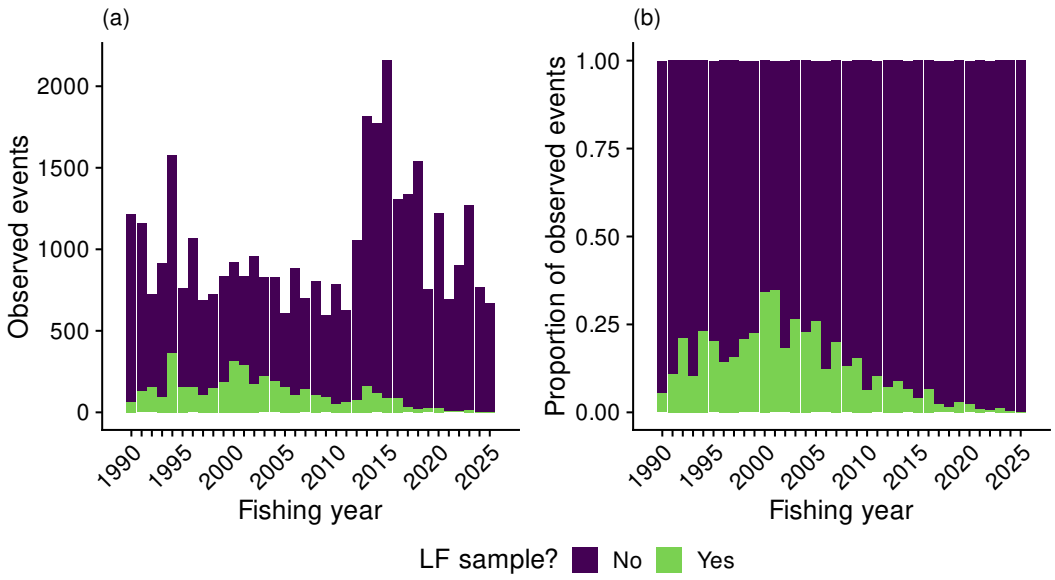


Figure 828: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SWA 1 where the silver warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

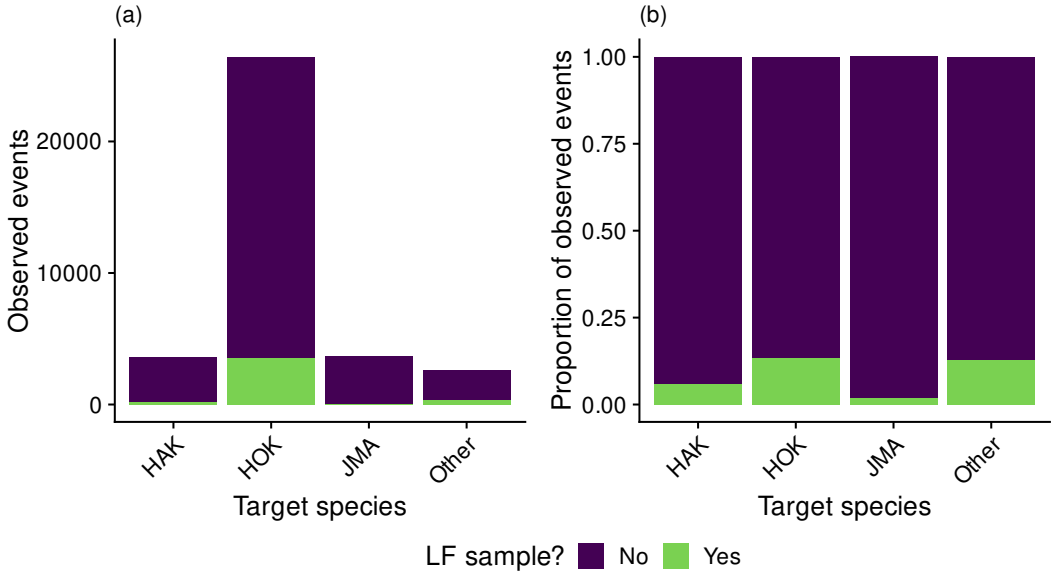


Figure 829: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SWA 1 where the silver warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

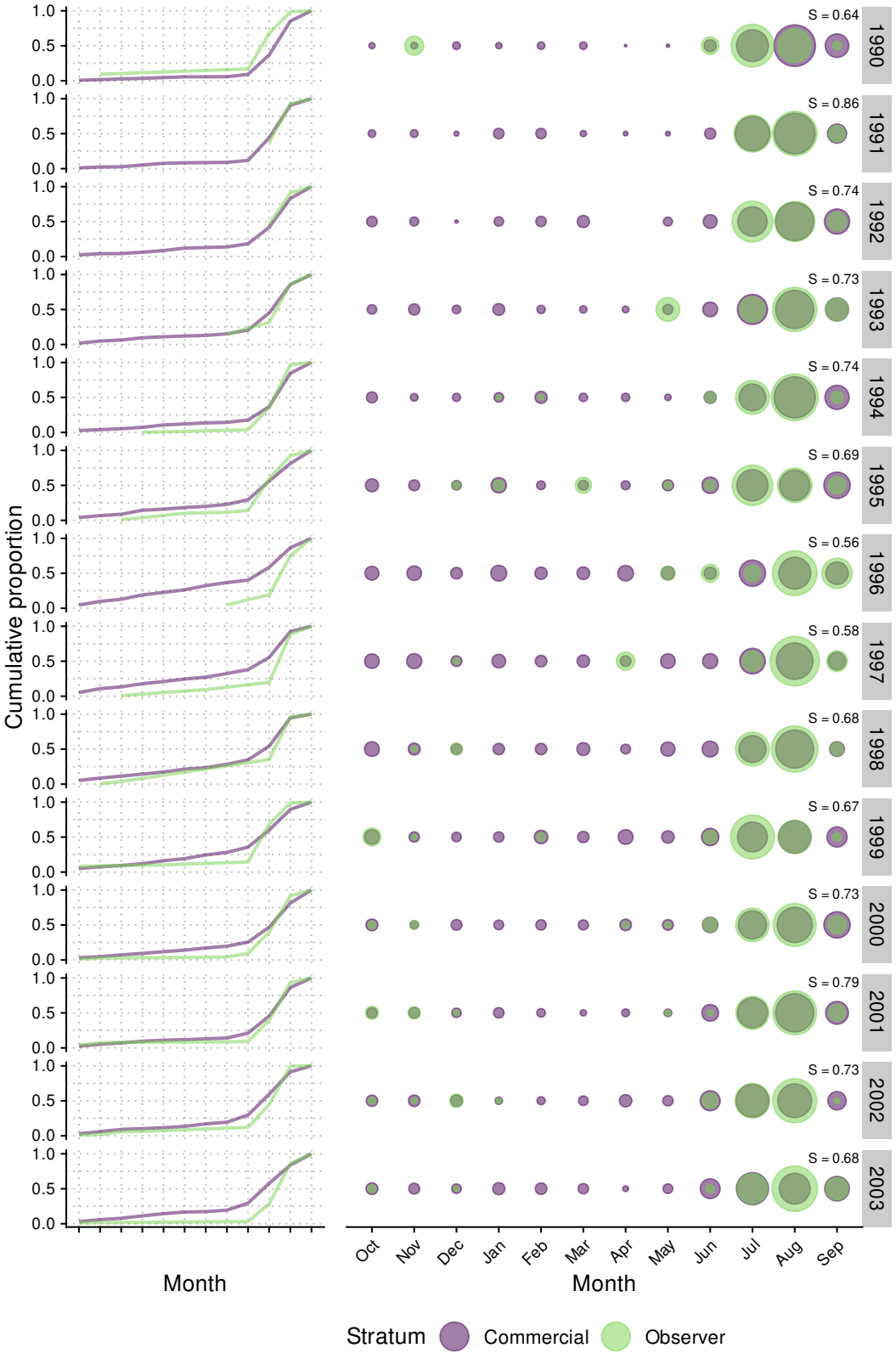


Figure 830: Monthly representativeness of observer sampling coverage of Trawl fishing events in SWA 1, where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

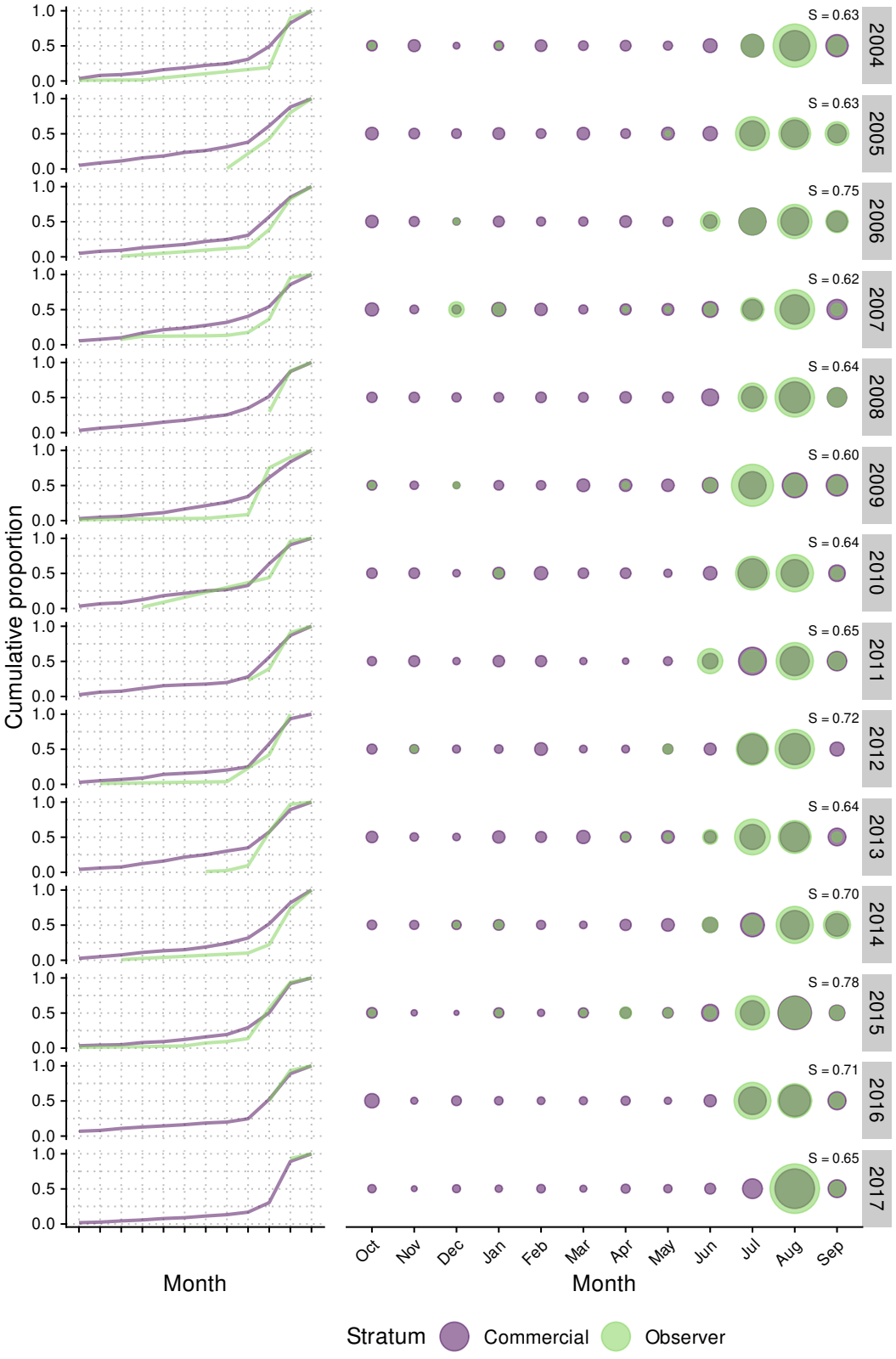


Figure 831: Monthly representativeness of observer sampling coverage of Trawl fishing events in SWA 1, where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

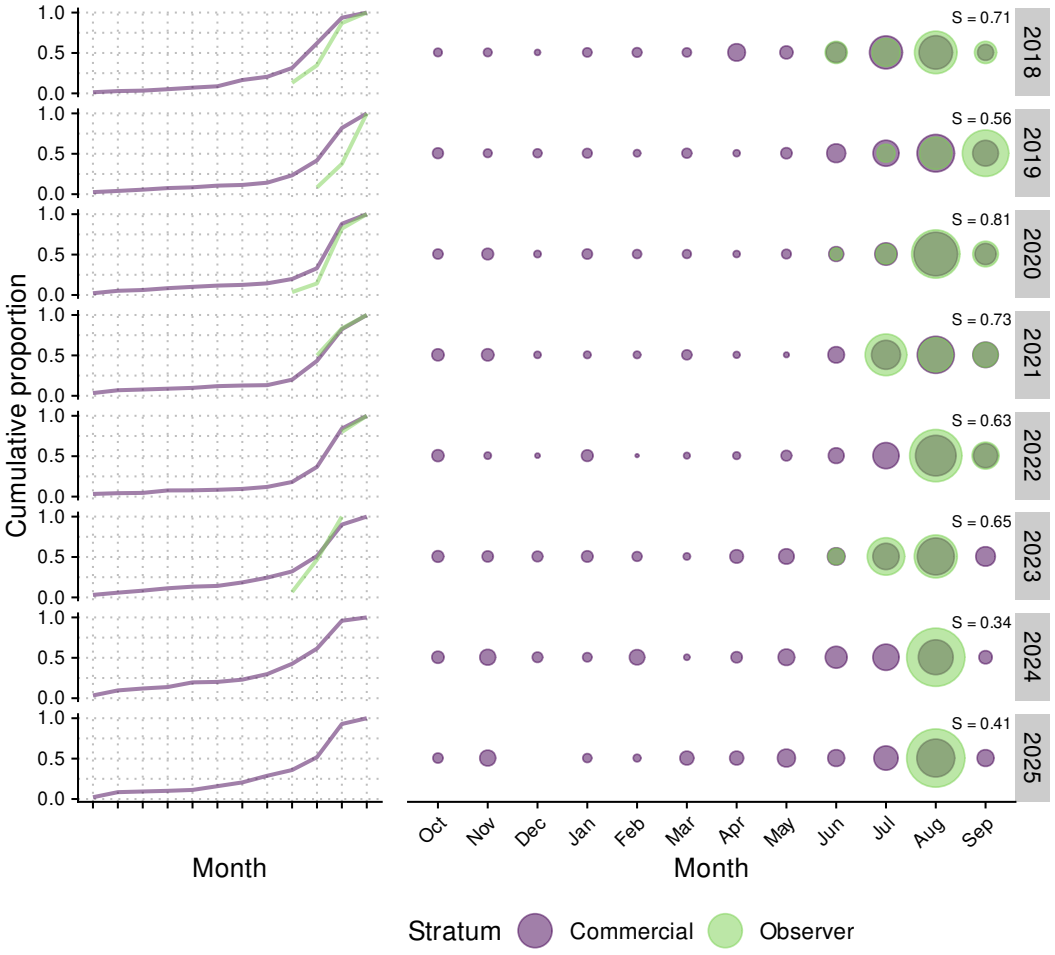


Figure 832: Monthly representativeness of observer sampling coverage of Trawl fishing events in SWA 1, where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

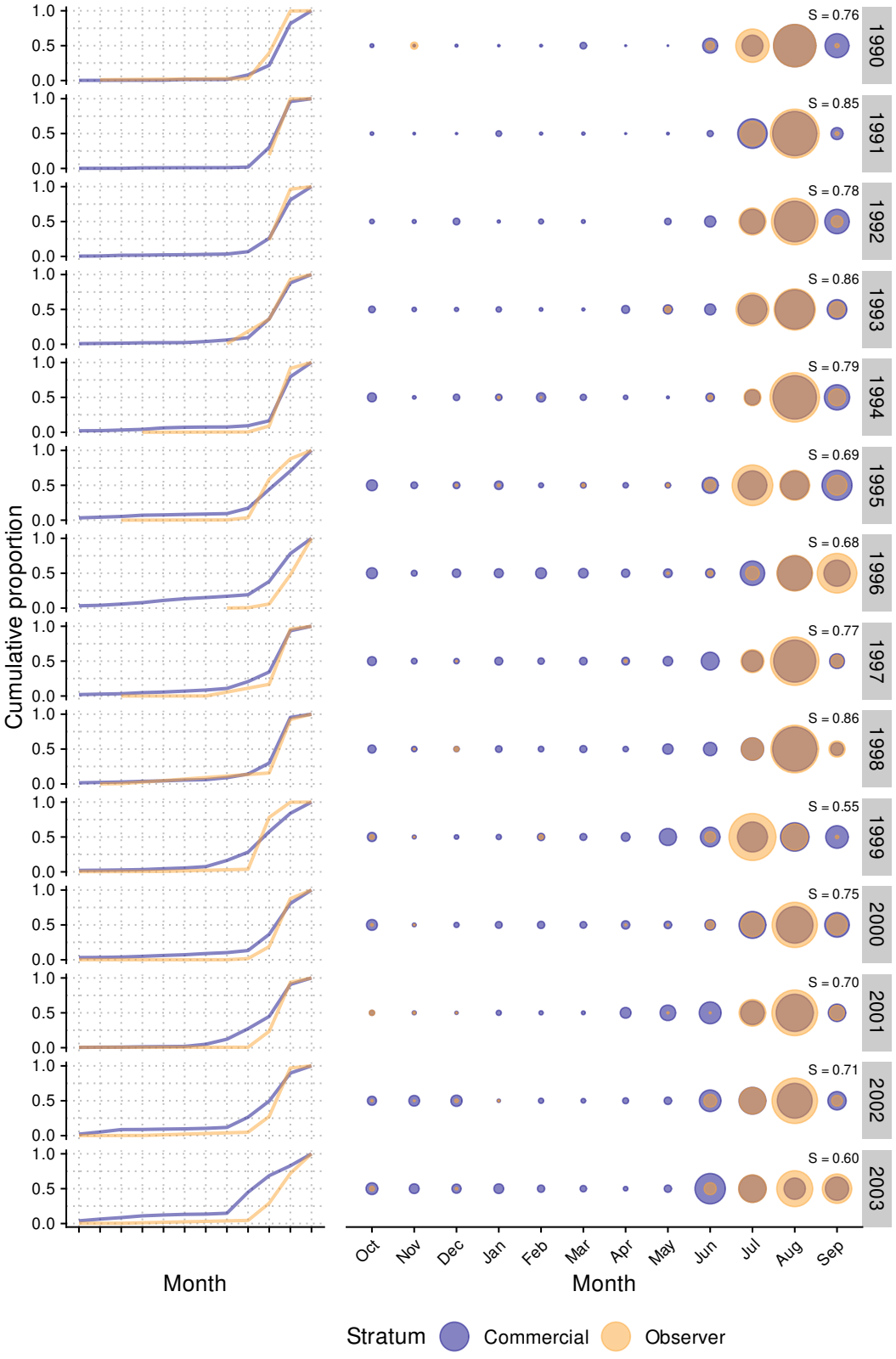


Figure 833: Monthly representativeness of observer sampling coverage of Trawl catch in SWA 1, from events where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

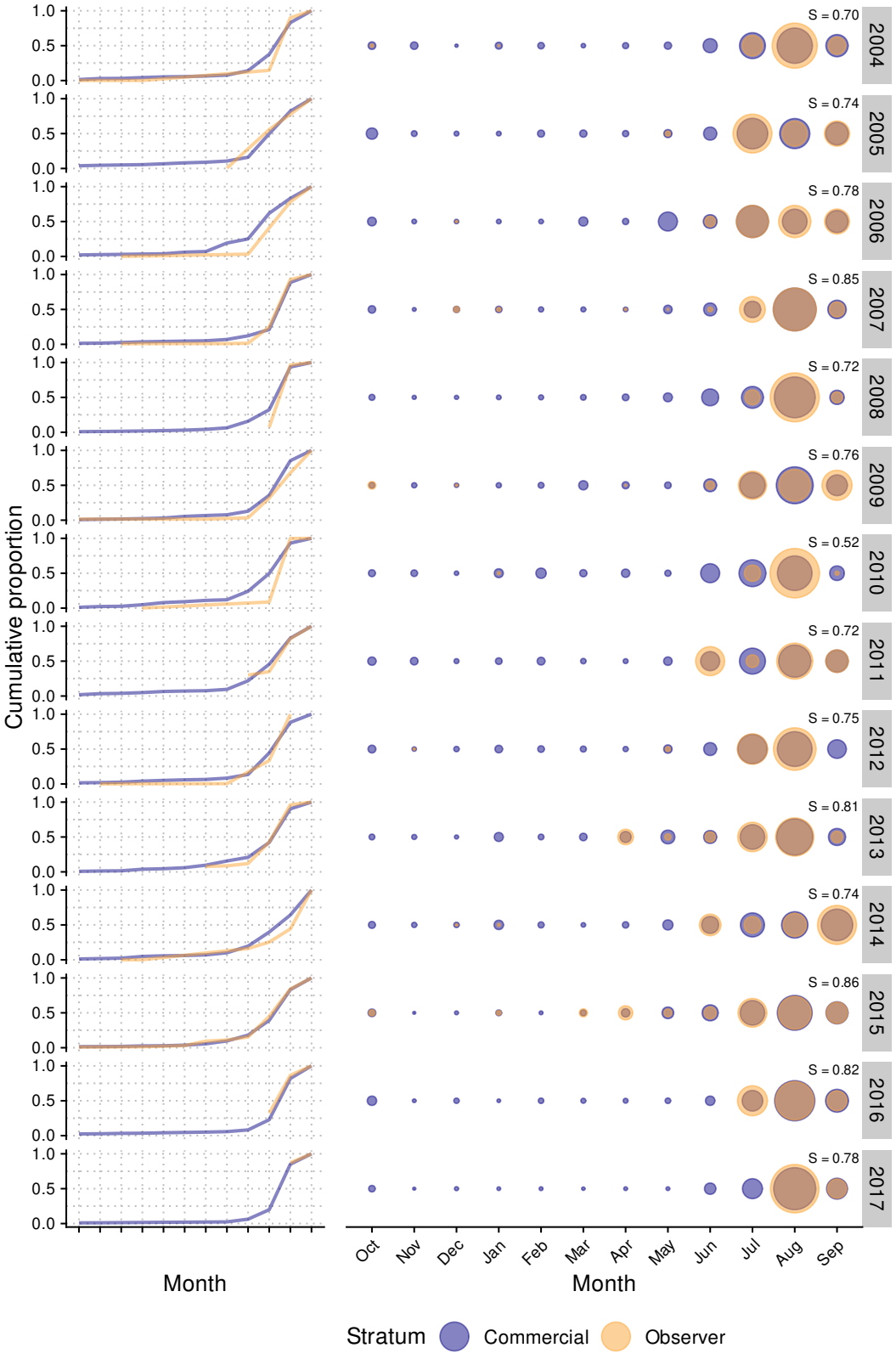


Figure 834: Monthly representativeness of observer sampling coverage of Trawl catch in SWA 1, from events where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

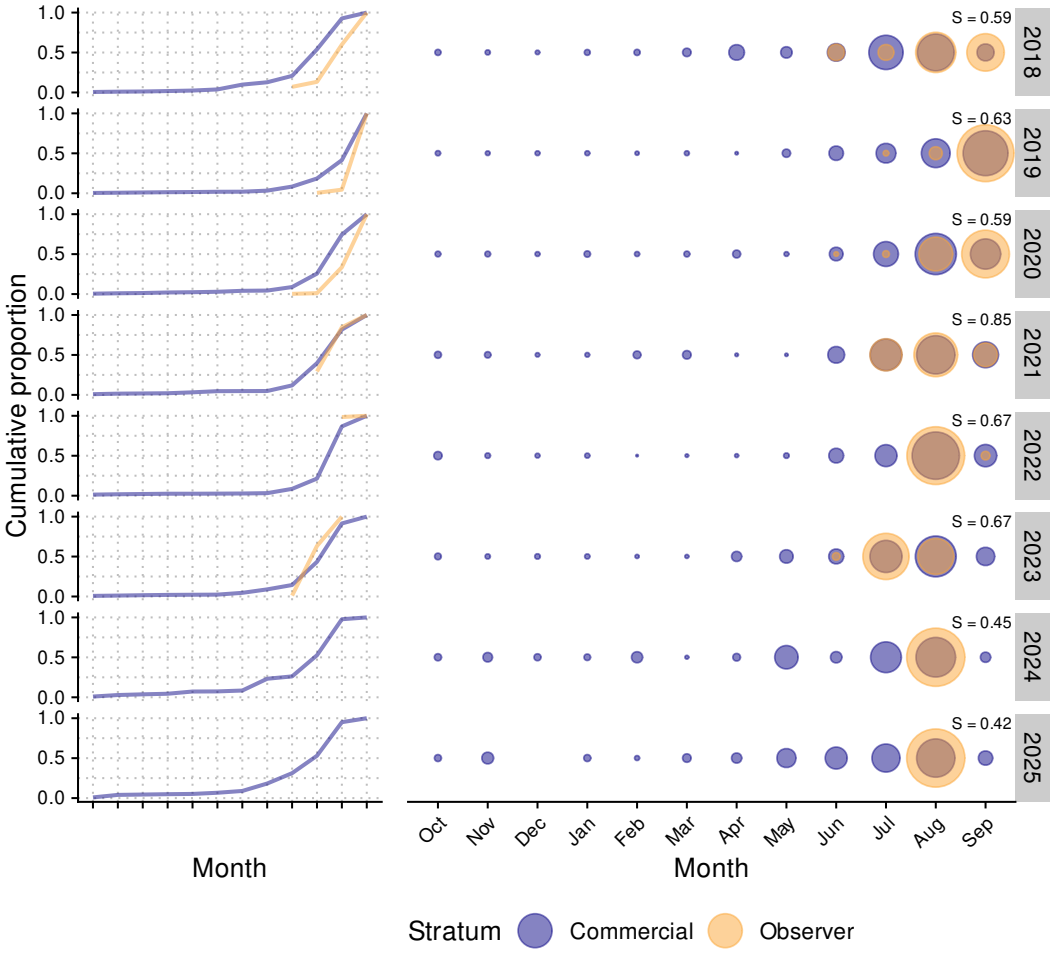


Figure 835: Monthly representativeness of observer sampling coverage of Trawl catch in SWA 1, from events where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

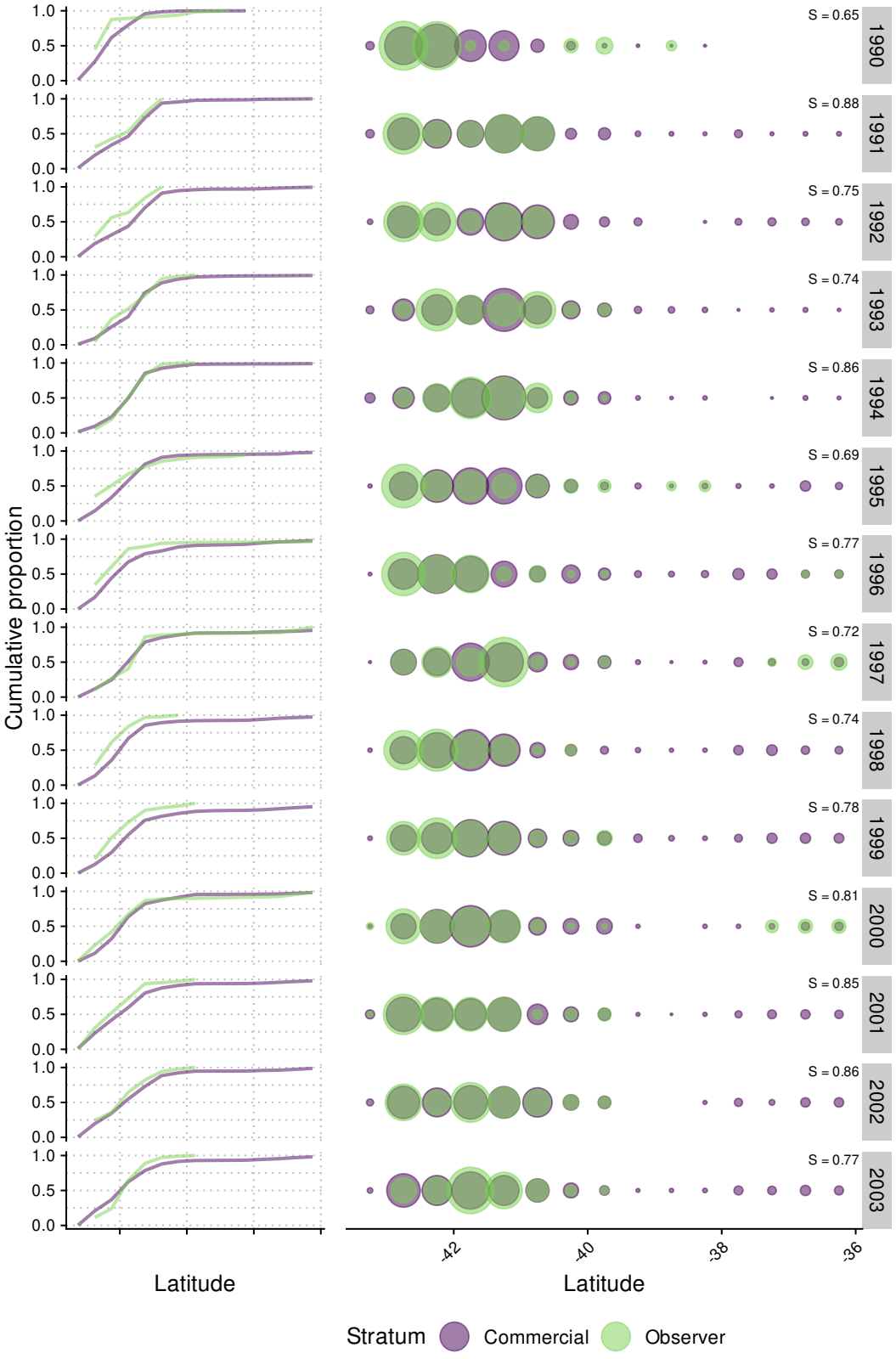


Figure 836: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 1, where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

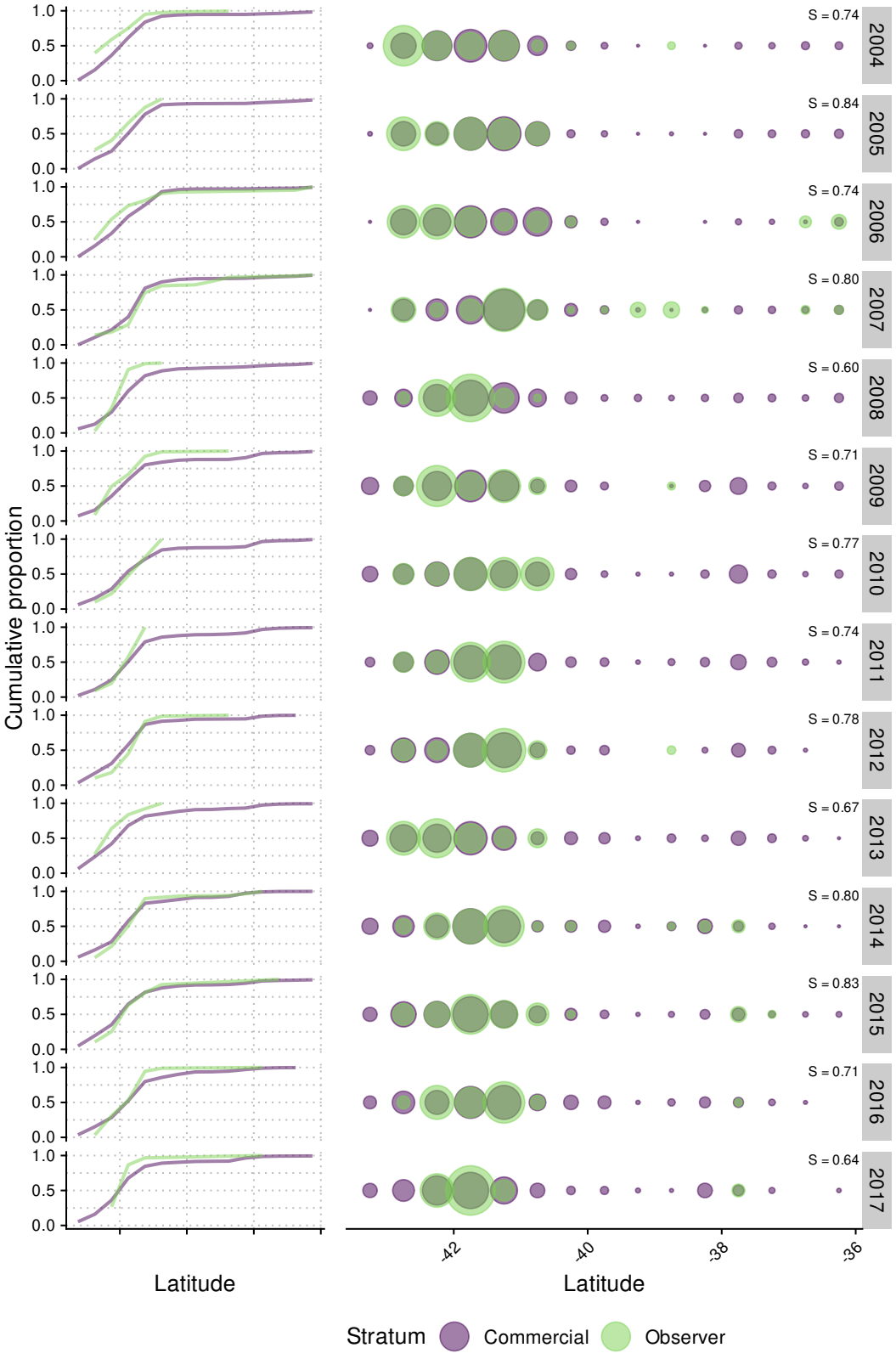


Figure 837: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 1, where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

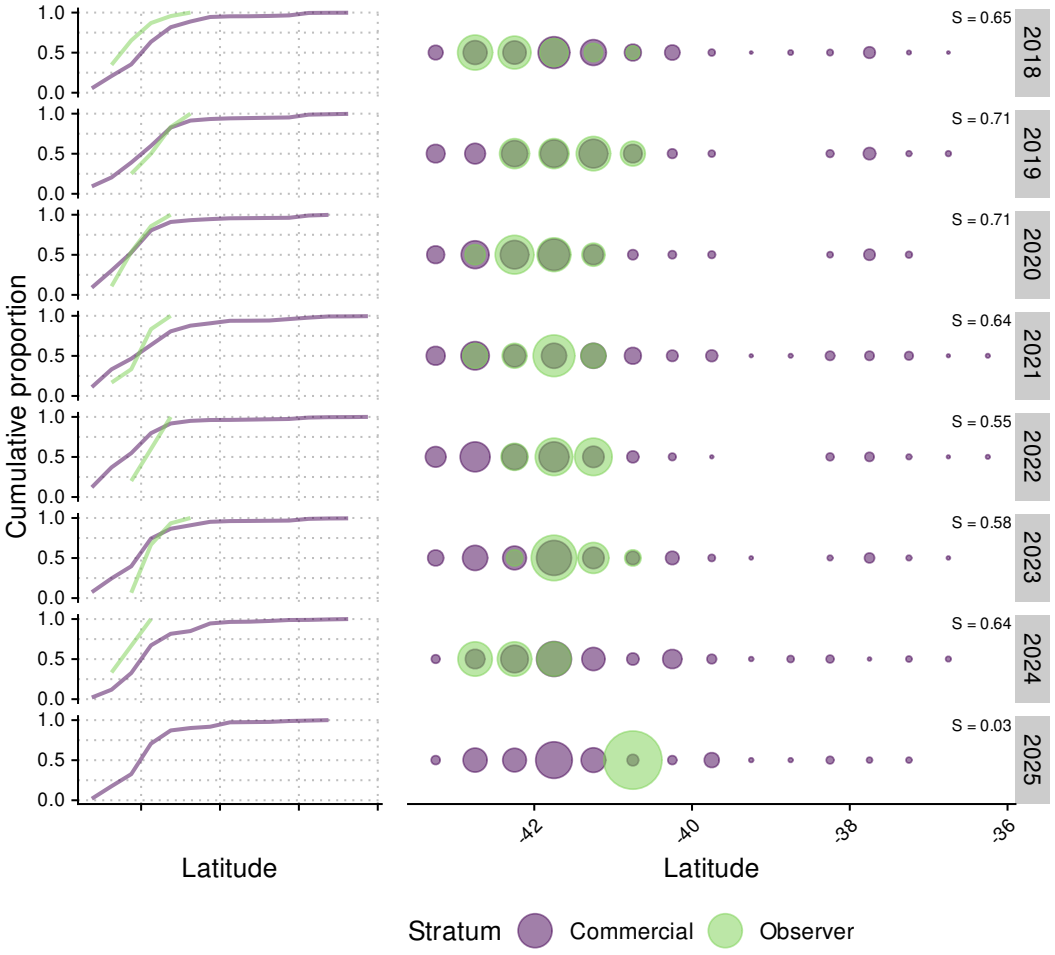


Figure 838: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 1, where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

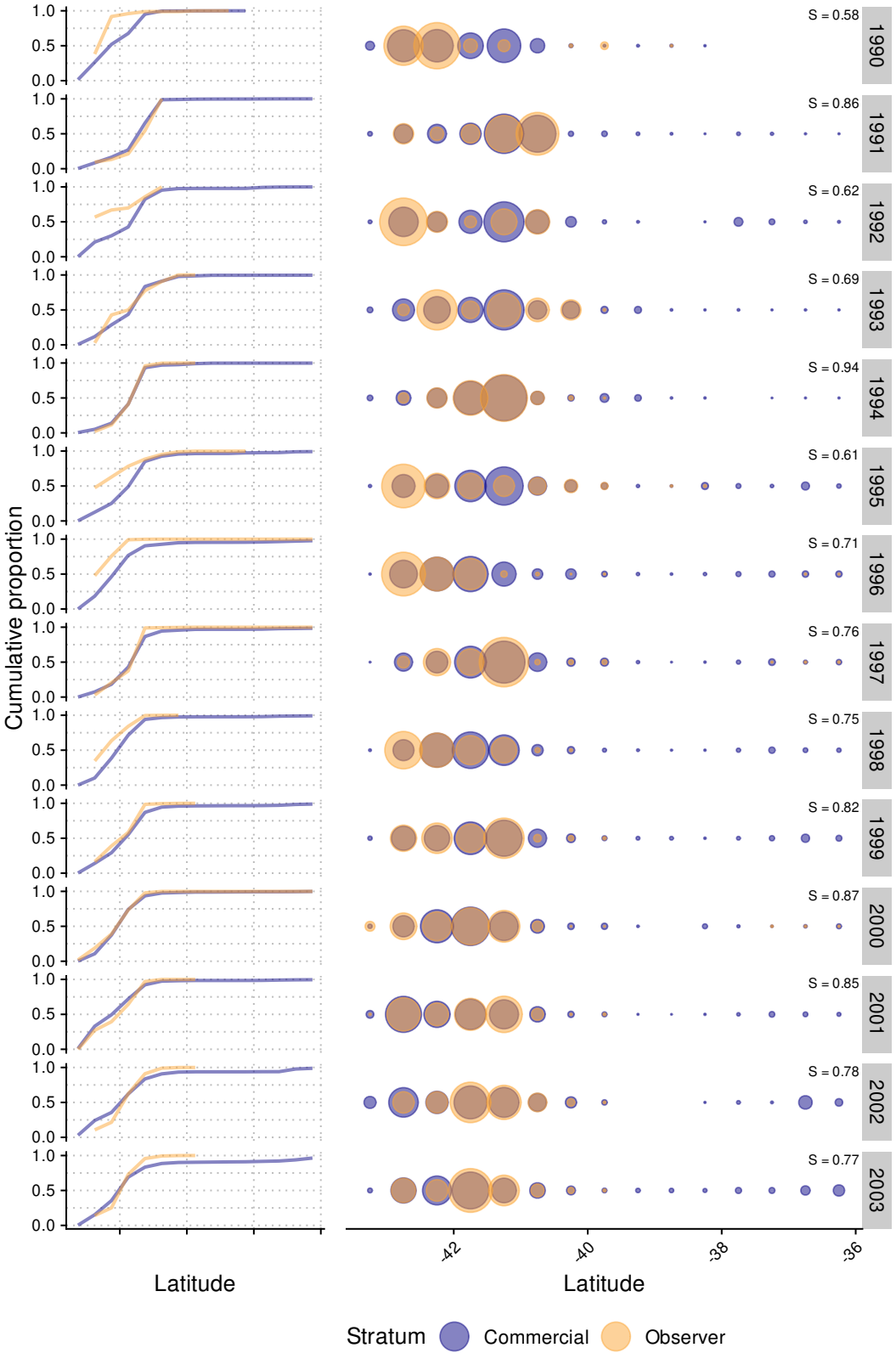


Figure 839: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SWA 1, from events where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

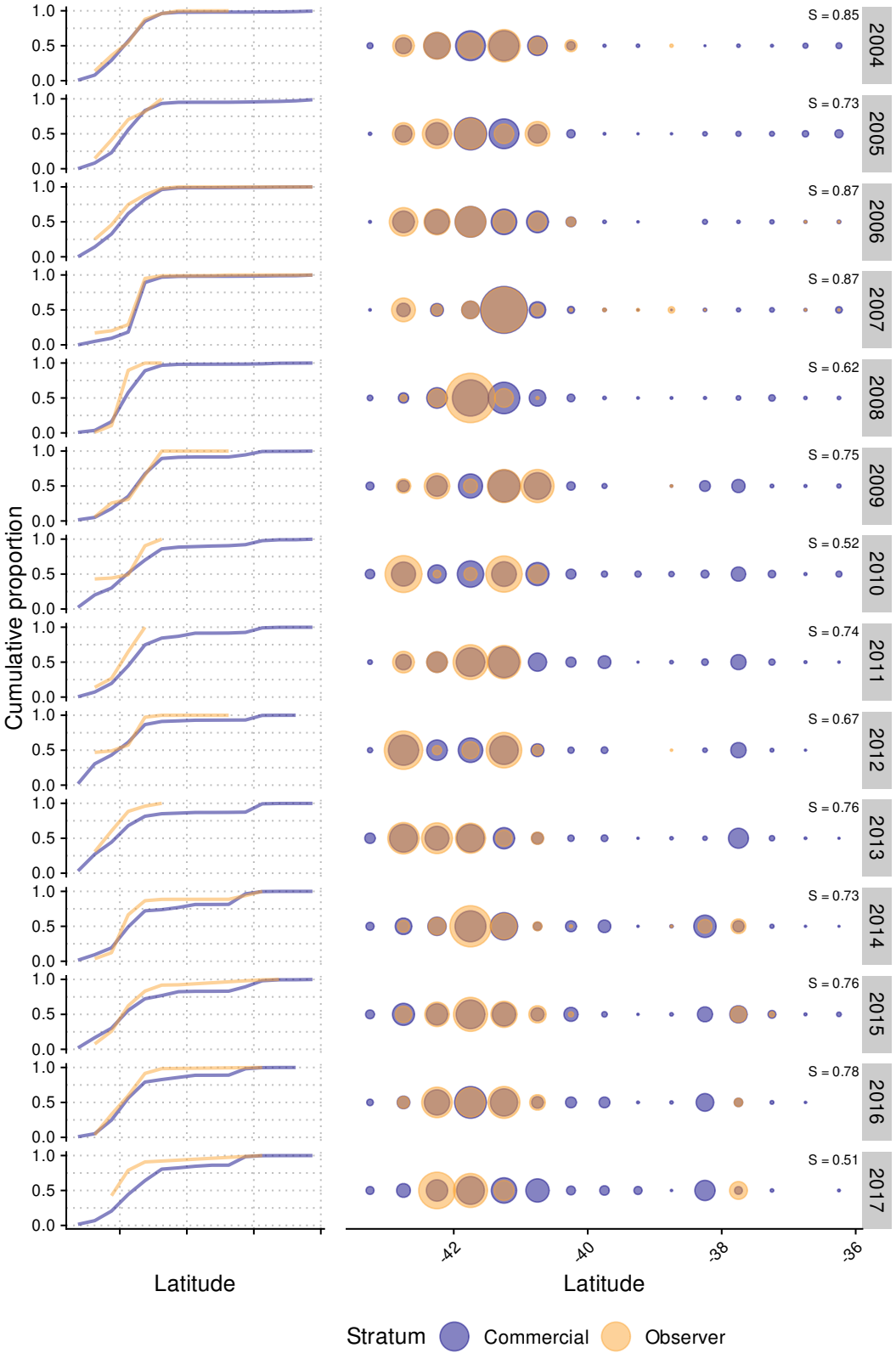


Figure 840: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SWA 1, from events where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

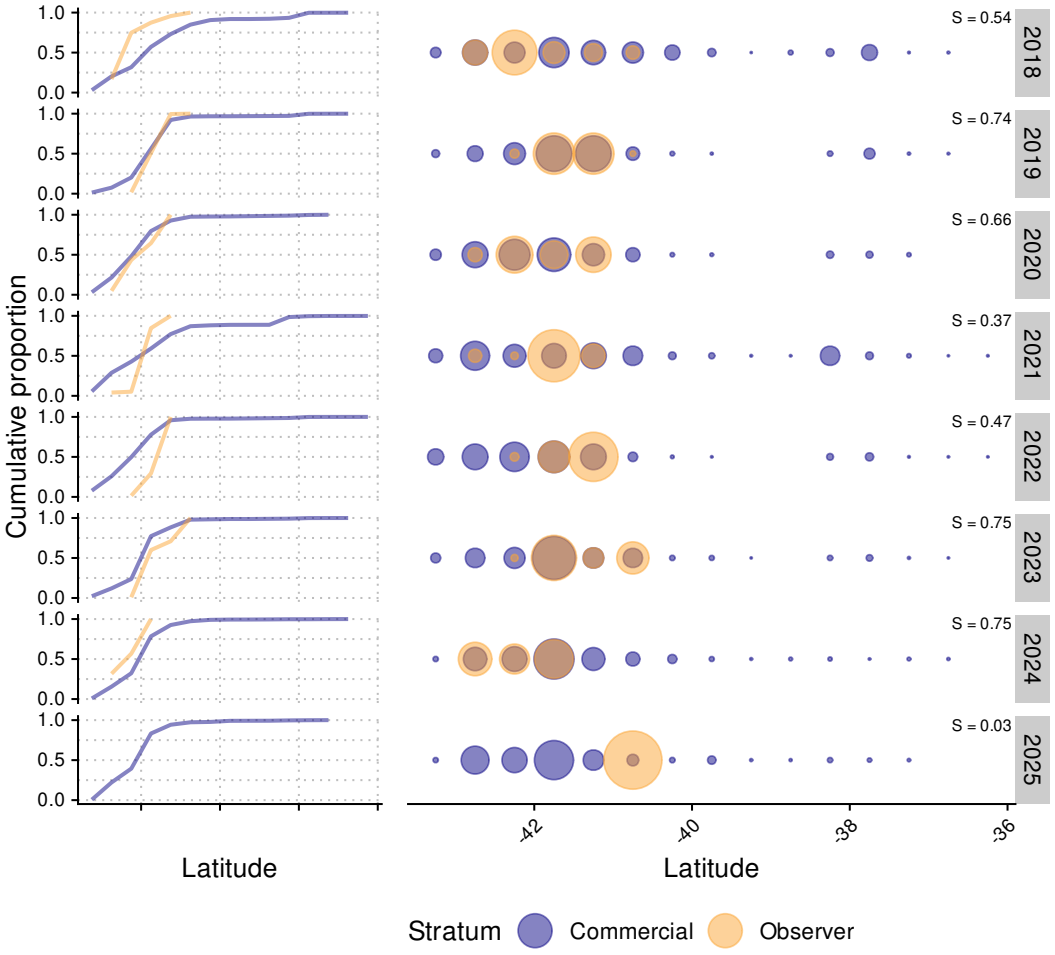


Figure 841: Latitudinal representativeness of observer sampling coverage of Trawl catch in SWA 1, from events where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

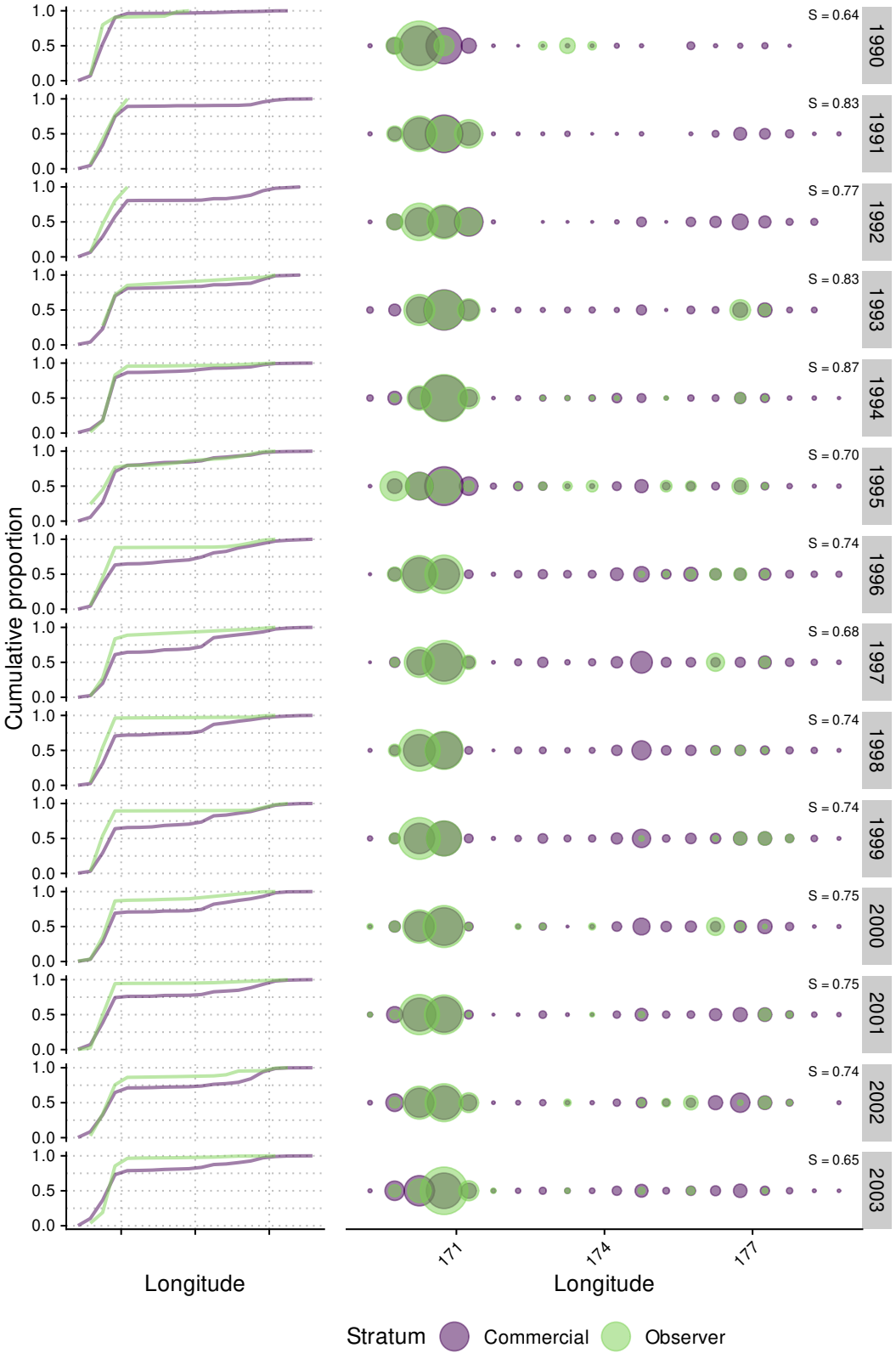


Figure 842: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 1, where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

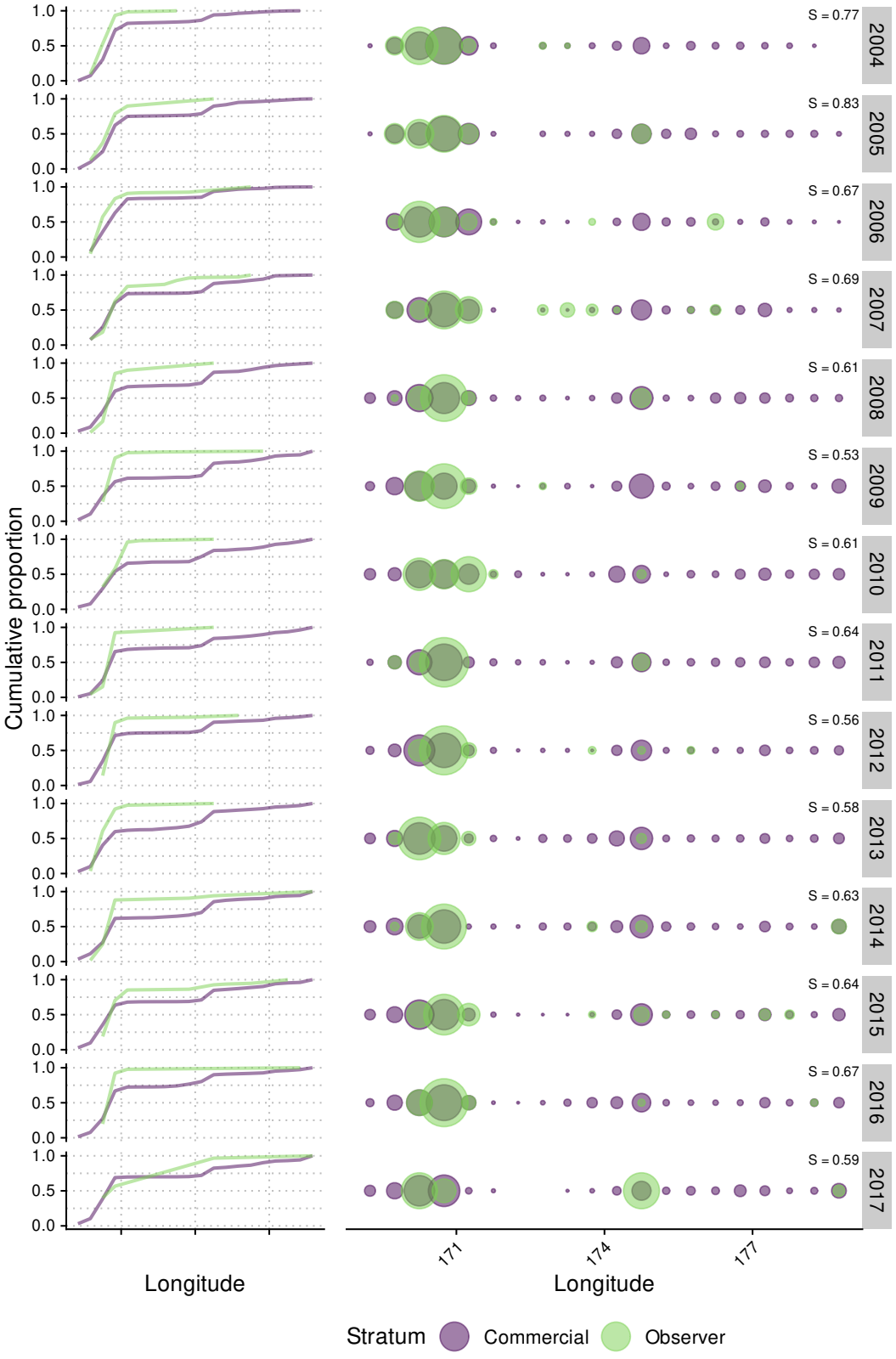


Figure 843: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 1, where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

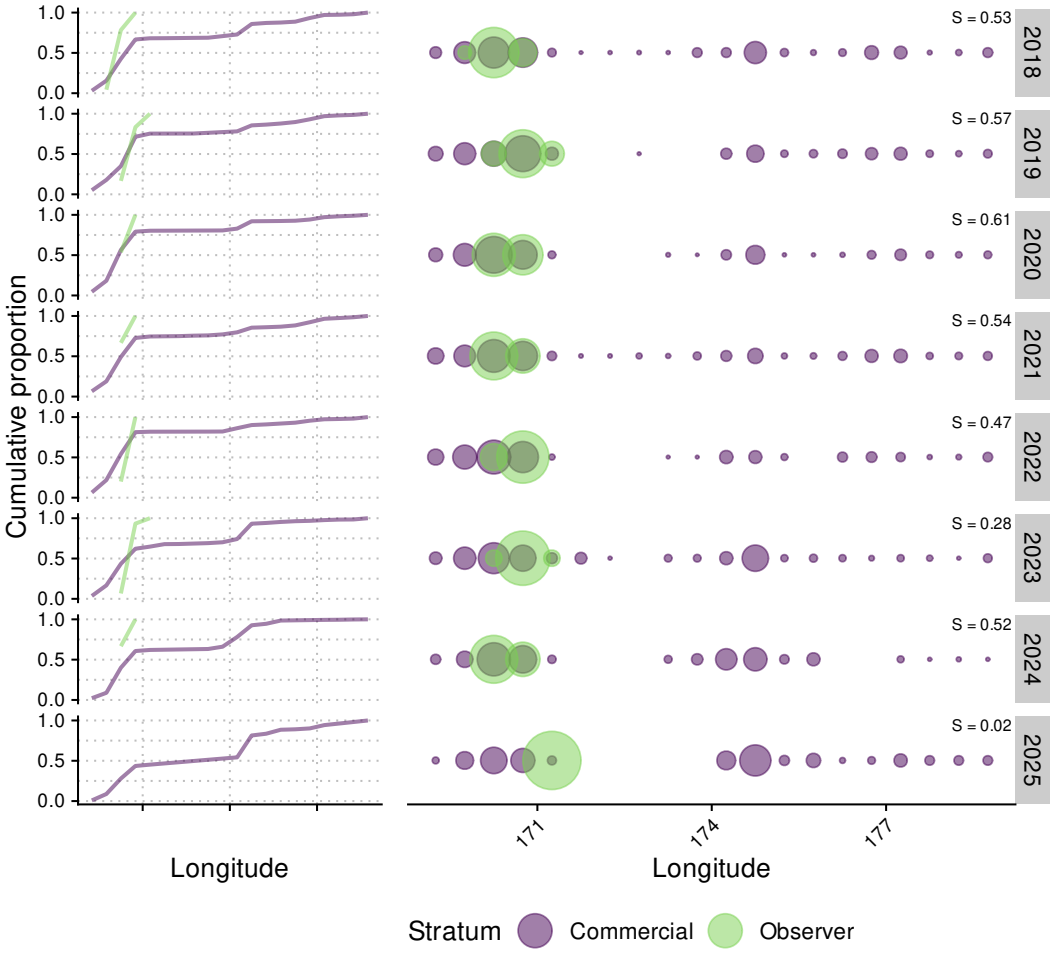


Figure 844: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 1, where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

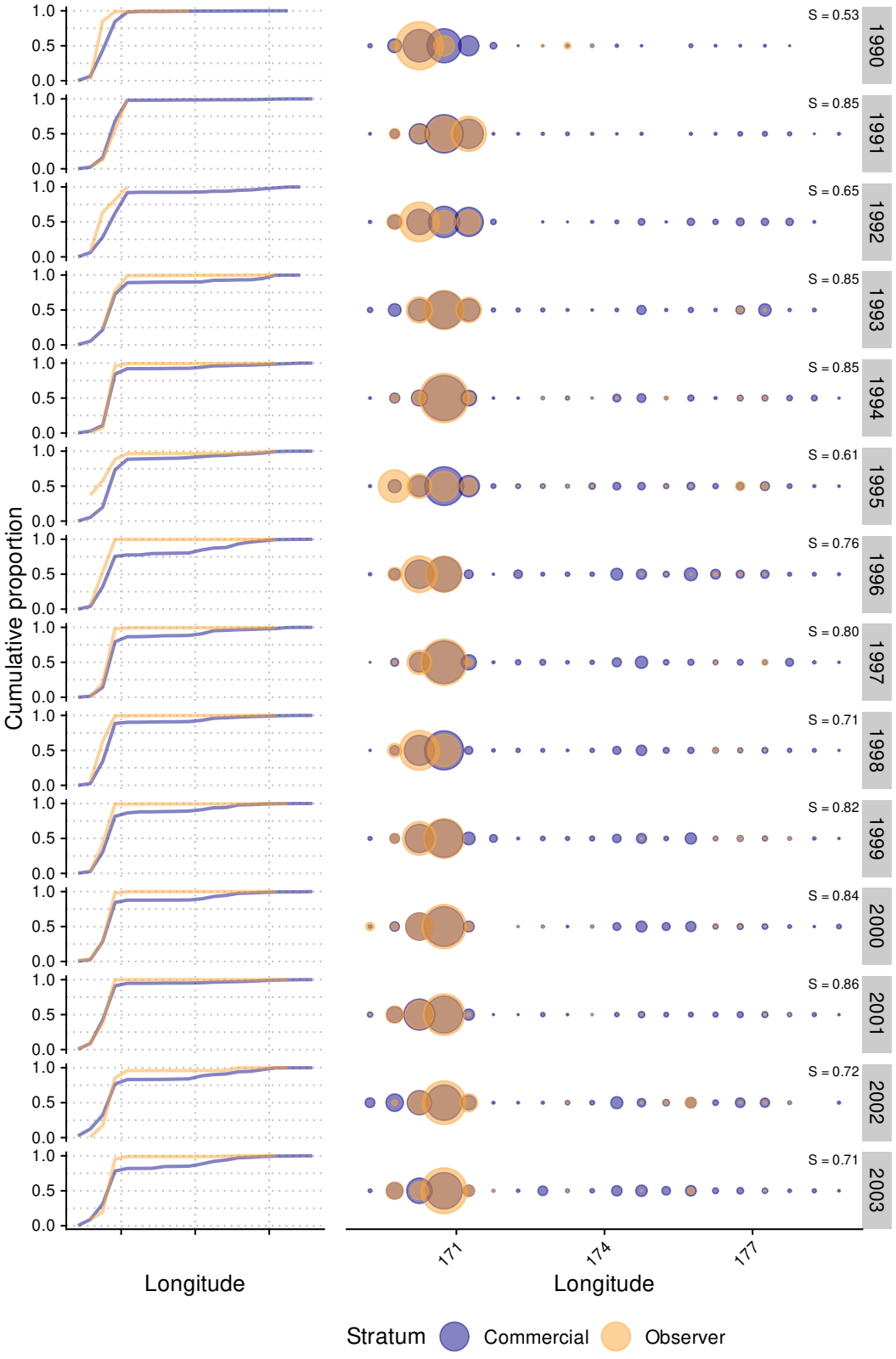


Figure 845: Longitudinal representativeness of observer sampling coverage of Trawl catch in SWA 1, from events where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

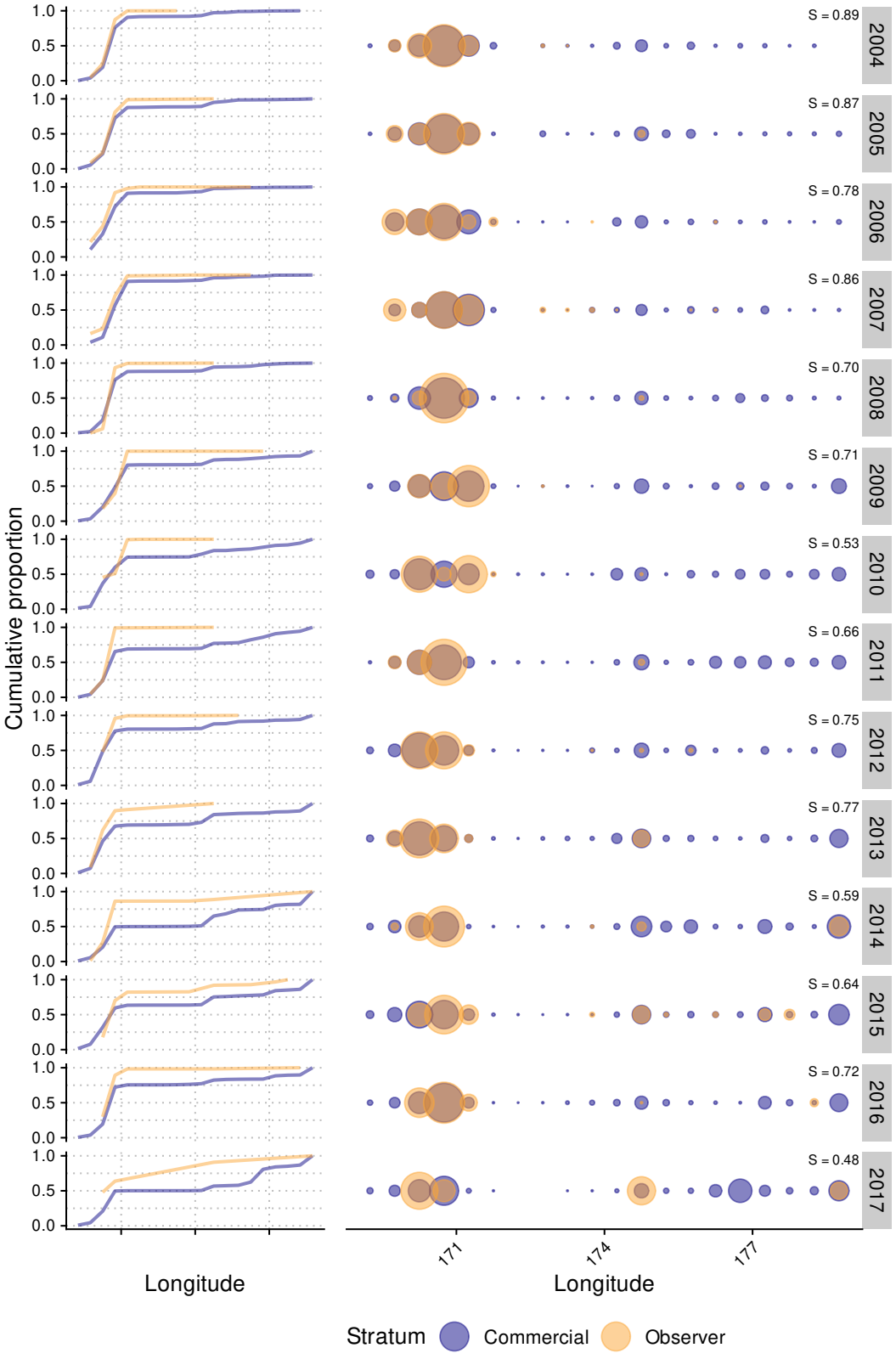


Figure 846: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SWA 1, from events where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

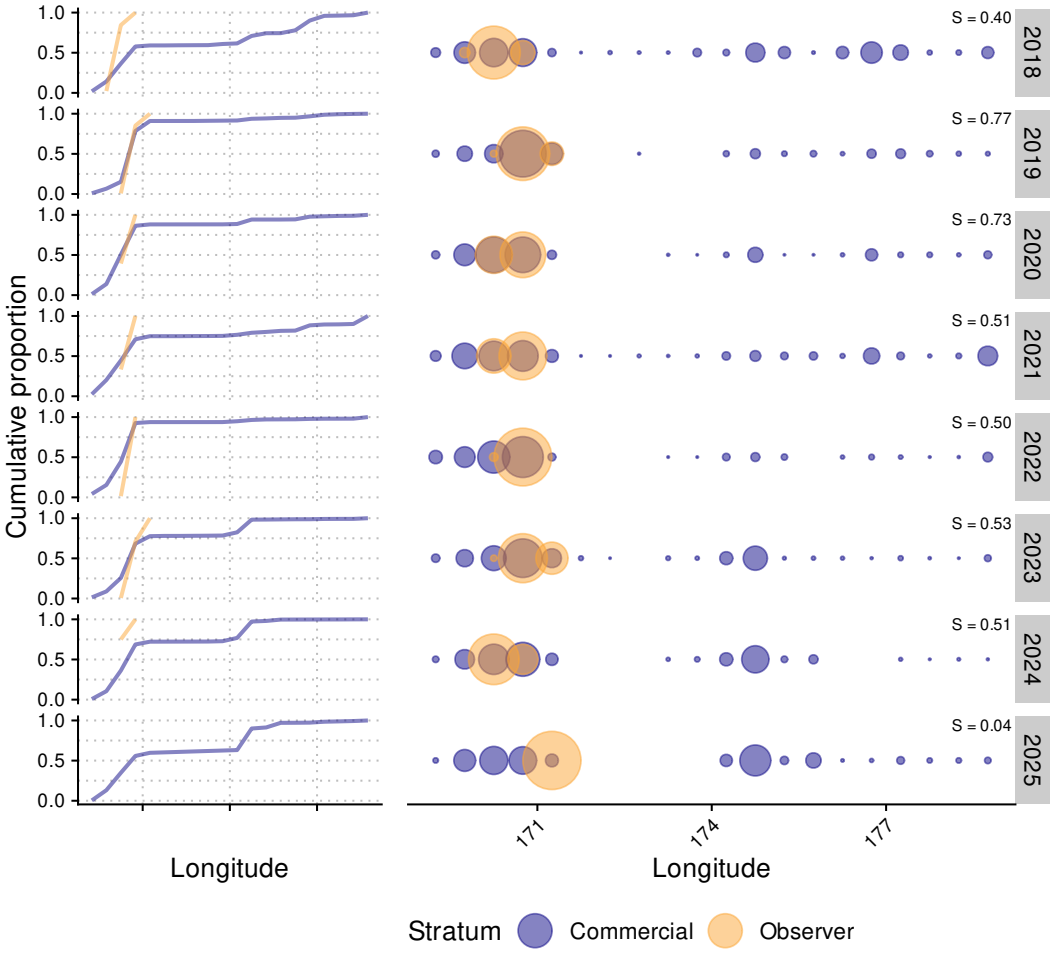


Figure 847: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SWA 1, from events where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

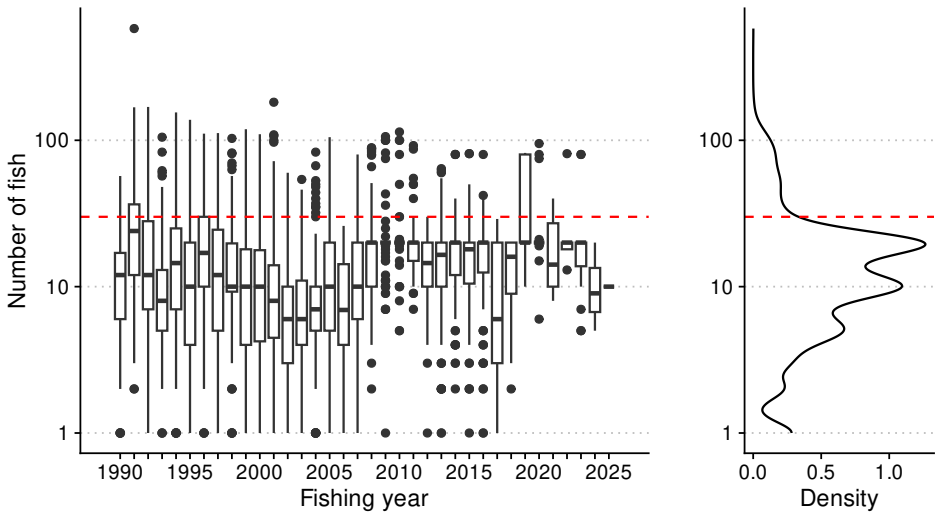


Figure 848: **Length-frequency sample sizes for observed fishing events in SWA 1 where silver warehou were sampled. The red dashed line indicates a sample size of 30 fish.**

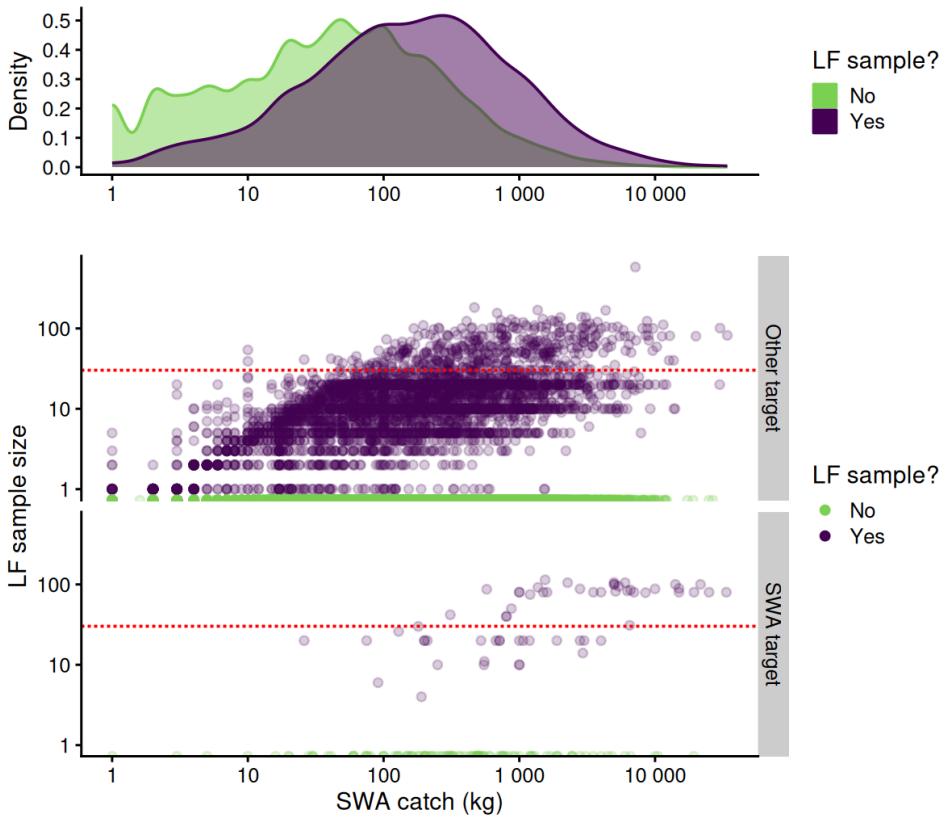


Figure 849: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in SWA 1 in relation to the total silver warehou catch from an event, separately for silver warehou target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.12.1.2 Otolith samples

Table 71: Otolith samples of silver warehou from the SWA 1 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of silver warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	2 516	0	0	0.00
1991	2 333	0	0	0.00
1992	2 022	0	0	0.00
1993	2 323	0	0	0.00
1994	3 413	0	0	0.00
1995	3 103	0	0	0.00
1996	3 828	0	0	0.00
1997	3 961	0	0	0.00
1998	3 952	0	0	0.00
1999	2 974	0	0	0.00
2000	4 041	0	0	0.00
2001	3 886	0	0	0.00
2002	2 007	0	0	0.00
2003	2 271	0	0	0.00
2004	2 422	0	0	0.00
2005	2 078	0	0	0.00
2006	1 812	0	0	0.00
2007	1 980	0	0	0.00
2008	1 717	0	0	0.00
2009	1 699	39	200	2.30
2010	1 649	22	116	1.33
2011	1 972	55	259	2.79
2012	1 826	56	289	3.07
2013	1 384	147	808	10.62
2014	1 655	48	232	2.90
2015	1 695	7	35	0.41
2016	1 543	78	360	5.06
2017	1 071	21	79	1.96
2018	1 619	21	91	1.30
2019	772	18	90	2.33
2020	986	27	136	2.74
2021	797	6	30	0.75
2022	848	5	31	0.59
2023	628	15	75	2.39
2024	551	3	15	0.54
2025	346	1	3	0.29

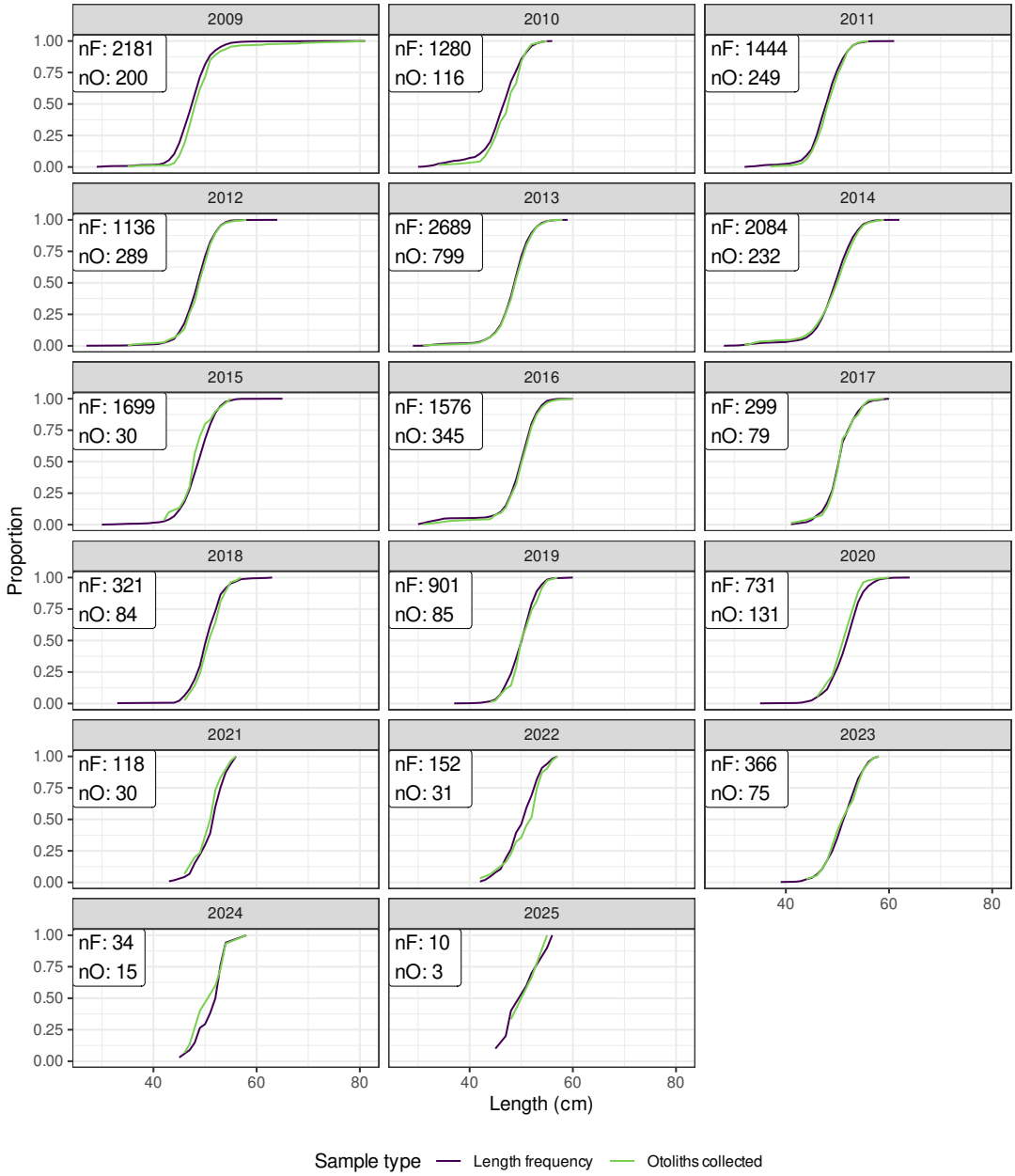


Figure 850: Cumulative distributions of the length of fish in the length frequency and otolith samples of silver warehou in the SWA 1 Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.12.1.3 Catch quantification

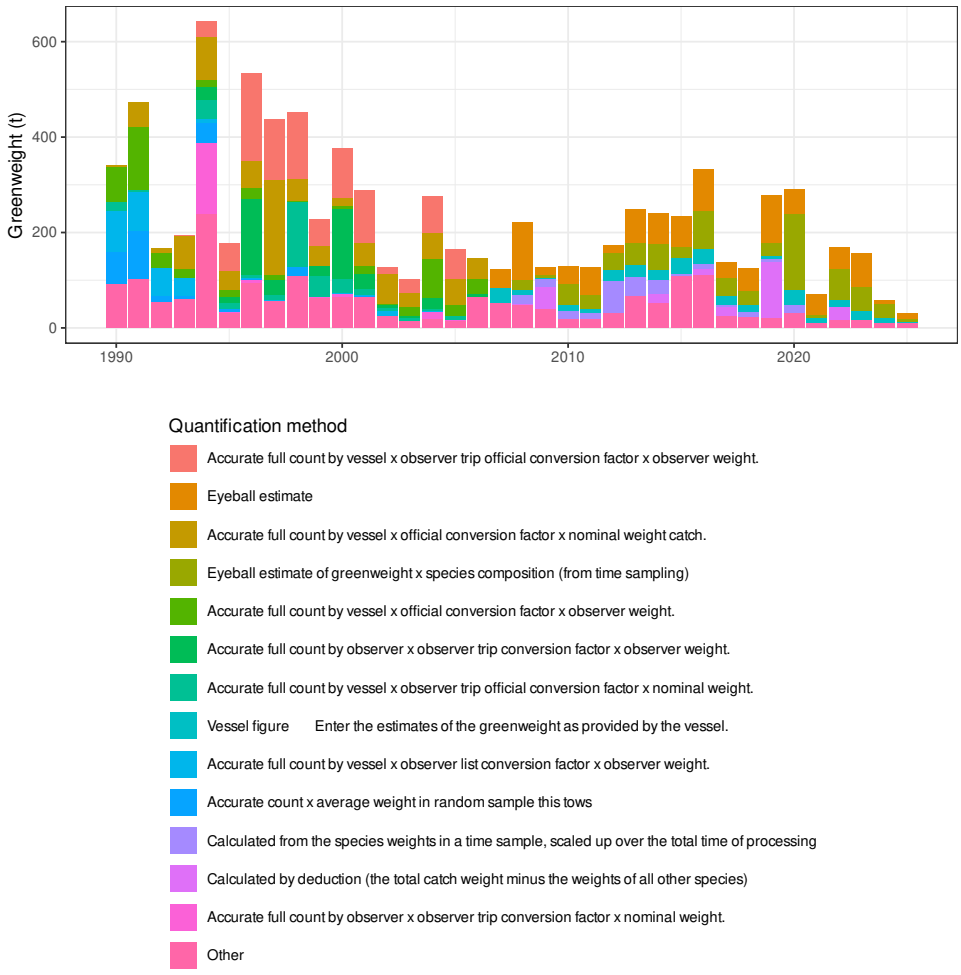


Figure 851: Methods used by observers to quantify the catch of silver warehou in the SWA 1 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.12.2 SWA 3: Trawl fishery

2.12.2.1 Length-frequency samples

Table 72: Length-frequency samples of silver warehou from the SWA 3 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of silver warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	1 487	12	266	0.81
1991	1 430	18	483	1.26
1992	1 851	19	309	1.03
1993	1 886	31	1 092	1.64
1994	2 119	58	782	2.74
1995	2 007	9	169	0.45
1996	2 405	46	1 204	1.91
1997	2 975	17	1 059	0.57
1998	3 053	61	923	2.00
1999	2 583	121	1 828	4.68
2000	3 220	123	2 196	3.82
2001	3 476	185	3 873	5.32
2002	2 164	47	825	2.17
2003	2 503	83	1 505	3.32
2004	2 730	85	1 486	3.11
2005	2 274	73	1 470	3.21
2006	2 597	93	1 750	3.58
2007	2 655	86	2 576	3.24
2008	1 782	73	1 319	4.10
2009	1 730	47	1 620	2.72
2010	1 595	89	2 398	5.58
2011	2 042	98	4 852	4.80
2012	1 448	34	1 635	2.35
2013	1 605	258	11 368	16.07
2014	1 420	192	8 822	13.52
2015	1 557	179	6 760	11.50
2016	1 284	121	5 043	9.42
2017	1 228	157	6 018	12.79
2018	1 791	135	4 845	7.54
2019	2 571	218	6 179	8.48
2020	2 041	195	6 155	9.55
2021	2 121	179	5 972	8.44
2022	2 395	164	6 060	6.85
2023	2 720	180	6 824	6.62
2024	3 135	228	8 179	7.27
2025	2 432	149	6 421	6.13

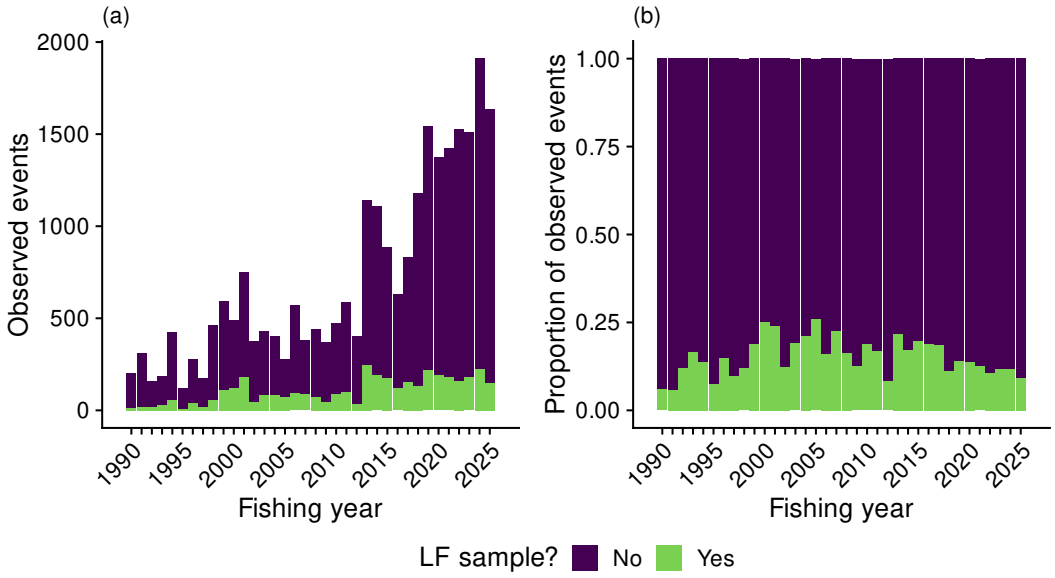


Figure 852: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SWA 3 where the silver warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

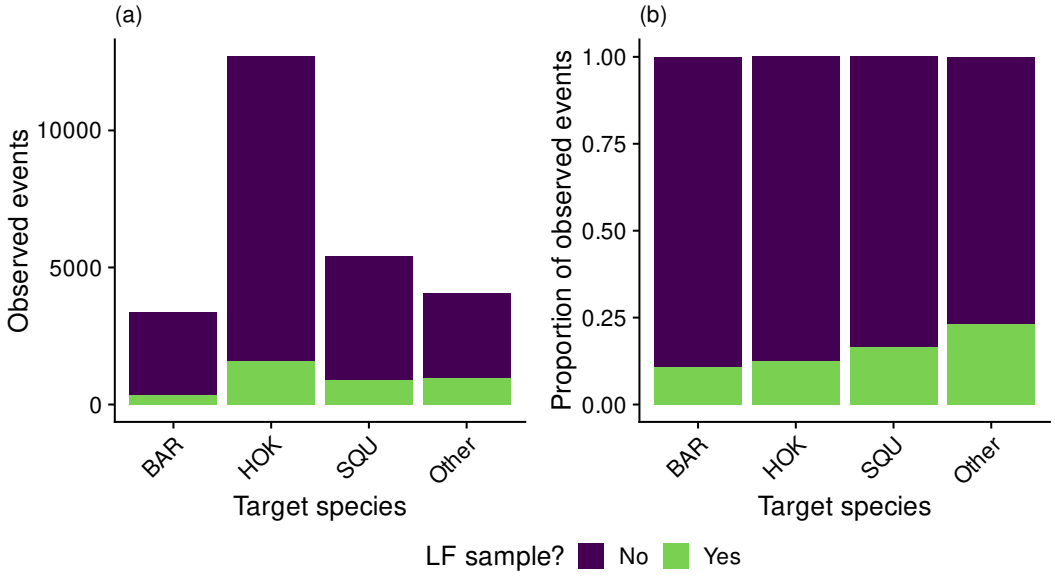


Figure 853: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SWA 3 where the silver warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

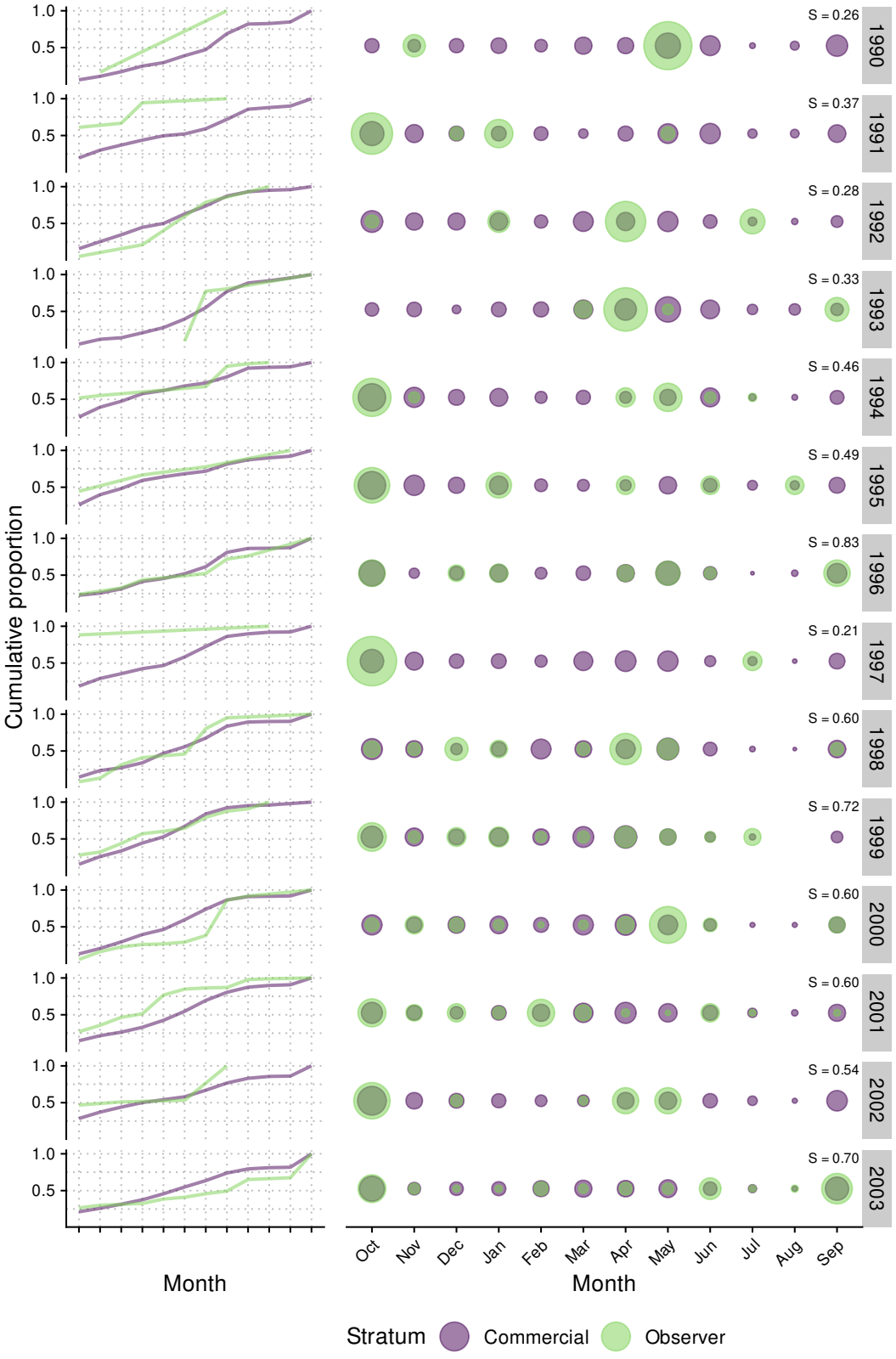


Figure 854: **Monthly representativeness of observer sampling coverage of Trawl fishing events in SWA 3, where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

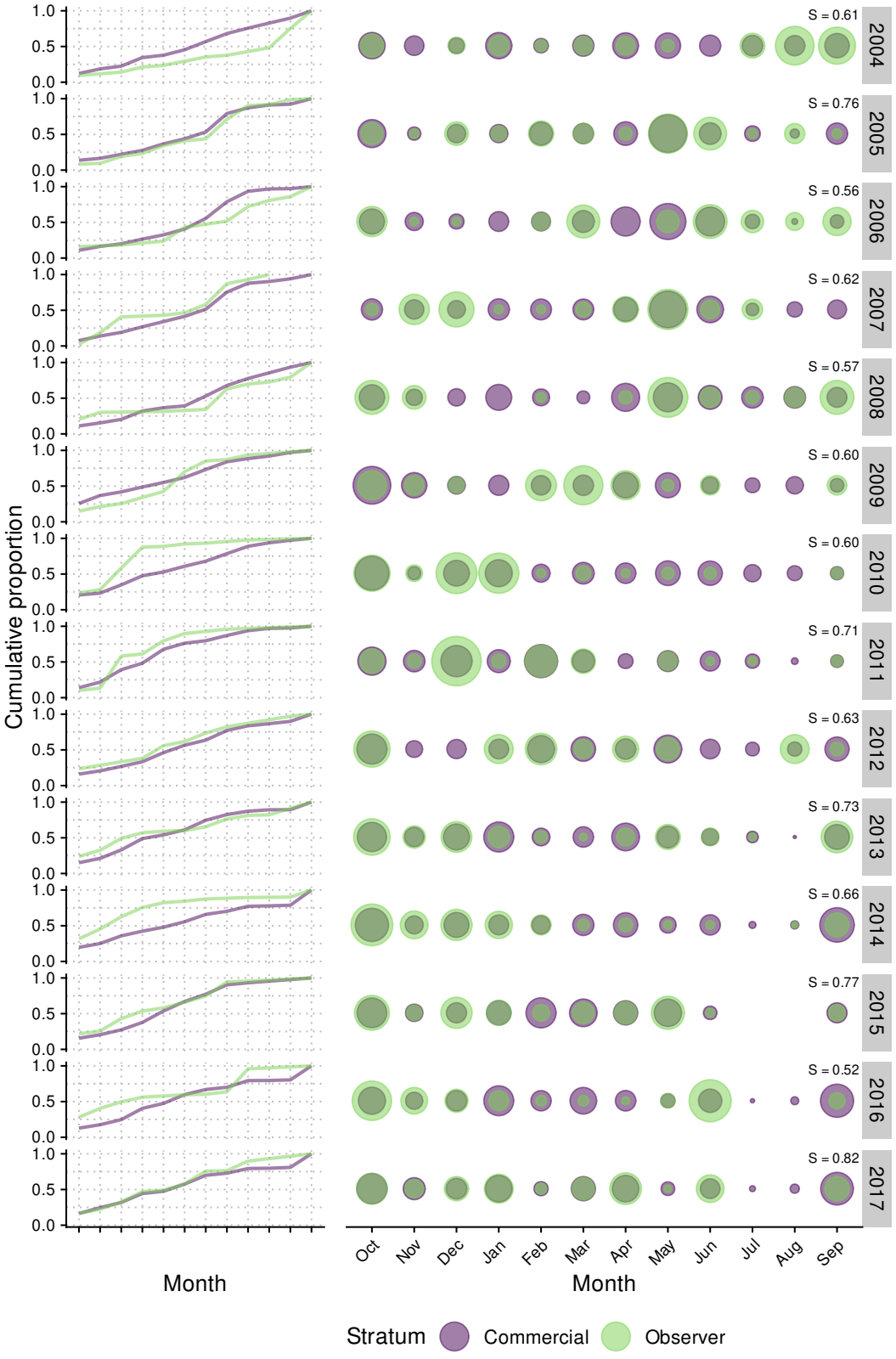


Figure 855: Monthly representativeness of observer sampling coverage of Trawl fishing events in SWA 3, where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

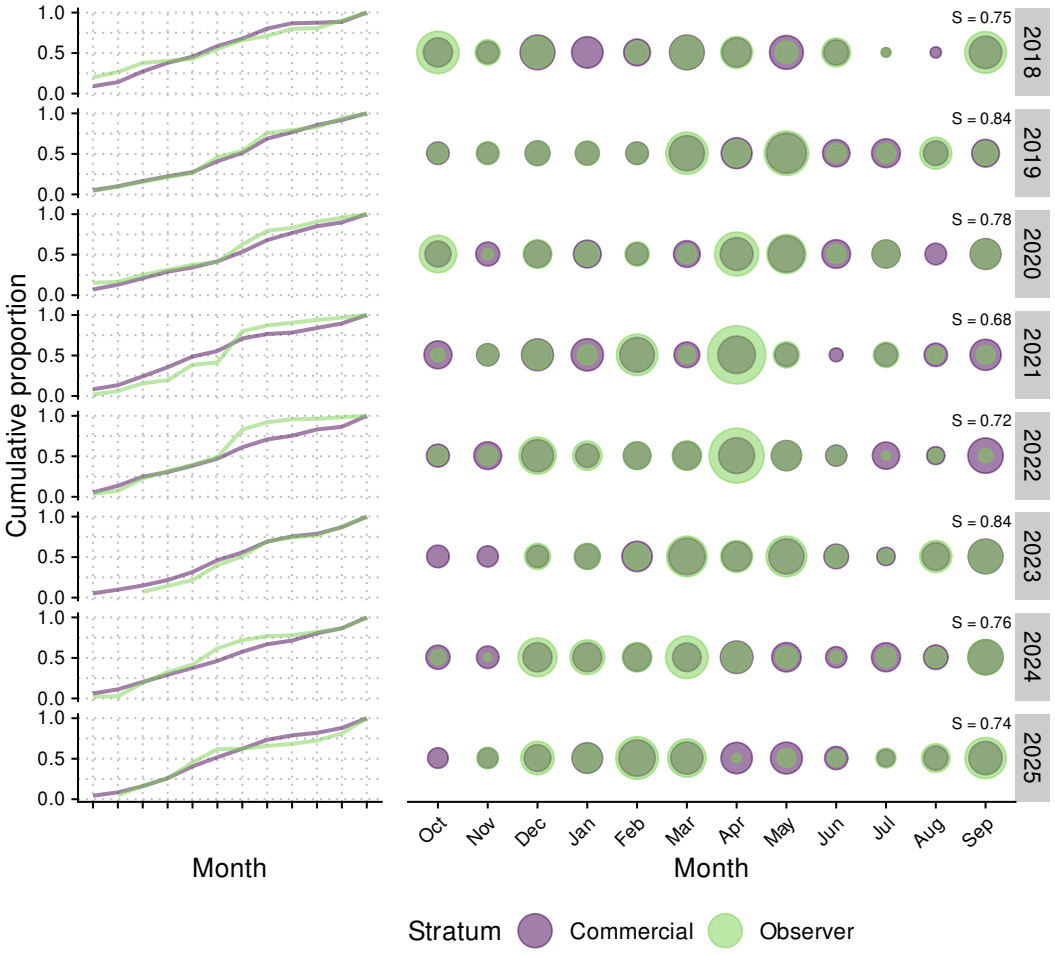


Figure 856: Monthly representativeness of observer sampling coverage of Trawl fishing events in SWA 3, where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

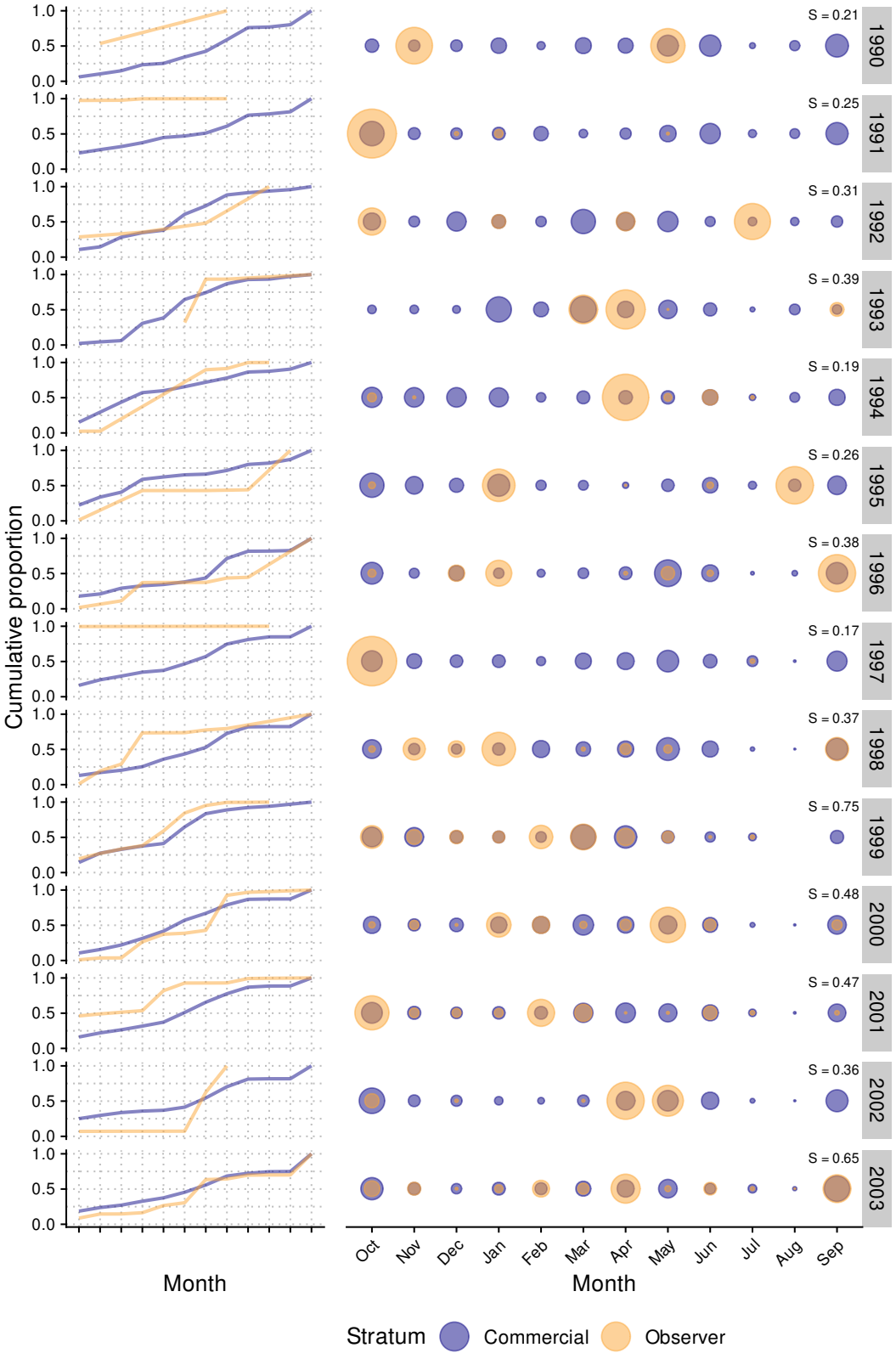


Figure 857: **Monthly representativeness of observer sampling coverage of Trawl catch in SWA 3, from events where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

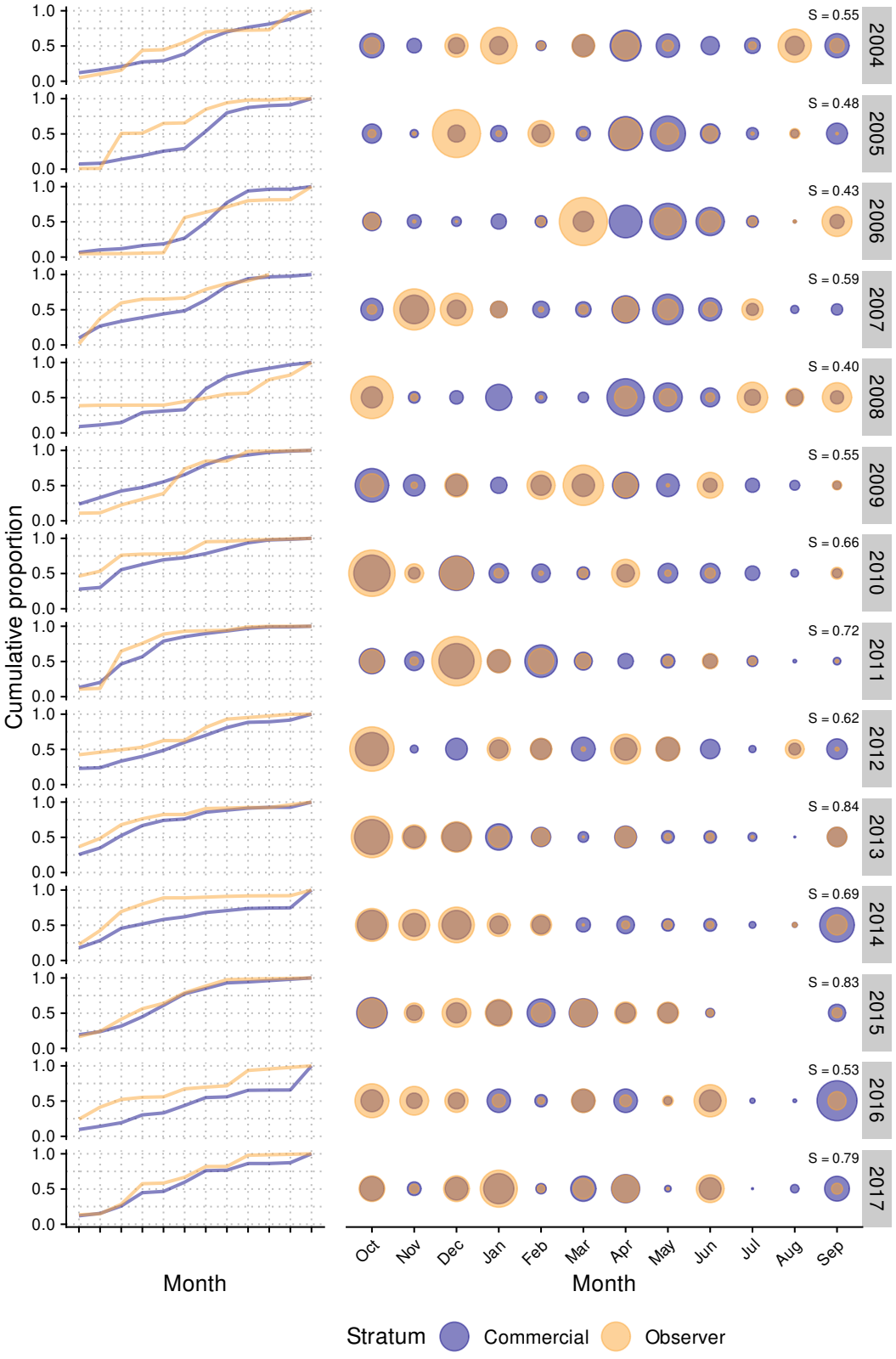


Figure 858: **Monthly representativeness of observer sampling coverage of Trawl catch in SWA 3, from events where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

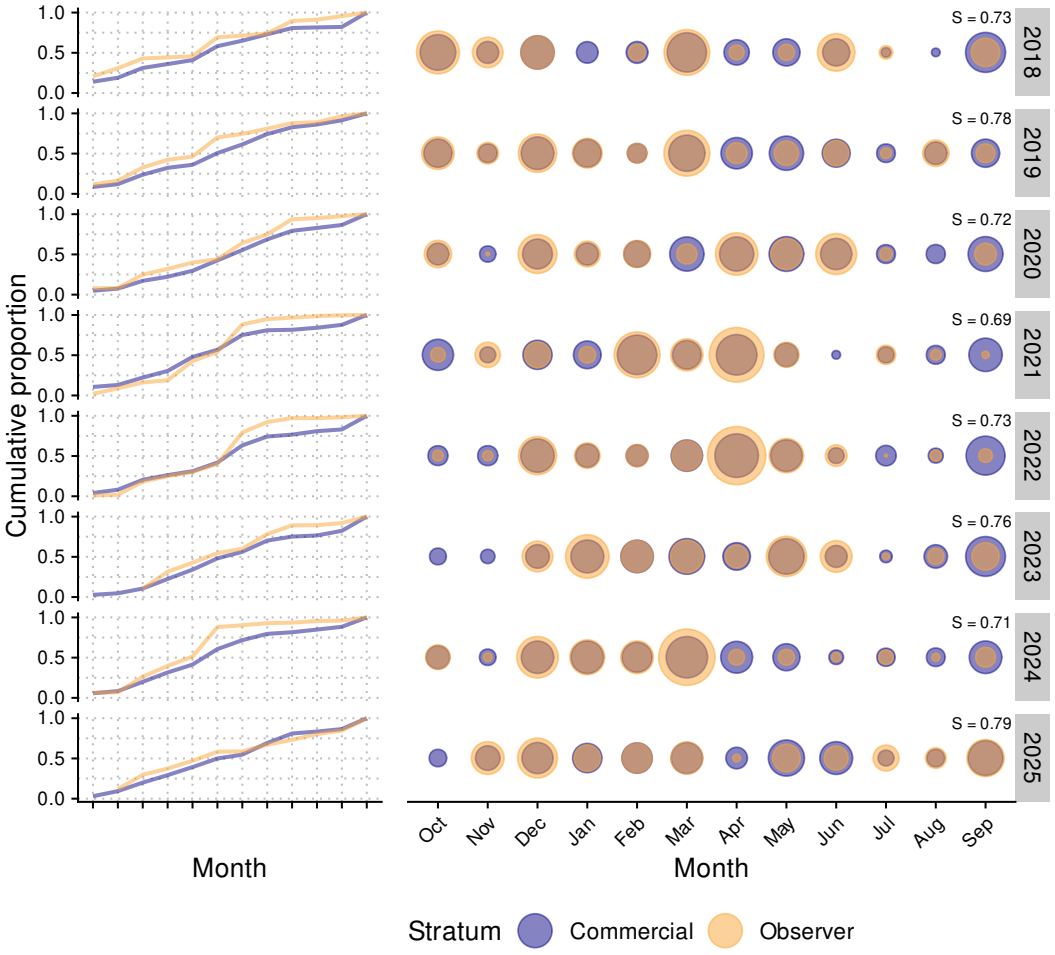


Figure 859: Monthly representativeness of observer sampling coverage of Trawl catch in SWA 3, from events where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

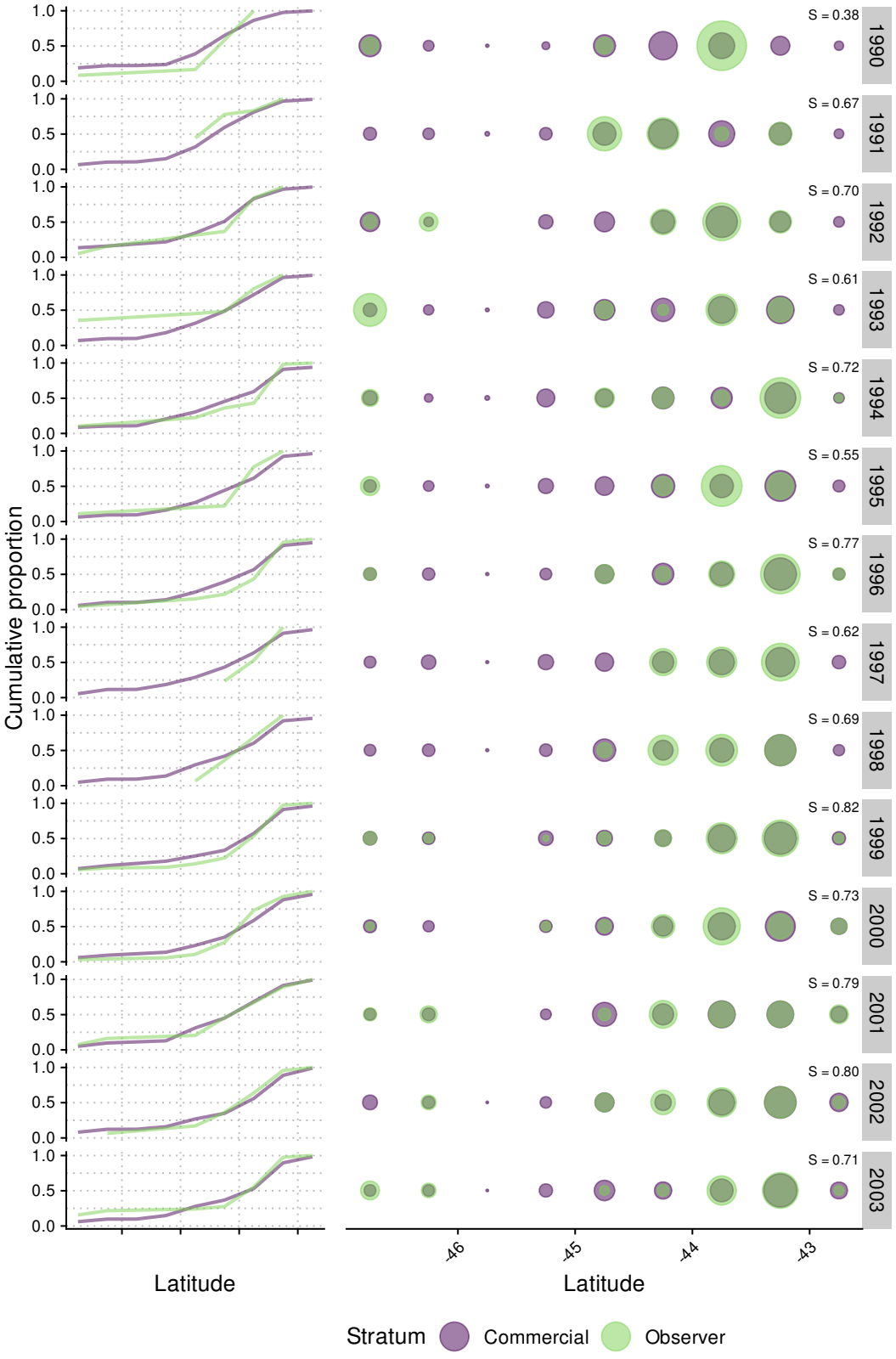


Figure 860: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 3, where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

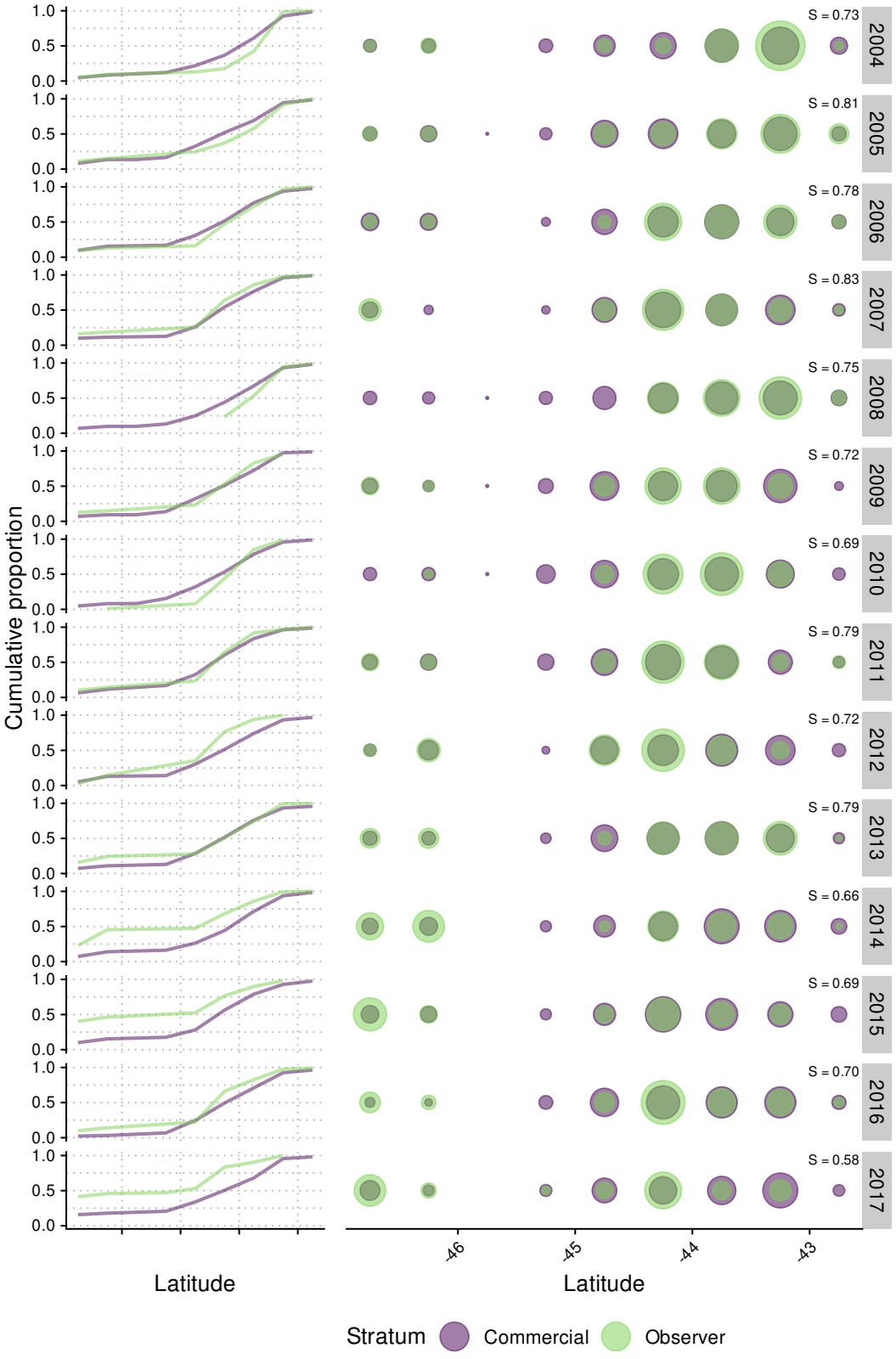


Figure 861: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 3, where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

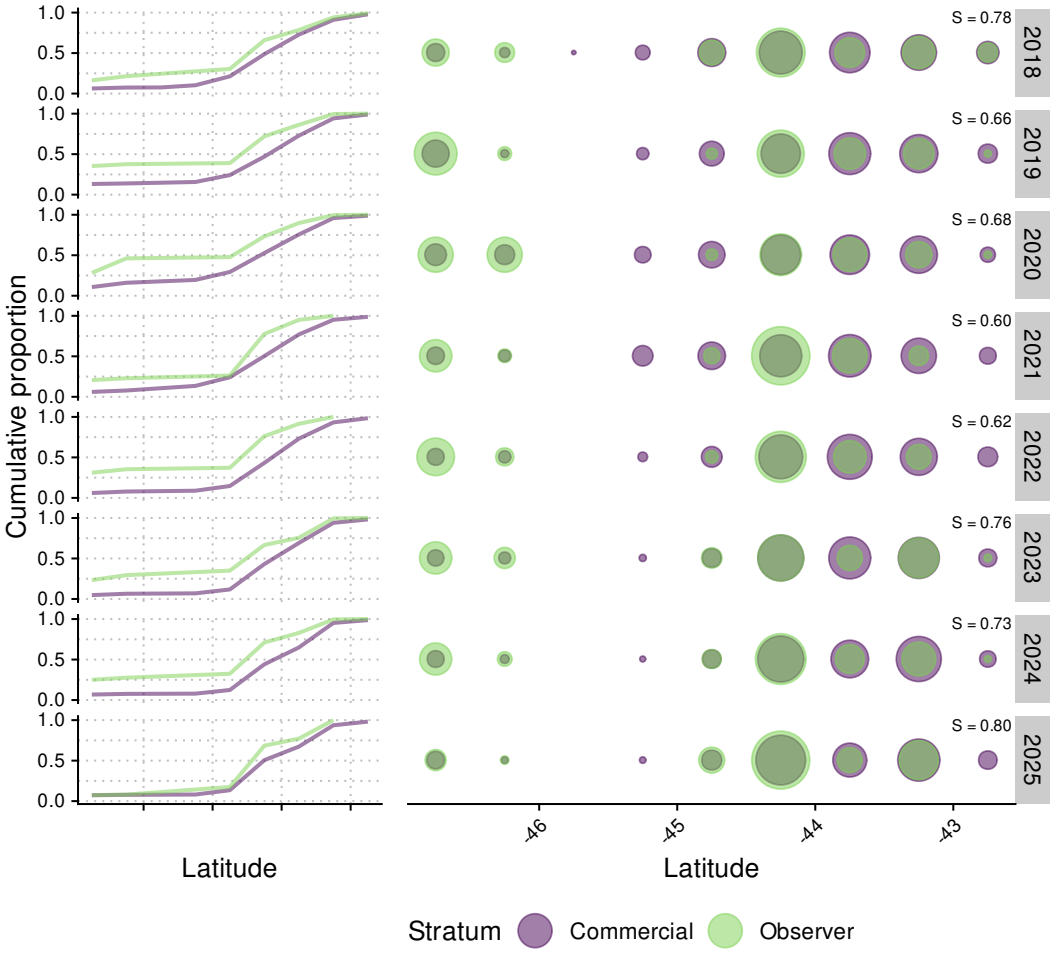


Figure 862: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 3, where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

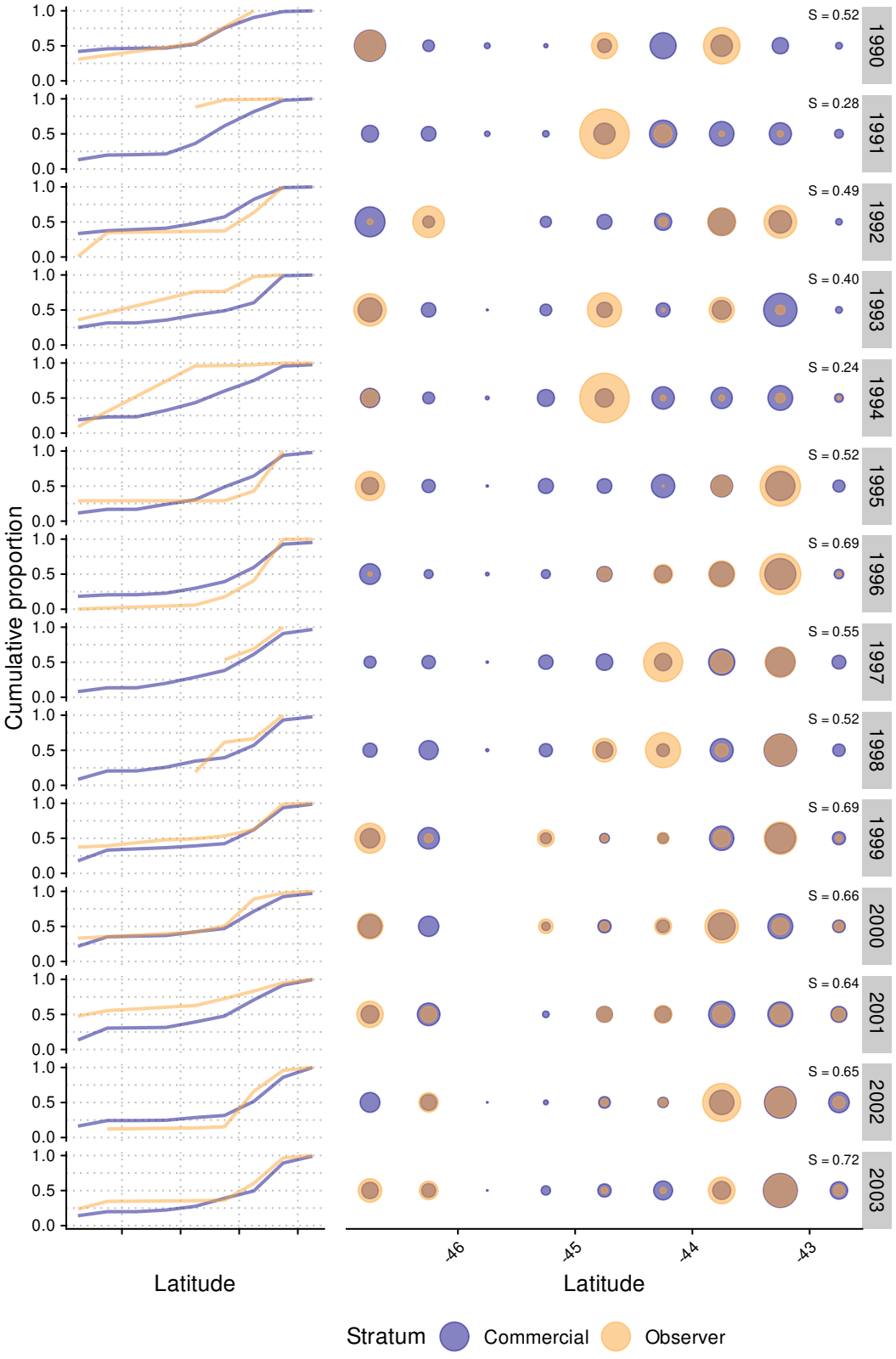


Figure 863: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SWA 3, from events where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

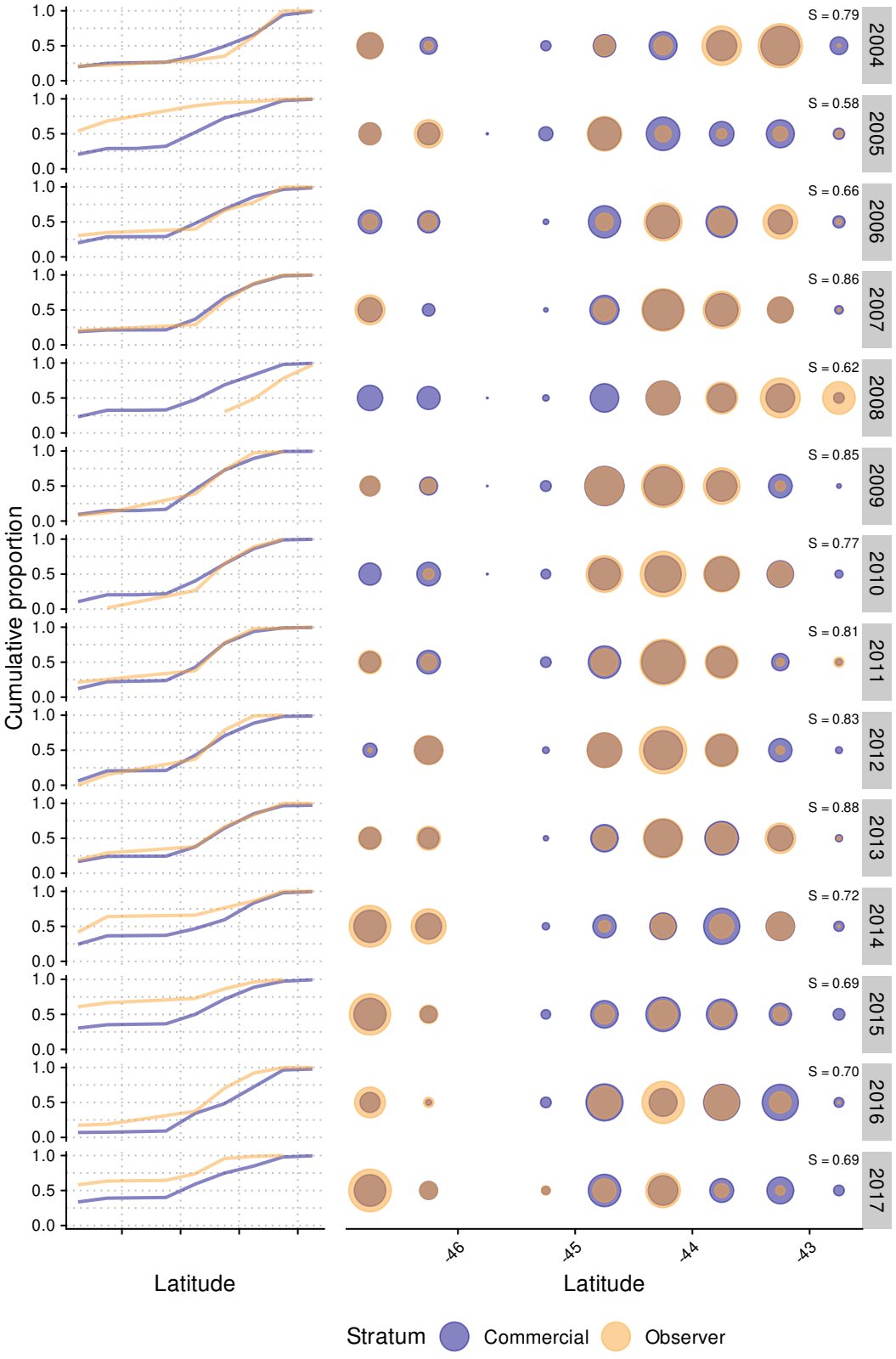


Figure 864: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SWA 3, from events where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

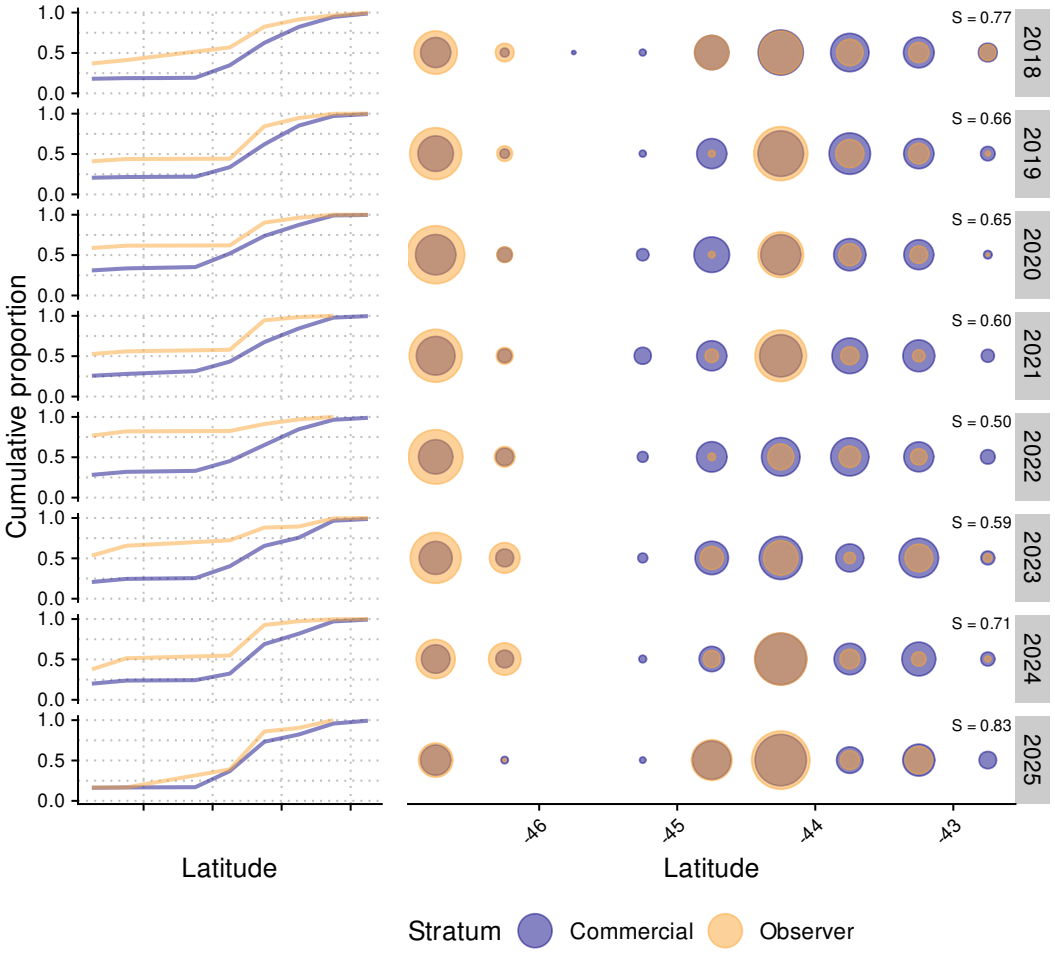


Figure 865: Latitudinal representativeness of observer sampling coverage of Trawl catch in SWA 3, from events where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

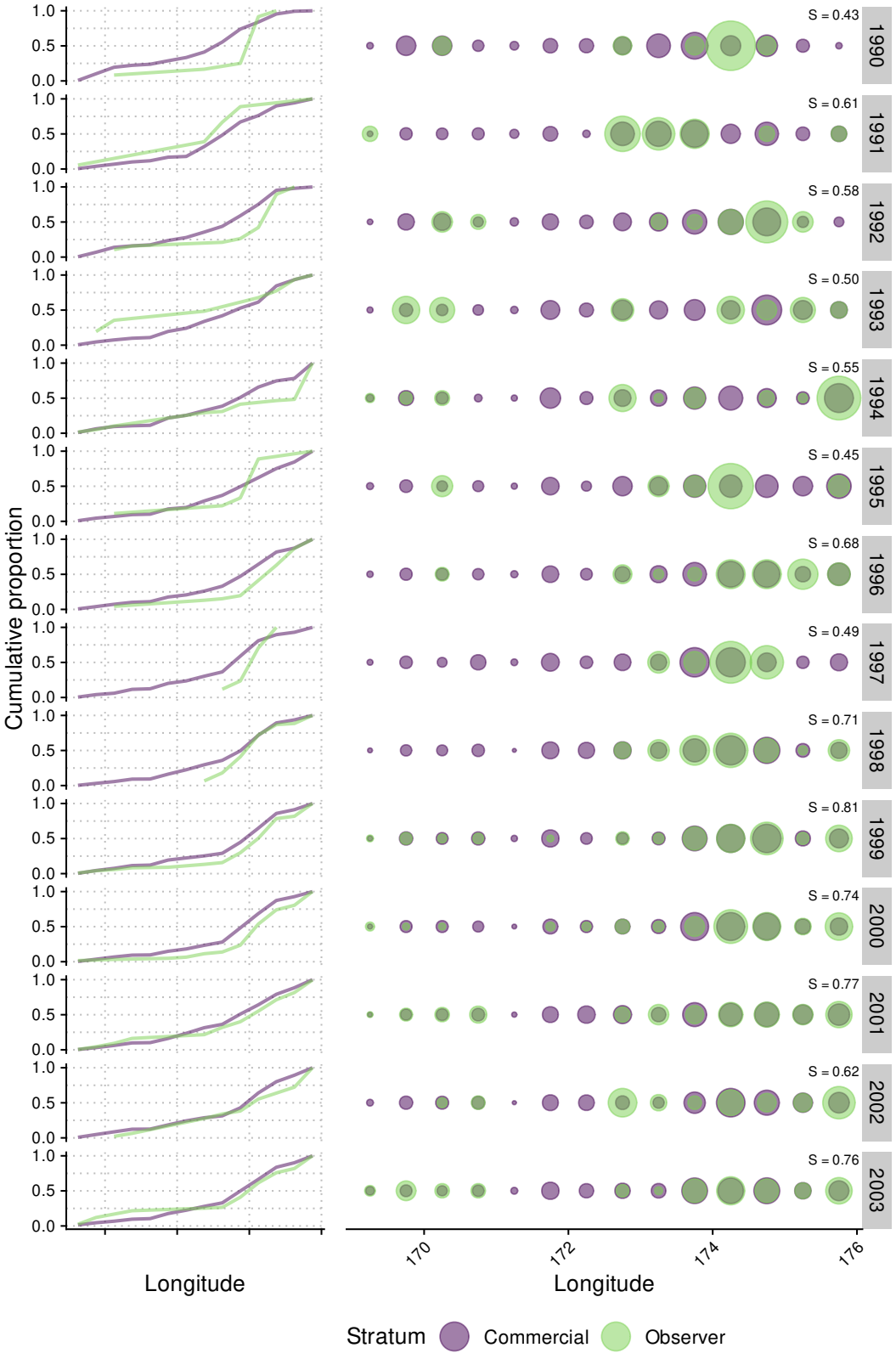


Figure 866: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 3, where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

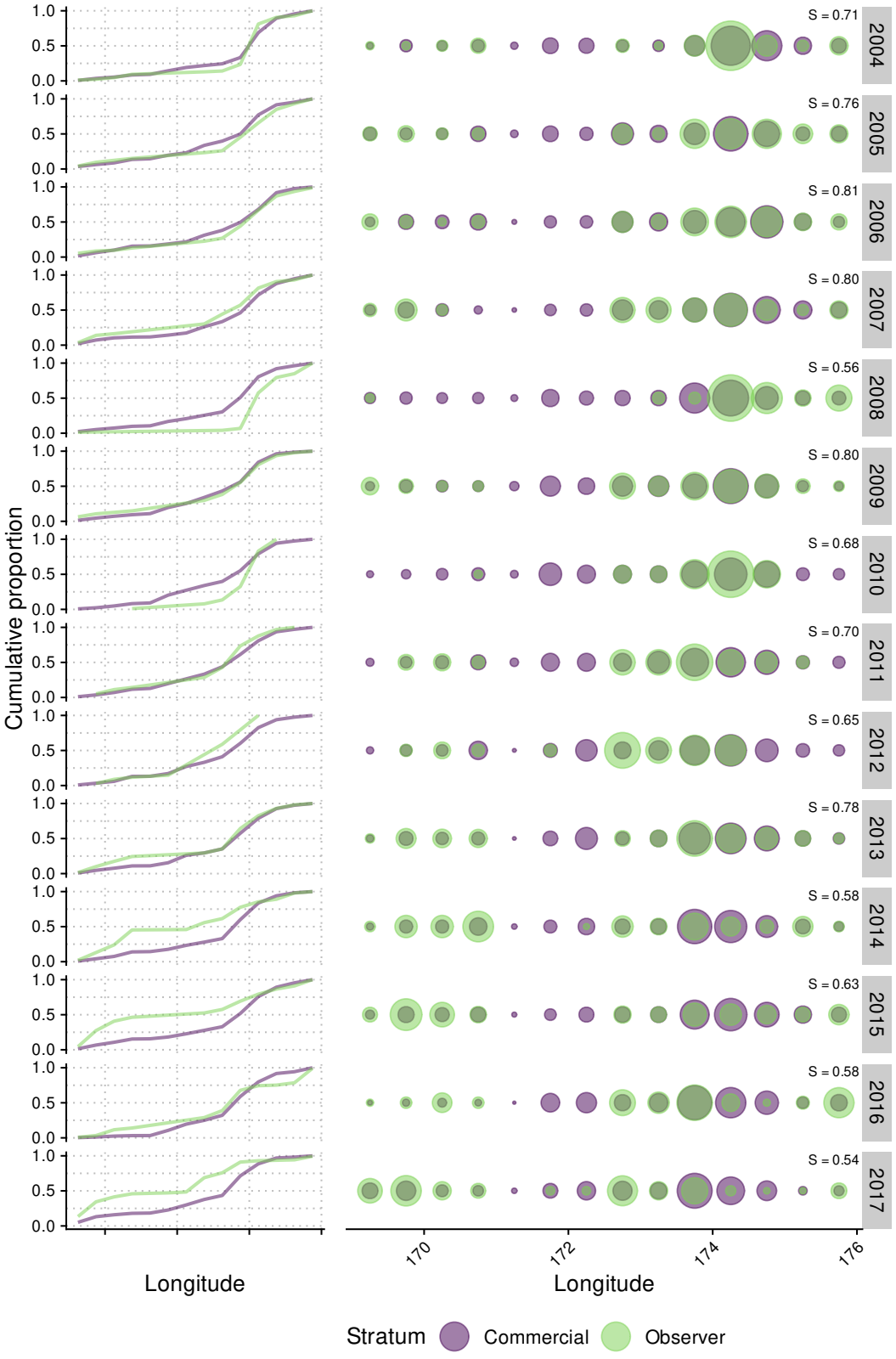


Figure 867: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 3, where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

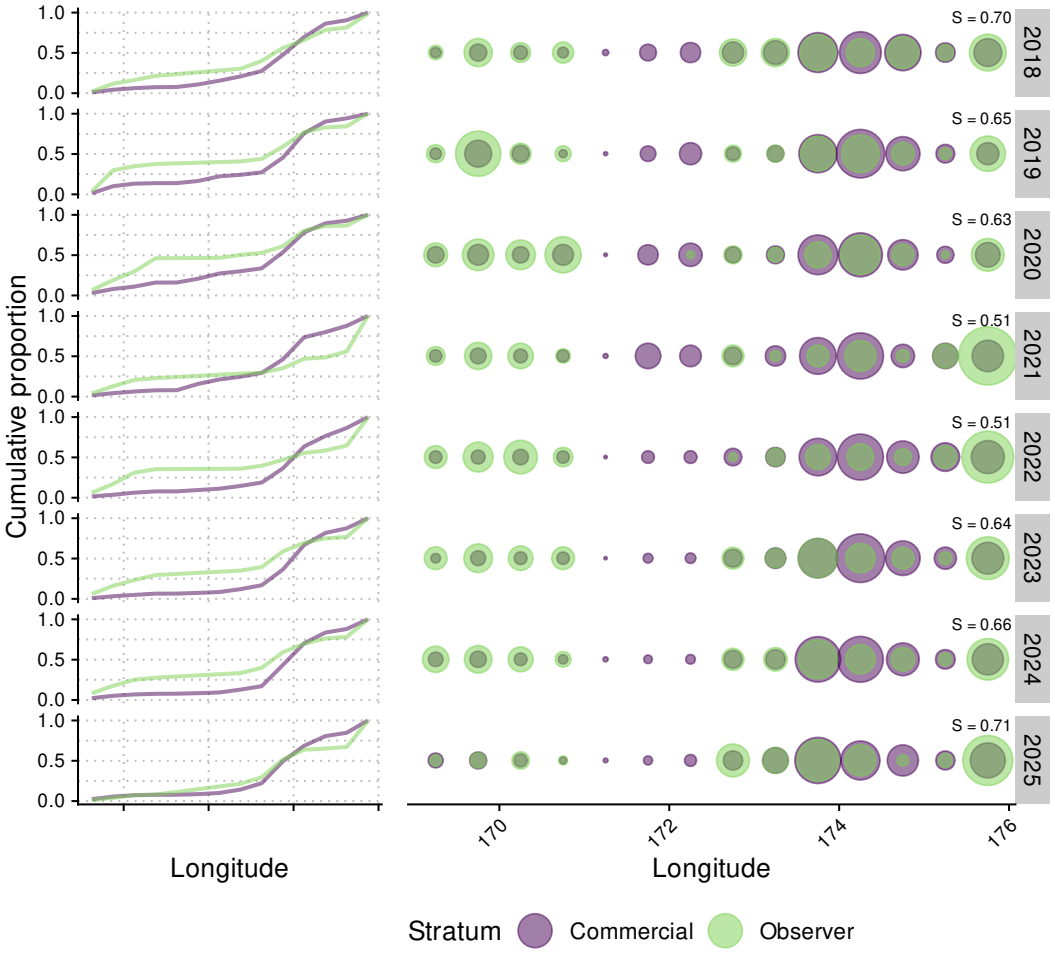


Figure 868: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 3, where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

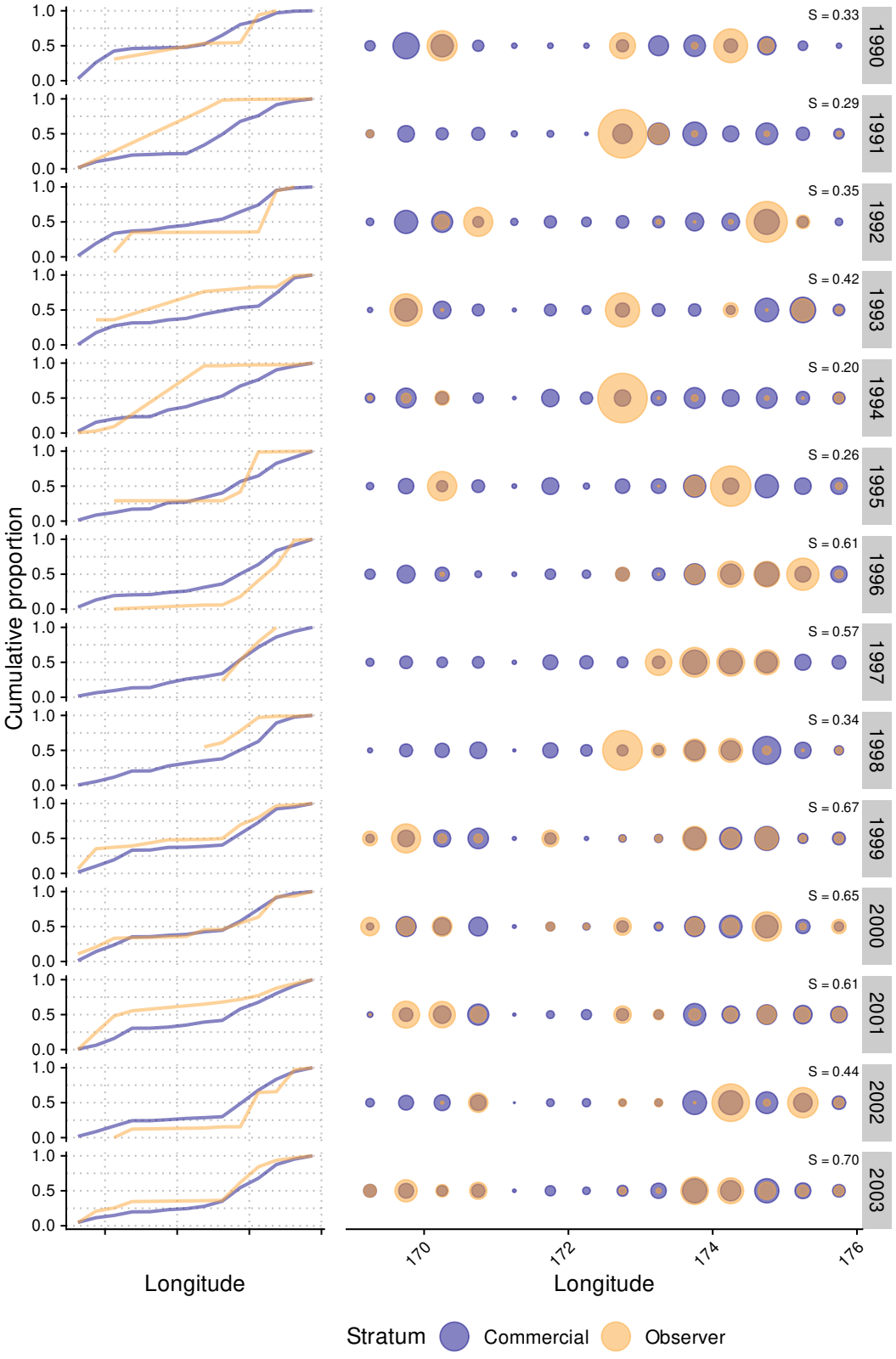


Figure 869: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SWA 3, from events where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

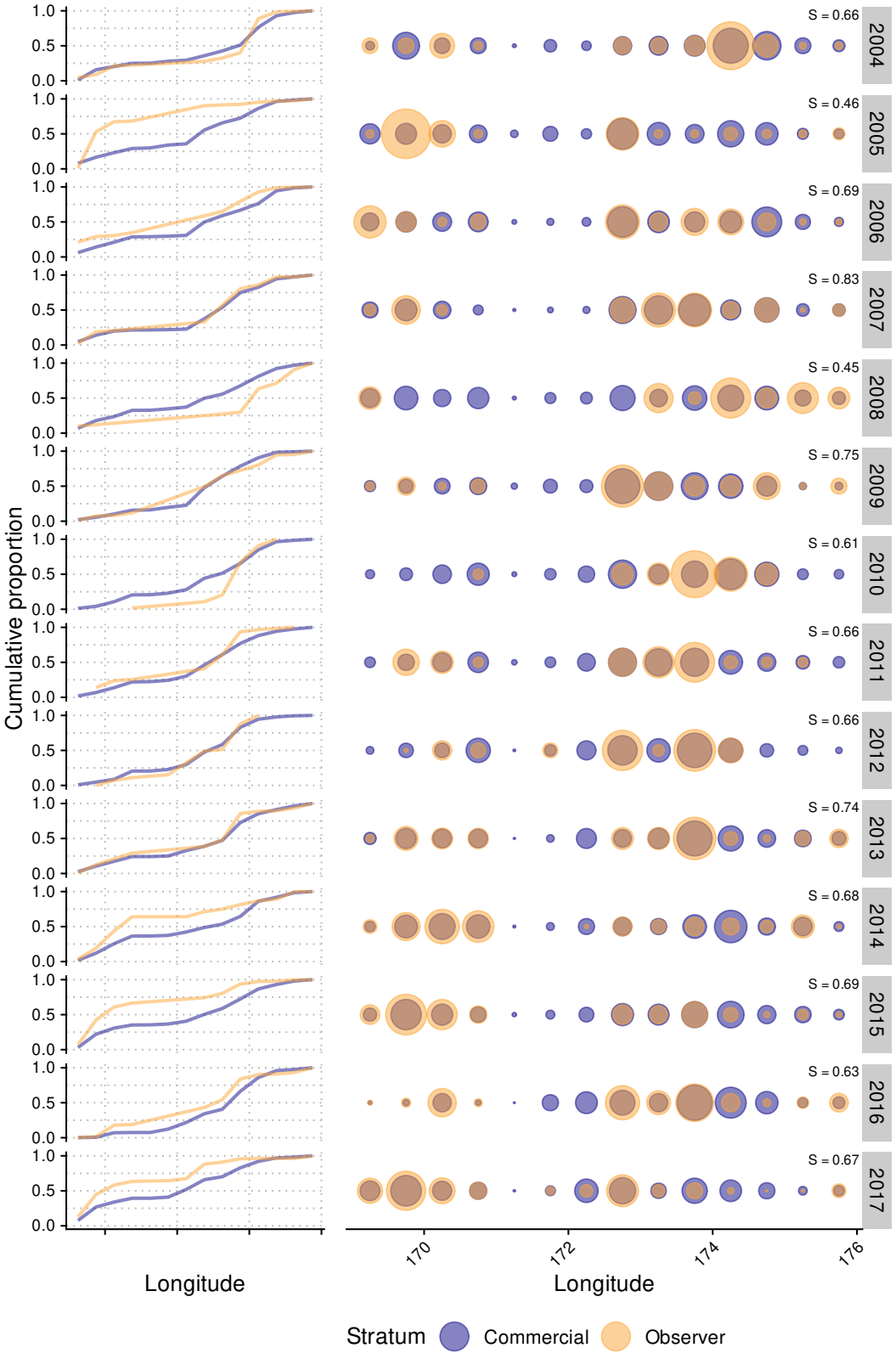


Figure 870: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SWA 3, from events where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

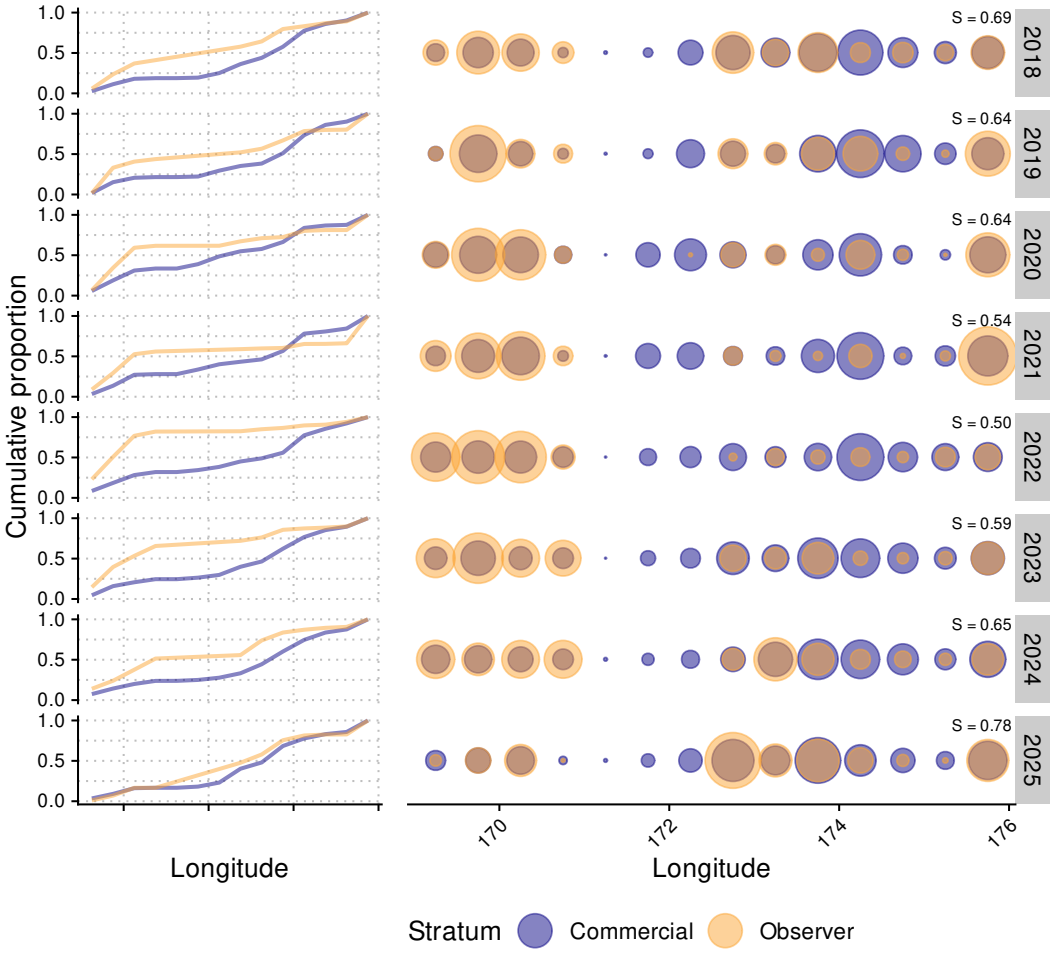


Figure 871: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SWA 3, from events where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

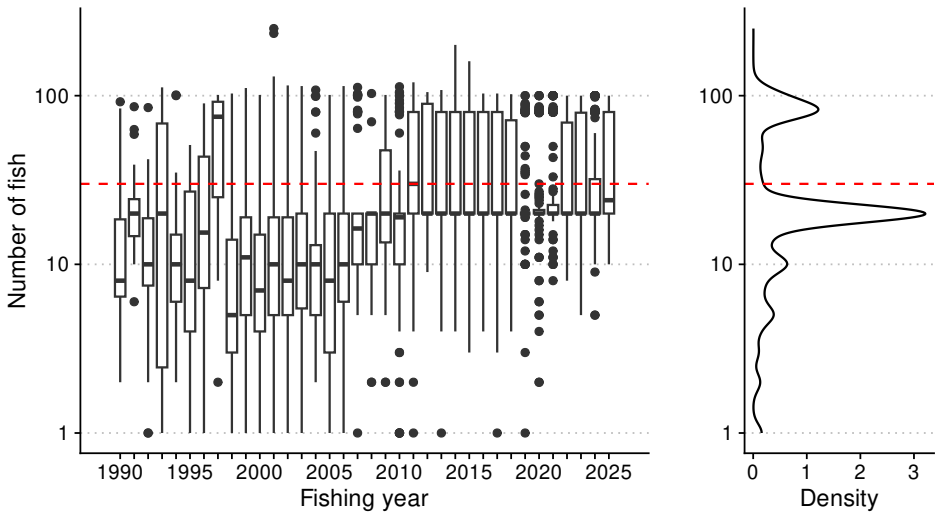


Figure 872: **Length-frequency sample sizes for observed fishing events in SWA 3 where silver warehou were sampled. The red dashed line indicates a sample size of 30 fish.**

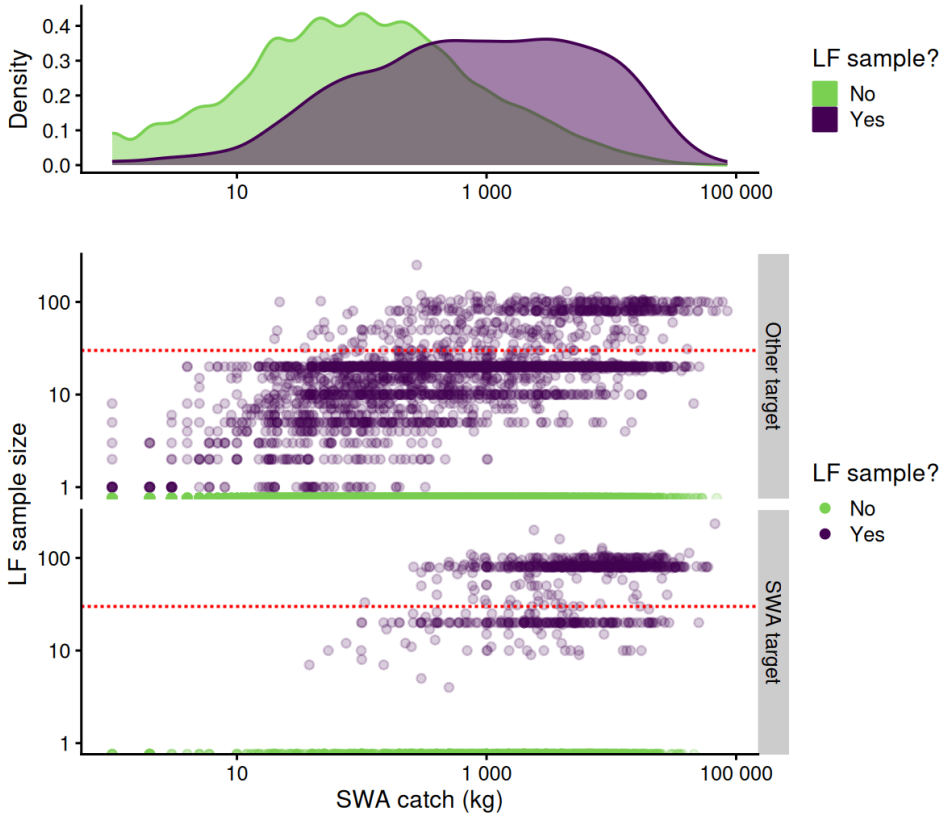


Figure 873: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in SWA 3 in relation to the total silver warehou catch from an event, separately for silver warehou target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.12.2.2 Otolith samples

Table 73: Otolith samples of silver warehou from the SWA 3 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of silver warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	1 487	0	0	0.00
1991	1 430	0	0	0.00
1992	1 851	0	0	0.00
1993	1 886	0	0	0.00
1994	2 119	0	0	0.00
1995	2 007	0	0	0.00
1996	2 405	0	0	0.00
1997	2 975	0	0	0.00
1998	3 053	0	0	0.00
1999	2 583	0	0	0.00
2000	3 220	0	0	0.00
2001	3 476	0	0	0.00
2002	2 164	0	0	0.00
2003	2 503	0	0	0.00
2004	2 730	0	0	0.00
2005	2 274	0	0	0.00
2006	2 597	0	0	0.00
2007	2 655	0	0	0.00
2008	1 782	0	0	0.00
2009	1 730	17	91	0.98
2010	1 595	54	228	3.39
2011	2 042	56	288	2.74
2012	1 448	27	142	1.86
2013	1 605	221	1 153	13.77
2014	1 420	176	886	12.39
2015	1 557	31	158	1.99
2016	1 284	51	258	3.97
2017	1 228	105	519	8.55
2018	1 791	130	692	7.26
2019	2 571	199	1 013	7.74
2020	2 041	188	1 004	9.21
2021	2 121	165	849	7.78
2022	2 395	154	799	6.43
2023	2 720	166	860	6.10
2024	3 135	217	1 188	6.92
2025	2 432	126	696	5.18

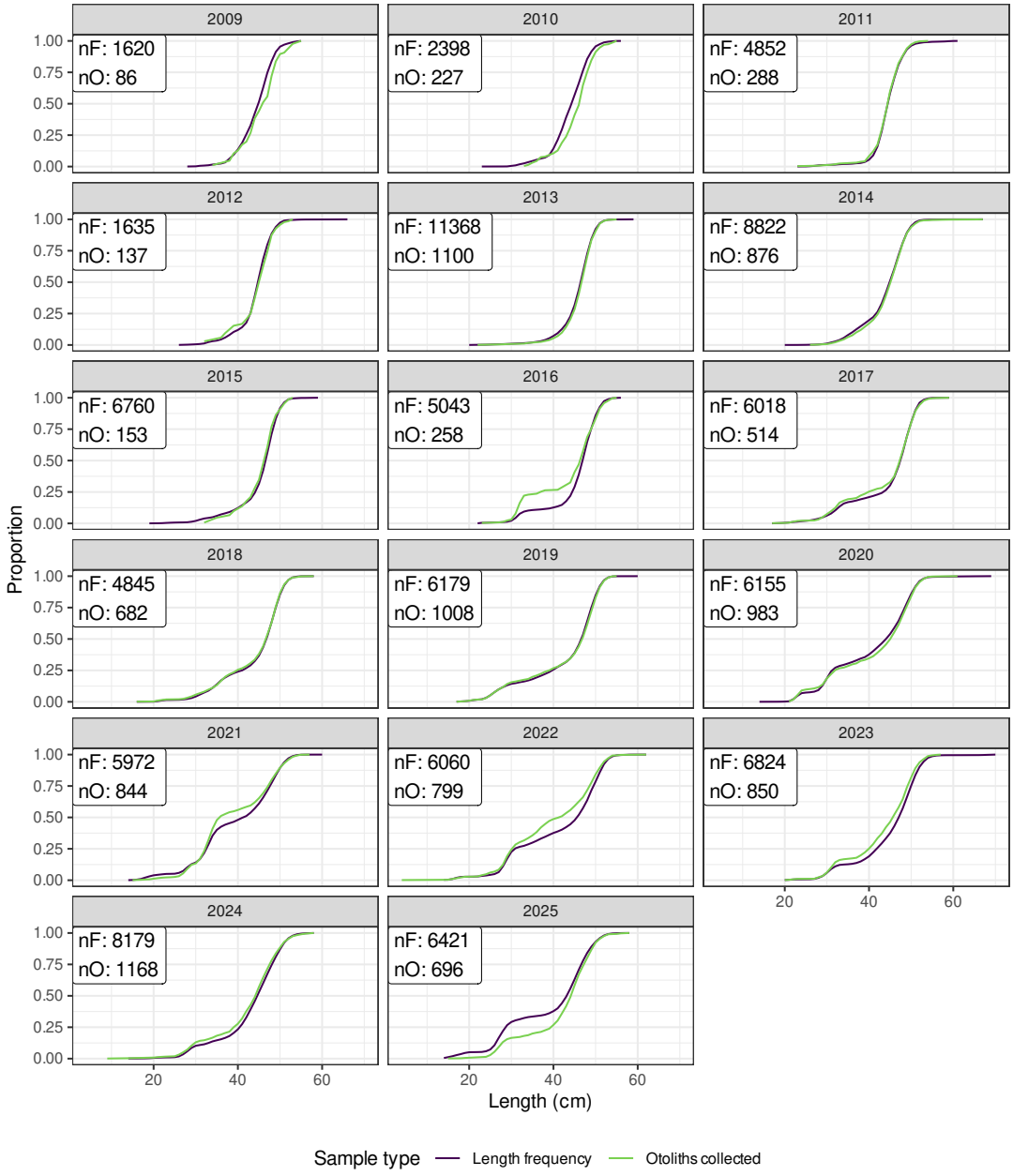


Figure 874: Cumulative distributions of the length of fish in the length frequency and otolith samples of silver warehou in the SWA 3 Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.12.2.3 Catch quantification

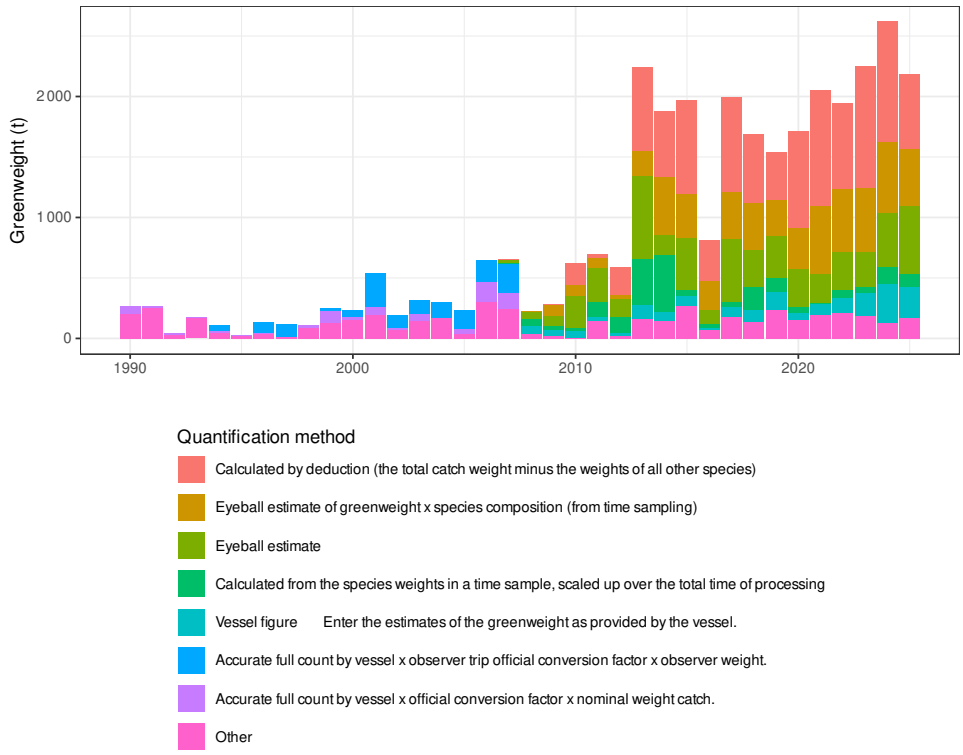


Figure 875: Methods used by observers to quantify the catch of silver warehou in the SWA 3 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.12.3 SWA 4: Trawl fishery

2.12.3.1 Length-frequency samples

Table 74: Length-frequency samples of silver warehou from the SWA 4 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of silver warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	1 341	6	80	0.45
1991	1 485	21	393	1.41
1992	1 608	50	697	3.11
1993	1 537	174	2 880	11.32
1994	1 465	104	2 061	7.10
1995	1 725	109	1 567	6.32
1996	1 733	87	1 709	5.02
1997	2 525	48	921	1.90
1998	2 049	159	5 286	7.76
1999	2 074	242	4 950	11.67
2000	2 501	348	6 359	13.91
2001	2 931	624	14 798	21.29
2002	2 491	309	6 055	12.40
2003	2 570	304	5 762	11.83
2004	3 594	472	8 455	13.13
2005	3 334	424	7 464	12.72
2006	3 513	385	6 153	10.96
2007	3 480	419	6 201	12.04
2008	2 222	187	3 655	8.42
2009	1 763	191	5 107	10.83
2010	2 655	224	6 714	8.44
2011	1 666	138	4 223	8.28
2012	1 944	154	4 818	7.92
2013	2 216	469	15 820	21.16
2014	1 426	286	11 148	20.06
2015	1 564	265	10 267	16.94
2016	1 273	279	9 179	21.92
2017	1 507	309	10 147	20.50
2018	2 200	356	10 711	16.18
2019	2 969	516	13 014	17.38
2020	2 103	277	7 859	13.17
2021	2 479	301	8 598	12.14
2022	2 067	265	8 886	12.82
2023	2 497	183	5 678	7.33
2024	3 129	217	7 370	6.94
2025	3 066	163	6 901	5.32

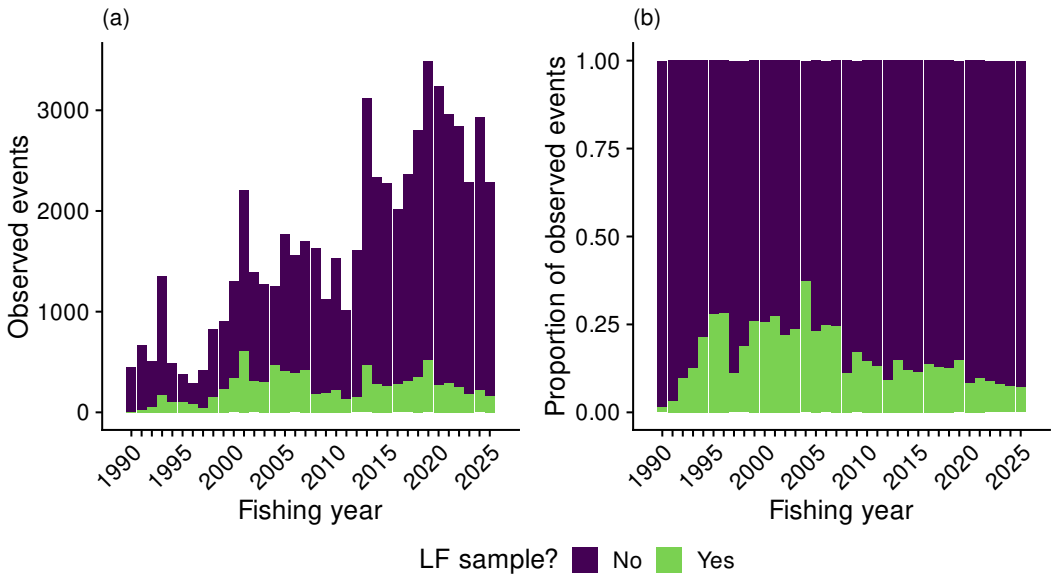


Figure 876: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SWA 4 where the silver warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

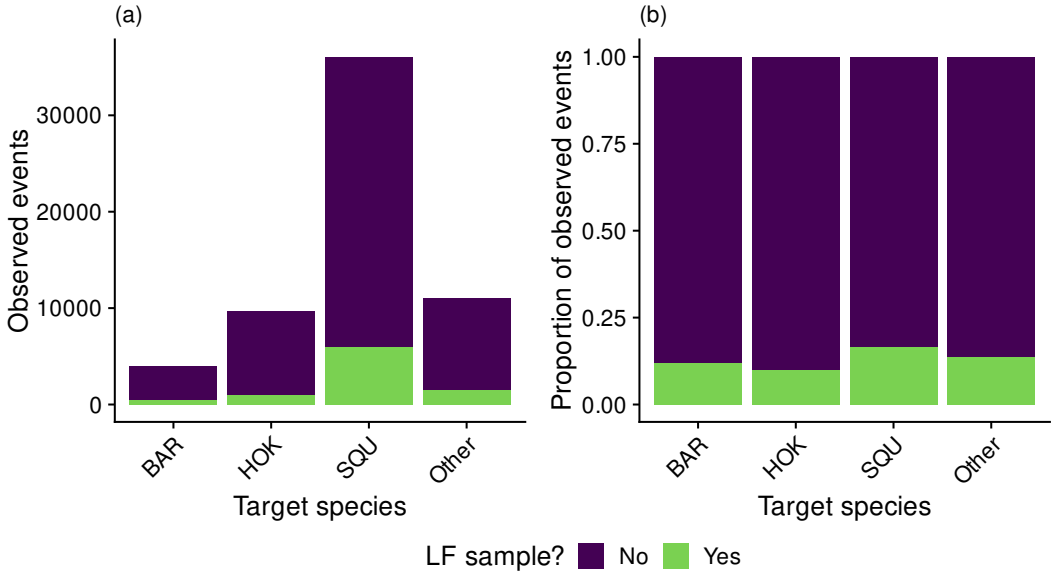


Figure 877: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in SWA 4 where the silver warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

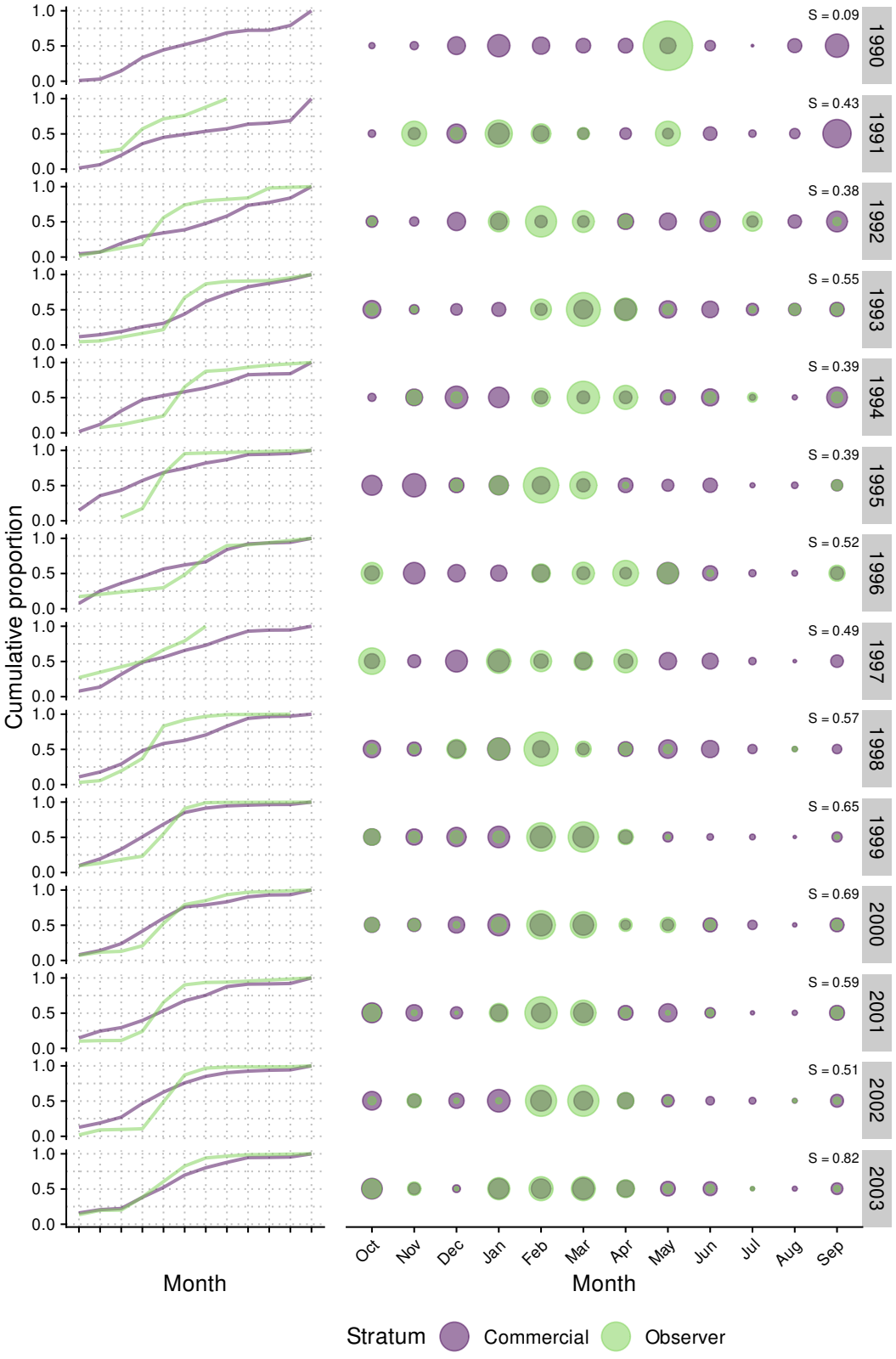


Figure 878: **Monthly representativeness of observer sampling coverage of Trawl fishing events in SWA 4, where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

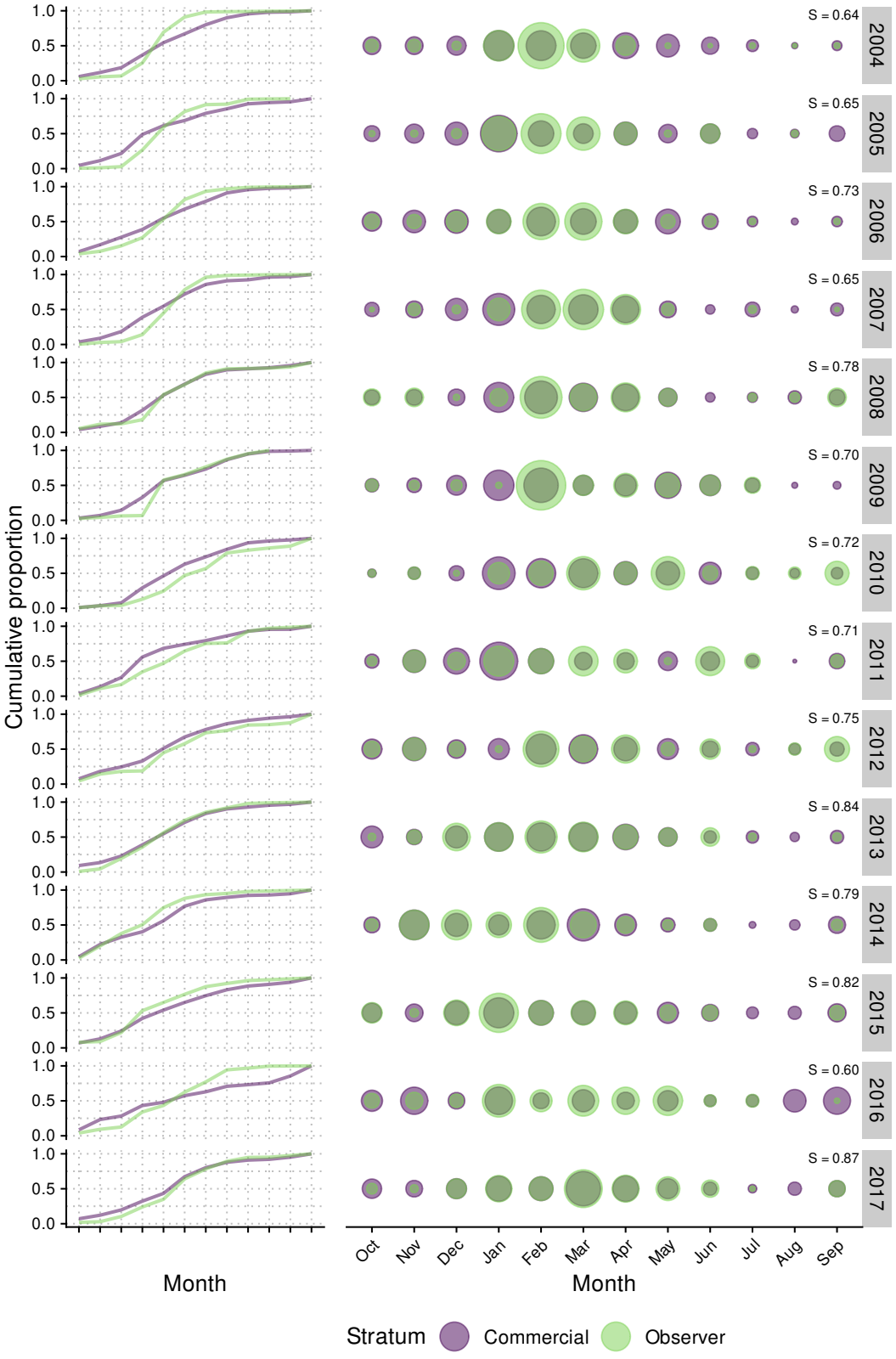


Figure 879: Monthly representativeness of observer sampling coverage of Trawl fishing events in SWA 4, where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

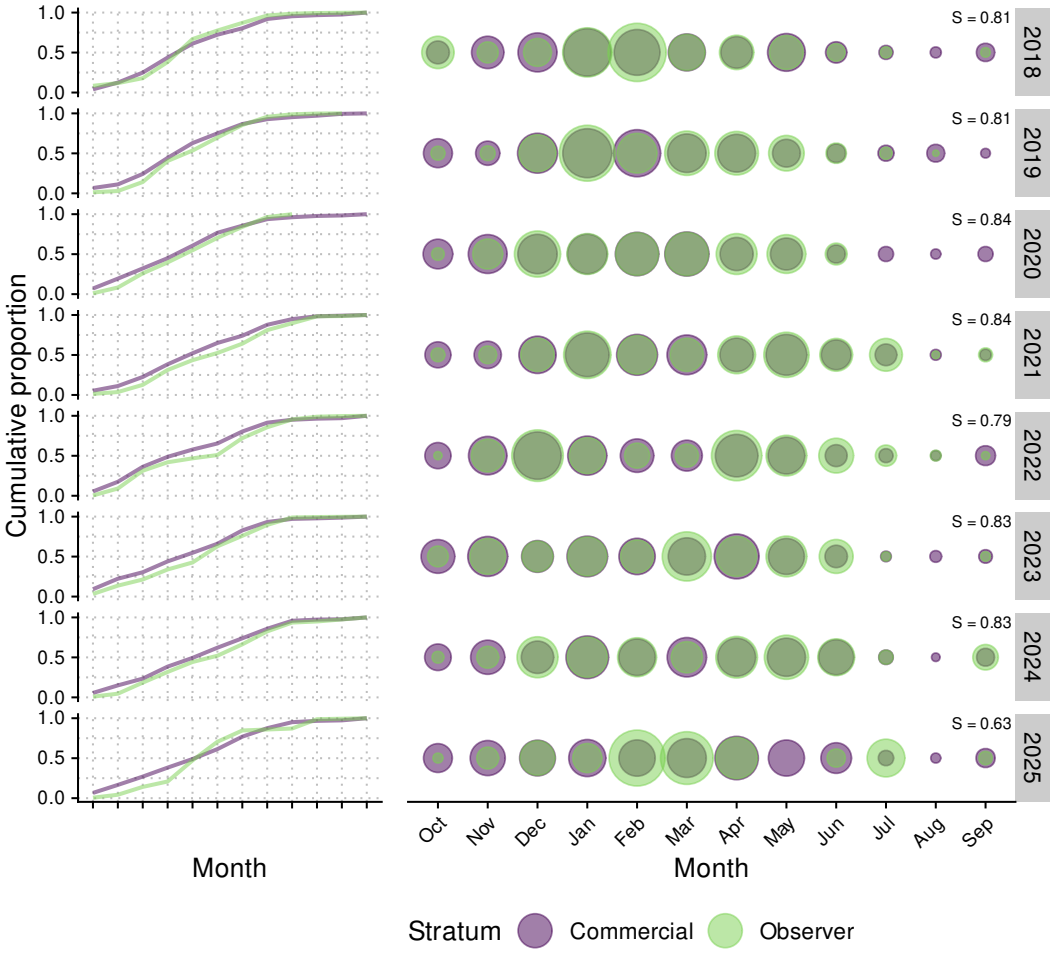


Figure 880: Monthly representativeness of observer sampling coverage of Trawl fishing events in SWA 4, where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

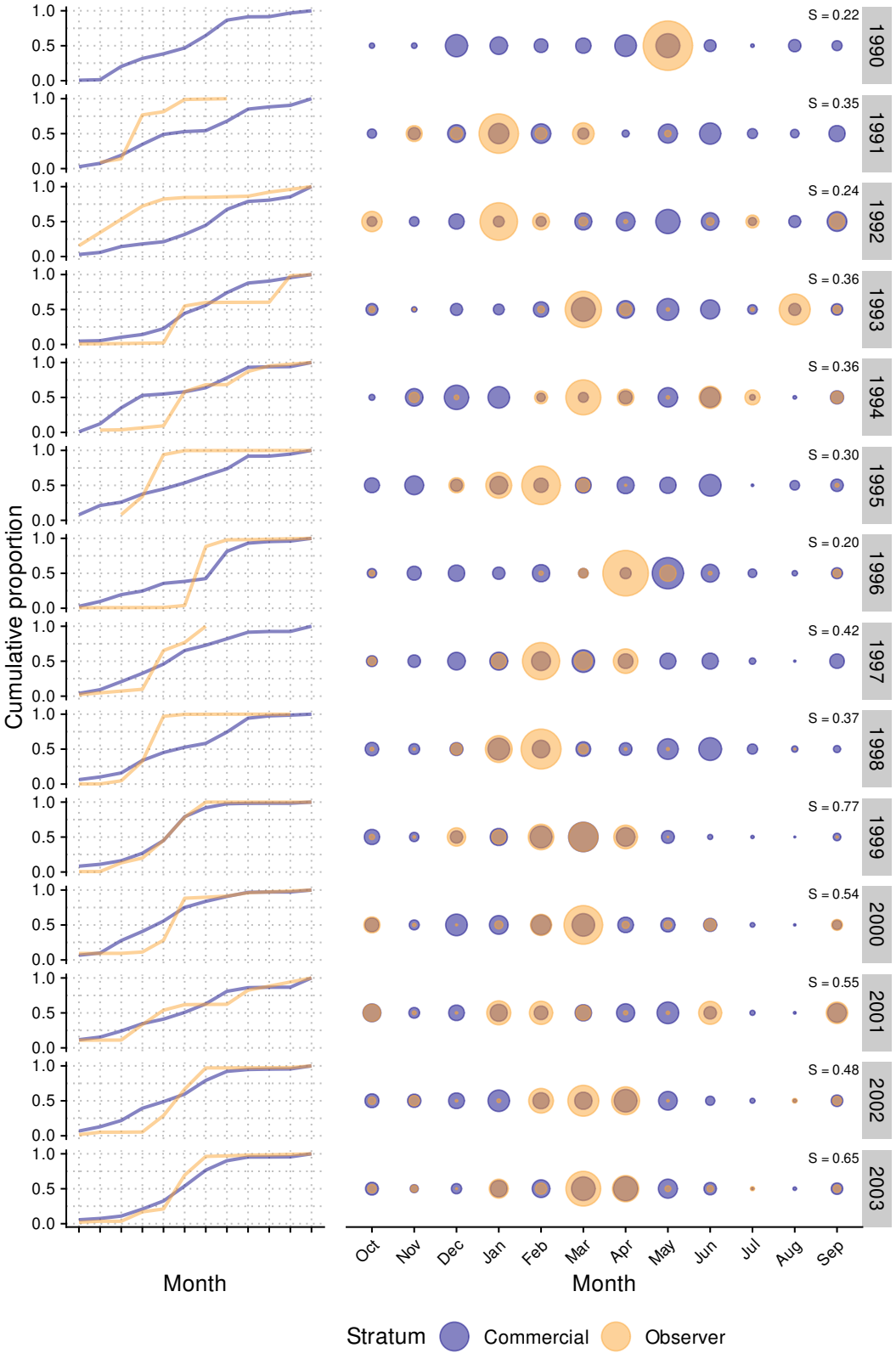


Figure 881: Monthly representativeness of observer sampling coverage of Trawl catch in SWA 4, from events where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

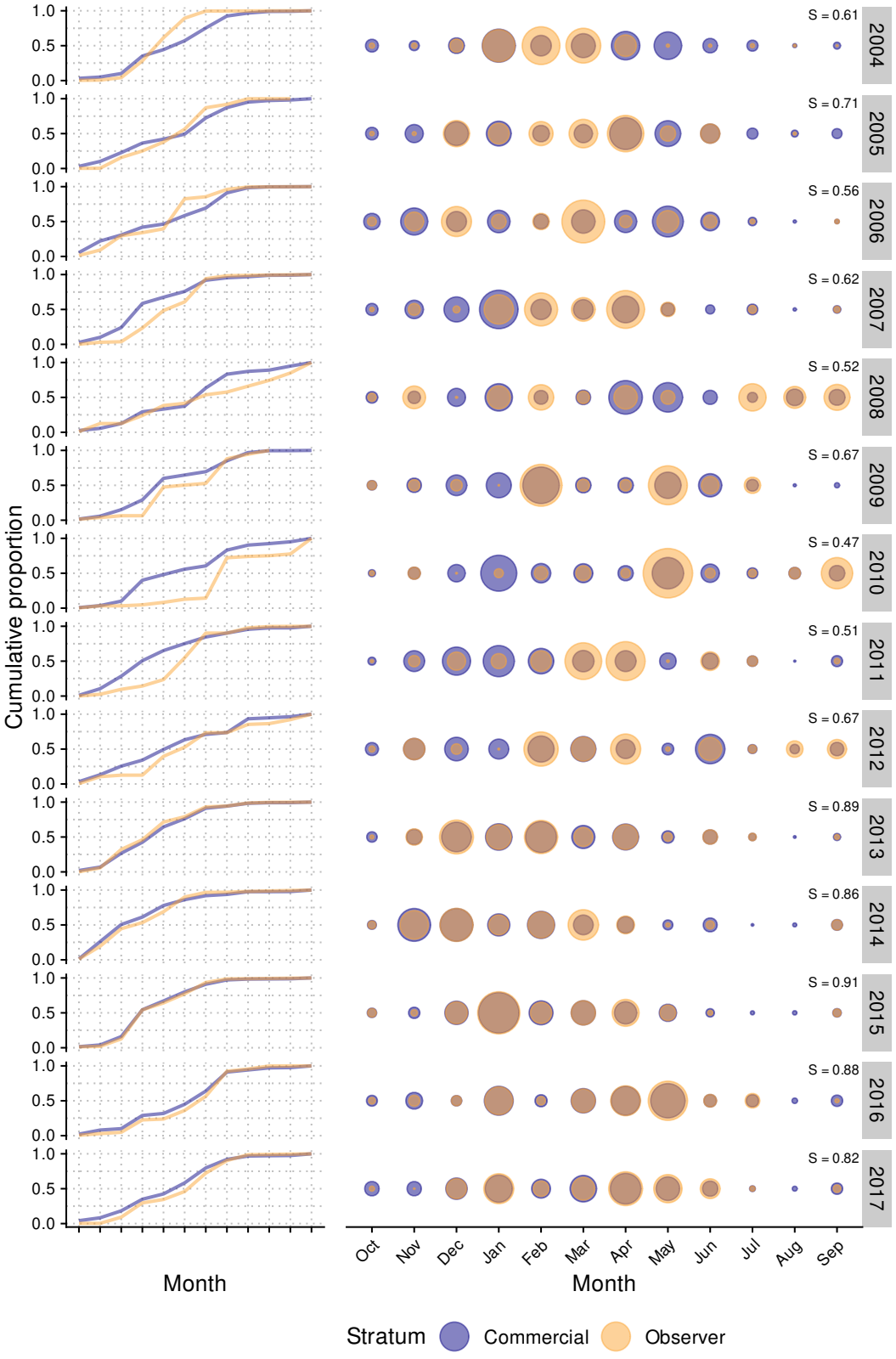


Figure 882: **Monthly representativeness of observer sampling coverage of Trawl catch in SWA 4, from events where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

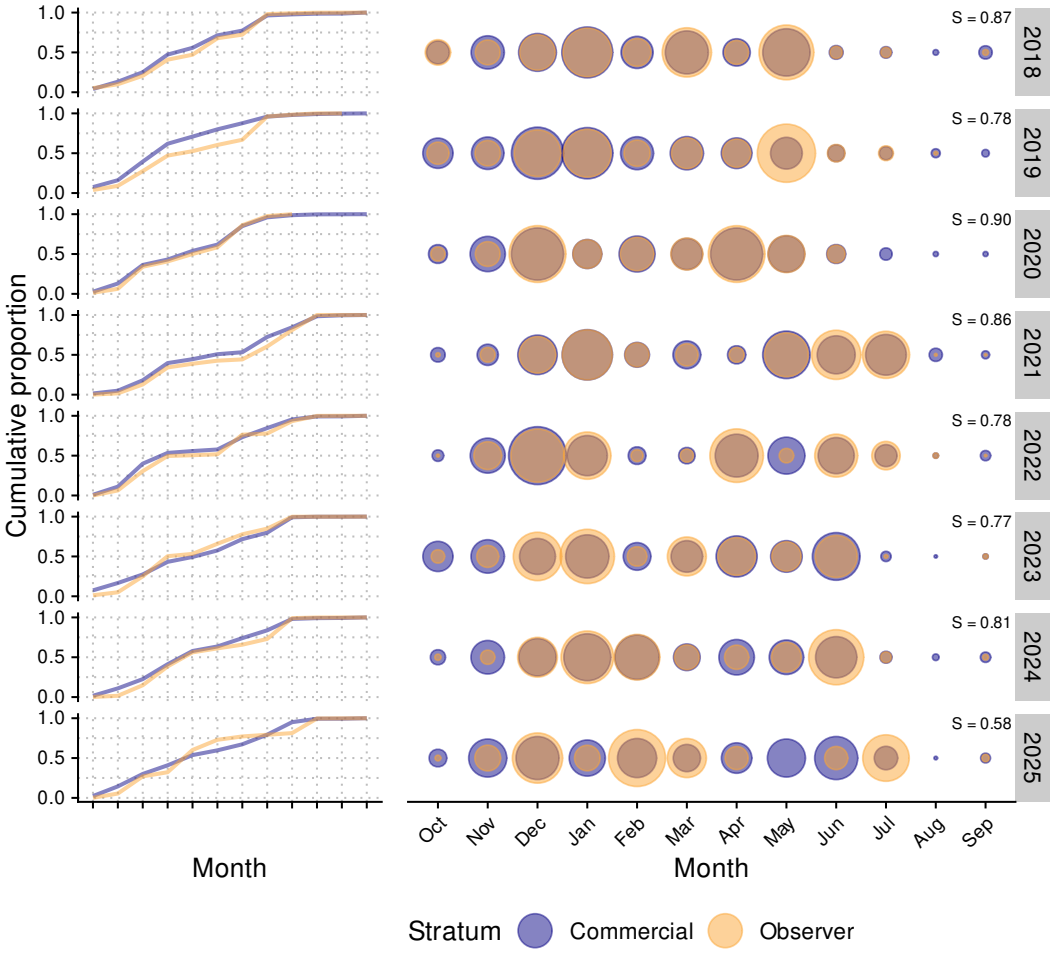


Figure 883: Monthly representativeness of observer sampling coverage of Trawl catch in SWA 4, from events where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

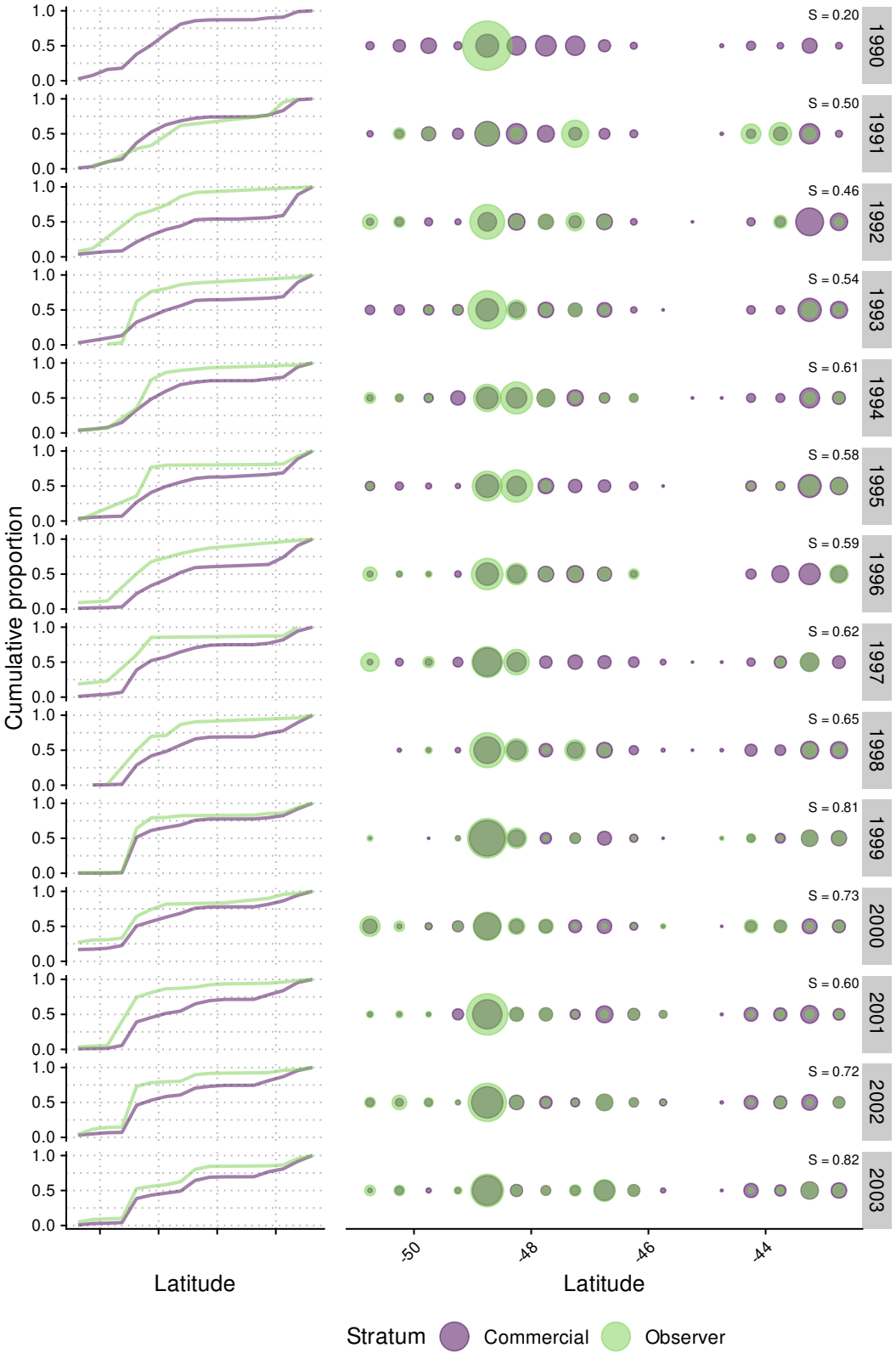


Figure 884: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 4, where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

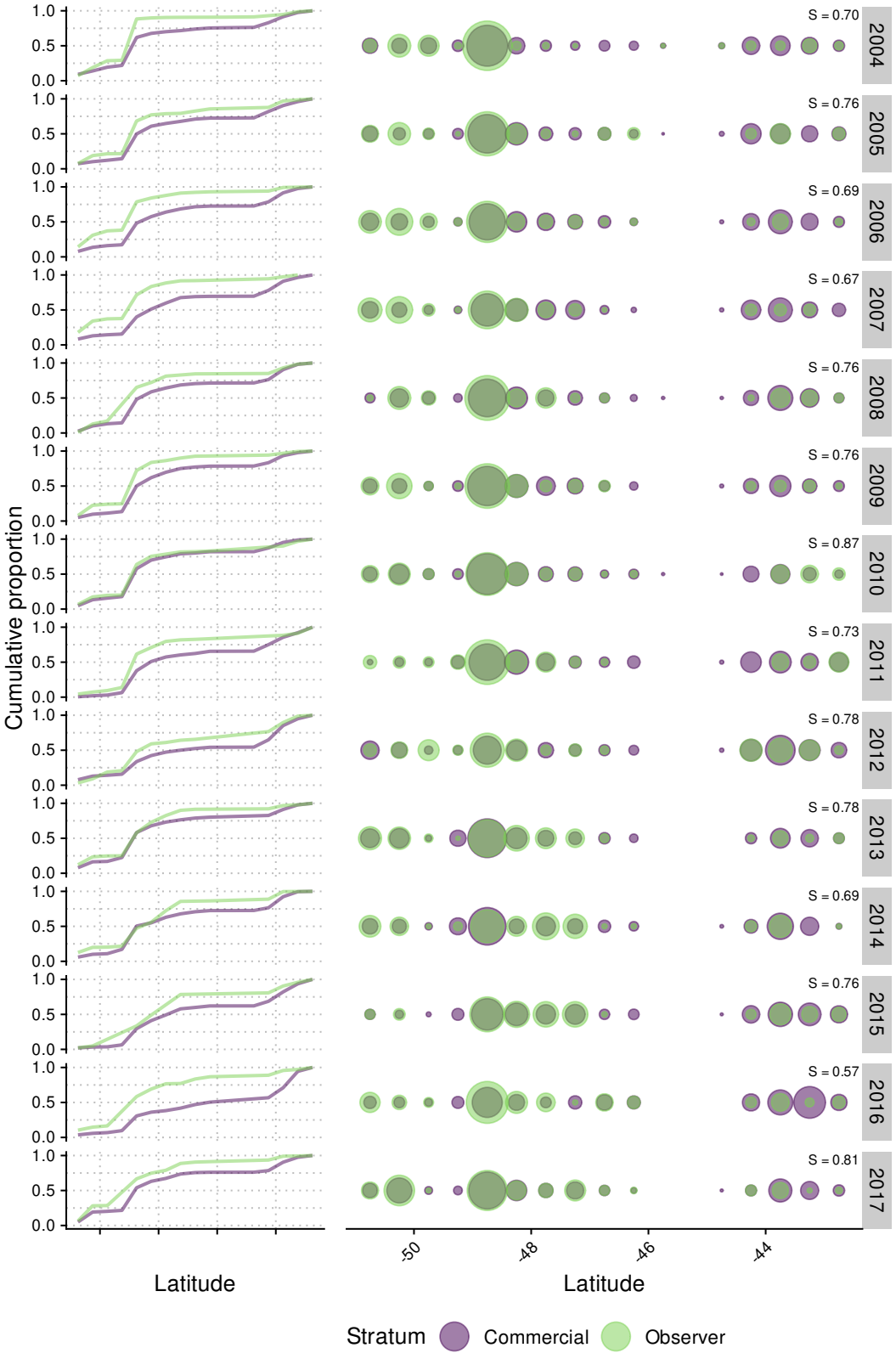


Figure 885: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 4, where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

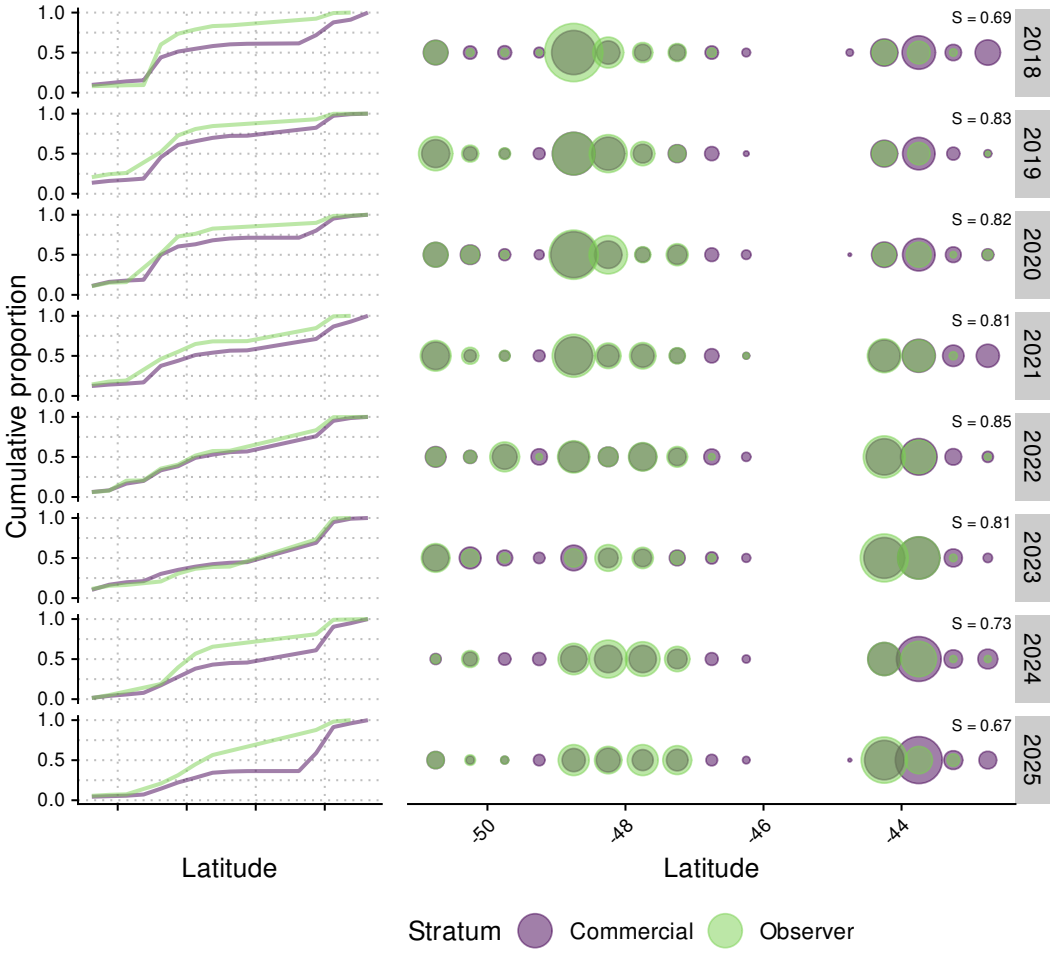


Figure 886: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 4, where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

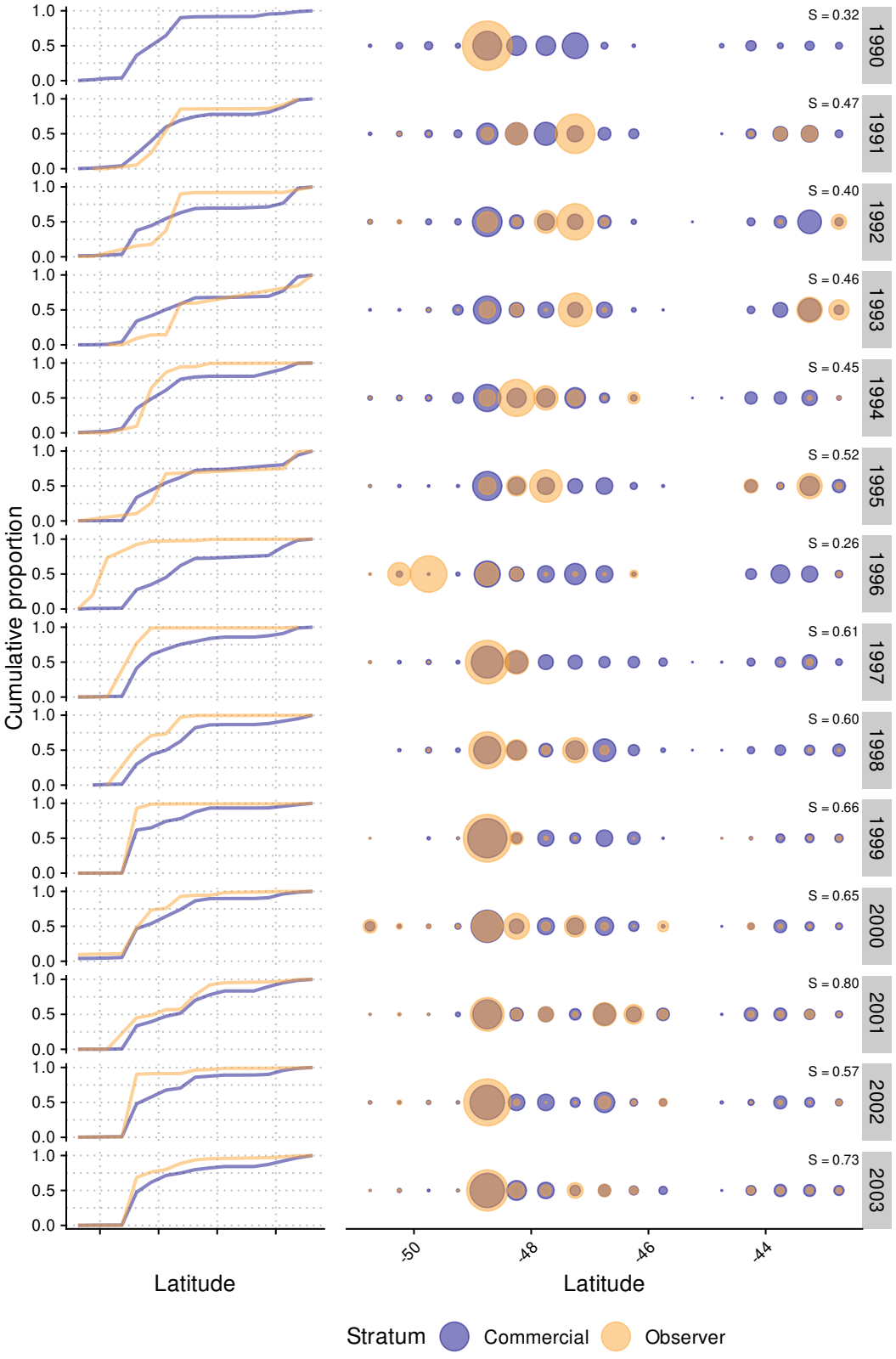


Figure 887: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SWA 4, from events where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

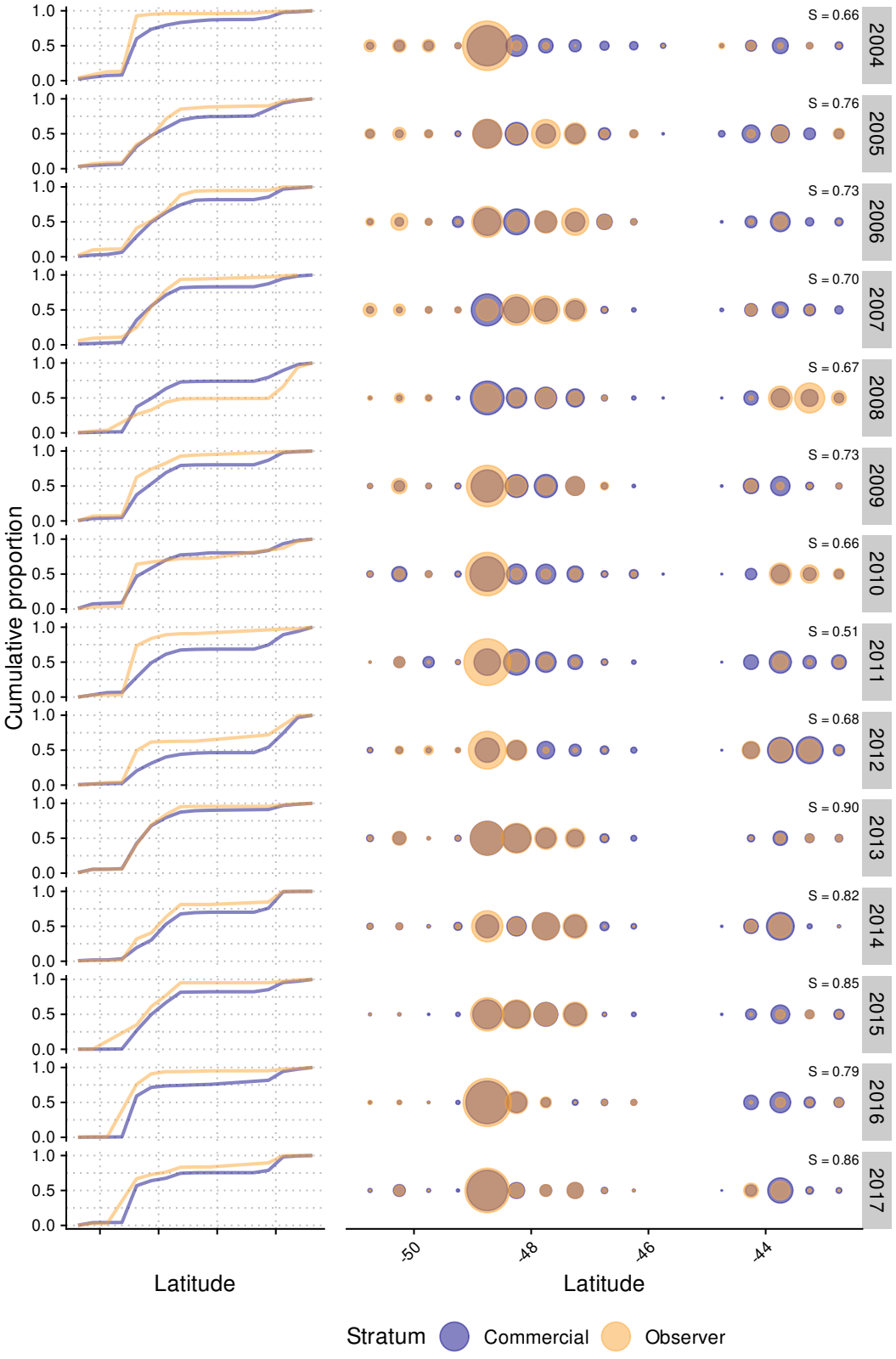


Figure 888: **Latitudinal representativeness of observer sampling coverage of Trawl catch in SWA 4, from events where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

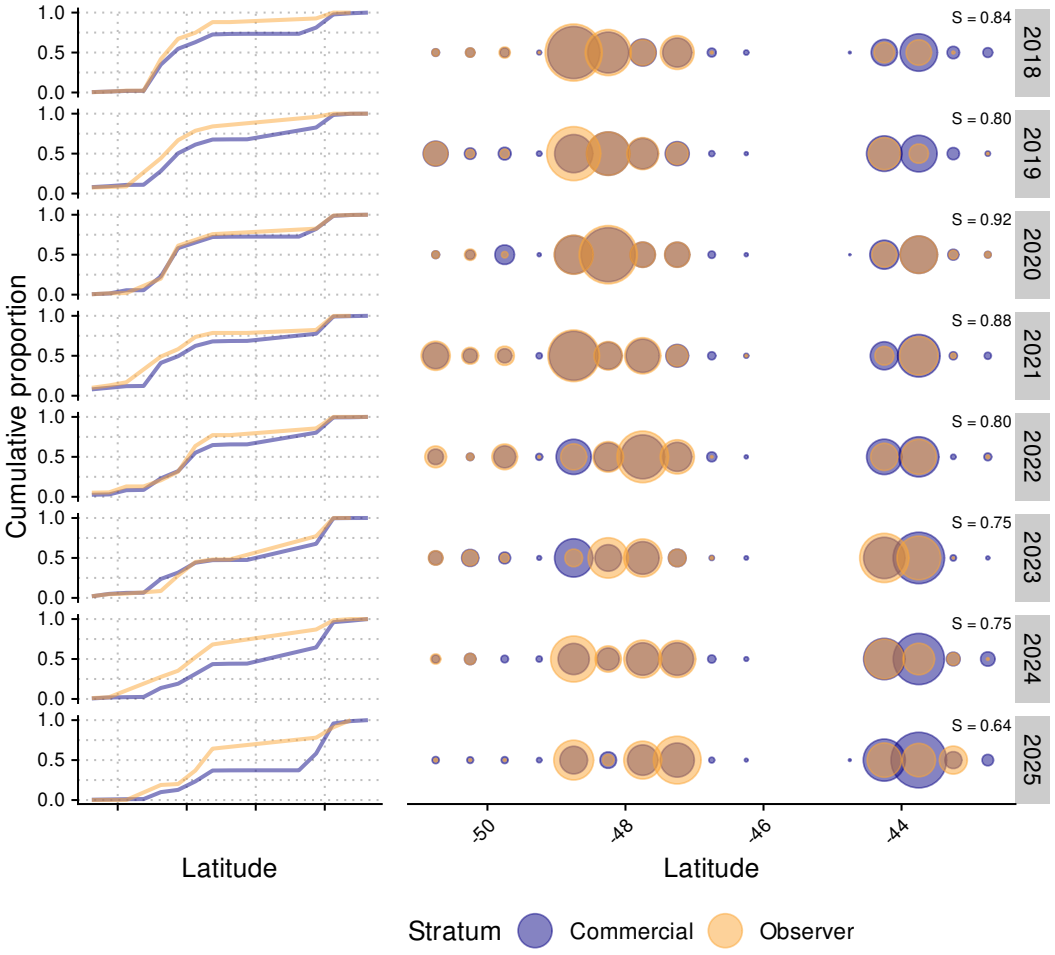


Figure 889: Latitudinal representativeness of observer sampling coverage of Trawl catch in SWA 4, from events where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

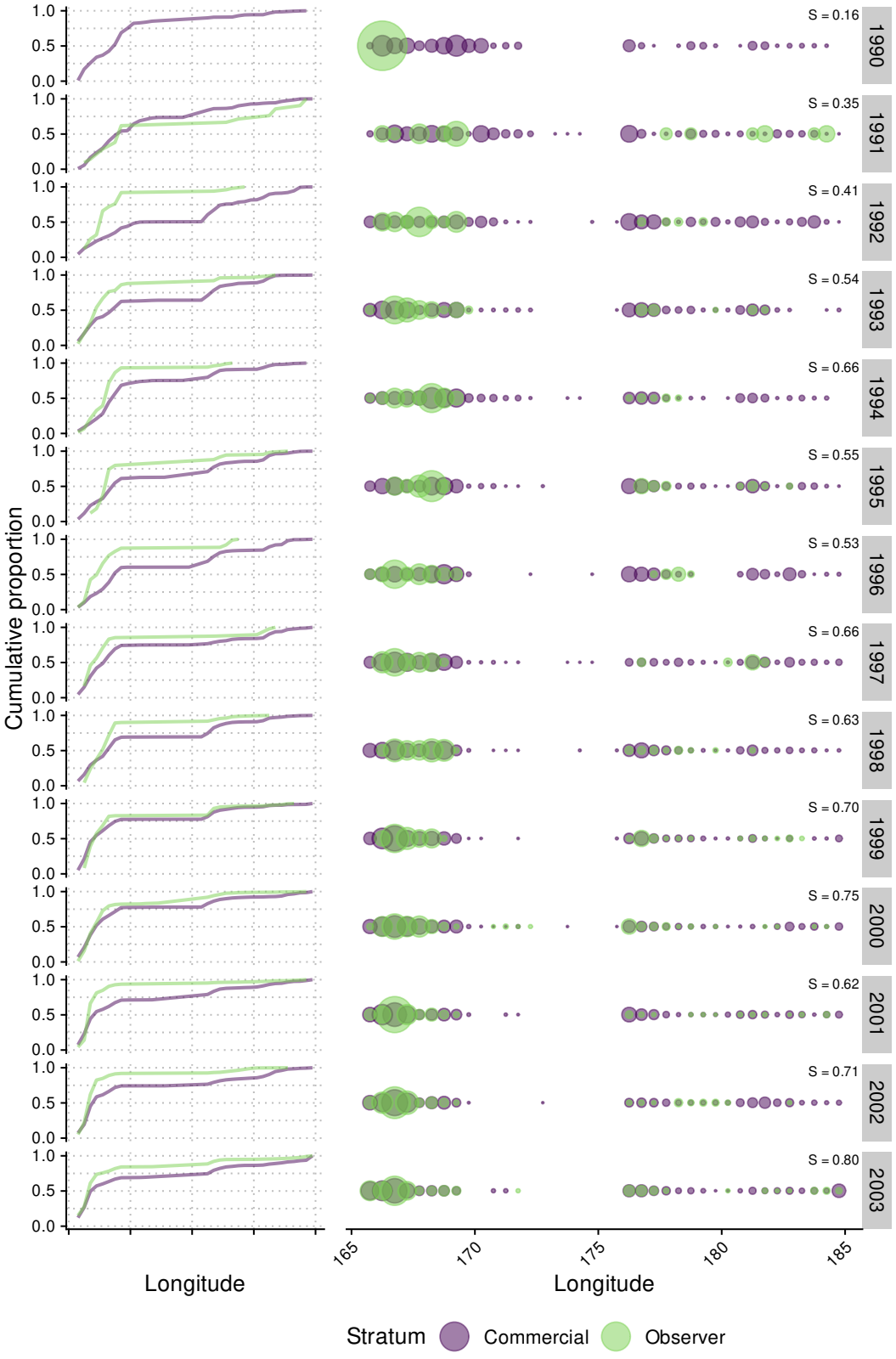


Figure 890: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 4, where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

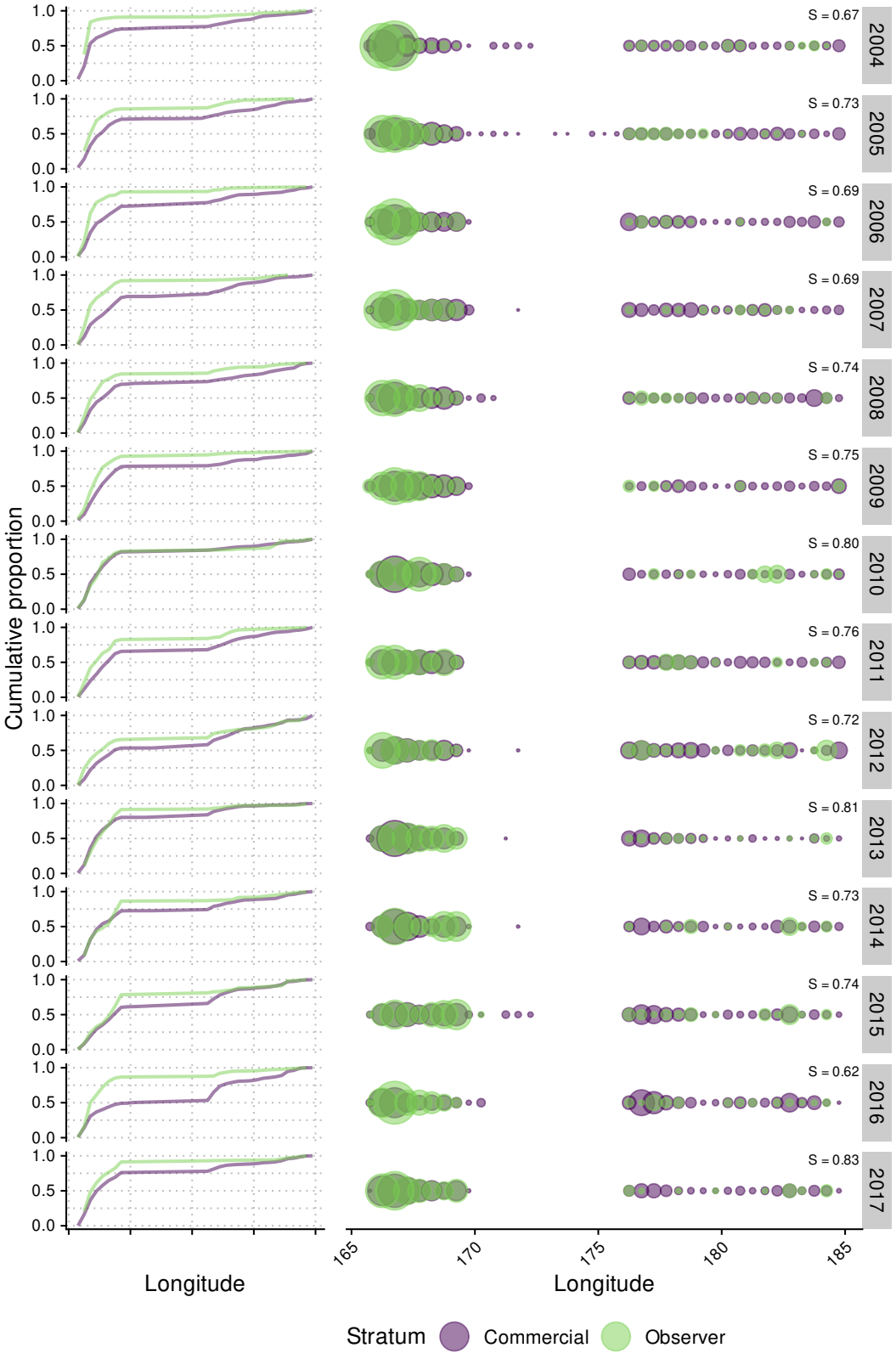


Figure 891: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 4, where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

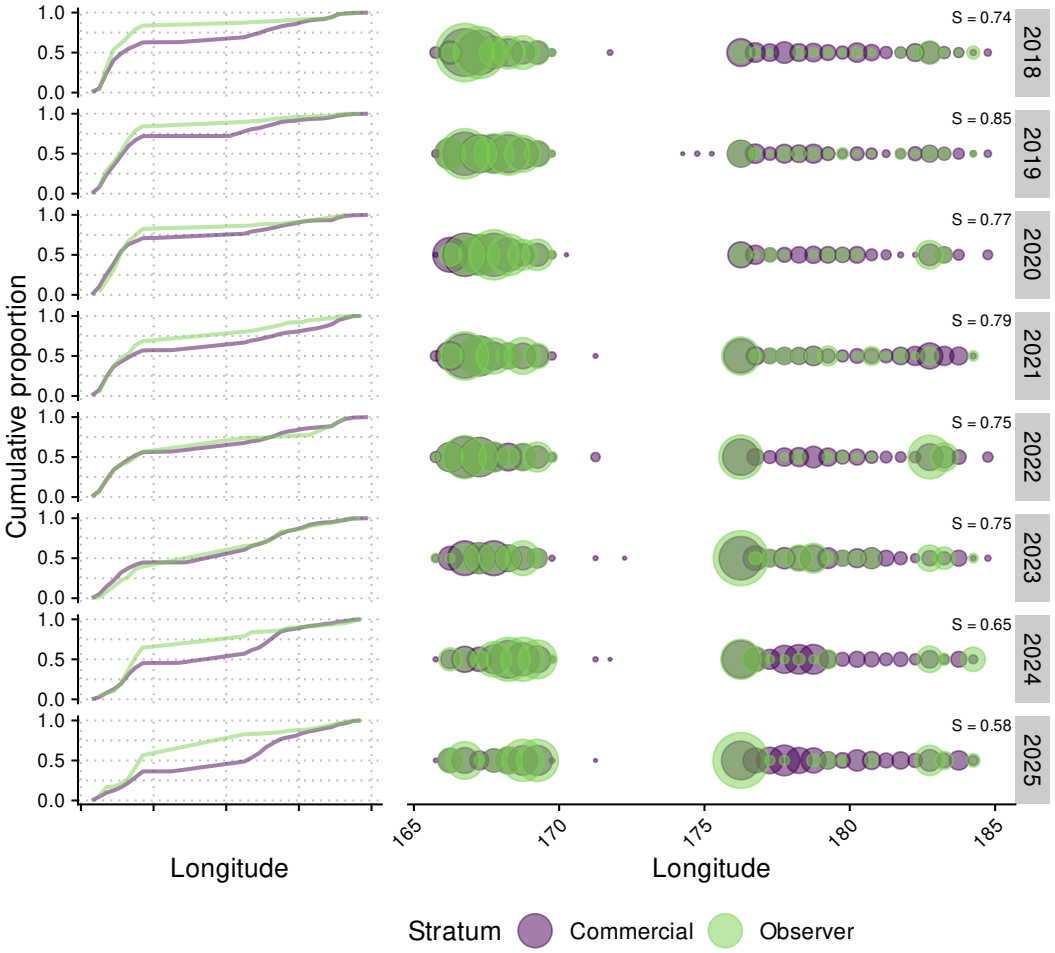


Figure 892: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in SWA 4, where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

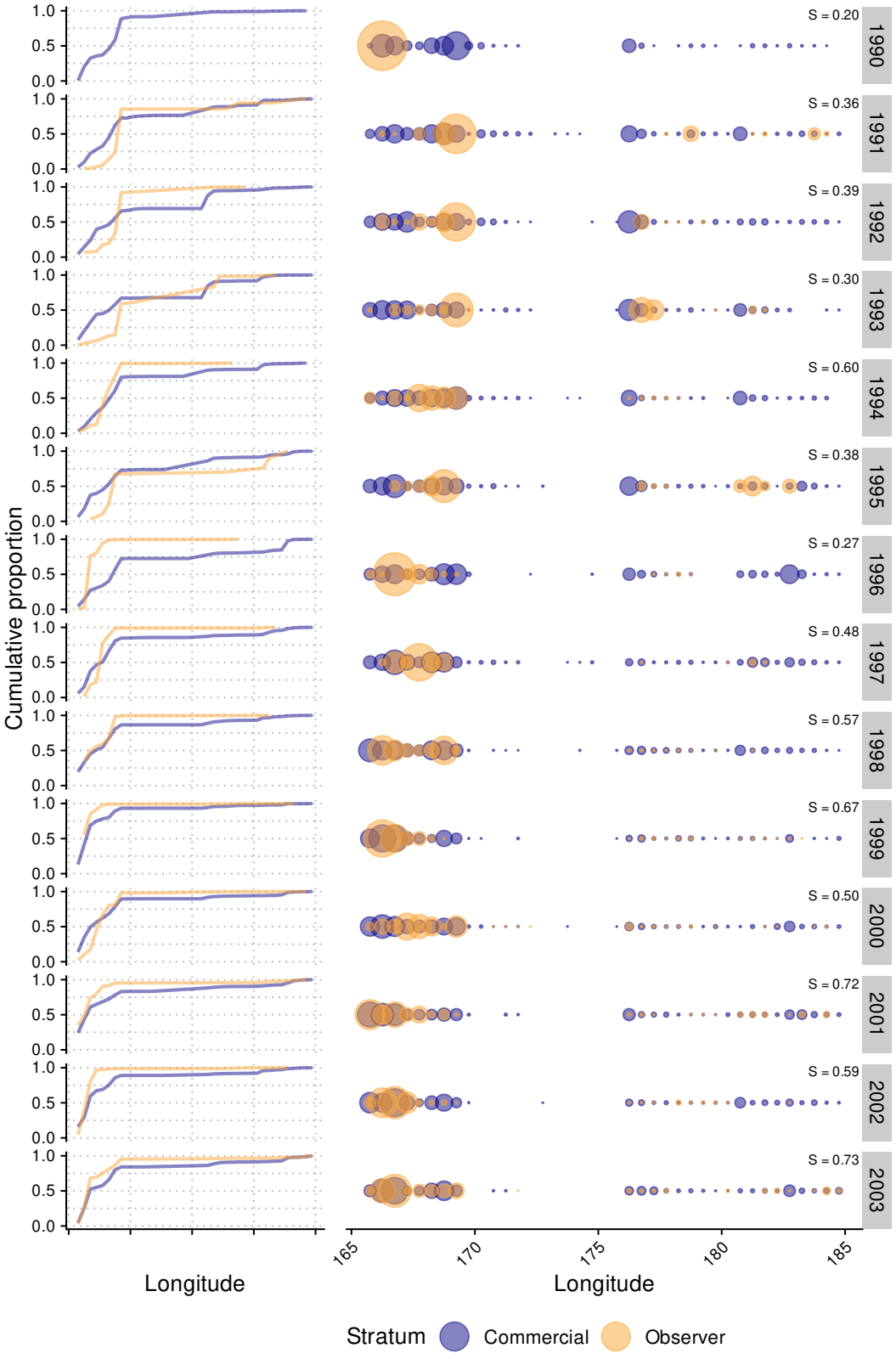


Figure 893: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SWA 4, from events where the silver warehou catch exceeded the 20kg threshold, in 1990 to 2003. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

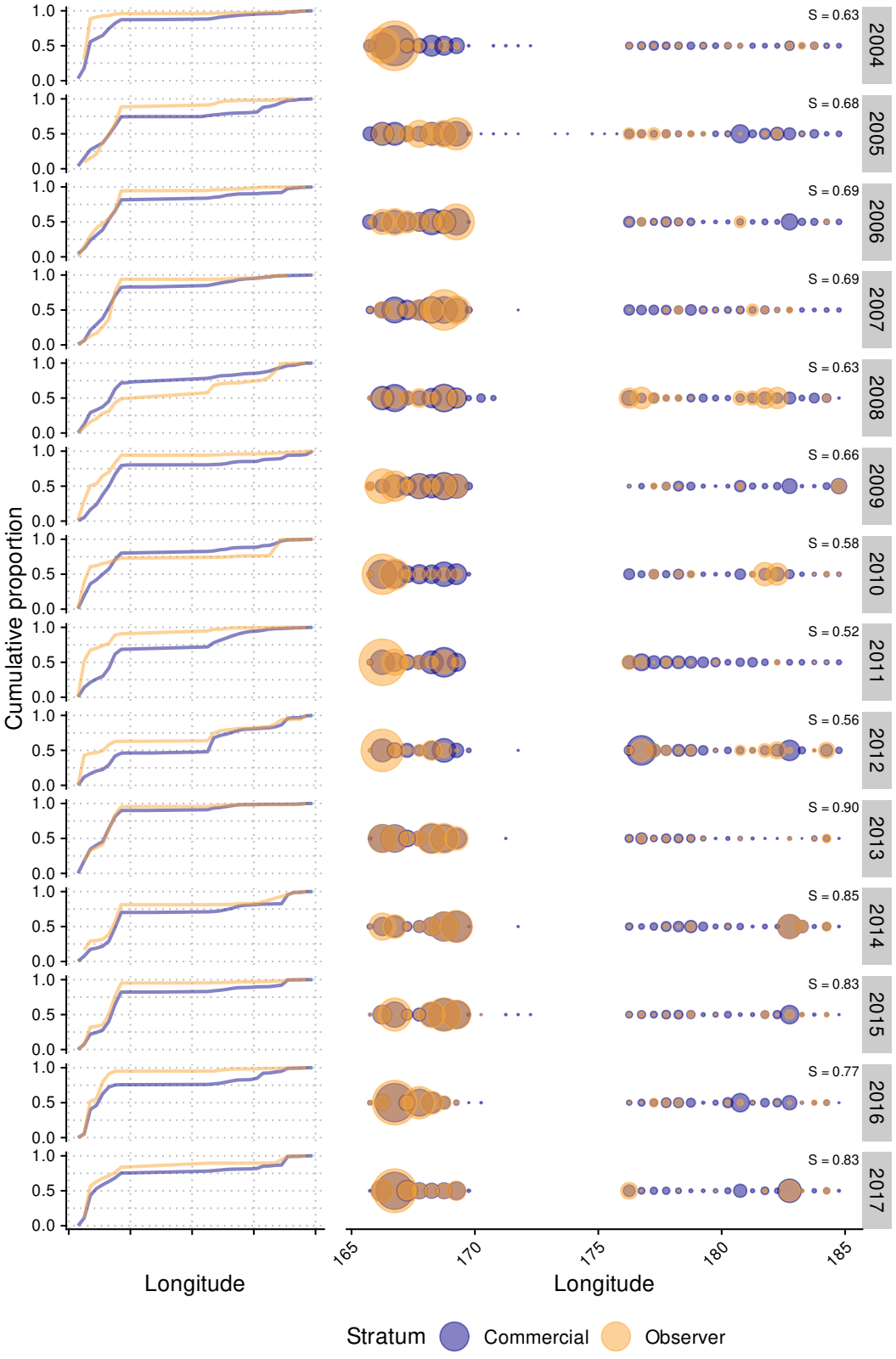


Figure 894: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SWA 4, from events where the silver warehou catch exceeded the 20kg threshold, in 2004 to 2017. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

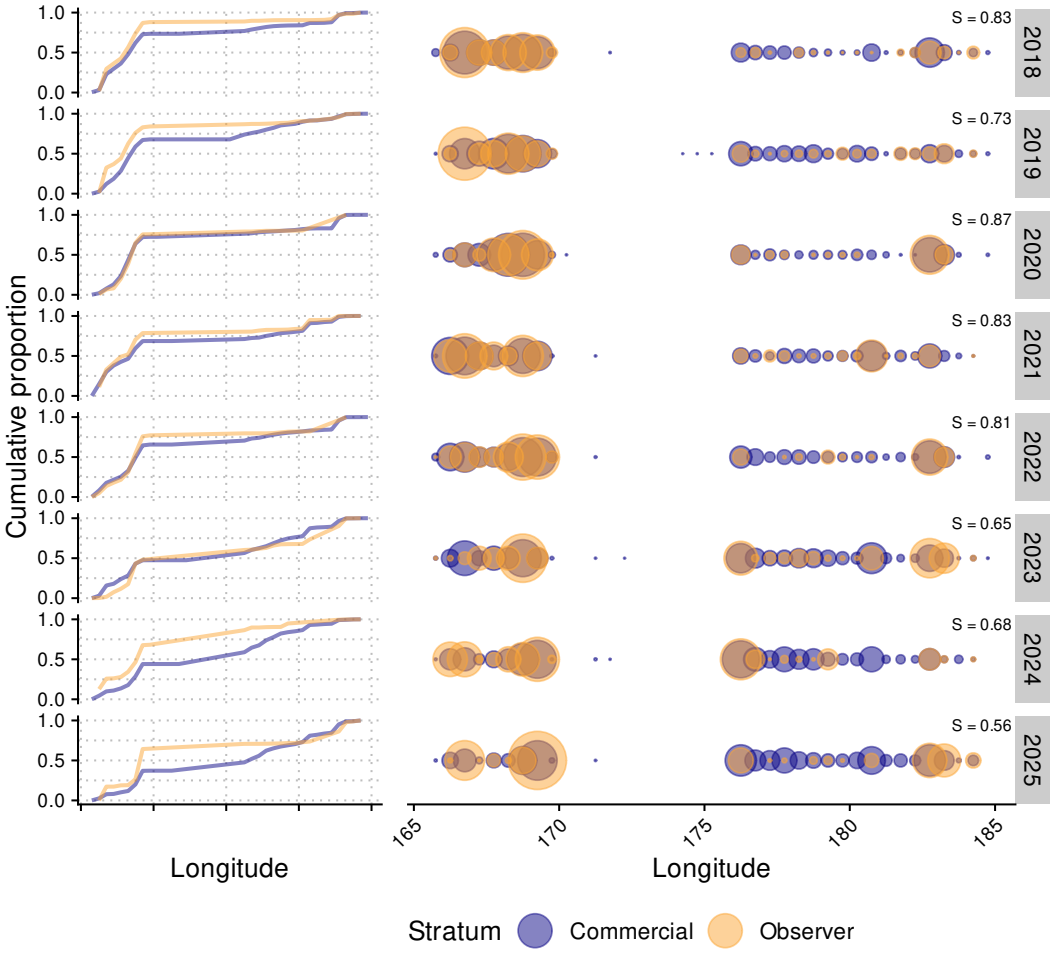


Figure 895: **Longitudinal representativeness of observer sampling coverage of Trawl catch in SWA 4, from events where the silver warehou catch exceeded the 20kg threshold, in 2018 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

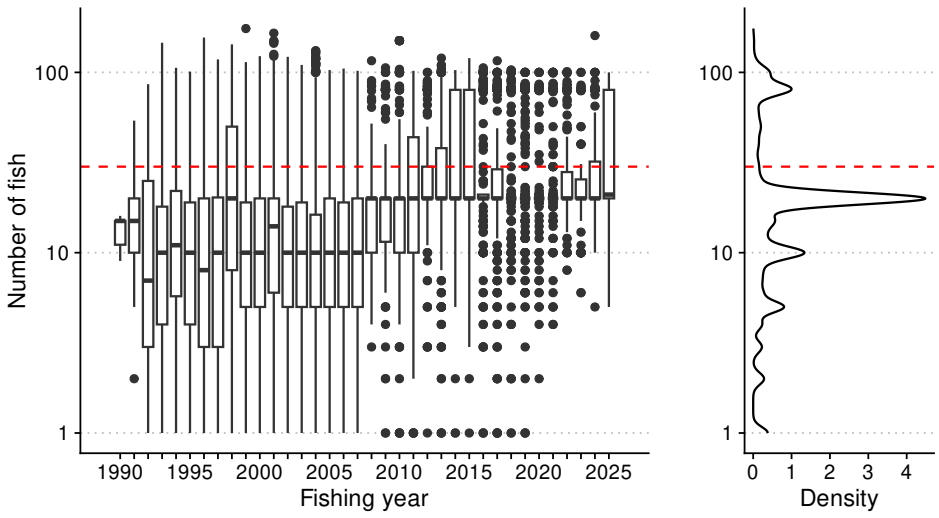


Figure 896: **Length-frequency sample sizes for observed fishing events in SWA 4 where silver warehou were sampled. The red dashed line indicates a sample size of 30 fish.**

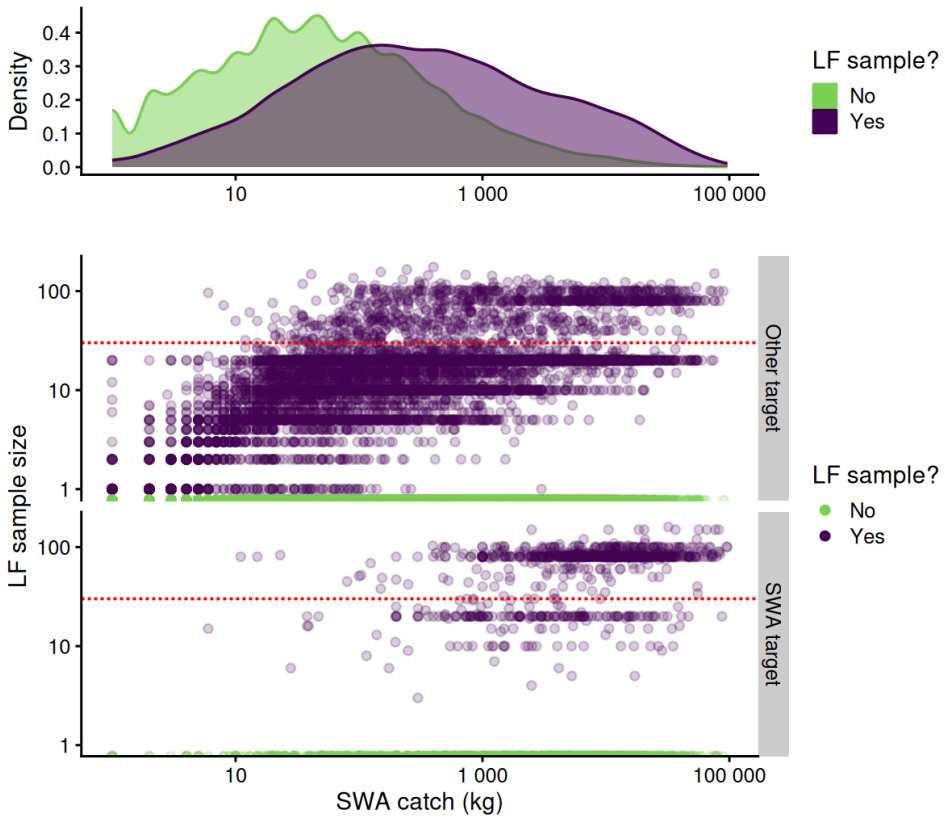


Figure 897: Length-frequency sample sizes (number of fish sampled) for observed fishing events in SWA 4 in relation to the total silver warehou catch from an event, separately for silver warehou target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.12.3.2 Otolith samples

Table 75: Otolith samples of silver warehou from the SWA 4 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of silver warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	1 341	0	0	0.00
1991	1 485	0	0	0.00
1992	1 608	0	0	0.00
1993	1 537	0	0	0.00
1994	1 465	0	0	0.00
1995	1 725	0	0	0.00
1996	1 733	0	0	0.00
1997	2 525	0	0	0.00
1998	2 049	0	0	0.00
1999	2 074	0	0	0.00
2000	2 501	0	0	0.00
2001	2 931	0	0	0.00
2002	2 491	0	0	0.00
2003	2 570	0	0	0.00
2004	3 594	0	0	0.00
2005	3 334	0	0	0.00
2006	3 513	0	0	0.00
2007	3 480	0	0	0.00
2008	2 222	0	0	0.00
2009	1 763	38	205	2.16
2010	2 655	135	755	5.08
2011	1 666	72	362	4.32
2012	1 944	104	525	5.35
2013	2 216	385	2 103	17.37
2014	1 426	262	1 316	18.37
2015	1 564	26	133	1.66
2016	1 273	54	287	4.24
2017	1 507	236	1 157	15.66
2018	2 200	344	1 818	15.64
2019	2 969	426	2 265	14.35
2020	2 103	264	1 322	12.55
2021	2 479	269	1 353	10.85
2022	2 067	255	1 326	12.34
2023	2 497	176	979	7.05
2024	3 129	210	1 078	6.71
2025	3 066	137	718	4.47

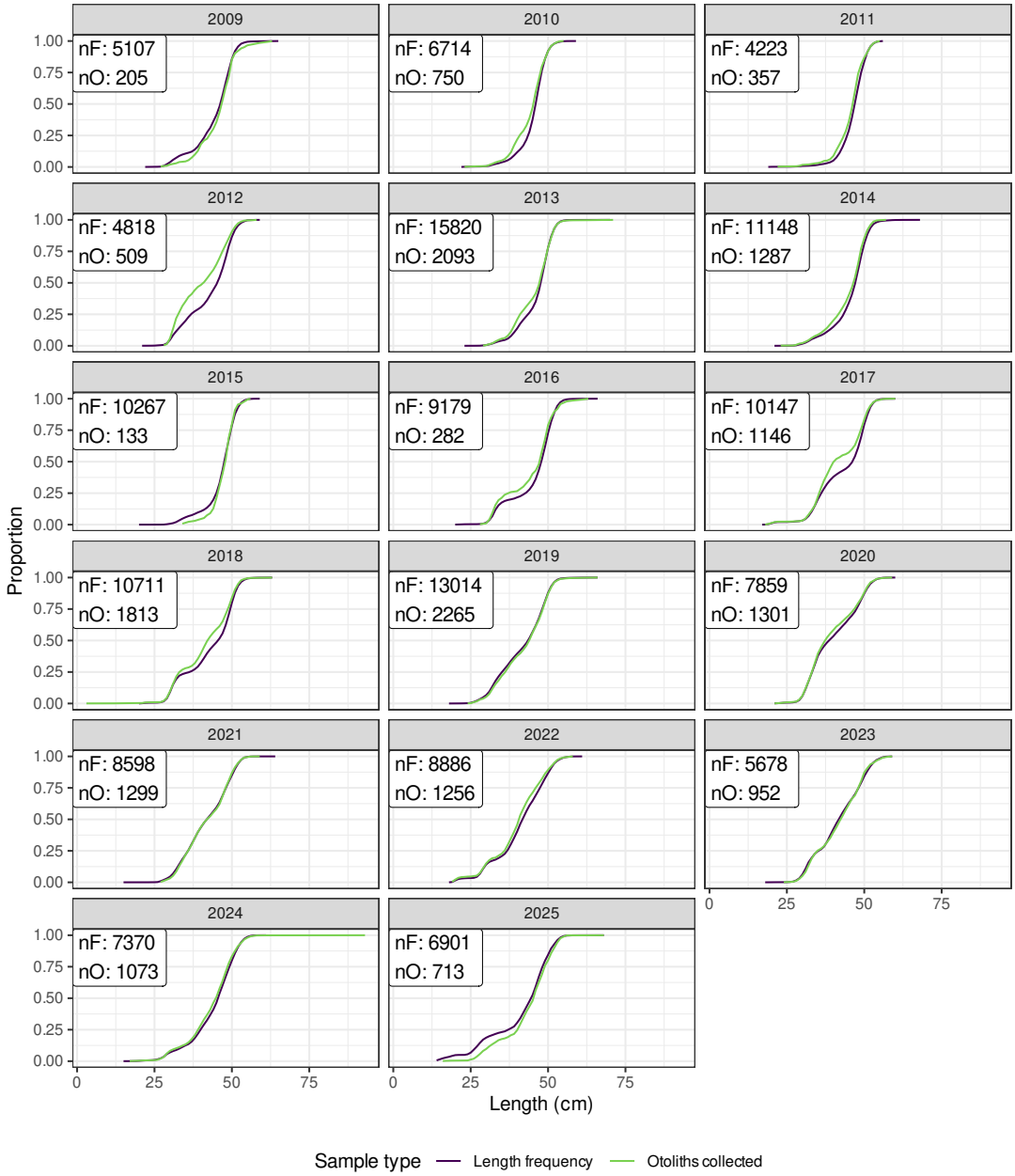


Figure 898: Cumulative distributions of the length of fish in the length frequency and otolith samples of silver warehou in the SWA 4 Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.12.3.3 Catch quantification

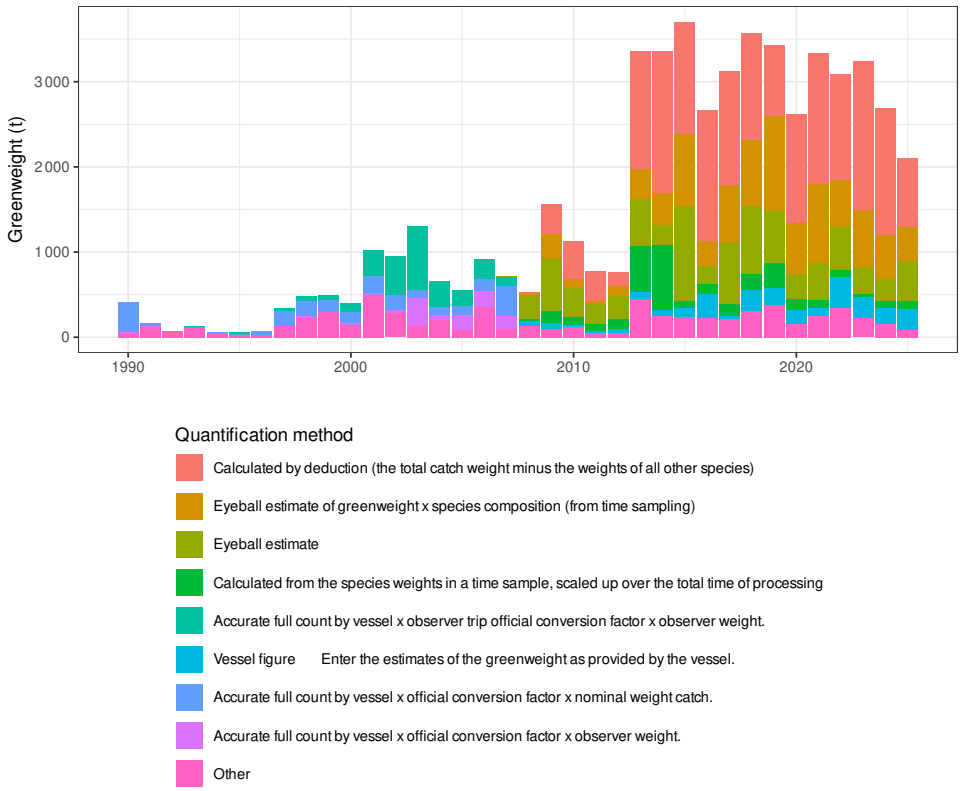


Figure 899: Methods used by observers to quantify the catch of silver warehou in the SWA 4 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.13 WWA stocks

Observer sampling of white warehou is considered with respect to the white warehou Quota Management Areas.

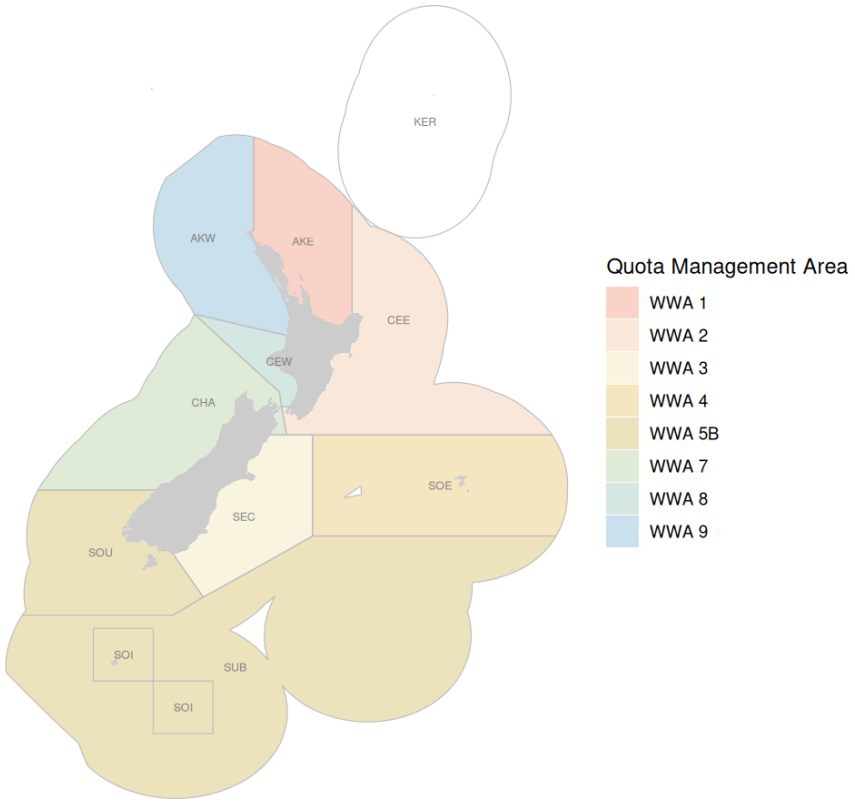


Figure 900: Observer Fisheries Management Areas (black borders, labels on plot) in relation to the Quota Management Area for white warehou (coloured areas, per legend).

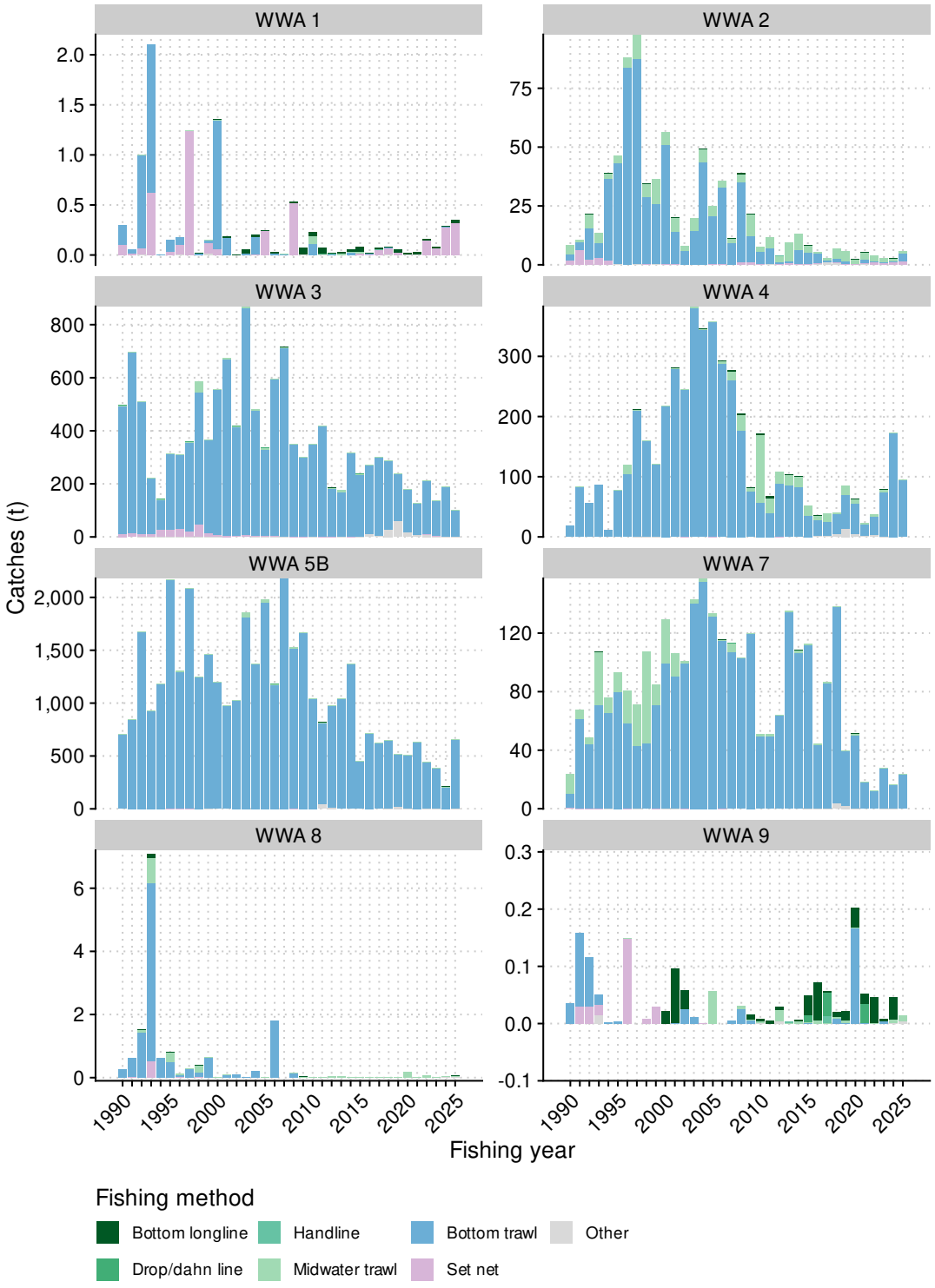


Figure 901: **Catches of white warehou by fishing method, for events within the white warehou Quota Management Areas. Methods grouped as Other include: BPT, BS, CP, CRP, DN, DS, DV, FP, H, MPT, PL, POT, PRB, PRM, PS, PSH, RLP, RN, SJ, SLL, T, TL.**

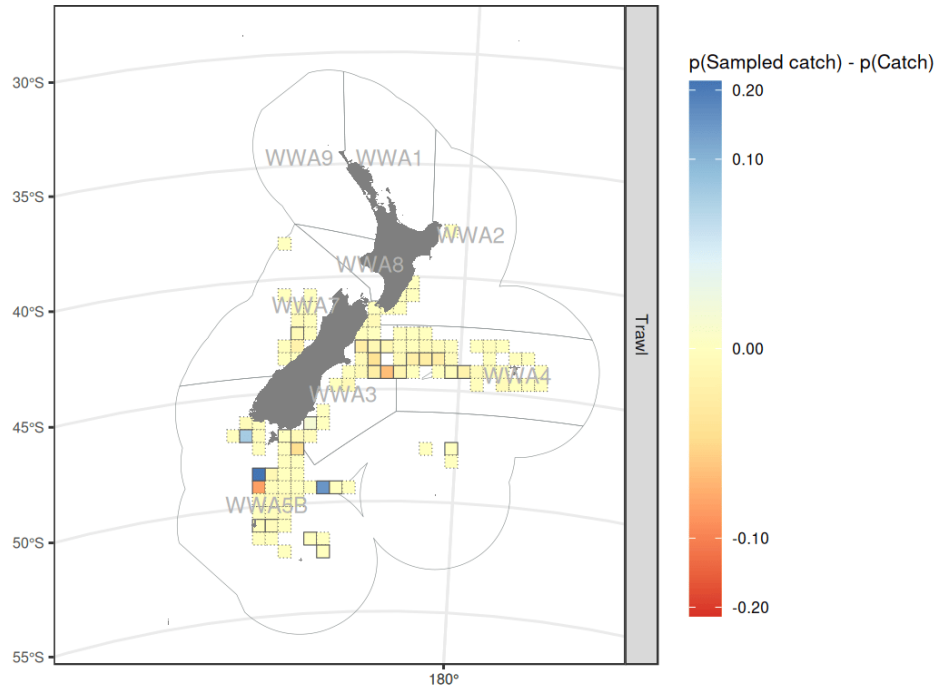


Figure 902: Differences in the relative proportions of catch and sampled catch for white warehou during 2021–2025. Cells with a dotted border had no sampling.

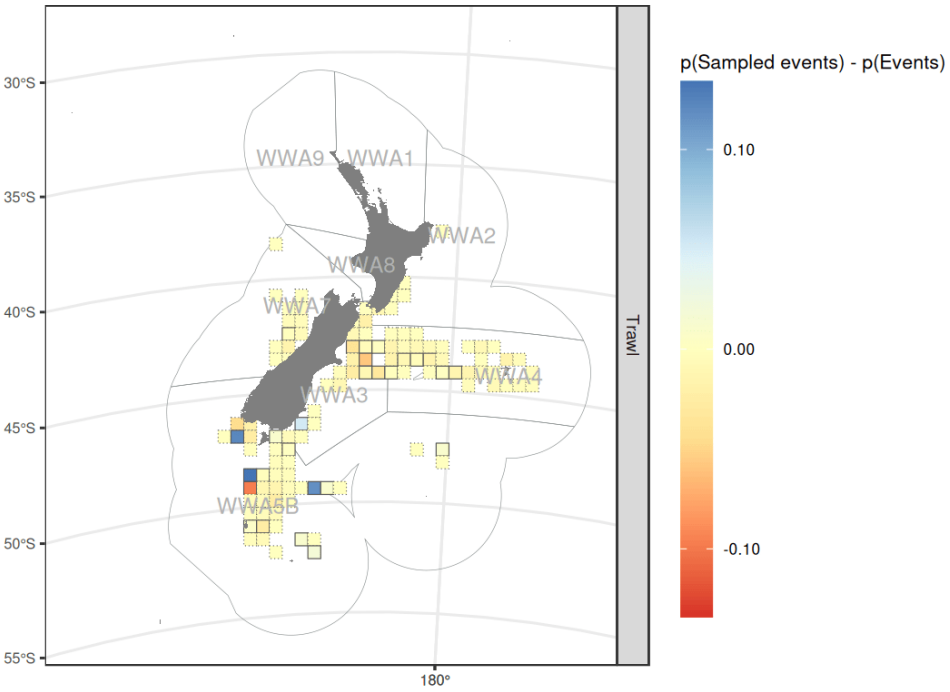


Figure 903: Differences in the relative proportions of events meeting the sampling threshold and sampled events for white warehou during 2021–2025. Cells with a dotted border had no sampling.

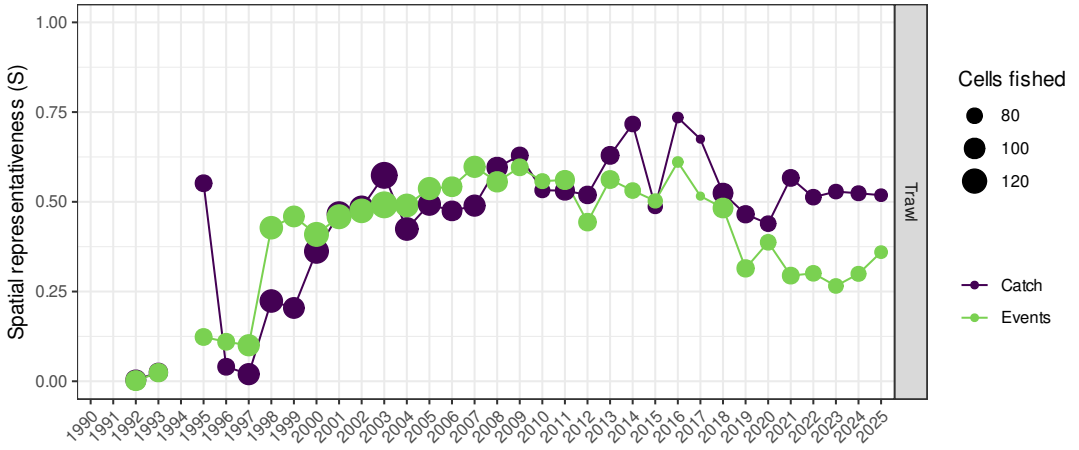


Figure 904: Spatial representativeness of observer sampling of white warehou by fishing year. Representativeness is assessed using the Manhattan distance metric (*S*) applied to 64 km grid cells, for both the proportion of catch sampled and the proportion of positive events sampled.

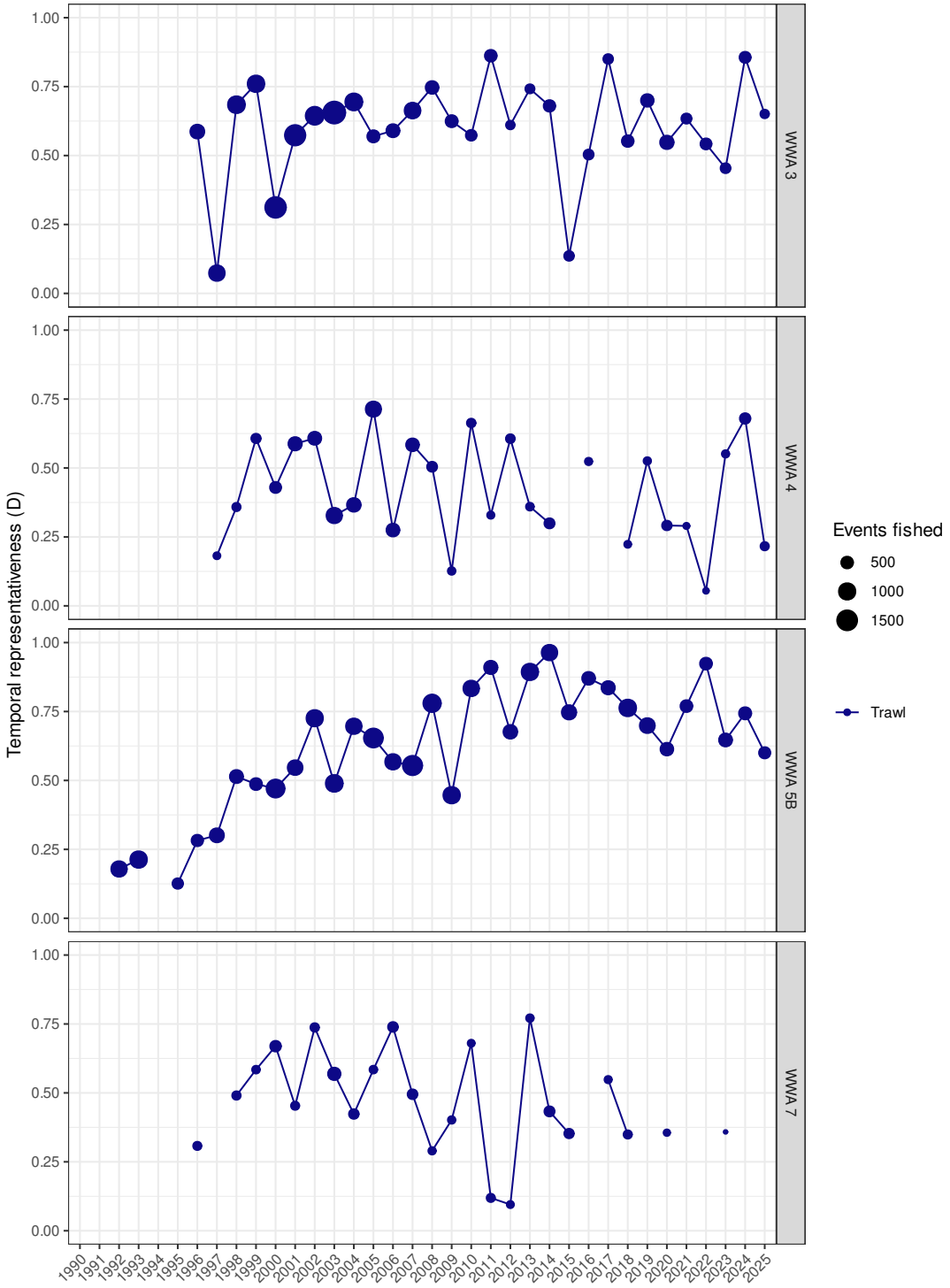


Figure 905: Temporal representativeness of observer sanpling of white warehou by fishing year and area. Temporal representativeness is assessed using the KS statistic (*D*) applied to the start date-times of all fishing events and all sampled fishing events, weighted by catch weight.

2.13.1 WWA 3: Trawl fishery

2.13.1.1 Length-frequency samples

Table 76: Length-frequency samples of white warehou from the WWA 3 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of white warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	483	0	0	0.00
1991	334	0	0	0.00
1992	510	0	0	0.00
1993	503	0	0	0.00
1994	309	0	0	0.00
1995	376	0	0	0.00
1996	572	7	41	1.22
1997	728	5	14	0.69
1998	809	54	431	6.67
1999	585	130	1 261	22.22
2000	917	42	551	4.58
2001	1 211	105	949	8.67
2002	876	45	345	5.14
2003	1 480	43	429	2.91
2004	738	57	506	7.72
2005	490	50	339	10.20
2006	582	43	436	7.39
2007	861	27	280	3.14
2008	562	39	473	6.94
2009	466	16	207	3.43
2010	374	31	325	8.29
2011	466	24	457	5.15
2012	253	6	163	2.37
2013	232	19	394	8.19
2014	366	28	964	7.65
2015	274	3	60	1.09
2016	247	11	476	4.45
2017	167	12	435	7.19
2018	467	12	300	2.57
2019	559	5	90	0.89
2020	576	9	190	1.56
2021	334	3	60	0.90
2022	423	5	190	1.18
2023	325	3	116	0.92
2024	430	8	160	1.86
2025	237	8	280	3.38

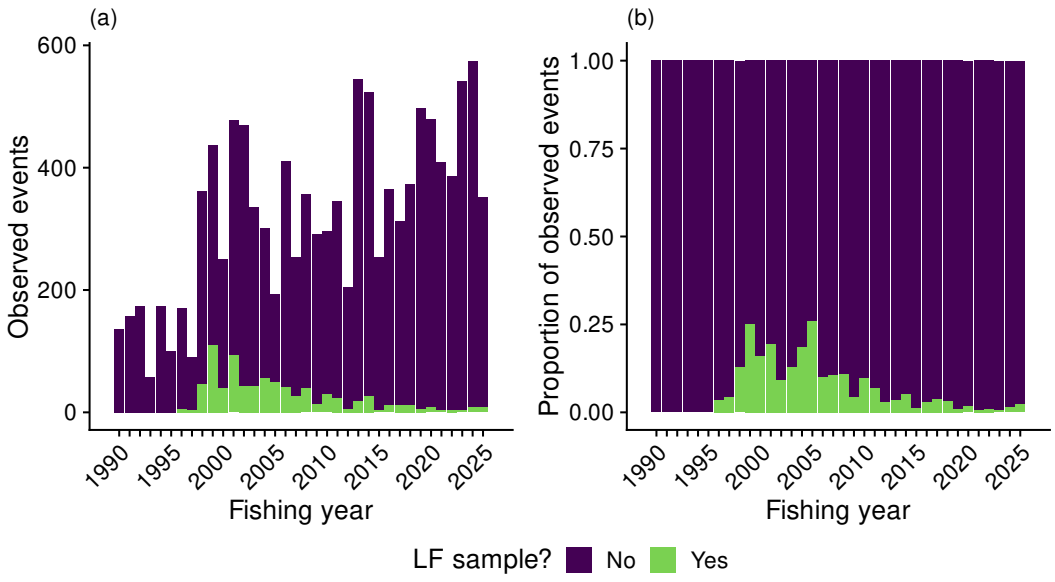


Figure 906: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in WWA 3 where the white warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

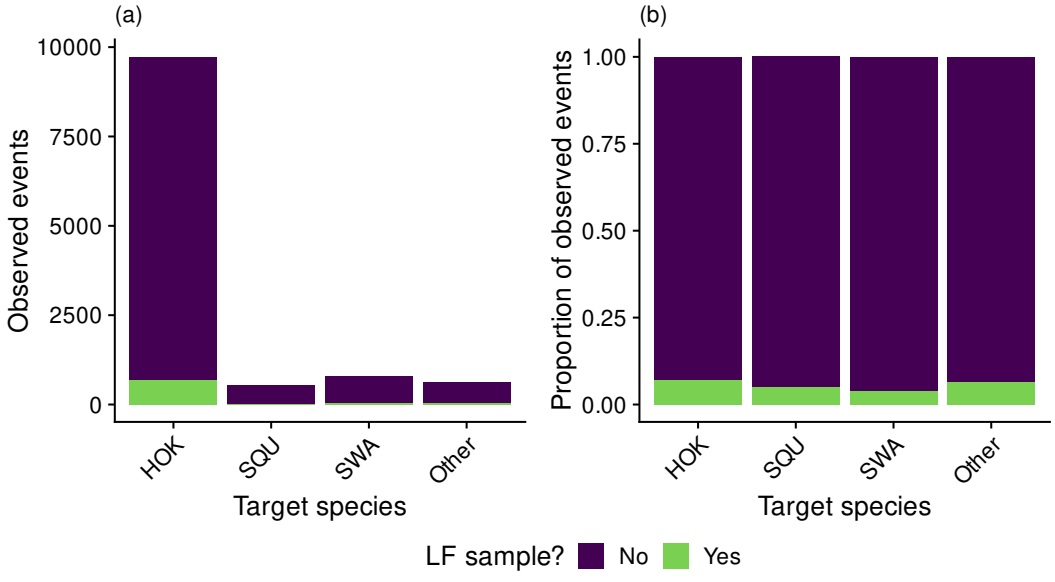


Figure 907: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in WWA 3 where the white warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

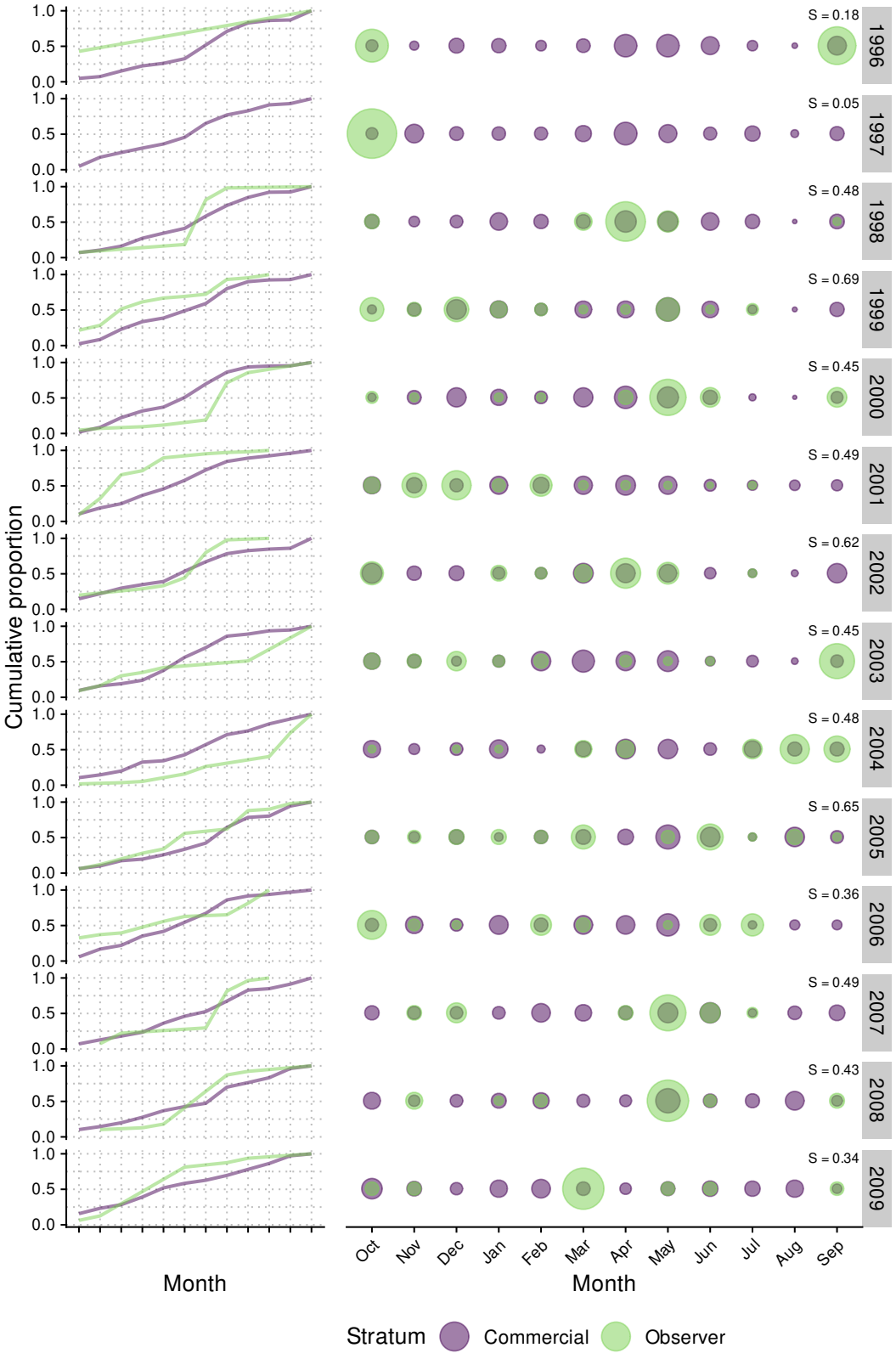


Figure 908: Monthly representativeness of observer sampling coverage of Trawl fishing events in WWA 3, where the white warehou catch exceeded the 20kg threshold, in 1996 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

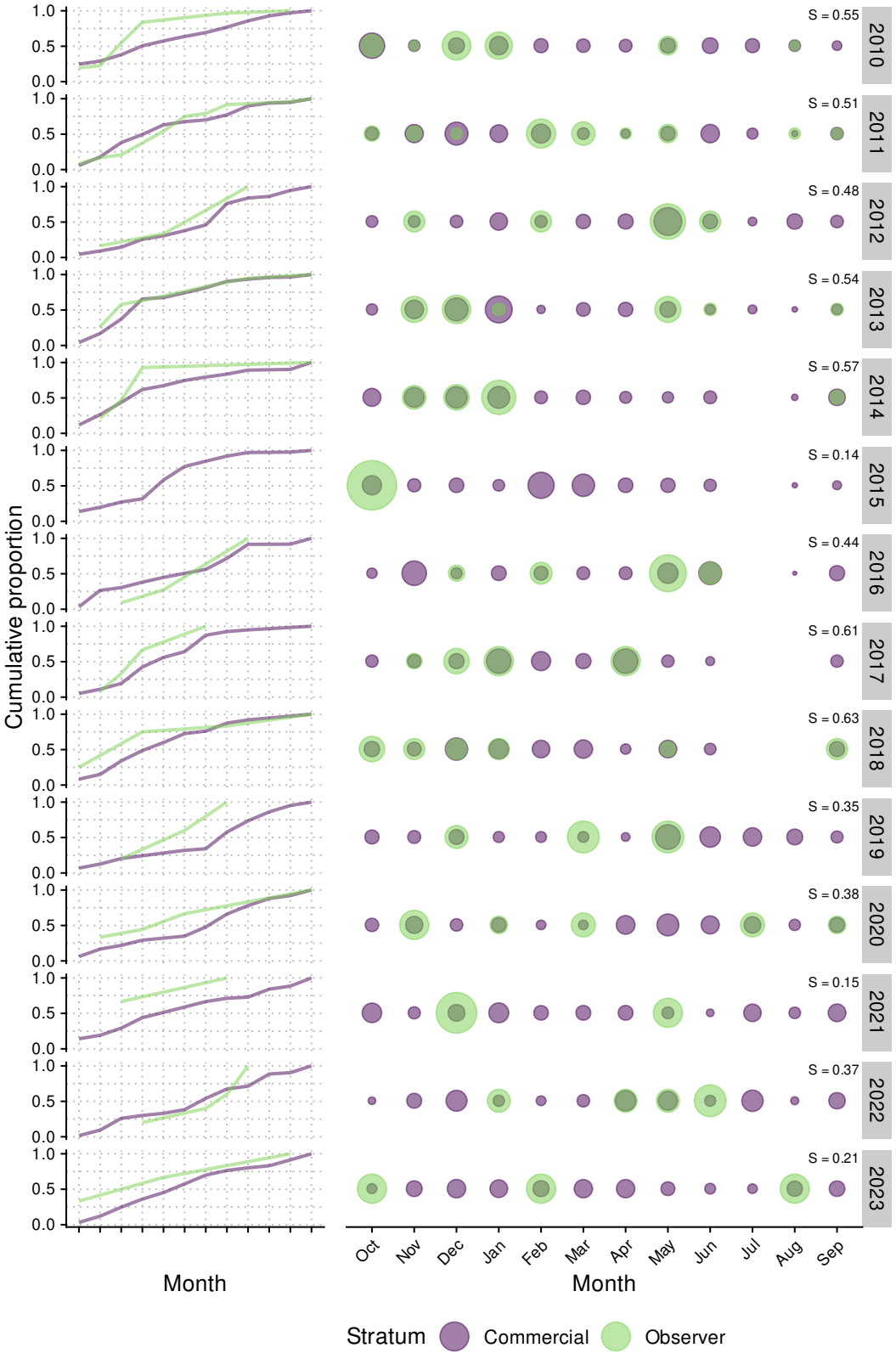


Figure 909: Monthly representativeness of observer sampling coverage of Trawl fishing events in WWA 3, where the white warehou catch exceeded the 20kg threshold, in 2010 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

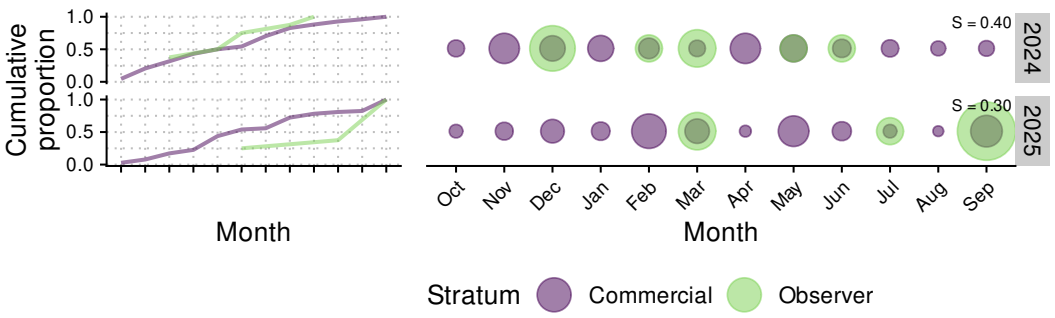


Figure 910: Monthly representativeness of observer sampling coverage of Trawl fishing events in WWA 3, where the white warehou catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

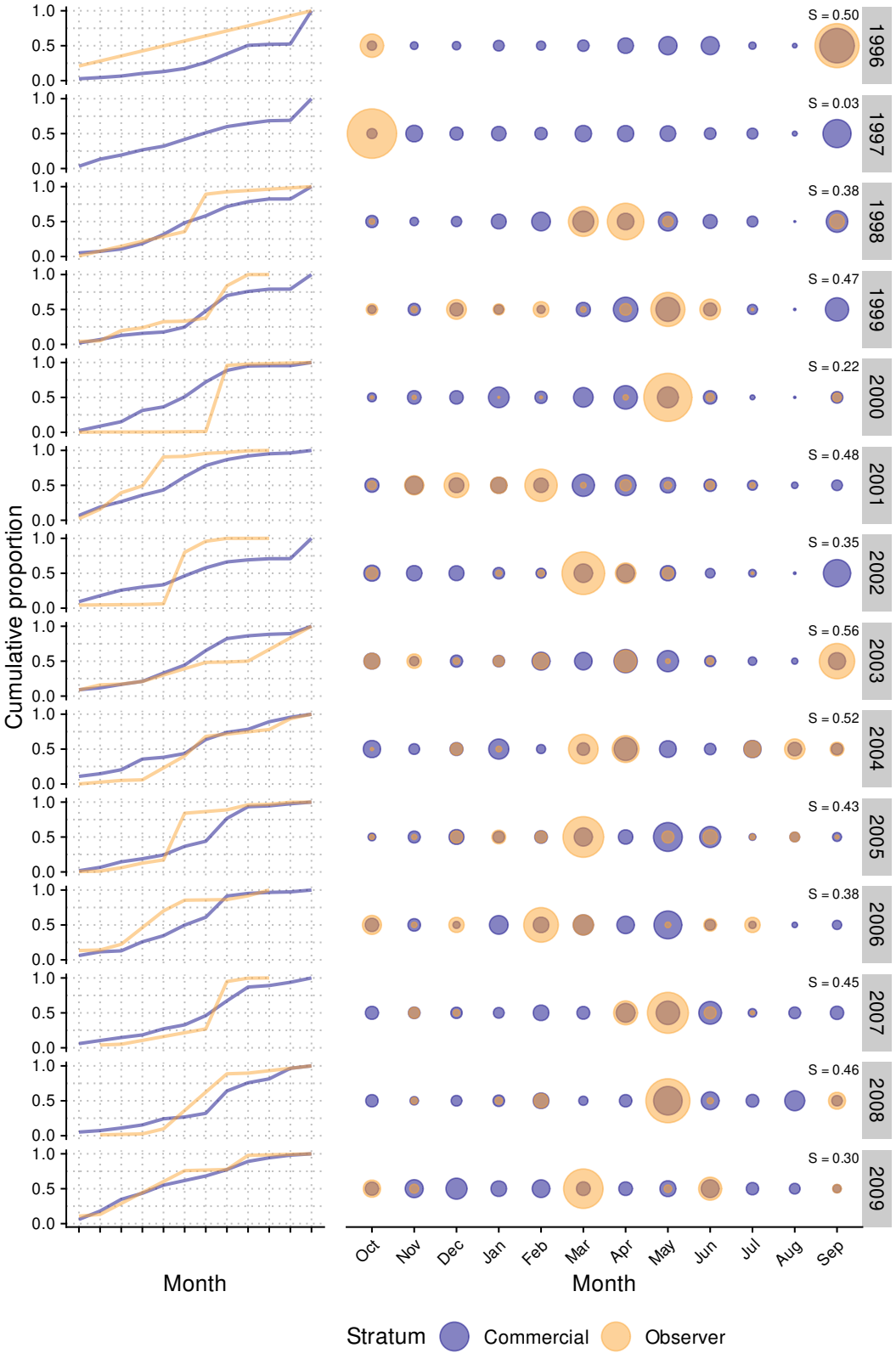


Figure 911: Monthly representativeness of observer sampling coverage of Trawl catch in WWA 3, from events where the white warehou catch exceeded the 20kg threshold, in 1996 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

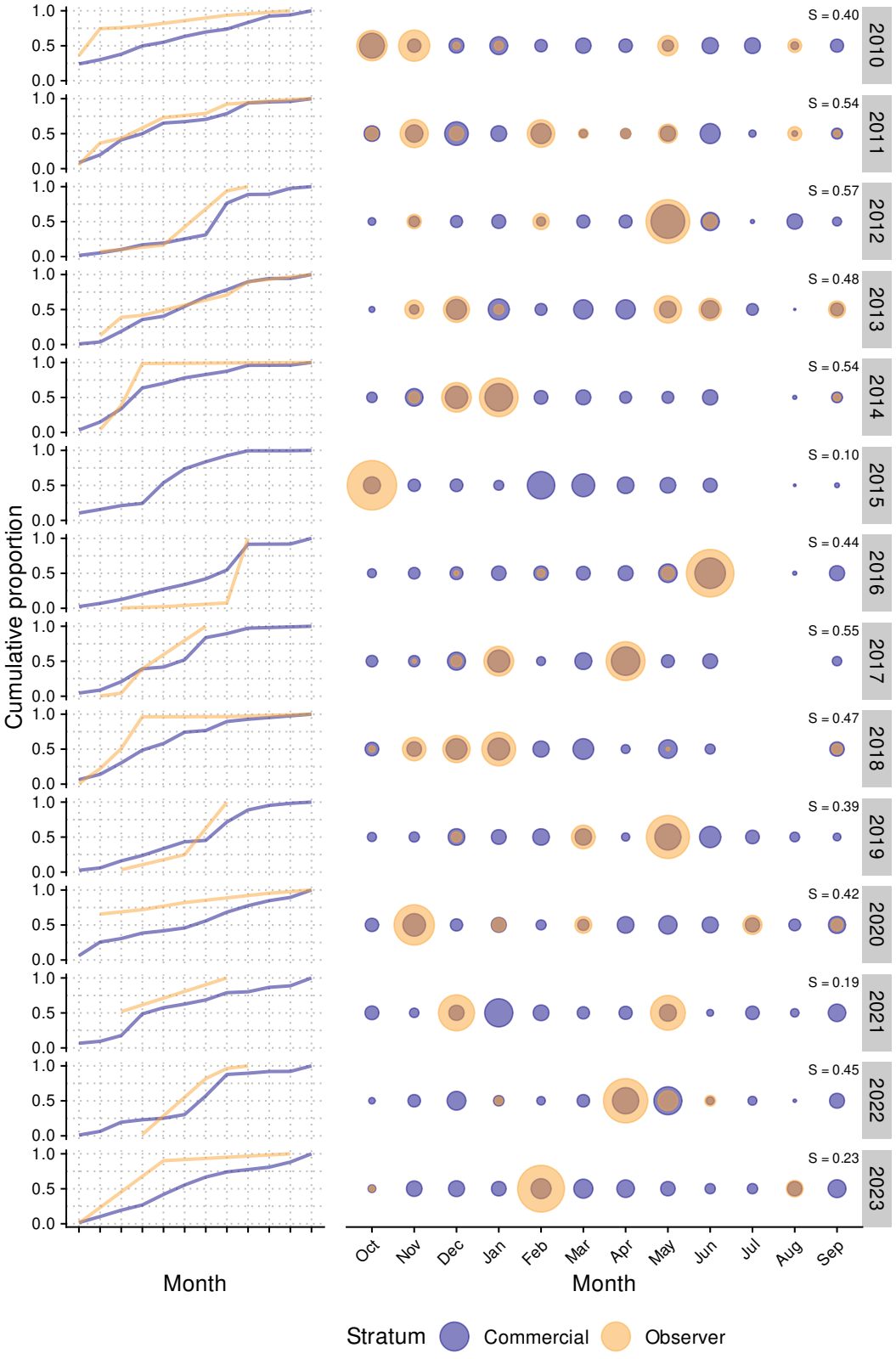


Figure 912: **Monthly representativeness of observer sampling coverage of Trawl catch in WWA 3, from events where the white warehou catch exceeded the 20kg threshold, in 2010 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

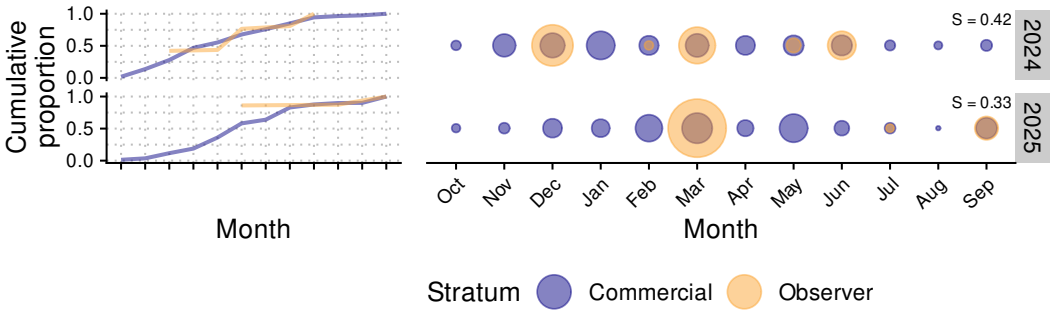


Figure 913: Monthly representativeness of observer sampling coverage of Trawl catch in WWA 3, from events where the white warehou catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

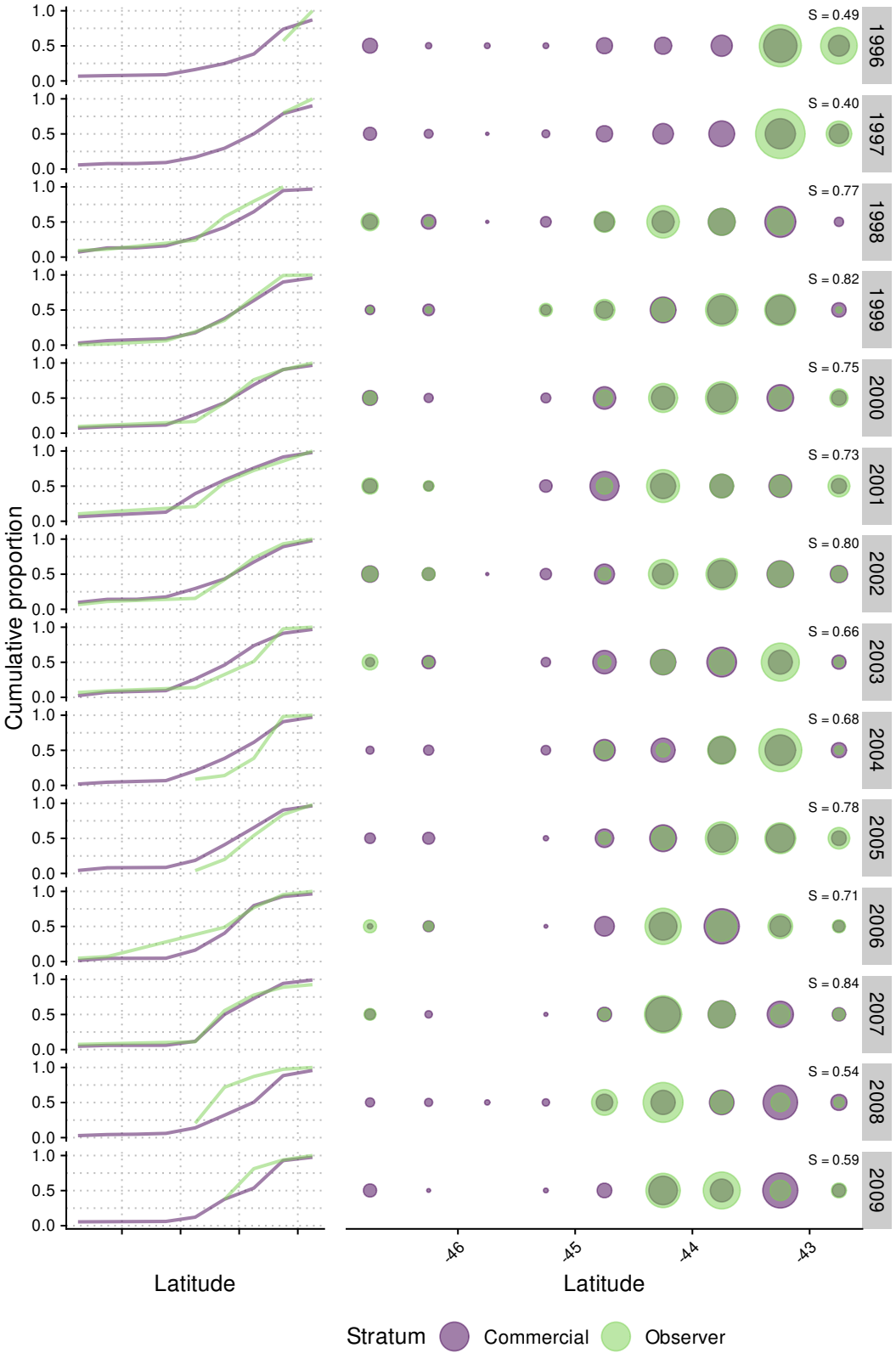


Figure 914: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 3, where the white warehou catch exceeded the 20kg threshold, in 1996 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

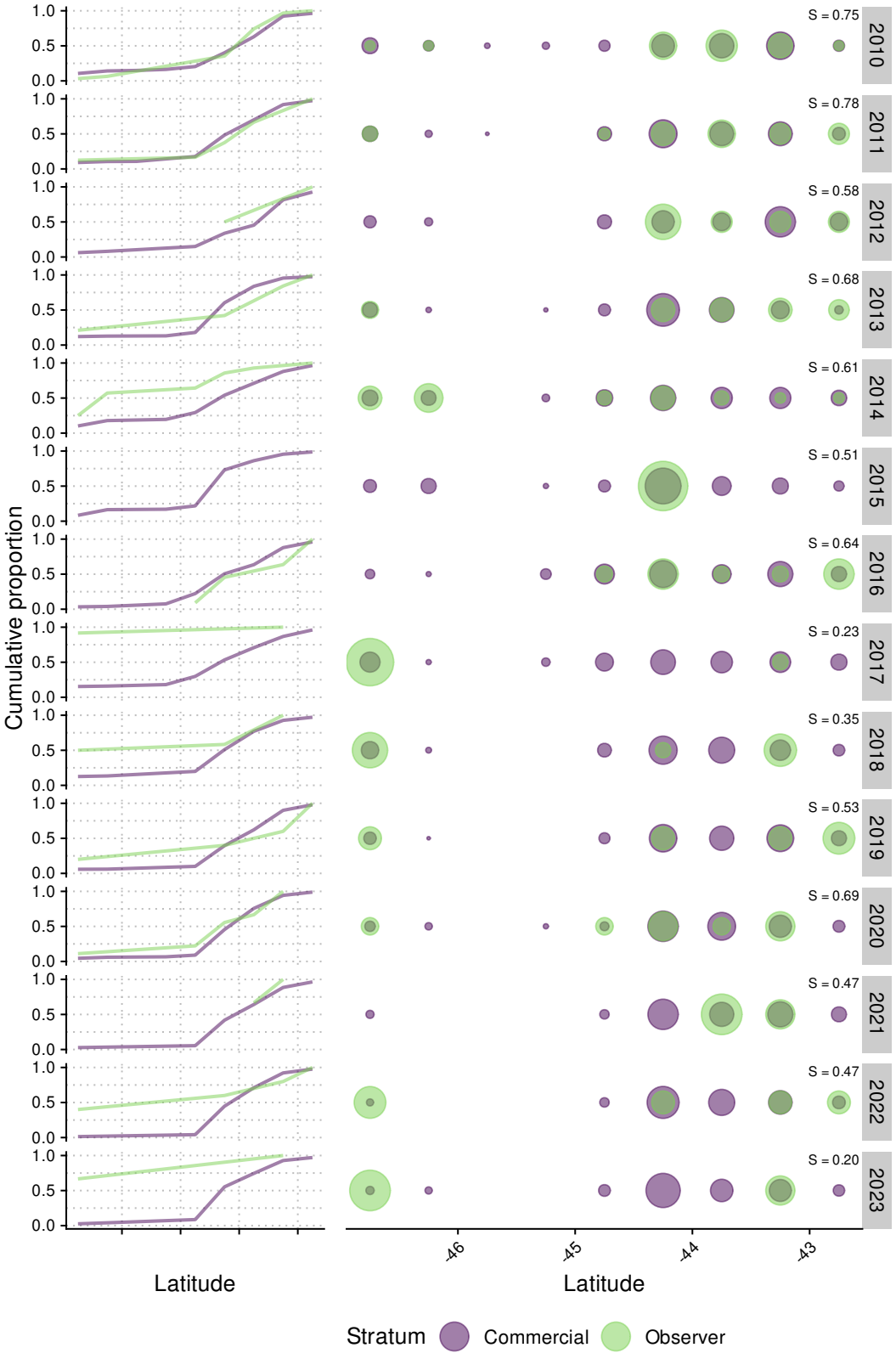


Figure 915: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 3, where the white warehou catch exceeded the 20kg threshold, in 2010 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

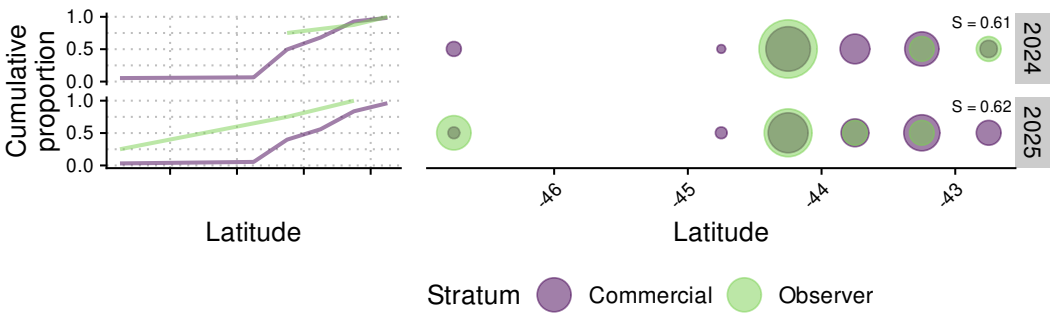


Figure 916: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 3, where the white warehou catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

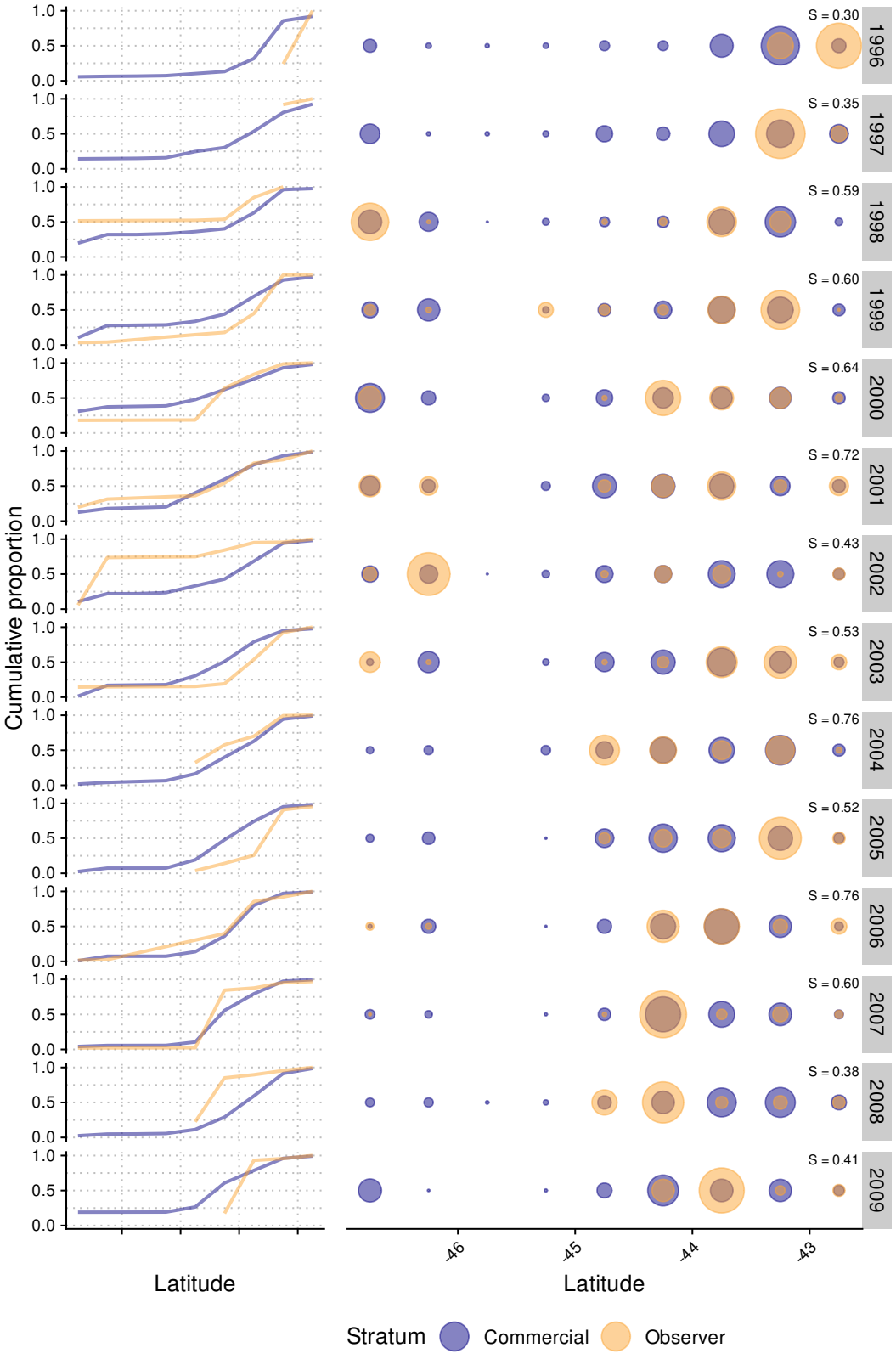


Figure 917: Latitudinal representativeness of observer sampling coverage of Trawl catch in WWA 3, from events where the white warehou catch exceeded the 20kg threshold, in 1996 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

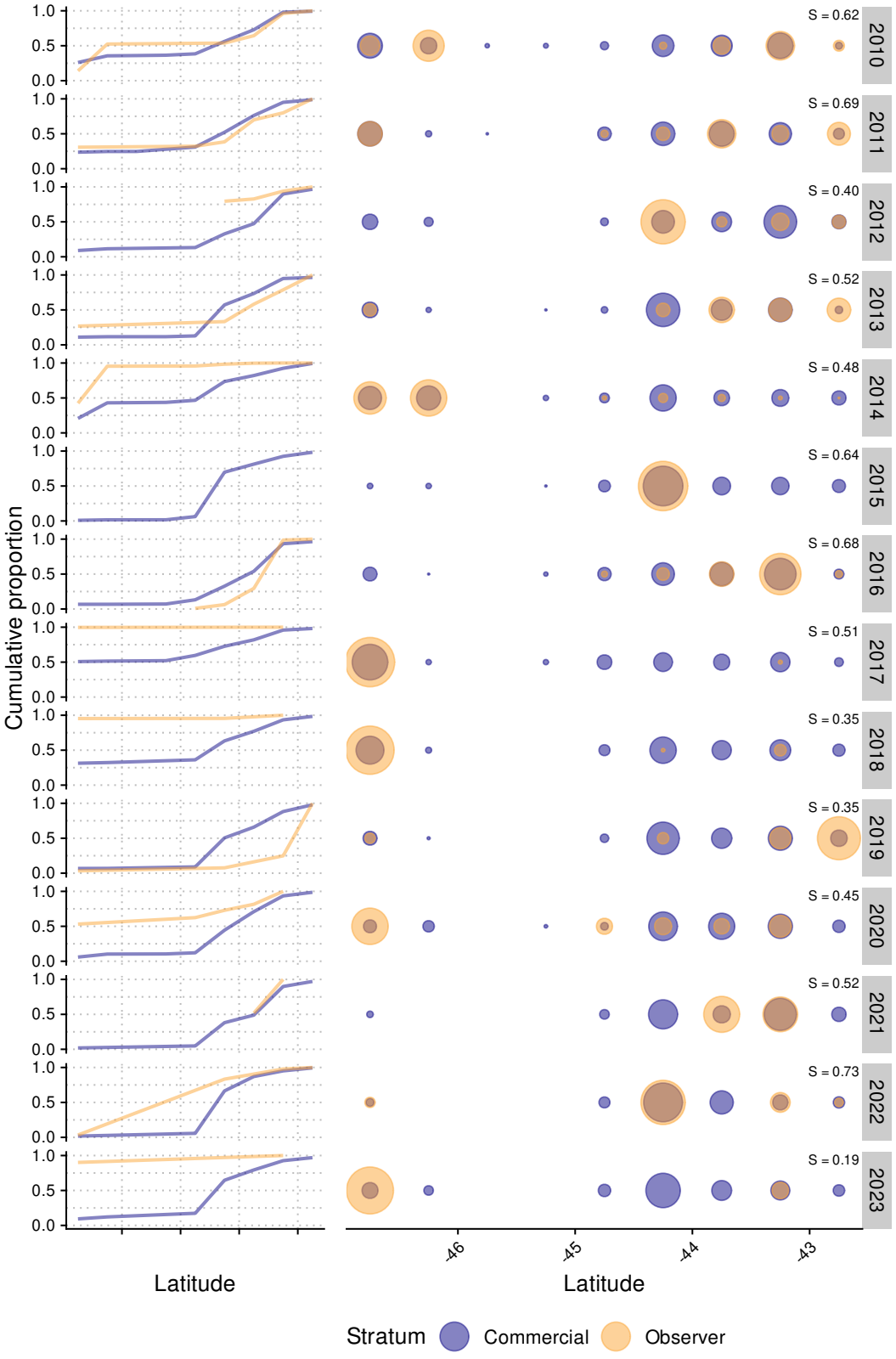


Figure 918: **Latitudinal representativeness of observer sampling coverage of Trawl catch in WWA 3, from events where the white warehou catch exceeded the 20kg threshold, in 2010 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

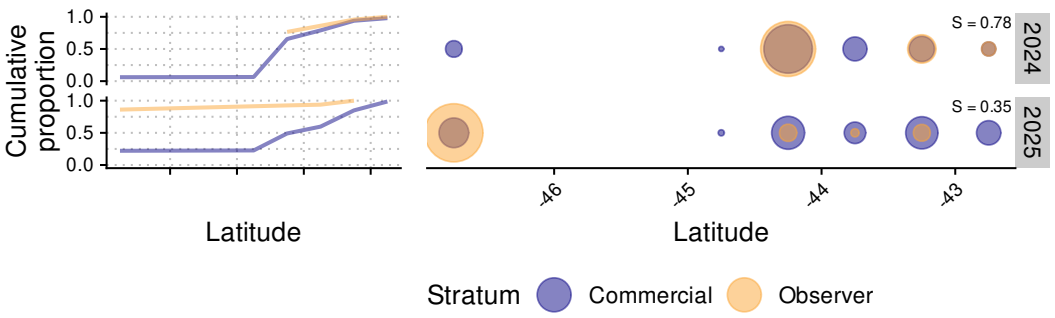


Figure 919: Latitudinal representativeness of observer sampling coverage of Trawl catch in WWA 3, from events where the white warehou catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

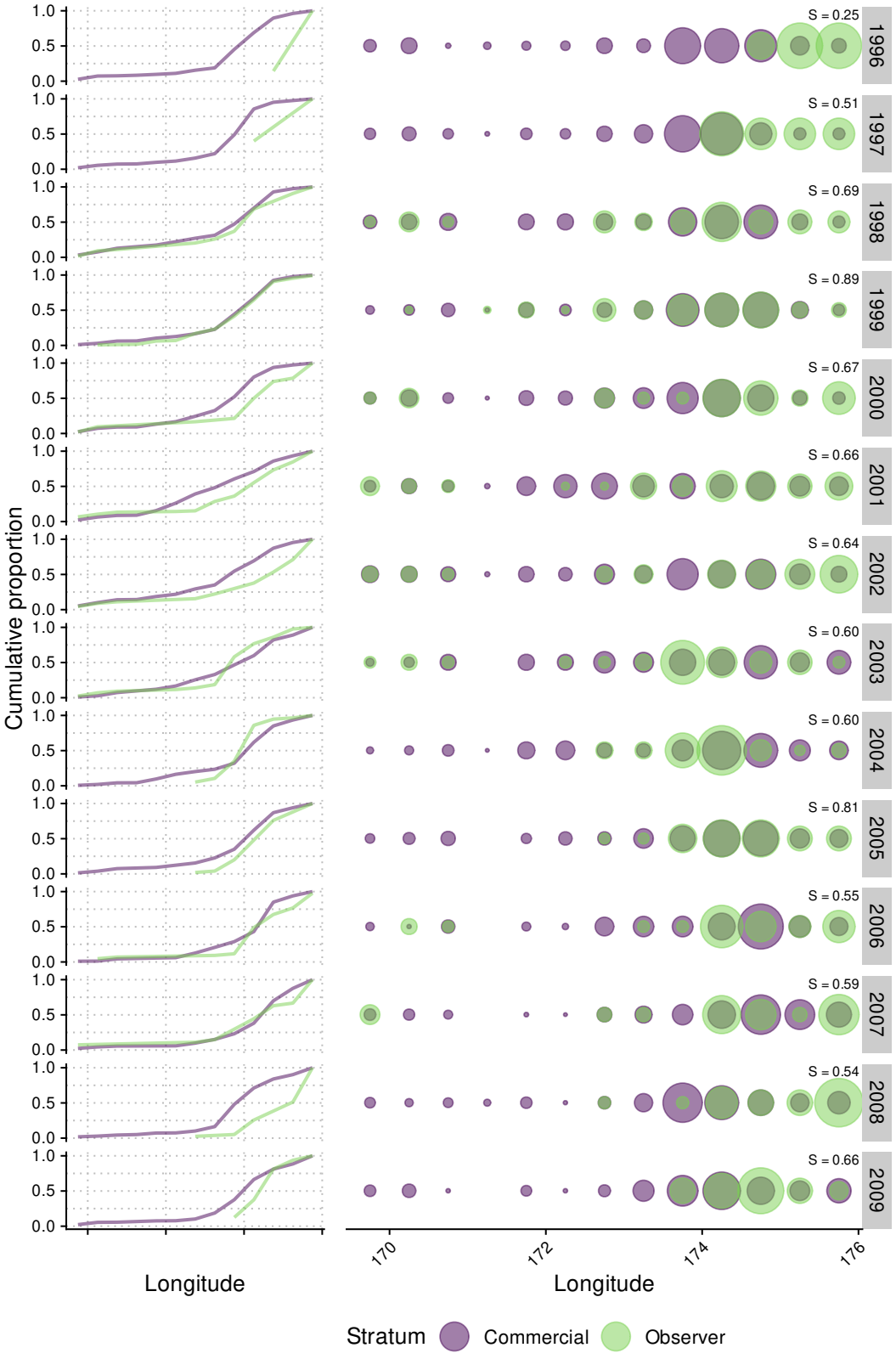


Figure 920: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 3, where the white warehou catch exceeded the 20kg threshold, in 1996 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

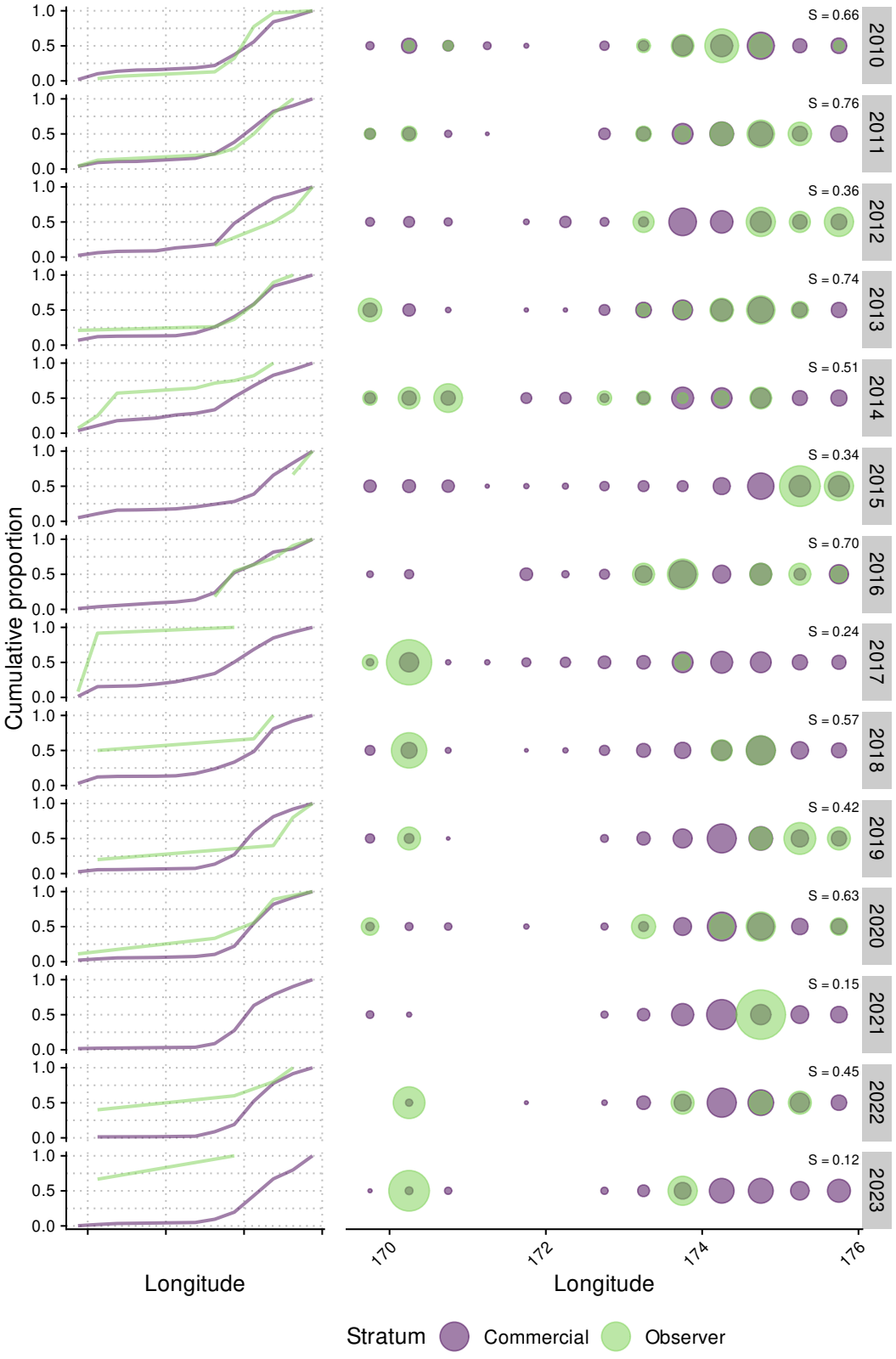


Figure 921: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 3, where the white warehou catch exceeded the 20kg threshold, in 2010 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

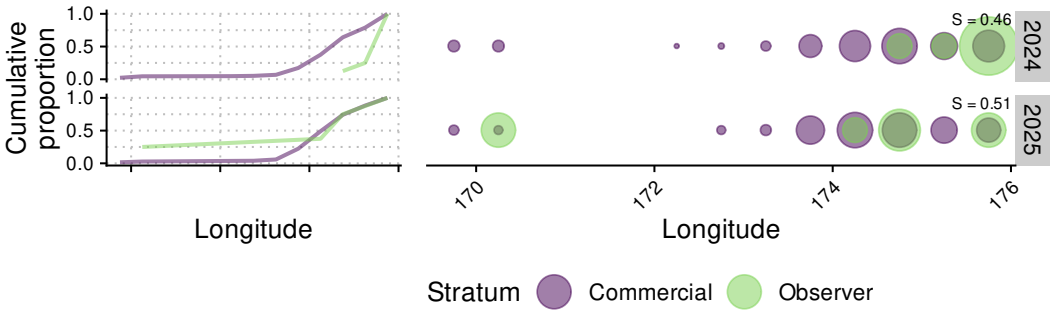


Figure 922: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 3, where the white warehou catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

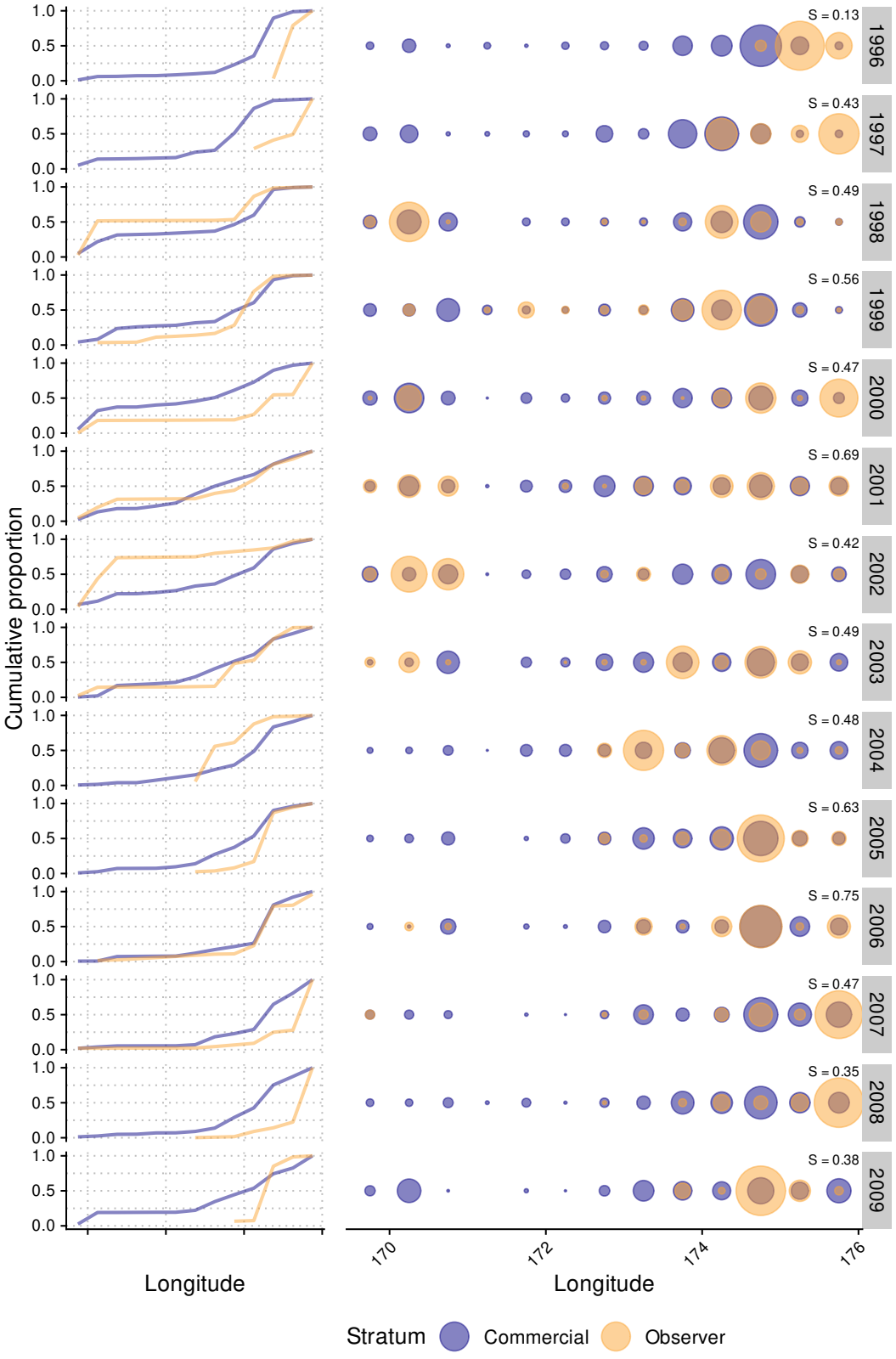


Figure 923: **Longitudinal representativeness of observer sampling coverage of Trawl catch in WWA 3, from events where the white warehou catch exceeded the 20kg threshold, in 1996 to 2009. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

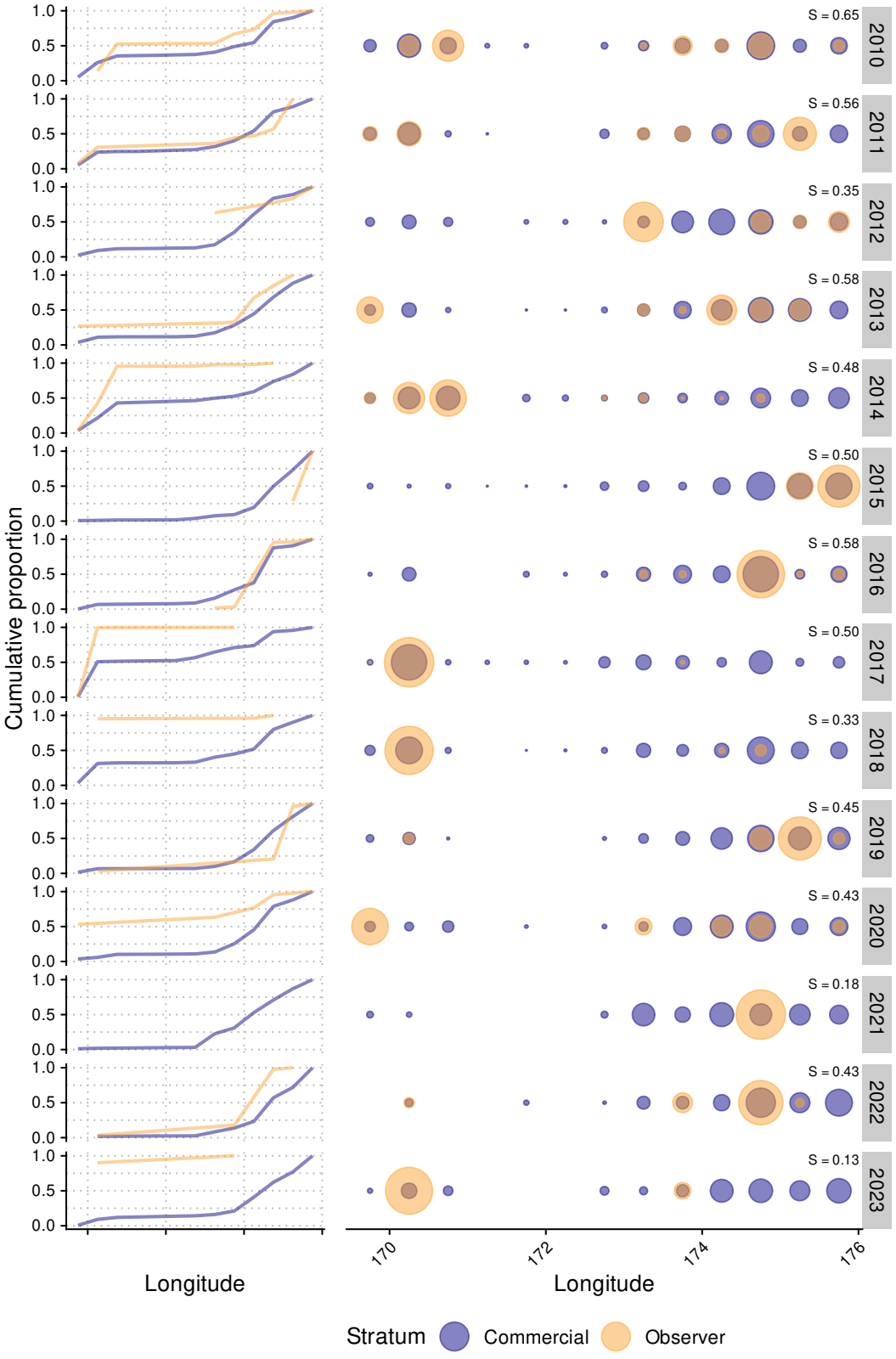


Figure 924: **Longitudinal representativeness of observer sampling coverage of Trawl catch in WWA 3, from events where the white warehou catch exceeded the 20kg threshold, in 2010 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

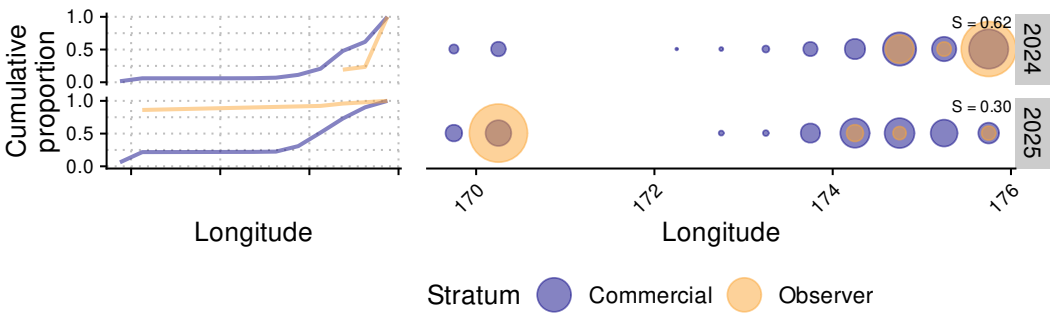


Figure 925: **Longitudinal representativeness of observer sampling coverage of Trawl catch in WWA 3, from events where the white warehou catch exceeded the 20kg threshold, in 2024 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

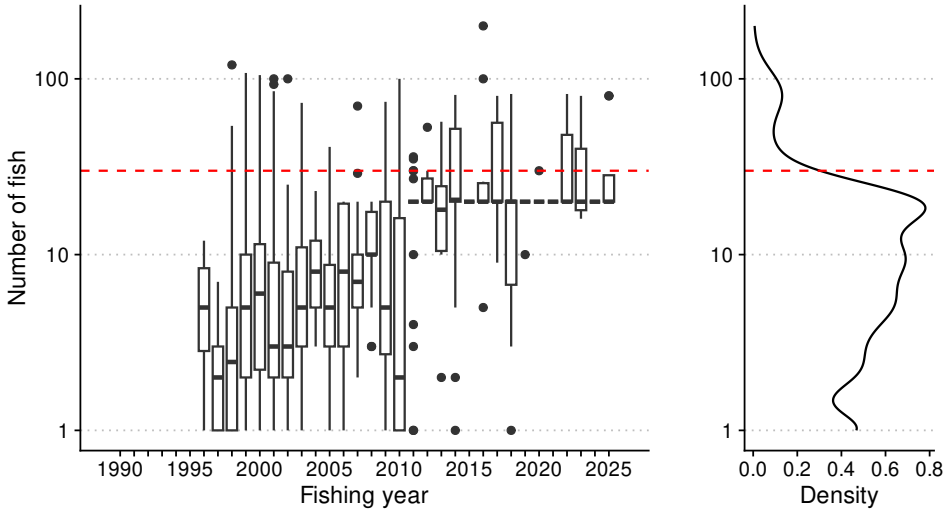


Figure 926: **Length-frequency sample sizes for observed fishing events in WWA 3 where white warehou were sampled. The red dashed line indicates a sample size of 30 fish.**

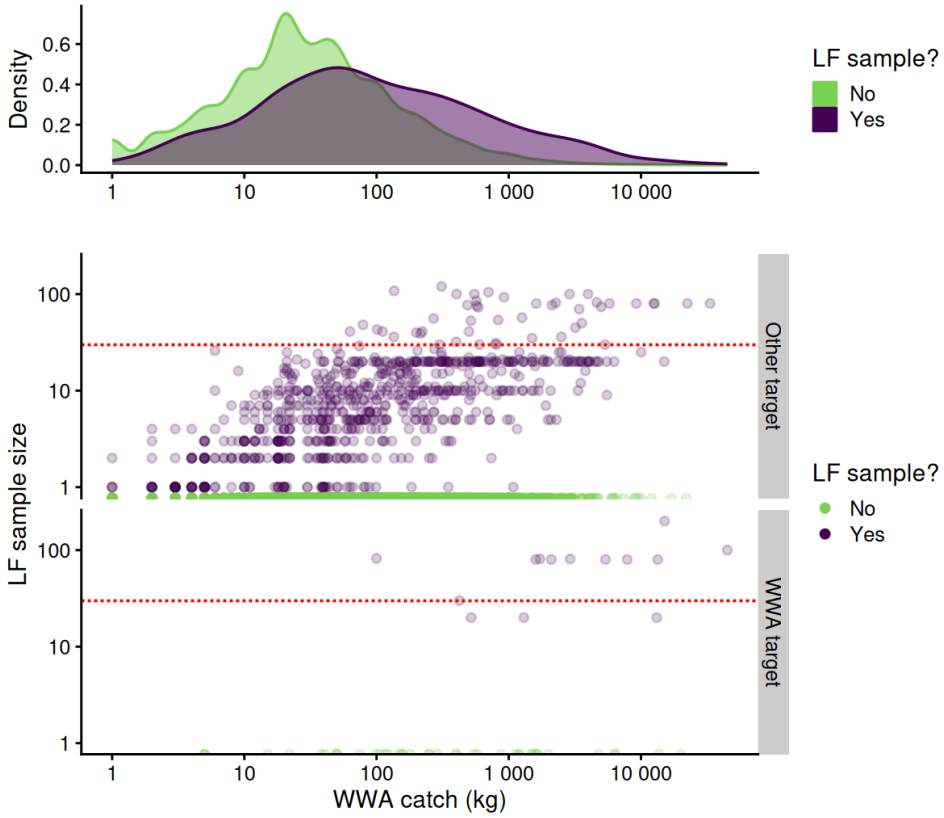


Figure 927: Length-frequency sample sizes (number of fish sampled) for observed fishing events in WWA 3 in relation to the total white warehou catch from an event, separately for white warehou target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.13.1.2 Otolith samples

Table 77: Otolith samples of white warehou from the WWA 3 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of white warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	483	0	0	0.00
1991	334	0	0	0.00
1992	510	0	0	0.00
1993	503	0	0	0.00
1994	309	0	0	0.00
1995	376	0	0	0.00
1996	572	0	0	0.00
1997	728	0	0	0.00
1998	809	0	0	0.00
1999	585	0	0	0.00
2000	917	0	0	0.00
2001	1 211	0	0	0.00
2002	876	0	0	0.00
2003	1 480	0	0	0.00
2004	738	0	0	0.00
2005	490	0	0	0.00
2006	582	0	0	0.00
2007	861	0	0	0.00
2008	562	0	0	0.00
2009	466	4	20	0.86
2010	374	20	62	5.35
2011	466	10	48	2.15
2012	253	5	25	1.98
2013	232	17	89	7.33
2014	366	28	131	7.65
2015	274	2	9	0.73
2016	247	7	35	2.83
2017	167	7	30	4.19
2018	467	9	45	1.93
2019	559	4	26	0.72
2020	576	9	44	1.56
2021	334	3	15	0.90
2022	423	5	29	1.18
2023	325	3	17	0.92
2024	430	8	43	1.86
2025	237	8	40	3.38

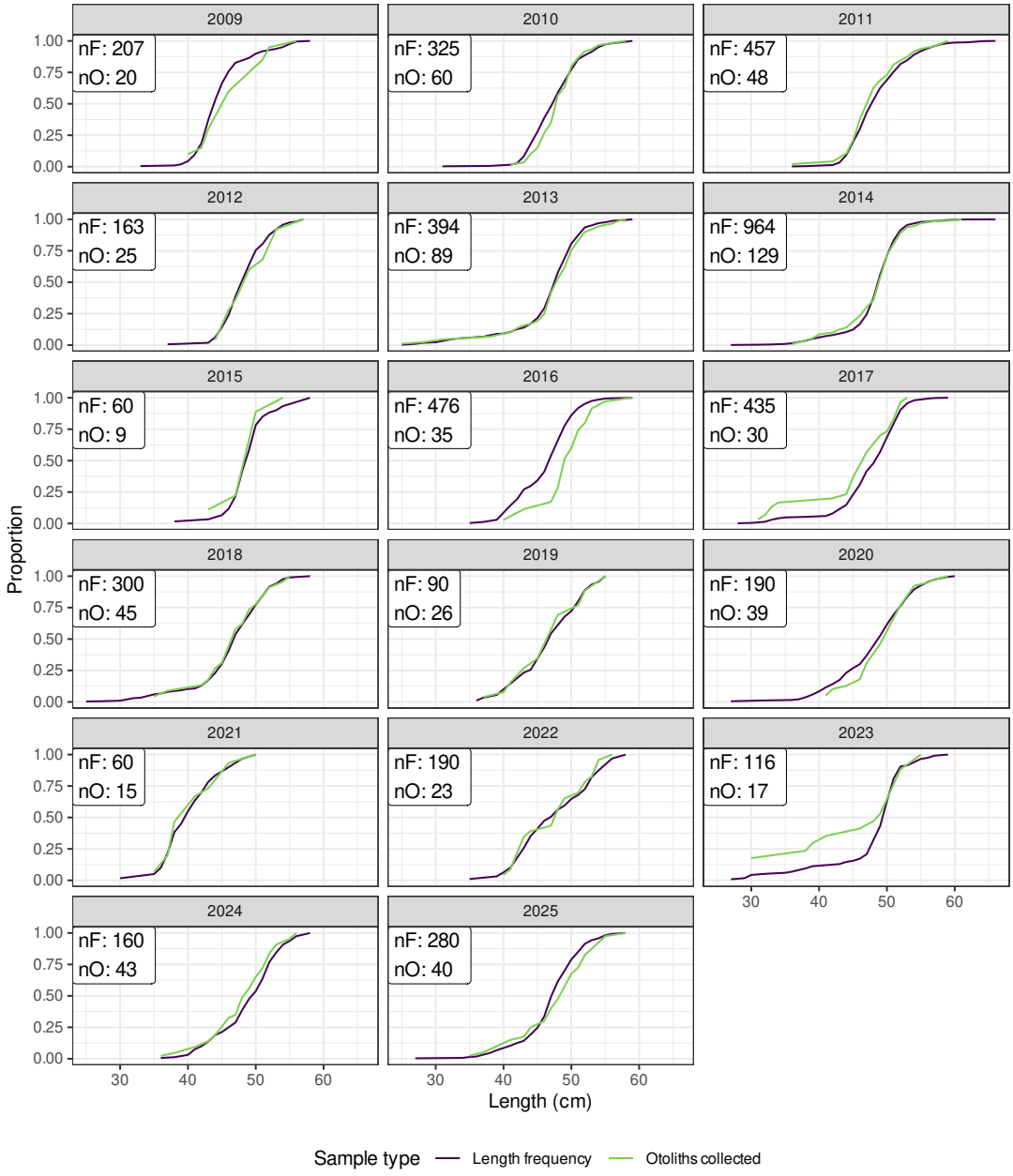


Figure 928: Cumulative distributions of the length of fish in the length frequency and otolith samples of white warehou in the WWA 3 Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.13.1.3 Catch quantification

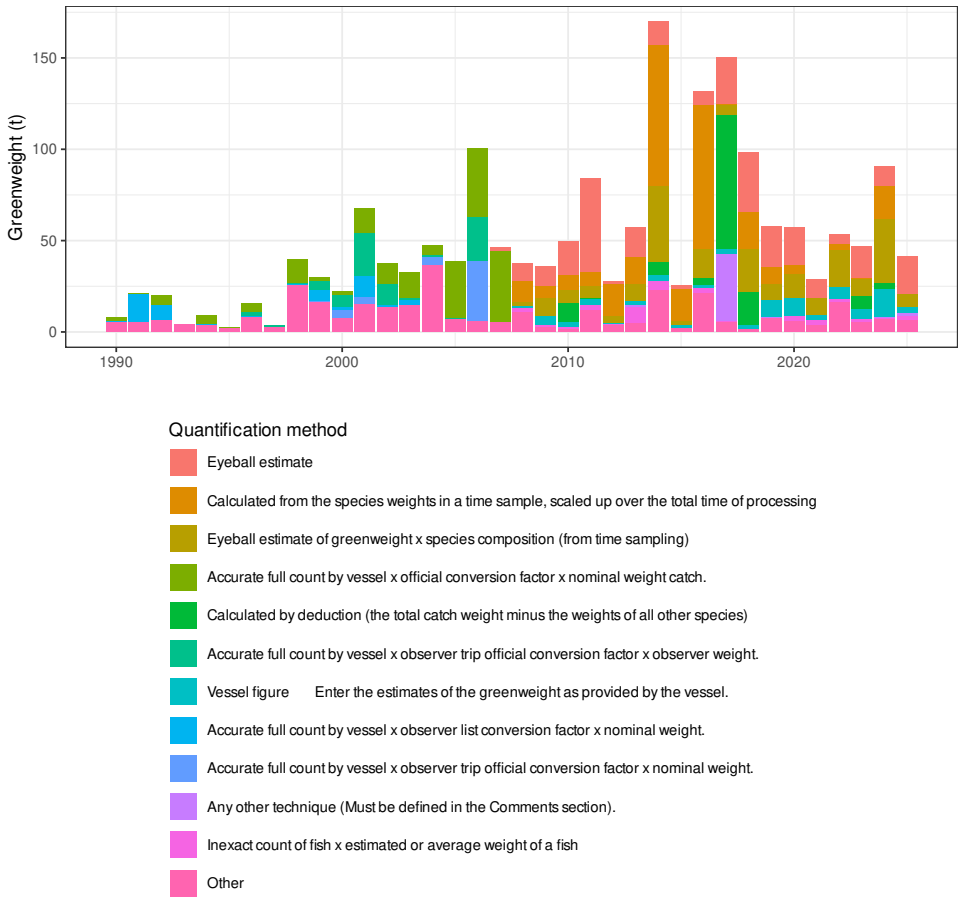


Figure 929: Methods used by observers to quantify the catch of white warehou in the WWA 3 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.13.2 WWA 4: Trawl fishery

2.13.2.1 Length-frequency samples

Table 78: Length-frequency samples of white warehou from the WWA 4 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of white warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	53	0	0	0.00
1991	94	0	0	0.00
1992	194	0	0	0.00
1993	136	0	0	0.00
1994	30	0	0	0.00
1995	109	0	0	0.00
1996	78	0	0	0.00
1997	143	2	52	1.40
1998	235	6	38	2.55
1999	233	69	280	29.61
2000	269	35	171	13.01
2001	337	23	131	6.82
2002	420	30	136	7.14
2003	713	18	486	2.52
2004	591	14	129	2.37
2005	597	55	487	9.21
2006	599	15	125	2.50
2007	541	21	187	3.88
2008	354	3	38	0.85
2009	198	2	27	1.01
2010	202	11	420	5.45
2011	156	5	116	3.21
2012	246	5	98	2.03
2013	162	4	72	2.47
2014	212	4	70	1.89
2015	132	0	0	0.00
2016	128	9	122	7.03
2017	52	0	0	0.00
2018	129	4	29	3.10
2019	179	4	66	2.23
2020	263	4	66	1.52
2021	130	1	20	0.77
2022	110	2	27	1.82
2023	178	2	26	1.12
2024	394	3	60	0.76
2025	241	1	20	0.41

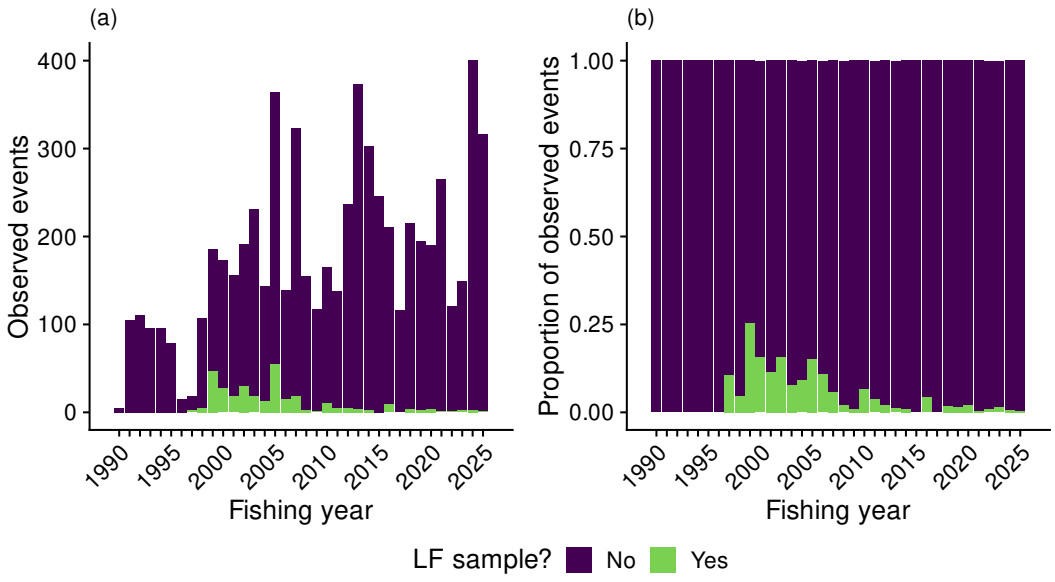


Figure 930: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in WWA 4 where the white warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

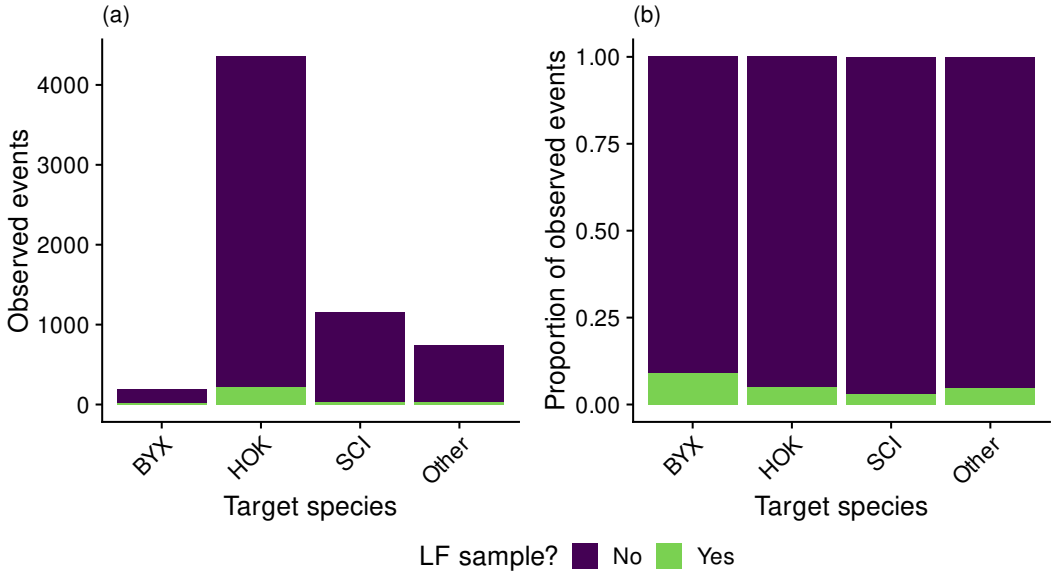


Figure 931: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in WWA 4 where the white warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

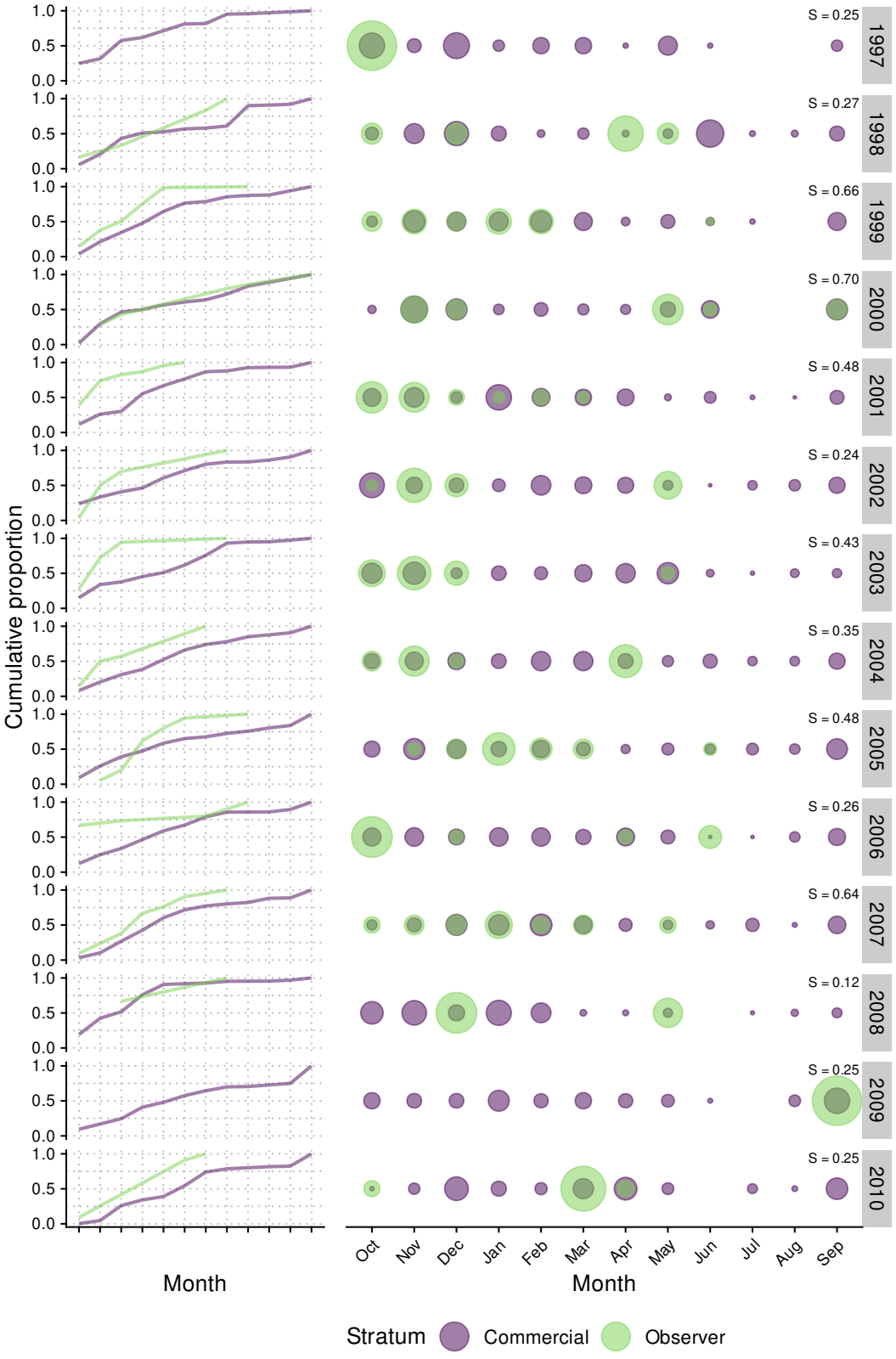


Figure 932: Monthly representativeness of observer sampling coverage of Trawl fishing events in WWA 4, where the white warehou catch exceeded the 20kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

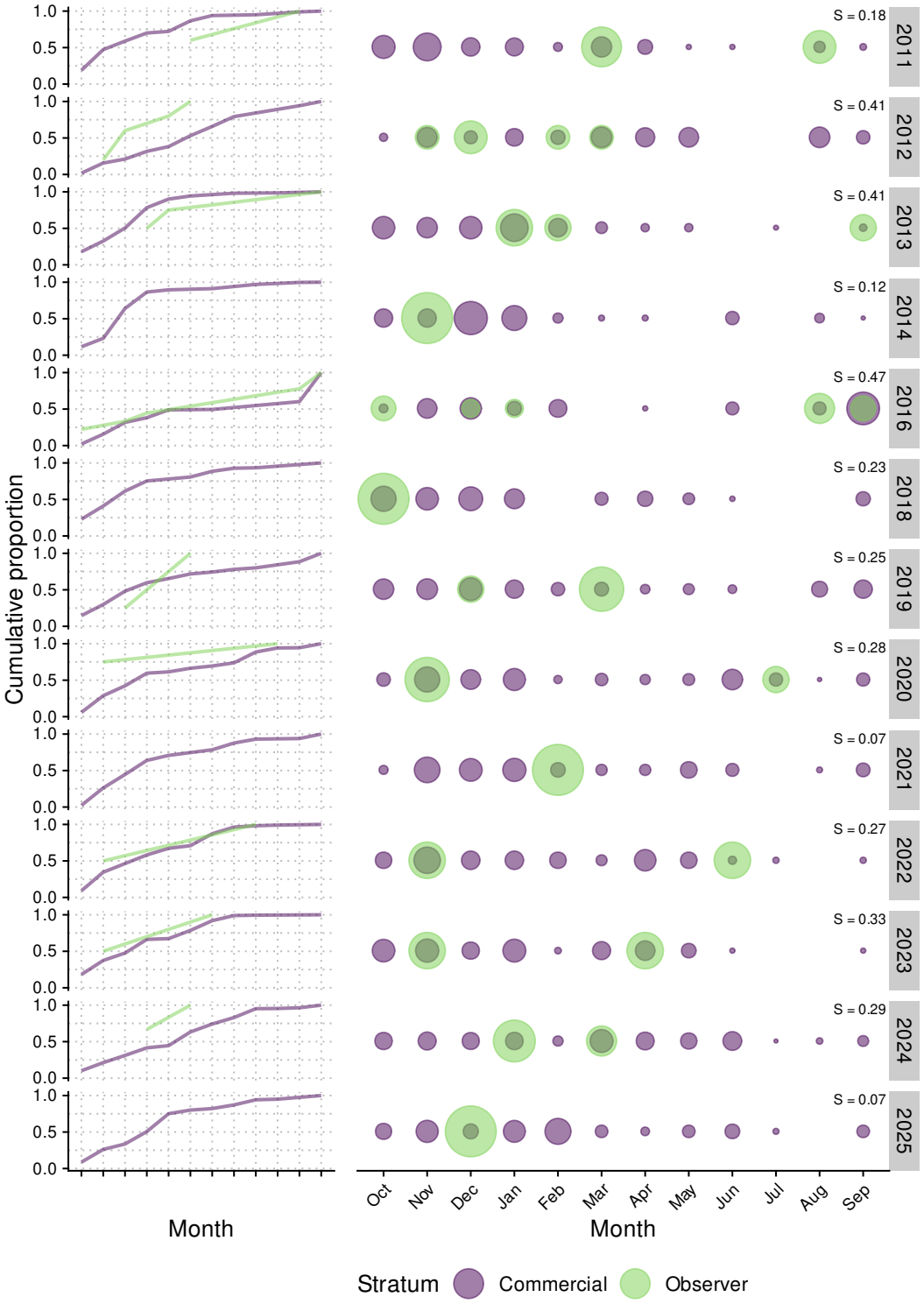


Figure 933: Monthly representativeness of observer sampling coverage of Trawl fishing events in WWA 4, where the white warehou catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

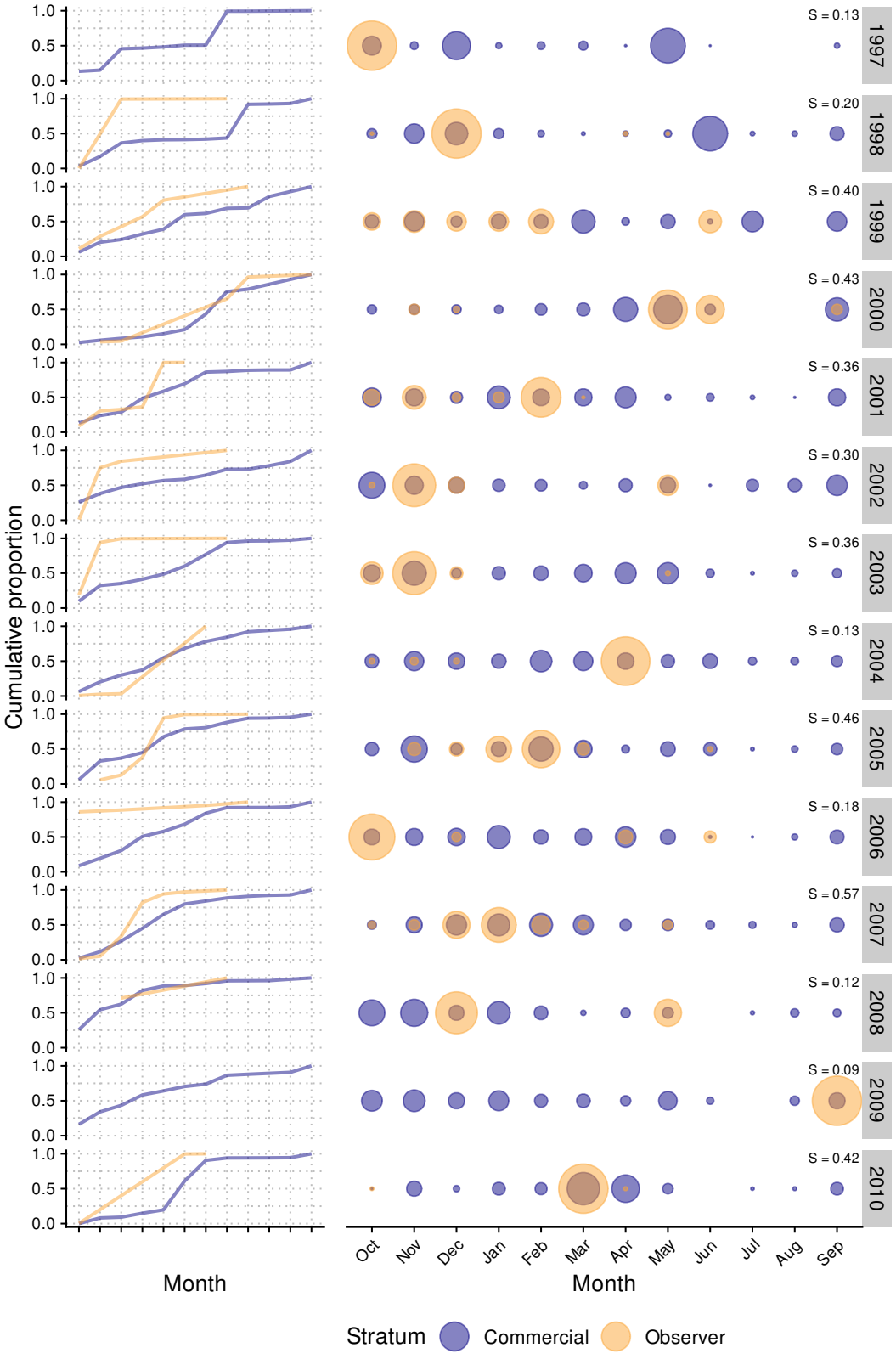


Figure 934: **Monthly representativeness of observer sampling coverage of Trawl catch in WWA 4, from events where the white warehou catch exceeded the 20kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

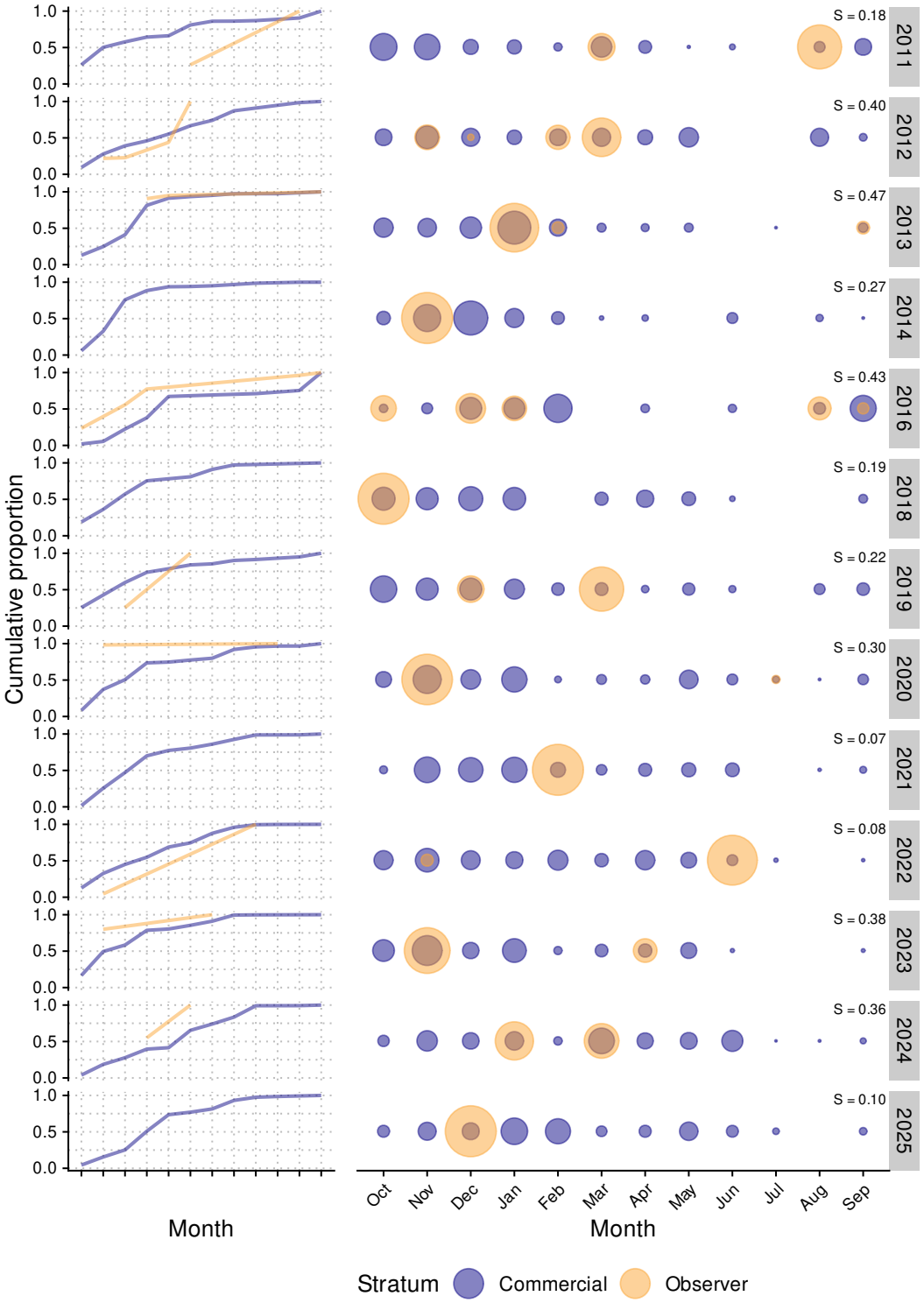


Figure 935: Monthly representativeness of observer sampling coverage of Trawl catch in WWA 4, from events where the white warehou catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

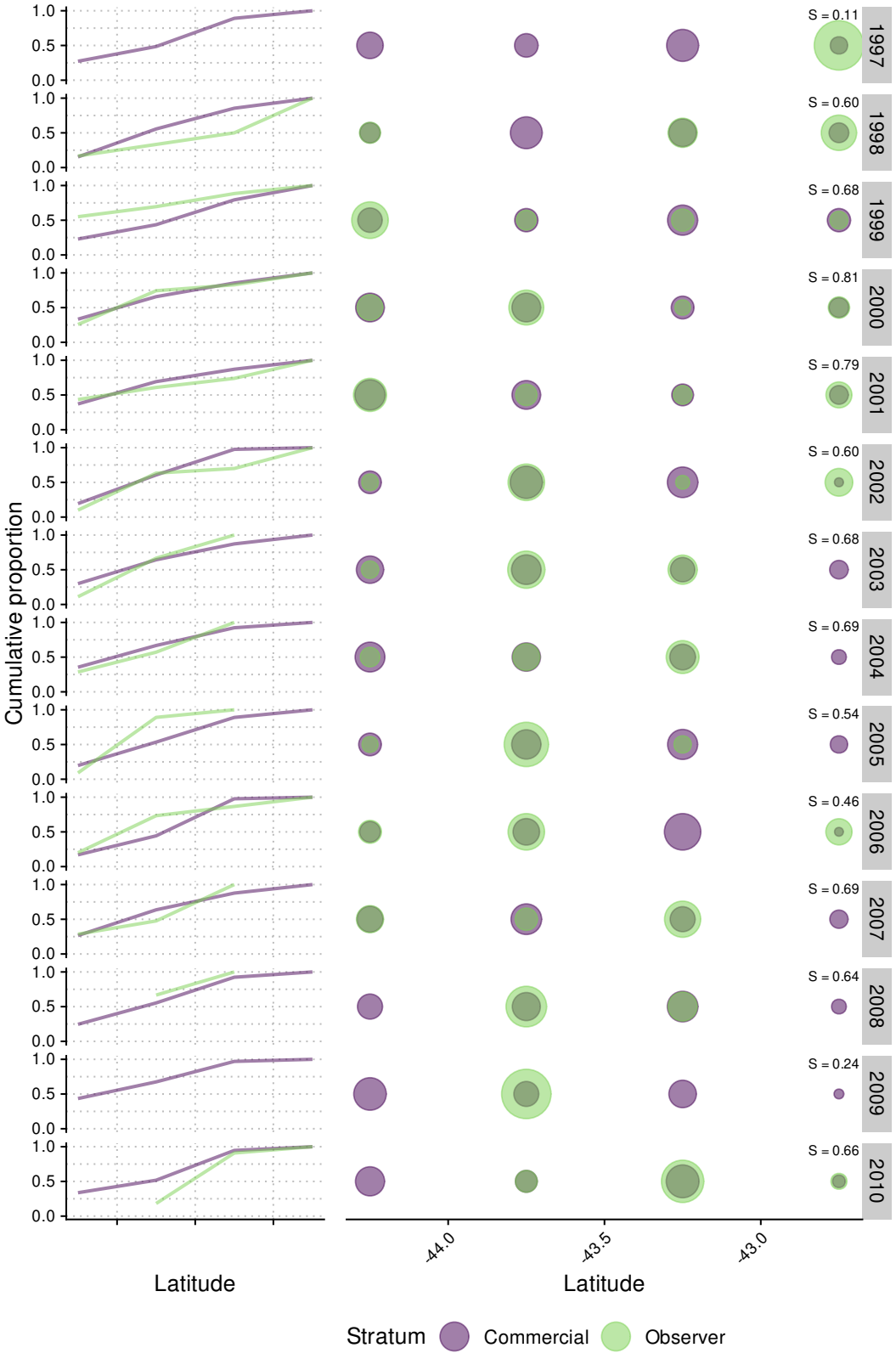


Figure 936: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 4, where the white warehou catch exceeded the 20kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

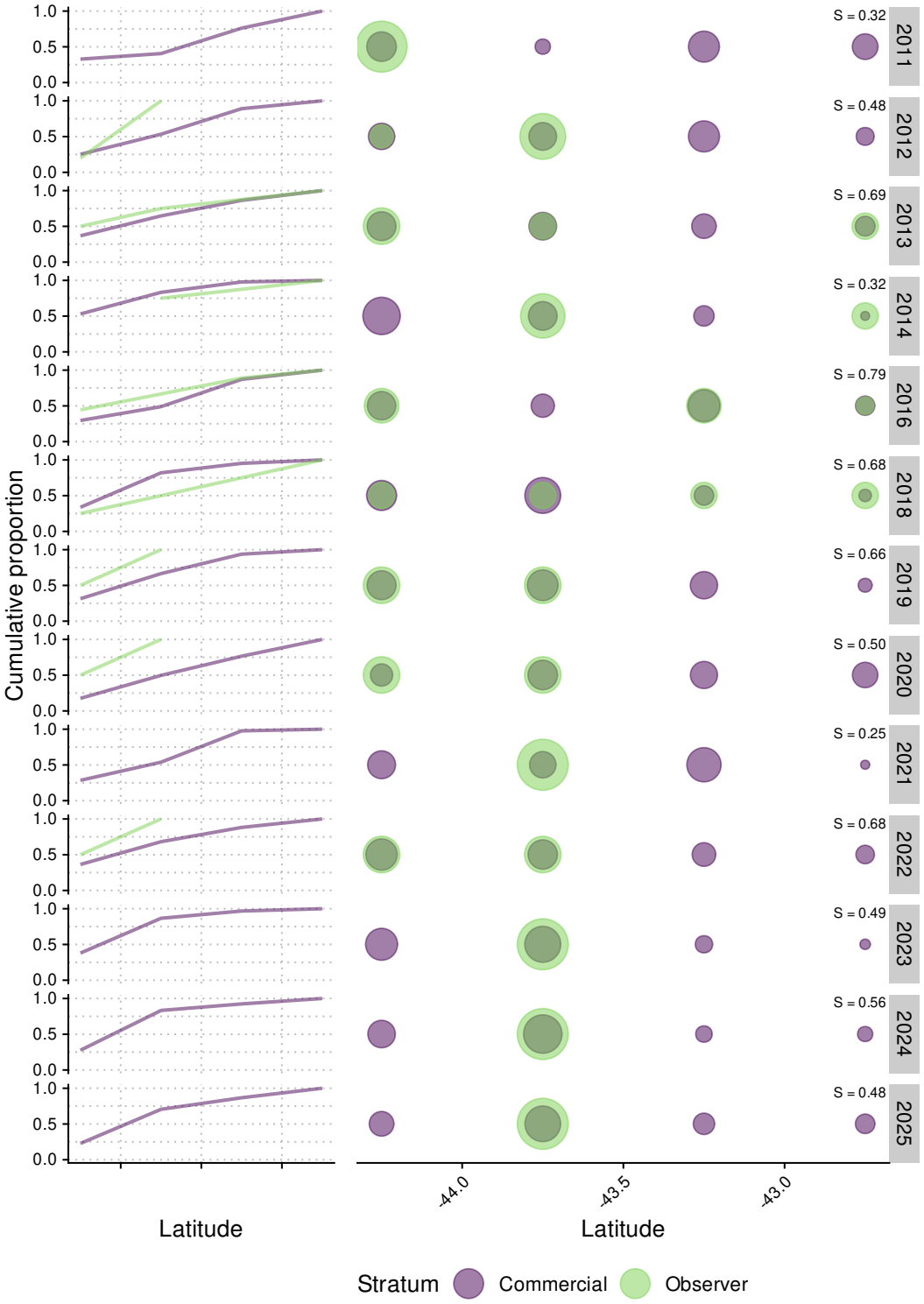


Figure 937: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 4, where the white warehou catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

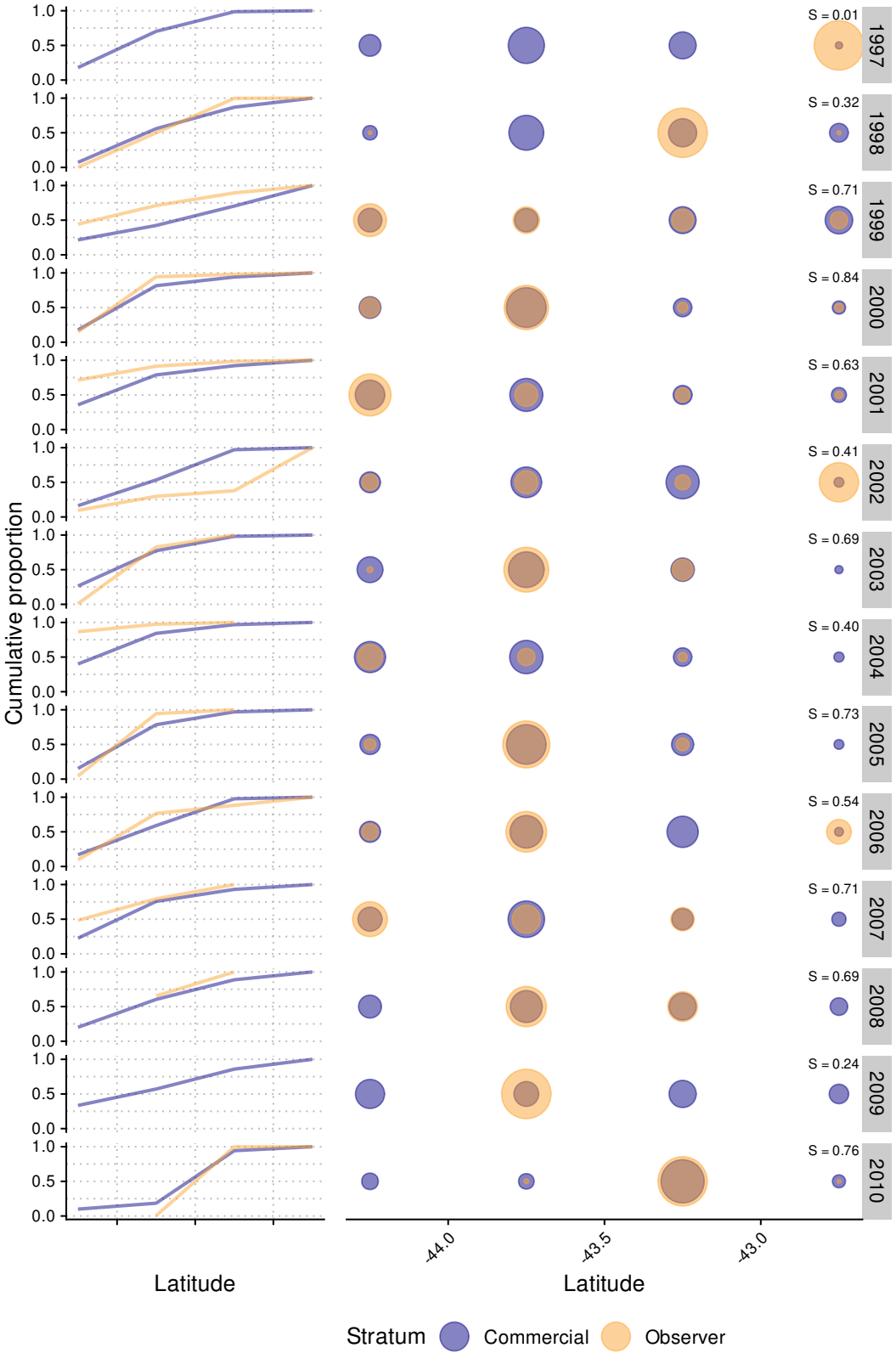


Figure 938: **Latitudinal representativeness of observer sampling coverage of Trawl catch in WWA 4, from events where the white warehou catch exceeded the 20kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

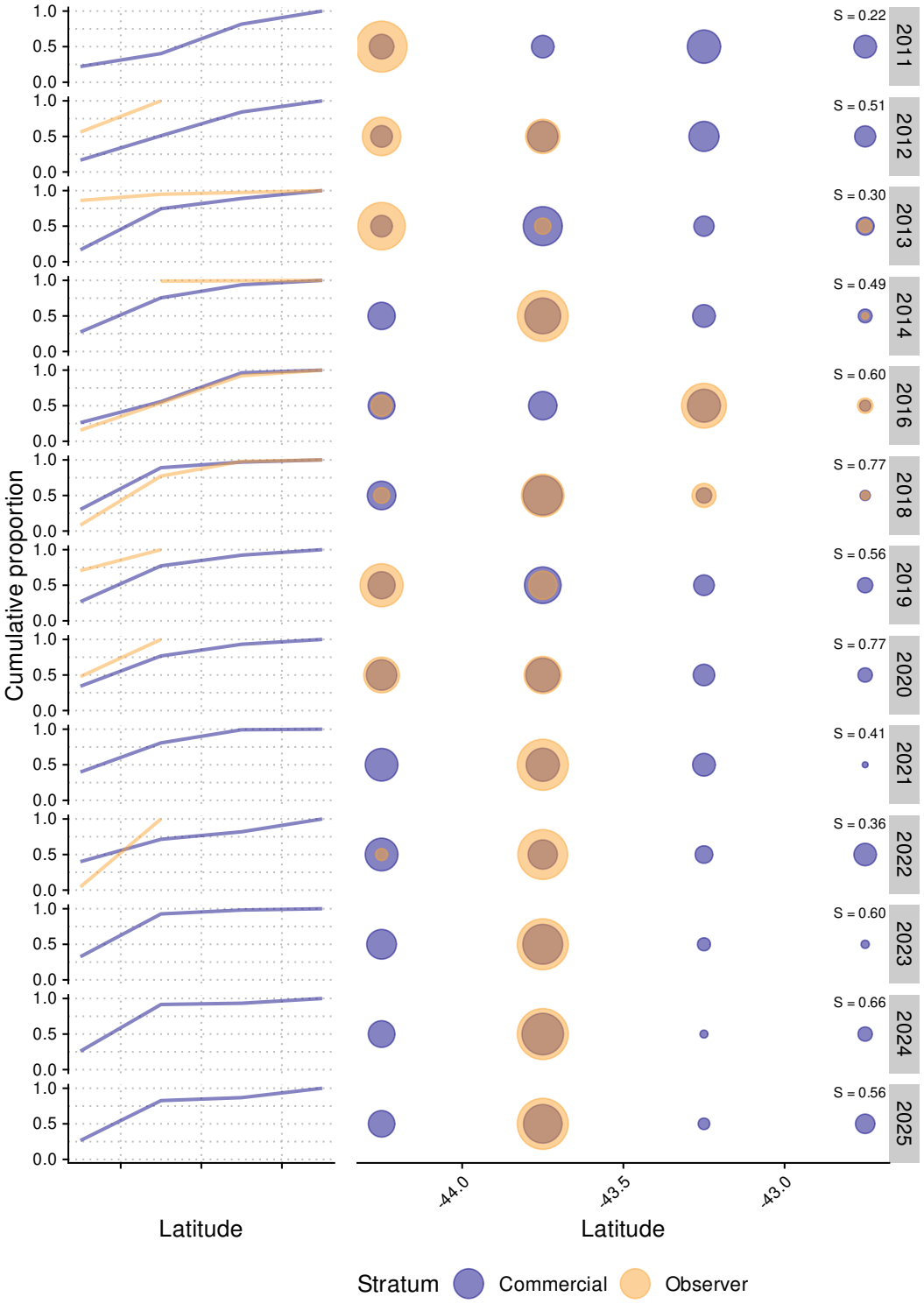


Figure 939: Latitudinal representativeness of observer sampling coverage of Trawl catch in WWA 4, from events where the white warehou catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

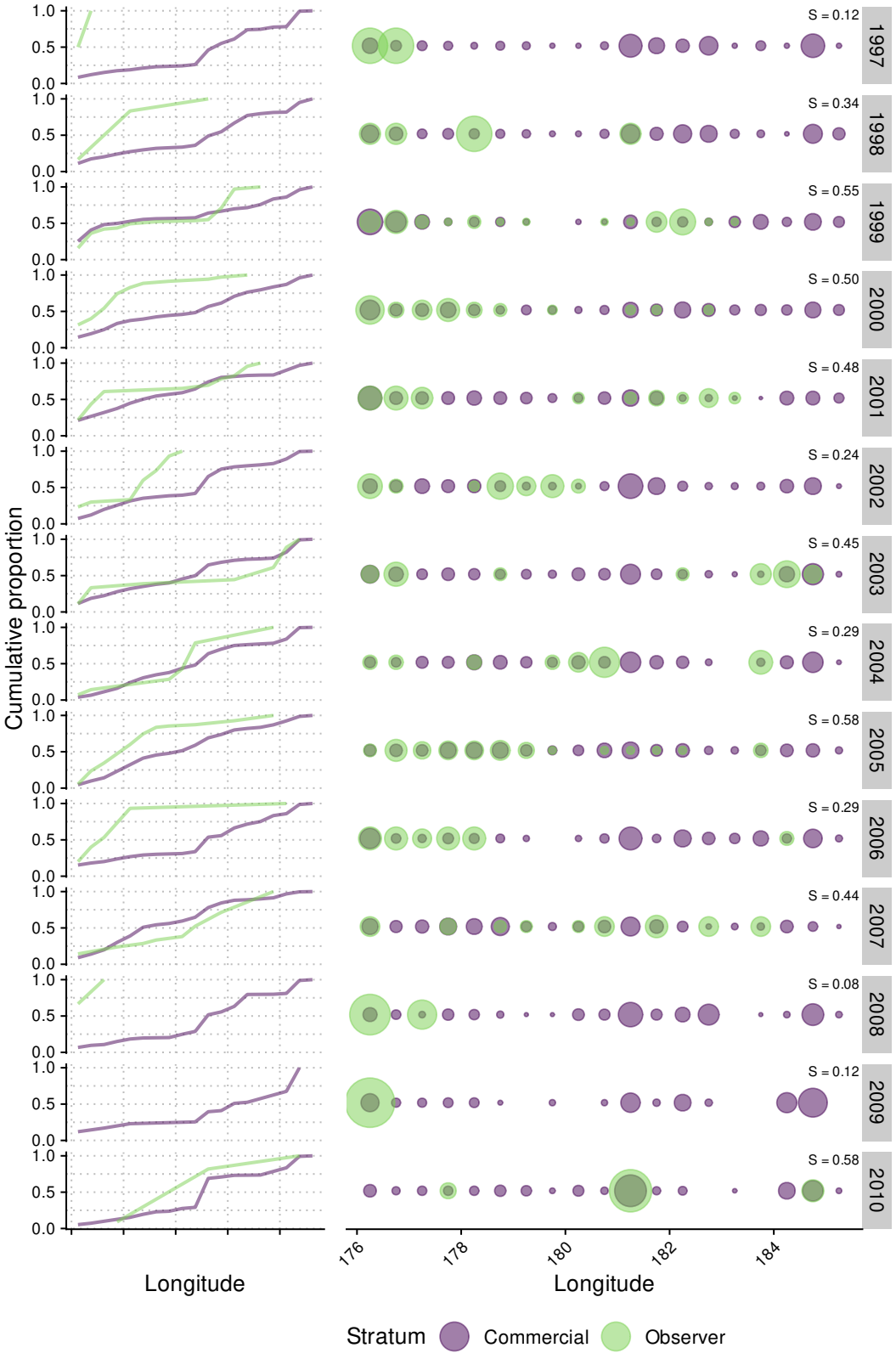


Figure 940: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 4, where the white warehou catch exceeded the 20kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

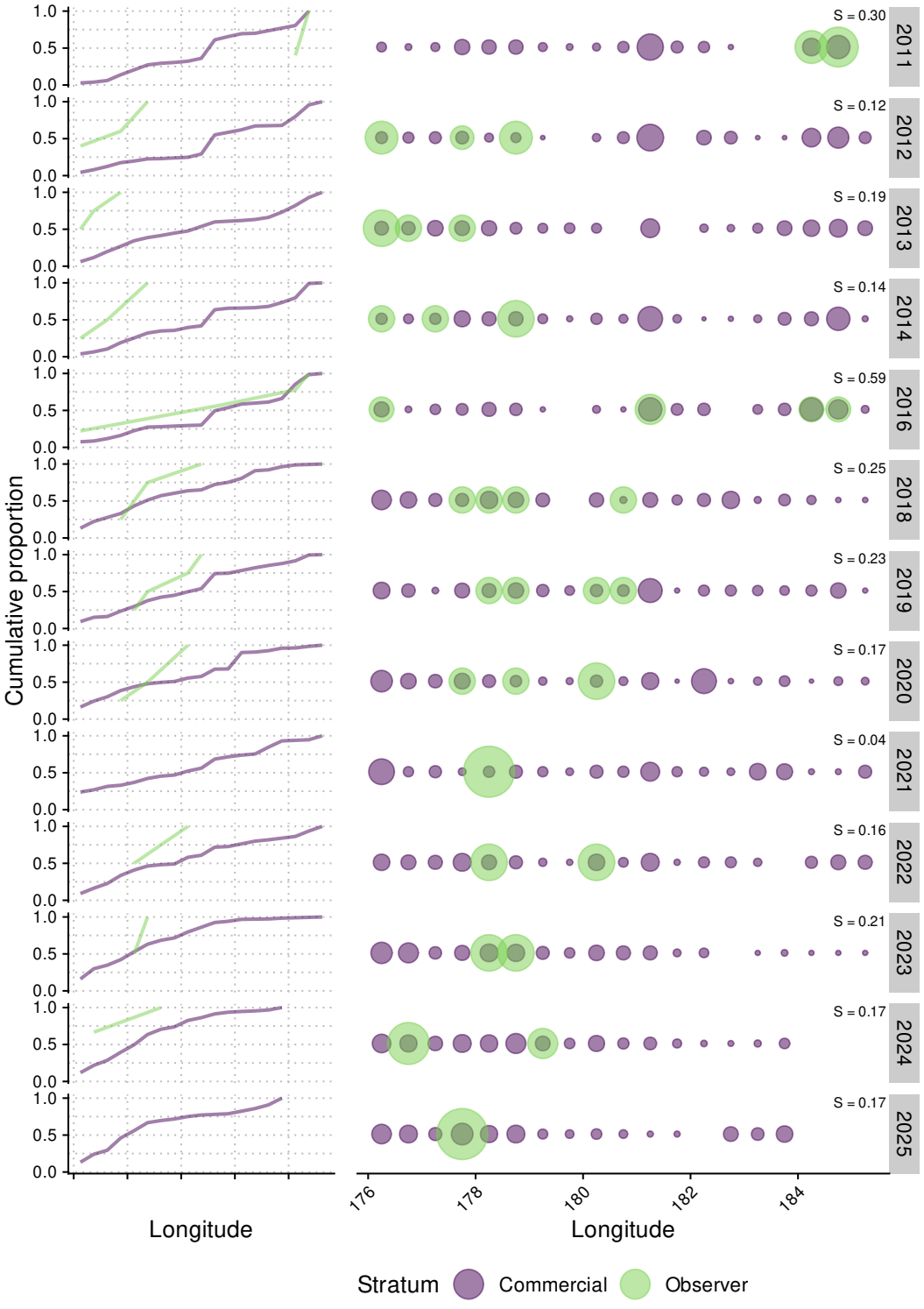


Figure 941: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 4, where the white warehou catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

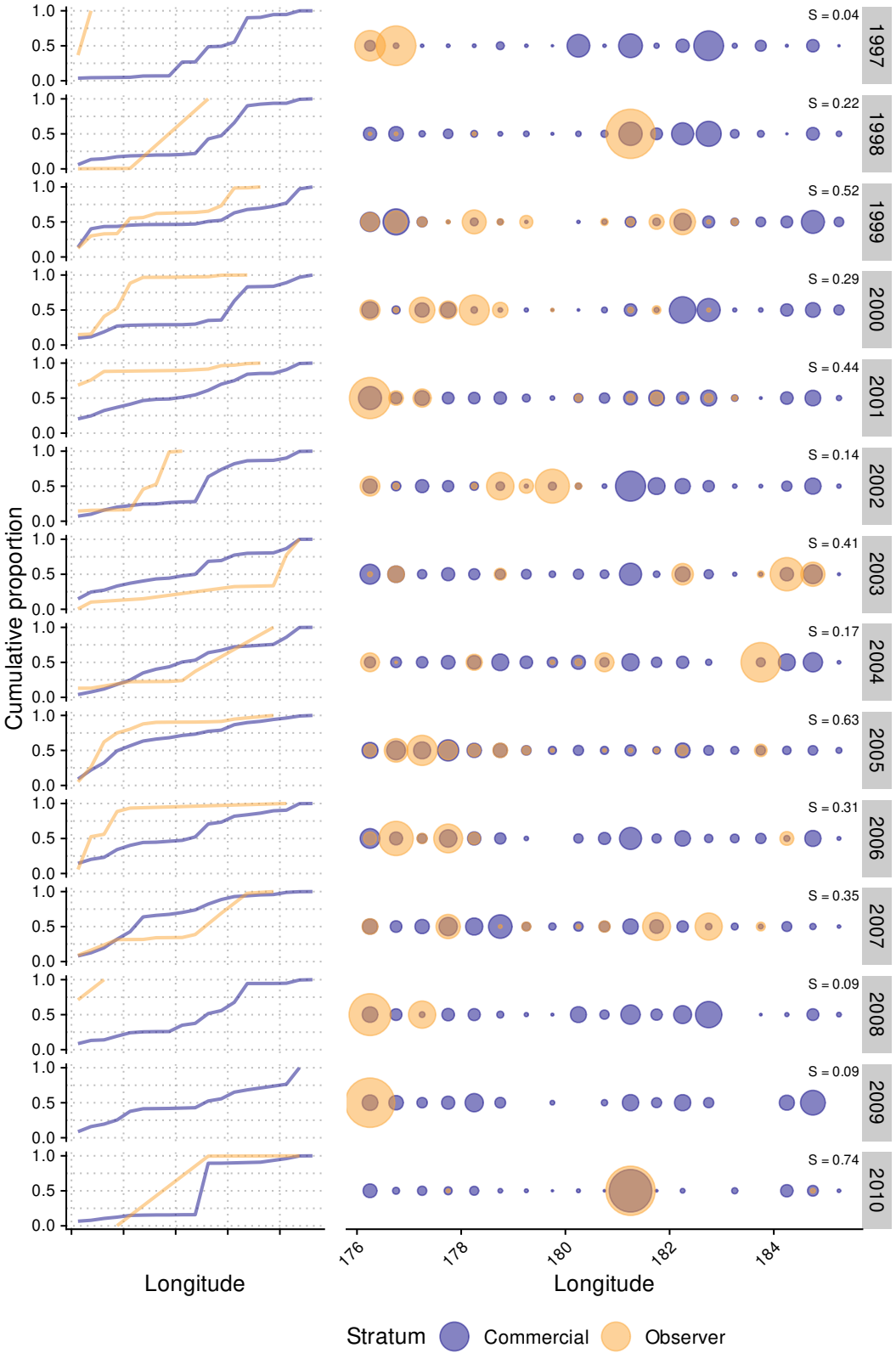


Figure 942: **Longitudinal representativeness of observer sampling coverage of Trawl catch in WWA 4, from events where the white warehou catch exceeded the 20kg threshold, in 1997 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

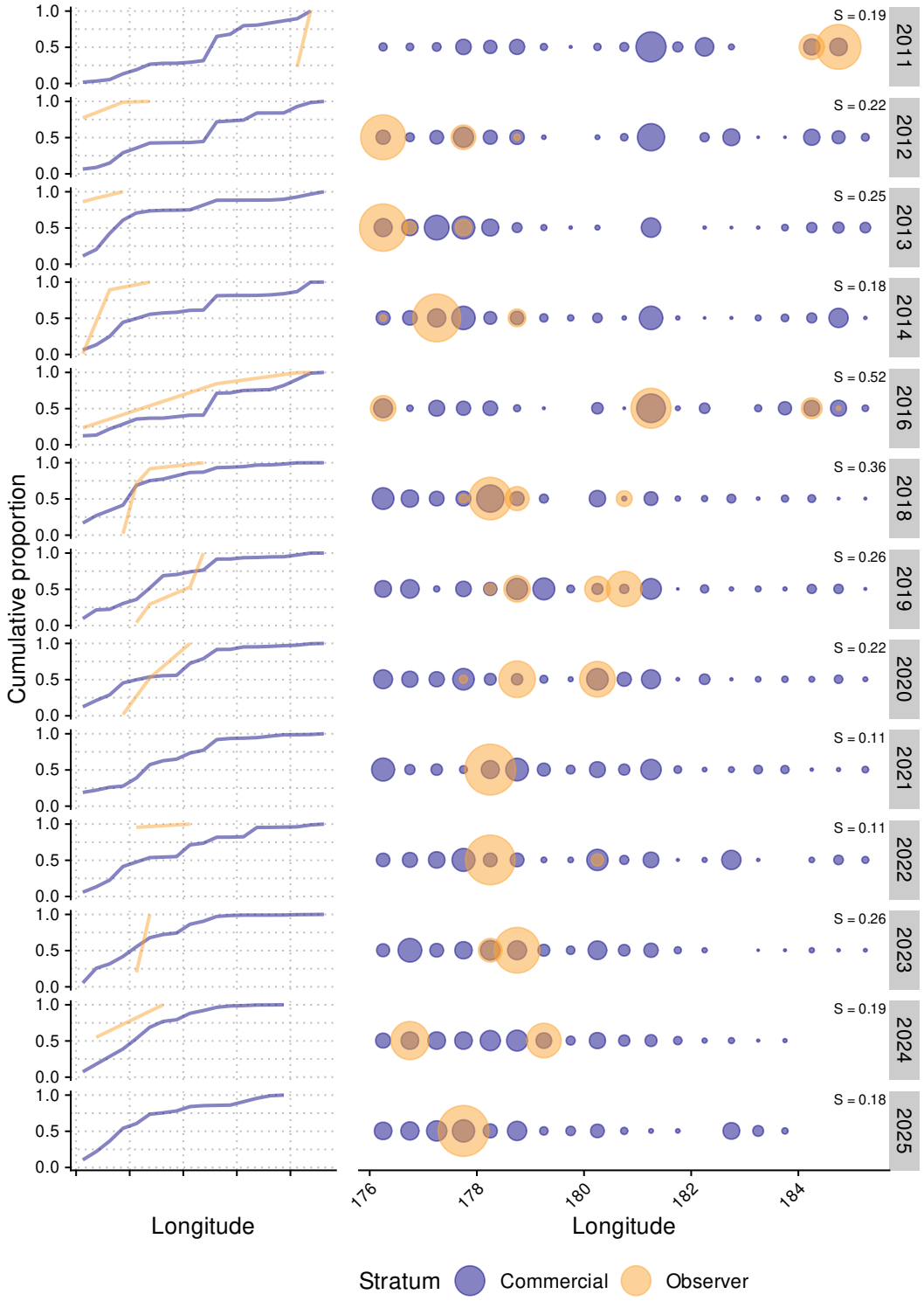


Figure 943: Longitudinal representativeness of observer sampling coverage of Trawl catch in WWA 4, from events where the white warehou catch exceeded the 20kg threshold, in 2011 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

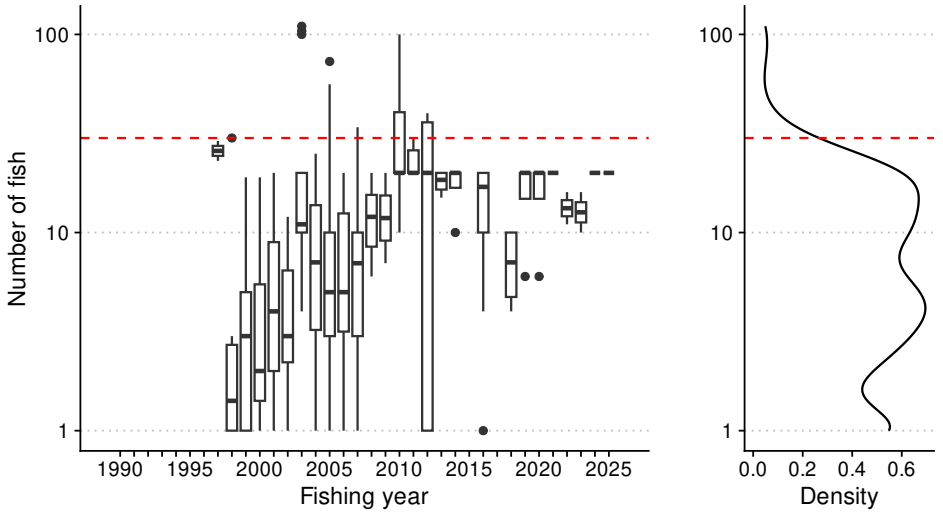


Figure 944: **Length-frequency sample sizes for observed fishing events in WWA 4 where white warehou were sampled. The red dashed line indicates a sample size of 30 fish.**

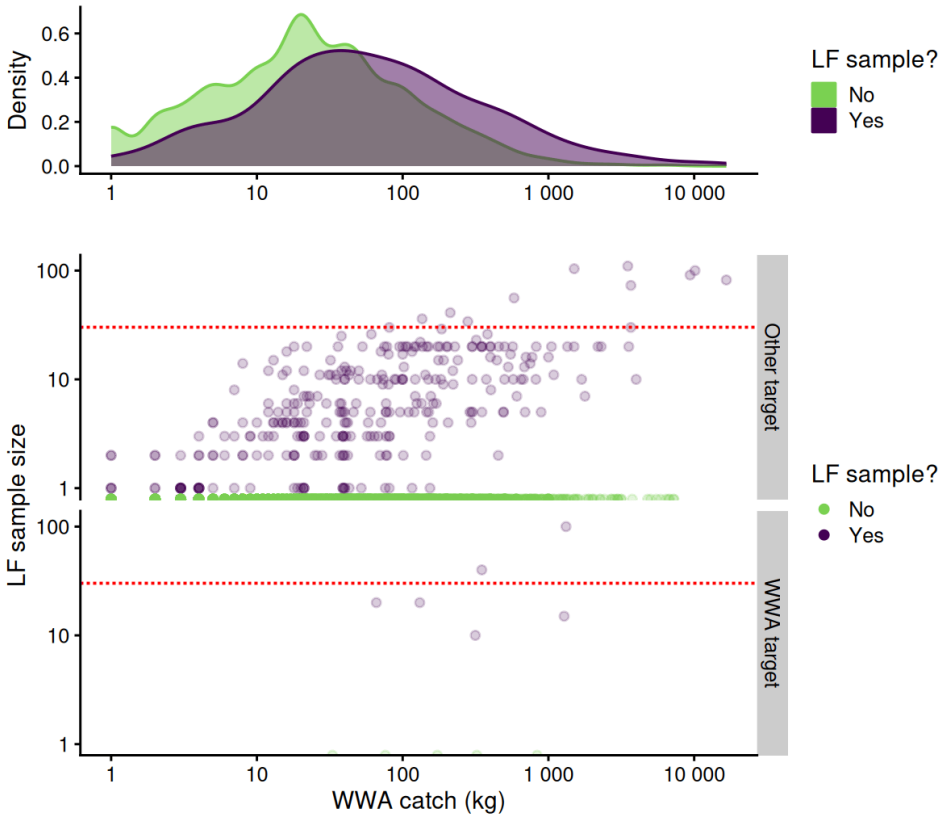


Figure 945: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in WWA 4 in relation to the total white warehou catch from an event, separately for white warehou target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.13.2.2 Otolith samples

Table 79: Otolith samples of white warehou from the WWA 4 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of white warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	53	0	0	0.00
1991	94	0	0	0.00
1992	194	0	0	0.00
1993	136	0	0	0.00
1994	30	0	0	0.00
1995	109	0	0	0.00
1996	78	0	0	0.00
1997	143	0	0	0.00
1998	235	0	0	0.00
1999	233	0	0	0.00
2000	269	0	0	0.00
2001	337	0	0	0.00
2002	420	0	0	0.00
2003	713	0	0	0.00
2004	591	0	0	0.00
2005	597	0	0	0.00
2006	599	0	0	0.00
2007	541	0	0	0.00
2008	354	0	0	0.00
2009	198	0	0	0.00
2010	202	1	5	0.50
2011	156	5	25	3.21
2012	246	1	5	0.41
2013	162	3	15	1.85
2014	212	4	20	1.89
2015	132	0	0	0.00
2016	128	0	0	0.00
2017	52	0	0	0.00
2018	129	2	7	1.55
2019	179	4	20	2.23
2020	263	4	19	1.52
2021	130	1	5	0.77
2022	110	2	15	1.82
2023	178	1	10	0.56
2024	394	3	15	0.76
2025	241	1	5	0.41

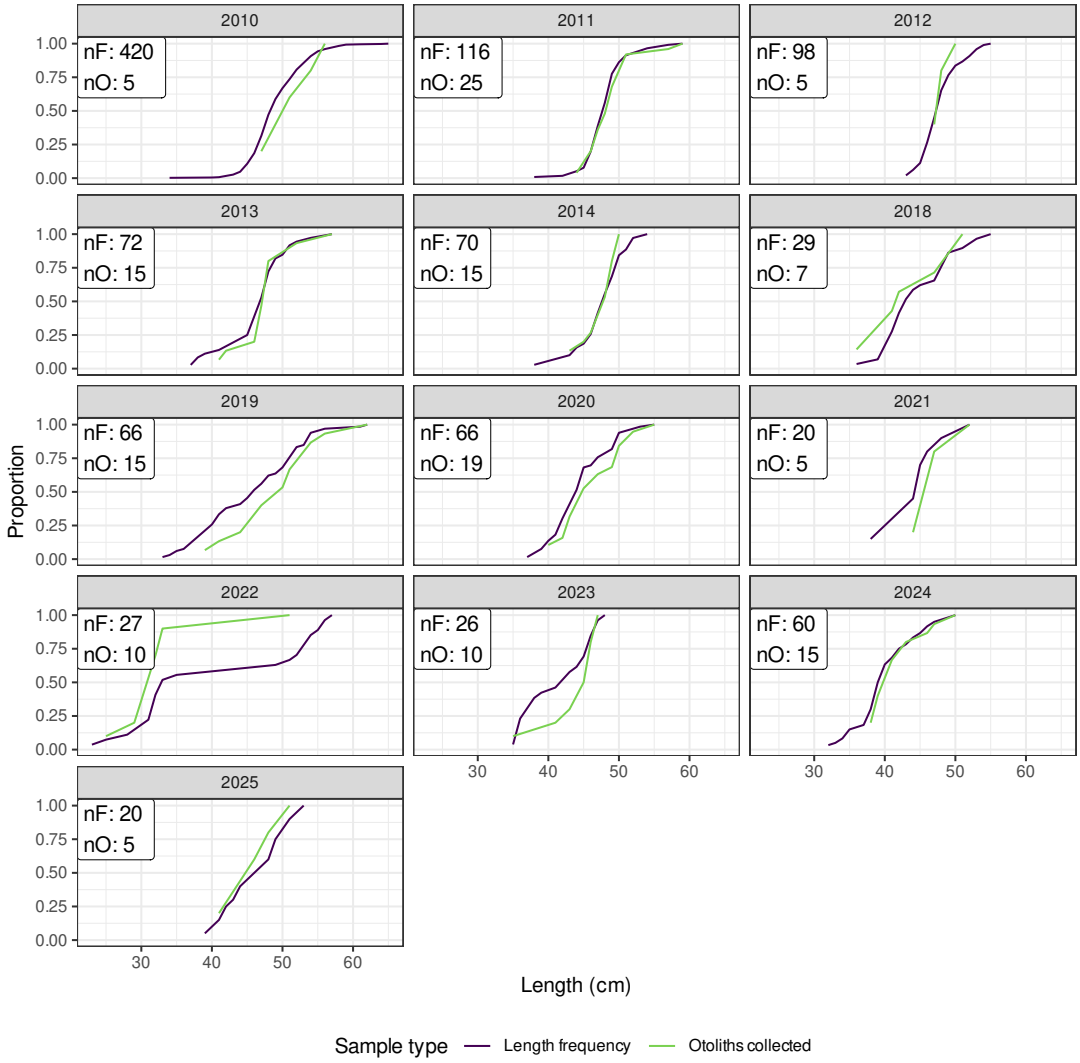


Figure 946: Cumulative distributions of the length of fish in the length frequency and otolith samples of white warehou in the WWA 4 Trawl fishery for the 2010 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.13.2.3 Catch quantification

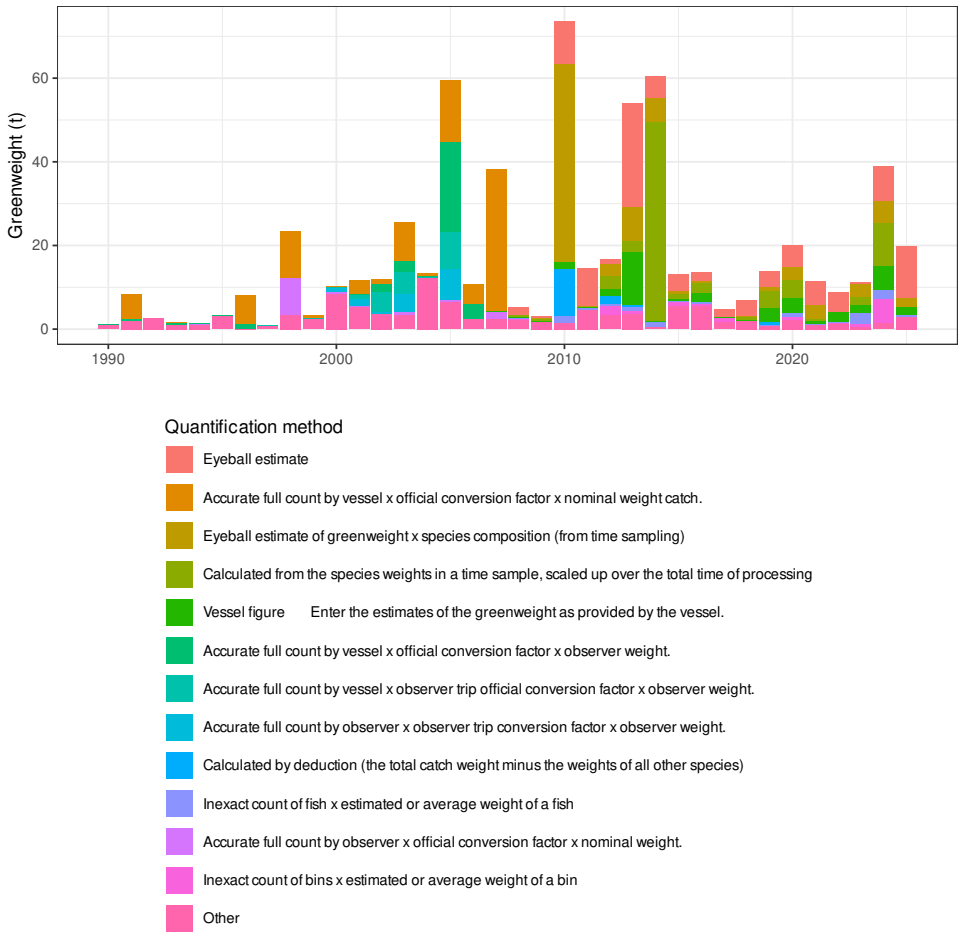


Figure 947: Methods used by observers to quantify the catch of white warehou in the WWA 4 Trawl fishery. The legend lists the methods used in descending order of total catch.

2.13.3 WWA 5B: Trawl fishery

2.13.3.1 Length-frequency samples

Table 80: Length-frequency samples of white warehou from the WWA 5B Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of white warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	341	0	0	0.00
1991	338	0	0	0.00
1992	713	1	104	0.14
1993	686	2	3	0.29
1994	394	0	0	0.00
1995	383	1	42	0.26
1996	387	1	48	0.26
1997	674	2	12	0.30
1998	612	79	576	12.91
1999	510	80	537	15.69
2000	889	113	1 012	12.71
2001	627	72	516	11.48
2002	948	119	1 453	12.55
2003	940	120	1 390	12.77
2004	841	68	1 007	8.09
2005	1 263	37	486	2.93
2006	888	45	789	5.07
2007	1 388	96	2 464	6.92
2008	1 148	65	1 333	5.66
2009	1 017	61	2 062	6.00
2010	894	55	2 314	6.15
2011	633	66	2 772	10.43
2012	692	106	4 354	15.32
2013	777	101	4 887	13.00
2014	777	96	5 485	12.36
2015	596	32	697	5.37
2016	504	52	2 645	10.32
2017	489	43	1 798	8.79
2018	913	51	1 812	5.59
2019	760	35	1 790	4.61
2020	558	18	940	3.23
2021	470	23	1 387	4.89
2022	490	31	1 352	6.33
2023	607	18	966	2.97
2024	493	16	670	3.25
2025	457	10	513	2.19

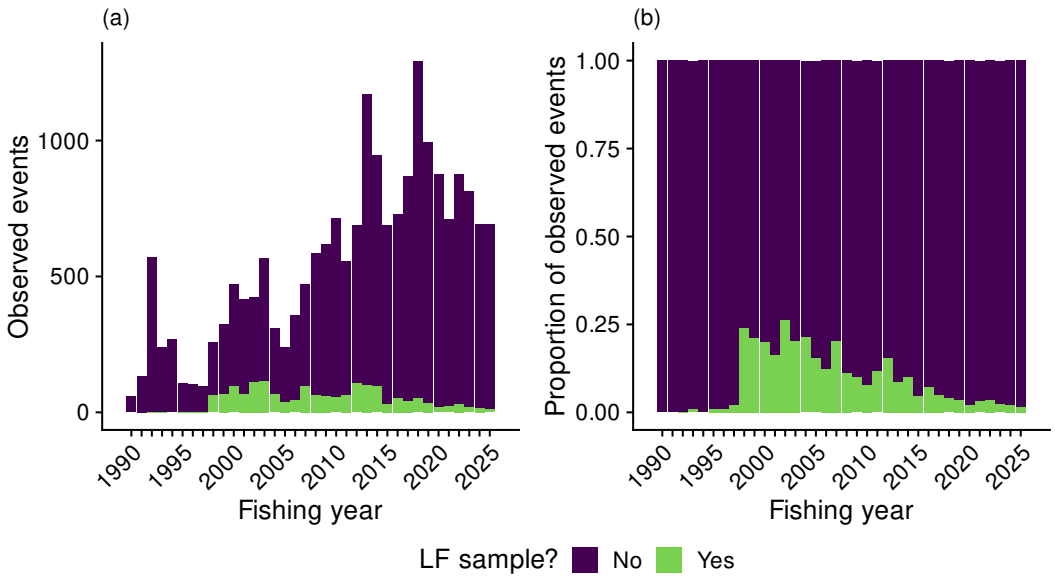


Figure 948: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in WWA 5B where the white warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

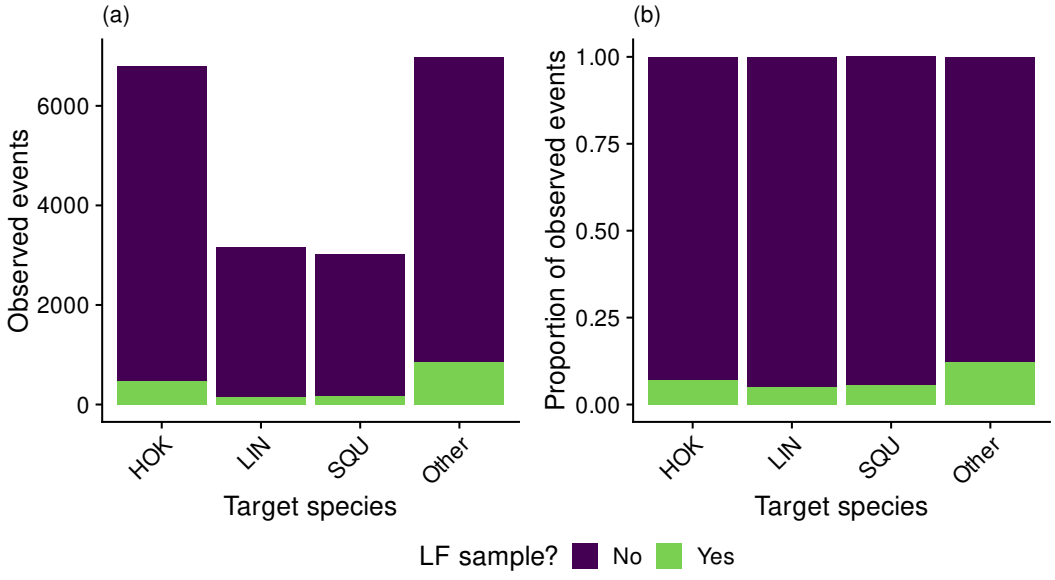


Figure 949: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in WWA 5B where the white warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

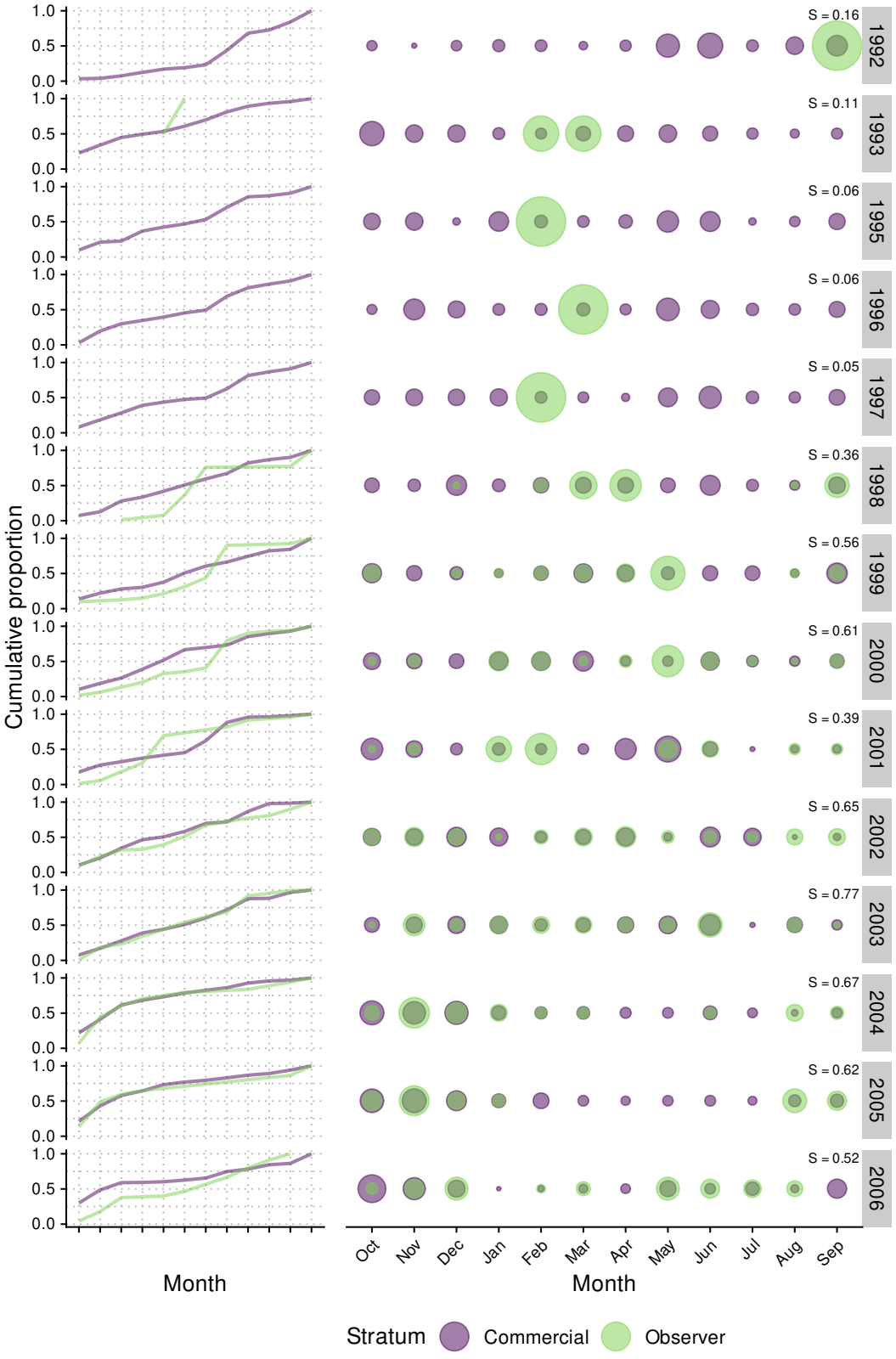


Figure 950: Monthly representativeness of observer sampling coverage of Trawl fishing events in WWA 5B, where the white warehou catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

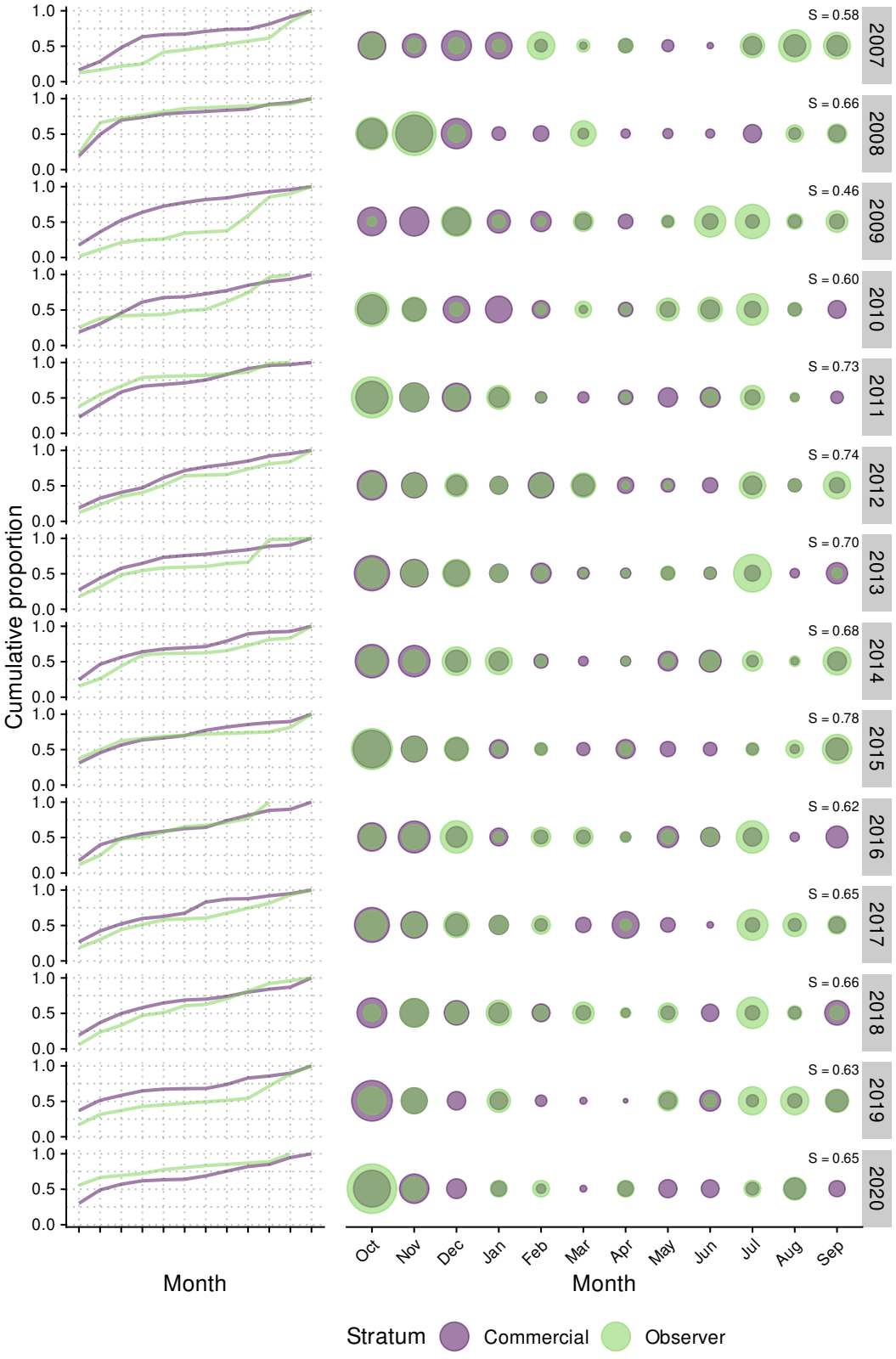


Figure 951: Monthly representativeness of observer sampling coverage of Trawl fishing events in WWA 5B, where the white warehou catch exceeded the 20kg threshold, in 2007 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

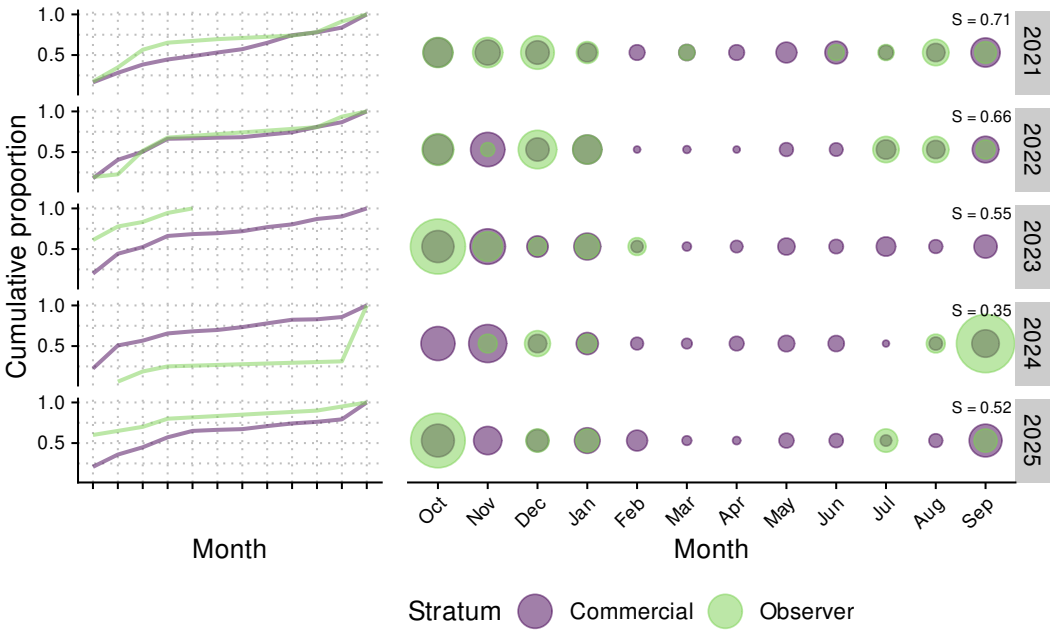


Figure 952: Monthly representativeness of observer sampling coverage of Trawl fishing events in WWA 5B, where the white warehou catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.

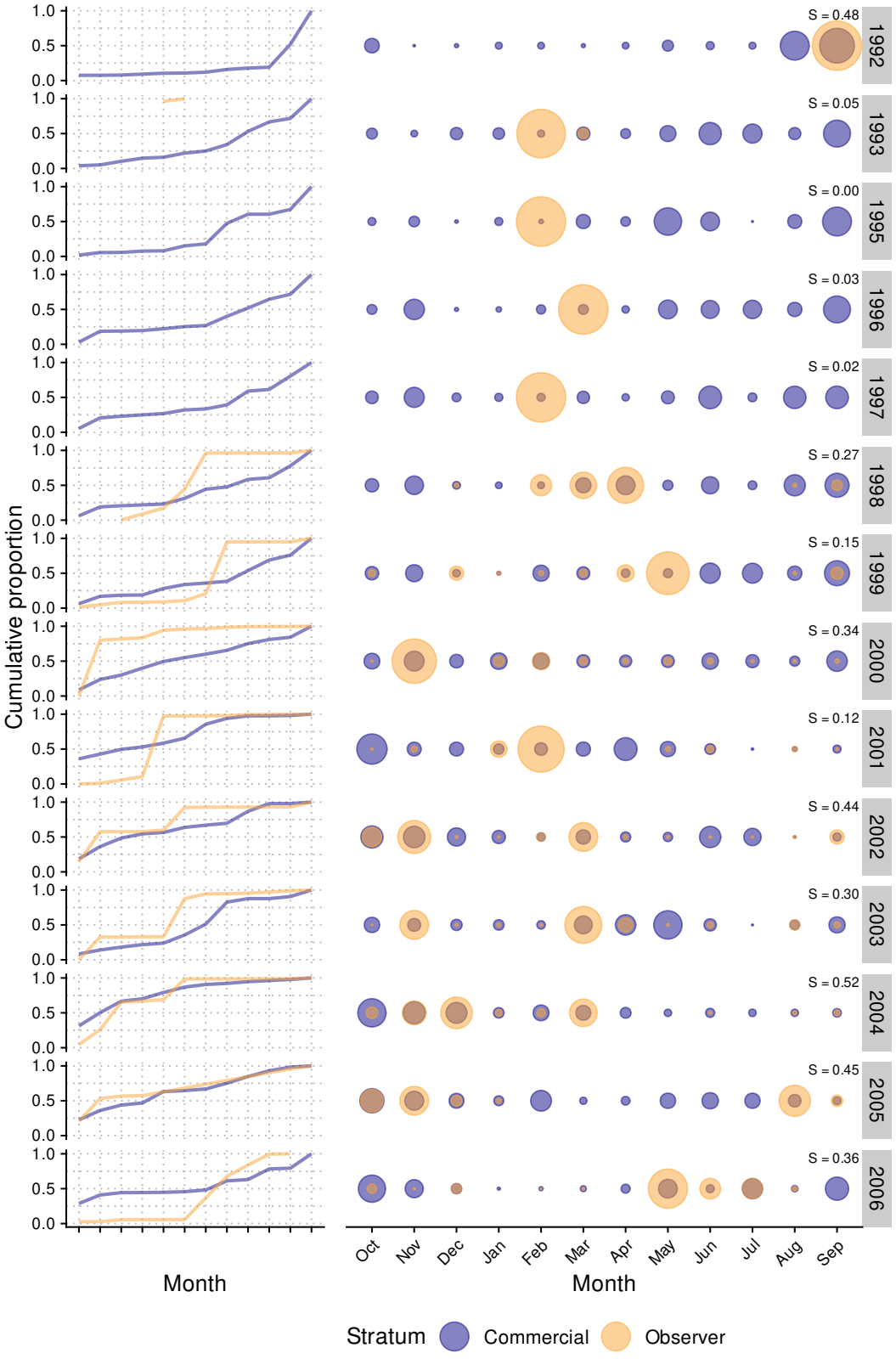


Figure 953: **Monthly representativeness of observer sampling coverage of Trawl catch in WWA 5B, from events where the white warehou catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

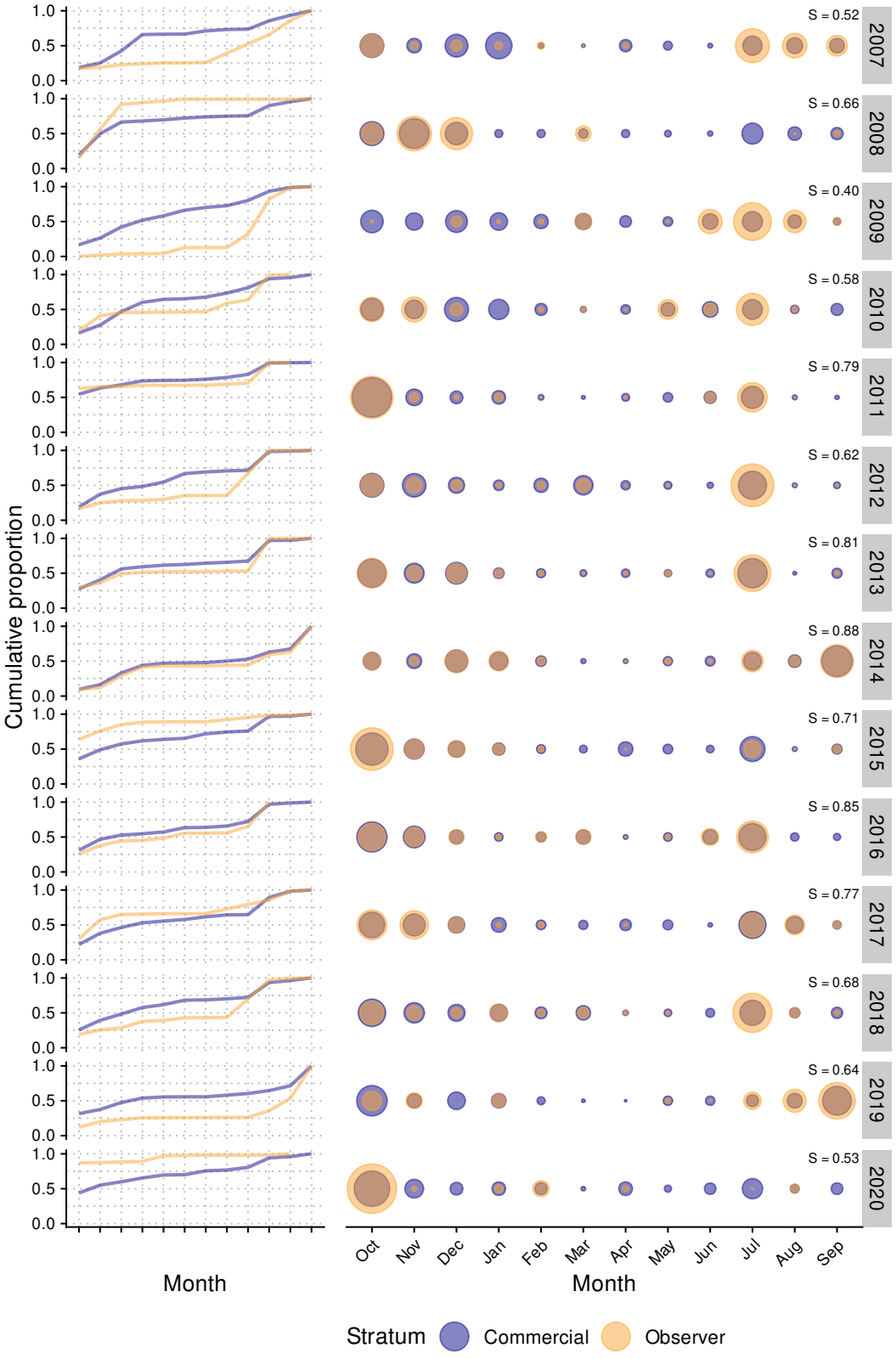


Figure 954: **Monthly representativeness of observer sampling coverage of Trawl catch in WWA 5B, from events where the white warehou catch exceeded the 20kg threshold, in 2007 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

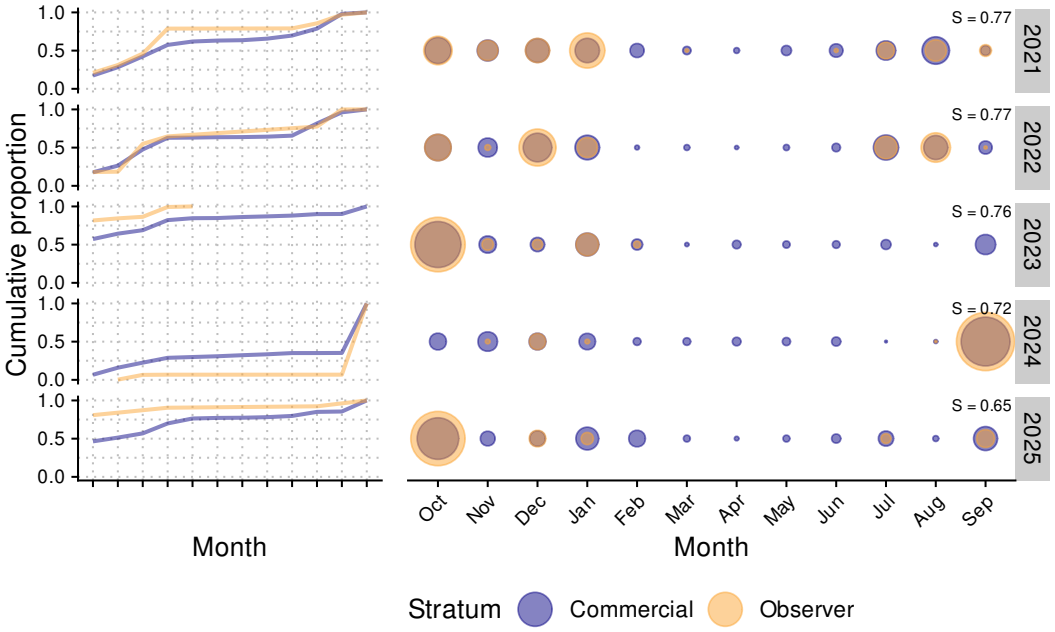


Figure 955: **Monthly representativeness of observer sampling coverage of Trawl catch in WWA 5B, from events where the white warehou catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

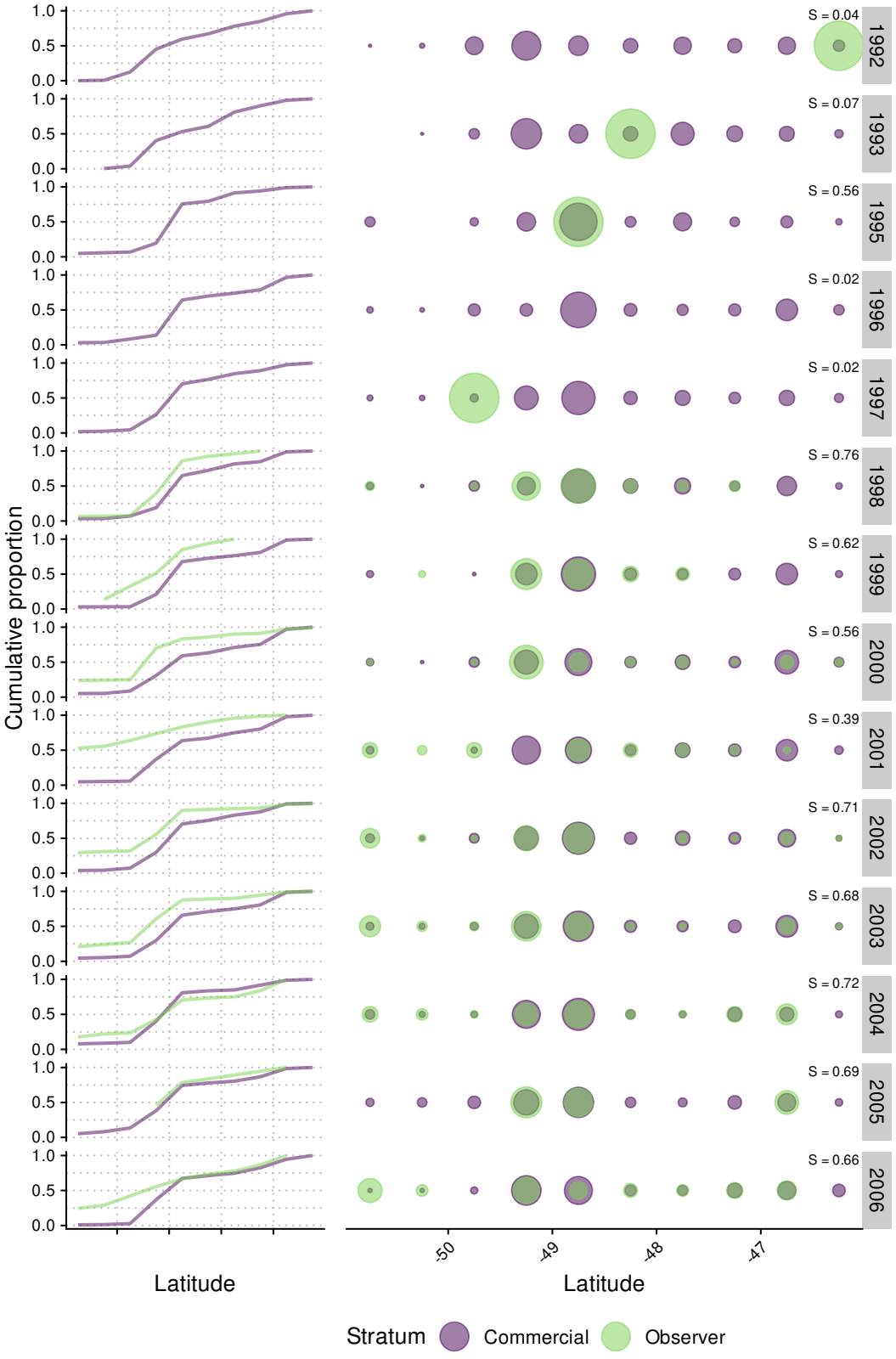


Figure 956: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 5B, where the white warehou catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

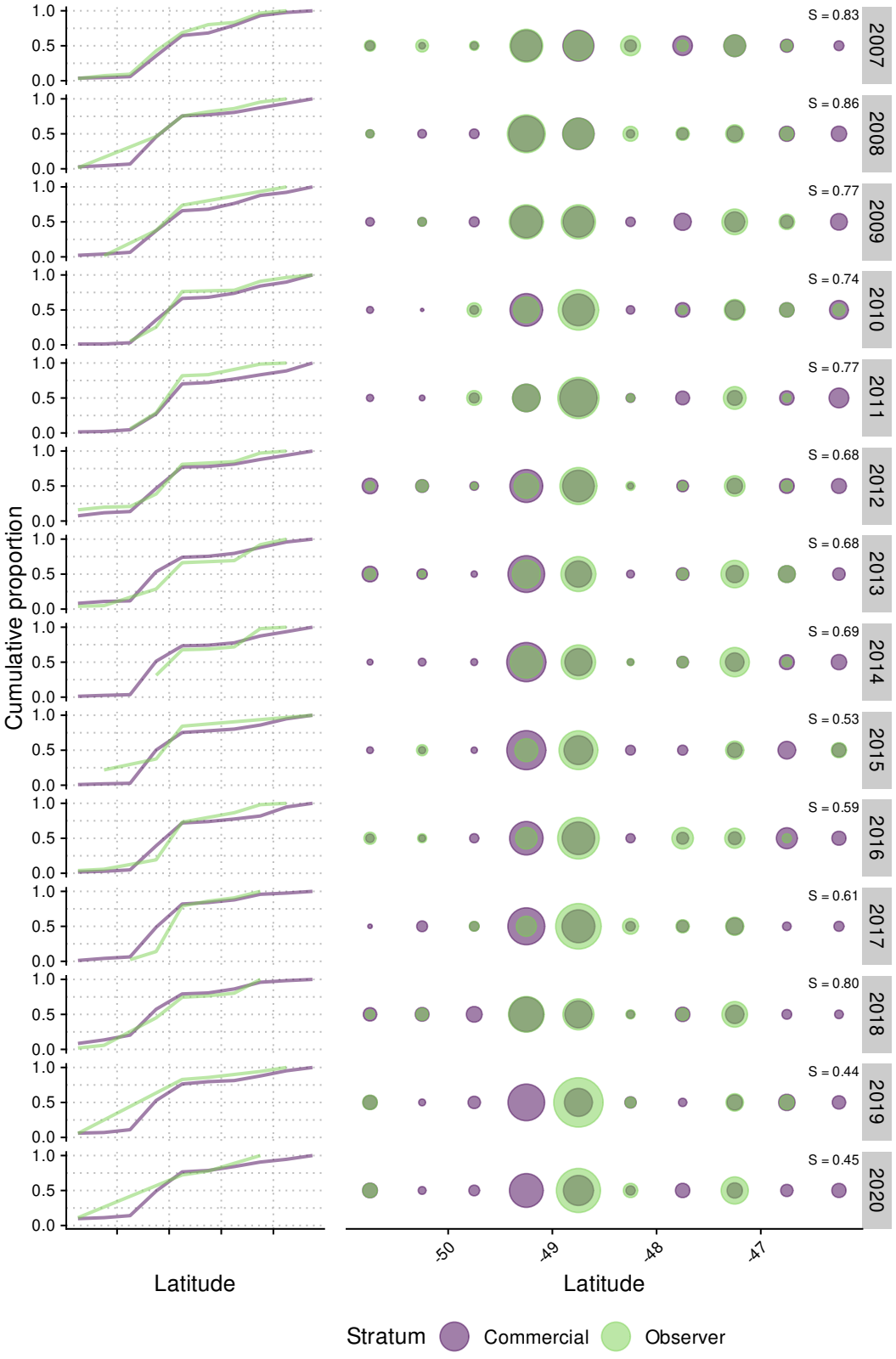


Figure 957: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 5B, where the white warehou catch exceeded the 20kg threshold, in 2007 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

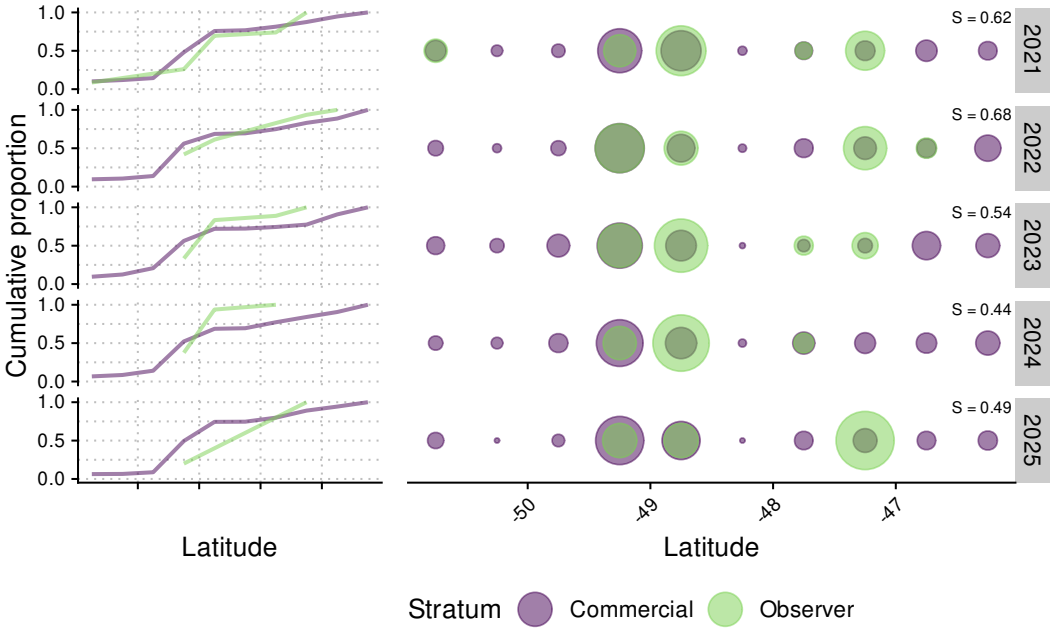


Figure 958: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 5B, where the white warehou catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

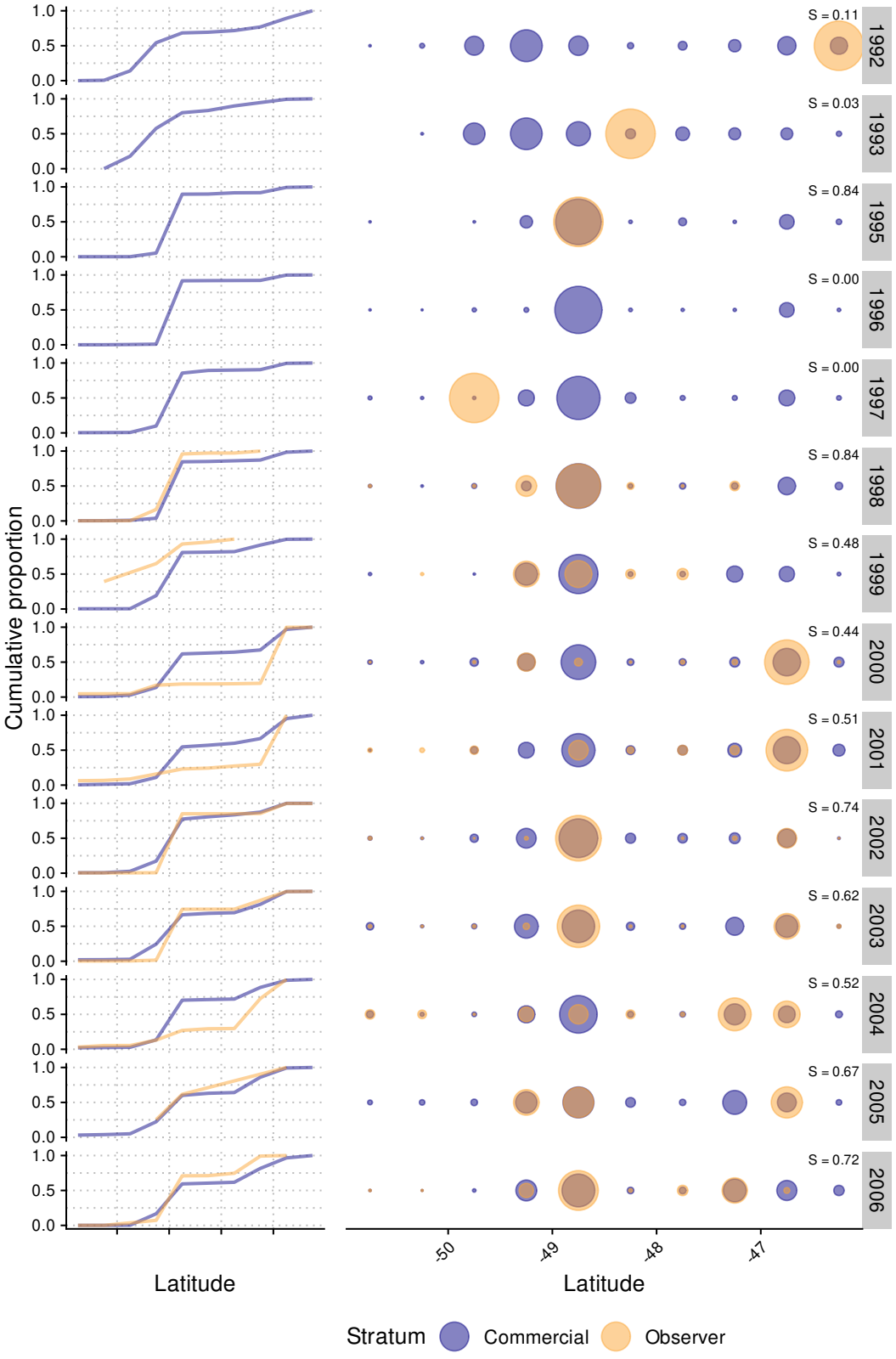


Figure 959: **Latitudinal representativeness of observer sampling coverage of Trawl catch in WWA 5B, from events where the white warehou catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

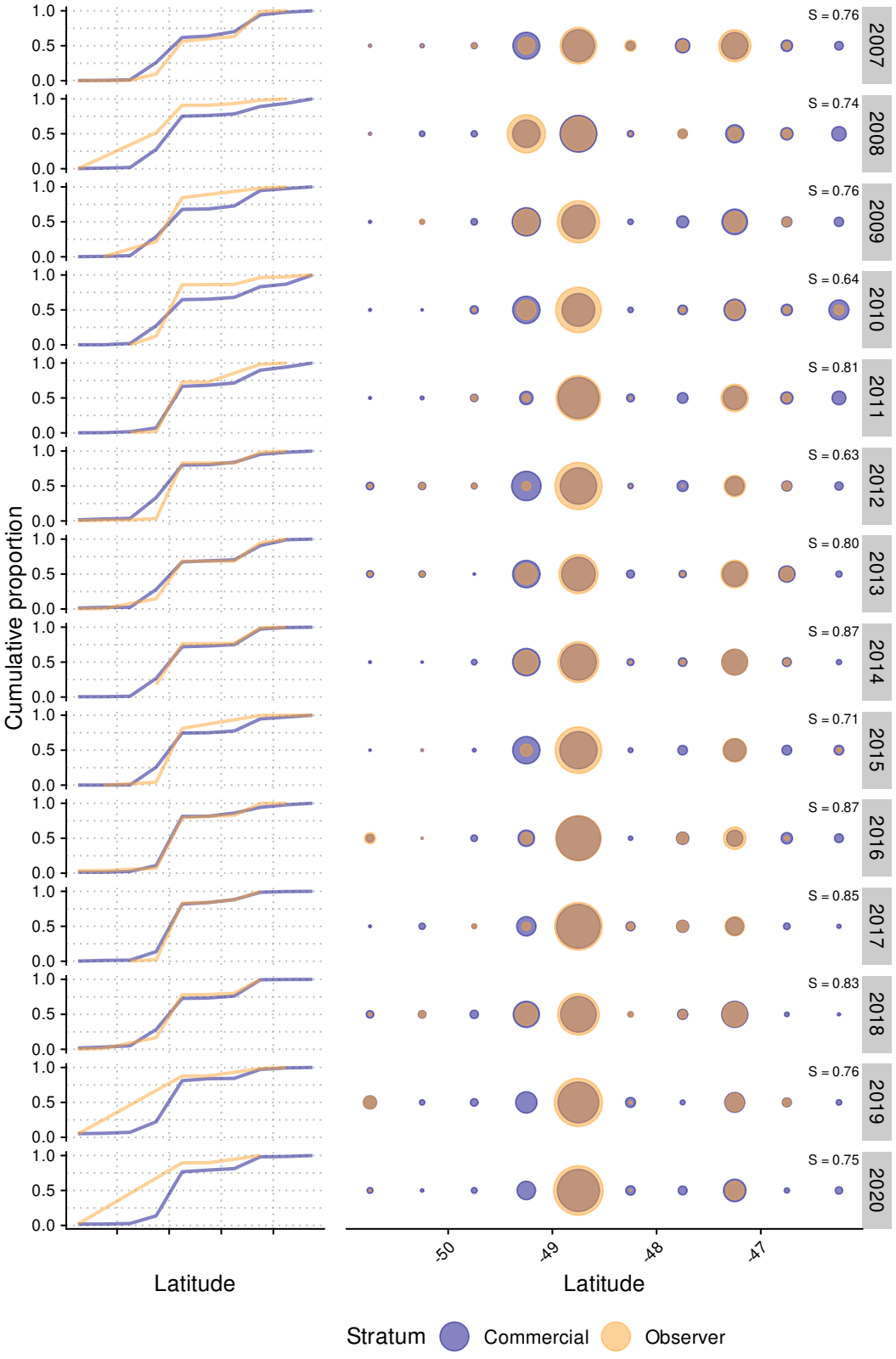


Figure 960: **Latitudinal representativeness of observer sampling coverage of Trawl catch in WWA 5B, from events where the white warehou catch exceeded the 20kg threshold, in 2007 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

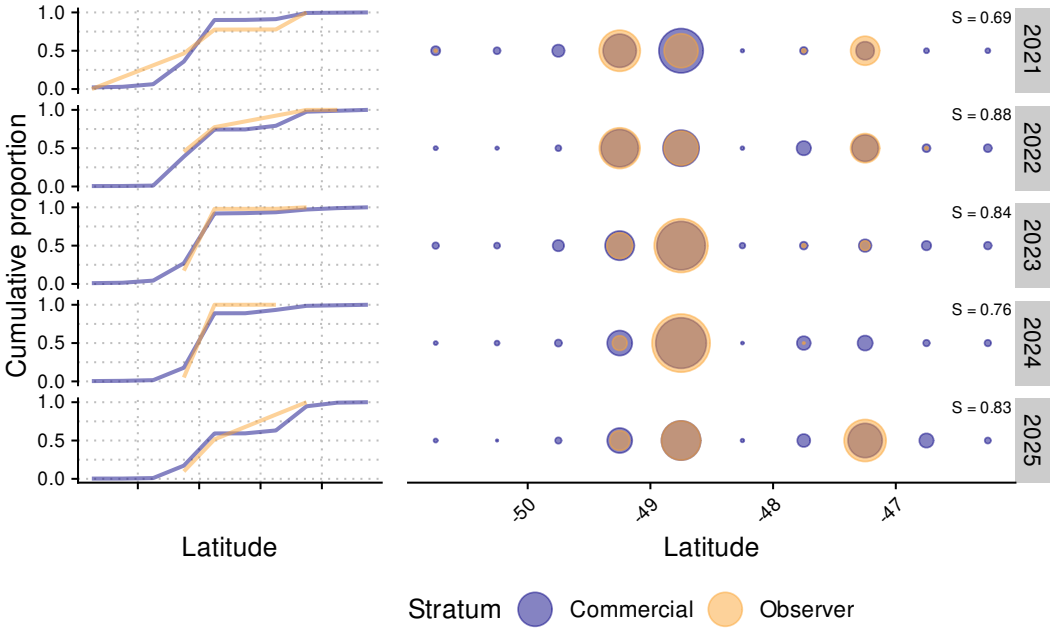


Figure 961: Latitudinal representativeness of observer sampling coverage of Trawl catch in WWA 5B, from events where the white warehou catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

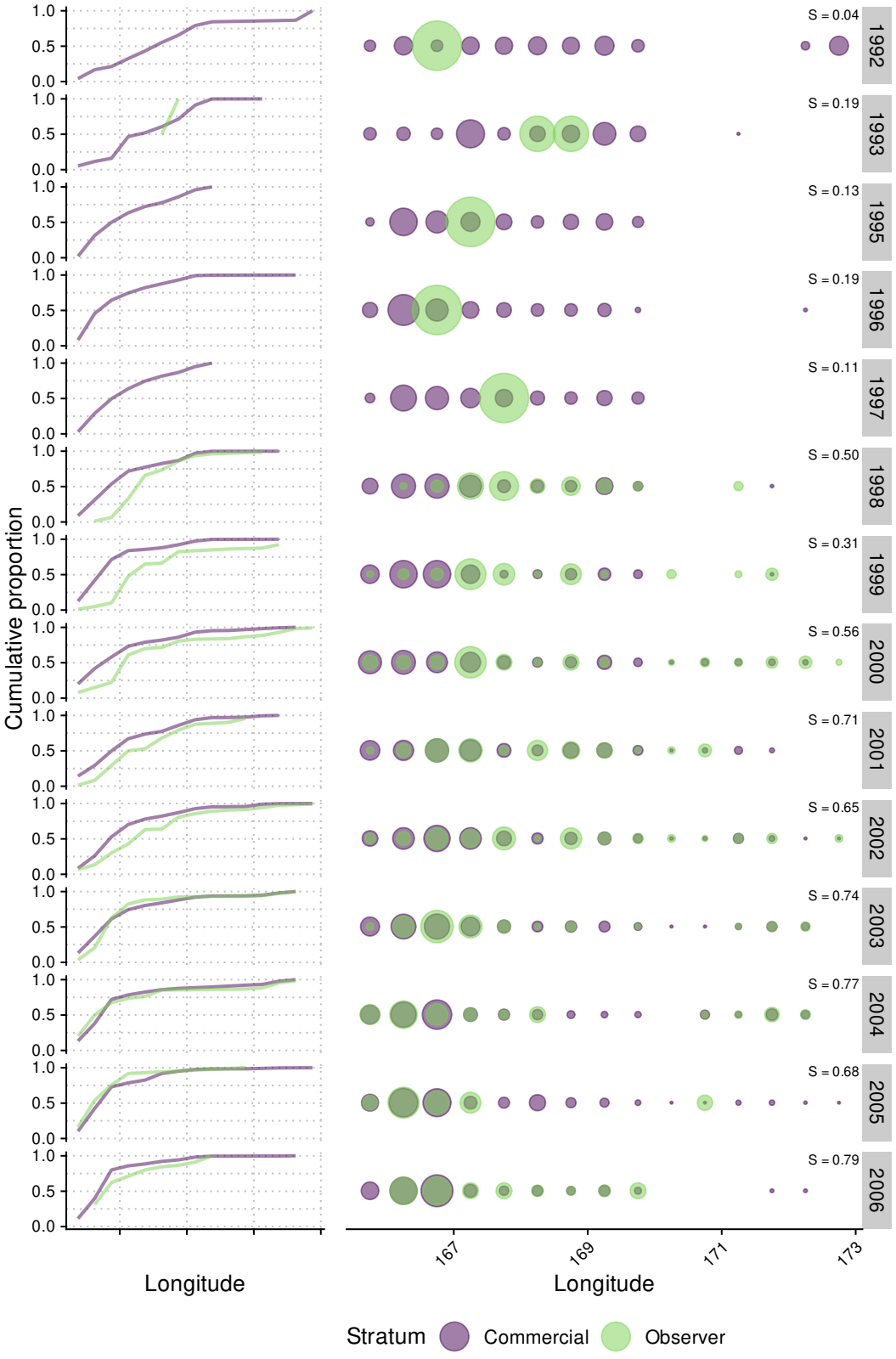


Figure 962: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 5B, where the white warehou catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

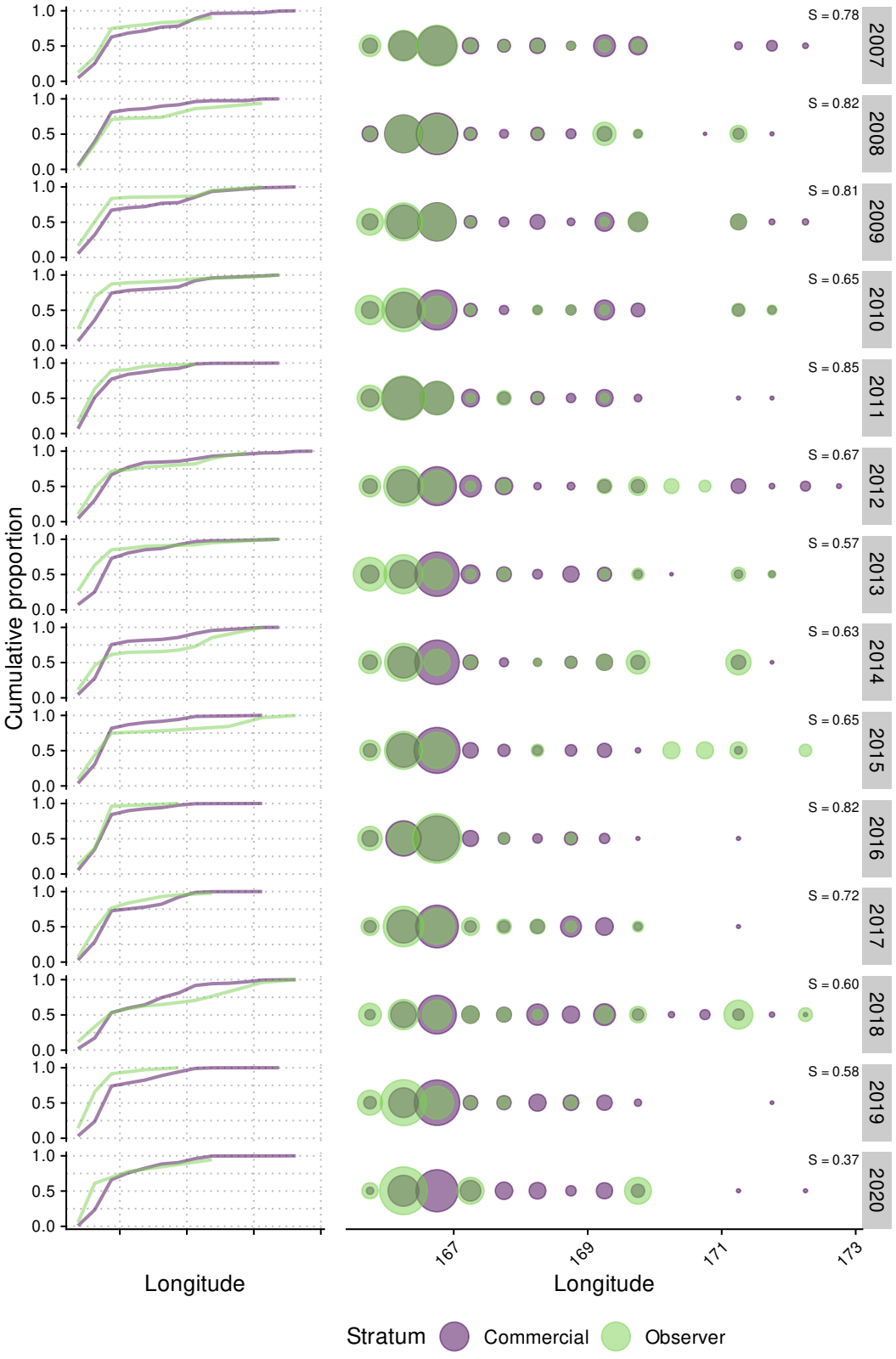


Figure 963: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 5B, where the white warehou catch exceeded the 20kg threshold, in 2007 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

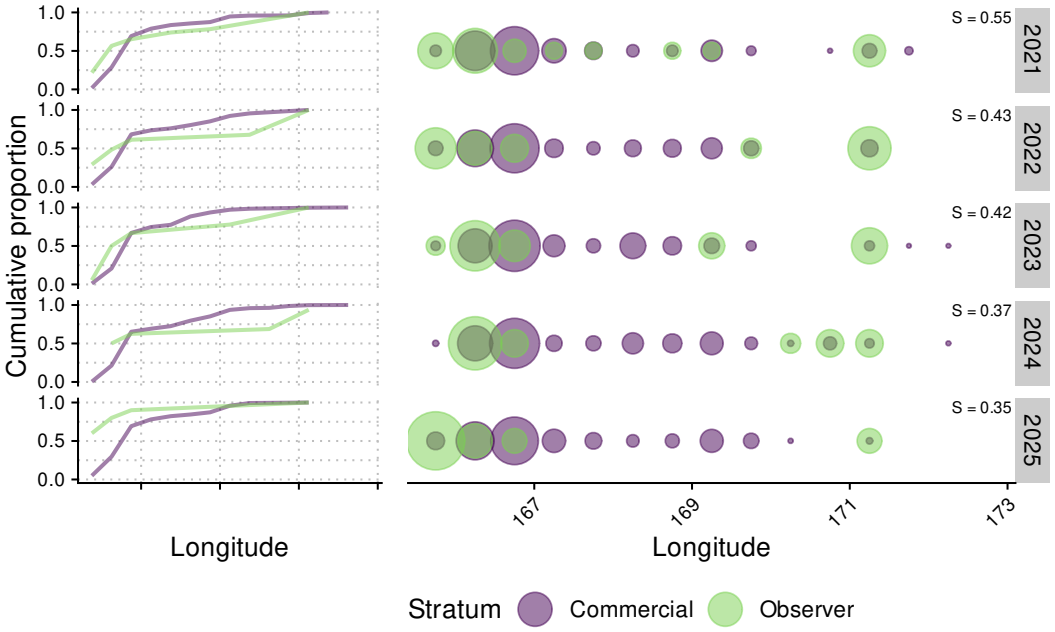


Figure 964: **Longitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 5B, where the white warehou catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

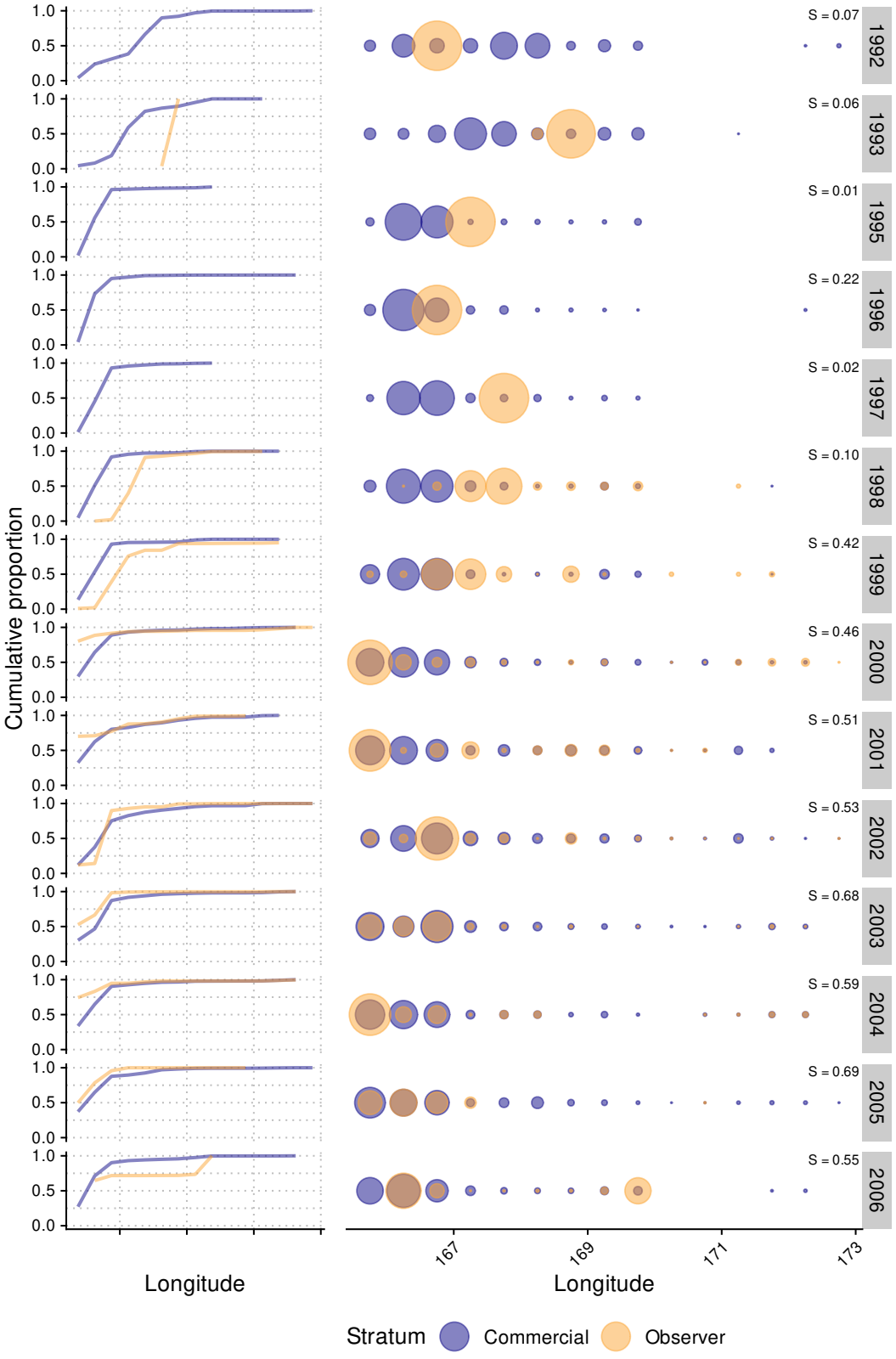


Figure 965: **Longitudinal representativeness of observer sampling coverage of Trawl catch in WWA 5B, from events where the white warehou catch exceeded the 20kg threshold, in 1992 to 2006. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

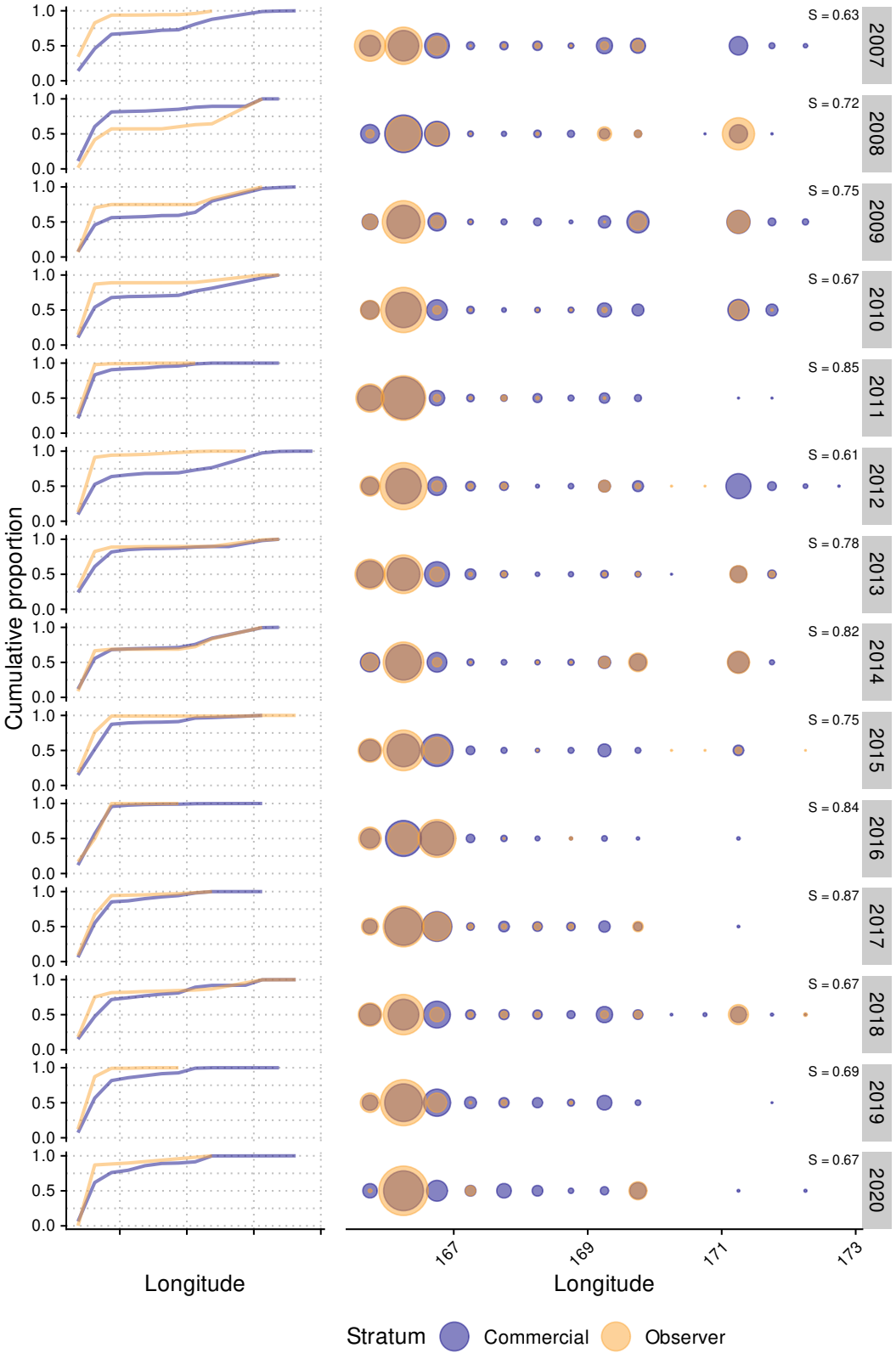


Figure 966: **Longitudinal representativeness of observer sampling coverage of Trawl catch in WWA 5B, from events where the white warehou catch exceeded the 20kg threshold, in 2007 to 2020. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

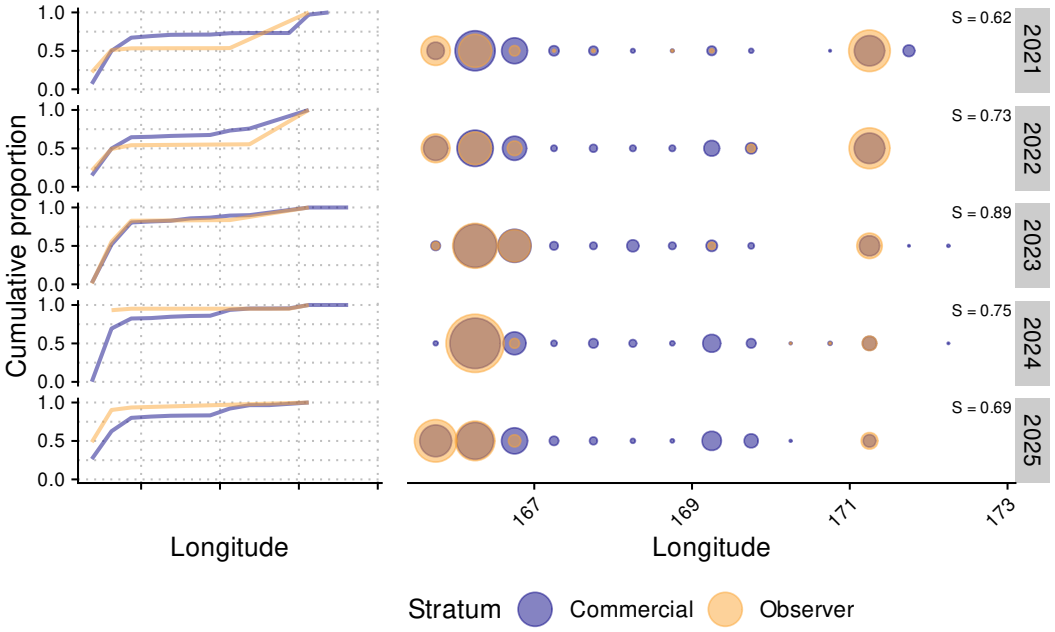


Figure 967: **Longitudinal representativeness of observer sampling coverage of Trawl catch in WWA 5B, from events where the white warehou catch exceeded the 20kg threshold, in 2021 to 2025. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

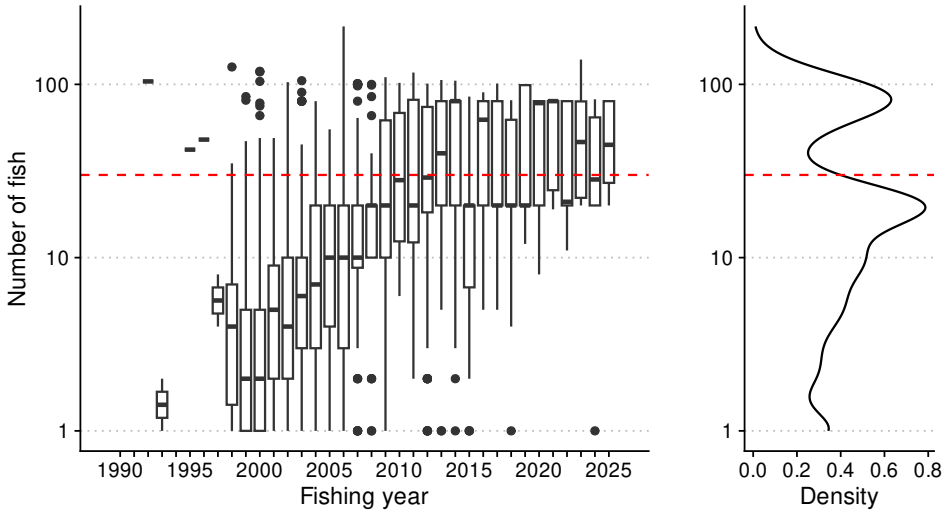


Figure 968: **Length-frequency sample sizes for observed fishing events in WWA 5B where white warehou were sampled. The red dashed line indicates a sample size of 30 fish.**

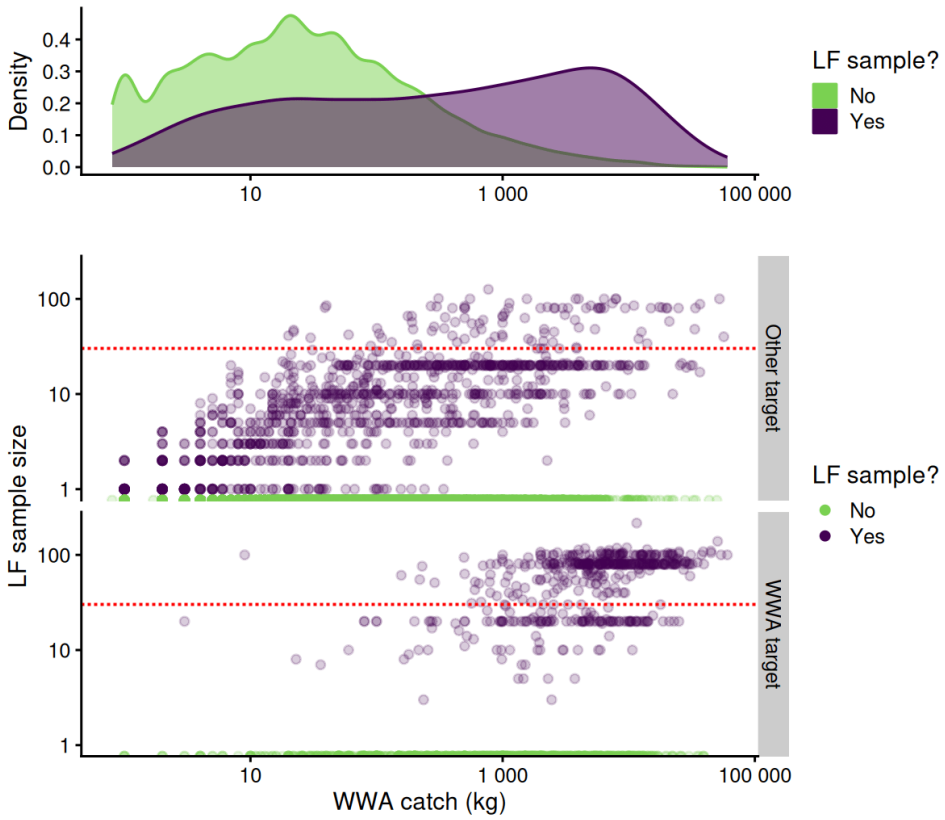


Figure 969: Length-frequency sample sizes (number of fish sampled) for observed fishing events in WWA 5B in relation to the total white warehou catch from an event, separately for white warehou target events and other target species. The red dashed line indicates a sample size of 30 fish.

2.13.3.2 Otolith samples

Table 81: Otolith samples of white warehou from the WWA 5B Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of white warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	341	0	0	0.00
1991	338	0	0	0.00
1992	713	0	0	0.00
1993	686	0	0	0.00
1994	394	0	0	0.00
1995	383	0	0	0.00
1996	387	0	0	0.00
1997	674	0	0	0.00
1998	612	0	0	0.00
1999	510	0	0	0.00
2000	889	0	0	0.00
2001	627	0	0	0.00
2002	948	0	0	0.00
2003	940	0	0	0.00
2004	841	0	0	0.00
2005	1 263	0	0	0.00
2006	888	0	0	0.00
2007	1 388	0	0	0.00
2008	1 148	0	0	0.00
2009	1 017	13	61	1.28
2010	894	43	244	4.81
2011	633	34	238	5.37
2012	692	80	433	11.56
2013	777	72	378	9.27
2014	777	69	367	8.88
2015	596	13	66	2.18
2016	504	25	133	4.96
2017	489	32	154	6.54
2018	913	51	303	5.59
2019	760	35	186	4.61
2020	558	18	98	3.23
2021	470	22	115	4.68
2022	490	31	166	6.33
2023	607	15	98	2.47
2024	493	15	114	3.04
2025	457	10	80	2.19

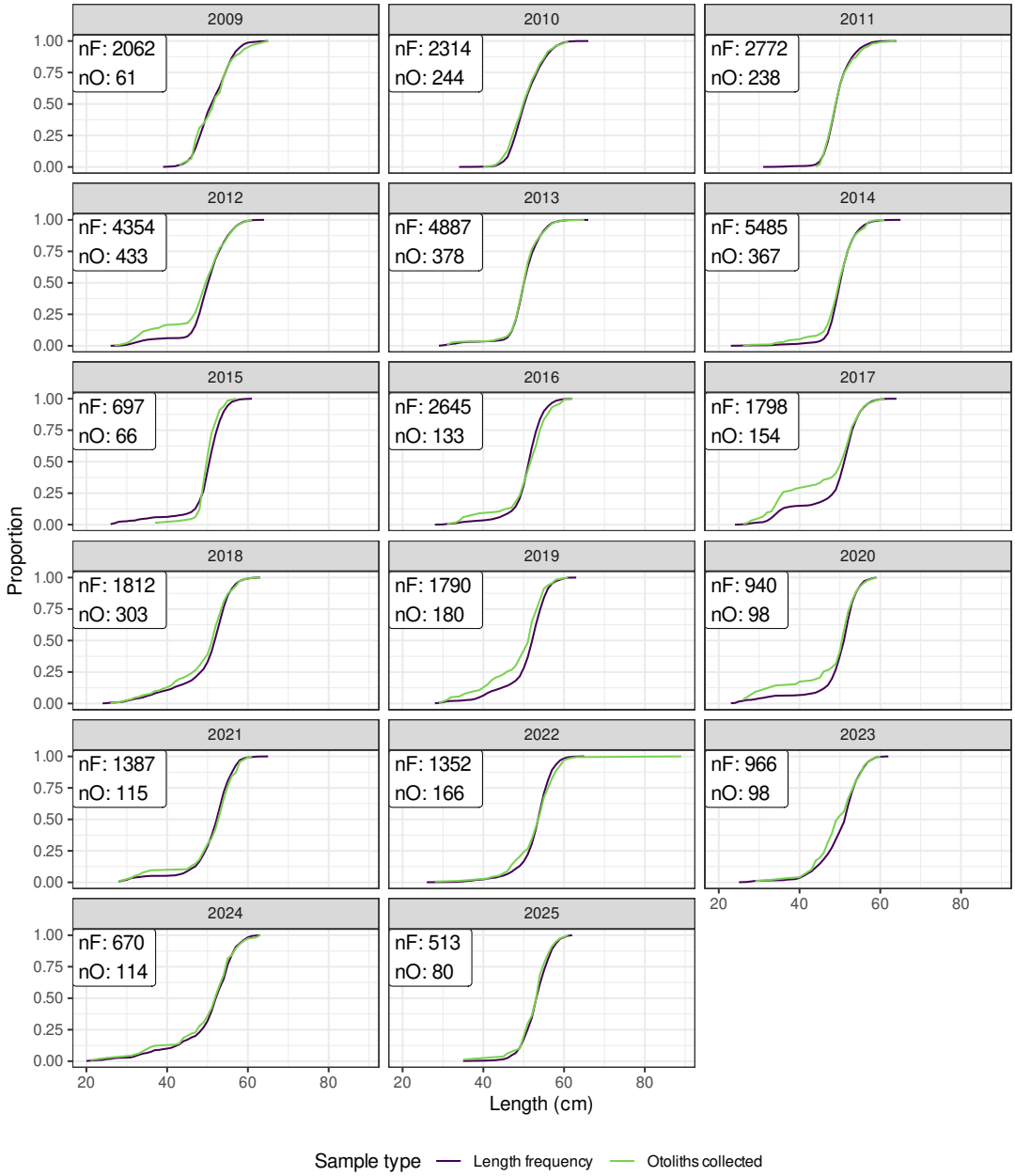


Figure 970: Cumulative distributions of the length of fish in the length frequency and otolith samples of white warehou in the WWA 5B Trawl fishery for the 2009 to 2025 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.13.3.3 Catch quantification

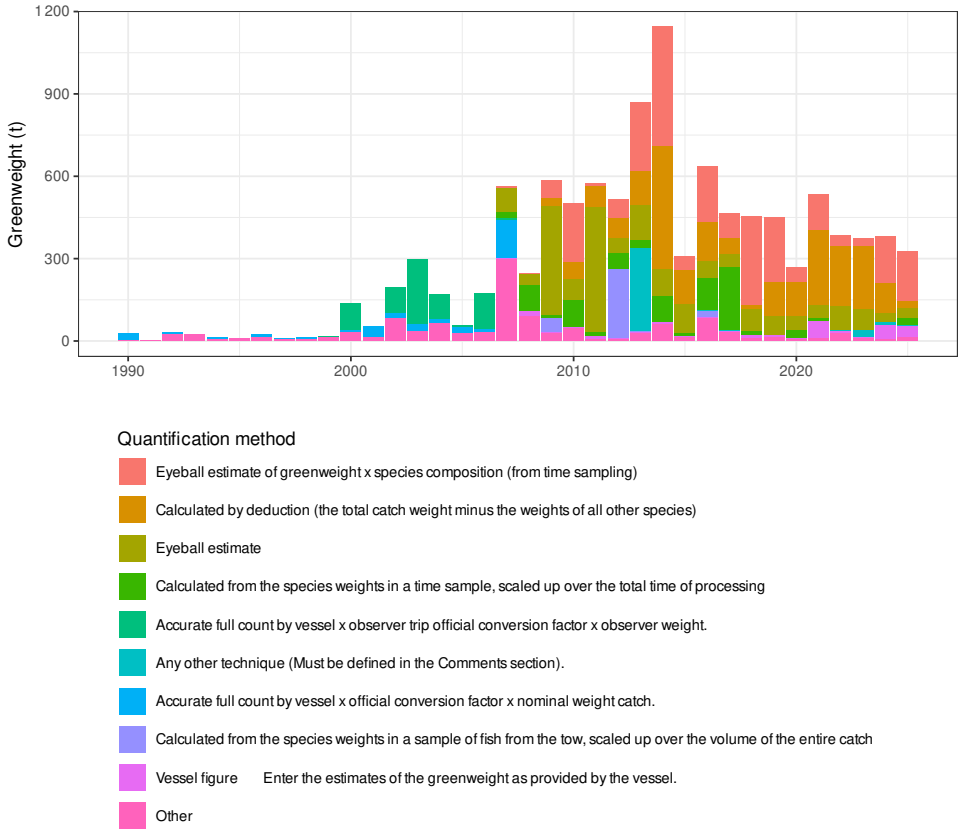


Figure 971: Methods used by observers to quantify the catch of white warehou in the WWA 5B Trawl fishery. The legend lists the methods used in descending order of total catch.

2.13.4 WWA 7: Trawl fishery

2.13.4.1 Length-frequency samples

Table 82: Length-frequency samples of white warehou from the WWA 7 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of white warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	44	0	0	0.00
1991	81	0	0	0.00
1992	90	0	0	0.00
1993	193	0	0	0.00
1994	213	0	0	0.00
1995	168	0	0	0.00
1996	228	1	2	0.44
1997	143	0	0	0.00
1998	111	6	38	5.41
1999	141	44	101	31.21
2000	209	22	187	10.53
2001	181	12	52	6.63
2002	214	32	154	14.95
2003	435	13	58	2.99
2004	246	17	63	6.91
2005	190	20	105	10.53
2006	340	44	293	12.94
2007	263	4	29	1.52
2008	187	9	113	4.81
2009	187	12	166	6.42
2010	95	5	80	5.26
2011	101	1	1	0.99
2012	144	1	5	0.69
2013	165	9	103	5.45
2014	218	7	72	3.21
2015	140	4	76	2.86
2016	77	0	0	0.00
2017	118	6	122	5.08
2018	207	5	94	2.42
2019	83	0	0	0.00
2020	70	1	18	1.43
2021	56	0	0	0.00
2022	23	0	0	0.00
2023	41	1	20	2.44
2024	27	0	0	0.00
2025	39	0	0	0.00

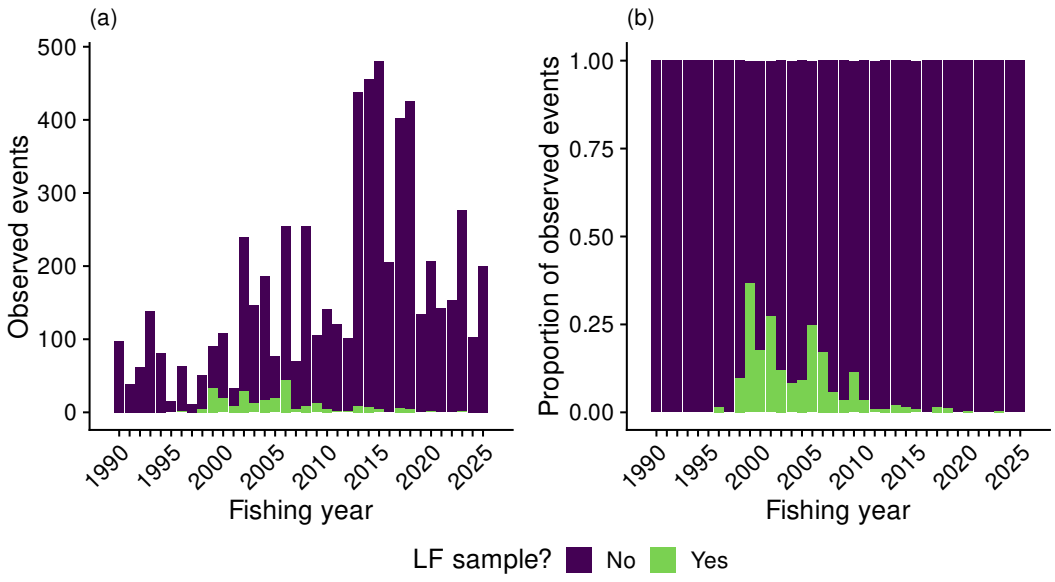


Figure 972: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in WWA 7 where the white warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling.**

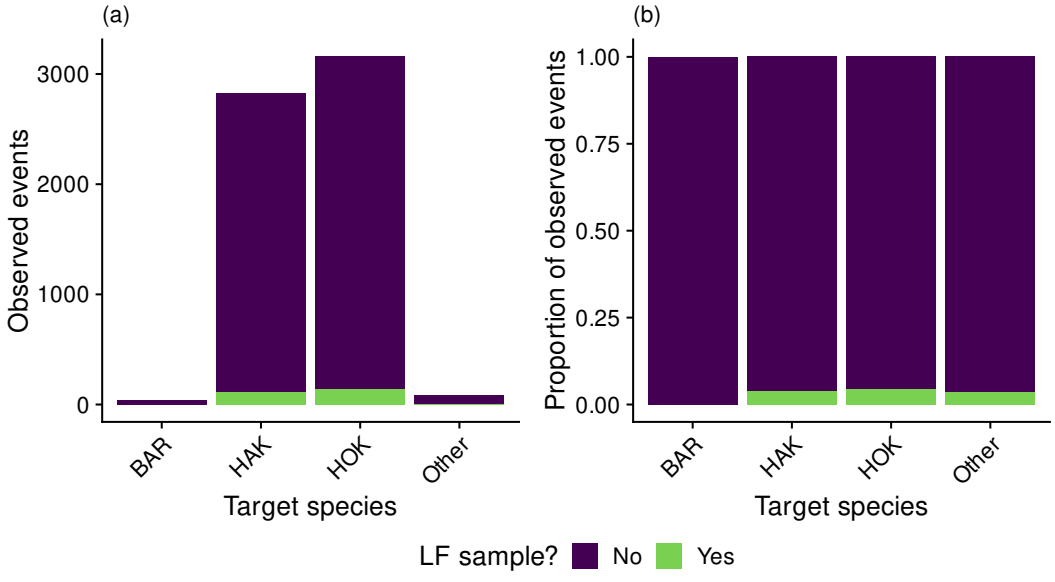


Figure 973: **(a) Observed Trawl fishing events, and (b) proportion of observed events, in WWA 7 where the white warehou catch exceeded the 20 kg threshold, with and without length-frequency sampling, by observer assessed target species.**

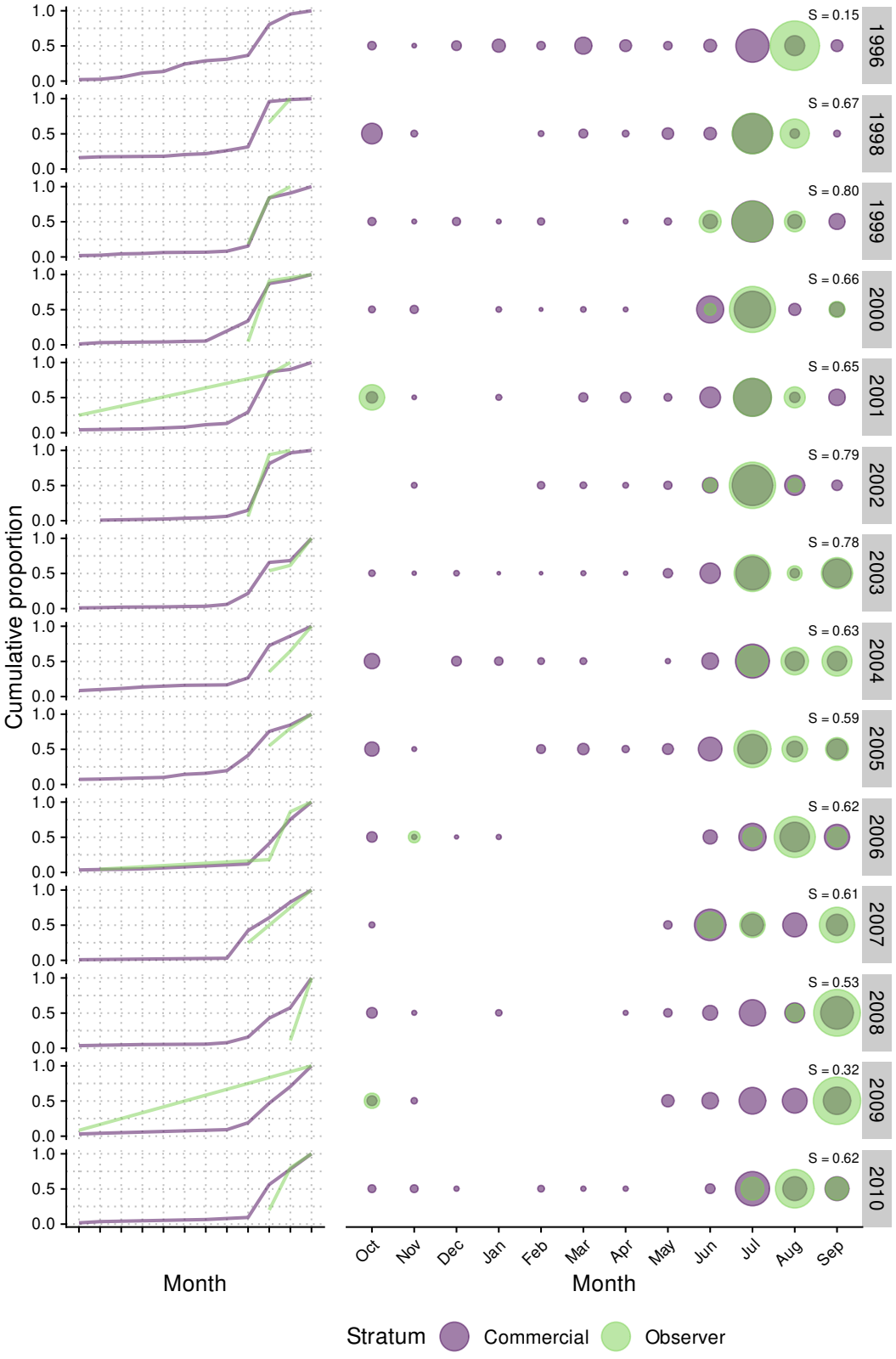


Figure 974: **Monthly representativeness of observer sampling coverage of Trawl fishing events in WWA 7, where the white warehou catch exceeded the 20kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

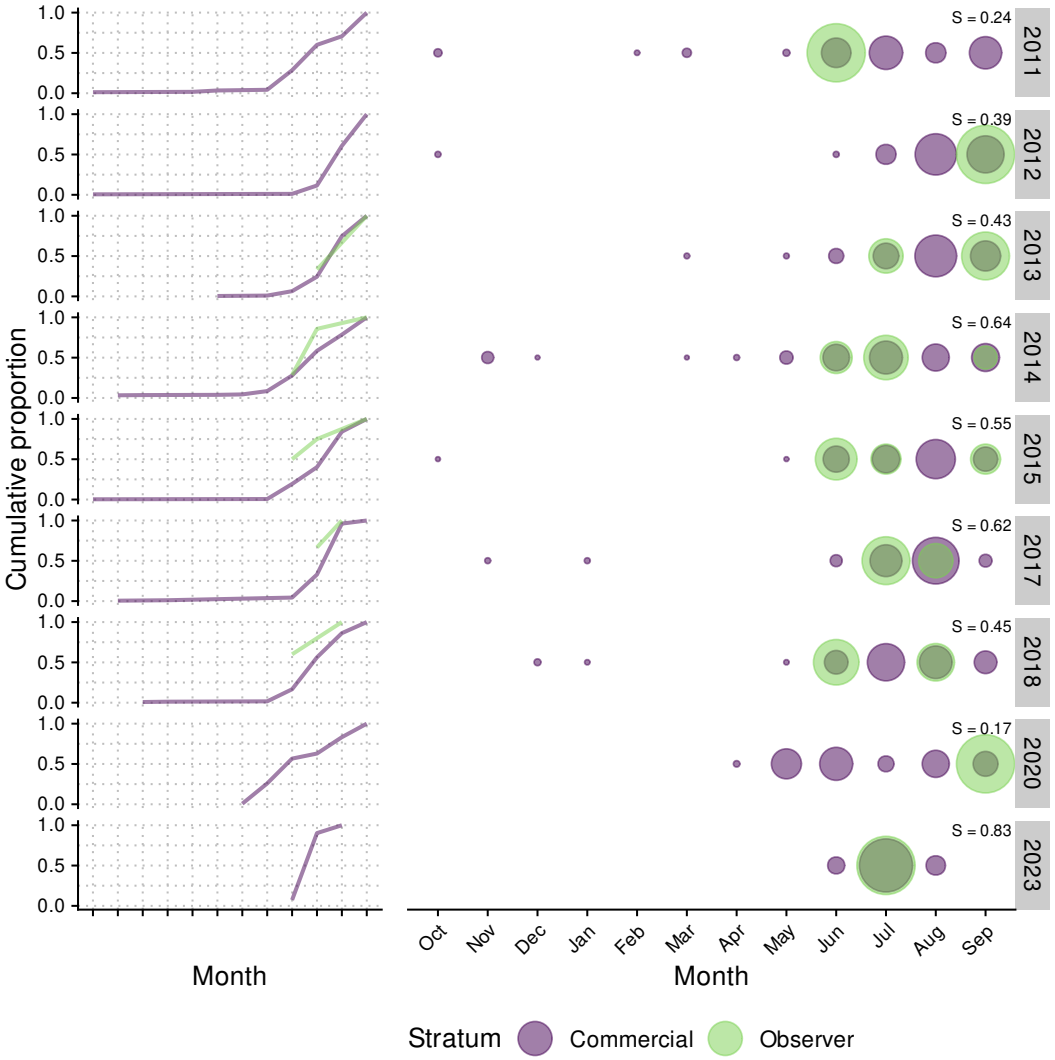


Figure 975: **Monthly representativeness of observer sampling coverage of Trawl fishing events in WWA 7, where the white warehou catch exceeded the 20kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

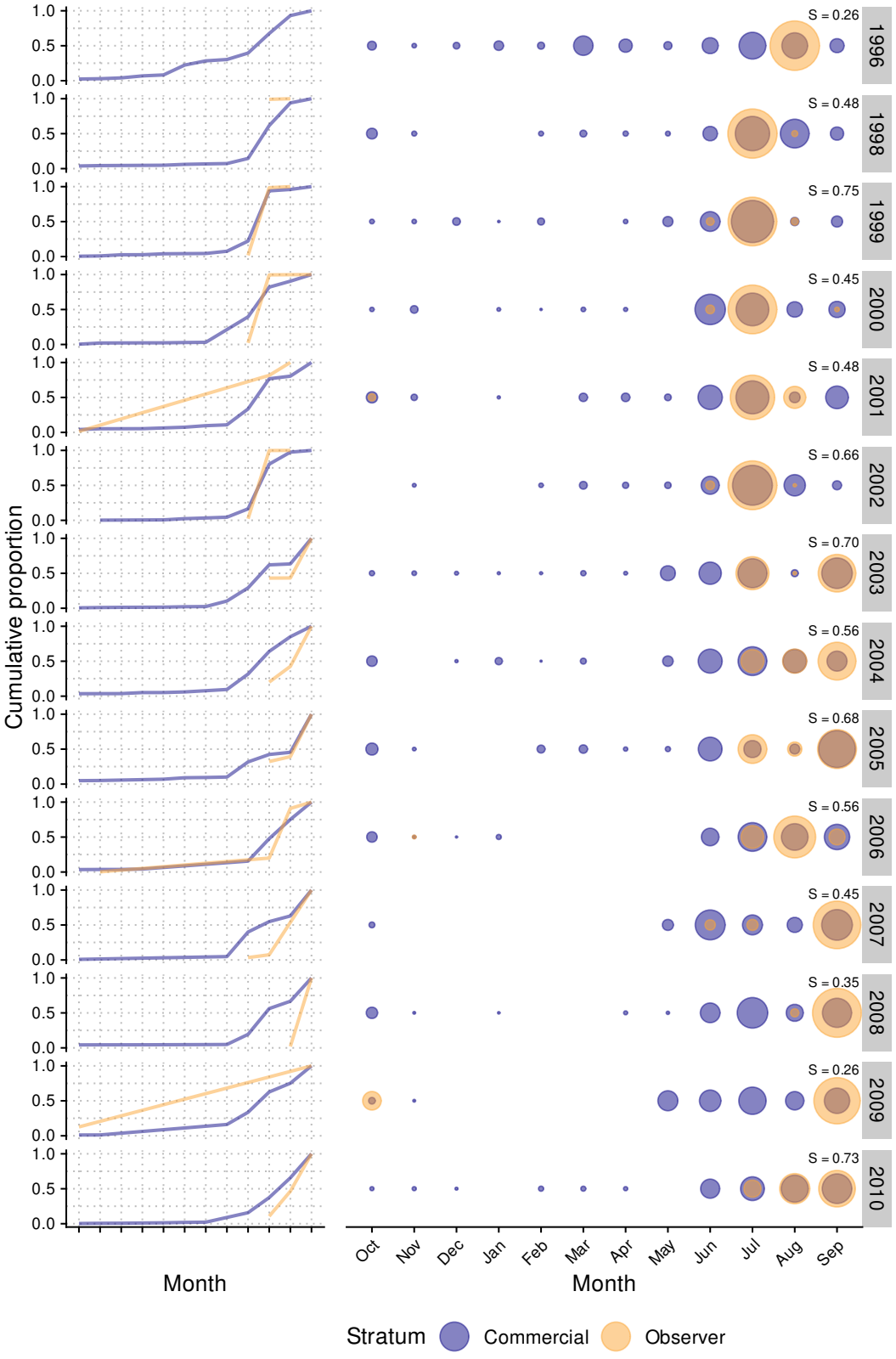


Figure 976: **Monthly representativeness of observer sampling coverage of Trawl catch in WWA 7, from events where the white warehou catch exceeded the 20kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

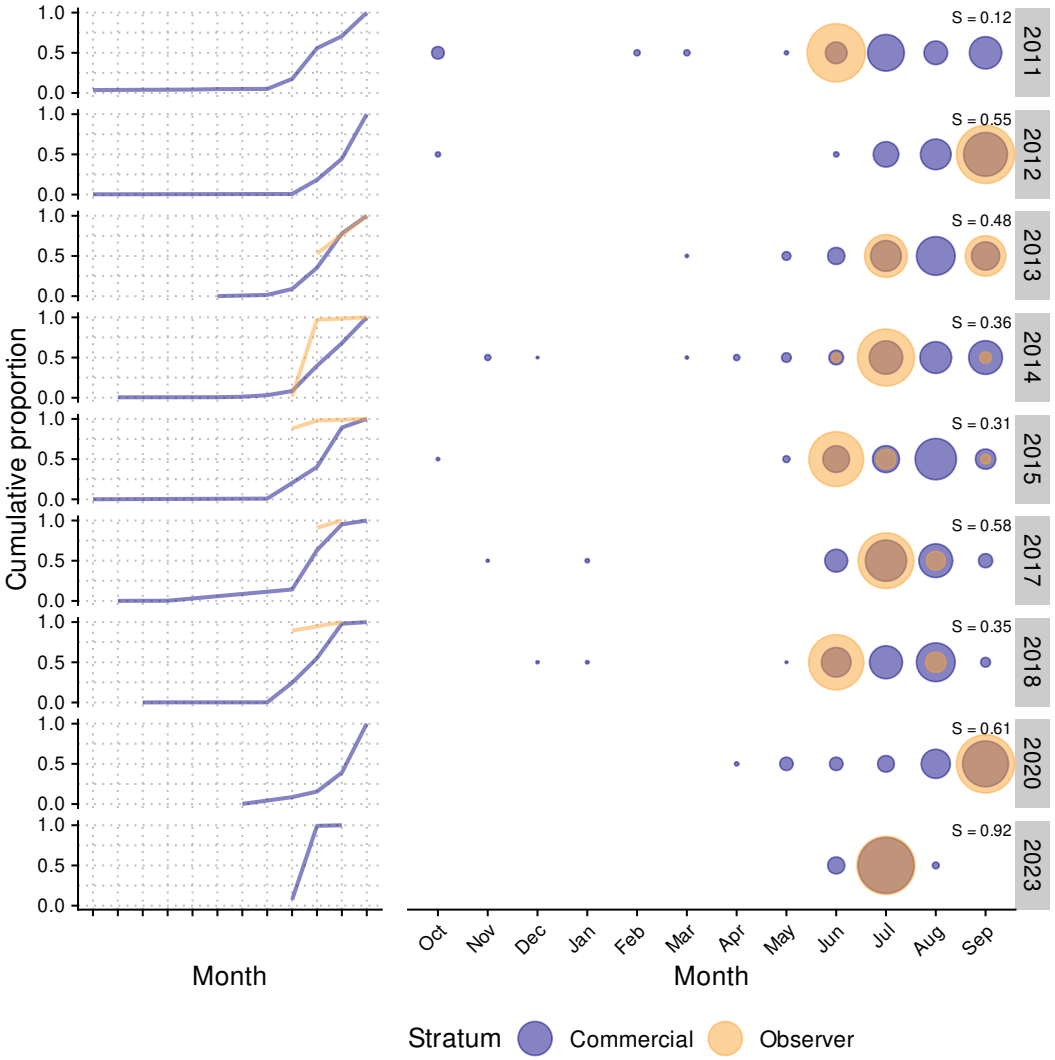


Figure 977: **Monthly representativeness of observer sampling coverage of Trawl catch in WWA 7, from events where the white warehou catch exceeded the 20kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a month, with proportions summing to one within each fishing year. S: Manhattan block distance.**

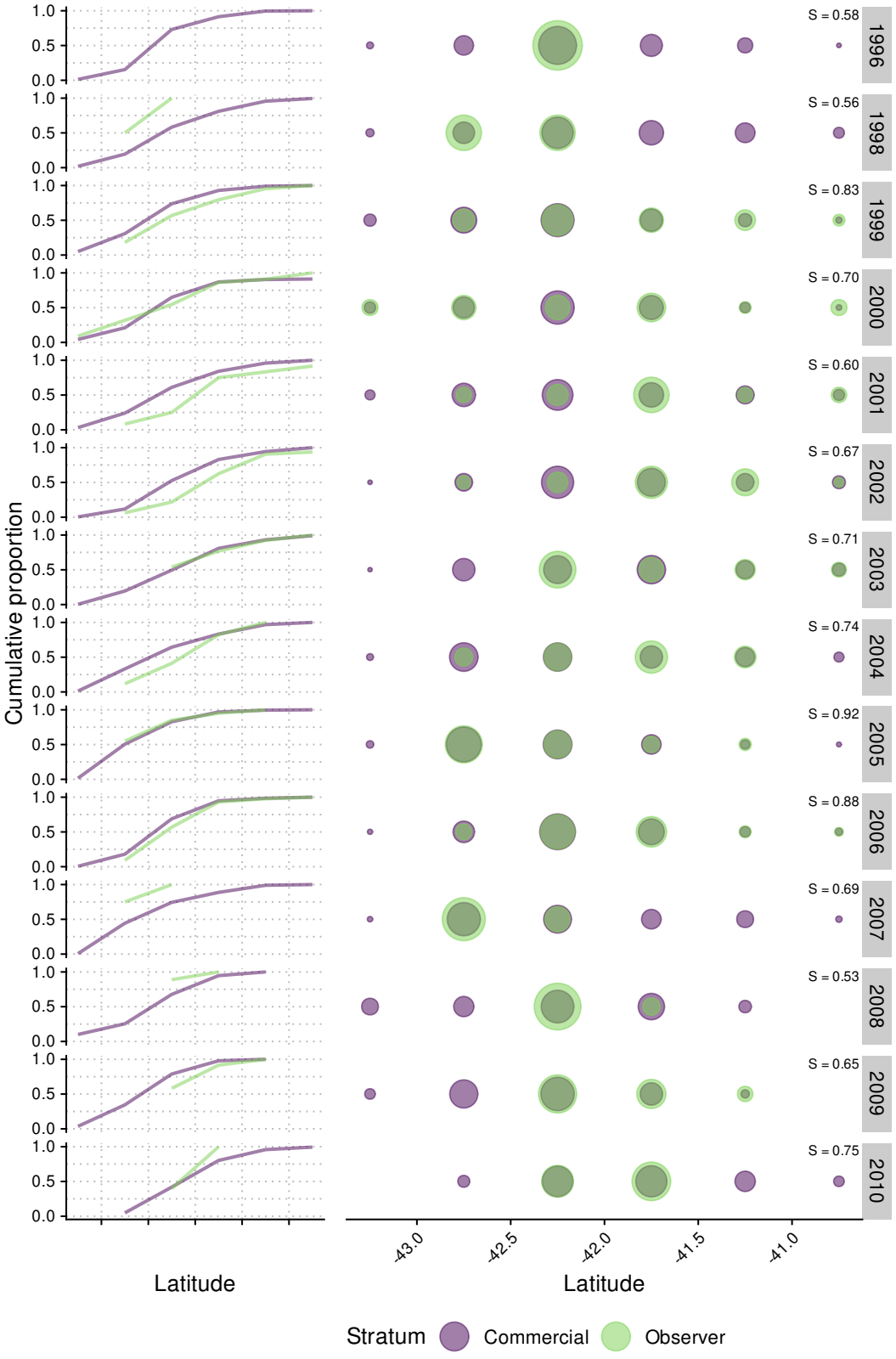


Figure 978: **Latitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 7, where the white warehou catch exceeded the 20kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

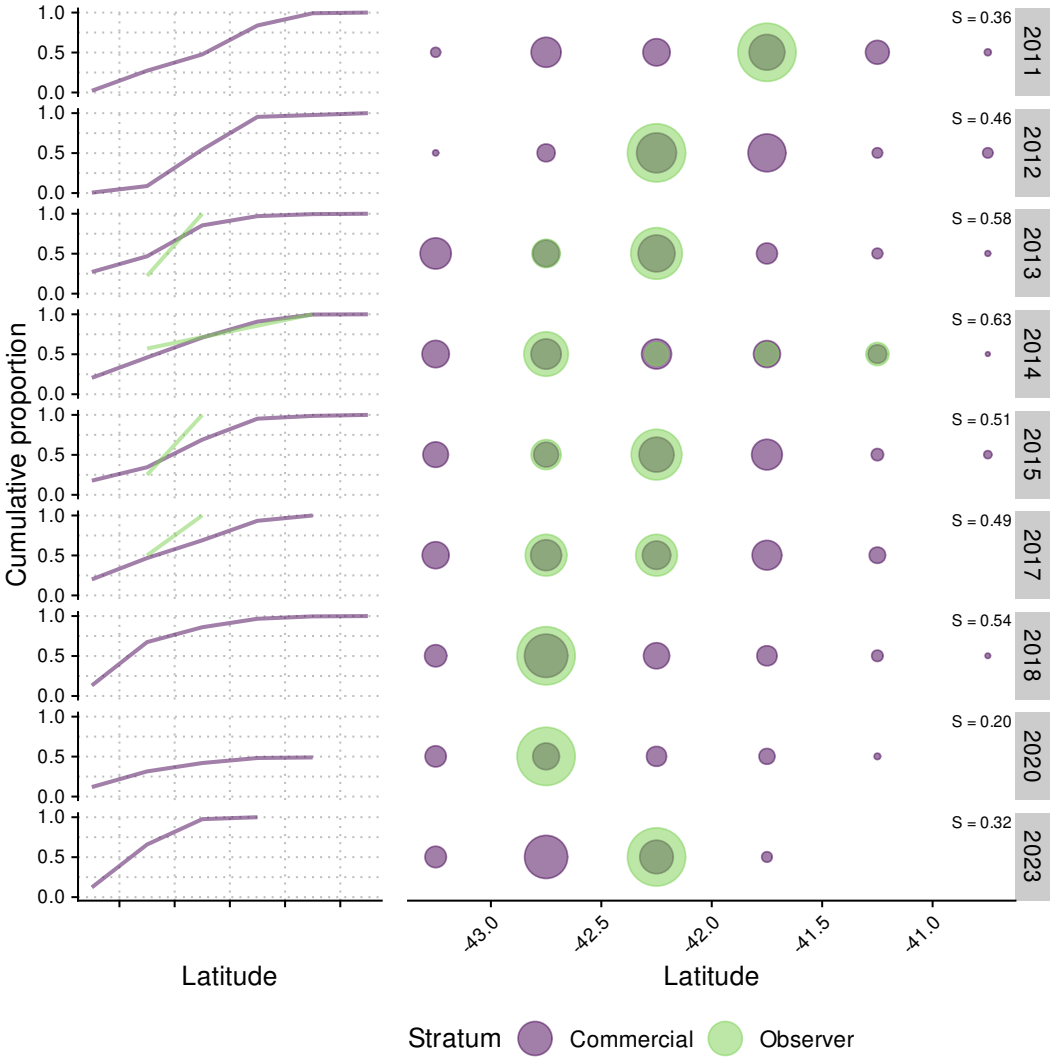


Figure 979: Latitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 7, where the white warehou catch exceeded the 20kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

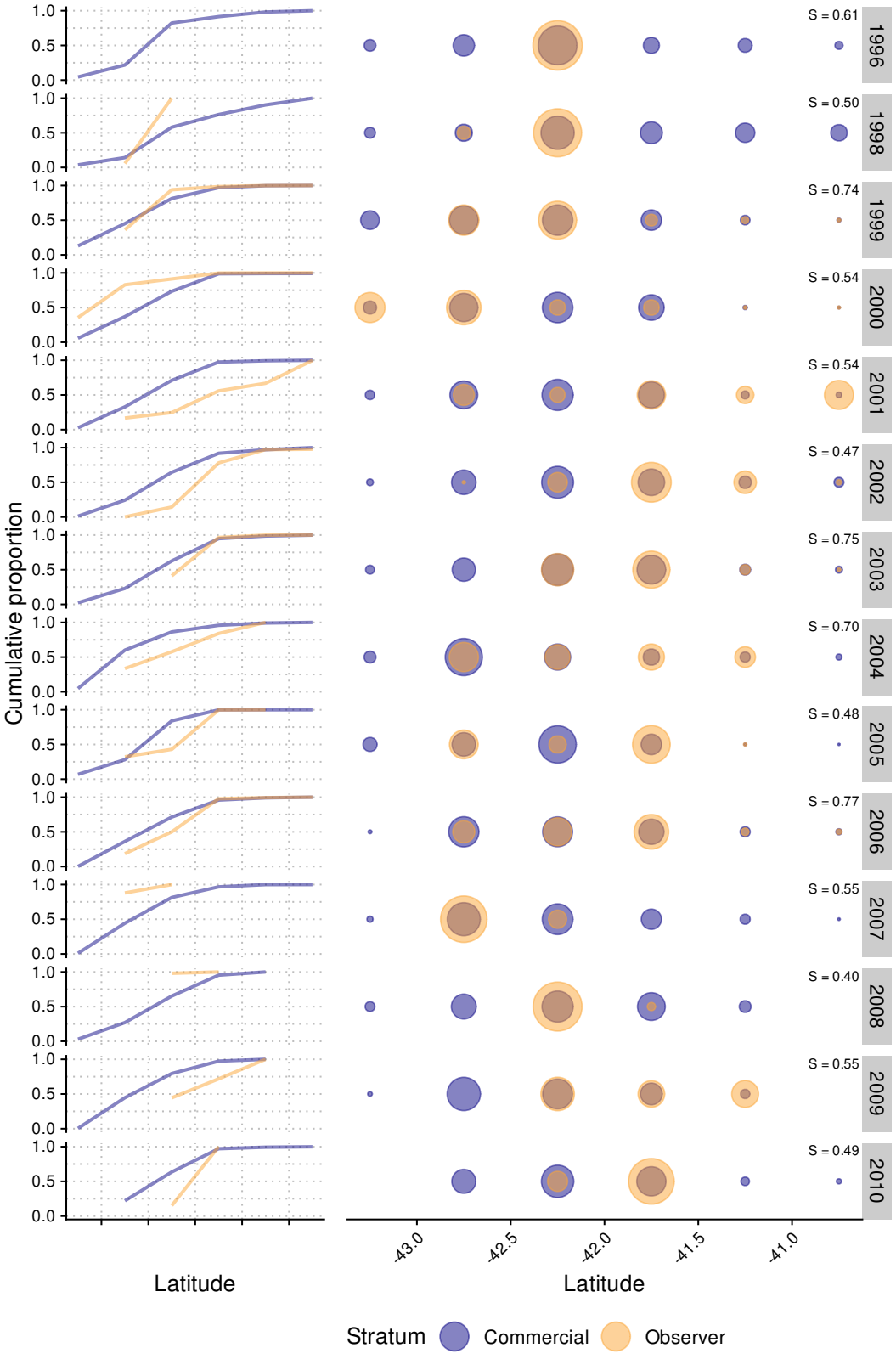


Figure 980: **Latitudinal representativeness of observer sampling coverage of Trawl catch in WWA 7, from events where the white warehou catch exceeded the 20kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

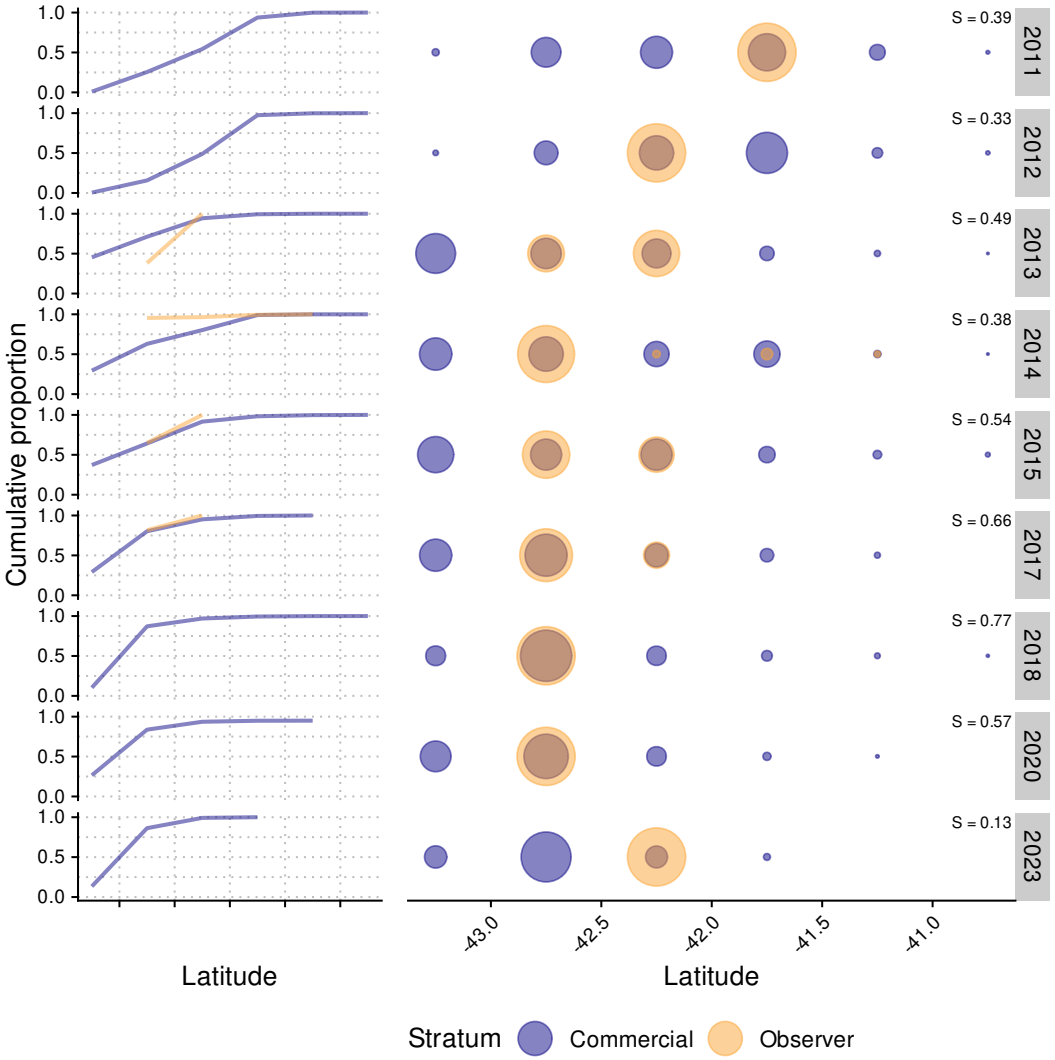


Figure 981: Latitudinal representativeness of observer sampling coverage of Trawl catch in WWA 7, from events where the white warehou catch exceeded the 20kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a latitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

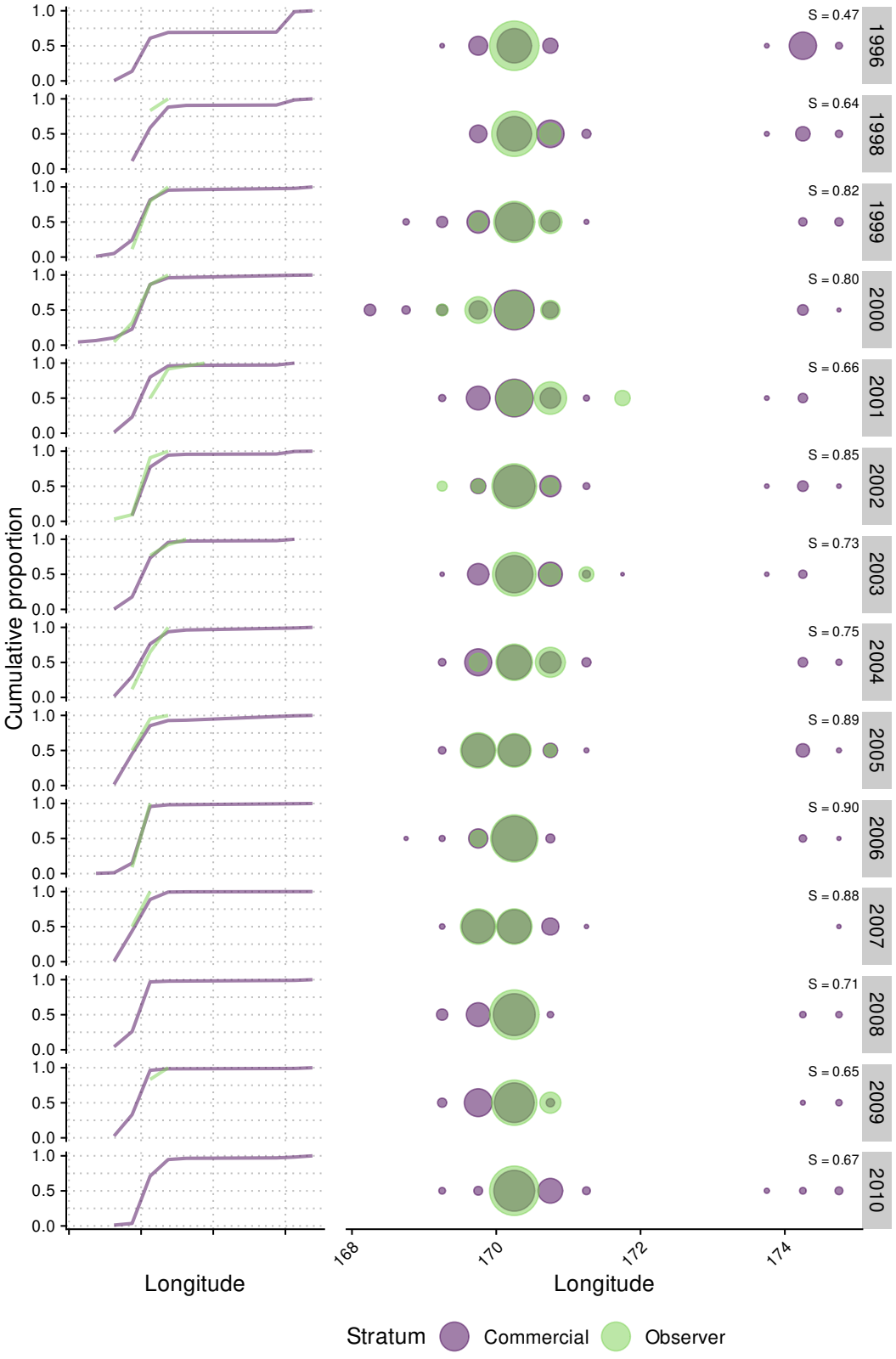


Figure 982: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 7, where the white warehou catch exceeded the 20kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

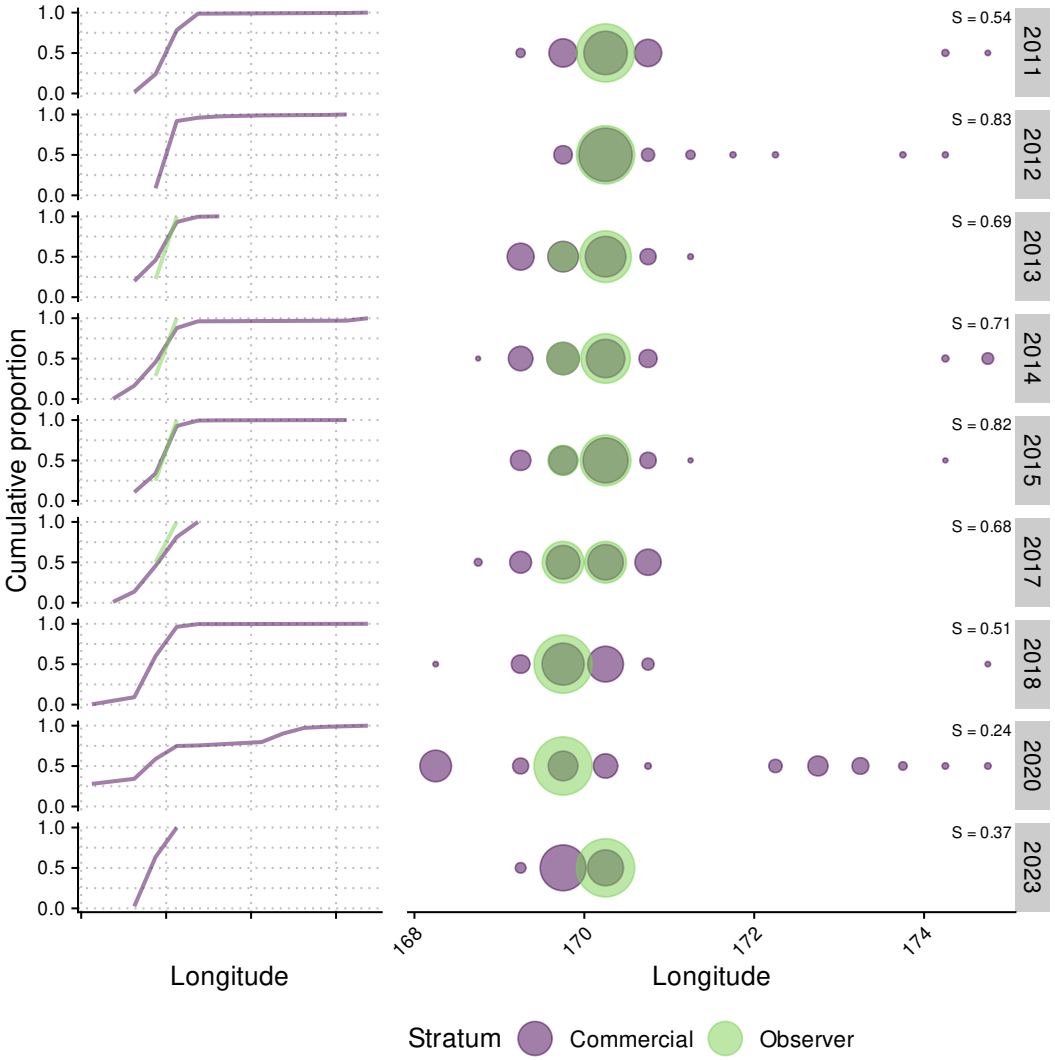


Figure 983: Longitudinal representativeness of observer sampling coverage of Trawl fishing events in WWA 7, where the white warehou catch exceeded the 20kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of events in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.

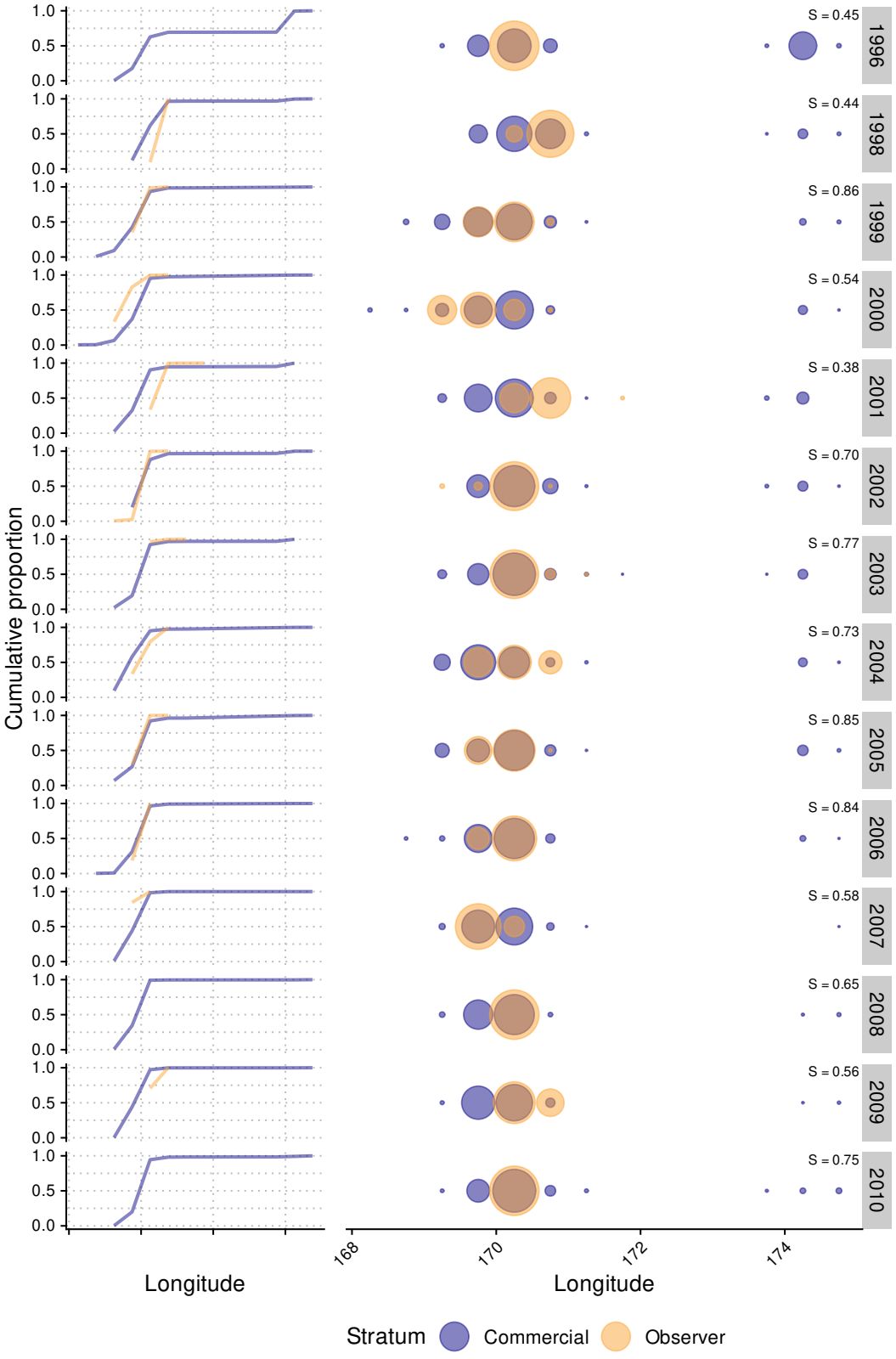


Figure 984: **Longitudinal representativeness of observer sampling coverage of Trawl catch in WWA 7, from events where the white warehou catch exceeded the 20kg threshold, in 1996 to 2010. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

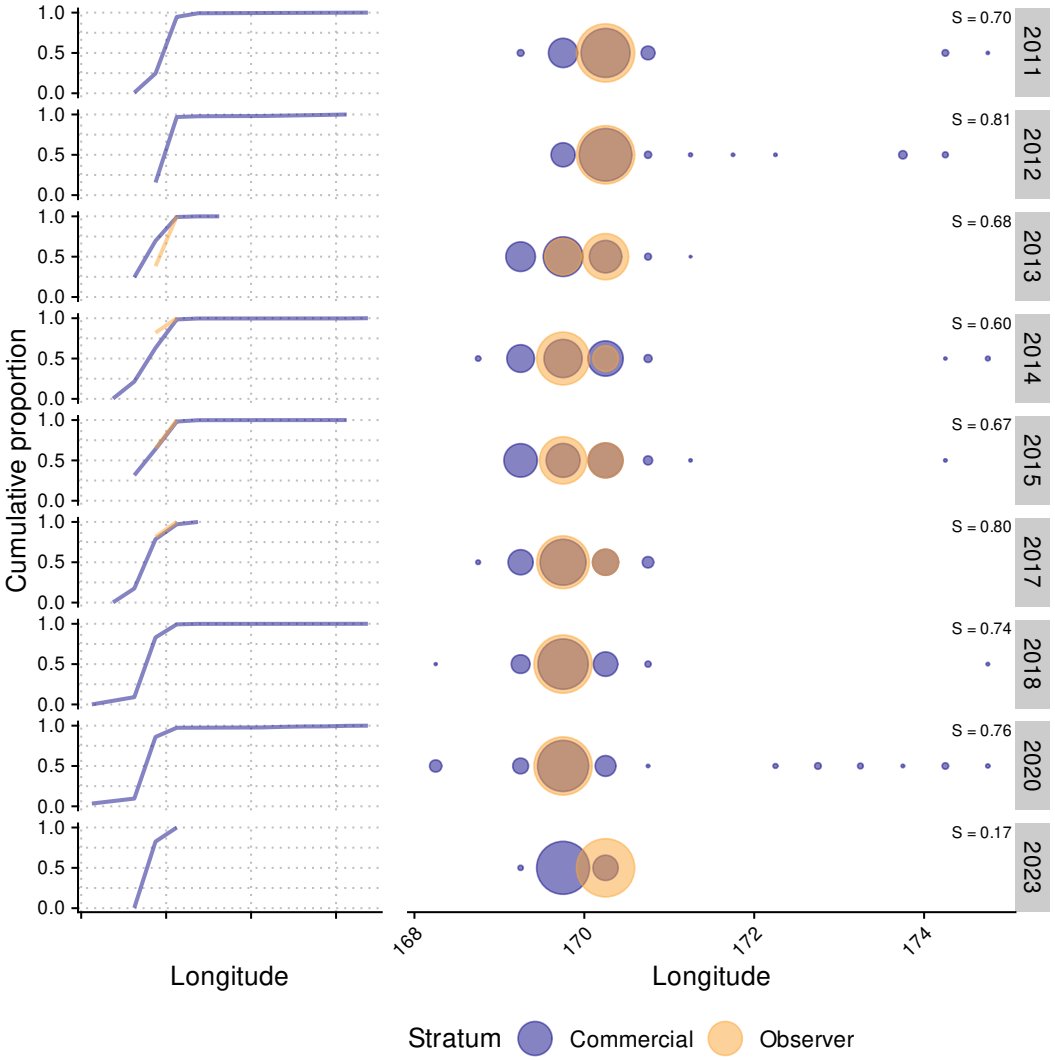


Figure 985: **Longitudinal representativeness of observer sampling coverage of Trawl catch in WWA 7, from events where the white warehou catch exceeded the 20kg threshold, in 2011 to 2023. Observer data are for observed events with length sampling. Circle area is proportional to the proportion of catch in a longitude bin, with proportions summing to one within each fishing year. S: Manhattan block distance.**

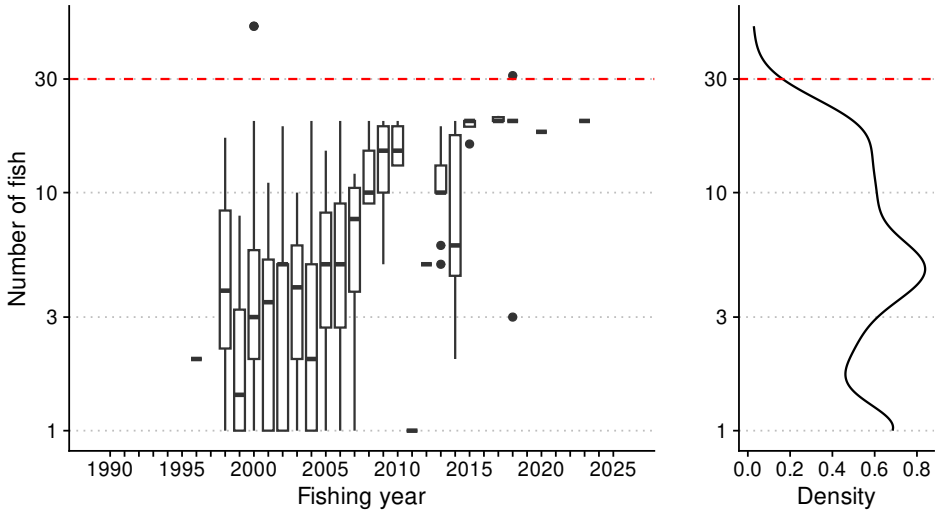


Figure 986: **Length-frequency sample sizes for observed fishing events in WWA 7 where white warehou were sampled. The red dashed line indicates a sample size of 30 fish.**

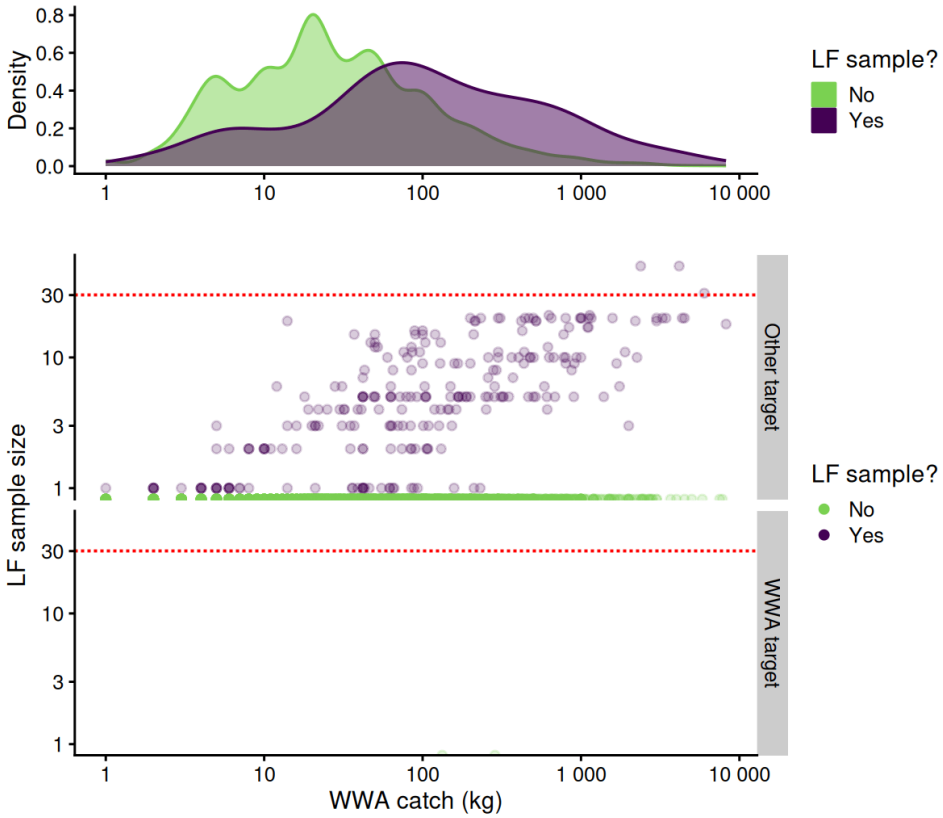


Figure 987: **Length-frequency sample sizes (number of fish sampled) for observed fishing events in WWA 7 in relation to the total white warehou catch from an event, separately for white warehou target events and other target species. The red dashed line indicates a sample size of 30 fish.**

2.13.4.2 Otolith samples

Table 83: Otolith samples of white warehou from the WWA 7 Trawl fishery sampled by the Observer Programme in fishing years 1990 to 2025. Positive fishing events are those where the catch of white warehou exceeded a potential sampling threshold of 20 kg.

Fishing year	Positive fishing events	Sampled events	Number of fish	Percent events sampled
1990	44	0	0	0.00
1991	81	0	0	0.00
1992	90	0	0	0.00
1993	193	0	0	0.00
1994	213	0	0	0.00
1995	168	0	0	0.00
1996	228	0	0	0.00
1997	143	0	0	0.00
1998	111	0	0	0.00
1999	141	0	0	0.00
2000	209	0	0	0.00
2001	181	0	0	0.00
2002	214	0	0	0.00
2003	435	0	0	0.00
2004	246	0	0	0.00
2005	190	0	0	0.00
2006	340	0	0	0.00
2007	263	0	0	0.00
2008	187	0	0	0.00
2009	187	11	54	5.88
2010	95	4	20	4.21
2011	101	0	0	0.00
2012	144	1	5	0.69
2013	165	5	31	3.03
2014	218	1	6	0.46
2015	140	0	0	0.00
2016	77	0	0	0.00
2017	118	6	30	5.08
2018	207	5	20	2.42
2019	83	0	0	0.00
2020	70	1	5	1.43
2021	56	0	0	0.00
2022	23	0	0	0.00
2023	41	0	0	0.00
2024	27	0	0	0.00
2025	39	0	0	0.00

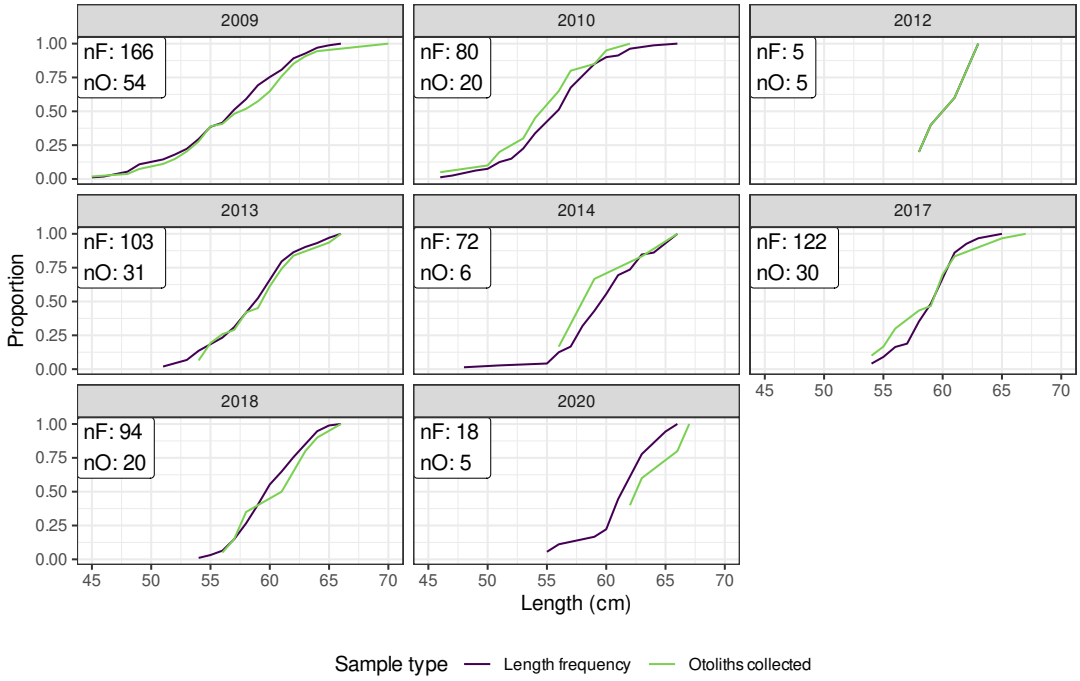


Figure 988: Cumulative distributions of the length of fish in the length frequency and otolith samples of white warehou in the WWA 7 Trawl fishery for the 2009 to 2020 fishing years. nF: number of fish in the length-frequency sample, nO: number of fish in the otolith sample.

2.13.4.3 Catch quantification

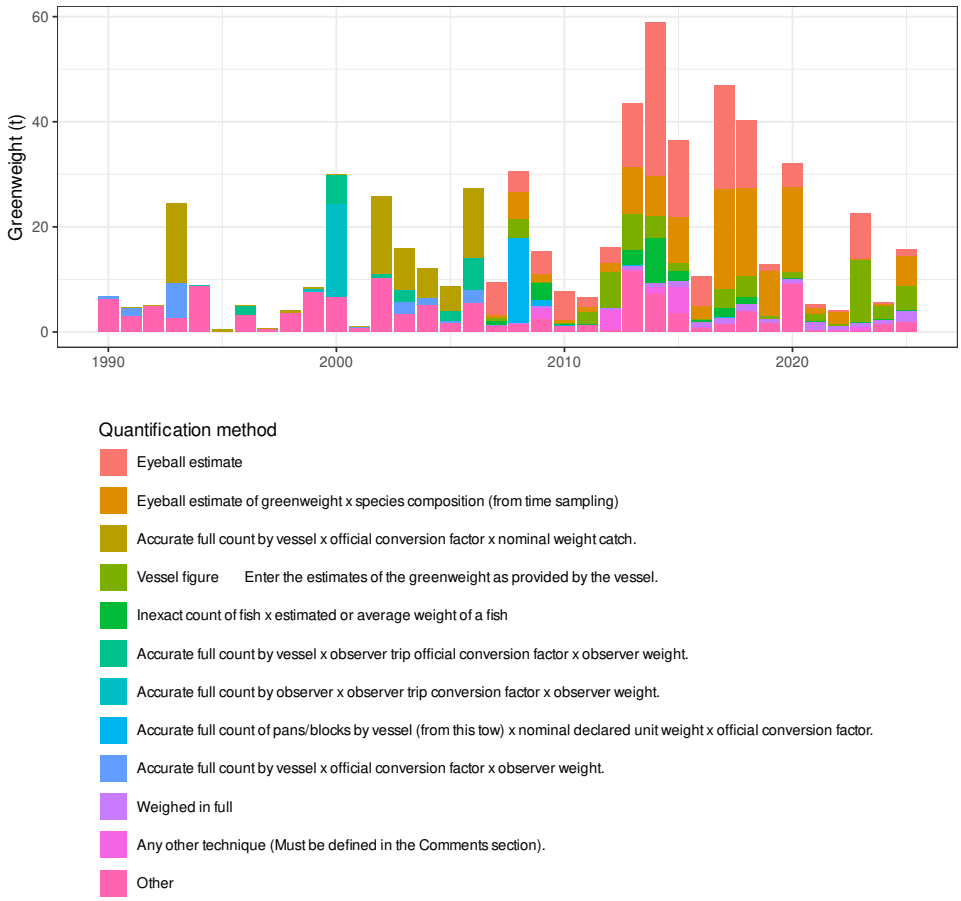


Figure 989: Methods used by observers to quantify the catch of white warehou in the WWA 7 Trawl fishery. The legend lists the methods used in descending order of total catch.

3. ACKNOWLEDGEMENTS

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4. REFERENCES

Middleton, D.A.J. (2026). Observer sampling of deepwater fisheries: reporting methods. *New Zealand Fisheries Assessment Report 2026/41*. 60 p.