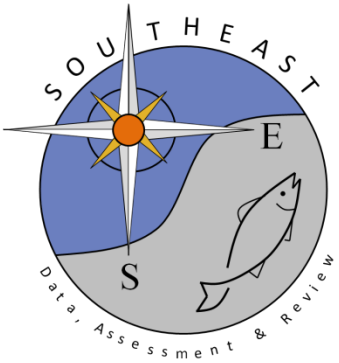
South Atlantic Black Sea Bass (*Centropristis striata*) length and age compositions from the U.S. recreational fishery

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SEDAR108-DW-08

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South Atlantic Black Sea Bass (*Centropristis striata*) length and age compositions from the U.S. recreational fishery

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Introduction

This document provides nominal and weighted length and age compositions and mean length-at-age (MLAA) of recreational landings, in U.S. waters, for the SEDAR 108 South Atlantic Black Sea Bass (*Centropristis striata*) assessment.

Data Description

Compositions in this document only include biological samples from Black Sea Bass harvested in U.S. waters from Cape Hatteras, North Carolina south to the east coast of Florida. A total of 182,503 lengths from 12 sampling programs (Tables 1 and 2) were included in the nominal and weighted length compositions and 12,976 ages from 7 programs (Table 1 and 3) were included in the nominal and weighted age compositions and MLAA analyses.

The sampling programs contributing the largest numbers of length and/or age samples are described below.

Marine Recreational Information Program (MRIP)

MRIP (formally known as the Marine Recreational Fishing Statistics Survey, MRFSS) began in March 1981. The access point angler survey (APAIS) component of MRIP collects information on recreational catch and fishing trip characteristics, including fish lengths and weights, from anglers at public marine fishing access sites. In the South Atlantic, APAIS samples recreational fishers from private, shore, and charterboat modes. APAIS sampling was temporarily suspended during Wave 2 in 2020 because of the COVID pandemic. APAIS sampling resumed in all states by August 2020 (Wave 4), however, sampling of fish lengths and weights were reduced due to social distancing guidelines and field officer safety protocols (NMFS OST 2023). For intercepted angler trips where both fish length and weight are missing, MRIP uses hot and cold-deck imputation to impute lengths (NMFS OST 2023). Imputed lengths were excluded from length composition analyses. MRIP provided 20,422 Black Sea Bass lengths. MRIP dockside samplers do not collect age structures from intercepted fish.

Southeast Region Headboat Survey (SRHS)

The SRHS program estimates landings and effort for headboat vessels. The SRHS program began in 1972 in North and South Carolina, expanded to Georgia and northeast Florida (Nassau-Indian River counties) in 1976, and to southeast Florida in (St. Lucie-Monroe counties) in 1978 (Fitzpatrick et al 2017). Biological samples (e.g. length, weight, and age structures) are collected

as part of the SRHS dockside intercept sampling program (DISP) component of the SRHS program (Fitzpatrick et al. 2017). DISP sampling was temporarily suspended in March 2020 due to the COVID pandemic and no biological samples were collected. DISP biological sampling resumed in July 2021 once NMFS/SEFSC approved safety measures were approved (Cheshire et al. 2023). SRHS sampled 155,795 Black Sea Bass for length and of those fish, 12,031 were also sampled for age.

Stock and Fleet Structure

Three recreational fleets, Headboat (HB), Gen Rec Inland (GRI), and Gen Rec Ocean (GRO) are defined for SEDAR 108. GRI and GRO both include catch from shore, private, and charter modes and the fleets are defined by using the area fished. The GRI fleet includes catch from the area defined as 'inland' by MRIP which includes inshore bodies of saltwater or brackish water, such as bays, estuaries, and sounds. The GRO fleet includes catch from the 'Ocean <= 3 miles' and 'Ocean > 3 miles' areas.

Changes from SEDAR 76U

Improvements in data provision, facilitated by the Life History Template, allowed unique records (n=965) in the age data to be added to the length-only data and included in the length compositions. These additional samples were not included in the length compositions for SEDAR 76U.

The recreational fleet structure for SEDAR 108 differs from SEDAR 76U. In SEDAR 76U, there were only two recreational fleets: HB and Gen Rec (GR). The GR fleet consisted of all catch from the shore, private, and charter modes.

The age data was also updated for SEDAR 108. SEFSC ageing protocol dictates that each age structure is aged by two independent readers. One of the readers is designated the 'priority reader' and if there is a disagreement in the age, the age associated with the priority reader is assigned as the final age. For Black Sea Bass, the reader designated as priority was changed and a small number of ages were updated as a result.

The bin range for SEDAR 76U was different than SEDAR 108 (see nominal and weighted length compositions below). For SEDAR 76U, fish were assigned to 1 cm bins with bins ranging from 10 - 100 cm with lengths outside of this range being pooled in the smallest or largest bin.

Morphometric Conversions

For this assessment, maximum total length (MTL), natural total length (NTL), and fork length (FL) were considered equivalent. Standard length (SL) in mm was converted to MTL using the following morphometric equation:

Standard Length (SL) to Maximum Total Length (MTL):

$$MTL = -10.83 + (1.35 * SL)$$

Nominal and Weighted Length Compositions

Nominal and weighted length compositions were developed for SEDAR 108. Fish were assigned to 1 cm bins with bins ranging from 10 - 50 cm with lengths outside of this range being pooled in the smallest or largest bin. The label represents the mid-point of the bin. For nominal length compositions, it is not recommended to use a length composition where there are not a minimum of 30 fish from at least 10 trips per stratum. Fishery-dependent sampling is typically opportunistic and sampled lengths may not be representative of the true landings composition of recreational Black Sea Bass in the South Atlantic. Possible sampling bias in the collection of length samples are typically removed by weighting the length compositions with the associated landings at the finest spatial and temporal scale available without losing data. The weighting subregions were defined as North (North Carolina and South Carolina), and South (Georgia and Florida). For weighted length compositions, it is not recommended to use a composition that does not have a minimum of 30 fish from at least 10 trips per weighting substratum (e.g. North, South). Sample sizes per weighting substratum, for each fleet, are provided in Table 4.

The nominal length distribution of the GRI fleet generally skews smaller than the GRO and HB fleets (Figure 1). The nominal length distributions of Black Sea Bass sampled from the GRO fleet generally skew larger than fish from the HB fleet, although differences are less pronounced in the later years of the time series.

Weighting had minimal impacts on the length compositions and the nominal and weighted length distributions are similar to one another for all fleets (Figures 2-4). The weighted length distributions exhibit similar patterns to the nominal length distributions and with the GRO and HB weighted length distributions being more similar in the later years (Figure 5).

The nominal (Figures 6 and 7) and weighted (Figures 8 and 9) length compositions are generally similar between SEDAR 76U and SEDAR 108 for the HB fleet. Length distributions from the SEDAR 76U GR fleet are more similar to the GRO fleet than the GRI fleet.

Weighted length compositions were also provided for the GRI fleet using the MRIP catch data where imprecise estimates ($CV \geq 0.5$) were replaced with estimates generated using a 3-year centered moving catch rate (SEDAR 108-DW-07). Weighting also had minimal impacts on the GRI weighted length compositions using the alternative catch data (Figure 10), and are similar to the original weighted length compositions. No landings estimates were replaced for the GRO fleet, so no additional length composition analyses were needed.

Comparison of Length and Age Data

The distribution of length samples, included in the length compositions (length-only) and samples with both length and ages included in the HB age compositions are shown in Figure 11. While there is good agreement between the length distributions of data used in the length and age compositions for most years, there is a period of time from 1988-1998 where there are differences and the length distribution of the age data skews larger than the length distribution of the length-only data. Age sample sizes are lower in these years compared to later years where the length distributions of the length-only and age data are more similar.

Nominal and Weighted Age Compositions

Black Sea Bass ages ranged from 1-11 years old, with the majority of fish being between 3-6 years old. Nominal and weighted age composition analyses were conducted using age bins ranging from 0-11. Age compositions were only provided for the HB fleet and this is consistent with previous SEDARs (e.g. SEDAR 76). There are limited age samples from the charter, private, and shore modes. Also, the age samples do not have information included on area fished and cannot be delineated between the GRI and GRO fleets (Table 5). For age compositions, it is recommended to exclude strata where there are not a minimum of 10 fish sampled from 10 trips.

Nominal and weighted age compositions were provided for SEDAR 108. The age compositions are weighted to account for potential sampling biases associated with fishery-dependent data. The weighting method is adapted from Chih (2009) and a reweighting factor (RW) was estimated within year *i* and length bin *j* and corrects the composition of the age data to more closely represent the final length composition of landings. For each fleet the reweighting factor $RW_{i,j}$ is calculated as

$$RW_{i,j} = \frac{LC_{i,j}}{a_{i,j}/a_i}$$

where $LC_{i,j}$ is the length composition from the length-only data, $a_{i,j}$ is the number of age samples in year *i* and length bin *j*, and a_i are the total number of age samples in year *i*. With this method, if there were age samples in $a_{i,j}$ not represented in $LC_{i,j}$ they are down-weighted to zero and effectively dropped from further analysis. The final weighted age compositions, for each fleet, were estimated as

$$AC_{i,k} = \sum_j \left(RW_{i,j} * \frac{a_{i,j,k}}{a_i} \right)$$

where all length bins *j* within age class *k w*ere summed and then rescaled to sum to 1 across each year.

The HB nominal age bubble plot is shown in Figure 12. Years where sample sizes do not meet the recommended sample size of 10 age samples from 10 fish and 10 trips are in red. Sample sizes recommendations were not met most years prior to 2002.

For years with larger sample sizes, weighting generally had little impact on the nominal age distributions (Figure 13). The HB weighted age bubble plot is shown in Figure 14.

Nominal and weighted age compositions from SEDAR 76U and SEDAR 108 are shown in Figure 15 and Figure 16, respectively. For most years, the compositions are very similar between SEDAR 76U and SEDAR 108. Years where there are differences can be attributed to changes in the final age due to the preferred reader update.

Mean Length-at-Age

Mean length-at-age (MLAA) is the average length for each age and is calculated as

$$MLAA_{i,k} = \frac{\sum L_{i,k}}{a_{i,k}}$$

where L are lengths, a is the number of associated sample sizes, i is year, and k is age class. MLAA are provided to aide in model diagnostics and is presented in Figure 17.

Data Adequacy and Availability

Tables 6-8 summarize the adequacy of data available for composition analyses for the HB, GRI, and GRO fleets, respectively. For each data product (e.g. nominal length compositions, weighted age compositions) the year is color-coded either gray, red, or green. Gray indicates that data are not available for that year. Years in red indicate that the samples sizes were not sufficient for that data product. For weighted age compositions, year is also shaded as red if the corresponding weighted length composition did not have sufficient sample sizes. For all analytical products, green was used to indicate minimum sample size thresholds were met.

The proportions of landings, length samples, and age samples from North and South weighting subregions was compared to evaluate how representative the biological sampling was of the landings (Figures 18-20). For the HB fleet, there is generally good agreement between the proportions of landings and length samples across the weighting subregions. The representativeness of the age data is more variable and there are years were all of the samples are from either the North or South weighting subregion or the proportions are not as similar to the landings proportions. For the GRI and GRO fleets, there are several years where the proportions of landings and length samples are not very similar. Weighting the length and age compositions helps mitigate any issues where the biological sampling is not reflective of the landings.

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Tables

Table 1: Number of fish (nfish) and trips (ntrip) sampled for length and age by each data source.

	Length		Age	
Sampling Program	nfish	ntrip	nfish	ntrip
FMRI	833	64	1,559	224
FMRI - AT-SEA SAMPLING	0	0	45	32
FMRI - EFP_LOTTERY_CONTROL	0	0	3	1
FMRI - FWRI-OBS	0	0	6	4
FMRI – REPBIO	0	0	29	8
FWRI-OBS	1,749	247	0	0
MARFIN	50	33	0	0
MRIP	20,422	4,682	0	0
NCDMF_438	55	9	55	9
QUANTECH - MRFSS	75	9	462	67
RECFIN	2	2	0	0
RECFIN/SEFL-CRP	2	1	0	0
REPBIO	8	3	0	0
SRFS	7	5	0	0
SRHS	155,795	17,437	12,031	3,424
SCDNR State Finfish Survey	3,505	670	0	0
TIP	0	0	323	88

Table 2: Annual number of fish sampled for length by each data source.

Year	FMRI	FWRI-OBS	MARFIN	MRIP	NCDMF_438	QUANTECH - MRFSS	RECFIN	RECFIN/SEFL-CRP	REPBIO	SRFS	SRHS	SCDNR State Finfish Survey
1973	0	0	0	0	0	0	0	0	0	0	1	0
1974	0	0	0	0	0	0	0	0	0	0	1,137	0
1975	0	0	0	0	0	0	0	0	0	0	1,032	0
1976	0	0	0	0	0	0	0	0	0	0	942	0
1977	0	0	0	0	0	0	0	0	0	0	3,211	0
1978	0	0	0	0	0	0	0	0	0	0	2,332	0
1979	0	0	0	0	0	0	0	0	0	0	1,654	0
1980	0	0	0	0	0	0	0	0	0	0	2,418	0
1981	0	0	0	220	0	0	0	0	0	0	3,025	0
1982	0	0	0	427	0	0	0	0	0	0	3,686	0
1983	0	0	0	180	0	0	0	0	0	0	5,729	0
1984	0	0	0	305	0	0	0	0	0	0	6,086	0
1985	0	0	0	493	0	0	0	0	0	0	5,842	0
1986	0	0	0	408	0	0	0	0	0	0	6,550	0
1987	0	0	0	696	0	0	0	0	0	0	6,442	0
1988	0	0	0	633	0	0	0	0	0	0	4,253	41
1989	0	0	0	641	0	0	0	0	0	0	3,836	2
1990	0	0	0	422	0	0	0	0	0	0	5,772	23
1991	0	0	0	286	0	0	0	0	0	0	5,380	111
1992	0	0	0	638	0	0	0	0	0	0	5,177	43
1993	0	0	0	363	0	0	0	0	0	0	3,941	149
1994	0	0	0	349	0	0	0	0	0	0	4,213	26

Year	FMRI	FWRI-OBS	MARFIN	MRIP	NCDMF_438	QUANTECH - MRFSS	RECFIN	RECFIN/SEFL-CRP	REPBIO	SRFS	SRHS	SCDNR State Finfish Survey
1995	0	0	0	352	0	0	0	0	0	0	3,323	49
1996	0	0	0	366	0	0	0	0	0	0	3,168	177
1997	0	0	0	340	0	0	0	0	0	0	3,656	0
1998	0	0	0	369	0	75	0	0	0	0	4,361	96
1999	0	0	0	408	0	0	0	0	0	0	4,115	350
2000	0	0	0	382	0	0	0	0	0	0	3,419	172
2001	0	0	0	565	0	0	0	0	0	0	2,983	212
2002	0	0	0	267	0	0	0	0	0	0	1,960	251
2003	4	0	0	745	0	0	0	0	0	0	3,267	258
2004	2	0	0	750	0	0	0	0	0	0	4,236	450
2005	146	0	0	715	0	0	1	0	0	0	3,819	225
2006	524	0	0	825	0	0	1	0	0	0	5,078	149
2007	114	0	0	746	0	0	0	0	0	0	3,060	125
2008	0	0	0	547	0	0	0	0	0	0	2,013	76
2009	0	0	0	656	0	0	0	0	0	0	2,899	158
2010	7	0	0	1,118	5	0	0	0	0	0	4,558	233
2011	36	543	0	521	0	0	0	2	0	0	3,243	26
2012	0	160	0	508	0	0	0	0	0	0	1,675	3
2013	0	273	0	530	4	0	0	0	0	0	2,259	4
2014	0	245	0	627	16	0	0	0	0	0	1,903	0
2015	0	189	0	436	0	0	0	0	0	0	1,907	5
2016	0	86	0	312	0	0	0	0	0	0	1,341	20
2017	0	54	5	274	10	0	0	0	0	0	1,331	13
2018	0	45	37	286	19	0	0	0	0	0	1,236	19

Year	FMRI	FWRI-OBS	MARFIN	MRIP	NCDMF_438	QUANTECH - MRFSS	RECFIN	RECFIN/SEFL-CRP	REPBIO	SRFS	SRHS	SCDNR State Finfish Survey
2019	0	17	8	295	1	0	0	0	0	0	504	13
2020	0	68	0	257	0	0	0	0	0	0	143	10
2021	0	2	0	277	0	0	0	0	7	0	1	0
2022	0	10	0	164	0	0	0	0	1	0	258	0
2023	0	1	0	218	0	0	0	0	0	0	548	16
2024	0	7	0	198	0	0	0	0	0	0	309	0
2025	0	49	0	307	0	0	0	0	0	7	563	0

Table 3: Annual number of fish sampled for age by each data source.

Year	SRHS	QUANTECH - MRFSS	TIP	FMRI	NCDMF_438	FMRI - AT-SEA SAMPLING	FMRI - REPBIO	FMRI - EFP_LOTTERY_CONTROL	FMRI - FWRI-OBS
1988	3	0	0	0	0	0	0	0	0
1989	4	0	0	0	0	0	0	0	0
1990	29	0	0	0	0	0	0	0	0
1991	76	0	0	0	0	0	0	0	0
1992	51	0	0	0	0	0	0	0	0
1993	7	0	0	0	0	0	0	0	0
1994	5	0	0	0	0	0	0	0	0
1995	3	0	0	0	0	0	0	0	0
1996	13	0	0	0	0	0	0	0	0
1997	4	0	0	0	0	0	0	0	0
1998	0	462	0	0	0	0	0	0	0
2000	1	0	0	0	0	0	0	0	0
2001	0	0	9	0	0	0	0	0	0
2002	22	0	81	2	0	0	0	0	0
2003	69	0	50	32	0	0	0	0	0
2004	202	0	124	124	0	0	0	0	0
2005	303	0	59	217	0	0	0	0	0
2006	542	0	0	688	0	0	0	0	0
2007	541	0	0	139	0	0	0	0	0
2008	307	0	0	0	0	0	0	0	0
2009	550	0	0	0	0	0	0	0	0
2010	1,021	0	0	7	5	0	0	0	0
2011	347	0	0	36	0	0	0	0	0

Year	SRHS	QUANTECH - MRFSS	TIP	FMRI	NCDMF_438	FMRI - AT-SEA SAMPLING	FMRI - REPBIO	FMRI - EFP_LOTTERY_CONTROL	FMRI - FWRI-OBS
2012	511	0	0	0	0	0	0	0	0
2013	1,028	0	0	35	4	0	0	0	0
2014	867	0	0	81	16	0	0	0	0
2015	852	0	0	64	0	14	0	0	0
2016	971	0	0	0	0	0	0	0	0
2017	919	0	0	61	10	0	0	0	0
2018	900	0	0	38	19	0	0	0	0
2019	337	0	0	35	1	0	0	0	0
2020	71	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	4	10	0	0
2022	222	0	0	0	0	20	14	0	0
2023	448	0	0	0	0	5	5	0	0
2024	299	0	0	0	0	2	0	0	0
2025	506	0	0	0	0	0	0	3	6

Table 4: Number of fish and trips sampled for length, by fleet, from the North (North Carolina and South Carolina), and South (Georgia and Florida) weighting subregions. Values in red do not meet the minimum recommended sample size of 30 fish from 10 trips per strata.

	Headboat				GR Inland				GR Ocean			
	Number of Fish		Number of Trips		Number of Fish		Number of Trips		Number of Fish		Number of Trips	
Year	North	South	North	South	North	South	North	South	North	South	North	South
1973	1	0	1	0	0	0	0	0	0	0	0	0
1974	1,137	0	143	0	0	0	0	0	0	0	0	0
1975	1,032	0	147	0	0	0	0	0	0	0	0	0
1976	648	294	128	48	0	0	0	0	0	0	0	0
1977	2,671	540	228	100	0	0	0	0	0	0	0	0
1978	1,381	951	142	185	0	0	0	0	0	0	0	0
1979	1,111	543	91	110	0	0	0	0	0	0	0	0
1980	1,932	486	173	103	0	0	0	0	0	0	0	0
1981	2,245	780	205	182	84	19	19	10	72	45	18	9
1982	2,242	1,444	249	190	76	28	29	13	92	231	20	42
1983	3,109	2,620	316	308	21	7	11	6	90	62	15	17
1984	3,430	2,656	379	316	17	46	10	16	115	127	23	26
1985	3,150	2,692	305	333	40	85	11	34	108	260	18	45
1986	4,100	2,450	374	309	16	90	9	27	81	221	30	75
1987	4,406	2,036	521	266	48	74	28	24	353	221	68	41
1988	2,908	1,345	369	176	43	27	23	10	516	88	115	21
1989	2,135	1,701	237	190	99	78	51	26	391	75	113	18
1990	3,491	2,281	277	204	61	4	30	3	351	29	95	5
1991	3,686	1,694	254	137	52	17	25	4	308	20	72	3
1992	3,842	1,335	273	126	115	17	36	8	419	130	88	25

	Headboat				GR Inland				GR Ocean			
	Number of Fish		Number of Trips		Number of Fish		Number of Trips		Number of Fish		Number of Trips	
Year	North	South	North	South	North	South	North	South	North	South	North	South
1993	3,163	778	255	132	64	23	28	12	394	31	91	18
1994	3,348	865	224	125	26	18	17	13	263	68	70	29
1995	2,777	546	185	97	53	2	20	2	255	91	61	19
1996	2,791	377	208	68	83	5	27	4	388	67	75	18
1997	2,602	1,054	224	150	36	6	16	4	256	42	65	29
1998	2,809	1,627	247	222	37	5	24	4	358	65	64	24
1999	2,505	1,610	209	193	56	27	19	17	550	125	78	40
2000	2,063	1,356	170	163	29	20	16	8	358	147	58	31
2001	1,466	1,517	138	191	38	23	17	16	486	230	88	57
2002	1,003	957	119	186	66	24	26	13	305	123	56	32
2003	1,984	1,287	202	204	46	12	26	9	323	622	51	71
2004	1,983	2,255	188	216	98	5	39	4	669	428	104	58
2005	1,303	2,662	134	221	100	6	33	5	315	519	76	49
2006	2,157	3,446	224	255	69	15	27	6	516	374	80	52
2007	1,460	1,714	190	147	39	10	14	6	325	497	57	51
2008	1,128	885	165	116	19	9	9	3	305	290	71	53
2009	1,352	1,547	206	190	9	7	4	5	414	384	78	50
2010	1,798	2,767	208	271	21	9	8	7	706	615	106	58
2011	1,619	2,205	145	172	10	4	7	3	272	261	39	28
2012	1,270	565	89	68	6	27	4	12	327	151	44	21
2013	1,437	985	183	179	11	25	3	13	302	196	49	40
2014	1,246	780	188	203	0	19	0	9	274	334	50	69
2015	1,345	690	157	145	3	15	3	8	235	188	53	50

	Headboat				GR Inland				GR Ocean			
	Number of Fish		Number of Trips		Number of Fish		Number of Trips		Number of Fish		Number of Trips	
Year	North	South	North	South	North	South	North	South	North	South	North	South
2016	918	509	160	147	13	6	11	4	199	114	46	42
2017	1,044	341	149	114	4	7	4	4	182	94	44	29
2018	1,075	206	190	90	3	1	3	1	244	57	56	29
2019	342	179	90	71	0	1	0	1	175	132	48	28
2020	106	105	16	13	1	2	1	2	153	111	46	12
2021	0	2	0	2	4	9	3	2	175	89	60	21
2022	241	27	65	15	3	3	3	3	95	63	37	21
2023	525	23	82	16	9	4	8	3	148	73	43	19
2024	291	23	83	16	5	3	5	3	86	104	38	19
2025	525	43	92	22	7	4	7	4	139	157	59	37

Table 5. Number of fish and trips sampled for age by fleet. Values in red do not meet the recommended minimum size threshold of 10 fish sampled from 10 trips.

	Number of Fish		Number of Trips	
Year	Headboat	GR Inland/Ocean	Headboat	GR Inland/Ocean
1988	3	0	2	0
1989	4	0	2	0
1990	29	0	11	0
1991	76	0	39	0
1992	51	0	26	0
1993	7	0	5	0
1994	5	0	2	0
1995	3	0	1	0
1996	13	0	8	0
1997	4	0	2	0
1998	75	387	9	58
2000	1	0	1	0
2001	0	9	0	4
2002	22	83	15	28
2003	73	78	29	22
2004	204	246	54	42
2005	449	130	108	37
2006	1,066	164	246	16
2007	655	25	230	3
2008	307	0	162	0
2009	550	0	225	0
2010	1,028	5	340	1
2011	383	0	123	0
2012	511	0	80	0
2013	1,028	39	238	16
2014	867	97	197	26
2015	852	78	156	16
2016	971	0	259	0
2017	919	71	205	26
2018	900	57	236	15
2019	337	36	109	12
2020	71	0	19	0

	Number of Fish		Number of Trips	
Year	Headboat	GR Inland/Ocean	Headboat	GR Inland/Ocean
2021	4	10	3	1
2022	242	14	88	4
2023	453	5	99	3
2024	301	0	95	0
2025	512	3	102	1

Table 6. Data suitability for the **Headboat** fleet. Years in green have sufficient sample sizes. Years in red do not meet minimum sample size thresholds. Years in gray do not have any samples.

Year	Nom Len	Wgt Len	Nom Age	Wgt Age
1973				
1974				
1975				
1976				
1977				
1978				
1979				
1980				
1981				
1982				
1983				
1984				
1985				
1986				
1987				
1988				
1989				
1990				
1991				
1992				
1993				
1994				
1995				
1996				
1997				
1998				
1999				

Year	Nom Len	Wgt Len	Nom Age	Wgt Age
2000				
2001				
2002				
2003				
2004				
2005				
2006				
2007				
2008				
2009				
2010				
2011				
2012				
2013				
2014				
2015				
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Table 7: Data Suitability for the **Gen Rec Inland** fleet. Years in green have sufficient sample sizes. Years in red do not meet minimum sample size thresholds. Years in gray do not have any samples.

Year	Nom Len	Wgt Len
1981		
1982		
1983		
1984		
1985		
1986		
1987		
1988		
1989		
1990		
1991		
1992		
1993		
1994		
1995		
1996		
1997		
1998		
1999		
2000		
2001		
2002		
2003		
2004		
2005		
2006		
2007		

Year	Nom Len	Wgt Len
2008		
2009		
2010		
2011		
2012		
2013		
2014		
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		
2024		
2025		

Table 8. Data suitability for the **Gen Rec Ocean** fleet.

Year	Nom Len	Wgt Len
1981		
1982		
1983		
1984		
1985		
1986		
1987		
1988		
1989		
1990		
1991		
1992		
1993		
1994		
1995		
1996		
1997		
1998		
1999		
2000		
2001		
2002		
2003		
2004		
2005		
2006		
2007		
2008		
2009		

Year	Nom Len	Wgt Len
2010		
2011		
2012		
2013		
2014		
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		
2024		
2025		

Figures

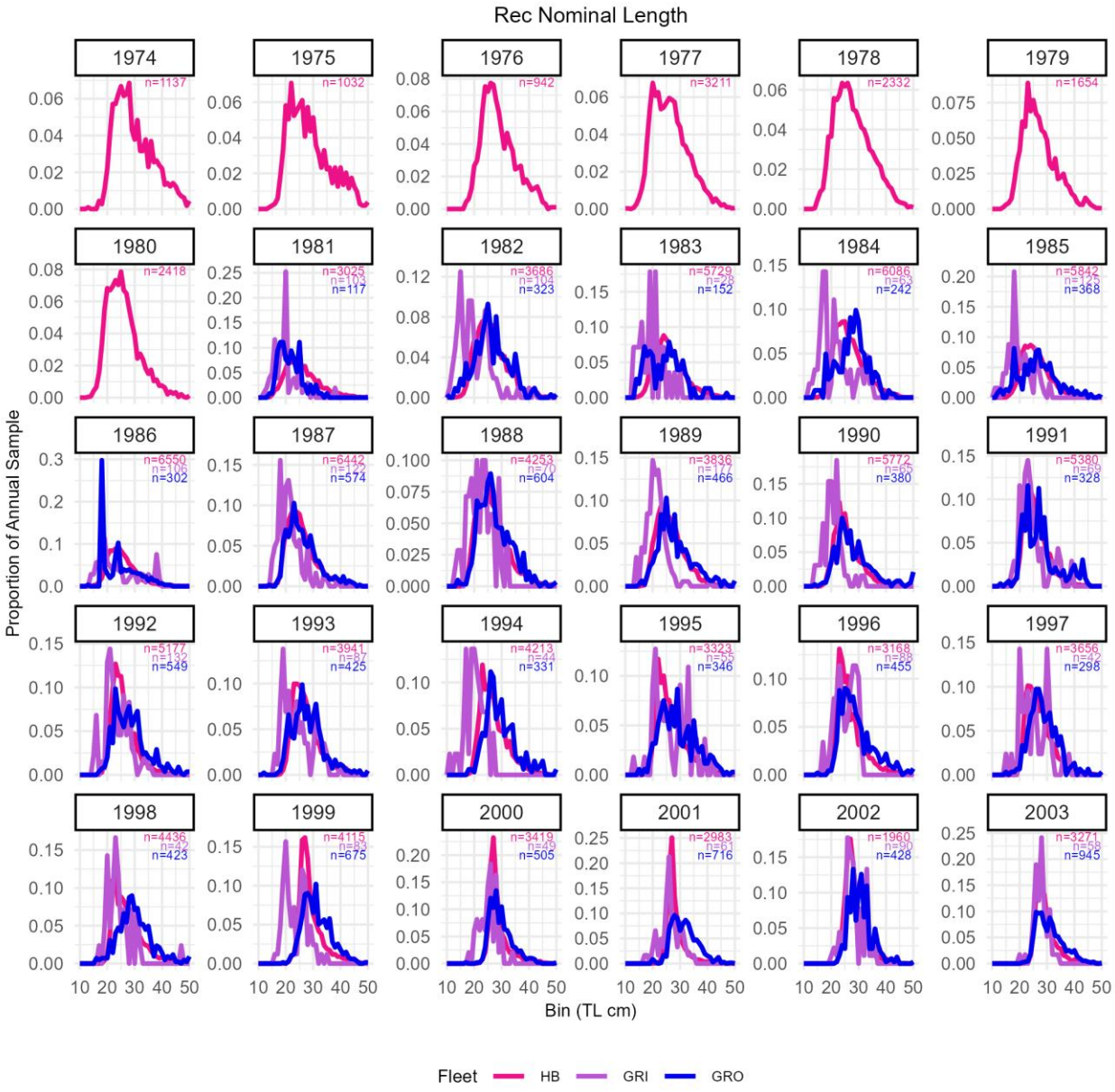


Figure 1. Nominal length distribution of Black Sea Bass sampled from the Headboat (HB), GRI (Gen Rec Inland), and GRO (Gen Rec Ocean) fleet.

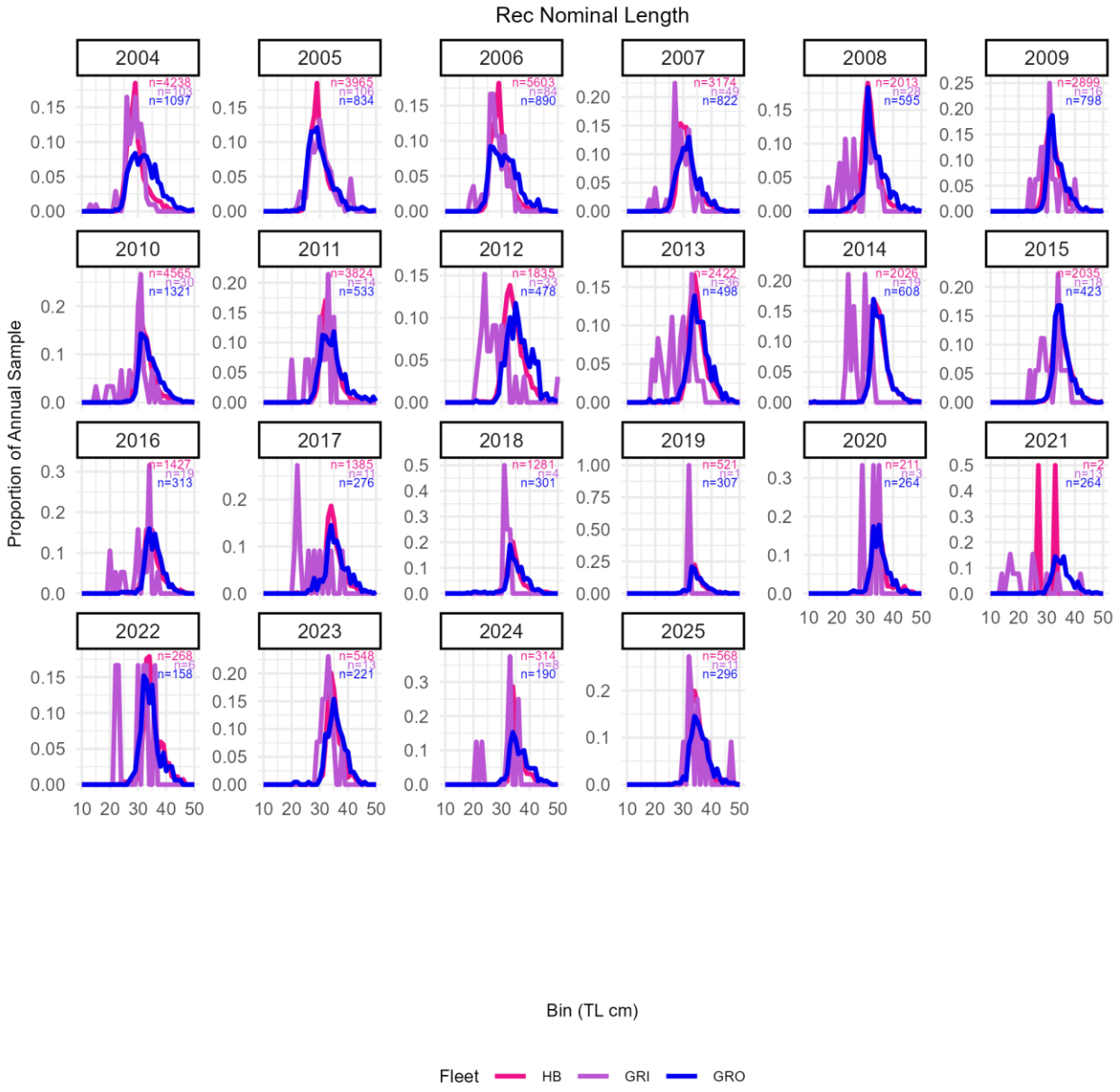


Figure 1 (continued). Nominal length distribution of Black Sea Bass sampled from the Headboat (HB), GRI (Gen Rec Inland), and GRO (Gen Rec Ocean) fleet.

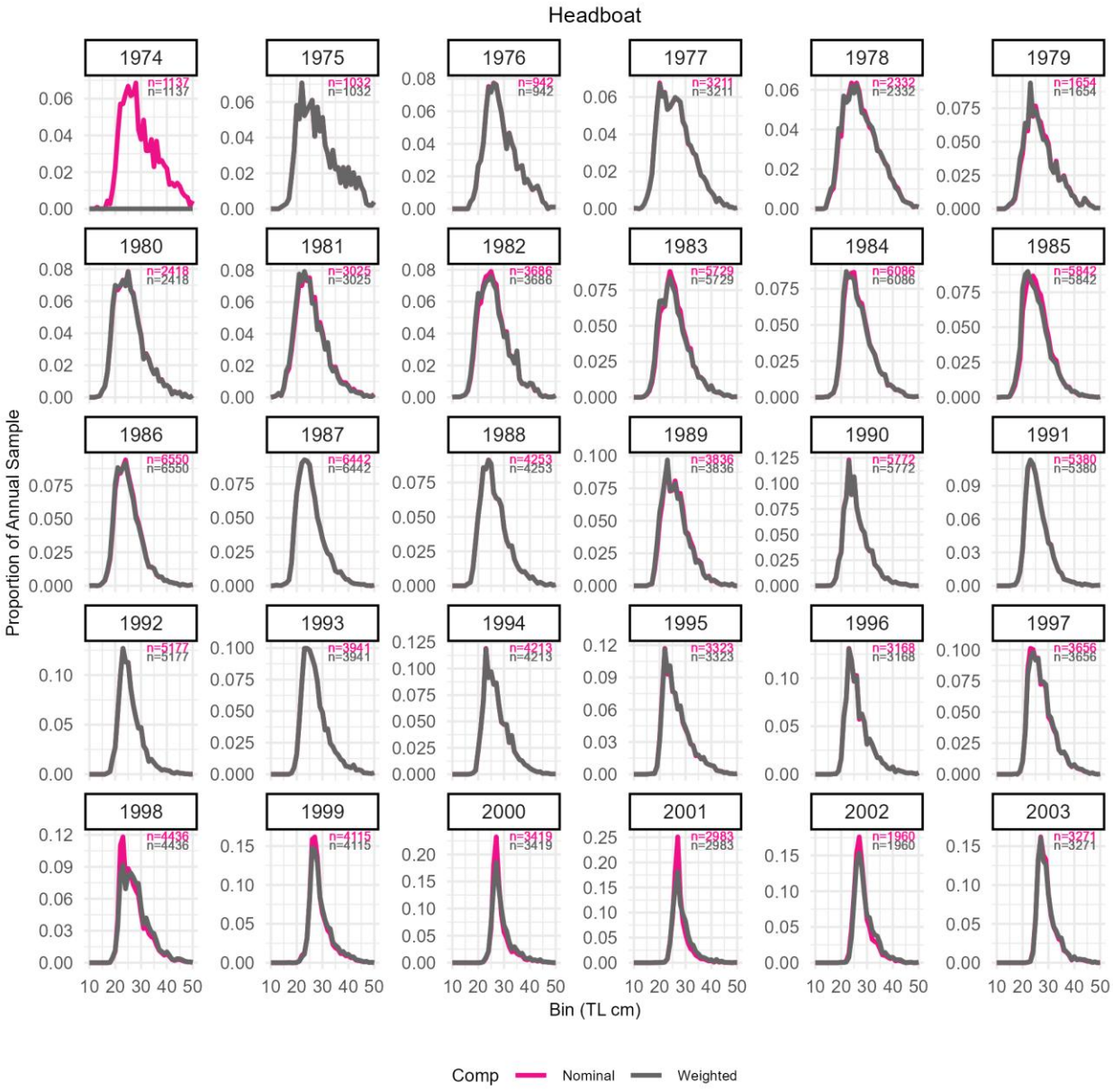


*Figure 2. Nominal and weighted length compositions for Black Sea Bass sampled from the **Headboat** fleet. Weighted length compositions where only one weighting substratum had sufficient sample sizes are presented in this figure, however, they are not recommended for use. In these cases, n will differ for the nominal and weighted length compositions since the weighted length compositions only include samples from the weighted substratum with sufficient sample sizes.*

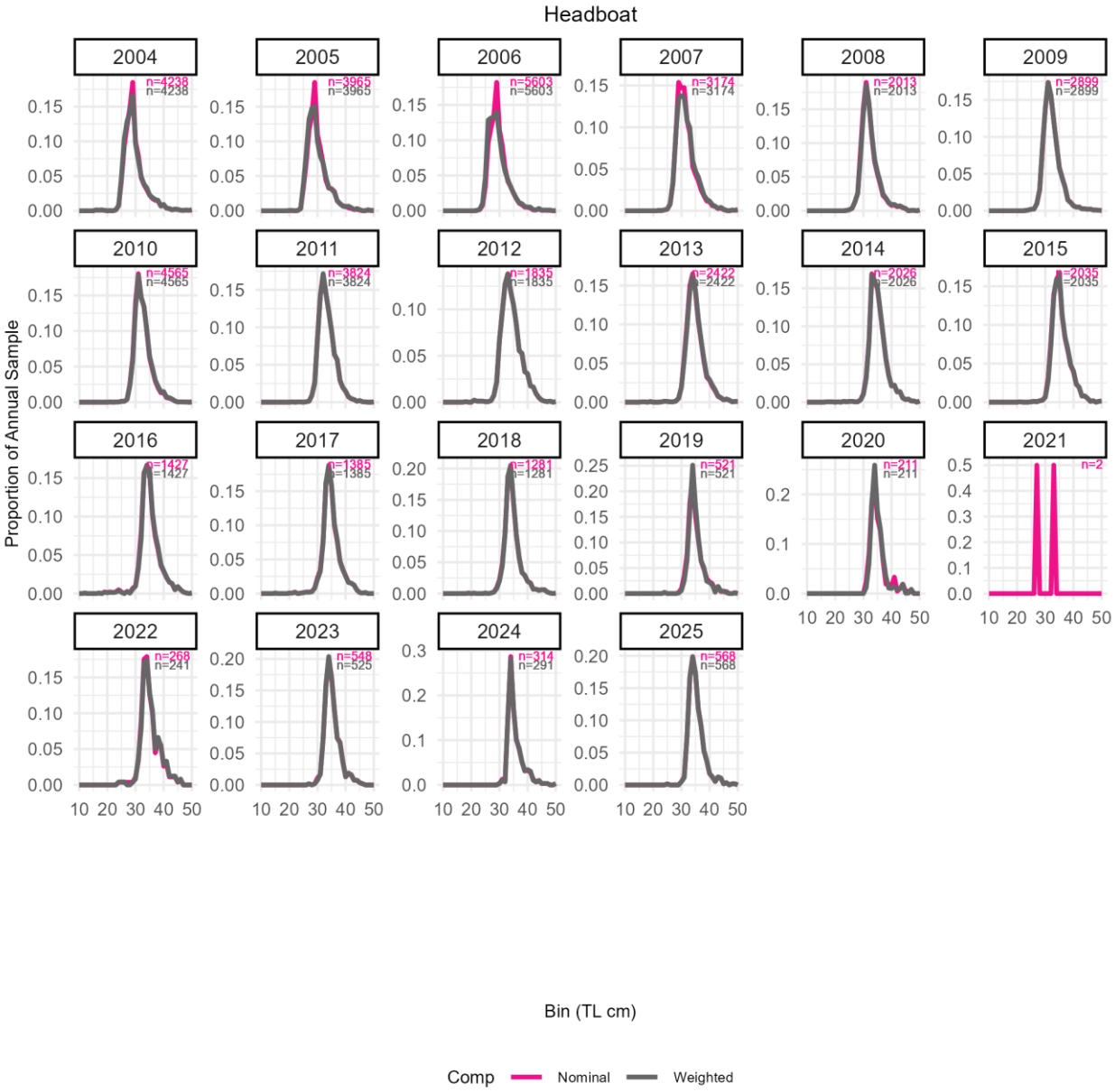


*Figure 2 (continued). Nominal and weighted length compositions for Black Sea Bass sampled from the **Headboat** fleet. Weighted length compositions where only one weighting substratum had sufficient sample sizes are presented in this figure, however, they are not recommended for use. In these cases, n will differ for the nominal and weighted length compositions since the weighted length compositions only include samples from the weighted substratum with sufficient sample sizes.*

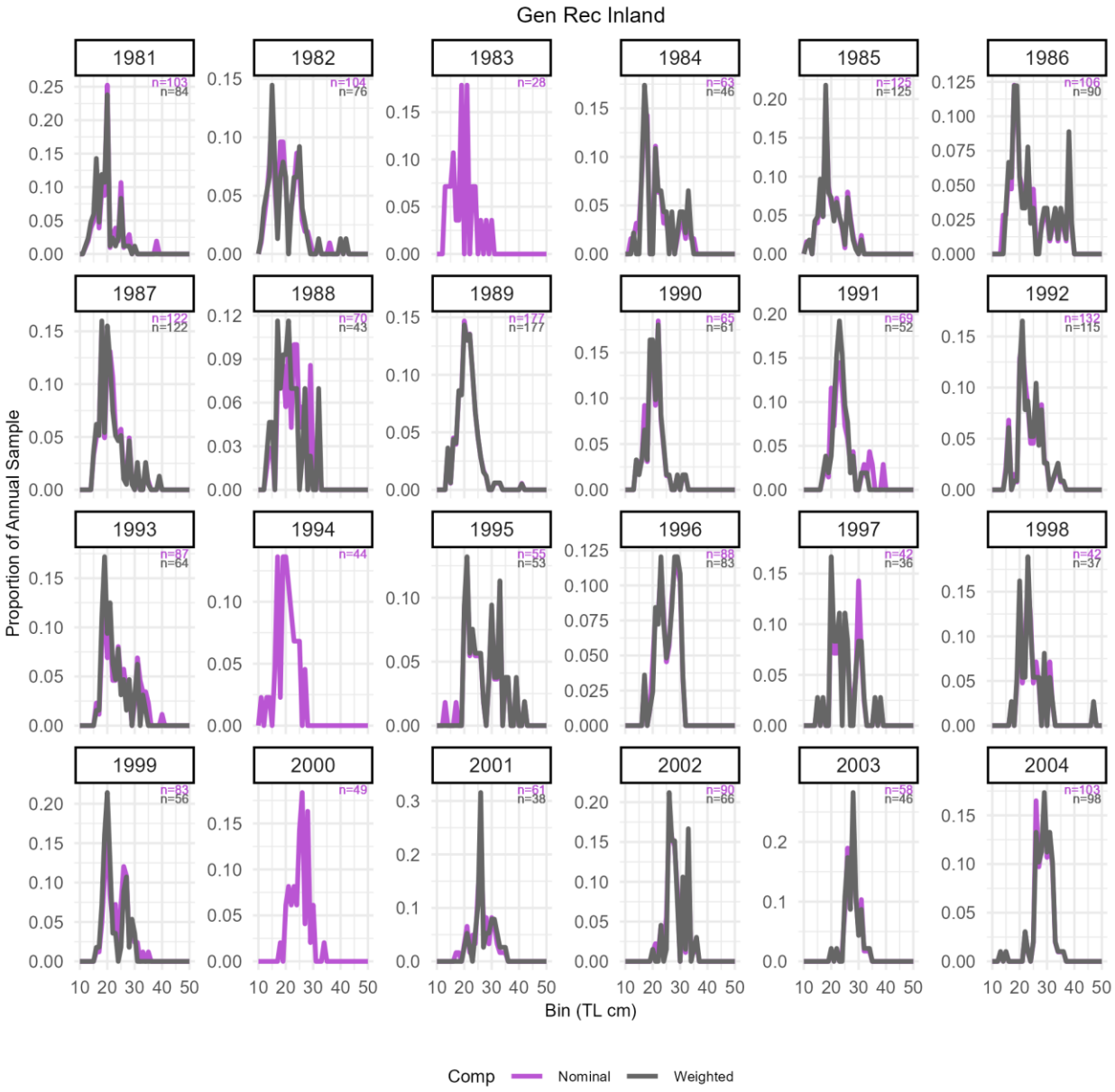


*Figure 3. Nominal and weighted length compositions for Black Sea Bass sampled from the **Gen Rec Inland** fleet. Weighted length compositions where only one weighting substratum had sufficient sample sizes are presented in this figure, however, they are not recommended for use. In these cases, n will differ for the nominal and weighted length compositions since the weighted length compositions only include samples from the weighted substratum with sufficient sample sizes.*

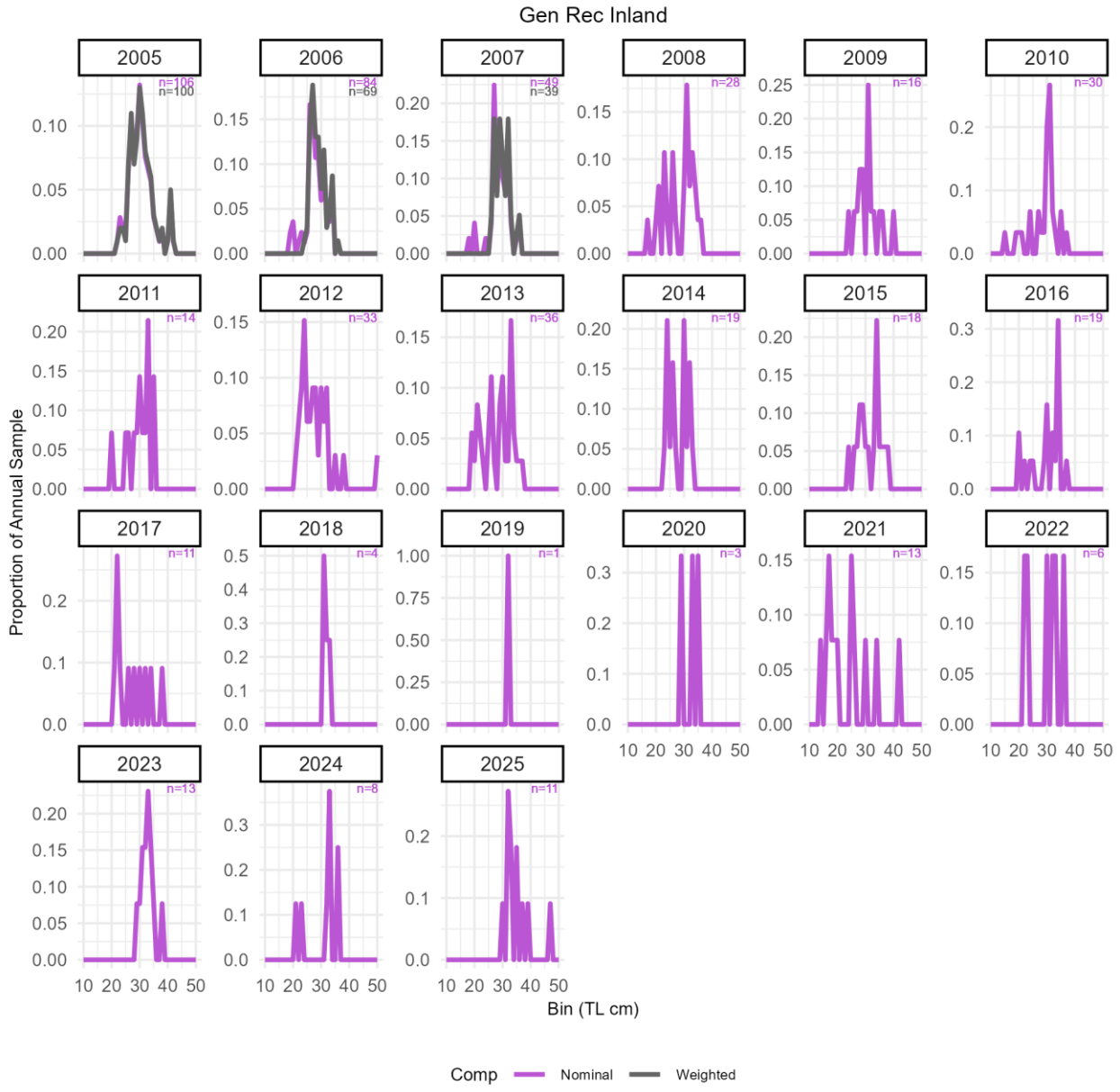


*Figure 3 (continued). Nominal and weighted length compositions for Black Sea Bass sampled from the **Gen Rec Inland** fleet. Weighted length compositions where only one weighting substratum had sufficient sample sizes are presented in this figure, however, they are not recommended for use. In these cases, n will differ for the nominal and weighted length compositions since the weighted length compositions only include samples from the weighted substratum with sufficient sample sizes.*

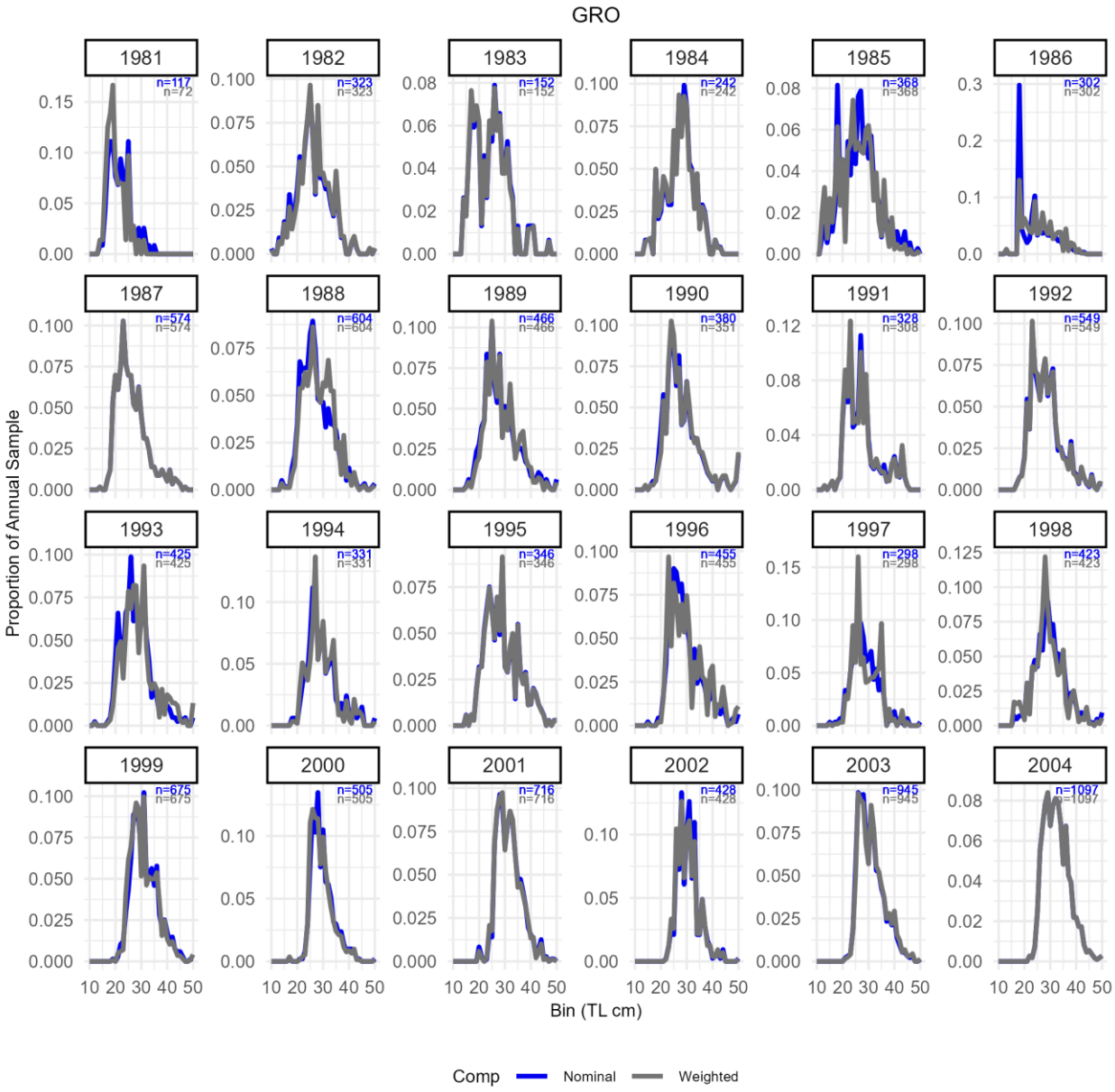


*Figure 4. Nominal and weighted length compositions for Black Sea Bass sampled from the **Gen Rec Ocean** fleet. Weighted length compositions where only one weighting substratum had sufficient sample sizes are presented in this figure, however, they are not recommended for use. In these cases, n will differ for the nominal and weighted length compositions since the weighted length compositions only include samples from the weighted substratum with sufficient sample sizes.*

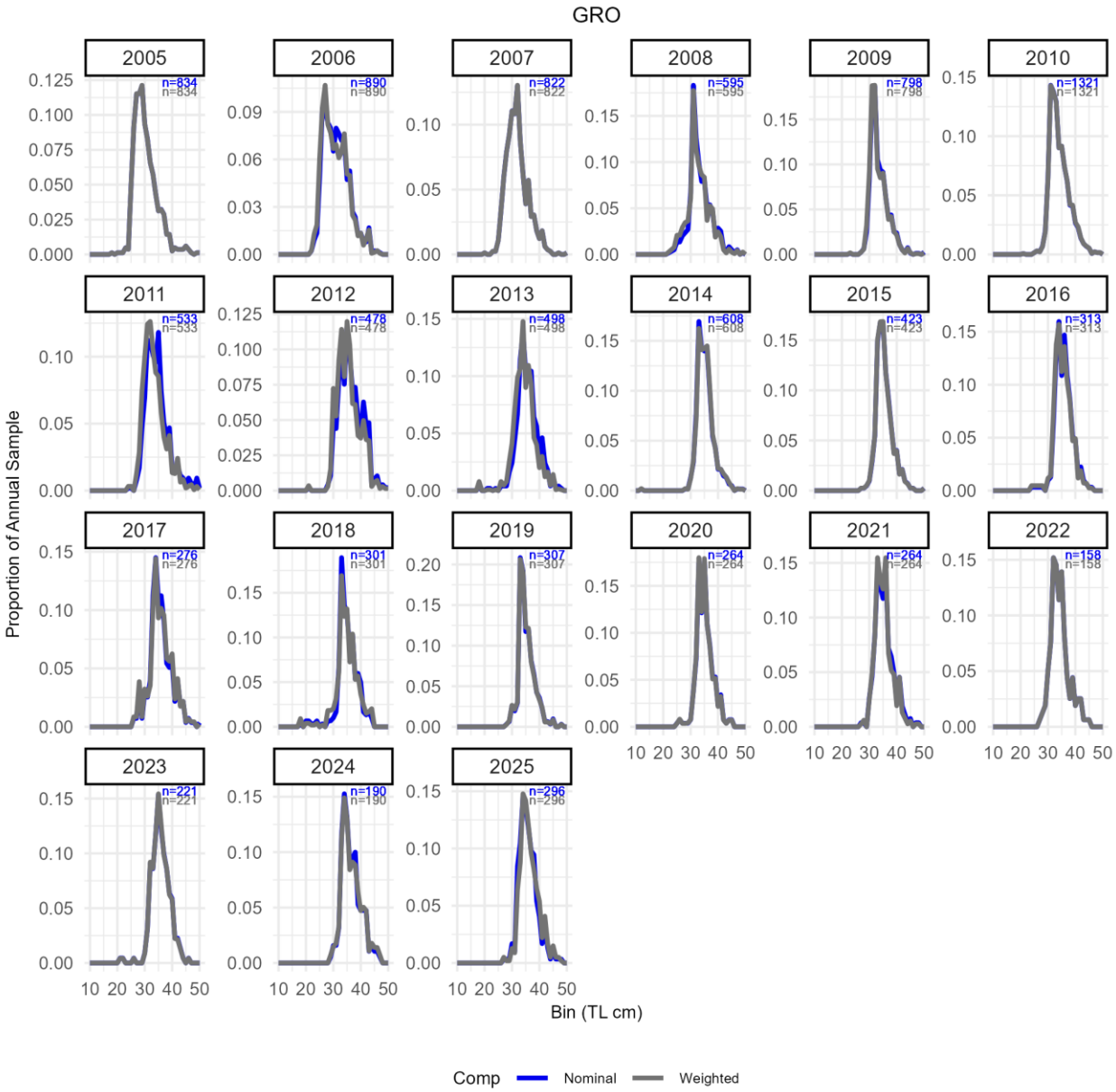


*Figure 4 (continued). Nominal and weighted length compositions for Black Sea Bass sampled from the **Gen Rec Ocean** fleet. Weighted length compositions where only one weighting substratum had sufficient sample sizes are presented in this figure, however, they are not recommended for use. In these cases, n will differ for the nominal and weighted length compositions since the weighted length compositions only include samples from the weighted substratum with sufficient sample sizes.*

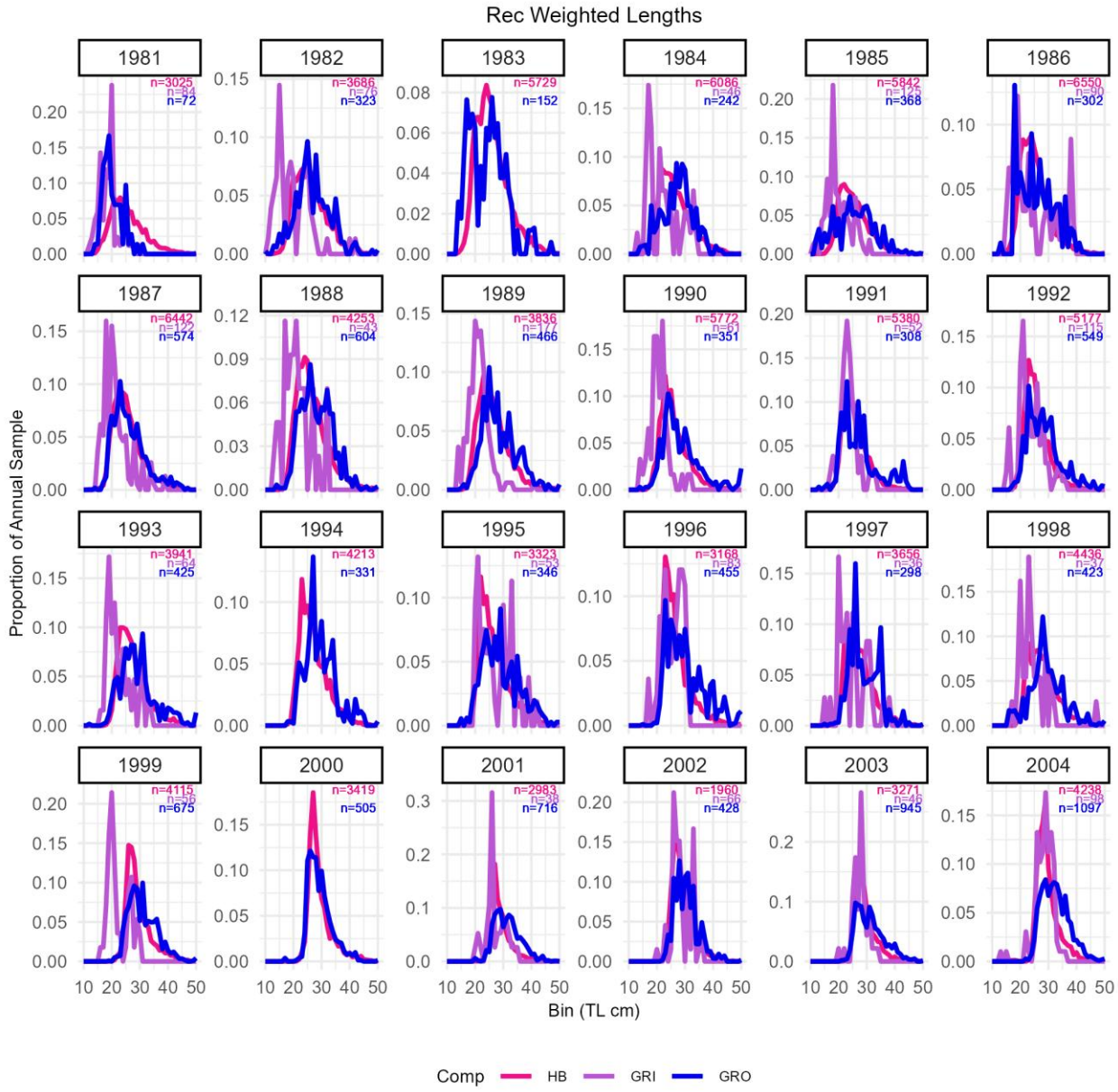


Figure 5. Weighted length distributions of Black Sea Bass sampled from the Headboat (HB), GRI (Gen Rec Inland), and GRO (Gen Rec Ocean) fleet.

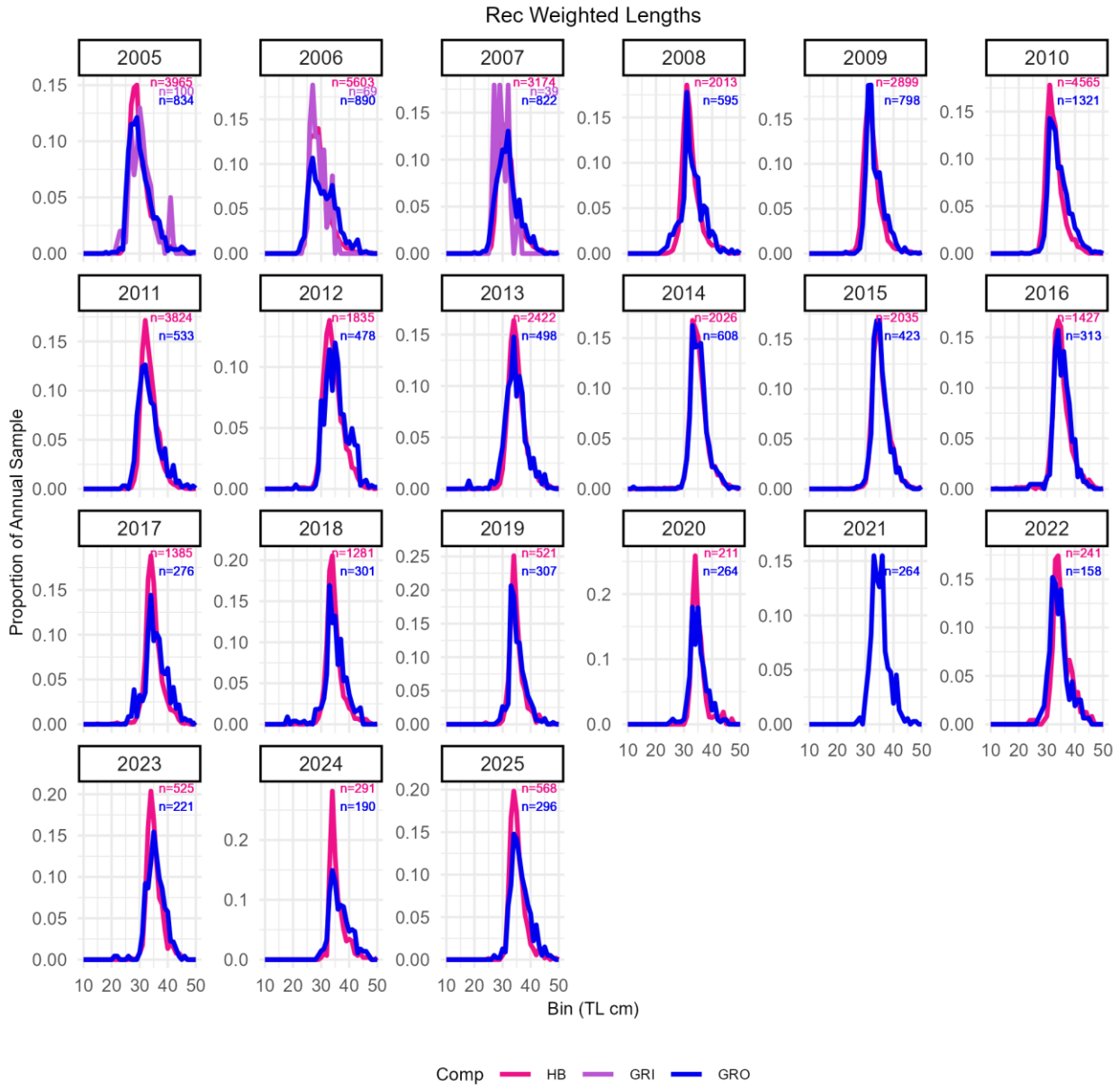


Figure 5 (continued). Weighted length distributions of Black Sea Bass sampled from the Headboat (HB), GRI (Gen Rec Inland), and GRO (Gen Rec Ocean) fleet.

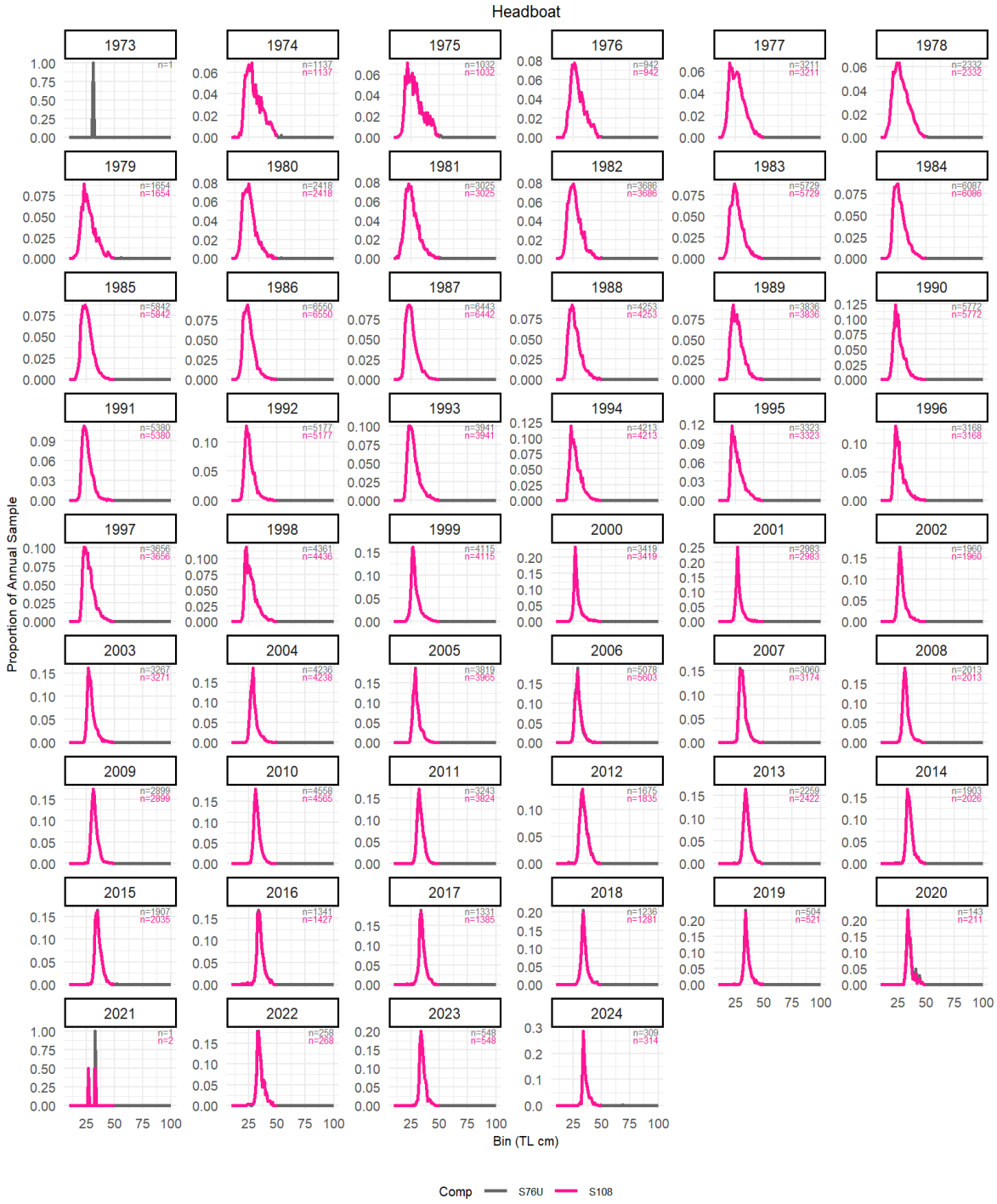


*Figure 6. Nominal length distributions of Black Sea Bass sampled from the **Headboat** fleet for SEDAR 76U and SEDAR 108.*

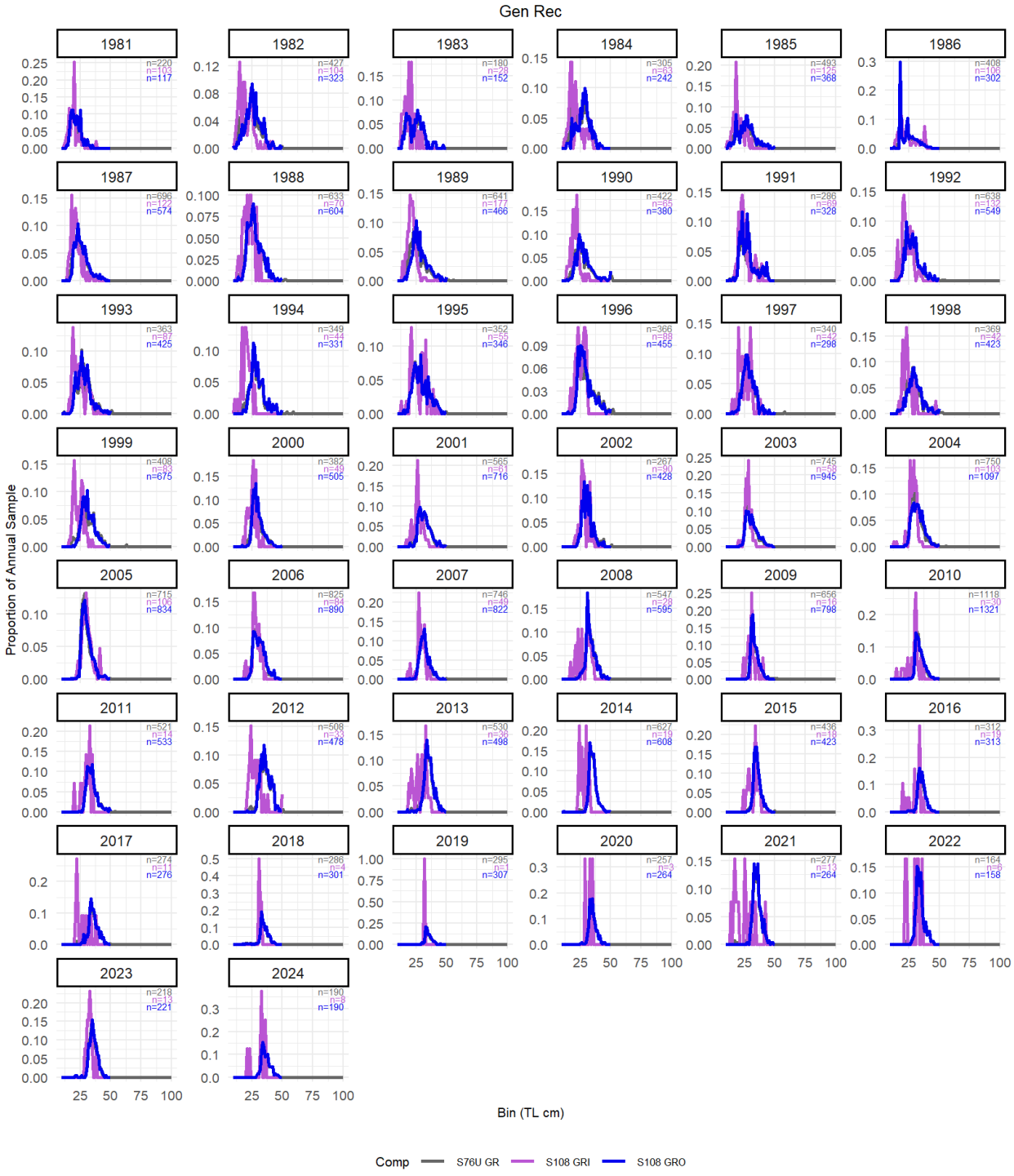


Figure 7. Nominal length distributions of Black Sea Bass sampled from the ***Gen Rec, Gen Rec Inland, and Gen Rec Ocean*** *fleets for SEDAR 76U and SEDAR 108*

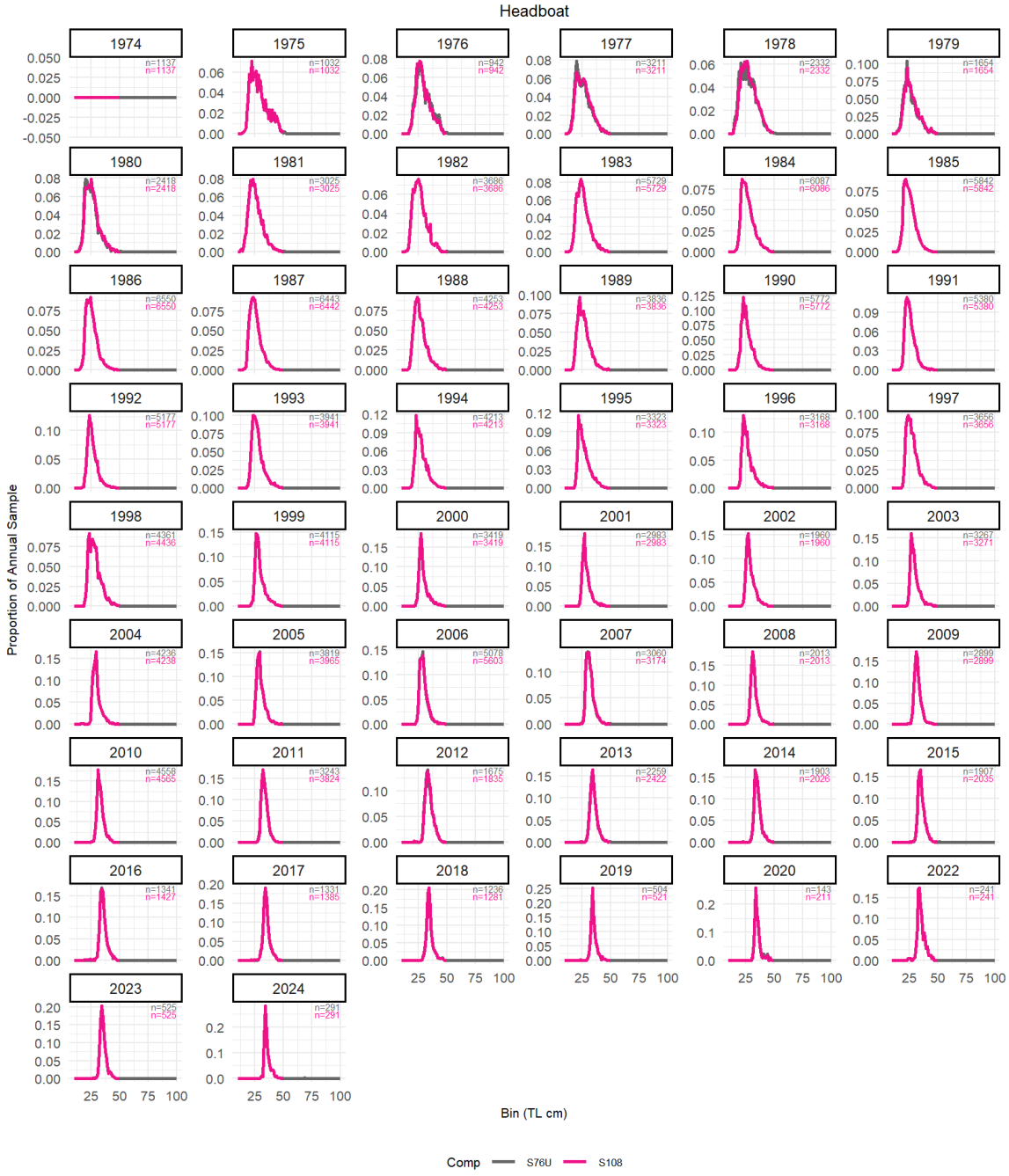


*Figure 8. Weighted length distributions of Black Sea Bass sampled from the **Headboat** fleet for SEDAR 76U and SEDAR 108.*

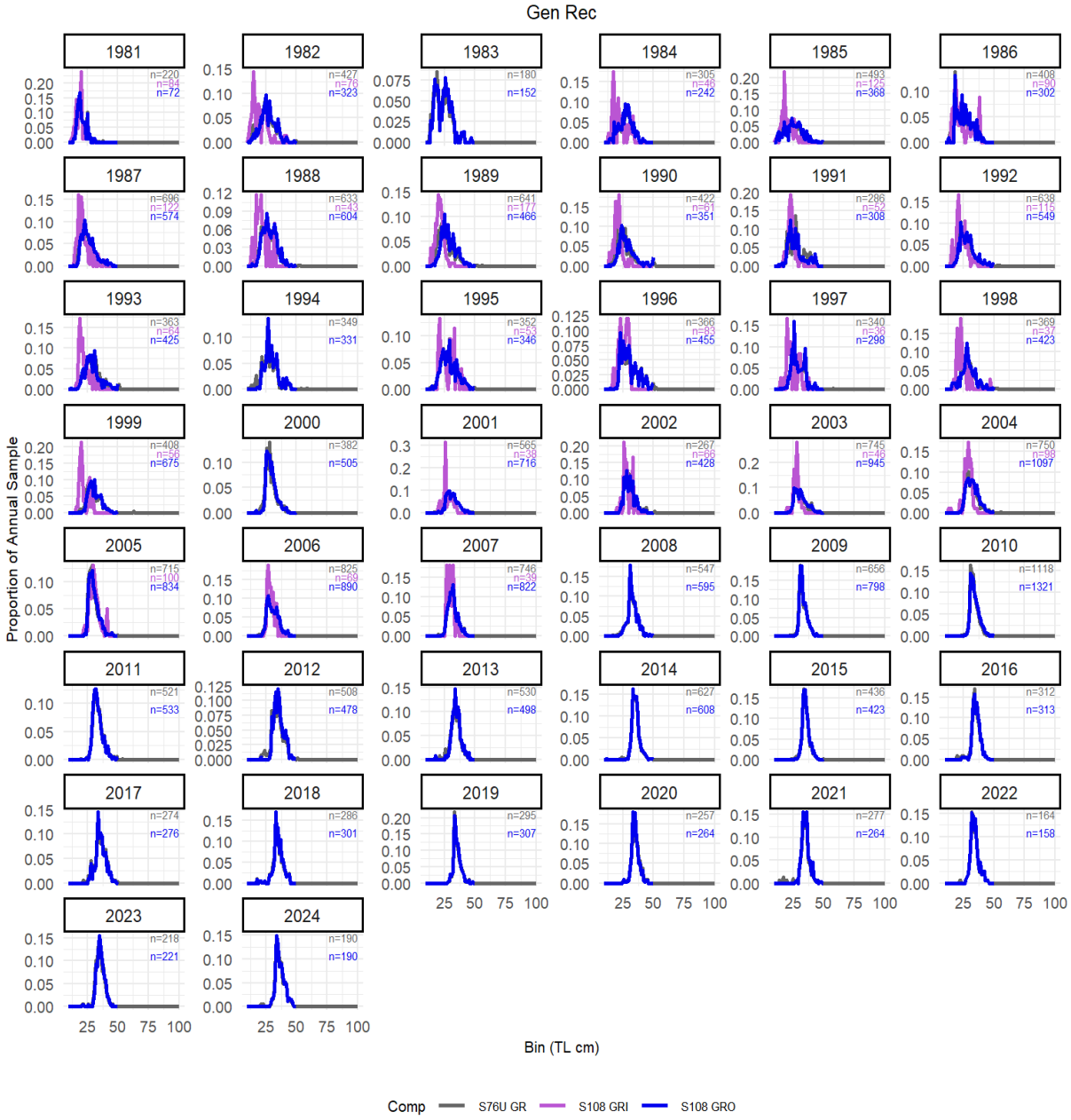


Figure 9. Weighted length distributions of Black Sea Bass sampled from the ***Gen Rec, Gen Rec Inland, and Gen Rec Ocean*** *fleets for SEDAR 76U and SEDAR 108.*

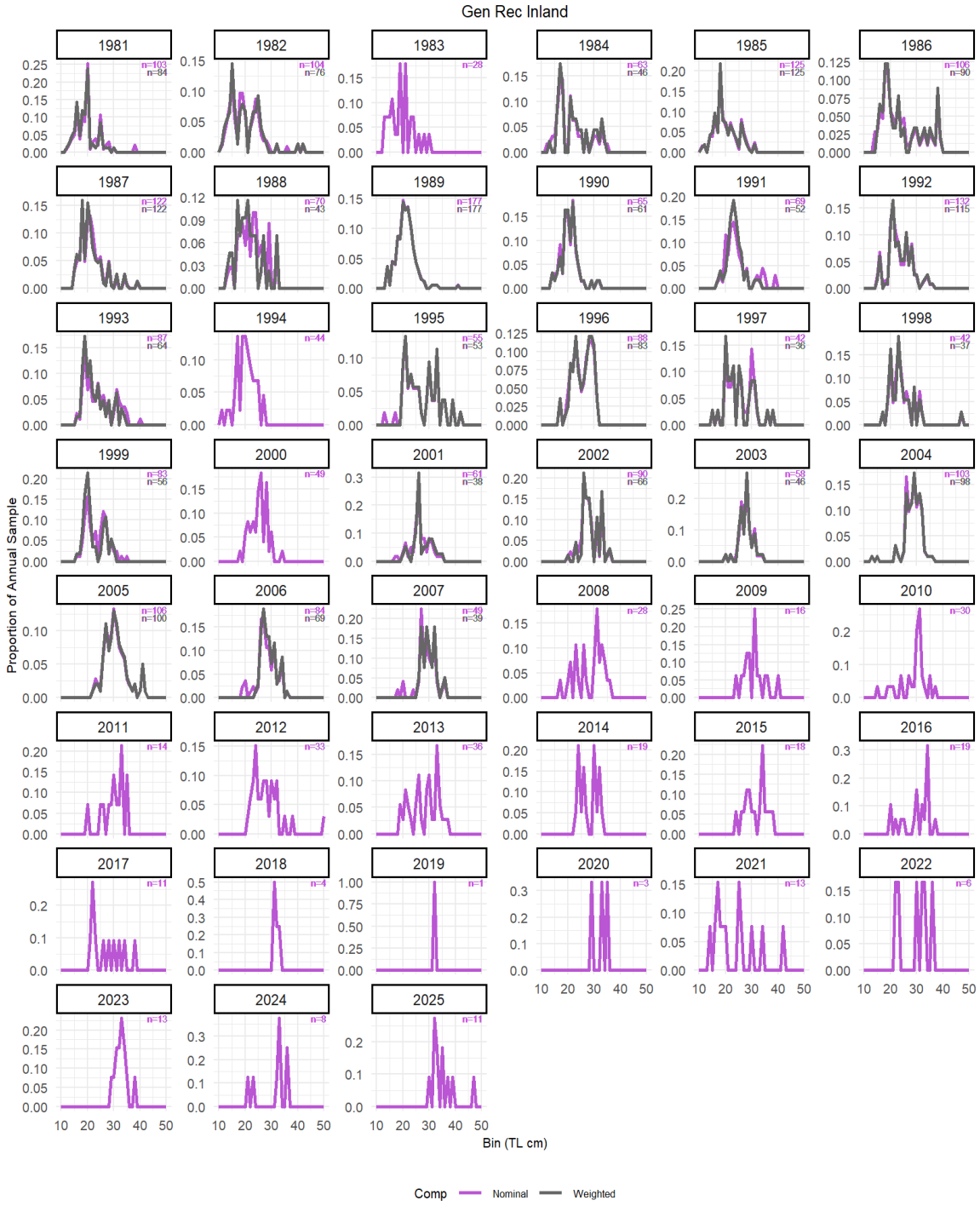


*Figure 10. Nominal and weighted length compositions for Black Sea Bass sampled from the **Gen Rec Inland** fleet. The MRIP catch data used for weighting had imprecise estimates (CV ≥ 0.5) replaced with estimates generated using a three-year centered average smoothing approach.*



Figure 11. Nominal length distributions of Black Sea Bass included in the length compositions and age compositions from the ***Headboat*** *fleet.*

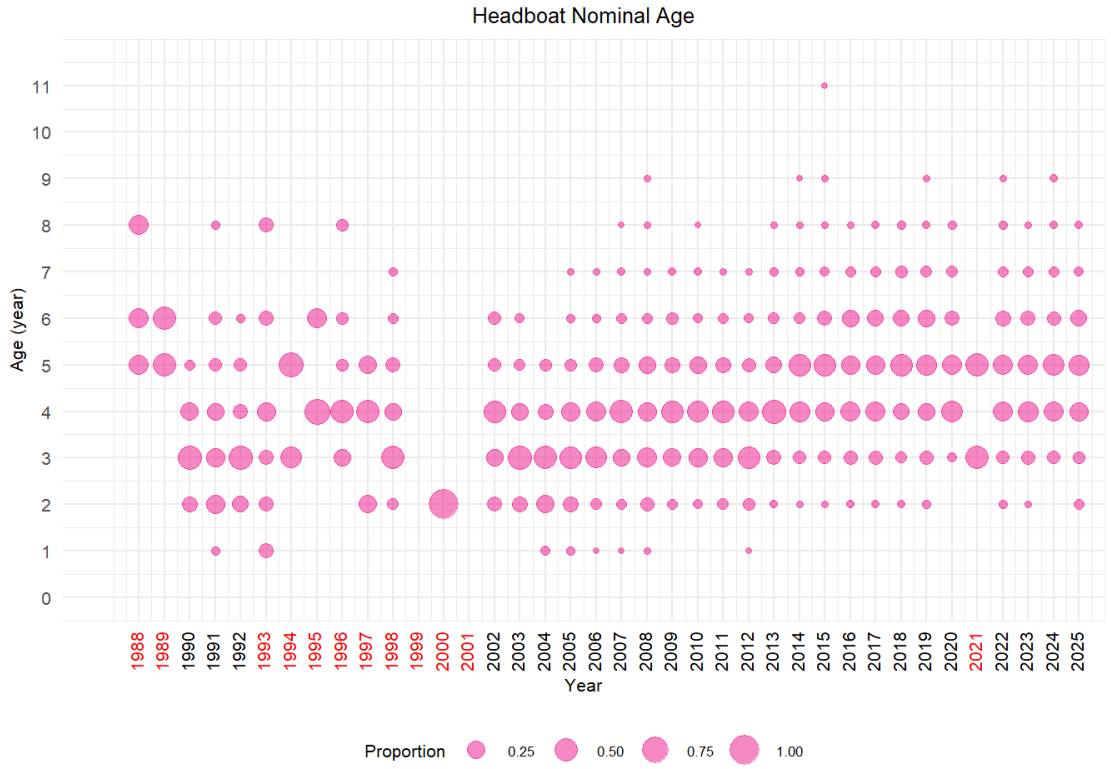


*Figure 12. Nominal age bubble plot for Black Sea Bass sampled from the **Headboat** fleet. Years in red do not meet the recommended sample size threshold of 10 samples from 10 fish and 10 trips.*

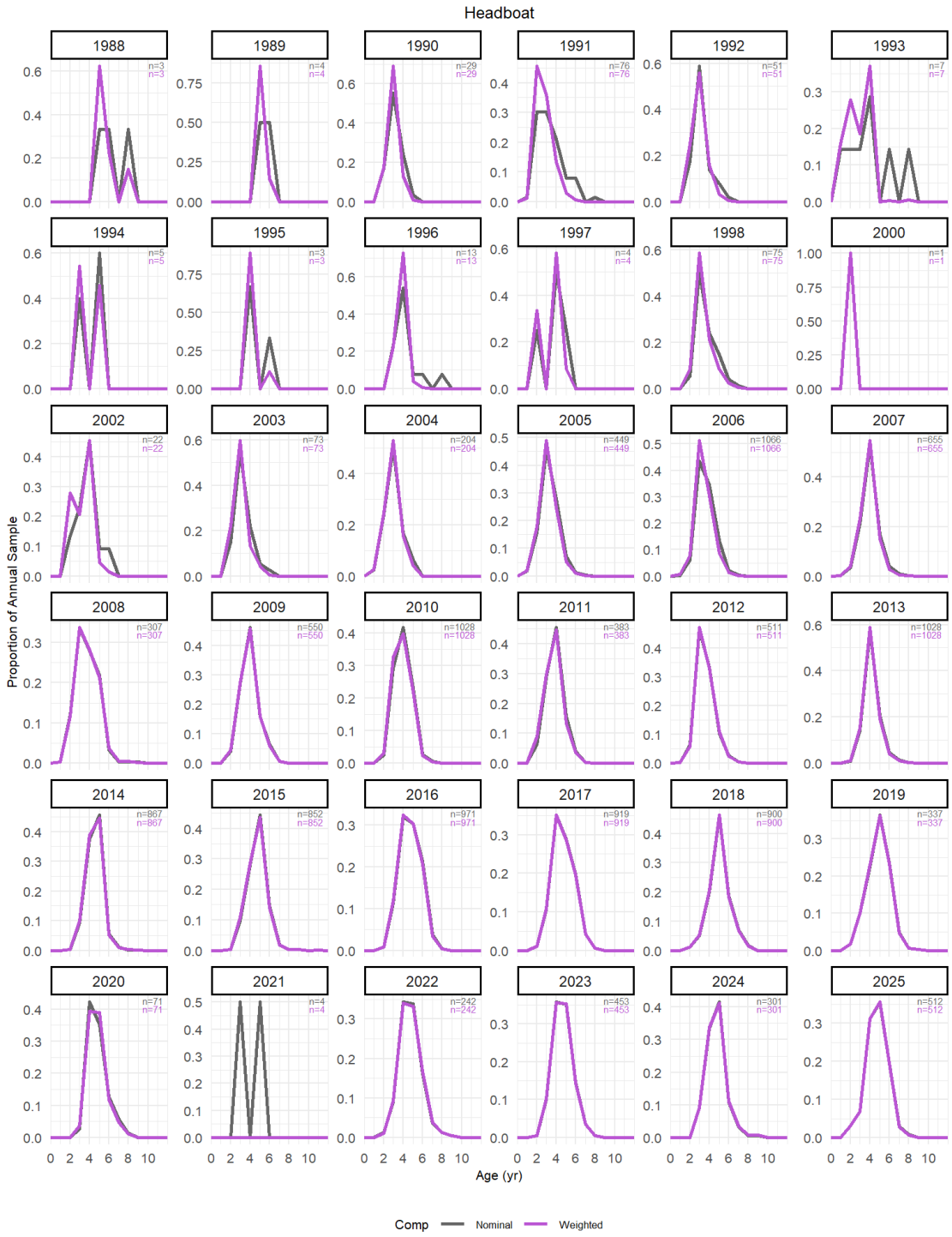


Figure 13. Nominal and weighted age distributions of Black Sea Bass sampled from the ***Headboat*** *fleet.*

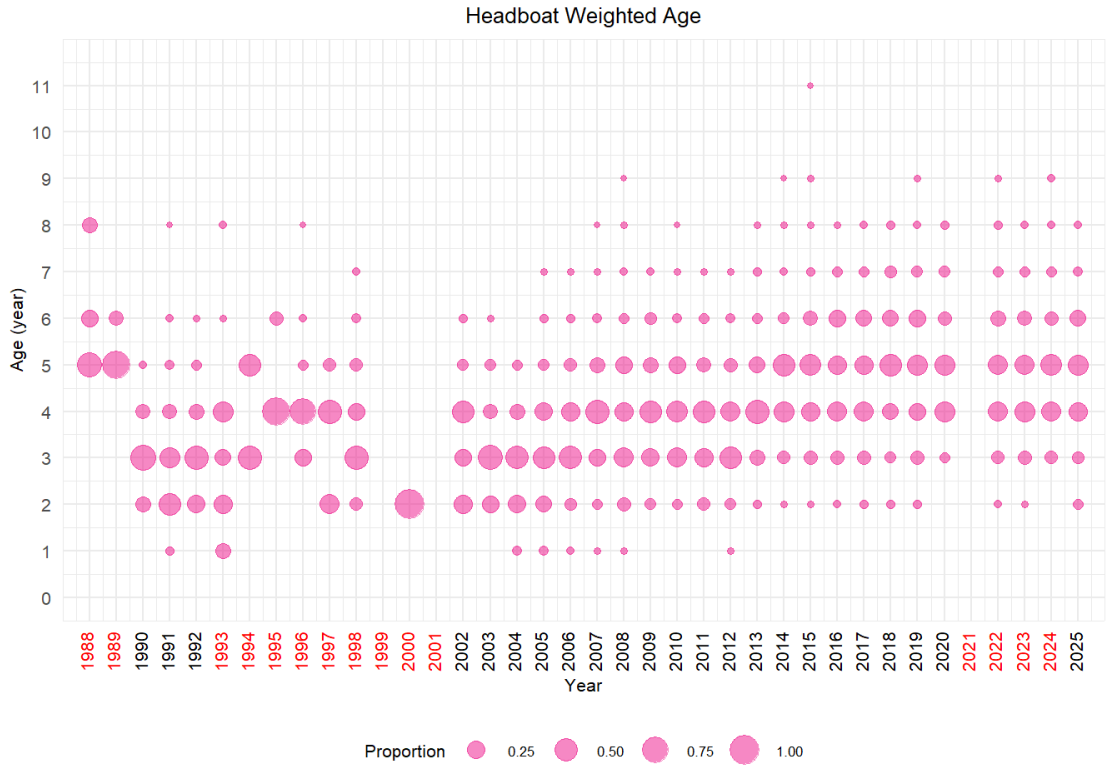


*Figure 14. Weighted age bubble plot for Black Sea Bass sampled from the **Headboat** fleet.*

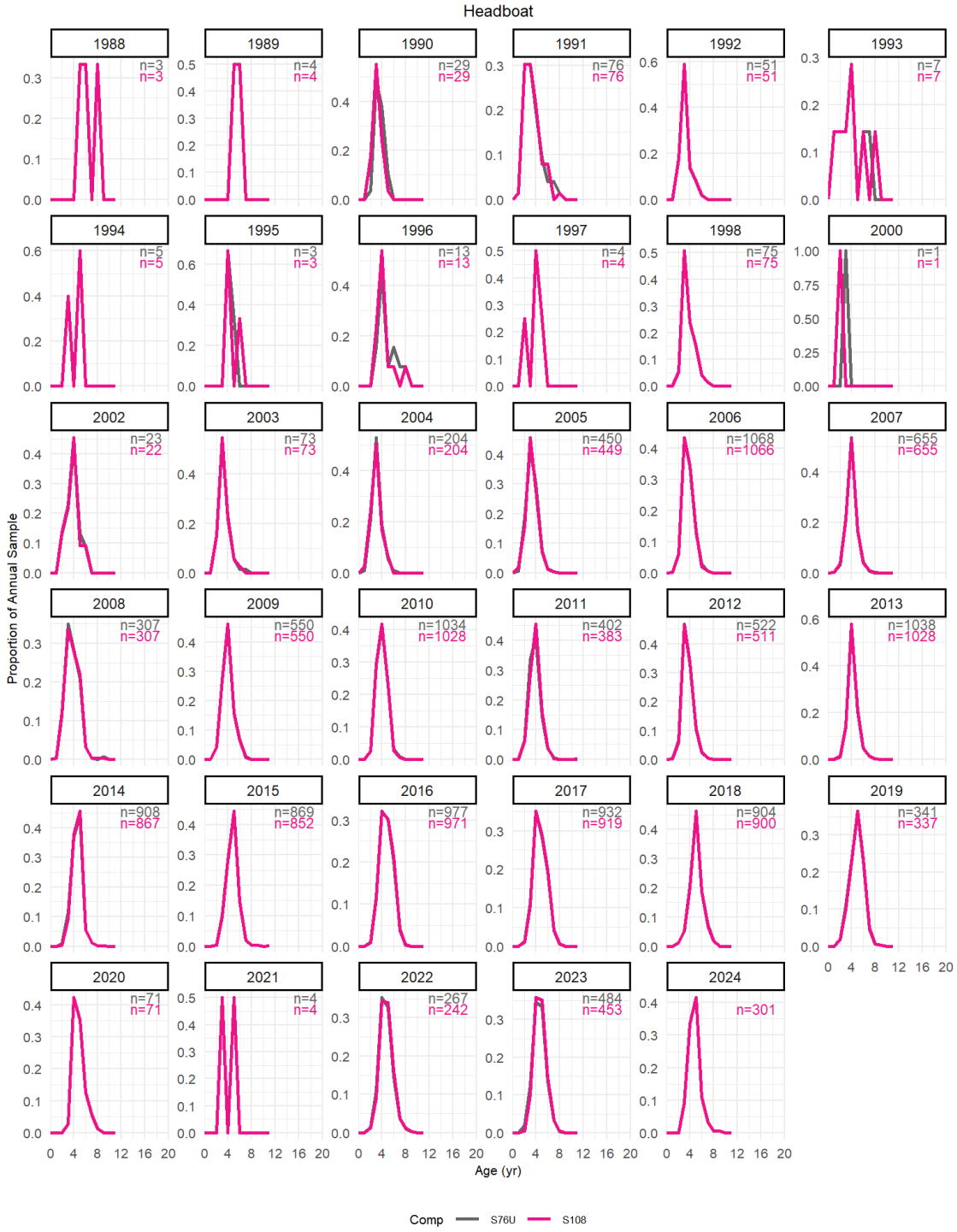


*Figure 15. Nominal age distribution of Black Sea Bass sampled from the **Headboat** fleet for SEDAR 76U and SEDAR 108.*

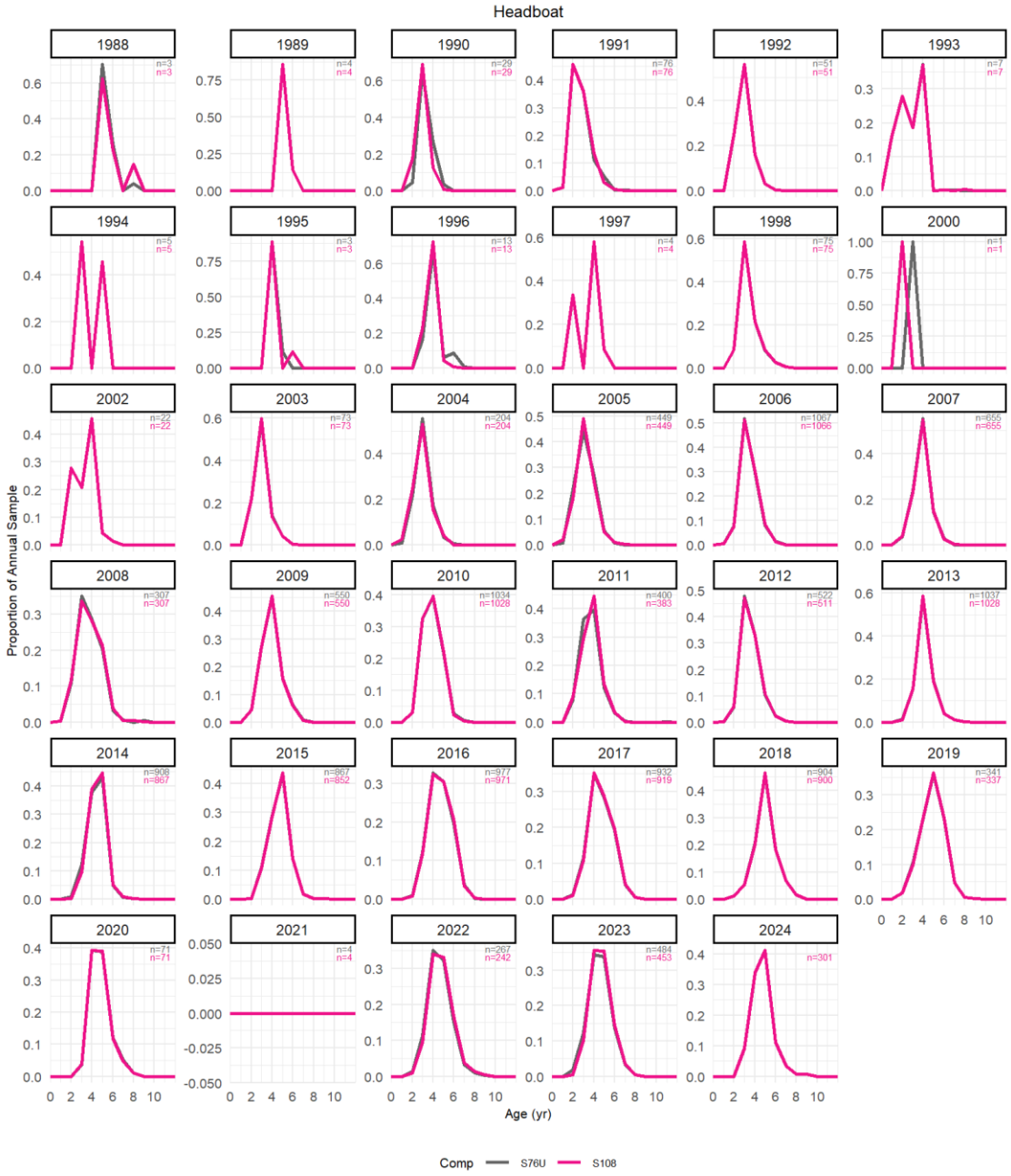


*Figure 16. Weighted age distribution of Black Sea Bass sampled from the **Headboat** fleet for SEDAR 76U and SEDAR 108.*

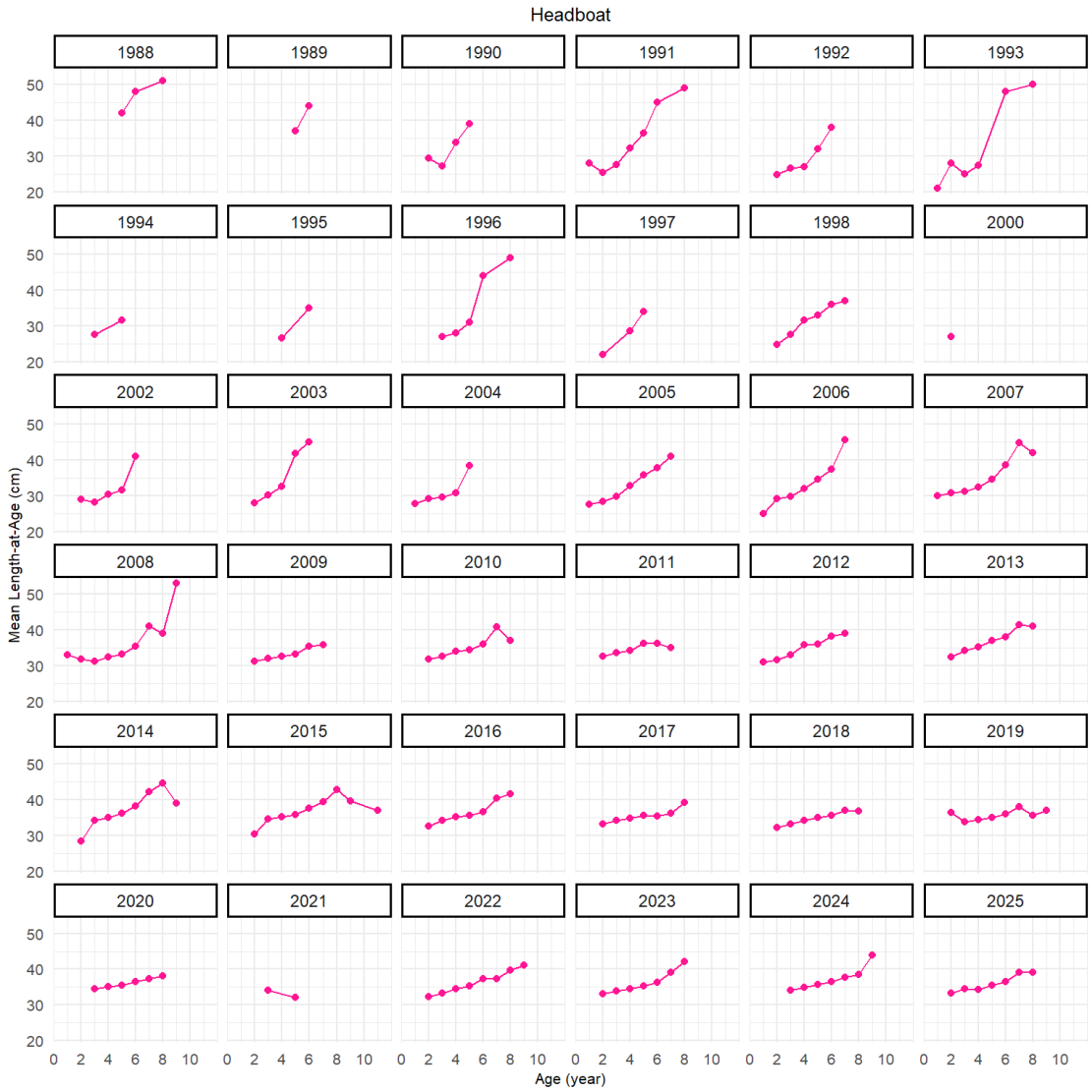


*Figure 17. Mean length-at-age (MLAA) of Black Sea Bass sampled from the **Headboat** fleet.*

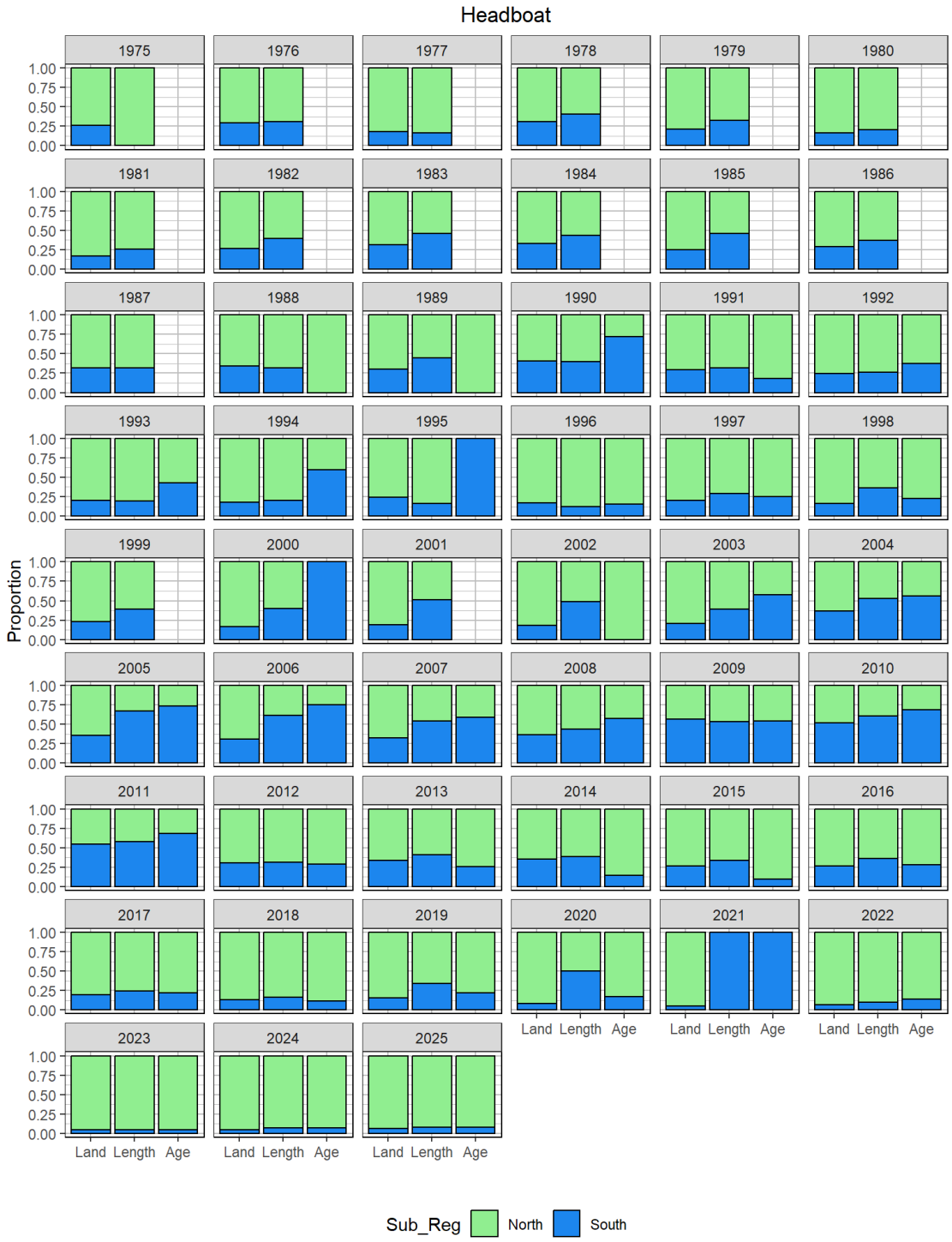


Figure 18. Proportions of landings, length samples, and age samples from the North and South weighting subregions for Black Sea Bass sampled from the Headboat fleet.

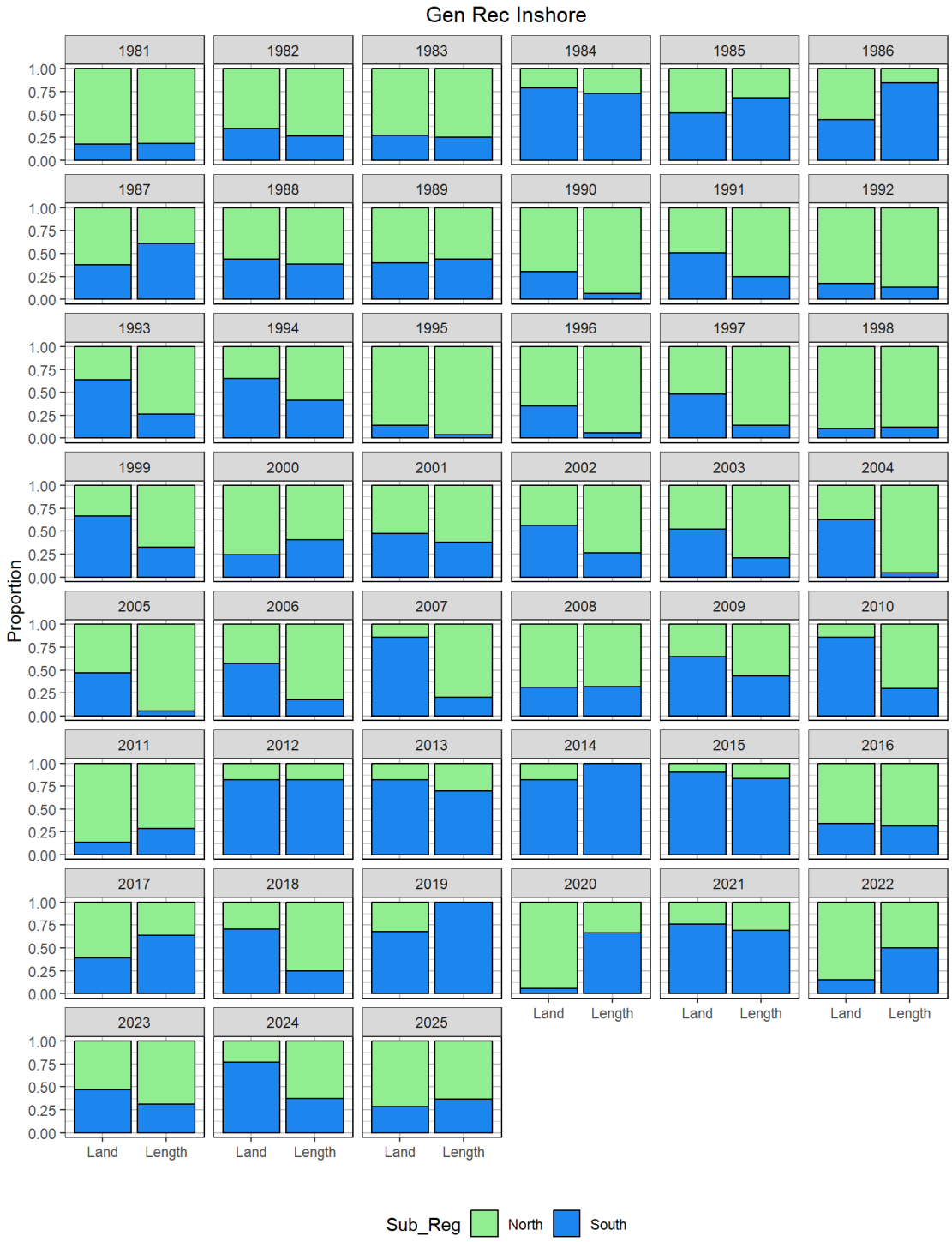


Figure 19. Proportions of landings and length samples from the North and South weighting subregions for Black Sea Bass sampled from the ***Gen Rec Inshore*** *fleet.*

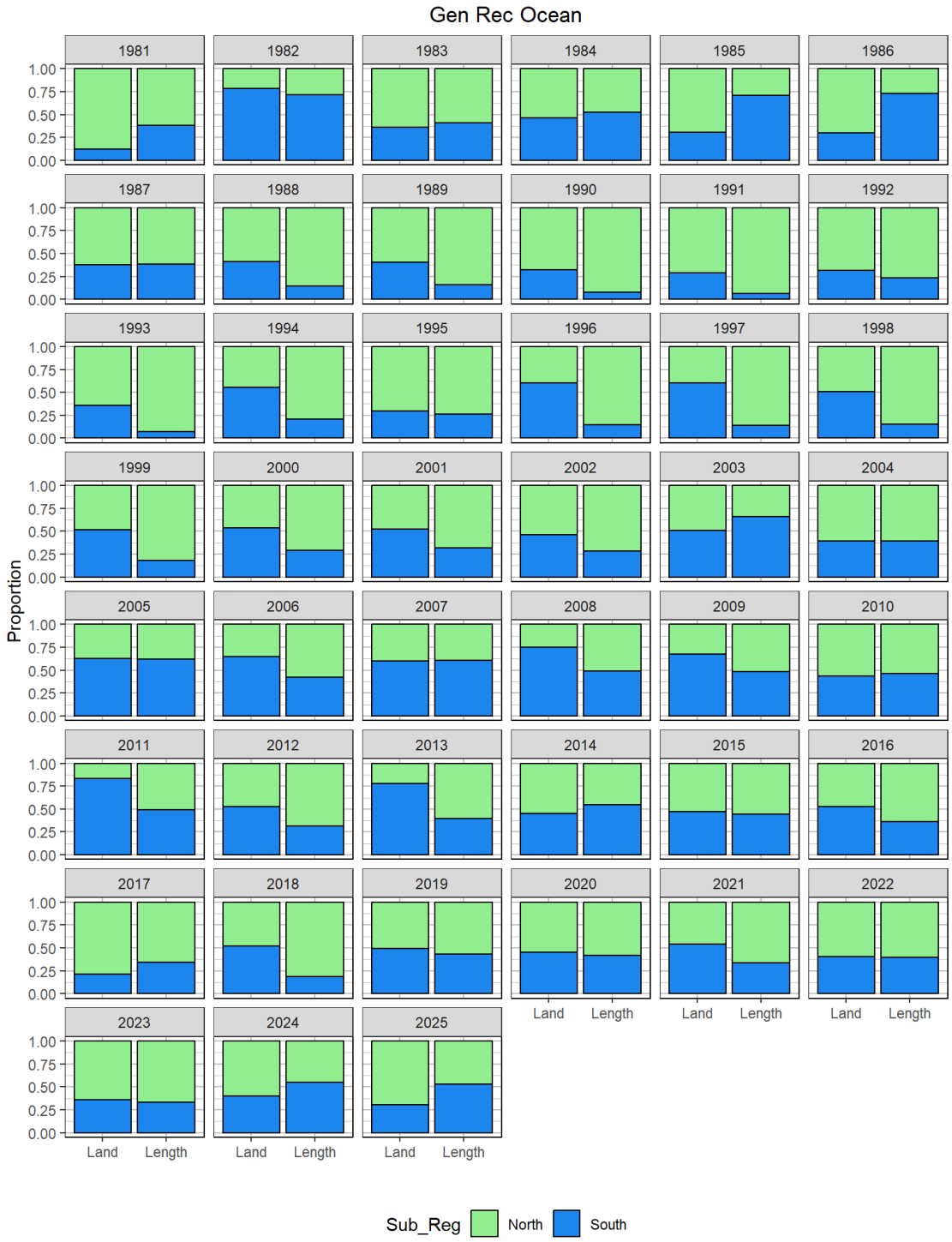


*Figure 20. Proportions of landings and length samples from the North and South weighting subregions for Black Sea Bass sampled from the **Gen Rec Ocean** fleet.*