Gulf of America Tilefish Complex Length and Age Compositions for the Commercial Handline and Longline Fisheries

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SEFSC01-WP-05

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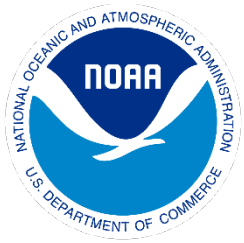

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Introduction

This document outlines the data and methodologies used to estimate length and age compositions of the commercial handline and longline landings for the SEFSC 01 Gulf of America (formerly Gulf of Mexico, hereafter referred to as "Gulf") Tilefish complex Assessment which includes Golden Tilefish (*Lopholatilus chamaeleonticeps*), Blueline Tilefish (*Caulolatilus microps*), Goldface Tilefish (*Caulolatilus chrysops*), and Tilefish - unspecified. These compositions were estimated using data sources approved in SEDAR 22. Compositions were requested by the analyst for Golden Tilefish only, and for all species combined (Tilefish complex). For Golden Tilefish only, annual nominal length and age compositions are presented here, as well as mean length at age. Ages were only available for Golden Tilefish, therefore, only nominal lengths were provided for the Tilefish complex.

Data Description

SEFSC 01 assesses all Gulf Tilefish complex in federal waters from the Florida Keys west to the Texas-Mexico border. For this assessment, compositions were estimated for two fleets: commercial handline and longline. A map of the areas included in this assessment is shown in Figure 1. For the landings, other gears are combined into the handline+ fleet. However, for length and age compositions only handline samples are used and samples from other gears are excluded. This is to avoid bias in the compositions due to the majority of the landings data coming from handline gears compared to "other" gears. The commercial data source utilized to generate the length and age compositions for the commercial fleets consists of length samples from the Trip Interview Program (Beggerly *et al.* 2022) and age samples collected by federal and state sampling programs.

Commercial Length Compositions of Landings

Length Samples

Length samples of commercial landings were obtained from the TIP database maintained by the NMFS Southeast Fisheries Science Center (SEFSC) and were filtered to remove biases that include samples from pooled trips and any size or effort bias. Samples from the handline and longline fisheries were available starting in 1984.

These data were compiled using length bins of 2 centimeters (cm) with the floor of the bin being labeled. Maximum total length in cm (MTL), Natural total length in cm (NTL), and standard length in cm (SL) were converted to fork length in cm (FL) using the following conversion equations provided for this assessment (Garner, Thornton and Willett 2026):

Golden Tilefish:

$$FL = 1.048 + 0.93 * MTL$$

$$FL = 2.058 + 0.91 * NTL$$

Blueline Tilefish:

$$FL = -0.244 + 0.95 * MTL$$

$$FL = 0.315 + 0.94 * NTL$$

$$FL = 2.698 + 1.1 * SL$$

Conversion equations were not available for Goldface Tilefish, and therefore the equations estimated for Golden Tilefish were used. A minimum length bin of 20 cm was used, and a maximum length bin of 114 cm was used, with fish falling outside of this range being pooled in the smallest or largest bin. Any fish lengths greater than 150 cm FL were deleted and assumed to be errors.

Nominal length Compositions

Nominal length compositions for the commercial handline fleet (HL) and commercial longline fleet (LL) were estimated for Tilefish complex landings and for Golden Tilefish landings, from the GMFMC/SAFMC boundary to the TX/Mexico border. Annual nominal length compositions were estimated using length bins of 2 cm, where for each year i, and length bin j,

$$LC_{i,j} = \frac{n_{i,j}}{n_i}$$

where $n_{i,j}$ is the number of samples in year i and length bin j; n_i is the number of samples in year i (i.e., summed across length bins); and $LC_{i,j}$ is the proportion of the total number of sampled fish in each year i within each length bin j.

Nominal length compositions are shown by gear for the Tilefish complex in Figure 2, and for Golden Tilefish in Figure 3. Annual sample sizes of commercial lengths and trips by species, as well as a total across species are shown in Tables 1 and 2 for commercial handline and longline, respectively. Years with fewer than 30 length samples or fewer than 10 trips are recommended to be dropped from further analyses. For the Tilefish complex, the total column is used to evaluate which strata should be dropped, while the Golden Tilefish column is used for the Golden only compositions. All available years are presented in Tables 1 and 2, regardless of the recommendation to drop.

Commercial Age Compositions of Landings

Age Samples

The commercial age samples were a subset of the length samples. Age data compiled by the SEFSC Panama City Laboratory were filtered to remove duplicated and biased data. For the commercial age compositions, a plus group of 30 was used, meaning all ages 30+ have been grouped into the same age bin.

Nominal Age Compositions

Nominal age compositions were estimated for the Golden Tilefish commercial handline fleet (HL) and longline fleet (LL) in each year. Any strata with fewer than 10 age samples or fewer than 10 trips were recommended to be dropped. Nominal age compositions of landings were estimated using the following equation within each year i, and age bin k,

$$AC_{i,k} = \frac{a_{i,k}}{a_i}$$

where $a_{i,k}$ is the number of age samples in year i and age bin k; a_i is the number of age samples in year i; and $AC_{i,k}$ is the proportion of the total number of sampled fish in each year i within each age bin k. A minimum sample size threshold was recommended annually within each year stratum, AC_{ik}, where these were recommended to be dropped and excluded from further analyses if $a_{is} < 10$ or if the number of trips the fish were sampled from is less than 10.

The annual nominal age compositions are shown by gear in Figure 4. Bubble plots of the annual age compositions are shown in Figures 5 and 6 for handline and longline, respectively. Annual sample sizes of commercial ages and trips by gear group are shown in Table 3. A summary of data availability by data product is shown in Table 4.

Commercial Mean Length-at-Age

Fleet-specific mean length-at-age and associated sample sizes were also provided to the lead analyst to aid in model diagnostics. Mean length-at-age, $MLAA_{i,k}$, was estimated as the sum of all lengths $L_{i,k}$ divided by the associated sample sizes $a_{i,k}$ within each year i and age class k.

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

The mean length-at-age by year is shown in Figures 7 and 8 for Golden Tilefish commercial handline and longline fleets, respectively.

References

Beggerly, S., M. Stevens, H. Baertlein. 2022. Trip Interview Program Metadata. SEDAR74-DW14. 12pp.

SEDAR. 2017. SEDAR 50 Stock Assessment Report: Atlantic Blueline Tilefish. SEDAR, North Charleston, SC 29405.

Garner, Steve, Laura Thornton, and Naeem Willett. 2026. A Review of Golden Tilefish (Lopholatilus chamaeleonticeps) Length and Age Data Collected from the Gulf of America from 1985 to 2024. SEFSC01-WP-06. National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC). Miami, FL. 42 pp.

Tables

Table 1. *Annual number of Gulf Tilefish complex commercial* ***handline (HL) length*** *samples and associated trips by species, and totals across species. Years not meeting the recommended* ***30*** *fish or* ***10*** *trip minimum filter are highlighted in* ***red****. When evaluating data for the TIL complex model, the sample sizes from the Total columns are used. When evaluating data for the Golden Tilefish only model, the sample sizes from the Golden columns are used. Any year with either too few fish or too few trips is recommended to be dropped.*

Year	Golden		Blueline		Goldface		Total*	
	# of Fish	# of Trips	# of Fish	# of Trips	# of Fish	# of Trips	# of Fish	# of Trips
1984	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1985	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**1**
1986	35	**1**	**0**	**0**	**0**	**0**	35	**1**
1987	**1**	**1**	**3**	**2**	**0**	**0**	**4**	**3**
1988	**28**	**1**	**0**	**0**	**0**	**0**	**28**	**1**
1989	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1990	**1**	**1**	**3**	**2**	66	21	70	21
1991	**28**	**7**	47	10	115	38	190	46
1992	96	20	86	10	171	51	353	68
1993	41	**7**	32	**6**	**27**	**9**	100	19
1994	46	**8**	80	23	125	40	251	61
1995	**8**	**5**	31	11	141	39	180	47
1996	49	**6**	276	15	93	34	418	45
1997	**20**	**5**	60	10	54	28	134	37
1998	**19**	**5**	82	13	37	13	138	24
1999	42	**6**	235	18	**8**	**5**	285	25
2000	30	**3**	106	**9**	**9**	**2**	145	12
2001	156	10	92	**9**	**2**	**1**	250	15
2002	73	**3**	60	**5**	**1**	**1**	134	**8**
2003	**21**	**3**	**26**	**1**	**0**	**0**	47	**4**
2004	**0**	**0**	**3**	**3**	**1**	**1**	**4**	**4**
2005	88	11	**8**	**4**	**0**	**0**	96	**14**
2006	**3**	**1**	**14**	**7**	**0**	**0**	**17**	**8**
2007	**9**	**2**	**13**	**3**	**0**	**0**	**22**	**4**
2008	66	11	59	12	**0**	**0**	125	18
2009	64	11	**9**	**6**	**0**	**0**	73	14
2010	**29**	**6**	**10**	**3**	**10**	**2**	49	10
2011	47	**9**	**9**	**4**	**11**	**5**	67	17
2012	169	16	35	**8**	**7**	**4**	211	27
2013	175	24	47	11	**3**	**3**	225	33
2014	31	10	**12**	**7**	**0**	**0**	43	15
2015	31	10	**22**	**8**	**1**	**1**	54	19
2016	**18**	**3**	**2**	**1**	**12**	**8**	32	11
2017	**17**	**9**	110	**8**	**4**	**4**	131	18

2018	59	12	**22**	10	**14**	11	95	29
2019	46	14	**29**	16	**26**	13	101	35
2020	**10**	**4**	**5**	**4**	**17**	**8**	32	12
2021	**0**	**0**	**0**	**0**	**3**	**3**	**3**	**3**
2022	**13**	**5**	**23**	**5**	**15**	**8**	51	16
2023	**0**	**0**	**22**	**8**	**5**	**3**	**27**	11
2024	**10**	**4**	**13**	**8**	**8**	**4**	31	11

*Note, the number of trips in the "Total" column may not equal the sum of trips across species columns due to the possibility of more than one species being observed on the same trip.

Table 2. *Annual number of Gulf Tilefish complex commercial* ***longline (LL) length*** *samples and associated trips by species, and totals across species. Years not meeting the recommended* ***30*** *fish or* ***10*** *trip minimum filter are highlighted in* ***red****. When evaluating data for the TIL complex model, the sample sizes from the Total columns are used. When evaluating data for the Golden Tilefish only model, the sample sizes from the Golden columns are used. Any year with either too few fish or too few trips is recommended to be dropped.*

Year	Golden		Blueline		Goldface		Total*	
	# of Fish	# of Trips	# of Fish	# of Trips	# of Fish	# of Trips	# of Fish	# of Trips
1984	207	**7**	**19**	**1**	**0**	**0**	226	**8**
1985	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**1**
1986	**26**	**3**	**9**	**2**	**0**	**0**	35	**5**
1987	151	**6**	**1**	**1**	**0**	**0**	152	**7**
1988	225	**9**	**6**	**1**	**0**	**0**	231	10
1989	84	**5**	**0**	**0**	**0**	**0**	84	**5**
1990	281	10	**8**	**3**	**15**	**2**	304	14
1991	454	28	543	12	89	**7**	1086	37
1992	418	23	470	17	62	**8**	950	37
1993	292	16	136	15	**14**	**5**	442	28
1994	1588	28	500	16	43	**2**	2131	39
1995	471	13	264	11	**23**	**1**	758	23
1996	743	13	250	**9**	**0**	**0**	993	18
1997	1249	18	488	27	**0**	**0**	1737	40
1998	533	18	1450	56	**0**	**0**	1983	63
1999	1019	19	1205	43	**0**	**0**	2224	55
2000	1387	37	2473	78	**0**	**0**	3860	93
2001	1067	31	1156	59	41	**2**	2264	71
2002	277	18	715	36	**0**	**0**	992	48
2003	706	35	991	50	**1**	**1**	1698	78
2004	1790	62	651	39	**0**	**0**	2441	88
2005	1803	50	363	31	**0**	**0**	2166	72
2006	1084	28	144	14	**0**	**0**	1228	38
2007	1000	38	79	19	**0**	**0**	1079	48
2008	891	44	169	26	**2**	**1**	1062	64
2009	1177	48	77	27	**2**	**2**	1256	66
2010	839	24	19	**5**	**0**	**0**	858	27
2011	1530	56	36	**7**	**0**	**0**	1566	61
2012	1452	70	69	**8**	**1**	**1**	1522	74
2013	1052	57	31	12	**4**	**2**	1087	69
2014	1300	58	269	21	**0**	**0**	1569	73
2015	1111	53	98	18	**0**	**0**	1209	67
2016	952	59	143	18	**0**	**0**	1095	70
2017	1412	74	124	25	**1**	**1**	1537	92
2018	1118	59	162	31	**0**	**0**	1280	77

2019	1109	74	315	59	**4**	**4**	1428	112
2020	664	33	**23**	10	**3**	**3**	690	35
2021	714	27	59	13	**6**	**4**	779	33
2022	1601	53	232	59	**2**	**2**	1835	90
2023	952	60	220	46	**8**	**3**	1180	89
2024	742	45	159	27	**0**	**0**	901	61

*Note, the number of trips in the "Total" column may not equal the sum of trips across species columns due to the possibility of more than one species being observed on the same trip.

Table 3. *Annual number of Gulf* ***Golden Tilefish*** *commercial* ***age*** *samples and associated trips* ***by fleet****. Years not meeting the recommended* ***10*** *fish or* ***10*** *trip minimum filter are highlighted in* ***red****. Any year with either too few fish or too few trips is recommended to be dropped.*

	Handline		Longline	
Year	# of Fish	# of Trips	# of Fish	# of Trips
1997	**0**	**0**	43	**1**
1998	**0**	**0**	**4**	**2**
1999	**0**	**0**	**0**	**0**
2000	**5**	**1**	11	**1**
2001	**0**	**0**	44	**6**
2002	24	**1**	74	**9**
2003	34	**4**	273	24
2004	**2**	**1**	507	41
2005	44	**3**	550	30
2006	**3**	**1**	237	20
2007	10	**3**	337	35
2008	55	10	691	58
2009	59	10	1323	94
2010	**4**	**2**	282	15
2011	**4**	**3**	283	36
2012	44	11	442	76
2013	52	19	335	69
2014	**8**	**3**	257	33
2015	12	**8**	271	46
2016	15	**3**	682	101
2017	**7**	**5**	388	51
2018	40	11	455	55
2019	27	10	743	67
2020	**1**	**1**	484	50
2021	**0**	**0**	372	28
2022	21	**3**	551	50
2023	**0**	**0**	720	70
2024	**3**	**2**	567	43

Table 4. *Data availability summary by data product, model type (Golden Only vs Complex), and fleet. Strata highlighted in green are appropriate for use in the stock assessment model. Strata highlighted in red are inappropriate for use in the stock assessment model. Strata highlighted in gray have no data available.*

	Nominal Length Comps					Nominal Age Comps	
	Golden Only			Tilefish Complex		Golden Only	
Year	HL	LL		HL	LL	HL	LL
1984							
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Figures

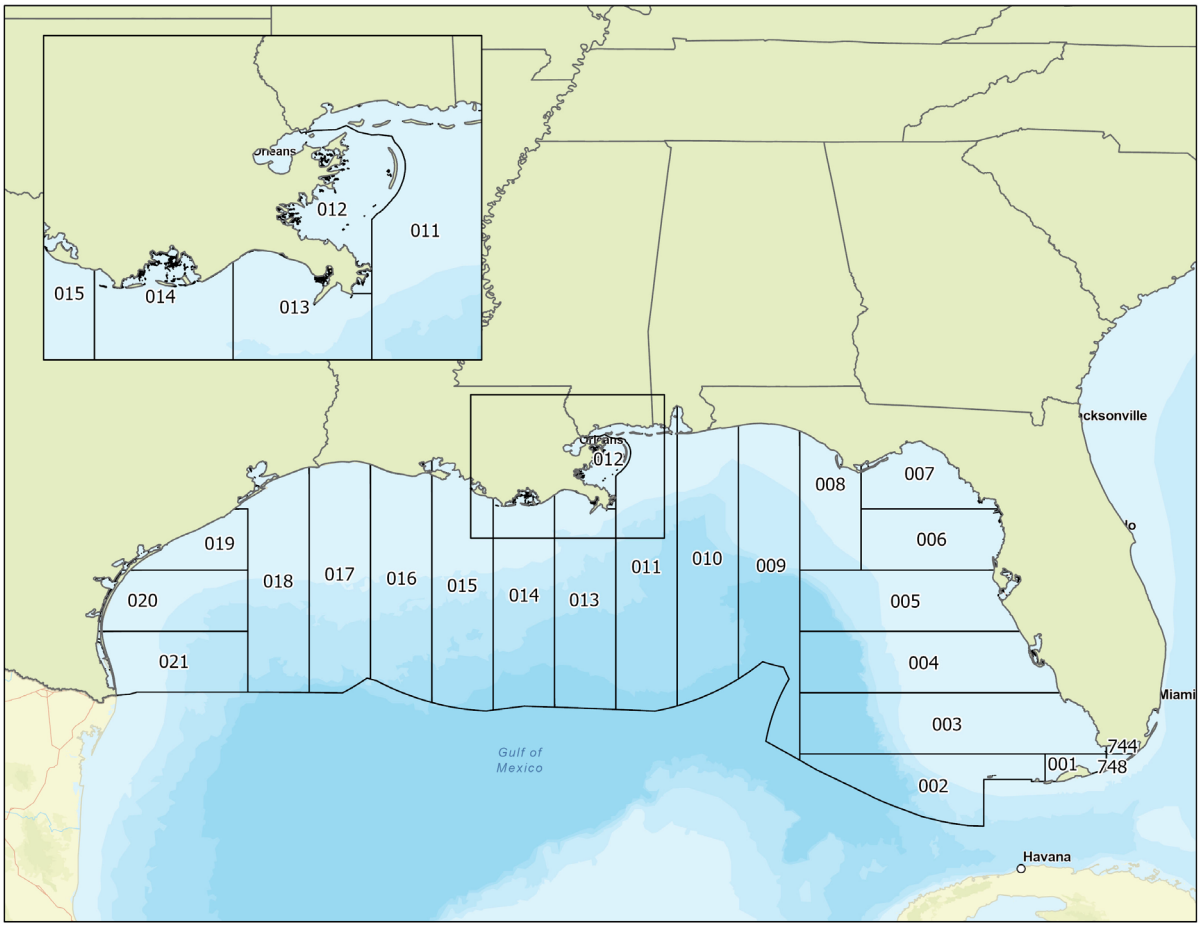

Figure 1. Gulf of America commercial fishing areas.

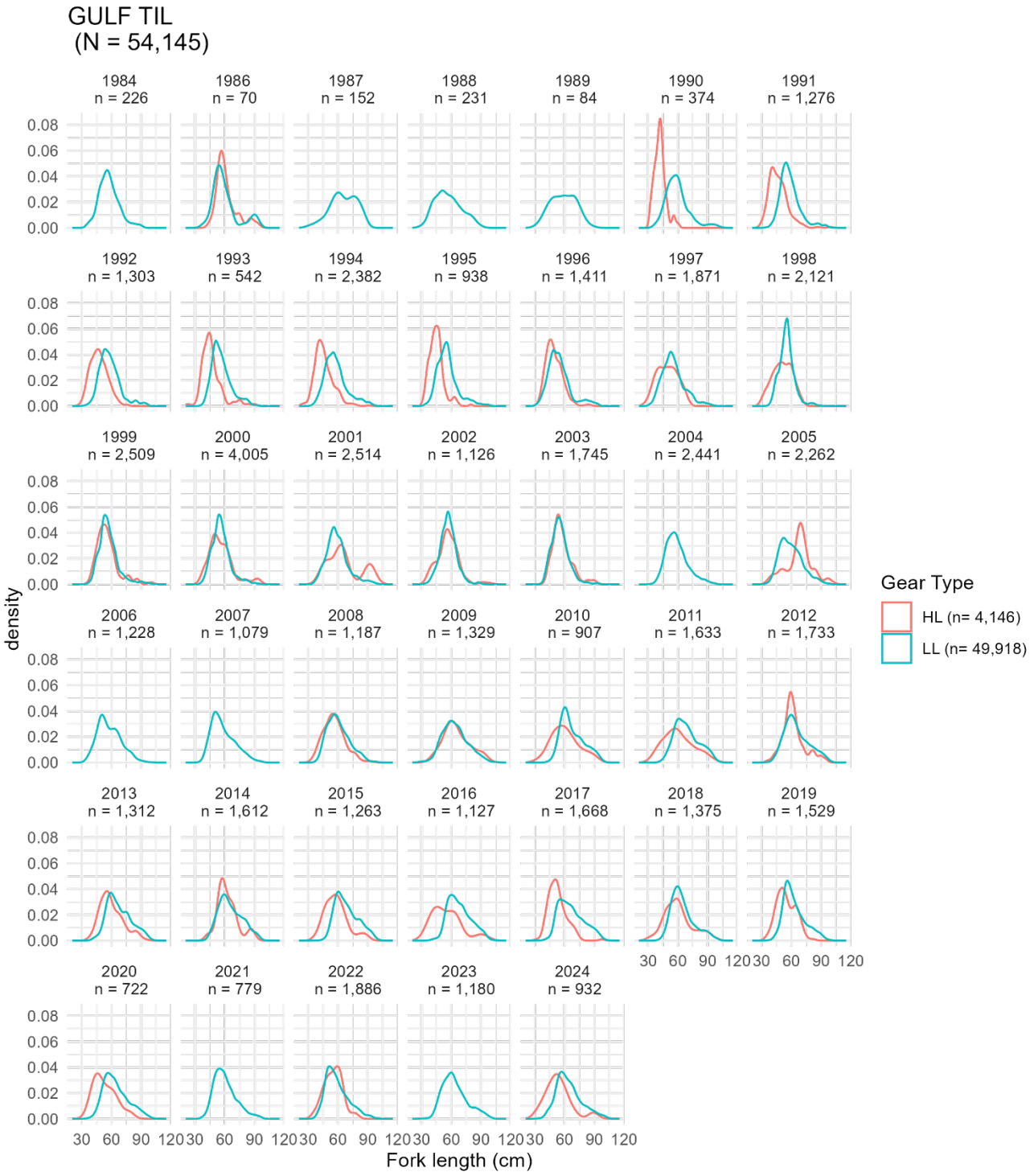

*Figure 2. Annual nominal length distributions for the Gulf **Tilefish complex** commercial handline and longline fisheries.*

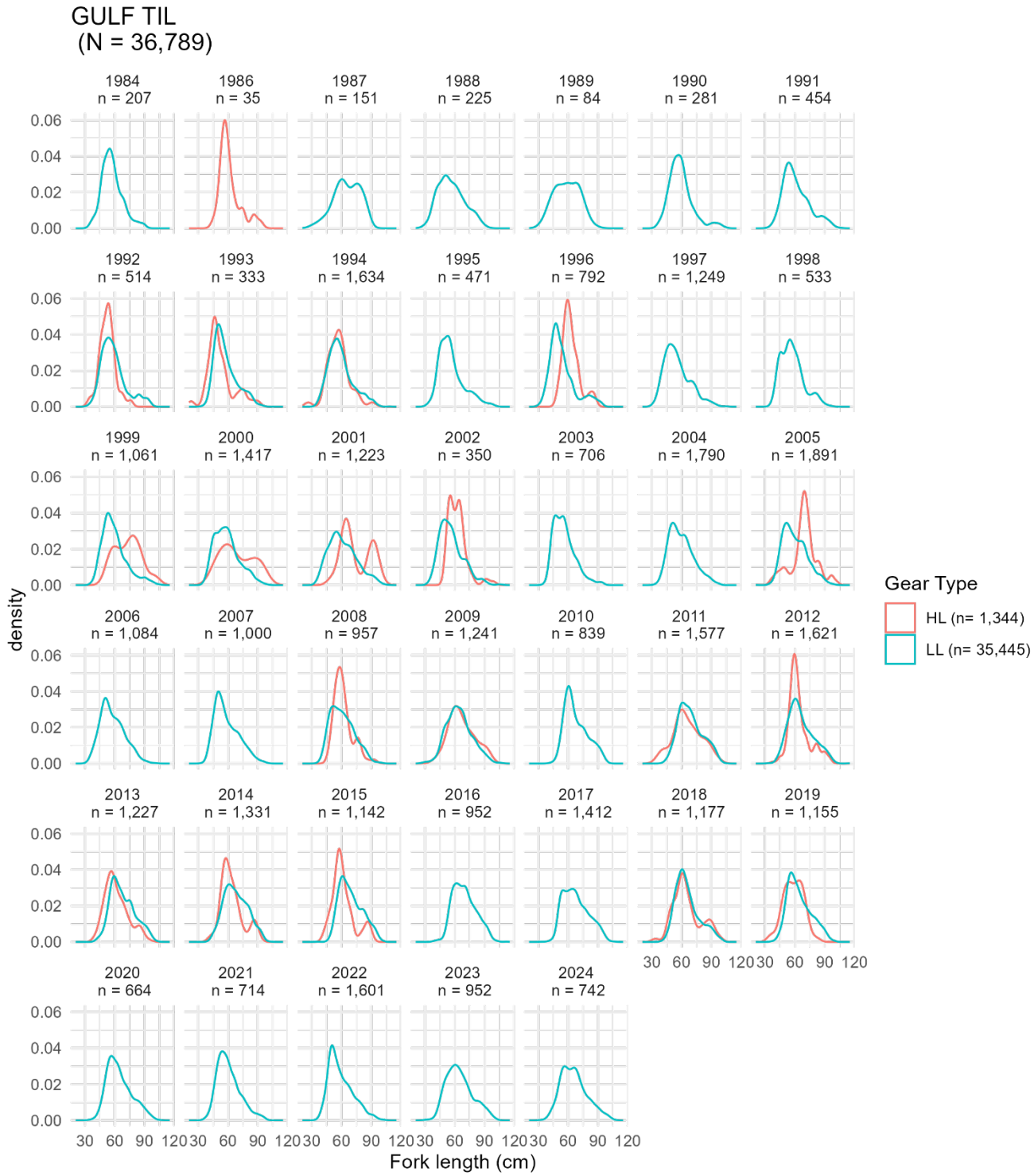

*Figure 3. Annual nominal length distributions for the Gulf **Golden Tilefish** commercial handline and longline fisheries.*

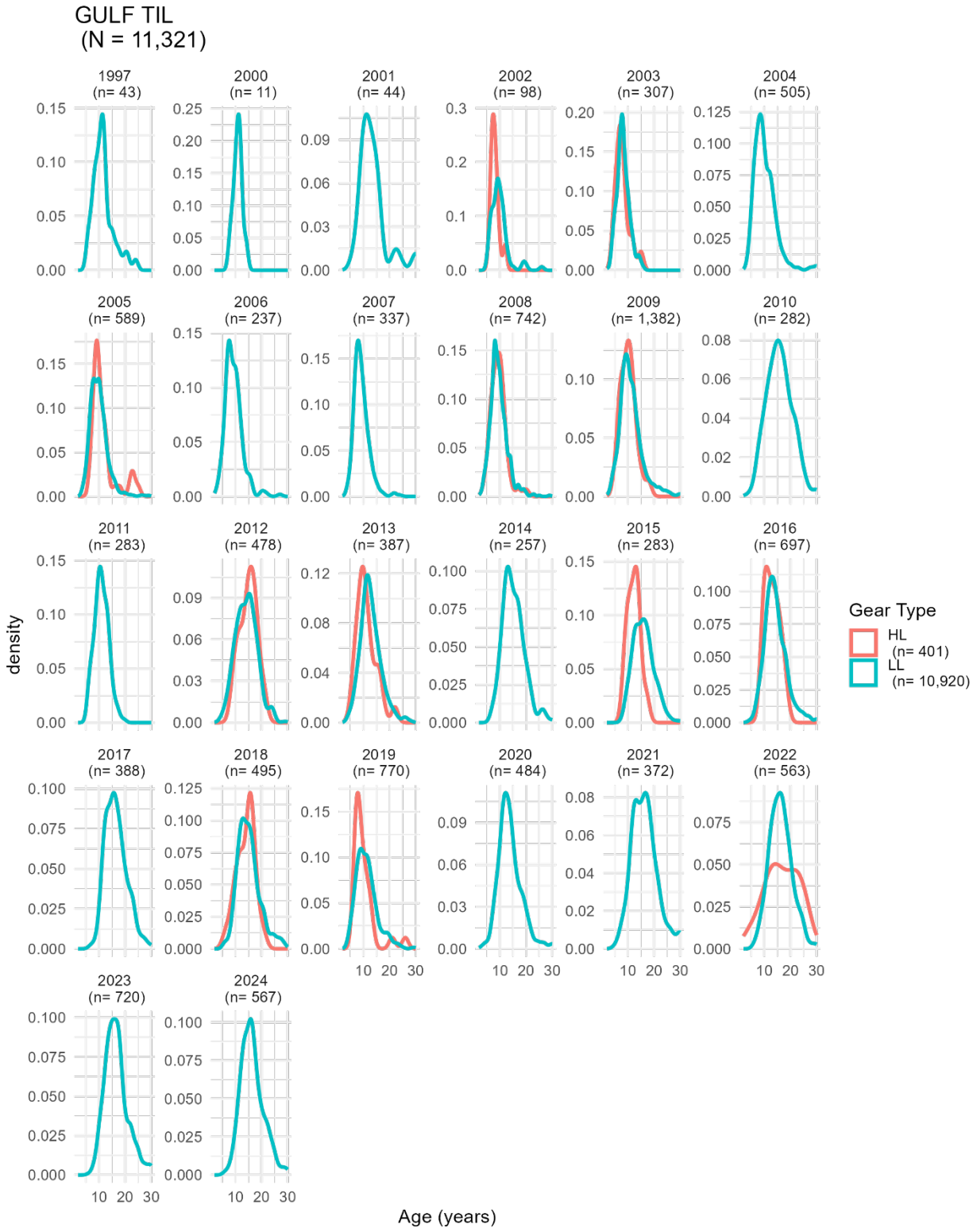

*Figure 4. Annual nominal age compositions for the Gulf **Golden Tilefish** commercial handline and longline fisheries.*

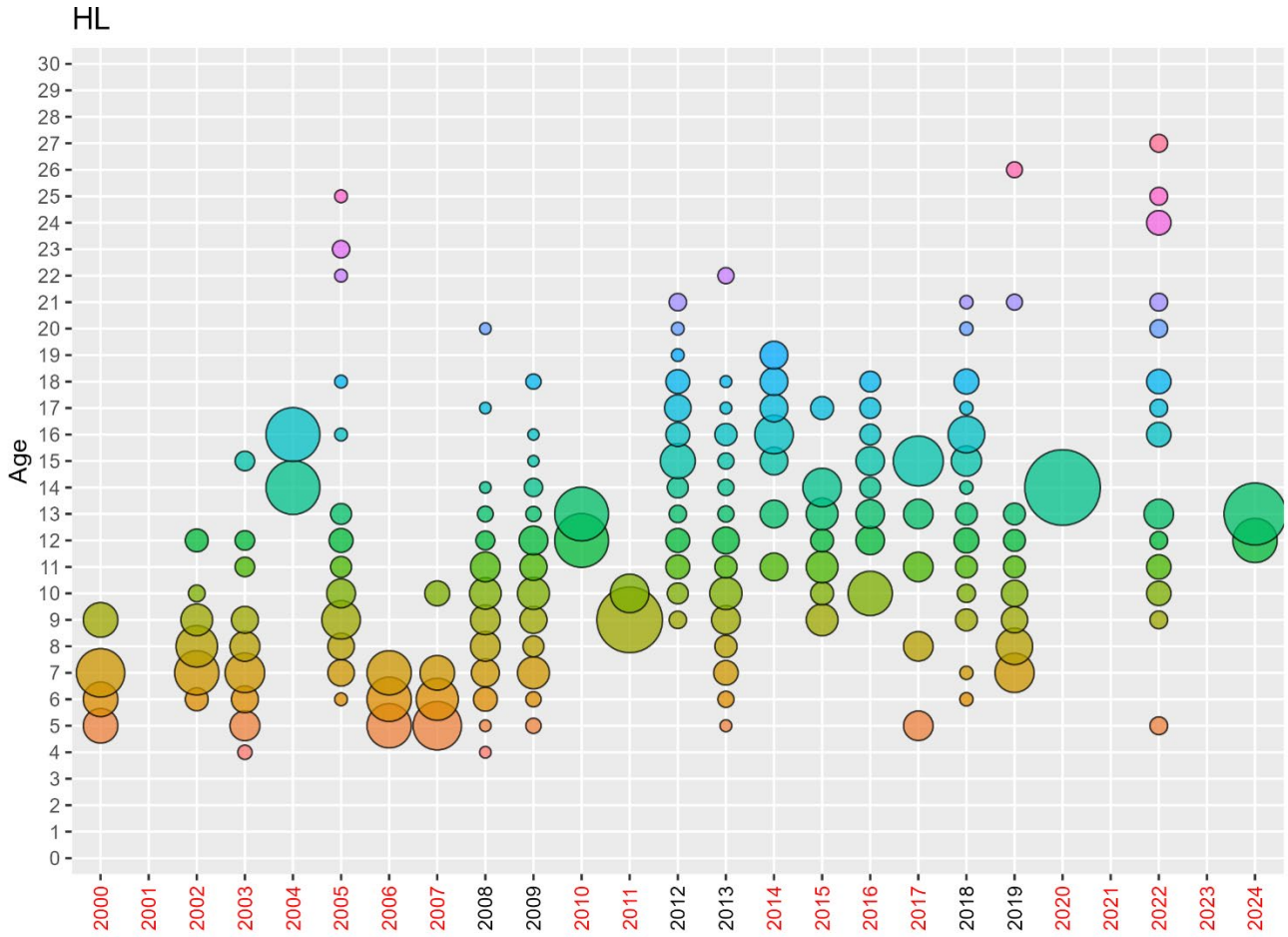

*Figure 5. Annual nominal age compositions for the Gulf **Golden Tilefish** commercial **handline fishery**. The size of the dots represents the relative proportion at age. Years recommended to be dropped have been highlighted in **red**.*

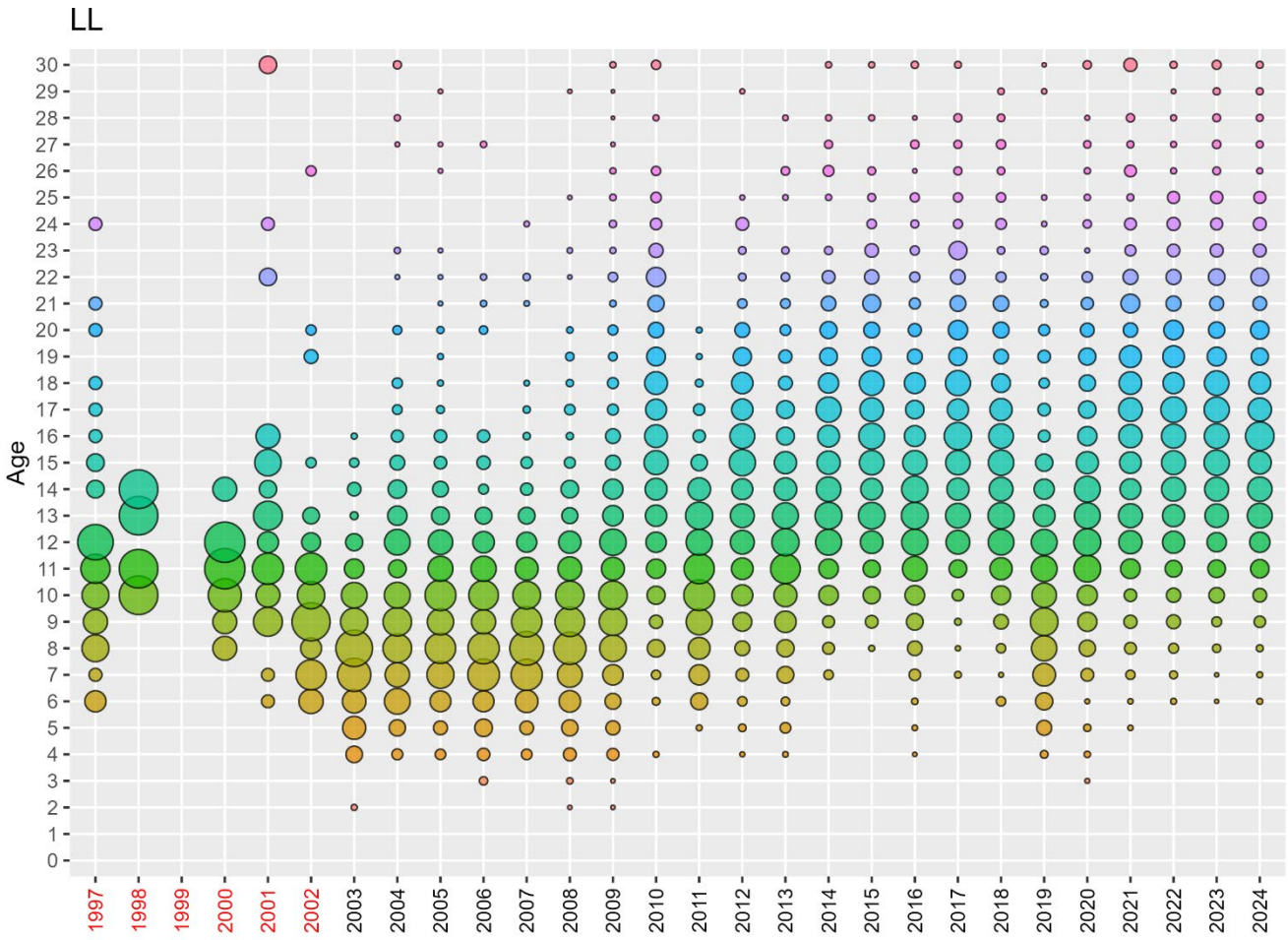

*Figure 6. Annual nominal age compositions for the Gulf **Golden Tilefish** commercial **longline fishery**. The size of the dots represents the relative proportion at age. Years recommended to be dropped have been highlighted in **red**.*

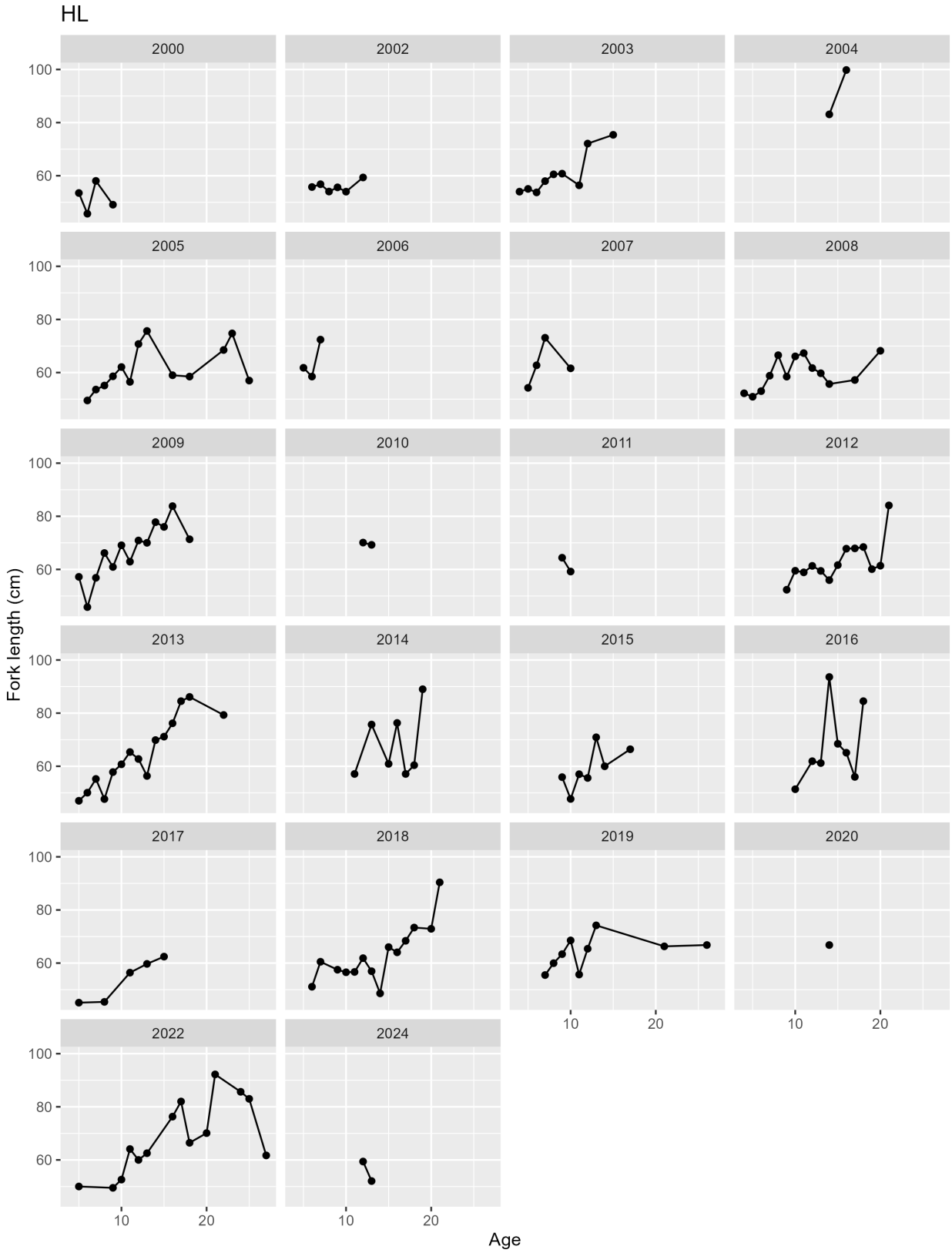

*Figure 7. Annual mean fork length at age for the Gulf **Golden Tilefish** commercial **handline fishery**.*

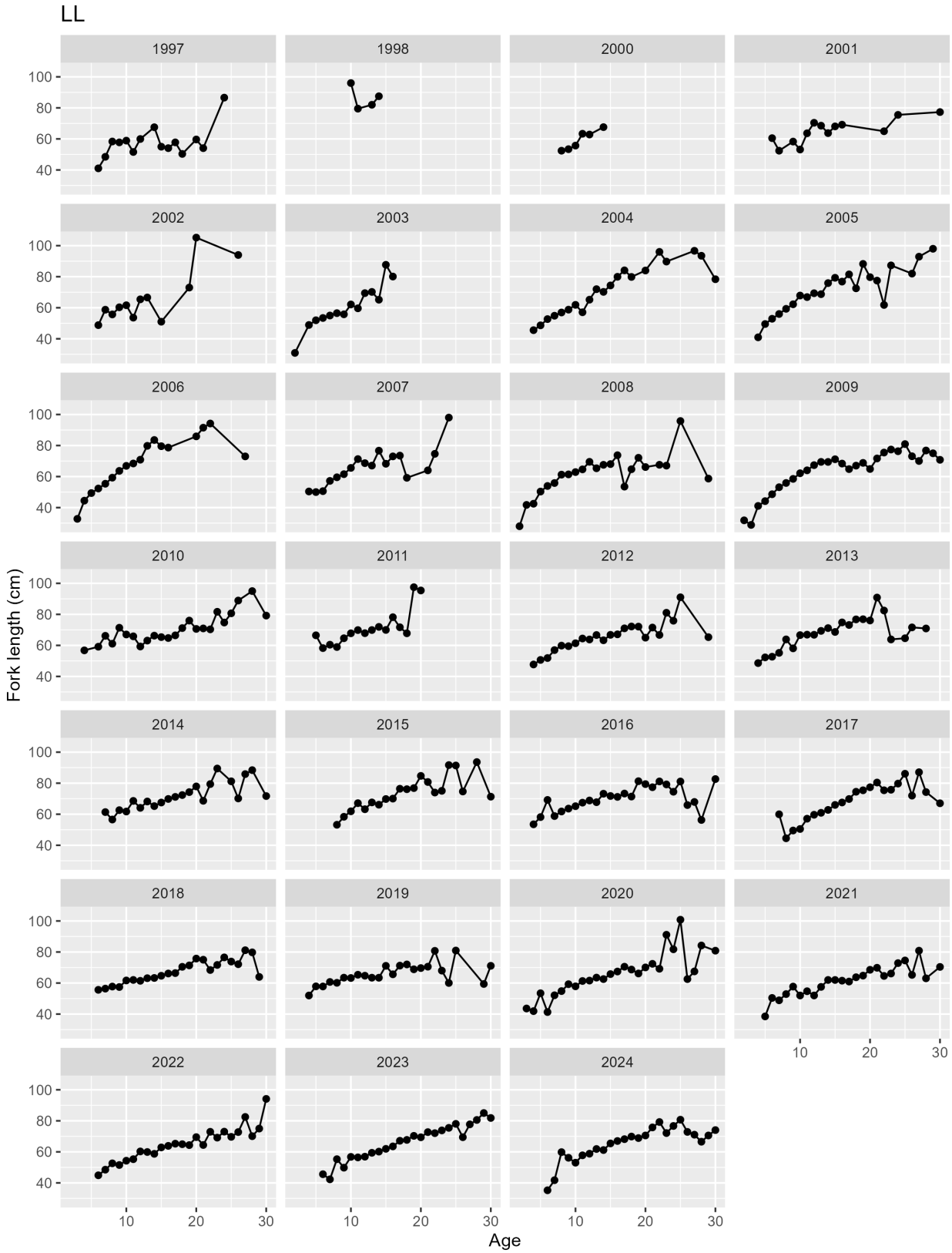

Figure 8. Annual mean fork length at age for the Gulf ***Golden Tilefish*** *commercial* ***longline fishery****.*