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Length frequency distributions for yellowtail snapper collected by TIPS in the Southeast from 1984 to 2017

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Introduction

This report documents changes in the length frequency distributions (LFDs) of yellowtail snapper samples collected from the Southeastern United States from 1986 to 2017. The 2012 yellowtail snapper update for SEDAR 27A produced length frequency distributions (LFDs) for fork length (FL) and max total length (maxTL). In this document, LFDs for both FL and maxTL using the For Hire Survey regions (FHS) described below were created for assessment staff to use in ASAP and Stock Synthesis models.

Materials and Methods

Length samples from commercial fisheries were obtained from the Trip Interview Program System (TIPS) database housed at the NOAA Fisheries Southeast Fisheries Science Center. Data were provided in Microsoft Access with each TIPS table present (interview, effort, landings, sample, observation, and observation sample) and imported and formatted with a SAS program written by Joe O'Hop (00 TIP_import_mdb_rev.sas). The program brings in each table while defining variable names and types. A second program (00 Rev_TIP_observation_for_1985_1988 and other errata.sas) manually executes changes in length types for 1985-1988 and some other errors that have been found by Mr. O'Hop and reported to TIPS. The program also uses length/length and length/weight regressions to create a FL, maxTL, and weight for each record when values are missing.

A final SAS program (YTS_S64_TIP_len.sas) sets up the LFDs and fits the data into the FHS regions (Table 1). Data was moved into the regions first by area fished and then county landed if area fished was not available. After data was put in the FHS regions flags were added to identify records to remove and include/exclude for FL and maxTL LFDs. Fork lengths between 146 and 700 mm were kept and marked for FL LFD use. Maximum total lengths between 174 and 750 mm were kept and marked for max TL LFD use. If an FHS region could not be determined the records were flagged for removal and exclusion from LFDs. Records were flagged for removal and exclusion from LFDs where bias type was not indicated as "NO BIAS KNOWN" or "NO INFORMATION". Additionally, records were flagged for removal and exclusion from LFDs if fishing mode was not indicated as "COMMERCIAL" or "UNKNOWN". Where samples were identified as "Is not random", records were flagged for removal and exclusion from LFDs.

Frequencies of the flags and other data descriptors were compiled into a series of worksheets (YTS_SEDAR64_type.xlsx) using FL (unless otherwise specified), the quantity column, and no records excluded. Descriptive statistics (PROC Means) of trimmed values for FL and maxTL were generated for each FHS region over all years and for each year/FHS region. LFDs were visually represented (PROC Chart) with trimmed values for FL and maxTL for each FHS region over all years and for each year/FHS region (all using 1 cm length bins).

Results

Assessment staff requested a non-weighted dataset with all fields retained, including the removal flags. Data flagged for exclusion of LFDs were just under 6% of all records (Table 2 & 3). The means and standard deviations between flagged and non-flagged data were not significantly different. Most quantity values, the frequency multiplier in TIPS data, were 1 (89.59%) and 1.87% of quantity values were over 5 (Table 4). Table 5 shows the means and standard deviations for each FHS region. The number of FL and maxTL records for each FHS region and year combination are shown in Tables 6 and 7 respectively. For both length types, only the FL Keys has a consistent number of samples for the entire time series, and Southeast FL started showing consistency in samples by 1992. Hook and line gears comprised 97.39% of

TIPS samples with traps being the second most abundant at 1.3% (Table 8). Length distributions for each of the FHS regions across all years for FL and maxTL are shown in Figures 1 and 2 respectively.

Table 1. For Hire Survey Regions dividing up Florida (1 through 5) and out of State (8). To match gaps in headboat data the Monroe county area off the everglades were moved into FHS region 2.

FHS region	Description
1	FL Northwest: Escambia to Dixie
2	FL West: Levy to Collier (Everglades Monroe)
3	Keys: Monroe
4	FL Southeast: Indian River to Miami-Dade
5	FL Northeast: Nassau to Brevard
8	South Atlantic: GA, SC, NC; Gulf: LA, MS, AL

Table 2. TIPS fork length (FL) records and their status for exclusion in LFDs.

Include_FL_LF	N Obs	Mean	Std Dev	Minimum	Maximum	N	Percentage
N	10011	316.396	54.607	0.07	920	9933	5.85%
Y	160992	312.287	48.294	146.8	698	160992	94.15%

Table 3. TIPS maximum total length (maxTL) records and their status for exclusion in LFDs.

Include_TL_LF	N Obs	Mean	Std Dev	Minimum	Maximum	N	Percentage
N	10079	396.975	77.9604	214.4	1176.7	10000	5.89%
Y	160924	388.391	62.063	174	748.8	160924	94.11%

Table 4. Quantity (frequency) values for TIPS FL data values.

QUANTITY	Mean	Std Dev	Minimum	Maximum	N	Percentage
1	317.531	51.123	0.07	920	117804	89.59%
2	316.318	48.907	197.5	550	5322	4.05%
3	307.969	43.118	195.8	487.5	2992	2.28%
4	302.880	41.558	191.9	497.5	1828	1.39%
5	297.616	37.436	222.5	560	1080	0.82%
6	295.085	34.342	232.5	461.8	751	0.57%
7	292.451	30.659	236.3	431	500	0.38%
8	292.238	31.918	230	434.8	370	0.28%
9	286.705	29.933	236.3	396.3	243	0.18%
10	289.815	31.548	242	400.1	164	0.12%
11	285.574	27.261	244	361.6	107	0.08%
12	290.869	28.885	240	380.8	101	0.08%
13	288.573	32.942	245.9	373.1	49	0.04%
14	286.449	26.931	249.8	357.7	49	0.04%
15	295.734	33.584	245.9	357.5	35	0.03%
16	295.777	35.502	232.5	369.3	30	0.02%
17	291.160	26.809	253.6	337.5	15	0.01%
18	287.162	30.769	247.5	352.5	13	0.01%
19	295.810	32.721	237.5	342.3	10	0.01%
20	293.760	42.013	257.5	346.1	5	0.00%
21	292.029	28.318	242.5	327.5	7	0.01%
22	288.300	.	288.3	288.3	1	0.00%
23	265.833	10.408	257.5	277.5	3	0.00%
24	288.300	38.184	261.3	315.3	2	0.00%
25	313.367	26.799	282.5	330.7	3	0.00%
26	262.500	14.142	252.5	272.5	2	0.00%
27	317.500	35.355	292.5	342.5	2	0.00%
33	287.500	.	287.5	287.5	1	0.00%

Table 5. FHS region distributions across all years for TIPS FL data values.

FHS Region	N Obs	Mean	Std Dev	Minimum	Maximum	N	Percentage
FL Northeast	580	357.064	66.654	220.8	600	580	0.34%
FL Northwest	127	283.365	37.611	238.2	427.1	127	0.07%
FL Southeast	28414	299.407	37.739	146.8	605	28405	16.70%
FL Southwest	2541	324.691	54.963	180	637.5	2537	1.49%
Keys	137514	314.469	48.963	0.07	920	137452	80.84%
Out of state	931	397.592	101.907	217	910	928	0.55%

Table 6. Non-excluded sample frequencies for each year by FHS region for TIPS FL data values (quantities not applied).

Year	FL Northeast	FL Northwest	FL Southeast	FL Southwest	FL Keys	Out of state	Total
1984	0	0	0	0	1279	8	1287
1985	0	0	0	0	2454	0	2454
1986	2	0	25	61	2759	7	2854
1987	0	0	0	0	1771	13	1784
1988	0	0	3	10	1941	11	1965
1989	0	0	0	0	2906	2	2908
1990	11	0	31	5	4903	10	4960
1991	8	0	5	211	5807	43	6074
1992	21	0	1301	123	3884	4	5333
1993	5	0	364	58	5260	26	5713
1994	16	1	264	37	5639	11	5968
1995	82	95	455	24	6244	40	6940
1996	2	0	672	321	3697	17	4709
1997	20	0	1859	104	5860	15	7858
1998	14	7	1496	25	5527	17	7086
1999	32	7	2081	147	6281	89	8637
2000	98	1	2021	105	2692	30	4947
2001	28	0	3261	110	4984	5	8388
2002	8	0	1486	42	5968	36	7540
2003	11	0	621	44	3650	31	4357
2004	0	0	1014	16	3138	43	4211
2005	2	0	939	86	2677	97	3801
2006	23	0	1110	20	1351	61	2565
2007	20	0	869	50	1712	33	2684
2008	2	0	685	161	2449	79	3376
2009	12	0	570	265	3171	72	4090
2010	8	0	522	31	1598	34	2193
2011	0	0	1079	22	2934	21	4056
2012	14	0	496	24	7050	21	7605
2013	2	0	815	16	4708	9	5550
2014	3	1	1323	70	5021	14	6432
2015	10	1	941	150	3946	7	5055
2016	2	6	482	74	2959	14	3537
2017	1	2	359	118	3591	4	4075
Total	457	121	27149	2530	129811	924	160992

Table 7. Non-excluded sample frequencies for each year by FHS region for TIPS maxTL data values (quantities not applied).

Year	FL Northeast	FL Northwest	FL Southeast	FL Southwest	FL Keys	Out of state	Total
1984	0	0	0	0	1278	7	1285
1985	0	0	0	0	2454	0	2454
1986	2	0	25	60	2759	7	2853
1987	0	0	0	0	1771	13	1784
1988	0	0	3	10	1941	11	1965
1989	0	0	0	0	2906	2	2908
1990	11	0	31	5	4903	10	4960
1991	8	0	5	211	5807	43	6074
1992	21	0	1301	123	3884	4	5333
1993	5	0	364	58	5260	26	5713
1994	16	1	264	37	5636	11	5965
1995	81	95	455	24	6244	40	6939
1996	2	0	672	321	3697	17	4709
1997	20	0	1859	104	5855	15	7853
1998	14	7	1496	25	5527	16	7085
1999	32	7	2081	147	6281	89	8637
2000	98	1	2021	105	2692	29	4946
2001	28	0	3260	110	4984	5	8387
2002	8	0	1486	42	5968	34	7538
2003	11	0	621	44	3632	27	4335
2004	0	0	1014	16	3138	42	4210
2005	2	0	939	86	2677	95	3799
2006	23	0	1110	20	1351	60	2564
2007	20	0	869	50	1712	31	2682
2008	2	0	685	161	2449	75	3372
2009	12	0	570	265	3171	71	4089
2010	8	0	522	31	1598	30	2189
2011	0	0	1079	22	2934	20	4055
2012	14	0	496	24	7050	15	7599
2013	2	0	815	16	4708	8	5549
2014	3	1	1323	70	5021	13	6431
2015	10	1	941	150	3946	5	5053
2016	2	6	482	74	2959	11	3534
2017	1	2	359	118	3591	4	4075
Total	456	121	27148	2529	129784	886	160924

Table 8. Gear distributions across all years for TIPS FL data values. Hook and line values are highlighted in green.

STANDARD GEAR ID	NAME	GEAR GROUP ID	GEAR CLASS ID	N Obs	Mean	Std Dev	Minimum	Maximum	N	Percentage
000	NOT CODED	0	0	1013	322.931	70.937	242	610	1013	0.66%
130	POTS AND TRAPS, CMB	130	2	1	256.000	.	256	256	1	0.00%
139	POTS AND TRAPS, FISH	139	2	1809	299.812	50.494	203	670	1809	1.18%
140	POTS AND TRAPS, SPINY LOBSTER	140	2	183	304.798	39.747	245	491	183	0.12%
205	GILL NETS, DRIFT, RUNAROUND	205	3	2	315.300	16.405	303.7	326.9	2	0.00%
207	GILL NETS, OTHER	207	3	904	347.528	47.393	238.2	492.6	904	0.59%
300	ROD AND REEL	300	4	82657	307.843	45.708	146.8	620	82657	53.75%
301	REEL, MANUAL	301	4	4017	319.900	43.918	218	540	4017	2.61%
302	ROD AND REEL, ELECTRIC (HAND)	302	4	107	362.242	76.870	232	607	107	0.07%
303	REEL, ELECTRIC OR HYDRAULIC	303	4	3426	337.814	72.822	199.6	680	3426	2.23%
320	LINES POWER TROLL OTHER	320	4	142	299.530	37.403	228.6	405	142	0.09%
400	LINES LONG SET WITH HOOKS	400	5	18	347.656	28.018	313.4	410	18	0.01%
401	BUOY GEAR, VERTICAL	401	5	6	312.833	40.474	273	378	6	0.00%
403	LINES LONG, REEF FISH	403	5	383	355.841	56.658	249	656.5	383	0.25%
551	CAST NETS	551	3	11	344.636	40.155	280	411	11	0.01%
660	SPEARS	660	6	37	292.541	57.509	246	528	37	0.02%
661	SPEARS, DIVING	661	6	1	404.000	.	404	404	1	0.00%
700	LINES HAND	700	4	59001	315.975	49.063	183	698	59001	38.37%
750	BY HAND	750	0	7	304.857	31.546	272.9	367.5	7	0.00%
752	BY HAND, DIVING GEAR	752	6	25	348.040	84.263	275	650	25	0.02%
801	UNSPECIFIED GEAR	801	0	9	328.111	44.301	255	393	9	0.01%
802	COMBINED GEARS	802	0	17	280.176	14.905	249	302	17	0.01%

Figure 1a. Proportion of fork lengths by FHS region (Florida Northeast, Florida Northwest, and Florida Southeast) using 1 cm bins.

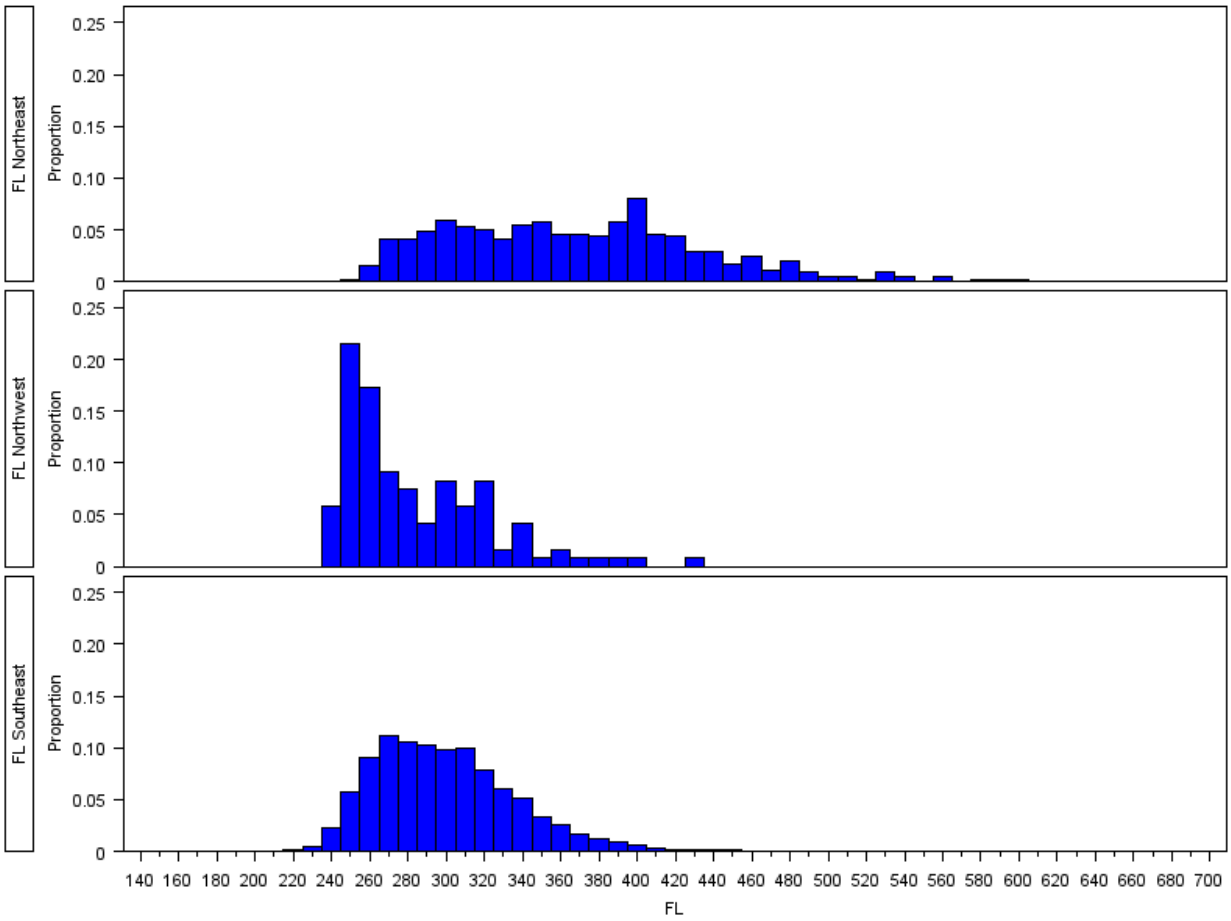

Figure 1b. Proportion of fork lengths by FHS region (Florida Southwest, Florida Keys, and Out of State) using 1 cm bins.

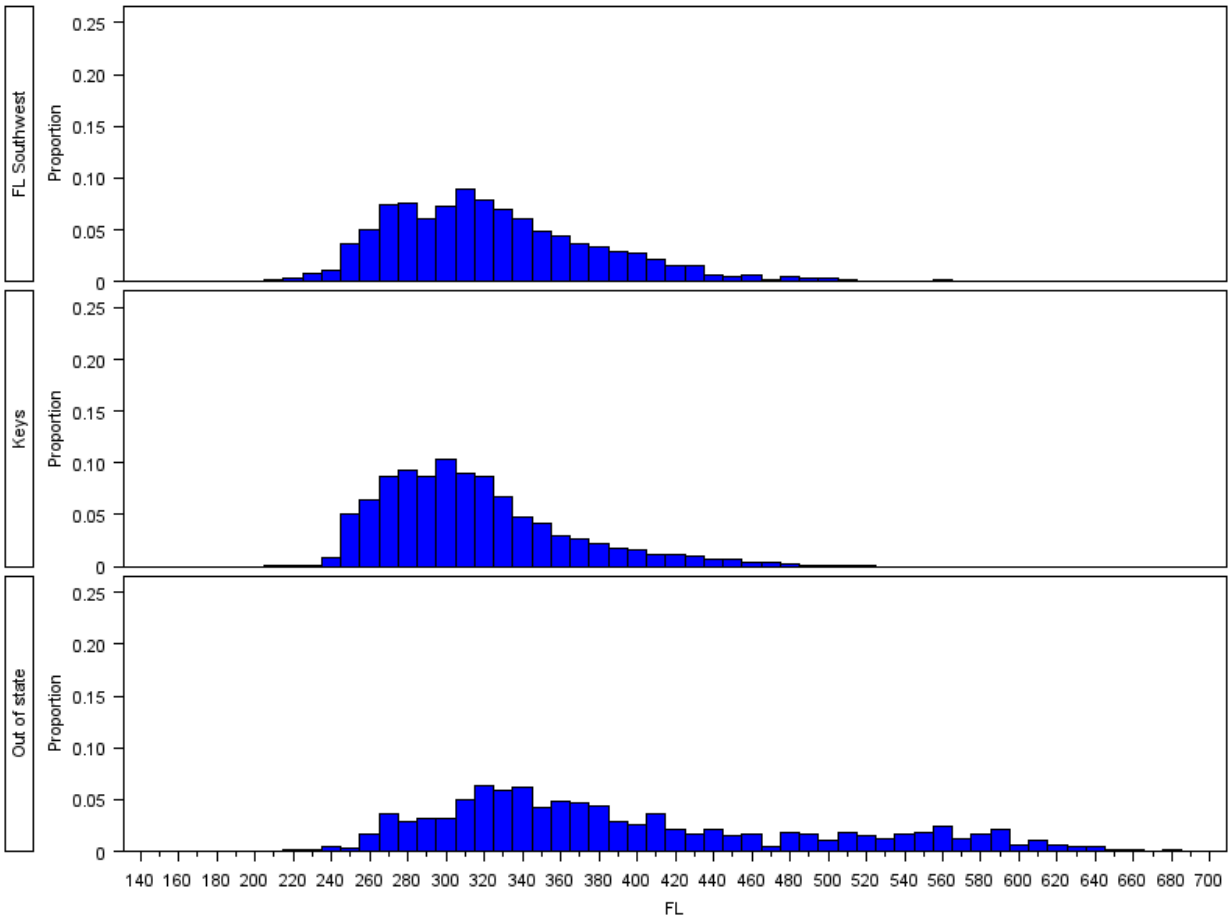

Figure 2a. Proportion of maximum total lengths by FHS region (Florida Northeast, Florida Northwest, and Florida Southeast) using 1 cm bins.

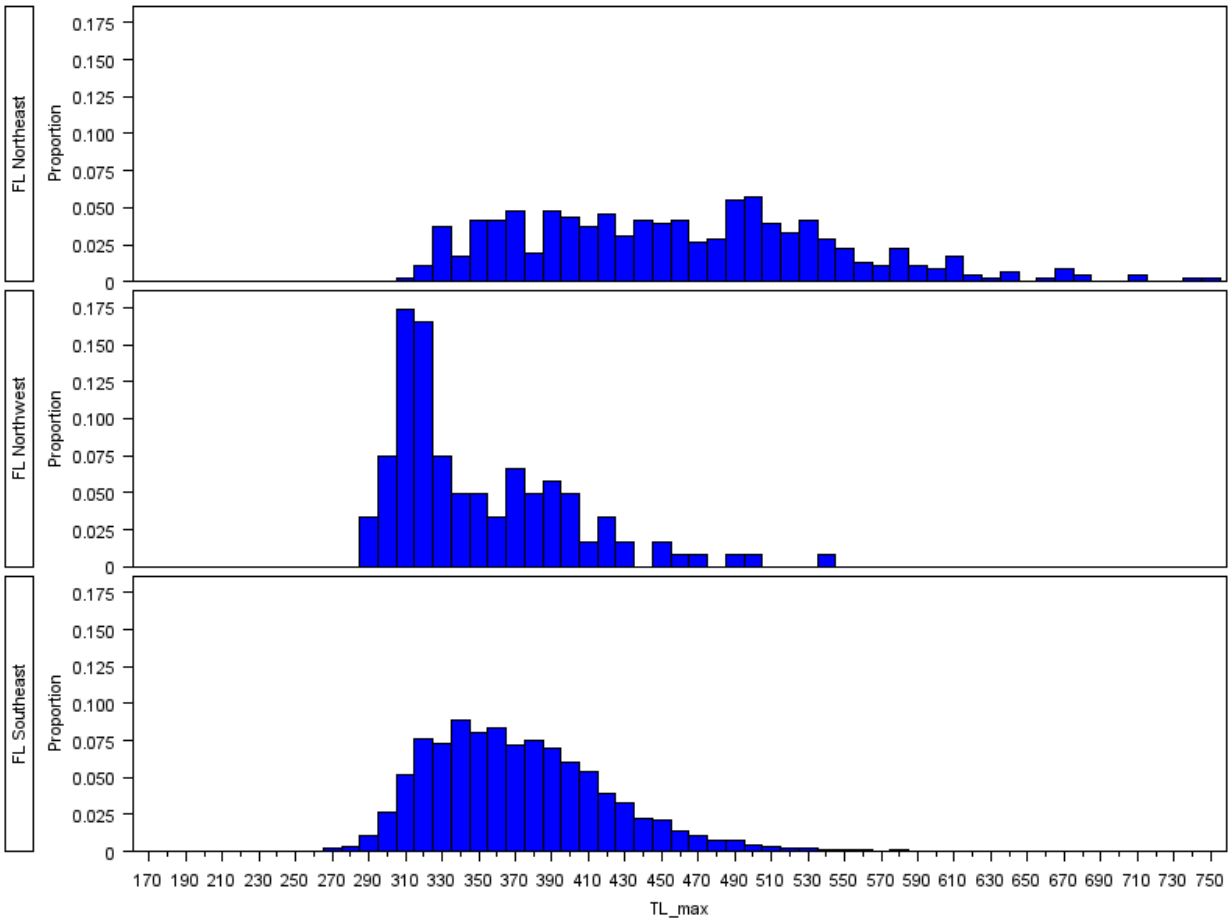

Figure 2b. Proportion of maximum total lengths by FHS region (Florida Southwest, Florida Keys, and Out of State) using 1 cm bins.