Headboat Data for Yellowtail Snapper in the Southeast U.S. Atlantic and Gulf of Mexico

Robin T. Cheshire, Kenneth Brennan, Matthew E. Green, Ariel Poholek and Jasmine Silvennoinen

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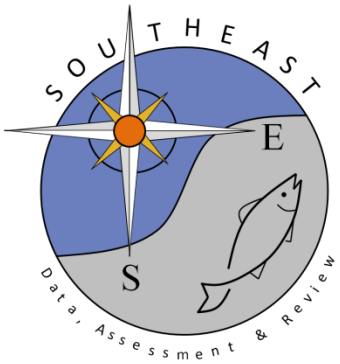

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Contents

1 Survey Description

The Southeast Region Headboat Survey (SRHS) estimates landings and effort for headboats in the southeast U.S. Atlantic and Gulf of Mexico. The Headboat Survey began in 1972 in North Carolina and South Carolina. In 1976 the survey expanded to northeast Florida (Nassau-Indian River counties) and Georgia, followed by southeast Florida (St. Lucie-Monroe counties) in 1978 (Chester et al. 1984; Grimes and Hollingsworth 1979; Huntsman 1976; Huntsman, Colby, and Dixon 1978). The SRHS began in the Gulf of Mexico in 1986 and extends from Naples, FL to South Padre Island, TX. The headboat survey generally includes 50-70 vessels participating in each region annually. The Florida Keys were assigned to the Gulf of Mexico region for this assessment and limited to Florida. Table 1 shows the number of vessels in FLorida for the Atlantic and Gulf of mexico area assignnment. Headboat data are considered confidential and cannot be publicly distributed if less than three vessels contribute to the data product.

The SRHS implemented electronic logbook reporting in the South Atlantic and Gulf of Mexico as of Jan 1, 2013. Headboat operators now have the ability to report trip information via a website or mobile application. A review of the headboat data methodology and validity was conducted in 2015 for the Atlantic waters of the Southeastern U.S. (Fitzpatrick et al. 2017; SEDAR 2015). Panelists agreed the SRHS data products were the best available information and should be used in stock assessments. The decision should translate to the Gulf of Mexico since the methodology and data collection are identical.

The paper headboat logbook forms varied by region and year due to space limitation on the forms during the early years of the survey. Predominant species listed on the paper forms varied by region. In general, the number of species listed increased in all regions over the early years. There were blank lines to write in species not listed on all forms. In the electronic logbook entry, starting in 2013, all species are available to users. Reporting of discards was added to the form in 2004.

The area definitions for SRHS were modified in 2013 primarily to remove the inshore - offshore component for the Carolinas and create state-specific areas for the Gulf of Mexico. A few other areas were collapsed in the Florida Keys and west Florida (Figures 1 and 2). For this assessment, subregion is used to define finer scale regions within Florida as advised by the assessment staff. The data provision was limited to Florida. The assignment of SRHS areas to subregions and regions are below:

- Areas 23 - NW_FL
- Areas 18,21,22 - SW_FL
- Areas 12,17 - Florida Keys
- Area 11= SE_FL
- Areas 7,8 - NE_FL
- Areas 7,8,11 - East Region
- Areas 12,17,18,21,22,23 - West Region

The SRHS dockside sampling was suspended in March 2020 due to concerns about COVID. No biological samples were collected during this time. During the dockside sampling suspension, port agents continued to monitor reporting compliance to ensure captains continued to report trip level catch and effort data via the electronic logbooks. Reported catch and effort data were used to estimate 2020 headboat landings and effort with no disruption. Converting landings in number to landings in weight requires mean weights by species. The logic for determining mean weights expands across strata and backwards in time until a minimum of 10 fish are available. The 2020 landings estimates in weight were derived by applying mean weights from 2019 to 2020 landings in number. Port agents continued to maintain QA-QC checks and validations in the database for their area of responsibility. Port agents also provided outreach and support to captains regarding the new for-hire reporting requirements and changes to the electronic reporting application. Given that headboat dockside sampling necessarily involves interactions between the sampler and headboat anglers and staff, biological samples were not collected until NMFS/SEFSC approved measures to resume sampling in July 2021. However, some port agents are supported by state agencies and returned to dockside sampling earlier.

2 Methods

2.1 Landings

The SRHS incorporates two components for estimating catch and effort. 1) Information about total catch and effort are collected via a logbook form that is filled out by vessel personnel for individual trips. These logbooks are summarized by vessel to generate estimated landings by species, area, and time strata. The compliance in reporting this information has improved over the years of the survey. Port agents are able to identify missing trip reports by contacting the captain or office associated with the fishing vessel, personal observations, reviewing the weekly compliance report, and other methods. If a missing trip is identified, the catch is estimated using a report from the same vessel when possible or a vessel of similar size over the same time and area. Reporting compliance has been near 100 percent since permits were tied to reporting requirements in 2008. The proportion of trips reported is the primary information used to develop a proxy for uncertainty estimates for landings and discards. 2) The size of the fish landed are collected by port samplers during dockside sampling, where fish are measured to the nearest mm and weighed to the nearest 0.01 kg. The mean weights by species, area, and month are used to convert reported landings in numbers of fish to landings in weight.

2.2 Discards

The Southeast Region Headboat Survey logbook form was modified in 2004 to include a category to collect self-reported discards for each reported trip. This category is described on the form as the number of fish by species released alive and number released dead. Port agents instructed each captain on criteria for determining the condition of discarded fish. A fish was considered "released alive" if it was able to swim away on its own. If the fish floated off or was obviously dead or unable to swim, it was considered "released dead". As of Jan 1, 2013 the SRHS began collecting logbook data electronically. Changes to the trip report were also made at this time, one of which removed the condition category for discards i.e., released alive vs. released dead. The new form now collects only the total number of fish released regardless of condition. Due to the subjectivity involved in determining the condition of the released fish from 2004 to 2012, live and dead releases are typically combined for 2004 to 2012 as total discards for consistency to match later years.

Some under reporting and misunderstanding of the data requested were identified in the initial years of the discard data collection (2004 - 2007). Observers with the headboat at-sea program collect catch and discard information from a subset of anglers. Annual catch rates from the observer data can be compared to catch rates reported on logbooks to evaluate the validity of logbook discard data for 2004 to 2007. Starting in January 2023, two fields were added to the logbook form, number of discard descended and number vented. These will be used to quantify the prevalence of use and effectiveness of fish descending devices and venting tools which are required to be onboard in both the South Atlantic and Gulf of Mexico.

2.3 Uncertainty

The first attempt to provide uncertainty estimates for headboat landings were developed for the SEDAR 68 scamp research track assessment (Nuttall et al. 2020). The approach was statistically valid but applied the uncertainty of reported SRHS landings (across areas, months, and vessels) as a proxy for uncertainty in SRHS landings estimates, which produced unrealistic coefficients of variation (CV) in some years. For SEDAR 68 scamp, years with only 60 percent of the vessels reporting had CV values of approximately 0.05. As an alternative, a proxy CV method was developed for the SEDAR 74 red snapper research track data workshop that relies on the proportion of trips reported (N) to total estimated trips (n) and adds a buffer of 0.05 to prevent the CV from reaching zero $proxyCV = 1 - \frac{N}{n} + 0.05$ (SEDAR 2022). This proxy CV method was again refined for the SEDAR 82 gray triggerfish research track data workshop to account for any spatial variability in species abundance and reporting compliance. In particular, using the SEDAR 74 approach, high CVs could be estimated for strata that have low compliance rates across most areas, even if

compliance was high in the few areas comprising the majority of catch. To address this concern, compliance rates are now weighted (spatially) by the associated landings estimates:

$$proxyCV_i = 1 - \sum_{j=1}^{n}\left[\left(\frac{N_{i,j}}{n_{i,j}}\right)*\left(\frac{L_{i,j}}{L_i}\right)\right]+0.05$$

where n is the number of reported trips, N is the number of estimated trips, and L is the landings in number for year i and subregion/region j.

2.4 Effort

Catch and effort data were reported on logbook forms provided to all headboats in the survey until 2012 and electronically since 2013. The information is entered by the owner, captain, or designated crew member after each trip and the total number of all the species landed on a given trip, along with the total number of fish discarded for each species. Data on effort are provided as number of anglers on a given trip. Effort is standardized as angler days by multiplying the number of hours associated with the type of trip (e.g., 40 anglers on a half-day trip would yield $40 * 0.5 = 20$ angler days). Angler days are summed by month for individual vessels. Each month, port agents review these trip reports and check for accuracy and completeness. Prior to electronic reporting port agents collected and reviewed paper logbook forms. Although reporting is mandatory, compliance is not 100% and is variable by location. To account for non-reporting, a correction factor is developed based on sampler observations, angler numbers headboat booking offices, and all available information. This information is used to provide estimates of total catch (expanded or corrected for non-reporting) by month and area, along with estimates of effort. The effort estimates for Louisiana in 2004 and 2005 are zero. During this time period only one or two vessels were active and did not report their catch in 2002, 2004, 2005, or 2006. In 2002, 2004 and early 2005 funding and staffing issues prevented the collection of trip information by port agents necessary to estimate effort and catch. In August 2005, Hurricane Katrina impacted Louisiana fishing operations to the extent it was unlikely there was any fishing effort through the end of the year and some of 2006. Alabama was assigned a separate area code in 2013. In prior years, Alabama was combined with northwest Florida. Mississippi was added to the headboat survey in 2010. In earlier years, there was little to no headboat fishing in Mississippi. Angler Days is the best practice unit of effort for headboat data. Angler trips can be calculated to match units for general recreational effort for the purpose of combining effort across sectors. There are some caveats with the method because it does not account for all effort expansions in the standard estimation method.

2.5 Biological Samples

Length data has been collected by SRHS dockside samplers since the initiation of the survey, the collection of which coincides with associated catch. Weights are typically collected for the same fish measured during dockside sampling. Other biological samples and data (scales, otoliths, spines, stomachs, gonads, and sex determination) are collected routinely and processed for ageing, diet studies, and maturity studies. Lists of priority species are provided to port agents but no specific sampling quotas are directed.

3 Results and Discussion

3.1 Landings

Landings for areas outside Florida were excluded to match decisions for the previous stock assessment. The annual landings for the areas West of Florida ranged from 0 to 641 fish and 0 to 6 discards from 0 to 6 trips. Port agents measured 0 to 11 fish annually from these areas. The annual landings for the areas North of Florida ranged from 0 to 692 fish and 0 to 11 discards from 0 to 11 trips. Port agents measured 0 to 15 fish annually from these areas.

Landings in number are given by subregion (Table 2, Figure 3) and region (Table 3, Figure 4). Landings in pounds are shown by subregion (Table 4, Figure 5) and by region (Table 5, Figure 6). The primary area of yellowtail snapper landings are Southeast Florida and the Florida Keys (Tables 2 - 5). Catch location maps were provided to stock assessment staff but were removed for the public working paper due to confidentiality.

3.2 Discards

The headboat discard rates were very low in the first 3 years of the addition of discard reporting relative to all other years, especially in East Florida (Figure 7). This is the case for many species and 2004-2007 discard values are not used in these situations. The comparison of headboat at-sea observer catch rates to reported discard rates from the headboat logbooks revealed higher discard rates from logbooks compared to observer data for some years in the Keys. However, the pattern is not consistent across years and the variability is large. For these reasons logbook discard estimates start in 2008 and no calibrations were used for any subregions.

Discards by subregion and region are primarily from the Florida Keys followed by southeast Florida and southwest Florida (Tables 6 - 7, Figure 8 - 9). Discards are highest in the West region which includes the Florida Keys for this assessment. There is no information within the SRHS on the size of these fish with which to convert the discards in number to weight. However, the at-sea observer size data may be adequate to inform size compositions and average annual weights for converting discards from number to weight if needed for model input. The headboat at-sea data will be used to compare discard rates of reported to observed values. This analysis will help determine the start year for headboat discards. The current best practice is to start using headboat reported discards in 2008 and to use proxy discards estimated from MRIP Charter relative to headboat for prior years as deemed appropriate. There were very few discards for any area prior to 2008 with the exception of the Florida Keys (Figure 8)

3.3 Confidentiality

Headboat landings and discards are confidential if fewer than three vessels contributed logbook records for any strata. The number of vessels reporting by subregion, region, and annually are given in tables 8 - 10. For yellowtail snapper, only the overall and regional annual catch and discards can be released to the public.

3.4 Uncertainty

Unweighted proxy CV estimates by subregion, region and overall are provided in tables 11 - 13. Regional proxy CV values weighted by subregion landings in number and weight are given in tables 14 and 15. Annual weighted proxy CV values weighted by regional landings in number and weight are provided in tables 16 and 17. The weighted proxy CVs should provide the best estimate for uncertainty.

3.5 Effort

Total estimated headboat angler days and angler trips decreased until about 2010 followed by an increase until 2015 after which it has been relatively constant (Tables 18 - 19). The Gulf of Mexico SRHS did not begin until 1986 so the West region effort for 1981 - 1985 is just from the Florida Keys. The same trend is seen in the East for the regional effort estimates (Tables 20 - 21, Figure 11). The finer scale effort estimates by subregion show the pattern observed in effort is consistent across subregions (Tables 22 - 23, Figure 10). Reports from industry staff, captains or owners, and port agents indicated fuel prices, the economy and fishing regulations are the factors that most affected the amount of trips, number of passengers, and overall decrease in fishing effort through 2010.

3.6 Biological Samples

Annual numbers of yellowtail snapper measured for natural total length in the headboat fleet by subregion and region are given in tables 24 - 25. The number of trips from which yellowtail snapper were measured are summarized in Tables 26 - 27. Mean total lengths (mm) and weight (g) and associated CVs for the headboat fishery are tabulated by subregion and region in Tables 28 - 35. Patterns in length and weight by year and region are shown in Figures 12 and 13. The annual distribution of lengths between regions is similar. The regional samples sizes are adequate to develop length compositions.

4 Tables

Table 1: Number of Florida vessels in the SRHS by year and region (FL Keys assigned to Gulf of Mexico).

year	Atlantic	Gulf
1981	44	22
1982	43	19
1983	44	18
1984	44	20
1985	49	14
1986	50	77
1987	51	72
1988	48	66
1989	50	90
1990	51	80
1991	48	74
1992	52	73
1993	46	73
1994	47	75
1995	43	72
1996	43	65
1997	39	62
1998	36	65
1999	36	61
2000	37	65
2001	36	65
2002	32	55
2003	31	54
2004	33	57
2005	32	60
2006	32	58
2007	34	56
2008	38	60
2009	36	64
2010	37	64
2011	33	57
2012	33	56
2013	34	46
2014	34	49
2015	33	49
2016	36	50
2017	25	53
2018	26	53
2019	25	53
2020	27	51
2021	25	52
2022	25	52
2023	23	53

Table 2: Yellowtail snapper landings by subregion in number. NW.FL was combined with SW.FL due to confidentiality of NW.FL data.

year	SW_FL	Keys	SE_FL	NE_FL	Total
1981	0	74428	84928	616	159972
1982	0	140757	60071	450	201278
1983	0	170331	34177	807	205315
1984	0	122354	33557	390	156301
1985	0	111863	25179	590	137632
1986	2955	172664	29035	1495	206149
1987	4731	193756	34736	2304	235527
1988	5559	230565	53087	2161	291372
1989	5729	115666	43794	1248	166437
1990	3565	165977	47198	2023	218763
1991	4172	155182	51289	2146	212789
1992	6033	143843	54365	1126	205367
1993	8140	164595	45274	692	218701
1994	6099	160086	76348	625	243158
1995	1576	119525	35954	441	157496
1996	3212	110978	23378	31	137599
1997	739	112110	26729	260	139838
1998	3077	101312	16007	130	120526
1999	7244	77243	24512	224	109223
2000	2056	95029	12027	188	109300
2001	544	96312	4770	243	101869
2002	536	117674	2382	420	121012
2003	674	97738	10267	175	108854
2004	473	109363	8118	468	118422
2005	1691	130487	16160	749	149087
2006	2160	94199	2157	458	98974
2007	1875	83873	17232	1618	104598
2008	1150	69631	31857	724	103362
2009	1248	66854	19329	949	88380
2010	294	63102	38577	201	102174
2011	1051	68229	29310	178	98768
2012	1224	74104	35265	222	110815
2013	1901	79299	31146	596	112942
2014	5395	92393	65601	601	163990
2015	5013	94481	73498	625	173617
2016	5936	80144	98313	183	184576
2017	7308	76190	26861	320	110679
2018	5935	80909	26241	197	113282
2019	8025	92486	20078	169	120758
2020	7497	57687	19586	43	84813
2021	27214	149618	37812	100	214744
2022	12712	82210	18908	38	113868
2023	12496	67305	22488	43	102332

Table 3: Yellowtail snapper landings by region in number

year	East	West	Total
1981	85544	74428	159972
1982	60521	140757	201278
1983	34984	170331	205315
1984	33947	122354	156301
1985	25769	111863	137632
1986	30530	175619	206149
1987	37040	198487	235527
1988	55248	236124	291372
1989	45042	121395	166437
1990	49221	169542	218763
1991	53435	159354	212789
1992	55491	149876	205367
1993	45966	172735	218701
1994	76973	166185	243158
1995	36395	121101	157496
1996	23409	114190	137599
1997	26989	112849	139838
1998	16137	104389	120526
1999	24736	84487	109223
2000	12215	97085	109300
2001	5013	96856	101869
2002	2802	118210	121012
2003	10442	98412	108854
2004	8586	109836	118422
2005	16909	132178	149087
2006	2615	96359	98974
2007	18850	85748	104598
2008	32581	70781	103362
2009	20278	68102	88380
2010	38778	63396	102174
2011	29488	69280	98768
2012	35487	75328	110815
2013	31742	81200	112942
2014	66202	97788	163990
2015	74123	99494	173617
2016	98496	86080	184576
2017	27181	83498	110679
2018	26438	86844	113282
2019	20247	100511	120758
2020	19629	65184	84813
2021	37912	176832	214744
2022	18946	94922	113868
2023	22531	79801	102332

Table 4: Yellowtail snapper landings by subregion in pounds. NW.FL was combined with SW.FL due to confidentiality of NW.FL data.

year	SW_FL	Keys	SE_FL	NE_FL	Total
1981	0.00	94316.56	134399.67	526.92	229243.15
1982	0.00	193274.57	99052.10	463.41	292790.08
1983	0.00	201179.19	48905.55	858.66	250943.40
1984	0.00	157894.21	48643.42	427.72	206965.35
1985	0.00	131103.77	33833.92	525.82	165463.51
1986	3909.65	216255.30	42522.57	1165.18	263852.70
1987	4208.62	236537.90	39324.62	2016.64	282087.78
1988	4334.67	329667.79	68558.92	2852.79	405414.17
1989	6487.95	158117.07	60735.90	1240.89	226581.80
1990	4693.00	268549.66	52771.37	1586.05	327600.07
1991	7349.34	220993.96	49402.91	1749.15	279495.36
1992	7376.48	194997.76	55529.55	1046.44	258950.23
1993	12811.84	312849.91	52314.33	832.11	378808.19
1994	6021.32	178724.80	84680.27	444.43	269870.82
1995	1726.24	118180.57	43525.24	503.82	163935.87
1996	2854.12	112199.00	25858.45	23.96	140935.54
1997	1259.50	111823.35	36576.48	252.21	149911.54
1998	3111.14	98947.16	20719.92	117.18	122895.40
1999	7108.71	69760.37	28748.40	311.89	105929.37
2000	2851.26	81824.34	12653.42	192.31	97521.32
2001	724.99	93395.86	5221.31	205.47	99547.63
2002	637.18	106984.72	2736.68	577.17	110935.75
2003	810.75	84111.65	12080.48	196.50	97199.38
2004	580.19	95258.04	7786.30	446.39	104070.92
2005	1635.32	129396.20	17229.35	675.54	148936.41
2006	2264.30	80536.64	2109.34	489.23	85399.51
2007	2395.18	64882.48	16392.06	1083.77	84753.48
2008	1246.44	58614.82	33441.15	767.30	94069.70
2009	1285.20	58347.17	19260.76	1225.52	80118.66
2010	521.97	52376.05	36620.59	220.15	89738.76
2011	3523.06	56414.26	32428.55	186.09	92551.96
2012	3880.97	75910.93	41430.39	195.07	121417.36
2013	5967.57	75383.56	32812.09	512.82	114676.05
2014	18081.09	89433.75	69306.73	509.97	177331.55
2015	14573.95	88423.40	74053.01	547.34	177597.69
2016	11523.72	75512.10	100397.73	625.09	188058.64
2017	16698.84	77462.26	23491.01	275.59	117927.70
2018	5074.08	76760.41	22967.33	133.32	104935.14
2019	15990.46	80514.67	21050.83	130.99	117686.96
2020	6975.74	54095.20	12543.10	27.16	73641.20
2021	40131.68	199826.62	50798.65	136.76	290893.71
2022	17849.09	62730.27	17859.98	31.64	98470.98
2023	17008.21	49581.57	18452.17	38.64	85080.59

Table 5: Yellowtail snapper landings by region in pounds.

year	East	West	Total
1981	134927	94317	229243
1982	99516	193275	292790
1983	49764	201179	250943
1984	49071	157894	206965
1985	34360	131104	165464
1986	43688	220165	263853
1987	41341	240747	282088
1988	71412	334002	405414
1989	61977	164605	226582
1990	54357	273243	327600
1991	51152	228343	279495
1992	56576	202374	258950
1993	53146	325662	378808
1994	85125	184746	269871
1995	44029	119907	163936
1996	25882	115053	140936
1997	36829	113083	149912
1998	20837	102058	122895
1999	29060	76869	105929
2000	12846	84676	97521
2001	5427	94121	99548
2002	3314	107622	110936
2003	12277	84922	97199
2004	8233	95838	104071
2005	17905	131032	148936
2006	2599	82801	85400
2007	17476	67278	84753
2008	34208	59861	94070
2009	20486	59632	80119
2010	36841	52898	89739
2011	32615	59937	92552
2012	41625	79792	121417
2013	33325	81351	114676
2014	69817	107515	177332
2015	74600	102997	177598
2016	101023	87036	188059
2017	23767	94161	117928
2018	23101	81834	104935
2019	21182	96505	117687
2020	12570	61071	73641
2021	50935	239958	290894
2022	17892	80579	98471
2023	18491	66590	85081

Table 6: Yellowtail snapper discards by subregion in number of fish. NW.FL was combined with SW.FL due to confidentiality of NW.FL data.

year	SW_FL	Keys	SE_FL	NE_FL	Total
2008	704	38976	1938	264	41882
2009	1333	35403	1684	320	38740
2010	1227	32610	2920	174	36931
2011	423	22663	1472	156	24714
2012	742	25678	4399	140	30959
2013	1018	31340	6985	434	39777
2014	931	51587	11930	44	64492
2015	836	34987	30009	12	65844
2016	1356	24950	42239	92	68637
2017	2105	25455	6235	23	33818
2018	1750	35489	9273	86	46598
2019	1624	57868	2964	43	62499
2020	1331	39458	4196	21	45006
2021	2084	44901	3656	5	50646
2022	1269	62071	6988	4	70332
2023	2476	57357	6376	6	66215

Table 7: Yellowtail snapper discards by region in number of fish

year	East	West	Total
2008	2202	39680	41882
2009	2004	36736	38740
2010	3094	33837	36931
2011	1628	23086	24714
2012	4539	26420	30959
2013	7419	32358	39777
2014	11974	52518	64492
2015	30021	35823	65844
2016	42331	26306	68637
2017	6258	27560	33818
2018	9359	37239	46598
2019	3007	59492	62499
2020	4217	40789	45006
2021	3661	46985	50646
2022	6992	63340	70332
2023	6382	59833	66215

Table 8: Yellowtail snapper number of vessels by subregion contributing to landings estimates. Strata with less than 3 vessels reporting are considered confidential.

year	NW_FL	SW_FL	Keys	SE_FL	NE_FL
1981			15	27	6
1982			14	23	8
1983			16	19	12
1984			17	13	11
1985			11	15	11
1986	2	20	11	26	16
1987	1	9	11	16	15
1988	1	11	9	17	13
1989		19	11	16	11
1990	2	25	7	13	9
1991	1	21	9	16	6
1992	1	23	17	27	12
1993	3	27	18	27	11
1994	5	23	18	26	12
1995	1	11	16	23	10
1996	2	10	16	17	7
1997	3	15	16	20	9
1998	4	14	15	15	9
1999	2	11	13	8	9
2000	6	11	13	10	7
2001	5	7	10	8	6
2002	3	7	10	8	9
2003		10	10	5	6
2004	3	12	12	8	12
2005	1	15	11	8	9
2006	4	12	11	5	11
2007	1	11	10	4	13
2008	3	19	11	18	14
2009	4	18	11	20	15
2010	3	10	11	20	13
2011	6	12	10	20	6
2012	3	14	10	20	8
2013	1	12	10	21	9
2014		13	11	22	11
2015	2	15	12	21	9
2016		15	10	22	7
2017	3	17	13	15	7
2018	1	13	11	16	8
2019	2	14	12	16	8
2020		19	12	18	6
2021		21	12	15	5
2022		21	12	16	6
2023		21	12	15	3

Table 9: Yellowtail snapper number of vessels by region contributing to landings estimates. Strata with less than 3 vessels reporting are considered confidential.

year	East	West
1981	33	15
1982	31	14
1983	31	16
1984	24	17
1985	26	11
1986	42	33
1987	31	21
1988	30	21
1989	27	30
1990	22	34
1991	22	31
1992	39	41
1993	38	48
1994	38	46
1995	33	28
1996	24	28
1997	29	34
1998	24	33
1999	17	26
2000	17	30
2001	14	22
2002	17	20
2003	11	20
2004	20	27
2005	17	27
2006	16	27
2007	17	22
2008	32	33
2009	35	33
2010	33	24
2011	26	28
2012	28	27
2013	30	23
2014	33	24
2015	30	29
2016	29	25
2017	22	33
2018	24	25
2019	24	28
2020	24	31
2021	20	33
2022	22	33
2023	18	33

Table 10: Yellowtail snapper number of vessels annually contributing to landings estimates. Strata with less than 3 vessels reporting are considered confidential.

year	n_vessel
1981	48
1982	45
1983	47
1984	41
1985	37
1986	75
1987	52
1988	51
1989	57
1990	56
1991	53
1992	80
1993	86
1994	84
1995	61
1996	52
1997	63
1998	57
1999	43
2000	47
2001	36
2002	37
2003	31
2004	47
2005	44
2006	43
2007	39
2008	65
2009	68
2010	57
2011	54
2012	55
2013	53
2014	56
2015	59
2016	54
2017	55
2018	49
2019	52
2020	55
2021	53
2022	55
2023	51

Table 11: Unweighted proxy CV values by subregion. These values are based on logbook reporting compliance and are consistent across species.

year	NW_FL	SW_FL	Keys	SE_FL	NE_FL
1981	0.000	0.000	0.546	0.163	0.485
1982	0.000	0.000	0.376	0.518	0.469
1983	0.000	0.000	0.554	0.334	0.414
1984	0.000	0.000	0.543	0.632	0.508
1985	0.000	0.000	0.555	0.615	0.535
1986	0.888	0.594	0.521	0.533	0.400
1987	0.710	0.759	0.448	0.578	0.356
1988	0.218	0.668	0.591	0.597	0.438
1989	0.241	0.573	0.647	0.627	0.501
1990	0.191	0.214	0.582	0.625	0.583
1991	0.265	0.082	0.576	0.669	0.604
1992	0.190	0.115	0.364	0.472	0.204
1993	0.153	0.094	0.253	0.462	0.146
1994	0.192	0.241	0.367	0.598	0.216
1995	0.144	0.492	0.223	0.612	0.185
1996	0.086	0.428	0.311	0.880	0.161
1997	0.135	0.334	0.210	0.715	0.143
1998	0.140	0.586	0.280	0.748	0.079
1999	0.175	0.552	0.287	0.941	0.097
2000	0.108	0.608	0.354	0.947	0.244
2001	0.128	0.610	0.508	0.909	0.145
2002	0.156	0.482	0.626	0.960	0.091
2003	0.250	0.413	0.648	0.976	0.085
2004	0.246	0.327	0.632	0.970	0.067
2005	0.249	0.257	0.617	0.964	0.129
2006	0.385	0.264	0.566	0.984	0.083
2007	0.427	0.236	0.373	0.915	0.206
2008	0.087	0.066	0.137	0.380	0.092
2009	0.055	0.055	0.073	0.109	0.176
2010	0.059	0.098	0.053	0.099	0.054
2011	0.051	0.066	0.081	0.093	0.019
2012	0.083	0.054	0.209	0.090	0.051
2013	0.050	0.050	0.066	0.161	0.050
2014	0.050	0.050	0.053	0.054	0.051
2015	0.052	0.050	0.056	0.073	0.054
2016	0.050	0.050	0.059	0.277	0.052
2017	0.050	0.054	0.059	0.060	0.057
2018	0.050	0.052	0.058	0.060	0.054
2019	0.053	0.051	0.053	0.057	0.071
2020	0.050	0.050	0.050	0.064	0.050
2021	0.050	0.050	0.050	0.050	0.050
2022	0.050	0.050	0.050	0.050	0.050
2023	0.050	0.050	0.050	0.050	0.050

Table 12: Unweighted proxy CV values by region. These values are based on logbook reporting compliance and are consistent across species.

year	East	West
1981	0.211	0.546
1982	0.512	0.376
1983	0.346	0.554
1984	0.608	0.543
1985	0.599	0.555
1986	0.504	0.641
1987	0.530	0.653
1988	0.559	0.564
1989	0.601	0.543
1990	0.617	0.319
1991	0.658	0.285
1992	0.409	0.211
1993	0.383	0.160
1994	0.520	0.269
1995	0.533	0.329
1996	0.764	0.312
1997	0.580	0.238
1998	0.580	0.376
1999	0.753	0.380
2000	0.800	0.412
2001	0.742	0.457
2002	0.772	0.440
2003	0.749	0.442
2004	0.796	0.406
2005	0.808	0.389
2006	0.815	0.414
2007	0.744	0.338
2008	0.288	0.091
2009	0.135	0.059
2010	0.085	0.077
2011	0.071	0.065
2012	0.079	0.105
2013	0.136	0.055
2014	0.053	0.051
2015	0.070	0.053
2016	0.242	0.053
2017	0.059	0.054
2018	0.058	0.053
2019	0.061	0.052
2020	0.060	0.050
2021	0.050	0.050
2022	0.050	0.050
2023	0.050	0.050

Table 13: Unweighted proxy CV values by year. These values are based on logbook reporting compliance and are consistent across species.

year	cv
1981	0.278
1982	0.489
1983	0.385
1984	0.595
1985	0.592
1986	0.559
1987	0.582
1988	0.561
1989	0.576
1990	0.485
1991	0.509
1992	0.320
1993	0.270
1994	0.400
1995	0.434
1996	0.545
1997	0.394
1998	0.462
1999	0.562
2000	0.606
2001	0.586
2002	0.588
2003	0.574
2004	0.589
2005	0.592
2006	0.621
2007	0.544
2008	0.177
2009	0.091
2010	0.081
2011	0.067
2012	0.094
2013	0.095
2014	0.052
2015	0.061
2016	0.150
2017	0.056
2018	0.055
2019	0.055
2020	0.054
2021	0.050
2022	0.050
2023	0.050

Table 14: Regional proxy CV values weighted by subregion landings of yellowtail snapper in number.

year	West	East
1981	0.254	0.088
1982	0.263	0.156
1983	0.460	0.057
1984	0.425	0.137
1985	0.451	0.115
1986	0.445	0.078
1987	0.383	0.089
1988	0.480	0.112
1989	0.469	0.169
1990	0.445	0.140
1991	0.421	0.167
1992	0.258	0.126
1993	0.194	0.096
1994	0.248	0.188
1995	0.174	0.140
1996	0.260	0.150
1997	0.170	0.137
1998	0.250	0.099
1999	0.239	0.211
2000	0.318	0.105
2001	0.484	0.043
2002	0.610	0.019
2003	0.585	0.092
2004	0.585	0.067
2005	0.543	0.105
2006	0.544	0.022
2007	0.303	0.154
2008	0.093	0.118
2009	0.056	0.026
2010	0.033	0.037
2011	0.057	0.028
2012	0.140	0.029
2013	0.047	0.045
2014	0.032	0.022
2015	0.032	0.031
2016	0.027	0.148
2017	0.044	0.015
2018	0.044	0.014
2019	0.044	0.010
2020	0.038	0.015
2021	0.041	0.009
2022	0.042	0.008
2023	0.039	0.011

Table 15: Regional proxy CV values weighted by subregion landings of yellowtail snapper in weight.

year	West	East
1981	0.225	0.097
1982	0.248	0.176
1983	0.444	0.066
1984	0.414	0.150
1985	0.440	0.127
1986	0.436	0.088
1987	0.387	0.083
1988	0.488	0.104
1989	0.468	0.171
1990	0.480	0.104
1991	0.457	0.122
1992	0.277	0.102
1993	0.212	0.064
1994	0.249	0.188
1995	0.166	0.163
1996	0.256	0.161
1997	0.159	0.175
1998	0.240	0.126
1999	0.226	0.256
2000	0.313	0.123
2001	0.481	0.048
2002	0.606	0.024
2003	0.565	0.122
2004	0.580	0.073
2005	0.539	0.112
2006	0.540	0.025
2007	0.292	0.180
2008	0.086	0.136
2009	0.054	0.029
2010	0.031	0.040
2011	0.052	0.033
2012	0.133	0.031
2013	0.046	0.046
2014	0.032	0.021
2015	0.032	0.031
2016	0.027	0.148
2017	0.046	0.012
2018	0.045	0.013
2019	0.043	0.010
2020	0.041	0.011
2021	0.041	0.009
2022	0.041	0.009
2023	0.039	0.011

Table 16: Annual proxy CV values weighted by regional landings of yellowtail snapper in number.

year	cv
1981	0.343
1982	0.419
1983	0.517
1984	0.562
1985	0.566
1986	0.523
1987	0.472
1988	0.592
1989	0.638
1990	0.585
1991	0.589
1992	0.385
1993	0.290
1994	0.436
1995	0.315
1996	0.410
1997	0.307
1998	0.350
1999	0.451
2000	0.423
2001	0.527
2002	0.629
2003	0.677
2004	0.651
2005	0.648
2006	0.566
2007	0.457
2008	0.211
2009	0.082
2010	0.070
2011	0.084
2012	0.169
2013	0.092
2014	0.053
2015	0.063
2016	0.175
2017	0.059
2018	0.058
2019	0.054
2020	0.053
2021	0.050
2022	0.050
2023	0.050

Table 17: Annual proxy CV values weighted by regional landings of yellowtail snapper in weight.

year	cv
1981	0.321
1982	0.424
1983	0.511
1984	0.564
1985	0.567
1986	0.524
1987	0.470
1988	0.592
1989	0.639
1990	0.584
1991	0.579
1992	0.380
1993	0.276
1994	0.437
1995	0.329
1996	0.417
1997	0.334
1998	0.366
1999	0.482
2000	0.436
2001	0.529
2002	0.630
2003	0.686
2004	0.653
2005	0.651
2006	0.565
2007	0.472
2008	0.222
2009	0.083
2010	0.072
2011	0.084
2012	0.163
2013	0.092
2014	0.053
2015	0.063
2016	0.175
2017	0.058
2018	0.058
2019	0.053
2020	0.052
2021	0.050
2022	0.050
2023	0.050

Table 18: Estimates of total effort in angler - days by year.

year	Angler_Day
1981	298883
1982	293133
1983	277863
1984	288994
1985	280845
1986	557135
1987	550090
1988	497723
1989	525189
1990	536801
1991	454334
1992	449325
1993	444871
1994	446858
1995	389910
1996	352086
1997	319809
1998	338670
1999	338312
2000	339428
2001	318295
2002	291105
2003	287796
2004	332131
2005	301311
2006	297653
2007	292064
2008	252545
2009	276767
2010	232723
2011	287952
2012	308613
2013	324066
2014	368422
2015	369577
2016	378060
2017	303201
2018	290875
2019	285809
2020	209893
2021	301291
2022	253800
2023	254880

Table 19: Estimates of total effort in angler - trips by year.

year	Angler_Trip
1981	302697
1982	364921
1983	329299
1984	433144
1985	447240
1986	753878
1987	741192
1988	667221
1989	720214
1990	769582
1991	664356
1992	648175
1993	600420
1994	641823
1995	575313
1996	551787
1997	473674
1998	450424
1999	418781
2000	507403
2001	455579
2002	410414
2003	419985
2004	475973
2005	445598
2006	453207
2007	373958
2008	368223
2009	402650
2010	342991
2011	426029
2012	471001
2013	469136
2014	552102
2015	556085
2016	564193
2017	434012
2018	412635
2019	403548
2020	288531
2021	426182
2022	367795
2023	350090

Table 20: Estimates of total effort in angler - days by region.

year	West	East
1981	71709	227174
1982	71614	221519
1983	64721	213142
1984	71314	217680
1985	67227	213618
1986	315521	241614
1987	299223	250867
1988	272589	225134
1989	289325	235864
1990	291561	245240
1991	241458	212876
1992	251472	197853
1993	279357	165514
1994	268272	178586
1995	239725	150185
1996	213734	138352
1997	205501	114308
1998	234936	103734
1999	217898	120414
2000	205559	133869
2001	202564	115731
2002	189735	101370
2003	186755	101041
2004	206749	125382
2005	181018	120293
2006	176727	120926
2007	170287	121777
2008	160825	91720
2009	173530	103237
2010	138542	94181
2011	190002	97950
2012	199745	108868
2013	196164	127902
2014	220895	147527
2015	224490	145087
2016	228330	149730
2017	220472	82729
2018	214688	76187
2019	211571	74238
2020	156713	53180
2021	225230	76061
2022	188864	64936
2023	189734	65146

Table 21: Estimates of total effort in angler - trips by region.

year	West	East
1981	84900	217797
1982	69033	295889
1983	74993	254306
1984	76002	357143
1985	65527	381713
1986	357938	395940
1987	354798	386394
1988	345675	321546
1989	365237	354977
1990	388913	380670
1991	315041	349315
1992	330496	317679
1993	343506	256914
1994	353502	288322
1995	324210	251103
1996	307351	244435
1997	278693	194981
1998	302659	147764
1999	229983	188798
2000	287071	220333
2001	273232	182347
2002	253289	157125
2003	262174	157810
2004	282984	192989
2005	261640	183959
2006	246468	206739
2007	237595	136363
2008	230878	137345
2009	253327	149323
2010	200738	142254
2011	276229	149800
2012	298586	172415
2013	268370	200766
2014	305931	246171
2015	309633	246452
2016	314006	250187
2017	305739	128273
2018	296520	116115
2019	290695	112853
2020	209672	78859
2021	312190	113992
2022	275929	91866
2023	253101	96989

Table 22: Estimates of total effort in angler - days by subregion. NW.FL was combined with SW.FL due to confidentiality of NW.FL data.

year	SW_FL	Keys	SE_FL	NE_FL
1981		71709	154747	72427
1982		71614	154558	66961
1983		64721	129643	83499
1984		71314	122446	95234
1985		67227	119169	94449
1986	239303	76218	128513	113101
1987	217049	82174	136723	114144
1988	195948	76641	115978	109156
1989	207739	81586	132944	102920
1990	210379	81182	147006	98234
1991	172990	68468	127765	85111
1992	183470	68002	107043	90810
1993	204659	74698	91020	74494
1994	203616	64656	113326	65260
1995	181464	58261	94293	55892
1996	154913	58821	93797	44555
1997	149442	56059	64450	49858
1998	185331	49605	53946	49788
1999	176117	41781	65261	55153
2000	159331	46228	76250	57619
2001	156676	45888	62271	53460
2002	141831	47904	54731	46639
2003	144211	42544	49672	51369
2004	158430	48319	74838	50544
2005	130233	50785	72515	47778
2006	124049	52678	73936	46990
2007	133856	36431	69981	51796
2008	129480	31345	40949	50771
2009	141289	32241	38881	64356
2010	109707	28835	42462	51719
2011	155620	34382	44808	53142
2012	161135	38610	51028	57840
2013	160277	35887	63205	64697
2014	174599	46296	88842	58685
2015	176375	48115	92384	52703
2016	183147	45183	98090	51640
2017	178816	41656	36166	46563
2018	171996	42692	34282	41905
2019	167167	44404	32169	42069
2020	126794	29919	23336	29844
2021	181632	43598	29373	46688
2022	149368	39496	31531	33405
2023	149735	39999	33832	31314

Table 23: Estimates of total effort in angler - trips by subregion. NW.FL was combined with SW.FL due to confidentiality of NW.FL data.

year	SW_FL	Keys	SE_FL	NE_FL
1981		84900	133946	83851
1982		69033	215658	80231
1983		74993	167572	86734
1984		76002	248306	108836
1985		65527	264254	117459
1986	274184	83754	263314	132626
1987	267591	87207	264877	121517
1988	260726	84949	208798	112748
1989	272942	92295	235771	119207
1990	297207	91706	253595	127075
1991	239661	75381	238147	111168
1992	248208	82288	204150	113529
1993	261706	81800	170598	86316
1994	271068	82434	211815	76507
1995	253612	70598	184790	66313
1996	226101	81250	190666	53770
1997	203473	75220	133604	61377
1998	234487	68172	89202	58562
1999	171206	58777	122283	66515
2000	225250	61821	152460	67873
2001	208022	65210	116563	65784
2002	192385	60904	101257	55869
2003	193631	68544	93512	64298
2004	210896	72088	130811	62178
2005	178513	83127	124135	59824
2006	172654	73814	147977	58762
2007	187669	49925	73033	63331
2008	185656	45222	74805	62540
2009	206000	47327	73720	75603
2010	158641	42097	81302	60951
2011	226768	49460	85627	64173
2012	237568	61019	96531	75883
2013	210147	58223	120260	80506
2014	230317	75614	173200	72971
2015	230305	79327	178991	67461
2016	241519	72487	183958	66229
2017	236702	69037	68349	59924
2018	227879	68641	63347	52768
2019	219139	71556	60085	52767
2020	164275	45397	42612	36247
2021	244632	67558	54899	59093
2022	213069	62860	50417	41449
2023	189400	63701	59039	37950

Table 24: Yellowtail snapper number of fish sampled by subregion.

year	SW_FL	Keys	SE_FL	NE_FL
1976				18
1977				18
1978		95	246	16
1979		349	469	4
1980		655	319	2
1981		1101	641	27
1982		2010	425	53
1983		1838	926	70
1984		1953	964	20
1985		1804	896	44
1986	50	2120	1002	49
1987	31	1851	973	64
1988	69	1115	482	37
1989	36	1511	811	26
1990	10	1117	228	66
1991	6	1339	346	65
1992	39	892	313	108
1993		1571	356	85
1994	1	1755	494	42
1995	1	1254	396	34
1996	9	1466	22	10
1997	1	1595	816	14
1998	1	1398	864	22
1999	9	1034	548	51
2000	3	1001	556	23
2001	1	901	514	15
2002	6	1002	672	73
2003	2	1320	1303	32
2004	2	814	1503	7
2005	17	861	1535	12
2006	77	841	1780	3
2007	3	904	2292	31
2008	2	1129	916	59
2009	10	1027	654	47
2010		809	535	9
2011	7	1235	737	21
2012	2	2987	478	19
2013	16	3125	583	122
2014	32	2662	777	121
2015	21	3616	623	82
2016	71	3974	738	27
2017	35	2982	454	28
2018	15	2667	383	16
2019	96	2622	372	37
2020	2	571	46	6
2021	68		91	
2022	126	2011	196	8
2023	204	1847	1142	10

Table 25: Yellowtail snapper number of fish sampled by region.

year	East	West
1976	18	
1977	18	
1978	262	95
1979	473	349
1980	321	655
1981	668	1101
1982	478	2010
1983	996	1838
1984	984	1953
1985	940	1804
1986	1051	2171
1987	1037	1882
1988	519	1184
1989	837	1547
1990	294	1127
1991	411	1345
1992	421	931
1993	441	1572
1994	536	1756
1995	430	1255
1996	32	1478
1997	830	1596
1998	886	1399
1999	599	1043
2000	579	1004
2001	529	902
2002	745	1008
2003	1335	1322
2004	1510	816
2005	1547	878
2006	1783	918
2007	2323	907
2008	975	1131
2009	701	1038
2010	544	809
2011	758	1242
2012	497	2989
2013	705	3141
2014	898	2694
2015	705	3637
2016	765	4045
2017	482	3017
2018	399	2682
2019	409	2718
2020	52	573
2021	91	68
2022	204	2137
2023	1152	2051

Table 26: Yellowtail snapper number of trips sampled by subregion.

year	SW_FL	Keys	SE_FL	NE_FL
1976				8
1977				11
1978		18	65	15
1979		42	122	3
1980		73	120	1
1981		186	145	13
1982		269	96	26
1983		287	221	34
1984		286	250	20
1985		291	240	26
1986	26	285	247	31
1987	18	256	185	37
1988	39	170	125	27
1989	15	209	167	9
1990	7	175	54	33
1991	5	168	84	24
1992	9	126	82	32
1993		212	91	39
1994	1	203	77	13
1995	1	196	92	16
1996	3	237	6	8
1997	1	247	169	10
1998	1	242	177	11
1999	2	225	95	31
2000	1	234	103	9
2001	1	211	104	6
2002	4	225	97	29
2003	2	256	189	15
2004	1	209	214	6
2005	6	190	186	6
2006	10	186	166	3
2007	3	178	235	4
2008	2	187	122	17
2009	6	205	91	27
2010		182	79	7
2011	2	175	119	9
2012	2	287	106	10
2013	6	244	107	31
2014	5	231	117	46
2015	7	279	121	27
2016	8	301	139	18
2017	8	226	65	17
2018	6	214	56	9
2019	13	244	50	27
2020	1	61	10	4
2021	10		24	
2022	22	192	46	4
2023	39	194	189	6

Table 27: Yellowtail snapper number of trips sampled by region.

year	East	West
1976	8	
1977	11	
1978	80	18
1979	125	42
1980	121	73
1981	158	186
1982	122	269
1983	255	287
1984	270	286
1985	266	291
1986	278	312
1987	222	274
1988	152	209
1989	176	224
1990	87	182
1991	108	173
1992	114	135
1993	130	213
1994	90	204
1995	108	197
1996	14	241
1997	179	248
1998	188	243
1999	126	227
2000	112	235
2001	110	212
2002	126	229
2003	204	258
2004	220	210
2005	192	196
2006	169	196
2007	239	181
2008	139	189
2009	118	212
2010	86	182
2011	128	177
2012	116	289
2013	138	250
2014	163	236
2015	148	286
2016	157	309
2017	82	234
2018	65	220
2019	77	257
2020	14	62
2021	24	10
2022	50	214
2023	195	233

Table 28: Yellowtail snapper mean total length in mm by subregion.

year	SW_FL	Keys	SE_FL	NE_FL
1976				380
1977				478
1978		398	470	421
1979		413	418	508
1980		401	405	362
1981		370	412	377
1982		391	417	376
1983		365	412	374
1984		369	399	394
1985		381	385	355
1986	380	388	391	369
1987	329	393	357	342
1988	326	384	371	362
1989	377	397	387	352
1990	415	412	368	344
1991	352	406	360	348
1992	408	399	355	381
1993		421	371	398
1994	350	397	365	355
1995	525	364	391	331
1996	374	366	386	329
1997	297	363	380	350
1998	307	359	380	376
1999	271	355	382	380
2000	337	349	369	351
2001	291	356	372	347
2002	341	355	390	390
2003	486	348	380	370
2004	424	343	358	329
2005	381	346	370	343
2006	381	348	364	334
2007	395	341	368	328
2008	374	351	368	360
2009	407	342	364	352
2010		347	361	334
2011	505	348	372	337
2012	502	370	382	307
2013	402	363	366	314
2014	462	358	366	345
2015	423	359	362	341
2016	404	355	362	401
2017	447	363	344	327
2018	417	359	345	329
2019	417	341	395	349
2020	382	361	341	316
2021	403		395	
2022	441	334	356	314
2023	391	330	352	341

Table 29: Yellowtail snapper total length CV in mm by subregion.

year	SW_FL	Keys	SE_FL	NE_FL
1976				0.18
1977				0.19
1978		0.31	0.17	0.13
1979		0.24	0.21	0.14
1980		0.23	0.21	0.19
1981		0.24	0.17	0.22
1982		0.20	0.15	0.24
1983		0.20	0.17	0.21
1984		0.19	0.18	0.16
1985		0.19	0.16	0.22
1986	0.19	0.18	0.18	0.36
1987	0.13	0.18	0.15	0.20
1988	0.16	0.19	0.15	0.19
1989	0.14	0.17	0.16	0.13
1990	0.15	0.35	0.12	0.12
1991	0.09	0.21	0.13	0.14
1992	0.19	0.21	0.14	0.16
1993		0.87	0.13	0.19
1994		0.77	0.13	0.08
1995		0.14	0.11	0.27
1996	0.16	0.15	0.08	0.18
1997		0.16	0.14	0.17
1998		0.71	0.16	0.14
1999	0.09	0.13	0.13	0.15
2000	0.08	0.12	0.13	0.14
2001		0.12	0.13	0.15
2002	0.12	0.23	0.58	0.13
2003	0.49	0.10	0.14	0.13
2004	0.07	0.12	0.12	0.07
2005	0.20	0.12	0.12	0.11
2006	0.17	0.11	0.14	0.08
2007	0.07	0.11	0.12	0.09
2008	0.14	0.13	0.13	0.12
2009	0.18	0.12	0.14	0.13
2010		0.14	0.13	0.16
2011	0.16	0.12	0.13	0.36
2012	0.11	0.15	0.13	0.08
2013	0.29	0.13	0.13	0.07
2014	0.22	0.14	0.12	0.12
2015	0.29	0.13	0.13	0.09
2016	0.11	0.13	0.12	0.30
2017	0.12	0.14	0.13	0.07
2018	0.11	0.12	0.14	0.13
2019	0.16	0.12	0.29	0.12
2020	0.23	0.15	0.14	0.04
2021	0.12		0.16	
2022	0.18	0.11	0.13	0.05
2023	0.20	0.10	0.11	0.05

Table 30: Yellowtail snapper mean weight (g) by subregion.

year	SW_FL	Keys	SE_FL	NE_FL
1976				623
1977				1188
1978		689	874	802
1979		727	804	1605
1980		679	695	450
1981		574	726	477
1982		608	719	498
1983		485	666	571
1984		486	661	637
1985		535	607	499
1986	617	559	684	466
1987	399	593	511	454
1988	354	568	583	569
1989	531	615	627	453
1990	707	681	524	342
1991	444	653	452	375
1992	629	631	465	524
1993		589	520	553
1994	670	515	503	337
1995	1200	442	549	569
1996	597	458	468	351
1997	280	450	608	453
1998	280	438	586	476
1999	300	404	543	594
2000	633	384	477	461
2001	260	417	486	476
2002	393	381	542	630
2003	1425	378	512	468
2004	665	369	428	347
2005	528	363	472	418
2006	506	363	457	330
2007	550	346	452	308
2008	490	381	460	432
2009	642	382	459	481
2010		376	442	448
2011	1111	378	484	446
2012	1205	463	535	344
2013	690	435	467	344
2014	973	434	457	438
2015	779	428	446	373
2016	589	433	449	797
2017	819	455	391	331
2018	725	432	402	386
2019	711	371	470	376
2020	420	436	367	278
2021	734		623	
2022	756	347	451	269
2023	597	338	393	302

Table 31: Yellowtail snapper weight CV in g by subregion.

year	SW_FL	Keys	SE_FL	NE_FL
1976				0.61
1977				0.52
1978		0.90	0.46	0.52
1979		0.68	0.70	0.46
1980		0.63	0.74	0.47
1981		0.80	0.44	1.01
1982		0.63	0.47	0.76
1983		0.62	0.51	0.84
1984		0.65	0.52	0.55
1985		0.60	0.43	0.80
1986	0.83	0.57	0.49	0.72
1987	0.33	0.59	0.47	0.62
1988	0.31	0.72	0.63	0.71
1989	0.48	0.72	0.46	0.47
1990	0.49	0.60	0.36	0.32
1991	0.28	0.68	0.41	0.44
1992	0.53	0.83	0.47	0.52
1993		0.74	0.41	0.59
1994		0.59	0.42	0.33
1995		0.50	0.39	0.34
1996	0.53	0.46	0.21	0.48
1997		0.59	0.51	0.45
1998		0.43	0.52	0.40
1999	0.11	0.50	0.43	0.57
2000	0.20	0.42	0.41	0.40
2001		0.42	0.39	0.75
2002	0.29	0.36	0.41	0.44
2003	1.11	0.33	0.39	0.42
2004	0.14	0.43	0.40	0.35
2005	0.75	0.38	0.38	0.38
2006	0.58	0.38	0.40	0.30
2007	0.25	0.40	0.36	0.26
2008	0.43	0.49	0.41	0.51
2009	0.46	2.46	0.43	0.54
2010		0.52	0.40	0.58
2011	0.44	0.38	0.46	1.26
2012	0.36	0.50	0.61	0.28
2013	0.86	0.43	0.47	0.25
2014	0.72	0.45	0.37	0.36
2015	0.74	0.40	0.38	0.31
2016	0.32	0.43	0.36	1.12
2017	0.32	0.58	0.37	0.31
2018	0.34	0.41	0.42	0.42
2019	0.48	0.44	0.52	0.48
2020	0.74	0.47	0.41	0.32
2021	0.94		0.43	
2022	0.49	0.45	0.79	0.13
2023	0.66	0.44	0.36	0.13

Table 32: Yellowtail snapper mean total length in mm by region.

year	East	West
1976	380	
1977	478	
1978	467	398
1979	418	413
1980	404	401
1981	411	370
1982	412	391
1983	409	365
1984	399	369
1985	384	381
1986	390	388
1987	356	392
1988	370	380
1989	386	396
1990	362	412
1991	358	406
1992	362	399
1993	376	421
1994	364	397
1995	386	364
1996	368	366
1997	380	363
1998	380	359
1999	382	355
2000	368	349
2001	371	356
2002	390	355
2003	380	348
2004	358	344
2005	370	347
2006	364	351
2007	367	341
2008	367	351
2009	363	343
2010	361	347
2011	371	349
2012	379	370
2013	357	363
2014	363	359
2015	360	360
2016	363	356
2017	343	364
2018	344	359
2019	391	344
2020	338	361
2021	395	403
2022	355	341
2023	352	336

Table 33: Yellowtail snapper total length CV in mm by region.

year	East	West
1976	0.18	
1977	0.19	
1978	0.17	0.31
1979	0.21	0.24
1980	0.21	0.23
1981	0.17	0.24
1982	0.17	0.20
1983	0.18	0.20
1984	0.18	0.19
1985	0.17	0.19
1986	0.19	0.18
1987	0.16	0.18
1988	0.15	0.20
1989	0.16	0.17
1990	0.12	0.35
1991	0.13	0.21
1992	0.15	0.20
1993	0.15	0.87
1994	0.13	0.77
1995	0.14	0.14
1996	0.13	0.15
1997	0.14	0.16
1998	0.16	0.71
1999	0.13	0.14
2000	0.13	0.12
2001	0.13	0.12
2002	0.56	0.23
2003	0.14	0.10
2004	0.12	0.12
2005	0.12	0.12
2006	0.14	0.12
2007	0.12	0.11
2008	0.13	0.13
2009	0.14	0.12
2010	0.13	0.14
2011	0.14	0.12
2012	0.14	0.15
2013	0.14	0.13
2014	0.12	0.14
2015	0.13	0.13
2016	0.13	0.13
2017	0.12	0.14
2018	0.14	0.12
2019	0.28	0.13
2020	0.14	0.15
2021	0.16	0.12
2022	0.13	0.14
2023	0.11	0.13

Table 34: Yellowtail snapper mean weight (g) by region.

year	East	West
1976	623	
1977	1188	
1978	870	689
1979	810	727
1980	694	679
1981	715	574
1982	694	608
1983	659	485
1984	660	486
1985	602	535
1986	673	561
1987	508	590
1988	582	556
1989	621	613
1990	479	681
1991	442	653
1992	480	631
1993	528	589
1994	491	515
1995	550	442
1996	431	458
1997	606	450
1998	584	438
1999	547	403
2000	476	384
2001	485	417
2002	550	381
2003	511	379
2004	427	370
2005	472	367
2006	457	375
2007	451	347
2008	458	381
2009	460	385
2010	442	376
2011	483	383
2012	527	463
2013	443	436
2014	453	440
2015	437	430
2016	463	437
2017	387	459
2018	401	434
2019	459	384
2020	355	436
2021	623	734
2022	442	374
2023	392	368

Table 35: Yellowtail snapper weight CV in g by region.

year	East	West
1976	0.61	
1977	0.52	
1978	0.46	0.90
1979	0.70	0.68
1980	0.74	0.63
1981	0.47	0.80
1982	0.50	0.63
1983	0.53	0.62
1984	0.52	0.65
1985	0.45	0.60
1986	0.50	0.58
1987	0.48	0.59
1988	0.64	0.73
1989	0.46	0.71
1990	0.39	0.60
1991	0.42	0.68
1992	0.49	0.82
1993	0.46	0.74
1994	0.43	0.59
1995	0.39	0.50
1996	0.31	0.46
1997	0.51	0.59
1998	0.52	0.43
1999	0.45	0.50
2000	0.41	0.42
2001	0.40	0.42
2002	0.42	0.36
2003	0.39	0.37
2004	0.40	0.43
2005	0.38	0.41
2006	0.40	0.44
2007	0.36	0.40
2008	0.41	0.49
2009	0.43	2.43
2010	0.40	0.52
2011	0.50	0.41
2012	0.62	0.50
2013	0.46	0.44
2014	0.36	0.49
2015	0.38	0.41
2016	0.53	0.43
2017	0.37	0.58
2018	0.42	0.41
2019	0.52	0.49
2020	0.41	0.47
2021	0.43	0.94
2022	0.79	0.55
2023	0.36	0.57

5 Figures

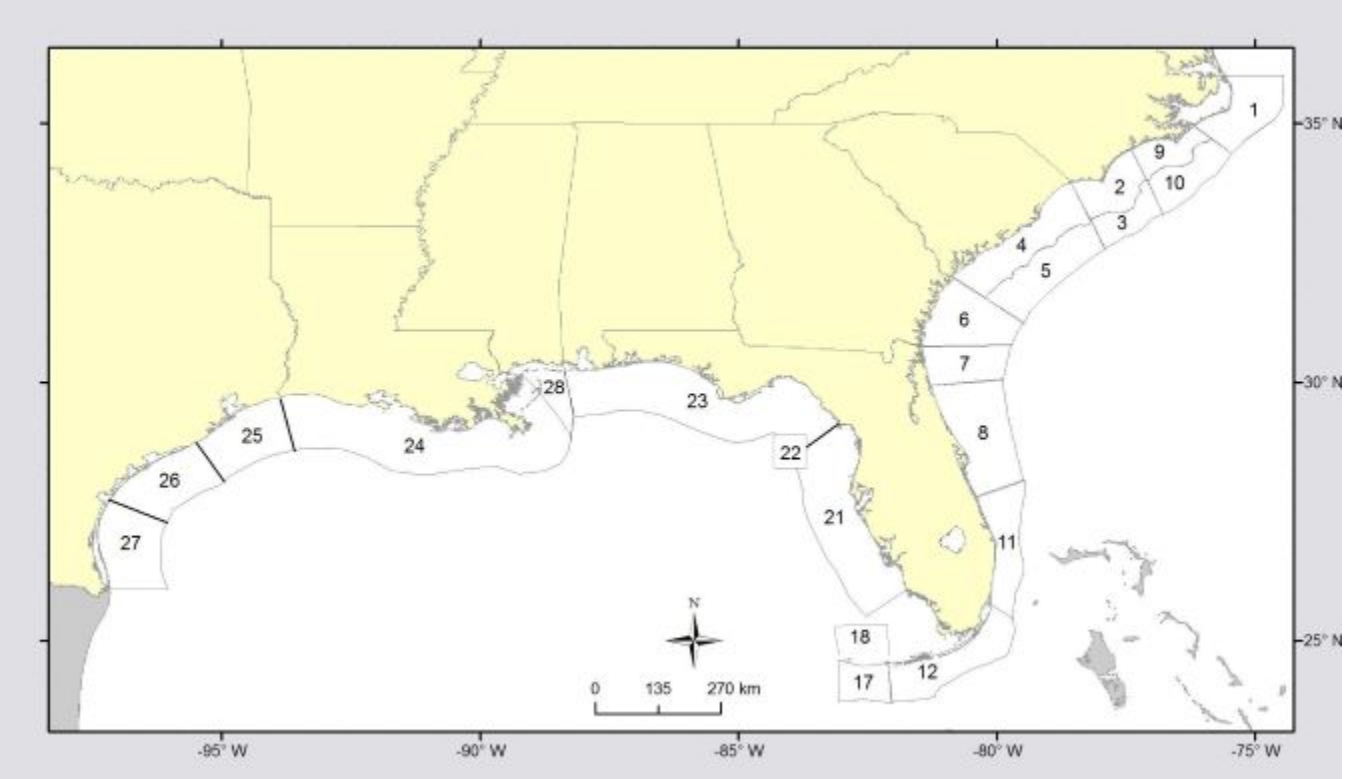

Figure 1: Headboat sampling areas prior to 2013.

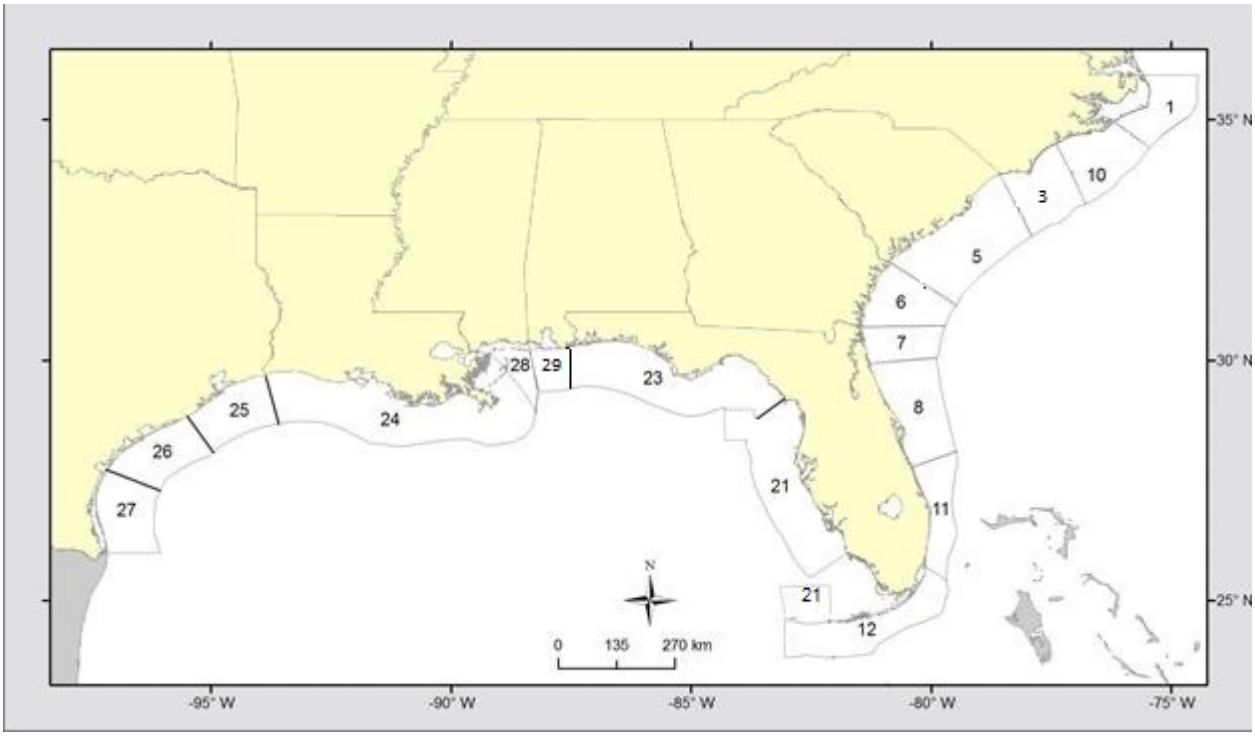

Figure 2: Headboat sampling areas 2013 - present.

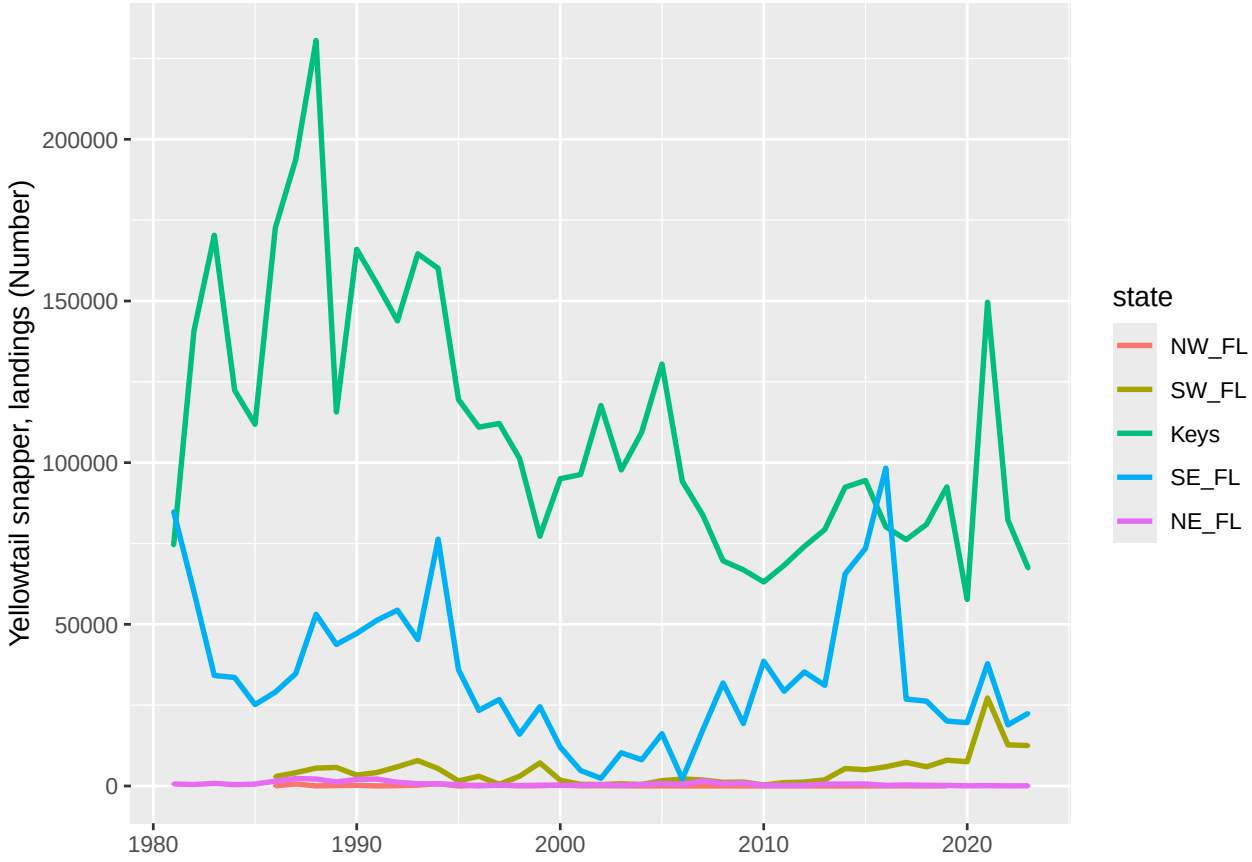

Figure 3: Yellowtail snapper landings in number

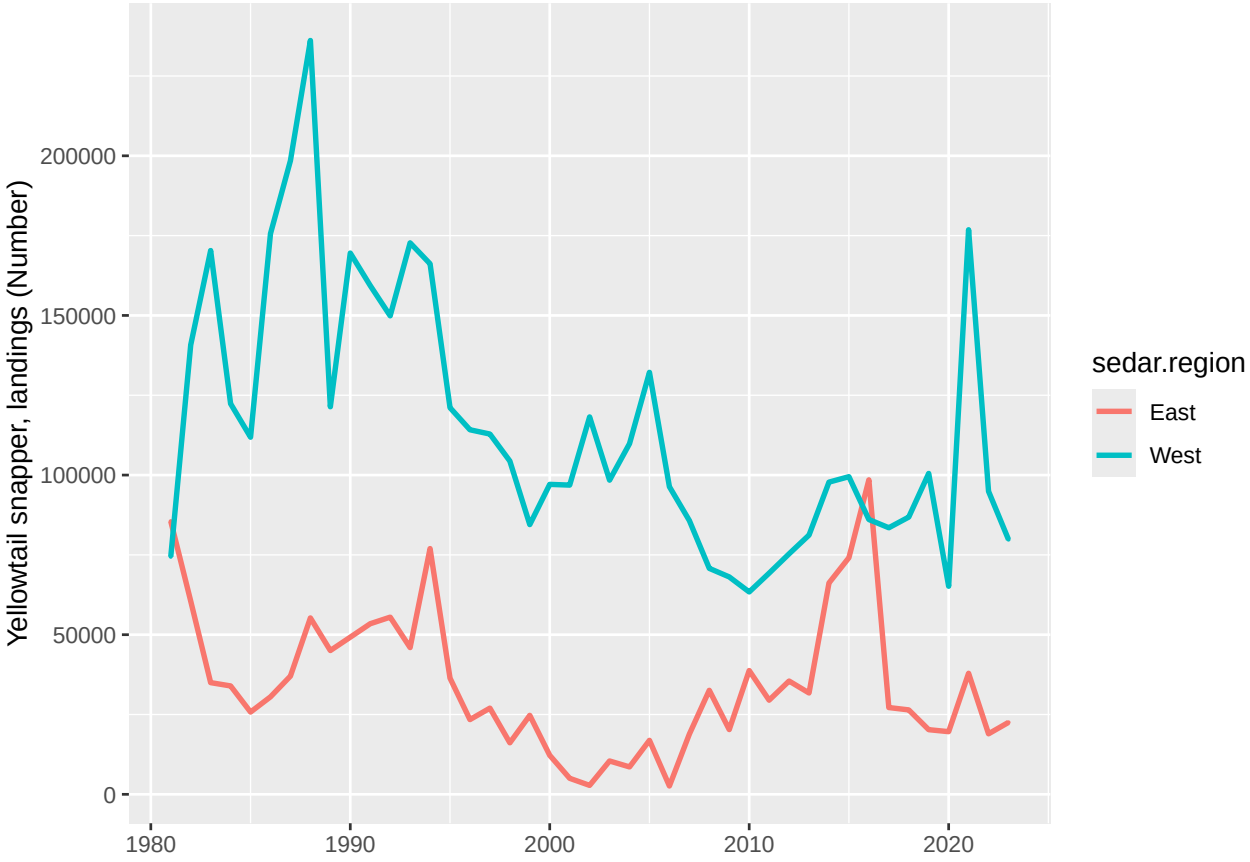

Figure 4: Yellowtail snapper landings in number by region

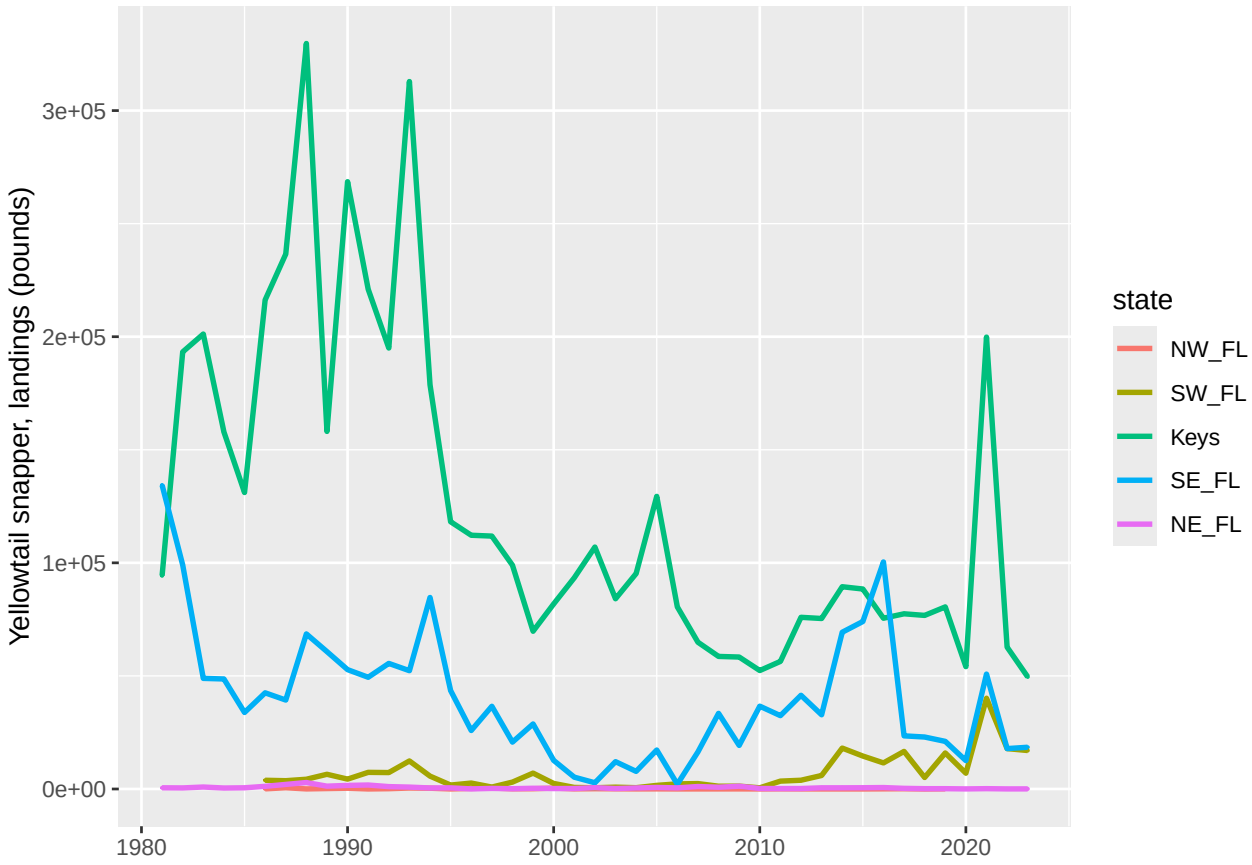

Figure 5: Yellowtail snapper landings in pounds.

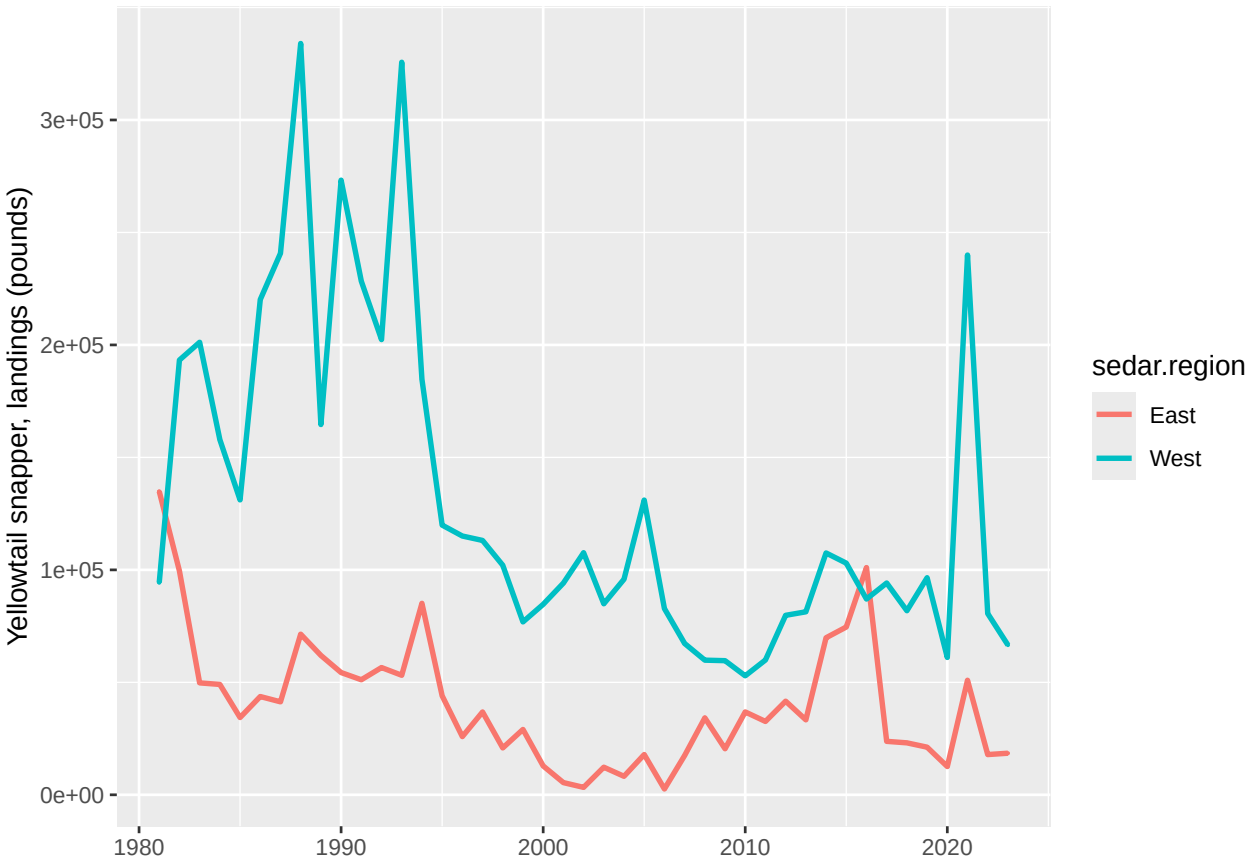

Figure 6: Yellowtail snapper landings in pounds by region.

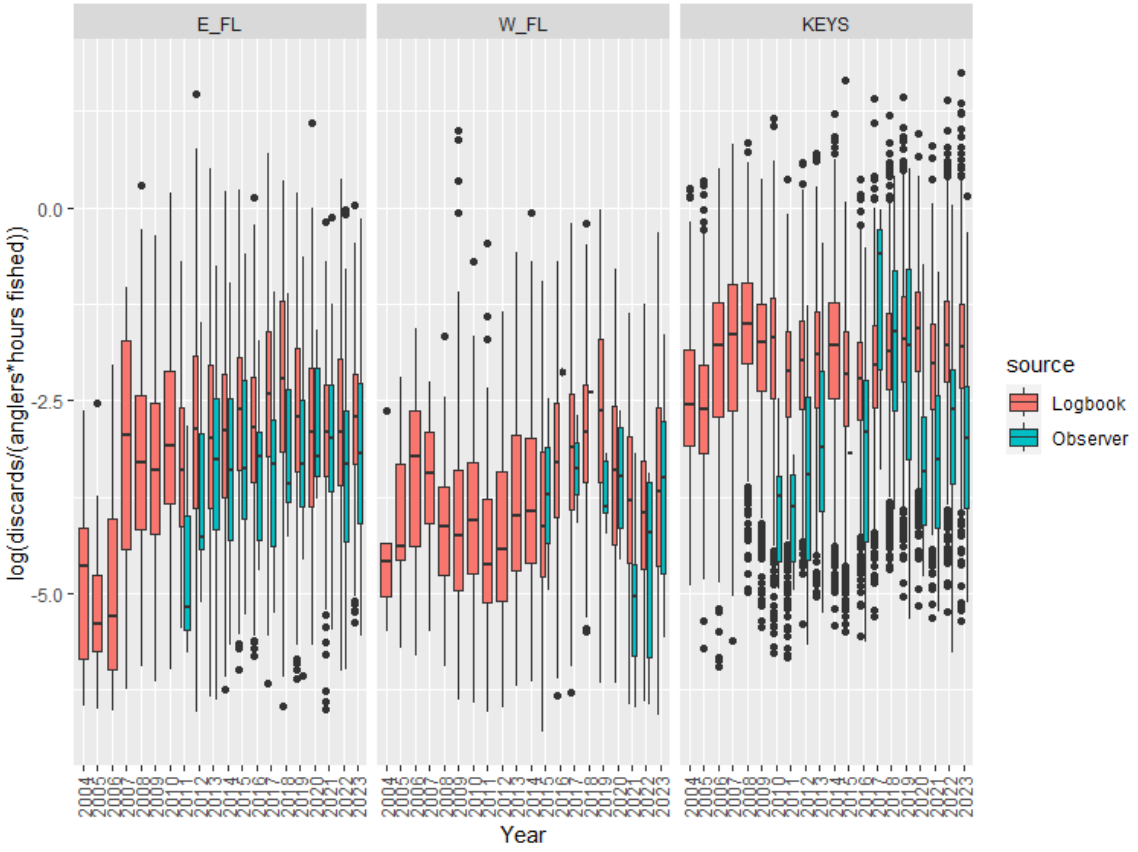

Figure 7: Discard rate comparison by subregion (E_FL combines NE_FL and SE_FL, W_FL combines NW_FL and SW_FL) from at-sea observer data and reported discards from headboat logbooks.

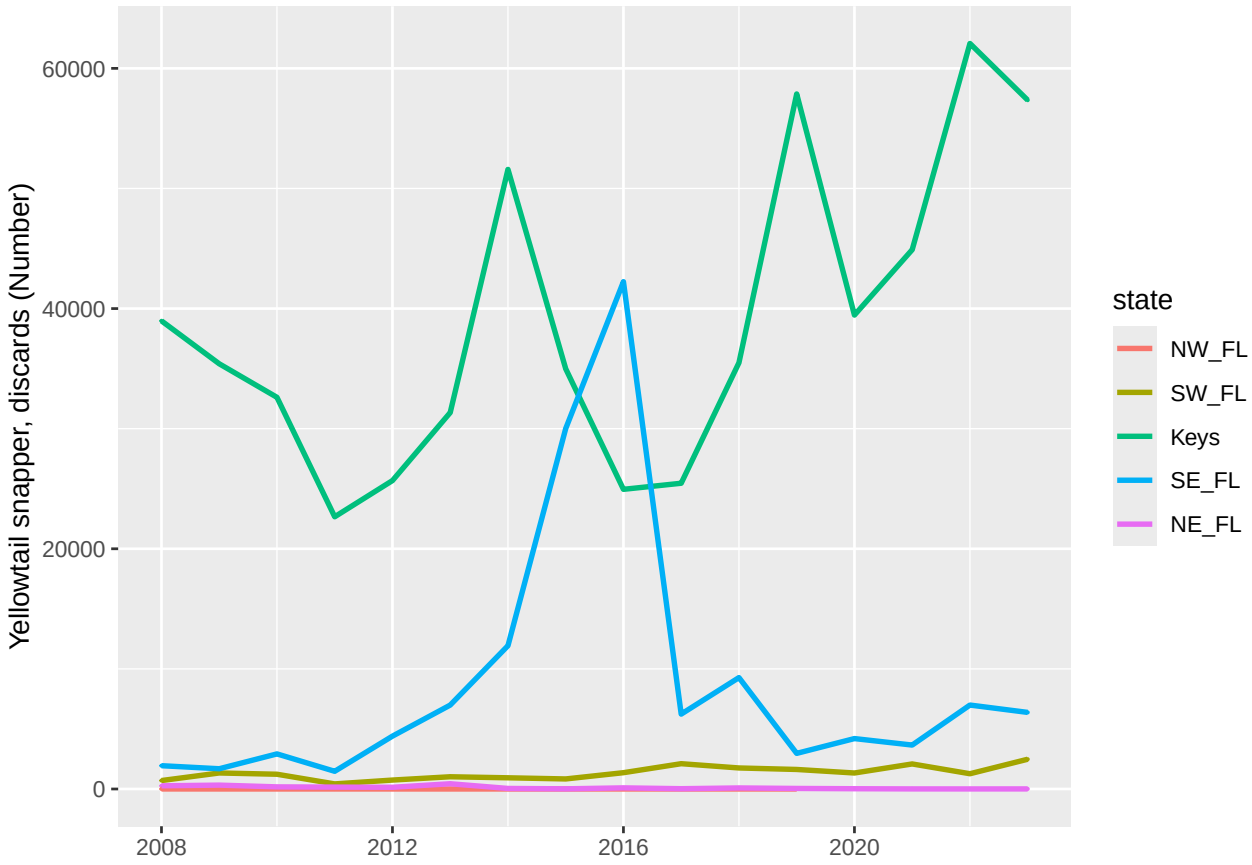

Figure 8: Yellowtail snapper discards in number

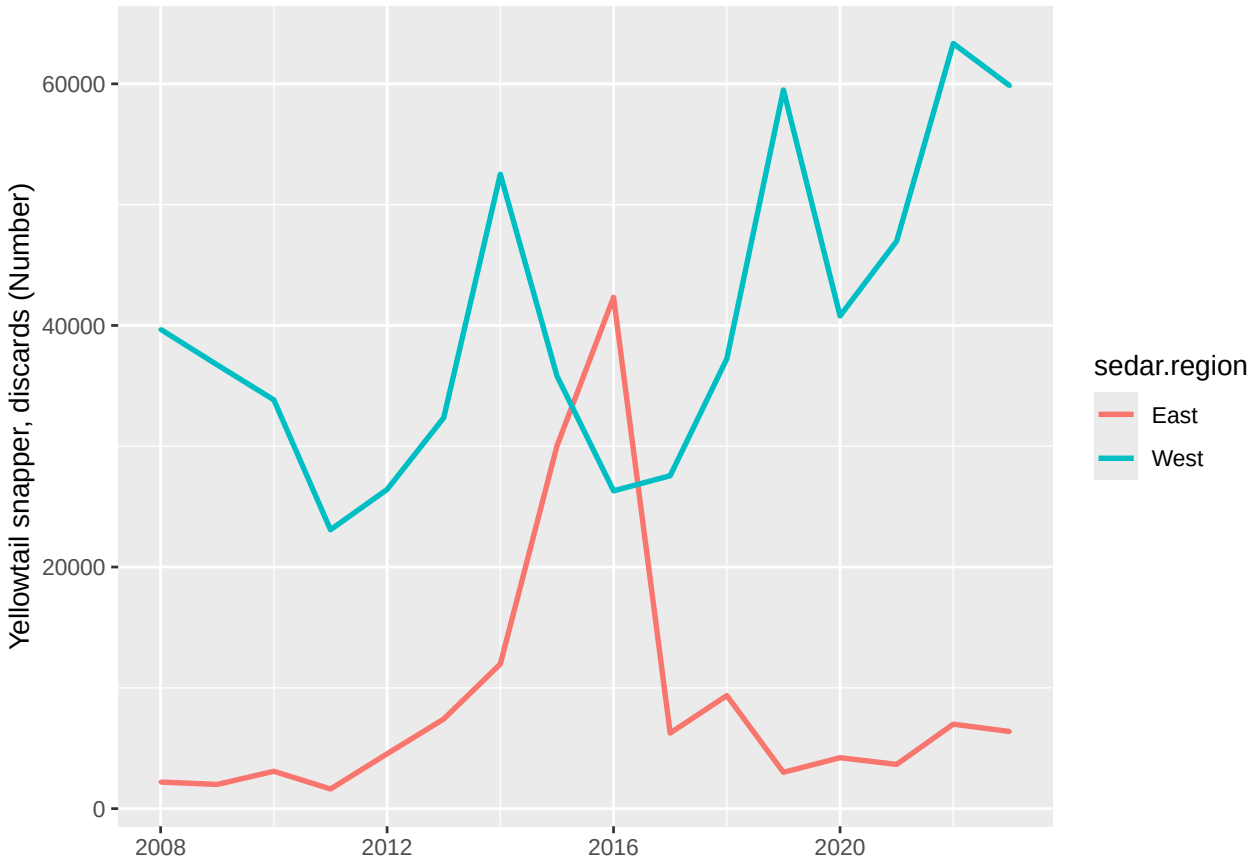

Figure 9: Yellowtail snapper discards in number by region

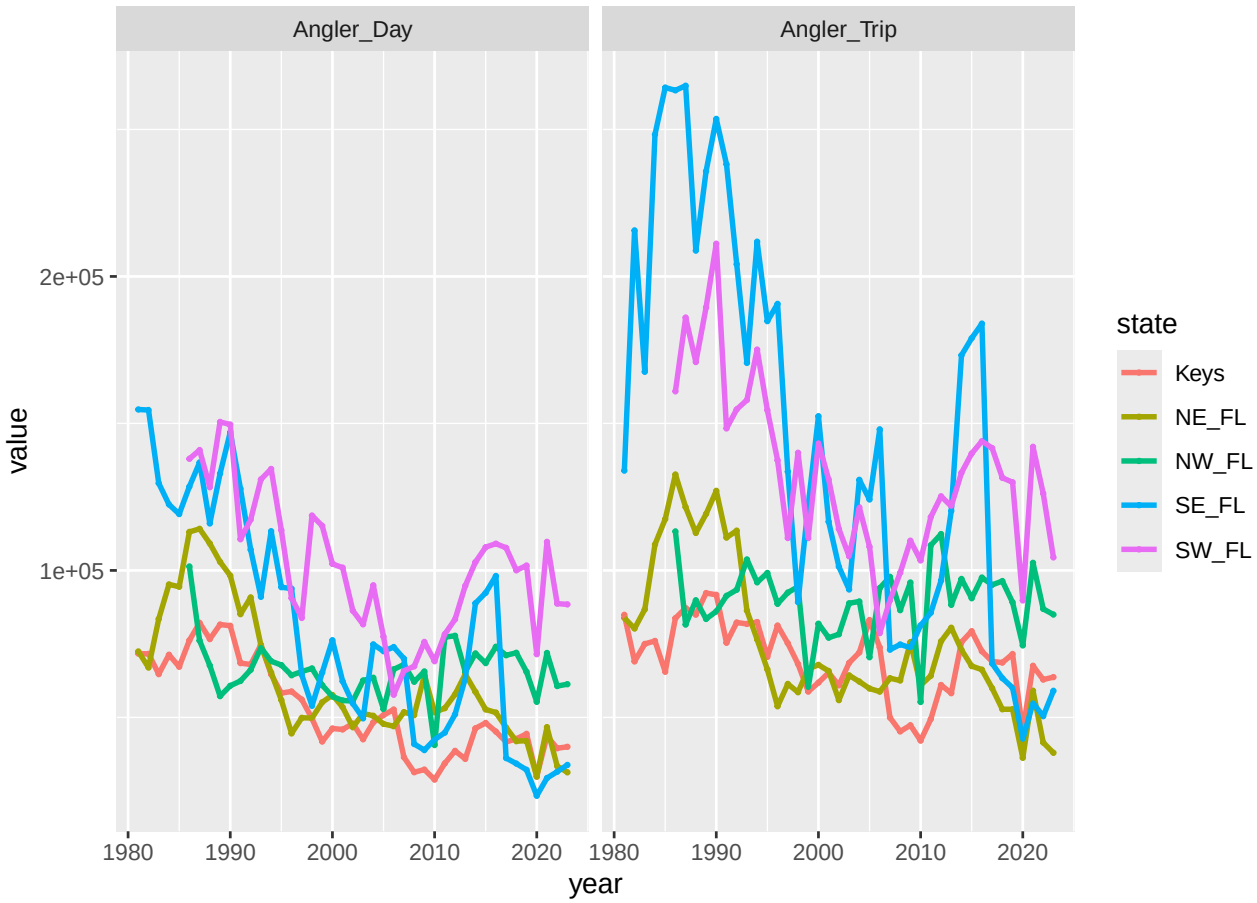

Figure 10: SRHS total estimated angler days and angler trips by state.

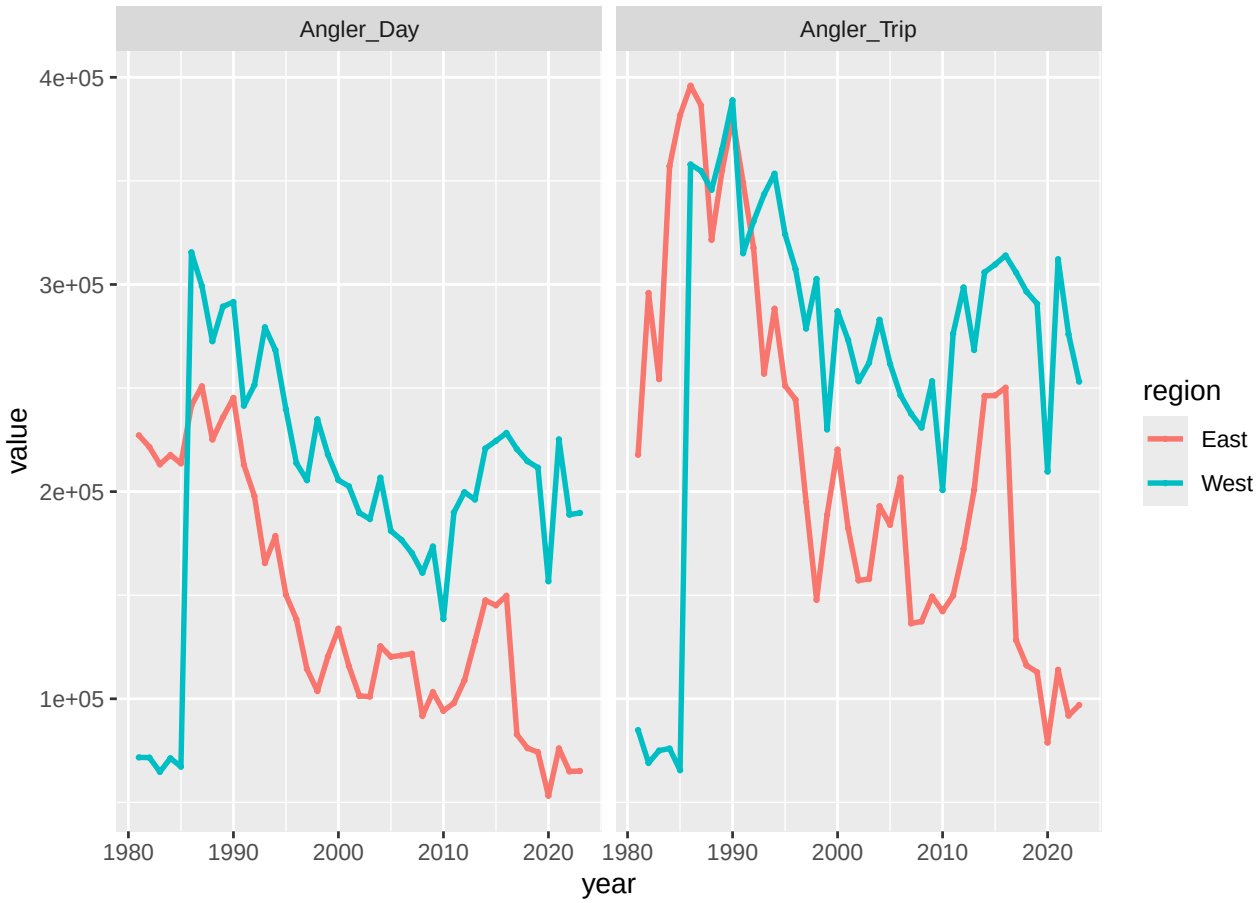

Figure 11: SRHS total estimated angler days and angler trips by region. East represents the Atlantic from NC to FL, West represents the Gulf of Mexico and the Keys (only the Keys prior to 1986 when SRHS expanded to the Gulf of Mexico).

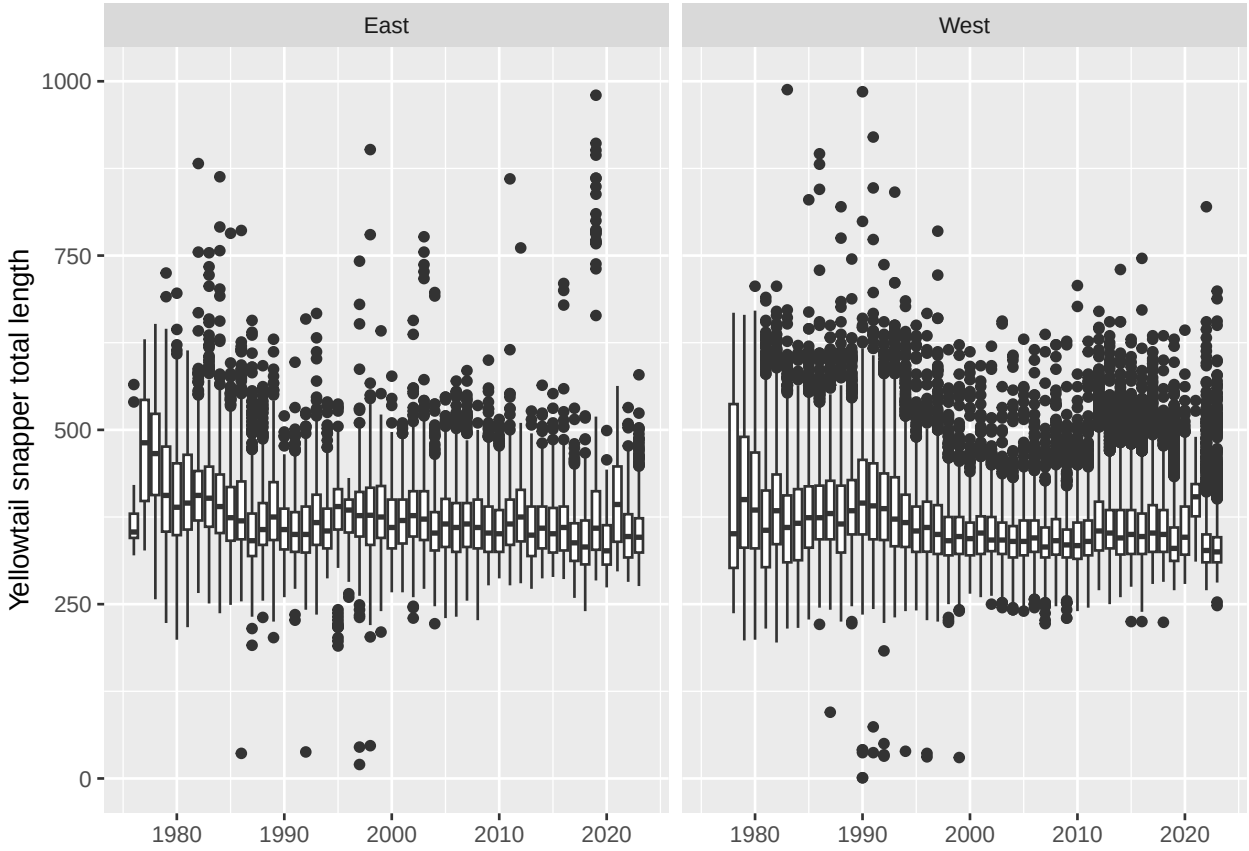

Figure 12: Yellowtail snapper total length by SEDAR region. East represents the Atlantic from NC to FL, West represents the Gulf of Mexico and the Keys.

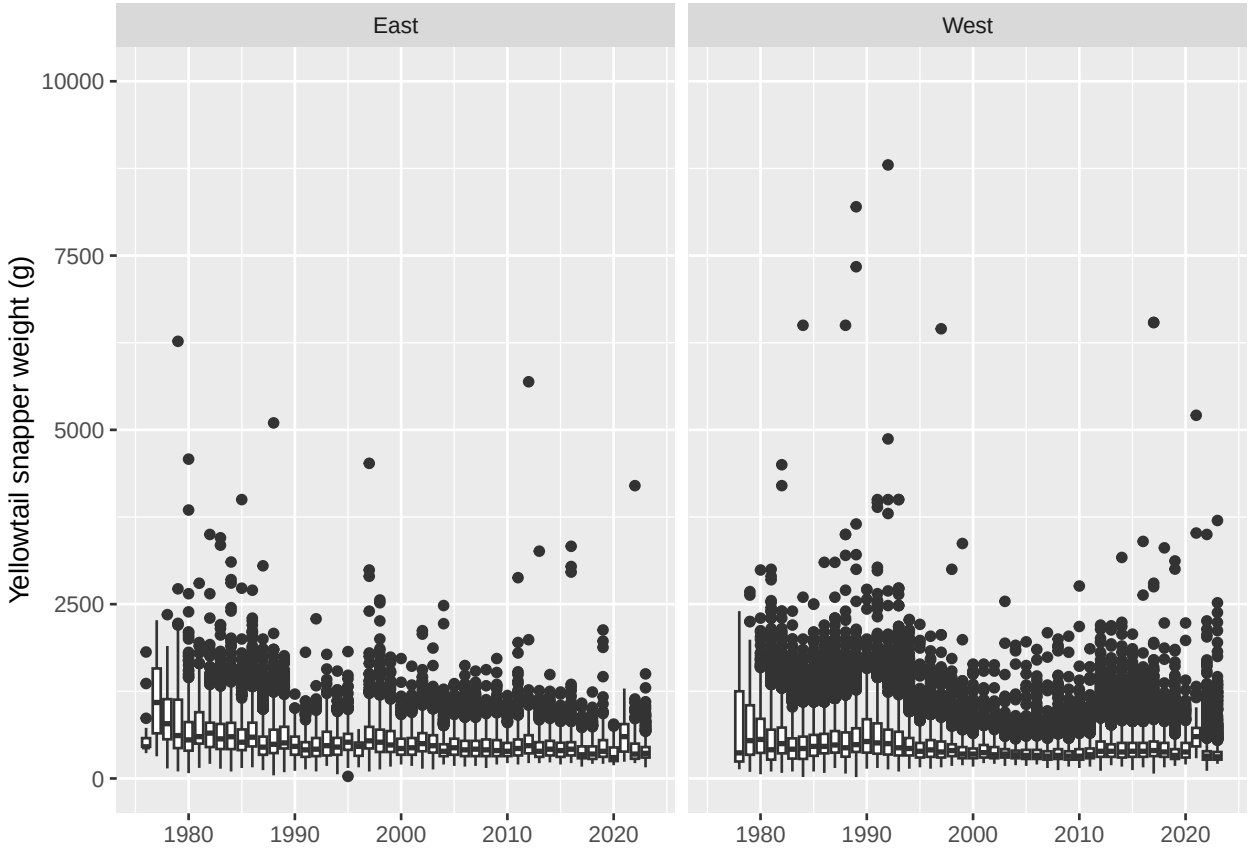

Figure 13: Yellowtail snapper weight (g) by SEDAR region. East represents the Atlantic from NC to FL, West represents the Gulf of Mexico and the Keys.

6 Files written to S drive

1. YTS_rec_effSRHS_8123_20240731C.xlsx

- metadata - description of information in workbook
- angler days by state
- angler trips by state
- angler days by region
- angler trips by region
- angler days by year
- angler trips by year
- raw_effort - angler days and angler trips by year and state

2. YTS_rec_catSRHS_8123_20240731C.xlsx

- metadata - description of information in workbook
- land_region_n - landings by region in numbers of fish (West/East)
- land_region_w_kg_whole - landings by region (West/East)
- land_region_w_lbs - landings in pounds
- disc_region_n - discards in numbers of fish (West/East)
- land_state_n - landings by state in numbers of fish
- land_state_w_kg_whole - landings by state
- land_state_w_lbs - landings in pounds
- disc_state_n - discards in numbers of fish
- raw_land_data - landings in numbers and weight (kg) by year and headboat area
- raw_disc_data - discards in number by year and headboat area
- conf_state_land - number of unique vessels contributing logbooks by state
- conf_region_land - number of unique vessels contributing logbooks by region (West/East)
- conf_year_land - number of unique vessels contributing logbooks by year

3. YTS_rec_cvSRHS_8123_20240731C.xlsx

- metadata - description of information in workbook
- cv_region - unweighted proxy CVs by region
- cv_region_wgt_n - proxy CVs by region weighted by state landings in number
- cv_region_wgt_w - proxy CVs by region weighted by state landings in weight
- cv_annual - unweighted proxy CVs by year
- cv_annual_wgt_n - proxy CVs by year weighted by regional (East/West) landings in number
- cv_annual_wgt_w - proxy CVs by year weighted by regional (East/West) landings in weight
- cv_state - unweighted proxy CVs by state

4. YTS_rec_sizeSRHS_7623_20240731C.xlsx

- metadata - description of information in workbook
- LH_Template - SRHS data in SEDAR LH Template format, length_flag=1 represents records with fork length and total length equal.
- n_fish_region - fish measured by region (East/West)
- n_trips_region - number of trips sampled by region (East/West)
- mean_tl_region - mean total length by region (East/West)
- cv_tl_region - cv of total length by region
- mean_wt_region - mean weight (g) by region
- cv_wt_region - cv of weight (g) by region

- n_fish_state - fish measured by state
- n_trips_state - number of trips sampled by state
- mean_tl_state - mean total length by state
- cv_tl_state - cv of total length by state
- mean_wt_state - mean weight (g) by state
- cv_wt_state - cv of weight (g) by state
- annual_summary - number of fish measured, number of trips sampled, and mean total length by year

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