

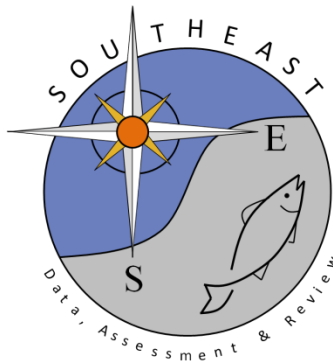
# Headboat Data for Red Snapper in the Southeast US Atlantic

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## 1 Survey Description

The Southeast Region Headboat Survey (SRHS) estimates landings and effort for headboats in the southeast U.S. Atlantic and Gulf of America. 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 America in

1986 and extends from Naples, FL to South Padre Island, TX. The headboat survey generally includes 70-80 vessels participating in each region annually (Table 1). Headboat data are considered confidential and cannot be publicly distributed if less than three vessels contribute to the data product in any particular strata.

The SRHS implemented electronic logbook reporting in the South Atlantic and Gulf of America as of Jan 1, 2013 which gave headboat operators 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 for regional headboat data and should be used in stock assessments. The decision should translate to the Gulf of America 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 America. A few other areas were collapsed in the Florida Keys and west Florida (Figures 1 and 2). For this assessment, state is used to define finer scale regions rather than actual states as advised by the assessment staff. The assignment of SRHS areas to states and regions are below:

- Areas 1,2,3,9,10 - NC
- Areas 4,5 - SC
- Areas 6,7,8 - GNFL
- Areas 11,12,17 - SFL
- Areas 1,2,3,4,5,9,10 - North Region
- Areas 6,7,8,11,12,17 - South 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.

There are two stanzas for SRHS landings estimates for the Atlantic coast for red snapper. Both use the methods above with more standardized estimation methods and full spatial coverage starting in 1981. Prior to 1981, landings estimates for a small number of species and species groups were tabulated. North Carolina and South Carolina estimates start in 1972 and Georgia-North Florida estimates start in 1976. There are logbook reports from South Florida starting in 1978. However, no landings estimates were tabulated for South Florida prior to 1981. Red snapper were one of the species with landings estimates in the early stanza (1972-1980). The tabulated estimates indicated that small amounts of other Lutjanids were included in the red snapper estimates for 1972 - 1975. A separate category for “other snappers” was added in 1976.

## 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 discards descended and number vented. These can 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 America.

## 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

$$proxyCV = 1 - \frac{N}{n} + 0.05 \text{ (SEDAR 2022).}$$

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 state/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 collect these logbook trip reports and check for accuracy and completeness. Although reporting via the logbooks 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 from the Marine Recreational Information Program (MRIP) 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 count. 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 of red snapper in number for the early stanza (1972-1980) are in table 2. Landings estimates of “other snapper” start in 1976 and are in table 3. The full time series for all areas based on available data was accomplished by:

1. applying the ratio of red snapper to “other snapper” for 1976-1978 to the red snapper estimates from 1972-1975 to reduce the 1972-1975 landings that included “other snapper”
2. fill in the missing landings estimates for GNFL (1972-1975) by multiplying the (NC+SC) landings by the average ratio of GNFL/(NC+SC) from 1976-1978
3. fill in the missing landings estimates for SFL (1972-1980) by multiplying the (NC+SC+GNFL) landings by the average ratio of SFL/(NC+SC+GNFL) from 1981-1983

The 1972-1980 landings estimates in number with other snappers removed and GNFL imputed (1972-1975) and SFL imputed (1972-1980) are given in table 4 and figure 3.

Landings for the second stanza (1981-2024) in number are given by state (Table 5, Figure 3) and region (Table 6, Figure 6). Landings in pounds are shown by state (Table 7, Figure 7) and by region (Table 8, Figure 8). The primary area of red snapper landings is the Georgia-north Florida area (Tables 5 - 8). Red snapper headboat landings decreased dramatically in 2010 due to a restrictive closure that has continued until present in various forms.

### 3.2 Discards

Discards by state and region are primarily from the Georgia-north Florida area (Tables 9 - 10, Figures 9 - 10). 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 use of descending and venting devices was documented for 2023 and 2024. The electronic reporting application has the option to report the number of fish that were descended or vented (not exclusive). Vessel operators were not required to enter a value of zero for each species to minimize the reporting burden. A blank is assumed to be zero for this evaluation. The proportion of red snapper discards that were reported as descended was 0.32 and vented was 0.49. The annual proportion of descended red snapper increased from 2023 to 2024 (0.28 and 0.38 respectively). The proportion of vented red snapper also increased from 2023 to 2024 (0.38 and 0.54 respectively).

### 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 state, region, and annually are given in tables 11 - 13. For red snapper, regional and annual catch and discards can be released to the public. State (NC, SC, GNFL, SFL) landings and discards can be released with the exception of 2007 due to the small number of vessels reporting red snapper in south FLorida.

### 3.4 Uncertainty

Unweighted proxy CV estimates by state, region and overall are provided in tables 14 - 16. Regional proxy CV values weighted by state landings in number and weight are given in tables 17 and 18. Annual weighted proxy CV values weighted by regional landings in number and weight are provided in tables 19 and 20. The proxy CVs weighted by landings in number 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 21 - 22). The same trend is seen in the regional

effort estimates but more extreme in the South (Tables 23 - 24, Figure 14). The finer scale effort estimates by state show the pattern observed in effort is consistent across states with the exception of NC in the early years (Tables 25 - 26, Figure 13). 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 red snapper measured for natural total length in the headboat fleet by state and region are given in tables 27 - 28. The number of trips from which red snapper were measured are summarized in Tables 29 - 30. Mean total lengths (mm) and weight (g) and associated CVs for the headboat fishery are tabulated by state and region in Tables 31 - 38. Patterns in length and weight by year and region are shown in Figures 15 and 16. There are inadequate samples annually to meet the SEDAR best practice of 30 fish and 10 trips for length compositions for the years 2010, 2011, 2015, 2016, and 2022. Weighting the compositions for years after 2009 will be difficult to accomplish due to small sample size outside the Georgia-north Florida area.

## 4 Tables

Table 1: Number of vessels in the SRHS by year and region (Gulf - SW Florida to Texas, Atlantic - North Carolina to SE Florida).

| year | Atlantic | Gulf |
|------|----------|------|
| 1980 | 89       |      |
| 1981 | 92       |      |
| 1982 | 89       |      |
| 1983 | 86       |      |
| 1984 | 90       |      |
| 1985 | 89       |      |
| 1986 | 94       | 87   |
| 1987 | 94       | 79   |
| 1988 | 94       | 72   |
| 1989 | 95       | 95   |
| 1990 | 93       | 88   |
| 1991 | 94       | 80   |
| 1992 | 105      | 80   |
| 1993 | 95       | 81   |
| 1994 | 95       | 84   |
| 1995 | 89       | 82   |
| 1996 | 90       | 73   |
| 1997 | 92       | 70   |
| 1998 | 89       | 73   |
| 1999 | 86       | 69   |
| 2000 | 89       | 72   |
| 2001 | 84       | 72   |
| 2002 | 77       | 61   |
| 2003 | 68       | 65   |
| 2004 | 81       | 65   |
| 2005 | 76       | 74   |
| 2006 | 76       | 70   |
| 2007 | 78       | 69   |
| 2008 | 84       | 71   |
| 2009 | 82       | 76   |
| 2010 | 86       | 78   |
| 2011 | 77       | 73   |
| 2012 | 78       | 71   |
| 2013 | 76       | 68   |
| 2014 | 76       | 68   |
| 2015 | 73       | 68   |
| 2016 | 76       | 69   |
| 2017 | 66       | 71   |
| 2018 | 65       | 72   |
| 2019 | 65       | 72   |
| 2020 | 66       | 68   |
| 2021 | 62       | 70   |
| 2022 | 62       | 68   |
| 2023 | 61       | 68   |
| 2024 | 62       | 68   |

Table 2: Red snapper landings by state in number.

| year | NC   | SC   | GNFL  | Total |
|------|------|------|-------|-------|
| 1972 | 1222 | 965  |       |       |
| 1973 | 2367 | 1615 |       |       |
| 1974 | 1885 | 1511 |       |       |
| 1975 | 1351 | 3872 |       |       |
| 1976 | 2212 | 3546 | 59473 | 65231 |
| 1977 | 1049 | 1316 | 42110 | 44475 |
| 1978 | 959  | 1248 | 43228 | 45435 |
| 1979 | 804  | 668  | 30924 | 32396 |
| 1980 | 424  | 2893 | 17840 | 21157 |

Table 3: Landings of other snappers by state in number.

| year | NC  | SC  | GNFL | Total |
|------|-----|-----|------|-------|
| 1976 | 0   | 0   | 6270 | 6270  |
| 1977 | 0   | 0   | 3515 | 3515  |
| 1978 | 165 | 244 | 4760 | 5169  |
| 1979 | 320 | 56  | 5232 | 5608  |
| 1980 | 299 | 53  | 8960 | 9312  |

Table 4: Red snapper landings by state in number with other snappers removed and GNFL imputed (1972-1975) and SFL imputed (1972-1980).

| year | NC   | SC   | GNFL  | SFL  | Total |
|------|------|------|-------|------|-------|
| 1972 | 1114 | 880  | 31713 | 1315 | 35022 |
| 1973 | 2159 | 1473 | 57742 | 2394 | 63767 |
| 1974 | 1719 | 1378 | 49245 | 2041 | 54383 |
| 1975 | 1232 | 3531 | 75738 | 3140 | 83641 |
| 1976 | 2212 | 3546 | 59473 | 2544 | 67775 |
| 1977 | 1049 | 1316 | 42110 | 1735 | 46210 |
| 1978 | 959  | 1248 | 43228 | 1772 | 47207 |
| 1979 | 804  | 668  | 30924 | 1263 | 33659 |
| 1980 | 424  | 2893 | 17840 | 825  | 21982 |

Table 5: Red snapper landings by state in number. Confidential data are reported as 'conf'.

| year | NC   | SC   | GNFL  | SFL  | Total |
|------|------|------|-------|------|-------|
| 1981 | 1194 | 1371 | 32415 | 1051 | 36031 |
| 1982 | 747  | 1612 | 16412 | 782  | 19553 |
| 1983 | 416  | 1844 | 27124 | 1314 | 30698 |
| 1984 | 740  | 1841 | 27934 | 631  | 31146 |
| 1985 | 8426 | 2183 | 38072 | 1655 | 50336 |
| 1986 | 997  | 881  | 14286 | 461  | 16625 |
| 1987 | 5346 | 1934 | 17155 | 561  | 24996 |
| 1988 | 9555 | 5235 | 13589 | 8148 | 36527 |
| 1989 | 1134 | 6207 | 15114 | 998  | 23453 |
| 1990 | 525  | 3650 | 15422 | 1322 | 20919 |
| 1991 | 725  | 3290 | 9580  | 262  | 13857 |
| 1992 | 2306 | 1275 | 1310  | 410  | 5301  |
| 1993 | 1639 | 3623 | 1541  | 544  | 7347  |
| 1994 | 567  | 2454 | 3576  | 1628 | 8225  |
| 1995 | 3791 | 866  | 3634  | 535  | 8826  |
| 1996 | 335  | 2374 | 2683  | 151  | 5543  |
| 1997 | 1779 | 557  | 2794  | 640  | 5770  |
| 1998 | 445  | 696  | 3426  | 174  | 4741  |
| 1999 | 973  | 1749 | 3559  | 555  | 6836  |
| 2000 | 777  | 984  | 6463  | 213  | 8437  |
| 2001 | 1816 | 3878 | 6023  | 311  | 12028 |
| 2002 | 2637 | 4345 | 5722  | 227  | 12931 |
| 2003 | 399  | 1346 | 3910  | 51   | 5706  |
| 2004 | 1274 | 1672 | 7786  | 110  | 10842 |
| 2005 | 106  | 1004 | 6681  | 1116 | 8907  |
| 2006 | 33   | 303  | 5393  | 216  | 5945  |
| 2007 | conf | conf | conf  | conf | 6889  |
| 2008 | 162  | 1551 | 17028 | 202  | 18943 |
| 2009 | 263  | 373  | 20107 | 764  | 21507 |
| 2010 | 4    | 180  | 235   | 58   | 477   |
| 2011 | 9    | 4    | 12    | 1334 | 1359  |
| 2012 | 110  | 11   | 1558  | 448  | 2127  |
| 2013 | 53   | 13   | 1080  | 374  | 1520  |
| 2014 | 431  | 101  | 2285  | 135  | 2952  |
| 2015 | 6    | 35   | 198   | 511  | 750   |
| 2016 | 0    | 0    | 0     | 331  | 331   |
| 2017 | 170  | 73   | 1623  | 858  | 2724  |
| 2018 | 79   | 223  | 3811  | 322  | 4435  |
| 2019 | 150  | 276  | 2871  | 758  | 4055  |
| 2020 | 206  | 278  | 2285  | 455  | 3224  |
| 2021 | 194  | 306  | 1603  | 416  | 2519  |
| 2022 | 48   | 78   | 1124  | 343  | 1593  |
| 2023 | 162  | 368  | 883   | 471  | 1884  |
| 2024 | 6    | 3    | 592   | 430  | 1031  |

Table 6: Red snapper landings by region in number.

| year | North | South | Total |
|------|-------|-------|-------|
| 1981 | 2565  | 33466 | 36031 |
| 1982 | 2359  | 17194 | 19553 |
| 1983 | 2260  | 28438 | 30698 |
| 1984 | 2581  | 28565 | 31146 |
| 1985 | 10609 | 39727 | 50336 |
| 1986 | 1878  | 14747 | 16625 |
| 1987 | 7280  | 17716 | 24996 |
| 1988 | 14790 | 21737 | 36527 |
| 1989 | 7341  | 16112 | 23453 |
| 1990 | 4175  | 16744 | 20919 |
| 1991 | 4015  | 9842  | 13857 |
| 1992 | 3581  | 1720  | 5301  |
| 1993 | 5262  | 2085  | 7347  |
| 1994 | 3021  | 5204  | 8225  |
| 1995 | 4657  | 4169  | 8826  |
| 1996 | 2709  | 2834  | 5543  |
| 1997 | 2336  | 3434  | 5770  |
| 1998 | 1141  | 3600  | 4741  |
| 1999 | 2722  | 4114  | 6836  |
| 2000 | 1761  | 6676  | 8437  |
| 2001 | 5694  | 6334  | 12028 |
| 2002 | 6982  | 5949  | 12931 |
| 2003 | 1745  | 3961  | 5706  |
| 2004 | 2946  | 7896  | 10842 |
| 2005 | 1110  | 7797  | 8907  |
| 2006 | 336   | 5609  | 5945  |
| 2007 | 753   | 6136  | 6889  |
| 2008 | 1713  | 17230 | 18943 |
| 2009 | 636   | 20871 | 21507 |
| 2010 | 184   | 293   | 477   |
| 2011 | 13    | 1346  | 1359  |
| 2012 | 121   | 2006  | 2127  |
| 2013 | 66    | 1454  | 1520  |
| 2014 | 532   | 2420  | 2952  |
| 2015 | 41    | 709   | 750   |
| 2016 | 0     | 331   | 331   |
| 2017 | 243   | 2481  | 2724  |
| 2018 | 302   | 4133  | 4435  |
| 2019 | 426   | 3629  | 4055  |
| 2020 | 484   | 2740  | 3224  |
| 2021 | 500   | 2019  | 2519  |
| 2022 | 126   | 1467  | 1593  |
| 2023 | 530   | 1354  | 1884  |
| 2024 | 9     | 1022  | 1031  |

Table 7: Red snapper landings by state in pounds. Confidential data are reported as 'conf'.

| year | NC    | SC    | GNFL   | SFL   | Total  |
|------|-------|-------|--------|-------|--------|
| 1981 | 7742  | 8762  | 98464  | 3062  | 118031 |
| 1982 | 10487 | 14535 | 69778  | 3224  | 98024  |
| 1983 | 5316  | 10179 | 55365  | 3143  | 74004  |
| 1984 | 4582  | 6875  | 68114  | 1846  | 81417  |
| 1985 | 31330 | 11768 | 83964  | 5022  | 132084 |
| 1986 | 7129  | 4515  | 40495  | 2241  | 54381  |
| 1987 | 21518 | 6310  | 52327  | 1685  | 81840  |
| 1988 | 36829 | 15250 | 50201  | 27791 | 130070 |
| 1989 | 6691  | 26459 | 35984  | 1662  | 70796  |
| 1990 | 2749  | 13341 | 46076  | 3520  | 65686  |
| 1991 | 15991 | 21781 | 33127  | 1131  | 72030  |
| 1992 | 12049 | 5924  | 8412   | 2531  | 28916  |
| 1993 | 9043  | 19865 | 10598  | 3211  | 42718  |
| 1994 | 3632  | 6349  | 21909  | 11127 | 43017  |
| 1995 | 23728 | 6340  | 23732  | 3674  | 57474  |
| 1996 | 3130  | 23837 | 18300  | 968   | 46235  |
| 1997 | 20969 | 6746  | 20316  | 3174  | 51205  |
| 1998 | 1082  | 6235  | 18591  | 939   | 26848  |
| 1999 | 6957  | 11257 | 22153  | 3192  | 43559  |
| 2000 | 5946  | 6562  | 35818  | 1076  | 49403  |
| 2001 | 9605  | 20513 | 36403  | 1864  | 68385  |
| 2002 | 14194 | 21727 | 33993  | 883   | 70797  |
| 2003 | 3679  | 12133 | 25242  | 299   | 41353  |
| 2004 | 12300 | 16111 | 51081  | 857   | 80349  |
| 2005 | 1114  | 10399 | 40742  | 6441  | 58695  |
| 2006 | 384   | 3540  | 36050  | 1458  | 41432  |
| 2007 | conf  | conf  | conf   | conf  | 37460  |
| 2008 | 888   | 8076  | 105436 | 908   | 115309 |
| 2009 | 2368  | 5105  | 127587 | 6028  | 141087 |
| 2010 | 17    | 870   | 1126   | 598   | 2610   |
| 2011 | 39    | 17    | 59     | 8546  | 8660   |
| 2012 | 415   | 82    | 7616   | 2359  | 10471  |
| 2013 | 240   | 125   | 8567   | 3104  | 12036  |
| 2014 | 1965  | 970   | 18718  | 797   | 22450  |
| 2015 | 32    | 187   | 1059   | 2732  | 4010   |
| 2016 | 0     | 0     | 0      | 1844  | 1844   |
| 2017 | 1172  | 372   | 12281  | 3698  | 17523  |
| 2018 | 601   | 1771  | 26248  | 1506  | 30126  |
| 2019 | 1050  | 2284  | 17702  | 5243  | 26279  |
| 2020 | 1170  | 1578  | 12973  | 2583  | 18305  |
| 2021 | 599   | 945   | 4950   | 2814  | 9308   |
| 2022 | 282   | 458   | 6023   | 1987  | 8751   |
| 2023 | 796   | 1570  | 5973   | 2364  | 10703  |
| 2024 | 62    | 31    | 5250   | 4101  | 9444   |

Table 8: Red snapper landings by region in pounds.

| year | North | South  | Total  |
|------|-------|--------|--------|
| 1981 | 16504 | 101526 | 118031 |
| 1982 | 25023 | 73002  | 98024  |
| 1983 | 15496 | 58508  | 74004  |
| 1984 | 11457 | 69960  | 81417  |
| 1985 | 43098 | 88985  | 132084 |
| 1986 | 11645 | 42736  | 54381  |
| 1987 | 27828 | 54012  | 81840  |
| 1988 | 52079 | 77991  | 130070 |
| 1989 | 33150 | 37646  | 70796  |
| 1990 | 16090 | 49596  | 65686  |
| 1991 | 37772 | 34258  | 72030  |
| 1992 | 17973 | 10943  | 28916  |
| 1993 | 28909 | 13809  | 42718  |
| 1994 | 9981  | 33036  | 43017  |
| 1995 | 30068 | 27406  | 57474  |
| 1996 | 26967 | 19267  | 46235  |
| 1997 | 27715 | 23490  | 51205  |
| 1998 | 7318  | 19530  | 26848  |
| 1999 | 18214 | 25345  | 43559  |
| 2000 | 12508 | 36894  | 49403  |
| 2001 | 30118 | 38267  | 68385  |
| 2002 | 35920 | 34877  | 70797  |
| 2003 | 15813 | 25541  | 41353  |
| 2004 | 28411 | 51938  | 80349  |
| 2005 | 11513 | 47183  | 58695  |
| 2006 | 3924  | 37508  | 41432  |
| 2007 | 5405  | 32055  | 37460  |
| 2008 | 8965  | 106344 | 115309 |
| 2009 | 7472  | 133615 | 141087 |
| 2010 | 887   | 1723   | 2610   |
| 2011 | 56    | 8605   | 8660   |
| 2012 | 497   | 9975   | 10471  |
| 2013 | 364   | 11671  | 12036  |
| 2014 | 2935  | 19515  | 22450  |
| 2015 | 219   | 3790   | 4010   |
| 2016 | 0     | 1844   | 1844   |
| 2017 | 1544  | 15978  | 17523  |
| 2018 | 2373  | 27753  | 30126  |
| 2019 | 3334  | 22945  | 26279  |
| 2020 | 2748  | 15557  | 18305  |
| 2021 | 1544  | 7764   | 9308   |
| 2022 | 740   | 8011   | 8751   |
| 2023 | 2366  | 8336   | 10703  |
| 2024 | 93    | 9351   | 9444   |

Table 9: Red snapper discards by state in number of fish. Confidential data are reported as 'conf'.

| year | NC   | SC   | GNFL  | SFL  | Total |
|------|------|------|-------|------|-------|
| 2004 | 31   | 574  | 17850 | 847  | 19302 |
| 2005 | 14   | 166  | 8391  | 1401 | 9972  |
| 2006 | 1223 | 68   | 15297 | 859  | 17447 |
| 2007 | conf | conf | conf  | conf | 73401 |
| 2008 | 1344 | 1084 | 71242 | 1016 | 74686 |
| 2009 | 416  | 415  | 54709 | 2366 | 57906 |
| 2010 | 1293 | 765  | 34248 | 2534 | 38840 |
| 2011 | 198  | 1042 | 31713 | 9029 | 41982 |
| 2012 | 438  | 396  | 42199 | 4272 | 47305 |
| 2013 | 438  | 154  | 43307 | 2841 | 46740 |
| 2014 | 1043 | 358  | 42398 | 2813 | 46612 |
| 2015 | 1623 | 682  | 49665 | 2435 | 54405 |
| 2016 | 1183 | 862  | 61450 | 3016 | 66511 |
| 2017 | 570  | 962  | 36339 | 3430 | 41301 |
| 2018 | 256  | 2294 | 41177 | 3559 | 47286 |
| 2019 | 1055 | 1379 | 44256 | 1871 | 48561 |
| 2020 | 1455 | 3541 | 47506 | 540  | 53042 |
| 2021 | 4271 | 5246 | 61935 | 615  | 72067 |
| 2022 | 2953 | 5893 | 35694 | 942  | 45482 |
| 2023 | 965  | 6522 | 27922 | 314  | 35723 |
| 2024 | 209  | 6025 | 20187 | 250  | 26671 |

Table 10: Red snapper discards by region in number of fish

| year | North | South | Total |
|------|-------|-------|-------|
| 2004 | 605   | 18697 | 19302 |
| 2005 | 180   | 9792  | 9972  |
| 2006 | 1291  | 16156 | 17447 |
| 2007 | 3463  | 69938 | 73401 |
| 2008 | 2428  | 72258 | 74686 |
| 2009 | 831   | 57075 | 57906 |
| 2010 | 2058  | 36782 | 38840 |
| 2011 | 1240  | 40742 | 41982 |
| 2012 | 834   | 46471 | 47305 |
| 2013 | 592   | 46148 | 46740 |
| 2014 | 1401  | 45211 | 46612 |
| 2015 | 2305  | 52100 | 54405 |
| 2016 | 2045  | 64466 | 66511 |
| 2017 | 1532  | 39769 | 41301 |
| 2018 | 2550  | 44736 | 47286 |
| 2019 | 2434  | 46127 | 48561 |
| 2020 | 4996  | 48046 | 53042 |
| 2021 | 9517  | 62550 | 72067 |
| 2022 | 8846  | 36636 | 45482 |
| 2023 | 7487  | 28236 | 35723 |
| 2024 | 6234  | 20437 | 26671 |

Table 11: Red snapper number of vessels by state contributing to landings estimates. Strata with less than 3 vessels reporting are considered confidential.

| year | NC | SC | GNFL | SFL |
|------|----|----|------|-----|
| 1981 | 5  | 6  | 11   | 20  |
| 1982 | 7  | 6  | 9    | 18  |
| 1983 | 5  | 8  | 13   | 21  |
| 1984 | 6  | 9  | 16   | 16  |
| 1985 | 7  | 11 | 18   | 16  |
| 1986 | 6  | 14 | 18   | 20  |
| 1987 | 7  | 14 | 19   | 16  |
| 1988 | 9  | 13 | 15   | 14  |
| 1989 | 7  | 9  | 14   | 13  |
| 1990 | 6  | 8  | 10   | 9   |
| 1991 | 9  | 11 | 6    | 10  |
| 1992 | 9  | 13 | 18   | 22  |
| 1993 | 7  | 15 | 15   | 17  |
| 1994 | 5  | 14 | 16   | 19  |
| 1995 | 7  | 12 | 18   | 20  |
| 1996 | 7  | 9  | 20   | 11  |
| 1997 | 4  | 11 | 17   | 15  |
| 1998 | 6  | 11 | 15   | 12  |
| 1999 | 7  | 12 | 15   | 6   |
| 2000 | 10 | 16 | 16   | 11  |
| 2001 | 8  | 10 | 15   | 9   |
| 2002 | 6  | 10 | 13   | 8   |
| 2003 | 5  | 12 | 11   | 4   |
| 2004 | 6  | 13 | 13   | 4   |
| 2005 | 7  | 9  | 13   | 9   |
| 2006 | 4  | 10 | 12   | 6   |
| 2007 | 5  | 12 | 14   | 1   |
| 2008 | 5  | 15 | 18   | 12  |
| 2009 | 6  | 15 | 20   | 10  |
| 2010 | 6  | 15 | 19   | 9   |
| 2011 | 5  | 12 | 16   | 10  |
| 2012 | 6  | 10 | 15   | 11  |
| 2013 | 6  | 8  | 15   | 12  |
| 2014 | 6  | 10 | 15   | 9   |
| 2015 | 5  | 7  | 14   | 9   |
| 2016 | 6  | 12 | 13   | 14  |
| 2017 | 6  | 12 | 11   | 14  |
| 2018 | 5  | 13 | 12   | 10  |
| 2019 | 5  | 14 | 11   | 10  |
| 2020 | 4  | 14 | 11   | 15  |
| 2021 | 4  | 12 | 10   | 10  |
| 2022 | 5  | 15 | 9    | 7   |
| 2023 | 5  | 15 | 9    | 12  |
| 2024 | 3  | 13 | 8    | 6   |

Table 12: Red snapper number of vessels by region contributing to landings estimates. Strata with less than 3 vessels reporting are considered confidential.

| year | North | South |
|------|-------|-------|
| 1981 | 11    | 31    |
| 1982 | 13    | 27    |
| 1983 | 13    | 34    |
| 1984 | 15    | 31    |
| 1985 | 18    | 34    |
| 1986 | 20    | 38    |
| 1987 | 21    | 35    |
| 1988 | 22    | 29    |
| 1989 | 16    | 27    |
| 1990 | 14    | 19    |
| 1991 | 20    | 16    |
| 1992 | 22    | 40    |
| 1993 | 22    | 32    |
| 1994 | 19    | 35    |
| 1995 | 19    | 38    |
| 1996 | 16    | 31    |
| 1997 | 15    | 32    |
| 1998 | 17    | 27    |
| 1999 | 19    | 21    |
| 2000 | 26    | 27    |
| 2001 | 18    | 24    |
| 2002 | 16    | 21    |
| 2003 | 17    | 15    |
| 2004 | 19    | 17    |
| 2005 | 16    | 22    |
| 2006 | 14    | 18    |
| 2007 | 17    | 15    |
| 2008 | 20    | 30    |
| 2009 | 21    | 30    |
| 2010 | 21    | 28    |
| 2011 | 17    | 26    |
| 2012 | 16    | 26    |
| 2013 | 14    | 27    |
| 2014 | 16    | 24    |
| 2015 | 12    | 23    |
| 2016 | 18    | 27    |
| 2017 | 18    | 25    |
| 2018 | 18    | 22    |
| 2019 | 19    | 21    |
| 2020 | 18    | 26    |
| 2021 | 16    | 20    |
| 2022 | 20    | 16    |
| 2023 | 20    | 21    |
| 2024 | 16    | 14    |

Table 13: Red snapper number of vessels annually contributing to landings estimates. Strata with less than 3 vessels reporting are considered confidential.

| year | n_vessel |
|------|----------|
| 1981 | 42       |
| 1982 | 40       |
| 1983 | 47       |
| 1984 | 46       |
| 1985 | 52       |
| 1986 | 58       |
| 1987 | 56       |
| 1988 | 51       |
| 1989 | 43       |
| 1990 | 33       |
| 1991 | 36       |
| 1992 | 62       |
| 1993 | 54       |
| 1994 | 54       |
| 1995 | 57       |
| 1996 | 47       |
| 1997 | 47       |
| 1998 | 44       |
| 1999 | 40       |
| 2000 | 53       |
| 2001 | 42       |
| 2002 | 37       |
| 2003 | 32       |
| 2004 | 36       |
| 2005 | 38       |
| 2006 | 32       |
| 2007 | 32       |
| 2008 | 50       |
| 2009 | 51       |
| 2010 | 49       |
| 2011 | 43       |
| 2012 | 42       |
| 2013 | 41       |
| 2014 | 40       |
| 2015 | 35       |
| 2016 | 45       |
| 2017 | 43       |
| 2018 | 40       |
| 2019 | 40       |
| 2020 | 44       |
| 2021 | 36       |
| 2022 | 36       |
| 2023 | 41       |
| 2024 | 30       |

Table 14: Unweighted proxy CV values by state. These values are based on logbook reporting compliance and are consistent across species.

| year | NC    | SC    | GNFL  | SFL   |
|------|-------|-------|-------|-------|
| 1981 | 0.514 | 0.204 | 0.485 | 0.250 |
| 1982 | 0.344 | 0.124 | 0.469 | 0.491 |
| 1983 | 0.337 | 0.097 | 0.414 | 0.380 |
| 1984 | 0.611 | 0.230 | 0.508 | 0.611 |
| 1985 | 0.619 | 0.226 | 0.535 | 0.603 |
| 1986 | 0.640 | 0.145 | 0.400 | 0.531 |
| 1987 | 0.579 | 0.186 | 0.356 | 0.549 |
| 1988 | 0.608 | 0.225 | 0.438 | 0.596 |
| 1989 | 0.869 | 0.275 | 0.501 | 0.632 |
| 1990 | 0.826 | 0.245 | 0.583 | 0.616 |
| 1991 | 0.663 | 0.339 | 0.604 | 0.650 |
| 1992 | 0.335 | 0.156 | 0.204 | 0.445 |
| 1993 | 0.474 | 0.077 | 0.146 | 0.397 |
| 1994 | 0.393 | 0.113 | 0.213 | 0.538 |
| 1995 | 0.401 | 0.118 | 0.169 | 0.514 |
| 1996 | 0.359 | 0.060 | 0.148 | 0.724 |
| 1997 | 0.425 | 0.076 | 0.154 | 0.538 |
| 1998 | 0.431 | 0.088 | 0.079 | 0.581 |
| 1999 | 0.458 | 0.099 | 0.095 | 0.754 |
| 2000 | 0.459 | 0.057 | 0.229 | 0.783 |
| 2001 | 0.478 | 0.091 | 0.136 | 0.776 |
| 2002 | 0.588 | 0.068 | 0.087 | 0.843 |
| 2003 | 0.425 | 0.161 | 0.082 | 0.855 |
| 2004 | 0.300 | 0.089 | 0.065 | 0.864 |
| 2005 | 0.542 | 0.055 | 0.122 | 0.850 |
| 2006 | 0.499 | 0.257 | 0.098 | 0.859 |
| 2007 | 0.540 | 0.187 | 0.232 | 0.771 |
| 2008 | 0.101 | 0.185 | 0.130 | 0.300 |
| 2009 | 0.175 | 0.160 | 0.176 | 0.096 |
| 2010 | 0.076 | 0.171 | 0.063 | 0.084 |
| 2011 | 0.112 | 0.107 | 0.028 | 0.089 |
| 2012 | 0.116 | 0.082 | 0.054 | 0.129 |
| 2013 | 0.072 | 0.079 | 0.053 | 0.134 |
| 2014 | 0.076 | 0.056 | 0.051 | 0.053 |
| 2015 | 0.050 | 0.054 | 0.053 | 0.068 |
| 2016 | 0.055 | 0.060 | 0.052 | 0.221 |
| 2017 | 0.051 | 0.057 | 0.056 | 0.060 |
| 2018 | 0.057 | 0.060 | 0.053 | 0.059 |
| 2019 | 0.052 | 0.061 | 0.070 | 0.055 |
| 2020 | 0.050 | 0.050 | 0.050 | 0.058 |
| 2021 | 0.050 | 0.050 | 0.050 | 0.050 |
| 2022 | 0.050 | 0.050 | 0.052 | 0.108 |
| 2023 | 0.050 | 0.051 | 0.051 | 0.070 |
| 2024 | 0.050 | 0.051 | 0.050 | 0.065 |

Table 15: Unweighted proxy CV values by region. These values are based on logbook reporting compliance and are consistent across species.

| year | North | South |
|------|-------|-------|
| 1981 | 0.268 | 0.278 |
| 1982 | 0.171 | 0.489 |
| 1983 | 0.151 | 0.385 |
| 1984 | 0.318 | 0.595 |
| 1985 | 0.317 | 0.592 |
| 1986 | 0.258 | 0.507 |
| 1987 | 0.272 | 0.514 |
| 1988 | 0.326 | 0.565 |
| 1989 | 0.456 | 0.610 |
| 1990 | 0.441 | 0.611 |
| 1991 | 0.434 | 0.643 |
| 1992 | 0.210 | 0.400 |
| 1993 | 0.196 | 0.350 |
| 1994 | 0.191 | 0.486 |
| 1995 | 0.203 | 0.458 |
| 1996 | 0.165 | 0.645 |
| 1997 | 0.187 | 0.467 |
| 1998 | 0.193 | 0.485 |
| 1999 | 0.218 | 0.636 |
| 2000 | 0.183 | 0.688 |
| 2001 | 0.215 | 0.667 |
| 2002 | 0.251 | 0.717 |
| 2003 | 0.265 | 0.710 |
| 2004 | 0.152 | 0.743 |
| 2005 | 0.249 | 0.745 |
| 2006 | 0.321 | 0.743 |
| 2007 | 0.274 | 0.659 |
| 2008 | 0.169 | 0.256 |
| 2009 | 0.163 | 0.121 |
| 2010 | 0.149 | 0.079 |
| 2011 | 0.108 | 0.074 |
| 2012 | 0.089 | 0.114 |
| 2013 | 0.077 | 0.119 |
| 2014 | 0.060 | 0.053 |
| 2015 | 0.053 | 0.066 |
| 2016 | 0.059 | 0.199 |
| 2017 | 0.055 | 0.059 |
| 2018 | 0.060 | 0.058 |
| 2019 | 0.059 | 0.057 |
| 2020 | 0.050 | 0.056 |
| 2021 | 0.050 | 0.050 |
| 2022 | 0.050 | 0.098 |
| 2023 | 0.051 | 0.068 |
| 2024 | 0.051 | 0.063 |

Table 16: Unweighted proxy CV values by year. These values are based on logbook reporting compliance and are consistent across species.

| year | cv    |
|------|-------|
| 1981 | 0.277 |
| 1982 | 0.450 |
| 1983 | 0.358 |
| 1984 | 0.557 |
| 1985 | 0.553 |
| 1986 | 0.472 |
| 1987 | 0.478 |
| 1988 | 0.527 |
| 1989 | 0.590 |
| 1990 | 0.589 |
| 1991 | 0.614 |
| 1992 | 0.372 |
| 1993 | 0.324 |
| 1994 | 0.442 |
| 1995 | 0.419 |
| 1996 | 0.579 |
| 1997 | 0.408 |
| 1998 | 0.416 |
| 1999 | 0.556 |
| 2000 | 0.589 |
| 2001 | 0.571 |
| 2002 | 0.615 |
| 2003 | 0.631 |
| 2004 | 0.620 |
| 2005 | 0.652 |
| 2006 | 0.650 |
| 2007 | 0.560 |
| 2008 | 0.233 |
| 2009 | 0.133 |
| 2010 | 0.100 |
| 2011 | 0.085 |
| 2012 | 0.107 |
| 2013 | 0.110 |
| 2014 | 0.054 |
| 2015 | 0.064 |
| 2016 | 0.170 |
| 2017 | 0.058 |
| 2018 | 0.058 |
| 2019 | 0.058 |
| 2020 | 0.054 |
| 2021 | 0.050 |
| 2022 | 0.085 |
| 2023 | 0.063 |
| 2024 | 0.060 |

Table 17: Regional proxy CV values weighted by state landings of red snapper in number.

| year | North | South |
|------|-------|-------|
| 1981 | 0.348 | 0.478 |
| 1982 | 0.194 | 0.470 |
| 1983 | 0.141 | 0.412 |
| 1984 | 0.340 | 0.510 |
| 1985 | 0.538 | 0.537 |
| 1986 | 0.408 | 0.404 |
| 1987 | 0.475 | 0.362 |
| 1988 | 0.472 | 0.497 |
| 1989 | 0.367 | 0.510 |
| 1990 | 0.318 | 0.586 |
| 1991 | 0.398 | 0.605 |
| 1992 | 0.271 | 0.262 |
| 1993 | 0.201 | 0.211 |
| 1994 | 0.166 | 0.315 |
| 1995 | 0.348 | 0.213 |
| 1996 | 0.097 | 0.179 |
| 1997 | 0.342 | 0.225 |
| 1998 | 0.222 | 0.104 |
| 1999 | 0.227 | 0.184 |
| 2000 | 0.235 | 0.247 |
| 2001 | 0.214 | 0.168 |
| 2002 | 0.264 | 0.116 |
| 2003 | 0.221 | 0.092 |
| 2004 | 0.180 | 0.076 |
| 2005 | 0.101 | 0.226 |
| 2006 | 0.280 | 0.127 |
| 2007 | 0.211 | 0.305 |
| 2008 | 0.177 | 0.132 |
| 2009 | 0.166 | 0.173 |
| 2010 | 0.169 | 0.067 |
| 2011 | 0.111 | 0.088 |
| 2012 | 0.113 | 0.071 |
| 2013 | 0.073 | 0.074 |
| 2014 | 0.073 | 0.051 |
| 2015 | 0.054 | 0.064 |
| 2016 | 0.000 | 0.221 |
| 2017 | 0.053 | 0.057 |
| 2018 | 0.059 | 0.054 |
| 2019 | 0.058 | 0.066 |
| 2020 | 0.050 | 0.051 |
| 2021 | 0.050 | 0.050 |
| 2022 | 0.050 | 0.065 |
| 2023 | 0.051 | 0.058 |
| 2024 | 0.050 | 0.056 |

Table 18: Regional proxy CV values weighted by state landings of red snapper in weight.

| year | North | South |
|------|-------|-------|
| 1981 | 0.349 | 0.478 |
| 1982 | 0.216 | 0.470 |
| 1983 | 0.179 | 0.412 |
| 1984 | 0.383 | 0.510 |
| 1985 | 0.511 | 0.538 |
| 1986 | 0.448 | 0.407 |
| 1987 | 0.490 | 0.362 |
| 1988 | 0.496 | 0.494 |
| 1989 | 0.395 | 0.507 |
| 1990 | 0.344 | 0.585 |
| 1991 | 0.476 | 0.605 |
| 1992 | 0.276 | 0.260 |
| 1993 | 0.201 | 0.204 |
| 1994 | 0.215 | 0.323 |
| 1995 | 0.341 | 0.215 |
| 1996 | 0.095 | 0.177 |
| 1997 | 0.340 | 0.206 |
| 1998 | 0.139 | 0.104 |
| 1999 | 0.236 | 0.178 |
| 2000 | 0.248 | 0.245 |
| 2001 | 0.214 | 0.167 |
| 2002 | 0.273 | 0.106 |
| 2003 | 0.222 | 0.092 |
| 2004 | 0.180 | 0.079 |
| 2005 | 0.102 | 0.221 |
| 2006 | 0.280 | 0.128 |
| 2007 | 0.213 | 0.303 |
| 2008 | 0.177 | 0.132 |
| 2009 | 0.165 | 0.172 |
| 2010 | 0.169 | 0.071 |
| 2011 | 0.111 | 0.089 |
| 2012 | 0.110 | 0.072 |
| 2013 | 0.074 | 0.074 |
| 2014 | 0.070 | 0.051 |
| 2015 | 0.054 | 0.064 |
| 2016 | 0.000 | 0.221 |
| 2017 | 0.053 | 0.057 |
| 2018 | 0.059 | 0.054 |
| 2019 | 0.058 | 0.066 |
| 2020 | 0.050 | 0.051 |
| 2021 | 0.050 | 0.050 |
| 2022 | 0.050 | 0.066 |
| 2023 | 0.051 | 0.056 |
| 2024 | 0.050 | 0.057 |

Table 19: Annual proxy CV values weighted by regional landings of red snapper in number.

| year | cv    |
|------|-------|
| 1981 | 0.469 |
| 1982 | 0.437 |
| 1983 | 0.392 |
| 1984 | 0.496 |
| 1985 | 0.538 |
| 1986 | 0.404 |
| 1987 | 0.395 |
| 1988 | 0.487 |
| 1989 | 0.465 |
| 1990 | 0.532 |
| 1991 | 0.545 |
| 1992 | 0.268 |
| 1993 | 0.204 |
| 1994 | 0.260 |
| 1995 | 0.285 |
| 1996 | 0.139 |
| 1997 | 0.272 |
| 1998 | 0.132 |
| 1999 | 0.201 |
| 2000 | 0.244 |
| 2001 | 0.190 |
| 2002 | 0.196 |
| 2003 | 0.132 |
| 2004 | 0.105 |
| 2005 | 0.210 |
| 2006 | 0.136 |
| 2007 | 0.294 |
| 2008 | 0.136 |
| 2009 | 0.173 |
| 2010 | 0.106 |
| 2011 | 0.089 |
| 2012 | 0.074 |
| 2013 | 0.074 |
| 2014 | 0.055 |
| 2015 | 0.063 |
| 2016 | 0.221 |
| 2017 | 0.057 |
| 2018 | 0.054 |
| 2019 | 0.066 |
| 2020 | 0.051 |
| 2021 | 0.050 |
| 2022 | 0.064 |
| 2023 | 0.056 |
| 2024 | 0.056 |

Table 20: Annual proxy CV values weighted by regional landings of red snapper in weight.

| year | cv    |
|------|-------|
| 1981 | 0.460 |
| 1982 | 0.405 |
| 1983 | 0.363 |
| 1984 | 0.492 |
| 1985 | 0.530 |
| 1986 | 0.415 |
| 1987 | 0.405 |
| 1988 | 0.495 |
| 1989 | 0.455 |
| 1990 | 0.526 |
| 1991 | 0.538 |
| 1992 | 0.270 |
| 1993 | 0.202 |
| 1994 | 0.298 |
| 1995 | 0.281 |
| 1996 | 0.129 |
| 1997 | 0.278 |
| 1998 | 0.113 |
| 1999 | 0.202 |
| 2000 | 0.246 |
| 2001 | 0.188 |
| 2002 | 0.191 |
| 2003 | 0.142 |
| 2004 | 0.115 |
| 2005 | 0.198 |
| 2006 | 0.142 |
| 2007 | 0.290 |
| 2008 | 0.135 |
| 2009 | 0.172 |
| 2010 | 0.104 |
| 2011 | 0.089 |
| 2012 | 0.074 |
| 2013 | 0.074 |
| 2014 | 0.054 |
| 2015 | 0.063 |
| 2016 | 0.221 |
| 2017 | 0.056 |
| 2018 | 0.054 |
| 2019 | 0.065 |
| 2020 | 0.051 |
| 2021 | 0.050 |
| 2022 | 0.064 |
| 2023 | 0.055 |
| 2024 | 0.057 |

Table 21: Estimates of total effort in angler - days by year.

| year | Angler_Day |
|------|------------|
| 1981 | 377287     |
| 1982 | 387611     |
| 1983 | 367426     |
| 1984 | 385173     |
| 1985 | 378230     |
| 1986 | 415472     |
| 1987 | 447108     |
| 1988 | 420664     |
| 1989 | 418250     |
| 1990 | 423286     |
| 1991 | 388940     |
| 1992 | 367489     |
| 1993 | 344216     |
| 1994 | 342703     |
| 1995 | 312748     |
| 1996 | 289928     |
| 1997 | 270612     |
| 1998 | 254082     |
| 1999 | 251147     |
| 2000 | 253891     |
| 2001 | 244433     |
| 2002 | 221614     |
| 2003 | 204565     |
| 2004 | 251418     |
| 2005 | 238448     |
| 2006 | 257332     |
| 2007 | 246881     |
| 2008 | 188388     |
| 2009 | 196807     |
| 2010 | 189684     |
| 2011 | 195594     |
| 2012 | 209468     |
| 2013 | 227189     |
| 2014 | 260606     |
| 2015 | 257397     |
| 2016 | 260432     |
| 2017 | 183210     |
| 2018 | 174984     |
| 2019 | 176734     |
| 2020 | 132239     |
| 2021 | 187994     |
| 2022 | 159877     |
| 2023 | 157602     |
| 2024 | 154519     |

Table 22: Estimates of total effort in angler - trips by year.

| year | Angler_Trip |
|------|-------------|
| 1981 | 392582      |
| 1982 | 492606      |
| 1983 | 440260      |
| 1984 | 563371      |
| 1985 | 582528      |
| 1986 | 613712      |
| 1987 | 629483      |
| 1988 | 566307      |
| 1989 | 576728      |
| 1990 | 596940      |
| 1991 | 568273      |
| 1992 | 535684      |
| 1993 | 477228      |
| 1994 | 500800      |
| 1995 | 456414      |
| 1996 | 449817      |
| 1997 | 395596      |
| 1998 | 354069      |
| 1999 | 375615      |
| 2000 | 406838      |
| 2001 | 363286      |
| 2002 | 330417      |
| 2003 | 345668      |
| 2004 | 394368      |
| 2005 | 392462      |
| 2006 | 419239      |
| 2007 | 342745      |
| 2008 | 283299      |
| 2009 | 289138      |
| 2010 | 285413      |
| 2011 | 296527      |
| 2012 | 328980      |
| 2013 | 354387      |
| 2014 | 419744      |
| 2015 | 419991      |
| 2016 | 422328      |
| 2017 | 282412      |
| 2018 | 267082      |
| 2019 | 270159      |
| 2020 | 195841      |
| 2021 | 284343      |
| 2022 | 245000      |
| 2023 | 239809      |
| 2024 | 219186      |

Table 23: Estimates of total effort in angler - days by region.

| year | North  | South  |
|------|--------|--------|
| 1981 | 78404  | 298883 |
| 1982 | 94478  | 293133 |
| 1983 | 89563  | 277863 |
| 1984 | 96179  | 288994 |
| 1985 | 97385  | 280845 |
| 1986 | 98414  | 317058 |
| 1987 | 114067 | 333041 |
| 1988 | 118889 | 301775 |
| 1989 | 101386 | 316864 |
| 1990 | 100391 | 322895 |
| 1991 | 108918 | 280022 |
| 1992 | 102966 | 264523 |
| 1993 | 107243 | 236973 |
| 1994 | 99922  | 242781 |
| 1995 | 102034 | 210714 |
| 1996 | 90071  | 199857 |
| 1997 | 97339  | 173273 |
| 1998 | 98741  | 155341 |
| 1999 | 87095  | 164052 |
| 2000 | 71642  | 182249 |
| 2001 | 81044  | 163389 |
| 2002 | 70068  | 151546 |
| 2003 | 59554  | 145011 |
| 2004 | 76018  | 175400 |
| 2005 | 65609  | 172839 |
| 2006 | 81810  | 175522 |
| 2007 | 89731  | 157150 |
| 2008 | 64445  | 123943 |
| 2009 | 60387  | 136420 |
| 2010 | 66022  | 123662 |
| 2011 | 63102  | 132492 |
| 2012 | 61769  | 147699 |
| 2013 | 61510  | 165679 |
| 2014 | 64716  | 195890 |
| 2015 | 62418  | 194979 |
| 2016 | 63772  | 196660 |
| 2017 | 57084  | 126126 |
| 2018 | 54424  | 120560 |
| 2019 | 57022  | 119712 |
| 2020 | 48234  | 84005  |
| 2021 | 67627  | 120367 |
| 2022 | 54888  | 104989 |
| 2023 | 51929  | 105673 |
| 2024 | 45183  | 109336 |

Table 24: Estimates of total effort in angler - trips by region.

| year | North  | South  |
|------|--------|--------|
| 1981 | 107488 | 285093 |
| 1982 | 123667 | 368939 |
| 1983 | 118586 | 321674 |
| 1984 | 130272 | 433099 |
| 1985 | 136083 | 446445 |
| 1986 | 134900 | 478813 |
| 1987 | 153645 | 475837 |
| 1988 | 159859 | 406448 |
| 1989 | 129663 | 447065 |
| 1990 | 126632 | 470308 |
| 1991 | 141884 | 426389 |
| 1992 | 134484 | 401200 |
| 1993 | 139959 | 337269 |
| 1994 | 127512 | 373288 |
| 1995 | 127827 | 328588 |
| 1996 | 113651 | 336166 |
| 1997 | 120181 | 275415 |
| 1998 | 125776 | 228293 |
| 1999 | 112470 | 263145 |
| 2000 | 117800 | 289037 |
| 2001 | 107935 | 255351 |
| 2002 | 104246 | 226171 |
| 2003 | 101141 | 244527 |
| 2004 | 107680 | 286688 |
| 2005 | 96895  | 295567 |
| 2006 | 122235 | 297004 |
| 2007 | 121172 | 221574 |
| 2008 | 94130  | 189170 |
| 2009 | 90460  | 198678 |
| 2010 | 98587  | 186827 |
| 2011 | 95318  | 201209 |
| 2012 | 95402  | 233578 |
| 2013 | 92118  | 262269 |
| 2014 | 95545  | 324198 |
| 2015 | 92243  | 327748 |
| 2016 | 96423  | 325905 |
| 2017 | 83136  | 199276 |
| 2018 | 80350  | 186732 |
| 2019 | 84469  | 185691 |
| 2020 | 70279  | 125562 |
| 2021 | 101853 | 182490 |
| 2022 | 82486  | 162514 |
| 2023 | 75693  | 164116 |
| 2024 | 64156  | 155030 |

Table 25: Estimates of total effort in angler - days by state.

| year | NC    | SC    | GNFL   | SFL    |
|------|-------|-------|--------|--------|
| 1981 | 19374 | 59030 | 72427  | 226456 |
| 1982 | 26939 | 67539 | 66961  | 226172 |
| 1983 | 23830 | 65733 | 83499  | 194364 |
| 1984 | 28865 | 67314 | 95234  | 193760 |
| 1985 | 31384 | 66001 | 94449  | 186396 |
| 1986 | 31187 | 67227 | 113101 | 203957 |
| 1987 | 35261 | 78806 | 114144 | 218897 |
| 1988 | 42421 | 76468 | 109156 | 192619 |
| 1989 | 38678 | 62708 | 102920 | 213944 |
| 1990 | 43240 | 57151 | 98234  | 224661 |
| 1991 | 40936 | 67982 | 85111  | 194911 |
| 1992 | 41176 | 61790 | 90810  | 173713 |
| 1993 | 42786 | 64457 | 74494  | 162479 |
| 1994 | 36691 | 63231 | 65745  | 177036 |
| 1995 | 40295 | 61739 | 59106  | 151608 |
| 1996 | 35142 | 54929 | 47239  | 152618 |
| 1997 | 37189 | 60150 | 52764  | 120509 |
| 1998 | 37399 | 61342 | 51790  | 103551 |
| 1999 | 31596 | 55499 | 57010  | 107042 |
| 2000 | 31351 | 40291 | 59771  | 122478 |
| 2001 | 31779 | 49265 | 55797  | 107592 |
| 2002 | 27601 | 42467 | 48911  | 102635 |
| 2003 | 22998 | 36556 | 52795  | 92216  |
| 2004 | 27255 | 48763 | 52243  | 123157 |
| 2005 | 31573 | 34036 | 49539  | 123300 |
| 2006 | 25736 | 56074 | 48908  | 126614 |
| 2007 | 29002 | 60729 | 53762  | 103388 |
| 2008 | 17158 | 47287 | 52345  | 71598  |
| 2009 | 19468 | 40919 | 66447  | 69973  |
| 2010 | 21071 | 44951 | 53676  | 69986  |
| 2011 | 18457 | 44645 | 54707  | 77785  |
| 2012 | 20766 | 41003 | 58901  | 88798  |
| 2013 | 20547 | 40963 | 66587  | 99092  |
| 2014 | 22691 | 42025 | 60752  | 135138 |
| 2015 | 22716 | 39702 | 54480  | 140499 |
| 2016 | 21565 | 42207 | 53387  | 143273 |
| 2017 | 20170 | 36914 | 48304  | 77822  |
| 2018 | 16813 | 37611 | 43586  | 76974  |
| 2019 | 15552 | 41470 | 43139  | 76573  |
| 2020 | 14154 | 34080 | 30750  | 53255  |
| 2021 | 19719 | 47908 | 47396  | 72971  |
| 2022 | 16140 | 38748 | 33962  | 71027  |
| 2023 | 16115 | 35814 | 31842  | 73831  |
| 2024 | 12654 | 32529 | 28473  | 80863  |

Table 26: Estimates of total effort in angler - trips by state.

| year | NC    | SC     | GNFL   | SFL    |
|------|-------|--------|--------|--------|
| 1981 | 23236 | 84252  | 83851  | 201243 |
| 1982 | 30016 | 93651  | 80231  | 288708 |
| 1983 | 26254 | 92332  | 86734  | 234940 |
| 1984 | 28101 | 102171 | 108836 | 324262 |
| 1985 | 30138 | 105945 | 117459 | 328986 |
| 1986 | 31157 | 103743 | 132626 | 346186 |
| 1987 | 31967 | 121679 | 121517 | 354321 |
| 1988 | 38650 | 121209 | 112748 | 293699 |
| 1989 | 32154 | 97509  | 119207 | 327858 |
| 1990 | 36733 | 89899  | 127075 | 343233 |
| 1991 | 39724 | 102160 | 111168 | 315222 |
| 1992 | 40004 | 94480  | 113529 | 287671 |
| 1993 | 44312 | 95647  | 86316  | 250953 |
| 1994 | 33949 | 93563  | 76874  | 296414 |
| 1995 | 37666 | 90161  | 69107  | 259480 |
| 1996 | 37243 | 76408  | 56284  | 279882 |
| 1997 | 36906 | 83275  | 65080  | 210335 |
| 1998 | 40456 | 85320  | 60663  | 167631 |
| 1999 | 36054 | 76416  | 68043  | 195102 |
| 2000 | 38531 | 79269  | 69309  | 219728 |
| 2001 | 36618 | 71318  | 67778  | 187573 |
| 2002 | 38772 | 65474  | 58012  | 168159 |
| 2003 | 32010 | 69131  | 65684  | 178843 |
| 2004 | 35808 | 71872  | 63829  | 222859 |
| 2005 | 41262 | 55633  | 61316  | 234251 |
| 2006 | 33776 | 88459  | 61358  | 235646 |
| 2007 | 33576 | 87596  | 67112  | 154462 |
| 2008 | 19948 | 74182  | 66304  | 122866 |
| 2009 | 21675 | 68785  | 77866  | 120812 |
| 2010 | 24330 | 74256  | 63650  | 123176 |
| 2011 | 21976 | 73343  | 66461  | 134748 |
| 2012 | 24233 | 71169  | 77490  | 156087 |
| 2013 | 23139 | 68979  | 83043  | 179226 |
| 2014 | 24838 | 70707  | 75363  | 248835 |
| 2015 | 26233 | 66010  | 69339  | 258409 |
| 2016 | 24808 | 71615  | 68132  | 257773 |
| 2017 | 23349 | 59788  | 61860  | 137416 |
| 2018 | 18752 | 61598  | 54714  | 132018 |
| 2019 | 17401 | 67068  | 54001  | 131689 |
| 2020 | 15225 | 55054  | 37451  | 88111  |
| 2021 | 22098 | 79755  | 60033  | 122457 |
| 2022 | 18482 | 64004  | 42296  | 120218 |
| 2023 | 18210 | 57483  | 38810  | 125307 |
| 2024 | 14390 | 49766  | 34050  | 120980 |

Table 27: Red snapper number of fish lengths sampled by state.

| year | NC  | SC  | GNFL | SFL |
|------|-----|-----|------|-----|
| 1972 | 18  | 30  |      |     |
| 1973 | 11  | 20  |      |     |
| 1974 | 29  | 65  |      |     |
| 1975 | 68  | 86  |      |     |
| 1976 | 143 | 51  | 303  |     |
| 1977 | 59  | 82  | 577  |     |
| 1978 | 49  | 45  | 643  | 3   |
| 1979 | 7   | 8   | 226  | 4   |
| 1980 | 10  | 14  | 212  | 22  |
| 1981 | 17  | 3   | 609  | 43  |
| 1982 | 30  | 6   | 415  | 6   |
| 1983 | 53  | 24  | 903  | 26  |
| 1984 | 48  | 103 | 1063 | 106 |
| 1985 | 169 | 51  | 894  | 76  |
| 1986 | 51  | 30  | 334  | 20  |
| 1987 | 50  | 53  | 207  | 6   |
| 1988 | 64  | 43  | 96   | 2   |
| 1989 | 50  | 53  | 250  | 21  |
| 1990 | 31  | 43  | 293  |     |
| 1991 | 7   | 29  | 113  | 3   |
| 1992 | 20  | 25  | 28   |     |
| 1993 | 22  | 128 | 43   | 10  |
| 1994 | 14  | 415 | 89   | 6   |
| 1995 | 13  | 41  | 91   | 2   |
| 1996 | 7   | 18  | 55   |     |
| 1997 | 4   | 6   | 53   | 5   |
| 1998 | 11  | 25  | 112  | 1   |
| 1999 | 7   | 14  | 139  | 1   |
| 2000 | 7   | 9   | 105  | 2   |
| 2001 | 17  |     | 230  | 7   |
| 2002 | 8   | 12  | 333  | 8   |
| 2003 | 9   | 21  | 297  | 2   |
| 2004 | 5   | 10  | 267  | 23  |
| 2005 | 3   | 3   | 171  | 16  |
| 2006 | 4   | 9   | 149  | 10  |
| 2007 | 2   | 15  | 149  | 4   |
| 2008 | 10  | 12  | 426  | 7   |
| 2009 | 16  | 12  | 713  | 25  |
| 2010 |     |     |      | 4   |
| 2011 |     |     |      | 1   |
| 2012 | 28  | 4   | 84   | 16  |
| 2013 | 32  | 2   | 51   | 90  |
| 2014 | 65  | 22  | 158  | 45  |
| 2015 |     |     |      | 64  |
| 2016 |     |     |      | 20  |
| 2017 | 40  | 21  | 134  | 51  |
| 2018 | 8   | 26  | 466  | 24  |
| 2019 | 14  | 19  | 247  |     |
| 2022 | 4   |     | 102  | 1   |
| 2023 | 12  | 51  | 84   | 50  |
| 2024 |     | 3   | 149  | 72  |

Table 28: Red snapper number of fish lengths sampled by region.

| year | North | South |
|------|-------|-------|
| 1972 | 48    |       |
| 1973 | 31    |       |
| 1974 | 94    |       |
| 1975 | 154   |       |
| 1976 | 194   | 303   |
| 1977 | 141   | 577   |
| 1978 | 94    | 646   |
| 1979 | 15    | 230   |
| 1980 | 24    | 234   |
| 1981 | 20    | 652   |
| 1982 | 36    | 421   |
| 1983 | 77    | 929   |
| 1984 | 151   | 1169  |
| 1985 | 220   | 970   |
| 1986 | 81    | 354   |
| 1987 | 103   | 213   |
| 1988 | 107   | 98    |
| 1989 | 103   | 271   |
| 1990 | 74    | 293   |
| 1991 | 36    | 116   |
| 1992 | 45    | 28    |
| 1993 | 150   | 53    |
| 1994 | 429   | 95    |
| 1995 | 54    | 93    |
| 1996 | 25    | 55    |
| 1997 | 10    | 58    |
| 1998 | 36    | 113   |
| 1999 | 21    | 140   |
| 2000 | 16    | 107   |
| 2001 | 17    | 237   |
| 2002 | 20    | 341   |
| 2003 | 30    | 299   |
| 2004 | 15    | 290   |
| 2005 | 6     | 187   |
| 2006 | 13    | 159   |
| 2007 | 17    | 153   |
| 2008 | 22    | 433   |
| 2009 | 28    | 738   |
| 2010 |       | 4     |
| 2011 |       | 1     |
| 2012 | 32    | 100   |
| 2013 | 34    | 141   |
| 2014 | 87    | 203   |
| 2015 |       | 64    |
| 2016 |       | 20    |
| 2017 | 61    | 185   |
| 2018 | 34    | 490   |
| 2019 | 33    | 247   |
| 2022 | 4     | 103   |
| 2023 | 63    | 134   |
| 2024 | 3     | 221   |

Table 29: Red snapper number of trips sampled by state.

| year | NC | SC | GNFL | SFL |
|------|----|----|------|-----|
| 1972 | 11 | 19 |      |     |
| 1973 | 7  | 18 |      |     |
| 1974 | 19 | 32 |      |     |
| 1975 | 38 | 36 |      |     |
| 1976 | 44 | 28 | 45   |     |
| 1977 | 29 | 43 | 125  |     |
| 1978 | 22 | 25 | 159  | 2   |
| 1979 | 5  | 6  | 77   | 3   |
| 1980 | 9  | 10 | 67   | 6   |
| 1981 | 13 | 3  | 171  | 12  |
| 1982 | 16 | 5  | 132  | 1   |
| 1983 | 32 | 18 | 191  | 12  |
| 1984 | 26 | 59 | 208  | 21  |
| 1985 | 59 | 22 | 190  | 27  |
| 1986 | 35 | 16 | 128  | 11  |
| 1987 | 30 | 28 | 101  | 4   |
| 1988 | 37 | 29 | 49   | 2   |
| 1989 | 26 | 33 | 92   | 9   |
| 1990 | 17 | 19 | 101  |     |
| 1991 | 7  | 14 | 41   | 2   |
| 1992 | 16 | 16 | 17   |     |
| 1993 | 15 | 52 | 27   | 2   |
| 1994 | 11 | 30 | 28   | 2   |
| 1995 | 9  | 22 | 41   | 2   |
| 1996 | 6  | 12 | 29   |     |
| 1997 | 3  | 6  | 31   | 3   |
| 1998 | 7  | 15 | 55   | 1   |
| 1999 | 6  | 11 | 72   | 1   |
| 2000 | 6  | 5  | 57   | 2   |
| 2001 | 15 |    | 99   | 4   |
| 2002 | 7  | 8  | 137  | 5   |
| 2003 | 8  | 16 | 120  | 1   |
| 2004 | 5  | 7  | 100  | 2   |
| 2005 | 1  | 2  | 84   | 8   |
| 2006 | 4  | 7  | 83   | 8   |
| 2007 | 2  | 12 | 51   | 4   |
| 2008 | 6  | 4  | 77   | 4   |
| 2009 | 12 | 8  | 157  | 9   |
| 2010 |    |    |      | 1   |
| 2011 |    |    |      | 1   |
| 2012 | 5  | 1  | 8    | 2   |
| 2013 | 6  | 1  | 7    | 17  |
| 2014 | 10 | 4  | 19   | 9   |
| 2015 |    |    |      | 3   |
| 2016 |    |    |      | 1   |
| 2017 | 6  | 4  | 8    | 6   |
| 2018 | 4  | 6  | 29   | 2   |
| 2019 | 3  | 4  | 16   |     |
| 2022 | 1  |    | 7    | 1   |
| 2023 | 2  | 6  | 5    | 5   |
| 2024 |    | 1  | 9    | 4   |

Table 30: Red snapper number of trips sampled by region.

| year | North | South |
|------|-------|-------|
| 1972 | 30    |       |
| 1973 | 25    |       |
| 1974 | 51    |       |
| 1975 | 74    |       |
| 1976 | 72    | 45    |
| 1977 | 72    | 125   |
| 1978 | 47    | 161   |
| 1979 | 11    | 80    |
| 1980 | 19    | 73    |
| 1981 | 16    | 183   |
| 1982 | 21    | 133   |
| 1983 | 50    | 203   |
| 1984 | 85    | 229   |
| 1985 | 81    | 217   |
| 1986 | 51    | 139   |
| 1987 | 58    | 105   |
| 1988 | 66    | 51    |
| 1989 | 59    | 101   |
| 1990 | 36    | 101   |
| 1991 | 21    | 43    |
| 1992 | 32    | 17    |
| 1993 | 67    | 29    |
| 1994 | 41    | 30    |
| 1995 | 31    | 43    |
| 1996 | 18    | 29    |
| 1997 | 9     | 34    |
| 1998 | 22    | 56    |
| 1999 | 17    | 73    |
| 2000 | 11    | 59    |
| 2001 | 15    | 103   |
| 2002 | 15    | 142   |
| 2003 | 24    | 121   |
| 2004 | 12    | 102   |
| 2005 | 3     | 92    |
| 2006 | 11    | 91    |
| 2007 | 14    | 55    |
| 2008 | 10    | 81    |
| 2009 | 20    | 166   |
| 2010 |       | 1     |
| 2011 |       | 1     |
| 2012 | 6     | 10    |
| 2013 | 7     | 24    |
| 2014 | 14    | 28    |
| 2015 |       | 3     |
| 2016 |       | 1     |
| 2017 | 10    | 14    |
| 2018 | 10    | 31    |
| 2019 | 7     | 16    |
| 2022 | 1     | 8     |
| 2023 | 8     | 10    |
| 2024 | 1     | 13    |

Table 31: Red snapper mean total length in mm by state.

| year | NC  | SC  | GNFL | SFL |
|------|-----|-----|------|-----|
| 1972 | 760 | 764 |      |     |
| 1973 | 842 | 794 |      |     |
| 1974 | 702 | 618 |      |     |
| 1975 | 607 | 549 |      |     |
| 1976 | 619 | 659 | 408  |     |
| 1977 | 659 | 623 | 428  |     |
| 1978 | 751 | 567 | 418  | 507 |
| 1979 | 750 | 563 | 474  | 357 |
| 1980 | 665 | 476 | 427  | 484 |
| 1981 | 561 | 490 | 423  | 429 |
| 1982 | 698 | 620 | 452  | 516 |
| 1983 | 696 | 519 | 371  | 402 |
| 1984 | 507 | 456 | 391  | 417 |
| 1985 | 452 | 502 | 387  | 388 |
| 1986 | 540 | 521 | 417  | 476 |
| 1987 | 487 | 429 | 400  | 510 |
| 1988 | 424 | 451 | 437  | 670 |
| 1989 | 493 | 475 | 400  | 332 |
| 1990 | 508 | 467 | 422  |     |
| 1991 | 477 | 468 | 409  | 647 |
| 1992 | 528 | 514 | 582  |     |
| 1993 | 550 | 552 | 589  | 529 |
| 1994 | 590 | 437 | 523  | 531 |
| 1995 | 552 | 611 | 586  | 494 |
| 1996 | 590 | 639 | 570  |     |
| 1997 | 761 | 680 | 596  | 354 |
| 1998 | 368 | 601 | 550  | 436 |
| 1999 | 584 | 562 | 562  | 415 |
| 2000 | 614 | 603 | 551  | 516 |
| 2001 | 547 |     | 571  | 535 |
| 2002 | 614 | 541 | 565  | 462 |
| 2003 | 634 | 632 | 564  | 571 |
| 2004 | 570 | 659 | 570  | 585 |
| 2005 | 647 | 747 | 581  | 544 |
| 2006 | 604 | 698 | 587  | 584 |
| 2007 | 517 | 641 | 554  | 506 |
| 2008 | 529 | 618 | 550  | 531 |
| 2009 | 572 | 573 | 546  | 569 |
| 2010 |     |     |      | 584 |
| 2011 |     |     |      | 625 |
| 2012 | 455 | 653 | 482  | 581 |
| 2013 | 505 | 726 | 547  | 604 |
| 2014 | 444 | 573 | 500  | 469 |
| 2015 |     |     |      | 535 |
| 2016 |     |     |      | 561 |
| 2017 | 590 | 502 | 584  | 512 |
| 2018 | 556 | 597 | 564  | 481 |
| 2019 | 533 | 600 | 551  |     |
| 2022 | 463 |     | 526  | 767 |
| 2023 | 534 | 502 | 568  | 584 |
| 2024 |     | 628 | 601  | 621 |

Table 32: Red snapper total length CV in mm by state.

| year | NC   | SC   | GNFL | SFL  |
|------|------|------|------|------|
| 1972 | 0.26 | 0.15 |      |      |
| 1973 | 0.08 | 0.11 |      |      |
| 1974 | 0.24 | 0.22 |      |      |
| 1975 | 0.29 | 0.22 |      |      |
| 1976 | 0.21 | 0.17 | 0.28 |      |
| 1977 | 0.18 | 0.14 | 0.29 |      |
| 1978 | 0.15 | 0.30 | 0.29 | 0.26 |
| 1979 | 0.14 | 0.29 | 0.33 | 0.15 |
| 1980 | 0.22 | 0.10 | 0.37 | 0.22 |
| 1981 | 0.23 | 0.26 | 0.29 | 0.19 |
| 1982 | 0.24 | 0.30 | 0.26 | 0.07 |
| 1983 | 0.23 | 0.18 | 0.25 | 0.31 |
| 1984 | 0.30 | 0.21 | 0.27 | 0.17 |
| 1985 | 0.24 | 0.20 | 0.21 | 0.21 |
| 1986 | 0.21 | 0.15 | 0.26 | 0.25 |
| 1987 | 0.21 | 0.24 | 0.26 | 0.26 |
| 1988 | 0.29 | 0.20 | 0.30 | 0.03 |
| 1989 | 0.23 | 0.18 | 0.27 | 0.26 |
| 1990 | 0.15 | 0.16 | 0.23 |      |
| 1991 | 0.35 | 0.34 | 0.25 | 0.08 |
| 1992 | 0.19 | 0.12 | 0.22 |      |
| 1993 | 0.10 | 0.13 | 0.19 | 0.09 |
| 1994 | 0.09 | 0.21 | 0.22 | 0.06 |
| 1995 | 0.08 | 0.14 | 0.14 | 0.05 |
| 1996 | 0.23 | 0.15 | 0.13 |      |
| 1997 | 0.14 | 0.09 | 0.15 | 0.22 |
| 1998 | 0.28 | 0.19 | 0.08 |      |
| 1999 | 0.26 | 0.13 | 0.13 |      |
| 2000 | 0.25 | 0.09 | 0.09 | 0.04 |
| 2001 | 0.05 |      | 0.13 | 0.08 |
| 2002 | 0.07 | 0.12 | 0.11 | 0.23 |
| 2003 | 0.08 | 0.12 | 0.13 | 0.16 |
| 2004 | 0.22 | 0.09 | 0.11 | 0.12 |
| 2005 | 0.18 | 0.15 | 0.13 | 0.10 |
| 2006 | 0.38 | 0.17 | 0.13 | 0.18 |
| 2007 | 0.01 | 0.20 | 0.14 | 0.02 |
| 2008 | 0.05 | 0.17 | 0.12 | 0.05 |
| 2009 | 0.10 | 0.14 | 0.14 | 0.16 |
| 2010 |      |      |      | 0.03 |
| 2011 |      |      |      |      |
| 2012 | 0.24 | 0.05 | 0.26 | 0.16 |
| 2013 | 0.22 | 0.01 | 0.22 | 0.21 |
| 2014 | 0.28 | 0.25 | 0.30 | 0.37 |
| 2015 |      |      |      | 0.15 |
| 2016 |      |      |      | 0.22 |
| 2017 | 0.20 | 0.29 | 0.18 | 0.23 |
| 2018 | 0.27 | 0.25 | 0.21 | 0.32 |
| 2019 | 0.29 | 0.25 | 0.28 |      |
| 2022 | 0.20 |      | 0.22 |      |
| 2023 | 0.18 | 0.18 | 0.26 | 0.16 |
| 2024 |      | 0.11 | 0.20 | 0.17 |

Table 33: Red snapper mean weight (g) by state.

| year | NC   | SC   | GNFL | SFL  |
|------|------|------|------|------|
| 1972 | 7574 | 8370 |      |      |
| 1973 | 9497 | 7784 |      |      |
| 1974 | 5490 | 4060 |      |      |
| 1975 | 4306 | 2842 |      |      |
| 1976 | 3929 | 4629 | 1295 |      |
| 1977 | 4645 | 3911 | 1505 |      |
| 1978 | 6574 | 3434 | 1605 | 2313 |
| 1979 | 7071 | 3581 | 2476 | 638  |
| 1980 | 6197 | 1759 | 1817 | 1916 |
| 1981 | 3072 | 1922 | 1546 | 1235 |
| 1982 | 6168 | 4911 | 1806 | 1883 |
| 1983 | 5575 | 2471 | 935  | 1198 |
| 1984 | 2745 | 1747 | 1180 | 1210 |
| 1985 | 1683 | 2138 | 1022 | 1026 |
| 1986 | 2832 | 2383 | 1402 | 2068 |
| 1987 | 1931 | 1452 | 1255 | 2163 |
| 1988 | 1476 | 1666 | 1663 | 4305 |
| 1989 | 2202 | 1833 | 1148 | 856  |
| 1990 | 2512 | 1698 | 1360 |      |
| 1991 | 2107 | 2754 | 1494 | 3983 |
| 1992 | 2488 | 2173 | 3399 |      |
| 1993 | 2434 | 2553 | 3006 | 2175 |
| 1994 | 3299 | 1310 | 2194 | 2035 |
| 1995 | 2554 | 3290 | 3107 | 1690 |
| 1996 | 4374 | 4105 | 2892 |      |
| 1997 | 4718 | 4920 | 3576 | 662  |
| 1998 | 887  | 3714 | 2480 | 1180 |
| 1999 | 3773 | 2804 | 2778 | 900  |
| 2000 | 4337 | 3236 | 2482 | 1960 |
| 2001 | 2460 |      | 2945 | 2296 |
| 2002 | 3516 | 2330 | 2661 | 1436 |
| 2003 | 4308 | 4086 | 2752 | 3100 |
| 2004 | 3909 | 4731 | 2921 | 3322 |
| 2005 | 5685 | 7510 | 2968 | 2318 |
| 2006 | 4610 | 5774 | 3069 | 3062 |
| 2007 | 2050 | 4533 | 2659 | 1860 |
| 2008 | 2194 | 3987 | 2597 | 1835 |
| 2009 | 2915 | 3186 | 2864 | 2946 |
| 2010 |      |      |      | 2785 |
| 2011 |      |      |      | 3520 |
| 2012 | 1661 | 4422 | 2457 | 2777 |
| 2013 | 2094 | 5685 | 3408 | 3302 |
| 2014 | 1664 | 3355 | 2463 | 1466 |
| 2015 |      |      |      | 2425 |
| 2016 |      |      |      | 2527 |
| 2017 | 3182 | 2314 | 3347 | 2113 |
| 2018 | 2866 | 3603 | 3129 | 2121 |
| 2019 | 1800 | 3754 | 2896 |      |
| 2022 | 1082 |      | 2418 | 7680 |
| 2023 | 2278 | 1935 | 2941 | 2773 |
| 2024 |      | 3550 | 3365 | 3481 |

Table 34: Red snapper weight CV in g by state.

| year | NC   | SC   | GNFL | SFL  |
|------|------|------|------|------|
| 1972 | 0.34 | 0.34 |      |      |
| 1973 | 0.22 | 0.28 |      |      |
| 1974 | 0.68 | 0.73 |      |      |
| 1975 | 0.83 | 0.77 |      |      |
| 1976 | 0.68 | 0.53 | 1.31 |      |
| 1977 | 0.57 | 0.47 | 1.18 |      |
| 1978 | 0.46 | 0.81 | 1.39 | 0.68 |
| 1979 | 0.40 | 0.94 | 1.10 | 0.68 |
| 1980 | 1.00 | 0.28 | 1.52 | 0.61 |
| 1981 | 0.92 | 0.78 | 1.32 | 0.69 |
| 1982 | 0.69 | 0.83 | 0.88 | 0.20 |
| 1983 | 0.57 | 0.62 | 1.16 | 0.97 |
| 1984 | 1.06 | 1.12 | 1.37 | 0.57 |
| 1985 | 1.23 | 0.88 | 1.17 | 0.62 |
| 1986 | 0.96 | 0.44 | 1.06 | 1.10 |
| 1987 | 0.67 | 0.74 | 1.05 | 0.62 |
| 1988 | 1.33 | 0.73 | 1.17 | 0.06 |
| 1989 | 0.93 | 0.65 | 1.24 | 1.86 |
| 1990 | 0.71 | 0.47 | 1.19 |      |
| 1991 | 1.09 | 1.14 | 1.20 | 0.19 |
| 1992 | 0.50 | 0.46 | 0.79 |      |
| 1993 | 0.32 | 0.51 | 0.73 | 0.64 |
| 1994 | 0.33 | 0.90 | 0.81 | 0.22 |
| 1995 | 0.28 | 0.47 | 0.57 | 0.16 |
| 1996 | 0.83 | 0.43 | 0.52 |      |
| 1997 | 0.58 | 0.25 | 0.61 | 0.69 |
| 1998 | 0.94 | 0.68 | 0.28 |      |
| 1999 | 0.73 | 0.58 | 0.46 |      |
| 2000 | 0.74 | 0.32 | 0.27 | 0.17 |
| 2001 | 0.20 |      | 0.50 | 0.20 |
| 2002 | 0.27 | 0.36 | 0.46 | 0.75 |
| 2003 | 0.26 | 0.57 | 0.58 | 0.48 |
| 2004 | 0.53 | 0.29 | 0.47 | 0.46 |
| 2005 | 0.11 | 0.46 | 0.51 | 0.31 |
| 2006 | 1.10 | 0.45 | 0.56 | 0.64 |
| 2007 |      | 0.59 | 0.63 | 0.06 |
| 2008 | 0.19 | 0.60 | 0.57 | 0.22 |
| 2009 | 0.36 | 0.58 | 0.55 | 0.47 |
| 2010 |      |      |      | 0.07 |
| 2011 |      |      |      |      |
| 2012 | 0.84 | 0.17 | 0.76 | 0.49 |
| 2013 | 0.66 | 0.05 | 0.61 | 0.66 |
| 2014 | 1.11 | 0.78 | 0.91 | 1.10 |
| 2015 |      |      |      | 0.44 |
| 2016 |      |      |      | 0.65 |
| 2017 | 0.62 | 1.06 | 0.57 | 0.61 |
| 2018 | 0.70 | 0.75 | 0.58 | 0.97 |
| 2019 | 0.64 | 0.83 | 0.72 |      |
| 2022 | 0.35 |      | 0.74 |      |
| 2023 | 0.47 | 0.56 | 0.72 | 0.54 |
| 2024 |      | 0.34 | 0.53 | 0.52 |

Table 35: Red snapper mean total length in mm by region.

| year | North | South |
|------|-------|-------|
| 1972 | 763   |       |
| 1973 | 811   |       |
| 1974 | 644   |       |
| 1975 | 575   |       |
| 1976 | 629   | 408   |
| 1977 | 638   | 428   |
| 1978 | 663   | 419   |
| 1979 | 650   | 472   |
| 1980 | 554   | 432   |
| 1981 | 550   | 423   |
| 1982 | 685   | 453   |
| 1983 | 641   | 372   |
| 1984 | 472   | 394   |
| 1985 | 464   | 387   |
| 1986 | 533   | 421   |
| 1987 | 457   | 403   |
| 1988 | 435   | 442   |
| 1989 | 484   | 395   |
| 1990 | 484   | 422   |
| 1991 | 470   | 415   |
| 1992 | 520   | 582   |
| 1993 | 552   | 577   |
| 1994 | 442   | 524   |
| 1995 | 597   | 584   |
| 1996 | 625   | 570   |
| 1997 | 712   | 575   |
| 1998 | 530   | 549   |
| 1999 | 569   | 561   |
| 2000 | 608   | 551   |
| 2001 | 547   | 570   |
| 2002 | 570   | 562   |
| 2003 | 632   | 564   |
| 2004 | 629   | 571   |
| 2005 | 697   | 578   |
| 2006 | 669   | 587   |
| 2007 | 627   | 553   |
| 2008 | 578   | 550   |
| 2009 | 573   | 547   |
| 2010 |       | 584   |
| 2011 |       | 625   |
| 2012 | 480   | 498   |
| 2013 | 518   | 584   |
| 2014 | 476   | 493   |
| 2015 |       | 535   |
| 2016 |       | 561   |
| 2017 | 560   | 564   |
| 2018 | 588   | 559   |
| 2019 | 572   | 551   |
| 2022 | 463   | 528   |
| 2023 | 508   | 574   |
| 2024 | 628   | 607   |

Table 36: Red snapper total length CV in mm by region.

| year | North | South |
|------|-------|-------|
| 1972 | 0.20  |       |
| 1973 | 0.10  |       |
| 1974 | 0.23  |       |
| 1975 | 0.26  |       |
| 1976 | 0.20  | 0.28  |
| 1977 | 0.16  | 0.29  |
| 1978 | 0.26  | 0.29  |
| 1979 | 0.26  | 0.33  |
| 1980 | 0.25  | 0.36  |
| 1981 | 0.23  | 0.29  |
| 1982 | 0.25  | 0.25  |
| 1983 | 0.26  | 0.25  |
| 1984 | 0.25  | 0.26  |
| 1985 | 0.23  | 0.21  |
| 1986 | 0.19  | 0.26  |
| 1987 | 0.23  | 0.26  |
| 1988 | 0.25  | 0.30  |
| 1989 | 0.21  | 0.28  |
| 1990 | 0.16  | 0.23  |
| 1991 | 0.33  | 0.26  |
| 1992 | 0.15  | 0.22  |
| 1993 | 0.13  | 0.18  |
| 1994 | 0.21  | 0.21  |
| 1995 | 0.14  | 0.15  |
| 1996 | 0.17  | 0.13  |
| 1997 | 0.12  | 0.19  |
| 1998 | 0.29  | 0.08  |
| 1999 | 0.18  | 0.14  |
| 2000 | 0.17  | 0.09  |
| 2001 | 0.05  | 0.12  |
| 2002 | 0.12  | 0.12  |
| 2003 | 0.11  | 0.13  |
| 2004 | 0.15  | 0.11  |
| 2005 | 0.17  | 0.13  |
| 2006 | 0.23  | 0.13  |
| 2007 | 0.20  | 0.14  |
| 2008 | 0.15  | 0.12  |
| 2009 | 0.12  | 0.14  |
| 2010 |       | 0.03  |
| 2011 |       |       |
| 2012 | 0.26  | 0.25  |
| 2013 | 0.23  | 0.22  |
| 2014 | 0.30  | 0.32  |
| 2015 |       | 0.15  |
| 2016 |       | 0.22  |
| 2017 | 0.24  | 0.20  |
| 2018 | 0.25  | 0.22  |
| 2019 | 0.26  | 0.28  |
| 2022 | 0.20  | 0.22  |
| 2023 | 0.18  | 0.23  |
| 2024 | 0.11  | 0.19  |

Table 37: Red snapper mean weight (g) by region.

| year | North | South |
|------|-------|-------|
| 1972 | 8072  |       |
| 1973 | 8392  |       |
| 1974 | 4491  |       |
| 1975 | 3493  |       |
| 1976 | 4121  | 1295  |
| 1977 | 4219  | 1505  |
| 1978 | 5207  | 1609  |
| 1979 | 5210  | 2443  |
| 1980 | 3496  | 1827  |
| 1981 | 2899  | 1525  |
| 1982 | 5958  | 1807  |
| 1983 | 4568  | 943   |
| 1984 | 2064  | 1183  |
| 1985 | 1789  | 1022  |
| 1986 | 2666  | 1439  |
| 1987 | 1682  | 1281  |
| 1988 | 1552  | 1717  |
| 1989 | 1994  | 1125  |
| 1990 | 2042  | 1360  |
| 1991 | 2573  | 1609  |
| 1992 | 2326  | 3399  |
| 1993 | 2535  | 2822  |
| 1994 | 1371  | 2183  |
| 1995 | 3113  | 3071  |
| 1996 | 4163  | 2892  |
| 1997 | 4839  | 3279  |
| 1998 | 2850  | 2467  |
| 1999 | 3127  | 2764  |
| 2000 | 3676  | 2472  |
| 2001 | 2460  | 2923  |
| 2002 | 2804  | 2627  |
| 2003 | 4152  | 2754  |
| 2004 | 4457  | 2940  |
| 2005 | 6780  | 2912  |
| 2006 | 5563  | 3069  |
| 2007 | 4378  | 2632  |
| 2008 | 3172  | 2583  |
| 2009 | 3035  | 2867  |
| 2010 |       | 2785  |
| 2011 |       | 3520  |
| 2012 | 2018  | 2508  |
| 2013 | 2319  | 3335  |
| 2014 | 2102  | 2274  |
| 2015 |       | 2425  |
| 2016 |       | 2527  |
| 2017 | 2856  | 3007  |
| 2018 | 3447  | 3079  |
| 2019 | 3568  | 2896  |
| 2022 | 1082  | 2469  |
| 2023 | 2000  | 2885  |
| 2024 | 3550  | 3401  |

Table 38: Red snapper weight CV in g by region.

| year | North | South |
|------|-------|-------|
| 1972 | 0.34  |       |
| 1973 | 0.27  |       |
| 1974 | 0.73  |       |
| 1975 | 0.85  |       |
| 1976 | 0.64  | 1.31  |
| 1977 | 0.53  | 1.18  |
| 1978 | 0.63  | 1.38  |
| 1979 | 0.67  | 1.11  |
| 1980 | 1.25  | 1.45  |
| 1981 | 0.92  | 1.30  |
| 1982 | 0.70  | 0.88  |
| 1983 | 0.68  | 1.15  |
| 1984 | 1.13  | 1.31  |
| 1985 | 1.14  | 1.14  |
| 1986 | 0.84  | 1.07  |
| 1987 | 0.72  | 1.03  |
| 1988 | 1.09  | 1.14  |
| 1989 | 0.81  | 1.28  |
| 1990 | 0.66  | 1.19  |
| 1991 | 1.13  | 1.14  |
| 1992 | 0.48  | 0.79  |
| 1993 | 0.49  | 0.73  |
| 1994 | 0.89  | 0.78  |
| 1995 | 0.45  | 0.58  |
| 1996 | 0.53  | 0.52  |
| 1997 | 0.37  | 0.69  |
| 1998 | 0.88  | 0.28  |
| 1999 | 0.66  | 0.46  |
| 2000 | 0.58  | 0.27  |
| 2001 | 0.20  | 0.50  |
| 2002 | 0.37  | 0.47  |
| 2003 | 0.49  | 0.58  |
| 2004 | 0.36  | 0.47  |
| 2005 | 0.39  | 0.50  |
| 2006 | 0.52  | 0.57  |
| 2007 | 0.61  | 0.63  |
| 2008 | 0.63  | 0.56  |
| 2009 | 0.47  | 0.55  |
| 2010 |       | 0.07  |
| 2011 |       |       |
| 2012 | 0.81  | 0.71  |
| 2013 | 0.69  | 0.64  |
| 2014 | 1.04  | 0.95  |
| 2015 |       | 0.44  |
| 2016 |       | 0.65  |
| 2017 | 0.76  | 0.62  |
| 2018 | 0.74  | 0.60  |
| 2019 | 0.84  | 0.72  |
| 2022 | 0.35  | 0.75  |
| 2023 | 0.54  | 0.67  |
| 2024 | 0.34  | 0.53  |

## 5 Figures

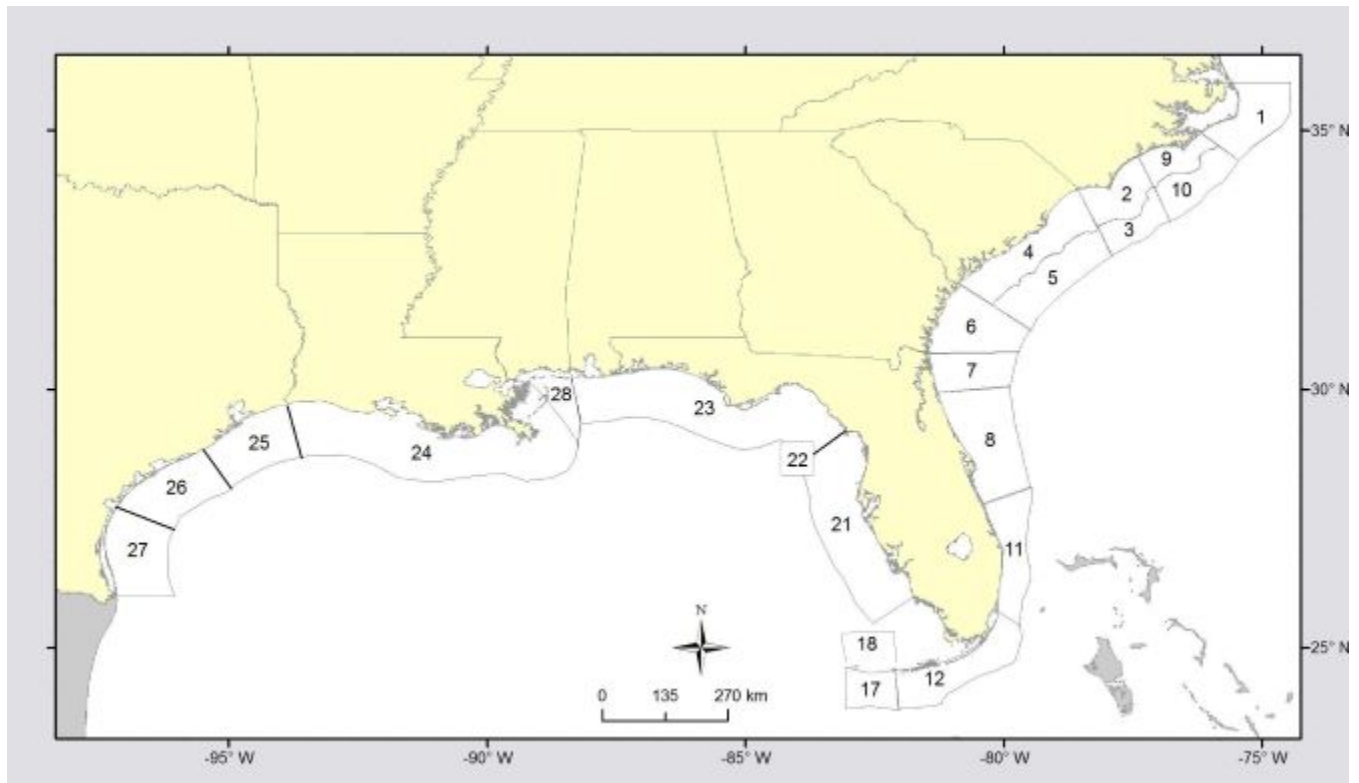


Figure 1: Headboat sampling areas prior to 2013.

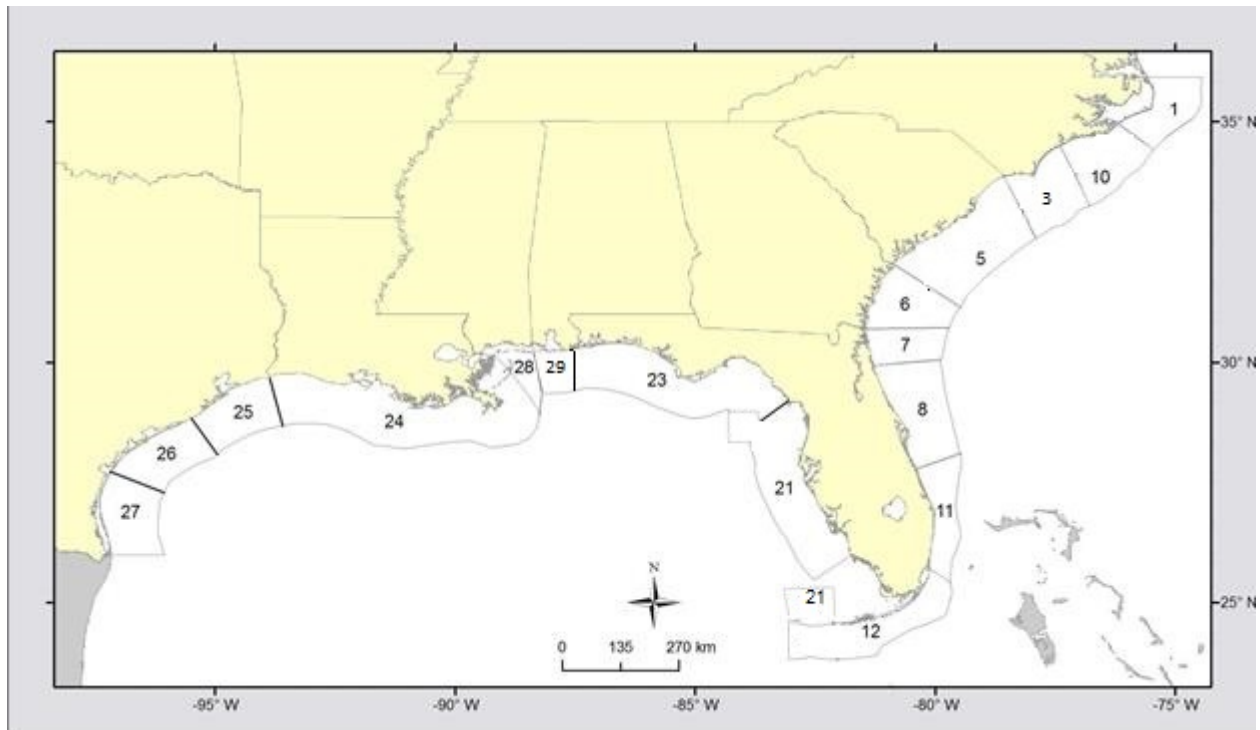


Figure 2: Headboat sampling areas 2013 - present.

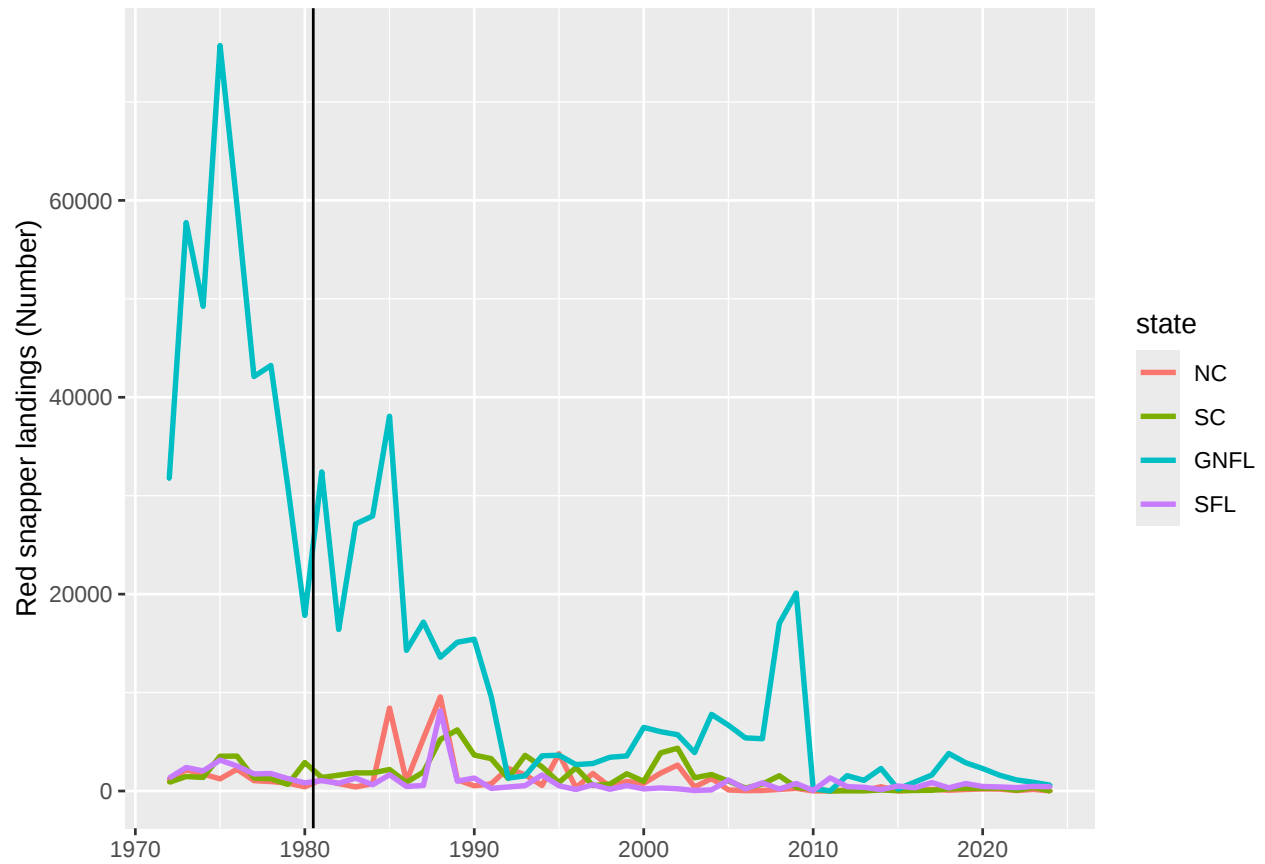


Figure 3: Red snapper landings in number. The vertical line separates the 2 stanzas for estimating landings. The values from 1972-1976 include corrections for species identification and imputed values for GNFL. The SFL landings were imputed for 1972-1980.

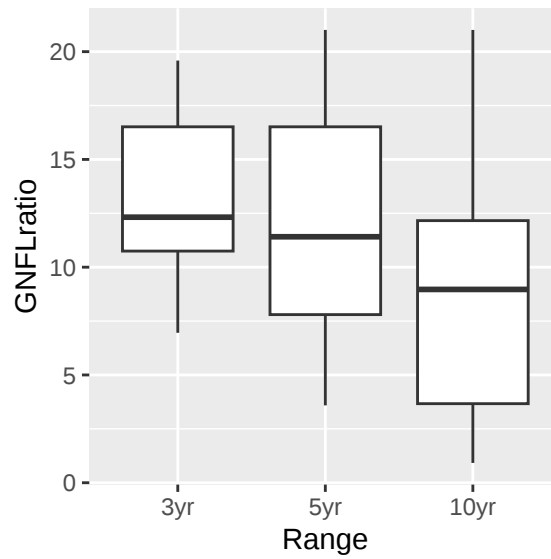


Figure 4: Red snapper ratio of landings from GNFL to NC + SC for the first 3 (1976-1978), 5 (1976-1980) and 10 (1976-1985) years with all areas estimated.

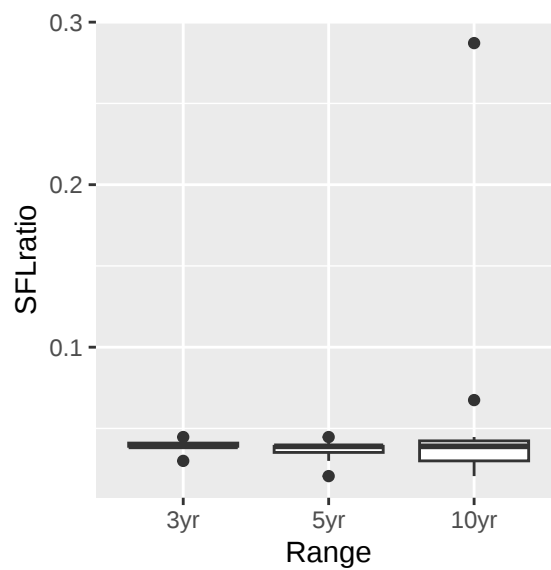


Figure 5: Red snapper ratio of landings from SFL to NC + SC+GNFL for the first 3 (1981-1983), 5 (1981-1985) and 10 (1981-1990) years with all areas estimated.

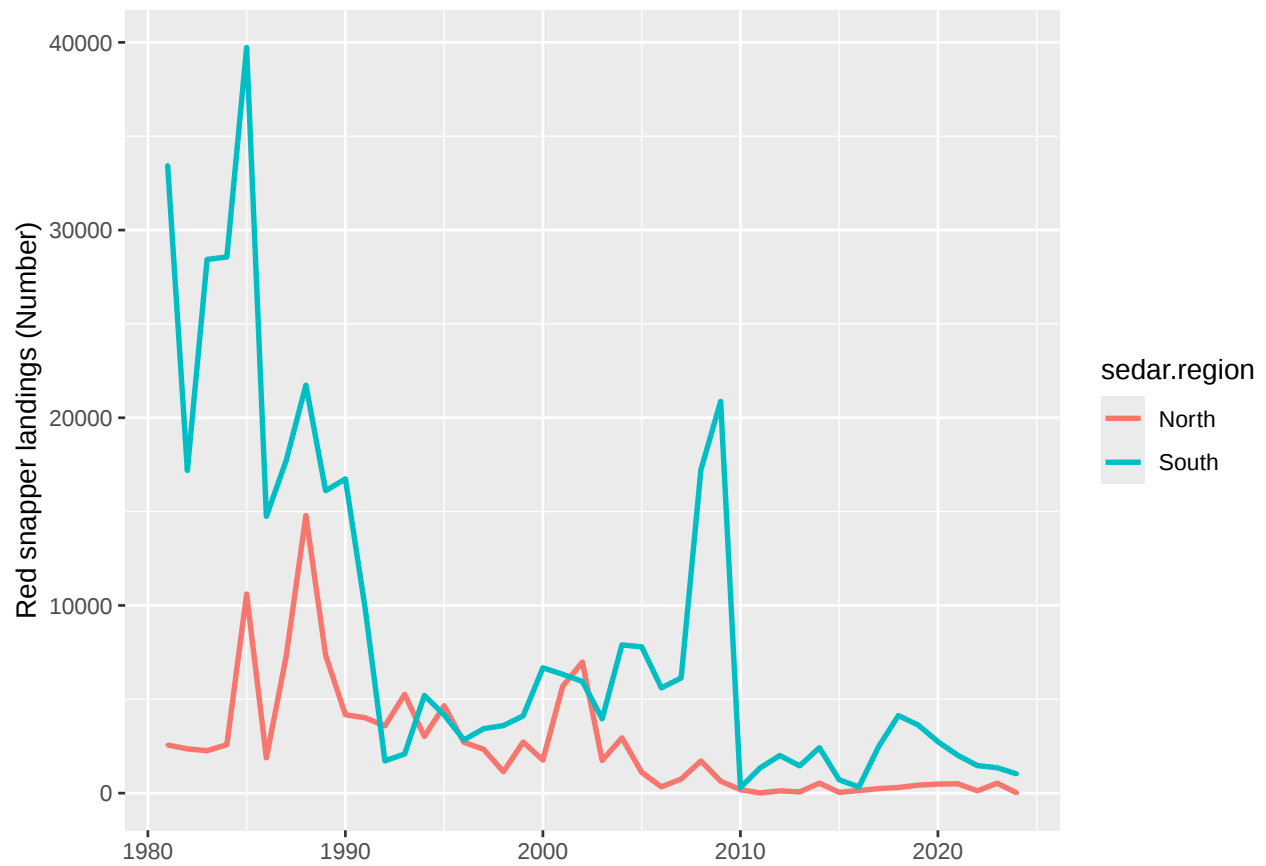


Figure 6: Red snapper landings in number by region.

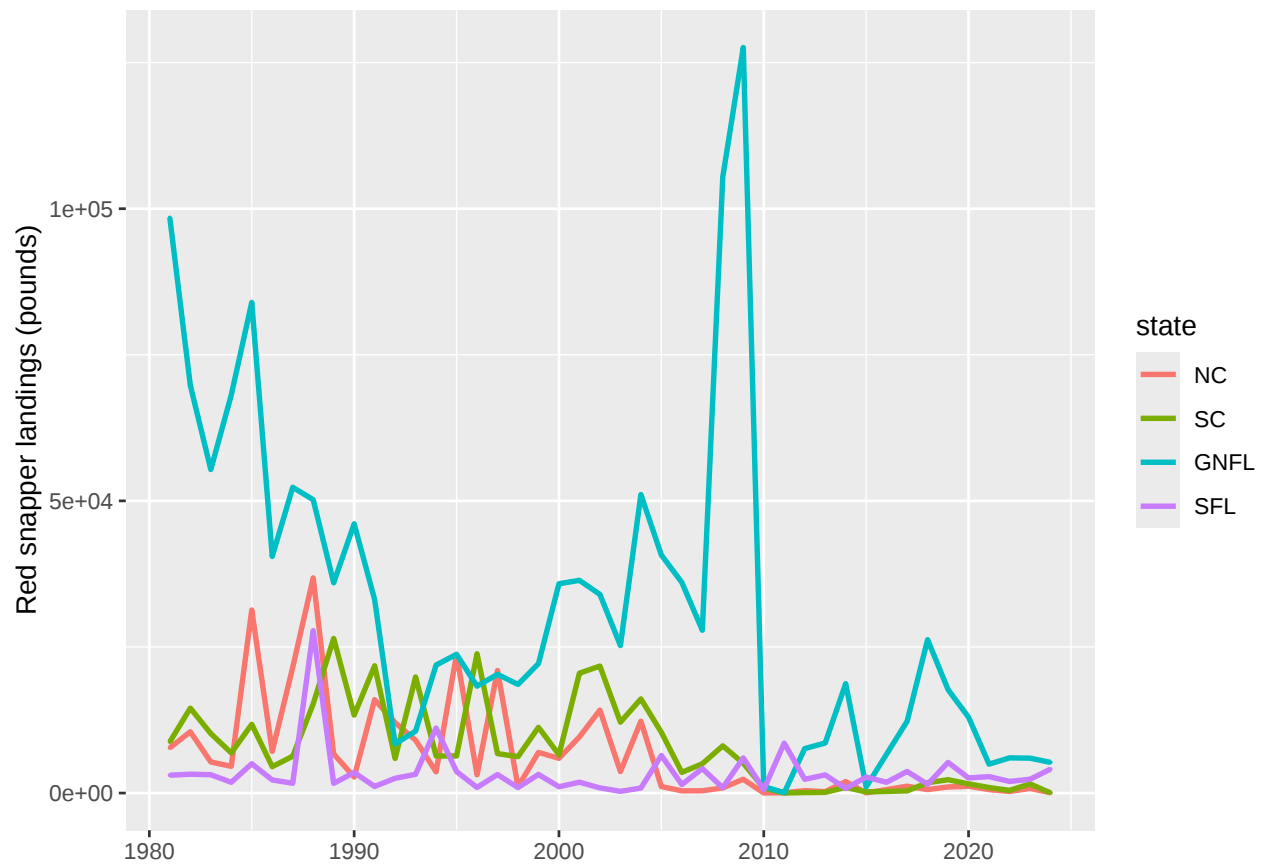


Figure 7: Red snapper landings in pounds.

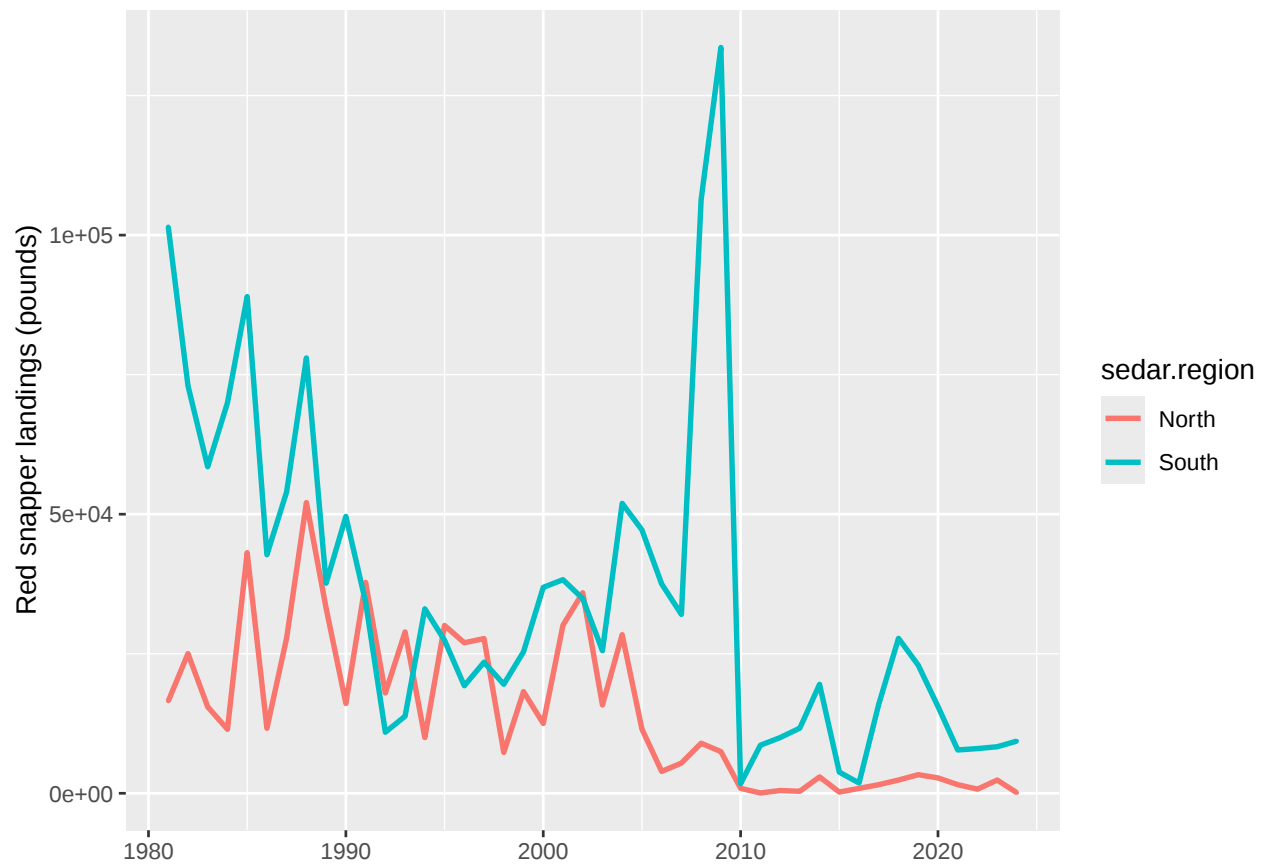


Figure 8: Red snapper landings in pounds by region.

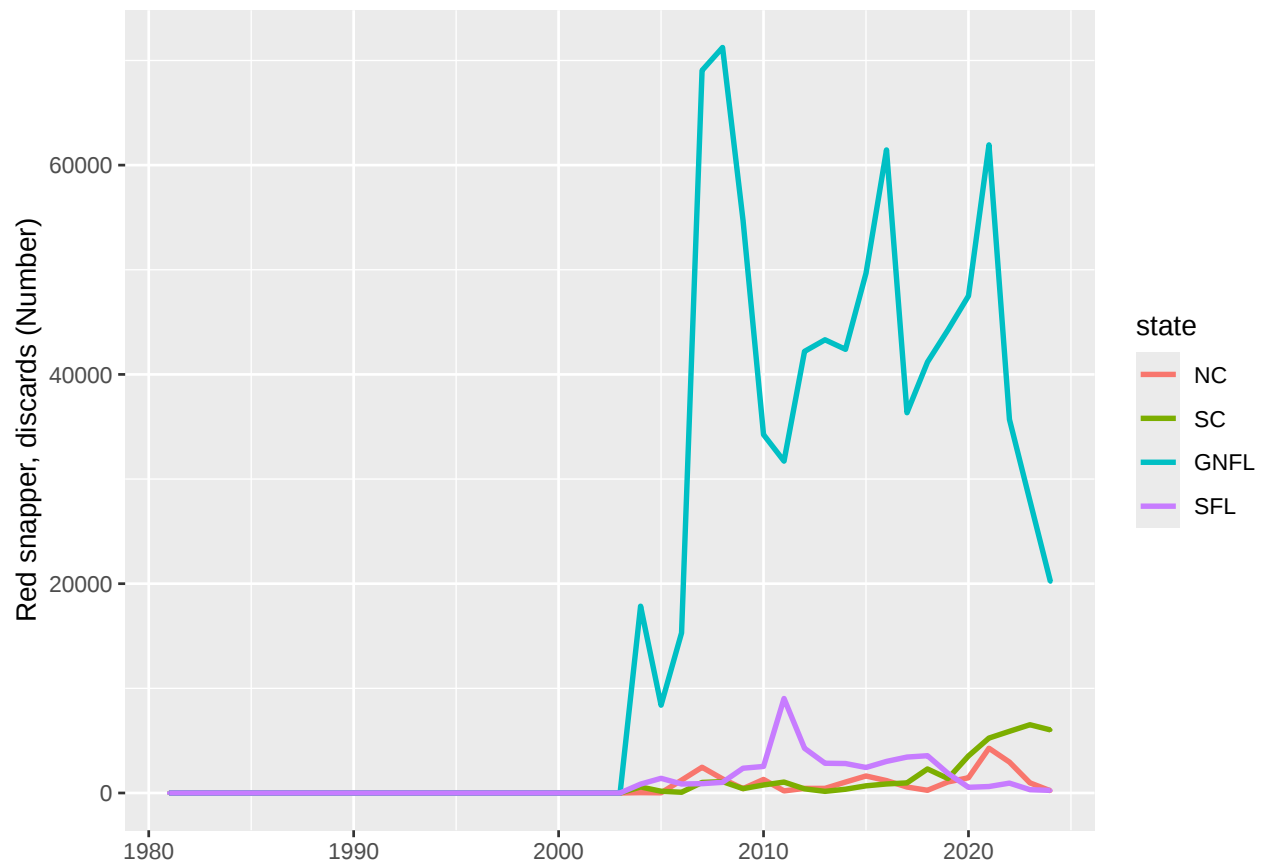


Figure 9: Red snapper discards in number

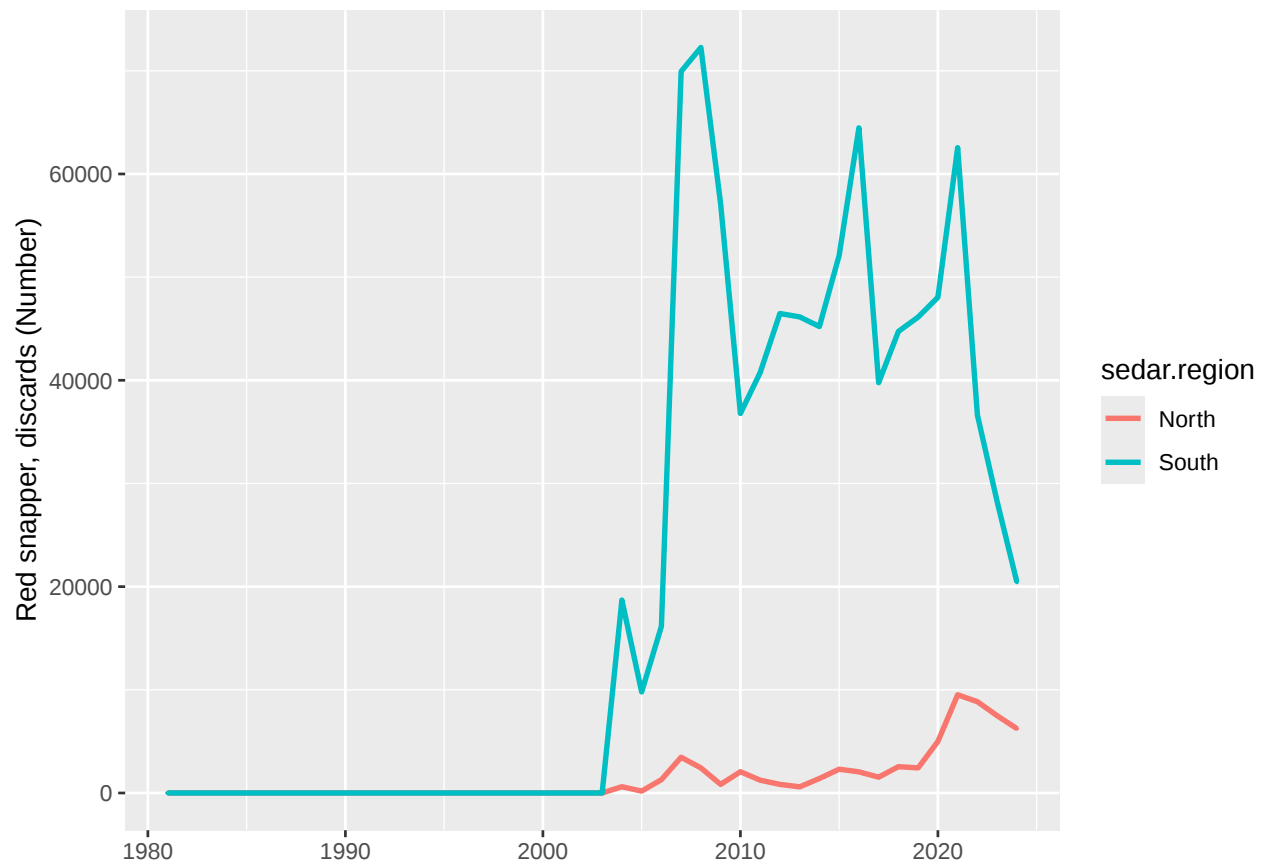


Figure 10: Red snapper discards in number by region

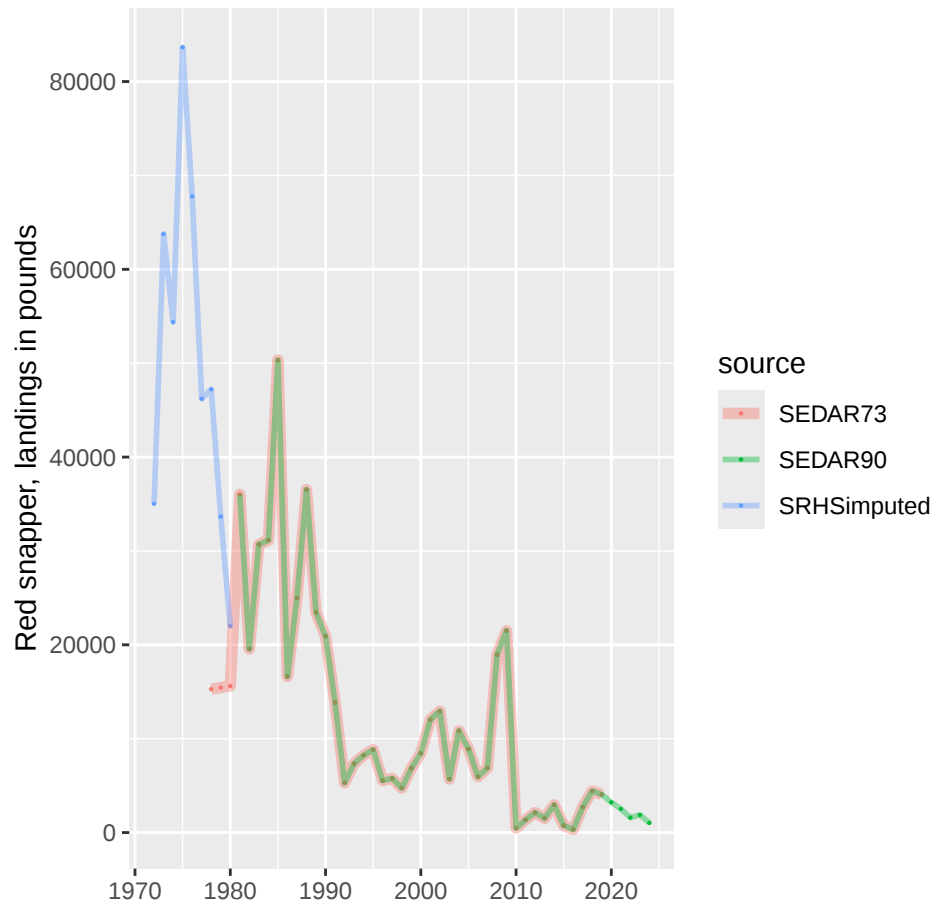


Figure 11: Comparison to SEDAR 73 Red snapper landings in number and SRHS early stanza (1972-1980) landings estimates . The SRHS early stanza landings estimates removed other snappers and imputed values for GNFL (1972-1976) and imputed values for SFL (1972-1980).

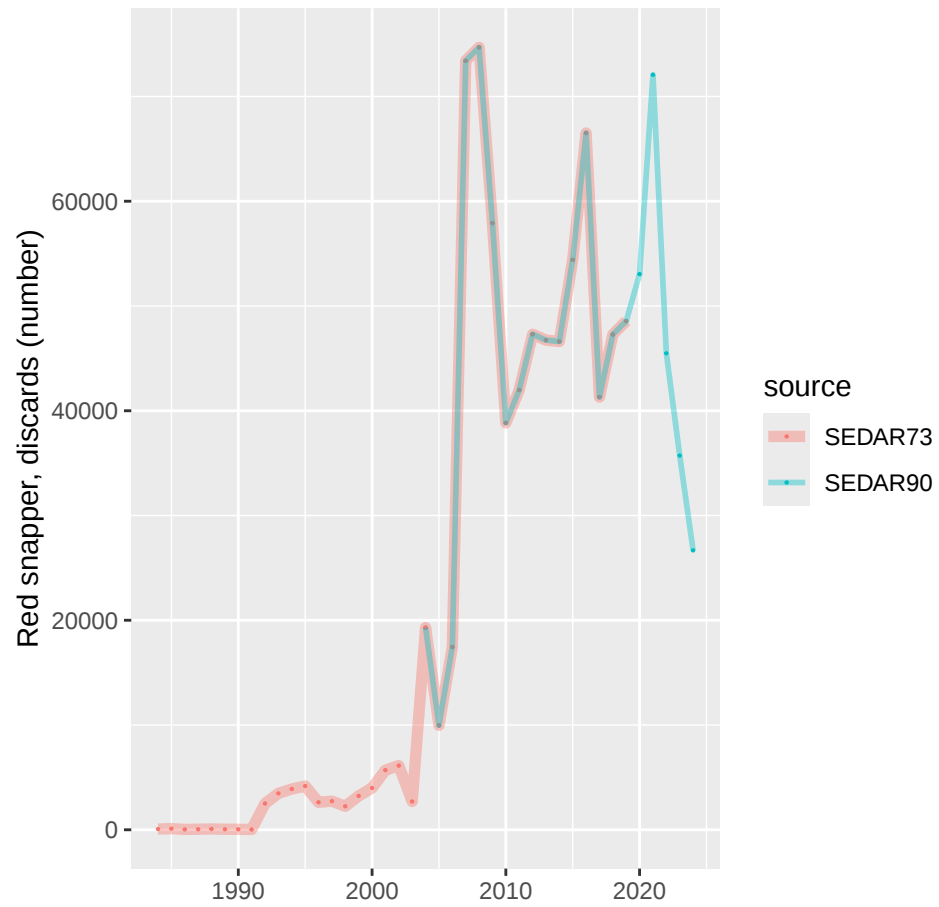


Figure 12: Comparison to SEDAR 73 Red snapper discards in number.

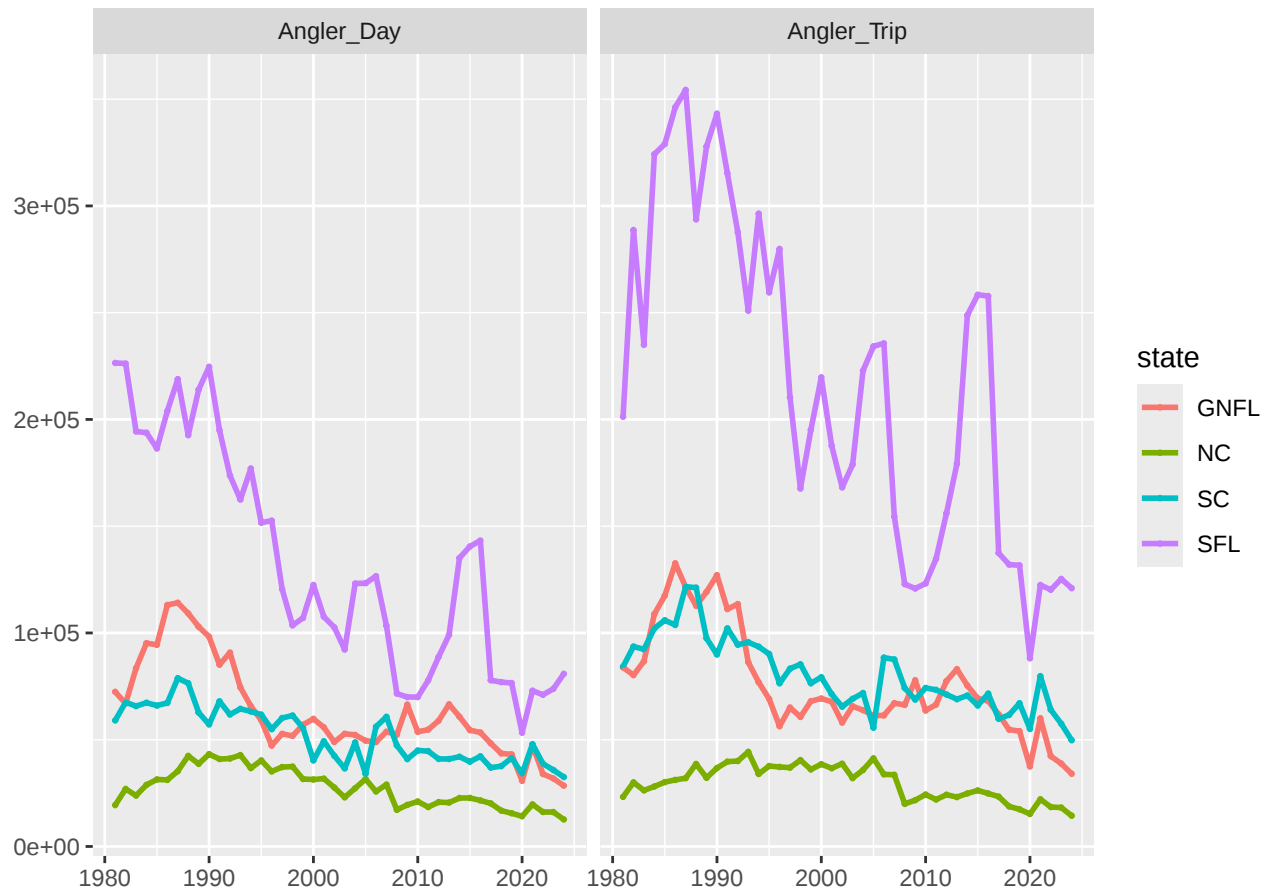


Figure 13: SRHS total estimated angler days and angler trips by state.

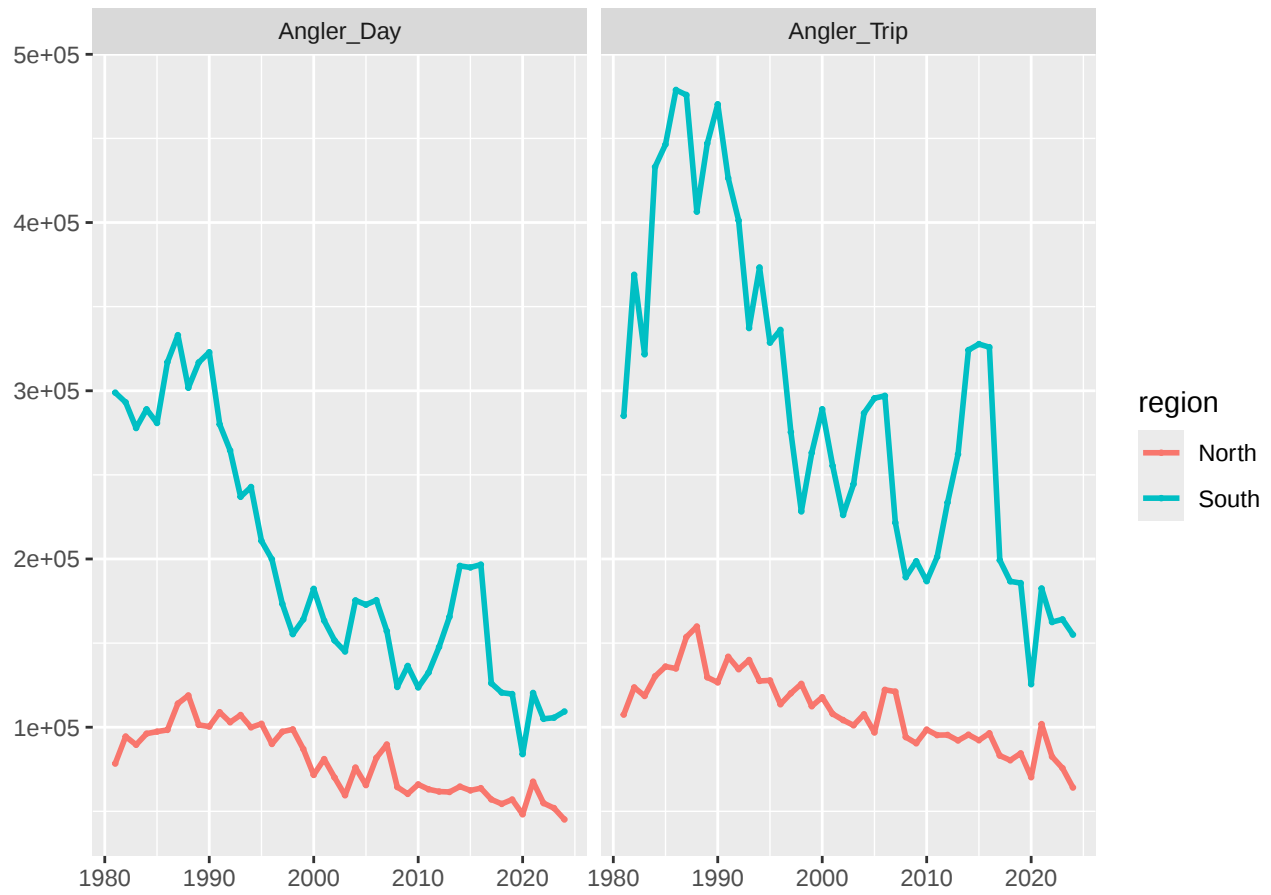


Figure 14: SRHS total estimated angler days and angler trips by region. North represents the Atlantic from NC to SC, South represents the Atlantic from Georgia to the Florida Keys.

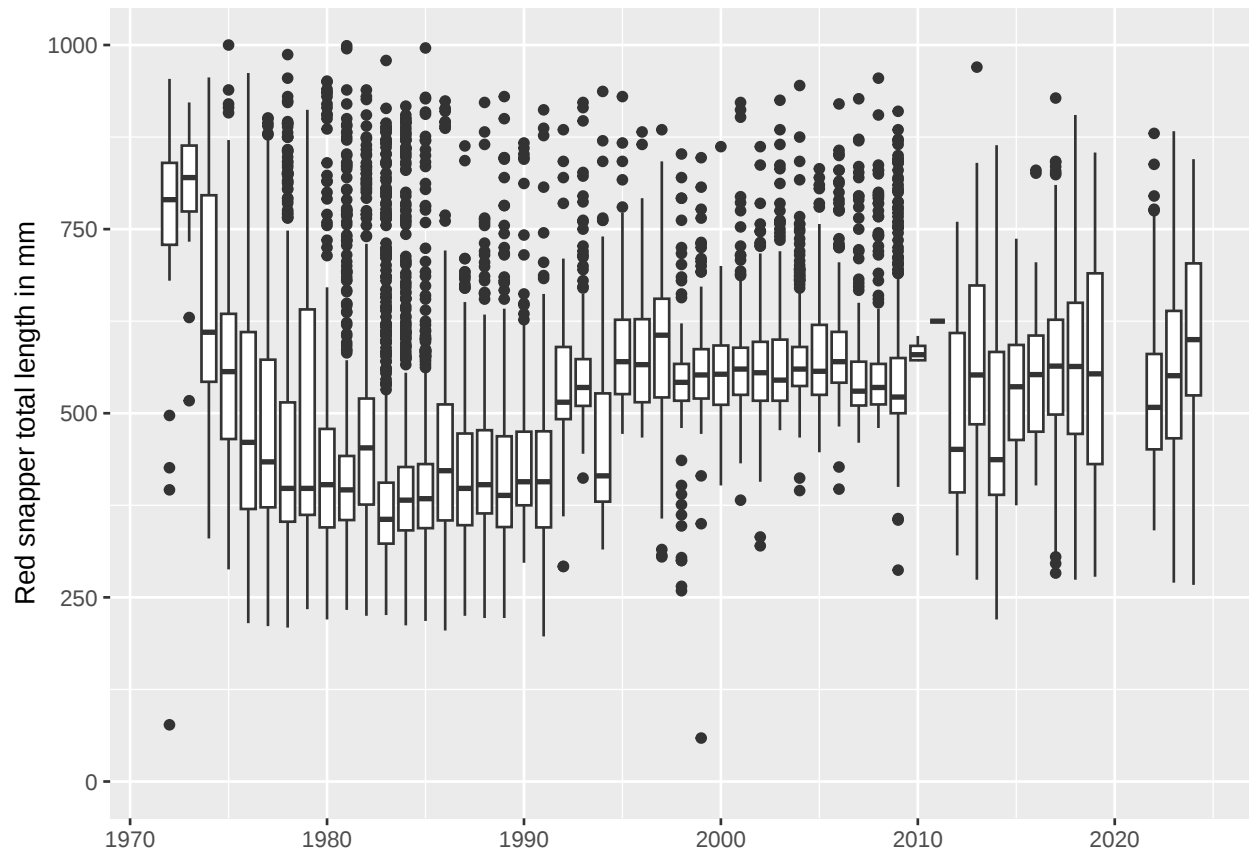


Figure 15: Red snapper total length.

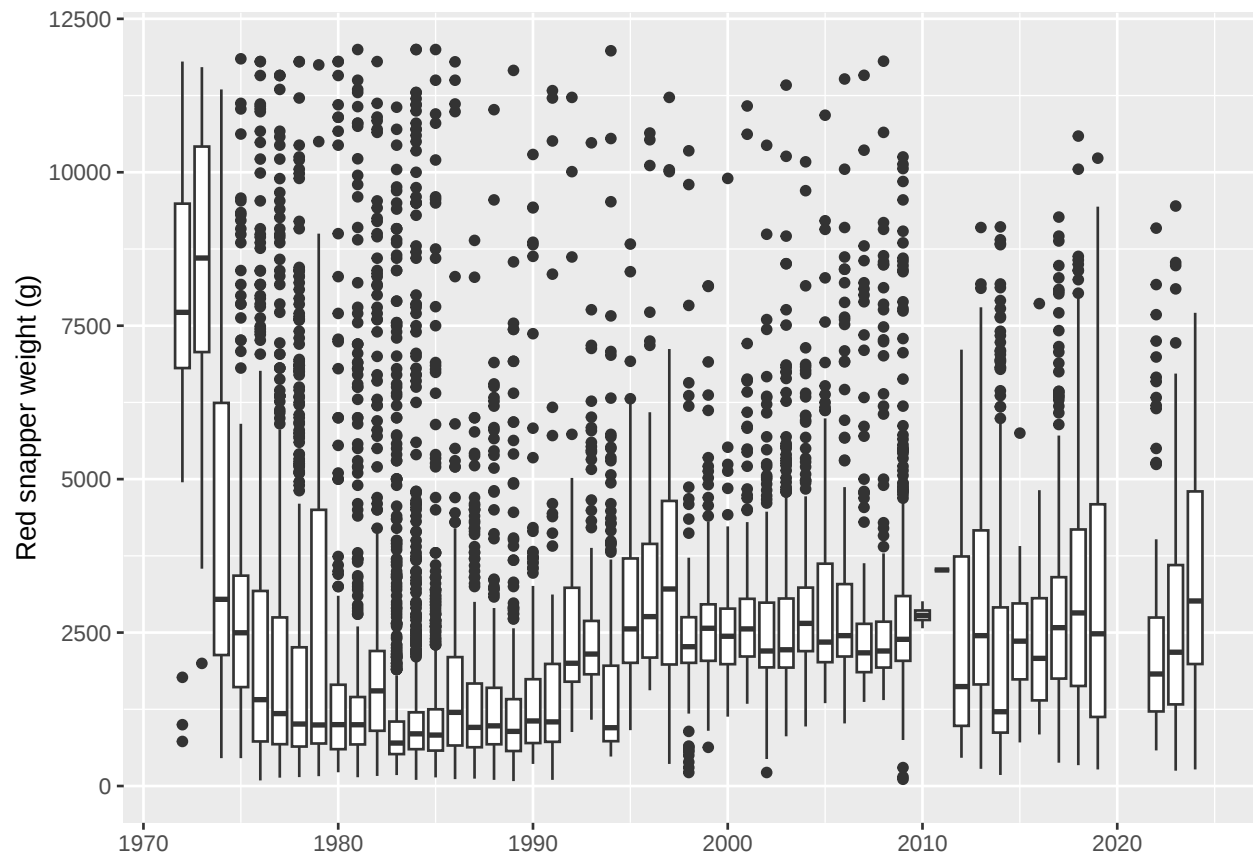


Figure 16: Red snapper weight (g).

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