SEDAR 17-DW-06

Preliminary Draft of

SEDAR 17 Data Workshop Spanish Mackerel Report

Commercial Fishery (Section 3)

Douglas Vaughan
Sustainable Fisheries Branch
Southeast Fisheries Science Center
101 Pivers Island Road
Beaufort, North Carolina 28516

Summary. This report serves as an initial draft of the report of the Commercial Workgroup for the SEDAR 17 Data Workshop Report on Spanish mackerel. In particular, it presents analyses of NMFS data sets on Spanish mackerel obtained from the NMFS website and from the Accumulated Landings System (ALS) of the SEFSC. These data were explored to address questions concerning:

(1) Geographic range: recommend that landings be used from Maine to Florida. The stock boundary in Florida with the Gulf of Mexico stock is based on landings from counties north of the Dade/Monroe county line as specified in the Mackerel FMP.
(2) Duration: recommend earliest year of available data, or 1950 as used in SEDAR 15 red snapper assessment? Final year will be 2007 (including Jan-Feb of 2008).
(3) Fishing year: recommend use of fishing year based on latest regulatory requirement (March 1 – February 28/29).
(4) Mis-identification: this was not an issue in previous assessments.
(5) Unclassified mackerels: there is not a category for this.
(6) Grouping of gear codes: There are four major gears: Gillnets (400-530), castnets (735), handlines (600-690) and pound nets (275-289). Minimal amount of landings from remaining gears can be lumped with gillnets.

State-specific landings data will be brought to the SEDAR 17 DW, and summarized by the respective state representatives. **State-specific summaries will provide the primary landings data for the Spanish mackerel stock assessment.** The ALS and other commercial landings data sources will be used to provide historical landings prior to those available from the individual states, and for states north of North Carolina. Preliminary annual length compositions by gear were provided by David Gloeckner for incorporation in this report.

Additional topics will be discussed and included in this report during the SEDAR 17 DW: (1) discard estimates by gear from commercial logbooks, (2) discard estimates from the shrimp trawl fishery, (3) information on length and age samples from TIP and other sources, and development of length and age compositions by gear for which sample size was deemed minimally adequate, and (4) research recommendations.

3 Commercial Fishery

Chair: Douglas Vaughan (NMFS Beaufort); Members: Alan Bianchi (NC DMF), Jack Holland (NC DMF), Fritz Rohde (NC DMF), Robert Wiggers (SC DNR), Julie Califf (GA DNR), Steve Brown (FL FWI), Dave Gloeckner (NMFS Beaufort), Kevin McCarthy (NMFS Miami), Kate Siegfried (NMFS Panama City).

3.1 Overview

Historical commercial landings data were explored to address several issues. These issues included: (1) geographic stock boundaries, (2) historical perspective of landings data (duration of data for stock assessment), (3) grouping of commercial gears for pooling landings, (4) mis-identification of species or need to expand unclassified mackerel landings (this category does not exist), and (5) final presentation of landings as gutted or whole weight. Subsequently, commercial landings for the U.S. South Atlantic Spanish mackerel stock were developed for the period 1950 through 2007.

3.2 Commercial Landings

3.2.1 NMFS Website for Commercial Landings

The NMFS website for commercial landings:

http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html

was queried for all Spanish mackerel landings along the Atlantic coast by state. This query produced annual landings by state and gear from 1950-2006 for Florida (east coast) to Maine (by region in Figure 3.1).

Decision 1. Because Spanish mackerel landings were reported as far north as Maine, the Workgroup recommends using commercial landings from along the entire US Atlantic coast to represent landings from the Atlantic Spanish mackerel stock.

Commercial landings data from the NMFS website are split for Florida into the Florida East Coast (Atlantic) and Florida West Coast (Gulf of Mexico) based on county landed. Landings from the Atlantic coast counties from Dade and north are considered given as Atlantic Florida. More detailed monthly landings data are available back to 1990. Currently data are available through the 2006 calendar year. Landings have been requested from the NMFS Northeast Regional Office for states north of North Carolina, and results will be compared to those downloaded from the NMFS website.

Commercial landings data from the northern states (Virginia through Maine) were summarized by gear, to determine which gears are most important for landing Spanish mackerel. Pound nets were found to be most important (69% of landings by weight),

followed by gillnets (22.6%), and smaller amounts by haul seines (3.3%), trawls (3.0%) and other gears (2.3%).

[Paragraph on how far back we should take Spanish mackerel landings? At least to 1950! As with red snapper (SEDAR 15) we have historical landings back to the 1920s, with gaps during and following WWII. We could provide estimates back to 1900 as per red snapper, but should we?]

Decision 2. With reasonably reliable data back to 1950, the Workgroup recommends that estimates of commercial landings be extended back to 1950.

3.2.2 **Accumulated Landings System (ALS)**

Historical commercial landings (1962 to present) for the US South Atlantic are maintained in the Accumulated Landings System (ALS) at the SEFSC. For detailed description of the Accumulated Landing System (ALS), see addendum to this section. These data were made available by Josh Bennett (NMFS Miami), and include landings from North Carolina through the Gulf of Mexico. The boundary of the Atlantic stock with the Gulf of Mexico stock is defined [Amendment 2 to the Coastal Migratory Pelagic Resources (Mackerels) FMP] as "*The Dade/Monroe county line (25^{o} 20.4' N. latitude in south Florida is to be the migratory group boundary for Spanish mackerel. Commercial fishery landings … have historically included Monroe County landings with the Gulf. There are few commercial landings of Dade and Palm Beach Counties and few ports available north of Marathon in Monroe County. Thus, there is a broad area of low catch on either side of this line which will facilitate enforcement.*" Rationale given in Amendment 2 was: *"While the stock identification for Spanish mackerel is not well defined, there is some evidence of Gulf and South Atlantic subpopulations with a mixing zone off south Florida, Williams, Murphy, and Muller (1985). The Councils' Stock Assessment Panel basing its recommendation on evidence from the electrophoresis studies, distributional patterns, spawning areas, and the history of exploitation suggested the Dade/Monroe County, Florida boundary as being a practical boundary because both recreational and commercial catch data for the Gulf and Atlantic have used this boundary. Dade County is the Miami area; while Monroe County includes the Florida Keys."* This demarcation was implemented in the ALS database by using only landings, rather than catches, associated with the Atlantic coast of Florida (i.e., ALSSTATE = 10). See maps showing shrimp statistical areas for the Gulf of Mexico and U.S. Atlantic coasts (Figure 3.2) and Florida statistical areas (Figure 3.3).

Decision 3. Based on the definition given for the southern boundary in Amendment 2 to the Coastal Pelagics (Mackerels) FMP, the Workgroup recommends using that definition as implemented below.

Spanish mackerel landings by region (Atlantic Florida, Georgia-North Carolina, and Virginia-Maine) are summarized in Table 3.1 and Figure 3.4 (estimates for Virginia-Maine from NMFS website). The ALS landings were compared to the landings from the NMFS website in Figure 3.5, with data available for the South Atlantic states (FL-NC)

from both sources for 1962-2006. Landings from these data agree remarkably well, with no deviations in many years.

Florida's commercial fishery dominates the Atlantic coastal stock of Spanish mackerel, with 77.3% of the landings for the recent period 1997-2006 (their landings represented even higher percentages historically). The remaining south Atlantic states (Georgia-North Carolina) accounted for 17.4% (same time period), and more northern states (Virginia-Maine) accounted for the remaining 5.4%

For the state of Florida, the ALS contains two databases. The primary database contains landings for all southern states by month and gear generally for 1962-2007. However, for the period 1977-1996 for Florida does not have gear specific information, with landings by gear listed as by combined gear. The other database just contains gear information from Florida for the period 1977-1996, but with no corresponding month information (month = 13). The proportion by gear from this second data base was applied to the "combined gear" landings from the first data base for the period 1977-1996.

These data were analyzed to assess the importance of the different commercial gears to the Spanish mackerel landings from the US south Atlantic (Florida-North Carolina) for the period 1962-2007. About 88% of Florida's commercial landings were by gillnets (mostly gear code 475), with lesser amounts from handlines (5.2%) and more recently castnets (6.8%). This latter category (code 735) shows up starting in 1995, with landings similar, or exceeding, gillnets since 2003. This gear is apparently in response to Florida's net ban. For Georgia – North Carolina, gillnets representing over 74% of the landings from this region, with significant landings by pound nets (11.4%), haul seines (8.2%), and handlines (4.3%). Landings by gear are summarized in Table 3.2 and Figure 3.6.

Decision 4. The Workgroup recommends that landings by fishing gear be reduced to four categories, gillnets, castnets, pound nets and handlines. The small percentage from miscellaneous other gears can be pooled with gillnets.

Because Atlantic Spanish mackerel management currently prescribes a fishing year from March 1 through February 28 (Amendment 15 to the Coastal Pelagic (Mackerel) FMP, the ALS database was used to investigate landings by month. We considered monthly landings separately from Florida and from the other southern states (Georgia-North Carolina) using the ALS database. Data for the northern states downloaded from the NMFS website by month for 1990-2006. Florida's commercial fishery is prosecuted primarily during the winter months (Figure 3.7), with few Spanish mackerel landed between May and September. Spanish mackerel landings are compared between using calendar year and fishing year (Figure 3.8). However, the fisheries to the north, both Georgia-North Carolina (Figure 3.9) and Virginia-Maine (Figure 3.10) are prosecuted principally during the summer and early fall. Only trivial landings from Georgia and north are made during January and February, such that any adjustment in landings to fishing year from calendar year would be minuscule at best (Figures 3.11 and 3.12). However, landings for Florida will be adjusted from calendar to fishing year. Data is available for Florida by month in the ALS since 1977. With no monthly data available for

1950 (or earlier) through 1976, adjustments will be based on an average from subsequent years when monthly data is available (e.g., 1977-1996).

Decision 5. The Workgroup recommends that commercial landings be aligned to the current fishing year definition, principally Atlantic Florida.

The workgroup will need to decide on which years to average over, for determining historical fishing year landings for Florida prior to the availability of monthly landings data in the ALS (prior to 1977).

3.2.3 **Commercial Landings Developed from State Databases**

Decision 6. [To present landings in whole or gutted weight and describe conversions as needed]

Commercial landings in whole weight were developed based on classified Spanish mackerel by the Working Group from each state by gear for fishing years 1950-2007 from state-specific data as supplemented by NMFS data. [These sections need to describe how state biologists prepared their data]

Florida – summary description prepared by Steve Brown.
Georgia – summary description prepared by Julie Califf
South Carolina – summary description prepared by Robert Wiggers
North Carolina – summary description prepared by Alan Bianchi.

[Annual landings in appropriate units by region and gear to be summarized in Tables and Figures]

[Vaughan - paragraph on converting landings in weight to landings in numbers based on TIP and other length sampling, including sample size criterion used to pool across years or even states and years]

3.3. Commercial Price

Price per pound was estimated for Spanish mackerel sold in the South Atlantic states from the ALS database (Atlantic Florida – North Carolina) for the years 1962 through 2007. The Producer Price Index (PPI) for "*prepared fresh fish and other seafood*" was obtained from the U.S. Bureau of Labor Statistics website (data.bls.gov), and this index is available starting in 1965. The PPI, like the CPI, is an index that reflects inflation. But the difference here is that the PPI reflects the inflation in costs associated with bringing the product to market. In other words, this PPI reflects more closely the change in costs to fishermen and processors such as trip costs. Using the initial year available (1965) as base year (divide annual index value by the 1965 index value), observed price per pound was adjusted to obtain inflation-adjusted values for the price per pound. Unadjusted and adjusted price per pound are compared in Figures 3.13. The observed price the fishermen

received noted a general upwards trend from approximately $0.10 on average in 1965 to $0.82 per pound in 2007. These values were adjusted by dividing them by the PPI index, such that PPI-adjusted values ranges from $0.10 in 1965 to $0.06 in 2007. Over time, the PPI-adjusted values initially declined to a minimum of about $0.04 in 1987 and then increased gradually since then.

3.4. Commercial Discards

3.4.1 Discards in the Commercial Fishery from Logbooks

[Summary of report developed by Kevin McCarthy will be added during the SEDAR 17 DW]

3.4.2 Discards from the Shrimp Trawl Fishery

[Summary of report developed by Kate Siegfried will be added during the SEDAR 17 DW]

3.5 Biological Sampling

Length frequency data were extracted from the TIP Online database. Data from the VA/NC line through Dade County in FL were included in the extraction. All lengths were converted to FL in mm using conversions derived from the Life History Group. We had no conversions for standard length, so these were deleted. Lengths were converted to cm and assigned to 1 cm length bins with a floor of 0.6 cm and a ceiling of 0.5 cm.

3.5.1 Sampling Intensity Length

Annual sample sizes are summarized in Table 3.4 by gear, and state for length data available for greater amberjack in the U.S. South Atlantic from the TIP data base.

Length/Age Distribution

Annual length compositions are created for each commercial gear using the following approach for weighting lengths across individual trips and by state:

- Trips: expand lengths by trip catch in numbers,
- State: expand lengths by landings in numbers.

Unweighted annual length compositions of Spanish mackerel for various commercial gears are summarized in Figures 3.14 – 3.20. Sample sizes are summarized for 1980-2008 in Table 3.8.

[**Summary paragraph describing sampling for ages (Table 3.4) and annual figures by gear to be supplied by Panama City**]

3.5.3 Adequacy for characterizing lengths

[Discussion of sampling adequacy for lengths and ages]

3.6 Research Recommendations for Spanish mackerel

[To be developed during SEDAR 17 DW]

==========

Addendum to Commercial Landings (Section 3.2):

NMFS SEFIN Accumulated Landings (ALS)

Information on the quantity and value of seafood products caught by fishermen in the U.S. has been collected as early as the late1890s. Fairly serious collection activity began in the 1920s. The data set maintained by the Southeast Fisheries Science Center (SEFSC) in the SEFIN database management system is a continuous data set that begins in 1962.

In addition to the quantity and value, information on the gear used to catch the fish, the area where the fishing occurred and the distance from shore are also recorded. Because the quantity and value data are collected from seafood dealers, the information on gear and fishing location are estimated and added to the data by data collection specialists. In some states, this ancillary data are not available.

Commercial landings statistics have been collected and processed by various organizations during the 1962-to-present period that the SEFIN data set covers. During the 16 years from 1962 through 1978, these data were collected by port agents employed by the Federal government and stationed at major fishing ports in the southeast. The program was run from the Headquarters Office of the Bureau of Commercial Fisheries in Washington DC. Data collection procedures were established by Headquarters and the data were submitted to Washington for processing and computer storage. In 1978, the responsibility for collection and processing were transferred to the SEFSC.

In the early 1980s, the NMFS and the state fishery agencies within the Southeast began to develop a cooperative program for the collection and processing of commercial fisheries statistics. With the exception of two counties, one in Mississippi and one in Alabama, all of the general canvass statistics are collected by the fishery agency in the respective state and provided to the SEFSC under a comprehensive Cooperative Statistics Program (CSP).

The purpose of this documentation is to describe the current collection and processing procedures that are employed for the commercial fisheries statistics maintained in the SEFIN database.

1960 - Late 1980s
==========

Although the data processing and database management responsibility were transferred from the Headquarters in Washington DC to the SEFSC during this period, the data collection procedures remained essentially the same. Trained data collection personnel, referred to as fishery reporting specialists or port agents, were stationed at major fishing ports throughout the Southeast Region. The data collection procedures for commercial landings included two parts.

The primary task for the port agents was to visit all seafood dealers or fish houses within their assigned areas at least once a month to record the pounds and value for each species or product type that were purchased or handled by the dealer or fish house. The agents summed the landings and value data and submitted these data in monthly reports to their area supervisors. All of the monthly data were submitted in essentially the same form.

The second task was to estimate the quantity of fish that were caught by specific types of gear and the location of the fishing activity. Port agents provided this gear/area information for all of the landings data that they collected. The objective was to have gear and area information assigned to all monthly commercial landings data.

There are two problems with the commercial fishery statistics that were collected from seafood dealers. First, dealers do not always record the specific species that are caught and second, fish or shellfish are not always purchased at the same location where they are unloaded, i.e., landed.

Dealers have always recorded fishery products in ways that meet their needs, which sometimes make it ambiguous for scientific uses. Although the port agents can readily identify individual species, they usually were not at the fish house when fish were being unloaded and thus, could not observe and identify the fish.

The second problem is to identify where the fish were landed from the information recorded by the dealers on their sales receipts. The NMFS standard for fisheries statistics is to associate commercial statistics with the location where the product was first unloaded, i.e., landed, at a shore-based facility. Because some products are unloaded at a dock or fish house and purchased and transported to another dealer, the actual 'landing' location may not be apparent from the dealers' sales receipts. Historically, communications between individual port agents and the area supervisors were the primary source of information that was available to identify the actual unloading location.

Cooperative Statistics Program

In the early 1980s, it became apparent that the collection of commercial fisheries statistics was an activity that was conducted by both the Federal government and individual state fishery agencies. Plans and negotiations were initiated to develop a program that would provide the fisheries statistics that are needed for management by both Federal and state agencies. By the mid- 1980s, formal cooperative agreements had been signed between the NMFS/SEFSC and each of the eight coastal states in the southeast, Puerto Rico and the US Virgin Islands.

Initially, the data collection procedures that were used by the states under the cooperative agreements were essentially the same as the historical NMFS procedures. As the states developed their data collection programs, many of them promulgated legislation that authorized their fishery agencies to collect fishery statistics. Many of the state statutes include mandatory data submission by seafood dealers.

Because the data collection procedures (regulations) are different for each state, the type and detail of data varies throughout the Region. The commercial landings database maintained in SEFIN contains a standard set of data that is consistent for all states in the Region.

A description of the data collection procedures and associated data submission requirements for each state follows.

Florida

Prior to 1986, commercial landings statistics were collected by a combination of monthly mail submissions and port agent visits. These procedures provided quantity and value, but did not provide information on gear, area or distance from shore. Because of the large number of dealers, port agents were not able to provide the gear, area and distance information for monthly data. This information, however, is provided for annual summaries of the quantity and value and known as the Florida Annual Canvas data (see below).

Beginning in 1986, mandatory reporting by all seafood dealers was implemented by the State of Florida. The State requires that a report (ticket) be completed and submitted to the State for every trip. Dealers have to report the type of gear as well as the quantity (pounds) purchased for each species. Information on the area of catch can also be provided on the tickets for individual trips. As of 1986 the ALS system relies solely on the Florida trip ticket data to create the ALS landings data for all species other than shrimp.

Georgia

Prior to 1977, the National Marine Fisheries Service collected commercial landings data Georgia. From 1977 to 2001 state port agents visited dealers and docks to collect the information on a regular basis. Compliance was mandatory for the fishing industry. To collect more timely and accurate data, Georgia initiated a trip ticket program in 1999, but the program was not fully implemented to allow complete coverage until 2001. All sales of seafood products landed in Georgia must be recorded on a trip ticket at

the time of the sale. Both the seafood dealer and the seafood harvester are responsible for insuring the ticket is completed in full.

South Carolina
==========
Prior to 1972, commercial landings data were collected by various federal fisheries agents based in South Carolina, either U.S. Fish or Wildlife or National Marine Fisheries Service personnel. In 1972, South Carolina began collecting landings data from coastal dealers in cooperation with federal agents. Mandatory monthly landings reports on forms supplied by the Department are required from all licensed wholesale dealers in South Carolina. Until fall of 2003, those reports were summaries collecting species, pounds landed, disposition (gutted or whole) and market category, gear type and area fished; since September 2003, landings have been reported by a mandatory trip ticket system collecting landings by species, disposition and market category, pounds landed, ex-vessel prices with associated effort data to include gear type and amount, time fished, area fished, vessel and fisherman information.

South Carolina began collecting TIP length frequencies in 1983 as part of the Cooperative Statistics Program. Target species and length quotas were supplied by NMFS and sampling targets of 10% of monthly commercial trips by gear were set to collect those species and length frequencies. In 2005, South Carolina began collecting age structures (otoliths) in addition to length frequencies, using ACCSP funding to supplement CSP funding.

North Carolina

The National Marine Fisheries Service prior to 1978 collected commercial landings data for North Carolina. Port agents would conduct monthly surveys of the state's major commercial seafood dealers to determine the commercial landings for the state. Starting in 1978, the North Carolina Division of Marine Fisheries entered into a cooperative program with the National Marine Fisheries Service to maintain the monthly surveys of North Carolina's major commercial seafood dealers and to obtain data from more dealers.

The North Carolina Division of Marine Fisheries Trip Ticket Program (NCTTP) began on 1 January 1994. The NCTTP was initiated due to a decrease in cooperation in reporting under the voluntary NMFS/North Carolina Cooperative Statistics Program in place prior to 1994, as well as an increase in demand for complete and accurate trip-level commercial harvest statistics by fisheries managers. The detailed data obtained through the NCTTP allows for the calculation of effort (i.e. trips, licenses, participants, vessels) in a given fishery that was not available prior to 1994 and provides a much more detailed record of North Carolina's seafood harvest.

NMFS SEFIN Annual Canvas Data for Florida

The Florida Annual Data files from 1976 – 1996 represent annual landings by county (from dealer reports) which are broken out on a percentage estimate by species, gear, area of capture, and distance from shore. These estimates are submitted by Port agents, which were assigned responsibility for the particular county, from interviews and discussions from dealers and fishermen collected through out the year. The estimates are processed against the annual landings totals by county on a percentage basis to create the estimated proportions of catch by the gear, area and distance from shore. (The sum of percentages for a given Year, State, County, Species combination will equal 100.)

Area of capture considerations: ALS is considered to be a commercial landings data base which reports where the marine resource was landed. With the advent of some State trip ticket programs as the data source the definition is more loosely applied. As such one cannot assume reports from the ALS by State or county will accurately inform you of Gulf vs South Atlantic vs Foreign catch. To make that determination you must consider the area of capture.

Table 3.1. Spanish mackerel commercial landings (pounds whole weight) for the Atlantic coast. Landings for Florida – North Carolina are from the SEFSC Accumulated Landings System (ALS). Landings for Virginia-Maine were downloaded from the NMFS website. These landings are reported by calendar year, 1950-2007. Years prior to 1962 are all from NMFS website.

	Atlantic Florida					Georgia - North Carolina						Virginia-Maine						Grand
Year	Gillnets	Handlines	Castnets	Other	Total	Gillnets	Handlines	Poundnet	Haul seine	Other	Total	Gillnets	Handlines	Poundnet	Haul seine	Other	Total	Total
1950	3,365,691	193,816	0	17,493	3,577,000	40,640	14,278	11,356	71,469	9,256	147,000	0	0	13,500	0	0	13,500	3,737,500
1951	1,860,210	107,122	0	9,668	1,977,000	56,952	20,008	15,914	100,154	12,971	206,000	0	0	6,400	300	0	6,700	2,189,700
1952	3,232,080	186,122	0	16,798	3,435,000	48,105	16,900	13,442	84,596	10,956	174,000	0	0	2,600	200	0	2,800	3,611,800
1953	3,368,514	193,979	0	17,507	3,580,000	53,911	18,940	15,065	94,806	12,278	195,000	0	0	800	2,100	100	3,000	3,778,000
1954	1,976,885	113,841	0	10,275	2,101,000	91,234	32,052	25,494	160,442	20,779	330,000	0	0	3,500	0	0	3,500	2,434,500
1955	3,046,718	175,448	0	15,835	3,238,000	45,617	16,026	12,747	80,221	10,389	165,000	0	0	5,700	0	0	5,700	3,408,700
1956	4,307,558	248,054	0	22,388	4,578,000	95,934	33,703	26,807	168,707	21,849	347,000	0	0	15,900	700	0	16,600	4,941,600
1957	3,971,648	228,710	0	20,642	4,221,000	68,564	24,087	19,159	120,574	15,616	248,000	0	0	14,900	9,200	0	24,100	4,493,100
1958	6,876,285	395,976	0	35,738	7,308,000	59,717	20,979	16,687	105,016	13,601	216,000	0	0	5,600	1,900	400	7,900	7,531,900
1959	2,213,057	127,441	0	11,502	2,352,000	43,129	15,152	12,052	75,845	9,823	156,000	0	0	16,500	2,400	100	19,000	2,527,000
1960	2,147,193	123,648	0	11,160	2,282,000	124,000	12,044	9,580	60,287	7,808	213,718	0	0	19,900	0	0	19,900	2,515,618
1961	2,971,444	171,113	0	15,444	3,158,000	138,000	13,404	10,661	67,094	8,689	237,848	0	0	122,400	400	400	123,200	3,519,048
1962	2,472,800	104,700	0	800	2,578,300	7,500	21,100	6,600	61,600	0	96,800	0	0	13,700	100	800	14,600	2,689,700
1963	2,070,400	51,500	0	1,500	2,123,400	17,200	24,200	13,900	89,200	0	144,500	0	0	65,500	13,800	0	79,300	2,347,200
1964	1,947,300	54,900	0	0	2,002,200	11,200	10,000	8,500	50,400	700	80,800	0	0	23,700	9,200	300	33,200	2,116,200
1965	2,774,800	124,300	0	1,800	2,900,900	13,300	20,600	16,300	71,900	9,000	131,100	0	0	73,000	1,300	300	74,600	3,106,600
1966	2,040,900	138,300	0	2,100	2,181,300	20,000	38,400	1,100	18,800	2,800	81,100	0	0	110,700	31,700	0	142,400	2,404,800
1967	1,667,400	130,800	0	3,300	1,801,500	26,400	0	1,400	45,000	4,400	77,200	0	0	21,900	8,000	200	30,100	1,908,800
1968	4,219,000	151,900	0	35,600	4,406,500	13,100	300	25,600	35,400	3,300	77,700	0	0	47,300	13,000	0	60,300	4,544,500
1969	2,239,900	99,200	0	19,700	2,358,800	2,500	1,100	200	86,600	2,000	92,400	0	0	83,700	40,600	0	124,300	2,575,500
1970	3,457,300	104,100	0	13,000	3,574,400	15,200	1,800	12,000	33,500	3,000	65,500	40,400	4,300	92,900	63,800	200	201,600	3,841,500
1971	2,416,400	134,900	0	30,500	2,581,800	61,300	0	3,400	32,500	2,300	99,500	12,300	1,200	22,300	16,100	200	52,100	2,733,400
1972	3,221,200	104,400	0	43,400	3,369,000	70,823	1,900	712	8,126	24,431	105,992	200	0	22,100	900	0	23,200	3,498,192
1973	3,020,300	154,800	0	27,900	3,203,000	23,719	0	1,518	38,776	9,047	73,060	600	0	49,200	400	100	50,300	3,326,360
1974	2,164,400	167,800	0	13,900	2,346,100	42,265	1,612	1,433	26,145	4,416	75,871	500	0	23,800	100	1,400	25,800	2,447,771
1975	4,753,900	373,900	0	17,000	5,144,800	21,463	1,223	6,133	21,925	13,539	64,283	9,200	100	55,400	900	2,200	67,800	5,276,883
1976	8,731,400	822,400	0	34,800	9,588,600	14,224	4,307	1,855	13,557	3,103	37,046	5,300	0	75,200	100	1,400	82,000	9,707,646

1977	10,665,286	320,797	0	1,100	10,987,183	18,085	0	9,460	18,678	1,915	48,138	2,000	0	19,500	0	0	21,500	11,056,821
1978	5,485,637	24,901	0	0	5,510,538	30,422	496	1,101	7,943	708	40,670	300	0	1,300	200	0	1,800	5,553,008
1979	4,842,828	41,700	0	1,100	4,885,628	4,275	7,970	126	0	2,701	15,072	0	0	600	0	100	700	4,901,400
1980	9,745,362	62,011	0	3,680	9,811,053	55,829	10,605	3,549	4,859	8,724	83,566	6,600	0	2,300	0	100	9,000	9,903,619
1981	4,148,436	23,914	0	2,082	4,174,432	24,632	20,731	1,370	1,791	3,686	52,210	200	100	4,200	0	0	4,500	4,231,142
1982	3,732,706	24,137	0	1,760	3,758,603	115,101	58,459	10,613	3,078	3,792	191,043	300	0	13,600	0	0	13,900	3,963,546
1983	5,922,637	18,453	0	6,012	5,947,102	12,399	13,578	10,497	4,819	749	42,042	500	100	5,900	0	2,900	9,400	5,998,544
1984	2,364,877	21,889	0	10,607	2,397,373	69,590	34,020	14,270	8,918	2,104	128,902	1,400	0	9,000	0	0	10,400	2,536,675
1985	3,213,660	5,007	0	26,313	3,244,980	99,573	23,531	32,917	14,261	3,752	174,034	1,000	0	14,300	0	100	15,400	3,434,414
1986	3,920,154	51,982	0	31,602	4,003,738	133,428	20,868	37,895	30,441	17,275	239,907	7,600	100	163,800	700	1,500	173,700	4,417,345
1987	3,420,674	43,034	0	33,427	3,497,135	154,995	57,701	231,133	43,476	17,974	505,279	41,100	800	239,300	100	39,500	320,800	4,323,214
1988	3,006,314	40,146	0	25,227	3,071,687	181,050	16,518	176,461	45,531	20,417	439,977	93,700	8,200	225,700	2,000	5,800	335,400	3,847,064
1989	2,809,177	28,941	0	15,059	2,853,177	317,040	8,225	162,940	74,851	27,982	591,038	54,700	2,500	346,100	600	24,000	427,900	3,872,115
1990	1,902,395	49,294	0	27,392	1,979,081	665,310	60,883	56,021	29,950	27,525	839,689	129,001	1,680	453,394	2,399	13,368	599,842	3,418,612
1991	2,893,514	62,459	361	30,537	2,986,871	582,898	78,511	113,702	52,747	31,591	859,449	322,727	3,042	357,498	4,783	77,465	765,515	4,611,835
1992	1,967,950	43,534	798	13,735	2,026,017	480,746	5,414	203,462	43,722	7,041	740,385	190,120	1,291	193,263	2,555	8,523	395,752	3,162,154
1993	3,803,156	85,568	0	13,516	3,902,240	449,707	11,688	86,000	37,411	5,637	590,443	162,414	1,817	242,328	1,578	4,943	413,080	4,905,763
1994	3,035,849	51,525	0	12,406	3,099,780	465,611	3,542	29,710	25,200	7,696	531,759	201,908	1,608	315,812	3,008	6,659	528,995	4,160,534
1995	2,838,218	201,883	15,419	9,406	3,064,926	338,085	1,742	49,079	8,849	4,821	402,576	18,778	98	158,294	485	17,876	195,531	3,663,033
1996	2,056,708	117,522	65,924	4,513	2,244,667	339,561	2,692	45,223	10,485	4,140	402,101	44,936	935	256,909	635	41,659	345,074	2,991,842
1997	1,953,623	83,547	204,282	27,837	2,269,289	676,621	5,097	60,870	18,326	6,209	767,123	47,091	825	146,700	648	15,738	211,002	3,247,414
1998	2,295,026	130,151	60,709	12,575	2,498,461	332,037	2,430	26,962	8,427	2,784	372,640	74,306	1,908	90,780	779	17,200	184,973	3,056,074
1999	1,327,212	170,808	54,550	14,136	1,566,706	396,301	4,266	49,486	4,907	4,209	459,169	73,435	1,772	252,320	3,615	9,746	340,888	2,366,763
2000	1,036,430	269,019	357,586	12,438	1,675,473	624,766	2,874	21,794	7,225	2,998	659,657	49,552	617	172,598	3,955	16,334	243,056	2,578,186
2001	923,695	295,348	889,742	6,997	2,115,782	598,460	15,986	32,963	5,094	1,000	653,503	31,794	744	185,056	496	22,727	240,817	3,010,102
2002	613,761	406,159	957,837	17,455	1,995,212	669,307	1,746	24,118	866	2,526	698,563	36,509	431	111,040	386	4,778	153,144	2,846,919
2003	473,927	349,702	1,878,878	38,125	2,740,632	448,399	1,063	5,218	925	1,196	456,801	23,615	800	106,179	606	2,091	133,291	3,330,724
2004	251,794	546,416	2,222,461	45,685	3,066,356	449,787	2,094	3,524	614	234	456,253	16,998	194	68,668	29	12,121	98,010	3,620,619
2005	731,344	791,037	1,562,626	48,814	3,133,821	437,957	2,993	2,184	2,455	427	446,016	7,970	99	47,356	1	3,468	58,894	3,638,731
2006	928,135	655,975	1,476,370	82,257	3,142,737	458,734	2,366	2,783	6,658	175	470,716	5,280	217	6,749	81	5,466	17,793	3,631,246
2007	980,849	596,188	1,193,820	74,044	2,844,901	477,491	4,007	3,440	1,779	1,060	487,777							3,332,678

Table 3.2. Spanish mackerel commercial landings (pounds whole weight) for the Atlantic coast, including landings for Virginia and north from the NMFS website, and for Florida-North Carolina from the SEFSC Accumulated Landings System (ALS). These landings are by calendar year, 1950-2007. Years prior to 1962 are all from NMFS website.

Year	Gillnets	Handlines	Castnets	Poundnet	Haul seines	Other	Total
1950	3,406,332	208,094	0	24,856	71,469	26,749	3,737,500
1951	1,917,162	127,130	0	22,314	100,454	22,639	2,189,700
1952	3,280,185	203,022	0	16,042	84,796	27,754	3,611,800
1953	3,422,425	212,918	0	15,865	96,906	29,886	3,778,000
1954	2,068,119	145,892	0	28,994	160,442	31,053	2,434,500
1955	3,092,334	191,474	0	18,447	80,221	26,224	3,408,700
1956	4,403,492	281,757	0	42,707	169,407	44,237	4,941,600
1957	4,040,211	252,798	0	34,059	129,774	36,258	4,493,100
1958	6,936,002	416,956	0	22,287	106,916	49,739	7,531,900
1959	2,256,186	142,592	0	28,552	78,245	21,425	2,527,000
1960	2,271,193	135,692	0	29,480	60,287	18,967	2,515,618
1961	3,109,444	184,516	0	133,061	67,494	24,533	3,519,048
1962	2,480,300	125,800	0	20,300	61,700	1,600	2,689,700
1963	2,087,600	75,700	0	79,400	103,000	1,500	2,347,200
1964	1,958,500	64,900	0	32,200	59,600	1,000	2,116,200
1965	2,788,100	144,900	0	89,300	73,200	11,100	3,106,600
1966	2,060,900	176,700	0	111,800	50,500	4,900	2,404,800
1967	1,693,800	130,800	0	23,300	53,000	7,900	1,908,800
1968	4,232,100	152,200	0	72,900	48,400	38,900	4,544,500
1969	2,242,400	100,300	0	83,900	127,200	21,700	2,575,500
1970	3,512,900	110,200	0	104,900	97,300	16,200	3,841,500
1971	2,490,000	136,100	0	25,700	48,600	33,000	2,733,400
1972	3,292,223	106,300	0	22,812	9,026	67,831	3,498,192
1973	3,044,619	154,800	0	50,718	39,176	37,047	3,326,360
1974	2,207,165	169,412	0	25,233	26,245	19,716	2,447,771
1975	4,784,563	375,223	0	61,533	22,825	32,739	5,276,883
1976	8,750,924	826,707	0	77,055	13,657	39,303	9,707,646
1977	10,685,371	320,797	0	28,960	18,678	3,015	11,056,821
1978	5,516,359	25,397	0	2,401	8,143	708	5,553,008
1979	4,847,103	49,670	0	726	0	3,901	4,901,400
1980	9,807,791	72,616	0	5,849	4,859	12,504	9,903,619
1981	4,173,268	44,745	0	5,570	1,791	5,768	4,231,142
1982	3,848,107	82,596	0	24,213	3,078	5,552	3,963,546
1983	5,935,536	32,131	0	16,397	4,819	9,661	5,998,544
1984	2,435,867	55,909	0	23,270	8,918	12,711	2,536,675
1985	3,314,233	28,538	0	47,217	14,261	30,165	3,434,414
1986	4,061,182	72,950	0	201,695	31,141	50,377	4,417,345
1987	3,616,769	101,535	0	470,433	43,576	90,901	4,323,214
1988	3,281,064	64,864	0	402,161	47,531	51,444	3,847,064
1989	3,180,917	39,666	0	509,040	75,451	67,041	3,872,115
1990	2,696,706	111,857	0	509,415	32,349	68,285	3,418,612
1991	3,799,139	144,012	361	471,200	57,530	139,593	4,611,835
1992	2,638,816	50,239	798	396,725	46,277	29,299	3,162,154
1993	4,415,277	99,073	0	328,328	38,989	24,096	4,905,763
1994	3,703,368	56,675	0	345,522	28,208	26,761	4,160,534
1995	3,195,081	203,723	15,419	207,373	9,334	32,103	3,663,033

1996	2,441,205	121,149	65,924	302,132	11,120	50,312	2,991,842
1997	2,677,335	89,469	204,282	207,570	18,974	49,784	3,247,414
1998	2,701,369	134,489	60,709	117,742	9,206	32,559	3,056,074
1999	1,796,948	176,846	54,550	301,806	8,522	28,091	2,366,763
2000	1,710,748	272,510	357,586	194,392	11,180	31,770	2,578,186
2001	1,553,949	312,078	889,742	218,019	5,590	30,724	3,010,102
2002	1,319,577	408,336	957,837	135,158	1,252	24,759	2,846,919
2003	945,941	351,565	1,878,878	111,397	1,531	41,412	3,330,724
2004	718,579	548,704	2,222,461	72,192	643	58,040	3,620,619
2005	1,177,271	794,129	1,562,626	49,540	2,456	52,709	3,638,731
2006	1,392,149	658,558	1,476,370	9,532	6,739	87,898	3,631,246
2007	1,458,340	600,195	1,193,820	3,440	1,779	75,104	3,332,678

Table 3.3. Spanish mackerel lengths sampled from the commercial fishery and available in the TIP data base, 1980-2008. Also includes data provided from inshore fisheries by NC DMF.

Sum of FREQ_SUM	GEAR						
YEAR	CAST NET	GILL NET	HAUL SEINE	HANDLINE	OTHER	POUND NET	Grand Total
1980			2			9	11
1982		15	4		3	259	281
1983			3		1	42	46
1984		68	1	11	335	56	471
1985		1102	17	7	719	296	2141
1986		882	34	20	31	181	1148
1987		1002	46	49		557	1654
1988		1510	264		21	666	2461
1989		411	100	2	140	1194	1847
1990		3530	220	33	584	1189	5556
1991		5865	221	151	157	1583	7977
1992		6847	153	110	393	2206	9709
1993		10589	307	112	245	549	11802
1994	2	5463	125	239	62	510	6401
1995		4029	20	46		1203	5298
1996		2951	153	102	2	531	3739
1997	50	1532	32	94	25	944	2677
1998	4	6253	136	607	15	827	7842
1999	1	5615	213	2956	40	1152	9977
2000	2141	5587	281	2192	24	133	10358
2001	3297	1371	259	2099	31	283	7340
2002	2623	941	71	5711	37	438	9821
2003	2660	854	66	906	1	64	4551
2004	307	1090	21	195	3292	56	4961
2005	725	2101	83	391	2634	243	6177
2006	1788	2626	80	200	2364	143	7201
2007	110	2052	121	5	10266	213	12767
2008					2012		2012
Grand Total	13708	74286	3033	16238	23434	15527	146226

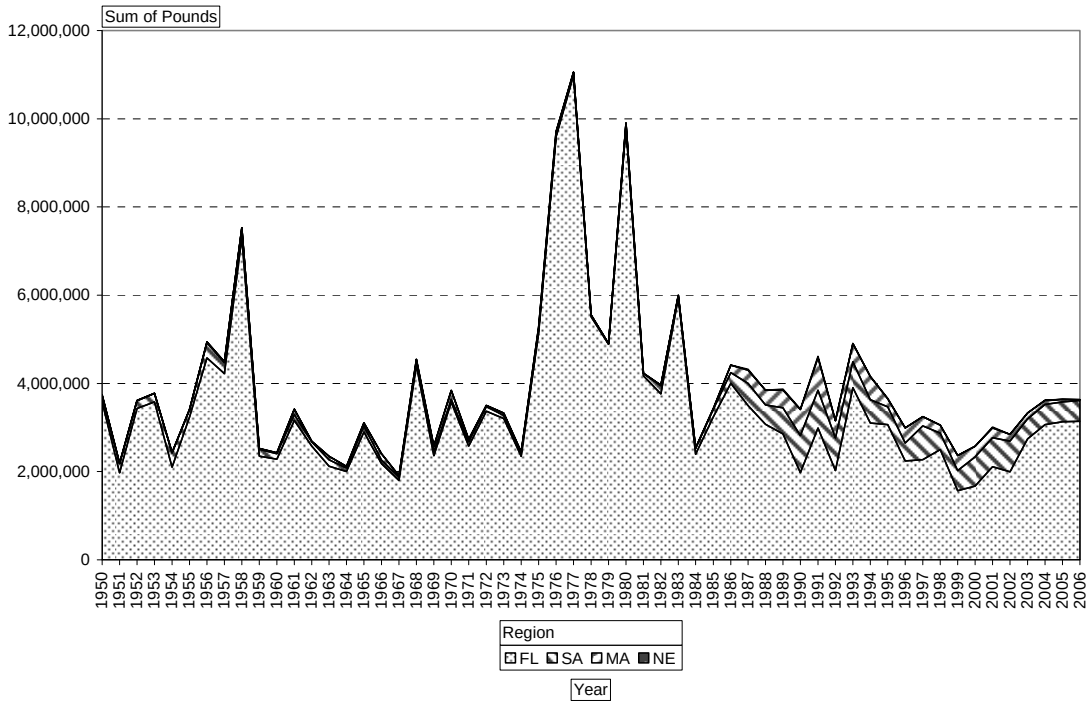

Figure 3.1. Spanish mackerel landings by region from the U.S. Atlantic, 1950-2007. These landings are based on the NMFS website for commercial landings.

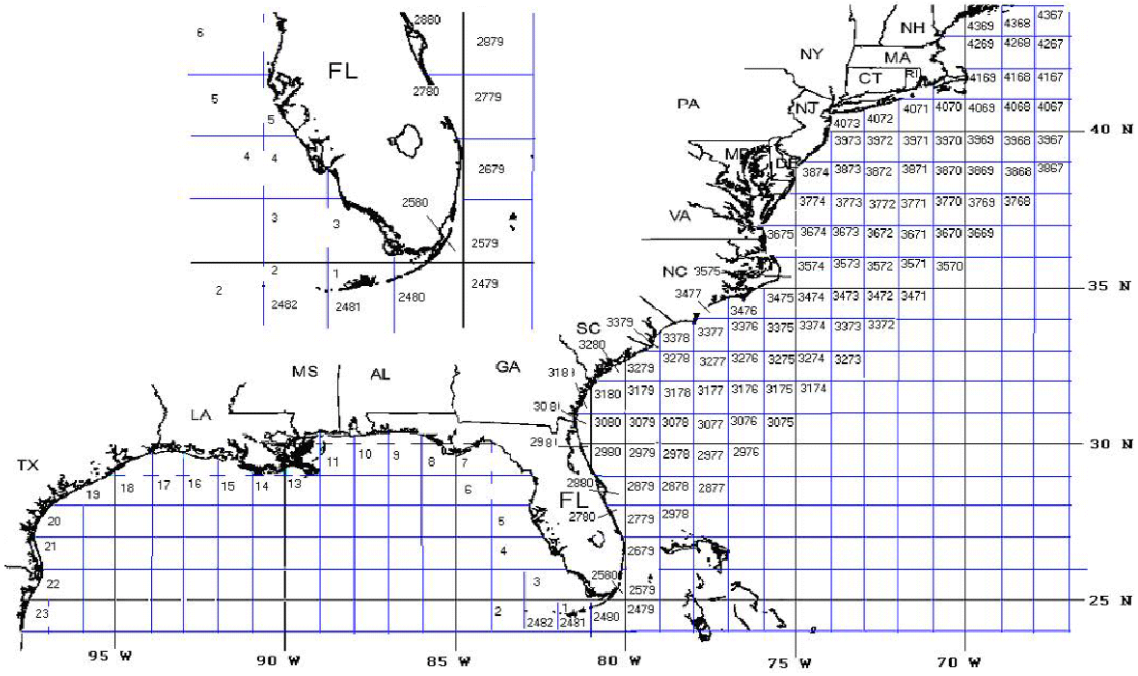

Figure 3.2. Map of U.S. Atlantic and Gulf coast with shrimp area designations.

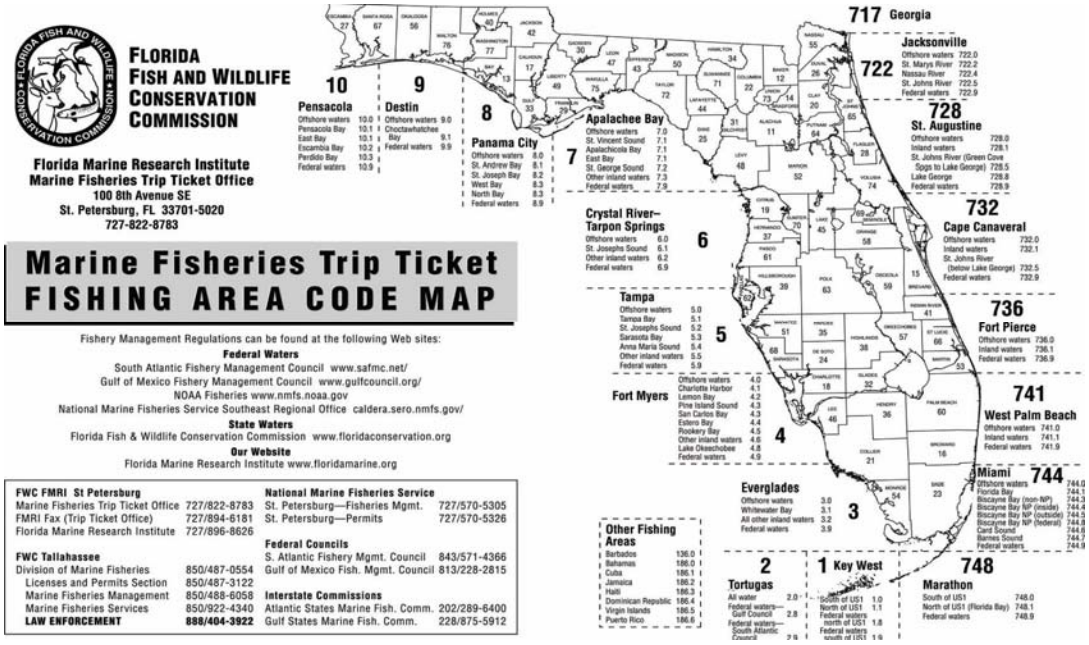

Figure 3.3. Map showing marine fisheries trip ticket fishing area code map for Florida.

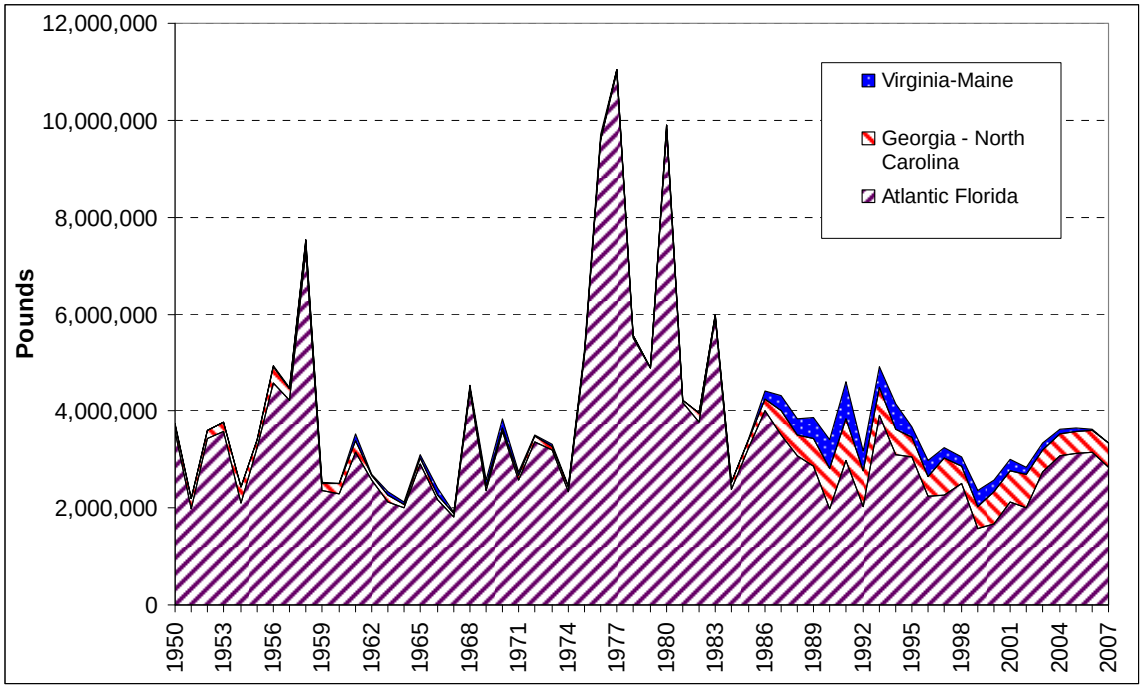

Figure 3.4. Spanish mackerel landings by region from the U.S. South Atlantic, 1950-2007. (Landings from all Atlantic states for 1950-61, and from Virginia to Maine 1950-2006 were from the NMFS website, and landings from Atlantic Florida to North Carolina for 1962-2007 were from the ALS database).

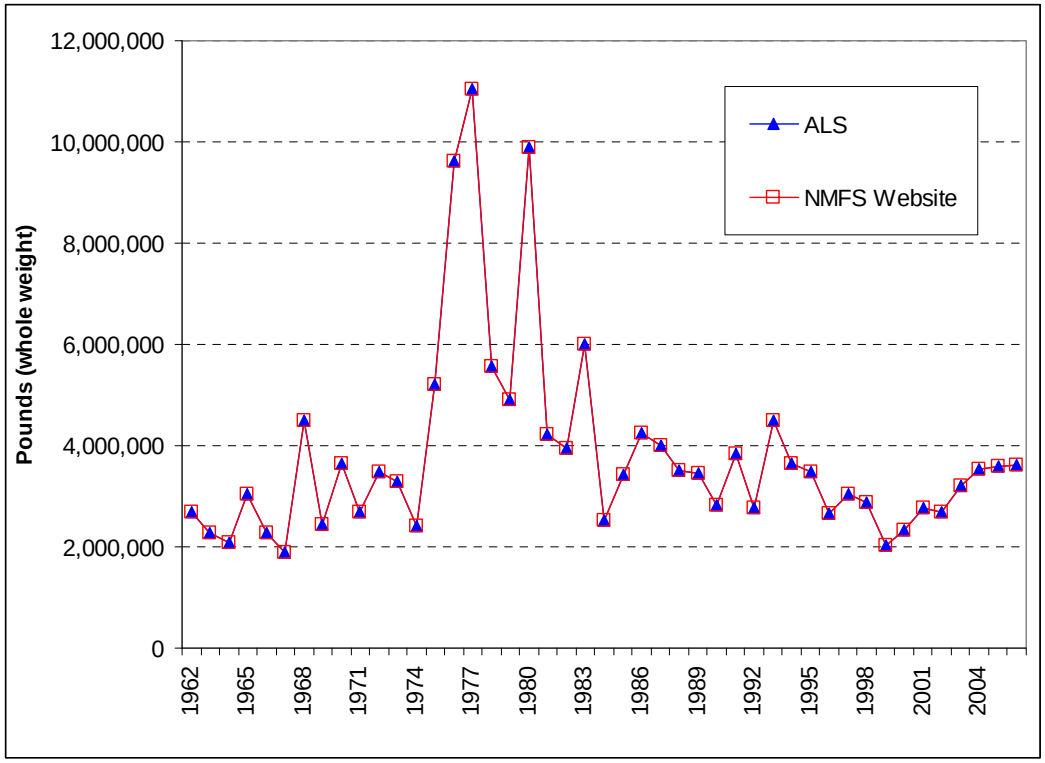

Figure 3.5. Spanish mackerel landings (FL-NC) compared by source: (1) NMFS website for commercial landings, and (2) SEFSC ALS database, 1962-2006.

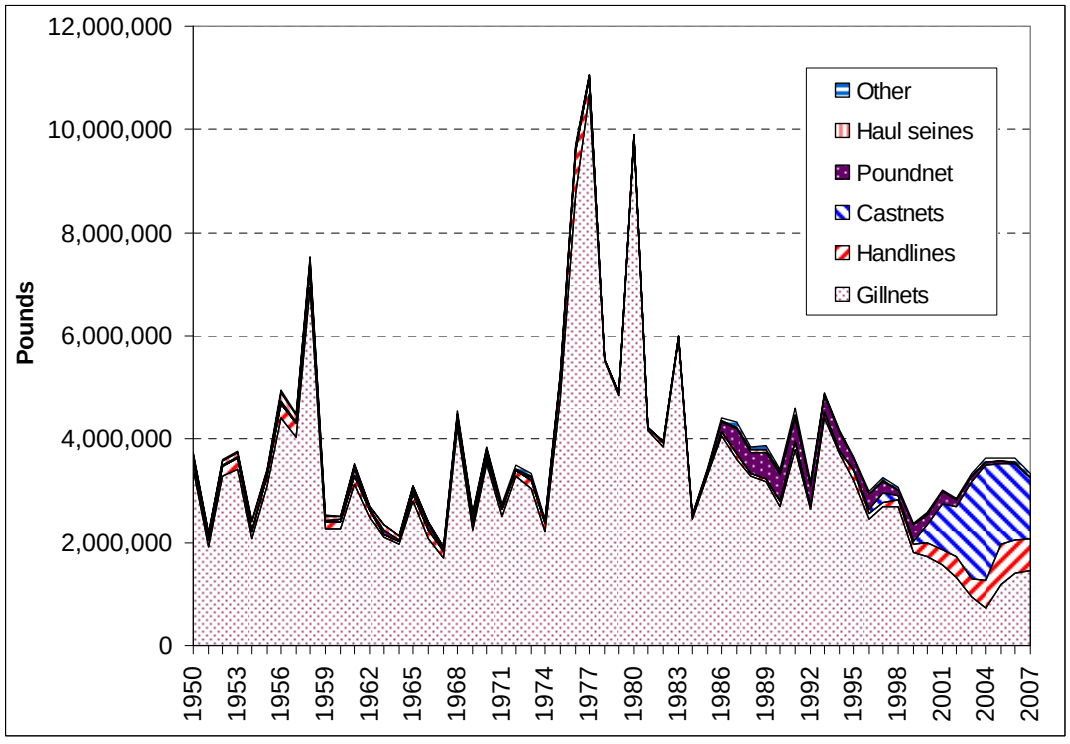

Figure 3.6. Spanish mackerel landings by gear from the US Atlantic coast, 1950-2007. (Data for 1950-1961 and Virginia north from NMFS website and data for 1962-2007 from Florida-North Carolina from the ALS database).

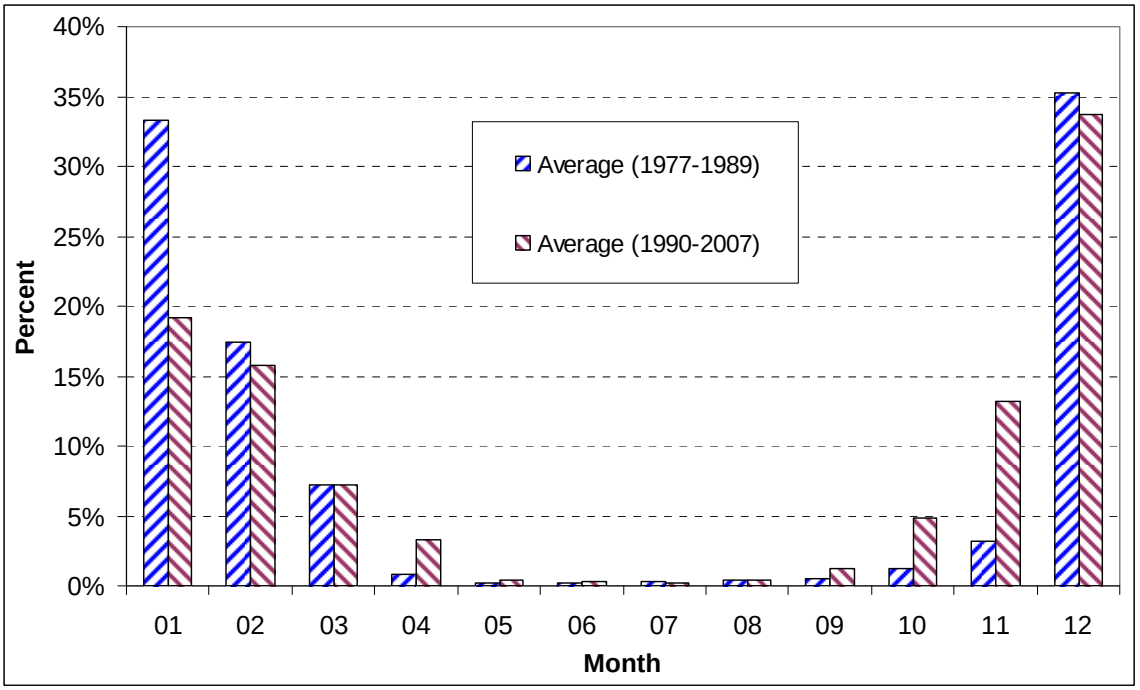

Figure 3.7. Spanish mackerel commercial landings by month from Atlantic Florida from ALS database, 1977-2007.

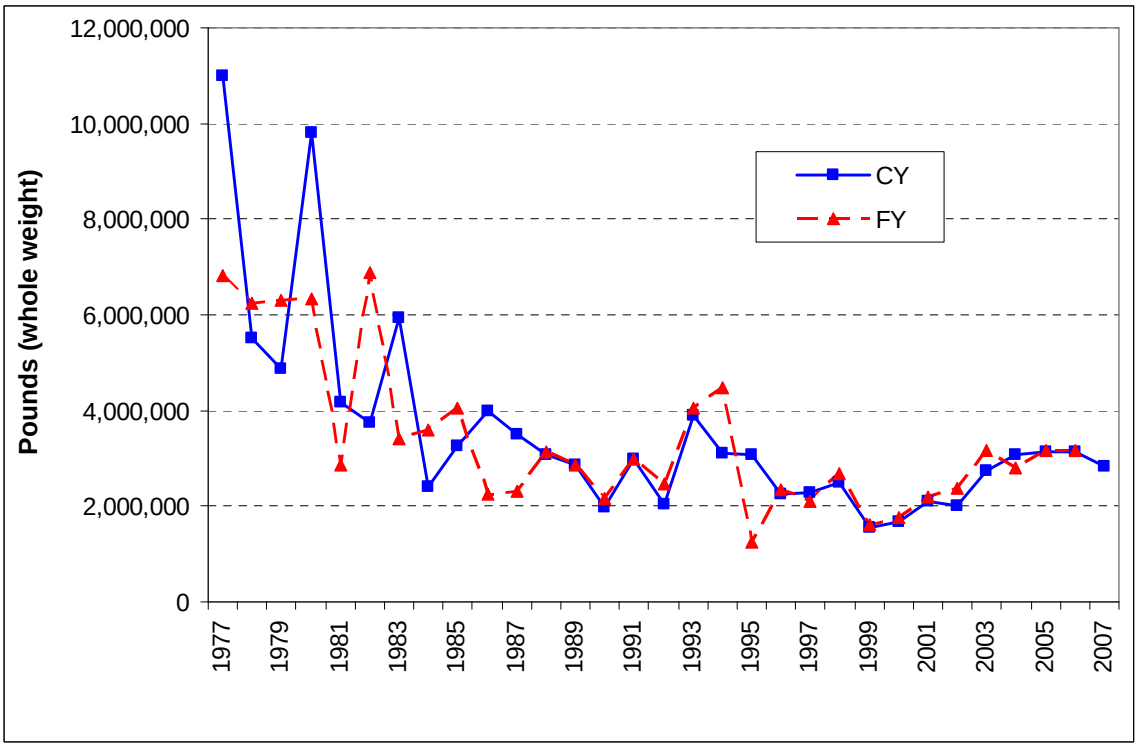

Figure 3.8. Spanish mackerel commercial landings from Atlantic Florida computed by calendar and fishing years from ALS database, 1977-2007.

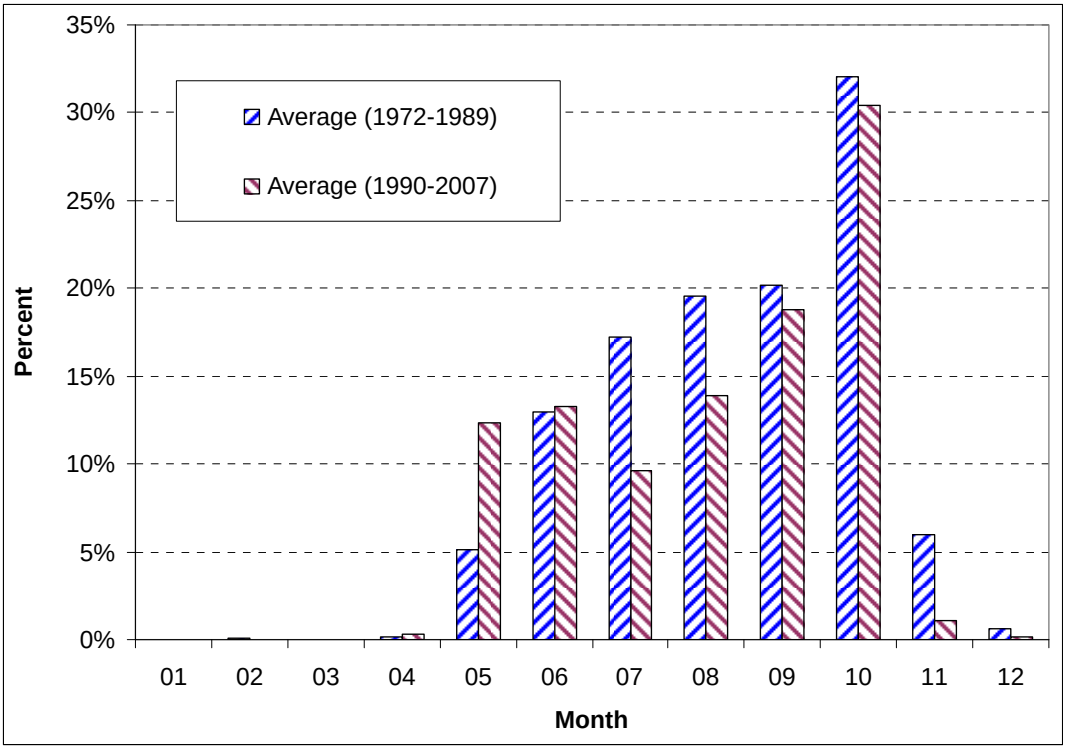

Figure 3.9. Spanish mackerel commercial landings by month from Georgia-North Carolina from ALS database, 1972-2007.

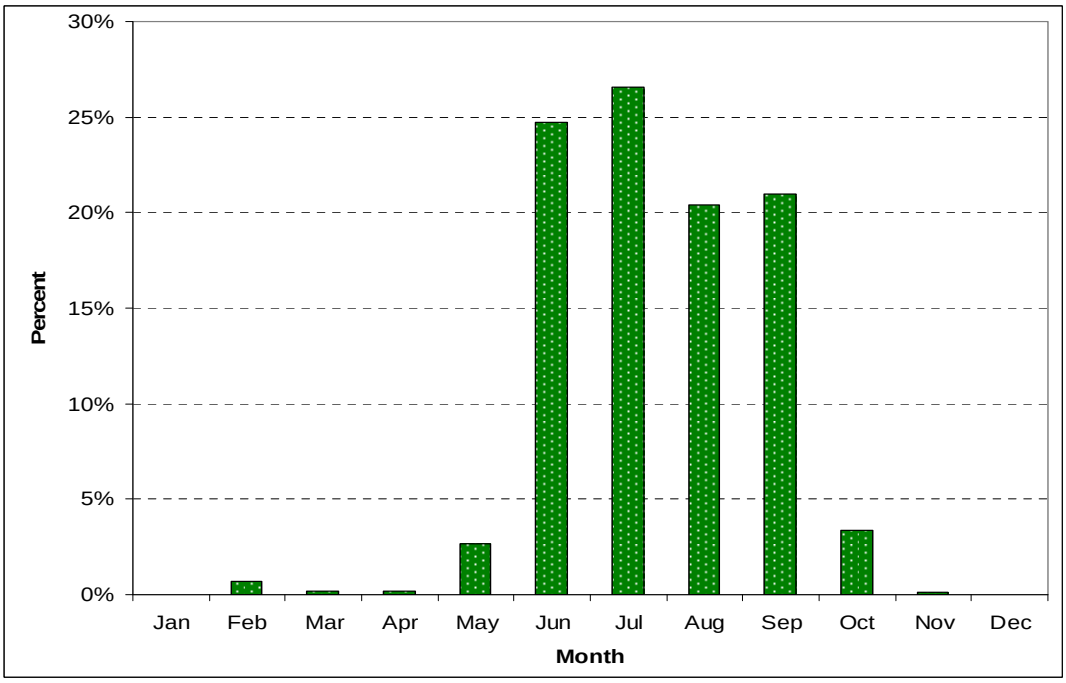

Figure 3.10. Spanish mackerel commercial landings by month from Virginia - Maine from NMFS website, 1990-2006.

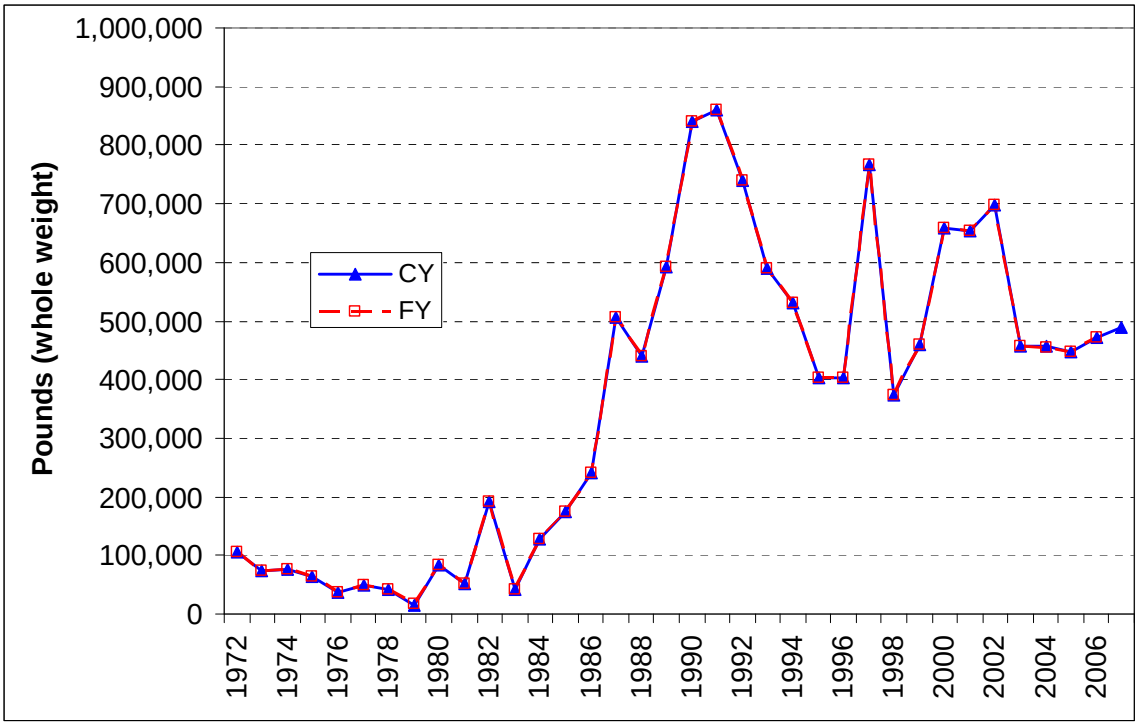

Figure 3.11. Spanish mackerel commercial landings from Georgia-North Carolina computed by calendar and fishing years from ALS database, 1972-2007.

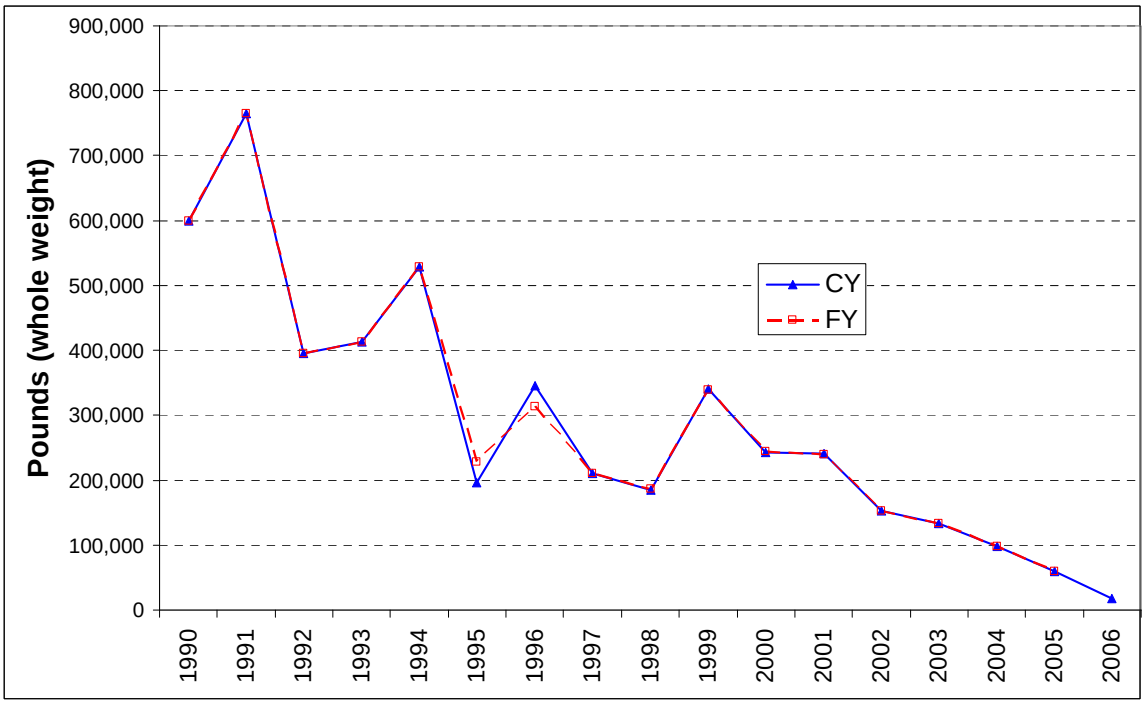

Figure 3.12. Spanish mackerel commercial landings from Virginia-Maine computed by calendar and fishing years from NMFS website, 1990-2006.

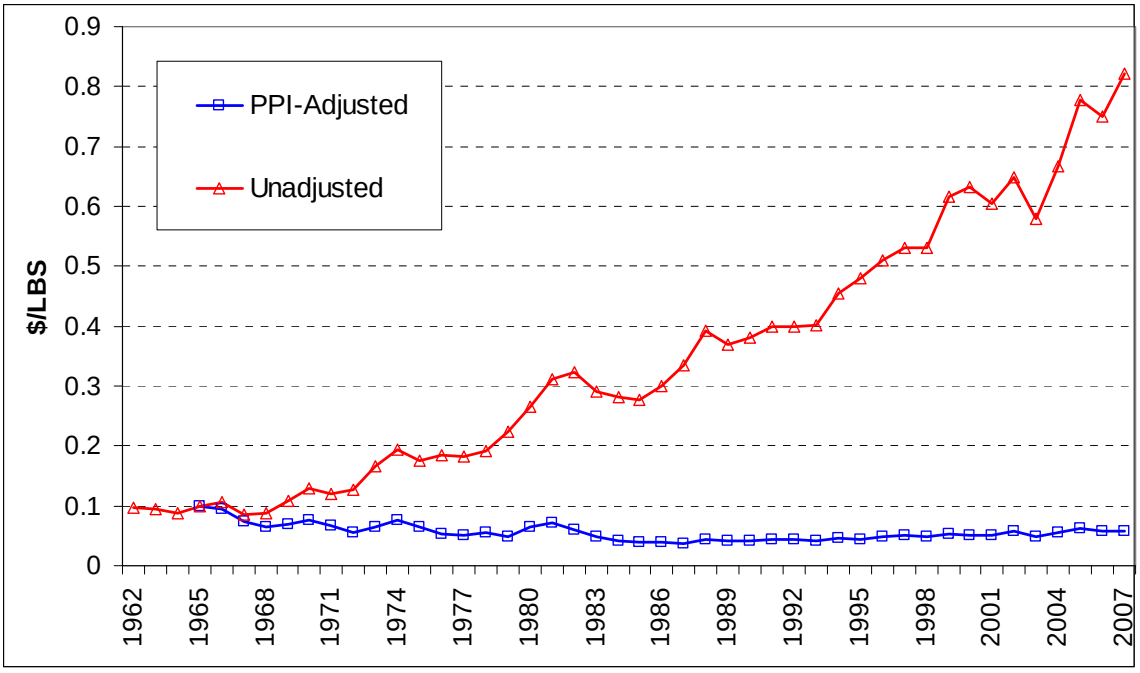

Figure 3.13. U.S. South Atlantic Spanish mackerel, price per pound, unadjusted and adjusted for inflation from the SEFSC ALS database, 1962-2007. Price is adjusted by producer price index (PPI) using 1965 as base year.

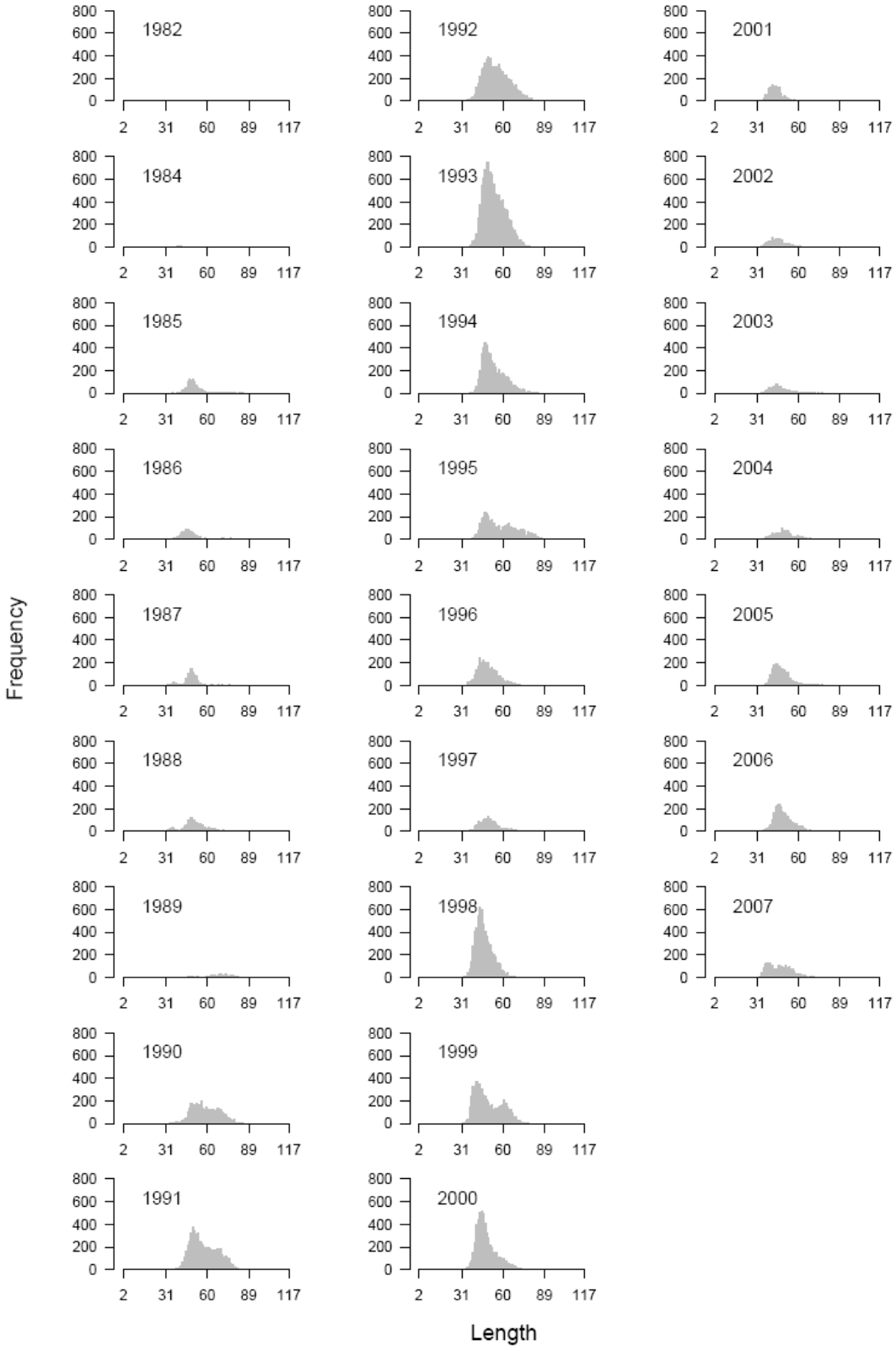

Figure 3.14. Spanish mackerel length frequencies (number at length, FL-cm) by year for commercial gill net gear in the South Atlantic.

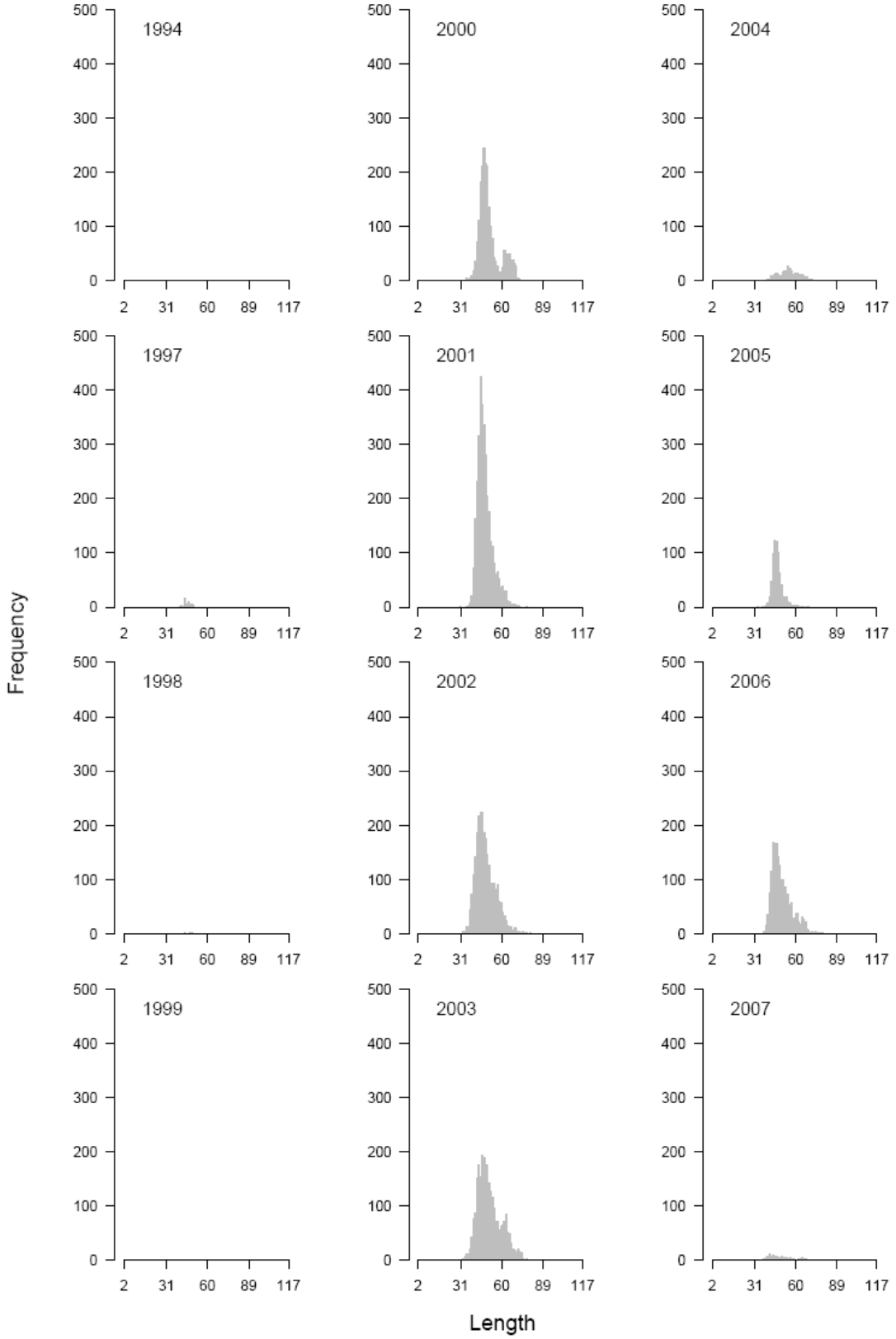

Figure 3.15. Spanish mackerel length frequencies (number at length, FL-cm) by year for commercial cast net gear in the South Atlantic.

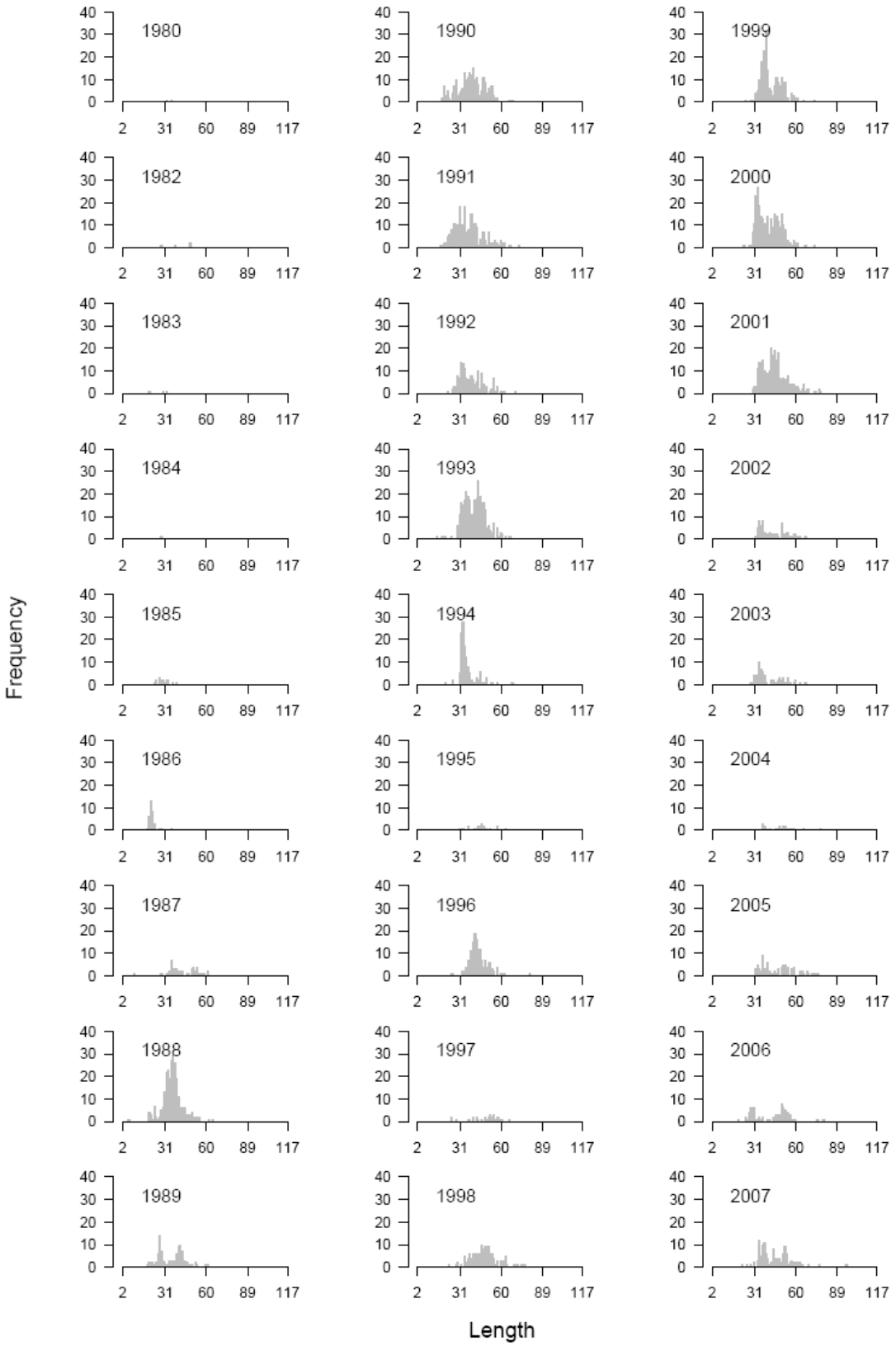

Figure 3.16. Spanish mackerel length frequencies (number at length, FL-cm) by year for commercial haul seine gear in the South Atlantic.

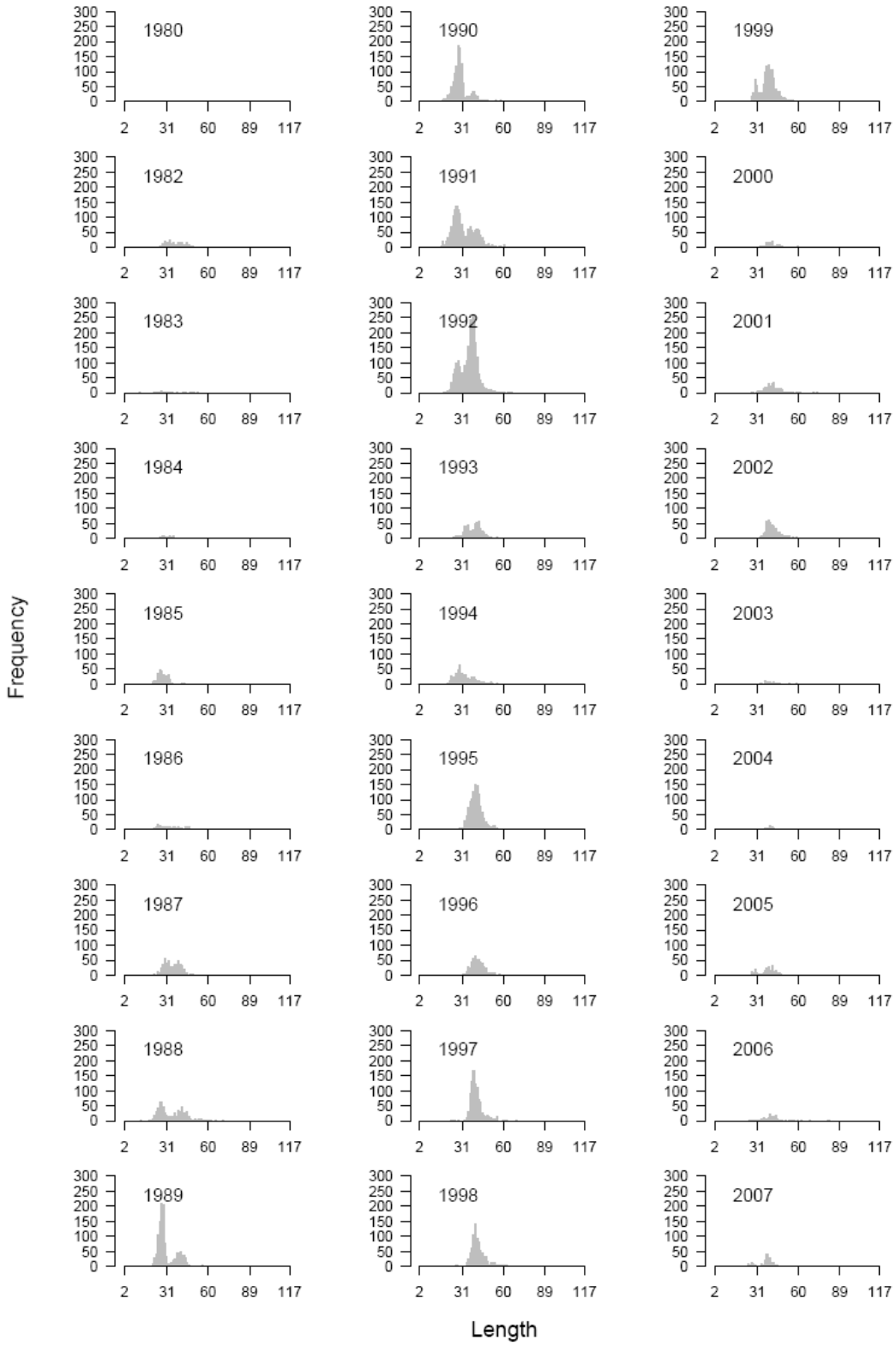

Figure 3.17. Spanish mackerel length frequencies (number at length, FL-cm) by year for commercial pound net gear in the South Atlantic.

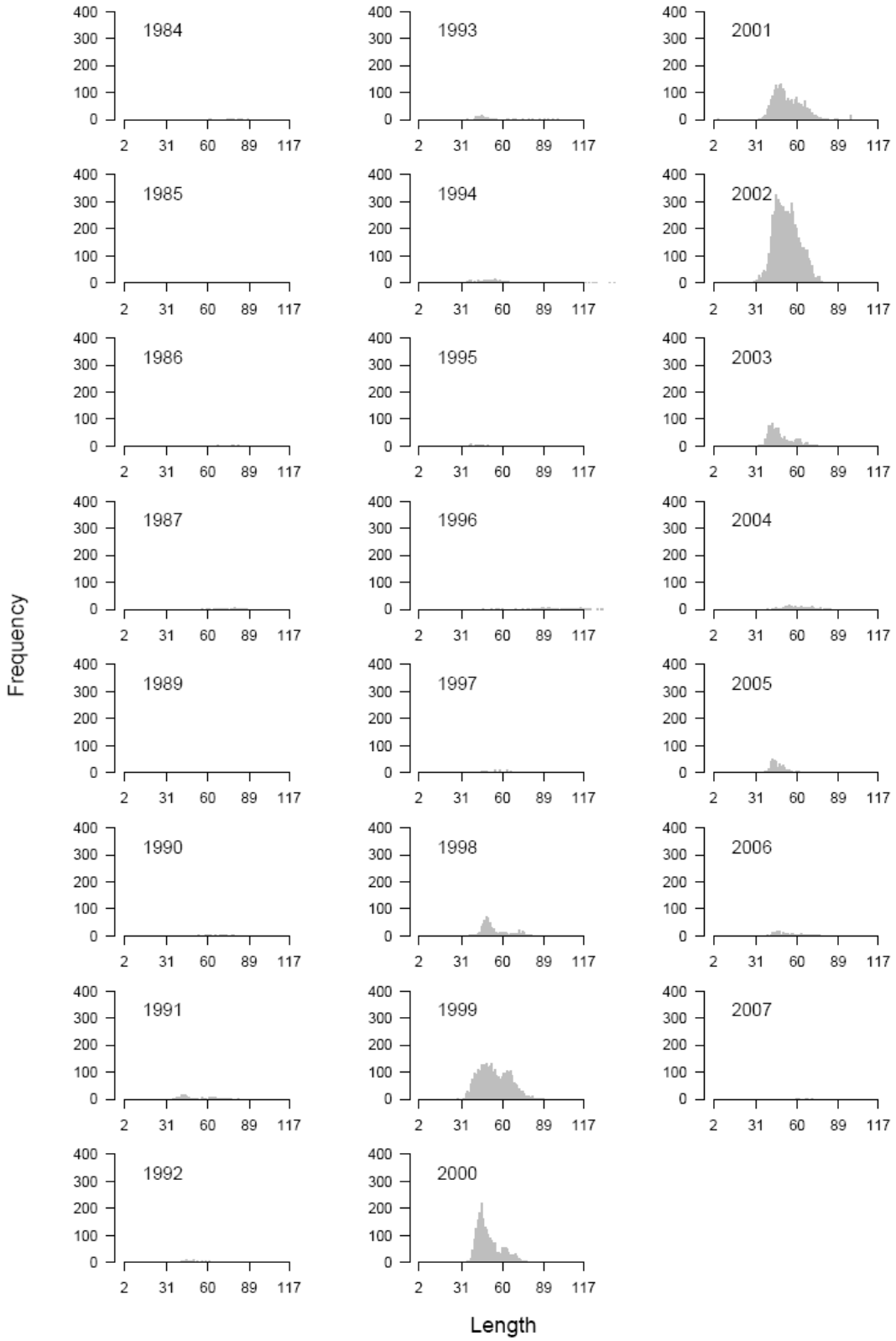

Figure 3.18. Spanish mackerel length frequencies (number at length, FL-cm) by year for commercial handline gear in the South Atlantic.

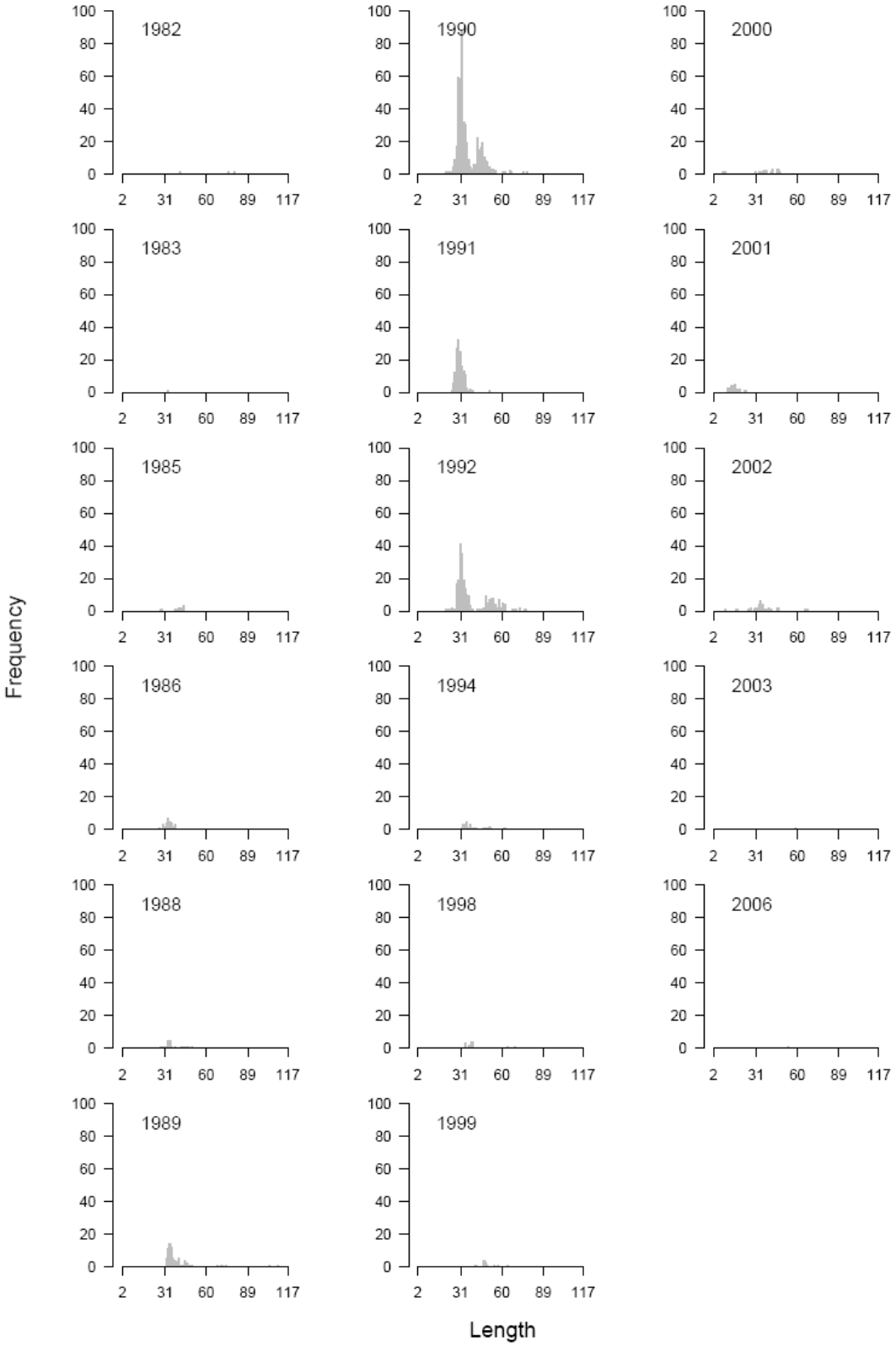

Figure 3.19. Spanish mackerel length frequencies (number at length, FL-cm) by year for commercial trawl gear in the South Atlantic.

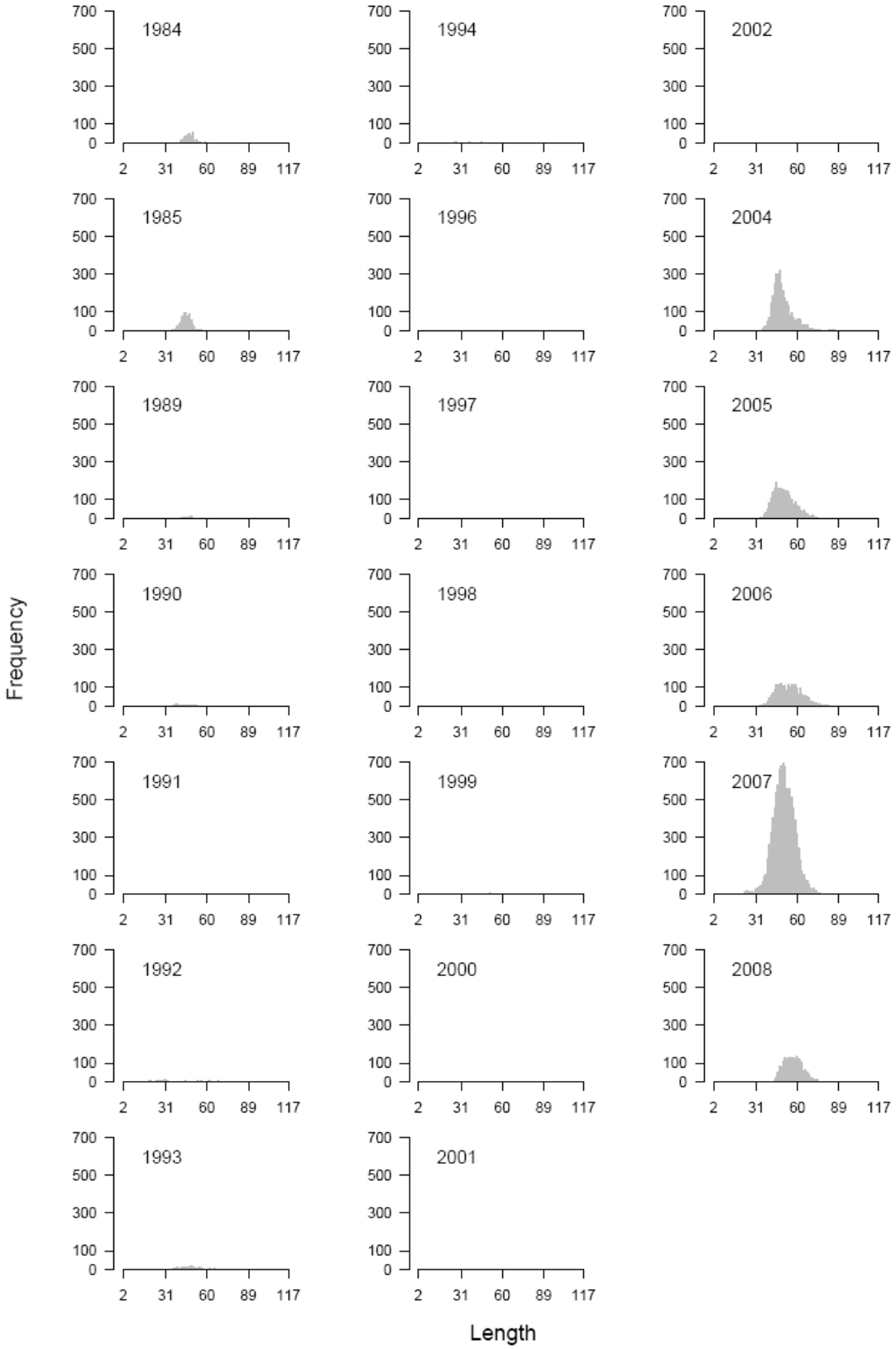

Figure 3.20. Spanish mackerel length frequencies (number at length, FL-cm) by year for other commercial gears in the South Atlantic.