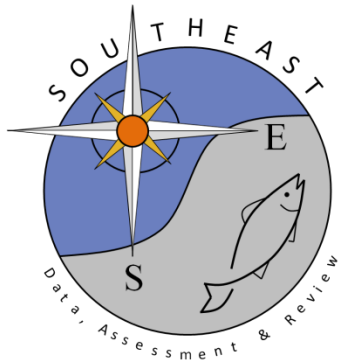


Commercial Landings of Gulf of America King Mackerel
(*Scomberomorus cavalla*) from fishing years 1926 – 2023

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SEDAR99-WP-04

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Commercial Landings of Gulf of America King Mackerel (*Scomberomorus cavalla*) from fishing years 1926 – 2023

Submitted May 2026

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Introduction

Commercial landings statistics are the quantities and value of seafood products caught by fishermen in the U.S. and sold to established (licensed) wholesale and retail seafood dealers. These data have been collected as early as the late 1890s. Currently, these data are collected by trip ticket programs (TTPs) managed by state agencies. In addition to the quantity and value, basic information on the gear used to catch the fish, the area where the fishing occurred and the county and state where the catch was landed are recorded (Gloeckner, 2014).

Commercial landings of King Mackerel for the Gulf of America (formerly known as the Gulf of Mexico, and hereafter referred to as the Gulf) are provided in whole weight (in pounds) for the period 1926-2024.

Methods

Commercial landings for Gulf King Mackerel were compiled using several data sources. Most of these data were accessed from an Oracle database housed at the Southeast Fisheries Science Center (SEFSC) in Miami, Florida. All landings were converted to whole weight using the conversion factor 1.04.

Data Sources

The Accumulated Landings System (ALS) is an Oracle database maintained by SEFSC. This database contains landings data from 1926 to present with data prior to 1962 considered historical. Most landings prior to 1977 are summarized annually. Beginning in 1977, landings were consistently provided as monthly summaries, while a few states for some species began reporting monthly in 1972. For more information on data collection of landings prior to the implementation of a state TTP (Trip Ticket Program) and ALS database structure, refer to Gloeckner (2014).

Data from state TTPs begin in various years, depending on the state (Donaldson, 2004). Trip ticket data for Texas, Louisiana, Mississippi, and Alabama were available through the Gulf States Marine Fisheries Commission (GSMFC). Florida trip ticket data were available through Atlantic Coastal Cooperative Statistics Program (ACCSP). Where data were available and considered reliable from state trip ticket programs, those data were used in lieu of data from ALS.

The Florida General Canvass dataset (housed within the ALS database) contains annual landings from 1976 to 1996. Originally collected by federal port agents at the county level, this dataset is primarily used to fill information gaps. Specifically, it provides estimated proportions of landings by gear and area; these proportions are then applied to Florida ALS or Trip Ticket records from 1977 to 1996 whenever specific gear or location data is missing.

Stock Boundary

Commercial landings for Gulf King Mackerel were compiled from Texas through West Florida. While the boundary for most Gulf assessments follows the Gulf Council boundary which is a line from Riley's Hump, the Tortugas and US 1, where the North of US 1 is assigned to the Gulf region and South of US 1 is considered outside of the Gulf region and is assigned to the South

Atlantic region, for this assessment fishing areas around Florida Keys are defined as a mixing zone (Figure 1). For winter months (November to March) the King Mackerel mixing zone landings are split and assigned 50/50 to the Gulf and South Atlantic stocks, while in all other months mixing zone landings are assigned to the South Atlantic stock. The specific areas that represent the King Mackerel mixing zone are as follows: South of US 1 in the Key West and Marathon areas (Areas 1.0, 1.9, 748.0, 748.9) and the Atlantic side of the Tortugas (Area 2.2, 2.9). Areas north of US 1 in Key West and Marathon (Area 1.1, 1.8, 748.1), Florida Bay (Area 744.1), and the Gulf side of the Tortugas (Area 2.0, 2.8) are assigned to the Gulf stock year round.

Gear Groups

Similar to the previous assessment (SEDAR 38U), commercial landings were summarized into 2 main gears (Handline and Gillnet). All other gears with reported King Mackerel landings were assigned to an “other” gear group for initial analyses, and then combined with Handline to create a Handline+ group for the final data summary. Table 1 highlights the NMFS and FIN gear codes associated with each gear group.

Data Compilation

The SEFSC maintained materialized view in ORACLE appropriately joins all data sources based on best practices. All data housed within ALS use the NMFS coding system, whereas TTP data are provided in the Fisheries Information Network (FIN) standard. All gear, area, county, state, and species information are translated to the common FIN coding standard. The following data were used for each respective state:

Texas

- ALS from 1926-2013
- Trip ticket from 2014-2024

Louisiana

- ALS from 1926-1999
- Trip ticket from 2000-2024

Mississippi

- ALS from 1926-2014
- Trip ticket from 2015-2024

Alabama

- ALS from 1926-2001
- Trip ticket from 2002-2024

Florida

- ALS from 1926-1985

- Trip ticket from 1986-2024
- General Canvass to proportion landings by gear and area from 1977-1996

To align landings with specific stock boundaries, data are typically filtered using three primary variables: area fished, county landed, and state landed; in the case of King Mackerel, sub-area was used in addition to area to define the mixing zone (Figure 1). County or state landing information alone are insufficient to determine whether a catch originated from the Gulf, the South Atlantic, the mixing zone, or foreign waters (Gloeckner, 2014). Therefore, the area of capture is prioritized when assigning catch to the appropriate region. However, in instances where area information is missing, the recorded county and/or state of landing is used to attribute those landings to the Gulf to ensure these removals are accurately accounted for in the stock biomass. Further details on this process are described in the analytical steps detailed below.

King Mackerel commercial landings analytical steps

The current assessment is modeled using fishing year (July 1 – June 30) rather than calendar year, and using non-standard stock boundaries which required assessment-specific analytical steps (titled in **red and bolded**), combined with our standard analytical steps (titled in **black and bolded**):

- 1) **Basic Exploratory Data Analysis** – Raw data are converted to a single weight type (i.e. gutted vs. whole). Region assignments are made in order to properly filter the data. When area information is not available and county is Monroe, region is assigned as “Monroe”. In a later step, the landings coming from region “Monroe” are proportioned and assigned to either Gulf, mixing zone, or South Atlantic (step 3).
- 2) **Proportioning of historical Florida landings** – Prior to 1962, county information is missing and Florida landings are reported as West Florida (WFL), East Florida (EFL), or inland FL. For this early time period, WFL landings are proportioned into Monroe County and non-Monroe County landings using the landings proportions of Monroe county to all other WFL counties from 1963 – 1977. Inland FL landings are proportioned into Gulf and South Atlantic landings using the landings proportions of Gulf and South Atlantic landed in inland FL counties from 1963 onward. This larger time period was necessary due to the relatively few landings coming from inland FL.
- 3) **Proportioning region “Monroe” into Gulf, mixing zone, and South Atlantic regions** When area fished information is not available, Monroe county landings are split between the Gulf, mixing zone, and South Atlantic regions using proportions calculated from logbook data. A 10-year period from 1999 – 2008 is used to calculate the proportions. While 1993 is considered to be the first year that logbook data are representative for reef fish fisheries, King Mackerel permit holders were not required to report until 1999 and therefore the logbook is not representative of the King Mackerel fishery behavior until 1999. For landings where gear and month information are both available, logbook proportions of regions from Monroe County are calculated by gear and month and applied to the landings data. When only either gear or month information was available, proportions were calculated by gear or month, respectively and applied to the landings

data. When neither gear nor month information was available, the overall proportion of logbook landings by region for Monroe county was applied to the landings data.

- 4) **Data gap filling for gear and area** – When gear and area information are missing, annual landings proportions by gear and area are used to attribute those landings to a gear group and fishing area. This method is used for all states and years with the exception of Texas landings from 1978-1983. In Texas in 1978 and 1979 gear information is missing for the entire year. Therefore, gear proportions by area are calculated as an average from 1973-1977. Additionally, from 1980-1983 the only gear reported by Texas is trawl gear. These landings are assumed to also include non-trawl gears, therefore, average gear and area proportions from 1984-1988 are used to proportion 1980-1983 Texas landings by gear and area. In the next step, landings occurring during the time period when the coastal fisheries logbook is considered to be representative (1999 on) are re-apportioned using logbook data, therefore, the gap filling procedure described in this step only impacts data through 1998.
- 5) **Coastal Fisheries Logbook proportioning to assign gear and area to the landings** – For landings reported during 1999 and after, gear and area information from the CFLP data are used to assign gear and area to the landings. This decision is based on the general acceptance that records regarding gear(s) used and area(s) fished are more likely to be accurately reported on the fishermen’s coastal logbook than the dealer reported trip tickets. The logbooks are completed by the fishing boat captains or designees, while the trip tickets are often reported online by secretarial staff. For a general description of the logbook data please review Atkinson et al. (2021) and Poffenberger (2003). This method involves calculating the proportion of logbook landings by year, state, gear (e.g., Handline, Gillnet, and Other) and fishing area. These proportions are applied to the annual landings by month and state.
- 6) **Proportioning season for years with no month data to assign fishing year and mixing zone landings** – In order to assign data to a fishing year rather than calendar year, and to account for landings in the mixing zone, it is necessary to ensure all data is assigned to a season. Month information was available beginning in 1977. For years with month information, data are assigned to the following seasons by month: Winter 1 (January – March), Spring (April – June), Summer/Fall (July – October), Winter 2 (November – December). For years with no month information, seasons are proportioned using landings data from 1977 – 1985 following the S38 methodology, with season proportions being summarized by region, state, and gear. Once season is assigned for all data, mixing zone landings are apportioned to the Gulf or South Atlantic stocks as follows: 1) Spring and Summer/Fall landings are assigned to the South Atlantic stock and 2) Winter 1 and Winter 2 landings are assigned 50/50 to the South Atlantic and Gulf stocks. Lastly, a fishing year is assigned to all landings where if season was Winter 1 or Spring, then fishing year = calendar year – 1, whereas, if season was Summer/Fall or Winter 2, then fishing year = calendar year.

- 7) **Data summary** – Final data available to the lead stock assessment analyst are summarized by region, fishing year, gear, and area. Data are reported by fishing year and gear group in this report to protect confidentiality.

Results

Annual calculated King Mackerel landings totals are summarized by region (Gulf and mixing zone) in Figure 2, and are summarized annually by gear grouping in Table 2. Total landings showed the highest peaks in 1973 and 1976 fishing years; however, they have remained relatively stable throughout the majority of the time series. Figure 3 shows the annual landings totals summarized by gear group, with the majority of landings coming from the handline fishery for much of the time series, although the gillnet fishery dominated the landings starting in the 1960s through 1980s. A comparison between SEDAR 99 and SEDAR 38U are shown in Figure 4.

Changes from SEDAR 38U

Landings provided here were compared to the landings estimates provided in SEDAR 38U and to methodologies documented in the SEDAR 38 assessment report.

- In the SEDAR 38 report, the methods describe proportioning region (i.e. Gulf, MIX, SATL) for Monroe county landings by calculating logbook proportions by month and gear for landings from 1978 – 1985, and by gear only for landings from 1962 – 1977. It is unclear what year range of logbook data was used for that procedure, and unclear what was done in cases where gear information was not available. The procedure done in these cases likely differs from the procedure we describe above (step 3, “Proportioning Monroe into Gulf/MIX/SATL”).
- In SEDAR 38 the methodology for filling in gear and area information (steps 4 and 5 above) differs from what was done in SEDAR 99. Two methods were used for Florida data, one for Monroe County, and one for all other Gulf FL counties. For Monroe County landings, data were apportioned to gear and area using, logbook proportions from 1996 – 2012 by month, gear, and area. These proportions were then applied to the trip ticket data by year and month for the 1986 – 2012 landings. For non-Monroe FL data, gear and area proportions from non-Monroe trip ticket data were calculated for the 1996 – 2012 time period and applied to landings data from 1986 – 1995. For SEDAR 99, as discussed in above, gear and area information is only apportioned in two scenarios: 1) gear and/or area information is missing – standard gap filling procedure is used to fill in this information (step 4 above); 2) For years when logbook is considered reliable, logbook proportions are used to reapportion gear and area (step 5 above). The differing start years for logbook proportions between S38 (1996) and S99 (1999) likely contribute to some of the observed differences. Additionally, differences in when and how data gap filling is carried out likely contribute to the differences as well.
- Additional differences likely exist due to updated data compilation procedures – we now use a standard automated process to create the commercial landings materialized view,

taking ALS data when trip ticket data are not yet available or appropriate, and using trip ticket data where appropriate. Additionally, we have a standardized methodology for proportioning gear and area information when it is missing from the landings data which likely differs from what has been done previously (step 4 above), although documentation from previous assessments is limited, and therefore it is impossible to tell exactly how different the methodology is. The standardization of landings preparations was necessary to provide more consistent and reproducible commercial landings data provisions.

Overall, there were several years with large differences in total landings when compared to S38U. Some years had more total landings, and some had fewer total landings. After much investigation, it is impossible to understand the cause of all the differences due to a lack of sufficiently detailed documentation of methods from the previous assessments. The current provision uses the most up-to date and standardized methodologies for commercial landings data provision resulting in more reliable and reproducible estimates of King Mackerel commercial landings. Finally, estimates of landings uncertainty have been provided in Table 3. These uncertainties are unidirectional, representing the possibility of underreporting, rather than a general misreporting of totals.

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Tables

Table 1: Gears observed in the King Mackerel (*Scomberomorus cavalla*) dataset, and their respective gear groupings used to aggregate the data.

FIN Gear Code	Gear Name	SEDAR Gear Group
300	HOOK AND LINE	HANDLINE
301	HOOK AND LINE, MANUAL	HANDLINE
302	HOOK AND LINE, ELECTRIC	HANDLINE
303	ELECTRIC/HYDRAULIC, BANDIT REELS	HANDLINE
320	TROLL LINES	HANDLINE
321	TROLL LINE, MANUAL	HANDLINE
322	TROLL LINE, ELECTRIC	HANDLINE
323	TROLL LINE, HYDRAULIC	HANDLINE
324	TROLL LINE, GREEN-STICK	HANDLINE
700	HAND LINE	HANDLINE
701	TROLL AND HAND LINES CMB	HANDLINE
702	HAND LINES, AUTO JIG	HANDLINE
200	GILL NETS	GILLNET
201	GILL NETS, FLOATING DRIFT	GILLNET
203	GILL NETS, FLOATING ANCHOR	GILLNET
204	GILL NETS, SINK ANCHOR	GILLNET
205	GILL NETS, RUNAROUND	GILLNET
206	GILL NETS, STAKE	GILLNET
207	GILL NETS, OTHER	GILLNET
210	TRAMMEL NETS	GILLNET
216	TRAMMEL NETS, OTHER	GILLNET
010	HAUL SEINES	OTHER
020	OTHER SEINES	OTHER
030	PURSE SEINE	OTHER
050	POUND NETS	OTHER
060	FYKE NETS	OTHER
073	FLOATING TRAPS (SHALLOW)	OTHER
077	HOOP NET	OTHER
091	OTTER TRAWL BOTTOM, CRAB	OTHER
092	OTTER TRAWL BOTTOM, FISH	OTHER
095	OTTER TRAWL BOTTOM, SHRIMP	OTHER
097	OTTER TRAWL MIDWATER	OTHER

110	OTHER TRAWLS	OTHER
115	TRAWL, ROLLER FRAME	OTHER
116	TRAWL, SKIMMER	OTHER
118	BUTTERFLY NETS	OTHER
120	FLY NET	OTHER
130	POTS AND TRAPS	OTHER
132	POTS AND TRAPS, BLUE CRAB	OTHER
139	POTS AND TRAPS, FISH	OTHER
140	POTS AND TRAPS, SPINY LOBSTER	OTHER
145	POTS AND TRAPS, STONE CRAB	OTHER
400	LONG LINES	OTHER
402	LONG LINES, SURFACE	OTHER
403	LONG LINES, BOTTOM	OTHER
404	LONG LINES, SURFACE, MIDWATER	OTHER
405	LONG LINES, TROT	OTHER
407	LONG LINES, DRIFT W/HOOOKS	OTHER
408	BOUY GEAR	OTHER
411	BOUY GEAR, PELAGIC	OTHER
500	DREDGE	OTHER
550	DIP NETS	OTHER
551	CAST NETS	OTHER
552	BULLY NETS	OTHER
660	SPEARS	OTHER
661	SPEARS, DIVING	OTHER
662	GIGS	OTHER
750	BY HAND, DIVING GEAR	OTHER
760	BY HAND, NO DIVING GEAR	OTHER
801	UNSPECIFIED GEAR	OTHER
804	CHEMICAL, OTHER	OTHER

Table 2: The annual calculated King Mackerel landings by gear grouping from 1926 – 2023 fishing year. The terminal year is a 2023 fishing year to represent July 1st, 2023 to June 30th, 2024. Any cells containing an asterisk (*) indicate confidential data.

Fishing Year	Gillnet	Handline Plus
1926	8,240	937,318
1927	444	194,890
1928		12,789
1929		9,642
1930		3,169
1931		538
1932		39
1933		
1934	95	410,805
1935		
1936		
1937	134,130	3,134,503
1938	138,431	3,423,196
1939	376,488	2,854,510
1940	20,502	448,979
1941		
1942		
1943		
1944		
1945		13,780
1946		
1947		
1948	506,480	660,623
1949	28,796	436,719
1950	191	935,994
1951	3,205	771,804
1952	2,800	1,088,267
1953	14,119	988,558
1954	764	1,052,851
1955	10,317	1,071,835
1956	5,265	837,347
1957	255	1,195,752
1958		1,136,488

1959	11,404	1,545,741
1960	53,472	1,524,186
1961	1,119,223	886,435
1962	2,051,600	635,730
1963	1,069,020	276,847
1964	1,535,077	286,594
1965	2,233,240	323,662
1966	2,411,243	433,236
1967	2,852,271	637,585
1968	2,397,623	869,083
1969	1,800,276	614,386
1970	2,295,877	427,803
1971	1,048,264	396,969
1972	1,697,582	432,836
1973	4,914,948	936,618
1974	2,058,679	740,680
1975	2,318,036	503,733
1976	4,453,446	544,526
1977	1,390,554	501,690
1978	980,891	473,999
1979	2,117,976	707,818
1980	2,215,625	735,749
1981	1,444,651	428,826
1982	966,011	1,525,009
1983	701,543	695,279
1984	561,789	1,096,820
1985	20,404	2,227,516
1986	3,183	863,430
1987	841	366,735
1988	2,284	894,988
1989	63,548	1,300,676
1990	6,364	905,533
1991	305,840	983,483
1992	845,725	1,778,146
1993	50,438	1,496,782
1994	341,592	1,680,584
1995	394,233	1,228,055
1996	216,348	1,216,744
1997	310,667	1,680,194

1998	717,086	1,806,930
1999	398,612	1,751,653
2000	386,338	1,723,655
2001	263,304	1,684,981
2002	288,115	1,718,795
2003	357,140	1,692,279
2004	535,579	1,676,761
2005	429,997	1,616,879
2006	420,715	1,710,727
2007	513,353	1,722,780
2008	718,236	1,911,151
2009	658,238	1,891,406
2010	451,151	1,734,834
2011	374,403	1,793,713
2012	529,353	2,110,363
2013	446,234	1,895,249
2014	526,635	2,223,042
2015	488,361	2,047,364
2016	523,869	2,240,233
2017	636,998	2,427,696
2018	676,932	2,040,716
2019	557,740	2,044,678
2020	563,737	1,853,338
2021	585,080	1,098,320
2022	702,242	1,106,178
2023	511,454	1,158,069

Table 3. Uncertainty estimates by state and time block for the King Mackerel commercial landings.

Year	TX	LA	MS	AL	FL	Comments
1926-1976	0.20	0.20	0.20	0.20	0.20	Annual state summaries
1977-1985	0.10	0.10	0.10	0.10	0.10	Monthly state summaries
1986-1999	0.10	0.10	0.10	0.10	0.05	FL starts state trip ticket in 1985; used starting in 1986
2000-2001	0.10	0.05	0.10	0.10	0.05	LA starts state trip ticket in 1997; used starting in 2000
2002-2013	0.10	0.05	0.10	0.05	0.05	AL starts state trip ticket and used starting in 2002
2014	0.05	0.05	0.10	0.05	0.05	TX starts state trip ticket in 2008; used starting in 2014
2015-Present	0.05	0.05	0.05	0.05	0.05	MS starts state trip ticket in 2012; used starting in 2015

Figures

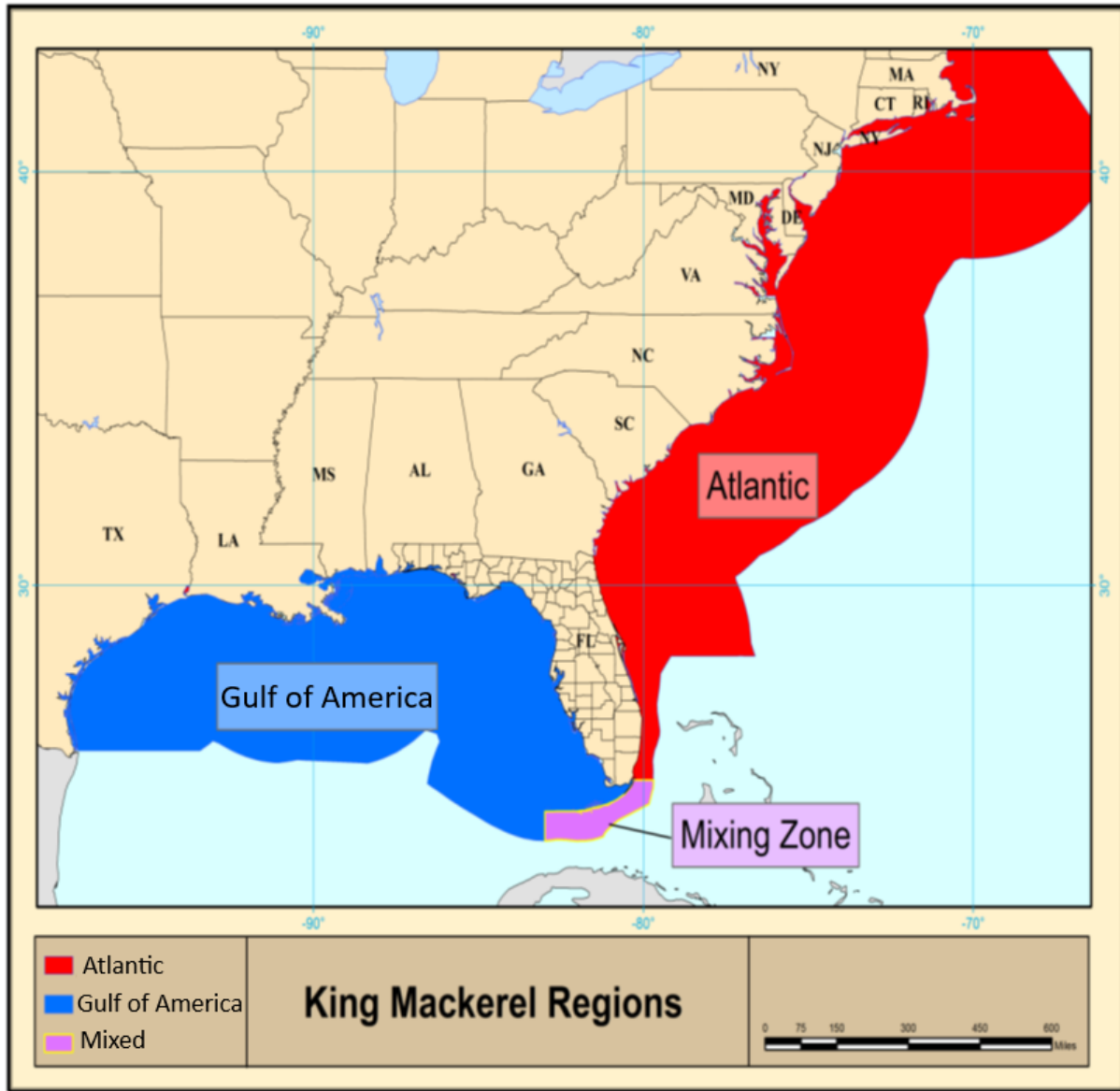


Figure 1: King Mackerel (*Scomberomorus cavalla*) assessment regions. The current assessment includes only the Gulf of America landings, and 50% of the winter mixing zone landings (with the other 50% going to the Atlantic). All mixing zone landings outside of the winter season are assigned to the South Atlantic.

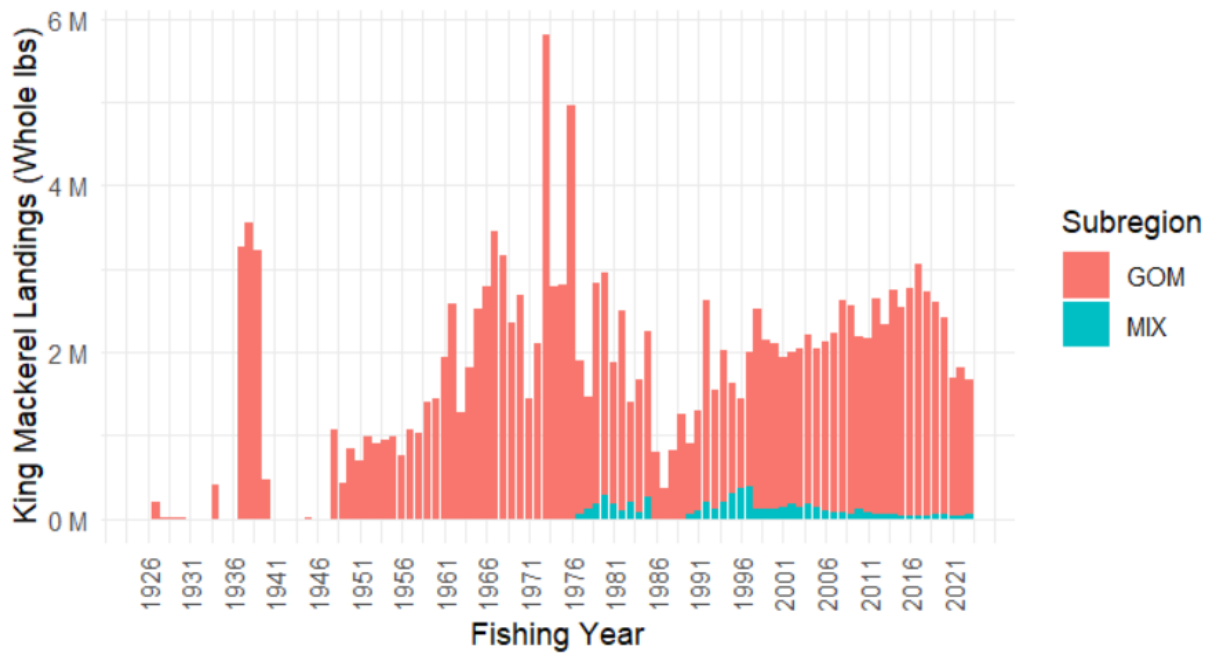


Figure 2: Annual calculated King Mackerel (*Scomberomorus cavalla*) commercial landings for the Gulf of America and Mixing Zone regions. Mixing zone sub-region only includes landings assigned to the Gulf stock.

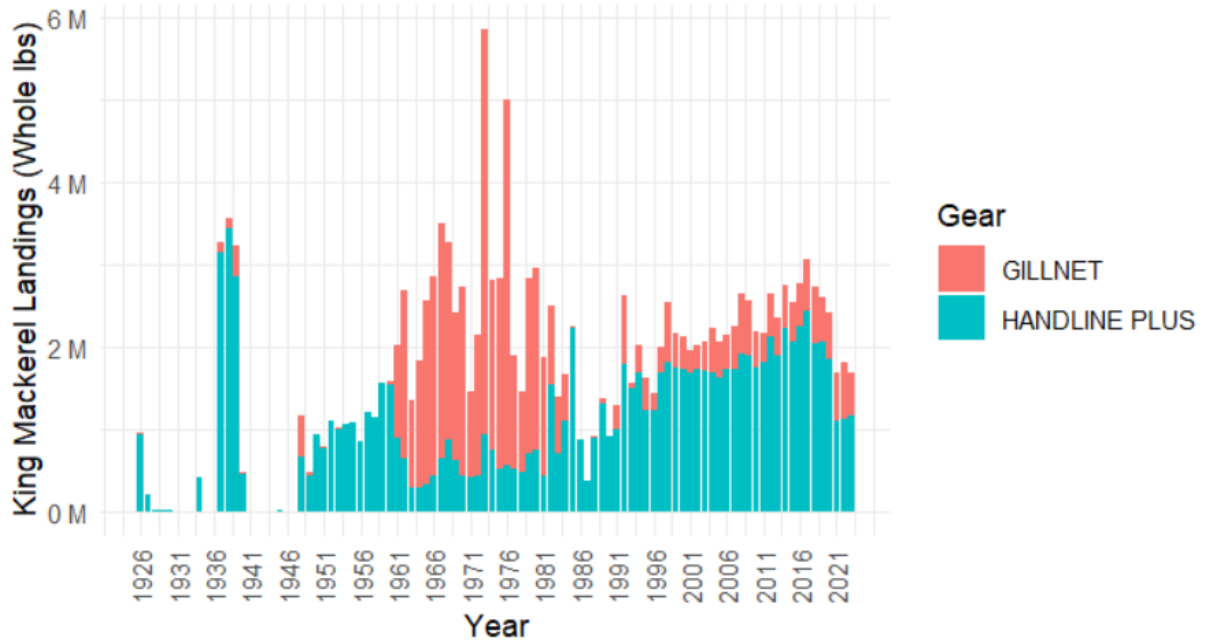


Figure 3: Annual calculated King Mackerel (*Scomberomorus cavalla*) commercial landings for Handline, Gillnet, and Other gears. Confidential landings have been excluded.

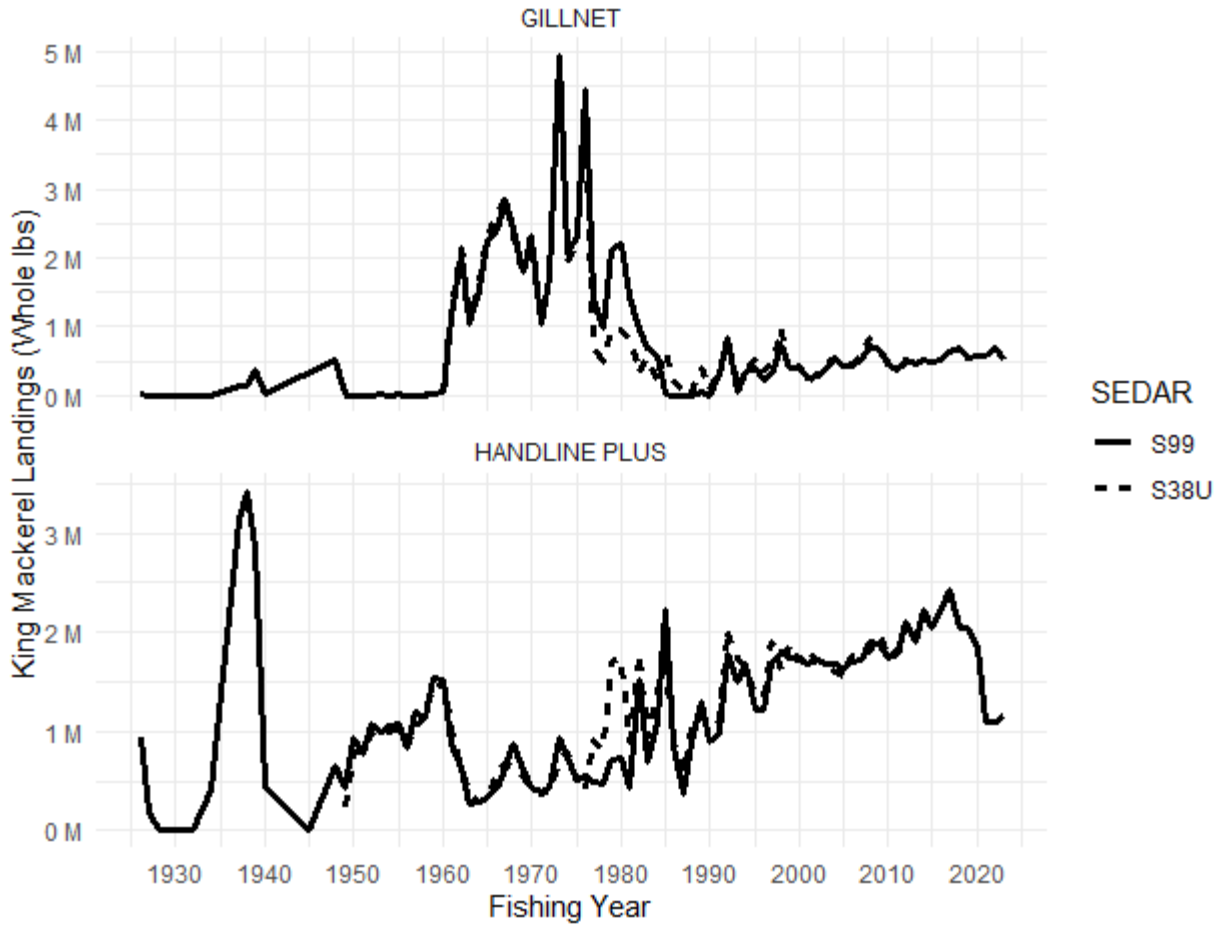


Figure 4: Annual calculated King Mackerel (*Scomberomorus cavalla*) commercial landings (in whole weight pounds) by gear for the current SEDAR 99 compared to the previous assessment SEDAR 38U from 1926 - 2024. Confidential landings have been excluded.