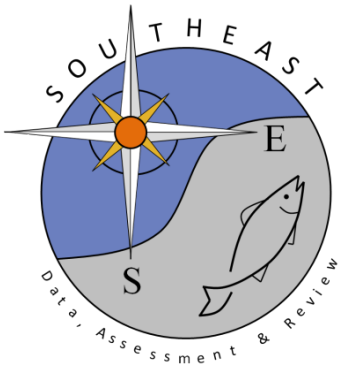
Commercial Landings of Sandbar Sharks in the U.S. Atlantic and Gulf of America (1950-2024)

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SEDAR101-DW28

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SEDAR 101-DW-28

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ABSTRACT

This document presents commercial landings of sandbar sharks (*Carcharhinus plumbeus*) from the U.S. Atlantic and Gulf of America for 1950-2024. Mexican landings are also presented from the Gulf of America. Information on the geographical distribution of commercial landings and gear-specific information of commercial landings is included.

KEYWORDS

Catch, Landings, Commercial fishing, Long lining, Shark fisheries, Observer programs, Sandbar sharks, Carcharhinus plumbeus

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1. Background

Commercial landing series from 1950-2024 are presented for the SEDAR 101 Sandbar Shark Assessment. Commercial landings data sources from the Gulf of America, Atlantic Ocean coasts, Puerto Rico and the US Virgin Islands, along with Mexican landings from the Gulf of America were examined. Information on the geographical distribution (state or territory of landing) and gear-specific information of commercial landings by major gear groups is presented.

2. Commercial Landings - Methods

Time range. Commercial shark landings data collected since the implementation of the 1993 FMP for Sharks of the Atlantic Ocean have been reassessed, and landings prior to this time available in federally maintained databases were investigated. The landings presented here cover the period 1950-2024.

Data sources. Commercial landings for 1950-2024 were collected from several data sources and combined to make a complete landings time series. ALS (Accumulated Landings System, referred to as general canvass data in earlier data workshop papers for commercial catches), the FIN (Fisheries Information Network) databases – comprised of GulfFIN (Gulf Fisheries Information Network) and ACCSP (Atlantic Coastal Cooperative Statistics Partners), PDC (Pelagic Dealer Compliance, referred to as QMS in previous data workshop papers), and eDealer, the Atlantic Highly Migratory Species (HMS) Division's collection program for HMS commercial landings. A discussion of shark data sources is described in SEDAR 21-DW-07 (Baremore et al, 2010).

These data sources do not cover the same time periods or the same geographical areas. The earliest data collections of NOAA Fisheries are represented in the general canvass data of ALS beginning in 1926. Prior to 1962, this system included coverage of shark landings from all coastal U.S. states, but since then is primarily focused on landings for the southeastern United States from Texas to North Carolina. Landings are in whole weights, typically summarized by year, month, and gear for the species reported. In 1972, dealer information and fishing area information were included in the summaries.

The FINS includes data maintained at GulfFIN, primarily from Texas to Florida, and at ACCSP, primarily from Florida to Maine. FINS data are trip level reports including details of gear, catch location, landing location, dealer, vessel, and grade information. Shark landings are represented in GulfFIN beginning in 1978 for Florida, in 1987 for Texas and Louisiana, in 1989 for Mississippi, and in 2002 for Alabama. ACCSP shark landings begin for most states in 1950 (e.g., Connecticut, Florida, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, and Virginia), with Delaware landings beginning in 1952, South Carolina in 1955, and Georgia in 1978. The ACCSP data prior to state trip ticket programs are a mirror of other data sources (e.g. ALS for South Atlantic states).

The Pelagic Dealer Compliance (PDC) program was established in 1993 for HMS quota monitoring, with bi-monthly summary reporting from all federal dealers permitted to purchase Atlantic sharks, swordfish, and/or BAYS (bigeye, albacore, yellowfin, and skipjack) tunas. While no gear, catch, or landing information were collected, a high-degree

of species-specific reporting was provided through this SEFSC-maintained system.

In 2013, the electronic HMS dealer reporting (eDealer) program was established by the Atlantic HMS Division, which collected HMS products submitted through the electronic state reporting programs, and replaced the PDC. The eDealer program incorporates a high degree of quality control and seeks to establish a complete history of HMS landings from 2014 onward.

The magnitude of the catches outside of the US EEZ is unknown but believed to be small, with the exception of the Mexican catches. Mexican landings of sandbar sharks in the Gulf of America were reconstructed as described below (Mexican landings, Section 4).

Shark landings for Puerto Rico and the U.S. Virgin Islands were gathered from the Accumulated Landings System (ALS) database and the Caribbean Commercial Vessel Logbook database (2012-2024). As no landings of sandbar sharks are reported in ALS or in the Caribbean logbook data, shark landings from these systems are not included. Additionally, no landings of sandbar in these Caribbean areas exist according to the Atlantic Coastal Cooperative Statistics Program (ACCSP) or eDealer data sources.

Landings series assemblage. Shark landings were extracted from each of the data sources for their entire time ranges and converted to dressed weight (dw) pounds: FINS data from GulfFIN (Texas through Alabama, 1978-2024) and ACCSP (Florida through Maine, 1950-2024); ALS data from 1950-2024; PDC from 1993-2013; and eDealer from 2013-2024. For PDC and eDealer, initial and terminal years were examined for completeness and removed if landings data were not collected for the entire calendar year. The transition year of 2013, when the PDC system was no longer maintained and dealers began to switch to electronic reporting, is not complete when combined together. Therefore, the PDC landings from 1994-2012 were considered in this assemblage and eDealer landings data from 2014-2024. Landings for 2013 were excluded from these datasets but are represented by FINS and ALS data.

FINS and ALS shark landings data are represented for the entire time series of these analyses (1950-2024). To consolidate these two sources, it was decided to use ALS data for those states represented in this data set (Texas through North Carolina) until the implementation year of each state's electronic trip-level dealer reporting program. Once these programs had been established for each state, FINS landings from these states were included instead of ALS. Landings between the two data sources were compared by year and state to verify maintenance of data continuity with this data source change. The start year was confirmed for all states except for South Carolina, where the first year of FINS data for South Carolina, based upon the implementation of the trip ticket system would have been 2004; however, at the time of this report, 2005 landings data were missing from the FINS for South Carolina. Therefore, South Carolina ALS shark landings were included through 2005 and FINS data beginning in 2006. The ending years for ALS data and the beginning years of FINS data used for shark landings by state is illustrated in **Table 1**.

As the Atlantic HMS Division's eDealer system focuses on data quality of HMS landings, the information contained in this system is preferred where possible for this assessment. As eDealer data includes only electronically submitted data at this time, any state landings collected via paper trip tickets would not be represented in eDealer. Therefore, a comparison between the consolidated FINS/ALS data and eDealer data was conducted by year and state to determine what years would be appropriate to switch from FINS to eDealer. If eDealer and

FINS shark landing were the same from each data source, then eDealer was the preferred source due to higher quality control measures under the eDealer program. Virginia eDealer and FINS data did not match since Virginia continues to receive a large portion of landings reported on paper tickets, and FINS data are considered the preferred source for the entire Virginia time series rather than eDealer. Virginia eDealer and FINS data did not match since Virginia continues to receive a large portion of landings reported on paper tickets, and FINS data are considered the preferred source for the entire Virginia time series rather than eDealer. This information is also presented in **Table 1**.

The resulting dataset is a consolidation of ALS, FINS, and eDealer data. To address the data quality and completeness of each data source, a table of *data uncertainty* was created by the analysts (**Table 2**). Data sources used in this assemblage cover different geographical regions and different time periods. Additionally, as federal shark reporting regulations were enacted, data sources' quality and completeness changed over time (i.e., federal reporting requirements in 1993, Shark Research Fishery with observer requirements in 2008, species-specific reporting requirements in 2013). **Table 2** lists the U.S. commercial landings data sources used in the landings series (1950-2024), the geographical region each data source covers, and the relative confidence for which the data analysts have in the data for assessing sandbar landings. Higher numbers in this table indicate higher levels of uncertainty and uncertainty values are bidirectional to indicate possible underreporting and overreporting of landings. For example, landings data maintained in the eDealer data system, from 2014 to the present, are assumed to have 5% uncertainty because these data were collected after the implementation of species-specific reporting, NMFS observers were aboard all sandbar-targeted trips, dealers maintained certifications of species identification workshops, and rigorous eDealer data maintenance was conducted. The values provided in the "Final Recommended Uncertainties" are provided as CV values for further analysis.

Regions are assigned to the data of Gulf of America, South Atlantic, and North Atlantic regions based on catch location. The boundary between the Gulf of America (GOA) and the South Atlantic (SAT) is defined in the Code of Federal Regulations § 635.27(b)(1) as "a line beginning on the East Coast of Florida at the mainland at 25°20.4′ N lat., proceeding due east. Any water and land to the south of that boundary is considered, for the purposes of setting and monitoring quotas, to be within the Gulf of America region." The boundary between North Atlantic (NAT) and South Atlantic regions is generally considered to be the state line between North Carolina and Virginia, with catch off the coast of Virginia and north to be in the North Atlantic, and catches off of North Carolina and waters south to be in the South Atlantic. If area information was not available, then the state of landing was used to identify the region. In cases where the state of landing was not available, such as in PDC, then the location of the dealer fish house was used.

The NMFS "Category Type" for gears was initially used to condense the gears reported in the shark landings data. These category types were examined to identify the main gear types used in sandbar landings and to further minimize the number of categories used in further analyses. Using the categorical information, the following longline gears, which account for 91% of the reported sandbar landings from 1993-2024, are included with LONG LINES: Drift with hooks, Set with hooks, Reef fish, Shark, Bottom, Surface, Surface-midwater, Trot, Vertical, and Not specified Long Lines. For GILL NETS, which account for 4.5% of the reported sandbar landings, the following gears are included: Runaround, Runaround drift, Floating anchor, Floating drift, Sink anchor, Sink drift, Other, Not specified, and Trammel Nets. The following gears are included with HANDLINE gears (2.7% of the reported sandbar shark landings): Hand

line, Hook and Line, Electric hook and line, Manual hook and line, Rod and reel, Electric or hydraulic reel, Diving gear by hand, Other hand lines, and trolls. For TRAWLS, which land just under 0.25% of the total sandbar sharks, include Otter trawls, Bottom otter trawls (for fish, shrimp), Midwater otter trawls, Scottish seine, Skimmer trawls, Other trawls, and Fly nets are included. OTHER GEARS account for less than 1 percent of the reported landings and include Pots and Traps (general, for fish, and for lobster), Floating traps (Shallow), Pound nets, Cast nets, Combined gears, Purse seine (general and Other), Haul seines, Other seines, other fixed nets, Dredge, and Spears. Landings reported as NOT CODED or UNSPECIFIED GEAR make up 1.5% of the total reports. Landings from the consolidated FINS, ALS, and eDealer dataset missing gear information were apportioned to gear by year, species (Unclassified sharks and sandbar), and region (GOA, SAT, and NAT). If there were strata still missing gear information, then proportions were calculated by species and region and applied to the remaining data missing gear.

While PDC landings were not used in calculations of reported totals, the information was used to define the species-assemblages applied to reports of 'Unclassified' sharks (described below). However, the PDC data (1994-2012), does not include gear information. Therefore, gear categories were assigned to the PDC shark landings using the same gear assemblage information from the consolidated FINS, eDealer, and ALS data set described above.

Unclassified sharks. Commercial shark landings were primarily reported as "unclassified" until federal regulations implemented species-specific reporting in the 1993 Fishery Management Plan for Sharks of the Atlantic Ocean. Species-specific reports of sharks first showed up in the commercial landings in 1984, with at least 5 species being reported annually beginning in 1987. The annual average percent of species-specific reporting prior to 1990 was never greater than 6% of the total landings in weight. In the 1990s, unclassified sharks comprised 65% of the sharks reported (excluding all dogfish sharks), 20% in the 2000s, less than 3% in the 2010s, and 0% reported since 2013.

Several management changes may have influenced reporting specificity, including Federal shark regulations in 1999 which included expanding the number of prohibited shark species, regulations in 2008 which established the Shark Research Fishery, and in 2013 with the implementation of the eDealer program coupled with state electronic trip-ticket reporting programs. Unclassified reporting between 1994-1998 averaged 59% of the total landings, between 1999-2007 averaged 22%, and between 2008 and 2012 averaged 11%.

Unclassified sharks have been reported under six different codes throughout the time series, including general shark, unknown pelagic shark, unknown small coastal shark, unknown large coastal shark, family Carcharhinidae, and genus Carcharhinus. In SEDAR 21, the allocation of unclassified sharks utilized the specificity of some of the unclassified codes (SEDAR21-DW-09), particularly the unknown large coastal shark reports. This method of apportioning a select unknown shark code(s) to specific groups of shark species was not applied here, as the availability of these reporting codes and their use was found to be inconsistent across states and data sources. To further complicate the reliability of these codes, three of these unclassified shark species codes were reassigned in 2013 to represent general shark fin species and general shark bellies. Therefore, the shark fin and shark bellies landings reported under the re-assigned unclassified codes were removed, and all unclassified shark reports were combined to represent all unclassified shark landings.

The pool of shark landings used to determine apportions of shark species included all sharks

reported to species, with the exclusion of the dogfish sharks found across the data sources. This includes 3 Mustelus spp (*M. canis, M. norrisi, M. sinusmexicanus*), *Squalus acanthias*, Squalidae, and *Isistius brasiliensis* (itis codes: 160230, 160234, 649700, 160617, 160604, and 160683, respectively).

A comparison between PDC, which contains landings data from 1994-2012, and the consolidated ALS, FINS, and eDealer dataset revealed that the PDC exhibited greater species richness than the data reported to other data sources of that same time frame. Conversely, the consolidated dataset, primarily consisting of ALS or FINS data from 1994-2012, contained a higher overall proportion of landings reported as unclassified sharks. This confirms the observations noted in all previous commercial shark landings SEDAR data workshop papers utilizing the PDC landings data. To more accurately determine species assemblages for these unclassified sharks, a combined dataset integrating PDC species composition with the consolidated ALS and FINS data was utilized for the 1994-2012 period. To construct this combined baseline, the maximum landings value between the PDC and the consolidated dataset was selected, stratified by species, year, region, and gear and used to create proportions of species for those stratifications. These percentages were applied to the unclassified shark landings in the consolidated data set. 'Region' was selected rather than 'state' information for two main reasons. First, for some states, species-specific information was absent and only reports of unclassified sharks existed for the entire year, making proportions difficult to apply. Second, the state information available in the PDC data represents the location of the fish house, rather than the location of landing. Using region information rather than state allows for more accurate proportioning.

This combined PDC, FINS, ALS dataset was then used to calculate a historical species assemblage by region and gear using aggregated data from 1994–1998; these proportions were subsequently applied to the unclassified shark landings in the consolidated dataset for the 1950–1998 period.

For the 1999–2012 period, annual species assemblages using the PDC+FINS+ALS dataset were calculated by gear and region from the combined dataset and applied to the corresponding unclassified landings.

For the final segment of the time series (2013–2024), unclassified sharks accounted for only 0.03% of the total reported shark landings (excluding dogfish sharks). To ensure all landings were fully accounted for, species proportions by year, region, and gear were calculated from the FINS/eDealer landings and applied to these minor unclassified quantities. Following the apportionment of all unclassified sharks, the estimated sandbar shark landings were added to the reported landings to complete the final time series.

3. Commercial Landings - Results

Data are checked for confidentiality and are not directly displayed if fewer than three dealers report for any set of summarized variables.

In the 1950-2024 consolidated data set, 56.9% of the total shark landings (excluding dogfish shark) were reported as unclassified sharks. A majority of the unclassified landings occurred between 1987-1996, corresponding to initial increased efforts in the shark fishery. The decline in landings after 1993, as well as the beginning of the decline in reports of unclassified sharks

can be correlated with the implementation of shark regulations that began in 1993. This surge of fishing effort can be observed in **Figure 1**, which shows total shark landings for all species, excluding dogfish sharks, by region and year. The high quantity of landings is most pronounced during this time in the Gulf of America region. This same peak is apparent in **Figure 2** for total sandbar shark landings, following unclassified allocations to species. After apportioning to species, 86% of the 35.3 mil lb dw apportioned to sandbar landings were added during the 1987-1996 surge.

Total estimated landings of sandbar sharks (**Table 3**) show a sharp increase in the 1980s, first observed in the North Atlantic (1980), followed by the South Atlantic (1981) and then the Gulf of America (1984), due to increased efforts in the shark fishery and prior to implementation of shark regulations that began in 1993. During this time, the Gulf of America dominated the regional distribution of landings from 1987-1992, almost tripling the 1986 Gulf landings at 1.3 million lb dw in 1987, and peaking at over 4.6 million lb dw in 1989. Landings in the South Atlantic rose to their highest levels in 1989, at just over 1.0 million lb dw dropping to 0.6 million lb dw before resurging to over 1.4 mill lb dw in 1992. While the North Atlantic region initiated the rise in landings, sandbar sharks are not reported in amounts as high as the other two regions. Between 1993 and 2006, sandbar shark landings decreased from 3.37 mil lb dw (1993) with approximately 52% of the landings occurring in the Atlantic region (70% in the South Atlantic, 30% in the North Atlantic), to 1.37 mil lb dw (1998), with approximately 50% of the landings occurring in the Atlantic region (50% in both the South Atlantic and North Atlantic), before dropping to less than 200,000 lb dw. There has been a further decline in landings since 2008, which is expected due to the management changes which began that year, heavily curtailing sandbar landings. The management measures implemented in 2008 stipulated that only vessels accepted into the Shark Research Fishery (SRF), which requires a NOAA Fisheries observer on board every trip, could target and land sandbar sharks.

After initial federal shark regulations went into effect in 1993 and prior to the additional measures implemented in 2008, the highest total sandbar landings occurred in 1994, with over 3 million lb, dw and almost 60% of the landings occurring in the Gulf of America (**Figure 3**). After 2008, the highest landings are observed in 2009 and 2015 with over 172,000 lb dw and 165,000 lb dw, respectively. Average annual landings from 2008 to 2024 are over 114,000 lb dw.

Most total estimated sandbar landings occur in Florida (**Figures 4-5**) and higher total quantities landed in the Gulf of America, followed closely by the South Atlantic. Sandbar landings and locations since 2008 are entirely dependent upon the SRF's participating vessels in the SRF.

Commercial landings by gear (**Tables 4; Figures 6-8)** are dominated by longlines (over 85% of the annual landings), with gillnets between 4-10%. Longline gear is reported for all three regions, but is most common in the Gulf of America for the time series. Handline gears are most frequently reported in the South Atlantic region, while Gill nets, Trawls, and "Other Gears" are more commonly reported in the North Atlantic region.

Assessment of changes to the data assemblage compared to previous SEDARs

Unclassified Sharks. Previous shark assessments involved various methods of proportional allocation of commercial landings of unclassified sharks on multiple year groups as described in working papers since the 1996 Shark Evaluation Workshop (SEW; See Appendix 3 of Cortés 1996, Cortés 1998, Cortés and Neer, 2005). In SEDAR 21, while commercial landings through 1995 as described in the 1996 SEW continued to be incorporated, unclassified reports attributed to the large coastal sharks were proportionally allocated to sandbar landings using the proportion of sandbars in the large coastal shark complex (Cortes and Baremore, 2010).

Unreported Catches. Landings provided to the 1996 SEW, which have continued to be included through the last sandbar assessment, SEDAR 54, were not included for SEDAR 101.

These landings consisted of unreported large coastal sharks (LCS) landings from 1986-1991, by Mr. Chris Brannon to NMFS. It was shared that the landings from 1986, 1987, 1990 and 1991 represented shark landings from the Gulf of America, while landings during 1988-1989 were split between the Gulf of America and the mid-Atlantic regions. Mr. Brannon estimated that in the Gulf of America in 1988-1989, approximately 2/3 of the landings represented blacktip sharks, with the remaining third being a combination of sandbar sharks and other LCS species. For the Atlantic in 1988-1989, Brannon reported that landings were approximately 80% sandbar sharks, with the remaining being a combination of blacktip sharks and other LCS species.

In SEDAR 11 at the Data Workshop, the Catch Group reevaluated these landings. There was general belief that landings were not being collected adequately prior to 1993 and none of these commercial landings had been reported to any collection system. Therefore, it was decided that these landings should be incorporated.

However, it was decided to not include these unreported landings for SEDAR 101 and instead rely upon the high uncertainty estimate (30%) assigned to this time period (see **Table 2**). By excluding this six-year period, we avoid applying a distinct assumption to the 1986-1991 data. Potential underreporting is instead addressed globally by applying uncertainty across the entire time series.

Comparison of Assembled Landings. A comparison of sandbar shark landings used in SEDAR 54 (1960-2015) for the Gulf of America and the Atlantic regions are compared to the sandbar shark landings constructed for SEDAR 101. Changes in methodology and improvements with data source selection and unclassified shark apportionment caused a decrease in sandbar shark landings in both regions over the time series, particularly from 1990-2007 in the Gulf of America and 1986-2008 in the Atlantic (**Figure 9**). Previous methodologies for creating shark landings data series were often species-specific. In cases where species-specific landings was reported to one data source (e.g., PDC), and unclassified reporting of the same landings to a second data source (e.g., state reporting programs feeding into ALS), this methodology would likely have resulted in double counting of landings. Additionally, excluding the unreported catches from Brannon could also be contributing leading to the observed discrepancy from 1986-1991. Again, these unreported catches were not included to avoid double counting data. While the presented methodology for SEDAR 101 utilizes the best available information to improve the reconstruction of a comprehensive sandbar shark landings time series, it may not address perceived misidentification issues for the species that was a concern raised at the Data Workshop.

4. Mexican Landings

The Mexican landings series constructed for SEDAR 54 covering the years 1976-2008 followed the methodology from Bonfil and Babcock (2005) developed for SEDAR 11. These data were combined using the same methodology to complete the time series through 2024 with data available from Mexico's CONAPESCA fisheries statistics on-line site (https://www.gob.mx/conapesca/documentos/anuario-estadistico-de-acuacultura-y-pesca).

In summary, estimates of sandbar landings and numbers of sharks from these data were calculated following the methods presented by Bonfil and Babcock (2005) and by the recommendations from the SEDAR 11 Data Workshop (SEDAR 11-Stock Assessment Report). Here it was determined that sandbar sharks were only recorded in the 'large shark', or "tiburón", category (>1.5 m TL) and only in the states of Tamaulipas, Veracruz and Yucatán (see **Figure 10** for a map of Mexican states). Sandbar sharks comprised 7% of the large sharks (in live weight) in Yucatán, and 7.3% in Tamaulipas and Veracruz. Average weights of 29.5 kg (65.04 lb) in Yucatán and 38 kg (83.776 lb) in Tamaulipas and Veracruz were applied to the weights to convert the landings to numbers of sharks. It was decided during the workshop that the entire tiburón landings reported for these regions would be used in the calculations, as there is no scientific evidence of nursery areas in Mexican waters and therefore all sandbar sharks would have come from the United States. In SEDAR 54, the history for Mexican landings was maintained for 1981-2004 and then estimated with values by using the last year of data (2004 data) through 2009.

For these analyses, landings of tiburónes and of the calculated sandbar sharks from 1976-1999 were transcribed from Bonfil and Babcock (2005) and landings data for 2000-2024 were pulled from the Government of Mexico's CONAPESCA website (See References, CONAPESCA ; **Table 5**). Data were then compared to data used in previous shark SEDAR data workshops. Two numbers were updated for landings of large sharks in Tamaulipas (2005 and 2007) and one data point for Veracruz (2005). A table of large shark, or "tiburónes", landings in metric tons, live weight, as reported from the CONAPESCA data, including that reported by Bonfil and Babcock (2005) is presented in **Table 6**.

Landings of sandbar shark were then estimated from Tamaulipas, Veracruz, and Yucatan using the percentages adopted in SEDAR 11 – 7% for Yucatan, 7.3% for Tamaulipas and Veracruz. Numbers of sharks were then calculated from the landings using the average weights presented in the same paper – 29.5 kg (65.04 lb) in Yucatán and 38 kg (83.776 lb) in Tamaulipas and Veracruz. Estimated landings and numbers of sandbar sharks from Mexican commercial data are presented in **Figure 11**. Landings, in dressed weight, and numbers of sandbar shark calculated from the CONAPESCA data are presented in **Table 7**.

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Tables

Table 1. Temporal and data source coverage of shark landings by the state of landing.

State	ALS	FINS	eDealer
AL	1950-2001	2002-2013	2014-present
CN		1950-2013	2014-present
CT		1950-2013	2014-present
DE		1950-2013	2014-present
FL	1950-1985	1986-2013	2014-present
GA	1950-2000	2001-2013	2014-present
LA	1950-1999	2000-2013	2014-present
MA		1950-2013	2014-present
MD		1950-2019	2020-present
MS	1950-present*		
NC	1950-1993	1994-2019	2020-present
NJ		1950-2013	2014-present
NY		1950-2013	2014-present
RI		1950-2013	2014-present
SC	1950-2005	2006-2013	2014-present
TX	1950-2013		2014-present
VA		1950-present	

*Note: no shark landings exist from Mississippi after 2006.

Table 2. Data Uncertainty Table for Sandbar Shark Commercial Landings Sources. Suggestions for the level of uncertainty for commercial landings sources are provided. These numbers are relative and are based on "expert opinion" of the data in regards to sandbar shark landings. The lowest uncertainty levels are suggested for datasets and time periods that provide high confidence in values needed for sandbar shark catch series construction. The highest uncertainty values are assigned to datasets and time periods where data may be incomplete, inaccurate, or a mixture of both. Source: suggested method borrowed from SEDAR 68 - GOM Scamp (pers. comm. S. Atkinson, M. Pawluk).

*The "Recommended Uncertainties for Year Ranges" should be treated as CVs for the model.

Uncertainty table for commercial catch sources for Sandbar shark									
Year	ALS	GulfFIN	ACCSP	PDC	eDealer	Percentage of catch Per Uncertainty Level		Final Recommended Uncertainties (CV values)	Uncertainty Direction (Underreporting "-" or Overreporting "+")
	TX-NC, Caribbean	*TX-FL*	*FL-ME*	*TX-ME, Caribbean*	*TX-ME, Caribbean*	*0.1*	*0.05*		
1950 - 1971	0.3		0.3					0.3	" - "
1972 - 1986	0.3		0.3					0.3	either "+"/"-"
1987 - 1992	0.3	0.3	0.3					0.3	either "+"/"-"
1993 - 2007	0.2	0.2	0.2	0.2				0.2	either "+"/"-". Overreporting likely for SBR (<2006); but incomplete reporting by fishery
2008 - 2013	0.1	0.05	0.05	0.1		0%	100%	0.05	" - "
2014 - present	0.1	0.05	0.05		0.05				" - "

Table 3. Commercial landings of sandbar sharks in weight (lb dw), 1950-2024 by region and year (GOA = Gulf of America; SAT = South Atlantic; NAT = North Atlantic).

* = Values are considered confidential and cannot be published.

Year	GOA	SAT	NAT
1950	3,215	212	198,553
1951	1,331	3,037	147,774
1952	1,717	12,118	154,102
1953	1,141	2,639	136,219
1954	1,543	173	107,362
1955	1,687	3,029	103,152
1956	1,699	1,444	74,674
1957	811	1,791	77,350
1958	541	1,339	322,298
1959	634	4,459	406,571
1960	1,256	4,966	33,952
1961	393,998	1,211	20,263
1962	559	4,068	24,556
1963	398	4,067	29,361
1964	299	502	31,967
1965	121	1,318	48,563
1966	258	37,580	44,072
1967	444	285,716	26,464
1968	263	541	12,125
1969	1,801	370	24,060
1970	1,248	140	13,905
1971	2,791	340	12,101
1972	3,220	353	22,616
1973	170,071	3,281	19,108
1974	5,550	1,284	30,095
1975	5,043	3,674	41,221
1976	21,623	5,278	28,863
1977	61,084	21,562	54,200
1978	307	3,108	46,803
1979	574	4,462	43,504
1980	967	9,192	139,108
1981	1,629	41,005	100,707
1982	9,289	39,993	83,350
1983	1,731	47,292	86,745
1984	36,599	81,190	88,688
1985	113,794	31,405	90,426
1986	610,673	234,819	123,845
1987	1,637,987	407,450	138,874

Year	GOA	SAT	NAT
1987	1,637,987	407,450	138,874
1988	3,170,265	711,809	123,383
1989	4,636,214	1,051,741	214,056
1990	3,351,007	879,611	148,137
1991	3,128,491	612,380	264,375
1992	2,674,004	1,435,895	490,130
1993	1,575,660	1,254,013	541,367
1994	1,400,758	711,066	764,398
1995	1,557,638	706,162	855,654
1996	1,123,608	639,817	655,711
1997	701,255	344,159	393,273
1998	670,371	350,551	358,567
1999	696,977	439,524	638,388
2000	676,865	441,522	544,076
2001	839,540	416,819	556,822
2002	961,320	544,436	840,428
2003	1,008,896	400,516	603,025
2004	760,406	462,140	410,122
2005	587,252	384,931	451,331
2006	857,169	446,124	449,292
2007	270,285	215,877	262,406
2008	28,824	31,158	43,051
2009	116,291	55,160	896
2010	46,842	58,603	29,643
2011	50,544	62,701	31,914
2012	25,827	35,739	16,621
2013	37,594	27,345	11,270
2014	*	*	35,651
2015	*	88,746	*
2016	*	*	28,807
2017	74,051	*	*
2018	63,324	*	*
2019	*	*	34,797
2020	*	*	*
2021	79,710	*	*
2022	*	*	
2023	*	*	*
2024	*	*	*

Table 4. Commercial landings of sandbar sharks in weight (lb, dw) by gear, 1950-2024.

Year	LONG LINES	GILL NETS	HANDLINE/H&L	TRAWLS	Other Gears
1950	12,532	107,689	4,317	39,099	38,342
1951	1,367	101,171	3,526	30,506	15,572
1952	7,330	116,539	13,446	20,039	10,583
1953	1,215	69,332	4,129	46,351	18,974
1954	835	69,384	2,238	24,488	12,132
1955	266	68,821	5,764	21,242	11,776
1956	266	36,186	4,334	22,102	14,930
1957	38	32,804	2,552	24,456	20,104
1958	949	296,754	2,227	12,097	12,151
1959	1,481	375,189	5,473	15,865	13,655
1960	1,025	3,459	6,953	21,966	6,771
1961	394,522	6,770	1,127	11,741	1,312
1962	987	6,311	3,649	17,224	1,011
1963	3,038	2,736	3,783	22,182	2,087
1964	3,494	1,762	82	21,332	6,098
1965	27,685	641	130	21,240	305
1966	57,196	241	325	22,979	1,170
1967	286,699	555	27	24,935	407
1968	266	307	193	11,040	1,123
1969		814	2,160	22,800	458
1970	76	1,073	1,336	11,409	1,399
1971	1,291	1,426	3,620	8,691	204
1972	342	778	4,644	20,299	127
1973	160,061	1,619	15,557	14,688	534
1974	1,671	1,096	8,898	24,093	1,170
1975	3,304	3,245	7,035	35,947	408
1976	23,527	6,863	8,759	16,387	229
1977	67,954	35,132	11,377	21,110	1,272
1978	9,619	10,248	2,680	25,483	2,187
1979	19,300	8,441	4,887	14,500	1,413
1980	28,918	11,194	4,765	103,521	869
1981	55,661	30,188	8,691	47,226	1,576
1982	66,105	32,394	26,760	5,388	1,985
1983	86,315	23,939	17,890	5,206	2,418
1984	140,746	23,839	29,845	5,840	6,207
1985	168,923	26,257	26,198	7,409	6,839
1986	743,923	35,653	177,156	11,833	773
1987	1,843,730	53,390	262,921	24,102	169
1988	3,778,411	49,553	163,102	13,985	406
1989	5,573,459	103,626	195,120	16,490	13,317

Table 4, cont'd. Commercial landings of sandbar sharks in weight (lb, dw) by gear, 1950-2024. * = Values are considered confidential and cannot be published.

Year	LONG LINES	GILL NETS	HANDLINE/H&L	TRAWLS	Other Gears
1990	4,173,854	98,118	82,759	23,408	615
1991	3,640,092	196,799	152,145	15,686	524
1992	3,972,302	182,962	427,686	16,691	388
1993	2,850,186	282,725	231,244	6,566	320
1994	2,647,461	110,284	105,669	9,706	3,102
1995	2,883,889	113,181	107,779	9,563	5,042
1996	2,184,856	128,167	92,375	12,470	1,267
1997	1,282,580	58,444	90,170	5,562	1,931
1998	1,200,554	87,863	75,668	11,701	3,704
1999	1,640,542	39,660	90,615	3,522	550
2000	1,571,830	65,899	20,623	4,077	34
2001	1,605,441	151,006	54,398	1,534	802
2002	2,077,068	151,430	101,316	13,731	2,640
2003	1,807,228	167,406	37,258	231	314
2004	1,475,884	108,513	47,842	15	414
2005	1,280,355	92,908	29,507	20,589	155
2006	1,563,985	166,398	18,460	3,632	110
2007	504,599	226,851	5,114	8,978	3,027
2008	50,127	50,115	387		2,404
2009	168,879	129	2,623	373	343
2010	126,938	5,938	2,198		*
2011	140,942	897	2,604	496	*
2012	67,307	6,341	4,433	*	88
2013	75,581	*	*	*	*
2014	119,374				
2015	165,773	*		*	
2016	113,971	*	*		
2017	120,948			*	
2018	133,968	*	*		
2019	150,010	*		*	
2020	*	*			
2021	108,131	*	*		
2022	86,809				
2023	49,144				
2024	123,526		*		

Table 5. Mexican landings of "tiburónes" (sharks greater than 150 cm TL) for the three states (metric tons ww) used for sandbar shark estimations. Source: CONAPESCA.

Year	Tamaulipas	Veracruz	Yucatán
1976	75	234	213
1977	155	190	251
1978	133	667	369
1979	203	738	121
1980	371	1351	277
1981	703	3676	679
1982	286	3461	1939
1983	423	2719	2139
1984	466	3133	2012
1985	378	1239	2025
1986	372	1935	2078
1987	494	1425	1377
1988	631	2283	1486
1989	573	1617	1741
1990	666	1823	2509
1991	551	1670	2019
1992	622	1823	2095
1993	593	1731	1942
1994	707	1685	1753
1995	1136	1683	1881
1996	1044	2047	2014
1997	697	2381	1023
1998	981	1519	1006
1999	784	1414	1578
2000	729	1652	1037
2001	814	1738	637
2002	698	1314	489
2003	751	974	427
2004	776	933	400
2005	593	1121	477
2006	562	1155	568
2007	756	842	425
2008	647	503	153
2009	520	505	170
2010	807	550	243
2011	531	282	179
2012	507	545	222
2013	1060	344	111
2014	654	652	126
2015	662	904	203
2016	874	1405	139
2017	1046	2209	185
2018	1912	1990	254
2019	1897	854	424
2020	2060	947	374
2021	2569	1354	267
2022	2349	1608	424
2023	2190	1634	515

2024	2785	1164	528

Table 6. Estimated Mexican landings of sandbars by state (lb dw) in the columns on the left, and numbers of sandbars by state in the columns on the right.

Note: Mexican landings were recalculated after the Data Workshop resulting in minor differences. See the table in the Data Workshop Report for updated numbers.

	Sandbar landings, lb dw				Sandbar landings, numbers			
Year	Tamaulipas	Veracruz	Yucatán	TOTAL	Tamaulipas	Veracruz	Yucatán	TOTAL
1976	12688	26963	23791	63442	145	452	503	1100
1977	17446	22205	28549	68200	299	367	593	1259
1978	15860	77716	44409	137986	257	1289	672	2218
1979	23791	85646	12688	122125	392	1426	286	2104
1980	42823	157018	30135	229976	717	2810	855	4382
1981	82474	428232	76130	586836	1358	7102	1605	10065
1982	33307	402855	215702	651864	553	6687	4582	11822
1983	49167	317209	237906	604282	817	5253	5055	11125
1984	53925	364790	223632	642347	900	8053	4756	13709
1985	44409	144330	225218	413957	730	2394	4786	7910
1986	42823	225218	229976	498018	719	3739	4911	9369
1987	57098	166535	152260	375892	954	2753	3254	6961
1988	72958	266455	164948	504362	1219	4411	3512	9142
1989	66614	188739	193497	448850	1107	3124	4114	8345
1990	77716	212530	282316	572562	1287	3522	5929	10738
1991	63442	195083	223632	482157	1085	3227	4771	9083
1992	72958	212530	233148	518636	1202	3522	4951	9675
1993	69786	201427	215702	486915	1146	3344	4589	9079
1994	82474	196669	195083	474227	1366	3256	4140	8762
1995	131642	196669	209358	537669	2195	3252	4445	9892
1996	122125	237906	223632	583664	2017	3856	4760	10633
1997	80888	277558	114195	472641	1347	4600	2418	8365
1998	114195	177637	111023	402855	1895	2935	2377	7207
1999	91991	164948	174465	431404	1515	2732	3729	7976
2000	85646	191911	115781	393339	1408	3192	2451	7051
2001	94246	201228	70722	366195	1564	3339	1512	6414
2002	80815	152136	54290	287242	1341	2524	1160	5025
2003	86952	112771	47407	247129	1443	1871	1013	4327
2004	89846	108024	44409	242279	1491	1792	949	4232
2005	68658	129791	52958	251407	1139	2154	1132	4425
2006	65069	133727	63061	261857	1080	2219	1348	4646
2007	87531	97488	47185	232203	1452	1618	1008	4078
2008	74910	58238	16987	150135	1243	966	363	2572
2009	60181	58455	18880	137516	999	970	402	2371
2010	93429	63654	27006	184089	1550	1056	575	3181
2011	61471	32707	19826	114004	1020	543	422	1985
2012	58678	63073	24638	146389	974	1047	525	2546
2013	61234	68454	12365	142053	1016	1136	263	2415
2014	75682	75518	14042	165242	1256	1253	299	2808

2015	76644	104689	22552	203885	1272	1737	480	3489
2016	101162	162637	15415	279214	1678	2698	328	4704
2017	121062	255730	20500	397292	2009	4243	437	6689
2018	221360	230397	28216	479973	3673	3823	601	8097
2019	219630	98917	47126	365673	3644	1641	1004	6289
2020	238523	109598	41505	289626	3958	1818	886	6660
2021	297392	156798	29643	483833	4934	2602	631	8167
2022	271971	186127	47057	505155	4513	3088	1002	8603
2023	253543	189215	57125	499883	4207	3139	1217	8563
2024	322501	134804	58650	515955	5351	2237	1249	8837

Figures

Figure 1. Commercial shark landings (excluding dogfish shark**s)** in weight (lb, dw) by region and year (1950-2024).

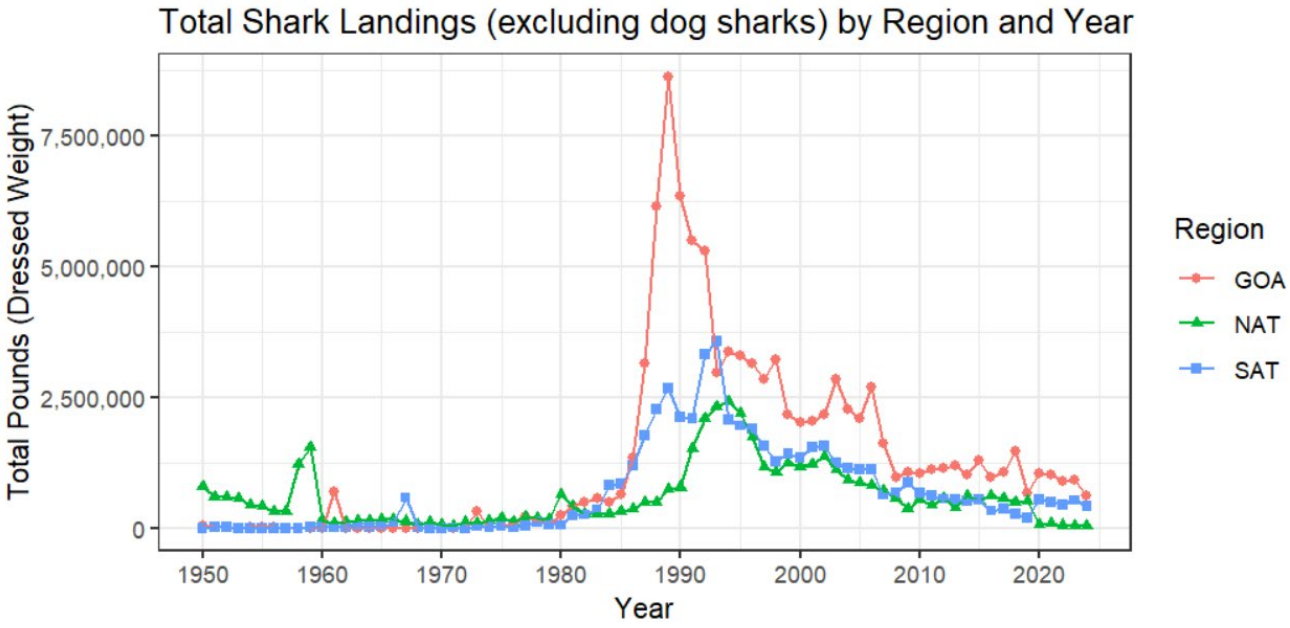


Figure 2. Commercial landings of sandbar sharks in weight (lb, dw) by year and region, 1950-2024.

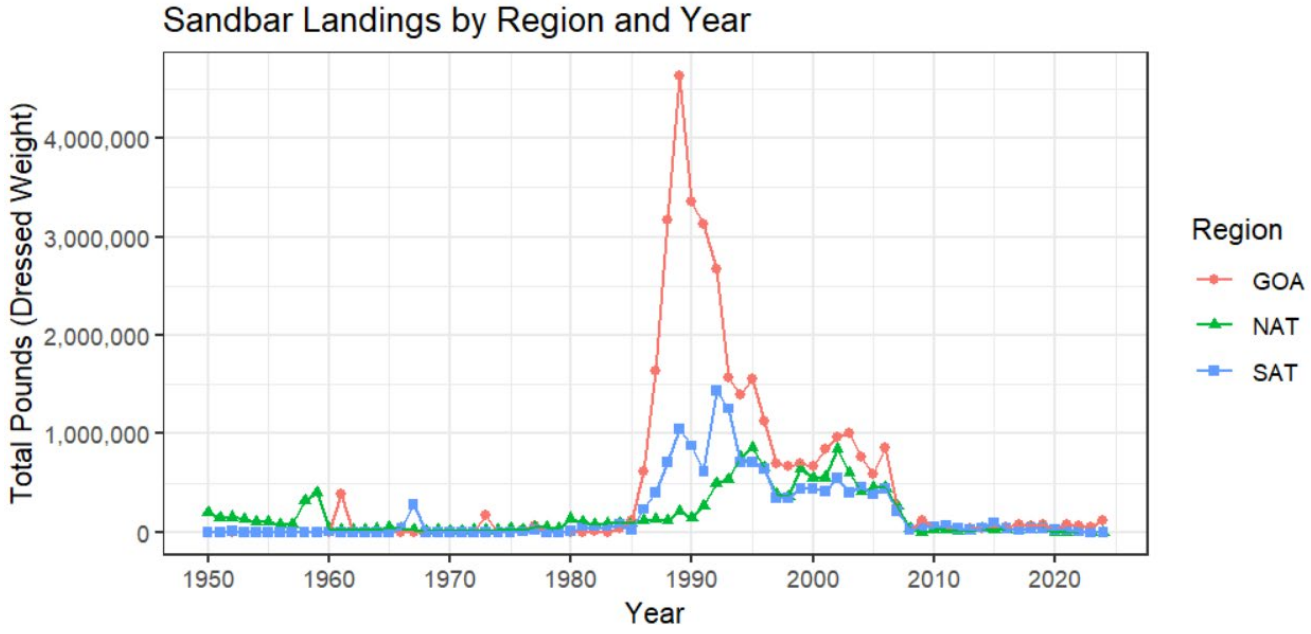


Figure 3. Commercial landings of sandbar sharks in percentage by year and region, 1950-

2024.

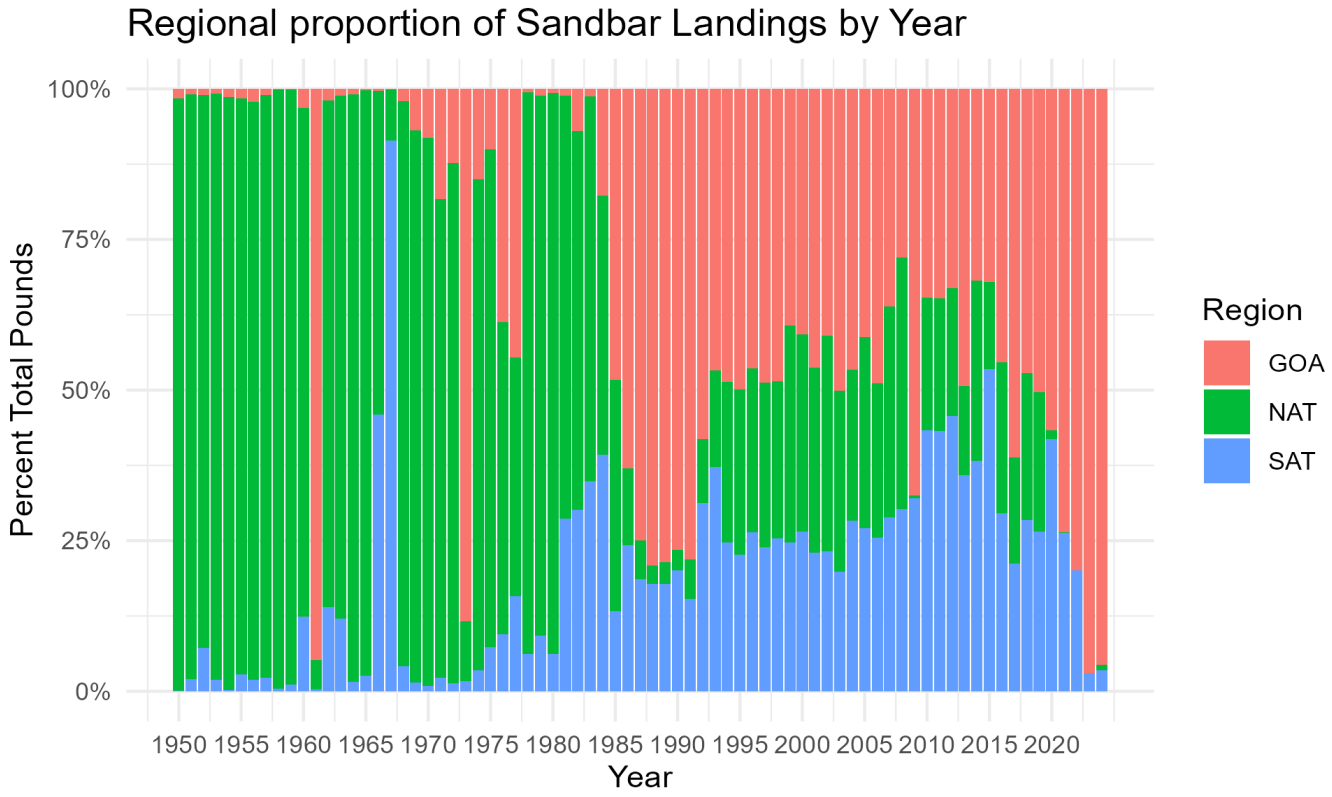


Figure 4. Commercial landings of sandbar sharks by year and state in weight (lb, dw) by gear, 1950-2024.

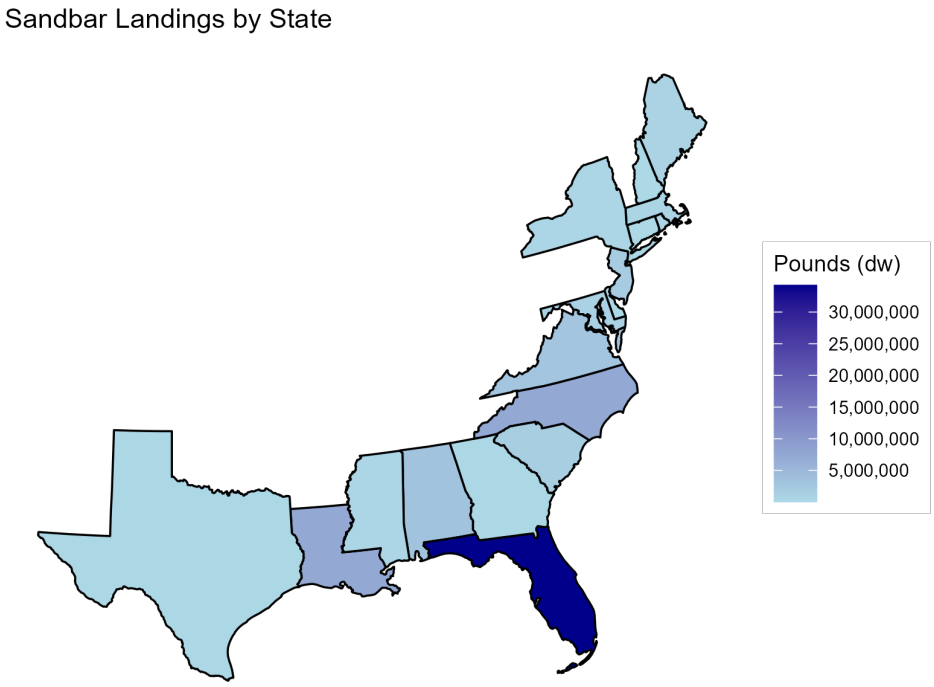


Figure 5. Commercial landings of sandbar sharks by year and state in weight (lb, dw) by gear, 1950-2024. Top panel: landings in the North Atlantic Region (NAT); middle panel: landings in the South Atlantic Region (SAT); bottom panel: landings in the Gulf of America (GOA).

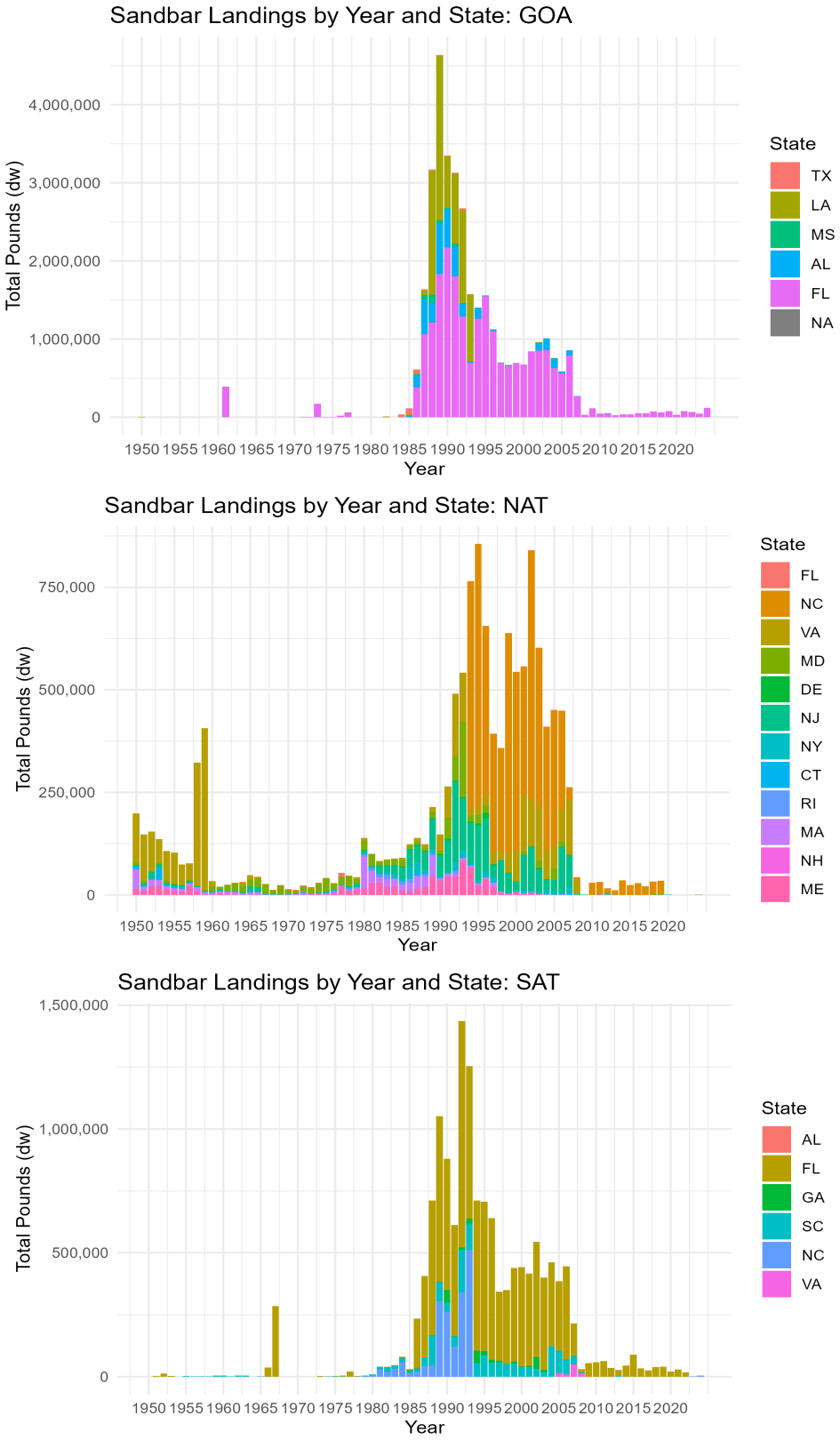


Figure 6. Proportions of gears in commercial landings of sandbar sharks in weight (lb,

dw). Left panel: 1950-2024. Right panel: 2008-2024.

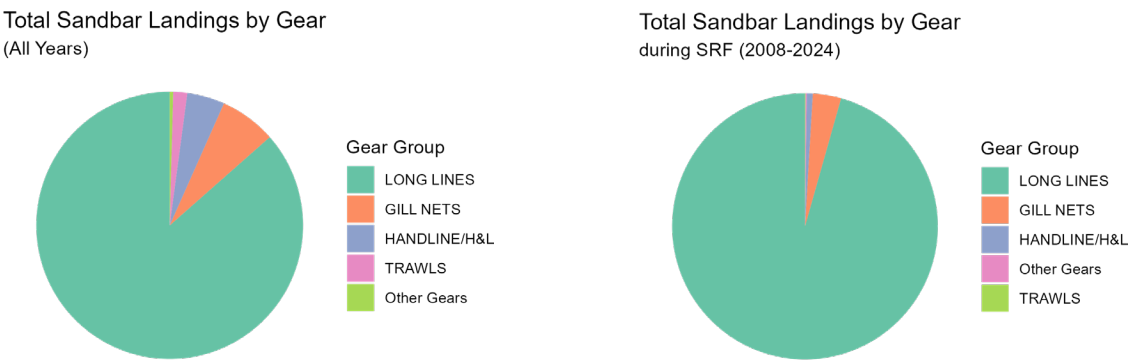


Figure 7. Commercial landings of sandbar sharks in weight (lb, dw) by gear and region, 1950-2024. Top panel: Aggregated weight. Bottom panel: region by percentage.

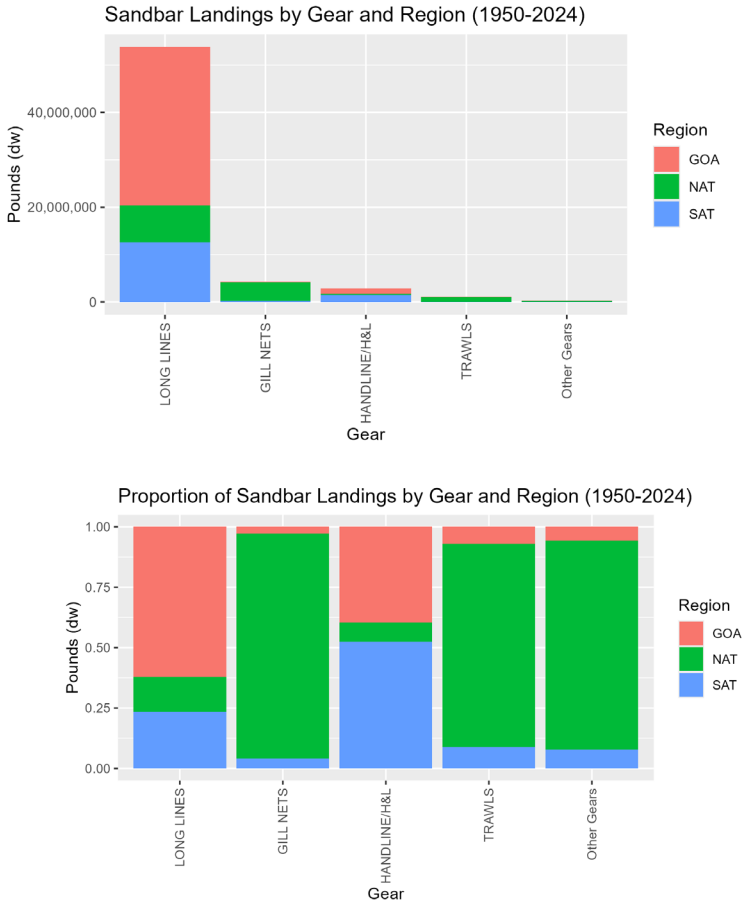


Figure 8. Commercial landings of sandbar sharks in weight (lb, dw) by gear and region, 2008-2024. Top panel: Aggregated weight. Bottom panel: region by percentage.

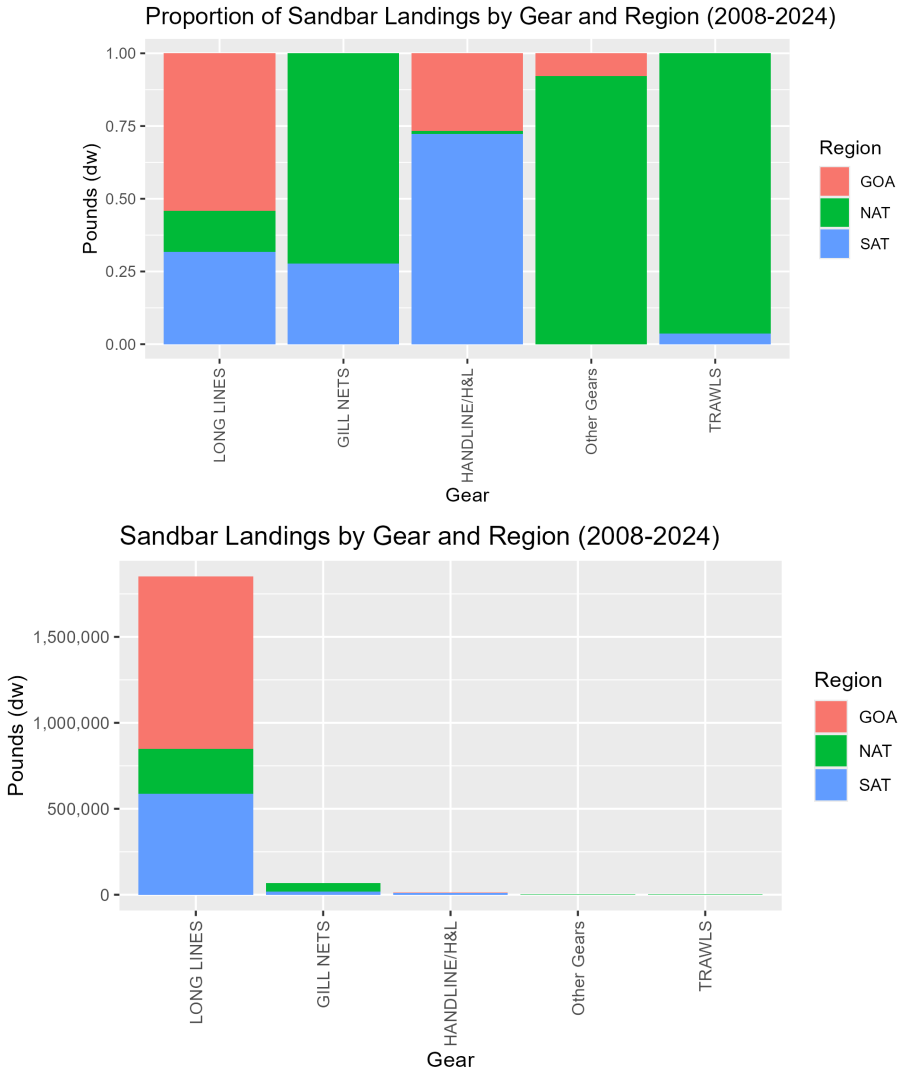
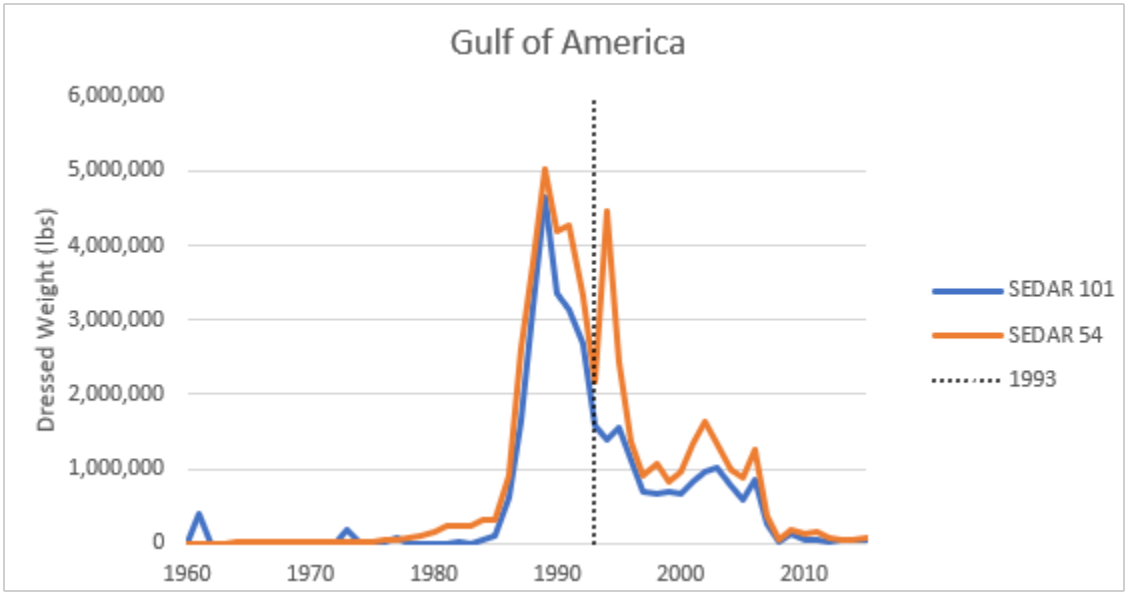


Figure 9. A comparison of the landings series compiled for SEDAR 54 and SEDAR 101 by region (1960-2015). SEDAR 54 values were converted to pounds from metric tons to the first decimal place and are therefore not precise. Top Panel: Landings, lb dw, for the Gulf of America. Bottom Panel: Atlantic region.



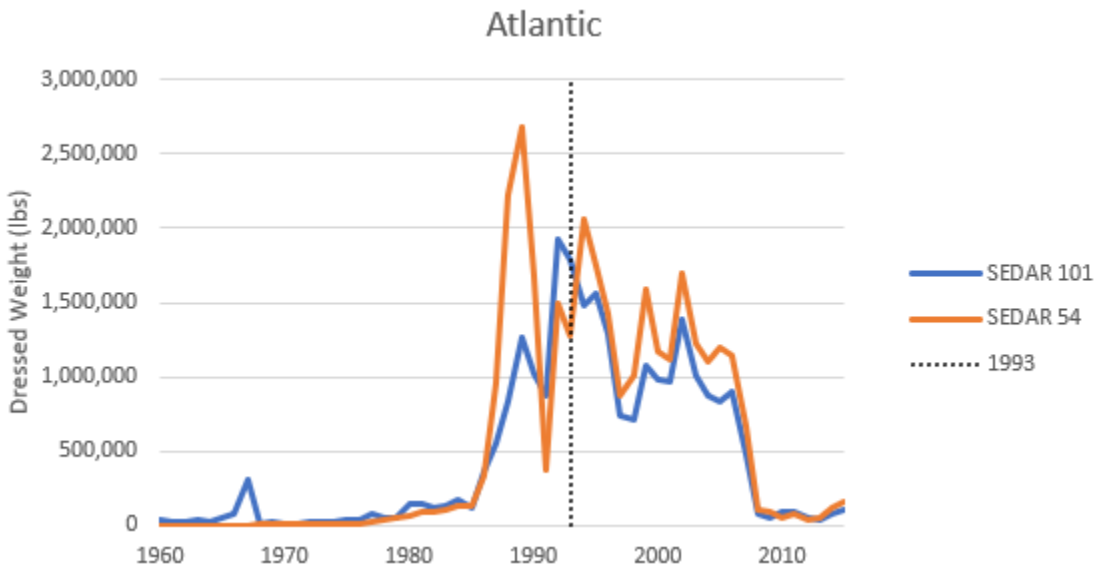


Figure 10. Map of the Gulf of Mexico showing the Mexican states of Tamaulipas, Veracruz, Tabasco, and Campeche sampled during the 1993-1994 Castillo et al. (1998) monitoring study.



Figure 11. Sandbar sharks as estimated from Mexico commercial landings from 1976-2024.

