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Length composition and catch of shortfin mako sharks in U.S. commercial and recreational fisheries in the North Pacific Ocean

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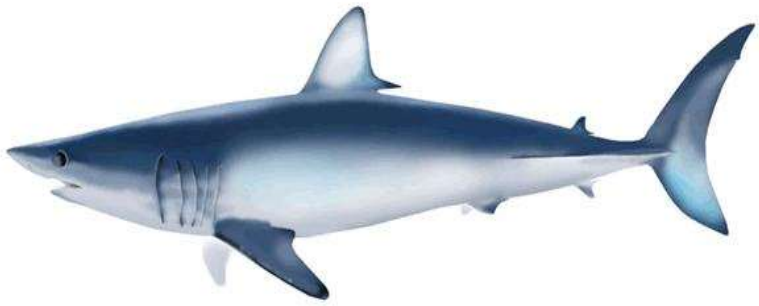

Abstract

Despite not being a target species for US Highly migratory fisheries in the Pacific, shortfin mako sharks are commonly retained by US fisheries since their flesh maintains a sufficient price to warrant landing in the majority of cases. Commercial catch of makos by US west coast fisheries peaked in 1987 at more than 400 metric tons (mt), but has subsequently been in decline since the 1990s. Catch since 2010 has been under 30 mt annually, with catch in 2016 less than 20 mt. Recreational catch of makos from commercial passenger fishing vessels and private recreational boats was highest in the 1980s (1981=12996 dead removals, 1987=21591) but has generally declined since with less than 250 dead removals in 2016. Catch in the Hawaii deep-set longline have generally been increasing since 1995 with catch in 2016 at more than 5,000 individuals. Catch in the Hawaii shallow-set longline has been mostly stable from 2005 to the present at under 1000 animals.

Introduction

A multitude of US fisheries operating in the Pacific, both along the US West Coast and out of Hawaii, catch shortfin mako sharks (*Isurus oxyrinchus*). Three commercial fisheries account for the majority of mako shark catch: 1) Hawaiian deep-set longline fishery targeting tuna; 2) Hawaiian shallow-set longline fishery targeting swordfish, and 3) US West Coast drift gillnets targeting swordfish and thresher sharks. Several smaller fisheries including small mesh drift and set nets targeting smaller pelagic and demersal species respectively, along with harpoon and albacore troll fisheries, also periodically take makos. While makos are not the target species of any of these fisheries, their flesh maintains a sufficient price to warrant landing in the majority of cases. Along with catch data from all of these fisheries, this working paper will present sex specific length frequency data for the three major US commercial fisheries listed above; as well as from a scientific survey for juvenile makos along the US West Coast.

West Coast Fisheries

Catch data for some commercial fisheries can be sourced as far back as 1931, however, reliable commercial catch data begins in 1969. Reliable recreational data from recreational charter boats can be traced as far back as 1957 while data on private recreational mako catch begins in 1980.

The two main sources of commercial catch for shortfin makos along the west coast of the United States are the large mesh drift gillnet (DGN) and longlining (CA-LL), with the DGN exceeding the catch of the CA-LL (Figure 1). There has also been a small amount of incidental take since 1999 in the commercial troll and pole-and-line fisheries that target albacore.

The DGN developed in the 1970s in the Southern California Bight after fishermen participating in the nearshore small-mesh gillnet fishery expanded to fish further offshore with larger mesh nets in order to target pelagic sharks (Lee et al. 2014). The mid 80's saw a shift to targeting swordfish; however, makos were still highly valued and so predominantly landed when caught. This fishery has seen a myriad of regulations imposed over time and has diminished from its peak in the 1980s of over 200 boats down to less than 20 (Lee et al. 2014).

Two experimental LL fisheries targeting sharks have operated briefly (1979-1980 and 1988-1991) off the west coast of the United States. Each was eventually shut down due to concerns over the high number of juvenile sharks being caught as well as dwindling markets for shark products (Teo 2013). Starting around 1991 California based vessels began moving to Hawaii and joined Hawaii-based vessels in the swordfish and tuna LL fishery, however, shallow-set swordfish LL has not been permitted for vessels operating with US West Coast HMS permits since 2005. A California-based deep-set LL fishery operated until 2015 with one participating vessel (Walsh & Teo 2012, Walsh & Teo 2013, Kohin et al. 2016).

Recreational angling for large pelagic fish, including sharks, has been popular along the US West Coast, especially during the 1980s (Holts et al. 1998), however, recreational catch of sharks has been minimal since the mid 2000s (Sippel et al. 2014a). Mako catch occurs aboard both small private vessels and charter boats (Kohin et al. 2016). There are two primary sources for recreational fishing data for highly migratory species like makos. One is California's commercial passenger fishing vessel (CPFV) database (Hill & Schneider 1999), and the other is the RecFIN database which is used to estimate catch from private recreational vessels.

Hawaii Fisheries

Mako catch around the Hawaiian Islands comes primarily from two commercial longline fisheries, the deep-set (HI-DLL) which primarily targets tuna, and the shallow-set (HI-SLL) which targets swordfish. Participation in these fisheries experienced a rapid expansion in the late 1980s in part due to the relocation of US longline vessels from the Atlantic and Gulf of Mexico fisheries (PIRO 2013, Sippel et al. 2014b). The HI-SLL fishery was closed briefly from 2001 and reopened in 2004 with 100% observer coverage. The HI-DLL generally had observer coverage below 5% prior to 2001, coverage after 2001 has been maintained at 20% (Carvalho et al. 2014). For this reason, observer data presented here for the HI-DLL represents a subsample of the fishery from 2005 to the present.

Changes also occurred in the geographic distribution for both shallow- and deep-set fisheries. In 1996, 1998 and 2000 shallow sets were deployed east of 130°W, but there was no shallow-set activity in these waters in 2004-2006. Deep sets occurred across 23° of longitude from 1995-2000, but occurred across 33° of longitude from 2004-2006 (Walsh et al. 2009, Sippel et al. 2014b).

Materials and Methods

Commercial Fisheries Catch

For the US west coast, landings data gathered from PacFIN were considered to be relatively representative of mako catch due to high retention rates (95.2%) (Teo et al. 2011) and so were used instead of logbook or observer data for catch information. These data were compiled from 1981-2016 and split into three categories just as in Sippel et al. (2014a), 1) drift gillnet and surface line (DGN-SL), 2) longline (CA-LL), and 3) other (OTH) which contains gear such as jig, troll, harpoon, and purse seine (Table 1). State gear codes were used to populate these categories. As in Sippel et al. (2014a), a dead discard rate of 2.7% was applied to all PacFIN data.

Catch in PacFIN identified as “hook and line” (California gear code 01) was grouped with DGN catch and this category was identified as DGN-SL representing drift gillnet and surface hook and line. In certain years, especially the mid to late ‘80s, this California “hook and line” gear accounted for a substantial amount of catch. Further investigation into this gear, and the boats using it, indicated that these were small boats typically using surface gear targeting albacore or other tuna. Sippel et al. (2015) explored the spatial and temporal size patterns in different mako fisheries and found that deeper set fishing gear tends to catch larger animals then similar gear set near the surface. It is therefore more likely that the makos caught using “hook and line” at the surface mirror the size structure of the drift gillnet more than they do the structure of the CA-LL which fishes deeper. Therefore, the California “hook and line” catch was grouped with DGN catch as the DGN-SL fishery (Table 1). Additionally, information was available on different net types (e.g. large and small mesh) within the DGN-SL category, however, average weight of makos caught in both mesh sizes proved to be highly similar and so the catch from these were collapsed into one category (Sippel et al. 2014a).

Historical data from the California Department of Fish and Wildlife (CDFW) on commercial catch from 1969-1980 were taken directly from Sippel et al. (2014a) and the 2015 assessment. Sippel et al. (2014a) originally sourced this information from Pearson et al. (2008) and split the catch into the same three commercial categories (DGN-SL, CA-LL, OTH) and then applied a weight correction to take CDFW dressed weight and converted it to round weight using an adjustment factor of 1.45. Catch data from 1931-1968 were also available but not currently recommended for use because these data have not been adequately reviewed and gear composition of the landings during that period is currently unknown.

As with the DGN-SL data, historical landings from 1969 to 1980 for CA-LL are taken from Sippel et al. (2014a) which were reconstructed by Pearson et al. (2008) from fish ticket data collected by CDFW. Data from 1980 to 1994 were taken from PacFIN landings for the CA-LL fishery. However, in the early 1990s when California based vessels began moving to Hawaii and joining Hawaii-based vessels in the swordfish and tuna LL fishery, it became difficult to accurately distinguish between CA-LL and the two Hawaii longlines (HI-SLL, HI-DLL). In order to avoid issues of double counting, CA-LL catch was combined with HI-SLL and HI-DLL catch from 1995 to the present.

Catch for the shallow-set (targeting swordfish) and deep-set (targeting bigeye tuna) were identified as those trips that used <15 hooks per float whereas deep-sets used ≥ 15.

Recreational Fisheries Catch

Recreational catch data have been described and presented previously to the ISC for both mako and blue sharks (Sippel & Kohin 2012, 2013, Sippel et al. 2014a). Historic data for makos through 2013 have been taken from Sippel et al. (2014a), including the assumed private recreational vessel catch from 1990 – 1992 which was an average of the catch from 1993 – 1996. Updates through 2016 have been taken from the most recent Stock Assessment and Fishery Evaluation (SAFE) document for CPFV (PFMC 2017) and from RecFIN for private recreational vessels.

Fisheries Size Compositions

Sex-specific size data for the DGN-SL fishery have been collected by observers from 1990-2016. Port based size sampling was also available for the DGN-SL and the CA- LL from 1981-1990 but sex was not recorded for the majority of port samples so these data were kept separate from observer data. Size and sex data have also been collected for sharks caught during the juvenile shark research longline sampling program conducted by the NOAA Southwest Fisheries Science Center from 1993-2015. These data were previously described in Sippel et al. (2014c), and have been updated here.

In Hawaii, sex and size of caught sharks have been recorded by observers in both the HI-DLL and HI-SLL fisheries from 1995-2016. These data were provided by Pacific Island Fisheries Science Center (PIFSC), and have been previously described in Walsh and Teo (2012) and Sippel et al. (2014c), and have been updated here.

All measurements are presented here in pre-caudal length (PCL). When required, measurements were converted to PCL using the following equations, as agreed upon previously by the ISC Shark Working Group:

$$PCL = (TL \times 0.816) + 0.784 \quad \text{(Joung \& Hsu 2005)}$$

$$TL = (FL + 0.397) / 0.913 \quad \text{(Wells et al. 2013)}$$

$$FL = (AL \times 2.402) + 9.996 \quad \text{(Wells et al. 2013)}$$

Results

Catch

Mako shark landings from US West Coast commercial fisheries were small through the 1970s, rapidly increased in the 1980s, and generally declined since the early 1990s (Figure 1; Table 2). The DGN-SL landings peaked at 402 mt in 1987 but since 2010 has been under 30 mt annually, and in 2016 were less than 20 mt. CA-LL landings peaked at 156 mt in 1988 but have been less than 10 mt since 1995. All other US West Coast fleets (OTH) have annually caught small amounts (<15mt) of mako shark since 1971, excluding one anomalously high catch in 1980 which is likely due to errors in reported gear codes, an issue which Pearson et al. (2008) indicated was present in landing receipts for highly migratory species. Since 1980 would correspond with the open period of California's first experimental LL fishery, it is likely that this spike is actually CA-LL catch from that fishery.

Recreational catch of makos in the Recfin database were highest in the 1980s (1981=12996 dead removals, 1987=21591) and have generally declined since (Figure 1; Table 2). Catch of mako sharks in the CPFV database were fewer than 30 animals annually from 1957-1966 and none were recorded from 1967-1979. CPFV catch began increasing beginning in 1980, peaking at 381 in 1997 and have been mostly constant since (Table 2). The number of makos released alive peaked between the 1990s and early 2000s, and have generally been declining since (Figure 2). Mako catch is strongly seasonal in the recreational fisheries, with the majority of catch occurring in summer for both CPFV and private

recreational boats (Figure 3). Here we plot only from 2004 and thereafter as prior years are reported in two-month "waves" and have shown the same seasonal pattern as found by Sippel et al. (2014a).

Catch from both the HI-SLL and HI-DLL has displayed a generally increasing trend since 1995 with combined catch in 2015 the highest yet recorded (Figure 4; Table 2).

Size Composition

Mako length data from DGN-SL observers were sparse. Despite this, we attempted several apaches for splitting the data in order to generate representative length compositions. We attempted to generate seasonal, yearly, and spatially segregated length compositions to account for changes in the distribution of the animal, and regulatory changes, which could affect the representatives of the collected length data. Unfortunately, limited data relegated our efforts to combining all length data for all years into a single static "super year" length composition, split by season and sex, for all mako catch in the DGN-SL (Figure 5). The length composition was not raised to the catch since limited data would make it difficult to properly identify homogeneous strata which could then be properly weighted to provide a representative length composition.

The majority of DGN-SL observer length data were from the third and fourth seasons. Despite limited data there did appear to be a bimodal distribution of length data for both males and females, with peaks around ~79 cm and ~106 cm for males and ~78 cm and ~107 cm for females. Port sampled data appeared to generally support this pattern, although with virtually no sex-specific information (Figure 6). Due to the general similarity of the DGN-SL observer length composition with the port sampled length composition, and with the lack of sex specific information in the port sampled data, we recommend that the length composition from the observer data be used to represent the size of makos caught by the DGN-SL fishery.

As with the DGN-SL observer data, length data for mako sharks caught by the scientific cruise carried out by the Southwest Fisheries Science Center from 1993 to 2015 were aggregated into a single year with data split by sex (Figure 7). Again, the data appeared to be bimodal, with peaks slightly below and above 100cm PCL. Since the scientific cruise does not have any catch (total dead removals) its use here is only to help inform size compositions for LL gear used close to shore in California, such as what was used during the two experimental LL fisheries previously described.

In the HI-LL observer data, size records show a relatively consistent range of pre-caudal lengths between 50 and 250 centimeters. The size distributions for the shallow set (HI-SLL) are skewed right, whereas the deep set (HI-DLL) appears slightly more normal. The length compositions for males and females caught in the HI-DLL indicated that makos caught in this fishery tended to be larger than makos caught in the HI-SLL (Figure 8). Mean lengths in the deep set (HI-DLL) were 173.5 cm and 166.6 cm for females and males, respectively, and 104.1 cm and 137.09 cm for females and males in the shallow set (HI-SLL). Annual size data were too sparse to construct a representative length composition so all years were combined into a single size composition. Port sampled data for the CA-LL were very limited, but suggested a size range most similar to the HI-SLL (Figure 9). Without sufficient data to construct a

representative independent size composition for the CA-LL, we suggest that the size composition for the HI-SLL be used for both.

Because there is no other source for size and sex-specific information for the HI-SLL and HI-DLL, the observer data were used to represent mako sharks in these fishery.

Discussion

Catch

Other than a brief period during the late '80s and early '90s when longline catch (CA-LL) along the west coast spiked due to the short lived experimental longline fisheries, drift gillnet catch (DGN-SL) of mako sharks has been, and continues to be, the dominant source of mako shark catch along the west coast of the US. In Hawaii, since the mid '90s, when logbook data were available, the majority of mako catch has come from the HI-DLL. We recommend that catch from all US West Coast commercial fisheries (i.e., DGN-SL, and others fisheries OTH), excluding the CA-LL, be combined into a single US West Coast fishery because the mako catch of these fisheries are relatively small and the size composition of makos, based on very limited data, appear to be similar. We recommend that the catch from the Hawaii-based longline fisheries be represented by separate HI-SLL and HI-DLL fisheries, and that catch from the CA-LL fishery be included in the HI-SLL. We recommend that the catch from the US recreational fisheries remain separate from commercial fisheries because the catch units are in number of fish.

Size Composition

Aliasing was observed in the length compositions and proved to be an effect of the length conversions applied to the data in order to standardize all length measurements to PCL. More work needs to be done to understand the level of precision which results from converting length measurements up to two times, however, for the moment, data are provided at the level of 1cm bins. Tests were run to understand what binning level is required to eliminate aliasing following two length conversions. These tests indicated that 5cm bins were effective at eliminating aliasing and we recommend that 5 cm length bins be used if fork lengths and/or total length were converted to pre-caudal length.

Given the paucity of data, we recommend that the size composition data for the US fisheries be aggregated and used in the assessment model as "super-year" or "super-season" size compositions. However, if the working group decides to work with the length composition data on a finer time scale, data are also provided here at a yearly scale (Supplemental Data).

There are very limited data for the "other" fisheries along the US west coast (e.g., small mesh drift and set nets, harpoon, and the juvenile scientific survey), and of what data there are, the size distributions appear to be similar to the DGN-SL data. We, therefore, recommend that the DGN-SL size compositions be used to represent the DGN-SL and "others" fisheries, while the HI-DLL and HI-SLL fisheries maintain their own representative size compositions. We recommend that the size composition of the recreational fishery be drawn from the DGN-SL length comps as well, since anecdotal information suggests the majority of sharks caught by recreational fishers are juveniles caught in the same areas where the DGN-SL operates.

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Figure Captions

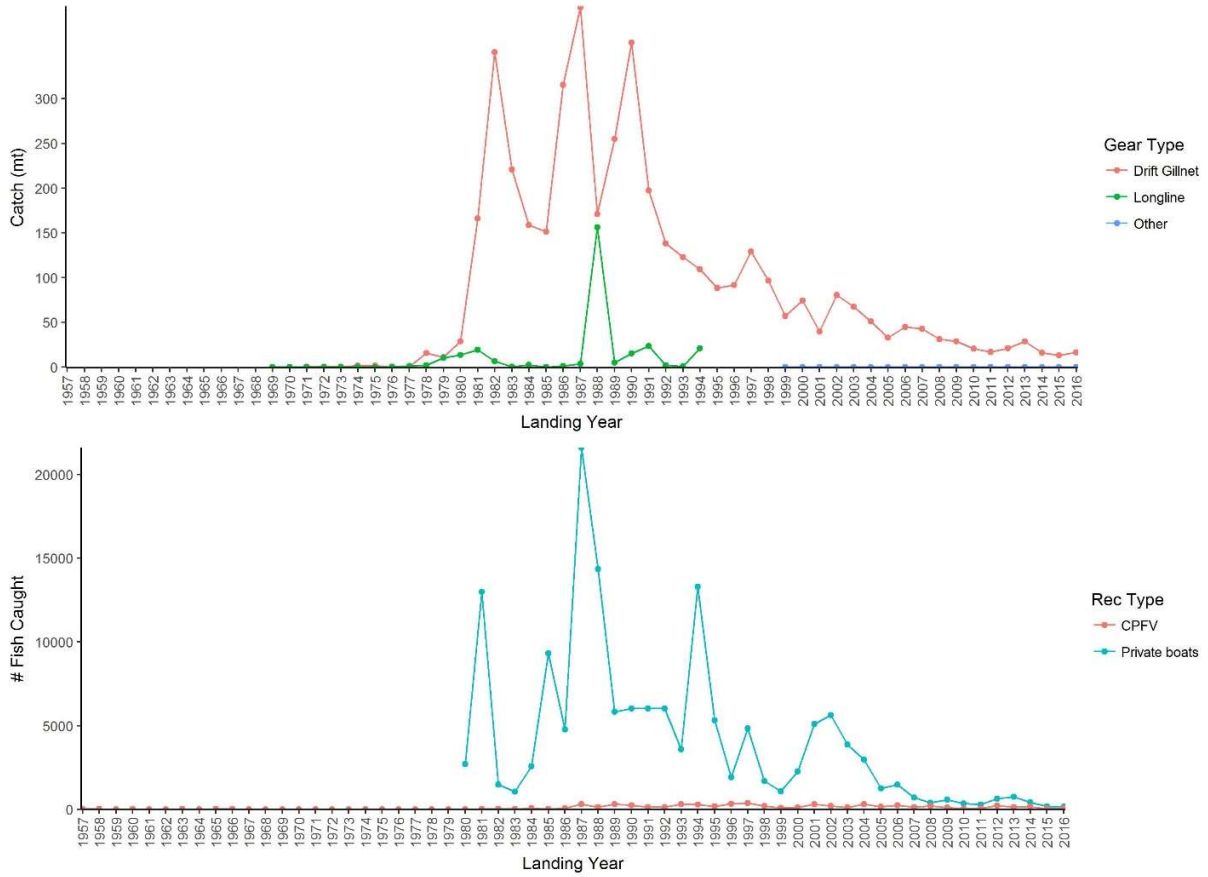

Fig 1: Upper panel) Yearly US West Coast commercial catch of shortfin mako sharks in metric tons split by the two primary commercial gear types, Gillnet (DGN-SL), and Longline (CA-LL), with miscellaneous gears grouped into an "Other" category (OTH). Data gathered from PacFIN based on fish tickets. Longline (CA-LL) data post 1994 has been subsumed into HI-SLL and HI-DLL catch in order to avoid double counting data. Lower panel) Yearly recreational catch of shortfin mako sharks by numbers of fish. Catch split between private recreational boats (gathered from RecFIN), and commercial passenger fishing vessels (CPFV) (gathered from the most recent Stock Assessment and Fishery Evaluation document). Data from 1990 – 1992 for private recreational boats are an average of the catch from 1993 – 1996 since no catch data were available for those three years.

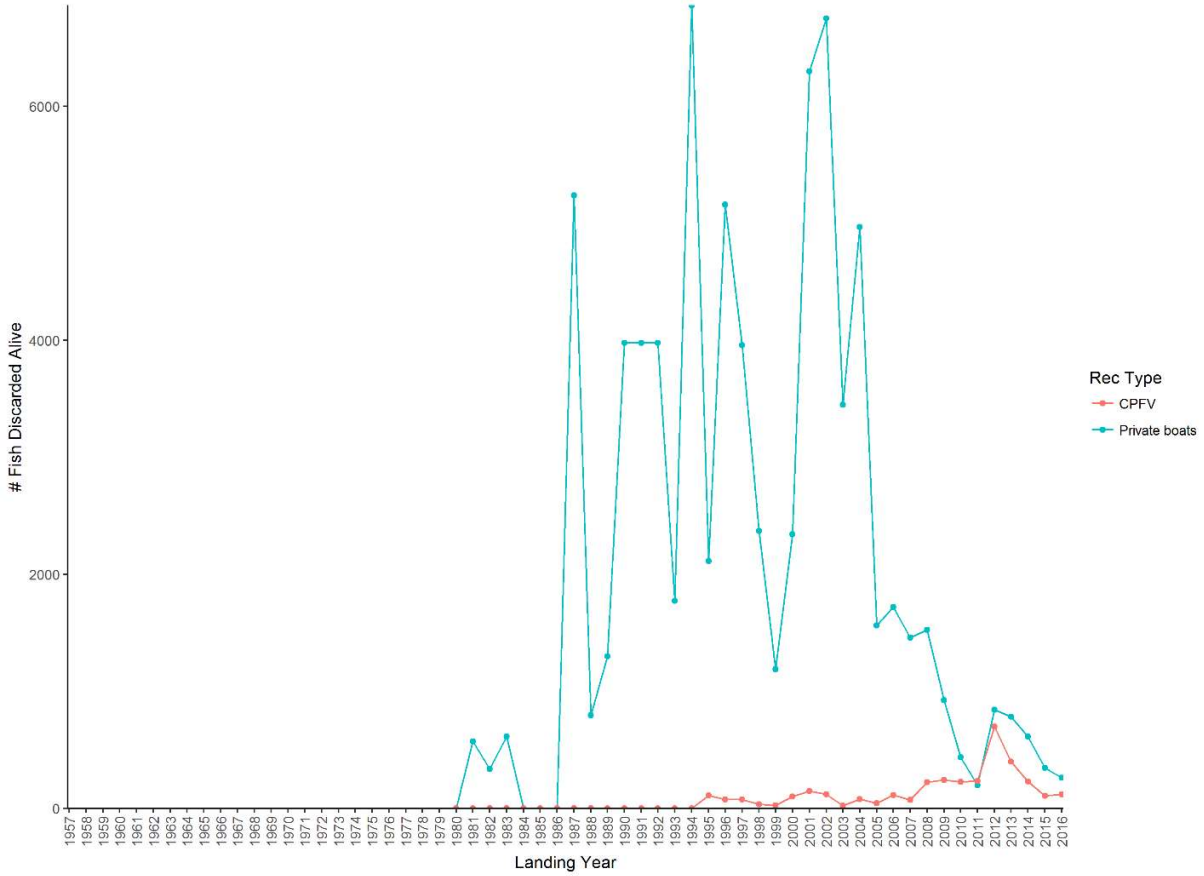

Fig 2: Yearly number of shortfin mako sharks released alive by recreational anglers from California commercial passenger fishing vessels (CPFV) and private recreational boats. Data from 1990 – 1992 for private recreational boats are an average of the catch from 1993 – 1996 since no discard data were available for those three years.

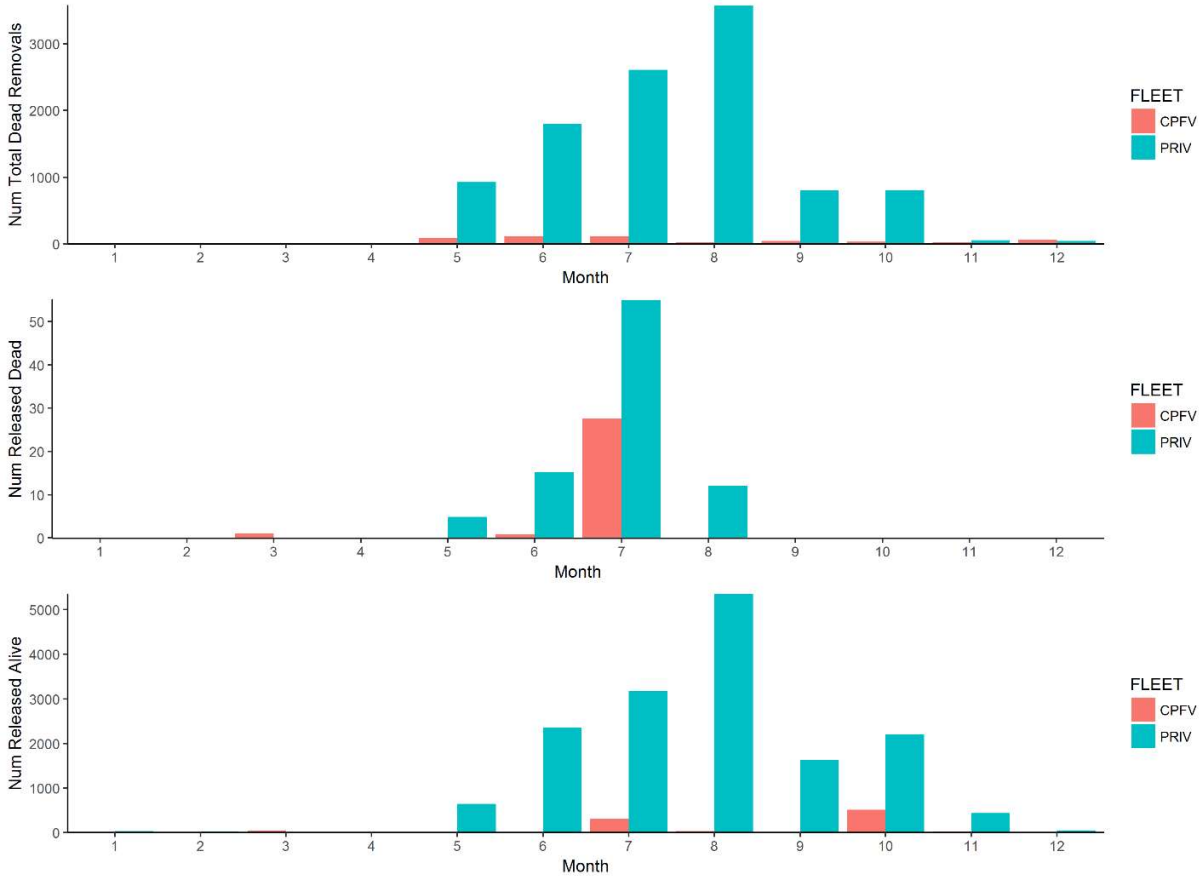

Fig 3: Recreational catch of shortfin makos in numbers of fish by month from California commercial passenger fishing vessels (CPFV) and private recreational boats. Data are summed from 2004 to 2016 and combined here to indicate which months contain the bulk of mako catch across years. a) Total dead removals, b) released dead, c) released alive.

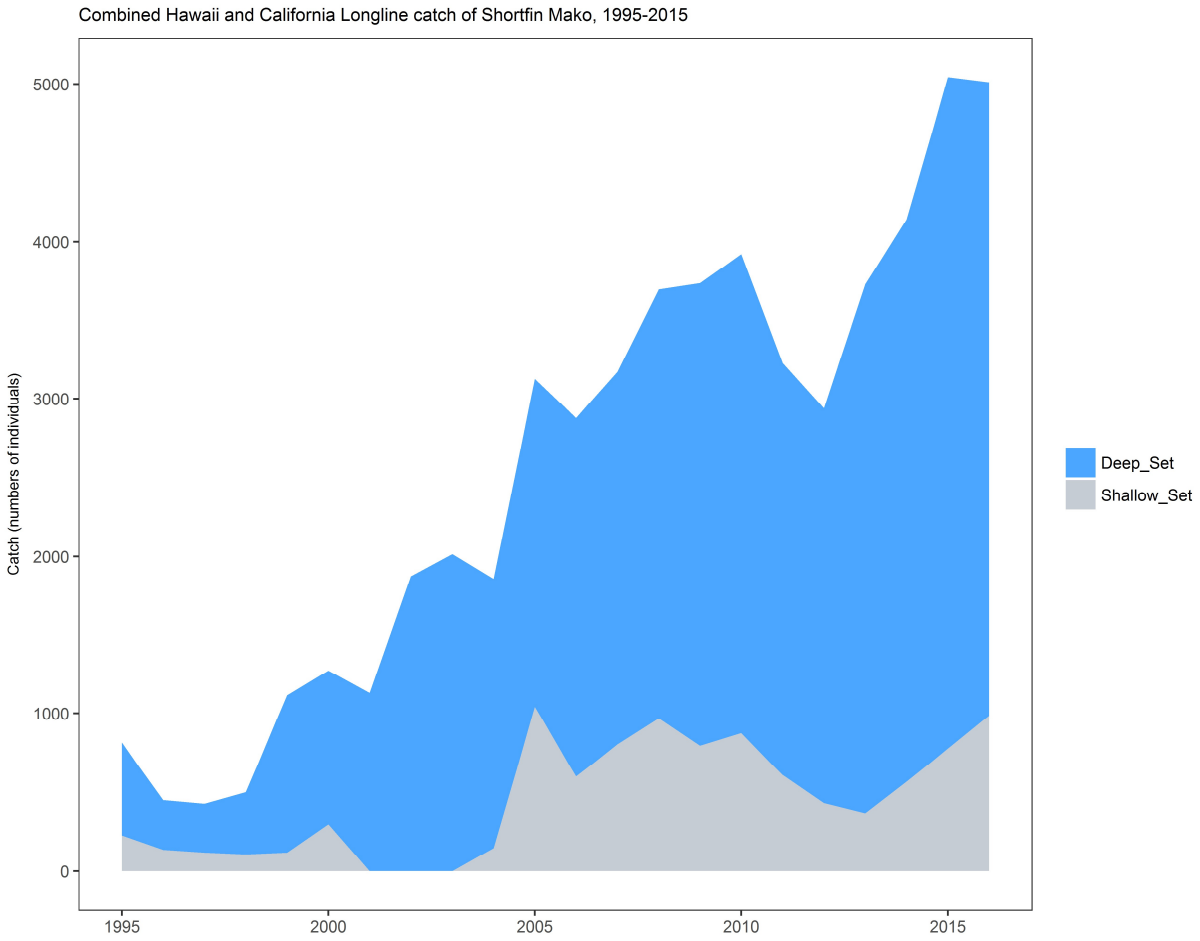

Fig 4: Total yearly catch of makos in since 1995 in the combined Hawaii California Longline. Catch split into Shallow (HI-SLL) and Deep set longlines (HI-DLL).

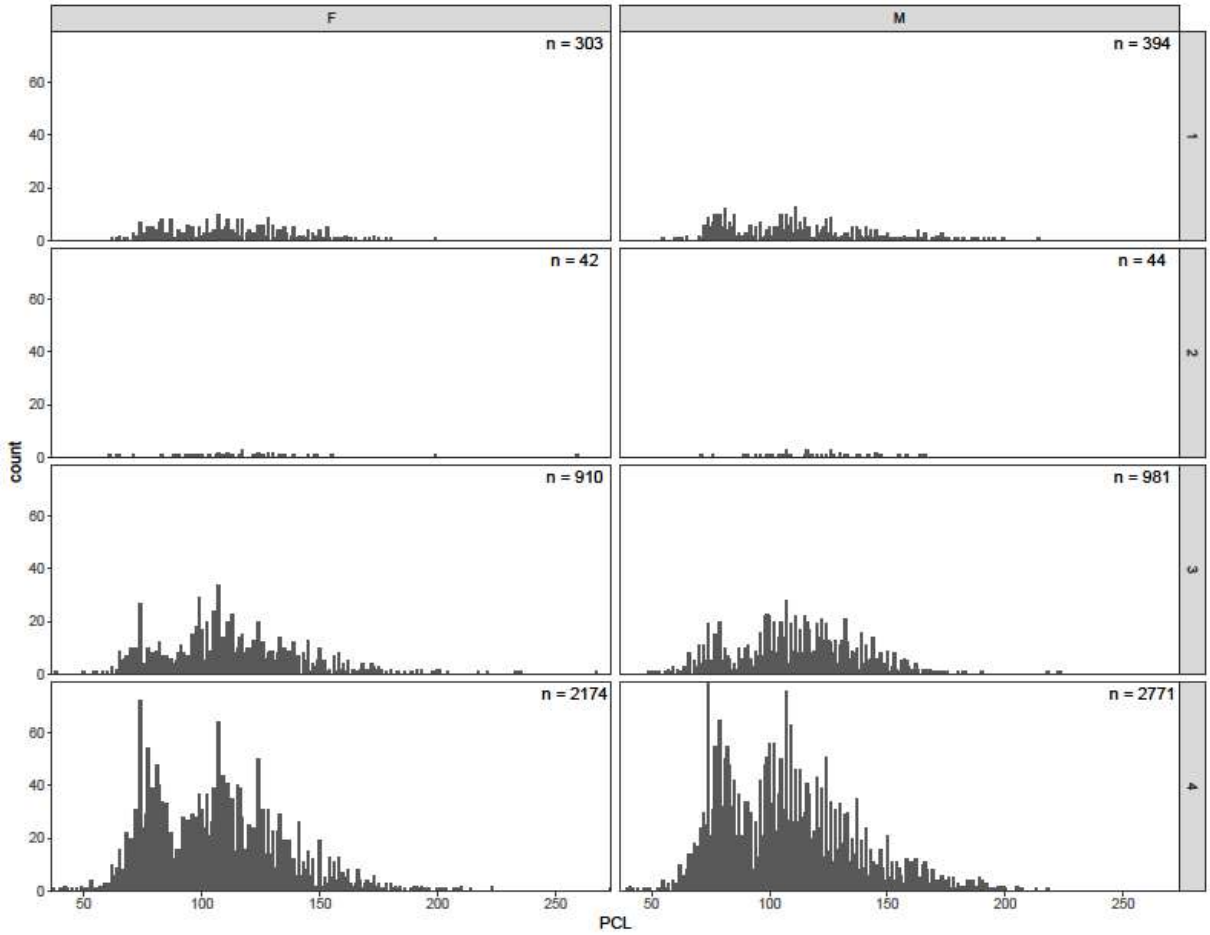

Fig 5: Shortfin mako shark length frequency histograms from California drift gillnet (DGN-SL) observer data. All years (1990 – 2016) have been combined to show length frequencies across seasons for each sex (with sample sizes indicated in the upper right corner of each plot). Lengths have been converted from total, or fork length measurements into pre-caudal length and are displayed in 1cm length bins.

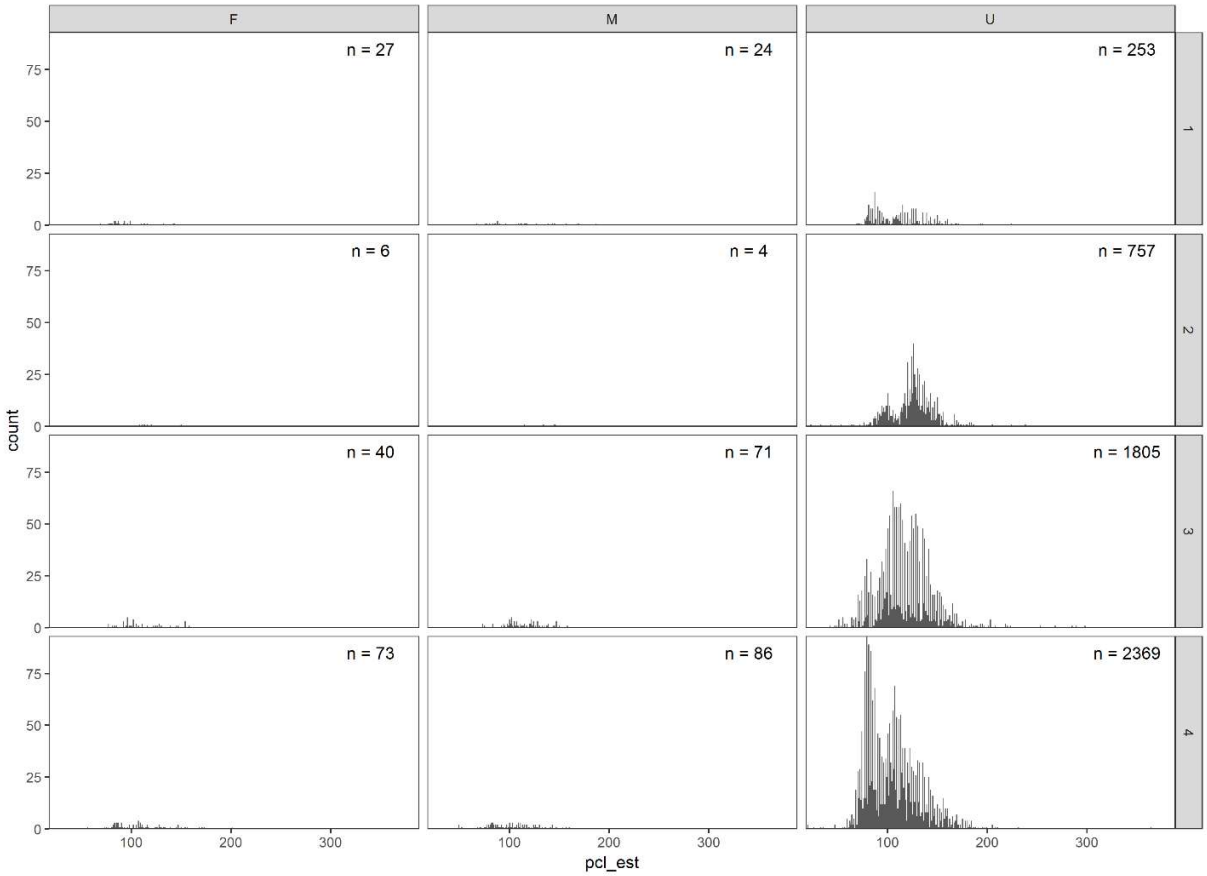

Fig 6: Shortfin mako shark length frequency histograms from California port sampled data from the drift gillnet fishery (DGN-SL). All years (1981 – 1990) have been combined to show length frequencies across seasons for each sex (with sample sizes indicated in the upper right corner of each plot). Lengths have been converted from total, or fork length measurements into pre-caudal length and are displayed in 1cm length bins.

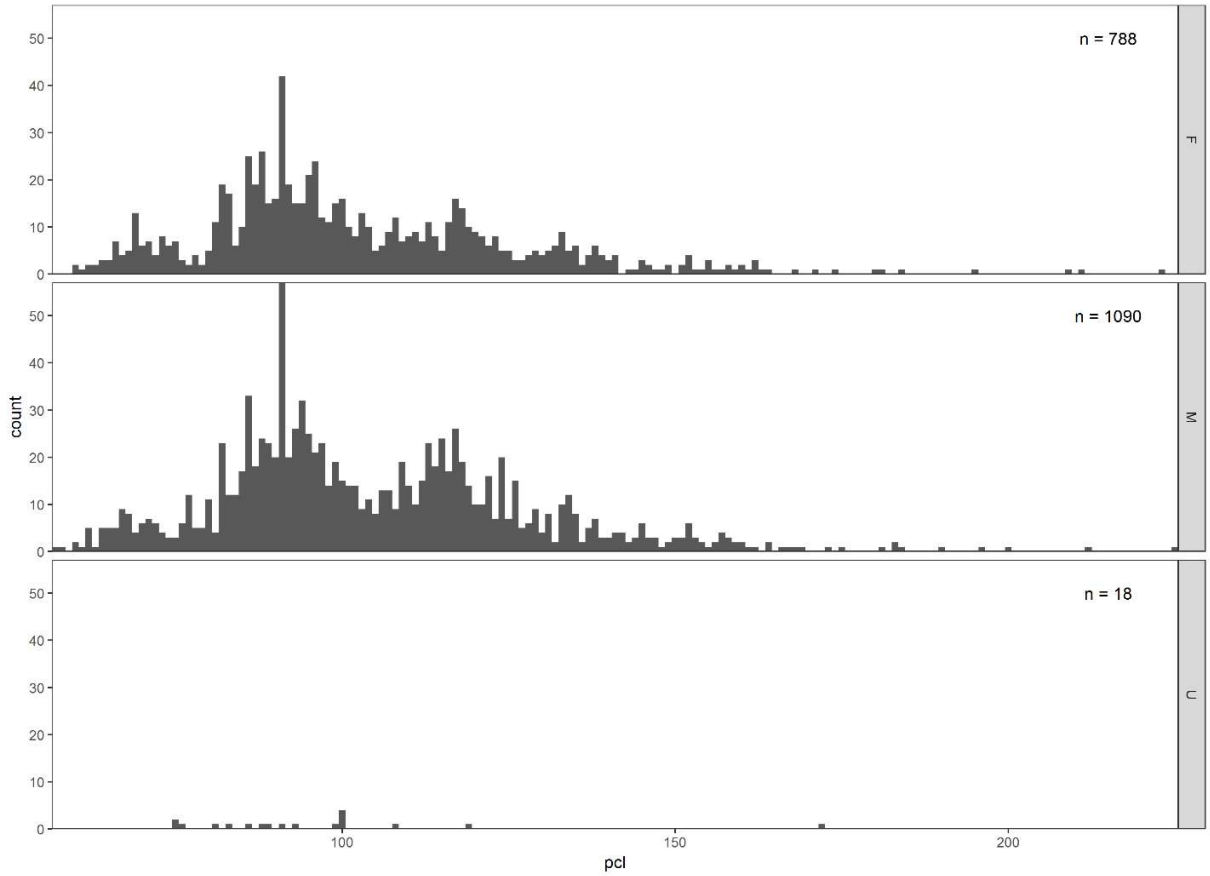

Fig 7: Sex specific shortfin mako shark length frequency histograms from the scientific cruise carried out by the Southwest Fisheries Science Center from 1993-2015. Lengths have been converted from total and fork lengths into pre-caudal length, separated by sex, and plotted in 1cm length bins (sample sizes indicated in the upper right corner of each plot).

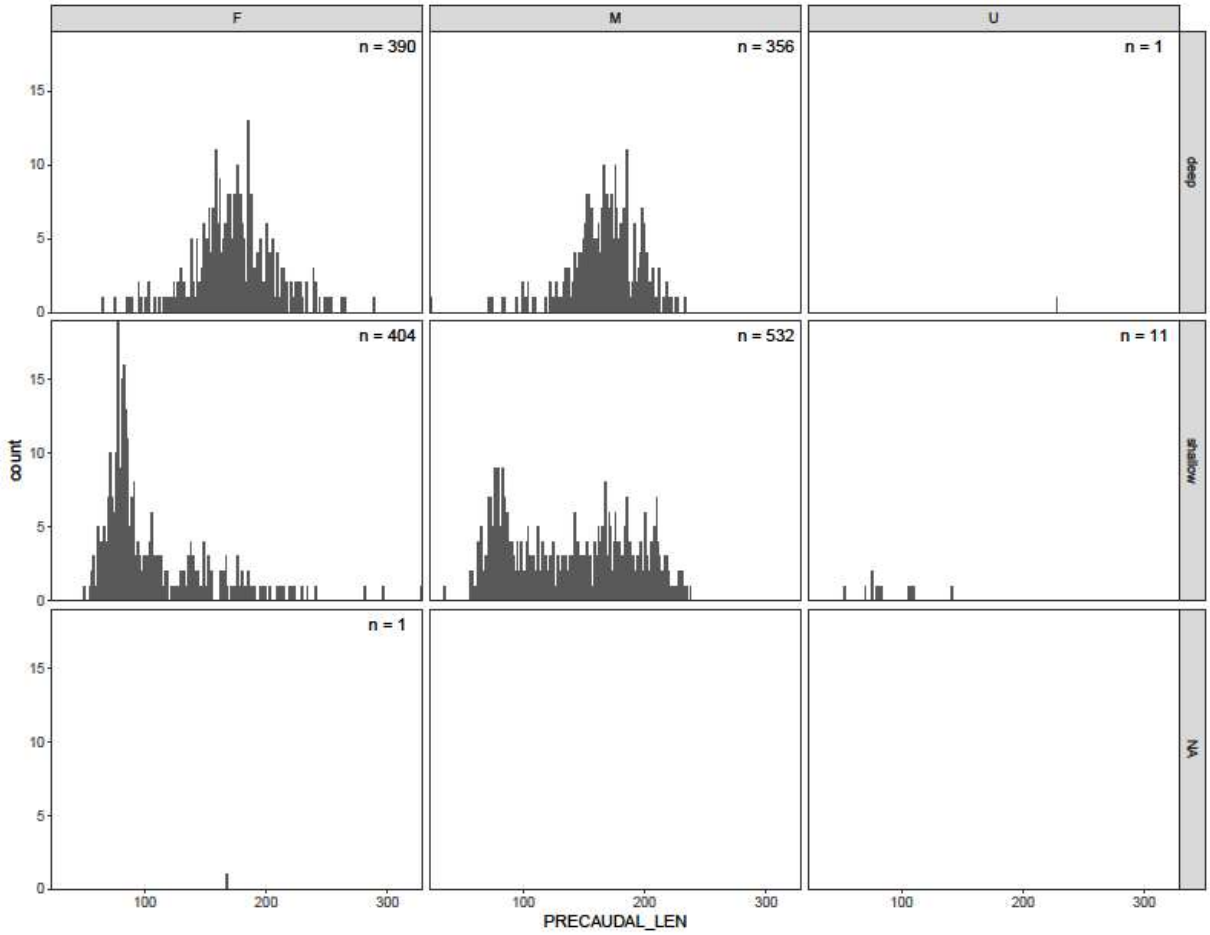

Fig 8: Shortfin mako shark length frequency histograms from combined Hawaii and California longline observer data (HI-SLL and HI-DLL). All years (1995 – 2016) have been combined to show length frequencies across fishery for each sex (with sample sizes indicated in the upper right corner of each plot). Lengths are all pre-caudal and displayed in 1cm length bins.

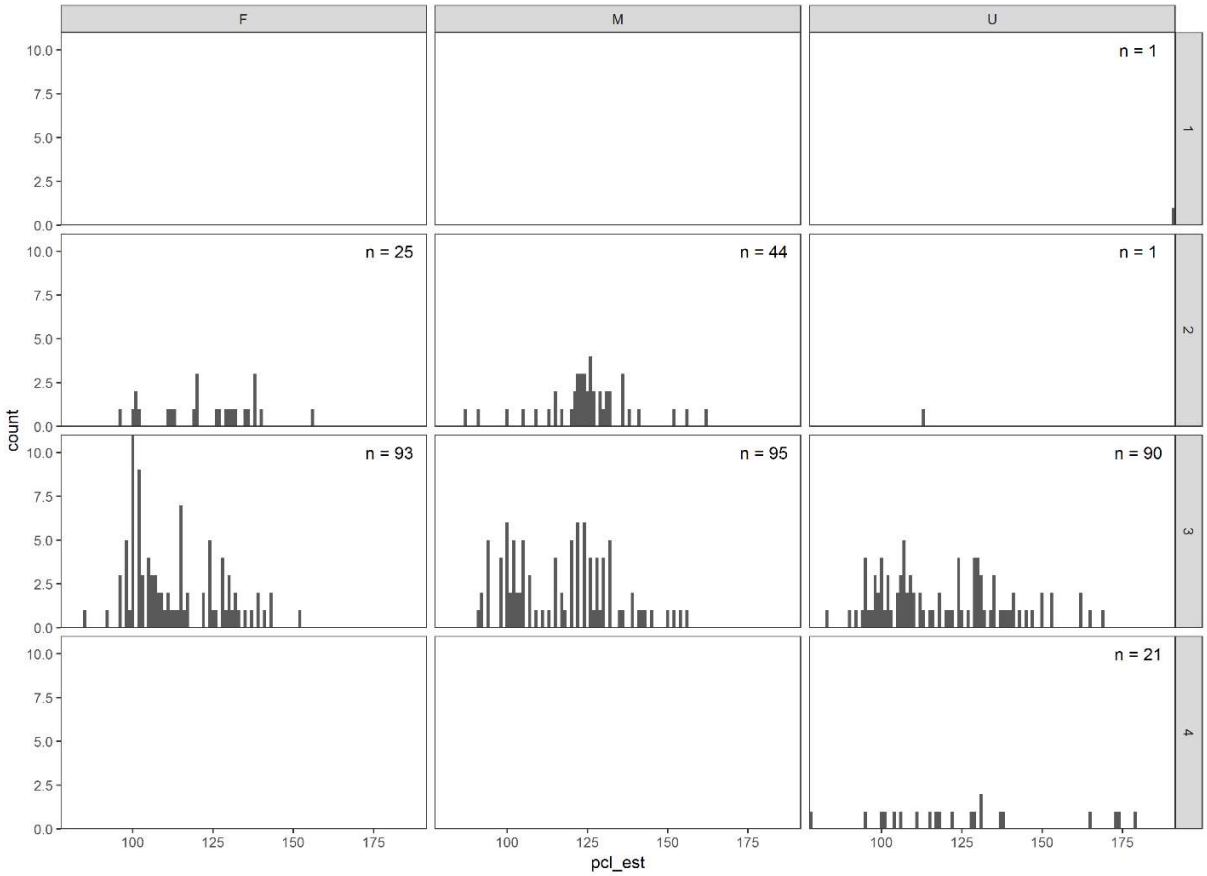

Fig 9: Shortfin mako shark length frequency histograms from California port sampled data from the longline fishery (CA-LL). All years (1981 – 1990) have been combined to show length frequencies across seasons for each sex (with sample sizes indicated in the upper right corner of each plot). Lengths have been converted from total, or fork length measurements into pre-caudal length and are displayed in 1cm length bins.

Table 1: General description of each fishery with acronyms, catch data time spans, and other descriptive information.

Fishery Acronym	Fishery	Time Period	Area of Operation	Target	Notes
DGN-SL	Drift gillnet and surface line	1969-2016	US west coast EEZ	Swordfish/Thresher	Catch from surface hook and line are combined with drift gillnet catch since each gear is likely catching similar sized animals.
CA-LL	California longline	1969-1994	US west coast	Sharks	Post 1994 catch allocated to HI data
OTH	Miscellaneous commercial gears (troll, purse, etc.)	1969-2016	US west coast	-	Includes catch from jig, troll, harpoon, purse seine, etc.
HI-SLL	Hawaii shallow longline	1995-2016	Central north Pacific	Swordfish	Includes CA, HI data
HI-DLL	Hawaii deep longline	1995-2016	Central north Pacific	Bigeye tuna	Includes CA, HI data
Private recreational	Private recreational	1980-2016	Southern California	Sharks and other HMS	Catch assumed to be mostly juveniles, observer size data from the DGN-SL was assumed to be the best source of comparable size data
CPFV	Charter recreational	1957-2016	Southern California	Sharks and other HMS	Catch assumed to be mostly juveniles, observer size data from the DGN-SL was assumed to be the best source of comparable size data

Table 2: Catch table with each fisheries retained catch, discards, and total dead removals. Data are provided in annual summaries and identified in native catch units, either x1000 of fish, or metric tons.

Year	Gillnet (mt) retained	estimated discarded catch	estimated total dead removals	California Longline (mt) retained	estimated discarded catch	estimated total dead removals	Set Longline (x1000 fish) retained	estimated discarded catch	estimated total dead removals	Set Longline (x1000 fish) retained	estimated discarded catch	estimated total dead removals	Other commercial (mt) retained	estimated discarded catch	estimated total dead removals	recreational (x1000 fish)	live discarded catch	estimated total dead removals	recreational (x1000 fish)	live discarded catch	estimated total dead removals
1957																					0.020
1958																					0.027
1959																					0.014
1960																					0.021
1961																					0.010
1962																					0.007
1963																					0.020
1964																					0.016
1965																					0.022
1966																					0.019
1967																					0.000
1968																					0.000
1969	0.097	0.003	0.100	0.000	0.000	0.000							0.487	0.013	0.500						0.000
1970	0.000	0.000	0.000	0.000	0.000	0.000							0.584	0.016	0.600						0.000
1971	0.459	0.012	0.472	0.000	0.000	0.000							3.414	0.092	3.506						0.000
1972	0.154	0.004	0.158	0.000	0.000	0.000							0.000	0.000	0.000						0.000
1973	0.190	0.005	0.195	0.007	0.000	0.007							0.342	0.009	0.352						0.000
1974	1.680	0.045	1.726	0.164	0.004	0.169							2.771	0.075	2.846						0.000
1975	1.475	0.040	1.515	0.066	0.002	0.068							5.004	0.135	5.139						0.000
1976	0.070	0.002	0.072	0.444	0.012	0.456							0.993	0.027	1.020						0.000
1977	0.348	0.009	0.358	1.128	0.030	1.158							11.612	0.314	11.925						0.000
1978	15.311	0.413	15.724	1.749	0.047	1.796							0.975	0.026	1.002						0.000
1979	10.723	0.290	11.012	10.118	0.273	10.392							2.385	0.064	2.450						0.000
1980	28.175	0.761	28.936	13.337	0.360	13.698							60.596	1.636	62.232		0.000	2.713		0.000	0.008
1981	161.556	4.362	165.918	18.608	0.502	19.110							2.257	0.061	2.318		0.571	12.996		0.000	0.037
1982	342.619	9.251	351.870	6.220	0.168	6.388							2.288	0.062	2.350		0.336	1.473		0.000	0.026
1983	215.179	5.810	220.989	0.541	0.015	0.556							1.511	0.041	1.552		0.614	1.054		0.000	0.029
1984	154.524	4.172	158.696	2.368	0.064	2.432							2.838	0.077	2.914		0.000	2.570		0.000	0.062
1985	147.363	3.979	151.342	0.020	0.001	0.021							1.670	0.045	1.715		0.000	9.317		0.000	0.026
1986	306.961	8.288	315.248	1.233	0.033	1.267							3.370	0.091	3.461		0.000	4.774		0.000	0.066
1987	391.693	10.576	402.269	3.412	0.092	3.504							7.473	0.202	7.675		5.239	21.591		0.000	0.303
1988	166.345	4.491	170.836	152.229	4.110	156.339							3.204	0.086	3.290		0.796	14.343		0.000	0.132
1989	248.034	6.697	254.731	4.634	0.125	4.759							2.749	0.074	2.824		1.299	5.831		0.000	0.310
1990	352.975	9.530	362.505	14.804	0.400	15.204							5.597	0.151	5.748		3.978	6.031		0.000	0.243
1991	192.058	5.186	197.243	22.646	0.611	23.257							3.964	0.107	4.071		3.978	6.031		0.000	0.138
1992	134.642	3.635	138.278	2.101	0.057	2.158							5.270	0.142	5.412		3.978	6.031		0.000	0.136
1993	119.561	3.228	122.789	0.781	0.021	0.803							1.711	0.046	1.757		1.774	3.597		0.000	0.308
1994	106.538	2.877	109.415	20.234	0.546	20.781							1.166	0.031	1.198		6.864	13.299		0.000	0.286
1995	86.124	2.325	88.449						0.228			0.589	2.298	0.062	2.360		2.113	5.311		0.109	0.181
1996	89.205	2.409	91.614						0.137			0.316	1.955	0.053	2.008		5.160	1.917		0.075	0.327
1997	125.670	3.393	129.063						0.118			0.311	3.749	0.101	3.850		3.961	4.830		0.075	0.381
1998	93.986	2.538	96.524						0.106			0.397	2.116	0.057	2.173		2.371	1.706		0.036	0.208
1999	55.732	1.505	57.237						0.118			0.998	0.718	0.019	0.737		1.190	1.082		0.025	0.097
2000	72.314	1.952	74.267						0.299			0.974	1.036	0.028	1.064		2.342	2.271		0.102	0.119
2001	38.589	1.042	39.631						0.000			1.131	1.170	0.032	1.201		6.299	5.112		0.147	0.302
2002	78.536	2.120	80.656						0.000			1.874	0.842	0.023	0.865		6.752	5.626		0.121	0.213
2003	65.641	1.772	67.413						0.000			2.015	0.576	0.016	0.592		3.449	3.875		0.022	0.116
2004	49.699	1.342	51.041						0.147			1.711	2.108	0.057	2.165		4.969	2.963		0.080	0.304
2005	31.897	0.861	32.758						1.041			2.085	0.687	0.019	0.706		1.564	1.255		0.044	0.162
2006	43.529	1.175	44.704						0.604			2.274	0.462	0.012	0.474		1.720	1.477		0.114	0.244
2007	41.760	1.128	42.888						0.807			2.365	0.553	0.015	0.568		1.460	0.709		0.071	0.135
2008	30.571	0.825	31.397						0.968			2.729	0.592	0.016	0.608		1.526	0.403		0.222	0.194
2009	27.923	0.754	28.677						0.798			2.938	0.907	0.024	0.931		0.924	0.582		0.243	0.116
2010	19.833	0.535	20.369						0.876			3.045	0.182	0.005	0.186		0.436	0.350		0.226	0.044
2011	16.480	0.445	16.925						0.612			2.614	0.450	0.012	0.462		0.199	0.300		0.234	0.064
2012	20.506	0.554	21.059						0.433			2.507	0.602	0.016	0.619		0.842	0.648		0.697	0.224
2013	28.103	0.759	28.862						0.368			3.361	0.195	0.005	0.200		0.783	0.757		0.399	0.128
2014	15.620	0.422	16.041						0.569			3.573	0.349	0.009	0.359		0.613	0.423		0.229	0.158
2015	12.706	0.343	13.049						0.780			4.264	0.100	0.003	0.103		0.347	0.182		0.106	0.046
2016	15.880	0.429	16.309						0.986			4.025	9.134	0.247	9.381		0.261	0.152		0.118	0.078