ISC/14/SHARKWG-3/03

Catches of shortfin mako sharks from U.S. commercial and recreational fisheries in the North Pacific Ocean[1]

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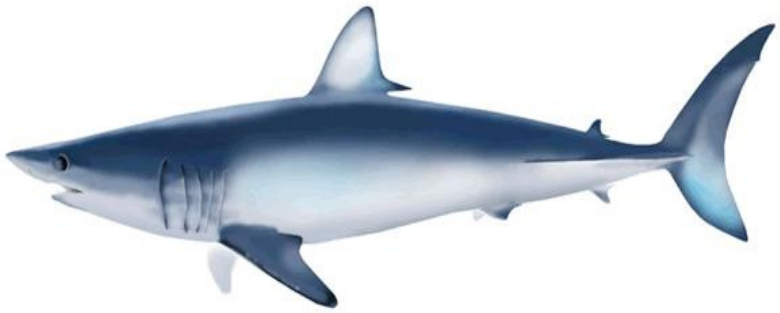

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Abstract

US fisheries for highly migratory species (HMS) in the Pacific operate from both the West Coast of the mainland and out of Hawaii. Although shortfin mako sharks are not commonly targeted, the meat does command a decent price in domestic markets and can be considered a welcome catch for both commercial and recreational fishers. Much of the mako commercial catch is retained, but as a non-target species in tuna and swordfish fisheries, it is also occasionally discarded. The maximum number of recreational dead removals (both from charter and private vessels) was nearly 22,000 animals in 1987, and since 2007 has been less than 1000 animals annually. Catches from the US west coast drift gillnet fishery were highest in the early 1980s (at about 300 mt) and have been steadily declining, now at around 10 mt. The commercial hook & line fishery had greatest catches in the late 1980s to early 1990s (~100-200 mt), but catch has declined to under 10 mt since the mid-1990s. Catch in other minor west coast fisheries has amounted to under ~20 mt for the last 20 years, with the exception of an anomalous peak catch of ~60 mt in 1980. Catches in the Hawaii deep-set longline fishery have steadily increased from 2001-2013, doubling over that time (from ~2000 to ~4000 animals). Within the Hawaii-based shallow-set longline fishery, catches were mostly stable from 2005-2010 (~1000 animals), but have declined sharply recently.

Introduction

US fisheries for highly migratory species (HMS) in the Pacific operate from both the West Coast of the mainland and out of Hawaii. The primary source of shortfin mako shark catches comes from Hawaiian longline fisheries targeting tuna and swordfish and California drift gillnets targeting swordfish and thresher sharks. Several smaller fisheries including small mesh drift gillnets targeting smaller pelagics, set nets targeting demersal species, and harpoon fisheries also occasionally take makos. Although they are not commonly targeted, the meat does command a decent price in domestic markets and can be considered a welcome catch for both commercial and recreational fishers. Much of the mako commercial catch is retained, but as a non-target species in tuna and swordfish fisheries, it is also occasionally discarded. However, there is not a lot of information about the survivorship of makos discarded from different fisheries. Catch data from some fisheries are available as far back as 1931, however, not all are considered to be of reliable quality. The objective of this working paper is to compile all catches of shortfin mako sharks from US fisheries in the North Pacific Ocean in support of a stock assessment by the ISC Shark Working Group (WG).

Materials and Methods

Along the US West Coast, there are two primary sources of recreational fishing data for highly migratory species. The first is the state of California's commercial passenger fishing vessel (CPFV) database (Hill and Schneider, 1999). The second source of recreational fishing data is the RecFIN database which is maintained by the Pacific States Marine Fisheries Commission (PSMFC) and was used to estimate the private recreational catch. The surveys conducted and databases maintained to compile catches from recreational fisheries have been described previously for the ISC blue shark assessment (Sippel and Kohin 2012 & 2013). Mako recreational data were processed the same way as blue shark data were in the previous working papers. Recreational catch data have been compiled on a monthly basis in case the WG decides to assess the stock on a seasonal basis. Because data in the RecFIN database from 1980-2003 are only available as two month summaries (called 'Waves', wave 1= Jan-Feb, etc.), the proportions of monthly catch from 2004-2013 are used to apportion monthly catches from the wave summaries.

In general, most shortfin mako catch by commercial fisheries along the US West Coast are landed because the flesh is commercially valuable. Therefore, two main sources of commercial landings data were used to estimate total mako dead removals by US commercial fisheries on the West Coast: 1) commercial landings in the PacFIN database (1981-2013), and 2) reconstructed historical California Department of Fish and Game (CDFG) commercial landings (Pearson et al. 2008). Commercial landings of mako sharks on the U.S. West Coast are collected by individual states through a fish ticket system and compiled in the PacFIN database back to 1981. In addition, historical landings in California from 1969 were reconstructed by Pearson et al. (2008) using fish ticket data collected by CDFG. Historical landings from California adequately represent total US West Coast landings because the amount of makos landed in Washington and Oregon are negligible. Therefore, the total seasonal landings of makos were based on the commercial landings recorded in the PacFIN database (1981-2013) and the historical CDFG commercial landings reconstructed (1969-1980) by Pearson et al. (2008). Historical California landings data from 1931-1968 are also available but are 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.

The total seasonal landings of shortfin mako sharks from PacFIN and CDFG data sources were then adjusted by three data sources to estimate total dead removals from various gears: 1) CDFG to PacFIN dressed to round weight adjustment, 2) dead discard rate estimated from onboard observer data, and 3) gillnet gear composition (large-mesh drift gillnet vs other gillnets) from gillnet vessel logbooks. The historical CDFG landings data (1969-1980) appeared to be in dressed weight and were therefore converted to round weight using the PacFIN adjustment factor of 1.45. A dead discard rate of 2.7% was estimated from observer records of the large-mesh drift gillnet fishery. Since the dead discard rate was relatively low, and the large-mesh drift gillnet fishery catches the majority of the mako sharks, the dead discard rate was applied to the landings data for all gears to obtain the estimated total dead removals. The landings data from PacFIN and CDFG data could easily be separated into three main gears: 1) gillnet, 2) hook-and-line and longline, and 3) other gears. The gillnet landings were further separated into large-mesh drift gillnet and other gillnets based on the relative number of mako sharks recorded in the logbook data and the average weight of the mako sharks from these components of the gillnet fishery. Based on observer records from the gillnet fishery, the average weight of mako sharks from the large-mesh drift gillnet and other gillnets were highly similar (large-mesh drift gillnet: 23.87 kg and other gillnets: 23.83 kg) and did not substantially affect the proportion of catch in these gillnet fisheries. The commercial hook-and-line and California longline landings could not be separated with any degree of confidence and were therefore retained as a combined gear.

Annual catches of shortfin mako sharks from the Hawaii-based pelagic longline fishery between 1995 and 2013 come from the records of the Pacific Islands Regional Observer Program (PIROP) submitted to the Pacific Islands Fisheries Science Center (PIFSC). Observed catches were presented separately for shallow-set (target: swordfish) and deep-set (target: bigeye tuna) sectors. The two set types were defined according Federal Register (Department of Commerce, 2004). Shallow-sets used < 15 hooks per float whereas deep-sets used ≥ 15 hooks per float (Walsh et al. 2009). Data from the shallow-set sector were tabulated from 1995–2000 and 2004–2012. The latter years represent the period after the reopening of this sector, and had mandatory 100% observer coverage (i.e., an observer was aboard all shallow-set trips). For the former period annual observer coverage in the shallow-set sector was generally below 5%. There are no 2001-2003 shallow-set data because the fishery was closed from mid-March 2001 until April 2004. In the latter part of 2000 observer coverage in the deep-set sector was increased and subsequently maintained at about 20% annually from 2001 to present. Prior to that, annual observer coverage in the deep-set sector was also generally below 5% (Sippel et al. 2014).

Observer data presented here thus represent a subsample of the fishery, and are only partially complete for the shallow-set sector from 2004 to present; in addition to the closure previously described, the shallow-set fishery was suspended in 2006, from mid-March through the end of the year, and again for the last several weeks of 2011. So, relative values of catch for the deep-set and shallow-set sectors do not represent the real proportions of catch between these sectors.

A total of 12,814 observed shallow-sets and 46,876 observed deep-sets were analyzed. The longline sets were distributed throughout a wide area in the north-central Pacific Ocean around the Hawaiian Islands, ranging from 50^0 N to 0^0 latitude and 180^0 W to 135^0 W longitude. Along with the increase in observer coverage in 2000, the observer sampling design was improved with the intent to provide a more unbiased and representative sample of the deep-set fishery, so that seasonality and geographic distribution of the observed data should reflect similar patterns as the entire sector. Logbook data are available for virtually 100% of operations in both sectors of the fishery but these do not accurately reveal the species of sharks in the catch.

In addition to total observed catch for both sectors of the fishery, this working paper provides estimates of the total catch for the deep-set sector from 2002 to 2013 using the generalized ratio estimator (for details see McCracken, 2013). The estimation process works best with an adequate level of observer coverage and an unbiased sampling regime, which were lacking in prior years.

Catches which are presented in numbers in this working paper (US recreational and Hawaiian longline) have been converted to tonnage for final data submission (see Appendix) using the length-weight conversion adopted previously by the SHARKWG (Teo et al., 2012).

$$\text{Weight (kilograms)} = 1.1025 \times 10^{-5} \times L\ (\text{fork length})^{3.0091}$$

Mean sizes from the Hawaiian deep- and shallow-set fisheries are used to convert numbers to metric tons. Because there is very little data on mean size from the recreational fishery, the mean size from the DGN fishery is used to convert recreational catches from numbers to mt.

Results

Catches of makos in the RecFIN database (representing private vessels) were highest in the 1980s (1981: 12,996 dead removals; 1987: 21,591) and have been declining since. Catches of mako sharks in the CPFV database were fewer than 30 animals annually from 1957-1966, and none were recorded from 1967-1979 in that database. Starting in 1980 CPFV catches began increasing, peaking at 381 in 1997 and have been mostly constant since. Mako catch is strongly seasonal in the recreational fishery, with the majority of catch occurring in summer for both CPFV and RecFIN (Figure 1). The number of makos released alive peaked between the early 1990s and early 2000s, and has declined since then (Figure 2).

Mako shark landings from US west coast commercial fisheries were very small through the 1970s, rapidly increased in the 1980s, and have been generally declining since the early 1990s (Figure 3). The large-mesh drift gillnet fleet landings peaked at 342mt in 1982, but since 2010 has been under 25mt annually. Longline and commercial hook & line landings peaked at 213mt in 1988, but have been less than 10mt since 2010. All other US west coast fleets have annually caught very small amounts (<10mt) of shortfin mako shark since 1971.

Nominal observed catch of shortfin mako shark for the Hawaiian deep-set and shallow-set sectors peaked in 2013 and 2010 respectively (Figure 4). However the observed catches for each sector prior to 2000 are not even relatively comparable to observed catch after observer coverage was increased in

2000. To make this comparison over time the observed sample would need to be extrapolated to the entire fleet. Shallow-set nominal observed catches were substantially larger after the reopening of this sector, averaging 740 individuals per year since 2004, but again this increase in observed catch was due to increased observer coverage. A higher nominal observed catch was also seen in the deep-set sector at the time of increased observer coverage in 2000, but this became an increasing trend through 2008 while observer coverage remained fairly stable around 20% through 2013. Estimates of total catch based on the generalized ratio estimator showed very similar annual trends to those from the observed catch from 2002 to 2013. However, the values for the estimated total catch were, on average, 5 times greater than the observed catch (Figure 4).

Discussion

The maximum number of recreational dead removals (both CPFV and recfin) was nearly 22,000 animals in 1987 and since 2007 has been less than 1000 animals annually. Since the 2000's the numbers of makos released alive from recreational vessels has sometimes been greater than dead removals. Because little is known about post-release mortality of makos (Musyl et al., 2011), any information that can be collected to understand this relatively small source of mortality would be helpful. The need for more research on shark bycatch has recently been addressed explicitly (Molina and Cooke, 2012).

Catch from the US West Coast drift gillnet fishery were highest in the early 1980's (~300mt) and have been steadily declining, now around ~10mt. The hook & line fishery had greatest catches in the late 1980s to early 1990s (~100-200mt), but has declined to under 10mt since the mid-1990's. Other West Coast fisheries have been under ~20mt for the last 20 years, with an anomalous peak catch of ~60mt in 1980.

Catches in the Hawaiian deep-set longline fishery have steadily increased from 2001-2013, doubling over that time (from ~2000 to ~4000 animals). Within the shallow-set longline fishery catches were mostly stable from 2005-2010 (~1000), but have declined sharply recently. However, consideration must be given to the changes in observer coverage and fishery practices in 2000 (deep-set) and in 2004 (shallow-set). Increases in nominal observed catch that occurred coincident with increases in observer coverage are not representative of the real change in catch.

Literature cited

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Figures

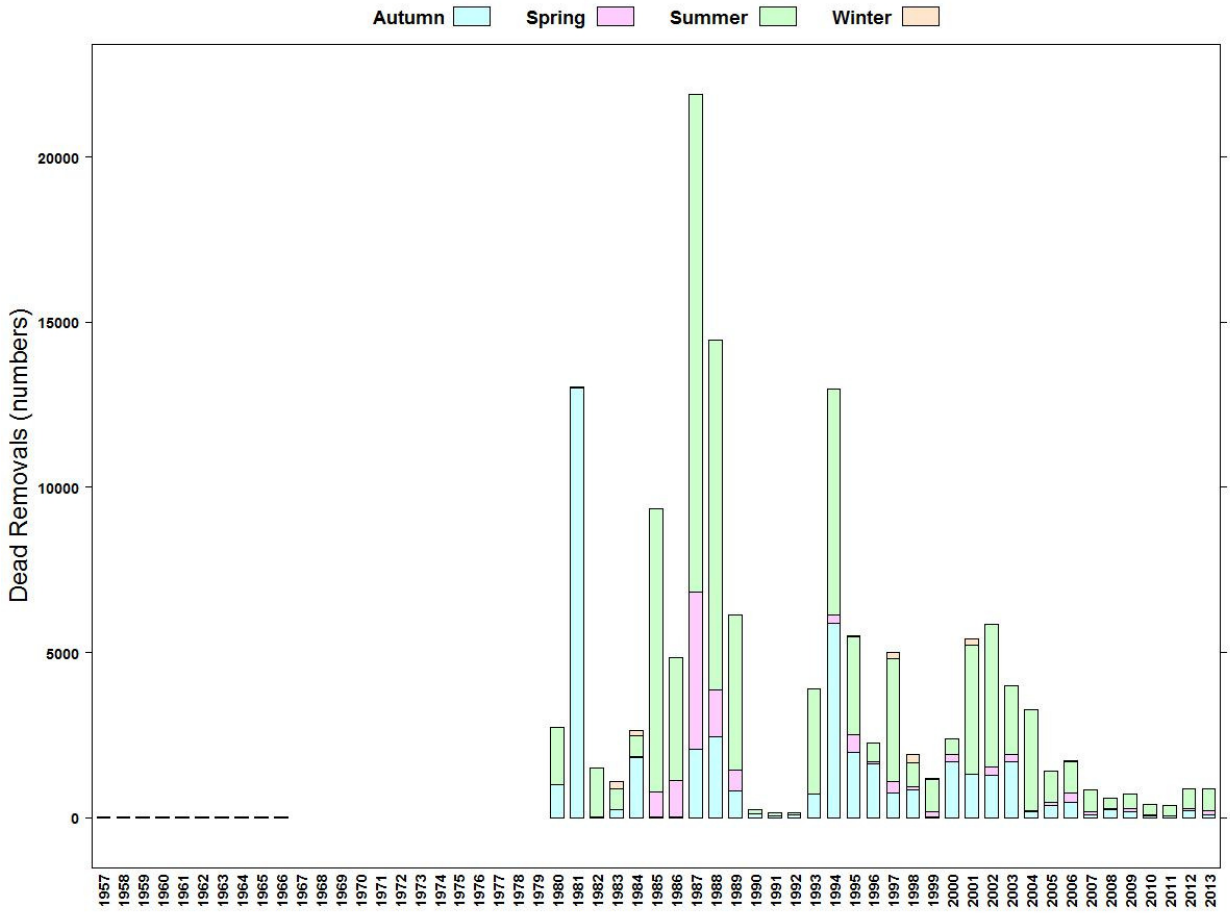

Figure 1. Dead removals of shortfin mako sharks (sum of kept and dead discards) from 1957-2013, by season, for RecFIN (private recreational) and CPFV combined. RecFIN survey data are available from 1980-present and CPFV records first appear in 1957 for mako sharks.

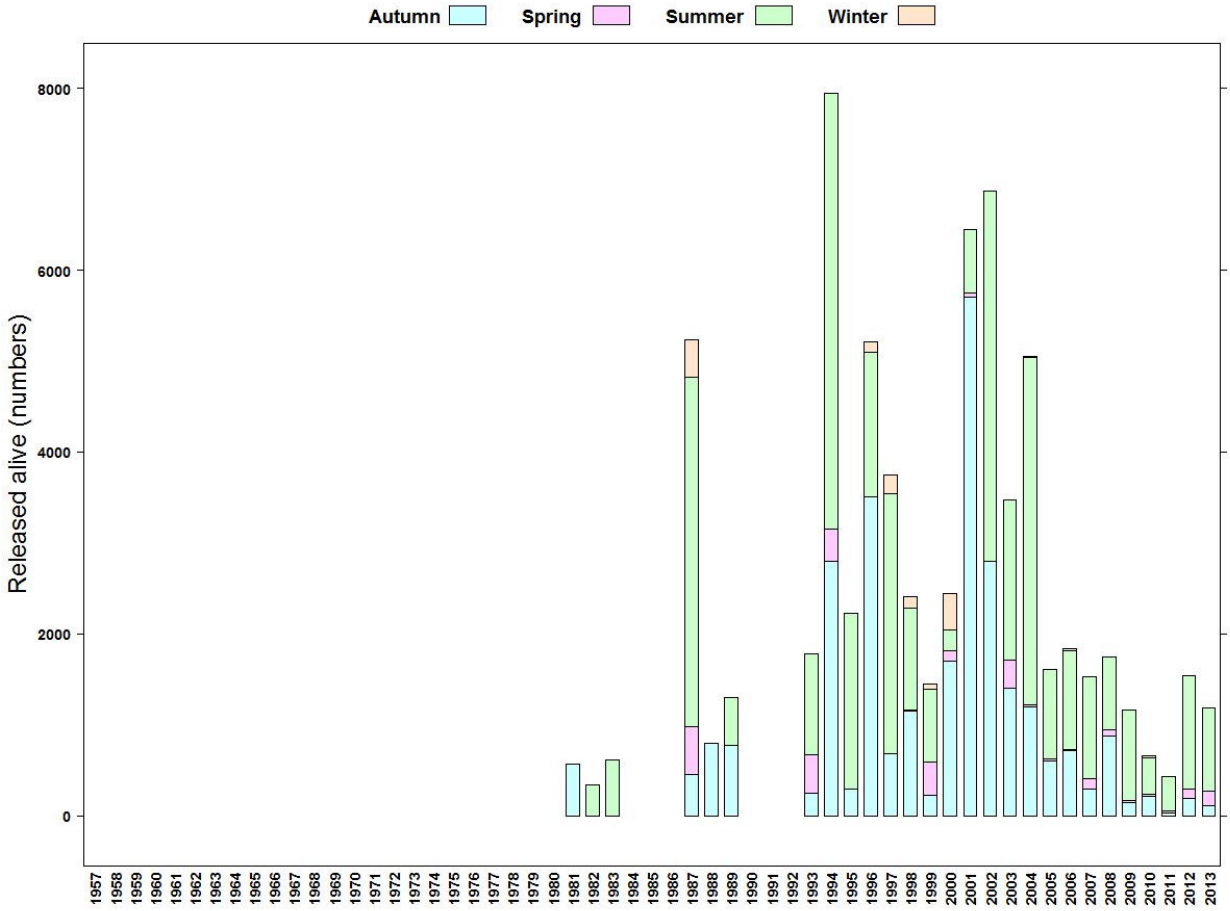

Figure 2. Live releases of shortfin mako sharks from 1957-2013, by season, for RecFIN (private recreational) and CPFV combined. RecFIN survey data are available from 1980-present and CPFV records first appear in 1957 for mako sharks.

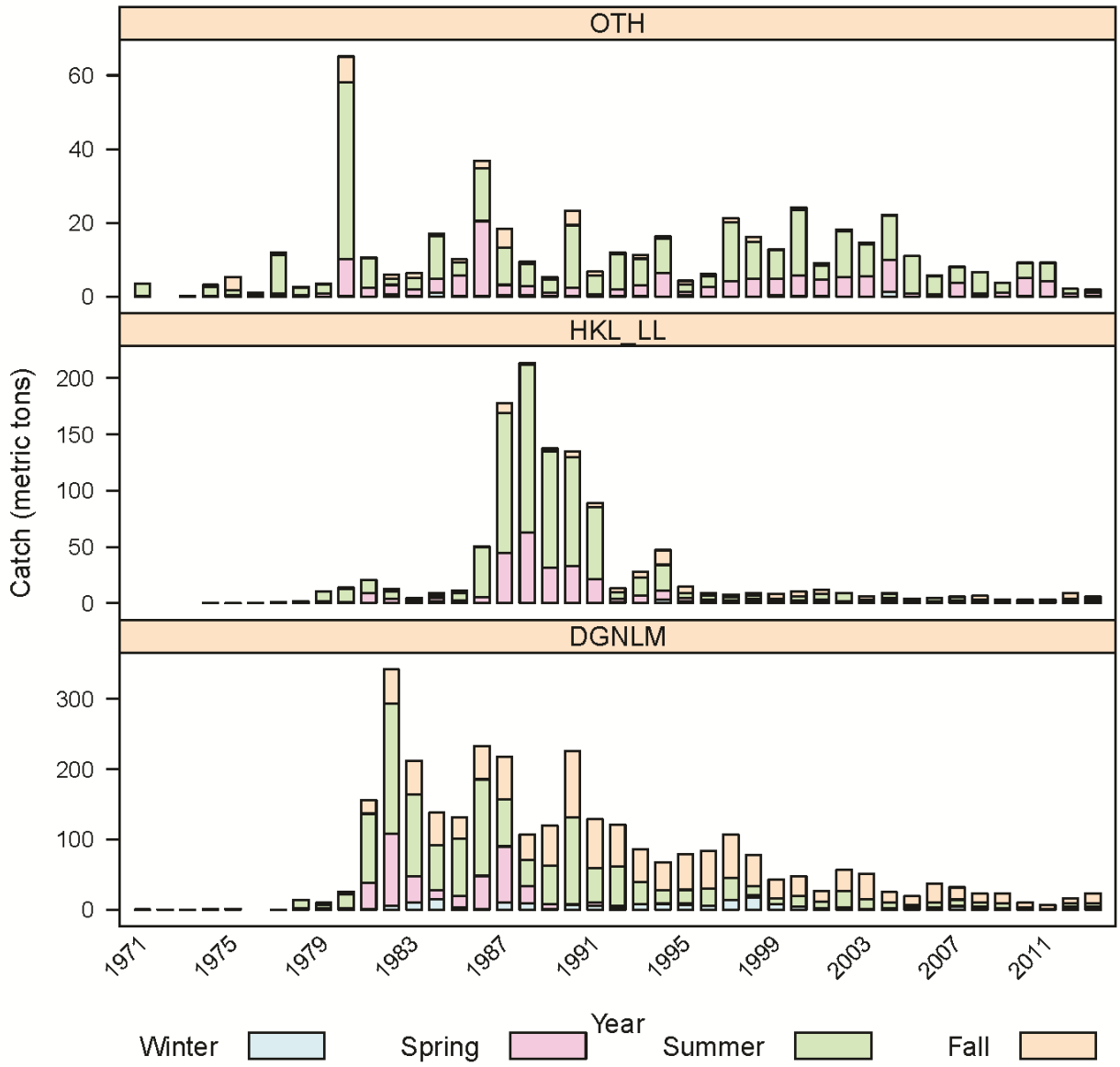

Figure 3. Total dead removals of shortfin mako sharks from US west coast commercial fisheries from 1971-2013: 1) OTH: Other gears, 2) HKL_LL: Hook-and-line and Longline, and 3) DGNLM: Large-mesh drift gill net.

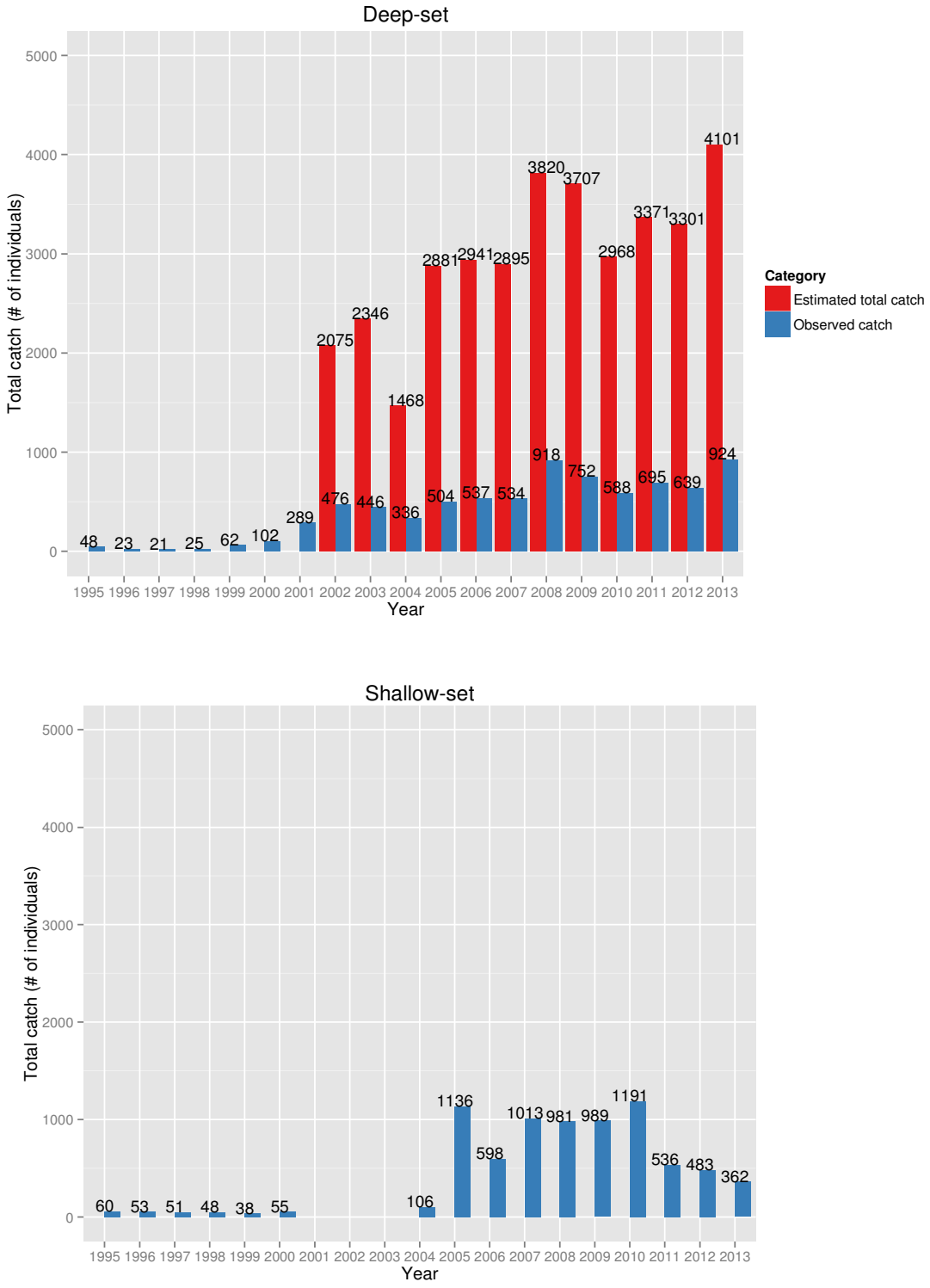

Figure 4. Total annual catch (numbers of fish) of shortfin mako shark by the deep-set (top panel) and shallow-set (bottom panel) sectors of the Hawaii-based pelagic longline fishery in 1995-2013. Total catch values are displayed at the top of the bars.

Appendix

Table A1. US west coast recreational shortfin mako shark catch

Year	Month	Recfin_ Dead_ Removals (numbers)	Recfin_ Live_ Release (numbers)	CPFV_ Dead_ Removals (numbers)	CPFV_ Live_ Release (numbers)	Recfin_ Dead_ Removals (mt)	Recfin_ Live_ Release (mt)	CPFV_ Dead_ Removals (mt)	CPFV_ Live_ Release (mt)
1957	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1957	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1957	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1957	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1957	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1957	6	NA	NA	0.0	NA	NA	NA	0.1	NA
1957	7	NA	NA	0.0	NA	NA	NA	0.2	NA
1957	8	NA	NA	0.0	NA	NA	NA	0.1	NA
1957	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1957	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1957	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1957	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1958	1	NA	NA	0.0	NA	NA	NA	0.4	NA
1958	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1958	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1958	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1958	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1958	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1958	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1958	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1958	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1958	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1958	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1958	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1959	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1959	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1959	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1959	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1959	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1959	6	NA	NA	0.0	NA	NA	NA	0.1	NA
1959	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1959	8	NA	NA	0.0	NA	NA	NA	0.1	NA
1959	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1959	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1959	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1959	12	NA	NA	0.0	NA	NA	NA	0.0	NA

1960	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1960	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1960	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1960	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1960	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1960	6	NA	NA	0.0	NA	NA	NA	0.1	NA
1960	7	NA	NA	0.0	NA	NA	NA	0.1	NA
1960	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1960	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1960	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1960	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1960	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1961	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1961	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1961	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1961	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1961	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1961	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1961	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1961	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1961	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1961	10	NA	NA	0.0	NA	NA	NA	0.1	NA
1961	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1961	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1962	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1962	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1962	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1962	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1962	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1962	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1962	7	NA	NA	0.0	NA	NA	NA	0.1	NA
1962	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1962	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1962	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1962	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1962	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1963	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1963	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1963	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1963	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1963	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1963	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1963	7	NA	NA	0.0	NA	NA	NA	0.1	NA

1963	8	NA	NA	0.0	NA	NA	NA	0.3	NA
1963	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1963	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1963	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1963	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1964	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1964	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1964	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1964	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1964	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1964	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1964	7	NA	NA	0.0	NA	NA	NA	0.1	NA
1964	8	NA	NA	0.0	NA	NA	NA	0.1	NA
1964	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1964	10	NA	NA	0.0	NA	NA	NA	0.1	NA
1964	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1964	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1965	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1965	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1965	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1965	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1965	5	NA	NA	0.0	NA	NA	NA	0.1	NA
1965	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1965	7	NA	NA	0.0	NA	NA	NA	0.1	NA
1965	8	NA	NA	0.0	NA	NA	NA	0.2	NA
1965	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1965	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1965	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1965	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1966	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1966	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1966	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1966	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1966	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1966	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1966	7	NA	NA	0.0	NA	NA	NA	0.1	NA
1966	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1966	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1966	10	NA	NA	0.0	NA	NA	NA	0.2	NA
1966	11	NA	NA	0.0	NA	NA	NA	0.1	NA
1966	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1967	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1967	2	NA	NA	0.0	NA	NA	NA	0.0	NA

1967	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1967	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1967	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1967	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1967	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1967	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1967	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1967	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1967	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1967	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1968	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1969	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1970	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1970	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1970	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1970	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1970	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1970	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1970	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1970	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1970	9	NA	NA	0.0	NA	NA	NA	0.0	NA

1970	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1970	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1970	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1971	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1972	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1973	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1974	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1974	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1974	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1974	4	NA	NA	0.0	NA	NA	NA	0.0	NA

1974	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1974	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1974	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1974	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1974	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1974	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1974	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1974	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1975	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1976	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1977	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1977	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1977	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1977	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1977	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1977	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1977	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1977	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1977	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1977	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1977	11	NA	NA	0.0	NA	NA	NA	0.0	NA

1977	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1978	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	1	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	2	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	3	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	4	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	5	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	6	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	7	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	8	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	9	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	10	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	11	NA	NA	0.0	NA	NA	NA	0.0	NA
1979	12	NA	NA	0.0	NA	NA	NA	0.0	NA
1980	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1980	7	0.0	0.0	0.0	0.0	13.5	0.0	0.0	0.0
1980	8	0.0	0.0	0.0	0.0	19.8	0.0	0.0	0.0
1980	9	0.0	0.0	0.0	0.0	10.3	0.0	0.0	0.0
1980	10	0.0	0.0	0.0	0.0	8.8	0.0	0.0	0.0
1980	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1981	7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1981	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981	9	0.0	0.0	0.0	0.0	135.2	5.9	0.5	0.0
1981	10	0.0	0.0	0.0	0.0	116.1	5.1	0.0	0.0
1981	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1981	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982	7	0.0	0.0	0.0	0.0	11.6	2.6	0.1	0.0
1982	8	0.0	0.0	0.0	0.0	16.9	3.9	0.2	0.0
1982	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982	10	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1982	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983	7	0.0	0.0	0.0	0.0	4.8	4.8	0.0	0.0
1983	8	0.0	0.0	0.0	0.0	7.1	7.1	0.1	0.0
1983	9	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1983	10	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1983	11	0.0	0.0	0.0	0.0	4.4	0.0	0.2	0.0
1983	12	0.0	0.0	0.0	0.0	4.1	0.0	0.1	0.0
1984	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1984	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1984	3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1984	4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1984	5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1984	6	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
1984	7	0.0	0.0	0.0	0.0	4.8	0.0	0.1	0.0
1984	8	0.0	0.0	0.0	0.0	7.0	0.0	0.2	0.0
1984	9	0.0	0.0	0.0	0.0	17.0	0.0	0.2	0.0
1984	10	0.0	0.0	0.0	0.0	14.6	0.0	0.1	0.0
1984	11	0.0	0.0	0.0	0.0	3.3	0.0	0.1	0.0
1984	12	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
1985	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1985	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1985	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1985	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1985	5	0.0	0.0	0.0	0.0	14.4	0.0	0.0	0.0
1985	6	0.0	0.0	0.0	0.0	29.7	0.0	0.0	0.0
1985	7	0.0	0.0	0.0	0.0	55.3	0.0	0.0	0.0
1985	8	0.0	0.0	0.0	0.0	80.9	0.0	0.1	0.0
1985	9	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
1985	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1985	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1985	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986	5	0.0	0.0	0.0	0.0	21.5	0.0	0.1	0.0
1986	6	0.0	0.0	0.0	0.0	44.3	0.0	0.3	0.0
1986	7	0.0	0.0	0.0	0.0	10.7	0.0	0.4	0.0
1986	8	0.0	0.0	0.0	0.0	15.7	0.0	0.3	0.0
1986	9	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1986	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987	4	0.0	0.0	0.0	0.0	45.9	0.0	0.1	0.0
1987	5	0.0	0.0	0.0	0.0	46.0	10.2	0.4	0.0
1987	6	0.0	0.0	0.0	0.0	94.7	21.0	0.2	0.0
1987	7	0.0	0.0	0.0	0.0	79.1	21.7	0.9	0.0
1987	8	0.0	0.0	0.0	0.0	115.7	31.7	0.8	0.0
1987	9	0.0	0.0	0.0	0.0	19.5	0.0	1.2	0.0
1987	10	0.0	0.0	0.0	0.0	16.7	0.0	1.7	0.0
1987	11	0.0	0.0	0.0	0.0	0.0	8.7	0.6	0.0
1987	12	0.0	0.0	0.0	0.0	0.0	8.1	0.0	0.0
1988	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988	5	0.0	0.0	0.0	0.0	27.6	0.0	0.1	0.0
1988	6	0.0	0.0	0.0	0.0	56.7	0.0	0.6	0.0
1988	7	0.0	0.0	0.0	0.0	59.6	0.0	0.8	0.0
1988	8	0.0	0.0	0.0	0.0	87.3	0.0	0.2	0.0

1988	9	0.0	0.0	0.0	0.0	24.9	8.3	0.6	0.0
1988	10	0.0	0.0	0.0	0.0	21.3	7.1	0.2	0.0
1988	11	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1988	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989	5	0.0	0.0	0.0	0.0	12.1	0.0	0.1	0.0
1989	6	0.0	0.0	0.0	0.0	25.0	0.0	1.7	0.0
1989	7	0.0	0.0	0.0	0.0	24.6	4.1	1.9	0.0
1989	8	0.0	0.0	0.0	0.0	36.0	6.0	1.7	0.0
1989	9	0.0	0.0	0.0	0.0	8.1	8.1	0.3	0.0
1989	10	0.0	0.0	0.0	0.0	6.9	6.9	0.2	0.0
1989	11	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
1989	12	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1990	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990	5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1990	6	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
1990	7	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
1990	8	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0
1990	9	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0
1990	10	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
1990	11	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
1990	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991	6	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
1991	7	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
1991	8	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
1991	9	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
1991	10	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
1991	11	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1991	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1992	4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1992	5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1992	6	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
1992	7	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
1992	8	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
1992	9	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
1992	10	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
1992	11	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
1992	12	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1993	1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1993	2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1993	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1993	4	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0
1993	5	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0
1993	6	0.0	0.0	0.0	0.0	0.0	2.4	0.3	0.0
1993	7	0.0	0.0	0.0	0.0	24.3	7.7	0.3	0.0
1993	8	0.0	0.0	0.0	0.0	35.5	11.2	1.2	0.0
1993	9	0.0	0.0	0.0	0.0	5.2	2.6	0.5	0.0
1993	10	0.0	0.0	0.0	0.0	4.5	2.3	3.2	0.0
1993	11	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
1993	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1994	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	5	0.0	0.0	0.0	0.0	4.6	6.9	0.2	0.0
1994	6	0.0	0.0	0.0	0.0	9.4	14.1	1.3	0.0
1994	7	0.0	0.0	0.0	0.0	48.2	31.8	1.7	0.0
1994	8	0.0	0.0	0.0	0.0	70.5	46.6	1.2	0.0
1994	9	0.0	0.0	0.0	0.0	58.0	17.9	0.6	0.0
1994	10	0.0	0.0	0.0	0.0	54.8	36.2	0.4	0.0
1994	11	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1994	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995	2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
1995	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995	5	0.0	0.0	0.0	0.0	9.9	0.0	0.1	0.0
1995	6	0.0	0.0	0.0	0.0	20.4	0.0	0.3	0.7
1995	7	0.0	0.0	0.0	0.0	14.3	14.4	0.8	0.6
1995	8	0.0	0.0	0.0	0.0	21.0	21.1	0.9	0.4
1995	9	0.0	0.0	0.0	0.0	20.0	2.9	0.8	0.1
1995	10	0.0	0.0	0.0	0.0	17.2	2.5	0.3	0.2

1995	11	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
1995	12	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1996	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
1996	4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1996	5	0.0	0.0	0.0	0.0	0.9	0.0	0.3	0.0
1996	6	0.0	0.0	0.0	0.0	1.8	0.0	1.3	0.2
1996	7	0.0	0.0	0.0	0.0	2.2	12.2	1.1	0.1
1996	8	0.0	0.0	0.0	0.0	3.3	17.9	0.8	0.2
1996	9	0.0	0.0	0.0	0.0	15.5	34.8	1.0	0.7
1996	10	0.0	0.0	0.0	0.0	13.3	29.9	1.3	0.1
1996	11	0.0	0.0	0.0	0.0	0.0	2.3	0.2	0.0
1996	12	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0
1997	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	5	0.0	0.0	0.0	0.0	6.3	0.0	0.4	0.0
1997	6	0.0	0.0	0.0	0.0	13.1	0.0	3.7	0.0
1997	7	0.0	0.0	0.0	0.0	21.8	22.1	0.4	0.8
1997	8	0.0	0.0	0.0	0.0	31.9	32.4	0.7	0.1
1997	9	0.0	0.0	0.0	0.0	4.4	4.4	1.2	0.5
1997	10	0.0	0.0	0.0	0.0	3.8	3.8	0.4	0.1
1997	11	0.0	0.0	0.0	0.0	4.3	4.3	0.7	0.0
1997	12	0.0	0.0	0.0	0.0	4.0	4.0	0.1	0.0
1998	1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
1998	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998	4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1998	5	0.0	0.0	0.0	0.0	1.1	0.0	0.2	0.1
1998	6	0.0	0.0	0.0	0.0	2.2	0.0	0.3	0.0
1998	7	0.0	0.0	0.0	0.0	4.3	8.7	0.4	0.1
1998	8	0.0	0.0	0.0	0.0	6.3	12.8	0.8	0.2
1998	9	0.0	0.0	0.0	0.0	5.3	10.6	0.9	0.2
1998	10	0.0	0.0	0.0	0.0	4.5	9.1	0.5	0.1
1998	11	0.0	0.0	0.0	0.0	4.8	2.4	0.3	0.0
1998	12	0.0	0.0	0.0	0.0	4.5	2.2	0.3	0.0
1999	1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
1999	2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1999	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999	5	0.0	0.0	0.0	0.0	2.6	7.1	0.0	0.0

1999	6	0.0	0.0	0.0	0.0	5.4	5.5	0.1	0.1
1999	7	0.0	0.0	0.0	0.0	5.2	3.9	0.5	0.1
1999	8	0.0	0.0	0.0	0.0	7.7	5.7	0.4	0.1
1999	9	0.0	0.0	0.0	0.0	0.0	1.6	0.3	0.1
1999	10	0.0	0.0	0.0	0.0	0.0	1.4	0.1	0.1
1999	11	0.0	0.0	0.0	0.0	0.0	1.2	0.1	0.0
1999	12	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
2000	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
2000	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	5	0.0	0.0	0.0	0.0	4.0	2.0	0.0	0.2
2000	6	0.0	0.0	0.0	0.0	8.1	4.1	0.1	0.1
2000	7	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2
2000	8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1
2000	9	0.0	0.0	0.0	0.0	17.1	12.8	0.5	0.1
2000	10	0.0	0.0	0.0	0.0	14.7	11.0	0.4	0.1
2000	11	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.8
2000	12	0.0	0.0	0.0	0.0	0.0	7.4	0.1	0.0
2001	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
2001	5	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
2001	6	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1
2001	7	0.0	0.0	0.0	0.0	29.6	5.0	0.8	0.7
2001	8	0.0	0.0	0.0	0.0	43.3	7.2	1.4	0.5
2001	9	0.0	0.0	0.0	0.0	9.8	59.0	2.4	0.4
2001	10	0.0	0.0	0.0	0.0	8.4	50.7	0.4	0.1
2001	11	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0
2001	12	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0
2002	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	5	0.0	0.0	0.0	0.0	5.2	0.0	0.1	0.0
2002	6	0.0	0.0	0.0	0.0	10.7	0.0	1.0	0.9
2002	7	0.0	0.0	0.0	0.0	28.0	31.2	1.6	0.8
2002	8	0.0	0.0	0.0	0.0	41.0	45.7	0.8	0.2
2002	9	0.0	0.0	0.0	0.0	12.9	28.9	0.4	0.4
2002	10	0.0	0.0	0.0	0.0	11.1	24.8	0.3	0.0
2002	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2003	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003	5	0.0	0.0	0.0	0.0	4.5	5.9	0.0	0.0
2003	6	0.0	0.0	0.0	0.0	9.2	12.2	0.1	0.0
2003	7	0.0	0.0	0.0	0.0	12.2	8.8	0.5	0.1
2003	8	0.0	0.0	0.0	0.0	17.8	12.8	0.5	0.1
2003	9	0.0	0.0	0.0	0.0	16.8	14.5	0.5	0.1
2003	10	0.0	0.0	0.0	0.0	14.5	12.4	0.5	0.1
2003	11	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
2003	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004	1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
2004	2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
2004	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004	5	0.0	0.0	0.0	0.0	0.8	0.3	0.1	0.0
2004	6	0.0	0.0	0.0	0.0	4.5	4.1	0.5	0.2
2004	7	0.0	0.0	0.0	0.0	4.5	3.6	3.6	0.5
2004	8	0.0	0.0	0.0	0.0	44.9	65.1	0.8	0.3
2004	9	0.0	0.0	0.0	0.0	1.0	4.5	0.3	0.1
2004	10	0.0	0.0	0.0	0.0	1.6	18.3	0.4	0.2
2004	11	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
2004	12	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
2005	1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
2005	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005	5	0.0	0.0	0.0	0.0	1.7	0.4	0.2	0.0
2005	6	0.0	0.0	0.0	0.0	1.8	4.3	0.4	0.1
2005	7	0.0	0.0	0.0	0.0	9.6	10.4	0.9	0.2
2005	8	0.0	0.0	0.0	0.0	4.7	3.9	0.6	0.0
2005	9	0.0	0.0	0.0	0.0	3.5	3.6	0.6	0.4
2005	10	0.0	0.0	0.0	0.0	2.3	5.8	0.3	0.0
2005	11	0.0	0.0	0.0	0.0	0.1	1.6	0.1	0.0
2005	12	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
2006	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006	5	0.0	0.0	0.0	0.0	5.1	0.0	0.5	0.2
2006	6	0.0	0.0	0.0	0.0	6.3	4.6	0.7	0.5
2006	7	0.0	0.0	0.0	0.0	7.1	9.5	1.0	0.6

2006	8	0.0	0.0	0.0	0.0	2.2	5.6	1.0	0.2
2006	9	0.0	0.0	0.0	0.0	4.1	8.4	0.8	0.2
2006	10	0.0	0.0	0.0	0.0	3.1	2.5	0.3	0.1
2006	11	0.0	0.0	0.0	0.0	0.2	2.5	0.2	0.1
2006	12	0.0	0.0	0.0	0.0	0.5	0.1	0.1	0.3
2007	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007	2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
2007	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007	5	0.0	0.0	0.0	0.0	1.4	2.2	0.2	0.1
2007	6	0.0	0.0	0.0	0.0	3.0	9.9	0.5	0.2
2007	7	0.0	0.0	0.0	0.0	4.0	2.9	0.8	0.4
2007	8	0.0	0.0	0.0	0.0	4.1	7.8	0.7	0.4
2007	9	0.0	0.0	0.0	0.0	0.4	2.9	0.4	0.1
2007	10	0.0	0.0	0.0	0.0	0.5	2.3	0.1	0.1
2007	11	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.0
2007	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008	4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
2008	5	0.0	0.0	0.0	0.0	0.2	1.1	0.0	0.1
2008	6	0.0	0.0	0.0	0.0	1.7	3.3	0.6	0.4
2008	7	0.0	0.0	0.0	0.0	1.8	3.7	0.7	2.6
2008	8	0.0	0.0	0.0	0.0	1.1	4.6	0.7	0.9
2008	9	0.0	0.0	0.0	0.0	1.7	5.6	1.5	0.2
2008	10	0.0	0.0	0.0	0.0	1.3	7.1	0.1	0.1
2008	11	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.1
2008	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2009	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2009	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2009	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2009	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2009	5	0.0	0.0	0.0	0.0	1.0	0.2	1.3	0.2
2009	6	0.0	0.0	0.0	0.0	1.5	1.7	0.1	0.8
2009	7	0.0	0.0	0.0	0.0	2.9	8.4	0.2	0.9
2009	8	0.0	0.0	0.0	0.0	3.1	5.3	0.2	2.1
2009	9	0.0	0.0	0.0	0.0	1.5	1.0	0.2	0.3
2009	10	0.0	0.0	0.0	0.0	1.3	1.2	0.1	0.2
2009	11	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
2009	12	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
2010	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
2010	2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0

2010	3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
2010	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2010	5	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.3
2010	6	0.0	0.0	0.0	0.0	4.8	2.0	0.2	1.6
2010	7	0.0	0.0	0.0	0.0	0.1	2.1	0.3	1.2
2010	8	0.0	0.0	0.0	0.0	0.1	0.7	0.2	0.3
2010	9	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.4
2010	10	0.0	0.0	0.0	0.0	0.6	3.0	0.1	0.4
2010	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2010	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	5	0.0	0.0	0.0	0.0	0.3	0.4	0.1	0.1
2011	6	0.0	0.0	0.0	0.0	0.7	1.0	0.3	0.8
2011	7	0.0	0.0	0.0	0.0	3.2	1.4	0.5	2.8
2011	8	0.0	0.0	0.0	0.0	0.9	0.8	0.1	0.4
2011	9	0.0	0.0	0.0	0.0	0.7	0.2	0.2	0.3
2011	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
2011	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011	12	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
2012	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012	5	0.0	0.0	0.0	0.0	1.3	1.8	0.2	0.2
2012	6	0.0	0.0	0.0	0.0	1.3	2.5	0.5	2.8
2012	7	0.0	0.0	0.0	0.0	4.6	5.0	2.2	8.2
2012	8	0.0	0.0	0.0	0.0	2.4	4.7	0.4	1.0
2012	9	0.0	0.0	0.0	0.0	0.9	1.1	0.9	0.6
2012	10	0.0	0.0	0.0	0.0	1.8	1.0	0.1	0.6
2012	11	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.1
2012	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	4	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.1
2013	5	0.0	0.0	0.0	0.0	1.5	1.7	0.2	1.2
2013	6	0.0	0.0	0.0	0.0	3.8	3.5	0.7	1.7
2013	7	0.0	0.0	0.0	0.0	6.3	7.1	1.0	3.3
2013	8	0.0	0.0	0.0	0.0	1.1	1.2	0.3	0.8
2013	9	0.0	0.0	0.0	0.0	1.2	1.4	0.1	0.1

2013	10	0.0	0.0	0.0	0.0	0.4	0.3	0.1	0.3
2013	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table A2. US west coast commercial catch (dead removals)

Year	Season	DGNLM_mt	HKL_LL_mt	OTH_mt
1931	1	0	0	0
1931	2	0	0	0
1931	3	0.1	0	0
1931	4	0	0	0
1932	1	0	0	0
1932	2	0	0	0
1932	3	0	0	0
1932	4	0	0	0
1933	1	0	0	0
1933	2	0	0	0
1933	3	0.1	0	0
1933	4	0	0	0
1934	1	0	0	0
1934	2	0	0	0
1934	3	0	0	0
1934	4	0.1	0	0
1935	1	0.1	0	0
1935	2	0	0	0
1935	3	1.2	0.1	0.3
1935	4	0.1	0	0
1936	1	0.1	0	0
1936	2	0	0	0
1936	3	0	0	0
1936	4	0.2	0	0
1937	1	0	0	0
1937	2	0	0	0
1937	3	0.1	0	0
1937	4	0	0	0
1938	1	0	0	0
1938	2	0	0	0
1938	3	0	0	0
1938	4	0	0	0
1939	1	0	0	0
1939	2	0.1	0	0
1939	3	0.8	0.1	0.2
1939	4	0.8	0.1	0.1
1940	1	0.1	0	0
1940	2	1.2	0.1	0.5
1940	3	1.6	0.2	0.4
1940	4	2.1	0.2	0.3

1941	1	0.5	0	0.1
1941	2	0.8	0.1	0.4
1941	3	4.9	0.5	1.3
1941	4	14.6	1.3	1.9
1942	1	1	0.1	0.2
1942	2	0.4	0	0.2
1942	3	2.3	0.2	0.6
1942	4	5.4	0.5	0.7
1943	1	1	0.1	0.2
1943	2	3.4	0.4	1.5
1943	3	8.5	0.8	2.2
1943	4	12.6	1.1	1.7
1944	1	1.3	0.1	0.2
1944	2	2.4	0.3	1
1944	3	4	0.4	1
1944	4	2	0.2	0.3
1945	1	0.2	0	0
1945	2	2.7	0.3	1.2
1945	3	11.9	1.1	3.1
1945	4	3.5	0.3	0.5
1946	1	0	0	0
1946	2	1.3	0.1	0.6
1946	3	5.2	0.5	1.4
1946	4	8.2	0.7	1.1
1947	1	0.8	0.1	0.1
1947	2	1.9	0.2	0.8
1947	3	1.6	0.1	0.4
1947	4	0.5	0	0.1
1948	1	0.2	0	0
1948	2	0.6	0.1	0.3
1948	3	4.1	0.4	1.1
1948	4	3.6	0.3	0.5
1949	1	0.2	0	0
1949	2	1.3	0.1	0.6
1949	3	2.6	0.3	0.7
1949	4	3.1	0.3	0.4
1950	1	0.2	0	0
1950	2	2.1	0.2	0.9
1950	3	1.5	0.1	0.4
1950	4	1.5	0.1	0.2
1951	1	0	0	0
1951	2	0.2	0	0.1
1951	3	1.3	0.1	0.3

1951	4	1.1	0.1	0.1
1952	1	0	0	0
1952	2	2.2	0.2	1
1952	3	0.8	0.1	0.2
1952	4	1.1	0.1	0.2
1953	1	0	0	0
1953	2	1	0.1	0.4
1953	3	1.1	0.1	0.3
1953	4	0.2	0	0
1954	1	0	0	0
1954	2	2	0.2	0.9
1954	3	1.3	0.1	0.3
1954	4	0.1	0	0
1955	1	0.1	0	0
1955	2	0.7	0.1	0.3
1955	3	0.7	0.1	0.2
1955	4	1.4	0.1	0.2
1956	1	0.3	0	0.1
1956	2	0.8	0.1	0.3
1956	3	0.9	0.1	0.2
1956	4	0.4	0	0.1
1957	1	0.8	0.1	0.1
1957	2	1.3	0.1	0.6
1957	3	0.9	0.1	0.2
1957	4	0.4	0	0
1958	1	0.1	0	0
1958	2	1.2	0.1	0.5
1958	3	0.7	0.1	0.2
1958	4	0.2	0	0
1959	1	0.4	0	0.1
1959	2	0.9	0.1	0.4
1959	3	2	0.2	0.5
1959	4	0.4	0	0
1960	1	0.1	0	0
1960	2	0.9	0.1	0.4
1960	3	0.6	0.1	0.2
1960	4	0.4	0	0.1
1961	1	0	0	0
1961	2	0.2	0	0.1
1961	3	0.6	0.1	0.2
1961	4	0.2	0	0
1962	1	0	0	0
1962	2	0	0	0

1962	3	0.6	0.1	0.2
1962	4	0.1	0	0
1963	1	0	0	0
1963	2	0.2	0	0.1
1963	3	1.4	0.1	0.4
1963	4	0.6	0	0.1
1964	1	0	0	0
1964	2	0	0	0
1964	3	1.9	0.2	0.5
1964	4	0.8	0.1	0.1
1965	1	0.2	0	0
1965	2	0.4	0	0.2
1965	3	0.9	0.1	0.2
1965	4	0.7	0.1	0.1
1966	1	0.6	0	0.1
1966	2	0.4	0	0.2
1966	3	0.3	0	0.1
1966	4	0.3	0	0
1967	1	0	0	0
1967	2	0.2	0	0.1
1967	3	0.3	0	0.1
1967	4	0.3	0	0
1968	1	0	0	0
1968	2	0.2	0	0.1
1968	3	0.4	0	0.1
1968	4	0	0	0
1969	1	0	0	0
1969	2	0.1	0	0.2
1969	3	0	0	0.2
1969	4	0	0	0.1
1970	1	0	0	0
1970	2	0	0	0.2
1970	3	0	0	0.3
1970	4	0	0	0.1
1971	1	0	0	0
1971	2	0.1	0	0.3
1971	3	0.3	0	3.3
1971	4	0	0	0
1972	1	0	0	0
1972	2	0	0	0
1972	3	0	0	0
1972	4	0.2	0	0
1973	1	0	0	0

1973	2	0.2	0	0.3
1973	3	0	0	0
1973	4	0	0	0
1974	1	0	0	0
1974	2	0.6	0	0.3
1974	3	0.8	0.2	2.4
1974	4	0	0	0.5
1975	1	0	0	0
1975	2	0.3	0	0.5
1975	3	1.1	0	1.3
1975	4	0	0.1	3.6
1976	1	0	0	0
1976	2	0	0	0.3
1976	3	0	0.2	0.5
1976	4	0	0.3	0.3
1977	1	0	0.1	0.1
1977	2	0.1	0.4	0.7
1977	3	0.1	0.5	10.6
1977	4	0.1	0.2	0.5
1978	1	0.8	0.1	0
1978	2	1.1	0.6	0.5
1978	3	11.4	0.8	2
1978	4	0.7	0.3	0.2
1979	1	0.2	0.2	0
1979	2	1.8	1.8	0.9
1979	3	5.4	8.2	2.4
1979	4	2.4	0.2	0.3
1980	1	0.1	0	0.2
1980	2	1.4	1.2	9.9
1980	3	20.2	11.3	48
1980	4	4.2	1.3	7
1981	1	0.7	0.3	0
1981	2	38	9	2.4
1981	3	98	11.3	8.1
1981	4	19.1	0.2	0.2
1982	1	6	0.3	0.6
1982	2	102.2	3.9	2.6
1982	3	185.6	6	1.6
1982	4	48.1	2.5	1.2
1983	1	10.7	0.3	0.1
1983	2	36.6	1.1	1.9
1983	3	116.3	2.3	3.1
1983	4	48.4	0.8	1.3

1984	1	14.8	1.4	1.1
1984	2	13.1	3.6	3.8
1984	3	63.9	1.7	11.6
1984	4	46.2	2.2	0.6
1985	1	2.8	0.1	0.1
1985	2	16.8	2.3	5.6
1985	3	81.9	6.9	3.6
1985	4	30.3	1.8	0.8
1986	1	0.9	0	0.1
1986	2	47.3	5.4	20.4
1986	3	137.5	44.6	14.4
1986	4	47.3	0.3	2
1987	1	10.6	0.1	0.5
1987	2	79.5	44.8	2.7
1987	3	67.1	123.8	10
1987	4	60.3	8.9	5.2
1988	1	9.1	0	0.4
1988	2	24.3	62.9	2.5
1988	3	37.5	149.2	5.9
1988	4	36.6	1.3	0.7
1989	1	0.9	0.1	0.2
1989	2	7	31.7	0.8
1989	3	55.1	103.3	3.7
1989	4	56.7	2.3	0.6
1990	1	6.4	0.1	0.1
1990	2	1	32.8	2.3
1990	3	124	96.9	17
1990	4	94.3	4.8	3.8
1991	1	6	0.3	0.3
1991	2	4.7	21.3	0.3
1991	3	49	64	5.1
1991	4	69	3.4	1.1
1992	1	2.5	0.6	0.1
1992	2	3	3	1.9
1992	3	55.7	5.9	9.6
1992	4	59.5	3.6	0.4
1993	1	7.7	0.2	0.3
1993	2	0	6.6	2.8
1993	3	31.8	16.1	7.2
1993	4	46.4	5.2	1
1994	1	8.3	3.4	0
1994	2	1	8	6.5
1994	3	18.6	22.7	9.2

1994	4	39.9	13.1	0.6
1995	1	7	1.6	0.5
1995	2	2.5	2.8	0.8
1995	3	18.8	4.7	2.1
1995	4	51	5.4	0.9
1996	1	5.6	1.1	0
1996	2	0	2	2.6
1996	3	24.7	3.8	3
1996	4	53.3	2.3	0.5
1997	1	13.3	0.7	0
1997	2	0	1.8	4.2
1997	3	31.8	3.2	15.9
1997	4	61.7	2	1.2
1998	1	17.7	2.1	0
1998	2	2.8	1.5	4.9
1998	3	13.5	2.9	10
1998	4	44	2.6	1.3
1999	1	8	1.7	0.4
1999	2	0.1	1.4	4.5
1999	3	7.9	1.1	7.8
1999	4	27.2	4.3	0.1
2000	1	4.1	1.9	0.2
2000	2	0.2	0.2	5.6
2000	3	15.8	4	17.7
2000	4	27.7	4.3	0.7
2001	1	1.2	2.1	0.2
2001	2	0.4	1	4.5
2001	3	9.4	5.1	3.8
2001	4	15.6	3.6	0.6
2002	1	2.4	0.7	0
2002	2	1.3	1	5.4
2002	3	22.5	7.2	12.4
2002	4	30.6	0.3	0.4
2003	1	1	1.3	0
2003	2	0.4	0.4	5.6
2003	3	13.2	1.7	8.5
2003	4	36.3	2.7	0.6
2004	1	2.3	2.4	1.4
2004	2	0	2.1	8.5
2004	3	8	3.8	12.1
2004	4	14.7	0.5	0.2
2005	1	0.4	0.3	0
2005	2	2.7	1.1	0.8

2005	3	3.4	2.3	10.2
2005	4	12.8	0.3	0
2006	1	0.7	0.7	0
2006	2	2	0.7	0.6
2006	3	7.6	3	4.9
2006	4	26.5	0.3	0.2
2007	1	4.9	0.5	0
2007	2	0.2	1.7	3.7
2007	3	9.3	2.9	4.3
2007	4	17.4	0.7	0.1
2008	1	1.6	0.7	0.1
2008	2	2.5	0.9	0.8
2008	3	6.2	1.9	5.7
2008	4	12.7	3.1	0.1
2009	1	0.8	0.5	0
2009	2	1.8	0.8	1.1
2009	3	6.3	2	2.6
2009	4	14.5	0.2	0.1
2010	1	2.5	0.3	0.1
2010	2	0	1.4	4.9
2010	3	0.9	0.6	4.1
2010	4	6.7	0.5	0.1
2011	1	0	0.2	0
2011	2	0	0.8	4.1
2011	3	0.9	0.7	4.9
2011	4	6.4	1.5	0.2
2012	1	0.5	0.8	0
2012	2	3.4	1.4	0.9
2012	3	5.2	1.7	1.2
2012	4	7	5.4	0
2013	1	1.6	1.8	0.1
2013	2	3.1	0.9	0.9
2013	3	4.7	1.1	0.6
2013	4	14.2	2.1	0.3

Table A3. Hawaii shallow- and deep-set longline shortfin mako catch

Category	Year	Shallow (#)	Shallow (mt)	Deep (#)	Deep (mt)
Observed catch	1995	60.0	0.9	48.0	3.6
Observed catch	1996	53.0	0.8	23.0	1.7
Observed catch	1997	51.0	0.8	21.0	1.6
Observed catch	1998	48.0	0.7	25.0	1.9
Observed catch	1999	38.0	0.6	62.0	4.6
Observed catch	2000	55.0	0.9	102.0	7.6
Observed catch	2001		0.0	289.0	21.6
Observed catch	2002		0.0	476.0	35.6
Observed catch	2003		0.0	446.0	33.4
Observed catch	2004	106.0	1.6	336.0	25.1
Observed catch	2005	1136.0	17.6	504.0	37.7
Observed catch	2006	598.0	9.3	537.0	40.2
Observed catch	2007	1013.0	15.7	534.0	40.0
Observed catch	2008	981.0	15.2	918.0	68.7
Observed catch	2009	989.0	15.3	752.0	56.3
Observed catch	2010	1191.0	18.4	588.0	44.0
Observed catch	2011	536.0	8.3	695.0	52.0
Observed catch	2012	483.0	7.5	639.0	47.8
Observed catch	2013	362.0	5.6	924.0	69.1
Estimated total	1995		0.0		0.0
Estimated total	1996		0.0		0.0
Estimated total	1997		0.0		0.0
Estimated total	1998		0.0		0.0
Estimated total	1999		0.0		0.0
Estimated total	2000		0.0		0.0
Estimated total	2001		0.0		0.0
Estimated total	2002		0.0	2075.0	155.3
Estimated total	2003		0.0	2346.0	175.6
Estimated total	2004		0.0	1468.0	109.9
Estimated total	2005		0.0	2881.0	215.6
Estimated total	2006		0.0	2941.0	220.1
Estimated total	2007		0.0	2895.0	216.6
Estimated total	2008		0.0	3820.0	285.9
Estimated total	2009		0.0	3707.0	277.4
Estimated total	2010		0.0	2968.0	222.1
Estimated total	2011		0.0	3371.0	252.3
Estimated total	2012		0.0	3301.0	247.0
Estimated total	2013		0.0	4101.0	306.9