https://doi.org/10.7289/V5/WP-PIFSC-18-003

Size composition for swordfish *Xiphias gladius* in the Hawaii-based pelagic longline fishery for 1995-2016[1]

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[1] PIFSC Working Paper WP-18-003.
Issued 18 May 2018.

Working document submitted to the ISC Billfish Working Group, International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, 17-23 January, 2018, Honolulu, HI, USA.

Abstract

Swordfish (*Xiphias gladius*) size frequency data are summarized for the Hawaii-based longline fishery from the Pacific Islands Regional Observer Program (PIROP) data set. Data were separated into deep-set and shallow-set sectors to account for the targeted-species and operational differences between the two sectors. Annual and quarterly mean lengths are presented, as well as a frequency table by year, quarter, and number of swordfish measured per 5-cm length bin. Results show significant interannual and annual variability in mean length for the swordfish caught in the deep-set sector which targets tuna. Fish caught in quarters three and four were generally smaller and largest fish were caught in quarter two. Fish caught in the deep-set sector are generally smaller than those caught in the shallow-set sector. Mean length for the shallow-set fishery, which targets swordfish, was much less variable. Like the deep-set sector, smaller fish were caught in quarter three and larger fish were caught in quarter two in the shallow-set sector.

Introduction

The 2009 ISC stock assessment of swordfish in the North Pacific explored the use of length composition data in Stock Synthesis (SS; Courtney and Piner, 2009a; Courtney and Piner, 2009b; Courtney and Piner, 2010; Methot and Wetzel, 2013) models for both the single-stock and two-stock scenario. In the two-stock scenario, length frequency data were only included for the western and central stock in a preliminary age-structured assessment model. Ultimately, length frequency data were not used in the assessment of the western and central North Pacific and eastern Pacific stocks, and management recommendations were made based on the Bayesian surplus production (BSP) models (ISC BILLWG, 2009). The 2014 swordfish stock assessment used the two-stock hypothesis to assess the stock, but only used BSP models because an update and not a benchmark assessment was conducted, which did not incorporate the length frequency data available primarily from pooled-sex swordfish samples (ISC BILLWG, 2014). Likewise, the 2010 Inter-American Tropical Tuna Commission (IATTC) swordfish stock assessment in the eastern Pacific did not incorporate length composition data and based management recommendations on the results of the BSP assessment models (IATTC SAC, 2011). In 2009, the ISC Billfish Working Group (WG) suggested a two-gender stock assessment model could provide a better approximation of swordfish population dynamics for future assessments due to the apparent sexual dimorphism in growth (DeMartini *et al.*, 2007; Brodziak and Courtney, 2009). However, the WG noted that this would be difficult due to the lack of sex-specific length composition data and a lack of information on the spatial patterns of swordfish size composition through time.

The Hawaii-based longline fishery began rapidly expanding in the late 1980s, and in the 1990s regulations were put into place to limit the number of vessels fishing and to place observers onboard the vessels to monitor catches of protected species (Ito and Childers, 2014). Observers recorded various operational variables for each set and recorded the number of individuals of each species caught and the lengths of many of these species. There have been several changes to the reporting regulations in PIROP since its onset in 1994 (Pacific Islands Region Office, 2017). Observer coverage varied significantly prior to 2000, with observer coverage between 3.3 and 10.4 % for the entire fishery (NMFS, 2017). Starting in 2001, the observer program had a target of 20% observer coverage on deep-set longline vessels and mandatory 100% observer coverage

on shallow-set longline vessels. Prior to 2006 observers measured every fish caught. Since 2006, observers measured every third fish caught, regardless of species. Therefore the proportion of swordfish measured in the catch decreased after 2006 but the total number of swordfish measured increased due to increased observer coverage (Figure 1).

This paper builds on previous exploration of swordfish (*Xiphias gladius*) size-frequency data from PIROP on the Hawaii-based longline fishery (Sculley et al., 2017), but with the purpose of presenting information for the upcoming benchmark stock assessment on North Pacific swordfish. Data were separated into deep-set and shallow-set sectors because of differences in targeting (deep set: tuna, shallow set: swordfish) and subsequent operational differences. Annual and quarterly mean lengths are presented, as well as a frequency table by year, quarter, and number of swordfish measured per 5-cm length bin.

Methods

Eye-fork length data were summarized from the Pacific Islands Region Observer Program database on the Hawaiian longline fishery (Accessed 31 March 2017), which included records from 1994 to 2016. A total of 110,192 lengths were available representing landings in both the shallow-set swordfish targeting (< 15 hooks per float) and the deep-set tuna targeting (≥ 15 hooks per float) sectors of the fishery (Walsh and Brodziak, 2015). The deep-set sector also incidentally catches swordfish. The deep-set and shallow-set data were summarized separately here due to the differences in spatial distributions, operations, and targeting of species between the two fleets.

Results and Discussion

The number of sets observed and number of fish measured are much lower for the deep-set sector than the shallow-set sector (Figure 2). This is due to the lower observer coverage for the deep-set sector, which was 20% after 2001 and less than 20% prior to 2001 while the shallow-set sector had 100% observer coverage after 2001. The deep-set sector fishing area was centered farther south than the shallow-set sector. The highest number of sets and fish measured for the deep-set sector occurred between 15°N and 25°N. The highest number of sets and fish measured for the shallow-set sector was between 25°N and 35°N, an area which coincides with the subtropical frontal zone (Bigelow *et al.,* 1999).

Overall, the mean length of swordfish caught in 5° × 5° squares was larger in the shallow-set sector than the deep-set sector (Figure 3). Fish caught in the deep-set sector had a mean length of < 100 cm for many of the squares with slightly larger fish caught in the north. Mean length for the shallow-set sector was around 140 cm for many of the squares and the largest fish were caught northwest of Hawaii. The annual mean length for the deep set was highly variable both within and between years (Figure 4, top). Generally, mean lengths are smaller prior to the closure in 2001 and larger after 2001. The shallow-set sector annual mean length has low annual and interannual variability (Figure 4, bottom). It appears that fishers were able to consistently target large swordfish in the shallow-set sector. Swordfish were more likely to be sexed in the shallow-set fishery than the deep-set fishery (Figure 5). This may be because smaller, immature fish caught in the deep-set fishery are more difficult to sex. Small fish caught in the shallow-set sector are also unlikely to be sexed, but there were more large fish caught and measured;

therefore, a smaller proportion of the fish were unsexed in the shallow-set sector. In the deep-set sector, 80% of measured fish were unsexed and in the shallow-set sector, 44% of measured fish were unsexed.

There was also substantial variability in the quarterly mean lengths for the deep-set fishery (Figure 6). Coefficient of variation (CV) for the mean lengths were between 0.3 and 0.5 for most quarters (Table 1). A pattern of lower mean lengths in quarters three and four is apparent Figures 6 and 7, which show smaller mean lengths and more fish measured in quarters three and four and the largest mean lengths in quarter two. Spatial distribution of fishing area changes quarterly for the deep-set sector (Figure 7). The fishing area was largest in quarter three and contracted towards the main eight Hawaiian Islands in quarter one.

Both annual mean lengths and quarterly mean lengths for the shallow-set sector were less variable (Figure 8) as compared to the deep-set sector. A trend of smaller mean lengths in quarters three and four was also apparent in the shallow-set sector (Figure 9), although CVs were smaller than in the deep-set sector (Table 2). Spatially, the largest fish were caught north of the Hawaiian Islands in quarter one, large fish were caught around the Hawaiian Islands in quarter two, and smaller and fewer fish were measured farther south in quarters three and four (Figure 9). Spatial distribution of fishing area for the shallow-set sector followed a similar pattern as the deep-set sector, with most fishing effort north of the islands in quarters one and two, shifting west in quarter three, and shifting east in quarter four. A frequency table of the number of swordfish measured by year, quarter, and five cm length bin is available for the deep-set sector (Table A 1) and the shallow-set sector (Table A 2) in the Appendix.

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Tables

Table 1. Swordfish mean length and CV by year and quarter, for the Hawaii-based longline fishery deep-set sector from the Pacific Islands Regional Observer Program data set.

Year	Quarter	Set	Mean Eye-fork Length (cm)	CV
1994	2	Deep	157.8	0.29
1994	3	Deep	67.9	0.25
1994	4	Deep	87.3	0.28
1995	1	Deep	94.0	0.29
1995	2	Deep	164.8	0.19
1995	3	Deep	70.3	0.45
1995	4	Deep	73.3	0.24
1996	1	Deep	92.3	0.30
1996	2	Deep	118.3	0.40
1996	3	Deep	81.3	0.30
1996	4	Deep	97.3	0.28
1997	1	Deep	78.0	0.13
1997	2	Deep	154.5	0.38
1997	3	Deep	72.0	0.04
1997	4	Deep	73.6	0.22
1998	1	Deep	76.9	0.24
1998	2	Deep	92.3	0.40
1998	3	Deep	64.2	0.25
1998	4	Deep	74.8	0.30
1999	1	Deep	111.2	0.39
1999	2	Deep	155.6	0.31
1999	3	Deep	65.7	0.20
1999	4	Deep	88.9	0.27
2000	1	Deep	124.7	0.37
2000	2	Deep	135.5	0.30
2000	3	Deep	74.5	0.52
2000	4	Deep	89.7	0.40
2001	1	Deep	112.0	0.26
2001	2	Deep	134.6	0.33
2001	3	Deep	86.9	0.43
2001	4	Deep	88.9	0.38
2002	1	Deep	119.0	0.34
2002	2	Deep	128.2	0.36
2002	3	Deep	86.4	0.40
2002	4	Deep	81.7	0.31
2003	1	Deep	117.4	0.30
2003	2	Deep	146.8	0.28

Year	Quarter	Set	Mean Eye-fork Length (cm)	CV
2003	3	Deep	69.3	0.33
2003	4	Deep	79.7	0.28
2004	1	Deep	98.1	0.31
2004	2	Deep	111.9	0.44
2004	3	Deep	96.1	0.45
2004	4	Deep	83.8	0.32
2005	1	Deep	114.3	0.26
2005	2	Deep	154.2	0.25
2005	3	Deep	91.8	0.47
2005	4	Deep	85.3	0.29
2006	1	Deep	110.1	0.33
2006	2	Deep	132.7	0.35
2006	3	Deep	97.7	0.43
2006	4	Deep	94.8	0.33
2007	1	Deep	111.4	0.20
2007	2	Deep	128.3	0.38
2007	3	Deep	97.0	0.49
2007	4	Deep	80.8	0.33
2008	1	Deep	112.2	0.32
2008	2	Deep	167.6	0.22
2008	3	Deep	112.1	0.45
2008	4	Deep	94.3	0.34
2009	1	Deep	122.5	0.25
2009	2	Deep	140.3	0.32
2009	3	Deep	111.7	0.37
2009	4	Deep	83.9	0.37
2010	1	Deep	118.2	0.32
2010	2	Deep	139.9	0.32
2010	3	Deep	102.7	0.51
2010	4	Deep	79.8	0.39
2011	1	Deep	101.7	0.32
2011	2	Deep	159.0	0.24
2011	3	Deep	79.5	0.48
2011	4	Deep	78.9	0.24
2012	1	Deep	115.4	0.31
2012	2	Deep	124.0	0.43
2012	4	Deep	105.8	0.30
2013	1	Deep	114.5	0.28
2013	2	Deep	153.4	0.28
2013	3	Deep	82.3	0.51
2013	4	Deep	82.4	0.32
2014	1	Deep	101.0	0.34

Year	Quarter	Set	Mean Eye-fork Length (cm)	CV
2014	2	Deep	153.3	0.28
2014	3	Deep	109.6	0.46
2014	4	Deep	98.3	0.31
2015	1	Deep	112.1	0.32
2015	2	Deep	152.6	0.23
2015	3	Deep	108.1	0.38
2015	4	Deep	85.1	0.32
2016	1	Deep	113.1	0.33
2016	2	Deep	153.0	0.29
2016	3	Deep	99.8	0.46
2016	4	Deep	85.4	0.35

Table 2. Swordfish mean length and CV by year and quarter, for the Hawaii-based longline fishery shallow-set sector from the Pacific Islands Regional Observer Program data set.

Year	Quarter	Set	Mean Eye-fork Length (cm)	CV
1994	1	Shallow	149.0	0.20
1994	2	Shallow	141.2	0.23
1994	3	Shallow	112.4	0.25
1994	4	Shallow	145.5	0.23
1995	1	Shallow	151.3	0.18
1995	2	Shallow	143.4	0.21
1995	3	Shallow	139.7	0.23
1995	4	Shallow	99.2	0.29
1996	1	Shallow	144.1	0.19
1996	2	Shallow	137.7	0.24
1996	3	Shallow	138.5	0.24
1996	4	Shallow	141.4	0.21
1997	1	Shallow	141.5	0.20
1997	2	Shallow	142.4	0.21
1997	3	Shallow	140.1	0.14
1997	4	Shallow	140.7	0.23
1998	1	Shallow	145.9	0.16
1998	2	Shallow	145.1	0.21
1998	3	Shallow	136.2	0.27
1998	4	Shallow	143.4	0.20
1999	1	Shallow	144.8	0.20
1999	2	Shallow	149.5	0.22
1999	3	Shallow	134.3	0.24
1999	4	Shallow	145.6	0.19
2000	1	Shallow	150.2	0.20
2000	2	Shallow	143.1	0.23
2000	3	Shallow	143.2	0.21
2000	4	Shallow	148.8	0.22
2005	1	Shallow	141.3	0.22
2005	2	Shallow	136.7	0.24
2005	3	Shallow	144.4	0.20
2005	4	Shallow	149.0	0.20
2006	1	Shallow	143.6	0.20
2007	1	Shallow	147.0	0.18
2007	2	Shallow	142.1	0.21
2007	3	Shallow	143.5	0.19
2007	4	Shallow	160.8	0.15
2008	1	Shallow	151.5	0.18
2008	2	Shallow	146.1	0.24

Year	Quarter	Set	Mean Eye-fork Length (cm)	CV
2008	3	Shallow	144.2	0.20
2008	4	Shallow	158.1	0.16
2009	1	Shallow	153.8	0.19
2009	2	Shallow	147.4	0.22
2009	3	Shallow	147.5	0.21
2010	1	Shallow	154.7	0.19
2010	2	Shallow	147.7	0.20
2010	3	Shallow	151.9	0.21
2010	4	Shallow	158.7	0.20
2011	1	Shallow	155.2	0.20
2011	2	Shallow	144.9	0.24
2011	3	Shallow	146.3	0.24
2011	4	Shallow	156.9	0.19
2012	1	Shallow	152.0	0.21
2012	2	Shallow	145.7	0.28
2012	4	Shallow	155.5	0.18
2013	1	Shallow	153.9	0.20
2013	2	Shallow	145.8	0.24
2013	3	Shallow	140.4	0.27
2013	4	Shallow	145.4	0.25
2014	1	Shallow	151.0	0.23
2014	2	Shallow	144.7	0.25
2014	3	Shallow	153.1	0.22
2014	4	Shallow	138.3	0.22
2015	1	Shallow	143.8	0.21
2015	2	Shallow	139.5	0.23
2015	3	Shallow	135.4	0.25
2015	4	Shallow	142.2	0.20
2016	1	Shallow	146.3	0.19
2016	2	Shallow	139.0	0.25
2016	3	Shallow	141.9	0.23
2016	4	Shallow	158.1	0.17

Figures

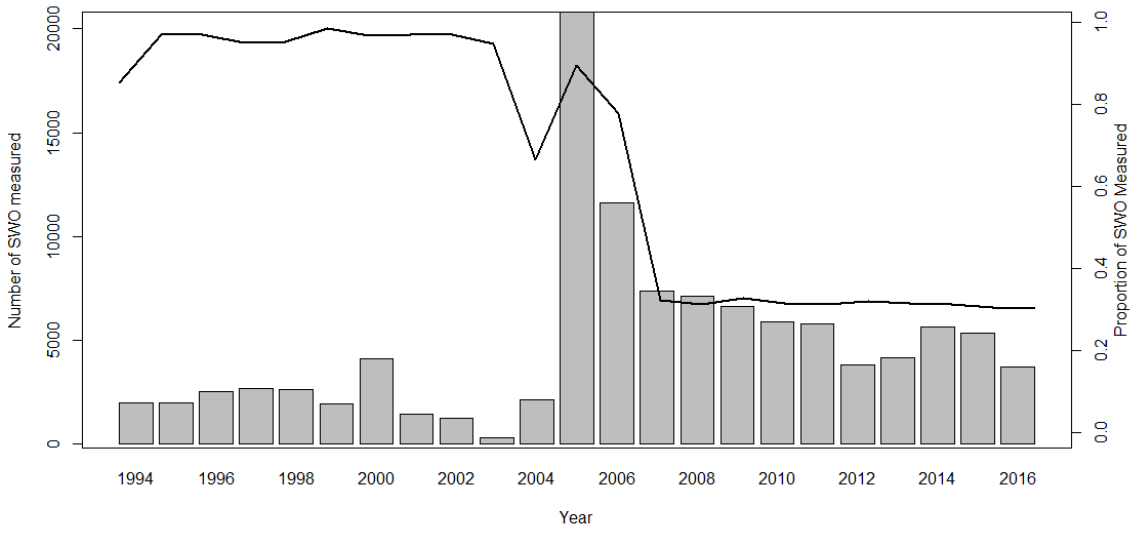

Figure 1. Proportion of swordfish measured (line, right axis) and total number of swordfish measured (histogram, left axis) in the catch by year for the combined shallow and deep-set sectors in the Hawaii-based longline fishery from the Pacific Islands Regional Observer Program database.

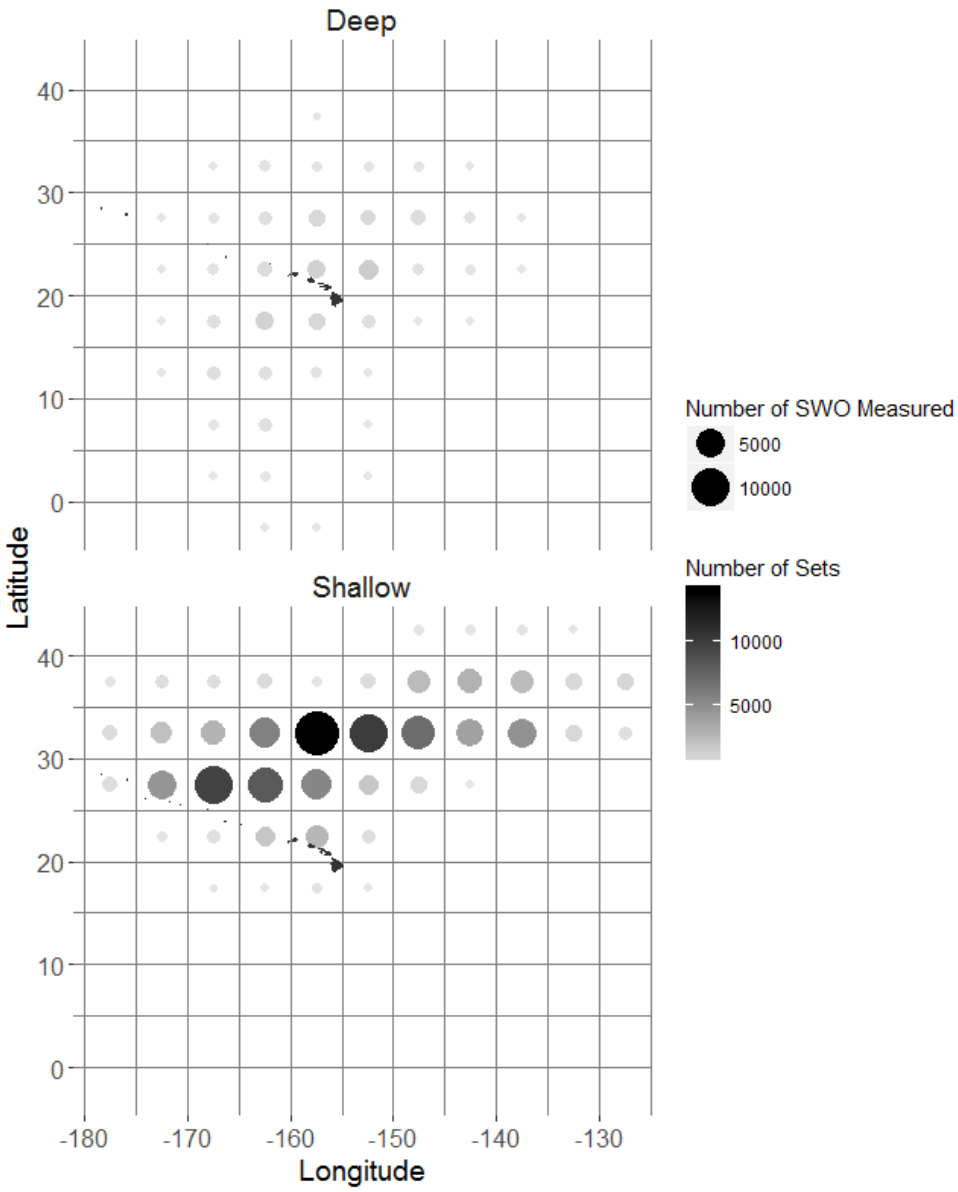

Figure 2. Number of swordfish measured (size of circle) and number of sets observed (color) for the deep-set (top panel) and shallow-set (bottom) sectors of the Hawaiian Longline fishery by 5° × 5° squares plotted over the Hawaiian Archipelago. Data for squares with fewer than three vessels were not plotted to preserve confidentiality.

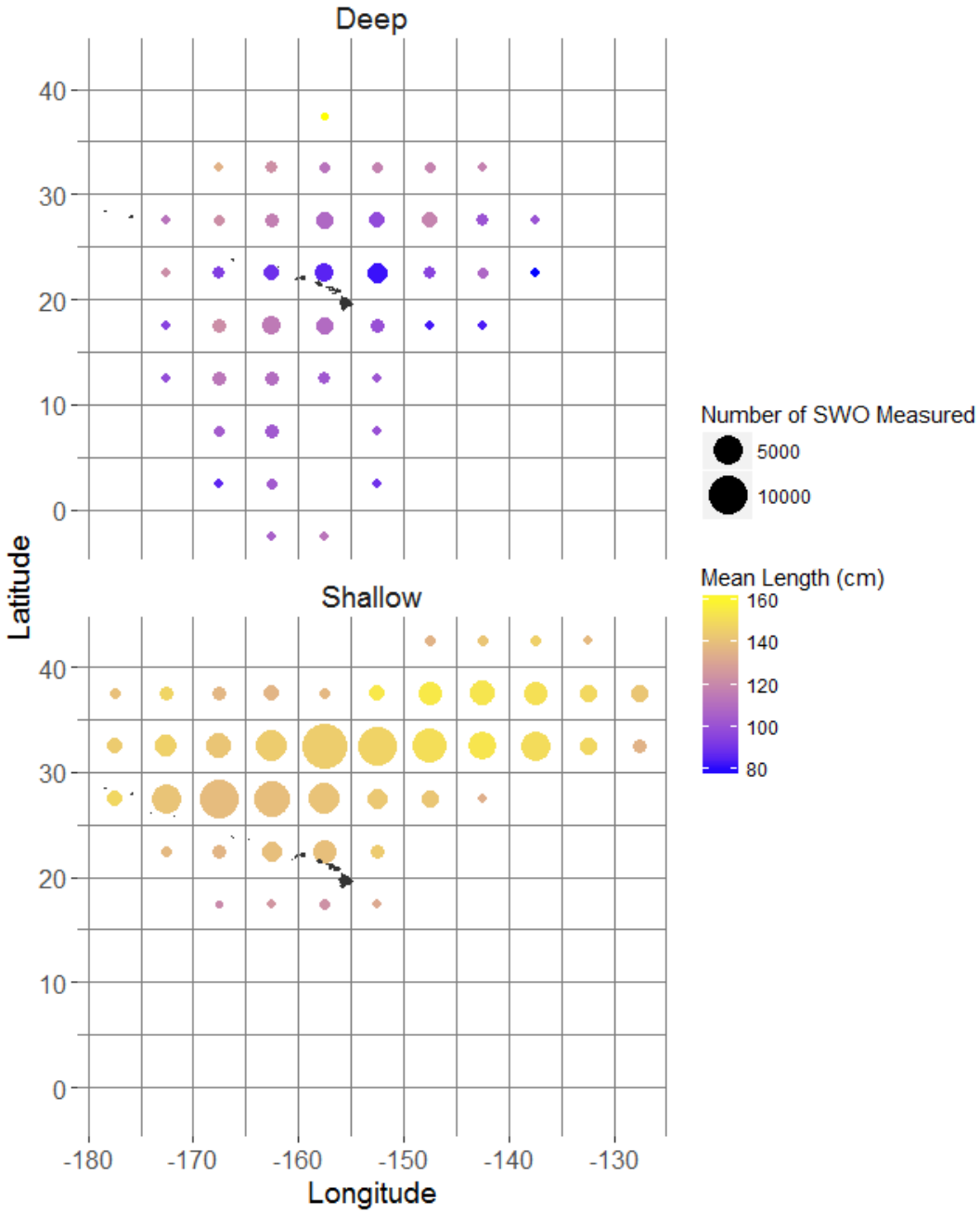

Figure 3. Spatial distribution of swordfish mean length in 5° × 5° squares for the deep-set sector (top panel) and shallow-set sector (bottom panel) plotted over the Hawaiian Archipelago. Data from squares with fewer than three vessels were not plotted to preserve confidentiality.

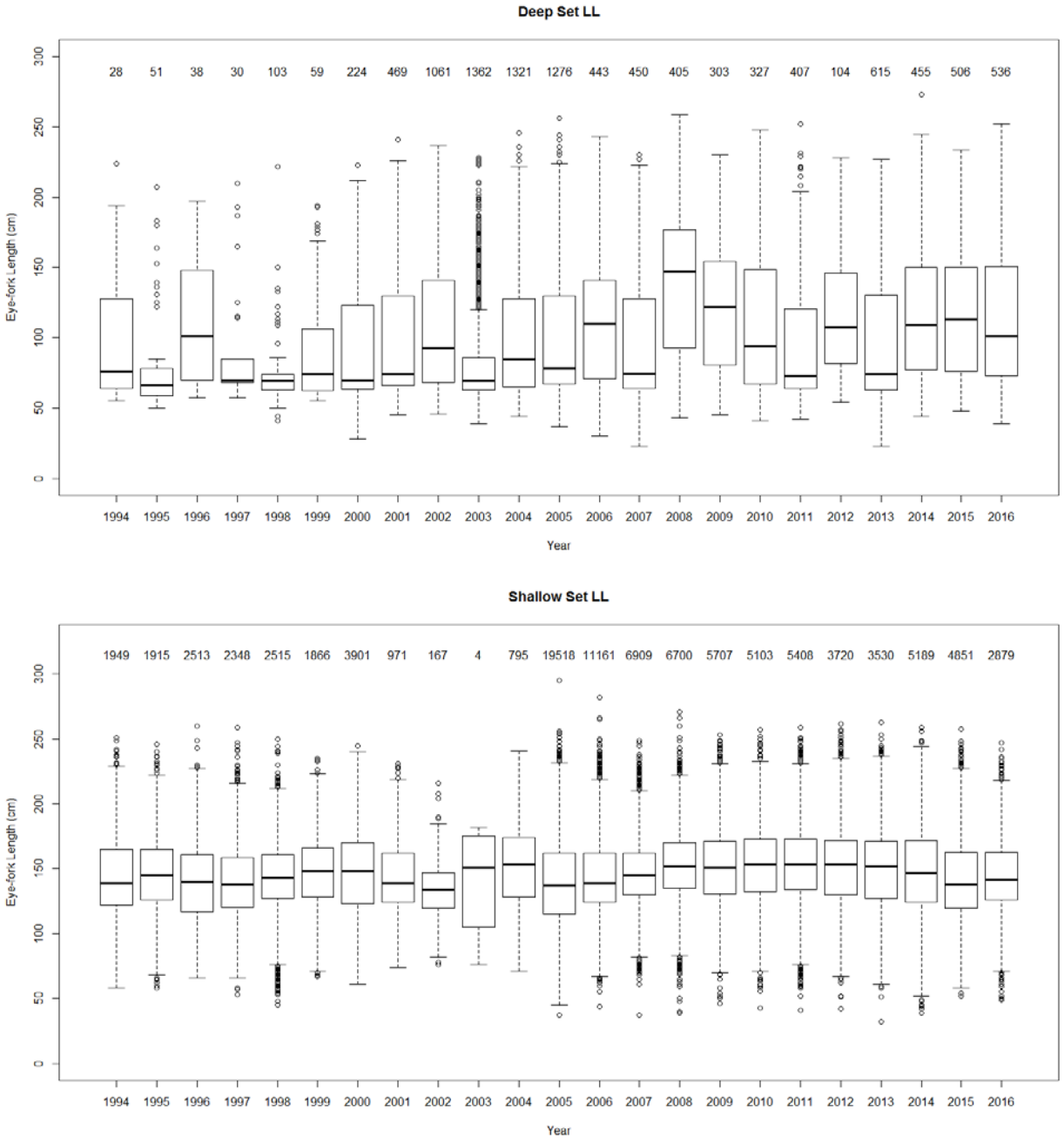

Figure 4. Box plot of swordfish lengths by year in 1994–2016 for the deep-set (top panel) and shallow-set (bottom panel) sector showing the median (solid black line) and quartiles (closed box). The whiskers show 1.5 times the interquartile range from the box and points indicate data outside of that range. Values above the boxes indicate the number of samples in each year.

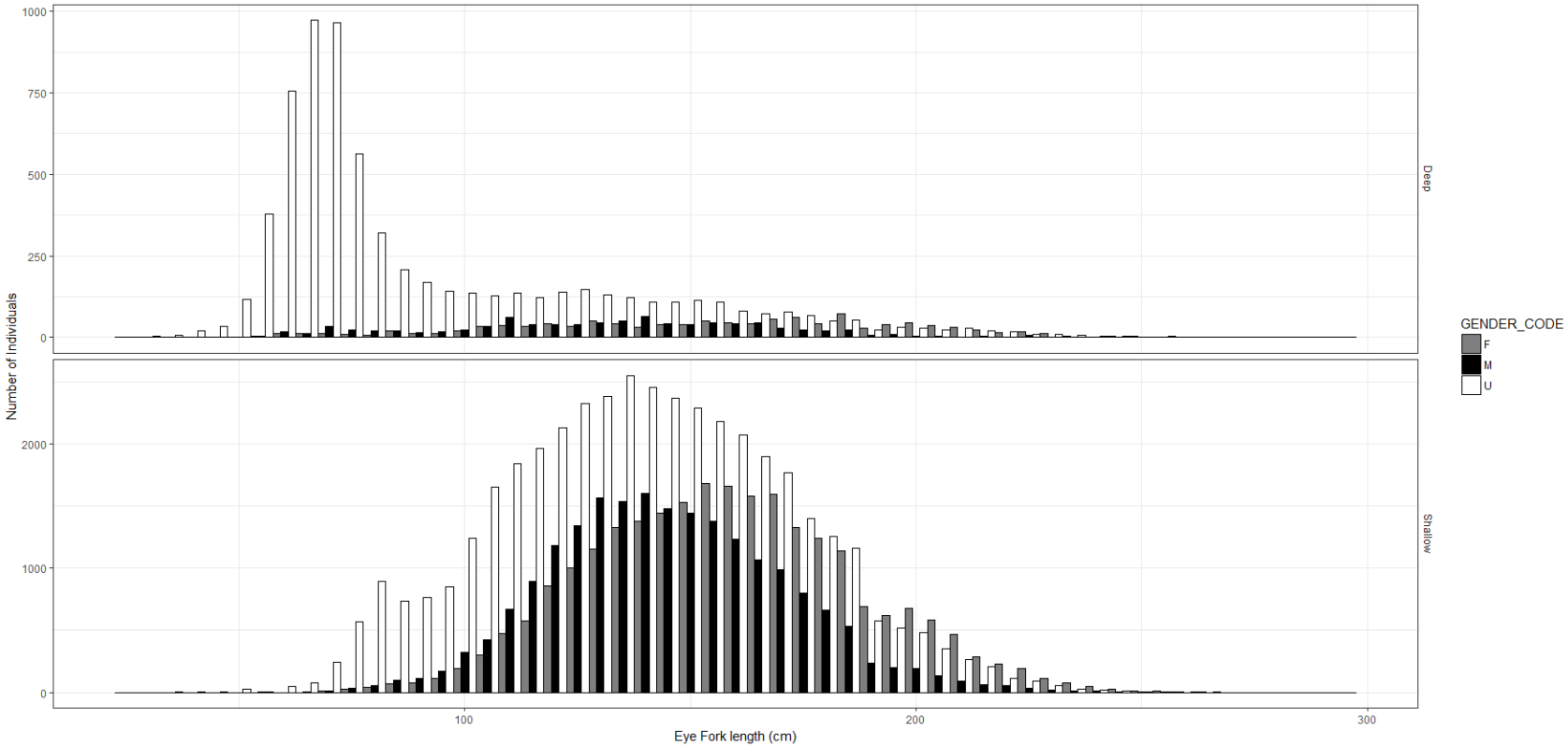

Figure 5. Histogram of swordfish lengths by sex (gray = female fish, black = male fish, white = unsexed fish) for the deep set (top) and shallow-set (bottom) sectors of the Hawaii-based longline fleet from the Pacific Islands Regional Observer Program data set.

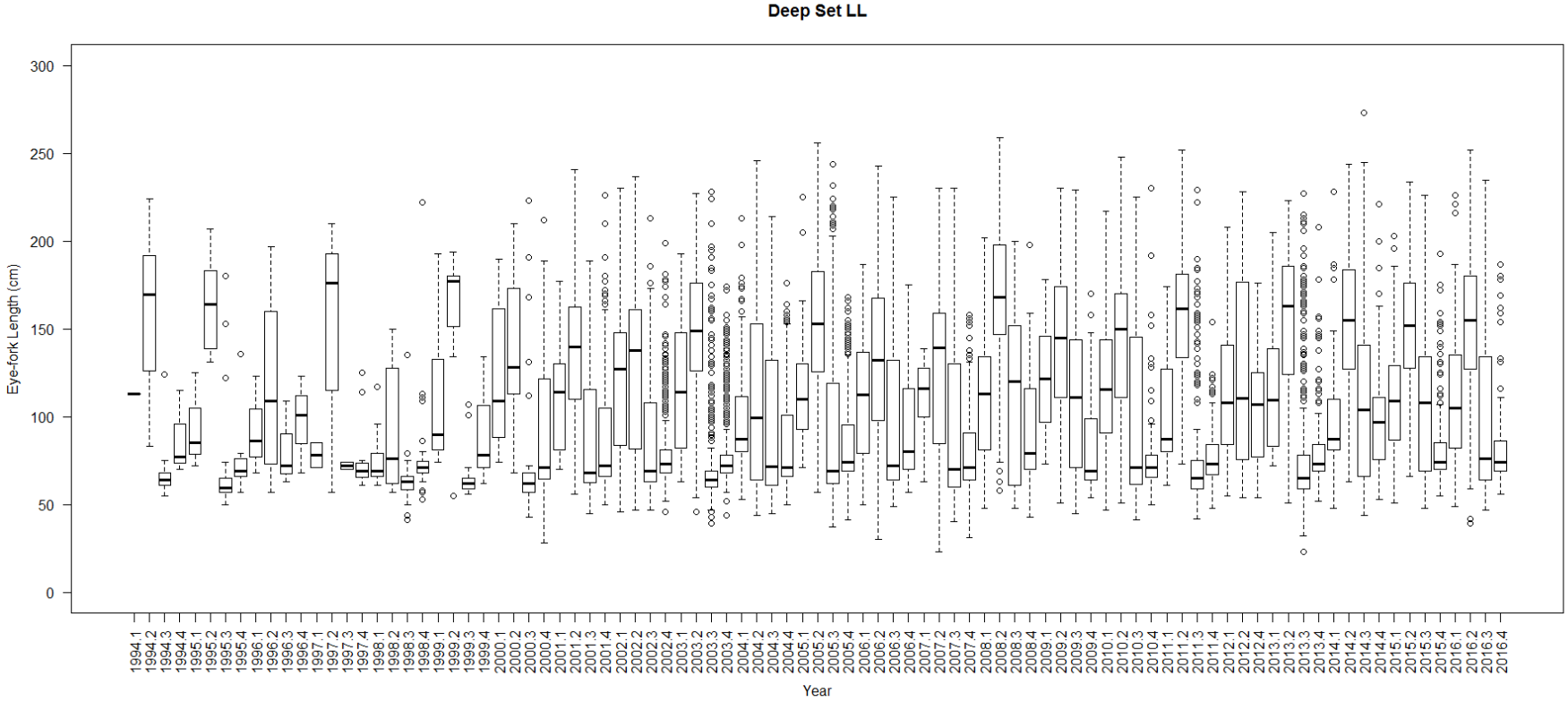

Figure 6. Box plot of swordfish lengths by quarter in 1994–2016 for the deep-set sector showing the median (solid black line) and quartiles (closed box). The whiskers show 1.5 times the interquartile range from the box and points indicate data outside of that range.

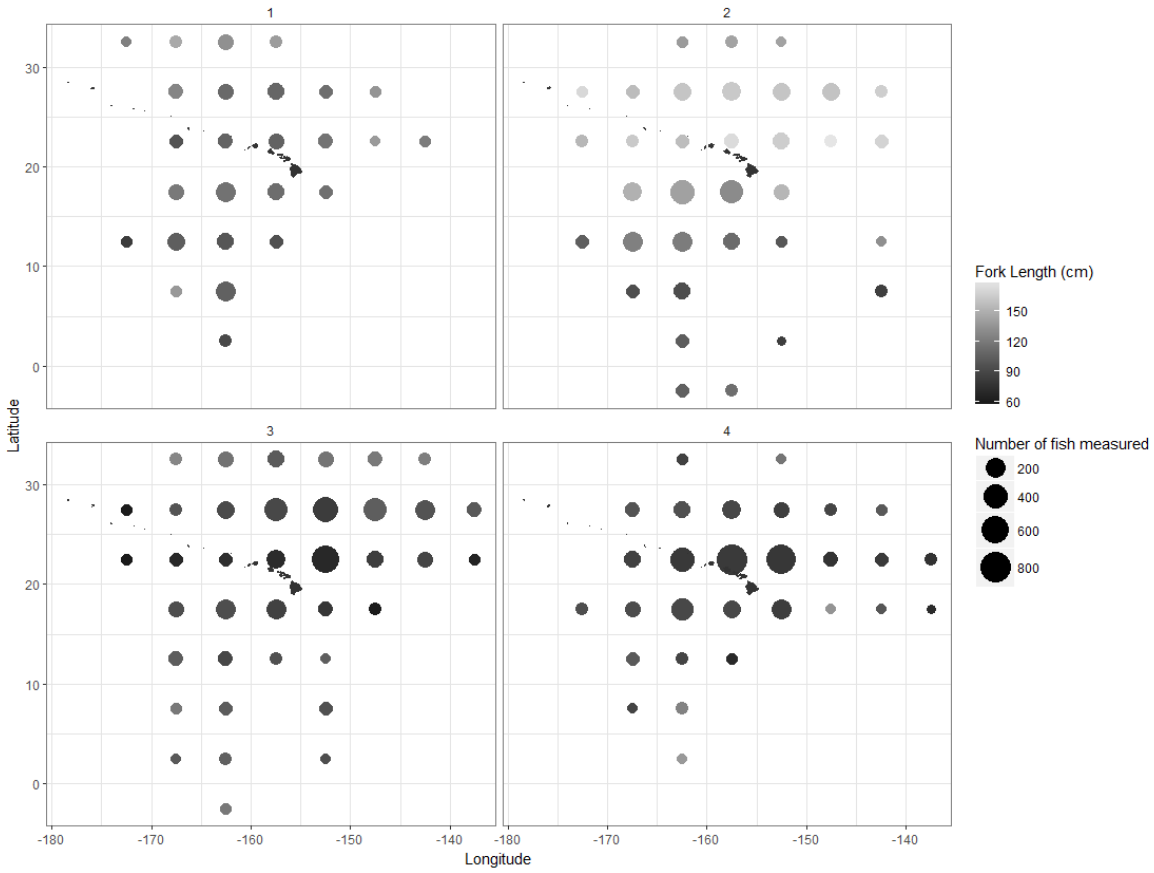

Figure 7. Spatial distribution of swordfish mean length by quarter in 5° × 5° squares for the deep-set sector plotted over the Hawaiian Archipelago. Color of circle indicates mean length, size of circle indicates number of fish measured. Data for squares with fewer than three vessels were not plotted to preserve confidentiality.

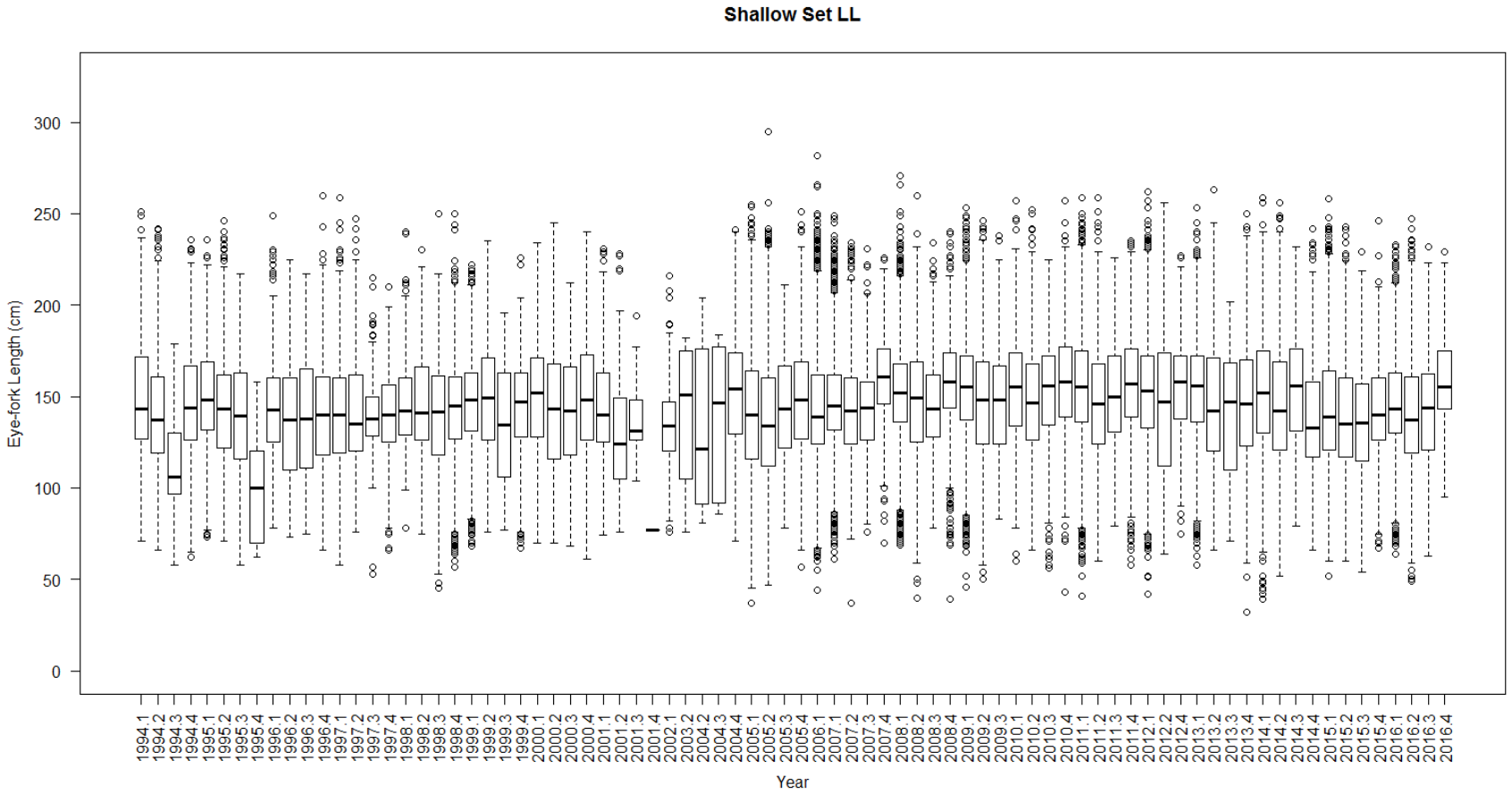

Figure 8. Box plot of swordfish lengths by quarter in 1994–2016 for the shallow-set sector showing the median (solid black line) and quartiles (closed box). The whiskers show 1.5 times the interquartile range from the box and points indicate data outside of that range.

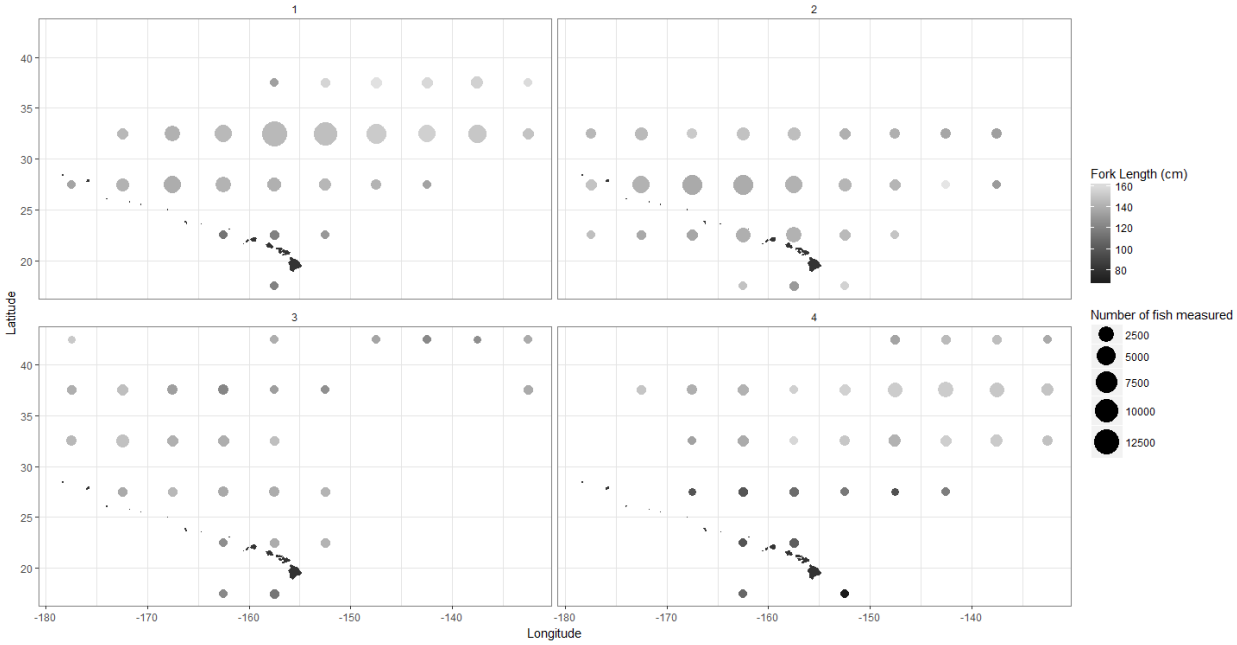

Figure 9. Spatial distribution of swordfish mean length by quarter in 5° × 5° squares for the shallow-set sector plotted over the Hawaiian Archipelago. Color of circle indicates mean length, size of circle indicates number of fish measured. Data for squares with fewer than three vessels were not plotted to preserve confidentiality.

Appendixes

Table A 1. Number of fish caught in 5 cm length bins by year and quarter for the shallow-set sector of the Hawaii-based longline fishery from the Pacific Islands Regional Observer Program data set.

Year	Quarter	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1994	1	0	0	0	0	0	0	0	0	2	6	0	1	2	3	9	13	20	37	44	55	47	46	26	27	31	29
1994	2	0	0	0	0	0	0	0	3	2	7	12	12	17	16	14	22	33	40	53	44	39	57	29	41	37	24
1994	3	0	0	0	0	0	2	5	5	3	0	0	5	9	11	15	12	4	4	7	9	7	1	5	1	4	1
1994	4	0	0	0	0	0	0	3	5	10	2	0	7	7	14	15	14	19	17	21	43	37	34	39	39	29	28
1995	1	0	0	0	0	0	0	0	0	3	3	0	0	2	4	17	25	16	20	45	41	58	56	60	57	51	44
1995	2	0	0	0	0	0	0	0	0	3	12	18	11	8	8	20	33	51	47	36	40	67	63	63	74	59	45
1995	3	0	0	0	0	0	2	0	2	2	1	4	2	6	2	8	7	14	16	6	15	10	16	14	9	5	16
1995	4	0	0	0	0	0	0	4	5	1	0	0	1	3	1	4	1	1	1	1	1	0	1	2	1	0	1
1996	1	0	0	0	0	0	0	0	0	0	5	5	2	3	3	13	11	18	25	44	44	35	32	36	24	38	43
1996	2	0	0	0	0	0	0	0	0	1	3	14	22	47	54	38	30	27	31	41	42	49	45	39	48	40	46
1996	3	0	0	0	0	0	0	0	0	1	4	4	11	16	10	23	17	20	16	15	13	18	13	18	21	20	13
1996	4	0	0	0	0	0	0	0	1	3	2	1	4	6	25	44	55	50	56	41	47	38	52	36	49	61	59
1997	1	0	0	0	0	0	1	0	1	3	3	0	3	4	13	45	71	89	85	86	64	56	68	78	69	76	64
1997	2	0	0	0	0	0	0	0	0	0	4	0	3	8	5	19	46	62	77	92	55	44	40	38	43	34	37
1997	3	0	0	0	0	1	1	0	0	0	0	0	0	0	1	2	2	12	13	21	39	42	29	32	30	20	18
1997	4	0	0	0	0	0	0	0	2	1	3	0	0	0	1	1	0	1	4	4	8	5	4	4	5	6	2
1998	1	0	0	0	0	0	0	0	0	0	3	0	0	0	1	6	10	11	33	44	66	65	53	56	35	47	30
1998	3	0	0	1	1	4	12	19	5	1	2	4	7	16	12	6	6	12	20	16	29	26	32	33	32	27	19
1998	4	0	0	0	0	0	2	2	13	17	11	3	2	6	10	30	42	39	49	55	48	63	101	95	106	95	63
1999	1	0	0	0	0	0	0	0	5	9	27	21	2	10	5	9	16	19	26	20	38	42	58	71	86	90	48
1999	2	0	0	0	0	0	0	0	0	0	3	15	19	7	9	14	17	23	22	24	22	23	34	48	37	33	33
1999	4	0	0	0	0	0	0	0	2	5	3	2	3	1	6	5	9	5	17	18	21	21	27	24	23	29	33
2000	1	0	0	0	0	0	0	0	2	8	10	3	10	7	14	38	37	37	60	58	66	63	57	71	60	72	95
2000	2	0	0	0	0	0	0	0	2	7	13	17	12	17	36	57	72	86	76	63	78	46	43	42	63	59	78
2000	3	0	0	0	0	0	0	0	1	0	0	0	4	0	6	6	12	18	18	16	13	11	7	12	8	6	14
2000	4	0	0	0	0	0	0	4	7	15	18	4	4	6	12	14	23	34	68	62	67	58	66	54	74	58	57
2005	1	0	1	1	1	0	0	1	8	37	64	51	46	117	236	356	436	459	474	405	395	360	390	391	380	367	433
2005	2	0	0	0	2	3	6	15	15	84	190	240	163	154	327	501	646	571	606	522	603	537	488	468	457	453	492
2005	3	0	0	0	0	0	0	0	0	0	1	2	5	8	12	19	17	17	18	32	37	26	24	18	31	23	24
2005	4	0	0	0	0	0	1	0	3	6	4	5	5	12	16	27	41	45	89	97	99	104	74	93	94	86	105
2006	1	0	0	1	0	1	2	6	20	54	95	70	75	90	121	153	251	420	788	933	1012	920	851	650	599	558	524
2006	2	0	0	0	0	0	0	0	0	0	0	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	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	0	0	0	0	0	0	0	0	0	0
2007	1	0	0	0	0	0	0	2	2	6	21	17	24	44	57	66	90	108	141	184	251	357	481	408	393	319	272
2007	2	0	1	0	0	0	0	0	0	6	26	25	33	24	55	58	67	57	70	83	121	144	156	149	133	142	122
2007	3	0	0	0	0	0	0	0	0	0	2	2	2	3	3	10	5	7	9	12	18	14	16	19	21	22	17
2007	4	0	0	0	0	0	0	0	1	0	0	2	0	2	1	3	2	5	0	4	10	8	12	31	27	31	24
2008	1	0	0	0	0	0	0	0	4	22	23	25	17	20	31	42	44	59	93	131	149	192	249	270	274	300	281
2008	2	0	1	0	3	0	2	3	3	14	35	41	34	35	30	27	40	31	46	73	76	84	83	104	88	115	109
2008	3	0	0	0	0	0	0	0	0	0	2	4	8	4	5	7	6	5	17	7	20	22	33	23	21	14	20
2008	4	0	1	0	0	0	0	0	3	4	2	4	6	3	6	15	13	15	19	19	38	42	66	97	90	122	121

Year	Quarter	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
2009	1	0	0	0	1	1	0	1	3	6	16	14	16	26	32	48	58	52	57	83	99	118	144	176	228	196	221
2009	2	0	0	0	1	1	1	0	1	5	16	30	30	53	70	79	111	117	99	100	118	143	160	159	172	168	176
2009	3	0	0	0	0	0	0	0	0	0	0	2	0	6	7	9	10	12	13	13	10	11	16	17	22	16	18
2009	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	1	0	0	0	0	0	1	2	0	0	6	5	10	22	20	46	58	76	96	115	149	133	167	156	192	172	189
2010	2	0	0	0	0	0	0	0	2	3	2	7	19	12	15	37	72	65	79	79	95	85	107	105	102	98	107
2010	3	0	0	0	0	0	2	3	0	3	1	4	2	3	4	1	2	8	5	11	14	13	20	20	15	14	23
2010	4	0	0	1	0	0	0	0	0	3	6	1	2	0	0	1	4	3	8	12	20	15	35	20	20	28	29
2011	1	0	0	1	0	4	3	5	5	21	26	17	25	17	16	18	33	40	69	103	164	173	225	221	197	179	223
2011	2	0	0	0	0	0	1	0	1	12	24	61	52	26	15	18	37	30	51	48	75	73	104	87	100	80	73
2011	3	0	0	0	0	0	0	0	0	0	4	9	8	7	1	1	2	3	2	2	2	9	11	8	14	10	7
2011	4	0	0	0	0	0	1	1	3	4	9	3	0	2	3	5	7	8	13	16	27	27	46	43	53	51	50
2012	1	0	0	1	0	2	0	1	10	14	34	26	24	22	38	60	70	58	59	75	100	130	169	166	165	180	190
2012	2	0	0	0	0	0	0	1	3	8	17	15	18	18	22	29	35	30	37	14	19	21	21	36	39	33	37
2012	3	0	0	0	0	0	0	0	0	0	0	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	1	0	1	3	2	8	5	4	8	14	16	16	9	11	14	23	29	34
2013	1	0	0	0	0	0	1	1	2	7	13	8	5	14	29	39	44	45	47	48	71	56	85	71	121	132	148
2013	2	0	0	0	0	0	0	0	4	2	11	15	16	11	20	22	42	33	44	46	44	45	54	52	35	21	42
2013	4	1	0	0	0	1	1	3	12	26	25	11	6	8	11	13	23	34	31	52	51	53	49	44	56	48	42
2014	1	0	1	6	2	1	3	5	9	55	58	30	14	16	26	18	33	50	91	103	156	143	141	149	156	127	143
2014	2	0	0	0	0	1	1	2	2	9	25	41	26	35	31	40	38	59	68	112	91	90	84	69	82	64	74
2014	3	0	0	0	0	0	0	0	0	0	1	8	5	6	4	2	6	6	3	10	13	15	9	11	15	16	13
2014	4	0	0	0	0	0	0	0	4	5	6	5	10	9	10	19	46	56	71	60	47	62	45	30	31	30	36
2015	1	0	0	0	0	1	1	1	2	7	25	19	13	26	59	82	128	172	253	228	239	216	208	167	172	162	158
2015	2	0	0	0	0	0	1	2	1	4	8	21	21	28	26	36	51	58	74	74	76	78	71	56	57	42	64
2015	3	0	0	0	0	1	1	2	3	0	1	1	4	1	5	6	5	7	8	3	14	9	17	7	6	4	4
2015	4	0	0	0	0	0	0	0	4	3	3	1	1	1	3	6	10	10	16	22	38	22	25	27	20	16	18
2016	1	0	0	0	0	0	0	1	2	10	12	10	7	2	12	14	34	21	49	66	110	142	135	117	106	93	53
2016	2	0	0	0	2	4	3	4	2	6	17	28	31	24	14	16	30	27	49	54	63	76	75	54	47	48	41
2016	3	0	0	0	0	0	0	3	1	4	4	8	9	13	13	8	16	12	15	19	26	26	23	22	32	31	28

Year	Quarter	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	285	295
1994	1	23	25	30	32	18	19	12	7	6	12	5	3	5	1	0	1	1	1	1	0	0	0	0	0	0
1994	2	20	18	25	23	17	10	13	7	15	5	6	3	1	3	1	3	2	0	0	0	0	0	0	0	0
1994	3	1	2	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	4	30	17	21	18	21	18	13	9	8	7	3	0	2	4	1	1	0	0	0	0	0	0	0	0	0
1995	1	48	39	34	30	35	20	20	12	7	7	8	9	3	2	0	1	0	0	0	0	0	0	0	0	0
1995	2	39	42	29	20	26	14	13	12	9	6	7	3	3	4	2	3	0	1	0	0	0	0	0	0	0
1995	3	12	13	7	3	10	6	0	6	2	1	0	1	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	0	0	0	0	0	0	0	0	0
1996	1	30	20	19	16	6	6	10	3	3	0	2	3	2	4	0	0	0	1	0	0	0	0	0	0	0
1996	2	36	28	23	18	19	13	24	10	8	10	5	2	4	0	0	0	0	0	0	0	0	0	0	0	0
1996	3	12	16	13	19	10	6	6	5	4	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	4	30	39	30	30	21	21	13	8	2	5	4	0	3	2	0	0	1	0	0	1	0	0	0	0	0
1997	1	48	43	32	37	29	20	22	14	8	7	1	4	3	3	0	0	2	0	0	1	0	0	0	0	0
1997	2	37	39	28	24	13	20	12	9	8	7	9	5	5	2	0	1	1	2	0	0	0	0	0	0	0
1997	3	12	9	2	4	2	3	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	4	3	2	1	4	0	0	1	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	1	24	22	26	17	11	11	12	9	6	2	4	0	0	0	0	2	0	0	0	0	0	0	0	0	0
1998	3	29	22	23	18	13	7	3	0	3	4	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0
1998	4	62	56	48	39	16	24	13	13	5	10	3	4	1	0	0	0	2	1	0	0	0	0	0	0	0
1999	1	54	47	25	23	27	16	13	13	4	3	5	4	1	0	0	0	0	0	0	0	0	0	0	0	0
1999	2	35	44	25	20	29	20	14	12	7	13	7	5	5	0	3	0	0	0	0	0	0	0	0	0	0
1999	4	23	17	18	17	12	5	2	5	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2000	1	91	71	70	57	53	48	22	27	14	10	8	11	6	1	2	0	0	0	0	0	0	0	0	0	0
2000	2	63	79	53	50	33	48	31	23	11	12	15	5	0	1	1	1	1	0	0	0	0	0	0	0	0
2000	3	17	16	3	12	10	7	6	3	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	4	58	51	52	43	56	43	33	35	8	10	5	6	8	4	1	1	0	0	0	0	0	0	0	0	0
2005	1	358	336	329	227	257	145	89	105	72	62	52	33	23	10	6	4	4	1	2	0	0	0	0	0	0
2005	2	450	387	334	295	286	156	105	139	81	67	38	38	34	18	13	10	2	0	0	1	0	0	0	0	1
2005	3	21	27	25	15	13	12	7	7	15	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	4	90	80	76	61	61	41	40	22	20	13	9	4	4	3	2	2	3	0	1	0	0	0	0	0	0
2006	1	482	495	398	319	294	235	130	157	136	114	66	44	38	20	20	9	4	3	0	0	1	1	0	1	0
2006	2	0	0	0	0	0	0	0	0	0	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	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	0	0	0	0	0	0	0	0	0
2007	1	207	177	157	141	137	73	57	66	42	27	19	20	16	9	4	2	1	2	0	0	0	0	0	0	0
2007	2	82	85	69	64	42	37	18	15	24	9	14	1	7	4	2	0	0	0	0	0	0	0	0	0	0
2007	3	7	9	7	5	5	5	3	2	1	2	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0
2007	4	39	21	23	19	17	11	6	15	7	5	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0
2008	1	253	245	176	144	113	97	56	48	44	32	12	15	8	4	5	3	1	1	1	0	0	1	1	0	0
2008	2	98	77	75	51	49	60	37	25	29	24	15	7	5	5	3	1	0	0	0	1	0	0	0	0	0
2008	3	18	11	14	10	7	4	2	1	1	5	1	3	1	0	2	0	0	0	0	0	0	0	0	0	0
2008	4	115	95	76	89	74	40	22	25	10	19	11	3	3	5	2	2	0	0	0	0	0	0	0	0	0
2009	1	174	170	158	153	130	67	44	45	42	31	20	19	13	6	4	3	4	2	1	0	0	0	0	0	0
2009	2	162	131	131	113	91	72	45	45	42	41	19	19	11	9	5	4	3	1	0	0	0	0	0	0	0
2009	3	15	17	10	12	8	5	7	1	3	4	1	2	2	0	1	1	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	0	0	0	0	0	0	0	0	0
2010	1	167	191	186	144	126	99	68	53	57	37	34	19	11	6	3	0	1	3	0	1	0	0	0	0	0
2010	2	81	66	77	79	48	37	20	21	16	19	14	11	10	6	1	1	2	1	1	0	0	0	0	0	0
2010	3	29	14	15	16	12	9	7	7	8	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0

Year	Quarter	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	285	295
2010	4	24	24	21	31	18	11	10	8	8	4	3	4	4	4	3	1	1	0	0	1	0	0	0	0	0
2011	1	193	207	184	187	128	87	61	61	61	45	33	31	18	16	11	4	4	2	0	1	0	0	0	0	0
2011	2	69	72	65	56	63	26	28	20	25	20	11	4	6	8	1	1	2	0	1	1	0	0	0	0	0
2011	3	7	14	8	6	8	8	6	3	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
2011	4	45	52	39	42	29	22	18	12	16	5	11	6	2	3	4	0	0	0	0	0	0	0	0	0	0
2012	1	187	155	158	107	112	59	39	45	45	45	26	20	16	16	13	5	3	1	1	1	1	0	0	0	0
2012	2	31	30	25	26	28	15	14	12	14	12	5	10	8	3	4	5	1	5	2	2	0	0	0	0	0
2012	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	4	31	32	26	15	18	12	6	9	12	2	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0
2013	1	151	130	98	83	69	54	32	19	32	26	17	9	8	12	0	4	1	0	1	0	0	0	0	0	0
2013	2	40	38	38	32	26	16	13	20	12	14	15	11	7	0	4	0	4	0	0	0	1	0	0	0	0
2013	4	42	53	37	39	21	29	18	21	20	12	8	7	3	4	3	2	2	1	0	0	0	0	0	0	0
2014	1	141	161	136	140	112	95	74	62	50	53	26	14	11	9	3	3	1	0	0	2	0	0	0	0	0
2014	2	52	84	54	48	48	42	31	30	25	27	17	15	6	6	6	4	1	4	0	1	0	0	0	0	0
2014	3	14	24	15	14	13	8	4	7	6	6	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0
2014	4	25	24	23	23	14	15	7	13	2	4	11	2	1	3	3	0	1	0	0	0	0	0	0	0	0
2015	1	148	143	134	105	96	51	51	43	44	36	24	21	13	8	6	5	4	1	0	1	0	0	0	0	0
2015	2	36	38	34	22	22	15	19	17	18	12	10	8	5	2	2	1	2	0	0	0	0	0	0	0	0
2015	3	9	3	6	2	2	2	1	3	2	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
2015	4	15	18	11	7	7	5	2	2	3	5	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0
2016	1	56	68	48	48	35	17	12	17	16	23	9	7	7	4	3	0	0	0	0	0	0	0	0	0	0
2016	2	40	34	36	28	22	17	12	13	13	7	3	6	4	5	2	1	1	1	0	0	0	0	0	0	0
2016	3	23	24	15	14	5	8	7	5	3	2	7	3	2	0	1	0	0	0	0	0	0	0	0	0	0

Table A 2. Number of fish caught in 5 cm length bins by year and quarter for the deep-set sector of the Hawaii-based longline fishery from the Pacific Islands Regional Observer Program data set.

Year	Quarter	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145
1994	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	0	0	0
1995	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0
1995	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
1995	3	0	0	0	0	0	1	3	10	7	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
1995	4	0	0	0	0	0	0	0	1	3	6	2	4	0	0	0	0	0	0	0	0	0	0	0	1	0
1996	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
1996	2	0	0	0	0	0	0	0	1	3	3	2	1	0	0	3	0	1	1	0	0	1	2	0	0	0
1997	4	0	0	0	0	0	0	0	0	5	9	4	0	0	0	0	0	0	0	1	0	1	0	0	0	0
1998	3	0	0	0	0	2	1	0	7	9	5	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0
1998	4	0	0	0	0	0	0	1	3	7	13	22	8	0	1	0	0	0	1	2	0	0	0	0	0	0
1999	1	0	0	0	0	0	0	0	0	0	0	1	1	3	1	0	0	2	0	0	0	0	0	0	0	0
1999	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
1999	4	0	0	0	0	0	0	0	0	2	3	3	2	1	1	0	1	0	3	0	0	0	1	2	0	0
2000	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0
2000	2	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	1	1	1	2	0	1	1
2000	3	0	0	0	0	1	2	5	9	11	6	1	0	0	0	0	0	0	0	1	0	0	0	2	0	0
2000	4	0	1	0	0	0	0	3	14	25	35	21	4	1	1	1	2	1	1	2	6	6	8	4	6	4
2001	1	0	0	0	0	0	0	0	0	0	1	3	7	5	0	1	0	1	5	4	3	2	6	1	2	1
2001	2	0	0	0	0	0	0	0	4	3	4	2	0	0	1	0	1	1	0	0	3	1	2	8	2	4
2001	3	0	0	0	0	1	2	6	20	21	30	9	0	2	2	0	1	0	2	2	1	1	3	5	4	3
2001	4	0	0	0	0	0	1	4	10	38	42	41	9	2	1	4	9	8	6	1	5	5	5	6	4	5
2002	1	0	0	0	0	0	2	9	24	24	3	3	9	9	10	11	4	3	10	9	9	16	17	18	17	25
2002	2	0	0	0	0	0	4	5	12	17	13	9	4	5	4	7	5	2	5	6	4	3	11	9	14	12
2002	3	0	0	0	0	0	3	10	17	45	34	20	8	2	2	1	1	7	5	2	4	4	5	5	7	5
2002	4	0	0	0	0	0	1	5	14	29	69	56	30	9	2	2	6	8	8	6	4	6	3	5	2	3
2003	1	0	0	0	0	0	0	0	0	1	2	4	9	5	3	2	3	2	2	6	6	1	0	3	5	1
2003	2	0	0	0	0	0	1	3	4	3	2	0	2	2	0	1	2	3	4	5	2	6	11	8	10	6
2003	3	0	0	0	1	1	10	51	132	200	161	55	10	3	3	2	4	7	4	3	3	2	2	2	2	3
2003	4	0	0	0	0	1	0	1	9	54	120	109	50	15	6	2	7	6	10	6	6	8	6	5	4	6
2004	1	0	0	0	0	0	0	3	5	3	5	8	30	28	33	12	5	4	5	5	5	9	1	5	3	3
2004	2	0	0	0	0	1	4	33	50	42	23	10	0	9	19	23	25	12	7	8	6	8	17	17	12	11
2004	3	0	0	0	0	1	5	17	42	47	24	11	6	0	2	5	11	1	11	4	2	5	11	8	8	5
2004	4	0	0	0	0	0	1	8	27	59	94	44	18	8	6	5	16	13	13	15	9	4	8	6	6	6
2005	1	0	0	0	0	0	0	0	0	0	0	4	5	4	3	2	3	8	6	6	4	4	5	1	4	2
2005	2	0	0	0	0	0	0	0	4	0	1	0	1	2	3	3	3	2	6	6	8	12	3	9	7	9
2005	3	0	0	0	2	3	4	22	70	85	92	51	10	5	4	3	5	8	8	10	13	8	13	13	12	7
2005	4	0	0	0	0	1	0	1	9	47	94	115	51	16	12	13	10	8	9	15	10	14	16	7	8	9
2006	1	0	0	0	0	0	1	6	6	1	0	8	4	6	5	1	3	4	3	4	4	4	6	8	3	3
2006	2	0	1	0	0	0	2	2	3	8	3	5	1	5	3	2	2	2	1	4	6	7	10	9	8	4
2006	3	0	0	0	0	0	1	0	8	21	12	5	4	1	0	0	2	2	2	2	1	2	3	4	3	1
2006	4	0	0	0	0	0	0	0	3	6	22	16	9	5	1	4	1	5	5	4	2	2	2	9	2	3
2007	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	1	1	0	2	0	2	1	1	0
2007	2	1	0	0	1	0	2	4	8	5	3	1	0	2	1	1	2	2	0	0	4	6	6	3	4	8
2007	3	0	0	0	2	1	0	11	15	13	13	3	2	3	1	1	1	3	2	0	2	6	3	2	2	3
2007	4	0	0	1	0	3	2	8	20	35	41	36	7	7	6	6	5	2	0	3	12	4	6	7	3	3

Year	Quarter	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145
2008	1	0	0	0	0	0	1	0	0	0	1	2	6	4	2	2	1	0	2	4	3	1	1	4	0	1
2008	2	0	0	0	0	0	0	0	1	1	1	1	2	2	3	0	0	3	4	3	1	1	4	10	5	7
2008	3	0	0	0	0	0	4	7	11	10	2	2	3	1	1	0	1	0	0	0	3	2	2	2	4	3
2008	4	0	0	0	0	1	0	1	0	4	10	9	4	2	1	0	4	1	2	3	3	2	1	2	0	3
2009	1	0	0	0	0	0	0	0	0	0	0	2	1	2	2	2	4	1	2	2	1	4	1	2	3	1
2009	2	0	0	0	0	0	0	1	4	3	1	3	2	2	6	3	1	2	1	3	5	3	6	6	4	3
2009	3	0	0	0	0	1	2	5	5	7	8	7	1	2	0	3	1	7	7	3	5	6	3	4	6	4
2009	4	0	0	0	0	0	0	1	4	7	5	6	0	0	0	1	1	0	1	1	1	2	0	0	0	0
2010	1	0	0	0	0	0	1	1	0	1	1	0	3	3	1	4	1	1	2	4	2	1	2	5	1	3
2010	2	0	0	0	0	0	0	4	2	1	2	1	1	3	2	2	4	0	0	3	4	3	1	5	1	3
2010	3	0	0	0	0	3	2	3	19	12	16	5	0	2	1	1	0	1	5	2	0	1	4	2	2	2
2010	4	0	0	0	0	0	2	4	5	9	17	21	5	3	0	1	2	0	1	1	0	0	4	1	0	0
2011	1	0	0	0	0	0	0	0	0	1	3	2	6	6	8	2	0	1	1	0	1	1	0	2	3	0
2011	2	0	0	0	0	0	0	0	0	0	0	1	0	1	3	1	0	0	1	0	1	2	4	3	1	2
2011	3	0	0	0	0	3	8	16	36	32	31	13	5	2	2	1	0	0	2	0	3	3	2	1	1	2
2011	4	0	0	0	0	0	1	2	6	13	26	21	12	8	3	1	3	5	5	5	1	4	0	0	0	0
2012	1	0	0	0	0	0	0	1	0	0	2	0	3	7	4	0	1	0	4	0	2	1	4	1	1	4
2012	2	0	0	0	0	0	0	3	1	3	1	1	1	1	2	1	1	3	0	0	2	0	0	0	0	1
2012	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	4	0	0	0	0	0	0	1	0	1	1	2	3	1	0	0	0	2	3	3	1	1	2	0	1	0
2013	1	0	0	0	0	0	0	0	0	0	0	2	6	5	1	1	0	4	3	1	3	1	1	0	4	2
2013	2	0	0	0	0	0	0	2	3	2	1	1	0	2	1	1	1	0	5	6	5	3	4	3	4	3
2013	3	1	0	1	6	1	9	26	49	68	47	25	8	3	3	5	2	2	1	7	2	0	5	2	3	1
2013	4	0	0	0	0	0	0	4	4	11	26	35	18	6	4	1	2	1	2	2	7	1	1	0	1	1
2014	1	0	0	0	0	0	1	0	1	1	0	3	7	12	7	3	5	1	3	1	0	3	0	1	1	3
2014	2	0	0	0	0	0	0	0	0	1	3	4	0	4	0	3	2	5	2	2	1	3	8	4	6	4
2014	3	0	0	0	0	1	7	3	7	22	17	8	5	3	2	4	3	4	6	8	9	3	5	5	4	2
2014	4	0	0	0	0	0	0	1	3	4	6	11	14	4	2	3	6	7	13	4	5	3	2	2	2	0
2015	1	0	0	0	0	0	0	4	0	0	1	3	4	5	3	4	5	1	8	2	5	2	3	3	1	2
2015	2	0	0	0	0	0	0	0	0	0	1	0	1	3	4	3	3	4	1	4	6	8	7	4	6	10
2015	3	0	0	0	0	0	1	4	7	11	19	8	3	4	1	2	2	9	4	6	7	14	5	4	3	3
2015	4	0	0	0	0	0	0	1	5	9	21	31	18	12	2	2	2	1	7	2	1	2	1	1	2	1
2016	1	0	0	0	0	0	1	0	0	1	1	12	12	16	6	6	5	7	7	5	5	5	5	6	5	1
2016	2	0	0	0	1	1	0	0	2	2	0	0	1	2	4	7	2	1	0	3	6	3	4	12	5	5
2016	3	0	0	0	0	0	1	6	12	26	15	11	3	4	3	4	2	3	2	2	6	1	4	4	5	4
2016	4	0	0	0	0	0	0	0	3	7	31	28	9	8	6	2	2	3	3	1	1	0	0	2	0	0

Year	Quarter	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	275
1994	2	0	0	0	1	0	0	1	0	1	2	0	0	0	0	0	1	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	0	0	0	0	0	0	0	0
1995	2	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
1995	3	0	1	0	0	0	0	1	0	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	0	0	0	0	0	0	0	0
1996	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	2	2	1	1	1	0	0	1	1	3	0	1	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	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	0	0	0	0	0	0	0	0
1998	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
1999	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	2	0	0	0	0	1	0	2	1	0	1	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	0	0	0	0	0	0	0	0
2000	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	2	0	1	0	0	0	2	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2000	3	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2000	4	5	0	1	1	2	1	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2001	1	1	2	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	2	5	1	3	5	4	0	2	0	3	1	0	1	0	2	0	0	0	0	0	1	0	0	0	0
2001	3	1	5	4	1	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	4	5	2	0	3	3	1	2	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0
2002	1	18	21	9	8	10	4	4	5	1	2	1	1	1	1	1	0	1	0	0	0	0	0	0	0
2002	2	15	10	16	11	8	12	5	4	4	6	5	3	2	4	0	3	0	0	1	0	0	0	0	0
2002	3	4	2	3	2	2	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2002	4	2	0	0	1	1	1	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	1	3	2	2	3	2	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	2	10	12	5	5	11	6	9	4	4	6	7	3	4	1	0	2	2	0	0	0	0	0	0	0
2003	3	2	1	4	2	2	1	0	2	0	2	1	0	1	0	0	1	1	0	0	0	0	0	0	0
2003	4	4	2	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	1	4	1	4	0	4	2	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
2004	2	8	18	15	12	15	10	11	7	8	4	7	5	3	4	2	2	2	0	1	0	1	0	0	0
2004	3	8	10	5	2	4	2	6	3	3	2	3	1	0	1	0	0	0	0	0	0	0	0	0	0
2004	4	5	6	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	1	2	1	1	2	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
2005	2	16	14	7	9	10	8	6	7	5	11	11	4	5	4	1	1	1	0	1	1	0	0	2	0
2005	3	6	6	7	6	7	10	5	8	2	3	2	2	3	3	3	1	0	1	0	1	0	0	0	0
2005	4	4	5	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	1	7	4	1	2	2	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	2	4	2	7	5	3	6	7	7	1	1	1	5	3	1	0	1	0	0	0	2	0	0	0	0
2006	3	2	2	2	2	4	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2006	4	0	1	4	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	2	5	9	4	3	1	2	3	4	3	2	3	2	0	2	0	0	1	0	0	0	0	0	0	0
2007	3	1	4	2	2	0	3	1	3	0	0	0	0	1	0	0	1	2	0	0	0	0	0	0	0
2007	4	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	1	1	3	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
2008	2	11	16	11	9	21	12	7	8	12	4	10	11	12	8	4	4	2	0	2	1	0	1	1	0

Year	Quarter	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	275
2008	3	5	5	1	2	4	2	1	4	5	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	4	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	1	1	2	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	2	6	3	5	6	6	4	5	6	4	5	1	0	1	0	2	2	2	0	0	0	0	0	0	0
2009	3	6	4	0	3	2	6	2	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
2009	4	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	1	1	3	1	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0
2010	2	3	4	10	5	6	2	4	1	2	2	3	2	1	1	0	0	1	0	0	0	1	0	0	0
2010	3	4	3	2	1	3	3	0	2	1	0	3	0	0	2	0	4	0	0	0	0	0	0	0	0
2010	4	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2011	1	1	0	0	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	2	6	4	1	5	5	3	4	1	1	1	4	3	1	1	1	1	0	1	0	0	0	1	0	0
2011	3	1	3	5	1	2	2	1	2	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
2011	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	1	1	2	0	1	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2012	2	1	1	1	2	0	0	4	1	1	1	0	1	1	0	0	0	1	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	0	0	0	0	0	0	0	0
2012	4	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	1	1	3	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2013	2	5	3	3	6	5	5	5	9	9	5	7	1	5	2	3	1	0	0	0	0	0	0	0	0
2013	3	3	3	3	6	3	3	6	2	1	2	2	0	2	4	0	0	1	0	0	0	0	0	0	0
2013	4	3	0	2	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2014	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2014	2	7	7	6	5	4	3	8	7	6	2	5	4	3	1	1	1	1	3	2	1	0	0	0	0
2014	3	6	3	4	2	6	2	1	0	2	1	1	2	3	4	1	0	0	1	0	1	0	0	0	1
2014	4	2	0	0	1	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
2015	1	0	2	1	1	1	1	2	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
2015	2	15	9	7	11	6	6	11	3	7	5	2	4	2	3	4	3	0	1	0	0	0	0	0	0
2015	3	5	4	3	0	2	3	5	1	3	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
2015	4	1	3	1	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	1	4	0	4	3	3	3	1	1	4	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
2016	2	6	6	7	10	3	5	11	3	5	1	2	6	3	1	5	3	3	3	0	0	0	1	0	0
2016	3	1	4	0	4	0	1	2	4	1	1	0	1	1	1	1	0	0	2	0	0	0	0	0	0
2016	4	0	2	2	2	1	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0