Input data available for the North Pacific swordfish stock assessment in Stock Synthesis

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Abstract

The data provided to the ISC Billfish Working Group for the 2018 swordfish stock assessment in Stock Synthesis are summarized. An analysis of the Western Central North Pacific stock area standardized CPUE was performed to investigate potential conflict and correlations using the FLCore package. When there were multiple time periods of standardized CPUE indices for a fleet, they were combined into a single time series for this analysis. The results show moderate positive correlations between most indices. The highest positive correlation was between the US longline shallow set index and Taiwanese longline (0.76). There were five negative correlations, the largest of which was between the Taiwan longline and Japan longline area 1 indices (-0.33). Overall, there were not substantial conflicts in the CPUE time series, and all indices should be considered for inclusion in the Stock Synthesis base case model.

Introduction

Time series of swordfish catch, standardized catch per unit effort (CPUE), and length frequency from the North Pacific Ocean were compiled for input into a Stock Synthesis (SS) model (version 3.30.08, Methot and Wetzel, 2013). Data were compiled by region assuming a two region model of the North Pacific Ocean with boundaries based upon those detailed in Ichinokawa and Brodziak (2008) with the modification that the Eastern Pacific Ocean (EPO) region ends at the equator (Figure 1). Countries were asked to contribute catch, CPUE, and length frequency data partitioned by these two regions so that two SS models could potentially be developed: one of just the Western Central North Pacific Ocean (WCNPO) and one of the entire North Pacific Ocean with fleets as areas. Details on the standardization of the CPUE indices, catch statistics, and length frequency data are available in working papers from the 2018 ISC BILLWG swordfish data preparatory meeting (ISC REPORT, 2018). This document will provide summaries of these data and an analysis of the CPUE indices to evaluate them for conflicts.

Catch

A total of 23 catch time series were provided for consideration in the 2018 SS assessment model; 18 in the WCNPO and 5 in the EPO (Tables Table 1 and Table 2). Annual catches were divided equally into each quarter in Table 2. Nine Japanese catch time series were provided from 1952-2016. The catch from longline fleets F1-5 were reported in numbers and reported quarterly. Fleets F6-9 reported biomass annually (Ijima, 2018). The Japanese off-shore distant water longline (OSDWLL, F1-4) fleets were also divided into four time series: early catch (1952-1993) and late catch (1994-2016), plus the WCNPO was divided into two sub-areas due to differences in targeting between the areas. The time series were divided at 1993 because of significant changes in the logbook reporting system which requires the CPUE data to be standardized in different time periods. The Japanese driftnet catch data were also divided into early and late time periods. F6, the early time series, encompasses catch from the off-shore driftnet fishery from 1960-1992. In 1993, driftnet fishing was restricted in international waters; therefore, F7 is the catch from the coastal driftnet fishery from 1993-2014. All other Japanese catch data from the WCNPO are aggregated into fleets 8 and 9 which are the early (1952-1993) and (1994-2016) late time periods. Japanese catch in the EPO was a single fleet representing the offshore-distant water longline catches from 1952-2016. Taiwanese catch data were provided from 1959-2016, and all

fleets reported annually in biomass (Chang *et al.*, 2018a). Five time series were provided. Taiwanese distant water longline catch data in both the WCNPO (1959-2016) and EPO (1967-2016) were divided in 1999 into early and late periods due to changes in targeting and fishing grounds. All other swordfish catch in the WCNPO by the Taiwanese fleets were combined into a single fleet from 1959-2016.

The US catch data were provided from 1970-2016 in biomass (Ito *et al.*, 2018). The longline fleet data were provided quarterly and the other fleets annually. The US longline catch were divided into three fleets. One fleet consisted of the deep set sector tuna-targeting catch where catch rates are much lower due to swordfish being bycatch and the length distribution of the catch being significantly different than the shallow set sector. The shallow set sector targeting swordfish was then further split into two time periods: early from 1990-2000 and late from 2004-2016. These time periods represent before and after a fishery closure during which the fishery regulations changed substantially and many vessels exited the fishery. All of the US catch was in the WCNPO. Delegates from Mexico provided a catch time series quarterly from 2011-2016 in biomass. The entire Mexico catch was also in the EPO. Other catch was included from countries which did not provide data or are not part of the ISC from the Western and Central Pacific Fisheries Commission (WCPFC) and the Inter-American Tropical Tuna Commission (IATTC) as "other" fleets. WCPFC data were all in the WCNPO, reported quarterly in biomass from 1970-2016. IATTC data were split into EPO and WCNPO and were reported quarterly in numbers from 1975-2016.

Length Composition

Ten length composition time series were provided for consideration in the 2018 SS assessment model; seven in the WCNPO region and three in the EPO region (Table 3). All length composition data were provided in 1 cm bin size and were then aggregated to 5 cm bin size as agreed in the data preparatory meeting (ISC REPORT, 2018). Japanese length composition data were provided for the swordfish-targeting offshore distant-water longline (OFDWLL) fleets in WNCPO area one from 1974-1993 and 1994-2016 and the EPO from 1970-2014 and for the offshore and coastal drift net fisheries from 1991-1992 and 1993-2016 (OSDF and CODF, Ijima, 2018). Taiwan length composition data were provided from 2000-2016 for the WCNPO and from 2004-2016 for the EPO offshore distant-water longline fleets (Chang *et al.*, 2018a). US length composition data were provided for the Hawaiian longline fleets from 1995-2016 (Sculley *et al.*, 2018a). Data were split into three fleets mirroring the catch data. Mexico provided length composition data from 2006-2016. The IATTC length composition data were provided only for the WCNPO region from 1998-1999 and 2009-2016.

Catch per Unit Effort Data

Thirteen standardized CPUE indices were provided for consideration in the SS base case assessment model; ten in the WCNPO and three in the EPO (Tables Table 4Table 6). All indices were for longline fleets and in numbers of fish except for the US gillnet fleet which was in biomass. In the WCNPO, indices are available from 1964 and in EPO from 1967. All indices were developed for the 2018 assessment except for the US gillnet index, which was calculated for the 2009 assessment and spans 1985-2006 (Courtney *et al.*, 2009). This document will provide an evaluation of available CPUE indices for the WCNPO model for conflict and

potential convergence problems. The acronyms in the fleet names are defined as follows: WCNPO is Western and Central North Pacific Ocean; EPO is Eastern Pacific Ocean; OSDWLL is offshore distant water longline; OSDWCOLL is offshore distant water and coastal longline; early is the early time period; late is the late time period, Area1 and Area2 are the Japanese fishery areas in the WCNPO as defined in Ijima and Kanaiwa (2018); OSDF is offshore driftnet gear; CODF is coastal driftnet gear; JPN_WCNPO_Other is Japanese unreported longline (mainly coastal longline), bait, and net fishing gear; DWLL is distant water longline gear; TWN_WCNPO_Other is Taiwanese offshore longline, coastal longline, gillnet, harpoon, and other gears; LL is longline gear; shallow is the Hawaii shallow set sector; deep is the Hawaii deep set sector; GN is gillnet gear; US_WCNPO_Other is harpoon and other gears; Mex_LL_EPO is Mexican longline gear in the EPO; WCPFC_LL is longline gear in the WCNPO; IATTC_LL is longline gear in the EPO north of the equator; IATTC_LL_Overlap is longline gear in the overlap area of the IATTC convention area and the WCNPO areas.

Methods

CPUE indices which were split into early and late time periods for the assessment model were combined for this analysis to allow for comparison across a single time-period. Therefore, six indices were compared for the WCNPO model. The analysis was performed using the diags component of the FLCore package (Version 2.6.6, Kell *et al.* 2007) in R (version 3.4.0, R Core Team, 2017). These packages provide a standardized method to plot and summarize CPUE data so that modelers can better evaluate their input data into assessment models. Each CPUE index was fit using a Loess smoother with only year as an explanatory variable, and the residuals from that smoother were examined graphically. The Loess smoother was fit using the gam package in R with a span on 0.5 and a 1^{st} degree local polynomial (Hastie, 2018). A pairwise correlation analysis was used to evaluate similarities and discrepancies in the trends of each pair of indices. A hierarchical clustering analysis using a set of dissimilarities was conducted to identify significant clusters of indices. Finally, a cross-correlation analysis was performed to evaluate strong year class trends which may appear in fleets if they are targeting different age-classes.

Results and Discussion

The CPUE time series are plotted in Figure 2 to compare trends by stock. Indices which were split into early and late periods were combined here to show the trend over the entire time period; however, these indices were split due to changes in the logbook reporting or changes in the fishery (regulations, etc.) which may explain some of the trends within an index. In general, the trends do not appear to be significantly in conflict. The overall trend for each index is increasing in the last 5-10 years with the exception of the Taiwanese LL CPUE, which is flat to slightly decreasing. The US indices all have a peak in the mid-2000s, followed by a slight decrease and subsequent increase in CPUE. Japan has a similar peak in the mid- 1980s followed by a dip and increase after 2004 in area 1, which is the swordfish targeted fleet. The trend in area 2 shows a general decrease in CPUE until 1995 and an increase in CPUE until present. The Taiwanese LL CPUE is relatively flat until the 2000s and peaks in around 2010.

To look at deviations from the overall trends, the residuals from the fits are compared in Figure 3. This allows for conflicts between indices to be highlighted by patterns in the residuals, autocorrelation within indices identified could be due to year-class effects, or the identification

of other potentially important factors not included in the standardization of the CPUE. Other than large residuals in the US Hawaiian LL shallow index, which were present because the data were standardized as two indices and combined for this analysis, there appears to be no significant patterns in the residuals. Evaluating the US Hawaiian LL shallow index as two indices does reduce the residuals in this figure but otherwise does not change the results of the analysis; therefore, this was left as a single index.

Figure 4 illustrates the correlation between indices; the lower left triangle displays the pairwise scatter plots of one index plotted against another with a linear smoother, the upper right triangle displays the correlation coefficients and the diagonal displays the range of observations. A single influential point may cause a strong spurious correlation. Therefore, it is important to look at the plots as well as the correlation coefficients. Most of the indices have moderate to strong positive correlations. The US Hawaiian LL shallow index has the highest correlations with Taiwan (0.762) and US gillnet (0.608). A few indices are negatively correlated, but none have very large negative correlations. The most negative correlation is -0.329 between the Japanese OSDWLL area 1 index and Taiwanese LL index.

If indices represent the same stock components, then it is reasonable to expect them to be correlated. If indices are not correlated or are negatively correlated, indicating conflicting trends, this may result in poor fits to the data and bias in the estimates. Therefore, the correlations can be used to select groups that represent a common hypothesis about the evolution of the stock (Kell *et al.*, 2007). This allows for multiple models to be proposed that may reflect different possible states of nature suggested by the CPUE indices. Figure 5 shows the results from a hierarchical cluster analysis using a set of dissimilarities. Blue indicates positive correlations and red indicates negative correlations. The width of the oval indicates the scale of the correlation. Most series appear to be similar, with the HI Shallow LL index and Taiwan DWLL index most similar. The Japan Area 1 index appears to be the least similar to the Taiwan LL index. The indices cluster into two groups, with the US Hawaiian LL deep index clustering with the Japanese OSDWLL area 1 index, and all the other indices clustering together.

Finally, the cross-correlations are plotted in Figure 6. These represent the correlations between series when they are lagged by -10 to 10 years. The diagonal from top left to bottom right shows the autocorrelations as an index is lagged against itself. For example, the HI LL Shallow index (2nd diagonal element) shows strong autocorrelation with a 1-3 year time lag which could be due to year-class effects. This could also be a reason for strong cross-correlations between series. A strong negative or positive cross-correlation could be due to series being dominated by different age-classes. For example, the strong correlations between the Japanese OSDWLL area 1 and area 2 fleets may be caused by the different targeting of the two fleets. Area 1 vessels primarily target swordfish, and area 2 vessels primarily catch swordfish as bycatch.

Overall, there does not appear to be substantial conflict between the candidate CPUE indices for the WCNPO region, and all should be considered for inclusion in the SS assessment model.

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Tables

Table 1. ISC Report (2018) Table 8.1. Fishing fleet definitions for the North Pacific swordfish stock assessment with fleet code, flag (JPN is Japan, TWN is Taiwan, US is United States, MEX is Mexico, WCPFC is Western and Central Pacific Fisheries Commission, IATTC is Inter-American Tropical Tuna Commission), fleet name, time period, quarterly data availability, catch units, standardized CPUE and size composition data availability.

Fleet Code	Flag	Fleet Name	Catch Time Period	Quarterly Data?	Catch Units	Standardized CPUE Available?	Size Composition Data Available?
F1	JPN	JPN_WCNPO_OSDWLL_early_Area1	1952-1993	Yes	Numbers	Yes, 1975-1993	Yes, 1970-1993, 1cm
F2	JPN	JPN_WCNPO_OSDWCOLL_late_Area1	1994-2016	Yes	Numbers	Yes, 1994-2016	Yes, 1994-2016, 1cm
F3	JPN	JPN_WCNPO_OSDWLL_early_Area2	1952-1993	Yes	Numbers	Yes, 1975-1993	No, Mirror F15
F4	JPN	JPN_WCNPO_OSDWLL_late_Area2	1994-2016	Yes	Numbers	Yes, 1994-2016	No, Mirror F15 or F11
F5	JPN	JPN_EPO_OSDWLL	1952-2016	Yes	Numbers	EPO, 1952-2016	Yes, Low coverage, 1cm
F6	JPN	JPN_WCNPO_OSDF	1960-1992	No	Weight	No	Yes, 1991-1992, 1cm
F7	JPN	JPN_WCNPO_CODF	1993-2014	No	Weight	No	Yes, Low coverage, 1cm
F8	JPN	JPN_WCNPO_Other_early	1952-1993	No	Weight	No	No, Mirror F1
F9	JPN	JPN_WCNPO_Other_late	1994-2014	No	Weight	No	No, Mirror F2
F10	TWN	TWN_WCNPO_DWLL_early	1959-1999	No	Weight	Yes, 1975-1999	No, Mirror F11 or F1
F11	TWN	TWN_WCNPO_DWLL_late	2000-2016	No	Weight	Yes, 2000-2016	Yes, 2004-2016, 1cm
F12	TWN	TWN_WCNPO_Other	1959-2016	No	Weight	No	No, Mirror F11 or F2
F13	TWN	TWN_EPO_OSDWLL_early	1967-1999	No	Weight	EPO, 1967-1999	No, Mirror F14
F14	TWN	TWN_EPO_OSDWLL_late	2000-2016	No	Weight	EPO, 2000-2016	Yes, 2004-2016, 1cm
F15	US	US_WCNPO_LL_deep	1995-2016	Yes	Weight	Yes, 1995-2016	Yes, 1995-2016, 1cm
F16	US	US_WCNPO_LL_shallow_early	1990-2000	Yes	Weight	Yes, 1995-2000	Yes, 1995-2000, 1cm
F17	US	US_WCNPO_LL_shallow_late	2005-2016	Yes	Weight	Yes, 2005-2016	Yes, 2005-2016, 1cm
F18	US	US_WCNPO_GN	1980-2016	No	Weight	Yes, 1985-2006	No, Mirror F15 or F16
F19	US	US_WCNPO_Other	1970-2016	No	Weight	No	No, Mirror F15 or F16
F20	MEX	MEX_LL_EPO	2011-2016	Yes	Weight	No	Yes, 2006-2016, 1 cm
F21	WCPFC	WCPFC_LL	1970-2016	Yes	Weight	No	No, Mirror F11 or F15
F22	IATTC	IATTC_LL	1975-2016	Yes	Weight	No	Yes, Low coverage, 1 cm

Fleet Code	Flag	Fleet Name	Catch Time Period	Quarterly Data?	Catch Units	Standardized CPUE Available?	Size Composition Data Available?
F23	IATTC	IATTC_LL_Overlap	1975-2016	Yes	Weight	No	No, Mirror F14 or F5

Table 2.Time series of catch by fleet submitted for the 2018 North Pacific swordfish stock assessment Fleets 1-5 and 22-23 are in numbers of fish, fleets 6-21 are in metric tons.

		Fleet																						
Year	**Quarter**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
1952	1	90494	-	333	-	0	-	-	700.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1952	2	20310	-	544	-	10	-	-	700.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1952	3	15498	-	143	-	0	-	-	700.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1952	4	48794	-	445	-	15	-	-	700.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1953	1	83749	-	2589	-	0	-	-	403.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1953	2	37093	-	333	-	6	-	-	403.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1953	3	10707	-	307	-	12	-	-	403.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1953	4	79050	-	587	-	32	-	-	403.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1954	1	118319	-	874	-	0	-	-	261.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1954	2	66616	-	261	-	18	-	-	261.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1954	3	15233	-	59	-	16	-	-	261.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1954	4	51442	-	926	-	317	-	-	261.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1955	1	103859	-	3130	-	23	-	-	261.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1955	2	68962	-	632	-	1	-	-	261.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1955	3	2982	-	185	-	20	-	-	261.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1955	4	81541	-	1468	-	180	-	-	261.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1956	1	145031	-	2392	-	0	-	-	222.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1956	2	57667	-	1853	-	4	-	-	222.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1956	3	1411	-	169	-	56	-	-	222.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1956	4	83341	-	652	-	46	-	-	222.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1957	1	145143	-	2567	-	6	-	-	245.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1957	2	54342	-	1015	-	166	-	-	245.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1957	3	1702	-	532	-	746	-	-	245.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1957	4	77685	-	1844	-	230	-	-	245.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1958	1	179317	-	2631	-	30	-	-	302.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1958	2	64187	-	2110	-	32	-	-	302.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1958	3	8468	-	1023	-	183	-	-	302.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1958	4	111146	-	1028	-	60	-	-	302.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1959	1	136471	-	2254	-	74	-	-	257.8	-	106.75	-	22.75	-	-	-	-	-	-	-	-	-	-	-
1959	2	47736	-	3964	-	314	-	-	257.8	-	106.75	-	22.75	-	-	-	-	-	-	-	-	-	-	-
1959	3	50421	-	446	-	297	-	-	257.8	-	106.75	-	22.75	-	-	-	-	-	-	-	-	-	-	-
1959	4	98626	-	1779	-	329	-	-	257.8	-	106.75	-	22.75	-	-	-	-	-	-	-	-	-	-	-
1960	1	182427	-	5635	-	10	0.35	-	335.0	-	130	-	31.75	-	-	-	-	-	-	-	-	-	-	-
1960	2	49834	-	5331	-	324	0.35	-	335.0	-	130	-	31.75	-	-	-	-	-	-	-	-	-	-	-
1960	3	28858	-	456	-	705	0.35	-	335.0	-	130	-	31.75	-	-	-	-	-	-	-	-	-	-	-
1960	4	122952	-	1160	-	314	0.35	-	335.0	-	-	-	31.75	-	-	-	-	-	-	-	-	-	-	-
1961	1	151311	-	7477	-	244	0.42	-	357.7	-	79.5	-	18.25	-	-	-	-	-	-	-	-	-	-	-

		Fleet																						
Year	**Quarter**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
1961	2	45065	-	10257	-	2039	0.42	-	357.7	-	79.5	-	18.25	-	-	-	-	-	-	-	-	-	-	-
1961	3	35099	-	3113	-	2593	0.42	-	357.7	-	79.5	-	18.25	-	-	-	-	-	-	-	-	-	-	-
1961	4	125754	-	3717	-	953	0.42	-	357.7	-	130	-	18.25	-	-	-	-	-	-	-	-	-	-	-
1962	1	57544	-	21566	-	602	0	-	377.1	-	123.5	-	15.5	-	-	-	-	-	-	-	-	-	-	-
1962	2	12678	-	15863	-	6215	0	-	377.1	-	123.5	-	15.5	-	-	-	-	-	-	-	-	-	-	-
1962	3	8474	-	1152	-	2887	0	-	377.1	-	123.5	-	15.5	-	-	-	-	-	-	-	-	-	-	-
1962	4	61014	-	14956	-	1486	0	-	377.1	-	79.5	-	15.5	-	-	-	-	-	-	-	-	-	-	-
1963	1	27431	-	36430	-	1634	0	-	230.4	-	85.75	-	4.5	-	-	-	-	-	-	-	-	-	-	-
1963	2	8686	-	5104	-	4124	0	-	230.4	-	85.75	-	4.5	-	-	-	-	-	-	-	-	-	-	-
1963	3	8460	-	2043	-	3896	0	-	230.4	-	85.75	-	4.5	-	-	-	-	-	-	-	-	-	-	-
1963	4	66700	-	29414	-	2198	0	-	230.4	-	123.5	-	4.5	-	-	-	-	-	-	-	-	-	-	-
1964	1	38594	-	6240	-	2876	1	-	294.75	-	89.5	-	2.5	-	-	-	-	-	-	-	-	-	-	-
1964	2	13141	-	2162	-	5262	1	-	294.75	-	89.5	-	2.5	-	-	-	-	-	-	-	-	-	-	-
1964	3	9056	-	917	-	4781	1	-	294.75	-	89.5	-	2.5	-	-	-	-	-	-	-	-	-	-	-
1964	4	36933	-	2469	-	20254	1	-	294.75	-	85.75	-	2.5	-	-	-	-	-	-	-	-	-	-	-
1965	1	45909	-	4563	-	2196	0	-	562.25	-	82.75	-	6.75	-	-	-	-	-	-	-	-	-	-	-
1965	2	12798	-	3896	-	2708	0	-	562.25	-	82.75	-	6.75	-	-	-	-	-	-	-	-	-	-	-
1965	3	15858	-	1635	-	3378	0	-	562.25	-	82.75	-	6.75	-	-	-	-	-	-	-	-	-	-	-
1965	4	60335	-	1438	-	11845	0	-	562.25	-	89.5	-	6.75	-	-	-	-	-	-	-	-	-	-	-
1966	1	59819	-	3091	-	3289	0	-	474.25	-	122.25	-	7.75	-	-	-	-	-	-	-	-	-	-	-
1966	2	16929	-	2714	-	3875	0	-	474.25	-	122.25	-	7.75	-	-	-	-	-	-	-	-	-	-	-
1966	3	21020	-	535	-	2539	0	-	474.25	-	122.25	-	7.75	-	-	-	-	-	-	-	-	-	-	-
1966	4	66868	-	1519	-	7257	0	-	474.25	-	205	-	7.75	-	-	-	-	-	-	-	-	-	-	-
1967	1	87043	-	3874	-	1165	0	-	281.25	-	161.5	-	8.75	5.25	-	-	-	-	-	-	-	-	-	-
1967	2	16528	-	4799	-	2673	0	-	281.25	-	161.5	-	8.75	5.25	-	-	-	-	-	-	-	-	-	-
1967	3	11717	-	1303	-	4369	0	-	281.25	-	161.5	-	8.75	5.25	-	-	-	-	-	-	-	-	-	-
1967	4	64978	-	1289	-	8695	0	-	281.25	-	161.5	-	8.75	5.25	-	-	-	-	-	-	-	-	-	-
1968	1	56379	-	7275	-	2943	0	-	459.75	-	190.75	-	3	3.75	-	-	-	-	-	-	-	-	-	-
1968	2	10519	-	3077	-	4651	0	-	459.75	-	190.75	-	3	3.75	-	-	-	-	-	-	-	-	-	-
1968	3	22762	-	708	-	8332	0	-	459.75	-	190.75	-	3	3.75	-	-	-	-	-	-	-	-	-	-
1968	4	53632	-	2414	-	12354	0	-	459.75	-	190.75	-	3	3.75	-	-	-	-	-	-	-	-	-	-
1969	1	67510	-	4579	-	2877	0	-	480	-	210.75	-	1.75	1.5	-	-	-	-	-	-	-	-	-	-
1969	2	9549	-	1597	-	10166	0	-	480	-	210.75	-	1.75	1.5	-	-	-	-	-	-	-	-	-	-
1969	3	16523	-	967	-	9685	0	-	480	-	210.75	-	1.75	1.5	-	-	-	-	-	-	-	-	-	-
1969	4	41571	-	3531	-	8774	0	-	480	-	210.75	-	1.75	1.5	-	-	-	-	-	-	-	-	-	-
1970	1	40007	-	5603	-	7217	0	-	555.75	-	226	-	1.25	6	-	-	-	-	-	155.5	-	7.5	-	-
1970	2	7927	-	3960	-	9540	0	-	555.75	-	226	-	1.25	6	-	-	-	-	-	155.5	-	7.5	-	-
1970	3	12427	-	1516	-	10853	0	-	555.75	-	226	-	1.25	6	-	-	-	-	-	155.5	-	7.5	-	-
1970	4	28713	-	3041	-	6381	0	-	555.75	-	226	-	1.25	6	-	-	-	-	-	155.5	-	7.5	-	-
1971	1	38940	-	6723	-	4908	0.25	-	227	-	248	-	0.75	3.5	-	-	-	-	-	25.5	-	8.25	-	-
1971	2	7281	-	2581	-	7873	0.25	-	227	-	248	-	0.75	3.5	-	-	-	-	-	25.5	-	8.25	-	-

		Fleet																						
Year	**Quarter**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
1971	3	10421	-	2486	-	7742	0.25	-	227	-	248	-	0.75	3.5	-	-	-	-	-	25.5	-	8.25	-	-
1971	4	32500	-	3346	-	6462	0.25	-	227	-	248	-	0.75	3.5	-	-	-	-	-	25.5	-	8.25	-	-
1972	1	36894	-	9744	-	9404	13.75	-	209	-	215.5	-	2.75	5.5	-	-	-	-	-	43.75	-	8.5	-	-
1972	2	7666	-	4382	-	10808	13.75	-	209	-	215.5	-	2.75	5.5	-	-	-	-	-	43.75	-	8.5	-	-
1972	3	5541	-	1291	-	4799	13.75	-	209	-	215.5	-	2.75	5.5	-	-	-	-	-	43.75	-	8.5	-	-
1972	4	22771	-	4401	-	6968	13.75	-	209	-	215.5	-	2.75	5.5	-	-	-	-	-	43.75	-	8.5	-	-
1973	1	34532	-	10764	-	9606	180	-	146.75	-	215	-	29.75	4.75	-	-	-	-	-	100.75	-	10.25	-	-
1973	2	8965	-	3821	-	12292	180	-	146.75	-	215	-	29.75	4.75	-	-	-	-	-	100.75	-	10.25	-	-
1973	3	4900	-	3180	-	9036	180	-	146.75	-	215	-	29.75	4.75	-	-	-	-	-	100.75	-	10.25	-	-
1973	4	22081	-	4135	-	7496	180	-	146.75	-	215	-	29.75	4.75	-	-	-	-	-	100.75	-	10.25	-	-
1974	1	20358	-	9775	-	3571	326	-	222.25	-	220	-	34	5.5	-	-	-	-	-	107	-	12	-	-
1974	2	8753	-	5058	-	5476	326	-	222.25	-	220	-	34	5.5	-	-	-	-	-	107	-	12	-	-
1974	3	9884	-	2793	-	4442	326	-	222.25	-	220	-	34	5.5	-	-	-	-	-	107	-	12	-	-
1974	4	34990	-	3178	-	7908	326	-	222.25	-	220	-	34	5.5	-	-	-	-	-	107	-	12	-	-
1975	1	30770	-	7324	-	1548	668	-	225.75	-	227.5	-	38.25	2	-	-	-	-	-	142.5	-	14.25	4	0
1975	2	17705	-	2854	-	5342	668	-	225.75	-	227.5	-	38.25	2	-	-	-	-	-	142.5	-	14.25	0	0
1975	3	12619	-	1221	-	5793	668	-	225.75	-	227.5	-	38.25	2	-	-	-	-	-	142.5	-	14.25	14	0
1975	4	41163	-	1918	-	6911	668	-	225.75	-	227.5	-	38.25	2	-	-	-	-	-	142.5	-	14.25	39	5
1976	1	38251	-	10662	-	7853	872	-	314.75	-	155.75	-	48.5	7.75	-	-	-	-	-	13.75	-	38.25	24	0
1976	2	18186	-	5049	-	6637	872	-	314.75	-	155.75	-	48.5	7.75	-	-	-	-	-	13.75	-	38.25	75	0
1976	3	13094	-	2003	-	8508	872	-	314.75	-	155.75	-	48.5	7.75	-	-	-	-	-	13.75	-	38.25	48	5
1976	4	33783	-	4718	-	5659	872	-	314.75	-	155.75	-	48.5	7.75	-	-	-	-	-	13.75	-	38.25	13	0
1977	1	49038	-	6841	-	4914	586	-	290.25	-	136.25	-	35.25	6.75	-	-	-	-	-	84.25	-	27.25	28	11
1977	2	22981	-	3941	-	12620	586	-	290.25	-	136.25	-	35.25	6.75	-	-	-	-	-	84.25	-	27.25	76	7
1977	3	10027	-	1542	-	6373	586	-	290.25	-	136.25	-	35.25	6.75	-	-	-	-	-	84.25	-	27.25	90	0
1977	4	34195	-	3568	-	4588	586	-	290.25	-	136.25	-	35.25	6.75	-	-	-	-	-	84.25	-	27.25	9	0
1978	1	43277	-	12209	-	3167	618.75	-	323.5	-	136.5	-	3	1.5	-	-	-	-	-	428	-	19.75	28	0
1978	2	24013	-	4892	-	6383	618.75	-	323.5	-	136.5	-	3	1.5	-	-	-	-	-	428	-	19.75	19	0
1978	3	10488	-	1741	-	3928	618.75	-	323.5	-	136.5	-	3	1.5	-	-	-	-	-	428	-	19.75	9	5
1978	4	35618	-	2947	-	1922	618.75	-	323.5	-	136.5	-	3	1.5	-	-	-	-	-	428	-	19.75	10	1
1979	1	42977	-	17880	-	1187	245.75	-	315.75	-	167	-	8.25	4	-	-	-	-	-	96.5	-	26	5	1
1979	2	23783	-	5415	-	4291	245.75	-	315.75	-	167	-	8.25	4	-	-	-	-	-	96.5	-	26	11	0
1979	3	16868	-	2254	-	5239	245.75	-	315.75	-	167	-	8.25	4	-	-	-	-	-	96.5	-	26	37	0
1979	4	35079	-	3142	-	1501	245.75	-	315.75	-	167	-	8.25	4	-	-	-	-	-	96.5	-	26	6	0
1980	1	25886	-	21356	-	1542	436.5	-	323	-	153.5	-	19	1.75	-	-	-	-	40	157	-	25	17	8
1980	2	18370	-	5314	-	4972	436.5	-	323	-	153.5	-	19	1.75	-	-	-	-	40	157	-	25	15	2
1980	3	7342	-	2042	-	2245	436.5	-	323	-	153.5	-	19	1.75	-	-	-	-	40	157	-	25	29	0
1980	4	18055	-	11514	-	2163	436.5	-	323	-	153.5	-	19	1.75	-	-	-	-	40	157	-	25	334	5
1981	1	31977	-	31033	-	724	462	-	231.6	-	164.25	-	6.25	6.25	-	-	-	-	115.25	71.75	-	29	517	113
1981	2	26258	-	6244	-	2654	462	-	231.6	-	164.25	-	6.25	6.25	-	-	-	-	115.25	71.75	-	29	72	0
1981	3	7085	-	3975	-	3139	462	-	231.6	-	164.25	-	6.25	6.25	-	-	-	-	115.25	71.75	-	29	295	0

		Fleet																					
Year	**Quarter**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
1981	4	19099	-	3143	-	3817	462	-	231.6	-	164.25	-	6.25	6.25	-	-	-	-	115.25	71.75	-	29	214	6
1982	1	24296	-	16750	-	3468	314.25	-	283.8	-	214	-	12.25	3.5	-	-	-	-	227.75	49.75	-	37	890	80
1982	2	18874	-	3863	-	4192	314.25	-	283.8	-	214	-	12.25	3.5	-	-	-	-	227.75	49.75	-	37	84	6
1982	3	5932	-	1328	-	3440	314.25	-	283.8	-	214	-	12.25	3.5	-	-	-	-	227.75	49.75	-	37	52	2
1982	4	26181	-	4326	-	6100	314.25	-	283.8	-	214	-	12.25	3.5	-	-	-	-	227.75	49.75	-	37	19	52
1983	1	45609	-	20459	-	3893	240.5	-	319.2	-	195.75	-	41.5	1.25	-	-	-	-	330.25	109	-	37.25	240	47
1983	2	28709	-	3029	-	3827	240.5	-	319.2	-	195.75	-	41.5	1.25	-	-	-	-	330.25	109	-	37.25	142	0
1983	3	8857	-	1108	-	1117	240.5	-	319.2	-	195.75	-	41.5	1.25	-	-	-	-	330.25	109	-	37.25	78	0
1983	4	25184	-	5681	-	1357	240.5	-	319.2	-	195.75	-	41.5	1.25	-	-	-	-	330.25	109	-	37.25	226	9
1984	1	29375	-	28640	-	1103	242.75	-	371.7	-	183.25	-	66	2.25	-	-	-	-	525.25	193.5	-	25.5	184	2
1984	2	20684	-	4133	-	1005	242.75	-	371.7	-	183.25	-	66	2.25	-	-	-	-	525.25	193.5	-	25.5	39	0
1984	3	14954	-	1830	-	1529	242.75	-	371.7	-	183.25	-	66	2.25	-	-	-	-	525.25	193.5	-	25.5	61	0
1984	4	28957	-	5222	-	1354	242.75	-	371.7	-	183.25	-	66	2.25	-	-	-	-	525.25	193.5	-	25.5	36	23
1985	1	40738	-	24261	-	874	256.5	-	344	-	141.5	-	64.75	2	-	-	-	-	747.5	274.25	-	31.75	0	29
1985	2	40438	-	4051	-	2151	256.5	-	344	-	141.5	-	64.75	2	-	-	-	-	747.5	274.25	-	31.75	11	0
1985	3	20984	-	1801	-	2663	256.5	-	344	-	141.5	-	64.75	2	-	-	-	-	747.5	274.25	-	31.75	4	0
1985	4	34442	-	6308	-	848	256.5	-	344	-	141.5	-	64.75	2	-	-	-	-	747.5	274.25	-	31.75	625	0
1986	1	48762	-	15217	-	2673	292.5	-	327.5	-	114	-	52.75	2.75	-	-	-	-	517.25	246.75	-	42.75	2520	22
1986	2	32783	-	3732	-	5048	292.5	-	327.5	-	114	-	52.75	2.75	-	-	-	-	517.25	246.75	-	42.75	2374	7
1986	3	15570	-	2062	-	3714	292.5	-	327.5	-	114	-	52.75	2.75	-	-	-	-	517.25	246.75	-	42.75	1350	0
1986	4	33316	-	4382	-	2450	292.5	-	327.5	-	114	-	52.75	2.75	-	-	-	-	517.25	246.75	-	42.75	2963	2
1987	1	57744	-	19627	-	4414	227.5	-	286.0	-	332.25	-	47.5	6.25	-	-	-	-	382.25	133.75	-	89.25	4402	10
1987	2	29781	-	4489	-	7034	227.5	-	286.0	-	332.25	-	47.5	6.25	-	-	-	-	382.25	133.75	-	89.25	2349	23
1987	3	13396	-	2297	-	3694	227.5	-	286.0	-	332.25	-	47.5	6.25	-	-	-	-	382.25	133.75	-	89.25	1867	0
1987	4	30346	-	10205	-	4643	227.5	-	286.0	-	332.25	-	47.5	6.25	-	-	-	-	382.25	133.75	-	89.25	3332	24
1988	1	56695	-	23635	-	1541	262	-	266.0	-	194.25	-	65.75	5.75	-	-	-	-	344	135	-	55.5	1908	8
1988	2	31357	-	3716	-	2212	262	-	266.0	-	194.25	-	65.75	5.75	-	-	-	-	344	135	-	55.5	2155	1
1988	3	10481	-	1789	-	2271	262	-	266.0	-	194.25	-	65.75	5.75	-	-	-	-	344	135	-	55.5	1588	1
1988	4	19719	-	11592	-	3690	262	-	266.0	-	194.25	-	65.75	5.75	-	-	-	-	344	135	-	55.5	2516	15
1989	1	33352	-	24261	-	2937	349.25	-	336.0	-	373.75	-	9.5	25.75	-	-	-	-	310.75	71.5	-	75.25	521	2
1989	2	23892	-	4689	-	4347	349.25	-	336.0	-	373.75	-	9.5	25.75	-	-	-	-	310.75	71.5	-	75.25	155	4
1989	3	8249	-	1278	-	7258	349.25	-	336.0	-	373.75	-	9.5	25.75	-	-	-	-	310.75	71.5	-	75.25	437	1
1989	4	18244	-	4509	-	5595	349.25	-	336.0	-	373.75	-	9.5	25.75	-	-	-	-	310.75	71.5	-	75.25	1111	15
1990	1	36962	-	20968	-	2282	256.5	-	220.75	-	328.5	-	38.5	7.25	-	-	0	-	282.75	50.25	-	52	376	7
1990	2	23450	-	3179	-	4158	256.5	-	220.75	-	328.5	-	38.5	7.25	-	-	0	-	282.75	50.25	-	52	606	7
1990	3	6777	-	1336	-	2421	256.5	-	220.75	-	328.5	-	38.5	7.25	-	-	0	-	282.75	50.25	-	52	1273	0
1990	4	12224	-	3360	-	3851	256.5	-	220.75	-	328.5	-	38.5	7.25	-	-	72.8	-	282.75	50.25	-	52	2458	2
1991	1	22310	-	11481	-	1708	106	-	264.75	-	350	-	45	11	-	-	866.2	-	236	39.25	-	39.75	949	14
1991	2	19652	-	2895	-	5013	106	-	264.75	-	350	-	45	11	-	-	1466.8	-	236	39.25	-	39.75	1437	0
1991	3	7672	-	1291	-	2519	106	-	264.75	-	350	-	45	11	-	-	460.5	-	236	39.25	-	39.75	498	0
1991	4	17279	-	3664	-	1082	106	-	264.75	-	350	-	45	11	-	-	383.1	-	236	39.25	-	39.75	287	0

		Fleet																						
Year	**Quarter**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
1992	1	27527	-	8928	-	890	210	-	407.75	-	368.75	-	60.75	4	-	-	1153.8	-	339	29.75	-	97.2	692	35
1992	2	24231	-	2846	-	3322	210	-	407.75	-	368.75	-	60.75	4	-	-	1235.9	-	339	29.75	-	97.2	813	10
1992	3	9727	-	1528	-	1025	210	-	407.75	-	368.75	-	60.75	4	-	-	608.3	-	339	29.75	-	97.2	166	3
1992	4	12483	-	2571	-	680	210	-	407.75	-	368.75	-	60.75	4	-	-	768.1	-	339	29.75	-	97.2	282	28
1993	1	29415	-	6608	-	1631	-	73	437.75	-	308	-	77.5	3.25	-	-	1335.8	-	353	51	-	144.5	1075	96
1993	2	29960	-	2538	-	3212	-	73	437.75	-	308	-	77.5	3.25	-	-	1177.4	-	353	51	-	144.5	989	141
1993	3	11229	-	1452	-	1081	-	73	437.75	-	308	-	77.5	3.25	-	-	716.7	-	353	51	-	144.5	317	12
1993	4	19258	-	2840	-	928	-	73	437.75	-	308	-	77.5	3.25	-	-	571.2	-	353	51	-	144.5	107	9
1994	1	-	34547	-	5118	937	-	105.25	-	87.25	288.75	-	54.75	4.5	-	-	861.9	-	197.75	41.25	-	262.25	2272	155
1994	2	-	26453	-	2467	1984	-	105.25	-	87.25	288.75	-	54.75	4.5	-	-	602.2	-	197.75	41.25	-	262.25	1077	3
1994	3	-	8556	-	1292	2272	-	105.25	-	87.25	288.75	-	54.75	4.5	-	-	146.7	-	197.75	41.25	-	262.25	265	14
1994	4	-	23342	-	1491	612	-	105.25	-	87.25	288.75	-	54.75	4.5	-	-	239.5	-	197.75	41.25	-	262.25	177	0
1995	1	-	27886	-	3728	844	-	140.25	-	116.25	301.5	-	56.25	0.5	-	0.0	271.9	-	192.75	32	-	256.6	254	38
1995	2	-	21059	-	2136	2261	-	140.25	-	116.25	301.5	-	56.25	0.5	-	0.7	707.1	-	192.75	32	-	256.6	560	12
1995	3	-	7541	-	1031	2490	-	140.25	-	116.25	301.5	-	56.25	0.5	-	11	206.6	-	192.75	32	-	256.6	91	8
1995	4	-	21734	-	1591	731	-	140.25	-	116.25	301.5	-	56.25	0.5	-	12.1	140.4	-	192.75	32	-	256.6	82	25
1996	1	-	30962	-	3912	1980	-	107	-	162.5	177.75	-	8	6	-	5.4	467.6	-	190.25	22.75	-	154.2	190	32
1996	2	-	23750	-	1977	5080	-	107	-	162.5	177.75	-	8	6	-	11.1	596.7	-	190.25	22.75	-	154.2	174	17
1996	3	-	7590	-	881	380	-	107	-	162.5	177.75	-	8	6	-	3.8	123.4	-	190.25	22.75	-	154.2	52	0
1996	4	-	15239	-	2594	680	-	107	-	162.5	177.75	-	8	6	-	4.1	294.6	-	190.25	22.75	-	154.2	255	2
1997	1	-	31260	-	2433	1994	-	91.25	-	103.5	344.5	-	15.25	6.5	-	2.6	654.4	-	177	21	-	98.75	316	0
1997	2	-	17006	-	1780	2650	-	91.25	-	103.5	344.5	-	15.25	6.5	-	10	782.2	-	177	21	-	98.75	388	8
1997	3	-	5509	-	792	4939	-	91.25	-	103.5	344.5	-	15.25	6.5	-	4	111.7	-	177	21	-	98.75	560	0
1997	4	-	19071	-	1331	998	-	91.25	-	103.5	344.5	-	15.25	6.5	-	3.6	66.4	-	177	21	-	98.75	1672	2
1998	1	-	28378	-	2006	2184	-	117.75	-	137.5	300	-	10.25	20	-	6.7	458.7	-	232.75	15.25	-	137.5	856	13
1998	2	-	16626	-	1851	7903	-	117.75	-	137.5	300	-	10.25	20	-	17.4	888.2	-	232.75	15.25	-	137.5	785	52
1998	3	-	4813	-	894	445	-	117.75	-	137.5	300	-	10.25	20	-	7.6	204	-	232.75	15.25	-	137.5	106	1
1998	4	-	15686	-	1453	112	-	117.75	-	137.5	300	-	10.25	20	-	9.9	138	-	232.75	15.25	-	137.5	1653	2
1999	1	-	22310	-	3388	484	-	181	-	117.5	362	-	15.25	17.25	-	10.8	687.7	-	151.5	20.75	-	207.3	821	29
1999	2	-	15843	-	1929	2257	-	181	-	117.5	362	-	15.25	17.25	-	21.2	673.9	-	151.5	20.75	-	207.3	294	1
1999	3	-	6029	-	1401	1426	-	181	-	117.5	362	-	15.25	17.25	-	11.4	155.1	-	151.5	20.75	-	207.3	213	33
1999	4	-	18573	-	2584	788	-	181	-	117.5	362	-	15.25	17.25	-	10.9	49.2	-	151.5	20.75	-	207.3	198	35
2000	1	-	27538	-	3462	1019	-	202	-	140	-	863.5	21.5	-	70.75	4.3	534.2	-	162.25	24.75	-	252.4	135	3
2000	2	-	14112	-	2620	4162	-	202	-	140	-	863.5	21.5	-	70.75	25.3	1098.2	-	162.25	24.75	-	252.4	788	1
2000	3	-	7651	-	1081	5829	-	202	-	140	-	863.5	21.5	-	70.75	11	143.3	-	162.25	24.75	-	252.4	489	120
2000	4	-	21135	-	2219	2418	-	202	-	140	-	863.5	21.5	-	70.75	9.8	18.7	-	162.25	24.75	-	252.4	230	22
2001	1	-	24407	-	2981	8028	-	183	-	71	-	983.3	22.75	-	523.75	5.9	-	20.7	93.75	14.25	-	282.25	1753	21
2001	2	-	10468	-	2522	8468	-	183	-	71	-	983.3	22.75	-	523.75	33.1	-	31.6	93.75	14.25	-	282.25	1995	167
2001	3	-	9113	-	1459	5642	-	183	-	71	-	983.3	22.75	-	523.75	20.9	-	0	93.75	14.25	-	282.25	1503	136
2001	4	-	16518	-	2185	3863	-	183	-	71	-	983.3	22.75	-	523.75	26.7	-	0	93.75	14.25	-	282.25	709	253
2002	1	-	22057	-	3406	3261	-	291	-	62.75	-	980.3	6.75	-	772	81	-	217.3	75.5	23.25	-	314	1429	81

		Fleet																					
Year	**Quarter**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
2002	2	-	9737	-	2970	5088	-	291	-	62.75	-	980.3	6.75	-	772	52.2	-	144.1	75.5	23.25	-	314	282	32
2002	3	-	9579	-	1003	4385	-	291	-	62.75	-	980.3	6.75	-	772	19.2	-	0	75.5	23.25	-	314	40	0
2002	4	-	18673	-	1564	2089	-	291	-	62.75	-	980.3	6.75	-	772	14.5	-	0	75.5	23.25	-	314	146	3
2003	1	-	18649	-	2466	1968	-	299.5	-	46.5	-	921.8	2.75	-	430	14.7	-	247.6	54	26.75	-	434.3	0	0
2003	2	-	7495	-	3700	2623	-	299.5	-	46.5	-	921.8	2.75	-	430	71.7	-	208	54	26.75	-	434.3	0	0
2003	3	-	5907	-	1161	2466	-	299.5	-	46.5	-	921.8	2.75	-	430	26.1	-	0	54	26.75	-	434.3	0	0
2003	4	-	21308	-	1498	590	-	299.5	-	46.5	-	921.8	2.75	-	430	16.9	-	49.4	54	26.75	-	434.3	0	0
2004	1	-	20930	-	5840	1876	-	265.5	-	66.75	-	953.3	4	-	357.25	23	-	643.6	45.5	26.5	-	375.25	0	0
2004	2	-	4682	-	5196	2274	-	265.5	-	66.75	-	953.3	4	-	357.25	80.2	-	59.2	45.5	26.5	-	375.25	0	0
2004	3	-	6765	-	1113	1793	-	265.5	-	66.75	-	953.3	4	-	357.25	28.0	-	0	45.5	26.5	-	375.25	0	0
2004	4	-	25366	-	916	304	-	265.5	-	66.75	-	953.3	4	-	357.25	19.9	-	15.3	45.5	26.5	-	375.25	0	0
2005	1	-	27767	-	3472	1345	-	239	-	133.25	-	947	6.5	-	202.5	17.2	-	576.1	55	19.25	-	293.75	0	0
2005	2	-	7049	-	1686	2727	-	239	-	133.25	-	947	6.5	-	202.5	99.3	-	619	55	19.25	-	293.75	0	0
2005	3	-	5149	-	1445	540	-	239	-	133.25	-	947	6.5	-	202.5	21.1	-	0	55	19.25	-	293.75	0	0
2005	4	-	24261	-	1661	309	-	239	-	133.25	-	947	6.5	-	202.5	20.7	-	0	55	19.25	-	293.75	0	0
2006	1	-	20221	-	5069	880	-	199	-	148.75	-	1020	15.25	-	284.5	21.1	-	929.1	110.75	17.75	-	266.5	525	31
2006	2	-	8960	-	2814	2541	-	199	-	148.75	-	1020	15.25	-	284.5	96.3	-	0	110.75	17.75	-	266.5	2359	18
2006	3	-	8540	-	1345	1959	-	199	-	148.75	-	1020	15.25	-	284.5	29.5	-	0	110.75	17.75	-	266.5	1291	5
2006	4	-	32613	-	845	1031	-	199	-	148.75	-	1020	15.25	-	284.5	27.8	-	0	110.75	17.75	-	266.5	47	0
2007	1	-	30939	-	2814	1247	-	207.25	-	123.5	-	991.5	6.5	-	192.5	17.4	-	758	122.5	14.75	-	253.3	113	556
2007	2	-	10286	-	2973	1633	-	207.25	-	123.5	-	991.5	6.5	-	192.5	112.2	-	269.8	122.5	14.75	-	253.3	1397	89
2007	3	-	5693	-	1007	537	-	207.25	-	123.5	-	991.5	6.5	-	192.5	36	-	10.3	122.5	14.75	-	253.3	357	7
2007	4	-	25850	-	1295	11	-	207.25	-	123.5	-	991.5	6.5	-	192.5	28.6	-	24.5	122.5	14.75	-	253.3	30	0
2008	1	-	19598	-	4304	1372	-	162	-	131.75	-	918.5	12	-	90.25	22.1	-	574.6	101.25	12.25	-	279.2	163	10
2008	2	-	6216	-	2128	3060	-	162	-	131.75	-	918.5	12	-	90.25	179.8	-	305.4	101.25	12.25	-	279.2	626	84
2008	3	-	4906	-	727	2325	-	162	-	131.75	-	918.5	12	-	90.25	16.9	-	30.2	101.25	12.25	-	279.2	318	1
2008	4	-	18967	-	556	33	-	162	-	131.75	-	918.5	12	-	90.25	18.4	-	39.3	101.25	12.25	-	279.2	0	7
2009	1	-	17277	-	999	2083	-	170.5	-	123	-	846.8	30.25	-	156.25	25.6	-	346.7	62.75	12.5	-	295.6	1242	13
2009	2	-	5335	-	1371	5599	-	170.5	-	123	-	846.8	30.25	-	156.25	101.3	-	624.5	62.75	12.5	-	295.6	4849	77
2009	3	-	6996	-	424	2287	-	170.5	-	123	-	846.8	30.25	-	156.25	35.9	-	51.8	62.75	12.5	-	295.6	3826	60
2009	4	-	20061	-	478	128	-	170.5	-	123	-	846.8	30.25	-	156.25	16.5	-	0	62.75	12.5	-	295.6	1125	18
2010	1	-	12442	-	3017	3089	-	123.5	-	87.5	-	649.3	13	-	269.25	34.8	-	397.5	15.25	9.25	-	411.6	2970	38
2010	2	-	3936	-	2196	5298	-	123.5	-	87.5	-	649.3	13	-	269.25	82.4	-	322.2	15.25	9.25	-	411.6	7946	516
2010	3	-	6817	-	660	129	-	123.5	-	87.5	-	649.3	13	-	269.25	31	-	25.6	15.25	9.25	-	411.6	3949	1088
2010	4	-	18219	-	446	277	-	123.5	-	87.5	-	649.3	13	-	269.25	10.8	-	0	15.25	9.25	-	411.6	2293	114
2011	1	-	9176	-	997	1275	-	48.25	-	61.75	-	841.5	19.5	-	266.25	21.9	-	291.3	29.5	6	1056	374.3	5818	87
2011	2	-	3360	-	1165	5853	-	48.25	-	61.75	-	841.5	19.5	-	266.25	98.1	-	283.1	29.5	6	4723	374.3	7617	65
2011	3	-	4574	-	761	885	-	48.25	-	61.75	-	841.5	19.5	-	266.25	20.8	-	0	29.5	6	13889	374.3	5206	165
2011	4	-	15902	-	428	56	-	48.25	-	61.75	-	841.5	19.5	-	266.25	11.9	-	0	29.5	6	128747	374.3	1650	0
2012	1	-	11833	-	1000	183	-	97.5	-	90	-	819.8	12	-	440	25.8	-	344.1	24.25	3.25	93204	370.3	4552	131
2012	2	-	4460	-	1215	2546	-	97.5	-	90	-	819.8	12	-	440	118.4	-	285.6	24.25	3.25	11180	370.3	4758	171

		Fleet																					
Year	**Quarter**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
2012	3	-	3955	-	436	1957	-	97.5	-	90	-	819.8	12	-	440	40.3	-	0	24.25	3.25	7005	370.3	7436	96
2012	4	-	14580	-	380	159	-	97.5	-	90	-	819.8	12	-	440	17.7	-	0	24.25	3.25	66151	370.3	3400	51
2013	1	-	12131	-	660	339	-	77.25	-	118	-	673.3	2.75	-	419.25	24.5	-	149.3	23.75	5	91753	262.4	6062	24
2013	2	-	6882	-	1155	2776	-	77.25	-	118	-	673.3	2.75	-	419.25	126.1	-	116.3	23.75	5	10666	262.4	10139	173
2013	3	-	3821	-	304	1590	-	77.25	-	118	-	673.3	2.75	-	419.25	26.4	-	0	23.75	5	206917	262.4	2267	81
2013	4	-	13649	-	454	1076	-	77.25	-	118	-	673.3	2.75	-	419.25	17.6	-	0	23.75	5	217081	262.4	1983	36
2014	1	-	11176	-	891	321	-	67.25	-	75.25	-	514.3	2	-	536.25	27	-	247	31	3.25	185993	312.4	6524	280
2014	2	-	5648	-	1019	4259	-	67.25	-	75.25	-	514.3	2	-	536.25	106.8	-	252.9	31	3.25	20729	312.4	8416	129
2014	3	-	3622	-	637	1072	-	67.25	-	75.25	-	514.3	2	-	536.25	36.6	-	42.1	31	3.25	161297	312.4	6003	53
2014	4	-	15427	-	537	15	-	67.25	-	75.25	-	514.3	2	-	536.25	26.6	-	0	31	3.25	193424	312.4	4612	48
2015	1	-	15277	-	994	265	-	69.25	-	122.25	-	709.8	2	-	455.25	41.1	-	169.7	24.25	6.5	131493	580.1	4941	287
2015	2	-	5298	-	1509	5370	-	69.25	-	122.25	-	709.8	2	-	455.25	157	-	186.6	24.25	6.5	24301	580.1	7025	197
2015	3	-	4883	-	425	1246	-	69.25	-	122.25	-	709.8	2	-	455.25	25	-	0	24.25	6.5	89377	580.1	3332	18
2015	4	-	16073	-	437	417	-	69.25	-	122.25	-	709.8	2	-	455.25	31	-	0	24.25	6.5	175266	580.1	433	5
2016	1	-	18236	-	620	913	-	75.75	-	107.5	-	466.8	1.25	-	520.25	54.7	-	48.4	44	17.75	96844	237.7	5519.8	227.8
2016	2	-	7258	-	1734	1888	-	75.75	-	107.5	-	466.8	1.25	-	520.25	174.5	-	155.2	44	17.75	15504	237.7	7584.5	125.8
2016	3	-	6868	-	201	165	-	75.75	-	107.5	-	466.8	1.25	-	520.25	27.4	-	19.9	44	17.75	57718	237.7	4759.5	39.5
2016	4	-	20272	-	163	27	-	75.75	-	107.5	-	466.8	1.25	-	520.25	28.7	-	0	44	17.75	116406	237.7	2607	89.25

Table 3. Number of swordfish lengths available in each year and quarter. Fleets are numbered as in Table 1 definitions: F1is JPN_WCNPO_OSDWLL_early_Area1; F2 is JPN_WCNPO_OSDWLL_late_Area1; F6 is JPN_WCNPO_CODF; F10 is TWN_WCNPO_DWLL_late; F12 is WCNPO_LL_ deep; F13 is US_WCNPO_LL_shallow_early; F14 is US_WCNPO_LL_shallow_late; F18 is IATTC_LL_Overlap.

		Fleet							
Year	**Quarter**	**F1**	**F2**	**F6**	**F10**	**F12**	**F13**	**F14**	**F18**
1970	3	28	-	-	-	-	-	-	-
1970	4	218	-	-	-	-	-	-	-
1971	1	262	-	-	-	-	-	-	-
1971	2	113	-	-	-	-	-	-	-
1971	3	15	-	-	-	-	-	-	-
1971	4	437	-	-	-	-	-	-	-
1972	1	36	-	-	-	-	-	-	-
1972	3	688	-	-	-	-	-	-	-
1972	4	1023	-	-	-	-	-	-	-
1973	1	99	-	-	-	-	-	-	-
1973	2	162	-	-	-	-	-	-	-
1973	3	217	-	-	-	-	-	-	-
1973	4	66	-	-	-	-	-	-	-
1974	1	363	-	-	-	-	-	-	-
1974	2	518	-	-	-	-	-	-	-
1974	3	1033	-	-	-	-	-	-	-
1974	4	876	-	-	-	-	-	-	-
1975	2	665	-	-	-	-	-	-	-
1975	3	2291	-	-	-	-	-	-	-
1975	4	2852	-	-	-	-	-	-	-
1976	1	326	-	-	-	-	-	-	-
1976	2	835	-	-	-	-	-	-	-
1976	3	1876	-	-	-	-	-	-	-
1976	4	844	-	-	-	-	-	-	-
1977	1	1191	-	-	-	-	-	-	-
1977	2	942	-	-	-	-	-	-	-
1977	3	1511	-	-	-	-	-	-	-
1977	4	1058	-	-	-	-	-	-	-
1978	1	1010	-	-	-	-	-	-	-
1978	2	587	-	-	-	-	-	-	-
1978	3	1606	-	-	-	-	-	-	-
1978	4	2300	-	-	-	-	-	-	-
1979	1	989	-	-	-	-	-	-	-
1979	2	1564	-	-	-	-	-	-	-
1979	3	2964	-	-	-	-	-	-	-
1979	4	2058	-	-	-	-	-	-	-
1980	1	360	-	-	-	-	-	-	-
1980	2	2288	-	-	-	-	-	-	-
1980	3	608	-	-	-	-	-	-	-
1980	4	1847	-	-	-	-	-	-	-

		Fleet							
Year	**Quarter**	**F1**	**F2**	**F6**	**F10**	**F12**	**F13**	**F14**	**F18**
1981	1	1818	-	-	-	-	-	-	-
1981	2	2672	-	-	-	-	-	-	-
1981	3	1635	-	-	-	-	-	-	-
1981	4	1030	-	-	-	-	-	-	-
1982	1	1767	-	-	-	-	-	-	-
1982	2	4196	-	-	-	-	-	-	-
1982	3	2601	-	-	-	-	-	-	-
1982	4	1343	-	-	-	-	-	-	-
1983	1	3171	-	-	-	-	-	-	-
1983	2	2134	-	-	-	-	-	-	-
1983	3	1967	-	-	-	-	-	-	-
1983	4	1002	-	-	-	-	-	-	-
1984	1	3304	-	-	-	-	-	-	-
1984	2	4195	-	-	-	-	-	-	-
1984	3	3889	-	-	-	-	-	-	-
1984	4	4604	-	-	-	-	-	-	-
1985	1	4651	-	-	-	-	-	-	-
1985	2	9528	-	-	-	-	-	-	-
1985	3	5820	-	-	-	-	-	-	-
1985	4	5267	-	-	-	-	-	-	-
1986	1	8049	-	-	-	-	-	-	-
1986	2	14149	-	-	-	-	-	-	-
1986	3	7937	-	-	-	-	-	-	-
1986	4	13652	-	-	-	-	-	-	-
1987	1	15316	-	-	-	-	-	-	-
1987	2	12407	-	-	-	-	-	-	-
1987	3	5906	-	-	-	-	-	-	-
1987	4	15255	-	-	-	-	-	-	-
1988	1	19853	-	-	-	-	-	-	-
1988	2	13785	-	-	-	-	-	-	-
1988	3	6637	-	-	-	-	-	-	-
1988	4	13514	-	-	-	-	-	-	-
1989	1	15627	-	-	-	-	-	-	-
1989	2	12508	-	-	-	-	-	-	-
1989	3	6292	-	-	-	-	-	-	-
1989	4	11176	-	-	-	-	-	-	-
1990	1	16751	-	-	-	-	-	-	-
1990	2	11350	-	-	-	-	-	-	-
1990	3	5356	-	-	-	-	-	-	-
1990	4	7917	-	-	-	-	-	-	-
1991	1	12578	-	-	-	-	-	-	-
1991	2	11713	-	-	-	-	-	-	-
1991	3	5337	-	-	-	-	-	-	-
1991	4	10184	-	-	-	-	-	-	-
1992	1	17228	-	-	-	-	-	-	-
1992	2	15280	-	-	-	-	-	-	-
1992	3	7858	-	-	-	-	-	-	-

		Fleet							
Year	**Quarter**	**F1**	**F2**	**F6**	**F10**	**F12**	**F13**	**F14**	**F18**
1992	4	12188	-	-	-	-	-	-	-
1993	1	18461	-	-	-	-	-	-	-
1993	2	16770	-	-	-	-	-	-	-
1993	3	8418	-	-	-	-	-	-	-
1993	4	12242	-	-	-	-	-	-	-
1994	1	-	18282	-	-	-	7491	-	-
1994	2	-	14851	-	-	-	6497	-	-
1994	3	-	4460	-	-	-	126	-	-
1994	4	-	10597	-	-	-	1193	-	-
1995	1	-	16282	-	-	-	7289	-	-
1995	2	-	11935	-	-	-	3229	-	-
1995	3	-	4830	-	-	17	1084	-	-
1995	4	-	10153	-	-	-	-	-	-
1996	1	-	15438	-	-	-	576	-	-
1996	2	-	13219	-	-	-	812	-	-
1996	3	-	4280	-	-	-	1908	-	-
1996	4	-	7631	-	-	-	1620	-	-
1997	1	-	14152	-	-	-	936	-	-
1997	2	-	9197	-	-	-	1222	-	-
1997	3	-	3341	-	-	-	1564	-	-
1997	4	-	9485	-	-	-	1462	-	-
1998	1	-	22513	-	-	-	496	-	-
1998	2	-	15788	-	-	-	1123	-	-
1998	3	-	3724	-	-	16	605	-	-
1998	4	-	11572	-	-	40	719	-	1572
1999	1	-	4823	-	-	-	585	-	746
1999	2	-	3577	-	-	-	951	-	-
1999	3	-	1589	-	-	19	411	-	-
1999	4	-	3657	-	-	16	299	-	-
2000	1	-	11600	-	-	-	813	-	-
2000	2	-	4234	-	-	-	1452	-	-
2000	3	-	3397	-	-	40	1853	-	-
2000	4	-	4321	-	-	134	653	-	-
2001	1	-	9879	-	-	41	-	-	-
2001	2	-	1666	-	-	36	-	-	-
2001	3	-	2427	-	-	122	-	-	-
2001	4	-	3913	-	-	208	-	-	-
2002	1	-	6143	-	-	320	-	-	-
2002	2	-	4811	-	-	260	-	-	-
2002	3	-	5303	-	-	184	-	-	-
2002	4	-	4554	-	-	265	-	-	-
2003	1	-	8524	-	-	72	-	-	-
2003	2	-	3139	-	-	150	-	-	-
2003	3	-	1012	-	-	671	-	-	-
2003	4	-	4761	-	-	434	-	-	-
2004	1	-	7897	-	949	185	-	-	-
2004	2	-	1330	-	720	449	-	-	-

		Fleet							
Year	**Quarter**	**F1**	**F2**	**F6**	**F10**	**F12**	**F13**	**F14**	**F18**
2004	3	-	3141	-	464	259	-	-	-
2004	4	-	9345	-	254	370	-	-	-
2005	1	-	9718	-	735	66	-	7524	-
2005	2	-	1727	-	361	203	-	9998	-
2005	3	-	802	-	157	524	-	458	-
2005	4	-	6020	-	112	448	-	1538	-
2006	1	-	7145	-	332	87	-	11161	-
2006	2	-	1473	-	285	144	-	-	-
2006	3	-	2347	-	69	85	-	-	-
2006	4	-	7195	-	55	91	-	-	-
2007	1	-	4732	-	254	-	-	4400	-
2007	2	-	2335	-	539	108	-	1945	-
2007	3	-	1310	-	15	85	-	232	-
2007	4	-	6476	-	31	199	-	332	-
2008	1	-	2937	-	166	39	-	3486	-
2008	2	-	1220	128	752	216	-	1639	-
2008	3	-	364	1129	336	72	-	298	-
2008	4	-	4141	264	37	51	-	1277	-
2009	1	-	2969	-	316	31	-	2682	-
2009	2	-	258	35	565	118	-	2754	38
2009	3	-	1880	563	187	113	-	271	26
2009	4	-	6816	237	18	27	-	-	-
2010	1	-	3402	-	597	41	-	2821	-
2010	2	-	396	60	1284	90	-	1602	-
2010	3	-	653	515	267	110	-	292	35
2010	4	-	6649	157	63	68	-	388	-
2011	1	-	2473	-	240	23	-	3119	55
2011	2	-	53	-	1347	65	-	1447	41
2011	3	-	234	51	879	181	-	164	53
2011	4	-	2793	441	55	93	-	678	-
2012	1	-	4147	-	424	23	-	2649	-
2012	2	-	864	76	1247	19	-	705	31
2012	3	-	941	675	513	-	-	-	28
2012	4	-	2027	128	31	-	-	366	-
2013	1	-	5685	-	492	15	-	1733	84
2013	2	-	1343	-	801	121	-	850	127
2013	3	-	775	223	53	318	-	-	21
2013	4	-	4039	74	23	114	-	923	-
2014	1	-	3845	-	86	39	-	2629	-
2014	2	-	2255	-	633	87	-	1545	68
2014	3	-	1187	224	136	169	-	262	38
2014	4	-	4841	52	-	99	-	753	57
2015	1	-	10132	-	276	67	-	3273	153
2015	2	-	1205	26	424	164	-	1112	295
2015	3	-	1318	266	632	146	-	142	135
2015	4	-	5981	76	25	129	-	324	-
2016	1	-	10176	-	545	132	-	1366	187

		Fleet							
Year	**Quarter**	**F1**	**F2**	**F6**	**F10**	**F12**	**F13**	**F14**	**F18**
2016	2	-	2451	60	1301	145	-	960	161
2016	3	-	1994	59	167	140	-	432	75
2016	4	-	10423	64	50	91	-	121	-

Table 4. List of CPUE indices provided for the 2018 Swordfish Stock Assessment and the source for more information about the standardization of the CPUE series.

Abundance Index	**Fleet Name**	**Time Series**	**Source**
S1	JPN_WCNPO_OSDWLL_early_Area1	1975-1993	Kanaiwa and Ijima 2018
S2	JPN_WCNPO_OSDWLL_late_Area1	1994-2016	Kanaiwa and Ijima 2018
S3	JPN_WCNPO_OSDWLL_early_Area2	1975-1993	Kanaiwa and Ijima 2018
S4	JPN_WCNPO_OSDWLL_late_Area2	1994-2016	Kanaiwa and Ijima 2018
S5	TWN_WCNPO_DWLL _early	1975-1999	Chang et al. 2018b
S6	TWN_WCNPO_DWLL _late	2000-2016	Chang et al. 2018b
S7	US_WCNPO_LL_deep	1995-2016	Sculley et al. 2018b
S8	US_WCNPO_LL_shallow_early	1995-2000	Sculley et al. 2018b
S9	US_WCNPO_LL_shallow_late	2005-2016	Sculley et al. 2018b
S10	US_WCNPO_GN	1985-2006	Courtney et al. 2009
S11	TWN_EPO_OSDWLL_Early	1967-1999	Chang et al. 2018b
S12	TWN_EPO_OSDWLL_Late	2000-2016	Chang et al. 2018b

Table 5. Time series of CPUE and log-scale CV for each WCNPO Fleet. Fleets S1-S5 CPUE are in fish per 1000 hooks.

Fleet	S1		S2		S3		S4		S5	
Year	**CPUE**	**CV**	**CPUE**	**CV**	**CPUE**	**CV**	**CPUE**	**CV**	**CPUE**	**CV**
1975	1.82	0.01	-	-	0.13	0.019	-	-	0.2	0.04
1976	1.77	0.008	-	-	0.14	0.016	-	-	0.36	0.04
1977	1.7	0.008	-	-	0.17	0.017	-	-	0.02	0.03
1978	1.45	0.008	-	-	0.13	0.018	-	-	-	-
1979	1.58	0.008	-	-	0.11	0.017	-	-	0.1	0.09
1980	1.46	0.009	-	-	0.14	0.016	-	-	0.05	0.14
1981	1.45	0.008	-	-	0.14	0.016	-	-	0.03	0.15
1982	1.44	0.009	-	-	0.1	0.017	-	-	-	-
1983	1.71	0.009	-	-	0.1	0.019	-	-	-	-
1984	1.68	0.008	-	-	0.11	0.017	-	-	-	-
1985	2.13	0.009	-	-	0.14	0.017	-	-	-	-
1986	1.9	0.009	-	-	0.14	0.018	-	-	-	-
1987	2.04	0.009	-	-	0.12	0.018	-	-	0.02	0.7
1988	1.73	0.009	-	-	0.11	0.019	-	-	-	-
1989	1.6	0.009	-	-	0.1	0.019	-	-	0.11	0.22
1990	1.75	0.009	-	-	0.11	0.019	-	-	0.2	0.27
1991	1.57	0.01	-	-	0.1	0.021	-	-	0.18	0.09
1992	1.4	0.01	-	-	0.09	0.022	-	-	0.44	0.38
1993	1.47	0.01	-	-	0.11	0.02	-	-	0.7	0.14
1994	-	-	1.69	0.031	-	-	0.09	0.033	-	-
1995	-	-	1.7	0.028	-	-	0.09	0.03	0.23	0.26
1996	-	-	1.44	0.027	-	-	0.11	0.03	0.05	0.36
1997	-	-	1.44	0.028	-	-	0.08	0.032	0.04	0.2
1998	-	-	1.4	0.029	-	-	0.08	0.032	0.01	0.24
1999	-	-	1.42	0.03	-	-	0.11	0.031	0.05	0.27
2000	-	-	1.36	0.029	-	-	0.13	0.03	-	-
2001	-	-	1.59	0.029	-	-	0.14	0.031	-	-
2002	-	-	1.22	0.03	-	-	0.12	0.032	-	-
2003	-	-	1.3	0.03	-	-	0.11	0.034	-	-
2004	-	-	1.25	0.029	-	-	0.1	0.035	-	-
2005	-	-	1.33	0.029	-	-	0.09	0.037	-	-
2006	-	-	1.4	0.028	-	-	0.11	0.037	-	-
2007	-	-	1.33	0.029	-	-	0.1	0.038	-	-
2008	-	-	1.1	0.031	-	-	0.13	0.038	-	-
2009	-	-	1.42	0.034	-	-	0.13	0.04	-	-
2010	-	-	1.23	0.035	-	-	0.11	0.042	-	-
2011	-	-	1.14	0.037	-	-	0.12	0.044	-	-
2012	-	-	1.35	0.037	-	-	0.12	0.045	-	-
2013	-	-	1.33	0.037	-	-	0.12	0.048	-	-
2014	-	-	1.66	0.037	-	-	0.11	0.052	-	-
2015	-	-	1.95	0.038	-	-	0.13	0.059	-	-
2016	-	-	1.49	0.044	-	-	0.13	0.07	-	-

Table 6. Time series of CPUE and log-scale CV for each WCNPO Fleet. Fleets S6-S9 CPUE are in fish per 1000 hooks and S10 CPUE are in fish caught per 1000 hours fished

Fleet	S6		S7		S8		S9		S10	
Year	CPUE	CV	CPUE	CV	CPUE	CV	CPUE	CV	CPUE	CV
1975	-	-	-	-	-	-	-	-	-	-
1976	-	-	-	-	-	-	-	-	-	-
1977	-	-	-	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-	-	-	-
1979	-	-	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-	-	-	-
1981	-	-	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-	-	-
1987	-	-	-	-	-	-	-	-	-	-
1988	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	0.137	0.022
1991	-	-	-	-	-	-	-	-	0.052	0.012
1992	-	-	-	-	-	-	-	-	0.097	0.020
1993	-	-	-	-	-	-	-	-	0.090	0.017
1994	-	-	-	-	-	-	-	-	0.063	0.013
1995	-	-	0.37	0.60	2.82	1.49	-	-	0.106	0.018
1996	-	-	0.22	0.50	2.97	1.55	-	-	0.085	0.019
1997	-	-	0.17	0.44	3.24	1.63	-	-	0.141	0.045
1998	-	-	0.26	0.50	3.55	1.69	-	-	0.025	0.200
1999	-	-	0.26	0.50	3.68	1.67	-	-	0.105	0.034
2000	0.19	0.35	0.23	0.48	4.09	1.75	-	-	0.040	0.017
2001	0.36	0.30	0.22	0.48	-	-	-	-	0.272	0.296
2002	0.39	0.34	0.28	0.51	-	-	-	-	0.008	0.001
2003	0.36	0.36	0.26	0.49	-	-	-	-	-	-
2004	0.34	0.37	0.30	0.52	-	-	-	-	-	-
2005	0.23	0.42	0.25	0.49	-	-	11.92	0.37	0.106	0.200
2006	0.44	0.22	0.26	0.50	-	-	12.59	0.37	0.359	0.043
2007	0.46	0.19	0.25	0.49	-	-	10.57	0.37	0.207	0.038
2008	0.52	0.17	0.24	0.48	-	-	10.20	0.37	0.078	0.039
2009	0.48	0.20	0.25	0.49	-	-	8.33	0.37	-	-
2010	0.49	0.21	0.24	0.48	-	-	7.25	0.37	-	-
2011	0.45	0.22	0.20	0.45	-	-	8.40	0.37	-	-
2012	0.46	0.27	0.24	0.48	-	-	8.07	0.37	-	-
2013	0.40	0.25	0.23	0.47	-	-	7.44	0.37	-	-
2014	0.45	0.22	0.26	0.49	-	-	8.62	0.37	-	-
2015	0.45	0.27	0.28	0.50	-	-	8.70	0.37	-	-
2016	0.45	0.35	0.26	0.48	-	-	10.19	0.38	-	-

Table 7. Time series of CPUE and log-scale CV available for the EPO region. CPUE are in fish per 1000 hooks.1

	S11		S12	
Year	**CPUE**	**CV**	**CPUE**	**CV**
1967	0.07	0.20	-	-
1968	0.05	0.13	-	-
1969	0.05	0.12	-	-
1970	0.06	0.21	-	-
1971	0.04	0.24	-	-
1972	0.05	0.18	-	-
1973	0.03	0.20	-	-
1974	0.04	0.16	-	-
1975	0.02	0.12	-	-
1976	0.20	0.03	-	-
1977	0.03	0.17	-	-
1978	0.02	0.20	-	-
1979	0.13	0.26	-	-
1980	0.08	0.21	-	-
1981	0.09	0.31	-	-
1982	0.05	0.27	-	-
1983	0.03	0.20	-	-
1984	0.04	0.16	-	-
1985	0.04	0.17	-	-
1986	0.04	0.21	-	-
1987	0.05	0.30	-	-
1988	0.05	0.29	-	-
1989	0.12	0.30	-	-
1990	0.06	0.20	-	-
1991	0.04	0.32	-	-
1992	0.07	0.21	-	-
1993	0.05	0.17	-	-
1994	0.06	0.25	-	-
1995	0.06	0.21	-	-
1996	0.29	0.78	-	-
1997	0.08	0.20	-	-
1998	0.10	0.40	-	-
1999	0.21	0.33	-	-
2000	-	-	0.45	0.20
2001	-	-	1.00	0.38
2002	-	-	0.78	0.27
2003	-	-	0.69	0.27
2004	-	-	0.66	0.29
2005	-	-	0.41	0.28
2006	-	-	0.48	0.28
2007	-	-	0.53	0.31
2008	-	-	0.52	0.27
2009	-	-	0.69	0.25
2010	-	-	0.59	0.26
2011	-	-	0.64	0.25
2012	-	-	0.59	0.28
2013	-	-	0.62	0.25
2014	-	-	0.79	0.26
2015	-	-	1.22	0.32
2016	-	-	1.09	0.22

Figures

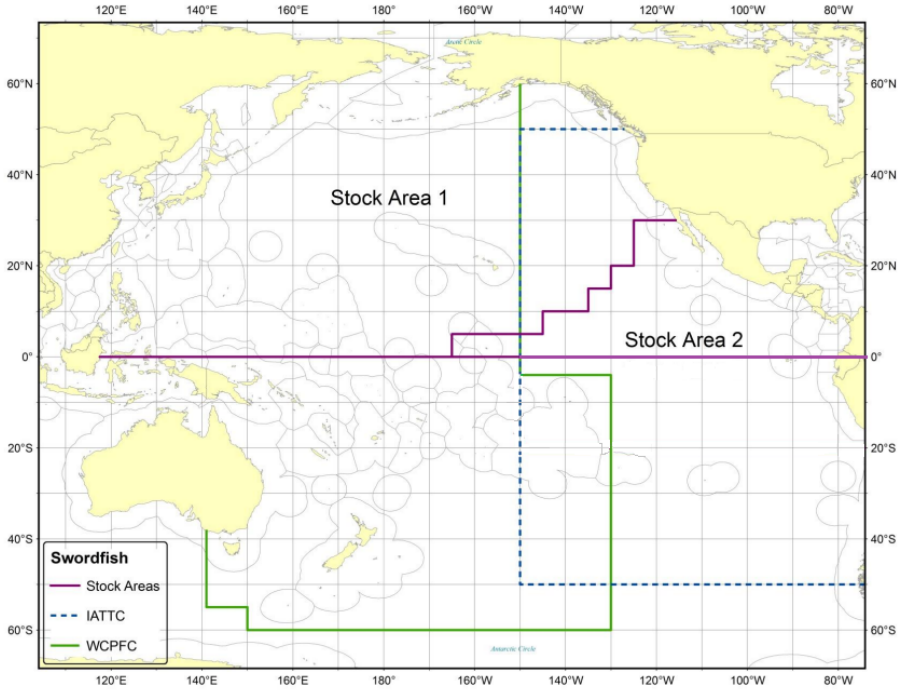

Figure 1. Stock boundaries for the 2018 North Pacific swordfish stock assessment. Stock area 1 is the Western Central Pacific Ocean (WCNPO) and stock area 2 is the Eastern Pacific Ocean (EPO). Purple lines indicate the stock boundaries. The green line indicates the Western and Central Pacific Fisheries Commission boundary and the blue dashed line indicates the Inter-American Tropical Tuna Commission boundary.

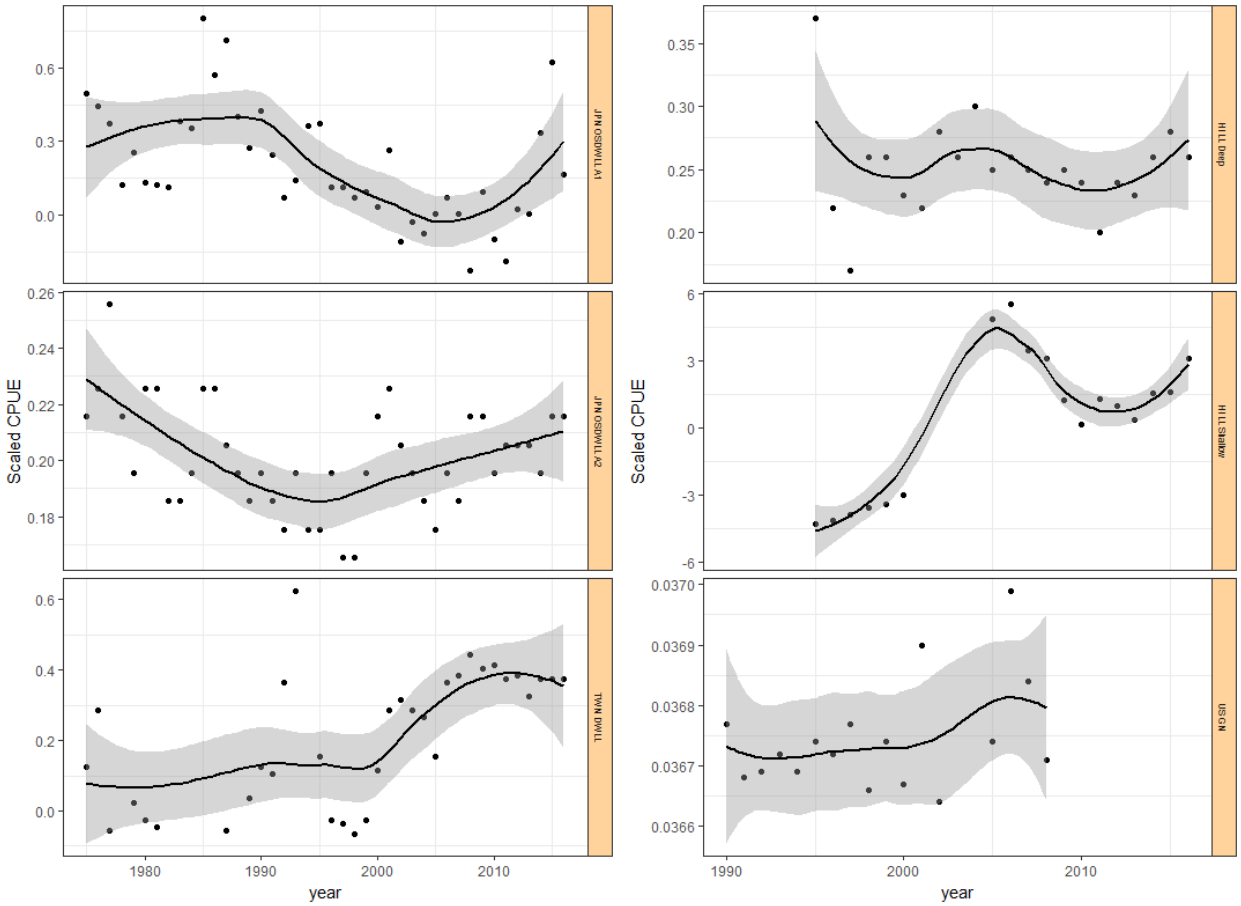

Figure 2. Time series of CPUE indices; continuous black line is a loess smoother showing the average trend by area (i.e. fitted to year for each area with series as a factor).

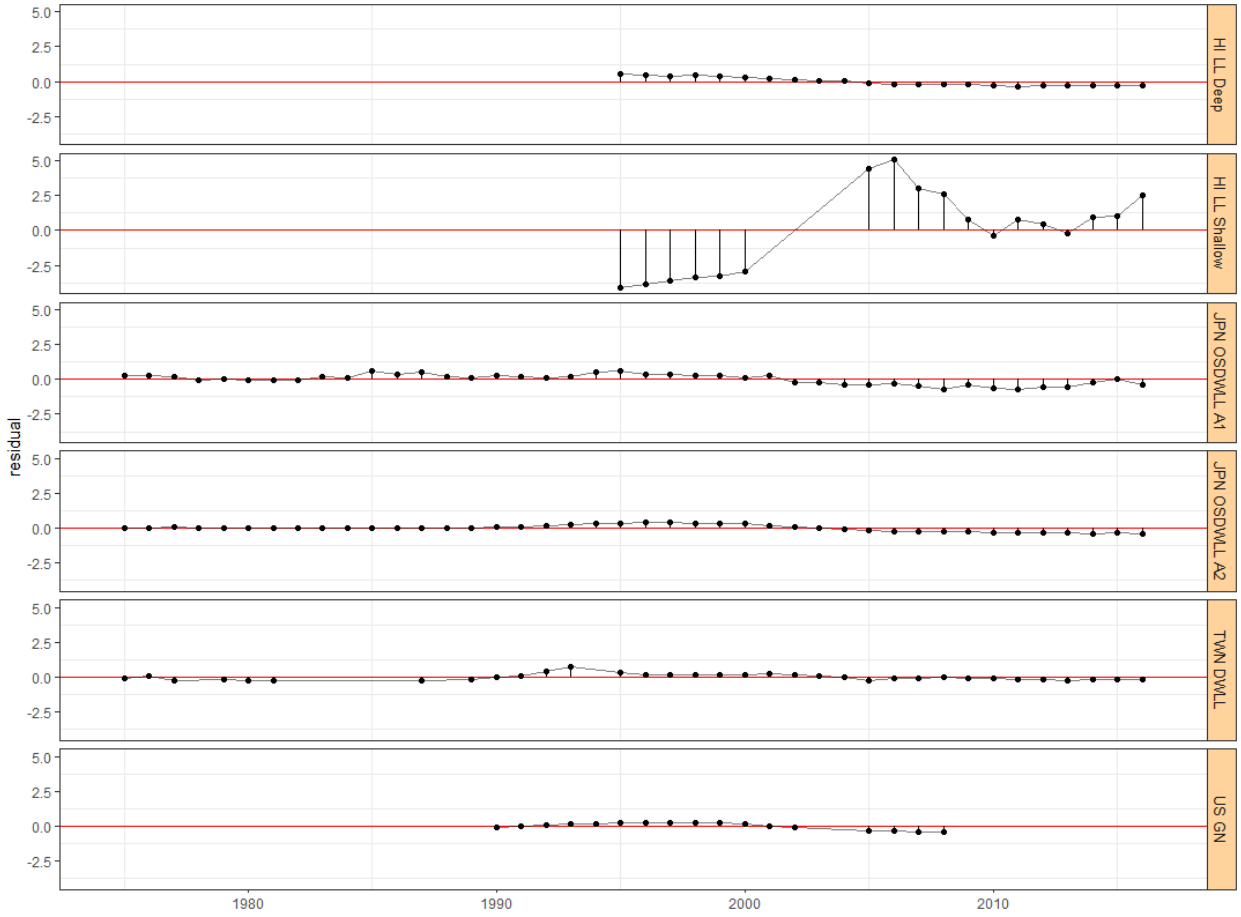

Figure 3. Time series of residuals from the Loess fit.

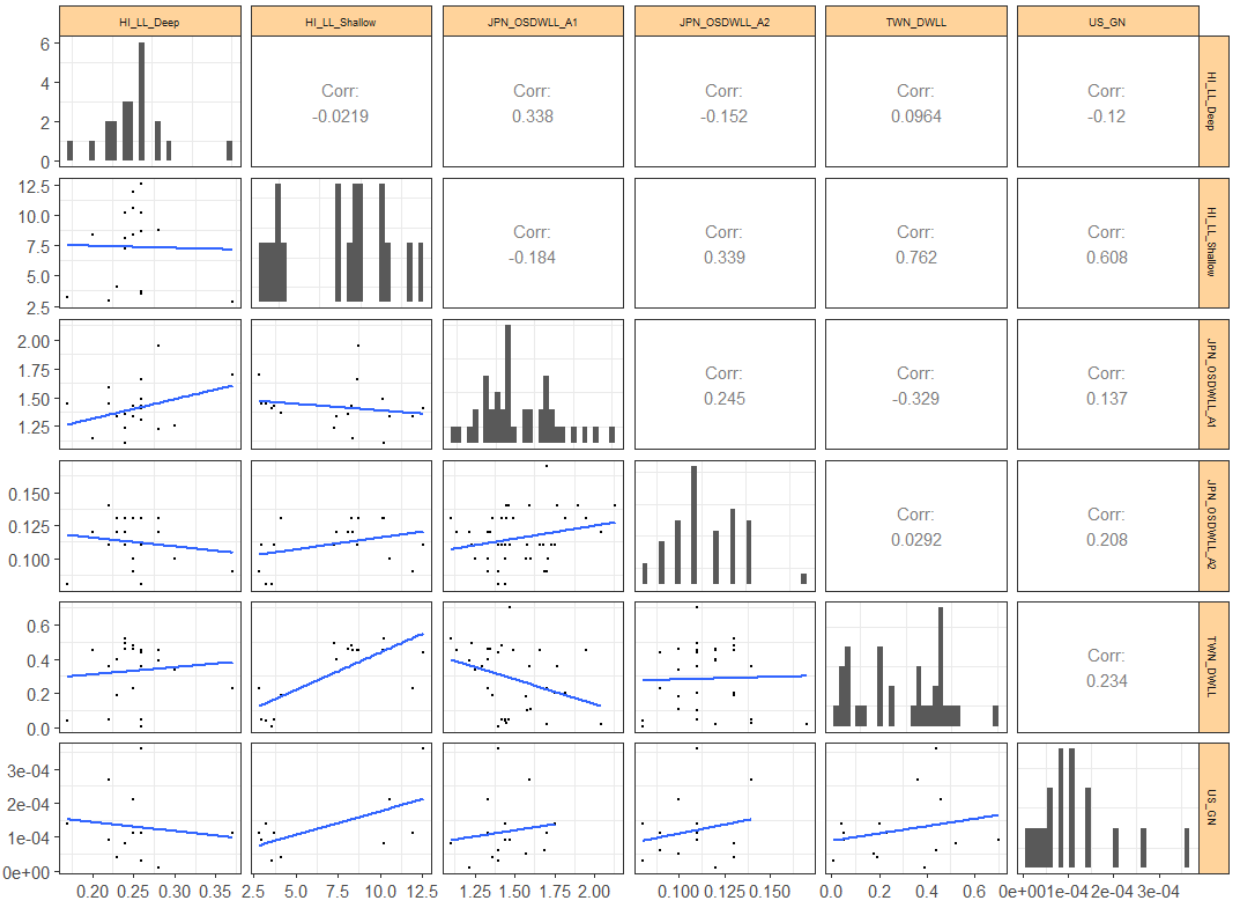

Figure 4. Pairwise scatterplots with blue regression lines (lower left), correlation coefficients (top right), and range of observations to illustrate correlations among all CPUE indices.

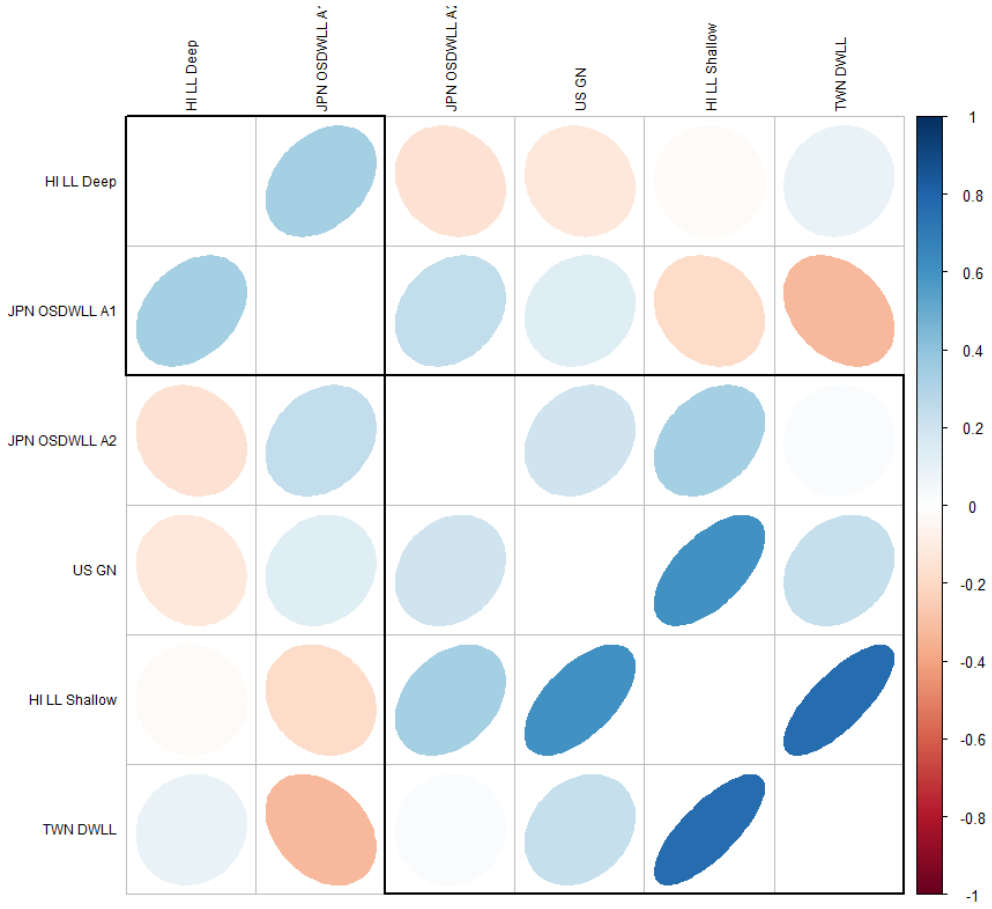

Figure 5. Plot of the correlation matrix for CPUE indices. Blue indicates a positive correlation, and red negative. The order of the indices and the rectangular boxes are chosen based on a hierarchical cluster analysis using a set of dissimilarities for the indices being clustered.

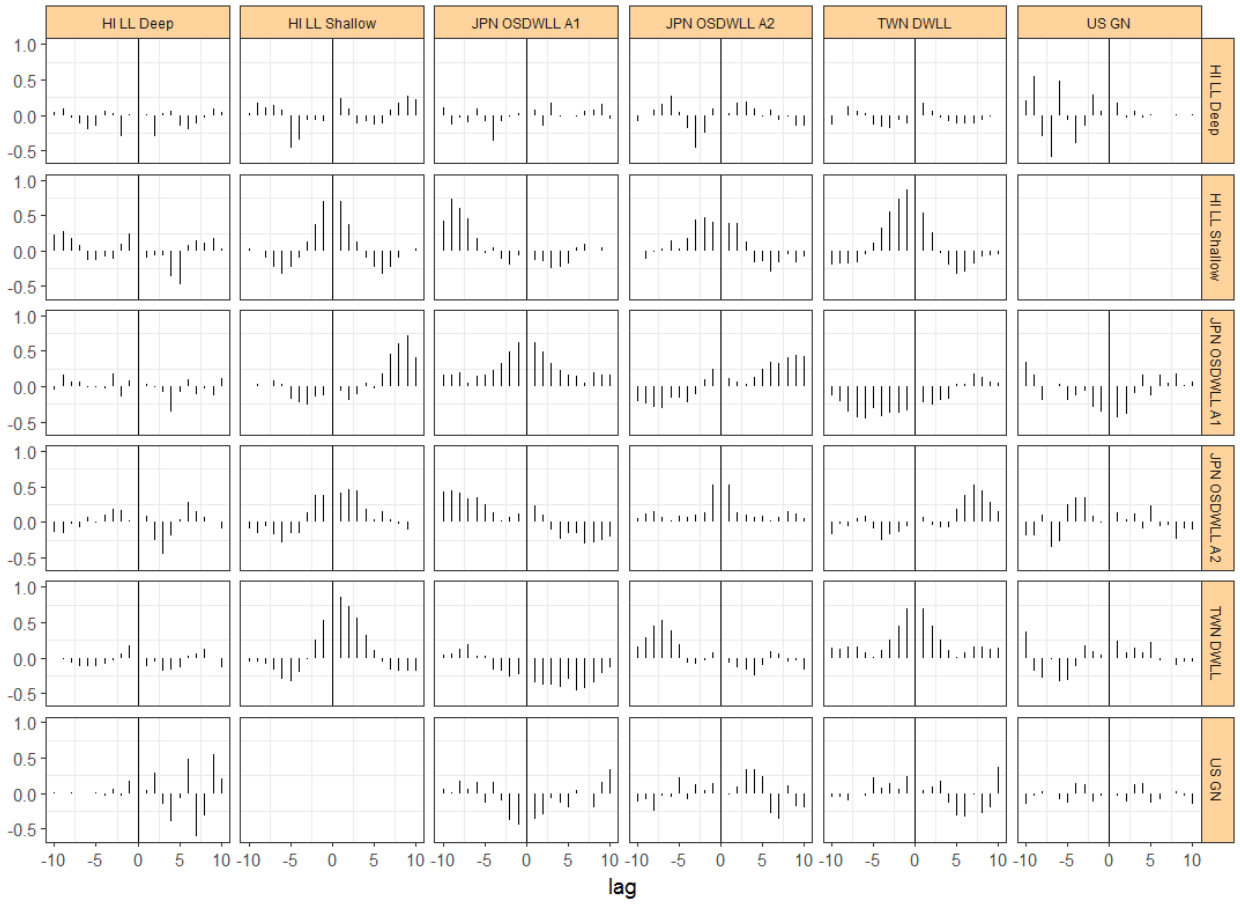

Figure 6. Cross correlations between CPUE indices to identify potential lags.