

Further squid statistics relevant to the data cleaning process

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Introduction

At the squid working group meeting held on 4 July 2008, the following further information was requested to inform the data cleaning process:

- Distribution of fishing days for each of the 12 vessels identified by Industry in MCM/2008/July/SWG-SQ/01 for the period 1995-2006.
- Distribution of catch for each of the 12 vessels identified by Industry in MCM/2008/July/SWG-SQ/01 for the period 1995-2006.
- Annual distribution of squid-fishing days over the period 1995-2006.

The data

Until recently the catch and effort information obtained from the blue books has been captured in the National Marine Linefish System (NMLS). In 2006 an independent squid database was developed, in which information from the yellow books is now being captured. Recall that in 2006 both blue and yellow books were issued, and it was expected that both books will be completed and submitted to MCM. The 2006 data were thus captured in both the NMLS and the independent squid database. The results presented in this paper are derived from the data contained in the NMLS only.

In the past, records (days) on which squid catches were reported in the NMLS were extracted and formed the basis of the squid database. Given this manner of extracting the squid data, if a vessel fished for 20 days and caught squid on only one of those days, only one record would have been extracted to the squid database. This has implications for the calculation of fishing days because although squid was caught on only one day, the potential still exists that squid could have been caught on the remaining 19 days. This has necessitated the separation of fishing days in this paper into two categories, namely “squid fishing days” (days on which squid were caught) and “total fishing days” (total days fished by a vessel that caught squid at some stage during the year concerned).

It is assumed that the vessel code attached to a particular vessel has not changed over the period considered in this study. Furthermore, it should be noted that in the 2006 data there are two vessel codes that appear to have been incorrectly entered, namely PEA3513 (fishing days = 20) and PEA2006 (fishing days = 11). It is assumed that these vessel codes should in fact be PEA351 (fishing days=138) and PEA200 (fishing days = 21) respectively. The fishing days from the incorrectly coded vessels have therefore been added to those of their assumed counterparts.

Results

The squid fishing days and total fishing days for each of the 12 vessels identified by Industry in MCM/2008/July/SWG-SQ/01 are shown in Table 1 for the period 1995-2006. It should be noted that a complete extract of the 2005 linefish database was not available and therefore it is assumed in the calculations in this paper that the squid fishing days and total fishing days are equivalent for 2005. This is considered a reasonable assumption given that for each of the twelve vessels the squid fishing days and total fishing days did not differ in either 2004 or 2006. The distribution of fishing days for each of these vessels is shown in Figure 1. The average catch, average fishing days and associated standard deviations for each vessel is shown in Table 2. Also shown in Table 2 is the ratio (average catch)/(average squid fishing days).

The time series of catches for each of the 12 vessels is shown in Figure 2, while Figure 3 plots the distribution of fishing days for all vessels that caught squid for the period 1995-2006.

Industry raised concern about the fact that in recent years the distribution of fishing days indicated that some vessels appear to fish for 30 days or less in a year (as illustrated in Figure 3). An inspection of Figure 3 indicates that this feature occurs in the earlier years as well. The data contributing to the 0-30 day interval were investigated for the period 2002-2004. Tables 3-5 indicate the vessels that contributed to this interval in each of the three years. From these it is clear that in the majority of cases squid catches were made only occasionally by those particular vessels, which caught other linefish species as well. Table 6 illustrates that for one of the vessels on a particular day five different species were caught, one of them being squid (and it would have only been that one squid record that was included in the squid database).

Input from Resource Management would be required to determine whether it is feasible to separate the vessels into squid-permitted and non squid-permitted vessels based on vessel registers. It is highly unlikely that this would be possible for years prior to 2006 (K. Morake, pers. commn). An inspection of the distribution of total fishing days for squid- and non squid-permitted vessels in 2006 in Figure 4 indicates that the non-squid permitted vessels do not contribute much to the overall fishing intensity on squid.

Overall, this analysis has indicated that the presence of vessels focusing on species other than squid in the database explains some of the past instances of vessels fishing for squid for relatively few days each year. Even so, however, there remains a large number of vessels now licensed to catch squid which appear to operate for relatively low numbers of days each year (e.g. see Figure 4).

Figure 1: Distribution showing proportions of fishing-days per year for a selection of vessels over the period 1995-2006.

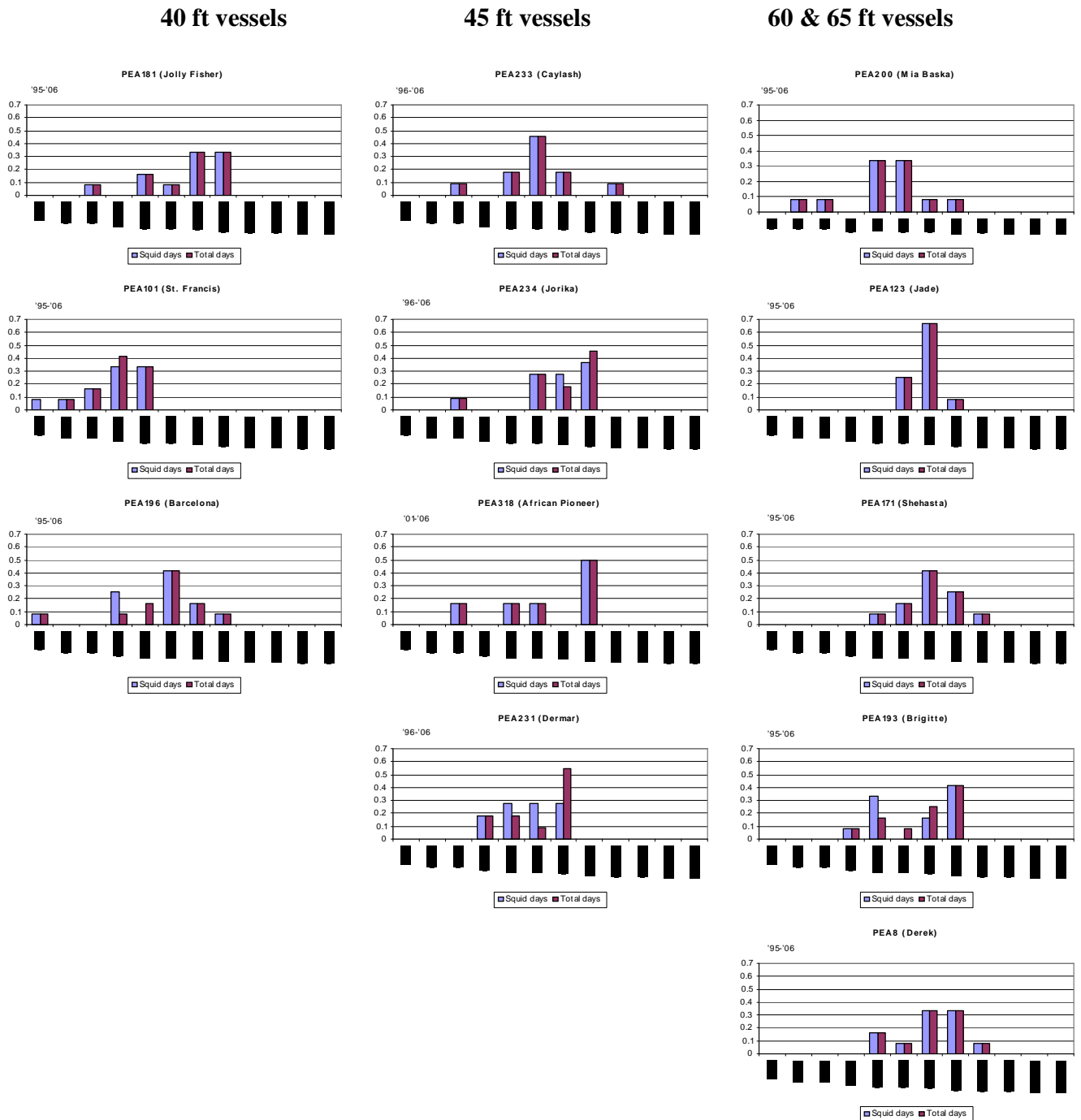


Figure 2: Time series of annual catches for a selection of vessels over the period 1995-2006.

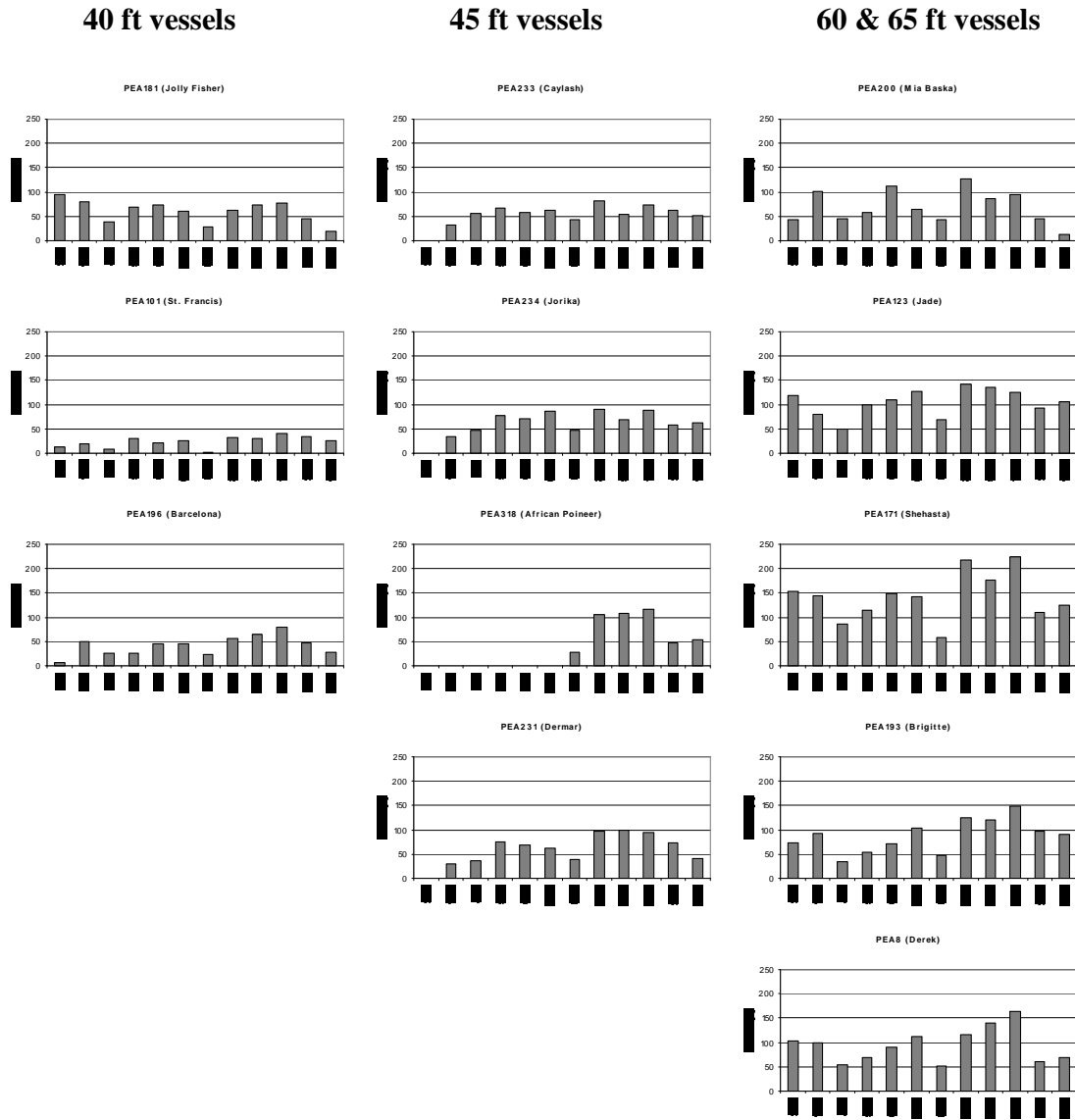


Figure 3: Annual distributions showing proportions of fishing-days for all vessels recording a squid catch in the year concerned.

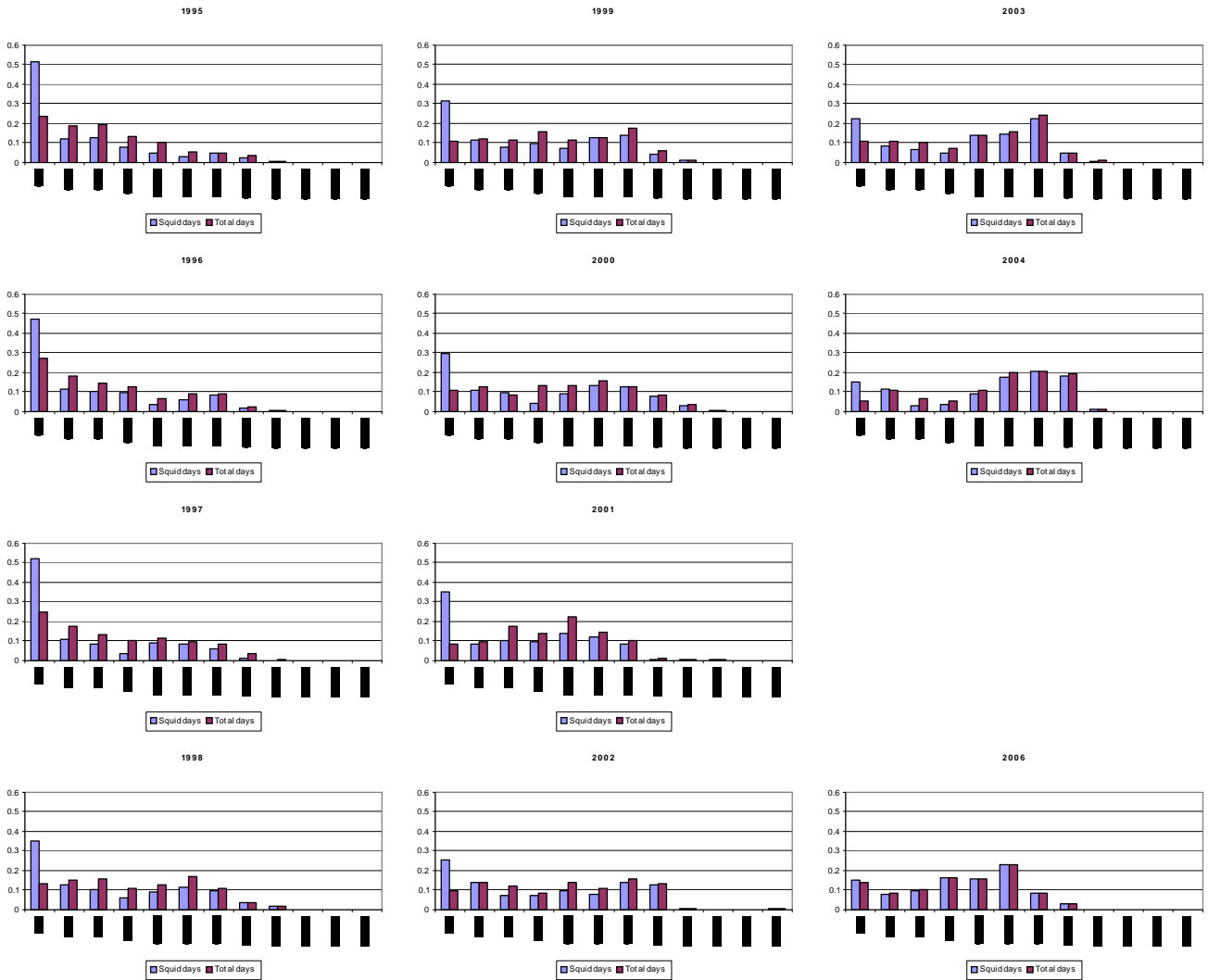
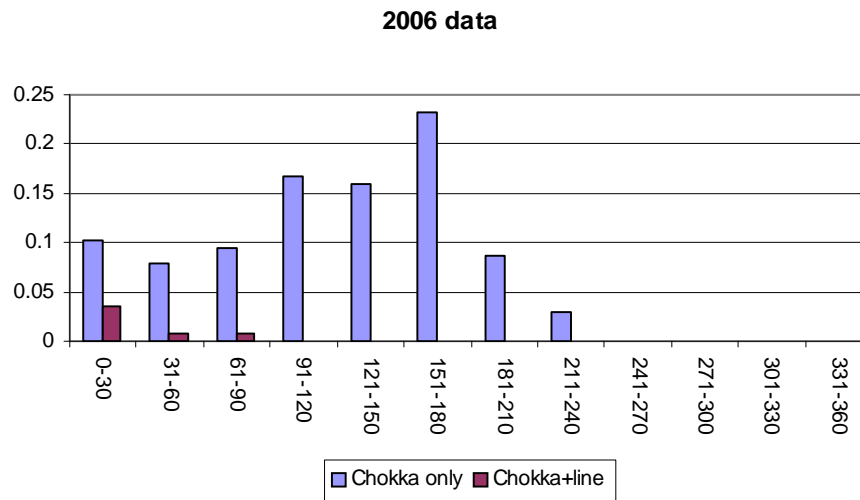


Figure 4: Distribution of total fishing days in 2006 for a) squid permitted vessels¹ and b) other vessels, where those other vessels include any vessel reporting a squid catch on at least one day.



¹ The list of vessels licensed to catch squid was not available at the time of these analyses. Therefore, for the purposes of the plot in Figure 4, those vessels which had squid fishing days = total fishing days are considered to be squid permitted vessels, and those that had squid fishing days < total fishing days are considered to be other vessels.

Table 1: Squid fishing days (i.e. days on which there is some squid in the catch) and total fishing days for a select group of vessels. In cells with two figures, the top figure reflects the squid fishing days and the bottom figure the total fishing days. Only a single figure is provided in cells where the two are the same.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
40 ft												
PEA181 (Jolly Fisher)	213 215	196	135 136	203 205	169	181	147	239	203	239	214	88
PEA101 (St. Francis)	58 114	97 119	67 84	146	96	141	17 47	150	106	89	128	106
PEA196 (Barcelona)	6	185	165 167	119 121	171	174	117 124	175 177	161	230	185	120
45ft												
PEA233 (Caylash)		73	145	168	138	159	175	244	166	198	195	152
PEA234 (Jorika)		72 74	206 212	238	210	228 232	177	238	179	238	189	159
PEA318 (African Pioneer)							69	224	221	220	172	144
PEA231 (Dermar)		101 103	174 183	208 210	162 185	179 191	135 174	195 204	193 197	136	142	95
60 & 65ft												
PEA200 (Mia Baska)	77	167	137	148	232 233	176	128 134	184	123	164	151	32
PEA123 (Jade)	206 208	194 207	181 191	184 190	188 191	169 173	181	217	189	165	181	179
PEA171 (Shehasta)	223	241	201	201	227	193 194	137 140	211	163	196	173	190
PEA193 (Brigitte)	131	224	144 181	135 153	207 208	218 219	128 132	218	117	224	227	206
PEA8 (Derek)	154 156	204	186	189	199	241 242	231	233	217	229	122	147

Table 2: Average annual catch and average days fished for a select group of vessels over the period 1995-2006. The standard deviations are shown in brackets. Also shown is the ratio (Average Catch)/(Average squid days fished).

Vessel	Average Catch	Average squid days fished	Average total days fished	Ratio
40 ft				
PEA181 (Jolly Fisher)	60.0 (22.6)	185.6 (44.6)	186 (44.6)	0.32
PEA101 (St. Francis)	23.5 (10.9)	100.1 (39.4)	110.5 (28.2)	0.23
PEA196 (Barcelona)	41.4 (20.2)	150.7 (56.0)	151.6 (55.6)	0.27
45ft				
PEA233 (Caylash)	58.3 (13.7)	164.8 (42.6)	164.8 (42.6)	0.35
PEA234 (Jorika)	67.0 (18.5)	194.0 (49.0)	195.1 (49.0)	0.35
PEA318 (African Pioneer)	76.7 (37.6)	175.0 (61.2)	175.0 (61.2)	0.43
PEA231 (Dermar)	65.3 (25.4)	156.4 (37.8)	165.5 (40.2)	0.42
60 & 65ft				
PEA200 (Mia Baska)	69.3 (34.4)	143.3 (51.5)	143.8 (51.5)	0.49
PEA123 (Jade)	104.3 (28.1)	186.2 (14.4)	189.3 (15.2)	0.56
PEA171 (Shehasta)	141.7 (48.8)	196.3 (28.8)	196.7 (28.2)	0.76
PEA193 (Brigitte)	87.9 (34.1)	181.4 (45.3)	186.7 (42.0)	0.48
PEA8 (Derek)	94.1 (35.5)	196.0 (38.2)	196.3 (38.1)	0.48

Table 3: Vessels that fished 30 days or less in 2002 and caught squid.

vessel	squid days	Total days
V1	1	153
V2	1	80
V3	1	96
V4	1	118
V5	1	140
V6	1	47
V7	1	106
V8	1	183
V9	1	163
V10	1	188
V11	2	166
V12	2	168
V13	2	8
V14	3	146
V15	3	92
V16	4	23
V17	5	5
V18	6	83
V19	6	135
V20	6	6
V21	6	13
V22	7	11
V23	8	8
V24	10	10
V25	10	141
V26	11	46
V27	11	15
V28	11	11
V29	12	12
V30	13	233
V31	18	18
V32	18	80
V33	19	19
V34	20	20
V35	24	36
V36	26	32

Table 4: Vessels that fished 30 days or less in 2003 and caught squid.

vessel	squid days	Total days
V1	1	109
V2	1	109
V3	1	75
V4	1	33
V5	1	20
V6	1	57
V7	1	175
V8	1	245
V9	1	39
V10	2	6
V11	2	73
V12	3	210
V13	3	17
V14	4	210
V15	4	71
V16	5	5
V17	5	31
V18	6	6
V19	6	6
V20	6	69
V21	9	9
V22	10	10
V23	11	11
V24	11	14
V25	12	12
V26	17	48
V27	24	24
V28	25	25
V29	26	83
V30	27	27
V31	29	29

Table 5: Vessels that fished 30 days or less in 2004 and caught squid.

vessel	squid days	total days
V1	1	65
V2	1	54
V3	1	27
V4	1	70
V5	1	238
V6	1	143
V7	1	159
V8	1	140
V9	2	96
V10	2	172
V11	3	78
V12	4	112
V13	6	108
V14	9	9
V15	11	135
V16	17	17
V17	19	19
V18	21	21
V19	22	22
V20	24	24
V21	29	29

Table 6: Extract from the Linefish database for a particular vessel fishing on a particular day.

Catch_month	Catch_Day	Species	Weight
1	11	CHOK	20
1	11	ELF	15
1	11	GLBK	10
1	11	KOB	126
1	11	SNOK	400