

An updated analysis of the jig catch and effort data.

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Introduction

An updated extract of the yellow book ACCESS database was made available on 20 January 2010. This database contains catch and effort information related to the vessels operating in the South African jig fishery for the years 2006 (partial data), 2007, 2008 and 2009 (currently still being captured). This paper presents basic statistics related to the 2007 and 2008 yellow book data and reports results from the application of General Linear Models (GLM) to a subset of vessels in order to derive a standardized commercial index of abundance for this resource.

Basic statistics related to the yellow book data

The yellow books for recording detailed catch and effort information in the jig fishery were introduced in 2006. Data are therefore available in an ACCESS database for the period 2006 – 2009, the 2009 data currently in the process of being captured. Prior to 2006 squid catch and effort data, completed in the linefish blue books, were captured on the National Marine Linefish System (NMLS). In 2006 both blue and yellow books were in circulation, and an examination of the data provided by each indicated that the 2006 NMLS (blue book) data were likely to be more reliable than the 2006 ACCESS (yellow book) data. The results reported here, in terms of yellow books, are therefore for 2007 and 2008 only.

Table 1 summarizes the data fields contained in the extracts that were provided for analysis purposes.

Table 2 provides basic statistics related to the extracted data, namely, for each year, the number of records (sessions), the number of vessels fishing, total catch, percentage of records with missing data and the percentage of vessels that fished ≤ 90 days.

Tables 3 and 4 provide a breakdown of the months fished and total catch taken per vessel each year, while Table 5 shows the number of days fished per vessel. 23/133 vessels fished ≥ 200 days in 2007, with the average number of days fished being 149, whereas in 2008 no vessels fished ≥ 200 days and the average number of days fished was 117. Figures 1 and 2 show the distribution of the proportion of fishing days for all vessels for 2007 and 2008 respectively.

Preliminary GLM analyses

A core set of 19 vessels (Table 6) comprises the data included in the CPUE analyses, which covers the period 1995-2008. The blue book NMLS database is the source of data for the period 1995-2006, while the yellow book ACCESS database is the source of data for 2007 & 2008.

As a result of the yellow book data being captured on a per session basis for each vessel, and due to the fact that more than one session can take place on a day, these data required accumulation across sessions in order for them to be at the same resolution of the blue book data. The maximum number of crew fishing across sessions on any given day for a given vessel was allocated to the record for that day, and the catches across sessions were summed. The choice of allocating the maximum number of fishers to the day is an attempt to make the yellow book data as comparable as possible with that of the blue book data (it is assumed that the number of crew reported as fishing in the blue books in most cases comprises the crew complement of the vessel).

There are 33751 records (days) for the core set of 19 vessels in the blue book database (1995-2006), 2594 of which did not have the number of crew recorded i.e. 31157 records are therefore available for analysis purposes. There are 4758 and 3752 fishing sessions for the same set of vessels in the yellow book database (for 2007 and 2008 respectively), which, after accumulating across fishing sessions where necessary for a given vessel and day, translates to 2752 and 2197 days for each year respectively. There are therefore 36106 records (days) in total for analysis purposes.

The following factors, common to both blue and yellow book databases, are available for inclusion in the GLM: year, month, number of crew and vessel. An area effect is currently not considered for inclusion in the model since the area codes reported in the blue and yellow books are not comparable, and a translation between codes has not yet been made available. Similarly, the inclusion of a parachute effect in the model is not considered since these data are only captured in the post-2006 yellow book ACCESS database.

The analyses are further restricted to data for the months April-December and to crew of between 3 and 20 men, as consistent with the criterion used to derive the historic CPUE index. The unit of effort considered is that of man-days, i.e. $CPUE = \text{catch per man-day}$, which is equivalent to catch per man since each record in the dataset is one day. Given that zero catch days are not recorded in either the blue or yellow book databases, there are no zero CPUE values.

Both crew size and vessel are considered potentially important explanatory variables, but there is concern that the inclusion of both variables in the model may lead to confounding. Exploratory analyses revealed that confounding is not an issue; hence the final model applied to derive a standardize index for the Apr-Dec period is of the form $\ln(CPUE) = \alpha + \beta_{year} + \eta_{month} + \kappa_{crew} + \nu_{vess} + \varepsilon$. 18769 records were included in the analysis and the amount of variation explained by the model was 24.5%. The standardized CPUE index, taken to be the exponent of the year factor, along with the nominal CPUE index is shown in Figure 3.

Table 1: Catch and effort data contained in the yellow book ACCESS database extract. These data are provided on a per session basis.

Description
Vessel number – a unique number attached to each vessel
Vessel name – name of the vessel
Sailing date – date on which the vessel sailed
Discharge date – date on which the catch was discharged
ID – a unique number that allows matching of effort records with the trip associated with those
Crew – total number of crew fishing per session
Catch (kg) – total catch per session
Start time – the start time of the fishing session
End time – the end time of the fishing session
Hour and minutes – the time fished per session based on the start and end times, split into hours and minutes
Fishing date – date on which the fishing sessions took place
Depth – depth at which fishing took place
Parachute – indicating whether parachute fishing took place
Block¹ – the fishing location according to the blocks demarcated on the map provided in the yellow books

Table 2: Basic statistics related to the catch and effort yellow book ACCESS database extract.

Year	<i>n</i>	# vessels fishing	Total catch (t)	Depth not reported (%)	Block not reported (%)	Start and/or end time not reported (%)	% vessels fishing \leq 90 days
2007	34709	133	8347	0.06	0.64	3.8	17.3
2008	28028	136	8364	0.09	0.63	2.6	22.8

¹ It should be noted that the fields related to the area fished in the NMLS database and the yellow book ACCESS database are not comparable. An area effect can therefore currently not be included in the GLM.

Table 3: Months fished per vessel in 2007. A vessel with blank entries across all months implies that the vessel did not fish in 2007.

Vessel	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	no. months fished
African Pioneer		x	x	x	x	x	x	x	x	x	x	x	11
Alcestis	x	x	x	x	x	x	x	x	x	x	x	x	12
Altair	x	x	x	x	x	x	x	x	x	x	x	x	12
Andejach	x	x	x	x	x	x	x	x	x	x	x	x	12
Angeley	x	x	x	x	x	x	x	x	x	x		x	11
Aranda	x	x	x	x	x	x	x	x	x	x	x	x	12
Bandido	x	x	x	x	x	x	x	x	x	x	x	x	12
Barcelona	x	x	x	x	x	x	x	x	x	x	x	x	12
Blue Marlin	x	x	x	x	x	x	x	x	x	x	x	x	12
Bonga									x	x	x	x	4
Braveheart							x	x	x	x	x	x	6
Brigitte	x	x	x	x	x	x	x	x	x	x	x	x	12
Camanga	x	x	x	x	x	x	x	x	x	x	x	x	12
Canan	x	x	x	x	x	x	x	x	x	x	x	x	12
Cape Natal	x	x	x	x	x	x	x	x	x	x	x	x	12
Cape Recife	x	x	x	x	x	x	x	x	x	x	x	x	12
Celia	x	x	x		x	x	x						6
Conquest													
Coombava	x	x	x	x	x	x	x	x	x	x	x	x	12
Craig	x	x	x	x	x	x	x	x	x	x	x	x	12
Derek							x	x	x	x	x	x	6
Dermar	x	x	x	x	x	x	x		x	x	x	x	11
Dheneb	x	x	x	x	x	x	x	x	x	x	x	x	12
Dodeka	x	x	x	x	x	x	x	x			x	x	10
Dolce-Vita					x	x	x			x			4
Dorothy Ann	x	x	x	x	x	x	x	x	x	x	x	x	12
El Nino							x	x	x	x	x	x	6
Elbe	x	x		x	x	x	x	x	x	x	x	x	11
Equinox	x	x	x	x	x	x	x	x	x	x	x	x	12
Erick W II	x	x	x	x	x	x	x	x	x	x	x	x	12
Erongo 2	x	x			x	x	x	x	x	x	x	x	10
Etosha II					x	x	x	x	x	x	x	x	8
Galaxy	x	x	x	x	x	x	x	x	x	x	x	x	12
Gambit	x	x	x	x	x	x	x	x	x	x	x	x	12
Gandalf	x	x	x	x	x	x	x	x	x	x	x	x	12
Gavin	x	x	x	x	x	x	x	x	x	x	x	x	12
Highland Queen		x	x	x	x	x	x	x	x	x		x	10
Ichabo											x	x	2
Jabula													
Jack Robyn	x	x	x	x	x	x	x	x	x	x	x	x	12
Jade				x	x	x	x	x	x	x	x	x	9
Jamie Jay	x			x	x	x		x	x	x	x	x	9
Jenny	x	x	x	x	x	x	x	x	x	x	x	x	12
Jika	x	x	x	x	x	x	x	x	x	x	x	x	12
Jolene	x	x	x	x	x	x	x		x	x	x	x	11
Jolly Fisher	x	x	x	x	x	x	x	x	x	x	x	x	12
Jorika					x	x		x	x		x	x	6
June II	x	x	x	x	x	x	x	x	x	x	x	x	12
Kendal	x	x	x	x	x	x	x	x	x	x			10
Kingfisher	x	x	x		x	x	x		x	x	x	x	10
Kraken	x	x	x	x	x	x	x	x	x	x	x	x	12
La Landi	x	x	x	x	x	x	x	x	x	x	x	x	12
Lady Grace	x	x	x	x	x	x	x	x	x	x		x	11
Langusta II	x	x	x	x	x	x	x	x	x	x	x	x	12

Table 3 cont: Months fished per vessel in 2007. A vessel with blank entries across all months implies that the vessel did not fish in 2007.

Vessel	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	no. months fished
langusta								x	x		x	x	4
Lazarus	x	x	x	x	x	x		x	x	x	x	x	11
Le Marsh	x	x	x	x	x	x	x	x	x	x	x	x	12
Letap												x	1
Louise Marie	x	x	x	x	x	x	x	x	x	x	x	x	12
Lucky Luke					x	x		x		x	x	x	6
Maluti	x	x	x	x	x	x	x	x	x	x	x	x	12
Manicwa	x	x	x		x	x	x	x	x	x	x	x	11
Maryke			x	x	x	x	x	x	x				7
Maverick													
Mia Barka									x	x	x	x	4
Michelle	x	x	x	x	x	x	x	x	x	x	x	x	12
Mtagati	x	x	x	x	x	x	x	x	x	x	x	x	12
Mufasa					x	x			x	x	x	x	6
Nomvuyo	x	x	x	x	x	x	x	x	x	x	x	x	12
Oresta								x	x	x	x		4
Pegasus	x	x	x	x	x	x	x	x	x	x	x	x	12
Peregrine	x	x	x	x	x	x	x	x	x	x	x	x	12
Pietro Leanja	x	x	x		x	x	x	x	x	x	x	x	11
Pumula III	x	x	x	x	x	x	x	x	x	x	x	x	12
Rafiki						x	x	x	x	x	x	x	7
Raka	x	x	x	x	x	x	x	x	x	x	x	x	12
Raptor	x	x	x		x	x	x	x	x	x	x	x	11
Rietgans	x	x	x	x	x	x	x	x	x	x	x	x	12
Robberg	x			x	x	x	x	x	x	x	x	x	10
Rosanna	x	x	x	x	x	x	x	x	x	x	x	x	12
Rupestris	x	x	x	x	x	x	x	x	x	x	x	x	12
Sagittarius	x	x	x	x	x	x	x	x	x	x	x	x	12
Samantha		x	x	x	x	x	x	x	x	x	x	x	11
Sangoma	x	x	x	x	x	x	x	x	x	x	x	x	12
Santa Ana	x	x	x	x	x	x	x	x	x	x			10
Santa Joana		x	x	x	x	x	x	x	x	x	x	x	11
Santa Lara	x	x	x	x	x	x	x	x	x	x	x	x	12
Santa Maria	x	x	x	x	x					x	x	x	8
Santo Mersk		x	x	x	x	x	x	x	x	x		x	10
Scaldis					x	x	x	x		x	x	x	7
Sceptre	x					x	x	x	x	x	x	x	8
Sea Gull	x	x	x	x		x	x	x	x	x	x	x	11
Sea Horse	x	x					x	x	x	x	x	x	8
Sea Lion	x	x	x			x	x	x	x	x	x	x	10
Sea Robin	x	x	x		x	x	x	x	x	x	x	x	11
Sea Star						x	x	x	x	x	x	x	7
SeaCat	x	x	x	x	x	x	x	x	x	x	x	x	12
Seaquest							x	x	x	x	x	x	6
Sharon	x	x	x		x	x	x	x	x	x	x	x	11
Shehasta	x	x	x	x	x	x	x	x	x	x	x	x	12
Shellfish	x	x	x	x	x	x	x	x	x	x	x	x	12
Sherene		x	x		x	x	x	x	x	x	x	x	10
Sikelela	x	x	x		x	x	x	x	x	x	x	x	11
Silver Champion	x	x	x	x	x	x	x	x	x	x	x	x	12

Table 3 cont: Months fished per vessel in 2007. A vessel with blank entries across all months implies that the vessel did not fish in 2007.

Vessel	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	no. months fished
Silver Dorado	x	x	x	x	x	x	x	x	x		x	x	11
Silver Explorer	x		x	x	x	x	x	x	x	x	x	x	11
Silver laguna													
Silver Reaper	x	x	x	x	x	x	x	x	x	x	x	x	12
Silver Taurus	x	x	x	x	x	x	x	x	x	x	x	x	12
silverspirit													
Sirocco	x	x	x	x	x	x	x	x	x	x	x	x	12
Snowgoose					x	x	x	x	x	x	x	x	8
Solitaire	x		x	x	x	x	x	x	x	x	x	x	11
Southern fighter	x	x	x	x	x	x	x	x	x	x	x	x	12
Southern Knight		x	x	x	x		x	x	x	x	x	x	10
Southern Star	x	x	x	x	x		x	x	x	x	x	x	11
Sparadon	x	x	x	x	x	x	x	x	x	x	x	x	12
Squidder	x	x	x	x	x	x	x	x	x	x	x	x	12
St Francis	x	x	x		x	x	x				x	x	8
Striker	x	x	x	x	x	x	x	x	x	x	x	x	12
Tern	x	x	x	x	x	x	x	x	x	x	x	x	12
Thane		x	x	x	x	x	x	x	x	x	x	x	11
The Don	x	x	x	x	x	x	x		x	x	x	x	11
Thundercat													
Trados				x	x	x	x	x	x	x	x	x	9
Triad	x	x	x	x	x		x		x	x	x	x	10
Trident	x	x	x	x	x	x	x	x	x	x	x	x	12
Umgibe	x	x	x	x	x	x	x	x	x	x	x	x	12
Umzamo					x	x	x	x	x	x	x	x	8
Vera Lynn							x	x	x	x	x	x	6
Virago				x	x	x	x	x	x	x	x	x	9
visarend													
Vukani	x				x				x	x	x	x	6
Vukani I		x	x	x	x	x	x	x	x		x	x	10
Vukani II	x	x	x	x	x	x	x	x	x	x	x	x	12
Vulgaris	x	x	x	x	x	x	x	x	x	x	x	x	12
Western Star	x	x	x	x	x	x	x	x	x	x	x	x	12
Willem W		x									x	x	3
Zanette									x	x			2
Zingela	x	x	x	x	x	x	x	x	x	x	x	x	12

Table 4: Months fished per vessel in 2008. A vessel with blank entries across all months implies that the vessel did not fish in 2008.

Vessel	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	no. months fished
African Pioneer	x	x	x	x	x	x	x						7
Alcestis	x	x	x	x	x	x	x				x	x	9
Altair	x	x	x	x	x	x	x					x	8
Andejach	x	x	x	x	x	x	x			x	x	x	10
Angeley	x	x	x	x	x	x	x				x	x	9
Aranda	x	x	x	x	x	x	x				x	x	9
Bandido	x	x	x										3
Barcelona	x	x	x	x	x	x	x					x	8
Blue Marlin	x	x	x	x	x	x					x	x	8
Bonga	x	x		x	x	x	x					x	7
Braveheart	x	x			x	x	x					x	6
Brigitte	x	x	x	x	x	x	x					x	8
Camanga	x	x	x	x		x	x				x	x	8
Canan	x	x	x	x	x								5
Cape Natal	x	x			x	x					x	x	6
Cape Recife	x	x	x	x	x	x	x						7
Celia													
Conquest						x	x						2
Coombava	x	x		x	x	x	x			x	x	x	9
Craig	x	x	x		x	x	x				x	x	8
Derek	x	x	x	x	x	x	x						7
Dermar	x	x						x			x	x	5
Dheneb	x	x	x	x	x	x	x				x	x	9
Dodeka	x	x	x	x	x	x	x						7
Dolce-Vita		x		x	x	x	x						5
Dorothy Ann	x	x										x	3
El Nino	x	x			x	x	x						5
Elbe	x	x		x	x	x	x	x	x			x	9
Equinox	x	x	x	x	x	x	x				x	x	9
Erick W II	x	x	x	x	x		x						6
Erongo 2	x				x	x	x				x	x	6
Etosha II	x	x		x	x	x	x						6
Galaxy	x	x	x	x	x	x	x				x	x	9
Gambit	x	x	x	x	x	x	x						7
Gandalf	x	x	x	x	x	x	x				x	x	9
Gavin	x	x		x	x	x	x			x		x	8
Highland Queen	x	x	x	x	x	x							6
Ichabo	x		x										2
Jabula											x	x	2
Jack Robyn	x	x	x	x	x	x	x					x	8
Jade	x	x		x	x	x	x					x	7
Jamie Jay	x	x	x	x	x	x					x	x	8
Jenny	x	x		x	x	x	x				x	x	8
Jika	x	x	x	x	x	x	x					x	8
Jolene	x	x	x	x	x	x	x				x	x	9
Jolly Fisher	x	x	x	x	x	x	x					x	8
Jorika	x	x		x	x	x	x						6
June II	x	x	x	x	x	x	x	x			x	x	10
Kendal	x	x	x	x	x						x	x	7
Kingfisher	x	x	x	x	x	x	x						7
Kraken	x	x	x	x	x	x						x	7
La Landi	x	x	x	x		x	x						6
Lady Grace	x	x	x	x	x	x							6
Langusta II	x	x		x	x	x	x				x	x	8

Table 4 cont: Months fished per vessel in 2008. A vessel with blank entries across all months implies that the vessel did not fish in 2008.

Vessel	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	no. months fished
langusta	x	x	x	x	x					x		x	7
Lazarus	x	x	x	x	x	x	x					x	8
Le Marsh	x	x	x	x	x	x	x				x	x	9
Letap	x	x	x	x	x	x	x				x	x	9
Louise Marie		x		x	x	x	x					x	6
Lucky Luke	x	x		x	x	x	x				x	x	8
Maluti	x	x	x	x	x	x	x			x	x	x	10
Manicwa	x	x	x	x	x					x			6
Maryke													
Maverick													
Mia Barka	x	x			x	x	x					x	6
Michelle	x	x		x	x	x	x				x	x	8
Mtagati	x	x	x	x	x	x	x	x				x	9
Mufasa	x	x		x	x	x	x						6
Nomvuyo	x	x		x	x	x	x					x	7
Oresta	x	x	x		x	x		x				x	7
Pegasus	x	x	x	x	x	x	x					x	8
Peregrine	x	x	x	x	x	x	x					x	8
Pietro Leanja	x	x	x	x	x	x	x			x	x	x	10
Pumula III	x	x	x		x	x	x			x			7
Rafiki	x	x		x	x	x	x		x	x	x	x	10
Raka	x	x	x							x	x	x	6
Raptor	x	x		x	x	x	x				x	x	8
Rietgans	x	x	x	x	x	x	x	x					8
Robberg		x	x	x	x	x	x					x	7
Rosanna	x	x	x	x	x	x	x						7
Rupestris	x	x	x	x	x	x	x						7
Sagittarius	x	x	x	x	x	x	x						7
Samantha	x	x	x	x	x	x	x				x	x	9
Sangoma	x	x			x	x	x				x	x	7
Santa Ana	x	x	x	x	x	x	x				x	x	9
Santa Joana	x	x	x	x	x	x	x					x	8
Santa Lara	x	x	x	x	x	x	x					x	8
Santa Maria	x	x	x	x	x	x	x	x				x	9
Santo Mersk	x	x	x	x	x	x	x				x	x	9
Scaldis	x		x	x	x	x	x				x	x	8
Sceptre	x	x	x	x	x	x	x				x	x	9
Sea Gull	x	x	x	x	x	x	x				x	x	9
Sea Horse	x	x	x	x	x	x	x					x	8
Sea Lion	x	x	x	x	x	x	x						7
Sea Robin	x	x	x	x	x	x	x				x	x	9
Sea Star	x	x	x	x	x	x	x				x	x	9
SeaCat	x	x	x		x	x	x						6
Seaquest	x	x											2
Sharon	x	x	x	x	x	x	x				x	x	9
Shehasta	x	x	x	x	x	x	x				x	x	9
Shellfish	x	x	x	x	x	x	x				x	x	9
Sherene	x	x										x	3
Sikelela	x	x	x	x	x	x	x						7
Silver Champion	x	x	x	x	x	x	x					x	8

Table 4 cont: Months fished per vessel in 2008. A vessel with blank entries across all months implies that the vessel did not fish in 2008.

Vessel	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	no. months fished
Silver Dorado	x	x	x	x	x	x	x						7
Silver Explorer	x	x	x	x	x	x	x		x	x	x	x	11
Silver laguna												x	1
Silver Reaper	x	x	x										3
Silver Taurus	x	x	x	x	x	x	x				x	x	9
silverspirit					x	x	x			x	x	x	6
Sirocco	x	x	x	x	x	x	x					x	8
Snowgoose	x	x	x		x	x	x				x	x	8
Solitaire	x	x	x	x	x	x					x	x	8
Southern fighter	x	x	x	x	x	x	x					x	8
Southern Knight	x	x	x	x	x	x	x					x	8
Southern Star	x	x	x	x	x	x	x				x	x	9
Sparadon	x	x		x	x	x	x		x	x	x	x	10
Squidder	x	x	x	x	x	x	x				x	x	9
St Francis													
Striker	x	x	x	x	x	x	x	x	x	x	x	x	12
Tern	x	x	x	x	x	x	x					x	8
Thane	x	x	x	x	x	x	x				x	x	9
The Don	x	x	x	x	x	x					x	x	8
Thundercat							x				x	x	3
Trados	x	x	x	x	x	x	x					x	8
Triad	x	x	x	x	x	x	x		x	x	x	x	11
Trident	x	x	x	x	x	x	x	x					8
Umgibe	x	x	x	x	x	x	x	x				x	9
Umzamo	x	x	x	x	x	x	x						7
Vera Lynn	x	x	x		x	x							5
Virago	x	x	x	x	x		x				x	x	8
visarend	x												1
Vukani	x	x	x		x	x	x				x	x	8
Vukani I	x	x	x		x	x	x			x	x	x	9
Vukani II	x	x	x	x	x	x	x				x	x	9
Vulgaris	x		x	x	x	x	x			x	x	x	9
Western Star	x	x	x	x	x	x	x					x	8
Willem W	x			x	x	x						x	5
Zanette	x	x			x							x	4
Zingela	x	x	x	x	x	x	x						7

Table 5: Number of days fished (determined from fishing date) per vessel in 2007 and 2008. Shaded cells represent ≤ 90 days. Vessels with blank days imply that they did not fish in the years shown here (but would have fished in 2006 or 2009).

Vessel	2007	2008	Vessel	2007	2008	Vessel	2007	2008
African Pioneer	161	140	langusta	47	83	Silver Dorado	151	118
Alcestis	222	170	Lazarus	164	128	Silver Explorer	166	183
Altair	178	159	Le Marsh	178	164	Silver laguna		17
Andejach	149	150	Letap	14	146	Silver Reaper	165	54
Angeley	182	151	Louise Marie	200	84	Silver Taurus	186	135
Aranda	218	168	Lucky Luke	77	133	silverspirit		88
Bandido	215	53	Maluti	226	193	Sirocco	223	144
Barcelona	213	140	Manicwa	155	69	Snowgoose	95	105
Blue Marlin	220	142	Maryke	82		Solitaire	138	99
Bonga	43	98	Maverick			Southern fighter	148	143
Braveheart	91	85	Mia Barka	56	89	Southern Knight	152	133
Brigitte	190	152	Michelle	192	114	Southern Star	151	120
Camanga	182	123	Mtagati	189	157	Sparadon	226	136
Canan	149	82	Mufasa	63	109	Squidder	162	140
Cape Natal	192	89	Nomvuyo	206	117	St Francis	50	
Cape Recife	153	70	Oresta	71	95	Striker	203	156
Celia	81		Pegasus	202	157	Tern	164	134
Conquest		32	Peregrine	207	153	Thane	181	140
Coombava	175	100	Pietro Leanja	162	150	The Don	189	149
Craig	209	136	Pumula III	218	127	Thundercat		30
Derek	78	145	Rafiki	85	132	Trados	91	87
Dermar	168	47	Raka	189	85	Triad	162	175
Dheneb	178	159	Raptor	160	141	Trident	172	119
Dodeka	142	129	Rietgans	193	118	Triton		
Dolce-Vita	43	67	Robberg	149	120	Umgibe	178	175
Dorothy Ann	179	23	Rosanna	194	130	Umzamo	131	126
El Nino	38	28	Rupestris	203	121	Vera Lynn	33	27
Elbe	126	110	Sagittarius	178	121	Virago	148	130
Equinox	148	126	Samantha	185	174	visarend		20
Erick W II	113	84	Sangoma	218	112	Vukani	69	112
Erongo 2	135	91	Santa Ana	158	138	Vukani I	151	133
Etosha II	93	97	Santa Joana	154	157	Vukani II	200	146
Galaxy	214	144	Santa Lara	184	140	Vulgaris	171	135
Gambit	162	126	Santa Maria	106	153	Western Star	192	110
Gandalf	138	133	Santo Mersk	115	132	Willem W	28	82
Gavin	168	89	Scaldis	86	137	Zanette	32	48
Highland Queen	121	88	Sceptre	99	156	Zingela	203	139
Ichabo	24	28	Sea Gull	150	140			
Jabula		28	Sea Horse	79	100			
Jack Robyn	208	155	Sea Lion	181	119			
Jade	104	126	Sea Robin	148	128			
Jamie Jay	109	110	Sea Star	110	144			
Jenny	188	124	SeaCat	189	102			
Jika	213	159	Seaquest	76	26			
Jolene	182	144	Sharon	138	138			
Jolly Fisher	218	159	Shehasta	177	165			
Jorika	64	93	Shellfish	145	127			
June II	176	153	Sherene	128	50			
Kendal	161	102	Sikelela	164	110			
Kingfisher	119	108	Silver Champion	187	139			
Kraken	169	108						
La Landi	172	102						
Lady Grace	148	105						
Langusta II	178	112						

Table 6: The vessels that comprise the core set of data for determining a standardized index of abundance for the jig squid resource.

Vessel name
African Pioneer
Barcelona
Brigitte
Canan
Derek
Jolly Fisher
Jorika
Kendal
Lazarus
Peregrine
Sangoma
Seaquest
Shehasta
Squidder
St Francis
Triad
Vera Lynn
Vukani
Vukani II

Figure 1: Distribution showing proportion of fishing days in 2007 across all vessels.

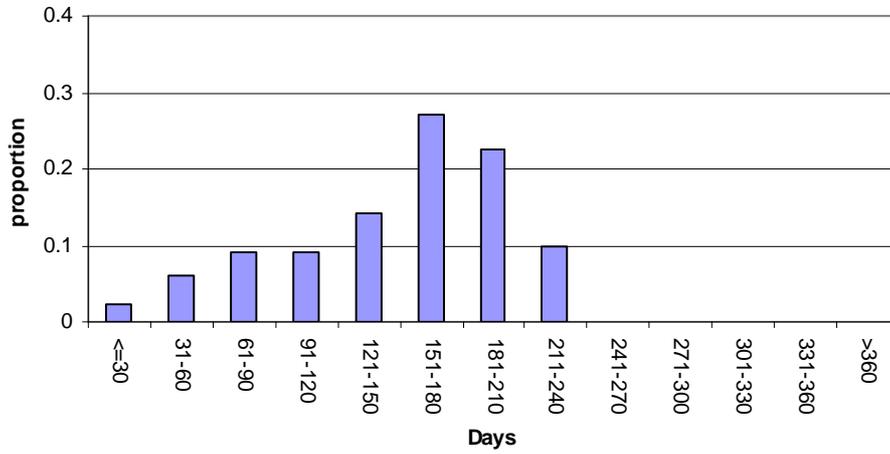


Figure 2: Distribution showing proportion of fishing days in 2008 across all vessels.

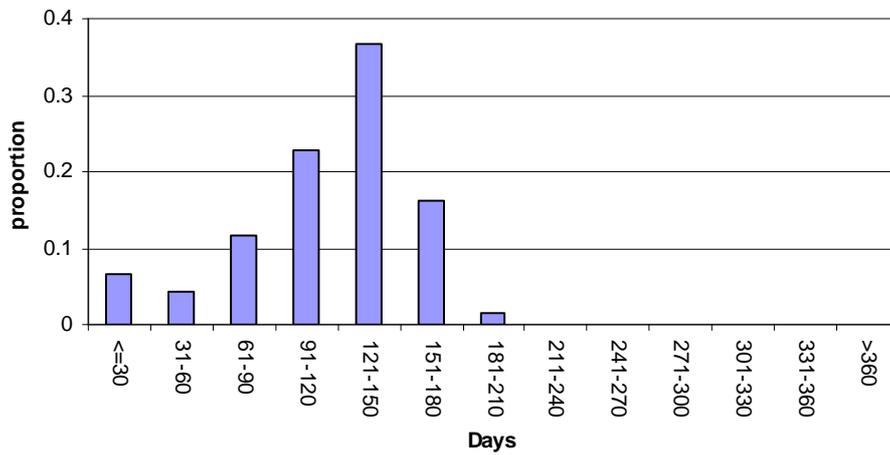


Figure 3: Nominal and standardized CPUE trends, restricted to data covering the period April-December and $3 \leq \text{crew} \leq 20$ for the core set of 19 vessels. Each index has been normalized to its mean.

