

# Preliminary data for the stock assessments of lobster around Inaccessible, Gough and Nightingale islands

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## Introduction

This document presents the catch and nominal catch per unit effort (CPUE) data available for the lobster (*Jasus tristani*) fisheries on the outer islands (Inaccessible, Gough and Nightingale). Data sources, calculation of the CPUE indices and changes to the fishery that may impact consistency of the CPUE time series are also briefly described.

## Data considerations

### Sources

Three sources of catch and effort data are available. These are the historical data supplied by Sea Fisheries (SF - now Marine and Coastal Management) South Africa, raw logsheet data completed by vessel captains, and factory records of catch (Edwards, 2007). Although fishing began in 1949, data collection started only in 1970, with total catch and effort data collected by SF between 1970 and 1996. The Natural Resources Department (NRD) was established on Tristan da Cunha in 1993 and has been responsible for data collection and CPUE calculations since 1997.

Both logsheet data and factory records have been collated into summary sheets by the NRD. The summary sheets, logsheets and factory records have

largely been reconciled although it is clear that some logsheets have been misplaced (Edwards and Glass, 2007).

### **Estimation of the CPUE**

Two methods are available to estimate the annual CPUE index, assuming a Season-Year that runs from May to April the following year. This choice of season is made because the SF data are recorded on this basis. Since 1970, CPUE for the longline fishery has been calculated by SF and subsequently by the NRD as total catch divided by total effort. Total catch is measured as the whole packed weight less the powerboat catch (Edwards, 2007) and total effort as the number of traps hauled. This CPUE series is referred to as Index 1.

Available logsheet data has also been used to estimate CPUE as the average over individual hauls of catch divided by effort in the usual manner. This CPUE series is referred to as Index 2.

At present the powerboat CPUE is excluded due to the unavailability (pre 1996) or unreliability (post 1996) of effort records (Edwards, 2007).

### **Changes to the fishery**

In 1974 Monster traps replaced the Plastic traps that had been used previously in the longline fishery. Although Bee Hive traps were used for a short period following a change of concession holder in 1997, Monster traps have remained the dominant choice.

A minimum size limit of 70mm (carapace length) was introduced at all islands in Season-Year 1983. This was changed in Season-Year 2003 to 75mm at Gough island and 68mm at Inaccessible.

Catch rates at these islands appeared to decline with the duration of continuous fishing at a particular island (Andrew James pers. comm.). To combat this, fishing practices were changed around 2002 so that vessels now distribute their effort amongst islands on a rotational basis throughout a given trip, instead of spending the entire duration of a single trip at one island. This practice has been implemented more successfully since 2005 when the fishery changed to a single vessel operation.

### **Data**

Total catches and nominal CPUE are given for each island in Tables 1, 2 and 3, and illustrated in Figures 1, 2 and 3. Here a detailed description of the data sources used is given.

## **Total catch**

Total catches between 1970 and 1989 were obtained directly from SF (Pollock, 1994). Total catches for Inaccessible and Nightingale islands between 1990 and 2006 were obtained from the TAC reconciliation administered by the NRD. Total catches for Gough over the same period were obtained from the summary sheets (see below). Because NRD catches are originally recorded in units of packed weight, they have been scaled upwards by approximately 2% to account for weight lost during processing and overpacking (Edwards, 2007).

The TAC reconciliation takes place according to a company year, which prior to 1997 corresponded to the dates of a Season-Year (May to April). In January 1997 there was a change of concession holder from Tristan Investments Limited to Ovenstone Fisheries. This entailed a change in the dates of a company year (to September to August). For Inaccessible and Nightingale the annual period of fishing overlaps with the dates of a Season-Year, so that the TAC reconciliation is still a valid record of catch. For Gough however, some catches since the change of concession holder have fallen in different company and Season- years. It is therefore not possible to use the TAC reconciliation as a record of catch for this island, and the summary sheet data have been used to estimate the total catches since 1997. Summary sheets are recorded for each vessel trip, and for company year 2000 a single trip to Gough fell into Season-Years 2000 and 2001. In this case total catch was partitioned between Season-Years using the weekly radio log records of packed weight (see Edwards, 2007).

Two TACs were allocated during Season-Year 1996, one for Tristan Investments and the other for Ovenstone. Ovenstone caught their share at Inaccessible and Nightingale early in 1997, and catches for these have been allocated to Season-Year 1996 (for Gough, catches allocated under the Ovenstone 1996 TAC were caught during the 1997 Season-Year).

## **CPUE Index 1**

Total powerboat catches between 1970 and 1993 are available directly from SF (Pollock, 1994). These were subtracted from the total catch described above to give the estimated total longline catch. Longline effort for these years was also provided by SF (Pollock, 1994). No data on powerboat catch were available from 1994 until the end of Tristan Investments' tenure, nor any record of total longline effort. Some fishing at Inaccessible and Nightingale took place in Season-Year 1996, shortly after Ovenstone took over the concession in January 1997. These data are recorded in the summary sheets and were used to calculate the CPUE at these islands for Season-Year 1996 (note that incomplete data from a period of experimental fishing at Inaccessible have been excluded). For all subsequent

years, CPUE has been calculated using data recorded on the summary sheets. A single trip to Gough island had to be excluded from these calculations since it fell across two Season-Years (2000 and 2001). For 2006 some powerboat data may have been lost prior to summation, leading to a possible overestimation of the longline catch (and therefore CPUE) for that year at all islands.

## CPUE Index 2

Although some logsheet records have been misplaced, it is assumed that these were not atypical so that this has not biased extractions from the data in any way.

## Conclusion

Preliminary data for the stock assessment of tristan lobster at the outer islands are presented here. Each CPUE index requires standardisation to ensure it provides a more accurate reflection of population abundance (Edwards and Butterworth, 2008). Changes to the fishery need to also be taken into account when considering comparability within each CPUE time series.

## References

- Edwards, C. T. T. (2007). Sources of data from the lobster fisheries on Inaccessible, Nightingale, Gough and Tristan da Cunha. Technical Report MARAM/Tristan/07/Dec/05, Ovenstone Fisheries.
- Edwards, C. T. T. and Butterworth, D. S. (2008). Towards standardisation of the longline CPUE series from the lobster fisheries around Inaccessible, Nightingale and Gough islands. Technical Report MARAM/Tristan/08/Mar/01, Ovenstone Fisheries.
- Edwards, C. T. T. and Glass, J. P. (2007). Reconciliation of data from the lobster fisheries on Inaccessible, Nightingale and Gough islands. Technical Report MARAM/Tristan/07/Dec/06, Ovenstone Fisheries.
- Pollock, D. (1994). Status report on the Tristan da Cunha islands rock lobster fishery 1993/94. Technical report, Tristan Investments Limited.

Table 1: Catch data and nominal CPUE series for **Inaccessible** Island. Catch is measured in kg of live weight, CPUE in kg/trap.

Season Year	Total Catch	CPUE	
		Index 1	Index 2
1970	80000	4.04	
1971	147000	3.84	
1972	116000	2.64	
1973	214000	6.56	
1974	282000	10.04	
1975	133000	9.5	
1976	224000	9.45	
1977	138000	4.45	
1978	123000	5.21	
1979	141000	8.1	
1980	74000	3.27	
1981	115000	4.7	
1982	92000	4.67	
1983	72000	3.7	
1984	77000	2.47	
1985	90000	2.58	
1986	62000	2.14	
1987	81000	2.58	
1988	72000	1.92	
1989	67000	1.98	
1990	78781	2.56	
1991	56552	2.45	
1992	71625	2.75	
1993	59886	1.73	
1994	61586		
1995	61465		
1996	73306	0.52	1.82
1997	62521	1.09	1.82
1998	61492	2.24	2.41
1999	64176	2.84	3.66
2000	66637	2.9	3.23
2001	70512	3.34	3.31
2002	70775	4.7	4.35
2003	77283	5.6	6.34
2004	84484	6.69	7.16
2005	92945	7.08	6.82
2006	103281	8.65	

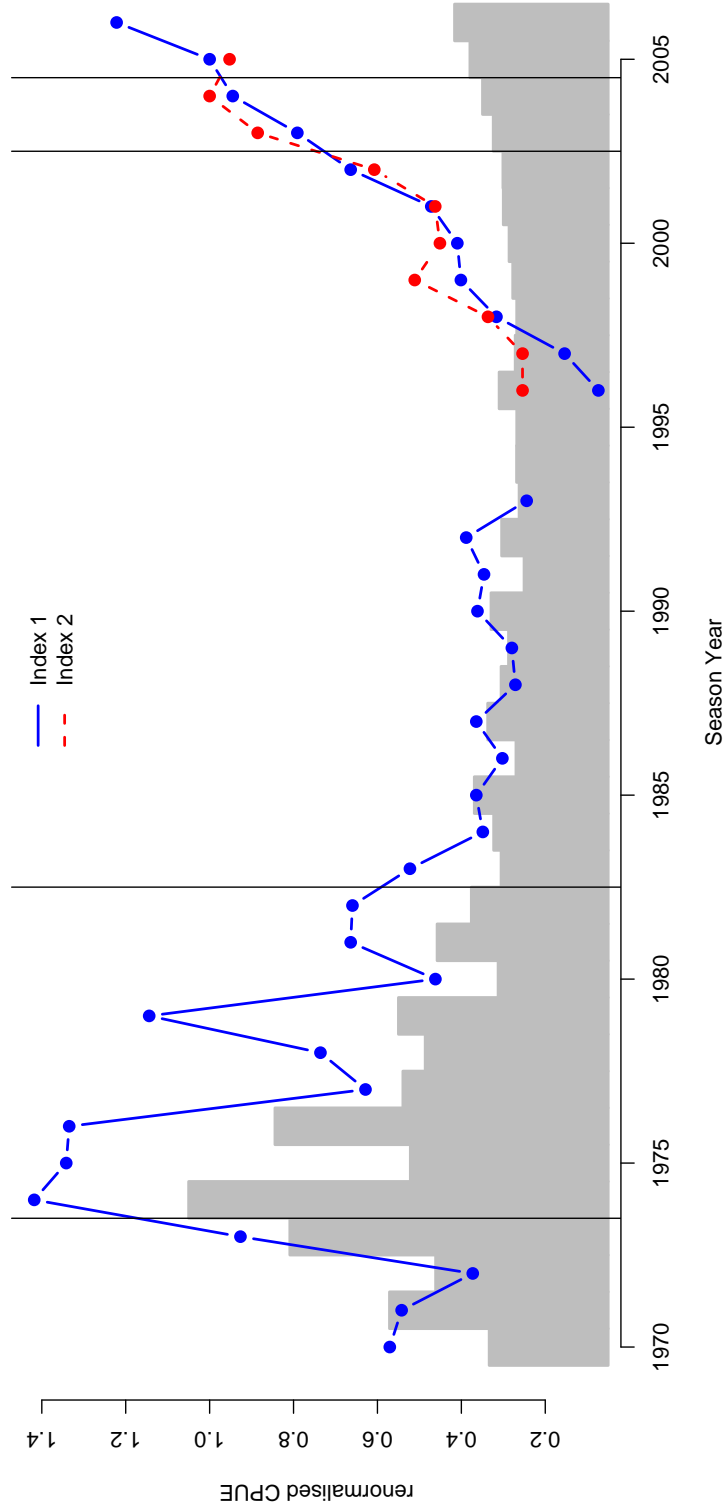


Figure 1: Nominal CPUE series for **Inaccessible** Island. Relative total catches are shown in grey. Vertical lines indicate changes to the fishery that may undermine comparability of the CPUE time series: 1974 - change from Plastic to Monster traps; 1983 - introduction of a minimum size limit; 2003 - change in the minimum size limit; 2005 - introduction of a single vessel fishery.

Table 2: Catch data and nominal CPUE series for **Nightingale** Island. Catch is measured in kg of live weight, CPUE in kg/trap.

Season Year	Total Catch	CPUE	
		Index 1	Index 2
1970	141000	5.8	
1971	98000	4.14	
1972	49000	3.71	
1973	77000	5.97	
1974	166000	12.67	
1975	245000	8.54	
1976	182000	8.13	
1977	71000	6.45	
1978	34000	5.76	
1979	114000	6.48	
1980	113000	5.24	
1981	57000	3.90	
1982	69000	4.49	
1983	48000	3.82	
1984	80000	3.25	
1985	69000	3.68	
1986	93000	3.23	
1987	70000	2.71	
1988	77000	2.81	
1989	44000	2.31	
1990	57295	2.86	
1991	62807	2.98	
1992	60686	3.16	
1993	52037	2.29	
1994	52366		
1995	52310		
1996	63474	2.09	
1997	52474	1.25	
1998	51812	2.73	
1999	52623	2.78	
2000	52536	4.06	4.47
2001	57037	3.11	3.19
2002	56614	3.23	3.33
2003	57472	5.95	5.75
2004	61368	5.83	5.89
2005	62276	7.24	7.22
2006	62333	8.33	

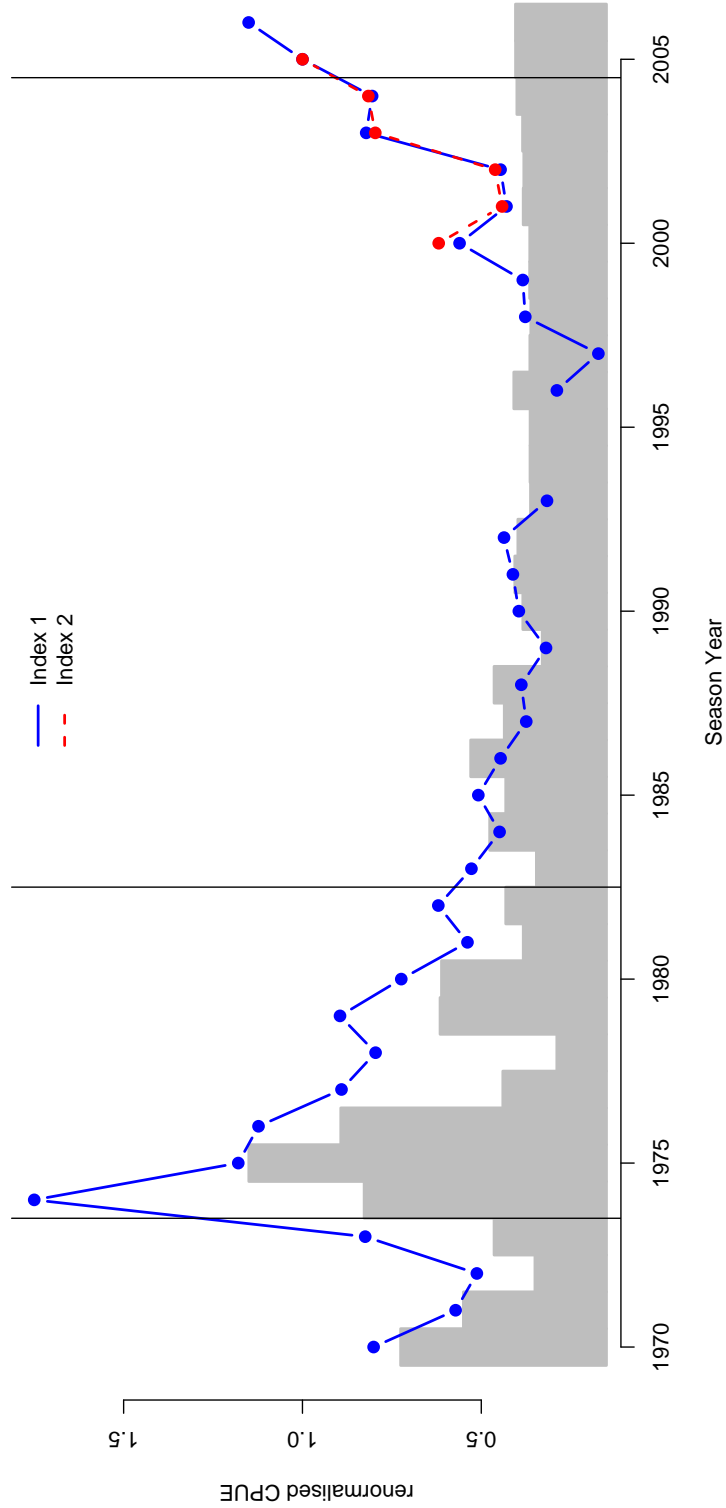


Figure 2: Nominal CPUE series for **Nighthingale** Island. Relative total catches are shown in grey. Vertical lines indicate changes to the fishery that may undermine comparability of the CPUE time series: 1974 - change from Plastic to Monster traps; 1983 - introduction of a minimum size limit; 2005 - change to a single vessel fishery.



Table 3: Catch data and nominal CPUE series for **Gough** Island. Catch is measured in kg of live weight, CPUE in kg/trap.

Season Year	Total Catch	CPUE	
		Index 1	Index 2
1970	123000	7.99	
1971	380000	5.44	
1972	190000	4.38	
1973	161000	5.46	
1974	182000	17.84	
1975	283000	13.74	
1976	64000	5.16	
1977	130000	7.93	
1978	110000	7.69	
1979	60000	6.67	
1980	113000	6.2	
1981	134000	8.18	
1982	102000	7.2	
1983	135000	5.65	
1984	105000	3.8	
1985	103000	3.43	
1986	110000	4.35	
1987	101000	3.96	
1988	123000	3.37	
1989	164000	3.09	
1990	137099	2.96	
1991	88010	4.01	
1992	99151	2.96	
1993	83941	3.1	
1994	98192		
1995	105902		
1996	104111		
1997	79097	1.91	
1998	99628	1.92	
1999	93647	2.03	1.51
2000	73617	1.37	1.46
2001	90133	1.27	1.30
2002	76608	1.41	1.43
2003	94868	1.47	1.46
2004	65245	1.85	1.72
2005	57071	2.76	2.65
2006	56646	3.97	

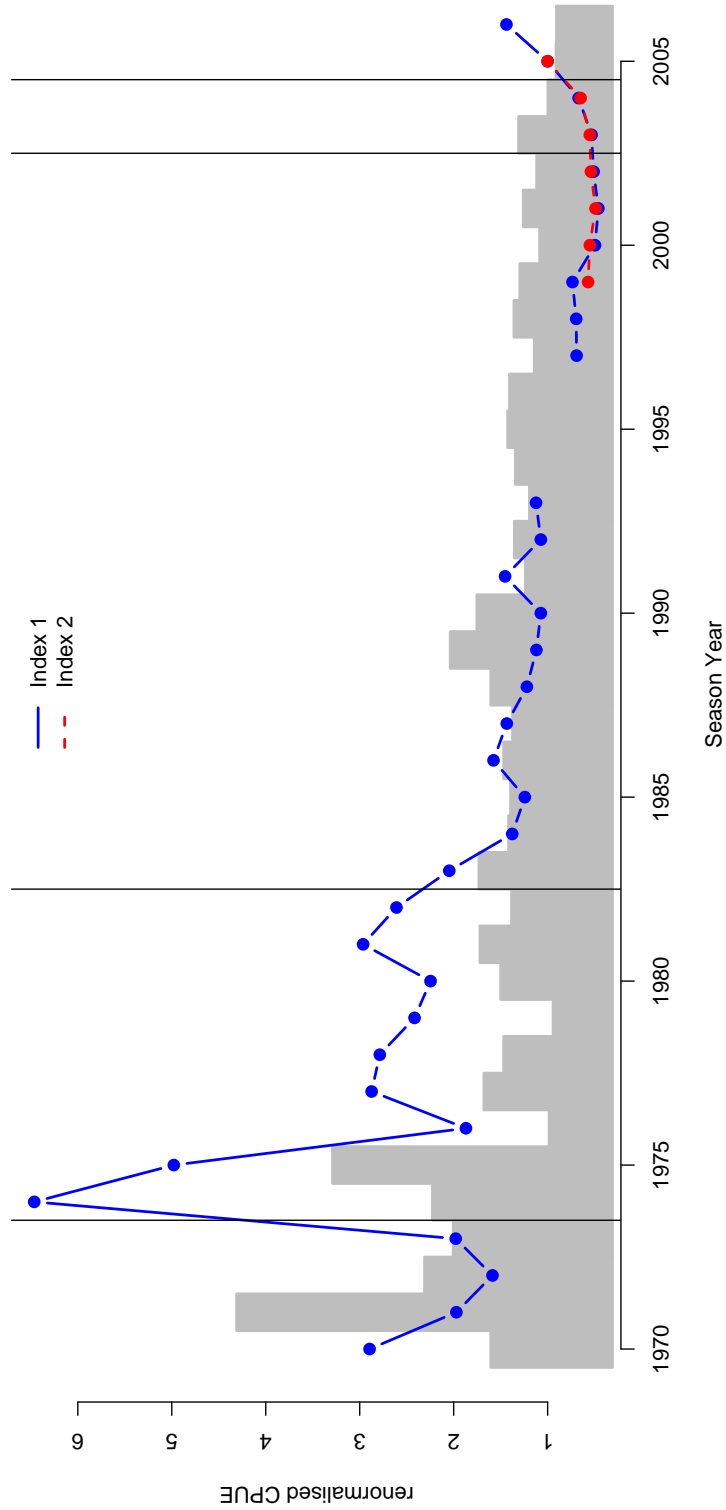


Figure 3: Nominal CPUE series for **Gough Island**. Relative total catches are shown in grey. Vertical lines indicate changes to the fishery that may undermine comparability of the CPUE time series: 1974 - change from Plastic to Monster traps; 1983 - introduction of a minimum size limit; 2003 - change in the minimum size limit; 2005 - introduction of a single vessel fishery.