



Surveillance Report
South Georgia Patagonian Toothfish Longline Fishery

Certificate No.: MML-FC-003

Moody Marine Ltd.
March 2008

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1.0 GENERAL INFORMATION

Scope against which the surveillance is undertaken:

MSC Principles and Criteria for Sustainable Fishing as applied to South Georgia Patagonian Toothfish Longline Fishery

Species: Patagonian Toothfish *Dissostichus eleginoides*

Area: Around the island of South Georgia and the associated plateau to the west around Shag Rocks, within the Government of South Georgia and the South Sandwich Islands (GSGSSI) 200 nm Maritime Zone. The fishery falls within CCAMLR sub-area 48.3

Method of capture: Bottom-set longlines.

Date of Surveillance Visit:	GSGSSI/Falkland Islands: 26 August - 1 September 2007			
	MRAG/UK: 31 January – 1 February 2008			
	Additional Information required for audit: Supplied January 2008			
Initial Certification	Date: 22 March 04		Certificate Ref: MML-FC-003	
Surveillance stage	1st	2nd	3rd	4th
Surveillance team:	Lead Assessor: A Hough			
	Assessor(s): J Rice, P Medley			
Company Name:	Government of South Georgia and the South Sandwich Islands			
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2.0 RESULTS, CONCLUSIONS AND RECOMMENDATIONS

This report contains the findings of the fourth surveillance cycle in relation to this fishery. Many findings relate to compliance with the Conditions of Certification set out in the certification report. This evaluation includes, where conditions are judged to be met, a re-evaluation of the scoring allocated to the relevant Performance Indicators in the original MSC assessment.

This report also addresses the overall ongoing operation of the fishery in relation to the MSC Principles and Criteria. As conditions are closed out (i.e. actions are completed), the assessment focus will concentrate on the overall ongoing operation of the fishery in relation to the MSC Principles and Criteria.

At the moment, this fishery is also undergoing re-assessment against the MSC Principles and Criteria. This will involve drafting, and stakeholder consultation on a revised set of Performance Indicators and Scoring Guidelines, and a complete review of the fishery against these. Stakeholders will be informed on all stages of this re-assessment and have opportunities to comment throughout.

The status of the Conditions of Certification as of May 2007 were as below.

Condition 1: Annual surveillance to continue. The first aspect of this condition, reviewing assessment methodologies, catch limits and catches in relation to sustainability of the population to continue (as for all certified fisheries). Second aspect is being or has been addressed through other conditions below.

Condition 2: This condition was met and closed out in 2007

Condition 3: This is an ongoing requirement to maintain Monitoring, Control and Surveillance at levels established in 2002/03. This condition will therefore not be closed out.

Condition 4: This will continue to be monitored as the study progresses, expected to be closed out in 2008.

Condition 5: This condition was met and closed out in 2005. Monitoring of compliance with, and updating of, the plan will now form part of the review of the overall management system.

Condition 6: This condition was met and closed out in 2005

Condition 7: This condition was met and closed out in 2005

Condition 8: This condition was met and closed out in 2006.

Condition 9: This Condition is not completed and is to be the subject of development of a research plan and the implementation thereof.

Condition 10: This Condition has a longer-term timescale. Work is ongoing in meeting the requirements of this Condition.

Following the previous annual surveillance audits, Conditions 2, 5, 6, 7 and 8 have been closed. Where appropriate, issues associated with these are now considered as a part of the overall fishery management.

For each remaining condition, the report sets out the requirements of the original condition ('Activity assessed'), the most recent information provided by the fishery (the 'GSGSSI Progress Report') and the evaluation of this by the assessment team ('Observations' and 'Conclusion'). Where the requirements of a condition are met, the relevant Performance Indicators are re-scored and if the score is 80 or more, then the condition is closed.

Information has been collected principally from the Government of South Georgia and South Sandwich Islands (GSGSSI), their consultants (MRAG) and industry representatives.

1	Condition of Certification 1: Ongoing Surveillance																																																																																																																																																																																																							
Activity assessed	<p>The fishery shall be subject to annual surveillance visits by Moody Marine. This surveillance will specifically include the following issues:</p> <ul style="list-style-type: none"> determining that catch limits for sub-area 48.3 continue to be set to achieve long-term management objectives that are at least as precautionary as those that are currently used when determining catch limits and that catches do not exceed catch limits by an extent that would have a long-term negative impact on the probability of sustaining the population the planning and execution of research focussed on achieving a better understanding of the impacts of the toothfish fishery. The initial focus of this research should be as set out in the following conditions. <p>As research into the impacts of toothfish fishing are discussed in specific detail in other Conditions, this section deals with catch limits, catches and effects upon the sustainability of the affected population.</p>																																																																																																																																																																																																							
GSGSSI Progress Report	<p>Table 1 shows the catch history for sub-area 48.3, catch levels have remained fairly stable since 2004.</p> <p>Table 1 Catch history for <i>Dissostichus eleginoides</i> in sub-area 48.3. Fishing areas are given (i.e.1988 / 89 is 1 December 1988 to 30th November 1988), the management areas are defined in Conservation Measure 41-02. Source: STATLANT and fine scale data (note: only 10 vessels were fishing in 2005/06 season).</p> <table border="1" data-bbox="503 982 1409 1749"> <thead> <tr> <th rowspan="3">Season</th> <th colspan="2">Regulated fishery</th> <th rowspan="3">Estimated IUU catch (tonnes)</th> <th colspan="3">Total removals (tonnes)</th> </tr> <tr> <th rowspan="2">Effort (no. vessels)</th> <th colspan="2"><i>D. eleginoides</i> catch (tonnes)</th> <th rowspan="2">SGSR</th> <th rowspan="2">West</th> <th rowspan="2">Subarea</th> </tr> <tr> <th>Limit</th> <th>Reported</th> </tr> </thead> <tbody> <tr><td>1984/85</td><td>1</td><td>-</td><td>521</td><td>0</td><td>517</td><td>4</td><td>521</td></tr> <tr><td>1985/86</td><td>1</td><td>-</td><td>733</td><td>0</td><td>733</td><td>0</td><td>733</td></tr> <tr><td>1986/87</td><td>1</td><td>-</td><td>1 954</td><td>0</td><td>1 954</td><td>0</td><td>1 954</td></tr> <tr><td>1987/88</td><td>2</td><td>-</td><td>876</td><td>0</td><td>876</td><td>0</td><td>876</td></tr> <tr><td>1988/89</td><td>3</td><td>-</td><td>7 060</td><td>144</td><td>6 963</td><td>241</td><td>7 204</td></tr> <tr><td>1989/90</td><td>2</td><td>-</td><td>6 785</td><td>437</td><td>6 838</td><td>384</td><td>7 222</td></tr> <tr><td>1990/91</td><td>1</td><td>2 500</td><td>1 756</td><td>1 775</td><td>3 531</td><td>0</td><td>3 531</td></tr> <tr><td>1991/92</td><td>23</td><td>3 500</td><td>3 809</td><td>3 066</td><td>6 864</td><td>11</td><td>6 875</td></tr> <tr><td>1992/93</td><td>18</td><td>3 350</td><td>3 020</td><td>4 019</td><td>7 039</td><td>0</td><td>7 039</td></tr> <tr><td>1993/94</td><td>4</td><td>1 300</td><td>658</td><td>4 780</td><td>5 246</td><td>191</td><td>5 438</td></tr> <tr><td>1994/95</td><td>13</td><td>2800</td><td>3 371</td><td>1 674</td><td>4 972</td><td>73</td><td>5 045</td></tr> <tr><td>1995/96</td><td>13</td><td>4 000</td><td>3 602</td><td>0</td><td>3 530</td><td>72</td><td>3 602</td></tr> <tr><td>1996/97</td><td>10</td><td>5000</td><td>3 812</td><td>0</td><td>3 808</td><td>4</td><td>3 812</td></tr> <tr><td>1997/98</td><td>9</td><td>3 300</td><td>3 201</td><td>146</td><td>3 347</td><td>0</td><td>3 347</td></tr> <tr><td>1998/99</td><td>12</td><td>3 500</td><td>3 636</td><td>667</td><td>4 303</td><td>0</td><td>4 303</td></tr> <tr><td>1999/00</td><td>17</td><td>5 310</td><td>4 904</td><td>1 015</td><td>5 910</td><td>9</td><td>5 919</td></tr> <tr><td>2000/01</td><td>18</td><td>4 500</td><td>4 047</td><td>196</td><td>4 232</td><td>11</td><td>4 243</td></tr> <tr><td>2001/02</td><td>17</td><td>5 820</td><td>5 742</td><td>3</td><td>5 717</td><td>29</td><td>5 745</td></tr> <tr><td>2002/03</td><td>19</td><td>7 810</td><td>7 528</td><td>0</td><td>7 510</td><td>18</td><td>7 528</td></tr> <tr><td>2003/04</td><td>17</td><td>4 420</td><td>4 497</td><td>0</td><td>4 460</td><td>37</td><td>4 497</td></tr> <tr><td>2004/05</td><td>8</td><td>3 050</td><td>3 039</td><td>23</td><td>3 062</td><td>0</td><td>3 062</td></tr> <tr><td>2005/06</td><td>11</td><td>3 556</td><td>3 535</td><td>0</td><td>3 535</td><td>0</td><td>3 535</td></tr> <tr><td>2006/07</td><td>10</td><td>3 554</td><td>3 535</td><td>0</td><td>3 535</td><td>0</td><td>3 535</td></tr> </tbody> </table>	Season	Regulated fishery		Estimated IUU catch (tonnes)	Total removals (tonnes)			Effort (no. vessels)	<i>D. eleginoides</i> catch (tonnes)		SGSR	West	Subarea	Limit	Reported	1984/85	1	-	521	0	517	4	521	1985/86	1	-	733	0	733	0	733	1986/87	1	-	1 954	0	1 954	0	1 954	1987/88	2	-	876	0	876	0	876	1988/89	3	-	7 060	144	6 963	241	7 204	1989/90	2	-	6 785	437	6 838	384	7 222	1990/91	1	2 500	1 756	1 775	3 531	0	3 531	1991/92	23	3 500	3 809	3 066	6 864	11	6 875	1992/93	18	3 350	3 020	4 019	7 039	0	7 039	1993/94	4	1 300	658	4 780	5 246	191	5 438	1994/95	13	2800	3 371	1 674	4 972	73	5 045	1995/96	13	4 000	3 602	0	3 530	72	3 602	1996/97	10	5000	3 812	0	3 808	4	3 812	1997/98	9	3 300	3 201	146	3 347	0	3 347	1998/99	12	3 500	3 636	667	4 303	0	4 303	1999/00	17	5 310	4 904	1 015	5 910	9	5 919	2000/01	18	4 500	4 047	196	4 232	11	4 243	2001/02	17	5 820	5 742	3	5 717	29	5 745	2002/03	19	7 810	7 528	0	7 510	18	7 528	2003/04	17	4 420	4 497	0	4 460	37	4 497	2004/05	8	3 050	3 039	23	3 062	0	3 062	2005/06	11	3 556	3 535	0	3 535	0	3 535	2006/07	10	3 554	3 535	0	3 535	0	3 535
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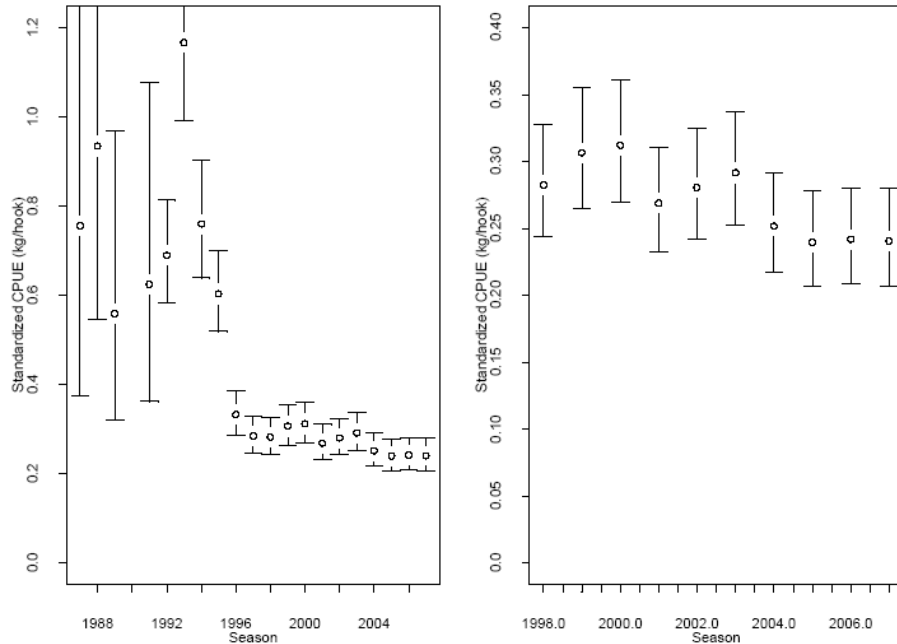


Figure 1 Standardised longline CPUE by fishing season for 48.3 using the GLMM method with vessel random-effects. The series has been standardised for Chilean vessels fishing in depths between 1000 and 1500 m. The right hand plot uses identical information to the left hand plot and is provided to reveal more detail in recent trends.

Full results of the assessment for 48.3 are summarised in the report of the CCAMLR FSA working group. The assessment appears to be robust, with now 7 years of tagging data giving a very good fix on current biomass, estimated to be above the target reference point. The new assessment estimates long term sustainable yield to be 3920 tonnes (SC-CAMLR-XXVI/4).

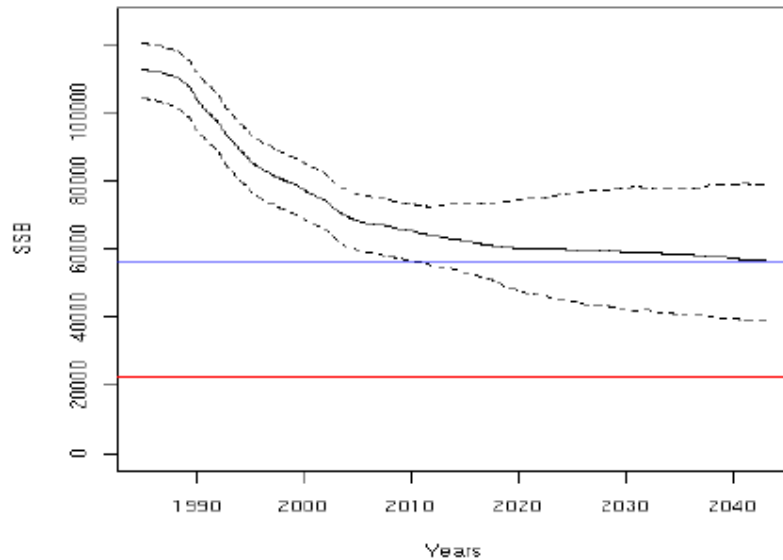


Figure 2 Spawning Stock Biomass trajectories under a constant future (2008-2043) yield of 3920 tonnes. Dotted lines are the 80% credible limit and the solid line is the median. The blue and red lines are the medians of 50% and 20% of virgin biomass respectively

Some uncertainties remain, particularly the poor fit of model and observed tag recaptures at

length. These final uncertainties, together with a move to a model using catch at age rather than catch at length data, will be fully investigated in 2008. In the meantime, CCAMLR has set a 2-year Conservation Measure in which the TAC for each of the two years, starting in the 2007/08 fishing season, will be 3920 tonnes. The TAC for 2008/09 will only be revised if significant new modelling is undertaken or changes in parameter values indicate that a substantial revision from 3920 tonnes would be appropriate.

Bycatch status

Catches of all bycatch species were within the TAC and a preliminary assessment has been made of the ray population (see Condition 4).

Table 2 By-catch (tonnes) reported from longline fisheries in Subarea 48.3. GRV – *Macrourus* spp., SRX – rajids.

Fishing season	GRV		SRX		Others	
	Removals	Limit	Removals	Limit	Removals	Limit
1988/89	2	*	22	*	0	*
1989/90	0	*	0	*	0	*
1990/91	9	*	26	*	0	*
1991/92	1	*	2	*	0	*
1992/93	2	*	0	*	0	*
1993/94	0	*	12	*	0	*
1994/95	13	*	98	*	11	*
1995/96	40	*	58	*	0	*
1996/97	34	*	44	*	4	*
1997/98	24	*	15	*	2	*
1998/99	21	*	19	*	1	*
1999/00	18	*	12	*	5	*
2000/01	22	*	28	*	3	*
2001/02	53	291	26	291	13	*
2002/03	75	390	38	390	19	*
2003/04	30	221	6	221	4	*
2004/05	112	152	9	152	19	*
2005/06	136	177	7	177	44	*
2006/07	131	177	4	177	27	*

* None specified

Working toward assessment of macrourids, but catches within by-catch limit, further mitigation measures underway.

The fishery caught no birds again for the second year running Table 3.

Table 3 Estimated by-catch of seabirds in Subarea 48.3

Fishing season	By-catch (birds/thousand hooks)	rate	Estimated by-catch
1996/97	0.23		5 755
1997/98	0.032		640
1998/99	0.013*		210*
1999/00	0.002		21
2000/01	0.002		30
2001/02	0.0015		27
2002/03	0.0003		8
2003/04	0.0015		27
2004/05	0.0015		13
2005/06	0		0
2006/07	0		0

* Excluding *Argos Helena* line-weighting experiment cruise

Compliance with CM25-02 in 48.3 was again good with only one vessel, the *Insung No 22*, being recorded as discarding any hooks (WG-FSA-07/08 Part II, para. 52) and not using a haul scaring device on all hauls (Part II, para. 57). In addition there was a minor compliance issue with *Jacqueline* on streamer lengths (Part II, para. 54).

The amount of fishing gear in black browed and wandering albatross nests increased this year to its highest level since 2001 (SC-CAMLR-XXVI/BG/18). In previous years it has been concluded that hooks found in nests are most likely taken from longline fisheries from out of the Area 48.3 and IMAF has suggested that the increase in hook ingestion could be due to the greater use of trotlines in the Convention Area and the associated cutting off of grenadier (WG-IMAF Part II, Para 93). To combat this, the working group have recommended CCAMLR produce a poster to instruct crews to remove hooks from all landed fish and hauled baits.

Observations

The previous Surveillance Report concluded that “*The assessment scientists have a model that is consistent with the data they believe is most reliable. The model indicates the stock is close to the target reference point. The catch quota continues to be set consistently with the model, taking into account the uncertainties.*

There are a number of significant uncertainties, but this is normal with stock assessment. The reports demonstrate active research and improvements in the integrated assessment proposed by CCAMLR, and increasing confidence that the stock is in a healthy condition.

Ongoing surveillance audits shall, of course, continue through the duration of the current certification.”

Since the last surveillance audit, condition 2 (stock identification) was closed, but continues to be monitored under condition 1. It has been demonstrated that there is genetic separation of those fish present in Subarea 48.3 from those found on the Patagonian Shelf (FAO Area 41). The SGSR stock, occurring within management areas A, B and C, is genetically separate from fish taken in the extreme north and west of Subarea 48.3. Results from the tagging experiments supports the stock structure currently being used. The data being collected should allow adjustments to the population structure if necessary and lead to increasing confidence in stock assessment results.

The tagging programme is also an important source of information for the stock assessment and monitoring, providing estimates of abundance and growth. In total, 17 815 fish have been tagged in Subarea 48.3 since the program started in 2000. In 2007, 530 tagged animals were

	<p>recovered. Of these, 7 were tagged in 2000 as juveniles and have shown similar movement to adults providing useful information on recruitment patterns. A tagging programme was also initiated in area 48.4 in 2006.</p> <p>The latest assessment was reviewed by the WG-FSA in 2007. The assessment used to determine the state of the stock was the same as that used in 2006, but with the dataset updated. The data used are the catch-weighted length-frequencies, the standardised GLMM CPUE series and the tag release (2000–2006) and recapture (2004–2007) data.</p> <p>WG-FSA-07/29, as well as reviewing the current model, reviewed a new assessment model with a different structure to that used for the management advice. The second model has several new features:</p> <ul style="list-style-type: none"> • catch-at-age data from 1998–2007 are used in the model; • revised tag growth-shock and mortality parameters are used (WG-FSA-07/29); • year-class strength is estimated within the model; • the growth parameters k and L_{∞} are estimated within the model, and the age-length data from 1998–2005 are used as observations within the estimation scheme; • GLMM standardised CPUE data are used from 1998 to 2007 only. <p>Although the new model has several advantages, various problems mainly to do with growth estimation resulted in it being sent to review by the WG SAM before a final version can be adopted. The working group gave the new model support as the basis for further development. Development of the new model would include:</p> <ul style="list-style-type: none"> • investigate the best way to account for the length-specific trends seen in tag growth-shock and mortality; • identify suitable values of recruitment variability to be used when calculating the yields via projections, given that this model now estimates year-class strength; • the best way to estimate the growth parameters within the assessment model, and the potential implications of fixing the t_0 parameter; • investigate the mechanism(s) driving the apparent trends seen in the tag recapture fits; • include sexual dimorphism within the model. <p>The new model will also address the recommendations suggested in the MSC certification report for improving the stock assessment modelling. The catch limit for 2008/09, if estimated with this new model, may be different from the current 3 920 tonnes.</p> <p>The Fish Stock Assessment Working Group recommended that the catch limit for toothfish in Subarea 48.3 (SGSR stock) should be 3 920 tonnes for the 2007/08 fishing season which is based on the stock assessment and the harvest control rule adopted by CCAMLR.</p> <p>The catch limits for management areas A, B and C will be adjusted in a pro-rata manner to 0 (excepting 10 tonnes for research fishing), 1 176 and 2 744 tonnes respectively. By-catch limits for skates/rays and macrourids will be similarly set at 196 and 196 tonnes respectively.</p> <p>The other conservation measures required by CCAMLR, mainly to reduce bycatch, remain in place.</p>
Conclusion	<p>There is clear evidence from the WGFSA and WGSAM of model development and review. The new model would make better use of age data and offer a significant advantage in describing the age structure, but is still having trouble improving the fit to the tagging data.</p> <p>The stock assessment together with the CCAMLR precautionary harvest control rule is used to set the TAC for the fishery. The TAC recommended on scientific and precautionary grounds is the one enforced in the fishery. The landed catch has not exceeded the TAC for toothfish or the bycatch for which CCAMLR has already set a precautionary limit. Based on the high level of surveillance, the IUU catch is reasonably estimated to be zero.</p> <p>There were no Performance Indicators (PI) which scored less than 80 in relation to this Condition. As this is the last surveillance audit, and the requirements of this condition have</p>

	been consistently met, this Condition is now considered to be closed.
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<p>2</p> <p>Activity assessed</p>	<p>Condition of Certification 3: Continuing Monitoring, Control and Surveillance</p> <p>The surveillance, monitoring and associated measures required to achieve certification should be maintained or improved (e.g. through improved/increased surveillance or proven effects of Catch Documentation Scheme). Improvement should include for the development of verifiable indicators of IUU activity in order to provide data for modelling of the extent and effect of IUU fishing.</p> <p>Timescale: This is an ongoing requirement for the fishery</p> <p>Relevant Performance Indicators: 2C.3, 2E.5</p>																				
<p>GSGSSI Progress Report</p>	<p>Condition 3: Surveillance</p> <p>Compliance by licensed vessels this year was again found to be good. Of the 10 licensed longline vessels all the vessels were inspected at least once at sea (15 inspections in all during 2007 on longline vessels). No problems were identified during these inspections. CCAMLR detected only minor incidences of non-compliance with the seabird measures 25-01 and 25-02 on a few vessels in 2007. The vessels identified by CCAMLR as non-compliant this year by category of non-compliance from the CCAMLR IMAF REPORT 2007, paragraph II.48 -58 were as follows (for Subarea 48.3);</p> <p>Line weighting: None Night setting: None Offal discharge: None Hook discard: One vessel (in Subarea 48.3) Streamer lines: In Subarea 48.3 only one vessel (a minor non-compliance on streamer lengths). Haul-scaring devices: One vessel (in Subarea 48.3).</p> <div data-bbox="519 1066 1445 1648" data-label="Figure"> <table border="1"> <caption>Data for Figure 3: FPV surveillance levels</caption> <thead> <tr> <th>Season</th> <th>FPV % days in SG Zone</th> </tr> </thead> <tbody> <tr> <td>1998/99</td> <td>~8%</td> </tr> <tr> <td>1999/00</td> <td>~24%</td> </tr> <tr> <td>2000/01</td> <td>~32%</td> </tr> <tr> <td>2001/02</td> <td>~35%</td> </tr> <tr> <td>2002/03</td> <td>~37%</td> </tr> <tr> <td>2003/04</td> <td>~42%</td> </tr> <tr> <td>2004/05</td> <td>~49%</td> </tr> <tr> <td>2005/06</td> <td>~48%</td> </tr> <tr> <td>2006/07</td> <td>~60%</td> </tr> </tbody> </table> </div> <p>Figure 3 FPV surveillance levels: % of available days (i.e. 365 for a year) that the FPV spent on surveillance inside the SG maritime zone. Split-years run October – September (this year is coincident with the toothfish fishing season and captures a full summer and winter, and is also consistent with our IUU analysis).</p> <p>Patrols carried out by Pharos, new patrol vessel with better speed and endurance, providing improved coverage of the area</p>	Season	FPV % days in SG Zone	1998/99	~8%	1999/00	~24%	2000/01	~32%	2001/02	~35%	2002/03	~37%	2003/04	~42%	2004/05	~49%	2005/06	~48%	2006/07	~60%
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2006/07	~60%																				

	<p>Additional measures have been implemented by GSGSSI to allow detection of IUU vessels. Details are not provided here for security reasons.</p> <p>No IUU vessels have been detected within the SG Maritime Zone, the last being the <i>Elqui</i> in 2005 which was apprehended.</p>
Observations	<p>The previous Surveillance Report concluded that <i>“The requirements of this condition have been consistently met according to the target timescale.</i></p> <p><i>Three Performance Indicators related to this condition, 2C.3, 2E.5, 2G.2. However, this Condition was established to assure an ongoing level of monitoring, control and surveillance to deter IUU fishing and ensure compliance within the licensed fishery. According to the original wording, this condition will be maintained until such time as the fishery is subject to an MSC re-assessment.”</i></p> <p>The conclusions of the previous report apply again here - the level of surveillance continues to be sufficient to meet the conditions for continued certification. It is also noted that the estimated IUU catch in 2006/07 of zero is the same as the previous year.</p> <p>There is 100% observer coverage although observers will not monitor all fishing activity. All vessels are inspected at the start and end of the fishing season and random inspections are carried out at sea. There were minor compliance issues which were discovered and corrected in the legal fishery. The lack of any observed bird by-catch suggests the compliance is adequate to achieve this objective of the fishery.</p>
Conclusion	<p>The surveillance coverage has been very good and continues to exceed the level required to meet the requirements of this Condition. The levels of surveillance are considered high enough to provide assurance that IUU fishing is not taking place.</p> <p>Evidence also suggests that compliance with the CCAMLR conservation measures applied to the legal fishery is closely monitored. Compliance, with the exception a few minor issues, has been good.</p> <p>Data provision is adequate to provide a true estimate of the extent and effect of IUU fishing.</p> <p>As this is the last surveillance report on this fishery under the current certification, the two relevant PI's are now re-scored.</p> <p>PI 2C.3 Do interactions pose an unacceptable risk to (protected, endangered, threatened) species?</p> <p>SG 80: Critical interactions are well estimated and do not threaten protected species. SG 100: It is known that the direct and indirect effects of fishing on threatened and endangered species are within acceptable limits.</p> <p>This issue (PET species) relates to seabird mortality. The requirements of this Condition have now been met through control of IUU fishing. The assessment team is satisfied that control of IUU fishing is effective and the amount of IUU fishing currently appears to be negligible. Therefore the impact of such fishing on protected species must also be considered to be negligible. Seabird mortality in the licensed fishery has been zero for the last two years. The score for this PI is now revised to 95.</p> <p>PI 2E.5 Is associated biological diversity and productivity affected to unacceptable levels?</p> <p>SG 80: The effects of the fishery on biological diversity and productivity have been considered and no unacceptable impacts have been found. SG 100: The effects of the fishery on biological diversity and productivity have been quantified and are within acceptable tested/justified limits</p>

	<p>The requirements of this Condition have now been met. Measures implemented are considered sufficient to consistently achieve negligible levels of IUU fishing within 48.3, accordingly with negligible impacts on biological diversity or productivity.</p> <p>The score for this PI is fully considered under Condition 10 below. The comments above will be taken into account in allocating the final score for this PI. Scoring is deferred until condition 10.</p>
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<p>3</p> <p>Activity assessed</p>	<p>Condition of Certification 4: Impacts of fishing on rajid populations</p> <p>A strategy (or research plan) should be developed to obtain reliable information on fishery-related impacts on rajid populations. The outcomes of this strategy should be sufficient to determine whether, and to what degree, populations are being maintained, depleted, or placed at risk of extinction and to provide points of reference to interpret the effects of by-catches on populations of these species.</p> <p>The strategy should include, but not be limited to, population estimates of rajids from by-catch and ongoing surveys and may require further research on the biology of the species concerned. Interpretation should include information from IUU effort estimates.</p> <p>Mitigation measures should be developed as part of, or in advance of, the strategy, as appropriate, and the biological basis of mitigation measures should be established.</p> <p>Timescale: A suitable strategy/research plan should be developed within 12 months of certification and the strategy fully implemented within three years of certification</p>
<p>GSGSSI Progress Report</p>	<p>Work continues on the ray mark recapture programme with tagging effort being concentrated on the core areas identified in Figure 4. Since the initiation of this tagging program in 2006, 936 tags have been deployed (60% of those tagged were <i>Raja variant</i>, the most commonly caught species, Figure 5). During the 2006/07 season, 9 tagged rays were recaptured (Figure 6), although 5 of these had been tagged and released during the same season, leaving only 4 recaptures of fish tagged in previous years available for population modelling purposes. It is expected that more recaptures will occur in the next season as a result of more tags having been deployed in total and due to research planned for the 2007/08 season.</p> <p>CCAMLR are to introduce ‘The Year of the Skate’ for the 2008/09 season which will focus observer work on rays, in particular assessing any impacts caused by longline fishing. In light of this, a recommendation was made during the CCAMLR working Group meeting on Fish Stock Assessment (2007) that “<i>where possible, skate be brought on board prior to release, with a view to making this mandatory in 2008/09</i>”. Accordingly, the viability of this action on all vessels will be assessed during the coming season, by asking each vessel to keep all skates caught on a small number of sets. This should improve tag detection at least for those sets.</p> <div data-bbox="500 1157 1422 1640" data-label="Figure"> <p>The figure is a map of South Georgia Island, showing three Management Areas (A, B, and C) defined by a grid. Management Area A is the westernmost section, B is the middle section, and C is the eastern section. A legend in the bottom left corner indicates that black dots represent Skate CPUE (Numbers per 1000 Hooks) with sizes corresponding to values of 0.2, 1, and 2. A hatched pattern represents the 500-2000m depth zone, and a solid grey area represents the Core Area. The map includes latitude and longitude coordinates: 43°30'W, 40°00'W, and 33°30'W along the top; and 52°30'S and 56°00'S along the right side.</p> </div> <p>Figure 4 Core areas of ray abundance.</p> <p>All tagged animals were injected with OTC before being released, and there has been some progress with validation of age determination of returned animals. Many of the vertebral samples have been sectioned and prepared by BAS at KEP, with additional work on the AgNO3 staining method with the aim of producing a plausible growth curve. Additional work on the diet of the shallower species caught during the survey (<i>A. georgiana</i>) is also being carried out.</p>

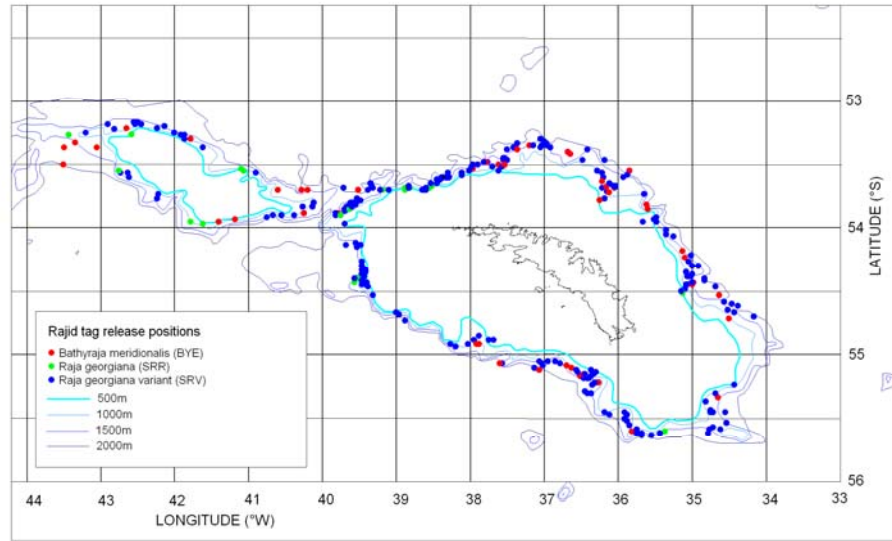


Figure 5 The distribution of rajid tagging by species.

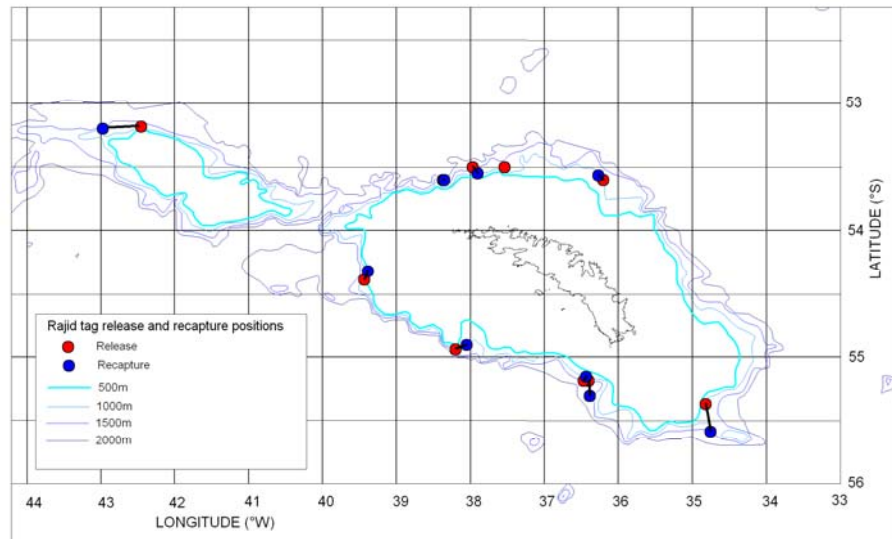


Figure 6 Rajid tag release and 2007 recapture positions.

Tagged rays have been recaptured from depths ranging from between 900 and 1600m highlighting that survivorship is possible if rays are released carefully post-hooking. Additional research is planned for the forthcoming season to assess the ability of observers to assess the condition of rays caught or cut off from the lines which will provide additional information for the current work on a population assessment for rays.

A preliminary assessment has been made of the ray population in 48.3 using a surplus

production model implemented with a Bayesian framework (see WG-SAM -07/11). Data on catch and CPUE was reconstructed from a number of different sources between 1985 and 2006 (see Figure 7) including vessel and observer data. The assessment paper was discussed at the Working Group meeting of Fish Stock Assessment in 2007. Although the model indicates that the level of mortality currently experienced by the population is sustainable and well above B_{msy} (Figure 8) and that population size is estimated to be around 1800 t or about 77% of B_0 , the Working Group noted that there were currently insufficient data to inform the assessment and that the results were strongly dependent on the informative priors for the two catchability parameters, and the intrinsic rate of increase, r . However, it also noted that the assessment was likely to be a 'worst-case' scenario, because the q for toothfish is likely to be higher than the q for rajids. At this stage the assessment should therefore be considered as a risk assessment rather than a stock assessment, but as tag returns appear and work is done on the survivorship, growth retardation and shedding rate for tagged animals, the mark and recapture data for this stock should contribute to and inform the present model, as it has for the fully age-structured toothfish assessment model (Hillary et al. 2006).

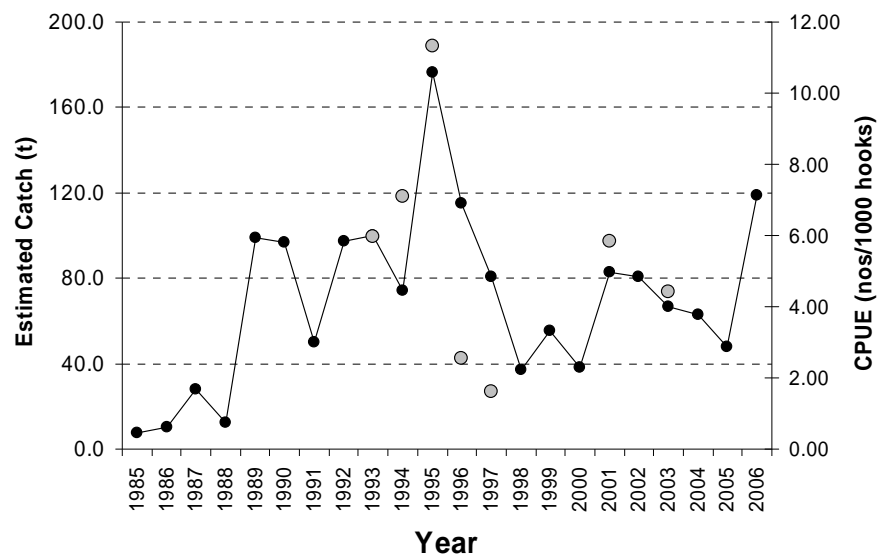


Figure 7 Estimated catch (t) of rays between 1985 and 2006 (black circles) and index of abundance represented by CPUE (numbers per thousand hook) from the Korean vessel, In Sung 66 (1993-97 from C2 data, 2001 and 2003 from observer data) (grey circles).

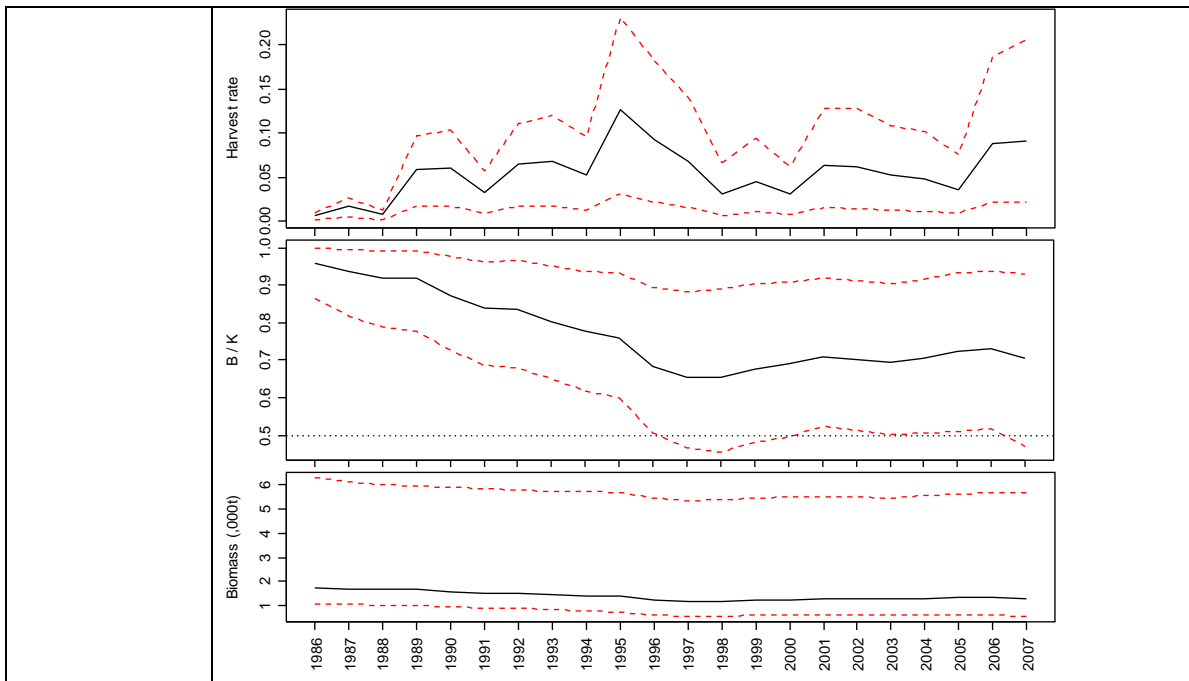


Figure 8 Time series posteriors. Biomass, harvest rate and B/K plots (upper three graphs): the solid black line is the median, the red lines represent the 90 percent probability interval. B/K plot: the dotted horizontal black line represents the biomass at maximum sustainable yield.

An estimate of total mortality was calculated for 2006/07 season data using a linear relationship between full survivorship at depths $\leq 900\text{m}$ and zero survivorship at depths $>2000\text{m}$: Reported numbers of rajids released were multiplied by the above “deaths by depth” factor and combined with numbers caught to give an estimate of total mortality by numbers of 5005 rajids. This number multiplied by an average weight for rajids of 7.42kg (derived from fine scale data for 48.3 2006/07) gives an estimate of total rajiid mortality by weight of 37t, which falls well below the bycatch limit of 177t set for rajids for the 2006/07 season by CCAMLR.

Trials testing different bait and hook types as mitigation measures to reduce bycatch of macrourids and rays were carried out in 2005/06 in South Georgia and in 2006/07 in the Ross Sea (WG-FSA-07/33). Although the results indicated that bait influenced catch rates of both species, effects on ray catch rates were not consistent between South Georgia and the Ross Sea, and also impacted toothfish catch efficiency negatively. There is evidence from previous studies testing vertical line systems (WG-FSA-06/15) that when hooks are placed further off the bottom the numbers of bycatch species such as skates and rays coming into contact with the line are reduced. Further trials are therefore planned for the 2008 season testing the effectiveness of integrated weight autolines against alternative rigs that mimic the Spanish system configuration for which bycatch rates appear to be lower.

Additional progress made under Condition 10 also contributes to rajid bycatch mitigation.

Observations

The priority given to training observers to recognize and record rajids as part of catch monitoring has increased knowledge of rate and distribution of bycatch of rajids in the toothfish fishery, and the reliability of the information on those properties.

The completion of a population assessment for rajids around SGSSI is an important milestone in being able to assess the sustainability of the impact of this bycatch on the rajid populations. There are limitations on data available for model parameterization, such that in particular the

	<p>productivity (r) is poorly determined. Nonetheless the results of the validation and sensitivity tests support considering the model to be adequate for an assessment of the risk that specific mortality sources, including the fishery, may be unsustainable.</p> <p>Tagging of rays is beginning to provide information on movement of individuals and allow improvements to the population modelling, particularly because the tagging is accompanied by OTC treatments to allow validation of the methods used in aging. This source of information should increase in value over time as results of the tagging continue to accumulate.</p> <p>Mitigation measures have also been implemented in the fishery, particularly cutting rays off the lines. Although survivorship of these released rays is not well quantified, tagging results indicate that at least a portion do survive capture and release.</p> <p>With a substantial increase in science and monitoring effort being allocated to skates and rays throughout the CCAMLR area in 2008, knowledge of the biology and distribution of these species, and of the impacts of fisheries on them, are expected to increase over the coming year.</p>
Conclusion	<p>Much more information is now available on the species composition and locations of rays and skates suffering impacts as bycatch in the SGSSI toothfish fishery. The modelling results, although preliminary, are consistent with the conclusion that bycatches are sustainable and not likely to cause the rays to fall below reasonable conservation benchmarks (50% Bo). The tagging results indicate that the mitigation measures in place offer some protection to the rays as well.</p> <p>Taken together these results support the conclusion that the Condition has been met. A research plan was developed and implemented, leading to increased knowledge of the species and the impacts of fisheries on them. Mitigation measures have been developed and implemented in the fishery, leading to a reduction in mortality that this fishery inflicts on skates and rays. The results have allowed a risk assessment of the impact of the fishery on the rays to be conducted, and the risk assessment supports the conclusion that impact of the fishery bycatches on skates and rays is sustainable. The additional information and knowledge gained during the 2008 “year of the skate” should further improve the knowledge available to manage these impacts, monitor the impact of the SGSSI toothfish fishery on skates and rays, explore measures to further reduce bycatch mortality on the species, and increase the confidence that the impacts of the fishery on skates and rays will remain sustainable into the future. Therefore the condition itself can be closed. The routine monitoring and assessment of the fishery and its impacts should continue to track and evaluate bycatch of skates and rays, and update the risk assessment as new information warrants. This ongoing monitoring and periodic updates would be particularly warranted if there were to be changes in the ways that the fishery is prosecuted.</p> <p>Two Performance Indicators relate to this condition; 2E.1, 2E.5.</p> <p>PI 2E.1 Have all the significant effects of the fishery on the ecosystem been identified?</p> <p>SG 80: There is a comprehensive evaluation of the effects of the fishery on the ecosystem. SG 100: The effects of the fishery on the ecosystem have been identified by appropriate comparative and/or experimental studies.</p> <p>The requirements of this Condition have now been met with regard to rajid by-catch, as discussed above. Other fish by-catch (notably macrourids) are taken fully into account in monitoring and management of the fishery. The score for this PI is fully considered under Condition 10 below. The comments above will be taken into account in allocating this score.</p> <p>PI 2E.5 Is associated biological diversity and productivity affected to unacceptable levels?</p> <p>SG 80: The effects of the fishery on biological diversity and productivity have been considered and no unacceptable impacts have been found. SG 100: The effects of the fishery on biological diversity and productivity have been quantified and are within acceptable tested/justified limits</p>

	<p>The requirements of this Condition have now been met with respect to rajid by-catch, effects are quantified and limits established. Effects on other key fish by-catch are taken into account in monitoring and management of the fishery, no unacceptable impacts have been demonstrated to date.</p> <p>The score for this PI is fully considered under Condition 10 below. The comments above will be taken into account in allocating this score.</p>
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4	Condition of Certification 9: Research into the ecosystem relations of toothfish
Activity assessed	<p>To direct specific research into the ecosystem relations of toothfish. This condition may be regarded as a sub-section of Recommendation 4. As stated in Recommendation 4, the assessment team recognise that resource requirements to implement a full ecosystem model would be high and the other conditions outlined here are of much greater significance for the fishery.</p> <p>This research should therefore specifically include, but not be limited to, identification of predators of toothfish at various life stages and prey of toothfish prior to recruitment into the fishery. This research should be carried out with development of a quantitative ecosystem model in mind, although production of such a model is not part of this condition at this time.</p> <p>Timescale: A research programme should be developed and implementation begun within 12 months of certification</p>
GSGSSI Progress Report	<p>Work within the BAS Discovery 2010 program has compiled an initial (Ecopath) model of the South Georgia shelf food web model, which includes Patagonian toothfish as a functional group. This exercise has improved understanding of the structure and operation of the food web but also revealed key uncertainties which require targeted data collection. In the current version of the model, the consumption of Patagonian toothfish (including fishery catch) exceeds production by about 25%. This is largely due to likely underestimates of the availability of toothfish prey and likely overestimates of the impact of seabird predation on juvenile toothfish.</p> <p>A second phase of the project will refine the model to focus more specifically on trophic interactions involving Patagonian toothfish. Key refinements will include extending the spatial scale of the model to cover the full depth range occupied by toothfish; dividing toothfish into at least two functional groups representing juveniles and adults; exploring the feasible parameter space of balanced models when key uncertainties about toothfish predators and prey are taken into account. This work will be conducted as an MSc project with co-supervisors from BAS and MRAG and should to be completed by late 2008. The outputs should identify potential trophodynamic impacts of the toothfish fishery and associated uncertainties. These results could then be used for developing dynamic models to further explore these impacts.</p> <p>The Discovery 2010 program is also using fatty acid and stable isotope analysis to investigate food web structure. These techniques integrate diet over longer time scales than direct diet sampling. Using fatty acid analysis, Brown et al. (1999*) identified southern elephant seals as a potentially important toothfish predator at South Georgia. The trophic role of southern elephant seals is one of the major uncertainties identified in the food web modelling exercise, and this uncertainty should be reduced as a result of further fatty acid analysis.</p>
Observations	<p>Previous Surveillance Reports concluded that <i>“Steady ongoing work has been completed in this area. No results suggest that natural mortality due to predation is substantially higher than assumed in the assessment model, or that there are dependent predators whose productivity is likely to be diminished by the SGSSI toothfish, as currently managed. In summary, there appear no major trophodynamic threats currently suspected to be associated with this fishery”</i> and <i>“With current knowledge there is no evidence that the SGSSI toothfish fishery is placing structural or functional components of the wider ecosystem at risk of major disturbance, let alone serious harm. However, the acquisition of knowledge on “ecosystem relations” is inherently incremental, and the important work of BSA 2010 is still in progress”</i></p> <p>Progress is steady and supplemented significantly by the BAS Discovery 2010 programme. Ecosystem modelling results for the area are beginning to come available. Without expressing undue confidence in the quantitative results of the current trophodynamic models, even the qualitative results place the information that has been acquired on prey and predators of various ages of toothfish into the context of the larger ecosystem. The qualitative results of the modelling also highlight that species such as krill play such a major role in foodweb dynamics that whole-ecosystem trophodynamic models may not be the most effective way to study with accuracy and precision how the SGSSI fishery for toothfish may be affecting its role in the ecosystem. Although the ecosystem modelling is appropriate to continue for the general</p>

	insights such work might provide, directed studies such as the fatty acid and stable isotope investigations may provide insights into the foodweb relationships of toothfish that are of more direct value as information to consider in managing this fishery within an ecosystem context.
Conclusion	<p>There is an almost endless sequence of progressively more detailed questions that can be posed regarding the ecosystem relationships of any species in marine ecosystems, particularly species such as toothfish which move through a range of sizes, and thus numerous different suites of potential predators and prey. Uncertainties remain, but at this point there seems to be adequate information on the ecosystem roles of toothfish to conclude that the major predators and prey of juvenile and adult toothfish have been identified. Moreover there is sufficient information to conclude that present exploitation rates and patterns in the toothfish fishery are not likely to severely alter the availability of smaller toothfish to its main predators, or the role of larger toothfish as predators on the ecosystem. That is sufficient to allow the condition to be closed. However the outputs of further research, particularly the BAS Discovery 2010 projects, should be reported as a component of the overall fishery management reporting.</p> <p>Three Performance Indicators relate to this condition; 2A.3, 2E.1, 2E.5.</p> <p>PI 2A.3 Is information available on the position and importance of the target species within the food web?</p> <p>SG 80: Information is available on the position and general importance of target species in the environment at key life stages. SG 100: Quantitative information is available on the position and importance of the target species within the food web at key life stages.</p> <p>The requirements of this Condition have now been met, the position and importance of the target species within the food web has been established and some quantitative information is available. The score for this PI is now revised to 85.</p> <p>PI 2E.1 Have all the significant effects of the fishery on the ecosystem been identified?</p> <p>SG 80: There is a comprehensive evaluation of the effects of the fishery on the ecosystem. SG 100: The effects of the fishery on the ecosystem have been identified by appropriate comparative and/or experimental studies.</p> <p>The requirements of this Condition have now been met. The position of juvenile and adult toothfish in the foodweb (in general) is established and current exploitation rate impacts on toothfish in the foodweb are not considered to be at a level which would alter the foodweb relationships significantly. By-catches in the fishery are also known and are not expected to alter the role of bycatch species in the foodweb.</p> <p>The score for this PI is fully considered under Condition 10 below. The comments above will be taken into account in allocating this score.</p> <p>PI 2E.5 Is associated biological diversity and productivity affected to unacceptable levels?</p> <p>SG 80: The effects of the fishery on biological diversity and productivity have been considered and no unacceptable impacts have been found. SG 100: The effects of the fishery on biological diversity and productivity have been quantified and are within acceptable tested/justified limits</p> <p>The requirements of this Condition have now been met as discussed above. The score for this PI is fully considered under Condition 10 below. The comments above will be taken into account in allocating this score.</p>

5	Condition of Certification 10: Determination of significant interactions with benthic habitat.
Activity assessed	<p>The potential for longline fishing activity to significantly impact upon benthic habitats is generally regarded as being low. However, research should be directed at locating areas of complex benthic habitat, particularly biogenic features, within the areas exploited by fishers. This may be addressed through observer recording of evidence of biogenic features through retrieval in long-lines.</p> <p>If such areas are found, efforts to protect these from gear impacts, including those associated with long-lines should be considered and results documented.</p> <p>Timescale: Collection of suitable information takes place at present and should be continued. Initial mapping of fishing activities and areas of complex benthic habitat should be carried out within three years following certification (or earlier if sufficient information is collected) and further developed thereafter as more information is collected.</p>
GSGSSI Progress Report	<p>The condition calls for</p> <p style="padding-left: 40px;">Research should be directed at locating areas of complex benthic habitat, particularly biogenic features, within the areas exploited by fishers. This may be addressed through (a) observer recording of evidence of biogenic features through retrieval in long-lines. If such areas are found, (b) efforts to protect these from gear impacts, including those associated with long-lines should be considered and results documented. Timescale: Collection of suitable information takes place at present and should be continued. (a) Initial mapping of fishing activities and areas of complex benthic habitat should be carried out within three years following certification (or earlier if sufficient information is collected) and (c) further developed thereafter as more information is collected [our labels]</p> <p>The 2007 surveillance report recognised that progress in addressing this Condition has been excellent. The report indicated that modifications to the observer program, to allow for targeted collection of information on deepwater corals and benthos, have allowed for a comprehensive spatial analysis of benthic biogenic features in the fishing area (Roberts, 2006), such that (a) is now complete.</p> <p>In fulfilment of (b), we have identified that restricted fishing areas should be implemented to protect major coral aggregations on a precautionary basis. We have made significant progress in optimising the site selection for these areas. This was achieved through a study that used a modelling approach to determined areas in which there was a maximum reduction in coral catch and minimum reduction in toothfish catches. This was supported by an analysis of coral diversity in the fishing area at South Georgia, conducted with Alex Rogers of the Zoological Society, which concluded that the octocoral fauna around South Georgia is likely to be at the high diversity end of ranges of diversities encountered in similar deep, cold-water coral communities (Agnew <i>et al.</i>, 2007).</p> <p>On the basis of this research, and following a stakeholder consultation period in 2007, a shortlist of three Reduced Impact Areas (RIAs) were identified for implementation prior to the beginning of the 2008 fishing season (See Figure 9):</p> <ol style="list-style-type: none"> 1. West Shag (WSHAG) – for protection of a very large and potentially diverse aggregation of deepwater corals; 2. West Gully (WGULLY) – for protection of a genetically diverse coral aggregation and protection of a key toothfish spawning ground; 3. Northeast South Georgia (NESG) – for protection of corals and for reduction of rajid bycatch. <p>It is proposed that limited fishing operations will be allowed within the RIAs, to enable continued tagging of toothfish (at an increased tagging rate), so that the accuracy of toothfish stock assessments are not compromised. There has been a de facto RIA in all waters shallower</p>

than 500m since the fishery was assessed in 2004 and therefore research is planned this year to assess the representative nature of benthic species in these shallower waters and depth-effects on deepwater coral and other benthic species abundance and species composition. Longliners carrying out research fishing in the RIAs will also be required to conduct a series of fishing transects running from 200 - 600m, in a number of locations across the entire fishing area both within and outside of RIAs, providing an overlap with existing data from the fishery (which is available from 500m and deeper). Transects will be positioned close to areas of the shelf swept by the bottom trawl survey to allow for calibration of the two sampling methods.

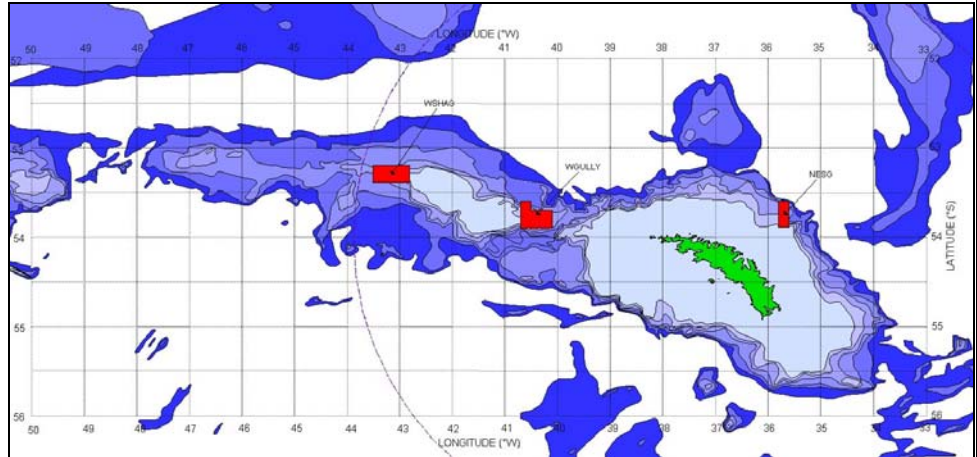


Figure 9 Location of RIAs selected for designation at South Georgia

Information to date does not indicate widespread detrimental impacts, notwithstanding which, RIA site selection is undertaken in a precautionary manner. As yet, the data available do not allow us to identify whether fishing is having a significant impact on coral or other benthic populations, or their recovery rates, particularly corals. Assuming recovery rates are as slow as have been documented for corals in some other areas (e.g. centuries), our RIA site implementation is a precautionary measure. In 2008, limited camera surveys of the seabed in the RIAs and other key areas identified from the observer data are planned to begin the process of identifying the impacts of fishing on the benthic ecosystem. This will be a precursor to a larger ROV video survey, which is currently planned to be conducted in 2010, depending on equipment availability and costs.

Future work will consider the wider Antarctic work on MPAs and bioregionalisation. There is a call for areas to be identified for protection across the CCAMLR area and one of the key criteria for site selection is representativeness. We intend to evaluate whether the RIA site selection is representative of South Georgia though continued genetic analysis of deepwater corals sampled from the fishery. This is being conducted by a Ph.D. student, supervised by Alex Rogers at ZSL and will allow for a comparative analysis of the coral species composition and diversity within the RIAs and across the fished area.

Observations

Past Surveillance Reports reported that *“The accumulated information from observers regarding corals and benthos captured by or entangled in the long-lines, and the dissertation by J Roberts, represent major steps forward on our knowledge of the interactions of the fishery with the benthic habitat. The information from observers does indicate that there is some entanglement of benthic habitat features, particularly deep/cold-water corals but the rate of occurrence is low and the scale of each event quite local. Work with underwater towed cameras is far from complete, but thus far results are consistent with the inferences from the observer data. Importantly, the dissertation by Roberts provides a comprehensive analyses of the spatial information on both habitat features and benthic (and other) bycatches, relative to the spatial operation of the fishery.”*

Further information is now available from observers. The new information continues to be

	<p>consistent with past information and supportive of the tentative conclusions from past years. Work is planned in 2008/2009 to trial deployment of video cameras to capture images of benthos. These images could contribute significantly to the knowledge available on the benthic communities present and might offer an insight into the impacts of longline fishing in general.</p> <p>Two major new sets of information on potential benthic impacts were made available this year. One set of information was an analysis of the biological diversity of the types of corals taken as bycatch in the fishery. These results could not be taken as quantitatively estimating the biological diversity of corals in the SGSSI area, because of unknown but likely highly variable likelihoods of retention of different types of corals in the long-line gears. Nonetheless the results were adequate to document that the SGSSI area is species-rich, both with many types of corals present and particularly with many species of Primnoidae. The other was the results of a benefit / impact analysis of the potential consequences of closures of specific areas known to support particularly high and/or diverse stands of corals. This analysis estimated both the potential reduction in benthic impacts that could accrue from excluding the fishery from specific areas and the consequences with regard to catch rates of the target species and increased impact on benthos elsewhere due to the relocation of fish effort to alternative areas. The analyses were well done, clearly presented, and packaged into options for spatial management that should reduce impact of the fishery on benthos without making the directed fishery unduly inefficient.</p>
Conclusion	<p>When the condition was issued, it was not to address known and possibly serious impacts of the fishing gear on benthos. Rather, although the long-line gear was not suspected of having large and unsustainable impacts of benthos, it was a concern that little was known of what benthos was present in the fished area and hence there could not be confidence that risks were known and being managed effectively. Since the condition was issued substantial information has been collected and reviewed on the distribution of main types of benthos, on the distribution specifically of cold-water corals, and on the biological diversity of the corals, which are considered to be one of the most vulnerable groups of benthic taxa. More information is also available on the rates of impact of the fishing gear on at least some of the deep water corals. This information has also been consolidated into a set of spatial management options to reduce the impact of the toothfish fishery on the corals, and we have been informed that these options will be implemented in the 2008 fishery. There remain many components of the benthic community that are poorly known, and scope for increasing knowledge through use of underwater visual recording, monitoring bycatches, etc remains. Nonetheless, there is now enough information to identify the major risks associated with the potential impacts of the toothfish longline fishery on the benthic communities and habitats, and to manage those risks. There is also evidence that actions are being taken consistent with an objective of reducing further such risks, even though the risks were never identified as high and serious. It is appropriate to consider this condition closed. Future (re-assessment) audits will take account of further developments with regard to information on benthic populations, communities and habitats, impacts of the fishery in those populations, communities, and habitats, and measures to manage and mitigate such impacts</p> <p>Five Performance Indicators relate to this condition; 2A.1, 2D.1, 2E.1, 2E.4, 2E.5.</p> <p>PI 2A.1 Are the nature and distribution of habitats relevant to the fishing operations known?</p> <p>SG 80: Nature and distribution of all main habitats are known in moderate detail. Information is recent. The distribution of fishing operations is monitored. SG 100: The nature and the distribution of all habitats relevant to the fishing operations are known in detail. Information is recent.</p> <p>The requirements of this Condition have now been met. Nature and distribution of all main habitats are known in moderate detail,. Information is very recent and the distribution of fishing operations is monitored in considerable detail. The score for this PI is now revised to 80.</p> <p>2D.1 Is there adequate knowledge of the physical impacts on habitat due to use of gear?</p>

	<p>SG 80: All impacts of gear use on the habitat are identified including extent and location of use and estimates of habitat recovery times. SG 100: The physical impacts on the habitat due to use of gear have been studied and quantified, including details of any irreversible changes.</p> <p>Although the knowledge of benthos is not complete, the extent and location of gear use is well monitored and the static gear that is used would not have frequent or extensive impacts on benthos other than the identified entanglement of biogenic features. Estimates of recovery times have been adopted based on precautionary estimates. The score for this PI is now revised to 80.</p> <p>PI 2E.1 Have all the significant effects of the fishery on the ecosystem been identified?</p> <p>SG 80: There is a comprehensive evaluation of the effects of the fishery on the ecosystem. SG 100: The effects of the fishery on the ecosystem have been identified by appropriate comparative and/or experimental studies.</p> <p>Impacts of the fishery on the benthic ecosystem have now been evaluated. In combination with the other Conditions considered above, there is now considered to be an appropriately comprehensive evaluation of effects on the ecosystem. Some specific interactions (of highest risk) have been specifically studied (e.g. rajids, food web relations and cold water corals). The score for this PI is now revised to 85.</p> <p>PI 2E.4 Does the fishery have unacceptable impacts on habitat structure?</p> <p>SG 80: No unacceptable impacts of the fishery on habitat structure within major fishing areas have been demonstrated. SG 100: Effects on habitat structure are documented and are within acceptable tested/justified limits.</p> <p>Appropriate studies on impacts on habitat structure have been undertaken and precautionary conservation measures taken to ensure the risks associated with the fishery are managed. Accordingly, no unacceptable impacts are expected at this time, but this is also the subject of ongoing work. The score for this PI is now revised to 80.</p> <p>PI 2E.5 Is associated biological diversity and productivity affected to unacceptable levels?</p> <p>SG 80: The effects of the fishery on biological diversity and productivity have been considered and no unacceptable impacts have been found. SG 100: The effects of the fishery on biological diversity and productivity have been quantified and are within acceptable tested/justified limits</p> <p>As discussed above, no unacceptable impacts on benthos are expected based on existing information. The option evaluation of the results of closing different areas provides a further relative quantification of the impacts and results of the area closure options. In combination with the other Conditions considered above in respect to this PI, there is now considered to be an appropriately comprehensive evaluation of effects on biological diversity and productivity. Some specific interactions (of highest risk) have been studied in appropriate detail (e.g. rajids, food web relations and cold water corals). The score for this PI is now revised to 90.</p>
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6	<p>Any complaints against the certified operation; recorded, reviewed and actioned</p> <p>No direct complaints in relation to the fishery management system are noted.</p> <p>A dispute, subject of judicial review, continues over the licensing of vessels participating in the experimental pot fishery. The dispute is raised by owners of the vessel Isla Alegranza of Uruguay. As reported previously reasons for licence allocation include issues such as UK Foreign Office policy as well as previous track record of compliance/research and ability to take part in experimental fishing/research activities. This is, however, not seen as significant in relation to the current MSC certification – being relating entirely to who is licensed, not the total quota or competence/adequacy of skippers or vessels.</p>
7	<p>Any relevant changes to legislation or management regime.</p> <p>GSGSSI continues to license vessels for experimental pot fishing, but this (together with longline catches) is strictly within the overall TAC for the stock.</p> <p>Operations manager Gordon Liddle has left GSGSSI in March 2007, although not directly involved in the fishery he provided <i>ad-hoc</i> advice and support. Other relevant staff remain in position, however, together with contracted support services and so this is not expected to present undue difficulties in the management of the toothfish fishery.</p> <p>A revised document of information for Applicants for licenses was introduced with a revision of the application form. Both are available on the Government of South Georgia official website (www.sgisland.org) and have been sent to potential applicants. This is seen as an appropriate development of the management system.</p>
8	<p>Overall Conclusions</p> <p>The overall management of the fishery through CCAMLR and the GSGSSI continues to at least the level as during the main assessment. Systems developed to allow tracking of fish, necessary for toothfish product to enter into future Chain of Custody assessment (and so to carry the MSC logo) continue with some minor refinements. Product tracking systems continue to work well.</p> <p>All conditions of certification raised during the initial MSC assessment of this fishery have now been met, to at least the 80 level, within the timeframe of the present certificate.</p> <p>The Performance Indicators re-scored in this report all relate to Principle 2 (2A.1, 2A.3, 2C.3, 2D.1, 2E.1, 2E.4, 2E.5). Following the above surveillance audit rescored, the revised score for Principle 2 for South Georgia Patagonian Toothfish Longline Fishery is now 86.</p>

Information Sources:

Meetings

1. GSGSSI. R McKee. 27 and 31 August 2007
2. Falklands Conservation. G Munro. 27 August 2007
3. Quark Fishing Ltd. M Summers. 28 August 2007
4. Beauchene Fishing. T Ormond 29 August 2007
5. Argos Pereira Ltd. P Thomson 30 August 2007
6. Polar Ltd. D Sawle, A Reid. 30 August 2007
7. Vessel inspections witnessed; San Aspiring, Antarctic Bay, Viking Bay, Argos Georgia

Reports etc

1. GSGSSI Case File – Ibsa Quinto
2. GSGSSI Case File – Isla Alegranza
3. GSGSSI File. Pre-season Licensing Inspection Reports 2007
4. GSGSSI File. Post-season vessel inspections 2007

Supporting documents for Condition 1

5. Report on the WG-IMAF Part II October 2007.
6. Report of the Working Group on Fish Stock Assessment (Hobart, Australia, 8 to 19 October 2007) SC-CAMLR-XXVI/4
7. CCAMLR FSA Appendix J: Fishery report *Dissostichus eleginoides* South Georgia
8. UK, 2007. Fishing equipment, marine debris and hydrocarbon soiling associated with seabirds at Bird Island, South Georgia, 2006/07, SC-CAMLR-XXV/BG/18.

Supporting documents for Condition 4

9. Agnew, D.J. and R.E. Mitchell 2007. Proposal for further trials aimed at reducing *Macrourus* spp. by catch on autoliners targeting *D. eleginoides* with longlines around South Georgia. CCAMLR, WG-FSA-07/30.
10. Agnew, D.J., Mitchell, R.E., Carruthers, T., Roberts, J., Hillary, R., and Pearce, J. (2007) Preliminary Assessment of the South Georgia Ray populations. CCAMLR WG-SAM-07/11.
11. Mitchell, R.E., Agnew, D.J., Carruthers, T., Clark, J., Ross, L. (United Kingdom) and van Heerden, J. (South Africa) (2007). Preliminary trials to test mitigation measures aimed at reducing *Macrourus* Spp. by-catch on autoliners targeting *D. eleginoides* with longlines in the CCAMLR Convention Area. CCAMLR, WG-FSA-07/33. 10 pp.

Supporting documents for Condition 10

12. D.J. Agnew, J. Roberts, J. Moir Clark, R.E. Mitchell, J. Pearce, T.T. Ang, A.D. Rogers. 2007. Options for restricted impact areas to protect areas of high coral biodiversity at South Georgia and Shag Rocks. A report for the Government of South Georgia and the South Sandwich Islands. June 2007.

Guidelines used:

1. MSC Principles and Criteria for Sustainable Fishing
2. MSC Fishery Certification Methodology Version 6 (in part; otherwise v5)
3. TAB Directives (All)