RECOMMENDATIONS ON ROCK LOBSTER TAC's FOR THE TRISTAN GROUP OF ISLANDS FOR THE 2012/13 SEASON

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SUMMARY

Based on a similar approach as used last year, but updated to take account of recent decisions about the probable impact of the OLIVA incident on the resources at Nightingale and Inaccessible, TACs have been calculated for all four islands which aim to achieve and maintain CPUE at the levels that would have applied in 2011 had it not been for the Oliva incident. The results suggest reductions in the present TAC at Inaccessible, Tristan and Nightingale. However, given the intended move to a management procedure approach for setting catch limits by next year, and taking cognisance of the greater industrial stability that such an approach intends, it is recommended that the TAC reductions as now calculated be considered for phasing in over time. Some immediate reduction is recommended for Inaccessible, where the evidence for a decline in resource status is clear. However for Tristan and Gough, the suggested reduction follows not because current catches are unsustainable, but rather because they are expected to lead over time to some reduction in CPUE. This means that there is no great urgency for any immediate TAC reductions at these two islands, so that a range of options for TACs there is put forward. Consequently the TAC recommendations for the 2012/13 season are:

Inaccessible	44 mt	(decrease of 9 mt)
Nightingale	Closed	
Tristan	170-174mt	(no change to a decrease of 4 mt)
Gough	91-95 mt	(no change to a decrease of 4 mt)
Total	305-313 mt	(decrease of from 9 to 17 mt)

Note that the recommendations for Nightingale and Inaccessible should be considered as provisional, pending further test fishing results to become available during the season for the former, and revaluation of the impact of the Oliva oil spill together with investigation of the merits of decreasing the size limit at the latter where considerable discarding is occurring at present. It is suggested that revision of the regulations for these two islands be considered after deliberations on results of analyses of these issues planned for a meeting to be held in November.

BACKGROUND

The assessment models used to provide advice for TACs for the islands have been updated recently to take into account the most recent data collected from the fishery. These include CPUE data, length distribution data from the fishery, data on discards, and estimates of lobster growth rates.

Advice must be given with long-term objectives for the fishery in mind. The objective for this fishery is to achieve target exploitable biomasses of the resource at each island, and hence associated catch rates. Last year this was based on a "balanced intermediate strategy" of a RY (replacement yield) intended to keep the exploitable biomass at its (pre-OLIVA) 2011 level into the future, and a RY set to get $B_{sp}/K \sim 0.85$ in the long term future (2061). However, following the OLIVA incident and estimates of the consequent loss of yield, this has been modified slightly for the OLIVA-impacted islands (Nightingale and Inaccessible) to focus on moving towards and maintaining the exploitable biomass at its pre-OLIVA 2011 level, as detailed further below.

One of the major uncertainties that needs to be considered relates to the estimate of the lobster growth rate at each island. In two cases this estimate is particularly uncertain, so that results are shown for two alternative growth models, with averages taken over these two models to obtain a final estimate for long-

term balanced RY above. The other major uncertainty to consider relates to the extent of any damage caused at Nightingale and Inaccessible islands in March 2011 as a result of oil and soya spills from the OLIVA grounding and break-up.

METHODS AND RESULTS

The updated assessments (see Appendix) provide estimates of current exploitable biomass (and hence CPUE) in 2011. These are reported in Table 1 as the "Target Biomass" values. The objective decided last year for Inaccessible and Nightingale after the Oliva incident was to attempt to achieve and maintain the fishery at such "Target Biomass" values into the future. Previously such targets were to be achieved smoothly over the long term (by 2066). Since the OLIVA incident occurred, a slightly more complex method has been employed to estimate the replacement yields (RYs) required at Inaccessible and Nightingale to achieve this objective without too large an immediate drop in catch, if possible. RYs for four different periods have been calculated for these two islands in order to achieve the "Target Biomass" values in all of 2016 (if possible), 2021, 2031 and 2061 (see Johnston and Butterworth (2011) for further details of this approach). Given the adoption of this approach in pursuit of the claim related to the Oliva incident, it seemed prudent to maintain this same calculation approach for these two islands in taking account of the further data now available for them. In contrast, for Tristan and Gough, which were not affected by the Oliva incident, the same smooth approach as last year has been applied, though now also with the objective of maintaining the 2011 CPUE level, as for the other two islands.

Note that as for previous RY calculations, the following apply:

1) Future recruitment levels: the assessment models estimate the recruitment variability for the period 1992-2007 (previous assessment estimated 1992-2005). For the period 2008+ it is not possible to estimate recruitment trends from the data so that one needs to make an assumption about recruitment level for the 2008+ period. Here it is assumed that the average of the 1998-2007 recruitment level applies to the 2008+ future (last year the 1998-2005 average was used). As last year, this is considered a conservative option, as the assessments estimate a higher recruitment just prior to 1998, which may re-occur in the future. However the more cautious approach of waiting for indications of this in new data before assuming that this will indeed happen is preferred as a basis for advice at this stage.

2) Future fishing selectivity: the future fishing selectivity is assumed to remain at that estimated for recent years.

Table 1 reports these RY values under the assumption that no OLIVA incident occurred. Both growth models are explored for Nightingale and Gough – with results also reported for an average of the two.

Table 2 reports similar values, but here calculations of the RYs take into account the effect of the OLIVA incident at Inaccessible and Nightingale islands, which are considered to have been as follows:

Inaccessible: Oil effect on juveniles (ages 1, 2, and 3 year olds) – 35% mortality

Nightingale : Oil effect on juveniles (ages 1, 2, and 3 year olds) – 80% mortality
Nightingale : Soya effect on adults (ages 4+ year olds) – 50% mortality

These assumptions are those agreed at the November 2011 workshop held in Cape Town.

Table 3 lists the TAC's which would follow for the 2012/13 season, and compares these with the original TACs set for the 2011/12 season and those TACs that were "updated" following the OLIVA incident.

DISCUSSION

The results in Table 3 suggest substantial reductions in the TAC at Inaccessible (53 to 34 mt). The primary reason for this reduction is clear from inspection of the updated assessment plot in the Appendix (Fig. A1). This shows that further lower CPUE values at Inaccessible in the last two years, plus model refinements which lead to a better fit to these data, now result in a marked decline in estimated abundance (a reflection of worse recruitment) since the 2005/06 season.

Table 3 also indicates reductions needed at Tristan (174 to 165 mt) and at Gough (95 to 87.5 mt). The reasons underlying these results need to be understood, and become evident from inspection of Figs 1 and 2, which show projections of the exploitable biomass and CPUE at these two islands under different levels of constant catch. All the catch levels shown are sustainable, but the higher catch levels result in the CPUE stabilizing at lower levels; this occurs because the assessments estimate these resources to be recovered (above the abundances that yield MSY). Thus although current TACs are sustainable, they are estimated to lead over the next one to two decades to drops in catch rate (CPUE) of some 10 to 20%.

It also needs to be kept in mind that by next year it is planned to have moved to a management procedure approach which may see an alteration in some targets once objectives are refined (particularly in carefully considering the most desirable trade-off between future catches and catch rates at each island) and furthermore would be likely to impose restrictions on any inter-annual TAC changes to less than the amounts reflected above, in the interests of enhanced industrial stability. The Tristan rock lobsters are a relatively long-lived species, so that TAC changes can effectively be phased in over time without putting the resource at risk.

In these circumstances, it is recommended that the full TAC reductions suggested in Table 3 for Inaccessible, Tristan and Gough need NOT be implemented immediately, but rather phased in over periods that may differ from island to island. For Inaccessible, for which resource status has deteriorated, there is the strongest case for immediate TAC adjustments, and it is recommended to consider a phase-down period of 2 years, so that the reduction in TAC for the 2012/13 season would be half the amount indicated in Table 3, i.e. 9 mt. For Tristan and Gough, the situations are different, with no cause for immediate concern so that a case could be made for maintaining the current TACs pending adoption of management procedures to set the TACs from next year. If reductions are to be considered, decreases of at most half the amounts shown in Table 3 might be appropriate (i.e. 4 mt at each island). If these two islands are to be differentiated, a greater reduction at Tristan than at Gough might be argued on the basis of the recent downward trend in CPUE at the former, but not the latter (see Figs A3 and A4)., Taking all the above into account, for 2012/13 the TAC recommendations are:

Inaccessible	44 mt	(decrease of 9 mt)
Nightingale	Closed	
Tristan	in range 170-174 mt	(from no change to a decrease of at most 4 mt)
Gough	in range 91-95mt	(from no change to a decrease of at most 4 mt)
Total	305- 313 mt	(decrease of between 9 and 17 mt)

It is further suggested that the recommendations for Inaccessible and Nightingale should be regarded as provisional. For Nightingale the results of test fishing to be undertaken during the coming season will allow a re-evaluation of the impact of the Oliva incident on the resource. At Inaccessible the fishery has been experiencing large discard rates, and there is a potential case to lower the size limit there, as discarding, particularly if repeated for the same lobster, leads to additional mortality. Assessment calculations to examine the possible benefits and disadvantages of such a change are to be pursued, and might in a matter of months lead to a recommendation for consideration of a size limit change in mid-season. Furthermore, a re-evaluation of the estimated impact of the oil spill from the Oliva at Inaccessible might be appropriate. Suggestions have been made for a meeting in November to review all of these matters, and it could be

appropriate to reconsider the regulations to apply for the latter part of the 2012/13 season at Inaccessible and Nightingale in the light of the outcome of those deliberations.

REFERENCE

Johnston, S.J. and D.S. Butterworth. 2011. Effect of the 2011 oil and soya spill events on rock lobster yields at Inaccessible and Nightingale islands. MARAM document, MARAM/TRISTAN/2011/SEP/13.

Table 1: The RY values (MT) estimated for each island assuming that **no OLIVA** incident occurred. Note that Inaccessible and Nightingale values change over time in line with the methodology adopted to deal with impacts caused by the Oliva incident, whereas for Tristan and Gough a single value is calculated for the whole period.

	Target Biomass	RY 2012-2015	RY 2016-2020	RY 2021-2030	RY 2030-2060
Inaccessible	364 MT	**103**	**98**	**98**	**98**
Nightingale:					
Pollock growth	248 MT	77	61	61	61
James Glass Growth	247 MT	63	60	60	60
Average		**70**	**60.5**	**60.5**	**60.5**
Tristan	481 MT	**165**	**165**	**165**	**165**
Gough:					
Pollock growth	217 MT	87	87	87	87
James Glass Growth	209 MT	88	88	88	88
Average		**87.5**	**87.5**	**87.5**	**87.5**
TOTAL		**425.5**	**411**	**411**	**411**

Table 2: The RY values (MT) estimated for each island when taking the OLIVA incident into account. (Note the values for Tristan and Gough are the same as for Table 1, as there was no OLIVA effect at these islands.)

	Target Biomass	RY 2012-2015	RY 2016-2020	RY 2021-2030	RY 2030-2060
Inaccessible	364 MT	**34**	**98**	**98**	**98**
Nightingale:					
Pollock growth	248 MT	0	0	60	61
James Glass Growth	247 MT	0	19	60	60
Average		**0**	**9.5**	**60**	**60.5**
Tristan	481 MT	**165**	**165**	**165**	**165**
Gough:					
Pollock growth	217 MT	87	87	87	87
James Glass Growth	209 MT	88	88	88	88
		87.5	**87.5**	**87.5**	**87.5**
TOTAL		**286.5**	**360**	**410.5**	**411**

Table 3: TACs (MT) for the 2012/13 season based on RY calculations and taking the OLIVA incident into account. Note discussion in the text motivated that the reductions indicated at Inaccessible and Gough be phased in over two years.

Inaccessible	Inaccessible	Nightingale	Tristan	Gough	Total
TAC 2011/12 Prior to OLIVA incident[#]	95	65	174	95	429
Reduced TAC 2011/12 post OLIVA incident	53	0	174	95	322
2012/13 TAC indicated taking OLIVA incident into account where relevant	34	0*	165	87.5*	**286.5**

*average of the Pollock and James Glass growth model values

[#] based on a "balanced intermediate strategy" of a RY intended to keep the exploitable biomass at its (pre-OLIVA) 2011 level into the future, and a RY set to get $B_{sp}/K \sim 0.85$ in the long term future (2061). Note too that the Nightingale and Gough results were based on the James Glass growth model at this stage, whereas in line with agreements at the November 2011 workshop, the averages of the Pollock and James Glass growth models are now used.

Figure 1: Model estimates off exploitable biomass at Tristan, projected into the future at four levels of constant catch (CC).
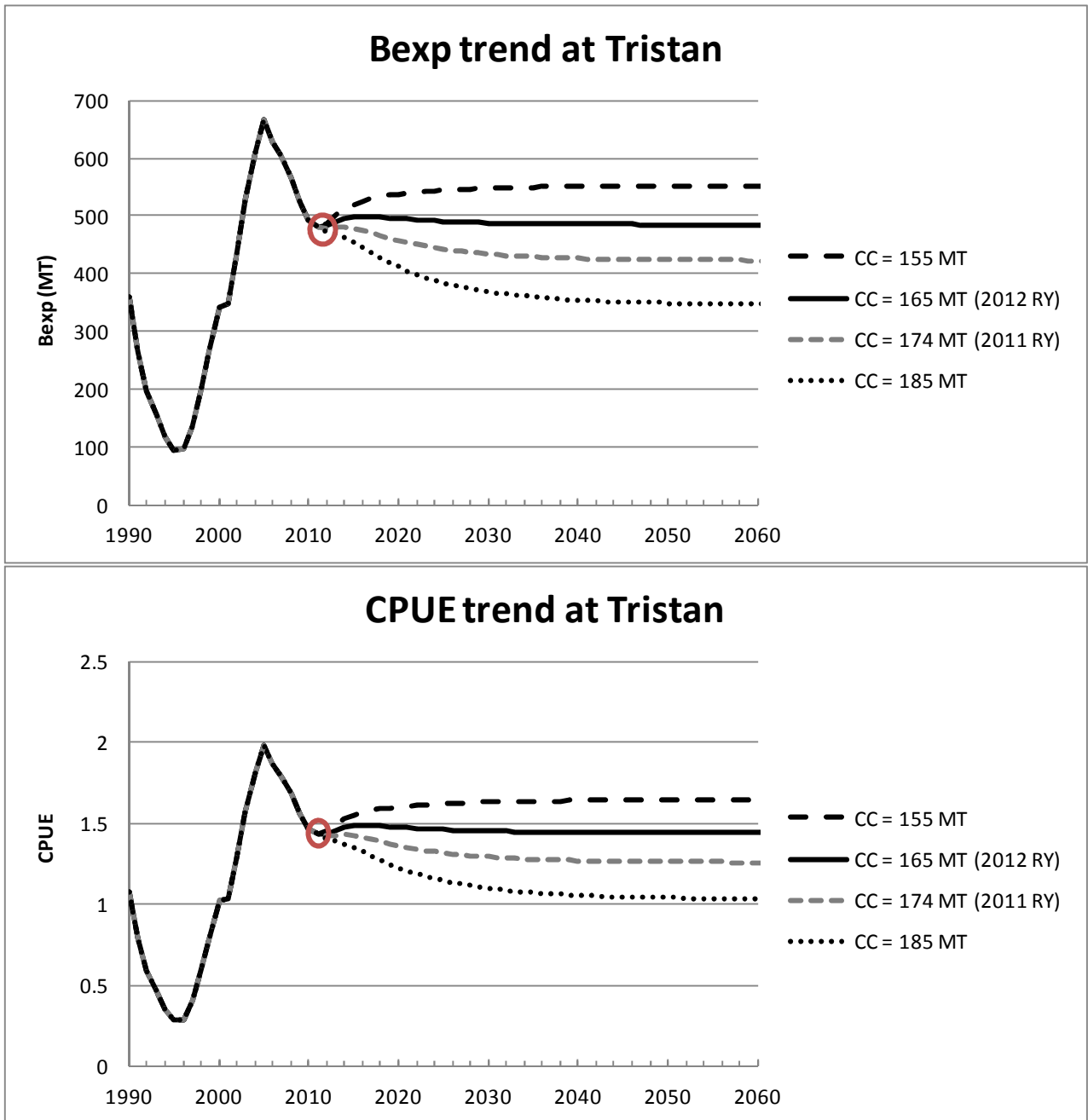
Figure 2a: Model estimates off exploitable biomass at Gough assuming the Pollock growth model, projected into the future at three levels of constant catch (CC).
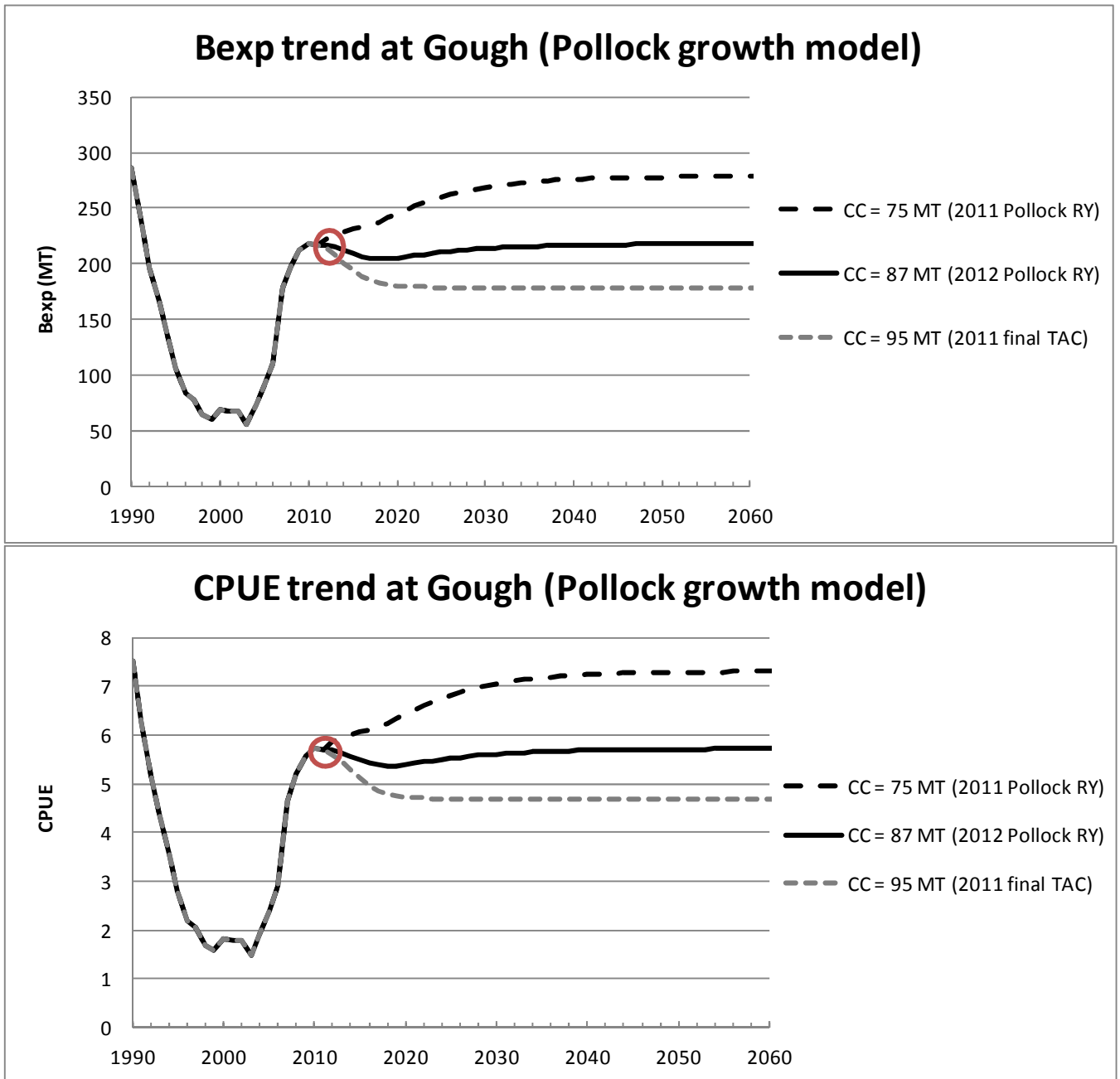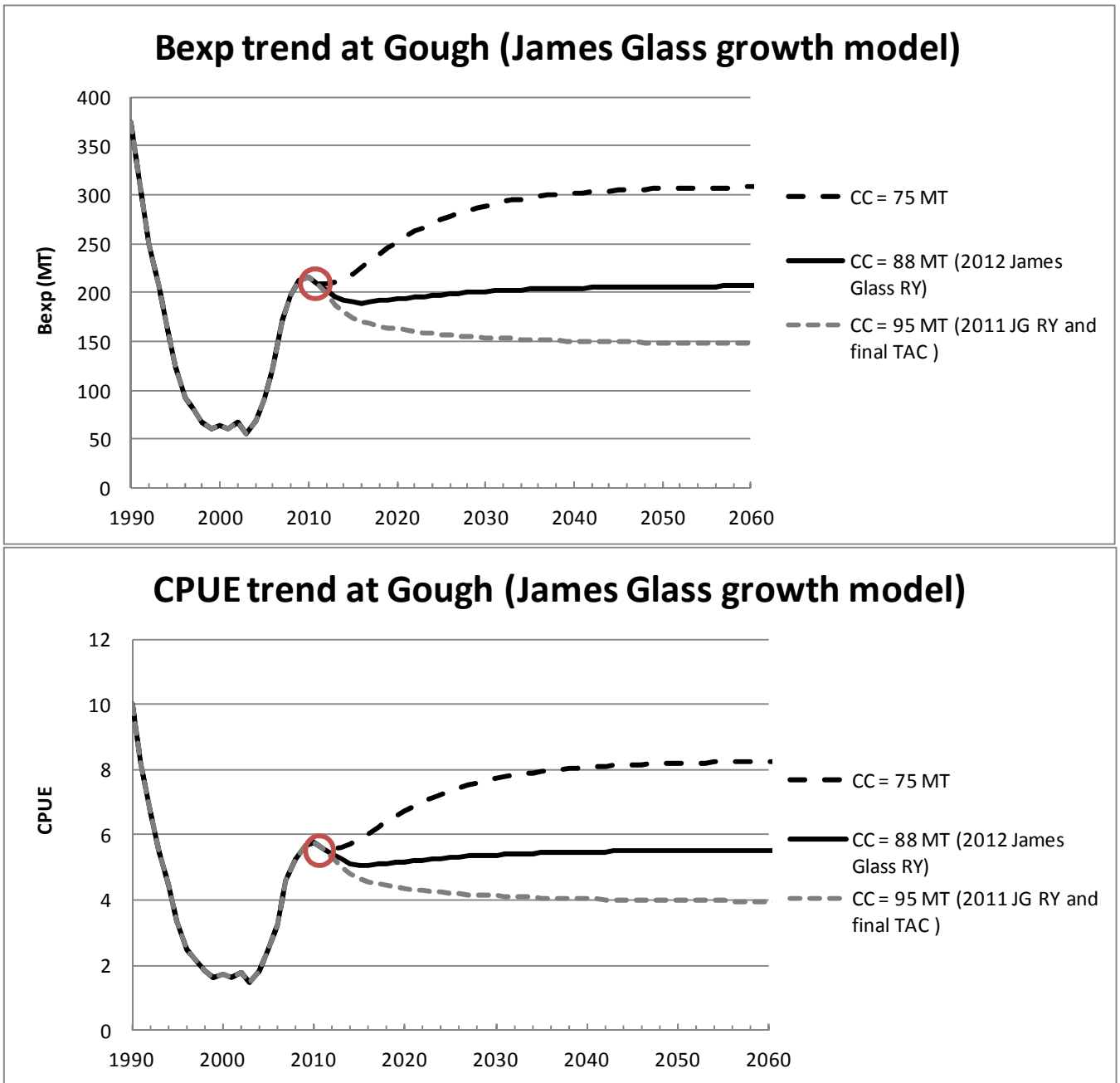
Figure 2b: Model estimates off exploitable biomass at Gough assuming the James Glass growth model, projected into the future at three levels of constant catch (CC).

Appendix: Plots of updated assessments showing model fitted exploited biomass fitted to observed CPUE trends.

Notes: A document detailing these updated assessments is in preparation.
      In the plots, the year 2009, for example, refers to the 2009/10 season
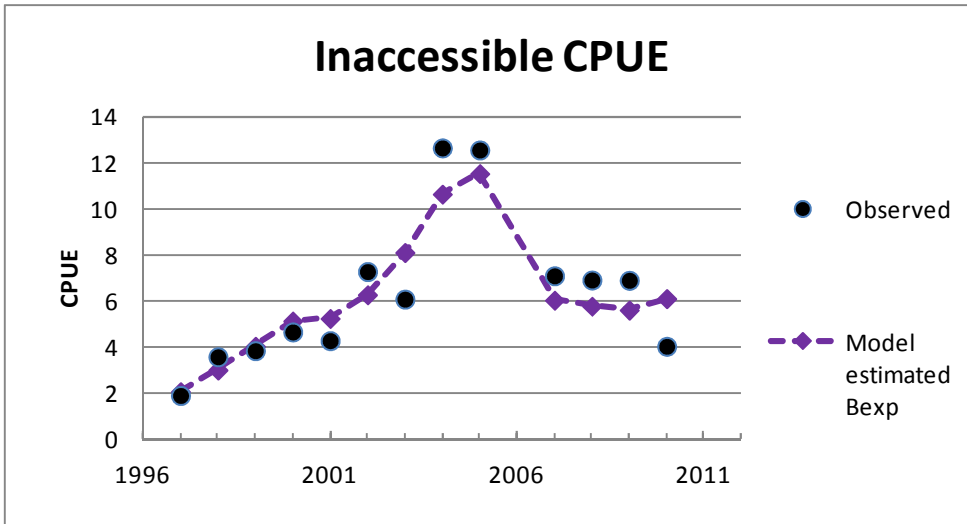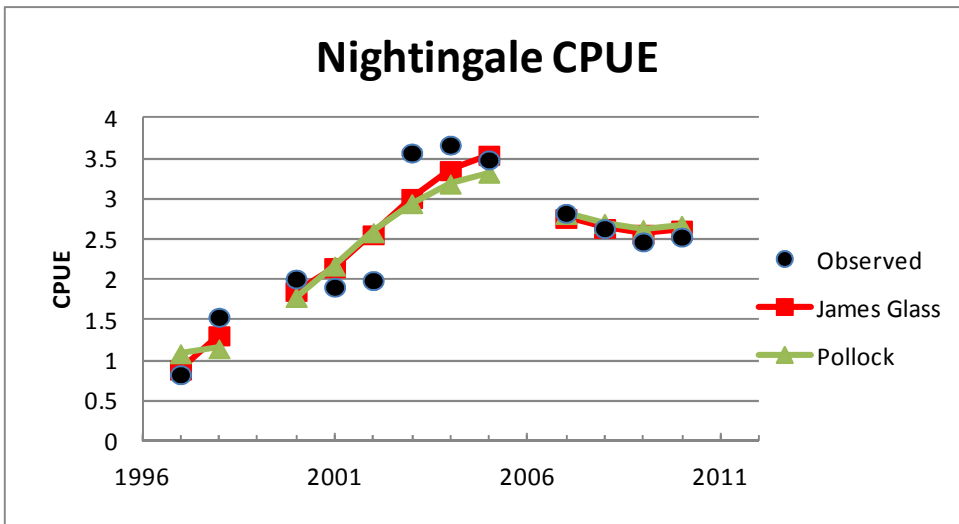
Figure A1: Inaccessible
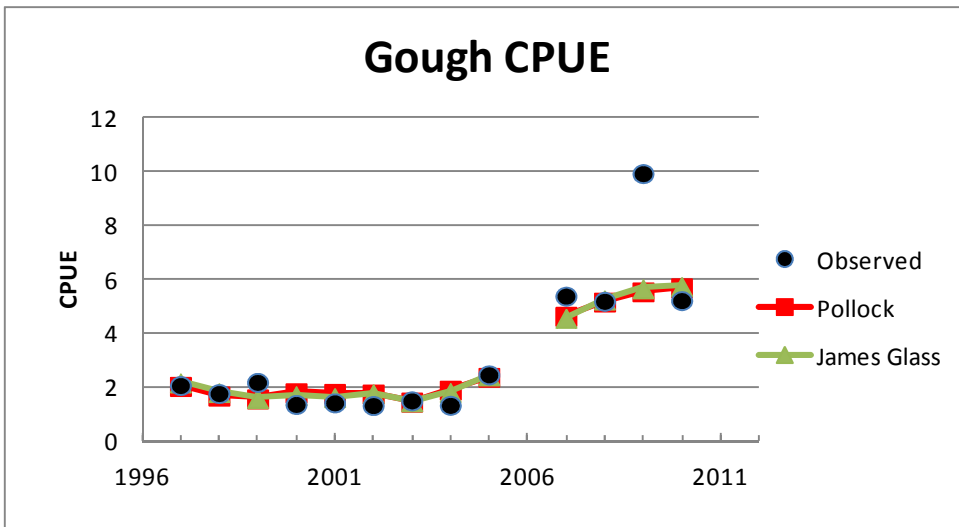

Figure A2: Nightingale

Figure A3: Gough

Figure A4: Tristan