

FROM: DIRECTOR-GENERAL: MS PAM YAKO

TO: DDG: MCM

VAN O.M. GEWINGSAKE
2007-12-14 11:55 AM

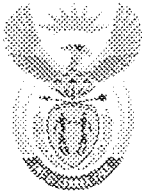
flow Details

COMMENTS:

17675 HAKE TAC 2008						
Date	Initiator:	Current Performer:	Due Date:	Done Date	Workflow Status:	
05 December 2007 04:27 PM	Beryl Batties	WF: ODG Scan Registry	20 December 2007 11:55 AM		Executing	
Initiator Comments:						
Step Details...						
Step Name	Performer	Task Disposition	Due Date	Done Date	Comments	
Step 2 - Director	Theressa Akkers	Forward to CD	07 December 2007 04:27 PM	05 December 2007 04:41 PM		
Step 3 - Chief Director	Andre Share	Recommended	07 December 2007 04:41 PM	10 December 2007 02:04 PM	Dear DDG New version has been added. Regards Andre	
Step 4 - Deputy Director-General	Monde Mayekiso	Recommended	12 December 2007 02:04 PM	11 December 2007 04:12 PM		
Step 5 - Chief Financial Officer (MCM)	Saliem Mohamed	Funds available	13 December 2007 04:12 PM	13 December 2007 07:34 PM		
Step 6 - Chief Operating Officer	Nosipho Jezile	Recommended	17 December 2007 07:34 PM	14 December 2007 09:09 AM		
Step 7 - Language Practitioner	Constance Molope		18 December 2007 09:09 AM	14 December 2007 10:59 AM		
Step 8 - Director-General	Pam Yako	Recommended	18 December 2007 10:59 AM	14 December 2007 11:50 AM		
Step 8D - Print Documents for DG	Betta Coetzee		18 December 2007 11:50 AM	14 December 2007 11:55 AM		
Step 8E - Scan & Attach Signed Submission	WF: ODG Scan Registry		18 December 2007 11:55 AM			
Step 9 - Workflow Complete	WF: D:O&HSFM		20 December 2007 11:55 AM			

MINISTERIE VAN OMGEWINGSAKE EN TOERISME
PRIVAATSAK X 447
PRETORIA 0001
2007 -12- 17
PRIVATE BAG X 447
PRETORIA 0001
MINISTRY OF ENVIRONMENT AFFAIRS AND TOURISM

17675



environment
& tourism

Department:
Environmental Affairs and Tourism
REPUBLIC OF SOUTH AFRICA

Reference: V1/20/5/1/2

MINISTER

TOTAL ALLOWABLE CATCH (TAC) FOR THE 2008 HAKE FISHING SEASON

1. PURPOSE

- 1.1 To request that you determine the Total Allowable Catch (TAC) for the 2008 Hake fishing season in terms of the provisions of Section 14 of the Marine Living Resources Act, 1998 (Act No. 18 of 1998).

2. SUMMARY

- 2.1 It is recommended that the global Total Allowable Catch (*TAC*) for the Cape hakes be reduced by 3.3096% from 135 000 t in 2007 to 130 532 t for 2008. It is further recommended that the reduction be applied evenly across all sub-sectors of the hake fishing industry, consistent with the existing access rights policy framework, with reductions to all Rights Holders and to the handline hake reserve, all reflecting the same proportion in reduction of 3.3096%.
- 2.2 It is further recommended that a portion of the hake *TAC*, amounting to 2% of the horse mackerel allocation for directed mid-water trawl (630 t), be set aside as a reserve to account for hake bycatch in the horse mackerel-directed mid-water trawl fishery. This quantum is to be deducted from the global hake *TAC* prior to proportional allocations to the sectors in the hake fishery.
- 2.3 Through the Hake Management Working Group, implementation of an effort control management regime, in terms of matching vessel capacity to its allocation of hake in the trawl sectors is being implemented. It is envisaged that the hake longline sector capacity management will be implemented subsequent to further consultations with Right Holders early in 2008.

- 2.4 The hake fishing season coincides with the calendar year from 1 January to 31 December. However, provision should be made for a 15-day overlap period at the start and end of the season to take account of Right Holders that have either caught their full allocation by 15 December of the preceding year or have not caught their allocation by 31 December and require additional time to do so.

3. BACKGROUND

- 3.1 For the 2007 season you determined a TAC of 135 000 tonnes for the hake fishery (Annexure A).

- 3.2 The Department considered the recommendations from the Chief Directorate: Research, Antarctica and Islands of the Branch: Marine and Coastal Management (as per Annexure B) and wishes to advise as follow:

- The new hake Operational Management Procedure (OMP) development process is based on the recommendations of an international stock assessment workshop focussed on the hake resource held in January 2004.
- Calculations conducted during the previous OMP development indicated the need for an appreciable reduction in the hake TAC in the short-term. It was recommended that this reduction be phased over two years.
- The Cape hakes combined spawning biomass is currently estimated at about 20% of its pristine level, while the biologically appropriate level for Cape hakes is likely about 35% of pristine. Clearly the resource is depleted below an optimal level and there is a need to urgently put a rebuilding strategy in place.
- A range of Management Procedures tuned to varying recovery rates were explored. Regard was also given to the WSSD target for rebuilding depleted stocks by 2015.
- A selection of OMP candidates were presented to Industry at Hake Management Working Group sectoral meetings held in Cape Town (deepsea trawl), Mossel Bay (inshore trawl and handline) and Port Elizabeth (longline) at the end of September

2006. This was subsequently followed by a more detailed presentation of a selection of candidate OMPs to an open meeting of all hake sectors held in Cape Town on 17 October 2006 to obtain Industry input to aid in the selection of the OMP to be adopted to provide scientific recommendations for hake TACs for the next four years. Since OMP 1 predicted recovery of the hake resource in a relatively short period, it was the preferred option.

- OMP 1 projected a 20-year recovery period with a 10% constraint in the change in TAC. OMP 1 with maximal reductions of 10% for 2007 and 2008, with a possibility of a further similar or lesser reduction in 2009. Thereafter, the TAC is expected to increase slowly. With these reductions, the deepwater trawl catch per unit effort is expected to increase by 50% over the next 10 years. This option coined the phrase "short-term pain for long-term gain".
- For the 2008 TAC, Catch Per Unit Effort (CPUE) and Scientific Survey data were used for the assessment and there were no major changes from the results obtained from the previous year thus the OMP formulae was applied in the standard way.
- Implementation of the OMP formulae resulted in the TAC for 2008 reducing by 3.3096 % to 130 532 tonnes, less than the anticipated 10 % reduction.
- The reason for the diminished reduction in TAC is primarily because the current trends in *Merluccius paradoxus* (hake) abundance indices are slightly improved than anticipated a year ago.
- A decrease in TAC, coupled with an increase in the CPUE, the effort required to catch the TAC will drop by about 40 % of what is currently expended by the deep sea trawl sector. Thus managing vessel capacity and matching effort to allocation will reduce the problem of under-reporting, discarding and unsustainable takes of by-catch.

- As an additional tool for managing the hake fishery at this critical time, the Department, through consultations in the Hake Management Working Group and stakeholder roadshows, is in the process of implementing a capacity management regime in order to match vessel capacity to allocations in the hake fishery.

4. OTHER BRANCHES/CHIEF DIRECTORATES CONSULTED

The Chief Directorates Marine Resource Management and Research, Antarctica and Islands within the branch Marine and Coastal Management have been consulted.

5. IMPLICATIONS

Personnel	:	Limited
Financial	:	None
Communication	:	Limited

6. RECOMMENDATION

It is recommended that:

- 6.1 a global Total Allowable Catch (TAC) of 130 532 tonnes of hake be determined for the 2008 season and such TAC be apportioned and allocated as follows:

Commercial Fishing	:	130 532 tonnes
Bycatch reserve	:	630 tonnes (mid-water trawl fishery for horse mackerel (incidental hake by-catch is 2% of the horse mackerel allocation (630 tonnes))
Directed catches	:	129 902 tonnes

TOTAL ALLOWABLE CATCH (TAC) FOR THE 2008 HAKE FISHING SEASON

<u>Sector</u>	<u>Percentage</u>	<u>Quantum</u>
Handline reserve	3.3433%	4 343 tonnes
Longline	6.5510%	8 509 tonnes
Inshore Trawl	6.1790%	8 026 tonnes

<u>Sector</u>	<u>Percentage</u>	<u>Quantum</u>
Offshore Trawl	83.9268%	109 022 tonnes
Subsistence fishing	Nil allocation	
Foreign Fishing	Nil allocation	
Recreational Fishing	Daily bag limit as per regulation	

6.2 the reduction be applied evenly across all sub-sectors of the hake fishing industry, consistent with the existing access rights policy framework, with reductions to all Rights Holders and to the handline hake reserve, all reflecting the same proportion reduction of 3.3096%.

DIRECTOR-GENERAL

DATE:

RECOMMENDATION IN PARAGRAPH 6.1 APPROVED/NOT-APPROVED

RECOMMENDATION IN PARAGRAPH 6.2 APPROVED/NOT-APPROVED

MINISTER *WS*

DATE:

Counter sign on 14/01/08.

*RECEIVED
MINISTER APPROVED
TELEPHONICALLY ON
19 DECEMBER 2007*



environment & tourism

Department:
Environmental Affairs and Tourism
REPUBLIC OF SOUTH AFRICA

Reference: V1/20/5/1/2

MINISTER

TOTAL ALLOWABLE CATCH (TAC) FOR THE 2007 HAKE SEASON

1. PURPOSE

- 1.1 To request that you determine the TAC for the 2007 Hake season in terms of the provisions of Section 14 of the Marine Living Resources Act, 1998 (Act No. 18 of 1998).

2. SUMMARY

- 2.1 It is recommended that the global TAC for the Cape hakes be reduced by 10% from 150 000 t in 2006 to 135 000 t for 2007 with a further reduction of a similar size anticipated for 2008. Furthermore, it is recommended that the reduction be applied evenly across all sub-sectors of the hake fishing industry, consistent with the existing access rights policy framework, with reductions to all rights holders and to the handline hake reserve, all reflecting the same proportion. It is further recommended that a portion of the hake TAC, amounting to 2% of the horse mackerel allocation for directed mid-water trawl (630 t), be set aside as a reserve to account for hake bycatch in the horse mackerel-directed mid-water trawl fishery.
- 2.2 This quantum is to be deducted from the global hake TAC prior to proportional allocations to the sectors in the hake fishery. The hake-fishing season coincides with the calendar year from 1 January to 31 December. However, provision should be made for a 15-day overlap period at the start and end of the season to take account of right holders that have either caught their full allocation by 15 December of the preceding year or have not caught their allocation by 31 December and require additional time to do so.

3. BACKGROUND AND DISCUSSION

3.1 For the 2006 season you determined a TAC of 150 000 tonnes for the hake fishery (Annexure A).

3.2 The department considered the recommendations from the Chief Directorate: Research, Antarctica and Islands of the Branch: Marine and Coastal Management (as per Annexure B) and wishes to advise as follow:

- The new hake Operational Management Procedure (OMP) development process is based on the recommendations of an international stock assessment workshop focussed on the hake resource held in January 2004.
 - Calculations conducted during the OMP development indicate the need for an appreciable reduction in the hake TAC in the short-term, which was recommended to be phased in over two years.
 - In considering an appropriate TAC recommendation for 2007 it is necessary to demonstrate that any reduction made is neither too small (resulting in possible further substantial reductions) nor too big (leading to unnecessary disruption and wasted resources).
 - After considering three different options (5 000t, 8 000t and 10 000t) for the extent of the initial annual fixed TAC reduction, the intermediate option of an 8 000 t reduction for 2006 was recommended in the light of a likely similar level of reduction for 2007.
 - The Cape hakes combined spawning biomass is currently estimated at about 20% of its pristine level, while the biologically appropriate level for Cape hakes is likely to be about 35% of pristine. Clearly the resource is depleted below an optimal level and a rebuilding strategy is necessary.
-
- A range of Management Procedures tuned to varying recovery rates were explored. Regard was also given to the WSSD target for rebuilding depleted fish stocks by 2015.
 - Furthermore, constraints on the inter-annual changes in the hake TAC were investigated with 5%, 7.5% and 10% reductions, as well as options involving substantial

initial cuts in an attempt to gain faster recovery and more long-term stability, and formulations where the variability was kept low unless the catch per unit effort dropped below a predefined threshold which would then trigger a relaxation of the variability constraint and result in larger reductions.

- A selection of OMP candidates were presented to Industry at the Hake Management Working Group sectoral meetings held in Cape Town (deepsea trawl), Mossel Bay (inshore trawl and handline) and Port Elizabeth (longline) at the end of September 2006. This was subsequently followed by a more detailed presentation of a selection of candidate OMPs to an open meeting of all hake sectors held in Cape Town on 17 October 2006 to obtain Industry input to aid in the selection of the OMP to be adopted to provide scientific recommendations for hake TACs for the next four years.
- OMP 1 projected a 20-year recovery period with a 10% constraint in the change in TAC. OMP 1 with maximal reductions of 10% for 2007 and 2008, with a possibility of a further similar or lesser reduction in 2009. Thereafter, the TAC is expected to increase slowly. With these reductions, the deepwater trawl catch per unit effort is expected to increase by 50% over the next 10 years. [This option coined the phrase short-term pain for long-term gain.]
- OMP 2 has an initial fixed phase-down period of 7.5% per annum for the first three years. Thereafter, inter-annual variations in the TAC are constrained to 5%, except that reductions may become as large as 15% if the catch per unit effort drops below 80% of the average 2002-2004. [This option coined the phrase long-term pain for short-term gain.]
- OMP 1 provides a greater element of predictability for reductions over a three-year period and would thus be less disruptive to the management of the fishery in the medium-term. Since OMP 1 also predicts recovery of the hake resource in a relatively short period, it is the recommended OMP.
- Furthermore, as an additional tool for managing the hake fishery at this critical time, the Hake Management Working Group is investigating effort control measures in terms of matching vessel capacity to allocations in the hake fishery.

4. IMPLICATIONS

4.1 Personnel
Limited.

4.2 Communication
Limited.

5. RECOMMENDATIONS

It is recommended that:

5.1 A global TAC of 135 000 tonnes of hake be determined for the 2007 season and such TAC be apportioned and allocated as follows:

Commercial Fishing: 135 000 tonnes

Bycatch reserve: 630 tonnes (mid-water trawl fishery for horse mackerel (incidental hake by-catch is 2% of the horse mackerel allocation (630 tonnes))

Directed catches: 134 370 tonnes

SECTOR	PERCENTAGE	QUANTUM
Handline Reserve	3.3433%	4 492 tonnes
Longline	6.5510%	8 802 tonnes
Inshore Trawl	6.1790%	8 302 tonnes
Deepsea (Offshore) Trawl	83.9268%	112 772 tonnes

Subsistence fishing: Nil allocation

Foreign Fishing: Nil allocation

Recreational Fishing: Daily bag limit as per regulation

5.2 The reduction be applied evenly across all sub-sectors of the hake fishing industry, consistent with the existing access rights policy framework, with reductions to all rights holders and to the handline hake reserve, all reflecting the same proportion.

Recommended by DG on EDMS 20/12/2006

DIRECTOR-GENERAL
DATE:

RECOMMENDATIONS
~~5.1 APPROVED/NOT APPROVED~~
~~5.2 APPROVED/NOT APPROVED~~

MINISTER
DATE:

*Minute approved telephonically. Will
counter-sign on return to Office*

[Signature]
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15/1/07
WS*



RECOMMENDATION ON THE HAKE TAC FOR 2008

Summary

It is noted that a policy aimed at matching vessel capacity to allocations as a basis for including effort control in addition to **TAC** control for management of the fishery is being developed by the Hake Management Working Group. This is in line with recommendations made in 2006, and this initiative is fully supported by the Demersal Scientific Working Group.

It is **recommended** that:

- in terms of the output from OMP₂₀₀₇, the **TAC** for 2008 be set at 130 532 t (i.e. a reduction of 3.3096% from the 2007 level of 135 000 t)
- the reduction be applied evenly across all sub-sectors of the hake fishing industry, consistent with the existing access rights policy framework, with allocations to each Right Holder and to the handline hake reserve each being reduced by 3.3096%; and
- the portion of the hake **TAC** set aside as a reserve to account for hake bycatch in the horse mackerel-directed midwater trawl fishery (about 2% of the horse mackerel allocation for directed midwater trawl) also be reduced by 3.3096% to 609 t.

Background

An international stock assessment workshop focussed on the hake resource was held in January 2004. Among the important recommendations of that workshop were that:

- i) the two species of which the hake resource is comprised – shallow-water hake *M. capensis* and deep-water hake *M. paradoxus* – should be assessed separately in constructing the models used to test a new OMP;
- ii) rather than developing separate west and south coast models as in the past, the assessments for each species should be for both coasts together, given indications that there is a single stock of each species distributed over both coasts, and;
- iii) as a first step, models for both coasts combined for each species should be developed. Later these models should then be expanded to incorporate a spatial element by dividing each coast into inshore and offshore regions (i.e. dividing the South African coast into 4 regions) and modelling stock movements between these regions.

During 2005 and 2006 an OMP development process to develop the initial coast-combined model was undertaken. A wide range of candidate OMPs was investigated and a selection of candidates was presented to Industry at sectoral meetings held in Cape Town (deepsea trawl), Mossel Bay (inshore trawl and handline) and Port Elizabeth (longline) at the end of September 2006. Finally a more detailed presentation of a selection of candidate OMPs was made to an open meeting of all hake sectors held in Cape Town on 17 October 2006 to obtain Industry input to aid in the selection of the OMP to be adopted to provide scientific recommendations for hake **TACs** for the next four years.

Industry expressed a slight preference for an OMP that avoided the possibility of annual **TAC** reductions in excess of 10% (during testing referred to as OMP1). Consequently, towards the end of 2006 it was recommended that that OMP formulation be implemented as the default basis for **TAC** recommendations for 2007-2010, unless that procedure is revised, or "exceptional circumstances" indicating a need for modification of its outputs arise, in terms of the formal guidelines in place to cover such eventualities. In terms of the output from OMP₂₀₀₇, a **TAC** of 135 000 t was recommended and subsequently adopted for 2007 (a 10% reduction from 2006) and it was noted that a further reduction of similar size was anticipated for 2008.

The Operational Management Procedure adopted in 2006 (OMP₂₀₀₇)

Uncertainties concerning a range of biological factors covering the ratio of *M. capensis* to *M. paradoxus* in the historic catches, natural mortality, and the steepness as well as other aspects of the stock-recruit relationship, were the primary factors incorporated in the different assessment models that were used as the basis to test candidate OMPs. These assessments indicated that the *M. paradoxus* component of the hake resource is severely depleted, whereas the *M. capensis* component is relatively healthy (Fig. 1). Although there is some doubt as to the species-specific biomass estimates, there is no doubt that the hake resource as a whole is depleted below an optimal level, and in particular that there has been an appreciable decline in the spawning biomass of both species over the last decade. The species combined spawning biomass is currently estimated at about 20% of its pristine level (Fig 1). Note that the biologically appropriate level for Cape hakes is likely about 35% of pristine. The cause of the depleted state of the hake resource appears to be poor recruitment near the turn of the century, and is reflected in the declining commercial CPUE over the last 10 years, which is causing economic problems for the industry (Fig 2). The reason that this was not detected with more confidence earlier is the positive trend in survey biomass estimates over the 1990s followed by the break in the survey time series in 2000 and 2001 caused by the breakdown of the FRS *Africana*. Only as more data became available has it become evident that these trends were misleading (Fig 2).

A wide range of Management Procedures was considered to allow the investigation of different management strategies, though all the candidate OMPs had the same underlying basis of increasing or decreasing the **TAC** in relation to the magnitude of recent trends in CPUE and survey abundance estimates for both *M. paradoxus* and *M. capensis*. The OMP eventually recommended for implementation over 2007-2010 was tuned to median recovery of the *M. paradoxus* resource to 20% of pristine over 20 years (lower 5%-ile to 12%), and changes in the **TAC** are constrained to 10% up or down from one year to the next (Fig 3). In particular in October 2006 it was noted regarding this OMP:

- It would most likely result in maximal (10%) reductions in the **TAC** for 2008 with, a possibility of a further similar reduction for 2009 (see median trajectory in lower right panel of Fig 3).
- However, there is a slight possibility that the **TAC** reduction for 2008 may be less than 10%, and a stronger possibility of a smaller reduction in 2009.
- Thereafter the **TAC** is expected to increase slowly.
- Although the OMP would allow decreases of as much as 10% in the **TAC**, the probability of a decrease of this magnitude is slight after the initial reductions for the first 2 or 3 years.
- The deepwater trawl CPUE is projected to increase by about 50% over the next 10 years.

Developments during 2007

During 2007, a further year's data on catch, CPUE and surveys have become available. The formal guidelines adopted for fisheries for which scientific recommendations are made using OMPs state that:

"Every year the Working Group will:

- Review population and fishery indicators, and any other relevant data or information on the population, fishery and ecosystem, and conduct a simple routine updated assessment (likely no more than core reference set models used in the OMP testing refitted taking a further year's data into account).
- On the basis of this, determine whether there is evidence for exceptional circumstances."

The review and simple assessment including these new data were carried out, with the latter failing to indicate any major changes from the results obtained a year previously. Accordingly it was agreed that there was no basis to conclude that exceptional circumstances existed, and that the OMP formulae should be applied in the standard way.

The OMP formulae depend on the trends over recent years in survey abundance estimates and CPUE for both *M. capensis* and *M. paradoxus* (as well as the TAC for the previous year). These data and the associated trend estimates are shown in Table 1 and Fig. 4.

Implementation of the OMP formulae resulted in a recommended **TAC** for 2008 of 130 532 t, i.e. a reduction of some 3.3%. Note that this is less than the 10% thought most likely a year ago, but still within the likely range indicated then (see the two bottom panels of Fig. 3). The reason for this slightly more positive picture is primarily that the current trends in *M. paradoxus* abundance indices are a little better than anticipated a year ago, given the new data now available.

Future work

The international stock assessment workshop on the hake resource which was held in January 2004 recommended that assessment models include a spatial component (i.e. an inshore and offshore zone on each coast) and that species interactions (primarily predation on *M. paradoxus* by *M. capensis*) be explicitly modelled. The work culminating in OMP₂₀₀₇ reflects the first phase in the development of this spatial model, and work on the next phase has begun.

As the two hake species co-exist to a large extent, and the commercial catches do not distinguish between the species, a single global **TAC** (the sum of the catch limits for each species) is set annually. However, simulation modelling suggests that an appreciable increase in hake yield is possible if the relative contribution per species to the annual catch could be adjusted to match the relative productivities of the two hake species. Practical ways of achieving this balance by modifying the distribution of fishing effort will be investigated. The incorporation of a spatial component in a future OMP will enable the effects of modifying the distribution of fishing effort to be assessed.

Associated issues

Sectoral Allocations

It is important to note that all model testing and projections undertaken during the OMP development assumed that the proportional allocation among sectors remained fixed at the current proportions. Therefore it is recommended that adjustments of the **TAC** be applied evenly across sectors. If the proportional allocation among sectors is changed, then the test results and associated projection results for the OMP proposed will differ from those reported, and further testing may need to be undertaken.

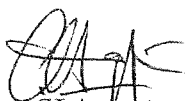
Effort limitation

Attention is drawn to the projected effort required to catch the **TAC** (Fig. 5). OMP test outputs indicate that, due to the lower **TAC** coupled with an expected increase in CPUE, the effort required to catch the **TAC** will drop by about 40% of that currently being expended by the Deep Sea trawl fleet. Excess capacity will exacerbate problems of under-reporting, discarding, and unsustainable takes of bycatch species; therefore it is important that management controls consider not only limitations on catch, but also on effort (capacity). In this regard, the initiatives to develop a policy aimed at matching vessel capacity to allocations as a basis for including effort control in addition to **TAC** control for management of the fishery are fully supported by the Demersal Scientific Working Group.

Recommendations

It is recommended that:

- in terms of the output from OMP₂₀₀₇, the **TAC** for 2008 be set at 130 532 t (i.e. a reduction of 3.3096% from the 2007 level of 135 000 t)
- the reduction be applied evenly across all sub-sectors of the hake fishing industry, consistent with the existing access rights policy framework, with allocations to each Right Holder and to the handline hake reserve each being reduced by 3.3096%; and
- the portion of the hake **TAC** set aside as a reserve to account for hake bycatch in the horse mackerel-directed midwater trawl fishery (about 2% of the horse mackerel allocation for directed midwater trawl) also be reduced by 3.3096% to 609 t.



CJ Augustyn

Chief Director: Research, Antarctica and Islands

15/11/2007

RECOMMENDATION ON THE HAKE TAC FOR 2008

Table 1: GLM-standardised CPUE series and west coast summer and south coast autumn survey abundance estimates used as input in the 2008 TAC recommendation computation. Note, the abundance estimates in bold are for surveys that have been conducted with the new gear on the FRS *Africana*.

Year	<i>M. paradoxus</i>			<i>M. capensis</i>		
	GLM-standardised CPUE	West coast summer	South coast autumn	GLM-standardised CPUE	West coast summer	South coast autumn
2001	5.569			4.526		
2002	4.836	272.172		4.952	108.025	
2003	5.686	405.457	108.756	4.768	74.771	126.749
2004	5.532	259.566	55.914	4.086	205.976	103.356
2005	5.303	281.991	25.834	3.193	71.272	77.024
2006	5.400	313.457	35.038	3.057	88.357	132.082
2007		392.026	120.886		81.981	69.358

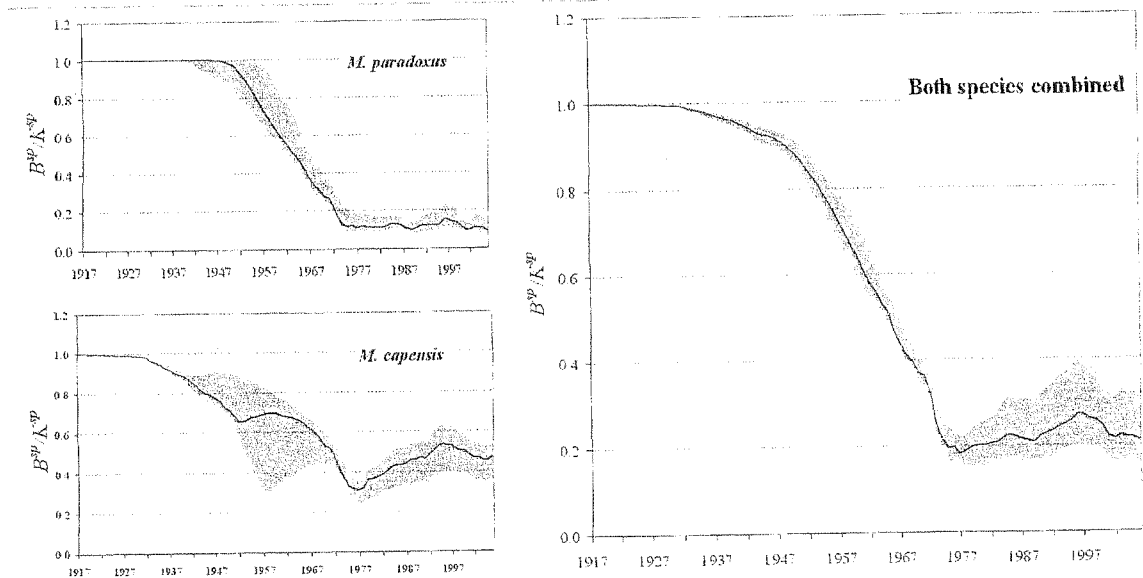


Figure 1: Status (current biomass as a proportion of pristine biomass) for *M. paradoxus* (top left), *M. capensis* (bottom left) and both species combined (right panel) as estimated in October 2006. The solid line represents the median value and the shaded area the 95% confidence envelope around the median.

RECOMMENDATION ON THE HAKE TAC FOR 2008

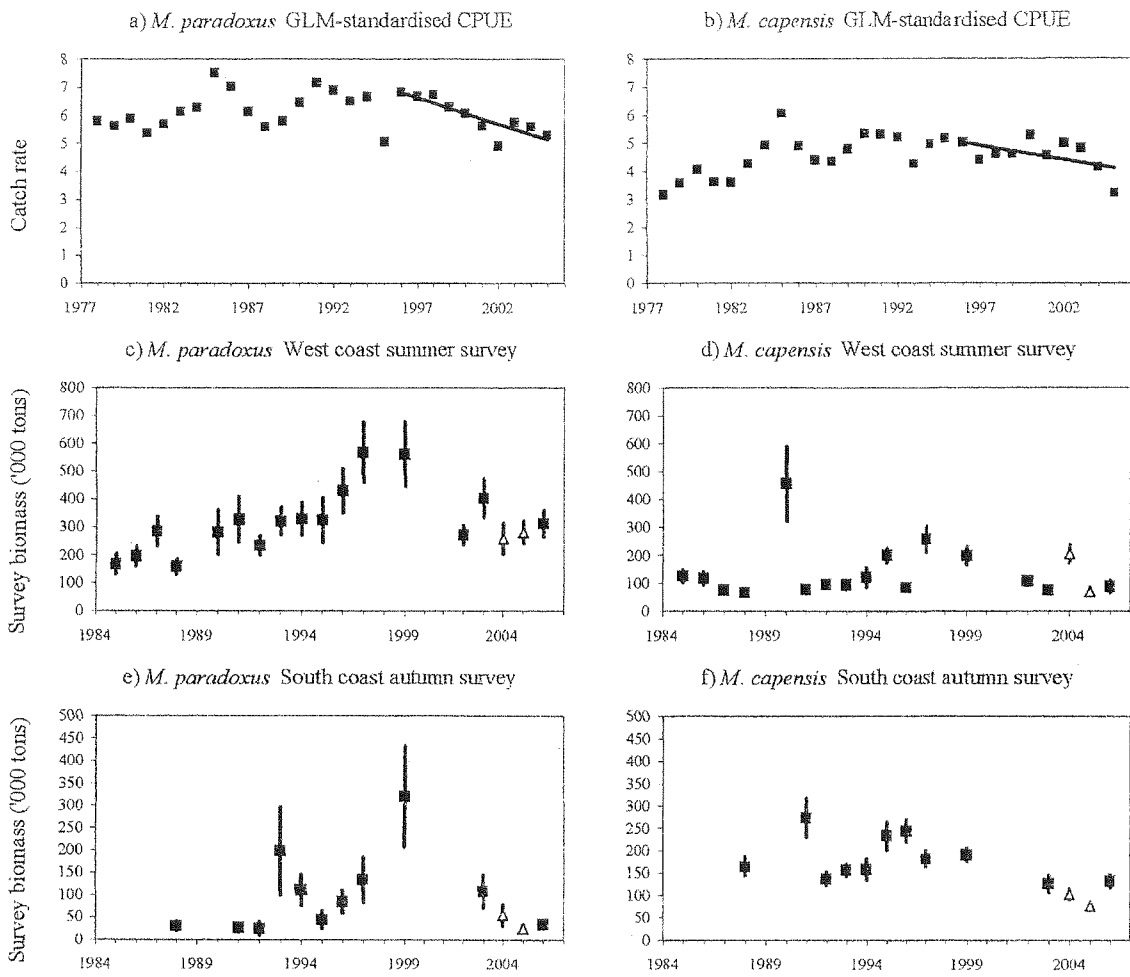


Figure 2: CPUE and survey abundance indices (for the survey series with longest time-series) for *M. paradoxus* and *M. capensis* as available at October 2006. Biomass estimates from surveys conducted with the new *Africana* gear have been recalibrated for comparability and are marked by Δ . Error bars reflect 95% confidence intervals.

RECOMMENDATION ON THE HAKE TAC FOR 2008

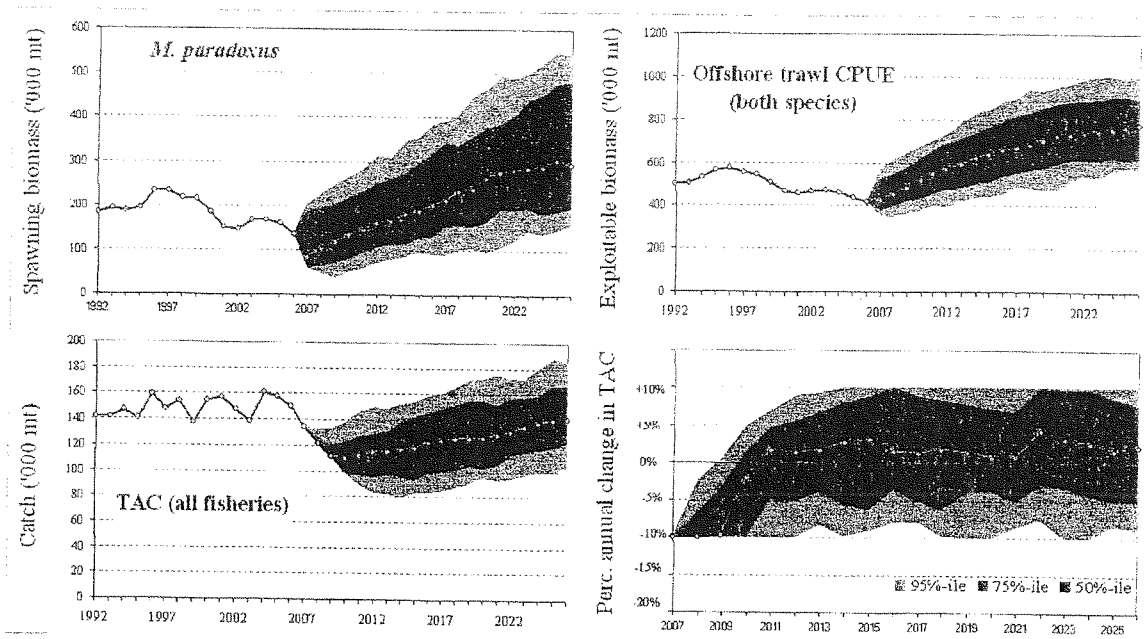


Figure 3: Future trajectories for *M. paradoxus* spawning biomass (top left), offshore trawl CPUE for both species combined (top right), global hake *TAC* (lower left), and inter-annual change in the *TAC* (lower right) under OMP₂₀₀₇ (as recommended late in 2006). The shaded areas show the probability envelopes at the 50th (darkest), 75th and 95th (lightest) percentiles.

RECOMMENDATION ON THE HAKE TAC FOR 2008

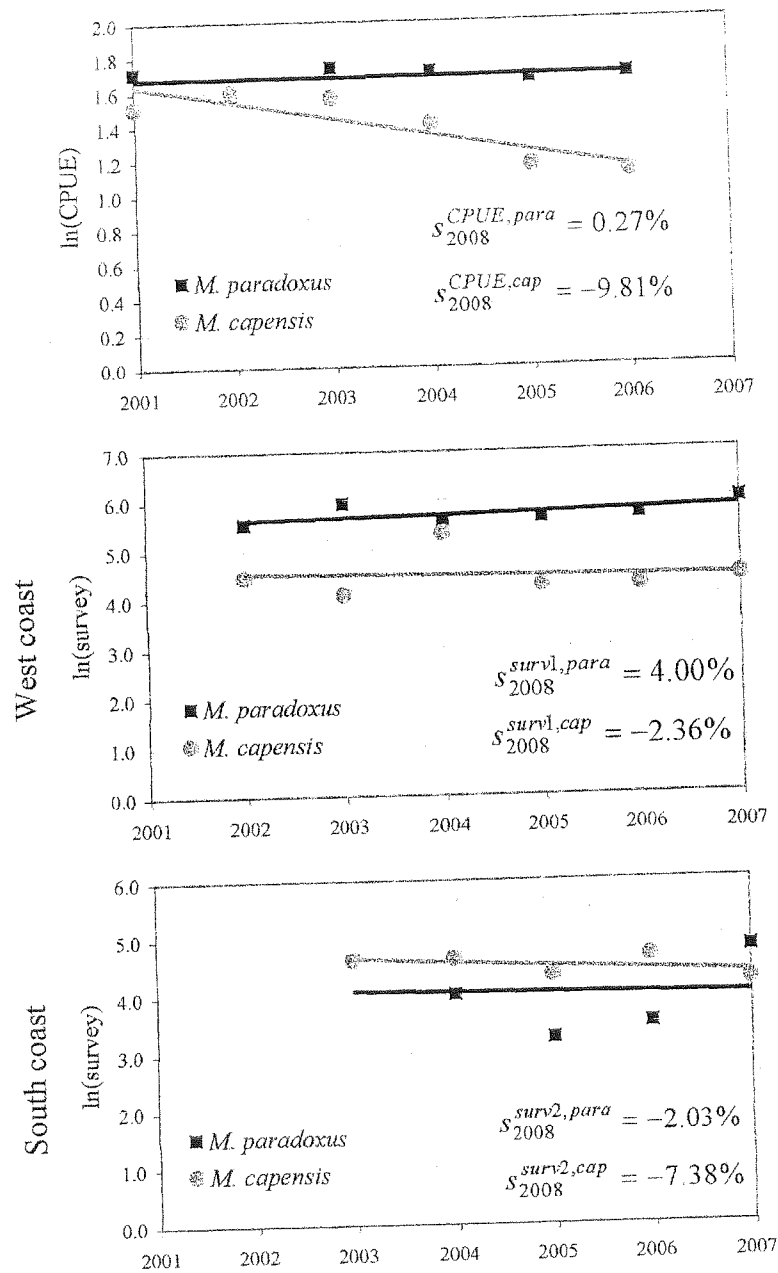


Figure 4: Recent trends in the GLM-standardised CPUE and survey abundance indices for *M. paradoxus* and *M. capensis* which are used in the TAC computation. The survey abundance estimates shown include the calibration factors specified in the OMP for the years in which the new gear was used on the FRS *Africana*.

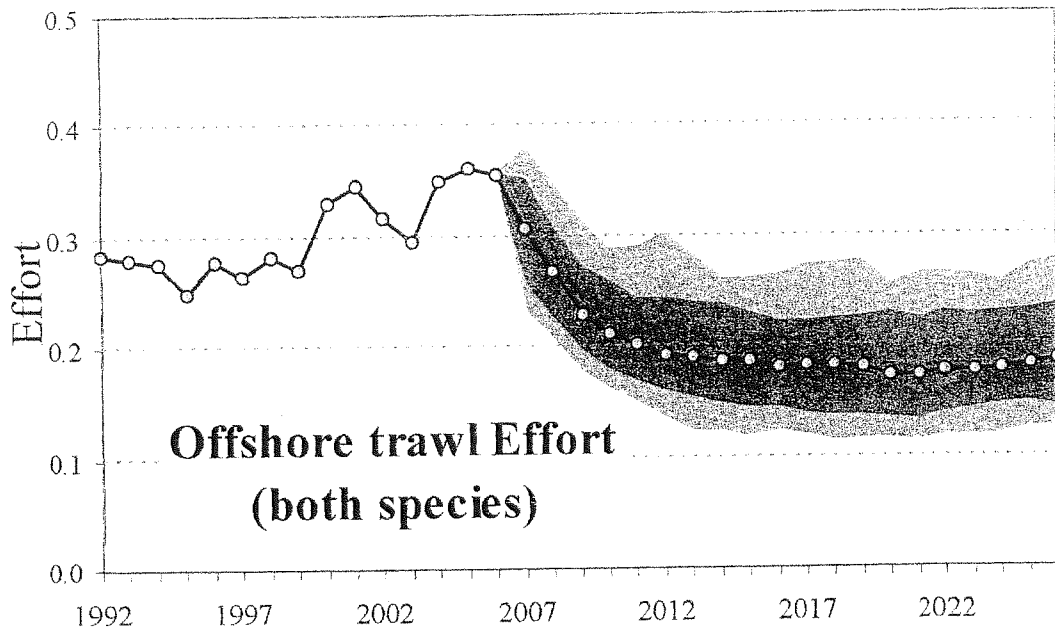


Figure 5: Projected future effort required by the deep sea fleet to catch the projected future allocations to the Deep Sea trawl sector. The shaded areas show the probability envelopes at the 50th (darkest), 75th and 95th (lightest) percentiles.