

**Report from the Mid-Year
Fishery Assessment Plenary, November 2010:
stock assessments and yield estimates**

Compiled by

**Ministry of Fisheries
Science**

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INTRODUCTION

1. This report presents the status of the fish stocks for highly migratory species, rock lobster and toothfish resulting from research and stock assessments completed during 2010.

Highly Migratory Species (HMS)

2. The reports from the Highly Migratory Species Working Group summarise the conclusions and recommendations of the meetings of the Working Group meetings held during 2010, and the outcomes of the Western and Central Pacific Fisheries Commission and the Commission for the Conservation of Southern Bluefin Tuna.
3. In all cases, consideration has been based on and limited to the best available information. The purpose has been to provide objective, independent assessments of the current state of the fish stocks.
4. Yields are estimated for highly migratory species for the 2010-2011 fishing season.
5. Where possible, the status of the stocks (specifically the sustainability of current TACs and recent catch levels and whether these are at levels that will allow the stock to move towards a size that will support the MSY) have been assessed. In many cases other management measures have also been discussed.
6. On the information provided, TACs were set for the New Zealand catches but in most cases TACC are not set for the entire stock.
7. In considering Maori, traditional, recreational and other non-commercial interests, some difficulty was experienced both in terms of the data available and the intended scope of this requirement.

Approach to Yield Estimation

8. Key issues to the approaches to estimation of yield include the need to account for variability in fish stocks in conjunction with the amount and type of data available on which assessments could be based.

Sources of Data

9. A major source of information for these assessments continues to be the fisheries statistics system. The importance of maintaining and developing that system to provide adequate and timely data for stock assessments was very apparent, there are issues with data reporting to the Western and Central Pacific Fisheries Commission that adds uncertainty to some of the regional assessments.

Other Information

10. Draft Fisheries Assessment Reports more fully describing the data and the analyses have also been prepared. These documents will be distributed when final versions are available.

Rock Lobster

11. The report from the Rock Lobster Working Group summarises the conclusions and recommendations of the meetings of the Working Group held during 2010. The decision rules were evaluated and are reported for each stock in the report.
12. In all cases, consideration has been based on and limited by the best available information. The purpose has been to provide objective, independent assessments of the current state of the fish stocks.
13. Where possible yields are estimated for rock lobster for the 1 April 2011 - 31 March 2012 fishing year.
14. Where possible, the status of the stocks (specifically the sustainability of current TACs and recent catch levels and whether these are at levels that will allow the stock to move towards a size that will support the MSY) have been assessed. In many cases other management measures have also been discussed. These assessments of the status of Rock Lobster stocks apply to the 2011–2012 fishing year (starting April 1, 2011) only, unless specifically stated otherwise.
15. Only actual TACCs are provided. The actual TACCs are the values as of the last day of the fishing year.
16. In considering Maori, traditional, recreational and other non-commercial interests, some difficulty was experienced both in terms of the data available and the intended scope of this requirement. In the absence of any more definitive guidelines, current interests and activities have been considered. In most cases, only very limited information is available on the nature and extent of non-commercial interests.

Approach to Yield Estimation

17. Key issues to the approaches to estimation of yield include the need to account for variability in fish stocks in conjunction with the amount and type of data available on which assessments could be based.

Sources of Data

18. A major source of information for these assessments continues to be the fisheries statistics system. The importance of maintaining and developing this system to provide adequate and timely data for stock assessments was very apparent.

Other Information

19. Draft Fisheries Assessment Reports more fully describing the data and the analyses have also been prepared. These documents will be distributed when final versions are available.

Toothfish

20. The report from the Antarctic Fisheries Working Group summarises the conclusions and recommendations of the meetings of the Working Group held during 2010.
21. In all cases, consideration has been based on and limited by the best available information. The purpose has been to provide objective, independent assessments of the current state of the fish stocks.
22. Yields are estimated for toothfish for the 1 December 2010 - 31 August 2011 fishing season.
23. Where possible, the status of the stocks (specifically the sustainability of current TACs and recent catch levels with respect to CCAMLR decision rules) has been assessed. In many cases other management measures have also been discussed.
24. The toothfish assessments were reviewed by the Working Group on Fish Stock Assessment (WG-FSA) of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) at its October 2009 meeting and accepted by the Scientific Committee and Commission of CCAMLR in November 2009.
25. On the basis of the assessment presented, the Commission implemented Conservation Measures for the 2009/10 and 2010/11 season setting the TACs for the toothfish stock(s) in the Ross Sea region.

Approach to Yield Estimation

26. Key issues to the approaches to estimation of yield include the need to account for variability in fish stocks in conjunction with the amount and type of data available on which assessments could be based.

Sources of Data

27. The major source of information for these assessments is the CCAMLR fisheries statistics system. The importance of maintaining and developing that system to provide adequate and timely data for stock assessments was very apparent.

Other Information

28. Draft Fisheries Assessment Reports and reports to the CCAMLR Scientific Committee and its working groups more fully describing the data and the analyses have also been prepared.

Terms of Reference for Fisheries Assessment Working Groups in 2010–11

Overall purpose

For fish stocks managed within the Quota Management System, as well as other important fisheries in the New Zealand EEZ:

to assess, based on scientific information, the status of fisheries and fish stocks relative to MSY-compatible reference points and other relevant indicators of stock status; to conduct projections of stock size under alternative management scenarios; and to review results from relevant research projects.

Fisheries Assessment Working Groups (FAWGs) evaluate relevant research, determine the status of fisheries and fish stocks and evaluate the consequences of alternative future management scenarios. They do not make management recommendations or decisions (this responsibility lies with MFish Fisheries Operations and the Minister of Fisheries).

Preparatory tasks

1. Prior to the beginning of the FAWG meetings, the DCE Fisheries Management and the Science Manager Stock Assessment will determine a preliminary list of stocks for which advice on fishery or stock status may be needed. The Science Manager Stock Assessment will then provide direction to FAWG Chairs as appropriate. FAWG Chairs will determine the final agendas and assign ownership of specific items on the agenda.

Technical objectives

2. To review any new research information on stock structure, productivity, abundance and related topics for each fish stock under the purview of individual FAWGs.
3. To estimate appropriate MSY-compatible reference points¹ for selected fish stocks for use as reference points for determining stock status, noting the approved Harvest Strategy Standard.
4. To conduct stock assessments or evaluations for selected fish stocks in order to determine the status of the stocks relative to MSY-compatible reference points¹ and associated limits, noting the "Guide to Biological Reference Points for the 2007-08 Fishery Assessment Meetings", and the approved Harvest Strategy Standard.
5. In addition to determining the status of fish stocks relative to MSY-compatible reference points, and particularly where the status is unknown, FAWGs should explore the potential for using existing data and analyses to draw conclusions about likely future trends in fishing mortality (or exploitation) rates and/or biomass levels if current catches and/or TACs/TACCs are maintained.
6. Where appropriate or practical, to conduct projections of likely future stock status using alternative fishing mortality (or exploitation) rates or catches and other relevant management actions, based on input from the FAWG, Fisheries Plan Advisory Groups and fisheries managers, noting the approved Harvest Strategy Standard.
7. For stocks that are deemed to be depleted, to develop alternative rebuilding scenarios based on input from the FAWG, Fisheries Plan Advisory Groups and fisheries managers, noting the approved Harvest Strategy Standard.

¹ MSY-compatible reference points include those related to stock biomass (i.e. B_{MSY}), fishing mortality (i.e. F_{MSY}) and catch (i.e. MSY itself), as well as analytical and conceptual proxies for each of the three of these quantities.

8. For fish stocks for which new stock assessments are not conducted in the current year, to review the existing Fisheries Assessment Plenary report text on the “Status of the Stocks” in order to determine whether the latest reported stock status summary is still relevant; else to revise the evaluations of stock status based on new data or analyses, or other relevant information.

Working Group reports

9. To include in the Working Group report information on commercial, Maori customary, non-commercial and recreational interests in the stock; as well as all other mortality to that stock caused by fishing, which might need to be allowed for before setting a TAC or TACC.
10. To provide information and advice on other management considerations (e.g., area boundaries, by-catch issues, effects of fishing on habitat, other sources of mortality, and input controls such as mesh sizes and minimum legal sizes) required for specifying sustainability measures.
11. To summarise the stock assessment methods and results, along with estimates of MSY-compatible reference points and other metrics that may be used as benchmarks for assessing stock status.
12. To review, and update if necessary, the “Status of the Stocks” sections of the Fisheries Assessment Plenary report for all stocks under the purview of individual FAWGs (including those for which a full assessment has not been conducted in the current year) based on new data or analyses, or other relevant information.
13. It is desirable that full agreement is achieved on the text of the FAWG reports, particularly the “Status of the Stocks” sections. If full agreement cannot be reached, then the Chair will document the extent to which agreement or consensus was achieved, and record and attribute any residual disagreement.

Working Group input to the Plenary

14. To advise the Chief Scientist, Ministry of Fisheries, about stocks requiring review by the Fishery Assessment Plenary and those stocks that are not believed to warrant review by the Plenary. The general criterion for determining which stocks should be discussed by the Plenary is that new data or analyses have become available that alter the previous assessment, particularly assessments of recent or current stock status, or projections of likely future stock status. Such information could include:
 - New or revised estimates of MSY-compatible reference points, recent or current biomass, productivity or yield projections
 - The development of a major trend in the catch or catch per unit effort
 - Any new studies or data that extend understanding of stock structure, fishing patterns, or non-commercial activities, and result in a substantial effect on assessments of stock status.

NOTE:

The Antarctic Fisheries Working Group works with different terms of reference, as CCAMLR yield estimates are based on alternative definitions of sustainability than those based on the Fisheries Act 1996. In all other ways the Antarctic Fisheries Working Group follows a similar approach.

Membership and Protocols for all Science Working Groups

15. Membership of Working Groups is open to all interested parties who agree to the following standards of participation. Participants must commit to:

- participating in the discussion
- resolving issues
- following up on agreements and tasks
- maintaining confidentiality of Working Group discussions and deliberations (unless otherwise agreed in advance, and subject to the constraints of the Official Information Act)
- adopting a constructive approach
- avoiding repetitions of earlier deliberations
- facilitating an atmosphere of honesty, openness and trust
- having respect for the role of the Chair
- listening to the views of others, and treating them with respect

Key roles are:

- Chair: MFish scientist – required. The Chair is an active participant in Working Groups, who also provides technical input, rather than simply being a facilitator. The Chair is responsible for setting the rules of engagement; promoting full participation by all members; facilitating constructive questioning; focussing on relevant issues; reporting on Working Group recommendations, conclusions and action items, and ensuring follow-up; and communicating with the MFish Chief Scientist, relevant MFish Fisheries Operations staff, and other key stakeholders
- Research providers – required (may be the primary researcher, or a designated substitute)
- Other scientists not conducting analytical assessments to act in a peer review capacity
- Representatives of relevant MFish Fisheries Operations teams

16. Working Group participants will be asked to declare any relevant affiliations.

17. *Working Group papers:* Working group papers will be posted on the MFish website prior to meetings if they are available. However, it is also likely that many papers will be tabled during the meeting due to time constraints. Working Group papers are “works in progress” whose role is to facilitate the discussion of the Working Groups. They often contain preliminary results that are receiving peer review for the first time and, as such, may contain errors or preliminary analyses that will be superseded by more rigorous work. For these reasons, attendees must agree not to release information contained in Working Group papers to external media. In general, Working Group papers should never be cited. Exceptions may be made in rare instances by obtaining permission in writing from the MFish Chief Scientist and the authors of the paper.

18. Participants who use Working Group papers inappropriately, or who do not adhere to the standards of participation, may be requested by the Chair to either leave a particular meeting or, in more serious instances, to refrain from attending one or more future meetings.

19. Meetings will take place as required, generally January-April and July-November for FAWGs and throughout the year for AEWGs and BRAGs.

20. A quorum will be reached when the Chair (a Ministry of Fisheries scientist), the designated presenter, and three or more other participants are present. In the absence of a quorum, the Chair may decide to proceed as a sub-group, with outcomes being taken forward to the next meeting at which a quorum is formed.

21. The Chair is responsible for deciding, with input from Working Group members:
 - The acceptability of the analyses under review
 - The way forward to address any deficiencies
 - The need for any additional analyses
22. The Chair is responsible for facilitating a consultative and collaborative discussion.
23. Working Group meetings will be run formally, with agendas pre-circulated, and formal records kept of recommendations, conclusions and action items.
24. A record of recommendations, conclusions and action items will be posted on the MFish website, shortly after each meeting has taken place.
25. Other principles guiding the operation of all MFish Science Working Groups include:
 - Data upon which analyses presented to the Working Groups are based must be provided to MFish in the appropriate format and level of detail in a timely manner (i.e. the data must be available and accessible to MFish; however, data confidentiality concerns mean that such data are not necessarily available to Working Group members)
 - Methods of analysis must be sound
 - Working Groups will seek to draw on the best available expertise, and will encourage and seek peer review
 - Working Groups will maintain high standards of professional integrity and science ethics
 - Working Groups will operate with openness and transparency
26. The outcome of each Working Group round will be evaluated, with a view to identifying opportunities to improve the process. The Terms of Reference may be updated as part of this review.
27. The MFish Science team will provide administrative support to the Working Groups.

Record-keeping

The overall responsibility for record-keeping rests with the Chair of the Working Group, and includes:

28. To keep notes on recommendations, conclusions and follow-up actions for all Working Group meetings, and to ensure that these are available to all members of the Working Group and the Chief Scientist, Ministry of Fisheries in a timely manner. If full agreement on the recommendations or conclusions cannot readily be reached, then the Chair will document the extent to which agreement or consensus was achieved, and record and attribute any residual disagreement.
29. To compile a list of generic assessment issues and specific research needs for each Fishstock or species or environmental issue under the purview of the Working Group, for use in subsequent Research Planning processes.

Fishery Assessment Working Groups – Membership 2010

Highly Migratory Species Working Group

Convenor: Stephen Brouwer

Members: Peter Ballantyne, Malcolm Francis, Lynda Griggs, Marc Griffiths, Ian Doonan, Bruce Hartill, Stephanie Hill, John Holdsworth, Arthur Hore, Charles Hufflet, Terese Kendrick, Adam Langley, Tania MacPherson, Jeremy McKenzie, David Middleton, Clive Monds, Marine Pomarede, Tim Sippel, Peter Smith

Species:

Albacore	Pacific bluefin tuna	Striped marlin
Bigeye tuna	Porbeagle shark	Swordfish
Blue shark	Ray's bream	Yellowfin tuna
Mako shark	Skipjack tuna	
Moonfish	Southern bluefin tuna	

Rock Lobster Working Group

Convenor: Kevin Sullivan (Andrew Penney)

Members: John Booth, Paul Breen, Jeff Forman, Vivian Haist, Steve Halley, Keith Ingram, Malcolm Lawson, Greg Lydon, Andy McKenzie, Alicia McKinnon, Pamela Mace, Marine Pomarede, Geoff Rowling, Paul Starr, Kevin Stokes, Daryl Sykes, Lance Wickman.

Species: Rock lobster

Antarctic Fisheries Working Group

Convenor: Neville Smith (Kevin Sullivan)

Members: David Bilton, Rebecca Bird, Tiffany Bock, Alistair Dunn, Jack Fenaughty, Malcolm Francis, Ingrid Jamieson, Stuart Hanchet, Peter Horn, Trevor Hughes, Craig Loveridge, David Lum, David Middleton, Sophie Mormede, Jocelyn Ng, Richard O'Driscoll, Steve Parker, Matt Pinkerton, Marine Pomarede, Ben Sharp, Darryn Shaw, Ben Sims, Andy Smith, Peter Smith, Darren Stevens, Kevin Sullivan, Colin Sutton, Di Tracey, Nathan Walker, Barry Weeber.

Species: Antarctic toothfish, Patagonian toothfish, rattails, skates, ecosystem effects of fishing

New Guidelines for Status of the Stocks Summaries

A new format for Status of the Stocks summaries was developed by the Stock Assessment Methods Working Group over the period February-April 2009. The purpose of this project was to provide more comprehensive and meaningful information for fisheries managers, stakeholders and other interested parties. To date, Status of the Stocks sections have generally not reflected the full range of information of relevance to fisheries management contained in the previous sections, and have been of variable utility to evaluations of stock status and management decisions.

There was only sufficient time to implement the new format for a limited number of stocks in May 2009, but have been completed for all stocks in this November Plenary. It is intended that the new format will continue to be implemented for other stocks each time they are reviewed and as time allows. The format will also be revised periodically so that it continues to remain relevant to fisheries management and other needs.

The table below provides a template for the new format for the Status of the Stocks summaries. The text following the table gives guidance on the contents of several of the fields in the table. Superscript numbers refer to the corresponding numbered paragraph in the following text.

STATUS OF THE STOCKS TEMPLATE¹

Stock Structure Assumptions²

<insert relevant text>

- **Fishstock name³**

Stock Status	
Year of Most Recent Assessment	2009
Assessment Runs Presented	
Reference Points ⁴	Target(s): Soft Limit: Hard Limit:
Status in relation to Target ^{5,6}	
Status in relation to Limits ^{5,6}	
Historical Stock Status Trajectory and Current Status	
<insert relevant graphs>	

Fishery and Stock Trends	
Recent Trend in Biomass or Proxy ⁷	
Recent Trend in Fishing Mortality or Proxy ⁷	
Other Abundance Indices ⁸	
Trends in Other Relevant Indicators or Variables ⁹	

Projections and Prognosis	
Stock Projections or Prognosis ¹⁰	

Probability of Current Catch or TACC causing decline below Limits ¹¹	Soft Limit: Hard Limit:
Assessment Methodology	
Assessment Type ¹²	
Assessment Method	
Main data inputs	
Period of Assessment	Latest assessment: Next assessment:
Changes to Model Structure and Assumptions ¹³	
Major Sources of Uncertainty	

Qualifying Comments ¹⁴

Fishery Interactions ¹⁵

Guidance on preparing the Status of the Stocks summary tables

1. Everything included in the Status of the Stocks summaries should be derived from the Working Group and Plenary reports. No new data should be presented in the summary which was not encompassed in the main text of the Working Group or Plenary reports.

Stock Structure Assumptions

2. The current assumptions regarding stock structure and distribution of the stocks being reported on should be briefly summarised. Where the stock being reported on is not an administrative fishstock, an explanation must be provided of how the stock being reported on relates to the administrative fishstocks it includes.

Stock Status

3. One Status of the Stocks summary table should be completed for each stock or stock complex being reported on.
4. Reference points for each stock will be established by fisheries managers or fisheries management advisory groups. Agreed reference points may not have been established for some stocks. Once established, these should be reported in this section.
5. Reporting the most “likely” stock status against reference points necessarily requires agreement on the most “likely” model run to use as a base case for the assessment. The preference, wherever possible, is to report on a single most probable base case, or to make a single statement which covers the range of results from a range of cases. Only where more than one equally plausible model run exists, and no agreement can be reached on a likely base case, should multiple runs be reported. This should still be done simply and concisely.
6. Where probabilities are used in qualifying a statement regarding the status of the stock in relation to target or limit reference levels, the probability categories and associated verbal descriptions to be used (IPCC, 2007) are:

Probability	Description
> 99 %	Virtually Certain
> 90 %	Very likely
> 60 %	Likely
40 - 60 %	About as likely as not
< 40 %	Unlikely
< 10 %	Very unlikely
< 1 %	Exceptionally unlikely

Recent Fishery and Stock Trends

7. Recent fishery or stock trends should be reported in terms of fishing pressure or stock size (or proxies for these), respectively. For quantitative assessments, median results should be used when reporting biomass, but it should be referred to as biomass (not median biomass). Observed trends should be reported using descriptors such as increasing, decreasing, stable, or fluctuating without trend. Where it is considered relevant and important to fisheries management, mention could be made of whether the indicator is moving towards or away from a target, limit or long term average.
8. Other Abundance Indices: Primarily intended for reporting of trends where only a Level 2 (semi-quantitative) evaluation has been conducted, but where appropriate abundance indices (such as standardised CPUE, or survey biomass) are available.
9. Other Relevant Indicators or Variables: Primarily intended for reporting of trends where only a Level 3 (qualitative) evaluation has been conducted. Potentially useful indicators might include trends in mean size, size or age composition, or recruitment indices. Catch trends vs TACC may be relevant here, provided these are qualified when other factors are known to have influenced these trends. This section could also be used to report trends in useful fishery indicators for assessed or un-assessed stocks, where these indicators are agreed to provide some insight into the status of the stock.

Projections and Prognosis

10. These sections should be used to report any available information on likely future trends in biomass or fishing pressure or related variables under current (or a range of) catch levels.
11. When reporting probabilities of current catches or TACC levels causing declines below limits, the probability rankings in the IPCC (2007) table above should be used. The years associated with the 'current' catch or TACC should also be reported. Results should be reported separately if catch and TACC differ appreciably. The catch and TACC levels being referred to over those years should be specified.

Assessment Methodology

12. Assessment type: the envisaged Assessment Levels are:
 - 1 - Full Quantitative Stock assessment - there is a reliable index of abundance and an assessment indicating status in relation to targets and limits.
 - 2 - Partial Quantitative Stock Assessment: Evaluation of agreed abundance indices (e.g. standardised CPUE) or other agreed appropriate fishery indicators - there is an agreed abundance index, but no assessment to state where are in relation to reference points.
 - 3 - Qualitative Evaluation: Fishery characterization with evaluation of fishery trends (e.g. catch, effort and nominal CPUE, length-frequency information) - there is no agreed index of abundance.
 - 4 - Low information evaluation - There are only data on catch and TACC, with no other fishery indicators.

Management Procedure (MP) updates should be presented in a separate table. In years when an actual assessment is conducted for stocks under MPs, the MP update table should be preceded by a Level 1 Status of the Stocks summary table.

Table content will vary for these different assessment levels.

The primary purpose of the section on changes in model assumptions and structure is to briefly identify only the most significant model changes that directly resulted in significant changes to results on the status of the stock concerned, and to briefly indicate the main effect of these changes. Details on model changes should be left in the main text of the report.

Qualifying Comments

13. The purpose of the ‘Qualifying Comments’ section is to provide for any necessary explanations to avoid misinterpretation of information presented in the sections above. This section may also be used for brief further explanation considered important to understanding the status of the stock.

Fishery Interactions

14. The ‘Fishery Interactions’ section should be used to simply list QMS by-catch species, non-QMS by-catch species and protected / endangered species interactions.

Additional Guidance

- For a well managed stock, fluctuating around a target within “acceptable” levels, it is appropriate to report that one is “near” the target. The proposed definition of “near” is: ‘Well within the range of natural fluctuations associated with fishing at levels that will achieve the target on average’. That then gives three “distances” to report for targets: above, near, or below, with above or below signifying being outside the range considered “near”. The relevant distance should be reported with a probability ranking (see IPCC 2007 table above).
- For limits, it is more appropriate to report the probability of being above or below the limits, and not near, as there are specific management actions to be taken depending on whether a stock is above or below the limit.

Reference

IPCC 2007. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. [Core Writing Team, Pachauri, R. K. and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104pp.