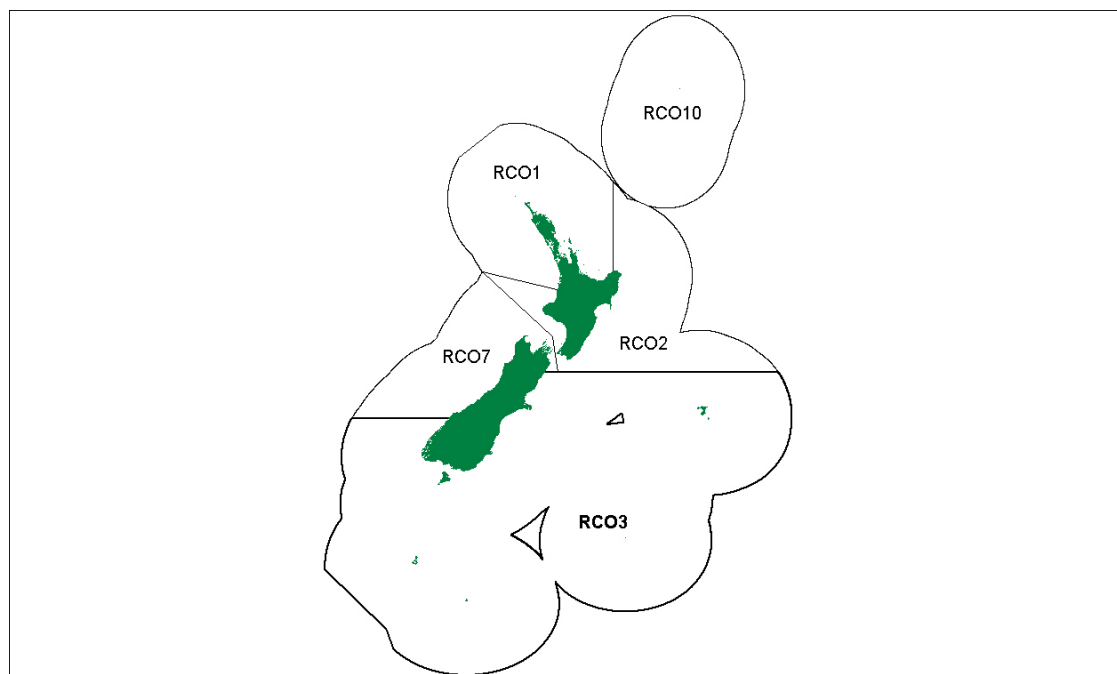


## RED COD (RCO 3)

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Figure 1: Location of boundaries of the red cod (RCO) Quota Management Areas



### Executive Summary

- 1 Red cod is a key target species within a complex of fished species in the Southern Inshore (trawl) Finfish Fishery (SIF fishery). Fishers target their operations around the inter-annual variation in the abundance of the species that make up this fishery complex.
- 2 Anecdotal information from all fishery sectors has raised concerns about the sustainability and utilisation of RCO 3 stocks off the east coast of the South Island. Commercial landings have declined substantially since the mid 1990s and recreational fishers consider some valuable local fisheries are lost.
- 3 The Minister of Fisheries has asked the Ministry of Fisheries (MFish) to review RCO 3 catch limits in response to these concerns. Currently, there is no Total allowable Catch (TAC) set for this fishery.
- 4 MFish believes that the current situation requires a review of the assumption that the fishery be managed at a level that is independent of biomass (because of the life history of red cod) and that reflects the inclusion of red cod on the Second Schedule of the Fisheries Act 1996 (the Act ). The Second Schedule allows for adjustment to the Total Allowable Commercial Catch (TACC) within a fishing year.

- 5 MFish believes that, on current available information, the RCO 3 biomass is below maximum sustainable yield (MSY) and requires rebuilding to a level that will support the MSY.
- 6 The most recent stock assessment (2001) is largely based on data which is now nine years old and which had followed an extended period of high landings. The Plenary considered that, if fully caught, the existing TACC is unlikely to move RCO 3 towards a level that could sustain the MSY. Red cod abundance is naturally variable (in relation to environmental variables) but the length and magnitude of the decline in commercial landings and recreational returns indicates fishing pressure may have significantly reduced spawning stock abundance.
- 7 In addition, the current substantial disparity between available catch and available Annual Catch entitlement (ACE) has created a “race for catch” fishery whereby there is (i) competition for access to local fishing grounds (ii) fishing in nursery areas (iii) discarding of non-marketable fish and bycatch and (iv) unnecessary sea bed damage caused by trawling for insignificant amounts of red cod. The disparity also distorts the ACE market. All these effects prevent RCO 3 fishers from using the resource efficiently in a sustainable way.
- 8 Red cod on the south-east coast lends itself to the provisions of the Second Schedule. An analysis of the recruitment-environment relationship shows there is a strong correlation between recruitment and environmental variables, with a 14 month lag. Further, the South-east coast trawl survey has recommenced this winter and will be able, in future years, to provide fishery independent information on the relative abundance of year class strength and recruitment into the fishery.

## **Summary of Options**

- 9 The following management measures are proposed for the RCO 3 fishery for the 2007-08 fishing year:

EITHER

- a) Option 1 - set a TAC of 13 299 tonnes for RCO 3 and within that TAC set:
  - i) a customary allowance of 5 tonnes;
  - ii) a recreational allowance of 280 tonnes;
  - iii) an allowance of 618 tonnes for other sources of fishing-related mortality; and
  - iv) a TACC of 12 396 tonnes.

OR

- b) Option 2 - set a TAC of 9 735 tonnes for RCO 3 and within that TAC set:

- i) a customary allowance of 5 tonnes;
- ii) a recreational allowance of 280 tonnes;
- iii) an allowance of 450 tonnes for other sources of fishing-related mortality; and
- iv) a TACC of 9000 tonnes.

OR

- c) c) Option 3 - set a TAC of 7 635 tonnes for RCO 3 and within that TAC set:
  - i) a customary allowance of 5 tonnes;
  - ii) a recreational allowance of 280 tonnes;
  - iii) an allowance of 350 tonnes for other sources of fishing-related mortality; and
  - iv) a TACC of 7 000 tonnes.

OR

- d) Option 4 - set a TAC of 4 930 tonnes for RCO 3 and within that TAC set:
  - i) a customary allowance of 5 tonnes;
  - ii) a recreational allowance of 95 tonnes;
  - iii) an allowance of 230 tonnes for other sources of fishing-related mortality; and
  - iv) a TACC of 4 600 tonnes, and
  - v) reduce the recreational daily bag limit for red cod in RCO 3 from 30 to 10.

The current TACC for RCO 3 is 12 396 tonnes. A TAC and other allowances have not yet been set for RCO 3.

10 The proposed management options are shown in Table 1.

**Table 1: The proposed TAC (tonnes), TACC (tonnes) and allowances for RCO 3 for the 2007-08 fishing year**

	<b>Proposed TAC (tonnes)</b>	<b>Customary allowance (tonnes)</b>	<b>Recreational allowance (tonnes)</b>	<b>Other sources of fishing-related mortality (tonnes)</b>	<b>Proposed TACC (tonnes)</b>
Option 1 (Proxy for <i>Status quo</i> )	13 299	5	280	618	12 396
Option 2 (TAC based on 25% reduction)	9 735	5	280	450	9 000
Option 3 (TAC based on average catch over last 20 years)	7 635	5	280	350	7 000
Option 4 (TAC based on average catch over last 5 years)	4 930	5	95	230	4 600

## **Rationale for Management Options**

### ***Biological characteristics***

- 11 Red cod are a fast-growing, short-lived species with few fish in the commercial fishery older than six years. Recruitment is highly variable resulting in large variations in catches between years. To allow fishers to access stocks in years of high abundance, the TACC has traditionally been set at the highest catch levels. This management approach assumes that recruitment is effectively independent of biomass.

### ***Stock status***

- 12 The most recent stock assessment (2001) and estimates of biomass and sustainable catch are largely based on data up to the end of the 1997-98 fishing year. The data used for this assessment is now nine years old.
- 13 Based on the historical data, the Plenary considered that, while a constant catch at the TACC level of RCO 3 was not attainable or sustainable in most years, biomass of RCO 3 appeared to be greater than the size that would support the BMSY. Based on current catches and anecdotal information from fishers, MFish considers that this may no longer accurately reflect the status of the fishery.
- 14 The stock assessment did estimate a Current Annual Yield (CAY) at 14 561 t, with a range of 2 624 t to 37 976 t. The Plenary considered this stock assessment to be uncertain.
- 15 The Plenary also considered that, if it were fully caught, the existing TACC (12 396 t) is unlikely to move RCO 3 towards a level that could sustain MSY.
- 16 Two estimates of Maximum Constant Yield (MCY), using two different methods, are available and are 4 400 t and 7 000 t. Landings over the seven year period from the 1992-93 fishing year until 1998-99 exceeded 8 000 t

annually. Since that extended period of landings in excess of MCY estimates, landings have averaged 4 600 t and declined to 3 222 t in the 2005-06 fishing year. Landings for the current fishing year are not expected to significantly exceed 1 500 t.

- 17 Both commercial and recreational fishers have expressed concern at the continued decline in the RCO 3 stock over the past seven years. Recorded landings at the time of writing (2/3 through the fishing year) are 906 t. This is an order of magnitude lower than the TACC. Even with the assumption that red cod stocks can respond positively from a low biomass, recent landings data reflect a trend of declining abundance and recruitment in RCO 3.
- 18 The sex ratio of the RCO 3 commercial catch sampled during the period 1989-90 until 1992-93 was skewed towards females during November (ratio F:M 3.4:1) with the ratio tending to even out by May. This implies that the fishery may be catching a predominance of breeding females.
- 19 Given current landings, as an indicator of current biomass, also suggest the available spawning stock may be low, a more conservative approach to management may be prudent. Future recruitment pulses may be smaller and there may be a need to protect the stock to allow the population to re- generate a significant pulse of recruitment.

### ***Existing catch limits***

- 20 The total allowable commercial catch (TACC) is 12 396 t.
- 21 The original TACC for RCO 3 was set at a high level, based on 1983 catch levels that were the highest on record at that time. Since 1986, the TACC was increased from 9 000 t to 12 396 t by quota appeals. The TACC was intended to allow high levels of commercial catch in years of high abundance. However, the TACC has only been caught three times over the last 25 years and it is substantially above the level of current catches. The Plenary concluded that if it were fully caught, the existing TACC is considered unlikely to move RCO 3 towards a level that could sustain the MSY.
- 22 Given this, MFish considers it unlikely that a TAC incorporating the current TACC (as well as allowances for recreational catch, customary catch and other sources of fishing-related mortality) would move RCO 3 towards a level that would support the MSY. A TAC needs to be set that is more likely to fulfil the obligation to move RCO 3 towards the level that can produce the MSY.
- 23 MFish considers the decline in landings indicates the best value is not being achieved from this fishery. MFish is also concerned that the high TACC set for RCO 3 means that, in most years, there is effectively an “open access fishery” as there is significantly more ACE available than realizable catch. This creates a number of anomalies including a “race for catch” rather than efficiently fishing to obtain the best value. The outcome includes competition for access to local fishing grounds, fishing in nursery areas, and discarding of non-marketable fish and bycatch.

- 24 The vast majority of red cod is caught by trawl. As RCO 3 is a component of the SIF fishery, there are a number of QMS stocks that are taken as an unavoidable bycatch of trawling for red cod. Section 13(2) notes that, when setting a TAC, the Minister shall have regard to the interdependence of stocks. Changes in catch rates of red cod, combined with the recovery of other quota species since the introduction of the QMS, have resulted in a catch mix for which some fishers do not have the appropriate quota holdings. Bycatch problems while targeting red cod are therefore common for stargazer, red gurnard, elephant fish, rig, school shark, blue cod, groper and tarakihi.
- 25 MFish considers that three of the proposed TAC options will move to alleviate bycatch issues associated with the interdependence of stocks and the RCO 3 fishery.
- 26 The open access fishery and race for catch also results in distortions in the ACE market for interdependent stocks where catches of bycatch species may be optimised during years of low red cod abundance. Higher catches of bycatch species leads to over-catching these stocks and discarding as ACE for those stocks become more difficult to procure.

### **Other factors**

- 27 As mentioned, the TACC for RCO 3 was set at the historical highest catch levels to allow fishers to take advantage of high abundance years. This management strategy was set when RCO 3 was put into the QMS in 1986, prior to the current Act. MFish consider this historical provision is no longer necessary to access catch during years of high abundance as red cod is on the Second Schedule of the Act to allow for within fishing year TACC increases.
- 28 The Second Schedule can apply to any stock whose abundance may vary significantly from year to year. For stocks listed on the Second Schedule, in years when the stock is particularly abundant, the TAC can be increased during the fishing year. The aim of an in-season adjustment to the TAC is still to manage a stock at, or above, a level that can produce the MSY.
- 29 Red cod on the south-east coast lends itself to the provisions of the Second Schedule as an analysis of the recruitment-environment relationship shows there is a strong correlation between recruitment and environmental variables, with a periodic 14 month lag. Further, the South-east trawl survey has recommenced this winter and will be able, in future years, to provide fishery independent information on the relative abundance and year class strength and recruitment into the fishery.
- 30 MFish notes that it is currently consulting on a proposal to increase the squid TAC (TAC set under s14, and on the Third Schedule of the Act; refer Initial Position Paper with this document). The fishery and biological characteristics of red cod and squid are sufficiently different to warrant different management approaches. Red cod is longer lived than squid and, while the abundance of red cod varies, it does so over longer time periods and at a smaller scale than squid. Red cod is also a shared fishery and recreational fishers are finding that

what was once an abundant and accessible species is now an uncommon catch under current management.

## Assessment of Management Options

### Setting a TAC

- 31 The Minister is obliged, under section 13 of the Act, to set a TAC for any stock under review that does not yet have one. MFish considers that setting a TAC and, within it, allowances for commercial and non-commercial fishing, is the best way of ensuring sustainable management of this fishery.
- 32 MFish proposes to set the TAC for RCO 3 using s 13 of the Fisheries Act 1996.
- 33 Most stocks in the Quota Management System (QMS) are managed under s 13. Section 14 provides an alternative means for setting a TAC under certain circumstances, where it would better meet the purpose of the Act. MFish considers that s 14 does not apply for RCO 3 because:
- a) it is possible to estimate the MSY of the species;
  - b) a catch limit for New Zealand has not been determined as part of an international agreement;
  - c) the stock is not managed on a rotational or enhanced basis; and
  - d) the stock does not include one or more highly migratory species.
- 34 The Minister of Fisheries must set a TAC under s 13 that:
- a) Maintains the stock at or above a level that can produce the MSY; or
  - b) Enables any stock that is currently below a level that can produce the MSY to be restored to a level at, or above, that which can produce the MSY; or
  - c) Enables the level of any stock currently above the MSY to be altered in a way and at a rate that will result in the stock moving towards the MSY.
- 35 MFish considers that the most current available information indicates that the existing TACC for RCO 3 is not moving the stock towards MSY and there are indications that the stock is in decline. While red cod is known to have highly variable recruitment, MFish is concerned that, on the available information, RCO 3 may require some considerable time to recover from the current downturn in the fishery and a period of rebuild is necessary.
- 36 Therefore, MFish proposes to set a TAC under s.13(2)(b) of the Act, taking into account interdependence of stocks in the SIF fishery.
- 37 In determining the way and rate at which the stock should be moved to a level that can support MSY, MFish has little information on the social, cultural and economic considerations of this fishery must be taken into account. MFish welcomes further information from submitters on these matters relating to the following TAC proposals.

### ***Proposed TAC options***

- 38 All options are based on RCO 3 being on the Second Schedule of the Act and, therefore, open to within fishing year TACC increases:
- Option 1 – A proxy *status quo*. This option is based on the 2001 Plenary report that the stock is above  $B_{MSY}$ . This option incorporates estimates of recreational catch, customary catch and other sources of fishing-related mortality as a constant factor during the period without a TAC and estimates have been added to the TACC.
  - Option 2 - TAC based around a 25% reduction to the TACC to move the TAC towards  $B_{MSY}$ , as Plenary considered that, if fully caught, the existing TACC is unlikely to move RCO 3 towards a level that could sustain the MSY. The TAC also incorporates estimates of recreational catch, customary catch and other sources of fishing-related mortality;
  - Option 3 – TAC based on the most recent 20-year average of commercial catches, plus estimates of recreational catch, customary catches and other sources of fishing-related mortality;
  - Option 4 - TAC based on the most recent 5-year average of commercial catches, plus estimates of recreational catch, customary catch and other sources of fishing-related mortality.

### ***Recreational catches***

- 39 It is proposed that 280 tonnes be used as the estimate for recreational catch as an input for calculating the TAC for all options, except for Option 4 where recreational catch has been reduced by two thirds, effected by a reduced recreational daily bag limit of 10. In this regard, MFish would appreciate information from recreational submitters on the value of the fishery to them.
- 40 Surveys of recreational fishing in 1992-94, 1996, 1999-00, and 2000-01 provide estimates of the recreational harvest of red cod in RCO 3. The estimates from the 1999-00 and 2000-01 surveys are very similar, and are considered the best available information about recreational take. These surveys estimate recreational red cod take in RCO 3 to be approximately 280 t and 207 t. The Plenary favoured the 2000 survey of 280 t.
- 41 The 1999-00 recreational survey estimates have relatively large ranges (210-349 tonnes in the 1999-00 survey and 189-352 tonnes in the 2000-01 survey). MFish considers it is more appropriate to use the mid-point of the 1999-00 survey as an estimate of recreational catch, rather than an alternative value such as the upper limit of the harvest estimate.

### ***Customary Maori catches***

- 42 It is proposed that a nominal 5 t be used as the estimate for customary Maori catch as an input for calculating the TAC. The same estimate is proposed for all options.

- 43 There are no records of customary take of red cod in RCO 3. Customary landings are managed by Tangata tiaki under Customary Regulations. Tangata tiaki have been appointed for FMA 5 and most of FMA 3 and they provide the permits for all customary take in the area. These permits describe the quantity and species of fish that can be taken and the purpose of the customary permit. No customary permits have been issued for red cod in RCO 3. Harvesting by tangata whenua is, therefore, assumed to be taken under the recreational catch. Therefore, a nominal customary allowance of 5 t is provided. Further information from submitters is keenly sought to ensure the customary allowance satisfactorily provides for customary catch.

### *Estimate of other sources of fishing-related mortality*

- 44 MFish proposes to include an estimate of 5% of the proposed TACCs for other sources of fishing-related mortality for RCO 3. No allowance is currently set but there are various potential sources of fishing-related mortality in RCO 3, including:

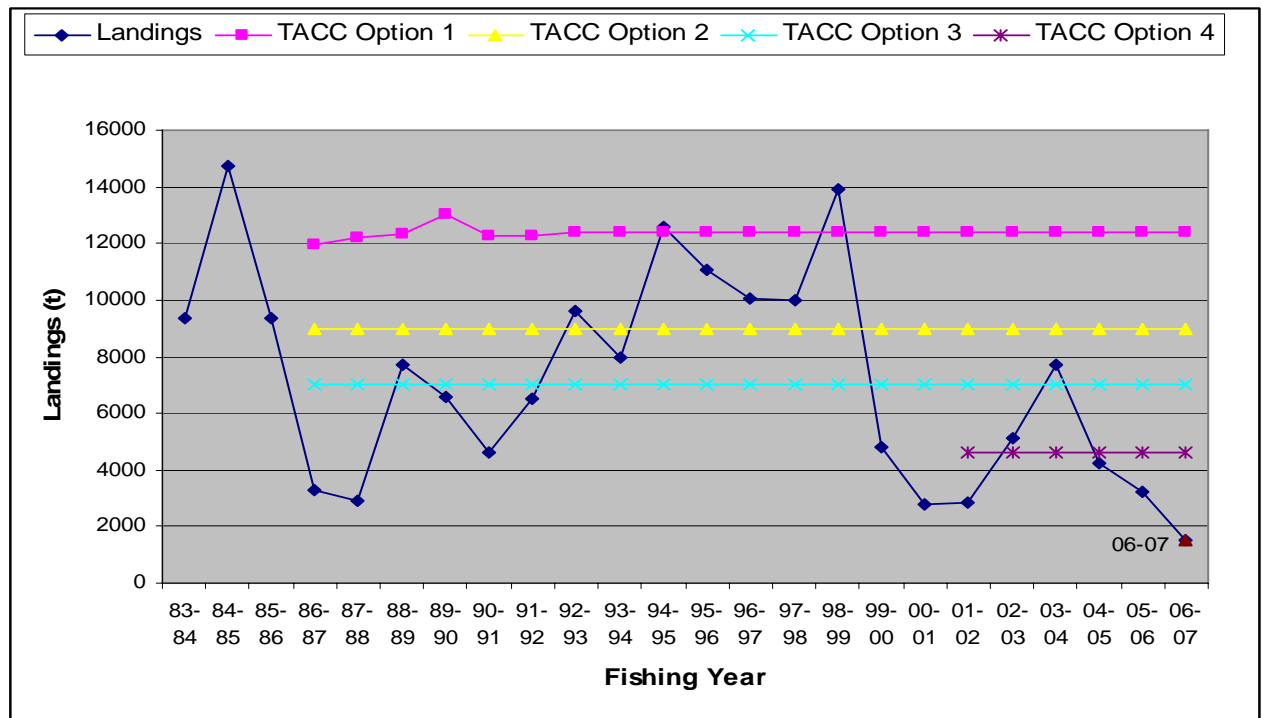
- Red cod have a minimum legal size limit of 25 cm. Red cod are soft fleshed and survival of returned undersized fish from the trawl fishery is thought to be low;
- Red cod may be subject to high-grading where market preference leads to the establishment of processor grading and size limits. Fishers may discard lower-grade fish that they are unable to sell. In times of high abundance, the significant price differential between the small grade (600 g) and larger fish (800 g) provides an incentive for high grading.
- The extent of any illegal catch of red cod for commercial sale is unknown but considered unlikely to occur.

### *Commercial catches*

- 45 The potentially high natural variability of red cod is acknowledged by the inclusion of red cod on the Second Schedule of the Act. Inclusion of red cod on the Second Schedule has been taken into account when providing the TAC options. TACCs under the TAC options are as follows:

- a) Option 1 – *Status quo* (12 396 t).
- b) Option 2 - 25% adjustment to commercial landings (9 000 t)
- c) Option 3 – Average commercial landings over 20 years (7 000 t)
- d) Option 4 – Average commercial landings over the last five years (4 600 t)

**Figure 2: Landings, current TACC and proposed TACCs.**



Note:- 06-07 To illustrate the current state of the fishery, a projected figure of 1500 t has been used for the current 06-07 fishing year.

### Option 1

- 46 Option 1, the proxy Status quo, proposes a TAC of 13 299 t, including a TACC of 12 396 t. This option supports the assumption that red cod can be fished as hard as is economically necessary every year and that their natural fecundity will ensure their plentiful abundance into the future.
- 47 MFish considers that this historical approach has a number of disadvantages to achieving best value from the fishery that also extend to inevitable bycatch species. It is possible that this management approach to the fishery also contributes to a boom or bust productivity from the fishery which will compromise marketing continuity and obtaining best value from the fishery. As expressed earlier in the paper, based on the current landings, MFish has concerns about the ability of the existing spawning biomass to respond to current fishing pressure and believes that precaution should be adopted with this fishery under the current situation.
- 48 Option 1 will meet the Minister’s obligation to set a TAC and ensure full access to the fishery in years of high abundance. MFish does not believe this option will meet the Minister’s obligations under s 13 of the Act given the statement from the Plenary that if it were fully caught, the existing TACC is considered unlikely to move RCO 3 towards a level that could sustain the maximum sustainable yield (MSY).
- 49 Under this option there are no expected economic changes.

## **Option 2**

- 50 Option 2 proposes to use the same estimates for customary and recreational catch, and the same proportion to estimate other sources of fishing-related mortality.
- 51 Option 2 proposes a TACC reduction of 25%, down to 9 000 t for the commercial fishery, and 450 t for other sources of fishing related mortality (5%).
- 52 At a TACC of 9 000 t, over the last 20 fishing years, catch would have been restrained on 30% of these fishing years. The average recorded landings over the last 20 fishing years is 6 848 t.
- 53 This TAC option is higher than past catches have been in most years. Given current catch levels, the socio-economic effects are not likely to be significant into the medium term. Because most of the RCO 3 catch is targeted, fishers would probably be able to adjust their activities without exceeding the TAC.

## **Option 3**

- 54 Option 3 proposes a TACC of 7 000 t for the commercial fishery and 350 t for other sources of fishing-related mortality (5%). This option is slightly above both the 10 and 20 year average recorded landings, being 6 407 t and 6 848 t, respectively. Under this option, catch would have been constrained in 45% of fishing years over the last 20 years. Catch has only once slightly exceeded 7 000 t (7 724 t) within the last seven years. This option also corresponds well with the MIAEL estimation of MCY (7 173 t) given in the Plenary document.
- 55 Should abundance eventually rise significantly, within fishing year adjustments would be available under the Second Schedule provisions, if appropriate. Therefore, this option would not constrain the fishery overly as there is always recourse to the Second Schedule. It could, however, restrict the use of RCO 3 ACE as a proxy to target other SIF fishery species, and reduce any discarding when ACE was thought to be difficult to obtain. This option could reduce the distortions associated with an unrestrained access to the fishery.
- 56 MFish considers that this option is likely to constrain fishing effort and ensure more constant sustainable stocks. This option would probably constrain further new entrants into the fishery.

## **Option 4**

- 57 Option 4 proposes a TACC of 4 600 t for the commercial fishery and 200 t for other sources of fishing-related mortality (5%). This option better reflects the current state of the fishery over the last five years and is slightly above the Yav estimation of MCY (4 400 t). This option is supported by recreational fishers, especially from the Canterbury/Banks Peninsula area, who consider the recreational fishery for “the renowned Akaroa cod” to have been deteriorating since 1996 and to be now, effectively, non-existent.

- 58 Under current landings, this option will have little impact on fishers as it is still above the current catch. This option may have economic impacts on smaller quota holding fishers who would no longer have an appropriate quota mix or economic parcel of RCO 3 ACE should they encounter quantities of red cod.
- 59 This option would also make a smaller allowance for recreational fishers – to be effected by a reduction of the recreational daily bag limit. Recreational fishers are supportive of this measure as they consider it is in the best interests of the fishery.

### ***Economic impacts***

- 60 RCO 3 has a relatively low commercial value, with a port price of \$0.59 per kg in 2006. RCO 3 quota trades at a low amount, generally \$2 - \$2.50 per kg.
- 61 Technically, any reduction in the TACC will mean an ‘opportunity cost’ for commercial fishers no longer being able to catch up to the current commercial catch limit. On the other hand, under current landings, there will be no actual financial impact on fishers under any of the options put forward for consultation. Based on previous landings trends, any rise in landings is likely to be a steady increase. Current landings would suggest that spawning biomass will be equally low and that any significant recruitment pulse could be some years away.
- 62 Because RCO 3 is listed on the Second Schedule, there is provision for an in-season increase to the TAC (under s 13(7)). This provision would mitigate lost opportunity costs because catches could be increased during years of high abundance. Using this provision would require a pre-recruit survey or some other way of assessing abundance.
- 63 Most of the RCO 3 commercial catch is taken by fishers who do not own quota but buy annual catch entitlement (ACE) from quota holders. The market for ACE is quite active. Most quota holders who do not choose to fish their own entitlement sell it to other fishers. If the commercial catch limit is reduced, MFish expects that most commercial fishers will still be able to obtain ACE to cover their catches. This assumption is based on quota holders continuing to trade their ACE in a similar manner to their current practices.
- 64 However, because ACE will become scarcer, the price is likely to increase above the current level of \$0.0738 per kg. This increase is likely to affect the profitability of some individual fishing operations.
- 65 Conversely, quota holders may benefit over the medium term because quota prices may increase.
- 66 Significant reductions in the TACC may impact on the value of quota share holdings. But, previous experience in fisheries has indicated that the inherent value of a fishery is already established and that the value of quota responds to adjustments accordingly.

- 67 Restricting the availability of ACE by reducing the TACC is also likely to limit the number of new fishers entering the fishery. MFish considers that existing fishers are more likely to be able to access ACE because they will already have relationships with quota holders.

### ***Social and cultural impacts***

- 68 Red cod is an important recreational fish species, especially in the Canterbury region. Recreational fishers from this region have expressed serious concerns about the state of the RCO 3 fishery. They find that what was once one of the more abundant and accessible species is now an uncommon or incidental catch. Consequently, recreational fishers favour that course of action most likely to quickly rebuild the fishery and have volunteered a 2/3rd reduction in their daily bag limit of red cod if option 4 is favoured.
- 69 There is an attendant cultural cost for recreational fishers being unable to access their fishery.
- 70 Non-commercial fishers cannot use the bulk harvesting methods that commercial fishers use. The high level of the current TACC may increase the likelihood that commercial fishers preferentially catch available red cod. This situation is likely to be particularly apparent in years of lower red cod abundance.

## **Other Management Controls**

### ***Deemed value***

- 71 Stocks that are being considered for a TACC review as part of the October 2007 sustainability round are also being included in a deemed value review process. This is to ensure that, in situations when a TACC is adjusted, the deemed value is also set at an appropriate level to defend the new TACC. MFish considers that if the TACC is reduced then deemed value rates should increase so that they adequately protect the new TACC. The current annual deemed value rate (\$0.32 per kg) is set below both the port price (\$0.54 per kg) and average export price (\$3.58 per kg). MFish proposes to increase the annual deemed value rate so that it better reflects the current port price. Differential deemed value rates will also change in line with the proposed annual deemed value rate. The proposed deemed value rates for the 2007-08 fishing season are as follows:
- a) Annual deemed value rate to increase from \$0.32 per kg to \$0.50 per kg.
  - b) Interim deemed value rate to increase from \$0.16 per kg to \$0.25 per kg, which is 50% of the new annual deemed value rate.
  - c) Differential deemed value rates adjusted to reflect the proposed new annual deemed value rate, outlined in the table below.
- 72 These proposed deemed value adjustments are dependant on a TACC decrease, if this is not approved by the Minister then MFish considers the deemed value rates should remain unchanged.

### **Recreational daily bag limit**

73 Under option 4, the South Recreational Marine Fishers Advisory Committee has volunteered to reduce the red cod recreational daily bag limit from 30 to 10 per day. This reduction has been put forward to assist in rebuilding the resource and underlines the recreational sector's deep concern for the current state of the fishery.

### **Statutory Considerations**

74 In forming the management options for RCO 3, the following statutory considerations have been taken into account:

- a) The purpose of the Act (as provided in s 8) is to provide for the use of fisheries resources while ensuring sustainability. Because information about red cod abundance is uncertain, MFish has provided a range of options consistent with the Act's purpose. Options aim to provide for use while ensuring sustainability.
- b) The TAC set under s 13 should be set at the level that can produce the MSY, or it should move the stock towards that level. As noted, there is uncertainty about where RCO 3 is in relation to the level that can produce the MSY. Because of this uncertainty, four TAC options are proposed. MFish considers, on the information available, that options 2, 3, and 4 are more likely to move the stock towards a level that can produce the MSY.
- c) The proposed TAC options have also taken into account the following factors:
  - i) Red cod stocks may vary from year to year because they are affected by *environmental conditions*. However, specific environmental conditions have not been identified that would affect the movement of the stock towards a level that will support the MSY (as discussed in s 13(2)(b)(ii) of the Act).
  - ii) The *biological* characteristics of red cod have been considered when proposing options for the TAC (as required under s 13(2)(b)(ii)).
  - iii) The vast majority of red cod is caught by trawl. As RCO 3 is a component of the SIF fishery, there are a number of QMS stocks that are taken as an unavoidable bycatch of trawling for red cod. Section 13(2) notes that, when setting a TAC, the Minister shall have regard to the *interdependence of stocks*. Changes in catch rates of red cod, combined with the recovery of other quota species since the introduction of the QMS, have resulted in a catch mix for which some fishers do not have the appropriate quota holdings. Bycatch problems while targeting red cod are, therefore, common for stargazer, red gurnard, elephant fish, rig, school shark, blue cod, groper and tarakihi. As a result, effort into targeting red cod may be reduced to

alleviate bycatch problems, despite the availability of red cod quota.

- iv) MFish considers that three proposed TAC options will move to alleviate bycatch issues associated with the interdependence of stocks and the RCO 3 fishery.
- d) Social, cultural and economic consequences are a relevant factor when the Minister considers the way in which and rate at which a stock is moved towards or above a level that can produce the MSY (s 13(3)). MFish has identified differing social and economic consequences of altering the TAC and TACC under the four options.
- e) Natural variability is a relevant factor to consider when setting or altering a sustainability measure such as a TAC (s 11(1)(c)). This factor has been taken into account when choosing the periods over which to calculate average commercial catch.
- f) Section 9 sets out environmental principles that must be taken into account when setting or altering a sustainability measure such as a TAC:
  - a) Associated or dependent species should be maintained above a level that ensures their long-term viability;
  - b) Biological diversity of the aquatic environment should be maintained;
  - c) Habitat of particular significance for fisheries management should be protected.
- g) The options proposed here are unlikely to lead to increased catches, or an expansion of fishing effort into previously unfished areas. All options are considered to adequately take into account these environmental principles.
- h) Associated or dependent species (s 9a) are any non-harvested species – such as seabirds or marine mammals – that are affected by the taking of any harvested species. There have been instances on the South Island east coast where endangered Hector's dolphin have been caught in commercial trawl nets. To manage this risk, a code of practice and regulations have been put in place in areas of concern within RCO 3. The proposed TAC options will not result in effort increasing but, rather, decreasing and risk to seabirds and marine mammals from trawling for red cod will decrease accordingly.
- i) Protection of biological diversity of the aquatic environment also needs to be considered (s 9(b)). Likewise, s 9(c) concerns the protection of habitat of particular significance to fisheries management. Because no increase in fishing effort is anticipated, it is not expected

that any of the proposed TAC options would have any additional impact on biological diversity or significant habitats.

- j) A wide range of international obligations relate to fishing, including use and sustainability of fishstocks; and maintaining biodiversity (s 5(a)). MFish considers that the management options for RCO 3 are consistent with these international obligations.
- k) MFish also considers that the proposed management options are consistent with the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 (s 5 (b)). Ongoing work is being done within the area covered by RCO 3 to promote policies that help to recognise customary use and management practices. This paper has identified a lack of information on the level of harvest and the importance of red cod fisheries to customary fishers in RCO 3. Further information on this topic would be welcomed.
- l) Existing control measures have been considered when making recommendations for any change to measures used to control the RCO 3 fishery (as outlined in s 11(1)(b)).
- m) No relevant fisheries plan has been approved under s 11(2A)(b) of the Act.
- n) MFish has considered relevant conservation services and fisheries services (as outlined in s 11(2A)(a and c)). No suggestion is made at this stage to alter any decision about whether such services are required. If the fishery moves to a CAY strategy, then development of an appropriate management mechanism or decision rule may be required.
- o) There are no known relevant provisions concerning the coastal marine area in any policy statement or plan under the Resource Management Act 1991, or any management strategy or plan under the Conservation Act 1987 (as outlined in s 11(2)(a) and (b) of the Fisheries Act). There 3 Regional Councils and one Territorial Local Authority in the RCO 3 QMA. These are Canterbury, Otago and Southland Regional Councils and the Chatham Islands Territorial Authority. Conservation Strategies exist for the Chatham Islands, Canterbury, Otago, Southland, Stewart Island and the Sub-Antarctic Islands.
- p) **Fiordland (Te Moana o Atawhenua) Marine Management Act 2005:** In recognition of the Fiordland (Te Moana o Atawhenua) Marine Area's local, national, and international importance, unique marine environment, distinctive biological diversity, and outstanding landscape and cultural heritage, the Government passed the Fiordland (Te Moana o Atawhenua) Marine Management Act 2005 (the 2005 Act).
- q) The purpose of the 2005 Act includes establishing the Fiordland Marine Guardians to provide advice on fisheries management,

biosecurity, sustainable management, and marine preservation and protection. The 2005 Act also seeks to facilitate and promote co-operation between the Guardians and management agencies, to assist in achieving the integrated management of the Fiordland Marine Area.

- r) Section 12 of the Act establishes the Fiordland Marine Guardians. Section 13 of the 2005 Act states that the functions of the Guardians are, *inter alia*, to advise and make recommendations to management agencies and Ministers who exercise functions under specified enactments (including the Fisheries Act), to achieve the purpose of this Act. This includes, but is not limited to, advice and recommendations on the effectiveness of management measures in the Fiordland (Te Moana o Atawhenua) Marine Area.
- s) The 2005 Act goes on to state in s 26 that all management agencies exercising powers or carrying out functions in the Fiordland (Te Moana o Atawhenua) Marine Area must take into account any advice or recommendations provided by the Guardians (this includes powers and functions under the Fisheries Act 1996).
- t) RCO 3 includes the Fiordland coast and the Ministry will seek specific comment from the Fiordland Marine Guardians on the proposals.
- u) The nature of the fishery and the interests of each fishing sector have been considered in proposing the TACC and allowances for customary and recreational interests and other sources of fishing-related mortality (sections 21(1)(a and b), 21(4)(i and ii) and 21(5)). There are currently three mātaihai reserves and a taiapure within RCO 3. There is also a 186B rāhui closed area at Kaikoura. These areas have been identified for customary fishing purposes in RCO 3, but the closures do not materially affect red cod fisheries. No restrictions have been placed on recreational fishing in any area within the QMA under s 311 of the Fisheries Act.
- v) Section 10 sets out information principles that are to be taken into account when setting TACs.
- w) The best available information on the status of RCO 3 is the Report from the Fisheries Assessment Plenary, May 2006: stock assessments and yield estimates compiled by the Ministry of Fisheries Science Group, May 2006.

75 MFish has used the surveys of recreational fishing in 1999-00, and 2000-01 as the basis for estimates of recreational catch in RCO 3. Limitations are acknowledged with the use of these surveys. However, in the absence of other information on recreational catches, the surveys are nonetheless considered to provide the best available information. MFish is also mindful that there are qualitative components to the recreational red cod fishery in RCO 3.

## Future Management

- 76 Three of the proposed allocations under a new TAC will reduce the current TACC. MFish requests feedback from stakeholders on the proposed options.
- 77 Should the fishery move to a CAY strategy using the Second Schedule of the Act, the development of a decision rule or management mechanism to anticipate pre- or within-season TACC adjustments may be required. It is envisaged at this stage that such a mechanism would be based on data generated by the south-east coast trawl survey and the recruitment-environment relationship.
- 78 The fishery could be closely monitored to determine the social and economic results of any reduction, as well as for sustainability outcomes. Over the next several years, MFish proposes to monitor:
- the ongoing availability of ACE to enable current fishers to continue to fish;
  - quota and ACE prices;
  - quantity of deemed values paid;
  - anecdotal evidence about the impact of any change implemented.
- 79 MFish will undertake further surveys to determine levels of recreational catch, including that for RCO 3. MFish would also welcome submitters providing further information on the social and customary importance of red cod.

## Preliminary Recommendations

- 80 MFish proposes that for the 2007-08 fishing year:

EITHER

- a) Option 1 - set a TAC of 13 299 tonnes for RCO 3 and within that TAC set:
  - i) a customary allowance of 5 tonnes;
  - ii) a recreational allowance of 280 tonnes;
  - iii) an allowance of 618 tonnes for other sources of fishing-related mortality; and
  - iv) a TACC of 12 396 tonnes.

OR

- b) Option 2 - set a TAC of 9 735 tonnes for RCO 3 and within that TAC set:
  - i) a customary allowance of 5 tonnes;

- ii) a recreational allowance of 280 tonnes;
- iii) an allowance of 450 tonnes for other sources of fishing-related mortality; and
- iv) a TACC of 9000 tonnes.

OR

- c) c) Option 3 - set a TAC of 7 635 tonnes for RCO 3 and within that TAC set:
  - i) a customary allowance of 5 tonnes;
  - ii) a recreational allowance of 280 tonnes;
  - iii) an allowance of 350 tonnes for other sources of fishing-related mortality; and
  - iv) a TACC of 7 000 tonnes.

OR

- d) Option 4 - set a TAC of 4 930 tonnes for RCO 3 and within that TAC set:
- i) a customary allowance of 5 tonnes;
  - ii) a recreational allowance of 95 tonnes;
  - iii) an allowance of 230 tonnes for other sources of fishing-related mortality; and
  - iv) a TACC of 4 600 tonnes.
  - v) Reduce the red cod recreational daily bag limit in FMAs 3 & 5 from 30 to 10 per day.

# ANNEX 1

## Fishery Information

### Biological Characteristics

#### Productivity and natural variability

- 81 Red cod (*Pseudophycis bachus*) are a fast-growing, short-lived species with few fish in the commercial fishery older than six years. Red cod grow to about 25 cm total length (TL) in the first year, followed by annual growth increments of around 15, 10 and 5 cm. Growth of sexes is similar for the first two years, after which females tend to grow faster than males and reach a larger overall length. Sexual maturity ranges from 45 to 55 cm TL with a mean value of 52 cm TL for both sexes at an age of 2–3 years. M has been estimated to equal 0.76 for both sexes.
- 82 In the 1989–90 to 1992–93 fishing years, 80% of the landings in RCO 3 were 2+ and 3+ fish (50–57 cm TL). The sex ratio of the commercial catch during this period was skewed towards females during November (ratio F:M of 3.4:1) with the ratio tending to even out by May. Schools generally comprise single age cohorts rather than a mix of age classes.
- 83 Spawning in red cod varies with latitude, with spawning occurring later at higher latitudes. In the Canterbury Bight, spawning occurs from August to October. No definite spawning grounds have been identified on the southeast coast, but there is some evidence that red cod spawn in deeper water (>300–750 m). Running ripe fish were caught on the Puysegur Bank in 600 m during the Southland trawl survey in February 1994. Juvenile red cod are found in offshore waters after the spawning period; but no nursery grounds are known for this species.
- 84 Red cod are seasonally abundant, with schools appearing in the Canterbury Bight and Banks Peninsula area around November. These schools are feeding aggregations and are not found in these waters after about June. Catch data indicates that they move into deeper water after this time. Recruitment is highly variable resulting in large variations in catches between years.

#### Estimates of biological parameters for red cod.

Fishstock	Estimate	Source			
<b>1. Natural mortality (M)</b>					
RCO 3 (1992)	0.76	Beentjes			
<b>2. Weight = a (length)<sup>b</sup> (Weight in g, length in cm fork length)</b>					
	<b>Females</b>	<b>Males</b>			
RCO 3 (1992)	a = 0.0074	b = 3.059	a = 0.0145	b = 2.892	Beentjes

### 3. von Bertalanffy growth parameters

	Females			Males			
	K	t <sub>0</sub>	L <sub>∞</sub>	K	t <sub>0</sub>	L <sub>∞</sub>	
RCO 3 (1995)	0.41	-0.03	76.5	0.47	0.06	68.5	Horn

**Table 2: Key Biological Variables for Red Cod.**

Species	Natural mortality rate (M)*	Fecundity*	Maturity length and Age	Maximum age	Growth	Nursery Areas	Main depth distribution
<b>Red cod</b>	<b>Very high</b> 0.76	High	50 cm/2yr	6	Fast	>300m	<200m

### **Catch Information**

#### *Commercial fishery*

- 85 Red cod catch fluctuates from year to year reflecting changes in abundance as recruitment varies. The red cod caught are usually two and three year fish.
- 86 Red cod was introduced into the QMS in 1986. The TACCs set for red cod in 1986 were set at the highest historic catch level to enable fishers to take advantage of the available catch when these stocks were plentiful.
- 87 Quota appeals, based on commitment and dependence, further increased the TACC by 27 %. Reduction of the TACCs to the highest historic catch level before 1991 would have required compensation, but does not now.
- 88 Annual red cod catches for RCO 3 range from 14 751 t in 1984–85 down to 2 776 t in 2000–01.

**Table 3 Reported landings (t) of red cod in RCO 3 from 1983–84 to 2005–06 and TACs (t) from 1986–87 to 2005–06**

<b>Fishing year</b>	<b>Catch landings (t)</b>	<b>TACc</b>
1983-1984	9 357	-
1984-1985	14 751	-
1985-1986	9 346	-
1986-1987	3 300	11 960
1987-1988	2 878	12 182
1988-1989	7 732	12 362
1989-1990	6 589	13 018
1990-1991	4 630	12 299
1991-1992	6 500	12 299
1992-1993	9 633	12 389
1993-1994	7 977	12 389
1994-1995	12 603	12 389
1995-1996	11 038	12 389
1996-1997	10 056	12 389
1997-1998	9 972	12 389
1998-1999	13 926	12 389
1999-2000	4 824	12 389
2000-2001	2 776	12 389
2001-2002	2 862	12 396
2002-2003	5 107	12 396
2003-2004	7 724	12 396
2004-2005	4 211	12 396
2005-2006	3 222	12 396

89 Most of the catch in RCO 3 is targeted by bottom trawl.