Ministry for Primary Industries
Manatū Ahu Matua

Review of Management Controls for Orange Roughy 3B (ORH 3B)

MPI Discussion Paper No: 2013/27

Prepared by the Ministry for Primary Industries

ISBN No: 978-0-478-41475-2 (online)
ISSN No: 2253-3907 (online)

July 2013

New Zealand Government

Growing and Protecting New Zealand

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INTRODUCTION

1 This Initial Position Paper provides the Ministry for Primary Industries (the Ministry's) initial proposals relating to catch limits and allowances for ORH 3B, to apply from 1 October 2013.

2 The Ministry has developed this IPP for the purpose of consultation as required under the Fisheries Act 1996 (the Act). The proposals outlined in the paper are preliminary and are provided as the basis for consultation with stakeholders.

3 In August 2013, the Ministry will provide a Final Advice Paper to the Minister for Primary Industries. The FAP will summarise the Ministry's and stakeholder's views on the proposed deemed value rate changes and make recommendations to the Minister. A copy of the FAP and the Minister's letter setting out his final decisions will be posted on the MPI website as soon as these become available.

DEADLINE FOR SUBMISSIONS

4 The Ministry welcomes written submissions on the proposals contained in the IPP. All written submissions must be received by the Ministry no later than 5pm on **Friday, 9 August 2013**.

Written submissions should be sent directly to:

Deepwater Fisheries Management
Ministry for Primary Industries
P O Box 2526
Wellington 6011

or emailed to fmsubmissions@mpi.govt.nz

Official Information Act 1982

5 All submissions are subject to the Official Information Act and can be released (along with the personal details of the submitter) under the Act. If you have specific reasons for wanting to have your submission or personal details withheld, please set out your reasons in the submission. MPI will consider those reasons when making any assessment for the release of submissions if requested under the Official Information Act.

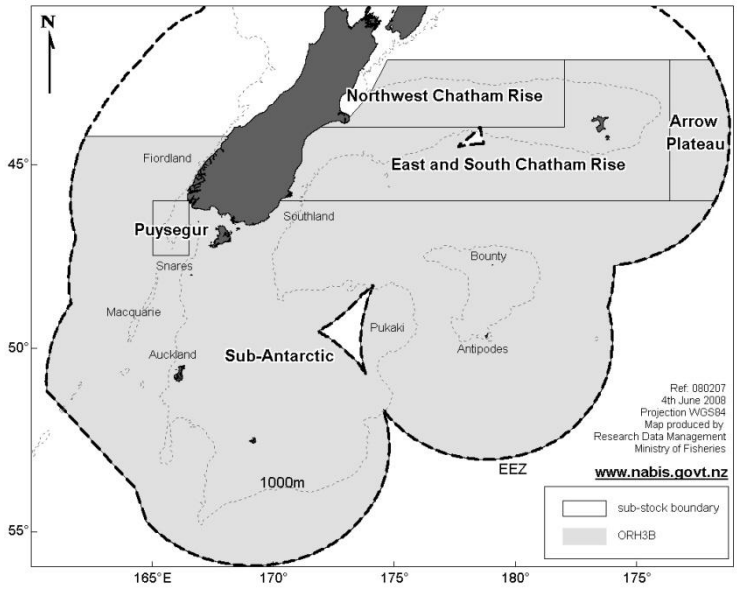

Figure 1: Quota Management Area (QMA) and sub-stock boundaries for ORH3B.

EXECUTIVE SUMMARY

6 ORH3B is a large and spatially-complex fishery that comprises at least five individual sub-stocks (Figure 1). The Minister for Primary Industries (the Minister) sets the total allowable catch (TAC) for the ORH3B stock as a whole. For each of the five sub-stocks the Deepwater Group Ltd (DWG), which represents approximately 98.0% of the ORH3B quota owners, agrees to catch limits at a sub-Quota Management Area level for the individual sub-stocks (catch limits).

Figure 1:

7 Based on the best available information, the ORH3B stock is unlikely to be at or above the B_{MSY}-compatible management target but also unlikely to be below the soft limit as described in the Harvest Strategy Standard. The East and South Chatham Rise fishery, which has provided approximately 70% of the orange roughy catch taken in ORH3B, has been the focus of ORH3B management in recent years and is the main focus of this paper.

8 The TAC for ORH3B has been reduced several times in recent years as a new harvest strategy was introduced for the sub-stock on the East and South Chatham Rise. As these reductions were made, the biomass of the East and South Chatham Rise continued to decline. However, in 2011 a significant new orange roughy plume was discovered and surveyed. The Ministry and DWG agreed not to increase catch limits in 2012, but to conduct a further survey of the new plume and continue work on a harvest strategy for this stock. On the basis of this work, the Ministry proposes that the Minister increases the TAC for ORH3B by 25% from 3780 tonnes to 4725 tonnes for the 2013/14 fishing year.

9 The increase of the TAC would result in the catch limit for the East and South Chatham Rise sub-stock increasing from 1950 tonnes to 3100 tonnes. Catch limits for all other sub-stocks in ORH3B would remain unchanged.

10 The Minister increased annual, interim and differential deemed values in 2010. The Ministry does not propose changing deemed values for the 2013/14 fishing year.

Summary of Management Proposals

11 The Ministry is proposing to recommend that the Minister set the TAC for ORH3B at 4725 tonnes for the 2013/14 fishing year. This would be an increase of 945 tonnes or 25% (i.e. from 3780 tonnes to 4725 tonnes). Within the TAC, allowances and the total allowable catch (TACC) would be set as follows:

a) Retain nil allowances for customary Māori and recreational fishing interests;

b) Set an allowance of 225 tonnes for other sources of fishing-related mortality;

c) Set the TACC for ORH3B at 4500 tonnes.

12 As part of managing the ORH3B fishery, by way of other management measures, the Ministry would request that industry implement the following sub-stock catch limits within the TACC (Table 1):

a) The catch limit for the East and South Chatham Rise sub-stock would be set at 3100 tonnes (an increase of 1150 tonnes or 59%). Note the previous research allowance of 250 tonnes (see b) below) has been subsumed into the new catch limit so the increase is only 41% from 2,200 tonnes to 3100 tonnes;

b) The industry research survey allowance of 250 tonnes for the East and South Chatham Rise sub-stock would be abolished. The Ministry's view is that this is no longer necessary and research will be conducted as required using a special permit;

c) The catch limit for the Sub-Antarctic sub-stock would remain at 500 tonnes;

d) The catch limit for the Puysegur sub-stock would remain at 150 tonnes.

Table 1: Summary of existing and proposed catch limits for the ORH3B fishery (tonnes)

ORH3B Sub-stocks	Existing catch limits for 2012/13 (t)	Option 1: Proposed catch limits for 2013/14 (t)
Northwest Chatham Rise	750	750
East and South Chatham Rise	1,950	3,100
Puysegur	150	150
Arrow Plateau (protected by BPA)	0	0
Sub-Antarctic	500	500
East and South Chatham Rise research allowance	250	0
TACC	3,600	4,500
Recreational and customary allowances	0	0
Other sources of fishing-related mortality (5% of TACC)	180	225
TAC	3,780	4,725

13 The Ministry would also request that industry reconfirm catch spreading within ORH3B and:

14 Continue to submit monthly monitoring reports regarding catch levels by sub-stock to the Ministry;

15 Continue to notify the Ministry when catch reaches 80% of any catch limit to allow more frequent reporting and also notify the Ministry when any limit has been reached so that fishing can be stop.

CONTEXT

16 The ORH3B fishery is spatially complex and comprises several biological stocks.[1] The status of each sub-stock is evaluated independently, with the results compiled to determine the status of ORH3B as a whole. Based on the best available information, the ORH3B stock as a whole has been declining and is unlikely to be at or above the biomass that can produce the maximum sustainable yield (B_{MSY}). However, the stock is unlikely to be below the soft limit.

17 The catch limit for the Northwest Chatham Rise sub-stock was reduced to 750 tonnes in 2006 and the current catch limit was projected to move the sub-stock towards the B_{MSY}-compatible management target, although the timeframe for this rebuild is not yet clear. Although the Ministry is not proposing any further management action at this time, the DWG in 2010 gave a commitment not to fish this sub-stock for the 2010/11, 2011/12 and 2012/13 fishing years. Further research is on-going to estimate the biomass of this sub-stock and a decision about whether to fish in this area will be reviewed during the 2013/14 fishing year.

18 The only sub-stock for which there is new information is the East and South Chatham Rise sub-stock. As such, the proposed management action for the 2013/14 fishing year would increase the ORH3B TAC but focuses only on the catch limit for the East and South Chatham Rise sub-stock.

East and South Chatham Rise

19 The 2013 Plenary report concluded that the biomass of the East and South Chatham Rise sub-stock was estimated to be 25% of un-fished biomass (B_0) (range 19-32% B_0). This is unlikely to be at or above the biomass that can produce the maximum sustainable yield of 30% B_0 (B_{MSY}). However, the Plenary considered that the stock was also unlikely to be below the soft limit of 20% B_0 (the point at which a time constrained rebuilding plan should be implemented). This assessment was made based on the most recent acoustic surveys of the main spawning area of the East and South Chatham Rise sub-stock that were conducted in 2011 and 2012. An important component of the management approach adopted for the East and South Chatham Rise fishery is an estimate of spawning biomass.

1 Unless otherwise clarified in the text "stock" refers to the QMA management unit ORH3B (per the definition of "stock" in section 2 of the Fisheries Act 1996 and "sub-stock" refers to a biologically or geographically distinct orange roughy population within ORH3B.

Estimating Spawning Biomass (B_{spawn})

20 Historically, spawning was known to occur primarily in an area to the north of the Chatham Islands (referred to as the Plume) with additional smaller spawning aggregations forming in other localities across the East and South Chatham Rise. The Plume has historically been the most significant input into calculating spawning biomass and an acoustic survey of the Plume has been undertaken annually since 2002. The most recent estimate of spawning biomass from the Plume is 19,392 tonnes for 2012 (Table 2).

21 In 2011, a new spawning aggregation, named the Rekohu Plume, was discovered to the west of the Plume. This was acoustically surveyed in 2011 and again in 2012. The Rekohu Plume was confirmed to be different fish to those in the Plume and the biomass estimated to be 28,114 tonnes and 27,121 tonnes in 2011 and 2012 respectively (Table 2).

22 In addition to the biomass in the Plumes, spawning is known to occur on other areas of the East and South Chatham Rise (the Northeast Flats, the Northeast Hills, Mt Muck, the Andes complex and the South Chatham Rise). Estimates of spawning biomass from these areas have been derived from existing survey data. These data have been collected sporadically and, with the exception of Mt Muck, the estimates are less well defined at this time. Mt Muck was surveyed in 2011, and the orange roughy biomass was preliminarily estimated to be 10,263 tonnes. No other new estimates of spawning biomass are available (Table 2).

Table 2: Estimates of spawning biomass for East and South Chatham Rise in 2011 and 2012 (Plenary: 2012 and 2013)

Area	2011 estimates of spawning biomass	2012 estimates of spawning biomass
Spawning Plume	16,422	19,392
Rekohu Plume	28,114	27,121
Mt Muck	10,263	10,263
Other areas	5,376	6,309
Total	60,156	63,085

Management Approach

23 The harvest strategy for the East and South Chatham Rise has, for the last five years, been based on applying the fishing mortality rate (F) that, if applied constantly, would result in the maximum sustainable yield (MSY). This fishing mortality rate is referred to as F_{MSY}.[2] Under an F_{MSY}-based harvest strategy, the same proportion of the biomass is taken from the stock each year. If the stock is above the biomass that can support the maximum sustainable yield (B_{MSY}), the amount taken will be higher than if the stock is at B_{MSY}, resulting in the

[2] F_{MSY} is a biological reference point. It is the fishing mortality rate that, if applied constantly, would result in an average catch corresponding to the Maximum Sustainable Yield (MSY) and an average biomass corresponding to B_{MSY}.

stock being fished down towards the target level. Conversely, if the stock is below B_{MSY} the amount taken will be lower, allowing the stock to rebuild.[3]

24 However, this year's proposed management measures differ based on implementation of an agreed harvest strategy for East and South Chatham Rise orange roughy.

Harvest strategy for the East and South Chatham Rise

25 The Harvest Strategy establishes a management target range of 30-40% B_0. This is based on modelling that estimated B_{MSY} to be 30% B_0.[4] The Ministry and DWG have agreed to set a higher management target range of 30-40% B_0 for this stock. The Harvest Strategy retains the default soft and hard limits of 20% B_0 and 10% B_0 respectively.

26 When mature biomass is within the target range of 30-40% B_0, the fishing mortality rate will be set at F_{MSY}, assumed to be equal to natural mortality at 4.5% of mature biomass (i.e. 1 in 22 mature fish will be taken). When mature biomass is between 30% B_0 and 10% B_0, the fishing mortality rate will be reduced linearly to rebuild the stock toward the management range at a faster rate than would be achieved under the previous F_{MSY} strategy (Figure 2). This represents a more conservative approach to that adopted in previous years.

27 The Harvest Strategy Standard specifies that when a stock is below the soft limit of 20% B_0, the stock should be rebuilt between T_{MIN} and $2*T_{MIN,}$ years, where T_{MIN} is the minimum time that the stock would rebuild in the absence of fishing. However, the harvest strategy being used for ORH3B is not based on a stock assessment model. As such, there is no model that can be used to estimate T_{MIN}. Rather, the harvest strategy is based on the reasonable assumption that fishing the stock at a fishing mortality below F_{MSY} will result in the stock rebuilding quickly to B_{MSY}. Although the stock is not considered to be below the soft limit, the Harvest Strategy reduces F below F_{MSY} to ensure that the stock rebuilds to B_{MSY} faster.

[3] Provided the stock has not been reduced to a level where "depensatory effects" are evident. Depensatory effects occur when a population level becomes very low, and may include fundamental changes in the biology or behaviour of the species, such as the inability to spawn or the inability of individuals to find mates. This effect inhibits a population from rebuilding back to former levels.

[4] Francis RICC. 1992. Recommendations concerning the calculation of maximum constant yield (MCY) and current annual yield (CAY). New Zealand Fisheries Assessment Research Document 1992/8. 26p.

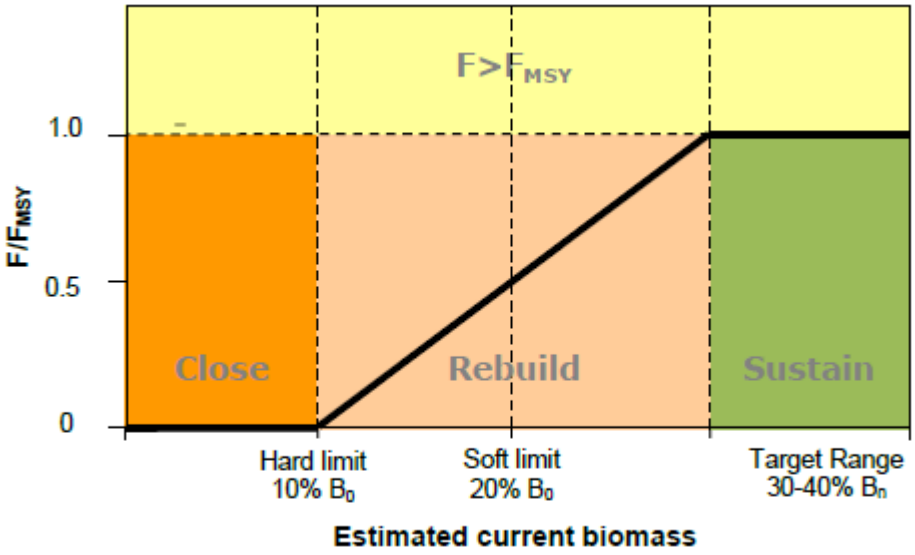

Figure 2: Orange roughy harvest strategy for East and South Chatham Rise

PROPOSED RESPONSE

28 Under the new orange roughy harvest strategy, the catch limit for this sub-stock is set as a proportion of mature biomass. As $B_{CURRENT}$ is less than 30% B_0, the yield from the fishery is lower than that available under the former F_{MSY} strategy.

29 For management purposes, the Ministry proposes using the mean biomass estimate from the last two years as the basis for calculating the yield from this fishery. These estimates are reported in the Plenary as 89,600 tonnes and 94,000 tonnes in 2012 and 2013 respectively.

30 The stock is currently estimated to be at 25% B_0 which equates to an F of 0.75*F_{MSY} (Table 3 and Figure 3). This results in a catch limit for the East and South Chatham Rise sub-stock of 3098 tonnes (i.e. 0.75 * 0.045 * 91,800 tonnes). This equates to 1 in 30 mature fish.

31 More detail regarding this calculation can be found in Annex I to this paper.

Table 3: Calculation of the yield under the new harvest strategy for the East and South Chatham Rise stock (tonnes)

Mean estimate of mature biomass (Source: 2012 and 2013 Plenary)	91,800 t
Multiply by 0.045 (F) to obtain yield under former F_{MSY} strategy	4,131 t
Multiply yield under the former F_{MSY} strategy by 0.75 to obtain the yield under the new harvest strategy	3,098 t

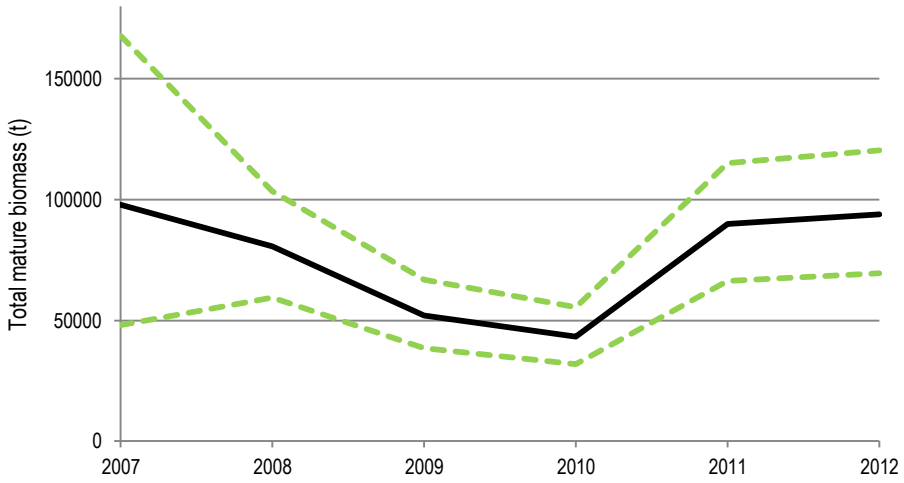

Figure 3: Estimates of mature biomass between 2007 and 2012

Assessment of Management Options

32 This section largely addresses the requirements of the Fisheries Act 1996 (the Act). The purpose of the Act is described in section 8 as being to provide for the utilisation of fisheries resources while ensuring sustainability. Section 8 also defines the meanings of utilisation and sustainability. The management options presented seek to achieve the purpose of the Act by recommending that the Minister sets sustainable catch limits as described below.

Setting the TAC – Section 13

Section 13(2)

33 ORH3B is managed under section 13 of the Act which requires that the Minister set a TAC that will result in the stock being restored to or above, or maintain the stock at or above, a level that can produce the maximum sustainable yield (B_{MSY}). B_{MSY} for this stock has previously been estimated to be 30% B_0. The recent stock assessment completed for the mid-east coast orange roughy stock estimated B_{MSY} at 23% B_0, this has not yet been formally adopted for the East and South Chatham Rise sub-stock but is indicative of an estimate of B_{MSY} for this stock.[5]

34 Stock assessment information reported in the 2013 Plenary considers ORH3B by sub-stock—specifically the Northwest Chatham Rise, the East and South Chatham Rise, and the Sub-Antarctic (Arrow Plateau, Puysegur, Pukaki South and the remaining southern areas). The status of ORH3B in relation to B_{MSY} is determined by considering the status of each sub-stock separately and then combining these assessments together to determine the status of the ORH3B stock as whole.

[5] The estimate calculated for ORH MEC is a deterministic (or theoretical) estimate of B_{MSY}. There are several ways to calculate B_{MSY} and MPI and DWG consider that the 23% B_0 estimate is lower than desirable. Consequently, MPI and DWG have agreed to use a higher (more conservative) range of 30-40% B_0 as the management target.

Status of the ORH3B stock as a whole

35 Based on the best available information, the East and South Chatham Rise sub-stock is unlikely to be above B_{MSY} but is likely to be above the soft limit.

36 The Norwest Chatham Rise sub-stock has recently been acoustically surveyed and the biomass of the sub-stock was preliminarily estimated to be 19,000 tonnes. However, the Deepwater Working Group did not accept the preliminary estimates and this result has not been included in the 2013 Plenary. In the absence of a final biomass estimate, the Ministry proposes using the mean of the recent estimate of 19,000 tonnes and the biomass estimate of 6,000 tonnes from 2006. The Ministry will finalise the recent data, and analyse data from a planned survey in 2013, that will be incorporated into future management of this fishery.

37 Although less information is available for the Sub-Antarctic sub-stock, the best available information suggests it is likely to be below B_{MSY}.

38 Combining the best available estimates of biomass for the Northwest Chatham Rise, the East and South Chatham Rise and Puysegur sub-stocks suggests that the current biomass of the ORH3B stock is of the order of 108,000 tonnes.[6] While there is no information on the biomass of the remainder of ORH3B, this part of the QMA probably contributes only a small percentage of the biomass of ORH3B as a whole. This is supported by a simple analysis of the total orange roughy catch that has been taken from the various sub-stocks that have made up ORH3B since the fishery began. Catch data indicate that 92% of the total catch has come from the East and South Chatham Rise and the Northwest Chatham Rise.[7]

39 B_0 for the East and South Chatham Rise sub-stock is thought to be between 300,000 tonnes and 450,000 tonnes; however, the Ministry considers that these figures may be unrealistically low and high respectively and has adopted a mean estimate of B_0 of 375,000 tonnes. B_0 for the Northwest Chatham Rise was estimated in the 2006 assessment to be 55,000 tonnes. As stated above, it is assumed that the majority of current and historic biomass in ORH3B is made up of these two sub-stocks, as indicated by past fishing practice.

40 Based on estimates of current biomass and B_0 for the two main sub-stocks, the stock as a whole is likely to be at approximately 25% B_0 which is above the soft limit of 20% B_0 but likely to be below B_{MSY} (30% B_0).[8] Estimates of current biomass and B_0 from the remainder of ORH3B are unlikely to materially affect the status of the stock as a whole.

41 The Ministry proposes that the TAC for ORH3B should be set under section 13(2)(b) of the Act. Section 13(2)(b) is appropriate in cases where the stock biomass is likely to be below B_{MSY} and requires a TAC that will result in the stock being restored to or above a level that can produce the maximum sustainable yield, having regard to the interdependence of stocks, biological characteristics and environmental conditions.

[6] East and South Chatham Rise (93,997 t); Northwest Chatham Rise (c. 12,500 t) and Puysegur (1,100 t) (see Plenary 2013 and previous years).

[7] Dunn, M. (2008) Draft descriptive analysis of catch and effort data from New Zealand orange roughy fisheries in ORH3B to the end of the 2006-07 fishing year.

[8] $B_{current}$ (ESCR: 94,000 t + NWCR: 12,500 t = 106,500 t). B_0 (ESR: 375,000 + NWCR 55,000 t = 430,000 t). Therefore 106,500 / 430,000 = 25% B_0.

42 There is no information to suggest that the interdependence of stocks should affect the level of the TAC for ORH3B at this time, given that the fishery primarily targets aggregations of orange roughy and bycatch proportions are low. In terms of their biological characteristics, orange roughy are understood to be very long-lived and late maturing. While these biological characteristics render orange roughy slow to recover from overfishing, this is taken into account in the assessment and management of the ORH3B stock. No specific environmental conditions that would affect the level of the TAC for ORH3B have been identified.

Section 13(3)

43 The proposed management under Option 1 will still move the stock towards B_{MSY}, despite an increase in the TAC. This is because the fishing mortality F (catch limit) is lower than F_{MSY} ($F = 0.75*F_{MSY}$). By increasing the TAC, the Minister would be making a decision about the rate at which that rebuild would be occurring. Section 13(3) requires that, in considering the way and the rate that the stock may be moved towards a level that can produce MSY, the Minister shall have regard to such social, cultural and economic factors as he considers relevant.

44 Orange roughy is a relatively valuable fishery and an increase in the TAC will result in a significant increase in export earnings. The Ministry considers that the appropriate way and rate to rebuild the stock towards a level that can produce the MSY is consistent with the agreed Harvest Strategy for this stock. This Strategy is consistent with the approach taken in the previous five years but is more conservative in that it reduces fishing mortality when the stock is below the lower level of the management target range. The Ministry accepts that the proposed increase of the TAC will slow the rate of rebuild toward the management target range. The Ministry considers this approach provides a different balance between providing for utilisation of the orange roughy stock whilst ensuring it remains a sustainable fishery and that the Minister could consider this approach.

45 The management measures proposed would equate to an increase of the ORH3B TACC of 900 tonnes. As the majority of orange roughy is exported, the best estimation of value is derived from export earnings. On the basis of the export value of the most common product state exported, 900 tonnes of orange roughy is worth approximately $3.7 million.[9]

46 The Ministry is not aware of any recreational or customary Mäori interest in the fishery and no other cultural factors that the Ministry considers are relevant to a determination under section 13(3).

Section 11 considerations

47 In making decisions on sustainability measures, the Minister must also have regard to the requirements of section 11 of the Act.

[9] Based on export figures for the 2012 calendar year of $4.12 / kg greenweight. This uses frozen fillets to estimate the greenweight export price as this form accounted for 86.6% of export earnings and 65.8% of export volume for orange roughy in the 2012 calendar year. Precise revenue loss is difficult to estimate and will be influenced by factors such as commodity prices, exchange rate, catching costs and export state.

a) Section 11(1)(a): Before setting or varying any sustainability measure for any stock, the Minister must take into account any effects of fishing on any stock and the aquatic environment. No information about any effects of fishing on any stock or on the aquatic environment, additional to that discussed elsewhere in this paper, is considered relevant to the review of sustainability measures for this stock at this time.

b) Section 11(1)(b): Before setting or varying any sustainability measure for any stock, the Minister must take into account any existing controls under the Act that apply to the stock or area concerned. For this stock the measures that apply currently are a TAC, TACC and an allowance for incidental fishing-related mortality. No other controls under the Act specifically apply to this stock.

c) Section 11(1)(c): Before setting or varying any sustainability measure for this stock, the Minister must take into account the natural variability of the stock. This is incorporated into the discussion above on setting the TAC for this stock.

d) Sections 11(2)(a) and (b): Before setting or varying any sustainability measure for any stock, the Minister must have regard to any provisions of any regional policy statement, regional plan, or proposed regional plan under the Resource Management Act 1991 and any management strategy or management plan under the Conservation Act 1987 that apply to the coastal marine area and that the Minister considers relevant. The Ministry is not aware of any such policy statements, plans or strategies that should be taken into account for this stock.

e) Section 11(2)(c): Before setting or varying any sustainability measure for any stock, the Minister must have regard to sections 7 and 8 of the Hauraki Gulf Marine Park Act 2000 that apply to the coastal marine area and the Minister considers relevant. The boundaries of the quota management area for this stock do not intersect with the Park boundaries. Therefore, the Ministry considers there are no relevant considerations under the Hauraki Gulf Marine Park Act 2000.

f) Section 11(2A)(b): Before setting or varying any sustainability measure for any stock, the Minister must take account of any relevant and approved fisheries plans. The application of the National Fisheries Plan for Deepwater and Middle-depth Fisheries is discussed later in this paper.

g) Sections 11(2A)(a) and (c): Before setting or varying any sustainability measure for any stock, the Minister must take into account any conservation or fisheries services, or any decision not to require such services. The Ministry does not consider that existing or proposed services materially affect the proposals for this stock. No decision has been made to not require a service in this fishery at this time.

Allocating the TAC

48 The TAC must be apportioned between the relevant sectors and interests set out under the provisions of sections 20 and 21 of the Act. Section 21 requires allowances to be made for

Mäori customary non-commercial interests, recreational fishing interests, and for any other sources of fishing-related mortality, before setting the TACC.

49 There are no known Mäori customary or recreational fisheries for orange roughy. The Ministry proposes to retain nil allowances for recreational and Mäori customary fishing, consistent with the approach that has been adopted since orange roughy became a QMS species in 1986.

50 The allowance for other sources of fishing-related mortality has been previously set at 5% of the TACC to account for lost fish and discards etc. There is no information to support a variation to this figure at this time. Under the option proposed this equates to 225 tonnes.

Environmental considerations

51 Section 9 of the Act sets out the following environmental principles. These principles must be taken into account when implementing management measures under the Act.

a) Sections 9(a) and (b) require the Minister to take into account that associated or dependent species (those that are not harvested) be maintained at or above a level that ensures their long-term viability, and that the biological diversity of the aquatic environment should be maintained.

b) Section 9(c) requires the Minister to take into account the principle that habitat of particular significance for fisheries management should be protected.

Finfish bycatch

52 While a number of deepwater species that share similar habitat to orange roughy are taken in the ORH3B fishery (including black, smooth and spiky oreo, black cardinal fish and alfonsino), targeted orange roughy fishing historically captures over 90% orange roughy by greenweight.[10] The increase of the ORH3B TAC contemplated should not have any adverse effects on other finfish species. A significant proportion of the by-catch is from stocks in the QMS species and any additional captures will be balanced with annual catch entitlement for those fisheries.

Biodiversity

53 The nature and extent of effects of fishing in ORH3B are generally understood to be localised and specific to aggregations of orange roughy at 850-1,200 metre depths. While some bycatch of non-harvested species is known, the impact that fishing for ORH3B has on the long term viability of non-harvested species and biological diversity of the aquatic environment is of greater concern in regions of steep sloping and highly diverse topographic features. Some features within ORH3B have been set aside from all trawling, including ten seamounts and the Arrow Plateau, to mitigate the effect that fishing has on the benthic environment.

[10] Anderson OF, Gilbert DJ, Clark MR (2001). Fish discards and non-target catch in the trawl fisheries for orange roughy and hoki in New Zealand waters for the fishing years 1990-91 to 1998-99. *New Zealand Fisheries Assessment Report 2001/16, 57* p.

54 The main prey species for orange roughy include mesopelagic and benthopelagic prawns, fish and squid, with other organisms such as mysids, amphipods and euphausiids occasionally being important. The Ministry has considered the effects on associated and dependent species and biodiversity that would affect the setting of the TAC and considers the impact is addressed under the catch spreading arrangements which are discussed later in this paper.

Shark bycatch

55 Deepwater sharks historically account for approximately 3% (by greenweight) of the bycatch in target orange roughy fisheries.[7] The New Zealand National Plan of Action for the Conservation and Management of Sharks (NPOA–Sharks) includes several actions to improve the monitoring of shark bycatch. The increase in the ORH3B TAC contemplated is likely to result in additional shark by-catch; however, levels are low in this fishery. As part of the revision of the NPOA-Sharks that is being conducted this calendar year, the Ministry will conduct a risk assessment process for sharks that will better identify risks and direct management measures as appropriate.

Marine mammals

56 There are very few marine mammal interactions with orange roughy fisheries (Table 5). The Ministry considers that the management proposal will have little, if any, additional effect on fur seals, sea lions and other marine mammals as a result of the increase in fishing effort.

Seabirds

57 Mandatory measures are in place across the deepwater fleet to address seabird captures, including the requirement that all trawlers deploy bird mitigation devices when fishing gear is in use. In addition, non-regulatory measures include vessel specific measures known as vessel management plans (VMPs) which set out the onboard practices that vessels must follow to avoid seabird interactions, including offal management and good factory cleanliness. The Ministry currently monitors vessel performance against VMPs and works in collaboration with the Deepwater Group (DWG) to rectify any issues that arise during the fishing season. This practice will continue during the 2013/14 fishing year.

58 While trawl fisheries for orange roughy are known to interact with seabirds, orange roughy fisheries pose very low risk (Table 4). The low risk to seabirds from deepwater fisheries is confirmed by the risk assessment conducted as part of the Seabird NPOA. The Ministry is satisfied that existing regulatory and non-regulatory measures are appropriate and that the management proposal should have little, if any, additional effect on seabirds.

Table 4: Observed interactions with seabirds and mammals from all orange roughy trawls[11]

Period	Observed bird captures	Observed mammal captures	Total number of tows	Observed tows	Percentage of tows observed
2011/12	1	0	1,593	429	26.9%
2010/11	0	0	1,899	485	25.7%
2009/10	12	0	2,922	1,099	37.6%
2008/09	5	0	3,543	1,435	40.5%
2007/08	1	0	3,695	1,592	43.1%
2006/07	1	1	3,882	1,152	29.7%
2005/06	2	0	4,477	778	17.4%

Benthic impacts and coral bycatch

59 Bottom trawling can affect fragile benthic invertebrate communities but effects may be reduced if vessels repeatedly trawl along the same towlines in a fishery. There are cost implications for industry in terms of lost or damaged gear when fishing in new areas. As a consequence industry generally follows known trawl tracks on the Chatham Rise.

60 Two initiatives are in place to address benthic impacts. In 2001, the Minister regulated trawl closures covering 18 areas containing seamounts of varying size and depth within New Zealand. Ten of these are within the ORH3B QMA. In addition 17 further areas have been closed to bottom trawling by regulation under the Fisheries (Benthic Protection Areas) Regulations 2007. Twelve of these, including the Arrow Plateau, are within the ORH3B QMA. Across the ORH3B QMA, 15% of the area within the recognised depth range of orange roughy is closed to bottom trawling through either the BPA initiative or the seamount closures.

Deemed Values

61 Section 75 of the Act requires that the Minister set deemed value rates for every stock in the QMS. This is to ensure there are appropriate incentives for fishers to acquire or maintain sufficient ACE so that catch limits are not exceeded.

62 The Ministry increased the deemed value rates in 2010 based on significant reductions in the TACC in previous years and the resultant risk of the TACC being exceeded. Furthermore, the deemed values for ORH3B were lower than those for neighbouring ORH 2B and ORH 3A stocks and increasing the deemed values in ORH3B aligned deemed value rates in all three stocks. The current deemed value rates are set as follows:

a) The annual deemed value rate is $5.00 per kg.

b) The interim deemed value rate is $2.50 per kg.

[11] Abraham ER, Thompson FN, Oliver MD. 2010. Summary of the capture of seabirds, marine mammals, and turtles in New Zealand commercial fisheries, 1998-99 to 2007-08. NZAEBR Report No. 45 (Table 5).

Abraham ER, Thompson FN. 2011. Summary of the capture of seabirds, marine mammals, and turtles in New Zealand commercial fisheries, 1998-99 to 2008-09. Draft Report to the AEWG (Table 5).

c) A differential deemed value rate of $6.25 applies to catch in excess of 110% of ACE holdings.

63 The Ministry does not propose increasing deemed values again for ORH3B. With few vessels operating in this fishery, and monthly catch monitoring arrangements working well, catch has historically been closely aligned with catch limits. The Ministry is confident this will continue. Fishing activity will continue to be monitored during the 2013/14 fishing year and if there is evidence that fishers are either fishing in excess of the TACC, or fishing in excess of their individual ACE holdings, then the deemed value rates will be reviewed for the 2014/15 fishing year.

Compliance Implications

64 Key offences that may occur in ORH3B include misreporting of QMA, species and weights; and fishing in closed areas. The significant increase in the TAC under this proposal is likely to reduce the incentive to offend.

65 The ORH3B fishery is closely managed from an industry perspective with few boats operating in the fishery and approximately 98.0% of the ORH3B quota owners represented by the DWG. DWG currently monitors adherence to catch spreading arrangements and provides monthly reports to the Ministry. DWG notifies the Ministry when catch reaches 80% of the sub-stock limits, and also notifies the Ministry when any limit has been reached. Observer coverage in the orange roughy trawl fisheries is relatively high with between 25 and 40% of tows observed in recent years (Table 5).

66 The Ministry considers that the monitoring arrangements are robust and appropriate. DWG and the Ministry will continue to monitor this fishery closely to ensure compliance with management arrangements.

Other Management Measures

Sub-QMA catch spreading arrangements

67 Where several biological stocks exist in a single QMA, catch spreading arrangements ensure fishing effort is not concentrated in one or two areas which would increase fishing pressure on those biological stocks. To achieve this, catch limits for each sub-stock are put in place to reduce fishing pressure on individual biological stocks and these limits are monitored by the Ministry and DWG. The Ministry continues to support catch spreading in the ORH3B fishery.

68 The Ministry recommends that sub-stock catch limits and the associated reporting requirements continue to be managed by DWG. The Ministry undertakes to continue to monitor DWG reports and operators' fishing patterns to evaluate the effectiveness of these catch limits. The Ministry will ensure that, through joint Ministry-DWG communications, operators are fully informed as to the progress of catch taken against sub-stock limits. Performance against catch spreading arrangements will be reported in the Annual Review Report that forms part of the National Fisheries Plan for Deepwater and Middle-Depth Fisheries (the National Deepwater Plan).

FUTURE MANAGEMENT

Fisheries Plan

69 The Ministry, in collaboration with industry and environmental organisations, has developed the National Fisheries Plan for Deepwater and Middle-depth Fisheries (National Deepwater Plan) that incorporates key deepwater stocks. The National Deepwater Plan was approved by the Minister in 2010 and sets out the long-term goals and objectives for deepwater fisheries. It also sets the specific operational objectives that will be delivered annually for each key deepwater species, and establishes performance indicators to assess if the management strategy has been delivered.

70 Orange roughy is one of five fishery-specific chapters of the National Deepwater Plan, the others being hoki, ling, hake and southern blue whiting. The Minister is required to take the National Deepwater Plan into account when making his decision on the management measures for ORH3B, and the management proposed in this IPP is consistent with the dual Outcomes of the National Deepwater Plan:

a) The Use Outcome: Fisheries resources are used in a manner that provides greatest overall economic, social and cultural benefit

b) The Environment Outcome: The capacity and integrity of the aquatic environment, habitats and species are sustained at levels that provide for current and future use.

71 These dual Outcomes are given effect to by a series of Management Objectives, the most relevant of those being:

a) Management Objective 1.1: Enable economically viable deepwater and middle-depth fisheries in New Zealand over the long-term

b) Management Objective 2.5: Manage deepwater and middle-depth fisheries to avoid or minimise adverse effects on the long-term viability of endangered, threatened and protected species.

72 The Ministry considers that the management presented in this IPP will contribute towards the achievement of these two Management Objectives.

ANNEX 1: FURTHER DETAILS REGARDING CALCULATION OF CATCH LIMITS

Table 6: Calculation of the TACC using the Harvest Strategy depicted in Figure 2 and equations 1 to 3 below

Percentage initial biomass (% B_0)	F/F_{MSY} multiplier	TACC for $B_{current}$ = 91,815 tonnes and F_{MSY}=0.045 where % B_0 30%
30	1.00	4,132
29	0.95	3,925
28	0.90	3,719
27	0.85	3,512
26	0.80	3,305
25	**0.75**	**3,099**
24	0.70	2,892
23	0.65	2,686
22	0.60	2,479
21	0.55	2,272
20	0.50	2,066
19	0.45	1,859
18	0.40	1,653
17	0.35	1,446
16	0.30	1,240
15	0.25	1,033
14	0.20	826
13	0.15	620
12	0.10	413
11	0.05	207
10 or less	0.00	0

Equations

$$\%B_0 = (B_{current}/B_{0)} * 100 \qquad \text{equation 1}$$

$$F/F_{MSY} \text{ multiplier} = a + b * \%B_0 \qquad \text{equation 2}$$

where, a is the intercept (-0.50) and b is the slope (0.05) of the Harvest Strategy line during the rebuild phase (Figure 2).

$$TACC = B_{current} * F_{MSY} * F/F_{MSY} \text{ multiplier} \qquad \text{equation 3}$$