

INITIAL POSITION PAPER - PROPOSAL TO REVIEW THE TAC FOR THE COROMANDEL SCALLOP FISHERY FOR 2008-09

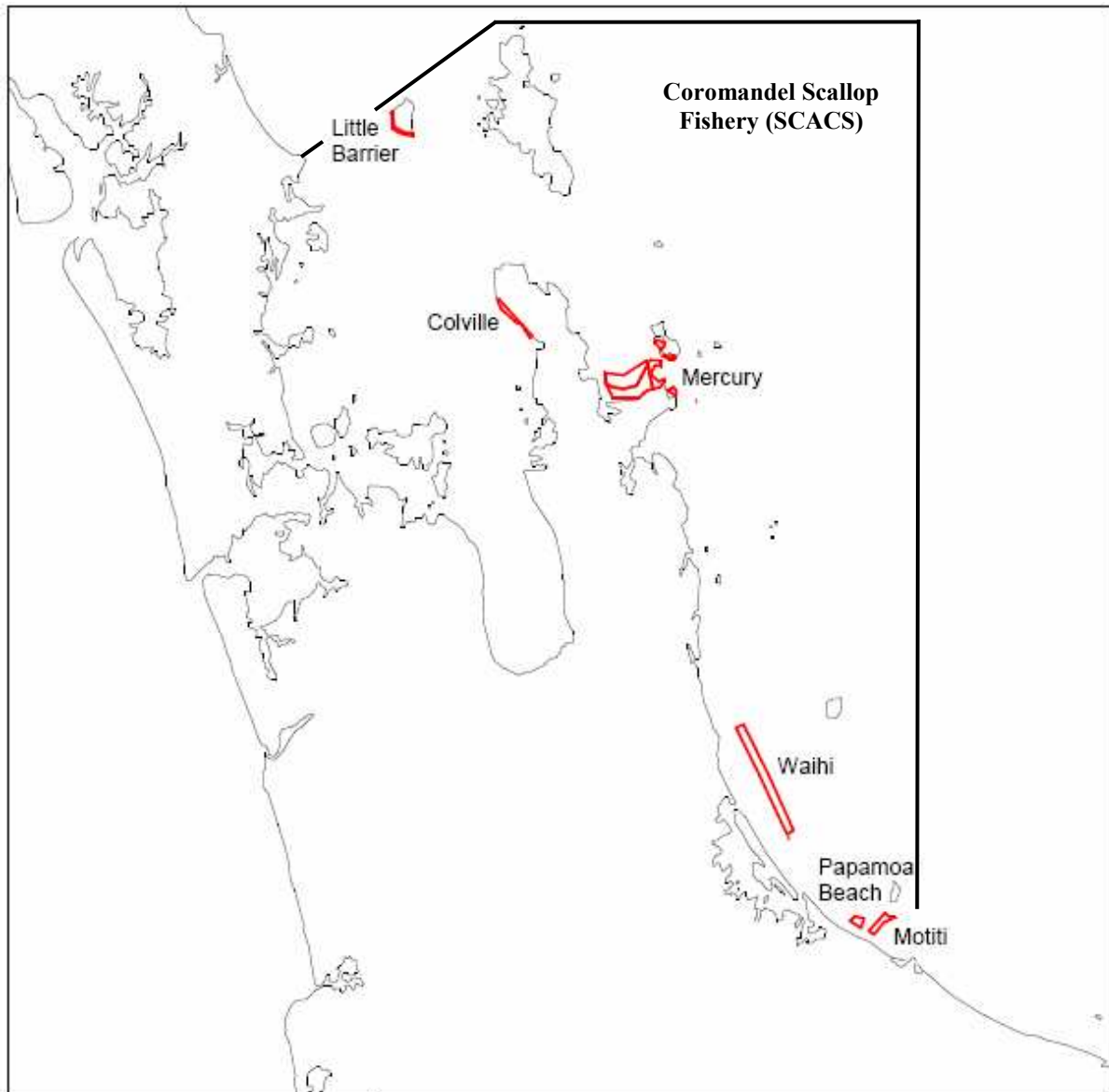


Figure 1: Boundary of the Coromandel Scallop Quota Management Area and the location of the commercial scallop beds included in the 2008 biomass survey.

Executive Summary

- 1 The Ministry of Fisheries (MFish) is reviewing the total allowable catch (TAC) for the Coromandel Scallop fishery (SCACS) for the 2008-09 fishing year. To inform this review, NIWA assessed the biomass of scallops within the commercial beds of the Coromandel fishery during May 2008. Analysis by NIWA estimates absolute biomass in the commercial areas of the fishery at the start of the commercial season (15 July) will be 868 tonnes meatweight¹. After initial discussions with the Coromandel Scallop Fishers Association (CSFA), the New Zealand Recreational Fishing Council (NZRFC) and the Environment and Conservation Organisations of Aotearoa/New Zealand (ECO), MFish's initial proposal is that the Minister of Fisheries (the Minister) agrees to one of the two management options in the table below:

	TAC	TACC/ACE	Recreational Allowance	Customary Allowance	Allowance for Other Sources of Fishing-related Mortality
Baseline	48	22/22	7.5	7.5	11
Option 1	148	22/95	10	10	33
Option 2	143	22/95	7.5	7.5	33

Table 1: TAC, TACC/ACE and Allowance proposals for the Coromandel Scallop fishery for the 2008-09 fishing season. Note: all figures given in meatweight tonnes.

- 2 At the conclusion of the fishing season (21 December 2008 for commercial fishers and 31 March 2009 for non-commercial fishers), the TAC, TACC, and allowances revert back to baseline levels.
- 3 MFish is seeking submissions on the management measures proposed in this paper from interested parties. Submissions are required by Wednesday 9 July 2008 and can be sent to either: Murray Bruges, Ministry of Fisheries, PO Box 19747, Avondale, Auckland 1746 or murray.bruges@fish.govt.nz.

¹ Meatweight refers to the weight of the edible part of the scallop (the adductor muscle and roe) once it has been shucked from its shell.

Introduction

- 4 The Coromandel scallop fishery is managed in accordance with s 13(7) of the Fisheries Act 1996. This section recognises the high degree of natural variability in the abundance of scallops and enables MFish to alter the total allowable catch (TAC), commercial annual catch entitlement (ACE), and other allowances within a fishing year. The Coromandel fishery is managed according to the 1 April to 31 March fishing year.
- 5 A biomass survey of the commercial beds was completed in May 2008 to assess scallop abundance and to enable MFish to propose appropriate TAC, ACE, and other allowances for the 2008-09 fishing season.
- 6 This Initial Position Paper outlines the management process for the Coromandel scallop fishery, proposes two management options for this fishing season, and seeks submissions on these proposals.
- 7 These options are consistent with the draft Fisheries Plan developed by tangata whenua, stakeholders and MFish (a copy of this draft plan is available at <http://fpcs.fish.govt.nz>). MFish intends to begin working with stakeholders again later this year to finalise the draft plan before formally consulting with the public.

Management Framework

- 8 The abundance of scallops in the Coromandel fishery area is known to vary considerably from year to year. This is a feature of many scallop populations around the world. The variable abundance arises from the relatively short lifespan of scallops and hence the few age classes that typically make up the population. Environmental factors can strongly influence the growth and natural mortality of young scallops, which in turn contribute to variability in abundance.
- 9 This is recognised in the Fisheries Act 1996 with specific provisions to list stocks whose abundance varies highly between years on the Second Schedule and manage them under s 13(7). Should information about the abundance within the season indicate that a greater TAC would be sustainable, then an increase to the TAC can be approved by the Minister within the season.
- 10 The Fisheries Act 1996 requires that, for most Quota Management System stocks managed under s 13, TACs are set to maintain or move stock biomass towards or above a biomass level that can produce the maximum sustainable yield (MSY). Section 13 requires the Minister to set a TAC that:
 - a. Maintains the stock at or above a level that can produce the maximum sustainable yield (MSY) having regard to the interdependence of stocks; or
 - b. Enables any stock that is currently below a level that can produce the MSY to be altered:
 - (i) in a way and at a rate that will result in the stock being restored to or above a level that can produce the MSY having regard to the interdependence of stocks; and

- (ii) within a period appropriate to the stock having regard to the biological characteristics of the stock and any environmental conditions affecting the stock; or
 - c. Enables the level of any stock currently above the biomass that can produce the MSY to be altered in a way and at a rate that will result in the stock moving towards or above a level that can support the MSY.
- 11 The Act defines the MSY as the greatest yield that can be achieved over time while maintaining the stock's productive capacity, having regard to the population dynamics of the stock and any environmental factors that influence the stock. The level that can produce the MSY may be a dynamic target rather than a fixed point, as is the case for the Coromandel Scallop fishery.
- 12 Section 13(7) provides that after considering information about the abundance during the current fishing year of any stock listed in Schedule 2 (such as scallops), and after having regard to the matters specified in subsections (2) and (3), the Minister may increase the TAC for the stock.
- 13 Having regard to the population dynamics of the Coromandel scallop stock, it has been determined that estimating the MSY as a constant proportion of each season's biomass or abundance is most appropriate. This approach takes account of the varying abundance or biomass and allows catch to be maximised over time while ensuring sustainability for most types of fisheries (including scallops). The constant harvest proportion is determined following international practice by applying a set fishing mortality rate (termed $F_{0.1}$) that has been shown to deliver good yields while ensuring sustainability. Each year's seasonal or annual yield is termed the Current Annual Yield or CAY, and forms the basis for considering any in-season increase to the TAC.
- 14 However, the determination of in-season abundance, yields, and TAC increases depend upon scientific surveys, analyses, and consultation within the season. Experience in the Coromandel fishery has shown that surveys are best done as close as possible to the start of the regulated fishing season in mid-July. A baseline TAC has been applied to the fishery to enable some fishing to start before the in-season survey results are finalised and consultation on any proposed increase to the TAC is completed. The approach has been used for several years and relies on a hybrid of two methods of estimating MSY in order to ensure the sustainable use of the fishery over time.
- 15 The maximum constant yield (MCY) has been estimated for the fishery as the unvarying maximum catch limit that the fishery can sustain year after year, with an acceptable level of risk. The MCY is the basis for the baseline TAC at the start of each season.
- 16 In general, the higher the natural variability in the abundance of a fish stock, the lower the catch limit under an MCY approach as the catch level must be sustainable, even when abundance is poor. When the Coromandel fishery was brought into the QMS in 2002, MFish estimated the MCY as follows, using the method set out in the "Guide to

Biological Reference Points” section of the Annual Plenary reports². In summary, this process involved the following steps:

- Catches over the preceding 10 year period (1992-2001) were averaged
 - A natural variability factor of 0.4 was selected to account for the considerable variability of scallop fisheries
 - The ten year average was multiplied by 0.4 to give an MCY estimate for the Coromandel fishery of 22 tonnes.
- 17 This MCY estimate of 22 tonnes for the Coromandel fishery forms the baseline TACC, and allows commercial fishers to harvest up to 22 tonnes in any fishing year.
- 18 If commercial fishers wish to harvest more than 22 tonnes, a biomass survey of the commercial areas of the fishery is required (commercial fishers have supported a survey in nine of the last 10 years). The biomass survey produces estimates of both stock biomass for the year and CAY for the fishery. The CAY estimate provides the basis for considering an in-season increase to the TAC for that year to achieve the maximum sustainable yield from the fishery over time. Taking a catch at the level of the CAY each year would, in theory, result in the stock being maintained at the (fluctuating) biomass level that can produce the MSY over the longer term. However, in all years since 2004, the TAC has been set at a level well below the CAY, which means that the biomass has been maintained above the B_{MSY} level (see Figure 3 below).

Coromandel Scallops In-season Review Process

- 19 Scallops have a number of biological characteristics that can contribute to marked fluctuations in population size from year to year. These fluctuations are thought to be driven by environmental influences on scallop biological processes and are largely independent of fishing pressure (further information on scallop biology is available in Appendix 1 of the draft Coromandel Scallop Fishery Plan, available at <http://fpcs.fish.govt.nz>).
- 20 The Coromandel fishery is listed on the Second Schedule of the Act. This schedule applies to stocks whose abundance is highly variable year to year and enables the fishery to be managed under s 13(7) of the Act. In turn, this section enables the Minister to increase a stock’s TAC within the fishing season, after considering scallop abundance in the current fishing year and having regard to the matters specified in ss 13(2) and 13(3). This mechanism allows fishery managers to tailor the level of sustainable utilisation to reflect the abundance of the stock on a year by year basis.
- 21 Accordingly, the Coromandel fishery has an established baseline TAC which is set at a deliberately low level to provide for utilisation and ensure sustainability, even in years of low abundance. In years where a pre-season survey shows scallop numbers are comparatively high, s 13(7) of the Act allows the total allowable catch, ACE and allowances to be increased.

² Ministry of Fisheries (2007). *Report from the Fisheries Assessment Plenary, May 2007: stock assessments and yield estimates*. Ministry of Fisheries, Wellington, New Zealand.

22 The baseline TAC is set at 48 tonnes meatweight, and is assigned as follows:

Table 2: Total allowable catch and allowances for Coromandel scallops (tonnes meatweight)

	Total allowable catch	Recreational allowance	Customary allowance	Allowance for other sources of mortality	Total allowable commercial catch
Coromandel scallops	48 tonnes	7.5 tonnes	7.5 tonnes	11 tonnes	22 tonnes

23 The annual review process normally is initiated when the Coromandel Scallop Fishermen’s Association (CSFA) informs MFish that it will support a biomass survey for a particular year. If the biomass assessment indicates that the fishery can support a greater harvest than the baseline TAC, MFish seeks the views of the CSFA, the New Zealand Recreational Fishing Council and ECO as to the level of increase each group would support³. MFish then develops management options within an Initial Position Paper and seeks submissions from interested parties through formal public consultation. Once submissions have been received, MFish drafts a Final Advice Paper advising the Minister of the management options available and the views of submitters. The Minister then makes a decision which is effected by a notice in the *New Zealand Gazette*. An outline of the in-season review process is given in Figure 2 below.

24 It should be noted that the in-season review process does not address recreational bag limits. Bag limits are set by regulation and any review would be the subject of a separate process. Should the recreational allowance within the TAC be increased this year, the daily bag limit will remain at 20 scallops per fisher per day, (with the option of a diver taking additional bag limits for up to two safety people per vessel). An increase in the recreational allowance recognises the likelihood of more daily bag limits being taken over the course of the season.

³ This “pre-consultation” allows readers of the IPP to see the views of several of the major groups involved in the fishery.

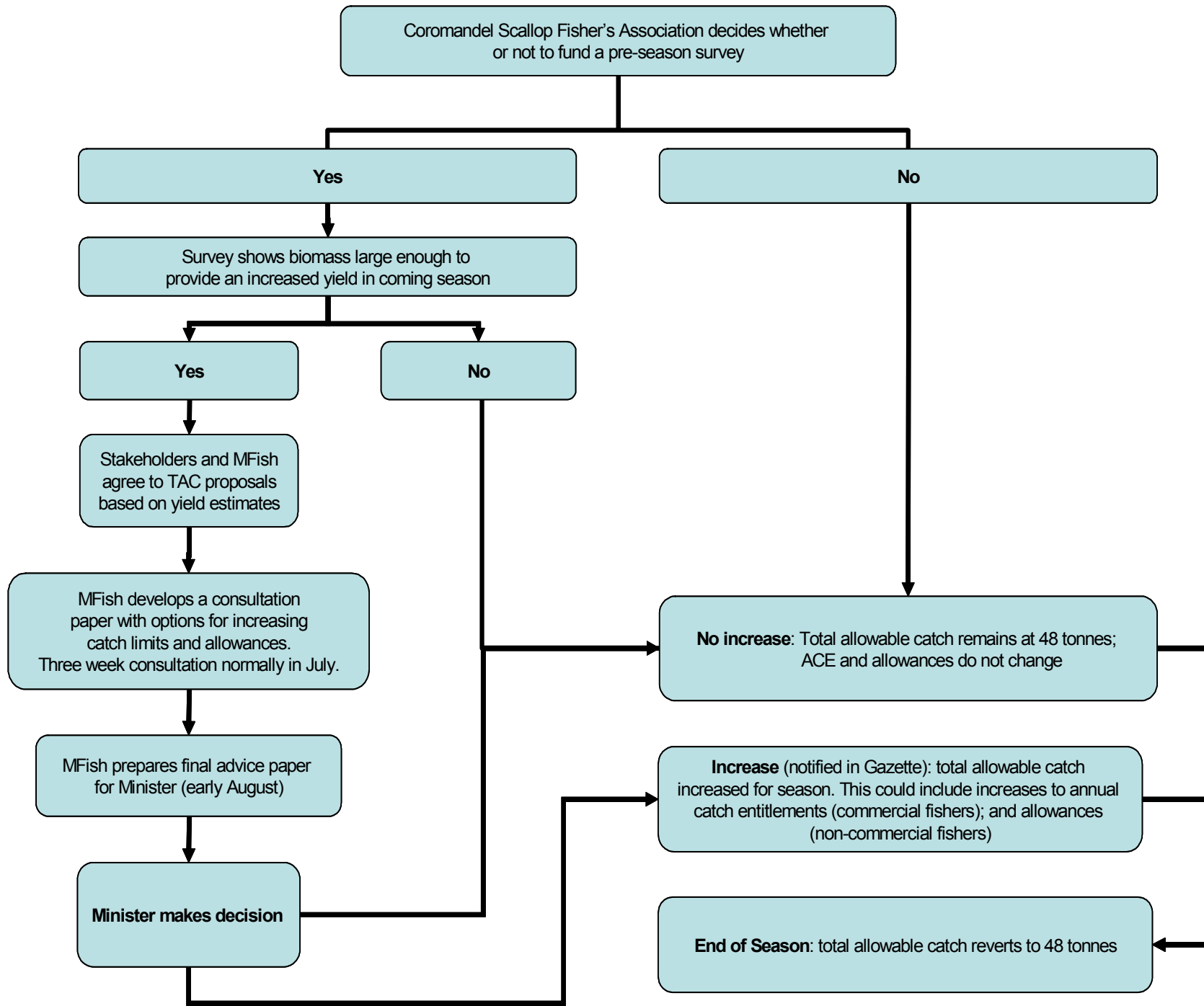


Figure 2: Process for in-season increase in the Coromandel scallop fishery

* In years of particularly low abundance, the total allowable catch could be reduced from 48 tonnes if necessary, however, this must occur before the start of the season on 1 April, or through the Emergency Measures as defined in s16 of the Act.

Fishery assessment

Biomass surveys

- 25 Since 1978, biomass surveys have been used to estimate the abundance of scallops in the Coromandel scallop fishery. Yield estimates derived from these surveys have been used to set limits on catch (including the TAC, ACE, and allowances) for the fishery. Further information on the management system used in the Coromandel scallop fishery is available in Appendix One to the Draft Fisheries Plan.
- 26 A biomass survey was undertaken by NIWA in May 2008 to assess the Coromandel fishery. Commercial beds adjacent to Little Barrier Island, Colville, Mercury Bay, Waihi and Papamoa were surveyed, with Waiheke Island and the northern part of Colville not surveyed this year.
- 27 Scallops were counted at each survey site and converted into numbers per square metre of seabed. The absolute density of scallops is estimated by correcting for the efficiency of the dredge. The number of scallops is calculated by multiplying the mean scallop density by the area of each survey stratum. Mean scallop meatweight is then estimated and used to calculate biomass.
- 28 The 2008 survey report by NIWA provides two current annual yield (CAY) estimates⁴ for the Coromandel fishery; one including putative habitat effects and one excluding these effects. If the putative effects of habitat modification caused by dredging on juvenile survival are included, the median CAY estimate is 189 tonnes (meatweight). If these effects are excluded (as has been the practice in recent years), the median CAY estimate is 276 tonnes (meatweight). Both these estimates assume that factors such as scallop growth, mortality, dredge efficiency and greenweight to meatweight conversion rates will be in line with the averages recorded over recent years in the fishery. The results of the NIWA report, including a comparison between the numbers of scallops greater than 95mm over the years 1990–2007 (Table 4), are summarised in Appendix 2.
- 29 The 2008 survey of commercial scallop beds in the Coromandel fishery estimates an 18% decrease in scallop biomass at time of survey compared with the same time last

⁴ ‘CAY’ is an estimate of sustainable catches from a fishery. It is based on the concept of harvesting the same proportion of the total scallop population every year (i.e. of total biomass - which refers to the total weight of fish in the population). Because scallop numbers can change significantly from year to year, the CAY estimate may be different each year. For the Coromandel scallop fishery, biomass surveys are done every year to give us this information. Matching catches to the CAY estimate each year is one way of ensuring that, over time, the stock stays at or above the biomass level that can support the maximum sustainable yield.

The other common way of trying to achieve that goal (i.e. managing a stock at or above the level that can produce maximum sustainable yield) is to set a constant catch that in theory can be taken in any given year, and over time will maintain the stock around the target level (with fluctuations). This is how most of New Zealand’s finfish fisheries are managed. However, due to the natural ups and downs of scallop populations, the *constant* catch that could be safely harvested *every year* would be close to zero. This is because in years in which scallop numbers are naturally low (e.g. because of environmental conditions), only a very small amount can be harvested without reducing the ability of the population to recover over a reasonable timeframe.

For scallops, although ‘CAY’ is an estimate of what can be sustainably taken from the fishery in a given year, research also indicates there are benefits to fishing more conservatively than this. In particular, the fishery could be more stable, with less risk of scallop numbers dropping below desirable levels. There are also other potential benefits, including higher catch rates, bigger fish, less fishing effort (lower costs), and lower environmental damage.

year. As the harvest strategy for this fishery involves taking a constant proportion of available biomass, the CAY estimate derived from this year's biomass estimate has also decreased 18% from last year's estimate. However, the Mercury Islands area which comprises the mainstay of the fishery (accounting for ~80% of commercial catch during 2007) is estimated to hold approximately the same biomass level at the time of this year's survey as it did at the same time in 2007.

- 30 As with all biomass surveys, there is a degree of uncertainty associated with survey results and actual biomass may differ from that estimated. For the 2008 survey, there is moderate to high uncertainty in the estimate of start-of-season biomass that underpins the estimate of yield (a c.v. of 31% suggests that there is a roughly 10% chance that the real start-of-season biomass will be either more than 50% higher or more than 50% lower than the point estimate). There is also moderate model uncertainty in the CAY calculation (i.e., whether or not to include habitat effects), and point estimates are 276 t excluding these effects and 189 t including them (a 32% reduction).
- 31 Taken together, these two cause substantial uncertainty in the yield estimate for the coming year. MFish believes this uncertainty, often ignored, is best communicated using a risk-based approach, calculating the likelihood that each of the two yield estimates would be exceeded for a given catch limit. For a commercial catch limit of 95 t, the chances that either the CAY estimate excluding habitat effects or the estimate including habitat effects would exceed the true CAY are both less than 1%.
- 32 A major cohort of sub-legal scallops was recorded by the survey. It is reasonable to expect many of these scallops (most currently sized around 75mm) will be recruited to the fishery during the season, and those that are projected to reach 90mm by July 15 are included in the CAY estimate. It is also worth noting that due to the current average size of the cohort (~75mm), only a small proportion of this cohort is actually included in the CAY estimate. It is likely that at least some of the remainder of this cohort will recruit to the fishery during the season.

Recent Catches

- 33 When the Coromandel fishery was introduced into the Quota Management System in 2002, the fishery had been at an unusually low level for several seasons (1999 remains the lowest biomass estimate since surveys began in 1980). While factors such as the blackgill disease and the tubeworm infestation might have contributed to these poor seasons, the root causes of this downturn are poorly understood.
- 34 In 2002 and 2003, the TAC exceeded the CAY estimates. However, it should be noted that the CAY estimate pertains only to those beds fished primarily by commercial fishers. Other areas of the fishery for which MFish does not have biomass and yield information (such as the areas closed to commercial fishing) will also contribute to the true CAY for the stock overall. MFish considers that overall removals from the Coromandel fishery are unlikely to have exceeded the true CAY for the stock in these years.
- 35 In 2004 and 2005, the fishery underwent remarkable resurgence to some of the highest biomass levels on record. As with the period of poor performance during 1999-2002,

the reasons for this recovery are poorly understood, though it is assumed environmental factors such as sea temperature and food availability were important.

- 36 In all years since the Coromandel fishery was brought into the QMS, commercial catches have been constrained to the baseline TACC and any applicable in-season increases. From 2004–2007, the TAC has not exceeded 50% of the amount of catch estimated to be sustainable in the annual yield estimates (see Figure 3). In this respect, the Coromandel fishery has been managed cautiously with the input and agreement of stakeholders over much of its recent history.
- 37 In 2007, commercial catches were significantly below the agreed limit, with landings only 57 out of an allowable 108 tonnes (meatweight) and that agreed limit was only 32% of the estimated sustainable yield. Commercial fishers note several reasons for this undercatch. Firstly, an unusually large number of easterly weather systems meant a high number of unfishable days during the season. Moreover, fishers note that easterly storms often leave scallops in poor condition for several weeks, and fishers judge that it is not economical to harvest them until their condition has improved.
- 38 Secondly, fishers report that late in last year’s season they noticed a large number of juvenile scallops caught in dredge tows in the Mercury Islands area. Attempts to avoid these scallops by fishing different areas within the Mercury area failed and members of the CSFA collectively agreed to stop fishing in the interests of protecting what appeared to be an exceptionally large cohort of juvenile scallops from incidental dredge damage. These fishers stress while they could have harvested scallops up to the agreed ACE limit, they felt that doing so might have impacted on the large cohort of juveniles and negatively impacted on the fishery. MFish notes that this responsible action by the commercial fishers is consistent with the principles of the draft Fisheries Plan which states that Coromandel Scallop fishery should be managed with a “cautious, respectful approach”.
- 39 While a large cohort is evident in the survey results, most of it has not yet grown to minimum legal size. It is however expected that much of this cohort could recruit to the fishery during the course of the season.

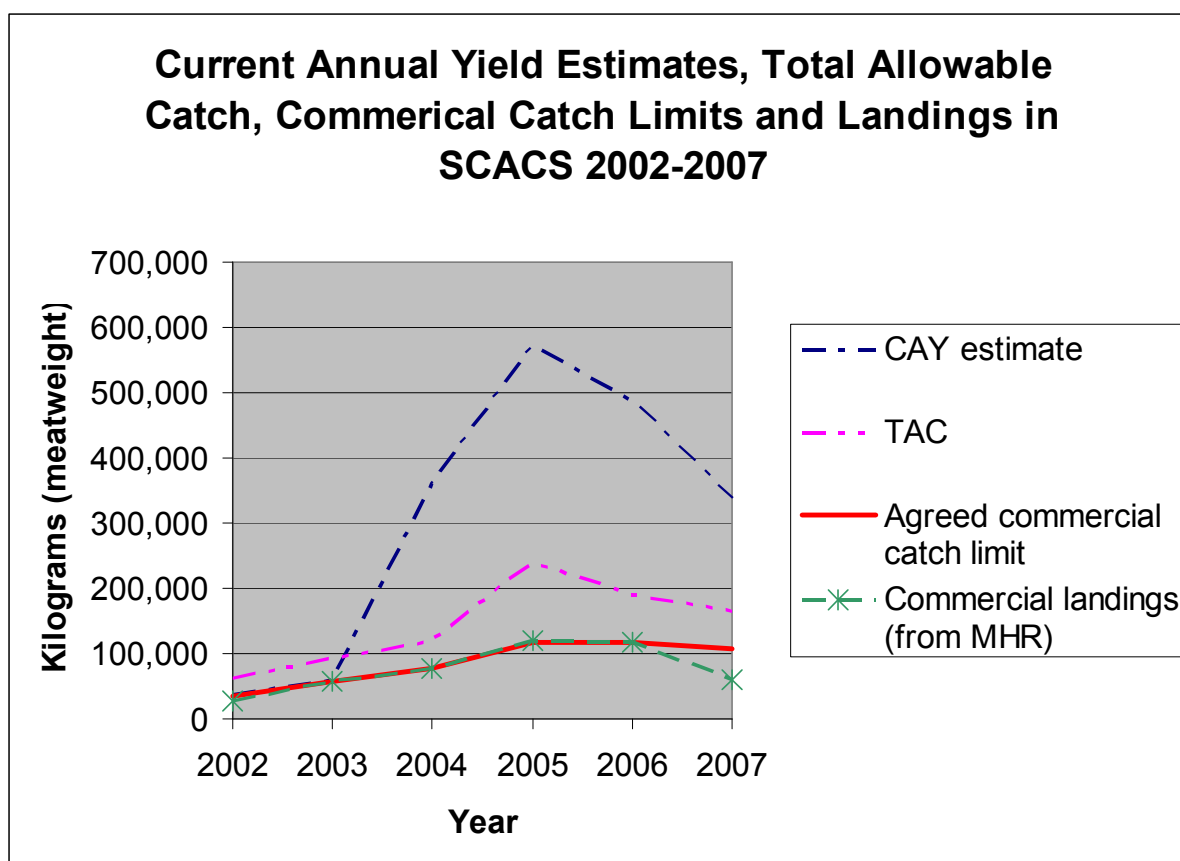


Figure 3: Trends in the Coromandel scallop fishery since its introduction to the Quota Management System

Proposed TAC, allowances, and ACE

40 In developing the options discussed below, MFish has had discussions with the Coromandel Scallop Fishermen’s Association, the New Zealand Recreational Fishing Council and ECO. Their initial views are summarised below.

TAC setting

41 There is no current assessment of the entire Coromandel stock on which to base a TAC. The available estimates of yield are based on a survey of the main commercial scallop fishing beds. The CAY method estimates sustainable yield from areas primarily fished by commercial fishers. The survey has provided estimates of sustainable yield for the coming year. Setting the catch limits for 2008–09 at or below the CAY estimates based on the survey is considered likely to maintain the stock above the level that can produce the maximum sustainable yield over time.

42 MFish has provided a copy of the draft NIWA research report entitled “Biomass surveys and stock assessments for the Coromandel scallop fishery, 2008” to the Coromandel Scallop Fishermen’s Association, the NZRFC and ECO. Other interested parties can obtain a copy of this report by calling MFish Auckland on (09) 8207768. This report presents the results of the survey carried out in May.

- 43 Based on the information from this report, the Coromandel Fishermen’s Association considered it appropriate to adopt a cautious approach towards the in-season TAC increase. The Association recommended that the total available ACE should be increased to 94.5 tonnes meatweight⁵. MFish recognises that the Association has again opted to seek a highly cautious catch level well below the CAY estimate, consistent with the “cautious, respectful approach” agreed to by all parties in the draft fisheries plan.
- 44 The President of the New Zealand Recreational Fishing Council (NZRFC) has commented to MFish on the draft NIWA report. The NZRFC considers that the catch limit for the Coromandel fishery should reflect changes in estimated biomass of the fishery. Therefore, it considers that the commercial catch limit for 2008-09 should be at least 20% lower than the same limit last year. However, as the NZRFC feels last year’s commercial limit of 108 tonnes was too high, it argues that this year’s limit should err on the side of caution at 50 tonnes. It argues that failure to make a significant cut could see the fishery continue its downward trend since 2005. The NZRFC also raises concerns about the damage done by commercial dredging and argues that commercial fishers should be encouraged to improve dredge design.
- 45 A spokesperson for the Environment and Conservation Organisations of Aotearoa/New Zealand (ECO) has also commented to MFish on the draft survey results. ECO argues that the reduction in biomass should be reflected in catch allocations. ECO also advises that care needs to be taken when assuming the large cohort of sub-legal scallops will grow through into the fishery during the season. ECO notes that the history of the Coromandel fishery shows that it is possible this cohort could disappear before it recruits to the fishery.
- 46 MFish notes the explanation of the survey results and CAY estimate can be found at paragraphs 13 and 25-32. Readers should note that the proposed TAC, ACE and non-commercial allowances options already take into account the changes in biomass between 2007 and 2008. Those options are based upon CAY estimates which directly correspond to changes in biomass, and the proposed TACs are at levels substantially lower than the sustainable CAY estimate.
- 47 MFish appreciates the preliminary input of these stakeholders into this initial proposal. These views—and the views of stakeholders who lodge submissions on this proposal before Wednesday 9 July— will be incorporated into the final advice paper (FAP) to the Minister.
- 48 At this stage, MFish has not received any comments on possible TAC increases from customary Māori fishers. MFish looks forward to submissions from this sector, and further submissions from the commercial, recreational and environmental sectors during the consultation period, so that they may be incorporated into the FAP.
- 49 The Minister is required to have regard to ss 7 and 8 of the Hauraki Gulf Marine Park Act (HGMPA) 2000. MFish considers that increasing the TAC of the Coromandel scallop fishery in response to information about abundance in the current season appropriately addresses this obligation in providing for the social, economic, recreational and cultural well-being of the people of the Hauraki Gulf.

⁵ For the purposes of this paper, this increase will be rounded to 95 tonnes meatweight.

50 MFish proposes that the Coromandel scallop TAC should be increased from 48 tonnes meatweight to either 148 or 143 tonnes meatweight. The proposed TAC increases for both options are largely based on the proposal to increase the total available ACE for commercial fishers for the 2008 season from 22 to 95 tonnes meatweight. As explained below, the difference between the two options is whether or not the allowances for recreational and customary Maori fishing should be increased.

Allowances and ACE

51 Section 68 of the Act says that where a TAC is increased under s 13(7) and the Minister believes, after considering the matters referred to in s 21(1), that he or she would have increased the TACC but for s 20(4), the Minister shall create additional ACE according to a formula set out in s 68(2). The matters referred to in s 21(1) are:

- non-commercial fishing interests (Maori customary non-commercial interests and recreational interests) and
- all other mortality to the stock caused by fishing.

52 In addition, s13 of the HGMPA 2000 requires the Minister to have particular regard to ss 7 and 8 of this Act. MFish considers that by increasing the TAC for the Coromandel scallop fishery during the current season, the Minister is satisfying his obligations under ss 7 and 8 by providing for the social, economic, recreational and cultural wellbeing of the people of the Hauraki Gulf (see section entitled “Hauraki Gulf Marine Park Act 2000” below).

Recreational allowance

53 In considering an in-season TAC increase, and having regard to the matters under s 21, MFish proposes two options for the recreational allowance. Option 1 proposes to increase the allowance as the 2008 biomass survey suggests a greater biomass level in the fishery than the time at which the baseline allowance was set. Conversely, option 2 proposes no change due to the lack of quantitative information available on yield and harvest levels in the recreational scallop fishery. Option 2 also reflects that although biomass may be greater than at the time the original allowance was set, scallop biomass in the areas surveyed was estimated to be 18% lower than in 2007.

Option 1: Increase the recreational allowance

54 The draft survey results relate primarily to the scallop beds mainly fished by the commercial sector. However, MFish considers that trends in scallop abundance in the “non-commercial” beds are likely to be similar to abundance trends for the surveyed beds. While the surveys estimate scallop biomass has decreased by 18% since the same time last year, MFish still considers that scallops are relatively abundant compared to historical levels.

55 In years of comparative scallop abundance, consideration of an increased recreational catch is necessary for several reasons. Firstly, it is probable that “regular” fishers will fish more frequently for scallops in these good years. Secondly, as people become more aware that scallops are relatively abundant, there are likely to be more “new” and “occasional” fishers fishing for scallops. In addition, when scallops are abundant, it is likely that fishers will more frequently attain their full legal entitlement of

scallops (ie. the current daily bag limit of 20 scallops per fisher per day). Thus, while scallop biomass (in commercial beds) is estimated to be 18% lower than the previous year, it is still relatively abundant by historical levels and recreational catch might still exceed the recreational allowance if the allowance is not increased.

- 56 In addition, several decisions made by the Minister in the last few years are likely to have improved recreational access to the Coromandel scallop fishery. Two of these decisions were made in 2005 and addressed long-standing management issues relating to the amateur scallop fishing regulations. The first decision concerned the “primary taker” issue and allowed a diver to take a scallop bag limit on behalf of up to two “safety people” on board the vessel during the diving operation. The second decision removed the ban prohibiting scallops from being processed (“shucked”) at sea.
- 57 As part of this regulation review, the Minister declined a proposal to increase the Coromandel scallop amateur bag limit from 20 to 30 scallops per gatherer per day. The Minister considered that there is not currently enough information available to support a bag limit increase. He requested that the Ministry obtain further information on the nature and extent of the recreational fishery (including through survey), and the potential impacts of an increase in the bag limit, particularly if the fishery were to enter a period of decline. There are several research projects currently underway which should provide further information “Current and Future Research” below.
- 58 A third decision altering the timing of the recreational scallop season between Cape Runaway and North Cape came into force last year. This change moved the recreational scallop season forward six weeks, so that it now runs 1 September – 31 March (inclusive). This change is expected to have increased recreational catch as the season now coincides with a period in which scallops are in better condition.
- 59 Given that the recreational catch might increase, it is reasonable to propose an increase in the recreational allowance. Therefore, MFish proposes to increase the allowance to recreational fishing from 7.5 tonnes meatweight to 10 tonnes meatweight for 2008-09. As part of this proposal, the recreational allowance would then decrease to 7.5 tonnes meatweight at the end of the current fishing year for the Coromandel fishery (31 March 2008).

Option 2: No change to the recreational allowance

- 60 There is a lack of quantitative information available on the recreational scallop fishery. Specifically, no reliable estimates of yield or harvest levels are available in the areas closed to commercial scallop fishing. While two biomass surveys have been completed on recreational beds in 2006 and 2007, this is part of an ongoing project attempting to establish a link between scallop abundance in commercial areas and abundance in recreational areas. As yet, conclusions cannot be drawn from the data, though it is hoped that this project will provide quantitative data on the recreational scallop beds in the future.
- 61 At present, it cannot be determined whether or not the current allowance of 7.5 tonnes is likely to be undercaught or overcaught. Accordingly, under option 2, MFish proposes no change to the recreational scallop allowance and the level would remain at 7.5 tonnes meatweight for the 08–09 recreational season. Neither of the two options proposed consider changes to the daily bag limit in the recreational fishery.

Māori customary interests

- 62 In common with many other shellfish, scallops (*tipa*) are important to Māori as a traditional food. However, no quantitative information on the level of customary take of the Coromandel fishery is available. MFish has applied a general policy that, in the absence of quantitative catch information and where the fishery is of known importance to Maori, the recreational allowance is used as a benchmark to set the customary allowance.
- 63 Accordingly, MFish proposes two options for the customary allowance. Option 1 is to increase the customary allowance to the level of the proposed recreational allowance—10 tonnes meatweight. The customary allowance would then revert to 7.5 tonnes meatweight at the end of the current fishing year for the Coromandel fishery (31 March 2009). Option 2 is to retain the customary allowance at the current level—7.5 tonnes meatweight.

Other sources of fishing-related mortality

- 64 The level of incidental mortality expected in the commercial dredge fishery has been estimated by NIWA to be 34.4% of the commercial catch level. Therefore, MFish proposes to increase the allowance for other sources of fishing-related mortality from 11 tonnes meatweight to 33 tonnes meatweight for 2008–09. It is worth noting that the estimated mortality value assumes fishing pressure at $F_{0.1}$ (i.e., commercial catches at the level of the yield estimate). As commercial fishers are consistently taking less than 50% of the yield estimate, the actual incidental fishing-related mortality caused to scallops is likely to be less than 34.4%.
- 65 Research suggests that incidental mortality from recreational dredging is likely to be minor. Therefore, no additional allowance for other sources of fishing-related mortality is proposed, even if the non-commercial allowances are increased.

ACE for commercial fishers

- 66 If the decision is made to increase the TAC in-season, the Minister can create additional ACE for fishers within a season after following the process outlined above.⁶
- 67 MFish proposes that the level of ACE for the Coromandel fishery for the 2008-09 fishing year be increased from 22 to 95 tonnes meatweight.
- 68 Based on the 2007/2008 port price of \$13.63 per kilogram of meatweight (\$13 630 per tonne), the proposed increase in ACE of 73 tonnes (from the baseline level) equates to an increased gross return to the commercial fishers of \$994 990 for the 2008 season. However, port price is known to have various limitations that tend to underestimate the value of the species. For example, the 2007 export price for scallops was \$17.61 per kg of meatweight. Assuming the same export prices as 2007, the proposed increase in ACE of 73 tonnes has a theoretical export value of \$1 285 530 for the

⁶ The total allowable commercial catch during the fishing year does not increase, although additional annual catch entitlements are made available during the season under section 20(4) of the Fisheries Act. When deciding to increase annual catch entitlements, the Minister must consider all the factors he/she has to take into account when making any decision about setting or changing a total allowable commercial catch (section 68(1) of the Fisheries Act 1996).

2008 season. However, MFish understands that majority of scallops harvested from the Coromandel fishery are sold on the domestic market. Regardless, export price is merely an indicator of value, and MFish believes that the true value of the additional 73 tonnes of ACE is likely to fall between these two figures (\$994 990 to \$1 285 530).

Environmental Issues

69 Section 9 of the Act prescribes the following environmental principles that must be taken into account when exercising powers in relation to utilisation of fisheries resources while ensuring sustainability:

- associated or dependent species (including non-fish bycatch) should be maintained above a level that ensures their long-term viability;
- biological diversity of the aquatic environment (ie, the variability of living organisms, including diversity within species, between species, and of ecosystems) should be maintained; and
- habitat of particular significance for fisheries management should be protected.

70 The history of commercial dredging in the Coromandel scallop fishery dates back to 1968, and trawling has occurred in the area since the late nineteenth century. There is no doubt that these fishing methods have had an impact on the seabed. There is some information available providing evidence of broad-scale changes in benthic communities that can be directly related to fishing. The seafloor in the area has also been modified by the impact of land-based activities over a much longer period. However, significant areas of habitat in the Firth of Thames and inner Hauraki Gulf are not open to commercial dredging.

71 MFish is not currently aware of any habitat of particular significance for fisheries management that requires additional protection within the Coromandel Scallop fishery. Scallop dredging is focussed in the relatively restricted areas where scallops are abundant and research suggests that dredging affects only a modest proportion of most habitat types within the fishery area. MFish is currently considering approaches to habitats more likely to be affected through the fisheries planning process. Therefore, MFish does not consider that the catch levels proposed below in this paper will put at risk the long term viability of associated species or biological diversity within the area of the fishery.

Hauraki Gulf Marine Park Act 2000:

72 In setting a TAC, the Minister is required under s 11(2)(c) of the Act to have regard to ss 7 and 8 of the HGMPA 2000 in so far as the decision relates to the Hauraki Gulf. In doing anything else under the Fisheries Act (such as setting a TACC or making allowances) the Minister must, under s 13 of the HGMPA, have particular regard to ss 7 & 8 of the HGMPA. Section 7 recognises the national significance of the Hauraki Gulf including its capacity to provide for the relationship of tangata whenua and the social, economic, recreational, and cultural wellbeing of people and communities. Section 8 sets out the objectives of the management of the Hauraki Gulf, which include the maintenance of the Hauraki Gulf for the social and economic well-being and its contribution to the recreation and enjoyment of the people and communities of

the Hauraki Gulf and New Zealand. The maintenance and enhancement of the physical resources of the Gulf, which include scallops, is also an objective.

- 73 The main commercial and non-commercial beds in the Coromandel Scallop fishery all fall within the Hauraki Gulf Marine Park.
- 74 MFish understands that at present, all landings from the Coromandel scallop fishery are sold on the domestic market and that it is a popular species with consumers. The wellbeing of commercial scallop fishers and of consumers who would purchase commercially caught scallops is likely to benefit from an in-season increase to the TACC. The primary benefit to commercial fishers would be an increase to ACE, which would allow these fishers to benefit from scallop abundance. Given that the increase proposed would increase ACE from 22 to 95 tonnes, this is likely to have a significant effect on fishers' incomes and possibly create temporary employment opportunities in processing sheds.
- 75 It is probable that the Coromandel scallop fishery is of considerable importance to the people of the Hauraki Gulf. MFish is aware of many recreationally fished beds within in the Marine Park (e.g. around Kawau Bay or Mercury Bay). While other beds are accessible outside the park (such as in Manukau Harbour or the Bream Bay), it is likely that a significant number of recreational fishers from within the Hauraki Gulf area derive wellbeing through this fishery.
- 76 As a species of considerable importance to recreational fishers, an increase in the allowances could better recognise the value of the Coromandel scallop fishery to the recreational sector and the wellbeing they derive from accessing this fishery. However, in the absence of information to suggest that the current allowances are insufficient for recreational and cultural wellbeing, MFish is not in a position to qualify or quantify the relative benefits of increases to the different sectors.
- 77 MFish invites submitters to provide any additional information that they have on the importance of the Coromandel scallop fishery to the social, economic, recreational and cultural wellbeing of people in the area of the Hauraki Gulf Marine Park.

Current and Future Research

- 78 This year, an optional biomass survey was conducted to estimate biomass and yield from the Coromandel fishery's commercial scallop beds. These surveys are required if an in-season increase is sought, and are generally conducted most years.
- 79 Building on surveys of recreational beds in Northland and Coromandel conducted in 2006 and 2007, an ongoing research program (SCA2007/03) aims to establish a relationship between scallop abundance in commercial beds and abundance in recreational fishing areas. It is hoped this research will assist decision-makers to better provide for non-commercial scallop catch in these areas.
- 80 A pilot study (REC2007/11) investigating the feasibility of estimating recreational catch in the Coromandel recreational scallop and rock lobster fisheries began on 1 October 2007. Results from this research are expected in late 2008. If successful, this study could provide information on the extent of catch from the main Whitianga scallop bed, and might lead to further studies of recreational scallop catch across the wider Coromandel fishery.

Consultation

- 81 Prior to the statutory consultation with stakeholders, MFish has talked with several key stakeholders from the commercial and non-commercial sectors regarding the ACE increase. However, the 2008 in-season review of the Coromandel scallop TAC is primarily based on the statutory consultation process that has operated for this fishery since 2002.
- 82 Stakeholders will have three weeks to Wednesday 9 July 2008 to provide MFish with written submissions commenting on the management proposals contained within this paper. MFish is also willing to facilitate a consultative meeting before this date if stakeholders wish to discuss the proposals in more detail. Individuals or groups interested in such a meeting should contact MFish Auckland on (09) 820 1990.
- 83 A relatively short consultation period is necessary because of the comparatively short commercial fishing season, which closes on 21 December. Commercial fishers in Coromandel are generally able to catch their “baseline” TACC and ACE quickly. If the increased amount of ACE is not immediately available, fishers are required to stop fishing, or pay deemed values on any catch. To avoid potentially major disruption and increased costs to commercial fishers, in-season changes to the management measures for the Coromandel fishery need to be implemented as early in the season as practical.

Summary

- 84 The proposed management options take into account the survey information showing relatively high biomass levels for the Coromandel scallop fishery compared to “average” abundance levels over the history of the fishery.
- 85 There is general support amongst key stakeholder groups for the TAC to be increased. However, not all support increasing ACE from 22 to 95 tonnes meatweight, with some preferring a smaller increase. MFish looks forward to further submissions from the various sectors outlining their views on the costs and benefits of the proposed in-season increase to ACE and any increase to the non-commercial allowances. MFish considers that the proposed measures for the Coromandel fishery are consistent with the purpose and principles of the Act and associated obligations.

Preliminary recommendation

- 86 MFish proposes two management options for the Coromandel scallop fishery 2008-09 season:

Option 1: Increase the TAC from 48 to 148 tonnes meatweight, and within the TAC:

- a) increase the allowance for recreational fishing from 7.5 tonnes meatweight to 10 tonnes meatweight;
- b) increase the allowance for customary Maori fishing from 7.5 tonnes meatweight to 10 tonnes meatweight;
- c) increase the allowance for other sources of fishing-related mortality from 11 tonnes meatweight to 33 tonnes meatweight;

- d) increase the Annual Catch Entitlement (ACE) from 22 tonnes meatweight to 95 tonnes meatweight; and

At the end of the current fishing year for the Coromandel fishery, the TAC will revert to 48 tonnes meatweight, the allowance for recreational fishing will revert to 7.5 tonnes meatweight, the allowance for customary fishing will revert to 7.5 tonnes meatweight, the allowance for other sources of fishing-related mortality will revert to 11 tonnes meatweight, and the ACE will revert to 22 tonnes meatweight.

Option 2: Increase the TAC from 48 to 143 tonnes meatweight, and within the TAC:

- a) retain the recreational fishing allowance at 7.5 tonnes meatweight;
- b) retain the customary fishing allowance at 7.5 tonnes meatweight;
- c) increase allowance for other sources of fishing-related mortality from 11 tonnes meatweight to 33 tonnes meatweight;
- d) increase the ACE for quota owners from 22 tonnes meatweight to 95 tonnes meatweight; and

At the end of the current fishing year for the Coromandel fishery, the TAC will revert to 48 tonnes meatweight; the allowance for other sources of fishing-related mortality will revert to 11 tonnes meatweight, and the ACE will revert to 22 tonnes meatweight.

Appendix One: Fishery Characteristics

- 87 The management arrangements for commercial and non-commercial fishers differ. Extensive parts of the Hauraki Gulf and many inshore scallop beds within the Coromandel fishery are closed by regulation to commercial scallop fishing. Therefore, the non-commercial and commercial fishing sectors are separated spatially to a large extent. The main beds in the commercial scallop fishery are found north of Whitianga (at the Mercury Islands), east of Waiheke Island, around Little Barrier, Cape Colville, and in the Bay of Plenty principally around Motiti Island and Papamoa Beach (see Figure 1). However, in some cases, commercially-fished beds are adjacent to non-commercial beds, and non-commercial fishers are known to fish in the commercial beds from time to time.
- 88 Within the Coromandel fishery, different minimum legal size limits apply to different sectors. The commercial sector cannot take scallops smaller than 90mm, while non-commercial fishers cannot take scallops smaller than 100mm⁷. Also, the fishing season differs depending on the sector, with commercial fishers operating 15 July to 21 December (inclusive) and non-commercial fishers now able to fish for scallops between 1 September and 31 March (inclusive) of the following year. The commercial and recreational fisheries can also be closed under shellfish sanitation requirements. In addition, recreational fishers are restricted to a maximum daily bag limit of 20 scallops per fisher per day (except when a diver collects the daily bag limit for up to two safety people on a boat).
- 89 Maori customary fishers are able to take scallops in excess of this limit or under the minimum size limit for hui and tangi purposes in accordance with regulation 27A of the Fisheries (Amateur Fishing) Regulations 1986. Kaitiaki have not yet been gazetted under the Fisheries (Kaimoana Customary Fishing) Regulations 1998 within the Coromandel Scallop management area.

Commercial fishery

- 90 The reported commercial catches have been variable in this fishery (see Table 3). Since 1992, limits on the overall commercial catch have been determined from the results of dredge and dive surveys undertaken before the start of each fishing season. However, the catch limits for the Coromandel fishery have not always been caught, notably in 1998, 1999 and 2000 (Table 3).

⁷ Different size limits for the commercial and non-commercial sectors reflects the different harvesting methods employed by the respective sectors. Modelling work in SCACS suggests that given the nature of the dredges used in the commercial fishery, a size limit of 90mm optimises fishing effort and minimises incidental mortality. However, the same logic does not apply to the non-commercial fishery where the primary mode of harvest is diving and the dredges that are used are lighter and thought to be significantly less efficient than those used by the commercial sector.

Table 3: Catch limits and landings (tonnes (greenweight or meatweight)) from the Coromandel fishery since 1974. Data before 1986 from Fisheries Statistics Unit (FSU) forms. Landed data are from the landed section of the Catch Effort Landing Return (CELR) forms and from Licensed Fish Receiver Returns (LFRR). “Estimated” data are from the CELR effort section and are pro-rated to sum to the CELR landed greenweight. The estimated catch by sub-areas within the fishery is based on the following scallop statistical reporting areas: “Hauraki” = 2X, 2W; “Mercury” = 2L, 2K; “Barrier” = 2R, 2S, 2Q; “Plenty” = 2A–2I. Catch limits (since 1992) are specified in meatweight (“Green” assumes the gazetted conversion factor of 12.5% and probably overestimates the actual greenweight taken in most years). The catch limits were based on the sum of permit condition entitlements (tonnes meatweight) for 1995 to 2000, a commercial catch limit was set for the 2001 season, and a TACC/ACE level has been set since 2002.

Season	Catch limits		Landings (t)			Total	Hauraki	Mercury	Estimated catch (t greenweight)	
	Meat	Green	LFRR	CELR					Barrier	Plenty
			Meat	Meat	Green					
1974	–	–	–	–	26	26	0	26	0	0
1975	–	–	–	–	76	76	0	76	0	0
1976	–	–	–	–	112	112	0	98	0	14
1977	–	–	–	–	710	710	0	574	0	136
1978	–	–	–	–	961	961	164	729	3	65
1979	–	–	–	–	790	790	282	362	51	91
1980	–	–	–	–	1 005	1005	249	690	23	77
1981	–	–	–	–	1 170	1170	332	743	41	72
1982	–	–	–	–	1 050	1050	687	385	49	80
1983	–	–	–	–	1 553	1553	687	715	120	31
1984	–	–	–	–	1 123	1123	524	525	62	12
1985	–	–	–	–	877	877	518	277	82	0
1986	–	–	162	–	1 035	1035	135	576	305	19
1987	–	–	200 ⁸	–	1 431	1431	676	556	136	62
1988	–	–	182	–	1 167	1167	19	911	234	3
1989	–	–	104 ⁹	–	360	360	24	253	95	1
1990	–	–	153	–	903	903	98	691	114	0
1991	–	–	203	–	1 392	1392	472 ¹⁰	822	98	0
1992	154	1 232	147	–	901	901	67	686	68	76
1993	132	1 056	62	–	455	455	11	229	60	149
1994	66	528	49	–	323	323	17	139	48	119
1995	86	686	88	79	574	574	25	323	176	50
1996	88	704	81	80	594	594	25	359	193	18
1997	105	840	94	89	679	679	26	473	165	15
1998	110	880	37	19	204	204	1	199	2	1
1999	31	248	8	7	47	47	0	12	17	18
2000	15	123	7	10	70	70	0	24	2	44
2001	22	176	22	20	161	161	1	63	85	12
2002	35	280	32	32	204	204	0	79	12	112
2003	58	464	58	58	451	451	63	153	13	223
2004	79	632	79	78	624	624	27	333	27	237
2005	118	944	119	121	–	968	21	872	75	0
2006	118	944	118	127	–	930	28	842	75	0
2007	108	864	–	59	471	471	51	373	45	2

⁸ The combined commercial catch for 1987 from the LFRRs is reported as 384 tonnes meatweight, but the Ministry and commercial fishers consider this catch total is unreliable due to catch reporting problems. There were general reporting problems in many commercial fisheries immediately following the introduction of the Quota Management System in 1986. The Ministry considers that 200 tonnes is a more reliable estimate of the commercial catch based on a review of the commercial catch-effort data for that year.

⁹ The catch for 1989 may have been under-reported due to mis-recording problems involved with the transition between the Ministry’s commercial catch reporting systems in 1989.

¹⁰ The Hauraki Gulf catch for 1991 includes a substantial catch taken from near Colville township (around 45 meatweight tonnes) that was mis-recorded as catch from the eastern Waiheke Island statistical area (2X).

Recreational fishery

- 91 Telephone/diary surveys were undertaken during 1993-1994, 1996 and 1999-2000. The recreational harvest estimate from the 1993-94 survey was 8.8 tonnes meatweight. The 1996 survey estimate of the recreational catch was 7.5 tonnes meatweight. The recreational catch estimate from the survey in 1999-2000 was 3.8 tonnes meatweight. The average of these recreational catch estimates is 6.7 tonnes.
- 92 The recreational diary surveys include catches reported from areas closed to commercial fishing by regulation. These areas include popular recreational and customary fishing areas such as Kawau Bay, Omaha Bay, parts of Waiheke Island and the Firth of Thames, Great Mercury Island, Otama Beach, Opito Bay, Slipper Island, and Motiti Island. The rationale for these closed areas in this fishery is to protect key non-commercial scallop fishing areas from the effects of commercial scallop dredging. Some of these closed areas were initially agreed under a three-year plan negotiated by the sectors. In general, the closures are utilisation measures, rather than sustainability measures.

Māori customary fishery

- 93 In common with many other shellfish, scallops are important to Māori as a traditional food. However, no quantitative information on the level of customary take in the Coromandel fishery is available. The level of customary catch is unknown. The Minister has set the customary allowance at the level of the recreational allowance. MFish has applied a general criterion that, in the absence of information and where the fishery is of known importance to Maori, the recreational allowance is used as a benchmark to set the customary allowance.

Other sources of fishing-related mortality

- 94 Quantitative information on the level of illegal catch is not available. However, quantitative information on other sources of fishing-related mortality was gathered in the Coromandel scallop fishery as part of MFish project AKSC03 during the 1996-97 fishing year. This work by NIWA assessed the incidental effects on growth and mortality of scallops from encounters with commercial dredges of various designs.
- 95 Individual-based population modelling and yield per recruit analysis suggested there are incidental effects of dredging on growth and mortality rates that are highly influential on the determination of yield from scallop dredge fisheries. Using NIWA's model, the level of incidental mortality was estimated to be 34.4% of the level of the commercial catch. Based on this model, an allowance for fishing-related mortality is proposed in this paper.

Appendix Two: Coromandel Scallop Fishery Stock Assessment Summary for 2008

- 96 A research survey of the main Coromandel scallop beds used for commercial fishing was conducted in May 2008. Dredge efficiency was assessed as part of most of the surveys in the 1990s by conducting experiments to compare scallop catch rates between divers and dredges operating in the same area at the same time. The vessel and skipper used for the 2008 survey were the same as used in many of the dredge efficiency experiments in the 1990s. Accordingly, for the 2008 assessment, the historical average dredge efficiency was used, as this most closely relates to the performance of the vessel and skipper used for the 2008 survey. By allowing for average dredge efficiency catch rates, the number of scallops above 90 mm is estimated to be 67.57 million.
- 97 To allow a comparison of trends over the history of the fishery since 1990, estimates based on scallops 95mm and above are provided (Table 3). The total survey estimate for 2008 (21.8 million 95 mm+ scallops) is lower than the previous three surveys, but continues to be high compared to the 1990s and early 2000s, which ranged from 3.3 million (1999) to 12.9 million (2003).

Table 4: Millions of scallops (95 mm or larger) estimated at the time of the survey in the main areas of the Coromandel commercial fishery since 1990. Historical average dredge efficiency has been assumed for all years, including 2001–03 when different vessels were used. Totals include data from all surveyed beds and are not directly comparable among years. Dashes (–) indicate no survey in an area or year.

Year	Whitianga / Mercury Is	Waihi Beach	Motiti / Papamoa	Little Barrier	Cape Colville	Waiheke Island	Total
1990	7.4	–	–	–	–	6.4	13.8
1991	11.1	–	–	–	–	2.8	13.9
1992	10.7	–	–	–	–	0.7	11.4
1993	6.6	7.1	–	–	0.3	0.4	14.4
1994	4.8	1.5	–	–	–	0.0	6.3
1995	4.4	0.6	4.5	2.5	0.1	0.3	12.5
1996	6.1	0.2	2.2	3.3	0.1	0.3	12.6
1997	6.1	0.7	1.9	4.0	0.3	5.4	18.4
1998	6.4	0.1	1.2	1.0	0.2	5.3	14.2
1999	1.8	0.2	0.9	0.2	0.0	0.2	3.3
2000	–	–	–	–	–	–	–
2001	1.5	–	0.7	1.6	–	0.2	4.2
2002	2.7	–	0.7	0.8	–	1.0	5.3
2003	4.2	–	2.1	1.4	3.5	1.7	12.9
2004	23.5	1.0	2.4	1.2	0.3	4.7	33.2
2005	53.2	3.7	1.8	2.8	2.5	2.4	66.6
2006	46.2	0.5	2.1	3.1	7.3	–	58.7
2007	34.8	1.8	2.4	2.0	2.6	0.6	44.2
2008	18.9	0.8	0.4	0.7	0.9	–	21.8

- 98 At the time of the survey, the total greenweight biomass of the fishery (90mm+ scallops) can be calculated by multiplying the estimate of the numbers of scallops against the average weight of a scallop (87 grams). This provides an estimate of 5415 tonnes (greenweight) allowing for historical average dredge efficiency.

- 99 The biomass of scallops at the start of the season can be estimated by projecting forward the numbers of scallops at the time of the survey, and by using assumptions concerning growth (determined from previous tagging programmes) and natural mortality (assumed to be $M=0.5$ spread evenly through the year). This approach resulted in a median estimate of biomass over 90 mm in length of 8428 tonnes (greenweight) with a CV of 22%, based on historical average values for dredge efficiency.
- 100 Using the assumptions of historical average dredge efficiency and a reference rate of fishing mortality of $F_{0.1}$ (MFish standard rate), the CAY is estimated to be 2197 tonnes greenweight. It is then necessary to convert the greenweight to meatweight, as meatweight is the standard unit of measurement used in the Coromandel scallop fishery. This conversion results in a meatweight CAY estimate of 276 tonnes (using the average recovery rate from 1995 to 2002 (12.6%) for extracting scallop meat from the scallop shell in processing sheds).
- 101 Scallop recruitment could be affected by dredging in two ways.¹¹ Firstly, scallops that are disturbed by a dredge, (but are either not captured or returned to the water) can suffer sub-lethal effects that appear to slow gonad development prior to spawning and hence could reduce fertility. Secondly, the destruction and removal of foliose material (e.g. horse mussel shells) by dredges might reduce the surfaces available for spat settlement and juvenile habitat. Such changes to the benthic environment could be incremental, as fishing activity gradually decreases the amount of foliose or highly structured material in the environment and, thereby, could gradually constrain recruitment.
- 102 Reducing habitat structure also increases the "natural" mortality of spat-sized juvenile scallops by rendering them more susceptible to predation. If these indirect "feedback" effects of habitat modification by dredging on juvenile scallop mortality are included in the yield estimate, the CAY is estimated to be 189 tonnes meatweight at $F_{0.1}$.

¹¹ See Cryer, M and Morrison, M 1997 Yield per recruit in northern commercial scallop fisheries: inferences from an individual-based population model and experimental estimates of incidental impacts on growth and survival. Final Report to Ministry of Fisheries on Project AKSC03. Unpublished report held by Ministry of Fisheries, Wellington.

Appendix Three: Statutory Considerations

Fisheries Act 1996:

- 103 **Section 5** of the 1996 Act requires that the Minister shall act in a manner consistent with New Zealand's international obligations and Treaty of Waitangi (Fisheries Claims) Settlement Act 1992. To this end, the provisions of general international instruments such as UNCLOS and the Fish Stocks Agreement have been implemented through the provisions of the 1996 Act. The Ministry is not aware of any specific international obligations relating to the Coromandel scallop fishery. The proposed options are consistent with the obligations relating to the Treaty of Waitangi (Fisheries Claims) Act 1992.
- 104 **Section 8:** the purpose of the Act is to provide for the utilisation of fisheries resources while ensuring sustainability—as discussed in the body of the paper.
- 105 **Section 9** Environmental Principles—are addressed in the body of the paper.
- 106 **Section 11** Sustainability measures: Before setting or varying any sustainability measure, s 11(1) of the Act requires the Minister to take into account specified matters. These include:
- i) any effects of fishing on any stock and the aquatic environment;
 - ii) any existing controls that apply to the stock or area concerned;
 - iii) the natural variation of the stock concerned.
- 107 Evaluation of the available information on the effects of fishing has led to a number of restrictions that underpin the existing commercial fishery management regime for the Coromandel fishery. These restrictions are consistent with the overriding obligation to avoid, remedy or mitigate the adverse effects of fishing. They are implemented through a combination of regulations and voluntary agreement and include:
- a) restrictions on dredge size to reduce adverse effects on the seafloor;
 - b) five day fishing week and daylight only fishing (reduces fishing intensity);
 - c) daily catch limits to reduce fishing intensity (Coromandel Scallop Fishers' Association voluntary initiative).
- 108 The proposal recognises that biological systems can be inherently variable, and stocks are prone to fluctuations in abundance. This is particularly applicable to scallop populations.
- 109 **Section 11(2):** Before setting or varying any sustainability measure under subsection (1) of this section, the Minister shall have regard to any provisions of:
- (a) any regional policy statement, regional plan, or proposed regional plan under the Resource Management Act 1991; and
 - (b) any management strategy or management plan under the Conservation Act 1987 that apply to the coastal marine area and are considered by the minister to be relevant; and
 - (c) sections 7 and 8 of the Hauraki Gulf Marine Park Act 2000 (for the Hauraki Gulf as defined in that Act).

- 110 MFish is not aware of any regional policy statements, regional plans or proposed regional plans under the Resource Management Act 1991 or any management strategies or management plans under the Conservation Act 1987 that are relevant to the setting of a TAC in SCA 1. Sections 7 and 8 of the Hauraki Gulf Marine Park are addressed in the body of the paper.
- 111 **Section 11(2A)** of the Act requires that before varying any sustainability measure the Minister must take into account:
- (a) any conservation services or fisheries services;
 - (b) any relevant approved fisheries plans
 - (c) any decisions not to require conservation or fisheries services.
- 112 The current fisheries service applying to the fishery is a pre-season survey to estimate CAY for the fishery. The survey estimate has been considered and forms the basis for the proposals contained in this paper. There are no conservation services applying to the fishery.
- 113 Currently, there is no approved fisheries plan for the Coromandel scallop fishery. However, the Ministry and stakeholder leaders are preparing a draft fisheries plan for this fishery. The plan is currently in the process of formal statutory consultation with stakeholders and the general public.
- 114 In relation to s 11(2) of the Act, there are no provisions applicable to the coastal marine area known to exist in any policy statement or plan under the Resource Management Act 1991, or any management strategy or plan under the Conservation Act 1987, that are considered relevant to the setting of sustainability measures for the Coromandel scallop fishery.
- 115 Under s 11(2)(c), the Minister must have regard to sections 7 and 8 of the Hauraki Gulf Marine Park Act 2000 as part of the Coromandel scallop fishery is part of the area defined as the Hauraki Gulf for the purpose of that legislation. In summary, sections 7 and 8 articulate the national significance of the Hauraki Gulf to sustain the life-supporting capacity of the environment and note that management objectives for the Hauraki Gulf are to protect the life supporting capacity of the environment and to maintain the contribution of the natural resources to the social, recreational, and economic well-being of the people and communities of the Hauraki Gulf and New Zealand (see ss7 and 8 below). Setting a sustainable commercial catch limit on a fishery resource, having taken into account the environmental principles of the Act, is consistent with these objectives as it provides for utilisation while ensuring sustainability.
- 116 **Section 11** of the Act also provides for the setting or varying of sustainability measures other than a TAC or catch limits. The Minister may determine that area closures and seasonal constraints required for the annual management of this fishery be set as sustainability measures. As mentioned, a number of commercial closed areas are already in place in the Coromandel scallop fishery, although these are not considered sustainability measures.

- 117 **Section 68:** under section 68 if the TAC is increased during a fishing year and the Minister believes that, after considering the matters referred to in section 21(1) he would have increased the TACC but for section 20(4), the Minister shall create additional ACE for the stock that equals the amount by which he would have increased the TACC. Section 21(1) relates to Maori customary non-commercial interests, recreational interests all other mortality caused by fishing.

Hauraki Gulf Marine Park Act 2000:

Section 7: Recognition of national significance of Hauraki Gulf

- (1) The interrelationship between the Hauraki Gulf, its islands, and catchments and the ability of that interrelationship to sustain the life-supporting capacity of the environment of the Hauraki Gulf and its islands are matters of national significance.
- (2) The life-supporting capacity of the environment of the Gulf and its islands includes the capacity—
 - (a) to provide for—
 - (i) the historic, traditional, cultural, and spiritual relationship of the tangata whenua of the Gulf with the Gulf and its islands; and
 - (ii) the social, economic, recreational, and cultural well-being of people and communities:
 - (b) to use the resources of the Gulf by the people and communities of the Gulf and New Zealand for economic activities and recreation:
 - (c) to maintain the soil, air, water, and ecosystems of the Gulf.

Section 8: Management of Hauraki Gulf

To recognise the national significance of the Hauraki Gulf, its islands, and catchments, the objectives of the management of the Hauraki Gulf, its islands, and catchments are—

- (a) the protection and, where appropriate, the enhancement of the life-supporting capacity of the environment of the Hauraki Gulf, its islands, and catchments:
- (b) the protection and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments:
- (c) the protection and, where appropriate, the enhancement of those natural, historic, and physical resources (including kaimoana) of the Hauraki Gulf, its islands, and catchments with which tangata whenua have an historic, traditional, cultural, and spiritual relationship:

- (d) the protection of the cultural and historic associations of people and communities in and around the Hauraki Gulf with its natural, historic, and physical resources:
- (e) the maintenance and, where appropriate, the enhancement of the contribution of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments to the social and economic well-being of the people and communities of the Hauraki Gulf and New Zealand:
- (f) the maintenance and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments, which contribute to the recreation and enjoyment of the Hauraki Gulf for the people and communities of the Hauraki Gulf and New Zealand.

Section 13: Obligation to have particular regard to sections 7 and 8:

Except as provided in sections 9 to 12, in order to achieve the purpose of this Act, all persons exercising powers or carrying out functions for the Hauraki Gulf under any Act specified in Schedule 1 [including the Fisheries Act 1996] must, in addition to any other requirement specified in those Acts for the exercise of that power or the carrying out of that function, have particular regard to the provisions of sections 7 and 8 and of this Act.