Setting of Sustainability and Other Management Controls for Stocks to be Introduced into the QMS on 1 October 2005

Initial Position Paper

31 March 2005

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INTRODUCTION

1 The Ministry of Fisheries (MFish) proposes to recommend to the Minister of Fisheries the management frameworks outlined in this document for those fishstocks gazetted for introduction into the Quota Management System (QMS) on 1 October 2005. These stocks and their Quota Management Areas (QMAs) are outlined in Table 1 below.

2 In accordance with sections 12, 21 and 75A of the Fisheries Act 1996 (the 1996 Act), the purpose of this document is to consult on behalf of the Minister of Fisheries on the Total Allowable Catches (TACs), Total Allowable Commercial Catches (TACCs), allowances and other management measures proposed for these stocks.

3 MFish requests that you provide your written comments no later than **15 April** for changes to the fisheries reporting regulations and deemed values, and no later than **10 May** for all other matters outlined in this IPP, including TAC changes and other regulatory changes not relating to reporting regulations.

4 Because of the administrative timeframe to introduce species into the QMS on 1 October 2005, if your comments are received after the dates stated above, MFish may not be able to consider them in the final advice to the Minister of Fisheries. Please send your written comments on this consultation document to:

5 Kristin Philbert, Ministry of Fisheries, P O Box 1020, Wellington, ph (04) 470 2585, fax (04) 470 2669, Kristin.Philbert@fish.govt.nz.

6 If you have any questions regarding this information you are encouraged to contact the person responsible for the relevant fisheries outlined in the list below, or contact your nearest MFish office:

Jodi Mantle, P O Box 19 747, Auckland (09) 820 7686 (Northern Inshore)

Rose Grindley, Private Bag 1926, Dunedin (03) 474 2689 (South inshore)

Table 1: QMAs for species/stocks gazetted for QMS Introduction on 1 October 2005

Species (code)	Quota Management Areas*
Cockles (COC)	COC 1B, COC 1C, COC 2, COC 3B, COC 4, COC 5, COC 7C, COC 8, COC 9
Non-QMS dredge oysters (OYS)	OYS 1, OYS 2A, OYS 3, OYS 4, OYS 5A, OYS 7A, 7B & 7C, OYS 8A, OYS 9
Pipi (PPI)	PPI 1B & 1C, PPI 2, PPI 3-5, PPI 7-9
Non-QMS scallops (SCA)	SCA 1A, SCA 2A, SCA 3, SCA 5, SCA 7A, 7B & 7C, SCA 8A, SCA 9A
Tuatua (TUA)	TUA 1A & 1B, TUA 2-5, TUA 7-9

Management Framework for QMS Introductions

7 The purpose of the initial management frameworks proposed in this document is to ensure that following QMS introduction each fishery operates effectively by achieving

the requirements outlined in the 1996 Act. The initial management framework consists of the following elements:

a) TACs;

b) TACCs;

c) Allowances for recreational, customary, and other sources of fishing-related mortality to the stock; and

d) Regulations and other management controls.

Outline of the Consultation Document

8 The first section of this document explains the statutory obligations and policy guidelines for the elements that make up the proposed initial management frameworks.

9 The next section sets out generic information on the setting of interim and annual deemed values and overfishing thresholds for the stocks.

10 This is followed by a generic section on the consequential amendments to the Fishing Reporting Regulations as a result of QMS introduction.

11 Subsequent sections outline MFish's proposed management frameworks for the respective stocks.

STATUTORY OBLIGATIONS AND POLICY GUIDELINES

Purpose of the Fisheries Act 1996

1 The purpose statement of the 1996 Act describes its overriding objective of providing for the utilisation of fisheries resources while ensuring sustainability. The 1996 Act defines "ensuring sustainability" as to "maintain the potential of fisheries resources to meet the reasonably foreseeable needs of future generations; and avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment". Management of a specific stock must be consistent with these dual requirements in order that sustainability of the stock can be ensured.

2 "Utilisation" of fisheries resources is defined as "conserving, using, enhancing, and developing fisheries resources to enable people to provide for their social, economic, and cultural wellbeing." Within the parameters of these sustainability standards, there is a positive obligation to provide for the use of fisheries resources.

3 The extent of management measures required to achieve the purpose of the 1996 Act will produce a continuum of potential outcomes. Utilisation may be provided for at different levels, and the extent of such use should be considered on a case-by-case basis. Where there is a significant threat to the sustainability of a fishstock, the measures adopted to achieve sustainability are likely to be more stringent than where there is a lesser threat.

4 Consideration of social, economic, and cultural wellbeing (in conjunction with other considerations consistent with the purpose and principles of the 1996 Act) may influence how measures to ensure sustainability are implemented. Hence, providing for utilisation while ensuring sustainability may be achieved in different ways, and the objective may be reached over time. Consideration of the purpose of utilisation may be relevant in determining which is the most appropriate approach.

Setting a Total Allowable Catch

5 Below the level of the purpose statement, the 1996 Act contains a number of specific provisions relating to ensuring a stock is managed sustainably. A key measure is the setting of a TAC for a QMS stock. The Minister is required to set a TAC for each QMS stock. The 1996 Act contains a number of different options in terms of the intended target level able to be implemented for a QMS stock. All of the options are consistent with the purpose of "ensuring sustainability," but each option provides for a fundamentally different management outcome.

Maximum Sustainable Yield (s 13)

6 Section 13 represents the default management option that is to be applied when setting a TAC for a stock within the QMS, unless that stock qualifies under criteria for management under ss 14 or 14A.

7 Under s 13 there is a requirement to maintain the biomass of a fishstock at a target stock level, being at, or above, a level that can produce the MSY, having regard to the interdependence of stocks. MSY is defined, in relation to any fishstock, as being 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. A requirement to maintain stocks at a level that is capable of producing the MSY is generally recognised internationally as being an appropriate fishstock target, although there is some international support for MSY representing a minimum fishstock threshold level.

8 If a stock is currently below the target stock level, there is a requirement pursuant to s 13(2)(b) to set a TAC that will result in the stock being restored to the target stock level (ie, at or above a biomass that will support MSY) and in a way and rate which has regard to the interdependence of stocks and within a period appropriate to the stock, and having regard to the stock's biological characteristics and any environmental conditions affecting the stock. If the stock is above a target stock level, there is a requirement to set a TAC that will result in the stock moving towards the target stock level, or alternatively remain above the target stock level, having regard to the interdependence of stocks (s 13(2)(c)). In determining the way in which, and rate at which, a stock is altered to achieve the target stock level, the Minister is to have regard to such social, cultural, and economic factors as he or she considers relevant (s 13(3)). Section 13(3) makes it explicit that such factors are relevant in the determination of the way and rate of progress to the target level, rather than in the determination of the target stock level itself.

9 There is no set rate, or time frame, within which a rebuild or a "fishing down" of a stock must be achieved. However, the progress of moving towards the target stock level must be suitable to the fishery in question, having also considered those matters specified in s 13 of the 1996 Act. Hence, a TAC should be viewed as a tool for moving a stock towards the target stock level. Other measures may be adopted in conjunction with a change in the TAC. However any additional measures should not be relied on in place of the TAC.

10 Additional flexibility is encompassed within s 13 by the capacity to provide for an in-season adjustment to the TAC for certain stocks. Any TAC that is set or varied has effect on and from the first day of the next fishing year for the stock concerned. An exception applies to those stocks listed on the Second Schedule to the 1996 Act. This Schedule can apply to any stock with a highly variable abundance. For such stocks in years of high abundance, the TAC may be increased in-season, and the Minister may allocate all or part of that increase as Annual Catch Entitlements (ACE) to commercial fishers. At the commencement of the next fishing year the TAC reverts to the level set at the commencement of the previous fishing year. This means that commercial catch levels, not property rights in the form of individual transferable quota, are increased during the fishing year.

11 An in-season TAC increase may be distributed between commercial, customary and recreational fishers, and an allowance made for other sources of mortality to the stock. The increase allocated to commercial fishers does not result in an increase to the TACC during the fishing year.

12 The fundamental objective of an in-season adjustment is to manage a stock at or above the level that can produce the MSY. Information about what is the desirable

level of the TAC that can produce the MSY is available at such a time that a decision is made after the start of the fishing year. However, at the end of the fishing year, the TAC reverts to the level that was applicable at the start of the fishing year.

No Specified Target Stock Level (s 14)

13 Section 14 of the 1996 Act prescribes an exception to the target stock level based on an assessment of the MSY for those stocks where:

a) it is not possible to estimate MSY because of the biological characteristics of the species; or

b) a catch limit for New Zealand has been determined as part of an international agreement; or

c) the stock is managed on a rotational or enhanced basis.

14 For stocks that meet the above criteria, and as a result are listed on the Third Schedule of the 1996 Act, a TAC may be set other than in accordance with the requirements in respect of target stock levels stated in s 13, provided the TAC better achieves the purpose of the 1996 Act.

15 While any TAC must be set in a way that ensures use of the stock is sustainable, there is no requirement to take into account or be guided by the need to manage in accordance with MSY. In contrast to s 13, s 14 provides significant flexibility as to the target stock level set for a stock. The rationale for that flexibility is different for each of the categories of stocks eligible for listing on the Third Schedule.

16 The biological characteristics of some stocks mean that it is not possible or necessary to estimate the MSY to ensure the sustainability of the stock. For example, squid is a short-lived species. There is currently no ability to estimate the available abundance either before or within the fishing season. The extent of catch taken from the available biomass will not affect future recruitment or abundance of the species. For this reason, the TACs set for squid stocks have not been significantly changed during the last decade, but the actual catch levels have fluctuated markedly within that time.

17 Under an international agreement, a catch limit for a species may be set and allocated between individual fishing nations, eg, southern bluefin tuna. Typically such international agreements relate to highly migratory species or species that straddle national boundaries. The overall catch limit set for the species must be consistent with international fisheries management law; hence, the catch limit would need to ensure the sustainability of the species. There is no requirement that New Zealand separately manages that portion of the species it is allocated at MSY.

18 The third category relates to those stocks managed on a rotational or enhanced basis. The effect of rotational fishing or fisheries enhancement is that MSY may no longer be the appropriate target level (eg, scallops in area 7 (SCA 7)). Enhancement is designed to increase the level of abundance. While enhancement of the stock may not need to be consistently maintained, the ability to intervene to increase abundance means that the sustainability of the stock can be ensured. The available yield will change over time.

19 Rotational harvesting involves selective harvesting of a portion of the stock. Rotational harvesting is best suited to sedentary species or stocks with established fishing grounds. The yield taken in any one year may not be the MSY available for the stock overall. The ability to successfully manage a stock on a rotational basis may be dependent upon the biological characteristics of the stock.

20 A combination of rotational harvesting and enhancement may result in greater flexibility in setting a TAC that will ensure the sustainability of the stock. Enhancement may enable rotationally harvested areas to be restocked at a level above that which could be naturally produced. Enhancement may also provide an ability to maximise catch from each area as it is rotationally fished. Areas closed to fishing allow both enhanced and wild stocks to contribute to the spawning biomass and reach harvestable size before being subjected to commercial fishing. Area closures may protect sufficient adult stocks to ensure adequate recruitment to the fishery.

21 As with s 13, s 14 provides for an in-season increase to the TAC for stocks listed on the Third Schedule. The purpose of an in-season increase under s 14 is to take advantage of the available yield beyond any pre-determined target stock level. However, the level of the in-season increase must be consistent with the objective of ensuring sustainability of the stock.

22 An in-season TAC increase may be distributed between commercial, customary and recreational fishers, and an allowance made for other sources of mortality to the stock. Additional ACE is generated during the fishing year in respect of the increase in the TAC allocated to commercial fishers. At the close of the fishing year the TAC reverts to the level set at the beginning of that fishing year.

Above Level of Long Term Viability (s 14B)

23 A further exception to setting a TAC in accordance with the MSY is the management of a stock under s 14B of the 1996 Act. A TAC is to be set at a level that ensures the stock is maintained above the level that ensures its long-term viability. However, the Minister must be satisfied that the purpose of the 1996 Act would be better achieved by setting a TAC other than in accordance with s 13 (ie, at or above MSY). Maintaining a stock above the level that ensures its long-term viability is consistent with the purpose of the 1996 Act in relation to meeting the reasonably foreseeable needs of future generations.

24 The purpose of s 14B is to enable other related stocks to be fully harvested. The stock in question must be taken primarily as an incidental catch during the taking of one or more other stocks and must constitute only a small proportion of the combined catch taken. The 1996 Act does not prescribe a level that is deemed to be above that which ensures the long-term viability of a stock. That determination is required on a case-by-case basis, subject to the requirement that the TAC must be set at a level no greater than what is required to allow for the taking of another stock in accordance with its own TAC and TACC. Quota owners are required to take all reasonable steps to minimise the catch of the stock managed below the biomass that will support the MSY ($B_{MSY)}$.

25 Section 14B addresses the difficulty of managing stocks within a mixed fishery to B_{MSY} without forgoing some economic return. In some mixed species fisheries the

TACs of minor bycatch species limit the ability of fishers to catch their entitlement of the target species and could result in closure of the target fisheries.

26 Section 14A specifies a number of significant tests apply in order to mitigate the risk of managing a stock below B_{MSY}. First, the stock must be able to be maintained above a level that ensures its long-term viability. Secondly, the Minister is required to consider the need to: (1) commission appropriate research to assess the impact of reducing the stock below B_{MSY}; (2) implement measures to improve the quality of information about the stock; (3) close areas to commercial fishing to reduce any sustainability risk to the stock; and (4) avoid any significant adverse effects on the aquatic environment of which the stock is a component. Hence, the setting of a TAC under s 14B to allow for the taking of another stock may need to be balanced by the closure of areas to fishing to ensure the stock is maintained above a level that ensures its long-term viability. Consideration of significant adverse effects of fishing could have potential implications for the aquatic ecosystem as a result of reducing the biomass of the stock.

27 Consideration also needs to be given to the social, cultural and economic implications of managing a stock below B_{MSY}. The setting of a TAC above the level that ensures the stock's long-term variability must have the support of quota owners who hold 95% of the shares in the stock. Arrangements need to be in place to address the concerns of those quota owners who do not support the setting of a TAC under s 14B. The total benefits of managing the stock at a level other than that permitted under s 13 must outweigh the total costs. Managing the stock in a manner other than s 13 must have no detrimental effects on non-commercial fishing interests in the stock.

28 A final important check and balance when setting a TAC under s 14B is that the Minister for the Environment is required to concur with a proposal to enable a TAC to be set for a stock above the level that ensures it long-term viability.

29 The ability to set a TAC under s 14B is triggered by the submission of a proposal from quota owners to the Minister of Fisheries to manage the stock in this way. An Order in Council (ie, a regulation) must be made specifying the application of s 14B for the named stock. No proposal relating to s 14B has been received in respect of the stocks to be introduced to the QMS on 1 October 2005.

Other Statutory Obligations Applicable When Setting a TAC

30 When setting a TAC, a number of generic provisions of the 1996 Act need to be taken into account – in particular, the purpose of the Act (s 8), the environmental and information principles (outlined in ss 9 and 10 respectively), factors to be taken into account when setting sustainability measures (s 11), and the application of international obligations and the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 (s 5).

Information Principles

31 The nature of the data and assumptions used to generate fisheries assessments and the results produced contain inherent variation and uncertainty. The 1996 Act specifies, in s 10, the information principles to use when information is uncertain. Decisions should be based on the best available information that, in the particular circumstances,

is available without incurring unreasonable cost, effort, or time. Decision makers should consider any uncertainty in the information available and be cautious when information is uncertain, unreliable, or inadequate. However, the absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of the 1996 Act.

Environmental Principles

32 The 1996 Act prescribes three environmental principles that the Minister must take into account when exercising powers in relation to utilising fisheries resources and ensuring sustainability. First, associated or dependent species (including non-fish bycatch) should be maintained above a level that ensures their long-term viability. Secondly, biological diversity of the aquatic environment should be maintained (ie, the variability of living organisms, including diversity within species, between species, and of ecosystems). Lastly, habitat of particular significance for fisheries management should be protected.

33 The 1996 Act defines associated and dependent species as any non-harvested species taken or otherwise affected by the taking of a harvested species. The term "long-term viability" is defined in the 1996 Act as a low risk of collapse of the stock or species, and the stock or species has the potential to recover to a higher biomass level. Long-term viability may be considered in the context of the natural dynamics of populations. At one level the concept implies the need to ensure the continuing existence of species in the sense of maintaining populations in a condition that ensures a particular level of reproductive success. At another level, long-term viability implies an ability to maintain populations at a level that ensures the maintenance of biodiversity. Long-term viability could be achieved at very low levels of population size, depending on associated risks, such as recruitment failure at low population sizes. Long-term viability also needs to be considered with respect to utilisation by different sector groups. Equally, where fishing is affecting the viability of associated and dependent species, there is an obligation to take appropriate measures, such as method restrictions, area closures, and potentially adjustments to the TAC.

34 "Biological diversity" includes the variability among living organisms, including diversity within species, between species, and of ecosystems. The aquatic environment is of broad scope and encompasses:

a) the natural and biological resource comprising any aquatic ecosystem; and

b) all aquatic life and all places where aquatic life exists.

35 The maintenance of biodiversity needs to be considered in the context of the purpose of the 1996 Act that assumes that, where possible, a resource should be used to the extent that sustainability is not compromised. Determination of the extent of fishing or the impacts of fishing that can occur requires an assessment of the risk that fishing might cause a species to become extinct or biodiversity is reduced to an unacceptable level. In the absence of information to undertake a detailed assessment, the information principles specified in the 1996 Act provide guidance for decision makers on the approach to be adopted.

36 Habitat can be defined as "the place or type of area in which an organism naturally occurs" (NZ Biodiversity Strategy). The Magnuson-Stevens Fishery Conservation

and Management Act (USA) defines "essential fish habitat" as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity". The maintenance of healthy fishstocks requires the mitigation of threats to fish habitat. However, the source of the threats may not be confined solely to the activity of fishing. A range of terrestrial activities may impact on fisheries habitats. Habitats that assist in the reproductive and productive process of a fishery, hence are of special significance, should be protected. Adverse effects on such areas are to be avoided, remedied, or mitigated.

37 There is insufficient information available to undertake a systematic assessment of biodiversity for the stocks to be introduced to the QMS on 1 October 2005. No ecosystem, population, assemblage assessment has been undertaken in respect of the stocks reviewed. However, an assessment of the relative information available and the degree of risk in relation to the environmental principles are outlined in this document for each stock.

International Obligations (s 5(a))

38 There is a range of international obligations that relate to fishing. The two key pieces of international law relating to fishing, and to which New Zealand is a party, are the United Nations Convention on the Law of the Sea, 1982 (UNCLOS) and the United Nations Convention on Biological Diversity 1992 (the Biodiversity Convention). It is MFish's view that the provisions of the 1996 Act, and the proposed exercise of powers under the legislation are consistent with New Zealand's international obligations.

39 The 1996 Act is to be interpreted, and all persons exercising or performing functions, duties, or powers under the Act are required to act, in a manner consistent with New Zealand's international obligations relating to fishing. As a general principle, where there is a choice in the interpretation of the 1996 Act or the exercise of discretion, the decision maker must choose the option that is consistent with New Zealand's international obligations relating to fishing (s 5(a) of the Act).

40 MFish is involved in a number of initiatives relating to the management of stocks within New Zealand fisheries waters that are consistent with its international obligations. MFish seeks to give effect to those obligations on a generic basis. Application of generic policies, such as the Marine Protected Area Strategy and MFish's Environmental Management Strategy, to the management of specific stocks will follow in due course.

Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 (s 5(b))

41 The 1996 Act is to be interpreted, and all persons exercising or performing functions, duties, or powers under the Act, are required to act in a manner consistent with the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 (s 5(b)). This requirement is intended to further the agreements expressed in the Deed of Settlement referred to in the Preamble to the Settlement Act. In particular, Mäori non-commercial fishing rights continue to give rise to Treaty obligations on the Crown.

42 The species-specific sections in this document set out information relating to the customary interest in the species concerned. An allowance for customary fishing has

been made for each stock on the basis of a qualitative assessment of that interest. The consultation process will provide Mäori with an opportunity to comment on the customary use and management of the stocks. However, no explicit consideration has been given to the application of the specific customary management tools available under the 1996 Act to the stocks concerned. Introduction of the species into the QMS will not preclude adoption of appropriate management measures in the future to provide for customary use and management practices.

43 In accordance with the Settlement legislation, the Treaty of Waitangi Fisheries Commission will be allocated 20% of all quota shares in the TACC set for the stocks upon introduction into the QMS.

Additional Factors to be taken into Account (s 11)

44 Before setting or varying any sustainability measure (including a TAC) the following factors must be considered:

a) 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 which the Minister considers to be relevant;

b) Any effects of fishing on the stock and the aquatic environment;

c) Any existing controls that apply to the stock or area concerned;

d) The natural variability of the stock concerned;

e) Any conservation services or fisheries services;

f) Any relevant fisheries plan approved under this Part; and

g) Any decisions not to require conservation services or fisheries services.

45 Where any of the above factors are relevant, they are discussed in the species-specific sections. MFish is not aware of any specific plans, statements or strategies that are relevant to the stocks in this document. No fisheries plans have been approved to date. MFish is not aware of any plans being contemplated at this time for any of the stocks being introduced into the QMS this year. No explicit decisions have been made not to require services in a fishery on the basis of any undertaking by stakeholders either within or outside a fisheries plan to undertake certain services directly.

46 Consideration also needs to be given to the most effective way of achieving the desired outcome of a sustainability measure. An important factor in supporting the use of non-statutory measures is the degree of support for the measure and the nature of the monitoring and enforcement regime proposed to support the measure. However, the process of introducing stocks to the QMS is unlikely to involve implementation of measures on a non-regulatory basis. The actual commercial participants in the fishery may be largely unknown until such time as quota is allocated.

Guidelines for Setting TACs for New Species

47 There are a number of closely interrelated factors that need to be taken into account when setting the TAC. The following factors are identified as being of particular significance:

- Identifying the appropriate TAC option for a stock (ss 13, 14, 14B) – The level at which the TAC is set will be heavily influenced by the statutory TAC option proposed for the stock. Existing estimates of yield based upon the MSY or an existing catch limit for a stock might not be applicable for a stock managed under ss 14 or 14B.

- The biological and fishery characteristics of the stock and associated stocks – The biological and fishery characteristics of the stock will influence the TAC option adopted for the stock. Implications of catch levels for associated stock complexes (target and bycatch relationships) should be expressly considered. In some instances information about current catch levels may not accurately reflect actual catch ratios in multi-species fisheries due to the nature of the reporting obligations for non-QMS stocks.

- The effects of harvesting the stock on the aquatic environment – The relative effects on the environment of different TAC options should be considered. Interactions with protected species and areas of high biodiversity need to be actively managed. Consideration of predator-prey relationships is an important factor. The effects of different fishing methods should also be considered.

- The capacity for development of the stock – The 1996 Act requires that consideration be given to the development of fisheries resources while ensuring the sustainability of those resources. In the purpose statement of the Act (s 8), the definition of the word "utilisation" includes "developing" fisheries resources. The QMS provides the most appropriate mechanism for development to occur. Development can be actively provided under the various TAC options. Rotationally harvested and enhanced fisheries provide scope for a TAC to be set at a level other than one that moves the stock towards B_{MSY}. A stock managed below B_{MSY} may provide for additional catch to be taken. In some instances stocks introduced into the QMS have been lightly fished and are deemed to be in a near virgin state; hence the stock is well above B_{MSY}. While there is no provision in the Act for TACs to be set at a nominal level, there is scope for additional catch to be taken in the short term as the stock is fished towards a level that can produce the MSY.

- Important factors to be considered when considering development potential are that –

    i) setting TACs at the level of current catch (in some instances a zero or one tonne TAC) may artificially constrain development of a stock where there is virtually no risk posed to the stock by setting a higher TAC;

    ii) existing catch limits (Competitive Catch Limit (CCL) or ICE) may not be appropriate for the purposes of setting a TAC/TACC. This is because they were originally designed to allow limited target fishing on a competitive basis for those fishers with existing permits. The CCLs may not be reflective of actual total landings for the species concerned;

iii) development may be constrained by a lack of a review of a stock in the immediate future once introduced into the QMS due to competing priorities for review of other stocks;

iv) a TAC may be set at a level that moves the stock over time towards a level that can produce the MSY (B_{MSY});

v) if a TAC is set at a level in order to move a stock towards B_{MSY}, information (catch and effort data or fishery independent research) needs to be forthcoming to assess when the stock is at or above the level that can produce the MSY;

vi) setting a TAC that provides for some level of initial development offers an incentive for fishers to invest in the fishery and develop initiatives such as adaptive management proposals and fisheries plans.

- The information principles – The 1996 Act specifies that the absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of the Act. As noted above, the purpose of the Act contains two distinct elements "ensuring sustainability" and "providing for utilisation". In the absence of an explicit hierarchy between the two objectives, a decision is to be made on a case-by-case basis that takes into account the available information to determine the relative weight given to each of the objectives. Any decision should explicitly identify the factors taken into account and the relative weighting placed upon the relevant information.
- Existing stock assessment information about the status of the stock – Information about current biomass and estimate of available yield may be available for only a limited number of stocks. An explicit Current Annual Yield or Maximum Constant Yield, or equivalent management approach, complementary with the characteristics of the stock, may be adopted with the reasons stated for that approach. The certainty, reliability, and adequacy of that information need to be taken into account. Existing estimates of yield might not be applicable for a stock managed under ss 14 or 14A.
- Current catch levels of the stock – In the absence of robust assessment information or an existing catch limit (CCL or ICE), current catch can be used as a basis for setting the TAC, subject to consideration of other relevant statutory obligations. The reliability of any information is to be taken into account.
- Monitoring of stock – Current and future monitoring of the stock is an important factor relating to an assessment of risk to sustainability. The ability to assess the stock, the nature of the assessment method and the likely robustness of that assessment, the level of observer coverage, and the nature of direct research are to be considered in the assessment of different potential TAC options.
- Relevant social, economic, and cultural factors – The ability to set a TAC at different levels will have commensurate social, economic, and cultural implications. The way and rate at which a stock is fished towards B_{MSY} should explicitly take into account relevant social, economic, and cultural factors. The interests of future generations is an important social consideration that is reflected in consideration of the TAC option adopted, the level at which the TAC is set, and the effects of fishing for the stock on the aquatic environment. Treaty obligations arising in respect of a stock are encompassed within relevant cultural factors.

Development opportunity

48 MFish acknowledges that information on which to base catch limits in a number of non-QMS fisheries is deficient. However, in accordance with the use of the information principles, as discussed above, MFish believes that there is opportunity in a number of fisheries, upon introduction into the QMS, to place greater weight on utilisation opportunity in the absence of any discernable risk to the stock or the aquatic environment when considering TACs.

49 Catch in a number of the fisheries proposed for QMS introduction is not reflective of abundance, but rather has been influenced by the inability to obtain access to the fishery (as a result of the permit moratorium) and marketing/processing issues. In some cases there is also likely to be significant levels of underreporting, particularly for bycatch species. Introduction into the QMS will potentially provide more access opportunities and a better framework for managing the stock, given the reporting and catch balancing requirements on fishers.

50 The opportunity for development and the extent of utilisation provided for needs to be assessed on a stock-by-stock basis having regard to risk based on the following factors:

- Information on sustainability risk to the stock;
- Biology of the stock, including potential for localised depletion;
- Information on historical catch, if the stock has been lightly fished therefore biomass is likely to be close to virgin or at least above B_{MSY};
- Likely impacts of fishing on aquatic environment, including bycatch species, etc;
- Socio-economic and cultural issues; and
- Anecdotal information on abundance, including consideration of the size of likely habitat in the management area.

51 In bycatch fisheries, in particular, interaction with other harvested stocks should be a consideration in any TAC proposed. In the absence of sustainability concerns fishers in bycatch fisheries will face punitive measures under the balancing regime if the TACs are not set appropriately.

52 While the initial TACs proposed are likely to provide some opportunity for development of the fishery by existing and/or new entrants, they might not provide the maximum utilisation possible for the stock. Further increases will require, in most cases, additional supporting information on the impacts of fishing on the stock and aquatic environment. There matters are best incorporated within stakeholder-driven initiatives following QMS introduction.

53 As a consequence of providing development opportunity above existing levels of utilisation, the TAC may not be fully caught immediately following QMS introduction, pending the development of harvesting/marketing/processing capacity. However, this in itself is not a reason not to provide opportunity for development when potential risk to the stock based on the factors noted above is considered acceptable.

54 MFish notes that a development opportunity within the TAC does not predetermine subsequent allocation decisions.

Use of information

55 The nature of the information available about each stock is likely to vary. A hierarchy (refer Table 2) is proposed in respect of the nature of the information and hence the weighting to be assigned to that information. As a general rule greater weight will be placed on information at a higher level on the hierarchy. Stock assessment information is afforded greater weight than a non-QMS catch limit set for the stock. A catch limit or CCL may be afforded greater weight than information about historical and current catch levels.

Table 2: Hierarchy of Information

1 Information about status of stock and estimates of available yield	Adopted in Plenary Report	Use as basis for setting TAC (subject to consideration of guidelines identified above – ie, general statutory obligations and TAC option, etc.)
	Not adopted in Plenary Report	Take information into account, but receive limited weighting
2 Existing catch limit set (CCL or ICE)	Catch limit or CCL and catch information of fishing sectors and other sources of mortality	Use as basis for setting TAC (subject to consideration of guidelines identified above, including validity of catch limit or CCL)
	Sustainability concern (in context of TAC option adopted)	Review and/or reduce existing catch limit when set TAC
3 Catch information and estimates of other sources of mortality	Apply criteria (identified below) for calculating catch information	Use as basis for setting TAC (subject to consideration of guidelines identified above)
	Sustainability concern (in context of TAC option adopted)	Review and/or reduce overall catch when set TAC

56 However, careful consideration is required in assessing the nature of any current catch limit. In some instances CCLs may not be reflective of actual total landings for the stocks concerned. CCLs may have also acted to constrain effort in a fishery in support of the permit moratorium (ie, to limit new entrants), rather than as a measure explicitly designed to ensure sustainability of the stock. They were originally designed to allow limited target fishing on a competitive basis for those fishers with existing permits.

57 The term "sustainability concern" is used to describe a situation where, after considering all relevant issues, there is a conclusion that the existing non-QMS catch limit or current catch is not sustainable and should not be used as a basis for setting a TAC. The term "sustainability" is intended to encompass issues relating to the stock

itself and the effects of fishing on the aquatic environment (ie, impacts of fishing method, trophic relationships, target/bycatch stock complexes).

58 A significant increase in catch levels of a stock in recent years may not necessarily equate to increased abundance, but rather might be an indication of increased effort and targeting of the stock. Consideration of relevant information may result in a TAC being set that is more precautionary than the current catch level.

Criteria for Determining Catch Levels

59 Criteria have been developed for determining catch levels and other sources of mortality (refer Table 3). In the absence of other information TACs may be set at levels based on consideration of known or estimated levels of recreational, Mäori customary, and commercial catch and all other sources of fishing-related mortality. The purpose of the exercise is to calculate the overall level of catch being taken from the fishery. The information about the catch of each sector group may act as a guide to the subsequent allocation of the TAC but, in itself, that will not be determinative of that exercise. After setting the TAC the Minister makes separate decisions about allocations for recreational, Mäori customary and commercial catches and all other sources of fishing-related mortality.

60 In the absence of an estimate of sustainable yield from the fishery, or the presence of a robust and reliable catch limit or CCL, an assessment of commercial catch based on the criteria of "stable" or "developing" has been undertaken. The criteria of "stable" and "developing" fisheries for estimating commercial catch were adopted in 1998 for the introduction of species into the QMS on 1 October 1998. A fishery is considered "stable" when reported catches have remained relatively constant over an extended period of time (ie, in excess of three years). Included in the category of a "stable" fishery are those stocks where the catch level has fluctuated over time. In most fisheries such fluctuation is anticipated as a natural biological occurrence. For "stable" fisheries commercial catch has been calculated using the average catch for a period since 1986 where the catch level has been relatively stable in excess of three years.

61 A fishery is "developing" where a substantial increase in catch has been recorded over the last three completed fishing years. Where this has occurred the average total landings over the last three completed fishing years have been used as a basis for determining current commercial catch.

62 Calculation of commercial catch based on the criteria of "stable" or "developing" is one factor to be considered when setting a TAC. As indicated above, there may be the potential to provide some opportunity for development of a stock above existing catch levels.

Table 3: Criteria for determining catch levels and other sources of mortality

Commercial Catch	Current catch	Current commercial catch from the fishery
	Stable fishery	Average catch for a period since 1986 where catch level has been relatively stable in excess of 3 years
	Developing fishery	Average catch over last 3 completed fishing years where a significant increase in catch has occurred
Recreational Catch	Existing estimates (diary surveys, etc.)	Use as basis for determining current recreational catch
	No estimates but known recreational catch	Nominal catch level included
	No known recreational catch	No catch level included
Customary Catch	Existing estimates (customary permits/authorisations; information provided by tangata whenua, etc.)	Use as basis for determining current customary catch
	No estimates but known to be of significant importance to Mäori above the level of recreational take	Catch level above the known recreational catch included
	No estimates but known to be of importance to Mäori	Catch level similar to known recreational catch included
	No estimates but known customary catch (and stock of no particular importance to Mäori)	Catch level half of known recreational catch included
	No known customary catch	No catch level included
Other Fishing-related Sources of Mortality	Quantitative information or estimates of illegal catch, discards, incidental gear mortality available	Use as basis for determining current level of other sources of mortality
	No estimates but other sources of mortality known to occur based on information about similar stocks and methods	Nominal mortality level included
	No known mortality	No mortality level included

Analysis of TAC Options

63 An analysis of different potential TAC options is undertaken in respect of each stock where there are viable alternatives. Where more than one statutory TAC option is available (ie, ss 13, 14 or 14A) an assessment of relevant information is provided. An important consideration is the respective trade-offs between different TAC options in terms of potential economic return, information levels (current and future), and sustainability concerns (stock specific and general environmental). The purpose is to

indicate the relative weighting assigned to different factors for each TAC option. In most instances only a relatively subjective qualitative assessment can be undertaken.

Allocation of TAC

64 The Minister is required to make allowances for different fishing interests under the 1996 Act. The Minister must have regard to the TAC and allow for:

a) customary Mäori;

b) recreational fishers;

c) all other sources of mortality to the stock caused by fishing; and

d) the TACC.

65 In the absence of other information TACs may be set at levels based on consideration of known or estimated levels of recreational, Mäori customary, and commercial catch and all other sources of fishing-related mortality. The information about the catch of each sector group also acts as a guide to the subsequent allocation of the TAC but that, in itself, will not be determinative of that exercise. The Minister makes a separate decision about allocation after setting the TAC.

66 The allocation of the TAC is an important element of the QMS introduction process. The amount allocated to the respective interest occurs (except for Fourth Schedule stocks) without any compensation of current interests in the fishery. For example, 20% of the commercial allocation to the Treaty of Waitangi Fisheries Commission occurs by pro-rating downwards the total provisional catches if they exceed more than 80% of the TACC. The QMS introduction process allocates quota to commercial fishers as a property right. Any subsequent redistribution of the commercial allocation of the fishery to another sector may be subject to payment of compensation. (No compensation is payable where measures are taken to ensure sustainability.) MFish considers there is benefit in considering the initial allocation of catch in light of both current and reasonable future needs or interests in the resource. Decisions at the point of introduction into the QMS may resolve some of the problems about allocation that may occur in the short to medium term at no or minimal cost to any sector where a TAC is able to set, in accordance with the provisions of the 1996 Act, at a level above the extent of current catch.

67 Generic factors relevant to the determination of allocation of the TAC include:

a) population trends;

b) existing catch levels (including popularity and importance of the resource to each sector);

c) current fishing practices (including overfishing, voluntary shelving, or closures by a stakeholder);

d) economic impact of allocative decisions; and

e) social and cultural impact of decisions.

68 Population trends are reflected in the level of recreational fishing undertaken, both on a national and regional context. The growth of urban centres, in particular Auckland,

has a significant impact on particular fisheries. An allowance for the recreational interest and the corresponding management controls for a stock should take into account existing population distribution and growth.

69 Certain fisheries are considered to be of particular importance to a particular sector. The value attributed to a resource is not limited solely to economic value but may also include the non-market value. The abundance of a species and the availability of particular size fish for a specific stakeholder group may also be factors relevant to the allocation decision.

70 The consistent overfishing of the TACC or an allowance, which results in the reduction of the TAC, as a general principle, ought to be attributed to the stakeholder group responsible for the overfishing. Equally stakeholders may elect to exercise their fishing rights in a manner, which results in their allocation in a fishery being under caught. Voluntary closures and temporary shelving of allocation may be undertaken as a means of improving the abundance of a species and the availability of certain sized fish. Current catch by customary Mäori may not reflect the extent of customary interests in a species. Decisions may be made not to fish a species due to non-availability. The allocation process should endeavour to take account of customary needs and not simply reflect the current level of catch, which may have been constrained by a lack of abundance.

71 The setting of a TAC and allocative decisions in a general context may impact on economic investment in terms of upgrading of plant and fleet structure. Downstream impacts may result as a consequence of allocative decisions made in respect of both recreational and commercial stakeholders. In addition to the commercial harvesting and processing sector a significant number of service industries are linked to the fishing industry, including charter operators, sale of fishing gear, repair, and transport-related services. Decisions may also impact on particular communities where the fishing and fishing-related services provide a significant contribution to a local economy. Information on these matters, if available, is to be taken into account.

Recreational Allowance

72 In some cases estimates of recreational catches are available from recreational surveys. Where available, these estimates have been included and used as the basis for setting the recreational allowance for stocks introduced into the QMS. Where estimates are not available but there is known to be recreational catch, a nominal allowance has been made. For species and stocks where there is no or negligible recreational catch, no allowance is proposed. In all instances the allowance proposed also takes into account the factors identified above. MFish also notes that recreational fishers are not accorded a priority in the allocation of the TAC. The recreational allowance does not need to fully satisfy estimated recreational requirements.

73 Where appropriate, bag limits may need to be set for the stocks introduced to the QMS. The purpose of a bag limit is to ensure that the recreational allowance is not exceeded. The bag limit may also act as a means by which the sustainability of the fishery is ensured. For a number of stocks introduced under this process there is no current bag limit. The need to set a bag limit may be averted in the short term where the recreational allowance is based not on current catch but takes into account future recreational interests in the resource. In the immediate term it may be unlikely that

the recreational allowance for some stocks will be exceeded even in the absence of a bag limit.

Mäori Customary Non-Commercial Allowance

74 There are no quantitative estimates of the size of Mäori customary non-commercial catch for any of the stocks. Where estimates of customary catch is available from permits or authorisations under customary fishing regulations that information has been taken in to account. However, as noted above, the current level of catch may not entirely reflect the importance of the resource to customary fishers. Where estimates are not available, but there is known to be customary catch, a nominal allowance has been made. In some instances the customary interest is considered to be greater than the level of recreational catch, and that is reflected in the respective allowances. For stocks of importance to customary Mäori the allowance is based on the level of the recreational catch. For species and stocks where there is some catch, but the stock is not considered of importance to customary Mäori, then the allowance is based on half the recreational catch. Where there is no catch and negligible if any interest in the stock, such as for deepwater species, no explicit allowance is proposed. In all instances the allowance proposed also takes into account the factors identified above. MFish notes that the allowance made for customary fishers is not intended to act as a constraint of the level of catch taken.

All Other Fishing-related Mortality

75 No quantitative information is available to assess the level of all other fishing-related mortality applicable to the stocks introduced into the QMS or to attribute such mortality to a particular sector group. However, some level of mortality may occur as a result of the particular method used to exploit a stock. Where appropriate MFish proposes to make an allowance for all other mortality to a stock caused by fishing. In addition, MFish proposes that the allowance for other fishing-related mortality be deducted from the allowance for a particular sector that is primarily responsible for the mortality.

Total Allowable Commercial Catch

76 The TACC for the stocks introduced into the QMS has been proposed on the basis of the criteria used to determine the TAC in the absence of stock assessment information. The criteria applied are:

a) existing catch limits or CCLs; or

b) average catch based on a “stable” or “developing” fishery category; or

c) potential development opportunity.

77 Where sustainability concerns exist as to the level of total landings, the TACC has been modified appropriately. In all instances the TACC proposed also takes into account the generic factors identified above.

78 The 1996 Act provides that under specific circumstances foreign licensed access to a stock is to be provided within the TACC set for a stock. Foreign access is to be provided to that portion of the TACC held by the Crown where the quota is not tendered off and the ACE remains unsold after the Crown has offered the ACE for

sale to persons entitled to own quota. MFish intends to undertake formal tenders for any quota and ACE allocated to it post-introduction of these stocks into the QMS. Where a TACC is set in excess of the current commercial catch there is the potential in some stocks for some ACE to remain unsold as from 1 October 2005. Technically this could be made available to foreign vessels through the Minster establishing a foreign allowable catch under s 81 of the 1996 Act. Practically, there may be limited interest in fishing small quantities of fish available to foreign vessels. MFish will not be in a position to advise the Minster on the potential to establish foreign allowable catches until sometime this year, at the earliest.

Other Management Controls

79 The TAC is invariably supported by a number of management controls that collectively ensure the sustainability of the stock and provide for utilisation within accepted limits. The 1996 Act explicitly provides for the setting of sustainability measures relating to size limits, biological state, fishing seasons, methods restrictions, closed areas, plus measures such as overfishing thresholds and bag limits.

80 The species-specific sections set out those measures that currently apply, which are being retained as part of the management framework for the stock under the QMS. The general intent is for the species-specific sections not to undertake a wide-scale review of all existing measures or potential measures that could be adopted. The ideal opportunity to discuss such issues will arise when quota is allocated to fishers and potentially within the context of developing fisheries plans. However, where necessary, consideration of appropriate measures, such as method restrictions, is outlined in each species-specific section.

Regulatory framework

81 The intent of the QMS is to provide a broad management framework that provides the opportunity to maximise efficient utilisation of fishing resources while ensuring sustainability. The introduction of a species into the QMS requires that a TAC and other management controls are set in order to ensure overall sustainability of the species. Certain controls in place for these species will no longer be required following implementation of QMS management measures. The review of regulations prior to QMS introduction will ensure that regulations inconsistent with the QMS management are removed. Proposed amendments to regulations are included as annexes at the end of each species-specific section.

Setting of Deemed Values and Overfishing Thresholds

82 As noted, a separate section of this document outlines the general principles relating to the setting of interim and annual deemed values and the deemed values proposed for the stocks to be introduced into the QMS on 1 October 2005. The section contains information on categories of stocks, determinates of market value and the setting of overfishing thresholds and tolerance levels.

DEEMED VALUES AND OVERFISHING THRESHOLDS

Introduction

1 This section sets out generic information on the setting of interim and annual deemed values and overfishing thresholds. The proposed deemed values for species gazetted for QMS introduction on 1 October 2005 are set out in Table 1 below.

Deemed Values

2 It is necessary to set deemed values for species being introduced into the QMS. The Fisheries Act 1996 (the 1996 Act), amended by the Fisheries Amendment Act 1999, brought about a major change in the way catches are controlled in the QMS. The new balancing regime established in the 1996 Act came into effect on 1 October 2001. The major elements of the new system are set out below.

Fisheries Act 1996 Balancing Regime

3 Under the 1996 Act, instead of it being a criminal offence to take catch in excess of quota - as under the Fisheries Act 1983 - overfishing is controlled in the first instance by the application of graduated administrative disincentives (interim and deemed values). Non-payment of deemed values will lead to suspension of permits.

4 Section 75 of the 1996 Act establishes the basis for setting interim and annual deemed values. Sections 77, 77A and 78 provide the basis for imposing the second part of the administrative regime - overfishing thresholds.

5 In the new balancing regime, interim and annual deemed values must be set for all QMS stocks. Deemed values are charged on a monthly (interim deemed values) and annual basis (annual deemed values) for any catch of QMS stocks in excess of a person's ACE holdings. Balancing of catch against ACE occurs on the 15th day of each month. Deemed values are charged immediately following this balancing process.

6 The Minister of Fisheries has the responsibility for setting interim and annual deemed values by *Gazette* Notice under s 75 of the 1996 Act. In setting interim and annual deemed values, the Minister must take into account the need to provide an incentive for fishers to cover catch with ACE. In addition, the Minister *may* have regard to:

a) the desirability of commercial fishers to land catch for which they do not have ACE;

b) the market value of ACE;

c) the market value of the stock;

d) the economic benefits gained by the most efficient person gaining benefit from that stock, or stocks taken in association with that stock;

e) whether or not the catch has or is likely to exceed the TACC; and

f) any other matters the Minister considers relevant.

7 Section 75(5) of the 1996 Act allows the Minister to set a different deemed value in respect of fish landed and received by a licensed fish receiver (LFR) at the Chatham Islands to a stock of the same species landed and received by a LFR elsewhere.

Annual Deemed Values

8 The annual deemed value is the main deterrent to fishers not balancing their catch with ACE. The Minister must set annual deemed values at a level that provides an incentive for every commercial fisher to acquire sufficient ACE to cover catch.

Interim Deemed Values

9 The interim deemed value plays an important role in ensuring that the overall objective of the balancing regime - ensuring catch is covered by ACE - is achieved. It does this by encouraging fishers to trade ACE during the year, thereby helping ensure they are in balance at the end of the year. It should be noted that the interim deemed value is designed to encourage fishers to balance throughout the year - not penalise them if they do not (provided they pay the interim deemed value demanded).

10 The interim deemed value also serves another role by helping prevent continued excessive fishing not covered by ACE during the year. It achieves this in conjunction with the permit suspension provisions in s 79 of the 1996 Act. Under this provision, a fisher's permit is suspended if a deemed value debt of more than $1 000 is not paid within 20 days of the demand. This helps ensure that a fisher does not continue fishing in excess of ACE with no intention of either acquiring ACE before the end of the year or paying annual deemed values at the end of the year. Without the requirement for payment of interim deemed values, such a fisher would only be excluded from the fishery at the end of the year.

11 The 1996 Act provides the same guidance to the Minister when setting an annual deemed value as for an interim deemed value. The only additional considerations are that the deemed value must be set at a higher rate than the interim deemed value, and that different deemed value rates may be set in respect of the same stock which apply to different levels of catch in excess of ACE. The 1996 Act further provides that the Minister must not have regard to the personal circumstances of any individual or class of people, or set separate deemed values in individual cases, when setting an individual or annual deemed value rate.

12 It is proposed to meet the Minister's obligation under s 75(3) by setting interim deemed values at 50% of the annual deemed value rate, for all stocks.

Categories of stocks

13 The policy framework for setting deemed values (approved by the Minister in 2001 and amended in 2003) separates commercial fisheries into four categories as follows:

High Value Single Species Fisheries Fishstocks

14 High value single species fisheries fishstocks are those that have high port prices and ACE values and are taken with little, if any, bycatch. They include all stocks of spiny rock lobster, packhorse rock lobster, paua, oysters, eels and scallops.

15 Annual deemed values for species in this category will be set as follows:

- Initially, deemed values to be set at 200% of the highest port price in the previous year.
- Increase by 20% each time total catch exceeds available ACE by more than 2% in one year or by more than 1% in two consecutive years.
- Review to occur where the port price for a stock has changed significantly since deemed values were last set.
- May be reduced if total catch does not exceed available ACE for several years.
- Differential deemed values to be applied.

Low Knowledge Fishstocks

16 Low knowledge fishstocks are stocks for which there is relatively little information on the fishery status, and there are no sustainability concerns. Fishstocks in this category are to be reclassified into another category within five years or once MFish has more confidence in the TACC, whichever is the sooner.

17 Annual deemed values for species in this category will be set as follows:

- Initially, deemed values to be set as a proportion of port price in the previous year.
- To be adjusted, as required, to encourage fishers to cover catch with ACE, and to land any catch in excess of ACE.
- Differential deemed values not to be applied.

All Other Fishstocks

18 Fishstocks in the All Others category are those that do not necessarily have a high unit value, and for which there is adequate knowledge on which to base a TACC.

19 Annual deemed values for stocks in this category will be set as follows:

- Initially, the deemed value to be set at a proportion of the port price in the previous year.
- Increase by 20% each time total catch exceeds available ACE by more than 10% in one year or by more than 1% in two consecutive years.
- Review to occur where the port price for a stock has changed significantly since deemed values were last set.
- May be reduced if total catch does not exceed available ACE for several years.
- Differential deemed values to be applied.

Low/Medium Value Bycatch Fishstocks

20 This is a new category covering low/medium value stocks where the majority of catch is taken as a bycatch and for which the TACC is to be reviewed within the next few years. The category includes stocks introduced into the QMS in 1998 and in subsequent years (ie, cardinal fish, frostfish, pale and dark ghost shark, ribaldo, rubyfish, sea perch, trumpeter, white warehou and yellow-eyed mullet), and other by-catch stocks meeting the following criteria:

- The stock is principally a bycatch fishery.
- Stocks are managed under s 13 of the Act.
- There has been insufficient stock assessment information to justify an increase in the TAC through the normal stock assessment process.
- Available information indicates there are no sustainability concerns. The information suggests an increase in the TAC may be appropriate.
- Catch has exceeded the TAC in a manner that would trigger an increase in deemed values for all other fishstocks under the balancing regime guidelines.
- The stock is not currently managed under the AMP framework.
- There has been no TACC increase for the stock for at least three years as a result of a review of management controls.

21 Deemed values will be set in the same manner as stocks in the "All Others" category except that, as an interim measure, MFish is proposing not to apply differential deemed values to those stocks until the review of the TACC is undertaken.

The Determination of the 'Market Value' for Stocks

22 Deemed values are initially set as a proportion of the value of the stock. A range of values, including the port price, wholesale price, export price and retail price, can represent a stock's market value. The most common measures are port price and export price. Port price is the value of fish sold ex-vessel. Export price, usually notional free on board (FOB), incorporates the price of processing and harvesting of the fish, but not the cost of transporting it to the international market place. The policy guidelines note that there are potential problems in collecting port price information, but states that the port price remains a useful indicator of the value of the stock to commercial fishers. Importantly, port price figures can be determined for all species.

23 For most of the stocks gazetted for QMS introduction on 1 October 2005, MFish has relied on port prices determined from two recent surveys it undertook of licensed fish receivers. The first was carried out early in 2003 and the second in November/December 2003. In regard to the latter survey, further information is being gathered for some species, which may lead to a revision of the figures.

24 In circumstances where MFish has no port price information on which to base a deemed value, it has used an estimated or nominal port price/deemed value.

25 MFish proposes to set the initial deemed value as a percentage of the port price as follows:

a) 200% of the highest port price for high value singles species fisheries fishstocks;

b) 60% of the port price for low knowledge fishstocks; and

c) 75% of the port price for all other fishstocks.

Species for QMS introduction on 1 October 2005

26 Each of the papers contained in this document includes a discussion of the proposed deemed values for species scheduled to enter the QMS from 1 October 2005. Table 1 summarises that information, setting out the proposed category for each species (high values single species fisheries fishstock, low knowledge or all other), the port price, the percentage of the port price, the annual deemed value and whether or not differential deemed values and overfishing thresholds apply.

Table 1: Proposed categories, annual deemed values, differential deemed values and overfishing thresholds for species to be introduced into the QMS on 1 October 2005 (2005-06 fishing year)

Species (all stocks)	Category	Port Price ($/kg)	Proposed % factor	Proposed Annual Deemed Value ($/kg)	Differential Deemed Value (Y/N)	Overfishing threshold / tolerance (Y/N)
Cockle (COC)	High value	1.90	200	3.80	Y	N
Non-QMS dredge oyster (OYS)	High value	4.00	200	8.00	Y	N
Pipi (PPI)	High value	1.10	200	2.20	Y	N
Non-QMS scallops (SCA)	Low knowledge	-	-	7.00*	N	N
Tuatua (TUA)	High value	1.25	200	2.50	Y	N

* Based on average of ACE price.

27 The Joint Crown and Industry Working Group on Deemed Values (JWG) has been reviewing policies for setting and adjusting deemed values and the information basis for those policies. Arising from the JWG's recommendations, in future –

a) The approach taken to setting deemed values may differ depending on stock characteristics, eg, shared or not shared, by-catch or target, sustainability risks, and whether a fishery plan is in place.

b) The information used to set deemed values may be expanded from solely using port price to include a broader range of information inputs, in particular ACE prices, but may also include export prices, cost recovery levies, and by-catch rates relative to target catches.

28 If agreed, the JWG's recommendations will inform future processes for setting deemed values for new QMS introductions.

Consultation

29 Industry participants are invited to make submissions in respect of the proposed deemed values for the stocks set out in Table 1.

Differential Deemed Values

30 The Act provides that the Minister of Fisheries may set different deemed value rates in respect of the same stock, which apply to different levels of catch in excess of ACE. A differential deemed value rate will apply only to the amount of catch above the threshold that triggers the differential annual deemed value. Differential annual deemed values apply to the individual fisher rather than for the fishery as a whole. The policy framework specifies that differential annual deemed values only apply to those stocks categorised as "high value single species" and "all other fishstocks", not those categorised as "low knowledge".

31 The regime set out in Table 2 below, approved by the Minister of Fisheries, will apply to all stocks to be introduced into the QMS on 1 October 2005 for which differential deemed values are to be used (refer Table 1). Differential deemed values are promulgated by *Gazette* Notice.

Table 2: Differential Annual Deemed Values

Individual Catch as a Percentage of ACE Held	Differential Annual Deemed Value
100% < x ≤ 120% of ACE	Basic annual deemed value
120% < x ≤ 140% of ACE	120% of basic annual deemed value
140% < x ≤ 160 % of ACE	140% of basic annual deemed value
160% < x ≤ 180% of ACE	160% of basic annual deemed value
180% < x ≤ 200% of ACE	180% of basic annual deemed value
x > 200% of ACE	200% of basic annual deemed value

Overfishing Thresholds

32 Overfishing thresholds (ss 77, 77A and 78 of the 1996 Act) ensure that, where interim deemed values have proved inadequate to prevent fishers continuing to catch in excess of ACE and where overfishing thresholds are applied, the fisher's permit is conditioned to prevent the fisher fishing in the relevant geographical area.

33 Tolerance levels (ss 77 and 78 of the Act) are designed to prevent overfishing thresholds being triggered by trivial amounts of catch in excess of ACE.

34 The Minister has established a policy framework for the imposition of overfishing thresholds and tolerances. Different approaches to the imposition of overfishing thresholds and tolerances exist depending on whether the fishery is a "high value single species fisheries fishstocks", a "low knowledge fishery" or "All other". At least initially, only "high value single species fisheries fishstocks" introduced into the QMS on 1 October 2005 will be subject to overfishing thresholds.

35 Table 1 indicates whether or not an overfishing threshold is proposed for species to be introduced into the QMS on 1 October 2005.

Consultation

36 Industry participants are invited to make submissions in respect of the proposal to set fishing thresholds or tolerances.

Preliminary Recommendations

37 MFish recommends that the Minister:

a) **Notes** the preliminary (subject to consultation) annual deemed values for those species entering the QMS from 1 October 2005, as set out in Table 1

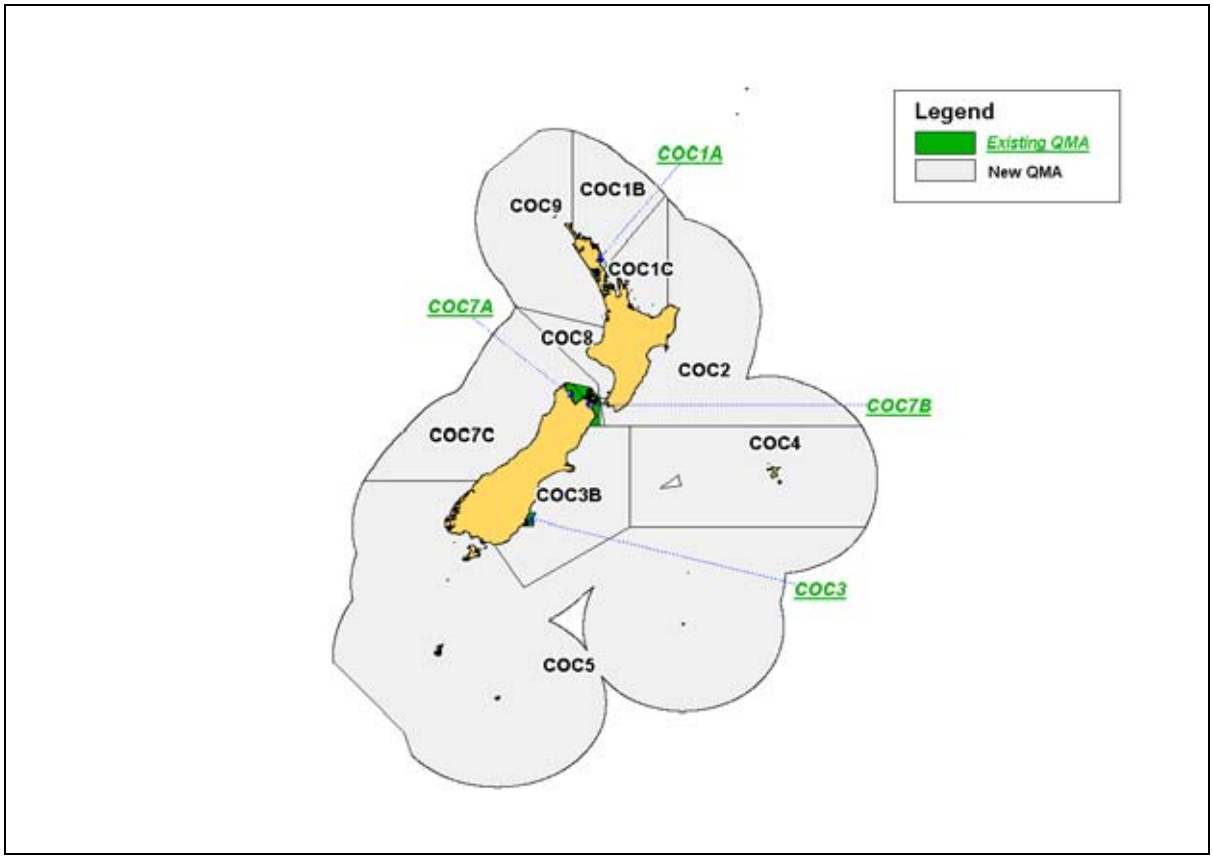
b) **Notes** that differential deemed values will apply to those new QMS species in the *High Value Single Species Fisheries Fishstocks* category, but not to the *Low Knowledge Fishstocks* category, as set out in Table 1.

COCKLE (COC)

Introduction into the Quota Management System (QMS)

1 Cockle (other than COC1A, COC 3, COC7A and COC7B) have been gazetted for QMS introduction on 1 October 2005. The Quota Management Areas (QMAs) for cockle are outlined in Figure 1. The fishing year for cockle will be from 1 October to 30 September in the following year, and Total Allowable Commercial Catches (TACCs) and Annual Catch Entitlements (ACE) are to be expressed in kilograms greenweight.

Figure 1 Quota Management Areas (QMAs) for cockle



Key Issues to be Considered

2 MFish considers the key issues that relate to the decisions for setting sustainability measures for cockle stocks in this paper are as follows:

a) An estimate of total biomass or sustainable yield is not available for any of the cockle stocks in this paper, although some estimates do exist for localised areas. Status of all stocks remains unknown.

b) Biologically, cockles are susceptible to localised depletion. They are sensitive to environmental factors, are vulnerable to habitat disturbance and degradation, and are extremely easy to harvest.

c) Cockle are an extremely important non-commercial resource and are harvested extensively by customary and recreational fishers.

d) Illegal catch of cockle is significant in some areas with recreational fishers far exceeding their bag limits.

e) Commercial fishing for stocks considered in this paper has only ever occurred at a small scale in Ohiwa Harbour (COC 1C).

f) A permit moratorium has prevented the access of new commercial fishers since 1992.

g) Regulatory measures have previously been put in place for these stocks (e. g. closed areas, bag limit reductions) due to sustainability concerns.

Management Options

3 MFish proposes that s 13 management arrangements are appropriate for cockle stocks considered in this paper.

4 The proposed options for setting TACs, TACCs and allowances for cockle are outlined below.

Table 1: Proposed options for TACs, TACCs, and allowances for cockle (tonnes greenweight)

Stock	TAC	Customary allowance	Recreational allowance	Other sources of mortality	TACC
COC 1B	46	22	22	2	0
COC 1C	67	32	32	3	0
OR					
COC 1C	72	32	32	3	5
COC 2	5	2	2	1	0
OR					
COC 2	7	2	2	1	2
COC 3B	57	27	27	3	0
OR					
COC 3B	59	27	27	3	2
COC 4	3	1	1	1	0
OR					
COC 4	5	1	1	1	2
COC 5	5	2	2	1	0
OR					
COC 5	7	2	2	1	2
COC 7C	7	3	3	1	0
OR					
COC 7C	9	3	3	1	2
COC 8	3	1	1	1	0
OR					
COC 8	5	1	1	1	2
COC 9	13	6	6	1	0

5 Additional management controls proposed include:

a) adding all cockle stocks to the Sixth Schedule to allow cockle caught incidentally or at an undesirable size to be returned to the water;

b) amending reporting regulations;

c) revoking daily catch limit restrictions on commercial fishers in FMA 1 and FMA 9;

d) revoking restrictions to commercial access in COC 1B, 1C and COC 9 should zero TACCs be the recommended option for these stocks; and

e) setting a deemed value and application of differential deemed values where TACCs are set above zero.

Proposed TACs

6 Section 13 of the Act represents the management option that is to be applied when setting a TAC for a QMS stock, unless the stock qualifies for management under the criteria outlined in s 14 or s 14A of the 1996 Act. In order for a stock to be added to the Third Schedule under the provisions of s 14, the biological characteristics of the species must prevent the estimation of B_{MSY}, the catch limit for any of the stocks must form part of an international agreement, or the stock must be managed on a rotational or enhanced basis. Cockle stocks considered in this paper do not meet any of these criteria.

7 Section 14A enables the Minister to set a TAC that maintains the stock at a level that ensures its long-term viability, while other inter-related stocks can be taken at TAC and TACC levels based on B_{MSY}. Cockle are single species fisheries with no inter-related stocks and MFish does not consider this management strategy to be appropriate.

8 MFish believes that the s 13 management arrangements are appropriate for cockle. Under s 13 there is a requirement to maintain a fishstock at a target stock level, being at, or above, a level that can produce the MSY, having regard to the interdependence of stocks. MSY is defined, in relation to any fishstock, as being 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.

9 As outlined in the Statutory Obligations and Policy Guidelines section, there are guidelines for setting TACs for new species. Among the more important considerations for cockle are the biological characteristics of the species, existing stock information and social, economic and cultural factors. An overlying consideration is the importance of cockle to non-commercial fishing interests.

Rationale for proposed TAC

10 There is no stock assessment information, or commercial catch limits for any of the cockle stocks considered in this paper. MFish therefore proposes to set TACs that reflect the current catches in each fishery.

11 Estimates of commercial catch can only be made for COC 1C. There have been no commercial catches of any of the other stocks considered in this paper. Guidelines suggest criteria to determine catch levels on the basis of current catch, or average catch depending on whether a fishery is stable or developing. There is no current commercial catch information from COC 1C as it has not been fished since 1999/2000. As the fishery cannot be considered *stable* (as catches have historically fluctuated significantly), or *developing* (as average catches over the last three fishing years did not significantly increase) an average of commercial catches in those years when cockle was actually harvested is considered reasonable.

12 For stocks where recreational harvest estimates (diary surveys, etc) have been made, these should be used as a basis for determining current recreational catch. While harvest estimates have been calculated at a few local cockle beds in different areas of New Zealand, the only estimates that have been undertaken relevant to recreational catch at the QMA scale have been the National Recreational Surveys. These surveys have been used to estimate recreational catch.

13 Quantitative estimates of recent customary catch at the QMA level are not available although customary harvest data in parts of COC 3B suggests annual customary harvest is currently about 0.5 tonnes. For stocks where no customary harvest estimates exist but the stock is known to be of importance to Mäori, a catch level similar to the known recreational catch should be included. Tuangi (cockle) are an extremely important customary resource and recreational catch estimates have therefore been used to estimate customary catch.

14 Quantitative estimates of other sources of fishing related mortality are not available. However, compliance information indicates that significant illegal catches occur in some areas due to recreational fishers exceeding their bag limits. A nominal level of catch has been estimated in proportion to the size of recreational catch in each stock, to account for this source of mortality.

15 When setting a TAC, there are also a number of closely interrelated factors that need to be taken into account. Areas of particular significance related to all stocks are discussed below.

16 The biological characteristics of cockle make them susceptible to localised depletion. Cockle are sensitive to factors such as temperature, salinity, exposure, hydrology and water quality, which can all have adverse effects on population dynamics. Further, events such as floods and storms can have significant and substantial localised effects, and can result in complete die-back of beds.

17 Further, cockle are sedentary and easily accessible from the shore, which makes them very easy to harvest. They commonly occur in harbours and coastal areas close to urban centres, which also makes them vulnerable to the effects of habitat disturbance and degradation. All of these issues can result in variable patterns of distribution and abundance.

18 There is no existing stock information for the cockle stocks considered in this paper. Some biomass estimates exist for local beds, particularly in the Auckland Fisheries Management Area where specific shellfish beds have been monitored over the last twelve years. However, these local estimates of biomass do not provide an indication

of biomass at the QMA level and at this stage there is no way to quantify such information. It is not possible therefore to determine whether cockle stocks are stable, declining or increasing.

19 Anecdotal information suggests that there is likely to be intensive non-commercial harvesting already in those beds where cockle biomass is moderate or high. Indeed, many beds are reported to be under pressure from existing levels of utilisation. It is unlikely that many cockle beds could support an increase in harvest levels.

20 There are important social, economic and cultural factors to be considered when setting TACs for these stocks. Socially and culturally, cockle represent an extremely important species for many New Zealanders; they are very important to Maori as a food source and have been harvested for this purpose consistently through history. Cockle have also become an extremely important recreationally harvested species, with most cockle beds around the country harvested to some extent on a recreational basis. Economically, these cockle stocks have not been commercially harvested to any significant extent; however they probably have an important socio-economic role for local communities as a valuable food source.

Northern Areas

21 Anecdotal evidence also suggests harvest pressure is higher in the northern regions of the North Island. Concerns for sustainability have already resulted in a variety of management interventions. For example, all areas of FMAs 1 and 9 are closed to commercial harvesting for cockle except for four small areas. Cheltenham, Karekare and Eastern Beach are permanently closed to the recreational harvesting of shellfish species including cockle. The western coast of the Coromandel Peninsula has been closed to the taking of cockle until December 2006. In 1998, recreational bag limits were decreased from the national bag limit of 150, to 50 in the Auckland Coromandel Area.

COC 1B & 9

22 MFish proposes to set TACs for COC 1B and COC 9 based on current utilisation of the fishery. MFish does not consider at this time that there is a capacity for development of these two stocks.

23 While an estimate of total biomass or sustainable yield is not available, anecdotal evidence suggests that most cockle beds in COC 1B and 9 are already fully utilised on a non-commercial basis. In addition, it is expected that this harvest will increase into the future as population numbers in the northern North Island are forecast to increase. The expected increase in non-commercial harvesting is unlikely to be sustainable. Further, current levels of illegal catch are reportedly high in these areas and estimates of other sources of fishery related mortality used to set the TAC are likely to be significantly underestimated.

24 Given these factors, as well as the generic issues discussed previously, MFish considers it appropriate to set TACs for COC 1B and 9 based on current catch as the stocks are not likely to support an increase in harvest level. However, as new research is undertaken and information improves, harvest levels may be increased at a later

date. Increases will require additional supporting information on the impacts of fishing on the stock and also the aquatic environment.

COC 1C

25 Two TAC options have been proposed for COC 1C. In the first option, MFish proposes to set a TAC based on current utilisation of the fishery. The significant issues previously discussed, including those generic to all stocks as well as additional issues specific to stocks in the northern North Island, are all applicable to COC 1C and support the need for caution in setting catch limits for this stock.

26 A second option has been proposed which recognises that recent catch, not current catch, may be a more suitable harvest estimate for COC 1C. This option incorporates a higher TAC to allow for development of the fishery. While there are significant sustainability issues throughout the QMA, it is recognised that cockle were previously harvested commercially in a small area of COC 1C (Ohiwa Harbour) and this level of harvesting may be sustainable provided the harvest is confined to Ohiwa Harbour.

27 MFish seeks stakeholder comment on which of the two approaches are preferable for these particular stocks.

COC 2, 3B, 4, 5, 7C & 8

28 Two TAC options have been proposed for these stocks. The first TAC option is based on current utilisation of each fishery. Sustainability concerns have resulted in management measures put in place in some of these stocks. For example, cockle harvesting is prohibited in Koukourarata Bay (Banks Peninsula) and the cockle bag limit has been reduced to 50 in Rapaki Bay (Lyttelton). Further, some stocks such as COC 4 are not of a significant size and may not support higher harvest levels. Given there are some localised sustainability concerns, as well as the generic issues applicable to all stocks which were discussed previously, there is a need for caution in setting catch limits for these fisheries.

29 A second option has been proposed with a higher TAC to allow for some development of the fisheries. Current non-commercial harvest levels are not likely to be as high in these stocks as they are in COC 1B, 1C and 9, and urban populations are not increasing at the same rates. A small increase in catch levels to provide for the development of the resource are likely to be sustainable.

30 MFish seeks stakeholder comment on which of the two approaches are preferable for these particular stocks.

Allocation of TAC

31 The TAC constitutes a composite of the respective stakeholder groups' catch allocations, plus any other fishing-related mortality. When setting any TAC, a TACC must be set, as well as allowances determined for customary and recreational fishing interests and for any incidental fishing related incidental mortality.

32 The 1996 Act stipulates a process by which the TAC is to be allocated. No explicit statutory mechanism provides guidance as to the apportionment of the TAC between

sector groups either in terms of a quantitative measure or prioritisation of allocation. The Minister has the discretion to re-allocate from one sector to another, based on available information. In shared fisheries MFish has a policy preference in favour of the catch history allocation model in the absence of clear information to the contrary. No information exists to support a re-allocation decision for cockle stocks considered in this paper. However, where development opportunities exist, it is considered appropriate to allow for a TACC increase, recognising that the permit moratorium has prevented commercial access since 1992.

Recreational allowance

33 The proposed recreational allowances for each QMA are set out in Table 1.

34 Harvest estimates from the National Recreational Surveys have been used to estimate current recreational utilisation of the fishery (see Table 3). The harvest estimates provided through the surveys are estimates only and need to be treated with caution for several reasons. Firstly, harvest information from the diary surveys was received in the form of "number of cockles caught". This number was subsequently converted to weight with the assumption that mean cockle weight collected was 25 g (as per 2004 Plenary). It is also important to note that estimates of error ("CVs") are very high in most cases and the higher the CV the less reliable the estimate. In some cases CVs have not been calculated at all due to too few respondents, which means the estimate is not likely to be representative. Finally, for shore-based fisheries like cockle, the surveys are likely to significantly underestimate recreational harvest.

35 Despite the potential for error in the data, harvest estimates from the National Recreational Surveys are the only estimate of recreational harvest that MFish has available at this scale. The estimates from the 2000 survey are considered to be the most reliable estimates of absolute harvest and MFish considers that these are appropriate for providing the initial recreational allowance. For COC 4, no information exists to indicate what the recreational harvest may be so a notional allowance has been proposed. For COC 8, the 1996 survey estimates were used, as there were no survey results for 2000 or 1993-94. COC 1B and 1C estimates were combined in the survey results as COC 1. Given the prevalence of high-density urban populations (eg, Auckland and Tauranga), as well as the occurrence of high-density cockle beds in COC 1C, it is likely that recreational catch is much higher in this area. MFish proposes that the allowance be divided 60:40 COC 1C: COC 1B, resulting in a recreational allowance of 32 tonnes for COC 1C and 22 tonnes for COC 1B.

Customary Maori allowance

36 The proposed customary allowances for each QMA are set out in Table 1.

37 Policy guidelines provide several options for setting a customary allowance. Where estimates are not available, but there is known to be customary catch, a nominal allowance may be made. For species and stocks where there is some catch, but the stock is not considered of importance to customary Mäori, then the allowance may be based on half the recreational catch. For stocks of importance to customary Mäori the allowance may be based on the level of the recreational catch.

38 Tuangi (cockle) are an extremely important customary resource for all coastal communities and information indicates that most beds around New Zealand are utilised by local iwi. In some areas, tuangi are taonga species (treasured species).

39 It is considered that customary harvest would be at least as extensive as recreational harvest and MFish proposes that the customary allowance for tuangi in each QMA be equal to that of the recreational allowance. This is a notional figure only and may need to be revised when information becomes available.

Allowance for other sources of mortality

40 The proposed allowances for other sources of mortality for each QMA are set out in Table 1.

41 Cockle stocks considered in this paper must be gathered by hand so there is a limited source of mortality related to the method of catch. There may be some discarding of cockle that are not within preferred size ranges but these should survive unharmed if returned to the water within a short time.

42 A significant source of mortality is illegal fishing. Compliance information indicates illegal catch of cockle is high in some areas due to recreational harvesters exceeding their daily bag limit, however estimates are not currently available. In the absence of quantified information, nominal allowances proportional to recreational allowances have been provided. As with all allowances, this may be reviewed at any stage when more information becomes available.

TACC

43 Proposed TACCs for each QMA are set out in Table 1.

COC 1B & 9

44 A zero TACC has been proposed for COC 1B and COC 9 which reflects current utilisation. MFish considers that a zero TACC is appropriate at this stage given the combination of sustainability risks, biological characteristics, environmental considerations, lack of stock assessment information and social and cultural issues related to the stocks. Should information become available that suggests particular beds will support a commercial fishery, the TACC can be revised in the future.

COC 1C

45 MFish proposes two TACC options for COC 1C. The first option reflects current utilisation while the second option reflects recent catch.

46 A fishery at Ohiwa Harbour in COC 1C is the only fishery in all of the cockle stocks considered in this paper that has been harvested commercially. The fishery consisted of three permit holders in the 1990/91 fishing year and two clients are still eligible to hold a fishing permit. Commercial harvesting has been inconsistent, with highly variable catches.

47 The first option proposed for COC 1C is a TACC of zero, based on current commercial catches as the Ohiwa Harbour fishery has not been utilised on a commercial basis since the 1999/2000 fishing year and no other areas in COC 1C have been harvested commercially. Recent monitoring of the Ohiwa Harbour area by MFish has shown that the cockle populations have declined substantially. Local users of the resource also advise that the beds are under significant pressure from recreational and customary users and are unlikely to withstand further pressure from an additional sector. There is a strong likelihood that commercial harvesting would cause significant tension in the local community. Further, flood and storm events regularly disturb the cockle beds in the harbour, making availability of the resource quite variable. No commercial fishing has taken place in the harbour over the last four years, and MFish does not consider that any commercial development opportunities exist elsewhere in the QMA.

48 The second option proposed for COC 1C is a TACC of 5 tonnes, based on the average landings of cockle in those years when cockle was actually harvested in Ohiwa Harbour. Since 1990/91 records, one permit holder fished in Ohiwa harbour in 1991/92, and one from 1992/93 - 1993/94. A third permit holder fished from 1991/92 – 1999/00, with highly variable catches. A discussion with this permit holder suggests that fishing did not occur from 1999/00 to present for personal reasons. MFish considers an average catch from the years actually fished to be the most appropriate mechanism for setting the TACC. Discussions have indicated that providing a TACC that allows commercial harvesting alongside non-commercial harvesting which has occurred for generations will cause significant tension. However, MFish understands that modest commercial activity has co-existed up to 1999/2000, and there might be scope for limited activity by the commercial sector in Ohiwa Harbour on a similar basis. Should conflicts arise, there are tools available under the Fisheries Act 1996 which can assist in reaching a resolution.

49 MFish recognises that the cockle fishery in Ohiwa Harbour is highly variable and that setting the TACC at the average commercial catch may constrain the fishery. However, in the absence of a stock assessment of the relevant beds, setting a TACC any higher would pose a sustainability risk to the stock. MFish recommends a cautious approach until research is undertaken, and non-commercial utilisation of the beds are better quantified.

50 There is a sustainability risk with the second option proposed. While five tonnes may be a sustainable harvest level in Ohiwa Harbour, current regulations applicable to the COC 1C stock allow commercial fishing in Ohiwa Harbour as well as Little Waihi estuary (Maketu) and Ponui Island (Auckland). A five tonne allocation could therefore be potentially harvested from Little Waihi estuary and Ponui Island. While no stock information exists for these areas, anecdotal evidence indicates an increase in current catch levels in either area would not be sustainable.

COC 2, 3B, 4, 5, 7C & 8

51 MFish proposes two TACC options for COC 2, 3B, 4, 5, 7C & 8. The first option for these stocks is a TACC of zero tonnes, which reflects current utilisation.

52 An alternative option for these stocks is a TACC of 2 tonnes. Cockle abundance in these QMAs is believed to be high, and non-commercial use is predicted to be quite

low. A TACC of 2 tonnes would provide for commercial use at a low level and allow the commercial potential for new areas to be explored. Providing existing regulations are maintained, which prohibit the commercial catch of cockle in certain areas, there is not likely to be significant tension between sectors[1].

Other Management Measures

Return of cockles to the water

53 MFish proposes that all cockle stocks be added to the Sixth Schedule of the Act to allow them to be returned to the water should they be landed inadvertently, with stated requirements that they must be likely to survive and must be returned to the waters from which they were taken as soon as practicable. Details of the proposal are set out in annex one.

Consequential amendment to regulations

54 Should zero TACCs be the preferred option for COC 1B, COC 1C and COC 9, regulations that currently restrict commercial harvesting of cockle to certain areas of FMA 1 and FMA 9 would no longer be needed. Details of amendments to regulations, should they be required, are set out in annex one.

55 MFish proposes to remove the component of Regulation 22A of the Fisheries (Auckland and Kermadec Areas Commercial) Fishing Regulations 1986 that imposes a 200 kg daily limit on the quantity of cockle that commercial fishers may take within FMA 1 and FMA 9. Applying a total allowable commercial catch removes the need to limit commercial harvesting on a daily basis. Details of the consequential amendments to regulations are set out in annex one.

56 MFish proposes to retain the part of regulation 22A(1) of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986; part of regulation 11K of the Fisheries (South-East Area Commercial Fishing) Regulations 1986; and part of regulation 15I of the Fisheries (Southland and Sub-Antarctic Areas Commercial Fishing) Regulations 1986 that restrict commercial gathering of cockle to the method of hand gathering.

57 The introduction of cockle into the QMS makes it necessary to amend the Fisheries (Reporting) Regulations 2001. The amendment will outline the codes to be used by commercial cockle fishers when completing their statutory catch returns.

Deemed Value and Overfishing Threshold

58 A separate section of this document sets out generic information on the setting of interim and annual deemed values.

59 Application of the policy framework for deemed values means that cockle fall within the 'high value single species fisheries' fishstock category. For those stocks where a TACC is set above zero, MFish proposes to set the annual deemed value at 200% of

[1] Regulations closing areas to shellfish harvesting in the South Island apply to specific areas withing the QMA. The regulations are not species specific and are not proposed for removal at this time.

the highest port price in the previous year, and the interim deemed value at 50% of the annual deemed value.

60 MFish proposes to set an interim deemed value at $1. 90 per kg and an annual deemed value of $3.80 per kg for cockle for the 2005-06 fishing year. The proposed deemed value is set using a port price of $1.90 per kg (based on the 2003 port price survey). Consistent with the policy framework for high value single species fishstocks, it is further proposed that differential deemed values apply.

61 MFish does not propose to set an overfishing threshold for cockle stocks, unless monitoring of catches suggests that this is required in the future.

Statutory Considerations

62 In evaluating the management options the following statutory considerations have been taken into account.

a) The purpose of the Act (s 8) is to provide for the utilisation of fisheries resources while ensuring sustainability. . The management options seek to ensure sustainability of the stock by setting a TAC and other appropriate measures. Utilisation is provided by way of setting allowances for commercial, recreational and customary fishers. Section 8 requires that social and economic effects be considered. As discussed throughout this document, pipi are an extremely important customary and recreational resource and these issues have been taken into account when setting the TACs.

b) Under s 13(2) of the 1996 Act, the TAC should be set at one of three options. MFish believe that the most appropriate option for cockles is s13(2)(a). This requires that the TAC should be set at or above a level that moves the stock towards the level that can produce the MSY having regard to the interdependence of stocks. No scientific stock assessment information is available indicating whether cockle stocks are at, above, or below a level that can produce MSY. Despite this, there are concerns about the sustainability of some cockle stocks due to the significant level of non-commercial harvesting which occurs. MFish considers that the proposed TACs should enable cockle stocks to be managed at a sustainable level in the short term, with further information required to determine the sustainability of the proposed TACs in the mid to long term.

c) The proposed TAC options are also based on:

i) Consideration of the environmental conditions affecting the stock (s13(2)(b)(ii)). Cockle populations are characterised by spatial and temporal fluctuations in biomass and size structure due to the influence of environmental factors on population dynamics. Factors include temperature, salinity, exposure and hydrology. In particular they are susceptible to local events such as floods and storms, which can have substantial negative effects on localised populations. Cockles are also influenced by coastal processes which are exacerbated in urbanised areas, such as increased siltation which can smother and suffocate cockles, increased organic and mineral pollution which may inhibit cockle growth and loss or reduction of habitat such as eel grass beds.

For example, cockle beds in Pauatahanui Inlet declined by more than 50% between 1976 and 1998, probably due to increased levels of silt washed onto the beds from urban development.

ii) Consideration of the biological characteristics of the stock (s13(2)(b)(ii)). As discussed in the previous paragraph, cockle are sensitive to environmental conditions. As sedentary species, cockle are unable to escape or avoid such adverse conditions. Further, cockle are commonly found in sheltered harbours and bays which are close to urban centres. This means they are extremely easy to harvest as well as prone to the negative effects of development and subsequent habitat disturbance and degradation. These biological characteristics result in cockle being particularly prone to localised depletion.

iii) Interdependence of stocks (s13(2)). There is no evidence to suggest that cockle and any other stocks are interdependent.

d) Section 11(1)(c) requires that the natural variability of the stock concerned is also taken into account when setting or varying a sustainability measure such as a TAC. The natural variability of cockle stocks can be high due to the sensitivity of stocks to environmental conditions, as previously mentioned. This natural variability has been considered in setting the TACs.

e) Section 9(a) requires that associated or dependent species should be maintained above a level that ensures their long-term viability. Similarly, s 9(b) requires the maintenance of biological diversity in the aquatic environment. Section 9(c) requires the protection of habitat of particular significance to fisheries management. Cockles are sedentary species that occur in the intertidal habitats along New Zealand's coastline. Cockle stocks in this paper are harvested by hand gathering, which is not expected to impact on other species or the intertidal habitat itself. However, cockles are an important part of the intertidal ecosystem and provide an important food resource for other animals such as wading birds. It is not known whether local depletions affect biological diversity.

f) There is a wide range of international obligations relating to fishing (including sustainability and utilisation of fishstocks and maintaining biodiversity). MFish considers the s 5 considerations arising from New Zealand's international obligations and the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 are adequately addressed by the management proposals for cockle stocks, particularly with the introduction of a total allowable catch to ensure sustainable utilisation.

g) Section 11(1)(b) requires that existing controls be taken into account when setting or varying a sustainability measure such as a TAC. MFish notes that in all stocks considered in this paper, commercial access is currently limited to existing permit holders by Schedule 4C of the Act. Areas where commercial access is restricted are defined by regulation. There are specific areas closed to recreational harvest. In COC 1B and 1C, commercial fishers are each allowed to take a maximum of 200 kg of cockles per day, by hand gathering only. There is a daily bag limit for recreational fishers of 150 per person per day, except in COC 1B and 1C where the daily bag limit is 50.

h) Section 11(2) requires the consideration of various other matters relating mainly to planning documents. MFish is not aware of any considerations in any regional policy statement, regional plan or proposed regional plan under the Resource Management Act 1991 or any management strategy or management plan under the Conservation Act 1987 that are specifically relevant to setting TACs for cockle stocks. Similarly, in terms of section 11(2A) MFish is not aware of any fisheries or conservation services or relevant fisheries plans, or any decisions not to require conservation or fisheries services, that are relevant to setting TACs for cockle stocks.

i) As required under s 11(2)(c), MFish considers that the proposals for cockle meet the requirements of ss 7 and 8 of the Hauraki Gulf Marine Park Act 2000. Implementation of catch limits and associated measures for cockle stocks into the QMS will allow for the sustainable utilisation of the species.

j) Sections 21(1)(a and b) and (21)(4)(i and ii) and (21)(5) require the Minister to allow for non-commercial fishing interests (recreational and Mäori), and other mortality to the stock caused by fishing. The nature of the cockle fishery and the interests of the respective fishing sectors have been influential in recommendations for the setting of the TACC.

k) Section 21(4) requires that when considering the proposed allowances for customary non-commercial interests, the Minister must take into account any mätaitai reserve or s 186A closure in the relevant QMA. MFish does not consider that the allowances proposed for customary harvest will detract from the intent of any mätaitai or s 186A closures presently in place, nor will the allowance be likely to be insufficient in terms of the customary use of tuangi in these areas.

l) Section 21(5) requires that when considering the proposed allowances for recreational interests, the Minister must take into account any regulations that prohibit or restrict fishing under s311 (area closures). MFish does not consider that the allowances proposed for recreational harvest will detract from the intent of any area closures presently in place.

m) Section 10 sets out information principles that are to be taken into account when setting TACs for new species. The principles are particularly important in relation to cockle stocks considered in this paper as the status of these stocks remains unknown. MFish has adhered to these principles in setting the TACs for these cockle stocks.

Preliminary Recommendations

63 MFish recommends that the Minister:

a) **Agrees** to set a TAC of 46 tonnes for COC 1B and within that TAC set:

   i) A customary allowance of 22 tonnes;

   ii) A recreational allowance of 22 tonnes;

   iii) An allowance for other fishing-related mortality of 2 tonne; and

   iv) A TACC of 0 tonnes.

b) **Agrees** to set a TAC of 67 tonnes for COC 1C and within that TAC set:

i) A customary allowance of 32 tonnes;

ii) A recreational allowance of 32 tonnes;

iii) An allowance for other fishing-related mortality of 3 tonne; and

iv) A TACC of 0 tonnes.

Or

Agrees to set a TAC of 72 tonnes for COC 1C and within that TAC set:

i) A customary allowance of 32 tonnes;

ii) A recreational allowance of 32 tonnes;

iii) An allowance for other fishing-related mortality of 3 tonne; and

iv) A TACC of 5 tonnes.

c) **Agrees** to set a TAC of 5 tonnes for COC 2 and within that TAC set:

i) A customary allowance of 2 tonnes;

ii) A recreational allowance of 2 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 0 tonnes.

Or

Agrees to set a TAC of 7 tonnes for COC 2 and within that TAC set:

i) A customary allowance of 2 tonnes;

ii) A recreational allowance of 2 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

v) A TACC of 2 tonnes.

d) **Agrees** to set a TAC of 57 tonnes for COC 3B and within that TAC set:

i) A customary allowance of 27 tonnes;

ii) A recreational allowance of 27 tonnes;

iii) An allowance for other fishing-related mortality of 3 tonne; and

iv) A TACC of 0 tonnes.

Or

Agrees to set a TAC of 59 tonnes for COC 3B and within that TAC set:

i) A customary allowance of 27 tonnes;

ii) A recreational allowance of 27 tonnes;

iii) An allowance for other fishing-related mortality of 3 tonne; and

iv) A TACC of 2 tonnes.

e) **Agrees** to set a TAC of 3 tonnes for COC 4 and within that TAC set:

i) A customary allowance of 1 tonnes;

ii) A recreational allowance of 1 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 0 tonnes.

Or

f) **Agrees** to set a TAC of 5 tonnes for COC 4 and within that TAC set:

i) A customary allowance of 1 tonnes;

ii) A recreational allowance of 1 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 2 tonnes.

g) **Agrees** to set a TAC of 5 tonnes for COC 5 and within that TAC set:

i) A customary allowance of 2 tonnes;

ii) A recreational allowance of 2 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 0 tonnes.

Or

Agrees to set a TAC of 7 tonnes for COC 5 and within that TAC set:

i) A customary allowance of 2 tonnes;

ii) A recreational allowance of 2 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 2 tonnes.

h) **Agrees** to set a TAC of 7 tonnes for COC 7C and within that TAC set:

i) A customary allowance of 3 tonnes;

ii) A recreational allowance of 3 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 0 tonnes.

Or

Agrees to set a TAC of 9 tonnes for COC 7C and within that TAC set:

i) A customary allowance of 3 tonnes;

ii) A recreational allowance of 3 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 2 tonnes.

i) **Agrees** to set a TAC of 3 tonnes for COC 8 and within that TAC set:

i) A customary allowance of 1 tonnes;

ii) A recreational allowance of 1 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 0 tonnes.

Or

Agrees to set a TAC of 5 tonnes for COC 8 and within that TAC set:

i) A customary allowance of 1 tonnes;

ii) A recreational allowance of 1 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 2 tonnes.

j) **Agrees** to set a TAC of 13 tonnes for COC 9 and within that TAC set:

i) A customary allowance of 6 tonnes;

ii) A recreational allowance of 6 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 0 tonnes.

k) **Agrees** to include all cockle stocks in the Sixth Schedule of the Act.

l) **Agrees** to amend regulation 22A of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 so that the 200 kg maximum daily weight limit for commercial harvests of cockle within the Auckland Fisheries Management Area will not apply.

m) **Notes** that commercial cockle harvesting will be restricted to the methods of hand gathering in COC 1B, COC 1C, COC 3B, COC 4, COC 5, and COC 9

n) **Agrees** to revoke restrictions to commercial access in COC 1B, 1C and COC 9 should zero TACCs be the recommended option for these stocks.

o) **Agrees** to amend the Fisheries (Reporting) Regulations 2001 to outline the codes to be used by commercial cockle fishers when completing their statutory catch returns.

p) **Agrees** to set an annual deemed value at $3. 80 per kg and an interim deemed value of $1.90 per kg.

q) **Agrees** not to set an overfishing threshold for cockle stocks at this time.

ANNEX ONE

Sixth Schedule - return of cockles to the water

Background

75 MFish proposes to provide for the return of cockle to the water by adding cockle stocks to the Sixth Schedule of the 1996 Act, with stated requirements that they are likely to survive, and must be returned to the same waters from which they were taken as soon as practicable.

76 Under s 72 of the Act, once cockle are introduced into the QMS, commercial fishers would be obliged to retain and report cockle obtained by any fishing method. If cockles were added to the Sixth Schedule, commercial fishers who took cockle as an unintentional bycatch would be able to return them to the sea alive, provided they comply with the requirements set out in the Schedule. Cockle are likely to be robust enough to enable them to be returned to the sea and subsequently survive if returned within a short time from being taken.

77 Addition to the Sixth Schedule is in line with current commercial practice whereby cockle fishers usually grade cockles by size and will provide cockle fishers with flexibility within the QMS to examine rotational management and enhancement options. It is also consistent with what is currently provided for COC1A, 3, 7A and 7B.

Problem definition

78 Cockles are occasionally caught as a bycatch in other shellfish fisheries. Unless cockles are added to the Sixth Schedule any cockle taken must be landed and reported, and with no ACE, fishers would be required to pay a deemed value. In addition markets require that cockles are supplied in specific sizes. Requiring that all cockles be retained is neither appropriate or efficient, particularly as cockles are not caught in large volumes as bycatch.

79 Cockle fishers also grade cockles by size according to specific market requirements, immediately returning outsize cockles to the beach. However, the legal requirement within the QMS to land all cockles taken does not align with this practice, and also precludes fishers from examining rotational enhancement practises, which could potentially benefit the productivity of cockle beds.

Preliminary consultation

80 No preliminary consultation has been undertaken concerning adding all cockle stocks to the Sixth Schedule. However, a similar approach was accepted by stakeholders when commercial cockle stocks were introduced into the QMS in 2002.

Options

Non-Regulatory Measures

81 Unless cockles are added to the Sixth Schedule, it will be illegal to return or release cockles caught incidentally. There is no non-regulatory mechanism for returning aquatic life taken under the QMS to the water.

Regulatory Measures

82 To implement this measure it is necessary to add cockle stocks to the Sixth Schedule of the 1996 Act.

Costs and benefits of the proposal

83 Adding cockle stocks to the Sixth Schedule will provide commercial fishers that catch cockle incidentally as a bycatch, or for other reasons, with the flexibility to legally return these fish to the water (provided they are immediately returned alive). Allowing cockle stocks to be returned to the water is the least cost option for commercial fishers since they will not be penalised by deemed value payments. It also provides utilisation benefits by allowing for the current commercial practice whereby cockle fishers grade cockles for specific markets and will provide cockle fishers with flexibility within the QMS to examine rotational management and enhancement options

Administrative implications

84 There are no significant administrative implications.

Removal of commercial shellfish prohibitions

Background

85 At present, Regulation 4C of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 restricts the commercial harvesting of cockles to certain areas of FMA1 and FMA 9. Should COC 1B, 1C or 9 be introduced into the QMS with TACCs of zero, these restrictions will not be required.

86 If COC 1B, 1C or 9 are introduced with TACCs above zero, the existing regulations will need to be reviewed. Under existing regulations, commercial harvesting could only be undertaken in three small areas of COC 1C, with no access allowed in COC 9 or COC 1B even if a TACC was allocated. However, simply revoking the regulation would enable commercial access throughout the whole of each QMA. This would not be sustainable as many beds are under significant non-commercial pressure.

Problem definition

87 MFish considers that area restrictions will no longer be required in COC 1B, 1C and 9 should TACCs of zero be allocated.

Preliminary consultation

88 No preliminary consultation has been undertaken concerning the removal of regulations restricting commercial shellfish harvesting to certain areas of FMA 1 and FMA 9.

Options

Non-Regulatory Measures

89 There are no non-regulatory alternatives to revoking the regulations.

Regulatory Measures

90 Revoking the commercial fishing prohibitions in FMA 1 and FMA 9 will remove an unnecessary restriction.

Costs and benefits of the proposal

82 There are no obvious costs associated with this proposal. The benefit is that redundant regulations will be removed.

Administrative implications

83 There are no significant administrative implications.

Removal of the catch limits in Auckland Fisheries Management Areas

Background

84 At present regulation 22A of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 restricts the maximum weight (greenweight) of cockles that may be taken or possessed by a commercial fisher on any day within the waters of the Auckland Fisheries Management Areas to 200kg.

Problem definition

85 With the introduction of the relevant cockle stocks into the QMS, the need for daily limits no longer exists.

Preliminary consultation

86 No preliminary consultation has been undertaken, however a similar approach was accepted by stakeholders when other cockle stocks were introduced in 2000 and 2003.

Options

Non-Regulatory Measures

87 There are no non-regulatory alternatives to revoking the daily catch limit.

Regulatory Measures

88 Revoking the regulation removes a restriction that is no longer necessary under the QMS.

Costs and benefits of the proposal

89 Revoking the regulation removes the requirement to enforce a daily catch limit, and will result in improved harvest efficiency for commercial fishers.

90 There are no costs associated with revoking this regulation.

Administrative implications

91 There are no significant administrative implications associated with revoking this regulation.

ANNEX TWO

Species Information

Species Biology

92 The New Zealand cockle (*Austrovenus stutchburyi*, formerly *Chione stutchburyi*, family Veneridae) is a shallow-burrowing, suspension-feeding bivalve. It is generally intertidal, found in soft mud to fine sand on beaches and enclosed shores around the North and South Islands, Stewart Island and the Chatham Islands.

93 Cockles are found from the lowest high water neap tide mark to the lowest part of the shore; there is some evidence that they extend to 20 m depth in some areas. It is suggested that the upper tidal limit is found where submergence is about 3.5 hours per day. Cockles tend to be more abundant in sediments with a larger grain size, and are extremely common in eelgrass (*Zostera* sp.), which often occurs on sand flats.

94 Cockles are often the dominant species on beaches, and densities as high as 4 500 m^{-2} have been reported. For example, in Pauatahanui Inlet, the biomass has been estimated at 5 000 tonnes; comprising 80% of the total intertidal biomass. In such dense beds, a cockle population can filter enormous amounts of water on each tidal cycle, with a profound effect on water quality.

95 Sexes are separate and the sex ratio is usually close to 1:1. Maturity appears to be primarily a function of size rather than age, with sexual maturity occurring at a size of about 18 mm shell length. Spawning extends over spring and summer, and fertilisation is followed by a planktonic larval stage lasting about three weeks. Reduced larval settlement has been recorded for areas of otherwise suitable substrate from which all live cockles have been removed. This suggests the presence of some conditioning factor.

96 Given that cockles recruit to the spawning biomass at ~18 mm shell length, but are not considered desirable for harvest until closer to 30 mm shell length, there may be some protection for the stock against egg overfishing. All currently commercially fished populations are not isolated in terms of recruitment of juveniles because they are in areas with other, non-fished populations. However, this generality should be treated with some caution, given that some adult populations seem to be required to stimulate settlement of spat. Survey data for Snake Bank and Papanui/Waitati Inlets populations suggest that the abundance of juvenile cockle varies considerably, presumably as a result of variable recruitment.

97 Quite extensive movements of juveniles and smaller animals have been documented, but individuals larger than about 25 mm are largely sessile, moving only in response to disturbance. Small cockles grow faster than large cockles, and overall, growth is fastest during spring and summer. Growth is slower in the higher tidal ranges and in high-density beds.

98 Birds are predators of small cockles but appear to have little impact on overall cockle abundance. Other predators include crabs and whelks. Cockles can be killed by sediment smothering during storms or strong tides.

Fisheries Characteristics

Commercial Catch

99 The only area where commercial harvesting has occurred in all of the stocks considered here is the Ohiwa Harbour fishery in COC 1C (Table 2). This fishery has consisted of three permit holders since 1990/91. One permit holder operated in 1991/92 (0. 1 tonnes) and one permit holder operated in 1992/93 (5. 3 tonnes) and 1993/94 (3. 9 tonnes) only. The third permit holder operated throughout the 1990's but no landings have been made since 1999/2000.

100 All fishing in Ohiwa Harbour has been undertaken by hand gathering. Catches have been highly variable, ranging from 11.6 – 0.2 tonnes. Highly variable catches are likely to be a result of the high variability in cockle populations in the area, as well as inconsistent fishing activity.

101 There is no current stock information available for the Ohiwa Harbour fishery so it is not known whether the fishery biomass is at, below or above a sustainable level. An independent report commissioned by a commercial fishing company in 1998 provided a biomass estimate for the population at 2 170 tonnes. The report estimated that a conservative total annual harvest level could be 170 tonnes, with 40 tonnes allocated to recreational harvest and 100 tonnes to commercial harvest. No customary harvest was provided for in the report. In the year following the report, significant flooding occurred in the catchment and local reports suggested the population was substantially reduced.

102 The Ministry of Fisheries has undertaken monitoring in Ohiwa Harbour as a part of the Auckland Intertidal Shellfish Population Surveys. Monitoring was undertaken in 2000, 2002 and 2003. Presuming average cockle weight was 25g (as per the 2004 Plenary), the biomass of cockles in Ohiwa Harbour was estimated at 458 tonnes, 456 tonnes and 144 tonnes respectively. The population declined significantly from 2002 to 2003. These estimates are significantly lower than the estimates made in the independent report noted above.

103 The only recorded commercial catch of cockle other than the COC 1C catch was 2.9 tonnes in COC 4. This catch occurred as a bycatch in the scallop dredge fishery on the Chatham Islands and occurred over a single three-week period in 1991. It is unlikely that the cockle caught was *A. stutchburyi* and MFish does not view this catch as relevant in the consideration of a TAC in COC 4.

Table 2. **Estimates of reported landings by QMA. Note that the estimates presented are different to estimates provided in the section 18 IPP from 2004, following analysis of the data and adjustments made to reporting errors.**

Estimates of Reported landings by QMA									
Year	**1B**	**1C**	**2**	**3B**	**4**	**5**	**7C**	**8**	**9**
1990/91	-	0. 4	-	-	-	-	-	-	-
1991/92	-	11. 6	-	-	2. 9	-	-	-	-
1992/93	-	9. 2	-	-	-	-	-	-	-
1993/94	-	11. 3	-	-	-	-	-	-	-
1994/95	-	0. 2	-	-	-	-	-	-	-
1995/96	-	-	-	-	-	-	-	-	-
1997/98	-	1. 1	-	-	-	-	-	-	-
1998/99	-	1. 6	-	-	-	-	-	-	-
1999/00	-	0. 2	-	-	-	-	-	-	-
2000/01	-	-	-	-	-	-	-	-	-
2001/02	-	-	-	-	-	-	-	-	-
2002/03	-	-	-	-	-	-	-	-	-
2003/04	-	-	-	-	-	-	-	-	-

Recreational and Customary Catch

104 Some local estimates have been made for recreational harvests. For example, three Auckland Beaches (Cornwallis Beach, Mill Bay and Okoromai Bay) were surveyed in 1998 and a harvest estimate of 3.269 tonnes was made. Estimates are also likely to exist for customary harvests in areas where kaitiaki and tangata whenua who issue Regulation 27 permits keep a record of catches made under permits.

105 At present however, there is no quantitative information on customary and recreational harvest levels at the scale of the QMA. Given the customary and recreational importance of cockles, combined with the accessibility of cockles to harvesters, non-commercial catch is likely to be significant.

106 As discussed in the main body of this document, despite the potential for error in the data, harvest estimates form the National Recreational Surveys are the only estimate of recreational harvest that MFish has available at the QMA scale. Table 3 provides a breakdown of the harvest estimates available for all cockle stocks. The estimates from the 2000 survey are considered to be the most reliable estimates of absolute harvest and have been used to provide non-commercial allowances for all stocks, except COC 4 where no harvest estimate exists and COC 8 where only the 1996 survey provided an estimate.

Table 3. Harvest estimates from the National Recreational Fishing Surveys.

QMA	Survey Year	Harvest (millions of cockles)	Harvest (t)	CV %
COC 1B and 1C	1993-94	2. 14	55	18
	1996	0. 57	14	18
	2000	2. 2*	53. 9*	24
COC 2	1993-94	0. 006	0. 15	
	1996	0. 03	0. 75	
	2000	0. 077	1. 925	137
COC 3B	1993-94	0. 106	2. 7	51
	1996	0. 144	3. 6	
	2000	1. 076*	26. 9*	45
COC 4	1993-94			
	1996			
	2000			
COC 5	1993-94	0. 006	0. 15	
	1996	0. 073	1. 825	
	2000	0. 059	1. 475	60
COC 7C	1993-94	0. 166	4	44
	1996	0. 325	8	
	2000	0. 1*	2. 5*	42
COC 8	1993-94			
	1996	0. 035	0. 875	
	2000			
COC 9	1993-94			
	1996	0. 049	1. 225	
	2000	0. 232	5. 8	56

***Indicates that the harvest number and weight listed are the QMA total estimate minus the recreational allowance provided for in commercial stocks introduced to the QMS in 2002.**

Regulatory framework

107 There are no existing regulations that specify commercial catch limits for cockles, although a daily catch limit of 200kg is in place in FMAs 1 and 9 which will be revoked. There is no minimum cockle size limit for amateur or commercial fishers. There are bag limit regulations for cockles for amateur fishers that should be retained. There are regulations that prohibit the commercial catch of cockle in certain areas of all QMAs and these should be retained. Conversely there are regulations that restrict commercial catch of cockle to certain areas only and these may be removed.

Fishery Assessment

108 There is no stock assessment information available for the cockle stocks discussed in this paper. There has been no scientific assessment of the maximum sustainable yield for these stocks. The reference or current biomass of any of the cockle stocks is unknown.

Environmental Issues

109 Environmental issues in relation to cockle stocks are discussed in the main section of this paper. There is no information on whether current cockle fishing activities are detrimental to the long-term viability of any other species.

Current and potential research

110 There has been no fisheries research specifically on the cockle stocks discussed in this paper except several monitoring events at local beds in the Auckland Fisheries Management Area (Auckland Intertidal Shellfish Research project). Given the paucity of information on this extremely important coastal resource, it is imperative that, as a first step, distribution and abundance information be collected in a coordinated way throughout New Zealand. All literature sources could be examined including university research and regional council reports, and all local knowledge utilized such as tangata whenua, the Honorary Fisheries Officer network and community groups.

Social cultural and economic factors

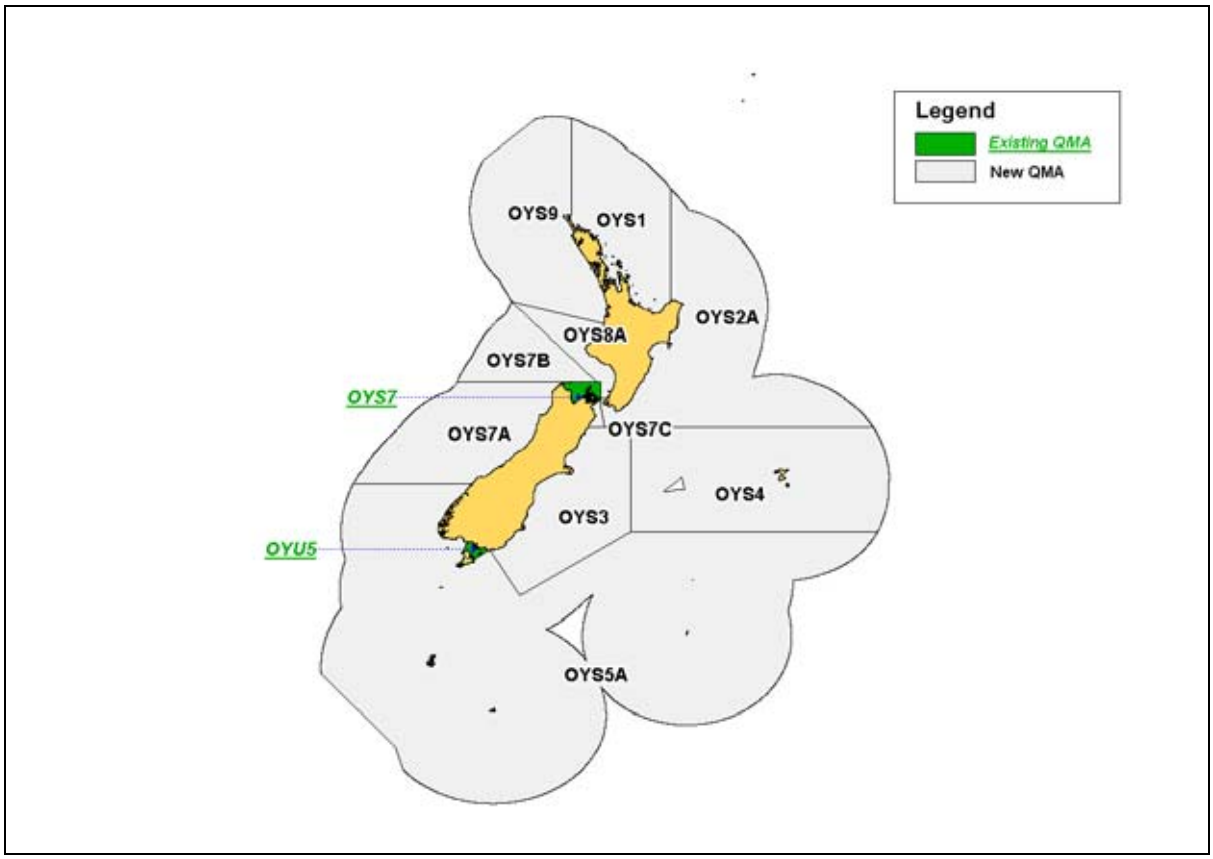
111 MFish is not aware of any information on particular social, economic, or cultural matters that could influence the setting of TACs and TACCs for cockle beyond those considered in the relevant sections earlier.

NON-QMS DREDGE OYSTER (OYS)

Introduction into the Quota Management System (QMS)

1 Dredge oysters[1] (other than OYU 5 and OYS 7) will be introduced into the QMS on 1 October 2005. The Quota Management Areas (QMAs) for oysters are outlined in Figure 1. The fishing year for each of these stocks will begin on 1 October and end on 30 September of the following year. The total allowable catch (TAC), total allowable commercial catch (TACC) and annual catch entitlement (ACE) are to be expressed in terms of greenweight.

Figure 1 Quota Management Areas for dredge oyster stocks to be introduced to the QMS.



Key Issues to be Considered

2 Key factors and issues that need to be taken into account in determining management options for this fishery are summarised below:

- An estimate of total biomass or sustainable yield is not available for any of the oyster stocks in this paper. Status of all stocks remains unknown.

[1] The dredge oyster is referred to in the Fisheries Act 1996 as *Tiostrea chilensis*, however, it has subsequently been reclassified as *Ostrea chilensis*.

- Outside of OYU 5, dredge oysters are largely landed as a bycatch of other fisheries, principally scallop and mussel dredging.

- Small, discrete, patches of dredge oysters exist throughout New Zealand's inshore waters, harbours and estuaries.

- Dredge oysters are sedentary animals with localised recruitment patterns, susceptible to localised overfishing.

- Dredging for oysters can destroy benthic habitat and reduce biodiversity.

Management Options

3 MFish proposes that section 13 of the Fisheries Act 1996 (the Act) management measures are appropriate for oysters.

4 MFish proposes the following TACs, TACCs and allowances for oyster stocks (Table 1):

Table 1: Proposed TACs, TACCs, and allowances for dredge oysters (in tonnes greenweight)

Stock	TAC	Customary allowance	Recreational allowance	Other sources of mortality	TACC
OYS 1	4	1	1	1	1
OYS 2A	4	1	1	1	1
OYS 3	7	2	2	1	2
OYS 4	20	2	2	1	15
OYS 5A	8	2	2	1	3
OYS 7A	4	1	1	1	1
OYS 7B	4	1	1	1	1
OYS 7C	5	1	1	1	2
OYS 8A	4	1	1	1	1
OYS 9	4	1	1	1	1

5 MFish also proposes to:

a) Add these dredge oyster stocks to the Sixth Schedule of the Act to allow oysters caught incidentally to be returned to the water;

b) Remove a redundant commercial fishing regulation that restricts fishing to certain times of the day;

c) Amend the Fisheries (Reporting) Regulations 2001 to outline the codes to be used by fishers when completing their statutory catch returns; and

d) Set a deemed value.

Proposed TACs

6 Section 13 of the Act represents the default management option that is to be applied when setting a TAC for a QMS stock, unless the stock qualifies for management under s 14 or s 14B of the Act.

7 Under s 13, there is a requirement to set a TAC that maintains a fishstock at a target level, being at, or above, a level that can produce maximum sustainable yield (MSY), having regard to the interdependence of stocks. MSY is defined, in relation to any fishstock, as being 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.

8 As an alternative to setting a TAC under s 13, the Act allows TACs to be set under s 14 if the stock is listed on the Third Schedule. By Order in Council, the Governor-General may add to that Schedule the name of any stock provided one of the four criteria specified in s 14(8)(b) applies to that stock. However, MFish does not consider that any of the criteria specified are applicable to oysters. Firstly, an MSY could theoretically be estimated for oyster stocks. Secondly, a catch limit for New Zealand has not been determined as part of an international agreement. Dredge oysters are not managed on a rotational basis, nor are dredge oysters highly migratory.

9 As outlined in the Statutory Obligations and Policy Guidelines section, there are guidelines for setting TACs for new species. Among the more important considerations for oysters are the biological characteristics of the species, existing stock information and social, economic and cultural factors.

Rationale for Proposed TAC

10 Policy guidelines have constructed an hierarchal approach in respect of the information for setting TACs and, hence, the weighting to be assigned to that information. Stock assessment information is afforded greater weight than a non-QMS commercial catch limit (CCL) set for a stock. A CCL may be afforded greater weight than information about historical and current catch levels.

11 There is no stock assessment information, or CCLs, for any of the oyster stocks considered in this paper. Policy guidelines provide a clear direction, on the basis of information available, for the setting of new TACs. In the absence of stock assessments, TACs for each oyster stock should be set to reflect current catch, or use, from each fishery. Since the available information for the oyster stocks under consideration is also inadequate for this purpose, MFish proposes to use information on the distribution, biology and life history of dredge oysters in proposing nominal TACs for consultation.

12 Dredge oysters occur from the intertidal to a depth of 100 m throughout New Zealand coastal waters. In most areas, dredge oysters are found on mud or muddy sand substrates but in OYU 5 they are a component of stable biogenic reefs. Abundance is limited by suitable settlement substrate. Competition, predation (particularly of oyster spat) and parasites, such as *Bonamia exitiosus*, also play a role in limiting dredge oyster distribution and abundance.

13 Relative to other shellfish fisheries, dredge oysters are a species with low productivity. They are long lived, slow growing, brood relatively few larvae that usually do not disperse widely, and have high post-settlement mortality and low recruit mortality. Repeated dredging of localised patches may cause significant incidental mortality and may alter habitat required for recruitment. Dredging may also exacerbate and spread disease, especially the parasite *B. exitiosus*, which is thought to be present in populations throughout New Zealand. All these traits indicate that repeated dredging of localised beds is likely to lead to localised depletion.

14 Local populations can attain high densities, however, dredge oysters are only targeted by commercial fishers in OYU 5 and OYS 7 (which are already in the QMS) and, periodically, OYS 4. In OYS 4 and OYS 7, dredge oysters are part of a multi-species fishery which includes scallops and (in OYS 7) green-lipped mussels. Dredge oysters are also found in moderate densities in deeper offshore waters along the south and east coast of the South Island and the east coast of the North Island.

15 In southern intertidal areas, dredge oysters are often mistaken for the New Zealand rock oyster (*Saccostrea glomerata*), however, rock oysters are not usually found south of Marlborough where they are ecologically replaced by dredge oysters.

16 MFish has used the best available information on which to base estimates of catch in accordance with s 10 of the Act, but the data available on both commercial and non-commercial catch is not considered to be reliable (see Annex 2). As no reliable catch information is available upon which to set TACs, and considering the combination of high sustainability risks because of the biological information as noted above, lack of stock assessment information, lack of abundance information, as well as the potential for conflict between commercial and non-commercial users, MFish proposes TACs that reflect the current bycatch status of the fishery.

17 At this stage, given the paucity of information available and the lack of stock assessments, MFish also considers that there is uncertain capacity for development of any of the oyster stocks considered here. However, as new research is undertaken and information improves, harvest levels may be increased at a later date. Increases will require additional supporting information on the impacts of fishing on the stock and also the aquatic environment.

18 The commercial catch information for the non-QMS oyster stocks is unreliable. Nominal catch levels have, therefore, been proposed to accommodate likely catch of dredge oysters in each area, including bycatches of dredge oysters, and take into account whether dredge oyster stocks have occurred in the area or suitable areas of habitat occur in each fishstock. The fishery at the Chatham Islands (OYS 4) and Southland (OYS 5B) are the only non-QMS dredge oyster fisheries that have been harvested commercially. These two fisheries had 10 permit holders between them, however, it is not known to what extent the permit moratorium constrained fishing within the remaining QMAs.

19 For stocks where recreational harvest estimates (diary surveys, etc) have been made, these should be used as a basis for determining current recreational catch. However National Recreational Surveys have not provided estimates of recreational harvest in these oyster fishstocks. Recreational and customary Maori fishers catch oysters by dredging and diving in the two QMS stocks in Foveaux Strait and Nelson/Marlborough. There are few records of recreational catches from non-QMS areas and these are small. Nominal levels of catch have, therefore, been estimated in each non-QMS fishstock in proportion to the biology of oysters, known occurrence of oysters in the area, and availability of suitable habitat.

20 Quantitative estimates of recent customary catch at the QMA level are not available. For stocks where no customary harvest estimates exist but the stock is known to be of importance to Mäori, a catch level similar to the known recreational catch should be included. Oysters are an important customary resource, therefore, the nominal catch

levels assigned to recreational fishing have also been used to assign similar nominal levels of catch for customary fishing.

21 Quantitative estimates of other sources of fishing-related mortality are not available. As dredge oysters are highly prized, it is not unreasonable to consider that there is a degree of poaching and the use of dredges as the main harvest method also likely contributes a source of mortality to the stocks. Nominal levels of catch have been estimated in each stock to account for this source of mortality.

22 When setting a TAC, policy guidelines and the Act advise there are a number of closely interrelated factors that need to be taken into account. Areas of particular significance are outlined below.

23 The biological characteristics of the stock result in variable patterns of abundance and distribution, which in turn make dredge oysters susceptible to localised depletion. The existence of the Haplosporidian parasite, *B. exitiosus*, may also play a role in the abundance of oysters.

24 The effect of harvesting the stock on the aquatic environment has not been quantified. However, the main method of harvesting is dredging, followed by diving. Diving is not likely to affect the environment, but bottom dredging does have adverse effects on the aquatic environment and affect biological diversity. Dredging, especially in areas with high silt levels, is thought to remove settlement surfaces and suspend silt that causes high mortality in newly settled oyster spat. If dredging effort increases, there may be adverse effects on settlement and recruitment.

25 MFish considers there is a risk that dredging for new QMS oyster stocks could expand to new areas and cause adverse effects on previously undredged areas.

26 There is no existing stock information for the oyster stocks considered in this paper. It is not possible, therefore, to determine whether oyster stocks are stable, declining or increasing.

27 Oysters do play an important role as prey for many species in the nearshore environment and localised depletions –natural or as a result of harvest pressure –may have an effect on those species that depend on them. Further, oysters are sedentary and the nearshore and intertidal beds are easy to harvest. Anecdotal information from local users of inshore and intertidal beds advise that these stocks are all under significant pressure from recreational and customary users and are unlikely to withstand further pressure from an additional sector. It is unlikely that many oyster beds could support an increase in harvest levels.

28 There are many social, economic and cultural factors to be considered when setting the TACs for the oyster stocks considered in this paper. Socially and culturally, oysters represent an extremely important species for many New Zealanders; they are very important to Maori as a food source and have been harvested for this purpose consistently through history. Oysters are a prized recreational species, with most beds around the country that are accessible to recreational fishers harvested to some extent. However, given the high level of interest in the species and the susceptibility to depletion, if not local extinction, the location, nature and extent of these beds are often closely guarded secrets. These oyster stocks have an important role for local communities as a highly prized food source.

29 The Act requires consideration be given to the development of fisheries resources while ensuring their sustainability. While there have been recent enquiries from commercial fishers interested in targeting dredge oysters under open access, MFish considers it unlikely at this time that there are oyster stocks in sustainable economic quantities and, therefore, it is unlikely there is a capacity for development of any of the stocks. Having said this, provision should be provided for the possibility for development.

30 In summary, MFish proposes that TACs be based on information on the distribution, biology and life history of dredge oyster in proposing nominal TACs. MFish considers that the biological characteristics of the species, lack of stock information and the social and cultural value of oysters supports a need for caution in setting catch limits for the stocks.

OYS 1

31 While areas in the Hauraki Gulf and Bay of Plenty might provide suitable habitat for dredge oysters, and some commercial landings were recorded in the early 1990s, there are only minimal landings recorded over the last five years. There are no estimates of recreational catch, and neither are there any for customary catch of this species in this area. Dredge oyster are highly prized, so some non-commercial catch is probable if suitable stocks are present.

OYS 2A

32 Dredge oysters are known to exist off Napier, but there are only minimal landings recorded over the last five years. There are no estimates of recreational or customary catch of this species for the area.

OYS 3

33 The Canterbury/Otago coastline has known populations of dredge oysters off Timaru and in estuaries and inlets of coastal Otago. There may also be oysters around Banks Peninsula and Pegasus Bay. Some landings are recorded over the last five years, however, these are all small. There are no estimates of recreational or customary catch of this species, however, MFish is aware that special provision was made to enable recreational fishers in this area to harvest "rock oysters", which south of Marlborough are replaced ecologically by an ecomorph of *O. chilenisis,* indicating that a more substantial harvest does occur.

OYS 4

45 There is a known fishery for dredge oysters at the Chatham Islands. Landings are mostly as a bycatch of the scallop fishery, however, some targeting has occurred in the past. The fishery was commercially investigated in the early 1990s when the Bluff fishery was closed but this did not result in a sustainable commercial fishery. Some larger catches (between 10 and 20 tonnes) are recorded from the early and mid 1990s but recorded landings have waned since that time.

46 There are no estimates of recreational or customary catch of this species in this area. MFish considers that, given the level of commercial landings, a component of the inevitable bycatch from commercial vessels will be retained as recreational catch by crew members, and also by recreational scallop fishers.

OYS 5A

46 Stewart Island (e.g. Port Adventure, Port Pegasus) and Fiordland have dredge oyster populations. The reported catch of oysters appears to have been low over recent years, but there are undoubted populations within the area. MFish notes that the Guardians of Fiordland's Fisheries and Marine Environment has developed a Fiordland Marine Conservation Strategy recommending that no commercial fishing is permitted inside fiord habitat lines[2]. The present government is currently seeking to implement this strategy and, therefore, it seems likely that commercial access to oysters will be restricted in Fiordland.

47 There is known recreational and customary catch from the Stewart Island and Fiordland areas, but there are no reliable estimates of the amount harvested. Accessible stocks do occur in Port Adventure, Lords River, Port Pegasus and several of the fiords, and these stocks are known to be used by hunters, trampers and fishers.

OYS 7A, 7B

48 It is unlikely that there are any substantial dredge oyster populations in these areas. There are no estimates of recreational or customary catch of this species for these areas.

OYS 7C

49 Cloudy Bay, Port Underwood, and possibly areas of Cook Strait may have areas with suitable dredge oyster habitat. Commercial fishers have fished the area in the past. Oyster beds are considered to have occurred here, but the size of the resource is not likely to be large and, therefore, not commercially sustainable. There are no estimates of recreational or customary catch of this species for this area.

OYS 8A

50 There are some minimal landings recorded from OYS 8 and oysters are known to occur in the area, however it is unlikely that commercially sustainable populations are present. There are no estimates of recreational or customary catch of dredge oysters for this area.

OYS 9

51 Manukau Harbour is known to have dredge oysters and it is not unreasonable to consider that dredge oysters occur in other northern, west coast harbours. Recorded commercial landings have been, effectively, zero over the last five years. There are no estimates of recreational or customary catch for this area.

Allocation of TAC

52 The TAC constitutes a composite of the respective stakeholder groups' catch allocations, plus any other fishing-related mortality. When setting any TAC, a TACC must be set, as well as allowances determined for customary and recreational fishing interests and for any incidental fishing related incidental mortality.

[2] Guardians of Fiordland's Fisheries & Marine Environment Inc 2003: Fiordland Marine Conservation Strategy. Page 43. www.fiordland-guardians.org.nz

53 The 1996 Act stipulates a process by which the TAC is to be allocated. However, no explicit statutory mechanism provides guidance as to the apportionment of the TAC between sector groups either in terms of a quantitative measure or prioritisation of allocation. In shared fisheries MFish has a policy preference in favour of the catch history allocation model in the absence of clear information to the contrary.

Recreational allowance

54 The proposed recreational allowances for each QMA are set out in Table 1.

55 There is very little quantative information available for estimates of recreational catch, however, MFish is aware that dredge oysters are highly prized, but there is little information available about the small beds that are accessible to recreational fishers. Anecdotal information suggests that harvest estimates given in Annex 2 are likely to be under-estimates. MFish is proposing that nominal one tonne allowances be allowed for recreational harvest in most fishstocks (i.e. OYS 1, 2A, 7A, 7B, 7C, 8A, 9) and two tonne allowances for those fishstocks where it is considered that the recreational harvest may be higher (i.e. OYS 3, 4, 5A).

Customary Maori allowance

56 The customary Maori allowances for each QMA are set out in Table 1.

57 There are no QMA-wide harvest estimates available to accurately provide for a customary allowance in the TAC of any oyster stocks considered here. For stocks where no harvest estimates exist, but the stock is known to be of importance to Mäori, policy guidelines indicate that a catch level similar to the known recreational catch should be included. Oysters are known to be very important to Maori as a food source and have been harvested for this purpose consistently through history. Therefore, MFish proposes that the customary Maori allowances of oysters be the same as those provided for recreational harvest (see above).

58 In considering the proposed allowances for customary non-commercial interests, the Minister is required to take into account any mätaitai reserve or s 186A closure in the relevant QMA. MFish does not consider that the allowances proposed for customary harvest will detract from the intent of any mätaitai reserve or s 186A closure presently in place, nor will the allowance be likely to be insufficient in terms of the customary use of tiopara (mud oyster) in these areas.

Allowance for other sources of fishing-related mortality

59 The proposed allowances for other sources of fishing-related mortality for each QMA are set out in Table 1.

60 There is no information on the current level of other sources of fishing-related mortality for dredge oysters within the QMAs considered here. However, as dredge oysters are highly prized, it is not unreasonable to consider that there is a degree of poaching and the use of dredges as the main harvest method also likely contributes a source of mortality to the stocks. MFish, therefore, proposes to set a nominal one tonne allocation for other sources of fishing related mortality for all stocks considered in this paper. However, as with all allocations and allowances, this may be reviewed at any stage when more information becomes available.

TACC

61 The proposed TACCs for each QMA are set out in Table 1.

62 As set out in the policy guidelines in a previous chapter of this document, the TACC for all oyster stocks considered in this paper should be based on the current commercial catch from each fishery. But, as noted, above the commercial catch information is unreliable. The TACCs proposed provide nominal catch levels to accommodate likely catch of dredge oyster in each area, including bycatches of dredge oyster, and take into account whether dredge oyster stocks have occurred in the area or suitable areas of habitat occur in each fishstock. With the availability of only unreliable catch information, it is not possible to stipulate whether the proposed TACCs are above or below the level of current commercial catch.

OYS 1, 2A

63 These areas provide suitable habitat for dredge oysters, and there have been minimal some commercial landings. Given these factors, MFish proposes a nominal TACC of 1 tonne for each of these areas.

OYS 3

64 The Canterbury/Otago coastline has known populations of dredge oysters off Timaru and in estuaries and inlets of coastal Otago. There may also be oysters around Banks Peninsula and Pegasus Bay. Some landings are recorded over the last five years, however, these are all small. MFish proposes a TACC of 2 tonnes for OYS 3.

OYS 4

47 There is a known fishery for dredge oysters at the Chatham Islands. Landings are mostly as a bycatch of the scallop fishery, however, some targeting has occurred in the past. The fishery was commercially investigated in the early 1990s when the Bluff fishery was closed but this did not result in a sustainable commercial fishery. Some larger catches (between 10 and 20 tonnes) are recorded from the early and mid 1990s but recorded landings have waned since that time. MFish proposes a TACC of 15 tonnes for OYS 4.

OYS 5A

65 Stewart Island (e.g. Port Adventure, Port Pegasus) and Fiordland have dredge oyster populations. The reported catch of oysters appears to have been low over recent years, but there are undoubted populations within the area. MFish notes that the Guardians of Fiordland's Fisheries and Marine Environment has developed a Fiordland Marine Conservation Strategy recommending that no commercial fishing is permitted inside fiord habitat lines[3]. The present government is currently seeking to implement this strategy and, therefore, it seems likely that commercial access to oysters will be restricted in Fiordland. MFish proposes a TACC of 3 tonnes be set for OYS 5A.

[3] Guardians of Fiordland's Fisheries & Marine Environment Inc 2003: Fiordland Marine Conservation Strategy. Page 43. www.fiordland-guardians.org.nz

OYS 7A, 7B

66 It is unlikely that there are any substantial dredge oyster populations in these areas. MFish proposes a nominal TACC of 1 tonne be set for each area to provide for any incidental bycatches.

OYS 7C

67 Cloudy Bay, Port Underwood, and possibly areas of Cook Strait may have areas with suitable dredge oyster habitat. Commercial fishers have fished the area in the past. Oyster beds are considered to have occurred here, but the size of the resource is not likely to be large and, therefore, not commercially sustainable. MFish proposes a TACC of 2 tonnes be set for OYS 7C.

OYS 8A

68 There are some minimal landings recorded from OYS 8 and oysters are known to occur in the area, however it is unlikely that commercially sustainable populations are present. MFish proposes a nominal TACC of 1 be set for OYS 8A to provide for any incidental bycatches by any method.

OYS 9

69 Manakau Harbour is known to have dredge oysters and it is not unreasonable to consider that dredge oysters occur in other northern, west coast harbours. Recorded commercial landings have been minimal in recent years. Given the known presence of dredge oyster, MFish proposes a TACC of 1 tonne be set for OYS 9.

Other Management Measures

Return of oysters to the water

70 MFish proposes that oyster stocks be added to the Sixth Schedule of the Fisheries Act to allow them to be returned to the water should they be landed inadvertently, with stated requirements that they must be likely to survive and must be returned to the waters from which they were taken as soon as practicable. Details of the proposal are set out in Annex One to the oyster section.

Redundant fisheries regulations

71 MFish also proposes to revoke regulation 12(1)(b) of the of Fisheries (Challenger Area Commercial Fishing) Regulations 1986 which restricts fishing for dredge oysters in the Challenger management area to the hours of daylight.

72 MFish is not proposing to make any changes to the regulations imposing seasons, minimum sizes, or closed areas to fishing for dredge oyster.

Consequential amendment to regulations

73 MFish notes that amendments are required to the Fisheries (Reporting) Regulations 2001 as a consequence of introducing these oyster fisheries into the QMS. Details of the proposed amendments are attached as Annex One to this section.

Deemed Value and Overfishing Threshold

74 MFish considers that the dredge oyster stocks under consideration fall within the same fishstock category as ascribed to OYS 7. MFish proposes to set the annual deemed value at 200% of the highest port price in the previous year, and the interim deemed value at 50% of the annual deemed value.

75 MFish proposes to set an interim deemed value at $4.00 per kg and an annual deemed value of $8.00 per kg for oysters for the 2005-06 fishing year. The proposed deemed value is set using a port price of $4.00 per kg (based on the 2003 port price survey).

76 MFish does not propose to set an overfishing threshold for oysters unless monitoring of catches suggests that this is required in the future.

Statutory Considerations

77 Before setting (or varying) any sustainability measure (which includes a TAC), the Minister must consider a range of factors as outlined in the Statutory Obligations and Policy Guidelines section.

a) The purpose of the Act (s 8) is to provide for the utilisation of fisheries resources while ensuring sustainability. The proposed management measures seek to ensure the sustainability of oysters by setting TACCs which reflect recent catches from each fishery and TACs which recognise the paucity of non-commercial oyster stock information that exists throughout New Zealand, and the potential for these oysters to become locally depleted;

b) The Act includes obligations to avoid, remedy, or mitigate any adverse effects of fishing on the aquatic environment, and that those effects and management measures are taken into account when decisions are made about the sustainable utilisation of fishery resources. This has been discussed in paragraphs 13 & 25;

c) Under s 13 of the Act, the TAC should be set at a level that moves the stock towards the level that can produce the MSY. No scientific stock assessment information is available indicating whether oyster stocks are at, above, or below a level that can produce MSY. Despite this, there are concerns about the sustainability of dredge oyster stocks. This has been discussed in para 14. MFish considers that the proposed TACs should enable oysters to be managed at a sustainable level in the short term, with further information required to determine the sustainability of the proposed TACs in the mid to long term;

d) Section 13(2)(b)(ii) also requires consideration of the environmental conditions affecting the stock. While dredge oyster populations inhabit a wide range of habitats, from intertidal rocks to 100m depth, they are subject to spatial and temporal fluctuations in stock size and structure due to the influence of environmental factors on population dynamics. Factors include temperature, salinity, hydrology and the effects of the parasite *B. exitiosus*. Inshore and intertidal dredge oysters populations are susceptible to increased siltation which can smother both adult oysters and recruitment settlement surfaces; increased organic and mineral pollution may inhibit oyster growth and cause a loss or reduction of suitable habitat area. For example, increased levels of silt washed onto the beds from urban development. All of these factors make oysters susceptible to localised depletions;

e) Section 9(a) requires that associated or dependent species should be maintained above a level that ensures their long term viability. Similarly, s 9(b) requires the maintenance of biological diversity. There is no evidence that associated or dependent species will be threatened by harvesting these stocks, particularly as it is anticipated that the stocks will largely be harvested as a bycatch of targeting other species. Section 9(c) requires the protection of habitat of particular significance to fisheries management. Dredge oyster stocks considered in this paper are harvested mainly by dredging, followed by hand gathering and diving. Hand gathering and diving are not likely to affect the environment, but bottom dredging can have adverse effects on the aquatic environment and affect biological diversity. Dredging, especially in areas with high silt levels, is thought to remove settlement surfaces and suspend silt that causes high mortality in newly settled recruits. If dredging effort increases, there may be adverse effects on settlement and recruitment of oysters;

f) The extent to which an increase in dredging would promote adverse effects is unknown. Previously undredged areas will be subject to a higher level of adverse effects than already modified habitat. MFish considers that new areas could be dredged once dredge oysters enter the QMS, however, the proposed TACCs have primarily been set to accommodate incidental bycatch fisheries and, therefore, should not result in significant un-dredged areas being heavily fished;

g) There are a wide range of international obligations relating to fishing (including sustainability and utilisation of fishstocks and maintaining biodiversity). MFish considers the s 5 considerations arising from New Zealand's international obligations and the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 are adequately addressed by the management proposals for oysters;

h) Section 11(1)(a) requires that any effects of fishing on the stock and aquatic environment are taken into account. This approach is intended to ensure that the risk of any effect of fishing is evaluated, and any positive effects from existing practices or new proposals are identified. MFish considers that proposed TACs will limit any adverse effects of fishing on the stock or the aquatic environment;

i) Section 11(1)(b) requires that existing controls are taken into account when setting or varying a sustainability measure such as a TAC. Areas where commercial access is restricted are defined by regulation. Further, there is a commercial size limit restriction of 58 mm, and a closed season from 1 September until the end of February for South Island fisheries. There is a daily bag limit for recreational fishers of 50 per person per day, and a minimum size limit of 58mm in all areas except when taken by hand gathering in OYS 3, where there is no size limit to allow access to dredge oysters that grow upon the rocks as these oysters do not reach the minimum legal size of 58 mm. MFish considers that there is insufficient evidence upon which to base any deliberation upon these measures at this time, but information may become available in time after introduction to the QMS;

j) Section 11(1)(c) recognises that biological systems can be inherently variable, and stocks are prone to fluctuations in abundance. This does not apply to dredge oysters;

k) Section 11(2) requires the consideration of various other matters relating mainly to planning documents. MFish is not aware of any considerations in any regional policy statement, regional plan or proposed regional plan under the Resource Management Act 1991 or the Conservation Act 1987 that are specifically relevant to setting TACs for oysters. Similarly, in accordance with s 11(2A) MFish is not aware of any fisheries or conservation services decisions, or any decisions not to require conservation or fisheries services that are relevant to setting TACs for dredge oysters. No fisheries plans have been approved that would have any bearing on setting the TACs for dredge oysters;

l) As required under s 12(2)(c), MFish considers that the proposals for dredge oyster meet the requirements of s 7 and s 8 of the Hauraki Gulf Marine Park Act 2000. The proposed catch limits for dredge oyster stocks into the QMS will allow for the sustainable utilisation of the species by all fishing interests.

m) The Act itemises (s 21) the relevant fishing interests and fishing-related mortality to be allowed for before setting a TACC. In setting the allowances for Mäori customary non-commercial interests the Minister is required to take into account mätaitai reserves notified in the Gazette under s 186 or temporary closures notified under s 186A when allowing for customary fishing interests. There are mätaitai in some QMAs. However, as yet they do not propose any changes to current controls on dredge oyster fisheries. No area has been closed or fishing method restricted under section 186A due to issues associated with dredge oysters.

n) In allowing for recreational fishing the Minister is required to take into account any non-commercial fishing areas under s 311 of the Act. No such areas are in place at this time.

Preliminary Recommendations

78 MFish recommends that the Minister:

a) **Agree** to set a TAC of 4 tonnes for OYS 1 and within that TAC set:

   i) A customary allowance of 1 tonne;

   ii) A recreational allowance of 1 tonne;

   iii) An allowance for other fishing-related mortality of 1 tonne; and

   iv) A TACC of 1 tonne.

b) **Agree** to set a TAC of 4 tonnes for OYS 2A and within that TAC set:

   i) A customary allowance of 1 tonne;

   ii) A recreational allowance of 1 tonne;

   iii) An allowance for other fishing-related mortality of 1 tonne; and

   iv) A TACC of 1 tonne.

c) **Agree** to set a TAC of 7 tonnes for OYS 3 and within that TAC set:

   i) A customary allowance of 2 tonnes;

   ii) A recreational allowance of 2 tonnes;

   iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 2 tonnes.

d) **Agree** to set a TAC of 20 tonnes for OYS 4 and within that TAC set:

i) A customary allowance of 2 tonnes;

ii) A recreational allowance of 2 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 15 tonnes.

e) **Agree** to set a TAC of 8 tonnes for OYS 5A and within that TAC set:

i) A customary allowance of 2 tonnes;

ii) A recreational allowance of 2 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 3 tonnes.

f) **Agrees** to set a TAC of 4 tonnes for OYS 7A and within that TAC set:

i) A customary allowance of 1 tonne;

ii) A recreational allowance of 1 tonne;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 1 tonne.

g) **Agree** to set a TAC of 4 tonnes for OYS 7B and within that TAC set:

i) A customary allowance of 1 tonne;

ii) A recreational allowance of 1 tonne;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 1 tonne.

h) **Agree** to set a TAC of 5 tonnes for OYS 7C and within that TAC set:

i) A customary allowance of 1 tonne;

ii) A recreational allowance of 1 tonne;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 2 tonnes.

i) **Agree** to set a TAC of 4 tonnes for OYS 8A and within that TAC set:

i) A customary allowance of 1 tonne;

ii) A recreational allowance of 1 tonne;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 1 tonne.

j) **Agree** to set a TAC of 4 tonnes for OYS 9 and within that TAC set:

i) A customary allowance of 1 tonne;

ii) A recreational allowance of 1 tonne;

iii) An allowance for other fishing-related mortality of 1 tonne1; and

iv) A TACC of 1 tonne.

k) **Agree** to include all the above oyster stocks on the Sixth Schedule of the Act.

l) **Agree** to revoke Regulation 12(1)(b) of the Fisheries (Challenger Area Commercial Fishing) Regulations 1986.

m) **Agree** to amend the Fisheries (Reporting) Regulations 2001 to outline the codes to be used by fishers when completing their statutory catch returns.

n) **Agree** to set interim deemed values for the dredge oyster stocks at $4.00 per kg and annual deemed values of $8.00 per kg.

ANNEX ONE

Sixth Schedule - return of oysters to the water

Background

79 MFish proposes to provide for the return of oysters to the water by adding oysters to the Sixth Schedule of the Act, with stated requirements that they are likely to survive, and must be returned to the same waters from which they were taken as soon as practicable.

80 Under s 72 of the Act, once oysters are introduced to the QMS, commercial fishers would be obliged to retain oysters obtained by any fishing method, unless oysters are listed on the Sixth Schedule

81 If oysters were added to the Sixth Schedule, commercial fishers who took oysters as an unintentional bycatch, out of season, or from closed areas would be able to return them to the sea alive, provided they comply with the requirements set out in the Schedule.

Problem definition

82 Oysters are occasionally caught as a bycatch in bottom trawls and dredges. Any species subject to the QMS, if taken, must be landed. Unless oysters are added to the Sixth Schedule any oyster taken must be landed. However, there is a closed season for dredge oyster from 1 September until the last day of February and, therefore, dredge oyster caught as bycatch during this period will be required to be returned to the water. Further, oysters that are brooding spat are not marketable and fast growing oysters may be of legal size but not of marketable quality and require more growth to acquire the depth of shell needed to meet market standard. Dredge oysters are robust enough to enable them to be returned to the sea and subsequently survive. Requiring that all oysters be retained is neither appropriate, nor efficient, particularly as oysters are not caught in large volumes as bycatch.

Preliminary consultation

83 No preliminary consultation has been undertaken concerning adding oysters to the Sixth Schedule.

Options

Non-Regulatory Measures

84 There is no non-regulatory mechanism for returning fish taken under the QMS to the sea.

Regulatory Measures

85 To implement this measure, it is necessary to add oysters to the Sixth Schedule of the 1996 Act.

Costs and benefits of the proposal

86 Adding oysters to the Sixth Schedule will provide fishers who catch oysters incidentally as a bycatch with the flexibility to legally return these fish to the sea (provided they are immediately returned alive). Allowing oysters to be returned to the sea is the least cost option for fishers since they will not be penalised by deemed value payments.

Administrative implications

87 There are no significant administrative implications.

Removal of commercial scallop prohibitions

Background

88 At present, there is a regulation in the Fisheries (Challenger Area Commercial Fishing) Regulations 1986 that prohibits the commercial harvesting of dredge oysters at night:

a) Regulations 12(1)(b) of the Fisheries (Challenger Area Commercial Fishing) Regulations 1986

Problem definition

89 This regulation is closely allied with a similar regulation for the usual target fishery, scallops, of which dredge oyster is often a bycatch.

90 It is anticipated that the majority of dredge oyster taken will be incidental bycatches rather than catches taken by targeted fishing. Therefore, the need for this restriction is no longer relevant. MFish is also proposing that this similar restriction be removed for the scallop stocks entering the QMS at the same time as the dredge oyster stocks considered in this paper.

Preliminary consultation

91 No preliminary consultation has been undertaken concerning the removal of this commercial dredge oyster prohibition.

Options

Non-Regulatory Measures

92 Not relevant

Regulatory Measures

93 The commercial dredge oyster prohibition is imposed by regulation. The only option to remove the prohibition is to amend relevant legislation.

Costs and benefits of the proposal

94 Revoking the regulation removes the requirement to enforce the restriction on fishing at certain times of the day and will result in improved harvest efficiency for commercial fishers.

95 There are no obvious costs associated with this proposal. The benefit is that redundant regulations will be removed.

Administrative implications

96 There are no significant administrative implications.

Amendment to regulations

Consequential amendments to the Fisheries (Reporting) Regulations 2001

Background

97 It is proposed to make consequential amendments to the Fisheries (Reporting) Regulations 2001 by amending:

a) Table 1 of Part 1 of Schedule 3 of those regulations which specifies the codes to be used when completing catch returns which must be furnished to the Chief Executive. This amendment will incorporate codes which reflect the QMAs for dredge oysters.

b) Table 2 and Table 9 to remove reference to the Area Name "Part-Southland" and the area reference number used in the fishstock code of "5B".

98 The Fisheries (Reporting) Regulations 2001 provide the framework for the completion and furnishing of statutory catch returns by fishers to the Chief Executive. Information contained in these returns is used for research, stock assessment, enforcement and administrative reasons (including balancing catch against ACE). With the revised QMAs established by the Minister, it is appropriate to amend these regulations to ensure that they reflect the Minister's decision establishing a number of QMAs for dredge oysters.

Problem definition

99 The obligations for fishers to report their catch and the codes used to complete these returns should reflect the Ministers decisions on QMAs for each species to be introduced into the QMS on 1 October 2005.

Preliminary consultation

100 No direct consultation on the need to amend these regulations has been undertaken as it is a consequential amendment flowing from the Minister's QMA decision.

Options

101 As the reporting framework is contained in regulations, there is no other option than to amend these regulations.

Costs and benefits of the proposal

102 The proposed amendments clarify the obligations for fishers when completing their statutory returns. Regulatory clarification means fishers are aware of their reporting obligations and complete their returns in the simplest fashion possible.

Administrative implications

90 Minor amendments to forms and explanatory notes will be required consequential to this regulatory amendment.

ANNEX TWO

Species Information

Species Biology

91 The dredge oyster *Ostrea chilensis* (= *Ostrea lutaria, Tiostrea lutaria, Tiostrea chilensis*) is a bivalve mollusc of the family Ostreidae (true oysters) comprising many species that are distributed worldwide. The most important commercial species include the Chilean oyster *O. chilensis*, with populations in New Zealand and Chile (Buroker et al. 1983), the European oyster *O. edulis*, and the American oyster *O. virginica*.

92 Oysters are heavy-shelled bivalves with curved left, usually upper, valves and flat right, lower valves. The shape of the shell and colouration vary with habitat and growth rate. Although Powell (1979) gave three species in the genus *Ostrea*, *O. lutaria*, *O. charlottae*, and *O. heffordi*, these were considered to be ecomorphs of *O. chilensis* by Buroker et al. (1983).

93 Populations of the dredge oyster are widely found from the intertidal to a depth of 100 m throughout New Zealand coastal waters and at the Chatham Islands. Live oysters have been recorded from depths down to 300 m. Local populations can attain high densities, but dredge oysters are targeted by commercial fishers only in Foveaux Strait. Commercial fisheries exist for dredge oysters in the Challenger area and at the Chatham Islands, where they are landed as bycatch of scallop fisheries.

94 Dredge oysters are known from inlets and harbours around New Zealand, populations existing for example in shallow waters at Stewart Island, Fiordland, Marlborough Sounds, Pauatahanui Inlet, and in the Bluff, Otago, Lyttelton, Akaroa, Wellington, Kaipara, and Manukau harbours. They are also found in deeper offshore waters along the south and east coast of the South Island, particularly off Timaru and Akaroa, off Tory Channel, and off the North Island along the coasts of Taranaki, Wairarapa, Hawkes Bay, Bay of Plenty, and Firth of Thames.

95 Dredge oysters tolerate a broad range of salinities, from 31–35 ppt in Foveaux Strait down to 3–5 ppt for extended periods in shallow inlets of Stewart Island. Its temperature tolerances are also broad, from 9–10°C in winter in Foveaux Strait (Cranfield 1968b) to 27°C in summer in the Manukau Harbour.

96 There have been no biological studies that are directly relevant to the recognition of separate stocks of dredge oysters around New Zealand. Reproduction in dredge oysters is characterised by an extended incubation period culminating in the release of benthopelagic larvae, most of which settle within minutes. This is likely to lead to more or less distinct substocks. Indeed, differences in growth rates and morphology of oysters within the Foveaux Strait fishery suggest genetically or environmentally different populations. However, some early-stage larvae are also released into the plankton in Foveaux Strait and in Golden and Tasman Bays, in the Hauraki Gulf and probably elsewhere. Although the proportion of larvae released, and its interannual variability, are unknown, such larvae may maintain connectivity between populations. Information currently available, however, supports limited larval dispersion from

localised patches of oysters, suggesting genetically and geographically more or less distinct stocks around New Zealand.

Reproduction

97 Oysters are protandrous hermaphrodites - they can possess both sex organs or change sex from male to female as they grow. Females mature at different sizes according to area (Table 1). Spawning takes place in the spring or summer months in water temperatures above 10°C in Foveaux Strait, above 14°C in the Challenger area, above 18°C in Wellington, and above 13°C in the Hauraki Gulf and Manukau Harbour. The proportion of the population breeding annually varies from place to place (Table 2). For example, reported only 6–18% of the sexually mature oysters spawning as females each year in Foveaux Strait.

Table 2: Size at sexual maturity of female dredge oysters.

Foveaux Strait	50 mm diameter (49 mm height)	Cranfield & Allen (1977)
Otago Harbour (sandbank)	42 mm diameter	Westerskov (1980)
Otago Harbour (rock-oyster)	28 mm diameter	Westerskov (1980)

Table 3: Percentage of population of dredge oysters breeding as females annually.

Foveaux Strait	6-18%	Cranfield & Allen (1977)
Foveaux Strait	~50%	Jeffs & Hickman (2000)
Otago Harbour (sandbank)	21-65%	Westerskov (1980)
Otago Harbour (rock-oyster)	24-36%	Westerskov (1980)

98 Females produce few (7,000–120,000) large (300–350 µm), yolky eggs that are thought to be fertilised in the inhalant chamber and brooded on the gills, and which then develop over 15–38 days (depending on water temperature) to late stage larvae (pediveligers). Mean fecundity of incubating oysters in Foveaux Strait was estimated to be 5.09×10^4 larvae. The larvae are very distinctive in appearance and are released at 470–556 µm in length in Foveaux Strait, 326–551 µm in northern New Zealand, 410–440 µm in Wellington, and 394–533 µm in the Challenger area. The planktonic swimming phase of most larvae is measured in minutes, at most, for oysters in Foveaux Strait, the majority of larvae settling immediately on release. Spatfall intensity closely paralleled adult density and little spatfall was observed any distance from stocks of adults.

99 An unknown percentage of larvae are, however, released at smaller sizes and spend time in the plankton. Challenger oyster larvae appear to be planktonic for longer periods because significantly smaller and less developed larvae have been collected in the plankton there than in Foveaux Strait. This could lead to enhanced gene flow and wider dispersal in Tasman and Golden Bays, where the water column is usually strongly stratified over summer months.

100 In Foveaux Strait, spat settlement is primarily during summer, from December to

February, whereas in northern New Zealand settlement peaks in late winter and early spring. Larvae prefer to settle on the under-surface of substrates, which may be an adaptation to prevent smothering by silt and other fine particles. In Foveaux Strait larvae settle primarily on live oysters, oyster shell, and circular saw shells *Astraea heliotropium*. Although settlement is predominately on under surfaces of oysters and shell, most surviving spat are attached to the left (curved and generally uppermost) valve of living oysters.

Growth and age

101 Estimating growth and size at age in oysters is problematic because of high variability in growth and variability in shell dimensions between individuals. As a result of this variability, together with the extended period of spat settlement, length frequencies do not have modes that can be tracked through time to estimate growth and mortality. In Britain, acetate peel replicas of polished and etched sections of the shell have been used to age the European flat oyster *O. edulis* as well as the dredge oyster *O. chilensis* transferred there, but annual growth lines in Foveaux Strait oysters are not well defined. Growth in New Zealand dredge oysters has therefore been estimated mainly from mark-recapture data and from captive ongrowing.

102 Estimated growth in Challenger dredge oysters derived from recapture data and concluded that growth was slow and highly variable, with some individuals not increasing in size after two years. Dredge oyster spat grown in Kenepuru Sound and in Wellington Harbour in suspended culture grew to a size of 20 mm in three to four months. Juvenile oysters on-grown in cages in Foveaux Strait showed oysters can grow to about 40 mm in height in 18 months in experimental bottom culture, but would take at least three years to reach marketable size. Growth can be highly variable for oysters held on rafts in Kenepuru Sound but averaged 82 mm over 18 months for spat ongrown from four months of age. Reports of oysters growing to legal size in less than two years on the shells of enhanced scallops suggest oysters are capable of rapid growth when the environmental conditions are optimal.

103 There was evidence for strong seasonal variation in growth, with no mean growth - or even slightly negative growth presumably through shell abrasion - over winter.

104 Growth rate of oysters in Foveaux Strait has also been estimated from height increment data. It varied between years and between areas of Foveaux Strait. Spat generally grow 5–10 mm in height by the winter after settlement. Mean height after one year is 18–25 mm, 25–35 mm after two, 30–51 mm after three, 40–65 mm after four, and 65–75 mm after the fifth year. The oysters recruit to the legal-sized population (a legal-sized oyster will not pass through a 58 mm diameter ring, i.e. it must be at least 58 mm in the smaller of the two dimensions, height or length) at four to eight years of age (Table 3).

Table 4: Length-based growth parameters (and 95% confidence intervals) for dredge oysters.

Otago Harbour (sandbank)	Diameter (H + L)/2, D∞ 106 mm, K = 0.33	Westerskov (1980)
Foveaux Strait		Dunn et al. (1998)
Area	L_∞	k
Area A	92.2 mm (86.7-97.9)	0.48 (0.41– 0.54)
Bird I.	76.2 mm (73.5-78.9)	0.85 (0.76– 0.94)
Lee Bay	77.8 mm (73.4-81.4)	0.77 (0.68– 0.86)
Saddle	81.0 mm (77.3-84.9)	0.51 (0.50– 0.52)
ϕ		-0.03

Mortality

105 In Foveaux Strait, 2% of the oyster spat survive the first winter, most mortality appearing to result from predation by polychaetes, crabs, and small gastropods.

106 Mortality of adult oysters (apart from epizootics) is probably low (Table 4).

Table 5: Estimates of natural mortality for dredge oysters.

Area	Natural mortality (M):	Estimate source
Foveaux Strait	0.042	Dunn et al. (1998a)
Foveaux Strait	0.1	Assumed (Allen 1979)
Challenger	0.2	Drummond (1994)

107 Two recruit-sized oysters, one tagged in 1973 and the other in 1976 or 1977, were recaptured live in early 2003 suggesting that the value of *M* can be exceptionally low. These two oysters lived to recruit size (four to eight years) and survived a further 26–29 years and grew very little in length or height in that time. One of the largest oysters recorded from Foveaux Strait was caught in 1999 and measured 116 mm in length and 131 mm in height.

Fisheries Characteristics

Commercial Catch

108 Records of oyster catches for non-QMS stocks are poor and should not be used to assess the size or distribution of non-QMS dredge oyster stocks.

Catch history

109 Data from the Ministry of Fisheries databases have been summarised to show estimated catches and reported landings for non-QMS dredge oyster stocks (Table 5). Totals for OYS are reported in green weight (t) and include catches and landings for the QMS stocks OYS 7 (Challenger) and OYS 5 (Foveaux Strait). Large differences exist between estimated catches and landings (Diff1). Reported landings of non-QMS dredge oyster stocks (Diff2), presumably caught as bycatch, range from 4–1467 t and are at times greater than dredge oyster catches in OYS 7. These estimates are almost certainly errors.

Catch by FMA

110 Estimated catches are reported by a number of different statistical and fisheries management areas, often for the same stock. Estimated catches from reporting areas were combined (with approximation at some boundaries) into FMAs. Catches reportedly taken within QMS stock boundaries (OYU 5 and OYS 7) were removed

from the data, as were null areas. Catches within FMAs, but outside QMS dredge oyster stock boundaries, have been summarised as FMA 5A and FMA 7A. Landings are reported by 'Fishstock', which for non-QMS species are the standard FMAs. Data for dredge oysters since the 1990s are shown in Table 6.

Table 6: **Reported and adjusted landings and estimated catch for dredge oysters (OYS), 1989/90–2001/02 fishing years from the Ministry of Fisheries databases and reported landings from Annala et al. (2002). All dredge oyster landings (LFRR 1) and estimated catches from CELR (CELR 1) shown are from Ministry of Fisheries databases. Diff1 shows difference between all landings (LFRR 1) and all estimated catches (CELR 1). Landings from the Challenger dredge oyster stock (OYS 7) alone are shown as LFRR 2, and landings adjusted with a correction factor for discards as LFRR 3. All landings from the Foveaux Strait stock (OYS 5), including special permit landings in pre-March 1996, are given as LFRR 4 from Annala et al. (2002). Diff2 is the differences between all dredge oysters landed (LFRR 1) and landings from Foveaux Strait and Challenger QMS stocks (LFRR 3 + LFRR 4), indicating total landings for non-QMS stocks. Landings reported in tonnes green weight.**

Fishing year	LFRR 1	CELR 1	Diff1	LFRR 2	LFRR 3	LFRR 4	Diff2
1990/91	3830.2	3794.4	35.8	208.0	175.0	3643.0	12.2
1991/92	4470.0	4466.1	3.8	185.0	206.0	4266.0	-2.0
1992/93	821.8	821.2	0.7	279.0	294.0	417.2	110.6
1993/94	716.9	630.7	86.2	476.0	497.0	248.1	-28.2
1994/95	974.8	841.6	133.1	584.0	598.0	314.9	61.9
1995/96	1077.9	1008.2	69.7	694.0	745.0	309.5	23.4
1996/97	2085.5	2062.2	23.3	580.0	674.0	94.7	1316.8
1997/98	2066.8	1971.2	95.6	444.0	600.0	-	1466.8
1998/99	778.6	2164.4	-1385.8	456.0	404.0	-	374.6
1999/2000	437.1	1216.8	-779.7	355.0	332.0	-	105.1
2000/01	198.2	330.0	-131.8	132.0	140.0	-	58.2
2001/02	224.8	302.4	-77.6	-	25.0	-	199.8
2002/03	5.4	4.9	0.5	-	1.4	-	4.0

Table 7: **Estimated catch (t) of dredge oysters for fishing years 1989/90 to 2001/2002 from various reporting areas summarised by FMA and fishing year. Estimated catches within QMS stock boundaries OYU 5 and OYS 7 have been removed with remaining catches summarised as FMA 5B and FMA 7A.**

Fishing year	FMA 1	FMA 2	FMA 3	FMA 4	FMA 5B	FMA 7A	FMA 9	Total
1989/90	4.1	0.0	0.0	0.3	0.0	0.2	0.0	4.6
1990/91	0.0	0.0	2.3	2.4	0.0	0.0	0.0	4.8
1991/92	10.3	1.6	0.1	20.2	3.4	0.0	0.0	35.5
1992/93	0.6	2.0	0.8	4.6	0.0	0.7	0.0	8.7
1993/94	16.7	0.0	4.0	0.0	0.0	0.0	0.0	20.7
1994/95	0.7	2.4	0.3	16.0	0.0	0.0	0.7	20.0
1995/96	0.0	0.0	1.6	12.5	0.0	1.4	0.6	16.0
1996/97	2.3	0.2	0.0	12.6	0.0	1.0	0.9	17.1
1997/98	0.0	0.6	0.2	6.9	19.7	0.2	30.2	57.8
1998/99	0.0	0.0	0.0	1.9	2.1	0.2	0.2	4.3
1999/2000	0.0	0.1	0.0	3.5	0.0	0.0	0.0	3.6
2000/01	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.4
2001/02	0.0	0.0	0.0	3.6	0.0	0.0	0.0	3.6
Total	34.6	6.9	9.5	84.8	25.2	3.7	32.5	

111 The accuracy of estimates from other areas is unknown, but errors are likely. Populations of oysters in commercial densities are not known to exist in FMAs 1 and 9 and estimates in other FMAs are driven by catches made over a small number of years.

Catch by method

112 Estimated catches are summarised by method in Table 7. Virtually all catches were made by dredge. Most of the catches made by bottom trawl, diving, fish traps, hand gathering, and rock lobster pot are likely to be errors.

Table 8: Estimated catch (t) of oysters by method, all FMAs, fishing years 1989/90 to 2001/2002. Dredge catches demoted by D, bottom trawl by BT, diving by DI, fish traps by FP, hand gathering by H, and rock lobster pot by RLP.

	Method					
Fishing year	BT	D	DI	FP	H	RLP
1989/90	0.0	3794.4	0.0	0.0	0.0	0.0
1990/91	2.3	4463.9	0.0	0.0	0.0	0.0
1991/92	12.4	800.5	5.4	0.0	1.3	1.5
1992/93	1.4	629.1	0.0	0.2	0.0	0.0
1993/94	0.0	841.5	0.0	0.1	0.0	0.0
1994/95	0.0	1007.8	0.4	0.0	0.0	0.0
1995/96	0.0	2046.9	0.0	0.0	0.0	0.0
1996/97	0.0	1959.1	0.0	0.0	0.0	0.0
1997/98	0.0	2164.4	0.0	0.0	0.0	0.0
1998/99	0.0	1216.8	0.0	0.0	0.0	0.0
1999/2000	0.0	330.0	0.0	0.0	0.0	0.0
2000/01	0.1	302.2	0.0	0.0	0.0	0.0
2001/02	0.0	4.9	0.0	0.0	0.0	0.0
Total	**16.3**	**19561.5**	**5.9**	**0.3**	**1.3**	**1.5**

Recreational and Customary Catch

113 Dredge oysters are taken by dredging or by diving (sheltered waters only), usually using UBA. Recreational fishers also sometimes hand-gather intertidal dredge oysters in FMA3.

114 Recreational catch of oysters is poorly estimated in recreational fishing surveys to-date, due to the localised nature of the fishery.

115 While dredge oyster is most highly esteemed by recreational fishers, most easily accessible beds have been fished out, and the location of any remaining beds are closely guarded secrets. Therefore, there are no data available for recreational harvest estimates for dredge oyster from the National Recreational Fishing Surveys for any of the QMAs under consideration.

116 Some data are available for recreational catch from commercial vessels. These are shown in Table 8

Table 9. **Recreational take of dredge oyster reported from registered fishing vessels recorded on the MFish FIS data base.**

QMA	Year	Harvest (kg)	Harvest (numbers)
OYS 1	2001/02	6.00	
	2002/03		
	2003/04	20.00	
OYS 2	2001/02		
	2002/03		
	2003/04		
OYS 3	2001/02		
	2002/03		
	2003/04	150.02	
OYS 4	2001/02		
	2002/03		
	2003/04		
OYS 5	2001/02		
	2002/03		300.00
	2003/04		76,861.00
OYS 5B	2001/02		
	2002/03	150.00	
	2003/04		
OYS 7	2001/02	352.94	
	2002/03	204.50	
	2003/04	726.00	
OYS 8	2001/02	7.00	
	2002/03		
	2003/04	250.00	
OYS 9	2001/02	2.00	
	2002/03		
	2003/04		

119 Tiopara (*Ostrea chilensis*) is again highly prized as kaimoana, however, data are scarce and not appropriate to use for establishing a TAC.

Regulatory framework

120 Since QMS introduction all dredge oysters taken from OYU 5 and OYS 7 for commercial purposes must be reported and landed, with the exception of undersize oysters which must be returned to sea. Oysters taken from non-QMS stocks may be returned to sea, as may dredge oysters in OYS 7 if taken during a closed season (there is currently no closed season in OYS 7).

121 Up until the mid 1990s all commercial and non-commercial South Island dredge oyster fisheries operated under a regulated 1 March to 31 August season. However, the commercial OYU 5 season was shortened as a response to *B. exitiosus* in 1996 while both the commercial and non-commercial OYS 7 season was extended to 12 months in 1999 to allow the scallop and oyster seasons to overlap. While there are sustainability reasons for setting an oyster season to avoid disturbance during

settlement, some animals are unsaleable when brooding larvae over the summer period, therefore there is also a strong economic component.

122 Commercial dredge oyster fisheries are regulated by a closed season, closed areas, minimum legal oyster size (58mm), and there are restrictions on the size of oyster dredges. Small parts of the coast adjacent to Stewart Island are closed to commercial fishing for dredge oysters and a few small areas in FMAs 2, 3, 7 and 8 are also closed.

123 The Chatham Islands closed season differs from the general South Island closed season commencing on the 1st day of January in any year and ending with the close of the 31st day of August in that year (both days inclusive).

124 The recreational dredge oyster fishery is regulated by a daily bag limit of 50 dredge oysters and, in the case of most dredge oyster stocks, seasonal closures and a minimum legal size (58mm). There is no closed season in FMA7 (including OYS 7) and in FMA 3 there is no size limit or season for oysters taken by the method of handgathering. Recreational dredge design is not regulated.

125 The customary dredge oyster fishery for most of the South Island is regulated by tangata tiaki.

Monitoring

126 There are no conversion factors currently applicable to any oyster fishery. The weight of oysters accidentally lost, discarded, consumed and landed whole (green) is the reportable weight.

127 Monitoring of commercial catch is based on fishery-dependent reporting. Fishers must complete CELRS and MHRs, which are reconciled with LFRRs submitted by processors.

128 There is no observer coverage in oyster fisheries.

129 Tangata tiaki/ Kaitiaki are required to provide MFish with collated information on the amount, species and location of fish, shellfish or aquatic life taken under customary authorisations.

Fishery Assessment

130 There is no stock assessment information available for the oyster stocks discussed in this paper. There has been no scientific assessment of the maximum sustainable yield for these stocks. The reference or current biomass of any of the oyster stocks is unknown.

Environmental Issues

131 Environmental issues in relation to oyster stocks are discussed in the main section of this paper. There is no information on whether current oyster fishing activities are detrimental to the long-term viability of any other species.

Current and potential research

132 There has been no fisheries research specifically on the oyster stocks discussed in this paper and no fisheries research is planned in the next two to three years for these stocks. However, given the paucity of information on this extremely important coastal resource, it is imperative that, as a first step, abundance and distribution information be collected in a coordinated way throughout New Zealand. It is recommended that all literature sources be examined including university research and regional council reports, and all local knowledge utilized such as tangata whenua, the HFO network and community groups.

Social cultural and economic factors

133 MFish is not aware of any information on particular social, economic, or cultural matters that could influence the setting of TACs and TACCs for oysters beyond those considered in the relevant sections earlier.

PIPI (PPI)

Introduction into the Quota Management System (QMS)

1 Pipi (*Paphies australis)* (other than PPI 1A which was previously introduced) has been gazetted for QMS introduction on 1 October 2005. The quota management areas (QMAs) for pipi stocks (species code PPI) are shown in Figure 1. The fishing year for pipi will be from 1 October to 30 September in the following year. Greenweight will be the unit of measurement for total allowable catch (TAC), total allowable commercial catch (TACC) and annual catch entitlements (ACE).

Figure 1 Quota Management Areas for pipi

Key Issues to be Considered

2 Key issues that need to be taken into account in determining management measures for this fishery are:

a) There are no estimates of biomass or sustainable yields of pipi in any QMA. There is no detailed and consistent information to provide an overview of the resource either nationwide or at the QMA scale.

b) Biologically, pipi are susceptible to localised depletion. They are sedentary, sensitive to environmental factors, vulnerable to habitat disturbance and degradation, and can be readily harvested.

c) Pipi are an extremely important non-commercial resource, which customary and recreational fishers extensively harvest.

d) Illegal catch of pipi is significant in some areas such as northern New Zealand. Recreational fishers may greatly exceed their bag limits.

e) Commercial fishing for stocks considered in this paper has only ever occurred at a small scale in Ohiwa Harbour (within PPI 1C), and as bycatch in the commercial cockle fishery in PPI 7 in two fishing years. A commercial stock in Mair Bank, Whangarei Harbour (PPI 1A) has already been introduced into the QMS.

f) A permit moratorium has prevented the access of new commercial fishers since 1992 (other mechanisms prevented access to these fisheries between the mid 1980s and 1992). MFish indicated in advice on the introduction of pipi into the QMS that it will explore the use of fisheries regulations to constrain commercial harvesting to existing harvest areas.

g) Regulatory measures have been put in place for these stocks, including closed areas and bag limit reductions, due to sustainability concerns.

Management Options

3 MFish proposes that s 13 management arrangements are appropriate for pipi stocks considered in this paper.

4 The proposed options for setting TACs, TACCs and allowances for pipi are outlined below.

Table 1: Proposed TACs, TACCs, and allowances (tonnes) for pipi QMAs

Stock	TAC	Customary allowance	Recreational allowance	Other sources of mortality	TACC
PPI 1B	160	76	76	8	0
PPI 1C	240	115	115	10	0
OR					
PPI 1C	243	115	115	10	3
PPI 2	7	3	3	1	0
OR					
PPI 2	9	3	3	1	2
PPI 3	19	9	9	1	0
PPI 4	3	1	1	1	0
PPI 5	3	1	1	1	0
PPI 7	3	1	1	1	0
OR					
	5	1	1	1	2
PPI 8	3	1	1	1	0
OR					
PPI 8	5	1	1	1	2
PPI 9	21	10	10	1	0

5 MFish also proposes additional management controls including:

a) adding all pipi stocks to the Sixth Schedule to allow pipi caught incidentally in other fisheries, or at undesirable sizes, to be returned to the water;

b) amending reporting regulations;

c) revoking daily catch limits restrictions on commercial fishers in Fisheries Management Area (FMA) 1 and FMA 9;

d) revoking restrictions to commercial access in PPI 1B, PPI 1C and PPI 9 should zero TACCs be the recommended option for these stocks; and

e) setting a deemed value and application of differential deemed values where TACCs are set above zero.

Proposed TACs

6 QMS stocks are managed under section 13 of the Act unless the stock qualifies for management under the criteria outlined in s 14 or s 14A of the 1996 Act. In order for a stock to be added to the Third Schedule under the provisions of s 14, the biological characteristics of the species must prevent the estimation of B_{MSY}, the catch limit for any of the stock must form part of an international agreement, or the stock must be managed on a rotational or enhanced basis. Pipi stocks considered in this paper do not meet any of these criteria.

7 Section 14A enables the Minister to set a TAC that maintains the stock at a level that ensures its long-term viability, while other inter-related stocks can be taken at a level based on B_{MSY}. Pipi are single species fisheries with no inter-related stocks, and MFish does not consider this management strategy to be appropriate.

8 MFish believes that the s 13 management arrangements are appropriate for pipi stocks. Under s 13 there is a requirement to maintain a fishstock at a target stock level, being at, or above, a level that can produce the MSY, having regard to the interdependence of stocks. MSY is defined, in relation to any fishstock, as being 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.

9 As outlined in the Statutory Obligations and Policy Guidelines section, there are guidelines for setting TACs for new stocks. Important considerations for pipi are the biological characteristics of the species; existing stock information; and social, economic and cultural factors. A further consideration is the importance of pipi to non-commercial fishing interests.

Rationale for Proposed TACs

10 There is no comprehensive information available to determine the stock status of pipi in any QMA. There are no fishery-independent estimates of either current biomass or sustainable yields for any pipi stock. In the absence of any stock assessment information at the appropriate scale, or commercial catch limits for any of the pipi stocks considered in this paper, MFish proposes to set TACs that reflect the recent catches from each fishery.

11 Estimates of recent commercial catch can only be made for PPI 1C. There have been no substantial commercial catches in any of the other stocks considered in this paper. Estimates of commercial catch can be based on either recent catch or average catch, depending on whether a fishery is stable or developing. PPI 1C has not been fished since 1999-2000. The fishery cannot be considered *stable* (catches have historically fluctuated significantly), or *developing* (average catches over the last three fishing

years did not significantly increase), so an average of commercial catches in those years when pipi was actually harvested is considered reasonable.

12 For stocks where recreational harvest estimates (diary surveys, etc) have been made, these should be used as a basis for determining current recreational catch. While harvest estimates have been calculated at a few local pipi beds in different areas of New Zealand, the only estimates that have been undertaken relevant to recreational catch at the QMA scale have been the National Recreational Surveys. These surveys have been used to estimate recreational catch.

13 Quantitative estimates of recent customary catch at the QMA level are not available. For stocks where no customary harvest estimates exist but the stock is known to be of importance to Maori, the MFish guidelines provide that an allowance should be made for a catch level similar to the known recreational catch.

14 Quantitative estimates of other sources of fishing related mortality are not available. However, compliance information indicates that significant illegal catches occur in some areas because recreational fishers exceed their bag limits. A nominal level of catch has been estimated in proportion to the size of recreational catch in each stock, to account for this source of mortality.

15 When setting a TAC, a number of closely interrelated factors need to be taken into account. Areas of particular significance related to all stocks are discussed below.

16 Pipi have biological characteristics which make them susceptible to localised depletion. Pipi experience significant natural variability in biomass. Recruitment, growth, and mortality differ from year to year with changing environmental influences including temperature, salinity, exposure, hydrology and water quality. Events such as floods and storms can have significant and substantial localised effects, and can result in complete die-back of beds. For example, major pipi beds at Little Waihi have shifted location and reduced in size since flooding occurred in 2003 and 2004.

17 Pipi are sedentary and easily accessible from the shore, which makes them very easy to harvest. They commonly occur in harbours and coastal areas close to urban centres, which also makes them vulnerable to the effects of habitat disturbance and degradation.

18 All of these factors may result in variable patterns of distribution and abundance, although they are found throughout New Zealand, including the Chatham and Auckland Islands. Pipi are only found in harbours and sheltered beaches, where they occur both intertidally and subtidally. Quite extensive beds of large pipi may occur in subtidal, high current harbour channels, down to water depths of at least seven metres. Some QMAs, including PPI 3, PPI 4, PPI 5, and parts of PPI 7 are less likely to have suitable habitat that would support pipi, because they lack sheltered harbours or beaches.

19 Pipi have ecological significance in coastal areas. They appear to play an important role in maintaining biodiversity in intertidal ecosystems, by providing a food source for fish and seabird populations. They are also thought to play a role in maintaining water quality and sediment stability, especially in harbours.

20 There is no existing stock information for the pipi stocks considered in this paper. Some biomass estimates exist for local beds, particularly in the Auckland FMA,

where specific shellfish beds have been monitored over the last twelve years. However, these local estimates of biomass do not provide an indication of biomass at the QMA level and at this stage there is no way to quantify such information. It is therefore not possible to determine whether pipi stocks are stable, declining or increasing.

21 Anecdotal information suggests that there is likely to already be intensive non-commercial harvesting in beds where pipi biomass is moderate or high. Many beds are reported to be under pressure from existing levels of utilisation. It is unlikely that many pipi beds could support an increase in harvest levels.

22 There are important social, economic and cultural factors to be considered when setting TACs for these stocks. Pipi have high social and cultural significance for many New Zealanders. Pipi are very important to Maori as a food source and there is a consistent historical record of Maori pipi harvesting. Recreational/subsistence harvesters also value pipi highly, and most pipi beds around the country are harvested non-commercially to some extent. As a valuable food source pipi are likely to play an important socio-economic role for local communities, although these stocks have not been commercially harvested to any significant extent. These shellfish provide a reasonably easily obtainable source of seafood for people living in coastal communities or visiting the coast. No specialised implements are needed to harvest pipi, so costs involved are negligible. In recognition of these benefits, provision is proposed to be made in all QMAs for non-commercial harvests at current levels.

Northern New Zealand

23 Anecdotal information suggests that there are higher levels of non-commercial harvesting in the northern North Island. Areas at Cheltenham, and Eastern beach (PPI 1C) are permanently closed to recreational harvesters because of localised depletion. Wilson's Bay to Ngarimu Bay in the western Coromandel (PPI 1C) has been closed to the taking of shellfish including pipi until December 2006. Closures have also been established in other areas, often to recognise customary relationships of tangata whenua with specific areas of coastline. In November 1999 the 150 pipi per day limit was reduced to 50 in the Auckland Coromandel region. The limit of 50 was considered a reasonable day's harvest given the pressure on intertidal shellfish species including pipi in this region.

PPI 1B & PPI 9

24 MFish proposes to set TACs for PPI 1B and PPI 9 based on current utilisation of the fishery. MFish does not consider at this time that there is a capacity for further utilisation or development of these stocks.

25 As outlined above, sustainability concerns have already resulted in a variety of management interventions for these stocks. All areas of FMAs 1 and 9 are closed to commercial harvesting for pipi, with the exception of five areas in which allowance has previously been made for limited historical fishing activity.

26 Anecdotal evidence suggests that most pipi beds in PPI 1B and PPI 9 are already heavily utilised non-commercially. It is expected this harvest will increase in the future because population numbers in the northern North Island are forecast to increase. The expected growth in non-commercial harvesting is unlikely to be

sustainable. Further, current levels of illegal catch are reportedly high in these areas and estimates used to set the TAC are likely to be significantly underestimated.

27 MFish considers that PPI 1B and PPI 9 are not likely to support an increase in harvest level, and it is appropriate to set TACs based on current catch. However, as new research is undertaken and information improves, harvest levels may be increased at a later date. Increases will require additional supporting information on the impacts of fishing on the stock and also the aquatic environment.

PPI 1C

28 Two TAC options have been proposed for PPI 1C. In the first option, MFish proposes to set a TAC based on current utilisation of the fishery. The issues previously discussed, including those generic to all stocks, as well as additional issues specific to PPI 1B and PPI 9, are applicable to PPI 1C. Commercial harvesting is currently only allowed in limited areas, at Ohiwa Harbour, Waihi Estuary, and Ponui Island. Access is limited to a small number of historical permit holders. There is a need for caution in setting a catch limit for this stock.

29 A second option incorporates a higher TAC to allow for development of the fishery. Although various factors place constraints on the available pipi resource, current catch may not be reflective of levels of abundance. Catches have varied from year to year, and pipi have not been commercially harvested in some years. A second option has been proposed which recognises that recent catch, not current catch, may be a more suitable harvest estimate. While there are significant sustainability issues throughout the QMA, it is recognised that pipi were previously harvested commercially in a small area of PPI 1C (Ohiwa Harbour) and this level of harvesting may be sustainable provided that additional harvest is confined to Ohiwa Harbour.

30 MFish seeks stakeholder comment on which of the two approaches is preferable for this stock.

PPI 3, PPI 4, & PPI 5

31 MFish proposes to set TACs for PPI 3, PPI 4, and PPI 5 based on current utilisation of the fishery. MFish does not consider at this time that there is a capacity for further utilisation or development of these stocks.

32 MFish considers that in PPI 3, PPI 4, and PPI 5 there is likely to be insufficient habitat to support substantial pipi beds. PPI 3 has predominantly open coastline with river gravel beaches, where sheltered harbours and beaches are limited. PPI 4 is unlikely to contain a significant amount of habitat suitable for pipi. PPI 5 is mostly exposed west coast South Island areas with limited potential to support substantial pipi beds. Recreational harvest estimates are relatively low in PPI 4 and PPI 5.

33 There are also area closures within some of these areas, including part of the Kaikoura Peninsula (PPI 3); and a reduced pipi bag limit of 50 per day at Rapaki Bay, Lyttelton (PPI 3).

34 Pipi beds are likely to be already fully utilised, where they occur, by non-commercial fishers in these areas. MFish considers that there is unlikely to be sufficient resource to allow for exploration of a commercial fishery in these areas, and the TACs should be based on current catch.

PPI 2, PPI 7, & PPI 8

35 Two TAC options have been proposed for these stocks.

36 The first TAC option is based on current utilisation of each fishery. Sustainability concerns have resulted in management measures being put in place for some of these stocks. Pukerua Bay (Kapiti Coast; PPI 8); and Hicks Bay (East Cape; PPI 2) have been closed until December 2006 and February 2007 respectively. Because there are some localised sustainability concerns, as well as the generic issues applicable to all stocks which were discussed previously, there is a need for caution in setting catch limits for these fisheries.

37 Furthermore, the PPI 7 stock is mostly exposed west coast South Island coastline, with limited potential to support substantial pipi beds. However, the Golden Bay/Tasman Bay area at the top of PPI 7 may provide more suitable habitat to support pipi beds. Pipi have been landed there as a bycatch of the commercial cockle fishery in the 2001-02 (0.2 tonnes) and 2002-03 (0.27 tonnes) fishing years.

38 A second option has been proposed with a higher TAC to allow for some development of the fisheries. Current non-commercial harvest levels are not likely to be as high in these stocks as they are in northern New Zealand (PPI 1B, 1C and 9), and urban populations are not increasing at the same rates. A small increase in catch levels to provide for the development of the fisheries is likely to be sustainable. In comparison to PPI 3, PPI 4, and PPI 5, there are likely to be more areas of suitable habitat for pipi within these QMAs. A TACC of two tonnes is considered sufficient for assessment of the development potential of commercial fisheries in these areas, and to allow for bycatch in other shellfish fisheries.

39 MFish seeks stakeholder comment on whether this approach is preferable for these particular stocks.

Allocation of TAC

40 The TAC is a composite of the respective stakeholder groups' catch allocations, and an allowance for any other sources of fishing-related mortality. When setting a TAC, a TACC must be set, as well as allowances determined for customary and recreational fishing interests and for any incidental fishing related incidental mortality.

41 The 1996 Act stipulates a process by which the TAC is to be allocated. No explicit statutory mechanism provides guidance as to the apportionment of the TAC between sector groups, either in terms of a quantitative measure or prioritisation of allocation. The Minister has the discretion to re-allocate from one sector to another, based on available information. In shared fisheries MFish has a policy preference in favour of the catch history allocation model in the absence of clear information to the contrary. No information exists to support a re-allocation decision. However, where development opportunities exist, it is considered appropriate to allow for a TACC, recognising that the permit moratorium which has been in place since 1992 constrained historical commercial use.

Recreational Allowance

42 The proposed recreational allowances for each QMA are set out in Table 1.

43 Both recreational and customary fishers harvest pipi in all QMAs, wherever there are accessible beds. Proposed recreational allowances are based on harvest estimates using information from National Recreational Fishing surveys in 1996 and 2000-01.

44 The diary surveys provide estimates only, which need to be treated with caution. Harvest information obtained in the surveys was in the form of number of pipi collected. This number was subsequently converted to weight estimates using 30g as the assumed mean weight of an individual pipi.[1] The coefficients of variance are generally high in the estimates of pipi numbers caught by recreational fishers (where a higher CV implies a less reliable estimate). Further, in some QMAs co-efficients of variance have not been calculated because there were too few respondents, indicating that these estimates may not be representative. Finally, for shore-based fisheries like pipi, the surveys are likely to significantly underestimate recreational harvest.

45 Despite these potential sources of inaccuracy, the diary survey estimates represent the best available information on recreational harvests. The information in the 2000 survey is considered to provide the most reliable estimates of recreational harvest. MFish considers that these estimates should be used to set the proposed initial recreational allowance. For PPI 4, no information exists to indicate what the recreational harvest may be, so a notional allowance has been proposed. PPI 1B and PPI 1C estimates were combined in the survey results as PPI 1. Because of the prevalence of high-density urban populations (e.g., Auckland and Tauranga), as well as the occurrence of high-density pipi beds in PPI 1C, it is likely that recreational catch is much higher in this area. MFish proposes that the allowance be divided 60:40 PPI 1C: PPI 1B, resulting in a recreational allowance of 115 tonnes for PPI 1C and 76 tonnes for PPI 1B.

Customary Maori Allowance

46 The proposed customary allowances for each QMA are set out in Table 1.

47 Policy guidelines provide several options for setting a customary allowance. Where estimates are not available, but there is known to be a customary catch, a nominal allowance may be made. For species and stocks where there is some catch, but the stock is not considered of importance to customary Maori, then the allowance may be based on half the recreational catch. For stocks of importance to Maori, the allowance may be based on the level of the recreational catch.

48 Pipi are an important customary taonga (treasured, significant) species taken as kaimoana in many parts of New Zealand. There is no information at present on estimated quantities harvested for customary purposes at a QMA level. It is likely that customary harvests are at least as high as recreational harvests. MFish proposes that the customary allowance for pipi in each QMA be equal to that of the recreational allowance. This is a notional figure only and may need to be revised when information becomes available.

49 There is a requirement to take any mataitai reserve and section 186A closure in each QMA into account when considering allowances for customary non-commercial interests. There are existing mataitai in FMAs 3 and 5, and applications have been made for mataitai in FMAs 2, 3, 5 and 7. However, as yet they do not propose any

[1] This estimate was based on the length-weight ratio of a sample of 181 pipi above 50mm in length, collected by NIWA staff at Mair Bank, Whangarei Harbour in March 2005.

changes to current controls on pipi fisheries. As noted previously, several areas have been temporarily closed under s 186A to harvest of various species including pipi (Western Coromandel, Pukerua Bay, Hicks Bay, and part of Kaikoura Peninsula).

Allowance for other sources of mortality

50 The proposed allowances for other sources of mortality for each QMA are set out in Table 1.

51 Both commercial and non-commercial fishers gather pipi by hand, so there is a limited source of mortality related to catch method. Some pipi that are not within preferred size ranges may be discarded, but they are likely to survive unharmed if returned to the water within a short time.

52 Illegal fishing is a significant source of mortality. MFish compliance staff advise that non-commercial fishers often take more than the amateur daily limits for pipi. However, estimates of the quantities taken are not presently available. In the absence of better information, nominal allowances proportional to the recreational allowances have been provided.

TACC

53 Proposed TACCs for each QMA are set out in Table 1.

PPI 1B, PPI 3, PPI 4, PPI 5, & PPI 9

54 A zero TACC has been proposed for PPI 1B, PPI 3, PPI 4, PPI 5, and PPI 9. MFish considers that a zero TACC, which reflects current use, is appropriate at this stage, because of biological and environmental characteristics, pipi distribution, lack of stock assessment information, and social and cultural issues related to the stocks. Should information become available that suggests particular beds will support a commercial fishery, the TACC can be revised in the future.

PPI 1C

55 MFish proposes two TACC options for PPI 1C. The first option reflects current utilisation, while the second option reflects catch history over a longer period.

56 Ohiwa Harbour in PPI 1C is the only area in all of the pipi stocks considered in this paper that has had any substantial commercial harvesting. Even so, commercial harvesting has been inconsistent, with highly variable catches that are relatively small.

57 The first option proposed for PPI 1C is a TACC of zero, based on current commercial catch. This option reflects uncertainty about potential yield from pipi beds in PPI 1C.

58 The state of the pipi population in the Ohiwa Harbour is not clear. The Ohiwa Harbour fishery has not been utilised on a commercial basis since the 1999-2000 fishing year, and no other areas in PPI 1C have been commercially harvested. MFish has had anecdotal reports that pipi are plentiful, but surveys of pipi populations there in 2000, 2002 and 2003 indicate that there has been a decline (from an estimate of 91.95 million pipi in 2000 to 47.91 million in 2003; the number of harvestable pipi above 50 mm declined from 3.51 million in 2000 to 0.2 million in 2003). Local users of the resource advise that the beds are under substantial pressure from recreational

and customary users and are unlikely to withstand further pressure from commercial harvesting. There is a strong likelihood that commercial harvesting would cause significant tension in the local community. Flood and storm events regularly disturb the pipi beds in the harbour, making availability of the resource quite variable. MFish does not consider that any commercial development opportunities exist elsewhere in the QMA (outside of Ohiwa Harbour).

59 The second option proposed for PPI 1C is a TACC of three tonnes, based on the rounded average landings of pipi in years in which it was harvested in Ohiwa Harbour.

60 One permit holder fished in Ohiwa harbour in 1991-92, and one in 1992-93. A third permit holder fished from 1991-92 to 1999-00, with highly variable catches. A discussion with this permit holder suggests that fishing did not occur from 1999-00 to present for personal reasons. It is unclear whether annual commercial catches have varied because of changes in biomass, flood events, changes in markets for pipi, costs associated with harvesting pipi, or a combination of these influences.

61 MFish considers an average catch from the years actually fished to be the most appropriate mechanism for setting the TACC. Discussions have indicated that providing a TACC that allows commercial harvesting alongside non-commercial harvesting which has occurred for generations will cause significant tension. However, MFish understands that modest commercial activity has co-existed up to 1999-2000, and there might be scope for limited activity by the commercial sector in Ohiwa Harbour on a similar basis. Should conflicts arise, there are tools available under the Fisheries Act 1996 which can assist in reaching a resolution.

62 MFish recognises that the pipi fishery in Ohiwa Harbour is highly variable and setting the TACC at the average commercial catch may constrain the fishery. However, in the absence of a stock assessment of the relevant beds, setting a TACC any higher would pose a sustainability risk to the stock. MFish recommends a cautious approach until research is undertaken, and non-commercial utilisation of the beds is better quantified.

63 There is a sustainability risk with the second option proposed. While three tonnes may be a sustainable harvest level in Ohiwa Harbour, current regulations applicable to the PPI 1C stock allow commercial fishing not only in Ohiwa Harbour, but also Little Waihi estuary (Maketu) and Ponui Island (Auckland). A three tonne allocation could therefore be potentially harvested from Little Waihi estuary and/or Ponui Island. At Little Waihi, a survey of total pipi numbers shows numbers fluctuating between 14.35 million in 2000; 21.29 million in 2002; and 6.77 million in 2003. Harvestable pipi above 50 mm decreased from 1.87 million in 2001 to 0.76 million in 2003. No stock information exists for Ponui Island, but anecdotal evidence indicates that an increase in current catch levels in either area would not be sustainable.

PPI 2, PPI 7, & PPI 8

64 MFish proposes two TACC options for PPI 2, PPI 7, and PPI 8. The first option for each of these stocks is a TACC of zero tonnes, which reflects the absence of any substantial commercial catches in these areas. PPI 7 has had small landings in the 2001-02 (0.20 tonnes) and 2002-03 (0.27 tonnes) fishing years. There is no history of commercial landings in PPI 2 or PPI 8. Any pipi caught as bycatch in other shellfish

fisheries could be returned to the water if pipi is placed on the Sixth Schedule as is proposed in this paper.

65 An alternative option for these stocks is a TACC of 2 tonnes. Pipi abundance in these QMAs is believed to be relatively high, and non-commercial use is predicted to be lower than in the northern North Island. A TACC of 2 tonnes would provide for commercial use at a low level and allow for the commercial potential of these areas to be explored. Providing existing regulations which prohibit the commercial catch of pipi in certain areas are maintained, significant tension between sectors is less likely to occur in these areas than it is in the northern regions.

Other Management Measures

Returning pipi to the water

66 MFish proposes that all pipi stocks should be added to the Sixth Schedule of the Fisheries Act to allow commercial fishers to return them to the water either if they are taken below optimum commercial size, or as an incidental by-catch in other fisheries. This is subject to requirements that the pipi are likely to survive and are returned to the waters from which they were taken as soon as practicable.

Method restriction

67 MFish also proposes to retain the part of regulation 22A(1) of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986; part of regulation 11K of the Fisheries (South-East Area Commercial Fishing) Regulations 1986; and part of regulation 15I of the Fisheries (Southland and Sub-Antarctic Areas Commercial Fishing) Regulations 1986 that restrict commercial gathering of pipi to the method of hand gathering. If commercial pipi fisheries can be shown to be sustainable in future, it would be desirable for the hand gathering regulation to apply in the area(s) where this harvesting occurs.

Consequential Amendments to Regulations

68 Should zero TACCs be the preferred option for PPI 1B, PPI 1C, and PPI 9, regulations that currently restrict commercial harvesting of pipi to certain areas of FMA 1 and FMA 9 would no longer be needed. Details of amendments to regulations, should they be required, are set out in annex one.

69 MFish proposes to remove the component of regulation 22A of the Fisheries (Auckland and Kermadec Areas Commercial) Fishing Regulations 1986 that imposes a 200 kg daily catch limit on the quantity of pipi that commercial fishers may take within FMA 1 and FMA 9. Applying a TACC for the relevant stocks removes the need to limit commercial harvesting on a daily basis. Details of the consequential amendments to regulations are set out in annex one.

70 The introduction of pipi into the QMS makes it necessary to amend the Fisheries (Reporting) Regulations 2001. The amendment will outline the codes to be used by commercial pipi fishers when completing their statutory catch returns.

Deemed Value and Over fishing Threshold

71 A separate section of this document sets out generic information on the setting of interim and annual deemed values.

72 Based on the policy framework for deemed values, pipi fall within the 'high value single species fisheries' fishstock category. MFish proposes to set the annual deemed value at 200% of the highest port price in the previous year for stocks in this category, in QMAs where TACCs are set above zero. MFish proposes that the interim deemed value should be 50% of the annual deemed value.

73 The most recent information available (November/December 2003 MFish port price survey) indicates a port price for pipi of $1.10 per kg. MFish therefore proposes an annual deemed value of $2.20 and an interim deemed value of $1.10.

74 Consistent with the policy framework for high value single species fishstocks, MFish proposes that differential deemed values will apply.

75 MFish does not propose to set overfishing thresholds for pipi stocks unless catch monitoring shows that this is required.

Statutory Considerations

76 In evaluating the management options the following statutory considerations have been taken into account.

a) The purpose of the Act (s 8) is to provide for the utilisation of fisheries resources while ensuring sustainability. The management options seek to ensure sustainability of the stock by setting a TAC and other appropriate measures. Utilisation is provided by way of setting allowances for commercial, recreational and customary fishers. Section 8 requires that social and economic effects be considered. As discussed throughout this document, pipi are an extremely important customary and recreational resource and these issues have been taken into account when setting the TACs.

b) Under s 13(2) of the 1996 Act, the TAC should be set under one of three options. MFish believe that the most appropriate option for pipi is s13(2)(a), which requires that the TAC should be set at or above a level that moves the stock towards the level that can produce the MSY having regard to the interdependence of stocks. No scientific stock assessment information is available indicating whether pipi stocks are at, above, or below a level that can produce MSY. There are concerns about the sustainability of some pipi stocks due to the significant level of non-commercial harvesting that occurs. MFish considers that the proposed TACs should enable pipi stocks to be managed at a sustainable level in the short term, with further information required to determine the sustainability of the proposed TACs in the medium to long term.

c) The proposed TAC options are also based on:

i) Consideration of the environmental conditions affecting the stock (s13(2)(b)(ii)). Pipi populations are characterised by spatial and temporal fluctuations in biomass and size structure. Environmental factors including temperature, salinity, exposure and hydrology affect population dynamics. Pipi are particularly susceptible to local events

such as floods and storms, which can have substantial negative effects on localised populations. Coastal processes also influence pipi populations. These influences are exacerbated in urbanised areas, where increased siltation can smother and suffocate pipi, and increased organic and mineral pollution may inhibit pipi growth. Loss or reduction of habitat such as eel grass beds may also influence pipi populations.

ii) Consideration of the biological characteristics of the stock (s13(2)(b)(ii)). As discussed in the previous paragraph, pipi are sensitive to environmental conditions. As sedentary species, pipi are unable to escape or avoid such adverse conditions. Further, pipi are commonly found in sheltered harbours and bays which are close to urban centres, where they are easily accessible for harvesting, as well as vulnerable to habitat disturbance and degradation. These biological characteristics result in pipi being particularly prone to localised depletion.

iii) Interdependence of stocks (s13(2)). There is no evidence to suggest that pipi and any other stocks are interdependent.

d) Section 11(1)(c) requires that the natural variability of the stock concerned is also taken into account when setting or varying a sustainability measure such as a TAC. The natural variability of pipi stocks can be high due to the sensitivity of pipi to environmental conditions. This natural variability has been considered in setting the TACs.

e) Section 9(a) requires that associated or dependent species should be maintained above a level that ensures their long-term viability. Similarly, s 9(b) requires the maintenance of biological diversity in the aquatic environment. Section 9(c) requires the protection of habitat of particular significance to fisheries management. Pipi are predominantly sedentary species that occur in intertidal habitats along New Zealand's coastline. Pipi stocks in this paper are harvested by hand gathering, which is not expected to impact on other species or the intertidal habitat itself. However, pipi are an important part of the intertidal ecosystem and provide an important food resource for other animals such as wading birds. It is not known whether local depletions affect biological diversity. Pipi are also thought to assist in maintaining water quality and the stability of sand banks, especially in harbours. Setting proposed TACs using a cautious approach has an additional benefit of helping to ensure that pipi continue to play these important roles in the aquatic environment.

f) There is a wide range of international obligations relating to fishing (including sustainability and utilisation of fishstocks and maintaining biodiversity). MFish considers the s 5 considerations arising from New Zealand's international obligations and the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 are adequately addressed by the management proposals for pipi stocks, particularly with the introduction of a total allowable catch to ensure sustainable utilisation.

g) Section 11(1)(b) requires that existing controls be taken into account when setting or varying a sustainability measure such as a TAC. MFish notes that in all stocks considered in this paper, commercial access is currently limited to existing permit holders by Schedule 4C of the Act. Areas where commercial

access is restricted are defined by regulation. Specific areas are also closed to recreational harvest. In PPI 1B and PPI 1C, commercial fishers are each allowed to take a maximum of 200 kg of pipi per day, by hand gathering only. There is a daily bag limit for recreational fishers of 150 per person per day, except in the Auckland Coromandel area (part of PPI 1C) where the daily bag limit is 50.

h) Section 11(2) requires the consideration of various other matters relating mainly to planning documents. MFish is not aware of any considerations in any regional policy statement, regional plan or proposed regional plan under the Resource Management Act 1991 or any management strategy or management plan under the Conservation Act 1987 that are specifically relevant to setting TACs for pipi stocks. Similarly, in terms of section 11(2A) MFish is not aware of any fisheries or conservation services or relevant fisheries plans, or any decisions not to require conservation or fisheries services, that are relevant to setting TACs for pipi stocks.

i) As required under s 11(2)(c), MFish considers that the proposals for pipi meet the requirements of ss 7 and 8 of the Hauraki Gulf Marine Park Act 2000. Implementation of catch limits and associated measures for pipi stocks into the QMS will allow for the sustainable utilisation of the species.

j) Sections 21(1)(a and b), 21(4)(i and ii), and 21(5) require the Minister to allow for non-commercial fishing interests (recreational and Maori), and other mortality to the stock caused by fishing. The nature of the pipi fishery and the interests of the respective fishing sectors have influenced recommendations for the setting of the TACC.

k) Section 21(4) requires that when considering the proposed allowances for customary non-commercial interests, the Minister must take into account any mataitai reserve or s 186A closure in the relevant QMA. MFish does not consider that the allowances proposed for customary harvest will detract from the intent of any mataitai or s 186A closures presently in place, and the allowance is likely to be sufficient for the customary use of pipi in these areas.

l) Section 21(5) requires that when considering the proposed allowances for recreational interests, the Minister must take into account any regulations that prohibit or restrict fishing under s 311 (area closures). No such area closures are currently in place.

m) Section 10 sets out information principles that are to be taken into account when setting TACs. The principles are particularly important because the status of these pipi stocks remains unknown. Section 10(c) states that "Decision makers should be cautious when information is uncertain, unreliable or inadequate." MFish has adhered to these principles in setting the TACs for these pipi stocks.

Preliminary Recommendations

77 MFish recommends that the Minister:

a) **Agrees** to set a TAC of 160 tonnes for PPI 1B and within that set:

i) a customary allowance of 76 tonnes;

ii) a recreational allowance of 76 tonnes;

iii) an allowance of 8 tonnes for other sources of mortality; and

iv) a TACC of 0 tonnes.

b) **Agrees** to set a TAC of 240 tonnes for PPI 1C and within that set:

i) a customary allowance of 115 tonnes;

ii) a recreational allowance of 115 tonnes;

iii) an allowance of 10 tonnes for other sources of mortality; and

iv) a TACC of 0 tonnes.

Or

c) **Agrees** to set a TAC of 243 tonnes for PPI 1C and within that set:

i) a customary allowance of 115 tonnes;

ii) a recreational allowance of 115 tonnes;

iii) an allowance of 10 tonnes for other sources of mortality; and

iv) a TACC of 3 tonnes.

d) **Agrees** to set a TAC of 7 tonnes for PPI 2 and within that set:

i) a customary allowance of 3 tonnes;

ii) a recreational allowance of 3 tonnes;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 0 tonnes.

Or

e) **Agrees** to set a TAC of 9 tonnes for PPI 2 and within that set:

i) a customary allowance of 3 tonnes;

ii) a recreational allowance of 3 tonnes;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 2 tonnes.

f) **Agrees** to set a TAC of 19 tonnes for PPI 3 and within that set:

i) a customary allowance of 9 tonnes;

ii) a recreational allowance of 9 tonnes;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 0 tonnes.

g) **Agrees** to set a TAC of 3 tonnes for PPI 4 and within that set:

i) a customary allowance of 1 tonne;

ii) a recreational allowance of 1 tonne;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 0 tonnes.

h) **Agrees** to set a TAC of 3 tonnes for PPI 5 and within that set:

i) a customary allowance of 1 tonne;

ii) a recreational allowance of 1 tonne;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 0 tonnes.

i) **Agrees** to set a TAC of 3 tonnes for PPI 7 and within that set:

i) a customary allowance of 1 tonne;

ii) a recreational allowance of 1 tonne;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 0 tonnes.

Or

j) **Agrees** to set a TAC of 5 tonnes for PPI 7 and within that set:

i) a customary allowance of 1 tonne;

ii) a recreational allowance of 1 tonne;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 2 tonnes.

k) **Agrees** to set a TAC of 3 tonnes for PPI 8 and within that set:

i) a customary allowance of 1 tonne;

ii) a recreational allowance of 1 tonne;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 0 tonnes.

Or

l) **Agrees** to set a TAC of 5 tonnes for PPI 8 and within that set:

i) a customary allowance of 1 tonne;

ii) a recreational allowance of 1 tonne;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 2 tonnes.

m) **Agrees** to set a TAC of 21 tonnes for PPI 9 and within that TAC set:

i) a customary allowance of 10 tonnes;

ii) a recreational allowance of 10 tonnes;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 0 tonnes.

n) **Agrees** to include all pipi stocks in the Sixth Schedule of the Act.

o) **Agrees** to amend Regulation 22A of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1996 so that 200 kg maximum daily weight limit for commercial harvests of pipi within the Auckland FMA will not apply.

p) **Agrees** to revoke restrictions to commercial access in PPI 1B, PPP 1C and PPP 9, should zero TACCs be the recommended option for these stocks.

q) **Agrees** to amend the Fisheries (Reporting) Regulations 2001 to outline the codes to be used by commercial pipi fishers when completing their statutory catch returns.

r) **Agrees** to set an annual deemed value of $2.20 per kg and an interim deemed value of $1.10 per kg.

s) **Agrees** not to set an overfishing threshold for pipi stocks at this time.

t) **Notes** that commercial pipi harvesting will be restricted to the methods of hand gathering in PPI 1B, PPI 1C, PPI 3, PPI 4, PPI 5, and PPI 9.

ANNEX ONE

Proposed amendments to management measures

Fisheries Act 1996 Sixth Schedule – return of pipi to the water

Background

78 MFish proposes to allow commercial fishers to return pipi to the water by adding pipi stocks to the Sixth Schedule of the Act, subject to requirements that they are likely to survive, and must be returned to the same waters from which they were taken as soon as practicable.

79 Under s 72 of the Act, once pipi are introduced into the QMS, commercial fishers will be obliged to retain and report pipi caught by any fishing method. If pipi were added to the Sixth Schedule, commercial fishers who took pipi at an undesirable size or as an unintentional bycatch would be able to return them to the sea alive, provided they comply with the requirement set out in the Schedule. Pipi are likely to be robust enough to enable them to be returned to the water and subsequently survive if returned within a short time from being taken.

80 Addition to the Sixth Schedule is in line with current commercial practice whereby pipi fishers may grade pipi by size. It is also consistent with what is currently provided for the PPI 1A stock.

Problem definition

81 Pipi are occasionally caught as bycatch in other shellfish fisheries. Unless pipi are added to the Sixth Schedule any pipi taken must be landed and reported. If no ACE is available, fishers would be required to pay a deemed value. Markets also require that pipi are supplied in specific sizes. Requiring all pipi to be retained is not appropriate or efficient, particularly because pipi are caught as bycatch only in small volumes.

Preliminary consultation

82 There has been no preliminary consultation on this proposal to add pipi stocks to the Sixth Schedule. However, stakeholders accepted a similar approach when PPI 1A was introduced into the QMS in October 2003.

Options

Non-Regulatory Measures

83 Unless pipi are added to the Sixth Schedule, it will be illegal to return incidentally caught pipi to the water. There is no non-regulatory measure that can be used to allow species taken under the QMS to be returned to the water.

Regulatory Measures

84 It is necessary to use the regulatory measure of adding pipi stocks to the Sixth Schedule of the Act to implement this proposal.

Costs and benefits of the proposal

85 Adding pipi stocks to the Sixth Schedule will allow commercial fishers who catch pipi incidentally as a bycatch to legally return them to the water (provided they are immediately returned alive and undamaged). It would also allow commercial pipi harvesters to return pipi that are not of marketable size, instead of having to keep them and become liable for deemed value payments.

86 There are no costs associated with this proposal.

Administrative implications

87 There are no significant administrative implications.

Removal of commercial shellfish prohibitions

Background

88 At present, Regulation 4D of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 restricts the commercial harvesting of pipi to certain areas of FMA 1 and FMA 9. Should PPI 1B, PPI 1C and PPI 9 be introduced into the QMS with TACCs of zero, these restrictions will not be required and can be revoked. If PPI 1B, PPI 1C or PPI 9 are introduced with TACCs above zero, the existing regulations will need to be reviewed.

89 Under existing regulations, commercial harvesting could only be undertaken in three areas of PPI 1C and two areas of PPI 1B, even if a TACC was allocated. Commercial harvesting may currently occur at North Cape to Cape Karikari (PPI 1B), Home Point – Mangawhai Heads (PPI 1B, although the commercial beds within this area are already incorporated into PPI 1A), Ponui Island (Auckland; PPI 1C), Little Waihi Estuary (Maketu; PPI 1C) and Ohiwa Harbour (Bay of Plenty; PPI 1C).

90 No changes are proposed to any of the regulations in the Fisheries (Central Area Commercial Fishing) Regulations 1986, the Fisheries (Challenger Area Commercial Fishing) Regulations 1986, the Fisheries (South-East Area Commercial Fishing) Regulations 1986 and the Fisheries (Southland and Sub-Antarctic Areas Commercial Fishing) Regulations 1986 that define areas where shellfish gathering, including for pipi, is prohibited.

Problem definition

91 MFish considers that – should TACCs of zero be set – historical area restrictions will no longer be required in PPI 1B, PPI 1C and PPI 9. These area restrictions are historic regulations with little or no utility if TACCs are set at zero, and can be revoked as an administrative consequence of the introduction process.

92 If non-zero TACCs are set in these areas, regulation 4D of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 will need to be reviewed to ensure that unsustainable fishing does not occur in some of the areas in which this regulation allows commercial fishing to take place. If the regulation were revoked, it would enable commercial access throughout the whole of each QMA. If the TACC is set higher than zero, this situation of open commercial access would not be sustainable because many beds are under significant non-commercial pressure, and

additional effort at individual beds could cause localised depletions, even if the TACC was set to constrain total removals from the fishery.

93 Of the five areas in which the regulations currently allow commercial fishing, MFish considers that only one area at Ohiwa Harbour could potentially sustain commercial fishing. Commercial beds in the Home Point to Mangawhai Heads area have already been introduced into the QMS as area PPI 1A. Anecdotal and stock assessment information from North Cape to Cape Karikari (PPI 1B), Ponui Island (Auckland; PPI 1C), and Little Waihi Estuary (Maketu; PPI 1C) suggest these resources could not sustain further harvesting.

Preliminary consultation

94 No preliminary consultation has been undertaken concerning the removal of regulations restricting commercial shellfish harvesting to certain areas of FMA 1 and FMA 9. During informal discussion with non-commercial interests in the Bay of Plenty, they have indicated that additional use of the resource would not be considered sustainable.

Options

Non-Regulatory Measures

95 There are no non-regulatory alternatives to revoking the regulations.

Regulatory Measures

96 Revoking the commercial fishing prohibitions in FMA 1 and FMA 9 will remove an unnecessary restriction (if TACCs are set at zero for the relevant stocks).

Costs and benefits of the proposal

97 There are no obvious costs associated with this proposal. The benefit is that redundant regulations will be removed.

Administrative implications

98 There are no significant administrative implications.

Removal of 200 kg daily catch limit on commercial pipi harvesting

Background

99 At present regulation 22A of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 restricts the maximum weight (greenweight) of pipi that may be taken or possessed by a commercial fisher on any day within the waters of the Auckland FMA to 200 kg.

100 While the commercial pipi fishery was outside the QMS, these catch limits represented the only control on quantities allowed to be harvested.

Problem definition

101 With introduction of pipi into the QMS, total commercial catches will be controlled by TACCs, and there will no longer be a need for daily limits on commercial harvesting.

Preliminary consultation

102 There has been no preliminary consultation on this proposal.

Options

Non-Regulatory Measures

103 There are no non-regulatory alternatives to revoking the daily catch limit.

Regulatory Measures

104 Revoking the regulation removes a restriction that is no longer necessary under the QMS.

Costs and benefits of the proposal

105 Revoking the regulation removes the requirement to enforce a daily catch limit, and will result in improved harvest efficiency for commercial fishers.

106 There are no costs associated with revoking this regulation.

Administrative implications

107 There are no administrative implications of this proposal.

ANNEX TWO

Species Information

Species Biology

108 Pipi are found throughout New Zealand, including the Chatham and Auckland Islands. They are found in harbours and sheltered beaches, both intertidally and subtidally. Quite extensive beds of large pipi may occur in subtidal, high current harbour channels, down to water depths of at least seven metres.

109 A study of distribution patterns within a harbour environment found that there was a distinct segregation of pipi sizes and ages within different types of habitat.[2] Juvenile pipi were found towards the higher reaches of intertidal shores, while fully mature adult pipi (over 40 mm shell length) occurred at high densities within distinctly subtidal beds in the main harbour channels. Intermediate sizes occurred between these habitats.

110 In this study, pipi of all sizes were found to drift, and made small-scale movements by forming mucus bubble strings and attaching to passing objects. These findings apply to a subtidal, high current environment, and may not be representative of all habitats of pipi populations, especially those on low energy, sheltered intertidal beaches.

111 Pipi are sexually mature by a size of 40 mm. Pipi reproduce in a spawning process that begins in early spring, and continues through spring and summer. Spawning does not appear to be a discrete event happening at one time across a population. Instead there seems to be a series of partial spawnings over weeks or months.

112 Pipi growth dynamics are not well known. A tagging study of juvenile pipi indicated that they might have a seasonal growth pattern, with increased growth in the spring and summer, and little growth in autumn and winter. Pipi above 50 mm grew very slowly.

Fisheries Characteristics

Commercial Catch

113 Virtually all (99%) of the commercial pipi catch in New Zealand comes from Mair Bank in the Whangarei Harbour, with the rest harvested intermittently from the Ohiwa Harbour.

114 As Table 2 shows, the quantities that have been harvested commercially at Ohiwa have been variable, and harvesting has not occurred in all years. The total amount harvested since 1990-91 has been 25.6 tonnes. There have been eight years when there has been commercial harvesting, giving an average annual harvest over that time of 3.2 tonnes. The limited commercial harvesting in the PPI 7 stock occurred when pipi was taken as a bycatch in the commercial cockle fishery.

[2] Hooker, S.H. (1995). Life history and demography of the pipi *Paphies australis* in northeastern New Zealand. Unpublished PhD thesis, University of Auckland. 231 p.

Table 2: **Estimates of reported landings (tonnes) of pipi by QMA (excluding PPI 1A).**

Year	1B	1C	2	3B	4	5	7	8	9
1990-91	-	0.29	-	-	-	-	-	-	-
1991-92	-	10.16	-	-	-	-	-	-	-
1992-93	-	5.46	-	-	-	-	-	-	-
1993-94	-	1.58	-	-	-	-	-	-	-
1994-95	-	0.10	-	-	-	-	-	-	-
1995-96	-	-	-	-	-	-	-	-	-
1997-98	-	-	-	-	-	-	-	-	-
1998-99	-	2.39	-	-	-	-	-	-	-
1999-00	-	4.69	-	-	-	-	-	-	-
2000-01	-	0.93	-	-	-	-	-	-	-
2001-02	-	-	-	-	-	-	0.20	-	-
2002-03	-	-	-	-	-	-	0.27	-	-
2003-04	-	-	-	-	-	-	-	-	-

Recreational catch

115 Major recreational landings of pipi are made in the Bay of Plenty and eastern Coromandel. Smaller quantities of pipi are taken from beaches all around the Hauraki Gulf and north-eastern coast. Moderate recreational catches are taken from northern Dargaville and Ninety Mile beaches. Pipi are also known to be an important resource on the north east coast (north of Whangarei).

116 The national marine recreational surveys of 1996 and 2000-01 provide information that allows total recreational pipi catches to be estimated for all QMAs except PPI 4. Pipi was not recorded in the 1993-94 recreational survey. The 1996 survey also included a general category 'molluscs' which is likely to have included pipi, but has been excluded from these estimates.

117 As discussed in the main body of this document, despite the potential for error in the data, harvest estimates form the National Recreational Surveys are the only estimate of recreational harvest that MFish has available at the QMA scale. Table 3 provides a breakdown of the harvest estimates available for all pipi stocks. The estimates from the 2000 survey are considered to be the most reliable estimates of absolute harvest and have been used to provide non-commercial allowances for all stocks, except PPI 4 where no harvest estimate exists.

118 PPI 1A, PPI 1B, and PPI 1C estimates were combined in the survey results as PPI 1. A recreational allowance of 25 tonnes was set for PPI 1A when that stock was introduced into the QMS in October 2003, and this amount has been deducted from the recreational harvest estimate for PPI 1B and PPI 1C. Because of the prevalence of high density urban populations (e.g., Auckland and Tauranga), as well as the occurrence of large pipi beds in PPI 1C, it is likely that recreational catch is much higher in this area. MFish proposes that the allowance be divided 60:40 PPI 1C: PPI 1B, resulting in a recreational allowance of 115 tonnes for PPI 1C and 76 tonnes for PPI 1B.

Table 3: Harvest estimates from the National Recreational Fishing Surveys

QMA	Survey Year	Harvest (thousands of pipi)	Harvest (t)	CV %
PPI 1B and 1C	1996	2 191	65.73	11
	2000	7 198	215.94	31
PPI 2	1996	61	1.83	–
	2000	98	2.94	42
PPI 3	1996	55	1.65	–
	2000	302	9.06	42
PPI 4	1996	N/A		–
	2000	N/A		–
PPI 5	1996	5	0.15	–
	2000	5	0.15	95
PPI 7	1996	87	2.61	–
	2000	37	1.11	60
PPI 8	1996	58	1.74	–
	2000	42	1.26	69
PPI 9	1996	289	8.67	–
	2000	328	9.84	73

Customary catch

119 There are no documented records of customary Maori catches in recent years. Consequently, like several other fisheries of known importance to customary Maori fishers, the customary allowance in all pipi QMAs is taken to equate with the estimates of recreational catch.

Regulatory Framework

120 Current regulations restrict commercial access to a small number of permitted fishers. In PPI 1B, PPI 1C and PPI 9 commercial fishers are allowed to take a maximum of 200 kg of pipi per day by hand gathering. At present this may only be done in areas identified in regulations where commercial harvesting is permitted. Regulations that prohibit the commercial catch of pipi in certain areas of all QMAs should be retained. There is a daily bag limit for recreational fishers of 150 per person per day (50 per day in the Auckland region).

Fisheries Assessment

121 There is no comprehensive information available to determine the stock status of pipi in any QMA. There is no time series of biomass surveys for pipi that would indicate whether pipi populations are changing in response to past and current levels of harvesting. There are biomass estimates for beds in the Auckland Fishery Management Area. However, they are local estimates and do not provide any basis for estimating biomass and impacts of harvesting at the QMA level.

122 There are estimates of the population in the Ohiwa Harbour, where the only substantial commercial harvesting outside Whangarei Harbour occurs. The estimates indicate that there has been a substantial decline in biomass between 2000 and 2003.

123 Anecdotal information from MFish staff around the country indicates that while there are accessible and popular areas where there are signs of localised depletion, overall pipi populations show no sign of QMA-wide depletion caused by harvesting in any of the pipi QMAs.

Associated Fisheries

124 Pipi are harvested by hand and there is minimal by-catch of other species. Pipi is sometimes taken as bycatch in other shellfish fisheries including cockle and tuatua.

Environmental Issues

125 Environmental issues in relation to pipi stocks are discussed in the main section of this paper. There is no information on whether current pipi fishing activities are detrimental to the long-term viability of any other species.

Research

126 There have been surveys of individual pipi populations in the northern North Island, to determine whether localised depletion may have been occurring. There has been no research to estimate biomass on a broader scale. A stock assessment of Mair Bank pipi (PPI 1A) is currently underway. Given the paucity of information on this important coastal resource, a useful first step would be to collect information on distribution and abundance in a coordinated way throughout New Zealand. All literature sources could be examined including university research and regional council reports, and all local knowledge utilized such as tangata whenua, the Honorary Fisheries Officer network and community groups.

Social, Cultural, and Economic Factors

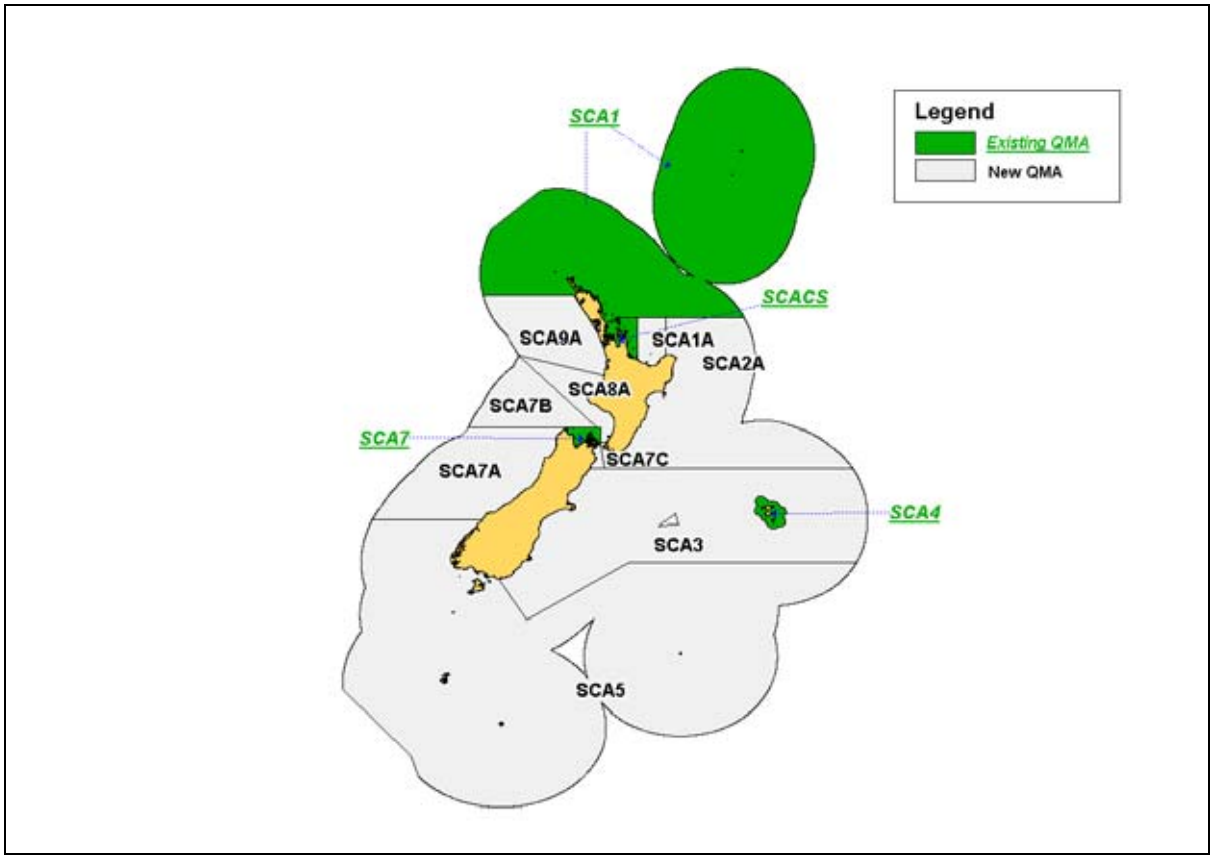
127 MFish is not aware of any information on particular social, economic, or cultural matters that could influence the setting of TACs and TACCs for pipi beyond those already considered in the relevant sections.

NON-QMS SCALLOPS (SCA)

Introduction into the QMS

1 **Non-QMS scallops**[1] (*Pecten novaezelandiae*) have been gazetted for QMS introduction on 1 April 2006. The Quota Management Areas (QMAs) for scallops[2] are outlined in Figure 1. The fishing year for scallops will be from 1 April through to 30 March in the following year, and Total Allowable Commercial Catch (TACC) and Annual Catch Entitlements (ACE) are to be expressed in kilograms meatweight.

Figure 1: Quota Management Areas for scallop stocks



Key Issues to be Considered

2 Key factors and issues that need to be taken into account in determining management options for this fishery are summarised below.

3 For the QMS-entry decision to be fully implemented for SCA 7A, SCA 7B, and SCA 7C, section 312(2) of the Fisheries Act 1996 (the Act) needs to be repealed.

[1] A number of scallop stocks are already managed within the QMS (SCA 1, SCA CS, SCA 4, and SCA 7)
[2] The Initial Position Paper dated 29 October 1994 concerning the proposed introduction of non-QMS scallop stocks into the QMS was in error concerning the status of the Fishery Management Area 10 - Kermadec. The IPP proposed that FMA 10 be retained outside of the QMS as a non-QMS fishery. However, FMA 10 is already in the QMS as part of SCA1 – Northland Scallop Fishery.

This section prohibits the taking of scallops for sale in any part of FMA 7 outside of SCA 7.

4 An estimate of total biomass or sustainable yield is not available for any of the scallop stocks in this paper. Status of all stocks is unknown. Abundance and distribution information is mostly anecdotal.

5 The very high fecundity of this species, and likely variability in the mortality of larvae and pre-recruits, leads to great variability in annual recruitment. This, combined with variable mortality of adults, leads to scallop populations being highly variable from one year to the next, especially in areas of rapid growth where the fishery may be supported by only one or two year classes. The size and structure of scallop populations, therefore, fluctuates widely both temporally and spatially, often independently of fishing pressure.

6 Enduring populations of scallops are likely to be geographically separated. These populations are located in areas where local hydrographic conditions allow the retention of larvae, particularly in enclosed harbours (e.g. Port Pegasus, Stewart Island, and Fiordland Sounds). These high density, isolated, enduring populations are at risk of local depletion. This potential for localised depletion is increased by the high variability in recruitment of scallop populations from year to year due to the influence of environmental factors.

7 Scallops are an extremely important non-commercial resource and are harvested extensively by customary and recreational fishers, wherever scallop beds are present. Despite the customary and recreational importance of scallops, the volume of non-commercial harvesting of some of these non-QMS scallop stocks is not well known.

8 Commercial fishing for stocks considered in this paper is mostly incidental bycatch, possibly interspersed with brief periods of target fishing when the scallop stocks in an area become more abundant. A permit moratorium has prevented the access of new commercial fishers since 1992.

Management Options

9 MFish proposes that section 13 management measures are appropriate for scallops.

10 MFish proposes the following catch limits for scallops (refer Table 1).

Table 1: Proposed TAC, TACC, and allowances for scallops (in tonnes meatweight).

Stock	TAC	Customary allowance	Recreational allowance	Other sources of mortality	TACC
SCA 1A	12	3	3	1	5
SCA 2A	4	1	1	1	1
SCA 3	4	1	1	1	1
SCA 5	10	3	3	1	3
SCA 7A	4	1	1	1	1
SCA 7B	2	0	0	1	1
SCA 7C	6	1	1	1	3
SCA 8A	4	1	1	1	1
SCA 9A	30	12	12	1	5

11 MFish also proposes to:

a) Add scallops to the Second Schedule of the Act to provide for an in-season adjustment of any TAC if required;

b) Add scallops to the Sixth Schedule of the Act to allow scallops caught incidentally to be returned to the water;

c) Remove redundant commercial fishing regulations that restrict fishing to certain times of the day and days of the week;

d) Amend the reporting regulations to ensure that the appropriate fishstock code for scallops is used under the QMS; and

e) Set a deemed value for scallops.

Proposed TACs

12 Section 13 of the Act represents the management option that is to be applied when setting a TAC for a QMS stock, unless the stock qualifies for management under the criteria outlined in s 14 or s 14A of the 1996 Act. In order for a stock to be added to the Third Schedule under the provisions of s 14, the biological characteristics of the species must prevent the estimation of B_{MSY}, the catch limit for any of the stock must form part of an international agreement, or the stock must be managed on a rotational or enhanced basis. Alternative TAC management strategies under s 14 or s 14A of the Act are considered either inappropriate, or unable to be applied. While preferred long-term approaches to harvesting scallops are likely to include rotational harvesting, or harvesting across small spatial scales, the scallop fisheries under consideration are not yet harvested on this basis and, because of the small stock sizes in most of these areas, may never be. MFish notes, however, that s 14 of the Act allows scallops to be added to the Third Schedule and managed under alternative TAC options if practical in the future.

13 MFish believes that the s 13 management arrangements are appropriate for scallops. Under s 13 there is a requirement to maintain a fishstock at a target stock level, being at, or above, a level that can produce the MSY, having regard to the interdependence of stocks. MSY is defined, in relation to any fishstock, as being 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.

14 As outlined in the Statutory Obligations and Policy Guidelines section, there are guidelines for setting TACs for new species. Among the more important considerations for scallops are the biological characteristics of the species, existing stock information and social, economic and cultural factors. An overlying consideration is the importance of scallops to non-commercial fishing interests.

15 Scallop stocks have highly variable recruitment and growth. MFish considers that, based on the annual variability in numbers of scallops, providing the opportunity for an in-season adjustment to the TACs for these scallop stocks is appropriate.

In-season increases to the TAC

16 Additional flexibility is encompassed within s 13 of the Act by the capacity to provide for an in-season increase to the TAC for any stock listed on the Second Schedule to the Act. Any stock with a highly variable abundance may be listed on this schedule. For such stocks, in years of high abundance, the TAC may be increased in-season and takes effect from the date notified in the Gazette. At the commencement of the next fishing-year, the TAC reverts to the level set at the commencement of the previous fishing-year.

17 An in-season TAC increase may be distributed between commercial, customary and recreational fishers, and an increased allowance can be made for other sources of fishing-related mortality. In terms of the increase of the TAC allocated to commercial fishers, the increase of the TAC does not result in an increase to the TACC. Rather, additional ACE is generated and allocated in terms of proportional quota share held by each quota owner. At the end of the fishing year, a TAC increased in this manner reverts to its original level.

18 The objective of an in-season increase remains to manage a stock at or above the level that can produce the MSY. Information about what is the desirable level of the TAC that can produce MSY may become available at such a time that a decision on the TAC can be made after the start of the fishing-year.

19 The mechanism envisaged for these scallop fisheries is that the TAC may be increased in-season for an identified scallop fishstock on the basis of information becoming available and, depending on the circumstances, an in-season survey of the scallop resources may be required.

Rationale for proposed TACs

20 Policy guidelines have constructed an hierarchal approach in respect of the information for setting TACs and hence the weighting to be assigned to that information. Stock assessment information is afforded greater weight than a non-QMS commercial catch limit (CCL) set for a stock. A CCL may be afforded greater weight than information about historical and current catch levels.

21 There is no stock assessment information, or CCLs, for any of the scallop stocks considered in this paper. MFish, therefore, proposes to set TACs that reflect the recent catches from each fishery.

22 Records of commercial scallop catches for non-QMS stocks are poor (see Annex 2). Guidelines suggest criteria to determine catch levels on the basis of current catch, or average catch depending on whether a fishery is stable or developing. These fisheries cannot be considered *stable* (as catches appear to have historically fluctuated significantly), or *developing* (as average catches over the last three fishing years did not significantly increase). MFish has used the best available information on which to base estimates of catch, but the data available on commercial catch is not considered to be fully reliable.

23 For stocks where recreational harvest estimates (diary surveys, etc) have been made, these should be used as a basis for determining current recreational catch. The only estimates that have been undertaken relevant to recreational catch at the QMA scale have been the National Recreational Surveys. These surveys have been used as a basis to estimate recreational catch.

24 Quantitative estimates of recent customary catch at the QMA level are not available. For stocks where no customary harvest estimates exist but the stock is known to be of importance to Mäori, a catch level similar to the known recreational catch should be included. Scallops are an important customary resource and recreational catch estimates have, therefore, been used to estimate customary catch.

25 Quantitative estimates of other sources of fishing-related mortality are not available. There is no information on the current level of illegal catch of scallops, although it possibly occurs on an opportunistic basis for this sought-after shellfish. The use of dredges as the main harvest method will contribute a source of mortality to the stocks by fishing. Nominal allowances have been proposed to account for these sources of mortality.

26 When setting a TAC, the Act requires that a number of closely interrelated factors need to be taken into account. Areas of particular significance related to all stocks are discussed below.

27 The biological characteristics of the stock result in highly variable patterns of abundance and distribution, which in turn make scallops susceptible to localised depletion. Scallops are sensitive to factors such as temperature, salinity, hydrology, water quality, and disease, which can all have adverse effects on scallop population dynamics. Environmental degradation and disease are thought to have been important factors in the dieback or decline of some scallop beds.

28 The effect of harvesting the stock on the aquatic environment has not been quantified. However, the main method of harvesting is dredging, followed by diving. Diving is not likely to affect the environment, but bottom dredging can have adverse effects on the aquatic environment and affect biological diversity. Dredging, especially in areas with high silt levels, is thought to remove settlement surfaces and suspend silt that causes high mortality in newly settled scallop spat. If dredging effort increases, there may be adverse effects on settlement and recruitment.

29 The extent to which an increase in dredging for these non-QMS scallop stocks would promote adverse effects is unknown. However, the fishing permit moratorium has largely prevented dredging in non-QMS scallop populations and MFish considers introduction to the QMS may cause dredging of new areas for scallops. Previously un-dredged areas will be subject to a higher level of adverse effects than the modified habitat that supports the existing QMS stocks.

30 In addition, scallops in some northern areas inhabit the same areas as high densities of horse mussels (*Atrina zelandica*), in the Challenger area they are found with green-lipped mussels (*Perna canaliculus*) and dredge oysters (*Tiostrea chilensis*[3]) and, at the Chatham Islands and in Southland, with dredge oysters. In localised areas where these filter-feeding species occur together in high densities, there may be competition for food. A wide range of invertebrate and vertebrate species prey upon scallops and localised depletions – natural or as a result of harvest pressure – may have an effect on such species.

31 There is no existing stock information for the scallop populations to be considered in this paper. Anecdotal information suggests that there is likely to be intensive non-commercial harvesting already in those nearshore beds where scallop biomass is high.

[3] In recent scientific literature this species has been renamed as *Ostrea chilensis*

Scallops commonly occur in harbours and coastal areas. As scallops are largely sedentary and easily accessible from the shore, they are relatively easy to harvest.

32 There are important social, economic and cultural factors to be considered when setting TACs for these stocks. Socially and culturally, scallops represent an extremely important species for many New Zealanders. They are a food source for Mäori. Scallops have also become an extremely important recreationally harvested species, with most scallop beds around the country harvested to some extent on a recreational basis for food. Economically, these scallop stocks have not been commercially harvested to any significant extent; however, they probably have an important socio-economic role for local communities as a valuable food source.

33 The Act requires consideration be given to the development of fisheries resources while ensuring their sustainability. MFish considers that the capacity for development of any of the stocks referred to in this paper is unproven at this time. However, as new research is undertaken and information improves, harvest levels may be increased at a later date. Increases will require additional supporting information on the impacts of fishing on the stock and also the aquatic environment. MFish considers that these matters are best included within stakeholder driven initiatives following QMS introduction.

34 In addition, the highly variable nature of scallop populations may lead to sporadic development of scallop beds. Abundant scallop resources are only likely to be occasionally available in these areas. Attempting to assess sustainable harvests for these sporadic occurrences of high scallop abundance is not feasible. Setting TACCs at a high level to provide for these sporadic occurrences would result in un-fished ACE, open-access fishing incentives and increased risk of environmental damage. It would also increase the risk of intensive commercial harvesting in inshore beds important to non-commercial harvesters. A preferable approach is to provide for these sporadic events by including these non-QMS stocks on the Second Schedule of the Act so that in-season adjustments to the TAC can be made if required to accommodate these sporadic events.

SCA 1A

35 Commercial fishers have fished this area in the past. Scallop beds are known to occur in the area, but the scallop resources are not likely to be large. Bay of Plenty has a large area of suitable habitat.

36 There are some estimates of recreational catch, but none for customary catch of this species. The estimated recreational catch is likely to be an under-estimate. Anecdotal information suggests that is likely to be some interest in targeting of scallops in this area. There is a large resident Mäori population in the area who will harvest scallops.

SCA 2A, 3, 7A, 7B, 8A

37 These areas appear to have few scallop resources and little or no target fishing for scallops.

38 Hawke Bay (SCA 2A), Canterbury/Otago (SCA 3), and Manawatu/Taranaki (SCA 8A) coastline have some suitable habitat for scallops, but adjacent land management practices are unlikely to allow development of substantial scallop populations. Reported catches have generally been very low from these areas.

39 The reported catches of scallops are comparatively high for SCA 3, but it is likely that these are mainly queen scallops caught on the outer Otago coast. There now appears to be little scallop resource in the area apart from at the Chatham Islands (in SCA 4).

40 It is unlikely that there are any substantial scallop populations on the west coast, South Island (SCA 7A). The most likely area to support a scallop resource is to the north off Whanganui Inlet-Cape Farewell because of the close proximity of Golden/Tasman Bays as a source of spat. But the Westland Current flows in the wrong direction to allow this to happen (from the south to the north).

41 It appears unlikely there are any substantial scallop populations in the area north of Cape Farewell (SCA 7B).

42 MFish proposes nominal TACs based on current utilisation be set for these fishstocks to provide for any incidental bycatches.

SCA 5

43 Stewart Island (e.g. Paterson Inlet, Port Pegasus) and Fiordland have scallop populations. The reported catch of scallops appears to be low and some of these reported catches are likely to be queen scallops. MFish notes that the Guardians of Fiordland's Fisheries and Marine Environment has developed a Fiordland Marine Conservation Strategy recommending that no commercial fishing is permitted inside fiord habitat lines[4]. The present government is currently seeking to implement this strategy and, therefore, it seems likely that commercial access to scallops will be restricted in Fiordland.

44 There are estimates of recreational catch, but none for customary catch in this area. These estimates are not considered to be reliable. There is a non-commercial scallop fishery in Paterson Inlet (currently closed because of low catches), and non-commercial catches of scallops are taken from other parts of Stewart Island and Fiordland.

45 MFish proposes that the TAC be based on estimates of the current utilisation.

SCA 7C

46 Cloudy Bay is an area with suitable scallop habitat, and is in close proximity to the Marlborough Sounds as a potential spat source. Commercial fishers have fished the area in the past. Scallop beds are known to have occurred here, but the size of the scallop resource is not likely to be large.

47 MFish proposes that the TAC be based on estimates of the current utilisation.

SCA 9A

48 The west coast, Auckland coastline has substantial scallop populations inside the numerous harbours (e.g. Kawhia Harbour, Aotea Harbour, Raglan Harbour, Manukau Harbour, Kaipara Harbour, Hokianga Harbour) along this coastline. These harbours are closed to commercial scallop fishing. On the open coast, there are likely to be

[4] Guardians of Fiordland's Fisheries & Marine Environment Inc 2003: Fiordland Marine Conservation Strategy. Page 43. www.fiordland-guardians.org.nz

sporadic scallop resources available, arising from spat being transported from adjacent harbours.

49 There are estimates of reasonably large recreational catches, but none for customary catch, for this area. MFish notes that there is a large Mäori population residing in the vicinity of these harbours.

50 MFish proposes that the TAC be based on estimates of the current utilisation.

Allocation of TAC

51 The TAC constitutes a composite of the respective stakeholder groups' catch allocations, plus any other fishing-related mortality. When setting any TAC, a TACC must be set, as well as allowances determined for customary and recreational fishing interests and for any incidental fishing related incidental mortality.

52 The 1996 Act stipulates a process by which the TAC is to be allocated. However, no explicit statutory mechanism provides guidance as to the apportionment of the TAC between sector groups either in terms of a quantitative measure or prioritisation of allocation. In shared fisheries MFish has a policy preference in favour of the catch history allocation model in the absence of clear information to the contrary.

Recreational allowance

53 The proposed recreational allowances for each QMA are set out in Table 1.

54 Harvest estimates from the National Recreational Surveys (see Table 6) have been used to estimate current recreational utilisation of the fishery. The harvest estimates provided through the surveys are estimates only and need to be treated with caution for several reasons. It is also important to note that estimates of error ("CVs") are very high in most cases and the higher the CV the less reliable the estimate. In some cases CVs have not been calculated at all due to too few respondents, which means the estimate is not likely to be representative.

55 Despite the potential for error in the data, harvest estimates from the National Recreational Surveys are the only estimate of recreational harvest that MFish has available at this scale. The estimates from the 1999-00 and 2000-01 surveys are considered to be the most reliable estimates of absolute harvest and MFish considers that these estimates are appropriate for providing the initial recreational allowance. For SCA 2A, 3, 7A, 7C, and 8A no information exists to indicate what the recreational harvest may be so a notional allowance has been proposed.

56 For SCA 7B no information exists to indicate what the recreational harvest may be and it seems unlikely that non-commercial fishers would take any scallops from this area. MFish proposes that no allowance be made for recreational or customary harvest in this fishstock.

Customary Mäori allowance

57 The proposed customary allowances for each QMA are set out in Table 1.

58 Policy guidelines provide several options for setting a customary allowance. Where estimates are not available, but there is known to be customary catch, a nominal

allowance may be made. For species and stocks where there is some catch, but the stock is not considered of importance to customary Mäori, then the allowance may be based on half the recreational catch. For stocks of importance to customary Mäori the allowance may be based on the level of the recreational catch.

59 Scallops are an extremely important customary resource for all coastal communities and information indicates that most beds around New Zealand are utilised by local iwi.

60 It is considered that customary harvest would be at least as extensive as recreational harvest and MFish proposes that the customary allowance for scallops in each QMA be equal to that of the recreational allowance (as has occurred in the existing QMS scallop stocks). This is a notional figure only and may need to be revised when information becomes available.

Allowance for other sources of fishing-related mortality

61 The proposed allowances for other sources of mortality for each QMA are set out in Table 1.

62 There is no information on the current level of illegal catch of scallops, although it possibly occurs on an opportunistic basis for this sought-after shellfish. It is suggested that some allowance is made to cover illegal catch.

63 The use of dredges as the main harvest method will contribute a source of mortality to the stocks by fishing.

64 In the absence of quantified information, nominal allowances have been proposed. As with all allocations and allowances, this may be reviewed at any stage when more information becomes available.

TACC

65 Proposed TACCs for each QMA are set out in Table 1.

66 MFish notes that, with the availability of only unreliable catch information, it is not possible to stipulate whether the proposed TACCs are above or below the level of current commercial catch.

67 The proposed TACCs are based on estimates of current commercial utilisation, and provide nominal catch levels to accommodate likely scallop catches in each area (including bycatch).

Other Management Measures

68 Specific measures are proposed in respect of:

- Removing the generic prohibition on taking scallops for sale outside SCA7 in FMA 7;
- Including all scallop stocks on the Second Schedule of the Act;
- Including all scallop stocks on the Sixth Schedule of the Act;

- Revoking redundant fisheries regulations;
- Making consequential amendments to the fisheries reporting regulations; and
- Setting deemed values for scallops.

Removing prohibition

69 There is a prohibition on taking of scallops for sale anywhere in FMA 7, except in SCA 7. This prohibition is imposed by s 312(2) of the Act. MFish recommends that this section be repealed. The process of repealing this section involves an amendment to the Act, which is outside the scope of this paper.

Second Schedule

70 Additional flexibility is encompassed within s 13 of the Act by the capacity to provide for an in-season increase to the TAC. Any stock with a highly variable abundance may be listed on this schedule. For such stocks, in years of high abundance, the TAC may be increased in-season and takes effect from the date notified. At the commencement of the next fishing-year, the TAC reverts to the level set at the commencement of the previous fishing-year. MFish recommends that all scallop stocks being introduced to the QMS be added to this schedule. Details of the proposal are attached as Annex One.

Sixth Schedule

71 This schedule includes stocks that may be returned to the sea in accordance with stated requirements. MFish notes that the southern and northern scallop fisheries are listed on this schedule to cover the situation where scallops are taken during any closed season or from any prohibited area. As scallops are occasionally a bycatch of other fisheries (for example, potting, dredging, and trawling), and may also be taken in closed seasons or areas, MFish recommends that these scallop fisheries be added to this schedule. Details of the proposal are attached as Annex One.

Redundant fisheries regulations

72 MFish notes that there are regulations applying to scallops that are considered redundant as a result of entry into the QMS. Commercial fishing in some areas is restricted to Sunday to Thursdays, and/or daylight hours, to reduce fishing intensity. MFish recommends revoking these regulations for the non-QMS scallops stocks (Note: MFish is not proposing to revoke these regulations within those areas already within the QMS i.e. SCA 1, SCA CS, SCA 4, SCA 7). Details of the proposed amendments are attached as Annex One.

73 There are no regulations that specify annual competitive catch limits for these scallop fisheries that need to be removed with QMS entry. MFish is not proposing to make any changes to the regulations imposing seasons, minimum sizes, or closed areas to fishing for scallops.

Consequential amendment to regulations

74 MFish notes that amendments are required to the Fisheries (Reporting) Regulations 2001 as a consequence of introducing these scallop fisheries into the QMS. Details of the proposed amendments are attached as Annex One.

Deemed values and over-fishing thresholds

75 In assessing a proposed interim and annual deemed value for scallops, MFish notes that the port price that has been used for setting deemed values for the existing QMS scallop stocks, ie, $14.00 per kg meatweight, with the annual deemed value set at $28 per kg and the interim deemed value at $14 per kg.

76 Existing QMS scallops are classified as high value single species fisheries, ie, stocks that are of high value and taken primarily with little, if any, by-catch. But it is anticipated that these non-QMS scallop stocks will mainly be taken as bycatch, with little target fishing. Therefore, MFish proposes to set deemed values, at least initially, lower than the existing QMS scallop stocks to encourage reporting. MFish notes that ACE prices for SCA 7 averaged $3.26 per kg in 2002-03. MFish considers that a balance needs to be struck between encouraging fishers to report catches while encouraging them to hold ACE to cover their catches in the non-QMS scallop stocks. MFish's initial proposal is, therefore, to set the annual deemed value at $7.00 per kg and the interim deemed value at $3.50 per kg.

77 As it is anticipated that these non-QMS scallop stocks will mainly be taken as bycatch it is not proposed that differential deemed values will be applied to these stocks.

78 MFish does not propose to set an overfishing threshold for scallops, unless monitoring of catches suggests that this is required in the future.

Consideration of other schedules

79 MFish notes that there are optional QMS management measures provided for by the Act that should be considered prior to the scallop fisheries becoming part of the QMS. These include Schedule 5A that list stocks to which s 67A does not apply (this section allows for under fishing rights) and the Eighth Schedule that lists minimum annual holdings of ACE for a specified stock.

Schedule 5A

80 This schedule provides an exception to the allocation of additional ACE in case of under-fishing. MFish notes that two other QMS scallop fisheries are listed on this schedule being single target high-value fisheries. The non-QMS scallop fisheries are not single target fisheries, they are more likely to be taken as bycatches of other fisheries. MFish recommends that these scallop fisheries not be added to this schedule.

Eighth Schedule

81 This schedule lists minimum annual holdings of ACE for specified stocks. Again, two QMS scallop fisheries are listed on this Schedule with minimum holdings of three tonnes. These fisheries, along with other fisheries on this schedule, are effectively high value target fisheries. The non-QMS scallop fisheries do not fall within this

category and, given the scale of these fisheries, MFish questions the need for a minimum holding. Generally, the rationale for including these fisheries on the Eighth Schedule has been to limit the numbers of fishers in each fishery. MFish considers that these non-QMS scallop fisheries are likely to be bycatch fisheries. MFish therefore, recommends that these fisheries are not added to the Eight Schedule.

Statutory Considerations

82 Before setting (or varying) any sustainability measure (which includes a TAC), the Minister must consider a range of factors as outlined in the Statutory Obligations and Policy Guidelines section.

83 The purpose of the Act (s 8) is to provide for the utilisation of fisheries resources while ensuring sustainability. The proposed management measures seek to ensure the sustainability of scallops by a) setting TACs that recognise the paucity of non-commercial scallop stock information that exists throughout New Zealand; b) TACCs that reflect recent catches from each fishery; and c) the potential for these scallop stocks to become locally depleted. The proposed TACs partly reflects an intention to conserve scallop stocks to meet the reasonably foreseeable needs of future generations, but they are also intended to permit continued use of stocks to enable people to provide for their social, economic, and cultural wellbeing. The provision for in-season TAC increases will allow the flexibility for adjusting the TACs when stocks are periodically abundant so that people can take advantage of these peaks and provide for their wellbeing.

84 The Act includes obligations to avoid, remedy, or mitigate any adverse effects of fishing on the aquatic environment, and that those effects and management measures are taken into account when decisions are made about the sustainable utilisation of fishery resources. This has been discussed earlier in this paper under the heading *Rationale for proposed TACs*.

85 Under s 13 of the Act, the TAC should be set at a level that moves the stock towards the level that can produce the MSY. No scientific stock assessment information is available indicating whether scallop stocks are at, above, or below a level that can produce MSY. MFish considers that the proposed TACs, set to provide for incidental bycatches, should enable scallops to be managed at a sustainable level. The proposal to include these scallop stocks on the Second Schedule will allow the flexibility for in-season adjustment to the TACs if scallop numbers become temporarily more abundant in an area.

86 Section 13(2)(b)(ii) also requires consideration of the environmental conditions affecting the stock. Scallop populations are characterised by being highly variable from year to year in stock size and structure largely due to the influence of environmental factors on population dynamics. Factors include temperature, salinity, hydrology, post spawning stress, and disease.

87 Section 9(a) requires that associated or dependent species should be maintained above a level that ensures their long-term viability. There is no evidence that associated or dependent species will be threatened by harvesting these scallop stocks, particularly as it is anticipated that scallop stocks will largely be harvested as a bycatch of targeting other species. Similarly, s 9(b) requires the maintenance of biological diversity, and s 9(c) requires the protection of habitat of particular significance to fisheries management. The diversity of epibenthic macrofauna on scallop habitats is often relatively low compared to other marine habitats. Scallop stocks considered in this

paper are harvested mainly by dredging, but also by diving. Diving is not likely to affect the environment, but bottom dredging can have adverse effects on the aquatic environment and affect biological diversity. Dredging, especially in areas with high silt levels, is thought to remove settlement surfaces and suspend silt that causes high mortality in newly settled scallop spat. If dredging effort increases, there may be adverse effects on settlement and recruitment.

88 The extent to which an increase in dredging for these non-QMS scallop stocks would promote adverse effects is unknown. MFish considers that introduction of these scallop stocks into the QMS could cause new areas to be dredged for scallops. Previously un-dredged areas will be subject to a higher level of adverse effects than the modified habitat that supports the existing QMS stocks. But the TACs proposed to accommodate incidental bycatch fisheries should not result in any significant un-dredged areas being heavily fished. Any in-season adjustments to the TAC will need to take into account environmental considerations, including whether the area of scallop abundance is in a previously dredged or un-dredged area.

89 Scallops provide a food resource for other animals. It is not known whether local depletions affect biological diversity.

90 There is a wide range of international obligations relating to fishing (including sustainability and utilisation of fishstocks and maintaining biodiversity). MFish considers the s 5 considerations arising from New Zealand's international obligations and the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 are adequately addressed by the management proposals for scallops.

91 Section 11(1)(a) requires that any effects of fishing on the stock and aquatic environment are taken into account. This approach is intended to ensure that the risk of any effect of fishing is evaluated, and any positive effects from existing practices or new proposals are identified. MFish considers that proposed TACs will limit any adverse effects of fishing on the stock or the aquatic environment while providing for in-season adjustment of the TACs will provide the flexibility to exploit any occasional explosion in stock numbers.

92 Section 11(1)(b) requires that existing controls be taken into account when setting or varying a sustainability measure such as a TAC. MFish notes that, in all stocks considered in this paper, commercial access is currently limited to existing permit holders by Schedule 4C. Areas where commercial access is restricted are defined by regulation. MFish proposes to remove some redundant regulations as these existing controls are not deemed necessary under the proposed TAC framework. There is a daily bag limit for recreational fishers of 20 scallops per day, except in for 50 scallop limit in Challenger and a 10 scallop limit in Southland Fishery Management Areas.

93 Section 11(1)(c) recognises that biological systems can be inherently variable, and stocks are prone to fluctuations in abundance. This particularly applies to scallop populations. Accordingly, in this advice paper flexibility in the management regime is supported.

94 Section 11(2) requires the consideration of various other matters relating mainly to planning documents. MFish is not aware of any considerations in any regional policy statement, regional plan or proposed regional plan under the Resource Management Act 1991 or the Conservation Act 1987 that are specifically relevant to setting TACs for scallops. Similarly, in accordance with s 11(2A), MFish is not aware of any fisheries or conservation services decisions, or any decisions not to require conservation or fisheries services, that are relevant to setting TACs for scallops. No

fisheries plans have been approved that would have any bearing on setting the TACs for scallops.

95 As required under s 12(2)(c), MFish considers that the proposals for scallops meet the requirements of s 7 and s 8 of the Hauraki Gulf Marine Park Act 2000. The proposed catch limits for scallop stocks in the QMS will allow for the sustainable utilisation of the species by all fishing interests.

96 The Act itemises (s 21) the relevant fishing interests and fishing-related mortality to be allowed for before setting a TACC. In setting the allowances for Mäori customary non-commercial interests the Minister is required to take into account mätaitai reserves notified in the Gazette under s 186 or temporary closures notified under s 186A when allowing for customary fishing interests. There are mätaitai in some QMAs. However, as yet they do not propose any changes to current controls on scallop fisheries. No area has been closed or fishing method restricted under section 186A due to issues associated with scallops.

97 In allowing for recreational fishing the Minister is required to take into account any non-commercial fishing areas under s 311 of the Act. No such areas are in place at this time.

98 Section 10 sets out information principles that are to be taken into account when setting TACs for new species. The principles are particularly important in relation to scallop stocks considered in this paper as the status of these stocks remains unknown. MFish has adhered to these principles in setting the TACs for these scallop stocks.

Preliminary Recommendations

99 MFish recommends that the Minister:

a) **Note** that section 312(2) of the 1996 Act needs to be repealed to allow the taking of scallops for sale in SCA 7A, SCA 7B, and SCA 7C.

b) **Agree** to set a TAC of 12 tonnes meatweight for SCA 1A and within that TAC set:

   i) A customary allowance of 3 tonnes;

   ii) A recreational allowance of 3 tonnes;

   iii) An allowance for other fishing-related mortality of 1 tonne; and

   iv) A TACC of 5 tonnes.

c) **Agree** to set a TAC of 4 tonnes meatweight for SCA 2A and within that TAC set:

   i) A customary allowance of 1 tonne;

   ii) A recreational allowance of 1 tonne;

   iii) An allowance for other fishing-related mortality of 1 tonne; and

   iv) A TACC of 1 tonnes.

d) **Agree** to set a TAC of 4 tonnes meatweight for SCA 3 and within that TAC set:

   i) A customary allowance of 1 tonne;

ii) A recreational allowance of 1 tonne;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 1 tonnes.

e) **Agree** to set a TAC of 10 tonnes meatweight for SCA 5 and within that TAC set:

i) A customary allowance of 3 tonnes;

ii) A recreational allowance of 3 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 3 tonnes.

f) **Agree** to set a TAC of 4 tonnes meatweight for SCA 7A and within that TAC set:

i) A customary allowance of 1 tonne;

ii) A recreational allowance of 1 tonne;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 1 tonnes.

g) **Agree** to set a TAC of 2 tonnes meatweight for SCA 7B and within that TAC set:

i) A customary allowance of 0 tonnes;

ii) A recreational allowance of 0 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 1 tonne.

h) **Agree** to set a TAC of 6 tonnes meatweight for SCA 7C and within that TAC set:

i) A customary allowance of 1 tonne;

ii) A recreational allowance of 1 tonne;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 3 tonnes.

i) **Agree** to set a TAC of 4 tonnes meatweight for SCA 8A and within that TAC set:

i) A customary allowance of 1 tonne;

ii) A recreational allowance of 1 tonne;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 1 tonne.

j) **Agree** to set a TAC of 30 tonnes meatweight for SCA 9A and within that TAC set:

i) A customary allowance of 12 tonnes;

ii) A recreational allowance of 12 tonnes;

iii) An allowance for other fishing-related mortality of 1 tonne; and

iv) A TACC of 5 tonnes.

k) **Agree** to include all scallop stocks in the Second Schedule of the Act.

l) **Agree** to include all scallop stocks in the Sixth Schedule of the Act.

m) **Agree** to revoke:

i) Regulation 22(5) of the Fisheries (Auckland and Kermedec Areas Commercial Fishing) Regulations 1986 except in SCA 1 and SCA CS;

ii) Regulations 12A(1)(b) and 12A(1)(c) of Fisheries (Challenger Area Commercial Fishing) Regulations 1986 except in SCA 7;

iii) Regulation 11G(1) of the Fisheries (South-East Area Commercial Fishing) Regulations 1986 except in SCA 4;

iv) **Agree** to amend the Fisheries (Reporting) Regulations 2001 to outline the codes to be used by fishers when completing their statutory catch returns; and

v) **Agree** to set annual deemed values for the scallop stocks at $7.00/kg and the interim deemed value at $3.50 per kilogram.

ANNEX ONE

Second Schedule – in-season adjustment of TACs

Background

100 MFish proposes to provide for in-season adjustments of the TACs for the scallop stocks to be introduced into the QMS by adding scallops to the Second Schedule of the Act.

101 Within s 13 of the Act, any TAC that is set or varied has effect on or from the first day of the next fishing-year for the stock concerned. An exception applies to those stocks listed on the Second Schedule to the Act. Any stock with highly variable abundance may be listed on this Schedule. For such stocks, in years of high abundance, the TAC may be increased in-season and takes effect from the date notified. At the commencement of the next fishing-year, the TAC reverts to the level set at the commencement of the previous fishing-year. The TAC may only be increased during the fishing-year and not decreased.

102 An in-season TAC increase may be distributed between commercial, customary and recreational fishers, and an allowance can be made for other sources of fishing-related mortality. In terms of the increase of the TAC allocated to commercial fishers, the increase does not result in an increase to the TACC. Rather, additional ACE is generated, not individual transferable quota, and is allocated in terms of proportional quota share held by each quota owner.

Problem definition

103 These scallop fisheries are likely to only have a very low abundance of scallops in most years, with catches mainly being incidental bycatches. Scallops do have highly variable abundance so that occasionally abundant scallop resources may develop in an area. Such information may not be available so that a decision on the TAC can be made before the start of the fishing-year. Unless scallops are listed on the Second Schedule there will be no flexibility to make an in-season adjustment to the TAC to take advantage of these infrequent events.

Preliminary consultation

104 No preliminary consultation has been undertaken concerning this proposal.

Options

Non-Regulatory Measures

105 There is no non-regulatory mechanism for making in-season adjustments to TACs.

Regulatory Measures

106 To implement this measure, it is necessary to add scallops to the Second Schedule of the Act.

Costs and benefits of the proposal

107 Providing in-season adjustment of the TAC will allow flexibility to make in-season adjustment to TACs when required. It removes the need to set higher TACs than would be taken in most years to provide for the infrequent year of greater abundance. It will allow improved harvest efficiency for commercial fishers.

108 There are no obvious costs associated with this proposal. The benefit is that TACs can be set at low levels to provide for incidental bycatches, but with the flexibility provided to adjust the TAC upward for any season when it becomes apparent that an abundant scallop resource has developed in an area. There will be additional benefits in most years of having only low levels of un-fished ACE by removing the incentives for fishers to undertake extensive exploratory fishing resulting in additional environmental damage and increasing fishers operating costs.

Administrative implications

109 There are no significant administrative implications.

Sixth Schedule – return of scallops to the water

Background

110 MFish proposes to provide for the return of scallops to the water by adding scallops to the Sixth Schedule of the 1996 Act, with stated requirements that they are likely to survive and must be returned to the same waters from which they were taken as soon as practicable.

111 Under s 72 of the Fisheries Act 1996, once scallops are introduced to the QMS, commercial fishers would be obliged to retain scallops obtained by any fishing method. However, scallops are likely to be robust enough to enable them to be returned to the sea and subsequently survive.

112 If scallops were added to the Sixth Schedule, commercial fishers who took scallops as an unintentional bycatch would be able to return them to the sea alive, provided they comply with the requirements set out in the schedule.

Problem definition

113 Scallops are occasionally caught as a bycatch of other fisheries – for example, potting, dredging, and trawling. Unless scallops are added to the Sixth Schedule, any scallop taken must be landed and, with no ACE, fishers would be required to pay a deemed value.

114 Scallops can also be taken inadvertently during scallop closed seasons or from prohibited areas by fishers who are otherwise legally fishing for other species. Unless scallops are added to the Sixth Schedule, any fishers taking scallops in these situations will be in breach of the relevant fisheries regulations.

115 No preliminary consultation has been undertaken concerning adding scallops to the Sixth Schedule.

Options

Non-Regulatory Measures

116 Unless scallops are added to the Sixth Schedule, it will be illegal to return or release scallops caught incidentally. There is no non-regulatory mechanism for returning fish taken under the QMS to the sea.

Regulatory Measures

117 To implement this measure, it is necessary to add scallops to the Sixth Schedule of the 1996 Act.

Costs and benefits of the proposal

118 Adding scallops to the Sixth Schedule will provide fishers who catch scallops incidentally as a bycatch with the flexibility to legally return these fish to the sea (provided they are immediately returned alive). Allowing scallops to be returned to the sea is the least cost option for fishers since they will not be penalised by deemed value payments. It will also allow fishers who inadvertently take scallops during any closed season or from any prohibited area to legally return any live scallops to the sea.

Administrative implications

119 There are no significant administrative implications.

Removal of commercial scallop prohibitions

Background

120 At present, a series of regulations prohibit the commercial harvesting of scallops on certain days of the week (Fridays and Saturdays) and/or times of the day (at night):

a) Regulations 22(2) and (5) of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986;

b) Regulations 12A(1)(b) and (c) of the Fisheries (Challenger Area Commercial Fishing) Regulations 1986; and

c) Regulation 11G(1) of the Fisheries (South-East Area Commercial Fishing) Regulations 1986

Problem definition

121 These regulations were originally designed to reduce target fishing intensity in the major scallop fisheries so that the scallop beds were spelled for periods of time to allow the water to clear and thus allow scallops to feed successfully. Scallops are filter-feeding shellfish whose filter-feeding mechanisms become clogged if too much silt is suspended in the water.

122 It is anticipated that the majority of the scallops taken in these non-QMS scallop fisheries will be incidental bycatches rather than catches taken by targeted fishing. Therefore, the need for these restrictions does not exist for these bycatch scallopfisheries with their introduction into the QMS. (Note: MFish is not proposing

to revoke these regulations within those areas already within the QMS i.e. SCA 1, SCA CS, SCA 4, SCA 7 where target fishing for scallops occurs.)

Preliminary consultation

123 No preliminary consultation has been undertaken concerning the removal of these commercial scallop prohibitions.

Options

Non-Regulatory Measures

124 Not relevant

Regulatory Measures

125 The commercial scallop prohibitions are imposed by regulations. The only option to remove these prohibitions is to amend relevant legislation.

Costs and benefits of the proposal

126 Revoking the regulation removes the requirement to enforce the restriction on fishing on certain days or at certain times of the day and will result in improved harvest efficiency for commercial fishers.

127 There are no obvious costs associated with this proposal. The benefit is that redundant regulations will be removed.

Administrative implications

128 There are no significant administrative implications.

Amendment to Regulations

Consequential amendments to the Fisheries (Reporting) Regulations 2001

Background

129 It is proposed to make consequential amendments to the Fisheries (Reporting) Regulations 2001 by amending:

a) Table 1 of Part 1 of Schedule 3 of those regulations that specifies the codes to be used when completing catch returns which must be furnished to the Chief Executive. This amendment will incorporate codes that reflect the QMAs for scallops.

130 The Fisheries (Reporting) Regulations 2001 provide the framework for the completion and furnishing of statutory catch returns by fishers to the Chief Executive. Information contained in these returns is used for research, stock assessment, enforcement and administrative reasons (including balancing catch against ACE). With the revised QMAs established by the Minister, it is appropriate to amend these

regulations to ensure that they reflect the Minister's decision establishing a number of QMAs for scallops.

Problem definition

131 The obligations for fishers to report their catch and the codes used to complete these returns should reflect the Ministers decisions on QMAs for each species to be introduced into the QMS on 1 April 2006.

Preliminary consultation

132 No direct consultation on the need to amend these regulations has been undertaken as it is a consequential amendment flowing from the Minister's QMA decision.

Options

133 As the reporting framework is contained in regulations, there is no other option than to amend these regulations.

Costs and benefits of the proposal

134 The proposed amendments clarify the obligations for fishers when completing their statutory returns. Regulatory clarification means fishers are aware of their reporting obligations and complete their returns in the simplest fashion possible.

Administrative implications

135 Minor amendments to forms and explanatory notes will be required consequential to this regulatory amendment.

ANNEX TWO

Species Information

Species biology

136 The New Zealand scallop *Pecten novaezelandiae* is one of several species of the family Pectinidae or 'fan shell' bivalve mollusc found in New Zealand waters. Others include queen scallops (*Zygochlamys delicatula*) and some smaller species of the genus *Chlamys*. *P. novaezelandiae* is endemic to New Zealand, but is very closely related to the Australian species *P. fumatus* and *P. modestus*. Scallops of various taxonomic groups are found in all oceans and support many fisheries worldwide. Most undergo large population fluctuations.

Distribution

137 Scallops have planktonic larvae that can be dispersed widely by currents. The adults are found in a variety of intertidal, coastal, and offshore areas where habitats provide suitable settlement surfaces and conditions for juvenile survival and growth. Scallops are mainly found on firm, low-silt substrates such as shell gravel and sand, but can occur on silty substrate where clean surfaces above the seabed provide areas for spat to settle and survive.

138 After the planktonic larval phase and a relatively mobile phase as very small juveniles, scallops are largely sessile and move actively mainly in response to predators. They may, however, be moved considerable distances by currents and storms and are sometimes thrown up in large numbers on beaches.

139 Enduring high-density populations occur in semi-enclosed areas (especially harbours, inlets, and fiords) where circulating currents retain larvae to provide regular recruitment. A number of these scallop stocks are managed under the QMS (SCA 1, SCA CS, on the northeast coast of the North Island; SCA 4 at the Chatham Islands; and SCA 7 in Tasman/Golden Bays and Marlborough Sounds). There is an important recreational fishery for scallops in Paterson Inlet, Stewart Island. Sporadic settlement of larvae can result in ephemeral (three to five years) scallop populations. The distribution of scallops can vary greatly at both temporal and spatial scales, thus limiting the value of historical records of scallop distribution outside the boundaries of enduring QMS stocks on the northeast coast of the North Island and in the Challenger area.

140 Scallops inhabit coastal waters all around mainland New Zealand including Stewart Island down to 60 m, but are found at the Chatham Islands in depths down to 88 m (Bull 1990) and on the Mernoo Bank at 155–175 m. Database records of the distribution of 'scallops' probably include species of the genus *Zygochlamys* and *Chlamys* that are common on the outer continental shelf, especially off Otago and the subantarctic islands, and which have a much wider and deeper distribution than *P. novaezelandiae*. Scallops are not known from the Kermadec Islands, or any of the subantarctic islands. The rocky offshore habitat of the Three Kings Islands and Poor Knights Islands suggest scallops are unlikely to be there in high densities.

141 There have been no biological studies that are directly relevant to the recognition of separate stocks of scallops around New Zealand. The potential for planktonic larvae to be widely dispersed by current increases the potential for gene flow over large distances. Some populations, particularly around the Chatham Islands, may be geographically separated from mainland stocks.

Reproduction

142 Scallops are functional hermaphrodites, are are thought to become sexually mature at about 60 mm shell length (SL) in northern and central populations. There are no data on size at sexual maturity for non-QMS stocks. Scallops are extremely fecund and may spawn several times during the late spring and summer, but the first major spawning during late spring is thought to contribute most to recruitment.

143 Fertilisation is external and larval development last for about three to four weeks. Initial settlement occurs when the larva attaches to a settlement surface (commonly clean live or dead shell) via a byssus thread (filamentous material). The major settlement of spat in northern fisheries usually takes place in early January, but can be earlier in the Challenger area, usually mid-December. After growth to about 2 mm SL, the byssus is detached. Some juvenile scallops do not move and have been observed to remain around horse mussels (*Atrina zelandica*) on which they have probably settled. Others have a highly mobile small juvenile phase after which the young scallops take up the relatively sedentary adult mode of life.

144 The very high fecundity of this species, and likely variability in the mortality of larvae and pre-recruits, leads to great variability in annual recruitment. This, combined with variable mortality of adults, leads to scallop populations being highly variable from one year to the next, especially in areas of rapid growth where the fishery may be supported by only one or two year classes. This variability is characteristic of scallop populations worldwide, and often occurs independently of fishing pressure.

Growth

145 Growth in scallop species is known to vary among areas, years, seasons, and depths, and probably among substrates. Estimates of growth are available for some scallop stocks in the QMS, but growth data are sparse for non-QMS stocks. In the Coromandel fishery (SCA CS) growth to 100 mm SL (recruit size) was estimated from mark-recapture data to take from 1.5 to 3.5 years or more. There is a relationship between depth and growth rate, scallops in shallow waters growing much faster than those deeper. This is not a simple relationship, however, as scallops in some very deep beds appear to grow at least as fast as those in favourable parts of the Coromandel fishery. Scallops in the Hauraki Gulf can grow to 100 mm SL in less than three years.

146 Growth rates of scallop populations in the Challenger area (SCA 7) also vary. The length frequencies of spat from three major settlements at a shallow water site (8–10 m) in Croisilles Harbour, eastern Tasman Bay were monitored over 24 months, 1984–85. Scallops grew rapidly over the summer and little over the winter. Spat grew at similar rates over the first summer and length frequency modes from each settlement remained separate. The three modes merged in the second summer with most scallops reaching 100 mm SL (and sexually maturity) at the end of the second summer. Scallops in outer Pelorus Sound grew to 60 mm SL in one year and 100 mm SL in

two years. This growth rate is thought typical of scallop populations in Golden Bay and Tasman Bay, but in some areas scallops may take three to four years to reach recruit size. The Challenger fishery is enhanced with wild spat that are caught on longlines and relocated to rotationally fished areas, to reduce the severity in troughs of natural recruitment. These areas are generally fished on a three-year rotation.

147 Between 1991 and 1993, two thousand scallops were tagged in Paterson Inlet, Stewart Island to estimate growth. Altogether 89 recaptures were made for which there were data on length at release and recapture. Only 63 showed any growth. Recaptured scallops were at liberty for 22–730 days, with about 60% at liberty for less than one year. The frequency of length at release for recaptured scallop showed 23 individuals below minimum legal size (100 mm SL). These data are inadequate for a robust estimate of growth, but show that scallops can grow to 100 mm SL in 1.5 years. Strong seasonal growth patterns appear to occur in Paterson Inlet scallops, with maximum growth occurring over the summer.

148 Growth rate in the Chatham Island fishery is not known, but anecdotal evidence (such as the rapidity of apparent changes in the abundance of large scallops) suggests that it might be quite fast, and similar to Paterson Inlet populations. Despite the considerable depth of most of the Chatham Island scallop populations, primary productivity is considered high.

Age

149 There are no studies to determine size at age, or age from scallop shells, but these have been inferred from growth curve data. Maximum age in unexploited populations is thought to be six or seven years for Coromandel scallops, three to five years for Challenger scallops, and eight to ten years for Paterson Inlet populations.

Natural, fishing and incidental mortality

150 There are no estimates of mortality for non-QMS stock. Natural mortality in the Coromandel fishery is quite high, at $M = 0.50\ y^{-1}$ (instantaneous rate), but is less well-known elsewhere. Natural mortality is thought to be lower for longer-lived populations, especially those around Stewart Island and the Chatham Islands.

151 Incidental mortality has been estimated from commercial dredging in northern areas and the Challenger area, but such incidental mortality in other areas is not well understood. No studies have been carried out for non-QMS stocks, predominantly fished by recreational dredges that vary greatly in design, size, and weight.

152 Dredging, especially in areas with high silt levels, is thought to remove settlement surfaces and suspend silt that causes high mortality in newly settled spat.

153 Large scale mortality of localised populations from post-spawning stress or disease, and the movement of the shells of dead scallops by currents, may have given rise to the perception that adult scallop populations are mobile.

Size frequencies

154 Size frequency data for non-QMS scallop stocks are sparse. Paterson Inlet, Stewart Island supported an important recreational fishery, but has been closed to fishing since 2001 because of a low population size.

155 Maximum sizes in northern and central populations are smaller (L_∞ 108–147 mm SL, compared with Paterson Inlet populations where scallops can grow to 180–200 mm SL.

Fisheries characteristics

Commercial catch

156 Records of scallop catches for non-QMS stocks are poor and should not be used to assess the size or distribution of non-QMS scallop stocks. Data are reported by scallop statistical area, fisheries statistical area, FMA, and rock lobster statistical area. The number of fishing methods reportedly catching scallops other than dredging suggests many errors, including miscoded catch, in the data.

157 Data from MFish databases have been summarised to show catches and landings reported for non-QMS scallop stocks. Table 2 gives landing data for scallops (SCA) from LFRR data and estimated catch from CELR data. Marked differences between estimated catch and landings suggest significant errors in the data. One significant known error is that some fishers report catches in meatweight, while others report in greenweight.

Table 2: Landings data for scallops (SCA) from licensed fish receiver reports (LFRR), estimated catch from catch effort landing returns (CELR), and the differences (landings subtracted from estimated catch, reported in tonnes).

Fishing year	Landings	Estimated	Difference
1989/90	1660.6	2353.0	692.4
1990/91	1173.5	3216.1	2042.5
1991/92	1085.2	4468.8	3383.7
1992/93	1019.3	4324.5	3305.3
1993/94	1508.4	6813.4	5304.9
1994/95	1227.0	4211.8	2984.8
1995/96	973.8	4609.6	3635.7
1996/97	1177.1	3517.9	2340.8
1997/98	816.1	2466.6	1650.5
1998/99	723.9	3758.1	3034.2
1999/00	666.4	3611.6	2945.2
2000/01	728.1	3019.1	2291.0
2001/02	962.9	4331.2	3368.3
Total	13722.4	50701.6	36979.2

Catch by region

158 Estimated catches are reported by a number of different statistical and fisheries management areas, often for the same stock. Estimated catches from reporting areas were combined (with approximation at some boundaries) into QMS stock boundaries (Table 3) and FMAs for non-QMS stocks (Table 4) for the fishing years 1989/90 to 2001/2002. QMS scallop stock summaries included estimated catches from scallop statistical areas, fisheries statistical areas, FMAs, and rock lobster statistical areas. Non-QMS scallops stock summaries report estimated catches by FMA, from fisheries statistical areas, FMAs, and rock lobster statistical areas combined. Catches are

reported in tonnes. Catches less than 50 kg are denoted as zero catches. Catches from the Auckland Islands are most likely queen scallops (*Zygochlamys delicatula*) and have been removed from the data. As estimated catches exceed landings, these data are likely to contain errors. Unidentifiable and Null (no area information provided) areas have been combined and summarised separately.

Table 3: **Estimated catches from CELR data where reporting areas were combined (with approximation at some boundaries) into QMS stock boundaries. Catches are reported in tonnes. Catches less than 50 kg are denoted as zero catches. (Note: this data is thought to contain many errors).**

Fishing Year	Area SCA 1	SCA CS	SCA 4	SCA 7
1989/90	583.4	507.5	112.2	827.4
1990/91	686.1	952.3	34.2	1526.0
1991/92	1285.4	1057.1	80.6	2030.0
1992/93	808.4	340.1	64.8	3098.7
1993/94	963.9	317.8	1.4	5528.2
1994/95	1371.8	586.9	97.6	2115.6
1995/96	1143.1	705.4	194.4	2492.1
1996/97	779.9	686.9	418.7	1592.4
1997/98	317.8	402.2	143.7	1575.3
1998/99	84.6	245.1	42.0	3367.1
1999/00	32.9	151.9	15.2	3383.8
2000/01	48.4	168.1	0.1	2802.1
2001/02	127.8	173.9	0.0	4028.4
Total	8233.7	6295.2	1204.7	34367.1

Table 4: **Estimated catches from CELR data where reporting areas were combined (with approximation at some boundaries) into non-QMS stock boundaries by Fisheries Management Areas (FMAs). Catches are reported in tonnes. Catches less than 50 kg are denoted as zero catches. Null denotes no area information provided. (Note: this data is thought to contain many errors).**

Fishing Year	Area FMA 10	FMA 2	FMA 3	FMA 5	FMA 7	FMA 8	Mernoo	Subtotal	Null
1989/90	0.0	35.0	19.8	0.0	0.0	0.0	0.0	54.9	267.7
1990/91	0.0	2.1	2.1	0.6	0.0	1.1	0.0	5.8	11.8
1991/92	0.0	2.2	1.5	0.0	0.0	0.0	0.0	3.6	12.1
1992/93	0.0	0.8	3.3	0.3	0.0	0.0	0.0	4.4	8.2
1993/94	0.0	1.0	0.1	0.1	0.7	0.0	0.0	1.9	0.0
1994/95	0.0	1.6	0.1	0.0	0.0	16.9	0.0	18.6	21.3
1995/96	0.0	5.1	11.7	3.9	0.0	0.4	0.1	21.1	53.4
1996/97	0.4	2.8	10.9	2.5	1.2	0.0	0.0	17.8	22.2
1997/98	0.0	0.3	16.3	1.3	2.6	0.2	0.0	20.6	6.8
1998/99	0.0	2.6	2.4	0.0	2.0	0.0	0.0	6.9	12.3
1999/00	0.0	0.0	0.3	5.8	3.5	0.0	0.0	9.7	18.3
2000/01	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.4	0.0
2001/02	0.0	0.1	0.0	0.1	0.0	0.7	0.0	0.8	0.1
Total	0.4	53.5	68.6	14.5	10.0	19.2	0.3	166.5	434.1

159 With the exception of the Null catches, the highest estimated catches for non-QMS stocks are reported in FMA 3. These are most likely estimated catches of queen scallops caught on the outer Otago shelf. Likewise catches in FMA 5 could be queen scallops as the fishery extends down the coast to the Snares Islands. It is highly unlikely catches reported in other FMAs are all *P. novaezelandiae*. Catches from fisheries statistical areas 401, 402, 410 are presumed to be estimated catches taken on an exploratory survey of the Mernoo Bank in 2000.

Catch by method

160 Estimated catches by method are summarised by method in Table 5. Virtually all catches are made by dredge. Small numbers of scallops are caught occasionally by fishing methods that involve contact with the seabed, however it is most likely that a high proportion of estimated scallop catches from methods other than dredging are errors, especially the mid water trawling and trolling ones. Trawls are used to catch queen scallops and some if not most estimated scallop catches reported by trawling methods are likely to be queen scallops.

Table 5: Estimated catch (t) of scallops by reported method from CELR data, all FMAs, fishing years 1989/90 to 2001/02. Bottom long lining denoted by BLL, bottom trawling (BT), dredge (D), diving (DI), drop lines (DL), inshore drift net (DN), hand gathering (H), hand lining (HL), lampara net (L), single midwater trawl (MW), no fishing method provided (NULL), rock lobster pot (RLP), set netting (SN), trolling (T), and trot lines (TL). (Note: this data is thought to contain many errors).

Fishing year	Fishing method															
	BLL	BT	D	DI	DL	DN	DS	H	HL	L	MW	NULL	RLP	SN	T	TL
1989/90	0.0	5.1	2347.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1
1990/91	0.1	3.6	3208.2	0.5	1.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.1	1.4	0.0	0.0
1991/92	0.9	2.1	4457.4	3.7	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.3
1992/93	0.2	0.4	4317.9	1.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.8	1.7	0.0	0.0
1993/94	0.0	2.3	6804.0	1.5	0.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
1994/95	0.0	3.0	4205.4	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.4	0.0	0.0	0.0
1995/96	0.4	2.6	4575.6	0.0	2.7	0.0	0.0	0.0	0.0	1.5	0.0	26.2	0.0	0.4	0.1	0.0
1996/97	1.1	0.4	3515.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0
1997/98	1.1	0.2	2462.4	1.4	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.0	0.1	0.3	0.0	0.0
1998/99	0.1	0.4	3754.3	1.7	0.0	0.3	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.2	0.0	0.0
1999/2000	0.5	1.1	3604.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	5.3	0.0	0.0
2000/01	0.8	1.8	3012.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.8	0.0	0.0	2.0	0.0
2001/02	0.0	1.1	4324.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	0.0	0.0
Total	5.1	24.1	50589.2	12.5	6.9	0.6	1.2	5.4	0.1	1.5	0.2	37.7	3.5	11.0	2.1	0.4

Recreational catch

161 The National Marine Recreational Fishing Surveys in 1992-94, 1996, 2000, and 2001 provide some estimates of the recreational harvest of scallops (Table 6). The 2002 and 2001 surveys are considered to provide more reliable estimates than the earlier surveys. Even so, the estimates for most non-QMS scallops stocks are very uncertain (high *cv*'s were obtained for all estimates except SCA 9A) and they probably under-estimate recreational catch in these areas.

Table 6: Estimated number of scallops harvested by recreational fishers, and the corresponding harvest tonnage in greenweight and meatweight (in tonnes). The existing scallop stocks in the QMS (SCA 1, SCA CS, SCA 4, SCA 7) are provided for comparative purposes.

QMA	Survey year	Harvest (number of scallops)	Greenweight (tonnes)	Meatweight (tonnes)
SCA 1	1992-94	390,000	40-60	5.0-7.5
	1996	272,000	32	8
	1999-00	322,000	33	4.1
	2000-01	283,000	29	3.6
SCA CS	1992-94	655,000	60-70	7.5-8.8
	1996	614,000	62	7.8
	1999-00	257,000	30	
	2000-01	472,000	55	
SCA 1A Non-QMS	1992-94			
	1996			
	1999-00	55,000	6.8	0.9
	2000-01	65,000	6.1	0.7
SCA 2A Non-QMS	All survevs	No harvest recorded		
SCA 3 Non-QMS	1992-94	5,000	0.5	0.06
	1996			
	2000-01			
SCA 4	All survevs	Not surveved		
SCA 5 Non-QMS	1992-94	45,000	4.5	0.6
	1996	24,000	2.4	0.3
	1999-00	4,000	0.4	0.05
	2000-01	25,000	2.7	0.3
SCA 7A Non-QMS	All survevs	No harvest recorded		
SCA 7	1992-94	1,680,000	168	22
	1996	1,456,000	160-190	19
	1999-00	3,391,000	339	42
	2000-01	2,867,000	287	36
SCA 7B Non-QMS	All survevs	No harvest recorded		
SCA 7C Non-QMS	All survevs	No harvest recorded		
SCA 8A Non-QMS	All survevs	No harvest recorded		
SCA 9A Non-QMS	1992-94	314,000	34	4.3
	1996	352,000	38	4.8
	1999-00	489,000	67	8.4
	2000-01	712,000	97	12.1

162 Commercial fishers, in recent years, have been required under s 111(1)(a) and s 190(1) of the 1996 Act to obtain approval to use their registered fishing vessel if they wish to take fish for recreational purposes and record their recreational take on their CELRs. Reported recreational catches of scallops taking on commercial fishing vessels is shown in Table 7. These catches are likely to under-estimate the recreational harvest as it is unlikely that all commercial fishers comply with these requirements.

Table 7: Recreational catch of scallops reported taken on registered fishing vessels, and the corresponding harvest tonnage in greenweight and meatweight (in tonnes). The existing scallop stocks in the QMS (SCA 1, SCA CS, SCA 4, SCA 7) are provided for comparative purposes.

QMA	Survey year	Harvest (number of scallops)	Greenweight (tonnes)	Meatweight (tonnes)
SCA 1	2001-02	420	0.05	0.01
	2002-03	788	0.08	0.01
	2003-04	1,254	0.13	0.02
	2004-05	668	0.07	0.01
SCA CS	2001-02	2,350	0.27	0.03
	2002-03	5,792	0.67	0.08
	2003-04	9,350	1.08	0.14
	2004-05	2,300	0.27	0.03
SCA 3	2001-02			
Non-QMS	2002-03	210	0.02	-
	2003-04			
	2004-05			
SCA 5	2001-02	620	0.07	0.01
Non-QMS	2002-03			
	2003-04	200	0.02	-
	2004-05			
SCA 7	2001-02	24,064	2.41	0.30
	2002-03	61,443	6.14	0.77
	2003-04	17,907	1.79	0.22
	2004-05	12,976	1.30	0.16
SCA 9A	2001-02			
Non-QMS	2002-03			
	2003-04	120	0.02	-
	2004-05	260	0.04	0.01

163 The amount of recreational catch is currently controlled by a daily limit (20 scallops in most areas) in conjunction with season (15 July to 14 February in most areas) and a minimum size limit (100 mm in most areas).

Customary catch

164 Scallops were undoubtedly used traditionally as food by Mäori, although quantitative information on the level of customary Mäori harvest for these non-QMS scallop stocks is not available[5].

Regulatory framework

165 There are existing regulations that specify catch sustainability measures for scallops:

a) A number of areas within the coastal waters are closed by regulation to commercial and/or non-commercial fishers for the taking of scallops.

b) There is a minimum legal size limit for scallops of 100 mm shell width for both the recreational and commercial sectors in most areas, except a 90 mm limit is specified for both recreational and commercial fishers in Challenger Fisheries Management Area[6].

[5] Customary authorisations for the South Island record only small harvests of scallops from SCA 7

[6] There are other existing fisheries regulations applying to the existing QMS scallop fisheries e.g. commercial fishing in the Coromandel scallop fishery has a 90 mm size limit, and an open season from 15 July to 21 December. The regulations applying to these QMS stocks are not being reviewed in this paper.

c) There are restrictions on dredges covering the number and design, including the use of fixed tines, to reduce the impact on the bottom substrate.

d) Seasons are also imposed for both sectors by regulation. The open season in most areas is from 15 July to 14 February, except for amateur fishing in the Southland Fisheries Management Area where the open season is from 1 October to 15 March.

e) A daily limit per person of 20 scallops applies under amateur fishing regulations to most areas, except for a 50 scallop limit in Challenger and a 10 scallop limit in Southland Fishery Management Areas.

f) Commercial fishing in some areas is restricted to Sunday to Thursdays only and/or to daylight hours, to reduce fishing intensity.

g) There are no regulations that specify annual competitive catch limits for these non-QMS scallop fisheries.

Fisheries assessment

166 There are no estimates of current or reference biomass for these scallop fisheries. Therefore, it is not known if recent landings are sustainable or whether they will allow the stock to move towards a size that will support the MSY.

167 **Estimates of fishery parameters and abundance**—current rates of fishing or total mortality within these scallop fisheries are unknown. There is no known stock-recruit relationship.

168 **Biomass estimates**—virgin biomass, B_0, and the biomass that will support the maximum sustainable yield, B_{msy}, have not been estimated for these scallop fisheries and are probably not appropriate reference points for a stock with highly variable recruitment and growth, such as scallops.

169 **Estimation of Maximum Constant Yield (MCY)**—MCY is not usually estimated for scallops due to highly variable recruitment and growth.

170 **Estimation of Current Annual Yield (CAY)**—CAY cannot be estimated because there are no estimates of current biomass.

Associated fisheries

171 There are probably few direct associations with other species. Scallops in some northern areas inhabit the same areas as high densities of horse mussels (*Atrina zelandica*), in the Challenger area with green-lipped mussels (*Perna canaliculus*) and dredge oysters (*Ostrea chilensis*), and at the Chatham Islands and in Southland with dredge oysters. In localised areas where these filter-feeding species occur together in high densities, there may be competition for food.

Environmental issues

172 Environmental issues in relation to scallop stocks are discussed in the main section of this paper. There is no information on whether current scallop fishing activities are detrimental to the long-term viability of any other species. Dredging is the main method used to harvest scallops. Bottom dredging can have adverse effects on the aquatic environment and affect biological diversity as discussed in the main section.

Research

173 There has been little direct research of relevance to the non-QMS scallop stocks. One recent scallop project undertaken within these stocks was: Project SCA2002/03 – to determine the size composition, growth rates and size dependent fecundity of scallops in Paterson Inlet, Stewart Island

174 There has been a series of stock assessments of existing QMS scallop stocks e.g. Coromandel/Northland, and Nelson/Marlborough, which provide general information of some relevance to the non-QMS stocks.

Social, cultural, and economic factors

175 MFish is not aware of any information on particular social, economic, or cultural matters that would influence the setting of TACs and TACCs for scallops beyond those considered in the relevant sections earlier.

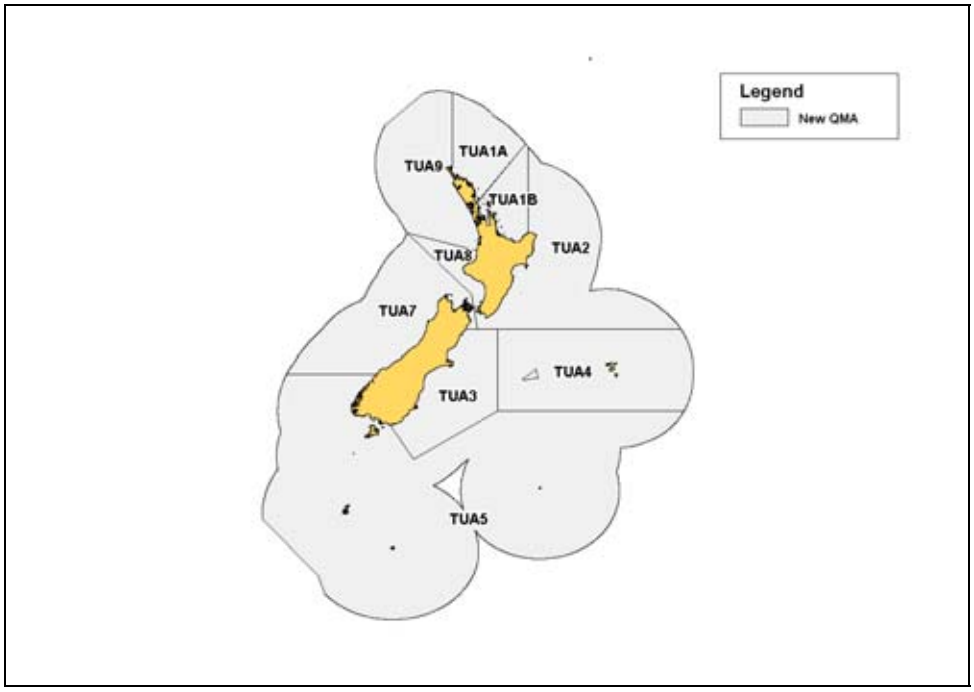
TUATUA (TUA)

Introduction into the QMS

1 The Minister of Fisheries has decided to introduce tuatua (*Paphies subtriangulata*) into the quota management system (QMS) to take effect on 1 October 2005. The quota management areas (QMAs) for tuatua stocks – species code TUA – are shown in Figure 1. The fishing year for tuatua stocks will begin on 1 October and end on 30 September in the following year. Commercial catches of tuatua will be measured in greenweight.

2 The related species, deepwater tuatua (*Paphies donacina*) has already been introduced into the QMS and this paper does not apply to that species.

Figure 1 Quota Management Areas for tuatua



Key Issues to be Considered

3 Key issues that need to be taken into account in determining catch limits and other management options for this fishery are:

a) There is no detailed and consistent information on tuatua abundance and distribution either nationwide, or within any QMA;

b) There are no estimates of biomass or sustainable yields of tuatua in any tuatua QMA and the status of all stocks is unknown;

c) Tuatua appear to play an important role in maintaining biodiversity, water quality and sediment stability in intertidal ecosystems;

d) Tuatua are sedentary and beds are susceptible to localised depletion caused by both harvesting pressure and habitat disturbance and degradation;

e) Tuatua are both a popular species for recreational fishers and a valued local customary resource. There are only approximate estimates of non-commercial harvest;

f) In recent years, the only commercial fishery for tuatua has been a dredge fishery in the entrance to the Kaipara Harbour. Commercial fishing elsewhere has been constrained by a permit moratorium. A number of historic areas specified in regulation for commercial fishing have not been used;

g) Compliance information indicates that the illegal catch of tuatua is significant in some areas, with some recreational fishers exceeding their bag limits, especially in the northern North Island.

Management Proposals

4 Table 1 shows proposed Total Allowable Catches (TACs), Total Allowable Commercial Catches (TACCs) and allowances for tuatua stocks:

Table 1: Proposed TACs, TACCs, and allowances (tonnes) for tuatua QMAs

Stock	TAC	Customary allowance	Recreational allowance	Other sources of mortality	TACC
TUA 1A	84	40	40	4	0
TUA 1B	126	60	60	6	0
TUA 2	7	3	3	1	0
OR					
TUA 2	9	3	3	1	2
TUA 3	7	3	3	1	0
TUA 4	3	1	1	1	0
TUA 5	3	1	1	1	0
TUA 7	3	1	1	1	0
TUA 8	5	2	2	1	0
OR					
TUA 8	7	2	2	1	2
TUA 9	102	26	26	7	43

5 MFish also proposes to:

a) Add all tuatua stocks to the Sixth Schedule to allow tuatua caught incidentally in other fisheries (such as cockle and pipi), or at undesirable sizes, to be returned to the water;

b) Amend Regulation 4A of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986, specifying a historic area between Papamoa Domain and Maketu Beach as being available for commercial harvest, in the event that a TACC of 0 tonnes is set for the TUA 1B stock, as this measure will become redundant;

c) Consider amending regulation 4A of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 to revoke specified historic commercial areas within TUA 9 (ie, Ninety Mile Beach, Hokianga Harbour to the Maunganui Bluff, and specific areas between Maunganui Bluff to the North Head of the Kaipara Harbour). Any new commercial activity following

QMS introduction is likely to give rise to a sustainability concern in these areas given the preliminary recommendation to set a TACC of 43 tonnes and the current capacity of these areas. Current commercial fishing can continue in the specified commercial area of the Kaipara Harbour entrance;

d) Amend regulations to remove the daily limits that apply to commercial harvesting of tuatua in Fishery Management Areas 1 and 9;

e) Amend the reporting regulations; and

f) Set deemed values for QMAs where TACCs are set above zero.

Proposed TACs

6 Sections 13 and 14 of the Fisheries Act 1996 (the Act) provide three options for the way that TACs can be determined. They are:

a) Section 13(2), that enables the Minister to set a TAC that either:

- Maintains the stock at or above a level that can produce the maximum sustainable yield, having regard to the interdependence of stocks (section 13(2)(a)); or
- Restores stocks to or above the level that can produce the maximum sustainable yield, if their current levels are too low to provide this yield (section 13(2)(b)); or
- Moves a stock that is above the level which can produce the maximum sustainable yield towards or above a level that can produce this yield (section 13(2)(c)).

b) Section 14 that applies to stocks where:

- It is not possible, because of the biological characteristics of the species, to estimate maximum sustainable yield; or
- A catch limit for New Zealand has been determined as part of an international agreement; or
- The stock is managed on a rotational or enhanced basis.

c) Section 14B that applies to TAC setting in situations where the catch limit for one species may affect the quantities of other inter-related species that may be caught.

7 MFish does not believe that the provisions of section 14 are applicable in determining how tuatua TACs should be set, because:

- A maximum sustainable yield could be estimated for tuatua stocks;
- No catch limits for any of the stocks have been determined as part of an international agreement;
- At present, no tuatua stocks are managed on either a rotational or enhanced basis.

7 Section 14B also does not apply because tuatua is a target fishery, with only small amounts potentially taken as bycatch in other fisheries.

8 MFish considers that the characteristics of the tuatua fishery are such that section 13(2)(a) provides the most appropriate approach to take in setting TACs for tuatua. This approach is intended to ensure that TACs for tuatua stocks are maintained at or above the level that can produce the maximum sustainable yield.

9 Maximum sustainable yield (MSY) is defined as being the greatest yield that can be achieved over time while maintaining the stocks reproductive capacity, having regard to the population dynamics of the stock and any environmental factors that influence it.

10 For the reasons outlined in the next section, proposed TACs for all stocks except TUA 2 and TUA 8 are based on recent catches. In TUA 2 and TUA 8 there are two options: one where TACs for these areas are based on recent catch; and the other where TACs are set slightly higher to allow a low level of additional harvest. Both of these options are considered capable of maintaining stocks at or above MSY.

Rationale for Proposed TACs, Catch Limits and Management Proposals

11 The proposed TACs, TACCs and other allowances shown in Table 1 are based on an assessment of the tuatua fishery against the statutory obligations and policy guidelines described in the introductory section of this IPP. All relevant obligations and guidelines have been applied. Among the most important considerations for tuatua are:

a) The information principle in section 10(c) of the Act that applies when information is lacking[1];

b) The policy guideline that recommends that where there is a lack of biomass and yield information, catch information and other estimates of fishing-related mortality should be used as the basis for setting TACs;

c) The biological characteristics of tuatua; and

d) Social, economic and cultural factors.

12 As required by section 10(c), MFish has taken a cautious approach in setting proposed TACs for tuatua, based on the following factors:

a) There is no comprehensive information available to determine the stock status of tuatua in any QMA;

b) There are no fishery-independent estimates of either current biomass or sustainable yields for any tuatua stock;

c) The only information sources available to obtain a basic indication of these important aspects are a NIWA report on tuatua biology, distribution and fisheries, and the local knowledge of MFish staff;

d) There are biomass estimates for a few beds in the Auckland Fishery Management Area, but these are local estimates and do not provide any basis for estimating biomass at the QMA level;

[1] Section 10 (c) "Decision makers should be cautious when information is uncertain, unreliable or inadequate".

e) There is uncertainty in the recreational tuatua harvest estimates. These estimates are based on information obtained from recreational diary surveys, but in most stocks there were only a few diarists who provided the information used to estimate recreational harvests, which increases the possibility that overall estimates may not be very accurate;

f) Customary catches/allowances are based on the recreational estimates and are therefore also uncertain;

g) Excess take (above recreational bag limits) is a component of other sources of fishing related morality, but quantities taken are unknown;

h) It is not known whether current commercial catches (in TUA 9) are sustainable.

13 There is both a lack of biomass and yield information for tuatua and no annual catch limits in place for tuatua stocks in any QMA. Because of this, MFish proposes that the TAC for each stock should consist of the combined quantities that catch information indicates commercial and non-commercial harvesters are taking in each QMA, and an allowance for other sources of fishing-related mortality. This approach is consistent with the MFish policy guideline that applies when there is both a lack of stock assessment information and no existing limits on overall catch (as well as the statutory obligation to be cautious when information is lacking).

14 Estimates of recreational catch are based on information from National Recreational Fishing surveys in 1996 and 2000-01 (see annex 2). The estimates from the 2000 survey are considered to be the most reliable estimates of absolute harvest. Nevertheless, it is important to note that they are estimates only, and need to be treated with caution because:

a) The information obtained in the surveys was about the number of tuatua collected, which was subsequently converted to weight estimates using 23g as the assumed mean weight of an individual tuatua. This weight estimate is derived from a sample of tuatua (n=40) collected from Orere Point (Auckland) in March 2005. Further average weight information from a range of areas across the country will be collected during the consultation period with a view to adjusting the estimates on a stock basis as appropriate;

b) Coefficients of variance about the number of tuatua harvested are mostly high, indicating that estimates may not be reliable. Further, coefficients of variance have not been calculated in some QMAs because there were too few respondents.

15 An estimate of recreational tuatua catch from FMA 1 (ie, 100 tonnes) was split 60:40 in favour of the TUA 1B stock (Hauraki Gulf/Bay of Plenty) over the TUA 1A stock (East Northland) in recognition that tuatua harvesting is probably more prevalent in the eastern Coromandel and Bay of Plenty areas.

13 For some stocks where estimates of recreational tuatua catch are not available through the National Recreational Fishing Survey (ie, TUA 4, TUA 5, TUA 7 and TUA 8), an estimate of 1 tonne has been made based on the prospect of some tuatua being found in the respective QMA, and the likelihood that recreational users will use the available resource. Customary catches are assessed as being comparable to recreational catches.

14 A bed at the entrance to the Kaipara Harbour in TUA 9 is the only place in all tuatua QMAs where there has been recent commercial harvesting (see annex 2). Determination of a commercial catch estimate that typifies the use of the tuatua resource by that sector is discussed further in the TUA 9 section that follows.

15 An alternative option in QMAs where there may be potential for additional harvest is to set proposed TACs at levels slightly higher than the total estimated recent removals from all sectors. This approach takes into account that the (commercial) permit moratorium in place before 1992 has effectively precluded potential commercial harvest of tuatua in most areas. MFish considers that this approach may be able to be applied to the TUA 2 and TUA 8 stocks, as discussed in subsequent paragraphs.

16 The assessment of total removals from the stock also needs to make provision for estimates of other sources of fishing related mortality prior to proposing TACs. Such sources include excess take above recreational bag limits, and mortality arising from commercial dredging.

17 The later section on Statutory Considerations summarises how the relevant statutory provisions have influenced the proposed TACs. Policy guidelines from the introductory section of this IPP have been applied in setting proposed TACs in all tuatua QMAs as follows.

18 The **biological characteristics** of tuatua relevant to TAC setting are that these shellfish experience significant natural variability in distribution and abundance.[2] Variability occurs because recruitment, growth and mortality differ from year to year as environmental influences (such as temperature, salinity, exposure, hydrology and water quality) change. Floods, storms, and desiccation (drying out) caused by warm winds can also have a substantial effect on populations. These natural influences (as well as harvesting) cause constant changes in the biomass of all tuatua beds.

19 Tuatua are sedentary (do not move far) and are therefore prone to local depletion, especially those in beds that are easily accessible and close to population centres like Auckland and Tauranga, or where commercial harvesting may become concentrated.

20 Tuatua is mainly a single species fishery, with limited **effects of harvesting on the aquatic environment**, and only small amounts of bycatch of other shellfish like pipi. MFish therefore considers that section 14B is not applicable to setting TACs for the fishery. In all areas except the Kaipara Harbour commercial fishery, tuatua are taken by handgathering – a method that has no adverse impact on the aquatic environment. Tuatua play an important role in aquatic ecosystems as food for both fish and seabirds. Ensuring that sufficient tuatua remain to continue to perform these ecosystem functions is another reason for taking a cautious approach in setting TACs in all QMAs.

21 Consideration has been given to **social, economic and cultural factors** in setting the proposed TACs. There is a combination of social, cultural and economic benefits associated with the extensive non-commercial harvesting of tuatua that occurs in many coastal areas. These shellfish provide a reasonably easily obtainable source of seafood for people living in coastal communities or visiting the coast. No specialised implements are needed to harvest tuatua, so this seafood can be collected at little cost.

[2] Words in bold are extracts from the relevant policy guidelines outlined in the introductory section to this IPP.

22 Because of the combination of a lack of stock assessment information, the biological importance of tuatua, and established often intensive harvesting of the most accessible tuatua beds by non-commercial fishers, MFish is not proposing higher TACs to give capacity for further **development potential**. However, comment is sought from stakeholders on the option of setting slightly higher TACs in TUA 2 and TUA 8 to enable commercial fishers to determine if there may be further developmental potential in these areas.

23 In future, harvest levels could be increased in relevant stocks once further research is done and information obtained on the status of such stocks. However, this would require that either catch and effort data, or fishery independent research information, is obtained to determine whether stocks are at or above a level that could produce the maximum sustainable yield.

TUA 1A, TUA 1B, TUA 3, TUA 4, TUA 5 and TUA 7

24 MFish proposes to set TACs for these areas that are based on estimates of recent catch. There has been no recent commercial harvesting in any of these QMAs. MFish does not possess any information at present showing that there is capacity for further development in these areas. There is already significant (non-commercial) harvesting pressure on beds in TUA 1A and TUA 1B. This pressure is reflected in the closure of some areas to all harvesting, and reduced shellfish bag limits in the Auckland – Coromandel region. It is likely that harvesting pressures in this region will increase with on-going population growth.

25 Consequently, the proposed TACs in each area are the sum of estimated recent non-commercial catches only, together with an estimate of other sources of fishing-related mortality. Setting catch limits in this way is consistent with the overall objective of maintaining stocks at or above the level that produces the maximum sustainable yield.

26 Allowances for other sources of fishing related mortality have been made for all areas. Anecdotal information from MFish compliance staff indicates that illegal harvesting (above amateur daily limits), is particularly common in TUA 1A, TUA 1B and TUA 9. Better estimates of illegal harvest, although qualitative in nature, may be offered during the consultation process, and as a result of further enquiries during the consultation period.

TUA 9

27 The proposed TAC for TUA 9 recognises the economic value and development potential of tuatua as a result of greater historical use of the resource. Because commercial landings in TUA 9 have varied, the fishery cannot be considered *stable* (catches have historically fluctuated significantly), or *developing* (average catches over the last three fishing years have not significantly increased).

28 The estimated commercial catch for the TUA 9 stock does not include commercial catch information for the Dargaville coast or Ninety Mile Beach areas. In the case of the Dargaville coast, this is because commercial fishing activity has not occurred there in any meaningful way for at least eight years (ie, since 1996-97), and anecdotal information from the commercial fishers, and from direct observation, indicates that the resource is unlikely to sustain commercial harvest at the level previously experienced, if at all. Commercial fishing has rarely occurred at Ninety Mile Beach is mostly historic (prior to 1994-95), and is at insignificant levels (less than 1.8 tonnes).

Consequently, the estimate of commercial catch that contributes to an estimate of total removals from the TUA 9 stock is derived solely from the Kaipara dredge fishery.

29 Catch from the commercial dredge fishery has fluctuated for various reasons, but is indicative of sustained use of the resource by the commercial sector. The average commercial catch over the 14 year period between the 1990-91 fishing year and the 2003-04 fishing year equates to 43.2 tonnes. This rounded estimate has been used to contribute to the estimate of total removals from the stock, and thereafter the TAC calculation.

30 The lack of both biomass or yield information, and information on dredge impacts for the commercial fishery prevents any higher TAC being proposed at present for TUA 9. The proposed TAC also includes an estimate of other sources of fishing-related mortality that recognises the likely level of both excess harvesting by some non-commercial fishers in the region and dredge mortality in the Kaipara Harbour entrance.

TUA 2 and TUA 8

31 While there has been no recent commercial harvesting in TUA 2 and TUA 8, these stocks may be able to sustain a low level of further harvest. Consequently, two TAC options are proposed for these areas – the first based on recent catch and the second based on recent catch, with an additional two tonnes. MFish has no information on tuatua biomass for either stock, but considers that the additional two tonnes is not likely to place the stocks in any greater sustainability risk in contrast to the development opportunity that may be provided. If more information on sustainable yields becomes available, the proposed TACs could be altered to reflect that information.

32 MFish seeks stakeholder comment on whether the approach of applying a slightly higher TAC than recent catch would be preferable for the TUA 2 and TUA 8 stocks. This might be appropriate where these stocks may not be fully utilised by the non-commercial sector and abundance may be sufficient to support a commercial fishery.

Allocation of TAC

33 Section 21 of the Act requires that when setting or varying TACCs, allowances are made for:

- Maori customary non-commercial fishing interests; and
- Recreational interests; and
- All other mortality to the stock caused by fishing.

34 As has been explained, the allowances are based on the relative use of the resource by the different sectors in recent times.

Customary Maori Allowances

35 Both customary and recreational fishers harvest tuatua in all stocks, wherever there are accessible beds. Tuatua are of appreciable social, cultural and economic value for non-commercial harvesters. MFish considers that this value needs to be reflected in the non-commercial allowances.

36 Tuatua are an important customary species taken as kaimoana in many parts of New Zealand. There is no information at present on estimated quantities harvested for customary purposes at a QMA level. It is likely that they are at least as much as recreational harvests in most areas. MFish policy guidelines for this situation are that the proposed customary allowance should be the same as the estimated recreational catch.

37 Consequently, proposed customary allowances for tuatua stocks in each QMA are based on the estimates of recreational harvests obtained from the national recreational diary surveys. This means that they have the same potential sources of inaccuracy as the recreational estimates and will need to be revised when information specifically about customary harvests becomes available.

38 There is a requirement to take any mataitai reserve and section 186A closure in each QMA into account when considering allowances for customary non-commercial interests. There are mataitai in some QMAs. However, as yet they do not propose any changes to current controls on tuatua fisheries. No area has been closed or fishing method restricted under section 186A due to issues associated with tuatua. For those areas that have been closed, there is no significant tuatua resource within the affected area that would affect the proposed allowance for the relevant stock.

Proposed Recreational Allowances

39 The proposed recreational allowances are based on estimates from the National Recreational Fishing Survey 2000. Despite potential sources of inaccuracy associated with the estimates of recreational catch, the diary survey estimates represent the best available recreational harvest information, and thereafter, the basis for recreational allowances.

40 In the Auckland – Coromandel region the 150 tuatua per day limit was reduced to 50 in November 1999. The latter quantity was considered to be a reasonable day's harvest given the pressure on intertidal shellfish including tuatua, in this region. Elsewhere, there are mixed reports about the state of tuatua beds and any impacts that non-commercial harvesters may be having at current levels of harvesting. For example, in some places such as Papamoa in the Bay of Plenty, there are concerns about depletion of popular tuatua beds, whereas in others, such as parts of Northland, it appears that tuatua populations are generally in a healthy state.

41 The proposed recreational allowances are based on the estimated recent recreational catch. The information in the 2000-01 national survey is considered to provide the most reliable estimates of recreational harvest. MFish considers that these estimates should be used to set the initial recreational allowance. There are issues associated with the apparent variable biomass of tuatua stocks and the harvesting pressure that they are under in some areas. However, such issues are localised and are likely to be more appropriately dealt with by area closures and daily limit adjustments, rather than changing allowances at the stock/QMA level.

42 There is a requirement that any regulations made under section 311 of the Act are taken into account when allowing for recreational interests. No restrictions under s 311 of the Act have been placed on fishing in any tuatua stock.

Allowances for other sources of mortality

43 Because non-commercial fishers gather tuatua by hand, there are no known sources of mortality caused by this harvesting method. While some tuatua that are not within preferred size ranges may be discarded, these should survive unharmed.

44 Some non-commercial harvesters are known to take more than the legal daily limit, especially in TUA 1A, TUA 1B, and TUA 9 where a high proportion of such harvesting occurs. Estimates of the quantities taken are not currently available, but are likely to be significant based on indications from previous research about public awareness and compliance with recreational fishing rules.

45 It is likely that there is incidental mortality of tuatua in the Kaipara harbour dredge fishery if tuatua are damaged but not taken during passage of the dredge. The level of mortality from this source is not known at present. However, based on the likelihood that it occurs (there is mortality in most shellfish dredge fisheries), the TAC for TUA 9 also includes a nominal allowance for this kind of mortality. MFish considers that it would be desirable to quantify this type of fishing-related mortality through future research.

46 In the absence of better information on excess quantities taken by non-commercial fishers and on the level of fishing related mortality in the Kaipara dredge fishery, nominal allowances proportional to the recreational allowances are proposed for other sources of mortality for all stocks. For TUA 9 a further allowance proportional to the TACC is proposed to account for mortality during commercial harvesting.

TACCs

TUA 1A, TUA 1B, TUA 3, TUA 4, TUA 5 and TUA 7

47 Proposed TACCs for TUA 1A, TUA 1B, TUA 3, TUA 4, TUA 5 and TUA 7 are zero (Table 1), because there have been no recent commercial harvests in these QMAs. Table 2 in Annex Two shows commercial catch history for all tuatua QMAs. Some limited landings recorded in TUA 1, TUA 7 and TUA 8 were considered likely to be errors, or records of deepwater tuatua, and have not been noted in Table 2.

TUA 9

48 During the early to mid 1990's part of the commercial harvest in TUA 9 came from tuatua beds on North Island west coast beaches in the vicinity of Dargaville. However, most permit holders have retired from this fishery, mainly because numbers of tuatua declined to levels that made harvesting uneconomic. Since 2000 all commercial harvests of tuatua in TUA 9 have come from dredging a sub-tidal bed at the entrance to the Kaipara Harbour. Quantities of landings from this bed fell from 72.6 tonnes in 1998-99 to 4.9 tonnes 2001-02, but were 36 tonnes in 2002-03 and 34 tonnes in 2003-04.

49 The proposed TACC of 43 tonnes is the average of the landings of tuatua reported to have been taken from this bed over the last 14 years.

50 There is a sustainability risk with the provision of the TACC for the TUA 9 stock that is derived from commercial fishing activity in the Kaipara Harbour entrance. New commercial fishers may not wish to fish tuatua from the area specified as the Kaipara

Harbour entrance (similar to the existing interests), and instead elect to start fishing at other areas fished historically, and still specified in regulation. The areas in question include Ninety Mile Beach, between the Hokianga Harbour and the Maunganui Bluff, and specified areas between Maunganui Bluff to the North Head of the Kaipara Harbour. Tuatua populations in these areas have been quite variable, and form important resources for non-commercial fishers, particularly Maori. Any additional harvest from these areas beyond the existing level is unlikely to be sustainable. The utility of these areas, as historically prescribed, will need to be reviewed as part of the introduction process. This issue is discussed further later in this paper.

TUA 2 and TUA 8

51 There are two proposed TACC options for TUA 2 and TUA 8. One option, consistent with the approach used for other tuatua stocks, is TACCs of zero because there has been no recent commercial harvesting in these QMAs. The alternative is a TACC of two tonnes, on the basis that there may be sufficient biomass for commercial fisheries in these areas. MFish envisages that the nominal TACCs would provide a means for commercial rights-holders to develop a sustainable fishery while meeting the requirements of the Act. This would include mitigating the potential effects of commercial harvesting on the aquatic environment and on non-commercial users.

52 Comment is sought from stakeholders on the option of setting slightly higher TACs in TUA 2 and TUA 8 to enable commercial fishers to determine if there may be further developmental potential in these areas.

Other Management Measures

Returning tuatua to the water

53 MFish proposes that all tuatua stocks should be added to the Sixth Schedule of the Act to allow commercial fishers to return them to the water either if they are taken below optimum commercial size, or as an incidental by-catch in other fisheries. This is subject to requirements that they are likely to survive and are returned to the waters from which they were taken as soon as practicable.

Method restriction

54 MFish proposes to retain regulation 4A(3) of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986. This regulation restricts commercial harvesting using a dredge to the area inside the entrance of the Kaipara Harbour where this method has been used for several years to take most of the national commercial tuatua catch.

55 MFish also proposes to retain the part of regulation 22A of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 that restricts commercial gathering of tuatua (other than in the Kaipara) to the method of hand gathering. This is because if any commercial fishing takes place in the future outside the area where dredging is allowed, it would most likely be along beaches where the hand gathering method would have least effect on the environment.

Consequential Amendments to Regulations – Changes to Prohibited Areas and to Commercial Daily Limits

56 Tuatua will be managed under the QMS from 1 October 2005. Because of this, MFish believes that changes are needed to the regulatory controls on where commercial harvesting is permitted in the northern region.

57 Regulations presently allow commercial tuatua harvesting at Maketu Beach (Bay of Plenty) within TUA 1B, even though MFish is not aware of anyone whose permit authorisations have allowed harvest within this area since at least the late 1980s. Should the Minister agree to the setting of a TACC of zero for the TUA 1B stock, then regulations that currently restrict commercial harvesting of tuatua to Maketu Beach (within TUA 1B) would no longer be needed.

58 In TUA 9 the only areas specified as being available for commercial access are along Ninety Mile Beach, at specific areas between the North Head of the Kaipara Harbour to Maunganui Bluff, Maunganui Bluff to the Hokianga Harbour, and an area in the entrance to the Kaipara Harbour. Given that a TACC of 43 tonnes is proposed for the TUA 9 stock, MFish considers that further harvest from these areas, other than the current non-commercial harvest, is likely to give rise to a sustainability issue. Accordingly, MFish considers that these historic commercial areas should be considered for removal, while commercial fishing for tuatua continues to occur in the Kaipara Harbour entrance. Details of amendments to regulations – should they be required – are set out in annex one.

59 MFish proposes to recommend the removal of part of the regulation that imposes a 600kg daily limit on the quantity of tuatua that commercial fishers (using a dredge in the Kaipara Harbour entrance) may take.[3] Setting a TACC for TUA 9 removes the need to limit harvesting on a daily basis. The proposed removal of the regulation should enable commercial fishers to achieve greater efficiency in their harvesting operations while still subject to overall constraints imposed by the TACC.

60 MFish also proposes to recommend removal of the 200kg daily limit that applies to commercial fishers hand gathering tuatua. There is no need to retain this limit because any commercial harvesting that may take place in future will be subject to TACCs to control quantities taken.

Reporting Regulations

61 The introduction of tuatua into the QMS makes it necessary to amend the Fisheries (Reporting) Regulations 2001. The amendment would outline the codes to be used by commercial tuatua fishers when completing their statutory catch returns.

Deemed Value and Overfishing Threshold

62 A separate section of this document sets out generic information on the setting of interim and annual deemed values.

63 As tuatua are taken primarily by a method that takes little, if any, bycatch, MFish considers that it falls within "the high value single species fish stock" category. MFish proposes to set the annual deemed value at 200% of the highest port price in

[3] Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986, regulation 22A.

the previous year for stocks in this category, in QMAs where TACCs are not zero. MFish proposes that the interim deemed value should be 50% of the annual deemed value.

64 The most recent information available (November/December 2003 MFish port price survey) indicates a port price for TUA 9 of $1.25 per kg. MFish therefore proposes an annual deemed value of $2.50 and an interim deemed value of $1.25 for relevant stocks.

65 Consistent with the policy framework for high value single species fishstocks, MFish proposes that differential deemed values will apply.

66 MFish does not propose to set overfishing thresholds for tuatua stocks unless catch monitoring shows that this is required.

Statutory Considerations

67 Section 5 of the Act requires that fisheries management decisions must be consistent with **New Zealand's international obligations** relating to fishing and with the provisions of the **Treaty of Waitangi (Fisheries Claims) Settlement Act 1992**. Maintaining sustainability and biodiversity while allowing utilisation of fish stocks are among the international obligations that relate to fishing. These are the primary intentions of the proposed catch limits and management measures for tuatua.

68 In terms of Treaty obligations associated with the Settlement Act, the decision to introduce tuatua into the QMS provides for allocation of 20% of the commercial harvest to Mäori. Tuatua are harvested for customary purposes in many places around New Zealand. Consequently the customary allowance has been set at a level that is intended to allow for recent levels of customary harvest to continue.

69 The TACs and other measures proposed for the tuatua fishery are intended to achieve the primary purpose of the Act which is to **provide for the utilisation of resources while ensuring sustainabilit**y (s 8). Proposed TACs for tuatua stocks in all QMAs are set at levels that anecdotal information indicates should be sustainable.

70 The Act defines utilisation as the conservation, use, enhancement and development of fisheries resources to enable people to provide for their social, economic and cultural well being. The cautious approach used to devise proposed TACs in all QMAs partly reflects an intention to conserve tuatua stocks because of their ecological importance in aquatic ecosystems. However, the proposed TACs are also intended to permit continued use of tuatua stocks at current levels. It is possible that proposals may be devised in future to enhance tuatua stocks, but there are none at present.

71 The TAC option of setting nominal TACCs of 2 tonnes in TUA 2 and TUA 8 is intended to allow commercial use, initially at a low level, to assess whether there may be potential for commercial fisheries to develop there.

72 Pipi is the main **associated species** (section 9(a)), and may be taken as a bycatch of tuatua harvesting. However, the quantities taken are not so much as to put sustainability of pipi at risk. MFish proposes that pipi stocks (including PPI 1A, already subject to the QMS) are included on the Sixth Schedule to the Act, so that commercial fishers can return them to the water. MFish also proposes that tuatua

stocks should be included in this schedule, so that they may be released if taken at less than marketable size, or caught as bycatch in pipi and other fisheries.

73 Tuatua help maintain **biological diversity** and tuatua beds represent habitats that are **significant for fisheries management** (section 9(b) and (c)). Tuatua are prey for fish and seabirds. They are also thought to assist in maintaining water quality and the stability of sand banks, especially in harbours. Setting proposed TACs using a cautious approach, replacing the previous situation where there were no limits, is partly to ensure that tuatua can continue to play these important roles in the aquatic environment.

74 With the exception of the Kaipara dredge fishery, all harvesting is done by the low impact method of hand gathering. Consequently, in all but part of TUA 9 there is little likelihood that there are any **effects of fishing on the stock and the aquatic environment** (section 11(1)(a)).

75 Commercial fishers using dredges may have an impact on the subtidal bed in the Kaipara Harbour. However, the dredging occurs in a part of the harbour where there is considerable movement of sand over each tidal cycle. It is not known whether natural processes may have a greater effect than dredging on the harbour environment in the vicinity of the tuatua bed.

76 **Existing controls that apply to the stock** (s 11 (b)) are that commercial access is restricted to permitted fishers holding historical access rights. Each of these fishers is allowed to take a maximum of 200kg of tuatua per day by hand gathering. This may only be done in TUA 1 and TUA 9 in areas identified in regulations where commercial harvesting is permitted. The only exception to this is that 600kg per day may be taken by dredge from a bed defined in regulation in the entrance to the Kaipara Harbour. There is a daily bag limit for recreational fishers of 150 per person per day (50 per day in the Auckland – Coromandel region).

77 There are no regional policy statements, plans, proposed plans, management strategies or plans that have provisions that relate to tuatua sustainability measures.

78 There is a requirement in section 11 that management decisions that apply within the Hauraki Gulf are consistent with the **Hauraki Gulf Marine Park Act**. This Act's objectives are to protect and maintain the natural resources of the Hauraki Gulf as matters of national importance. Parts of TUA 1A and TUA 1B are within the Marine Park. Management measures intended to ensure sustainable utilisation of tuatua in the beds in the park are considered to be consistent with the objectives of the Marine Park Act.

Preliminary Recommendations

79 MFish recommends that the Minister:

a) **Agrees** to set a TAC of 84 tonnes for TUA 1A and within that set:

i) a customary allowance of 40 tonnes;

ii) a recreational allowance of 40 tonnes;

iii) an allowance of 4 tonnes for other sources of mortality; and

iv) a TACC of 0 tonnes.

b) **Agrees** to set a TAC of 126 tonnes for TUA 1B and within that set:

i) a customary allowance of 60 tonnes;

v) a recreational allowance of 60 tonnes;

vi) an allowance of 6 tonnes for other sources of mortality; and

vii) a TACC of 0 tonnes.

c) **Agrees** to set a TAC of 7 tonnes for TUA 2 and within that set:

i) a customary allowance of 3 tonnes;

ii) a recreational allowance of 3 tonnes;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 0 tonnes.

Or

d) **Agrees** to set a TAC of 9 tonnes for TUA 2 and within that set:

i) a customary allowance of 3 tonnes;

ii) a recreational allowance of 3 tonnes;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 2 tonnes.

e) **Agrees** to set a TAC of 7 tonnes for TUA 3 and within that set:

i) a customary allowance of 3 tonnes;

ii) a recreational allowance of 3 tonnes;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 0 tonnes.

f) **Agrees** to set a TAC of 3 tonnes for TUA 4 and within that set:

i) a customary allowance of 1 tonne;

i) a recreational allowance of 1 tonne;

ii) an allowance of 1 tonne for other sources of mortality; and

iii) a TACC of 0 tonnes.

g) **Agrees** to set a TAC of 3 tonnes for TUA 5 and within that set:

i) a customary allowance of 1 tonne;

i) a recreational allowance of 1 tonne;

ii) an allowance of 1 tonne for other sources of mortality; and

iii) a TACC of 0 tonnes.

h) **Agrees** to set a TAC of 3 tonnes for TUA 7 and within that set:

i) a customary allowance of 1 tonne;

i) a recreational allowance of 1 tonne;

ii) an allowance of 1 tonne for other sources of mortality; and

iii) a TACC of 0 tonnes.

i) **Agrees** to set a TAC of 5 tonnes for TUA 8 and within that set:

i) a customary allowance of 2 tonnes;

ii) a recreational allowance of 2 tonnes;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 0 tonnes.

Or

j) **Agrees** to set a TAC of 7 tonnes for TUA 8 and within that set:

i) a customary allowance of 2 tonnes;

ii) a recreational allowance of 2 tonnes;

iii) an allowance of 1 tonne for other sources of mortality; and

iv) a TACC of 2 tonnes.

k) **Agrees** to set a TAC of 102 tonnes for TUA 9 and within that TAC set:

i) a customary allowance of 26 tonnes;

ii) a recreational allowance of 26 tonnes;

iii) an allowance of 7 tonne for other sources of mortality; and

iv) a TACC of 43 tonnes.

l) **Agrees** to include all tuatua stocks in the Sixth Schedule of the Act.

m) **Agrees** to remove references from regulation 22A of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 to 200kg daily limits for hand gathering and 600kg for dredging that currently apply to commercial harvests of tuatua.

n) **Agrees** to amend regulation 4A of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 to remove the area specified as being available to commercial fishing activity for tuatua at Maketu (Bay of Plenty), should zero TACCs be the recommended option for the TUA 1B stock.

o) **Agrees** to amend the Fisheries (Reporting) Regulations 2001 to show the codes to be used by commercial tuatua fishers when completing their statutory catch returns.

p) **Agrees** to set an annual deemed value of $2.50 per kg and an interim deemed value of $1.25 per kg;

q) **Notes** that provision of a TACC for TUA 9 is likely to give rise to a sustainability concern if any new commercial fishing for tuatua occurs in areas where commercially fishing has historically been allowed (Ninety Mile Beach, specific areas between the North Head of the Kaipara Harbour to Maunganui Bluff and Maunganui Bluff to the Hokianga Harbour), as well as in the existing area of commercial dredge fishery at the entrance to the Kaipara Harbour. A review of these historic areas should be undertaken as part of this introduction process, to determine if commercial fishing should potentially not be allowed to continue in those areas.

r) **Notes** that MFish does not intend to recommend at present that an over fishing threshold for tuatua stocks should be set.

s) **Notes** that commercial tuatua harvesting is restricted to the methods of dredging in the Kaipara Harbour and hand gathering elsewhere.

ANNEX ONE

Proposed amendments to management measures

Fisheries Act 1996 Sixth Schedule - return of tuatua to the water

Background

80 MFish proposes to allow commercial fishers to return tuatua to the water by adding tuatua stocks to the Sixth Schedule of the Act, subject to requirements that they are likely to survive, and must be returned to the same waters from which they were taken as soon as practicable.

Problem definition

81 Under s 72 of the Act, once tuatua are introduced into the QMS, commercial fishers will be obliged to retain tuatua caught by any fishing method. However, MFish proposes to set the TACC for most tuatua stocks at zero which makes no allowance for tuatua taken as bycatch to be landed and sold by commercial fishers, (unless they pay deemed values). It would also not be possible for commercial fishers who harvest tuatua to put back shellfish that are smaller than marketable sizes.

82 Adding tuatua to the Sixth Schedule would allow commercial fishers who took tuatua as an unintentional bycatch, or in an unmarketable state, to return them to the water alive, provided they comply with the requirements set out in the Schedule.

Preliminary consultation

83 There has been no preliminary consultation on the proposal to add tuatua stocks to the Sixth Schedule of the Act.

Options

Non-Regulatory Measures

84 Unless tuatua are added to the Sixth Schedule, it will be illegal to return tuatua caught incidentally, or in an unmarketable state. There is no non-regulatory measure that can be used to allow species taken under the QMS to be returned to the water.

Regulatory Measures

85 It is necessary to use the regulatory measure of adding tuatua stocks to the Sixth Schedule of the Act to implement this proposal.

Costs and benefits of the proposal

86 Adding tuatua stocks to the Sixth Schedule will give commercial fishers who catch tuatua incidentally as a bycatch the flexibility to legally return these shellfish to the water (provided they are immediately returned alive). It would also allow commercial tuatua harvesters to return tuatua that are not of marketable size. Doing this will

enable fishers to return unwanted tuatua, instead of having to keep them and become liable for deemed value payments.

87 There are no costs associated with this proposal.

Administrative implications

88 There are no significant administrative implications.

Changes to restrictions on commercial tuatua harvesting

Background

89 At present, regulation 4A of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 prohibits commercial tuatua harvesting in any area except those defined in 4A(2) – Maketu Beach (TUA 1B) and within TUA 9 at Ninety Mile Beach, specific areas between the North Head of the Kaipara Harbour to Maunganui Bluff, Maunganui Bluff to the Hokianga Harbour, and an area in the entrance to the Kaipara Harbour.

90 The proposed amendment recognises that the introduction of commercial catch limits for tuatua in TUA 1B and TUA 9 has implications for the current controls that define where commercial harvesting can occur. In TUA 1B MFish considers that with a proposed zero TACC, there is no need to have any additional controls on the location of commercial harvesting. In TUA 9 where a TACC of 43 tonnes is proposed, it is necessary to consider confining commercial harvesting to the area in the Kaipara Harbour entrance where it occurs at present, for sustainability reasons.

91 No changes are proposed to any of the regulations in the Fisheries (Central Area Commercial Fishing) Regulations 1986, the Fisheries (Challenger Area Commercial Fishing) Regulations 1986, the Fisheries (South-East Area Commercial Fishing) Regulations 1986 and the Fisheries (Southland and Sub-Antarctic Areas Commercial Fishing) Regulations 1986 that define areas where shellfish gathering is prohibited.

Problem definition

92 With introduction of tuatua into the QMS, MFish considers that the regulation defining the area at Maketu in TUA 1B where commercial harvesting is allowed should be revoked. MFish is not aware that there has been any commercial tuatua harvesting in this area since at least its specification in regulations (November 1989). MFish proposes to revoke the closure at Maketu because the proposal to set a TACC of zero for TUA 1B will ensure that there will be no commercial harvesting anywhere in this region, which makes additional regulatory controls there unnecessary.

93 In TUA 9, MFish proposes that the TACC should be 43 tonnes, based on the quantities landed from the dredge fishery at the Kaipara Harbour entrance. Landings from the Dargaville coast and Ninety Mile Beach areas are largely historic (ie, pre-1996-97 for Dargaville, and pre-1994-95 for Ninety Mile Beach). No commercial fishery, or specific catch information, is known for the area between the Hokianga Harbour and the Maunganui Bluff. Furthermore, commercial harvesting that did occur in some of these areas ceased in the 1990's. However, these west coast sites are places with on-going non-commercial harvesting, subject to the variability in the abundance of the stock. Consequently, there is likely to be a sustainability risk if

removals from these areas increased due to a resumption of commercial fishing in areas other than the Kaipara Harbour entrance.

94 MFish considers that regulation 4A should be reviewed, with a view to determining whether amending it to remove historic areas specified as available for commercial harvest is appropriate, while maintaining the specified area currently used by the commercial tuatua fishery in the Kaipara Harbour entrance. Such an amendment would ensure that sustainability outcomes are not compromised in other parts of the stock, but current use of the resource can continue.

95 Should information become available in future that indicates that commercial harvests of tuatua in any QMA could be feasible, management arrangements can be applied to deal with sustainability and utilisation issues. Under these arrangements it is possible that tuatua could either be taken commercially from anywhere within QMAs, or restricted to areas defined by regulation, as is done currently for commercial harvesting of other shellfish stocks.

Preliminary consultation

96 No preliminary consultation has been undertaken concerning revocation of the areas where commercial harvesting is currently allowed, although some non-commercial interests have indicated their support for TACCs being set at zero in the upper North Island. At Ninety Mile Beach Maori have expressed concern at the prospect of any future commercial use of tuatua resources, and this sentiment, in the context of resource sustainability, is likely to be similarly expressed along the Dargaville coast.

Options

Non-Regulatory Measures

97 Not relevant – the proposal is to remove a regulatory prohibition on harvesting because there is no longer a need for it.

Regulatory Measures

98 Regulations identify the areas in TUA 1B and TUA 9 where commercial harvesting of tuatua is currently permitted. In order to rationalise these historically specified areas, and avoid a sustainability risk through additional fishing effort, the most simple and direct means would be to amend the relevant section of the regulations.

Costs and benefits of the proposal

99 There are no obvious costs associated with reviewing this regulation. In recent years commercial fishing for tuatua has only taken place within the Kaipara Harbour entrance. The main benefit of the proposal is that restricting commercial access in TUA 9 to just the Kaipara Harbour entrance minimises sustainability risks if such access was also allowed to other parts of this QMA.

Administrative implications

100 There are no significant administrative implications.

Removal of 600kg daily limit on commercial tuatua harvesting in TUA 9 and 200kg daily limit in other areas.

Background

101 At present regulation 22A of the Fisheries (Auckland and Kermadec Areas Commercial Fishing) Regulations 1986 restricts the maximum weight (greenweight) of tuatua that may be taken or possessed by a commercial fisher on any day within the waters of 'Quota Management Area 1 or Quota Management Area 9' (upper North Island) to:

a) 600kg per day if dredging;

b) 200kg per day if hand gathering.

102 While the commercial tuatua fishery was outside the QMS, these limits were the only control on quantities allowed to be harvested.

Problem definition

103 With introduction of tuatua into the QMS and in turn the application of catch limits, there is no longer a need for daily limits on commercial harvesting. This includes the 600kg limit on the Kaipara dredge fishery, a constraint that may mean that the fishery at present is only marginally cost effective. If sustainable commercial fisheries develop in other tuatua QMAs, TACCs, rather than daily limits would be the most effective way to constrain commercial catches.

Preliminary consultation

104 There has been no consultation on this proposal although there was some preliminary discussion with the commercial dredge fisher about removing daily limits about two years ago. The commercial fisher was in favour of the idea in order that he could improve his harvest and marketing efficiencies.

Options

Non-Regulatory Measures

105 Not relevant.

Regulatory Measures

106 The 600 and 200kg daily limits are imposed by regulation. Therefore the only option available to make this change involves an amendment to the relevant regulation.

Costs and benefits of the proposal

107 There are no obvious costs associated with this proposal. The main benefit is that it will allow commercial harvesters to arrange their fishing activities so that tuatua are harvested optimally to meet market demand. TACs and TACCs will ensure sustainability of the resource while allowing this harvesting flexibility.

Administrative implications

108 There are no administrative implications of this proposal.

ANNEX TWO

Species Information

Species Biology

109 Tuatua (*Paphies subtriangulata*; TUA) belongs to the family Mesodesmatidae, a group of wedge shaped surf clams that include the toheroa (*Paphies ventricosum*), the deepwater tuatua (*Paphies donacina*) and the pipi (*Paphies australis*).

110 Tuatua are widespread around New Zealand, found on sandy beaches around the North Island, at more scattered locations in the northern South Island and Stewart Island, and on the Chatham Islands. A study of twelve North Island beaches with different physical characteristics indicated that tuatua have different sizes and abundance, depending on the nature of the beach (and irrespective of the effects of any harvesting pressure).

111 Tuatua are broadcast spawners with separate sexes. There are two seasonal peaks in spawning, one between September and November, the other between February and April. Spawnings have been observed at high water on a number of occasions with only a small proportion of the population participating in each event. These spawning events were synchronized with pipi spawning in nearby estuaries.

112 The size of tuatua egg larvae in their early stage is such that they can disperse quite widely if hydrographic conditions do not retain larvae in the spawning area. Stable circulation of seawater within the surf zone and along surf beaches can retain larvae close to shore. Recruitment is variable, possibly because of the influence of variable winds on seawater circulation. Tuatua populations can be dominated by the large recruitment of just one age class.

113 Larvae settle high in the intertidal where they form a band with densities frequently reaching 4000 m^2. Spat are highly mobile on the beach, moving around as the tide comes in and are able to rebury very rapidly. Spat high up the beach are vulnerable to changes in the water table, while vehicles driven on the beach can change sand conditions from a state that spat can move through to one where they can't and may desiccate and die.

114 Tuatua spat and juveniles are prey of the paddle crab. These crabs can consume up to 400 tuatua spat per day during the summer. The extreme tidal height at which tuatua spat settle could provide a refuge from such attacks until their physical size 25–30 mm) and strength of the shell protects them from attack. Tuatua move down the beach to occupy the lower intertidal when they grow to this size.

115 Growth, mortality and recruitment vary from year to year as the environment changes. A study of tuatua growth rates found that they reach 40 mm shell length in two years, 50 mm in three years, with a maximum age of more than five years when large individuals reached lengths of 80mm. A study of tuatua on Dargaville Beach indicated that they reached acceptable commercial size (70-80 mm) during their third year - they grew faster and reached larger sizes on this beach than elsewhere.

Fisheries Characteristics

Commercial Catch

Table 2: Commercial landings (tonnes) of tuatua by fishing year.

Fishing Year	TUA 1	TUA 2	TUA 3	TUA 4	TUA 5	TUA 7	TUA 8	TUA 9		
								90 Mile	Dargaville	Kaipara
1990/91	–	–	–	–	–	0.176	–	0.96	35.765	31.52
1991/92	–	–	–	–	–	1.667	–	0.6	70.692	10.71
1992/93	–	–	–	–	–	0.891	–	0.16	104.373	4.75
1993/94	–	–	0.042	–	–	–	–	1.8	161.881	13.485
1994/95	–	–	–	–	–	–	–	1.15	142.645	38.462
1995/96	–	–	–	–	–	–	–	–	53.565	46.451
1996/97	–	–	0.125	–	–	0.005	–	–	11.3845	57.19
1997/98	–	–	0.184	–	–	–	–	–	1.773	190.489
1998/99	–	–	–	–	–	–	–	–	0.19	76.015
1999/00	–	–	–	–	–	–	–	–	–	44.45
2000/01	–	–	–	–	–	–	–	–	–	16.15
2001/02	–	–	–	–	–	–	–	–	–	4.9
2002/03	–	–	–	–	–	–	–	–	–	36.160
2003/04	–	–	0.054	–	–	–	–	–	–	34.336

116 With the closing of commercial harvesting of toheroa in 1969, an increasing amount of effort was expended commercially hand-gathering tuatua in northern New Zealand, especially on the Dargaville coast (the area between Maunganui Bluff and North Head of the Kaipara Harbour). Landings of 40.5 tonnes, 61.5 tonnes, and 42.4 tonnes were recorded in the fishing years 1975-1977. 108 tonnes of tuatua were landed in 1979.

117 Average landings in the region rose further to around 106 tonnes between 1979 and 1984. In 1984, 63 tonnes were landed from Dargaville Beach alone. Since that time quantities harvested from the Dargaville coast have fallen significantly, but increased for three years from 1992-93. Since 1999 all the targeted catch has come from the Kaipara Harbour dredge fishery (Table 2), as the resource on the Dargaville coast had significantly diminished (probably through natural influences rather than fishing pressure), and participants retired from the fishery. MFish databases show tuatua landings from the subtidal dredge fishery in the Kaipara Harbour of 31.5 tonnes in the 1990-91 fishing year, a high of 190.5 tonnes in the 1997-98 fishing year, and much reduced catch in more recent fishing years.

118 There is no apparent seasonality to the commercial fishery, with tuatua being harvested throughout the year.

Recreational catch

119 The national marine recreational fishing surveys of 1996 and 2000-01 collected diary data that allows total recreational tuatua catches to be estimated for specific fishing zones. These estimates show that the major recreational landings of tuatua were made in the Bay of Plenty and in eastern Coromandel. The information indicates that small quantities of tuatua have been taken from beaches all around the Hauraki Gulf and the north-eastern coast. Moderate recreational catches were taken from northern Dargaville and Ninety Mile beaches.

Table 3: Harvest estimates from the National Recreational Fishing Surveys

QMA	Survey Year	Harvest (thousands of pipi)	Harvest (t)	CV %
TUA 1A and 1B	1996	1 141	26.24	14
	2000	4 334	99.68	19
TUA 2	1996	3	0.07	–
	2000	110	2.53	88
TUA 3	1996	87	2.00	–
	2000	133	3.06	45
TUA 4	1996	N/A	N/A	–
	2000	N/A	N/A	–
TUA 5	1996	N/A	N/A	–
	2000	N/A	N/A	–
TUA 7	1996	N/A	N/A	–
	2000	N/A	N/A	–
TUA 8	1996	N/A	N/A	–
	2000	96	2.21	62
TUA 9	1996	390	8.97	–
	2000	1 119	25.74	68

Customary catch

120 Traditional harvesting of tuatua on the Kapiti and Manawatu coasts supported important Maori hand-gathering fisheries. Steamed and dried tuatua meats were an important part of the diet of local Maori. Both oral tradition and the numerous substantial middens of *P. subtriangulata* shell alone clearly show this fishery to have been important for several hundred years.

121 There are no documented records of customary Maori catches in recent years. Consequently the customary allowance in all tuatua QMAs, like several other fisheries, is taken to equate with the estimates of recreational catch.

Regulatory Framework

122 As outlined in the main part of this IPP, regulations that currently apply to commercial tuatua harvesting are a combination of daily weight limits and area restrictions – the area restrictions mostly applying in the northern North Island (TUA 1B and TUA 9). As part of the QMS introduction process, it is proposed to revoke the commercial daily limits and either revoke or revisit the use of the regulations specifying restricted areas for commercial harvesting in TUA 1B and TUA 9, except at the Kaipara Harbour entrance.

123 There is a limit of an amateur daily limit of 150 tuatua, except in the Auckland – Coromandel area where the limit is 50. No changes are proposed to these limits.

Fisheries Assessment

124 There is no time series of biomass surveys for tuatua both in the bed in the Kaipara Harbour entrance where commercial harvesting by dredge occurs now, or anywhere else that would indicate whether tuatua populations are changing in response to past

and current levels of harvesting. Nor is there any information on catch per unit effort that would give a measure of changes in abundance.

125 Commercial catches from the Kaipara bed have fallen significantly in recent years, principally as a result of the historic participants retiring from the fishery, although there has been occasional use of those permits by agents of the permit holder. Catches are likely to be influenced by the fact that commercial fishing is intermittent with only one or two fishers involved.

126 Anecdotal information from MFish staff around the country indicates that while there are accessible and popular areas where there are signs of localised depletion, overall tuatua populations show no sign of QMA-wide depletion in any of the tuatua stocks.

Associated Fisheries

127 Where tuatua are harvested by hand there is minimal by-catch of other species. A range of other benthic species may be taken in the Kaipara dredge fishery.

Environmental Issues

128 There is information on environmental issues in the main part of this paper. This information relates to those aspects of the biology of tuatua that are relevant to setting catch limits. It also relates to the environmental principles in s 9 of the Act.

Research

129 There have been surveys of individual tuatua populations in the northern North Island to determine whether localised depletion may have been occurring. However there has been no research to estimate biomass on a broader scale and none is proposed at this stage. There would be value in beginning assessments of both the biomass of the Kaipara Harbour bed, and of what impacts current dredge harvesting may be having.

Social, Cultural, and Economic Factors

130 As explained in the main body of this part of the IPP, both Maori and recreational harvesters derive socio-economic and cultural benefits from harvesting tuatua. Commercial harvests, currently only obtained in the Kaipara Harbour dredge fishery, deliver economic benefits.