



Ministry of
Fisheries
Te Tautiaki i nga tini a Tangaroa

**Setting of Management Controls to Support the Introduction of
Attached Bladder Kelp Seaweed, *Macrocystis pyrifera* (KBBG),
in Fisheries Management Areas 3 and 4 into the
Quota Management System on 1 October 2010**

Initial Position Paper



Purpose of this paper

- 1 The purpose of this paper is to commence a consultation process on behalf of the Minister of Fisheries (the Minister) on proposals to set Total Allowable Catches (TACs), Total Allowable Commercial Catches (TACCs), sector allowances, and other management controls to support the introduction of attached bladder kelp (*Macrocystis pyrifera*) in Fisheries Management Areas (FMAs) 3 and 4 into the Quota Management System (QMS) on 1 October 2010. These stocks are referred to in this paper as KBB 3G (FMA 3) and KBB 4G (FMA 4).
- 2 This step is in accordance with s 12 of the Fisheries Act 1996 (the Act).
- 3 The proposals presented in this paper are restricted to the attached (growing) seaweed stage only. The Ministry of Fisheries (MFish) will continue to manage bladder kelp in the free-floating and beach-cast states outside of the QMS framework.
- 4 This paper outlines the supporting rationale to set TACs, TACCs, sector allowances and other management controls for the KBB 3G and KBB 4G stocks. The Quota Management Areas (QMAs), fishing years, and units of measure for the two attached seaweed stocks were gazetted in October 2009 and are outlined in Table 1.

Table 1: Quota Management Areas, Fishing Years and Units of Measure for attached bladder kelp stocks to be introduced into the QMS on 1 October 2010

Species Code	Quota Management Areas	Fishing Year	Unit of Measure
Attached bladder kelp (KBB G)	KBB 3G, KBB 4G	1 October to 30 September	Greenweight

- 5 MFish welcomes your comments on these proposals to assist the Minister to set appropriate management measures to support QMS management of the above attached bladder kelp stocks.
- 6 Stakeholders are requested to forward their comments on this proposal by **5 pm on Thursday, 15 April 2010** to:

Tracey Steel
Ministry of Fisheries
PO Box 1020
Wellington

Or e-mail to tracey.steel@fish.govt.nz.
Or fax to 04 819 4208

- 7 A copy of this paper can be found at www.fish.govt.nz by clicking on the 'Consultations' link.

MANAGEMENT MEASURES RELATING TO INTRODUCTION OF BLADDER KELP SEAWEED (KBB 3G AND KBB 4G) INTO QMS ON 1 OCTOBER 2010 – INITIAL POSITION PAPER

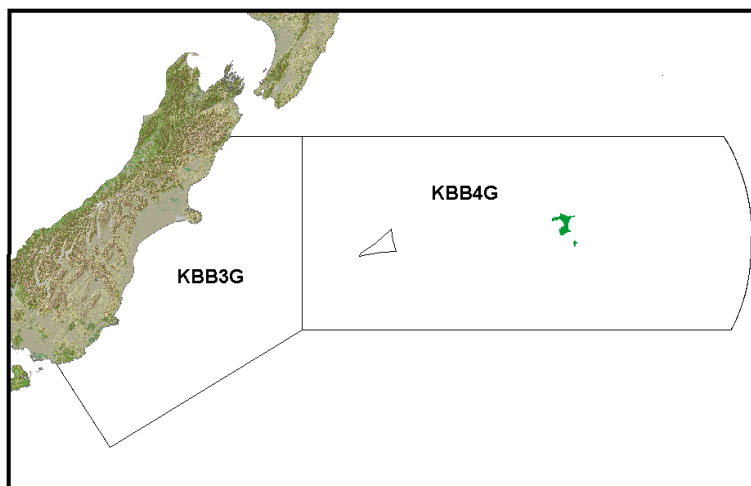


Figure 1. Quota Management Areas (QMAs) for attached bladder kelp seaweed.

Executive Summary

1 Attached bladder kelp (KBB G) in Fisheries Management Areas (FMAs) 3 and 4 will enter the Quota Management System (QMS) on 1 October 2010. The Quota Management Areas (QMAs) for KBB 3G and KBB 4G are shown in Figure 1.

2 The purpose of this document is to initiate a consultation process on behalf of the Minister of Fisheries (the Minister) regarding management controls for the KBB 3G and KBB 4G stocks.

3 The Ministry of Fisheries (MFish) is considering the following options for proposed TACs, sector allowances and other sources of fishing-related mortality (Table 2):

Table 2. Proposed TACs, TACCs, and sector allowances for the KBB 3G and KBB 4G stocks

Stock		TAC	Customary allowance	Recreational allowance	Other sources of mortality	TACC
KBB 3G	Option 1	377 tonnes	0.1 tonne	0.1 tonne	1 tonne	375.8 tonnes
	Option 2	41.2 tonnes	0.1 tonne	0.1 tonne	1 tonne	40 tonnes
	Option 3	18.2 tonnes	0.1 tonne	0.1 tonne	1 tonne	17 tonnes
KBB 4G	Option 1	26.2 tonnes	0.1 tonne	0.1 tonne	1 tonne	25 tonnes
	Option 2	2.2 tonnes	0.1 tonne	0.1 tonne	1 tonne	1 tonne

- 4 Additionally, MFish proposes the following management measures for each stock to support QMS management:
- a) Add KBB 3G and KBB 4G to the Sixth Schedule of the Fisheries Act 1996 (the Act);
 - b) Amend the Fisheries (Reporting) Regulations 2001 to outline the codes to be used by commercial seaweed fishers when completing their statutory catch returns; and
 - c) Set the interim and annual deemed values for attached bladder kelp using one of the two options outlined below:
 - i) Annual deemed value of \$4.00 per kg
AND
Interim deemed value of \$2.00 per kg; **OR**
 - ii) Annual deed value of \$1.00 per kg
AND
Interim deemed value of \$0.50 per kg
 - iii) Standard differential deemed value rates are used in KBB 3G and KBB 4G but no overfishing thresholds will be set at this time.

Regulatory impact analysis requirements

- 5 This Initial Position Paper (IPP) required a Regulatory Impact Statement (RIS), which was reviewed internally within MFish. The RIS is attached at the end of this paper (Appendix 2).
- 6 A RIS is a summary of the key information that decision-makers need to know in order to make an informed decision as to which option is best by assessing the likely impact from making regulatory changes. MFish is not seeking stakeholder views on the attached RIS.
- 7 For more information on the Regulatory Impact Analysis Requirements please refer to the Treasury website, www.treasury.govt.nz.

The Issue

- 8 On 6 November 2009 the Minister of Fisheries, by notice in the *New Zealand Gazette*, declared that attached bladder kelp (*Macrocystis pyrifera*) in FMAs 3 and 4 would be subject to the QMS on and from 1 October 2010. Free-floating and beach-cast bladder kelp will managed outside of the QMS, under an open access fishery. Concurrently, the Minister also defined the QMAs (Figure 1) for attached bladder kelp, which will be referred to as KBB 3G (FMA 3) and KBB 4G (FMA 4).
- 9 The Minister declared the fishing year will begin on 1 October and end on 30 September in the following year. The TACs, TACCs and Annual Catch Entitlements (ACE) will be expressed in terms of greenweight (kilograms, kg).

- 10 MFish considers the following key issues affect the setting of sustainability measures and other management controls for attached bladder kelp:
- a) Bladder kelp forests are characterised as being amongst the most productive marine communities in New Zealand. Bladder kelp plays a highly significant ecological role within the marine ecosystem because of its:
 - i) Ecological characteristics, productivity and forest-like structural form that provide significant habitat, food, and shelter for many marine species; and
 - ii) Significant contribution to ecosystem function, nutrient cycling, and modification of wave action and coastal erosion.
 - b) Estimates of total biomass or sustainable yield are unavailable for either KBB 3G or KBB 4G. There is some limited information on harvestable bladder kelp canopy biomass within Akaroa Harbour¹ (located in KBB 3G). Status of both seaweed stocks remains unknown but is considered to be near virgin biomass levels, as most kelp beds are either un-fished or lightly fished. Despite a lack of stock assessment information, both stocks are likely to sustain significantly higher catch levels than present.
 - c) Bladder kelp beds are susceptible to localised depletion if fishers use inappropriate harvest practices (ie, whole plant is removed), and naturally experience large biomass fluctuations both spatially and temporally. Kelp beds are sensitive to changes in environmental factors (e.g. light, nutrients) and vulnerable to habitat disturbance.
 - d) Attached bladder kelp is generally not harvested by non-commercial fishers. Very limited commercial harvest of attached bladder kelp occurs within FMAs 3 and 4. This low catch level reflects the restrictive commercial access arrangements to attached bladder kelp under the previous management regime. Higher commercial catches are anticipated under QMS management in the long-term.
 - e) There is general support to maintain commercial catches at low levels until robust stock assessment information for each attached bladder kelp stock becomes available.

Available Information

Biological Characteristics

- 11 *Macrocystis pyrifera* (bladder kelp) is a large seaweed species occurring throughout New Zealand. This seaweed can form extensive undersea forests in coastal waters around southern North Island, the South Island, Chatham Islands, Stewart Island, and the sub-Antarctic islands.
- 12 Individual plants can grow up from depths of 30 metres to reach the sea surface where they form a floating canopy. The canopies themselves can be extensive, reaching many metres in length along the sea surface. In older plants, over 50% of the plant biomass can be within 1 metre of the sea surface.

¹ Pirker, J., Schiel, D.R., and H. Lees. 2000. Seaweed Products for Barrel Culture Puaa Farming. Foundation for Research Science and Technology's Technology for Business Growth Development project.

- 13 Bladder kelp typically occurs in dense stands and is the predominant habitat forming species in many coastal systems. This seaweed undergoes annual and seasonal cycles of abundance; with canopy growth rates generally highest between autumn and spring. Canopy biomass is typically greatest during winter and lowest during summer (due to die-off from higher water temperatures and lower nutrient levels). Storm events substantially contribute to a decline in surface-canopy biomass. A significant proportion of the annual kelp production becomes free-floating and beach-cast as a result of storm events, seasonal mortality, or senescence.
- 14 Bladder kelp is one of the fastest growing seaweed species and the fronds of plants have been recorded as growing up to 300 mm per day in length in the Northern Hemisphere.² In New Zealand, however, growth rates have been estimated at significantly lower levels (approximately 1 – 15 mm per day).³⁴ Growth rates and peaks in biomass can vary significantly over very short distances (i.e., a few kilometres apart) in response to changes in currents, light, nutrient levels, and other environmental factors. Kelp beds can also decline and regenerate over different spatial and temporal scales.
- 15 Bladder kelp, like all other large seaweeds, occurs in one of three states – (i) attached (growing) to the substrate, (ii) free-floating, and (iii) beach-cast. The key ecological characteristics of each seaweed state are described in Figure 2. Increased biodiversity of associated and/or dependent species is generally found with attached and beach-cast states compared to free-floating seaweed, which acts more as a temporary refuge for a variety of marine species.

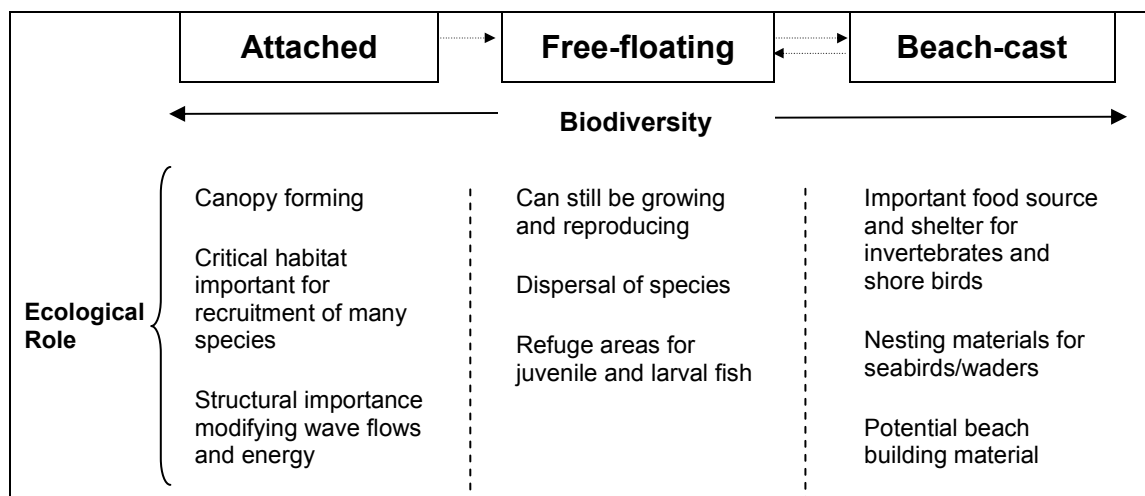


Figure 2. Key ecological characteristics of each seaweed state.

- 16 Attached bladder kelp forests play a critical role in coastal, inshore and estuarine environments by providing a wide and diverse range of ecosystem services. These include:

- a) Providing important three-dimensional structures that act as nurseries, shelters, and

² North, W.J. 1971. Growth of individual fronds of the mature giant kelp, *Macrocystis pyrifera*. *Nova Hedwigia* 32: 123-168.

³ Brown, M.T., Nyman, M.A., Keogh, J.A., and N.K.M. Chin. 1997. Seasonal growth of the giant kelp *Macrocystis pyrifera* in New Zealand. *Marine Biology* 129: 417-424.

⁴ Ibid no. 1.

refuge habitats for a wide variety of coastal and inshore species of high social, cultural and economic value (e.g. rock lobster, paua, kina, and butterflyfish);

- b) Providing food for a wide range of species that support a variety of coastal, inshore and estuarine foodwebs and fisheries;
- c) Modifying wave and tidal action, which affects species living in and around kelp beds, as well as coastal physical processes such as erosion siltation, and sunlight penetration (affecting sheltered and shaded understory species); and
- d) Driving primary production and energy cycling that contribute to other near-shore systems including sandy beaches and deepwater ecosystems.

The Bladder Kelp Fishery

- 17 Prior to introduction of the bladder kelp fishery into the QMS, access to bladder kelp was controlled by fishing permits. Under this regime there were no TACs or associated sector allowances for bladder kelp in either FMA 3 or FMA 4. Bladder kelp could only be taken for the purpose of sale when done in accordance with a current fishing permit issued under s 91 of the Act.
- 18 Historically, commercial access to bladder kelp has been constrained by moratoria on new fishing permits. The most recent of these was implemented in 1992. Bladder kelp was identified as being vulnerable to sustainability risk in an open-access permit environment; therefore it was a moratorium species to ensure these risks were adequately managed prior to QMS introduction.
- 19 Only commercial fishers who were authorised to target bladder kelp prior to 1992 were able to harvest this seaweed in accordance with fishing permits issued under s 91. Prior to its introduction to the QMS there were only two commercial fishers in FMA 3 and one commercial fisher in FMA 4 authorised to target attached bladder kelp. From 2004, permit holders in FMA 3 were restricted to a combined competitive catch limit of 20 tonnes of attached bladder kelp per fishing year in Akaroa Harbour only. The single permit holder in FMA 4 was restricted to 25 tonnes of attached bladder kelp per fishing year.
- 20 Commercial harvesting under the s 91 permits was restricted to the method of hand-gathering only (including manual cutting). The current hand-gathering method restriction and other permit conditions will be revoked once KBB 3G and KBB 4G are introduced into the QMS, but harvesting methods could be considered in the future under a harvesting strategy. No other management controls to fishing apply other than the generic fishing restrictions prescribed under the Act and fisheries regulations.
- 21 There is uncertainty in relation to commercial catch landing information for seaweed. Mandatory reporting of commercial seaweed catches only began in 2001, therefore, MFish cannot determine whether all seaweed catches were reported prior to 2001. There is also uncertainty about whether the reported catches reflect only attached kelp, or includes the free-floating and beach-cast states; fishers are not required to differentiate between states when reporting seaweed catches. While most beach-cast seaweed is reported under a generalised species code for seaweed (“SEO”, which does not differentiate between species), some is reported by species code. Free-floating seaweed is indistinguishable from attached seaweed under the current reporting regime.

- 22 The introduction of attached bladder kelp into the QMS will improve the reporting regime by requiring attached bladder kelp to be reported as KBB 3G and KBB 4G to identify its landed state. Free-floating bladder kelp will be managed outside of the QMS, under an open access fishery, and be reported as KBB 3 and KBB 4. MFish acknowledges there may be difficulty distinguishing between cut and free-floating bladder kelp that is landed, which could lead to false reporting. MFish will monitor this risk and apply additional education and enforcement activity, or additional management controls, if required. MFish considers the condition of the bladder kelp [e.g. clearly manually cut stipes (central stalk) versus jagged tears from storm activity] will provide an indication whether the bladder kelp was previously attached or free-floating.
- 23 Reported catches do not include attached kelp taken as bycatch (e.g. caught within set nets and trawl gear) as fishers immediately return this seaweed back to the sea (although this catch is expected to be negligible). Additionally, there is difficulty in determining whether bladder kelp taken in a trawl net was previously attached to the substrate or was free-floating.
- 24 There is no quantitative information on the extent of customary and recreational harvest of attached bladder kelp (or any other state) in FMAs 3 and 4. The national recreational harvest surveys did not report seaweed catches. However, the customary and recreational harvest of attached kelp is likely to be negligible. Non-commercial catches of seaweed are generally restricted to the collection of beach-cast seaweed for composting purposes, and beach-cast and free-floating as a customary food source (both of which can be presently collected without restriction) and are outside the scope of setting TACs for the attached bladder kelp stocks. Information on non-commercial use of attached bladder kelp is sought from customary and recreational fishers.
- 25 Quantitative estimates of other sources of fishing-related mortality are not available for attached bladder kelp.

KBB 3G (east coast South Island)

- 26 No commercial catch limit applies to the KBB stock in FMA 3. Over the past six fishing years (2003-09), a total catch of approximately 100 tonnes of bladder kelp has been reportedly taken from FMA 3 (with an average annual catch of 17 tonnes). Reported annual bladder kelp landings over the past six years ranged between 8 and 17 tonnes, with the exception of the 2008-09 fishing year where approximately 63.5 tonnes was reported. The majority of these catches were taken from Akaroa Harbour. MFish assumes that 20 tonnes of bladder kelp was taken as attached bladder kelp (as per the current catch limit in FMA 3) and the remaining harvest was free-floating bladder kelp. However, under the current reporting regime there is no way to determine whether the catch was comprised solely of attached bladder kelp, free-floating or a mixture of bladder kelp states. Once in the QMS, reporting regulations will enable identification of attached bladder kelp landings to monitor harvest levels more closely.
- 27 Reported commercial catches of bladder kelp in FMA 3 are shown in Figure 3.

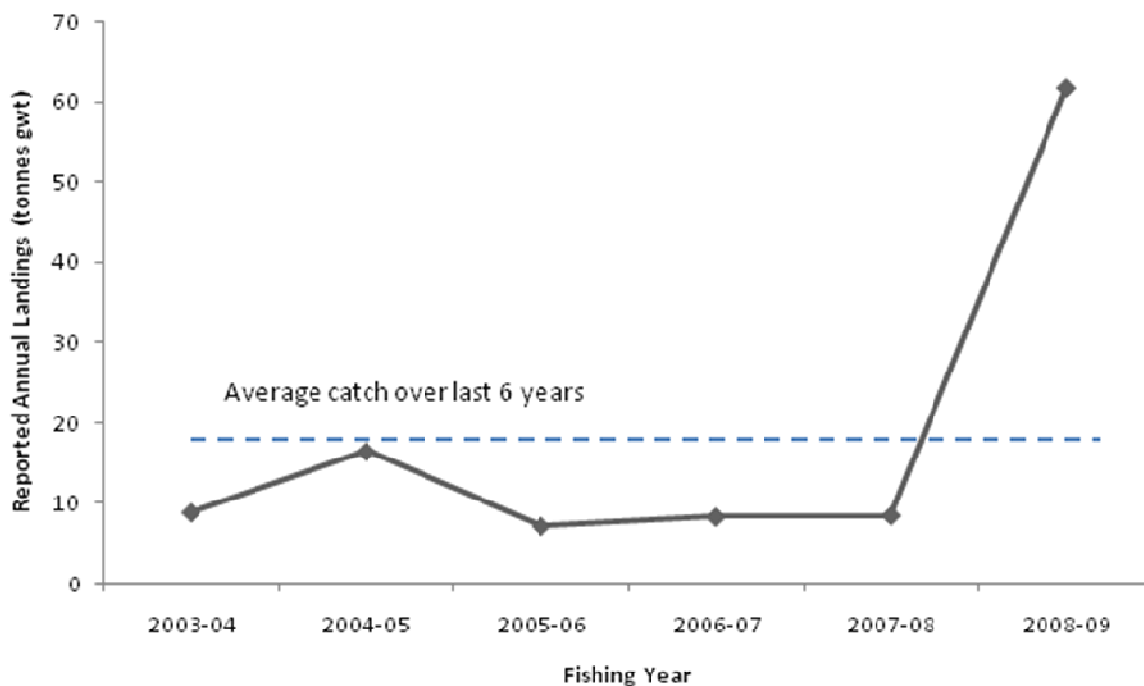


Figure 3. Reported landings (tonnes greenweight) of bladder kelp for FMA 3 for the period between 2003-04 and 2008-09 fishing years. Average catches over past six years is indicated.

KBB 4G (Chatham Islands)

- 28 A commercial catch limit of 25 tonnes currently applies to the KBB stock in FMA 4. This catch limit was prescribed on a s 91 fishing permit held by the only commercial fisher entitled to harvest this seaweed in FMA 4 under the previous statutory regime. However, a total catch of less than 2 tonnes has been reportedly taken from FMA 4 over the past 10 years, with all catches landed between the 1999-00 and 2001-02 fishing years (average annual catch of 200 kg) from Whangamoe, Chatham Islands.
- 29 Reported commercial catches of bladder kelp in FMA 4 are shown in Figure 4.

Stock Status

- 30 There is no stock assessment information to determine current stock biomass or sustainable yield of either the KBB 3G or KBB 4G stocks. Therefore, MFish is unable to ascertain whether the current biomass of both attached bladder kelp stocks is stable, increasing or decreasing. There are also no long-term studies on the implications of commercial harvesting of attached bladder kelp beds in New Zealand to guide TAC setting.
- 31 There is information on past bladder kelp biomass and potential yield at three sites in Akaroa Harbour (Wainui, Ohinepaka, and Mat White Bays)⁵, located in KBB 3G. This study estimated a combined annual harvestable canopy biomass of 377 tonnes for 1999.

⁵ Ibid no. 1.

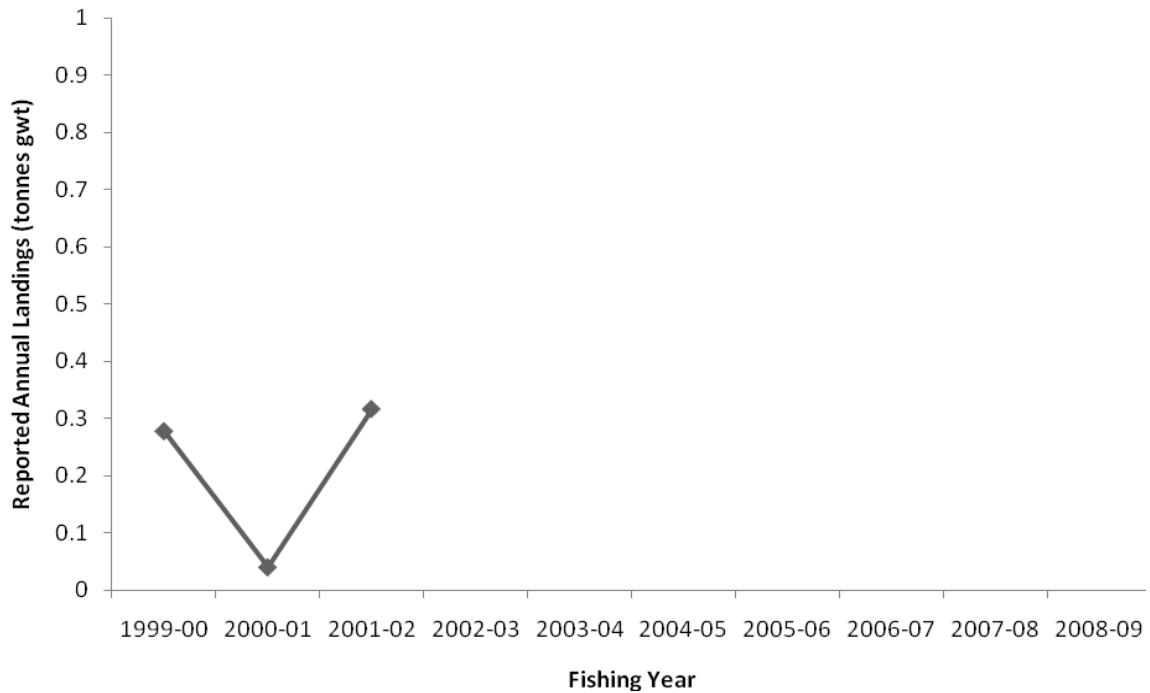


Figure 4. Reported landings (tonnes greenweight) of bladder kelp for FMA 4 for the period between 1999-00 and 2008-09 fishing years.

- 32 The 1999 estimate in Akaroa Harbour should be treated with caution. The methods used to estimate biomass are satisfactory; however, the survey investigations on the impacts of harvest were restricted to assessing the impact of small-scale removal of bladder kelp and/or associated seaweed species in one location only. Additionally, the survey provides only seasonal point estimates of harvestable biomass during the time the survey was conducted, with the 1999 estimate being the highest.
- 33 Attached bladder kelp biomass can fluctuate significantly over spatial and temporal (annual and seasonal) scales. Canopy biomass (portion of the bladder kelp near the sea surface that is harvested) generally peaks between autumn and spring and dies off during summer. Annual biomass variations within and between individual kelp forests necessitates the need for initial annual stock assessments of targeted beds to determine credible biomass and sustainable yield information to ensure long-term sustainability. The 1999 estimate is historic and does not provide an indication of biomass at a QMA level; however, it does indicate that some kelp beds could provide significant harvest opportunities.

Management Options

Basis for Setting TACs: Section 13/14 management

- 34 Section 13 of the Act represents the default management approach that applies when setting a TAC for a QMS stock. Section 13(2) requires the Minister to set a TAC at a level that:
- a) maintains the stock at, or above, a level that can produce the B_{MSY} having regard to the interdependence of stocks; or

- b) enables the level of any stock whose current level is below that which can produce the maximum sustainable yield (MSY) to be altered –
 - i) in a way and at a rate that will result in the stock being restored to or above a level that can produce the MSY, having regard to the interdependence of stocks; and
 - ii) within a period appropriate to the stock, having regard to the biological characteristics of the stock and any environmental conditions affecting the stock; or
- c) enables the level of any stock whose current level is above that which can produce the MSY to be altered in a way and at a rate that will result in the stock moving towards or above a level that can produce the MSY, having regard to the interdependence of stocks.

35 The current status of KBB 3G and KBB 4G in relation to B_{MSY} are unknown and unable to be reliably estimated using best available information. However, Section 13(2A) enables the Minister to set a TAC under s 13 where the current biomass of a stock and the biomass that produce a MSY are not able to be estimated reliably.

36 Alternative options for setting the TACs are available:

- a) The Act allows TACs to be set under section 14 if the quota management stock is listed on the Third Schedule. A stock can be added to the Third Schedule (stocks managed with an alternative total allowable catch) provided it satisfies one of four criteria specified in s 14(8). MFish considers none of the criteria, which are detailed below, are applicable to attached bladder kelp.
 - i) It is not possible, because of the biological characteristics of the species, to estimate MSY. MFish considers that MSY could be estimated for attached bladder kelp.
 - ii) A national allocation for New Zealand has been determined as part of an international agreement. There are no international agreements regarding bladder kelp.
 - iii) The stock is managed on a rotational or enhanced basis. Attached bladder kelp is not currently managed on this basis.
 - iv) The stock comprises 1 or more highly migratory species. Bladder kelp is not a highly migratory species.
- b) Section 14B enables the Minister to set a TAC for certain specified stocks. The intention of s 14B is to ensure the harvest of a target stock is not constrained by the TAC of an associated bycatch species. Use of s 14B depends on owners of at least 95% of the quota shares for a stock proposing that it be used. As quota will not be allocated until 1 October 2010, this section cannot be used for the initial setting of TACs for attached bladder kelp stocks KBB 3G or KBB 4G.

37 Given the low levels of harvest for bladder kelp in both FMA 3 and FMA 4 in the last 10 years, attached bladder kelp stocks are considered to be in a near virgin state and likely to

be at a level that is at, or above, B_{MSY} . MFish considers, therefore, that is appropriate to set the TACs under s 13(2A) of the Act.

- 38 In setting a TAC under this section, the Minister must have regard to such social, cultural, and economic factors that he considers are relevant. Statutory obligations in respect of TAC setting and allocation are set out and discussed in Appendix 1.

Summary of Proposals

- 39 MFish is consulting on the following management options for setting TACs, TACCs, and sector allowances for KBB 3G and KBB 4G (Table 3).

Table 3. Proposed TACs, TACCs, and sector allowances for the KBB3G and KBB4G stocks

Stock		TAC	Customary allowance	Recreational allowance	Other sources of mortality	TACC
KBB 3G	Option 1	377 tonnes	0.1 tonne	0.1 tonne	1 tonne	375.8 tonnes
	Option 2	41.2 tonnes	0.1 tonne	0.1 tonne	1 tonne	40 tonnes
	Option 3	18.2 tonnes	0.1 tonne	0.1 tonne	1 tonne	17 tonnes
KBB 4G	Option 1	26.2 tonnes	0.1 tonne	0.1 tonne	1 tonne	25 tonnes
	Option 2	2.2 tonnes	0.1 tonne	0.1 tonne	1 tonne	1 tonne

- 40 Additionally, MFish proposes the following management measures for each stock to support QMS management:

- a) Add KBB 3G and KBB 4G to the Sixth Schedule of the Fisheries Act 1996 (the Act);
- b) Amend the Fisheries (Reporting) Regulations 2001 to outline the fish stock codes to be used by commercial seaweed fishers when completing their statutory catch returns; and
- c) Set the interim and annual deemed values for attached bladder kelp using one of the two options outlined below:
 - i) Annual deemed value of \$4.00 per kg
AND
Interim deemed value of \$2.00 per kg; **OR**
 - ii) Annual deed value of \$1.00 per kg
AND
Interim deemed value of \$0.50 per kg

- iii) Standard differential deemed value rates are used in KBB 3G and KBB 4G but no overfishing thresholds be set at this time.

- 41 In the absence of a reliable estimate of sustainable yield, the TAC options outlined in this paper represent points on a continuum (from 18.2 tonnes to 377 tonnes for KBB 3G and 1 tonnes to 25 tonnes for KBB 4G). Each option represents a different balance in terms of risk to sustainability (including impacts on associated species) and benefits from utilisation. We consider all points on the continuum would meet the Ministers legislative obligations. The Minister is free to choose any point on the continuum, having regard to information in this IPP and submissions from stakeholders.
- 42 MFish considers the proposed sustainability measures acknowledge: the lack of stock assessment information; the ecological significance of this seaweed within the marine environment; and the susceptibility of kelp beds to localised depletion from the effects of fishing. MFish considers the TAC options proposed to be well below the amount of attached bladder kelp that would likely be removed during natural annual cycles of senescence and after storm events throughout the FMA; therefore, MFish considers the proposed options a low risk to the sustainability of the bladder kelp stock in each FMA. MFish acknowledges the potential for localised depletion of kelp beds and consequent adverse effects on associated and/or dependent species if harvest occurs in an area of low kelp abundance. New information to quantify risks to sustainability or the adverse effects of fishing would be welcomed for future reviews of the TAC.

Total Allowable Catch (TAC) Setting

- 43 MFish proposes the following TAC options for the KBB 3G and KBB 4G stocks (Table 4).

Table 4. Proposed TACs for the KBB 3G and KBB 4G stocks

Stock	TAC	
KBB 3G	Option 1	377 tonnes
	Option 2	41.2 tonnes
	Option 3	18.2 tonnes
KBB 4G	Option 1	26.2 tonnes
	Option 2	2.2 tonnes

KBB 3G (East Coast South Island)

- 44 Three TAC options are proposed for KBB 3G:

Option 1 – TAC 377 tonnes

- 45 Under Option 1, the TAC for KBB 3G would be set at 377 tonnes. This TAC is based on

the Akaroa Harbour study which estimated the sustainable yield of kelp in 1999 to be about 377 tonnes⁶. The survey was carried out on three sites within Akaroa Harbour (Wainui, Ohinepaka, and Mat White Bays) from the spring of 1995 to the winter of 1998. The 377 t estimate was the highest harvestable biomass estimate combined for all three sites (combined) during the study period. There are other larger areas of kelp abundance within KBB 3G (principally off the coast of Otago) which mean that the harvest level for Akaroa would be a conservative limit when applied to the QMA as a whole.

- 46 This option would enable the greatest level of utilisation and immediate development of the KBB resource in FMA 3. The highest level of commercial catch of KBB in FMA 3 has been 63.5 tonnes taken in the last (2008-09) fishing year. The proportion of free-floating to attached bladder kelp is uncertain but MFish assumes 20 tonnes was harvested as attached (the current catch limit). No non-commercial catch of attached bladder kelp has been recorded. MFish considers it unlikely that the TAC would be fully taken in the first year but the TAC would provide considerable potential to develop greater levels of utilisation and therefore socio-economic benefit from the resource.
- 47 MFish considers Option 1 poses no sustainability risk to KBB 3G. However, MFish notes the following environmental risks associated with harvesting under this option:
- a) The Akaroa Harbour survey provides seasonal point estimates of harvestable biomass at each of three sites between 1995 and 1998 when the survey was conducted. Kelp beds vary considerably spatially and temporally, which was evident in the survey results. Harvestable biomass estimates during the survey ranged between zero and approximately 300 t dependent upon site, season and year. Accordingly, although the survey provides information of likely yields in the late 1990s, there is no estimate of current yield.
 - b) There is no information to estimate the sustainable yield for the wider QMA. In the absence of controls to restrict harvest in finer spatial scales within the QMA, there is a risk that a large TAC could result in localised depletion of beds within the QMA (and potential localised ecosystem impacts) given the importance of the species to near shore ecosystems.
 - c) Localised depletion of kelp beds may result if harvesting occurs outside areas of known high abundance. Localised depletion could result in adverse environmental impacts if depletion of beds occurs in area where they form a habitat of significance for fishery management and/or leads to impacts on associated species.
- 48 The effect of intensity of harvesting at this level has not been investigated and the potential impact on associated seaweed and fish species is unknown. There is no information available to quantify this risk. Incentives to maximise harvesting efficiency associated with the QMS management framework should encourage fishers not to harvest in areas of low abundance, but some risk remains under this option. However, MFish considers Option 1 to pose a low sustainability risk to the attached bladder kelp stock as a whole based on likely abundance across the wider QMA.
- 49 Sustainability risks surrounding localised depletion and associated impacts (e.g. effects on

⁶ Ibid no. 1.

associated species) could be managed to a significant degree by development of a harvest strategy (see the *Other Management Measures* section of this paper). In the absence of estimates of sustainable yield or a harvest strategy, MFish considers Option 1 poses the largest localised depletion risk with consequent potential for adverse effects on associated and/or dependent species.

Option 2 – TAC 41.2 tonnes

- 50 Under Option 2, the TAC for KBB 3G would be set at 41.2 tonnes. Option 2 recognises that attached bladder kelp in KBB 3G (Akaroa Harbour) has been subject to increased commercial fishing over the past six fishing years. This TAC reflects the permit conditions that applied to the harvest of attached bladder kelp in Akaroa Harbour alone (20 tonnes), and considers the opportunity for further expansion of the fishery (either within Akaroa Harbour or throughout the rest of QMA 3) by providing an additional 21.2 tonnes of allowable catch.
- 51 While there is no estimate of current sustainable yield, the TAC under this option is considered to be much lower than the biomass and sustainable yield that is likely available across the entire QMA, particularly if fishing occurs in areas where kelp beds are understood to be sporadically prolific (see Akaroa Harbour survey noted above). While the current sustainable yield from the sites in Akaroa has probably changed (either increased or decreased) in response to annual fluctuations, MFish considers it is likely to be well in excess of the proposed TAC under Option 2 given the historical abundance of kelp in this area.
- 52 Considering the existing harvest permit condition (i.e. 20 tonnes), the proposed TAC would moderately increase current levels of utilisation and socio-economic benefit from the stock. Compared to Option 1 it would provide for minimal development with respect to current permit catch limits, although consequential removal of the restriction to harvesting in Akaroa Harbour only will allow utilisation in other areas of the QMA. MFish notes that 63.5 tonnes of KBB was landed during the last fishing year, but assumes that only 20 tonnes of KBB was attached relative to other states.
- 53 MFish considers the sustainability risk of Option 2 to the kelp stock across all of QMA 3 to be low given potential abundance (e.g. Akaroa Harbour). Localised depletion of kelp beds and consequent potential for adverse effects on associated and/or dependent species is still a risk under this option (albeit significantly lower than Option 1) if harvesting occurs outside areas of known high abundance. However, incentives to maximise harvesting efficiency associated with the QMS management framework should encourage fishers not to harvest in areas of low abundance.

Option 3 – TAC 18.2 tonnes

- 54 Under Option 3, the TAC for KBB 3G would be set at 18.2 tonnes. This TAC reflects the average annual commercial utilisation (17 tonnes) of bladder kelp in FMA 3 (from 2003-04 to 2008-09) and provides for additional utilisation by customary and recreational sectors, and other sources of fishing-related mortality.
- 55 Option 3 poses the lowest sustainability risk to KBB 3G compared with Options 1 or 2. MFish considers the proposed TAC of 18.2 tonnes to be a highly conservative estimate of the sustainable yield that could be harvested from the entire QMA given the sustainable

biomass that is likely to be available and recent commercial utilisation of bladder kelp in KBB 3G. However, this option also recognises the uncertainty in past commercial catches regarding the state of bladder kelp caught (attached or free-floating), and takes a more precautionary approach than the proposed TAC under Option 2.

- 56 Option 3 would pose the lowest risk of localised depletion and consequent potential for adverse effects on associated and/or dependent species. However, if fishers chose to harvest kelp in areas of low abundance then there remains some environmental risk, albeit the smallest, under this option.
- 57 This option would restrict utilisation at or below current levels and therefore reduce socio-economic benefit from the stock. Although this TAC reflects average commercial catch, the current permit limit on commercial catch of attached bladder kelp is 20 tonnes. A TAC set at 18.2 tonnes would reduce current utilisation assuming 20 tonnes of attached bladder kelp was harvested in the 2008-09 fishing year.

KBB 4G (Chatham Islands)

- 58 Two alternative options for TAC setting are being proposed for KBB 4G:

Option 1 – TAC 26.2 tonnes

- 59 Under Option 1, the TAC for KBB 4G would be set at 26.2 tonnes. This TAC reflects the commercial catch limit of 25 tonnes that currently applies to KBB 4G. This catch limit was prescribed on a s 91 fishing permit held by the only commercial fisher entitled to harvest bladder kelp in FMA 4 under the previous statutory regime.
- 60 There is no stock assessment information to determine whether a TAC of 26.2 tonnes is sustainable. Over the past 10 years (1999-2000), a total catch of less than 2 tonnes has been reportedly taken from the QMA. An average annual catch of 200 kg was taken between 1999-00 and 2001-02, when the last commercial landing occurred. The proposed TAC under Option 1 is unlikely pose a risk to the sustainability of KBB 4G. However, localised depletion and consequent potential for adverse effects on associated and/or dependent species could occur if the entire TAC is taken from one or few small areas where abundance is low. If localised depletion occurs in kelps beds where they form a habitat of significance for fishery management and/or leads to impacts on associated seaweed or fish species, this could produce adverse environmental effects. Currently, there is no information available to quantify this risk. Incentives to maximise harvesting efficiency associated with the QMS management framework should encourage fishers not to harvest in areas of low abundance, but some risk remains under this option.
- 61 This TAC option would provide immediate potential for increased levels of utilisation and therefore socio-economic benefit from KBB 4G. As noted, the permit moratorium has prevented access to the KBB resource for commercial purposes, beyond the one current permit holder. Introduction into the QMS provides the opportunity for new entrants to develop resource.

Option 2 – TAC 2.2 tonnes

- 62 Under Option 2, the TAC for KBB 4G would be set at a nominal 2.2 tonnes. This TAC reflects the:

- a) lack of commercial harvesting that has occurred in the area despite permit conditions that would have enabled an annual commercial harvest of 25 tonnes;
- b) lack of stock assessment information to set sustainable catch limits; and
- c) lack of information regarding which areas in the Chatham Islands could sustain higher levels (and what those levels might be) of bladder kelp removal in light of the seaweed's ecological role in the marine environment.

63 Unlike KBB 3G there is no information (catch or research driven) to indicate what, if any areas, can sustain utilisation. Option 2 poses no sustainability risk to the KBB 4G stock, and a lower risk of localised depletion and consequent potential for adverse effects on associated and/or dependent species than Option 1. However Option 2 would not provide any immediate economic development opportunities for the stock.

Sustainability of the KBB 3G and KBB 4G stocks

64 MFish considers that none of the proposed TACs for KBB 3G and KBB 4G propose a sustainability risk to the attached bladder kelp stocks across the entire QMAs, based on likely abundance. While both KBB 3G and KBB 4G can likely sustain higher harvest levels than proposed under the above options, MFish believes the proposed TACs present an appropriate management approach to either maintain average harvest levels or facilitate the development of new attached bladder kelp fisheries based on a significant seaweed resource. A higher level of utilisation increases the level of risk to sustainability of the stock, which is exacerbated by the current lack of a harvest strategy. However, MFish considers that none of the options proposed create a risk to the sustainability of the bladder kelp stock across the entire QMAs.

65 MFish highlights that the TAC options linked to introduction into the QMS provide the opportunity for rights-holders to develop sustainable attached bladder kelp fisheries over the long-term. This includes incentives to collect appropriate stock assessment information to review the TACs, and to develop and implement appropriate harvest regimes/practices.

66 MFish notes that the environmental risks for each option mainly surround the issue of localised depletion of kelp beds and consequent potential for adverse effects on associated and/or dependent species. These risks could increase under the following scenarios:

- a) The entire TAC is taken from an area of high ecological significance (ie, taken from a fish nursery area); and
- b) Fishers harvest seaweed in a way that is detrimental to individual kelp plants, beds and associated species (ie, taking entire the individual plant rather than restricting harvest to the canopy only).

67 To mitigate the potential adverse effects of serial localised depletion in areas of low kelp biomass and/or of high ecological importance, consideration should be given to future management strategies to ensure best harvesting practices are developed, such as rotational harvesting strategies and/or restricting harvest to the canopy only. These measures could be

implemented under s 11⁷ of the Act and are discussed in more detail under the *Other Management Measures* section.

Allocation of the TAC

- 68 When setting any TAC, that TAC must be apportioned between the relevant sectors and interests set out under the provisions of s 21 of the Act. Section 21 prescribes that the Minister shall make allowances for Maori customary non-commercial interests, recreational fishing interests, and for any other sources of fishing-related mortality, before setting the TACC.
- 69 The Act does not provide an explicit statutory mechanism to apportion available catch between sector groups either in terms of a quantitative measure or prioritisation of allocation. Accordingly, the Minister has the discretion to make allowances for various sectors based on the best available information.

Customary Maori and Recreational allowances

- 70 MFish proposes to set initial customary Maori and recreational allowances of 0.1 tonne (greenweight), respectively, under the TAC options for KBB 3G and KBB 4G (Table 2).
- 71 For stocks where no customary Maori and recreational harvest estimates are available and where the stock is not considered to be of importance to the customary and recreational sectors, MFish guidelines provide nominal allowances to account for these harvests.
- 72 MFish is not aware of any customary Maori and recreational harvest of attached bladder kelp within KKB 3G and KBB 4G, but harvest is unrestricted. Any non-commercial fisher can harvest bladder kelp in any state, from any harvest area, and in any quantity. Non-commercial fishers must not sell their seaweed catch.
- 73 MFish contends the proposed 0.1 tonne allowances for customary Maori and recreational interests, respectively, reflect realistic harvest levels for attached bladder kelp. These allowances can be revised if new information becomes available.

Allowance for other sources of fishing-related mortality

- 74 MFish proposes to set an initial allowance for other sources of fishing-related mortality of 1 tonne (greenweight) under both TAC options for KBB 3G and KBB 4G (Table 2).
- 75 For stocks where there is no information on the extent of other sources of fishing-related mortality, MFish guidelines provide a nominal allowance to account for this harvest.

⁷ Section 11(3) Without limiting the generality of subsection (1) of this section, sustainability measures may relate to—

- (a) The catch limit (including a commercial catch limit) for any stock or, in the case of a quota management stock that is subject to section 13 or section 14 of this Act, any total allowable catch for that stock;
- (b) The size, sex, or biological state of any fish, aquatic life, or seaweed of any stock that may be taken;
- (c) The areas from which any fish, aquatic life, or seaweed of any stock may be taken;
- (d) The fishing methods by which any fish, aquatic life, or seaweed of any stock may be taken or that may be used in any area;
- (e) The fishing season for any stock, area, fishing method, or fishing vessels.

- 76 There is no quantitative information on the quantity of attached bladder kelp taken as incidental bycatch in other target fishers. While some attached bladder kelp is likely to be collected as a result of using fishing gear over kelp beds, this catch is likely to be negligible. The vast majority of seaweed taken as bycatch in various fishing gear would comprise of free-floating material.
- 77 MFish considers there is no or negligible illegal catches of attached bladder kelp.
- 78 MFish contends the proposed 1 tonne allowances reflect a realistic level of other sources of fishing-related mortality and can be revised if new information becomes available.

Total Allowable Commercial Catch (TACC)

- 79 MFish proposes the following TACCs for the KBB 3G and KBB 4G stocks under each option (Table 5).

Table 5. Proposed TACCs for KBB 3G and KBB 4G stocks

Stock		TACC
KBB 3G	Option 1	375.8 tonnes
	Option 2	40 tonnes
	Option 3	17 tonnes
KBB 4G	Option 1	25 tonnes
	Option 2	1 tonne

- 80 The TACC options allocate harvest rights to quota owners that create incentives to invest and develop both fisheries to provide economic opportunities.

KBB 3G (east coast South Island)

Option 1 – TACC 375.8 tonnes

- 81 Under Option 1, the TACC for KBB 3G would be set at 375.8 tonnes. This TACC reflects the maximum estimated harvestable yield (377 tonnes⁸) found in Akaroa Harbour (see *Total Allowable Catch Setting* for further information) minus the proposed allowances for the customary and recreational sectors, and other sources of fishing related mortality.
- 82 A TACC of 375.8 tonnes will create the largest incentives for rights-holders to invest and develop the fishery. Maximum commercial catch from KBB 3 to date has been 63.5 tonnes (20 tonnes assumed to be attached bladder kelp). MFish notes that it is unlikely that the proposed TACC will be harvested in full in 2010-11 given recent commercial catches and a

⁸ Ibid, no. 1.

lack of established markets. This scenario will provide MFish with an opportunity to develop a harvest management strategy with stakeholders in order to prevent or mitigate any potential adverse effects of fishing on sensitive kelp beds.

Option 2 – TACC 40 tonnes

- 83 Under Option 2, the TACC for KBB 3G would be set at 40 tonnes. This TACC reflects recent commercial catch limits (20 tonnes under a special permit) and the opportunity to expand utilisation of this fishery into other parts of the QMA by providing an additional 20 tonnes for commercial harvest.
- 84 The proposed option provides a more conservative basis, compared to Option 1, to develop a long-term sustainable attached bladder kelp fishery within KBB 3G, and gives rights-holders the incentive to invest and rationally develop this fishery resource.
- 85 The proposed TACC would maintain current levels of commercial utilisation and socio-economic benefit from the stock based on the existing permit condition, and provide for conservative expansion across the entire QMA. MFish notes that 63.5 tonnes of KBB was landed during the last fishing year. The proportion of free-floating to attached bladder kelp is uncertain, but MFish assumes 20 tonnes was harvested as attached (the current catch limit).

Option 3 – TACC 17 tonnes

- 86 Under Option 3, the TACC for KBB 3G would be set at 17 tonnes. This TACC reflects the average annual commercial utilisation of bladder kelp (from 2003-04 to 2008-09). This option also considers that not all bladder kelp previously harvested may have been in an attached state.
- 87 The opportunity for rights-holders to derive economic value from KBB 3G under this proposed TACC is initially low. Nevertheless, the proposed TACC will provide incentives for rights-holders to invest and rationally develop this fishery resource, along with opportunities for collective action to help identify and manage any adverse effects of fishing. This will include a review of the TACC in light of new information.

KBB 4G (Chatham Islands)

Option 1 – TACC 25 tonnes

- 88 Under Option 1, the TACC for KBB 4G would be set at 25 tonnes. This TACC reflects the commercial catch limit of 25 tonnes that currently applies to the KBB stock in FMA 4. This catch limit was prescribed on a s 91 fishing permit held by the only commercial fisher entitled to harvest bladder kelp in FMA 4 under the previous statutory regime.
- 89 MFish recognises that KBB 4G has the potential to sustain an initial TACC of 25 tonnes. Option 1 provides the maximum development potential with 25 tonnes of utilisation opportunities and associated socio-economic benefits. MFish notes that it is unlikely that the commercial sector will harvest the proposed TACC in full in 2010-11 based on historical commercial catches. This option will provide MFish with an opportunity to develop a harvest management strategy with stakeholders in order to prevent or mitigate any potential adverse effects of fishing on sensitive kelp beds.

Option 2 – TACC 1 tonne

- 90 Under Option 2, the TACC for KBB 4G would be set at 1 tonne.
- 91 The opportunity for rights-holders to derive economic value from KBB 4G under the proposed TACC is initially low. Nevertheless, the proposed TACC will provide incentives for rights-holders to invest and rationally develop this fishery resource, along with opportunities for collective action to help identify and manage any adverse effects of fishing. This will include a review of the TACC in light of new information. Under this scenario, the commercial sector will derive greater economic value from the fishery over time.

Environmental Impacts

- 92 Setting or varying sustainability measures under the Act requires consideration of the potential impacts of increased fishing effort on any stock and the surrounding aquatic environment.
- 93 The biological characteristics of attached bladder kelp mean this seaweed is very susceptible to localised depletion. Individual kelp beds can demonstrate significant fluctuations over both time and space in response to storm events, changes in sea temperature, nutrient levels, land run-off, siltation, etc., and variable recruitment and growth cycles. These fluctuations mean kelp forests are vulnerable to the effects of fishing because the ability for individual kelp beds to respond will vary from area to area, as well as over time. In addition, kelp beds are also extremely vulnerable to the effects of habitat disturbance. A change in attached bladder kelp biomass across all scales not only influences the seaweed species itself, but also the associated fisheries and wider marine environment.
- 94 Because bladder kelp is essential to the functioning of coastal, inshore and estuarine ecosystems, the harvest of this seaweed must be carefully managed to ensure long-term sustainability of the seaweed species harvested and the diverse range of marine communities it supports.
- 95 A reduction in bladder kelp beds could lead to the appearance and/or increase in localised abundance of the invasive seaweed *Undaria pinnatifida*. This seaweed is opportunistic and colonises surfaces where little or no macro seaweeds occur. The harvest of attached bladder kelp could promote the emergence of new stands of *Undaria*. The proliferation of *Undaria* may have a localised impact on various native marine flora and fauna species.
- 96 Setting the initial TACs for both stocks at a relatively low level should mitigate against these potential sustainability risks.
- 97 Other statutory obligations in respect of setting a TAC and addressing the environmental principles of the Act are set out and discussed in Appendix 1.

Other Management Measures

Return of attached bladder kelp to the sea

- 98 MFish proposes that KBB 3G and KBB 4G are added to the Sixth Schedule of the Act to enable commercial fishers to immediately return attached bladder kelp taken as incidental

bycatch back to the sea.

- 99 Commercial fishers inevitably take attached bladder kelp as a direct consequence of using fishing gear (ie, set and trawl nets) within the vicinity of kelp beds. A requirement to land this seaweed and balance catches with ACE (a default requirement under the QMS) will impose an unnecessary cost on these fishers.
- 100 Attached bladder kelp could be returned to the sea regardless of its condition, unlike most species listed on the Sixth Schedule that can only be returned if likely to survive. Bladder kelp provides a variety of important ecological functions in all three of its physical states (beach-cast, free-floating, and attached). MFish considers that returning incidental catch of attached bladder kelp will enable the species to re-enter the ecosystem in its free-floating state to potentially reproduce, provide for dispersal of the species, and/or act as refuge areas for juvenile and larval fish.
- 101 Details of this proposal are set out in Appendix 2.

Amendments to reporting regulations

- 102 The introduction of attached bladder kelp into the QMS requires an amendment to the Fisheries (Reporting) Regulations 2001 to prescribe reporting codes for attached bladder kelp stocks that commercial fishers must use when completing their statutory catch returns. Specifically, MFish propose to amend Table 1 of Part 1 of Schedule 3 of those regulations to incorporate the following reporting codes in line with the QMAs for attached bladder kelp: KBB 3G and KBB 4G.
- 103 Free-floating bladder kelp will be denoted by the species code KBB (KBB 3, KBB 4)The differentiation of attached versus free-floating bladder kelp will improve catch information and provide a better basis for assessing harvest trends of the attached state over time.

Deemed value and overfishing threshold

- 104 Under s 75(1) of the Act, the Minister of Fisheries is required to set interim and annual deemed value rates for each quota management stock. Section 75(2A) requires the Minister, when setting deemed value rates, to take into account the need to provide an incentive for every commercial fisher to acquire and hold sufficient annual catch entitlement (ACE) in respect of each fishing year that is not less than the total catch of that stock taken by the commercial fisher.
- 105 MFish developed a Deemed Value Standard in 2007 to set out a process for managing the setting, reviewing and amendment of deemed value rates. This standard is available to view on the MFish Infosite website⁹.
- 106 MFish acknowledges that there are small niche markets for high quality product and a broader “general use” market for seaweed. The estimated landed price for bladder kelp can range between \$2.00 and \$20.00 per kg. In this deemed value analysis MFish is using an estimated landed price for bladder kelp of \$2.00 per kg, which is based on the general reported market value for seaweed.

⁹ <http://fs.fish.govt.nz/Page.aspx?pk=119>

- 107 Based on this information, MFish proposes two options to set the annual and interim deemed value for attached bladder kelp:

Option 1	Set an annual deemed value of \$4.00 per kg and an interim deemed value of \$2.00 per kg.
Option 2	Set an annual deemed value of \$1.00 per kg and an interim deemed value of \$0.50 per kg.

Option 1

- 108 Option 1 sets the annual deemed value at twice the estimated landed price (\$2.00 per kg) for the 2010-11 fishing year. In adopting this approach, MFish proposes setting an interim deemed value at \$2.00 per kg (excluding GST) and an annual deemed value of \$4.00 per kg (excluding GST) for the KBB 3G and KBB 4G stocks for the 2010-11 fishing year.
- 109 This option treats attached bladder kelp as if it is in the “high-value single stock” fish stock category as set out in the deemed value review standard. Bladder kelp is a valuable species in ecological systems, providing critical habitat for many juvenile fish, lobster and other important associated species. MFish considers Option 1 an appropriate way to provide incentive for fishers to balance catches with ACE and avoid harvesting on deemed values even if landed prices increased during a fishing year.

Option 2

- 110 Option 2 sets the annual deemed value at 50% the estimated landed price (\$2.00 per kg) for the 2010-11 fishing year. In adopting this approach, MFish proposed setting an interim deemed value at \$0.50 per kg (excluding GST) and an annual deemed value of \$1.00 per kg (excluding GST) for the KBB 3G and KBB 4G stocks for the 2010-11 fishing year.
- 111 This option treats attached bladder kelp as if it is in the “all other” fish stock category as set out in the deemed value review standard. Fishstocks in this category are to have their annual deemed value rate set above ACE price and below landed price to encourage fishers to balance their catch with ACE rather than pay deemed values. Currently, attached bladder kelp is not in the QMS, meaning that there is no ACE price information available that can be used to set deemed value rates.

Differential deemed values

- 112 For both Options 1 and 2, MFish proposes to apply standard differential annual deemed value rates to KBB 3G and KBB 4G for the 2010-11 fishing year. However, MFish not propose to set an overfishing threshold for these seaweed stocks, unless monitoring of catches suggests that this is required in the future.
- 113 MFish invites submitters to provide information on landed prices of attached bladder kelp to provide a basis for future assessments of deemed value rates.
- 114 MFish notes that deemed value rates for KBB 3G and KBB 4G will be adjusted, as required, when information about ACE price becomes available. Currently deemed values for all

species are reviewed on an annual basis. When information becomes available on the ACE price for the bladder kelp stocks, this will be incorporated into the annual deemed value review process to ensure the correct deemed value rates are set for all bladder kelp stocks.

Potential Future Development

- 115 The proposed TACs for these bladder kelp stocks are considered conservative and likely to have a low sustainability risk for both bladder kelp and associated and/or dependent species at the QMA level in the short-medium term based on the likely biomass available across entire QMAs. If further development of the fisheries is desirable to maximise yield, a more robust approach would be to conduct annual biomass estimates that determine the maxima canopy biomass that could be harvested (similar to a Current Annual Yield strategy, CAY), and would respond to annual fluctuations across various spatial scales. However, this management strategy costs more as it involves annual biomass surveys and yield calculations that can be costly.
- 116 In addition, management by output controls alone will not effectively manage sustainability at the QMA level or risks associated with localised depletion of bladder kelp without impacting significantly on levels of utilisation and therefore the socio-economic benefit that can be provided by the resource.
- 117 Development of a harvest strategy has the potential to significantly mitigate risks to fisheries resources at a variety of levels (QMA and local). The more robust the harvest strategy (effective measures and level of buy-in from harvesters) the greater the potential for risk management and accordingly the larger the yield that can be provided. With only a small number of quota owners expected in this fishery, it is likely that a Commercial Stakeholder Organisation (CSO) could form to effectively implement harvest strategies.
- 118 MFish notes that at least one harvester has developed a business plan outlining proposed development of the bladder kelp fishery that would require a TAC larger than what is proposed in this paper. Such development would require further information about the effects of seaweed harvesting and a framework to manage potential risks.
- 119 Pirker et al. (2000)¹⁰ outline a management framework that could mitigate these risks, but would likely require further investigation in to their effectiveness. These management tools include:
- a) constraining harvest of each kelp bed to no more than twice a year to allow for regrowth;
 - b) establishing a maximum cutting depth of no more than 1.2 m to ensure that the structure and ecological benefits of the beds are maintained, whilst protecting against invasion of other kelp species to the same habitat if whole plants were uprooted; and
 - c) establishing a maximum harvest width and spacing between to prevent competition with other algal species that are established or invade the area.
- 120 MFish seeks stakeholder feedback on development of a harvesting strategy.

¹⁰ Ibid no. 1.

Preliminary Recommendations

121 MFish proposes that the Minister of Fisheries:

EITHER

Option 1

- a) **Agree** to set a TAC of 377 tonnes for KBB 3G and within this set:
 - i) A customary allowance of 0.1 tonne
 - ii) A recreational allowance of 0.1 tonne
 - iii) An allowance for other sources of fishing related mortality of 1 tonne; and
 - iv) A TACC of 375.8 tonnes
- b) **Agree** to set a TAC of 25 tonnes for KBB 4G and within this set:
 - i) A customary allowance of 0.1 tonne
 - ii) A recreational allowance of 0.1 tonne
 - iii) An allowance for other sources of fishing related mortality of 1 tonne; and
 - iv) A TACC of 23.8 tonnes.

OR

Option 2

- a) **Agree** to set a TAC of 41.2 tonnes for KBB 3G and within this set:
 - i) A customary allowance of 0.1 tonne
 - ii) A recreational allowance of 0.1 tonne
 - iii) An allowance for other sources of fishing related mortality of 1 tonne; and
 - iv) A TACC of 40 tonnes.
- b) **Agree** to set a TAC of 2.2 tonnes for KBB 4G and within this set:
 - i) A customary allowance of 0.1 tonne
 - ii) A recreational allowance of 0.1 tonne
 - iii) An allowance for other sources of fishing related mortality of 1 tonne; and
 - iv) A TACC of 1 tonne.

OR

Option 3 (KBB 3G only)

- c) **Agree** to set a TAC of 18.2 tonnes for KBB 3G and within this set:
 - i) A customary allowance of 0.1 tonne
 - ii) A recreational allowance of 0.1 tonne
 - iii) An allowance for other sources of fishing related mortality of 1 tonne; and
 - iv) A TACC of 17 tonnes.

AND

- d) **Agree** to add KBB 3G and KBB 4G to the Sixth Schedule of the Fisheries Act 1996 (the Act);
- e) **Agree** to amend the Fisheries (Reporting) Regulations 2001 to outline the fish stock codes to be used by commercial seaweed fishers when completing their statutory catch returns; and
- f) **Agree** to set the interim and annual deemed values for attached bladder kelp using one of the two options outlined below:
 - i) Annual deemed value of \$4.00 per kg (excluding GST)
AND
Interim deemed value of \$2.00 per kg (excluding GST); **OR**
 - ii) Annual deemed value of \$1.00 per kg (excluding GST)
AND
Interim deemed value of \$0.50 per kg (excluding GST)
- g) **Agree** that standard differential deemed value rates are used in KBB 3G and KBB 4G but no overfishing thresholds be set at this time.

Appendix 1

Statutory Considerations

122 In evaluating the proposed management options for KBB 3G and KBB 4G, the following statutory considerations have been taken into account.

- a) **Section 5(a) and 5(b)** – Application international obligations and Treaty of Waitangi (Fisheries Claims) Settlement Act 1992: There are a wide range of international obligations relating to fishing, including sustainability and utilisation of fishstocks and maintaining biodiversity. MFish considers issues arising under international obligations and the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 are adequately addressed in the management options for both KBB 3G and KBB 4G. MFish considers that the management options for attached bladder kelp are consistent with these international obligations.
- b) MFish also considers that the proposed management options are consistent with the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 (s 5(b)). Ongoing work is being done within the area covered by KGG 3G and KBB 4G to promote policies that help to recognise customary use and management practices. MFish invites submitters to provide further information on customary take of bladder kelp.
- c) **Section 8** sets out the purpose of the Act – to provide for the utilisation of fisheries resources while ensuring sustainability. The proposed management options seek to ensure the sustainability of KBB 3G and KBB 4G by setting TACs and other appropriate management measures. Utilisation is provided by way of setting allowances for commercial, customary Maori and recreational interests. Section 8 requires that social, cultural, and economic effects to be taken into account.
- d) The development of commercial attached bladder kelp fisheries within environmental limits will have positive economic implications for the east coast, South Island and the Chatham Islands regions. The proposed management measures will provide a basis to develop long-term sustainable fisheries using the attached bladder kelp resource. Under the proposed TACCs, rights-holders will have an incentive to invest and rationally develop these fisheries resource, along with opportunities for collective action to help identify and manage any adverse effects of fishing. As the fishery develops, the commercial sector will derive greater economic value over time.
- e) The addition of attached bladder kelp to the Sixth Schedule will reduce unnecessary waste within the fishery, allow management of bycatch to reduce industry costs, and enable the return of bladder kelp in its free-floating state to the marine system.
- f) **Section 9** requires the Minister to take into account the following environmental principles:
 - i) **Section 9(a)** requires associated or dependent species to be maintained above a level that ensures their long-term viability;
 - ii) **Section 9(b)** requires biological diversity of the aquatic environment to be maintained.

- iii) **Section 9(c)** requires habitat of particular significant for fisheries to be protected.
- g) Attached bladder kelp plays a critical role in coastal, inshore and estuarine environments by providing a wide and diverse range of ecosystem services. These services include:
- i) Providing an important nursery, shelter, and refuge habitats for a wide variety of coastal and inshore species;
 - ii) Providing food for a wide range of species, which in turn supports a variety of coastal, inshore and estuarine foodwebs and fisheries;
 - iii) Modifying wave and tidal action, and thereby influencing coastal physical processes such as erosion siltation, and sunlight penetration;
 - iv) Driving primary production and energy cycling; and
 - v) Possibly inhibiting the presence and spread of the invasive seaweed *Undaria pinnatifida*.
- h) The proposed TACs and supporting management measures for bladder kelp beds and their potential impact on its ecological role within the marine environment are discussed under *Environmental Impacts*. Setting the initial TACs for both stocks at a relatively low level should mitigate against these potential sustainability risks. MFish notes that the risk for localised depletion and associated impacts under each option could increase if the entire TAC is taken from an area of high ecological significance (ie, taken from a fish nursery area) and/or fishers harvest seaweed in a way that is both detrimental to both individual kelp plants, beds and associated species. For example, taking entire the individual plant rather than restricting harvest to the canopy only. The development of a harvesting strategy with stakeholders will reduce these sustainability risks.
- i) **Section 10** requires that decisions are based on the best available information, taking into account any uncertainty in that information, and applying caution when information is uncertain, unreliable, or inadequate. The absence of information should not be used as a reason to postpone, or fail to take any measure to achieve the purpose of the Act. Information sources relied upon for this proposal primarily include an MFish information brief on New Zealand seaweeds, an Initial Position Paper (IPP) entitled *Introduction of Bladder Kelp Seaweed, *Macrocystis Pyrifera* (KBB), in Fisheries Management Areas 3 and 4 into the Quota Management System On 1 October 2010* (dated 21 August 2009), a report by Pirker et al. 2000¹¹, and information provided in various submissions received in response to the IPP.
- j) Section 11(1)(a) requires that the Minister must take into account the effects of fishing on the aquatic environment. MFish considers the options presented in this paper will not change the non-commercial and commercial fishing methods used to harvest attached bladder kelp in the short-medium term. Commercial harvesting is generally conducted by hand-gathering (manual cutting) from a vessel. Without method restrictions harvesters may use mechanical harvesters to cut the canopy biomass in the

¹¹ Ibid no. 1.

future and such changes in practice will be monitored.

- k) **Section 11(1)(b)** requires the Minister to take into account existing controls under the Act that apply to the stocks when setting or varying a sustainability measure such as a TAC. For KBB 3G and KBB 4G, commercial access is currently limited to existing permit holders by Schedule 4C of the Act. The commercial harvest of these stocks was restricted to the method of hand-gathering (including the cutting of seaweed) under the previous permits, but this restriction will no longer apply once these stocks enter the QMS. No other measures to fishing apply other than the generic fishing restrictions prescribed under the Act and fisheries regulations.
- l) **Section 11(1)(c)** requires that the natural variability of the stock concerned is taken into account when setting or varying a sustainability measure such as a TAC. The natural variability of KBB 3G and KBB 4G is understood to be high on both spatial and temporal scales due to a variety of factors including storm events, changes in sea temperature, nutrient levels, land run-off, siltation, etc., and variable recruitment and growth cycles. This natural variability has been considered in setting the proposed TACs.
- m) **Section 11(2)** requires the consideration of various matters relating 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 plan under the Conservation Act 1987 that are relevant to implementing proposed measures for KBB 3G and KBB 4G at this time. MFish notes the existence of Pohatu (Flea Bay) marine reserve on the south east of Banks Peninsula. MFish does not consider that the proposed TACs will detract from the intent of any existing or future marine reserve.
- n) Section 13 of the Act requires the Minister to set a TAC for every stock management under the quota management system. Section 13 requires the Minister to set a TAC that maintains the stock at, or above, a level that can produce the B_{MSY} having regard to the interdependence of stocks. Refer to the *Management Options* section of the paper for a discussion of Section 13 considerations.
- o) In respect to KBB 3G and KBB 4G, the TAC for each stock will be set under s 13(2)(A) as the current level of each stock and the level that can produce the B_{MSY} cannot be reliably estimated using best available information.
- p) MFish considers that the proposed TAC options are based on:
 - i) Consideration of the biological characteristics of each seaweed stock: Individual kelp beds can demonstrate significant fluctuations over both time and space in response to storm events, changes in sea temperature, nutrient levels, land run-off, siltation, etc., and variable recruitment and growth cycles. These fluctuations mean kelp forests are vulnerable to the localised effects of fishing because the ability for individual kelp beds to respond will vary from area to area, as well as over time.
 - ii) Consideration of the ecological characteristics of each seaweed stock: Attached bladder kelp beds play a critical role in coastal, inshore and estuarine environments by providing a wide and diverse range of ecosystem

services. A change in attached bladder kelp biomass across all scales not only influences the seaweed species itself, but also the associated fisheries and wider marine environment.

- iii) The absence of stock assessment information for the attached bladder kelp stocks at the QMA scale. There are also no long-term studies on the implications of commercial harvesting of attached bladder kelp beds in New Zealand. While an historical canopy biomass estimate is available for three sites in Akaroa Harbour (1999), this estimate is historic and does not provide an indication of biomass at a QMA level. This information does, nevertheless, indicate that some kelp beds could provide significant harvest opportunities.
- q) **Section 21(1)(a and b)** and **Section 21(4)(a and b)** require the Minister to allow for non-commercial fishing interests (customary Maori and recreational), and other sources of fishing-related mortality. These matters have been taken into account in the setting the proposed TACCs.
- r) **Section 21(4)** requires that when considering the proposed allowances for customary Maori interests, the Minister must take into account any mātaihai reserve or s 186A closure in the relevant QMA. MFish does not consider that the proposed allowances for customary harvest will detract from the intent of any existing or future mātaihai or s 186A closure, nor will these allowances be insufficient in terms of the customary use of attached bladder kelp in these areas.
- s) **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). MFish does not consider that the proposed allowances for recreational harvest will detract from the intent of any existing or future s 311 closures in the respective QMA.
- t) **Section 75** provides for the Minister to set deemed values. Refer to the *Other Management Measures* section of the paper for a discussion of Section 75 considerations.
- u) **Section 297** of the Act empowers the Governor-General to make regulations for certain purposes. MFish considers that the proposed changes to the Fisheries (South East Commercial Fishing) Regulations 1986 fit within the relevant provisions of s 297.

Appendix 2.

REGULATORY IMPACT STATEMENT

Regulatory amendment to support introduction of attached bladder kelp in Fisheries Management Areas 3 and 4 into the Quota Management System

Executive summary

Attached bladder kelp (bladder kelp) stocks in Fisheries Management Areas (FMAs) 3 and 4 will be introduced into the Quota Management System (QMS) on 1 October 2010. MFish proposes two consequential regulatory amendments in order to support the introduction of bladder kelp into the QMS. First, MFish is proposing that attached bladder kelp in FMAs 3 and 4 (KBB 3G and KBB 4G) be added to the Sixth Schedule of the Fisheries Act 1996 ('the Act') to enable commercial fishers to immediately return bladder kelp taken as incidental bycatch back to the sea. Secondly, the Fisheries (Reporting) Regulations 2001 ('Reporting Regulations') need to be amended to incorporate the reporting codes to be used by commercial fishers when bladder kelp comes into the QMS.

Adequacy statement

This Regulatory Impact Statement has been reviewed by MFish's Regulatory Impact Analysis Review Committee and is considered adequate according to the criteria agreed by Cabinet.

Status quo and Problem

Bladder kelp stocks (KBB 3G and KBB 4G) will enter the QMS on 1 October 2010. Commercial fishers targeting other species may inevitably take attached bladder kelp as a direct consequence of certain harvesting methods within the vicinity of kelp beds. A requirement to land this seaweed and balance catches with ACE (a default requirement under the QMS) will impose an unnecessary cost on these fishers.

The reporting codes to be used by commercial fishers from 1 October 2010 will be different from those currently in use. Reporting codes are specified in the Reporting Regulations and it is necessary to update these regulations. Reporting codes for all QMS species are specified in the regulations.

Objectives

The objective is to ensure that the regulatory framework in place when bladder kelp stocks enter the QMS on 1 October 2010 is consistent with all other QMS species.

Alternative options

There are no alternative options.

Preferred option

With regard to the Sixth Schedule, MFish's preferred option is that bladder kelp is added to the Schedule. The incidental harvest of bladder kelp as by-catch would impose an unnecessary cost to fishers and return of bladder kelp to the sea will enable continuation of nutrient cycling and

ecosystem processes that rely on floating seaweeds.

With regard to reporting codes, MFish's preferred option is that the codes for bladder kelp are specified in the Reporting Regulations. The reporting codes for all other QMS species are specified in those regulations and it would be inconsistent if bladder kelp reporting codes were not added.

There are no additional compliance costs associated with any of these proposals and no existing rules that become redundant.

Implementation and Review

Once listed on the Sixth Schedule of the Act it is possible to review whether retaining a species on that Schedule is appropriate. A review would likely be initiated by stakeholders.

Review of the Reporting Regulations in relation to reporting codes for bladder kelp will only be necessary if the quota management areas for bladder kelp change at some point in the future.

MFish proposes that both regulatory amendments come into effect at the same time as bladder kelp stocks enter the QMS on 1 October 2010. Stakeholders will be informed on the outcome of these proposals once decisions have been made by Cabinet.

Consultation

Stakeholders are aware of the Minister's decision to introduce bladder kelp stocks in FMAs 3 and 4 into the QMS. However, no specific preliminary consultation on these proposals has been undertaken.

This IPP will be available for comment on MFish's website. Notification of its release will also be sent to MFish's wider stakeholder list.