FISH MAINLAND
Roopu Ika ki Te Waipounamu
Recreational fishers. Your voice
fishmainland.nz

22 July 2022

Fisheries Management, Fisheries New Zealand
FMSubmissions@mpi.govt.nz

Review of Sustainability Measures for Snapper (SNA7), Red Gurnard (GUR 3, GUR 7) Rig (SPO 3, SPO 7) and Gemfish (SKI 3, SKI 7) for 2022/23

Introduction

Fish Mainland is an incorporated society with charitable status whose purpose is to coordinate and assist the South Island marine fishing community in restoring and sustaining fisheries resources for the benefit of all who fish in South Island waters. In so doing, Fish Mainland works collaboratively with government, tangata whenua and others to bring about the best public outcomes.

Fish Mainland is a member-based organisation. The members have democratic control over the organisation through the power to nominate, elect and remove Regional Directors of the Board. Also, the South Island Mandated Iwi Organisations can appoint and remove two other Directors. The Board appoints more Directors and an independent Chair of the Board.

Elected and appointed Directors of the Board demonstrate Fish Mainland's mandate to represent South Island recreational fishers Recreational Fishing South Island NZ - Fish Mainland

Submission

Fish Mainland acknowledges the importance of the species that make up the FMA 7 inshore commercial mixed trawl fishery, along with these species' importance for the other fishing sectors. These species are increasingly important for recreational fishers as they have had to contend with further restrictions on the take of blue cod.

Accordingly, Fish Mainland does not support options that increase the Total Allowable Catch (TAC) and Total Allowable Commercial Catch (TACC) for these species, especially when there would also be a decrease in the recreational allowance (SPO 7). Fish Mainland questions why there are options that increase the TAC (on two occasions) and TACC (on all occasions) but no increase in the recreational allowances.

In summary, Fish Mainland supports Option 1 for SNA 7, GUR 7 and SPO 7.

Similarly, Fish Mainland supports Option 1 for GUR 3, SPO 3 and Gemfish (SKI 3, SKI 7), noting that Gemfish is increasingly taken by recreational fishers as bycatch when targeting Blue Nose and Groper.

Yours sincerely,

James Crossland
Chair of the Board
info@fishmainland.nz

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22 July 2022

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Review of Sustainability Measures for Blue Cod (BCO 7) for 2022/23

Introduction

Fish Mainland is an incorporated society with charitable status whose purpose is to coordinate and assist the South Island marine fishing community in restoring and sustaining fisheries resources for the benefit of all who fish in South Island waters. In so doing, Fish Mainland works collaboratively with government, tangata whenua and others to bring about the best public outcomes.

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Elected and appointed Directors of the Board demonstrate Fish Mainland's mandate to represent South Island recreational fishers Recreational Fishing South Island NZ - Fish Mainland

Submission

Fish Mainland supports Option 2 that sets the Total Allowable Catch (TAC) at 157 tonnes, Total Allowable Commercial Catch at 58 tonnes, customary allowance at 27 tonnes, recreational allowance at 58 tonnes and allowance for other sources of fishing-related mortality at 14 tonnes.

We consider this more cautious option best addresses the establishment of the TAC at a time when the fishery is likely below target and indicators are pointing to fishing pressure reducing the size and abundance of blue cod, particularly in the Marlborough Sounds.

Fish Mainland supports actions that provide greater likelihood of rebuilding the stock towards the target. We acknowledge the shared nature of this important fishery, and recreational fishers' contributions to rebuilding it (e.g., daily bag limit reductions in some parts of BCO 7).

It follows that all fishing sectors should collaborate in examining other actions for rebuilding the fishery (e.g., addressing land-based impacts on spawning and juvenile habitat and other impacts on the aquatic environment), as opposed to simply viewing the solution as another reduction in recreational effort.

Furthermore, Fish Mainland supports discussion on other management considerations, such as closed season, rotational season, and reductions in incidental mortality to reduce localised overfishing that would help to rebuild the stock, along with improving social, economic, and cultural wellbeing, which would require further consultation.

Finally, Fish Mainland supports addressing the shortcomings of the National Blue Cod Strategy, such as the Strategy not specifying the information needed to legitimise colour

changes in the traffic light system. For this purpose, Fish Mainland has promoted fisher self-reporting of catch and effort data to better inform management decision making.

Self-reported data collection provides a cost-effective solution to legitimising colour changes across any of the blue cod zones. The veracity of these changes is critical to gaining recreational fisher buy-in for the traffic light system.

Self-reported data collection could also address the shortcomings in the Strategy that make it illegal for fishers to transit from one zone with a daily bag limit to another zone with a lower daily bag limit or to be able to fillet blue cod at sea.

For these purposes, Fish Mainland has worked with Fisheries New Zealand to design and develop a self-reporting system first applied to the South Island blue cod fishery, aptly named *Mainland Catch.*

***Mainland Catch*, coupled with minor regulatory amendments, could address all the shortcomings of the Blue Cod Strategy, and greatly improve the management of this important fishery.**

Yours sincerely,

James Crossland
Chair of the Board
info@fishmainland.nz

From:	Andrew Crossland
To:	FMSubmissions
Subject:	Fish Management Sustainability
Date:	Tuesday, 19 July 2022 6:24:01 pm

"I agree with Fish Mainland's submissions, dated 22 July 2022, regarding its preferred options for BCO7, SNA 7, GUR 3, GUR 7, SPO 3, SPO 7, SKI 3 and SKI 7 for 2022/23."

--

Andrew Crossland

From: Alan Reay
To: FMSubmissions
Subject: Review of Sustainability Measures for Snapper (SNA7), Red Gurnard (GUR 3, GUR 7)
Date: Thursday, 21 July 2022 8:52:28 am

"I agree with Fish Mainland's submissions, dated 22 July 2022, regarding its preferred options for BCO7, SNA 7, GUR 3, GUR 7, SPO 3, SPO 7, SKI 3 and SKI 7 for 2022/23."

Alan Reay

From:	barrycapill
To:	FMSubmissions
Subject:	Fish submissions for BCO7, SNA 7, GUR 3, GUR 7, SPO 3, SPO 7, SKI 3 and SKI 7 for 2022/23."
Date:	Tuesday, 19 July 2022 2:11:54 pm

"I agree with Fish Mainland's submissions, dated 22 July 2022, regarding its preferred options for BCO7, SNA 7, GUR 3, GUR 7, SPO 3, SPO 7, SKI 3 and SKI 7 for 2022/23."

Sent from my Galaxy

From:	Bruce&Gayle Stewart
To:	FMSubmissions
Subject:	Review of Sustainability Measures for Blue Cod (BCO 7) for 2022/23 & Review of Sustainability Measures for Snapper (SNA7), Red Gurnard (GUR 3, GUR 7) Rig (SPO 3, SPO 7) and Gemfish (SKI 3, SKI 7) for 2022/23
Date:	Tuesday, 19 July 2022 2:59:13 pm

I agree with Fish Mainland's submissions, dated 22 July 2022, regarding its preferred options for BCO7, SNA 7, GUR 3, GUR 7, SPO 3, SPO 7, SKI 3 and SKI 7 for 2022/23.

Bruce Stewart

Sent from my iPad

From:	Barbara Reay
To:	FMSubmissions
Subject:	Review of sustainability measures – October 2022 round
Date:	Thursday, 21 July 2022 4:18:34 pm

"I agree with Fish Mainland's submissions, dated 22 July 2022, regarding its preferred options for the Blue Cod Stock (BCO7), and other fish stocks - Snapper (SNA 7), Red Gurnard (GUR 3, GUR 7), Rig (SPO 3, SPO 7), and Gem Fish (SKI 3 and SKI 7) for 2022/23."

Kind Regards
Barbara Reay

From:
To: FMSubmissions
Subject: submission
Date: Wednesday, 20 July 2022 9:50:30 am
Attachments: Fish Mainland 22 July 2022 submission on SNA 7, GUR 3, GUR 7 SPO 3, SPO 7, SKI 3 and SKI 7.docx
Fish Mainland BCO7 submission 22 July 2022.docx

Dear Sir

I wish to submit agreement with Fish Mainland's submissions (attached), dated 22 July 2022, regarding its preferred options for BC07, SNA 7, GUR3, GUR 7, SPO 3, SPO 7, SKI 3 and SKI 7 for 2022/23.

With regards

David Broome

From:	gary mcinnes
To:	FMSubmissions
Subject:	FM Submissions
Date:	Tuesday, 19 July 2022 4:36:50 pm

I agree with Fish Mainland's submissions, dated 22 July 2022, regarding its preferred option for BC07, SNA 7,GUR 3 GUR 7, SPO 3, SPO 7, SKI 3 and SKI 7 for 2022/23.

Kind Regards
Gary McInnes

From: Matt Lamb
To: FMSubmissions
Subject: Submission
Date: Wednesday, 20 July 2022 11:45:56 am

Hi,

"I agree with Fish Mainland's submissions, dated 22 July 2022, regarding its preferred options for BCO7, SNA 7, GUR 3, GUR 7, SPO 3, SPO 7, SKI 3 and SKI 7 for 2022/23."

Kind Regards

Matt Lamb

From:	Robert Meikle
To:	FMSubmissions
Subject:	Submission of Robert A Meikle on preferred options for BCO7, SNA 7, GUR 3, GUR 7, SPO 3, SPO 7, SKI 3 and SKI 7 for 2022/23."
Date:	Thursday, 21 July 2022 2:48:47 pm

I agree with Fish Mainland's submissions, dated 22 July 2022, regarding its preferred options for BCO7, SNA 7, GUR 3, GUR 7, SPO 3, SPO 7, SKI 3 and SKI 7 for 2022/23. Thank you.

Submitter details:--
R. A. (Bob) Meikle

Fisheries New Zealand
Tini a Tangaroa

Submission Form

Review of sustainability measures for 1 October 2022

Once you have completed this form

Email to: FMsubmissions@mpi.govt.nz

While we prefer email, you can also post your submission to:

2022 Sustainability Review, Fisheries Management, Fisheries New Zealand, PO Box 2526, Wellington 6140, New Zealand.

Submissions must be received no later than 5pm on Friday 22 July 2022.

Anyone may make a submission, either as an individual or on behalf of an organisation. Please ensure all sections of this form are completed. You may either use this form or prepare your own but if preparing your own please use the same headings as used in this form.

Submitter details:

Name of submitter Campbell Robertson or contact person:	
Organisation (if applicable):	N/A
Email:	[redacted]
Fishstock(s) this submission refers to:	FMA 7 mixed trawl fishery (Snapper - SNA 7, Red Gurnard - GUR 7 and Rig - SPO 7) for 2022/23 and Blue Cod (BCO 7) for 2022/23
Your preferred option as detailed in the discussion paper (write "other" if you do not agree with any of the options presented):	Mixed trawl fishery – Option 1 – Status quo BCO 7 – Option 2

Official Information Act 1982

Note, that your submission is public information. Submissions may be the subject of requests for information under the Official Information Act 1982 (OIA). The OIA specifies that information is to be made available to requesters unless there are sufficient grounds for withholding it, as set out in the OIA. Submitters may wish to indicate grounds for withholding specific information contained in their submission, such as the information is commercially sensitive or they wish personal information to be withheld. Any decision to withhold information requested under the OIA is reviewable by the Ombudsman.

FMA7 Mixed Trawl

Which option do you support for revising the TAC and allowances? Why?

Status quo, a keen recreational fisher on both the Northern West Coast and Tasman and Sounds, I am enjoying the relative recovery of the snapper stocks. I am concerned that increase of quota may reduce the availability for recreational fishing and decrease the CPUE for commercial fishers. Increased effort results in more energy expended (fuel), more ground trawled (benthic effects) and more opportunity for bycatch.

If stocks improve then commercial fishers will be able to catch their quota more efficiently and quicker, although I do not know if these savings outweigh the lost opportunity of a larger catch.

Are the allowances for customary Māori, recreational and other sources of mortality appropriate? Why?

I have no views on this

• Do you think these options adequately provide for social, economic, and cultural wellbeing?

Yes the status quo best provides for this, as it caters across a wider spectrum of society in that recreational and cultural wellbeing is better provided for and commercial should be able to catch quota more efficiently with less bycatch and environmental harm.

• Do you have any concerns about potential impacts of the proposed options on the aquatic environment?

Yes if quota increased (Benthic impacts predominantly)

• Do you agree that the recreational bag limit for snapper in the Marlborough Sounds Area should be increased? If so, to how much per fisher?

No – 3 snapper per person is sufficient for more than one decent feed of fresh snapper. From experience one snapper at about 55cm will feed a family of four people, and a 35cm will feed two people. Any more than 3 may result in waste, opportunities for trade/barter which I understand are illegal.'

BCO7

Which option do you support for setting a TAC and allowances? Why?

Option 2

I am concerned that the BCO stocks are too low and need to be given the best chance possible to recover. My experience is that is often difficult to catch legal sized BCO without considerable effort and travel from popular boat launching destinations. This indicates localised depletion.

•Do you think these options adequately provide for social, economic, and cultural wellbeing?

I am unsure if the proposed measures are sufficient, but they need to be implemented, monitored and reviewed.

• Do you support extending the closed season for blue cod within the Marlborough sounds closed area? And, if so, for what period should the area be closed?

I do not know whether the closure is having any benefit. At the time the closures were introduced, so were other measures, including reduction from 3 to 2 fish per person (recreational). The data suggests that at many locations the populations are still declining, which could be a result of a number influences.

• Are there fishing practises or gear designs that could reduce incidental mortality of blue cod, for example, by reducing mortality from shag or barracouta predation when undersize blue cod are returned during recreational lining?

My experience is that these issues are areas specific (Sounds). I have tried waving flags or poles to scare shags which has limited effect, I am interested if a pipe is effective and if so, these could be encouraged – unsure about barracouta though. Circle hooks are effective, and need to be encouraged, but if targeting tarakihi smaller hooks (Cricle) are more effective, so it would be difficult to mandate these.

Please continue on a separate sheet if required.

July 2022

Submission to:	Review of Sustainability Measures for the FMA 7 mixed trawl fishery for 2022/23i
	Fisheries NZ Discussion Paper No: 2022/07
	ISBN No: 978-1-99-103910-1 (online)
	ISSN No: 2624-0165 (online)
	June 2022
Submission from:	Eric Jorgensen Waikawa Bay & Port Underwood
Relevant experience (past and present):	Born, raised and fished in the area since 1966. Extensive organisational performance and design, consultation and management roles in various corporate institutions. Chair, Marlborough Sounds Integrated Management Trust. Deputy Chair and Treasurer, Marlborough Sounds Restoration Trust. Member, Marlborough Sounds Blue Cod Advisory (and then Working) Group. Member, National Blue Cod Advisory Group. Member, SNA7 Working Group Member, Advisory Group to the Minister, New Zealand King Salmon Relocation Group. Member, Marlborough District Council Aquaculture Review Working Group. Stakeholder Panel Member, Sustainable Seas National Science Challenge Project Leader, Marlborough Sounds Shellfish Restoration Project, Sustainable Seas National Science Challenge. Honrary Fisheries Officer. Member, Sounds Advisory Group. President, Port Underwood Association

Table 1: Proposed management options (in tonnes) for SNA 7, GUR 7 and SPO 7 from 1 October 2022.

Stock	Option	TAC	TACC	Allowances		
				Customary Māori	Recreational	All other mortality caused by fishing
SNA 7	Option 1 *(Status quo)*	645	350	20	250	25
	Option 2	743 ↑ (102 t)	450 ↑ (100 t)	20	250	23 ↓ (2 t)
GUR 7	Option 1 *(Status quo)*	1,422	1,298	17	42	65
	Option 2	1,582 ↑ (160 t)	1,450 ↑ (152 t)	17	42	73 ↑ (8 t)
SPO 7	Option 1 *(Status quo)*	373	298	15	33	27
	Option 2	371 ↓ (2 t)	315 ↑ (17 t)	15	25 ↓ (8 t)	16 ↓ (11 t)

Table 1: Proposed Management Options

Questions for submitters

1. Which option do you support for revising the TAC and allowances? Why?

SNA7 – Option 2 (with caution)

GUR7 – Option 2

SPO7 – Option 1

Comment:

SNA7 – Support Option 2; reason for caution:

1.1. SNA Option 2 proposes an increase of (circa) 15% to the TAC. This is in addition to recent increases of (circa) 18.3% in Oct 2020 and 68.3% in Oct 2016. If Option 2 is adopted the consequence is that since Oct 2016 the SNA7 TAC will have increased by (circa) 133%[1]. Cumulatively, this represents a steep increase in catch over a relatively short (6-year) period of fishing. I submit it is difficult to confidently determine the impact on the medium to long-term sustainability of such increases over. There is therefore a need to treat future potential increases with the utmost of caution if Option 2 implemented.

Year	Stock	TAC		Change		Cummulative Change (2020-Proposed)		TACC & Allowance Changes																				
								TACC					Customary					Recreational					All other mortality caused by fishing				
		Current	Proposed	Weight	Percent	Weight	Percent	Current	New	Change	Percent	Cumm %	Current	New	Change	Percent	Cumm %	Current	New	Change	Percent	Cumm %	Current	New	Change	Percent	Cumm %
Oct-16	SNA7	306	515	209	68.30%	209	68.30%	200	250	50	25.00%	25.00%	16	20	4	25.00%	25.00%	90	250	160	177.78%	177.78%	0	25	25	-	-
Oct-20		545	645	100	18.35%	309	100.98%	250	350	100	40.00%	75.00%	20	20	0	0.00%	25.00%	250	250	0	0.00%	177.78%	25	25	0	0.00%	0.00%
Oct-22		645	743	98	15.19%	407	133.01%	350	450	100	28.57%	125.00%	20	20	0	0.00%	25.00%	250	250	0	0.00%	177.78%	25	23	-2	-8.00%	-8.00%
Oct-20	GUR7	1176	1294.65	118.65	10.09%	118.65	10.09%	1073	1180	107	9.97%	9.97%	15	15	0	0.00%	0.00%	38	38	0	0.00%	0.00%	50	61.65	11.65	23.30%	23.30%
Oct-21		1294.65	1422	127.35	9.84%	246	20.92%	1180	1298	118	10.00%	20.97%	15	17	2	13.33%	13.33%	38	42	4	10.53%	10.53%	61.65	65	3.35	5.43%	30.00%
Oct-22		1422	1582	160	11.25%	406	34.52%	1298	1450	152	11.71%	35.14%	17	17	0	0.00%	13.33%	42	42	0	0.00%	10.53%	65	73	8	12.31%	46.00%

Table 2 : Summary of recent TAC changes

1.2. With current (and ongoing) impacts of climate change and marine heatwaves we must consider the probable movement and potential re-distribution of finfish species throughout Fisheries Management Areas. While the most recent trawl survey results (coupled with recruitment pulses) in SNA7 may indicate higher levels of extraction are sustainable within the fishery, the potential for abundance to have been inflated by movements into FMA7 from other areas is real. This means that when considering these (and future) sustainability proposals it is necessary to consider the effect of management decisions on adjacent FMA's. It is likely no longer appropriate to make sustainability decisions for SNA7 alone, but rather consider the impacts on the entire West Coast Aotearoa.

[1] See table 2

1.3. Option 2, with the proposed TAC of 743, *appears* (data to work through this accurately is not readily available in public documents (that I could find!) to be relatively close to average total catch of SNA7 prior to the collapse of the fishery in the early 1980's[2]. We experience sharp declines in abundance when catches -even for a very short period - exceed sustainable levels, and the rebuilds are slow.

It is my view that if the minister were to support Option 2 then it would be appropriate to signal that the TAC of 743 will be locked-in for a period for 7-10 years to enable the fishery to 'settle', as:

- The TAC setting under Option 2 is close to the sustained catch levels experienced prior to the collapse of the SNA fishery. Caution should be taken to ensure this level of removals from the fishery are sustainable over time and provide for resilience in the fishery from increasing climate and other anthropocentric impacts.
- We must build an understanding of the sustainability of SNA7 and associated species over many years, spawning events and fishing seasons/years to understand these effects regionally and nationally. The last two significant increases would have been essentially biennial , which have not allowed for an understanding of these impacts to be developed over a sustained period of time.

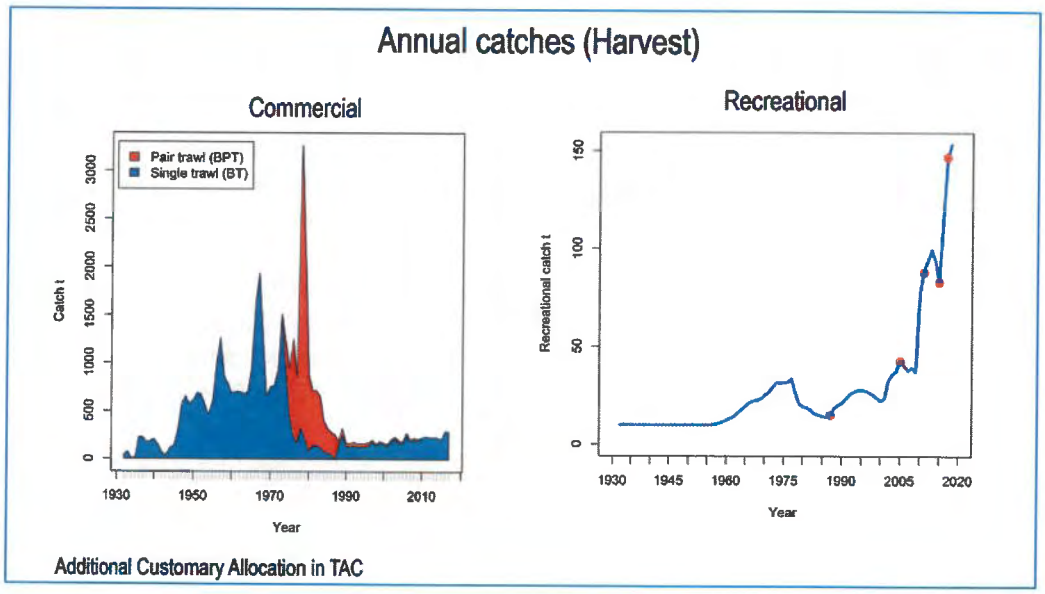

Figure 1

GUR7 – Support Option 2; comment:

1.4. As per the matters raised above with Option 2 SNA, while the progressive increases for GUR7 have not been as great, Option 2 GUR7 raises some similar thoughts regards the long-term sustainability of sustained incremental increases. It may be more appropriate in such fisheries to adjust (upwards) the default management targets rather than continually increase TAC as abundance increases. This would not only provide increased resilience in the fishery but also, given that the string of previous increases that have provided for greater economic returns, ensures these increased economic returns are locked in and not put at risk.

[2] See *Figure 1*.

SPO7 – Support Option 2; comment:

1.5. While understanding the reasoning to the adjustments across the TACC, Recreational and Other Mortality Allowances my personal observations are that on the East Coast of FMA7 (Cape Campbell to Cape Jackson area) SPO abundance has continued to rise since the marine mammal protection measures were introduced.

1.6. For the recreational sector, the ***decrease*** in the allowance is the ***opposite*** of what I see and hear through my many contacts as an HFO and recreational fisher and would therefore unlikely to reflect what is actually happening on the water/beaches.

2. If you do not support any of the options listed, what alternative(s) should be considered? Why?

2.1. n/a

3. Are the allowances for customary Māori, recreational and other sources of mortality appropriate? Why?

3.1. Can not comment of customary Māori allowance.

3.2. Allowance for recreational, based on the previous NPS, would appear to be adequate; whilst noting that this survey is about ready to commence again. In the future it will be important to continue to recalibrate amateur daily bag limits such that total actual estimates of recreational catch stay relevant and reconcile with the management allowance used to sustainably manage the fishery.

3.3. Other sources of mortality for the fisheries are applied as a percentage (circa 5.0%) of the TACC.
I may have this wrong, however; my understanding (from para. 57) is that after acknowledged improvements in commercial mixed-trawl fishing practices it was determined to use a 5.0% mortality allowance for commercial fishing methods (thus 5% of TACC).
There is fishing related mortality[3] for the recreational sector, particularly with the return of under-sized fish and high-grading (colloquially called "catch-and-release" by recreational fishers). This catch and release aspect, particularly in the snapper fishery, is increasingly observed. The mortality associated with recreational fishing needs to be accounted for in the settings.
It remains unclear (to me) whether the 5% of TACC mortality figure incorporates mortality associated with non-commercial fishing?

4. Do you think these options adequately provide for social, economic, and cultural wellbeing?

4.1. I believe the SNA7 options presented contribute positively and adequately towards economic and social wellbeing.

4.2. As noted above (1.4), if abundance continues to build in the SNA7 and GUR7 fisheries, it may be more appropriate to adjust (upwards) the default management targets rather than continually increase TAC as abundance increases. This would not only provide increased resilience in the fishery but also, given the string of recent increases that have provided for greater economic returns, ensures these increased economic returns are locked in and not put at risk.

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[3] It would be interesting to review the research proposal in terms of the mortality from non-commercial fishing practices

5. Do you have any concerns about potential impacts of the proposed options on the aquatic environment?

5.1. Yes. Despite current increases in SNA7 and GUR 7 abundance, it seems improbable that the productivity of those fisheries has increased to the extent there would be no associated increase in fishing effort under Option 2. When we consider effects on the aquatic environment under Option 2, we must presume there will be increased fishing effort.

5.2. The most common commercial method of fishing the targeted species of SNA7 and GUR7 in trawl and set-netting. These methods have known issues in terms of adverse effects on non-target species (including marine mammals and seabirds) and adverse impacts on marine ecologies, particularly the benthic environment.

5.3. While there are existing research projects and developments in terms of measuring, monitoring and minimising/mitigating such adverse effects, many of these are works in progress and are yet to be adopted into fishing practice.

5.4. Therefore, the Option 2, in allowing for increased catches, ***will*** result in increased adverse effects in the marine environment and these should be considered as part of the decision making process.

6. Do you agree that the recreational bag limit for snapper in the Marlborough Sounds Area should be increased? If so, to how much per fisher?

6.1. No.

6.2. There has been no assessment of Marlborough Sounds SNA abundance to hep inform a decision as to whether or not such an increase is warranted and/or sustainable.

6.3. It is inappropriate to 'piggy-back' off the broader SNA7 survey results (and presume the same increasing abundance applies to the local Marlborough Sounds area); the reason there is a recreational bag-limit differential between Marlborough Sounds and the rest of SNA7 it that it is understood Marlborough Sounds SNA was a stand-alone/sufficiently different stock (for management of recreational fishing purposes). There is no information to suggest this is no longer the case.

6.4. There are broader aquatic environmental matters that raise concerns regards the sustainability of Marlborough Sounds SNA. These are largely to do with the loss of habitat for juvenile fish through the severely compromised quality of a number of estuaries and sea grass beds[4]. Increasing extraction of SNA within that fishery under such circumstances and without further research into understand the potential impacts of such issues on the SNA stocks is not sensible.

6.5. Various Marlborough Sounds recreational fishing and residential groups have also previously raised concerns regards the effects of aquaculture farming in the Marlborough Sounds and the potential adverse effects on the success of spawning fish. Although research undertaken by NIWA points to this largely being a non-factor; this research is not widely accepted by such groups.

6.6. There are no social or economic needs demonstrated to warrant an increase the Marlborough Sounds SNA daily bag-limit. The current 3 fish per angler provides ample fish for the table (without even considering the likely additional by-catches also available).

6.7. Even if it were thought that Marlborough Sounds recreational fishers need more than 3 SNA/day to meet their social needs, I submit the matters raised in 6.2 to 6.45 above need to be resolved before such consideration in made.

Other Submitter Comment(s):

[4] See MDC website reports https://www.marlborough.govt.nz/environment/coastal/coastal-reports

July 2022

Submission to:	FMsubmissions@MPI.govt.nz Review of Sustainability Measures for Blue Cod (BCO 7) for 2022/23 Fisheries NZ Discussion Paper No: 2022/07 ISBN No: 978-1-99-103910-1 (online) ISSN No: 2624-0165 (online) June 2022
Submission from:	Eric Jorgensen Waikawa Bay & Port Underwood
Relevant experience:	Born, raised and fished in the area since 1966. Extensive organisational design and performance management gained through various professional roles. Chair of the Marlborough Sounds Integrated Management Trust. Deputy Chair and Treasurer of the Marlborough Sounds Restoration Trust. Member Marlborough Sounds Blue Cod Advisory (and then Working) Group. Member National Blue Cod Advisory Group. Member, SNA7 Working Group Member, Advisory Group to the Minister, New Zealand King Salmon Relocation Group. Member, Marlborough District Council Aquaculture Review Working Group. Stakeholder Panel Member, Sustainable Seas National Science Challenge Project Leader, Marlborough Sounds Shellfish Restoration Project, Sustainable Seas National Science Challenge. Honrary Fisheries Officer. Member Sounds Advisory Group.

Introduction

This submission is based upon experience, observations and knowledge gained through having lived and fished in the Marlborough Sounds area all my life, the personal contacts and

relationships I have built over that time, and the various professional and advisory positions I have held over the years. Collectively, these roles have contributed to my broad and sometimes in-depth knowledge of the biophysical attributes and characteristics (past and present) of the Marlborough Sounds area, knowledge regards the values held by people living and utilising that same area (past and present) and the roles of governance, policy and management in those contexts.

I found this review paper and the process through which has been developed frustrating and somewhat disappointing. In my view it fails to acknowledge or progress previous discussions, positions and recommendations made by both the Marlborough Sounds BCO Working Group and the National BCO Advisory Group.

I believe we have built sufficient knowledge and experience of the Marlborough Sounds and BCO fisheries management to have put forward more considered, realistic and nuanced options and discussion points/questions. Options and discussion points that would have helped meaningfully progress BCO management beyond where it has previously been left, rather than opening to door for relitigating such in a context where – on and in the water- little (if anything) has changed.

I focus the majority of my submission responding to the Questions for submitters and conclude with some further minor comment on Other matters raised.

Questions for submitters

1. Which option do you support for setting a TAC and allowances? Why?

I support the Status Quo.

Rationale:

The premise of this review of sustainability measure for BCO7 appears to be "*BCO 7 fishing mortality is estimated to be above the threshold and other indicators point to fishing pressure reducing the size and abundance of blue cod in the main fishing area of the Marlborough Sounds. This suggests a reduction in fishing pressure is appropriate.*" Neither of the two Options presented in this review will result in meaningful changes towards achieve this objective.

The allocation of an allowance (in particular) to the recreational sector provided for in both Options 1 & 2; *will not reduce fishing effort, take or associated mortality;* it only exists on paper (not on the water). Relative to the objective, the allocation of these allowances is ineffective and meaningless without directly associated changes to -at least- the daily bag limit, combined species daily bag limit and accumulation limits. Changes to the allocation alone will not change the behaviours, practices and effort of fishers in this sector.

With option 1 the removal of the "head room" for the commercial sector is unlikely to reduce fishing pressure from current levels (*though it will prevent increases to current landings for the commercial sector)*. Caution needs to be taken to not presume the existence of head-room is taken by fisheries management as de-facto measure of abundance, it is not as many other drivers determine fish plans for commercial fishers. We should also consider that recent mesh size changes have likely resulted in reduced fishing associated mortality for BCO in the commercial sector. My view is that in this instance, the suggested removal of the commercial sector head room is largely window dressing, for a primary purpose other than reducing fishing mortality and that it is unjust to only target the commercial sector with meaningful reductions.

With Option 2, it is totally inappropriate and unjust to target only the commercial sector with meaningful (20%) reductions in a shared fishery. As discussed above, the allocation of allowances for (particularly) the recreational sector is meaningless in terms of what happens on the water and the impact on BCO. Introducing an allowance for recreational fishing (at

either setting provided for in the options) will not and cannot reduce fishing mortality. FNZ acknowledge this (para 71. *"...FNZ will explore further ways to give effect to a reduction in recreational effort (see section 12 Other Matters))"*.

I would take the view that the Marlborough Sounds BCO fisheries would be better served to maintain the current status-quo for another year, a year in which more effective management options can be developed.

2. If you do not support any of the options listed, what alternative(s) should be considered? Why?

As discussed above (with the exception of -what I consider to be - the unjust targeting of commercial fishers through the reduction of TACC in option 2) the only change the options presented introduce is the allocation of allowances for the other sectors. Such measures exist on paper only, they do nothing to reduce fishing pressure. Where the objective is to facilitate a reduction in fishing pressure, such measure alone are wholly ineffective.

It seems obvious that the increasing recreational fishing pressure over a period of decades is one of the key drivers of low BCO abundance. Unlike the other drivers that we believe also adversely affect BCO abundance (primarily via effects on habitat through deposits of land-based sediments and, of course, climate change impacts) we can respond to fishing related effects more rapidly (and, we also tend to see the results of such changes more rapidly).

There is a long history in the Marlborough Sounds of the adoption of measures specific to BCO, attempts where to "better" manage the fishery a reduction in BCO fishing pressure in and of itself has been seen as a proxy for "better" management. Examples of these measures include consistently reducing amateur daily bag limits, the introduction of accumulation limits, filleting at sea and transiting rules, limiting the numbers of hooks used recreationally and seasonal closures.

As the current surveys suggest *"a reduction is fishing pressure is appropriate"*, we are seeing that collectively these rules, focussed solely on BCO, have been ineffective in stabilising and rebuilding Marlborough Sounds BCO abundance. Simply 'adjusting' these settings will likely be inadequate to turn this situation around. By way of example; surveys in the area demonstrate that most fishers fish for true recreational (*i.e.* not subsistence) so, given this and combined with the known incidental mortality issues for BCO, using a reduced (2) BCO DBL for recreational fishers does not stop fishers fishing once achieved and thus, as BCO are the predominant fish 'hooked' further damage continues to be done to that fishery as people continue to fish 'recreationally'.

Compounding this:

- Accumulation Limits are notoriously difficult to attend to from a compliance perspective.
- Seasonal Closures can work (see discussion below), but there are matters of effectiveness and fairness that may be difficult to resolve with further seasonal closures.
- With a current Daily Bag Limit of 2 BCO proving to be less than effective for ensuring BCO abundance there is limited room to move, a closure is realistically the next level of reduction.

Given the significant recreational fishing effort in the Marlborough Sounds, particularly in the period of from Labour Weekend through to Easter we must rethink how we manage the effects these high levels of activity are having on the fisheries.

We simply must to adopt a more holistic approach to managing recreational (and probably for all fishing sectors) fin-fishing pressures in the Marlborough Sounds. This is something that can commence immediately and evolve over time. We must adopt an approach where we can discuss the potential effectiveness of broader sets of management measures that can

collectively result in lower fishing pressures whilst still providing for the different needs and values associated with those fisheries.

Our immediate focus should be here because, not only do we know that reducing and/or changing fishing pressure can provide relatively quick responses in fisheries (we have seen this already) there are other workstreams underway to look at the broader habitat-based impacts. For instance; the Te Hoiere catchment programme and FNZ's Habitats of Particular Significance for Fisheries Management.

It is timely and appropriate to bring together people with in-depth knowledge of these fisheries matters to plan a pathway forward. The draft Inshore Finfish Fisheries Management Plan envisions such processes.

3. Are the allowances for Māori customary, recreational and other sources of fishing mortality appropriate? Why?

This is in the current context a redundant question, refer comments above (regards meaninglessness of such allowances without effective tools to implement, monitor and manage impacts of actual fishing pressure based on fishing to the allowances).

4. Do you think these options adequately provide for social, economic, and cultural wellbeing?

For the recreational sector, the options provided offer no impact on the wellbeing's of the recreational fishing sector. Further, taken literally, the wellbeing of the recreational fishing sector does not (and should not) hinge on the recreational allowance for BCO.

That is not the case for customary wellbeing, but I am not in a position to comment.

Similarly for commercial.

5. Do you support extending the closed season for blue cod within the Marlborough sounds closed area? And, if so, for what period should the area be closed?

If the pre-eminent objective is to achieve a reduction in fishing pressure, then I would support extending the closed season.

The current closure seeks to protect spawning and brooding fish. Extended closures would-should be to address reducing fishing pressure.

The only meaningful extension when weighed against the effectiveness of the objective would therefore be to extend to closed season to incorporate the months of January and February. This would deliver the greatest reduction in fishing pressure.

6. Are there fishing practises or gear designs that could reduce incidental mortality of blue cod, for example, by reducing mortality from shag or barracouta predation when undersize blue cod are returned during recreational lining?

It is not only undersized BCO that are returned to sea. Once the DBL for BCO is caught, *ANY* further BCO caught must be returned to the sea regardless of size and state.

Potential practices and gear designs have been discussed and evaluated by both the National BCO Advisory Group and the Marlborough Sounds BCO Working Group. To the best of my knowledge there have been no further developments in these areas - so those evaluations previously undertaken likely remain relevant today.

7. Do you have any concerns about potential impacts of the proposed options on the aquatic environment?

No.

Other matters raised:

12 Other considerations.

Some brief responses to matters not already raised.

Response to paragraphs

107. The closed season largely covers a period where potting surveys show the presence of spawning cod. A small extension, in either or both date directions, could better cover this important period as well as reduce fishing effort. Analysis of the NPS data suggests that starting the closed season on 1 August rather than the current 1 September would reduce recreational take by around 10%. A small extension beyond 19 December would also significantly reduce recreational take.

The benefits and fairness of closing the BCO season earlier (1 August rather than 1 September) are questionable;

1. While the analysis of NPS data *suggests* a reduction in recreational take of circa 10%, this is unlikely to be achieved. Also, the 10% of the total catch for the month of September is likely inflated as:
    - Regardless of the start date of the closure the above circumstances found in i & ii above will exist, thus behaviours that drive the 10% of take will occur in the month preceding closure. A more accurate assessment of the likely reduction in take by extending the closed season would be to take the current take figure for July *rather* than August.
2. In my view it is unfair to target local fishers with an extended closure period, which this option would clearly do. To do so is less effective in terms of achieving the objective (reducing fishing pressure) than extending closed season beyond December 19 and also the values associated with the fishery for local fishers, including customary fishers, are more likely fishing for reasons other than simply recreation values most often associated with the visitor fishers over summer..

While analysis of the NPS data is not provided relative to extending the closed period beyond December 19) it seems obvious that through the months of January and February the fishery sees the most recreational effort occurring (driven by significant increases in visitor numbers). In terms of the objective, this would be the 'best' period through which to extend the closure of the fishery.

It would be good to see more detailed analysis for the NPS presented to understand how this 10% figure has been arrived at and how other management options might play out.

Fisheries New Zealand
Tini a Tangaroa

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While we prefer email, you can also post your submission to:

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Submissions must be received no later than 5pm on Friday 22 July 2022.

Anyone may make a submission, either as an individual or on behalf of an organisation. Please ensure all sections of this form are completed. You may either use this form or prepare your own but if preparing your own please use the same headings as used in this form.

Submitter details:

Name of submitter or contact person: Lester Brewer	
Organisation (if applicable):	
Email:	
Fishstock(s) this submission refers to:	Snapper -SNA7, Red Gurnard – GUR7 and Rig-Sp07 for 2022-23
Your preferred option as detailed in the discussion paper (write "other" if you do not agree with any of the options presented):	Option 1 status quo

Official Information Act 1982

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The snapper fishery is a very important part of Kiwi culture. The modelling information MPI has provided provided suggests the snapper biomass is increasing which very good. The most recent survey is an important part of this model. In this survey it is outlined that the 'survey of age composition poorly fitted the assessment models and correspondingly, the selectivity function for the trawl survey is not well estimated, primarily for the older classes'. Along with a lack of large fish in this survey much of the biomass increase estimated is based on the strength of the 2017 and 2018 classes which is good for the long term outlook. The size of the fish in these classes are estimated to be between 20-28cm according to www/niwa.co.nz/fisheries/ecosystem-influence-on-snapper/life cycle which is a shorter length than the MPI estimate, but are too small for commercial or recreational .fishermen to target. The 2020 quota increase in snapper for SNA 7 was also based on the 2017 class fish and at this time the fish in this class were very small. It is not surprising that commercial operators and recreational fishermen did not target these fish. They targeted the larger fish which at the time were between 35-60cm in size in 2019-20. At the time there very few fish in the 3-5 year range.

It dosn't surprise me that 'the older fish in the population >10 years do not appear to be fully available in the survey' (2021 trawl survey). They are the fish that have been targeted over the last two years.

The fish from the 2017 and 2018 classes are still either too small to catch commercially and unlikely to be targeted by many recreational fishermen and should not be included in the biomass that can be caught. Not only are many of the fish too small to catch but remaining fish offer very low recovery of saleable fish. Recovery of fish increases considerably when snapper get to seven years of age. The commercial catch rate should not be increased again when justified on small fish. This increase in quota will ensure that less large fish will appear in the next trawl survey and they need to be protected. This could be done by closing the top end of Tasman Bay for commercial fishing and long lining by recreational fishermen. This should be at the November commercial fishermen voluntary no trawl line. The closing of the top end of Tasman Bay would also protect the Hector and Maui dolphin, seals and blue penguin from being caught in commercial trawl nets. It would also protect the seabed in the part of Tasman Bay that is very important for snapper and other fish species spawning.

It is also very important to protect New Zealanders culture which includes the right to be able to go fishing and catch a meal.

The snapper fishery is a very important part of Kiwi culture. The constant pressure to continue to increase quota when the data is not overwhelming is a threat to that culture. People who live in Tasman Bay remember well how the snapper stocks were decimated through commercialgreed in the past.

From:	Tim & JIll Robinson
To:	FMSubmissions
Subject:	Sustainability measures.
Date:	Wednesday, 20 July 2022 7:54:43 pm

I support option 1 as I believe fish stocks have not recovered enough yet to warrant any increases, at the sametime stocks are holding out well, therefore no reduction is necessary either. I believe a bit longer period will give us a better picture of the stocks to make a more informed decision. Also the introduction of the mainland catch app will give us a more accurate read.
My comments here relate to BC07,SNA7,GUR7. Mainly Tasman Bay, Golden Bay, Durville and Stephen's Island areas.
Regards Tim Robinson. Tasman.

Fisheries New Zealand
Tini a Tangaroa

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Submitter details:

Name of submitter or contact person: Chris Millson	
Organisation (if applicable):	Royale Portage Bay Boating Club (Kenepuru based)
Email:	
Fishstock(s) this submission refers to:	Marlborough Sounds Snapper Fishing Resource/Biomass
Your preferred option as detailed in the discussion paper (write "other" if you do not agree with any of the options presented):	Strongly Disagree with increasing limits. Support status quo of 3 fish per person.

Official Information Act 1982

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Fisheries New Zealand
Tini a Tangaroa

Submission:[1]

Details supporting your views:

The Royale Portage Bay Boating Club is an Incorporated Society and based in Portage Bay of the Kenepuru Sound.

Our membership numbers 44 Families and 7 single – Representing approximately 140 people.

We hold three official fishing competitions per year Labour Weekend, Christmas and Easter.

The club dates back to 2004 however also includes many years of activity prior to that as well.

We also have a lot of discussion and awareness from our members and others of fish being caught throughout the year. All competitions are for Snapper Fishing.

Our Labour weekend competitions generally yield very few fish (1 or 2 over the past 5 years)

Christmas competitions over the last 5 years have resulted in more fish being caught but small and certainly not ideal breeding fish. The weights would average 0.5-1.5 kg, with 5 -10 being weighed in.

Easter this year was the first year we have seen any larger fish being caught for our competition, With a 8.8 kg and two 6kg fish being weighed in (along with 13 small juvenile fish).

The proposal to increase fishing limits from three to six snapper demonstrates a significant ignorance by the proposers of the fragile state of the fishery within the Kenepuru Sound.

The increasing presence of Juvenile or small snapper is an encouraging sign.

When the Kenepuru Sound fished well back in the 1990's three fish per person was a very adequate amount. Since then, there has been a very serious decline observed in the fishery.

We are still very concerned at the lack of fish numbers and certainly the lack of large breeding fish in the Kenepuru.

As one measure of supporting this position our club is introducing a snapper catch and release competition.

We would like to **support the status quo of three fish** maximum per person.

The fishery needs to be protected preserved and nurtured.

We **strongly disagree with increasing** Snapper limits and would really love to see the fishery return to it's pre year 2000 stocks.

Chris Millson

Commodore

Royale Portage Bay Boating Club Inc

Please continue on a separate sheet if required.

[1] Further information can be appended to your submission. If you are sending this submission electronically we accept the following formats – Microsoft Word, Text, PDF and JPG.

From:	Ben Pritchard
To:	FMSubmissions
Subject:	Snapper (SNA 7), Red Gurnard (GUR 3, GUR 7), Rig (SPO 3, SPO 7) and Gemfish (SKI 3, SKI 7).
Date:	Wednesday, 20 July 2022 9:33:16 am

I support option one but don't agree that the proposed changes go far enough and disagree with some of the statements made in the assessment as follows.

Tasman and golden bay's should be managed as a separate fishery from the rest of sna7 etc
In particular the trawl prohibition currently in place for inner golden bay should extend out to at least the 30m line in both Tasman and golden bays. The disturbance to the benthic environment from trawling activity creates a significant impact to the marine ecology and subsequently productivity.
Evidence to support this approach includes the decimation of the scallop stocks which remain closed largely due to benthic disturbance. Evidence proving that ongoing trawling is not having a detrimental effect to the scallop fishery has not been demonstrated therefore the minister should take a conservative approach
Also the te tiriti inclusions do not make provisions for traditional pakeha iwi who have become tangata whenua. These parties are no longer aligned with the English signatories of the treaty. Pakeha iwi are not suitably represented in the current te tiriti interpretation in the fisheries provisions which discriminates on ethnic grounds. This is a racist approach and therefore should be illegal.

Nga mihi,
Ben Pritchard

From: brent sheehan
To: FMSubmissions
Subject: Limit to fin fish caught in Kenepuru Sound
Date: Wednesday, 20 July 2022 10:30:22 am

To Whom it may concern.

My name is Brent Sheehan and I have been in the Kenepuru since 1956. Since that time have seen a big decline in snapper over the years. Last year saw more snapper being caught in 20 years here, so would like to see limit of 3 per person kept so that stocks can increase. Please consider this. Thanks Brent Sheehan

Sent from my iPad

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Email to: FMsubmissions@mpi.govt.nz

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Submitter details:

Name of submitter or contact person: Ron Rolston	
Organisation (if applicable):	
Email:	
Fishstock(s) this submission refers to:	Snapper
Your preferred option as detailed in the discussion paper (write "other" if you do not agree with any of the options presented):	Part other

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As part of this review Marlborough Recreational fishers ASSOC. is submitting a proposal to increase the snapper daily bag limit for recreational fishers to six from three. I **object** to this proposal.

I have fished for snapper in the Marlborough Sounds for twenty years. Mostly in Kenepuru Sound.

I live in Kenepuru Sounds and was for many years a commitee member of the Kenepuru and Central Sounds Residents Association and my wife and I were Commadore and Secretary of the Royale Portage Bay Boating Club . The committees organised at least four fishing competitions per year.

Although this year was especially productive, not all years have been the same. This year the number of boats and fishers was extremely high. At the peak of the Christmas and New Year holiday season Havelock marina and Picton marina were at peak and overflowing.

I have discussed the increase with many local fishers and we all agree that three snapper per person per day is perfectly adequate.

I am aware of data which shows an increase in snapper stocks in SNA 7 but my objection is specific to Marlborough Sounds only.

Thank You.

From:	Ross & Sylvia Withell
To:	FMSubmissions
Subject:	Review of sustainability measures for 1 October 2022
Date:	Monday, 18 July 2022 10:55:38 am

Submitter : H R Withell
Resident of Kenepuru Sound.
Email :
My submissions refers to the recreational catch limits for Snapper within the Marlborough Sounds.
Snapper have only returned to the Kenepuru Sound in any numbers during this last summer (2021-22) . I do not believe it is prudent to increase the catch limit to 6 per fisher at this time and until another year to prove sustainability.
I SUBMIT THAT THE RECREATIONAL CATCH LIMIT SHOULD REMAIN AT 3 PER FISHER FOR THIS YEAR.
.
Regards
H Ross Withell

Fisheries New Zealand
Tini a Tangaroa

Submission Form

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Submitter details:

Name of submitter or contact person:	**Hori Turi Elkington**
Organisation (if applicable):	Ngati Koata Iwi
Email:	
Fish stock(s) this submission refers to:	BCO 7
Your preferred option as detailed in the discussion paper (write "other" if you do not agree with any of the options presented):	Other

Official Information Act 1982

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Submission:

Details supporting your views:

Introduction.

This paper is on behalf of Ngati Koata whanau, hapu and Iwi and supports other submissions by Ngati Koata Iwi members and is written from a kaitiaki perspective.
For the purpose of the 2022/23, "Review of Blue Cod Sustainable Measures" Ngati Koata interests for the purpose of this submission is within the area of a line drawn from Alligator Head, including Takapourewa (Stephens Island), Nile Head, all of the western side of Rangitoto ki te Tonga (D'Urville Island) extending about 2 miles seaward, and then to Moutere Bluff. The area hereby enclosed is hereafter, (in this submission) referred to as **"The Line".** Ngati Koata shares some of this area with other iwi.
Ngati Koata presently, only has one commercial fisherman fishing Blue Cod within "the line".
Ngati Koata commercial fishers are a "**rare and endangered species**".

Proposed Management Options

Ngati Koata propose three changes as follows.

1. Option 3.
2. The closed season be reviewed.
3. Recreational and Customary catch within the rohe moana of Ngati Koata be reported.

Option 3.

Option 3. The TACC remain at 70.005 t, the Customary allowance be set at 27 t, the Recreational allowance be set at 60 t. and the commercial catch limit within **"The Line"** remain at the average catch limit for the past 10 years, based on a rolling 10year period, going forward.

This paper provides some reasons why we do not agree with options 1 or 2.
Furthermore, we note that clause 24 of Fisheries NZ Discussion Paper No: 2022/07 states "The outer Sounds, D'Urville Island and Cook Strait, where commercial fishing occurs, also appear stable. If the commercial fishery is stable, don't rock the boat.

Closed Season.

The integrity of the whakapapa of the closed season is questionable. There have been 4 different closed season periods. "Trial and error" don't align with tikanga and lack credibility.
Ngati Koata invite FNZ to engage directly with us as per clause 50 of Fisheries NZ Discussion Paper No: 2022/07 which states, (however, FNZ will also engage directly with iwi on matters that effect their fisheries interest in their takiwa). The 3 proposed management options above are a flavour of matters that Ngati Koata would like to engage directly with FNZ on. This paper gives FNZ a brief, from which to prepare for engagement with us.

We also ask for a review of the effectiveness of the closed season, relative to the stress that it applies to the western side of Rangitoto ki te Tonga.

Recreational Fishers Reporting BCO catch within the rohe of Ngati Koata.

Te Tauihu hui Forum agrees that subject to recreational catch being reported, kaitiaki will report customary catch also. Having all fishers reporting catch, will lead to accurate sustainability policy, and if done respectfully, it will give ownership of policy to all interested parties.

Rare and endangered.

In my lifetime, I have seen our commercial fishing families who have enjoyed a career and a lifestyle from fishing BOC 7 within "**the line**" reduce from ten resident families, (including several fishers from the same family), to only one now.
Whilst other influences are a factor, regulation including quota reduction and increased recreational fishing have been the most significant factors.

For the last 30 years my wife and I have owned a commercial fishing vessel and since 2010, two commercial fishing vessels. This year however, for the first time ever, we decided not to renew their commercial fishing registrations, regulation and ACE cuts, are significant factors influencing this decision.
Our commercial fishers are an endangered species, and the loss will be significant in terms of cultural and industry values.

The survival of our one and only commercial Blue Cod fisherman is crucial.

Cultural Values.

Cultural values include but are not limited to;

1. Supplying Blue Cod for tangi and hui.
2. Retaining and passing on intergenerational protocols and practices.
3. Giving cultural advice.
4. Protecting the environment and the industry.
5. Search and rescue.

Supplying BCO for tangi and hui.

For many generations our people have traditionally supplied Blue Cod and other kaimoana as koha for customary purposes, wherever our people live. This is a value that Ngati Koata seek to protect. Our commercial Blue Cod fishermen have been the most significant suppliers of kaimoana throughout our history, and they are crucial to the retaining of this treasured customary practice.

Retaining and passing on intergenerational protocols and practices, (tikanga/Kawa).

Our commercial fishers are traditionally the kaitiaki and tohunga of Ngati Koata tikanga in the realm of Tangaroa. The best way for our mokopuna to learn nga tikanga a Tangaroa is to watch our kaitiaki and learn on the job from them. Our sole surviving commercial fisherman is also a kaitiaki and a tohunga of our kite matauranga, (basket of knowledge) and he learnt from watching our older kaitiaki/tohunga.

Giving cultural advice.

FIN, representing the Crown, as our treaty partner could make better informed decisions by working in partnership with Iwi commercial fishers.
Working in partnership is different to the practice called "consultation".
As practitioners, our commercial fishers have a different, a wider, a deeper, and a more up to date basket of knowledge.
Ngati Koata invite FIN to meet with us and our commercial Blue Cod fisherman and we will share cultural advice as it relates to our rohe moana.

Protecting the environment and the industry.

Our commercial fishers are our eyes and ears, both on and off the water. They see and know what is going on and understand how such will affect both the environment and the industry.
For generations our fishing families have been the kaitiaki of our fishery. Just as Māori and whenua are one and the same, the principle of Māori and Moana, are one and the same. Some call it "salt

water in the blood". Our commercial fishers are crucial to the protection of the environment and the protection of the fishing industry.

Search and rescue.

Our commercial fishers are our best resource for search and rescue.
Our sole surviving commercial fisherman was involved in the two most significant rescues in our takiwa in the last 30 odd years. Lives were saved simply because Ngati Koata commercial fishermen were able to respond to the call for help.
If our commercial fishers become extinct, people will die.

There are two dominant causes of lower reported commercial landings of Blue Cod.

1. **Commercial fishers have left the industry.**

My dad talked about there being more than 30 boats commercially fishing Blue Cod within **"the line"** during his lifetime. All of those boats would likely have been local residents or families of local residents. There is an alarming rate of exit from the Blue Cod Fishery in just two generations. Two years ago, we had two local commercial Blue Cod fisherman fishing within "the line", they are from long established fishing families, the Aston and the Elkington families. Effectively the local commercial fishing fleet has halved in two years, it's reasonable to expect a comparable lower commercial landing. "Sustainability Measures" based solely on landings are flawed. When departures from the industry at the rate near or consistent to 50% as we have seen in the past two years is properly considered; any reduction in ACE without including our commercial fishers in the decision-making analysis process is questionable.

2. **The recreational fisher base has grown.**

The recreational fisher base has grown, the Blue Cod fishery is under duress, yet we still don't have a measure of landings for either the Blue Cod recreational take, or the customary take. Ngati Koata' view is that guessing the recreational and the customary take for Blue Cod sustainability measure, will result in a policy based on guessing, rather than a science-based result. As kaitiaki of Blue Cod, (which is a taonga species at the top of our best and most precious list), we recommend that FIN and Ngati Koata, engage with the recreational and the customary sectors, to find the best way forward in terms of protecting and enhancing the Blue Cod fishery, within the takiwa of Ngati Koata.

Summary.

We ask that FIN engage directly with Ngati Koata and our front-line fishermen regarding the matters addressed in this submission before making decisions.

Nga mihi nui,

Hori Turi Elkington

22 July 2022

From: craigandmaree
To: FMSubmissions
Subject: BC07 SUBMISSION
Date: Friday, 22 July 2022 3:09:03 pm

To whom it may concern

We are a small family fishing business and the biggest harvester of blue cod in bco7. We have been Commercial blue cod potting in bco7 for around 12 years and have always taken the sustainability of the fish stocks very seriously , as we understand the importance of a healthy fishery for all sectors.

We have read the changes that are been suggested for bco7 and would like to voice our opinion.

As a fisher no one wants to see a quota cut but if we had to choose we would go with option 1, with a 7 tonnne reduction to the total tac. In saying that we do not support an extended closed time on top of quota cuts as it would put more pressure on other parts of bco7 and also have a large impact on our fishing business. A large percentage of our fish is caught live and sold live to restaurants in a small but steady flow which comes out of the closed area when open. We are not opposed to the closed time we have at present, but do not want to see it extended. We fully respect that this fishing area is a shared fishery and already try not to go back into this area till mid January to let the recreational sector have their time over Christmas to limit any interaction with us which comes at our cost. If the closed time was brought back to the 1st of August we would have no choice but to fish over the Christmas time as financially we would have to . The closed time was put in place to protect the fish through there spawning time and not as a fisheries management tool. So we feel that what we already have is adequate for that and fair to all sectors .

Over the last 5 years we have steadily noticed a large increase in recreational fishing pressure in all parts of area 7. In previous years we have not seen the volume of vessel mid week but now it's not unusual to see 30 to 40 boats fishing Stephen's Island in the middle of the week.

We are all for people getting out fishing but feel there needs to be a better way to know what the recreational take is to better understand what is actually coming out of the water.
We would also like to see more fisheries officers out on the water more often throughout the year to make sure compliance is been met with all sectors.

Kind regards

Craig Perano

Maris Fishing ltd

F/V Sapphire bay

Sent from my Galaxy

Fisheries New Zealand
Tini a Tangaroa

Submission Form

Review of sustainability measures for 1 October 2022

Once you have completed this form

Email to: FMsubmissions@mpi.govt.nz

While we prefer email, you can also post your submission to:

2022 Sustainability Review, Fisheries Management, Fisheries New Zealand, PO Box 2526, Wellington 6140, New Zealand.

Submissions must be received no later than 5pm on Friday 22 July 2022.

Anyone may make a submission, either as an individual or on behalf of an organisation. Please ensure all sections of this form are completed. You may either use this form or prepare your own but if preparing your own please use the same headings as used in this form.

Submitter details:

Name of submitter or contact person:Lawrence Stevenson	
Organisation (if applicable):	
Email:	
IFishstock(s) this submission refers to:	BC07
Your preferred option as detailed in the discussion paper (write "other" if you do not agree with any of the options presented):	OTHER

Official Information Act 1982

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I put othe rin the above gap as I am a biot baffled as to how MPI can come to the conclusions they have made with the very limited research that they have done regading the Marlborough Sounds Blue Cod.

For instance the potting surveys dont take into account weather patterns Tidal flows etc.

They dont take into account the experience and information of locals both recreational and commercial.

Much credence is placed on the research done by Glenn Carbine Ifeel that this should be revisited as some things have been proven to be wrong for the Marlborough Sounds.

I believe that if recreational fishers were able to keep the undersized Blue Cod alive and relatively unharmed in tanks and released when the boat moves off this will greatly decrease the number that the shags take. This number should be taken into consideration as it is substantial.

I hope this helps.

From: Scott Wilson
To: FMSubmissions
Subject: Review of sustainability measures – 2022 October round
Date: Friday, 17 June 2022 1:22:09 am

I wish to make the following submission with regard to the

Blue cod	BCO 7 - West Coast and Top of South Island	↓	BCO 7 is an important domestic shared fishery. While recent surveys suggest the overall abundance of blue cod has remained fairly stable since 2017, the fishery is below the target biomass and all indicators point to fishing pressure reducing the size and abundance of blue cod in the main fishing area of the Marlborough Sounds. Fisheries New Zealand is proposing options to set the TAC and allowances of BCO 7, and to decrease the TACC to reduce fishing pressure. Fisheries New Zealand is also seeking feedback on whether other measures, such as extending the closed season or voluntary approaches, would help recovery of the stock towards its management target.

I have fished the Marlborough sounds area of BCO 7 for over 50 years and experienced first hand the degradation of this fishery to the point I now no longer target Blue Cod. More recently the degradation has been primarily caused by recreational fishers.

The season closure should be the summer months when the fishery is under most pressure from recreational fishers, this is also the most productive breeding period. This is what's best for the fishery not as it is now, a political expediency for people on holiday.

Scott Wilson
Wellington, New Zealand
Caravan, Out Back Aussie

From: Reid Forrest
To: FMSubmissions
Subject: Submission for review of sustainability for Blue Cod BCO7
Date: Monday, 18 July 2022 10:08:39 pm

Questions for submitters

• Which option do you support for setting a TAC and allowances? Why?

I support Option 2 because being a long term fisherman in the top of the south blue cod fishery it's obvious that the stock is undery heavy pressure, continues to be declining and there is a real sex ratio issue. The fishery is definitely below target and pressures are only set to increase further in the future with greater pressure and increasing environmental stress through warming waters.

• If you do not support any of the options listed, what alternative(s) should be considered? Why?

• Are the allowances for Māori customary, recreational and other sources of fishing mortality appropriate? Why?

No they aren't appropriate. Your allowance should never be based on race for a start. Sources of fishing mortality are likely to be highly underestimated in the Marlborough Sounds where there is such massive recreational focus to the fishery, as despite all the publications and education the handling of blue cod by most fishers is very poor, so estimates of mortality are far too low. Additionally, the shag population in the Marlborough sounds are becoming more and more boat focussed, and foraging of their own accord less and less thanks to the easier feeding opportunities provided by catching the undersized fish being released from recreational fishers.

• Do you think these options adequately provide for social, economic, and cultural wellbeing?

• Do you support extending the closed season for blue cod within the Marlborough sounds closed area? And, if so, for what period should the area be closed?

Yes, I heavily support extending the closed season for Blue cod in the Marlborough sounds. The evidence around cod spawning that was first put forward and still stands today showed that the breeding season extended well past the current end date to the closed period, but political pressure to have the sounds open for peak tourist season forced a back down from MPI. The season should remain closed until the end of January to cover the entire breeding period and cover the period when the greatest recreational

pressure is on this spatially limited fishery. Your details in the review of sustainability measures for blue cod document state that extending the closed period earlier to August 1 could reduce recreational take by around 10%, but I would put a large sum of money on the fact that pushing it out longer at the other end by the same period (one month) would decrease it by a far larger amount than 10%. But this would be very politically unpopular and the managers of those preparing the reports don't even want to have such ideas and the numbers around them put out in the public. It's time to grow some balls and put in changes to this fishery that will actually make a large and long term difference - this is one of those options that could have a huge positive impact for the fishery.

• Are there fishing practises or gear designs that could reduce incidental mortality of blue cod, for example, by reducing mortality from shag or barracouta predation when undersize blue cod are returned during recreational lining?
Yes, by allowing recreational fisherman to hold undersize blue cod onboard in live bait tanks to be later released when shags have moved away, or when the vessel is slowly moving off and there are not shags present. Barracoutta are also less likely to following a motoring boat so releasing undersize cod while slowly on the move will result in greater chance of the cold making it safely back to the bottom. Also, if all the undersize cod were released in a single hit, then a single barracouta would be unlikely to snare as many as they all went for the bottom at the same time, rather than hanging around and hitting a large number of individuals as they were periodically caught and then released in an area. At the current time any person holding undersize cod onboard their vessel would be prosecuted, but if it can be proved that they are being held in suitable live bait tanks for later release then this should be allowed. If a fishery officer stops the vessel and they are motoring far away from a fishing area, or there are no shags around, or the fishers have no 'caught' fish that have been killed and placed in cooler, then there would be grounds for suspicion and fine/prosecution. There would need to be some onus on the fisherman to prove why they were holding the undersize fish onboard.

• Do you have any concerns about potential impacts of the proposed options on the aquatic environment?
The outer chetwode banks and the wynens bank areas in the outer pelorus are important nursery grounds but there is growing creep of soft sediment accumulation pushing further nad further outwards in the Pelorus Sound. Areas of Wynens bank to the north of titirangi, and east of Forsyth Island that once were abundant bryozoan and shell hash/ coarse sand beds are now becoming more barren areas dominated by muds and fine sands. If this creep continues then important nursery grounds could be lost. However, areas of the outer queen charlotte that were once very low numbers of juvenile blue cod are now seeing large numbers of juveniles again being present over the last 3-4 years since the closure of the commercial scallop fishery. The removal of seabed structure destroying fishing activities, in this case commercial scallop dredges, from these areas has meant that shell hash and rubble has remained undisturbed and juvenile blue cod have been able to settle from their planktonic phase in these areas and use the hash/rubble as shelter to survive and grow. It is important that such habitats are now protected in the long term to

continue to allow juveniles to survive and thrive to hopefully assist in rebuilding the blue cod population in the Marlborough Sounds.

From: Lindsay Elkington
To: FMSubmissions
Subject: submission re bco7
Date: Tuesday, 19 July 2022 2:00:49 pm

NAME OF SUBMITTER: Lindsay Elkington
EMAIL ADDRESS:
FISH STOCK REFERED TO: BCO7
PREFERRED OPTION: Other.

I am a 6th generation Durville Islander and a decendent of Ngati Koata.I grew up on the island and I began commercial fishing for Blue Cod with my dad when I was 10 years old. As a commercial fisher,tangata whenua and kaitiaki for Ngati Koata I am very aware of the need to protect fish stocks for ALL future generations of fishers and it would appear that the preferred tool used for fish stock protection is quota reductions and in this particular case we have what appears to be a Robin Hood proposal where a TAC is introduced which begins with a reduction to the existing TACC and ends with recreational fishers getting more of the TAC then commercial fishers.As is the case with the proposed option 1.While option 2 offers a more evenly distributed TAC between commercial and recreational the proposed TACC reduction of option 2 has an even greater negative impact on commercial fishers.

As for extending the seasonal closure.
The existing seasonal closure is already at least 14 days longer for commercial fishers then it is for recreational fishers.Albeit unintentional.
Due to the public holidays of xmas and new year most LFR's stop taking fish on 22nd December and close for the holiday period,they don't reopen again untill around 10th January.So if we want to consider extending the seasonal closure lets start by bringing recreational fishers into line with the commercial sector and maybe extend the re-opening date to 4th January.Doing this would have the added benefit of excluding recreational fishers from taking Blue Cod from the Marlborough sounds area during the xmas,new year week when recreational fishing activity particularly at Durville Island is at its peak. However my preference would not be to extend the closure but to change the dates to closing on 14 September and re-opening on 4th January.

When I returned to Durville Island 8 years ago.I became 1 of 3 commercial Blue Cod fishers,fishing entirely at Durville,2 of us lived on the island (and still do) while the 3rd lived in Picton.He eventually got out of Blue Cod and began supplying the live fish market in Auckland with live Banded Wrasse.The other fisher got out of the fishery soon after the pot mesh size was increased to 54mm.It turns out that a lot of our Blue Cod are long and skinny and although they meet the legal size limit they are also skinny eneough to fit through the 54mm mesh.As a handliner the pot mesh size doesn't effect my fishing.So i am now the only Blue Cod commercial fisher who lives on Durville Island,almost all of my fishing is done on the eastern side of Durville including some of the smaller,off lying islands i.e. Rangitotos,Trios and Stephens.
I tend to do less fishing during the closed season as the predominant westerly weather during spring makes accessing the western side of the island quite differcult and i often struggle to get eneough fishing time to catch the minimum amount required for export to the Sydney fish market before the weather forces me home.

Given the ever increasing number of recreational fishers.I really don't believe that cutting the TACC and introducing a TAC is going to be eneough to protect the top of the south Blue Cod stocks long term.I think a reduction in fishing effort is also required but asking recreational fishers to reduce thier fishing effort would most likely cause another riot on

parliament grounds while forcing commercial fishers out of the fishery and into bankruptcy is draconian.However,as I am the only commercial Blue Cod fisher,fishing entirely at Durville island,why not try a new approach and consider compensating me to leave the fishery,voluntarily and then close the eastern side of Durville Island to commercial Blue Cod fishing.Maybe draw a line from Harding Point to Trios to Stephens Island,effectively closing the eastern coastline of Durville and some of the smaller off lying islands to commercial fishing for Blue Cod.I catch between 6 and 7 tonnes of Blue Cod annually which is about the same amount of TACC reduction proposed in option 1,alternatively,if my annual catch is combined with the proposed TACC reduction of option 1 the total reduction of Blue Cod actually caught is better then the proposal of option 2 while only reducing the TACC by 7 tonnes,bringing it into line with the 10 year average of 63 tonnes caught annually.

Customary Catch:
Although I am a kaitiaki and authorised to issue customary permits I can only speak to the amount of customary take for which i personally have issued permits.I have no idea what other kaitiaki may or may not be doing regarding thier right to issue customary permits and so i don't believe i'm qualified to comment on this particular matter.

Nga mihi
Lindsay

Fisheries New Zealand
Tini a Tangaroa

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Anyone may make a submission, either as an individual or on behalf of an organisation. Please ensure all sections of this form are completed. You may either use this form or prepare your own but if preparing your own please use the same headings as used in this form.

Submitter details:

Name of submitter or contact person: Glen Jarvie	
Organisation (if applicable):	
Email:	
Fishstock(s) this submission refers to:	BCO7
Your preferred option as detailed in the discussion paper (write "other" if you do not agree with any of the options presented):	Other

Official Information Act 1982

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Questions for submitters •

Which option do you support for setting a TAC and allowances? **Other.**

Why?

Recreational fisheries catch; there is not enough data to suggest actual volumes caught to comment. Therefore, confidence level is None.

• Are the allowances for Māori customary, recreational and other sources of fishing mortality appropriate? Why?

I have Fished D'Urville for 20 years & observed little evidence to suggest Birds or Barracuda are responsible for Mortality rates on recreational fishing release.

Recreational fisheries catch there is not enough data to suggest actual volumes to comment. Therefore confidence level is None.

• Do you think these options adequately provide for social, economic, and cultural wellbeing?

The Catch limit of two PP is sufficient, however the transfer of filleted fish between islands needs addressed. As opposed to gutted & gilled.

• Do you support extending the closed season for blue cod within the Marlborough sounds closed area? **NO** ,

However there should be areas within the sounds with little or no stock to have limited Bans to all fishing of Blue Cod.

• Are there fishing practises or gear designs that could reduce incidental mortality of blue cod, for example, by reducing mortality from shag or barracouta predation when undersize blue cod are returned during recreational lining? **Yes.**

Education, Promote No contact release ie; fish removal tools, Barbless hooks.

There is little evidence to suggest Birds or Barracuda are responsible for Mortality rates on recreational fishing release. Therefore confidence level is None.

• Do you have any concerns about potential impacts of the proposed options on the aquatic environment? **Yes.**

There needs to be Significant research on the effect of land use & run off from land. Ie: Forestry & Dairy Farming etc.

Fisheries New Zealand
Tini a Tangaroa

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Submitter details:

Name of submitter or contact person:Spencer Pomeroy	
Organisation (if applicable):	Kahurangi Shoals Sustainability Group
Email:	
Fishstock(s) this submission refers to:	Blue Cod BC07
Your preferred option as detailed in the discussion paper (write "other" if you do not agree with any of the options presented):	Other

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Kahurangi Shoals Sustainability Group (KSSG)

- Catch effort from Marlborough Sounds and Nelson is now being moved to Kahurangi Shoals (this also happen to the Paua fishery after the Kaikoura earthquake, recreational pressure moved to Kahurangi Shoals. Fisheries NZ have now reduced from 10 to 5 per person) ,the same needs to happen for at Kahurangi Shoals (KS)as it is a small Cod fishery.
- All sectors need to take a reduction in catch rates to make this fishery sustainable for future generations
- There is no recreational catch data on cod at KS nor has there been any potting surveys until this happens Fisheries NZ should reduce Cod from 10 down to 5 per person to stop this small fishery from becoming over fished like the Marlborough Sounds and many other areas around the South Island.
- In the last couple of years there has been many new boats coming to KS, this is only going to increase with population growth plus catch effort coming from Marlborough Sounds and Nelson due to over fishing.
- Bad weather and high fuel costs is not going to stop over fishing at KS
- Kahurangi Shoals has many fish species such as Tarahiki,Snapper, Kingfish, Trumpiter,Gurnard,Kahawai etc. To take the pressure off Cod and Groper and give recreational fishers a fair go at taking a fair daily catch home .By changing fishing technique and moving to different areas to target these different species
- Kahurangi Shoals Sustainability Group was set up in 2016 after Golden Bay community had concerns about over fishing at KS. After two community meetings information gathered from them ,it was used to run a petition which 21 percent of the local community signed (806 signatures total)to get action to protect KS
- To get a new area set up in Challenger West area from Farewell Spit Light House South to the Heaphy River. Which now has happened called Kahurangi Shoals.
- A reduction of total allowable catch limits per fisher from 35 to 10 per person, it is now set at 20 finfish per fisher.
- Groper from 5 down to 2 per fisher this is now being set down to 2 .
- Cod was set at 20 per fisher ,KSSG wanted it set down to 5 per fisher, at that time the National Blue Cod Strategy was set up and the daily catch limits were set at 10 per fisher at KS .It is now time to review Cod once again because of the above concerns of catch effort moving to KS.
- With all the good work so far we need to continue this effort to make KS a sustainable fishery for future generations

A

From:	Grant Smith
To:	FMSubmissions
Subject:	blue cod sustainability
Date:	Wednesday, 15 June 2022 11:34:25 pm

To whom it may concern
I have been making submissions on blue cod for many years.All i ask is you view my face book page headed Blue Cod The Future . and comment with any thoughts.
If You can forward this email to the minister of fishery's also would be appreciated.
Regards
Grant Smith

Te Rūnanga o NGĀI TAHU

22 July 2022

Fisheries New Zealand
FMSubmissions@mpi.govt.nz

Tēnā koutou,

NGĀI TAHU RESPONSE TO THE REVIEW OF SUSTAINABILITY MEASURES FOR KBB 3G

Te Rūnanga o Ngāi Tahu continues to support the gradual and careful proofing-up of the KBB 3G fishery, as we did in 2010 when this stock as introduced into the Quota Management System (QMS).

The setting of sustainability measures for this stock must be based on the best scientific information that is currently available which may not be that used in 2010 for QMS introduction.

Te Rūnanga o Ngāi Tahu also wishes to remind the Minister that the commercial harvesting of bladder kelp is now prohibited within the East Otago Taiāpure.

Nāhaku noa, nā

Jacqui Caine

Jacqui Caine
General Manager, Strategy & Influence

Te Rūnanga o Ngāi Tahu
15 Show Place, Addington, Christchurch 8024
PO Box 13-046, Christchurch, New Zealand
Phone + 64 3 366 4344, 0800 KAI TAHU
Email: info@ngaitahu.iwi.nz
Website: www.ngaitahu.iwi.nz

2022 Sustainability Review, Fisheries Management,
Fisheries New Zealand,
PO Box 2526,
Wellington 6140.

26th July 2022

Emailed to:fmsubmissions@mpi.govt.nz

Submission on the Review of Sustainability Measures for Attached Bladder Kelp KBB 3G for 2022/23
Fisheries NZ Discussion Paper No: 2022/10 (the "Discussion Paper")

A. Introduction to this submission and submitters

This submission is made on proposals for the KBB3G fishery, and is on behalf of the following KBB3G quota owners:

- Mr Roger Douglas Beattie
- Mr Dominic Preece (Aotearoa Quota Brokers Ltd)
- Mrs Gina Tess Preece
- Gisborne Fisheries 1955 Ltd
- Rekohu Ocean Fisheries Ltd

~67% of the KBB3G Quota holdings are represented by this submission (see table below):

The address for service for this submission is: Attn: Bill Chisholm, Chisholm Associates, PO Box

The submitters support the status quo option only. The submitters oppose all other options presented in the Discussion Paper. This submission provides reasons for opposition to any TACC reductions in KBB3G.

There are currently eight owners of KBB3G Quota. These are listed in the table below. Further information on the nature and extent of the KBB3G fishery is available in the 2022 Plenary Report.

We also draw your attention to the CONFIDENTIAL Annexure 1 Comments on: Review of Sustainability Measures for Attached Bladder Kelp (KBB 3G and KBB 4G) for 2022/23; Fisheries NZ Discussion Paper No: 2022/10, prepared **by DR Schiel, Distinguished Professor, Marine Science School of Biological Science Canterbury University**

Quota Owned by Stock

FishServe
Commercial Fisheries Services Ltd

Date as at: **18 July 2022**
Stock code(s): **KBB3G - Bladder Kelp**

Stock	Client	Account	Total shares	Restricted	Trans-ferable
KBB3G	9791803 - Aotearoa Quota Brokers Limited	Normal	24,272,316		24,272,316
KBB3G	9791956 - Gina Tess Preece	Normal	404,269		404,269
KBB3G	8440865 - Gisborne Fisheries 1955 Limited	Normal	2,126,779		2,126,779
KBB3G	9790940 - KPF Investments Limited	Normal	12,000,000	12,000,000	
KBB3G	9791706 - Ngai Tahu Fisheries Settlement Limited	Settlement	20,000,000		20,000,000
KBB3G	9791695 - Rekohu Ocean Fisheries Limited	Normal	468,952		468,952
KBB3G	8470162 - Roger Douglas Beattie	Normal	40,000,000		40,000,000
KBB3G	9900548 - Seaweed Limited	Normal	727,684		727,684

B. The Bladder Kelp Fishery (*Macrosystis* – KBBG)

(Macrocystis pyrifera)

"Giant Kelp (*Macrocystis*) is the fastest growing and most prolific of all plant species found on Earth"

Schiel & Foster (2015) The biology and ecology of Giant Kelp Forests

Figure 1. Map of attached Bladder kelp (*Macrocystis pyrifera*) Quota Management Areas KBB3G & KBB4G (referred in this document as "KBB3G").

Bladder kelp (KBB3G), like all other large seaweeds, occurs in one of three states: attached (growing on the substrate); free-floating; and beach cast. The attached growing state of bladder kelp is the only state managed under the QMS.

For KBB3G bladder kelp harvest is restricted by a TACC of 1236 tonnes. Harvesting is restricted to hand cutting of the surface canopy to a maximum cutting depth of 1.2m.

Research by John Pirker (including Pirker *et al* 2000 and Pirker 2002) was used to provide the original stock assessment information on New Zealand KBBG stocks. The commercial harvest of KBB3G is largely based on experiences with the Californian fishery coupled with New Zealand fisheries management practices (see Schiel and Foster 2015 and Mace *et al* 2014). Further information on harvest dynamics is provided by Geange (2014) and Geange *et al* (2014).

NZ Kelp Ltd, who lease ACE from Roger Beattie, has harvested 514,573 kg of KBB3G Kelp from Akaroa Harbour and Shag Point from April 2010 to June 2020. For the last two decades NZ Kelp Ltd has worked hard to develop markets and distribution channels for this new industry. The number of products is expanding, and sales are increasing, providing sustainable eco-friendly products to a multitude of end users, while also providing valuable employment and income for New Zealanders.

NZ Kelp Ltd reports all its annual catch to MPI through daily Electronic Returns and Monthly Harvest Returns.

Kelp is used for animal dietary supplements, pasture and cropping foliar sprays, soil conditioning additives, human condiments and health supplements.

C. Submitters Response to Questions from Discussion Paper

The Discussion Paper Section 12 poses several questions to submitters:

Q. ***Which option do you support for revising the TAC and allowances?*** **Why?**
A. The only option supported by the submitters for KBB3G is the Status Quo option. See Section D of this submission for reasons why.

Q. If you do not support any of the options listed, what alternative(s) should be considered? Why?
A. The submitters only support the Status Quo option for KBB3G. Alternatives do not need consideration because TACC changes cannot increase KBB kelp stocks or improve kelp habitats.

Q. Do you think these options adequately provide for social, economic, and cultural wellbeing?
A. Only the Status Quo option provides for actual and potential social, economic, and cultural wellbeing for KBB3G.

Q. Do you have any concerns about potential impacts of the proposed options on the aquatic environment?
A. Yes. Implementing any TAC/TACC reduction may give a false impression that this will protect kelp beds from decline. Nothing could be further from the truth.

D. Reasons why this submission requires the Status Quo Option

1. Options (other than status quo) are contrary to the provisions of the Fisheries Act (FA) Section 13

The options (other than status quo) provided by the Discussion Paper are a reduction in KBB3G of 50% or 75%. These percentage reductions are not derived from any stock assessment, stock availability, changes in harvest dynamics or CPUE. They appear to have been arbitrarily "plucked

from the air" in reaction to unranked studies which have little direct relevance to fisheries management.

The FA Section 13(2) provides for the Minister to set a TACC that is not inconsistent with the objective of maintaining fisheries stocks at or above, or moving stocks towards or above, the BMSY level. The difficulty here for KBB3G is that it is unlikely that TACC reductions would either "maintain fish stocks" or "move stocks towards, or above the BMSY level." Consequently, even if TACC reductions in KBB3G were implemented, it has clearly not been established that such measures would have the effect of meeting the purpose of FA Section 13 (2).

Furthermore, the information presented in the Discussion Paper does not provide robust justification for TAC/TACC changes. The studies presented in the Discussion Paper do not meet the required Research Standard, and contain inconsistencies which at least need further investigation and peer review. Reducing the (currently very conservative) TACC for KBB3G on the basis of this information would establish ugly legal precedents for fisheries management as a whole.

Other analyses required by FA Section 13 are only briefly mentioned in the Discussion Paper, or are absent altogether. This includes no description of which studies constitute "best available information", and no meaningful analysis of the social, cultural and economic factors described in FA Section 13 A (3).

The initial KBB3G TAC/TACC was based on known bladder kelp biomass information. A range of MCY estimates were developed. However, for KBB3G the Minister decided to impose the lowest, most conservative estimate as the basis of setting TAC and TACC levels. This (most conservative) estimate was based on uncertainty about biomass estimates because of wide natural fluctuations in kelp biomass. Bladder kelp is known to exhibit wide changes in density, often of a cyclic nature. There is no information provided which suggests that these fluctuations are permanent in FMA 3. Nor is there any information demonstrating that current KBB3G densities have reduced below levels anticipated when the original (very conservative) TAC/TACC was set. A knee-jerk TACC change in response to current kelp bed fluctuations, as suggested by the Discussion Paper, is contrary to the principles inherent in FA Section 13.

These are the central legal issues addressed in this submission, and if they are not addressed must inevitably lead to legal proceedings.

2. Regulations are already in place to avoid damage to stocks

When KBB3G was brought into the QMS the Minister agreed to introduce a maximum hand cutting depth of <1.2 metres to avoid any harvesting effects. This additional rule prevents adverse effects on the resource resulting from harvest. In effect, KBB3G harvest is likened to "mowing the lawn". Sporophytes are not harvested or damaged during harvesting, so no damage occurs to reproductive fronds.

The Discussion Document states:

As such, the Minister agreed to introduce a maximum hand cutting depth of <1.2 metres to reduce potential fishing effects, as well as signalling an expectation that quota owners would develop a Memorandum of Understanding (MOU) to promote appropriate harvest strategies and management measures for both fisheries. The MOU has not been developed given the very small nature of each fishery.

The Discussion Paper implies that a Memorandum of Understanding has not been developed in contravention of an "expectation" from the Minister, and that this is because the KBB3G fishery is *de minimus*. This implication is mistaken. Harvest strategies and management measures for KBB3G are progressively developed as the fishery continues to develop. Such measures cannot be developed in an environment whereby random TACC cuts are promoted by inadequate science.

The Discussion Paper states:

In the absence of appropriate spatial management controls, commercial fishers have the potential to catch the TACC in one or few localised areas. This option may not provide adequate protection to existing and future bladder kelp beds which are important habitats for marine communities and has the potential to affect associated and dependent species.

This statement, and similar statements on "protection" outlined in paragraphs 74 and 76, are incorrect in their assumptions. The "1.2 metre rule" is designed to prevent overharvest of fronds to the extent that each individual harvested plant is fully protected from undue harm. The issue of where they are harvested is therefore redundant. There is no information provided which demonstrates any adverse harvest effect on marine habitats or communities. On the contrary, studies on the effects of kelp harvest on the ecosystem have been studied in some considerable detail. Although the May 2022 Plenary Report states that the wider habitat effects of harvest have not been measured, Pirker *et al* (2000) studied this issue in depth and concluded: "*Overall there were no negative flow on effects resulting from harvesting the kelp forests.*"

Consequently, statements in the Discussion Paper correlating TACC adjustments with kelp habitat "protection" are also redundant. Commercial kelp harvest has no detrimental effect on kelp beds. Pirker *et al* (2000) states:

"*Harvesting canopy biomass had no measurable effect on Macrocystis plants, or the dominant understory species, including juvenile Macrosystis, Ecklonia radiata and macroinvertebrates.*"

For *Macrosystis*, whole plants live for only 2-6 years and fronds live for 4-9 months. Commercial harvesting harvests groups of fronds. These can legally be harvested to 1.2m deep but are normally harvested to only 0.5m deep. Commercial harvest does not harvest sporophylls. Individual plants regrow rapidly after harvest. In fact, commercial harvest helps recruitment and juvenile frond growth by creating light wells. Harvesting is known to reduce the ripping out of entire beds of kelp including holdfasts. This is done by reducing surface 'rafting', and by creating a more diverse maturity profile i.e. a better balance between old mature fronds and immature fronds. This allows light to penetrate deeper to the growing immature fronds. Pirker *et al* (2000) demonstrates that associated species are not affected by commercial harvesting.

In conclusion, the 1.2 metre rule prevents damage to kelp beds, and probably enhances them, as "mowing" reduces the development of top-heavy senescent fronds which break off in rough weather. It is not possible to unduly damage kelp beds or their habitats through the method of harvesting which is currently regulated. Regardless of the state of the kelp beds themselves, they cannot be altered or improved through reduction in harvest. Consequently, FA Section 13 (2) cannot be enabled through TACC reductions.

3. Studies quoted do not meet necessary standards for TAC/TACC setting

The studies quoted in the Discussion Paper come from the general literature, albeit some are via published articles in scientific journals. These studies have not been formally peer reviewed through the Fisheries NZ Science Working Group process. Consequently, according to the Fisheries NZ's Research Standard, these studies have an "unranked" status. The Research Standard describes the value of "unranked" studies as follows:

Unranked – U is accorded to information that has not been subjected to any formal quality assurance or peer review against the requirements of this Standard. Where unranked information is used to inform fisheries management decisions, it should be noted that the information has not been reviewed against the Standard, and that the quality of the information has not been ranked and cannot be assured.

The Discussion Paper fails to note this important feature of the studies quoted in support of TACC reductions. This applies to those studies quoted in the Discussion Paper as providing "evidence" of a major decline in KBB3G stocks; most notably Tait *et al* (2021) and Glover (2020).

The Discussion Paper presents options for significant TACC reductions in the absence of robust, peer reviewed studies corresponding to those which occurred >20 years ago, when KBB3G was brought into the QMS. Instead, the Discussion Paper relies on "U-rated" studies which are lacking in relevant data and robust analyses. To use these as the basis for TACC reductions is to abandon the FA Section 13 principles of "best available information" entirely, and instead rely on "any available information".

4. Discussion Paper conclusions conflict with 2022 Plenary Report

The Fisheries NZ 2022 Plenary Report for KBB3G, in considering the information provided by a range of "U-rated" studies, made the following conclusion:

Because of the apparent rapid spatio-temporal fluctuations in biomass, the status of KBB 3G and KBB 4G biomass is unknown and unable to be reliably estimated using currently available information. Therefore, Fisheries New Zealand was unable to ascertain whether the current biomass of both attached bladder kelp stocks is stable, increasing, or decreasing.

Despite this, the Discussion Paper concludes that climate change and anthropogenic sedimentation have brought KBB3G stocks to the brink of collapse, and that reductions in harvest are necessary to prevent this from being exacerbated. These conclusions appear to be based principally on Tait *et al* (2021). This study found a correlation between loss of surface floating kelp, sea temperatures and water clarity (sedimentation). The study was not able to assess sub-surface kelp beds and its stated correlations between surface-reaching and sub-surface kelp beds were not robust. Even if they were robust, the study was unable to determine whether such correlations were of a temporary or permanent nature. The study also made no comment on the likely effects of kelp harvest on these correlations. In short, Tait *et al* (2021) provided some information of the potential reaction of surface reaching kelp beds to various environmental stressors, but was unable to do the same for all kelp beds. It also provided some suggestions for further research. It did not, however, provide information of any value to TAC/TACC setting.

In considering Tait *et al* (2021) and other "U-ranked" studies, the 2022 Plenary Report concluded that stock projections for KBB3G and KBB4G were unknown. This is unsurprising, given the severe limitations in methodology used by Tait *et al* (2021) in making assessments of kelp biomass from satellite photography of surface reaching fronds. Similarly, the interview-based conclusions of Glover (2020) do not provide a robust basis for TACC setting. Knee-jerk TACC reductions, based on tangential studies with no suitable peer review, would set a dangerous precedent which would adversely affect future industry confidence in fisheries management.

5. Contradictory conclusions relating to the cyclic nature of the resource

The Discussion Paper states:

Bladder kelp beds exhibit pronounced spatial and temporal variability driven by many interacting abiotic and biotic factors that influence reproduction, senescence, growth, and survival (Cavanaugh et.al., 2021). Short-term growth rates and peaks in biomass can vary significantly over very short distances, and fluctuations in canopy area can occur naturally. As such, estimates of abundance and biomass must be treated with caution in both time and space.

The Discussion Paper then describes the effect of marine heatwaves in reducing surface canopies of kelp. However, the Discussion Paper does not mention any research on how the affected stocks might recover after marine temperatures return to normal. Schiel and Foster (2015) explain how kelp naturally dies back in the summer and then regrows in the autumn and winter months. The rate and extent of cyclic die-back and regrowth, and its bearing on long-term trends in kelp biomass, are not explored by Tait *et al* (2021) nor the Discussion Paper.

The Discussion Paper then explains why satellite-based measurements of (only) surface-reaching kelp abundance from Tait *et al* (2021) justify substantial TACC reductions. Such justification is nonsensical in the light of the cyclic nature of the resource, and the fact that the original TACC settings took this cyclic nature into account.

6. Earthquake effects are not relevant to the purposes of FA Section 13

The Discussion Paper describes loss of kelp beds following the 2016 Kaikoura earthquake. It is accepted that kelp, like other harvested marine species such as paua and rock lobster, might have declined in the affected area – about 12% of FMA3. However, there is no information on how much kelp was in the affected area prior to the earthquake. The Discussion Document asserts that many areas of affected coastline still remain devoid of kelp. Given it is unknown if kelp ever existed there in the first place, evidence of a wholesale "decline" is not really there. In any event, kelp had not been harvested from the affected area, and if it were, it would have had no adverse effect on the subsequent resource. Using this one-off event as justification for wholesale TACC reductions across the entire FMA3, without relevant supporting information, is spurious at best

7. Social, cultural and economic factors are not considered in the Discussion Paper

The Discussion Paper regards the TACC reduction proposals to have no immediate economic implications on the commercial fishery, as recent (very low) catch levels could continue to be taken.

FA Section 13 A (3) describes, in considering the way in which and rate at which a stock is moved towards or above a level that can produce maximum sustainable yield, the Minister shall have regard to such social, cultural, and economic factors as he or she considers relevant.

It should be noted that when making TACC decisions, information related to social and economic interests may include current **and potential** utilisation. Potential utilisation is particularly important for quota allocated under Treaty Settlements. No analyses have been provided by the Discussion Paper on the effects on potential utilisation. In short, the Discussion Paper appears to adopt a "use it or lose it" stance, which is a very dangerous precedent to set for future fisheries management.

No cost-benefit analysis has been done on the reduction of KBB3G quota as proposed in the Discussion Paper. Much could be said about the adverse effects on potential utilisation. For example, Table 2 provides the annual loss of potential earnings from each Option:

	KBB3G
Option 1 (Status quo)	**$0**
Option 2	**$3,710,400**
Option 3	**$5,565,600**

Table 2: Estimated annual losses of potential earnings caused by Options proposed in the Discussion Paper. These costs are based on a landed value of Bladder Kelp of NZ$6000 per tonne.

8. Summary and conclusion

In summary, the commercial harvest of bladder kelp through current TACC settings and 1.2 metre rule poses no risk to kelp plants, the wider environment or the wider ecosystem supported by kelp forests. The TACC setting therefore cannot be adjusted to fulfil the requirements of FA Section 13(2). Research needs to be of sufficient quality to meet the Research Strategy Standard, before it is used to justify TACC adjustments. Social, cultural and economic factors need to be properly considered, including actual and potential factors.

In effect, this means that, contrary to the arbitrary quota-reduction options presented in the Discussion Paper, the Status Quo Option is the only option which can be implemented for KBB3G at this time.

Yours faithfully

W.P Chisholm, on behalf of the above KBB3G quota owners.

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Annexure 1 - CONFIDENTIAL

THIS REPORT IS NOT FOR GENERAL CIRCULATION.
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Comments on: Review of Sustainability measures for Attached Bladder Kelp (KBB3G and KBB4G) for 2022/23. Discussion paper No 2022/10.

Confidentially prepared for Roger Beattie of Sea-Right Investment Ltd. 11 July 2022
By DR Schiel Distinguished Professor, Marine Science School of Biological Science
Canterbury University, Private Bag 4800 Christchurch

For internal citation: DR Schiel, Comments on: *Review of Sustainability Measures for Attached Bladder Kelp (KBB 3G and KBB 4G) for 2022/23; Fisheries NZ Discussion Paper No: 2022/10*, prepared for RD Beattie, July 2022.

This is a summary of relevant literature and comments relating to giant kelp (*Macrocystis pyrifera*) with respect to the statements and clauses in the FNZ document. It is by no means a comprehensive review of the literature on giant kelp, which exceeds 1000 scientific papers and reports (Schiel & Foster 2015).

I. *In response to Section 12: Questions for submitters, potential reply*

• Support the *status quo* on the basis that there is no robust or logical scientific and verifiable evidence presented to support a reduction in the TAC.

• The option of maintaining the status quo adequately provides for social, economic and emotional wellbeing, as there is no credible evidence for impacts or stressors on giant kelp, *Macrocysis pyrifera* (called 'bladder kelp' in the FNZ report), from harvesting. Furthermore, the original setting of TACs considered effects widely, and the evidence in this report does not support a conclusion that the situation has changed. In fact, Clause 40 states that *"all stocks are effectively in a virgin state"*.

• Concerns about potential impacts. Of course, most people working in or making a living from natural resources have concerns about environmental impacts. However, all of the scientific evidence indicates no impacts from harvesting giant kelp, or detrimental impacts detectable in the wider environment. Great care is taken in harvesting giant kelp canopies, whereby only a relatively small proportion of the canopy is harvested at a time in local patches, and harvesting is done on a rotational basis as giant kelp canopies recover, thereby ensuring minimal of no impacts, and causing no concerns about sustainability.

II. *Rationale for Objections to details of the FNZ document with respect to sustainability of harvesting Macrocystis pyrifera.*

1. The document *Fisheries NZ Discussion Paper No. 2022/10* is misleading, in my view, in many respects and erroneous in parts, has a very selective use and interpretation of the scientific literature relevant to *Macrocystis* harvesting and the status of giant kelp populations worldwide, and a faulty logic chain in arguing for reductions in the TAC. Because faulty premises lead to erroneous conclusions, the core arguments and conclusions are questionable, and I show here that they do not follow from the evidence available.

2. The logic chain reads as a) there is reduction in kelp beds in several areas of the world, b) there is evidence of kelp decline during periods of highly elevated sea-surface temperatures (SST) during marine heat waves in New Zealand (section 3.3), c) that this contributed to the decline of crayfish, pāua and reef fish (Clause 28), d) that the original TACs *"may no longer be relevant to estimate current biomass"* (Clause 36), e) the clear implication that harvesting will add to the 'stressors' of giant kelp, and f) that therefore the quotas should be reduced. This conclusion is flawed because the premises are weak. This false deductive reasoning from a selective general case (i.e., decline worldwide – which is not by any means globally true) to a specific case (in southern NZ) ignores the great spatial and temporal variability of this widely distributed species of kelp. As well, it conflates

impacts on smaller kelps to those on giant kelp, which has such a far different morphology and basic biology that comparisons with other kelps are largely spurious. In particular, the high connectivity of populations of giant kelp, based on their prolific reproductive output and dispersal abilities, render them exceptional among the kelp species in their biogeographic distribution and ability to recover from disturbances, even quite large ones.

3. As pointed out in the comprehensive book on giant kelp by Schiel & Foster (2015; uncited in this FNZ document), *Macrocystis pyrifera* is substantially different from all other seaweeds. This is not summarised well in Section 3.2 (Biology) of the FNZ document. It is the most-studied of seaweeds, and much is known about its biology, ecology, resilience, recovery from disturbances, variability within and among regions in the world over time. It has the fastest growth rate of any kelps, has up to 80% of its biomass in the canopy floating on the sea surface when mature, is highly prone to removal in storms, and has quickly regenerating sub-surface fronds that grow to the sea surface. Clause 19 does not mention its other major component, that of its reproductive sporophylls that are at the base of the plant and are generally unaffected by canopy removal. The huge, year-round reproductive potential of *Macrocystis* and its ability to form floating rafts when whole plants are removed in storms, greatly aid recovery after a disturbance, even a large one from El Nino storms, usually within two years (Edwards & Estes 2006). It is one of the most resilient of kelps to disturbances. Large-scale, repeated disturbance experiments showed importantly that recovery was based on the original state of the kelp forest and the quality of habitat (Castorini et al 2021). In many areas of the world, giant kelp canopies regress during summer because of high SST, water column stratification, and low nutrients. These usually do not greatly affect subsurface fronds, which grow when conditions become more favourable. This massive kelp has a weedy life history, is unlike other kelps, which usually do not have multiple fronds, have their reproductive structures in the laminae (blades) at the top of plants, and often have little or no ability to float and disperse (such as the NZ common kelp *Ecklonia radiata and Lessonia spp*). These are crucial differences between giant kelp and other kelps that render their populations highly resilient to disturbances.

4. *A note on diversity and kelp.* All kelp 'beds' (i.e., only a few form 'forests' that extend to the sea surface) have greater diversity than when kelps are removed. This is mostly due to the biogenic habitat and 3-dimensional structure afforded by kelps (cf. Graham et al 2007). So, whereas Clause 18 is correct about kelps generally, it is not specific to *Macrocystis*, and there are no obligate species associated with *Macrocystis* in NZ (compared to California; Graham et al 2007). As well, stipitate kelps, like *Ecklonia* in NZ, are usually present in the *Macrocystis* understory and are abundant on reefs in NZ. Studies overseas have shown that when *Macrocystis* canopies are removed, light increases to the understory and in some cases there is productivity compensation by understory kelps (e.g., Castorini et al 2021, among others). With few exceptions (e.g., NZ butterfish *Odax pullus*) these kelps in combination fuel the food web through detritus and particulate organic matter rather than direct feeding on attached tissue (Udy et al 2019). In any case, the 'standing crop' of giant kelp typically recycles quickly as new fronds are formed. In fact, few fronds live past 200 days (Rodriquez et al 2013).

5. *The influence of sea warming.* Virtually all algal species are limited in distribution by high temperatures, but this varies considerably by species and physiology. The kelp declines mentioned in Clause 22 were significant, but this section is misleading. All kelps undergo losses for a wide range of environmental reasons. For giant kelp, this can be highly seasonal, due to storms or in some cases overgrazing by sea urchins, can be localised or basin-wide, with considerable differences regionally such as along the coast of California (Reed et al 2011, Bell et al 2015). Recovery usually quickly follows, especially after winter storms remove much of the surface canopy of *Macrocystis*. However, a signal paper by Reed et al (2016) showed from longterm data *"that giant kelp and the majority of species that associate with it did not presage ecosystem effects of extreme warming off southern*

California despite giant kelp's expected vulnerability. Our results challenge the general perception that kelp dominated systems are highly vulnerable to extreme warming events and expose the more general risk of relying on supposed sentinel species that are assumed to be very sensitive to climate change".

6. *Replacement by small weedy turfs* (Clause 23). There are numerous references on small-scale effects on fucoids and smaller kelps, but replacement by turfs in not generally the case for *Macrocystis.* Unlike other species, giant kelp require only around 1 recruit per several square meters to form a canopy eventually, so they are not normally out-competed well on the benthos over extensive areas.

7. *General decline in kelp worldwide*. An influential paper (uncited in the FNZ report) examining global patterns of kelp forest change over the past half-century, by a wide list of authors who worked in kelp forests (Krumhansl et al 2015), identified kelp declines in 38% of ecoregions, no change in 35%, and increases in 27% of ecoregions. Their conclusion was that global drivers could be affecting kelp forests at multiple scales, but local stressors and regional variation in the effects of these drivers dominate kelp dynamics. Therefore, understanding local drivers and not just speculating on them, is of considerable importance. It is germane that they identified three ecoregions where there was a high probability of increases in kelp abundance, which included north-eastern New Zealand, although there was statistical uncertainty in this. This simply makes the point that in one of NZ's warmest regions, there was no decline.

8. *Decline of* Macrocystis *in Tasmania.* It was not just temperature that caused the decline of giant kelp along eastern Tasmania, but this involved the movement inshore of the warm-water East Australian Current, which also brought oligotrophic water causing nutrient stress (see Mabin et al 2019, and Johnson et al 2011 for current shifts). The current along the south-east coast of NZ, where giant kelp are common, flows mostly from the south and brings cooler waters (Schiel 2011).

9. *Decline of Macrocystis in NZ* (Clause 25). This is misleading about SST and its influence on kelps and giant kelp. As clearly described in Thomsen et al (2019), bull kelp *Durvillaea spp.* (which are fucoid algae and not 'kelp') is a low intertidal zone species that declined because of a combination of very high and desiccating air temperatures, prolonged exposure of the algae during very low tides, combined with warm SST from the 2017-18 Marine Heat Wave. The incursion of the annual kelp *Undaria* in this study occurred because this species is opportunistic and very good at capturing patches of bare space, and is generally a poor competitor (see experimental studies by Thompson & Schiel 2012). This clause therefore has little bearing on giant kelp.

10. *Citation for decline*, Clauses 26-27. The major paper cited for the decline of giant kelp was Tait, L.W., Thoral, F., Pinkerton, M.H., Thomsen, M.S. and Schiel, D.R. (2021). These clauses capture some of the conclusions of the study, but are cursory and misleading. The graphs presented in the FNZ report are not a temporal sequence of decline, but rather show the decline of surface canopies in some areas at prolonged SST >18o C during a marine heat wave. A time series from this paper is shown in its Supplementary Figure 1. This clearly indicates that between summer 2016 onwards when giant kelp canopies were at their lowest point, the subsurface populations of giant kelp were often at their highest abundances. The "0" values for remote data have been obscured by the log-transformation, but zero values for remote observations were more frequent than *in situ* zeros. The *in situ* large plants at or near the surface were almost always present, yet these were not always detectable from satellite. Smaller plants and recruits were also present, and often abundant, but these do not relate to detections at the surface so were excluded. This figure was included to clarify that remote sensing and *in situ* data have some agreement, but that subsurface forests are almost always present. This was stated categorically in the methods of the main paper. If this figure is being

used as evidence of populations "stressed" by SST, it is very much being misinterpreted. For example, *Macrocystis* recruits were more abundant during the 2017-18 MHW than at any other time during a three-year period. While there was a significant negative trend of high temperature anomalies at all latitudes, southern sites retained high coverage even during the most severe heat wave. All of the giant kelp beds recovered fairly quickly (less than 6 months) after reductions in cover (showing that subsurface plants and seedbanks were resilient). It is noteworthy that further data (i.e., this time period was not covered by the 2021 paper), in the summer/autumn of 2020-21, kelp coverage across NZ was the highest seen by the authors (as estimated remotely) despite temperature anomalies in southern/central regions being + 2-3 degrees warmer than the 30-year average. The paper found that over the time period examined, key determinants of *in situ* population density were significant waveheight, then water clarity.

11. *Use of anecdotal evidence* (Clauses 28). In our experience, almost everyone you talk to thinks most things are in decline! The Glover (2020) study is a MSc thesis, which has not been externally peer-reviewed or published, and it is based on interviews and is not a field-based empirical study. It is by no means a "similar recent study" reporting a significant loss of bladder kelp – Tait et al 2021 was highly empirical and analytical. It is simply unsupportable evidentially to conclude that "the loss of kelp forest cover contributed to a gradual decline in the local abundance of crayfish, pāua, and reef fish". Overfishing of these species, often by recreational fishers, has led to declines elsewhere. For example, the recent 7-fold overfishing of pāua by recreational fishers along the Kaikoura coast over a 3-month period is a clear indication of decline of pāua that had nothing at all to do with kelp dynamics. This statement and clause should not be used as supportive evidence for kelp decline – at best it is anecdotal, and it sheds no light at all on process, dynamics, other species, or causes.

12. *Earthquake effects*, Clause 30. This clause and the cited publications have no direct bearing on *Macrocystis*. They had to do with the huge coastal uplift caused by the Kaikoura earthquake, great mortality of many species, continued loss of bull kelp (*Durvillaea*) because of poor population connectivity, and generally poor recovery to the original state of the ecosystem. This was further expounded by Schiel et al (2021), who discussed the loss of 'ecological infrastructure' relating to the earthquake and how physical forcing interacted with species' life histories and population dynamics to determine resilience and recovery. As also highlighted by Tait et al (2021), the poor light environment due to sedimentation was highlighted as an important impediment to recovery and productivity. It should also be borne in mind that these studies were largely of intertidal species, which were also subjected to severe air temperatures that often exceeded their physiological abilities to recover. This is not the case for giant kelp populations.

13. *Harvesting kelp as a 'stressor"*. There is no evidence that harvesting a portion of the canopy of giant kelp has a deleterious effect on *Macrocystis* or its related communities. This is not because of having no studies to examine the problem, but because no adverse effects were found. This was reviewed by Schiel & Foster (2015). Considerable kelp harvesting (tens of thousands of tonnes annually) occurred along Californian kelp beds for most of the 20th Century, before it became uneconomic on a large commercial scale. Schiel & Foster state: *"Questions over possible impacts of harvesting on the environment and a desire for sustainability led to various harvesting investigations in California, beginning in the 1950s. Concerns included possible loss of entire kelp forests, reduction of canopy-dwelling fishes and invertebrates, reduction of fish populations due to loss of food and / or habitat, increased beach erosion due to less dampening of water motion, and an increase in the abundance of drift kelp on beaches from cut fronds and dislodged plants not captured by the harvester. Early studies of these potential problems were summarized by North and Hubbs (1968) who concluded that "No adverse influence of harvesting could be found among the statistics or field observations for the periods studied. A later review by Barilotti and Zertuche-González (1990) came to the same conclusion"*. In New Zealand, giant kelp canopies are rotationally harvested by hand.

Only a portion of the canopy is taken and only when the kelp appear to be healthy and robust (i.e., it is easy to determine when giant kelp is stressed because it loses much of its pigments). This cautionary approach to harvesting is used because there are no adverse effects (Pirker, Schiel, Lees, kelp harvesting report, funded by the Technology and Business Growth fund and it is not good commercial practice to take kelp in poor condition, or to have populations be unsustainable.

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2022 Sustainability Review, Fisheries Management,
Fisheries New Zealand,
PO Box 2526,
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26th July 2022

Emailed to:fmsubmissions@mpi.govt.nz

Submission on the Review of Sustainability Measures for Attached Bladder Kelp (KBB4G) for 2022/23
Fisheries NZ Discussion Paper No: 2022/10 (the "Discussion Paper")

A. Introduction to this submission and submitters

This submission is made on proposals for the KBB4G fishery, and is on behalf of the following KBB4G quota owners:

- Mr Roger Douglas Beattie
- Chatham Islands Quota Holdings Ltd
- Hokotehi Settlement Quota Holding Co. Ltd
- Ngati Mutunga O Wharekauri AHC Ltd

100% of the KBB4G Quota holders are represented by this submission (see table below):

The address for service for this submission is: Attn: Bill Chisholm, Chisholm Associates, PO Box

The submitters support the status quo option 1 only. The submitters oppose the other option presented in the Discussion Paper. This submission provides reasons for opposition to any TACC reduction in KBB4G.

We also draw your attention to the CONFIDENTIAL Annexure 1 Comments on: Review of Sustainability Measures for Attached Bladder Kelp (KBB 3G and KBB 4G) for 2022/23; Fisheries NZ Discussion Paper No: 2022/10, prepared **by DR Schiel, Distinguished Professor, Marine Science School of Biological Science Canterbury University**

Quota Owned by Stock

FishServe
Commercial Fisheries Services Ltd

Date as at: **18 July 2022**
Stock code(s): **KBB4G - Bladder Kelp**

Stock	Client	Account	Total shares	Restricted	Trans-ferable
KBB4G	9470001 - Chatham Islands Quota Holdings Limited	Normal	70,835,777		70,835,777
KBB4G	9791514 - Hokotehi Settlement Quota Holding Company Limited	Settlement	10,000,000		10,000,000
KBB4G	9791502 - Ngati Mutunga O Wharekauri Asset Holding Company Limited	Settlement	10,000,000		10,000,000
KBB4G	8470162 - Roger Douglas Beattie	Normal	9,164,223		9,164,223

B. The Bladder Kelp Fishery (*Macrosystis* – KBB4G)

(Macrocystis pyrifera)

KBB*G
"Giant Kelp (*Macrocystis*) is the fastest growing and most prolific of all plant species found on Earth"

Schiel & Foster (2015) The biology and ecology of Giant Kelp Forests

Figure 1. Map of attached Bladder kelp (*Macrocystis pyrifera*) Quota Management Areas KBB3G & KBB4G (referred in this document as "KBB4G").

Bladder kelp (KBB4G), like all other large seaweeds, occurs in one of three states: attached (growing on the substrate); free-floating; and beach cast. The attached growing state of bladder kelp is the only state managed under the QMS.

For KBB4G bladder kelp harvest is restricted by a TACC of 272.8 tonnes. Harvesting is restricted to hand cutting of the surface canopy to a maximum cutting depth of 1.2m.

Research by John Pirker (including Pirker *et al* 2000 and Pirker 2002) was used to provide the original stock assessment information on New Zealand KBB stocks. The commercial harvest of KBB is largely based on experiences with the Californian fishery coupled with New Zealand fisheries management practices (see Schiel and Foster 2015 and Mace *et al* 2014). Further information on harvest dynamics is provided by Geange (2014) and Geange *et al* (2014).

Commercial harvesting to date has been limited to NZ Kelp Ltd, who lease ACE from Roger Beattie, who have harvested 514,573 kg of KBB3G Kelp from Akaroa Harbour and Shag Point from April 2010 to June 2020. For the last two decades NZ Kelp Ltd has worked hard to develop markets and distribution channels for this new industry. The number of products is expanding, and sales are increasing, providing sustainable eco-friendly products to a multitude of end users, while also providing valuable employment and income for New Zealanders.

NZ Kelp Ltd reports all its annual catch to MPI through daily Electronic Returns and Monthly Harvest Returns.

Kelp is used for animal dietary supplements, pasture and cropping foliar sprays, soil conditioning additives, human condiments and health supplements.

C. Submitters Response to Questions from Discussion Paper

The Discussion Paper Section 12 poses several questions to submitters:

Q. ***Which option do you support for revising the TAC and allowances?*** **Why?**
A. The only option supported by the submitters is the Status Quo option. See Section D of this submission for reasons why.

Q. If you do not support any of the options listed, what alternative(s) should be considered? Why?
A. The submitters only support the Status Quo option. Alternatives do not need consideration because a TACC change cannot increase KBB kelp stocks or improve kelp habitats.

Q. Do you think these options adequately provide for social, economic, and cultural wellbeing?
A. Only the Status Quo option provides for actual and potential social, economic, and cultural wellbeing.

Q. Do you have any concerns about potential impacts of the proposed options on the aquatic environment?
A. Yes. Implementing any TAC/TACC reduction may give a false impression that this will protect kelp beds from decline. Nothing could be further from the truth.

D. Reasons why this submission requires the Status Quo Option

1. Options (other than status quo) are contrary to the provisions of the Fisheries Act (FA) Section 13

The option (other than status quo) provided by the Discussion Paper is a reduction in KBB4G of 75%. This percentage reduction is not derived from any stock assessment, stock availability, changes in harvest dynamics or CPUE. It appears to have been arbitrarily "plucked from the air" in reaction to unranked studies which have little direct relevance to fisheries management.

The FA Section 13(2) provides for the Minister to set a TACC that is not inconsistent with the objective of maintaining fisheries stocks at or above, or moving stocks towards or above, the BMSY level. The difficulty here for KBB4G is that it is unlikely that TACC reduction would either

"maintain fish stocks" or "move stocks towards, or above the BMSY level." Consequently, even if a TACC reduction in KBB4G was implemented, it has clearly not been established that such a measure would have the effect of meeting the purpose of FA Section 13 (2).

Furthermore, the information presented in the Discussion Paper does not provide robust justification for TAC/TACC changes. The studies presented in the Discussion Paper do not meet the required Research Standard, and contain inconsistencies which at least need further investigation and peer review. Reducing the (currently very conservative) TACC for KBB4G on the basis of this information would establish ugly legal precedents for fisheries management as a whole.

Other analyses required by FA Section 13 are only briefly mentioned in the Discussion Paper, or are absent altogether. This includes no description of which studies constitute "best available information", and no meaningful analysis of the social, cultural and economic factors described in FA Section 13 A (3).

The initial KBB4G TAC/TACC was based on known bladder kelp biomass information. A range of MCY estimates were developed. However, for KBB4G the Minister decided to impose the lowest, most conservative estimate as the basis of setting the TAC and TACC levels. This (most conservative) estimate was based on uncertainty about biomass estimates because of wide natural fluctuations in kelp biomass. Bladder kelp is known to exhibit wide changes in density, often of a cyclic nature. There is no information provided which suggests that these fluctuations are permanent in FMA4. Nor is there any information demonstrating that current KBB4G densities have reduced below levels anticipated when the original (very conservative) TAC/TACC was set. A knee-jerk TACC change in response to current kelp bed fluctuations, as suggested by the Discussion Paper, is contrary to the principles inherent in FA Section 13.

These are the central legal issues addressed in this submission, and if they are not addressed must inevitably lead to legal proceedings.

2. There is no regard for Settlement issues

Both Hokotehi Settlement Quota Holding Co. Ltd and Ngāti Mutunga o Wharekauri AHC have their respective 10% quota holdings in KBB4G as a consequence of the Fisheries Settlement. Iwi and Imi received equal rights in a wide range of fisheries under that Settlement and bladder kelp sat within the category of a "development fishery" within that Settlement context. It is a species with proven commercial potential internationally but with perhaps lesser immediate development potential on the Chatham Islands than the less remote and calmer marine environments of the South Island.

The principle of fisheries development consistent with the QMS post the Fisheries Settlement is that fisheries development should take place under the TACC. It is axiomatic, therefore, that the TACC in a development fishery must contain sufficient headroom to provide for that development and that unused headroom in a development fishery does not warrant the same kind of management response as under-catch in a fully developed (or over-utilized) fishery. There is no acknowledgement of this crucial distinction in the Discussion Paper. Hokotehi and Ngāti Mutunga o Wharekauri consider that the current TACC level is appropriate for the present "development fishery" status of KBB4G as a Settlement asset.

Iwi and Imi are very mindful of the potential impact of the harvesting of surface reaching kelp beds on associated species, particularly paua and kina which are of major economic and employment significance to both Iwi/Imi and the Chathams community generally. Accordingly, neither iwi nor imi would support KBB4G harvesting that risks an adverse impact on those critical fisheries. Ngāti

Mutunga o Wharekauri, Hokotehi and the Chatham Islands Enterprise Trust will determine if, when and how the "development quota" they hold under their respective Settlements will be used so as to protect their existing fisheries interests and the health of the coastal marine ecosystem of the Chatham Islands.

In determining the protocols and conditions they would impose upon the harvesting of their ITQ, the two Chathams Iwi/Imi and the Enterprise Trust would work together with other quota owners in the fishery. Until that time, the modest development opportunity provided under the Fisheries Settlement by the existing TACC should be protected by the Crown.

3. Regulations are already in place to avoid damage to stocks

When KBB4G was brought into the QMS the Minister agreed to introduce a harvest control of hand cutting only and to a maximum depth of <1.2 metres to avoid any harvesting effects. These additional rule prevent adverse effects on the resource resulting from harvest. In effect, KBB4G harvest is likened to "mowing the lawn". Sporophytes are not harvested or damaged during harvesting, so no damage occurs to reproductive fronds.

The Discussion Document states:

As such, the Minister agreed to introduce a maximum hand cutting depth of <1.2 metres to reduce potential fishing effects, as well as signaling an expectation that quota owners would develop a Memorandum of Understanding (MOU) to promote appropriate harvest strategies and management measures for both fisheries. The MOU has not been developed given the very small nature of each fishery.

The Discussion Paper implies that a Memorandum of Understanding has not been developed in contravention of an "expectation" from the Minister, and that this is because the KBB fisheries are *de minimus*. This implication is mistaken. Harvest strategies and management measures for KBB3G are progressively developed as the fishery continues to develop. Such measures cannot be developed in an environment whereby random TACC cuts are promoted by inadequate science.

The Discussion Paper states:

In the absence of appropriate spatial management controls, commercial fishers have the potential to catch the TACC in one or few localised areas. This option may not provide adequate protection to existing and future bladder kelp beds which are important habitats for marine communities and has the potential to affect associated and dependent species.

This statement, and similar statements on "protection" outlined in paragraphs 74 and 76, are incorrect in their assumptions. The "1.2 metre rule" is designed to prevent overharvest of fronds to the extent that each individual harvested plant is fully protected from undue harm. The issue of where they are harvested is therefore redundant. There is no information provided which demonstrates any adverse harvest effect on marine habitats or communities. On the contrary, studies on the effects of kelp harvest on the ecosystem have been studied in some considerable detail. Although the May 2022 Plenary Report states that the wider habitat effects of harvest have not been measured, Pirker *et al* (2000) studied this issue in depth and concluded: "*Overall there were no negative flow on effects resulting from harvesting the kelp forests.*"

Consequently, statements in the Discussion Paper correlating TACC adjustments with kelp habitat "protection" are also redundant. Commercial kelp harvest has no detrimental effect on kelp beds. Pirker *et al* (2000) states:

"*Harvesting canopy biomass had no measurable effect on Macrocystis plants, or the dominant understory species, including juvenile Macrosystis, Ecklonia radiata and macroinvertebrates.*"

For *Macrosystis*, whole plants live for only 2-6 years and fronds live for 4-9 months. Commercial harvesting harvests groups of fronds. These can legally be harvested to 1.2m deep but are normally harvested to only 0.5m deep. Commercial harvest does not harvest sporophylls. Individual plants regrow rapidly after harvest. In fact, commercial harvest helps recruitment and juvenile frond growth by creating light wells. Harvesting is known to reduce the ripping out of entire beds of kelp including holdfasts. This is done by reducing surface 'rafting', and by creating a more diverse maturity profile i.e. a better balance between old mature fronds and immature fronds. This allows light to penetrate deeper to the growing immature fronds. Pirker *et al* (2000) demonstrates that associated species are not affected by commercial harvesting.

In conclusion, the 1.2 metre rule prevents damage to kelp beds, and probably enhances them, as "mowing" reduces the development of top-heavy senescent fronds which break off in rough weather. It is not possible to unduly damage kelp beds or their habitats through the method of harvesting which is currently regulated. Regardless of the state of the kelp beds themselves, they cannot be altered or improved through reduction in harvest. Consequently, FA Section 13 (2) cannot be enabled through TACC reductions.

4. Studies quoted do not meet necessary standards for TAC/TACC setting

The studies quoted in the Discussion Paper come from the general literature, albeit some are via published articles in scientific journals. These studies have not been formally peer reviewed through the Fisheries NZ Science Working Group process. Consequently, according to the Fisheries NZ's Research Standard, these studies have an "unranked" status. The Research Standard describes the value of "unranked" studies as follows:

Unranked – U is accorded to information that has not been subjected to any formal quality assurance or peer review against the requirements of this Standard. Where unranked information is used to inform fisheries management decisions, it should be noted that the information has not been reviewed against the Standard, and that the quality of the information has not been ranked and cannot be assured.

The Discussion Paper fails to note this important feature of the studies quoted in support of TACC reductions. This applies to those studies quoted in the Discussion Paper as providing "evidence" of a major decline in KBB stocks; most notably Tait *et al* (2021) and Glover (2020).

The Discussion Paper presents options for significant TACC reductions in the absence of robust, peer reviewed studies corresponding to those which occurred >20 years ago, when KBB was brought into the QMS. Instead, the Discussion Paper relies on "U-rated" studies which are lacking in relevant data and robust analyses. To use these as the basis for TACC reductions is to abandon the FA Section 13 principles of "best available information" entirely, and instead rely on "any available information".

5. Discussion Paper conclusions conflict with 2022 Plenary Report

The Fisheries NZ 2022 Plenary Report for KBB3G & KBB4G, in considering the information provided by a range of "U-rated" studies, made the following conclusion:

Because of the apparent rapid spatio-temporal fluctuations in biomass, the status of KBB 3G and KBB4G biomass is unknown and unable to be reliably estimated using currently available information. Therefore, Fisheries New Zealand was unable to ascertain whether the current biomass of both attached bladder kelp stocks is stable, increasing, or decreasing.

Despite this, the Discussion Paper concludes that climate change and anthropogenic sedimentation have brought KBB stocks to the brink of collapse, and that reductions in harvest are necessary to prevent this from being exacerbated. These conclusions appear to be based principally on Tait *et al* (2021). This study found a correlation between loss of surface floating kelp, sea temperatures and water clarity (sedimentation). The study was not able to assess sub-surface kelp beds and its stated correlations between surface-reaching and sub-surface kelp beds were not robust. Even if they were robust, the study was unable to determine whether such correlations were of a temporary or permanent nature. The study also made no comment on the likely effects of kelp harvest on these correlations. In short, Tait *et al* (2021) provided some information of the potential reaction of surface reaching kelp beds to various environmental stressors, but was unable to do the same for all kelp beds. It also provided some suggestions for further research. It did not, however, provide information of any value to TAC/TACC setting.

In considering Tait *et al* (2021) and other "U-ranked" studies, the 2022 Plenary Report concluded that stock projections for KBB3G and KBB4G were unknown. This is unsurprising, given the severe limitations in methodology used by Tait *et al* (2021) in making assessments of kelp biomass from satellite photography of surface reaching fronds. Similarly, the interview-based conclusions of Glover (2020) do not provide a robust basis for TACC setting. Knee-jerk TACC reductions, based on tangential studies with no suitable peer review, would set a dangerous precedent which would adversely affect future industry confidence in fisheries management.

6. Contradictory conclusions relating to the cyclic nature of the resource

The Discussion Paper states:

Bladder kelp beds exhibit pronounced spatial and temporal variability driven by many interacting abiotic and biotic factors that influence reproduction, senescence, growth, and survival (Cavanaugh et.al., 2021). Short-term growth rates and peaks in biomass can vary significantly over very short distances, and fluctuations in canopy area can occur naturally. As such, estimates of abundance and biomass must be treated with caution in both time and space.

The Discussion Paper then describes the effect of marine heatwaves in reducing surface canopies of kelp. However, the Discussion Paper does not mention any research on how the affected stocks might recover after marine temperatures return to normal. Schiel and Foster (2015) explain how kelp naturally dies back in the summer and then regrows in the autumn and

winter months. The rate and extent of cyclic die-back and regrowth, and its bearing on long-term trends in kelp biomass, are not explored by Tait *et al* (2021) nor the Discussion Paper.

The Discussion Paper then explains why satellite-based measurements of (only) surface-reaching kelp abundance from Tait *et al* (2021) justify substantial TACC reductions. Such justification is nonsensical in the light of the cyclic nature of the resource, and the fact that the original TACC settings took this cyclic nature into account.

7. Social, cultural and economic factors are not considered in the Discussion Paper

The Discussion Paper regards the TACC reduction proposals to have no immediate economic implications on the commercial fishery, as recent (very low) catch levels could continue to be taken.

FA Section 13 A (3) describes, in considering the way in which and rate at which a stock is moved towards or above a level that can produce maximum sustainable yield, the Minister shall have regard to such social, cultural, and economic factors as he or she considers relevant.

It should be noted that when making TACC decisions, information related to social and economic interests may include current **and potential** utilisation. No analyses has been provided by the Discussion Paper on the effects on potential utilisation. In short, the Discussion Paper appears to adopt a "use it or lose it" stance, which is a very dangerous precedent to set for future fisheries management.

No cost-benefit analysis has been done on the reduction of KBB4G quota as proposed in the Discussion Paper. Much could be said about the adverse effects on potential utilisation. For example, Table 2 provides the annual loss of potential earnings from the reduction:

	KBB4G
Option 1 (Status quo)	**$0**
Option 2	**$1,227,600**

Table 2: Estimated annual losses of potential earnings caused by the reduction proposed in the Discussion Paper. These losses are based on a landed value of Giant Kelp of NZ$6000 per tonne.

8. Summary and conclusion

In summary, the commercial harvest of kelp through current TACC settings and 1.2 metre rule poses no risk to kelp plants, the wider environment or the wider ecosystem supported by kelp forests. The TACC setting therefore cannot be adjusted to fulfil the requirements of FA Section 13(2). Research needs to be of sufficient quality to meet the Research Strategy Standard, before it is used to justify TACC adjustments. Social, cultural and economic factors need to be properly considered, including actual and potential factors. Settlement issues are also relevant, particularly for KBB4G.

In effect, this means that, contrary to the arbitrary quota-reduction option presented in the Discussion Paper, the Status Quo Option is the only option which can be implemented for KBB4G at this time.

Yours faithfully

W.P Chisholm, on behalf of the above KBB4G quota owners.

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Annexure 1 - CONFIDENTIAL

THIS REPORT IS NOT FOR GENERAL CIRCULATION.
ANY USE OF IT OR CITATION OF IT MUST BE GRANTED IN WRITING BY EITHER ROGER D BEATTIE OR DAVID R SCHIEL.

Comments on: Review of Sustainability measures for Attached Bladder Kelp (KBB3G and KBB4G) for 2022/23. Discussion paper No 2022/10.

Confidentially prepared for Roger Beattie of Sea-Right Investment Ltd. 11 July 2022
By DR Schiel Distinguished Professor, Marine Science School of Biological Science
Canterbury University, Private Bag 4800 Christchurch

For internal citation: DR Schiel, Comments on: *Review of Sustainability Measures for Attached Bladder Kelp (KBB 3G and KBB 4G) for 2022/23; Fisheries NZ Discussion Paper No: 2022/10*, prepared for RD Beattie, July 2022.

This is a summary of relevant literature and comments relating to giant kelp (*Macrocystis pyrifera*) with respect to the statements and clauses in the FNZ document. It is by no means a comprehensive review of the literature on giant kelp, which exceeds 1000 scientific papers and reports (Schiel & Foster 2015).

I. *In response to Section 12: Questions for submitters, potential reply*

• Support the *status quo* on the basis that there is no robust or logical scientific and verifiable evidence presented to support a reduction in the TAC.

• The option of maintaining the status quo adequately provides for social, economic and emotional wellbeing, as there is no credible evidence for impacts or stressors on giant kelp, *Macrocysis pyrifera* (called 'bladder kelp' in the FNZ report), from harvesting. Furthermore, the original setting of TACs considered effects widely, and the evidence in this report does not support a conclusion that the situation has changed. In fact, Clause 40 states that *"all stocks are effectively in a virgin state"*.

• Concerns about potential impacts. Of course, most people working in or making a living from natural resources have concerns about environmental impacts. However, all of

the scientific evidence indicates no impacts from harvesting giant kelp, or detrimental impacts detectable in the wider environment. Great care is taken in harvesting giant kelp canopies, whereby only a relatively small proportion of the canopy is harvested at a time in local patches, and harvesting is done on a rotational basis as giant kelp canopies recover, thereby ensuring minimal of no impacts, and causing no concerns about sustainability.

II. *Rationale for Objections to details of the FNZ document with respect to sustainability of harvesting Macrocystis pyrifera.*

1. The document *Fisheries NZ Discussion Paper No. 2022/10* is misleading, in my view, in many respects and erroneous in parts, has a very selective use and interpretation of the scientific literature relevant to *Macrocystis* harvesting and the status of giant kelp populations worldwide, and a faulty logic chain in arguing for reductions in the TAC. Because faulty premises lead to erroneous conclusions, the core arguments and conclusions are questionable, and I show here that they do not follow from the evidence available.

2. The logic chain reads as a) there is reduction in kelp beds in several areas of the world, b) there is evidence of kelp decline during periods of highly elevated sea-surface temperatures (SST) during marine heat waves in New Zealand (section 3.3), c) that this contributed to the decline of crayfish, pāua and reef fish (Clause 28), d) that the original TACs *"may no longer be relevant to estimate current biomass"* (Clause 36), e) the clear implication that harvesting will add to the 'stressors' of giant kelp, and f) that therefore the quotas should be reduced. This conclusion is flawed because the premises are weak. This false deductive reasoning from a selective general case (i.e., decline worldwide – which is not by any means globally true) to a specific case (in southern NZ) ignores the great spatial and temporal variability of this widely distributed species of kelp. As well, it conflates impacts on smaller kelps to those on giant kelp, which has such a far different morphology and basic biology that comparisons with other kelps are largely spurious. In particular, the high connectivity of populations of giant kelp, based on their prolific reproductive output and dispersal abilities, render them exceptional among the kelp species in their biogeographic distribution and ability to recover from disturbances, even quite large ones.

3. As pointed out in the comprehensive book on giant kelp by Schiel & Foster (2015; uncited in this FNZ document), *Macrocystis pyrifera* is substantially different from all other seaweeds. This is not summarised well in Section 3.2 (Biology) of the FNZ document. It is the most-studied of seaweeds, and much is known about its biology, ecology, resilience, recovery from disturbances, variability within and among regions in the world over time. It has the fastest growth rate of any kelps, has up to 80% of its biomass in the canopy floating on the sea surface when mature, is highly prone to removal in storms, and has quickly regenerating sub-surface fronds that grow to the sea surface. Clause 19 does not mention its other major component, that of its reproductive sporophylls that are at the base of the plant and are generally unaffected by canopy removal. The huge, year-round reproductive potential of *Macrocystis* and its ability to form floating rafts when whole plants are removed in storms, greatly aid recovery after a disturbance, even a large one from El Nino storms, usually within two years (Edwards & Estes 2006). It is one of the most resilient of kelps to disturbances. Large-scale, repeated disturbance experiments showed importantly that recovery was based on the original state of the kelp forest and the quality of habitat (Castorini et al 2021). In many areas of the world, giant kelp canopies regress during summer because of high SST, water column stratification, and low nutrients. These usually do not greatly affect subsurface fronds, which grow when conditions become more favourable. This massive kelp has a weedy life history, is unlike other kelps, which usually do not have multiple fronds, have their reproductive structures in the laminae

(blades) at the top of plants, and often have little or no ability to float and disperse (such as the NZ common kelp *Ecklonia radiata and Lessonia spp*). These are crucial differences between giant kelp and other kelps that render their populations highly resilient to disturbances.

4. *A note on diversity and kelp.* All kelp 'beds' (i.e., only a few form 'forests' that extend to the sea surface) have greater diversity than when kelps are removed. This is mostly due to the biogenic habitat and 3-dimensional structure afforded by kelps (cf. Graham et al 2007). So, whereas Clause 18 is correct about kelps generally, it is not specific to *Macrocystis*, and there are no obligate species associated with *Macrocystis* in NZ (compared to California; Graham et al 2007). As well, stipitate kelps, like *Ecklonia* in NZ, are usually present in the *Macrocystis* understory and are abundant on reefs in NZ. Studies overseas have shown that when *Macrocystis* canopies are removed, light increases to the understory and in some cases there is productivity compensation by understory kelps (e.g., Castorini et al 2021, among others). With few exceptions (e.g., NZ butterfish *Odax pullus*) these kelps in combination fuel the food web through detritus and particulate organic matter rather than direct feeding on attached tissue (Udy et al 2019). In any case, the 'standing crop' of giant kelp typically recycles quickly as new fronds are formed. In fact, few fronds live past 200 days (Rodriquez et al 2013).

5. *The influence of sea warming.* Virtually all algal species are limited in distribution by high temperatures, but this varies considerably by species and physiology. The kelp declines mentioned in Clause 22 were significant, but this section is misleading. All kelps undergo losses for a wide range of environmental reasons. For giant kelp, this can be highly seasonal, due to storms or in some cases overgrazing by sea urchins, can be localised or basin-wide, with considerable differences regionally such as along the coast of California (Reed et al 2011, Bell et al 2015). Recovery usually quickly follows, especially after winter storms remove much of the surface canopy of *Macrocystis*. However, a signal paper by Reed et al (2016) showed from longterm data *"that giant kelp and the majority of species that associate with it did not presage ecosystem effects of extreme warming off southern California despite giant kelp's expected vulnerability. Our results challenge the general perception that kelp dominated systems are highly vulnerable to extreme warming events and expose the more general risk of relying on supposed sentinel species that are assumed to be very sensitive to climate change".*

6. *Replacement by small weedy turfs* (Clause 23). There are numerous references on small-scale effects on fucoids and smaller kelps, but replacement by turfs in not generally the case for *Macrocystis.* Unlike other species, giant kelp require only around 1 recruit per several square meters to form a canopy eventually, so they are not normally out-competed well on the benthos over extensive areas.

7. *General decline in kelp worldwide*. An influential paper (uncited in the FNZ report) examining global patterns of kelp forest change over the past half-century, by a wide list of authors who worked in kelp forests (Krumhansl et al 2015), identified kelp declines in 38% of ecoregions, no change in 35%, and increases in 27% of ecoregions. Their conclusion was that global drivers could be affecting kelp forests at multiple scales, but local stressors and regional variation in the effects of these drivers dominate kelp dynamics. Therefore, understanding local drivers and not just speculating on them, is of considerable importance. It is germane that they identified three ecoregions where there was a high probability of increases in kelp abundance, which included north-eastern New Zealand, although there was statistical uncertainty in this. This simply makes the point that in one of NZ's warmest regions, there was no decline.

8. *Decline of* Macrocystis *in Tasmania*. It was not just temperature that caused the decline of giant kelp along eastern Tasmania, but this involved the movement inshore of the warm-

water East Australian Current, which also brought oligotrophic water causing nutrient stress (see Mabin et al 2019, and Johnson et al 2011 for current shifts). The current along the south-east coast of NZ, where giant kelp are common, flows mostly from the south and brings cooler waters (Schiel 2011).

9. *Decline of Macrocystis in NZ* (Clause 25). This is misleading about SST and its influence on kelps and giant kelp. As clearly described in Thomsen et al (2019), bull kelp *Durvillaea spp.* (which are fucoid algae and not 'kelp') is a low intertidal zone species that declined because of a combination of very high and desiccating air temperatures, prolonged exposure of the algae during very low tides, combined with warm SST from the 2017-18 Marine Heat Wave. The incursion of the annual kelp *Undaria* in this study occurred because this species is opportunistic and very good at capturing patches of bare space, and is generally a poor competitor (see experimental studies by Thompson & Schiel 2012). This clause therefore has little bearing on giant kelp.

10. *Citation for decline*, Clauses 26-27. The major paper cited for the decline of giant kelp was Tait, L.W., Thoral, F., Pinkerton, M.H., Thomsen, M.S. and Schiel, D.R. (2021). These clauses capture some of the conclusions of the study, but are cursory and misleading. The graphs presented in the FNZ report are not a temporal sequence of decline, but rather show the decline of surface canopies in some areas at prolonged SST >18o C during a marine heat wave. A time series from this paper is shown in its Supplementary Figure 1. This clearly indicates that between summer 2016 onwards when giant kelp canopies were at their lowest point, the subsurface populations of giant kelp were often at their highest abundances. The "0" values for remote data have been obscured by the log-transformation, but zero values for remote observations were more frequent than *in situ* zeros. The *in situ* large plants at or near the surface were almost always present, yet these were not always detectable from satellite. Smaller plants and recruits were also present, and often abundant, but these do not relate to detections at the surface so were excluded. This figure was included to clarify that remote sensing and *in situ* data have some agreement, but that subsurface forests are almost always present. This was stated categorically in the methods of the main paper. If this figure is being used as evidence of populations "stressed" by SST, it is very much being misinterpreted. For example, *Macrocystis* recruits were more abundant during the 2017-18 MHW than at any other time during a three-year period. While there was a significant negative trend of high temperature anomalies at all latitudes, southern sites retained high coverage even during the most severe heat wave. All of the giant kelp beds recovered fairly quickly (less than 6 months) after reductions in cover (showing that subsurface plants and seedbanks were resilient). It is noteworthy that further data (i.e., this time period was not covered by the 2021 paper), in the summer/autumn of 2020-21, kelp coverage across NZ was the highest seen by the authors (as estimated remotely) despite temperature anomalies in southern/central regions being + 2-3 degrees warmer than the 30-year average. The paper found that over the time period examined, key determinants of *in situ* population density were significant waveheight, then water clarity.

11. *Use of anecdotal evidence* (Clauses 28). In our experience, almost everyone you talk to thinks most things are in decline! The Glover (2020) study is a MSc thesis, which has not been externally peer-reviewed or published, and it is based on interviews and is not a field-based empirical study. It is by no means a "similar recent study" reporting a significant loss of bladder kelp – Tait et al 2021 was highly empirical and analytical. It is simply unsupportable evidentially to conclude that "the loss of kelp forest cover contributed to a gradual decline in the local abundance of crayfish, pāua, and reef fish". Overfishing of these species, often by recreational fishers, has led to declines elsewhere. For example, the recent 7-fold overfishing of pāua by recreational fishers along the Kaikoura coast

over a 3-month period is a clear indication of decline of pāua that had nothing at all to do with kelp dynamics. This statement and clause should not be used as supportive evidence for kelp decline – at best it is anecdotal, and it sheds no light at all on process, dynamics, other species, or causes.

12. *Earthquake effects*, Clause 30. This clause and the cited publications have no direct bearing on *Macrocystis*. They had to do with the huge coastal uplift caused by the Kaikoura earthquake, great mortality of many species, continued loss of bull kelp (*Durvillaea*) because of poor population connectivity, and generally poor recovery to the original state of the ecosystem. This was further expounded by Schiel et al (2021), who discussed the loss of 'ecological infrastructure' relating to the earthquake and how physical forcing interacted with species' life histories and population dynamics to determine resilience and recovery. As also highlighted by Tait et al (2021), the poor light environment due to sedimentation was highlighted as an important impediment to recovery and productivity. It should also be borne in mind that these studies were largely of intertidal species, which were also subjected to severe air temperatures that often exceeded their physiological abilities to recover. This is not the case for giant kelp populations.

13. *Harvesting kelp as a 'stressor"*. There is no evidence that harvesting a portion of the canopy of giant kelp has a deleterious effect on *Macrocystis* or its related communities. This is not because of having no studies to examine the problem, but because no adverse effects were found. This was reviewed by Schiel & Foster (2015). Considerable kelp harvesting (tens of thousands of tonnes annually) occurred along Californian kelp beds for most of the 20th Century, before it became uneconomic on a large commercial scale. Schiel & Foster state: *"Questions over possible impacts of harvesting on the environment and a desire for sustainability led to various harvesting investigations in California, beginning in the 1950s. Concerns included possible loss of entire kelp forests, reduction of canopy-dwelling fishes and invertebrates, reduction of fish populations due to loss of food and / or habitat, increased beach erosion due to less dampening of water motion, and an increase in the abundance of drift kelp on beaches from cut fronds and dislodged plants not captured by the harvester. Early studies of these potential problems were summarized by North and Hubbs (1968) who concluded that "No adverse influence of harvesting could be found among the statistics or field observations for the periods studied. A later review by Barilotti and Zertuche-González (1990) came to the same conclusion"*. In New Zealand, giant kelp canopies are rotationally harvested by hand. Only a portion of the canopy is taken and only when the kelp appear to be healthy and robust (i.e., it is easy to determine when giant kelp is stressed because it loses much of its pigments). This cautionary approach to harvesting is used because there are no adverse effects (Pirker, Schiel, Lees, kelp harvesting report, funded by the Technology and Business Growth fund and it is not good commercial practice to take kelp in poor condition, or to have populations be unsustainable.

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22nd July 2022

Emailed to:fmsubmissions@mpi.govt.nz

Submission on the Review of Sustainability Measures for Bladder Kelp KBB4G
Fisheries NZ Discussion Paper No: 2022/10

To Whom It May Concern,
The **Chatham Islands Quota Holding Co** (CIQH) is a significant quota owner in the waters adjacent to the Chatham Islands and **owns 70% of the KBB4G quota shares.** Commercial fishing is the primary revenue stream for Island and further on-island development of the sector is a key element of future economic development. The revenue generated from the CIQH quota holding makes a significant contribution to the wellbeing of the entire island population, therefore maintaining healthy and abundant fish stocks is mission critical for us.

CIQH strongly supports the status quo Option 1.
We understand that 100% of the KBB4G quota owners & TOKM have the same position.

Chatham Islands Quota Holding Co also supports the; technical, scientific and legal arguments made in the collective KBB4G quota owners' submission, compiled by Bill Chisholm, which also has the support of 100% of KBB4G quota owners.

We also draw your attention to the CONFIDENTIAL Annexure 1, a paper prepared **by DR Schiel, Distinguished Professor, Marine Science School of Biological Science Canterbury University**

KBB4G Quota ownership is shown in the table below:

Quota Owned by Stock

FishServe
Commercial Fisheries Services Ltd

Date as at: **18 July 2022**
Stock code(s): **KBB4G - Bladder Kelp**

Stock	Client	Account	Total shares	Restricted	Trans-ferable
KBB4G	9470001 - Chatham Islands Quota Holdings Limited	Normal	70,835,777		70,835,777
KBB4G	9791514 - Hokotehi Settlement Quota Holding Company Limited	Settlement	10,000,000		10,000,000
KBB4G	9791502 - Ngati Mutunga O Wharekauri Asset Holding Company Limited	Settlement	10,000,000		10,000,000
KBB4G	8470162 - Roger Douglas Beattie	Normal	9,164,223		9,164,223

Our Position on the Developmental Bladder Kelp Fishery (*Macrosystis* – KBB4G)

Bladder Kelp (KBB4G) is a developmental fishery which only entered the QMS 11 years ago. The original TACC was set based on the best available information and the Minister agreed to adopt the lower estimate as the basis of setting TAC/TACC levels[1].

As an added precaution harvest control rules, of hand gathering only and to a maximum depth of 1.2m, were imposed at that time to reduce any potential fishing effects.

Bladder kelp harvesting is not like other fisheries as catch does not equal mortality, in fact there are arguments that trimming the canopy encourages growth and enhances the plants ability to avoid damage/destruction through wave action on that canopy.

On the basis that there is no new scientific information on KBB4G, that the current harvest control rules adequately mitigate any potential impacts of commercial fishing and that there has been no commercial harvesting of KBB4G, we cannot understand the logic of seeking to reduce the TACC.

Changing the TACC will have no effect, positive or negative, on the KBB4G biomass but will have a huge impact on the aspirations of the quota owners. Reducing the TACC to 68.2 tonnes will remove the commercial viability of this fishery and undermine the value of the quota gifted to CIQH when the species entered the QMS.

Kelp is used for animal dietary supplements, pasture and cropping foliar sprays, soil amendments, human condiments and health supplements. These are rapidly growing areas of the seafood market providing sustainable eco-friendly products to a multitude of end users, whilst also providing valuable employment and income opportunities for Chatham Islanders.

Response to Questions from Discussion Paper

The Discussion Paper Section 12 poses a number of questions to submitters.

Q. ***Which option do you support for revising the TAC and allowances?*** **Why?**
A. The only option supported by CIQH is the Status Quo Option 1, for the reasons noted above and in the collective KBB4G quota owners' submission compiled by Bill Chisholm.

Q. If you do not support any of the options listed, what alternative(s) should be considered? Why?
A. CIQH supports the Status Quo Option 1.

Q. Do you think these options adequately provide for social, economic, and cultural wellbeing?
A. Only the Status Quo Option 1 provides for actual and potential social, economic, and cultural wellbeing.

Q. Do you have any concerns about potential impacts of the proposed options on the aquatic environment?
A. Yes. Implementing any TAC/TACC reduction may give a false impression that this will protect kelp beds from decline. Nothing could be further from the truth.

[1]Minister of Fisheries decision letter, September 2010.

Conclusion

"Use it or loss it" is not an accepted or valid fisheries management approach. The very nature of developmental fisheries leads to very long exploratory and implementation phases (not helped with years of covid impacts) and naturally there will be significant head room between take and TACC during this phase.

There is no evidence of any risk to the KBB4G biomass from commercial harvesting. Extinguishing 75% of our property rights based on a potential environmental risk is unjustified, especially when there are already adequate commercial harvest management controls in place.

The Status Quo Option is the only appropriate option at this time.

Yours sincerely,

Greg Johansson
Director/Fisheries Asset Manager
Chatham Islands Quota Holding Ltd

Chatham Islands Enterprise Trust
Group Of Companies

Annexure 1 - CONFIDENTIAL

THIS REPORT IS NOT FOR GENERAL CIRCULATION.
ANY USE OF IT OR CITATION OF IT MUST BE GRANTED IN WRITING BY EITHER ROGER D BEATTIE OR DAVID R SCHIEL.

Comments on: Review of Sustainability measures for Attached Bladder Kelp (KBB3G and KBB4G) for 2022/23. Discussion paper No 2022/10.

Confidentially prepared for Roger Beattie of Sea-Right Investment Ltd. 11 July 2022
By DR Schiel Distinguished Professor, Marine Science School of Biological Science
Canterbury University, Private Bag 4800 Christchurch

For internal citation: DR Schiel, Comments on: *Review of Sustainability Measures for Attached Bladder Kelp (KBB 3G and KBB 4G) for 2022/23; Fisheries NZ Discussion Paper No: 2022/10*, prepared for RD Beattie, July 2022.

This is a summary of relevant literature and comments relating to giant kelp (*Macrocystis pyrifera*) with respect to the statements and clauses in the FNZ document. It is by no means a comprehensive review of the literature on giant kelp, which exceeds 1000 scientific papers and reports (Schiel & Foster 2015).

I. *In response to Section 12: Questions for submitters, potential reply*

• Support the *status quo* on the basis that there is no robust or logical scientific and verifiable evidence presented to support a reduction in the TAC.

• The option of maintaining the status quo adequately provides for social, economic and emotional wellbeing, as there is no credible evidence for impacts or stressors on giant kelp, *Macrocysis pyrifera* (called 'bladder kelp' in the FNZ report), from harvesting. Furthermore, the original setting of TACs considered effects widely, and the evidence in this report does not support a conclusion that the situation has changed. In fact, Clause 40 states that *"all stocks are effectively in a virgin state"*.

• Concerns about potential impacts. Of course, most people working in or making a living from natural resources have concerns about environmental impacts. However, all of the scientific evidence indicates no impacts from harvesting giant kelp, or detrimental impacts detectable in the wider environment. Great care is taken in harvesting giant kelp canopies, whereby only a relatively small proportion of the canopy is harvested at a time in local patches, and harvesting is done on a rotational basis as giant kelp canopies recover, thereby ensuring minimal of no impacts, and causing no concerns about sustainability.

II. *Rationale for Objections to details of the FNZ document with respect to sustainability of harvesting Macrocystis pyrifera.*

1. The document *Fisheries NZ Discussion Paper No. 2022/10* is misleading, in my view, in many respects and erroneous in parts, has a very selective use and interpretation of the scientific literature relevant to *Macrocystis* harvesting and the status of giant kelp populations worldwide, and a faulty logic chain in arguing for reductions in the TAC. Because faulty premises lead to erroneous conclusions, the core arguments and conclusions are questionable, and I show here that they do not follow from the evidence available.

2. The logic chain reads as a) there is reduction in kelp beds in several areas of the world, b) there is evidence of kelp decline during periods of highly elevated sea-surface temperatures (SST) during marine heat waves in New Zealand (section 3.3), c) that this contributed to the decline of crayfish, pāua and reef fish (Clause 28), d) that the original TACs *"may no longer be relevant to estimate current biomass"* (Clause 36), e) the clear implication that harvesting will add to the 'stressors' of giant kelp, and f) that therefore the quotas should be reduced. This conclusion is flawed because the premises are weak. This false deductive reasoning from a selective general case (i.e., decline worldwide – which is not by any means globally true) to a specific case (in southern NZ) ignores the great spatial and temporal variability of this widely distributed species of kelp. As well, it conflates impacts on smaller kelps to those on giant kelp, which has such a far different morphology and basic biology that comparisons with other kelps are largely spurious. In particular, the high connectivity of populations of giant kelp, based on their prolific reproductive output and dispersal abilities, render them exceptional among the kelp species in their biogeographic distribution and ability to recover from disturbances, even quite large ones.

3. As pointed out in the comprehensive book on giant kelp by Schiel & Foster (2015; uncited in this FNZ document), *Macrocystis pyrifera* is substantially different from all other seaweeds. This is not summarised well in Section 3.2 (Biology) of the FNZ document. It is the most-studied of seaweeds, and much is known about its biology, ecology, resilience, recovery from disturbances, variability within and among regions in the world over time. It has the fastest growth rate of any kelps, has up to 80% of its biomass in the canopy floating on the sea surface when mature, is highly prone to removal in storms, and has quickly regenerating sub-surface fronds that grow to the sea surface. Clause 19 does not mention its other major component, that of its reproductive sporophylls that are at the base of the plant and are generally unaffected by canopy removal. The huge, year-round reproductive potential of *Macrocystis* and its ability to form floating rafts when whole plants are removed in storms, greatly aid recovery after a disturbance, even a large one from El Nino storms, usually within two years (Edwards & Estes 2006). It is one of the most resilient of kelps to disturbances. Large-scale, repeated disturbance experiments showed importantly that recovery was based on the original state of the kelp forest and the quality of habitat (Castorini et al 2021). In many areas of the world, giant kelp canopies regress during summer because of high SST, water column stratification, and low nutrients. These usually do not greatly affect subsurface fronds, which grow when conditions become more favourable. This massive kelp has a weedy life history, is unlike other kelps, which usually do not have multiple fronds, have their reproductive structures in the laminae (blades) at the top of plants, and often have little or no ability to float and disperse (such as the NZ common kelp *Ecklonia radiata and Lessonia spp*). These are crucial differences between giant kelp and other kelps that render their populations highly resilient to disturbances.

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5. *The influence of sea warming*. Virtually all algal species are limited in distribution by high temperatures, but this varies considerably by species and physiology. The kelp declines mentioned in Clause 22 were significant, but this section is misleading. All kelps undergo losses for a wide range of environmental reasons. For giant kelp, this can be highly seasonal, due to storms or in some cases overgrazing by sea urchins, can be localised or basin-wide, with considerable differences regionally such as along the coast of California (Reed et al 2011, Bell et al 2015). Recovery usually quickly follows, especially after winter storms remove much of the surface canopy of *Macrocystis*. However, a signal paper by Reed et al (2016) showed from longterm data *"that giant kelp and the majority of species that associate with it did not presage ecosystem effects of extreme warming off southern California despite giant kelp's expected vulnerability. Our results challenge the general perception that kelp dominated systems are highly vulnerable to extreme warming events and expose the more general risk of relying on supposed sentinel species that are assumed to be very sensitive to climate change"*.

6. *Replacement by small weedy turfs* (Clause 23). There are numerous references on small-scale effects on fucoids and smaller kelps, but replacement by turfs in not generally the case for *Macrocystis*. Unlike other species, giant kelp require only around 1 recruit per several square meters to form a canopy eventually, so they are not normally out-competed well on the benthos over extensive areas.

7. *General decline in kelp worldwide*. An influential paper (uncited in the FNZ report) examining global patterns of kelp forest change over the past half-century, by a wide list of authors who worked in kelp forests (Krumhansl et al 2015), identified kelp declines in 38% of ecoregions, no change in 35%, and increases in 27% of ecoregions. Their conclusion was that global drivers could be affecting kelp forests at multiple scales, but local stressors and regional variation in the effects of these drivers dominate kelp dynamics. Therefore, understanding local drivers and not just speculating on them, is of considerable importance. It is germane that they identified three ecoregions where there was a high probability of increases in kelp abundance, which included north-eastern New Zealand, although there was statistical uncertainty in this. This simply makes the point that in one of NZ's warmest regions, there was no decline.

8. *Decline of* Macrocystis *in Tasmania*. It was not just temperature that caused the decline of giant kelp along eastern Tasmania, but this involved the movement inshore of the warm-water East Australian Current, which also brought oligotrophic water causing nutrient stress (see Mabin et al 2019, and Johnson et al 2011 for current shifts). The current along the south-east coast of NZ, where giant kelp are common, flows mostly from the south and brings cooler waters (Schiel 2011).

9. *Decline of Macrocystis in NZ* (Clause 25). This is misleading about SST and its influence on kelps and giant kelp. As clearly described in Thomsen et al (2019), bull kelp *Durvillaea spp*. (which are fucoid algae and not 'kelp') is a low intertidal zone species that declined because of a combination of very high and desiccating air temperatures, prolonged exposure of the algae during very low tides, combined with warm SST from the 2017-18 Marine Heat Wave. The incursion of the annual kelp *Undaria* in this study occurred because this species is opportunistic and very good at capturing patches of bare space, and is generally a poor competitor (see experimental studies by Thompson & Schiel 2012). This clause therefore has little bearing on giant kelp.

10. *Citation for decline*, Clauses 26-27. The major paper cited for the decline of giant kelp was Tait, L.W., Thoral, F., Pinkerton, M.H., Thomsen, M.S. and Schiel, D.R. (2021). These clauses capture some of the conclusions of the study, but are cursory and misleading. The graphs presented in the FNZ report are not a temporal sequence of decline, but rather show the decline of surface canopies in some areas at prolonged SST >18o C during a marine heat wave. A time series from this paper is

shown in its Supplementary Figure 1. This clearly indicates that between summer 2016 onwards when giant kelp canopies were at their lowest point, the subsurface populations of giant kelp were often at their highest abundances. The "0" values for remote data have been obscured by the log-transformation, but zero values for remote observations were more frequent than *in situ* zeros. The *in situ* large plants at or near the surface were almost always present, yet these were not always detectable from satellite. Smaller plants and recruits were also present, and often abundant, but these do not relate to detections at the surface so were excluded. This figure was included to clarify that remote sensing and *in situ* data have some agreement, but that subsurface forests are almost always present. This was stated categorically in the methods of the main paper. If this figure is being used as evidence of populations "stressed" by SST, it is very much being misinterpreted. For example, *Macrocystis* recruits were more abundant during the 2017-18 MHW than at any other time during a three-year period. While there was a significant negative trend of high temperature anomalies at all latitudes, southern sites retained high coverage even during the most severe heat wave. All of the giant kelp beds recovered fairly quickly (less than 6 months) after reductions in cover (showing that subsurface plants and seedbanks were resilient). It is noteworthy that further data (i.e., this time period was not covered by the 2021 paper), in the summer/autumn of 2020-21, kelp coverage across NZ was the highest seen by the authors (as estimated remotely) despite temperature anomalies in southern/central regions being + 2-3 degrees warmer than the 30-year average. The paper found that over the time period examined, key determinants of *in situ* population density were significant waveheight, then water clarity.

11.*Use of anecdotal evidence* (Clauses 28). In our experience, almost everyone you talk to thinks most things are in decline! The Glover (2020) study is a MSc thesis, which has not been externally peer-reviewed or published, and it is based on interviews and is not a field-based empirical study. It is by no means a "similar recent study" reporting a significant loss of bladder kelp – Tait et al 2021 was highly empirical and analytical. It is simply unsupportable evidentially to conclude that "the loss of kelp forest cover contributed to a gradual decline in the local abundance of crayfish, pāua, and reef fish". Overfishing of these species, often by recreational fishers, has led to declines elsewhere. For example, the recent 7-fold overfishing of pāua by recreational fishers along the Kaikoura coast over a 3-month period is a clear indication of decline of pāua that had nothing at all to do with kelp dynamics. This statement and clause should not be used as supportive evidence for kelp decline – at best it is anecdotal, and it sheds no light at all on process, dynamics, other species, or causes.

12.*Earthquake effects*, Clause 30. This clause and the cited publications have no direct bearing on *Macrocystis*. They had to do with the huge coastal uplift caused by the Kaikoura earthquake, great mortality of many species, continued loss of bull kelp (*Durvillaea*) because of poor population connectivity, and generally poor recovery to the original state of the ecosystem. This was further expounded by Schiel et al (2021), who discussed the loss of 'ecological infrastructure' relating to the earthquake and how physical forcing interacted with species' life histories and population dynamics to determine resilience and recovery. As also highlighted by Tait et al (2021), the poor light environment due to sedimentation was highlighted as an important impediment to recovery and productivity. It should also be borne in mind that these studies were largely of intertidal species, which were also subjected to severe air temperatures that often exceeded their physiological abilities to recover. This is not the case for giant kelp populations.

13.*Harvesting kelp as a 'stressor"*. There is no evidence that harvesting a portion of the canopy of giant kelp has a deleterious effect on *Macrocystis* or its related communities. This is not because of having no studies to examine the problem, but because no adverse effects were found. This was reviewed by Schiel & Foster (2015). Considerable kelp harvesting (tens of thousands of tonnes annually) occurred along Californian kelp beds for most of the 20th Century, before it became uneconomic on a large commercial scale. Schiel & Foster state: *"Questions over possible impacts of*

harvesting on the environment and a desire for sustainability led to various harvesting investigations in California, beginning in the 1950s. Concerns included possible loss of entire kelp forests, reduction of canopy-dwelling fishes and invertebrates, reduction of fish populations due to loss of food and / or habitat, increased beach erosion due to less dampening of water motion, and an increase in the abundance of drift kelp on beaches from cut fronds and dislodged plants not captured by the harvester. Early studies of these potential problems were summarized by North and Hubbs (1968) who concluded that "No adverse influence of harvesting could be found among the statistics or field observations for the periods studied. A later review by Barilotti and Zertuche-González (1990) came to the same conclusion". In New Zealand, giant kelp canopies are rotationally harvested by hand. Only a portion of the canopy is taken and only when the kelp appear to be healthy and robust (i.e., it is easy to determine when giant kelp is stressed because it loses much of its pigments). This cautionary approach to harvesting is used because there are no adverse effects (Pirker, Schiel, Lees, kelp harvesting report, funded by the Technology and Business Growth fund and it is not good commercial practice to take kelp in poor condition, or to have populations be unsustainable.

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2022 Sustainability Review, Fisheries Management,
Fisheries New Zealand,
PO Box 2526,
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22nd July 2022

Emailed to:fmsubmissions@mpi.govt.nz

Submission on the Review of Sustainability Measures for Red Gurnard (GUR3)
Fisheries NZ Discussion Paper No: 2022/10

To Whom It May Concern,
The Chatham Islands Quota Holding Co (CIQH) is a significant quota owner in the waters adjacent to the Chatham Islands. The revenue generated from this quota holding makes a significant contribution to the wellbeing of the entire island population, therefore maintaining healthy and abundant fish stocks is mission critical.

CIQH have no concerns over the health of the GUR3 fishery and believe the proposed increase presents no risk to the fish stock.

CIHQ wish to support Option 2; to have the TAC/TACC increased in GUR3.

Yours sincerely,

Greg Johansson
Director/Fisheries Asset Manager
Chatham Islands Quota Holding Ltd

Fisheries New Zealand
Tini a Tangaroa

Submission Form

Review of sustainability measures for 1 October 2022

Once you have completed this form

Email to: FMsubmissions@mpi.govt.nz

While we prefer email, you can also post your submission to:

2022 Sustainability Review, Fisheries Management, Fisheries New Zealand, PO Box 2526, Wellington 6140, New Zealand.

Submissions must be received no later than 5pm on Friday 22 July 2022.

Anyone may make a submission, either as an individual or on behalf of an organisation. Please ensure all sections of this form are completed. You may either use this form or prepare your own but if preparing your own please use the same headings as used in this form.

Submitter details:

Name of submitter or contact person: Matthew Joseph Desmond De Roe	
Organisation (if applicable):	University of Otago
Email:	
Fishstock(s) this submission refers to:	*Macrocystis pyrifera*
Your preferred option as detailed in the discussion paper (write "other" if you do not agree with any of the options presented):	Other

Official Information Act 1982

Note, that your submission is public information. Submissions may be the subject of requests for information under the Official Information Act 1982 (OIA). The OIA specifies that information is to be made available to requesters unless there are sufficient grounds for withholding it, as set out in the OIA. Submitters may wish to indicate grounds for withholding specific information contained in their submission, such as the information is commercially sensitive or they wish personal information to be withheld. Any decision to withhold information requested under the OIA is reviewable by the Ombudsman.

Values

Macrocystis pyrifera forests represent one on the most productive habitat types within coastal Aotearoa and support some of the most lucrative and customarily valuable inshore fishery species *e.g.* rocklobster (*Jasus edwardsii*), pāua (*Haliotis iris*) and numerous finfish. The services they provide, additional to fisheries values, include nutrient uptake of land derived inputs, coastal stabilisation through controlling sediment movement and minimising wave and storm surges, localised buffering against the negative effects of ocean acidification and the facilitation and preservation of biodiversity by creating habitat for other species [1]. We propose a reduction in TAC to 0 tonnes in order to safeguard the values associated with this foundation species.

Trajectory and stressors

The current global trajectory of kelp forest systems is a decline of ~2% per year recorded for at least the past 50 years [2,3]. In particular areas of the world, *M. pyrifera* has declined by up to 95% [4–6]. In Aotearoa, *M. pyrifera* has, and continues to suffer significant declines [7–9]. The main drivers of decline are increasing temperature, reduced light availability and smothering[9–11], the latter two drivers being a result of land derived sediment inputs . It is likely that invasive species such as *Undaria pinnatifida* may also contribute to the decline in *M. pyrifera* forests due to competition for space and light [12].

Long term data from the past ~80 years shows significant declines of *M. pyrifera* distribution in both northern (Marlborough) and southern (Stewart Island) populations. The general trend is an eastward retreat away from the Tasman Sea that is likely due to increasing ocean temperatures breaching the thermal threshold of this species [7]. Since the 1940's *M.pyrifera* has disappeared from ~67km of coastline in the Marlborough region and ~27km in the Stewart Island region[13] (Williams et al. unpublished data). On the east coast of the South Island, decline has also been recorded as a result of marine heatwaves and increased turbidity since 2015 [9] and over the last 40 years whole stretches of kelp forest habitat (>3km in length) have completely disappeared [8].

Recent work has shown that in southern populations (Otago), *M. pyrifera* cannot produce offspring at temperatures above 18.8 – 20.2 °C and its ability to fertilise is sharply reduced at temperatures above 16 – 17 °C (Le et al, unpublished data). This species is therefore particularly vulnerable to rising ocean temperature and marine heatwaves. In early 2022, Fiordland and more generally the west coast of New Zealand's South Island experienced the strongest marine heatwave with respect to cumulative intensity (duration x intensity), a measure of accumulated heat stress, since the >40-year satellite time series that started in September 1981. Temperatures were in some places >4°C above average and breached current known thermal thresholds for *M. pyrifera* with maximum coastal temperatures of 20°C observed (Bell et al., in prep.; RNZ, 2022). These types of events have increased in frequency and magnitude over the past 40 years [14] and will likely continue to do so around New Zealand over the next century [15].

Genetic information from *M. pyrifera* populations across Aotearoa highlights the vulnerability of genetically isolated populations to the negative effects of ocean warming and marine heatwaves. An example is Fiordland populations which show very low levels of gene flow with other populations in Aotearoa (Le et al. unpublished data). This means that if *M. pyrifera* is lost from these areas it is unlikely to recover due to lack of recruitment. Other populations of *M. pyrifera* can be roughly grouped into two main genetic groups which include Southland, Otago and Banks Peninsula in one and Stewart Island, Marlborough, Wellington and Chatham Island in the other. There does however appear to be a significant amount of genetic relatedness between these two groups, meaning that impacts experienced by one population may have consequences for genetically connected populations (Le et al. unpublished data. Management of *M. pyrifera* populations must therefore be considered at both broad (national) and local (regional) scales.

Sedimentation and reduced light availability in coastal waters is also driving kelp forest decline. Reduced light availability as a result of catchment modification and sediment runoff can result in 2-5 times less kelp forest biomass when all macroalgal species inhabiting those forests are

considered [11]. Data from KBB 3G show significant reductions in kelp forest distribution as a result of reduced light availability [9,11,16] and reduced light availability acts to exacerbate the negative effects of rising ocean temperature [9]. Due to the effects of climate change, greater rainfall and increased frequency of extreme rainfall events are predicted as are strengthening easterly winds across areas of KBB 3G [17]. These changing conditions will likely increase land derived sediment input and resuspension in the coastal environment, resulting in further reduced light availability.

Current understanding of M. pyrifera *populations in Aotearoa*

M. pyrifera abundance and distribution respond strongly to natural variation in conditions resulting in highly variable distribution and abundance over seasonal and annual cycles [3,18]. Stressors have and continue to drive decline in distribution and abundance of *M. pyrifera* stocks making disentangling anthropogenic effects from natural variation difficult. The recovery of *M. pyrifera* forests following disturbance relies heavily on the resilience of these systems [19,20] and the maintenance of genetic diversity within communities, as certain strains show greater tolerance to increased temperatures and other stressors such as low light (Le et al. unpublished data). *M. pyrifera* is a particularly data deficient species, especially considering its status as a harvestable resource under the QMS. We have no comprehensive understanding of how much biomass is produced on a seasonal or annual cycle, no information on reproductive variability between populations, little information on population structure and limited data (geographically and through time) regarding the impacts of harvest [21] on primary productivity or any wider ecosystem or fisheries impacts. Kelp forest ecosystems are in a known state of decline nationally and internationally and we do not have the legislative tools to manage or mitigate this decline let alone inform sustainable harvest limits, this should prompt the need for a greater understanding of population structure, health and vulnerability before any harvest is considered.

Efforts to restore M. pyrifera *and the growing algal industry*

In response to observed decline, there has recently been significant investment by government agencies and the private sector to restore areas of lost kelp forest and develop strategies to buffer existing forests against the inevitable effects of ocean warming and climate change e.g. incorporation of more resilient strains into wild populations. This field of research is in its infancy and will require greater investment before large scale restoration projects can be attempted. The ability to directly harvest *M. pyrifera* populations that are under stress and in decline, or are being actively restored, undermines ecological resilience, compromises restoration efforts and essentially deems investment pointless.

The acknowledgement and rapid growth of the algal sector on a global scale has stimulated significant interest in the values associated with kelp and macroalgal extracts [22] and it is only a matter of time before an industry for these products is established in Aotearoa [23,24]. A reduction in TAC now, while harvest rates are low and the industry is underdeveloped, would minimise negative impacts on fishers and circumvent further decline of wild populations. Efforts should be focused on developing a sustainable aquaculture industry for *M. pyrifera* and other species which would instead create net positive ecosystem benefits rather than compromising those provided by wild populations.

Summary

1. *M. pyrifera* populations are in a state of decline in Aotearoa due to the effects of local and global stressors which are predicted to increase in intensity in the coming decades, driving further decline.
2. Active restoration of wild *M. pyrifera* is underway in Aotearoa at a considerable time and monetary expense, optimising restoration approaches will take years and continued harvest will undermine efforts.

3. Very little information regarding the ecological effects of harvesting *M. pyrifera* are known in an Aotearoa context, or in light of recent findings of significant anthropogenically driven decline.
4. Allowing harvest of *M. pyrifera* could cause localised extinctions of stressed and vulnerable populations which may have flow on effects to recruitment and gene flow in adjacent populations.
5. A growing algal market in Aotearoa will place greater demand on algal resources and a transition to an aquaculture industry as opposed to wild harvest will protect current wild populations and help facilitate restoration efforts.

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Fisheries New Zealand
Tini a Tangaroa

Submission Form

Review of sustainability measures for 1 October 2022

Once you have completed this form

Email to: FMsubmissions@mpi.govt.nz

While we prefer email, you can also post your submission to:

2022 Sustainability Review, Fisheries Management, Fisheries New Zealand, PO Box 2526, Wellington 6140, New Zealand.

Submissions must be received no later than 5pm on Friday 22 July 2022.

Anyone may make a submission, either as an individual or on behalf of an organisation. Please ensure all sections of this form are completed. You may either use this form or prepare your own but if preparing your own please use the same headings as used in this form.

Submitter details:

Name of submitter or contact person: Roger Douglas Beattie	
Organisation (if applicable):	Roger Beattie trading as "NZ Kelp"
Email:	
Fishstock(s) this submission refers to:	KBB 3G & 4G
Your preferred option as detailed in the discussion paper (write "other" if you do not agree with any of the options presented):	Option 1 for both KBB 3G and 4G

Official Information Act 1982

Note, that your submission is public information. Submissions may be the subject of requests for information under the Official Information Act 1982 (OIA). The OIA specifies that information is to be made available to requesters unless there are sufficient grounds for withholding it, as set out in the OIA. Submitters may wish to indicate grounds for withholding specific information contained in their submission, such as the information is commercially sensitive or they wish personal information to be withheld. Any decision to withhold information requested under the OIA is reviewable by the Ombudsman.

Submission:[1]

Details supporting your views:

Please see attached document sent alongside this form.

Please continue on a separate sheet if required.

[1] Further information can be appended to your submission. If you are sending this submission electronically we accept the following formats – Microsoft Word, Text, PDF and JPG.

Roger Beattie

RD BEATTIE
-- Beyond Organics --

26 July 2022

Re: Submission in response to the Review of sustainability measures for attached Bladder Kelp for 2022/2033

Introduction

1. This submission is made by Roger Beattie, a QMS holder in respect of *Macrocystis pyrifera* (bladder or giant kelp). He holds 40% of the TACC in FMA3 (KBB 3G) and 9.16% of the TACC in the Chatham Islands (KBB 4G). For the purposes of this submission, *Macrocystis pyrifera* will be referred to as "bladder kelp".

2. "NZ Kelp" is a trading name used by Roger Beattie in developing this industry.

3. Fisheries NZ Discussion Paper No. 2022/10 (the Paper) invites submitters to answer the following questions in respect of options for varying TACs, TACCs, and allowances:[1]
   a. Which option do you support for revising the TAC and allowances? Why?
   b. If you do not support any of the options listed, what alternative(s) should be considered? Why?
   c. Do you think these options adequately provide for social, economic, and cultural wellbeing?
   d. Do you have any concerns about potential impacts of the proposed options on the aquatic environment?

4. Prior to responding to the questions posed, we express our reservations as to the form and structure of the discussion paper, which drives submitters to focusing on the outcomes that are posed in the paper. This approach:

   a. presents predetermined outcomes to the Minister that may be the subject of a judicial review; and
   b. drives submitters to respond to the questions posed, which does not provide objective and unbiased information to the Minister upon which to base his decision; and
   c. lacks scientific rigor for the reasons highlighted in this submission; and
   d. constrains the ability of the submitters to respond fully and fairly.

[1] Fisheries NZ Discussion Paper No. 2022/10, at 12.

5. In forming an assessment on increasing or decreasing the TACC, the Minister is required to have (amongst other things) regard to the matters in section 8 of the Fisheries Act 1996 (the Act) – namely that he or she has to hold in balance two matters namely, to manage the utilisation of fisheries resources while ensuring sustainability. In Section 8:

> **ensuring sustainability** means—
> (a) maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations; and
> (b)avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment
> **utilisation** means conserving, using, enhancing, and developing fisheries resources to enable people to provide for their social, economic, and cultural well-being.

6. It is submitted that the Paper does not hold these two concepts in balance. In particular it fails to conduct any analysis on whether the development of this resource:
   a) Would contribute to the reasonably foreseeable needs of future generations; or
   b) Would enable and develop people to provide for their social, economic well-being.

   We address this in more detail in the submission.

7. We also express the concern that claims made by the authors of the Paper are not sufficiently based on or supported by clear evidence or in some cases any evidence at all. As such the minister does not have the best available information on which to make an informed decision. We address these hereunder.

8. Our right to contest the format and content of the Discussion paper is specifically reserved and any submissions made herein should not be construed as a recognition that a rigorous and adequate process has been followed.

Summary of Submission

9. We oppose the proposal to decrease the Total Allowable Commercial Catch (TACC) in KBB 3G under options 2 and 3 (50% and 75% reductions respectively), and in KBB 4G under option 2 (75% reduction).

10. For the reasons outlined in this submission we favour a process by which:

    a. The TACC is accurately assessed; and
    b. The TACC is progressively increased over the next 5 years.

11. Commercial kelp harvesting is a nascent growth industry and a reduction in the TACC will limit growth and opportunity in this fully sustainable industry and be at odds with the objectives of the Act.

12. Commercial kelp harvesting in New Zealand is growing in terms of value domestically and internationally, and the biology of bladder kelp coupled with targeted commercial harvesting supports an increase in the TACC. Commercial kelp harvesting can *help* the growth of bladder kelp. This has wider benefits for other kelps and obligate species such as finfish.

13. The proposed reduction in TAC and TACC is not based on the best available information and fails to take into account the utilisation principles of the Fisheries Act 1996. The fishery is in excellent health, is underutilised, and is of a species that is incredibly prolific and resilient.

14. In terms of climate change responses, bladder kelp works to sequester ocean carbon as it grows, which for the reasons set out in the submission commercial harvesting promotes. Reducing the TACC will reduce the scope of these benefits in the marine environment and would be at odds with NZ's wider approach to measures to mitigate the effects of climate change.

Bladder Kelp Overview

15. The industry has an interest in ensuring its harvesting is sustainable and continues to be productive; something that is supported by the biology of bladder kelp. Bladder kelp is the most suitable of all kelps for commercial harvesting of attached plants (Schiel & Foster 2015). Current harvesting techniques take only from the surface canopy, meaning the reproductive parts of the plant (sporophylls) are retained at the bottom of the plant, which enables the continual release of reproductive spores. This also allows for greater sunlight penetration towards the base of the plant as only the upper canopy is harvested.

16. As additional sunlight reaches the understory, photosynthesis and plant development at lower levels is encouraged, which further contributes to the recovery and growth of the plants after harvest (Rosenthal, Clarke, & Dayton, 1974), (Kimura & Foster 1984). As bladder kelp canopies are thinned or removed, there is productivity compensation in understory (lower) kelps which helps them respond to disturbance and recover quickly (Castorani et. al., 2021). This is analogous to grass harvests, which can at least double in yield when they are harvested, as dead matter buildup at the base of the plant is removed, which sends a signal to the plant to grow more leaf.[2]

17. In addition to this, bladder kelp is the fastest growing organism on the planet (Schiel & Foster, 2015), with growth rates of up to 50cm per day, and adult plants reach up to 60m in length. Their biology means they are a prolific, resilient and fast-growing plant that when harvested in

[2] Email from Professor Derrick Moot, 13 July 2022 (attached – appendix 1).

accordance with current commercial techniques can be done so in a sustainable and economically successful way.

18. Two older studies on commercial harvesting in California assessed there were *no* adverse effects of harvesting from the observations they could make (North & Hubbs, 1968), (Barilotti & Zertuche-Gonzalez, 1990).

19. Bladder kelp is considerably different to other seaweeds. In addition to the speed of its growth, it has been highly studied and so much is known about its distribution, resilience and recovery around the world (Schiel & Foster, 2015). Biomass distribution is heavily weighted towards the canopy, with up to 80% of biomass floating on the surface when mature. It is an incredibly resilient species with huge recovery potential, indeed it is one of the most resilient of kelp species.[3] Established beds of bladder kelp typically recycle quickly as new fronds form, with most fronds having a lifespan of no more than 200 days (Rodriquez et. al. 2013).

20. Sustainable use of bladder kelp resources in New Zealand underpins an industry that currently generates tens of thousands of dollars annually for the New Zealand economy in direct sales, with potential for exponential growth over the next few years.

21. Furthermore, the properties of kelp products help increase agricultural yields without contributing to nutrient runoff and help in GHG (greenhouse gases). The remarkable growth rates of bladder kelp are such that sustainable commercial harvesting practices have no detectable adverse impacts on populations; it is readily able to recover when the canopy is cut back but the sporophylls are preserved (Schiel, 2022).

22. The Paper claims at paragraph 10 that commercial harvesting is restricted to hand cutting of the surface canopy. This is incorrect. The current commercial practice is for hand harvesting at depths of no more than 1.2m, but there is nothing to stop machine harvesting at these same depths.[4] This is not referred to in the Paper, which raises the concern that the authors of the paper may be out of touch with this rapidly developing industry.

[3] Compare for example *Ecklonia radiata* and *Lessonia spp.*, which have their reproductive fronds at the top of plants, thus being vulnerable to high SST, and a lack of the entire plant structure to float (which aids dispersal).
[4] And indeed trials for mechanical harvesters are going to take place shortly.

Current Status of Stocks

23. Currently bladder kelp quota shares are held by eight entities and four entities across KBB 3G and KBB 4G respectively:

Quota Owned by Stock

FishServe Commercial Fisheries Services Ltd

Date as at: **18 July 2022**
Stock code(s): **KBB3G - Bladder Kelp**

Stock	Client	Account	Total shares	Restricted	Trans-ferable
KBB3G	9791803 - Aotearoa Quota Brokers Limited	Normal	24,272,316		24,272,316
KBB3G	9791956 - Gina Tess Preece	Normal	404,269		404,269
KBB3G	8440865 - Gisborne Fisheries 1955 Limited	Normal	2,126,779		2,126,779
KBB3G	9790940 - KPF Investments Limited	Normal	12,000,000	12,000,000	
KBB3G	9791706 - Ngai Tahu Fisheries Settlement Limited	Settlement	20,000,000		20,000,000
KBB3G	9791695 - Rekohu Ocean Fisheries Limited	Normal	468,952		468,952
KBB3G	8470162 - Roger Douglas Beattie	Normal	40,000,000		40,000,000
KBB3G	9900548 - Seaweed Limited	Normal	727,684		727,684

Quota Owned by Stock

FishServe Commercial Fisheries Services Ltd

Date as at: **18 July 2022**
Stock code(s): **KBB4G - Bladder Kelp**

Stock	Client	Account	Total shares	Restricted	Trans-ferable
KBB4G	9470001 - Chatham Islands Quota Holdings Limited	Normal	70,835,777		70,835,777
KBB4G	9791514 - Hokotehi Settlement Quota Holding Company Limited	Settlement	10,000,000		10,000,000
KBB4G	9791502 - Ngati Mutunga O Wharekauri Asset Holding Company Limited	Settlement	10,000,000		10,000,000
KBB4G	8470162 - Roger Douglas Beattie	Normal	9,164,223		9,164,223

24. The studies cited by the Paper ((Pirker, et.al., 2000), (Fyfe, et.al., 1999)) are over twenty years old, and served as the basis for setting the original TACs.[5] While there are no suggestions that these studies were incorrect at the time they were published, there is a need for current data to understand the extent of biomass in the KBB 3G and KBB 4G areas. This is acknowledged by the Paper itself,[6] and by a 2019 study which highlighted the uncertainty around the extent of population and distributional declines (D'Archino et. al., 2019). To reduce the TACs in the absence of such data is to abandon the principles contained within section 13 of the Fisheries Act 1996.

[5] Fisheries NZ Discussion Paper No. 2022/10, above n1, at 34.
[6] Ibid, at 39.

25. Part 3.3 the Paper does not contain a standard assessment for defining stock numbers in New Zealand and is therefore fundamentally flawed. The Paper refers to a reduction in bladder kelp surface canopy along the eastern and southern coastline of New Zealand but fails to adequately quantify the biomass baseline against which this is measured.[7]

26. The Paper acknowledges that current harvests in KBB 3G and KBB 4G are significantly lower than the TACs.[8] Against within the context of lacking full and accurate information as to the scale of the biomass of bladder kelp, it is impossible to conclude that current or projected growth in bladder kelp harvesting will have a detrimental effect on bladder kelp populations. The Paper describes reduced surface canopies during marine heatwaves. [9] This is not disputed. What the Paper does not address how well the stocks were able to recover once marine temperatures reduced. The biology of bladder kelp is such that it naturally dies back in summer with regrowth occurring in autumn, meaning die-back should not be accorded with the weight that is ascribed to in the Paper, without up-to-date data on bladder kelp recovery rates in New Zealand.

27. A total of 595.78 tonnes of greenweight kelp has been harvested from KBB 3G in the 2010-2021 fishing year period.[10] Notwithstanding this extraction, bladder kelp biomass has remained indistinguishable (that is, healthy and sustainably harvestable) throughout this period. NZ Kelp harvesting operations report harvesting being easier across this time period despite using the same methods, indicating a strengthening of stocks.[11]

28. The Paper refers to the effects of earthquakes on the bladder kelp biomass. It refers to a study that showed loss of kelp following the 2016 Kaikōura earthquakes.[12] With respect, this is an unhelpful assessment to make in the context of proposing to reduce TACs and TACCs, as it is a highly localized and sporadic occurrence, and primarily affected fucoid algae (such as *Durvillaea*), rather than bladder kelp, which undermines the validity of the point the Paper is trying to make. In any case, kelp quota owners have vested interests in the management of kelp forests, and accordingly would not harvest recovering populations. The Paper claims that many areas of the coastline still lack "large brown kelp and understory algae" but this is not contextualized against the state of the coastline prior to the earthquakes (which was largely absent of bladder kelp in affected areas), something that is necessary to truly appreciate the extent to which the relevant populations have been affected.

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[7] Ibid, at 25 – 26.
[8] Ibid, at 4.
[9] Ibid, at 41.
[10] Ibid, at 43.
[11] NZ Kelp have employed fewer people to harvest more kelp per year, indicating a greater abundance of kelp.
[12] Fisheries NZ Discussion Paper No. 2022/10, above n1 at 30.

29. Further to this, if indeed it can be shown that the earthquake had a demonstrable and long-lasting impact on kelp populations, in the absence of data showing this applied to the entirety of kelp populations in KBB 3G it is unreasonable to rely on this as a factor justifying the reduction of TAC and TACC across the FMA. Claiming that parts of a 110km length of coastline are still absent their historic kelp populations should not be considered as a cumulative factor reducing TAC for an operator in Otago, for example. That the bulk of marine plant loss following the earthquake was not of bladder kelp only reinforces this position.

30. In the absence of fishery parameters or abundance estimates, a proposal to reduce the TAC and TACC is flawed. Put differently the proposed reductions are based on a flawed assessment that lacks an objective and scientifically based foundation.

31. Whilst climatic variations and changes may have an impact on kelp stocks it is submitted that proper scientific analysis must be undertaken to inform what comprises best available information before any consideration is given to reducing TACs and TACCs.

Bladder kelp and the environment

32. Earlier we referred to bladder kelp die-back in the summer months before growing back in autumn. The extent to which this occurs varies as there is both seasonal and inter-annual variation in abundance (Hay 1990, Pirker et al 2000). Average sea temperatures have been less important, with the peak summer temperature being the primary cause of die-back. Further, nutrient limitations frequently occur during periods of high sea temperatures and interact to affect bladder kelp, which has only a limited capacity to store nutrients.

33. Once the water temperatures reduce post-summer the kelp stocks resume their prolific growth pattern which is assisted by the sustainable harvesting techniques of commercial operations, which helps promote growth of kelp by taking only from the upper canopy.

34. High sea surface temperatures (SST) do not generally affect the reproductive sporophylls in the subsurface (Schiel, 2022). A Californian study based on long-term data also suggested that despite bladder kelp (and associated species) being expected to be vulnerable to extreme warming, kelp dominated systems may not be as vulnerable as once thought. This highlights the fallibility of relying on "sentinel species" that are supposed to be sensitive to climate change (Reed et. al., 2016).

35. Climate change has a role in increasing the intensity of storms. The large size of adult bladder kelp provides considerable drag, which makes them vulnerable to high water motion brought about by storm activity (Dayton et. al., 1984, Seymour et. al., 1989, Schiel et. al., 1995, Fyfe & Israel 1996,

Graham et. al., 1997, Fyfe et. al., 1999). It is submitted however that commercial harvesting can *improve* the survivability of kelp populations.

36. By reducing the amount of surface canopy through commercial harvesting, the risk of winter storms ripping out entire kelp plants is reduced.[13] While bladder kelp populations can generally recover within two years of a large-scale disturbance, a thinning out of the canopy by way of commercial harvesting can reduce such disturbances in the first place (Edwards & Estes 2006). This is analogous to any other harvesting operation where harvests occur during periods of abundance, and conservation of the resource occurs outside of this period.

37. Furthermore, sustainable commercial harvesting increased the growth of new fronds, meaning subsurface recovery (including in the aftermath of storm events) is improved, thus allowing the population to recover better.

38. Figures 2A and 2B at paragraph 26 of the Paper purport to show a decline in bladder kelp populations due to climate change induced heatwaves. What is not accurately explained by the Paper is that this is part of the normal lifecycle of bladder kelp populations. Every summer as the water temperature rises the kelp experiences canopy dieback, recovering again in the winter. To state that there were especially noticeable reductions in surface coverage of bladder kelp between 2015-2020 can be accounted for in the normal seasonal cycle of growth and die-back of bladder kelp.

39. It is also necessary to highlight a further misleading aspect of figures 2A and 2B. These figures do not show a temporal sequence of decline, rather a decline of surface canopies in some areas with an SST>18C during a marine heat wave. The quoted paper contains a time series within its supplementary Figure 1, which indicates that from summer 2016 onwards, when bladder kelp canopies were at their lowest points, the subsurface populations were often at their highest abundances. This does not indicate a stressed population, as subsurface forests are almost always present. In other words, the biology of bladder kelp is such that even during the most severe heat wave, southern sites retained high coverage.

40. All of the kelp bed populations surveyed recovered in less than 6 months after reductions in cover, demonstrating the resilience of the subsurface plants and seed-banks. Indeed, further data in the summer 2020/21 period showed some of the highest kelp recruitment in New Zealand ever seen by the authors, despite temperatures being 2-3 degrees higher than the 30-year average.

41. Further to this, following the 2017-2018 marine heat wave, NZ Kelp experienced their largest commercial harvesting month since the QMS was

[13] See NZ Kelp documentary evidence of destroyed bladder kelp beds following the 29 June 2021 Canterbury storm in areas that had not been harvested versus areas that had been (attached – appendix 2).

implemented. In October 2018 15,680kg was harvested, demonstrating the ability of bladder kelp to bounce back from warm water induced die back.[14]

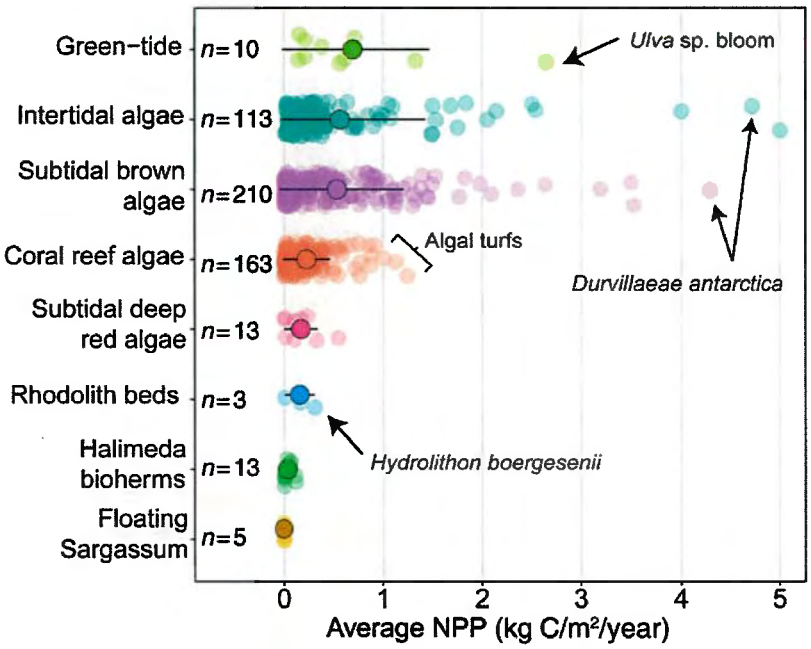
Role of kelp on Green House Gas (GHG) reductions

42. Bladder kelp is a remarkable source of carbon sequestration. Atmospheric carbon absorption by bladder kelp is three times greater than that of the fastest growing silviculture systems (such as *Pinus radiata*).[15] Its biomass of ~0.4kg dry matter/m^2 has a rapid turnover of approximately twelve times a year, meaning it is an excellent carbon sink.[16] An pilot carbon removal algae farm in Korea drew down an estimated 10 tonnes of CO_2/ha/year; an indicator of the potential for bladder kelp in New Zealand (Chung, Oak, Lee, Shin, & Kim, 2013).

43. Generally, algal beds and reefs are a potent source of carbon absorption. An Australian study suggested absorption rates of 1.4 t CO_2/year in kelp forests, although subject to local factors this could be even higher (Filbee-Dexter & Wernberg, 2020). While carbon sequestration potential varies widely across macroalgal species, there is considerable absorption potential across the range of species surveyed by the literature. With thick leathery tissue, high ratios of structural to photosynthetic cells and slow turnover rates, kelps (including bladder kelp) and other macroalgae are likely to be better sources of carbon sequestration than other species such as sea lettuce (Krause-Jensen et. al., 2018).

[14] Based on landing data produced by NZ Kelp (attached – appendix 3)
[15] Robert Hickson, "Integrated Multi-Trophic Aquaculture for Carbon Sequestration and Shellfish Production" Blue Carbon Services New Zealand, October 2018, at 6.
[16] Ibid.

Average Net Primary Production for different macroalgal habitat types (Duarte et. al., 2021)



44. The above graphic highlights the potential for carbon absorption in subtidal brown algae, of which bladder kelp is a variety, with plenty of species between 1-2kg, with a number that absorb more than 2kg of carbon per year. While acknowledging variability based on specific circumstances and species, it also shows the extent to which Net Primary Production can range. As iterated in this submission, given bladder kelp's prolific growth and response to canopy harvesting, commercial harvest and utilisation of the resource stands to have a significant positive climate impact.

45. It can be concluded that New Zealand bladder kelp has significant capacity to be a reliable and consistent absorber of carbon, which is enhanced through selective harvesting.

46. New growth of bladder kelp is encouraged where the canopy is harvested and happens relatively quickly. This has twin benefits from a climate change perspective, as two conduits to carbon reduction are accessed. Products derived from the harvested plant are used in terrestrial agriculture where they have GHG reduction properties and the resultant new growth in the bladder kelp absorbs more carbon from the ocean.

47. Detrital sequestration relies on significant bodies of detached bladder kelp canopy separating and flowing to the deepwater where it will sink and sequester carbon in the seabed. Conversely, commercial harvesting and utilisation of the resource for terrestrial purposes such as agriculture have a measurable and scalable impact. As a surer process of using and sequestering carbon, the benefits from commercial utilisation should be

actively encouraged through promoting growth in the industry, rather than relying primarily on the uncertain role of detrital sequestration.

48. As an already fast-growing plant, which has no overall negative flow on effects as a result of commercial harvesting (Pirker, Schiel, & Lees, 2000), the current commercial harvesting approach is one that is scalable and climate friendly.

49. Ongoing monitoring of the effects of climate change on the biomass is important but it is submitted that the benefits of commercial bladder kelp harvesting and consequent use, have clear climate change mitigation benefits which are not addressed in the Paper and it is submitted that do not support a reduction in the TAC and TACCs. On the contrary this should encourage further research and innovation which make it short sighted to reduce the TAC and TACCs.

50. The paper relies on short term population fluctuations as a basis for caution in terms of TACC, but this is an inherent property of the biology of bladder kelp. As summer dieback occurs the population reduces, and then in winter the population regenerates – this is consistent with all kelp species which undergo seasonal loss for a variety of reasons. In the case of bladder kelp in New Zealand, this process is acknowledged by the industry and is in fact assisted by sustainable harvesting which encourages more growth.

Flawed assumptions in the Paper

51. There are assumptions surrounding the convergence of harvesting techniques and bladder kelp biology within the Paper that require clarification. Whilst not cited by the Paper, a proposal to establish a South East Marine Protected Area by the South East Marine Protection Forum relied on a study by Geange to simulate the results of commercial harvesting of bladder kelp (Geange, 2014).

52. In Geange's study, bladder kelp plants were spot harvested, taking from the canopy and the sporophylls at the base of the plant. This limited the ability of the plant to recover as it was surrounded by fully grown plants (thus limiting its ability to receive sunlight and photosynthesize), and with its sporophylls removed it could not reproduce. Commercial operations do neither of these practices and instead actively encourage plant regrowth. It is therefore important for assessments of information to be contextualized against the realities of bladder kelp harvesting, to ensure that inaccurate assumptions are avoided.

53. At paragraph 3.3 of the Paper, the claim is made that internationally there have been reports of significant losses of kelp beds. While this is true in some respects, the Paper makes assumptions based on these that are not directly relevant to the New Zealand context. For example, Tasmania experienced a significant and permanent kelp dieback which has been

attributed to a change in oceanic currents (Mabin et. al., 2019). This was a situation unique to the marine hydrology of the area and has no bearing especially on KBB 3G as the currents in this area where bladder kelp is common generally flow from the south and bring cooler water (Schiel 2011).

54. The Paper cites a May 2022 Fisheries Assessment Plenary Report which assumes all stocks of bladder kelp are in a 'virgin' state.[17] There is an issue with this classification as if a particular population is significantly affected by weather or climatic occurrences and then recovers, it is still presumably considered 'virgin'. By contrast where a population is harvested using sustainable and commercial techniques, it is no longer considered 'virgin', despite harvesting practices encouraging faster regrowth and providing a degree of protection to plants from storm damage.

55. Paragraph 42 of the Paper assumes that current and future biomass of bladder kelp will be lower compared to pre-QMS stocks from before 2010. This is not supported by any clear evidence and fails to acknowledge the role of sustainable harvesting in promoting regrowth of bladder kelp plants. The only way to accurately quantify this would be through a comprehensive biomass and stock assessment, which could then be compared against the 20 year old studies that currently represent the most comprehensive stock assessment ((Pirker, et.al., 2000), (Fyfe, et.al., 1999)) to give a truer and more up to date understanding of the stock.

56. The Paper also makes some fundamental errors in its assumptions regarding the biology of bladder kelp. At paragraph 18 of the Paper, it states that (bladder) kelp beds are a diverse and productive three-dimensional habitat, being critical for reef assemblages, crustacea and finfish. This applies to kelps generally, but it is not specific to bladder kelp in New Zealand (Schiel, 2022).

57. Unlike in California, New Zealand bladder kelp has few, if any, obligate species associated with it, and that instead bladder kelp beds often have other kelp species living within them (which do have obligate species) (Graham et. al. 2007). As bladder kelp canopies are harvested, this encourages the growth of other species with corresponding advances in obligate species' habitats. This has obvious beneficial implications for maintaining protecting habitats of significance.

58. Bladder kelp is also very capable of replacing itself where a decline in kelp forest has occurred. Unlike with other kelps, replacement by algal turfs is not generally the case for bladder kelp (as is indicated by the Paper at paragraph 23) – in other words bladder kelp is not easily outcompeted by turfs on the benthos (Schiel, 2022).

[17] Fisheries NZ Discussion Paper No. 2022/10, above n1 at 40.

59. The Paper does relies on obscure logic to support a reduction to TAC and TACC. It assumes the following:

    1. There has been a reduction in bladder kelp beds overseas in some locations;
    2. There is evidence of kelp bed decline during periods of elevated sea-surface temperatures during heatwaves in New Zealand;[18]
    3. This contributed to a decline in crayfish, pāua and reef fish species;[19]
    4. That the original TACs and TACCs may not be relevant for gauging the current biomass levels;[20]
    5. Implying that harvesting represents an additional "stressor" of bladder kelp;
    6. Therefore the TACC should be reduced.

60. This amounts to a broad conclusion that "kelp is declining in some places in the world, so it must be declining in New Zealand", which ignores the individual biology of bladder kelp vis-à-vis other kelp species as well as the geographic characteristics of KBB 3G and 4G.

61. The Paper's conclusions are *not* based on best available information, despite the Paper claiming this at para 62. The Paper appears to be selective with its use and interpretation of literature. Indeed, one of the studies cited by the Paper for defining the change in distribution of bladder kelp along the Otago coastline was based on estimates from 19 people.[21] This study is classified as "similar to the Tait et. al. study, which is highly misleading given the former as a non-peer reviewed or published study, which the latter is. Anecdotal data has its uses in gauging perceptions, if done in a structured way and with a sufficiently large sample size, but a more comprehensive and objective assessment of bladder kelp biomass should be undertaken before any reductions to TAC and TACC are entertained.

62. One such example of this is the remote sampling used to inform Figure 2A at paragraph 26 of the Paper. While not seeking to undermine the research done in that study, it is submitted that when assessing whether or not to reduce the TAC and TACC, a more comprehensive and practical sample of the biomass should be conducted. This will provide a far better idea of the extent of biomass and stocks, which is necessary for quality decision making.

63. When the TAC and TACC was established in 2010, it was done based on the 1999 and 2000 assessments of the stock and acknowledged a need for

[18] Ibid, at 3.3.
[19] Ibid, at 28.
[20] Ibid, at 36.
[21] Glover, M. (2020). The lost kelp forest: a multi-disciplinary approach to understand change of Macrocystis pyrifera habitat in Otago, New Zealand, at 25. University of Otago Thesis. https://ourarchive.otago.ac.nz/bitstream/handle/10523/10866/GloverMadeline2021Msc.pdf?sequence=1&isAllowed=y.

a current stock assessment to take place in order to develop a harvesting strategy.[22] The current Paper goes against this, seeking to act without current robust stock assessment information. Indeed, when setting the 2010 TAC and TACCs, the MFish final advice paper acknowledged that kelp beds were considered to be much more extensive than what had been surveyed to date.[23]

64. When the TAC and TACCs were set, the final advice paper claimed new information would likely be available by 2013 to support future decision making.[24] That the current Paper is reliant on the same 1999 and 2000 studies suggests this was not the case, and further highlights the need for more up to date information to be gathered before a decision is made.

65. Furthermore, the final advice paper concluded that both KBB 3G and KBB 4G were at near virgin biomass levels and thus likely able to support significantly high catch levels than what was then occurring.[25] The current Paper is essentially arriving to the opposite conclusion, without the support of up-to-date information.

66. The Paper makes considerable reference to Professor David Schiel's work studying kelp, but either misinterprets or misrepresents it and fails to cite his book on the subject.[26] Professor Schiel supports sustainable commercial harvesting of bladder kelp, and his 2022 report points towards the potential for continual and expanded sustainable commercial utilisation of the resource in the KBB 3 and 4G areas.

67. The assessment of Option 1 (status quo) at paragraph 71 of the Paper suggests that it "may not provide adequate protection to existing and future bladder kelp beds". This does not acknowledge how commercial kelp harvesting actually works. Kelp is harvested only where it is abundant, and as discussed in this submission, sustainable harvesting techniques promotes a greater abundance of kelp. In other words, the status quo actively preserves existing kelp beds, and actively encourages the growth of new ones.

68. The precautionary principle, arising from the 1992 Rio Declaration is recognized as a well-accepted doctrine of international environmental law.[27] While acknowledging the nuances of this principle, given an objective analysis of the current biomass and stock of bladder kelp can be done relatively easily (as opposed to benthic studies in the high seas, for example), a contemporary and methodical assessment of the stock should

[22] Ministry of Fisheries Final Advice Paper on TACs for bladder kelp in KBB 36 and KBB 4G, 2009-2010, p 28. https://www.option4.co.nz/Fisheries_Mgmt/documents/BladderKelp_MF_FAP_910.pdf
[23] Ibid, p 35.
[24] Ibid, p 38.
[25] Ibid, p 59-60.
[26] Schiel, D., and Foster, M. S., The Biology and Ecology of Giant Kelp Forests. University of California Press, 2015.
[27] 1992 Rio Declaration, principle 15.

be undertaken prior to adjusting the TAC and TACCs. This would address a number of shortcomings admitted by the Paper in terms of its own lack of information on the current situation.

69. The Paper appears to be primarily focused on conservation matters which, while important, need to be balanced against the principles of utilisation. Acknowledging that current harvest volumes are less than the TAC and TACC levels and that there would be some room for growth retained by the proposed reductions, the proposals if realized may serve to hinder the full development of this industry to its full potential.

70. Given the benefits of kelp in the terrestrial agricultural sector, and New Zealand's strong climate change and GHG emission reduction stance, to constrain the growth of this highly sustainable industry would run contrary to what should be a supportive position.

71. Reading the Paper an impression is given that globally kelp is on the decline. However an influential paper (Krumhansl et. al., 2015) examined global kelp patterns over the past half century. It identified declines in kelp populations in 38% of ecoregions, no change in 35%, and increases in 27%. While not doubting that global drivers may be affecting kelp populations at numerous scales, it emphasizes the importance of understanding local drivers in kelp dynamics.

72. It is therefore essential in this proposal to gain an accurate understanding of local drivers rather simply speculating on them or relying on 20 year old data.

73. Further to this, the Paper makes a number of claims that have little to no bearing on bladder kelp. Taking paragraph 25 of the Paper as an example, *Durvillaea spp.* is used to describe the adverse impact of SST on kelp species. *Durvillaea spp.* is not a kelp species (instead being a fucoid algae), and is a low intertidal species that declined due to the combination of high and desiccating air temperatures, prolonged exposure of the algae to these conditions at low tide, combined with warm water at high tide that did not allow it to recover (Thomsen et. al., 2019). That *Undaria* was able to become established is because it is an opportunistic species, and one that is a poor competitor against bladder kelp. Accordingly, the paragraph has little bearing on bladder kelp, instead misleading and failing to recognize the uniqueness of this particular species.

Commercial utilisation and economic value of kelp

74. As mentioned in our introduction to this submission, the Minister is required to have regard to whether the development of this resource:
    a) Would contribute to the reasonably foreseeable needs of future generations; or
    b) Would enable and develop people to provide for their social, economic well-being.

75. Whilst the Paper is silent on these points it is submitted that the commercial development of bladder kelp will contribute significantly to these objectives.

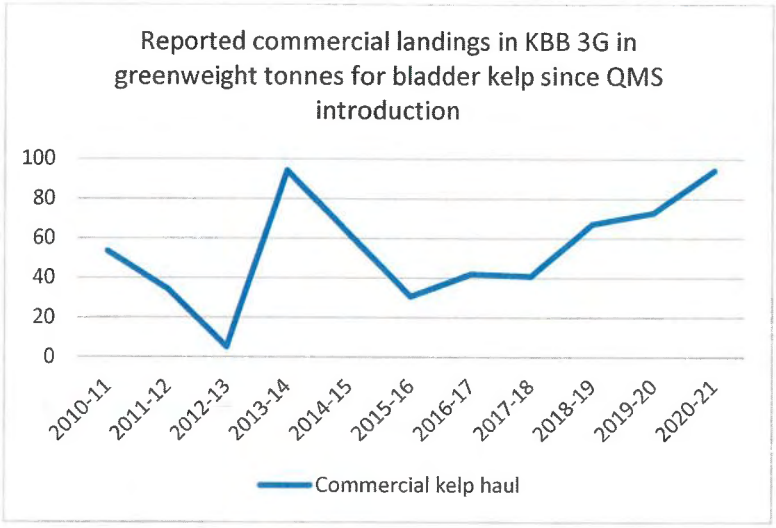
76. Bladder kelp can and is being used as:
    a. A foodstuff;
    b. An agricultural supplement;
    c. A tool in reducing greenhouse gas emissions;
    d. A sustainable and regenerative ecosystem service provider;
    e. An economic earner and job provider.

77. It is also important to emphasize that commercial operators have a vested interest in the continued sustainability of the resource for future generations. NZ Kelp has built a business around the renewability of bladder kelp and works to be responsible stewards of the resource. This approach informs their harvesting techniques, which takes a relatively small amount of the whole plant and is done on a rotational basis to allow the canopy to recover.

78. The TACs that were set in 2010 were done so to establish and support the development of an emerging industry in line with the sustainable utilisation principles within the Fisheries Act 1996.[28] Commercial demand and available storage have been the primary drivers of harvest volume, representing fluctuations in yearly takes. Overall, however, there has been a trend of growth in terms of harvested amount with commercial operators reporting no noticeable impact on kelp populations. This is reflected in the chart below.

[28] Fisheries NZ Discussion Paper No. 2022/10, above n1, at 32.

Commercial landing of bladder kelp in KBB 3G area since 2010-11 fishing year[29]



79. TACs are set to maintain, or move each stock towards, a biomass at or above the level that can support maximum sustainable yield.[30] This system is fundamentally predicated on the basis of removing fish (often spawning stock) from the fishery through killing the fish. Kelp harvesting does not kill the plant, rather it takes only the top fronds, and so while it is important to consider the overall sustainability of the fishery, it also supports a different management approach than with other QMS (particularly finfish) fisheries.

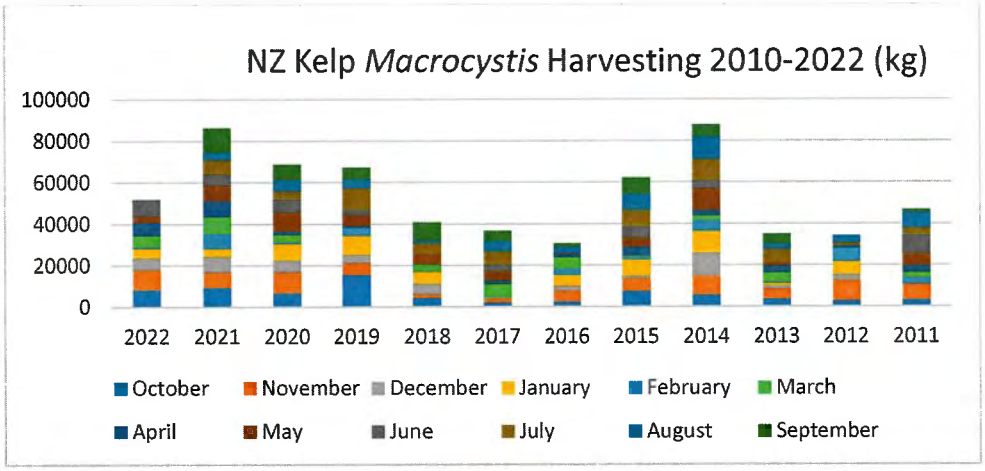
80. Paragraph 65 of the Paper states that the TACCs were set up to in 2010 to incentivize the development of a commercial fishery, and that this has not occurred. This is an incorrect and unfair assessment. In 2016 the South East Marine Protection Forum proposed a total ban of bladder kelp harvesting from Timaru to the Otago Peninsula. NZ Kelp have expended considerable time and resources seeking to be heard. As a consequence NZ Kelp management have been largely focused on maintaining their right to harvest kelp in the KBB 3G area and to use their quota, which has diverted attention away from business growth and marketing.

81. Furthermore, the establishment of TAC and TACC was only the first step to establishing an industry around bladder kelp. There has been considerable research occurring over the last decade to identify markets and applications for bladder kelp products, with the industry now entering a period of more concerted growth and export potential. This is consistent across many industries, where an extensive period of research and development must first occur and calculated risks be taken.

[29] Ibid, at 43.
[30] Fisheries Act 1996, s 13.

82. Quota holders of bladder kelp recognize the value of the resource and have not rushed in to utilise it, instead taking a measured and responsible approach. For the Paper to suggest no industry has established since fails to recognize the realities of developing new markets and products. It amounts to a proposition that "because a resource has not been fully utilised, the right to access it should be taken away". This is incorrect. The graphic below shows a consistent growth in the industry from 2016 onwards.

Commercial harvesting of bladder kelp in KBB 3G area by NZ Kelp 2010-2022[31]



83. As such, to claim a commercial kelp fishery has not materialized fails to account for the wider context in which this industry is being developed over the past 5-10 years. International inquiries into kelp products and orders are increasing, indicating NZ Kelp is finally in a position to begin active growth.

84. Further to this, the Paper claims at paragraph 68 that there would be no immediate economic implications on the commercial fishery. No analysis supports this conclusion and it is submitted that this fails fundamentally to recognise the trajectory of the industry. As the commercial fishery has taken time to establish there has been a delay to growth, but it is now experiencing interest and growth both domestically and internationally. This is particularly evident in the interest that is being generated by bladder kelp's ability to reduce GHC and support NZ's climate change objectives.

85. Furthermore, to reduce the TACC would have immediate implications in terms of recouping sunk investment and opportunity costs. This is not considered or investigated in the Paper.

86. NZ Kelp represents over 90% of the commercial harvesting industry and has grown from first year sales of $20,295 growing to currently

[31] Based on landing data produced by NZ Kelp (attached – appendix 3).

approximately $176,000, with the bulk of product being exported to international markets. NZ Kelp is on a sales growth trajectory, notwithstanding the challenges introduced by COVID, demonstrating the value of its product. As discussed earlier the industry has not been able to grow as quickly as may have otherwise been hoped, because substantial time and resource has been focused on preserving harvesting rights in the KBB 3G area, primarily in response to SEMPF proposals.

87. NZ Kelp have recently received enquiries for customers for large volumes of giant kelp products that for 2022 represents 580,000kg of greenweight kelp. This equates to a potential of over $1.3 million in revenue over a 12-month period, (over and above revenue generated by existing customers). Thus it anticipates prospective growth to over $1.8 million by 2024.

88. We have attached a chart of potential growth.[32] We can provide further detail on these prospective sales, but for reasons of commercial sensitivity specific details have been omitted.

89. The above orders and interest, when assessed against previous annual sales, demonstrates growing interest in NZ Kelp's product which has reached a critical point in their growth which would be severely curtailed by a TACC decrease. The bulk of product is sold to domestic businesses which then export their products overseas.

90. One such example is a company that uses NZ Kelp products in their product and exports 98% of its production, and which was recently sold for over NZD $1 billion. Projected growth in this relationship is set to almost triple, with an estimated 190 tonnes of greenweight bladder kelp being required to keep up with demand. NZ Kelp forecasts it will be harvesting and selling 500 tonnes of greenweight bladder kelp by 2025. This is only 95 tonnes less than the total amount harvested between 2010 and 2021 in KBB 3G.[33]

91. Whilst this is not considered in the Paper, the proposed reductions in the TACC will have an immediate effect in the quota value to QMS holders. The tables show the impact of these reductions for the 3 options.

[32] Attached (appendix – 4)
[33] Fisheries NZ Discussion Paper No. 2022/10, above n1 at 43.

Cost implications in relation to proposed TACC reduction – KBB 3G

Current TACC	**Total Quota Value**	**Submitter's quota (40%) Value**	**Industry Economic Loss**	**My Economic loss**
Option 1 **1236 tonnes KBB3G**	1236.8 tonnes x $10,000/t = $12,368,000	494.72 tonnes x $10,000/t =$4,947,200	0	0
Option 2 (50% cut) **618.4 tonnes KBB3G**	618.4 tonnes x $10,000 = $6,184,000	247.36 tonnes x $10,000/t = $2,473,600	$6,184,000	$2,473,600
Option 3 (75% cut) **309.2 tonnes KBB3G**	309.2 tonnes x $10,000 = $3,092,000	123.68 tonnes x $10,000/t = $1,236,800	$9,276,000	$3,710,400
Potential harvest 10,000 tonnes p.a.	$10,000/tonne		Potential Quota value 10,000 t TACC X $10,000/t = $100 Million	

Cost implications in relation to proposed TACC reduction – KBB 4G

Current TACC	**Total Quota Value**	**Submitter's quota Value**	**Industry Economic Loss**	**My Economic loss**
Option 1 **272.83 tonnes KBB4G**	272.8 tonnes x $10,000/t = $2,728,000	25 tonnes x $10,000/t =$250,000	0	0
Option 2 (75% cut) **68.2 tonnes KBB4G**	68.2 tonnes x $10,000 = $682,000	6.25 tonnes x $10,000/t = $62,500	$2,046,000	$187,500
Sustainable harvest from Chatham Islands estimated to be 3,000 tonnes p.a.	$10,000/tonne		Potential Quota value 3,000 t TACC X $10,000/t = $30 Million	

92. The Paper ignores the medium- and longer-term potential for the industry and if given effect to will significantly limit the growth and commercial viability of bladder kelp operations. This will have obvious and detrimental impacts on the ability for commercial operators to plan for future growth with clear implications for employment opportunities.

Current and growth projections for NZ Kelp

Annual harvest volumes	**Number of employees**	**Value of sales (based on $2.90/kg) wet weight**
Current level – 60 tonnes	2 FTE (harvesting, drying, processing, sales)	2019 - $119,000 2020 - $ 176,000
9,000 tonnes	100+ employees and contractors, with additional focus on R&D	$26,100,000

Other benefits of bladder kelp

93. New Zealand harvested bladder kelp has numerous applications that present significant opportunities to grow the New Zealand economy. Use of bladder kelp products as a soil additive in farming can support soil biology and biota (Jones, 2015), which can increase biomass potential and resilience to environmental stress (Cardinale, et.al., 2011), (Doak, et.al., 1998). Application of kelp products to soil has numerous benefits, the facilitation of which should be encouraged to grow through increased harvesting potential rather than being limited by reductions to TAC and TACC.

94. Kelp can be used as a substitute for urea and other nutrients, the runoff of which end up in waterways. A farm in Leeston has reduced its urea inputs by over 90% relative to that of a neighbouring farm through the use of kelp products and other biological farming products.[34] By harnessing the chemical properties of bladder kelp (including plant growth hormones and natural stimulants), increased horticultural yields can be achieved with far less urea inputs.[35]

95. NZ Kelp have run a number of trials to examine the application of kelp products on crop growth and yield.[36] An application of 1g/m of kelp to a carrot row produced a 27% increase in yield of first grade carrots relative to the control group.[37] This was also economically advantageous as the

[34] Nigel Greenwood email 19 July 2022 (attached – appendix 5).
[35] Ibid.
[36] See NZ Kelp agricultural trials document (attached – appendix 6).
[37] Ibid.

$483/ha expense for the kelp application produced an additional yield of $7,897/ha in carrots, representing an investment return of 16 times.[38]

96. Similar studies resulted in additional yield for swedes[39], fodder beets[40] and radish bulbs[41], speaking to the efficacy of kelp products as a sustainable nutrient source for agriculture in New Zealand. NZ Kelp have worked with a number of farmers who can attest to the value added to their operations through application of kelp products.[42]

97. When kelp products are added to feed, reductions can be achieved in terms of the amount of methane produced by ruminants. In 2019, New Zealand had 10.1 million head of cattle (dairy and beef cows, deer), representing a significant output of methane gas emissions.[43] One study that included other kelp varieties into cattle feed reduced methane emissions in beef cattle by over 80 percent (Roque et. al., 2021). There is potential for bladder kelp, which also has potential application as a prebiotic for animals, to be similarly applied in New Zealand (Makkar et. al., 2016).

98. Kelp can be an important part of biological farming (providing nutrients to soil through organic matter and organisms rather than synthetic chemicals).[44] Biological farming develops more humus in the earth, which increases the soil's capacity for carbon sequestration (Ghabbour, et. al., 2017). This approach is contrasted with chemical farming practices which can harm the microbial flora present in soil, compromising its ability to store carbon and can instead result in more greenhouse gases being released.

99. Humus formation is anabolic, with sugars and other organic molecules being used by microbes in soil to create complex and stable forms of carbon (Jones, 2015). Bladder kelp is high in both carbon and sugars, which contributes to biologic farming practices. Sustainable harvesting techniques described in paragraph 8 promote growth of bladder kelp plants, which correspondingly absorbs more carbon from the ocean and atmosphere.

100. New Zealand soil contains relatively low concentrations of iodine (Thompson, 2004). Iodine deficiency is associated with health issues such as goiter, stunted physical and mental development, and lethargy, among

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[38] Ibid.
[39] Ibid.
[40] Ibid.
[41] Ibid.
[42] Ibid.
[43] Stats New Zealand "Livestock numbers", updated 15 April 2021 https://www.stats.govt.nz/indicators/livestock-numbers
[44] Clayton Wallwork, "Biological Farming – A new way of doing business" December 2011, Carbon Farming Group.org.nz https://www.carbonfarming.org.nz/wp-content/uploads/Biofarmingsystemssml.pdf

other things.[45] In the developed world the most severe of these afflictions, hypothyroidism, has been largely eliminated through the iodisation of salt, though it is still estimated to affect 2 million children globally every year (Zimmerman & Anderson, 2012). Despite our relative affluence, iodine deficiency is still prevalent in New Zealand, with the 2014/15 New Zealand Health Survey showing women of European/Other ethnicity having an overall iodine deficiency.[46]

101. With a growing demand for natural salts over iodised varieties, bladder kelp will be able to play an ever-increasing role in preventing iodine deficiencies. Applying kelp to pasture as part of biological farming practices, or as a supplement to grazing animal feed both increase the amount of iodine in the overall population's diet.

102. Iodine deficiency in animals presents health issues as with humans, including lower rates of growth and overall health. Thyroid function is crucial to tissue metabolism, and thyroid function is driven by iodine-based compounds (Chung, 2014). Iodine is also essential for the assimilation of other vitamins and minerals, making iodine foundational for animal farming (Coleby, 2004).

103. In summary, bladder kelp provides a huge variety of uses and value-added potential to New Zealand, both in terms of domestic production but also exports. To reduce the TACC as the industry is just starting to take off runs counter to the sustainable utilisation principles of the Fisheries Act 1996 and disregards the evidence behind the benefits of bladder kelp. To conserve a resource is not to preserve it, and as iterated, the role of the Act is to enable sustainable utilisation of fisheries resources, not preserve them. The role of government is to promote sustainable and value-added industries in New Zealand and enable businesses to establish new products and markets, which will be undone by the current proposal if anything other than the status quo goes ahead.

Conclusion

104. In conclusion we submit that the Minister should:

a. Retain the current TAC and TACCs until an up to date, objective and reliable data can be gathered about the current state of bladder kelp stocks and biomass.

b. Commission independent studies about the state of bladder kelp in New Zealand, with a particular emphasis on the KBB 3G and KBB

[45] Harvard School of Public Health, The Nutrition Source "Iodine". https://www.hsph.harvard.edu/nutritionsource/iodine/
[46] New Zealand Ministry of Health, "Iodine" https://www.health.govt.nz/our-work/preventative-health-wellness/nutrition/iodine

4G areas. Whilst comprehensive studies are being completed, undertake a geospatially restricted biomass survey analysis to better inform an understanding of the relevant areas and the stock present. At the simplest level this can be done simply through an applied Google Earth analysis. For the purposes of this analysis, it is important that the data is relevant and reliable for the purposes of making an informed decision.

c. Commission an independent study to determine the climate change benefits from sustainably harvesting bladder kelp.

d. Commission an independent study on the role of forestry and farming practices in contributing to seabed sedimentation and its effects on bladder kelp.

ENDS.

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-----Original Message-----
From: Roger Beattie <
Sent: Wednesday, 13 July 2022 4:56 PM
To: Moot, Derrick <
Subject: Comparing pasture & kelp growth

Caution: This email originated from outside our organisation. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Derrick,

Hope you are well & Covid has missed you.

I'm busy defending my quota & harvest rights to Giant kelp.
Because Giant kelp is the first plant in the Quota Management System it is an anomaly to the scientists & management people in Fisheries New Zealand.
They think in terms of killing fish not harvesting the surface canopy of a continuously growing plant.

Part of my argument is to compare Giant kelp growth & harvest to pasture or grasses. [redacted]

Because the industry is so young we haven't developed systems & techniques to help assess the difference between Biomass at a point in time & yield over a year.
Also there has been no work done on comparing unharvested production & multiple harvested area production over a year. WHICH WOULD DO NO HARM- IT GROWS BACK.....

Off the top of your head - what would you say was the difference in yearly yield between pasture or grasses of 1 harvest per year compared to optimal maximum harvests? A YEARLY PRODUCTION OF GRASS WILL MAX OUT AT ABOUT 6 TONNE OF DRY MATTER- AT THAT TIME THE CANOPY IS MATURE AND THE MASS OF HERBAGE AT TH EBOTTOM STARTS TO DIE AS TH NEW LEAVES ARE PRODUCED AT THE TOP OF THE CANOPY - SO YOU JUST BUILD UP DEAD MATERIAL AT THE BASE THAT DIES. THIS IS EFFECTIVELY WHAT WE DO WITH A HAY CROP- WE GROW MAXIMUM YILED BUT LET THE QULITY DECLINE UNTIL WE DECIDE TO CUT. A PASTURE WOULD PRODUCE AT LEAST DOUBLE THAT YIELD AND IF IRRIGATED AND FERTILISER IT COULD DO THREE TIMES AS MUCH

[redacted]

Cheers

Roger Beattie

Macrocystis beds that <u>had</u> been harvested prior to the Canterbury storm of 29th June 2021 suffered no catastrophic loss of plant material. This shows that Using, Enhances the Conserving of the *Macrocystis* resource.
By using we are conserving – refer to photos attached.

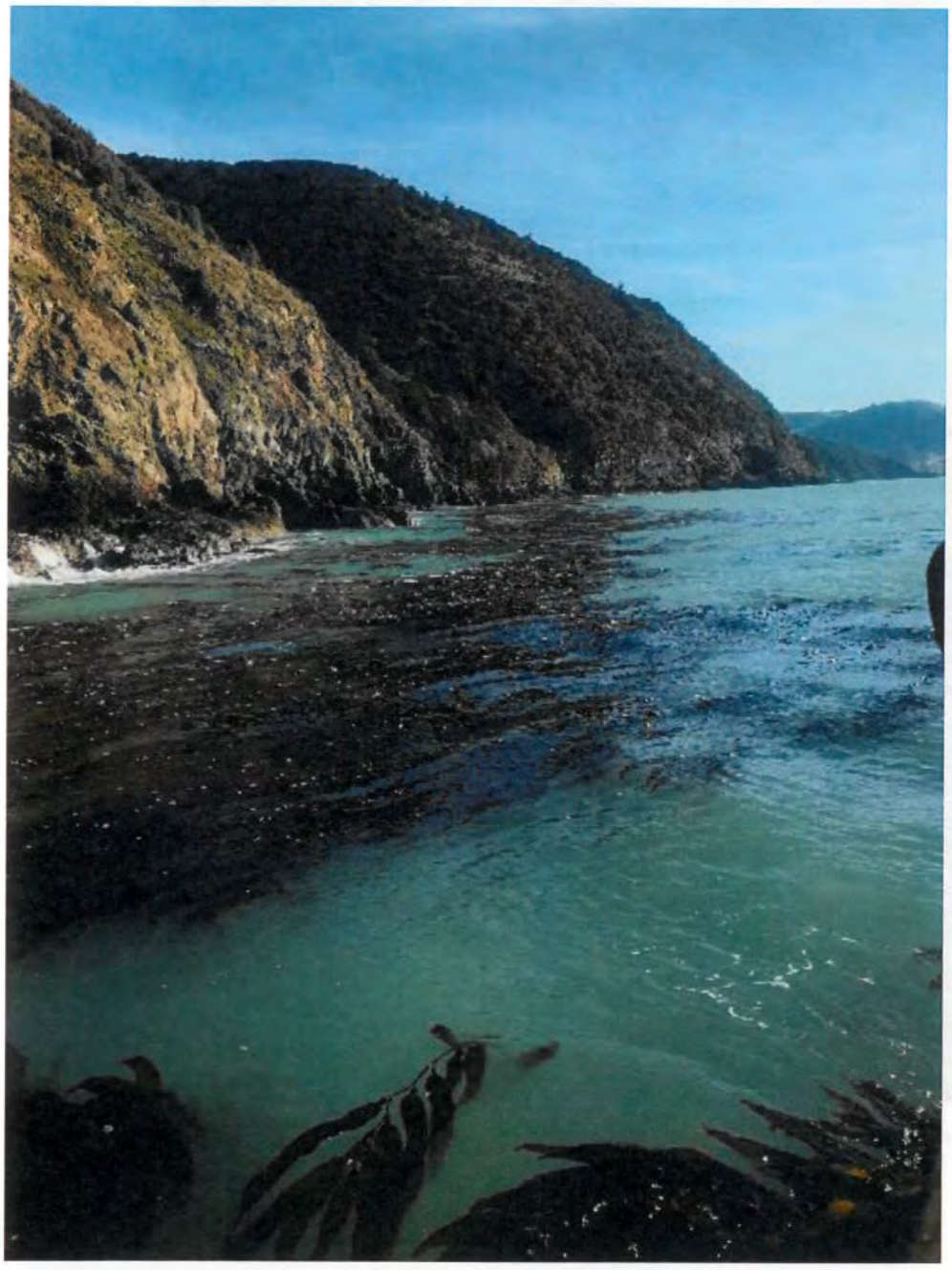


Figure 1: After the June 29th 2021 polar blast storm. Photo taken 14/07/21.

Areas we have not been actively harvesting.

Figure 2: Mat Wight bay before the storm.

Figure 3: Mat Wight Bay after the storm. Photo taken 14/07/21

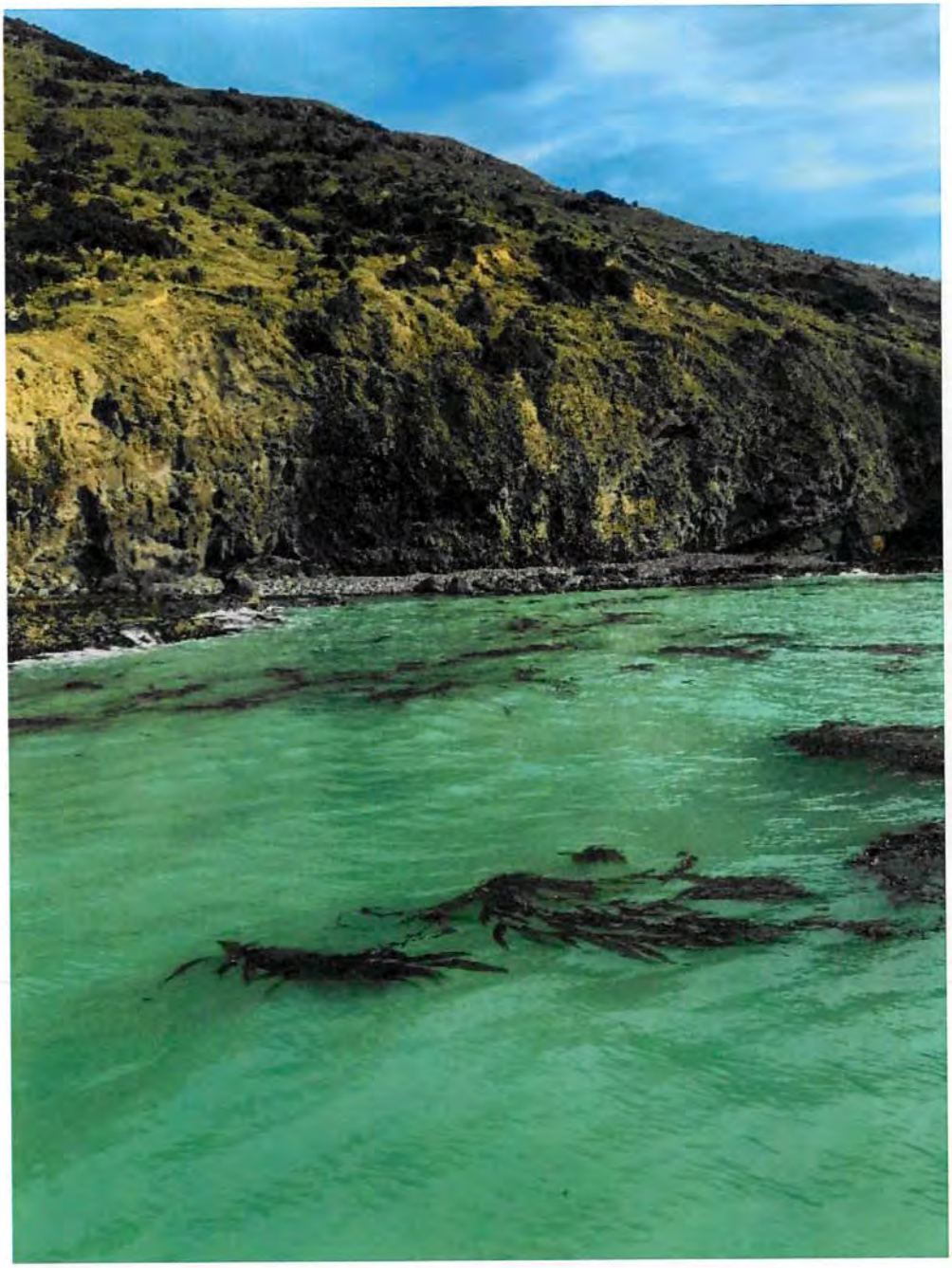


Figure 4

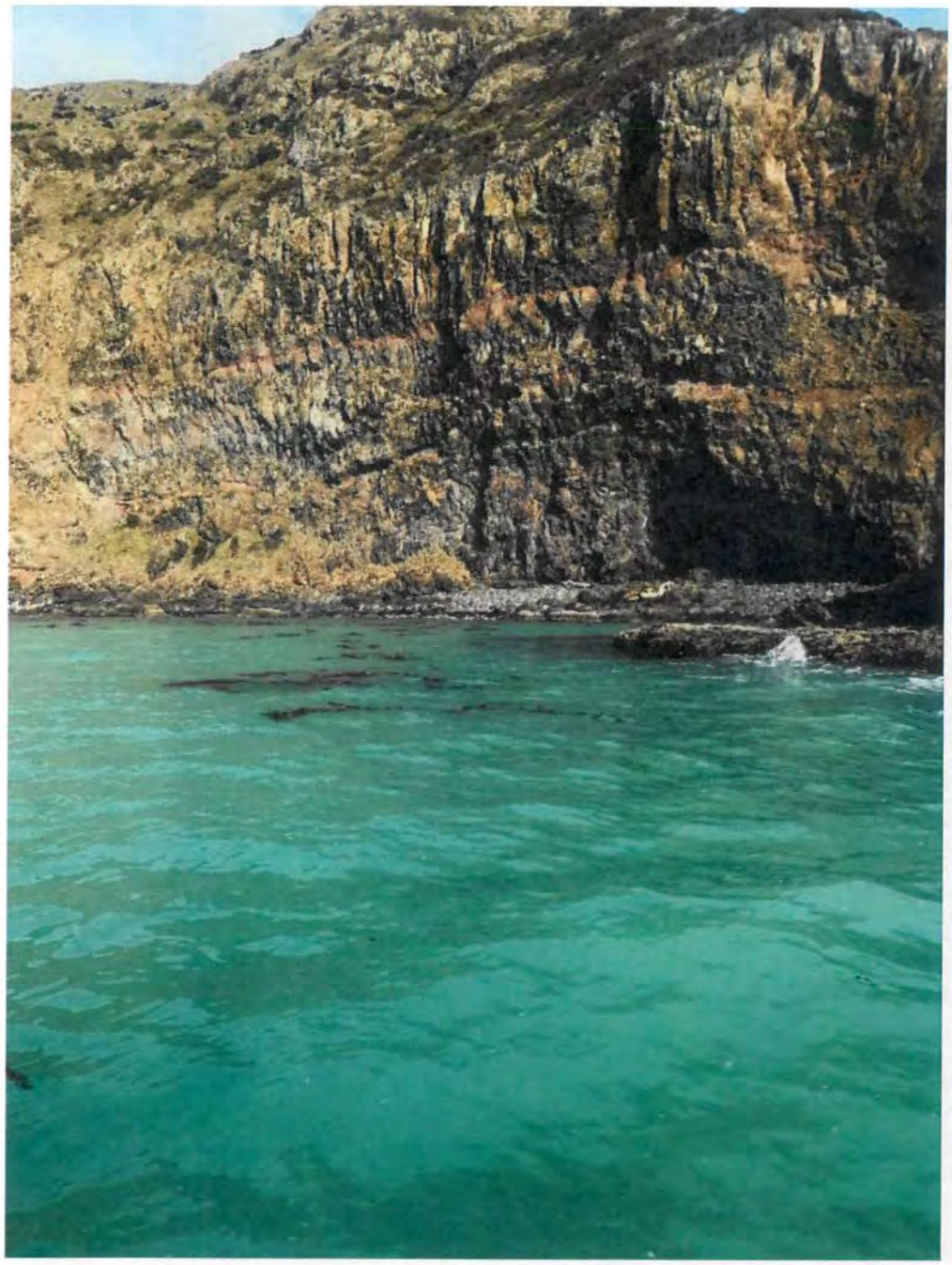


Figure 5

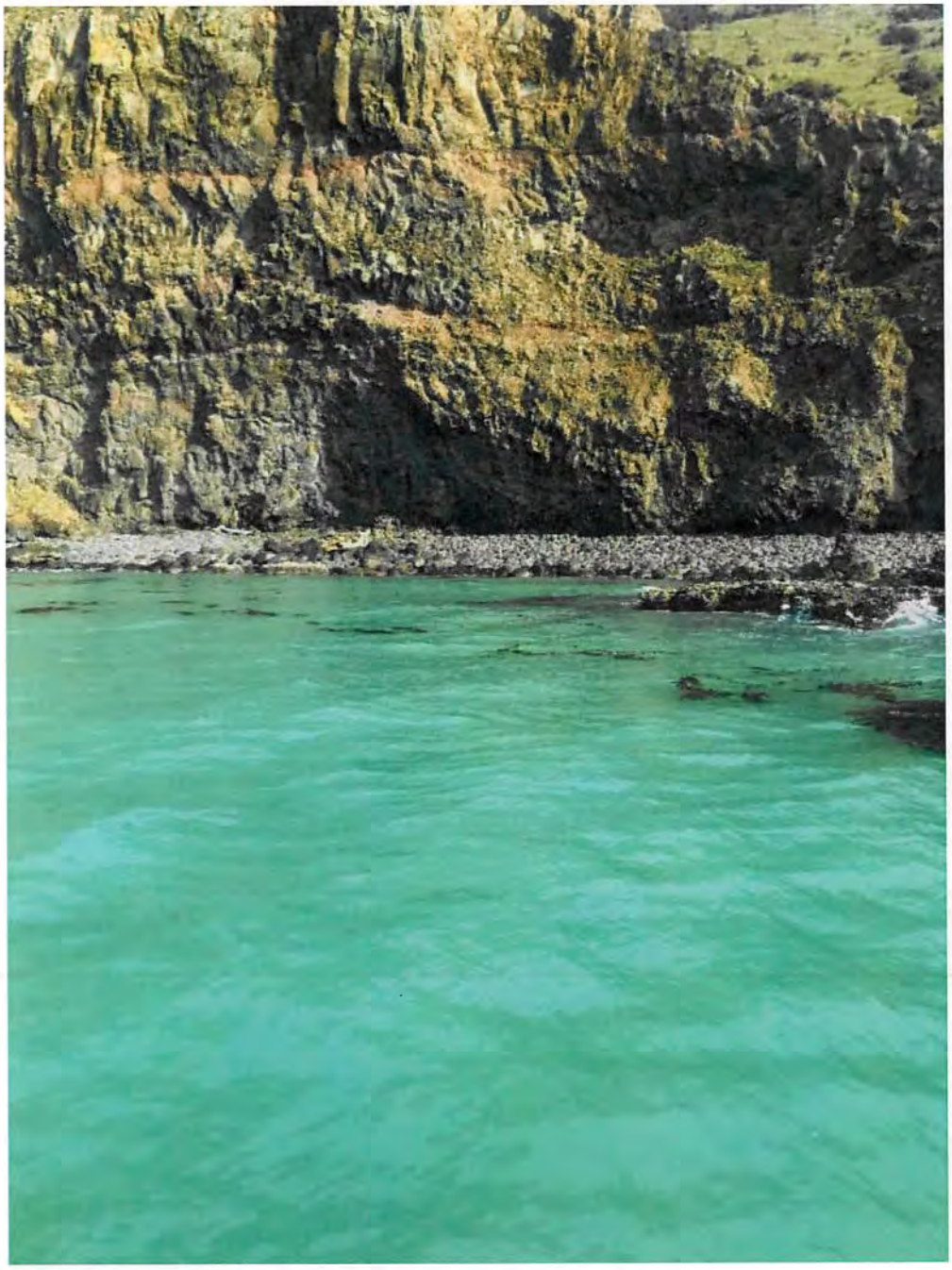


Figure 6

Figure 5,6 and 7 is the area around red rock, this area is our furthest area we harvest. This area is usually an abundant kelp forest year round. We last harvested from this area on the 8th June 2021 which was only half a load as we harvested another area as well that day. Photos taken after the June 29th polar blast storm.

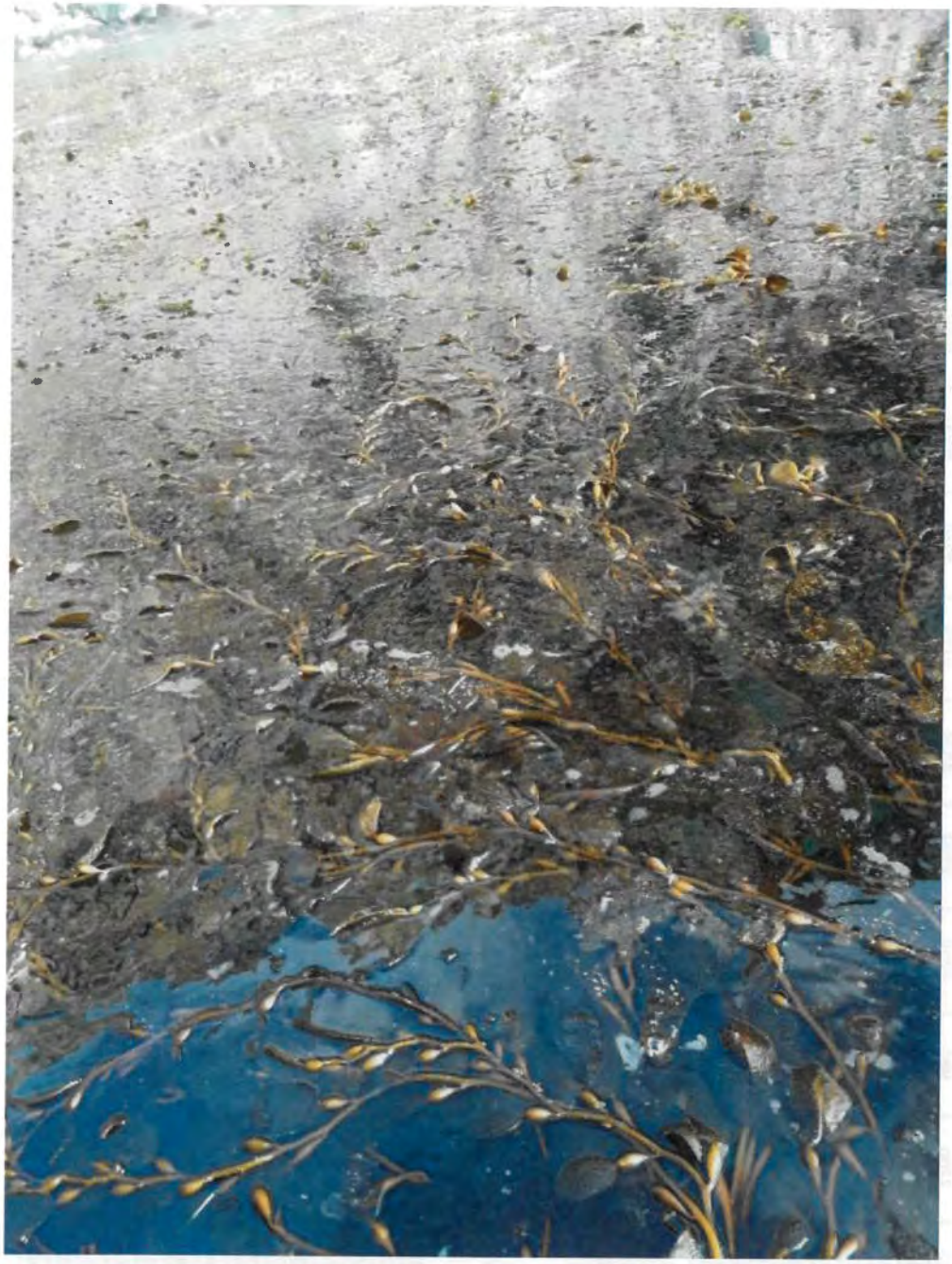


Figure 7: red rock kelp forest. photo taken before the storm.

LFR NZ Kelp Harvesting GW 2010-2022

LFR

		October	November	December	January	February	March	April	May	June	July	August	September	YEARLY TOTAL
2021	2022	8330	9450	5950	4550	840	5250	6330	2800	8330				51830
2020	2021	9450	7280	7720	3710	7420	7840	7560	7420	5670	6790	3780	11620	86260
2019	2020	6790	9870	6020	7700	980	3290	1890	8820	6790	3570	5600	7560	68880
2018	2019	15680	5460	4130	8890	3710	0	1050	5110	3290	9800	4550	5460	67130
2017	2018	4480	1680	5110	5530	420	3220	0	5250	0	4900	1680	8540	40810
2016	2017	2100	1960	540	0	0	6300	1820	4270	3360	6300	5040	5040	36730
2015	2016	2592	5040	2520	5040	3452	5040	1400	0	1260	0	2520	1680	30544
2014	2015	7542	5642	1680	7744	1610	280	4200	4152	5880	7720	7704	7914	62068
2013	2014	5688	8994	11276	10358	5334	2048	2582	10156	4632	9858	10844	6054	87824
2012	2013	3798	4525	1922	874	744	4300	3307	1608	0	6420	2662	4830	34990
2011	2012	2966	9432	3004	6208	6188	0	1336	0	0	1326	3788	0	34248
2010	2011	3240	7532	0	0	3384	2000	3394	5536	9480	3108	7474	1692	46840
TOTAL		72656	76865	49872	60604	34082	39568	34869	55122	48692	59792	55642	60390	648154
Average monthly total		6055	6405	4156	5050	2840	3297	2906	4594	4058	4983	4637	5033	3986
													Yearly average	55162

NZ Kelp Harvesting per Financial Year

Financial Year End

		April	May	June	July	August	September	October	November	December	January	February	March	FINANCIAL YEAR TOTALS
2022	2023	6330	2800	8330										17460
2021	2022	7560	7420	5670	6790	3780	11620	8330	9450	5950	4550	840	5250	77210
2020	2021	1890	8820	6790	3570	5600	7560	9450	7280	7720	3710	7420	7840	77650
2019	2020	1050	5110	3290	9380	4550	5460	6790	9870	6020	7700	980	3290	63490
2018	2019	0	5250	0	4900	1680	8540	15680	5460	4130	8890	3710	0	58240
2017	2018	1820	4270	3360	6300	5040	5040	4480	1680	5110	5530	420	3220	46270
2016	2017	1400	0	1260	0	2520	1680	2100	1960	540	0	0	6300	17760
2015	2016	4200	4152	5880	7720	7704	7914	2592	5040	2520	5040	3452	5040	61254
2014	2015	2582	10156	4632	9858	10844	6054	7542	5642	1680	7744	1610	280	68624
2013	2014	3307	1608	0	6420	2662	4830	5688	8994	11276	10358	5334	2048	62525
2012	2013	1336	0	0	1326	3788	0	3798	4525	1922	874	744	4300	22613
2011	2012	3394	5536	9480	3108	7474	1692	2966	9432	3004	6208	6188	0	58482
2010	2011	0	0	1885	613	3104	3712	3240	7532	0	0	3384	2000	25470
														484728

Greenweight requirement	Frequency	Yearly dry weight (10% recovery)	Estimated value /year	Future requirements	2022 Greenweight Yearly total	2023 Greenweight Yearly total	2024 Greenweight Yearly total
4,000kg approx.	Monthly	5,000kg	$ 200,000	Projected 10t in 2023 & 15t 2024	50,000kg ($200,000)	100,000kg ($400,000)	150,000kg ($600,000)
10,000 to 50,000kg	One off	1,000kg - 5,000kg	$40,000-200,000 (one off)	-	10,000 to 50,000kg (one off) ($40,000-200,000)	-	-
40,000kg	Monthly	Wants wet product	$ 960,000	Increase 12% per year	480,000kg ($960,000)	537,600kg ($1,075,200)	602,112kg ($1,204,224)

From: Nigel Greenwood

Sent: Tuesday, 19 July 2022 1:46 PM

To: Angela Low

Subject: Zelp on my farm

Hi Angela,

Zelp Kelp is a critical input in my low input arable system, the collective benefits I get allow me to not only reduce my Fertiliser inputs, but also my chemical inputs

Zelp Kelp promotes strong plant growth, which in turn does not need large amounts of synthetic Fertiliser, such as Superphospate and Urea. One result I can put on paper is a 10.8T barley crop, with only 78 kg of N from urea to achieve, Kelp was a big driver in the reduced Nitrogen need. My neighbour, less than 600 metres away, grew a 9.6t barley crop, with 210kg of N from urea.

This same crop of mine required 2 less chemical fungicide applications.

Zelp Kelp is a critical addition to regenerative agriculture, and to general sustainability of my farming business.

Thanks, Nigel Greenwood

ZELP AND CARROTS (Feb, 2011)

(Roger Beattie)

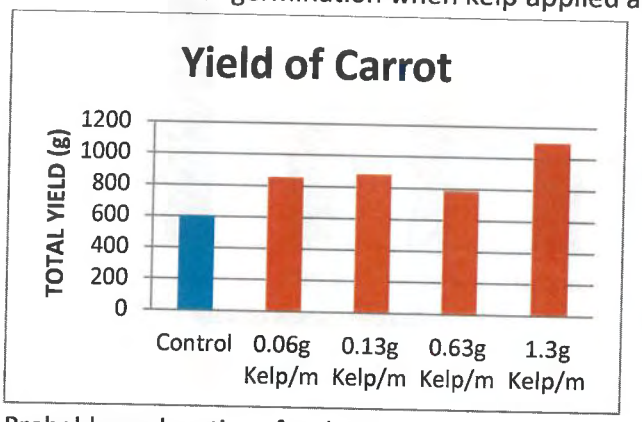
PLANTING

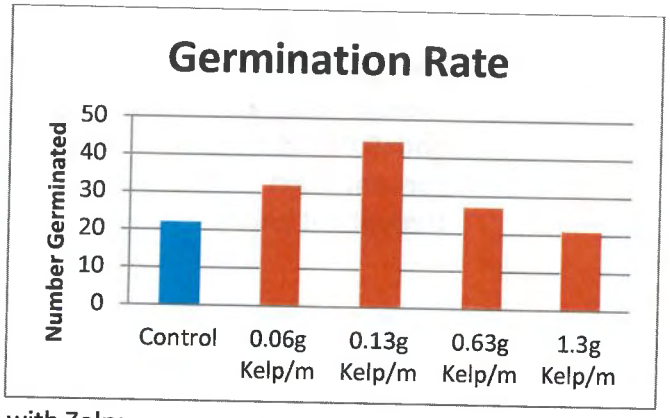
This experiment was conducted in the Vege Garden at R & N Beattie's property in Lansdowne Valley. A quantity of carrots seeds was split into 5 equal amounts. Each of the 5 lots of seed represents a different treatment - One control and four different kelp concentrations. The seed was mixed into 50g of soil and either 0.25g kelp, 0.5g kelp, 2.5g kelp or 5g kelp (or no kelp for the control). This seed, soil, kelp mixture was spread evenly into 5 x 4m rows. The final 1m in each row was harvested, the number that germinated and the total weight was recorded.

November 2010 – Sowing Date
February 2011 – Harvest Date

RESULTS

- 1.8 x greater yield of carrots when kelp applied at 1.3g/m of row
- 1.5 x greater yield of carrots when kelp applied at 0.13g/m of row
- 2 x better germination when kelp applied at 0.13g/m of row





Probable explanations for the increase in productivity with Zelp:

- **Zelp has extremely high antimicrobial properties** – Planted within the immediate vicinity of the seed, Zelp acts as a protective barrier to fight off harmful bacteria and fungi giving the plant a more resistant & resilient start.
- **Zelp is high in plant growth hormones** – Auxins, Cytokinins, Giberellins. These hormones help regulate cell mitosis (more, bigger, faster).
- **Zelp has a large number of bioavailable micronutrients** – These encourage plant growth and the growth of beneficial soil microbes, helping to establish crucial root symbioses
- **Zelp is high in complex polysaccharides (sugars)** – These help soil life and plant life

ZELP AND RADISHES (Sep, 2013)

(Peter Randrup)

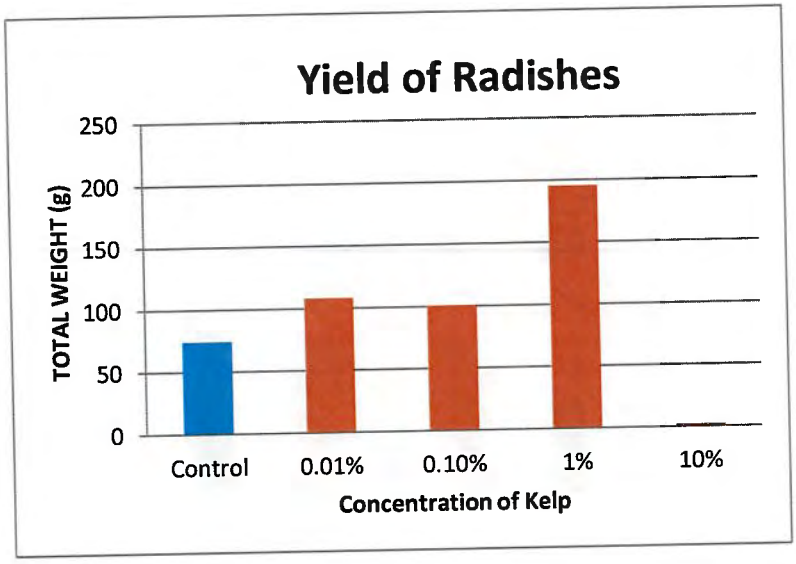
PLANTING

This experiment was conducted in greenhouse conditions on R & N Beattie's Property at Lansdowne Valley. A total of 70 radish seeds were planted across 5 groups (14 radish seeds per group). Four different concentrations of kelp were used and one control. The kelp was mixed throughout the entire pot.

10/07/2013 – Sowing Date
06/09/2013 – Harvest Date

RESULTS

- 2.6 x greater yield of radishes when Zelp is at 1% concentration throughout pots
- 1.4 x greater yield of radishes when Zelp is at both 0.01% & 0.1% concentration throughout pots.



Probable explanations for the increase in productivity when Zelp is mixed through soil:

- **Zelp has extremely high antimicrobial properties** – Planted within the immediate vicinity of the seed, Zelp acts as a protective barrier to fight off harmful bacteria and fungi giving the plant a more resistant & resilient start.
- **Zelp is high in plant growth hormones** – Auxins, Cytokinins, Giberellins. These hormones help regulate cell mitosis (more, bigger, faster).
- **Zelp has a large number of bioavailable micronutrients** – These encourage plant growth and the growth of beneficial soil microbes, helping to establish crucial root symbioses
- **Zelp is high in complex polysaccharides (sugars)** – These help soil life and plant life

ZELP AND RADISHES (Oct, 2013)

(Camille Moreau)

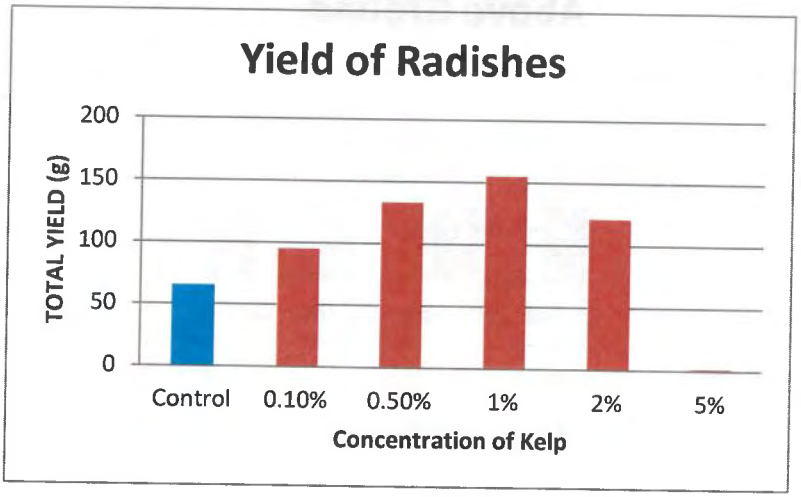
PLANTING

This experiment was conducted in greenhouse conditions on R & N Beattie's Property at Lansdowne Valley. A total of 90 radish seeds were planted across 6 groups (15 radish seeds per group). Five different concentrations of kelp were used and one control. The kelp was mixed into the seed bed only – the top 2cm. The total weight from each group was measured after 10 weeks.

Sowing Date: August 2013
Harvest Date: October 2013

RESULTS

- 2.4 x greater yield of radishes when Zelp is at 1% concentration in seed bed.
- 1.5 x greater yield of radishes when Zelp is at 0.1% concentration in seed bed.



Probable explanations for the increase in productivity when Zelp is mixed into seed bed:

- **Zelp has extremely high antimicrobial properties** – Planted within the immediate vicinity of the seed, Zelp acts as a protective barrier to fight off harmful bacteria and fungi giving the plant a more resistant & resilient start.
- **Zelp is high in plant growth hormones** – Auxins, Cytokinins, Giberellins. These hormones help regulate cell mitosis (more, bigger, faster).
- **Zelp has a large number of bioavailable micronutrients** – These encourage plant growth and the growth of beneficial soil microbes, helping to establish crucial root symbioses
- **Zelp is high in complex polysaccharides (sugars)** – These help soil life and plant life

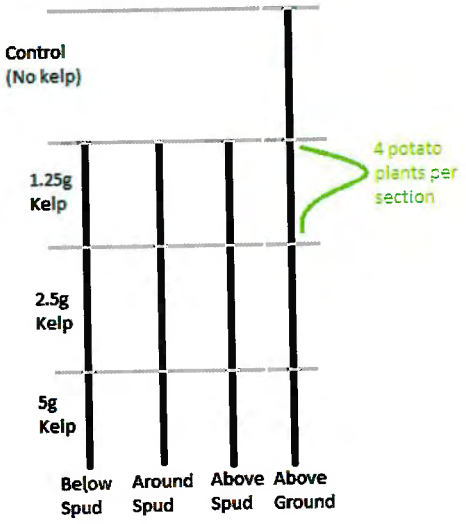
The next experiment will test Zelp applied directly with the seed.

ZELP AND POTATOES (Feb, 2014)

(Roger Beattie)

PLANTING

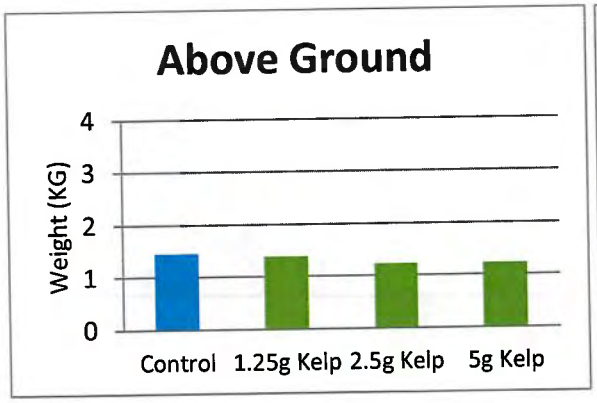
This trial was conducted on R & N Beattie's property at Ataahua in 'Hay' paddock.
52 potatoes were planted across 13 groups (4 potatoes in each group), with 3 different concentrations of kelp and 1 control (see diagram →)

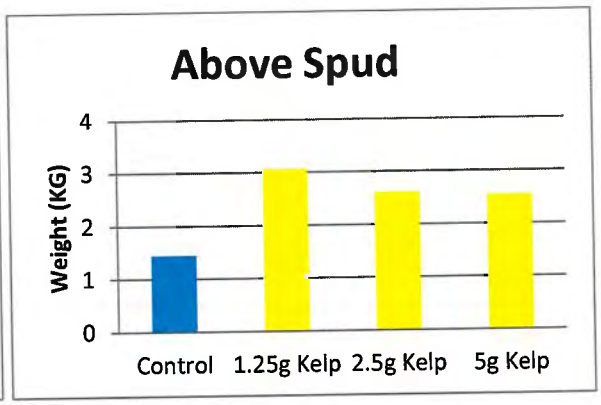


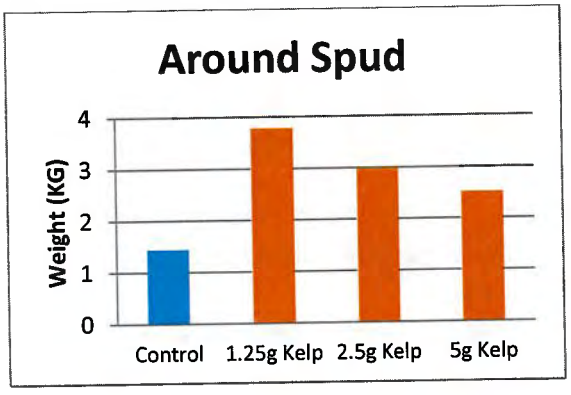
The kelp was applied in four different ways: 1) spread over the soil, 2) above the seed potato, 3) around the seed potato, and
4) applied below the seed potato

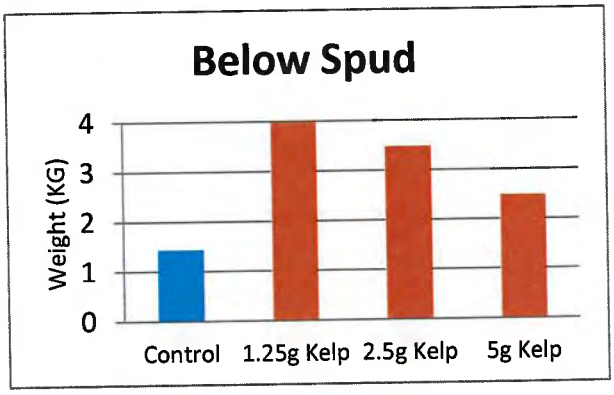
4/10/2013 - Sowing date
18/02/2014 – Harvest date (19wks 4 days)

RESULTS









The group with 1.25g of kelp applied below the spud had a total yield of 3.98kgs, 2.76 times greater the yield obtained from the control, 1.44Kg. The only method that was as bad/worse than the control was applying kelp on top of the soil. In every situation 1.25g of kelp outperformed 2.5g and 5g of kelp. Therefore, applications of 5g and 2.5g are too much. It may be that the optimum concentration is even lower than 1.25g. Another trial will be conducted later this year using smaller concentrations of 0.05g, 0.1g, 0.5g and 1g.

ZELP AND POTATOES (Feb, 2014)

(Roger Beattie)

KELP HEALTH
AG & HORT

CONTROL

1.25g Zelp

ZELP AND BRASSICAS (Apr, 2014)

KELP HEALTH
AG & HORT

(Roger Beattie)

PLANTING

A 3.64ha paddock (R & N Beattie's property – Back Middle at Ataahua) was cultivated with a grubber, harrowed and then rolled. The paddock was split into four 0.91ha sections. The same brassica seed mix (see table) was broadcast spread onto all four sections. Three sections were spread with Zelp (2kg, 10Kg, 30Kg) and one section was spread with seed only (control). After sowing the paddock was harrowed and rolled.

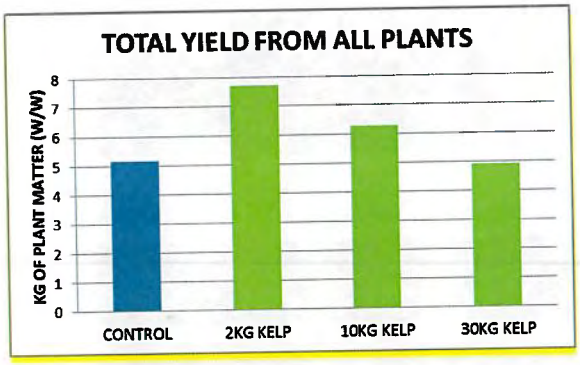
Brassica Seed Mix:

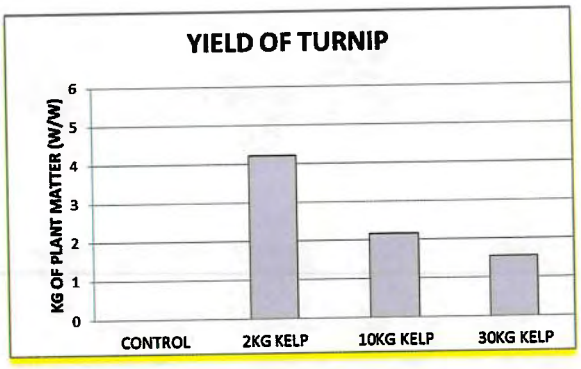
Actual Seed Quantity in each section	Per hectare equivalent
1.75Kg Rape (Winfred) per section	1.92kg/ha
0.125Kg Turnip (York Globe) per section	0.14kg/ha
0.125Kg Mustard per section	0.14kg/ha

*25kg of Aglime was also added to both the control and the 2kg Zelp as a carrier.

12/02/14 – Sowing date
15/04/14 – Sampling Date

RESULTS





Each treatment was randomly sampled with 3 x $1m^2$ samples.

The 2kg Zelp treatment resulted in the highest overall yield of 7.7kg, 49% higher than the control's 5.18kg. The yield from the 10kg Zelp treatment was 6.28kg, while the 30Kg Zelp treatment was the lowest, 4.92kg. Nearly all of the plants in the control were rape, whereas all the Zelp groups contained rape, turnip and mustard. This demonstrates that the Zelp is assisting in the germination of turnip and mustard.

Probable explanations for the increase in productivity when Zelp is sown with seeds:

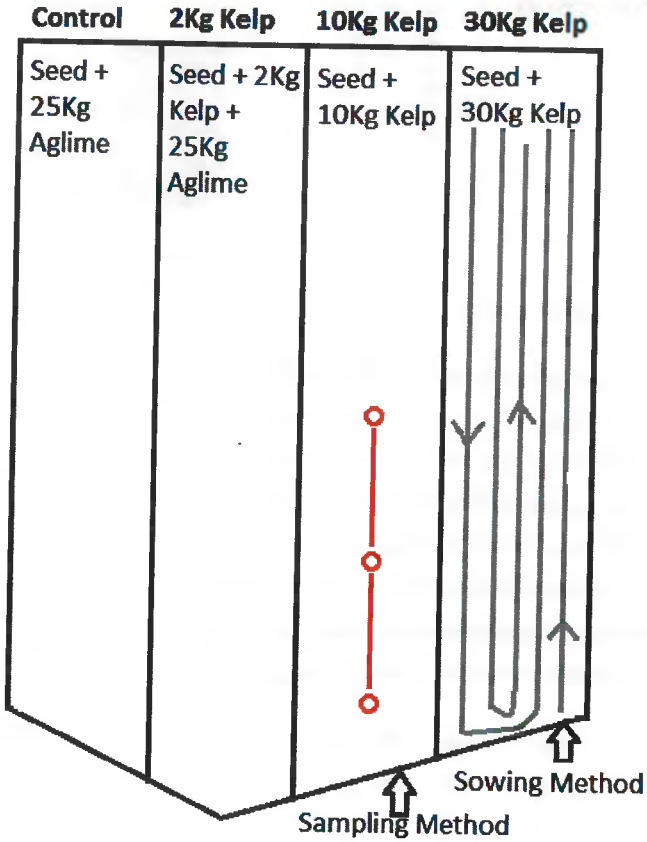
- **Zelp has extremely high antimicrobial properties** – Planted within the immediate vicinity of the seed, Zelp acts as a protective barrier to fight off harmful bacteria and fungi giving the plant a more resistant & resilient start.
- **Zelp is high in plant growth hormones** – Auxins, Cytokinins, Giberellins. These hormones help regulate cell mitosis (more, bigger, faster).
- **Zelp has a large number of bioavailable micronutrients** – These encourage plant growth and the growth of beneficial soil microbes, helping to establish crucial root symbioses
- **Zelp is high in complex polysaccharides (sugars)** – These help soil life and plant life

ZELP AND BRASSICAS (Apr, 2014)

(Roger Beattie)

Control Group – No Turnip Visible

2Kg Kelp/Ha Group – (7 turnip/sm)



22/08/2014 1:11 p.m.

ZELP AND CARROTS TESTIMONIAL (May, 2014)

(Nigel Greenwood)

PLANTING

8 beds were given kelp and 8 were used as controls. The concentration of kelp applied was 1g of kelp/meter/double row (equivalent to 23Kg/ha or $483 worth of product/ha). On a per seed basis it is approximately 1g kelp per 64 seeds.

Planting date: Mid-late September 2013
Harvest date: End of April/start of May 2014

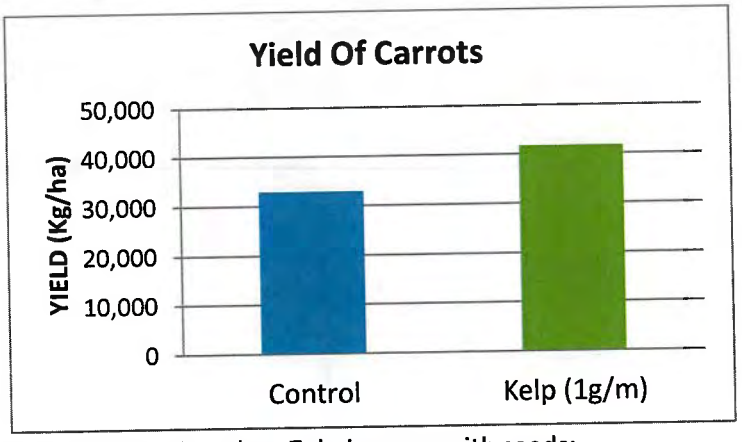
Carrot rows showing 4-5 beds (image above)

RESULTS

Total weight of *first grade* carrots to market:

Control	With kelp	Absolute Difference	Extra Revenue	% Difference
32,909Kg/ha	41,684Kg/ha	8775Kg/ha	$7897/ha	26.7% more with Kelp

"After both groups were washed the carrots in the kelp treatment were more orange, more even in size and were more dense"



Probable explanations for the increase in productivity when Zelp is sown with seeds:

- **Zelp has extremely high antimicrobial properties** – Planted within the immediate vicinity of the seed, Zelp acts as a protective barrier to fight off harmful bacteria and fungi giving the plant a more resistant & resilient start.
- **Zelp is high in plant growth hormones** – Auxins, Cytokinins, Giberellins. These hormones help regulate cell mitosis (more, bigger, faster).
- **Zelp has a large number of bioavailable micronutrients** – These encourage plant growth and the growth of beneficial soil microbes, helping to establish crucial root symbioses
- **Zelp is high in complex polysaccharides (sugars)** – These help soil life and plant life

From an economic point of view, $483 spent on kelp/ha resulted in $7897/ha more revenue. $7897/483 = 16.35 x return on kelp!

Mt Cass, Zelp & Potatoes (January 2015)

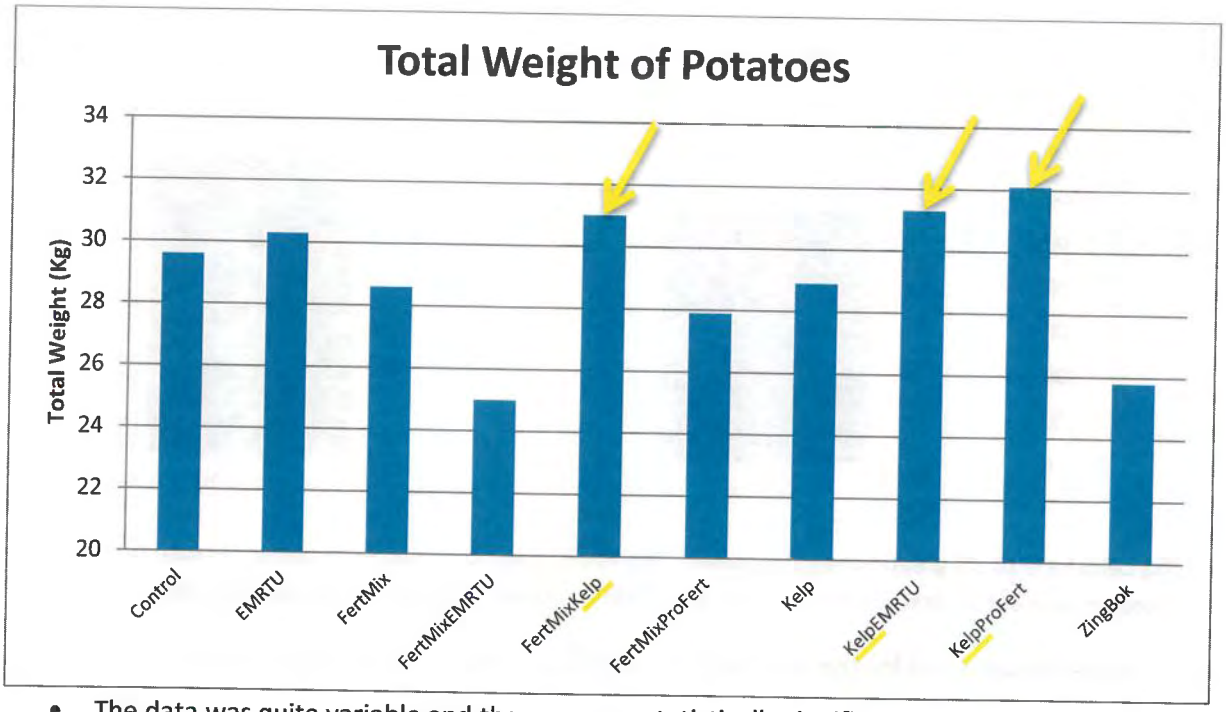
KELP HEALTH
AG & HORT

PLANTING

This trial was held on Tim Chamberlain's property at Mt Cass, Waipara. Over 1000 potatoes were planted across 9 treatments, with 4 replicates. The treatments were various combinations of fertilizers and stimulants. Plots were 10m long (8 sm?) with 28 potatoes per plot. The potatoes were planted with a machine, with the mounding setting off. They were given the treatment and then covered with another pass of the machine. A sample of 10 plants were harvested per plot for measurements. The sampling was done 'Blind'.

03/09/2014 - Sowing Date
20/01/2015 - Harvest Date (139 days after planting)

RESULTS



- The data was quite variable and there was no statistically significant difference. However there were some solid trends in the data, which are important to note for next time.
- The three best treatments all involved kelp and were all better than the control (4-8% greater yield)
- Whenever Zelp was added to another product the performance of that product was improved.
- The FertMix and the EM products (profert & EM RTU) seemed to work synergistically with kelp.

Zelp and Pasture (January 2015)

KELP HEALTH AG & HORT

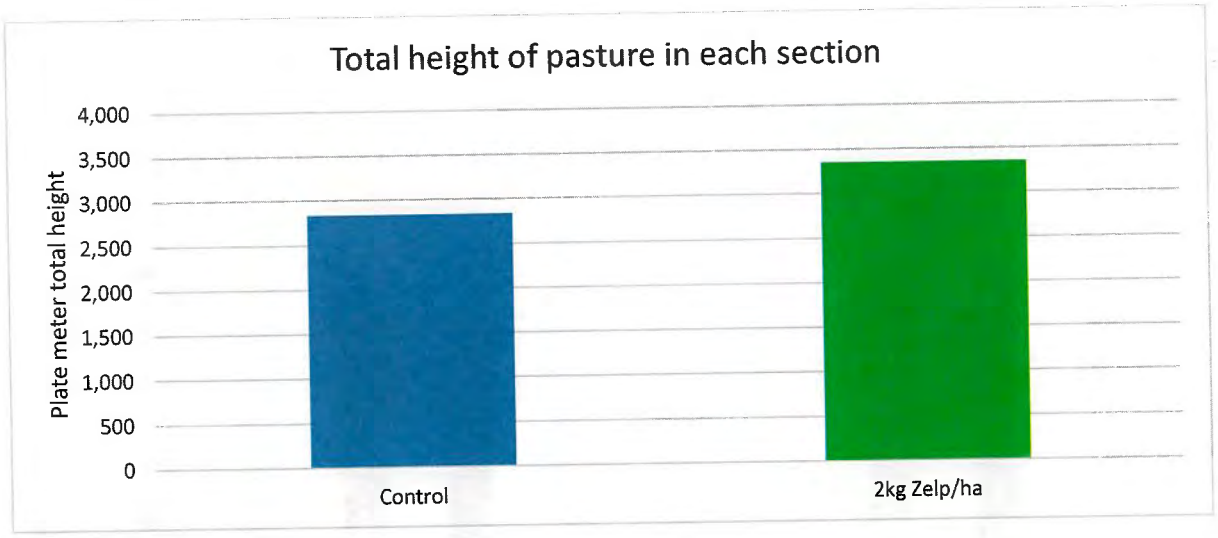
PLANTING

This trial was held on Roger Beattie's property at Ataahua, on a paddock called 'Back Middle'. It was divided into four 1ha sections. There was a control and 2kg Zelp/ha. It was replicated twice to give 4 sections. A mixture of seed was used. The per hectare rates were: 4kg Chicory, 2kg Plantain, 2kg Red Clover, 2kg White Clover. The same amount of seed was used in each section and 25kg of lime was used in each section to bulk out the mixture. The results were measured using a plate meter. This acts a proxy for yield by measuring the heights of the pasture.

Roger Beattie adding the 2kg of Zelp to the Zelp treatments

23/10/14 - Sowing Date
26/01/2015 - Harvest Date (94 days after planting)

RESULTS



2kg Zelp/ha is 18.3% greater than the control. This figure may have been even higher because the plate meter maxed out 13 times when measuring the Zelp treatment, but just 7 times with the control.

Probable explanations for the increase in productivity when Zelp is sown with seed:

- **Zelp has extremely high antimicrobial properties** – Planted within the immediate vicinity of the seed, Zelp acts as a protective barrier to fight off harmful bacteria and fungi giving the plant a more resistant & resilient start.
- **Zelp is high in plant growth hormones** – Auxins, Cytokinins, Giberellins. These hormones help regulate cell mitosis (more, bigger, faster).
- **Zelp has a large number of bioavailable micronutrients** – These encourage plant growth and the growth of beneficial soil microbes, helping to establish crucial root symbioses
- **Zelp is high in complex polysaccharides (sugars)** – These help soil life and plant life

Hamish Reid, Pea Testimonial (January 2015)

PLANTING

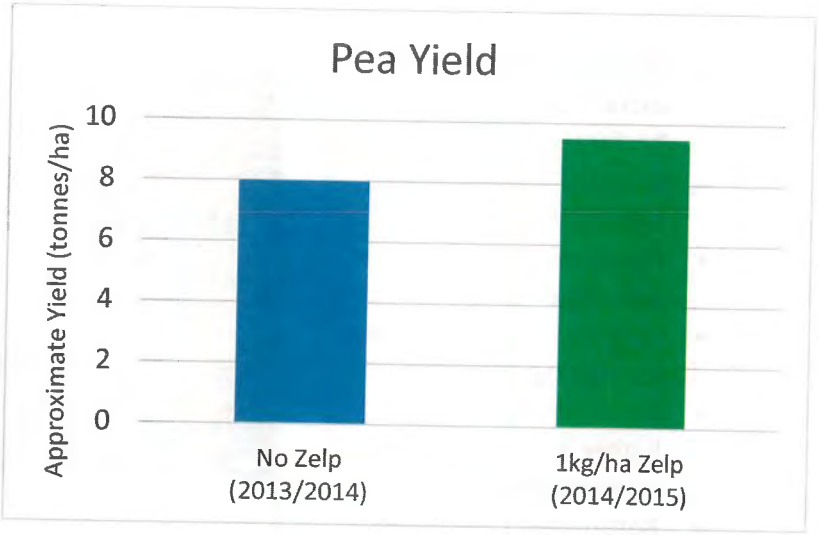
Hamish Reid is a customer that used Zelp powder on his Peas in the 2014/2015 season. He also applied it to his Carrots & Radishes for seed production but for various seasonal and logistical problems couldn't get a measurable difference. He is contracted by Wattie's to grow peas. He applied 1kg/ha of Zelp once to his peas, 2 weeks before flowering and saw an increase in yield of washed weight of peas. After application via a contract sprayer failed, he mixed it into a 1000L tank, agitated it and hooked it up to his irrigator. He agitated it every couple of hours because it tended to settle.

Photo shown is not from the trial

10th - 15th October 2014 – Sowing Date
1st - 15th January 2015 – Harvest Date

RESULTS

- "The peas grew almost exponentially in size in the 2 weeks after application"
- "They didn't double in size after application but it wasn't far from it"
- An extra $1,000/ha
- An extra 1.5t/ha with 1kg/ha of Zelp.
- "Really dark green colour to peas"



Probable explanations for the increase in productivity when Zelp is applied via fertigation:

- **Zelp has extremely high antimicrobial properties** – Planted within the immediate vicinity of the seed, Zelp acts as a protective barrier to fight off harmful bacteria and fungi giving the plant a more resistant & resilient start.
- **Zelp is high in plant growth hormones** – Auxins, Cytokinins, Giberellins. These hormones help regulate cell mitosis (more, bigger, faster).
- **Zelp has a large number of bioavailable micronutrients** – These encourage plant growth and the growth of beneficial soil microbes, helping to establish crucial root symbioses
- **Zelp is high in complex polysaccharides (sugars)** – These help soil life and plant life

Zelp and Barley, Testimonial

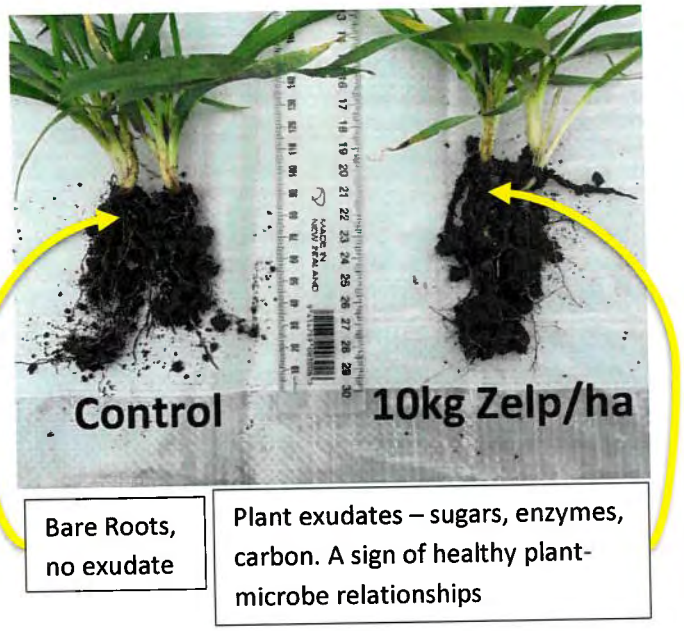
(Nigel Greenwood, 5/1/15)

PLANTING

This trial was conducted on Nigel Greenwood's property in Leeston. Malting barley was used. There was one control group (3.8 ha) and one Zelp Group (1 ha) – given 10kg/ha of Zelp. The yield per hectare was measured for each group.

The Zelp was simply added to the seed box – a layer of seed, zelp, seed then zelp again. It was then mixed a little and spread on the paddock – "very quick and easy". There were no issues with the Zelp going through the machine faster than the seed.

Planting date – 16/5/14
Harvest date – 5/1/15 (234 days after planting)



RESULTS

- 14% greater yield – an extra 1.23 ton per hectare!
- An extra $348.90 *profit* per hectare
- Plants matured 7 days later (see right).
- Larger grains in test done by malting company
- Tissue sample showed higher levels of nutrients in plants given Kelp
- Better condition plants

Probable explanations for the increase in productivity with Zelp:

- **Zelp has extremely high antimicrobial properties** – Planted within the immediate vicinity of the seed, Zelp acts as a protective barrier to fight off harmful bacteria and fungi giving the plant a more resistant & resilient start.
- **Zelp is high in plant growth hormones** – Auxins, Cytokinins, Giberellins. These hormones help regulate cell mitosis (more, bigger, faster).
- **Zelp has a large number of bioavailable micronutrients** – These encourage plant growth and the growth of beneficial soil microbes, helping to establish crucial root symbioses
- **Zelp is high in complex polysaccharides (sugars)** – These help soil life and plant life

Zelp and Onions, Chamberlain (March 2015)

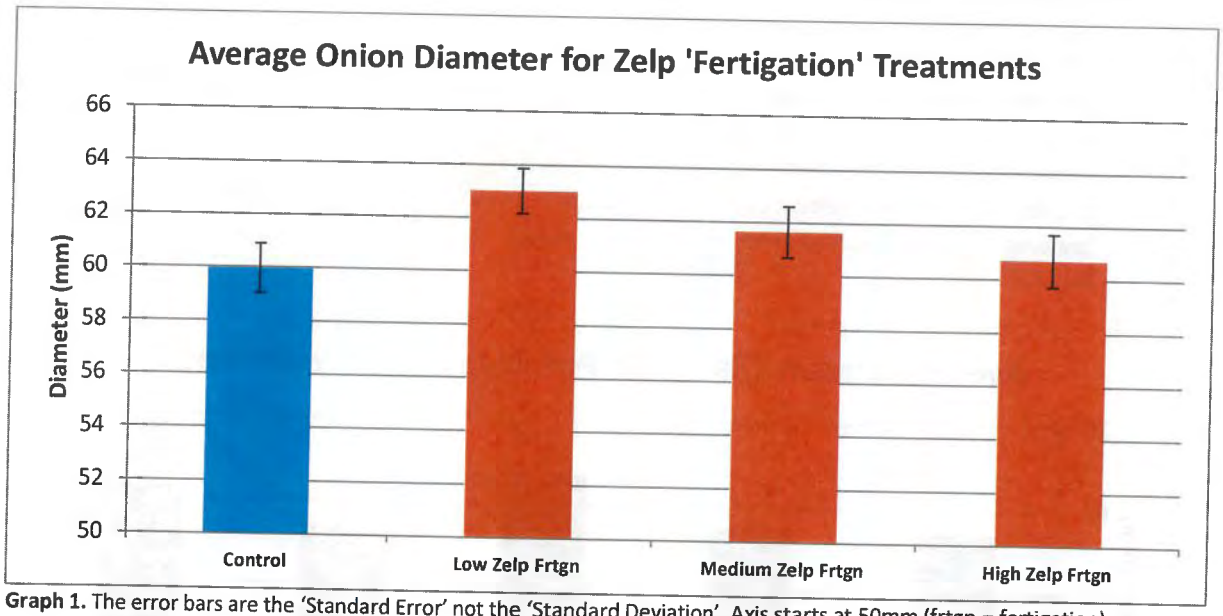
(Peter Randrup)

PLANTING

This trial was based in Leeston in a 4ha onion paddock. Two rows, (like shown to right) that were 1m wide x 300m long were split into 10sm plots and treated with different quantities of Zelp powder, Zelp Tea, & Kelp Juice. There were 13 treatments (incl. 3 controls), replicated 3 times. The diameter (as a proxy for weight) of 30-40 onions was measured in each plot, giving about 100 measurements for each treatment. The trial plan was drawn blind.

30/1/15 – Application date
3/3/15 – Sample date (Same week as harvesting date)

RESULTS

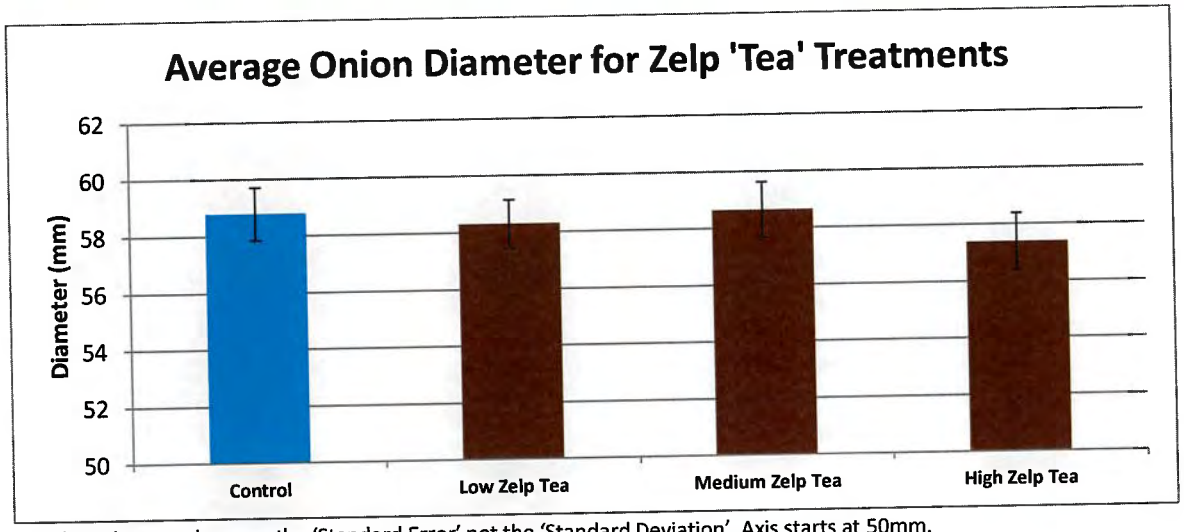


Graph 1. The error bars are the 'Standard Error' not the 'Standard Deviation'. Axis starts at 50mm (frtgn = fertigation)

- Above is the Zelp powder group. The control and treatments were given 10L water across the 10sm patch. The Zelp groups had Zelp powder mixed in with the water (5g, 10g & 20g respectively). This is the equivalent of: Low treatment = 5kg/ha, Medium treatment = 10kg/ha, High treatment = 20kg/ha
- The 5kg/ha was clearly the best with on average a 5% greater onion diameter than the control. Because of the nature of a sphere, a 5% increase in diameter results in a greater than 15% increase in volume, and therefore a 15% increase in weight. A 60mm diameter onion typically weighs 100g. An onion measuring 63mm, typically weighs 116g. This is a 16% increase in onion weight and therefore a 16% increase in yield.
- P-value = 0.117

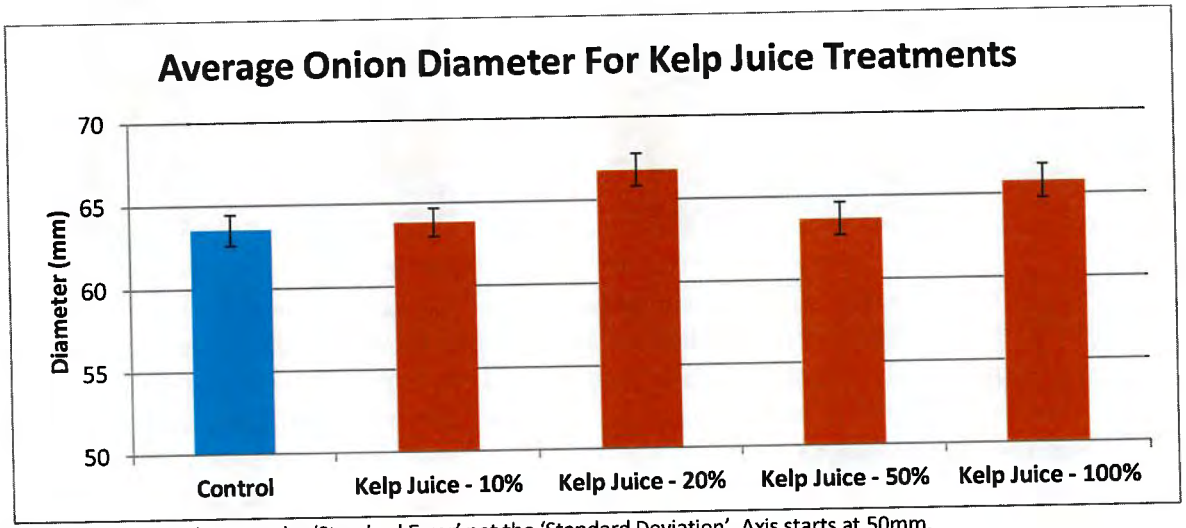
Zelp and Onions, Chamberlain (March 2015)

(Peter Randrup)



Graph 2. The error bars are the 'Standard Error' not the 'Standard Deviation'. Axis starts at 50mm.

- All groups had 1L of water in each 10sm plot (equivalent to 1000L /ha and therefore would be applied with a sprayer). The quantities, type & batch of kelp were the same as in the fertigation groups, but the powder was simply brewed for 45mins and then the fibrous parts sieved out so it could go through the sprayer.
- None of the tea's seemed to work effectively.
- Due to it's viscosity it had great difficulty running through the sprayer – it dribbled out more than sprayed out. This will have resulted in a less even coating which is important when the concentration is high - Some plants may have got too much while others none at all. It may work fine in a large commercial sized sprayer with a strong pump to overcome the viscosity issues.
- It is also possible that the best parts of the kelp are in the solid parts and won't come out simply by brewing. They may need microbes to break them down.
- P=0.717



Graph 3. The error bars are the 'Standard Error' not the 'Standard Deviation'. Axis starts at 50mm.

- All groups received 1L of solution per 10sm plot.
- It is difficult to conclude a lot from this part of the trial. However, 20% dilutions should be the starting point for future Kelp Juice trials.
- P=0.128

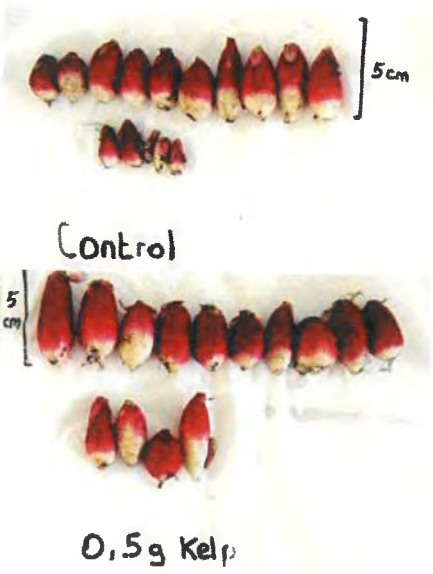
Zelp and Radishes (August 2015)

(Marine Bulourde, ESA University)

PLANTING

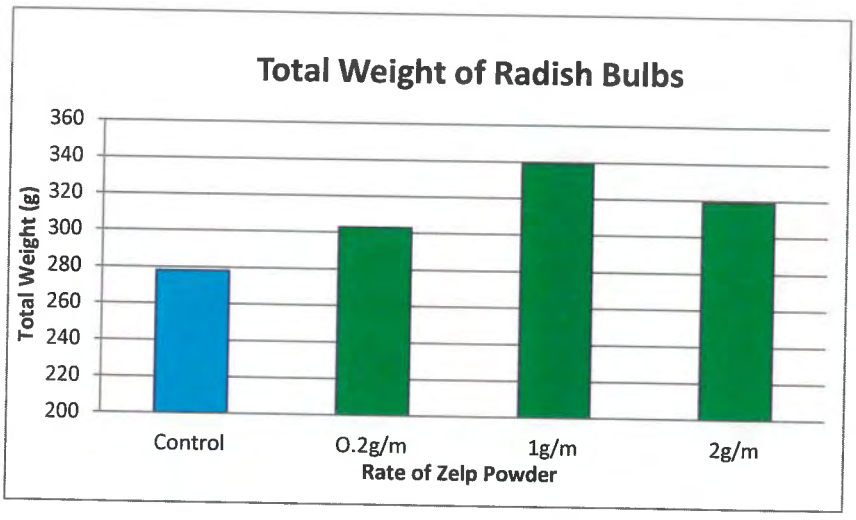
This trial was conducted in a greenhouse on R & N Beattie's property at Lansdowne Valley. There were 4 treatments and each treatment had 17 radish seeds. The trial was replicated 5 times, meaning a total of 340 seeds and 20 rows. The row locations were varied to prevent this affecting the data. The soil was homogenous. Treatments were Control, 0.2g Zelp, 1g Zelp, 2g Zelp. The Zelp was applied by being sprinkled evenly along each row on top of the seed. Seeds were planted at 3cm intervals along a 0.5m seed bed. Rows were about 15cm apart.

Sowing Date = 10/7/15
Harvest Date = 24/8/15 (45 days after planting)



RESULTS

- 24% increase in yield when Zelp applied at 1g/m (20kg/ha)
- 9% increase in yield when Zelp applied at 0.2g/m (4kg/ha)
- Radishes given Zelp were larger and more even in size.
- Fewer stunted radishes with Zelp
- Zelp reduced time to harvestable size.



Probable explanations for the increase in productivity when using Zelp:

- **Zelp has extremely high antimicrobial properties** – Planted within the immediate vicinity of the seed, Zelp acts as a protective barrier to fight off harmful bacteria and fungi giving the plant a more resistant & resilient start.
- **Zelp is high in plant growth hormones** – Auxins, Cytokinins, Giberellins. These hormones help regulate cell mitosis (more, bigger, faster).
- **Zelp has a large number of bioavailable micronutrients** – These encourage plant growth and the growth of beneficial soil microbes, helping to establish crucial root symbioses
- **Zelp is high in complex polysaccharides (sugars)** – These help soil life and plant life

Zelp™

KELP HEALTH

AG & HORT

Laurie Hunter

Maize, Pasture (Waikato)

Maize

"I had a bumper crop this year. My contractor was amazed, he has never seen a crop like it and I only used 100 Kg of urea. He is 6 foot 8 and still had to reach up to grab the first cob. We had some of it raw, it was so rich and as sweet as sweetcorn. I used 3kg/ha Zelp sprayed on cultivated soil before planting." Oct, 2015

Pasture

"I had some paddocks that weren't really firing so I put 2 Kg/ha of Zelp powder. Before applying Zelp the roots were about 45mm deep. Three weeks later they were 250-300mm deep. We didn't have any rain in that time. A month or so later, the paddock is as green as a spring paddock with plenty of worms and after very little rain. I have saved money because I don't have to use expensive mineral supplements - my animals are getting enough nutrients from my pasture now." Feb, 2016

Zelp and Weeds, Testimonial

(Nigel Greenwood)

PLANTING

This is a follow up from a previous trial done before on Nigel Greenwood's property in Leeston.

The paddock had been planted in barley previously and a one-pager was written about this trial. One side received 10Kg/ha Zelp, the other side was a control.

The next year the entire paddock was planted in peas and no kelp was given.

The year after that, the entire paddock was planted in clover and Nigel noticed something on the side that had received the Zelp 2 years earlier. The effect was observed with 20 people present, who were all there as part of a field trip. Everyone agreed that there was a difference.

Hawksbeard

Milk thistle (puha)

RESULTS

- "Virtually no weeds (Milk Thistle & Hawk's Beard) on the right hand side of the paddock, where Zelp was applied 2 years earlier"
- "It looked like that piece had been sprayed out - it was that obvious."
- Zelp has a multi-year effect

	Left Hand Side	**Right Hand Side**
Year 1	Barley - No Zelp	Barley *with Zelp*
Year 2	Peas - No Zelp	Peas - No Zelp
Year 3	Clover - Weeds Present	Clover - *No Weeds*

Possible explanations for the decrease in weeds:

- **Zelp increased the vigour of the clover.** This would have allowed the clover to outcompete the weeds more in the Zelp section, than in the control section.
- **Zelp inhibited the weeds.** These particular weeds (Sour Thistle & Hawk's Beard) had an intolerance to the Zelp – possibly the Iodine content.
- **Zelp promoted the growth of microbes.** The presence of Zelp may have stimulated the growth of beneficial microbes in the soil, which helped the clover perform better than the weeds.

Zelp and Swedes/Fodderbeet, Testimonial

(Allan Richardson, 27/6/17)

PLANTING

This trial was conducted on Allan Richardson's property in Heriot.

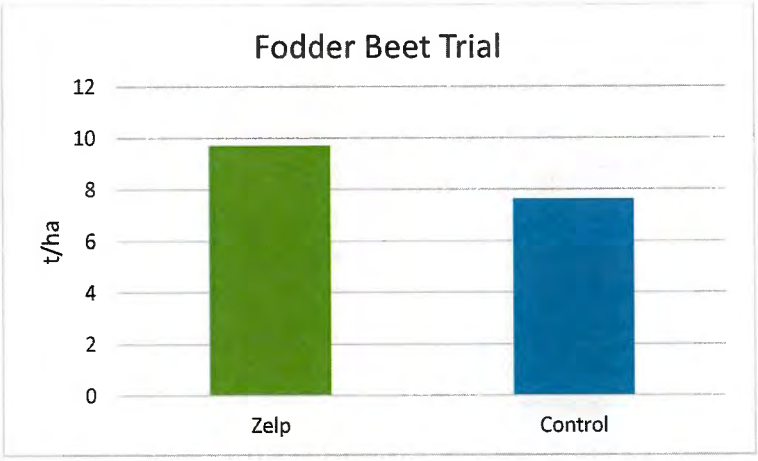
There were 3 swede paddocks and 1 fodder beet (brigadier, uncoated) paddock. Each paddock had one control group and one Kelp Powder (Zelp) group of 2Kg/ha.

The Zelp was applied with fertilizer before planting.

Sowing Date - 27th Nov
Sample Taken - 16th May

RESULTS

- All 3 swede paddocks had higher yields in the Zelp group +32%, +62%, +9% = **+34%** average
- The fodder beet had a **27%** higher yield in the Zelp group
- "More leaf and more bulb"
- "Established more quickly with the Zelp"
- "Will definitely use it again"



Zelp = 9.7t/ha **Control** = 7.6t/ha

Probable explanations for the increase in productivity when Zelp is mixed through soil:

- **Zelp has extremely high antimicrobial properties** – Planted within the immediate vicinity of the seed, Zelp acts as a protective barrier to fight off harmful bacteria and fungi giving the plant a more resistant & resilient start.
- **Zelp is high in plant growth hormones** – Auxins, Cytokinins, Giberellins. These hormones help regulate cell mitosis (more, bigger, faster).
- **Zelp has a large number of bioavailable micronutrients** – These encourage plant growth and the growth of beneficial soil microbes, helping to establish crucial root symbioses
- **Zelp is high in complex polysaccharides (sugars)** – These help soil life and plant life

Zelp and Fodderbeet, Testimonial

(Simon O'Meara, 11/8/17) *(027 2426 248)*

PLANTING

This trial was conducted on Simon O'Meara's property in Otago.

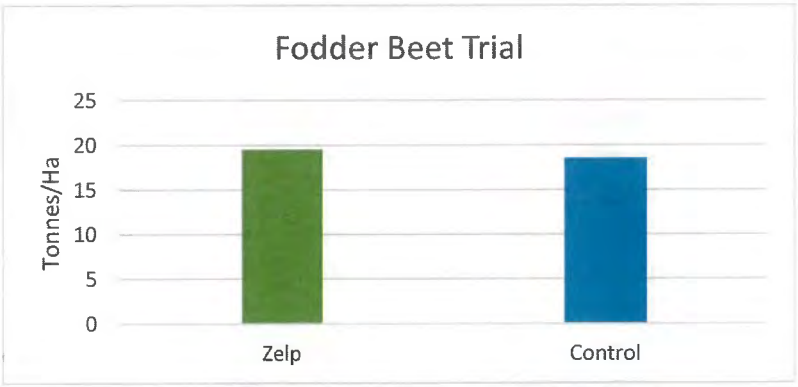
There was one control group and one Kelp Powder (Zelp) group of 2Kg/ha. The Zelp was applied from the fert bin of the precision sower. There was also two spray applications.

The seed used was UpBeet, an uncoated multigerm variety of fodder beet

Four samples from each group were weighed.

RESULTS

- 5.5% higher yield
- 20% better germination
- "40 days after sowing it looked a better strike in the Zelp block"
- At 25c/kg, there was an extra $250/ha in food, for the price of $42/ha = **net benefit of $200+**



Zelp = 19.5T/ha (9 plants/sm) **Control** = 18.5T/ha (7.5 plants/sm)

Probable explanations for the increase in productivity when Zelp is mixed through soil:

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Zelp and Swedes, Testimonial

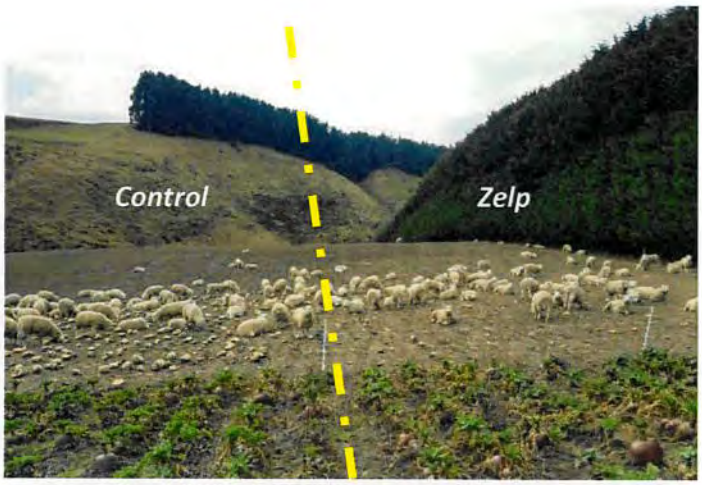
(Mike McElrea, 18/8/17 - mcelrea@farmside.co.nz)

PLANTING

This trial was conducted on Mike McElrea's property in Otago.

There was one control group and one Kelp Powder (Zelp) group of 2 Kg/ha. The Zelp was mixed in with his fert and applied at time of sowing.

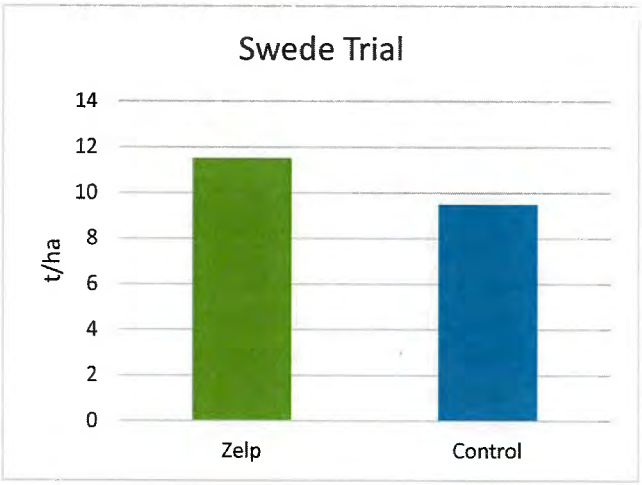
Dry rot is a often a problem with swedes for Mike.



Several days after grazing the sheep have eaten all of the swedes on the Zelp side, and very little from the control

RESULTS

- 21% higher yield of swedes with Zelp
- "Very little dry rot on area treated with Zelp as opposed to 1 in 7 swedes showing signs of dry row in control"
- "Stock prefer the Zelp area to the point they eat swedes in Zelp area before the rest"
- "I grazed my stud ram hoggets on this crop and they are the best ram hoggets I've ever had"



Zelp = 11.5t/ha **Control** = 9.5t/ha

Probable explanations for the increase in productivity when Zelp is mixed through soil:

- **Zelp has extremely high antimicrobial properties** – Planted within the immediate vicinity of the seed, Zelp acts as a protective barrier to fight off harmful bacteria and fungi giving the plant a more resistant & resilient start.
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Mike has a fert rep who was saying South Africa grow swedes and apply a lot of boron and Iodine liquid fert.

Used to grow very good crops of swedes

18t crop of peas?

From: Nino Basile
To: FMSubmissions
Subject: Review of sustainability measures – 2022 October round
Date: Thursday, 7 July 2022 4:48:35 pm

Dear Sirs, I object to the reduction of the SNA2 DV. FYI the port prices used are incorrect and should be reviewed. Also the place of FINZ is not to set the DV as a income stream for the consolidated fund but to set the TACC correct for the Quota holders. Regards Nino Basile

From:	Pat Nepia
To:	FMSubmissions
Subject:	Review of fisheries sustainability measures for October 2022
Date:	Monday, 27 June 2022 10:32:59 am

Kia ora MPI

Thank you for your email offering the opportunity to make a submission about fisheries sustainability.

In our mutual quest to support strategies and efforts that restore the diversity, vitality, and resilience of the ecosystems to a state of abundance you have our support.

However, we would like to see a significant reduction to the commercial harvesting of eels.

Nga mihinui
Pat Nepia
Trustee
Korokota Marae
Titoki

From: fullee
To: FMSubmissions
Subject: submission on sustainability review October 2022
Date: Saturday, 23 July 2022 4:10:30 pm

I am pleased to be able to comment this fisheries review.

I had 23 years fisheries experience as an observer for Sealords as well as a recreation fisher and a long history of conswrvation work generally and have made submissions before to MAF.

My interest is to see a much more sustainable use of fisheries. Presently i do not feel NZ is there in both commercial and recreation activities.

I am only going to comment here on two issues i am concerned about in the Nelson , Golden Bay areas but will no doubt apply nationally too.

Snapper, daily limits and mininium size and scollops.

!0 snapper per person is far to many regardless of stock assesments and the 250mm min length is from my experience far to small . I think 300mm would be a more sensible size and 5 per person and if the recreation scollop season ever reopens 30 per person and only hand picked, would be useful.

Long line hook numbers to be reduced to 15 per line and only one line per person per day.

Just because stock numbers appear to be healthy should be no reason to increase daily take.

I hope the scollop review will not allow a return to dredging. There is plenty of good examples where hand harvesting works for a number of shell fish.

One reason the fish stocks are in a far healthy state is due to the lack to any dredging and a reduced trawling effort resulting in a healthy seabed and therfore,

fish food. The closure of the scollop take is a good example, where the benthic forna has returned to healthy levels.

I hope we see some sensible new fisheries regulations that reflect what most people i talk too agree ned to change.

Peter Fullerton. Golen Bay.

20th July 2022

From:	Neil Wilson Heather Cresswell
To:	FMSubmissions
Subject:	its wrong
Date:	Wednesday, 15 June 2022 7:19:19 pm

leave us out of the laws etc ,does that mean you have no issues with us bread and butter fishos great well leave it alone cheers neil in blenheim