



Fisheries New Zealand

Tini a Tangaroa

Review of Sustainability Measures for Tarakihi (TAR 1, 2, 3 and 7) for 2019/20

Fisheries New Zealand Discussion Paper No: 2019/13

ISBN No: 978-1-98-859473-6 (online)

ISSN No: 2624-0165 (online)

June 2019

New Zealand Government

Disclaimer

While every effort has been made to ensure the information in this publication is accurate, Fisheries New Zealand does not accept any responsibility or liability for error of fact, omission, interpretation or opinion that may be present, nor for the consequences of any decisions based on this information.

Requests for further copies should be directed to:

Publications Logistics Officer
Fisheries New Zealand
PO Box 2526
WELLINGTON 6140

Email: brand@mpi.govt.nz
Telephone: 0800 00 83 33
Facsimile: 04-894 0300

© Crown Copyright – Fisheries New Zealand

Contents	Page
1 Stocks being reviewed	1
2 Summary	1
3 Quota Management System	2
4 Legal basis for managing fisheries in New Zealand	2
5 Treaty of Waitangi obligations	2
5.1 Input and participation of tangata whenua	2
5.2 Kaitiakitanga	3
6 Relevant plans, strategies, statements and context	3
7 About the stock	3
7.1 About the species	3
7.2 Management target	3
7.3 Stock assessment	4
7.4 Current status, trends and projections in biomass	4
7.5 Current TAC, TACC and allowances	8
7.6 Current other sustainability measures	9
7.7 Uncertainties	9
8 Options	9
9 Analysis of options	10
9.1 Background	10
9.2 Setting or varying the allowances	12
9.3 Analysis of options for varying TAC and TACC	13
9.4 Economic evaluation	16
9.5 Environmental interactions	18
10 Questions for submitters on options	19
11 Deemed values	19
12 How to get more information and have your say	19
Appendix 1 The Industry Rebuild Plan	20

1 Stocks being reviewed

Tarakihi (TAR 1, TAR 2, TAR 3 and TAR 7)

Nemadactylus macropterus; tiki

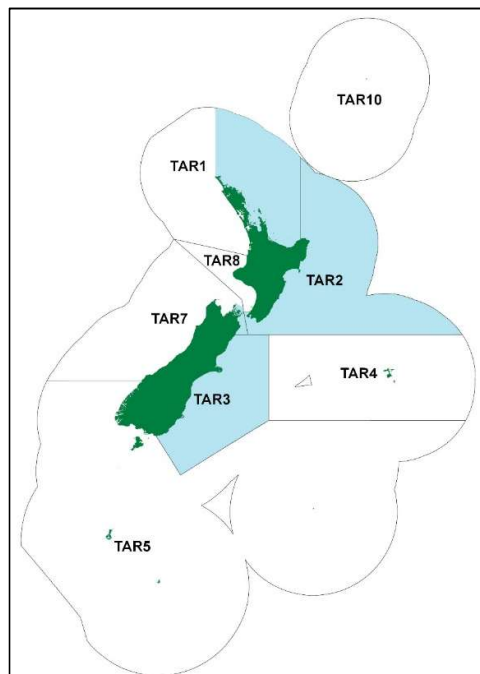


Figure 1: The Quota Management Area (QMAs) for East Coast tarakihi (TAR 2 and 3, and East Coast portions of TAR 1 and 7)

2 Summary

The primary driver for the review of East Coast tarakihi is the sustainability risk associated with the current catch levels. This stock consists of TAR 2, TAR 3, and the East Coast portion of TAR 1 and TAR 7 (Figure 1).

The stock assessment for East Coast tarakihi indicates that it is a single biological stock, and stock abundance in 2019 is estimated to be 15.9% SB_0 ¹. This is below the level that the Harvest Strategy Standard recommends the development of a formal, time constrained rebuilding plan. As part of the October 2018 sustainability round, the Minister of Fisheries (the Minister) decided to implement the first stage (20% cut to the Total Allowable Commercial catch (TACC)) of a two-staged plan to rebuild tarakihi abundance back to a target level of 40% SB_0 . The second stage is to implement additional measures, as outlined in this paper, to further assist in the rebuild of East Coast tarakihi.

Three options are proposed to further support the rebuild of this stock:

- **Option 1:** A 31% reduction to the combined TACC for TAR 1, TAR 2, TAR 3 and TAR 7 as proposed by the Minister in the 2018 Decision Document. This is predicted to achieve a target of 40% SB_0 within 12 years, with cuts spread unevenly across quota management areas

¹ SB_0 is the spawning biomass (adult fish) of the unfished population.

(QMAs) 1, 2, 3 and 7. In addition to this, the reduction for TAR 1 is assumed to occur across the entire QMA, and not just the East Coast portion of that stock.

- **Option 2:** A 35% reduction to the combined TACC for TAR 1, TAR 2, TAR 3 and TAR 7. This is predicted to achieve a target of 40% SB_0 within 11 years, which is generally consistent with Fisheries New Zealand's Harvest Strategy Standard. Catch reductions are proportionately shared across the East Coast tarakihi stock, e.g. 50% catch reductions to TAR 2 and 3 and the East Coast portion of TAR 1 and TAR 7.
- **Option 3:** Maintain TACCs at current levels, and adopt additional management controls as proposed through the commercial fishing industry's *'Eastern Tarakihi Management Strategy and Rebuild Plan'* (the Industry Rebuild Plan). This option aims to rebuild the stock to a target level of 35% SB_0 , over an unspecified timeframe, without any further TACC reductions.

The industry considers that the management actions outlined in the Industry Rebuild Plan will significantly decrease the rebuild timeframes associated with the current catch limits, negating the need for further cuts. The Industry Rebuild Plan is attached in Appendix 1, and discussed in section 9.3.

3 Quota Management System

Within New Zealand, tarakihi is managed using the Quota Management System (QMS). The fishing year for tarakihi runs from 1 October to 30 September. For more information about the QMS go to <https://www.mpi.govt.nz/law-and-policy/legal-overviews/fisheries/quota-management-system/>.

4 Legal basis for managing fisheries in New Zealand

The Fisheries Act 1996 provides the legal basis for managing fisheries in New Zealand, including the Minister's responsibilities for setting and varying sustainability measures. See the separate document *Overview of legislative requirements and other considerations* on the Fisheries New Zealand sustainability consultation webpage (<https://www.fisheries.govt.nz/news-and-resources/consultations/review-of-sustainability-measures-for-1-october-2019>) for more information.

5 Treaty of Waitangi obligations

5.1 Input and participation of tangata whenua

Input and participation into sustainability processes is provided through Iwi Fisheries Forums, which were established for that purpose. Each Iwi Fisheries Forum has developed an Iwi Fisheries Forum Plan, which describes how the iwi in the Forum exercise kaitiakitanga over the fisheries of importance to them, and their objectives for the management of their interests in fisheries. The Minister must have particular regard to kaitiakitanga when making sustainability decisions.

Te Waka a Māui me Ōna Toka Iwi Forum (Te Waka a Māui), Te Hiku o te Ika Fisheries Forum, the Mai I Ngā Kuri a Whareki Tihirau Iwi Fisheries Forum, Te Taihauauru and the Ngā Hapū o te Uru Fisheries Forum had input into the selection of stocks to be reviewed in the 2018 and 2019 sustainability reviews.

Te Waka a Māui (TAR 3 & 7) represents the nine South Island iwi, each of which hold mana moana and significant commercial and non-commercial interests in South Island fisheries. During 2018, the Forum supported a review of TAR 3 and TAR 7, but did not support setting a customary allowance for TAR 7 based on reported catch as this does not account for the full harvest. The forum has not expressed a firm opinion in relation to the 2019 review, due to the lack of scientific information available when the Forum met.

During 2018, Ngā Hapū o Te Uru (TAR 1) supported the highest reduction in TACC. The Forum supported a recreational bag limit for tarakihi, but did not support any reduction in customary allowance. Mai I Ngā Kuri a Whārei ki Tihirau (TAR 1) also supported a species-specific recreational bag limit for tarakihi. During 2019, both of these forums recognised this species is a taonga to Māori, recognising its importance to tangata whenua for customary, commercial, subsistence and recreational purposes.

The Murihiku Mahinga Kai Hui (Southland) expressed no significant concerns during the 2018 review.

5.2 Kaitiakitanga

The fisheries plans associated with Te Waka a Māui me Ōna Toka, Mai I Ngā Kuri a Whārei ki Tihirau, Ngā Hapū o Te Uru, and Te Hiku o te Ika Forums includes objectives for the management of fish stocks, aligned with the aspirations of local iwi.

Fisheries New Zealand considers that the rebuild options presented in this discussion document will contribute towards maintaining kaitiakitanga for Te Waka a Māui me Ōna Toka, Te Hiku o te Ika, Ngā Hapū o Te Uru o Tainui, and Mai I Ngā Kuri a Whārei ki Tihirau and support the objectives of their Fisheries Plans.

6 Relevant plans, strategies, statements and context

The Draft National Inshore Finfish Fisheries Plan (2011), whilst not a statutory plan, provides guidance on management objectives and strategies for finfish fisheries. The TAR 1 stock also intersects with the Hauraki Gulf Marine Park, and the Minister is required to have regard to provisions in the Hauraki Gulf Marine Park Act (HGMPA) 2000.

The proposals outlined in this paper are considered to be consistent with the objectives of the Hauraki Gulf Marine Park Act and the Draft National Inshore Finfish Fisheries Plan.

Additionally, the East Coast tarakihi stock intersects with a number of regional council boundaries to which coastal plans may apply. Fisheries New Zealand notes that both the Marlborough District Council and the Bay of Plenty Regional Council coastal plans have measures to exclude some types of fishing from inshore areas. Fisheries New Zealand notes that these measures are generally outside of where tarakihi is targeted.

7 About the stock

7.1 About the species

Tarakihi are caught in coastal waters of the North and South Islands in depths from 30 m to 250 m. They are a long-lived species, living to 40+ years, and reaching sexual maturity, on average, at 6 years and 33 cm in length. Tarakihi grow rapidly for the first 8 years and reach minimum legal size (25 cm fork length) at 3-4 years. The best available science indicates that East Coast tarakihi is one biological stock. Due to its biological characteristics and natural mortality rate, it is considered to be a low productivity species (according to the Harvest Strategy Standard (HSS) operational guidelines), which means that it is less resilient to high levels of fishing pressure than high productivity species.

7.2 Management target

Tarakihi is managed under Section 13 of the Fisheries Act 1996 (the Act). Section 13(2) of the Act requires that stocks are maintained at or above a level that can produce the maximum sustainable yield (*MSY*). Where *MSY* is not known, for low productivity species such as tarakihi, the HSS recommends default proxies of 40% of the unfished biomass (40% *SB₀*) for the target, 20% of the unfished biomass (20% *SB₀*) for the soft limit, and 10% of the unfished biomass (10% *SB₀*) for the

hard limit. Stocks should be managed to fluctuate around the management target, with at least a 50% probability of being at or above the target. This target represents a real-world biomass level that will produce the *MSY*, taking into account the characteristics of the species, variability in productivity, environmental variability, and uncertainties in stock status.

The Minister has ultimate discretion as to the management target that is set for this stock. The HSS provides guidance on an appropriate management target, but equally the Minister is able to choose an alternative. During his 2018 decisions, the Minister indicated that he considered the proxy target of 40% SB_0 for East Coast tarakihi to be appropriate. He also indicated an alternative target maybe considered, if supported by scientifically robust and peer-reviewed information.

7.3 Stock assessment

The 2017 East Coast tarakihi stock assessment represented the first fully quantitative stock assessment for East Coast tarakihi. It integrated all available commercial catch and catch per unit effort (CPUE), commercial catch-at-age data, recreational catch estimates, relative biomass estimates, and catch-at-age data from fishery-independent surveys from the East Coast of the South Island. Combined with the updates to the stock assessment in 2018 and 2019, Fisheries New Zealand considers this to be the best available information.

7.4 Current status, trends and projections in biomass

The abundance of East Coast tarakihi is currently estimated to be at 15.9% SB_0 , which is significantly below the management target of 40% SB_0 . It has also been below the soft limit of 20% SB_0 since the early 2000s, and had an overall downward trend for approximately 30 years reaching its lowest point circa 2014. Since then it has shown an increasing trend, with a small dip in the most recent year. Projections at current catch levels suggest the stock is rebuilding and the biomass will have a 50% probability of meeting a target 40% SB_0 in approximately 35² years (refer Figure 2).

When a stock declines below its soft limit the HSS and guidelines recommend developing a formal, time-constrained, rebuilding plan. The plan should aim to restore the stock to at least the target level of biomass within a timeframe of between T_{min} (minimum timeframe to achieve rebuild to target in the absence of fishing), and $2 * T_{min}$ (twice the minimum timeframe), with a 50% probability. For tarakihi, T_{min} has been determined by the stock assessment model to be 5 years for a target of 40% SB_0 , and 4 years for a target of 35% SB_0 .

² Note the simulation period is for 30 years, therefore the rebuild timeframe of 35 years for a target of 40% SB_0 has been estimated based on continuation of the same linear trend.

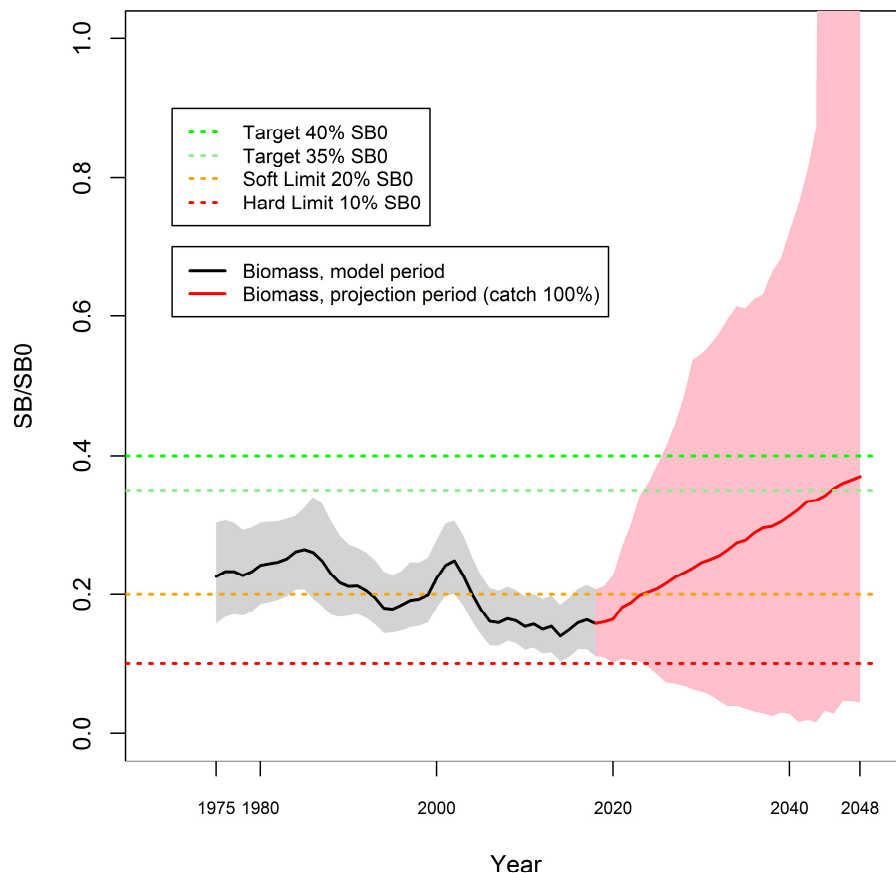


Figure 2: Spawning biomass levels. The projection, from 2018 forward (red shading), is based on current catch and the large confidence intervals are due to uncertainty in spawning success and subsequent recruitment (fish above the minimum legal size entering the fishery).

Customary fishery

Tarakihi (tiki) is an important species for customary fishing and is identified as a taonga species in the Iwi Fisheries Plans that apply to the East Coast of the North and South Islands. Best available information on customary catch was analysed in the 2018 tarakihi consultation document³, and data from the most recent fishing year indicates little to no change to those estimates.

Customary catch reporting information for the East Coast tarakihi is incomplete, with areas of TAR 1 and TAR 2 under the Fisheries (Amateur Fishing) Regulations 2013, which do not require reporting of customary take. The information nevertheless suggests that current customary allowances adequately provide for customary use of tarakihi at this time. Tangata whenua in TAR 1, 2, 3 & 7 may also be using recreational bag limits to meet their needs.

Fisheries New Zealand notes that the proposals are likely to positively impact on the taiāpure and mātaihai reserves by contributing to increasing abundance through the rebuild.

³ Available at <https://www.fisheries.govt.nz/news-and-resources/consultations/review-of-sustainability-measures-for-1-october-2018/>

Recreational fishery

Tarakihi is one of the top five inshore recreational finfish species. Recreational fishing of tarakihi is managed through daily bag limits. Depending on the area, tarakihi is included in a combined maximum daily bag limit of between 20 and 30 finfish per person per day. Within the combined daily bag limit there is an individual daily bag limit for tarakihi of either 10 (Kaikōura Marine Area), 15 (South East Area) or 20 (other areas within East Coast tarakihi). Nationally, there is a minimum net mesh size of 100 mm, and a minimum legal size (MLS) of 25 cm (fork length)⁴.

The National Panel Survey of Marine Recreational Fishers represents the best available information on recreational harvest. The preliminary results of the 2017/18 survey are outlined in Table 1 below.

Table 1: Recreational allowances and National Panel Survey harvest estimates for TAR 1, 2, 3 & 7.

Stock	Recreational Allowance (t)	2011/12 National Panel Survey harvest estimate (t)	2017/18 National Panel Survey harvest estimate (t)
TAR 1	110	117 ± (50)	62.23 ± (17)
TAR 2	73	72 ± (31)	110.23 ± (47.5)
TAR 3	15	3 ± (2)	5.18 ± (3)
TAR 7	23	23 ± (17)	20.57 ± (7.5)

Commercial fishery

Tarakihi is the third most valuable inshore commercial finfish fishery, with more than 80% of the Total Allowable Catch (TAC) taken in commercial fisheries. The commercial fishery for tarakihi on the East Coast, based on the TACC, is currently 3188 tonnes per annum, which is landed as follows:

TAR 1 (east): approximately 15% of the East Coast TAR fishery

The tarakihi target fishery accounts for about 80% of the annual catch. Most of the remainder of the catch is taken as bycatch from bottom trawl fisheries targeting snapper, john dory, and gemfish. A small percentage of the catch is taken by the danish seine, setnet, and bottom longline methods (<10% collectively). The TACC for the wider TAR 1 stock was increased between 2004 and 2018. During this time the TACC was only fully caught once (refer Figure 3 below).

⁴ Refer to the Fisheries New Zealand website on the following for area specific recreational fishing rules: <https://www.fisheries.govt.nz/travel-and-recreation/fishing/fishing-rules/>

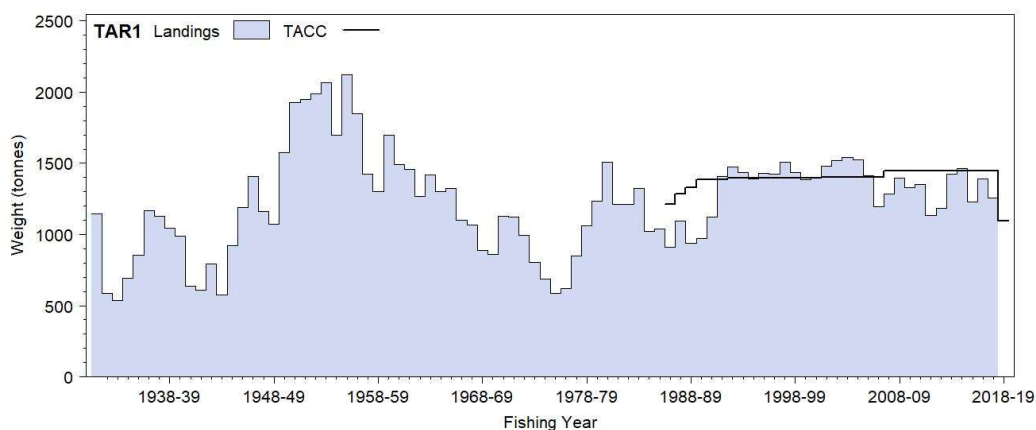


Figure 3: Landings vs TACC for TAR 1 from the 1930 to 2017/18

TAR 2: approximately 46% of the East Coast TAR fishery

The target trawl fishery has consistently accounted for about 88% of the annual catch, with a small proportion of the catch taken as by-catch in the red gurnard trawl fishery. The TACC was increased between 2004 and 2018. During this time the TACC has been over-caught by up to 10% in 8 of the 13 years (Refer Figure 4).

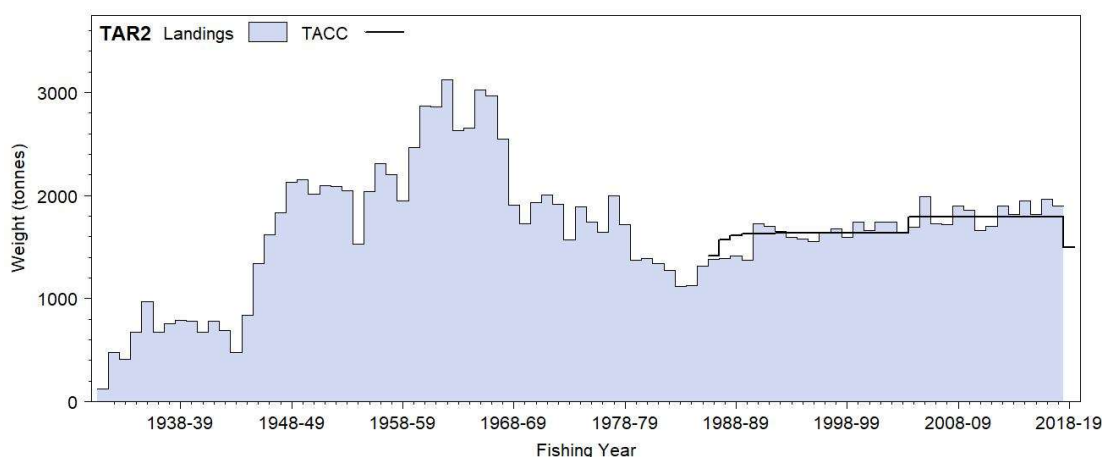


Figure 4: Landings vs TACC for TAR 2 from 1930's to 2017/18.

TAR 3: approximately 33% of the East Coast TAR fishery

Approximately 78% of the catch is taken by the target trawl fishery; and 10-15% is taken by a small target setnet fishery operating off Kaikōura. The remainder of tarakihi is taken as by-catch by bottom trawl fisheries. The TACC was increased between 2004 and 2018. During that time the TACC was significantly under caught (Figure 5).

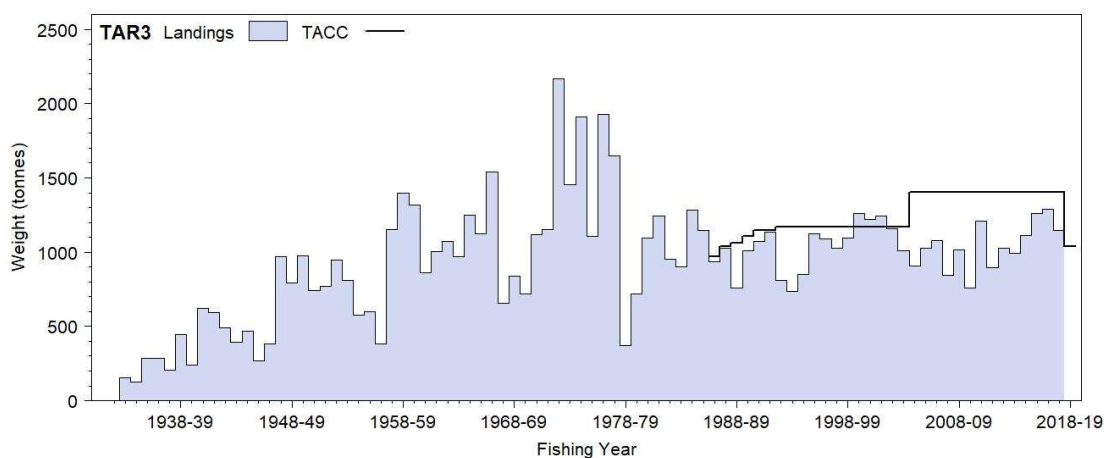


Figure 5: Landings vs TACC for TAR 3 from 1930's to 2017/18.

TAR 7: approximately 6% of the East Coast TAR fishery

Catches from TAR 7 are mainly from the trawl fisheries targeting tarakihi (78%), blue warehou, red cod, and giant stargazer. The TACC for TAR 7 is set at 1,042 tonnes (Figure 6), and approximately 15% of the total catch in recent years has been taken in the Cook Strait area.

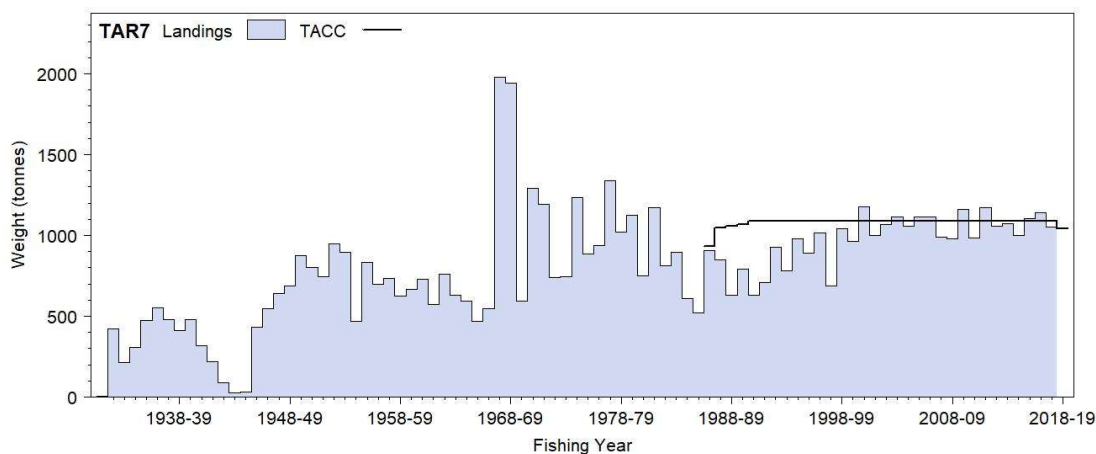


Figure 6: Landings vs TACC for TAR 7⁵ (includes all of TAR 7 - not restricted to Cook Strait) from 1930's to 2017/18.

7.5 Current TAC, TACC and allowances

Table 2 below sets out current TACs, TACCs and allowances for TAR 1, TAR 2, TAR 3 and TAR 7.

Values for TAR 1 and TAR 7 are for the entire QMA, including the sub-areas TAR 1 (east) and TAR 7 (Cook Strait).

⁵ Note that, on average, the Cook Strait region represents approximately 15% of the total catch from TAR 7.

Table 2: Total Allowable Catch for TAR 1, 2, 3, & 7

Stock	Total Allowable Catch (tonnes)	Total Allowable Commercial Catch (tonnes)	Allowances (tonnes)		
			Customary Māori (tonnes)	Recreational (tonnes)	All other mortality to the stock caused by fishing (tonnes)
TAR 1	1390	1097	73	110	110
TAR 2	1823	1500	100	73	150
TAR 3	1174	1040	15	15	104
TAR 7	1174	1042	5	23	104

7.6 Other sustainability measures

The main methods used to manage recreational harvests of tarakihi are Minimum Legal Size, method restrictions (e.g. net mesh restrictions), and daily bag limits (refer section 7.4 above).

Commercial and recreational fishers are limited by a Minimum Legal Size of 25 cm fork length for tarakihi in all areas.

7.7 Uncertainties

There are uncertainties around the stock structure and other assumptions in the assessment model. These uncertainties lead to uncertainty in estimates of stock status, i.e., the current biomass as a proportion of the virgin/unfished biomass.

Nevertheless, the assessment model has been peer reviewed and accepted by the Fisheries New Zealand Southern Inshore Fisheries Assessment Working Group. The assessment model provided the basis for the 2018 decisions, and is considered to represent best available information. All of the available evidence clearly points to a sustainability risk, with the stock below the soft limit of 20% SB_0 .

Fisheries New Zealand acknowledges additional uncertainty around the projections of future stock status based on alternative TACCs, largely resulting from unpredictable fluctuation in recruitment driven by environmental conditions. Fisheries New Zealand plans to undertake regular stock assessments and adjust catch limits accordingly, to ensure that the stock rebuild remains on track.

8 Options

Table 3 below sets out the options for varying the TACs, TACCs and Allowances for TAR 1, TAR 2, TAR 3 and TAR 7. The third option has been proposed by the commercial fishing industry through its Industry Rebuild Plan. The Industry Rebuild Plan proposes a suite of management actions as an alternative to further TACC reductions, and is attached as Appendix 1.

Table 3: Proposed catch limits and allowances

Stock	Option	Total Allowable Catch (tonnes)	Total Allowable Commercial Catch (tonnes)	TACC % change	Allowances		
					Customary Māori (tonnes)	Recreational (tonnes)	All other mortality caused by fishing (tonnes)
Combined	Option 1	3989	3249	31% ↓	193	221	326
	Option 2	3783	3063	35% ↓	193	221	306
	Option 3	5561	4679	0%	193	221	468
	<i>Status quo TACC with additional controls</i>						
TAR 1	Option 1	871	625	43% ↓ *	73	110	63
	Option 2	1106	839	24% ↓ *	73	110	84
	Option 3	1390	1097	0%	73	110	110
	<i>Status quo TACC with additional controls</i>						
TAR 2	Option 1	1383	1100	27% ↓	100	73	110
	Option 2	998	750	50% ↓	100	73	75
	Option 3	1823	1500	0%	100	73	150
	<i>Status quo TACC with additional controls</i>						
TAR 3	Option 1	623	539	48% ↓	15	15	54
	Option 2	602	520	50% ↓	15	15	52
	Option 3	1174	1040	0%	15	15	104
	<i>Status quo TACC with additional controls</i>						
TAR 7	Option 1	1112	985	5% ↓ *	5	23	99
	Option 2	1077	954	9% ↓ *	5	23	95
	Option 3	1174	1042	0%	5	23	104
	<i>Status quo TACC with additional controls</i>						

* Catch limit reductions are proposed to come exclusively from the eastern portions of the TAR 1 and TAR 7 stocks, referred to as TAR 1 (East) and TAR 7 (Cook Strait). This equates to approximately 50% reductions in catch for TAR 1 (East) and TAR 7 (Cook Strait).

9 Analysis of options

9.1 Background

As part of the Minister's decisions on the 2018 October Sustainability Round, he decided to implement a two-stage process for rebuilding the East Coast tarakihi stock. The staged approach provided the commercial fishing industry an opportunity to plan and adjust their operations. The second stage committed to a further additional review in 2019, with the expectation that additional cuts would be required, to ensure the stock is rebuilt in an appropriate timeframe.

When rebuilding a stock, regard should be given to relevant social, cultural and economic factors. This is of particular importance when considering the target, rate and way in which a stock is moved towards or above a level that can produce the *MSY* (Section 13(3) of the Act).

The Minister's decision letter from the 2018 October Sustainability Round provided some clear messages in relation to his objectives for the rebuild of this fishery, including:

- A biomass target of 40% SB_0 was considered robust and to constitute best available information, noting that an alternative target maybe considered if supported by scientifically robust and peer-reviewed information;
- Support for a rebuild timeframe of 10 years; and
- Acknowledgement that a 20% reduction (in 2018) will begin the process of rebuilding the stock, but will not rebuild the stock at the rate and to the target agreed without significant further measures.

In addition to these messages, the Minister acknowledged the work Industry had done to gather more information to better inform tarakihi management and support stock rebuild, and invited the Industry to submit a plan detailing this work for inclusion as part of the October 2019 Sustainability review for tarakihi.

The proposed targets, and the associated way and rates of meeting those target under the different options, are summarised in Table 4 below.

Table 4: The 3 rebuild options for the tarakihi stock in TAR 1 (east), 2, 3, and 7 (Cook Strait).

	Option 1	Option 2	Option 3
Target	40% SB_0	40% SB_0	35% SB_0
Rebuild timeframe (years) (Rate)	12 year, or $2.4 * T_{min}$	11 years, or $2.1 * T_{min}$	< 27 years, or $6.75 * T_{min}$ Industry has indicated that the management actions outlined in its plan will contribute to a faster rate of rebuild, but the actual time frame is unclear.
Method of achieving target (Way)	Catch reductions: 31% reduction in TACC; implemented in 2019/20	Catch reductions: 35% reduction in TACC implemented in 2019/20	Industry Rebuild Plan: catch spreading, move on rules, and increased fishing selectivity to avoid juvenile/ unwanted fish.

The HSS proposes a proxy target of 40% SB_0 for long-lived stocks such as tarakihi in the absence of a robust, peer reviewed alternative. A target of 35% SB_0 represents the industry proposed alternative. While both targets meet the risk profiles in the HSS, Fisheries New Zealand would also encourage industry to consider through its submission on this consultation, evidence that would demonstrate that 35% SB_0 will provide for *MSY*, as is required under the Act. The Southern Inshore Science Working Group was not able to determine if 35% SB_0 was a more appropriate target than 40% SB_0 due to the lack of supporting evidence.

Based on the current stock status of 15.9% SB_0 , and taking into account the HSS, a formal, time-constrained rebuilding plan for tarakihi is required. The HSS deems a stock to be fully rebuilt when there is at least a 70% probability the stock is at or above the target. At 50% probability it is deemed that a rebuilding plan is no longer required. Due to the fluctuating nature of fish stocks, an acceptable level of probability that has been adopted to measure progress towards achieving the rebuild target is 50%.

The stock assessment determined that East Coast tarakihi would require a minimum of 5 years to rebuild to the target of 40% SB_0 , or minimum of 4 years to rebuild to a target of 35% SB_0 , in the

absence of fishing. The HSS suggests a rebuild timeframe of $2 \times T_{min}$, where T_{min} is the stock rebuild time in the absence of fishing (e.g. 5 years or 4 years depending on the target).

To meet either of these timeframes, significant changes to the current regime are required. Figure 7 (below) compares the rebuilding rates for Options 1, 2 and the Status Quo. Option 3 (Industry Rebuild Plan) was not included in the graph below because the timeframe associated with the Industry Rebuild Plan as a whole package is not known. The Industry Rebuild Plan is proposing that its management actions will accelerate the rate of rebuild compared to the status quo, but does not define a timeframe.

While the HSS provides guidance, the Minister has discretion regarding the choice of target biomass and the way and rate the stock is moved towards the target. Alternative TACs and rebuilding timeframes may be chosen by the Minister in consideration of the relevant factors.

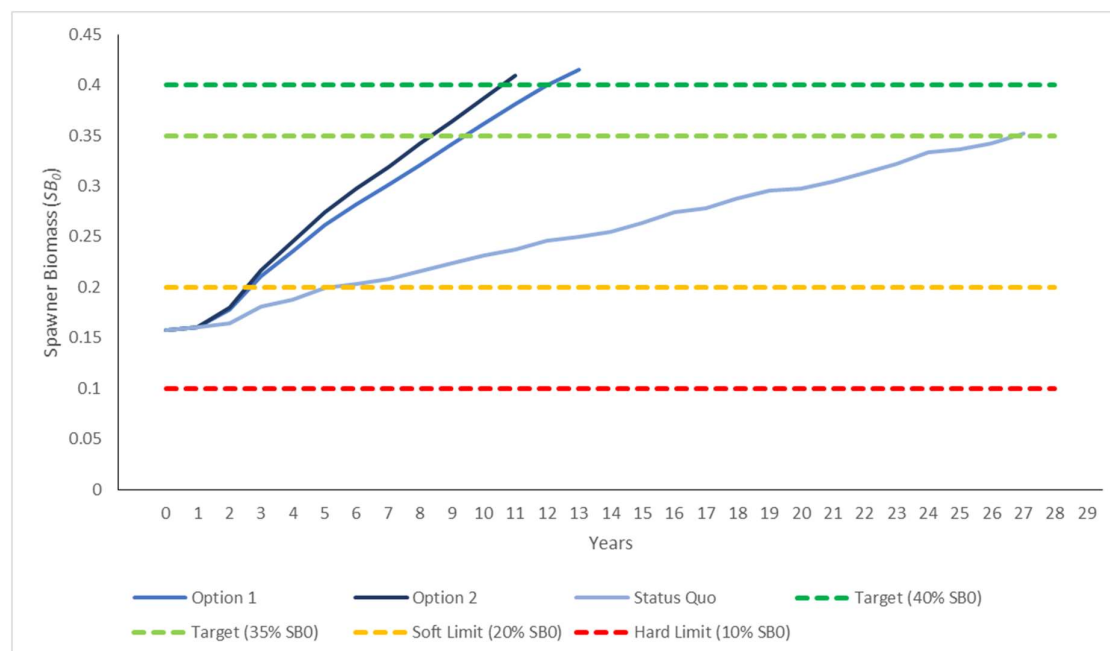


Figure 7: Comparison of rebuild rates for options 1, 2 and the status quo. Option 3 has not been displayed as the rebuild rate is unable to be calculated. The status quo represents the worst case scenario without any additional controls.

9.2 Setting or varying the allowances

Having set the TAC, the Minister must make allowances for Māori customary non-commercial fishing interests, recreational fishing interests, and all other mortality to the stock caused by fishing, and then set or vary the TACC (as provided for in sections 20 and 21 of the Act).

9.2.1 CUSTOMARY NON-COMMERCIAL AND RECREATIONAL ALLOWANCES

There are no proposals to change the current allowances for customary non-commercial and recreational catch.

Customary non-commercial catch in the East Coast tarakihi fishery makes up only a small component of total removals (<5%) and, based on the best available information, it meets the needs of this sector.

Similarly, due to the small amount of recreational harvest (< 5% of the TACC), when compared to the commercial harvest (80% of the TACC), reducing the recreational harvest would have minimal impact on improving the tarakihi stock.

This is supported by the results of the 2017/18 National Panel Survey of Marine Recreational Fishers. The survey showed, despite the daily bag limit for tarakihi being between 10 and 20 per person per

day (depending on location), 4 tarakihi or less per person per day were landed on 73% (TAR 1), 51% (TAR 2), 97% (TAR 3) and 84% (TAR 7) of recreational fishing trips.

9.2.2 ALLOWANCE FOR ALL OTHER MORTALITY TO THE STOCK CAUSED BY FISHING

All options propose allowances for other sources of fishing mortality equivalent to 10% of the commercial catch. The proposed allowances account for illegal take, under-reporting, death of fish required to be returned to sea, “ghost fishing” by lost gear, and burst nets.

9.3 Analysis of options for varying TAC and TACC

The options proposed outline two approaches to managing the rebuild of a fish stock. Options 1 and 2 represent the more traditional approach of adjusting the TAC, whereas Option 3 proposes alternative management measures outside of TAC settings. These approaches are not exclusive and can be combined where appropriate to achieve an effective outcome.

Fisheries New Zealand is interested in stakeholder feedback pertaining to which is the most appropriate approach for the rebuild of East Coast tarakihi, or whether combining aspects of these approaches is preferred.

Furthermore, regardless of which option is selected Fisheries New Zealand is committed to regular monitoring and review of the East Coast tarakihi fishery to ensure its rebuild.

Option 1

Table 5: Summary of Option 1.

Target	40% SB_0
Rebuild rate (years)	12 years or $2.4 * T_{min}$
Method of achieving target	Catch reductions: 31% reduction in TACC; implemented in 2019/20

Option 1 represents a 31% reduction to the combined TACC for TAR 1, 2, 3 & 7. The Minister proposed that this option be considered for the 2019 review as part of his decisions outlined in the 2018 Decision Document⁶.

The changes to TAC and TACC in Option 1 allow for East Coast tarakihi to recover to its management target of 40% SB_0 in 12 years (with a 50% probability). This would lead to a rebuild timeframe that is 2 years longer than that recommended by the HSS.

The primary difference between Option 1 and Option 2 is how the TACC reductions are shared across the four stocks. Under Option 1, the TACC reduction for TAR 1 is assumed to be spread across the entire stock, and not taken solely from the East Coast portion of the QMA. This assumption was made because if the entire TACC cut was implemented in the East Coast portion of TAR 1 it would result in an approximate 90% reduction in catches from the East Coast portion of TAR 1, effectively closing the fishery.

The economic impact of this Option is estimated to be \$7.3 million per annum over 12 years, and is the largest economic impact over the period of rebuild (refer section 9.4 below).

Option 1 aligns with the objectives in the relevant Iwi Fisheries Forum Plans, primarily by ensuring that the stock will rebuild to a level that supports specific goals, such as ensuring a thriving fishery, within a

⁶ <https://www.fisheries.govt.nz/news-and-resources/consultations/review-of-sustainability-measures-for-1-october-2018/>

significantly shorter timeframe than would be achieved through Option 3, but will take 1 year longer than the rebuild time proposed under Option 2.

Option 2

Table 6: Summary of Option 2.

Target	40% SB_0
Rebuild rate (years)	11 years or $2.1 * T_{min}$
Method of achieving target	Catch reductions: 35% reduction in catch; implemented in 2019/20.

Option 2 represents a 35% reduction to the combined TACC for TAR 1, 2, 3 & 7. This option results in the largest catch reductions to East Coast tarakihi, and therefore the fastest rate of rebuild. This option is the closest to the guidance in the HSS, which recommends a rebuild timeframe of 10 years for a target of 40% SB_0 .

The changes to the TAC and TACC in Option 2 allow for the stock to recover to a management target of 40% SB_0 in 11 years (with a 50% probability).

The difference between this option and Option 1 is that the TACC reductions are evenly shared across the whole of the East Coast tarakihi stock. In practice this amounts to a 50% reduction to the TACC of TAR 2 and TAR 3, as well as 50% reductions to the East Coast portion of TAR 1 and the Cook Strait portion of TAR 7.

The economic impact would be approximately \$8.1 million per annum over 11 years (refer Section 9.4 below).

Option 2 aligns with the objectives in the relevant Iwi Fisheries Forum Plans, primarily by ensuring that the stock will rebuild to a level that supports specific goals, such as ensuring a thriving fishery, within a shorter timeframe than would be achieved through Option 1 or 3.

Option 3

Table 7: Summary of Option 3.

Target	35% SB_0
Rebuild rate (years)	≤ 27 years or $6.75 * T_{min}$ Note: this is the worst case rebuild timeframe and doesn't take into account any reduction to the rebuild timeframe as a consequence of the additional management action. The Industry Rebuild Plan proposes that the management actions outlined in the plan will accelerate the rate of rebuild, but does not define a timeframe.
Method of achieving target	No TAC/TACC/Allowance cuts. Industry <i>Eastern Tarakihi Management Strategy and Rebuild Plan</i> : i.e., catch spreading, move on rules, and increased fishing selectivity (avoid catching unwanted fish).

Option 3 proposes no reductions to catch limits or allowances, and instead proposes to rebuild the stock through a combination of management measures as outlined in the Industry Rebuild Plan (see Appendix 1).

The Industry Rebuild Plan supports a management target of 35% SB_0 . The industry consider that this target more accurately reflects the HSS requirements when the species specific requirements of tarakihi are taken into account.

Stock assessment projections show that, based solely on current catch limits, the stock would rebuild to a target of 35% SB_0 over 27 years ($6.75 * T_{min}$). This represents the slowest rebuild rate of the three options. The Industry Rebuild Plan, however, proposes that additional management actions will accelerate the current rate of rebuild, but the accelerated timeframe is unknown, when taking into account the package of measures proposed.

Fisheries New Zealand notes there is uncertainty as to whether the Industry Rebuild Plan will deliver an accelerated rate of rebuild. This is because research is still being undertaken on the effectiveness of some of the proposals outlined in the Industry Rebuild Plan, including trials on selectivity of fishing gear.

The economic impact would be approximately \$3.1 million per annum until the rebuild is achieved (refer Section 9.4 below), or over 27 years in the absence of additional controls delivering sustainability outcomes.

Eastern Tarakihi Management Strategy and Rebuild Plan 2019

The plan, *Supporting a Sustainable Fishery: Eastern Tarakihi Management Strategy and Rebuild Plan*, is attached in Appendix 1 and summarised below. The plan has been submitted to the Minister of Fisheries for consideration by Fisheries Inshore New Zealand, Te Ohu Kaimoana and Southern Inshore Fisheries.

The Industry Rebuild Plan proposes an alternative to further catch reductions for the rebuild of East Coast tarakihi.

Objective: Implement an effective strategy to rebuild and maintain a healthy fishery for our future generations.

Goal: To rebuild and maintain the stock at or above the biomass that achieves maximum sustainable yield.

Action: Engaged and active management throughout the entire rebuild timeframe and beyond.

Work stream 1: Management Measures:

Industry modelling indicates that improved selectivity from commercial gear could potentially increase the rate of rebuild.

As part of this strategy industry has committed to selectivity research, move-on rules to avoid juvenile tarakihi, reduction in targeting of tarakihi, and voluntary closed areas. In addition to this, industry has committed to catch spreading to reduce the pressure on the East Coast portion of TAR 1 and TAR 7.

The industry has committed to the development of an East Coast tarakihi management procedure informed by the 2021 stock assessment.

Initially, it is proposed that all these measures will be implemented on a voluntary basis, however industry has proposed the use of overfishing thresholds provided for in section 77 of the Fisheries Act as a method to restrict specific permit holders that do not follow the agreed management measures.

Work stream 2: Enhancing Science:

Industry has acknowledged that implementing a successful strategy to rebuild and maintain the East Coast tarakihi fishery requires a long-term research plan that provides the appropriate information to make informed decisions.

Industry has committed to undertake additional fisheries surveys to assist in verification of commercial fishing data, additional catch sampling, and management strategy evaluations via computer modelling scenarios.

35% SB_0 as a management target

Fisheries New Zealand is seeking further information on the suitability of the alternative management target of 35% SB_0 .

This target was presented to the Southern Inshore Science Working Group in February 2019. It is acknowledged that both targets (35% SB_0 and 40% SB_0) meet the risk profiles in the HSS, but the Working Group was not able to determine if 35% SB_0 was a more appropriate target than 40% SB_0 , due to the lack of supporting evidence. Furthermore, Fisheries New Zealand is interested in understanding how a target of 35% SB_0 will provide for *MSY* as required by the Act. We would encourage industry to provide this evidence, as part of their submission in response to consultation.

Actions to expedite rebuild

The rate at which the package of management actions described in the Industry Rebuild Plan will deliver a rebuild of East Coast tarakihi remains unclear. Further detail, commitments and certainty around a target rebuild time would be useful to support Option 3 and Fisheries New Zealand is having ongoing discussions with industry in this regard.

The Industry Rebuild Plan does provide detail around a specific measure within the plan and how it will expedite the rebuild time. That is, increasing the average size of fish caught, otherwise interpreted as the age of the fish caught, by one year, through catch selectivity improvements it is proposed to reduce the rebuild time by approximately 12 years. Catch selectivity trials conducted by industry are underway. These are aimed towards determining the types of selectivity measures required to achieve an increase in size/age of catch. Fisheries New Zealand welcomes these trials and is interested in receiving further evidence on the success of certain selectivity measures.

9.4 Economic evaluation

The economic assessment compares the TACC reductions to the 2017 pre-rebuild limits, multiplied by port price. This was done to compare the economic impact of the total rebuild, and not just the additional cuts proposed in 2019. The relative loss in revenue under the 3 rebuild options is summarised in Table 8. The expected effect on revenue ranges between \$3.115 million and \$8.175 million per annum. To put this in perspective the total value of the TAR 1, 2, 3 and 7 fishery in 2017, prior to the commencement of the rebuild commencing, was approximately \$16.7 million.

Table 8: Current TACCs for TAR 1, 2, 3, and 7, proposed TACC reductions, and predicted revenue change based on reported port prices

Option	Stock	TACC	Change from 2017 (t)	Predicted revenue change (\$ p.a.)
2017 settings	TAR 1	1447		
	TAR 2	1796		
	TAR 3	1403		
	TAR 7	1088		
Option 1	TAR 1	625	822 ↓	\$2,433,120 ↓
	TAR 2	1100	696 ↓	\$2,714,400 ↓
	TAR 3	539	864 ↓	\$1,978,560 ↓
	TAR 7	985	103 ↓	\$209,090 ↓
	TOTAL		2485	\$7,335,170 ↓
Option 2	TAR 1	784	608 ↓	\$1,799,680 ↓
	TAR 2	750	1046 ↓	\$4,079,400 ↓
	TAR 3	520	883 ↓	\$2,022,070 ↓
	TAR 7	933	135 ↓	\$274,050 ↓
	TOTAL		2672	\$8,175,200
Option 3	TAR 1	1097	350 ↓	\$1,036,000 ↓
	TAR 2	1500	296	\$1,154,400 ↓
	TAR 3	1040	363	\$831,270 ↓
	TAR 7	1042	46	\$93,380 ↓
	TOTAL		1055	\$3,115,050 ↓

Fisheries New Zealand notes that while there are significant differences between the options on a per annum basis, when compared to the total life of the rebuild the financial impact is similar (Option 1: \$88 million for 12 years; Option 2: \$90 million for 11 years; Option 3: \$84 million for 27 years). This however assumes the slowest rebuild timeframe for Option 3. If the Industry Rebuild Plan is successfully implemented, the rebuild may occur at a faster rate and could lead to lower total economic impacts.

Industry has raised concerns about the risk of tarakihi becoming a choke species; i.e. there may be a risk that other species caught in association with tarakihi are constrained due to the reduction in availability of tarakihi Annual Catch Entitlement (ACE), thereby increasing the overall economic impact on the fishing industry.

The proposed options will have significant impacts on fishers, their livelihoods and the communities in which they live. We also acknowledge that there is uncertainty surrounding the economic impacts, as the economic assessment has been based on port price⁷ only, therefore this assessment is considered indicative only.

Fisheries New Zealand has commissioned a more detailed economic analysis of the rebuilding options. This will include, but not be limited to: the consideration of impacts on ACE packages and ACE trading for individual operators and companies; impacts on both target, bycatch, and associated species with specific consideration of tarakihi becoming a choke species for other fisheries; and

⁷ Port price is the price, per kilogram a fisher receives for fish when sold to a licenced fish receiver.

identification of ports, regions or markets that may be disproportionately impacted by management changes.

To assist the Minister in making an informed decision, we encourage submitter's views on each option and what they consider the socio-economic impacts will be.

The results of the detailed economic assessment along with the information that stakeholders provide in submissions, will be provided in the final advice to the Minister.

9.5 Environmental interactions

The key environmental interactions with the fishery, which must be taken into account when setting or varying TAC and TACC, are summarised below.

Marine mammals

There have been instances on the East Coast of the South Island where penguins and the nationally vulnerable Hector's dolphins have been caught in commercial and non-commercial set nets. To manage this risk, there are extensive areas within TAR 3 that are closed to set netting and trawling.

Reductions in fishing effort on tarakihi may result in an overall reduction in trawl effort in some areas, therefore impacts on marine mammals may be reduced.

Fish bycatch

Tarakihi is taken as a target and bycatch in a number of fisheries. Reductions in TACCs for tarakihi may lead to a shift in fishing effort to other species, such as red cod, barracouta, and flatfish (TAR 3 and 7) or red gurnard, snapper and trevally (TAR 2) for example. However, catch of these species is sustainably managed through the TAC and TACC set for these individual stocks.

Reductions in fishing effort on tarakihi may result in an overall reduction in trawl effort in some areas, therefore additional impacts on bycatch species are unlikely.

Seabirds

The 'National Plan of Action – 2013 to Reduce the Incidental Catch of Seabirds in New Zealand' (NPOA Seabirds 2013), which is currently under review, guides actions to reduce the incidental mortality of seabirds from fishing.

The species at highest risk in relation to the East Coast tarakihi fishery are the black petrel and flesh-footed shearwater in Fisheries Management Area (FMA) 1 in the bottom longline and trawl fisheries. As part of the review of the NPOA Seabirds, mitigation devices and their guidelines for deployment in both fisheries are being revised to minimise risk of seabird capture.

Reductions in fishing effort on tarakihi may result in an overall reduction in trawl effort in some areas, therefore impacts on seabirds may be reduced.

Biological diversity

Reductions in fishing effort on tarakihi may result in an overall reduction in trawl effort in some areas, therefore impacts on biological diversity may be reduced.

Habitats of significance

Reductions in fishing effort on tarakihi may result in an overall reduction in trawl effort in some areas, therefore impacts on habitats of significance may be reduced.

10 Questions for submitters on options

- Which option is most appropriate for achieving a rebuild of East Coast tarakihi, taking into account social, cultural and economic factors?
- Do you support rebuilding the stock through traditional TAC adjustments (Option 1 and 2) or alternative measures in collaboration with industry (Option 3) or a combination of the two types of approaches?
- Which option proposes the most appropriate rebuild timeframe and why?
- Is there any other evidence that you feel should be considered in this review and why?
- Which option sets the most appropriate commercial catch limits and why?
- Is the customary allowance for East Coast tarakihi appropriate and why?
- Are the recreational allowances for East Coast tarakihi appropriate and why?
- Are the allowances for other sources of fishing mortality appropriate and why?

11 Deemed values

The purpose of deemed values are to provide incentives for commercial fishers to balance the catch of QMS species with Annual Catch Entitlement within each fishing year. The deemed value rates for TAR 1, 2, 3 and 7 were last reviewed for 1 October 2018. Fisheries New Zealand is not proposing a review tarakihi deemed values as part of the October 2019 sustainability round.

12 Referenced reports

June 2019 Fisheries Assessment Plenary: <https://www.fisheries.govt.nz/news-and-resources/science-and-research/fisheries-research/>.

Fisheries New Zealand (2008). Harvest Strategy Standard for New Zealand Fisheries. Fisheries New Zealand, Wellington, New Zealand: <https://fs.fish.govt.nz/Page.aspx?pk=113&dk=16543>

2017 National Panel Survey of Marine Recreational Fishers: *Pending release – June/July 2019*: <https://www.fisheries.govt.nz/dmsdocument/20816/send>

Draft Inshore Finfish Fisheries Plan (2011), Ministry of Fisheries, Wellington, New Zealand.

13 How to get more information and have your say

Fisheries New Zealand invites you to make a submission on the proposals set out in this discussion document. We must receive your submission by 5pm on 26 July 2019. Please see the Fisheries New Zealand sustainability consultation webpage (<https://www.fisheries.govt.nz/news-and-resources/consultations/review-of-sustainability-measures-for-1-october-2019>) for related information, a helpful submissions template, and information on how to submit your feedback. If you cannot access the webpage or require hard copies of documents or any other information, please email FMSubmissions@mpi.govt.nz.

Fisheries New Zealand will be holding public stakeholder meetings in Auckland, Napier and Christchurch during the consultation period. Refer to the Fisheries New Zealand website for further information relating to the time, date and location of the meetings: <https://www.mpi.govt.nz/fisheriesnz>.

Appendix 1

Supporting a Sustainable Fishery – Eastern Tarakihi Management Strategy and Rebuild Plan 2019.
Prepared by Fisheries Inshore New Zealand, Southern Inshore Fisheries and Te Ohu Kaimoana.

See the Fisheries New Zealand consultation page on the 2019 October Sustainability Measures to download this appendix.